600 NE Grand Ave.
Portland, OR 97232-2736
oregonmetro.gov

NOTICE OF URBAN GROWTH BOUNDARY AMENDMENT
METRO COUNCIL ORDINANCE NO. 24-1520

Date: December 19, 2024

An amendment to the Metro urban growth boundary (UGB) became final on December 5, 2024. On that date, the Metro Council adopted Ordinance 24-1520, which is an amendment to the Metro regional UGB that adds approximately 1,291 acres of land to the UGB in the Sherwood West planning area for housing and employment purposes.

You may review a copy of this decision at the Metro Regional Center, located at 600 NE Grand Avenue, Portland, Oregon 97232. Office hours are 8:00 a.m. to 5:00 p.m., Monday through Friday. The decision may also be viewed online at www.oregonmetro.gov/public-projects/2024-growth-management-decision. You may also request a copy of the decision by contacting the Metro Planning Department at (503) 797-1562. Ordinance 24-1520 and its exhibits supporting the UGB amendment constitute over a thousand pages, and there may be a fee to cover copying costs if a complete hard copy is requested.

If you believe that the UGB amendment does not comply with applicable regulations, you may submit an objection to the Oregon Department of Land Conservation and Development (DLCD). An objection must include the following three elements:

1. Show how you participated in the UGB amendment process either by speaking at a public hearing or by submitting written comments about the proposal;

2. Explain your objection to the adopted amendment. Be as specific as possible, including what goal, rule, or statute you believe has been violated and why; and

3. Recommend a specific change that would resolve your objection.

Submit the objection in hard copy or via email to:

Attention: Periodic Review Specialist
Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, OR 97301
E-mail: DLCD.PR-UGB@dlcd.oregon.gov

DLCD must **receive** the objection no later than 21 days from the date this notice was sent by Metro (the postmark date if received by US mail). Also please send a copy of the objection to Roger Alfred at the Office of Metro Attorney, 600 NE Grand Avenue, Portland OR 97232, or via email at roger.alfred@oregonmetro.gov.

If you have questions about DLCD's review of the Metro decision, please contact DLCD Regional Representative Laura Kelly at (503) 798-7587 or laura.kelly@dlcd.oregon.gov.

Council meeting agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Thursday, December 5, 2024 **10:30 AM** **Metro Regional Center, Council chamber, https://zoom.us/j/615079992 (Webinar ID: 615079992) or 888-475-4499 (toll free)**

This meeting will be held electronically and in person at the Metro Regional Center Council Chamber. You can join the meeting on your computer or other device by using this link: https://zoom.us/j/615079992 (Webinar ID: 615 079 992)

1. Call to Order and Roll Call

2. Public Communication

Public comment may be submitted in writing. It will also be heard in person and by electronic communication (video conference or telephone). Written comments should be submitted electronically by emailing legislativecoordinator@oregonmetro.gov. Written comments received by 4:00 p.m. the day before the meeting will be provided to the council prior to the meeting.

Those wishing to testify orally are encouraged to sign up in advance by either: (a) contacting the legislative coordinator by phone at 503-813-7591 and providing your name and the agenda item on which you wish to testify; or (b) registering by email by sending your name and the agenda item on which you wish to testify to legislativecoordinator@oregonmetro.gov. Those wishing to testify in person should fill out a blue card found in the back of the Council Chamber. Those requesting to comment virtually during the meeting can do so by using the "Raise Hand" feature in Zoom or emailing the legislative coordinator at legislativecoordinator@oregonmetro.gov. Individuals will have three minutes to testify unless otherwise stated at the meeting.

3. Presentations

3.1 Regional Supportive Housing Services And Affordable Housing Funding: Governance And Accountability — 24-6151

Presenter(s): Metro Council President Lynn Peterson (she/her)

Attachments: Staff Report
Attachment 1

4. Ordinances (Second Reading and Vote)

4.1 Ordinance No. 24-1520 For the Purpose of Expanding the Urban Growth Boundary to Provide Capacity for Housing and Employment to the Year 2044 and Amending the Metro Code to Conform — ORD 24-1520

Presenter(s): Eryn Kehe (she/her), Urban Policy and Development Manager, Metro
Ted Reid (he/him), Principal Regional Planner, Metro

Attachments:
Ordinance No. 24-1520
Staff Report
Attachment A
Exhibit A
Exhibit B
Exhibit C
Exhibit D
Exhibit E
Exhibit E Appendix 1
Exhibit E Appendix 1A
Exhibit E Appendix 2
Exhibit E Appendix 3
Exhibit E Appendix 4
Exhibit E Appendix 5A
Exhibit E Appendix 5B
Exhibit E Appendix 6
Exhibit E Appendix 7
Exhibit E Appendix 7A
Exhibit E Appendix 8
Exhibit E Appendix 8A
Exhibit E Appendix 9
Exhibit E Appendix 10
Exhibit E Appendix 11
Exhibit F

5. Chief Operating Officer Communication

6. Councilor Communication

7. Adjourn

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ការគោរពសិទ្ធិពលរដ្ឋរបស់ ។ សំរាប់ព័ត៌មានអំពីកម្មវិធីសិទ្ធិពលរដ្ឋរបស់ Metro ឬដើម្បីទទួលពាក្យបណ្តឹងរើសអើងសូមចូលទស្សនាគេហទំព័រ www.oregonmetro.gov/civilrights។
បើលោកអ្នកត្រូវការអ្នកបកប្រែកាសនៅពេលអង្គប្រជុំសាធារណៈ សូមទូរស័ព្ទមកលេខ 503-797-1700 (ម៉ោង 8 ព្រឹកដល់ម៉ោង 5 ល្ងាច ថ្ងៃធ្វើការ) ប្រាំពីរថ្ងៃថ្ងៃធ្វើការ មុនថ្ងៃប្រជុំដើម្បីអាចឲ្យគេសម្រួលតាមសំណើរបស់លោកអ្នក ។

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January 2021

4.1 Ordinance No. 24-1520 For the Purpose of Expanding the Urban Growth Boundary to Provide Capacity for Housing and Employment to the Year 2044 and Amending the Metro Code to Conform (Second Reading and Vote)
Ordinance

Metro Council Meeting
Thursday, December 5, 2024

BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF EXPANDING THE URBAN GROWTH BOUNDARY TO PROVIDE CAPACITY FOR HOUSING AND EMPLOYMENT TO THE YEAR 2044 AND AMENDING THE METRO CODE TO CONFORM	))))))	ORDINANCE NO. 24-1520 Introduced by Marissa Madrigal, Chief Operating Officer, with the concurrence of Lynn Peterson, Council President

WHEREAS, state law requires Metro to assess the capacity of the urban growth boundary (UGB) at least every six years and, if necessary, to increase the region's capacity for housing and employment for the next 20 years; and

WHEREAS, Metro's previous growth management analysis was made in 2018 when Metro adopted the 2018 Urban Growth Report (UGR) via Ordinance No. 18-1427, which forecasted population and employment growth in the region to the year 2038, inventoried the supply of buildable land inside the UGB, and concluded there was a need to add land to the UGB to address housing needs; and

WHEREAS, Ordinance No. 18-1427 added approximately 2,181 acres of urban reserve land to the UGB in four locations in order to provide approximately 6,100 single-family housing units and approximately 3,100 multifamily units, for a total of approximately 9,200 homes; and

WHEREAS, in advance of the 2024 growth management decision, Metro convened the Urban Growth Report Roundtable, which was comprised of public and private sector representatives with the goal of lending more transparency to Metro's growth management analyses and processes. The Roundtable met eleven times from September 2023 through July 2024. Metro staff incorporated feedback received from the Roundtable into the 2024 UGR; and

WHEREAS, Metro also convened a Youth Cohort to provide Metro staff with youth perspectives on urban planning and growth management in the context of the 2024 growth management decision. The Youth Cohort met eight times from September 2023 through July 2024; and

WHEREAS, consistent with Metro's approach to regional growth management decisions focusing on city readiness for development, on April 3, 2024, the City of Sherwood submitted a proposal to Metro to add approximately 1,291 acres of land to the UGB in its Sherwood West planning area for housing and employment purposes; and

WHEREAS, the city's proposal was reviewed by Metro staff and by the Metro Technical Advisory Committee (MTAC), the Metro Policy Advisory Committee (MPAC), the Metro Committee on Racial Equity (CORE), and the Urban Growth Roundtable, and city staff made a presentation to the Metro Council regarding its concept plan for Sherwood West at a work session on May 28, 2024; and

WHEREAS, Metro also convened a Land Use Technical Advisory Group, comprised of public and private sector experts, which met regularly with Metro staff from July 2023 through June 2024 to provide advice on Metro's methods for identifying buildable lands and estimating growth capacity; and

WHEREAS, Metro provided its draft buildable land inventory and growth capacity estimates to all cities and counties in the region for review and comment; and

WHEREAS, Metro convened an expert panel of demographers and economists to review the draft regional population, household, and employment forecast; and

WHEREAS, on July 9, 2024, Metro staff published the draft 2024 UGR, which provides a range forecast for future population, household, and employment growth in the region, an inventory of buildable residential and employment land in the region, and an analysis of multiple growth scenarios involving different assumptions and permutations regarding population, redevelopment potential, and different mixes of potential housing demand by housing type; and

WHEREAS, the 2024 UGR estimates that approximately 60 percent of the region's new renter households and 33 percent of new owner households will have incomes below $60,000 and, depending on household size, households in this income bracket are classified by the U.S. Department of Housing and Urban Development as low income or very low income; and

WHEREAS, the UGR finds that meeting the housing needs of many low income households will require public subsidies; and

WHEREAS, Metro held a 45-day public comment period on the draft 2024 UGR from July 9, 2024 through August 22, 2024; and

WHEREAS, the 2024 UGR concludes that the Metro Council has latitude to determine whether there is a regional need for the City of Sherwood's proposed UGB expansion; and

WHEREAS, on August 26, 2024, Metro's Chief Operating Officer (COO) issued her recommendation to the Metro Council to expand the UGB to include Sherwood West with conditions of approval, and

WHEREAS, on September 19, 2024, CORE provided its recommendations to the Metro Council; and

WHEREAS, on September 25, 2024, MPAC endorsed the COO Recommendation for approval by the Metro Council with three additional recommendations for consideration; and

WHEREAS, on September 26, 2024, the Metro Council held a public hearing on the COO recommendation regarding the Sherwood West proposal, and that hearing was continued to October 3, 2024 for further testimony; and

WHEREAS, on October 8, 2024, the Metro Council held a work session and directed Metro staff to prepare an ordinance to expand the UGB to include the Sherwood West area and to prepare conditions of approval that address the topics included in the COO Recommendation; and

WHEREAS, the Sherwood West expansion area will add approximately 1,291 acres of urban reserve land to the UGB and provide approximately 3,120 housing units or an average density of 9.2 units per net acre, and employment land sufficient to support approximately 4,500 new jobs; and

WHEREAS, Metro staff evaluated all land in the region designated as urban reserves for possible addition to the UGB based upon their relative suitability under the Goal 14 locational factors; and

WHEREAS, the Metro Council held a public hearing on this ordinance on November 21, 2024; now therefore

THE METRO COUNCIL ORDAINS AS FOLLOWS:

1. The UGB is amended to add the Sherwood West area shown on Exhibit A, attached and incorporated into this ordinance, to provide capacity for housing and employment growth.

2. The conditions of approval set forth in Exhibit B, attached and incorporated into this ordinance, are applied to the City of Sherwood as part of this UGB expansion decision.

3. The Urban Growth Boundary and Urban and Rural Reserves Map in Title 14 of Metro's Urban Growth Management Functional Plan is amended to reflect the UGB amendment as shown on Exhibit C, attached and incorporated into this ordinance.

4. The Industrial and other Employment Areas Map in Title 4 of Metro's Urban Growth Management Functional Plan is amended to place an Industrial designation on the northern portion of the Sherwood West expansion area as shown on Exhibit D, attached and incorporated into this ordinance.

5. The 2024 Urban Growth Report attached as Exhibit E to this ordinance is hereby adopted as support for the Metro Council's decision to amend the Metro UGB to provide capacity for housing and employment growth.

6. The Findings of Fact and Conclusions of Law attached as Exhibit F to this ordinance are hereby adopted to explain how this ordinance is consistent with state law and applicable Metro policies, and to provide evidentiary support for this decision.

7. The areas being added into the Metro UGB by this ordinance are also annexed into the Metro jurisdictional boundary as provided by ORS 268.390(3)(b).

ADOPTED by the Metro Council this 5th day of December 2024.

Lynn Peterson, Council President

Attest:

Georgia Langer

Georgia Langer, Recording Secretary

Approved as to Form:

Carrie MacLaren

Carrie MacLaren, Metro Attorney

ORDINANCE NUMBER 24-1520 FOR THE PURPOSE OF EXPANDING THE URBAN GROWTH BOUNDARY TO PROVIDE CAPACITY FOR HOUSING AND EMPLOYMENT TO THE YEAR 2044 AND AMENDING THE METRO CODE TO CONFORM

Date: November 4, 2024
Department: Planning, Development, and Research
Meeting Date: November 21, 2024

Prepared by: Ted Reid, Principal Regional Planner ted.reid@oregonmetro.gov
Presenter(s): Ted Reid; Eryn Kehe (Metro Planning, Development, and Research)
Length: 60 minutes

ISSUE STATEMENT

The region's urban growth boundary (UGB) delineates urban and rural uses and is a tool for ensuring thoughtful and efficient growth patterns. The Metro Council is required by state law to – at least every six years – determine whether the UGB has adequate land for expected housing and job growth. The Metro Council last made this determination in December 2018 and is scheduled to do so again by the end of 2024.

Over the course of the past year, staff has presented the elements of the Urban Growth Report (UGR) that estimate how many people may live or work in the region over the next 20 years and whether the land inside the existing UGB is sufficient to accommodate their homes and places of employment. The 2024 UGR provides the analysis to support the Metro Council as it determines if there is a demonstrated regional need for a UGB expansion.

For the 2024 urban growth management decision cycle, Metro received one proposal from the City of Sherwood to expand the UGB to include the 1,300-acre Sherwood West urban reserve area. Metro has also completed a comparison of urban reserves, including Sherwood West, assessing them according to several factors specified in state law.

Earlier this summer, Metro held a 45-day open comment period for the public to engage with the UGR and the Sherwood West proposal through an online survey or by directly submitting comments. A summary report of the public comments received during this period was shared with Metro Council, MTAC, MPAC, and CORE.

Staff, led by the Chief Operating Officer, developed recommendations that took the draft UGR, public comment and Metro committee discussions into account. Those recommendations, released on August 26, 2024, included a proposal for where to fall in the housing and employment forecast range provided in the draft UGR, a recommendation about the proposed expansion area, and topics to consider for potential conditions of approval.

Many groups, including MPAC and CORE, have reviewed and commented on the Chief

Operating Officer/Staff recommendations and these various perspectives were presented at the Council public hearing on September 26, 2024. That hearing was carried over to October 3rd.

On October 8, 2024, the Metro Council directed staff to prepare an ordinance for Council consideration that is consistent with the Chief Operating Officer recommendations and that would accomplish the following:

- Adopt a final 2024 UGR that utilizes the middle (baseline) population and employment forecast.
- Amend the UGB to include the Sherwood West urban reserve to address housing and job land capacity needs identified in the 2024 UGR.
- Adopt UGB conditions of approval that are consistent with the Chief Operating Officer recommendations released on August 26, 2024.

Council also indicated its intent to hold a Council work session in early 2025 to discuss preparation of a resolution that will provide direction on activities to undertake after the 2024 growth management decision. The resolution is expected to provide direction on topics such as:

- Convening a public/private sector group to discuss how to improve the development readiness of industrial lands.
- Working with advisory groups to draft potential amendments to Metro Code (Title 11: Planning for New Urban Areas) to incorporate requirements for Tribal Consultation and equity analyses when local jurisdictions are completing concept plans for urban reserve areas and comprehensive planning for UGB expansion areas.
- Responding to concerns raised by Metro's Committee on Racial Equity related to growth management decision processes.

ACTION REQUESTED
Conduct a first reading and public hearing for Ordinance Number 24-1520, followed by Council consideration of the ordinance on December 5, 2024.

IDENTIFIED POLICY OUTCOMES
State law and regional policies lay out goals to make efficient use of land inside the UGB and to only expand the UGB if there is a demonstrable regional need to accommodate expected housing or job growth. The Metro Council makes this growth management decision for the region after significant engagement with stakeholders and residents.

To ensure that areas added to the UGB are ready for growth, it is the Metro Council's policy to only expand the UGB in urban reserves that have been concept planned by a city or a county. Metro provides grant funding for local jurisdictions to complete concept planning.

The Metro Council will decide if there is a regional need for additional land to

accommodate housing and job growth. If so, the Council will also determine conditions of approval to be placed on the expansion area.

POLICY QUESTION(S)

- Does the Council wish to adopt the proposed 2024 Urban Growth Report as the basis for its 2024 urban growth management decision?
- Does the Council wish to amend the UGB to include the Sherwood West urban reserve to address housing and job land capacity needs identified in the 2024 Urban Growth Report?
- Does the Council wish to adopt the proposed conditions of approval?

POLICY OPTIONS FOR COUNCIL TO CONSIDER

- Act on previous Council direction and adopt Ordinance Number 24-1520 to conclude the 2024 Urban Growth Management decision.

STAFF RECOMMENDATIONS

- Adopt Ordinance Number 24-1520 to conclude the 2024 Urban Growth Management decision according to the deadlines specified in state law.

STRATEGIC CONTEXT & FRAMING COUNCIL DISCUSSION

Regional urban growth management decisions have long been one of the Metro Council's core responsibilities. The Metro UGB – first adopted in 1979 – is one of Metro's tools for achieving the 2040 Growth Concept's vision for compact growth, thereby protecting farms and forests outside the UGB and focusing public and private investment in existing communities. These are all key to reducing greenhouse gas emissions and expanding housing options.

The UGB is just one policy tool, however, and must be accompanied by other policies, partnerships, and investments to make good on the 2040 Growth Concept and to address challenges like housing affordability, displacement, houselessness, and economic development. Often, growth management processes provide a venue for identifying the need for new initiatives.

Metro strives for transparency in its growth management work, which can be challenging given its highly technical aspects. The 2024 decision provided opportunities for interested parties to inform and understand the many technical and policy aspects of this work. Those opportunities included, not only standing advisory committees, but also groups formed for this decision process such as the UGR Roundtable, the Land Use Technical Advisory Group, the regional forecast expert review panel, and the Youth Cohort.

BACKGROUND

At its March 7, 2023 work session, the Council directed staff to begin implementing the work program for the 2024 urban growth management decision. Staff have returned periodically to update the Council on the progress of key components of the work program. At an October 8, 2024 work session, the Council provided direction for its intended growth

management decision. That direction is reflected in Ordinance Number 24-1520, which would adopt a final 2024 UGR, amend the UGB to include the Sherwood West urban reserve, and apply conditions of approval for the UGB expansion.

Consistent with Council direction, the final 2024 UGR summary document includes a finalized housing needs analysis and a revised industrial land inventory. The following UGR appendices have been edited accordingly:

Appendix 2 (UGB capacity estimates): Updated to reflect a lower (10%) slope threshold for industrial lands that are considered buildable.

Appendix 6 (Employment land site characteristics): Updated to reflect the revised buildable industrial land inventory in Appendix 2.

Appendix 7 (Goal 14 Locational Factors Analysis): Added to address state legal requirements to assess urban reserves as potential UGB expansion candidates.

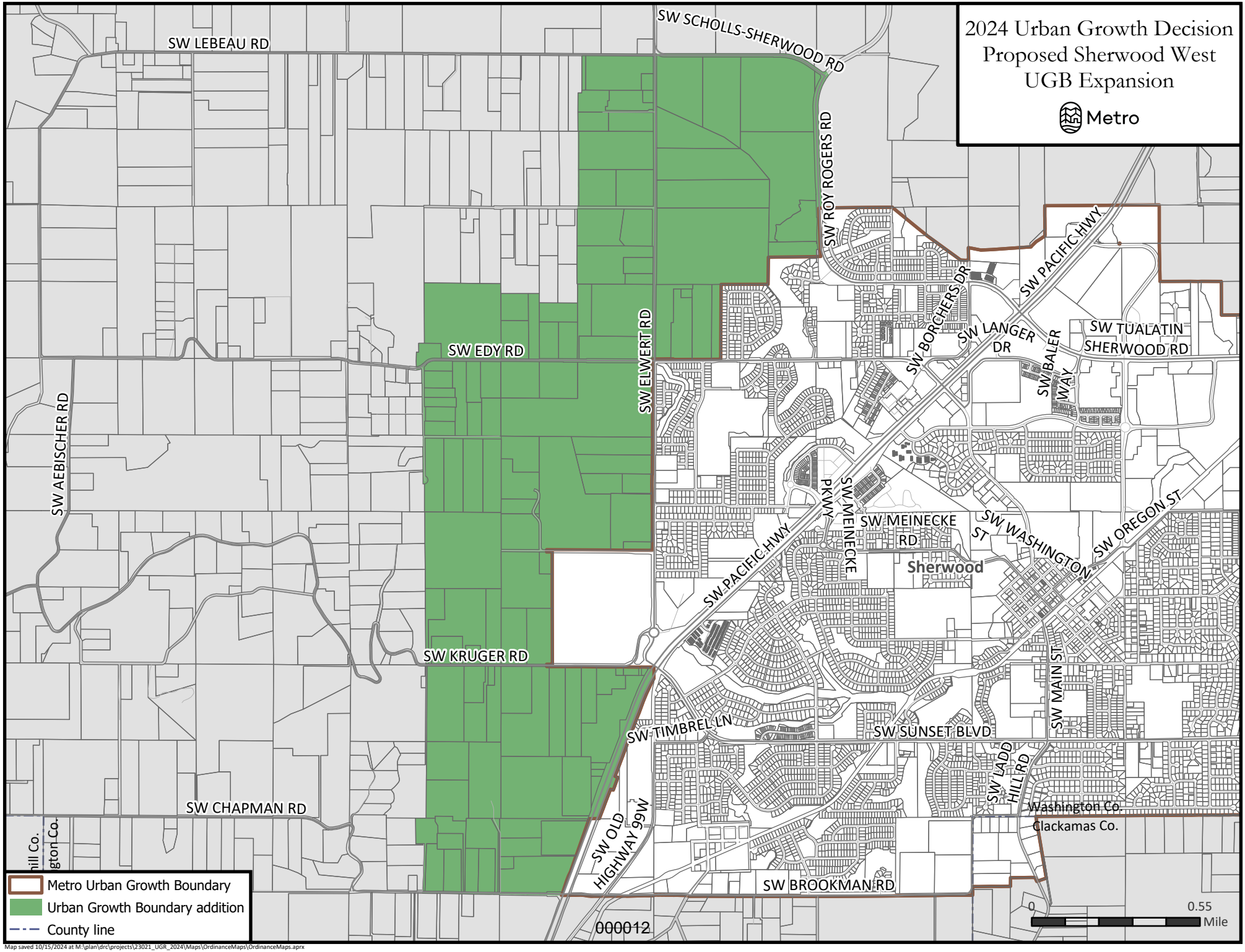
Appendix 7A (Metro Code Locational Factors Analysis): Added to address Metro Code requirements to assess urban reserves as potential UGB expansion candidates.

Appendix 8 (Housing Needs Analysis): Updated to reflect direction from Council to plan for the middle (baseline) forecast.

Appendix 11 (Oregon Semiconductor Taskforce Report): Added as an appendix because it is referenced a basis for finding a need for additional large industrial sites.

ATTACHMENTS

- Is legislation required for Council action? x Yes No
- If yes, is draft legislation attached? x Yes No
- What other materials are you presenting today?
    - Attachment A: Map of proposed UGB expansion area


2024 Urban Growth Decision
Proposed Sherwood West
UGB Expansion
Metro
SW LEBEAU RD
SW SCHOLLS-SHERWOOD RD
SW ROY ROGERS RD
SW PACIFIC HWY
SW BORCHERS DR
SW LANGER DR
SW BALER WAY
SW TUALATIN SHERWOOD RD
SW EDY RD
SW ELWERT RD
SW AEBISCHER RD
SW MEINECKE PKWY
SW MEINECKE RD
SW WASHINGTON ST
SW OREGON ST
Sherwood
SW KRUGER RD
SW TIMBREL LN
SW SUNSET BLVD
SW MAIN ST
SW LADD HILL RD
SW CHAPMAN RD
SW OLD HIGHWAY 99W
SW BROOKMAN RD
Washington Co.
Clackamas Co.
Metro Urban Growth Boundary
Urban Growth Boundary addition
County line
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Mile
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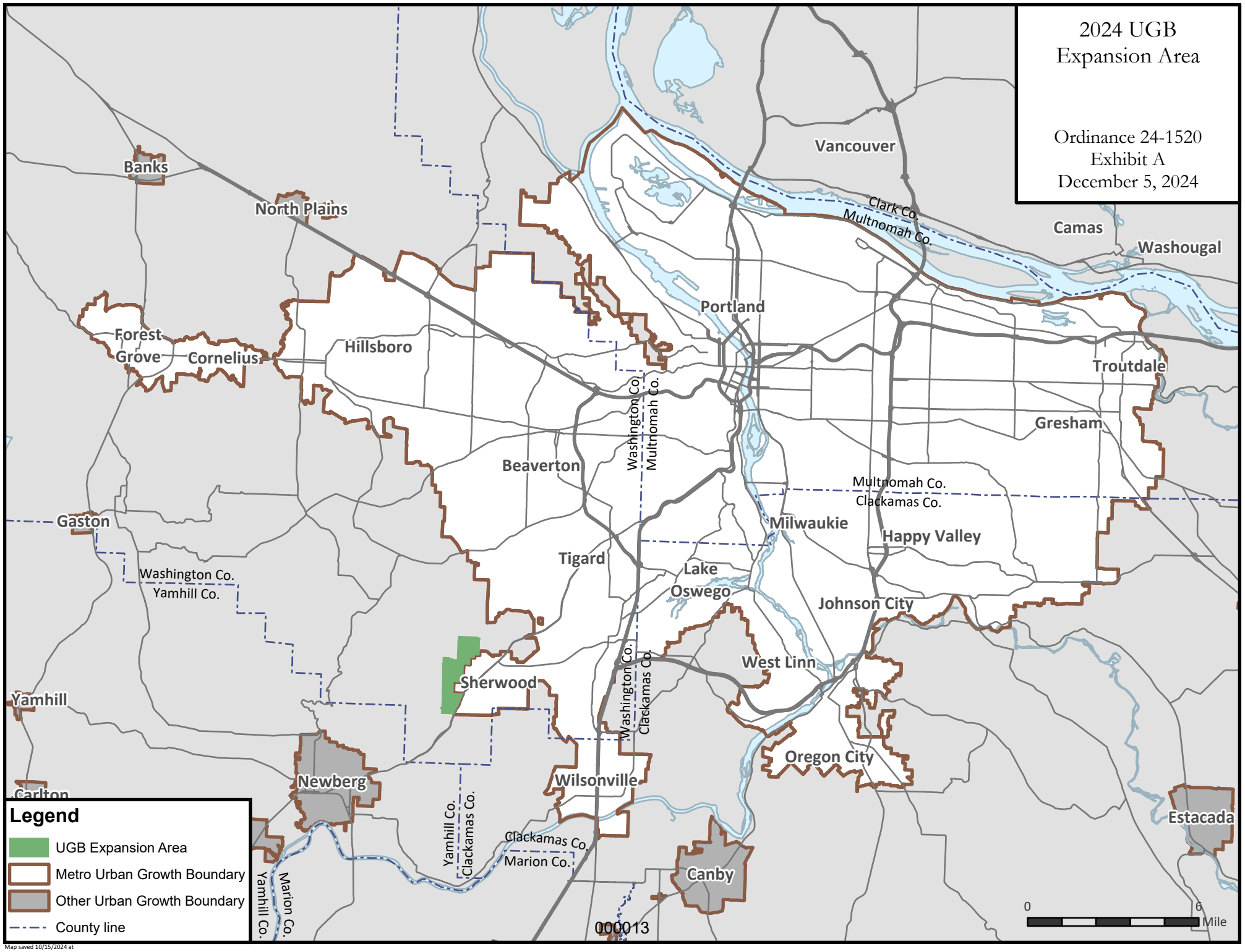

2024 UGB
Expansion Area
Ordinance 24-1520
Exhibit A
December 5, 2024
Banks
North Plains
Vancouver
Clark Co.
Multnomah Co.
Camas
Washougal
Portland
Forest
Grove
Cornelius
Hillsboro
Troutdale
Gresham
Washington Co.
Multnomah Co.
Beaverton
Multnomah Co.
Clackamas Co.
Gaston
Milwaukie
Happy Valley
Tigard
Lake
Oswego
Johnson City
Washington Co.
Yamhill Co.
West Linn
Sherwood
Washington Co.
Clackamas Co.
Yamhill
Oregon City
Newberg
Wilsonville
Carlton
Estacada
Yamhill Co.
Clackamas Co.
Clackamas Co.
Marion Co.
Canby
Marion Co.
Yamhill Co.
Legend
UGB Expansion Area
Metro Urban Growth Boundary
Other Urban Growth Boundary
County line
0
6
Mile
000013
Map saved 10/15/2024 at

Exhibit B to Ordinance Number 24-1520

Conditions of approval

Number of homes to plan for/residential density

The City shall adopt comprehensive plan amendments that are likely to result in either: 3,120 housing units in the Sherwood West expansion area; or, an average density of 9.2 units per net acre across areas in the Sherwood West expansion that are zoned to allow residential uses. The average density represents the total housing units likely to be built, divided by the total residential net acres, with "net acres" as defined in Title 10 of Metro's Urban Growth Management Functional Plan.

Housing affordability

The City shall work to institute new strategies and incentives to encourage the production of affordable housing. Examples include:

- SDC waivers
- Zoning changes
- Expedited review/ prioritized permitting
- Reduced parking requirements
- Reduced discretionary review
- Density bonuses
- Vertical housing tax abatements
- Voluntary inclusionary housing
- Public/private partnerships

As part of its upcoming work on a Housing Production Strategy, the City of Sherwood shall work with Metro and Washington County to identify funding opportunities with the goal of meeting citywide housing affordability targets to be set by the State of Oregon.

During the Comprehensive Planning for Sherwood West, the City shall explore – within the existing Town Center, which may include the four tax lots depicted in the map that is Attachment A to this exhibit – the feasibility of regulated affordable housing, including workforce housing for employees of nearby industries.

Industrial areas

The City shall plan the area depicted in Exhibit D as a Title 4 Industrial area in compliance with requirements in Metro code 3.07.430.

City land use regulations, annexation procedures, or other means shall provide for creation of at least two sites of 50 gross acres or larger. The resulting sites shall be protected from division. Data centers, storage facilities, and warehousing, distribution, and fulfillment centers shall be prohibited as the primary use on these large sites.

2040 Growth Concept design types

To encourage mixed-use development, as part of its comprehensive planning process, the City shall identify at least one Main Street or Neighborhood Center in the expansion area in areas not designated on Metro's Title 4 Map.

Community engagement

At the beginning of comprehensive planning, the City shall develop – in consultation with Metro – a public engagement plan that encourages broad-based, early and continuing opportunity for public involvement. Throughout the planning process, focused efforts shall be made to engage historically marginalized populations, including people of color, people with limited English proficiency and people with low income, as well as people with disabilities, older adults, and youth.

Tribal consultation and resource protection

The City shall notify and invite potentially affected and interested Tribes to participate in the comprehensive planning process for the expansion area. Oregon's Legislative Commission on Indian Services can advise the city on which Tribes to consult.

The City shall ensure compliance with applicable local, state and federal laws, regulations and policies regarding protection of archeological, cultural or historic resources, ancestral human remains, cultural areas or landscapes, and natural resources.

The City shall develop and implement an Inadvertent Discovery Plan (IDP) for all city development projects in the expansion area. IDPs are an important planning tool that provide direction for on-site project staff for what to do if ground disturbing activities unearth an unanticipated discovery of historic or prehistoric resources or human remains. The Oregon State Historic Preservation Office and Legislative Commission on Indian Services have created an IDP template and can provide guidance on which Tribes to notify. For private development projects in the expansion area, the city should explore opportunities to require an IDP during city permitting processes.

Habitat

As part of its comprehensive planning for the expansion area, the City shall conduct an updated inventory of fish and wildlife habitat in the expansion area using the same methodology used to establish Metro's Regionally Significant Fish and Wildlife Habitat Inventory Map. Metro may use the City's inventory to, by order of the Chief Operating Officer, update Metro's Regionally Significant Fish and Wildlife Habitat Inventory Map and Habitat Conservation Areas Map pursuant to Metro Code Section 3.07.1370.

Comprehensive Planning deadlines

Within four years after the date of this ordinance and any appeals to the ordinance, the City shall complete comprehensive planning consistent with Metro code section 3.07.1120 (Planning for Areas Added to the UGB).

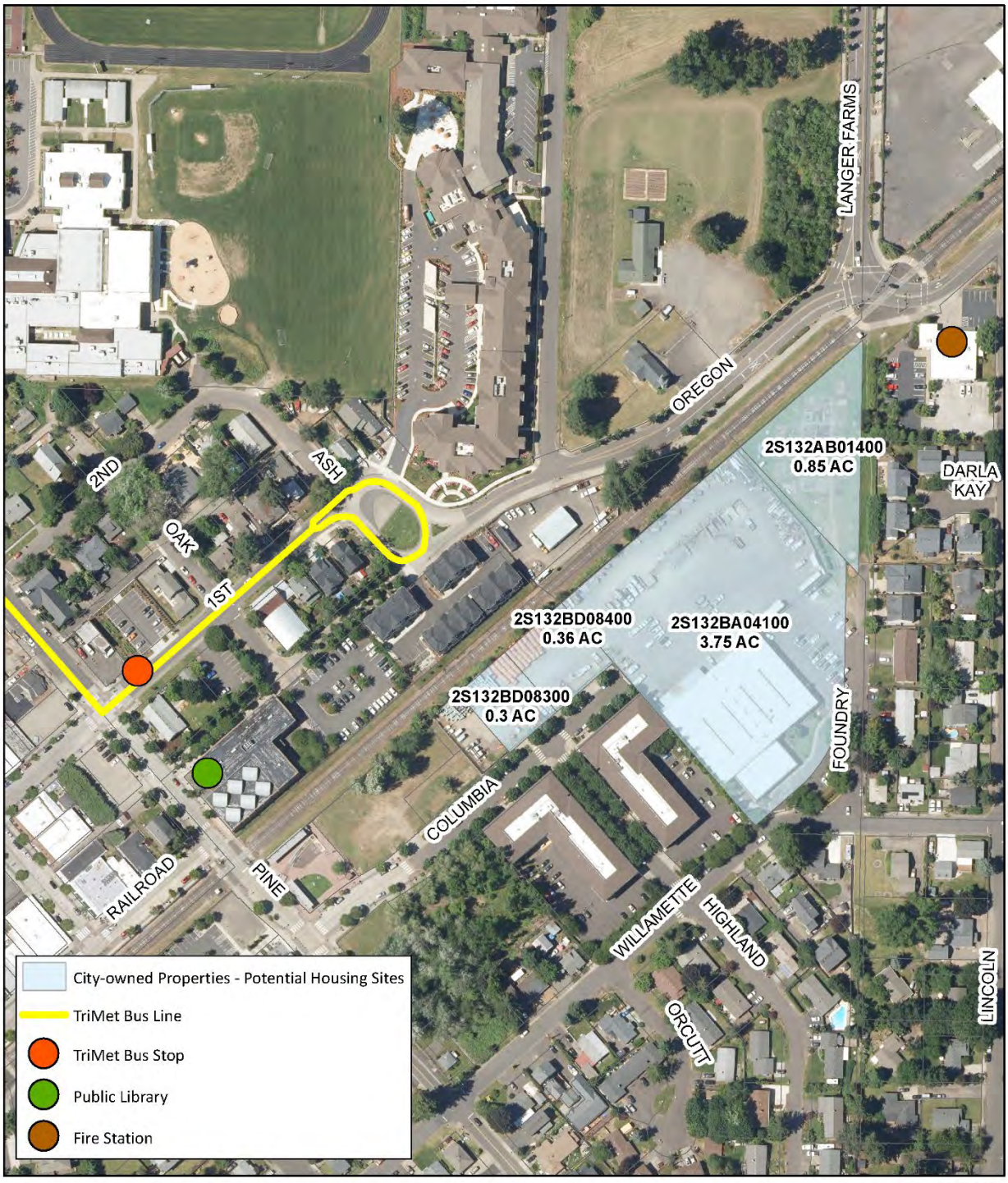
Exhibit B to Ordinance Number 24-1520

Reporting

For at least six years after this UGB expansion, the City shall provide Metro with a written annual report on compliance with these conditions as well as planning and development status in the expansion area. These reports will be due to the Metro Chief Operating Officer by December 31 of each year, beginning December 31, 2025.

Exhibit B to Ordinance Number 24-1520

Attachment A to conditions of approval



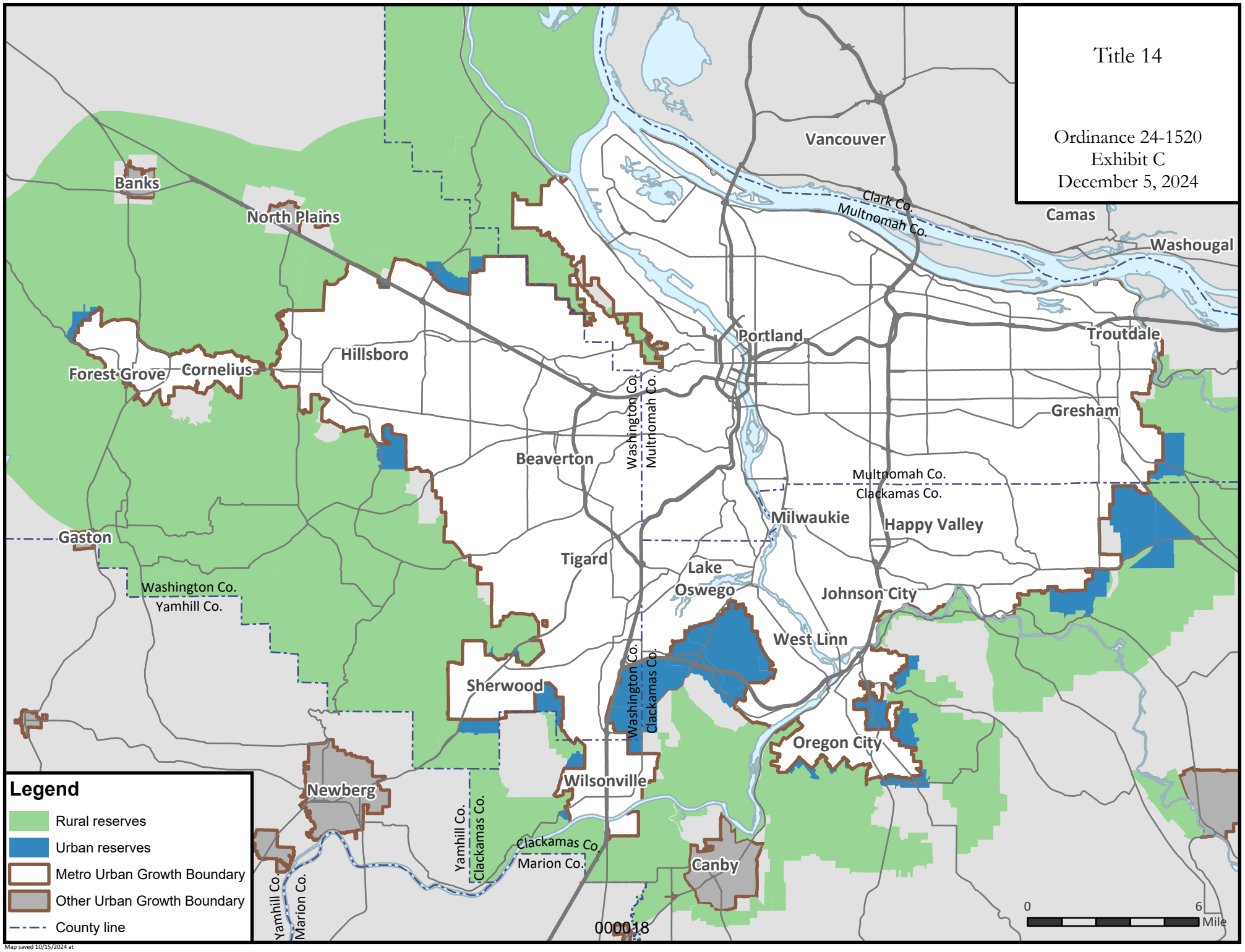
Date: 10/22/2024

N

0 100 200 400

Feet

Map data provided by METRO and the City of Sherwood. The City of Sherwood's infrastructure records,drawings, and other documents have been gathered over many years, using many different formats and standards. While the data provided is generally believed to be accurate, occasionally it proves to be incorrect; thus its accuracy is not guaranteed.


Title 14
Ordinance 24-1520
Exhibit C
December 5, 2024
Vancouver
Clark Co.
Multnomah Co.
Camas
Washougal
Banks
North Plains
Hillsboro
Forest Grove
Cornelius
Portland
Troutdale
Gresham
Beaverton
Washington Co.
Multnomah Co.
Multnomah Co.
Clackamas Co.
Milwaukie
Happy Valley
Gaston
Tigard
Lake
Oswego
Johnson City
Washington Co.
Yamhill Co.
West Linn
Sherwood
Washington Co.
Clackamas Co.
Oregon City
Wilsonville
Newberg
Yamhill Co.
Clackamas Co.
Clackamas Co.
Marion Co.
Canby
Yamhill Co.
Marion Co.
Legend
Rural reserves
Urban reserves
Metro Urban Growth Boundary
Other Urban Growth Boundary
County line
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Mile
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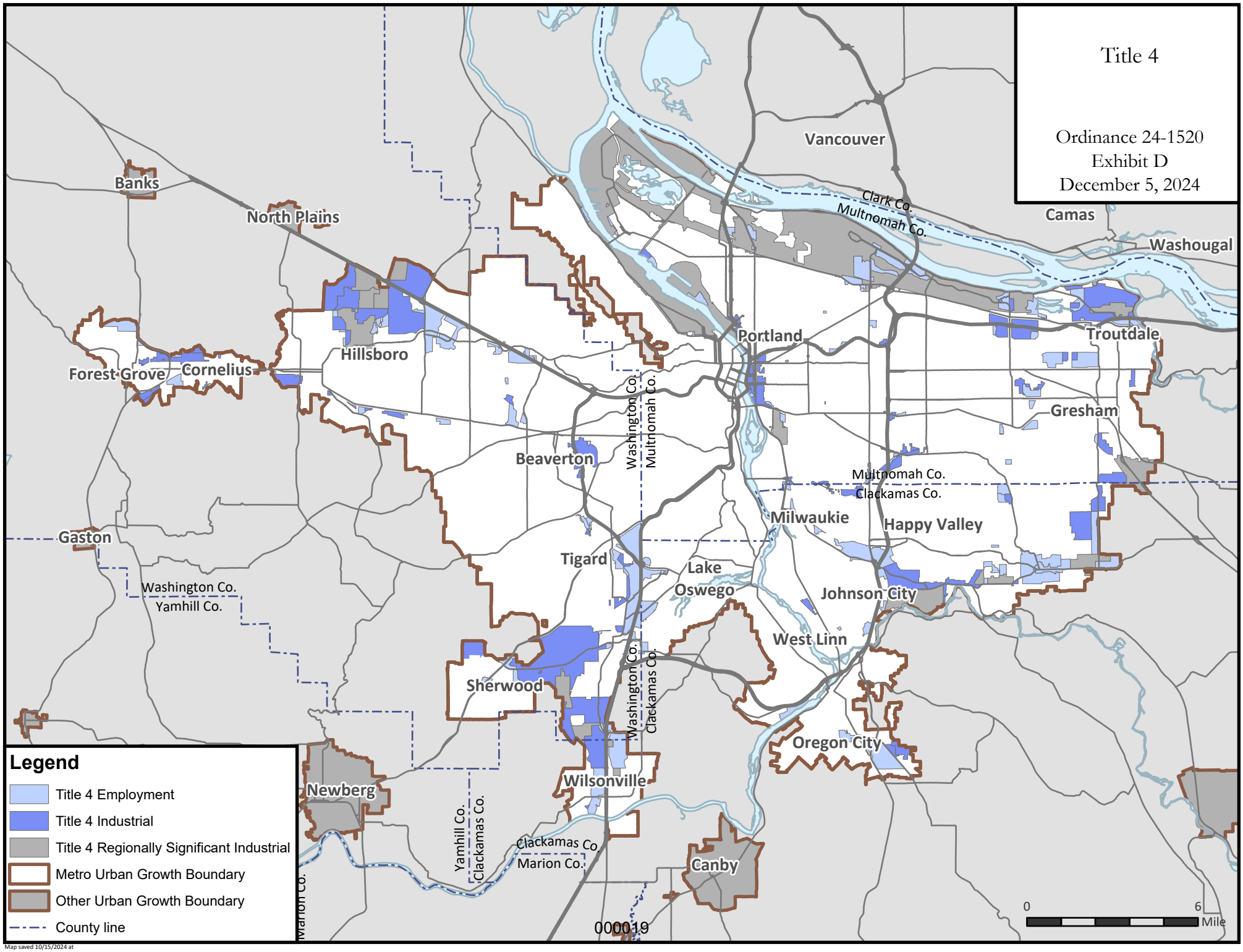
Map saved 10/15/2024 at


Title 4
Ordinance 24-1520
Exhibit D
December 5, 2024
Vancouver
Clark Co.
Multnomah Co.
Camas
Washougal
Banks
North Plains
Hillsboro
Forest Grove
Cornelius
Portland
Troutdale
Gresham
Beaverton
Washington Co.
Multnomah Co.
Multnomah Co.
Clackamas Co.
Milwaukie
Happy Valley
Gaston
Tigard
Lake Oswego
Johnson City
Washington Co.
Yamhill Co.
West Linn
Sherwood
Washington Co.
Clackamas Co.
Oregon City
Wilsonville
Newberg
Yamhill Co.
Clackamas Co.
Clackamas Co
Marion Co.
Canby
Marion Co.
Legend
Title 4 Employment
Title 4 Industrial
Title 4 Regionally Significant Industrial
Metro Urban Growth Boundary
Other Urban Growth Boundary
County line
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Map saved 10/15/2024 at

2024 Urban Growth Report

December 5, 2024

Metro respects civil rights

Metro fully complies with Title VI of the Civil Rights Act of 1964 that requires that no person be excluded from the participation in, be denied the benefits of, or be otherwise subjected to discrimination on the basis of race, color or national origin under any program or activity for which Metro receives federal financial assistance.

Metro fully complies with Title II of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act that requires that no otherwise qualified individual with a disability be excluded from the participation in, be denied the benefits of, or be subjected to discrimination solely by reason of their disability under any program or activity for which Metro receives federal financial assistance. If any person believes they have been discriminated against regarding the receipt of benefits or services because of race, color, national origin, sex, age or disability, they have the right to file a complaint with Metro. For information on Metro's civil rights program, or to obtain a discrimination complaint form, visit oregonmetro.gov/civilrights or call 503-797-1890.

Metro provides services or accommodations upon request to persons with disabilities and people who need an interpreter at public meetings. If you need a sign language interpreter, communication aid or language assistance, call 503-797-1700 or TDD/TTY 503-797-1804 (8 a.m. to 5 p.m. weekdays) 5 business days before the meeting. All Metro meetings are wheelchair accessible. For up-to-date public transportation information, visit TriMet's website at trimet.org.

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LIST OF ACRONYMS

The following is a list of acronyms used throughout this document.

BLI: buildable land inventory
CEDS: Comprehensive Economic Development Strategy
CORE: Committee on Racial Equity
MPAC: Metro Policy Advisory Committee
MSA: Metropolitan Statistical Area (7-county area)
MTAC: Metro Technical Advisory Committee
OEA: Oregon Office of Economic Analysis
UGB: urban growth boundary
UGR: urban growth report

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EXECUTIVE SUMMARY

Oregonians have a long tradition of taking a thoughtful approach to growth that protects farms and forests and helps shape vibrant, sustainable urban communities. Tools like the urban growth boundary (UGB) enable us to make the most of the land we have as we work toward achieving our region's shared goals. Over the past four decades the urban growth boundary has helped the Portland metro region minimize our carbon footprint and focus development in town centers and along transportation corridors, providing easier access to destinations where people live, work, play and study.

Under Oregon state land use law, urban growth management decisions focus on whether there is an identified regional need to add land to the UGB for forecasted housing and jobs growth. But a decision about whether to expand the boundary goes beyond that requirement. It also provides a chance to check in on how the region is changing, highlight successes, and draw attention to areas of concern. In the coming months, the Metro Council will make their 2024 growth management decision against a backdrop of new regional challenges and opportunities, informed by a shared desire to improve housing affordability, community stability, downtown revitalization, and equitable economic growth.

Metro and its partners are prepared to confront the challenges faced by our region with policies and investments that extend beyond managing the region's UGB. Examples include investing in supportive housing services, affordable housing, parks and nature. Together we are building regional transit connections along 82nd Avenue in east Portland and Clackamas County and along the Tualatin Valley Highway; and these new connections are leveraged by Comprehensive Economic Development Strategy (CEDS) plans and investments.

We also understand that collectively, we must do more to broaden the availability of affordable housing and economic prosperity. In this context, if a need is identified to provide more land for housing and job creation, Metro's charge is to work with cities seeking proposed UGB expansions that meet certain conditions. For the 2024 growth management decision, only one city – Sherwood – has requested an expansion. The request includes a completed concept plan for a proposed expansion within a designated urban reserve area.

This Urban Growth Report (UGR) sets out data and analysis to inform the Metro Council's decision whether to expand the UGB as proposed by the City of Sherwood.

Planning amid uncertainty

Slower population and employment growth

Several factors shape the context for the decision whether to expand the UGB. Among them, regional population growth is slowing. This reflects a nationwide trend where people are choosing to have fewer children (U.S. Department of Health and Human Services, 2024) - and Oregon's birth rates are among the nation's lowest. This means that in coming years our region

is likely to see population growth only from net in-migration. Consequently, regional population growth rates are projected to be lower over the next 20 years. The relatively high cost of living on the West Coast may be an additional headwind for regional population growth from migration, which historically has been highly variable from year to year. However, the regional forecast contains optimism that, over the long run, greater Portland's quality of life will attract people seeking a place to live and work at rates similar to the decades long historic average.

Slowing population growth also means slower job growth. Sectors expected to grow the most are those that serve the existing population, such as health care and professional services.

Holding our ground in semiconductor manufacturing

Despite long-term declines at the national level, the greater Portland region is expected to maintain its historic strength in high-tech manufacturing thanks in part to assistance from the CHIPS Act. Computer and electronic manufacturing jobs are holding steady with modest gains due to our region's advantages in semiconductor research and development rather than large-scale production, which is more vulnerable to offshoring to countries with lower costs.

Underproduction of housing, particularly for people with the fewest resources

Our nation's housing markets continue to struggle to produce enough housing to match household growth, particularly for households with lower incomes. This backlog of housing production became evident in the aftermath of the 2008 housing bubble and recession – and its effects are still felt today. Those who experience this housing shortage most acutely are people with the fewest resources. Housing instability and houselessness disproportionately impact people of color.

For developers and builders, the cost of labor, materials and lending remain a burden on housing production. Nationwide, access to buildable lots is a challenge in part because of lower numbers of land development companies. In our region, as elsewhere, the cost of serving raw lands with needed infrastructure is a significant barrier to housing development.

On a positive note, jurisdictions around the state have removed regulatory barriers to producing a greater variety of housing types. "Middle housing" options that include townhouses, duplexes, triplexes, quadplexes and cottage clusters hold promise for providing additional housing types for people of varying incomes – particularly ownership options in smaller formats. In fact, in the future middle housing may well be more profitable to build than single unit detached housing.

Pandemic impacts on work

Though many aspects of life have returned to normal after the COVID-19 pandemic in 2020 and 2021, it has had lasting impacts on what that "normal" looks like. After peaking in 2021, the share of employees working from home full time or hybrid remained at 24 percent in 2022 for the greater Portland metropolitan area. While offering more flexibility for office workers and

some cost savings for businesses, this persistent trend has led to high office vacancy rates and has long-term implications for demand for office space.

Housing capacity needs

While there is a housing crisis nationally and in our region, it is not clear that shortage is caused by a sheer lack of space for additional housing to be built. Metro's UGB housing need analysis shows that within the Metro area UGB, there is an existing need for approximately 27,000 homes to address historic underproduction and its impacts, including houselessness, as well as housing being used as second homes or vacation rentals. Additionally, under the baseline population forecast conducted for this Urban Growth Report, approximately 150,000 additional homes are needed to meet expected population growth over the next 20 years.

Trends projecting more one-person households and an aging population (often on fixed incomes) indicate that the need for more affordable, smaller homes will increase. To meet these housing needs, we must continue to focus on public investment and removing barriers to housing production in existing urban locations.

Housing capacity gap analysis

Analysis conducted for the draft Urban Growth Report revealed that there is likely room to accommodate most, if not all, of the region's existing and future housing needs inside the existing UGB for the next 20 years. Growth projections vary, however - and based on the range of those projections the Metro Council has latitude to determine there is a need to add the Sherwood West urban reserve to the UGB or to take other measures to encourage redevelopment. This latitude derives from several factors described in more detail in this report. Generally, those factors relate to uncertainty around future migration rates, redevelopment potential, and middle housing potential. As a result of different growth projections, the UGB capacity deficit, or "gap," for accommodating housing needs can vary.

Based on the analysis in the draft 2024 UGR, Metro's Chief Operating Officer subsequently recommended that the Metro Council address a regional deficit of growth capacity for 2,300 to 5,300 homes and further recommended that the Council expand the UGB to include the Sherwood West urban reserve to address the growth capacity deficit. Based on Council direction, this analysis provides a final assessment of housing capacity needs as a basis for the 2024 growth management decision.

Employment land needs

Industrial land needs

Although analysis shows a surplus of industrial land in aggregate throughout the region, individual businesses seeking specific development-ready properties for sale or lease may struggle to find options.

Metro, with review by cities and counties, identified over 5,000 acres of industrial land inside the UGB that meets the legal definition of being buildable.[1] The Urban Growth Report analysis shows a regional surplus of 3,930 acres of industrial land to accommodate expected industrial job growth under the most likely (baseline) forecast. There is a small surplus even under a high growth employment forecast.

However, the available acres of industrial land may not always have the location and site characteristics that will accommodate current needs for industrial development, particulary with regard to site size. The Sherwood West employment area offers the potential for business growth because of unique characteristics that are in short supply elsewhere in the UGB, including the potential for assembling larger 50+ acre sites, relatively flat parcels, and relative proximity to existing job clusters.

Industrial land options

Informed by the analysis in the draft 2024 UGR, Metro's Chief Operating Officer subsequently recommended that the Council expand the UGB to include the Sherwood West urban reserve to address the need for two 50-acre industrial sites identified by the Oregon Semiconductor Task Force. The need for those two large sites cannot reasonably be met on industrial lands already inside the UGB because the inventory of industrial lands lacks a sufficient number of industrial sites of this size that also have the site characteristics needed to accommodate high-tech manufacturing.

Commercial land needs

Depending on the amount of employment growth anticipated, this analysis identifies a potential surplus of 814 buildable acres of commercial land (low growth forecast) to a potential deficit of 1,786 buildable acres (high growth forecast). Under the most likely (baseline) growth forecast, there is a deficit of 286 buildable acres.

Commercial land options

Informed by the analysis in the draft 2024 UGR, Metro's Chief Operating Officer subsequently recommended that the Council expand the UGB to include the Sherwood West urban reserve to address the need for additional commercial land under the baseline forecast. Consistent with observed development trends, it is reasonable to assume that a small portion of the region's industrial land surplus will be available for commercial uses[2], thereby addressing any remaining, negligible commercial capacity gap. Likewise, it is reasonable to assume that, if there is

[1] This estimate has been revised downward since the release of the draft UGR based on advice to use a lower (10 percent) slope threshold for industrial lands.

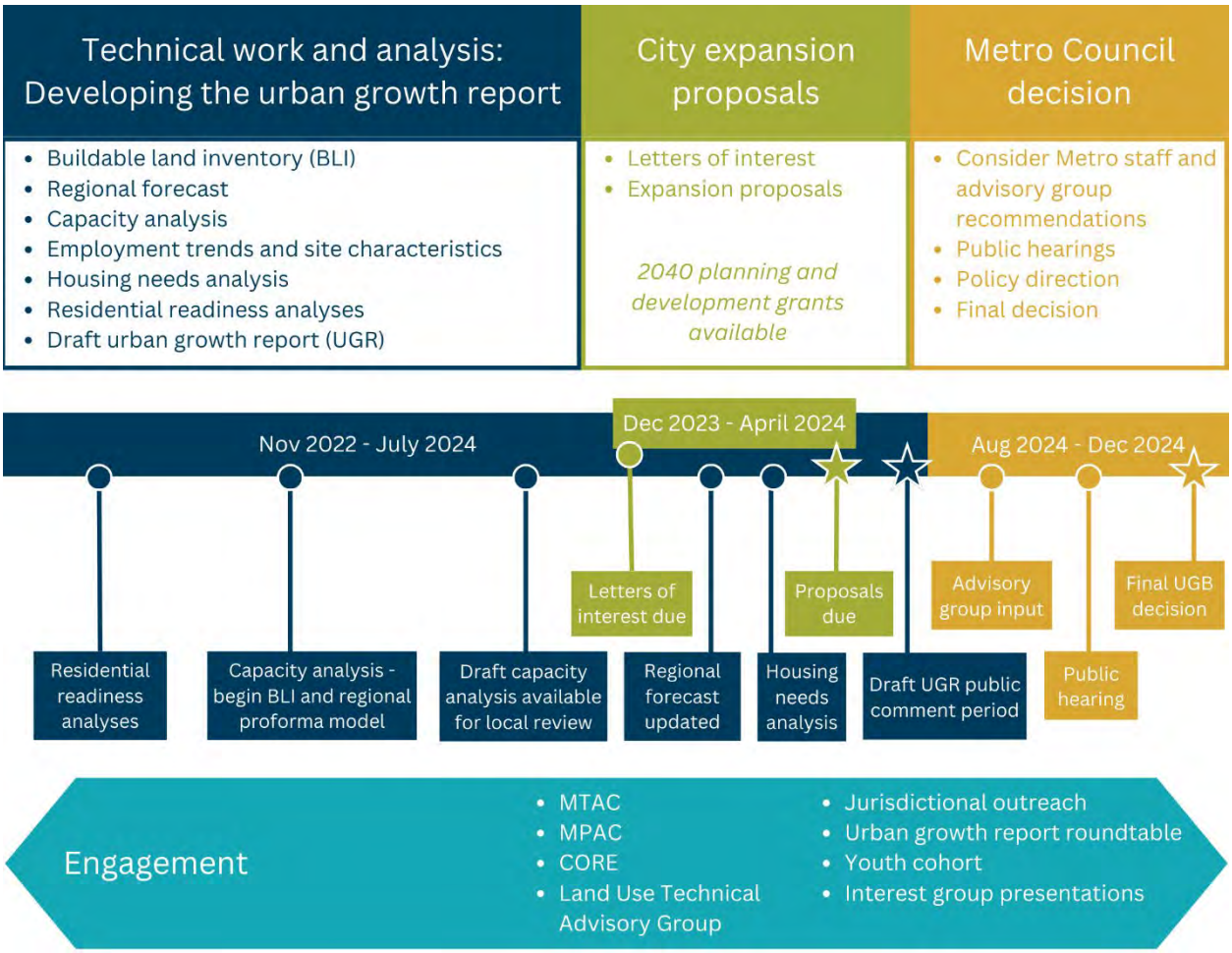
[2] These may be, for instance, office jobs at industrial firms or smaller retail uses in industrial areas that serve the needs of nearby workers.

remaining demand for commercial space, additional commercial redevelopment in mixed-use zones would occur.[3]

Engagement

Metro staff have shared information from this report and explained the methods used to collect and analyze the data during its production. An Urban Growth Report Roundtable started meeting in September 2023 and met eleven times to discuss approaches used to collect data and share early information.

Staff from cities, counties and local experts were invited to review data during the process to ensure accuracy. Thank you to everyone who participated in the production of this analysis.



[3] As described in Appendix 2, pro forma modeling typically identified residential uses, rather than commercial uses, as the most financially feasible form of redevelopment in mixed-use zones.

2024 Urban Growth Report

Urban Growth Report Roundtable and Youth Cohort perspectives

For the 2024 urban growth management decision, Metro's Chief Operating Officer convened an Urban Growth Report Roundtable with the goal of having additional transparency around how Metro conducts its analyses.

Metro also convened a Youth Cohort with the goals of developing future leadership in urban planning and providing avenues for youth to share their perspectives in this decision process.

Youth Cohort and Roundtable perspectives are summarized in sidebars throughout this document.

LAND READINESS, NOT JUST LAND SUPPLY

Our region has learned that growth management decisions need to focus on at least two major factors:

- Whether there is a long-term regional need for more land inside the UGB. State laws establish this expectation to which Metro's analyses respond.
- Whether there is a plan for making UGB expansions ready for development of housing and businesses. Metro, as a matter of adopted policy, orients its decision making around city readiness for UGB expansions.

Before the adoption of urban and rural reserves in 2010, growth management decisions focused solely on the first factor, establishing whether there was a regional need for land. While we continue to strive for objective analyses of land need, we also have learned that we must pay attention to the readiness of potential UGB expansion areas. This was based on multiple instances of expanding the UGB only to see the land sit for years or decades before developing as intended. Figure 1 illustrates this point, showing the slow production of housing in older UGB expansion areas that did not answer the question of readiness before UGB expansion.

UGR Roundtable perspectives: Development barriers

Development barriers and the feasibility of future development was another recurring topic in the group. The discussions included barrier to housing, commercial and industrial development. During an activity where participants identified development barriers, the list included:

- Price of property
- Zoning and market mismatch
- Market conditions outweigh subsidies
- Property owner motivations
- Cost of infrastructure to serve site
- Parcel assembly
- Site constraints
- Environmental challenges – brownfields, floodplains
- Absentee landowner
- Land banking
- Political challenges
- Public ownership
- Easements
- Regulatory requirements – frontage, trees, stormwater, fees
- Transportation infrastructure not well maintained and difficult site access

Members seek creative solutions and collaboration between the development community, local jurisdictions, Metro, and the State of Oregon. Some roundtable members specifically called out the long timeline from the beginning of the concept planning process to the start of construction and suggested reducing the amount of detail and procedures required to complete these steps. Others mentioned that their biggest barriers are expensive infrastructure and cost prohibitive development code requirements, especially on infill sites.

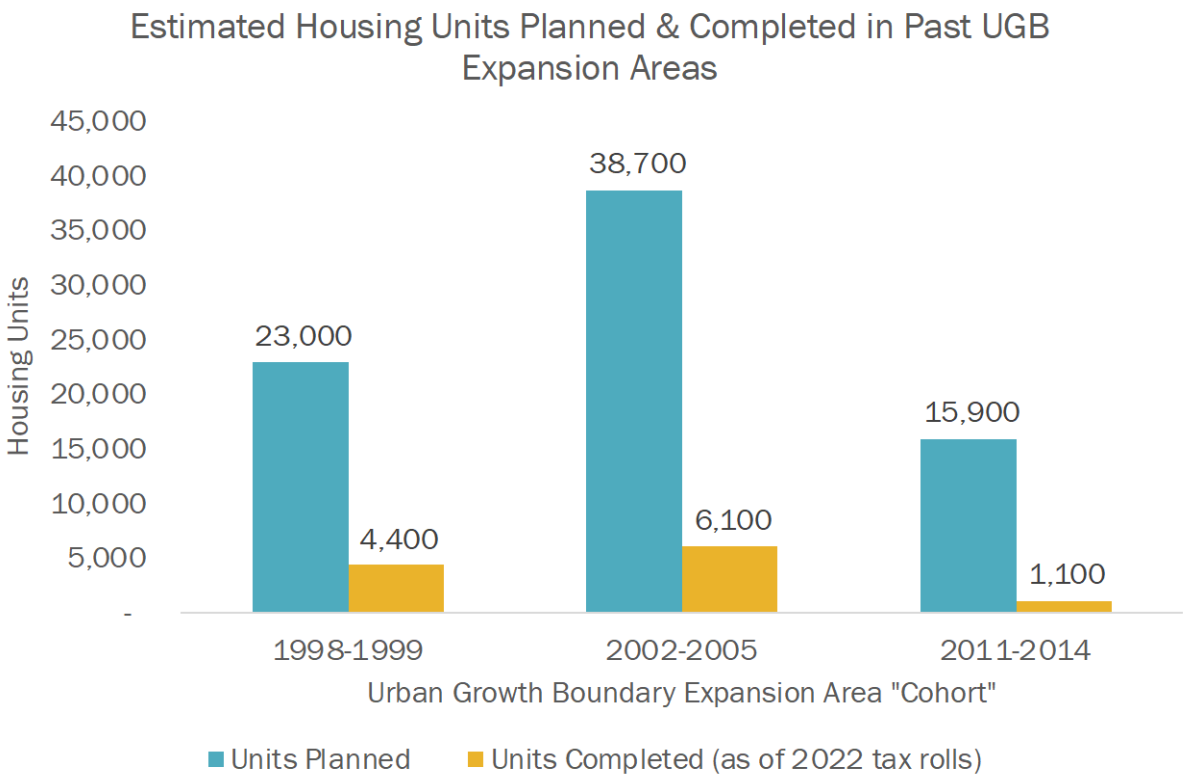


Figure 1: housing units planned and built to date in older UGB expansion areas

Since 2010, it is the Metro Council's policy to only expand the UGB into urban reserves that have been concept planned by a local jurisdiction. Metro provides grant funding for cities seeking to complete concept plans for urban reserves. Title 11 of Metro code lays out concept planning requirements.

In 2017, on advice from the City Readiness Advisory Group, the Metro Technical Advisory Committee (MTAC), and the Metro Policy Advisory Committee (MPAC), the Metro Council adopted additional policies that provide more clarity for cities regarding what needs to be addressed in their UGB expansion proposals. Title 14 of the Metro code describes those factors, including, for example, demonstrating that the city has worked to remove barriers to mixed-use development and has implemented best practices for preserving and increasing the supply and diversity of affordable housing in its existing urban areas.

The 2018 growth management decision was the first full implementation of this readiness-focused approach. In 2018, four cities proposed UGB expansions and the Metro Council approved all four. Today, these cities have completed or are working to complete comprehensive planning for these areas. However, even with a focus on city readiness, development can take time. To date, no housing development has occurred in these four expansion areas.

For the 2024 growth management decision, one city, Sherwood, has proposed a UGB expansion in the Sherwood West urban reserve. The City of Sherwood's concept plan includes a mix of housing and employment uses as well as protection of habitat and open space areas.

UNDERSTANDING THE IMPACT OF THE URBAN GROWTH DECISION

Who benefits and who is burdened?

The UGB helps us make the most of public resources by focusing on development that supports building and maintaining streets, pipes, schools and parks that every community needs. However, not everyone benefits equally from these investments.

The greater Portland area has a history of inequitable and racist land use and development such as redlining, destruction of neighborhoods through the misuse of urban renewal, exclusionary covenants, and zoning codes that only allowed single-unit detached housing on larger lots, which has led to gentrification and displacement.

Displacement has disproportionately affected communities of color, leading to a shift in the racial geography of the region over the last decade. Displacement is a geographic consequence of a series of systemic inequities and racist policies and can have wide-ranging impacts on health and well-being – impacts that can span generations.

Youth Cohort perspectives: Equity and engagement

As the youth cohort learned about the urban growth management decision, a primary focus of their feedback was ensuring that the process centered on **equity and meaningful community engagement.** Many participants wanted the Metro Council to make sure that they were hearing a broad variety of perspectives, especially those that are not always heard in this process. When learning about the Sherwood West proposal, the group wanted to consider how people living in surrounding areas may be affected and wanted the plan to reflect racial equity considerations when discussing access to future homes and job opportunities. The group emphasized the importance of local participation and education, and underlined the role of young people in this process as the primary source for understanding the priorities and challenges that the next generation will face as they will grow up to inherit the outcomes of the plans that are made today.

Understanding the impacts of planning decisions is critical in building a more equitable region where all people have access to the places and resources they need to flourish. Continued work at all levels of government is needed to affirmatively further fair housing and to ensure that affordable housing is available in all communities.

To better understand the wide-ranging impacts of urban growth management decisions, Metro examined previous expansion areas ahead of the 2024 growth decision to determine who has benefited and who has been harmed in expansions of the boundary.

These case studies focus specifically on population demographics, housing type, and home values to measure how the urban growth boundary might impact affordability, housing type, and displacement in greater Portland, and how we can build thriving communities for all in UGB expansion areas and beyond.

A Snapshot of Bethany and Happy Valley

Metro gathered housing and census and housing data for two past expansion areas: Bethany in 2002 and Happy Valley in 1998.

Metro examined this data to understand who has moved to expansion areas as well as how many houses have been built, the types of housing available (townhome, single-unit detached home, etc.), as well as median home value.

These case studies provide a snapshot of two communities that have developed the land within the expanded UGB. Metro focused on assessing these two areas because many other past expansion areas have not yet developed or have been slow to develop.

UGR Roundtable perspectives: Diversity, equity and justice

Diversity, equity, inclusion, and justice topics were woven throughout the UGR roundtable discussions. Staff heard from some members that it is important to center community in our conversation and remember the people that are represented in the technical analysis, elevating qualitative data to the same importance and value as quantitative data. Participants suggested connecting the data related to race, ethnicity with personal stories of lived experiences. This is a way to understand how different demographic groups have different needs and unique positions in the community.

Happy Valley

In 1998, Metro expanded the UGB near Happy Valley to include an additional 660 acres of land. The city has further expanded their city limits into a portion of the 13,000-acre expansion of the Damascus area approved in 2002. Since this time, more than 6,200 housing units (source: RLIS Housing Inventory) have been built or permitted in the expansion areas, and the expanded UGB is now home to more than 20,000 people.

Table 1: Race and ethnicity of people living in Happy Valley (2020 Census)

Race/Ethnicity Census Categories	Happy Valley expansion only	Happy Valley total
White	62%	64%
Black	2%	2%
AIAN (Amer. Indian/Alaskan Native)	0%	0%
Asian	21%	20%
NHPI (Native Hawaiian/Pacific Islander)	0%	0%
Other	0%	0%
Multiple	6%	6%
Hispanic	8%	7%
BIPOC (total non-white)	38%	36%

Analysis: There is no significant difference in the demographics of residents within the expanded UGB area and the total Happy Valley population.

Table 2: Housing types in Happy Valley (Source: RLIS Housing Inventory)

% of homes built that are middle housing	Happy Valley expansion only	Happy Valley total
Middle housing		7%
Multifamily	31%	20%
Other	6%	5%
Single-unit detached housing	58%	68%

Analysis: A higher percentage of middle family and multifamily housing was developed in Happy Valley's UGB expansion areas than in Happy Valley overall.

Implication for affordability: Middle family and multifamily housing types support denser communities where you live closer to places you work, live, play, etc.

Table 3: Affordability & assessed home values in Happy Valley (Source: County Tax Assessor data)

Median home assessed value by home type	Happy Valley expansion only	Happy Valley total
Single-unit detached housing	$695,786	$733,856
Townhouse	$438,329	$431,854

Analysis: Townhouses in the UGB are slightly more affordable than those in the other areas of Happy Valley, in which single-unit detached homes are slightly less expensive. All housing types in Happy Valley are, on average, above the regional average home value. High housing production costs contribute to the overall regional supply shortage and can have a long-term impact on housing costs.

Bethany

In 2002, the Metro Council brought 960 acres into the UGB in Washington County's North Bethany area. More than 5,000 homes are planned for the area.

Since then, approximately 3,525 homes have been built or approved for construction in the area.[4] As of mid-February, the least expensive home in the area was for sale for $405,995.

Table 4: Race and ethnicity of people living in Bathany (2020 Census)

Race/Ethnicity Census Categories	Bethany expansion	Bethany total
White	27%	40%
Black	3%	2%
AIAN (Amer. Indian/Alaskan Native)	0%	0%
Asian	58%	44%
NHPI (Native Hawaiian/Pacific Islander)	0%	0%
Other	1%	1%
Multiple	4%	5%
Hispanic	6%	7%
BIPOC (total non-white)	73%	60%

Analysis: The Bethany expansion area is home to significantly more residents who identify as Asian than the Bethany population overall.

Table 5: Housing types in Bethany (source: Metro Land Development Monitoring System)

% of homes built that are middle housing	Bethany expansion	Bethany total
Middle housing	11%	8%
Multifamily	20%	20%
Other	0%	2%
Single-unit detached housing	69%	70%

Analysis: A slightly higher percentage of middle family and multifamily housing was developed in the UGB expansion area than in Bethany overall.

Implication for affordability: These housing types are supportive of denser communities where you live closer to places you work, live, play, etc.

Table 6: Affordability & assessed home values in Bethany (source: Metro Land Development Monitoring System)

Median home assessed value by home type	Bethany expansion	Bethany total
Single-unit detached housing	$784,740	$761,170
Townhouse	$474,310	$481,895

[4] Note that this is a correction to an error in the draft UGR, which inadvertently understated the number of homes built to date.

Analysis: Townhouses in the UGB are slightly more affordable than those in Bethany overall which Single-unit detached homes were slightly less expensive. All housing in Bethany is above the regional average home value. High housing production costs contribute to the overall regional supply shortage and can have a long-term impact on housing costs.

Limitations of census data and data collection

While the data in this report is accurate and reliable, it relies heavily on census data. Different communities have different levels of comfort engaging with government censuses and surveys. Additionally, smaller demographic segments of the population are harder to count in the census.

These longstanding cultural and statistical issues can result in undercounts, especially for marginalized communities, such as immigrants and refugees, people of color, people who speak limited English, people who are unhoused and people with disabilities. Comparing and making sense of decennial censuses in the United States can be difficult for other reasons, as well.

Additionally, the size and shape of the UGB expansion areas limit the amount of reliable demographic data available. Expansion areas are often small portions of larger geographies used by the census. For example, there is census data about race and ethnicity available at a geographic scale that more closely aligns with expansion areas but the census does not provide data about income for the same geographic scale.

Lessons learned

Metro's analysis of these case studies did not provide conclusive results. This process highlights the need for more and different data to understand equity impacts.

This initial attempt at understanding the impact of UGB expansions paves the way to continue exploring affordability, equity areas, the social consequences, how people move and why, and what it means to benefit from and be impacted by expansion decisions.

Urban growth boundary expansion areas are sparsely populated when added to boundary. The number of people living and working in these areas who are directly affected by UGB expansions is relatively small, but they are important to consider. People with direct connections to expansion areas include property owners (who will likely profit from the sale and development of their land), renters (who are at risk of displacement), as well as farm and forest workers (whose jobs are at risk of displacement). It is worth noting that land that is considered most important for commercial agriculture and forestry use is in rural reserves and not eligible for urban expansion.

It is difficult to draw conclusions about the impact of urban growth decisions on the affordability or livability of existing urban areas because there are many economic and social factors at play. One way of examining the potential impact of the UGB on housing affordability is

to compare the greater Portland region to similar metro regions without urban growth boundaries. Austin, Denver and Atlanta have similar housing prices to greater Portland, which could indicate that the UGB does not have a significant impact on affordability in greater Portland.

Looking forward

While it is not possible to predict who will move into newly urbanized areas, there are many ways to help make newly developed areas welcoming to a diversity of community members. These strategies include, but are not limited to, local zoning policies that encourage a diversity of housing types and mixed-use developments, fostering strong communities that include access to nature and community spaces, as well as building affordable housing and transportation infrastructure. Strategies could also include a racial equity assessment and deep community engagement that inform expansion proposals.

Metro can evolve this process to better understand how the urban growth management decision impacts communities and reduces racial disparities in the greater Portland region. Future urban growth management decisions must prioritize community engagement with community members early and often and improve the agency's approach to involving community members in this technical and long-term process.

If community members are not working alongside Metro, there is a risk of perpetuating the inequities in this region. With a commitment to building a more equitable region, Metro will set the tables for continued conversations and collaboration to advance the region's understanding of how urban growth management impacts marginalized communities—particularly people of color.

HOW MUCH POPULATION GROWTH IS EXPECTED?

A core aspect of making growth management decisions is determining the rate of population, household, and job growth in the Metro UGB over the next 20 years. Metro accomplishes this by first conducting a forecast for the seven-county Metropolitan Statistical Area (MSA). As described in appendices 1 and 1A, this forecast is based on the best available data sources and uses accepted practices for forecasting. To ensure the quality of the forecast, external economists and demographers review it for its reasonableness.

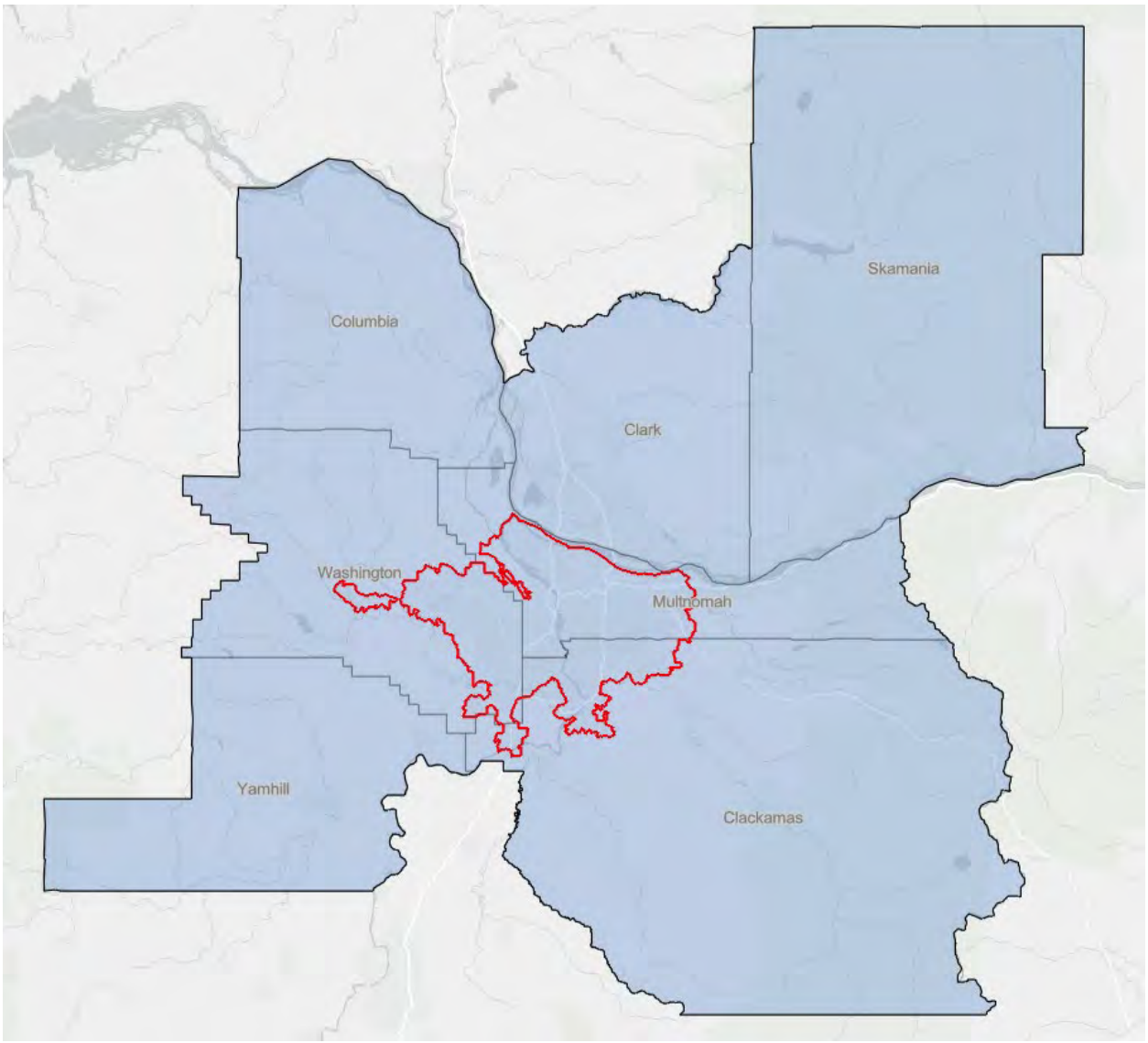


Figure 2: 7-county Metropolitan Statistical Area (MSA) and Metro UGB (shown in red)

People are choosing to have fewer children

In previous population forecasts, the long-term decline in birth rates in the U.S. and the Metro region was expected to plateau. However, birth rates have continued to decline and it is now a widely held view that the population in our nation, state, and region will decline without migration.

Our region is not alone. A recent study published in the British medical journal, The Lancet, estimates that by the year 2100, 97 percent of countries will see population declines without net positive migration.[i] Figure 3 depicts the greater Portland MSA's history and forecast for annual natural change (live births minus deaths). After a near-term increase, natural change is expected to be negative after the year 2033.

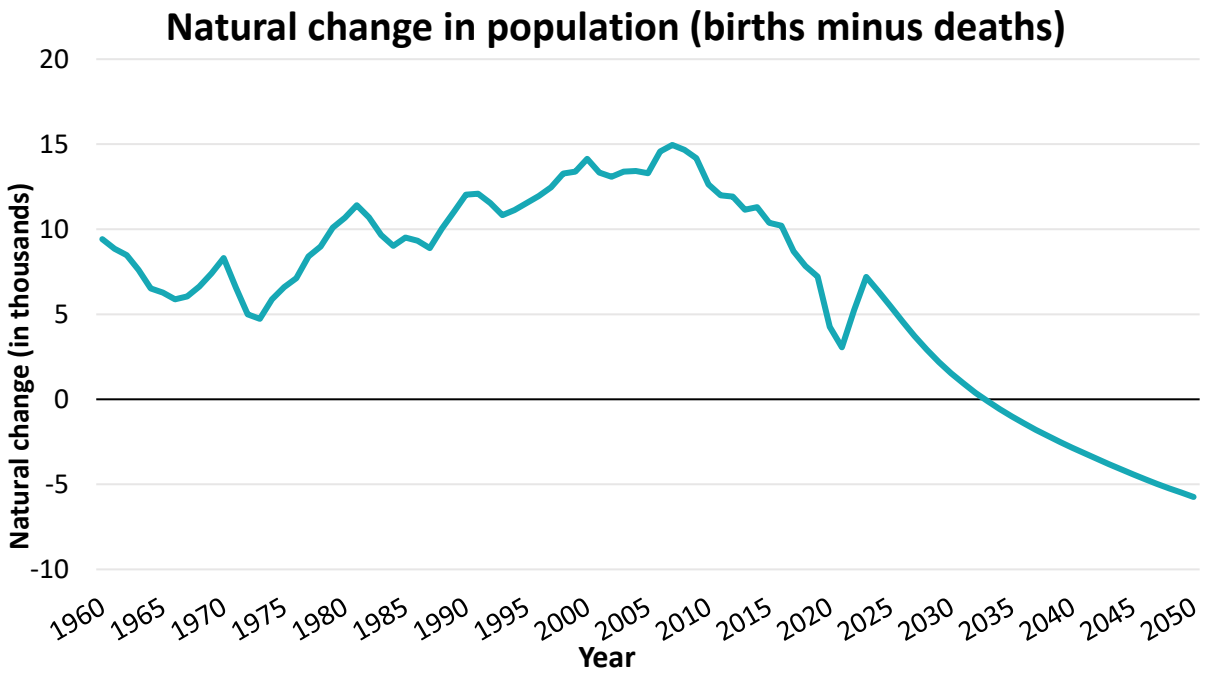


Figure 3: Natural change (live births minus deaths) for the Portland MSA

Future migration levels are a source of uncertainty

The baseline draft regional forecast assumes that net migration will be sustained at the historic average level, which would result in regional population growth, albeit at a slower rate because of negative natural change (deaths will outnumber births). Under the baseline forecast, net migration is expected to add 15,000 people per year to the MSA population.

Expert reviewers of the regional forecast emphasized that, while it is a reasonable assumption, there is uncertainty around maintaining this historic average net migration rate. Reviewers saw potential for lower net migration rates due to affordability issues on the West Coast, including greater Portland.

Reviewers also indicated that, though it makes intuitive sense that the Pacific Northwest will attract migrants from areas with higher climate risk, there is no data to support this assumption. The variation in historic net migration rates illustrates this lack of a trend (see Figure 4). Metropolitan areas that have higher climate risk in the desert, southwest, coastal areas, and the Sunbelt continue to see some of the highest rates of growth in the country. A 2016 symposium on the topic also emphasized these points (Binder, 2016).

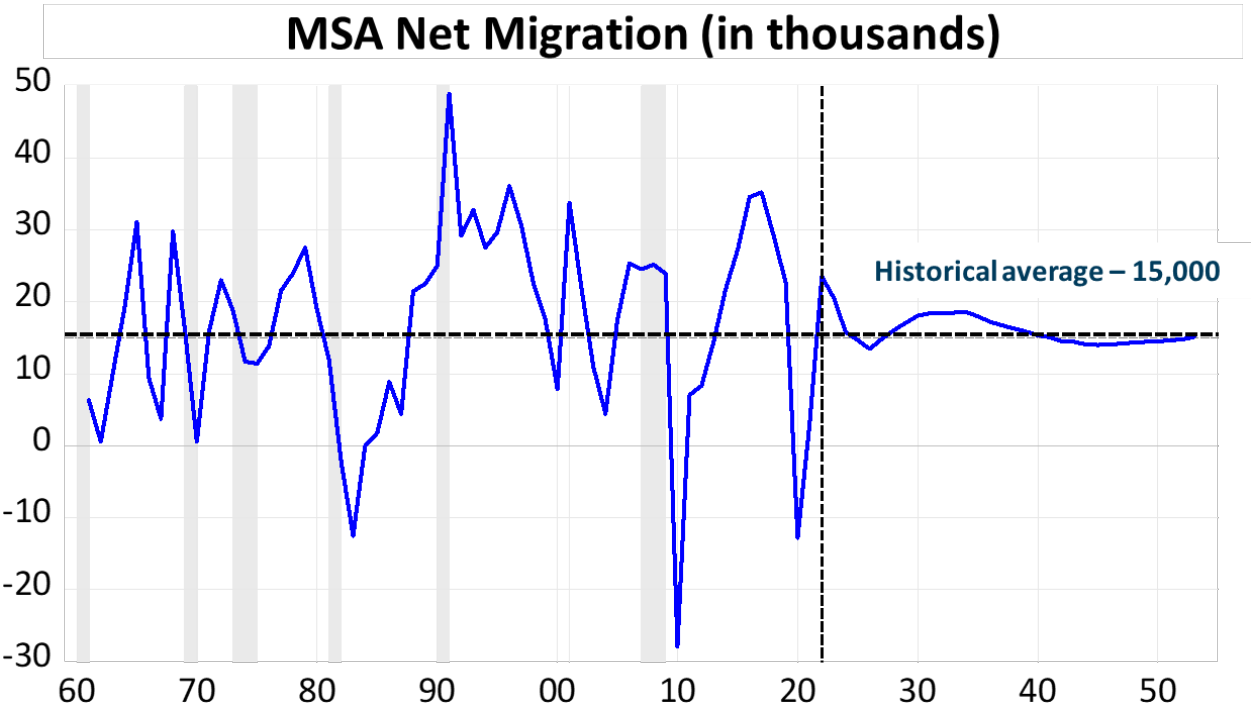


Figure 4: Net migration (in 1000s of people) for the Portland MSA: 1960-2050

Population forecast results

The baseline forecast estimates approximately 315,000 more people in the Portland region between 2024 and 2044 for a total population of 2,901,000 by 2044. The baseline forecast is the most likely forecast. However, as noted, there is uncertainty surrounding population growth, particularly for future migration trends. To recognize that uncertainty, Metro has also completed low and high growth forecasts. While these alternative forecasts are both possible, they are not as likely as they would require sustained and sizable decreases or increases in net migration.

Table 7: Population range forecast for the Portland MSA: 2024-2044

	Low	Baseline	High
2024	2,529,000	2,586,000	2,644,000
2044	2,521,000	2,901,000	3,281,000
Difference	-8,000	315,000	637,000

Note: 2024 population numbers are estimates and therefore vary between low and high forecasts

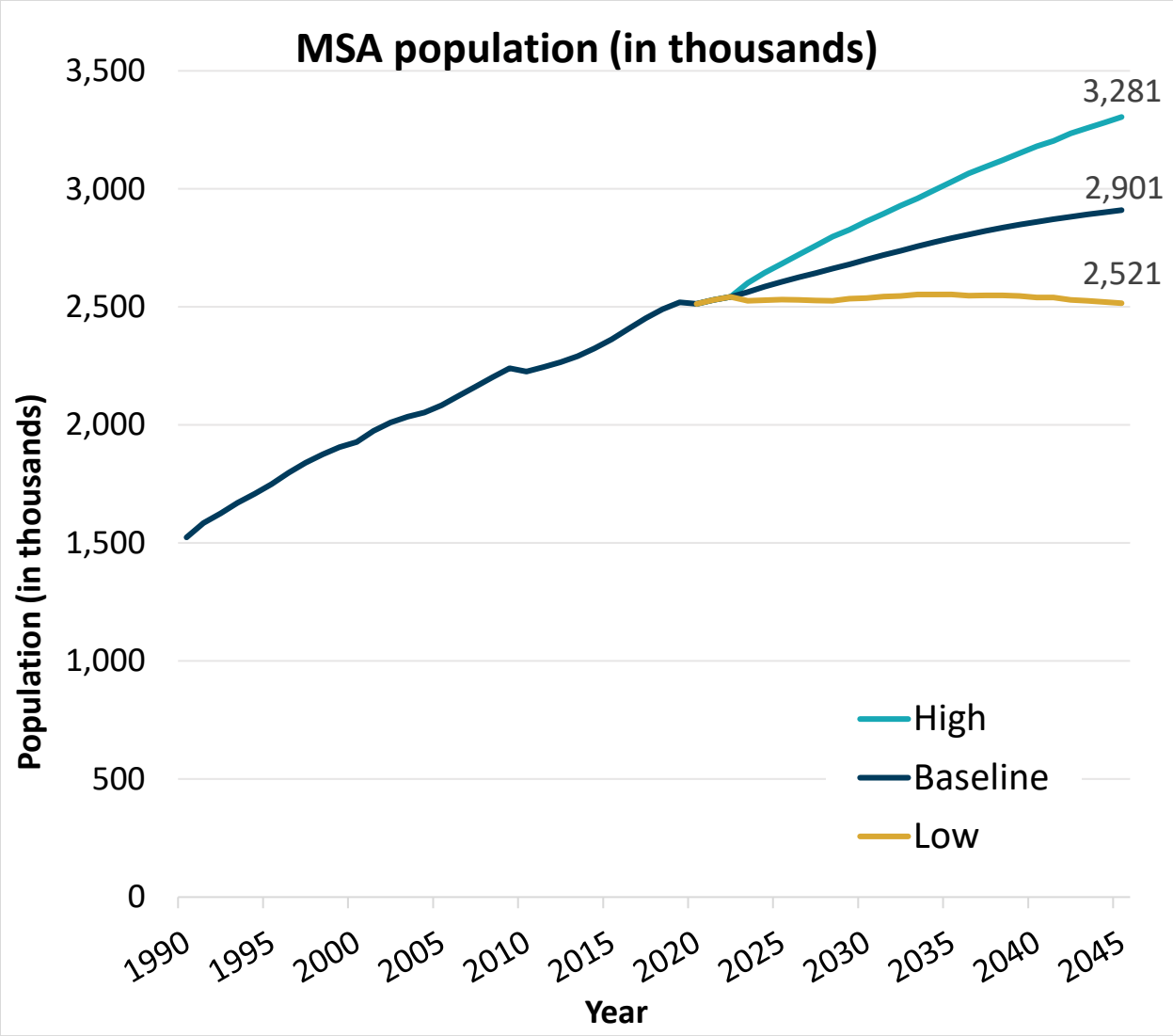


Figure 5: Portland MSA population history and forecast: 2024-2044

REGIONAL HOUSING NEEDS ANALYSIS

Even with a population growing at a slower rate, the region needs to remain focused on people's housing needs. Demographic shifts related to this slower growth rate provide insights into the region's future housing needs for the 2024-2044 period.

Demographic trends

People are choosing to have fewer children:

- In our region, the average household will have fewer people, dropping from 2.41 people today to 2.27 people in 2044.
- Today, approximately two-thirds of households have two or fewer people. That share is expected to increase.

- With fewer people choosing to have children, the median householder age will increase. Households headed by someone over 65 years will constitute the greatest share – almost two-thirds – of the change in households.

As the Millennial generation ages, Gen Z follows in its wake as a smaller generation:

- Compared to today, there will be a slight decrease in the number of families with children with a householder 25-44 years old (instead of Millennials, the smaller Gen Z will be in this age cohort in the year 2044).
- About a quarter of new households will be aged 45 to 64 with children (this will be the Millennial generation in the year 2044).

Smaller, older households mean, on average, fewer wage earners per household:

- With an older population, more people will be retired and on fixed incomes. 41 percent of new households will be seniors with lower (below $60,000) household incomes.
- Over 60 percent of new renter households will have household incomes less than $60,000, contributing to additional need for housing affordable to households earning 30 to 80 percent of area median income.
- 82 percent of new renter households will have incomes less than $100,000.

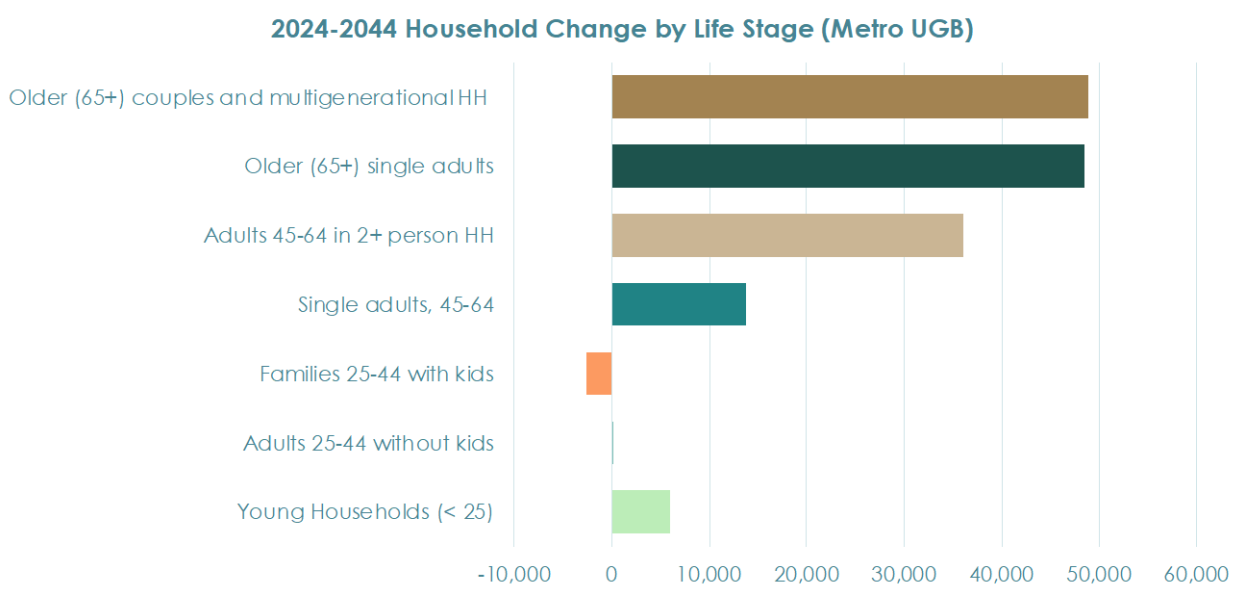


Figure 6: 2024-2044 household change (UGB) by life stage (source: ECONorthwest analysis of Metro baseline regional forecast)

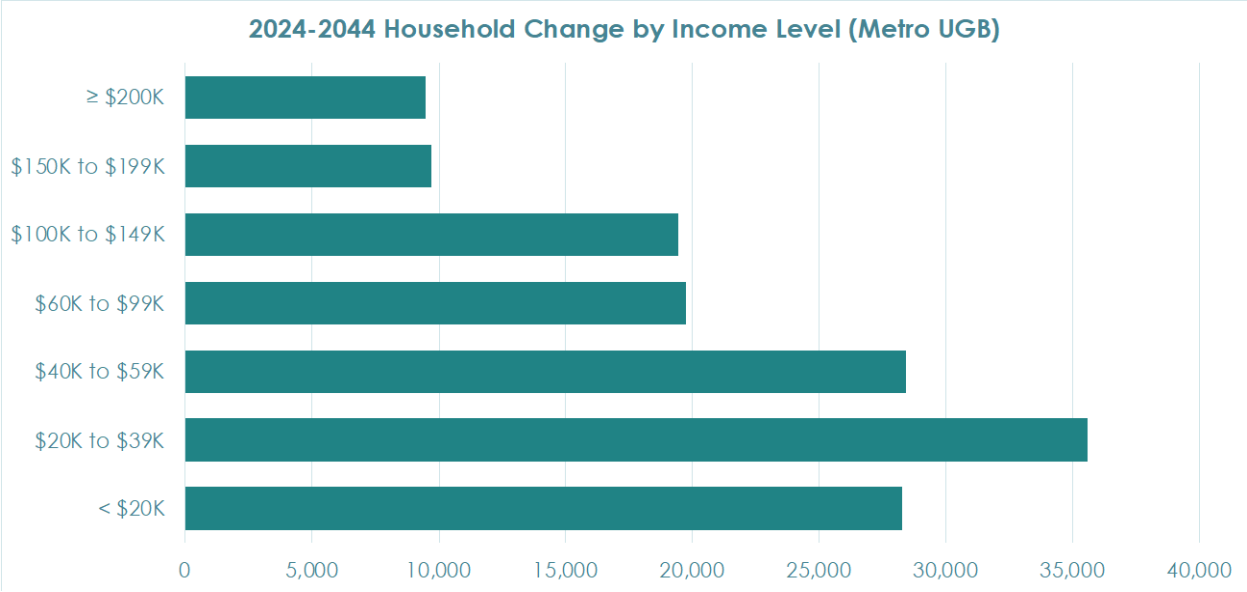


Figure 7: 2024-2044 household change (UGB) by income level (source: ECONorthwest analysis of Metro baseline forecast)

Residential trends

Underproduction of housing

Our nation's housing markets continue to struggle to produce enough housing to match household growth, particularly for people earning lower incomes. This backlog of housing production became clear in the aftermath of the 2008 housing bubble and is still with us today.

More recently, higher interest rates have caused many homeowners who might otherwise move to stay put since they cannot afford to take on a new mortgage at higher rates. This contributes to low inventory of houses for sale. In the end, those that feel the housing shortage most acutely are people with the fewest resources.

For developers and builders, the costs of labor, materials and lending remain a drag on housing production. Nationwide, access to buildable lots is a challenge in part because of lower numbers of land development companies and the costs of serving raw lands with needed infrastructure.

Regional housing production, gentrification, and displacement

The interaction between housing supply and demand influences affordability. While new market rate housing is rarely "affordable," housing production contributes to the overall regional supply and can have a long-term impact on housing costs. Metro, seeking to better understand the role of regional housing supply in affordability, contracted with ECONorthwest to provide an overview of these regional housing market dynamics.

UGR Roundtable perspectives: Housing production and affordability

Housing production and affordability was an important topic to UGR roundtable members. Participants expressed the need for renewing funding sources and establishing clear goals for affordable housing development to meet regional needs at various income levels. This affordable housing production should include units for both rent and ownership. Members mentioned that housing and land are resources for generational wealth building. Other roundtable members working in housing development cited the high infrastructure costs as a substantial barrier to housing affordability and production. This led to conversation about the need for policies to address historic underproduction and advocate for infrastructure funding. Some roundtable members advocated for workforce housing to support job growth in the region. By proactively planning for workforce housing at different income levels, including addressing the specific needs for farmworker housing, cost of living may become less of a barrier for workers here today and those considering moving in the future.

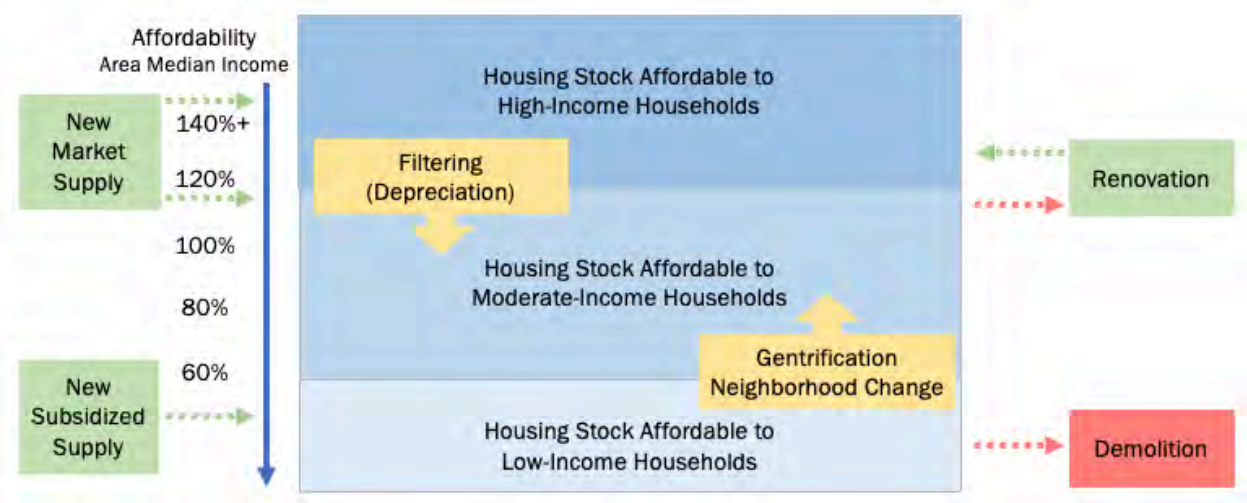


Figure 8: illustration of how new housing supply affects housing markets (source: ECONorthwest)

ECONorthwest's work on this topic can be found in Appendix 10. Takeaways include:

- The supply of new market-rate housing is crucial for moderating price increases.
    - However, depreciation of housing (filtering) alone won't meet the needs of lower-income households.
- Housing displacement risk should inform public policies and investments, but not necessarily inhibit them.
    - Creating affordability in high-opportunity areas with access to services and amenities is as important as maintaining affordability in areas at risk of displacement.
    - Investments in existing communities may increase property values and may need to be paired with investments in stability.
    - Households experiencing economic precarity face displacement risks wherever they live without appropriate support.
- Preventing and mitigating displacement is hard, but not impossible.
    - The UGB is just one policy tool. Many more interventions and partnerships are required to succeed.
- Data alone is not enough to understand gentrification and displacement.
    - Lived experiences and awareness of history can supplement data.

Housing production by location

The 2040 Growth Concept, Greater Portland's long-standing plan for growth, seeks to focus housing development in urban centers, corridors and main streets. This is typically achieved through redevelopment or infill. Approximately 93,000 homes were built inside the UGB from 2013 to 2022. A little more than half of that housing was built through redevelopment rather than vacant land development. Figure 9 depicts the intensity of residential development around the region for the 2009-2023 period. Many 2040 centers and corridors have contributed to this housing production.

Focusing growth in urban areas helps our region to minimize impacts on rural areas outside the UGB. Ongoing efforts are needed to ensure equitable access to nature in urban areas. Climate change brings with it additional urgency to enhance our urban tree canopy to protect people from extreme heat events.

Youth Cohort perspectives: Building communities with access

A recurring theme throughout the youth cohort meetings was the importance of **building communities with access** to opportunities and a variety of community spaces, especially for access that was not car-dependent. This theme included the cohort priority that new neighborhoods should include spaces for everyone and that people should be able to meet their needs without having to rely on a car. Cohort participants emphasized priorities of walkability, public transit access, and accessibility in connections through new neighborhoods. The theme of access also included access to opportunity – jobs with livable wages, and opportunity to meet needs like buying nutritious foods and gathering with other community members.

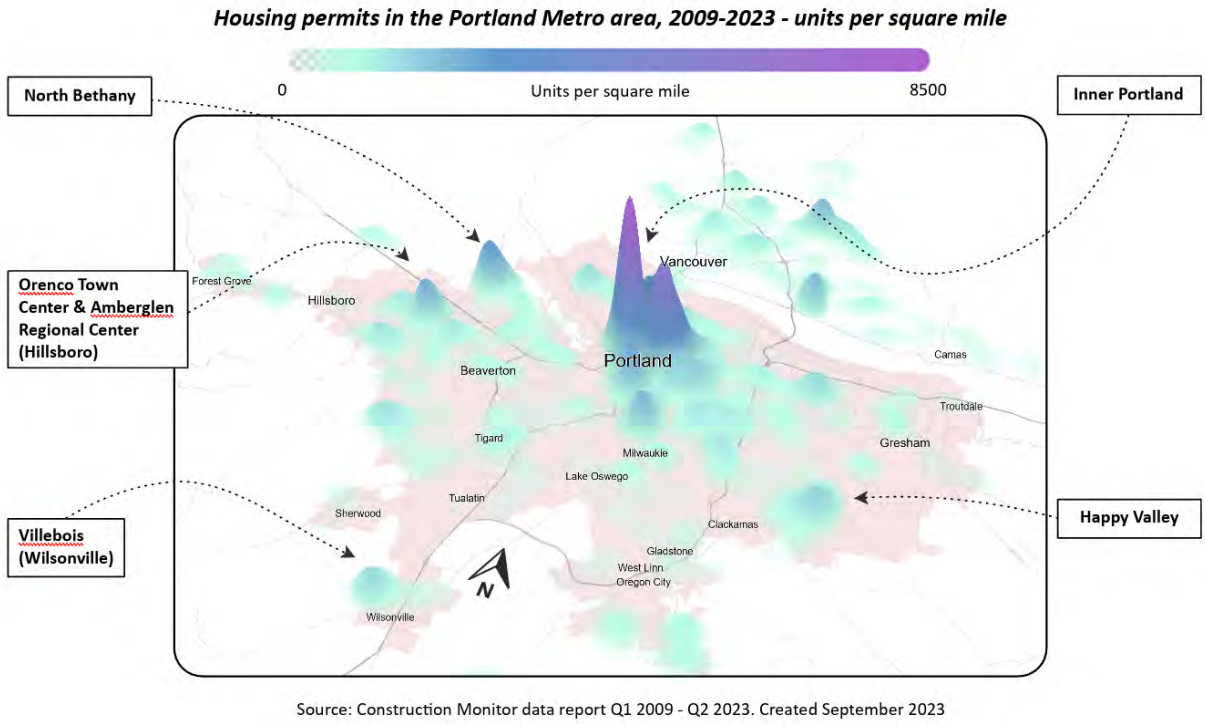


Figure 9: housing units permitted per square mile 2009-2023

Housing type trends

Today's housing mix is the result of decades of change. Though single-unit detached homes are the predominant housing type today (52 percent of housing inside the Metro UGB), as shown in Figure 10 they have represented a smaller share (30 percent) of new housing over the last decade.

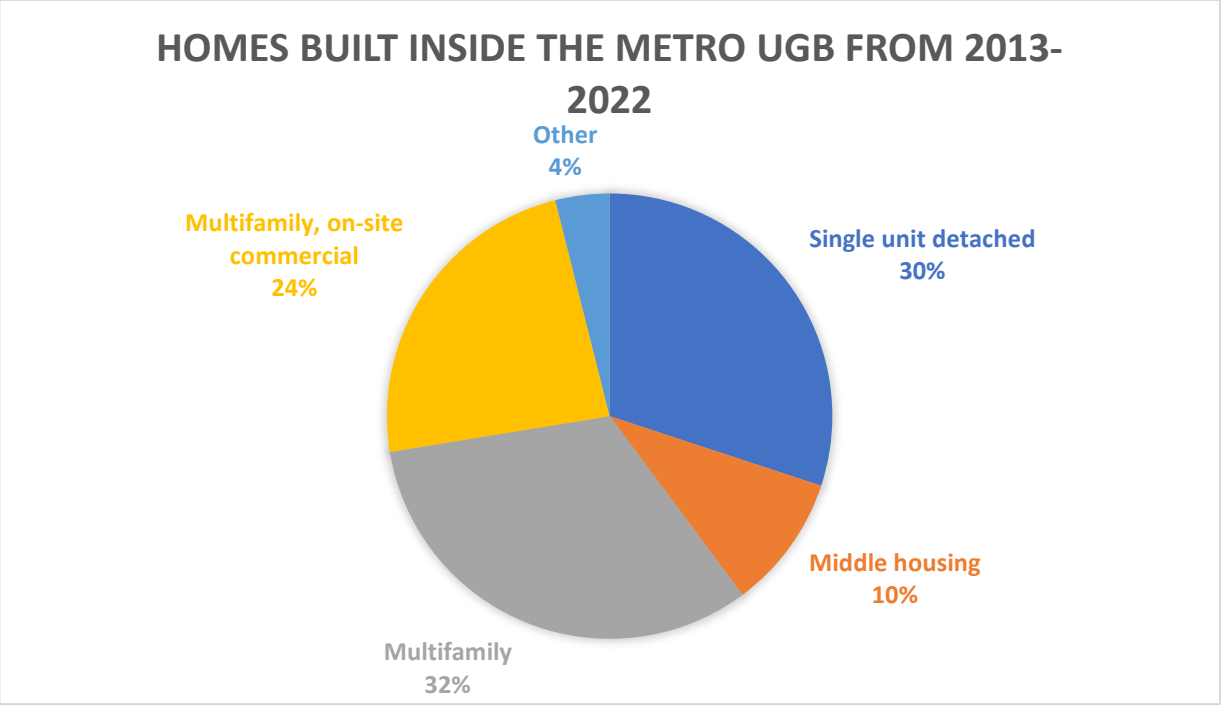


Figure 10: new housing built by type inside the Metro UGB from 2013-2022

Middle housing options such as townhouses, duplexes, triplexes, quadplexes, cottage clusters and accessory dwelling units are now allowed in zones that allow single-unit detached homes. This legalization of middle housing is recent for several of these housing types. Others, such as townhouses, duplexes and accessory dwelling units have a longer history. Over 9,000 middle housing units were built inside the UGB from 2013 through 2022 with townhouses and accessory dwelling units making up the majority. See Figure 11.

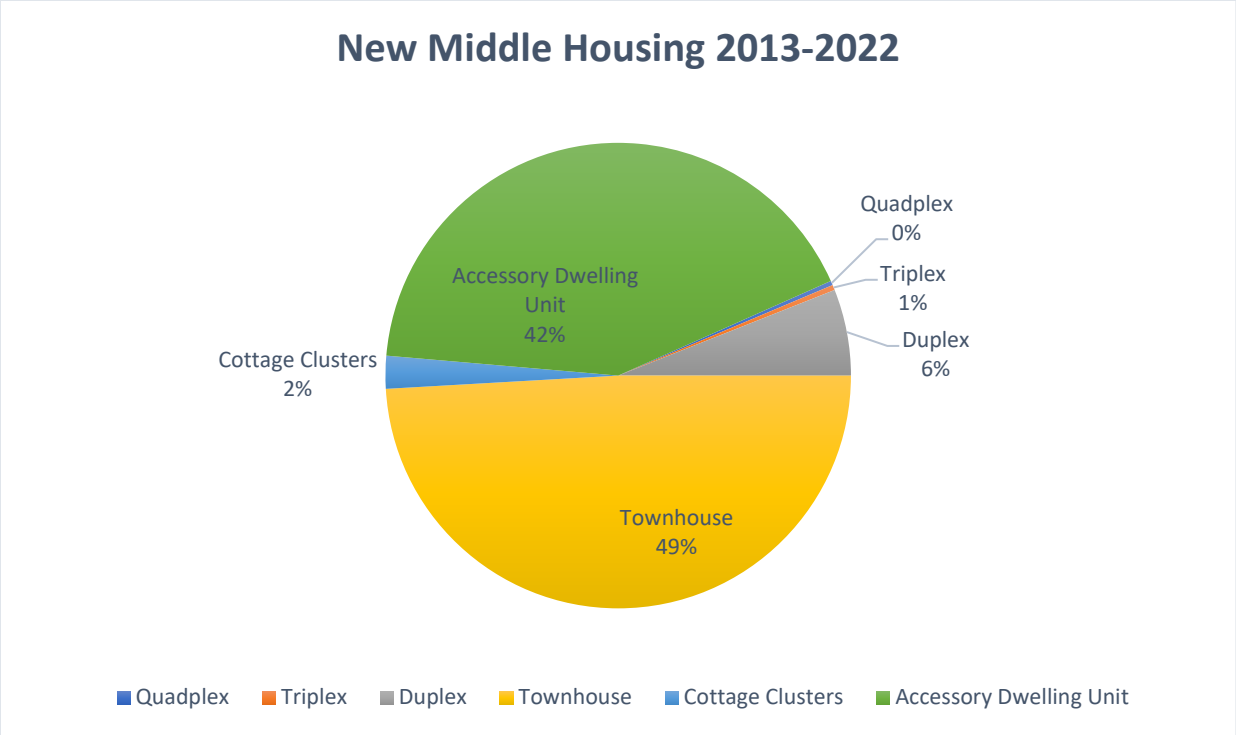


Figure 11: Middle housing developed in the Metro UGB from 2013-2022

Housing density trends

The region has adopted policies to encourage efficient use of land inside the UGB. On average, higher density has been achieved through redevelopment rather than vacant land consumption. However, there are exceptions such as single-unit detached and middle housing, which have achieved higher densities on vacant land.

Table 8: housing density for new housing (units per acre) by housing type and land source (Metro UGB, 2013-2022)

Housing type	Infill/ Redevelopment	Vacant land consumption	Total
Single-unit detached	5.4	7.5	**6.6**
Middle housing	17.1	21.3	**19.8**
Multifamily	71.9	35.1	**49.7**
Multifamily, on-site commercial	148.0	67.4	**101.2**
Other	28.9	26.9	**27.7**
Total	**18.8**	**14.4**	**16.3**

Note: "other" housing includes, for instance, dormitories, retirement facilities, and floating homes

The 2040 Growth Concept seeks to focus housing growth in urban centers and corridors. Figure 12 summarizes where housing has been built in relation to the 2040 Growth Concept over the last decade. The largest shares of housing have been built in non-center areas (neighborhoods) in Multnomah and Washington counties, followed by Multnomah County corridors.

UGR Roundtable perspectives: Regional vision for the future

Many of the topics brought to the roundtable inspired broader conversations about the **regional vision for the future**. As challenges and solutions grew beyond land use interventions, members felt that it was important to be proactive about change rather than reacting. Some participants felt that the reputation of our region is at risk, and that bold, optimistic visions are needed to create a different future for the region. This will might involve a messy process to bring many different voices, perspectives, and priorities to the table. Many of the challenges and concerns mentioned throughout this process go beyond the urban growth management decision itself and require continued leadership and collaboration to find new solutions and commitment to see them through.

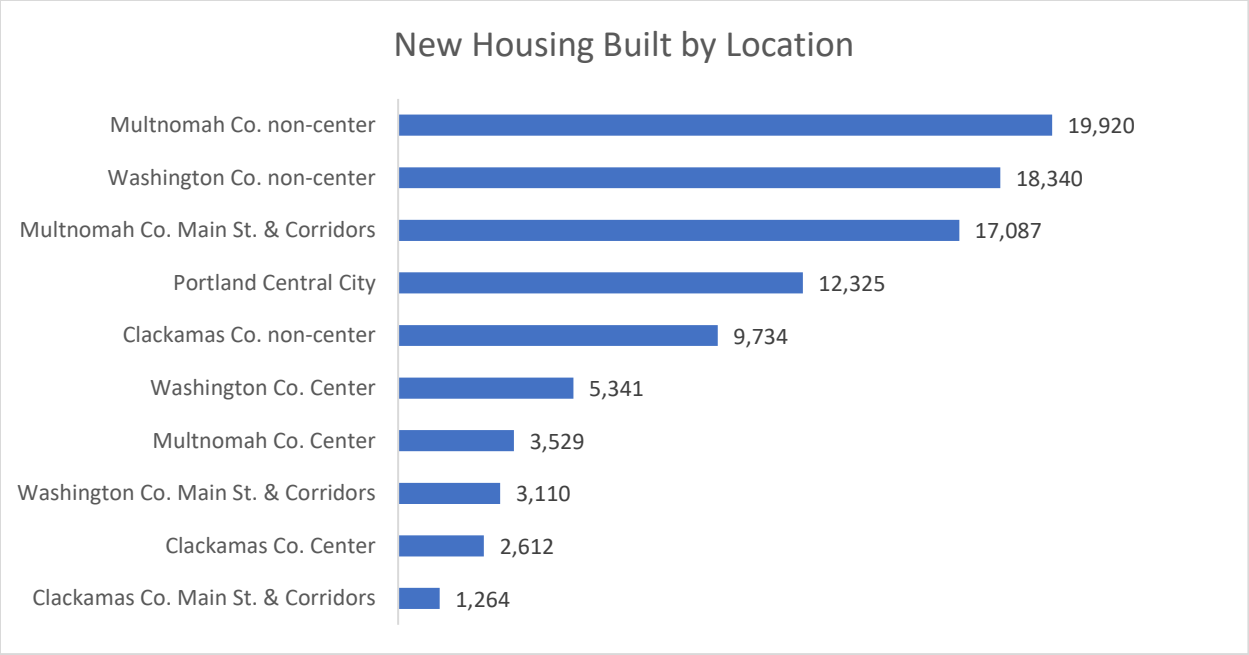


Figure 12: housing units built inside the Metro UGB by location 2013-2022

The highest densities of new housing have been built in the Portland Central City (average 235 units per acre) and Multnomah County corridors and main streets (56 units per acre). The lowest densities of new housing have been built in Clackamas County non-centers (6 units per acre) and Washington County non-centers (10 units per acre).

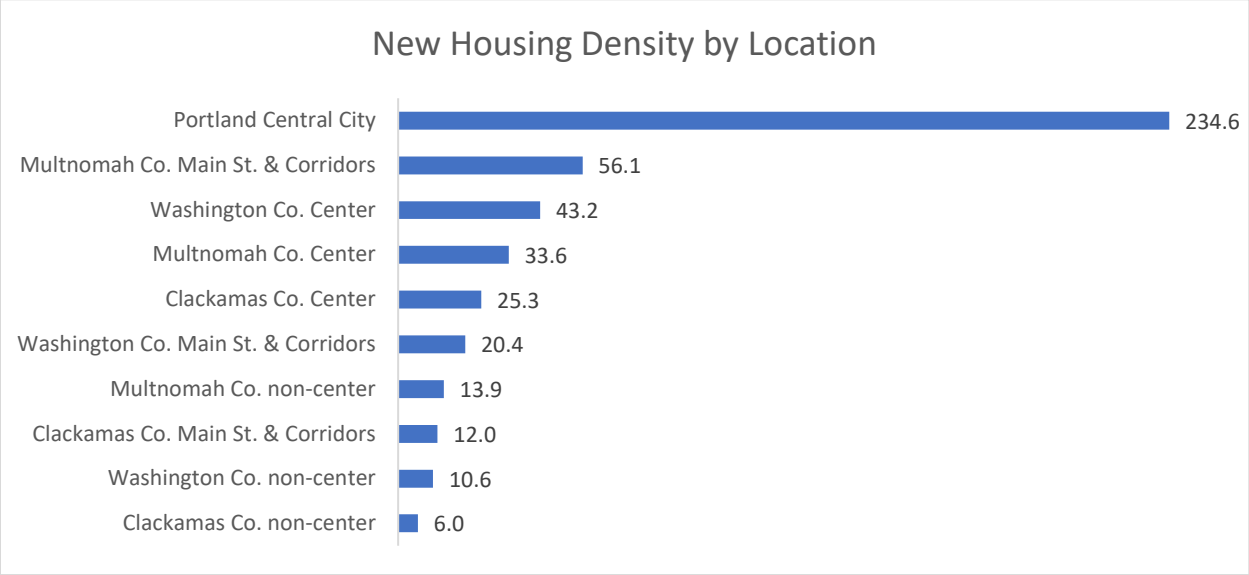


Figure 13: housing densities (units per acre) by location for new housing built from 2013-2022 inside the Metro UGB

Housing growth capacity

In addition to forecasting household growth and reviewing housing development trends, a core aspect of the UGR is determining how much capacity there is inside the current UGB for additional housing growth. Using methods discussed by the Land Use Technical Advisory Group (LUTAG)[5], Metro identifies three main categories of capacity that are described in more detail in Appendix 2:

- Vacant and partially vacant land
- Land that may be usable for redevelopment over the next 20 years
- New urban areas, which are areas that have been added to the UGB in recent years that do not yet have urban level zoning.

Because of long-standing challenges with city governance, planning or infrastructure costs, Metro does not count growth capacity on approximately 3,000 acres in the eastern portion of the former City of Damascus, where Happy Valley has not indicated an intention to annex.

All cities and counties in the region were provided opportunities to review and suggest edits to the buildable land inventory and capacity estimates for those lands.

New methods for estimating potential housing production on existing lands

Because most of the region's housing growth occurs through redevelopment of already-developed lands, Metro has sought to improve how it estimates growth capacity from redevelopment in each UGR. Additionally, recent allowances for middle housing necessitate new methods of estimating potential market responses. While we seek to improve the accuracy of our capacity estimates, we also need to be clear about uncertainty

UGR Roundtable perspectives: Access to nature and climate

Access to nature and climate adaptation was a high priority for some of the roundtable members. More broadly, some participants voiced the need to prioritize environmental conservation during land use decisions and that these decisions should reflect adaptation for climate change. The conversations about infill and redevelopment sparked comments about the need to support a healthy urban tree canopy and to ensure equitable access to parks and publicly accessible green spaces.

As the climate continues to change and result in warmer summers and increased fire seasons, some members urged the group to consider tradeoffs between density, livability, and climate resilience. There was interest in how housing built in different parts of the region will result in different climate impacts based on access to transit, density levels, and reliance on cars.

[5] LUTAG is a special purpose group that is periodically convened by Metro to provide advice on how we estimate growth capacity. The group met six times for the draft 2024 UGR.

when forecasting future market feasibility. This is why Metro expresses capacity estimates as a range.

For the 2024 UGR, Metro worked with Johnson Economics to develop a pro forma model that estimates future development for individual properties, creating a regional estimate of growth capacity. The underlying assumption is that if the value of a property with new development is high relative to the current value of the property, it will be more likely to see development or redevelopment. Essentially, development or redevelopment is more likely if it is profitable. Documentation of the model can be found in Appendix 2.

The model identifies one of 43 possible building prototypes that represents the most profitable use. Even when the model indicates that properties are financially feasible for redevelopment, not all properties are counted as redevelopment capacity. Instead, the model uses backcasting to estimate the smaller share of properties that may actually redevelop. This is intended to make sure that housing production estimates are reliable. Likewise, it addresses the legal requirement that capacity estimates are based on what has historically been built and market factors that may influence future development.

Youth Cohort perspectives: Housing crisis and affordability

The youth cohort learned about the statewide housing crisis and the role of local and regional government in helping to address the needs of today's population and future incoming residents and felt strongly that **housing affordability** was a strong value that should guide the UGB process. Cohort members wanted to see plans that included housing options that would work for many different people – including options for different housing types and price points. They group wanted to see that an expansion would help with the housing crisis and also that any expansion would be using the land available wisely to provide the most options to the most amount of people.

Of note, modeling indicates that middle housing – which has only recently been extensively allowed under zoning codes– will often be more profitable to develop than single-unit detached housing. This housing type presents opportunities to better match the changing needs of smaller households.

The pro forma model and other methods provide the means of estimating a range of potential growth capacity inside the UGB. Capacity is summarized in three categories:

- Single-unit detached housing
- Middle housing
- Multifamily housing

The methods used to establish a range of capacity for these three housing categories include:

- Pro forma scenarios that assume baseline market conditions as well as market erosion and market recovery
- An "expected density" approach that is based on observed development of vacant land
- A range for future accessory dwelling unit production and middle housing conversion/infill. This includes internal conversions of existing homes into multiple units as well as infill development where the original structure is retained and additional housing units are added to the lot.
- A range for possible office-to-residential conversion. See Appendix 2 for more details about how conversion potential was estimated.
- Capacity scenarios that include residential zones skewing more towards single-unit detached housing or middle housing.[6]

[6] In their review of capacity estimates, some jurisdictions noted that preliminary estimates skewed more towards middle housing than they would expect. Since middle housing is allowed in zones that allow single-unit detached homes, there is a tradeoff that occurs. Assuming more single-unit detached housing capacity results in lower middle housing capacity. Conversely, assuming more middle housing capacity results in lower single-unit detached housing capacity. Because middle housing develops at higher densities, this is not a one-for-one tradeoff.

Table 9 summarizes the residential capacity assumptions that are assumed as the basis for the 2024 growth management decision. As noted, Appendix 2 describes a range of capacity which depends on market responses. The final assumptions described below lie within that range.

Table 9: Summary of residential growth capacity inside the UGB by housing type

	UGB Capacity Assumptions (number of homes)			
	single-detached	middle housing	multifamily	Total
Vacant land (mix leans toward single-unit detached)[6]	34,944	13,228	42,970	91,142
Redevelopment (Baseline)	12,292	11,727	24,382	48,400
Concept plan areas and planned development on vacant land	9,096	6,662	4,138	19,896
Other planned redevelopment (e.g., OMSI District)	135	172	9,830	10,137
Office-to-residential conversion (baseline)	-	-	1,000	1,000
ADUs and middle housing conversion/infill (low)	-	4,955	-	4,955
Total UGB capacity (rounded)	**56,500**	**36,700**	**82,300**	**175,500**
Capacity housing mix	32%	21%	47%	100%

Housing needs

State law instructs Metro to estimate current and future housing needs. Methods for estimating current housing needs are described in more detail in Appendix 8A. Methods for estimating future housing needs are described in more detail in Appendix 8.

Current housing needs

As described in state law, current housing needs include:

- Historic underproduction of housing, essentially the backlog of homes that ideally would have been built to keep up with household growth. Underproduction of housing has been a nationwide phenomenon since the 2007/2008 Housing Bubble.
- Housing for people experiencing houselessness. Houselessness is caused by underproduction of housing, particularly affordable housing.
- Homes lost to second homes and vacation rentals.

People experiencing houselessness are not counted by the Census, so additional data sources are necessary. Methods for estimating current housing needs are described in more detail in Appendix 8A. To estimate the number of homes needed to house people experiencing houselessness, this analysis relies on an April 2024 Portland State University (PSU) report on findings on the 2023 Point in Time Count for the three-county area (Zapata, 2024). As noted in the report, point in time counts have limitations and are an undercount for several reasons:

1. It is impossible to find and count everyone sleeping outside.
2. The count is conducted on a single night so does not capture every experience or episode of houselessness.
3. The U.S. Department of Housing and Urban Development definition of houselessness does not include people who are "doubled up" with other households.

The PSU report attempts to address the second issue by including administrative data about people in need of homeless services, which has been deduplicated with the point in time count. However, the administrative data are uneven across the three counties.

The report attempts to adjust for the third issue by using McKinney-Vinto data on students experiencing houselessness.

Table 10: Current housing needs by income group (Metro UGB)

Percent area median income	Historic underproduction	For people experiencing homelessness
0-30%	4,200	7,750
30-60%	5,300	700
60-80%	2,700	250
80-120%	2,200	-
120%+	700	-
Total	**15,000**	**8,700**

Note: housing for households earning less than 80 percent area median income is generally understood to require government assistance. Numbers are rounded and may not add exactly to the total shown. The third component of current housing needs (units lost to second and vacation homes) is not shown here because those homes do not address the needs (by income) of resident households. This third component is, however, included in subsequent estimates of housing needs that inform the analysis of how much housing capacity is needed.

Using methods like those under development for the Oregon Housing Needs Analysis (OHNA) program, ECONorthwest assigned these housing needs by income group to housing types as depicted in Table 11. Multifamily housing is the predominant housing type needed because of the affordability required to match household incomes described in Table 10. Table 11 also

summarizes housing "lost" to second and vacation homes. These homes are included because they are not available for housing the region's residents.

Table 11: current housing needs by housing type (Metro UGB)

	Historic underproduction	For people experiencing homelessness	Second and vacation homes
Single-Unit Detached	700	-	1,100
Middle Housing	2,100	50	1,800
Multifamily	12,200	8,650	400
Total	**15,000**	**8,700**	**3,300**

Note: numbers are rounded to avoid implying too much precision

Future housing needs

Estimating future housing needs entails several steps:

1. Forecast household growth for 7-county MSA for the 2024-2044 period.[7]
2. Apply an assumed UGB capture rate to determine housing need in the Metro UGB. Based on history and an opportunity to attract more growth with the proposed Sherwood West expansion, it is assumed that 70.7% of MSA household growth is captured in Metro UGB.
3. Apply a vacancy rate of 5 percent to allow household moves within the UGB and to convert households into housing units.
4. Express total housing unit needed in the UGB for 2024-2044.

Table 12 depicts these first four steps for the baseline forecast, which the basis for the 2024 growth management decision.

Table 12: Steps for translating 7-county MSA household growth into Metro UGB future housing units needed (2024-2044)

	Baseline, most likely
7-county total HH Growth 2024-2044	203,500
UGB capture rate	70.7%
UGB total household growth 2024-2044	143,900
Housing units needed per new household (5% vacancy rate)	1.05
UGB total housing units needed 2024-2044	151,100

[7] This final analysis relies on the baseline (most likely) forecast.

The next step is to assign housing types based on household life stage (age, income, size, presence of kids). This step is handled through several scenarios intended to model different possibilities. These scenarios paired housing choices with forecasts (low, baseline, high) that follow internal logic. For instance, high growth has historically manifested itself as heightened demand for urban development since growth tends to come from younger households migrating to the region. These scenarios are described in more detail in Appendix 8.

a. High growth, strong urban market: high growth forecast; housing trends like development over the last decade with high demand for housing in urban locations; market uptake of middle housing.
b. Baseline growth, new normal: baseline (most likely) growth forecast; as households age, their housing choices shift towards those of older households today, but not to same extent as past generations. More households choose middle housing than have historically.
c. Low growth, following in footsteps: housing choices at each life-stage remain constant – as current households age, their housing choices look the same as those of older households today. This is accompanied by slower household growth, an aging population, and weaker market conditions as these would likely be necessary conditions for households to continue making these housing choices.

Figure 14 depicts the mix of housing in these three scenarios. The share of single-unit detached housing is highest in the “following in footsteps” scenario, followed by “new normal,” and “strong urban market.” The shares of middle housing and multifamily housing are highest in the “strong urban market” scenario, followed by “new normal,” and “following in footsteps.”

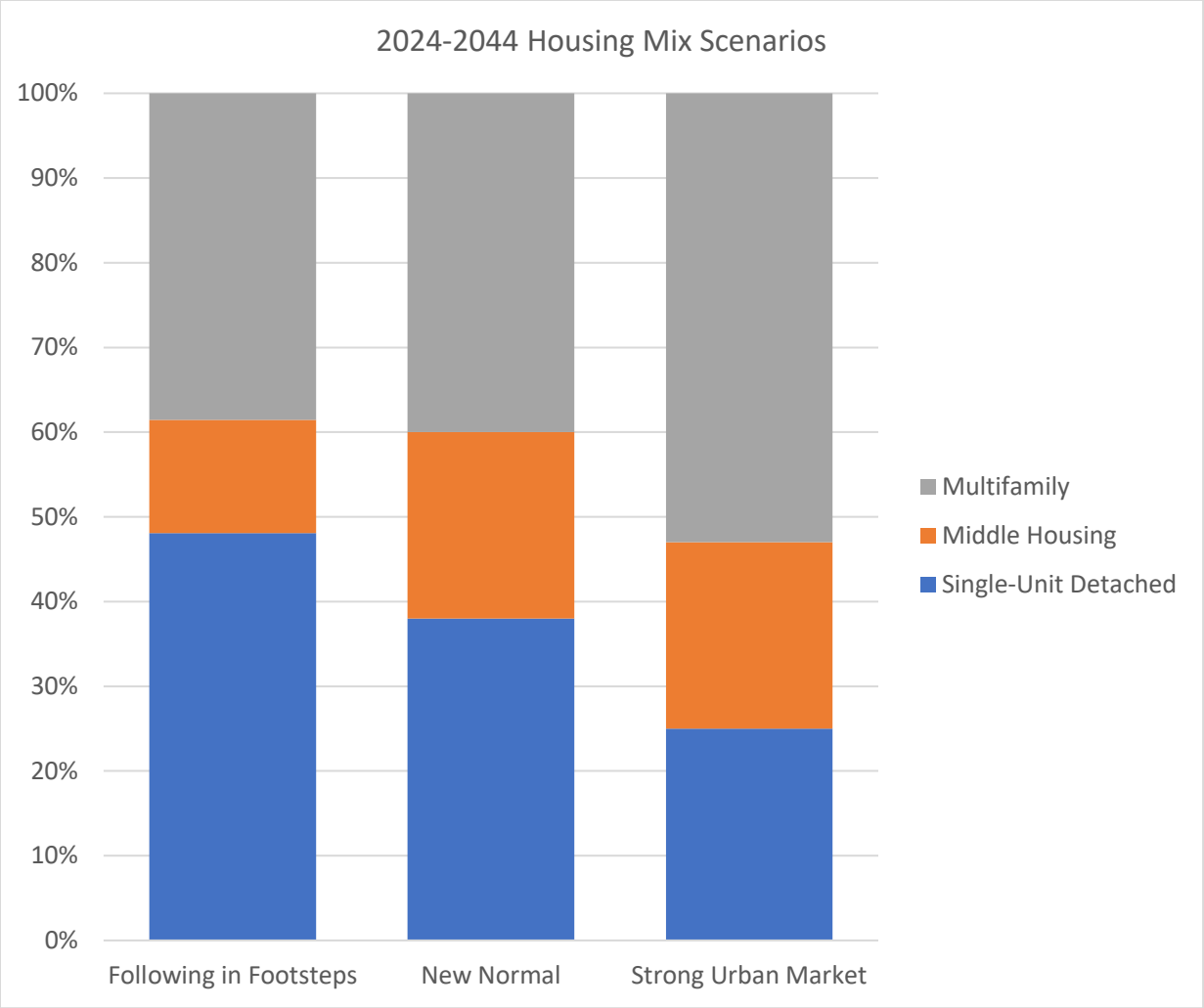


Figure 14: 2024-2044 housing mix scenarios (source: ECONorthwest)

Because the baseline forecast coupled with "new normal" housing mix assumptions is the basis for the 2024 growth management decision, only that scenario is summarized below. Details about other scenarios can be found in Appendix 8.

Table 13: Future housing need under the preferred scenario: baseline growth, "new normal" (Metro UGB, 2024-2044)

Housing type	Baseline growth, new normal
Single-Unit Detached	57,400
Middle Housing	33,250
Multifamily	60,450
Total	151,100

Total Metro UGB housing needs

Current and future housing needs by housing type are summarized in Table 14.

Table 14: current and future housing needs for the Metro UGB under the preferred scenario (2024-2044)

	UGB Housing under the Preferred Scenario (baseline forecast, "new normal")			
	single-detached	middle housing	multifamily	Total
Future need: baseline forecast (see Table 13)	57,400	33,250	60,450	151,100
Units lost to 2nd and vacation homes	1,072	1,769	443	3,285
Historic underproduction	726	2,089	12,160	14,975
Households experiencing houselessness	-	40	8,653	8,693
Total Housing Need (rounded)	**59,200**	**37,100**	**81,700**	**178,000**
Needed housing mix	33%	21%	46%	100%

Note: final totals are rounded to the nearest 100 to avoid implying too much precision

Housing capacity gap analysis

The draft 2024 UGR indicated that the Metro Council has latitude to determine whether additional housing capacity is needed to accommodate potential household growth. This latitude derives from several factors.

- Uncertainty regarding the amount of future household growth from future migration into and out of the Metro region.
    - Increased migration would likely come from younger households who typically seek multifamily housing.
    - Decreased migration would amplify the trend of an aging population, which will tend to age in place.
- Uncertainty regarding the potential redevelopment of lands inside the UGB, depending on market conditions.
    - Even for properties that are financially feasible for redevelopment, there is uncertainty regarding which ones of them may redevelop over the twenty-year time horizon.
    - Redevelopment capacity is not static. Additional population/household growth would likely increase redevelopment potential as more developers respond to demand. This would increase multi-family and middle housing production (capacity), which corresponds to the housing needs of the younger households that are more likely to migrate to our region.

- The extent to which future housing choices are influenced by smaller household sizes and affordability concerns vs. the persistence of past trends.
- Whether households perceive middle housing as a relatively lower cost ownership alternative to single-unit detached homes or condos.
- The degree to which builders shift from single-unit detached to middle housing to achieve higher profitability.[8]

Depending on the above factors, the UGB capacity gaps for accommodating existing and future housing needs vary. The draft UGR's ranges were developed using several illustrative demand and capacity scenarios that sought to apply consistent economic reasoning in any given scenario. The three demand scenarios are as previously described, now paired with four capacity scenarios. See Appendix 8 for more detail. These scenarios are not the only ones that could be considered plausible. Instead, these scenarios are intended to provide information to support decision making. Slight changes to assumptions about demand, capacity, or housing mix would produce different results.

Scenario 1: following in footsteps, low growth, lower redevelopment, and less middle housing
Housing choices at each life-stage remain constant – as current households age, their housing choices look the same as those of older households today. This is accompanied by slower household growth, an aging population, and weaker market conditions as these would likely be necessary conditions for households to continue making these housing choices. Redevelopment potential is lower and housing capacity on vacant land skews towards detached single-unit housing.

Scenario 2: new normal with baseline assumptions about growth and capacity
As households age, their housing choices shift towards those of older households today, but not to same extent as past generations. More households choose middle housing than in scenario 1. This is accompanied by baseline (most likely) household growth. Capacity assumptions tend towards baseline with middle housing slightly more likely on vacant lands than detached single-unit housing.

Scenario 3: new normal with baseline assumptions about growth and capacity, except vacant land capacity skews towards single-unit detached
As households age, their housing choices shift towards those of older households today, but not to same extent as past generations. More households choose middle housing than in scenario 1. This is accompanied by baseline (most likely) household growth. Capacity assumptions tend towards baseline with single-unit detached housing more likely on vacant lands than middle

[8] Pro forma modeling shows that middle housing is often more profitable than single-family housing. However, some suburban jurisdictions indicated in their review of capacity estimates that they would expect a bigger share of single-unit detached housing than middle housing. This feedback is reflected in scenario 3 with a heavier mix of single-unit detached housing expected on vacant lands.

housing.[9] This scenario also assumes less accessory dwelling unit production and middle housing conversion as sources of capacity. Scenario 3 is the basis for Metro's 2024 growth management decision.

Scenario 4: strong urban market with fast growth, higher redevelopment potential, and more middle housing

Consistent with historic migration dynamics, faster household growth comes from increased in-migration of younger households who are more apt to relocate than older households.[10] This influences the types of housing that are most in demand. Specifically, consistent with their life stage and incomes, these younger households typically will seek multifamily and middle housing. Redevelopment potential increases with stronger market demand for urban residential options. Consistent with development trends over the last decade, multifamily housing makes up a majority share.

[9] This increased mix of single-unit detached housing (as opposed to middle housing) reflects feedback received from some suburban jurisdictions in their review of capacity estimates.

[10] Per the U.S. Census, a majority of the people that moved to the Portland MSA from 2000-2010 are between the ages of 25 to 34. Using U.S. Census 2022 Current Population Survey data, we calculate that the odds of changing homes in 2022 were highest for the 20-25 age cohort (5.5% odds), followed by those aged 25-44 (3.75% odds), 45-64 (1.75% odds), and 65+ (1% odds).

Housing capacity gap results

Metro is relying on Scenario 3 as the basis for its growth management decision since it represents the most likely conditions for population growth, growth capacity, and housing mix. Table 15 summarizes this scenario and the resulting housing capacity deficits.

Table 15: Capacity deficits or surpluses for current and future housing needs under the assumed scenario (2024-2044)

	UGB Housing Need (Scenario 3)			
	single-detached	middle housing	multifamily	Total
Future need: baseline forecast (see Table 13)	57,400	33,250	60,450	151,100
Units lost to 2nd and vacation homes	1,072	1,769	443	3,285
Historic underproduction	726	2,089	12,160	14,975
Households experiencing houselessness	-	40	8,653	8,693
Total Housing Need (rounded)	**59,200**	**37,100**	**81,700**	**178,000**
Needed housing mix	33%	21%	46%	100%
Total UGB capacity (rounded; see Table 9)	56,500	36,700	82,300	175,500
Deficits (rounded)	**(2,700)**	**(400)**	**600**	

Note: numbers are rounded to avoid implying too much precision

As shown, under the assumed scenario there is a regional capacity deficit for single-unit detached and middle housing that totals 3,100 units.

Table 16 compares the current housing mix as well as the mix of new housing built from 2013 through 2022 with the scenario that is the basis for the 2024 growth management decision. Compared with housing production trends over the last decade, the assumed scenario indicates similar single-unit detached housing demand. The notable change is that newly allowed middle housing is expected to represent a larger share of future housing demand than it has over the last decade. Pro forma modeling conducted for the purpose of estimating growth capacity finds that middle housing is often financially feasible (see Appendix 2). Likewise, middle housing may offer more affordable ownership options for smaller households that make up a significant portion of expected household growth.

Table 16: current total, recent trend, and future mix of new housing (Metro UGB)

	Single-unit detached	Middle housing	Multifamily
Current total housing mix	52%	7%	35%
New housing built 2013-2022	30%	10%	57%
Assumed scenario	33%	21%	46%

Note: current and historic housing shares don't total 100% because Metro also tracks "other" housing types that are not listed here, for instance dormitories, floating homes, and retirement facilities. Those "other" housing types are not specifically forecasted for future housing demand.

Housing capacity options

When the Metro Council determines that there is a need for additional capacity to address housing needs, there are two approaches it may pursue. The Metro Council may take measures to increase the likelihood of housing development on land already inside the UGB and/or expand the UGB. The Council has indicated that it intends to do the latter and expand the UGB to include the Sherwood West urban reserve, which will provide 3,120 homes to meet the need identified above. Likewise, the Council intends to adopt conditions of approval to help achieve the housing mix and number of housing units that will best meet the region's housing needs. Regardless of the Council's growth management decision, there is a need for ongoing work to spur the production of housing, particularly for households with the fewest resources.

UGR Roundtable perspectives: Infrastructure funding

The need for **infrastructure funding** came up frequently in roundtable discussions. It was mentioned as a necessary solution in discussions of housing production and affordability, development barriers and the role of Metro and local governments. This is an area where many roundtable participants advocated for regional partnership in advocating for infrastructure funding at the State and with the Federal government.

REGIONAL EMPLOYMENT ANALYSIS

Employment trends

Much has changed in the economy in recent years and more change appears to be on the way. Drivers of change include:

- Persistence of working from home for many office workers
- High office vacancy rates
- Automation and artificial intelligence
- Slowing population growth
- An aging workforce
- Domestic manufacturing policies such as the CHIPS Act

Pandemic impacts on work

Though many aspects of life have returned to normal after the coronavirus pandemic, it has had lasting effects on what that "normal" looks like. After peaking in 2021, the share of workers working from home either full time or hybrid remained at 24 percent in 2022 for the greater Portland metropolitan area. This persistent trend has led to high office vacancy rates and has long-term implications for demand for office space.

Greater Portland is among the top 10 metro areas in the country for the highest shares of people working from home. As shown in Figure 15, rates increased drastically after 2019 and have persisted as of 2022. For office workers, hybrid and remote work is expected to endure. This has implications for future demand for office space.

In the last few years, there was early enthusiasm about the potential for converting vacant office buildings into housing. That enthusiasm has been tempered by recognition that many office buildings do not lend themselves to these conversions because of issues related to inadequate access to exterior windows and complications related to replumbing buildings for kitchens and bathrooms in individual apartments. Metro worked with ECONorthwest to develop estimates for conversion potential over the 20-year planning period. Those estimates, modest as they are, are included in the residential capacity estimates. ECONorthwest's analysis can be found in Attachment A to Appendix 2.

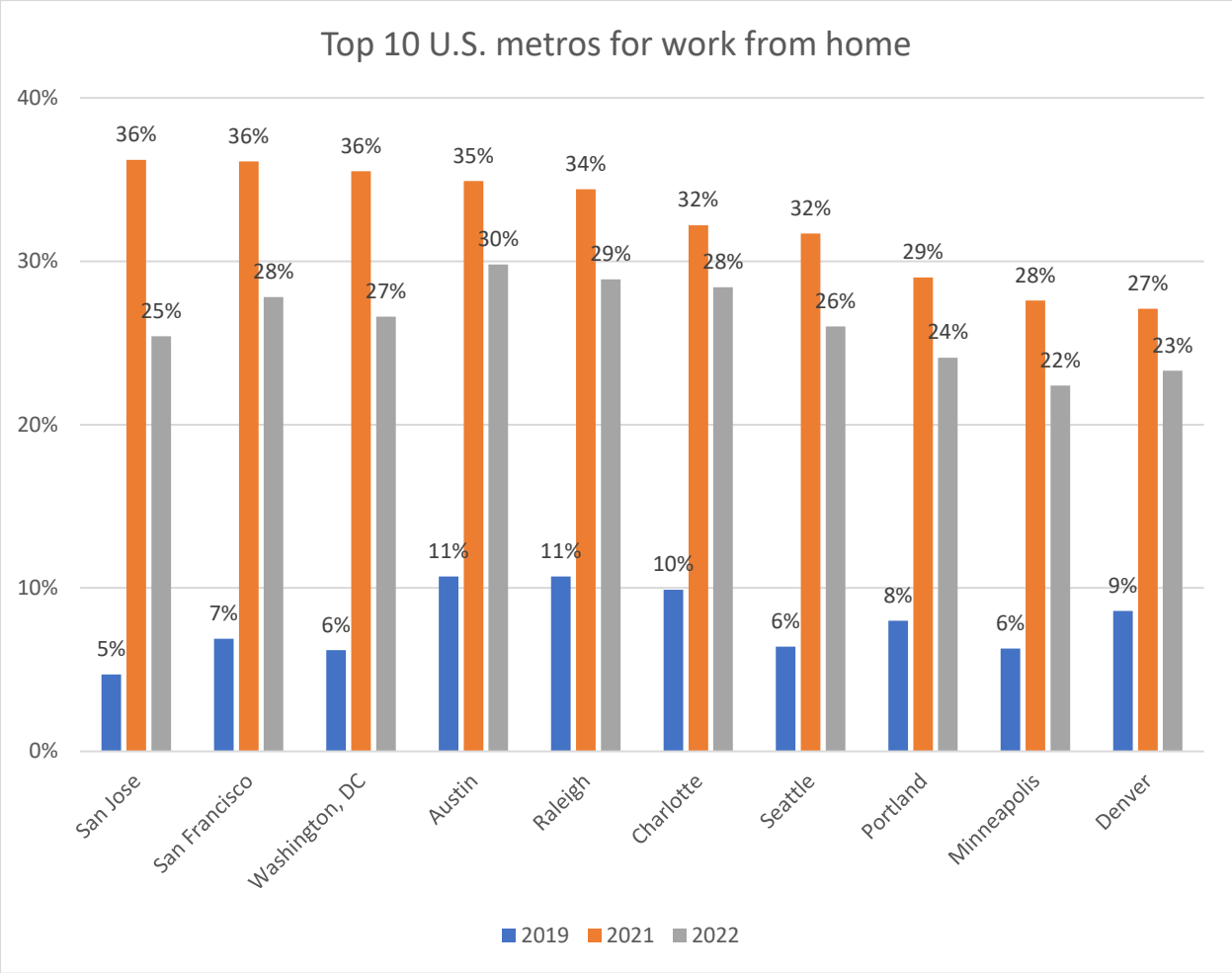


Figure 15: share of all workers that report working from home by MSA (ACS 1-year estimates)

Greater Portland's economy is regional. People's lives span city, county and state boundaries. As shown in Figure 16, many workers live in one county and work in another. This is a product of the complex decisions that people make about where to live and work, including consideration of community and housing preferences, quality of local schools, proximity to friends and family, budget, their career choices, and career choices of a partner or spouse.

This is one reason why Metro is tasked with having a regional perspective in its growth management decisions. Keeping the region compact is the best way to keep commutes as short as possible. The outward growth of metropolitan areas elsewhere in the U.S. has not resulted in their residents living and working in the same community. In fact, their average vehicle miles travelled per capita tend to be higher than those in greater Portland.

More recently, there is evidence that the increased prevalence of working from home has fundamentally shifted these commute patterns, sometimes reducing the share of commuters that live in one county and work in another by half. For instance, in 2021, the share of workers

that live in Clark County, but work in Multnomah County and vice versa had been cut roughly in half compared to 2019.

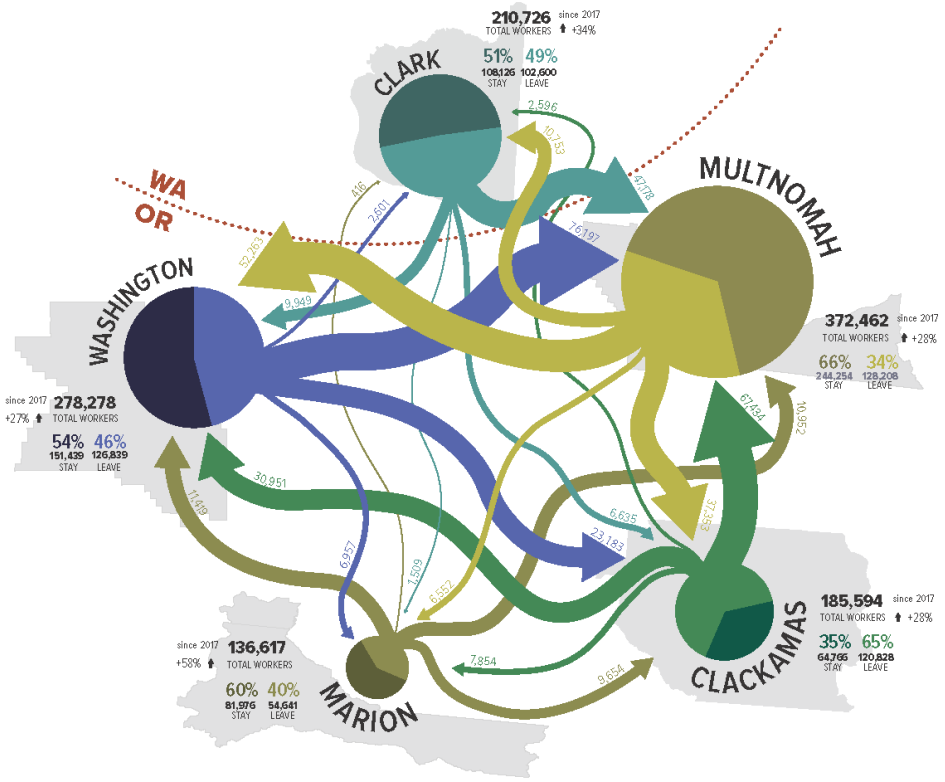


Figure 16: regional commute patterns in 2019 (source U.S. Census, LEHD)

Automation and artificial intelligence

Automation of tasks is typically done with the goal of lowering costs and increasing productivity. Automation can complement human labor, allowing workers to focus on other tasks. For example, voice mail has freed businesses from writing down phone messages. This does not mean that automation will entirely replace occupations, but it may replace repetitive tasks once completed by workers. According to the Brookings Institution, occupations that are most susceptible to having a high share (70-100 percent) of tasks automated include production, food service and transportation. More recently, artificial intelligence has made inroads into tasks like software coding.

Given the mix of occupations in the greater Portland region, 45 percent of tasks are susceptible to automation (Muro, 2019).This study also indicates that younger workers, and Hispanic, American Indian, and Black workers are most likely to be adversely impacted by automation. These trends will be monitored in years to come. For some sectors, automation may result in lower job growth rates or lower employment densities.

Slower population growth means slower workforce growth

Job growth is expected to be closely tied to population growth, both in terms of the degree of growth and the types of sectors that are expected to growth the most. As with the population and household forecast, the employment forecast was reviewed by an external panel of economists and demographers. The panel found the regional employment forecast to be reasonable. A summary of that review is included as Appendix 1A.

With birth rates expected to decline, population growth will continue, but a slower rate, and the workforce will age. Figure 17 depicts the current population pyramid for the region. Age cohorts that are younger than 25 are smaller than older age cohorts. This will mean that, without additional migration of young people into the region, there will be fewer people in their prime working years 20 years from now.

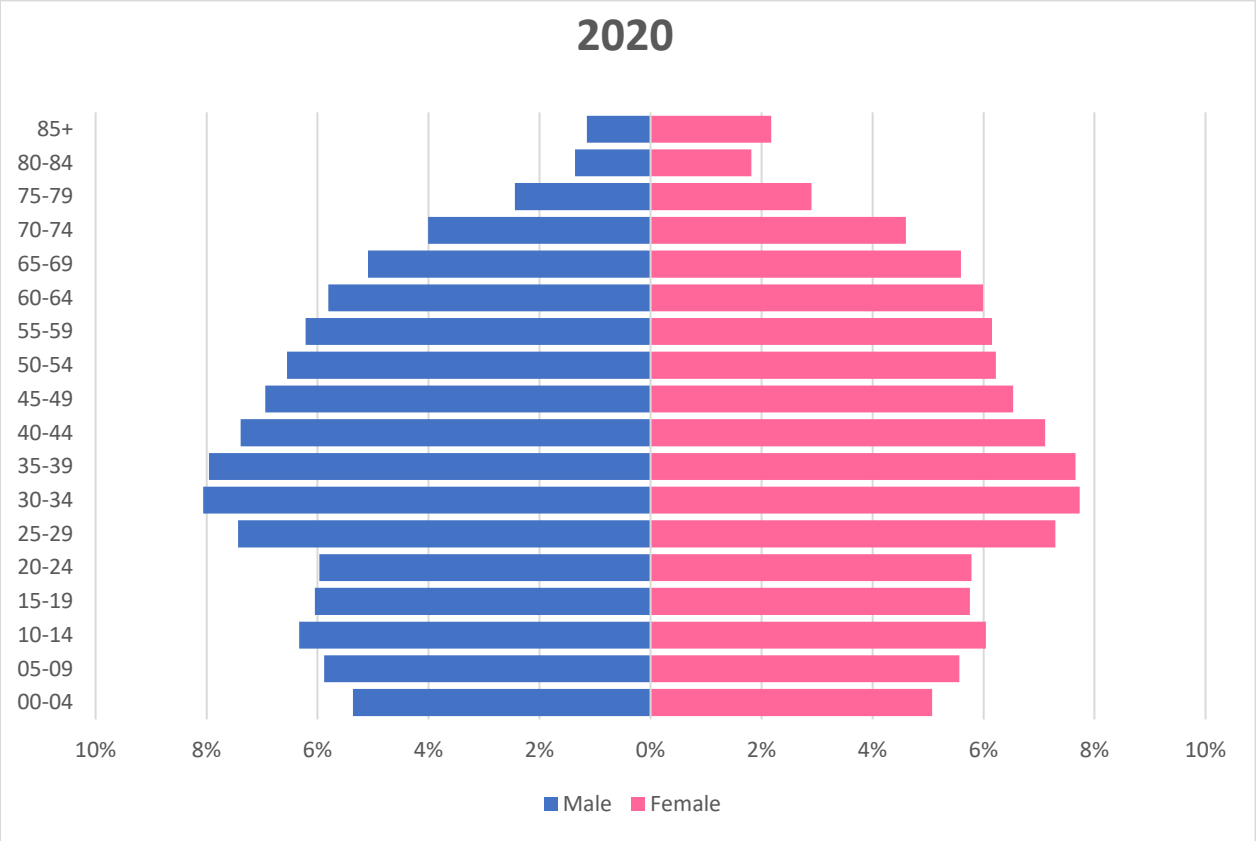


Figure 17: Portland MSA population pyramid in 2020 (source: U.S. Census)

With slower population growth, job growth will also be slower. Under the baseline forecast, 110,400 additional jobs are expected in the 7-county MSA between 2024 and 2044.

Uncertainty in the employment forecast

Even more so than with population growth, there is uncertainty surrounding employment growth. The regional economy is part of a global economy and is subject to current events as well as those that may come, but that cannot be predicted: pandemics, wars, innovations, new

trade policies, federal investments, interest rates, recessions and rebounds. For these reasons, Metro uses a range forecast depicting possible growth (see Figure 18). While low and high growth are possible, they are not as likely to materialize as the baseline forecast. Higher job growth would require sustained increases in people moving to the region beyond historic rates of net migration.

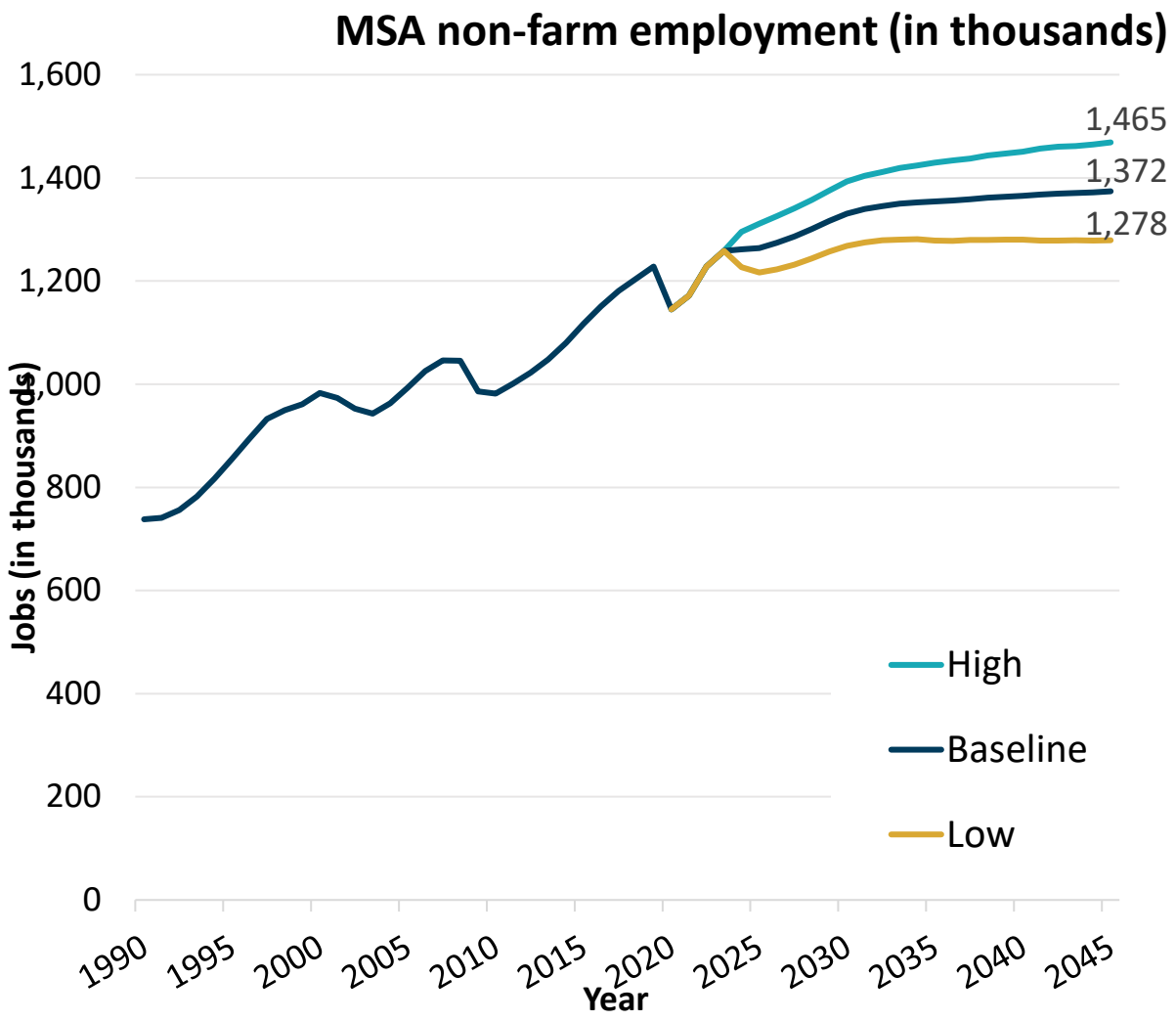


Figure 18: 7-county MSA non-farm employment forecast 2024-2044

Despite this uncertainty, Metro has a strong track record with its employment forecasts. Compared with actual employment numbers from 2019 (pre-pandemic), the three most recent regional forecasts have all been reliable. As shown in Table 17, forecasts for total non-farm employment are all with two percentage points of actuals. In the case of computer and electronic manufacturing – a sector of interest to the region – Metro overestimated jobs in two out of three of the most recent forecasts.

Table 17: Comparison of past Metro forecasts for the 7-county MSA with 2019 actual employment

	Past regional forecasts compared to 2019 actual employment		
	2009 forecast	**2014 forecast**	**2018 forecast**
Total non-farm employment	1.3%	-1.8%	-1.1%
Computer and electronics manufacturing employment	-2.3%	5.1%	0.8%

The fastest growing sectors are expected to be those that serve the population. As shown in Figure 19, sectors like professional and business services, healthcare, retail trade, and construction are forecast to have the most job growth. Because this forecast is intended to inform a decision about whether there is a need to expand the UGB for urban uses, it focuses on non-farm employment. However, it is important to note that agriculture continues to play a prominent role in Oregon's economy. In 2022, the value of Oregon's agricultural exports was $2.37 billion (Oregon Department of Agriculture, 2024).

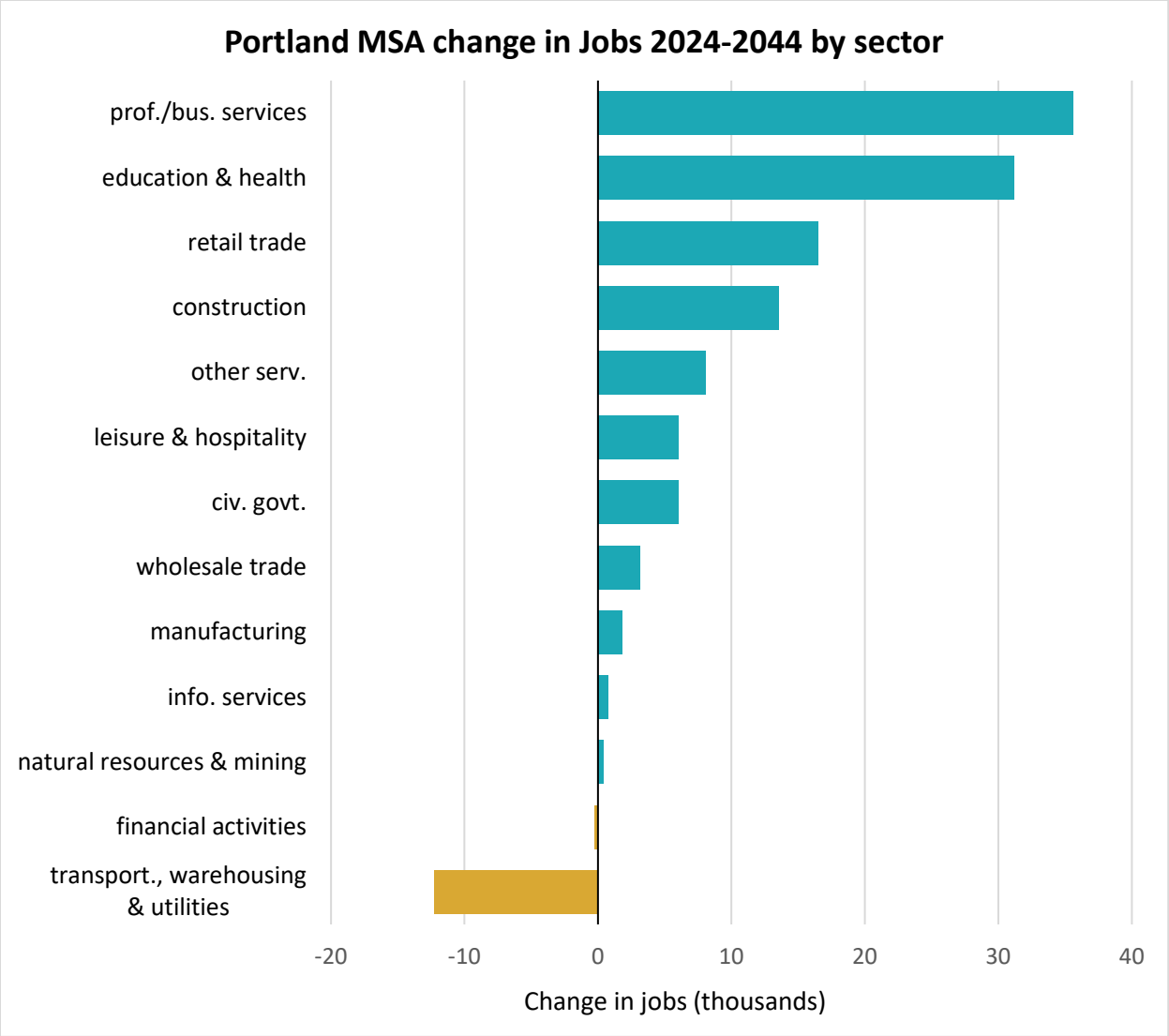


Figure 19: Metro employment forecast by sector (MSA, 2024-2044)

High-tech manufacturing employment in the draft 2024 regional forecast

Because of greater Portland's relative strengths in computer and electronic products manufacturing, there is long-standing interest in this sector. Consequently, Metro often fields questions about its forecast for this sector, including questions about how the CHIPS Act and its investments in semiconductor manufacturing influence Metro's forecast.

Greater Portland has significant strength in engineering and design of semiconductors. CHIPS Act investments help maintain those competitive advantages, which have different implications for land use and land needs than the construction of new semiconductor fabrication facilities.

National context for manufacturing employment

According to the U.S. Bureau of Labor Statistics (BLS), manufacturing employment reached its national peak four decades ago, in 1979. Since then, manufacturing employment has fallen in each of the five recessions and, in each case, never recovered to pre-recession levels. In the Metro region (7-county Metropolitan Statistical Area), the peak was reached in the late 1990s. Going forward, Metro's forecast shows more resilience for manufacturing employment at the regional scale than the S&P Global Insight forecast indicates for the nation. See Figure 20.

UGR Roundtable perspectives

Economic development was a high priority topic for many roundtable participants they encourage Metro to think about how we stay competitive as a region. There were some conversations about the importance of desirable industrial land that will attract manufacturing and industrial businesses to the region to increase the number of high paying jobs for the region's residents. Others raised concern about what barriers are causing businesses to leave. Some participants pointed to zoning code as a barrier for mixed employment and industrial areas where allowed uses can be unclear. Some members mentioned land affordability as a barrier. Overall, many participants support recruitment efforts for high tech manufacturing.

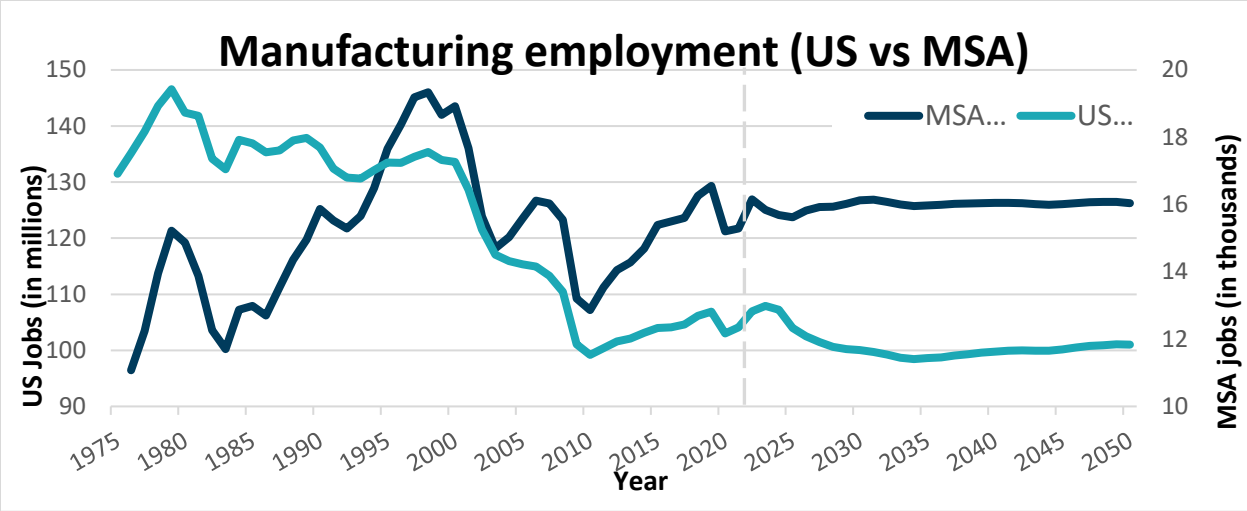


Figure 20: Manufacturing employment in the U.S. and the 7-county Portland Metropolitan Statistical Area (note different y axes)

Sources: Historic data: U.S. Bureau of Labor Statistics; National forecast: S&P Global Insight; MSA forecast: Metro

Nationally, durable goods manufacturing sectors, including the computer and electronics manufacturing sector, are all well below their 1979 job numbers. There are 55 percent the number of jobs in the computer and electronics manufacturing sector today as there were in 1979. The causes are well established and include offshoring and automation.

State context for computer and electronic product manufacturing

For the state of Oregon, early 2001 marks the high point for employment in the computer and electronic manufacturing sector. For this sector, the state is currently at the same employment level as it was 20 years ago.

The Oregon Office of Economic Analysis (OEA) forecasts that the CHIPS Act will result in an additional 3,000 computer and electronic product manufacturing jobs statewide over the next five years (Oregon Office of Economic Analysis, 2023) before flattening for the duration of the 10-year forecast.

Regional forecast for computer and electronic product manufacturing

Metro's draft regional forecast for computer and electronic manufacturing is consistent with the forecast from the OEA. As shown in Figure 20, Metro's forecast indicates short-term impacts of the CHIPS Act. The average annual growth rates for the computer and electronics manufacturing sector are 0.5% (statewide jobs) in the OEA forecast and 0.4% (MSA jobs) in the Metro forecast. Metro's expert forecast review panel indicated that job increases from the CHIPS Act will be in the nearer term, followed by a longer-term slide, resulting in a slight net increase from 2024 to 2044. Panelists indicated that a second or third CHIPS Act or similarly scaled public subsidies would be necessary for computer and electronic product manufacturing job gains persist in the longer term.

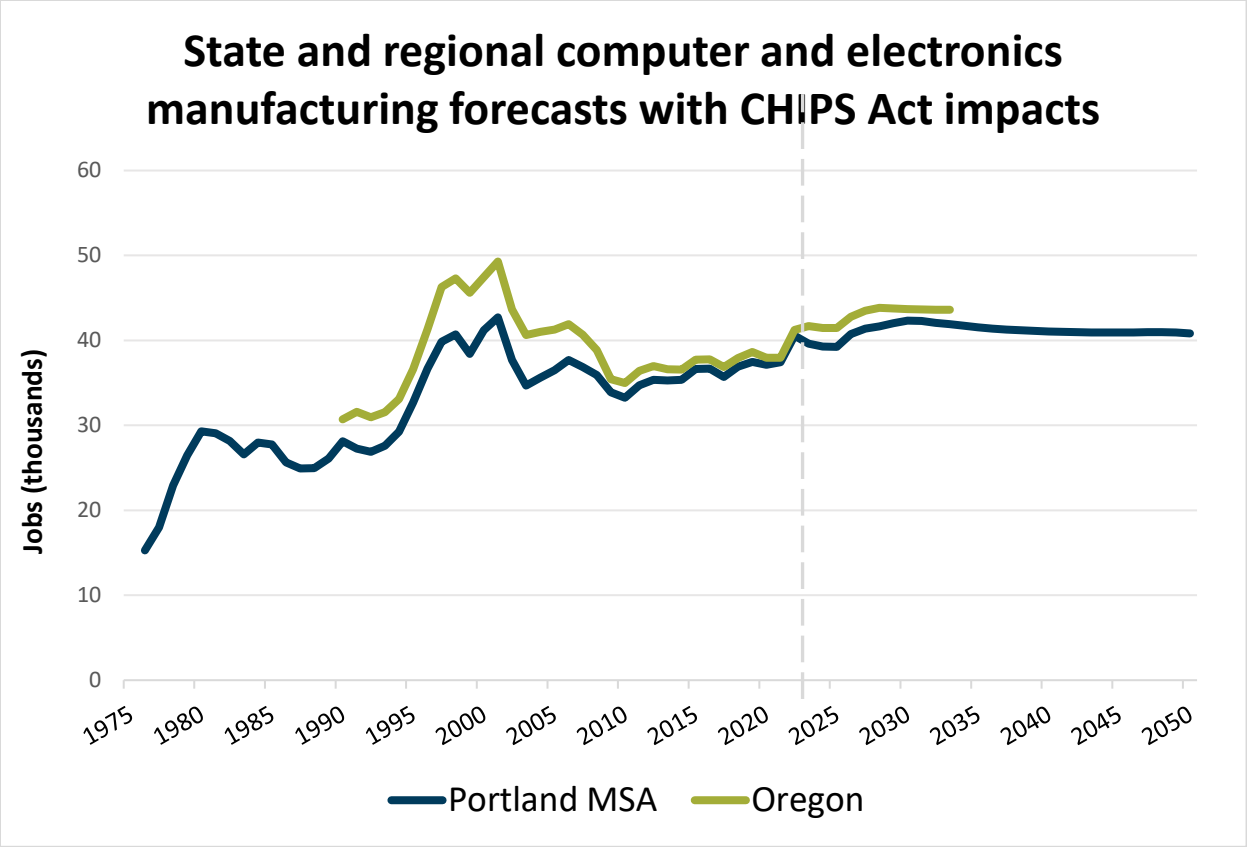


Figure 21: comparison of state and regional forecast for computer and electronics manufacturing with CHIPS Act impacts; State forecast; OEA; MSA forecast: Metro

The positive effects of the CHIPS Act in the computer electronics manufacturing sector are incorporated into the regional forecast model as an exogenous assumption (added from outside the forecast model framework). The model has inter-industry demand variables which estimate indirect and induced effects of computer and electronics manufacturing job increases on other sectors such as the construction or professional and business services sectors.[11] In other words, each new high-tech manufacturing job will have a multiplier effect in other sectors. Those multipliers effects are implicit in the forecast results.

Employment growth capacity

Employment land is sorted into two categories: industrial and commercial. The commercial category includes a portion of lands zoned for mixed uses. Appendix 2 has more details about the methods and results of this capacity analysis. As described earlier in this report, the pro forma model was also used to estimate redevelopment potential on employment lands. Unlike

[11] Metro staff has not specifically calculated these impacts in other sectors with and without the CHIPS Act, but an increase in the manufacturing sector will generally lead to increases in some other sectors. Economic literature indicates that each high-tech manufacturing job has a multiplier effect of 3.5 to 4 jobs in other sectors in regional economies with an existing high-tech cluster.

with residential lands, the model identified minimal redevelopment potential on employment lands. As shown in Table 18, the region's employment growth capacity comes almost entirely from vacant land and infill potential.

Relatively low redevelopment capacity for commercial employment uses can, in part, be explained by the fact that the pro forma model used for estimating redevelopment chooses the most profitable development option. This can produce skewed results in mixed-use zones. In many cases, the model identifies multifamily residential as the most profitable use on lands zoned for mixed-use. In reality, demand for commercial space would lead to more redevelopment for that use, potentially with ground-floor commercial and residential uses above. Consequently, redevelopment capacity for commercial uses as depicted in Table 18 may be an underestimate.

Jurisdiction-level capacity estimates were provided for review by local jurisdictions and reflect suggested edits. Buildable lands are part of the region's long-term land supply but are not necessarily development ready or for sale today. Of note, employment growth capacity is not counted on West Hayden Island and the eastern portion of the former City of Damascus. This is because of long-standing planning, governance, or infrastructure provision challenges.

The industrial land inventory has been revised downward since it was published in the draft UGR to reflect a lower threshold for slopes. For this final analysis, industrial lands are not counted as buildable if their slope exceeds 10 percent. This threshold is based on advice from the Oregon Department of Land Conservation and Development.

Table 18: employment capacity in the Metro UGB as reviewed by local jurisdictions

Capacity type	Industrial buildable acres	Commercial buildable acres
Vacant	2,405	288
Infill	2,803	147
Redevelopment	59	46
New urban areas	65	33
Total	**5,331**	**514**

Appendix 6 includes a description of the site characteristics of these employment lands.

Employment land needs analysis

The regional employment forecast is a primary source of information for estimating the region's future employment land needs. Several steps are taken to convert those forecast jobs into demand for land and are summarized in Figure 23. These methods are like those typically used by cities when completing Economic Opportunities Analyses. Additional details about these steps can be found in Appendix 3.

Generally, these steps are intended to address three issues:

- Not all the larger 7-county MSA employment growth will occur inside the Metro UGB. We use a UGB "capture rate" based on historic rates to estimate UGB employment growth.
- There are factors impacting future employment land need that must be accounted for:
    - Work from home and hybrid work have become more widely accepted and reduce demand for commercial office space.
    - Current high office vacancies provide an additional source of commercial office capacity that has not been accounted for in employment capacity estimates because it cannot be characterized as vacant land, redevelopment, or infill.
- Distinct types of jobs have different building and space requirements. For instance, office buildings can be multi-story and have higher employment densities while warehouses tend to be single-story and have lower employment densities because of automation. A group of public and private sector experts was convened on two occasions to provide input on these assumptions.

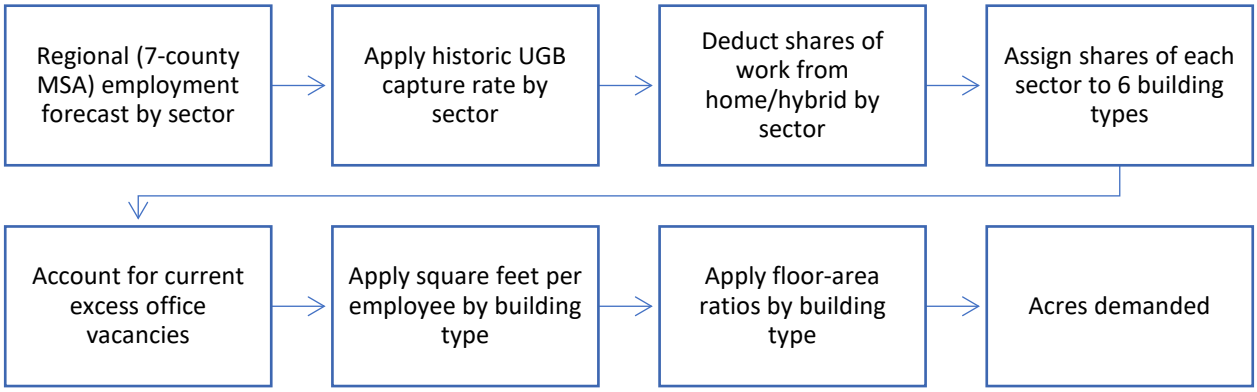


Figure 22: overview of steps for translating forecast jobs into 20-year demand for land

Applying these steps, results in an estimated baseline regional demand from 2024 to 2044 for the following:

- 1,400 buildable acres needed for industrial employment
- 800 buildable acres needed for commercial employment

Employment lands gap analysis results

Industrial land gap analysis results

Industrial lands support uses like industrial, flex/business parks, and warehousing. This analysis found that, in aggregate, there is a surplus of industrial lands inside the UGB for meeting expected industrial employment growth. This is true even under the high growth forecast.

Table 19: Industrial land capacity gap for Metro UGB 2024-2044

	Capacity (acres)	Demand (acres)	Surplus or deficit (acres)
Low growth forecast	5,331	-1,500	+6,831
Baseline growth forecast	5,331	1,400	+3,931
High growth forecast	5,331	5,200	+131

Though, in aggregate, there is a regional surplus of industrial land, those acres of land may not have the location and site characteristics that will lead to industrial development. Over the years, Metro has partnered on several updates of the Regional Industrial Site Readiness inventory. Those analyses consistently find that many of the region's large industrial sites (25+ buildable acres) are not ready for development and need action or investment to address:

- Transportation improvements
- Wetland mitigation
- Brownfield cleanup
- Site assembly
- City annexation and zoning

The inventory of large industrial sites was updated for the Oregon Semiconductor Task Force in 2022. The portion of the inventory for the Metro UGB is shown in Figure 24. Tier One sites could be development ready within six months. Tier Two sites would likely take 7 to 30 months to become development ready. Tier Three sites would likely take over 30 months to become development ready.

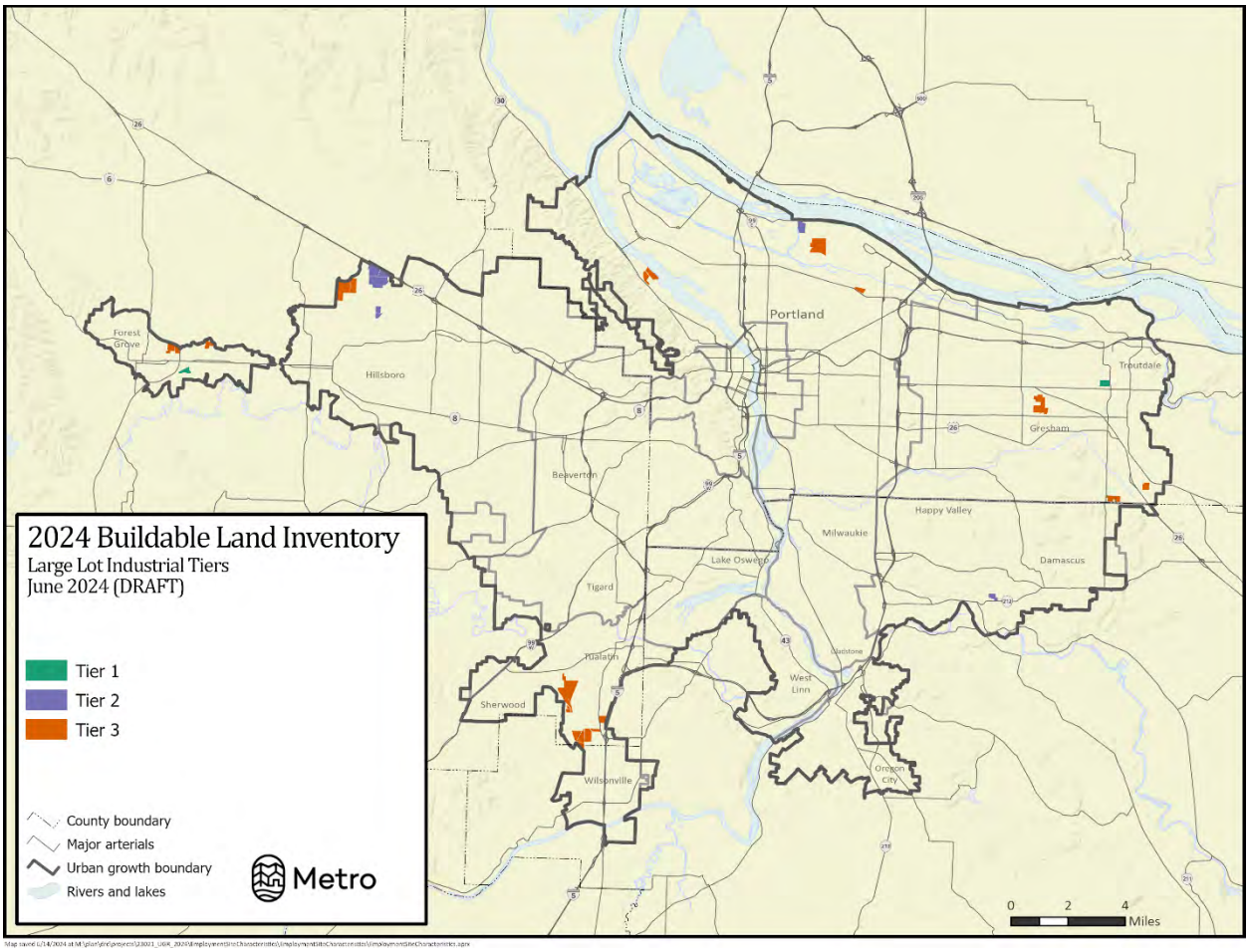


Figure 23: Inventory of large industrial sites (25+ buildable acres) in the Metro UGB

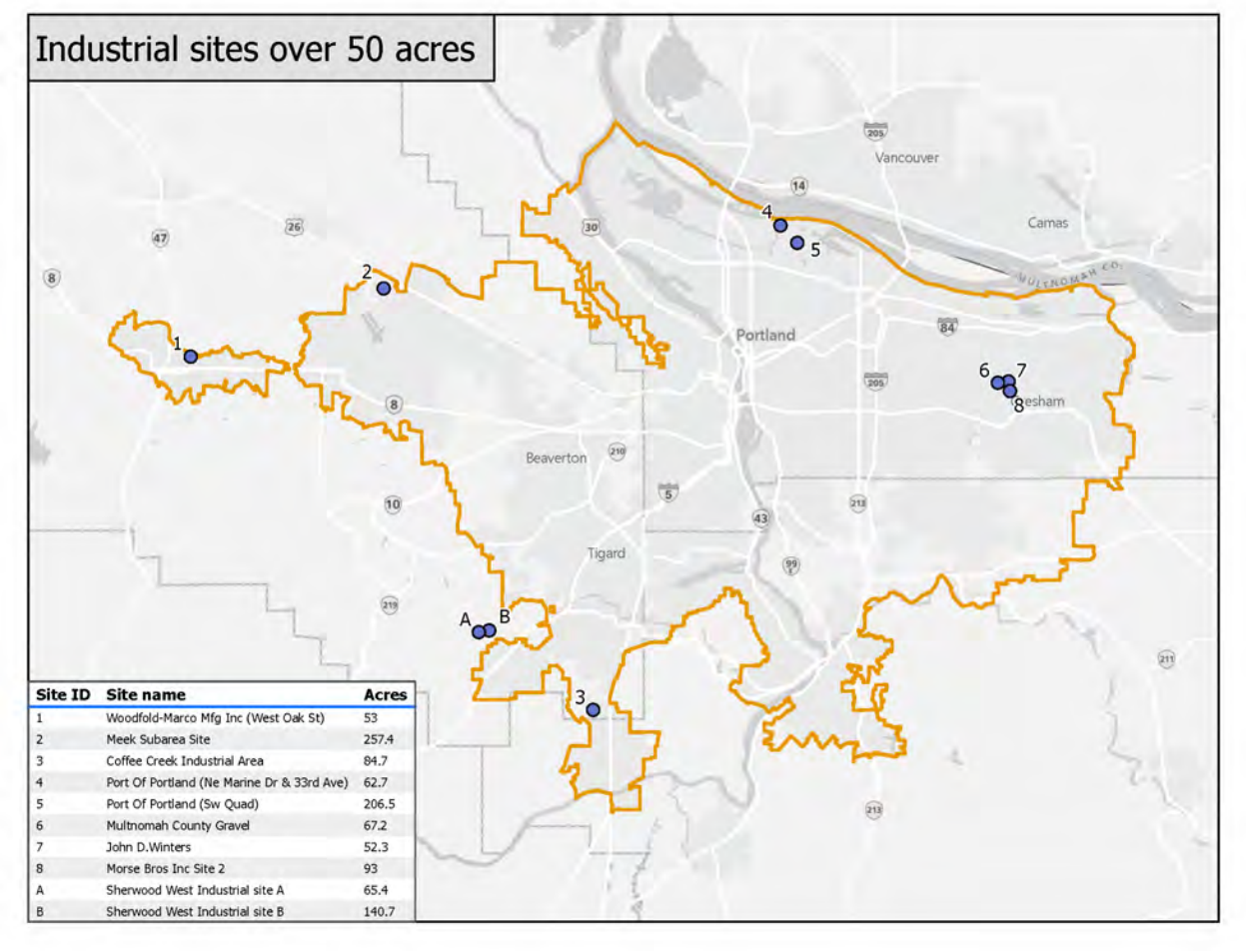
While a site-by-site review of development challenges is not possible for the thousands of acres of smaller industrial sites in the UGB, it is likely that many smaller sites are also held back by similar challenges. A more general assessment of the characteristics of these employment lands is included in Appendix 6. Much of the region's industrial land supply consists of smaller parcels with an average lot size of 3.8 acres and a median lot size of 1.7 acres.[12] Metro's 2023 Small Site Industrial Readiness report found that small industrial spaces are in high demand and have lower vacancy rates than the overall industrial space vacancy rate. These small spaces and parcels that can accommodate them serve an important role for new or smaller businesses, which are often woman or minority owned.

However, smaller industrial spaces and smaller parcels can't serve the entire industrial market. In particular, larger sites are in demand for expansion of existing businesses and recruitment of businesses from outside of the region. For that reason, the Metro Council established the following policy in the Regional Framework Plan:

[12] These statistics are for vacant and infill lands and do not include redevelopment lands.

"1.4.6 Consistent with policies promoting a compact urban form, ensure that the region maintains a sufficient supply of tracts 50 acres and larger to meet demand by traded-sector industries for large sites and protect those sites from conversion to non-industrial uses."

Since the 2017 update of the Regional Industrial Site Readiness inventory of large industrial sites, 15 large industrial sites have developed. Six of the sites that developed are over 50 acres in size. There are eight remaining available sites over 50 acres inside the UGB and their locations are shown in Figure 24. Of those, two sites (numbered 4 and 5 on the map) are owned by the Port of Portland and have zoning restrictions for marine or airport use, leaving only six sites over 50 acres inside the UGB that are available to the general industrial market.



Site ID	Site name	Acres
1	Woodfold-Marco Mfg Inc (West Oak St)	53
2	Meek Subarea Site	257.4
3	Coffee Creek Industrial Area	84.7
4	Port Of Portland (Ne Marine Dr & 33rd Ave)	62.7
5	Port Of Portland (Sw Quad)	206.5
6	Multnomah County Gravel	67.2
7	John D.Winters	52.3
8	Morse Bros Inc Site 2	93
A	Sherwood West Industrial site A	65.4
B	Sherwood West Industrial site B	140.7

Figure 24: regional inventory of industrial sites over 50 buildable acres in size (note, sites A and B are part of the proposed Sherwood West UGB expansion)

It is not possible to precisely forecast long-term demand for individual sites since development of these sites depends on individual business decisions. Firms have idiosyncratic site needs or preferences such as access to skilled workers, specialized infrastructure, proximity to existing economic clusters, availability of financial incentives, and tax climate. However, the State of

Oregon has a priority of supporting high-tech manufacturing and it is informative to assess the typical site needs for that sector.

The August 2022 Oregon Semiconductor Task Force report is attached as Appendix 11 and incorporated as part of this UGR. That report identifies short term needs for the following:

- Two sites of 500+ acres each to accommodate large-scale semiconductor R&D and/or production fabrication operations.
- Four sites of 50-100 acres suitable for integrated device manufacturers or major semiconductor equipment manufacturers.
- At least eight sites of 15-35 acres to enable key suppliers to the semiconductor cluster to locate and expand.

The Task Force report also explains the importance of clustering to the semiconductor industry, which is driven in part by a need for proximity to suppliers. As noted above, there are six sites in the Metro UGB that are 50-plus acres in size that have slopes less than seven percent and are available for use by the general industrial market. However, four of those sites are not proximate to existing high-tech manufacturing clusters and cannot reasonably be expected to accommodate high-tech manufacturing uses, which require proximity to other high-tech firms to create a mutually beneficial network of suppliers and skilled labor. Thus, the two remaining sites currently in the UGB are insufficient to address the need for four sites of 50-100 acres identified by the Oregon Semiconductor Task Force.

Analysis of the specific site characteristics in the proposed Sherwood West employment area

The Sherwood West Concept Plan includes land for housing, schools and civic facilities, park space and 265 net acres[13] for employment uses that would support about 4,500 new jobs. Though there is, in aggregate, a surplus of industrial acreage inside the UGB, there are still valid reasons that support adding the Sherwood West urban reserve to the UGB. ECONorthwest explored regional and local data trends to assess whether the sites identified for future employment growth in Sherwood West have characteristics that make them more suitable for meeting the employment needs of the Metro region.

ECONorthwest's analysis is attached as Appendix 9 and finds that the land within the North District Mixed Employment Area of the Sherwood West urban reserve has specific characteristics that meet a regional need for large 40 to 50-acre parcels with minimal need for site aggregation, slopes under seven percent, and proximity to the highway and existing semiconductor companies. This assessment indicates that Sherwood West would be more suitable to meet identified needs for high-tech industrial growth than other lands inside the existing UGB.

UGR Roundtable perspectives: Agricultural land demand

The discussions around future growth and urbanization prompted some members to express concern about **competing demands on agricultural land**. Participants expressed that agriculture land is employment land pointing out that industrial or commercial zoned uses are not the only way to support job growth in the region. It was important to some roundtable participants that as urban reserves come into the growth boundary and develop, that there is an understanding of the transportation needs for both rural and residential uses – and that those transportation needs are addressed in a compatible way. Other participants noted the link between environmental policy goals and preserving agricultural land, including mentioning that there is an increased cost and carbon footprint of pushing food production outside of Oregon.

Industrial land options

The Metro Council concurs with the Oregon Semiconductor Task Force determination that there is a need for additional 50-plus acre sites in the Metro region that could be addressed by adding Sherwood West to the UGB. The 130 net acre mixed employment portion of the Sherwood West

[13] Includes employment lands in the southern "hospitality zone" as well as lands in the northern mixed employment area.

urban reserve offers unique site characteristics for industrial and flex building uses that are in demand and that cannot be found elsewhere in the UGB.

Commercial land gap analysis results

Commercial lands support all other non-industrial employment uses like offices, retail, and medical. To some extent, commercial demand also gets met on industrial lands, for example through retail uses on industrially zoned lands. However, this analysis has not estimated that potential crossover. The binary classification of employment capacity as industrial or commercial may have the effect of overstating the deficit for commercial land. A similar issue may be present for mixed use zones since the pro forma model often "chooses" residential redevelopment over commercial redevelopment. In reality, demand for commercial space would lead to more redevelopment for that use, potentially in combination with residential uses above.

Table 20: commercial land capacity gap for Metro UGB 2024-2044

	Capacity (acres)	Demand (acres)	Surplus or deficit (acres)
Low growth forecast	514	-300	+814
Baseline growth forecast	514	800	-286
High growth forecast	514	2,300	-1,786

Given the current nationwide challenge of there being excess vacant office buildings, this finding of a potential capacity deficit creates some dissonance. However, it is important to remember that the commercial category includes uses that go beyond office uses (for instance, retail and medical) and this is a long-term demand forecast.

Commercial land options

Informed by this analysis, the Metro Council has indicated its intention to plan for the baseline forecast and find a need for a UGB expansion:

- Add the 135-net-acre commercial employment portions of Sherwood West urban reserve to the UGB; and,
- Consistent with observed development trends, assume that a small portion (about 150 acres) of the region's industrial land surplus is available for commercial employment uses, thereby addressing any remaining commercial capacity gap.

CONCLUSION

The 2024 urban growth management decision, like growth management decisions before it, has surfaced people's thoughts on many topics. Some of those topics relate directly to long-term land supply while others relate more generally to land use planning. Others require collaboration across sectors.

UGR Roundtable perspectives: Summary

Discussing the variety of regional challenges and concerns led to conversations about the **role of Metro and local governments** in finding solutions. Roundtable members highlighted primary roles of Metro as listening to local concerns, partnering with cities to find infrastructure funding, advocating at the state level, and being nimble and flexible to change. Some of the local jurisdiction representatives mentioned the increasing need for fiscal balance in their community to continue to fund their local services.

BIBLIOGRAPHY

Binder, L. a. (2016, December 1). *Winds of Change? Exploring climate change-driven migration and related impacts in the Pacific Northwest.* Retrieved from Climage Impacts Group, University of Washington: https://cig.uw.edu/wp-content/uploads/sites/2/2014/11/climate-migration-symposium-summary.pdf

Bughin, J. a. (2019, January 22). *Navigating a World of Disruption.* Retrieved from McKinsey Global Institute: https://www.mckinsey.com/featured-insights/innovation-and-growth/navigating-a-world-of-disruption

Muro, M. R. (2019, January 24). *Automation and Artificial Intelligence: How machines are affecting people and places.* Retrieved from Brookings Institution: https://www.brookings.edu/articles/automation-and-artificial-intelligence-how-machines-affect-people-and-places/

Oregon Department of Agriculture. (2024, June). *Oregon Agricultural Statistics.* Retrieved from Oregon Department of Agriculture: https://www.oregon.gov/oda/shared/Documents/Publications/Administration/ORAgFactsFigures.pdf

Oregon Office of Economic Analysis. (2023, September 7). *Oregon and the Chips and Science Act*. Retrieved from Oregon Economic News, Analysis and Outlook: https://oregoneconomicanalysis.com/2023/09/07/oregon-and-the-chips-and-science-act/

U.S. Department of Health and Human Services. (2024, April 4). *National Vital Statistics Reports.* Retrieved from Centers for Disease Control and Prevention: https://www.cdc.gov/nchs/data/nvsr/nvsr73/nvsr73-02.pdf

Washington University Institute for Health Metrics and Evaluation. (2024, March 20). *Dramatic declines in global fertility rates set to transform global population patterns by 2100*. Retrieved from Institute for Health Metrics and Evaluation: https://www.healthdata.org/news-events/newsroom/news-releases/lancet-dramatic-declines-global-fertility-rates-set-transform#data

Zapata, M. (2024, April 29). *2023 Point in Time Findings Report.* Retrieved from Portland State University: https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1047&context=hrac_pub

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[i] (Washington University Institute for Health Metrics and Evaluation, 2024)

APPENDIX 1 – 2024 REGIONAL ECONOMIC FORECAST

Executive Summary

This appendix summarizes Metro's 2024-44 Regional Economic Forecast. The forecast includes projections of future population growth (i.e., age, sex, race, disability status, household size and income bracket), nonfarm payroll employment and employment by industry sector (i.e., NAICS, North American Industry Classification System) for the seven-county Metropolitan Statistical Area (MSA).

Key Findings about the regional forecast

- A panel of experts, economists and demographers found the Metro regional forecast to be reasonably sound (please see Appendix 1A)
- The region (or MSA) has largely rebounded from the pandemic-era induced recession, although sector-level (or industry) employment details differ.
- The baseline regional forecast is consistent with a "soft-landing" with no recession expected in the near term (though a non-negligible risk still exists and is encapsulated in a forecast range).
- Headline nonfarm payroll employment in the MSA rebounded to its pre-pandemic peak in 2023 but has since drifted lower because of the twin burden of higher interest and inflation rates slowing down national growth and weighing down regional trends.
- The pandemic caused some trends to accelerate and likely to persist for the long-run duration of the forecast (e.g., work from home, online purchases of goods, supply-chain dislocations, and other economic scarring).
- Other impacts from the recession aren't likely to persist and their impact on the regional economy are projected to become more muted over time (e.g., elevated inflation, interest rate hikes, high vacancy rates, temporary supply-chain disruptions, and labor market tightness).
- The regional forecast incorporates a boost to regional employment growth due to national legislation to "re-shore" high-tech development (including jobs) to the US; separately, a spending boost on infrastructure has a positive impact on job growth, particularly in construction.
- A notable change in the regional projections (to both population and employment) has been included in this latest release of the regional forecast. The change centers on demographics with stark implications that constrain labor market developments in the long run.
- Total fertility rates (TFR) have declined sharply and were temporarily made worse during the pandemic. Once, a TFR of about 2 children per woman in the 1990's was common. Recently, the rate fell to 1.25 during the pandemic but is expected to edge back up to 1.5 and hold relatively steady through the twenty-year MSA forecast.
- Life expectancy is expected to continue improving, but due to the existing large segment of the "baby boom" generation, the number of total deaths is expected to rise more sharply as "boomers" mature and age out of the population.
- Natural change (live births minus total deaths) in the regional baseline forecast anticipates that the number of deaths will exceed the number of births in the next decade.
- If not for the expectation of positive regional net migration, annual population growth for the MSA would tilt negative, and even so, regional population growth will fall to 0.4% APR (annual percentage rate) in the second half of the twenty-year forecast.

- The significance of the sharp slowdown in population growth is reflected in the tapering of overall nonfarm payroll employment which severely flattens during the second half of the twenty-year forecast. The average annual growth rate projected for nonfarm payroll employment in the MSA is 0.4%.

What's new?

- MSA Population projections from 2024 to 2044
- MSA Population projections by age, sex, and race (white, Hispanic, Asian-Pacific Islander (API), black, and native Americans (AIAN))
- MSA Household projections by age of householder, income bracket, household size (number of persons) – known as the forecast of "HIA distributions"
- MSA Population disability projection
- MSA Nonfarm payroll employment projections from 2024 to 2044

State of the Region

The MSA region has made big strides in overcoming the economic disruptions after the pandemic-induced recession. The downturn in regional employment was swift and sharp, and between February 2020 and April 2020, more than 176,000 workers (source: BLS) had been completely shut down from their workplace and lost their jobs. The unemployment rate in the region jumped to 13.3% in April from 3.0% (source: Census) in two months prior to the economic shutdown. It has taken the region over 2 ½ years to recover from the pandemic induced job losses to bounce back to pre-pandemic employment levels.

At least in the case of headline employment figures, total nonfarm payroll employment has fully recovered. The details for individual sectors are still mixed, although most industry sectors have fully recovered or very nearly so. Leading the recovery in the last several years, and unsurprisingly, were the industry sectors which let go the greatest number of jobs during the pandemic. The leisure and hospitality (NAICS 71 & 72) sector suffered the largest job losses at the onset of the pandemic, but the sector has since made sizeable gains since the re-opening of the economy for business. Service and retail sectors which directly served the public were hit hardest by the government mandates to close or curtail business operations. The majority have rebounded.

The economy continued healing from the pandemic but is now faced with the twin specter of high inflation and higher interest rates. Job growth materially eroded in regional sectors most sensitive to elevated interest rates. Financial activity (NAICS 52 & 53) was one such sector as interest rates made home buying less affordable and cut into company profit margins. Individual industries in manufacturing

(NAICS 31-33) also saw sharp employment declines which lessened overall growth in the region as regional producers didn't want to get stuck with unsold inventory during a possible economic downturn.

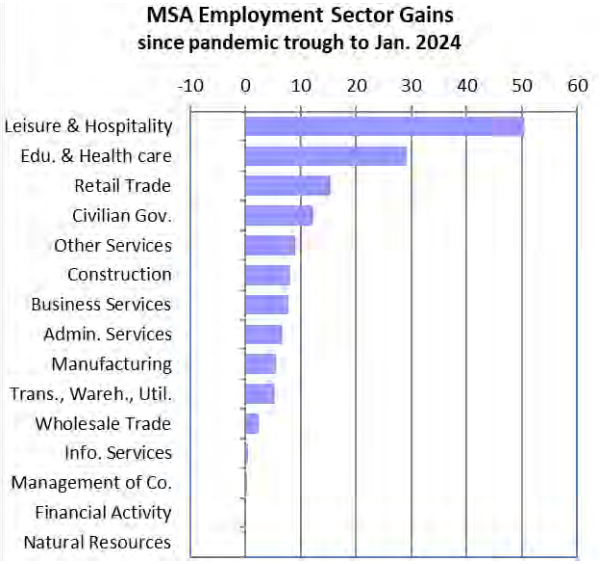


Figure 1: MSA sector growth of major industries

Economic conditions in the region have softened recently and labor market easing has begun appearing in more sectors of the region as inflation has taken its toll on consumers and businesses alike. Headline economic growth has eased with hikes in interest rates. The region's manufacturing sectors along with industries highly sensitive to interest rate fluctuations (e.g., retail trade, especially of stores that sell "big ticket" items and discretionary goods, finance and real estate, and professional services, especially temporary-help jobs) were driven to cut back on hiring and have had forced layoffs in some sectors. With the Federal Reserve still trying to tamp down inflation, the nation's monetary authority has induced a slowdown in manufacturing that has since spread into the service and retail sectors of the economy.

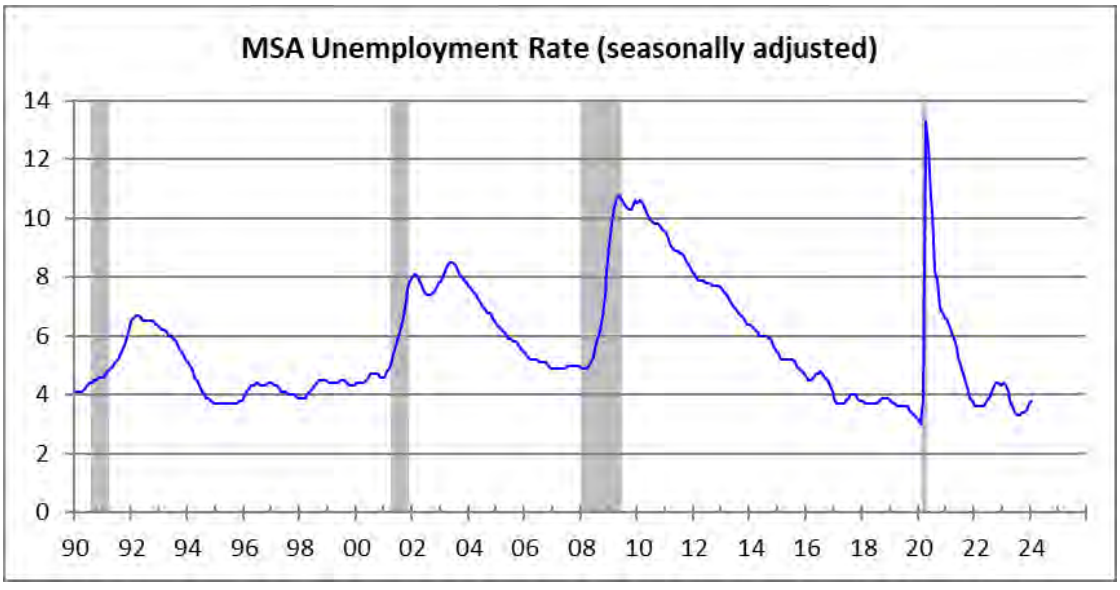


Figure 2: MSA Unemployment rate

Still, the region's overall labor market remains unusually tight for this latter stage of the current business cycle. Before the pandemic, regional unemployment was 3%. The unemployment rate for the entire MSA, though not as low as what it had been pre-pandemic, remains quite low, having recently edged up to 3.8% from a low of 3.3% in the middle of 2023. Labor market conditions remain healthy despite recent economic turbulence.

MSA Long-term Demographic Trends

The MSA has been facing similar demographic pressures that both the state of Oregon and the US have been contending with for many years. Wide fluctuations and a large net inflow of new migrants partly obscured the emergent trend, but now with over a decade of solid natality and mortality trends in place, it is quite evident that natural change (i.e., births minus deaths) in the region is falling and will continue to do so. Most notably, female fertility rates have fallen more sharply than previously anticipated. Life expectancies are projected to continue improving, but the overall crude death rate (i.e., ratio of deaths to total population) is expected to climb as the unusually large segment of the population known colloquially as the "baby boom" generation incrementally ages out during the twenty-year forecast. The result of declining births and a higher crude death rate in the Metro regional forecast means that future regionwide population growth will be much slower on an annual basis.

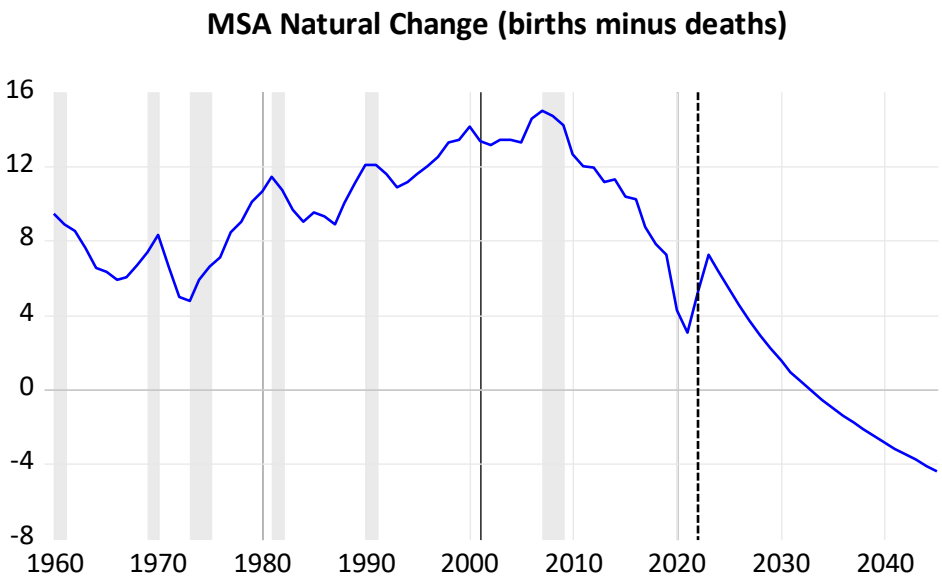


Figure 3: MSA natural change (births minus deaths). Natural change in resident population will turn negative in the next decade and absent positive net migration, the region's total population will start to decline.

MSA Fertility Assumptions

From 1990 to 2000, the MSA region experienced robust population growth of 2.4% (average annual rate). The population growth in that decade was supported by a strong economy that drew in a sizable proportion from migration. The total fertility rate (TFR) in the region was about 2.0, which was near replacement level. The replacement level fertility rate is the level of fertility at which a population exactly replaces itself from one generation to the next. In developed countries, like the US (and the MSA), replacement level fertility can be taken as requiring an average of 2.1 children per woman (source: National Institute of Health (NIH)).

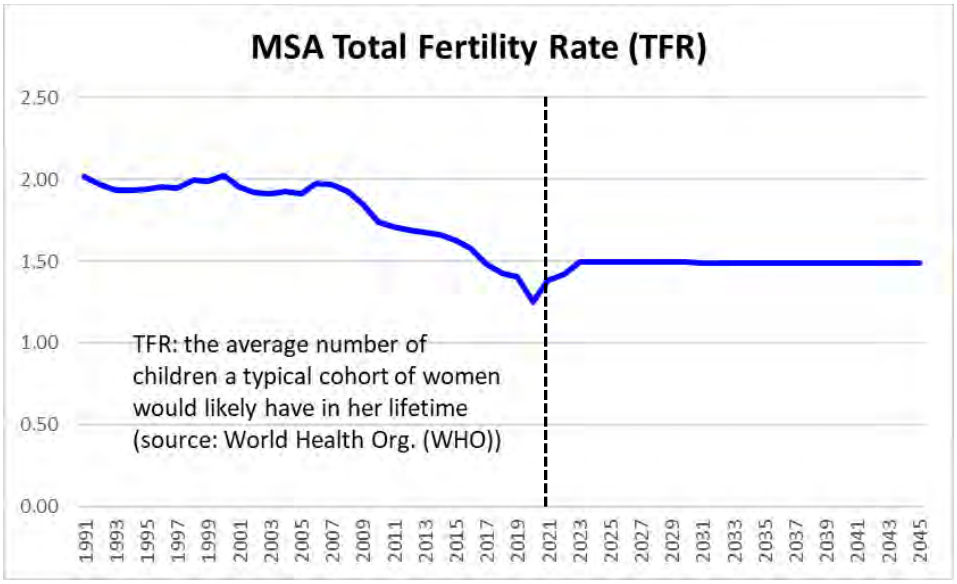


Figure 4: MSA Total Fertility Rate (TFR).

Fertility rates in the MSA clung near replacement level up until the Great Recession (Dec. 2007 to June 2009, source: National Bureau of Economic Research (NBER)). Since then and even after the economy rebounded from the Great Recession, fertility rates did not recover and continued sliding lower in subsequent years. The downward trend briefly accelerated during the pandemic but has since begun to rebound. The rebound will be modest and short-lived in the baseline Metro forecast, returning the region's fertility rate to about 1.5 children, a number just higher than before the onset of the pandemic. The forecast contemplates the total fertility rate holding steady during the twenty-year forecast at roughly 1.5 children per woman residing in the region.

The impact of lower fertility rates and projected decrease in the natural change should (other things being equal) result in a significant slowdown in annual regional population growth. This began happening in the decade between 2000 and 2010 and the trend accelerated into the decade between 2010 and 2020. Regional population in the 2000's fell to 1.4% annual growth and in the decade after 2010 had diminished even more, down to a 1.2% annual growth.

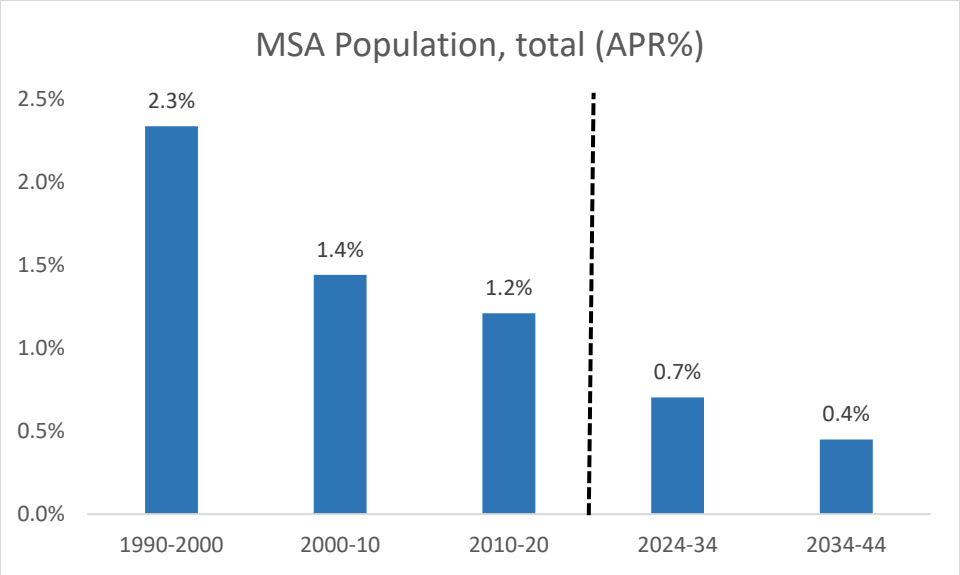


Figure 5: MSA total population, annualized growth rates by decade

MSA Life Expectancy Assumptions

Life expectancies in the US will continue to improve, according to US Census Bureau projections. This is reflected in the baseline MSA forecast, which incorporates an identical set of life expectancies into age-specific death rates for the region. These death rates are then applied to the age cohorts to estimate the number of deaths in the regional outlook.

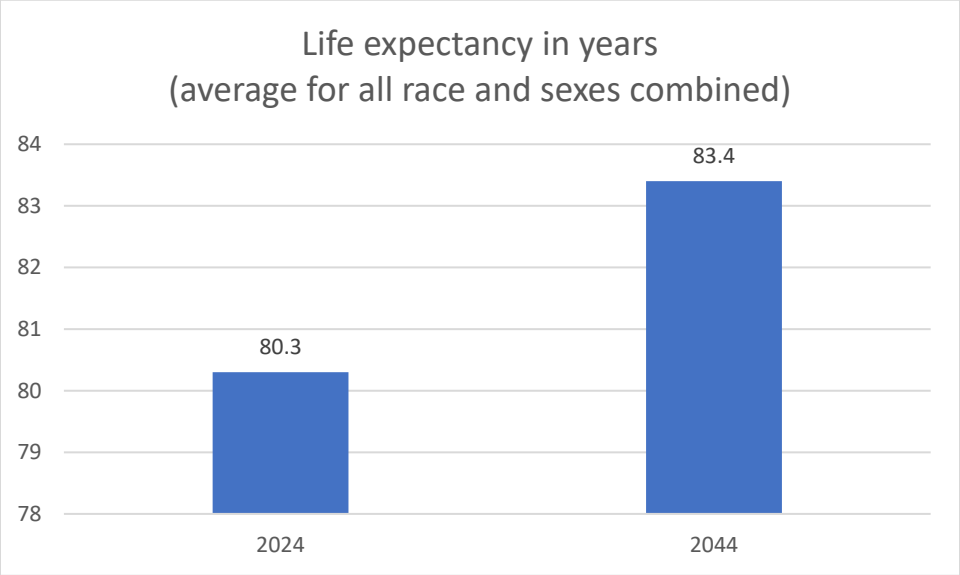


Figure 6: MSA life expectancy is expected to increase in the baseline 20-year Metro forecast.

Life expectancy in general is age specific. For example, a person born in 2024 has an average life expectancy of 80.3 years; and by the forecast horizon, a person born in 2044 will have an average life expectancy of 83.4 years – an increase of more than 3 years. This is why we say that life expectancy is expected to rise in the outlook, but for the population already born (or migrated to the region), their individual average life expectancies remain fixed depending on the person's specific age.

MSA Net Migration

Net migration is the difference between the number of persons who relocate to the MSA from outside the region and the number who leave, generally calculated over a year. Since 1960, annual net flows of MSA migration have tended to swing up and down with movements in economic business cycles, though oftentimes notable lags may exist. Moving carries with it transactional risks and relocation costs that may delay the immediate decision to relocate or stay at home. There are other reasons adults choose to relocate and they aren't always about money and housing, such as moving to be closer with family, going to college, or caregiving responsibilities. Regardless of a migrant's underlying reason, we observe that the annual historical net migration has been mostly positive during recent decades, except in brief periods of economic recessions (marked by gray bars in the figure).

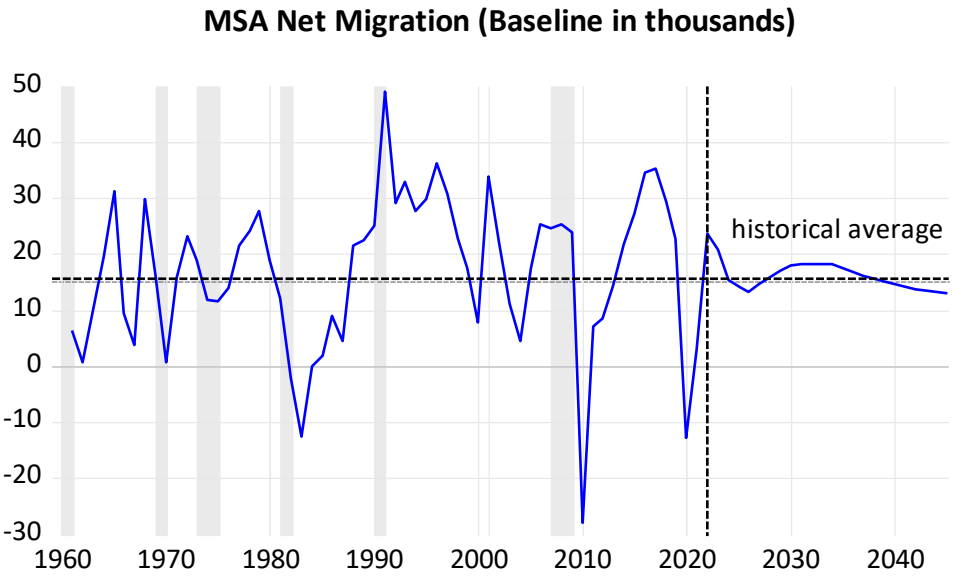


Figure 7: MSA net in-migration

Migration topped out during the decade of the 1990's, with the high technology industries and firms in advanced manufacturing attracting highly skilled workers to computer technology and fabrication plants in the region. In the years leading up to the Great Recession, the region experienced a sharp downturn in migration before rebounding just before the pandemic induced recession in 2020. The economic boom after the Great Recession was beginning to show its age, and the specter of another economic recession loomed over the economy before the economic shutdown finally tipped the US into a sharp economic tailspin.

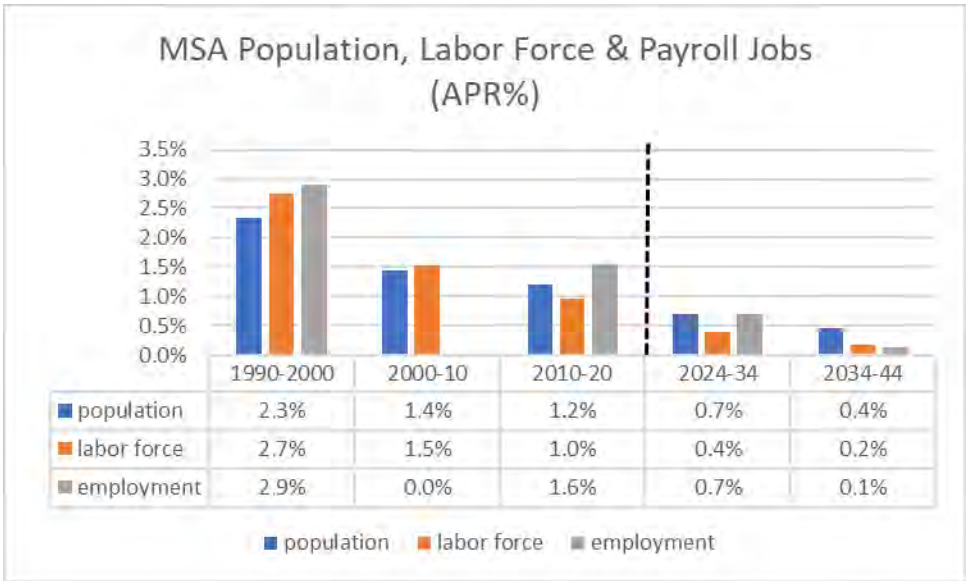
Over the last 60 years of population data for the region, average annual net migration has been positive and added to the region's demographic growth. Behind this six decades of prosperity in the region, net in-migration has averaged about 15,000 people.

The MSA population projection incorporates fluctuations in the current business cycle. It plays out a "soft landing scenario" in the short run in which the economy is projected to see much slower annual growth (but no recession) going forward. This is reflected in downward drifting of net migration near the outset of the forecast. In the long-run, net migration hews to a steady-state of migration reminiscent of historical trends. Regional migration is expected to continue forward as many of the popular reasons for why people might want to relocate still exist in the future and the relative economic advantages that the

region has enjoyed over the rest of the nation and state-level neighbors to the north and south aren't going to materially change in the migration outlook.

MSA Long-term Employment Trends

Employment growth trends in the future are expected to be substantially lower in the current forecast. Compared to prior employment forecasts, the job growth in this forecast vintage reflects substantially slower payroll increases. The projection of job growth will also be considerably more subdued than previous periods of history. The reason behind this slower projected employment growth stems primarily from a significant step down in the projected supply of labor.



	1990-2000	2000-10	2010-20	2024-34	2034-44
population	2.3%	1.4%	1.2%	0.7%	0.4%
labor force	2.7%	1.5%	1.0%	0.4%	0.2%
employment	2.9%	0.0%	1.6%	0.7%	0.1%

Figure 8: MSA annual percentage rates for population, labor force supply, employment demand

In earlier decades, population in the region boomed (at least compared to nowadays). This led to a need to match up the rate of population expansion with jobs people could do. The economy was also in greater transition as women with college degrees continued to enter the labor force in droves. The labor force theoretically doubled, (with sizeable chunks of capable women adding to the labor supply) which meant labor became relatively cheaper, other things being equal. Domestic employers took advantage of this trend in labor supply by hiring more people. On top of this, the advent of computers and improved automation of factory floors also made the economic contributions of each employee proportionally more valuable; we call this increase in productivity and that usually means higher pay. Higher productivity and more hiring meant workers were able to spend more in the economy and thus boost demand for the goods and services that many were providing as employees. This virtuous cycle elevated the growth rate in jobs and industry growth.

Attitudes in family formation (or not) and child rearing had once changed quite slowly, but this trend has taken a sharp turn after the Great Recession and may have accelerated with the pandemic. Going forward, the growth rate in the labor force of the region is projected to be much slower, even slower than the overall rate of population growth. Working age adults and the overall population are impacted in the same way by fewer children being born and an aging labor force that more and more will leave and enter retirement. Labor force participation rates may edge higher when the economy improves in

the short run, but this is only a temporary offset to the declining trend in the labor force. The long-term expectation is both labor force and participation rates are on a long-run decline. Final demand for employees is thus scheduled to experience substantially slower growth rates in large part due to the structural transition happening in the population and the labor force.

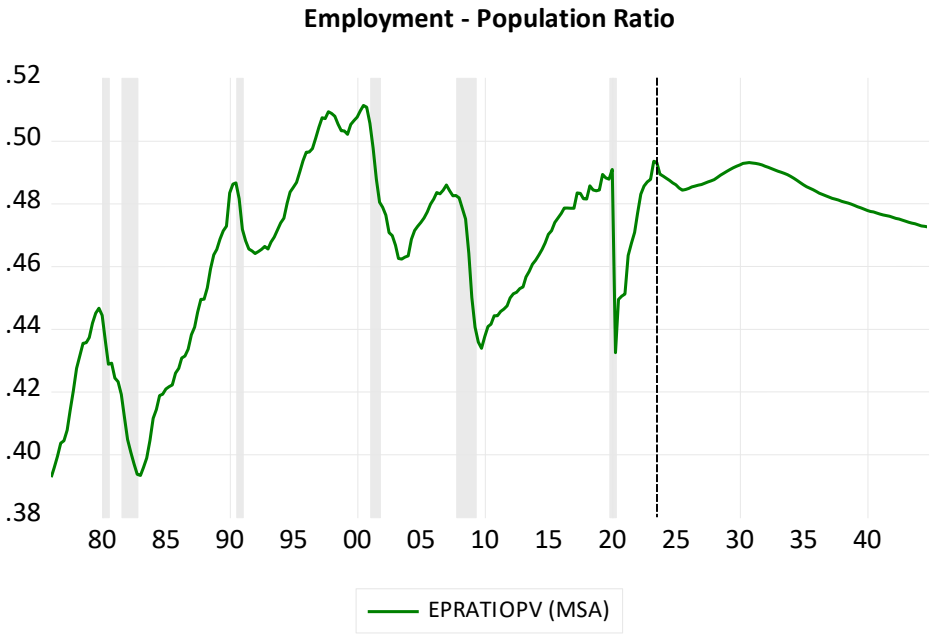


Figure 9: MSA ratio of nonfarm payroll employment and total population

The employment rate, also known as the employment-population ratio, is the percent of individuals who are employed out of the total population (source: US Labor Department). Higher employment rates indicate that more of the population is at work. The ratio tends to fluctuate more near recessions, but since the baseline regional forecast is trend-based (i.e., forecast excludes business cycles), the future year estimate of the employment-population ratio tends to be smoother. Since 1990, the employment-population ratio has been close to 0.5 and to the extent that this relationship holds, the regional nonfarm payroll employment forecast projects similar consistency with the historical ratio.

Manufacturing Sector (private sector)

For the most part, individual industry-sector growth in the MSA is shaped by forecast assumptions contained in the US long-term macroeconomic forecast. Metro relies on a trend US forecast prepared by S&P Global. The regional forecast primarily utilizes the national economic trends of certain macroeconomic variables for its own forecast of regional employment trends. These macroeconomic variables include (but are not limited to) real GDP, US consumer spending trends, inflation, interest and foreign exchange rates, income and wages to employees, productivity, and demographic trend factors. The derivation of the regional forecast is thus hinged to the set of macro-economic forecasts of our national forecast advisor, S&P Global.

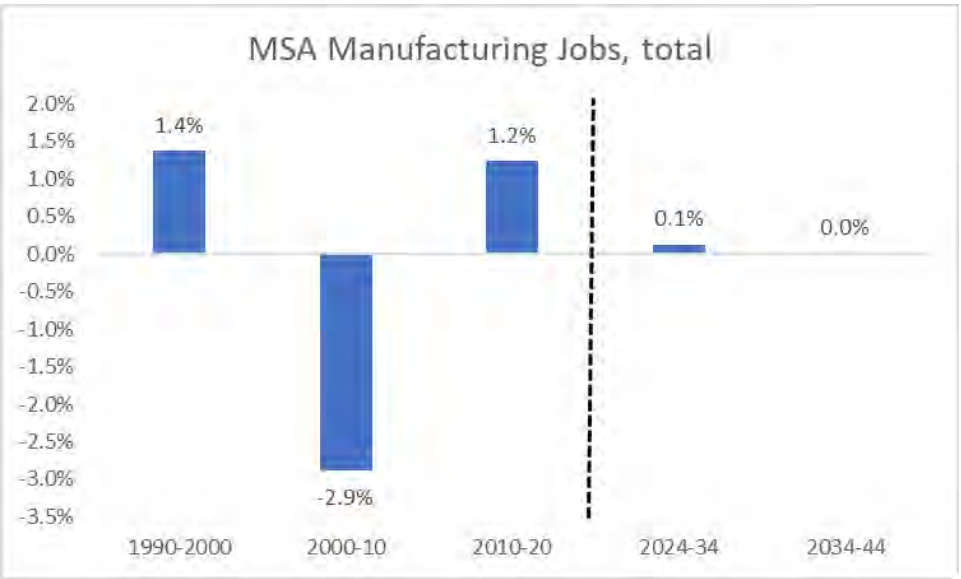


Figure 10: MSA total manufacturing job growth, APR%

The "high-tech sector" (NAICS 334) was a key industry in which the regional forecast implemented an override (called an add factor) which subsequently bolstered short-run job growth in the industry. This override to the region's forecast meant an increase in the number of jobs in the computer and electronics industry instead of an easing in job numbers as would more likely have been the case without the intervention of the CHIPS Act (federal statue enacted by Congress and signed into law on 8/9/2022). The CHIPS Act aims to improve the investment in US semiconductor manufacturing, research and development (R&D), and number of jobs in the workforce. The perception of most, including pundits responding to the review of this forecast, was that the government subsidies would temporarily boost job growth over the next few years, but afterwards continuing efforts to boost sector productivity and improved automation would begin to erode prospects of longer-run job growth in the industry. Job growth tapers in the region as soon as CHIPS Act investments fade.

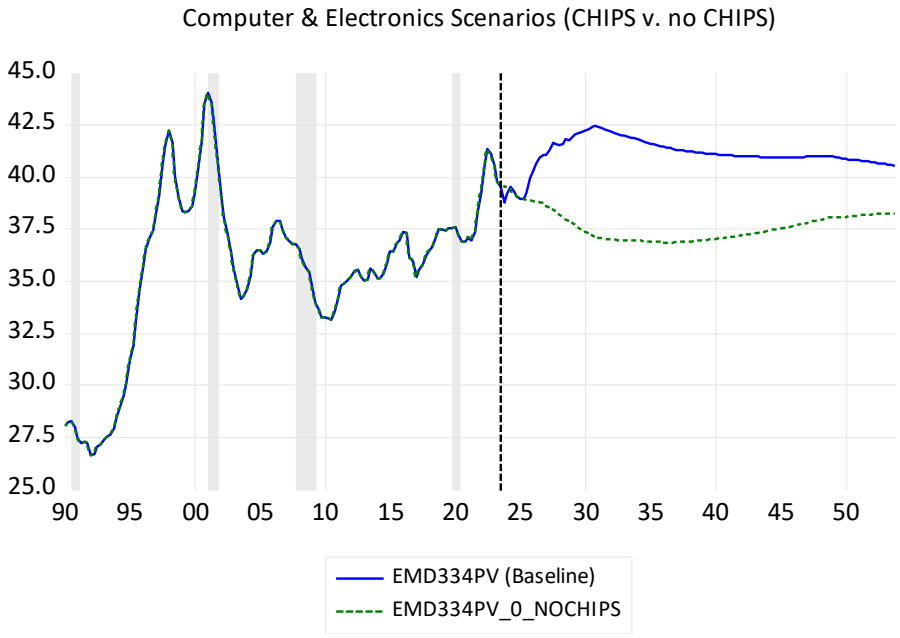


Figure 11: MSA Computer & Electronics industry forecast (with and without CHIPS Act intervention)

Nonmanufacturing Sector (private sector)

The nonmanufacturing sector is comprised of only private sector jobs. Almost half of these are consumer-oriented in such industries like the retail trade sector, health services, and the leisure and hospitality industries; the other half caters more to businesses-to-business relationships which include such sectors of the economy as wholesale trade, the warehousing/ distribution industries and business service sectors. The more business-oriented service sectors have a greater tendency to be impacted by swings in the business cycle while consumer-oriented service sectors may not grow as quickly during economic booms, but they also do not decline as sharply as the business service sectors. At the end of the 2000's, the US and this region suffered one of the steepest declines during the Great Recession and it was most evident in its negative impact to business-oriented industries (and manufacturing too.) It wasn't a great time for consumer-services employment, but the industries that predominantly serviced the public maintained a certain level of job growth commensurate with general population growth.

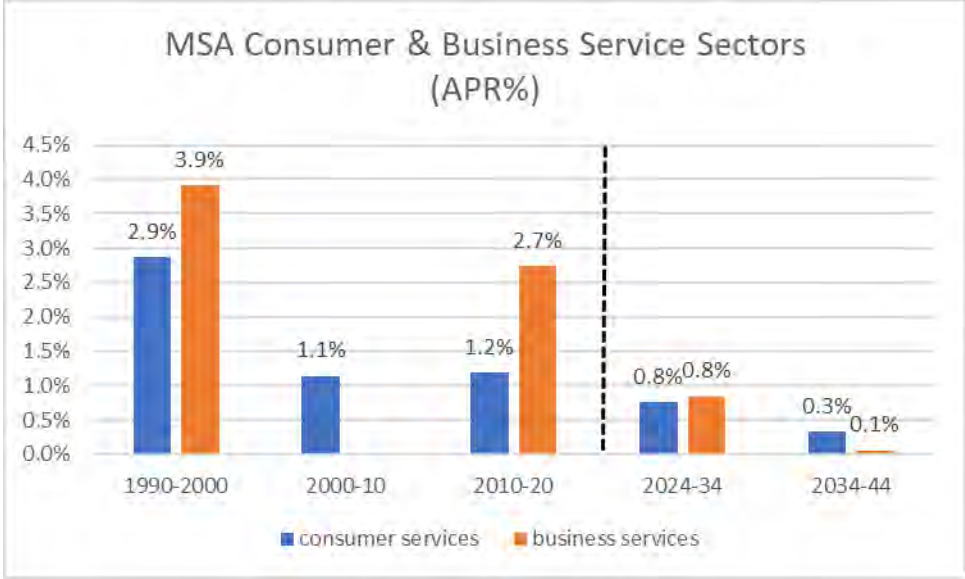


Figure 12: MSA private sector nonmanufacturing employment

With population growth (as noted before) substantially subdued compared to prior decades, the region experienced much slower nonmanufacturing employment gains between 2010 and 2020, which was particularly evident in the consumer servicing industries. The business service sectors rebounded more sharply in the decade of the 2010's but this was still slower growth than in the 1990's. Going forward, population and domestic job needs are expected to ease even more. Annual population growth is expected to be cut in half in each of the next 10-year periods and is expected to hamper the likelihood of job growth approaching the robust growth rates the region once experienced. The regional forecast reflects a big change in demographics which then impacts prospects for future long-run job growth.

There are two sectors for which the regional forecast projects "outsized" job gains compared to projected population growth rates. One is the health care/ medical services sector. The population in the region is getting older. There will be a larger proportion of retirement age people living in the region in the next two decades than in prior decades. As more of this cohort enters retirement age and beyond, the demand for medical services will rise and the need for professionals in the health care industry will grow faster to meet anticipated need. The second industry anticipated to see job growth outpacing population growth will likely be the arts and entertainment sector. With a proportionally larger population of retirees with more disposable income than previous generations, the demand in this sector will likely be outsized compared to other sectors. Growth will increase as retirees look to find leisure activities other than work. Once again, the "baby boom" generation will dominate demographic and economic headlines until this population cohort ages out entirely, until then, this segment will have a greater influence on select industry job growth.

The construction industry is also anticipated to enjoy growth rates almost twice as fast as population growth during the first half of the twenty-year forecast. A combination of factors lends themselves to this expectation. The first is the Infrastructure Investment and Jobs Act, which looks to strategically invest in industries to bolster ones deemed important to national security. This intervention will likely give a boost to nonresidential construction as firms look to "re-shore" production capability that was once completed overseas. Construction will also receive a leg up from increased investment and

construction of residential structures as there is widespread acknowledgement that the US (and this MSA) has under-produced housing after the Great Recession. A period of above average housing development will require a period of more substantial growth in construction jobs to support an increase in needed housing stock.

Government Sector

Government payroll jobs are unlikely to grow very much in the twenty-year forecast. Its job growth is tied mainly to population increases which will be very subdued. Federal employment will remain flat for most of the forecast except in 2030 and 2040 when the Decennial Census is taken. Federal employment will temporarily spike with Census enumerators hired to help count the population in America but will drop back sharply to prior employment levels when enumerators are no longer needed. State and local employment is projected to rise more slowly in the future because of the slowness expected in MSA population growth. Government jobs in education account for half of all nonfederal government jobs in the MSA. The demand for additional education jobs in the future is anticipated to be much less than in the past due to fewer children being born each year. The child population in the MSA is projected to average about 0.2% growth per year in the twenty-year forecast, compared to about 0.6% for the total population. The share of children in the MSA falls to 14.8% in 2044 compared to the 16.1% estimated for 2024.

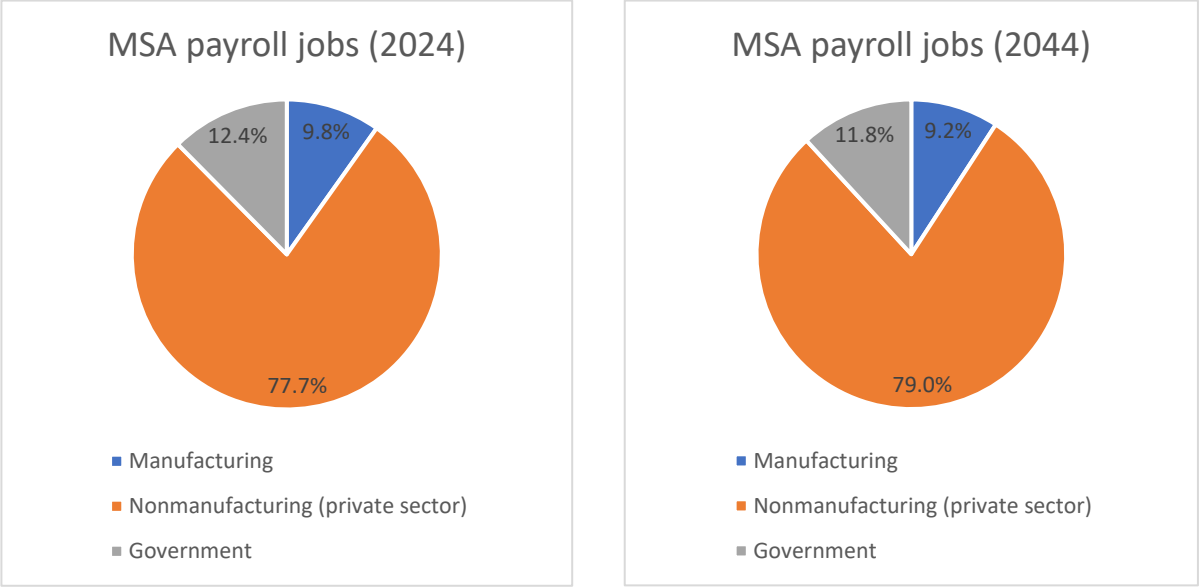


Figure 13: Share of manufacturing, service and retail, and government jobs in the MSA in year 2024 and 2044

US Forecast Outlook (the backbone underlying the MSA forecast)

Last year, the economy outperformed what many pundits and forecasters thought growth would be. Many had believed the US was heading into a recession and doubled down on that prediction when the US Federal Reserve (FED) began sharply raising interest rates to slow the rise of inflation, which topped 9.3% in June 2023. The benchmark federal reserve funds rate went from a range of 0% to ¼% up to a target rate between 5¼% to 5½%, where it now stands as of mid-March 2024. Instead of a recession, the US has had four outstanding quarters of above trend GDP growth, fueled by robust consumer spending, export growth and productivity increases; all of which are leading into this year. Employment gains throughout all twelve months of 2023 were well above expectations and boosted workers take home

pay. Wage rates also rose at a healthy pace, supported by a tight labor market and productivity gains. However, inflation eroded much of the nominal increase that payroll workers received, and this was reflected in the plunge in consumer confidence last year.

Inflation has eased considerably since it peaked last year, but the last percentage point or so is usually the toughest to wring out from a vigorous economy. Core inflation did fall below 2% in Q42023, but monthly data since suggests that it won't maintain as producer prices edged higher than expected in the first two months of this year. Higher shelter costs (i.e., rents and mortgages) will likely add to headline CPI inflation and core inflation, or at least make it "stickier" for rates to ease. This suggests more inflation is already in the pipeline and higher prices heading at consumer pocketbooks. Monthly CPI inflation edged up to 3.2% in February 2024, higher than mainstream pundits had expected.

The economy is still operating at a healthy pace. Forecasters view the US operating at near potential already, so there is very little capacity to drive growth higher without inciting greater inflation. The economy will slow more because the FED hasn't yet achieved its goal of price stability. That means driving the US inflation rate down to 2 percent and holding at that rate. It's not quite there, so the FED has said that it needs more economic evidence that the inflation rate will not accelerate before they decide to switch from its current monetary restrictions. So, pundits believe that this gives the FED ample room to maintain its current vigilance against inflation, which means that it is likely that rate cuts will be put off until June 2024 at the earliest. Even then the rate cuts are likely to be gradual, unlike the sharp hikes that the FED engineered at the beginning of the current interest rate cycle.

Metro's national forecast advisor believes real GDP will gradually ease in 2024 and 2025 to about 1.4% growth per year. The belief is that a period of below trend growth is required to achieve the last step down in core inflation (i.e., price of goods and services excluding volatile food and energy prices). The US unemployment rate is currently at 3.9% (Feb. 2024). To facilitate the easing of inflation that is still too uncomfortably high, US unemployment will necessarily inch higher, expected to peak at about 4.7% at the end of 2025.

A "soft-landing" (i.e., the FED able to bring inflation down and cool a hot economy without setting off a significant decline in economic activity, a recession) is assumed in the US outlook, which is reflected in the Metro regional forecast. Consumer confidence has rebounded roughly half of what was lost last year, so there is plenty of room for improvement, but that optimism seems well-founded given near term economic developments.

Long-run projections of GDP and US employment growth have lowered from prior growth outlooks that Metro has used to forecast regional growth. Real GDP in the long-run rebounds from the engineered "soft-landing" by the FED to a peak of 1.8% and eases to roughly 1.7% per year in later years of the US forecast. This is slower growth for the US economy than the annual average of 2.4% real GDP growth in the 10-year span prior to the pandemic. Nonfarm payroll employment grew an average of 1.6% between the Great Recession and the year of the pandemic. Going forward, annual US job growth after recovering from the FED's "soft-landing" is projected to rise 0.5% per year and then drift lower to about 0.3% per year in the forecast outyears.

The US economic forecast is in keeping with national population projections. The US population outlook is anticipated to ease from a near-term peak of 0.5% growth per year after all the confusion from the pandemic settles out. Even so, long-run population growth is expected to drift lower to about 0.3%

growth per year. US population growth continues slowing because of a tapering of total fertility rates at the same time the total number of deaths will creep higher as the median age of the US becomes older. By the end of this forecast, many baby boomers will have aged out of the population so the number of deaths will begin to taper. Meanwhile, immigration rates, which are highly volatile and very much at the whim of political interests and include factors outside of the US economy, could be a greater source of population growth in the long run if immigration exceeds expectations. Bottomline, US (and MSA) population will trend lower mainly because natural change is tapering rapidly.

HIA (Household, Income and Age Bracket) Forecast

Metro's household forecast now includes a joint distribution which projects the change in composition of households in the MSA. These components of the household forecast include a breakdown of households in the MSA by household size (i.e., number of persons in each household), by income brackets and by age brackets (i.e., the age of head of household). Previous forecasts for the UGR broke out the households by just age. New to this forecast is the additional delineation of household income brackets and household size.

We summarize in a nearby table the marginal values of the HIA household forecast distribution, but the reader should understand that cross-dimensions among all three categories/ brackets were estimated for every dimension of the HIA forecast.

Household Size Categories

	1 person	2-person	3-person	4-person	5 or more		(excludes pop in GQ) average HH size
2020	27.2%	36.0%	15.4%	12.9%	8.5%	100.0%	2.52
2030	30.1%	35.8%	16.5%	12.5%	5.1%	100.0%	2.32
2040	31.3%	35.6%	16.9%	12.4%	3.9%	100.0%	2.25
2050	32.0%	35.5%	17.1%	12.2%	3.1%	100.0%	2.21

Household Income Brackets

	under $15,000	$15,000 - $24,999	$25,000 - $34,999	$35,000 - $49,999	$50,000 - $74,999	$75,000 - $99,999	$100,000- $149,999	$150,000 and over	
2020	7.5%	5.9%	6.6%	10.3%	16.8%	13.8%	19.1%	20.0%	100.0%
2030	8.3%	6.9%	7.5%	11.5%	16.1%	12.7%	18.1%	19.0%	100.0%
2040	8.6%	7.4%	7.9%	12.1%	15.9%	12.2%	17.7%	18.4%	100.0%
2050	8.8%	7.6%	8.1%	12.4%	15.7%	11.9%	17.4%	18.1%	100.0%

Household Age Brackets (Head of Household)

	under 25	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 to 84	85 & over	
2020	3.3%	16.9%	19.9%	17.9%	17.8%	15.0%	6.6%	2.6%	100.0%
2030	3.3%	14.1%	18.5%	18.2%	16.7%	14.8%	10.2%	4.4%	100.0%
2040	3.4%	13.3%	16.6%	17.6%	17.3%	15.0%	10.9%	6.0%	100.0%
2050	3.3%	12.6%	15.5%	16.6%	17.3%	15.8%	11.8%	7.3%	100.0%

Figure 14: Margins of households by size, income and age in the MSA HIA forecast

MSA Population by Race Forecast

The race forecast for the MSA region isn't a different forecast from the regional population forecast. The races add up to be the same on a total regional basis. Here we describe in more detail the added dimensions of the population forecast by race and ethnicity. For purposes of exposition and adequacy in the population by race forecast, the number of categories of race are narrowed to 1) white, 2) black, 3) AIAN – American Indian or Alaskan native, 4) API – Asian or Pacific islander, 5) Hispanic or Latino.

Simplifying assumptions are made in the forecast of population by race. First, people self-identified in the Census as Hispanic or Latino, regardless of their self-identified race, are lumped as one into a 5th category that the forecast treats as its own race. Second, people self-identified in the Census as being of "two-or-more races" are separated into 1 of the 5 main racial categories in the forecast. For example, someone who identified him(er)self as bi-racial of white and Asian descent would be categorized in the Asian population segment for purposes of the forecast; someone identifying as black and Hispanic/ Latino would be categorized in the Hispanic/ Latino population segment. Thus, a person identifying as Hispanic/ Latino regardless of racial self-selection is designated (for purposes of this forecast) into the subpopulation of Hispanics; and someone that has self-identified as multi-racial is designated in one of the "non-white" categories (for purpose of this forecast).

Population segments are assumed to have separate rates of fertility and mortality based on race. These rates are arrived from Census birth and death demographic data and forecasts are based on projections from a Census forecast of these vital rates. Projections of fertility for each race are both age-specific adjusted and further altered to reflect detectable differences between birth rates of women (by age) residing in the MSA versus the national trend. Projections of mortality, age-specific death rates, for residents in the MSA are assumed to reflect the same trends nationally.

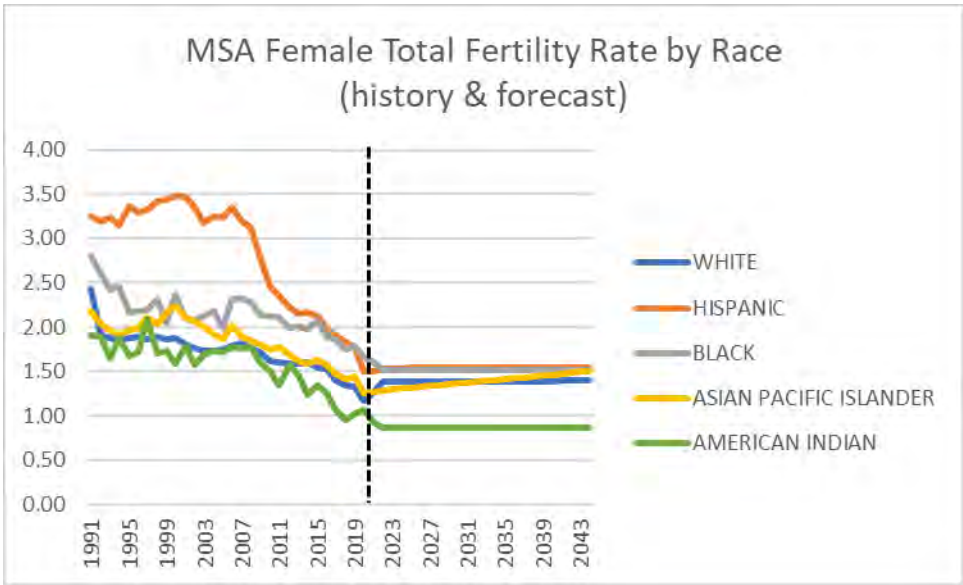


Figure 15: Total Fertility Rate (TFR) by Race (TFR is the average number of children a woman is likely to have in her lifetime)

The total fertility rate is an "aggregation" of age-specific birth rates of women of child bearing ages estimated by each race in the MSA in terms of how the individual birth rates sum to represent an average number of expected children per woman.

The life expectancy (in years) for men and women are so starkly different that the assumption is split between for them. Women generally live longer in the US (and MSA too) and this is reflected in the life expectancy chart (below). There is also a difference among races, with Hispanic subpopulations having the highest life expectancies, followed by white and API, then black and AINA.

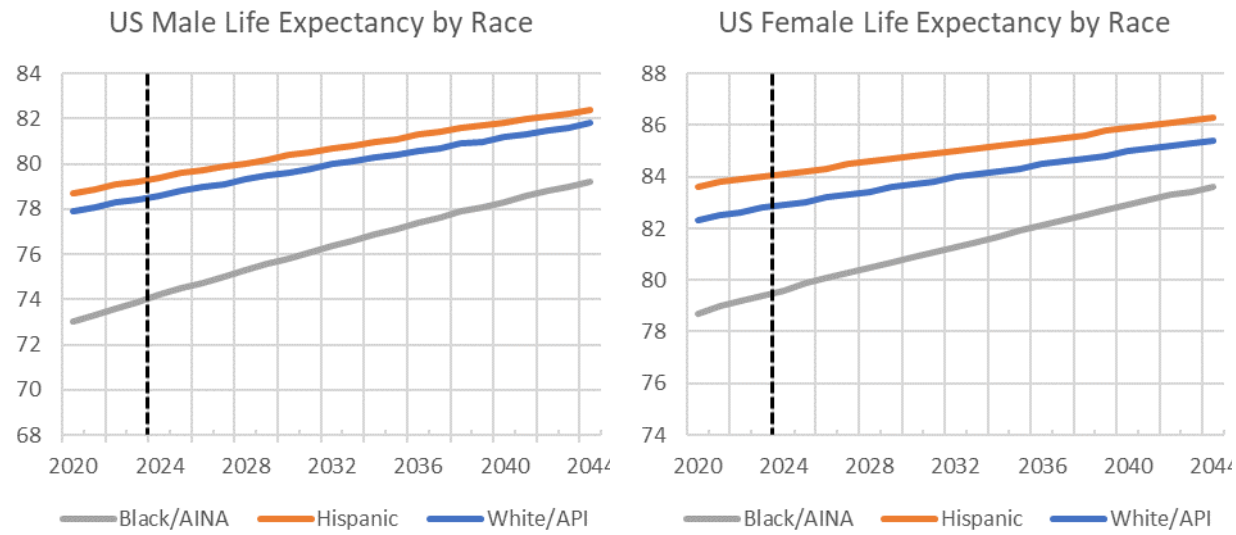


Figure 16: MSA Life expectancies (in years) by race (same as US); (note: Census assumes black & AINA subpopulation have same life expectancies and white & API subpopulations have same)

The region's population is expected to become more racially diverse even as the overall MSA population more slowly expands, and the population grows older. The white population is anticipated to grow the least, at an annualized rate of 0.1%; this is followed by the Native American community at 0.2% growth per year. The fastest growing segment will be the Hispanic/ Latino population, and the Black and Asian community are all expected to exceed average population growth for the entire region.

	MSA Population (2024-44)		
	change	%change	%APR
white	41,918	2.4%	0.1%
black	30,316	27.8%	1.3%
AIAN	1,288	5.0%	0.2%
API	81,350	31.6%	1.4%
Hispanic	159,966	43.1%	1.9%
total pop.	314,837	11.8%	0.6%

Figure 17: MSA population by race: growth, %growth, annualized percentage rate

MSA Disability Forecast

The number of persons with a disability is based on self-identification and that person might identify with multiple incidents of some form of disability according to Census data. The likelihood of a person identifying him(her)self with at least 1 of 6 disability attributes rises with the age of the person. Thus, the MSA disability forecast is produced on an age-adjusted basis to reflect the projected increase in median age of the regional population and the increasing proportion of the population entering retirement age when the incident of one form of disability sharply increases.

The disability forecast is defined by data from a recent Census survey of the MSA region. This survey asks the respondent whether the person has difficulty in 1 or more areas (listed below). The term 'disability' is not specifically used in the survey instrument; however, the Census uses the questions in the survey to glean the number of disabled residents for the region.

- Hearing difficulty, defined as deaf or having serious difficulty hearing.
- Vision difficulty, defined as blind or having serious difficulty seeing, even when wearing glasses.
- Cognitive difficulty, defined as, because of a physical, mental, or emotional problem, having difficulty remembering, concentrating, or making decisions.
- Ambulatory difficulty, defined as having serious difficulty walking or climbing stairs.
- Self-care difficulty, defined as having difficulty bathing or dressing.
- Independent living difficulty, defined as, because of a physical, mental, or emotional problem, having difficulty doing errands alone such as visiting a doctor's office or shopping.

Following the methodology of Portland State University's Population Research Center (PRC), responses to individual disability categories with significant correlation are grouped together into three broader disability categories. The three groupings include 1) hearing and vision difficulties combined, 2) ambulatory and self-care difficulties combined, and 3) cognitive and independent living difficulties combined. The reasoning behind the groupings is individuals who report difficulty(s) in one of the three groupings have a very high incident of having both difficulties; and thus, the groupings reduce the "double counting" of persons with disabilities but do not fully eliminate it.

The six disability categories, and subsequent three groupings, are mutually inclusive. For example, respondents can self-identify as having both hearing and vision difficulties, as well as having self-care and ambulatory difficulties and/ or cognitive and independent living difficulties; in other words, all three, or two of the three, or in just one of the groupings.

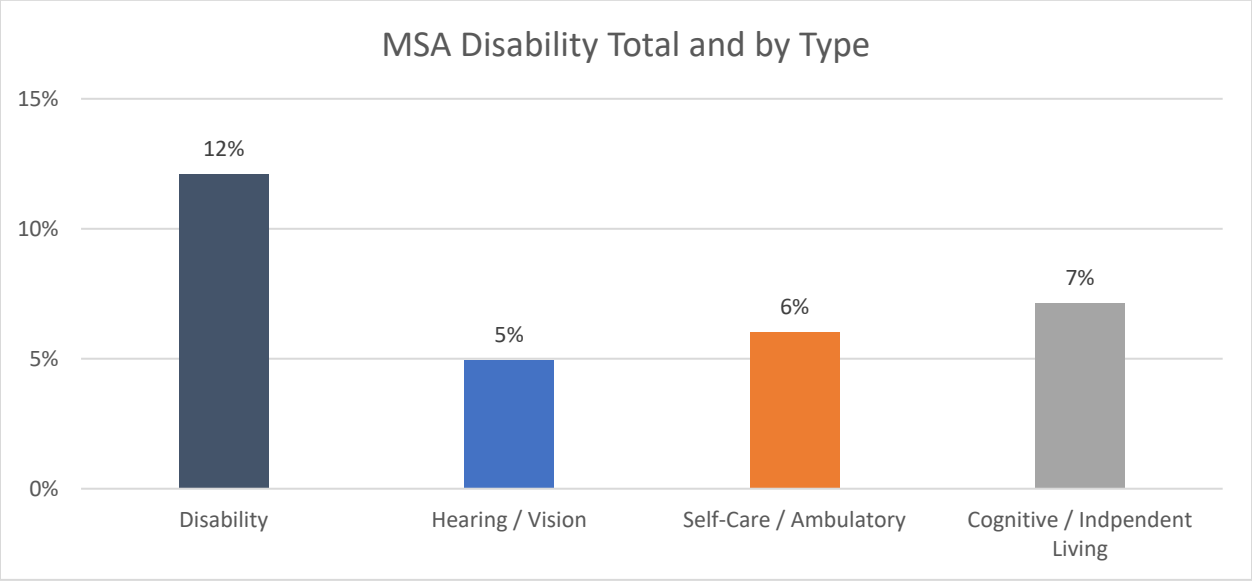


Figure 18: Disability groupings (note: overlap in the disability groupings sum to exceed overall percentage disabled)

Since disability positively correlates with age, the three disability groupings are further disaggregated by age to apply current age-specific disability rates to age-specific forecast brackets.

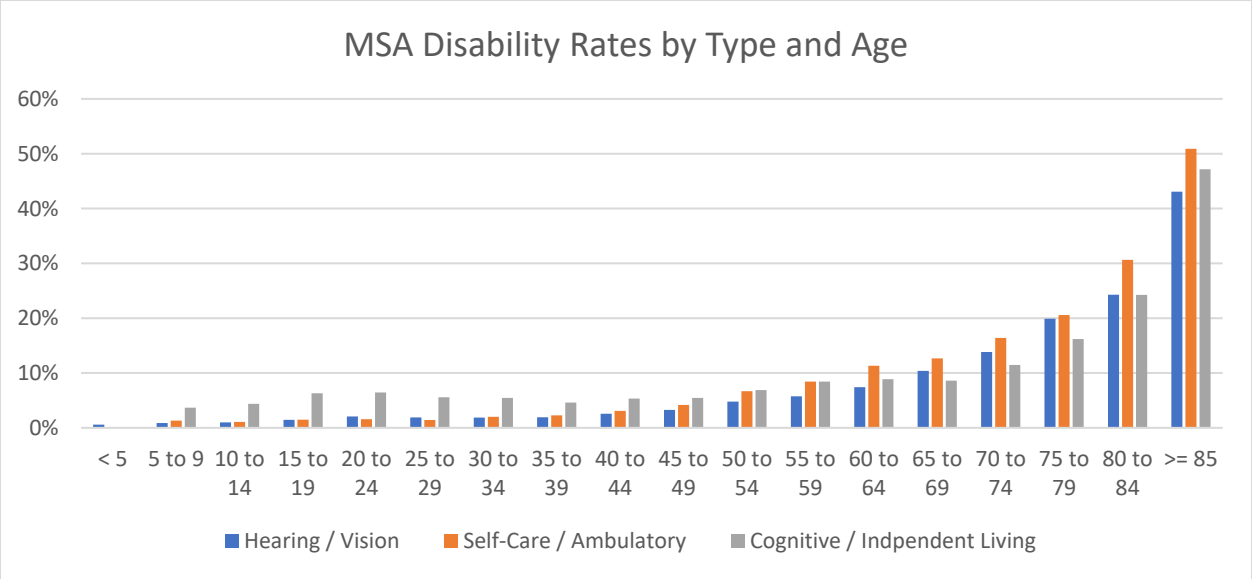


Figure 15: MSA incident rate of disability by groupings by age

MSA Employment Forecast

(Employment figures in thousands)	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	1,261.2	1,263.9	1,274.0	1,286.2	1,300.6	1,316.4	1,330.4	1,339.5	1,345.1
Manufacturing, TOTAL	124.2	123.7	124.9	125.5	125.6	126.1	126.7	126.8	126.5
Durables, total	92.7	92.4	93.6	94.1	94.0	94.3	94.8	94.8	94.4
Wood Products	4.0	4.0	4.0	3.9	3.9	3.8	3.8	3.8	3.7
Primary Metals	4.9	5.2	5.1	5.0	4.9	4.7	4.6	4.6	4.5
Fab. Metals	12.7	12.6	12.6	12.6	12.5	12.5	12.5	12.6	12.6
Machinery Mfg.	10.3	9.7	9.5	9.3	9.2	9.2	9.2	9.1	9.1
Computer & Electronics	39.3	39.2	40.7	41.4	41.7	42.0	42.3	42.3	42.1
Transp. Equipment	6.4	6.2	5.8	5.6	5.4	5.3	5.2	5.1	5.0
Other Durable Goods	15.1	15.4	15.8	16.2	16.5	16.8	17.1	17.3	17.4
Nondurables, total	31.5	31.3	31.3	31.5	31.6	31.8	32.0	32.1	32.1
Food Processing	13.7	13.7	13.8	13.9	13.9	14.0	14.0	14.1	14.0
Paper	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2
Other Nondurables	15.5	15.2	15.2	15.3	15.4	15.5	15.7	15.8	15.8
Nonmanufacturing (private), TOTAL	980.5	982.5	990.0	1,000.0	1,012.8	1,026.6	1,038.7	1,047.3	1,053.2
Natural Resources & Mining	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7
Construction	91.4	92.1	93.3	94.9	96.6	98.5	100.3	101.5	102.1
Trade, Transport & Utilities	224.4	222.7	223.8	225.2	226.0	226.5	227.4	228.6	229.3
Wholesale Trade	57.9	58.2	58.4	59.0	59.3	59.4	59.6	59.8	60.0
Retail Trade	115.5	114.3	115.8	117.0	117.8	118.5	119.8	121.1	122.2
TWU	51.0	50.2	49.6	49.2	48.8	48.5	48.1	47.7	47.1
Information Services	28.5	29.5	29.7	29.8	30.2	30.8	31.2	31.5	31.6
Publishing	13.0	13.6	13.9	14.0	14.2	14.5	14.8	14.9	14.9
Internet, etc.	15.5	15.9	15.9	15.8	16.0	16.3	16.4	16.6	16.6
Financial Activities	76.8	78.1	79.0	79.4	79.4	79.5	79.4	79.5	79.8
Finance & Insurance	41.9	43.2	44.2	44.7	44.9	45.0	45.0	45.1	45.5
Real Estate	34.9	34.9	34.8	34.7	34.6	34.6	34.4	34.4	34.3
Pro. Business Services	199.3	195.7	195.2	197.3	203.0	209.0	214.2	217.3	219.7
Pro., Sci., Tech.	87.6	87.5	87.2	87.6	88.1	88.5	89.2	89.9	90.3
Mgmt. of Co.	41.7	41.7	42.0	42.4	42.8	43.3	43.8	44.0	44.1
Admin Sup. + Waste	70.0	66.4	66.0	67.3	72.1	77.1	81.2	83.4	85.3
Education + Health	191.5	194.5	197.0	199.8	202.6	205.3	207.7	209.9	211.9
Education	27.7	28.2	28.4	28.8	29.2	29.5	29.6	29.7	29.6
Health	163.8	166.2	168.6	171.0	173.4	175.8	178.1	180.3	182.2
Leisure + Hospitality	124.3	125.4	126.8	127.7	128.3	129.4	130.0	129.8	129.2
Arts, ent. & rec.	18.9	19.3	19.7	20.1	20.5	21.0	21.4	21.8	22.1
Lodgings & Food	105.4	106.1	107.1	107.6	107.8	108.4	108.6	108.0	107.1
Other Services	43.0	43.4	43.9	44.6	45.3	46.1	46.9	47.5	48.0
Government, Civilian TOTAL	156.5	157.7	159.1	160.6	162.2	163.7	165.0	165.4	165.4
Federal, Civilian	18.3	18.4	18.4	18.4	18.5	18.5	18.7	18.6	18.6
State & Local	138.2	139.3	140.7	142.2	143.7	145.2	146.3	146.8	146.9

MSA Employment Forecast

(Employment figures in thousands)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	1,349.9	1,352.7	1,354.0	1,355.9	1,358.5	1,361.5	1,363.6	1,365.4	1,367.5
Manufacturing, TOTAL	126.0	125.7	125.8	125.9	126.1	126.2	126.3	126.3	126.3
Durables, total	93.9	93.7	93.7	93.8	93.9	93.9	93.9	93.9	93.9
Wood Products	3.7	3.6	3.6	3.6	3.5	3.5	3.4	3.4	3.4
Primary Metals	4.4	4.4	4.4	4.3	4.3	4.3	4.2	4.2	4.2
Fab. Metals	12.7	12.7	12.9	13.1	13.3	13.4	13.5	13.6	13.7
Machinery Mfg.	9.0	9.0	9.0	9.1	9.1	9.1	9.1	9.1	9.2
Computer & Electronics	41.9	41.7	41.5	41.4	41.3	41.2	41.1	41.1	41.0
Transp. Equipment	4.9	4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.6
Other Durable Goods	17.4	17.4	17.5	17.6	17.7	17.7	17.8	17.8	17.8
Nondurables, total	32.1	32.1	32.1	32.2	32.2	32.3	32.4	32.4	32.4
Food Processing	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Paper	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9
Other Nondurables	15.9	15.9	16.0	16.1	16.2	16.2	16.3	16.4	16.5
Nonmanufacturing (private), TOTAL	1,058.6	1,062.0	1,063.6	1,065.8	1,068.6	1,071.8	1,074.0	1,075.9	1,078.3
Natural Resources & Mining	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.5
Construction	102.9	103.9	104.4	104.6	104.4	104.0	103.8	103.6	103.6
Trade, Transport & Utilities	229.7	229.3	229.2	229.6	230.2	230.7	231.4	231.7	232.0
Wholesale Trade	60.1	60.1	60.1	60.2	60.3	60.5	60.6	60.8	60.9
Retail Trade	123.3	123.6	124.5	125.7	127.0	128.0	129.1	130.0	130.7
TWU	46.3	45.5	44.5	43.7	42.9	42.2	41.6	40.9	40.4
Information Services	31.4	31.1	30.8	30.5	30.3	30.2	30.1	29.9	29.7
Publishing	14.8	14.6	14.3	14.1	13.8	13.6	13.4	13.3	13.2
Internet, etc.	16.6	16.5	16.4	16.4	16.5	16.6	16.6	16.6	16.5
Financial Activities	79.7	79.3	78.8	78.3	77.9	77.6	77.3	77.2	77.0
Finance & Insurance	45.7	45.7	45.5	45.2	45.1	45.0	45.0	45.0	45.0
Real Estate	34.0	33.6	33.3	33.1	32.8	32.6	32.4	32.2	32.0
Pro. Business Services	222.4	224.4	225.3	226.8	228.7	230.9	231.9	233.0	234.0
Pro., Sci., Tech.	90.9	91.6	92.1	92.5	92.7	93.0	93.2	93.5	93.7
Mgmt. of Co.	44.2	44.2	44.1	44.1	44.1	44.1	44.0	44.0	44.0
Admin Sup. + Waste	87.3	88.5	89.1	90.2	91.8	93.9	94.6	95.5	96.3
Education + Health	213.6	215.0	215.7	216.3	216.7	217.3	217.9	218.6	219.5
Education	29.6	29.4	28.8	28.2	27.6	27.0	26.6	26.2	26.1
Health	184.0	185.5	186.9	188.1	189.2	190.2	191.3	192.4	193.5
Leisure + Hospitality	128.9	128.6	128.9	129.1	129.4	129.8	130.2	130.2	130.5
Arts, ent. & rec.	22.5	22.8	23.0	23.3	23.6	23.9	24.2	24.4	24.7
Lodgings & Food	106.4	105.8	105.8	105.8	105.9	105.9	106.0	105.8	105.8
Other Services	48.4	48.7	48.9	49.1	49.4	49.7	50.0	50.2	50.4
Government, Civilian TOTAL	165.3	165.0	164.5	164.1	163.8	163.6	163.3	163.2	162.9
Federal, Civilian	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.7	18.6
State & Local	146.7	146.4	146.0	145.6	145.2	145.0	144.7	144.4	144.3

MSA Employment Forecast

(Employment figures in thousands)	2042	2043	2044	Average Percent Rate 1990-2000	2000-10	2010-20	2024-34	2034-44
Nonfarm Wage & Salary Jobs, TOTAL	1,369.3	1,370.4	1,371.6	2.9%	0.0%	1.6%	0.7%	0.1%
Manufacturing, TOTAL	126.2	126.1	126.0	1.4%	-2.9%	1.2%	0.1%	0.0%
Durables, total	93.7	93.6	93.5	1.9%	-3.0%	1.2%	0.1%	0.0%
Wood Products	3.3	3.3	3.3	-2.9%	-5.0%	0.6%	-1.0%	-1.0%
Primary Metals	4.2	4.1	4.0	-0.9%	-3.4%	-0.6%	-1.2%	-0.8%
Fab. Metals	13.7	13.8	13.8	2.4%	-2.0%	0.9%	0.0%	0.8%
Machinery Mfg.	9.1	9.1	9.2	1.2%	-3.8%	3.0%	-1.4%	0.2%
Computer & Electronics	41.0	41.0	40.9	3.9%	-2.1%	1.1%	0.6%	-0.2%
Transp. Equipment	4.5	4.5	4.4	1.6%	-5.6%	-0.1%	-2.8%	-1.0%
Other Durable Goods	17.9	17.9	17.9	1.5%	-3.0%	1.8%	1.5%	0.3%
Nondurables, total	32.5	32.5	32.5	0.0%	-2.6%	1.4%	0.2%	0.1%
Food Processing	14.0	14.0	14.0	-0.7%	0.7%	3.2%	0.3%	0.0%
Paper	1.9	1.9	1.8	-1.4%	-5.7%	-3.6%	-1.1%	-1.5%
Other Nondurables	16.5	16.6	16.6	0.8%	-3.5%	1.3%	0.3%	0.4%
Nonmanufacturing (private), TOTAL	1,080.3	1,081.7	1,083.1	3.4%	0.3%	1.9%	0.8%	0.2%
Natural Resources & Mining	1.6	1.6	1.6	-0.9%	-5.5%	1.2%	3.8%	-1.0%
Construction	103.8	104.3	104.9	3.7%	-1.7%	5.0%	1.3%	0.1%
Trade, Transport & Utilities	232.0	232.0	231.8	2.5%	-0.8%	1.6%	0.2%	0.1%
Wholesale Trade	61.0	61.0	61.1	2.6%	-1.0%	1.2%	0.4%	0.2%
Retail Trade	131.2	131.7	132.0	2.6%	-0.5%	0.9%	0.7%	0.7%
TWU	39.8	39.3	38.7	2.0%	-1.5%	4.0%	-1.1%	-1.6%
Information Services	29.6	29.4	29.2	4.9%	-1.3%	0.8%	0.9%	-0.6%
Publishing	13.1	12.9	12.8	8.0%	-0.6%	2.1%	1.2%	-1.3%
Internet, etc.	16.5	16.5	16.4	3.5%	-1.7%	-0.2%	0.6%	-0.1%
Financial Activities	76.9	76.7	76.5	2.6%	-0.5%	1.6%	0.3%	-0.4%
Finance & Insurance	45.1	45.1	45.0	3.3%	-0.4%	0.8%	0.9%	-0.2%
Real Estate	31.8	31.7	31.5	1.5%	-0.6%	3.0%	-0.4%	-0.6%
Pro. Business Services	234.8	234.7	234.9	5.4%	0.0%	2.9%	1.2%	0.5%
Pro., Sci., Tech.	94.0	94.2	94.4	2.9%	0.9%	3.7%	0.5%	0.3%
Mgmt. of Co.	43.9	43.9	43.8	8.2%	2.0%	4.0%	0.6%	-0.1%
Admin Sup. + Waste	96.8	96.7	96.7	6.9%	-1.5%	1.6%	2.4%	0.9%
Education + Health	220.5	221.6	222.7	3.4%	3.2%	2.1%	1.2%	0.4%
Education	25.9	25.9	26.0	4.4%	3.3%	-0.3%	0.6%	-1.2%
Health	194.6	195.6	196.7	3.3%	3.2%	2.6%	1.3%	0.6%
Leisure + Hospitality	130.5	130.5	130.3	3.0%	1.0%	-0.4%	0.3%	0.1%
Arts, ent. & rec.	25.0	25.3	25.6	2.8%	0.5%	-1.4%	1.9%	1.2%
Lodgings & Food	105.5	105.2	104.7	3.1%	1.1%	-0.3%	0.0%	-0.1%
Other Services	50.7	50.9	51.1	2.6%	0.4%	0.9%	1.2%	0.5%
Government, Civilian TOTAL	162.7	162.6	162.5	2.3%	1.2%	-0.1%	0.5%	-0.1%
Federal, Civilian	18.6	18.6	18.6	0.0%	-0.2%	0.1%	0.1%	0.0%
State & Local	144.1	144.0	143.9	2.7%	1.4%	-0.2%	0.6%	-0.2%

MSA Employment Forecast

(Annual percent change)	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	0.2%	0.2%	0.8%	1.0%	1.1%	1.2%	1.1%	0.7%	0.4%
Manufacturing, TOTAL	-0.7%	-0.4%	1.0%	0.5%	0.1%	0.4%	0.5%	0.1%	-0.3%
Durables, total	-0.6%	-0.3%	1.3%	0.5%	0.0%	0.3%	0.4%	0.0%	-0.4%
Wood Products	-4.2%	0.1%	-1.4%	-1.3%	-1.1%	-0.9%	-1.4%	-1.2%	-1.0%
Primary Metals	5.3%	4.4%	-1.1%	-1.7%	-3.1%	-3.1%	-2.0%	-0.5%	-1.2%
Fab. Metals	0.4%	-0.7%	0.2%	-0.2%	-0.8%	-0.2%	0.3%	0.7%	0.4%
Machinery Mfg.	-2.1%	-5.0%	-2.6%	-1.5%	-1.3%	-0.6%	-0.1%	-0.2%	-0.9%
Computer & Electronics	-0.9%	-0.1%	3.8%	1.6%	0.6%	0.9%	0.7%	-0.1%	-0.5%
Transp. Equipment	1.2%	-3.3%	-6.1%	-3.8%	-3.1%	-2.1%	-1.1%	-2.6%	-2.4%
Other Durable Goods	-0.9%	2.3%	2.6%	2.4%	1.9%	1.9%	1.7%	1.0%	0.4%
Nondurables, total	-1.1%	-0.6%	0.1%	0.4%	0.4%	0.6%	0.6%	0.3%	0.0%
Food Processing	-1.3%	0.5%	0.5%	0.6%	0.3%	0.5%	0.4%	0.1%	-0.1%
Paper	-3.4%	-0.6%	-1.1%	-0.9%	-0.9%	-0.9%	-1.1%	-1.1%	-1.2%
Other Nondurables	-0.6%	-1.5%	-0.1%	0.4%	0.6%	1.0%	1.1%	0.7%	0.3%
Nonmanufacturing (private), TOTAL	0.3%	0.2%	0.8%	1.0%	1.3%	1.4%	1.2%	0.8%	0.6%
Natural Resources & Mining	5.4%	-0.4%	7.1%	6.0%	5.3%	6.1%	6.0%	4.7%	3.0%
Construction	4.1%	0.8%	1.3%	1.8%	1.8%	2.0%	1.8%	1.2%	0.6%
Trade, Transport & Utilities	-0.8%	-0.8%	0.5%	0.6%	0.3%	0.2%	0.4%	0.5%	0.3%
Wholesale Trade	3.0%	0.5%	0.3%	1.0%	0.6%	0.2%	0.2%	0.4%	0.4%
Retail Trade	-1.9%	-1.1%	1.3%	1.1%	0.7%	0.6%	1.0%	1.1%	0.9%
TWU	-2.5%	-1.5%	-1.2%	-0.7%	-0.8%	-0.7%	-0.8%	-0.8%	-1.3%
Information Services	1.8%	3.6%	0.8%	0.2%	1.4%	1.9%	1.4%	0.7%	0.3%
Publishing	1.2%	4.6%	2.1%	0.7%	1.8%	2.2%	1.7%	0.8%	0.1%
Internet, etc.	2.3%	2.7%	-0.2%	-0.3%	1.1%	1.6%	1.1%	0.7%	0.5%
Financial Activities	-0.5%	1.7%	1.1%	0.5%	0.1%	0.1%	-0.2%	0.2%	0.4%
Finance & Insurance	-2.0%	3.2%	2.3%	1.1%	0.4%	0.3%	-0.1%	0.3%	0.9%
Real Estate	1.3%	0.0%	-0.4%	-0.3%	-0.2%	-0.1%	-0.3%	-0.1%	-0.3%
Pro. Business Services	-2.4%	-1.8%	-0.2%	1.1%	2.9%	2.9%	2.5%	1.5%	1.1%
Pro., Sci., Tech.	1.0%	-0.1%	-0.4%	0.5%	0.5%	0.5%	0.7%	0.7%	0.5%
Mgmt. of Co.	-1.0%	0.0%	0.7%	0.9%	1.1%	1.2%	1.0%	0.6%	0.2%
Admin Sup. + Waste	-7.0%	-5.1%	-0.6%	1.9%	7.1%	6.9%	5.3%	2.8%	2.2%
Edu. + Health	1.1%	1.5%	1.3%	1.4%	1.4%	1.4%	1.2%	1.1%	0.9%
Education	2.8%	1.9%	0.7%	1.1%	1.5%	1.2%	0.3%	0.2%	-0.1%
Health	0.8%	1.5%	1.4%	1.4%	1.4%	1.4%	1.3%	1.2%	1.1%
Leisure + Hospitality	2.5%	0.9%	1.1%	0.7%	0.4%	0.9%	0.4%	-0.2%	-0.4%
Arts, ent. & rec.	5.3%	2.0%	2.0%	2.0%	2.1%	2.2%	2.1%	1.8%	1.6%
Lodgings & Food	2.0%	0.7%	1.0%	0.5%	0.1%	0.6%	0.1%	-0.5%	-0.8%
Other Services	1.2%	0.8%	1.2%	1.6%	1.7%	1.8%	1.7%	1.3%	0.9%
Government, Civilian TOTAL	0.6%	0.7%	0.9%	1.0%	1.0%	0.9%	0.8%	0.3%	0.0%
Federal, Civilian	0.8%	0.3%	0.2%	0.2%	0.2%	0.2%	1.1%	-0.8%	-0.1%
State & Local	0.6%	0.8%	1.0%	1.1%	1.1%	1.0%	0.8%	0.4%	0.0%

MSA Employment Forecast

(Annual percent change)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	0.4%	0.2%	0.1%	0.1%	0.2%	0.2%	0.2%	0.1%	0.2%
Manufacturing, TOTAL	-0.4%	-0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Durables, total	-0.5%	-0.3%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Wood Products	-0.8%	-1.1%	-1.5%	-0.9%	-1.3%	-1.1%	-1.1%	-0.9%	-1.0%
Primary Metals	-2.4%	-1.5%	-0.5%	-0.4%	-0.5%	-0.9%	-0.6%	-0.3%	-0.7%
Fab. Metals	0.2%	0.1%	1.7%	1.5%	1.4%	1.1%	0.8%	0.8%	0.5%
Machinery Mfg.	-1.1%	-0.1%	0.6%	0.5%	0.5%	0.2%	0.2%	0.1%	0.0%
Computer & Electronics	-0.4%	-0.4%	-0.5%	-0.4%	-0.3%	-0.2%	-0.2%	-0.1%	-0.1%
Transp. Equipment	-1.9%	-1.4%	-0.8%	-0.6%	-0.5%	-0.5%	-0.7%	-0.6%	-0.9%
Other Durable Goods	0.1%	0.4%	0.6%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%
Nondurables, total	-0.1%	0.0%	0.1%	0.1%	0.2%	0.2%	0.2%	0.1%	0.1%
Food Processing	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Paper	-1.3%	-1.4%	-1.5%	-1.4%	-1.4%	-1.4%	-1.4%	-1.4%	-1.5%
Other Nondurables	0.1%	0.3%	0.5%	0.4%	0.6%	0.5%	0.5%	0.4%	0.4%
Nonmanufacturing (private), TOTAL	0.5%	0.3%	0.2%	0.2%	0.3%	0.3%	0.2%	0.2%	0.2%
Natural Resources & Mining	0.7%	-0.3%	-0.4%	-4.2%	-3.5%	-2.7%	-0.9%	-1.4%	1.1%
Construction	0.8%	1.0%	0.5%	0.2%	-0.2%	-0.3%	-0.2%	-0.2%	0.0%
Trade, Transport & Utilities	0.2%	-0.2%	0.0%	0.2%	0.3%	0.2%	0.3%	0.1%	0.1%
Wholesale Trade	0.1%	0.0%	-0.1%	0.1%	0.2%	0.3%	0.3%	0.2%	0.2%
Retail Trade	0.9%	0.3%	0.7%	0.9%	1.0%	0.8%	0.9%	0.7%	0.6%
TWU	-1.6%	-1.8%	-2.1%	-1.9%	-1.7%	-1.6%	-1.5%	-1.6%	-1.4%
Information Services	-0.5%	-1.0%	-1.1%	-0.8%	-0.6%	-0.4%	-0.4%	-0.6%	-0.6%
Publishing	-0.9%	-1.4%	-1.8%	-1.8%	-1.7%	-1.5%	-1.3%	-1.1%	-0.9%
Internet, etc.	-0.2%	-0.6%	-0.6%	0.1%	0.3%	0.5%	0.3%	-0.2%	-0.5%
Financial Activities	-0.2%	-0.4%	-0.6%	-0.6%	-0.5%	-0.4%	-0.3%	-0.2%	-0.2%
Finance & Insurance	0.4%	0.0%	-0.4%	-0.6%	-0.4%	-0.1%	-0.1%	0.1%	0.1%
Real Estate	-0.9%	-1.0%	-0.9%	-0.7%	-0.7%	-0.7%	-0.7%	-0.6%	-0.5%
Pro. Business Services	1.2%	0.9%	0.4%	0.7%	0.8%	1.0%	0.4%	0.5%	0.5%
Pro., Sci., Tech.	0.6%	0.8%	0.5%	0.4%	0.3%	0.2%	0.3%	0.3%	0.3%
Mgmt. of Co.	0.2%	0.0%	-0.1%	-0.1%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
Admin Sup. + Waste	2.4%	1.4%	0.6%	1.3%	1.8%	2.2%	0.8%	0.9%	0.9%
Edu. + Health	0.8%	0.7%	0.4%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%
Education	-0.2%	-0.6%	-1.9%	-2.2%	-2.2%	-2.0%	-1.6%	-1.4%	-0.7%
Health	1.0%	0.9%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Leisure + Hospitality	-0.3%	-0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.1%	0.2%
Arts, ent. & rec.	1.5%	1.3%	1.1%	1.2%	1.2%	1.2%	1.3%	1.2%	1.1%
Lodgings & Food	-0.6%	-0.5%	0.0%	-0.1%	0.1%	0.1%	0.1%	-0.2%	0.0%
Other Services	0.8%	0.7%	0.5%	0.5%	0.5%	0.6%	0.6%	0.5%	0.5%
Government, Civilian TOTAL	-0.1%	-0.2%	-0.3%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%
Federal, Civilian	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.8%	-0.7%
State & Local	-0.1%	-0.2%	-0.3%	-0.3%	-0.2%	-0.2%	-0.2%	-0.2%	-0.1%

MSA Employment Forecast

	2042	2043	2044
(Annual percent change)			
Nonfarm Wage & Salary Jobs, TOTAL	0.1%	0.1%	0.1%
Manufacturing, TOTAL	-0.1%	-0.1%	-0.1%
Durables, total	-0.1%	-0.2%	-0.1%
Wood Products	-1.2%	-0.6%	-0.5%
Primary Metals	-1.2%	-1.6%	-1.4%
Fab. Metals	0.2%	0.2%	0.2%
Machinery Mfg.	0.0%	0.0%	0.2%
Computer & Electronics	-0.1%	-0.1%	0.0%
Transp. Equipment	-1.6%	-1.9%	-2.0%
Other Durable Goods	0.2%	0.1%	0.2%
Nondurables, total	0.1%	0.0%	0.1%
Food Processing	0.0%	0.0%	0.0%
Paper	-1.6%	-1.6%	-1.5%
Other Nondurables	0.4%	0.2%	0.3%
Nonmanufacturing (private), TOTAL	0.2%	0.1%	0.1%
Natural Resources & Mining	2.4%	-0.1%	0.0%
Construction	0.3%	0.5%	0.5%
Trade, Transport & Utilities	0.0%	0.0%	-0.1%
Wholesale Trade	0.1%	0.1%	0.1%
Retail Trade	0.3%	0.4%	0.3%
TWU	-1.3%	-1.4%	-1.4%
Information Services	-0.3%	-0.6%	-0.7%
Publishing	-0.8%	-1.0%	-1.0%
Internet, etc.	0.2%	-0.3%	-0.4%
Financial Activities	-0.2%	-0.2%	-0.2%
Finance & Insurance	0.1%	0.0%	-0.1%
Real Estate	-0.5%	-0.5%	-0.4%
Pro. Business Services	0.3%	0.0%	0.1%
Pro., Sci., Tech.	0.3%	0.2%	0.3%
Mgmt. of Co.	-0.1%	-0.1%	-0.1%
Admin Sup. + Waste	0.5%	-0.2%	0.0%
Edu. + Health	0.4%	0.5%	0.5%
Education	-0.4%	0.0%	0.2%
Health	0.6%	0.6%	0.6%
Leisure + Hospitality	0.0%	0.0%	-0.1%
Arts, ent. & rec.	1.2%	1.2%	1.1%
Lodgings & Food	-0.3%	-0.3%	-0.4%
Other Services	0.5%	0.4%	0.4%
Government, Civilian TOTAL	-0.1%	-0.1%	0.0%
Federal, Civilian	-0.1%	0.0%	0.0%
State & Local	-0.1%	-0.1%	0.0%

MSA Population

by Age (in thousands)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Total Population	2,586.4	2,606.9	2,625.1	2,643.2	2,661.8	2,680.7	2,700.0	2,719.3	2,738.1	2,756.3
under 4 years old	131.0	133.1	134.5	135.6	136.4	137.1	137.7	138.2	138.6	138.9
5 to 9 years old	138.1	138.0	138.1	138.4	139.0	139.7	140.4	141.1	141.8	142.5
10 to 14 years old	147.3	146.4	145.5	144.9	144.5	144.4	144.5	144.7	145.0	145.4
15 to 19 years old	148.8	149.4	149.7	149.8	149.9	150.0	150.1	150.3	150.5	150.7
20 to 24 years old	154.6	155.9	156.8	157.7	158.7	159.8	160.8	161.7	162.5	163.3
25 to 29 years old	176.9	175.0	173.4	172.4	172.0	172.0	172.3	172.9	173.5	174.2
30 to 34 years old	199.9	196.8	193.9	191.3	189.3	187.6	186.4	185.6	185.1	184.7
35 to 39 years old	200.2	200.7	200.5	199.9	199.0	198.0	197.0	196.0	195.1	194.3
40 to 44 years old	194.2	195.8	197.1	198.0	198.8	199.2	199.5	199.5	199.4	199.1
45 to 49 years old	176.4	179.9	183.0	185.7	188.1	190.3	192.1	193.7	195.0	196.0
50 to 54 years old	168.7	170.1	171.9	173.9	176.1	178.3	180.5	182.7	184.7	186.6
55 to 59 years old	153.9	156.2	158.4	160.5	162.6	164.8	167.0	169.3	171.5	173.7
60 to 64 years old	147.5	148.0	148.8	149.8	151.1	152.6	154.3	156.1	158.0	159.9
65 to 69 years old	137.7	138.2	138.6	139.2	140.0	140.9	141.9	143.1	144.4	145.8
70 to 74 years old	118.5	120.1	121.4	122.7	123.8	124.9	125.9	127.0	128.1	129.3
75 to 79 years old	90.2	92.9	95.3	97.5	99.5	101.3	102.9	104.4	105.8	107.2
80 to 84 years old	54.0	58.0	61.5	64.7	67.5	70.1	72.4	74.5	76.4	78.1
85 years or older	48.4	52.5	56.7	61.1	65.5	69.9	74.2	78.5	82.6	86.6

(annualized pct. change)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Total Population	0.9%	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
under 4 years old	2.3%	1.6%	1.1%	0.8%	0.6%	0.5%	0.4%	0.3%	0.3%	0.2%
5 to 9 years old	-0.5%	-0.1%	0.1%	0.3%	0.4%	0.5%	0.5%	0.5%	0.5%	0.4%
10 to 14 years old	-0.7%	-0.7%	-0.6%	-0.4%	-0.2%	-0.1%	0.1%	0.2%	0.2%	0.3%
15 to 19 years old	0.8%	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%
20 to 24 years old	1.1%	0.9%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%	0.4%
25 to 29 years old	-1.4%	-1.1%	-0.9%	-0.6%	-0.2%	0.0%	0.2%	0.3%	0.4%	0.4%
30 to 34 years old	-1.5%	-1.5%	-1.5%	-1.3%	-1.1%	-0.9%	-0.6%	-0.4%	-0.3%	-0.2%
35 to 39 years old	0.7%	0.3%	-0.1%	-0.3%	-0.4%	-0.5%	-0.5%	-0.5%	-0.5%	-0.4%
40 to 44 years old	0.9%	0.8%	0.6%	0.5%	0.4%	0.2%	0.1%	0.0%	-0.1%	-0.1%
45 to 49 years old	2.3%	2.0%	1.7%	1.5%	1.3%	1.1%	1.0%	0.8%	0.7%	0.5%
50 to 54 years old	0.6%	0.9%	1.0%	1.2%	1.2%	1.3%	1.2%	1.2%	1.1%	1.0%
55 to 59 years old	1.7%	1.5%	1.4%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
60 to 64 years old	0.0%	0.3%	0.5%	0.7%	0.9%	1.0%	1.1%	1.2%	1.2%	1.2%
65 to 69 years old	0.4%	0.3%	0.4%	0.4%	0.5%	0.6%	0.7%	0.8%	0.9%	1.0%
70 to 74 years old	1.6%	1.3%	1.1%	1.0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
75 to 79 years old	3.5%	3.0%	2.6%	2.3%	2.0%	1.8%	1.6%	1.5%	1.4%	1.3%
80 to 84 years old	9.1%	7.4%	6.1%	5.2%	4.4%	3.8%	3.3%	2.9%	2.5%	2.3%
85 years or older	8.3%	8.3%	8.1%	7.7%	7.2%	6.7%	6.2%	5.7%	5.3%	4.8%

MSA Population

by Age (in thousands)	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Total Population	2,774.1	2,791.1	2,806.7	2,821.4	2,835.2	2,848.2	2,860.3	2,871.6	2,882.1	2,892.0
under 4 years old	139.1	139.3	139.4	139.4	139.4	139.4	139.3	139.1	139.0	138.8
5 to 9 years old	143.0	143.5	143.9	144.1	144.3	144.4	144.5	144.4	144.4	144.2
10 to 14 years old	145.9	146.3	146.7	147.0	147.3	147.6	147.8	147.9	148.0	148.0
15 to 19 years old	151.0	151.3	151.5	151.8	152.0	152.2	152.3	152.4	152.5	152.6
20 to 24 years old	163.9	164.4	164.7	164.9	165.1	165.1	165.1	165.1	165.0	164.8
25 to 29 years old	174.9	175.5	175.9	176.3	176.5	176.6	176.6	176.6	176.5	176.3
30 to 34 years old	184.6	184.6	184.6	184.6	184.6	184.6	184.5	184.5	184.3	184.2
35 to 39 years old	193.6	193.0	192.4	192.0	191.5	191.2	190.8	190.5	190.2	189.9
40 to 44 years old	198.8	198.4	197.9	197.4	196.9	196.3	195.8	195.3	194.9	194.4
45 to 49 years old	196.8	197.3	197.7	197.9	197.9	197.8	197.7	197.4	197.2	196.8
50 to 54 years old	188.3	189.8	191.1	192.2	193.2	193.9	194.5	194.9	195.3	195.5
55 to 59 years old	175.8	177.8	179.7	181.5	183.1	184.6	185.9	187.1	188.2	189.1
60 to 64 years old	161.9	163.9	165.9	167.8	169.7	171.6	173.4	175.0	176.6	178.1
65 to 69 years old	147.3	148.9	150.6	152.4	154.1	155.9	157.7	159.5	161.2	163.0
70 to 74 years old	130.5	131.8	133.2	134.6	136.1	137.6	139.2	140.8	142.4	144.1
75 to 79 years old	108.5	109.8	111.1	112.4	113.7	115.0	116.4	117.8	119.2	120.7
80 to 84 years old	79.7	81.3	82.7	84.0	85.3	86.6	87.9	89.1	90.4	91.6
85 years or older	90.4	94.2	97.8	101.2	104.6	107.8	111.0	114.1	117.1	120.0

(annualized pct. change)	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Total Population	0.6%	0.6%	0.6%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.3%
under 4 years old	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%
5 to 9 years old	0.4%	0.3%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	-0.1%	-0.1%
10 to 14 years old	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%
15 to 19 years old	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
20 to 24 years old	0.4%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%
25 to 29 years old	0.4%	0.3%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	-0.1%	-0.1%
30 to 34 years old	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
35 to 39 years old	-0.4%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
40 to 44 years old	-0.2%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%
45 to 49 years old	0.4%	0.3%	0.2%	0.1%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.2%
50 to 54 years old	0.9%	0.8%	0.7%	0.6%	0.5%	0.4%	0.3%	0.2%	0.2%	0.1%
55 to 59 years old	1.2%	1.2%	1.1%	1.0%	0.9%	0.8%	0.7%	0.6%	0.6%	0.5%
60 to 64 years old	1.2%	1.2%	1.2%	1.2%	1.1%	1.1%	1.0%	1.0%	0.9%	0.8%
65 to 69 years old	1.0%	1.1%	1.1%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%
70 to 74 years old	0.9%	1.0%	1.0%	1.1%	1.1%	1.1%	1.1%	1.2%	1.2%	1.2%
75 to 79 years old	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
80 to 84 years old	2.1%	1.9%	1.7%	1.6%	1.6%	1.5%	1.5%	1.4%	1.4%	1.4%
85 years or older	4.5%	4.1%	3.8%	3.5%	3.3%	3.1%	2.9%	2.8%	2.6%	2.5%

MSA Population

by Age	2044	Average Percent Rate 1990-2000	2000-10	2010-20	2024-34	2034-44
(in thousands)						
Total Population	2,901.2	2.3%	1.4%	1.2%	0.7%	0.4%
under 4 years old	138.5	1.5%	0.7%	-1.0%	0.6%	0.0%
5 to 9 years old	144.1	1.8%	0.5%	-0.1%	0.3%	0.1%
10 to 14 years old	148.0	2.2%	0.7%	0.5%	-0.1%	0.1%
15 to 19 years old	152.6	2.8%	0.8%	0.4%	0.1%	0.1%
20 to 24 years old	164.7	2.4%	0.8%	0.6%	0.6%	0.0%
25 to 29 years old	176.1	1.8%	1.3%	1.1%	-0.1%	0.1%
30 to 34 years old	184.0	0.8%	1.1%	1.6%	-0.8%	0.0%
35 to 39 years old	189.6	1.0%	0.4%	1.8%	-0.3%	-0.2%
40 to 44 years old	194.0	2.3%	-0.1%	1.3%	0.2%	-0.2%
45 to 49 years old	196.5	5.3%	0.3%	0.6%	1.1%	0.0%
50 to 54 years old	195.6	6.9%	1.9%	0.1%	1.1%	0.4%
55 to 59 years old	189.8	4.9%	5.0%	0.3%	1.3%	0.8%
60 to 64 years old	179.4	1.1%	7.0%	1.7%	0.9%	1.0%
65 to 69 years old	164.6	-1.2%	5.3%	4.8%	0.7%	1.1%
70 to 74 years old	145.7	0.2%	1.6%	6.9%	1.0%	1.1%
75 to 79 years old	122.2	1.7%	-0.5%	5.0%	1.9%	1.2%
80 to 84 years old	92.9	2.8%	1.0%	1.5%	4.0%	1.5%
85 years or older	122.9	3.4%	3.5%	0.8%	6.4%	3.1%

	2044
(annualized pct. change)	
Total Population	0.3%
under 4 years old	-0.2%
5 to 9 years old	-0.1%
10 to 14 years old	0.0%
15 to 19 years old	0.0%
20 to 24 years old	-0.1%
25 to 29 years old	-0.1%
30 to 34 years old	-0.1%
35 to 39 years old	-0.2%
40 to 44 years old	-0.2%
45 to 49 years old	-0.2%
50 to 54 years old	0.1%
55 to 59 years old	0.4%
60 to 64 years old	0.8%
65 to 69 years old	1.0%
70 to 74 years old	1.2%
75 to 79 years old	1.2%
80 to 84 years old	1.4%
85 years or older	2.4%

MSA Households

by Age of Head	2024	2025	2026	2027	2028	2029	2030	2031	2032
(in thousands)									
Total Households	1,073.4	1,086.4	1,098.6	1,110.6	1,122.6	1,134.5	1,146.4	1,158.1	1,169.6
15 to 24 years old	34.4	35.0	35.6	36.1	36.7	37.2	37.8	38.4	38.9
25 to 34 years old	166.8	165.0	163.4	162.2	161.5	161.2	161.2	161.5	161.9
35 to 44 years old	210.2	211.3	211.9	212.2	212.1	211.9	211.6	211.2	210.7
45 to 54 years old	192.5	195.3	198.0	200.8	203.4	205.9	208.2	210.3	212.2
55 to 64 years old	178.2	180.0	181.9	184.0	186.2	188.6	191.1	193.6	196.3
65 to 74 years old	162.5	163.7	164.8	165.9	167.0	168.2	169.4	170.8	172.2
75 to 84 years old	95.9	100.4	104.3	107.9	111.1	114.0	116.6	119.0	121.2
85 years and older	32.9	35.7	38.6	41.5	44.5	47.5	50.5	53.4	56.2
Household size (avg.)	2.41	2.40	2.39	2.38	2.37	2.36	2.36	2.35	2.34

	2024	2025	2026	2027	2028	2029	2030	2031	2032
(annualized percent change)									
Total Households	1.3%	1.2%	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	1.0%
15 to 24 years old	2.2%	1.9%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
25 to 34 years old	-1.2%	-1.1%	-1.0%	-0.7%	-0.4%	-0.2%	0.0%	0.2%	0.3%
35 to 44 years old	0.8%	0.6%	0.3%	0.1%	0.0%	-0.1%	-0.2%	-0.2%	-0.2%
45 to 54 years old	1.5%	1.5%	1.4%	1.4%	1.3%	1.2%	1.1%	1.0%	0.9%
55 to 64 years old	1.0%	1.0%	1.1%	1.1%	1.2%	1.3%	1.3%	1.3%	1.4%
65 to 74 years old	0.9%	0.7%	0.7%	0.6%	0.7%	0.7%	0.7%	0.8%	0.9%
75 to 84 years old	5.5%	4.7%	4.0%	3.4%	3.0%	2.6%	2.3%	2.1%	1.9%
85 years and older	8.3%	8.3%	8.1%	7.7%	7.2%	6.7%	6.2%	5.7%	5.3%

MSA Households

by Age of Head	2033	2034	2035	2036	2037	2038	2039	2040	2041
(in thousands)									
Total Households	1,180.8	1,191.8	1,202.5	1,212.7	1,222.5	1,231.9	1,241.0	1,249.4	1,256.7
15 to 24 years old	39.5	40.1	40.6	41.1	41.6	42.1	42.6	42.9	42.9
25 to 34 years old	162.5	163.1	163.8	164.4	164.9	165.4	165.9	166.1	166.1
35 to 44 years old	210.1	209.6	209.1	208.6	208.2	207.7	207.3	206.9	206.4
45 to 54 years old	213.9	215.3	216.6	217.5	218.3	218.9	219.3	219.6	219.7
55 to 64 years old	198.9	201.5	204.1	206.7	209.1	211.4	213.6	215.6	217.3
65 to 74 years old	173.8	175.5	177.2	179.1	181.0	182.9	185.0	187.0	189.2
75 to 84 years old	123.2	125.2	127.1	128.9	130.6	132.4	134.1	135.8	137.6
85 years and older	58.9	61.5	64.0	66.5	68.8	71.1	73.3	75.5	77.6
Household size (avg.)	2.33	2.33	2.32	2.31	2.31	2.30	2.30	2.29	2.29

	2033	2034	2035	2036	2037	2038	2039	2040	2041
(annualized percent chan									
Total Households	1.0%	0.9%	0.9%	0.8%	0.8%	0.8%	0.7%	0.7%	0.6%
15 to 24 years old	1.4%	1.4%	1.3%	1.3%	1.2%	1.2%	1.1%	0.7%	0.0%
25 to 34 years old	0.3%	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%	0.1%	0.0%
35 to 44 years old	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
45 to 54 years old	0.8%	0.7%	0.6%	0.5%	0.4%	0.3%	0.2%	0.1%	0.1%
55 to 64 years old	1.3%	1.3%	1.3%	1.2%	1.2%	1.1%	1.0%	0.9%	0.8%
65 to 74 years old	0.9%	1.0%	1.0%	1.0%	1.1%	1.1%	1.1%	1.1%	1.1%
75 to 84 years old	1.7%	1.6%	1.5%	1.4%	1.4%	1.3%	1.3%	1.3%	1.3%
85 years and older	4.8%	4.5%	4.1%	3.8%	3.5%	3.3%	3.1%	2.9%	2.8%

MSA Households

by Age of Head	2042	2043	2044	Average Percent Rate 2000-22	2022-32	2032-45
(in thousands)						
Total Households	1,263.7	1,270.5	1,276.9	1.5%	1.1%	0.7%
15 to 24 years old	42.9	42.9	42.8	-1.3%	1.7%	0.7%
25 to 34 years old	166.0	165.8	165.6	0.7%	-0.4%	0.2%
35 to 44 years old	206.0	205.6	205.2	0.8%	0.2%	-0.2%
45 to 54 years old	219.7	219.7	219.5	0.6%	1.3%	0.3%
55 to 64 years old	218.9	220.3	221.6	3.0%	1.1%	1.0%
65 to 74 years old	191.3	193.4	195.5	4.5%	0.7%	1.1%
75 to 84 years old	139.4	141.2	143.0	2.4%	3.8%	1.4%
85 years and older	79.6	81.6	83.6	2.6%	6.9%	3.3%
Household size (avg.)	2.28	2.28	2.27			

	2042	2043	2044
(annualized percent chan			
Total Households	0.6%	0.5%	0.5%
15 to 24 years old	0.0%	0.0%	0.0%
25 to 34 years old	-0.1%	-0.1%	-0.1%
35 to 44 years old	-0.2%	-0.2%	-0.2%
45 to 54 years old	0.0%	0.0%	-0.1%
55 to 64 years old	0.7%	0.6%	0.6%
65 to 74 years old	1.1%	1.1%	1.1%
75 to 84 years old	1.3%	1.3%	1.3%
85 years and older	2.6%	2.5%	2.4%

MSA Range Forecast Annual Percentage Rate:			
2024-34	1.3%	0.7%	0.1%
2034-44	0.9%	0.4%	-0.1%
Total %Change:			
2024-34	13.3%	7.3%	1.0%
2034-44	9.5%	4.6%	-1.2%
Difference (in thousands):			
2024-44	637.1	314.8	-7.4

MSA Range Forecast Annual Percentage Rate:			
2024-34	1.5%	1.1%	0.6%
2034-44	1.1%	0.7%	0.2%
Total %Change:			
2022-32	16.2%	11.0%	5.7%
2032-45	11.6%	7.1%	2.1%
Difference (in thousands):			
2024-44	323.2	203.5	83.9

MSA Range Forecast

(in thousands)

	Population		
	High	Baseline	Low
2020	2,512.9	2,512.9	2,512.9
2021	2,530.4	2,530.4	2,530.4
2022	2,542.0	2,542.0	2,542.0
2023	2,601.3	2,563.5	2,525.7
2024	2,644.2	2,586.4	2,528.6
2025	2,683.0	2,606.9	2,530.8
2026	2,721.1	2,625.1	2,529.1
2027	2,759.7	2,643.2	2,526.7
2028	2,797.3	2,661.8	2,526.3
2029	2,826.3	2,680.7	2,535.2
2030	2,863.2	2,700.0	2,536.9
2031	2,895.0	2,719.3	2,543.5
2032	2,929.2	2,738.1	2,546.9
2033	2,959.9	2,756.3	2,552.7
2034	2,995.5	2,774.1	2,552.6
2035	3,029.2	2,791.1	2,552.9
2036	3,065.9	2,806.7	2,547.6
2037	3,093.9	2,821.4	2,549.0
2038	3,121.4	2,835.2	2,549.1
2039	3,150.4	2,848.2	2,546.0
2040	3,180.1	2,860.3	2,540.5
2041	3,203.1	2,871.6	2,540.1
2042	3,234.5	2,882.1	2,529.7
2043	3,258.1	2,892.0	2,525.9
2044	3,281.3	2,901.2	2,521.2

	Households		
	High	Baseline	Low
2020	1,021.5	1,021.5	1,021.5
2021	1,033.5	1,033.5	1,033.5
2022	1,055.5	1,045.2	1,034.9
2023	1,071.0	1,059.4	1,047.8
2024	1,090.7	1,073.4	1,056.1
2025	1,109.9	1,086.4	1,063.0
2026	1,128.7	1,098.6	1,068.6
2027	1,147.1	1,110.6	1,074.1
2028	1,164.6	1,122.6	1,080.6
2029	1,182.3	1,134.5	1,086.6
2030	1,199.8	1,146.4	1,092.9
2031	1,216.4	1,158.1	1,099.8
2032	1,233.5	1,169.6	1,105.7
2033	1,248.9	1,180.8	1,112.7
2034	1,267.2	1,191.8	1,116.5
2035	1,284.7	1,202.5	1,120.4
2036	1,300.8	1,212.7	1,124.6
2037	1,316.7	1,222.5	1,128.3
2038	1,331.6	1,231.9	1,132.3
2039	1,347.4	1,241.0	1,134.7
2040	1,361.9	1,249.4	1,136.9
2041	1,375.4	1,256.7	1,138.1
2042	1,390.0	1,263.7	1,137.4
2043	1,402.1	1,270.5	1,138.8
2044	1,413.8	1,276.9	1,140.0

MSA Range Forecast Annual Percentage Rate:			
2024-34	1.0%	0.7%	0.4%
2034-44	0.3%	0.1%	0.0%
Total %Change:			
\	9.9%	7.3%	4.4%
2034-44	2.8%	1.4%	-0.2%
Difference (in thousands):			
2024-44	169.3	110.4	51.5

MSA Range Forecast

(in thousands)

	Nonfarm Payroll Jobs		
	High	Baseline	Low
2020	1,145.1	1,145.1	1,145.1
2021	1,171.8	1,171.8	1,171.8
2022	1,227.8	1,227.8	1,227.8
2023	1,258.3	1,258.3	1,258.3
2024	1,295.4	1,261.2	1,226.9
2025	1,311.1	1,263.9	1,216.7
2026	1,325.8	1,274.0	1,222.3
2027	1,340.9	1,286.2	1,231.5
2028	1,357.2	1,300.6	1,244.1
2029	1,375.6	1,316.4	1,257.2
2030	1,392.9	1,330.4	1,267.8
2031	1,404.0	1,339.5	1,275.1
2032	1,411.3	1,345.1	1,278.9
2033	1,419.3	1,349.9	1,280.4
2034	1,424.2	1,352.7	1,281.1
2035	1,429.3	1,354.0	1,278.6
2036	1,433.9	1,355.9	1,277.9
2037	1,437.2	1,358.5	1,279.8
2038	1,443.5	1,361.5	1,279.5
2039	1,447.2	1,363.6	1,280.0
2040	1,450.4	1,365.4	1,280.3
2041	1,456.7	1,367.5	1,278.4
2042	1,460.4	1,369.3	1,278.2
2043	1,461.9	1,370.4	1,278.9
2044	1,464.8	1,371.6	1,278.4

MSA Personal Income Accounts

	2024	2025	2026	2027	2028
(in millions nominal dollars)					
Personal Income	197,546,550	206,127,050	214,328,675	222,214,925	230,429,425
+ Wage & Salary Disbursement	109,126,400	111,830,075	115,489,175	119,531,550	124,030,550
- Social Ins. Contribution	17,096,390	17,366,825	17,850,235	18,243,108	18,814,633
+ Transfer Payments	31,874,183	32,743,055	33,909,540	35,233,960	36,691,628
+ Other Labor Income	22,008,035	22,748,540	23,605,945	24,511,663	25,494,498
+ Farm Proprietors Inc.	35,209	48,476	50,611	46,449	45,911
+ Bus. Proprietors Inc.	12,035,503	12,086,335	12,159,310	12,290,108	12,471,833
+ Div., Interest, & Rent	39,493,825	43,965,780	46,890,420	48,767,813	50,430,355
+ Resident Adjustment	69,812	71,605	73,879	76,471	79,289
Per capital income (dollars)	76,379	79,070	81,646	84,071	86,569

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	2024	2025	2026	2027	2028
(annualized percent change)					
Personal Income	3.6%	4.3%	4.0%	3.7%	3.7%
+ Wage & Salary Disbursement	2.4%	2.5%	3.3%	3.5%	3.8%
- Social Ins. Contribution	1.8%	1.6%	2.8%	2.2%	3.1%
+ Transfer Payments	1.0%	2.7%	3.6%	3.9%	4.1%
+ Other Labor Income	3.8%	3.4%	3.8%	3.8%	4.0%
+ Farm Proprietors Inc.	3.4%	37.7%	4.4%	-8.2%	-1.2%
+ Bus. Proprietors Inc.	0.7%	0.4%	0.6%	1.1%	1.5%
+ Div., Interest, & Rent	9.2%	11.3%	6.7%	4.0%	3.4%

MSA Personal Income

	2029	2030	2031	2032	2033
(in millions nominal dollars)					
Personal Income	239,224,500	248,352,500	257,612,350	267,210,025	277,318,225
+ Wage & Salary Disbursement	129,054,325	134,302,450	139,528,900	144,914,100	150,622,650
- Social Ins. Contribution	19,475,090	20,157,573	20,838,823	21,536,188	22,276,393
+ Transfer Payments	38,245,980	39,820,918	41,439,420	43,108,618	44,838,295
+ Other Labor Income	26,553,390	27,653,100	28,789,190	29,986,428	31,256,188
+ Farm Proprietors Inc.	47,975	49,599	50,517	51,623	53,091
+ Bus. Proprietors Inc.	12,691,385	12,935,935	13,179,283	13,430,193	13,684,055
+ Div., Interest, & Rent	52,024,130	53,662,388	55,374,883	57,162,915	59,044,405
+ Resident Adjustment	82,414	85,686	88,967	92,364	95,959
Per capital income (dollars)	89,238	91,981	94,735	97,591	100,612

Metro Data Resource Center, Febru

	2029	2030	2031	2032	2033
(annualized percent change)					
Personal Income	3.8%	3.8%	3.7%	3.7%	3.8%
+ Wage & Salary Disbursement	4.1%	4.1%	3.9%	3.9%	3.9%
- Social Ins. Contribution	3.5%	3.5%	3.4%	3.3%	3.4%
+ Transfer Payments	4.2%	4.1%	4.1%	4.0%	4.0%
+ Other Labor Income	4.2%	4.1%	4.1%	4.2%	4.2%
+ Farm Proprietors Inc.	4.5%	3.4%	1.8%	2.2%	2.8%
+ Bus. Proprietors Inc.	1.8%	1.9%	1.9%	1.9%	1.9%
+ Div., Interest, & Rent	3.2%	3.1%	3.2%	3.2%	3.3%

MSA Personal Income

	2034	2035	2036	2037	2038
(in millions nominal dollars)					
Personal Income	287,380,100	297,525,650	308,426,075	319,838,725	331,717,200
+ Wage & Salary Disbursement	156,487,600	162,316,925	168,476,750	175,027,125	181,942,775
- Social Ins. Contribution	23,059,018	23,844,318	24,657,085	25,522,073	26,441,090
+ Transfer Payments	46,588,845	48,320,063	50,113,073	51,931,370	53,795,538
+ Other Labor Income	32,396,855	33,603,165	34,915,450	36,304,205	37,736,533
+ Farm Proprietors Inc.	53,915	54,645	55,802	57,024	58,287
+ Bus. Proprietors Inc.	13,884,128	14,062,070	14,272,830	14,489,468	14,699,155
+ Div., Interest, & Rent	60,928,270	62,910,045	65,142,365	67,440,658	69,810,858
+ Resident Adjustment	99,515	103,074	106,878	110,914	115,144
Per capital income (dollars)	103,595	106,600	109,887	113,360	116,998

Metro Data Resource Center, Febru

	2034	2035	2036	2037	2038
(annualized percent change)					
Personal Income	3.6%	3.5%	3.7%	3.7%	3.7%
+ Wage & Salary Disbursement	3.9%	3.7%	3.8%	3.9%	4.0%
- Social Ins. Contribution	3.5%	3.4%	3.4%	3.5%	3.6%
+ Transfer Payments	3.9%	3.7%	3.7%	3.6%	3.6%
+ Other Labor Income	3.6%	3.7%	3.9%	4.0%	3.9%
+ Farm Proprietors Inc.	1.6%	1.4%	2.1%	2.2%	2.2%
+ Bus. Proprietors Inc.	1.5%	1.3%	1.5%	1.5%	1.4%
+ Div., Interest, & Rent	3.2%	3.3%	3.5%	3.5%	3.5%

MSA Personal Income

	2039	2040	2041	2042	2043
(in millions nominal dollars)					
Personal Income	343,993,825	356,855,675	370,281,225	384,416,925	399,047,575
+ Wage & Salary Disbursement	189,041,650	196,552,575	204,364,125	212,493,075	220,889,625
- Social Ins. Contribution	27,393,728	28,402,490	29,446,753	30,528,623	31,652,430
+ Transfer Payments	55,765,900	57,844,570	60,041,530	62,396,200	64,874,068
+ Other Labor Income	39,210,953	40,769,268	42,429,205	44,154,448	45,934,700
+ Farm Proprietors Inc.	59,743	61,229	62,628	64,303	66,017
+ Bus. Proprietors Inc.	14,893,153	15,093,065	15,295,703	15,506,750	15,711,018
+ Div., Interest, & Rent	72,296,715	74,813,418	77,405,950	80,197,003	83,085,695
+ Resident Adjustment	119,471	124,044	128,823	133,797	138,922
Per capital income (dollars)	120,775	124,762	128,945	133,381	137,984

Metro Data Resource Center, Febru

	2039	2040	2041	2042	2043
(annualized percent change)					
Personal Income	3.7%	3.7%	3.8%	3.8%	3.8%
+ Wage & Salary Disbursement	3.9%	4.0%	4.0%	4.0%	4.0%
- Social Ins. Contribution	3.6%	3.7%	3.7%	3.7%	3.7%
+ Transfer Payments	3.7%	3.7%	3.8%	3.9%	4.0%
+ Other Labor Income	3.9%	4.0%	4.1%	4.1%	4.0%
+ Farm Proprietors Inc.	2.5%	2.5%	2.3%	2.7%	2.7%
+ Bus. Proprietors Inc.	1.3%	1.3%	1.3%	1.4%	1.3%
+ Div., Interest, & Rent	3.6%	3.5%	3.5%	3.6%	3.6%

MSA Personal Income

	2044	Average Percent Rate 1990-2022	2024-34	2034-44
(in millions nominal dollars)				
Personal Income	414,229,150	5.7%	3.8%	3.7%
+ Wage & Salary Disbursement	229,676,225	5.6%	3.7%	3.9%
- Social Ins. Contribution	32,837,165	5.3%	3.0%	3.6%
+ Transfer Payments	67,486,433	7.4%	3.9%	3.8%
+ Other Labor Income	47,771,200	5.1%	3.9%	4.0%
+ Farm Proprietors Inc.	67,370	-3.0%	4.4%	2.3%
+ Bus. Proprietors Inc.	15,907,738	5.2%	1.4%	1.4%
+ Div., Interest, & Rent	86,013,080	5.3%	4.4%	3.5%
+ Resident Adjustment	144,257	0.4%	3.6%	3.8%
Per capital income (dollars)	142,777	4.0%	3.1%	3.3%

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	2044
(annualized percent change)	
Personal Income	3.8%
+ Wage & Salary Disbursement	4.0%
- Social Ins. Contribution	3.7%
+ Transfer Payments	4.0%
+ Other Labor Income	4.0%
+ Farm Proprietors Inc.	2.0%
+ Bus. Proprietors Inc.	1.3%
+ Div., Interest, & Rent	3.5%

Total Disabled (categories do not add due to some individuals having multiple forms of disability)

MSA population	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
TOTAL DISABLED	335,063	342,137	348,947	355,631	362,224	368,700	375,056	381,261	387,283	393,128	398,808
under 5 years old	767	780	788	794	799	803	807	809	812	813	815
5 to 9 years old	6,345	6,336	6,340	6,357	6,383	6,414	6,448	6,482	6,514	6,543	6,569
10 to 14 years old	7,740	7,689	7,643	7,610	7,591	7,585	7,589	7,601	7,619	7,640	7,662
15 to 19 years old	10,722	10,767	10,785	10,792	10,798	10,805	10,816	10,829	10,844	10,861	10,881
20 to 24 years old	12,838	12,948	13,026	13,103	13,186	13,269	13,354	13,433	13,502	13,561	13,614
25 to 29 years old	12,425	12,288	12,177	12,107	12,077	12,078	12,102	12,141	12,186	12,233	12,280
30 to 34 years old	14,738	14,514	14,297	14,108	13,954	13,834	13,746	13,686	13,645	13,621	13,611
35 to 39 years old	13,492	13,526	13,511	13,467	13,408	13,341	13,274	13,209	13,148	13,093	13,045
40 to 44 years old	15,280	15,402	15,500	15,577	15,634	15,671	15,691	15,695	15,685	15,664	15,637
45 to 49 years old	15,624	15,935	16,208	16,451	16,667	16,857	17,021	17,159	17,272	17,362	17,431
50 to 54 years old	20,282	20,458	20,673	20,916	21,177	21,446	21,713	21,972	22,216	22,441	22,646
55 to 59 years old	23,435	23,786	24,114	24,437	24,764	25,097	25,436	25,776	26,114	26,446	26,768
60 to 64 years old	27,751	27,842	27,993	28,195	28,442	28,724	29,035	29,371	29,723	30,089	30,463
65 to 69 years old	29,116	29,212	29,315	29,440	29,595	29,781	30,000	30,249	30,525	30,826	31,150
70 to 74 years old	32,618	33,052	33,425	33,758	34,066	34,362	34,656	34,954	35,261	35,583	35,921
75 to 79 years old	32,043	33,004	33,864	34,636	35,332	35,965	36,545	37,084	37,590	38,073	38,541
80 to 84 years old	25,610	27,509	29,195	30,700	32,049	33,260	34,353	35,343	36,244	37,071	37,836
85 years or older	34,238	37,088	40,093	43,182	46,301	49,407	52,470	55,467	58,383	61,208	63,939

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
Hearing and Vision Disa	140,957	144,816	148,564	152,236	155,835	159,349	162,778	166,111	169,341	172,471	175,509
under 5 years old	767	780	788	794	799	803	807	809	812	813	815
5 to 9 years old	1,201	1,199	1,200	1,203	1,208	1,214	1,220	1,227	1,233	1,238	1,243
10 to 14 years old	1,448	1,439	1,430	1,424	1,420	1,419	1,420	1,422	1,425	1,429	1,434
15 to 19 years old	2,172	2,181	2,185	2,186	2,188	2,189	2,191	2,194	2,197	2,200	2,204
20 to 24 years old	3,193	3,221	3,240	3,259	3,280	3,301	3,322	3,341	3,358	3,373	3,386
25 to 29 years old	3,371	3,334	3,304	3,285	3,277	3,277	3,283	3,294	3,306	3,319	3,332
30 to 34 years old	3,745	3,688	3,633	3,585	3,546	3,515	3,493	3,477	3,467	3,461	3,458
35 to 39 years old	3,842	3,852	3,848	3,835	3,818	3,799	3,780	3,762	3,744	3,729	3,715
40 to 44 years old	4,997	5,038	5,070	5,095	5,113	5,126	5,132	5,133	5,130	5,123	5,114
45 to 49 years old	5,741	5,855	5,955	6,045	6,124	6,194	6,254	6,305	6,346	6,379	6,405
50 to 54 years old	8,056	8,126	8,211	8,308	8,412	8,518	8,624	8,727	8,824	8,914	8,995
55 to 59 years old	8,853	8,985	9,109	9,231	9,355	9,481	9,608	9,737	9,865	9,990	10,112
60 to 64 years old	10,952	10,988	11,048	11,127	11,225	11,336	11,459	11,591	11,730	11,875	12,022
65 to 69 years old	14,299	14,346	14,397	14,458	14,534	14,626	14,733	14,855	14,991	15,139	15,298
70 to 74 years old	16,388	16,605	16,793	16,960	17,115	17,264	17,411	17,561	17,716	17,877	18,047
75 to 79 years old	17,960	18,499	18,981	19,413	19,804	20,158	20,484	20,785	21,069	21,340	21,602
80 to 84 years old	13,110	14,083	14,946	15,716	16,407	17,027	17,586	18,093	18,554	18,978	19,369
85 years or older	20,861	22,598	24,429	26,311	28,211	30,103	31,970	33,796	35,573	37,294	38,958

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
Selfcare / Ambulatory D	170,169	174,803	179,320	183,752	188,101	192,352	196,502	200,540	204,454	208,250	211,933
under 5 years old	0	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	1,811	1,809	1,810	1,815	1,822	1,831	1,841	1,850	1,859	1,868	1,875
10 to 14 years old	1,613	1,602	1,592	1,585	1,581	1,580	1,581	1,584	1,587	1,592	1,596
15 to 19 years old	2,196	2,205	2,209	2,210	2,212	2,213	2,215	2,218	2,221	2,224	2,228
20 to 24 years old	2,455	2,476	2,491	2,506	2,522	2,538	2,554	2,569	2,582	2,593	2,603
25 to 29 years old	2,532	2,504	2,481	2,467	2,461	2,461	2,466	2,474	2,483	2,493	2,502
30 to 34 years old	4,000	3,939	3,880	3,829	3,787	3,754	3,731	3,714	3,703	3,697	3,694
35 to 39 years old	4,575	4,587	4,581	4,566	4,546	4,524	4,501	4,479	4,458	4,440	4,424
40 to 44 years old	5,988	6,037	6,075	6,105	6,127	6,142	6,150	6,151	6,147	6,139	6,129
45 to 49 years old	7,360	7,507	7,635	7,750	7,852	7,941	8,018	8,084	8,137	8,179	8,211
50 to 54 years old	11,289	11,387	11,506	11,641	11,787	11,936	12,085	12,229	12,365	12,491	12,605
55 to 59 years old	12,985	13,180	13,361	13,540	13,722	13,906	14,094	14,283	14,470	14,654	14,832
60 to 64 years old	16,718	16,773	16,864	16,986	17,135	17,304	17,492	17,694	17,907	18,127	18,352
65 to 69 years old	17,461	17,519	17,580	17,655	17,748	17,860	17,991	18,140	18,306	18,486	18,681
70 to 74 years old	19,426	19,684	19,906	20,104	20,288	20,464	20,639	20,817	21,000	21,191	21,392
75 to 79 years old	18,564	19,121	19,619	20,066	20,470	20,836	21,173	21,485	21,778	22,057	22,329
80 to 84 years old	16,543	17,770	18,859	19,832	20,703	21,485	22,191	22,831	23,413	23,947	24,441
85 years or older	24,653	26,705	28,869	31,093	33,338	35,575	37,781	39,939	42,038	44,072	46,038

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
Cognitive / Independen	194,516	198,485	202,332	206,147	209,941	213,690	217,384	220,996	224,499	227,893	231,183
under 5 years old	0	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	5,066	5,059	5,063	5,076	5,097	5,122	5,149	5,176	5,201	5,224	5,245
10 to 14 years old	6,439	6,397	6,358	6,331	6,315	6,310	6,313	6,324	6,338	6,355	6,374
15 to 19 years old	9,380	9,419	9,434	9,441	9,446	9,452	9,461	9,473	9,486	9,501	9,518
20 to 24 years old	9,978	10,064	10,125	10,184	10,249	10,314	10,379	10,441	10,494	10,541	10,582
25 to 29 years old	9,847	9,739	9,651	9,595	9,572	9,572	9,591	9,622	9,658	9,695	9,733
30 to 34 years old	10,919	10,753	10,592	10,452	10,338	10,249	10,184	10,139	10,109	10,092	10,084
35 to 39 years old	9,218	9,242	9,231	9,201	9,161	9,115	9,069	9,025	8,983	8,946	8,913
40 to 44 years old	10,362	10,445	10,512	10,564	10,603	10,628	10,641	10,644	10,637	10,623	10,605
45 to 49 years old	9,612	9,803	9,971	10,120	10,253	10,370	10,471	10,556	10,626	10,681	10,723
50 to 54 years old	11,631	11,731	11,854	11,994	12,144	12,298	12,451	12,599	12,739	12,869	12,986
55 to 59 years old	12,983	13,178	13,359	13,538	13,720	13,904	14,092	14,280	14,467	14,651	14,830
60 to 64 years old	13,102	13,145	13,216	13,312	13,428	13,561	13,709	13,867	14,033	14,206	14,382
65 to 69 years old	11,850	11,889	11,931	11,982	12,045	12,121	12,210	12,311	12,424	12,546	12,678
70 to 74 years old	13,580	13,760	13,915	14,054	14,183	14,306	14,428	14,552	14,680	14,814	14,954
75 to 79 years old	14,618	15,056	15,448	15,801	16,118	16,407	16,672	16,917	17,148	17,368	17,582
80 to 84 years old	13,095	14,066	14,928	15,698	16,387	17,007	17,565	18,072	18,532	18,955	19,346
85 years or older	22,837	24,738	26,742	28,803	30,883	32,955	34,998	36,997	38,942	40,826	42,647

MSA population	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
(count)										
TOTAL DISABLED	404,307	409,597	414,710	419,665	424,477	429,151	433,704	438,138	442,477	446,724
under 5 years old	816	817	817	817	816	816	815	814	813	812
5 to 9 years old	6,590	6,607	6,619	6,628	6,633	6,635	6,634	6,630	6,625	6,618
10 to 14 years old	7,685	7,705	7,724	7,739	7,752	7,762	7,769	7,772	7,774	7,773
15 to 19 years old	10,901	10,918	10,934	10,949	10,963	10,974	10,984	10,990	10,995	10,997
20 to 24 years old	13,656	13,683	13,700	13,710	13,715	13,715	13,711	13,702	13,693	13,681
25 to 29 years old	12,323	12,354	12,376	12,392	12,400	12,402	12,399	12,391	12,379	12,365
30 to 34 years old	13,610	13,609	13,610	13,611	13,610	13,607	13,601	13,592	13,580	13,566
35 to 39 years old	13,004	12,967	12,934	12,905	12,880	12,857	12,835	12,815	12,795	12,775
40 to 44 years old	15,604	15,566	15,526	15,485	15,444	15,404	15,366	15,328	15,293	15,259
45 to 49 years old	17,480	17,511	17,527	17,531	17,525	17,511	17,490	17,465	17,437	17,406
50 to 54 years old	22,828	22,986	23,119	23,231	23,321	23,391	23,444	23,482	23,506	23,518
55 to 59 years old	27,076	27,366	27,636	27,885	28,112	28,315	28,496	28,654	28,791	28,908
60 to 64 years old	30,840	31,214	31,582	31,942	32,290	32,622	32,937	33,234	33,510	33,765
65 to 69 years old	31,492	31,848	32,214	32,589	32,967	33,346	33,722	34,092	34,455	34,806
70 to 74 years old	36,276	36,649	37,038	37,444	37,865	38,299	38,742	39,192	39,647	40,103
75 to 79 years old	39,002	39,460	39,920	40,386	40,861	41,346	41,842	42,350	42,868	43,395
80 to 84 years old	38,550	39,224	39,867	40,487	41,093	41,690	42,282	42,875	43,471	44,073
85 years or older	66,573	69,114	71,566	73,935	76,231	78,461	80,634	82,760	84,847	86,905

	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
(count)										
Hearing and Vision Disa	178,454	181,299	184,059	186,744	189,361	191,916	194,416	196,864	199,271	201,639
under 5 years old	816	817	817	817	816	816	815	814	813	812
5 to 9 years old	1,247	1,251	1,253	1,254	1,255	1,256	1,256	1,255	1,254	1,253
10 to 14 years old	1,438	1,442	1,445	1,448	1,450	1,452	1,453	1,454	1,454	1,454
15 to 19 years old	2,208	2,212	2,215	2,218	2,221	2,223	2,225	2,226	2,227	2,228
20 to 24 years old	3,397	3,403	3,408	3,410	3,411	3,411	3,410	3,408	3,406	3,403
25 to 29 years old	3,343	3,352	3,358	3,362	3,364	3,365	3,364	3,362	3,359	3,355
30 to 34 years old	3,458	3,458	3,458	3,458	3,458	3,457	3,456	3,453	3,451	3,447
35 to 39 years old	3,703	3,693	3,683	3,675	3,668	3,661	3,655	3,649	3,644	3,638
40 to 44 years old	5,104	5,091	5,078	5,065	5,051	5,038	5,026	5,013	5,002	4,991
45 to 49 years old	6,423	6,434	6,440	6,442	6,439	6,434	6,427	6,417	6,407	6,395
50 to 54 years old	9,067	9,130	9,183	9,227	9,263	9,291	9,312	9,327	9,336	9,341
55 to 59 years old	10,228	10,338	10,440	10,534	10,619	10,696	10,764	10,824	10,876	10,920
60 to 64 years old	12,171	12,319	12,464	12,606	12,743	12,874	12,999	13,116	13,225	13,325
65 to 69 years old	15,466	15,641	15,821	16,004	16,190	16,376	16,561	16,743	16,921	17,093
70 to 74 years old	18,225	18,412	18,608	18,812	19,024	19,241	19,464	19,690	19,919	20,148
75 to 79 years old	21,861	22,117	22,375	22,636	22,902	23,174	23,452	23,737	24,027	24,323
80 to 84 years old	19,735	20,080	20,409	20,727	21,037	21,342	21,646	21,949	22,254	22,562
85 years or older	40,563	42,111	43,605	45,049	46,447	47,806	49,130	50,425	51,697	52,951

	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
(count)										
Selfcare / Ambulatory D	215,503	218,952	222,296	225,546	228,710	231,795	234,807	237,754	240,644	243,482
under 5 years old	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	1,881	1,886	1,889	1,892	1,893	1,894	1,894	1,893	1,891	1,889
10 to 14 years old	1,601	1,605	1,609	1,612	1,615	1,617	1,619	1,619	1,620	1,619
15 to 19 years old	2,232	2,236	2,239	2,242	2,245	2,248	2,249	2,251	2,252	2,252
20 to 24 years old	2,612	2,617	2,620	2,622	2,623	2,623	2,622	2,620	2,619	2,616
25 to 29 years old	2,511	2,517	2,522	2,525	2,527	2,527	2,527	2,525	2,523	2,520
30 to 34 years old	3,694	3,693	3,694	3,694	3,694	3,693	3,691	3,689	3,686	3,682
35 to 39 years old	4,410	4,397	4,386	4,376	4,367	4,360	4,352	4,345	4,339	4,332
40 to 44 years old	6,116	6,101	6,085	6,069	6,053	6,037	6,022	6,008	5,994	5,980
45 to 49 years old	8,235	8,249	8,257	8,259	8,256	8,249	8,239	8,228	8,214	8,200
50 to 54 years old	12,706	12,793	12,868	12,930	12,980	13,019	13,049	13,070	13,083	13,090
55 to 59 years old	15,003	15,164	15,313	15,451	15,577	15,689	15,790	15,877	15,953	16,018
60 to 64 years old	18,579	18,805	19,027	19,243	19,453	19,653	19,843	20,021	20,188	20,342
65 to 69 years old	18,886	19,099	19,319	19,543	19,770	19,998	20,223	20,445	20,662	20,873
70 to 74 years old	21,604	21,826	22,058	22,300	22,550	22,809	23,072	23,341	23,612	23,883
75 to 79 years old	22,596	22,861	23,127	23,397	23,673	23,954	24,241	24,535	24,835	25,141
80 to 84 years old	24,903	25,338	25,753	26,154	26,545	26,931	27,314	27,697	28,082	28,470
85 years or older	47,935	49,765	51,530	53,237	54,890	56,495	58,060	59,591	61,094	62,575

	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
(count)										
Cognitive / Independen	234,356	237,389	240,305	243,117	245,833	248,459	251,005	253,475	255,887	258,241
under 5 years old	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	5,262	5,276	5,285	5,292	5,296	5,298	5,297	5,294	5,290	5,284
10 to 14 years old	6,393	6,410	6,425	6,438	6,449	6,457	6,463	6,466	6,467	6,466
15 to 19 years old	9,535	9,551	9,565	9,578	9,590	9,600	9,608	9,614	9,618	9,620
20 to 24 years old	10,615	10,635	10,648	10,656	10,660	10,660	10,657	10,650	10,643	10,634
25 to 29 years old	9,766	9,791	9,809	9,821	9,828	9,829	9,827	9,820	9,811	9,800
30 to 34 years old	10,083	10,083	10,083	10,084	10,083	10,081	10,077	10,070	10,061	10,051
35 to 39 years old	8,885	8,860	8,837	8,817	8,800	8,784	8,770	8,755	8,742	8,729
40 to 44 years old	10,582	10,557	10,529	10,501	10,474	10,447	10,421	10,395	10,371	10,348
45 to 49 years old	10,753	10,772	10,782	10,785	10,781	10,772	10,760	10,744	10,727	10,708
50 to 54 years old	13,091	13,181	13,257	13,321	13,373	13,413	13,444	13,465	13,479	13,486
55 to 59 years old	15,000	15,161	15,311	15,449	15,574	15,687	15,787	15,875	15,951	16,015
60 to 64 years old	14,561	14,737	14,911	15,081	15,245	15,402	15,551	15,691	15,821	15,942
65 to 69 years old	12,817	12,962	13,111	13,264	13,418	13,572	13,725	13,876	14,023	14,166
70 to 74 years old	15,103	15,258	15,420	15,589	15,764	15,945	16,129	16,317	16,506	16,696
75 to 79 years old	17,792	18,001	18,211	18,424	18,640	18,862	19,088	19,320	19,556	19,796
80 to 84 years old	19,712	20,056	20,385	20,702	21,012	21,317	21,620	21,923	22,228	22,535
85 years or older	44,405	46,099	47,735	49,315	50,846	52,334	53,783	55,201	56,594	57,966

US Forecast Flash

	2024	2025	2026	2027	2028	2029
Gross Domestic Product (billions real $)	22,655.5	22,968.4	23,358.1	23,745.9	24,131.6	24,507.0
Nonfarm payroll employment (millions)	157.2	157.3	157.9	158.6	159.4	160.0
Civilian unemployment rate (%)	4.3	4.7	4.6	4.5	4.4	4.3
Population, total (millions)	337.3	339.0	340.7	342.5	344.2	346.0
Federal Reserve funds rate (%)	5.4	4.1	2.9	2.6	2.6	2.6
10-year Treasury bond yield (%)	4.3	3.6	3.3	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	7.0	5.7	5.1	5.0	4.9	4.9
Price of West-Texas crude oil ($ / bbl)	80.6	70.1	76.8	80.4	83.0	85.2
Consumer Price Index (all items 1982-84=100)	3.1	3.2	3.3	3.3	3.4	3.5
Producer Price Index (all commodities 1982=100)	2.5	2.5	2.6	2.6	2.7	2.7
Housing starts (millions unit)	1.4	1.5	1.5	1.5	1.5	1.5
Cons. Sentiment Index (Univ. of Mich., 1966=100)	79.7	88.2	91.5	91.4	90.1	88.1
S&P 500 Stock Market Index	4,249.5	4,441.4	4,477.3	4,450.1	4,502.9	4,577.8

source: S&P Global, IHS Global Insight | U.S. Macroeconomic Outlook, Baseline Trend, November 2023 (T30112.

(annualized percent change)

Gross Domestic Product (billions real $)	1.4%	1.4%	1.7%	1.7%	1.6%	1.6%
Nonfarm payroll employment (millions)	0.7%	0.0%	0.4%	0.5%	0.5%	0.4%
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Price of West-Texas crude oil ($ / bbl)	2.0%	-13.0%	9.6%	4.6%	3.2%	2.7%
Consumer Price Index (all items 1982-84=100)	2.7%	2.0%	2.5%	2.2%	2.2%	2.2%
Producer Price Index (all commodities 1982=100)	-3.2%	1.1%	2.9%	1.6%	1.3%	1.3%
Housing starts (millions unit)	-3.7%	4.6%	1.8%	-0.5%	-0.2%	-0.1%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	18.2%	10.7%	3.7%	0.0%	-1.5%	-2.3%
S&P 500 Stock Market Index	0.2%	4.5%	0.8%	-0.6%	1.2%	1.7%

US Forecast Flash

	2030	2031	2032	2033	2034	2035
Gross Domestic Product (billions real $)	24,899.4	25,285.3	25,703.9	26,154.7	26,613.5	27,061.6
Nonfarm payroll employment (millions)	160.6	161.1	161.6	162.1	162.7	163.2
Civilian unemployment rate (%)	4.3	4.3	4.3	4.3	4.3	4.3
Population, total (millions)	347.7	349.3	351.0	352.6	354.2	355.7
Federal Reserve funds rate (%)	2.6	2.6	2.6	2.6	2.6	2.6
10-year Treasury bond yield (%)	3.2	3.2	3.2	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	4.8	4.8	4.8	4.8	4.8	4.8
Price of West-Texas crude oil ($ / bbl)	87.3	89.5	91.7	93.7	95.6	97.4
Consumer Price Index (all items 1982-84=100)	3.6	3.6	3.7	3.8	3.9	4.0
Producer Price Index (all commodities 1982=100)	2.7	2.8	2.8	2.9	2.9	3.0
Housing starts (millions unit)	1.5	1.5	1.5	1.5	1.4	1.4
Cons. Sentiment Index (Univ. of Mich., 1966=100)	87.3	86.2	86.4	86.7	86.4	86.3
S&P 500 Stock Market Index	4,671.0	4,791.0	4,932.2	5,097.7	5,327.1	5,553.8

source: S&P Global, IHS Global Insight | U.S. Macroec3.bnk)

(annualized percent change)

Gross Domestic Product (billions real $)	1.6%	1.5%	1.7%	1.8%	1.8%	1.7%
Nonfarm payroll employment (millions)	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Price of West-Texas crude oil ($ / bbl)	2.5%	2.5%	2.5%	2.2%	2.0%	1.9%
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
Producer Price Index (all commodities 1982=100)	1.4%	1.8%	1.9%	1.8%	1.9%	1.6%
Housing starts (millions unit)	-0.7%	-0.5%	-0.6%	-2.0%	-2.9%	-3.4%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	-0.9%	-1.3%	0.3%	0.3%	-0.3%	0.0%
S&P 500 Stock Market Index	2.0%	2.6%	2.9%	3.4%	4.5%	4.3%

US Forecast Flash

	2036	2037	2038	2039	2040	2041
Gross Domestic Product (billions real $)	27,507.8	27,955.1	28,421.8	28,891.1	29,379.7	29,875.2
Nonfarm payroll employment (millions)	163.7	164.3	165.0	165.6	166.3	166.8
Civilian unemployment rate (%)	4.3	4.3	4.3	4.2	4.2	4.2
Population, total (millions)	357.2	358.6	359.9	361.3	362.5	363.8
Federal Reserve funds rate (%)	2.6	2.6	2.6	2.6	2.6	2.6
10-year Treasury bond yield (%)	3.2	3.2	3.2	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	4.8	4.8	4.8	4.8	4.8	4.8
Price of West-Texas crude oil ($ / bbl)	99.3	101.1	103.0	105.0	107.0	109.0
Consumer Price Index (all items 1982-84=100)	4.0	4.1	4.2	4.3	4.4	4.5
Producer Price Index (all commodities 1982=100)	3.0	3.1	3.1	3.2	3.2	3.3
Housing starts (millions unit)	1.3	1.3	1.2	1.2	1.2	1.2
Cons. Sentiment Index (Univ. of Mich., 1966=100)	86.7	86.8	87.0	87.1	87.2	87.0
S&P 500 Stock Market Index	5,795.6	6,051.3	6,328.0	6,618.5	6,897.6	7,166.2

source: S&P Global, IHS Global Insight | U.S. Macroec

(annualized percent change)

Gross Domestic Product (billions real $)	1.6%	1.6%	1.7%	1.7%	1.7%	1.7%
Nonfarm payroll employment (millions)	0.3%	0.4%	0.4%	0.4%	0.4%	0.3%
Population, total (millions)	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%
Price of West-Texas crude oil ($ / bbl)	1.9%	1.9%	1.9%	1.9%	1.9%	1.8%
Consumer Price Index (all items 1982-84=100)	2.1%	2.0%	2.1%	2.1%	2.1%	2.2%
Producer Price Index (all commodities 1982=100)	1.6%	1.7%	1.8%	1.7%	1.9%	1.9%
Housing starts (millions unit)	-4.3%	-3.5%	-2.0%	-2.1%	-0.3%	-0.3%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	0.4%	0.1%	0.1%	0.1%	0.1%	-0.2%
S&P 500 Stock Market Index	4.4%	4.4%	4.6%	4.6%	4.2%	3.9%

US Forecast Flash

	2042	2043	2044
Gross Domestic Product (billions real $)	30,395.5	30,915.2	31,440.0
Nonfarm payroll employment (millions)	167.3	167.8	168.3
Civilian unemployment rate (%)	4.2	4.2	4.2
Population, total (millions)	365.0	366.2	367.3
Federal Reserve funds rate (%)	2.6	2.6	2.6
10-year Treasury bond yield (%)	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	4.8	4.8	4.8
Price of West-Texas crude oil ($ / bbl)	110.6	112.2	113.9
Consumer Price Index (all items 1982-84=100)	4.6	4.7	4.8
Producer Price Index (all commodities 1982=100)	3.4	3.4	3.5
Housing starts (millions unit)	1.2	1.2	1.2
Cons. Sentiment Index (Univ. of Mich., 1966=100)	87.0	87.0	87.0
S&P 500 Stock Market Index	7,460.8	7,779.8	8,109.4

source: S&P Global, IHS Global Insight | U.S. Macroec

(annualized percent change)

Gross Domestic Product (billions real $)	1.7%	1.7%	1.7%
Nonfarm payroll employment (millions)	0.3%	0.3%	0.3%
Population, total (millions)	0.3%	0.3%	0.3%
Price of West-Texas crude oil ($ / bbl)	1.5%	1.5%	1.5%
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%
Producer Price Index (all commodities 1982=100)	1.7%	1.7%	1.9%
Housing starts (millions unit)	-0.5%	-0.6%	0.1%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	0.0%	0.0%	0.1%
S&P 500 Stock Market Index	4.1%	4.3%	4.2%

US Forecast Keys

	2024	2025	2026	2027	2028	2029
Inflation (index)						
Consumer Price Index (all items 1982-84=100)	312.8	319.0	327.0	334.2	341.6	349.0
Core Consumer Price Index (except food and ener	318.1	326.0	333.2	340.6	348.2	356.2
GDP Price Deflator	125.67	128.50	131.16	133.88	136.79	139.86
Consumer spending Deflator	123.46	125.96	128.63	131.20	133.85	136.55
Employ. cost index (wages & salaries, 2005=1.0)	1.68	1.74	1.79	1.85	1.91	1.97
Employment cost index (benefits)	1.60	1.65	1.71	1.76	1.81	1.87
Interest Rates (percent)						
Effective rate on federal funds	5.38	4.05	2.87	2.63	2.63	2.63
10-year Treasury notes yield	4.32	3.63	3.28	3.21	3.20	3.19
30-year Treasury bonds yield	4.50	3.94	3.65	3.58	3.58	3.57
conventional 30-year fixed rate mortgage	7.01	5.74	5.14	4.96	4.90	4.87
Exchange Rates (index)						
Real US trade-wtd. For. Ex - adv. economies)	1.35	1.30	1.24	1.21	1.18	1.17
Real US trade-wtd. For. Ex. - emerging markets)	1.38	1.33	1.28	1.24	1.22	1.21
Housing & Population						
Total	1.330	1.370	1.390	1.383	1.380	1.379
Single family (1-unit; millions)	0.941	0.970	0.975	0.966	0.964	0.963
Multi-family (2 or more units; millions)	0.389	0.400	0.414	0.417	0.416	0.416
Housing Affordability Index	0.87	1.01	1.11	1.12	1.12	1.12
Population, total (millions)	337.3	339.0	340.7	342.5	344.2	346.0
Households, total (millions)	131.4	132.5	133.6	134.7	135.7	136.7
Household size (persons per household)	2.57	2.56	2.55	2.54	2.54	2.53

source: S&P Global, IHS Global Insight | U.S. Macroeconomic Outlook, Baseline Trend, November 2023 (T3011

	2024	2025	2026	2027	2028	2029
(annualized percent change)						
Inflation variables						
Consumer Price Index (all items 1982-84=100)	2.7%	2.0%	2.5%	2.2%	2.2%	2.2%
Core Cons. Price Index (except food and energy)	3.2%	2.5%	2.2%	2.2%	2.2%	2.3%
GDP Price Deflator	2.7%	2.2%	2.1%	2.1%	2.2%	2.2%
Consumer spending Deflator	2.5%	2.0%	2.1%	2.0%	2.0%	2.0%
Employ. cost index (wages & salaries, 2005=1.0)	3.9%	3.2%	3.3%	3.1%	3.2%	3.2%
Employment cost index (benefits)	3.7%	3.2%	3.2%	3.1%	3.1%	3.2%
Housing & Population						
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Households, total (millions)	0.9%	0.8%	0.8%	0.8%	0.8%	0.8%

US Forecast Keys

	2030	2031	2032	2033	2034	2035
Inflation (index)						
Consumer Price Index (all items 1982-84=100)	356.5	364.3	372.3	380.4	388.6	396.8
Core Consumer Price Index (except food and energ	364.1	372.2	380.4	388.9	397.3	405.8
GDP Price Deflator	143.01	146.30	149.67	153.11	156.56	159.93
Consumer spending Deflator	139.27	142.03	144.86	147.72	150.61	153.50
Employ. cost index (wages & salaries, 2005=1.0)	2.04	2.11	2.18	2.26	2.34	2.42
Employment cost index (benefits)	1.93	2.00	2.07	2.14	2.22	2.29
Interest Rates (percent)						
Effective rate on federal funds	2.63	2.63	2.63	2.63	2.63	2.63
10-year Treasury notes yield	3.18	3.18	3.17	3.17	3.17	3.17
30-year Treasury bonds yield	3.56	3.55	3.55	3.55	3.55	3.55
conventional 30-year fixed rate mortgage	4.85	4.84	4.84	4.84	4.84	4.84
Exchange Rates (index)						
Real US trade-wtd. For. Ex - adv. economies)	1.17	1.17	1.17	1.17	1.18	1.19
Real US trade-wtd. For. Ex. - emerging markets)	1.21	1.22	1.22	1.22	1.22	1.21
Housing & Population						
Total	1.371	1.363	1.353	1.322	1.281	1.235
Single family (1-unit; millions)	0.957	0.952	0.945	0.923	0.898	0.871
Multi-family (2 or more units; millions)	0.413	0.411	0.408	0.399	0.383	0.365
Housing Affordability Index	1.12	1.12	1.12	1.12	1.13	1.14
Population, total (millions)	347.7	349.3	351.0	352.6	354.2	355.7
Households, total (millions)	137.8	138.8	139.8	140.8	141.7	142.6
Household size (persons per household)	2.52	2.52	2.51	2.50	2.50	2.49

source: S&P Global, IHS Global Insight | U.S. Macro(23.bnk)

	2030	2031	2032	2033	2034	2035
(annualized percent change)						
Inflation variables						
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
Core Cons. Price Index (except food and energy)	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
GDP Price Deflator	2.3%	2.3%	2.3%	2.3%	2.3%	2.2%
Consumer spending Deflator	2.0%	2.0%	2.0%	2.0%	2.0%	1.9%
Employ. cost index (wages & salaries, 2005=1.0)	3.2%	3.4%	3.5%	3.6%	3.6%	3.5%
Employment cost index (benefits)	3.2%	3.4%	3.5%	3.6%	3.6%	3.5%
Housing & Population						
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Households, total (millions)	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%

US Forecast Keys

	2036	2037	2038	2039	2040	2041
Inflation (index)						
Consumer Price Index (all items 1982-84=100)	405.0	413.2	421.8	430.5	439.6	449.1
Core Consumer Price Index (except food and energ	414.6	423.5	432.7	442.2	452.0	462.2
GDP Price Deflator	163.31	166.75	170.26	173.81	177.48	181.26
Consumer spending Deflator	156.42	159.41	162.49	165.62	168.86	172.24
Employ. cost index (wages & salaries, 2005=1.0)	2.51	2.59	2.69	2.78	2.88	2.98
Employment cost index (benefits)	2.38	2.46	2.55	2.64	2.73	2.82
Interest Rates (percent)						
Effective rate on federal funds	2.63	2.63	2.63	2.63	2.63	2.63
10-year Treasury notes yield	3.17	3.17	3.17	3.17	3.17	3.17
30-year Treasury bonds yield	3.55	3.55	3.55	3.55	3.55	3.55
conventional 30-year fixed rate mortgage	4.84	4.84	4.84	4.84	4.84	4.84
Exchange Rates (index)						
Real US trade-wtd. For. Ex - adv. economies)	1.19	1.19	1.20	1.20	1.20	1.21
Real US trade-wtd. For. Ex. - emerging markets)	1.20	1.20	1.19	1.18	1.18	1.17
Housing & Population						
Total	1.175	1.131	1.109	1.084	1.079	1.075
Single family (1-unit; millions)	0.837	0.814	0.794	0.773	0.769	0.771
Multi-family (2 or more units; millions)	0.338	0.317	0.315	0.310	0.310	0.304
Housing Affordability Index	1.14	1.15	1.16	1.17	1.17	1.18
Population, total (millions)	357.2	358.6	359.9	361.3	362.5	363.8
Households, total (millions)	143.5	144.4	145.3	146.1	146.9	147.8
Household size (persons per household)	2.49	2.48	2.48	2.47	2.47	2.46

source: S&P Global, IHS Global Insight | U.S. Macro

	2036	2037	2038	2039	2040	2041
(annualized percent change)						
Inflation variables						
Consumer Price Index (all items 1982-84=100)	2.1%	2.0%	2.1%	2.1%	2.1%	2.2%
Core Cons. Price Index (except food and energy)	2.2%	2.2%	2.2%	2.2%	2.2%	2.3%
GDP Price Deflator	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Consumer spending Deflator	1.9%	1.9%	1.9%	1.9%	2.0%	2.0%
Employ. cost index (wages & salaries, 2005=1.0)	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Employment cost index (benefits)	3.6%	3.6%	3.5%	3.4%	3.5%	3.5%
Housing & Population						
Population, total (millions)	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%
Households, total (millions)	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%

US Forecast Keys

	2042	2043	2044
Inflation (index)			
Consumer Price Index (all items 1982-84=100)	458.9	468.8	479.2
Core Consumer Price Index (except food and energ	472.7	483.6	494.9
GDP Price Deflator	185.11	189.02	193.03
Consumer spending Deflator	175.70	179.24	182.88
Employ. cost index (wages & salaries, 2005=1.0)	3.09	3.19	3.31
Employment cost index (benefits)	2.92	3.02	3.13
Interest Rates (percent)			
Effective rate on federal funds	2.63	2.63	2.63
10-year Treasury notes yield	3.17	3.17	3.17
30-year Treasury bonds yield	3.55	3.55	3.55
conventional 30-year fixed rate mortgage	4.84	4.84	4.84
Exchange Rates (index)			
Real US trade-wtd. For. Ex - adv. economies)	1.21	1.22	1.22
Real US trade-wtd. For. Ex. - emerging markets)	1.16	1.15	1.15
Housing & Population			
Total	1.070	1.063	1.064
Single family (1-unit; millions)	0.768	0.767	0.767
Multi-family (2 or more units; millions)	0.302	0.296	0.297
Housing Affordability Index	1.19	1.20	1.21
Population, total (millions)	365.0	366.2	367.3
Households, total (millions)	148.6	149.4	150.2
Household size (persons per household)	2.46	2.45	2.45

source: S&P Global, IHS Global Insight | U.S. Macro

	2042	2043	2044
(annualized percent change)			
Inflation variables			
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%
Core Cons. Price Index (except food and energy)	2.3%	2.3%	2.3%
GDP Price Deflator	2.1%	2.1%	2.1%
Consumer spending Deflator	2.0%	2.0%	2.0%
Employ. cost index (wages & salaries, 2005=1.0)	3.5%	3.5%	3.5%
Employment cost index (benefits)	3.5%	3.5%	3.5%
Housing & Population			
Population, total (millions)	0.3%	0.3%	0.3%
Households, total (millions)	0.5%	0.5%	0.5%

National Income and Production Accounts

(billions of US dollars, chained-inflation adj.)	2024	2025	2026	2027	2028
Gross Domestic Product	22,655.5	22,968.4	23,358.1	23,745.9	24,131.6
Personal Consumption Expenditures	15,723.7	15,957.5	16,241.3	16,531.8	16,820.3
Durable Goods	2,096.7	2,169.5	2,263.7	2,356.5	2,455.0
Computers	167.7	171.4	177.2	186.3	196.5
Software	336.4	348.6	360.2	377.0	392.3
Info. Processing Equipment	449.0	463.3	478.9	501.8	524.3
Nondurables	3,396.7	3,420.9	3,445.2	3,472.8	3,500.7
Food	2,080.3	2,088.1	2,089.1	2,094.8	2,092.2
Gasoline & other fuels	309.7	307.1	298.4	291.3	284.5
Clothing & footwear	513.3	533.6	546.6	561.7	582.4
Gross Domestic Investments	4,056.7	4,151.7	4,257.1	4,331.5	4,410.0
Nonresidential Fixed Investments	3,308.0	3,350.5	3,407.5	3,468.7	3,530.3
Industrial Equipment	246.2	245.6	251.6	257.7	264.2
Computer Equipment	151.6	161.2	172.5	182.7	192.2
Software	830.5	859.7	882.1	906.0	930.6
Transportation Equip.	265.1	276.9	283.4	290.8	300.6
Structures/Buildings	558.2	554.8	559.1	565.0	570.9
Residential Fixed Investments	718.0	743.3	771.3	785.2	803.8
Equipment	23.1	24.1	25.0	25.7	26.2
Structures/Buildings	561.9	581.6	603.5	614.3	628.8
Exports	2,589.8	2,686.2	2,794.6	2,901.8	3,001.3
Goods	1,944.3	2,020.5	2,101.8	2,184.2	2,259.5
Services	773.8	799.6	832.1	862.6	891.9
Imports	3,589.5	3,726.8	3,855.2	3,945.9	4,029.4
Federal Spending	1,488.8	1,496.7	1,502.8	1,500.3	1,494.6
State & LocalSpending	2,367.0	2,376.3	2,386.2	2,395.1	2,404.8

(annualized percent change)	2024	2025	2026	2027	2028
Gross Domestic Product	1.4%	1.4%	1.7%	1.7%	1.6%
Personal Consumption Expenditures	1.9%	1.5%	1.8%	1.8%	1.7%
Durable Goods	2.6%	3.5%	4.3%	4.1%	4.2%
Computers	6.9%	2.2%	3.4%	5.1%	5.5%
Software	8.5%	3.6%	3.3%	4.7%	4.1%
Info. Processing Equipment	8.0%	3.2%	3.4%	4.8%	4.5%
Nondurables	1.4%	0.7%	0.7%	0.8%	0.8%
Food	1.9%	0.4%	0.0%	0.3%	-0.1%
Gasoline & other fuels	-1.5%	-0.8%	-2.8%	-2.4%	-2.3%
Clothing & footwear	2.8%	3.9%	2.4%	2.8%	3.7%
Gross Domestic Investments	0.5%	2.3%	2.5%	1.7%	1.8%
Nonresidential Fixed Investments	1.4%	1.3%	1.7%	1.8%	1.8%
Industrial Equipment	-2.5%	-0.3%	2.5%	2.4%	2.5%
Computer Equipment	3.7%	6.3%	7.0%	5.9%	5.2%
Software	5.1%	3.5%	2.6%	2.7%	2.7%
Transportation Equip.	7.0%	4.5%	2.3%	2.6%	3.4%

Structures/Buildings	0.5%	-0.6%	0.8%	1.1%	1.0%
Residential Fixed Investments	-1.8%	3.5%	3.8%	1.8%	2.4%
Equipment	4.9%	4.4%	3.5%	2.9%	1.8%
Structures/Buildings	-1.9%	3.5%	3.8%	1.8%	2.4%
Exports	3.2%	3.7%	4.0%	3.8%	3.4%
Goods	3.1%	3.9%	4.0%	3.9%	3.4%
Services	3.5%	3.3%	4.1%	3.7%	3.4%
Imports	4.2%	3.8%	3.4%	2.4%	2.1%
Federal Spending	1.0%	0.5%	0.4%	-0.2%	-0.4%
State & LocalSpending	1.6%	0.4%	0.4%	0.4%	0.4%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2029	2030	2031	2032	2033
Gross Domestic Product	24,507.0	24,899.4	25,285.3	25,703.9	26,154.7
Personal Consumption Expenditures	17,116.4	17,433.6	17,782.9	18,164.0	18,590.5
Durable Goods	2,565.7	2,688.8	2,822.1	2,965.5	3,123.0
Computers	206.6	217.6	231.0	249.1	270.7
Software	406.8	419.7	432.3	449.6	472.8
Info. Processing Equipment	545.9	566.6	588.9	619.0	657.2
Nondurables	3,529.7	3,561.9	3,599.6	3,643.4	3,696.3
Food	2,094.2	2,104.2	2,116.4	2,126.5	2,142.0
Gasoline & other fuels	278.2	272.5	267.6	263.2	259.7
Clothing & footwear	603.1	622.2	643.1	663.5	689.8
Gross Domestic Investments	4,492.3	4,587.0	4,675.8	4,773.9	4,879.9
Nonresidential Fixed Investments	3,594.3	3,668.3	3,752.0	3,847.3	3,958.8
Industrial Equipment	268.8	274.1	280.8	288.3	296.3
Computer Equipment	201.7	211.4	221.4	232.1	243.7
Software	949.9	968.2	989.9	1,020.0	1,054.4
Transportation Equip.	313.1	327.7	341.3	354.4	366.3
Structures/Buildings	577.2	583.8	590.5	597.4	604.5
Residential Fixed Investments	824.2	844.4	852.5	857.9	856.8
Equipment	26.9	27.6	28.4	29.3	30.3
Structures/Buildings	644.8	660.6	666.7	670.7	669.5
Exports	3,090.5	3,171.1	3,243.9	3,313.8	3,379.1
Goods	2,325.5	2,384.2	2,436.5	2,487.0	2,533.9
Services	919.3	944.7	968.3	990.7	1,011.8
Imports	4,123.8	4,237.9	4,366.4	4,509.2	4,670.7
Federal Spending	1,488.6	1,494.3	1,487.4	1,488.6	1,490.4
State & LocalSpending	2,412.8	2,418.8	2,424.0	2,428.5	2,432.3

(annualized percent change)	2029	2030	2031	2032	2033
Gross Domestic Product	1.6%	1.6%	1.5%	1.7%	1.8%
Personal Consumption Expenditures	1.8%	1.9%	2.0%	2.1%	2.3%
Durable Goods	4.5%	4.8%	5.0%	5.1%	5.3%
Computers	5.1%	5.3%	6.2%	7.9%	8.6%
Software	3.7%	3.2%	3.0%	4.0%	5.2%
Info. Processing Equipment	4.1%	3.8%	3.9%	5.1%	6.2%
Nondurables	0.8%	0.9%	1.1%	1.2%	1.4%
Food	0.1%	0.5%	0.6%	0.5%	0.7%
Gasoline & other fuels	-2.2%	-2.1%	-1.8%	-1.6%	-1.3%
Clothing & footwear	3.5%	3.2%	3.3%	3.2%	4.0%
Gross Domestic Investments	1.9%	2.1%	1.9%	2.1%	2.2%
Nonresidential Fixed Investments	1.8%	2.1%	2.3%	2.5%	2.9%
Industrial Equipment	1.8%	2.0%	2.5%	2.7%	2.8%
Computer Equipment	5.0%	4.8%	4.7%	4.8%	5.0%
Software	2.1%	1.9%	2.2%	3.0%	3.4%
Transportation Equip.	4.2%	4.6%	4.2%	3.8%	3.4%

Structures/Buildings	1.1%	1.1%	1.2%	1.2%	1.2%
Residential Fixed Investments	2.5%	2.5%	1.0%	0.6%	-0.1%
Equipment	2.7%	2.5%	3.0%	3.2%	3.4%
Structures/Buildings	2.5%	2.5%	0.9%	0.6%	-0.2%
Exports	3.0%	2.6%	2.3%	2.2%	2.0%
Goods	2.9%	2.5%	2.2%	2.1%	1.9%
Services	3.1%	2.8%	2.5%	2.3%	2.1%
Imports	2.3%	2.8%	3.0%	3.3%	3.6%
Federal Spending	-0.4%	0.4%	-0.5%	0.1%	0.1%
State & LocalSpending	0.3%	0.2%	0.2%	0.2%	0.2%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2034	2035	2036	2037	2038
Gross Domestic Product	26,613.5	27,061.6	27,507.8	27,955.1	28,421.8
Personal Consumption Expenditures	19,022.3	19,444.4	19,876.3	20,312.0	20,744.3
Durable Goods	3,281.2	3,440.9	3,606.7	3,777.6	3,952.8
Computers	293.7	318.5	345.4	374.3	405.4
Software	497.1	525.5	557.4	592.9	632.2
Info. Processing Equipment	697.5	742.8	793.1	848.2	908.6
Nondurables	3,755.6	3,820.5	3,890.0	3,958.9	4,025.7
Food	2,156.4	2,168.2	2,181.3	2,194.1	2,206.6
Gasoline & other fuels	257.0	254.4	251.7	248.8	245.7
Clothing & footwear	718.7	744.6	772.9	802.5	833.2
Gross Domestic Investments	4,982.0	5,070.4	5,147.2	5,210.8	5,291.4
Nonresidential Fixed Investments	4,067.6	4,167.0	4,258.1	4,347.1	4,444.6
Industrial Equipment	303.0	312.6	321.1	328.2	334.5
Computer Equipment	256.1	269.3	283.5	298.3	314.0
Software	1,080.3	1,103.7	1,128.3	1,154.2	1,181.4
Transportation Equip.	383.1	396.8	405.5	414.6	427.5
Structures/Buildings	610.9	618.0	624.2	628.4	634.6
Residential Fixed Investments	857.4	860.9	858.0	851.0	848.2
Equipment	31.5	32.6	33.7	34.9	36.1
Structures/Buildings	669.6	672.0	669.4	663.5	661.0
Exports	3,442.0	3,502.4	3,564.7	3,628.5	3,687.1
Goods	2,579.8	2,623.9	2,669.8	2,716.9	2,757.7
Services	1,031.5	1,050.5	1,069.9	1,089.4	1,109.4
Imports	4,835.7	4,993.8	5,159.3	5,314.1	5,450.6
Federal Spending	1,493.5	1,497.6	1,502.5	1,508.1	1,513.6
State & LocalSpending	2,444.5	2,462.5	2,481.4	2,499.3	2,516.5

(annualized percent change)	2034	2035	2036	2037	2038
Gross Domestic Product	1.8%	1.7%	1.6%	1.6%	1.7%
Personal Consumption Expenditures	2.3%	2.2%	2.2%	2.2%	2.1%
Durable Goods	5.1%	4.9%	4.8%	4.7%	4.6%
Computers	8.5%	8.4%	8.4%	8.4%	8.3%
Software	5.1%	5.7%	6.1%	6.4%	6.6%
Info. Processing Equipment	6.1%	6.5%	6.8%	7.0%	7.1%
Nondurables	1.6%	1.7%	1.8%	1.8%	1.7%
Food	0.7%	0.5%	0.6%	0.6%	0.6%
Gasoline & other fuels	-1.0%	-1.0%	-1.1%	-1.1%	-1.3%
Clothing & footwear	4.2%	3.6%	3.8%	3.8%	3.8%
Gross Domestic Investments	2.1%	1.8%	1.5%	1.2%	1.5%
Nonresidential Fixed Investments	2.8%	2.4%	2.2%	2.1%	2.2%
Industrial Equipment	2.3%	3.1%	2.7%	2.2%	1.9%
Computer Equipment	5.1%	5.2%	5.3%	5.2%	5.3%
Software	2.5%	2.2%	2.2%	2.3%	2.4%
Transportation Equip.	4.6%	3.6%	2.2%	2.2%	3.1%

Structures/Buildings	1.1%	1.1%	1.0%	0.7%	1.0%
Residential Fixed Investments	0.1%	0.4%	-0.3%	-0.8%	-0.3%
Equipment	3.7%	3.5%	3.6%	3.5%	3.4%
Structures/Buildings	0.0%	0.4%	-0.4%	-0.9%	-0.4%
Exports	1.9%	1.8%	1.8%	1.8%	1.6%
Goods	1.8%	1.7%	1.7%	1.8%	1.5%
Services	1.9%	1.8%	1.8%	1.8%	1.8%
Imports	3.5%	3.3%	3.3%	3.0%	2.6%
Federal Spending	0.2%	0.3%	0.3%	0.4%	0.4%
State & LocalSpending	0.5%	0.7%	0.8%	0.7%	0.7%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2039	2040	2041	2042	2043
Gross Domestic Product	28,891.1	29,379.7	29,875.2	30,395.5	30,915.2
Personal Consumption Expenditures	21,172.9	21,597.6	22,025.7	22,464.4	22,919.0
Durable Goods	4,125.6	4,296.2	4,470.0	4,649.5	4,837.3
Computers	438.7	474.0	511.8	551.9	594.5
Software	675.7	723.0	774.6	830.3	890.0
Info. Processing Equipment	974.6	1,045.8	1,123.1	1,205.9	1,294.5
Nondurables	4,091.1	4,155.3	4,219.5	4,286.1	4,356.6
Food	2,218.9	2,230.8	2,242.6	2,254.4	2,266.6
Gasoline & other fuels	242.5	239.2	235.8	232.4	229.0
Clothing & footwear	865.3	898.8	933.6	970.2	1,008.4
Gross Domestic Investments	5,380.8	5,470.8	5,578.5	5,702.7	5,819.2
Nonresidential Fixed Investments	4,546.6	4,650.7	4,761.0	4,876.9	4,996.4
Industrial Equipment	340.8	347.1	354.2	362.6	371.9
Computer Equipment	330.6	348.1	366.5	386.0	406.5
Software	1,209.8	1,238.8	1,268.7	1,299.3	1,331.1
Transportation Equip.	442.5	457.6	474.3	491.9	509.0
Structures/Buildings	640.7	647.5	655.3	663.4	672.3
Residential Fixed Investments	847.9	849.4	855.9	868.0	877.8
Equipment	37.3	38.5	39.8	41.1	42.6
Structures/Buildings	660.5	661.3	666.1	675.3	682.7
Exports	3,747.3	3,812.3	3,876.1	3,943.7	3,996.4
Goods	2,799.3	2,845.9	2,889.7	2,936.4	2,965.0
Services	1,130.0	1,151.1	1,173.2	1,196.3	1,220.1
Imports	5,592.2	5,717.9	5,838.1	5,971.8	6,104.3
Federal Spending	1,519.1	1,531.8	1,529.4	1,534.9	1,540.5
State & LocalSpending	2,534.4	2,552.2	2,570.5	2,588.1	2,608.6

(annualized percent change)	2039	2040	2041	2042	2043
Gross Domestic Product	1.7%	1.7%	1.7%	1.7%	1.7%
Personal Consumption Expenditures	2.1%	2.0%	2.0%	2.0%	2.0%
Durable Goods	4.4%	4.1%	4.0%	4.0%	4.0%
Computers	8.2%	8.1%	8.0%	7.8%	7.7%
Software	6.9%	7.0%	7.1%	7.2%	7.2%
Info. Processing Equipment	7.3%	7.3%	7.4%	7.4%	7.3%
Nondurables	1.6%	1.6%	1.5%	1.6%	1.6%
Food	0.6%	0.5%	0.5%	0.5%	0.5%
Gasoline & other fuels	-1.3%	-1.4%	-1.4%	-1.4%	-1.4%
Clothing & footwear	3.9%	3.9%	3.9%	3.9%	3.9%
Gross Domestic Investments	1.7%	1.7%	2.0%	2.2%	2.0%
Nonresidential Fixed Investments	2.3%	2.3%	2.4%	2.4%	2.5%
Industrial Equipment	1.9%	1.8%	2.0%	2.4%	2.6%
Computer Equipment	5.3%	5.3%	5.3%	5.3%	5.3%
Software	2.4%	2.4%	2.4%	2.4%	2.4%
Transportation Equip.	3.5%	3.4%	3.6%	3.7%	3.5%

Structures/Buildings	1.0%	1.1%	1.2%	1.2%	1.3%
Residential Fixed Investments	0.0%	0.2%	0.8%	1.4%	1.1%
Equipment	3.3%	3.3%	3.3%	3.4%	3.5%
Structures/Buildings	-0.1%	0.1%	0.7%	1.4%	1.1%
Exports	1.6%	1.7%	1.7%	1.7%	1.3%
Goods	1.5%	1.7%	1.5%	1.6%	1.0%
Services	1.9%	1.9%	1.9%	2.0%	2.0%
Imports	2.6%	2.2%	2.1%	2.3%	2.2%
Federal Spending	0.4%	0.8%	-0.2%	0.4%	0.4%
State & LocalSpending	0.7%	0.7%	0.7%	0.7%	0.8%

National Income and Production A

	2044	Average Percent Rate 2002-22	2024-34	2034-44
(billions of US dollars, chained-inflation adj.)				
Gross Domestic Product	31,440.0	2.1%	1.6%	1.3%
Personal Consumption Expenditures	23,380.9	2.3%	1.9%	1.6%
Durable Goods	5,028.5	5.0%	4.6%	3.3%
Computers	639.2	15.5%	5.8%	6.2%
Software	953.2	21.9%	4.0%	5.1%
Info. Processing Equipment	1,387.9	18.6%	4.5%	5.4%
Nondurables	4,427.2	2.3%	1.0%	1.3%
Food	2,278.5	2.1%	0.4%	0.4%
Gasoline & other fuels	225.4	0.0%	-1.8%	-1.0%
Clothing & footwear	1,048.0	3.0%	3.4%	2.9%
Gross Domestic Investments	5,932.9	3.0%	2.1%	1.4%
Nonresidential Fixed Investments	5,115.5	3.8%	2.1%	1.8%
Industrial Equipment	381.1	1.7%	2.1%	1.8%
Computer Equipment	428.2	7.8%	5.4%	4.0%
Software	1,363.6	9.2%	2.7%	1.8%
Transportation Equip.	525.0	1.3%	3.7%	2.5%
Structures/Buildings	681.4	0.3%	0.9%	0.8%
Residential Fixed Investments	885.6	-0.2%	1.8%	0.2%
Equipment	44.0	5.2%	3.1%	2.6%
Structures/Buildings	688.6	-0.3%	1.8%	0.2%
Exports	4,049.5	3.5%	2.9%	1.3%
Goods	2,994.0	3.7%	2.9%	1.2%
Services	1,243.9	3.3%	2.9%	1.5%
Imports	6,234.1	3.5%	3.0%	2.0%
Federal Spending	1,546.1	1.7%	0.0%	0.3%
State & LocalSpending	2,628.0	0.4%	0.3%	0.6%

(annualized percent change)	2044
Gross Domestic Product	1.7%
Personal Consumption Expenditures	2.0%
Durable Goods	4.0%
Computers	7.5%
Software	7.1%
Info. Processing Equipment	7.2%
Nondurables	1.6%
Food	0.5%
Gasoline & other fuels	-1.6%
Clothing & footwear	3.9%
Gross Domestic Investments	2.0%
Nonresidential Fixed Investments	2.4%
Industrial Equipment	2.5%
Computer Equipment	5.3%
Software	2.4%
Transportation Equip.	3.1%

Structures/Buildings	1.3%
Residential Fixed Investments	0.9%
Equipment	3.4%
Structures/Buildings	0.9%
Exports	1.3%
Goods	1.0%
Services	2.0%
Imports	2.1%
Federal Spending	0.4%
State & LocalSpending	0.7%

US Employment Forecast

	2024	2025	2026	2027	2028	2029	2030	2031	2032
(figures in millions)									
Nonfarm Wage & Salary Jobs, TOTAL	157.2	157.3	157.9	158.6	159.4	160.0	160.6	161.1	161.6
Manufacturing, TOTAL	12.9	12.3	12.1	11.9	11.8	11.7	11.7	11.6	11.5
Durables, total	8.1	7.7	7.5	7.4	7.2	7.2	7.1	7.1	7.1
Wood Products	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
Primary Metals	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Fab. Metals	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3
Machinery Mfg.	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Computer & Electronics	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
Transp. Equipment	1.8	1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.3
Other Durable Goods	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
Nondurables, total	4.8	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5
Food Processing	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8
Paper	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Other Nondurables	2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4
Nonmanufacturing (private), TOTAL	121.3	121.7	122.5	123.3	124.1	124.7	125.2	125.6	126.1
Natural Resources & Mining	0.6	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7
Construction	8.1	8.2	8.3	8.4	8.6	8.7	8.8	8.9	9.0
Trade, Transport & Utilities	28.5	28.1	28.2	28.2	28.1	28.0	27.9	27.8	27.8
Wholesale Trade	6.1	6.2	6.2	6.2	6.2	6.1	6.0	6.0	6.0
Retail Trade	15.2	14.7	14.7	14.7	14.6	14.6	14.6	14.6	14.7
TWU	7.2	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.1
Information Services	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Publishing	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
Internet, etc.	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
Financial Activities	9.2	9.3	9.4	9.5	9.5	9.5	9.4	9.4	9.5
Finance & Insurance	6.7	6.9	7.0	7.1	7.1	7.1	7.0	7.1	7.1
Real Estate	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Pro. Business Services	23.0	23.0	23.0	23.3	23.8	24.3	24.8	25.1	25.4
Pro., Sci., Tech.	11.0	11.1	11.0	11.1	11.1	11.1	11.1	11.2	11.3
Mgmt. of Co.	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3
Admin Sup. + Waste	9.4	9.4	9.5	9.7	10.3	10.8	11.3	11.6	11.8
Edu. + Health	26.1	26.3	26.4	26.6	26.7	26.8	26.9	27.1	27.3
Education	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Health	22.2	22.4	22.5	22.7	22.8	22.9	23.0	23.2	23.4
Leisure + Hospitality	16.8	17.0	17.3	17.4	17.4	17.3	17.2	17.1	16.9
Arts, ent. & rec.	2.5	2.7	2.7	2.8	3.0	3.1	3.1	3.2	3.2
Lodgings & Food	14.3	14.3	14.5	14.6	14.4	14.3	14.1	13.9	13.6
Other Services	5.9	6.0	6.0	6.1	6.2	6.3	6.3	6.4	6.4
Government, Civilian TOTAL	23.1	23.2	23.3	23.4	23.5	23.6	23.8	23.8	23.9
Federal, Civilian	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
State & Local	20.1	20.3	20.4	20.5	20.6	20.7	20.8	20.9	21.0

US Employment Forecast

(figures in millions)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	162.1	162.7	163.2	163.7	164.3	165.0	165.6	166.3	166.8
Manufacturing, TOTAL	11.4	11.4	11.4	11.5	11.5	11.6	11.6	11.6	11.7
Durables, total	7.0	7.0	7.0	7.1	7.1	7.1	7.2	7.2	7.2
Wood Products	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Primary Metals	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Fab. Metals	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
Machinery Mfg.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Computer & Electronics	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Transp. Equipment	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Other Durable Goods	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7
Nondurables, total	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Food Processing	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0
Paper	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Other Nondurables	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1
Nonmanufacturing (private), TOTAL	126.7	127.1	127.5	127.9	128.3	128.8	129.3	129.8	130.2
Natural Resources & Mining	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
Construction	9.1	9.1	9.2	9.2	9.2	9.1	9.1	9.1	9.1
Trade, Transport & Utilities	27.7	27.6	27.5	27.5	27.4	27.4	27.4	27.4	27.4
Wholesale Trade	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.8	5.7
Retail Trade	14.7	14.7	14.8	14.8	14.9	15.0	15.1	15.1	15.2
TWU	7.1	7.0	6.9	6.8	6.7	6.6	6.6	6.5	6.4
Information Services	3.1	3.0	3.0	3.0	3.0	3.1	3.1	3.1	3.1
Publishing	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
Internet, etc.	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3
Financial Activities	9.5	9.5	9.5	9.5	9.6	9.6	9.6	9.7	9.8
Finance & Insurance	7.2	7.2	7.2	7.3	7.3	7.3	7.4	7.5	7.6
Real Estate	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2
Pro. Business Services	25.8	26.2	26.4	26.7	27.0	27.3	27.5	27.7	28.0
Pro., Sci., Tech.	11.4	11.6	11.8	11.9	12.0	12.1	12.2	12.2	12.3
Mgmt. of Co.	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1
Admin Sup. + Waste	12.1	12.3	12.4	12.6	12.8	13.1	13.3	13.4	13.6
Edu. + Health	27.5	27.7	27.7	27.8	27.8	27.9	27.9	28.0	28.0
Education	3.9	3.9	3.8	3.8	3.7	3.7	3.6	3.6	3.6
Health	23.6	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.4
Leisure + Hospitality	16.8	16.7	16.8	16.8	16.9	17.0	17.1	17.1	17.2
Arts, ent. & rec.	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.5	3.5
Lodgings & Food	13.5	13.4	13.5	13.5	13.6	13.6	13.6	13.7	13.7
Other Services	6.4	6.5	6.5	6.6	6.6	6.7	6.8	6.9	6.9
Government, Civilian TOTAL	24.0	24.1	24.2	24.3	24.5	24.6	24.7	24.9	24.9
Federal, Civilian	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
State & Local	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	22.0

US Employment Forecast

(figures in millions)	2042	2043	2044	Average Percent Rate 1990-2022	2024-34	2034-44
Nonfarm Wage & Salary Jobs, TOTAL	167.3	167.8	168.3	1.0%	0.3%	0.3%
Manufacturing, TOTAL	11.7	11.7	11.7	-1.0%	-1.2%	0.2%
Durables, total	7.3	7.2	7.2	-0.9%	-1.4%	0.4%
Wood Products	0.4	0.4	0.4	-0.7%	1.7%	-1.6%
Primary Metals	0.3	0.3	0.3	-2.0%	-2.6%	-1.0%
Fab. Metals	1.5	1.6	1.6	-0.4%	-0.7%	1.4%
Machinery Mfg.	1.1	1.1	1.1	-0.8%	-1.5%	1.1%
Computer & Electronics	1.0	1.0	1.0	-1.7%	-0.8%	0.3%
Transp. Equipment	1.2	1.2	1.2	-0.7%	-3.3%	-1.0%
Other Durable Goods	1.7	1.7	1.7	-0.9%	-1.3%	0.8%
Nondurables, total	4.4	4.4	4.4	-1.1%	-0.8%	0.0%
Food Processing	2.0	2.0	2.1	0.4%	0.4%	1.5%
Paper	0.3	0.3	0.3	-1.8%	-1.2%	0.1%
Other Nondurables	2.1	2.1	2.0	-1.7%	-1.6%	-1.3%
Nonmanufacturing (private), TOTAL	130.6	131.0	131.3	1.5%	0.5%	0.3%
Natural Resources & Mining	0.8	0.8	0.8	-0.7%	1.6%	0.1%
Construction	9.2	9.2	9.3	1.2%	1.2%	0.2%
Trade, Transport & Utilities	27.4	27.3	27.3	0.7%	-0.3%	-0.1%
Wholesale Trade	5.7	5.7	5.7	0.4%	-0.3%	-0.3%
Retail Trade	15.2	15.2	15.3	0.5%	-0.3%	0.4%
TWU	6.4	6.4	6.3	1.7%	-0.4%	-1.0%
Information Services	3.1	3.1	3.1	0.4%	-0.1%	0.2%
Publishing	0.7	0.7	0.7	0.2%	-1.3%	-0.9%
Internet, etc.	2.4	2.4	2.4	0.5%	0.4%	0.5%
Financial Activities	9.9	9.9	10.0	1.0%	0.4%	0.5%
Finance & Insurance	7.6	7.7	7.8	0.9%	0.7%	0.8%
Real Estate	2.2	2.2	2.2	1.2%	-0.5%	-0.5%
Pro. Business Services	28.1	28.3	28.4	2.3%	1.3%	0.8%
Pro., Sci., Tech.	12.4	12.5	12.6	2.6%	0.6%	0.7%
Mgmt. of Co.	2.0	2.0	2.0	1.3%	-1.2%	-1.4%
Admin Sup. + Waste	13.7	13.8	13.9	2.3%	2.7%	1.2%
Edu. + Health	28.0	27.9	27.9	2.5%	0.6%	0.1%
Education	3.6	3.6	3.6	2.6%	-0.1%	-0.7%
Health	24.4	24.3	24.3	2.5%	0.7%	0.2%
Leisure + Hospitality	17.3	17.3	17.4	1.7%	-0.1%	0.4%
Arts, ent. & rec.	3.5	3.6	3.6	2.2%	2.6%	0.9%
Lodgings & Food	13.7	13.7	13.8	1.6%	-0.6%	0.3%
Other Services	7.0	7.1	7.2	0.9%	1.0%	1.0%
Government, Civilian TOTAL	25.0	25.2	25.3	0.6%	0.4%	0.5%
Federal, Civilian	3.0	3.0	3.0	-0.3%	0.0%	0.0%
State & Local	22.1	22.2	22.3	0.7%	0.5%	0.5%

US Employment Forecast

(Annual percent change)	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	0.7%	0.0%	0.4%	0.5%	0.5%	0.4%	0.4%	0.3%	0.3%
Manufacturing, TOTAL	-0.8%	-4.2%	-2.0%	-1.4%	-1.2%	-0.6%	-0.2%	-0.5%	-0.7%
Durables, total	-0.6%	-4.7%	-2.3%	-1.8%	-1.8%	-1.0%	-0.4%	-0.6%	-0.7%
Wood Products	-4.3%	-2.3%	5.3%	4.3%	3.3%	3.9%	4.3%	1.8%	0.4%
Primary Metals	0.7%	-5.2%	-2.6%	-2.7%	-3.7%	-3.3%	-2.4%	-0.7%	-1.6%
Fab. Metals	0.1%	-3.3%	-1.2%	-1.4%	-1.9%	-1.0%	-0.2%	0.6%	0.4%
Machinery Mfg.	-1.1%	-5.7%	-2.1%	-1.6%	-1.8%	-1.2%	-0.6%	-0.4%	-0.8%
Computer & Electronics	-0.8%	-1.1%	-0.7%	-1.4%	-1.7%	-1.6%	-1.3%	-0.6%	-0.1%
Transp. Equipment	1.1%	-7.7%	-6.0%	-4.3%	-3.5%	-1.7%	-1.7%	-2.9%	-2.1%
Other Durable Goods	-1.5%	-4.8%	-2.3%	-1.6%	-1.4%	-0.7%	0.3%	-0.1%	-0.8%
Nondurables, total	-1.3%	-3.5%	-1.5%	-0.8%	-0.2%	0.2%	0.0%	-0.4%	-0.7%
Food Processing	-0.1%	-3.2%	-0.4%	0.5%	1.3%	1.7%	1.5%	1.0%	0.7%
Paper	-3.4%	-5.8%	-2.0%	-0.8%	-0.2%	0.2%	-0.1%	-0.5%	-0.8%
Other Nondurables	-1.8%	-3.3%	-2.1%	-1.6%	-1.1%	-0.9%	-1.0%	-1.3%	-1.6%
Nonmanufacturing (private), TOTAL	0.6%	0.4%	0.6%	0.7%	0.6%	0.5%	0.4%	0.4%	0.4%
Natural Resources & Mining	0.4%	2.6%	6.8%	5.5%	1.1%	-1.1%	-2.0%	-1.4%	1.3%
Construction	1.6%	0.8%	1.8%	1.5%	1.8%	1.5%	1.4%	0.7%	0.8%
Trade, Transport & Utilities	-1.2%	-1.4%	0.2%	0.2%	-0.4%	-0.5%	-0.4%	0.0%	-0.1%
Wholesale Trade	0.6%	1.0%	0.3%	0.4%	-0.6%	-0.9%	-1.1%	-0.5%	-0.5%
Retail Trade	-2.2%	-3.4%	-0.1%	0.1%	-0.3%	-0.4%	0.1%	0.4%	0.3%
TWU	-0.5%	0.8%	0.5%	0.1%	-0.3%	-0.5%	-0.7%	-0.5%	-0.8%
Information Services	-0.4%	2.7%	-1.2%	-1.2%	0.1%	0.5%	0.1%	0.1%	0.2%
Publishing	-2.7%	-2.0%	-2.0%	-1.1%	-0.8%	-1.0%	-1.1%	-0.9%	-1.2%
Internet, etc.	0.6%	4.6%	-0.9%	-1.3%	0.4%	1.0%	0.6%	0.5%	0.8%
Financial Activities	0.6%	1.7%	1.1%	0.4%	0.0%	-0.1%	-0.4%	0.2%	0.7%
Finance & Insurance	0.6%	2.2%	1.7%	0.7%	0.1%	0.0%	-0.3%	0.3%	1.0%
Real Estate	0.9%	0.3%	-0.5%	-0.6%	-0.4%	-0.4%	-0.7%	-0.1%	-0.3%
Pro. Business Services	0.0%	0.2%	0.0%	1.1%	2.2%	2.1%	2.0%	1.4%	1.3%
Pro., Sci., Tech.	1.3%	0.7%	-0.7%	0.6%	0.2%	-0.1%	0.5%	0.7%	0.8%
Mgmt. of Co.	1.0%	-0.5%	-1.7%	-1.2%	-1.1%	-1.3%	-1.3%	-0.9%	-1.1%
Admin Sup. + Waste	-1.7%	-0.2%	1.3%	2.3%	5.3%	5.3%	4.2%	2.6%	2.2%
Edu. + Health	2.8%	0.9%	0.3%	0.6%	0.6%	0.3%	0.4%	0.7%	0.7%
Education	0.1%	-0.9%	0.0%	0.4%	0.7%	0.1%	-0.6%	-0.2%	-0.1%
Health	3.3%	1.3%	0.3%	0.6%	0.6%	0.3%	0.6%	0.8%	0.9%
Leisure + Hospitality	1.2%	1.2%	1.6%	0.7%	-0.2%	-0.1%	-0.6%	-1.0%	-1.1%
Arts, ent. & rec.	3.4%	4.4%	3.1%	3.4%	4.7%	3.2%	2.5%	1.8%	1.0%
Lodgings & Food	0.8%	0.6%	1.3%	0.2%	-1.2%	-0.8%	-1.2%	-1.6%	-1.5%
Other Services	0.4%	1.2%	1.4%	1.5%	1.6%	1.1%	0.7%	0.7%	0.5%
Government, Civilian TOTAL	1.6%	0.6%	0.5%	0.4%	0.4%	0.4%	0.7%	0.1%	0.4%
Federal, Civilian	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	-2.3%	0.0%
State & Local	1.7%	0.7%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

US Employment Forecast

	2033	2034	2035	2036	2037	2038	2039	2040	2041
(Annual percent change)									
Nonfarm Wage & Salary Jobs, TOTAL	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.3%
Manufacturing, TOTAL	-0.8%	-0.3%	0.3%	0.2%	0.5%	0.4%	0.4%	0.3%	0.2%
Durables, total	-0.9%	-0.1%	0.6%	0.4%	0.7%	0.5%	0.5%	0.4%	0.4%
Wood Products	-1.2%	-2.2%	-1.8%	-5.7%	-3.5%	-3.3%	-1.3%	-2.4%	0.8%
Primary Metals	-2.6%	-1.4%	-0.5%	-0.7%	-0.8%	-1.3%	-0.8%	-0.4%	-0.8%
Fab. Metals	0.2%	1.2%	2.3%	2.2%	2.0%	1.7%	1.4%	1.4%	1.1%
Machinery Mfg.	-1.0%	0.2%	1.5%	1.6%	1.7%	1.3%	1.2%	1.2%	0.8%
Computer & Electronics	0.1%	0.0%	0.1%	0.2%	0.3%	0.3%	0.4%	0.4%	0.4%
Transp. Equipment	-1.8%	-0.9%	-0.4%	-0.5%	-0.3%	-0.5%	-0.5%	-0.6%	-1.3%
Other Durable Goods	-1.0%	0.0%	0.8%	1.1%	1.5%	1.1%	0.9%	0.8%	0.7%
Nondurables, total	-0.8%	-0.7%	-0.3%	-0.2%	0.0%	0.2%	0.2%	0.1%	0.0%
Food Processing	0.4%	0.5%	1.0%	1.2%	1.6%	1.7%	1.8%	1.7%	1.4%
Paper	-1.0%	-0.7%	-0.3%	-0.1%	0.3%	0.3%	0.3%	0.2%	0.0%
Other Nondurables	-1.7%	-1.5%	-1.3%	-1.3%	-1.2%	-1.2%	-1.2%	-1.3%	-1.4%
Nonmanufacturing (private), TOTAL	0.4%	0.4%	0.3%	0.3%	0.3%	0.4%	0.3%	0.4%	0.3%
Natural Resources & Mining	2.1%	1.6%	0.3%	-0.5%	-0.8%	-0.5%	-0.1%	0.0%	0.7%
Construction	1.1%	1.0%	0.6%	0.1%	-0.4%	-0.4%	-0.3%	-0.1%	0.2%
Trade, Transport & Utilities	-0.2%	-0.4%	-0.3%	-0.2%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
Wholesale Trade	-0.7%	-0.5%	-0.6%	-0.5%	-0.5%	-0.3%	-0.3%	-0.3%	-0.3%
Retail Trade	0.4%	-0.1%	0.3%	0.5%	0.6%	0.5%	0.6%	0.4%	0.4%
TWU	-1.1%	-1.0%	-1.3%	-1.4%	-1.3%	-1.1%	-1.1%	-1.0%	-0.9%
Information Services	-0.6%	-1.0%	-0.6%	0.2%	0.6%	0.7%	0.6%	0.1%	-0.4%
Publishing	-1.6%	-1.4%	-1.3%	-1.3%	-1.3%	-1.1%	-0.9%	-0.6%	-0.7%
Internet, etc.	-0.3%	-0.9%	-0.3%	0.8%	1.2%	1.3%	1.1%	0.3%	-0.3%
Financial Activities	0.3%	0.1%	0.0%	0.0%	0.2%	0.4%	0.5%	0.7%	0.7%
Finance & Insurance	0.7%	0.5%	0.3%	0.2%	0.5%	0.7%	0.8%	1.0%	1.1%
Real Estate	-1.2%	-1.2%	-0.9%	-0.6%	-0.7%	-0.6%	-0.7%	-0.4%	-0.4%
Pro. Business Services	1.5%	1.4%	0.9%	1.1%	1.1%	1.1%	0.7%	0.8%	0.8%
Pro., Sci., Tech.	1.3%	1.8%	1.4%	1.0%	0.7%	0.5%	0.6%	0.7%	0.6%
Mgmt. of Co.	-1.5%	-1.4%	-1.5%	-1.5%	-1.5%	-1.3%	-1.3%	-1.2%	-1.3%
Admin Sup. + Waste	2.3%	1.6%	1.0%	1.5%	1.9%	2.2%	1.1%	1.3%	1.3%
Edu. + Health	0.8%	0.7%	0.2%	0.1%	0.1%	0.2%	0.2%	0.3%	0.0%
Education	0.1%	-0.6%	-1.5%	-1.6%	-1.7%	-1.3%	-1.0%	-0.6%	-0.1%
Health	0.9%	0.9%	0.5%	0.4%	0.4%	0.5%	0.3%	0.4%	0.1%
Leisure + Hospitality	-0.7%	-0.5%	0.5%	0.4%	0.5%	0.4%	0.5%	0.4%	0.4%
Arts, ent. & rec.	0.9%	0.6%	0.7%	1.0%	1.0%	1.1%	0.9%	0.9%	0.8%
Lodgings & Food	-1.1%	-0.7%	0.4%	0.3%	0.4%	0.2%	0.4%	0.2%	0.3%
Other Services	0.4%	0.6%	0.5%	0.8%	1.1%	1.2%	1.2%	1.2%	1.1%
Government, Civilian TOTAL	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%	0.7%	0.2%
Federal, Civilian	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	1.8%	-1.9%
State & Local	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

US Employment Forecast

	2042	2043	2044
(Annual percent change)			
Nonfarm Wage & Salary Jobs, TOTAL	0.3%	0.3%	0.3%
Manufacturing, TOTAL	0.1%	-0.1%	0.0%
Durables, total	0.2%	-0.2%	0.0%
Wood Products	2.3%	-0.8%	-0.2%
Primary Metals	-1.3%	-1.7%	-1.4%
Fab. Metals	0.7%	0.6%	0.7%
Machinery Mfg.	0.5%	0.4%	0.7%
Computer & Electronics	0.4%	0.5%	0.5%
Transp. Equipment	-1.7%	-2.0%	-1.9%
Other Durable Goods	0.5%	0.1%	0.3%
Nondurables, total	0.0%	0.0%	0.0%
Food Processing	1.4%	1.4%	1.4%
Paper	0.0%	0.0%	0.0%
Other Nondurables	-1.3%	-1.4%	-1.4%
Nonmanufacturing (private), TOTAL	0.3%	0.3%	0.3%
Natural Resources & Mining	1.3%	0.8%	-0.2%
Construction	0.6%	0.8%	0.8%
Trade, Transport & Utilities	-0.1%	-0.1%	-0.1%
Wholesale Trade	-0.1%	-0.2%	-0.1%
Retail Trade	0.1%	0.2%	0.1%
TWU	-0.6%	-0.6%	-0.5%
Information Services	0.6%	0.0%	-0.2%
Publishing	-0.7%	-0.8%	-0.7%
Internet, etc.	1.0%	0.2%	0.0%
Financial Activities	0.8%	0.8%	0.8%
Finance & Insurance	1.1%	1.1%	1.1%
Real Estate	-0.4%	-0.4%	-0.2%
Pro. Business Services	0.7%	0.4%	0.5%
Pro., Sci., Tech.	0.7%	0.6%	0.7%
Mgmt. of Co.	-1.3%	-1.4%	-1.3%
Admin Sup. + Waste	1.0%	0.5%	0.6%
Edu. + Health	-0.1%	-0.2%	0.0%
Education	0.1%	0.6%	0.6%
Health	-0.1%	-0.3%	-0.1%
Leisure + Hospitality	0.2%	0.3%	0.2%
Arts, ent. & rec.	0.9%	0.9%	1.1%
Lodgings & Food	0.0%	0.2%	0.0%
Other Services	1.1%	1.0%	1.0%
Government, Civilian TOTAL	0.5%	0.5%	0.5%
Federal, Civilian	0.1%	0.1%	0.1%
State & Local	0.6%	0.6%	0.6%

US Personal Income Accounts

	2024	2025	2026	2027	2028	2029	2030	2031
(in billions nominal dollars)								
Personal Income	24096.6	25318.7	26465.0	27605.6	28768.2	29957.7	31197.8	32485.7
+ Wage & Salary Disbursement	12327.2	12786.8	13300.1	13847.3	14408.4	14977.9	15572.7	16187.8
- Social Ins. Contribution	1879.7	1938.3	2009.4	2069.8	2148.9	2234.1	2323.4	2416.1
+ Transfer Payments	4230.8	4425.9	4651.1	4902.2	5165.9	5437.9	5710.3	5990.8
+ Other Labor Income	1693.7	1756.9	1827.4	1902.6	1979.7	2058.0	2139.7	2224.2
+ Farm Proprietors Inc.	60.8	83.6	87.3	80.1	79.2	82.8	85.6	87.2
+ Bus. Proprietors Inc.	1843.9	1886.2	1933.5	2002.6	2088.9	2187.3	2298.0	2413.7
+ Div., Interest, & Rent	5003.1	5475.9	5803.0	6042.3	6262.1	6477.5	6705.1	6947.2
Per capita income (dollars)	71,450	74,687	77,668	80,601	83,572	86,594	89,735	92,989

source: S&P Global, IHS Global Insight | U.S. Macroeconomic Outlook, Baseline Trend, November 2023 (T30112

	2024	2025	2026	2027	2028	2029	2030	2031
(annualized percent change)								
Personal Income	4.9%	5.1%	4.5%	4.3%	4.2%	4.1%	4.1%	4.1%
+ Wage & Salary Disbursement	4.3%	3.7%	4.0%	4.1%	4.1%	4.0%	4.0%	3.9%
- Social Ins. Contribution	3.8%	3.1%	3.7%	3.0%	3.8%	4.0%	4.0%	4.0%
+ Transfer Payments	3.1%	4.6%	5.1%	5.4%	5.4%	5.3%	5.0%	4.9%
+ Other Labor Income	4.6%	3.7%	4.0%	4.1%	4.1%	4.0%	4.0%	3.9%
+ Farm Proprietors Inc.	3.4%	37.7%	4.4%	-8.2%	-1.2%	4.5%	3.4%	1.8%
+ Bus. Proprietors Inc.	3.5%	2.3%	2.5%	3.6%	4.3%	4.7%	5.1%	5.0%
+ Div., Interest, & Rent	8.3%	9.5%	6.0%	4.1%	3.6%	3.4%	3.5%	3.6%

US Personal Income

	2032	2033	2034	2035	2036	2037	2038	2039
(in billions nominal dollars)								
Personal Income	33851.8	35305.0	36752.6	38258.3	39856.2	41499.4	43203.3	44983.5
+ Wage & Salary Disbursement	16845.7	17552.9	18273.7	19017.5	19793.8	20601.2	21441.7	22317.0
- Social Ins. Contribution	2515.0	2621.2	2728.8	2839.7	2955.5	3075.9	3201.3	3331.8
+ Transfer Payments	6278.9	6577.6	6874.8	7178.1	7493.2	7809.3	8138.2	8487.7
+ Other Labor Income	2314.6	2411.8	2489.0	2574.2	2667.9	2767.4	2870.6	2977.4
+ Farm Proprietors Inc.	89.1	91.6	93.0	94.3	96.3	98.4	100.6	103.1
+ Bus. Proprietors Inc.	2538.4	2669.4	2781.8	2891.0	3016.0	3144.9	3273.4	3399.2
+ Div., Interest, & Rent	7205.2	7480.7	7781.6	8110.2	8464.1	8823.5	9197.0	9593.1
Per capita income (dollars)	96,444	100,123	103,767	107,557	111,590	115,734	120,030	124,521

source: S&P Global, IHS Global Ins23.bnk)

	2032	2033	2034	2035	2036	2037	2038	2039
(annualized percent change)								
Personal Income	4.2%	4.3%	4.1%	4.1%	4.2%	4.1%	4.1%	4.1%
+ Wage & Salary Disbursement	4.1%	4.2%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
- Social Ins. Contribution	4.1%	4.2%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
+ Transfer Payments	4.8%	4.8%	4.5%	4.4%	4.4%	4.2%	4.2%	4.3%
+ Other Labor Income	4.1%	4.2%	3.2%	3.4%	3.6%	3.7%	3.7%	3.7%
+ Farm Proprietors Inc.	2.2%	2.8%	1.6%	1.4%	2.1%	2.2%	2.2%	2.5%
+ Bus. Proprietors Inc.	5.2%	5.2%	4.2%	3.9%	4.3%	4.3%	4.1%	3.8%
+ Div., Interest, & Rent	3.7%	3.8%	4.0%	4.2%	4.4%	4.2%	4.2%	4.3%

US Personal Income

	2040	2041	2042	2043	2044	Average Percent Rate 1990-2022	2024-34	2034-44
(in billions nominal dollars)								
Personal Income	46854.9	48791.2	50858.8	53009.2	55238.1	4.8%	4.3%	3.2%
+ Wage & Salary Disbursement	23245.3	24184.5	25175.4	26207.1	27279.5	4.5%	4.0%	3.1%
- Social Ins. Contribution	3470.2	3610.2	3758.0	3911.8	4071.6	4.5%	3.8%	3.1%
+ Transfer Payments	8854.9	9246.7	9666.6	10106.9	10574.5	6.1%	5.0%	3.4%
+ Other Labor Income	3091.8	3211.7	3335.8	3462.4	3593.2	4.4%	3.9%	2.9%
+ Farm Proprietors Inc.	105.6	108.1	111.0	113.9	116.2	3.0%	4.4%	1.7%
+ Bus. Proprietors Inc.	3531.5	3667.0	3812.3	3958.2	4103.4	5.4%	4.2%	3.0%
+ Div., Interest, & Rent	10000.0	10429.0	10899.3	11391.6	11895.3	4.6%	4.5%	3.3%
Per capita income (dollars)	129,243	134,125	139,343	144,764	150,373	3.8%	3.8%	2.9%

source: S&P Global, IHS Global Ins

	2040	2041	2042	2043	2044
(annualized percent change)					
Personal Income	4.2%	4.1%	4.2%	4.2%	4.2%
+ Wage & Salary Disbursement	4.2%	4.0%	4.1%	4.1%	4.1%
- Social Ins. Contribution	4.2%	4.0%	4.1%	4.1%	4.1%
+ Transfer Payments	4.3%	4.4%	4.5%	4.6%	4.6%
+ Other Labor Income	3.8%	3.9%	3.9%	3.8%	3.8%
+ Farm Proprietors Inc.	2.5%	2.3%	2.7%	2.7%	2.0%
+ Bus. Proprietors Inc.	3.9%	3.8%	4.0%	3.8%	3.7%
+ Div., Interest, & Rent	4.2%	4.3%	4.5%	4.5%	4.4%

2024-2044 regional population, household, and employment forecast:

Expert panel review summary

Context

On January 30, 2024, Metro staff convened an expert panel of economists and demographers to review the preliminary regional forecast that will be part of the 2024 Urban Growth Report. This review is intended to identify areas of agreement or disagreement among experts in forecasting. The group is advisory to Metro staff. The following summary describes the topics brought forward in the forecast review, staff reasoning, as well as expert panelist views on those topics.

Main takeaways

The long-term trend of declining birth rates will lead to slower population growth rates

Metro's forecast for slower population growth is aligned with other forecasters' assessments. Specifically, panelists agreed that declining birth rates will mean that deaths will begin to outnumber births in the next decade. That negative natural change is expected to continue after that point, and without positive net migration, the region would begin to lose population. This expected slowdown is not because of the pandemic, the ensuing 2020 recession, or because of recent out-migration from the region. It is because of demographic shifts.

Panelists believe there is considerable uncertainty around migration, but that Metro's assumption, based on historic averages is reasonable. Panelists advised Metro to be clear about this uncertainty and that high cost of living on the west coast may lead to lower net in-migration.

Panelists indicated that, while intuition supports the notion that the region may see increased migration from climate refugees drawn to the Pacific Northwest's temperate climate, there is currently no observable evidence that this is happening. Panelists did not recommend building in an add-factor for climate induced migration at this time.

Employment growth will slow because of declining population growth rates

External experts agree that population growth is inextricably tied to employment growth and that slowing population growth would lead to slowing employment growth. Both are expected to grow at 0.4 percent per year over the forecast period. This is less than historic growth rates.

Panelists felt that Metro's preliminary employment forecast looked right in total, but that it was too optimistic about the CHIPS Act and its impacts on computer and electronics manufacturing and metal fabrication. Peer reviewers indicated that the CHIPS Act will primarily prevent manufacturing job losses that would otherwise occur in the next 10 years. Longer term, they expect manufacturing employment to be flat. In response, Metro staff has adjusted the computer and electronics and metal fabrication sectors downward slightly. The result is that manufacturing employment– after an initial increase in the next five to ten years—returns (declines) to pre-pandemic levels by the end of the 20-year forecast period.

NOTE: graphs included in this document are ones that were discussed by the peer review panel. As such, they may differ from the eventual draft or final regional forecast because staff has made adjustments based on expert feedback.

Expert panelists and Metro economics staff

Panelists

Peter Hulseman, City Economist, City of Portland
Neal Marquez, Forecast Program Manager, Portland State University Population Research Center
Ethan Sharygin, Director, Portland State University Population Research Center
Amy Vandervliet, Economist, Oregon Employment Department

Metro economics staff

Josh Harwood, Director of Fiscal and Tax Policy
Katelyn Kelley, Economist
Dennis Yee, Economist

Panel discussion

National macroeconomic conditions

Metro staff presented data on recent national gross domestic product (GDP) as well as GDP projections from S&P Global |IHS Markit. The national outlook shows GDP returning to a slow growth trend after seeing variability during the pandemic. The national outlook does not include another recession, but instead points to a "soft landing" from a period of high inflation.

National population

Metro staff presented national population growth rate forecasts which depict slowing population growth rates. By the end of the forecast period, average annual population growth rates are expected be at 0.4 percent, down from the 0.9 percent rate for the previous 30 years. Panel members suggested comparing this IHS Markit data to 2023 Census data but indicated that those data show a similar trend and forecast.

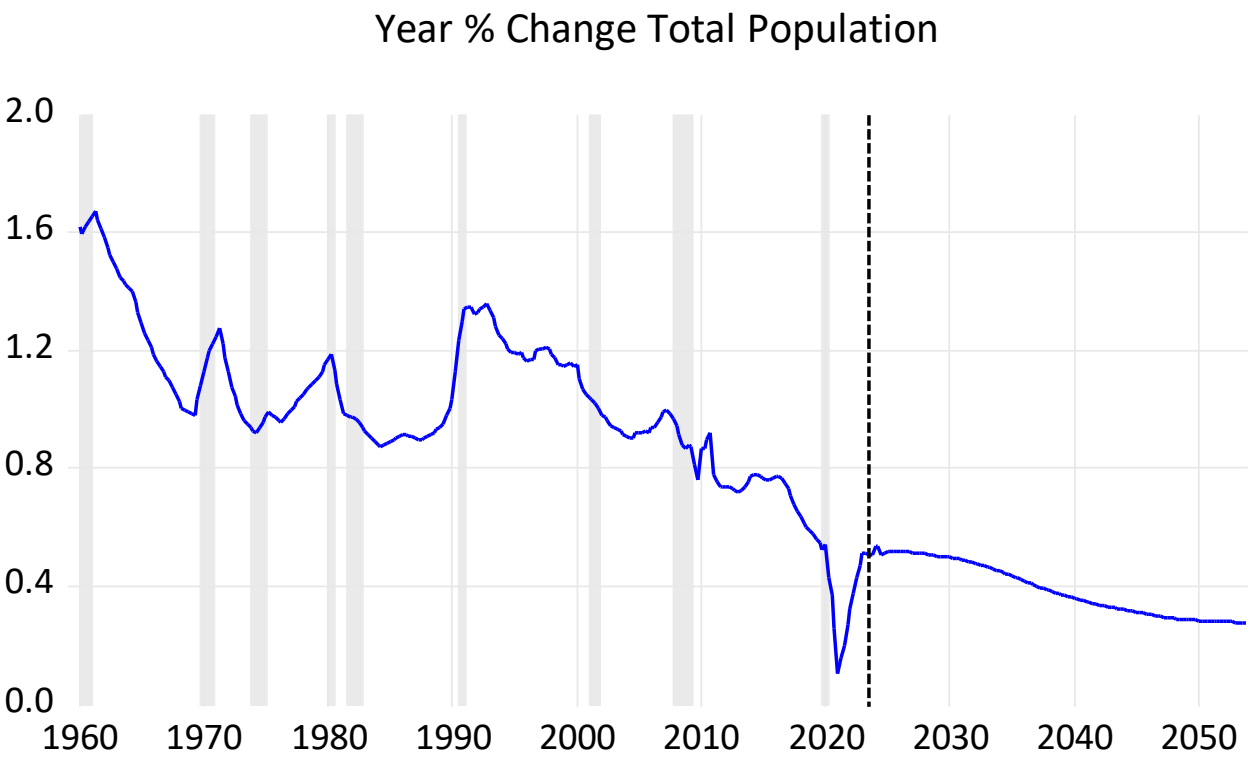


Figure 1: Annual percent change in total U.S. population (source: IHS Markit)

Declining birth rates are a main driver for slowing population growth rates. Though average life expectancy is expected to increase, the continued aging of the Baby Boomer generation will contribute to higher numbers of deaths in the next two decades. At the national level, deaths now outnumber births.

Going forward, national population would decline if it were not for international migration into the U.S. The pandemic is not seen as the cause of slower population growth. Rather, the continuation of the long-term trend of declining birth rates has become clearer since the completion of the 2018 forecast. Panelists did not indicate any disagreement with these overarching trends and their implications for regional population growth.

National Employment

Employment growth depends on population growth and labor force participation among that population. Having presented national data on slowing population growth, staff presented information on labor force participation and employment-to-population ratios.

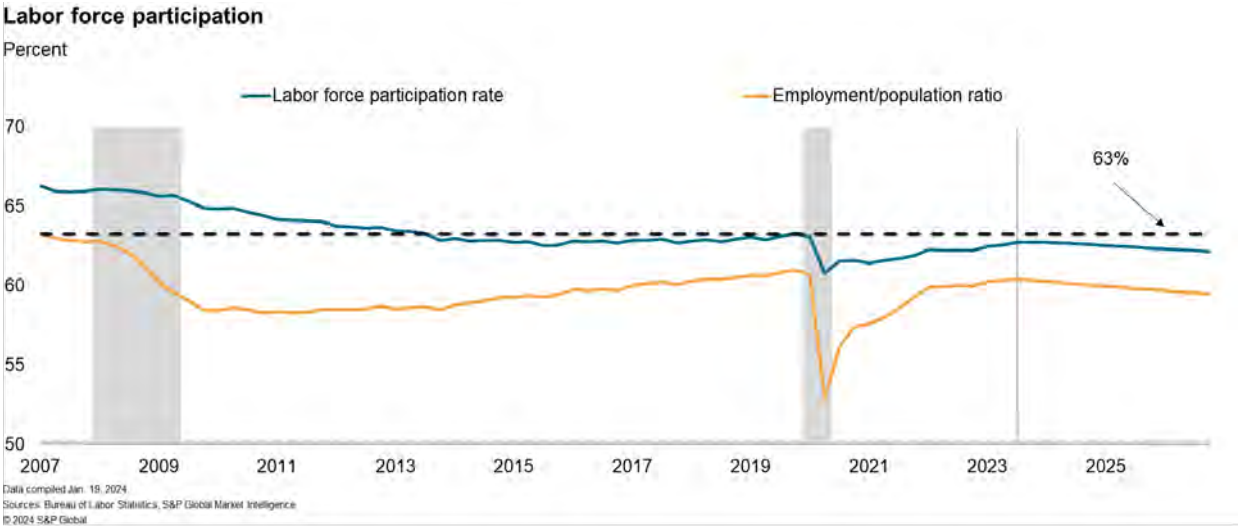


Figure 2: U.S. labor force participation

The national employment forecast shows slowing growth rates in coming decades. IHS Markit's national employment forecast indicates an average of 0.4 percent growth per year through the year 2055. This matches the national forecast for 0.4 percent population growth.

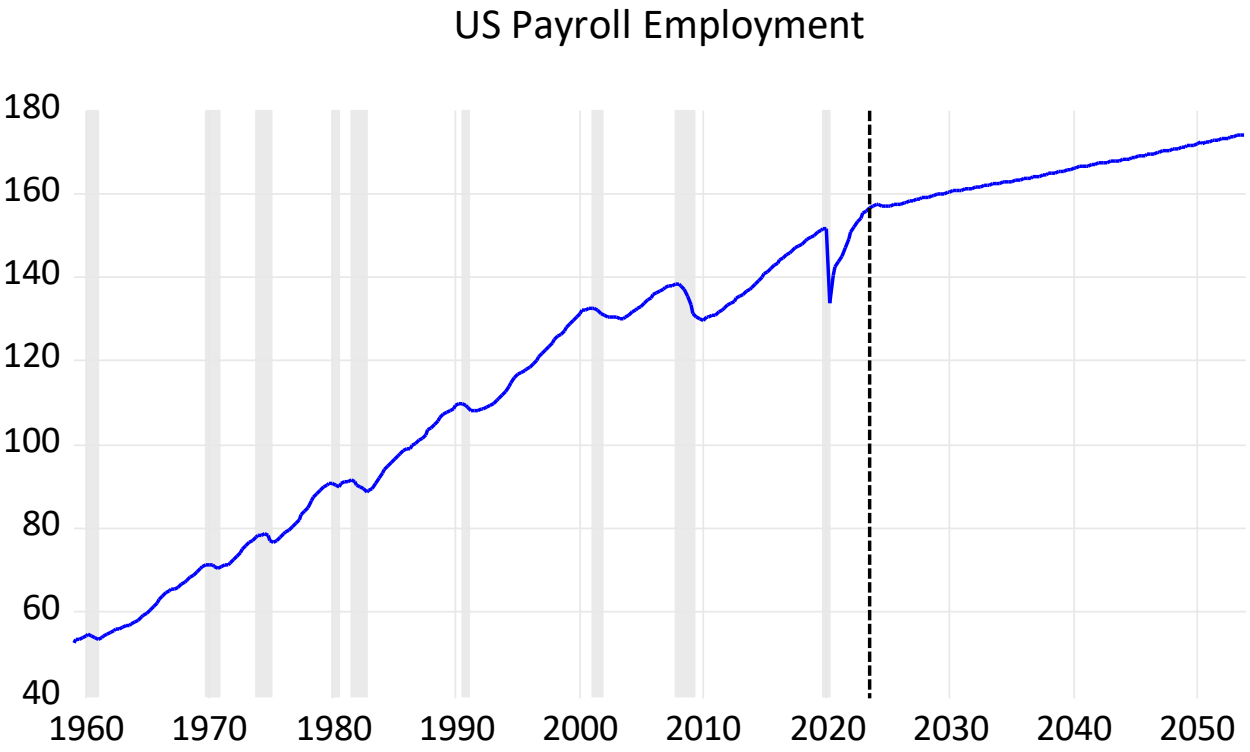


Figure 3: U.S. employment in millions (source: IHS Global Insight)

Regional population

Switching from the national context to the seven-county Portland/Vancouver Metropolitan Statistical Area (MSA), Metro staff presented the current population pyramid for the region.

Current age distribution

Figure 4 depicts an aging population with constricted younger age cohorts. This type of population pyramid indicates that a population will have diminishing natural increase (in which deaths exceed live births) and would shrink over coming decades were it not for net increases from migration.

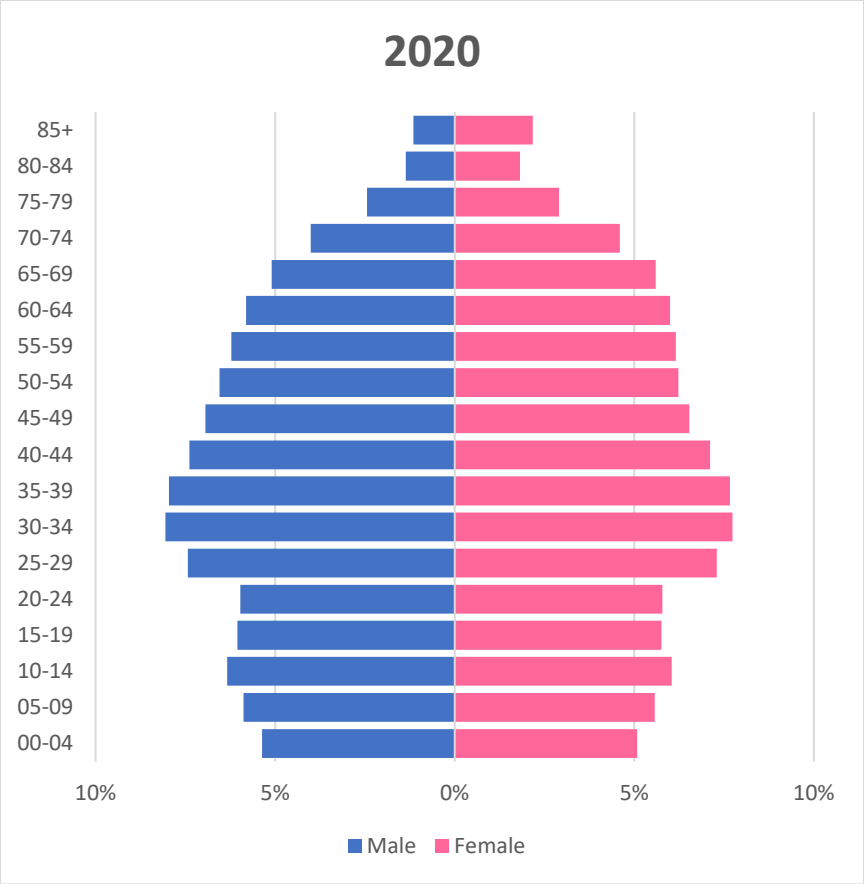


Figure 4: Portland/Vancouver MSA population pyramid in 2020 (source U.S. Census)

Panel members discussed how the regional population pyramid compares with other regions in the U.S.:

- Relative to other states, Oregon has a higher share of population that is 65 and older.
- The region continues to attract young working age migrants (ages 20-39).

Regional birth rates and fertility rates

Metro staff presented data on age-specific birth rates for the region. As depicted in Figure 5, births are being delayed until later in life and the average woman is having fewer children than in previous decades.

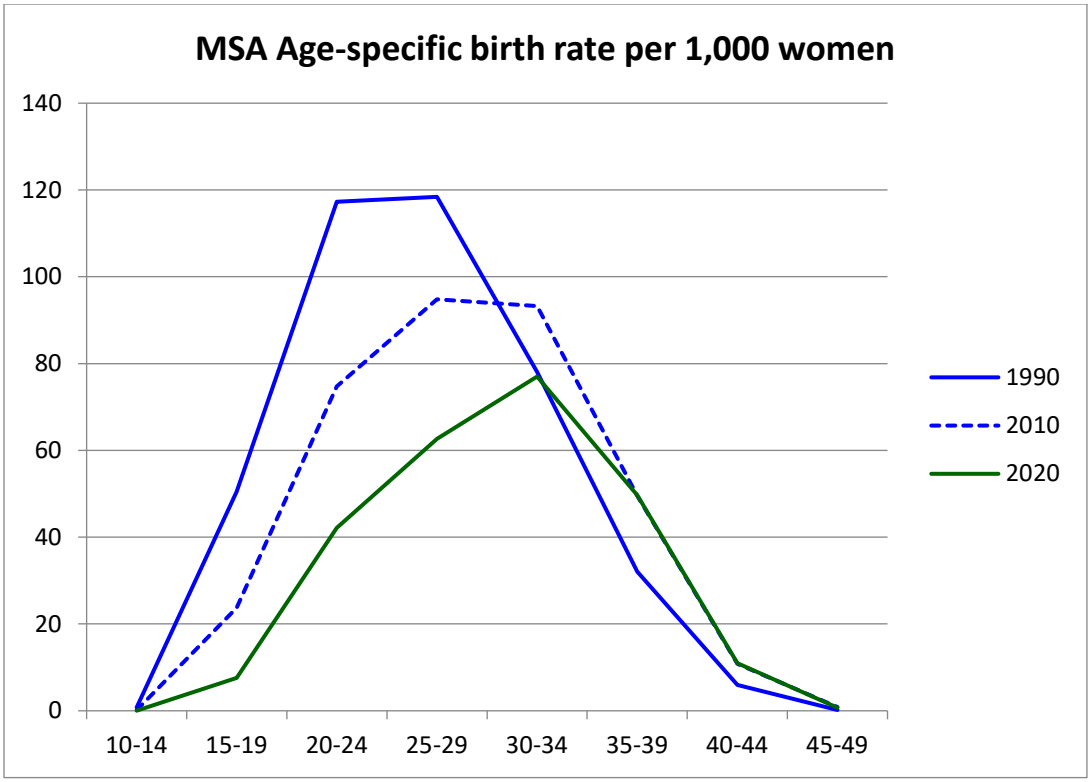


Figure 5: age-specific birth rates for the Portland MSA (source: U.S. Census)

Metro staff also presented total fertility rates for the MSA as depicted in Figure 6.

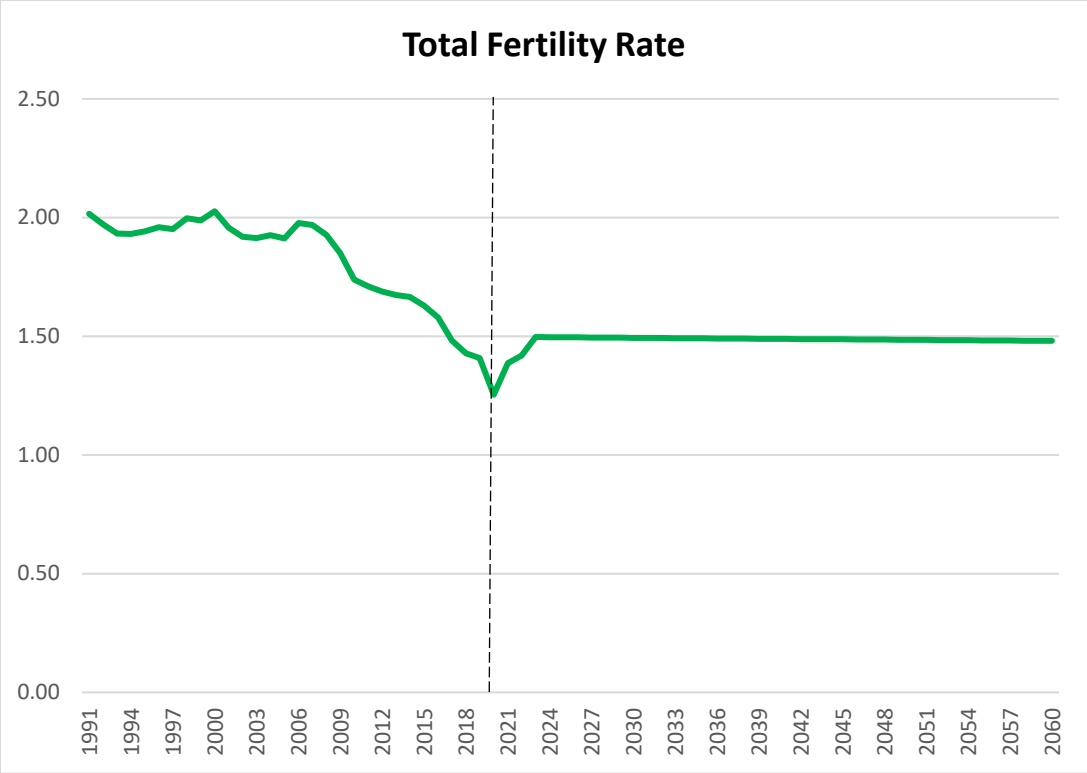


Figure 6: Portland MSA total fertility rate history and forecast (sources: PSU Population Research Center and Metro modeling)

Panelists from PSU's Population Research Center noted that Metro's forecast total fertility rate of 1.5 children per woman is slightly higher than PSU's forecasts for 1.4 children per woman. Metro will retain its assumption of 1.5 for the baseline forecast but will express a low and high forecast range to account for uncertainty around this and other assumptions.

Regional mortality assumptions

Though average life expectancy is expected to rise, the sheer number of people in the Baby Boomer generation will result in rising numbers of deaths in the region in coming years (despite living longer on average). See Figure 7. The peak circa 2020 is because of the pandemic.

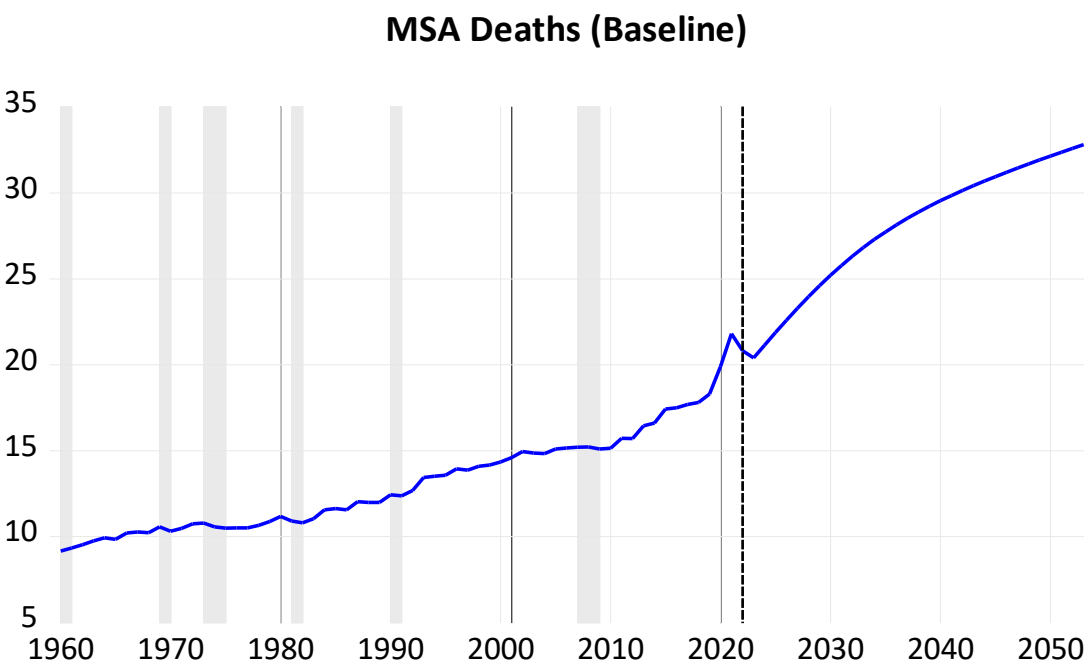


Figure 7: Annual deaths (in 1000s) for Portland MSA (Source: PSU Population Research Center)

Panel members asked whether Metro accounts for the age of people migrating in and out of the region. Metro staff indicated "yes," that these data come from PSU and include the age of migrants.

Panelists asserted that migrants to the region tend to have better health than people born in the region and inquired whether different life expectancies are assumed for those born here vs. those that migrate here. Metro staff indicated that its forecast does not differentiate.

Panelists inquired whether the forecast includes mortality by race and ethnicity. Metro staff indicated that yes, this is calculated in a post-processor.

Natural change

Natural change is the net change in total population after accounting for births and deaths. As depicted in Figure 8, natural change in the region will be negative in about a decade when deaths outnumber births. The expert panel did not indicate any disagreement with these fundamental demographic trends. Negative natural change will leave net migration as the potential source of regional population growth.

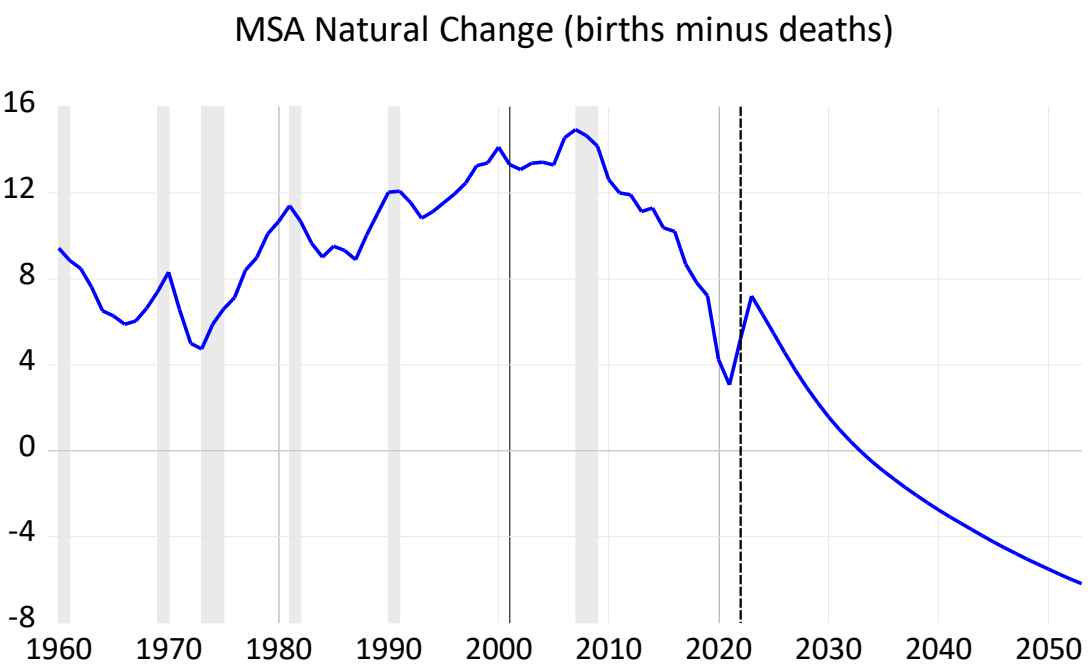


Figure 8: Natural change in the Portland MSA, 1000s of people per year (source: PSU Population Research Center)

Regional migration

Panelists discussed how migration into and out of the region is volatile and difficult to forecast. See Figure 9.

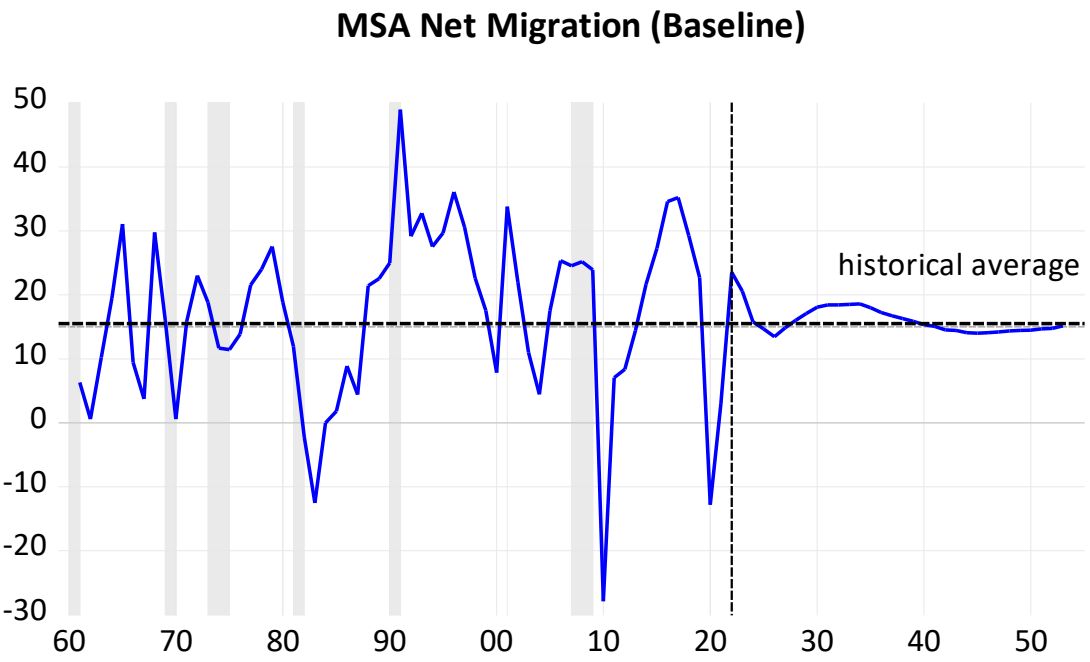


Figure 9: Portland MS net migration, 1000s per year (source: PSU Population Research Center)

Migration rates will determine regional population growth outcomes since natural increase will not be a long-term source of population growth. Panelists indicated that the persistence of remote work, quality

of life concerns in downtowns, and cost of living on the West Coast potentially reduce the relative attractiveness of the region for migration, making it more challenging to forecast than before. Panelists indicated general agreement that using the long-term historic average of about 15,000 net migrants per year into the region seemed reasonable, but that staff should be clear about the uncertainty surrounding that assumption. The State of Oregon Office of Economic Analysis has recently published an analysis of a zero-migration scenario to assess the potential impacts of diminished net migration.

Staff indicated that this uncertainty is a reason why we utilize a range forecast. The preliminary, pre-peer-review range forecast is depicted in Figure 10. Negative net migration – as factored into the low forecast – would lead to regional population losses. The baseline forecast assumes a continuation of the historic average of net regional migration. The high forecast assumes increased net migration compared to historic averages (in addition to natural increase in population).

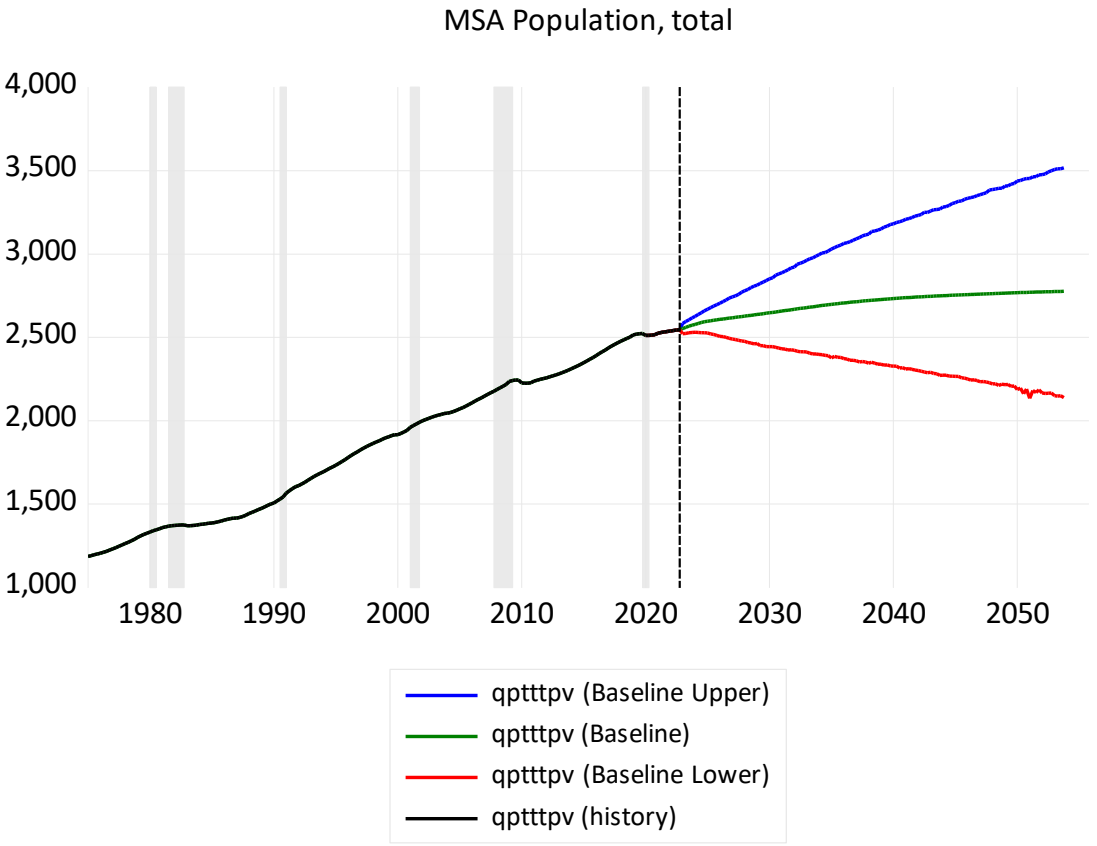


Figure 10: Portland MSA preliminary range forecast for population (in 1000s)

Housing prices and migration

Some have posited that relatively high housing costs on the west coast are one reason why migration to the region may slow down. Metro staff asked panelists a question that has been posed to them in other venues: could migration into the region be maintained by increasing housing production. The reasoning is that an increase in housing supply could moderate price increases, thereby inducing migration.

Staff's sense is that, while increased housing production should remain a goal for the nation, state, and region, it appears unlikely that it could be achieved at a scale that would give our region an affordability advantage relative to other regions. The scale of housing production needed to give our region that

advantage would likely require that builders in the region build in a speculative fashion, beyond the point of profitability.

Panelists indicated that, under this theoretical construct of intense housing production, the type of housing that gets built would matter. Specifically, homes with more bedrooms would be needed to attract households with children to bolster population growth. Housing with this many bedrooms can be built as multifamily housing or middle housing, but in our region, it has more typically taken the form of single-family housing.

Related, household formation can happen even without population growth. For instance, a person who once lived with roommates may form their own one-person household. One and two-bedroom units accommodate those newly formed small households.

Climate-induced migration

Staff introduced the topic of climate-induced migration, noting that many believe that our region's temperate climate could attract migrants leaving unfavorable environmental conditions elsewhere (e.g., extreme heat, sea level rise, increased storm intensity). Panelists indicated that this may be true, but that there is no data trend to indicate that this has happened yet. Panelists cited a recent consumer preference survey in which just two percent of respondents indicated that climate change influenced their decision to move. The panel does not recommend explicitly factoring it into the population forecast at this time. This recommendation is consistent with a 2016 symposium on the topic.

Staff suggested that households may become more sensitive to climate risk if insurance companies raise rates for property owners in more vulnerable regions. Staff intends to continue monitoring this issue in future regional forecasts. Countervailing considerations include recent extreme heat in the Pacific Northwest and the increased prevalence of wildfire smoke.

Regional employment

Staff presented information about employment recovery from the 2020 pandemic recession. As shown in Figure 11, non-manufacturing employment in the region has fully recovered, but manufacturing employment has not (see Figure 12).

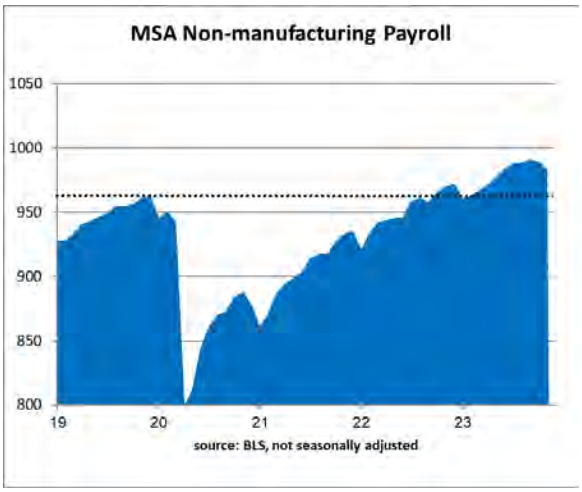


Figure 11: non-manufacturing employment in 1000s of jobs in the Portland MSA, 2019-2024 (source: Bureau of Labor Statistics)

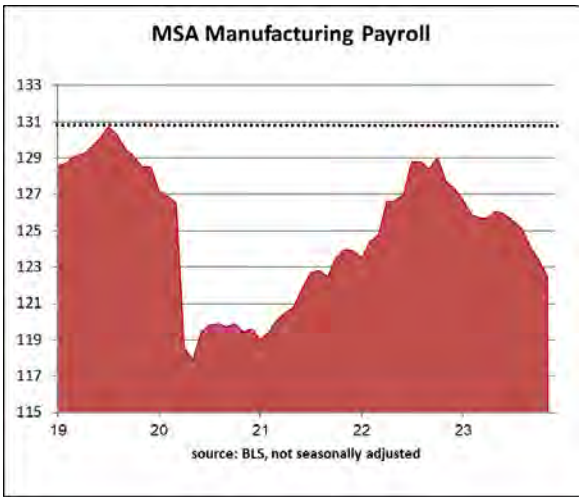


Figure 12: manufacturing employment in 1000s of jobs in the Portland MSA, 2019-2024 (source: Bureau of Labor Statistics)

Moving forward from recent history, Metro staff indicated that they believe that future employment growth rates will track closely with population growth rates, with both at 0.4 percent annual average growth. Staff presented the employment range forecast for the MSA as depicted in Figure 13.

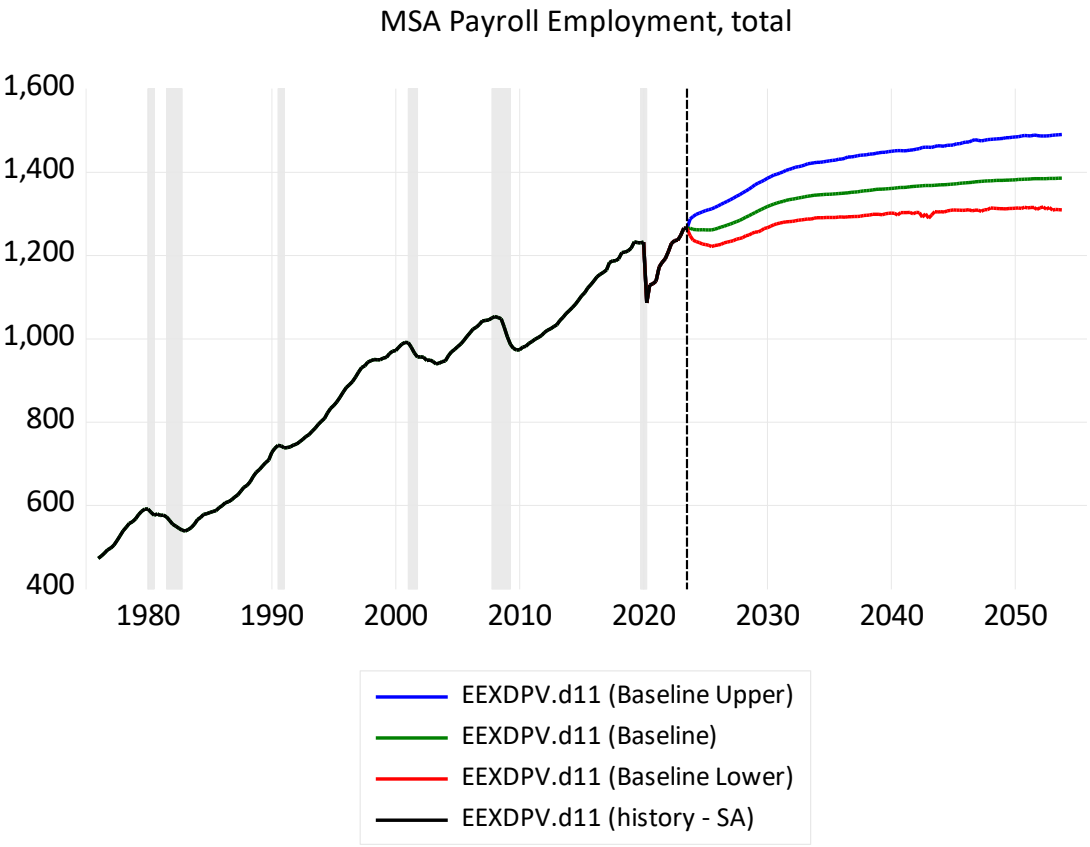


Figure 13: employment history and range forecast for the Portland MSA in 1000s of jobs

Panelists felt that Metro's preliminary employment forecast looked right in total, but that it was too optimistic about manufacturing employment (see Figure 14) and the employment impacts of the CHIPS

Act on computer and electronics manufacturing and fabrication of metal sectors as depicted in Figure 15 and Figure 16.

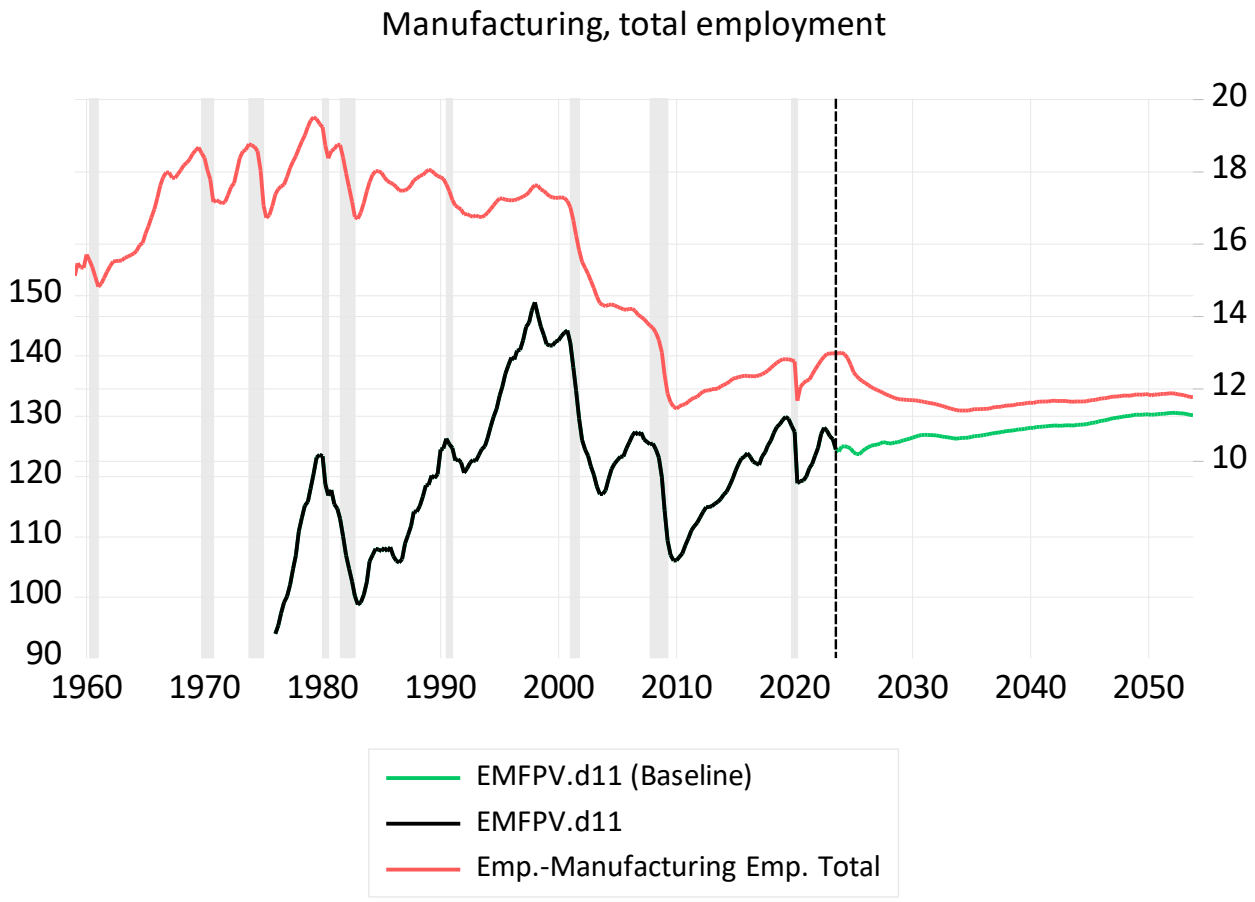


Figure 14: manufacturing employment history and forecast in 1000s of jobs for the Portland MSA (black and green lines) and the U.S. (red line)

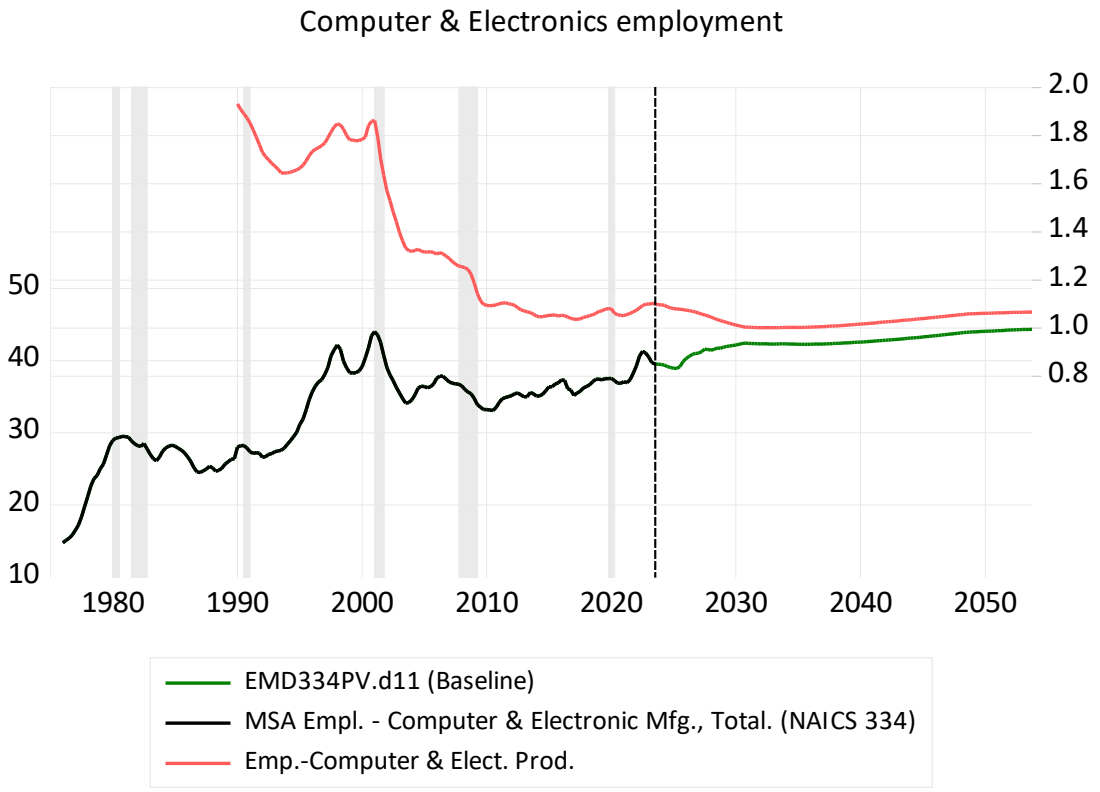


Figure 15: computer and electronics employment; red is U.S.; black is MSA history; green is MSA baseline forecast (in 1000s of jobs)

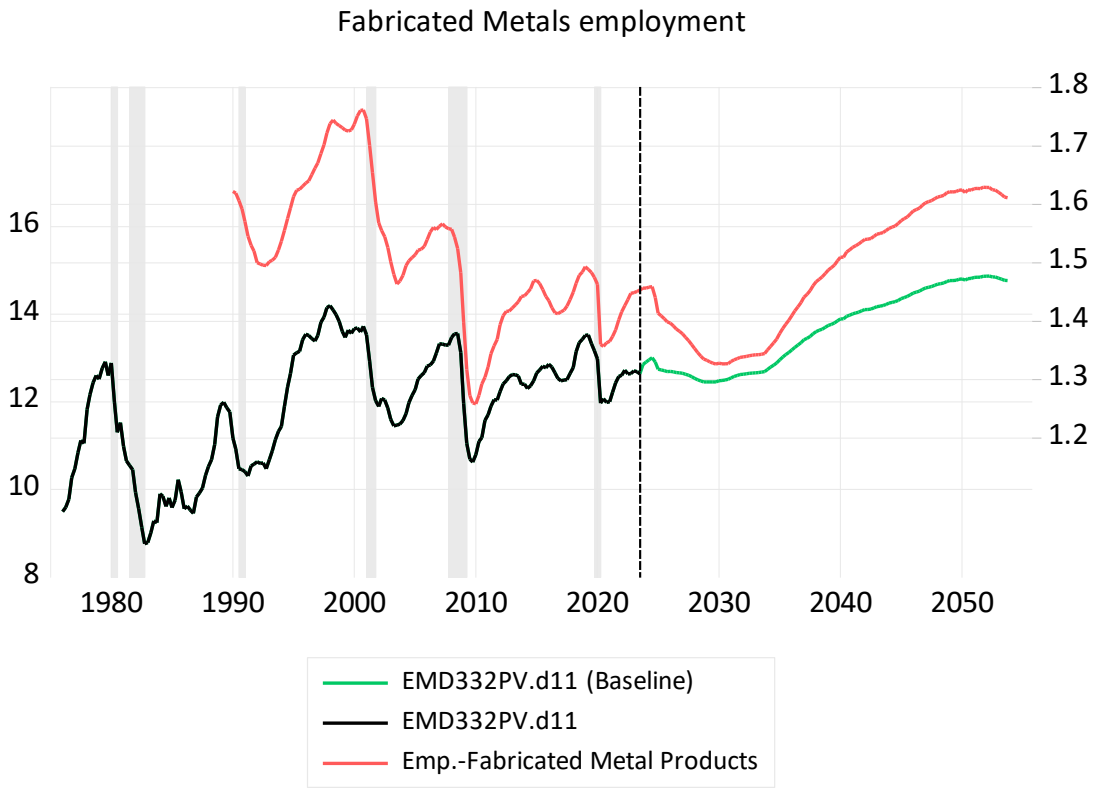


Figure 16: fabricated metals employment; red is U.S.; black is MSA history; green is MSA baseline forecast (in 1000s of jobs)

Panelists noted that Metro "would have to be really confident in the CHIPS Act" to forecast growth as shown in Figure 15 and Figure 16 and that "manufacturing does not seem like the most likely sector for employment growth." Panelists indicated that Metro's forecast for manufacturing carried "too much long-term momentum from the one-time shock of the CHIPS Act" and that, while there may be a short-term bump in high-tech manufacturing, it will be relatively small in the context of overall employment. In summary, panelists indicated that the CHIPS Act is best thought of as preventing manufacturing job losses that would likely otherwise occur over the next decade. Panelists further noted that the statewide forecast show a decline in metal fabrication.

Longer term (past 10 years), panelists believe there is too much uncertainty around technological changes, automation, and productivity to be confident in sustained high-tech manufacturing employment growth when the historic trend would indicate otherwise.[1]

In response, Metro staff will adjust the computer and electronics and metal fabrication sector forecasts downward slightly. The result is that computer and electronics manufacturing employment– after an initial increase—will be at roughly year 2022 levels by the end of the forecast period in 2044. Metal fabrication will be at roughly pre-pandemic levels by 2044.

Panelists inquired whether the first ten years or the end point (year 2044) that matters for the growth management decision. Staff indicated that the land need analysis looks at the 20-year timeframe that

[1] As depicted in Figure 14, today in the Portland MSA, there are about 85 percent the number of manufacturing jobs that there were in 1998.

begins in 2024 and ends in 2044. Panelists reiterated their view that the longer-term outlook for manufacturing employment is flat at best.

Regarding other employment sectors depicted in Figure 17, panelists discussed the following, but did not indicate any disagreement:

- The high growth rate depicted in the natural resources (mining and logging) sector is because of its small size (i.e., small increases in absolute numbers result in big growth rates).
- The computer and electronic manufacturing sector is expected to grow slower (flat growth) than in the past.
- There will be a notable decline in the transportation and warehousing sector (U.S. and Portland MSA) after a decade of steep growth.
- Drivers for state and local government sector growth:
    - Slowing population growth will really impact this sector
    - However, positive tax collections and budget can drive this sector forward too
- Range forecast – in the past, the Metro Council has adopted the baseline (most likely) forecast.

Industry Name by NAICS	APR%: History 1976-2022	ST 2022-32	LT 2022-45
Total Nonfarm Payroll	2.1%	0.9%	0.5%
Manufacturing, total	0.6%	0.0%	0.1%
Durable MF, total	0.7%	0.0%	0.1%
Lumber products	-1.9%	-1.3%	-1.1%
Primary metals	-0.1%	-0.6%	-0.7%
Fabricated metals	0.6%	0.0%	0.6%
Machinery	0.4%	-1.5%	-0.6%
Computer & Electronics	2.1%	0.4%	0.3%
Transportation Equipment	-0.4%	-1.9%	-1.5%
Other Durable MF	0.8%	0.9%	0.5%
Non-durable MF, total	0.2%	0.0%	0.0%
Food processing	1.0%	0.0%	0.0%
Paper products	-2.1%	-1.5%	-1.4%
Other Non-durable MF	0.3%	0.1%	0.3%
Private Non-manufacturing, total	2.5%	1.0%	0.6%
Natural resources	-0.9%	4.8%	1.7%
Construction	2.9%	2.4%	1.2%
Wholesale trade	1.4%	0.5%	0.3%
Retail trade	1.5%	0.5%	0.6%
Transportation, Warehousing & Utilities	2.1%	-1.1%	-1.4%
Info - Publishing	3.5%	1.6%	0.0%
Info - Internet	0.8%	1.2%	0.4%
Finance & Insurance	1.5%	1.3%	1.1%
Real Estate	2.6%	0.4%	-0.2%
Pro., Sci., Tech. services	3.9%	0.6%	0.5%
Mgmt. of Companies	4.2%	0.8%	0.3%
Admin. & Waste Mgmt. Services	3.5%	1.4%	1.2%
Education	3.6%	1.2%	-0.1%
Health care	3.3%	1.4%	0.9%
Leisure	2.3%	3.1%	2.0%
Hospitality	2.5%	0.9%	0.3%
Other services	2.3%	1.5%	1.0%
Government, total	1.4%	1.0%	0.3%
Federal gov.	0.3%	0.4%	0.2%
State & Local gov.	1.5%	1.1%	0.4%

Figure 17: Employment growth rates by sector in the Portland MSA, history and forecast

Work from home and office vacancies

Staff presented a comparison of work from home trends in several metropolitan areas (Figure 18). Staff noted that this topic was somewhat outside of the regional forecast review scope, but that our growth management assessment will need to account for changes in demand for commercial office space. Panelists correctly noted that survey respondents may in fact be working in the office some days but reported that they primarily work remotely. Panelists also noted that work from home shares may

decrease somewhat if the labor market loosens (i.e., employers have more bargaining power over working conditions). Staff will strive to account for these considerations as they estimate commercial office demand.

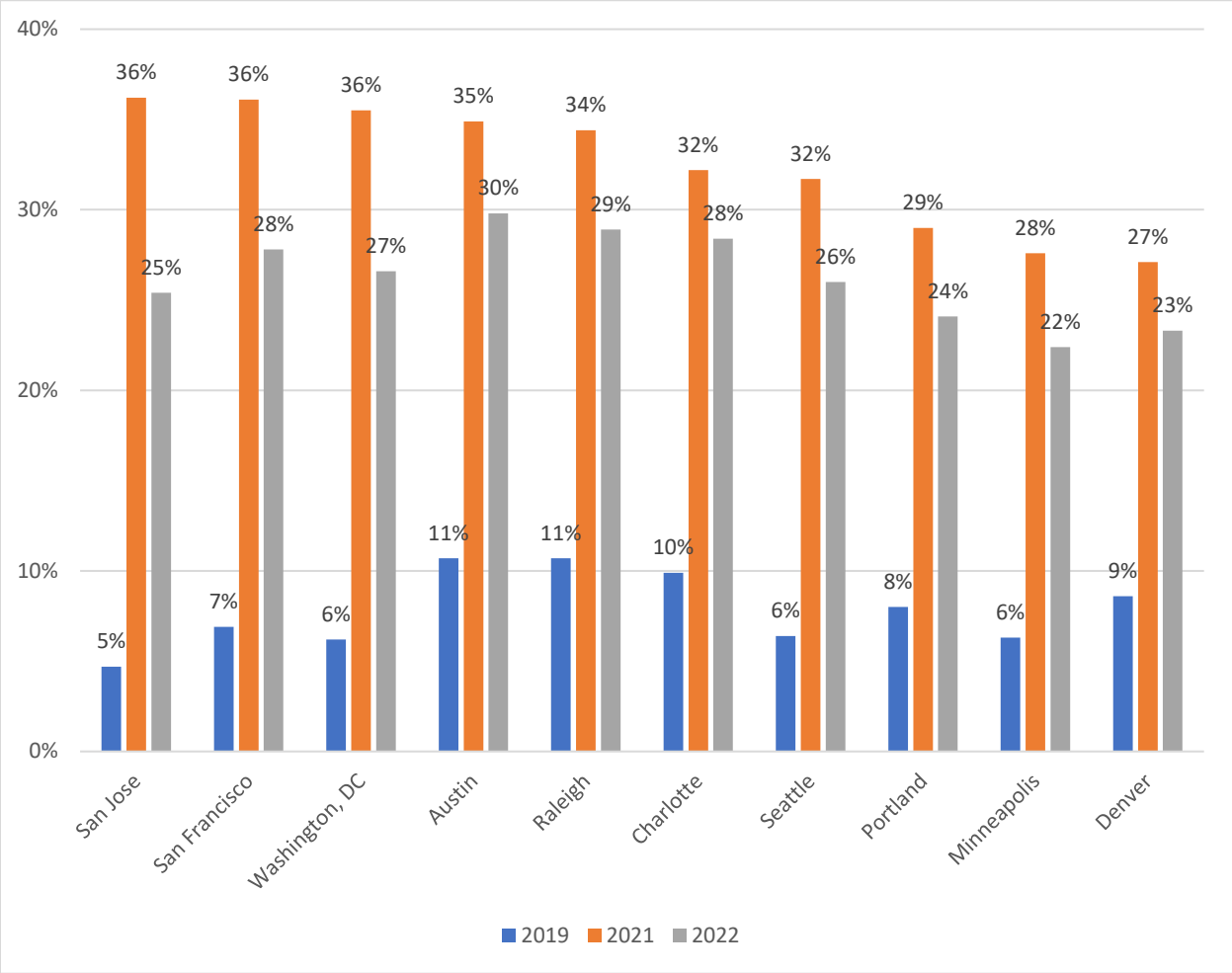


Figure 18: comparison of shares of all workers in different MSAs reporting that they primarily work from home (source ACS)

Office vacancies

As with work from home trends, staff introduced the topic of office vacancies as potentially being outside of the panels' area of expertise. However, staff is interested in whether we need to consider office vacancies as a source of growth capacity (we have not in the past, instead focusing on vacant land or redevelopment of existing structures). Metro staff believes that vacancies will reset in the next couple years or so and will likely not be a long-term capacity consideration.

APPENDIX 2 – 2024 BUILDABLE LAND INVENTORY (BLI) AND CAPACITY ESTIMATES

Introduction

This appendix presents the *draft* data in the 2024 Buildable Land Inventory (BLI). This 2024 BLI draft provides a range of potential future scenarios acknowledging the uncertainty in future markets for development capacity. Indeed, the BLI should be considered a forecast in its own right given that uncertainty. Capacity estimates explore a combination of difference scenarios for both vacant and redevelopable land. Additionally, there are several expansion areas added to the UGB in the last several years that are currently in various stages of being made ready for development. In some cases, (i.e. River Terrace 2.0 and Cooper Mountain) urban level zoning do not exist in these areas, so the BLI relies on anticipated capacity from concept plans submitted when areas were added to the Urban Growth Boundary (UGB). In other areas (Witch Hazell Village, South Hillsboro, Frog Pond) master planning is far enough along as to have solid unit estimates. This category also includes estimates for known development sites which override the model estimates.

Local Review

All cities and counties in the region were given several opportunities to review preliminary versions of this data. This draft incorporates edits submitted by the local jurisdictions as a result of their review. Review opportunities were provided to local jurisdictions:

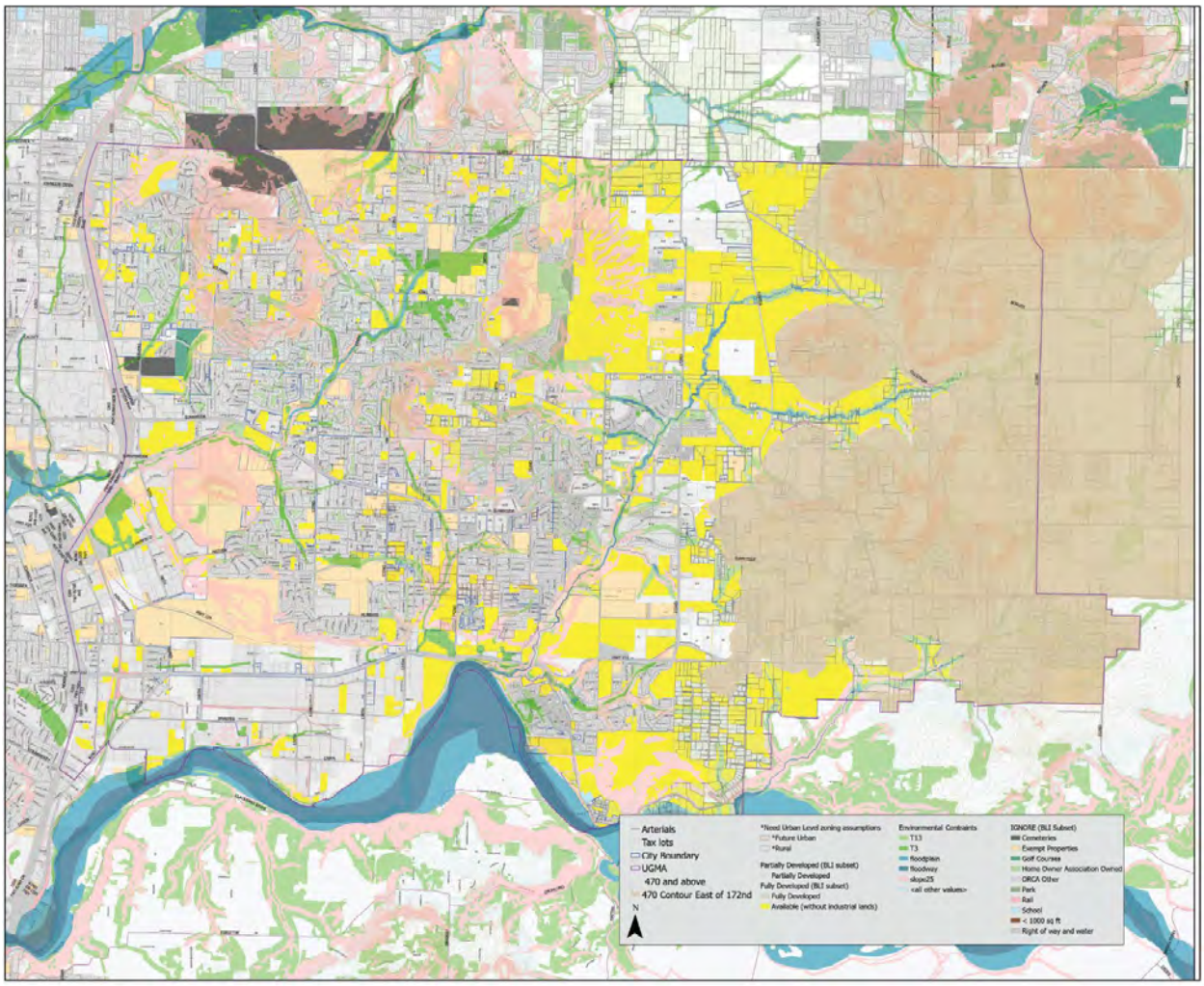
1. After refreshing Metro's regional zoning classifications
2. The tax lot base GIS layer was provided to verify development status, proper zoning assumptions and removal of constraints
3. After the preliminary capacity model runs.
4. After revised model runs.

Damascus BLI Note

Since the last UGR, the City of Happy Valley has committed to eastward expansion into the former City of Damascus. Due to challenges providing urban level utility services, Happy Valley can only commit to developing to the 470-foot elevation contour, a limit set by the Sunrise Water Authority. All other areas to the east are assumed to have rural level zoning in the 20-year timeframe. While those areas contain buildable lands, Metro has not calculated urban growth capacity in those areas to the east.

Map 1, next page, illustrates the foreseeable limits to urban level zoning east of Happy Valley (provided by City of Happy Valley).

Map 1: Limit of development potential in the former City of Damascus area



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- Residential BLI – Vacant land scenarios
- Residential BLI – Redevelopment land scenarios
- Residential BLI – New urban and other planned developments
- Employment BLI

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- Vacant Residential - Expected Density Method, Heavy Middle Housing Mix
- Vacant Residential - Expected Density Method, Heavy Single Family Housing Mix
- Residential Redevelopment – Pro Forma Method, Baseline Scenario
- Residential Redevelopment – Pro Forma Method, Market Recovery Scenario
- Residential Redevelopment – Pro Forma Method, Market Erosion Scenario
- Vacant Employment
- Infill Employment (Land Banked) Map
- Redevelopable Employment Map
- New Urban and Other Planned Development Map

2024 Buildable Lands Inventory Housing Units

Residential Vacant Land Capacity

Expected Density Method - Heavy Middle Housing Mix

Row Labels	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	1,660	2,312	8,283	12,255
CORNELIUS	43	186	557	786
DURHAM	14	20	-	34
FAIRVIEW	101	157	426	683
FOREST GROVE	751	1,460	749	2,959
GLADSTONE	23	30	31	83
GRESHAM	2,050	2,514	881	5,445
HAPPY VALLEY	3,354	5,120	3,378	11,852
HILLSBORO	1,555	2,438	4,077	8,070
JOHNSON CITY	-	-	-	-
KING CITY	5	5	-	9
LAKE OSWEGO	236	365	676	1,277
MAYWOOD PARK	1	1	-	2
MILWAUKIE	442	274	373	1,088
OREGON CITY	2,181	2,348	769	5,298
PORTLAND	3,044	3,496	12,513	19,052
RIVERGROVE	7	11	-	18
SHERWOOD	250	480	187	916
TIGARD	1,823	840	3,413	6,076
TROUTDALE	422	520	62	1,003
TUALATIN	14	82	98	194
UNINCORP CLACKAMAS CO	3,249	4,688	1,538	9,475
UNINCORP MULTNOMAH CO	489	735	24	1,248
UNINCORP WASHINGTON CO	3,785	4,299	772	8,856
WEST LINN	318	543	125	986
WILSONVILLE	359	422	576	1,357
WOOD VILLAGE	24	142	117	282
Grand Total	**26,197**	**33,486**	**39,621**	**99,304**
Percent of Total	26%	34%	40%	100%

Expected Density Method - Heavy SFR Mix

Row Labels	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	1,952	1,818	8,668	12,438
CORNELIUS	50	173	557	779
DURHAM	16	4	-	20
FAIRVIEW	120	47	426	592
FOREST GROVE	931	760	749	2,440
GLADSTONE	26	14	31	71
GRESHAM	2,548	940	881	4,369
HAPPY VALLEY	4,106	1,369	3,378	8,853
HILLSBORO	1,832	1,356	4,077	7,265
JOHNSON CITY	-	-	-	-
KING CITY	6	1	-	7
LAKE OSWEGO	289	96	676	1,061
MAYWOOD PARK	-	-	-	-
MILWAUKIE	516	142	767	1,424
OREGON CITY	2,607	1,056	769	4,432
PORTLAND	3,977	825	14,860	19,662
RIVERGROVE	13	3	-	16
SHERWOOD	312	249	187	748
TIGARD	2,096	292	3,413	5,801
TROUTDALE	533	130	62	725
TUALATIN	16	66	98	180
UNINCORP CLACKAMAS CO	4,276	1,398	1,538	7,212
UNINCORP MULTNOMAH CO	626	162	24	813
UNINCORP WASHINGTON CO	7,128	1,846	995	9,968
WEST LINN	399	214	125	738
WILSONVILLE	540	154	576	1,270
WOOD VILLAGE	28	113	117	258
Grand Total	**34,944**	**13,228**	**42,970**	**91,142**
Percent of Total	35%	13%	43%	92%

2024 Buildable Lands Inventory Housing Units

Redevelopment Scenarios

Baseline Scenario

Jurisdiction	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	2	87	1,504	1,593
CORNELIUS		39	222	261
DURHAM		35	4	39
FAIRVIEW		2	60	62
FOREST GROVE		124	585	709
GLADSTONE		21	2	24
GRESHAM		1,328	2,019	3,346
HAPPY VALLEY	-	1,231	1,578	2,809
HILLSBORO	4	1,596	1,149	2,749
JOHNSON CITY			0	0
KING CITY		0	0	1
LAKE OSWEGO	2,654	61	498	3,213
MAYWOOD PARK		-		-
MILWAUKIE	124	434	516	1,073
OREGON CITY		580	723	1,302
PORTLAND	5,957	812	11,734	18,503
RIVERGROVE	4	8		12
SHERWOOD		782	638	1,420
TIGARD	0	118	872	990
TROUTDALE	3	5	16	23
TUALATIN	7	126	286	418
UNINCORP CLACKAMAS CO	1,027	2,345	1,102	4,474
UNINCORP MULTNOMAH CO	1,489	16	-	1,505
UNINCORP WASHINGTON CO	855	1,291	688	2,835
WEST LINN	2	643	147	792
WILSONVILLE	166	43	19	228
WOOD VILLAGE		0	20	20
Grand Total	**12,292**	**11,727**	**24,382**	**48,400**
Percent of Total	25%	24%	50%	100%

Market Recovery Scenario

Jurisdiction	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	9	202	2,123	2,334
CORNELIUS		88	318	406
DURHAM		59	4	63
FAIRVIEW		9	155	164
FOREST GROVE		314	921	1,236
GLADSTONE		22	22	43
GRESHAM		2,131	2,841	4,972
HAPPY VALLEY	-	2,439	1,766	4,206
HILLSBORO	4	2,398	1,466	3,869
JOHNSON CITY			24	24
KING CITY		1	1	2
LAKE OSWEGO	3,159	61	586	3,807
MAYWOOD PARK		0		0
MILWAUKIE	127	707	609	1,443
OREGON CITY		1,043	928	1,971
PORTLAND	8,112	1,168	20,159	29,439
RIVERGROVE	12	8		20
SHERWOOD		925	739	1,663
TIGARD	26	320	1,151	1,497
TROUTDALE	11	10	45	66
TUALATIN	14	201	370	585
UNINCORP CLACKAMAS CO	1,304	3,593	1,763	6,660
UNINCORP MULTNOMAH CO	1,626	68	-	1,694
UNINCORP WASHINGTON CO	1,531	2,182	1,084	4,796
WEST LINN	7	946	204	1,157
WILSONVILLE	231	56	41	329
WOOD VILLAGE		0	75	75
Grand Total	**16,175**	**18,951**	**37,397**	**72,522**
Percent of Total	22%	26%	52%	100%

Market Erosion Scenario

Jurisdiction	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	-	42	815	858
CORNELIUS		6	135	141
DURHAM		11	1	13
FAIRVIEW		1	0	1
FOREST GROVE		55	276	331
GLADSTONE		-		-
GRESHAM		678	1,144	1,822
HAPPY VALLEY	-	417	1,139	1,556
HILLSBORO	1	892	809	1,702
JOHNSON CITY		-		-
KING CITY		0	-	0
LAKE OSWEGO	2,098	55	328	2,480
MAYWOOD PARK		-		-
MILWAUKIE	120	230	386	736
OREGON CITY		233	395	629
PORTLAND	4,122	453	6,110	10,685
RIVERGROVE	1	5		5
SHERWOOD		653	510	1,163
TIGARD		48	582	630
TROUTDALE	-	0	-	0
TUALATIN	3	73	222	298
UNINCORP CLACKAMAS CO	749	1,506	623	2,877
UNINCORP MULTNOMAH CO	1,358	10	-	1,368
UNINCORP WASHINGTON CO	424	605	357	1,386
WEST LINN	0	375	106	481
WILSONVILLE	102	11	11	125
WOOD VILLAGE		0	-	0
Grand Total	**8,978**	**6,360**	**13,950**	**29,288**
Percent of Total	31%	22%	48%	100%

SCENARIOS	
Market Recovery	ELEVATED PRICING
	- Residential pricing elevated 5% for all parcels
Market Erosion	DEPRESSED PRICING
	- Residential pricing decreased 5% for all parcels

2024 Buildable Lands Inventory Housing Units

New Urban and Other Planned Developments

New Urban Areas

Concept Plan Area	Single Family Detached	Middle Housing	Multi-family	Total	Planning Jurisdiction	Current Jurisdiction
North Cooper Mt	255	45	-	300	Beaverton	WashCo
Cooper Mt.	2,200	1,450	1,350	5,000	Beaverton	WashCo
Kingston Terrace	1,788	572	1,216	3,576	King City	WashCo
River Terrace 2.0a	546	1,775	410	2,731	Tigard	WashCo
River Terrace 2.0b	362	1,177	272	1,810	Tigard	WashCo
Frog Pond South	224	249	25	498	Wilsonville	WashCo
Frog Pond East	436	381	272	1,089	Wilsonville	WashCo
Frog Pond Ridge	63	8	-	71	Wilsonville	Wilsonville
Frog Pond Crossing	29	-	-	29	Wilsonville	Wilsonville
Frog Pond Oaks	41	-	-	41	Wilsonville	Wilsonville
Frog Pond Vista	41	-	-	41	Wilsonville	Wilsonville
Frog Pond Estates	17	-	-	17	Wilsonville	Wilsonville
Frog Pond Other	299	21	-	320	Wilsonville	WashCo
Clermont Wilsonville	89	-	-	89	Wilsonville	Wilsonville
Total	**6,390**	**5,678**	**3,544**	**15,612**		
Percent of Total	41%	37%	23%	100%		

Other Planned Development*

Plan/Area Name	Single Family Detached	Middle Housing	Multi-family	Total	Planning Jurisdiction	Current Jurisdiction
	36			36	Durham	Durham
	300	50		350	Cornelius	Cornelius
	141	80		221	Forest Grove	Forest Grove
	133	32		165	Forest Grove	Forest Grove
	123	62	348	533	Beaverton	WashCo
	118			118	Forest Grove	WashCo
	93			93	Forest Grove	WashCo
Alpenrose	135	172		307	Portland	Portland
Pop Blocks			1,130	1,130	Portland	Portland
Lloyd District			5,000	5,000	Portland	Portland
OMSI District			1,200	1,200	Portland	Portland
Broadway Corridor			2,500	2,500	Portland	Portland
South Hillsboro Area	1,122	578	-	1,700	Hillsboro	WashCo
Witch Hazel Village S	640	182	246	1,068	Hillsboro	WashCo
Total	**2,841**	**1,156**	**10,424**	**14,421**		
Percent of Total	20%	8%	72%	100%		

*Projects in the approval stages that bypassed modeling due to known unit quantities

Total New Urban and Planned

	Single Family Detached	Middle Housing	Multi-family	Total
Total	**9,231**	**6,834**	**13,968**	**30,033**
Percent of Total	31%	23%	47%	100%

Housing type split based on concept plans and/or feedback from local staff

2024 Buildable Lands Inventory

Employment Acres Summary (10% slope exclusion for industrial)

	Commercial Acres						Industrial Acres					
Jurisdiction	Vacant	MUR Vacant	Infill	Redevelopment	New urban and planned	Total Commercial	Vacant	Infill	Redevelopment	New urban and planned	Total Industrial	Total Employment
BEAVERTON	3.8	2.3	3.4	8.9	-	18.5	9.2	6.4	2.3		17.9	36.4
CORNELIUS	6.5	0.1	6.3	-	-	12.9	17.5	4.6			22.1	35.0
DURHAM	-	-	-	-	-	-	0.8				0.8	0.8
FAIRVIEW	0.4	10.6	-	-	-	11.0	72.2	22.8	2.3		97.2	108.2
FOREST GROVE	-	8.5	-	-	-	8.5	77.2	121.6			198.8	207.3
GLADSTONE	0.5	-	-	0.2	-	0.7	0.5	38.3	-		38.7	39.4
GRESHAM	4.9	53.9	1.0	-	-	59.8	185.5	222.7	12.5		420.8	480.6
HAPPY VALLEY	0.0	16.3	-	0.0	-	16.4	179.9	92.3	0.6		272.8	289.1
HILLSBORO	15.3	5.8	6.7	8.1	-	35.8	298.4	419.3	6.0		723.6	759.5
JOHNSON CITY	-	-	-	-	-	-	-	-	-	-	-	-
KING CITY	-	-	3.6	0.5	-	4.1	-	-	-	-	-	4.1
LAKE OSWEGO	-	1.3	-	0.0	-	1.3	-	-	-	-	-	1.3
MAYWOOD PARK	-	-	-	-	-	-	-	-	-	-	-	-
MILWAUKIE	0.1	0.3	-	0.0	-	0.4	0.6	7.0	0.7		8.3	8.7
OREGON CITY	0.4	10.3	10.8	0.7	-	22.2	27.9	56.1	1.8		85.7	107.9
PORTLAND	1.8	26.9	4.4	1.2	-	34.4	521.1	464.6	1.4	65.0	1,052.2	1,086.6
RIVERGROVE	-	-	-	-	-	-	-	-	-	-	-	-
SHERWOOD	4.2	0.3	8.4	1.0	-	13.9	36.9	41.9	3.8		82.6	96.6
TIGARD	2.6	1.5	21.0	13.1	-	38.2	10.7	6.6	5.1		22.4	60.6
TROUTDALE	43.9	4.7	9.7	-	-	58.3	139.0	56.6	0.3		195.8	254.1
TUALATIN	10.6	0.0	5.9	5.3	-	21.8	108.7	94.0	10.2		212.9	234.8
UNINC-CLACK	0.6	6.2	4.5	0.1	4.9	16.3	51.1	146.1	3.5		200.7	217.0
UNINC-MULT	7.7	2.0	35.6	-		45.2	35.0	291.3	(1.5)		324.8	370.1
UNINC-WASH	6.7	0.5	25.7	4.7	28.0	65.5	568.0	608.0	9.2		1,185.2	1,250.7
WEST LINN	-	0.4	-	0.1	-	0.5	3.5	1.2	1.0		5.7	6.2
WILSONVILLE	4.0	0.5	-	2.1	-	6.6	58.4	96.7	(0.5)		154.6	161.2
WOOD VILLAGE	-	21.4	-	-	-	21.4	2.4	4.8	0.0		7.1	28.5
Total	**114.0**	**173.9**	**146.8**	**46.0**	**32.9**	**513.6**	**2,404.5**	**2,802.8**	**58.6**	**65.0**	**5,330.9**	**5,844.5**
Percent Total	22%	34%	29%	9%	6%		45%	53%	1%	1%		

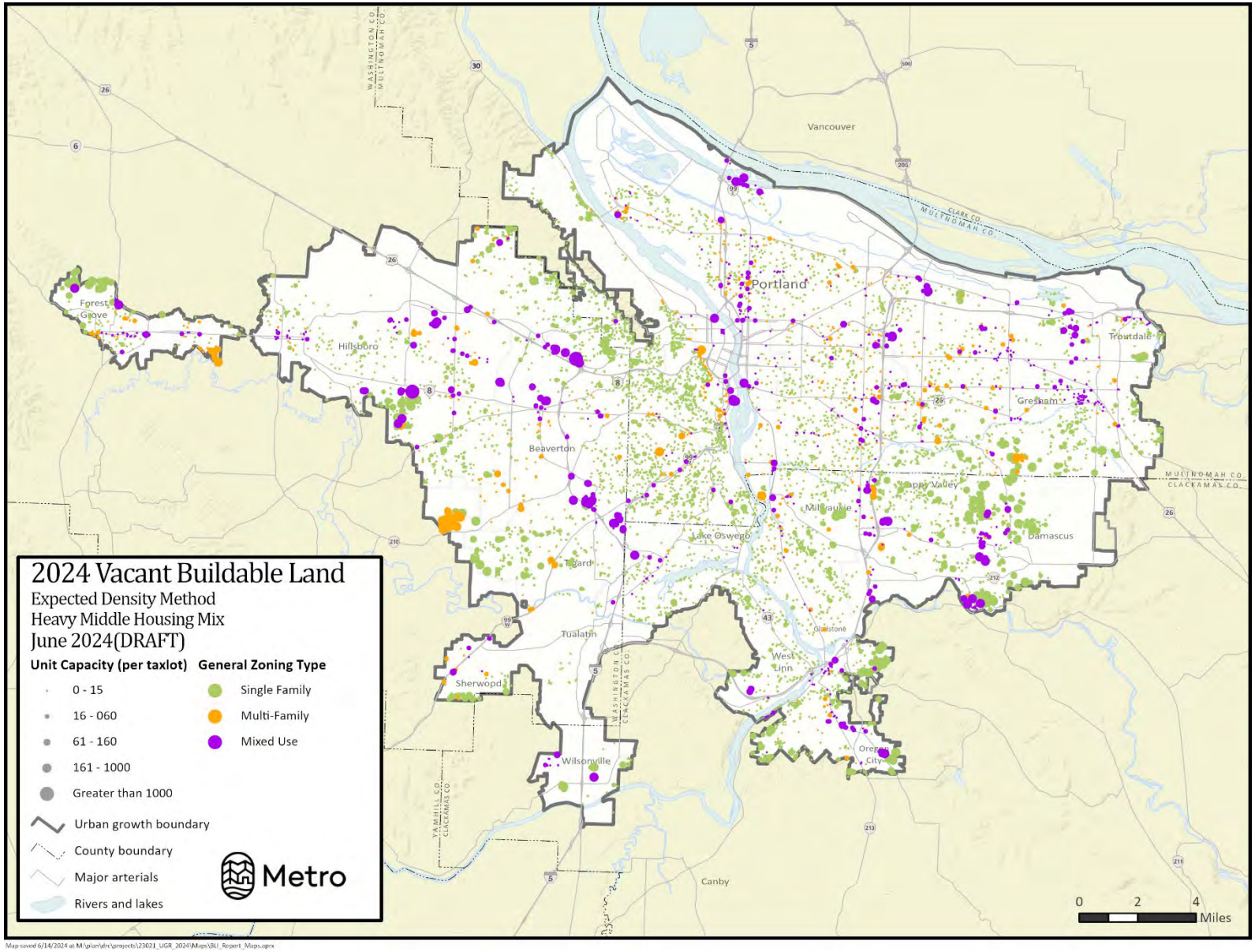
New urban and planned Employment Acres

Development	Acres	Type
Frog Pond East	4.9	Mixed Use (commercial)
River Terrace 2.0	28.0	Mixed Use (commercial)
Riverside Golf	65.0	Industrial

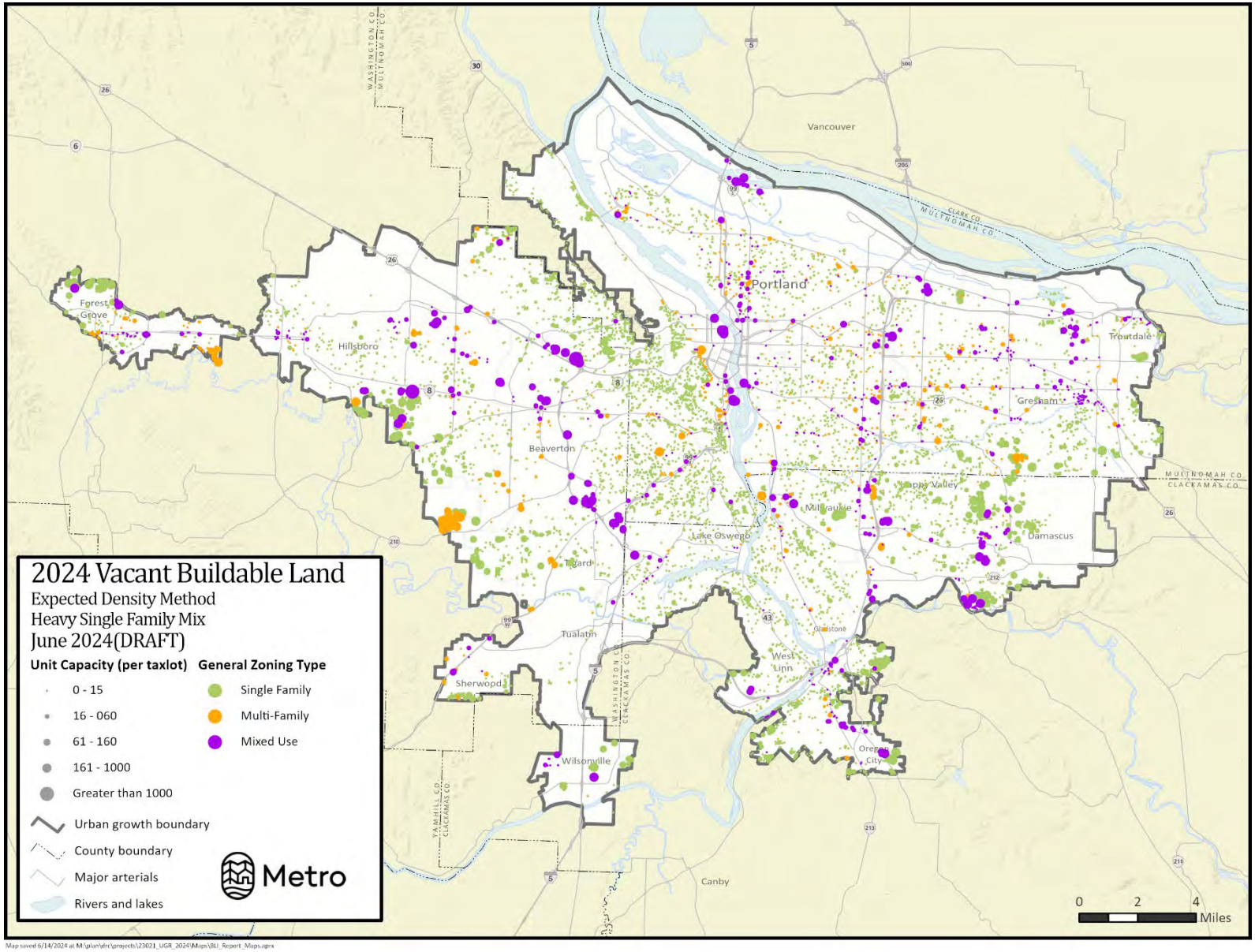
Conversions and accessory dwelling units (ADUs)

	Baseline	Low	High	Housing Type
Office-to-residential conversions	1,000	250	1,500	Multifamily
ADUs and internal conversions	8,692	4,955	11,716	Middle housing

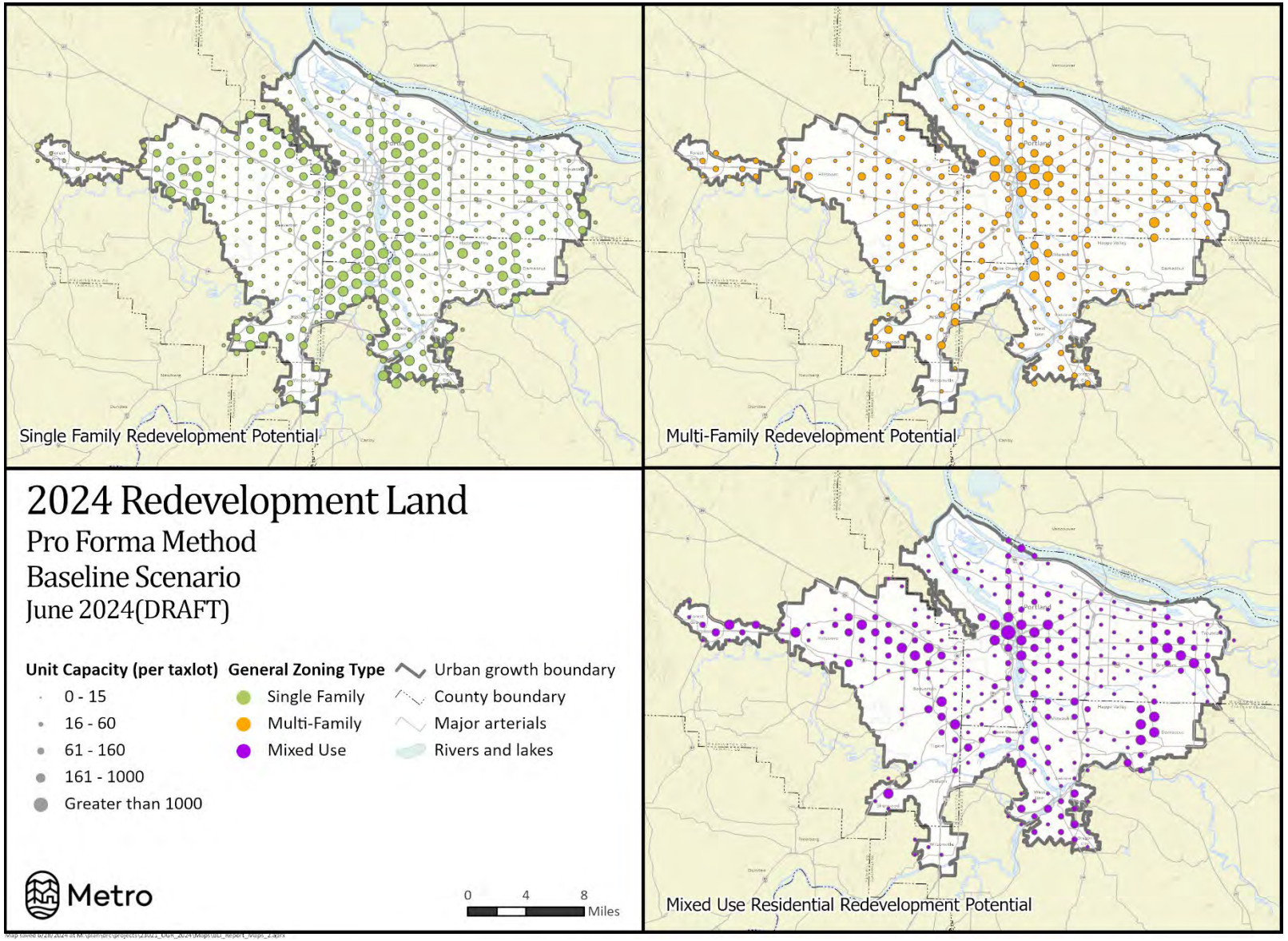
Vacant Residential Map – Expected Density Method, Heavy Middle Housing Mix



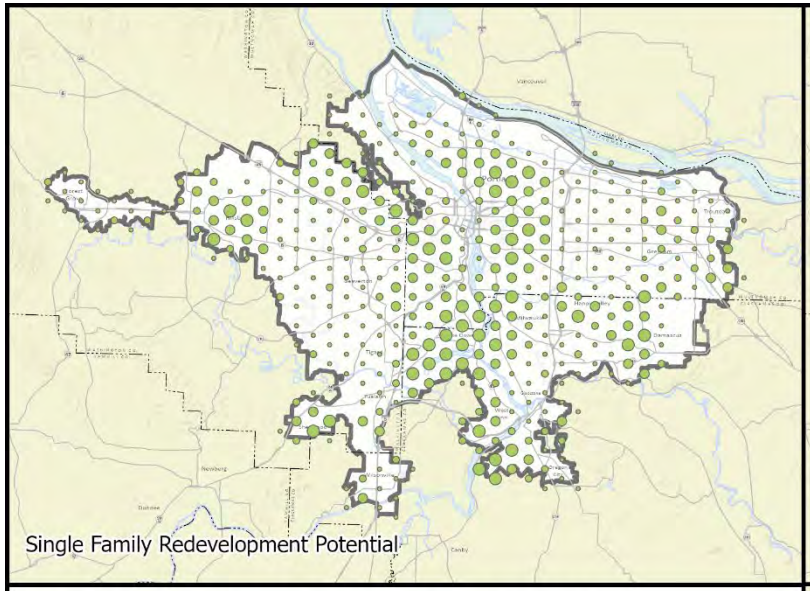
Vacant Residential Map – Expected Density Method, Heavy Single Family Housing Mix

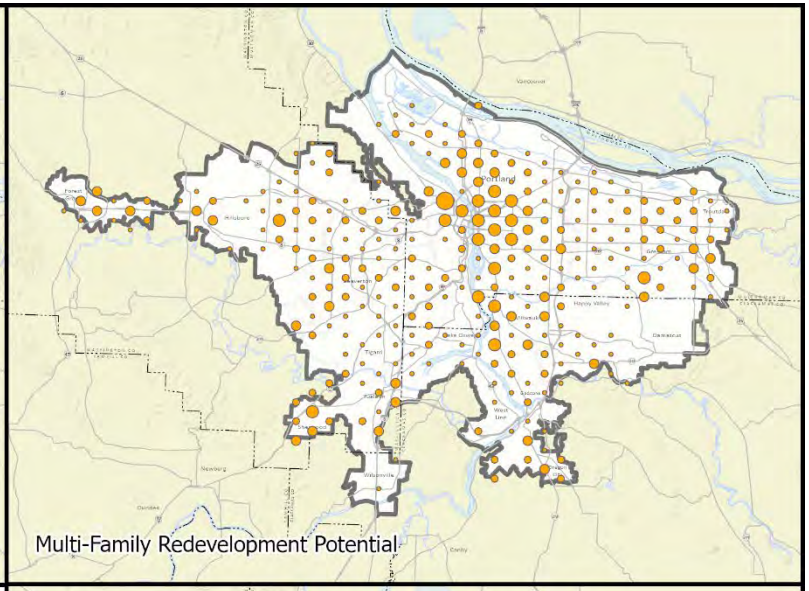


Residential Redevelopment Maps – Baseline Scenario



Residential Redevelopment Maps – Market Recovery Scenario





2024 Redevelopment Land
Pro Forma Method
Market Recovery Scenario
June 2024(DRAFT)

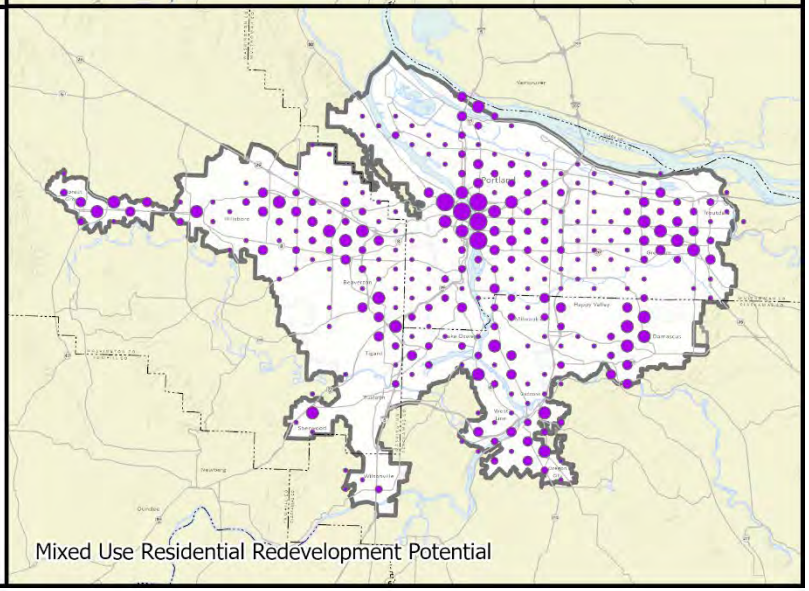
Unit Capacity (per taxlot)
- 0 - 15
- 16 - 60
- 61 - 160
- 161 - 1000
- Greater than 1000

General Zoning Type
- Single Family
- Multi-Family
- Mixed Use

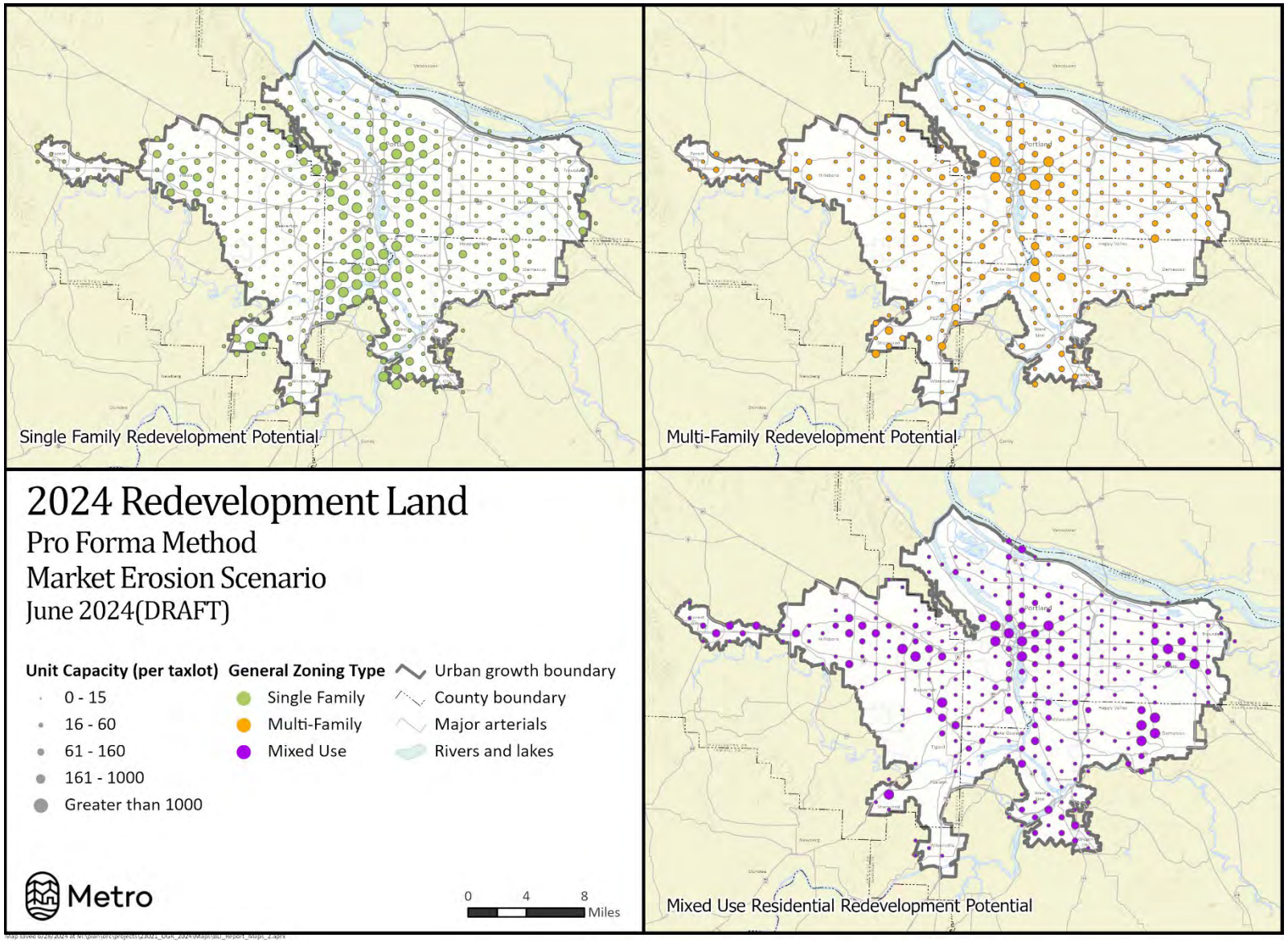
- Urban growth boundary
- County boundary
- Major arterials
- Rivers and lakes

Metro

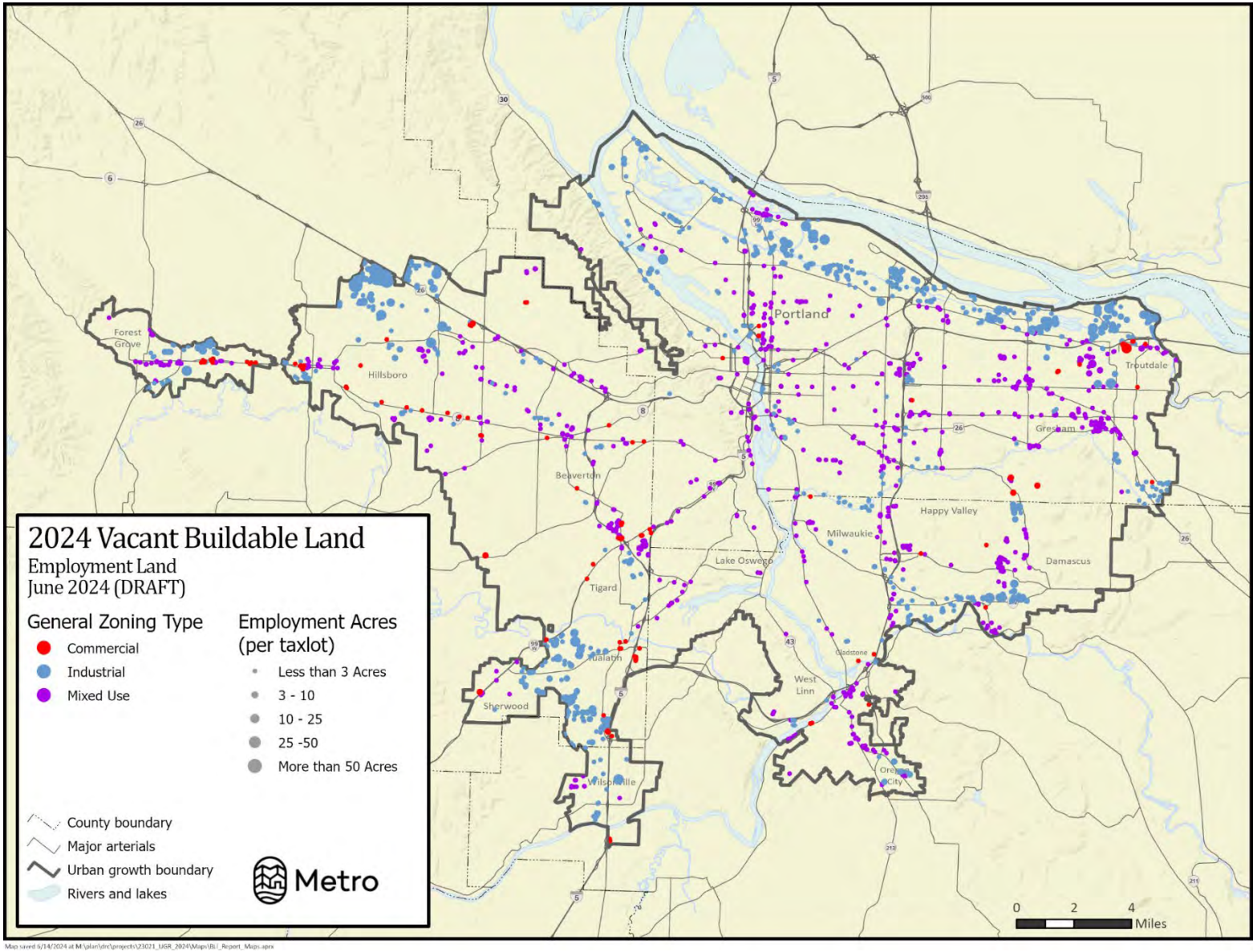
0 4 8 Miles



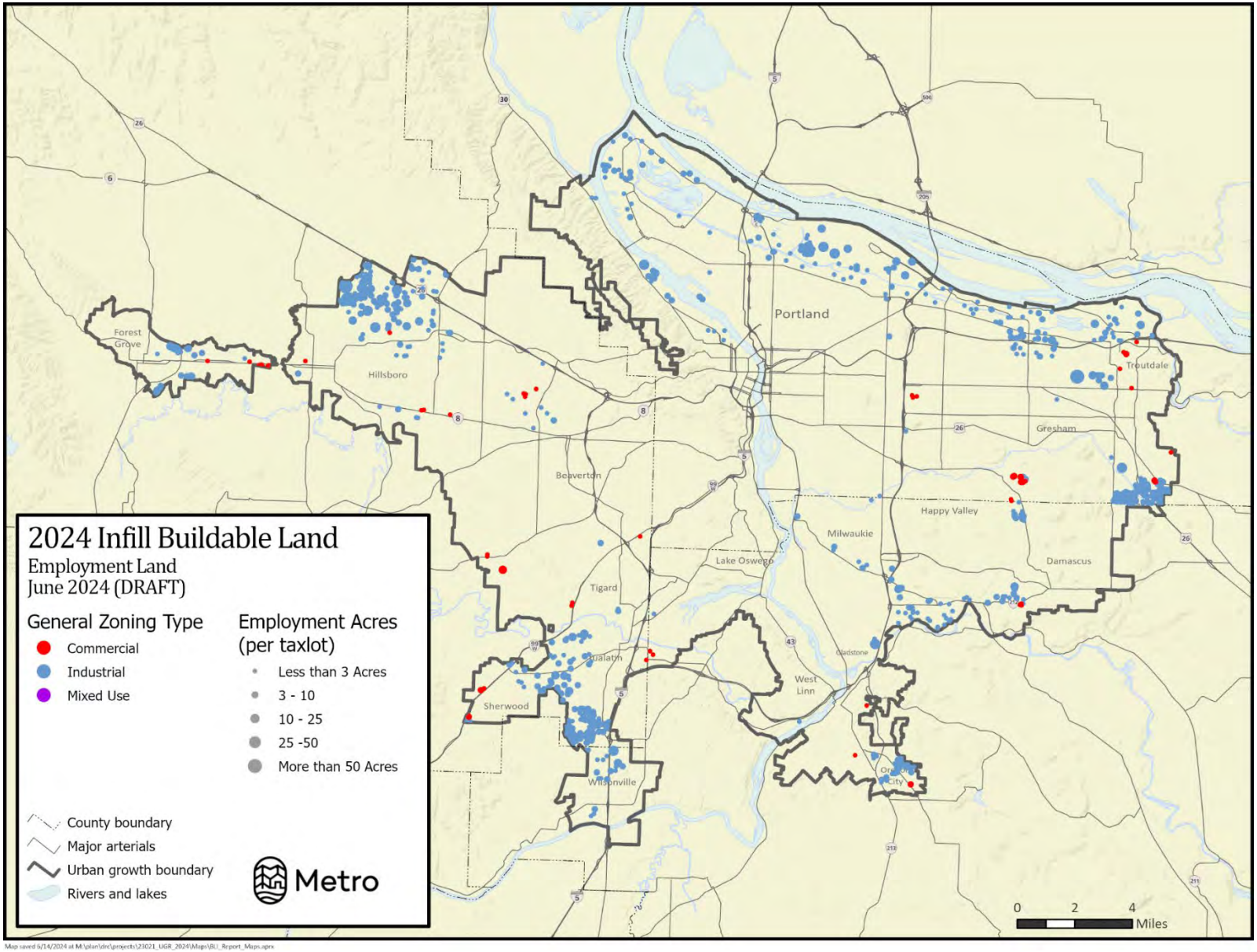
Residential Redevelopment Maps – Market Erosion Scenario



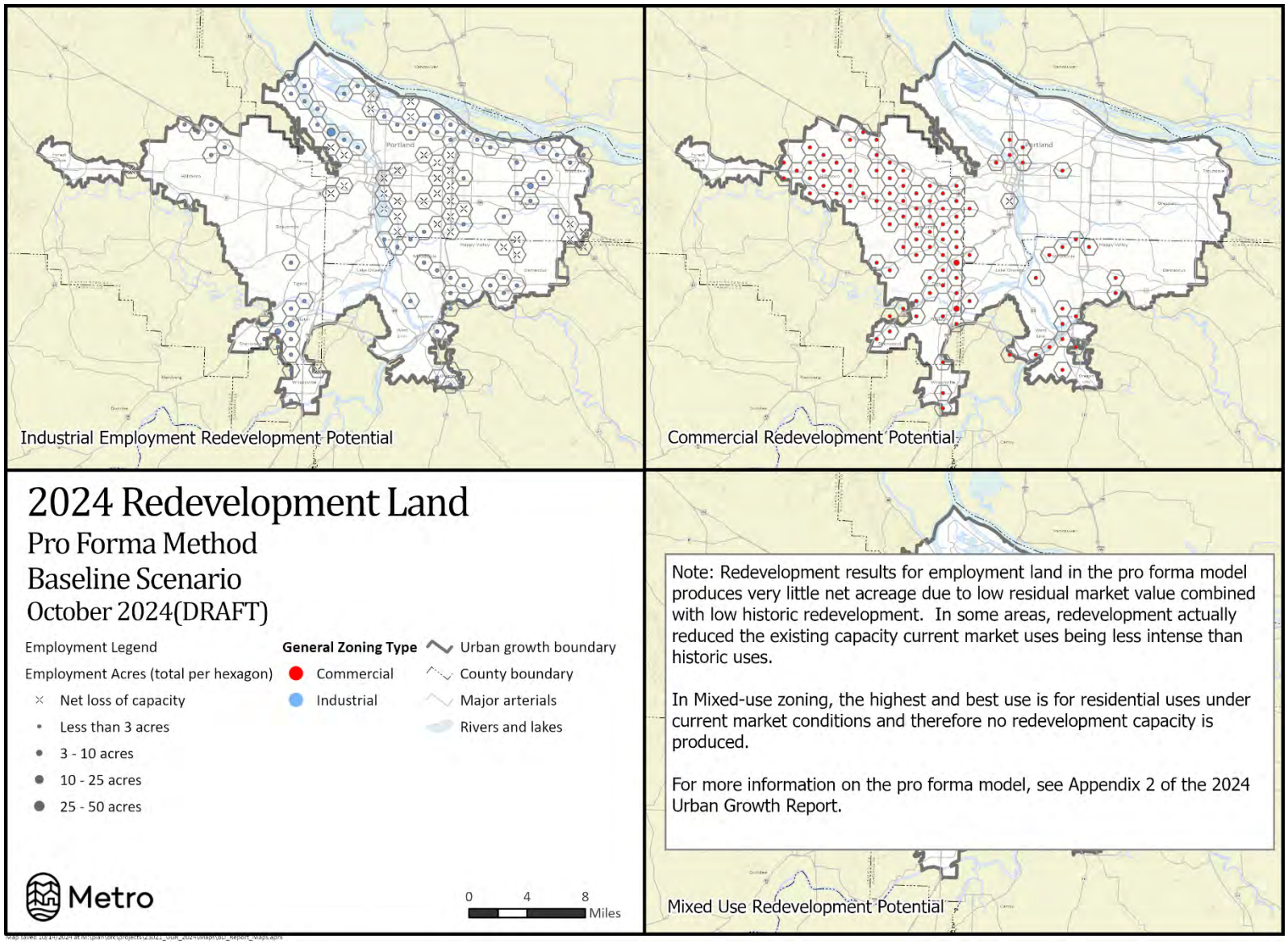
Vacant Employment Map



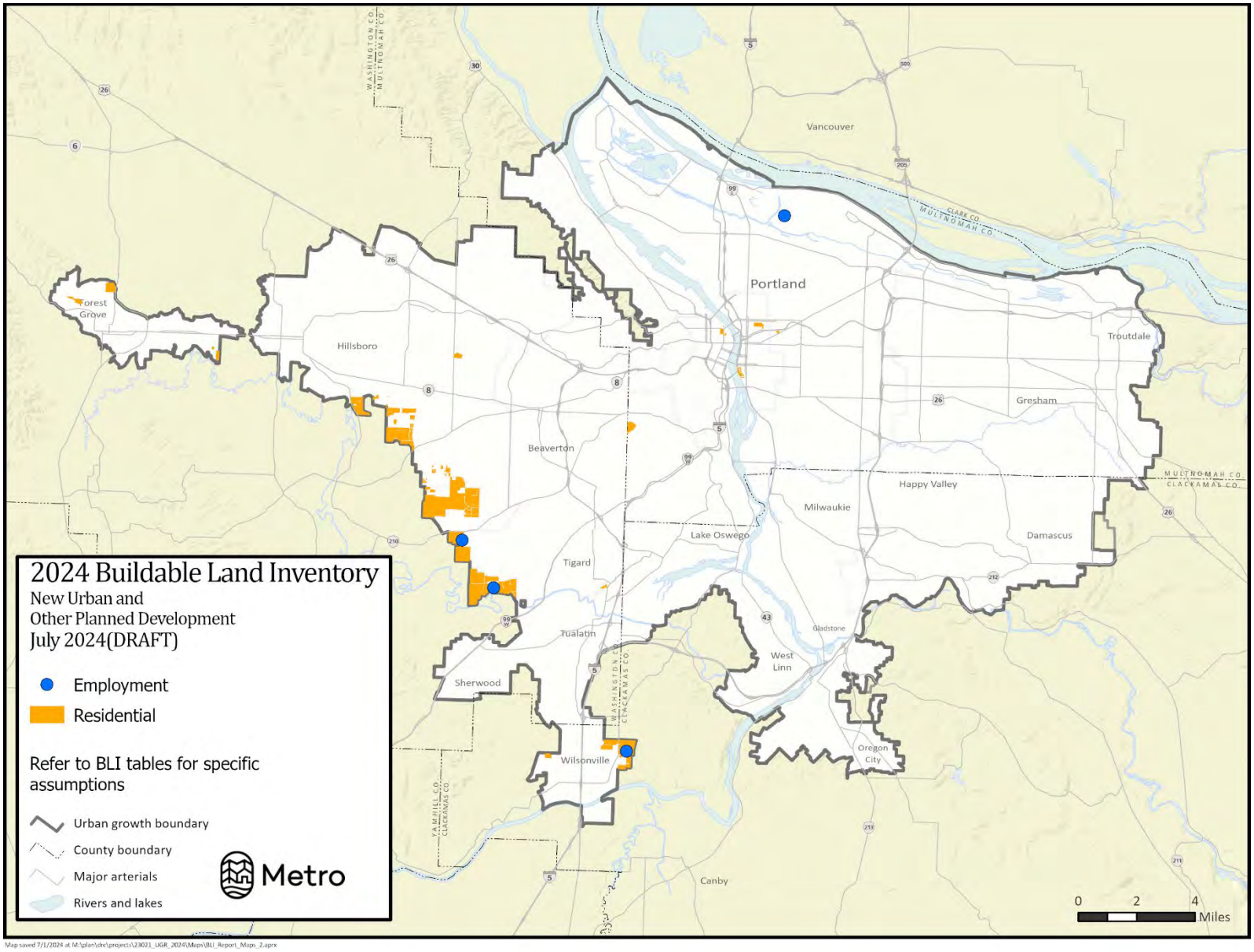
Infill Employment (Land Banked) Map



Redevelopable Employment Map



New Urban and Other Planned Development Map



GENERAL METHODOLOGY FOR DETERMINING THE 2024 URBAN GROWTH REPORT'S BUILDABLE LAND INVENTORY (BLI)

Background

Under state land use regulations, Metro is required to ensure that its regional plan contains sufficient buildable land within the urban growth boundary (UGB) to accommodate estimated housing needs for 20 years. Metro is mandated to conduct this analysis at least every 6 years in its Urban Growth Report (UGR). The UGR is a basis for the Metro Council's urban growth management (UGM) decision. A technical underpinning of the UGR is its buildable land inventory (BLI) which includes vacant and redevelopable land supply estimates. This document provides a summary of the capacity assumptions and a methodology description of how land supplies are estimated.

During the winter of 2023/2024, all local governments in the region were given an opportunity to review the draft BLI and to suggest revisions to the results. These revisions reflect local knowledge about specific tax lots and properties. More detailed information on recent development trends can be found in Appendix 5.

Forecast analytics for the UGR go through additional steps to determine how much of this buildable land inventory may be market feasible in the 20-year planning timeframe. See Appendix 1 for forecast results.

Peer review of methods

Beginning in the summer of 2023, Metro staff worked closely with a land use technical advisory group (LUTAG) that included about 20 planners from jurisdictions around the region as well as other stakeholders to update the regional BLI methodology originally developed in 2018. The 2018 BLI also benefited from that extensive engagement with local jurisdiction planners. The 2018 advisory group discussed the ambiguity inherent in developing 20-year capacity estimates, particularly on a regional scale. On several topics, the group advised Metro that there was not a clear "right" or "wrong" answer, but helped Metro staff to arrive at methods that are, on the whole, reasonably sound for a regional analysis, and that use the best available information. These assumptions were reviewed by LUTAG (2024) and, except as noted below, the assumptions and methods from the 2018 BLI were used in this BLI.

Uncertainty in the BLI

From the Great Recession to the year-over-year double-digit gains in housing prices preceding and during the Covid-19 Global Pandemic to the highest inflation in 40 years, the last two decades remind us that unforeseen economic and societal changes affect our ability to accurately forecast the future.

Therefore, Metro has produced a range of scenarios for the BLI which, taken together present high-end and a low-end estimates. The range of scenarios acknowledges the uncertainty around future market conditions as well as how developers and property owners will respond to those conditions. While this BLI attempts to establish a whether a 20-year supply of land exists within the current UGB, State law requires periodic review specifically to account for potential future changes to underlying conditions.

GENERAL METHODOLOGY

Step 1: Identify vacant and developed tax lots and classify by regional zoning classification

Step 2: Remove tax lots from the BLI that don't have the potential to provide residential or employment growth capacity (e.g., parks)

Step 3: Calculate deductions for environmental resources[1]

Step 4: Calculate deductions for "future streets"[2]

Step 5: Calculate BLI estimates (BLI includes capacity estimates for vacant and redevelopment)

a) Single Family Residential (SFR)
b) Multifamily residential (MFR) and Mixed Use Residential Capacity (MUR)
c) Employment (industrial and commercial)

Identify vacant and developed land by zoning (or comp plan)

Issue:
The BLI methodology treats vacant and redevelopment as separate categories for clarity and to avoid any double counting of capacity on the partially vacant lots. However, Metro's vacant lands inventory (a basis for the BLI) includes some "partially vacant" land.

Solution:
The region's buildable land inventory is sorted into either *vacant* or *developed* tax lots. A categorization as *developed* does not, however preclude the possibility of redevelopment. For the purposes of this analysis, infill and redevelopment are accounted for by subjecting to economic screens (described in this document) to determine whether they should be counted as **potential** redevelopment capacity.

Vacant land definition[3]:

- Any tax lot that is fully vacant (Metro aerial photo)
- Tax lot with less than 2,000 sq. ft. developed AND developed part is under 10% of entire tax lot
- Tax lots that are 95% or more "vacant" from the GIS vacant land inventory[4]

Developed land definition:

[1] Environmental resources considered include Metro's Title 3, Title 13, FEMA flood way and flood plain, and steep slopes over 25%.
[2] The BLI accounts for future streets on a tax lot-by-tax lot basis. The buildable area of each tax lot is reduced on the basis of individual tax lot size.
[3]Small inconsistencies in the alignment of the tax lot GIS layer and the vacant/developed GIS layer create slivers along property boundaries. In order to deal with this issue, any tax lot that is 95% or more vacant is considered "fully vacant".
[4] GIS tax lot layers change over time as the counties update their parcel base. Because of this, over time, the vacant land layer may develop inconsistencies, resulting in slivers of vacant or developed land that intrude on adjacent tax lots. Setting a 95% threshold prevents full vacant tax lots from being categorized as "developed".

- Part vacant / part developed tax lots are considered developed and will be treated in the redevelopment filter

Rationale:
Categorizing tax lots as vacant or developed (and potentially redevelopable) more closely aligns the inventory approach with that of other local governments and state administrative rules, which refer to vacant and redevelopable land. A lot that might be considered "partially vacant" in older analysis methods are still inventoried but are simply redefined to fit into the vacant or developed categories. Tax lots with fewer than 2,000 sq. ft. developed and a developed part that is less than 10% of the entire tax lot are considered completely vacant with the understanding that tax lots with this condition resemble a fully vacant tax lot. The developed portion would minimally impact new development.

In case of tax lots in employment zones that do not pass through various redevelopment filters, for relatively large tax lots greater than 1 acre, we apply a final screen to include "land banked" parcels into the BLI. These tax lots are categorized as "infill" in the employment summaries of the BLI.

Remove tax-exempt lots, parks.

Issue:
Some vacant tax lots (e.g., parks) should not be recognized as carrying capacity for employment and/or housing going into the future.

Solution:
Remove the following types of tax lots from the residential (and employment) BLI based on Assessor PCA code designations, owner names, assessed values and other data sources:

- Tax exempt with property codes for city, state, federal and Native American designations
- Schools
- Churches and social organizations[5]
- Private[6] "streets"
- Rail properties
- Tax lots under 1,000 sq. ft. (0.023 gross acres)
- Parks, open spaces and where possible private residential common areas

Use the best available GIS data to remove parks, rail yards and railroad properties, major petroleum, natural gas lines and BPA power line right of ways. Parks is a data layer maintained by Metro that includes all parks in the region (e.g., community parks, regional parks, open space areas, golf courses, private common areas, and cemeteries).

EXCEPTIONS:
Included in Residential Capacity Calculations the following list of exemptions:

- Housing Authorities (not just Portland)

Included in Employment Capacity Calculations the following list of exemptions:

[5] Based solely on tax exempt codes.
[6] This was used for SFR, MFR and MUR zoning only. It proved problematic for COM and IND zoning

- Port of Portland
- Portland Development Commission

Rationale:
Tax lots that are not capable of supporting future employment and/or housing because of use restrictions should be removed from the BLI.

Calculate Environmental Constraints

Issue:
Local governments vary in how they implement environmental regulations found in Urban Growth Management Functional Plan Title 3 (Water Quality and Flood Management) and Title 13 (Nature in Neighborhoods). Moreover, estimation of residential housing capacity of tax lots (TL) with environmental impact may vary substantially on a case by case basis. Typically, ***density transfers*** from the environmentally impacted portion of a tax lot to the unconstrained part of the tax lot may vary significantly depending on the environmental impact and city regulations.

The capacity calculations for environmentally constrained tax lots recognize residential density transfers and Title 13's more flexible protections, which are applied on a site-by-site basis during the development review process. Generally, under Title 13, development is to avoid, minimize, or mitigate (in that order) designated habitat areas. Typically, precise delineations of habitat conservation areas are identified during the site development process. Therefore, the data and BLI calculation methods are more appropriate at a higher geographic scale than individual tax lots. The residential capacity computation (though accurate at a regional or subregional scale) may **NOT** accurately portray the precision needed to calculate the environmental deduction for each tax lot. This may also affect the calculation for the transfer of density from the environmentally constrained area to the unconstrained part for individual tax lots, but we believe that on balance, the variance in the calculation of net density and net residential capacity offset each other over the entire region.

For the 2018 BLI, a technical working group was asked to provide advice on how to handle capacity assumptions in Title 13 areas. The group agreed that counting full residential capacity was not appropriate, but that discounting all capacity was not appropriate either. Metro staff then sent an e-mail inquiry out to all local jurisdictions in the region to determine their jurisdictions' historic development experience in Title 13 areas. Metro staff received varied responses with many caveats that preclude meaningful summarization. In the end, this inquiry did not produce a clear answer. Aside from the fact that Title 13 gets interpreted on a site-by-site basis, another challenge is that local implementation of Title 13 is fairly recent, which means that there is not a lot of development experience from which to draw (particularly in light of the Great Recession). Given this ambiguity and the fact that Title 13 areas comprise a relatively small portion of the region's single-family zoned vacant land (approximately 5.5%) and even less of its multi-family zoned vacant land (approximately 0.5%), Metro staff determined that the most reasonable approach was to rely on percentages found in the Title 13 Model Ordinance. This is the best available information and is being used on the advice of the BLI technical working group. These assumptions were reviewed by LUTAG in late 2023, early 2024 and agreed that they were still the best approach for calculating environmental constraints.

Solution:
Most areas that are considered environmentally sensitive fall into multiple categories of overlap including Titles 3 and 13, or are in a floodway or flood prone soils, or include steep slopes or some other ecosystem feature. Metro employs an environmental hierarchy to classify the environmental features to avoid double counting the capacity deduction for the BLI. BLI reductions will reflect the higher assumed protections when environmental features are overlapping.

Methods differ for single-family, multi-family, and employment lands. Generally, using the best available GIS data:

- Remove 100% of the area of floodways
- Recognize environmental constraints such as slopes over 25% and as defined by cities and counties under Title 3 and Title 13. In many instances, the delineation of the environmental buffers are GIS modeled data; where available we utilize environmental buffers from local government GIS data
- By assumption, permit 1 dwelling unit (DU) per residentially-zoned (SFR, MFR, MUR) tax lot if environmental encumbrances would limit development such that by internal calculations no (zero) dwelling units would otherwise be permitted ("essentially avoid takings")

As a result, we define the following land area calculations (used in formulas below):
Vacant buildable = Calculated area of TL – utility easements – parks – railroads – tax exempt sites
Net unconstrained[7] = vacant buildable – environmental constraints

The "calculated area of TL" is the GIS calculation of area (sq. ft.) of the tax lot as defined in Metro's GIS tax lot data layer. (Generally, individual tax lots are not affected by utility easements, parks, railroads or other tax exempt uses, but on a regional scale, these factors add up to be somewhat significant and therefore handled in the regional BLI calculations for the UGR capacity estimates.) Environmental constraints are handled as follows (by land use type):

<u>Single-family residential</u>

1. Floodways: 100% removed
2. Slopes > 25% and Title 3 treated the same way: 100% removed
    a. If tax lot > (or equal to) 50% constrained, follow the "maximum capacity rule" (defined below) to add back units[8]
    b. If tax lot is <50% constrained, assume 90% of unconstrained area is in BLI (i.e., apply 10% discount to vacant buildable acres)[9]
3. Title 13: 50% of Title 13 constrained acres removed from BLI (consistent with Title 13 model Ordinance).
4. Floodplain: 100% removed

[7] This is the calculation for SFR, MFR and MUR. The calculation for COM and IND is a 100% deduction of environmental constraints.

[8] This add back represents Metro's approach for estimating / calculating the density transfer to mitigate the loss of potential development productivity for dwelling units.

[9] Based on feedback from 2018 BLI working group, including local experience.

5. Assume at least one unit per tax lot, even if fully constrained

Multi-family residential

1. Floodways: 100% removed
2. Slopes > 25%: 100% removed
3. Title 3: remove 50% of the constrained land with the other 50% considered buildable
4. Title 13: 15% of Title 13 constrained acres removed from BLI (consistent with Title 13 Model Ordinance)
5. Floodplain: 50% removed
6. Assume at least one unit per tax lot, even if fully constrained

Industrial and commercial

Employment zoned land applies a simple approach of netting out all constrained land. This is based on the input of the BLI technical working group, which indicated that constrained areas are typically avoided altogether by new commercial or industrial employment uses.

1. Floodways: 100% removed
2. Slopes:
    a. Mixed-use and Commercial - slopes greater than 25%: 100% removed
    b. Industrial - slopes greater than 10%: 100% removed.
3. Title 3: 100% removed except for the Portland Harbor Access Land where a 70% discount rate is applied[10]
4. Title 13: 100% removed

NOTE: Although State law does not provide any specific guidance on slopes in non-residential land, during the Draft Urban Growth Report comment period DLCD staff provided input to remove slopes greater than 10% for industrial zoned land based on industry trends.

Calculate deductions for "future streets"

This BLI methodology sets aside a portion of the vacant land supply (not redevelopment supply) in order to accommodate future streets and sidewalks. This assumption is calculated on a per tax lot basis:

- Tax lots under 3/8 acre assume 0% set aside for future streets
- Tax lots between 3/8 acre and 1 acre assume a 10% set aside for future streets
- Tax lots greater than an acre assume an 18.5% set aside for future streets
- Industrial (IND) zoning assumes a 10% set aside regardless of size.

The basis for these net street deduction ratios derive from previous research completed by the Data Resource Center and local jurisdictions for the 2002 UGR. These assumptions were presented to LUTAG and revalidated for this analysis.

[10] Based on input from City of Portland staff.

Vacant Land Calculations

Calculate single-family and middle housing residential capacity

Issue: In 2019, the Oregon Legislature passed House Bill 2001 which required cities and counties allow duplexes, triplexes, fourplexes/quadplexes, cottage clusters, and townhouses in residential areas by July 2022, essentially doing away with traditional "single family" zoning which previously limited uses to predominantly single unit detached homes. Collectively these housing types are referred to as "middle housing" and can develop at densities significantly higher than traditional detached single-family development. While some homebuilders are starting to make greater use of these types of dwellings in their portfolios in the last 2 years, the overall numbers are relatively small making traditional forecasting difficult. To address this inherent uncertainty, Metro relied on the expertise of ECOnorthwest, a consulting firm of planners and economists with extensive development and planning experience working in and with local jurisdictions in the Metro region to create a range of possible development scenarios resulting from HB2001.

Expected Density Methods

Expected Density Method – Heavy middle housing mix
This scenario anticipates higher use of middle housing within the Metro region as more affordable products. The assumed densities and housing mix in the table below were applied to Vacant SFR land as well as lower density multifamily and mixed-use residential zones (MFR1, MFR2, MUR1, MUR2).

Baseline Expected Density Method Assumptions

	Assumed Housing Mix			Assumed Density by Type			
	SF	MH	MF	SF	MH	MF	Weighted Avg
SFR1	40%	60%	0%	5.4	18.0		13.0
SFR2	50%	50%	0%	9.7	20.0		14.8
SFR3	70%	30%	0%	17.4	26.0		20.0
MFR1	0%	50%	50%		20.0	20.0	20.0
MFR2	0%	25%	75%		25.0	25.0	25.0
MFR3	0%	0%	100%			35.0	35.0
MFR4	0%	0%	100%			45.0	45.0
MFR5	0%	0%	100%			84.0	84.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MFR5	0%	0%	100%			99.0	99.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MUR1	0%	50%	50%		22.0	22.0	22.0
MUR2	0%	25%	75%		28.0	28.0	28.0
MUR3	0%	0%	100%			43.0	43.0
MUR4	0%	0%	100%			58.0	58.0
MUR5	0%	0%	100%			80.0	80.0
MUR6	0%	0%	100%			176.0	176.0
MUR7	0%	0%	100%			321.0	321.0

Heavy single family detached mix

Even with affordability issues in the detached single family housing market, demand for single family detached homes remains high. This scenario anticipates a lower mix of middle housing in SFR zones.

Detached Single Family Emphasis Method Assumptions

	Assumed Housing Mix			Assumed Density by Type			
	SF	MH	MF	SF	MH		Weighted Avg
SFR1	80%	20%	0%	5.4	18.0		8.0
SFR2	85%	15%	0%	9.7	20.0		11.2
SFR3	90%	10%	0%	17.4	26.0		18.3
MFR1	0%	50%	50%		20.0	20.0	20.0
MFR2	0%	25%	75%		25.0	25.0	25.0
MFR3	0%	0%	100%			35.0	35.0
MFR4	0%	0%	100%			45.0	45.0
MFR5	0%	0%	100%			84.0	84.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MFR5	0%	0%	100%			99.0	99.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MUR1	0%	50%	50%		22.0	22.0	22.0
MUR2	0%	25%	75%		28.0	28.0	28.0
MUR3	0%	0%	100%			43.0	43.0
MUR4	0%	0%	100%			58.0	58.0
MUR5	0%	0%	100%			80.0	80.0
MUR6	0%	0%	100%			176.0	176.0
MUR7	0%	0%	100%			321.0	321.0

Calculate multi-family residential capacity (including mixed-use residential)

If the tax lot is zoned MFR (or MUR) and vacant, the BLI capacity estimate is simply the number of units per acre permitted by the zoning class multiplied by the vacant buildable acres, which in the case of the unconstrained tax lot is the area of the tax lot.

In the case of the lowest density multi-family zoning (MFR1, MFR2, MUR1, MUR2) a portion of the resulting units were allocated to middle housing as described in the previous section.

Formula for calculating density transfers on environmentally constrained tax lots (for MFR and MUR Redevelopment and Vacant tax lots):
If (unconstrained > 50% of total lot) => apply zoning density to entire tax lot.
Else the **buildable** area = unconstrained area * 2: Apply zoning density to **buildable** area.

Note: the deduction for environmental constraints is defined in previous sections of this report.

Density Transfer Rationale:
A tax lot with a majority of it unconstrained, a full density transfer is assumed from the constrained portion to the unconstrained. Therefore, capacity is estimated as the zoned density and the lot size of the entire site.

The capacity estimated for a highly constrained tax lot is calculated differently. In this case, a density transfer is allowed, but the adjusted buildable capacity is based on the unconstrained area and multiplied by a factor of 2 and then applying the zoned density to this adjusted buildable area. For example, if a 10,000 sq. ft lot has a constrained area of 6,000 sq. ft., the method would assume that the zoned density would be applied to 8,000 sq. ft.

Vacant Employment Land Calculations

Vacant employment acres are simply the net area of tax lots after removing environmental constraints and right of way as described in previous sections.

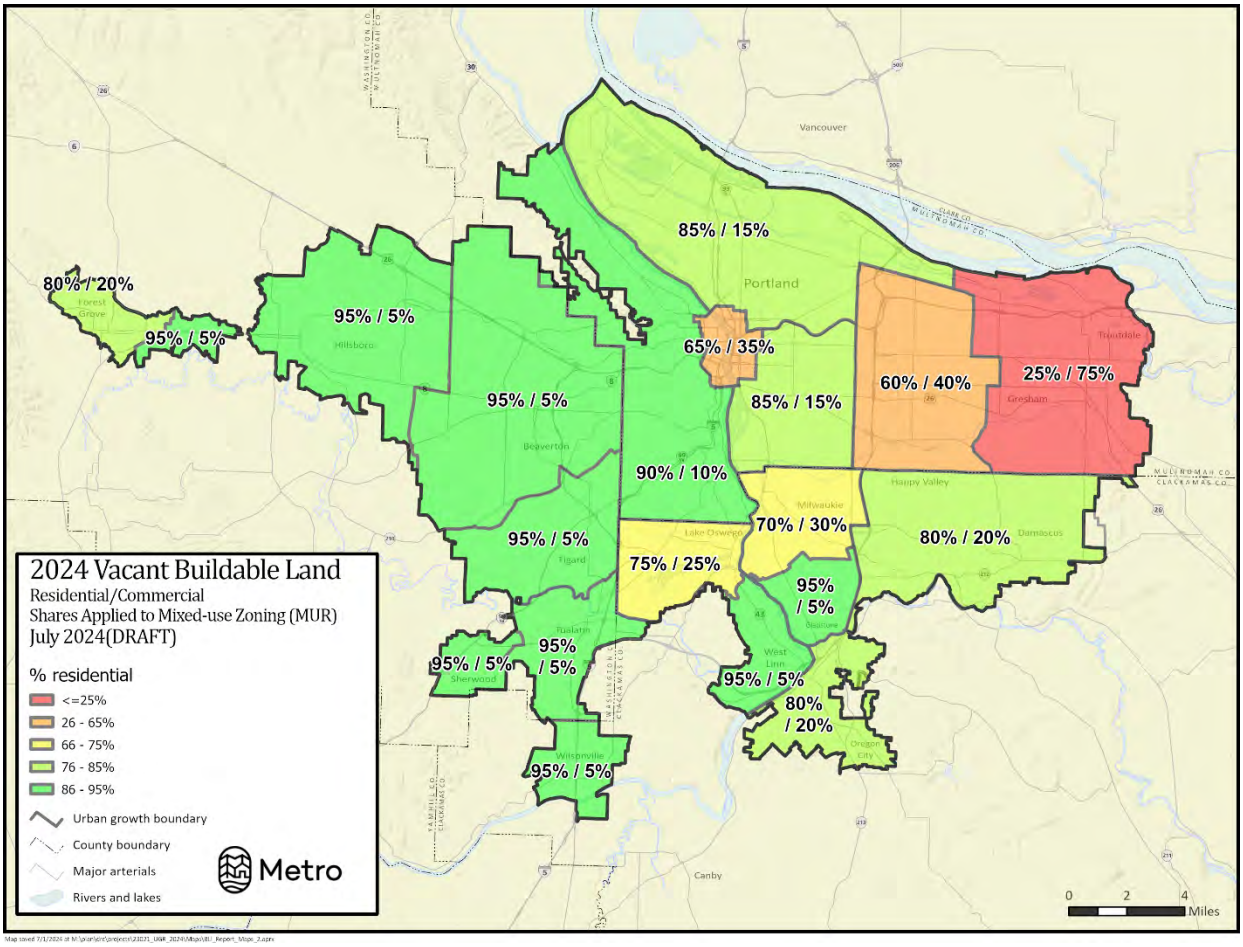
Mixed Use capacity estimates (splitting residential and commercial capacity on MUR zoned tax lots)

More and more tax lots in the region are designated in mixed use residential (MUR) zones. Predicting whether MUR-zoned areas throughout the region will be developed as residential or commercial (or what mix of the two) is a challenge. MUR districts in the Metro region can allow *vertical mixed use*, (ground floor retail/service or office uses with housing units above). Horizontal mixed use can also occur, where a mix of retail, service, office and residential apartments occur in the same area, usually on separate tax lots.

MUR residential/non-residential capacity split formula:
Employment capacity in mixed use residential areas, measured in acres, is calculated from the dwelling unit capacity determined in the residential supply.

For the purposes of determining the residential/non-residential split, Metro performed an analysis of observed development from 2013 through 2022 in mixed use zones. Draft findings by sub-regions were

developed presented to LUTAG for review and adjustment. The final splits are displayed in Map 2 below.



Map 2: Residential/Commercial Shares Applied to Mixed Use Residential (MUR) zoning in 2018 BLI Draft

These geographically-based residential/non-residential splits were then applied to MUR tax lots with capacity for vacant land. For vacant tax lots with MUR zoning:

- Total effective acres = Total additional units allowed if 100% of lot is used for residential * acres per unit required at maximum zoned density
- Residential effective acres = ResSplit * Total effective acres
- Employment effective acres = EmpSplit * Total effective acres

Mixed-Use-Residential (MUR) proportion assumptions

Metro staff analyzed the observed development data from the Land Development Monitoring System (LDMS) to update the assumed proportion of land zoned mixed-use-residential (MUR) that would develop as housing units. Metro applies this assumption to all vacant MUR lands to estimate the maximum possible residential and employment capacity in those lands for the BLI. Staff generally refer to these assumptions as the "MUR splits."

Metro first used the 2013-2022 LDMS data to summarize and compute observed average proportions by jurisdiction, then reviewed those results with a Land Use Technical Advisory Group (LUTAG).

Staff summarized the identified tax lots by geography to compute the total acres and units (if applicable) of residential and non-residential properties by geography. Residential properties with on-site commercial space had their area counted only as residential acres. Staff computed the share of commercial and residential land within each geography from total acreage rounded to the nearest 5%. Staff made minor adjustments to some proportions based on input from LUTAG members based on their local knowledge of recent trends and future plans.

These splits were not applied to the redevelopment eligible land and instead deferred to the results of the pro forma model (described below) which evaluates the financial feasibility of both commercial and residential uses in MUR zones.

Redevelopable Residential and Employment Land Calculations

The "pro forma" model (also known in the technical documentation as the "developer supply preprocessor model" or DSP) is designed to predict what tax lots with existing development are likely to redevelop within the 20 year time frame. The model uses the existing real market values (RMV) as derived from tax assessor data against different development prototypes allowable in the underlying zone. The model uses assumptions about construction costs as well as achievable pricing (rental and sales) to determine if redevelopment of the tax lot would be financially feasible. The model then picks the "highest and best use" of the potential redevelopment prototypes that were determined to be financially feasible. Furthermore, the model applies a probability, based on past performance of similar tax lots; the higher the profit potential, the higher the likelihood of redevelopment. Finally, any existing development is subtracted from the achievable to produce a net capacity.

The same method is applied across all zoning types, with different prototypes allowed in each zone. A list of the eligible prototypes by zone can be found at the end of **Attachment A.**

Example: The model determines that a tax lot with an existing single-family home in a MFR zone can support several different prototypes. Of the available options, the most "profitable" are " 3-story wood townhomes". Due to the parcel size, the model determines that 5 townhomes (middle housing) could replace the existing single-family home for a net of 4 new dwelling units. The model predicts that there is a 19% chance of the tax lot redeveloping under this scenario, so the tax lot is assigned 0.76 units of middle housing capacity. In other words, approximately 1 in 5 similar tax lots would be expected to develop in this way, however that potential capacity is spread across all similar tax lots.

As demonstrated in the above example, totals from the model results should be aggregated to larger areas and not viewed at the tax lot level.

More detailed explanation of methods and prototypes can be found in **Attachment A**.

Infill employment land

Tax lots that have been identified as part vacant (at least ½ an acre undeveloped) are considered developed and are put through the pro forma model to test market feasibility for redevelopment. (See **Attachment A** for future explanation of the pro forma model.)

However, due in part to the relatively low value per square foot for employment land when compared to improvements, many tax lots that are partially developed still do not meet the threshold for redevelopment. There remain some tax lots with large vacant pieces that do not get through the pro forma model and into the redevelopment supply. The assumed values in the pro forma model which identify which tax lots have potential to be redeveloped are not well suited and calibrated to identify partially developed tax lots with significant amounts of undeveloped real estate.

A final screen for these so called "land banked" parcels was applied by adding back into the redevelopment supply the *net unconstrained* vacant portion of any lot with at least 1 acre of unconstrained vacant land. In the 2018 BLI, these tax lots were included in the redevelopment supply, however, in the 2024 BLI, they have been separated into their own category called "infill" for clarity.

New urban areas and planned development capacity

"New urban areas" are those areas that have been added to the UGB in recent years that do not yet have urban zoning or adopted comprehensive plans. Consequently, planning documents, rather than GIS analysis, are typically the basis for how capacity in new urban areas is handled in the BLI. Possible sources of information include:

- Draft comprehensive plans
- Adopted concept plans
- Draft concept plans
- Conditions of approval that were attached to the UGB expansion.

Additionally, there are several large developments which are currently in the approval and permitting processes with local jurisdictions. While these developments have urban zoning in place, their expected built-out capacity is known due to other planning processes so there is no need to estimate the capacity using various BLI methods. Additionally, while they are already committed to development, full build out will take at least several years, contributing to the 20-year supply.

Overall, this category adds approximately 30,000 units to the UGB land supply.

Office to residential conversion

With the post-pandemic transition to hybrid and remote work and the accompanying housing crisis, the prospect of converting vacant office space to residential units is a possibility. Metro contracted with ECOnorthwest to explore the prospect of office-to-residential conversions and how that might contribute to the future land supply for the region. Due to many market factors in the region, the magnitude of such conversions is likely to be small, with total expected units ranging between 250 and

1,500 total multi-family style units in the next 20 years regionwide. **Attachment B** details the methodology and rationale for these assumptions.

ADUs and internal conversions

Additional capacity in the region is also expected to come from the construction of detached ADUs, as well as conversions of garages, attics, and/or basements into additional units through internal partitions creating multi-unit buildings. Since the pro forma model only looks at complete redevelopment of a tax lot from one types of development to another (i.e.

Metro relied on ECOnorthwest to estimate the capacity potential from these development types. ECOnorthwest estimates a baseline of 8,692 units with a high-low range between 4,955 and 11,716 units possible over the next 20 years through this type of redevelopment. The following assumptions were used:

- **Low:** continue average annual ADU production for 2019-2022
    - This captures the trend since Portland changed its ADU SDC waiver policy to include a restriction on use for short-term rentals
    - Assumes that any additional middle housing conversion that isn't captured by the pro forma analysis would be instead of adding an ADU, so that there is no overall increase in units beyond what was happening with ADUs alone and the redevelopment component from the pro forma model.
- **Baseline:** continue average annual ADU production plus 10% of average annual middle housing from 2013-2022 (all available data years)
    - This assumes that roughly 10% of middle housing production was through conversion, and that longer-range past trends for ADUs and conversion will continue.
- **High:** continue average annual middle housing infill/redevelopment between 2014 and 2023
    - Assumes that as much conversion could take place per year (on top of redevelopment) as all middle housing infill/redevelopment during this period, most of which pre-dates HB2001

GIS Data and Metadata

The final GIS database and accompanying metadata are available upon request from Metro by contacting the Data Resource Center at:

503-797-1742
DRC@oregonmetro.gov
https://www.oregonmetro.gov/tools-partners/data-resource-center
Staff contact: Clint Chiavarini

Attachments

Attachment A: Office-to-Residential Conversion Potential; ECOnorthwest, April 2024
Attachment B: Documentation of Predictive Development/Redevelopment Model; Johnson Economics, June 2024

DATE: April 22, 2024
TO: Metro
FROM: ECONorthwest
SUBJECT: Residential Readiness Task 5: Office-to-Residential Conversion Potential

Overview

The Metro Regional Government (Metro) has contracted with ECONorthwest to evaluate residential readiness in preparation for its 2024 Urban Growth Management decision. ECONorthwest evaluated whether the growing interest in office-to-residential conversions could meaningfully contribute to housing capacity over the next 20 years.

In 2020, the onset of the COVID-19 pandemic accelerated work-from-home trends, raising questions about whether an oversupply of office space in some locations could be converted to residential uses. This memorandum documents opportunities and barriers to office-to-residential conversions in the Portland metropolitan area, including the continuity of work-from-home trends, office vacancy rates, market indicators to understand demand for space in different subareas, and general characteristics of viable residential conversions. It also estimates a range of housing units that could be accommodated through office-to-residential conversions over the next 20 years inside the Metro Urban Growth Boundary (UGB) and their likely price ranges.

This memorandum draws on national studies, articles, and reports; office market data for the Portland region collected in the first quarter of 2023; and findings from a January 2024 study by ECONorthwest for Prosper Portland that evaluated the financial feasibility of office-to-residential conversion for several example office buildings downtown as well as the impact of specific policies and incentives.

Key Findings

- **Lasting remote and hybrid work trends**[1] **have dramatically increased office vacancy rates**, particularly for older Class B and C office space.[2] This is expected to represent a lasting shift in office real estate. This national trend is present in Portland, where the vacancy rate downtown has exceeded 30%, with lower vacancy rates in the suburbs.[3]
- **Office-to-residential conversions are challenging and require specific building characteristics and market conditions to succeed**. Key factors affecting building conversations include the dimensions and floor plate, the configuration of internal

[1] Caitlin Gilbert et al., "Remote Work Appears to Be Here to Stay, Especially for Women," Washington Post, June 22, 2023, https://www.washingtonpost.com/wellness/2023/06/22/remote-work-family-socialization-time-use/.
[2] Emma Goldberg, "What Would It Take to Turn More Offices into Housing?," The New York Times, December 27, 2022, sec. Business, https://www.nytimes.com/2022/12/27/business/what-would-it-take-to-turn-more-offices-into-housing.html?partner=slack&smid=sl-share.
[3] Samuel Hatcher, Dan Peterson, and Jason Green, "Portland Office Figures Q1 2023" (Portland, OR: CBRE, May 7, 2023), https://www.cbre.com/insights/figures/portland-office-figures-q4-2022, 1.

systems, and window design.[4,5] In Portland, compliance with seismic requirements is another key consideration.[6] In addition, the building must have high office vacancy rates and it, and its surrounding context must be attractive as a place to live.

- **Nationally, some jurisdictions are offering incentives for conversions, sometimes tied to affordability requirements**.[7] Portland offers exemptions on System Development Charges (SDCs) for conversion projects that require seismic upgrades,[8] but does not exempt these projects from the City's Inclusionary Housing (IH) program. Other Metro jurisdictions do not have similar programs.
- **Units resulting from office-to-residential conversion are often high-end, though some have more moderate rents.**[9,10,11] In Portland, in the absence of compelling amenities, rents for conversion projects are expected to be below those of purpose-built new apartments,[12] which is helpful for affordability, but challenging for feasibility.
- **Potential for conversions in Downtown Portland is limited.** Despite challenges with large floorplates and utilities, large, modern office buildings are most likely to be financially feasible because they would avoid the cost of seismic upgrades. However, public subsidies or incentives beyond the City's existing SDC exemption program are likely necessary to support most office-to-residential conversion projects in Downtown Portland.[13]
- **Office-to-residential conversions are unlikely to happen in Portland's suburban markets**. Given the lower office vacancy rates in suburban markets (particularly in Class B and C offices)[14] and the lack of surrounding amenities near most office parks, it would take unique circumstances, a desirable location, and a willing developer to pursue a suburban conversion project. An underperforming suburban office building may be more attractive as a tear-down for new development or for conversion to other nonresidential uses.
- While it is difficult to predict the number of potential successful office-to-residential conversion projects over the next 20-years, it is **unlikely that more than a few downtown office buildings** would convert to residential use over the next 20 years.

[4] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?" (Washington DC: Up for Growth, November 2022).

[5] Jeffrey Havsy, Xiaodi Li, and Kevin Fagan, "Why Office-To-Apartment Conversions Are Likely a Fringe Trend at Best," Moody's Analytics CRE, January 3, 2023.

[6] ECOnorthwest to Prosper Portland: "Office to Residential Conversion Study – Feasibility Results Memo," January 5, 2024.

[7] Abu-Khalaf, Ahmad, and Ray Demers. "What Will It Take to Convert Offices to Housing?" Enterprise Community Partners, April 10, 2023, https://www.enterprisecommunity.org/blog/what-will-it-take-convert-offices-housing.

[8] Alex Zielinski, "Portland City Council approves incentives to help convert office buildings into apartments."

[9] Gensler, "Franklin Tower," n.d., https://www.gensler.com/projects/franklin-tower.

[10] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade."

[11] Ximena Gonzalez, "Calgary's Adventure in Office Conversion," The Globe and Mail, May 5, 2023, https://www.theglobeandmail.com/real-estate/article-calgarys-adventure-in-office-conversion/.

[12] ECOnorthwest to Prosper Portland: "Office to Residential Conversion Study – Feasibility Results Memo," January 5, 2024.

[13] Ibid.

[14] Samuel Hatcher, Dan Peterson, and Jason Green, "Portland Office Figures Q1 2023" (Portland, OR: CBRE, May 7, 2023), https://www.cbre.com/insights/figures/portland-office-figures-q4-2022, 1.

This could result in somewhere between **200 to 1,500 new housing units** depending on the number of successful projects, size of individual buildings, level of efficiency in using interior space, and unit mix. Conversion in the suburban market is even less likely, but one or two suburban conversion projects could result in up to 500 units. This suggests that the region could potentially see **between a few hundred units and roughly 2,000 units of housing resulting from office-to-residential conversion projects**.

Why should Metro consider office-to-residential conversions?

Remote workplace trends are driving office tenants to smaller, higher quality spaces.

Remote and hybrid work trends that increased dramatically during the COVID-19 pandemic have continued to impact business operations and real estate demand, and are likely to persist into the future, albeit at a lower rate than during the peak of the pandemic. These impacts are largely concentrated in certain industries and occupations, including professional services like computer science and technology, business and finance, arts and design, legal services, and architecture and engineering, which have seen the highest rates of working from home in Oregon.[15]

Despite uncertainty about the future of remote work, data show a lasting trend particularly among white-collar workers: in 2022, 34 percent of workers nationwide reported working at least part of the week from home compared to only 24 percent pre-pandemic.[16] While this has declined from the 42 percent of workers doing remote jobs at the onset of the pandemic,[17] it indicates a lasting trend for at least some segments of workers. Trends in remote work are not evenly distributed among the workforce: women and workers with bachelor's degrees or higher work from home more compared to the workforce overall.[18]

In many professional service industries, expectations for locational flexibility have changed. In a survey done in New York for the city's Office Adaptive Reuse Task Force (one of the most comprehensive studies of worker and employer preferences at the city level), 77 percent of office-based employers indicated a hybrid schedule would be their preferred post-pandemic policy.[19] In Oregon, these trends vary across the state and region. In 2021, the Portland metro ranked 11th amongst metro areas nationwide for its high share of remote workers.[20] In the City

[15] Josh Lehner, "Working from Home during the Pandemic," Oregon Office of Economic Analysis, January 18, 2023, https://oregoneconomicanalysis.com/2023/01/18/working-from-home-during-the-pandemic/.
[16] Caitlin Gilbert et al., "Remote Work Appears to Be Here to Stay, Especially for Women," Washington Post, June 22, 2023, https://www.washingtonpost.com/wellness/2023/06/22/remote-work-family-socialization-time-use/.
[17] Ibid.
[18] Caitlin Gilbert et al., "Remote Work Appears to Be Here to Stay, Especially for Women," Washington Post, June 22, 2023, https://www.washingtonpost.com/wellness/2023/06/22/remote-work-family-socialization-time-use/.
[19] New York City Department of City Planning, "New York City Office Adaptive Reuse Study," January 2023, https://www.nyc.gov/site/planning/plans/office-reuse-task-force/office-reuse-task-force.page.
[20] Josh Lehner, "Working from Home during the Pandemic."

of Portland, over 35 percent of workers reported working from home in 2021, compared with about 25 percent of workers in the Portland suburbs, and 12 percent in rural areas.[21]

National level trends indicate that companies are gradually adjusting their space usage and real estate footprints in response to these trends. While many businesses in these industries have long-term leases (e.g., five to ten years), many of those with expiring leases are considering whether to maintain their existing space and footprint (e.g., because of attractive lease rates as property owners try to maintain occupancy), pursue a remote work environment and eliminate their office footprint altogether, or find a space (often smaller) that better fits their hybrid work arrangements.[22] These decisions are often driven by worker preferences so as to attract and retain quality employees, as well as economizing on real estate expenses.

For companies maintaining an office presence, higher quality space, smaller footprints, and flexible configurations are most in demand. Many employers who chose to retain a physical office space in the wake of the pandemic have changing needs for office space, and many are downsizing their total office footprints in exchange for higher-quality spaces as they adjust to new hybrid and flexible schedules. As a result, demand for premium Class A office space is stronger than older, Class B and C office spaces, many of which were constructed before the 1980s and are not seen as 'commute-worthy.' This is translating into higher vacancy rates for Class B and C offices.[23]

Developers and property owners are responding to changes in office tenant decisions.

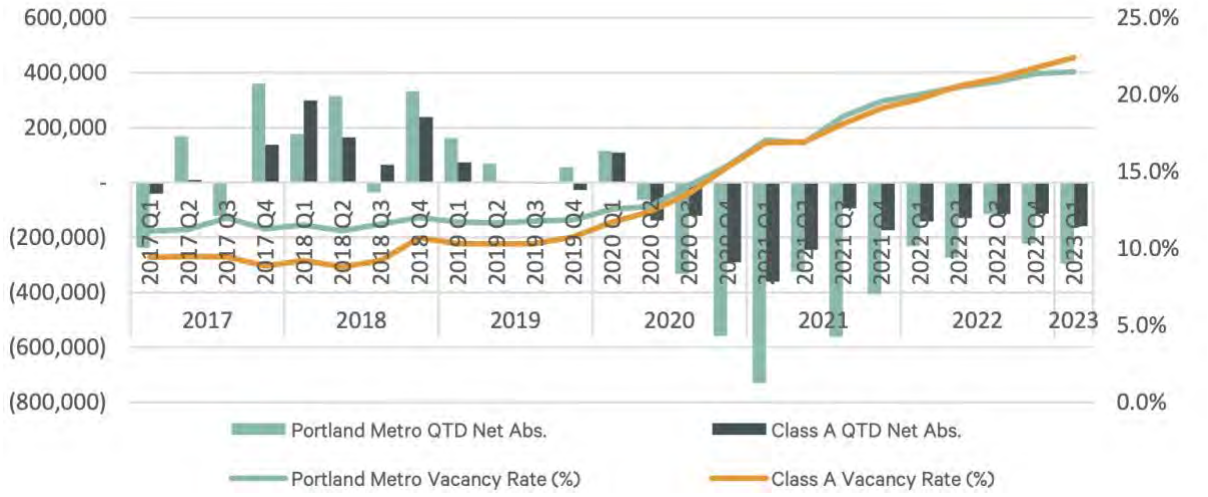
Redevelopment trends are an indicator of this 'flight to quality,' as developers and property owners seek new opportunities for older Class B and C office space. In some cases, renovations and modern upgrades can transform older offices into more attractive spaces, but converting offices to other uses altogether is a growing trend. In 2021 and 2022, only 12 percent of redeveloped office space remained as office use, a decline from prior years.[24] Local government subsidies and incentives have made it more attractive to pursue residential conversions in some cities, including Chicago, Washington DC, and Los Angeles. However, many building owners have hesitated to sell their office properties or invest in conversion projects until they are more comfortable with hybrid work trends and the desires of companies.[25]

[21] Ibid.
[22] Patrick J. Kiger, "How to Make Office-To-Residential Conversions Work," Urban Land Magazine (Urban Land Institute, December 1, 2022), https://urbanland.uli.org/planning-design/how-to-make-office-to-residential-conversions-work/?utm_source=realmagnet&utm_medium=email&utm_campaign=HQ%20Urban%20Land%2012%2E05%2E2022.
[23] Emma Goldberg, "What Would It Take to Turn More Offices into Housing?," The New York Times, December 27, 2022, sec. Business, https://www.nytimes.com/2022/12/27/business/what-would-it-take-to-turn-more-offices-into-housing.html?partner=slack&smid=sl-share.
[24] Jacob Rowden and Elena Lanning, "Conversion Activity Gaining Momentum" (JLL Research, October 19, 2022), https://www.us.jll.com/en/trends-and-insights/research/office-research-snapshot-10-19-22.
[25] Richard McGahey, "Converting Offices to Residences Can Help Fight the Housing Shortage," Forbes, December 9, 2022, https://www.forbes.com/sites/richardmcgahey/2022/12/09/converting-offices-to-residences-can-help-fight-the-housing-shortage/?sh=139de24f7eb3.

Office vacancy rates in the Portland area are high and still increasing compared to pre-pandemic rates, especially downtown.

Downtown office vacancy remained high throughout 2022, showing the continued impacts of remote and hybrid work. Even as most workplaces lifted COVID-19 restrictions and pivoted to hybrid and return to in-person work, the Portland MSA ended the fourth quarter of 2022 with an overall office vacancy rate of 21.4 percent.[26] Rather than rebounding, trends in the first quarter of 2023 show continuing high vacancy rates (Exhibit 1), indicating an escalating trend rather than a receding one.

Exhibit 1. Portland MSA Office Absorption (1,000 SF) and Vacancy Rate, 2017-2023
Source: CBRE



Office vacancies are not evenly distributed across the Portland Metro.

The office vacancy rate remains higher in the Portland central business district (CBD) compared with suburban markets, sitting at 32 percent compared to roughly 19 percent in the suburbs.[27] Downtown and suburban offices in the Portland region show different trends in what type of office space is in demand. While downtown offices have lower vacancies in newer Class A space, offices in the suburban markets show the reverse, with higher vacancy in higher-quality spaces (Exhibit 2). Considering that the Portland suburbs have lower rates of remote work, this may indicate that suburban offices are losing fewer tenants in lower cost offices while Downtown businesses are seeking premium space. Nationally, many suburban areas with high quality of life indicators are attracting businesses, including offices.[28] This may be due to desires for shorter commutes and or generational demographic changes as Millennials move out of urban centers.[29]

[26] Samuel Hatcher, Dan Peterson, and Jason Green, "Portland Office Figures Q1 2023" (Portland, OR: CBRE, May 7, 2023), https://www.cbre.com/insights/figures/portland-office-figures-q4-2022, 1.
[27] Ibid.
[28] Marie Ruff, "What the Urban to Suburban Shift Means for the Office Sector" (National Association for Industrial and Office Parks, August 11, 2022), https://blog.naiop.org/2022/08/what-the-urban-to-suburban-shift-means-for-the-office-sector/.
[29] Ibid.

Exhibit 2. Downtown vs. Suburban Market Statistics in the Portland Metro Area (Q1 2023)
Source: CBRE

	Total SF	Vacant SF	Vacancy Rate	2023 Q1 Net Absorption	Average Direct Asking Rate (PSF)
	Downtown				
Class A	12.0 million	3.7 million	31.0%	(76,486)	$39.99
Class B	8.4 million	2.6 million	31.2%	(24,176)	$32.45
Class C	2.7 million	910,000	33.7%	(23,879)	$28.60
Class D	3.2 million	1.1 million	36.31%	8,025	$26.00
Total	**26.5 million**	8.4 million	**32.0%**	**(116,516)**	**$34.26**
	Suburban				
Class A	10.8 million	2.2 million	20.9%	(82,068)	$34.20
Class B	11.8 million	2.1 million	18.0%	(29,302)	$26.14
Class C	2.0 million	258,000	12.9%	16,399	$19.41
Class D	67,000	-	0.0%	-	-
Total	**24.7 million**	**4.6 million**	**18.8%**	**(94,971)**	**$29.47**

What makes for a successful office-to-residential conversion?

Successful office-to-residential conversion projects are site specific and depend on the existing building's physical configuration.

Converting vacant office space to housing may theoretically make sense given shifting demand trends, but successful office-to-residential conversion projects depend on physical and financial feasibility. Office buildings must have high vacancy rates and be underperforming financially, and they must also have a layout and design that can relatively easily meet residential building requirements, with considerations of the overall building size, configuration, and placement of internal systems.

Several studies use different methodologies to determine eligibility for residential conversion. This analysis references Up for Growth's Office to Residential Conversions Policy Brief which includes an analysis of office conversion viability in Denver[30] and a Moody's Analytics' survey of New York office buildings.[31] Exhibit 3 provides an overview of the parameters used to assess viability in these studies.

[30] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?" (Washington DC: Up for Growth, November 2022).
[31] Jeffrey Havsy, Xiaodi Li, and Kevin Fagan, "Why Office-To-Apartment Conversions Are Likely a Fringe Trend at Best," Moody's Analytics CRE, January 3, 2023.

Exhibit 3. Survey of Successful Office-to-Residential Conversion Metrics
Source: Up for Growth, Moody's Analytics

		Rationale	Metrics
Physical Factors	Building Size	Floor plates must be configurable into residential unit sizes.	• Floor plates between 5,000 to 14,000 SF (depending on building shape) • 5+ Stories
	Building Dimensions	Floor plates must be a sufficient depth to hold living area, but not limit access to natural light.	• Floor depth up to 100 feet • Space to hold at least 4 1,000 SF units per floor with a maximum depth of 50 ft for resulting units
	Internal Systems	Features limiting plumbing and electrical lines can make it difficult to reroute utilities to individual units.	• Open floorplans which support rerouting central utility lines
	Year Built	Newer office buildings will be too costly for acquisition and typically come with sealed windows.	• Built before 2010 • Operable windows
Market Factors	Rent	Conversions could be viable if they generate more effective revenue as apartments than offices.	• Office rent PSF below median price for apartment rent PSF
	Vacancy Rates	Buildings that are no longer attracting office tenants incentivize owners to convert.	• 25-30%+ office vacancy rate

Generally, existing studies find that **deeper floor plates, limited access to natural light, inoperable windows, and centralized utilities (like plumbing and HVAC systems) make office buildings difficult to redevelop to meet residential building code specifications.** Office building dimensions typically vary by their age:

- Older, turn-of-the century buildings which typically occupy roughly a quarter block are generally more suitable for redevelopment into residential units due to their configuration and scale. In some cases, they may also be eligible for historic tax credits to help with financing projects and provide unique character features which can attract higher rents.[32] In Portland, many turn-of-the century manufacturing spaces have been turned into residential lofts.
- Mid-century offices which may occupy about a half-block of space can have potential for conversion as the flight-to-quality trend continues, but these depend greatly on building shape and layout to be suitable candidates.[33] They may also not have the aesthetic or historical appeal to attract premium rents.
- Class B or C office spaces (many of which were built in the 1970s and 1980s) tend to be more easily converted as they have open floorplans, operable windows, and tall ceilings with smaller total square footage that provide more flexibility for redevelopment.

[32] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade: The Feasibility of Converting Commercial Real Estate to Multifamily" (National Multifamily Housing Council and Urban Land Institute, February 21, 2023), https://www.nmhc.org/research-insight/research-report/behind-the-facade-the-feasibility-of-converting-commercial-real-estate-to-multifamily/.

[33] Miriam Hall, "Far from 'Easy Money': Experts on the Hurdles Facing Office-To-Residential Conversions," Bisnow, October 13, 2022, https://www.bisnow.com/national/news/construction-development/as-distress-comes-to-the-office-market-office-to-residential-conversions-may-prove-elusive-for-some-115846.

- Modern, Class A office buildings tend to occupy full city blocks and present cost and design challenges.[34] Many of the modern offices in Portland's CBD have floor plates that are too large, making it difficult to plan interior space in a way that meets building codes and tenant expectations. Even if building configuration does allow office spaces to meet code standards, many floor plates lead to long, narrow units that can also limit how attractive units may be to tenants. The Up for Growth and Moody's Analytics models capped the depth of floor plates between 80 and 120 ft. These buildings are also often more costly to acquire, even if they are seeing high vacancy rates. However, if these projects are successful, they hold potential to yield a greater number of units.

Office-to-residential conversion projects can be financially risky and depend on local market context and conditions.

Converting office space to residential units has different financial considerations than ground-up construction because it requires the acquisition of a performing asset; in most cases, this involves higher acquisition costs than vacant land or tear-down structures.[35] However, if vacancy rates in a building are higher than the local market and office rents are lower than achievable residential rents, property owners may have enough incentive to pursue conversion projects.

These projects are still risky, given the relatively small field of architectural and engineering experience related to office-to-residential conversion in the Portland region, the potential for unknown challenges with reconfiguring buildings, and the lingering uncertainty around remote and hybrid work trends. All else being equal, it is likely that most property owners and developers would prefer to upgrade existing offices than pursue conversion if it is viable. Building owners who might convert properties to residential uses likely have little to no debt on a building and a long-term hold on office properties in the Portland area market.

Jurisdictions can encourage office-to-residential conversions with regulatory flexibility and financial incentives like tax abatements, tax increment financing dollars, or housing subsidies.[36] In the Metro area, the City of Portland has already begun implementing some incentives, including SDC exemptions for conversions that include seismic retrofits.[37] However, the high cost of seismic retrofitting generally creates substantial additional costs for conversion projects.[38] While these incentives could be applicable for developers in the Downtown market, there are none available yet for developers in other surrounding jurisdictions (but also no seismic retrofit requirements).

[34] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[35] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[36] Abu-Khalaf, Ahmad, and Ray Demers. "What Will It Take to Convert Offices to Housing?" Enterprise Community Partners, April 10, 2023, https://www.enterprisecommunity.org/blog/what-will-it-take-convert-offices-housing.
[37] Ibid.
[38] Alex Zielinski, "Portland City Council approves incentives to help convert office buildings into apartments," OPB, https://www.opb.org/article/2023/03/15/portland-oregon-housing-city-council-apartments-vacant-office-buildings-conversion-incentives/ March 15, 2023.

What is the potential for office-to-residential conversions in the Metro area?

Because the scale and form of office space differs substantially between downtown Portland and suburban locations, the potential for residential conversion must be evaluated separately. As noted previously, office vacancies and remote work trends are generally higher in the CBD compared with suburban areas, though total office square footage is similar (Exhibit 2). This section summarizes the characteristics of office buildings that exist in both markets, and indicators potential of residential conversion projects.

Downtown Office Market

The Downtown Portland market encompasses office buildings in Portland's CBD. This market is generally characterized by taller, denser buildings than the suburban market, and a larger inventory of Class A office space that commands higher rents per square foot (Exhibit 2).

ECONorthwest analyzed the viability of office-to-residential conversion in downtown Portland on behalf of Prosper Portland, in partnership with Gensler Architects and Turner Construction (summary memorandum attached). This analysis considered three different representative types of office buildings in Portland, including a prototypical quarter-block, half-block, and full-block office building that characterize the range of older, mid-century, and modern office buildings found in the CBD. Given the range of office types in Downtown Portland, these are representative of buildings in the market that might be suitable for conversion, ranging from 35,000 to 305,000 square feet.

Suburban Office Market

Other cities in the Metro area also have small downtown districts. The building stock of suburban downtowns like Beaverton and Hillsboro tend to have a small inventory of mid-rise buildings, but none reach the same scale and employment density as the Portland CBD. The suburban office market in Portland is generally characterized by older, low- or mid-rise buildings in office parks with more lot area dedicated to surface parking lots as well as older, smaller standalone office buildings scattered outside of these areas. The suburban office market in the metro area has a greater inventory of Class B office space (Exhibit 2), which can lend itself well to residential conversion in some cases.[39]

However, the suburban market does not currently have the same high vacancy rates as downtown buildings. A greater share of suburban office space overall is still functioning as a performing asset for property owners, providing less incentive to pursue conversions. Class A offices have the highest vacancies in the suburban market (Exhibit 2), but these buildings are generally less feasible to convert to residential because of higher acquisition costs. Because suburban offices have a higher occupancy rate compared with the downtown market, the cost

[39] Jeffrey Havsy, Xiaodi Li, and Kevin Fagan, "Why Office-To-Apartment Conversions Are Likely a Fringe Trend at Best."

of acquisition would generally be higher on a per square foot basis, including the cost of relocating existing tenants.[40]

Suburban office parks developed around 1980's have opportunities for redevelopment or adaptive reuse, as more companies and workers perceive them as obsolete in terms of amenities and design.[41] Many of these buildings are part of sprawling corporate campuses with lower heights/wider footprints than offices in the CBD; many are also occupied by large, single tenants. Some of these buildings can be attractive for residential redevelopment from a physical and financial standpoint if they offer access to operable windows and have floor plates with open floor plans that can be configured into residential units (or low enough height for an atrium lightwell). However, office parks were not designed with residential uses in mind and may lack attractiveness for residential use, particularly if nearby buildings continue to serve corporate functions. Many office parks have large parking lots and few retail options nearby. Research with developers suggests that "the inefficiency of low-density, suburban land use means that they can do better by starting over these days. Compare that to a dense, built-up area, where the existing office footprint is typically maxed out."[42]

What kind of units could office-to-residential conversion produce in the Metro area?

Downtown Portland could see a modest number of office-to-residential conversion units; well-calibrated policy initiatives could increase those opportunities.

Given the physical and financial feasibility challenges associated with office-to-residential conversions, Downtown Portland could see a handful of projects but is unlikely to see a large wave of office-to-residential conversions. The City of Portland's current incentives for SDC exemptions may help to incentivize some property owners to consider conversion projects in Downtown, but the cost of seismic retrofits associated with the program remain prohibitively high (even with the flexibility provided by the City).[43]

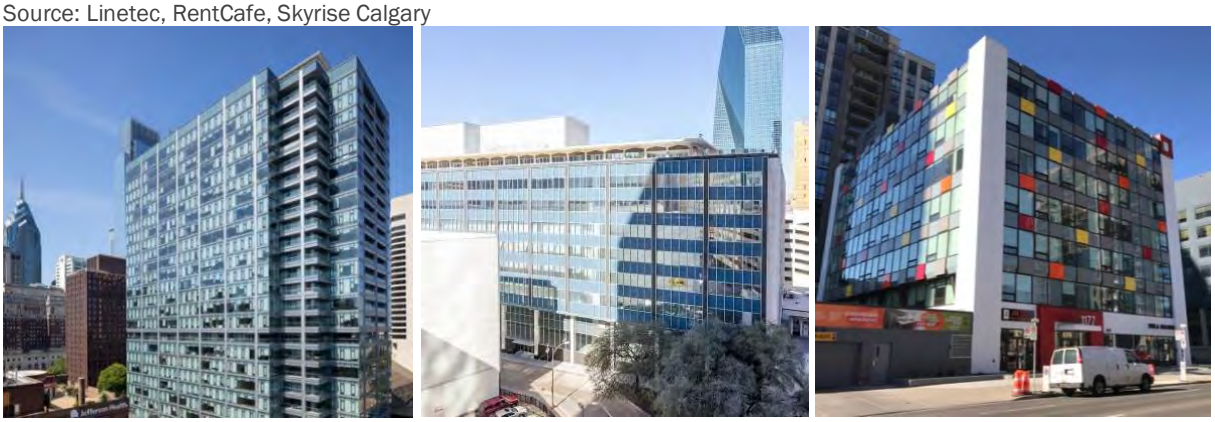
To understand the potential of office-to-residential conversion in the Portland Metro, this analysis uses successful examples in other cities to calculate (1) the average number of units produced by conversion projects and (2) the average gross square footage of building area per unit. Example conversions shown in Exhibit 4 have a wide range in the original building's characteristics, age, and location; all are within the central business district of their respective markets; and all were completed in the past decade.

[40] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[41] Dustin C. Read, "Profiles in the Evolution of Suburban Office Parks" (National Association for Industrial and Office Parks, August 2019).
[42] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Façade."
[43] Alex Zielinski, "Portland City Council approves incentives to help convert office buildings into apartments."

Exhibit 4. Example CBD Office-to-Residential Conversion Projects
Source: See individual citations

	508 West Apartments[44]	Franklin Tower[45]	Broadway Lofts[46]	Mayflower Apartments[47]	Lofts @ Centennial Yards South[48]	Stephenson Building[49]
Location	Spokane, WA	Philadelphia, PA	Los Angeles, CA	Dallas, TX	Atlanta, GA	Calgary, AB
Year Built	1964	1979	1906	1965	1908	1981
Year Converted	2022	2019	2014	2017	2021	2020
Building Gross SF	91,500	605,000	39,500	253,000	187,000	62,000
Units Produced	112	549	58	215	162	65
Gross Building SF/Unit	817	1,102	681	1,177	1,154	954
Rents	High-End	High-End	High-End	Mixed-Income	Mid-Market	Mid-Market

Exhibit 5. Example Projects (L to R: Franklin Tower, Mayflower Apartments, Stephenson Building)
Source: Linetec, RentCafe, Skyrise Calgary



On average across these examples, conversions yielded roughly one residential unit per 980 square feet of gross floor area in the existing office building, with a range from 681 to 1,177 square feet. Most of these examples include some amenities, including roof decks, lounges, fitness centers, pools, and bicycle rooms. These amenities are one way that the building can be configured to use space that is not suitable for conversion, while adding features that can help attract residents.[50] Given the type and size of office spaces that are most appropriate for conversion in the Portland Metro, variation exists depending on the original building:

[44] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade."
[45] Gensler, "Franklin Tower," n.d., https://www.gensler.com/projects/franklin-tower.
[46] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade."
[47] Ibid.
[48] Ibid.
[49] Ximena Gonzalez, "Calgary's Adventure in Office Conversion," The Globe and Mail, May 5, 2023, https://www.theglobeandmail.com/real-estate/article-calgarys-adventure-in-office-conversion/.
[50] Steven Paytner, "What We've Learned by Assessing More Than 300 Potential Office-to-Residential Conversions," Gensler, June 16, 2022, What We've Learned by Assessing More Than 300 Potential Office-to-Residential Conversions.

- **Quarter-block buildings** are typically older and meet the dimensions criteria described in Exhibit 3. This building type can be suitable for conversion projects on a case-by-case basis, yielding up to approximately 50 units per building depending on the efficiency of the layout, number of floors, and space dedicated to amenities. However, seismic retrofit requirements may make these more financially difficult to upgrade in line with Portland's standards.
- **Half-block buildings** include Downtown's medium-sized, mid-century offices which may be experiencing higher vacancy rates and could have some potential for conversion. Successful projects like these could yield between 100 to 200 units per building if an existing building has a shape that allows for more natural light. However, these buildings typically see challenges with floor plate and depend highly on the building's layout.
- **Large, modern full-block buildings** like those in Downtown Portland are difficult from a physical standpoint because of their large floorplates but are most likely to be financially feasible because they already comply with seismic retrofit requirements. These buildings could yield upwards of 300 units per building but would also likely face challenges with configuration and the location of building utilities.

Exhibit 6. Prototypical Building Configurations
Source: ECONorthwest analysis

	Quarter-Block	Half-Block	Full-Block
Building Square Footage	35,000-60,000 SF	150,000-250,000 SF	300,000-400,000 SF
Estimated Unit Yield (70-80% efficiency)	25-49 units	107-204 units	214-326 units

Suburban offices are less likely to see residential conversions that produce a measurable number of units.

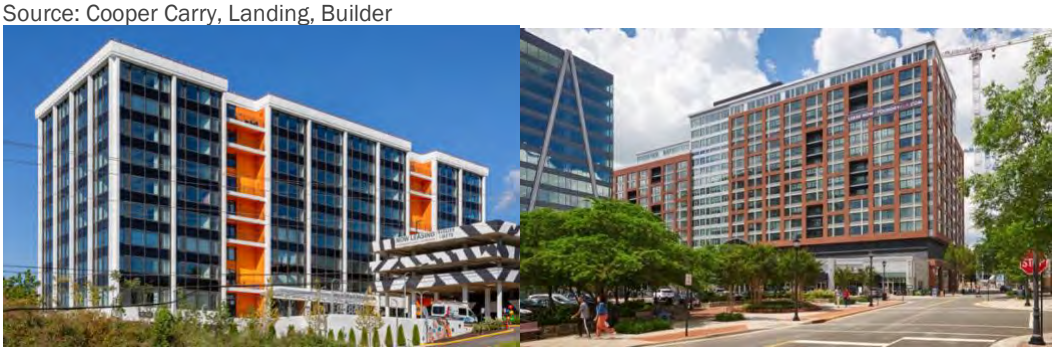
Given the lower vacancy rates in Portland's suburban office parks (particularly in Class B and C office spaces), it is unlikely that many office-to-residential conversion projects will take place in the suburban market. In this context, it may be more feasible to purchase underperforming offices as tear-down projects for new construction. If a suburban building had high vacancy rates, low rents, a physical layout suitable for conversion and it was in a desirable location (like near regional transit lines, a commercial hub, or higher education campus), and or standout historic/architectural character, conversion would be more likely.

Exhibit 7 shows some examples of office-to-residential conversion projects outside of central business districts, but these are primarily from larger east coast markets with different market dynamics and available building stock in suburban areas. The scale and context of these buildings and their surrounding markets do not reflect what is present or possible in most of Portland's suburbs. For example, the D.C./Maryland/Virginia suburban office market is not comparable with Portland's suburbs as it has 12+ story buildings, relatively high walk scores, and a large presence of national and international employers.

Exhibit 7. Example Suburban Office-to-Residential Conversion Projects
Source: National Multifamily Housing Council Research Foundation and Urban Land Institute

	The Foundry	Mission Lofts	Park + Ford
Location	Alexandria, VA	Falls Church, VA	Alexandria, VA
Year Built	1967	1968	1981
Year Converted	2020	2020	2021
Building Gross SF	660,000	178,000	450,000
Units Produced	520	156	435
Building Amenities	Yes	Yes	Yes
Gross Building SF/Unit	1,269	1,141	1,034
Rents	High-End	High-End	Mid-Market

Exhibit 8. Example Suburban Office-to-Residential Projects (L: The Foundry, R: Park + Ford)
Source: Cooper Carry, Landing, Builder



In some cases, conversion of office parking space to residential units has been successful in smaller cities and outside of major downtown areas (see Exhibit 9). However, these are typically either located near new public investments (such as trails/pedestrian improvements connecting to other commercial or mixed-use areas) or included components like ground floor retail.

Exhibit 9. Example Parking Conversion Projects
Source: Retrofit, UBC Sustainability Scholars Program, Urbanism Next

	508 West Apartments	Link Apartments	Broadway Autopark
Location	Spokane, WA	Charlotte, NC	Wichita, KS
Year Built	1964	1969	1949
Year Converted	2022	2020	2016
Parking Type	Structured	Surface	Structured
Building Gross SF	63,500 (building) 28,000 (garage)	555,000	55,000
Units Produced	85	533	44
Building Amenities	Yes	Yes	Yes
Gross Building SF/Unit	1,076	1,003	1,147
Rents	High-End	High-End	High-End

Example: Link Apartments (Charlotte NC)

The Link Apartments are located in Charlotte, North Carolina outside of the city's central business district. At the time of construction, the Little Sugar Creek greenway had recently been extended to the area (providing improved bike access) and another new renovation project nearby created a new anchor for dining and shopping within walking distance. In 2014, Grubb Properties purchased two old mid-century office buildings located in this developing area outside of Charlotte's downtown, including ten acres total of the two buildings and their large surface parking lots. In the following years, the developer first renovated the outdated offices into premium Class A spaces, and then repurposed the parking lots for new construction multifamily housing. The process involved rezoning the land for multifamily use and making a number of public realm improvements to sidewalks surrounding the buildings. The final project includes a shared parking garage to serve office and residential tenants.

Source: Grubb Properties

Without public incentives, most office-to-residential conversions are likely to be slightly below market rate apartments.

Office-to-residential conversions are different from new ground-up construction because their starting point is already a performing asset. Despite nationwide examples, office conversions in Portland are still seen by many property owners and developers a risky investment without many comparable examples or strong local industry expertise.[51] To be feasible and attractive to property owners and developers, these projects usually need to promise close to market rate rents or public incentives.

In some markets (particularly east coast cities), conversion projects can achieve top-of-the-market rents if they adapt historic buildings with distinctive features or offer high-rise units that are otherwise unavailable. Portland has availability of high-end purpose-built apartments with premium amenities and rents which suggests that converted units would face competition. Unless a building in Portland includes special, standout features or premium amenities, it will likely achieve only moderate rents (at or below 100 percent of area median income).

An analysis of office-to-residential conversion projects across the country found the median cost of conversion per unit was $255,000 (accounting for hard and soft costs), but costs vary widely and depend on the complexity of individual buildings.[52] In general, rents for converted units tend to track the market. While some examples show that converted units cost less than newly constructed units, local market factors, public incentives, and site-specific opportunities (such as historic tax credits) can have a large impact.[53]

[51] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[52] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade," 11.
[53] Macleans, "How this Calgary company is transforming empty offices into housing units" (December 2022) https://www.macleans.ca/society/how-this-calgary-company-is-transforming-empty-offices-into-housing-units/

Some jurisdictions are implementing affordability requirements with office-to-residential conversion incentives.

Within the Metro area, Portland is the only jurisdiction that currently offers incentives for office-to-residential conversions (SDC exemptions for some types of conversion projects).[54] However, the City of Portland's IH ordinance may apply for office-to-residential conversion projects that trigger the requirements (e.g., has at least 20 units). Jurisdictions across the Metro area have different regulations and incentives for affordable and mixed-income housing.

Financial incentives like tax abatements, local contributions, or SDC exemptions could help the financial feasibility of office-to-residential conversion projects that include affordable units. However, if the same incentives are also available for new construction projects that have less complexity and risk, they will likely be used for new buildings.[55]

Some jurisdictions throughout the country that are implementing public incentives for office-to-residential conversions are also including affordability requirements for a share of units (see Exhibit 10). However, this presents an extra financial hurdle. Since these are relatively new initiatives, most have not yet seen a significant number of new conversion projects completed. Chicago and Washington D.C. have begun to see hundreds of planned affordable units, the highest number coming from Chicago's program which proposes to contribute urban renewal funding to projects with affordable units. Public contributions can help to overcome financial feasibility hurdles and ensure that buildings transition to their highest and best use, but they require individual localities to allocate funds.

Exhibit 10. Office-to-Residential Conversion Incentives and Affordability Requirements
Source: Urban Redevelopment Authority of Pittsburgh, Urban Land Institute

Jurisdictions	Incentive	Affordability Requirements	Status/Units Produced or Planned
Pittsburgh, PA[56]	$60-100k/unit (depending on depth of affordability); <40% of total project costs	20% at 50 – 80% AMI	Program currently open for proposals
Washington, DC[57,58]	20-year property tax abatement	15% at 60% AMI in eligible area (min. 10 units in building)	1,100+ before incentive (projects with proposed affordable units upcoming)
Chicago, IL[59]	$188 million from tax increment financing	30% at 60% AMI	Proposals under review; Planned: 1,600+ units (600+ affordable)

[54] Ken Ray, "Portland City Council Adopts Two Ordinances to Assist in Office-To-Residential Conversions" (City of Portland Bureau of Development Services, March 17, 2023), https://www.portland.gov/bds/commercial-permitting/news/2023/3/17/portland-city-council-adopts-two-ordinances-assist-office.
[55] Connor Allen, "From Boardrooms to Bedrooms: The Challenge of Converting Vacant Office Space Into Housing," May 2, 2023, https://camoinassociates.com/resources/converting-vacant-office-space-into-housing/.
[56] Urban Redevelopment Authority of Pittsburgh, "Pittsburgh Downtown Conversion Program," accessed June 23, 2023, https://www.ura.org/pages/pittsburgh-downtown-conversion-program.
[57] Erica Williams, "Downtown Tax Abatement Tailor-Made for Developers at the Expense of DC Residents," DC Fiscal Policy Institute, April 21, 2023, https://www.dcfpi.org/all/downtown-tax-abatement-tailor-made-for-developers-at-the-expense-of-dc-residents/.
[58] Mimi Montgomery, "DC Area Leads the Way in Office-to-Apartment Conversions," *The Washingtonian*, November 14, 2022, https://www.washingtonian.com/2022/11/14/dc-area-leads-the-way-in-office-to-apartment-conversions/.
[59] Alby Gallun, "Converting Chicago Office to Mixed Use on LaSalle Street," Urban Land Institute, April 24, 2023, https://urbanland.uli.org/development-business/team-announced-for-lasalle-street-redesign/.

Partial building conversions could also be a more appealing option for building owners to add residential units to office buildings.

Although it would be less precise to estimate the potential number of units from partial conversions given the case-by-case nature of these projects, building owners and developers could explore partial rather than full building conversions. These projects may require a lower financial commitment than a full-building residential conversion. In downtown Portland, this could also be targeted to upper floors of larger office buildings where step-backs create smaller floorplates more suitable for residential units. In the suburban market, some developers could also pursue adding floors of residential to existing low-rise office buildings that have not yet maximized their allowed height and floor area ratios.

Adaptive reuse can help achieve climate goals.

The built environment is responsible for approximately 40 percent of global CO2 emissions, with new construction generating roughly 11 percent on its own.[60] Demolition is a large part of this equation, which the United States Environmental Protection Agency (EPA) estimates accounts for 90 percent of building debris, compared with only 10 percent from new construction.[61] In Portland, a 2019 report from the Oregon Department of Environmental Quality (DEQ) found that over 85 percent of materials were able to be salvaged from buildings that avoided demolition, significantly reducing carbon emissions, sequestering bioenergetic carbon in wood, and mitigating environmental pollution.[62]

Implications for Residential Capacity

Downtown Office Market

While it is difficult to predict the number of feasible conversion projects given the amount of public support estimated to be needed to make conversion feasible, it is **unlikely that more than a few downtown office buildings** would convert to residential use over the next 20 years. This could result in somewhere between **200 to 1,500 new units** depending on the number of successful projects, size of individual buildings, level of efficiency in using interior space, and unit mix.

Suburban Office Market

If a building in the suburban market with **high vacancy rates and low rents** were located near a **desirable location** (like regional transit lines or shopping centers) or with standout historic/architectural character, conversion could be likely. Likewise, underutilized parking space (either structured garages or surface lots) could have potential with a desirable location or new investments nearby.

[60] Architecture 2030, "Why the Built Environment?" 2018, https://architecture2030.org/why-the-building-sector/.
[61] US Environmental Protection Agency, "Advancing Sustainable Materials Management: 2018 Fact Sheet," December 2020, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management.
[62] Oregon Department of Environmental Quality, "Deconstruction vs. Demolition: An Evaluation of Carbon and Energy Impacts from Deconstructed Homes in the City of Portland" (Portland Bureau of Planning and Sustainability, March 2019), https://www.oregon.gov/deq/FilterDocs/DeconstructionReport.pdf.

If a building conversion were to happen with advantageous circumstances and a willing developer, the number of units produced would be highly dependent on the scale of the building. Based on example suburban office conversion projects in other places (including building and parking space conversions), in a larger building or parking lot, this could yield **up to 500 units** depending on the configuration of an individual property.

Total Potential Housing Capacity

Taken together, **the range of potential housing units that could result from office-to-residential conversion in the region could be between a few hundred units and roughly 2,000 units** over the next 20 years. Units would likely have mid-market rents unless the building had particularly desirable amenities or location that would lead to top-of-market rents.



Documentation of Predictive Development/Redevelopment Model

Prepared for Metro

June 2024

JOHNSON ECONOMICS

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I. INTRODUCTION

Metro contracted with Johnson Economics to develop a modeling tool to predict anticipated development and redevelopment activity. The model is designed from the perspective of a developer and is designed to generate a supply side response to key market parameters. At this time, the model is not dynamically matched with a demand side model, but demand limitations and input can be partially addressed with manual limitation functions incorporated into the model.

The following is a general overview of the model, assumptions utilized in the Urban Growth Report work, as well as instructions for use.

II. GENERAL MODEL OVERVIEW

The developer supply preprocessor model is designed to predict the magnitude and form of likely development or redevelopment activity over an assumed time frame. The primary metric used to predict likely development patterns is the relationship between the supportable residual land value for prospective entitled uses and the current value of the property (including land as well as improvements, if any). The underlying assumption is that when the value of a property for new development is high relative to the current value of the property, it will be more likely to see development or redevelopment over a defined period.

The model is designed to generate an estimated ratio between the current value of a parcel (land and improvements) and the underlying value of the parcel under potential development scenarios. This ratio is used as the primary indicator of the likelihood of development or redevelopment. Within the model, we use Real Market Value (RMV) from the assessors' office as a proxy for the value of the site. While we understand that this is an imperfect measure, it is readily available at the parcel level and any inherent bias is expected to be largely consistent. The residual land value is determined using a series of simplified pro formas that represent potential prototypical development forms. The resulting ratio between current and residual value has proven to be a strong predictor of the likelihood of development or redevelopment at the parcel level.

The model solves for a development solution that represents the highest and best use at the parcel level under the assumptions used, as well as outputting an associated residual property value. The highest and best use of each parcel is defined as the allowable land use program that yields the greatest return to the existing property, and the residual property value reflects the maximum acquisition value supported by that program under the assumptions used.

The model currently incorporates a total of 43 prototypical programs which cover a range of land use types and development forms. An entitlement screen narrows the allowed use types to reflect development forms entitled under existing zoning. In the model, this is done using a matrix that evaluates whether the theoretical programs are allowable under the range of zoning codes in the study area.

The probability of development/redevelopment activity is predicted by the model at the parcel level based on the ratio generated by dividing the current value (RMV) by the indicated residual land value. A shift in assumptions that increases the value of the property under a new development scenario, such as higher achievable pricing, will increase the denominator in this ratio as well as the likeliness of development or redevelopment. Sites with relatively high current values resulting from significant physical improvements will have a relatively high numerator and will be significantly less likely to redevelop.

The model evaluates the likelihood of development at the parcel level, although the results should be expressed publicly only in aggregated geographies. What the model solves for is probabilities to redevelop as well as anticipated development forms, and the results reflect the expected value of development/redevelopment activity. The model will not indicate that a specific parcel will or will not redevelop, it will change the probability of that occurrence as well as the likely form of development.

The following outline summarizes the data feeding into the model, as well as the general function of the model.

Data

Parcel Database

Assumptions

- Achievable Pricing by use type
  - Residential pricing gradient providing parcel specific solutions for rental and ownership units.
  - Commercial and industrial pricing by submarket, expressed in net annual lease rates per square foot.
- Capitalization Rates
  - Vary by use type.
- Threshold rates of return (targeted returns by development community)
- Construction Cost Estimates
- Assumed conversion rate by RMV/Residual ratio.

Entitlement screening matrix

Geographic screening columns

- Geographic submarkets for office, industrial, and retail markets

Parcel Level Data

- Select parcel from database.
- Populate assumptions.
  - Parcel ID
  - Site size (SF)
    - This should be net developable area, deducting slope and wetland.
  - RMV/SF
  - Pricing
    - Residential Pricing (lookup from gradient)
    - Remaining use types set pricing by market area.
  - Zoning (Metro simplified)
  - Current improvements expressed in residential units and/or square feet of commercial and industrial space.

Prototype Screening

- Determine prospective prototypes to run.
  - Screen by zoning designation and entitlement screen

Residual Land Value Calculations

- Run residual land value calculations for allowed prototypes.
- Determine highest and best use based on prototype supporting the greatest residual land value.
  - Establish preferred, as well as second and third options.

Residual land value represents the maximum supportable value and should not be confused with market clearing prices (which should be inherently lower).

Redevelopment Module

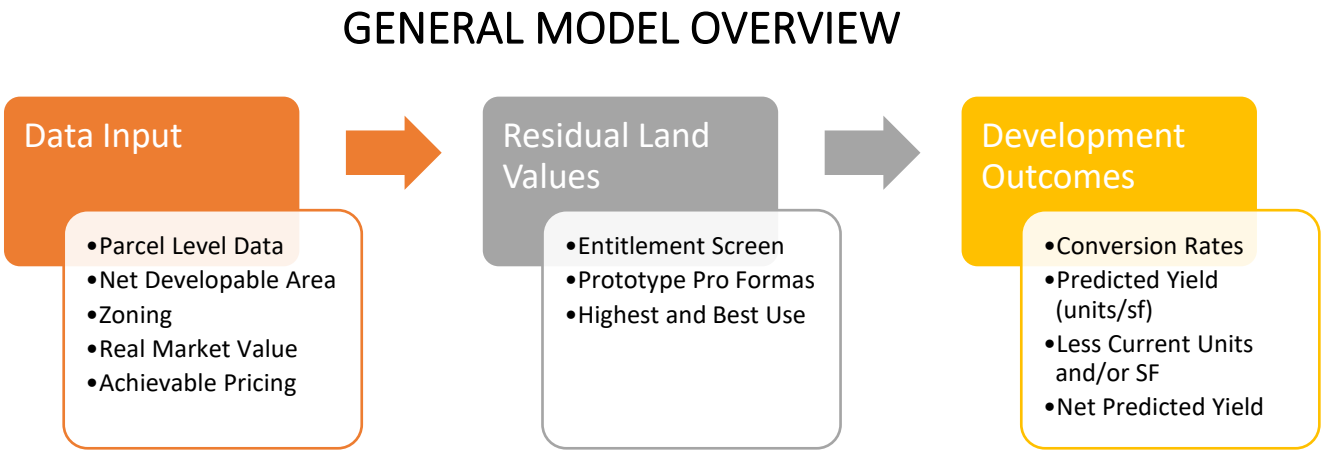
- Categorize parcels into bins based on RMV/Residual ratio and geographic code.
- Apply redevelopment probabilities.
- Predict expected development yield at parcel level.

Market Limit Parameters

- The model allows for demand limits to be placed on output based on a maximum solution for residential units by tenure, office space, retail space, and industrial space.
- The model will sort parcels by likelihood of redevelopment, and when the limit is met will shift the highest and best use determination to the next highest rated use.

Output

- Expected value of predicted development activity and yield within the designated time frame
- Expected value of deduction of current improvements
- Net incremental supportable development capacity
- Output data is printed into a .csv file, which can be imported into a GIS program for further output options.



The model's perspective is intended to mimic that of a developer's, and does not dynamically interact with the demand model. The model will have a tendency to identify a development prototype as highly viable, and this prototype will consistently out-bid alternative uses. The end result is a solution that is highly skewed towards a solution that is immediately viable under current market conditions. If the predicted development output is not consistent with market demand, we would expect the market to respond in ways that reduce the relative return of this product. The market limit parameters component of the model, part of the redevelopment module, is a feedback loop that limits prototype solutions to what can be suported from the demand side.

As an example the model may indicate that rental residential housing is the prevailing development form in most markets where allowed. This output needs to be evaluated in light of market support for this product type. If the model indicates a development output over the next five years of 70,000 new units, while projected demand for rental apartments is only 50,000 units, then the market would be expected to respond with some combination of higher vacancy rates, reduced lease rates, higher capitalization rates, and subsequently lower residual land values. The model in its current form cannot reset these variables dynamically, so we have included the market limit parameters to place demand side limits on the projected development yields. Conversely, if the development is underproducing a product that is demanded we would expect price signals to increase production of that product. A future refinement of this approach would mesh a demand-side model to this model (supply side), allowing for dynamic markt responses to production/demand mismatches.

The model populates a series of fields at the parcel level, which are added to the parcel attributes input from the baseline RLIS/GIS information and input assumptions such as market parameters, financing terms, and construction costs. The highest and best use calculations generate up to three highest and best solutions for each site, as well as the indicated residual land value associatd with each of these uses. The development prediction component of the

model sets an assumed conversion rate during the time period based on the RMV/Residual ratio, and well as the predicted yield.

In summary, the model uses the relationship between current value of the property and the indicated value of the property under the highest and best use development prototype as the primary predictive measure of the likelihood of redevelopment.

III. DATA

The model has a series of data requirements in order to run, and this section outlines the sources for this data as well as the processes required to get the data in a format that suports the model.

A. PARCEL DATABASE

The data requirements at the parcel level are relatively simple. This includes physical data such as net developable area, current real market value (RMV), zoning (Metro's simplified zoning), and parcel reference numbers. The parcel database is further refined to include market information. For residential uses, the model uses parcel-specific pricing data, which has been imported to the parcel database to populate the achievable pricing field for these uses. For retail, office, and industrial uses, the parcels are allocated into defined market areas, and assumed achievable pricing is set at the market level and imported into the parcel database for these uses. The parcel database also includes fields to account for current residential units as well as estimated square footage of commerical and industrial space.

The following is a list of the necessary content.

HEADER	CONTENT DESCRIPTION
reference	Tax lot ID
code	Generalized Metro code
code_general	Generalized code category
tract	Census tract
design type	Metro 2040 design type
vac_dev	Current development status
jurisdiction	Jurisdiction
rmv	Total RMV, land and improvements
net_no_row	Net developable area, deducting constraints and ROW
sf	Current sf of improvements
res_rent	Achievable residential rent psf
res_price	Achievable residential price psf
off_rent	Achievable rent psf for office
ret_rent	Achievable rent psf for retail
wd_rent	Achievable rent psf warehouse/distribution
flex_rent	Achievable rent psf industrial flex space
park_rent	Monthly rent for covered and secured parking
park_own	Value of covered and secured parking space
units	Current residential units

The model utilizes a generalized zoning code used by Metro. The codes of individual jurisdictions are converted into this generalized code using a bridge. This approach is required to keep the number of codes manageable at the

metropolitan area leve but may not capture specific elements of a jurisdictions's development code. If used for a single jurisdiction or smaller study area, the actual codes could be used. This would require some minor customization.

The model requires an assumption of achievable pricing levels per square foot for residential uses at the parcel level. For the analysis completed in support of the Urban Growth Report these numbers were generated through the development of residential pricing surfaces, which allow for variation in pricing on the parcel level throughout the region. This variable does not require this level of analysis for all applications and can be generated using market areas and or single assumptions for smaller geographic areas.

The following is a summary of the methodology utilized to create the pricing surfaces.

B. Creating Residential Pricing Surfaces

The residential pricing at the site level was generated using the interpolated rental and ownership pricing surface developed in 2016, with the methodology summarized in Appendix A.

The residential pricing surfaces were adjusted upwards based on marginal shifts in rental and ownership residential pricing since the creation of the surfaces in 2016. Rental residential pricing was adjusted based on observed changes in same product pricing from 2016 through 2023 as reported by CoStar, a third-party data provider tracking a significant pool of rental apartment projects. The 2016 gradient was shifted to match the marginal change in rents during that period. The following is a summary of the approach and adjustments.

- Methodological Approach
  - Matched Pair Pricing
    - Observed current quoted pricing for new projects matched against those predicted in the model.
    - Used CoStar quoted rents for new construction and parcel level model predictions.
- Overall Median Market Shift of 111%
- Sharp Split Between Central PDX and Suburban Markets
  - Urban area rents averaged 123% of predicted.
    - Reduced marketability of many areas
    - Elevated vacancy levels in urban areas since 2017
  - Outside of Central PDX the pricing changes were generally consistent at roughly 150% of previously predicted.
    - Some market saw greater increase (Milwaukie)

Ownership pricing was adjusted based on observed sales of new product relative to the predicted achievable pricing in the 2016 gradients. This analysis indicated an overall upward shift in pricing of 11%, with pricing in the suburbs increasing 31% while those in central Portland decreased 10%. The pricing was further adjusted for several specific communities that have seen more significant pricing changes during this period.

ADJUSTMENTS TO PRICING

Overall Metro	
Median	111%
Average	112%
Central PDX	
Median	90%
Average	92%
Suburbs	
Median	131%
Average	127%

- Methodological Approach
  - Matched Pair Pricing
    - Observed last quarter new home sales matched against predicted in model.
    - Used recorded RMLS sales data and parcel level model predictions.
- Overall Median Market Shift of 111%
- Sharp Split Between Central PDX and Eastside/Suburban Markets
  - Likely reflects reduced marketability of urban area as well as interest in condominiums.

    - Outside of Central PDX the pricing changes were largely consistent.
- Final Adjusted Gradient split adjustment

The final pricing gradients were merged with the parcel level data for use in the model.

C. Office, Industrial, and Retail Pricing Analysis

In addition to the normalization of apartment rental data, the model requires lease rate assumptions for office, retail, and industrial properties. These assumptions were created using a submarket approach. Rent levels were adjusted to reflect triple-net (NNN) rents, i.e., rents in which ancillary costs are not factored.

The submarket approach can capture the differences in achievable lease rates throughout the Metro area but is not able to pick up the differences that exist on a more micro level. As residential pricing can differ substantially within a short distance, so, too, can rents for office, industrial, and retail properties, though not, perhaps, to the same extent as their prices are generally more homogenized across broader areas.

The following tables summarize the assumed pricing for the delineated submarkets for office, retail, and industrial uses.

Submarkets and Assumed Achievable Pricing, NNN Lease Rates

	Office	Retail
217 Corridor Beaverton	$28.00	$33.60
CBD	$32.00	$43.20
Close-In NE	$27.00	$33.60
Close-In SE	$29.00	$38.40
Close-in SW	$25.00	$36.00
Columbia Corridor	$23.00	$24.00
Cornelius Forest Grove	$19.00	$22.80
East-Mid	$24.00	$28.80
	$24.00	$28.80
I-5 South Corridor	$23.00	$28.80
Kruse Way	$26.00	$36.00
Milwaukie and Clackamas	$23.00	$26.40
Northwest	$28.00	$36.00
Outer NW	$19.00	$21.60
Outer SE	$20.00	$24.00
Sellwood-Westmoreland-Woodstock	$26.00	$31.20
Sunset Corridor	$22.00	$30.00

WD/Flex	W/D	Flex
217 Corridor Beaverton	$9.80	$19.60
CBD/NW/Guilds Lake	$13.30	$26.60
Milwaukie and Clackamas	$9.80	$19.60
Close-In Eastside	$17.50	$35.00
Cornelius Forest Grove	$6.30	$12.60
Hayden Island	$8.40	$16.80
I-5 South Corridor	$9.10	$18.20
Columbia Corridor	$9.10	$18.20
Outer SE	$10.50	$21.00
Rivergate	$7.00	$14.00
Sunset Corridor	$9.10	$18.20
Close-in SW	$11.90	$23.80
Swan Island	$8.40	$16.80

D. Use of Generated Achievable Pricing Assumptions

The pricing assumptions for residential, commercial, and industrial space were used to populate the parcel database that is fed into the model (parcel.csv file). Each parcel evaluated is assigned an achievable pricing parameter based on the preceding work, which then feeds into the prototype pro formas to generate associated supportable residual land values.

IV. ESTIMATION OF REDEVELOPMENT PROBABILITIES/BACKCASTING

A key variable in estimating the likelihood of development/redevelopment activity is the assumed probability of development/redevelopment within a time frame. This factor is expected to vary by region and was established within the modeling framework using a backcasting exercise. This exercise was deemed necessary to calibrate the model by means of predicting development over an extended period and comparing that predicted level of development to *actual* observed rates of development. This approach was used for two time periods. The first of these was 2000 through 2015, with that analysis completed in 2017. A second analysis was completed for activity between 2015 and 2021. The two periods reflect several business cycles with significant recessions.

The approach used the modeling framework previously outlined to determine the RMV/residual value calculations at the parcel level in 2015, and then matched observed development activity at the parcel level through 2022. Market and financial variables used in the model were based on 2015 data provided by Johnson Economics, while construction activity was based on data collected by Metro. The modeling was done on five major zoning designations:

- Multifamily Residential
- Mixed-Use
- Single Family Residential
- Commercial
- Industrial

Parcel and pricing data at the parcel level was available from the 2017 analysis. Sites were aggregated based into five categories of RMV/Residual ratios:

- Less than 0.75
- 0.75 to 1.25
- 1.25 to 2.00
- 2.00 to 4.00
- Greater than 4.00

Over 178,000 parcels were evaluated, of which over 127,000 were single family residential, almost 30,000 multi-family, 16,700 mixed-use, 1,278 commercial, and over 3,400 industrial.

Calculation of Development/Redevelopment Conversion Rates

The observed development activity was matched with the parcels by RMV/Residual ratio, providing for an observed development/redevelopment rate by category. As summarized in the following table, the overall rate of development/redevelopment over the 6-year observation period was 2.58% of parcels, with the rate of redevelopment sharply higher on parcels with a low RMV/Redevelopment ratio. This is consistent with the expectations that parcels with a lower current value relative to the parcel's residual value would be expected to redevelop at a significantly higher rate. It should be noted that this category includes vacant land. The redevelopment rate when adjusted for acreage increases to 7.05%, reflecting a higher likelihood of redevelopment on larger parcels. This likely includes the inclusion of a number of larger vacant sites.

The resulting pattern of observed development relative to the RMV/Residual ratio was largely consistent with expectations. One notable exception was a higher observed rate of redevelopment for industrial properties with a ratio of .75-1.25. A potential explanation for this is shifting needs of industrial tenants necessitating significant investments in already improved properties.

The following figures summarize the observed rate of development/redevelopment, sorted by RMV/Residual ratio and broad land use category.

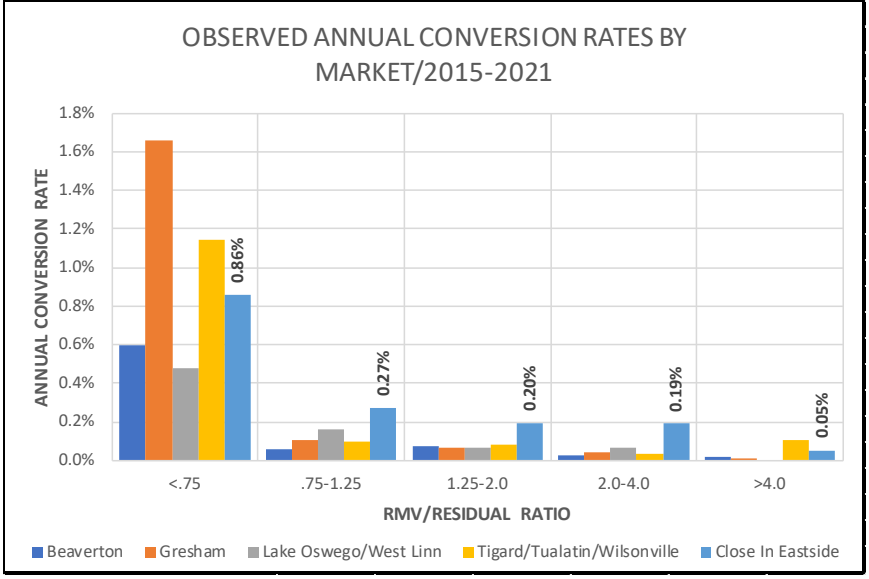
SUMMARY OF OBSERVED DEVELOPMENT RATE BY RMV/RESIDUAL RATIO, 2015-2021

	RMV/Residual Ratio					
	<.75	.75-1.25	1.25-2.0	2.0-4.0	>4.0	Total
TOTAL						
Total Parcels	78,222	50,505	24,751	12,697	12,302	178,477
Developed Parcels	3,879	509	135	48	26	4,597
% Developed	4.96%	1.01%	0.55%	0.38%	0.21%	2.58%
Total Acres	23,600	7,239	4,378	1,944	485	37,647
Developed Acres	2,371	199	47	34	4	2,654
% Developed	10.04%	2.74%	1.08%	1.73%	0.74%	7.05%
MFR						
Total Parcels	9,630	3,349	5,122	5,702	5,877	29,680
Developed Parcels	491	28	13	4	12	548
% Developed	5.10%	0.84%	0.25%	0.07%	0.20%	1.85%
Total Acres	1,484.0	481.6	486.0	195.5	96.4	2,743.5
Developed Acres	153.6	10.8	9.2	3.5	0.1	177.3
% Developed	10.35%	2.24%	1.89%	1.79%	0.12%	6.46%
MUR						
Total Parcels	6,693	2,315	1,509	1,906	4,318	16,741
Developed Parcels	729	117	52	13	10	921
% Developed	10.89%	5.05%	3.45%	0.68%	0.23%	5.50%
Total Acres	2,267.6	597.9	401.1	375.4	181.0	3,823.0
Developed Acres	367.7	29.1	23.9	10.0	0.9	431.5
% Developed	16.21%	4.87%	5.97%	2.65%	0.48%	11.29%
SFR						
Total Parcels	60,470	44,054	17,342	3,881	1,581	127,328
Developed Parcels	2,571	318	50	11	0	2,950
% Developed	4.25%	0.72%	0.29%	0.28%	0.00%	2.32%
Total Acres	16,680.9	5,325.1	2,403.5	423.6	27.8	24,861.0
Developed Acres	1,468.2	72.1	6.3	2.0	0.0	1,548.6
% Developed	8.80%	1.35%	0.26%	0.47%	0.00%	6.23%
COM						
Total Parcels	242	198	271	324	241	1,276
Developed Parcels	11	2	3	5	4	25
% Developed	4.55%	1.01%	1.11%	1.54%	1.66%	1.96%
Total Acres	416.7	128.0	245.2	367.6	97.2	1,254.7
Developed Acres	35.0	0.7	0.8	10.8	2.6	49.9
% Developed	8.40%	0.53%	0.34%	2.93%	2.69%	3.98%
IND						
Total Parcels	1,187	589	507	884	285	3,452
Developed Parcels	77	44	17	15	0	153
% Developed	6.49%	7.47%	3.35%	1.70%	0.00%	4.43%
Total Acres	2,751.1	706.5	842.5	581.9	82.3	4,964.5
Developed Acres	346.0	85.9	7.0	7.4	0.0	446.3
% Developed	12.58%	12.15%	0.83%	1.28%	0.00%	8.99%

The analysis was converted into an average annual conversion rate (% of parcels developed) for the period. The following tables summarize the results by selected jurisdictions and use categories.

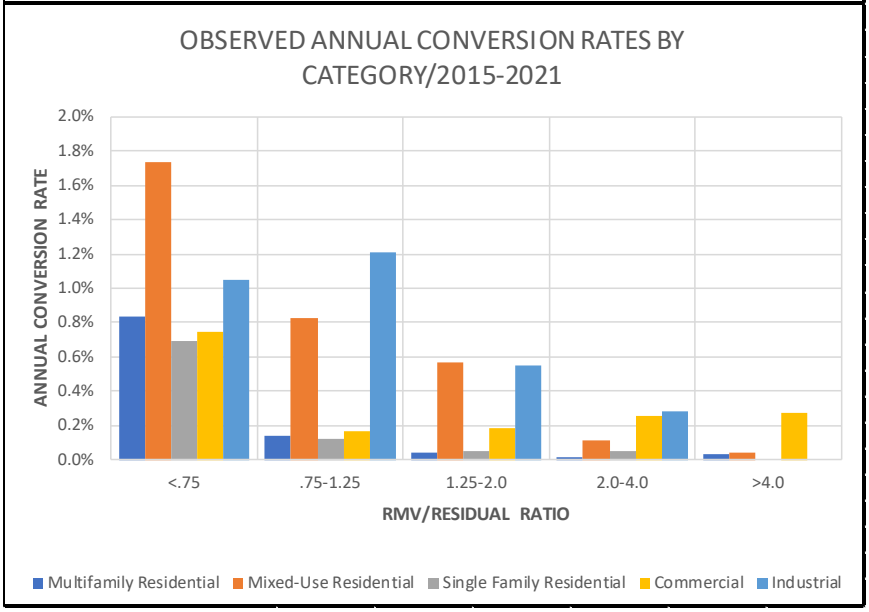
SUMMARY OF ANNUAL CONVERSION RATES BY RMV/RESIDUAL RATIO AND JURISDICTION, 2015-2021

	RMV/Residual Ratio					
	<.75	.75-1.25	1.25-2.0	2.0-4.0	>4.0	Total
Beaverton	0.60%	0.06%	0.07%	0.02%	0.02%	0.14%
Gresham	1.66%	0.11%	0.07%	0.04%	0.01%	0.29%
Lake Oswego/West Linn	0.48%	0.16%	0.07%	0.07%	0.00%	0.33%
Tigard/Tualatin/Wilsonville	1.14%	0.09%	0.08%	0.04%	0.10%	0.40%
Close In Eastside	0.86%	0.27%	0.20%	0.19%	0.05%	0.62%
OVERALL	0.83%	0.17%	0.09%	0.06%	0.04%	0.43%



SUMMARY OF ANNUAL CONVERSION RATES BY RMV/RESIDUAL RATIO AND LAND USE CATEGORY, 2015-2021

	RMV/Residual Ratio					
	<.75	.75-1.25	1.25-2.0	2.0-4.0	>4.0	Total
Multifamily Residential	0.83%	0.14%	0.04%	0.01%	0.03%	0.31%
Mixed-Use Residential	1.74%	0.83%	0.57%	0.11%	0.04%	0.90%
Single Family Residential	0.70%	0.12%	0.05%	0.05%	0.00%	0.38%
Commercial	0.74%	0.17%	0.18%	0.26%	0.27%	0.32%
Industrial	1.05%	1.21%	0.55%	0.28%	0.00%	0.73%
OVERALL	0.83%	0.17%	0.09%	0.06%	0.04%	0.43%



The results of this analysis were joined with those of the preceding analysis to assess average redevelopment rates from 2000 through 2021. The combined annual conversion rates by RMV/Residual ratio for the period was as follows:

RMV/Residual Ratio	< 0.75	0.75-1.25	1.25-2.00	2.01-4.00	> 4.00
Annual Conversion Rate	0.964%	0.43%	0.16%	0.054%	0.054%

While the preceding methodology provides for a range of assumptions that are empirically derived, ongoing use of the model will ongoing data to update these assumptions in subsequent periods. When the model is run, it generates indicated RMV/Residual ratios at the parcel level for each parcel evaluated. This datafile should be dated and preserved. Metro currently tracks marginal development activity at the parcel level, which can be matched to the parcels evaluated with the model. Over time, an updated conversion ratio can be generated based on observed redevelopment patterns. This should be added to the base layer over time, modifying the results. Ideally the backcasting will include a rolling period of fifteen to twenty years, allowing for multiple business cycles. The rate and pattern of redevelopment varies significantly within a business cycle, and short-term patterns may not be indicative of what should be used for a longer-term forecast.

The model should continue to be refined going forward, and ongoing monitoring and backcasting of the model should increase its reliability.

V. PROTOTYPE SCREENING

The prototypes evaluated on individual parcels were limited based on entitlements. Current simplified zoning designations used by Metro and available for all parcels within the UGB were used. A matrix of allowed prototypes by zoning designation was used, which limits prototypes considered to those that are consistent with current entitlements.

The model is structured to evaluate a total of 43 prototypical development programs, covering a range of land use categories as well as construction types. The general use types evaluated include office, retail, industrial, rental residential, and ownership residential. These are modeled using simplified pro formas, which are designed to yield supportable residual property values associated with the development of each of the programs under the assumptions used.

The following are the basic program parameters of the prototypes used. The prototypical development programs are listed across the top, with assumptions for each listed in the column below:

SUMMARY OF DEVELOPMENT PROTOTYPES

	FAR	Efficiency Ratio	Parking Per 1,000	% Structured
INDUSTRIAL				
Warehouse / Distribution	0.33	100%	1.00	0%
Fullfillment Center	0.25	100%	3.50	0%
Data Center	0.33	100%	0.40	0%
Manufacturing	0.25	100%	3.00	0%
Multi-Tenant Flex	0.28	100%	1.00	0%
OFFICE				
Office high rise	7.50	90%	1.50	100%
Office mid/struc	3.75	90%	1.50	100%
Office mid / ext. struc	2.00	90%	1.50	85%
Office mid/surf	0.50	90%	1.50	0%
Office high rise - CC	7.50	90%	0.50	100%
Office mid/struc - CC	3.75	90%	0.50	85%
Office mid / ext. struc - CC	2.00	90%	0.50	85%
Office high rise - LP	7.50	90%	1.00	100%
Office mid/struc - LP	3.75	90%	1.00	100%
Office mid / ext. struc - LP	2.00	90%	1.00	85%
Office mid/surf - LP	0.50	90%	1.00	0%
Office low rise	0.30	100%	1.50	0%
RETAIL				
Multi-Story Structured	1.00	90%	3.50	85%
Single Story Structured	0.50	100%	3.50	85%
Single Story Surface	0.30	100%	3.50	0%

	Units/ Acre	Unit Size (SF)	Efficiency Ratio	Parking Ratio	% Structured
RENTAL RESIDENTIAL					
Rental high rise	400.0	725	85%	1.00	100%
Rental Mid Rise w/ Garage	225.0	750	85%	1.00	100%
Rental 5 over 2	225.0	750	85%	1.25	100%
Rental 4 over 1	170.0	750	85%	0.75	100%
Rental high rise-IZ	400.0	725	85%	0.25	100%
Rental Mid Rise w/ Garage - IZ	225.0	750	85%	0.25	100%
Rental 5 over 2 - IZ	225.0	750	85%	1.25	100%
Rental 4 over 1 - IZ	170.0	750	85%	0.75	100%
Rental 5-story wood w/surf	90.0	750	85%	1.25	0%
Rental 4-story wood w/zero	120.0	750	85%	0.00	0%
3-story garden w/surf	35.0	750	100%	1.50	0%
Rental Plexes	16.0	750	100%	1.25	50%
Rental 3-story Townhome	20.0	1,000	100%	1.50	50%
Rental_Middle_TypeV	16.0	750	100%	1.25	50%
OWNERSHIP RESIDENTIAL					
Condo residential high rise	400.0	775	83%	1.50	100%
Condo Mid Rise w/ Garage	250.0	775	83%	1.50	100%
Condo 5 over 2	210.0	775	85%	1.50	100%
Condo 4 over 1	170.0	775	85%	1.00	100%
Condo 3-story wood w/surf	35.0	800	100%	2.00	0%
3-story wood townhome	22.0	1,250	100%	2.00	50%
For-Sale Duplexes	16.0	1,250	100%	2.00	50%
Small Lot Detached	18.0	1,750	100%	2.00	50%
Detached Single Family	8.7	2,800	100%	2.00	50%

The 43 prototypes were cross referenced with Metro's 54 simplified zoning codes, enabling the model to determine which prototypes are entitled at the site level.

The prototype models are reliant upon a series of assumptions, many of which are highly variable over time. One of the key determinants of residual land value is the capitalization rate. This rate is a real estate valuation measure and is calculated as the ratio between the net operating income produced by an asset and the market value. As an example, an asset with an annual net income stream of $100,000 per year would be worth $1,000,000 if the capitalization rate was 10%, or $2,000,000 if the capitalization rate was 5%. The lower the rate, the lower the rate of return an investor will accept to hold that asset. The rate fluctuates based on the perceived risk in the asset class, as well as alternative available returns. Construction costs are also highly variable and are more difficult to establish.

For both capitalization rates and construction costs, we would recommend that periodic updates revise the assumptions based on a survey of local brokers and general contractors. A simple matrix of cost assumptions corresponding to the data included in the model could be circulated to update assumptions. As the model is intended for use in a regional forecasting context, with a forecasts period of decades, there is little input that these groups will likely be able to offer in terms of long-term assumptions. Setting the capitalization rate at a risk premium vis-à-vis a commonly forecasted variable such as treasury rates would allow for setting assumptions in out years.

Additional Comments

- The model does not address brownfield redevelopment, or other unusual site costs and infrastructure requirements to develop properties. While we recognize that these are important considerations, it is not within the scope to generate this specificity of analysis. There is a high level of uncertainty and wide cost variances, and it would require significant effort to refine these assumptions at the regional level. We would suggest that the results of the model be open to the input of jurisdictions and/or interested parties that either have or can generate information pertinent to specific properties.

- The model does not reflect any interaction to influence development outcomes. Market interventions such as active public investment to offset costs, property tax abatements, new market tax credits, and low-income housing tax credits can substantively impact development viability. As with brownfield and unusual site-specific costs, jurisdictions could be allowed the opportunity to provide additional information that can refine the output of the model.

VI. Residual Land Value Calculations

A series of simplified pro forma models are used to calculate supportable residual land values. These models incorporate the assumptions on cost, revenue, operating costs, and return parameters. The models are static and the unleveraged return on cost is used as the measure to establish supportable residual values. For income property types we use the net operating income (NOI) in the first stabilized year of occupancy, while ownership residential uses a return on cost after sales costs.

The model is structured to evaluate the allowed prototypical development programs, based on the market assumptions provided. These are modeled using highly simplified pro formas, which are designed to yield supportable residual property values associated with the development of each of the programs under the assumptions used. The output of the pro formas is evaluated and a highest and best use determination is made for each parcel. The full pro formas using a hypothetical set of assumptions is included in the appendix.

The pro formas for each of the land use types reflects a relationship between achievable pricing, development form, and indicated residual land values. The construction types vary in cost as well as yield, with construction types with high yields in terms of density typically being costlier to construct. In markets in which pricing is adequate to support higher density development forms, these forms will be able to outbid lower intensity development solutions for land. The residual land value in the model is a function of achievable pricing and yield by prototype, with the prototype that supports the highest residual land value representing the “highest and best use” of the property.

A total of up to three highest and best use solutions is derived for every parcel. The second and third alternatives will support lower residual land values, and therefore not represent the highest and best use in an unconstrained situation, there are instances in which the demand side of the equation will preclude the initial indicated use type.

Additional details on the pro forma models are included in Appendix B.

VII. REDEVELOPMENT PREDICTIONS

The highest and best use determination is reconciled with information specific to the study area to generate a prediction of new development activity. As outlined previously, each parcel is assumed to have a higher probability to develop or redevelop under the indicated highest and best use program when the market value of the property in its current use is close to or below the supportable residual property value.

The ratio generated by dividing the RMV/SF by the residual value per square foot is used as an indicator of a parcel's likelihood of development. The model sets expected values of development at a parcel level, as opposed to specific predictions. The output is best viewed at an aggregated level, as individual parcel information will reflect only a shift in development probability and the resulting expected value of development.

Individual parcels are evaluated based on their RMV/Residual ratio, as well as their indicated highest and best use development prototype. The model applies the development/redevelopment rates derived from the backcasting exercise summarized earlier and produces an expected value of development from these sites.

Market Limit Feedback

The previous steps in the model will solve for a highest and best use solution that is not limited by market demand. To the extent that the highest and best use solution delivers product in a quantity that is above what the market demands, then we would expect that market forces would shift in a way that reduces the yield for that development type. This would then reduce indicated residual land values, as the highest and best use would then shift to a prototype that supports less in terms of value.

The model allows the user to place limits on the predicted development output by major land use type. For each parcel, the model will output the highest and best use determination and associated indicated residual value, as well as a second and third option. These will be determined in the same manner as the initial highest and best use determination but will be restricted to a separate broad land use category. The following are the broad categories that output will be limited at:

- Industrial
- Office
- Residential Ownership
- Residential Rental
- Retail

The model has a cascading function which works as follows if limits are set:

- All the prototypes are calculated per parcel.
- The resulting rows are sorted descending by residual property value per square foot.
- Starting with the prototype that yielded the highest residual property value per square foot and working down, each prototype is compared to the limit if it is set for that prototype class.
    - Residential limits are expressed in number of units.
    - Commercial/Industrial limits are expressed in square feet.
- If the limit has not been reached, the row is preserved, and the counter is incremented.

- If the limit has been reached, the row is not included in the output file, and all remaining highest and best use solutions for that parcel are promoted. I.E the previous #2 use will be the new #1 use.

Conversion to Net

The model is designed to predict anticipated development/redevelopment activity. For the Urban Growth Report (UGR), it is necessary to convert this activity to net gain in capacity. The calculation to do this is a simple deduction of current capacity, expressed in terms of residential units, office, retail, and industrial space. The estimates of current capacity are developed in the baseline data file fed into the model.

An example of a net conversion would be redevelopment of a current single-family home into a tri-plex unit. The new development of three units would replace a single unit, yielding a net gain of two units.

Redevelopment of parcels does not always yield a net increase in capacity, as new development is not always at a higher intensity than previous development. This is primarily true for use types such as industrial space, with new development often having similar or lower floor area ratios (FAR) relative to existing development. As a result, the model may predict redevelopment of industrial property, which would yield development that is more marketable, but not necessarily representing a net increase in industrial space.

APPENDIX A: PRICING GRADIENT METHODOLOGY DETAILS

The following documentation is from a 2017 study[1] prepared for Metro.

A. CREATING AN INTERPOLATED RENTAL SURFACE FROM RAINMAKER AND AXIOMETRICS APARTMENT RENTAL DATA

Purpose

Johnson Economics has set forth to generate a map showcasing existing rents throughout the Metro area. Whereas previous versions of this analysis divided the Metro area into areas with set rental prices based on surveyed properties, this analysis would use interpolation methods in GIS software to set the rental prices at the tax lot level.

Obtain rental data

Before this project started, Johnson Economics had created an interpolated rental grid for use in other projects. To collect data, Johnson Economics surveys rental properties by using apartment complex websites and calling the complexes and talking to leasing agents directly. By obtaining rents, square footage and, most importantly, the number of each type of floor plan (sometimes given actual rental rolls), we can calculate accurate blended per-square-foot rental averages for the complexes. Though the process is more time consuming up front than, say, data obtained by web scraping, the data obtained is of very high quality, which makes interpolation of the rents after this collection very straightforward after normalization.

Metro provided Johnson Economics with two different rental data sets: Rainmaker and Axiometrics. Rainmaker is a web-scraping tool that searches apartment sites and other listing sites such as Craigslist for rents. Axiometrics is a survey-based panel that contains information on just under 400 different properties in the Oregon Metro area.

Cleaning of Rainmaker Data

The Rainmaker data consists of over 1.6 million observations from mid-2011 to mid-2016. Though large in number, the data is chaotic and includes several issues that need to be addressed. Though rents and square footage are included in the data, it is not possible to discern the number of each type of unit in each complex, making the previous method of attaining blended averages moot. Further complicating the issue is that individual properties have a wide range of observations, ranging from 1 to over 1,900. While we could evenly spread surveys geographically in our original interpolation method, this clustering of data presents problems. Using the data as is would mean not using apples-to-apples comparisons.

Johnson Economics and Metro communicated on several occasions to determine how best to move forward with this issue. The first idea was to round rents to the nearest $10 to $50 to see if that would make a difference. It was then suggested to just take averages for each complex, which makes some sense on the surface. However, upon further reflection, this proved to not be the correct way to proceed. In the Rainmaker data, we are presented with one rent per floor plan, not for an individual unit (at least, not in complexes; single family housing units in this data were another matter altogether). As such, we may see rents for one studio plan, two different one bedroom, and two different two bedrooms. Averaging them would, clearly, be better than not. However, it would also be misleading. What if, for instance, the above imagined complex had 40% of its units as studios? If that is the case, then the PSF averages calculated without that knowledge would vastly underestimate the PSF averages for that building.

Johnson Economics thus decided that the best course of action was to aggregate rents into larger areas. Aggregation was first tried at the census block group level, but that quickly proved too small for this analysis. Instead, aggregation by neighborhoods as defined in the Oregon Metro Regional Land Information System (RLIS) was determined to be the best course of action. While not perfect, the resulting numbers better reflect potential unit mixes in the areas and begin to give a better reflection of underlying rents in the Metro area. As will become clear in the following section, the Axiometrics data is much more streamlined and avoids many of these pitfalls.

[1] Johnson Economics, Developer Supply Preprocessor Documentation, Metro, December 2017

Before processing the data in Stata, it is necessary to preprocess the data using GIS. The CSV of the Rainmaker data is loaded into QGIS. The data expands beyond the boundaries of Oregon Metro proper, crossing the Columbia River and including such areas as Vancouver, Washington. These outlying areas are excluded by clipping the data with the Metro area's geographical boundaries. The data is then intersected with the Metro neighborhood and tax lot layers. By using the tax lot layer, we can join Metro's affordable housing layer for use in cleaning the data. The data is then exported into a new csv file.

The Rainmaker data we obtained from Metro had already been cleaned before it was given to Johnson Economics. Metro removed over 80% of the observations, reducing the final count to just over 300,000 from more than 1.6 million. The removed observations were deemed to be duplicates in the data after accounting for address, list year/quarter, bedrooms, and price. Square footage was not considered in this process as many of the Rainmaker observations were missing this variable.

Square footage, however, is an essential piece of this analysis. Because of this, one of the first steps in the cleaning process is to remove any listings without this information. After removing these, the next step in the cleaning process is to look at the rental types. Rainmaker classifies observations into several different categories, including apartments, single family residences, mobile homes, condominiums, and time-depended units such as executive suites. For our purposes, we wanted to whittle these categories down to apartments only.

Upon close inspection of the data, however, there are many instances where categories do not match the notes in the observation. For instance, there are quite a few instances where well known apartment complexes in the Portland Metro area are listed as single-family residences even though that is clearly not the case. As such, code needs to be written to cycle through the observations to search for key words and reclassify the rental types based on names of complexes and certain key words. So, for example, we search the notes column for the word "house" and relabel the rental type as SFR.

Observations listed as duplexes/triplexes, townhomes, time (short-term rentals, such as executive suites), single family residences, mobile homes, and condominiums are all removed from the data in the cleaning process. As this Rainmaker data is to be combined with data from Axiometrics—which has only apartment units—the decision to remove these is made for consistency across the data sets. Future iterations of this work could take advantage of the many different housing categories present in this database. For instance, it may be interesting and useful to compare how rents in single family residences are changing compared to those of condominiums and apartments.

Bedrooms and bathrooms in the Rainmaker data are presented as strings. Additionally—like the rental type variable—there are issues with consistency in the observations. For instance, apartments with 1 bath and a partial bath are listed as having either 1.2, 1.3, 1.5 or 1.7 baths. We call these "1.5" baths. Similarly, 2-bedroom units are listed as "21BR", "22BR", or "2BR". These are all simply renamed "2Bed" for the purposes of this analysis. The renamed strings are then turned into integers for use in hedonic regression analysis.

Given that we almost never see new apartments built with over 4 bedrooms or 3 baths, all observations with either of these are dropped. Similarly, almost all new units that we see are between 350 square feet and 1,600 square feet. As such, units outside of this range are eliminated. There is another reason for this as well. We have recently seen several "micro-apartments" being built in the Metro area. However, as these units are often no bigger than 150 square feet, the per-square-foot values (on which the interpolation is built) become problematic. These units can easily fetch $5-6 PSF or more, which is higher than penthouse units in high-end towers near the central business district.

We next concatenate year and quarter. After sorting it, it becomes clear that there are very few observations before the third quarter of 2011. As such, these, too, are dropped. At this point, we drop all observations that are identified in the data as affordable. As our model predicts market-rate apartment development, these need to be removed. After removing the layer, there are still many observations that fall well below what we observe to be market-rate in 2016. We rarely, regardless of size, see any apartments renting under $1.10 PSF, and certainly not below $1.00 PSF. These are conservative numbers. Still, we need to have a cut-off point and chose $1 for the purposes of this analysis.

This, of course, is just relevant for 2016 data. We assume a 10% gain in PSF per year and go backwards in time dropping anything below adjusted thresholds. Again, we are being very conservative here and are still likely keeping some observations that are not entirely relevant.

At this point, we need to think of the age of a property. If we include anything built before 2000, there is a strong possibility that renovations may have been done to the property. For example, Lumina apartments in Gresham was built in 1994 and just recently finished renovations in their buildings. PSF values shot up dramatically. As the Rainmaker data does not denote which complexes have been renovated, we simply drop any observations built before 2000.

Cleaning of Axiometrics Data

To expand the number of points for use in rent interpolation in GIS software, Metro obtained apartment rental data from Axiometrics. Unlike the web-scraped data from Rainmaker, Axiometrics data is a panel based on monthly surveys. In the Oregon Metro region (including Clark County, Washington), there are 388 properties with a combined 2,999 floor plans and 74,494 units represented in the dataset.

Whereas the Rainmaker dataset was missing a lot of data points, the Axiometrics dataset has complete information for all properties represented. So, for instance, square footage of every property floor plan is listed. More importantly, the Axiometrics data includes the unit count for each type of floor plan, which makes finding weighted per-square-foot rent averages much more straightforward to calculate. Despite the much more complete nature of the data, some cleaning of the data was necessary to keep assumptions like those of the Rainmaker data.

Before doing anything in Stata, the CSV file was imported into QGIS. The data was then clipped with the most recent Metro boundary layer to ensure that no points from Clark County or other outlying areas was included. Additionally, the data points were joined with Metro's RLIS neighborhood layer. After these adjustments, the data was imported into Stata for cleaning.

As the Rainmaker rent data was given as individual points, the Axiometrics data was expanded from floor plans into individual units. For instance, if an apartment's 1B/1b floor plan had 10 units, the data point was expanded into 10 identical data points. This has the benefit of matching the type of data with Rainmaker while simultaneously expanding the number of observations. Note: It is reasonable to assume that there is within floor plan variation of rents. For instance, premiums are often given to units that are on higher levels in a building as they often have a view. However, given that this information was not present, the decision was made to keep all expanded rent levels at the average listed in the Axiometrics data.

Secondly, as in the Rainmaker data, units with square footage of less than 350 or greater than 1,600 were removed. As mentioned previously, beyond a small amount of so-called "micro studios," apartments in these sizes are simply not being built and are not reflective of regular market rate rents that will likely be built in the future. Even if micro-studios are built in the future, we find that they are a much different product than the other market-rate units used for the purposes of this study; they tend to be priced no lower than $5-6 per square foot, well above even the highest levels seen in the Portland central core.

As stated above, we are interested in newer properties for this analysis. As we do not have data on the types of materials used for building the properties and the amenities that they may have, we use year built as a proxy for this. While the Axiometrics data includes whether a property has been rehabbed, we drop observations for apartments built prior to 2000 to keep as much consistency as possible with the Rainmaker dataset.

In the Rainmaker dataset, we removed any properties with per-square-foot rents of less than $1 to weed out potential affordable properties. However, after removing the properties built before 2000, no such observations existed. Consideration was taken to try and remove properties on the high end to try and account for penthouse units. However, given the wide spectrum on which different properties price their units, we did not feel that there was a

sufficient foundation to decide on these price cutoffs. Given extra time, future studies could attempt to incorporate this information by doing more detailed surveys of properties. As it is, all remaining units were left in the data.

Normalization Process

Note, please see the appendix for output and a more detailed explanation of results. We also offer suggestions for future iterations of this work using quantile regression as there seems to be clear shifts in effects at difference price levels. Further information can be gleaned from Stata .do files for this project, which will likely be converted into R during future iterations of this work. We will now cover the process that we followed from a broader perspective.

Because of the spatial gaps present in the Rainmaker data, it was necessary to include observations further back than the current quarter. Future iterations should aim to simply include the most recent quarterly information, if possible, but it was our judgment that this was not ideal with the data given. As such, we needed to find a way to deal with the time variables.

The Axiometrics data is a balanced panel. Information is gathered on a set number of properties on a monthly basis by employees making direct calls to property management for the most current information. If a panel regression had been necessary (it was not), it would have been straightforward to implement. The Rainmaker data, on the other hand, is "scraped" from the web from a variety of sources. Whereas you have properties repeated on a consistent basis in Axiometrics, this is not so in the Rainmaker data. Some properties have one observation over several years of data while others have hundreds or—in some more extreme cases—thousands. One could, theoretically, create a panel from this, but it would be overwhelmingly unbalanced. We cannot justify use of panel regression.

Instead, attempt two different analyses with the creation of time indicator variables. The data given is quarterly. We create dummies for year, quarter, and a newly created variable YearQuarter, which is a combination of the two. In the first analysis, we use our intended independent variables plus year and quarter. In the second, we use the same variables and the YearQuarter variable. Both results are, not surprisingly, remarkably similar and included in the appendix. We would hope that future Rainmaker data is more thorough and only has to focus on the most recent quarter, eliminating the need for this process.

In addition to these time dummies, we control for spatial autocorrelation with the inclusion of an indicator variable for neighborhood. Neighborhoods are a catch-all of sorts for many variables that are often included in hedonic regressions, such as distance to schools, walk score, transit score, income levels, education levels, median age, etc. When one chooses a home to rent or own, they may certainly do so because of a single issue such as the strength of a school for their children. One might also simply choose a neighborhood because it is attractive for prospective renters/buyers at the aggregate level. Given time, future iterations could certainly be more detailed and include any number of variables. We do not do so at this stage.

Other than the time indicator variables (not shown below), the variables included in the Rainmaker and Axiometrics regressions are the same and follow the equation specified below:

$$PSF = \alpha+\beta_1*(SquareFeet)+ \beta_2*(Beds)+\beta_3*(Baths)+\beta_4*(YearBuilt)+ \beta_{5+}*(Neighborhood)+\varepsilon$$

Heteroscedasticity is assumed and, upon testing, shown to exist. We adjust for this by using the Huber-White Sandwich Estimator when running the regressions. Using the coefficients resulting from the regression, we normalize the current rent levels to that of a *newly built* 750 square foot, 1-bedroom, 1-bath apartment. This new variable, PSF750, is calculated using the following equation:

$$PSF750 = PSF+(750-sqft)* \beta_{SquareFeet}+(1-Beds)* \beta_{Beds}+(1-Baths)* \beta_{Baths}+(2016-year_built)* \beta_{YearBuilt}$$

GIS Process

1. Interpolation of Rents (In QGIS; the steps will be similar, but not exactly the same in ArcGIS)
   a. Using the RLIS neighborhood layer, create neighborhood centroids.
   b. Join the information just generated in Stata to this centroid layer using the neighborhood name.

   Create Interpolated raster grid in QGIS
   c. Under Vector→Raster tools, click on "Multilevel B-Spline Interpolation"
   d. Choose the point layer (the MF Comp data)
   e. Choose normalized PSF as your Attribute on which to interpolate
   f. Under Method, change to "With B-Spline refinement"
   g. Leave Output Extent blank
   h. Make cell size no less than 100 feet, preferably a bit larger, say, 500 ft. Processing takes a much longer time the smaller the cells are.
2. Obtain relevant tax lot layer
   a. Do NOT clip to your final shape until the end.
   b. If you want to make processing quicker, you can create a ¼ mile buffer around your desired study area. However, clipping to the final shape proper will likely mean missing certain important lot centroids.
3. Create a layer for tax lot centroids.
4. Intersect the centroids layer with zoning.
5. Use the QGIS tool "Add Grid Values to Points"
   a. Under Raster→Vector tools
   b. Choose the Tax lot/Zoning points later.
   c. Choose the interpolated grid created in Step 3.
   d. Choose "Inverse Distance Interpolation" [2] as your interpolation method. There are several others if you so choose. The choice matters less the more input points you have.
6. Join the newly created point layer to the original tax lot polygon layer (or the clipped and buffered tax lot layer as explained in Step 4).
7. Save this as its own file, then remove the join.
8. Remove any duplicate columns.
   a. Make sure to leave in the zoning and PSF columns.
9. *Now* you can clip to the final shape.
10. Extract the table as a csv for use in the BLI modeling in Excel.
11. Display the PSF rent gradient with graduated colors. Use the following:
    a. Start with < $1.50 and then increase by $0.25 increments. End with >$3
    b. Alternatively, the map can be broken up with Jenks natural breaks. However, the former method would certainly be more intuitive for a wider audience should the maps be published.

B. Creating an Interpolated Ownership Residential Sales Surface from County Assessor Data

Purpose

Because the implementation of the interpolated multifamily rental surface for the Metro area was successful, Johnson Economics wanted to determine the potential of creating a similar surface for ownership residential sales. Instead of normalizing to a set home size and other characteristics, Johnson Economics thought that it would also be pertinent to normalize the pricing to lot square footage. As with the multi-family normalization, this process aimed to provide Metro with parcel-level detail on single-family home pricing instead of broader regions as seen in the office, industrial, and retail maps below. As home sales (and rents) can vary from neighborhood-to-neighborhood and, even, street to street, it is important to work towards this type of mapping to give a more accurate look at potential future redevelopment.

Obtain Sales Data

There are a limited number of ways to obtain sales data, and each has their plusses and minuses. For the use in these iterations of the interpolated sales surface, Johnson Economics, via Metro, obtained sales data by way of county assessor records. These obtained records went back to 1996 and consisted of sales records in Clackamas, Multnomah, and Washington Counties. However, for future iterations of this work, Johnson Economics recommends that Metro obtain sales data from a different source. The reasons for this will be discussed in the "Limitations and Suggestions for Future Iterations" section below.

Clean Sales Data

As with the multi-family data, the most time-consuming aspect of the interpolated sales map for single-family residential properties is the cleaning of the data. Also like the multi-family data—which came via Rainmaker and Axiometrics, two very differently organized data sources—the SFR sales data came from multiple sources, i.e., Clackamas, Multnomah, and Washington Counties. These three counties organize their data sets in different ways, which makes what could have been a straightforward process follow a more circuitous route.

To calculate sales price per square foot, the two most obvious variables needed are 1) sales price and 2) house square footage. While the former is in all three county assessor data sets, the latter is—somewhat surprisingly—not included in the Washington County records (this was later fixed by joining the assessor data to the RLIS tax lot layer, which does have square footage). Similarly, data on the attributes of single-family residences is sparse. Whereas we could consider variables such as number of bedrooms and number of bathrooms in the MFR properties, this is not possible with the available data. As such, the process of cleaning and normalization had to be done in a different manner.

As the data goes back to 1996, we are also presented with an interesting time issue. Because this map was to create the *current* SFR PSF landscape and because there were thousands of readily available recent data points, Johnson Economics decides to focus solely on sales in the second quarter of 2016, the last such quarter for which we had full data. However, the ultimate purpose of this model is to help determine what tax lots will be developed/redeveloped and the type of development it will serve to fit into a 20-year forecast. As prices will inevitably increase over the course of a two-decade extended period, future work should consider historic price fluctuations to help predict future price increases across different use types. Single-family residential rates and retail rental rates will, almost assuredly, grow at different rates in the future. The rates at which they grow could very well make the highest and best use of a certain property change over time. While this is not included in the scope of this current work, it should be looked at in the future as we work to merge the supply and demand models together.

We aimed to include only sales which were deemed to be arm's-length transactions. That is, we need to make sure that both the seller and buyer in an agreement are both working for their own interests. A transfer of deed from one family member to another, for instance, would not be included as such. Each of the three counties has different way of determining whether a transaction falls under this category. For instance, Clackamas County uses a "screening code" with different letters and symbols. By using guidelines from each of the counties, we could filter the transactions to those deemed to be arm's-length. In the limitations and suggestions section below, we offer a way for a much simpler solution to avoid this filtering process.

Any observations without sales price were dropped out of necessity as that is one of the key components to the analysis. Similarly, observations were—after joining the files to the RLIS tax lot file—dropped if they did not contain house square footage. As we use year built as a variable in the normalization process, observations lacking this information are dropped as well. The final step before the initial steps in GIS is to remove duplicates vis-à-vis multiple sales of the same property. As we limited this data to three months, this was not a big problem for the most part. However, another problem was presented in that some of the assessor data would list a sale multiple times if there were multiple sellers on record. So, for instance, if John and Jane Doe sold a house and were both on the deed, the sale could potentially be listed twice in the data. By collapsing the data on property id, sale date and sale price, we could remove these instances of multiple owners.

GIS Process I

The lack of house square footage in the Washington County assessor data throws a hiccup into an otherwise straightforward, albeit tedious, process. The way we chose to deal with this issue was to wait until after all the cleaning for each of the three counties was done. The one caveat here is that, whereas we could remove observations without house SF in the initial cleaning of the Multnomah and Clackamas County assessor data sets, we had to remove these same observations in Washington County after the join had taken place. This is a minor difference but needs to be pointed out as it just reemphasizes that the three data sets need to be treated differently to get matching variables that can be used in the normalization process.

Assuming the above cleaning has been completed, the next few steps should be followed to obtain lot size (and house size for Washington County), which is needed in the normalization process.

1. Bring the CSVs into ArcGIS.
2. Join the Clackamas and Washington County tax lots to the RLIS tax lot file via tax lot ids. The Multnomah County assessor data lacks tax lot ids, but it does include parcel ids (R numbers) which can be used as a joining mechanism.
    a. This could also be done via address matching. Alternatively, one could geocode all the addresses in the three files and spatially match them to parcels. However, this is likely much more time-consuming than simply joining based on the other columns mentioned.
3. Create a ¼ mile buffer around Metro.
    a. Depending on the future use of this information, we want to be able to clip to either the Metro boundary or the UGB. By using the buffer, we can assure that both are possible in the future.
4. Clip the tax lot layer with the joined variables by using the ¼ mile buffer Metro buffer.
    a. As the assessor data includes areas beyond Metro and the UGB, we can limit the dataset to only relevant observations by doing this.
5. Drop all observations that do not have information joined from the assessor data. This will drop the size of the data set dramatically from the hundreds of thousands in the full RLIS file.
6. Join the remaining file with the RLIS neighborhood layer.
    a. As with the multi-family layer, we need a component to help account for spatial autocorrelation as clustering is sure to be a problem with this type of data.

These are the only steps needed at this point. The file—to be exported in a CSV—now has the lot size and, for Washington County, house size.

Normalization Process

Because of all the joins that took place in the previous steps, some consolidation is necessary. We create a new variable simply named “SF” to represent square footage of a house. This takes in the values of square footage from the three counties and consolidates them into one column. Similarly, we created a “SalePrice” column to aggregate the sales prices from the three different counties. Using these two variables, we create a “PSF” column to detail sales price per square foot. In addition to these, we generate a “LotSF” variable from the acreage we have from the tax lot file. In addition to this we create natural log variables of the sale price, house size, and lot size. Neighborhood indicator variables are generated for use as controls for spatial autocorrelation in the regression analysis.

At this point, we double check arm’s length transactions and look for clear outliers that could end up causing problems in the normalization process. We do this on a county-by-county basis. Removing sales based on different counties’ sales codes was effective, but sorting the new PSF column presented us with quite a few observations with abnormally low values, such as $1 per square foot. While it is possible that this could technically be the case, we surmise that these instances are likely other types of transactions. For instance, there could be a property that has been deemed condemned. A sale may go through with the information on square footage, but the house would in this case be of zero value. Any residual value would be solely due to the land and/or development potential.

The result of this process is the elimination of all observations below the 5th percentile. Similarly, we look at the reverse for outliers. Some houses sell for well more than surrounding houses. However, at the same time many of these sales could be simply due to where they are located. For instance, a 10,000-square foot house adjacent to Lake Oswego may well sell for $15 million, which would indicate a PSF of $1,500. We are wary of removing properties that have added value just because of an area, but still want to be able to remove observations that are abnormally high due to other reasons. We remove all observations at or above the 99th percentile in PSF for each of the three counties. This process is repeated for lot size, which results in observations below 300 SF and above 1.69 acres to be dropped from analysis. Again, we offer a much simpler solution to this cleaning process in the sections below but present these steps as if they were the ones taken with the available data.

We changed our approach to the hedonic analysis from what we did with the multifamily rent data. One of the reasons for this is simply the fact that we do not have many variables to add to the equation. Whereas we had bedroom and bathroom data for the multifamily units, we do not have the luxury of this information from the data given to us. In this type of analysis for single-family residences, we would also generally look at potential variables such as number of fireplaces, view type, finishes, etc., but the assessor data given does not contain this information. The other change we have made is in terms of specification; we opt to use the natural log of price, square feet, and lot size in this model. Year built remains unchanged. We wish to make this analysis more complete in future iterations but are constrained by the data set we have at hand. Please see the limitations section for potential future work on this process. As it is, the regression equation stands as follows:

$$lnPrice = \alpha+\beta_1*(lnSquareFeet)+ \beta_2*(Year\ Built)+\beta_3*(lnLotSquareFeet)+ \beta_{4\text{-}238}*(Neighborhood)+\varepsilon$$

Though, as stated, we are lacking several common variables such as the number of bedrooms and bathrooms, the signs are no doubt significant, and the signs are in the theoretically correct direction. Using the resulting coefficients of square feet, lot size, and year built, we can normalize all house sales to a 1,200 SF home and 5,000 SF lot. We do not normalize for neighborhood as it is merely a control variable. A house is static. It cannot be moved. Normalizing a house in Laurelhurst to be priced as one from Lents could well make sense for a different type of analysis, but it does not make sense in this type of analysis where we need the sales to stay in their representative locations. If we did normalize for this, it would end up masking the spatial patterns that naturally underlie the existing market.

For the normalization, we first create a variable *lnNorm*, representing the natural log of the normalized price:

$$lnNorm = lnPrice + (ln(1200)\text{-}lnSF)* \beta_{lnSF}+(ln(5000)\text{-}lnLotSF)* \beta_{lnLotSF}+ (2016\text{-}YearBuilt)* \beta_{YearBuilt}$$

From there, we create the variable *NormSalePrice* by the straightforward process below:

$$NormSalePrice = exp(lnNorm)$$

The last step in achieving a sale per-square-foot variable is by simply dividing *NormSalePrice* by 1,200 square feet, as that is the size of the property after normalization.

GIS Process II

After normalization, the well-known-text (WKT) variable should still exist for each observation. All that needs to be done at this point is to bring the WKT and newly created normalized PSF variables into GIS software. From there, the interpolation should follow the same process that was used with the multifamily properties. The number of pricing categories should be debated. For the purposes of our early mapping, we have used seven graduated categories created with Jenks natural breaks. This is fine for internal mapping, though more clearly defined prices in, say, $50 or $100 increments may be more appropriate for clearer interpretation by a wider audience.

APPENDIX B

ENTITLEMENT SCREEN

Metro Regional Zone Class look up table

Standardized Regional Zones	Zone Class	Lot Size Min	Lot Size Max	Expected Density	PROTOTYPES: OFFICE: Office high rise	Office mid/struc	Office mid / ext. struc	Office mid/surf	Office high rise - CC	Office mid/struc - CC	Office mid / ext. struc - CC	Office high rise - LP	Office mid/struc - LP	Office mid / ext. struc - LP	Office mid/surf - LP	Office low rise	RETAIL: Multi-Story Structured	Single Story Structured	Single Story Surface	INDUSTRIAL: Warehouse / Distribution	Fulfillment Center	Data Center	Manufacturing	Multi-Tenant Flex	RENTAL RESIDENTIAL: Rental high rise	Rental Mid Rise w/ Garage	Rental 5 over 2	Rental 4 over 1	Rental high rise-tz	Rental Mid Rise w/ Garage - tz	Rental 5 over 2 - tz	Rental 4 over 1 - tz	Rental 5-story wood w/surf	Rental 4-story wood w/zero	3-story garden w/surf	Rental Plexes	Rental 3-story Townhome	Rental_Middle _Type4/	OWNERSHIP RESIDENTIAL: Condo residential high rise	Condo Mid Rise w/ Garage	Condo 5 over 2	Condo 4 over 1	Condo 3-story wood w/surf	3-story wood townhome	For-Sale Duplexes	Skinny Homes	Detached Single Family
Single Family Large Lot /Mid Options	SFR1	6,000	43,560		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Single Family Standard Lot /Mid Optio	SFR2	3,500	6,000		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Single Family Skinny Lot /Mid Options	SFR3	2,000	3,500		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Multi-family-Very Low Density	MFR1	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Multi-family-Low Density	MFR2	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Multi-family-Moderate Density	MFR3	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Multi-family-Medium Density	MFR4	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	1	0	0	0	1	1	1	0
Multi-family-Med. High Density	MFR5	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0
Multi-family-High Density	MFR6	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1	0	0
Multi-family-Very High Density	MFR7	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	1	1	0	0
Multi-family-Med. High w/Min	MFR5	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	1	1	0	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0
Multi-family-High w/Min	MFR6	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0
Multi-family-Very High w/Min	MFR7	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1		1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Multi-family-Very Low Density	MFR1z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Multi-family-Low Density	MFR2z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Multi-family-Moderate Density	MFR3z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0
Multi-family-Medium Density	MFR4z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	0
Multi-family-Med. High Density	MFR5z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0
Multi-family-High Density	MFR6z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0
Multi-family-Very High Density	MFR7z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	1	0	0
Mixed-Use Comm. & Res.	MUR1	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Mixed-Use Comm. & Res.	MUR2	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Mixed-Use Comm. & Res.	MUR3	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0
Mixed-Use Comm. & Res.	MUR4	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0
Mixed-Use Comm. & Res.	MUR5	Approx. FA	0		1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	1	1	0	0
Mixed-Use Comm. & Res.	MUR6	Approx. FA	0		1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	0	0	0	0	0	1	1	1	0
Mixed-Use Comm. & Res.	MUR7	Approx. FA	0		1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	1	1	1	1	0
Commercial - Central	CC	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - General	CG	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Neighborhood	CN	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Office	CO	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Central	CC2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - General	CG2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Neighborhood	CN2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Office	CO2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public & semi-public uses	PF	0	0		1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Campus	IC	0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Office	IO	0	0		0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Light	IL	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Heavy	IH	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Limited Dist.	IND	Distribution Limited			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Limited DataCenter	IND	Data Centers Limited			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parks & Open Space	POS	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exclusive Farm Use	EFU	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Residential	RRFU	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rural Commercial	RC	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Industrial	RI	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		OFFICE PROTOTYPES												RETAIL PROTOTYPES			INDUSTRIAL				
		Office high rise	Office mid/struc	Office mid / ext. struc	Office mid/surf	Office high rise - CC	Office mid/struc - CC	Office mid / ext. struc - CC	Office high rise - LP	Office mid/struc - LP	Office mid / ext. struc - LP	Office mid/surf - LP	Office low rise	Multi-Story Structured	Single Story Structured	Single Story Surface	Warehouse / Distribution	Fullfillment Center	Data Center	Manufacturing	Multi-Tenant Flex
PROGRAM	**Property Assumptions**																				
	Site Size (SF)	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	120,000	120,000	120,000	120,000	40,000
	Stories	10	5	4	4	10	5	4	10	5	4	4	1	2	1	1	1	1	1	1	1
	FAR	7.50	3.75	2.00	0.50	7.50	3.75	2.00	7.50	3.75	2.00	0.50	0.30	1.00	0.50	0.30	0.40	0.40	0.50	0.45	0.33
	Building Square Feet	300,000	150,000	80,000	20,000	300,000	150,000	80,000	300,000	150,000	80,000	20,000	12,000	40,000	20,000	12,000	48,000	60,000	60,000	60,000	13,000
	Efficiency	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	100%	90%	100%	100%	100%	100%	100%	100%	100%
	Leasable Area	270,000	135,000	72,000	18,000	270,000	135,000	72,000	270,000	135,000	72,000	18,000	12,000	36,000	20,000	12,000	48,000	60,000	60,000	60,000	13,000
	Parking Ratio/000 SF	1.50	1.50	1.50	1.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.50	3.5	3.5	3.5	1.0	3.5	0.4	3.0	1.0
	Parking Spaces	405	202	108	27	135	67	36	270	135	72	18	18	126	70	42	48	210	24	180	13
	Parking Spaces - Surface	-	-	16	27	-	10	5	-	-	11	18	18	19	11	42	48	210	24	180	13
	Parking Spaces - Structure	405	202	92	-	135	57	31	270	135	61	-	-	107	60	-	-	-	-	-	-
	Structured Parking %	100%	100%	85%	0%	100%	85%	85%	100%	100%	85%	0%	0%	85%	85%	0%	0%	0%	0%	0%	0%
	Cost Assumptions																				
	Base Construction Cost/SF	$275	$250	$250	$250	$275	$250	$250	$275	$250	$250	$250	$158	$150	$150	$150	$95	$95	$112	$122	$105
	Tenant Improvement Allowance	$105	$105	$105	$105	$105	$105	$105	$105	$105	$105	$105	$105	$95	$95	$95	$0	$0	$0	$0	$0
	Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
	Construction Cost/SF	$380	$355	$355	$355	$380	$355	$355	$380	$355	$355	$355	$263	$245	$245	$245	$95	$95	$112	$122	$105
	Base Parking Costs/Space	$60,000	$45,000	$36,750	$5,500	$60,000	$45,000	$36,750	$60,000	$45,000	$36,750	$5,500	$5,500	$36,750	$36,750	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500
	Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
	Structured Parking Cost/Space	$60,000	$45,000	$36,750	$5,500	$60,000	$45,000	$36,750	$60,000	$45,000	$36,750	$5,500	$5,500	*$36,750*	*$36,750*	*$5,500*	*$5,500*	*$5,500*	*$5,500*	*$5,500*	*$5,500*
OPERATING ASSUMPTIONS	**Income Assumptions**																				
	Base Income/Sf/Yr.	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$12.00	$12.00		$13.00	$13.00
	Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	*0.00%*	*0.00%*	0.00%	0.00%	0.00%	0.00%	0.00%
	Achievable Pricing	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	*$30.00*	*$30.00*	*$30.00*	*$12.00*	*$12.00*	*$0.00*	*$13.00*	*$13.00*
	Parking Charges/Space/Mo	$120	$120	$120	$120	$270	$270	$270	$120	$120	$120	$120	$120	$0	$0	$0	$0	$0	$0	$0	$0
	Expense Assumptions																				
	Vacancy/Collection Loss	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
	Base Operating Expenses	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
	Adjustment Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
	Operating Expenses	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*
	Valuation Assumptions																				
	Base Capitalization Rate	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	6.00%	6.00%	6.00%	6.00%	6.00%
	Adjustment Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
	Capitalization Rate	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	6.00%	6.00%	6.00%	6.00%	6.00%
SUPPORTABLE PROPERTY VALUE	**Cost**																				
	Cost/Construct w/o prkg.	$114,000,000	$53,250,000	$28,400,000	$7,100,000	$114,000,000	$53,250,000	$28,400,000	$114,000,000	$53,250,000	$28,400,000	$7,100,000	$3,156,000	$9,800,000	$4,900,000	$2,940,000	$4,560,000	$5,700,000	$6,720,000	$7,320,000	$1,365,000
	Total Parking Costs	$24,300,000	$9,090,000	$3,373,650	$0	$8,100,000	$2,562,750	$1,124,550	$16,200,000	$6,075,000	$2,249,100	$0	$0	$4,630,500	$2,572,500	$231,000	$264,000	$1,155,000	$132,000	$990,000	$71,500
	Estimated Project Cost	$138,300,000	$62,340,000	$31,773,650	$7,100,000	$122,100,000	$55,812,750	$29,524,550	$130,200,000	$59,325,000	$30,649,100	$7,100,000	$3,156,000	$14,430,500	$7,472,500	$3,171,000	$4,824,000	$6,855,000	$6,852,000	$8,310,000	$1,436,500
	Income																				
	Annual Base Income	$8,100,000	$4,050,000	$2,160,000	$540,000	$8,100,000	$4,050,000	$2,160,000	$8,100,000	$4,050,000	$2,160,000	$540,000	$360,000	$1,080,000	$600,000	$360,000	$576,000	$720,000	$0	$780,000	$169,000
	Annual Parking	$583,200	$290,880	$132,192	$0	$437,400	$184,518	$99,144	$388,800	$194,400	$88,128	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Gross Annual Income	$8,683,200	$4,340,880	$2,292,192	$540,000	$8,537,400	$4,234,518	$2,259,144	$8,488,800	$4,244,400	$2,248,128	$540,000	$360,000	$1,080,000	$600,000	$360,000	$576,000	$720,000	$0	$780,000	$169,000
	Less: Vacancy & CL	$868,320	$434,088	$229,219	$54,000	$853,740	$423,452	$225,914	$848,880	$424,440	$224,813	$54,000	$36,000	$108,000	$60,000	$36,000	$57,600	$72,000	$0	$78,000	$16,900
	Effective Gross Income	$7,814,880	$3,906,792	$2,062,973	$486,000	$7,683,660	$3,811,066	$2,033,230	$7,639,920	$3,819,960	$2,023,315	$486,000	$324,000	$972,000	$540,000	$324,000	$518,400	$648,000	$0	$702,000	$152,100
	Less Expenses:																				
	Operating Expenses	$234,446	$117,204	$61,889	$14,580	$230,510	$114,332	$60,997	$229,198	$114,599	$60,699	$14,580	$9,720	$29,160	$16,200	$9,720	$15,552	$19,440	$0	$21,060	$4,563
	Annual NOI	$7,580,434	$3,789,588	$2,001,084	$471,420	$7,453,150	$3,696,734	$1,972,233	$7,410,722	$3,705,361	$1,962,616	$471,420	$314,280	$942,840	$523,800	$314,280	$502,848	$628,560	$0	$680,940	$147,537
	Property Valuation																				
	Return on Cost	5.48%	6.08%	6.30%	6.64%	6.10%	6.62%	6.68%	5.69%	6.25%	6.40%	6.64%	9.96%	6.53%	7.01%	9.91%	10.42%	9.17%	0.00%	8.19%	10.27%
	Threshold Return on Cost	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	6.90%	6.90%	6.90%	6.90%	6.90%
	Residual Property Value	($44,133,123)	($15,264,370)	($6,915,468)	($1,243,851)	($29,514,283)	($9,890,586)	($5,024,765)	($38,141,337)	($13,295,668)	($6,268,780)	($1,243,851)	$748,099	($2,718,202)	($965,668)	$733,099	$2,463,652	$2,254,565	($6,852,000)	$1,558,696	$701,717
	RPV/SF	**($1,103.33)**	**($381.61)**	**($172.89)**	**($31.10)**	**($737.86)**	**($247.26)**	**($125.62)**	**($953.53)**	**($332.39)**	**($156.72)**	**($31.10)**	**$18.70**	**($67.96)**	**($24.14)**	**$18.33**	**$20.53**	**$18.79**	**($57.10)**	**$12.99**	**$17.54**

PROTOTYPE RENTAL RESIDENTIAL PROGRAMS

	Rental high rise	Rental Mid Rise w/ Garage	Rental 5 over 2	Rental 4 over 1	Rental high rise-IZ	Rental Mid Rise w/ Garage - IZ	Rental 5 over 2 - IZ	Rental 4 over 1 - IZ	Rental 5-story wood w/surf	Rental 4-story wood w/zero	3-story garden w/surf	Rental Plexes	Rental 3-story Townhome	Rental_Middle_TypeV
Property Assumptions														
Site Size (SF)	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	5,000	40,000	5,000
Density	400	225	225	170	400	225	225	170	90	120	35	30	20	30
Unit Count	367	206	206	156	367	206	206	156	82	110	32	3	18	3
Ave Unit Size	725	750	750	750	725	750	750	750	750	750	750	750	1,000	750
Efficiency Ratio	85%	85%	85%	87%	85%	85%	85%	87%	85%	85%	100%	100%	100%	100%
Building Square Feet	313,029	181,765	181,765	134,483	313,029	181,765	181,765	134,483	72,353	97,059	24,000	2,250	18,000	2,250
FAR	7.83	4.54	4.54	3.36	7.83	4.54	4.54	3.36	1.81	2.43	0.60	0.45	0.45	0.45
Parking Ratio/Unit	1.00	1.00	1.25	0.75	0.25	0.25	1.25	0.25	1.50	1.50	1.50	1.25	1.50	1.25
Total Parking Spaces	367	206	258	117	92	52	258	39	123	165	48	4	27	4
Parking Spaces - Surface	-	-	-	-	-	-	-	-	123	165	48	2	14	2
Parking Spaces - Structure	367	206	258	117	92	52	258	39	-	-	-	2	14	2
Structured Parking %	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	50%	50%	50%
Cost Assumptions														
Base Construction Cost/SF	$450	$325	$300	$300	$450	$325	$300	$300	$300	$220	$220	$230	$230	$230
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Construction Cost/SF	*$450*	*$325*	*$300*	*$300*	*$450*	*$325*	*$300*	*$300*	*$300*	*$220*	*$220*	*$230*	*$230*	*$230*
Base Parking Costs/Space	$60,000	$45,000	$36,750	$36,750	$60,000	$45,000	$36,750	$36,750	$5,500	$5,500	$5,500	$5,500	$21,125	$5,500
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Structured Parking Cost/Space	*$60,000*	*$45,000*	*$36,750*	*$36,750*	*$60,000*	*$45,000*	*$36,750*	*$36,750*	*$5,500*	*$5,500*	*$5,500*	*$5,500*	*$21,125*	*$5,500*
Income Assumptions														
Base Income/Sf/Mo.	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$0.00	$2.50	$2.50
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Achievable Pricing	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$0.00*	*$2.50*	*$2.50*
Parking Charges/Space/Mo	$135	$135	$135	$70	$70	$70	$135	$135	$135	$135	$135	$0	$135	$135
Expenses														
Vacancy/Collection Loss	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Operating Expenses	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Operating Expenses	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*
Valuation														
Capitalization Rate	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Capitalization Rate	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%
Cost														
Cost/Construct w/o prkg.	$140,863,235	$59,073,529	$54,529,412	$40,344,828	$140,863,235	$59,073,529	$54,529,412	$40,344,828	$21,705,882	$21,352,941	$5,280,000	$517,500	$4,140,000	$517,500
Total Parking Costs	$22,020,000	$9,270,000	$9,481,500	$4,299,750	$5,520,000	$2,340,000	$9,481,500	$1,433,250	$676,500	$907,500	$264,000	$22,000	$570,375	$22,000
Estimated Project Cost	$162,883,235	$68,343,529	$64,010,912	$44,644,578	$146,383,235	$61,413,529	$64,010,912	$41,778,078	$22,382,382	$22,260,441	$5,544,000	$539,500	$4,710,375	$539,500
Income														
Annual Base Income	$7,982,250	$4,635,000	$4,635,000	$3,510,000	$7,982,250	$4,635,000	$4,635,000	$3,510,000	$1,845,000	$2,475,000	$720,000	$0	$540,000	$67,500
Annual Parking	$594,540	$333,720	$417,960	$98,280	$77,280	$43,680	$417,960	$63,180	$0	$0	$0	$0	$21,870	$3,240
Gross Annual Income	$8,576,790	$4,968,720	$5,052,960	$3,608,280	$8,059,530	$4,678,680	$5,052,960	$3,573,180	$1,845,000	$2,475,000	$720,000	$0	$561,870	$70,740
Less: Vacancy & CL	$428,840	$248,436	$252,648	$180,414	$402,977	$233,934	$252,648	$178,659	$92,250	$123,750	$36,000	$0	$28,094	$3,537
Effective Gross Income	$8,147,951	$4,720,284	$4,800,312	$3,427,866	$7,656,554	$4,444,746	$4,800,312	$3,394,521	$1,752,750	$2,351,250	$684,000	$0	$533,777	$67,203
Less Expenses:														
Operating Expenses	$2,648,084	$1,534,092	$1,560,101	$1,114,056	$2,488,380	$1,444,542	$1,560,101	$1,103,219	$569,644	$764,156	$222,300	$0	$173,477	$21,841
Annual NOI	$5,499,867	$3,186,192	$3,240,211	$2,313,810	$5,168,174	$3,000,204	$3,240,211	$2,291,302	$1,183,106	$1,587,094	$461,700	$0	$360,299	$45,362
Property Valuation														
Return on Cost	3.38%	4.66%	5.06%	5.18%	3.53%	4.89%	5.06%	5.48%	5.29%	7.13%	8.33%	0.00%	7.65%	8.41%
Threshold Return on Cost	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%
Residual Property Value	($71,976,350)	($15,679,204)	($10,453,712)	($6,399,792)	($60,958,878)	($11,823,388)	($10,453,712)	($3,905,323)	($2,826,907)	$3,972,513	$2,087,405	($539,500)	$1,244,983	$210,286
RPV/SF	**($1,799.41)**	**($391.98)**	**($261.34)**	**($159.99)**	**($1,523.97)**	**($295.58)**	**($261.34)**	**($97.63)**	**($70.67)**	**$99.31**	**$52.19**	**($107.90)**	**$31.12**	**$42.06**

	Condo residential high rise	Condo Mid Rise w/ Garage	Condo 5 over 2	Condo 4 over 1	Condo 3-story wood w/surf	3-story wood townhome	For-Sale Duplexes	Skinny Homes	Detached Single Family
Property Assumptions									
Site Size (SF)	40,000	40,000	40,000	40,000	40,000	40,000	5,000	40,000	40,000
Density	400	225	225	170	35	30	18	18	9
Unit Count	367	206	206	156	32	27	2	16	8
Ave Unit Size	775	775	775	775	800	1,250	1,250	1,500	1,750
Efficiency Ratio	83%	83%	85%	85%	100%	100%	100%	100%	100%
Building Square Feet	342,681	192,349	187,824	142,235	25,600	33,750	2,500	24,000	14,000
FAR	8.57	4.81	4.70	3.56	0.64	0.84	0.50	0.60	0.35
Parking Ratio/Unit	1.3	1.3	1.50	1.00	2.0	2.0	2.0	2.0	2.0
Total Parking Spaces	459	258	309	156	64	54	4	32	16
Parking Spaces - Surface	-	-	-	-	64	27	2	16	8
Parking Spaces - Structure	459	258	309	156	-	27	2	16	8
Structured Parking %	100%	100%	100%	100%	0%	50%	50%	50%	50%
Cost Assumptions									
Base Construction Cost/SF	$473	$341	$315	$315	$231	$242	$242	$221	$221
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Construction Cost/SF	*$473*	*$341*	*$315*	*$315*	*$231*	*$242*	*$242*	*$221*	*$221*
Base Parking Costs/Space	$60,000	$45,000	$36,750	$36,750	$5,500	$23,875	$5,500	$21,125	$21,125
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Parking Cost/Space	*$60,000*	*$45,000*	*$36,750*	*$36,750*	*$5,500*	*$23,875*	*$5,500*	*$21,125*	*$21,125*
Income Assumptions									
Sales Price/SF	$390	$390	$390	$390	$390	$390	$390	$390	$390
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Achievable Pricing	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*
Parking Charges/Space	$25,000	$25,000	$25,000	$19,500	$19,500	$19,500	$19,500	$19,500	$19,500
Expenses									
Sales Commission	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Cost									
Cost/Construct w/o prkg.	$161,916,642	$65,639,232	$59,164,412	$44,804,118	$5,913,600	$8,150,625	$603,750	$5,292,000	$3,087,000
Total Parking Costs	$27,540,000	$11,610,000	$11,355,750	$5,733,000	$0	$644,625	$11,000	$338,000	$169,000
Estimated Project Cost	$189,456,642	$77,249,232	$70,520,162	$50,537,118	$5,913,600	$8,795,250	$614,750	$5,630,000	$3,256,000
Income									
Gross Income - Units	$133,645,482	$75,016,265	$73,251,176	$55,471,765	$9,984,000	$13,162,500	$975,000	$9,360,000	$5,460,000
Gross Income - Parking	$11,475,000	$6,450,000	$7,725,000	$3,042,000	$0	$526,500	$39,000	$312,000	$156,000
Gross Sales Income	$145,120,482	$81,466,265	$80,976,176	$58,513,765	$9,984,000	$13,689,000	$1,014,000	$9,672,000	$5,616,000
Less: Commission	($5,804,819)	($3,258,651)	($3,239,047)	($2,340,551)	($399,360)	($547,560)	($40,560)	($386,880)	($224,640)
Effective Gross Income	$139,315,663	$78,207,614	$77,737,129	$56,173,214	$9,584,640	$13,141,440	$973,440	$9,285,120	$5,391,360
Property Valuation									
Return on Sales	-26.47%	1.24%	10.23%	11.15%	62.08%	49.42%	58.35%	64.92%	65.58%
Threshold Return	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Residual Property Value	($68,312,587)	($9,242,611)	($2,922,658)	($1,690,845)	$2,420,870	$2,632,089	$231,720	$2,444,017	$1,432,139
	($1,707.81)	**($231.07)**	**($73.07)**	**($42.27)**	**$60.52**	**$65.80**	**$46.34**	**$61.10**	**$35.80**

APPENDIX 3 – 2024 REGIONAL EMPLOYMENT LAND DEMAND METHODOLOGY

Background

This appendix summarizes potential 20-year demand for land based on the regional employment forecast. This forecast-based approach is one source of information that the Council may choose to consider in making its growth management decision. In addition to this forecast-based demand analysis, the Council may wish to consider the potential benefits of adding the Sherwood West employment area to the UGB as proposed by the City of Sherwood, which have been assessed in a separate appendix to this 2024 Urban Growth Report (UGR).

Overview of approach

This appendix summarizes the approach and set of assumptions used in informing the employment land demand projections for this 2024 UGR. The overall methodology is similar to the one used in UGRs dating back to 2009 and is similar to methods commonly used in city Economic Opportunities Analyses. Generally, this analysis goes through several steps, as follows:

1. Estimate how much of the 7-county Metropolitan Statistical Area (MSA) job growth is likely to be "captured" in the Metro UGB over the 20-year planning period.
2. Account for work from home and hybrid work, which reduce future demand for business space (new in this UGR because work from home/hybrid work will likely persist for a sizable share of jobs).
3. Sort shares of jobs in each employment sector into six prototypical building types.
4. Account for current excess office vacancies that are expected to be absorbed over the 20-year planning period (new in this UGR because of historically high office vacancy rates resulting from the pandemic and increased work from home/hybrid work).
5. Translate jobs into building square footage demand by applying square feet per employee assumptions to each of the six building types, recognizing submarket variations.
6. Translate employee square footage to acreage demand by applying floor-area-ratios to each of the six building types, recognizing submarket variations.
7. Summarize acreage demand by building type and then sort into more general commercial and industrial categories for comparison with commercial and industrial growth capacity estimates (capacity estimation methods are summarized in a separate appendix).

Assumptions for the above-listed steps are updated with additional years of data and/ or revised to reflect newer available information to the current methodology. The analysis includes updated projections of employment growth for the Metro UGB (i.e., [1] capture rate assumption); and new data that are deductions to that demand based on negative space need factors (i.e., [2] future job absorption through existing office vacancies in the region and [3] an increased expectation of work from home/ hybrid work (WFH) which is expected to lower on-site job needs). The combination of these three factors we are calling as "Triple Net" and incorporated into this DRAFT UGR non-residential space demand projections.

The MSA forecast includes a range (high, medium, and low growth scenarios) of alternatives and is carried through this UGR jobs demand analysis as three distinct growth options; however, to avoid

repetition in explaining the methodology, we use the medium case (or baseline forecast) for purposes of exposition and explanation of our approach.

- An updated Metro UGB employment forecast for 2024 to 2044 serves as the economic trend basis for nonresidential land demand projections of the 2024 Employment UGR. The MSA regional forecast provides the economic foundations for the UGB employment forecast.
- The three growth factors that pare the regional forecast down to the UGB we call collectively "Triple Net" are [1] UGB capture rate, [2] office vacancy rate (based on recent published information from real estate brokers, [3] Census hybrid/ work-from-home data.
    - Factor [1] pares the regional MSA forecast down to the employment growth for just the Metro UGB
    - Factors [2] and [3] do not alter the amount of the UGB employment forecast but rather reduce the impact on brand-new future land demand for office space.
    - Assumes that abnormally high office vacancy rates (today) will stabilize in the long-run and that stabilization will absorb a share of future office demand, partly negating the demand for new/ additional office space.
    - Assumes the WFH trend will persist and continue at current elevated levels during the 20-year forecast, offsetting a portion of demand for new/ additional office employment space.
- The historical capture rate for employment growth in the Metro UGB from 1979 to 2022 is 75%.
- The projection period for the 2024 UGR is 2024 to 2044. For purposes of the DRAFT analytics, future value of the Metro UGB capture rate is assumed to be an average of 75%, same as history, with variation for individual sectors.
- Other key density and growth assumption factors on future land demand:
    - Square foot per job density (updated per advice from public and private sector experts)
    - Floor area ratios (initial consultant input from the 2009 UGR; it appears unlikely that these ratios have changed in recent construction)
    - Employment allocations by 2040 design type & development hubs/ rings (revised with 2019 information)

Data sources

- MSA regional forecast (2024 to 2044) *updated* (w/ peer review)
- UGB employment forecast (2024 to 2044) *updated* – derived from MSA regional forecast
- UGB capture rate *updated* (source: Metro LDMS & BLS)
- Work from home factor *added* to methodology for office demand (source: Census ACS)
- Office vacancy rate *added* to methodology (source: regional real estate brokerage reports)
- Contingency table for UGB jobs to six building types *updated* (source: OED | QCEW & Metro LDMS | RLIS)
- Square foot density per employee *updated* (w/ stakeholder input)

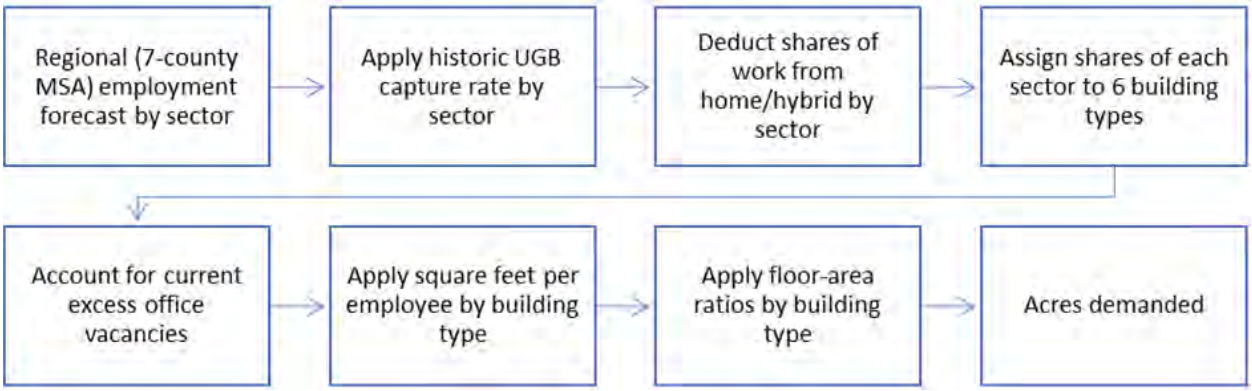


Figure 1: Concept diagram of UGB employment demand calculation.

Methodology details

Metro UGB Employment Capture Rate

The purpose of the Metro UGB employment capture rate is to pare the 7-county MSA regional forecast down to only payroll jobs inside the Metro UGB. The rate excludes projected amounts of employment growth in Clark and Skamania counties in Washington; Columbia and Yamhill counties in Oregon; and the portion of cities and unincorporated county areas in Clackamas, Multnomah and Washington outside the Metro UGB. The rate is used as a forecast allocation tool for splitting the MSA employment forecast between growth assigned to inside the Metro UGB (and to the outside).

The Metro capture rate is both a statistic and an assumption in the UGB forecast. As a statistic, it simply describes the historical share of employment growth (also for example, households or population) within the Metro UGB and the MSA region. When used as an assumption about the future, staff recommends that the capture rate have a basis in historic observations or that there be a clear rationale for why it may be higher or lower than those observations in the future. This analysis assumes a continuation of the historic 1979-2022 UGB capture rate.

The MSA region is delineated by federal data sources to include the counties of Clackamas, Columbia, Multnomah, Washington and Yamhill in Oregon and the counties of Clark and Skamania in Washington State. The Metro UGB is designated by Metro, and its boundaries have increased incrementally over the years with UGB expansions as decided by the Metro Council.

Equation 1: Metro UGB Employment Capture Rate

$$\text{Capture Rate} = \frac{(E_t^{UGB} - E_0^{UGB})}{(E_t^{MSA} - E_0^{MSA})}$$

where,

E	is payroll employment
UGB	is delineation (of employment) in the Metro Urban Growth Boundary
MSA	is delineation (of employment) in the 7-county metropolitan statistical area
t	is a future time
0	is the base year time

The historical value of the Metro capture rate fluctuates over time, depending on business cycle peaks and troughs as well as the span of years included in the capture rate's computation. A nearby table illustrates several examples of different historical periods and the calculations of the capture rate at different points and intervals of business cycles in the region. The table shows that capture rates do indeed vary because of business cycles and these economic impacts may hit organizations differently, depending upon the mix of industries inside vs. outside the UGB and the type of economic driver causing variations in the business cycle.

	Payroll Employment		
	UGB	MSA (7-county)	
difference: **1979-2022**	483,400	646,900	75% capture rate
trough-to-trough: **1983-2010**	337,200	435,800	77% capture rate
peak-to-peak: **1979-2007**	334,500	464,900	72% capture rate

Table 1: Historical capture rate estimates of payroll employment in the region (source: Metro and US BLS)

Historic capture rate data suggests that systemic economic change could be underway as the trend in the historic capture rate payroll employment has been trending lower since peaking at 89% in 2014. A nearby chart illustrates the recent downward trajectory in Metro UGB capture rates. The capture rate, more recently in 2022, edged higher. More data will be needed to determine if the uptick is an anomaly or a return to the higher capture rate readings prior to 2015 when the rate hung closer to 80%.

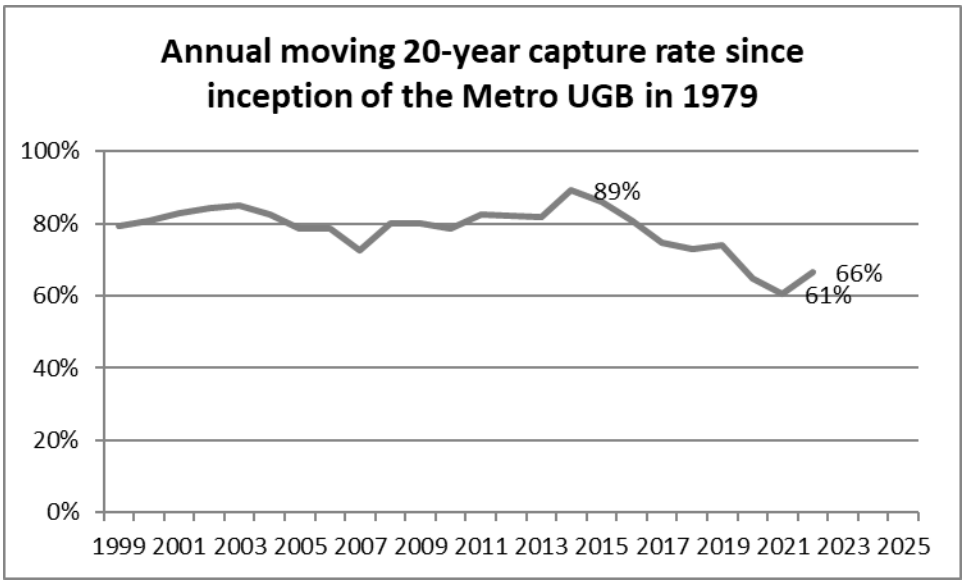


Figure 2: Historic 20-year capture rates of payroll employment in the Metro UGB

For purposes of the DRAFT Employment UGR, staff recommends assuming a 75% capture rate which is the long-term historical rate for the Metro UGB and considers the rate's "average" through several business cycles (i.e., 1980-82 double-dip recession, 1991 recession, 2000 dot-com bust, 2008-2009 Great Recession and 2020 pandemic). The regional economy recently suffered through one of the steepest downturns in history, a pandemic-induced recession which battered growth across many industries. Since then, the recovery suggests the onset of a rebound in the capture rate. A 75% capture rate assumes that the UGB job forecast will stabilize near its long-term "average" and further implies that growth is roughly unchanged from the region's historical long-term growth share.

Hybrid/ Work-from-home Assumption

The purpose of the WFH factor is to calculate a reduced demand for the "housing" of employment growth in non-residential spaces / or buildings. A fairly large fraction of employees now work from home and should be considered going forward in the UGR. Part-time or hybrid employees are assumed to have a smaller workspace footprint than regular on-site employees. Fully home-based employees are assumed to have no workspace footprint in the businesses that employ them.

Most employees continue to be "on-site" workers, about three-fourths, according to a recent Census report for the nation, falling from 84% before the pandemic (see nearby figure). 16% of workers were either hybrid (i.e., a mix of working from home and part-time on-site) or fully home-based employees before the pandemic. After the pandemic, the share of employees working away from home was nearly double, at 27%. The share of employees working from home (full + mixed) held steady during and after the pandemic. Separately, additional Census ACS data (2022) suggests a persistence in work away from home. This is assumed to continue and held steady in the twenty-year forecast of non-residential building demand.

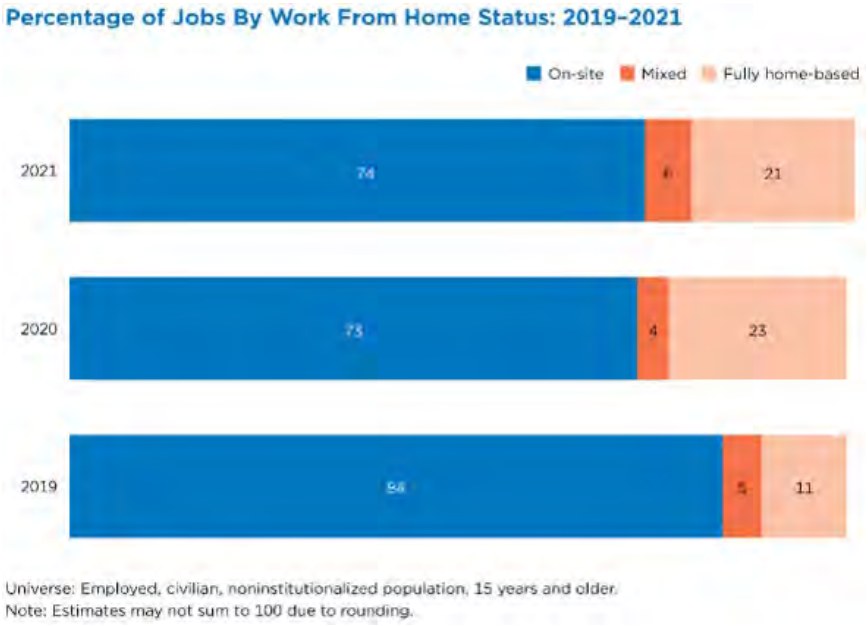


Figure 3: Work from Home Status of Employees (source: US Census, 2020-22 Survey of Income and Program Participation (SIPP))

The Metro and UGB employment forecasts are unchanged by the WFH net reduction. Instead, a hypothetical calculation (much in the manner of a pro forma) is said to reduce the forecast and adjust for a lowering of the number of employees demanding future non-residential building space. This represents a necessary step to avoid over-estimating non-residential land need going forward when roughly one-third of employees are expected to have a status that is work from home. A nearby figure illustrates the work from home assumptions applied to the industry job forecast as a step in calculating the hypothetical employment land need of the Metro region.

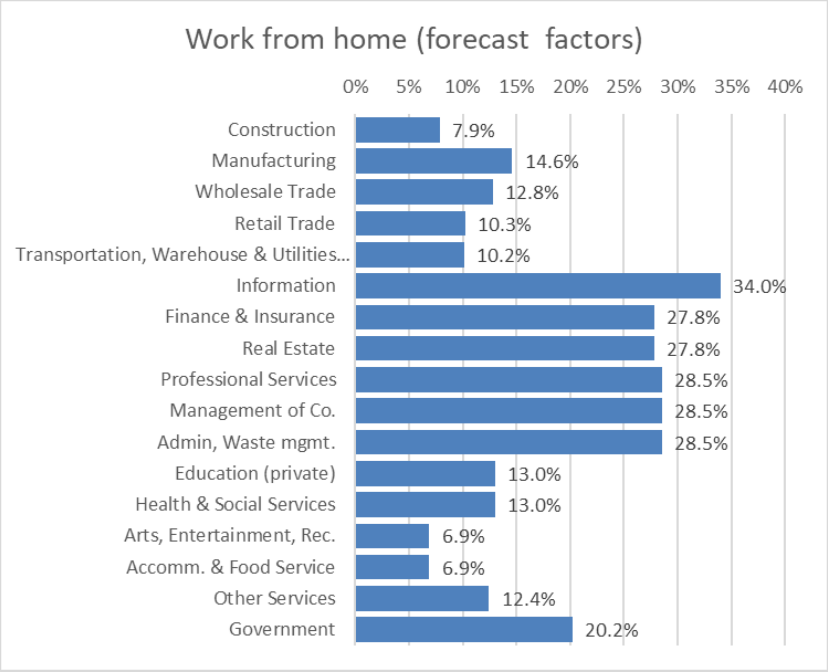


Figure 4: Work from home factors (source: Census ACS, Census SIPP and Metro calculations)

UGB Employment forecast by Building Type

The first level of employment projections was of the MSA (7 counties). The second level, the MSA projections were then trimmed to the Metro UGB, assuming a capture rate for the twenty-year forecast. The third level is the transformation of the UGB employment forecast to the forecast of UGB employment by building space (i.e., the job components for industrial vs. commercial non-residential demand). These employment projections are tallied to jobs by building archetypes. Six types are assumed: (1) general industrial, (2) flex/business park, (3) warehouse/ distribution facilities; (4) office, (5) retail stores, (6) institutional uses (schools, hospitals, medical clinics, etc.).

A contingency table based on Oregon Employment Department (OED) Quarterly Census of Employment and Wages (QCEW) confidential jobs data for the Metro region is used to distribute the UGB payroll employment projections into the 6 building types. The equation below explains the formula for how this was calculated.

Equation 2: Metro UGB Employment Forecast by Building Type

$$E_{j,t} = \sum_{i=1}^{17} (E_{i,t} * \mathbf{B}_{i,j})$$

where,

E is payroll UGB employment (less hypothetical reduction for WFH factors)

B is a contingency table of job shares by building type, a matrix that displays the bivariate frequency distribution of employment by NAICS and building type.

t is the job growth of 2024 to 2044 (end points for the twenty-year forecast)

i is the list of two-digit NAICS contained by the regional forecast (17 industry categories)

j is the list of building archetypes/ 6 types (i.e., general industrial, flex/business park, warehouse/ distribution facilities; office, retail stores, institutional uses ([schools, hospitals, medical clinics, etc.])

The building archetypes used primarily by the region's businesses vary by industry classification. Some industries have a very distinct "preference" for a certain building archetype, but all industries utilize a mix of all six forms to a higher or lesser degree. This degree is based on current employment data and the figures represent shares of jobs in each NAICS by building type.

- Construction employment mainly utilizes general industrial space, but also office space and warehousing/ distribution facilities.
- Manufacturing mostly uses general industrial buildings and flex/ business parks.
- Wholesale trade job classifications are mostly in warehouse/ distribution facilities but also in flex/ business parks.
- Transportation, warehouse & utilities (TWU) sector employs workers in warehousing/ distribution facilities, office buildings, and flex/ business parks.
- Information services, comprised of print media businesses and internet service-based providers, which include data centers and the like, primarily utilize office spaces followed by warehouse/ distribution building spaces.
- Finance & Real Estate firms employ workers in mostly office settings and retail locations.
- Professional Service providers mainly are in office buildings and some retail locations.
- Management of Companies are employees of big corporations and the holding company that owns or oversees its subsidiaries. The workers are predominantly office workers.
- Administration services are support staff occupations and temporary help workers plus businesses in waste management services, which occupy primarily office buildings and retail formats.
- Private education services are mostly located in institution spaces and office buildings.
- Health care providers mostly utilize institutional space, but some medical clinics are located in retail formats or are in office buildings.
- Arts, entertainment, and recreation jobs are classified into retail formats and larger entertainment activities are assumed in large footprints and classified in warehouse/ distribution.
- Food and accommodation services have workers in largely retail formats.
- Other services sector is more of a "catch-all" category that doesn't have a real dominant footprint
- Government is mostly classified into office spaces. Note: space demand from public schools is excluded here because public school land supply and demand is not fungible across school districts in the region (in other words, a regional calculation of the adequacy of school land supply is not meaningful to individual school districts that must address their site needs within their respective school districts). The UGR analysis also reflects this on the supply side of the ledger by excluding school district lands from the buildable land inventory. Metro has a Major UGB Amendment process that is better suited for addressing the site needs of individual school districts.

NAICS	Sectors Represented	Office	Institution	Flex/BP	Gen Industrial	Ware-house	Retail
23	Construction	27%	2%	1%	40%	20%	10%
31-33	Manufacturing	3%	0%	33%	40%	20%	4%
42	Wholesale Trade	12%	1%	23%	7%	50%	8%
44-45	Retail Trade	5%	1%	0%	2%	50%	42%
22, 48-49	Transportation, Warehouse & Utilities	31%	6%	10%	1%	43%	9%
51	Information	50%	2%	2%	1%	30%	15%
52	Finance	74%	2%	0%	0%	0%	23%
53	Real Estate	73%	3%	1%	2%	1%	21%
54	Professional Services	62%	4%	1%	2%	10%	20%
55	Management	78%	6%	1%	1%	0%	14%
56	Admin, Waste	69%	2%	2%	1%	5%	21%
61	Education (private)	33%	63%	0%	0%	0%	3%
62	Health & Social Services	17%	67%	0%	0%	0%	15%
71	Arts, Entertain, Rec	17%	13%	1%	1%	20%	49%
72	Accomm & Food Service	7%	1%	0%	1%	25%	65%
81	Other Services	34%	8%	1%	2%	35%	18%
92	Government	76%	0%	0%	0%	0%	3%
	TOTAL	36%	16%	6%	8%	5%	29%

Table 2: Metro UGB employment by building type contingency table (source: QCEW 2019 data, Metro tabulation using LDMS information; note: government does not add to 100% because of school employment – please reference the major UGB amendment process for the handling of school uses)

Office Vacancy Rate Assumption

Portland's office vacancy rate in the Central Business District (CBD) has been recently tracked by various professional real estate brokerage reports as somewhere between 25% to 30% (2023Q4 to 2024Q1). The broader Metro region has shown an office vacancy rate of about half that of the Portland CBD. Significant economic dislocations occurred during the pandemic, and difficulties in the office market continue to persist. Many pundits have said that conditions will likely worsen before improving as more leases come up for renewal, and employers who don't need as much office space as before will choose to relocate elsewhere or rent significantly less office square footage. This leaves a "surplus" of existing office space that will take additional time to absorb.

As a result of the current market surplus, most would agree that the current excess supply will get absorbed by market growth and future demand in office space. That trend will indeed resolve existing surpluses, but it will on the flip side reduce the demand for brand new office space going forward. A fraction of projected office need is expected to be absorbed by refilling of today's empty office buildings. Because this refilling of existing vacant office space is not accomplished through redevelopment of buildings, it is not addressed in the UGB capacity analysis. Instead, it is factored in here, as a demand reduction.

The office vacancy rate across the entire Metro area is currently about 15%. Market professionals have noted that a well-functioning market has a vacancy rate between 5 and 10%. This rate accounts for a "friction-less" or the smooth transaction between re-location and rental of new movers and new tenants. For purposes of computation for the UGR employment land need, a friction-less vacancy rate of 7.5% is assumed – a number arrived at from the midpoint between 5 and 10%. With the current office vacancy rate about 15% and subtracting the estimated 7.5% friction-less vacancy rate, the amount of excess office space is assumed to be 7.5% of current office space – regionally. This 7.5% of current excess office space is assumed to then reduce the amount of future office space construction in the twenty-year

forecast. This is the third component of the "triple-net" calculation applied to future nonresidential development needs.

Using Square Foot Per Employee (SFE) to Forecast Physical Building Space Needs

At this stage in calculations, we begin to translate "triple-net" job numbers into demand for building space. This is a step towards estimating demand for acres of land for employment growth. This is an approach commonly used in city Economic Opportunities Analyses.

First, we gratefully acknowledge the contributions of experts from local governments, developers, brokers, and knowledgeable individuals in the region's various real estate markets for their insights on the density and scope of non-residential construction trends. We thank them for their generous aid in reviewing the density assumptions for the 2024 UGR. Final values are Metro assumptions after consideration of external expert opinions.

The density methodology and assumptions attempt to differentiate by business unit types, generally following zoning by industrial or commercial and NAICS code, by building structure type, and by price gradients depending on proximity to the urban core. Generalization is necessary to make a regional scale employment demand analysis feasible and is in keeping with Oregon Administrative Rules such as OAR 660-024-0040(1), which states that "The 20-year [land need] determinations are estimates which, although based on the best available information and methodologies, should not be held to an unreasonably high level of precision."

Reasons for needing to generalize are at least threefold. First, there are numerous types of businesses doing production, fabrication, assembly, service provision, etc. in a variety of industry fields, and each having quite disparate space need requirements to house their operations and employees, handling and storage of materials, and the usage of large and small-scale machinery. These wide division of activities don't always lend themselves to a fully representative "average".

Second, even classifying the activities of industries into a loose organization by building type does not necessarily make the estimate of job density any easier. Building types serve a useful breakdown of the density of different structure uses, but even within this distinction there were many businesses and organizations that did not fit harmoniously into the list of building types.

Third, real estate economic theory and observed price gradients suggest that the "efficient" usage of space for various industries and firms would argue that some variation in job density should exist depending upon location. The simplest formulation imagines that, other things being equal, that closer-in locations would likely fetch a higher price premium than locations out on the edge of a region. In practice, locations aren't likely to be as fungible (or easily interchangeable) with the particular space usage needs of a business unit. The land supply isn't necessarily that fungible either because of the wide variability of the land itself, which can have quite unique aspects in its topography (i.e., good or bad for development), historic development patterns (e.g., airports, railroad stations, port facilities, existing infrastructure, etc.), and regulatory barriers. This aside, theory would offer that higher real estate prices ought to influence efficiency in density. Prices near the center of a region are generally more highly prized and therefore price per square footage is generally greater. Other things being equal, theory suggests land supply near the edge of a region might show less density.

Most have agreed that there is wide uncertainty around any job density statistic, or its estimate, and Metro staff would agree. However, external review indicated that the square footage assumptions used in this analysis strike a reasonable balance between observed variability, economic theory, and market trends that may lead to future changes in densities over the 20-year planning period.

Our approach attempts to acknowledge some of the wide variability in space efficiency by considering multiple tiers as we have; however, we acknowledge that there is significant uncertainty in the scope of possible development going forward. Density assumptions in the UGR, generally reflect greater density (i.e., lower square foot per employee) among commercial activities than compared to businesses units that need to operate on industrial sites and zoning districts. Densities between industrial activities vary too, with warehousing and distribution types generally assumed to have greater space usage per employee (i.e., less density per employee). In largely commercial activities, the office archetype is assumed to utilize space most efficiently per employee. Institutional spaces are largely assumed to be medical clinics, hospitals and other medical facilities. Retail is perhaps the most difficult to fathom because so many industry groups can find themselves located in a retail format. These could vary between a small corner grocery store up in size to a "big box" retail footprint with a regional service coverage. Additionally, a wide range of businesses activities are in retail sites, and when these traditional retail outlets change hands, a new "non-retail" establishment could replace the location turnover.

2024 Urban Growth Report – Non-residential employment density assumptions (square-foot per employee)

Building Archetypes	Central Hub	Inner Ring	Outer Ring
General Industrial	850	800	800
Warehousing/ Distribution	950	1,400	2,000
Flex	600	625	1,000
Office	300	300	300
Retail	450	450	475
Institutional	500	500	550

The density assumptions represent a curated "average" after consideration of stakeholder input.

Table 3: Reviewed Square Foot per Employee Density Assumptions

Future square footage demand is calculated by the following generalized formula.

Equation 3: Projected industrial demand (square footage)

$$Sq.ft.(of\ industrial\ demand) = \sum_{i=1}^{3} \sum_{j=1}^{3} (SFE_{i,j} * E_{i,j})$$

where,

SFE is square feet per employee

E is subarea payroll employment by building type

i is building type = {general industrial, warehouse/ distribution, flex}

j is subarea = {central hub, inner ring, outer ring}

Equation 4: Projected commercial demand (square footage)

$$Sq.ft.(of\ commercial\ demand) = \sum_{i=1}^{3}\sum_{j=1}^{3}(SFE_{i,j} * E_{i,j})$$

where,

SFE is square feet per employee
E is subarea payroll employment by building type
i is building type = {office, retail, institutional}
j is subarea = {central hub, inner ring, outer ring}

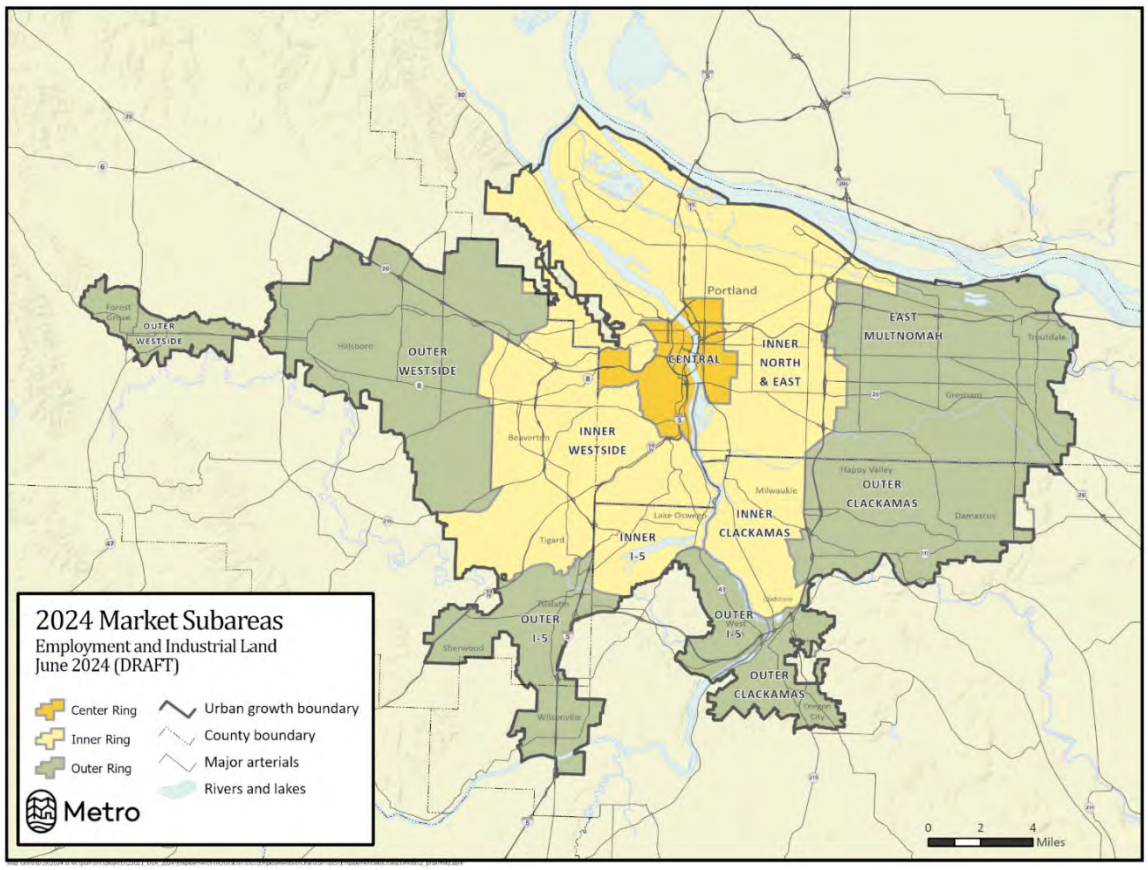


Figure 5: Map of subarea (central, inner & outer rings)

Using Floor-to-Area Ratios (FAR) to Forecast Physical Land Area Need (in net acres)

Floor area ratios convert the square footage space needs of employment and employers from buildings to net acres. The notion is conceptualized in the general equation shown nearby.

Equation 5: Concept formula for estimating net acre land demand from an employment forecast

$$Net\ acre\ land\ demand\ = \frac{(Employment)\ *\ (sq.ft.per\ employee)}{Floor\ area\ ratio}$$

where, the floor area ratio (FAR) is the relationship between a building's total usable floor space and the total area of the lot on which the building stands. FAR may be expressed as a decimal number and is derived by dividing the total area of the building by the total area of the parcel (building area ÷ lot area). Employment is the "triple net" 2024-44 Metro UGB job forecast by building type and distributed to subareas. Subareas employment is based on current employment geographic distributions. Square foot per employee assumptions are noted in Table 3. FAR assumptions are discussed conceptually, next.

The FAR values assumed in the UGR methods have been developed in past UGRs and range from 0.25 to 5.0. Individual FAR contingency tables exist for each of the 6 building types, in other words 6 matrices of FAR. Each table has individual FAR values by subarea and 2040 design type. An illustration of this contingency matrix is shown in a nearby image.

Subareas/ 2040 designs	Central	Corridors	Regional Center	Town Center	RSIA	Industrial	Employment	Other
Central								
Inner Westside								
Inner North & East								
Inner Clackamas								
Inner I-5								
Outer Westside								
East Mult Co								
Outer Clackamas								
Outer I-5/205								

Illustrative table. Actual tables contain FAR values (one table for each building type)

Figure 6: Illustration of the contingency matrix: row and column headings (FAR values populate the cells of the matrix of which there are 6 different arrays – 1 for each building type)

FAR distinction by 2040 design type:

- Central: 1.0 to 5.0
- Corridors: 0.3 to 0.75
- Regional Centers: 0.3 to 0.75
- Town Centers: 0.4 to 0.9
- RSIA (regionally significant areas – Metro Title 4): 0.25 to 0.5
- Industrial: 0.25 to 0.5
- Employment: 0.25 to 0.5
- Other (areas not in a designated 2040 design type): 0.25 to 0.6

FAR distinction by subarea:

- Most notably, FAR's are highest in the central hub and become incrementally less dense (i.e., smaller FAR value) as sites radiate out to the inner ring and then outer ring subareas.
- The names of the subarea denote which of the 3 rings the subarea belongs (also see Map nearby)

Employment land demand results

Applying these steps results in the following estimates of 20-year demand for industrial and commercial land.

	Industrial Demand (acres)
Low growth forecast	-1,500
Baseline growth forecast	1,400
High growth forecast	5,200

	Commercial Demand (acres)
Low growth forecast	-300
Baseline growth forecast	800
High growth forecast	2,300

Negative demand shown in the low growth forecast is a result of job losses under that scenario. The baseline forecast is the most likely outcome.

Additional Notes:

- Redevelopment calculations are handled on the supply-side. The real estate pro forma model is used to estimate the supply of non-residential redevelopment in the twenty-year forecast.
- Public education land demand is handled through the major amendment process, which is outside Metro's 6-year review of the UGB. Experience in past UGR cycles has shown that land for public schools is generally not fungible across different school districts. We exclude from the UGR land demand computation the portion of government employment that can be attributed to demand for future public-schools. Also note that the BLI excludes school owned property from the land available for future development.

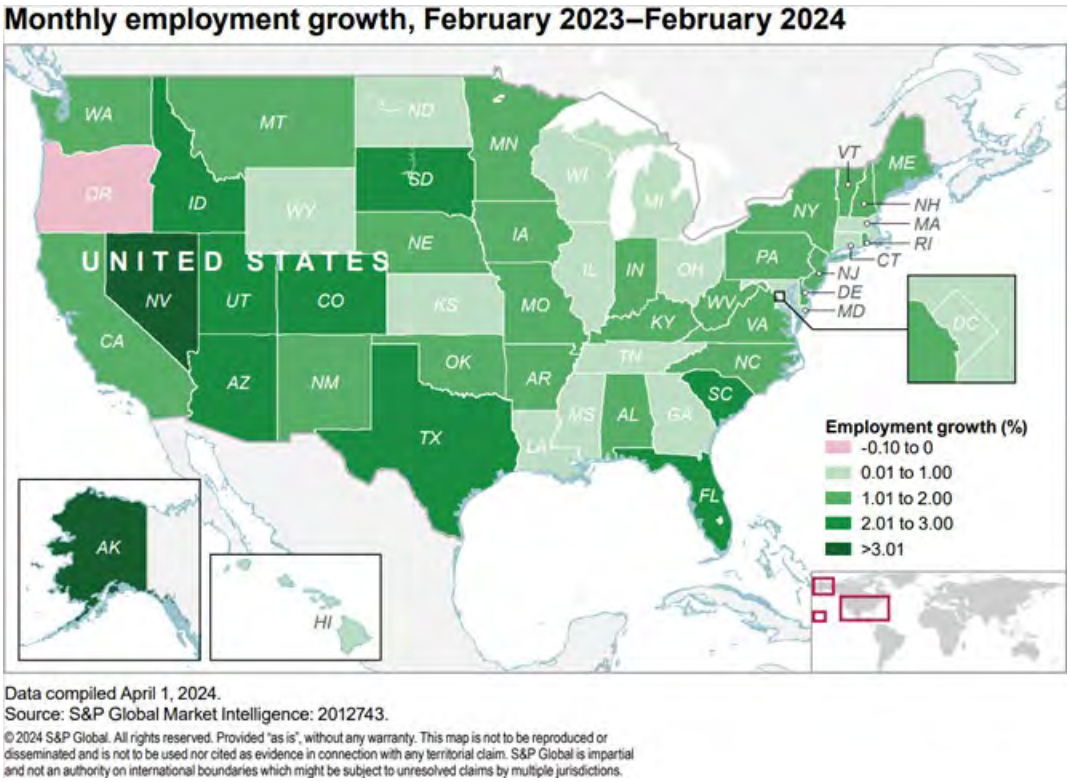
APPENDIX 4 – EMPLOYMENT TRENDS

Background

The material presented in this appendix offers additional insight into recent employment trends and a comparison of forecast details for the MSA. The MSA region includes the counties of Clackamas, Columbia, Multnomah, Washington and Yamhill in Oregon plus the counties of Clark and Skamania in Washington. Additional forecast details for the current UGR job forecast can also be found in another appendix. This appendix offers a narrative of regional job trends torqued by the Great Recession and the more recent pandemic-induced downturn and the impact each had on the subsequent job recovery and adaptation of this information on previous forecast vintages. The information herein includes headline employment trends and unemployment information, sector details, and other work force data for the MSA.

Recent employment trends in the MSA

The trend in MSA-level employment began cycling into negative growth beginning this year. The first three months of 2024 saw the rates of year-over-year (y/y) payroll employment growth for the MSA region fall to -1.9% in January, -1.76% in February and settle to -1.75% decrease in March. The number of unemployed workers went up to 60,000-65,000 in the region during this quarter, a number that is roughly 10,000 more unemployed compared to the annual average number of unemployed workers in 2023. During these last 3 months, the seasonally adjusted unemployment rate for the MSA inched up to 4.2%, up from 3.7% at the end of last year – a sure sign that the regional economy is slowing and the labor market in the region is beginning to loosen.



Data compiled April 1, 2024.
Source: S&P Global Market Intelligence: 2012743.

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Figure 1: Map of year ago payroll employment growth in each state

The labor market in Oregon and specifically the region has been easing more rapidly than compared to national labor trends. Nowhere else in the US has employment growth been worse than here in Oregon. Consequently, the Oregon economy is dead last in y/y job growth as a nearby map of the annual growth in state-level employment indicates. This information is based on Bureau of Labor Statistics (BLS) payroll employment data and compiled by S&P Global.

A year of restrictive monetary policy has led to the region's slower growth in employment. Factors that contributed to this recent slowdown include: 1) ongoing effects of past FED tightening, 2) tightening bank lending standards on loans to businesses and consumers, 3) diminishing economic tailwinds that had boosted growth rates in 2023, 4) strengthening dollar which weighs down exports. The downshift in regional economic activity is shown in both aggregate payroll employment and the gradual rise in MSA unemployment rates. A nearby chart illustrates this step down in MSA payroll employment and the edge up of MSA unemployment rates, with both indicators indicating the onset of a deterioration in the regionwide labor market.

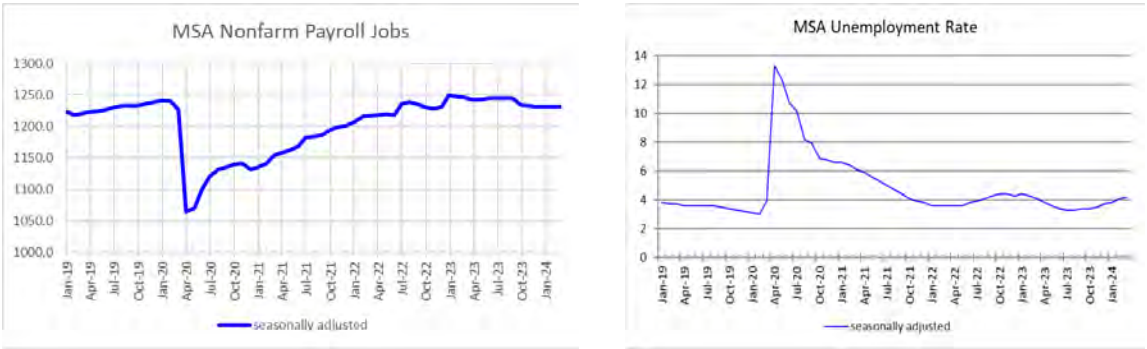


Figure 2: MSA payroll jobs (in thousands) and unemployment rate (in percent) point to a loosening labor market

The nation's central bank engineered an increase to interest rates to slow employment/ economic growth to stem elevated inflation rates. With some lag, signs of labor market weakness in the MSA appeared at the end of 2023, primarily in job sectors most vulnerable to elevated interest rates. Higher rates have made capital expenditure and investments much costlier and riskier to finance. Industries in the region susceptible to the higher cost of obtaining investment funding, such as the information services industry has led the decline in regionwide job growth with jobs in the information sector decreasing -10% (y/y), while the construction industry fell -5.7%, followed closely by the financial services sector declining -5.5%. The manufacturing sector dropped -3.5% from a year ago, led primarily by durable goods producers, which include high-tech and advanced manufacturing industries in this mix.

Interest-sensitive sectors have been leading the dip in regional job growth, but that strain has now carried over into the hiring and employment decisions made in the retail and service sectors. Consumer spending, which centers around service and retail industries, began the year more subdued compared to the second half of 2023. Real consumer purchases in the second half were well over 3% annualized growth. The first quarter of 2024 saw real US consumer spending drift lower to 2.5%, an indication that both high interest rates and elevated inflation rates. The slowdown in US growth has begun to weigh against retailers and service providers and will likely lead to additional erosion in the regional consumer consumption cycle. Hiring and job growth are thus affected by the slower rate of consumer expenditures in the region.

Several counter-cyclical elements of the region's economy remain upbeat, such as in private education, health care, and nonfederal government jobs. However, even these industries are starting to show easing of year-over-year sector growth. There are fewer bright spots that can be pointed to in the region nowadays compared to regional conditions from a year ago.

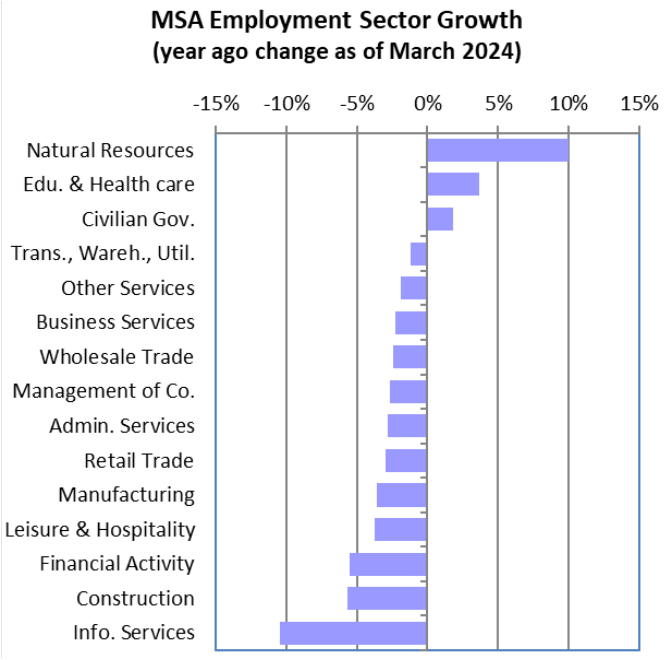


Figure 3: MSA job growth is slowing due to the twin specter of elevated interest and inflation rates of the past year

Pandemic employment recovery

Despite the recent dip in regional employment, the recovery in the MSA since the pandemic's end remains intact. The dip so far is unlikely to be deep nor long lasting if the US can skirt a recession. Most pundits still believe a "soft-landing" is still achievable, one in which the inflation rate declines to about 2% and the labor market loosens without undue hardship, holding unemployment rates below 5%. The macroeconomic advisor (S&P Global | IHS Markit) for the 2024 UGR presents a near-term outlook of slower expansion of real GDP and consumer spending, with macro-economic growth slowing and avoiding an outright recession. Interest rates for the US will remain elevated until later this year to squeeze and force inflation rates to step down to the central bank's preferred target. A period of slower job growth is expected to achieve the price stability sought by the US Federal Reserve (FED). The regional forecast assumes the region will share a similarly muted growth path and an economic outcome consistent with widely held views which incorporate assumptions by the FED and our macro-economic advisor.

The MSA forecast incorporates the assumption of moderate easing in national growth estimates and this is reflected in the downstream economics and demographics assumed of the MSA economy. Slowing growth is not predicated on a recession, anticipating the FED will successfully skirt a downturn while successfully lowering inflation to its long-run expectation of 2% annual growth. Assuming the national economy can ease into a soft-landing, the MSA economy is expected to also settle into a period of easing or slight declines in regional growth.

To date, aggregate employment in the region crested above pre-pandemic employment levels in mid-2022 and has remained above this mark until recently. The leisure and hospitality service industry led all sectors in job growth since the economy was re-opened, but of course this makes sense, since it was the industry that had the sharpest decline overall during the pandemic-induced recession. Medical services buoyed job growth in the health care sector during and after the pandemic. Construction employment also remained highly resilient during and after the pandemic, and only seeing its recent downturn as cost of construction rose sharply with the FED engineering higher interest rates to stem the rise in US inflation. The financial activity sector had largely recovered its modest losses during the pandemic, but recent interest rate hikes have decimated previous recovery gains.

Manufacturing and information services, which depend on capital investments to drive growth, has also slipped in their growth trajectory ever since capital costs rose due to higher interest rates. The cost of building a new home (or apartment building) and the cost of consumer mortgages also rose sharply in the last year, impacting housing affordability (and rents). The steep rise in inflation has lowered consumer purchasing power and made normal household expenditure that much more costly and eating into consumer spending. Higher interest rates have made consumer purchase of "big-ticket" consumer items costlier too. Business investments have been more subdued given higher interest rates. Overall, the economic headwinds have finally begun to drag down demand for payroll employment in the MSA. The recovery in MSA employment peaked about a year ago, and then the FED's shift to a more restrictive monetary stance has had the expected result in easing employment demand.

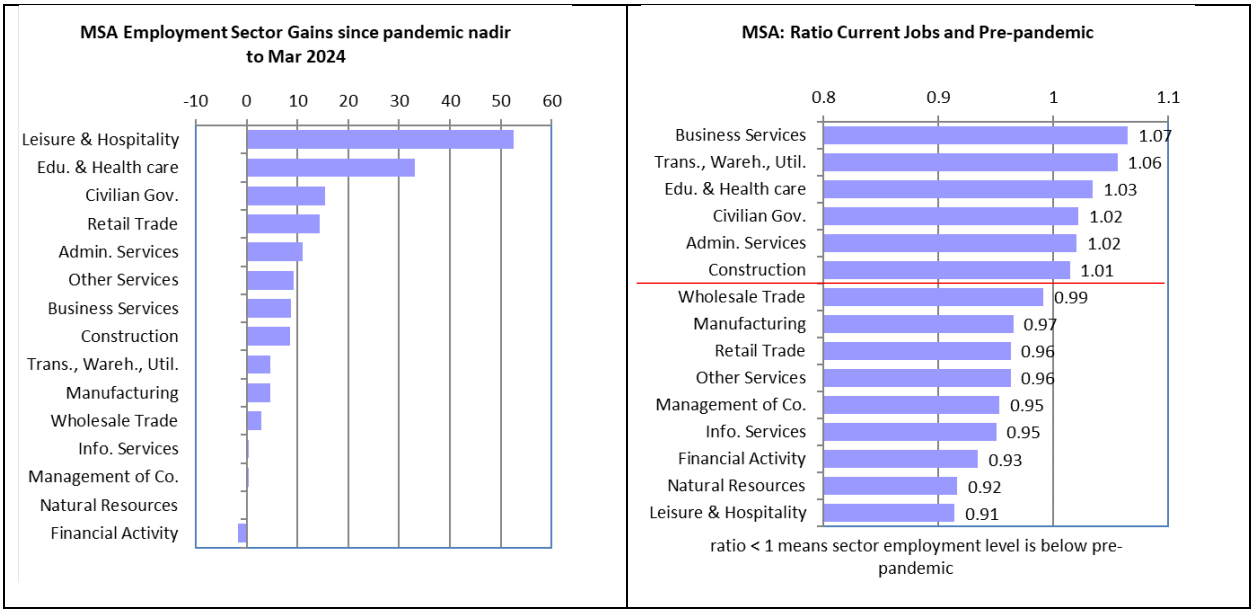


Figure 4

Regional employment growth has slowed and indeed tilted into negative growth. In a nearby chart, industry sectors above the "redline" have current employment levels above what they were before the pandemic, while those below have sagged below employment levels that existed before the onset of the pandemic. Roughly a year ago, all regional sectors had achieved full recovery (i.e., employment above pre-pandemic levels), but that hasn't been the case since the FED shifted its outlook to tightening of monetary policies. There is perhaps greater concern in Oregon for the slowing employment growth because the state ranks dead last in y/y job growth and is either seen as lagging in the recovery or

leading the nation into a soft landing that might just be a bit "harder-landing" here in this state compared to elsewhere in the country.

Regional employment declined roughly to the same degree as the US during the depth of the pandemic. The region carried a slight advantage heading into the pandemic recession, experiencing relatively greater job growth before the pandemic. That advantage disappeared with the ensuing recession. Since reopening of the economy to business, the MSA region has lagged the US. More recently, that lag has grown wider (see nearby chart).

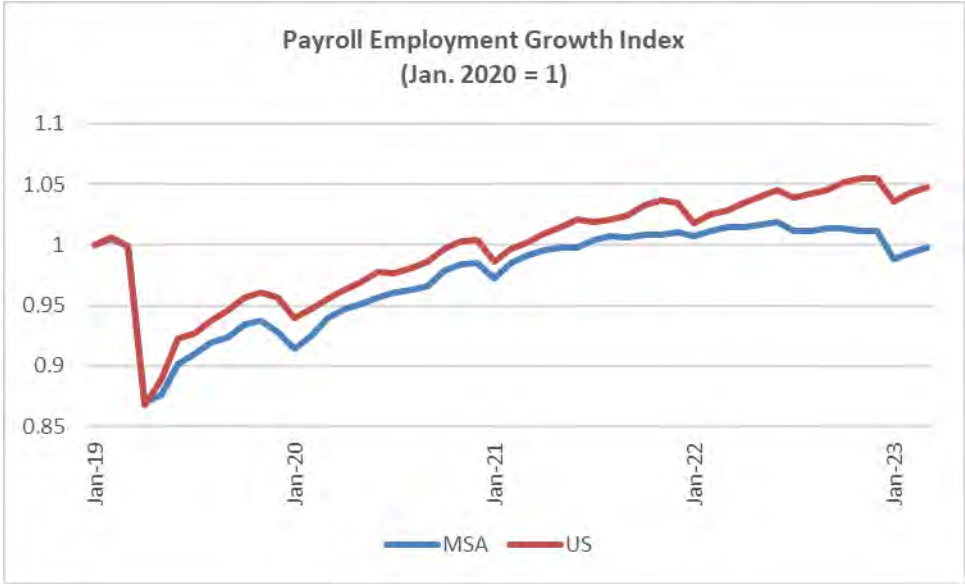


Figure 5: MSA vs. US payroll employment trends since the onset of the COVID pandemic

A brief post-mortem Metro's MSA employment forecasts since the Great Recession

Payroll employment briefly declined more in the region (see nearby chart) than the nation during the Great Recession (2007-09). The regional economy fell sharply after the housing bubble broke. Financial sectors were in turmoil, discombobulated by mountains of bad debt. Major financial institutions went bankrupt while others were forced into merging with more stable and financially stronger firms. While the downturn was less than two years, the initial recovery took 2 to 3 times longer. The recovery was muted by a finance sector unable to respond normally to financial incentives and monetary policies usually capable of elevating a troubled economy. The housing bubble had short circuited many of the financial tools that normally helped heal an ailing economy. As it was, there were moments during the extended recovery period in which the region didn't seem much like one that was rebounding because the pace of growth had been so incrementally slow in materializing. It took almost 5 years for this region to rebound to pre-loss aggregate conditions.

Metro had just completed a regional forecast for the 2010 UGR. It had been near the nadir of the business cycle and was optimistic that regional growth would rebound sharply. However, the reality was that regional growth would be much slower between 2010 and 2015. The 2010 UGR regional employment forecast was in hindsight too optimistic compared to what had actually come to pass.

In 2015, the next UGR cycle, the regional employment forecast partly self-corrected and downshifted future growth in the short-run to reflect the milder growth trend that existed between 2010 and 2015.

Generally, the long-run half of the job forecasted remained moderately optimistic, but the growth trend had been marked down to reflect updated US macro assumptions that pointed to more subdued growth going forward. The reality for the short-run portion for the 2015 UGR forecast was those adjustments over corrected and became too low for the remainder of the decade, compared to the uptick that actually occurred between 2015 and 2019. Regional growth between 2015 and 2019 trended up more quickly than expected (see nearby chart). The long-run portion of the 2015 UGR forecast had been shifted down in part due to the perception that growth in the outyears would be even slower than expected. This less optimistic outlook in the 2015 forecast owed partly to a population forecast that anticipated growth in the future wasn't going to be as fast as what it had been in the prior decade.

In the 2018 mid-cycle periodic UGR, the short-run forecast edged up to compensate for what was by then seen as more robust growth in the latter half of the 2010's, but this adjustment to the new information was itself still shading itself to the lower end of prospective job growth for reasons similar to prior regional forecasts. The 2018 UGR incorporated an even less sanguine national macroeconomic baseline view of economic growth rates in the future. A principal driver was a continuation of demographic factors that began suggesting a lower population trajectory – more baby boomers leaving the work force, fertility rates that were significantly lower than before, and increased recognition of additional economic headwinds. These factors meant more economic turbulence and slower growth, although no pundits back then would have imagined the pandemic-induced shutdown of the global economy. The 2018 UGR employment forecast included near term adjustments that partly lifted the job outlook in the near-term but not to the detriment of drastically lower employment projections in the long run. Consideration of what was then an emerging change in the trend of key demographic components had yet to be fully apparent back then as they are now. Still, the expectation that the labor force supply (i.e., population growth) would be more muted began to influence and tamp down prospects of larger job projections in the outyears of the forecast.

It could be described that each subsequent forecast from the 2010 UGR to the 2018 UGR adapted reasonably well with the data on hand at that juncture in history to help narrow the discrepancy between prior forecasts and actual history. Uncertainty was rising and a directional change in the business cycle was being hinted at by economic data at that time. Growth at the end of the last decade seemed more turbulent as more economic headwinds were perceived which would knock down the longest uninterrupted peace-time expansion in real GDP growth. Economic momentum was already flagging even before the pandemic.

The Great Recession had set in motion a period of that represented significant growth opportunities in the region, but also a greater degree of uncertainty going forward. This is reflected in the gyrations in past employment projections that were at first too high and then subsequent ones in which growth projections in the region were lowered. At these midpoints, the first forecast adjustment was too low and that adjustment was revised up in the last regional forecast before this 2024 UGR employment forecast.

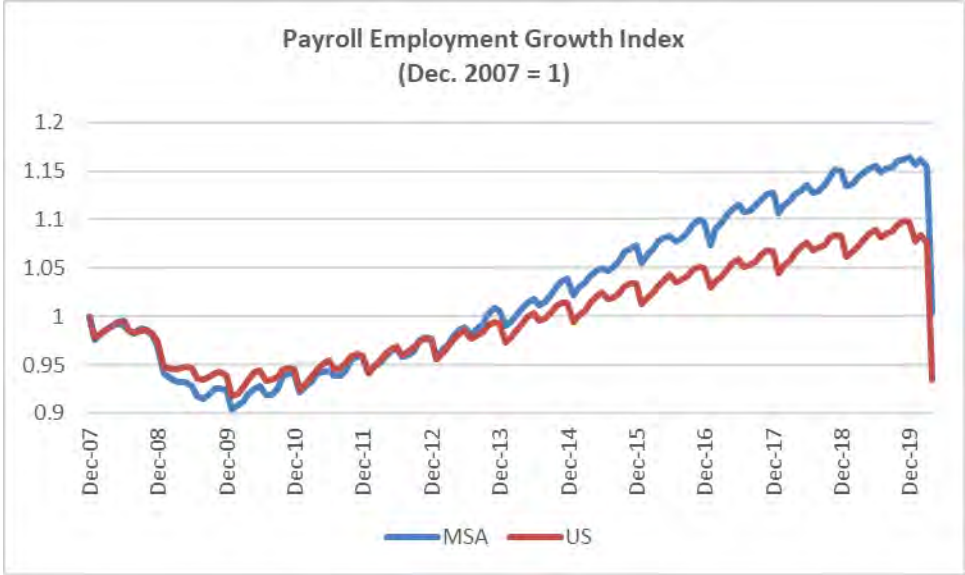


Figure 6: MSA vs. US payroll employment trends since the start of the Great Recession

In now, the current 2024 UGR regional forecast, the projections have the benefit of over a decade of hindsight and incorporates the latest base year course corrections to the regional forecast. However, even so, there is potentially more uncertainty that now exists in the aftermath of the pandemic-induced recession. A great many more post-pandemic questions about what might be the "new normal" and the economic trends that have either accelerated or emerged in the latest aftermath.

Some of the new trends which are visible today include:

- Accelerated and elevated shares of employees working from home or in a hybrid work setting;
- Elevated rates of office vacancy, with some office leases still needing to be renegotiated in the next year or so as longer-term leases continue to expire;
- Artificial intelligence and its implications on future work and industry;
- Rise of mercantilism (and protectionism) in industrial policies.

Forecast table of prior vintages: 2010 UGR, 2015 UGR, 2018 UGR and 2024 UGR

MSA Employment Forecast	*previous regional forecast assumptions*						*current forecast*		year 2019 forecast			comparison of 2040 forecast year		
	circa 2009 US macro		circa 2014 US macro		circa 2017 US macro		circa 2023 US macro		difference from 2019 actual			vs. current 2040 forecast		
	2010 UGR		2015 UGR		2018 UGR		2024 UGR							
(Employment figures in thousands)	2019	2040	2019	2040	2019	2040	2019 (actual)	2040	2010 UGR	2015 UGR	2018 UGR	2010 UGR	2015 UGR	2018 UGR
Nonfarm Wage & Salary Jobs, TOTAL	1,244.2	1,707.4	1,206.4	1,571.3	1,214.3	1,432.3	1,228.0	1,365.4	1.3%	-1.8%	-1.1%	25%	15%	5%
Manufacturing, TOTAL	127.0	133.8	122.5	127.2	127.6	117.7	129.3	126.3	-1.8%	-5.3%	-1.3%	6%	1%	-7%
Durables, total	96.1	102.5	92.9	100.0	94.9	88.7	95.3	93.9	0.8%	-2.5%	-0.4%	9%	6%	-6%
Wood Products	4.9	4.4	4.6	3.8	4.1	4.2	4.0	3.4	22.2%	14.8%	1.4%	30%	11%	24%
Primary Metals	5.7	4.3	5.2	4.4	6.1	4.9	6.2	4.2	-7.1%	-15.4%	-0.9%	2%	3%	16%
Fab. Metals	12.5	11.9	13.3	12.3	13.2	11.1	13.4	13.6	-6.8%	-0.8%	-1.8%	-13%	-9%	-19%
Machinery Mfg.	7.9	7.3	8.7	7.9	9.8	8.6	10.1	9.1	-21.9%	-13.9%	-2.7%	-20%	-14%	-7%
Computer & Electronics	36.6	44.2	39.4	51.1	37.8	40.8	37.5	41.1	-2.3%	5.1%	0.8%	8%	24%	-1%
Transp. Equipment	9.9	10.9	6.5	4.8	6.8	6.2	7.4	4.7	33.3%	-12.0%	-7.6%	133%	4%	32%
Other Durable Goods	18.6	19.5	15.1	15.8	17.1	13.0	16.7	17.8	11.1%	-9.4%	2.2%	9%	-11%	-27%
Nondurables, total	30.9	31.3	29.6	27.2	32.7	28.9	34.0	32.4	-9.1%	-13.1%	-3.8%	-3%	-16%	-11%
Food Processing	9.6	9.4	9.9	9.5	13.9	13.1	13.6	14.0	-29.4%	-27.2%	2.1%	-33%	-32%	-7%
Paper	4.9	4.8	3.1	1.8	2.7	1.9	2.5	2.0	100.2%	26.6%	8.2%	142%	-9%	-2%
Other Nondurables	16.4	17.2	16.6	15.9	16.2	13.9	18.0	16.4	-8.8%	-7.9%	-9.8%	5%	-3%	-15%
Nonmanufacturing (private), TOTAL	959.5	1,362.9	919.6	1,229.7	927.0	1,118.4	946.1	1,075.9	1.4%	-2.8%	-2.0%	27%	14%	4%
Natural Resources & Mining	1.5	1.2	1.8	1.3	1.4	0.9	1.3	1.5	16.9%	35.4%	6.1%	-20%	-18%	-42%
Construction	68.5	93.0	70.8	110.9	74.2	94.0	76.0	103.6	-9.9%	-6.8%	-2.4%	-10%	7%	-9%
Trade, Transport & Utilities	269.9	345.1	254.5	317.7	245.0	262.8	221.8	231.7	21.7%	14.8%	10.5%	49%	37%	13%
Wholesale Trade	69.7	92.0	65.5	82.7	56.7	60.2	57.3	60.8	21.6%	14.3%	-1.1%	51%	36%	-1%
Retail Trade	121.8	144.6	121.9	150.7	118.8	127.4	118.1	130.0	3.1%	3.2%	0.6%	11%	16%	-2%
TWU	49.5	65.4	41.1	46.1	43.2	41.1	46.3	40.9	6.7%	-11.4%	-6.7%	60%	13%	0%
Information Services	29.0	43.1	26.1	38.3	26.3	34.0	26.4	29.9	9.8%	-1.2%	-0.3%	44%	28%	14%
Financial Activities	87.2	119.8	67.8	78.7	73.4	81.6	73.5	77.2	18.6%	-7.8%	-0.2%	55%	2%	6%
Pro. Business Services	178.5	265.0	190.5	270.5	189.9	253.7	190.0	233.0	-6.0%	0.3%	0.0%	14%	16%	9%
Education + Health	185.0	301.2	173.0	240.8	175.9	237.7	188.0	218.6	-1.6%	-8.0%	-6.4%	38%	10%	9%
Leisure + Hospitality	119.6	164.2	120.0	151.0	125.7	140.5	126.4	130.2	-5.4%	-5.1%	-0.6%	26%	16%	8%
Other Services	49.3	73.4	41.4	58.9	41.6	47.2	42.8	50.2	15.4%	-3.3%	-2.8%	46%	17%	-6%
Government, Civilian TOTAL	157.7	210.7	164.3	214.4	159.6	196.3	152.6	163.2	3.3%	7.7%	4.6%	29%	31%	20%
Federal, Civilian	18.1	18.1	16.8	18.6	17.8	19.3	18.4	18.7	-1.6%	-8.6%	-3.5%	-3%	-1%	3%
State & Local	139.5	192.5	147.5	195.8	141.8	177.0	134.2	144.4	4.0%	9.9%	5.7%	33%	36%	23%

2024 UGR Appendix 5A: residential development indicators

Background

To better understand how to plan for future housing needs in the region, it is useful to put in context the type and density of residential development trends in recent years. This report provides residential development data required under ORS 197.296 (the "needed housing" statute) and data specified by ORS 197.301 (metropolitan service district performance measures). Data is provided at the regional level for the Metro Urban Growth Boundary. This appendix addresses most aspects of ORS 197.301; except 197.301 (2)(c) which is reported in the "employment trends" appendix of this UGR, 197.301(2)(e)(h)(i) are dealt with in other reports, and 197.301(f) of which data are incomplete and of limited accuracy.

Data sources:

RLIS Housing Inventory
RLIS Vacant and Developed Land
RLIS Land Development Monitoring System

Terms and definitions:

Vacant land refers to a tax lot (or parcel) which has no detectable structure or any other form of development or building on that site. It can be of any size. Vacant land is determined by administrative records (such as assessors' records) and GIS techniques which can detect the absence of structures on the site. Exceptions: (1) a partially developed tax lot which has less than 5% of the total site area with a development on it is included in the vacant land inventory for purposes of the UGR; (2) a site that was once developed but has become fallow, (abandoned and/or unused), and the structure removed since 1993 is also included in with vacant land.

Infill refers to additional development that occurred on a tax lot (or parcel) that was already deemed developed (i.e., not vacant) in Metro's land inventory, where the original structure has been left intact. Infill is adding more residential units to the tax lot with an already existing development or splitting that "parent" lot into separate "child" lots and adding additional structures or buildings to the parent and/or child lots.

Redevelopment refers to additional development that occurred on a tax lot (or parcel) that was deemed "developed" in Metro's land inventory, in which the original structure was demolished to make room for the new construction. Redevelopment may or may not involve subdividing or reconfiguring the original site to accommodate the new development. Note: additional redevelopment capacity is only counted when the new construction nets more building square footage (in the case of nonresidential development) or net new residential units (typically the new structures are middle housing or apartments/ condos that replace a razed structure with fewer units).

Housing categories:

Single family (SFR) are single housing units, typically one-per-taxlot.

- **Single family detached** have a land use designation of SFR (translated from PCA codes), and do not share walls with other housing units. Some may have condominium-style ownership.
- **Other SFR** units include single residences on designated farm or forest land, and mixed home/businesses with only one residence.

Middle Housing are any housing units that share walls or common area(s), but not stacked vertically. They may include condominium-style ownership, and/or share commonly owned land like a pool, playground or clubhouse.

- **Townhouses** (or rowhouses) are dwelling units constructed in a row of multiple attached units. Townhouses share at least one common wall and may each have their own tax lot.
- **Duplex, Triplex, Quadplex** are residential structures composed of side-by-side units, sharing common floor-to-ceiling wall(s), with no other units above or below.
- **Accessory Dwelling Units (ADU)** is a second dwelling unit created on a lot with at least one SFR unit, attached house or manufactured home. The ADU is created auxiliary to, and is smaller than, the main dwelling. ADUs can be created in a variety of ways, including conversion of a portion of an existing house, addition to an existing house, conversion of an existing garage, or the construction of an entirely new building. The unit count of ADU (and year built) is tabulated separately from the parent house in the residential inventory.
- **Cottage Clusters** are residential structures with four or more individual units. Each unit is 900 square feet or less and built on a shared taxlot or sharing a common space among all units.

Multifamily housing are housing units that are stacked vertically. Some multifamily properties are mixed-use, typically with on-site, ground-floor commercial space.

- **Lowrise** apartments and condominiums, under 5 floors and under 50 feet tall, and often include multiple buildings within a property.
- **Midrise** apartments and condominiums, with 5-12 floors or 50-140 feet tall.
- **Highrise** apartments and condominiums, over 12 floors or greater than 140 feet tall.

Other Housing are any housing units not included in single family, multifamily, or middle housing as defined above.

- **Dormitories** are shared residential units associated with educational institutions.
- **Retirement Facilities** are a planned community or facility associated with retired or senior cohorts.
- **Manufactured homes** are semi-mobile housing units associated with shared common area(s), such as a mobile home park or trailer park.
- **Floating homes** are dwelling units floating on water, typically multiple units on a single dock with a shared shore access point. Unit counts are for residential units, and do not include non-residential slips or other structures.
- **Other MFR** is any other type of multi-unit welling not described above.

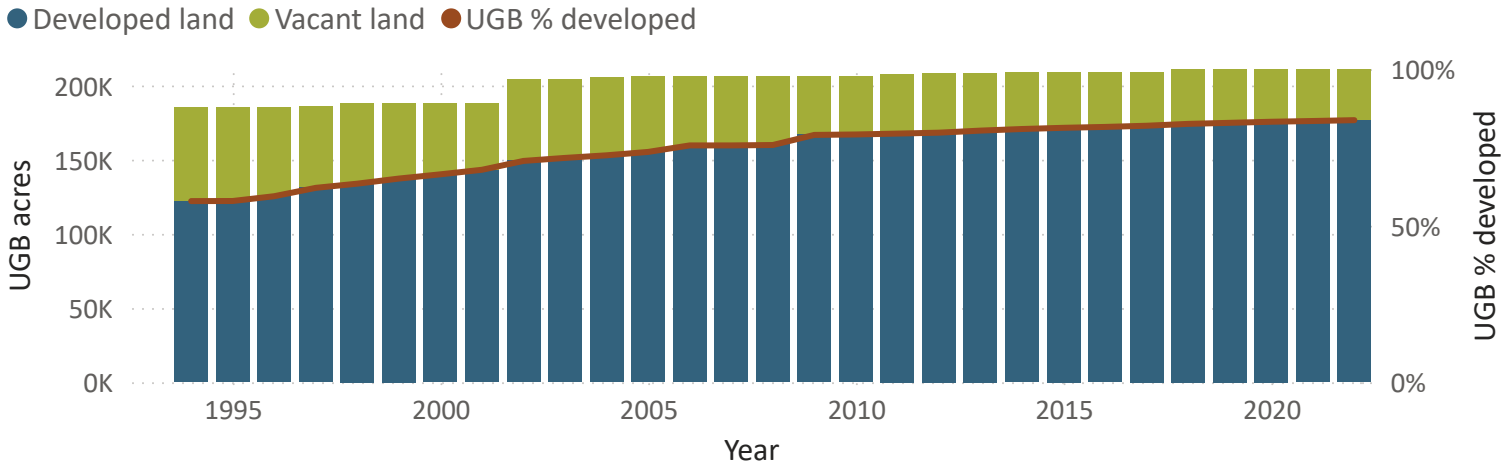
This report generally focuses on gross new units. This differs from total reported building permits, in that it reflects an estimate of what was actually built, rather than all issued permits, some of which don't get built or are later modified to change unit counts. Current totals minus recently built totals may not give the same number as 'before' totals, as unit teardowns are included in 'before' totals.

UGB Land Usage

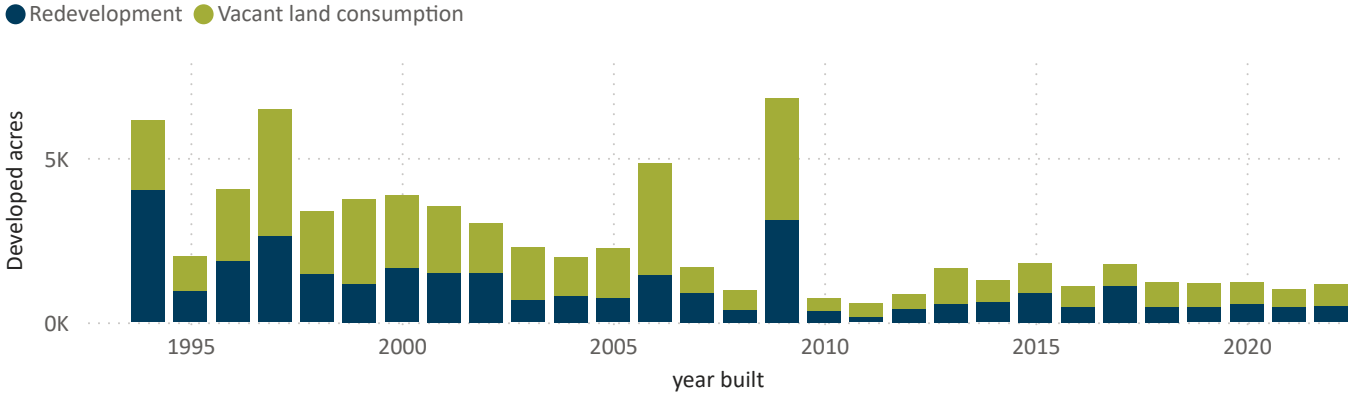
Development type (vacant/infill/redevelopment) is identified as a regional indicator under ORS 197.296 and 197.301

The Urban Growth Boundary was created in 1979 to control urban expansion onto farm and forest lands. The original boundary of 227,000 acres has expanded to 261,000 acres today. The largest expansion was 17,300 acres in 2002. Today, 49,400 acres of the UGB are right-of-way including water, roads, and easements.
In 1993 Metro began mapping vacant and developed land. The chart below shows total acres of vacant vs. developed land inside the UGB over time. Typically, expansions add mostly vacant land to the boundary, which slowly becomes developed over time. The charts below exclude all land that is right-of-way today.
As the UGB has become more developed, we have come to depend more on redevelopment to accommodate future development.

UGB land usage



Acres developed by year



Acres by zoning type as of 2022

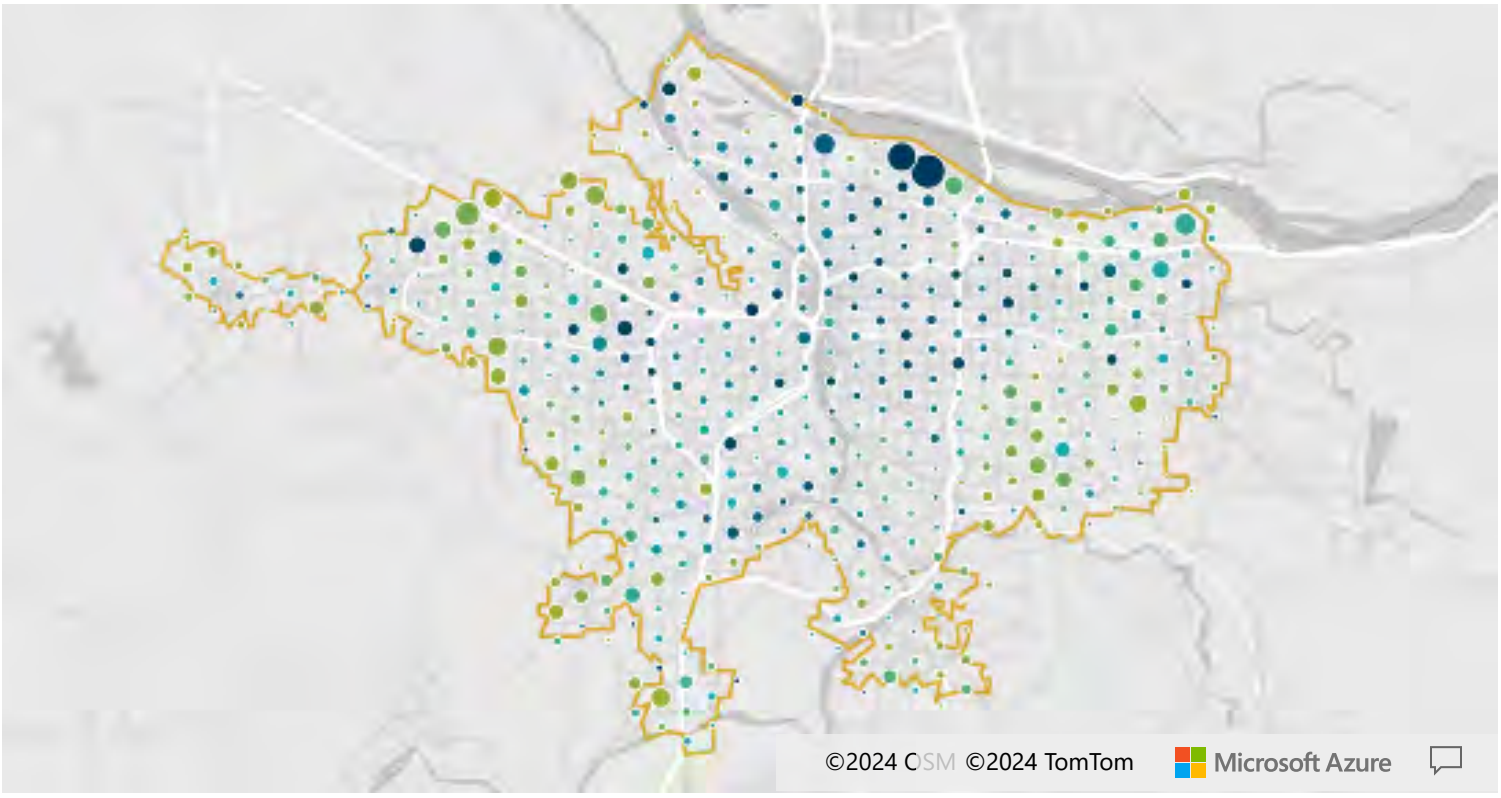
Zoning	Total Acres	Vacant acres	% Developed
Single Family	98,835	10,764	89%
Industrial	34,738	7,596	78%
Parks and Open Spaces, other zoning	23,294	676	97%
Rural or Future Urban Zoning	19,359	11,617	37%
Mixed Use	15,992	1,785	89%
Multifamily	15,603	1,100	93%
Commercial	3,760	368	90%
Total	**211,581**	**33,907**	**84%**

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Development Acres- Where is Development Happening?

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301

Geographic distribution of new construction within the Urban Growth Boundary

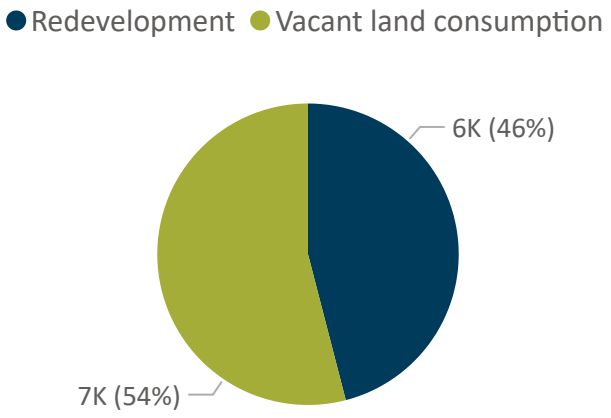


The map above shows relative distribution of acres of new construction within the Urban Growth Boundary (yellow line). The size of the dot represents the total number of acres developed. A green dot represents consumption of vacant land, while a dark blue dot represents more redevelopment, or construction on previously developed land. A light blue dot is a mix of vacant land consumption and redevelopment.

Acres of new development by development type, 2013 to 2022

Zoning	Redevelopment	Vacant land consumption	Total
Single Family	2,019	2,787	**4,806**
Industrial	2,000	1,993	**3,993**
Mixed Use	933	941	**1,874**
Multifamily	416	579	**994**
Parks and Open Spaces, other zoning	452	393	**845**
Rural or Future Urban Zoning	144	368	**512**
Commercial	148	126	**275**

Total acres of new development



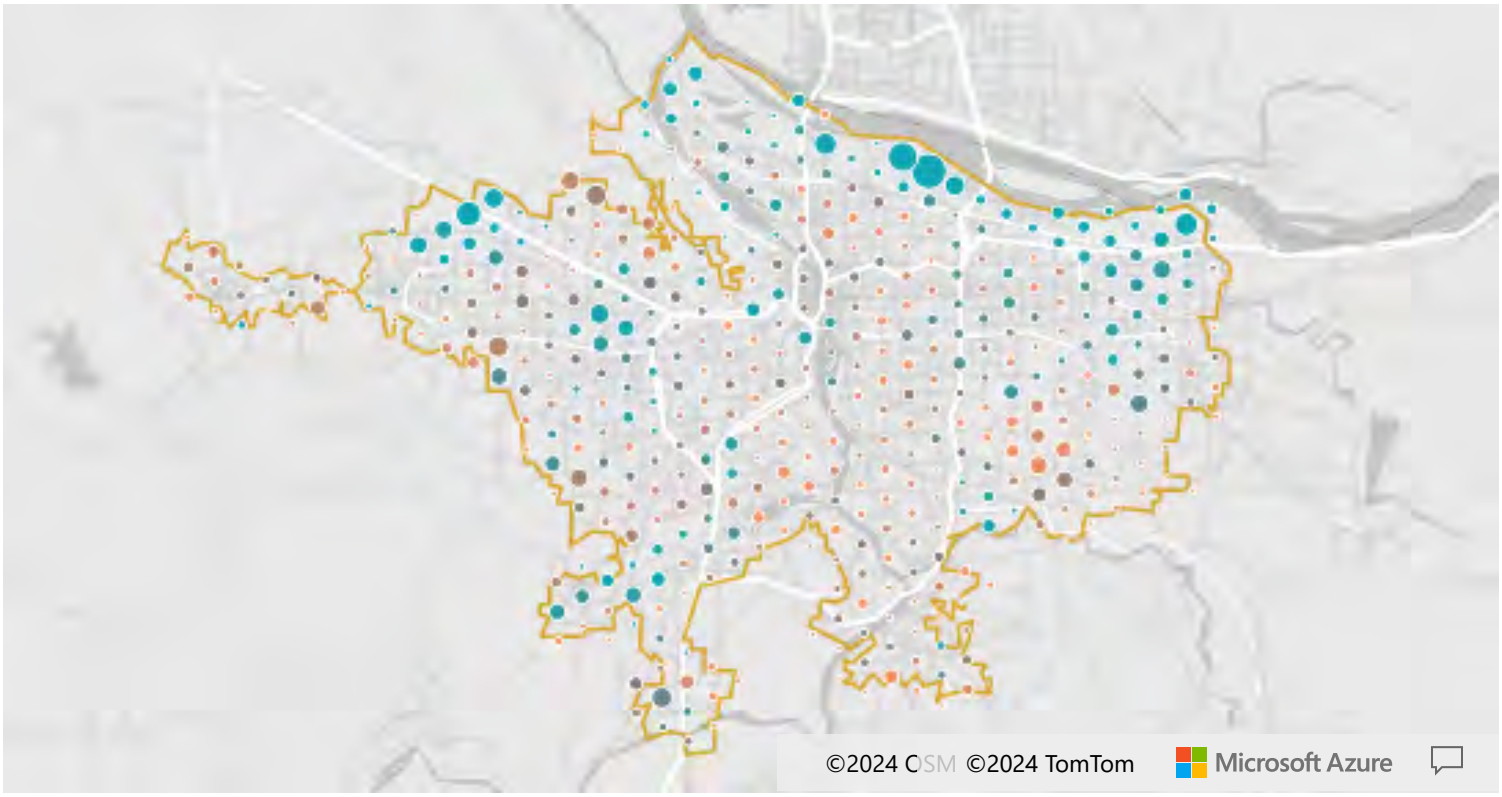
- A total of 13,300 acres were developed between 2013 and 2022. 7,187 acres of that (54 %) were consumption of vacant land.
- Single Family zoning had the most redevelopment, at 2,019 acres (33 % of all redevelopment)
- The zoning type that consumed the most vacant land was Single Family, at 2,787 acres.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Where is Residential vs Non-Residential Development Happening?

Residential and employment land are identified as a regional indicators under ORS 197.296 and 197.301

Geographic distribution of new construction within the Urban Growth Boundary

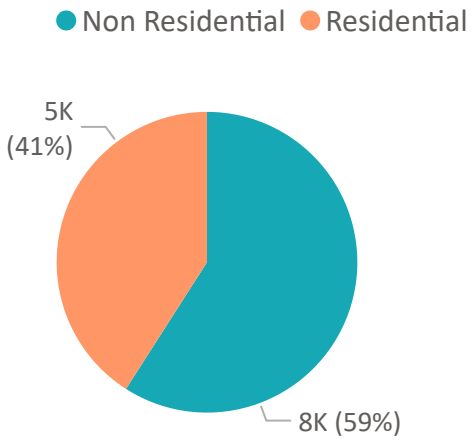


The map above shows relative distribution of acres of new construction within the Urban Growth Boundary (yellow line). The size of the dot represents the total number of acres developed. A light blue dot represents commercial construction, while an orange dot represents residential construction. A grey dot is a mix of residential and commercial.

To 10 areas of development by total acres, 2013 to 2022

Value	Total acres developed	% residential
NE Portland	1,812	18%
Hillsboro	1,431	30%
Beaverton	853	23%
SE Portland	843	57%
Gresham	838	28%
N Portland	797	20%
Happy Valley	633	80%
Tigard	473	57%
Troutdale	455	5%
SW Portland	444	43%

Total acres of new development



- Residential and non-residential development were distributed across the region, but the most acres of development were in NE Portland with 1,812 acres.
- A total of 5,446 residential acres were developed since 2013, 41 % of all development.
- Non-residential development affected 7,854 acres.

- Acres on this page calculated by taxlot, and may differ from per-unit of housing.

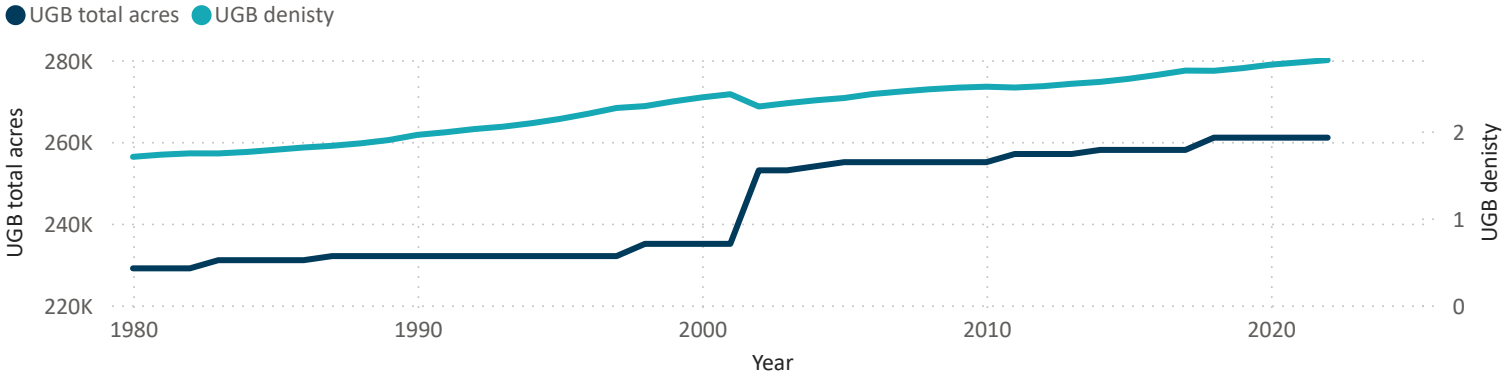
Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

UGB Housing Density

Development density is identified as a regional indicator under ORS 197.296 and 197.301

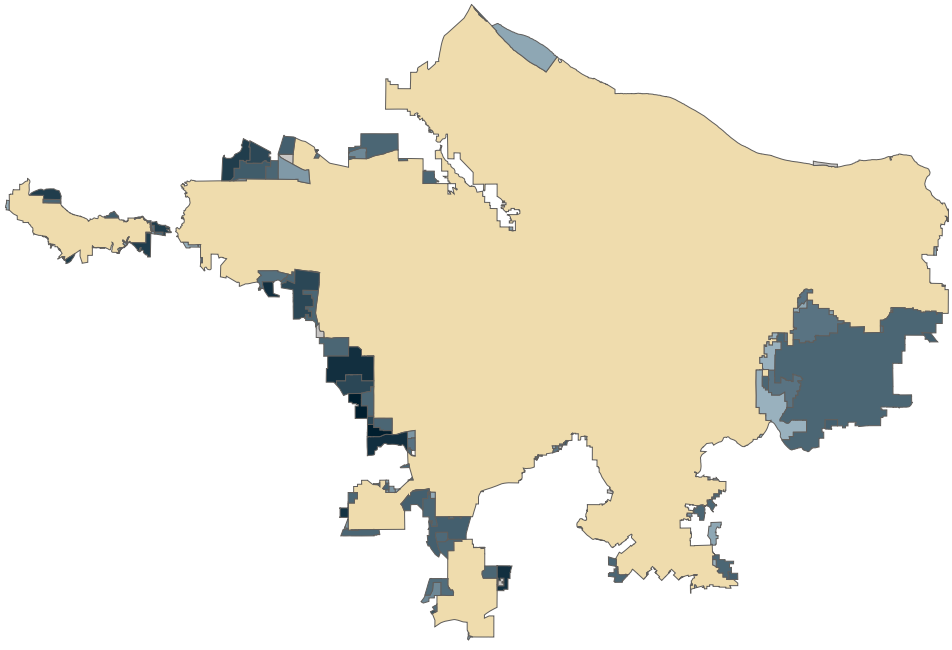
The Urban Growth Boundary was created in 1979 to control urban expansion onto farm and forest lands. The original boundary of 227,000 acres has expanded to 261,000 acres today. The largest expansion was 17,300 acres in 2002.

Total UGB acres



Housing production in the region has continued both on the edges of the UGB in expansions areas, and in the interior of the original UGB. Overall, 83 % of housing built in the last 10 years has been inside of the original 1979 UGB. The total density of the UGB has increased from 1.70 to 2.82 units/acre (calculated as total UGB units / total UGB acres).

Current Metro Urban Growth Boundary, by year added.



The map above shows the Metro Urban Growth Boundary today. The tan area is the original 1979 UGB. Expansion areas are represented in blue tones, with darker blue representing more recent expansions.

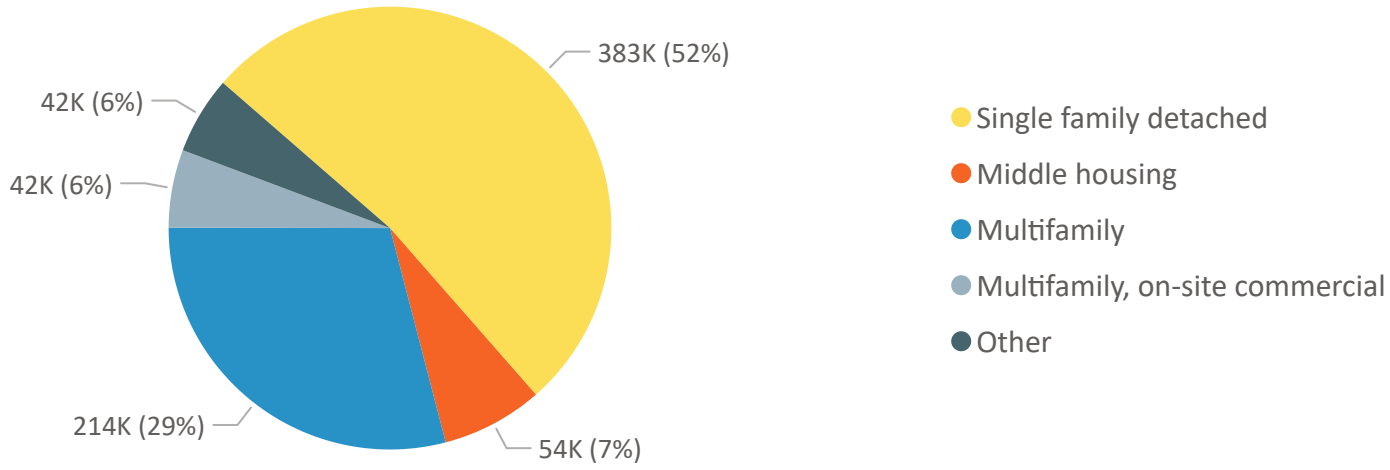
- Unit density on this page calculated as total UGB units / total UGB acres as of 2022

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Housing Today

Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

As of 2022 There were 735,295 total housing units inside the UGB



Housing type	Total units	% of all units	Units/acre average	% growth over range *
Single family detached	383,491	52%	4.1	8%
Middle housing	54,444	7%	13.8	20%
Multifamily	213,875	29%	23.2	17%
Multifamily, on-site commercial	41,819	6%	103.4	112%
Other	41,666	6%	12.3	10%
Total	**735,295**		**6.6**	**14%**

* Range = 2013 to 2022

- As of 2022 there were 735,295 total housing units inside the UGB.
- The number of housing units inside the UGB has grown by 14% since 2013.
- Overall, the most abundant type of housing by total unit count is Single family detached with 383,491 units (52 % of all units).
- Multifamily has grown the most in total units over the past 10 years, adding 30,407 units and growing by 17 %.
- Multifamily, on-site commercial has grown by 112 % since 2013, adding 22,058 units.

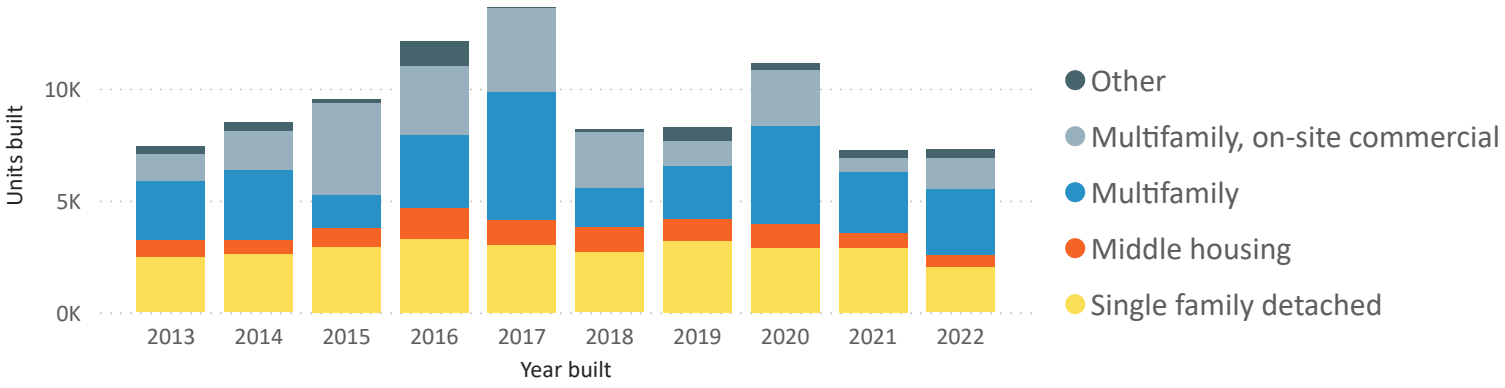
- Units per acre on this page includes all housing inside the UGB as of 2022
- Accessory Dwelling Units excluded from acre calculations on this page

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Housing Production Trends

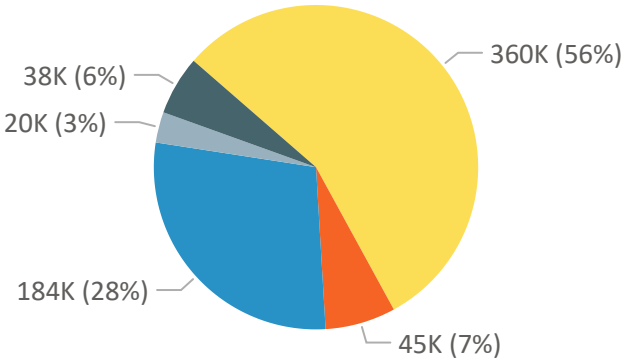
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

Units built per year by housing type

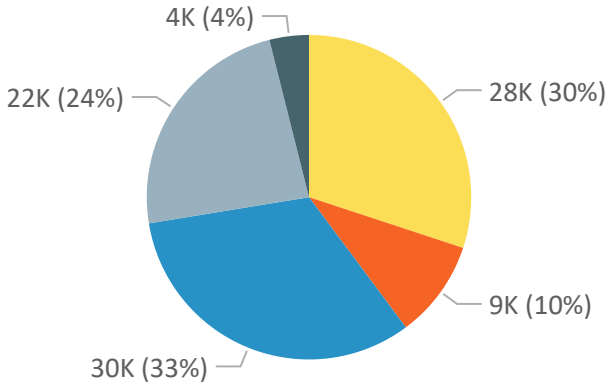


- Total housing units in the region grew by 14 % since 2013, adding 93,262 units.
- The composition of housing in the region is changing. As we build more densely on previously developed land, we have built proportionally less single family homes, and proportionally more multifamily and middle housing.
- Of the housing built since 2013, Multifamily, on-site commercial has been the most dense unit type, adding 22,058 units with an average of 101.2 units/acre.
- The largest housing type by total acres developed was Single family detached, developing 4,264 acres with a density of 6.6 units/acre.

Composition of housing built prior to 2013



Composition of housing built 2013 and after



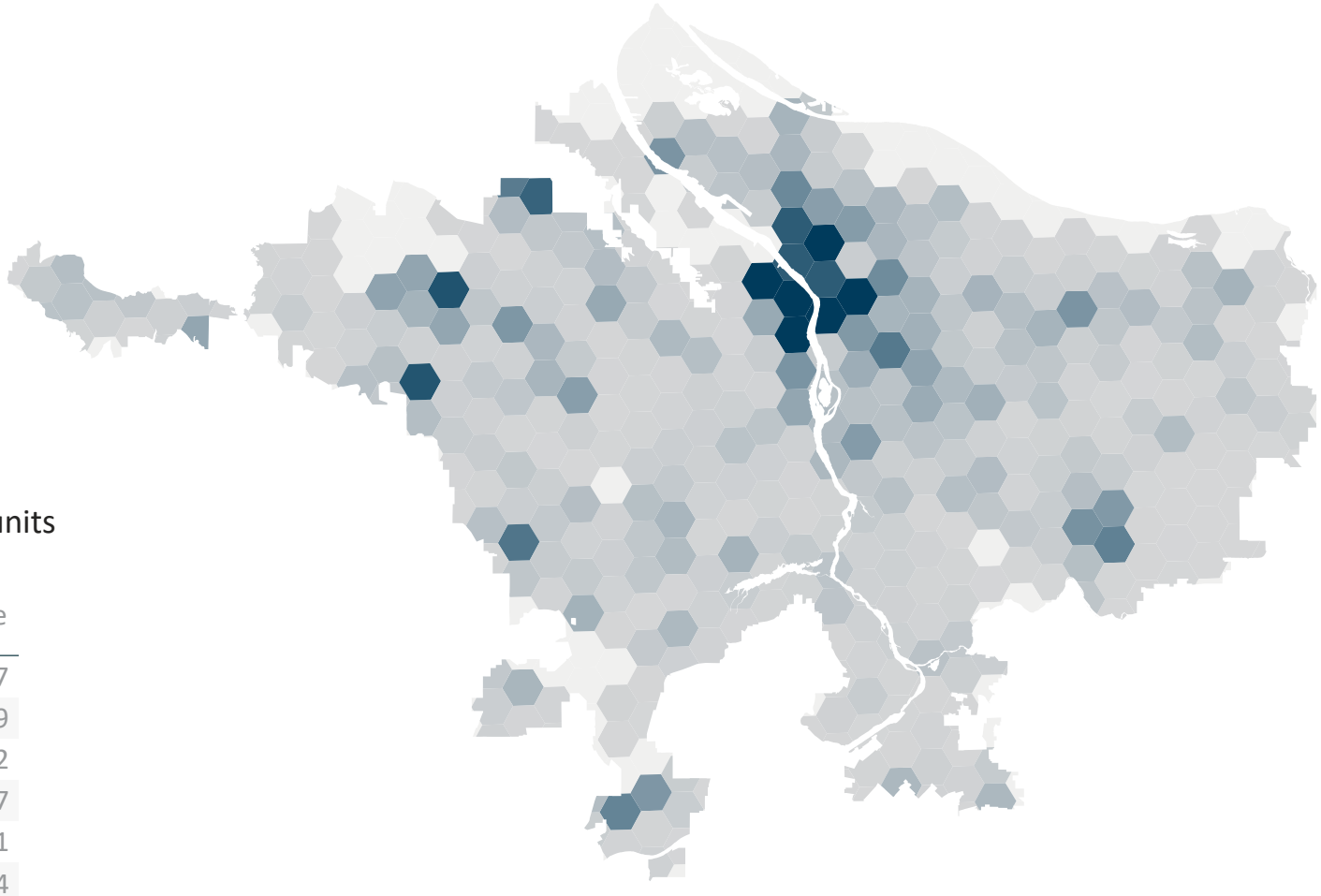
Housing type	New units built	Acres built	density of new units (units/acre)
Single family detached	28,035	4,264.2	6.6
Middle housing	9,098	266.8	19.8
Multifamily	30,407	612.0	49.7
Multifamily, on-site commercial	22,058	217.9	101.2
Other	3,664	132.5	27.7
Total	**93,262**	**5,493.4**	**16.3**

- Unit density on this page includes only new housing inside the UGB built since 2013.
- Accessory Dwelling Units excluded from acre calculations on this page

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

New housing, total new units by area

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301



To 10 areas of new residential units built 2013 to 2022

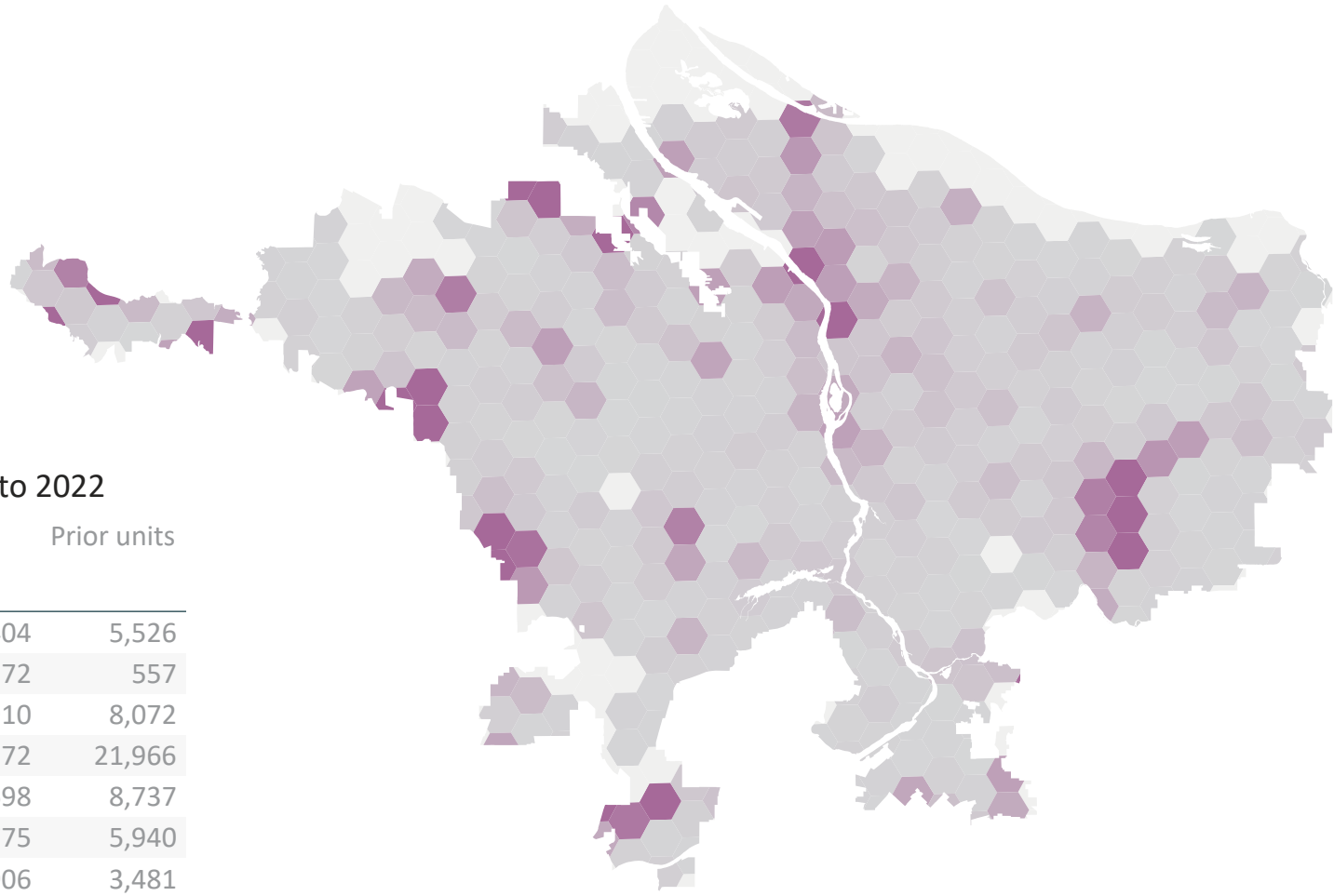
Value	Units built over range
SE Portland	14,387
NE Portland	11,879
NW Portland	8,172
N Portland	7,727
Hillsboro	7,131
SW Portland	5,234
Happy Valley	4,404
Bethany	3,910
Beaverton	3,870
Tigard	3,512

The map above shows where new housing has been built in the region. Dark blue hexagons represent more housing units. The darkest blue represents over 2k new units built in that hexagon.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

New housing, % growth by area

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301



To 10 highest % growth areas 2013 to 2022

Value	% growth over range	Units built over range	Prior units
Happy Valley	80%	4,404	5,526
Durham	67%	372	557
Bethany	48%	3,910	8,072
NW Portland	37%	8,172	21,966
Wilsonville	31%	2,698	8,737
S Portland	30%	1,775	5,940
Cornelius	26%	906	3,481
N Portland	26%	7,727	29,753
Rivergrove	24%	40	169
Forest Grove	19%	1,596	8,240

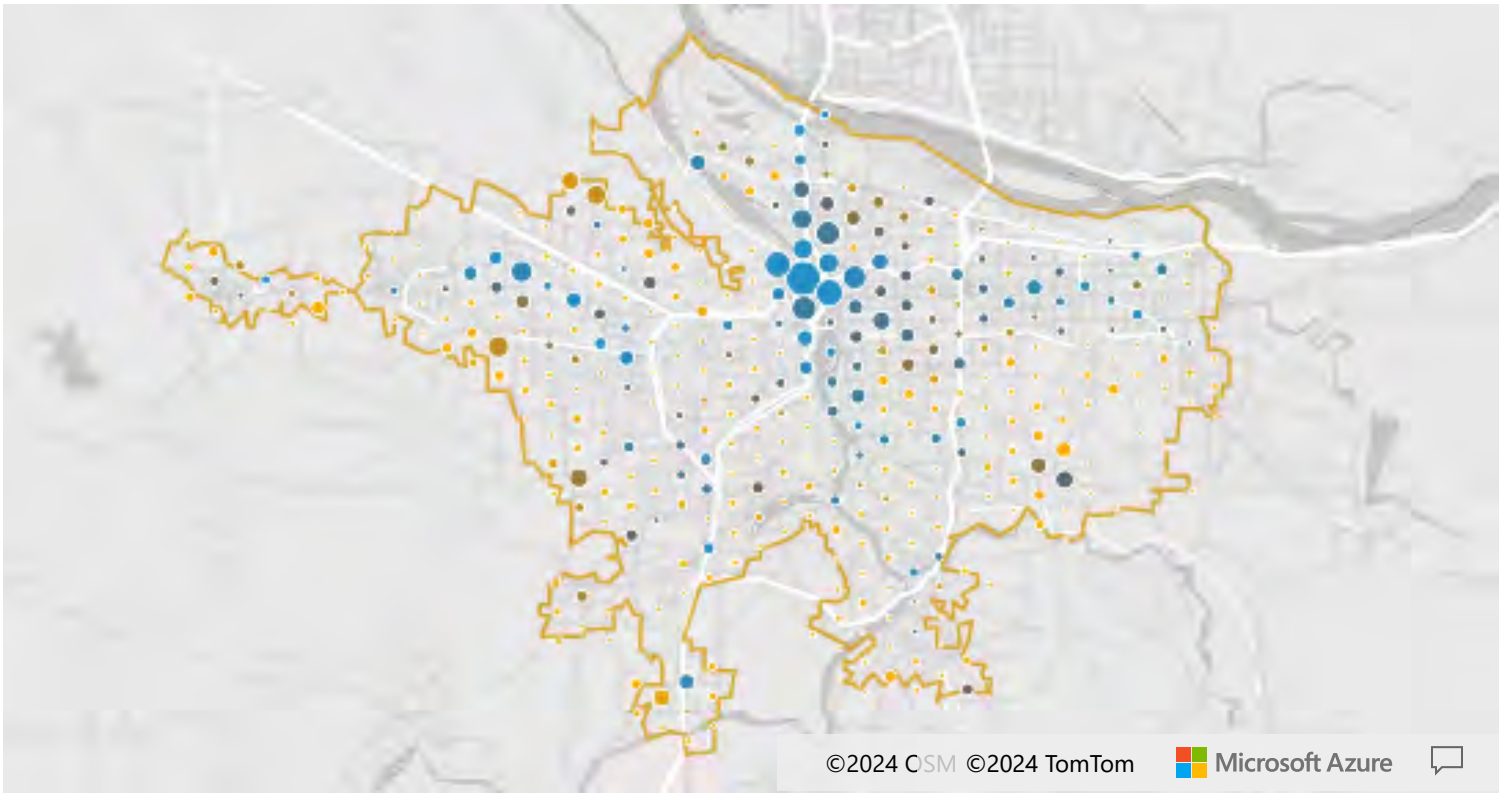
The map above shows areas that are growing quickly relative to the number of previous housing units in that area. Areas that have added more housing units compared to previous units appear dark purple. Newly developing suburbs stand out, like Happy Valley and Bethany, but also former industrial areas like NW Portland.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Location of Recent Residential Construction

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301

Geographic distribution of new housing units built within the Urban Growth Boundary

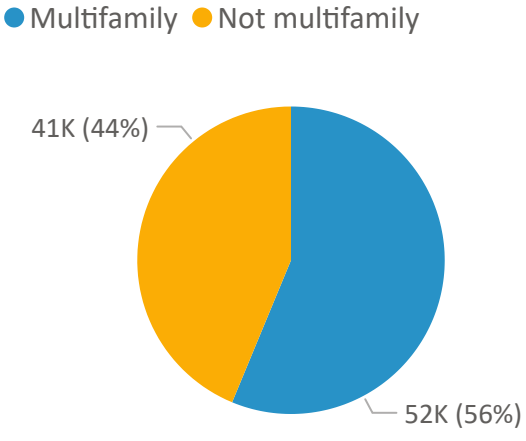


The map above shows relative numbers of new housing units built in the region, and the share of those units that are Multifamily. Multifamily here includes properties with on-site commercial. The largest dot represents 5k new units. A blue dot represents more multifamily units, and a yellow dot represents more other types of units. Generally, Multifamily has been more prominent in the more-dense urban core and interior of the region. Other types of housing like Single-family and Middle Housing have been more prominent on the edges of the region.

To 10 areas of new residential units built 2013 to 2022

Value	Total new units	% MFR
SE Portland	14,387	63%
NE Portland	11,879	68%
NW Portland	8,172	97%
N Portland	7,727	70%
Hillsboro	7,131	51%
SW Portland	5,234	72%
Happy Valley	4,404	25%
Bethany	3,910	18%
Beaverton	3,870	66%
Tigard	3,512	45%

Composition of housing built 2013 and after

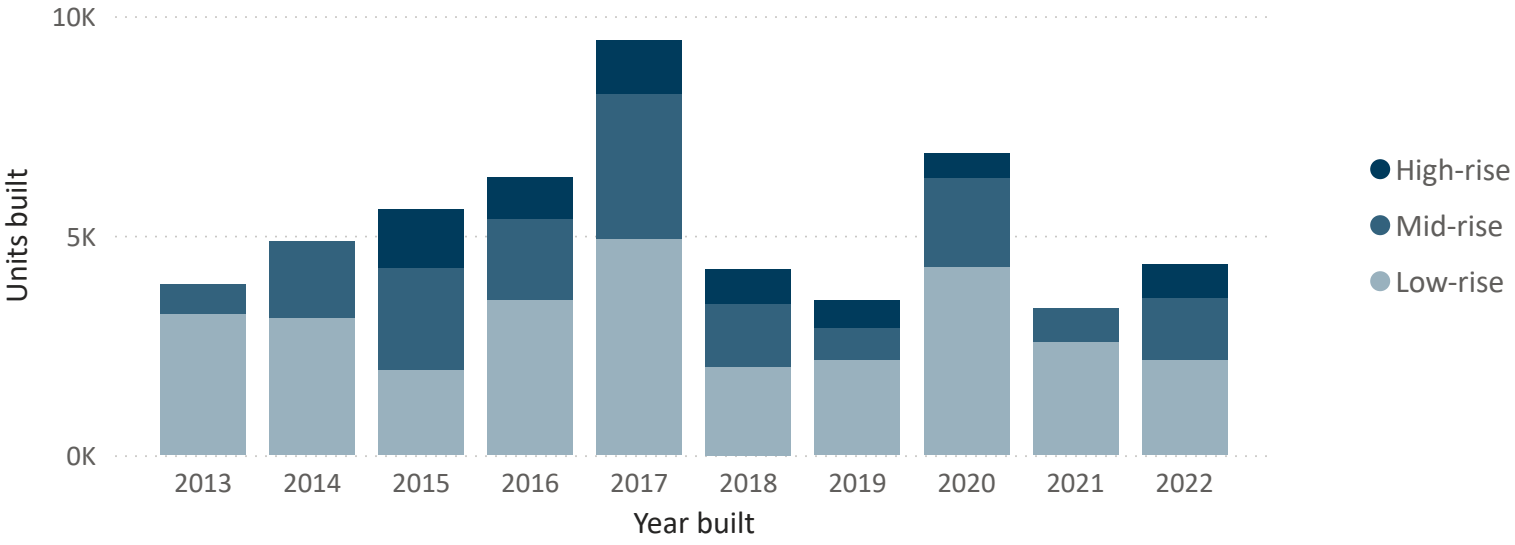


Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Multifamily Construction Trends

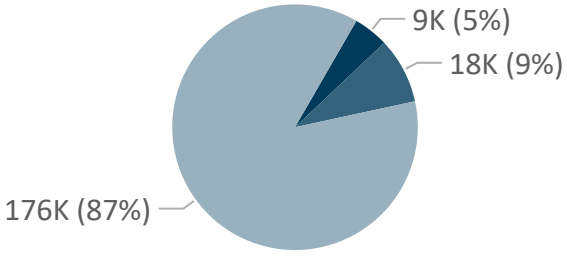
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

Units of Multifamily housing built per year by housing type

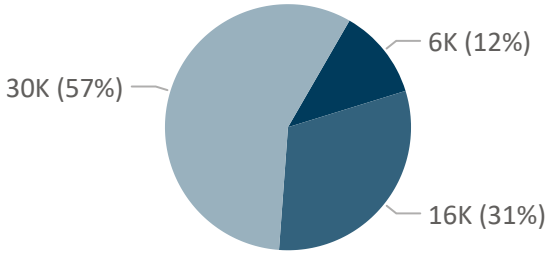


- Multifamily housing in the region grew by 26 % since 2013, adding 52,465 units.
- The most-built type of Multifamily housing was Low-rise, adding 29,993 units (57 % of all Multifamily)
- Of the new units built since 2013, High-rise units have been built at the highest density, adding 6,241 units on only 22 acres- an average of 286.4 units/acre.
- The type of Multifamily housing with the most new total acres was Low-rise, developing 29,993 units on 683 acres.

Composition of multifamily housing built prior to 2013



Composition of new multifamily housing built 2013 and after



ShortDesc	New units built	Total units today	Acres built	density of new units (units/acre)	% growth over range
High-rise	6,241	15,626	21.8	286.4	66%
Mid-rise	16,231	33,821	125.2	129.6	92%
Low-rise	29,993	206,086	682.8	43.9	17%
Total	**52,465**	**255,533**	**829.9**	**63.2**	**26%**

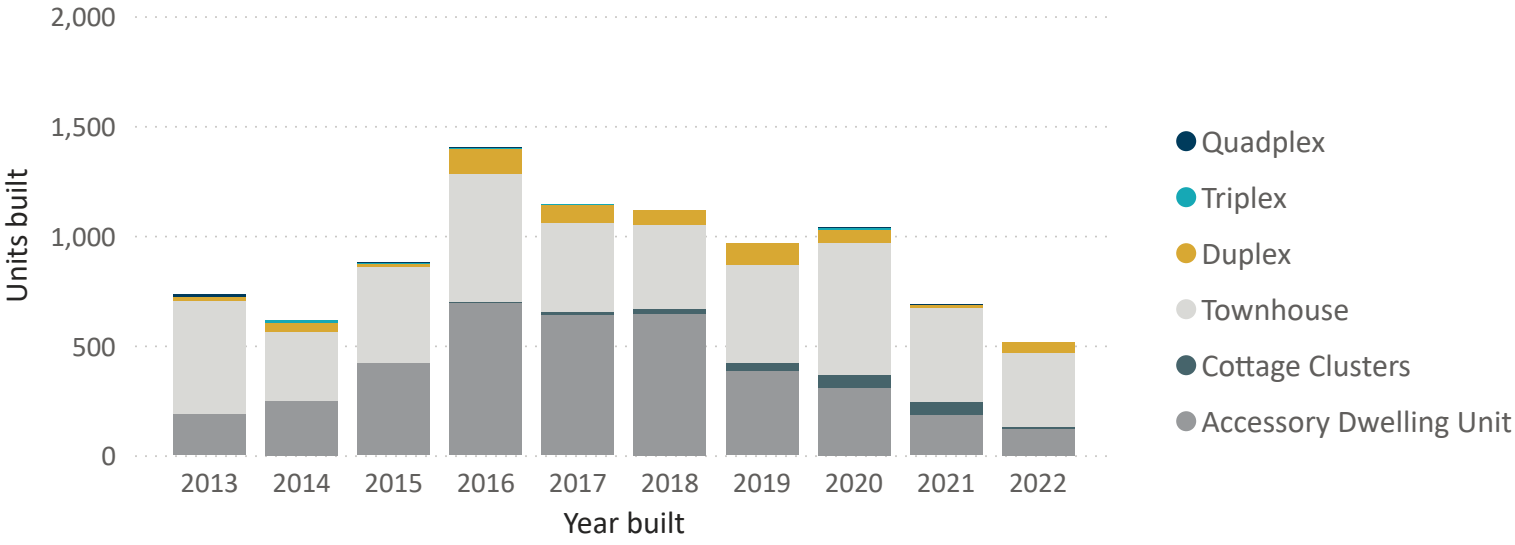
- Multifamily here includes properties with on-site retail/commercial

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Middle Housing Construction Trends

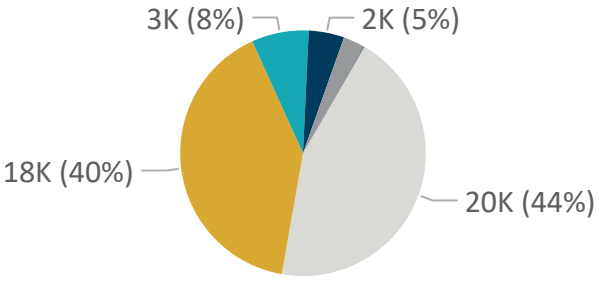
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

Units of middle housing built per year by housing type

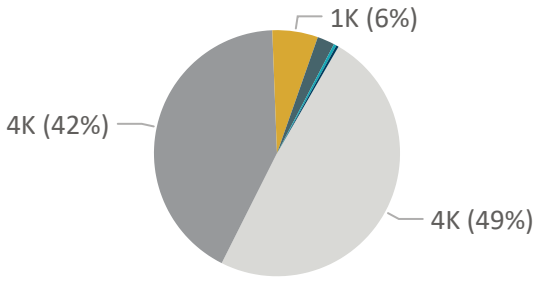


- Middle housing in the region grew by 20 % since 2013, adding 9,098 units.
- The most-built type of Middle housing was Townhouse, adding 4,466 units (49 % of all Middle housing)
- Of the new units built since 2013, Triplex units have been built at the highest density, adding 33 units on only 1 acres- an average of 30.4 units/acre.
- The type of Middle housing with the most new total acres was Townhouse, developing 4,466 units on 219 acres.

Composition of middle housing built prior to 2013



Composition of new middle housing built 2013 and after



ShortDesc	New units built	Total units today	Acres built	density of new units (units/acre)	% growth over range
Quadplex	28	2,160	1.0	27.7	1%
Triplex	33	3,449	1.1	30.4	1%
Duplex	546	18,931	33.5	16.3	3%
Townhouse	4,466	24,720	219.4	20.4	22%
Cottage Clusters	207	250	11.8	17.6	481%
Accessory Dwelling Unit	3,818	5,095			298%
Total	**9,098**	**54,605**	**266.8**	**19.8**	**20%**

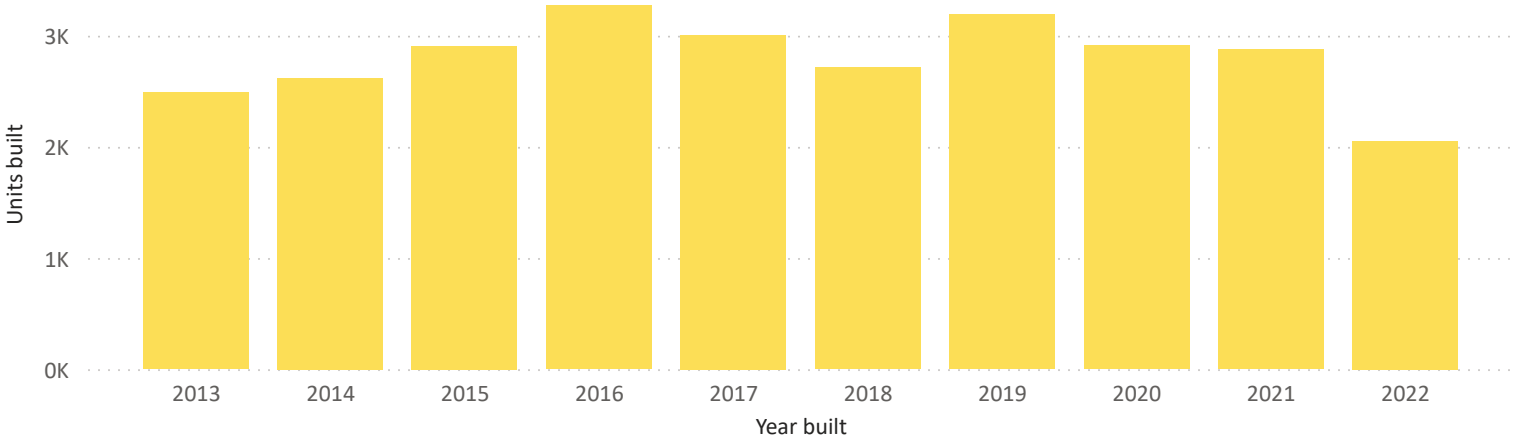
- Acreage of ADUs are not included, as they are accessory to other housing.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

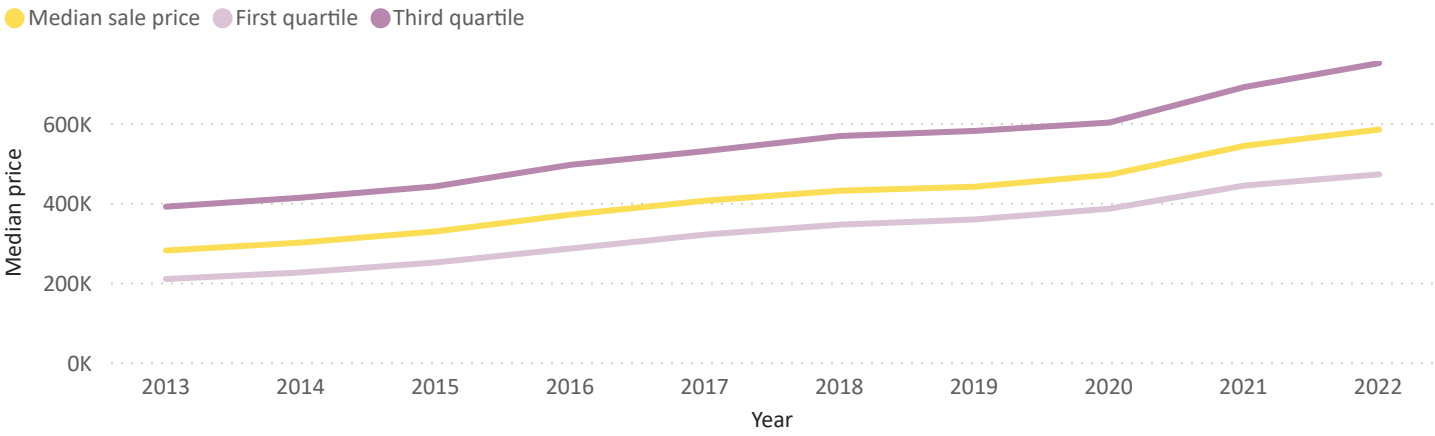
Detached Single family homes

Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

Detached single family homes built per year



Median sale price of single family homes



The bar chart at top shows units of Single family detached homes built each year from 2013 to 2022.
The lower figure shows first, median (second) and third quartiles of single family home sale prices over the past 10 years. This is for all available sales in that year, regardless of when the home was built.

- Single family detached housing in the region grew by 8 % since 2013, adding 28,035 units on 4,264 acres- an average density of 6.6 units/acre.
- Generally, we are building larger houses on smaller lots. This uses land space more efficiently, but does not provide as many new 'starter homes' for first-time home buyers.
- The median building size of new homes since 2013 was 2,363 square feet (sqft), 575 sqft larger than the median building size of 1,788 sqft for all single family homes built prior to 2013.
- The median lot size of new homes was 0.11 acres, 0.06 acres smaller than the median property size of 0.17 acres for all previously existing single family homes.
- The median sale price of Single family homes increased from $279,995 to $583,424 over the past 10 years, an increase of 108 %

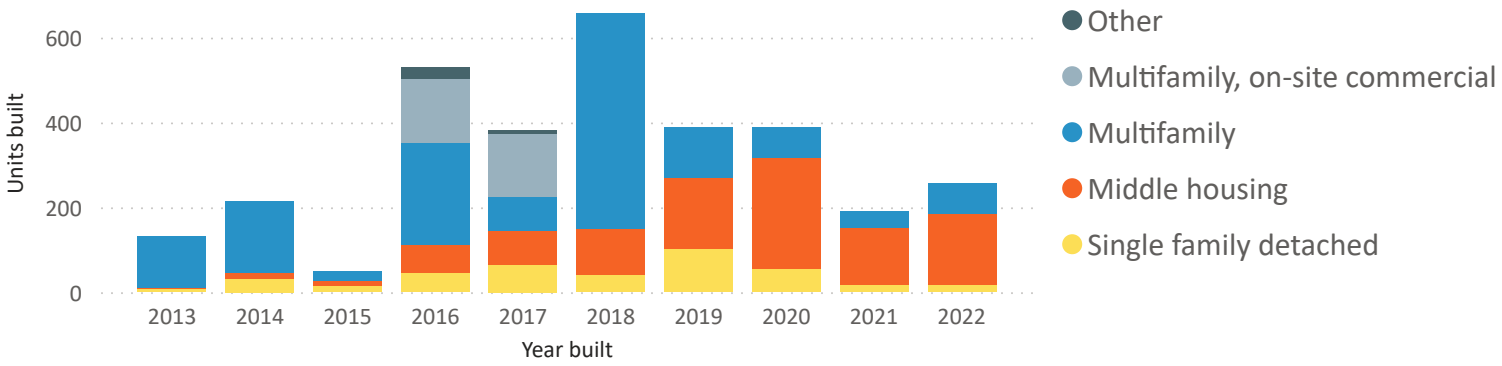
- Home sales from RLIS taxlot sale date/price, published quarterly. This dataset may omit some home sales, specifically 'flipped' houses where the taxlot sells twice in a single quarter. This figure may also omit sales of homes where the taxlot ID has changed over time through property division.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Condominium Ownership

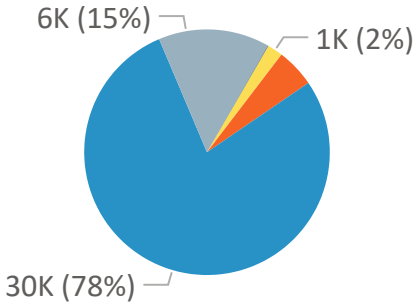
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).
Condominium ownership is where each unit or structure of a property is individually owned, but the land is commonly owned by a condo association representing all owners. Condominium ownership is independent of physical construction, and a taxlot with a single owner could later be sold to the residents and divided into condo units. Ownership for this report is from the most recent available RLIS data, and may not reflect the ownership style during original construction. Senate Bill 458 allowed additional lot divisions for middle housing, including options for condominium ownership.

Units built per year by housing type

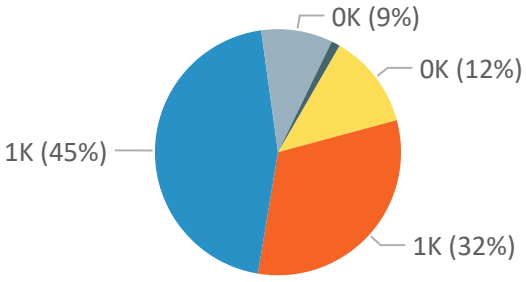


- Condominium units are only 6 % of all regional housing today. A total of 3,191 condo units were built between 2013 and 2022 (3.4 % of all units built in that period).
- The most-built type of housing with condo ownership was Multifamily, adding 1,442 units (45 % of all condo units).
- Of the new units built since 2013, Multifamily, on-site commercial units have been built at the highest density, adding 300 units on only 1.8 acres- an average of 163.3 units/acre.

Composition of condominium units built prior to 2013



Composition of condominium units built 2013 and after



UGR housing type	New units built	Total units today	Acres built	density of new units (units/acre)
Single family detached	398	1,183	31.0	12.8
Middle housing	1,015	2,970	45.5	19.6
Multifamily	1,442	31,511	54.6	26.4
Multifamily, on-site commercial	300	5,930	1.8	163.3
Other	36	64	5.4	6.7
Total	**3,191**	**41,658**	**138.3**	**22.2**

- Accessory dwelling units, by definition for the RLIS Housing dataset, cannot have condo ownership- if they are individually owned 'condo style' units, then they are no longer 'accessory' and are put into another category.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

New Housing by Development Type

Development type (vacant/infill/redevelopment) is identified as a regional indicator under ORS 197.296 and 197.301

Housing type	New units built	Acres built	% of new units built on vacant land
Single family detached	28,035	4,264.2	64%
Middle housing	9,098	266.8	40%
Multifamily	30,407	612.0	43%
Multifamily, on-site commercial	22,058	217.9	39%
Other	3,664	132.5	62%
Total	**93,262**	**5,493.4**	**49%**

New unit denisty (units/acre) by development type

Housing type	Infill/ Redevelopment	Vacant land consumption	**Total**
Single family detached	5.4	7.5	**6.6**
Middle housing	17.1	21.3	**19.8**
Multifamily	71.9	35.1	**49.7**
Multifamily, on-site commercial	148.0	67.4	**101.2**
Other	28.9	26.9	**27.7**
Total	**18.8**	**14.4**	**16.3**

Unit density of Single family and Middle housing tends to be lower on infill/redevelopment compared to vacant land consumption. One reason for this is optimal use of space on large, greenfield sites compared to working with available space on infill/redevelopment sites.

Multifamily (with and without on-site commercial) tends to be much higher density on redevelopment sites, mainly because redevelopment tends to happen closer to the urban core where zoning requires/allows higher density, compared to greenfield development on the edges of the region where densities are not as high.

- Of the 93,262 units built since 2013, 45,318 (49 %) were on previously vacant land.

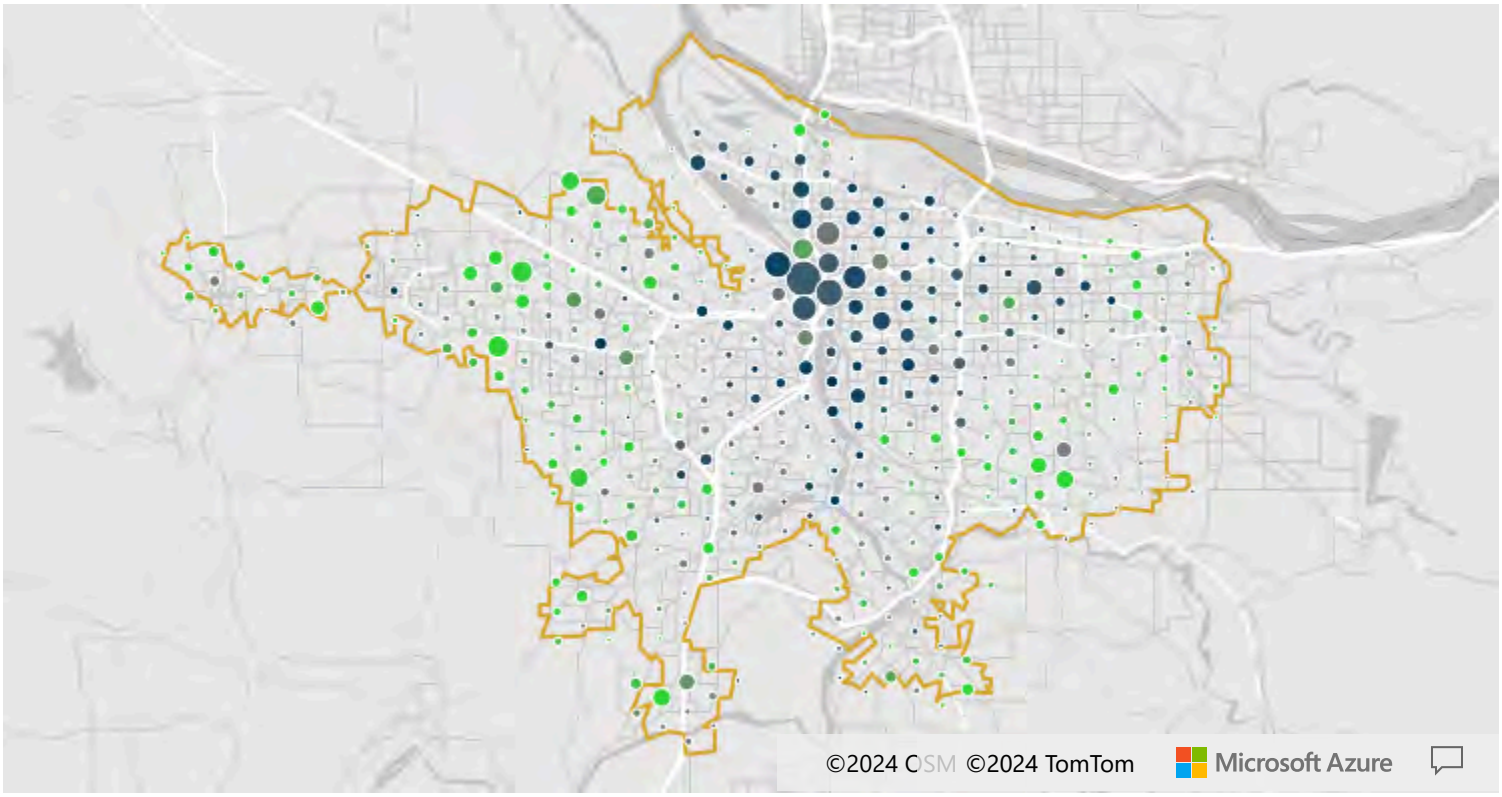
- Unit density on this page includes only new housing inside the UGB built since 2013.
- Acres calculated from total property area from Housing Inventory.
- Accessory Dwelling Units excluded from acre calculations on this page.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Where is Residential vs Non-Residential Development Happening?

Development type (vacant/infill/redevelopment) is identified as a regional indicator under ORS 197.296 and 197.301

Geographic distribution of new housing units built within the Urban Growth Boundary

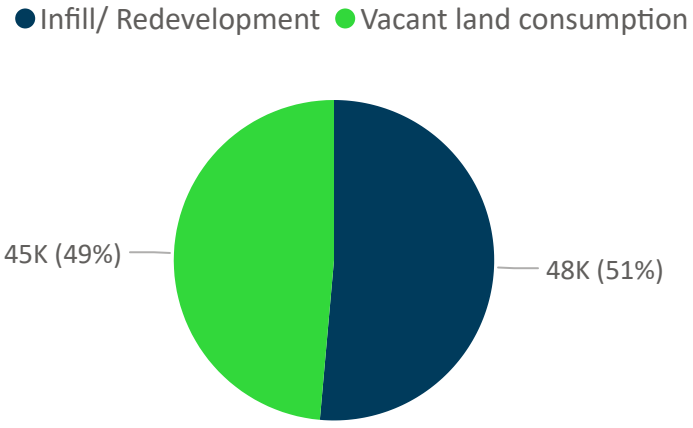


The map above shows relative distribution of new housing units built within the Urban Growth Boundary (yellow line). The size of the dot represents the total number of new units built. A light dark blue dot represents more redevelopment, while an green dot represents vacant land consumption. A grey dot is a mix of both.

To 10 areas of new residential units built 2013 to 2022

Value	Units built over range	% new units on vacant land
SE Portland	14,387	18%
NE Portland	11,879	29%
NW Portland	8,172	26%
N Portland	7,727	24%
Hillsboro	7,131	90%
SW Portland	5,234	19%
Happy Valley	4,404	87%
Bethany	3,910	84%
Beaverton	3,870	72%
Tigard	3,512	69%

Total new units built

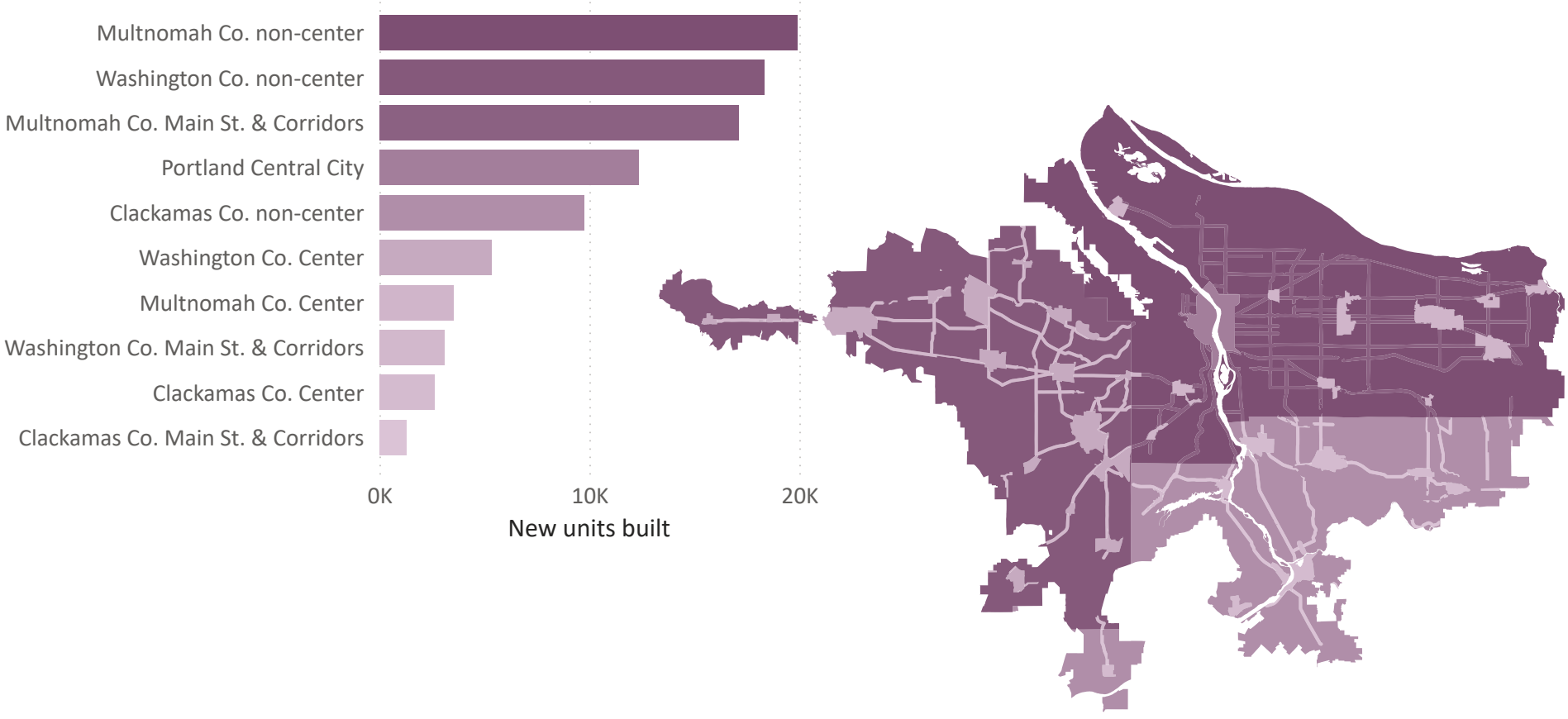


Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

How is housing growth occurring in the 2040 Growth Concept centers?

The type of housing units built is identified as a regional indicator under ORS 197.296 and 197.301. This information provides geographic context as to development types and recent development locations.

Housing production over last 10 years from 2013 to 2022



The map and chart above show new units built by Metro 2040 Growth Concept area types. Centers, Main Streets & Corridors tend to be relatively small areas of intentionally dense development. Many of these areas have been developed already, and therefore have less new units than the rest of the larger non-center area.

The most new units were built in Multnomah Co. non-centers, with 19,920 new units (21 % of all new units built).

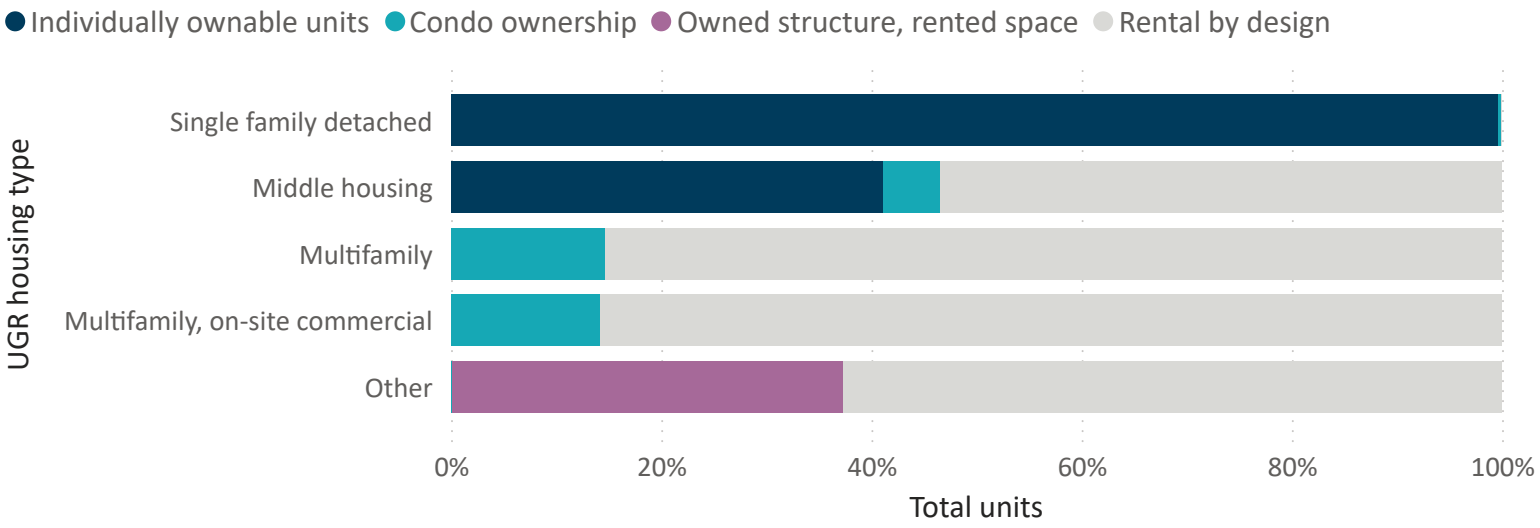
Portland Central City is the smallest of these geographic areas at only 2,972 acres, but grew by 46 %, adding 12,325 new units for a total of 39,000 units.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Housing Production Tenure and Ownership Type

Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

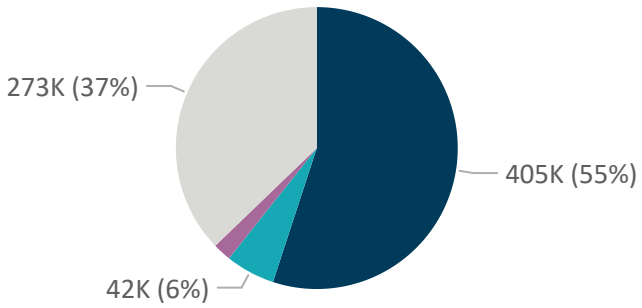
Total units by UGR housing type and owership type



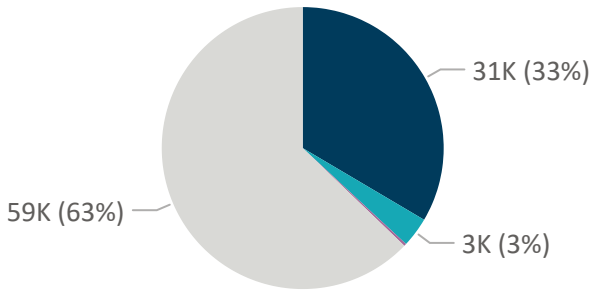
Generally, high-density housing are designed to be rental units, and not owner-occupied or individually owned.

- Large properties (multifamily, with or without on-site retail) can have condominium-style ownership, where each unit is owned by an individual, but this is not common. Multifamily mostly consists of rental units.
- Single family homes are intended for individual ownership. More recently, under SB 458, a small number of single family homes have created condominium associations, similar to homeowner associations but sharing ownership of the overall land while retaining individual ownership of each home.
- Middle housing includes many types of residential units, including townhouses, which are typically individually owned units, and quadplexes, with four units on a taxlot and designed to be rental units. Lot divisions under SB 458 could allow further ownership potential of this type of housing, either through condominium associations or lot divisions.
- manufactured home parks and floating homes are not currently a common development type, but can be individually owned units placed on rented land. Rental housing in the 'other' housing type includes retirement centers, dormitories which are typically rented.

Ownership type of housing built prior to 2013



Ownership type of housing built 2013 and after



Definitions for this page-

- Individually ownable units are defined here as a single unit on a single taxlot.
- Condo ownership is where each unit is individually owned, and the overall property (land) is collectively owned by the condominium association.
- Owned structure, rented space is primarily floating homes and manufactured home parks, where each unit is owned and the space is rented by the owner.
- Rental by design includes all other types of housing. Some of these properties may have an owner-occupied unit, like a duplex where the owner lives in one unit and rents out the 2nd unit.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Subregional Summary

Summary by

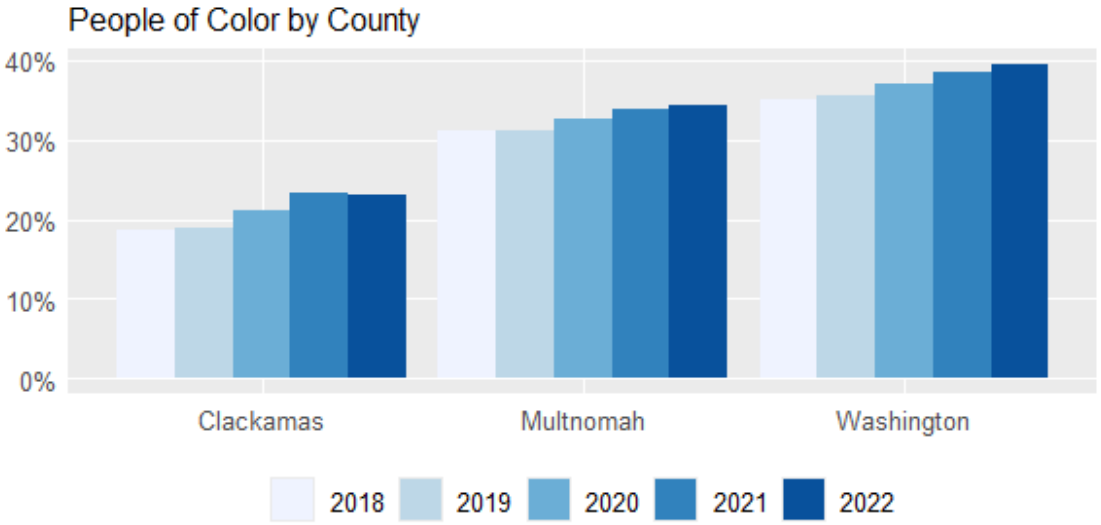
Metro Council district

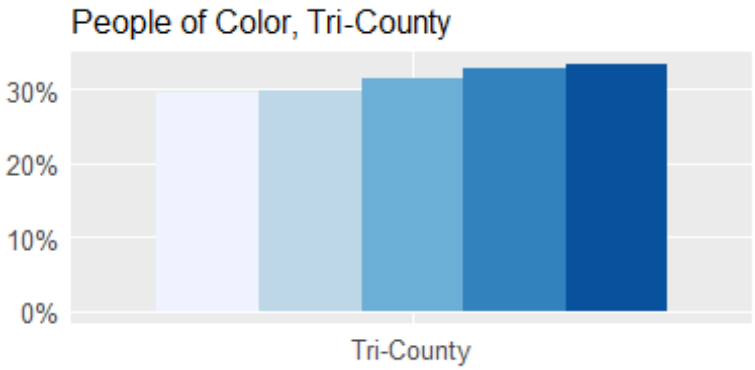
Value	Total acres	% Developed	Acres developed over range	Total units	Total unit density	Units built over range	% growth over range
District 1 (Ashton Simpson)	40,395	71%	2,501	103,071	4.5	8,468	9%
District 2 (Christine Lewis)	40,241	87%	1,851	114,329	4.7	9,327	9%
District 5 (Mary Nolan)	39,606	90%	2,810	150,757	12.2	28,768	23%
District 3 (Gerritt Rosenthal)	36,574	82%	2,445	120,843	5.9	13,178	12%
District 4 (Juan Carlos Gonzalez)	32,673	85%	2,696	114,482	7.0	15,202	15%
District 6 (Duncan Hwang)	19,763	95%	938	130,433	9.7	18,193	16%
Outside Metro jurisdiction	2,549	39%	58	1,380	1.1	126	10%
Total	**211,800**	**84%**	**13,300**	**735,295**	**6.6**	**93,262**	**14%**

Appendix 5B: Demographic indicators

People of color

Diversity, equity and inclusion are cornerstone values in Metro policy. This information helps provide contextual information that informs policy makers.



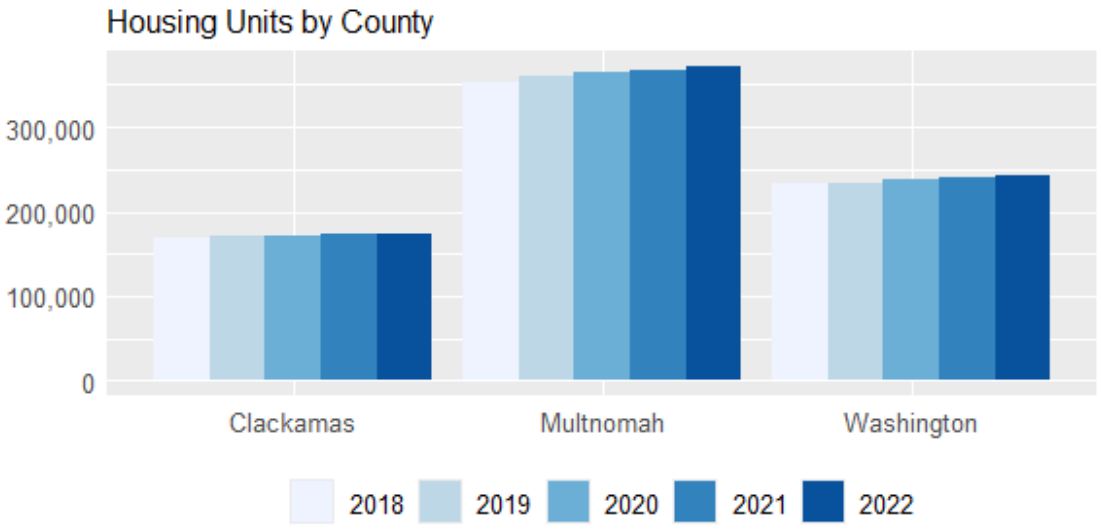


People of color percentages have steadily increased in the tri-county region from 29.6% in 2018 to 33.3% in 2022.

Generally, all three counties have individually followed a similar pattern of small annual increases in the people of color population.

Housing Units

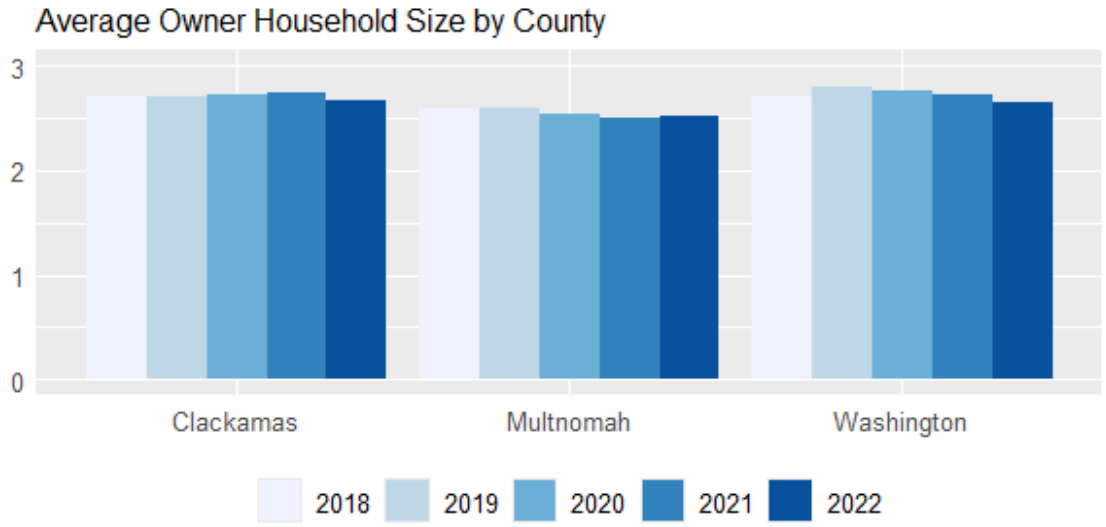
Housing units are identified as a regional indicator under ORS 197.296.



- Clackamas County has seen a small increase in housing units from approximately 170,000 in 2018 to 174,000 in 2022.
- Multnomah County has seen a larger increase in housing units from approximately 354,000 to 371,000.
- Washington County has seen an increase in housing units from approximately 232,000 to 243,000.

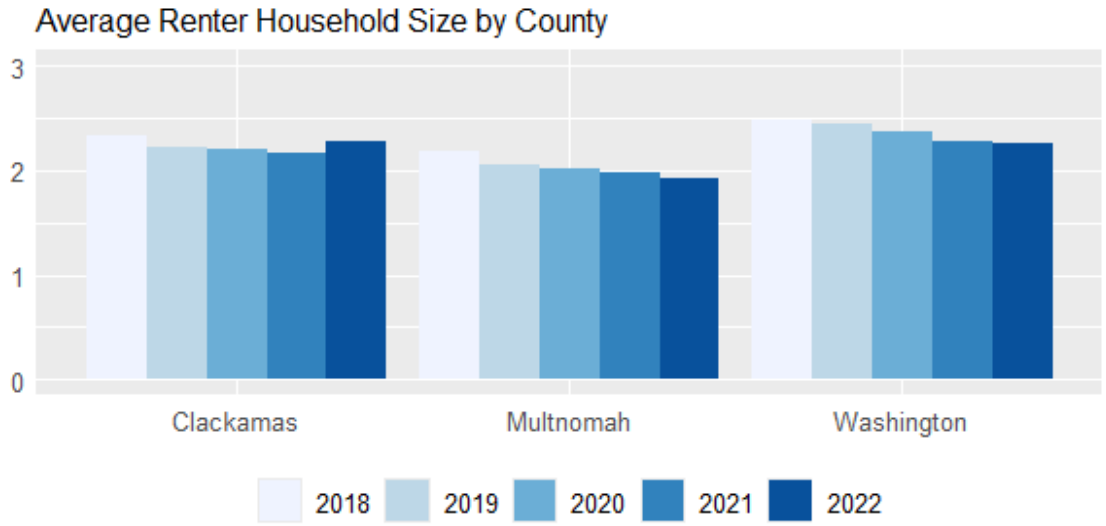
Average Household Size

Tenure choice and household size trends are indicative of economic and demographic trends, housing trends and development policies. ORS 197.296 and 197.301 reference reporting on such trends and performance indicators.



Average owner household sizes have generally slightly increased in Clackamas County over the past five years – except for a decrease in 2022 – and conversely both Multnomah and Washington counties have generally seen annual decreases.

For all counties, average owner household sizes remain above 2.5 persons per household.

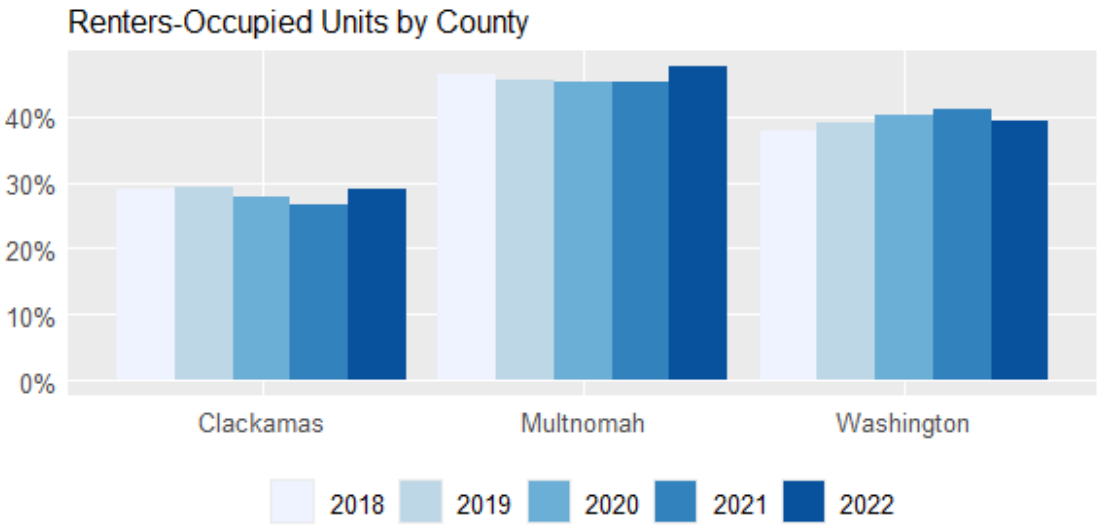


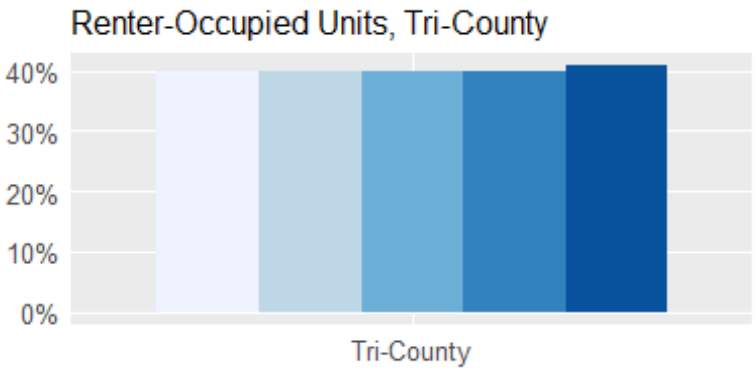
Average renter household sizes have generally decreased across all counties, except for an increase in Clackamas County in 2022.

For all counties, average renter household sizes remain below 2.5 persons per household.

Renter-Occupied Housing Units

Renter-occupied housing units are identified as a regional indicator under ORS 197.296.



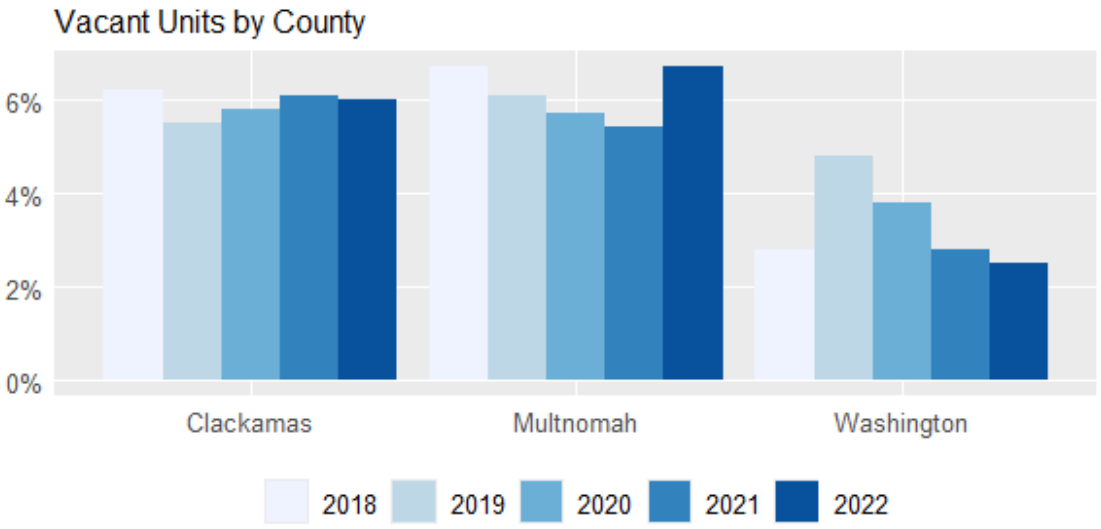


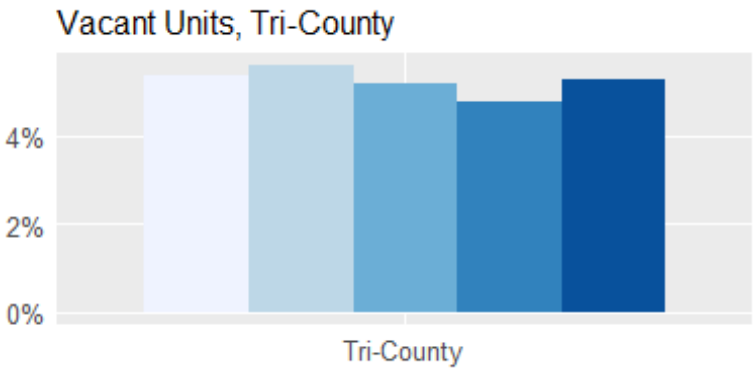
The tri-county region has largely remained steady in terms of the share of renter-occupied housing units, with a slight overall increase in 2022.

The individual counties have varied. Clackamas County has seen fair decreases year-over-year, with an uptick in 2022. Multnomah County, similarly, but to a lesser degree, has seen slight decreases followed by an increase in 2022. Washington County has conversely seen annual increases since 2018, followed by a decrease of renter-occupied housing units in 2022.

Vacant Residential Units

Residential vacancy rates are identified as a regional indicator under ORS 197.301.



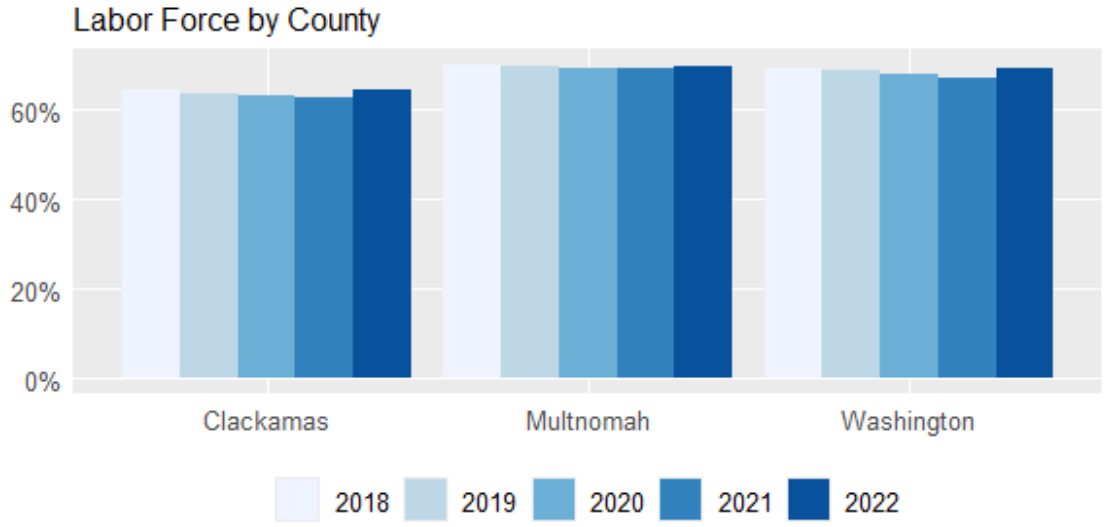


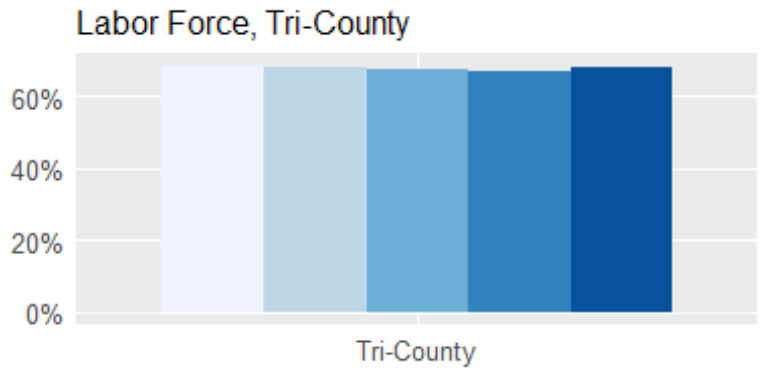
The tri-county region's vacancy rate has oscillated over the past five years, with an increase in 2019 followed by consecutive decreases followed by a fair increase in 2022.

Again, the story is varied across counties. Clackamas County saw a fair decrease in 2019, followed by a general upward trend in vacant housing units. Multnomah County saw general annual decreases in vacancy rates from 2018 to 2021, followed by a sharp increase in 2022. Washington County, conversely, saw a sharp increase in 2019 followed by steady significant decreases since.

Labor Force

Labor force is identified as a regional indicator under ORS 197.296 (economic trends/cycles). Labor force participation rates have been declining for a long time. Arresting this trend would promote greater economic opportunities and raise prosperity in the region. This data provides information about the size of the region's labor supply.





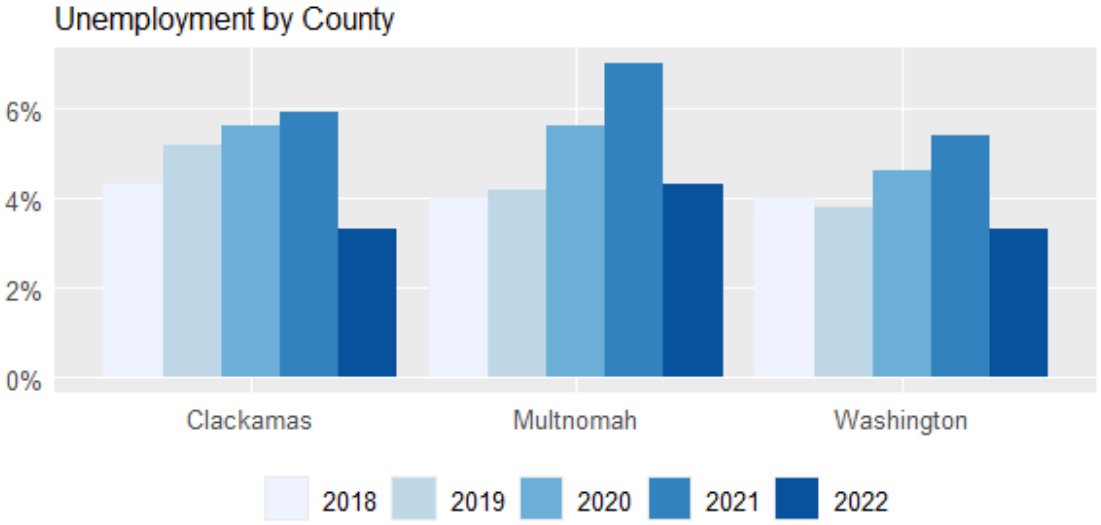
Labor force participation decreased slightly from 68.5% in 2018 to 67.1% in 2021, followed by a rebound to 68.3% in 2022.

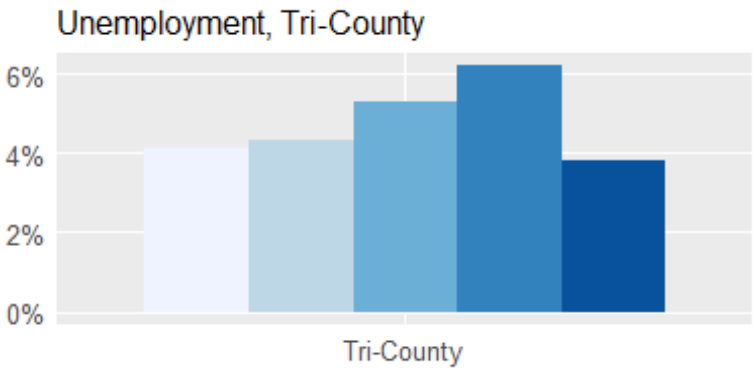
The overall tri-county trend is similar across the individual counties, although Clackamas and Washington counties saw greater decreases and rebounds.

Multnomah County currently has the greatest labor for participation at 69.6%, followed by Washington County at 69.1% and Clackamas County at 64.5%.

Unemployment

Unemployment is identified as a regional indicator under ORS 197.296 and ORS 197.301 (economic trends/cycles and job creation). The unemployment rate is one of the broadest indicators of employment growth and economic vitality of the region.



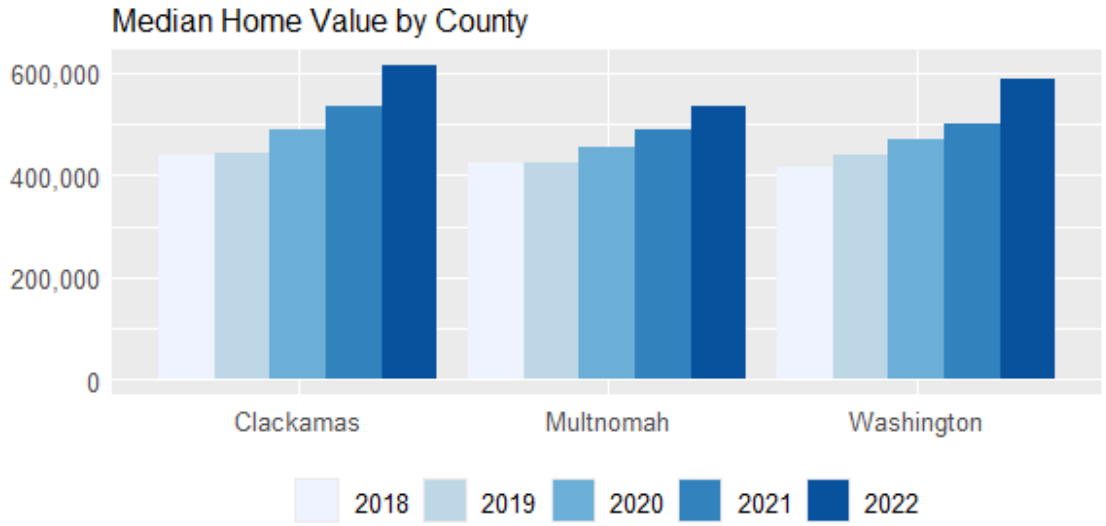


The tri-county region has seen significant increases in unemployment from 2018 to 2021, followed by an equally significant decrease in 2022.

This pandemic-related trend is mirrored across all counties. The sharpest increases of unemployment were in Multnomah and Washington counties. The highest rates of unemployment were in Multnomah and Clackamas counties.

Median Home Value

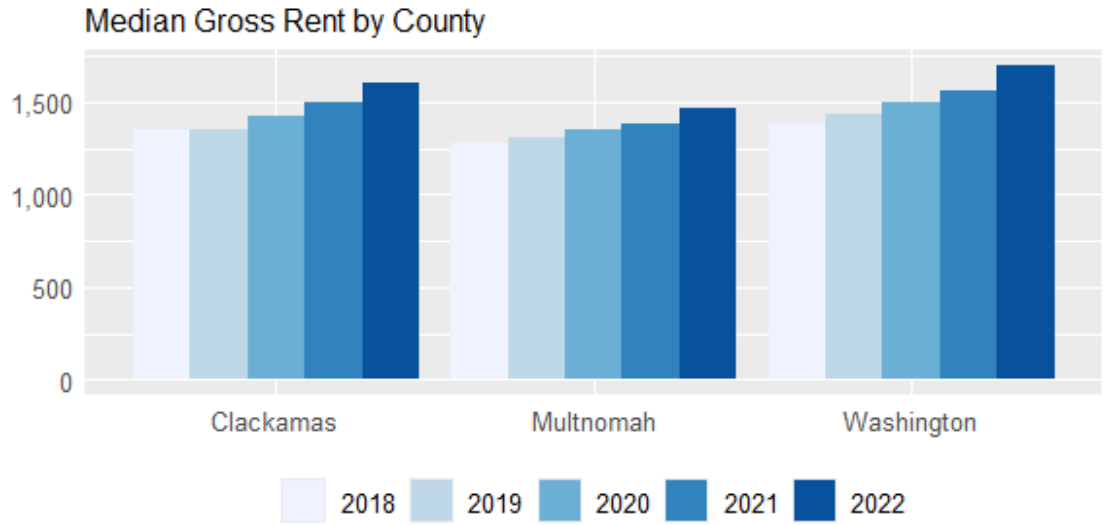
Housing values are indicative of real estate trends. As such they provide a "shadow price" indication of vacant land value (per ORS 197.301).



Housing cost, as approximated by home value, has continued to climb in the tri-county region, with median home values by county hovering above $400,000 in 2018, and steadily increasing to above $500,000 in Multnomah County and around $600,000 in Clackamas and Washington counties.

Median Gross Rent

Apartment rents are indicative of real estate trends. As such they provide a "shadow price" indication of vacant land value (per ORS 197.301).



Like ownership costs, rent prices have steadily increased in the tri-county region, with Multnomah County being slightly more affordable over the past five years than Clackamas or Washington counties.

Currently, Multnomah County median gross rent is around $1,500, and Clackamas and Washington counties are at $1,600 and $1,700 respectively.

Data Sources and Methods

Census Bureau, American Community Survey (ACS), 1-Year County Estimates, 2018-2022.

The ACS was not released in 2020 due to the Covid pandemic. For the purposes of time series analysis, 2020 values are interpolated between 2019 and 2021.

Appendix 6
Employment land site characteristics

Background

Under Division 24 (Urban Growth Boundaries) of the Oregon Administrative Rules, Metro is required to complete an employment land inventory that describes site characteristics of buildable lands inside the urban growth boundary (as described in Division 9, Economic Development). Cities and counties, during their own planning efforts, are responsible for determining whether sites are suitable for uses that match their economic development objectives. This is an appropriate approach given the regional scale of this inventory and the desire to not replicate or supplant local efforts.

The approach used for this analysis is also informed by Division 9 (Economic Development) of the Oregon Administrative Rules, that states "The effort necessary to comply… will vary depending on the size of the jurisdiction…" and that "a jurisdiction's planning effort is adequate if it uses the best available or readily collectible information..." This clause acknowledges that a detailed region-wide analysis of employment sites is not feasible either to complete or interpret in any meaningful fashion.

This analysis uses a general approach developed in consultation with Oregon Department of Land Conservation and Development staff for the 2014 Urban Growth Report. Table 1 summarizes the site characteristics mentioned in the Administrative Rules and the various data points used to summarize them. For practical reasons, this report presents regional maps and summary tables. Metro can provide its tax lot level buildable land inventory GIS database on request. Employment land is organized into three categories for this analysis:

- Commercial land
- General industrial land
- Large industrial sites (maps depict dots for each tax lot that comprises a large site; some sites may consist of multiple tax lots)

For the purposes of this analysis, "Parcels" refers to assessor tax lots.

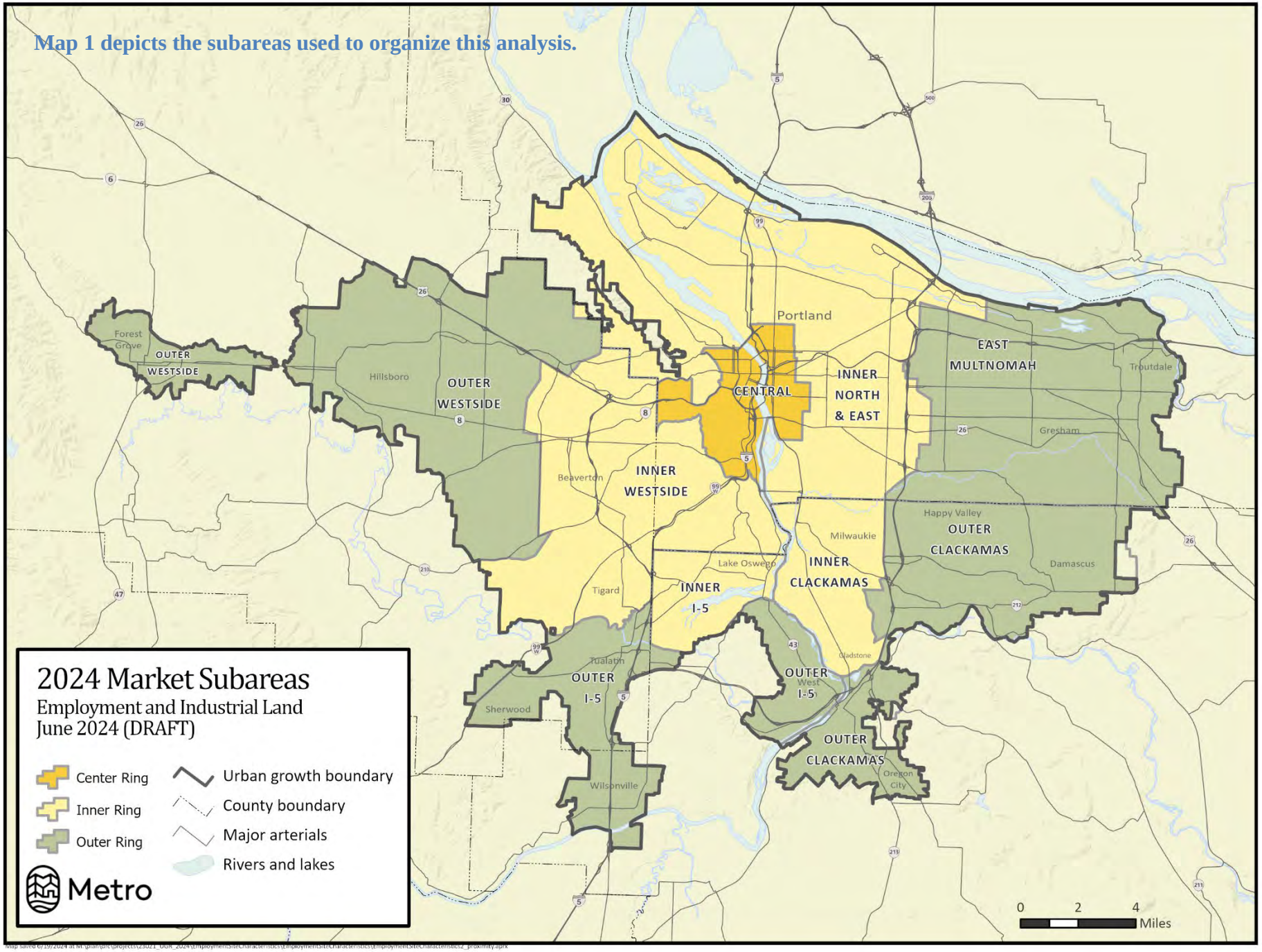
A note about totals: Appendix 2 totals include negative redevelopment (highest and best future use is less intense/less sq. ft. than existing structures) whereas Appendix 6 tables omit these negative redevelopment numbers. Overall, redevelopment to less intense uses accounts for about -50 acres over the entire region. Therefore, Appendix 2 employment land totals will be approximately 50 acres less than the numbers represented here. For more detail on the pro forma redevelopment model, please refer to the attachments to Appendix 2.

Table 1: summary of approach for describing site characteristics

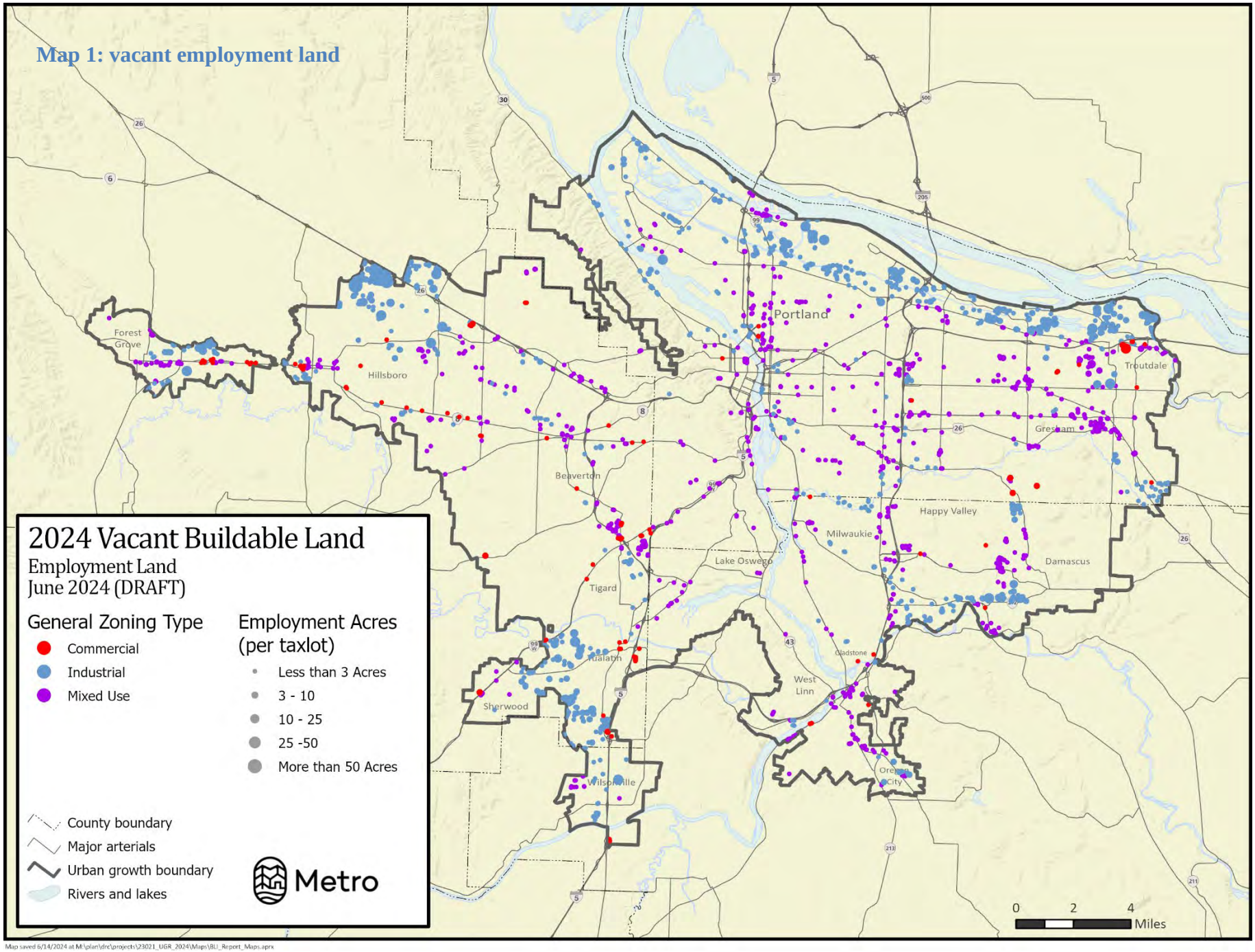
OR Administrative Rules Division 9 – Economic Development	Metro employment land inventory approach
Description of minimum acreage or site configuration characteristics including shape and topography	Acreage – summary tables of net buildable acreages are provided. Metro can provide its tax-lot-level buildable land inventory GIS database on request. Shape - site shapes cannot be summarized in any meaningful fashion at the regional scale, but the GIS database includes a visual depiction of the shape of each tax lot in the inventory. Metro can provide its tax-lot-level buildable land inventory GIS database on request. Topography - portions of tax lots with slopes over 25% (10% for industrial land) have been removed from the inventory since they are deemed unbuildable. This report describes, as a site characteristic, the portion of each inventoried tax lot that has a slope between 7-25%. This range was chosen because slopes over 7% are often regarded as an impediment to industrial uses with larger development footprints. (Tables 2&2a)
Visibility	This characteristic is taken to mean visibility from a public right of way. For each tax lot in the inventory, distance to the nearest major arterial is computed. (Map 5)
Specific types of public facilities, services or energy infrastructure	Region-wide data to address this site characteristic are not readily available. For public security reasons, Metro does not have access to data on where power and gas transmission lines are. Metro also do not have access to data on where water and sewer facilities are located. The inventory depicts the following: - Distance to closest major arterial (Map 5) - Fire district name (Map 6) -Sewer district name (Map 7) -Water district name (Map 8)
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes.	-Distance to nearest rail terminal (Map 9) -Distance to transshipment facilities (Map 10) -Distance to major arterial (Map 5) -Distance to designated freight route (Map 11) -Distance to airport (Maps 12&13) -Distance to marine terminals (Map 14)
Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory	-Number of environmentally constrained acres (note – these acres are removed from buildable land inventory). (Table 3) -Portion of each tax lot that has a slope between 7-25% (Table 4)

OR Administrative Rules Division 9 – Economic Development	Metro employment land inventory approach
	-Inside or outside marine use restriction area (Map 15) -Inside or outside an aviation overlay zone (Map 16) -Inside city (yes/no) (Map 17 and Table 5) -Land value per square foot (county assessor data) (Map 18) Available in GIS data at parcel level: -Owner flagged for tax exempt status (removed from inventory if not available for employment use) -Vacant or redevelopment land category (Metro) -Estimate of future streets and sidewalks acreage needs for vacant tax lots. However, we should note that our method uses a regional approach and may not reflect the actual needs of specific sites.

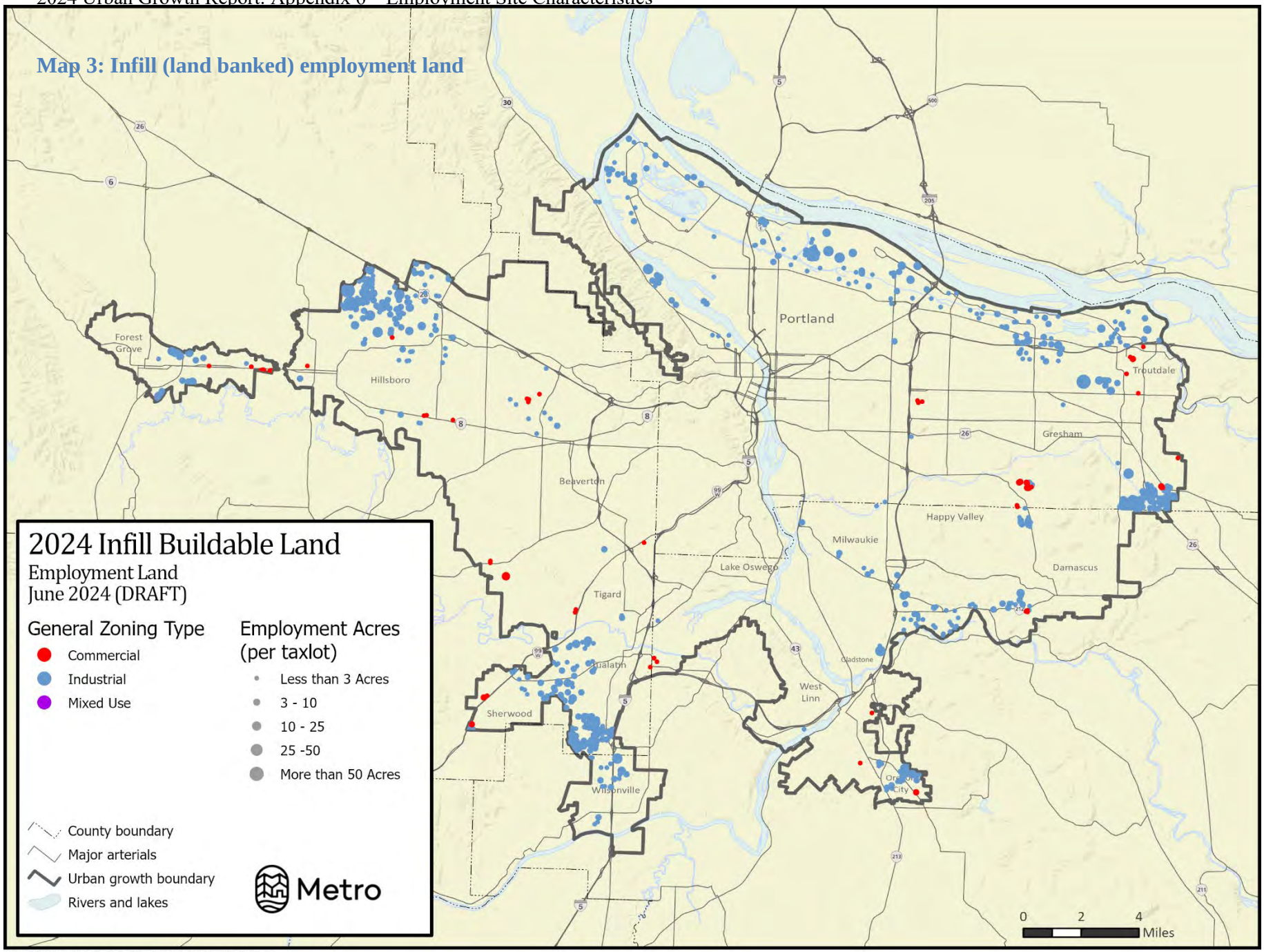
Map 1 depicts the subareas used to organize this analysis.



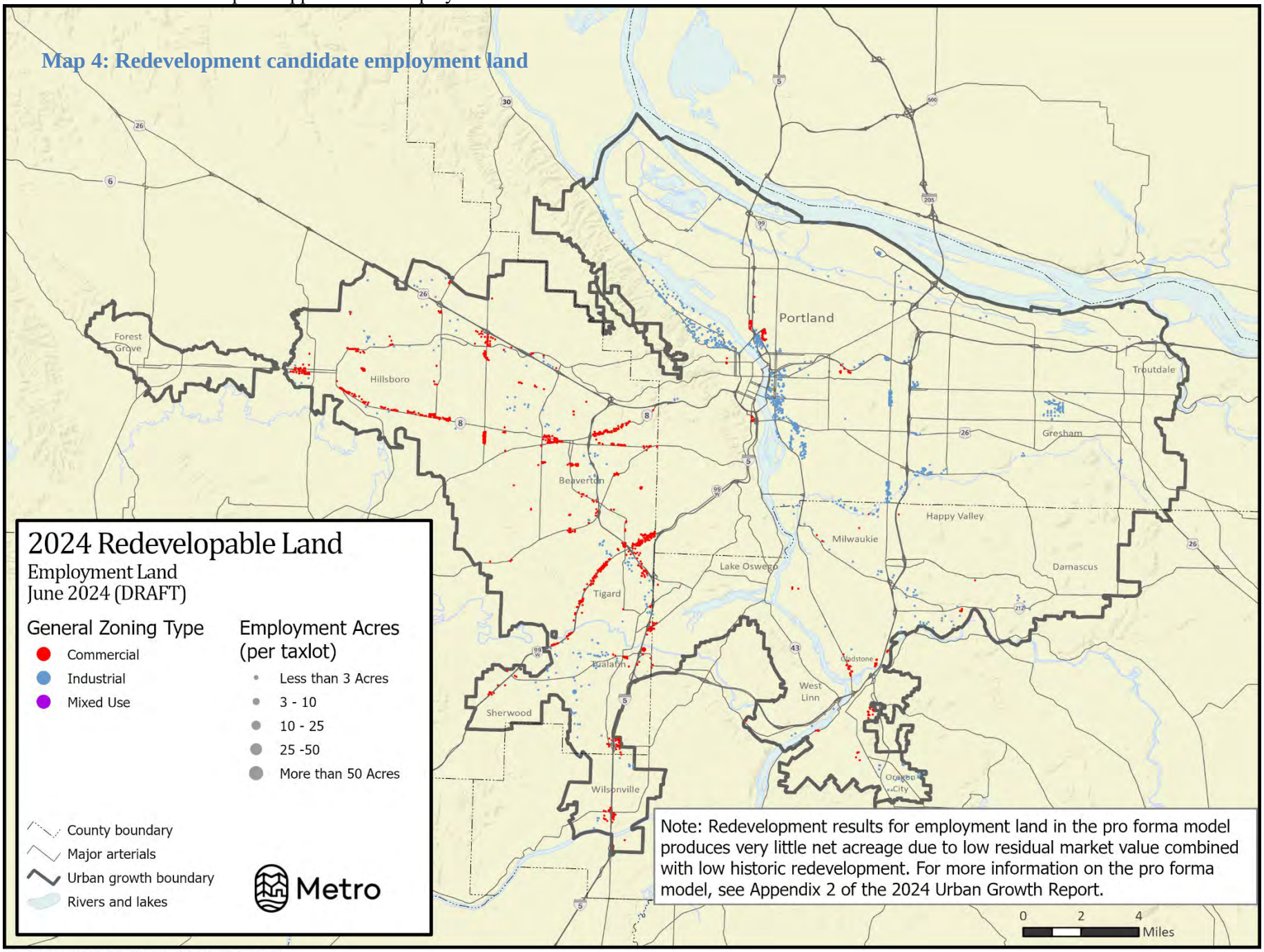
Map 1: vacant employment land



Map 3: Infill (land banked) employment land



Map 4: Redevelopment candidate employment land



Description of minimum acreage or site configuration characteristics including shape and topography

Table 2: Summary data on acres of buildable employment land inside the Metro urban growth boundary

Market Subarea	Vacant		Infill		Redevelopment		New Urban and Planned		Total	
	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Central	**110**	**11.4**			**370**	**4.0**			**480**	**15.5**
Commercial	78	6.7			56	0.8			134	7.5
Industrial	32	4.7			314	3.2			346	8.0
East Multnomah	**348**	**661.3**	**181**	**614.2**	**117**	**17.3**			**646**	**1,337.5**
Commercial	226	161.1	18	46.2					244	207.3
Industrial	120	425.7	161	521.6	93	6.3			374	998.2
Large Lot Industrial	2	74.6	2	46.4	24	11.0			28	132.0
Inner Clackamas	**48**	**7.6**	**9**	**53.2**	**70**	**1.1**			**127**	**61.9**
Commercial	24	1.6			32	0.2			56	1.8
Industrial	24	6.0	9	53.2	38	0.9			71	60.1
Inner I-5	**13**	**1.3**	**1**	**1.3**	**9**	**0.1**			**23**	**2.7**
Commercial	13	1.3			8	0.1			21	1.4
Industrial			1	1.3	1	0.0			2	1.3
Inner North & East	**520**	**460.1**	**105**	**432.5**	**500**	**45.6**	**9**	**65.0**	**1,134**	**1,025.2**
Commercial	178	9.9	3	4.4	39	0.6			220	14.9
Industrial	336	364.0	96	371.8	458	41.9	9	65.0	899	864.6
Large Lot Industrial	6	86.3	6	56.3	3	3.1			15	145.7
Inner Westside	**149**	**35.8**	**14**	**43.6**	**501**	**29.1**	**1**	**28.0**	**665**	**139.4**
Commercial	126	10.2	5	26.8	446	23.7	1	28.0	578	88.7
Industrial	23	25.6	9	16.8	55	5.4			87	50.6
Outer Clackamas	**271**	**284.4**	**89**	**280.4**	**92**	**6.4**			**452**	**590.6**
Commercial	198	33.2	6	15.2	29	0.8			233	49.2
Industrial	71	242.5	80	255.0	63	5.6			214	519.3
Large Lot Industrial	2	8.8	3	10.2					5	22.2
Outer I-5	**162**	**370.9**	**149**	**517.3**	**183**	**31.2**	**1**	**4.9**	**495**	**948.8**
Commercial	45	15.8	4	14.6	106	7.9	1	4.9	156	43.2
Industrial	91	285.7	116	394.3	73	18.7			280	716.1
Large Lot Industrial	26	69.4	29	108.3	4	4.6			59	189.5
Outer Westside	**302**	**859.5**	**154**	**872.8**	**398**	**21.5**			**854**	**1,774.5**
Commercial	158	48.2	17	39.4	346	12.2			521	99.8
Industrial	126	404.0	131	682.6	51	9.3			308	1,116.7
Large Lot Industrial	18	407.2	6	150.7	1	0.0			25	557.9
Grand Total	**1,923**	**2,692.3**	**702**	**2,815.4**	**2,240**	**156.3**	**11**	**97.9**	**4,876**	**5,896.1**

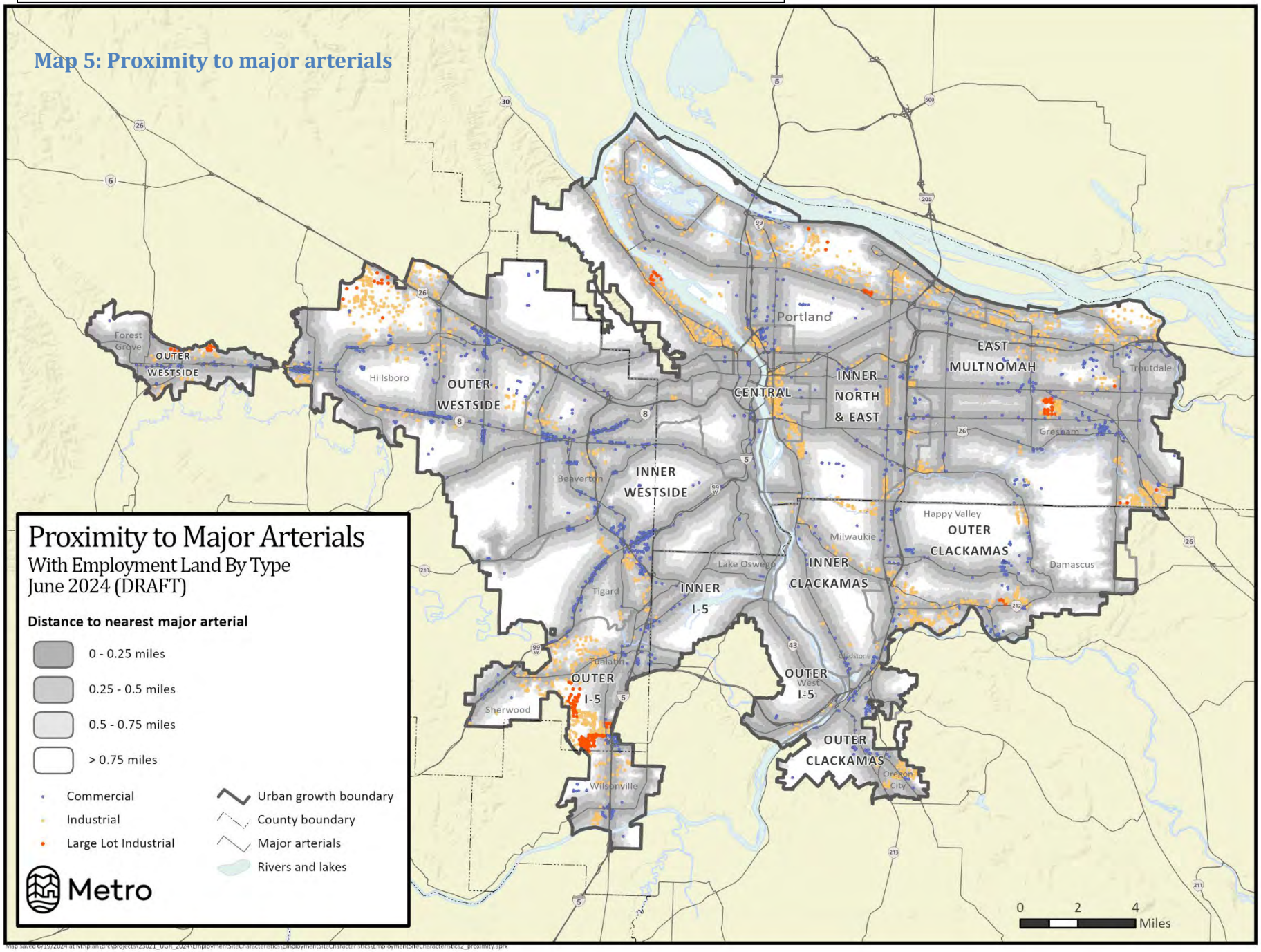
Table 2a: Average and median sites sizes of buildable employment land inside the Metro urban growth boundary (redevelopment and "new urban and planned" categories not included)

	Infill				Vacant				Totals			
Market Subareas	Parcels	Acres	Mean Acres	Median Acres	Parcels	Acres	Mean Acres	Median Acres	Parcels	Acres	Mean Acres	Median Acres
Central					**110**	**11.4**	**0.10**	**0.04**	**110**	**11.4**	**0.10**	**0.04**
Commercial					78	6.7	0.09	0.03	78	6.7	0.09	0.03
Industrial					32	4.7	0.15	0.07	32	4.7	0.15	0.07
East Multnomah	**181**	**658.9**	**3.64**	**2.11**	**348**	**661.3**	**1.90**	**0.28**	**529**	**1,320.2**	**2.50**	**1.11**
Commercial	18	46.2	2.57	2.36	226	161.1	0.71	0.19	244	207.3	0.85	0.21
Industrial	161	566.3	3.52	2.03	120	425.7	3.55	1.80	281	991.9	3.53	1.98
Large Lot Industrial	2	46.4	23.20	23.20	2	74.6	37.29	37.29	4	121.0	30.25	28.38
Inner Clackamas	**9**	**53.2**	**5.91**	**1.67**	**48**	**7.6**	**0.16**	**0.06**	**57**	**60.8**	**1.07**	**0.11**
Commercial					24	1.6	0.07	0.04	24	1.6	0.07	0.04
Industrial	9	53.2	5.91	1.67	24	6.0	0.25	0.12	33	59.2	1.79	0.17
Inner I-5	**1**	**1.3**	**1.34**	**1.34**	**13**	**1.3**	**0.10**	**0.09**	**14**	**2.6**	**0.19**	**0.09**
Commercial					13	1.3	0.10	0.09	13	1.3	0.10	0.09
Industrial	1	1.3	1.34	1.34					1	1.3	1.34	1.34
Inner North & East	**105**	**454.5**	**4.33**	**2.16**	**520**	**460.1**	**0.88**	**0.10**	**625**	**914.6**	**1.46**	**0.15**
Commercial	3	4.4	1.47	1.59	178	9.9	0.06	0.02	181	14.3	0.08	0.02
Industrial	96	393.8	4.10	2.00	336	364.0	1.08	0.21	432	757.7	1.75	0.39
Large Lot Industrial	6	56.3	9.38	6.22	6	86.3	14.38	6.81	12	142.5	11.88	6.22
Inner Westside	**14**	**46.5**	**3.32**	**1.84**	**149**	**35.8**	**0.24**	**0.03**	**163**	**82.3**	**0.50**	**0.04**
Commercial	5	26.8	5.36	1.89	126	10.2	0.08	0.02	131	37.0	0.28	0.02
Industrial	9	19.6	2.18	1.79	23	25.6	1.11	0.57	32	45.3	1.41	1.40
Outer Clackamas	**89**	**299.8**	**3.37**	**2.01**	**271**	**284.4**	**1.05**	**0.07**	**360**	**584.2**	**1.62**	**0.26**
Commercial	6	15.2	2.54	1.40	198	33.2	0.17	0.04	204	48.4	0.24	0.04
Industrial	80	271.2	3.39	2.04	71	242.5	3.41	1.32	151	513.6	3.40	1.87
Large Lot Industrial	3	13.4	4.46	3.17	2	8.8	4.38	4.38	5	22.2	4.43	3.17
Outer I-5	**149**	**541.8**	**3.64**	**2.72**	**162**	**370.9**	**2.29**	**0.77**	**311**	**912.7**	**2.93**	**1.98**
Commercial	4	14.6	3.66	2.22	45	15.8	0.35	0.06	49	30.5	0.62	0.10
Industrial	116	411.7	3.55	2.51	91	285.7	3.14	1.12	207	697.4	3.37	2.11
Large Lot Industrial	29	115.5	3.98	3.36	26	69.4	2.67	2.85	55	184.9	3.36	3.10
Outer Westside	**154**	**893.5**	**5.80**	**2.99**	**302**	**859.5**	**2.85**	**0.27**	**456**	**1,753.0**	**3.84**	**1.22**
Commercial	17	39.4	2.32	1.98	158	48.2	0.31	0.05	175	87.7	0.50	0.06
Industrial	131	703.4	5.37	3.21	126	404.0	3.21	1.22	257	1,107.4	4.31	2.01
Large Lot Industrial	6	150.7	25.12	15.14	18	407.2	22.62	11.64	24	558.0	23.25	14.22
Grand Total	**702**	**2,949.5**	**4.20**	**2.33**	**1,923**	**2,692.3**	**1.40**	**0.13**	**2,625**	**5,641.9**	**2.15**	**0.41**

	Infill				Vacant				Totals			
Employment Land Type	Parcels	Acres	Mean Acres	Median Acres	Parcels	Acres	Mean Acres	Median Acres	Parcels	Acres	Mean Acres	Median Acres
Commercial	53	146.8	2.77	1.89	1,046	287.9	0.28	0.04	1,099	434.7	0.40	0.05
Industrial	603	2,420.5	4.01	2.24	823	1,758.1	2.14	0.49	1,426	4,178.6	2.93	1.41
Large Lot Industrial	46	382.3	8.31	3.89	54	646.3	11.97	3.52	100	1,028.5	10.29	3.59
Grand Total	**702**	**2,949.5**	**4.20**	**2.33**	**1,923**	**2,692.3**	**1.40**	**0.13**	**2,625**	**5,641.9**	**2.15**	**0.41**

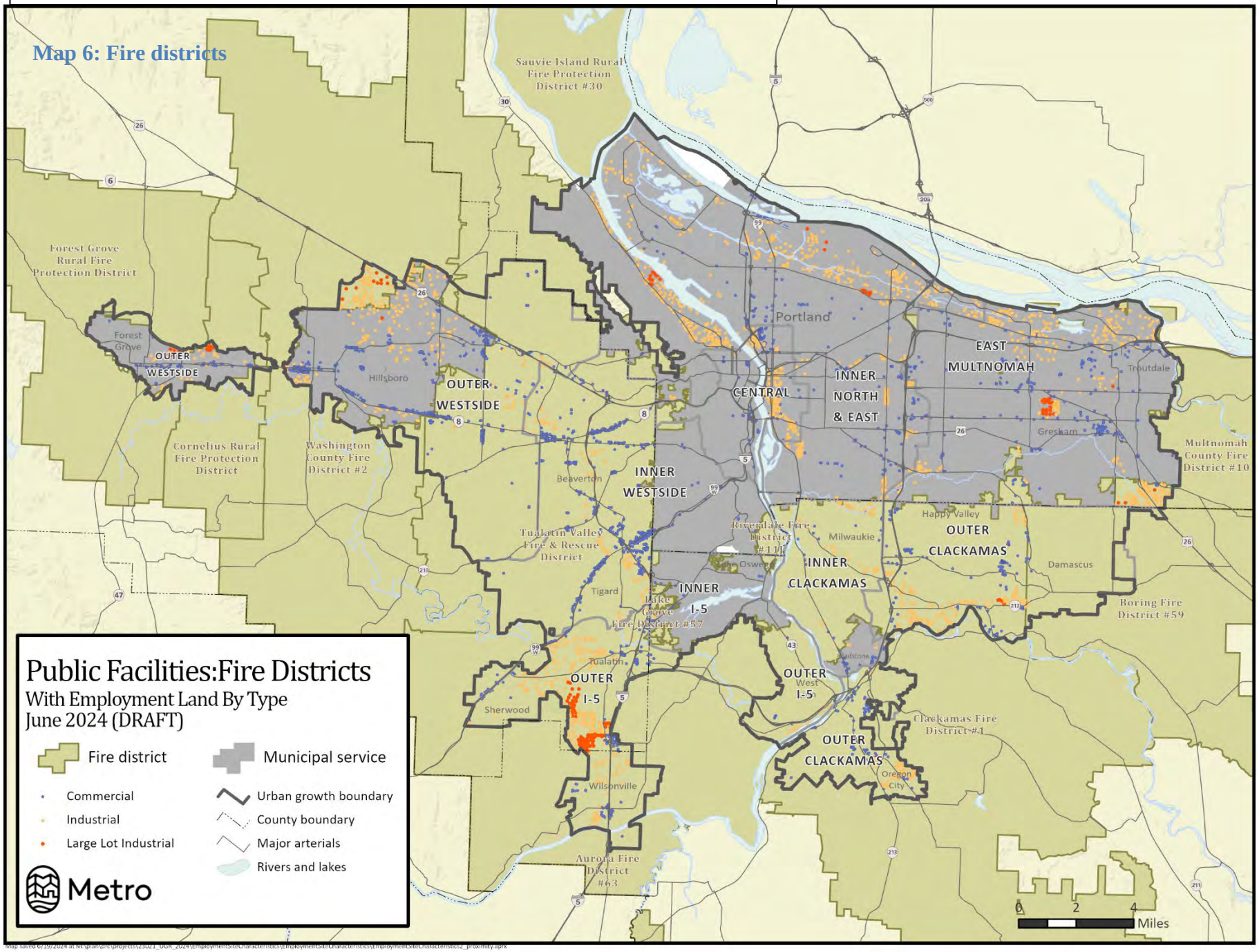
Site visibility

Map 5: Proximity to major arterials



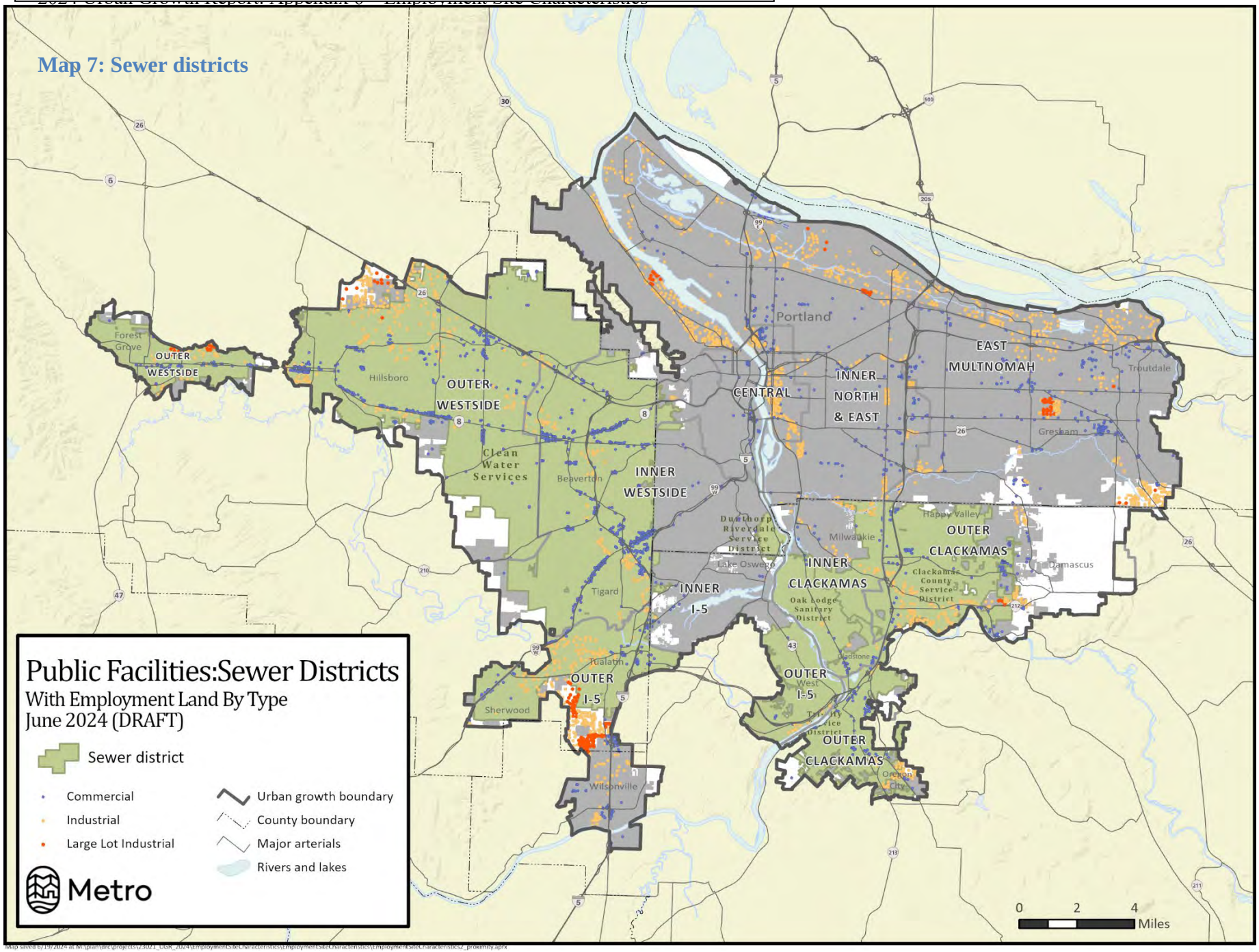
Specific types of public facilities, services or energy infrastructure

Map 6: Fire districts



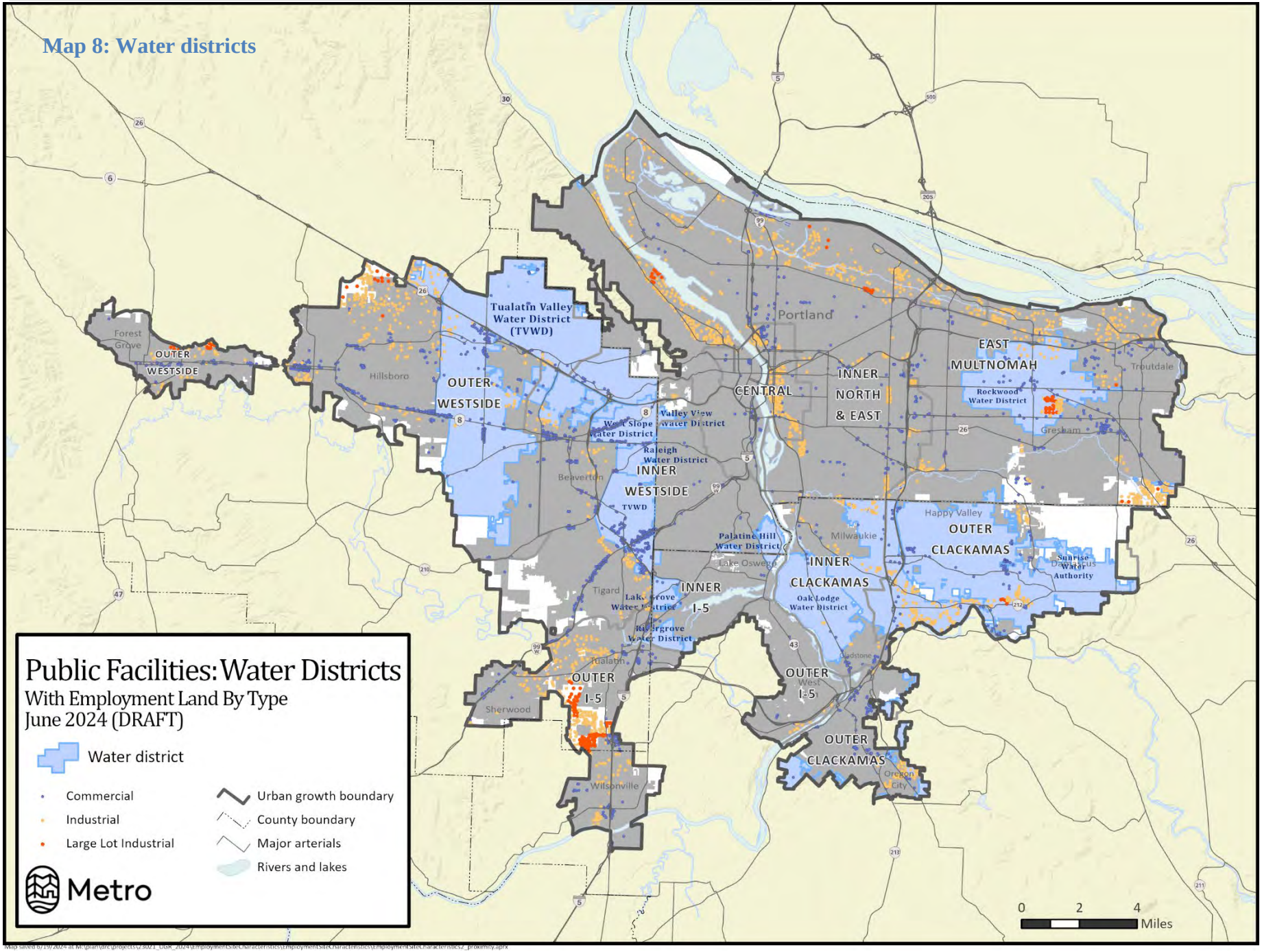
Specific types of public facilities, services or energy infrastructure

Map 7: Sewer districts



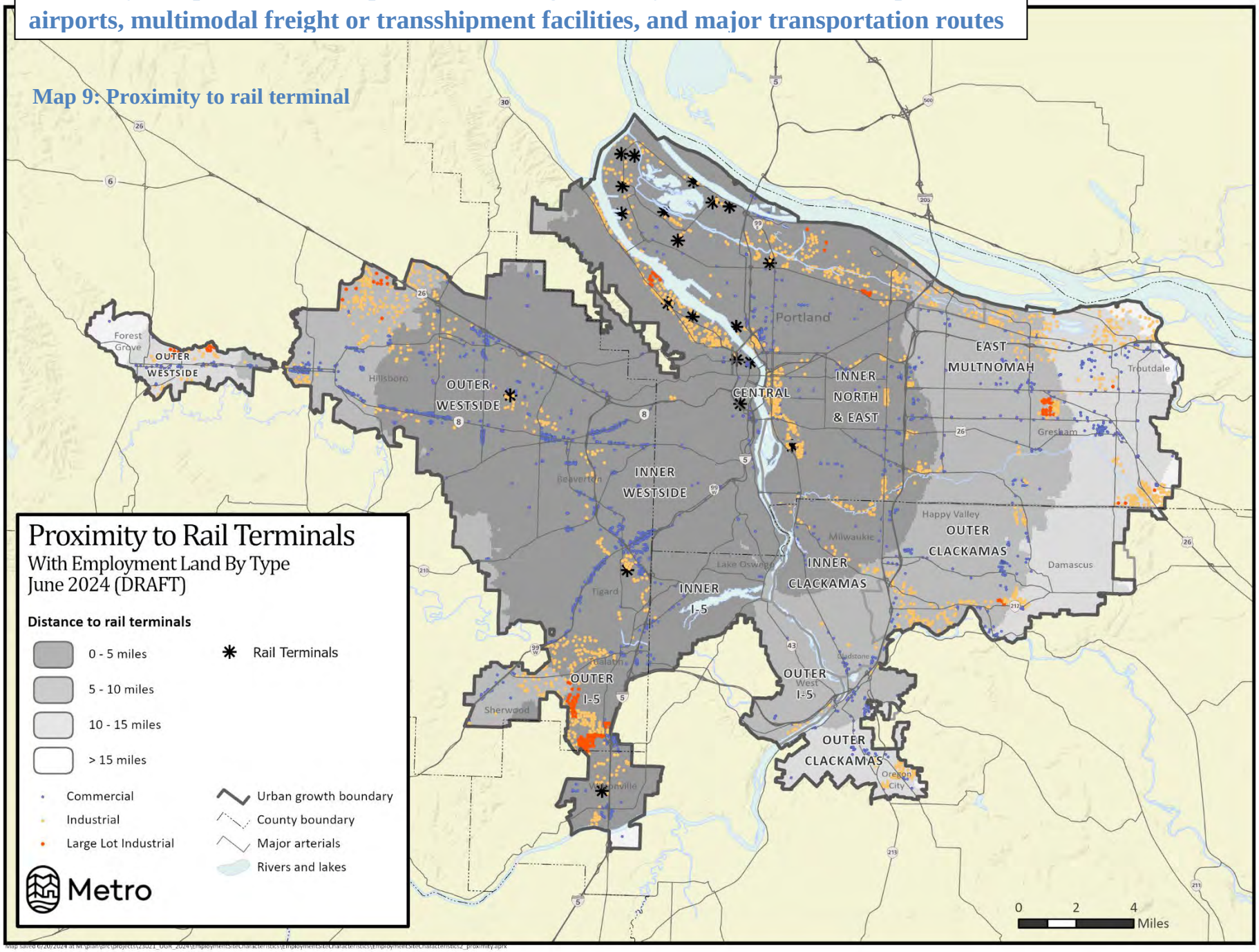
Specific types of public facilities, services or energy infrastructure

Map 8: Water districts



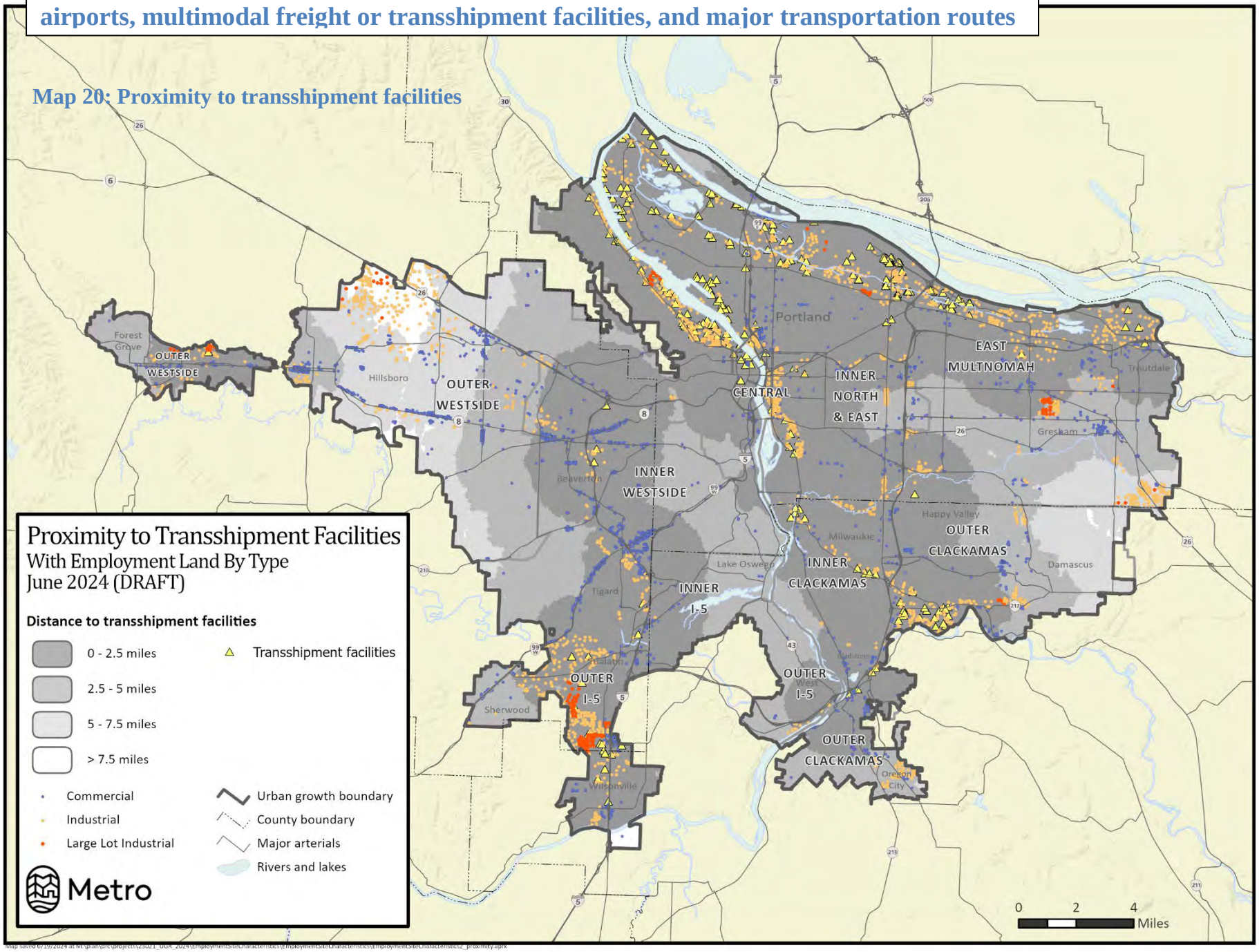
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

Map 9: Proximity to rail terminal



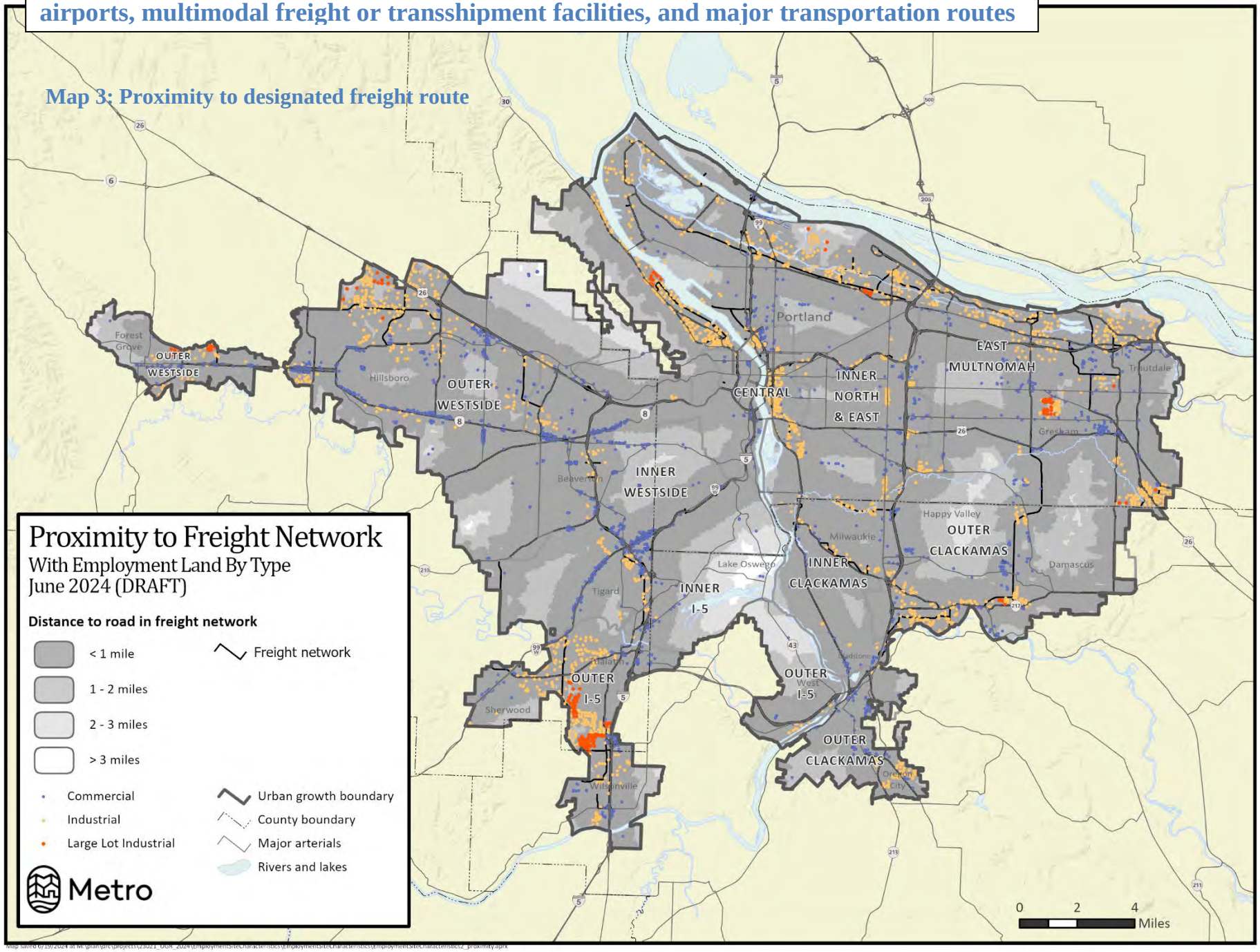
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

Map 20: Proximity to transshipment facilities



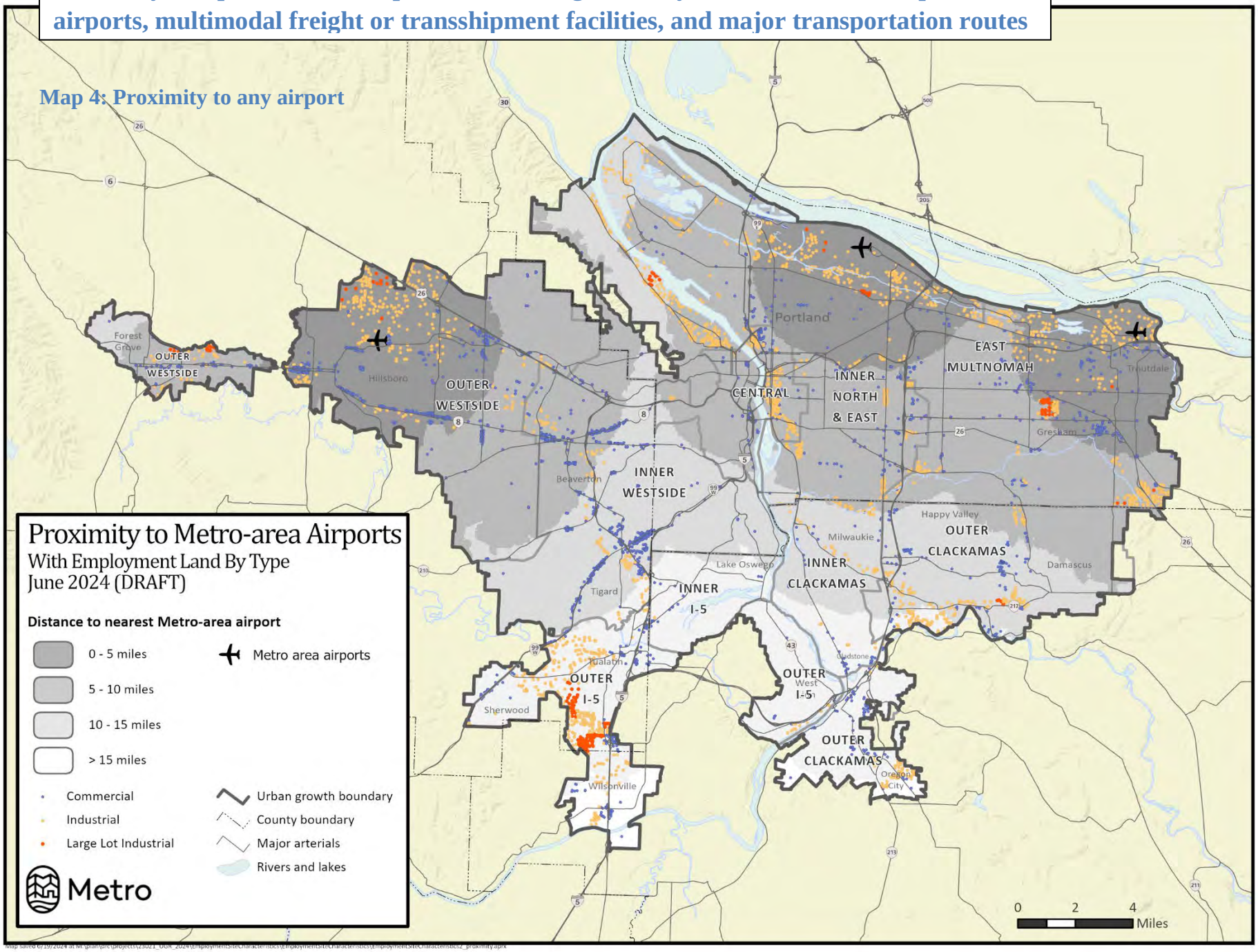
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

Map 3: Proximity to designated freight route



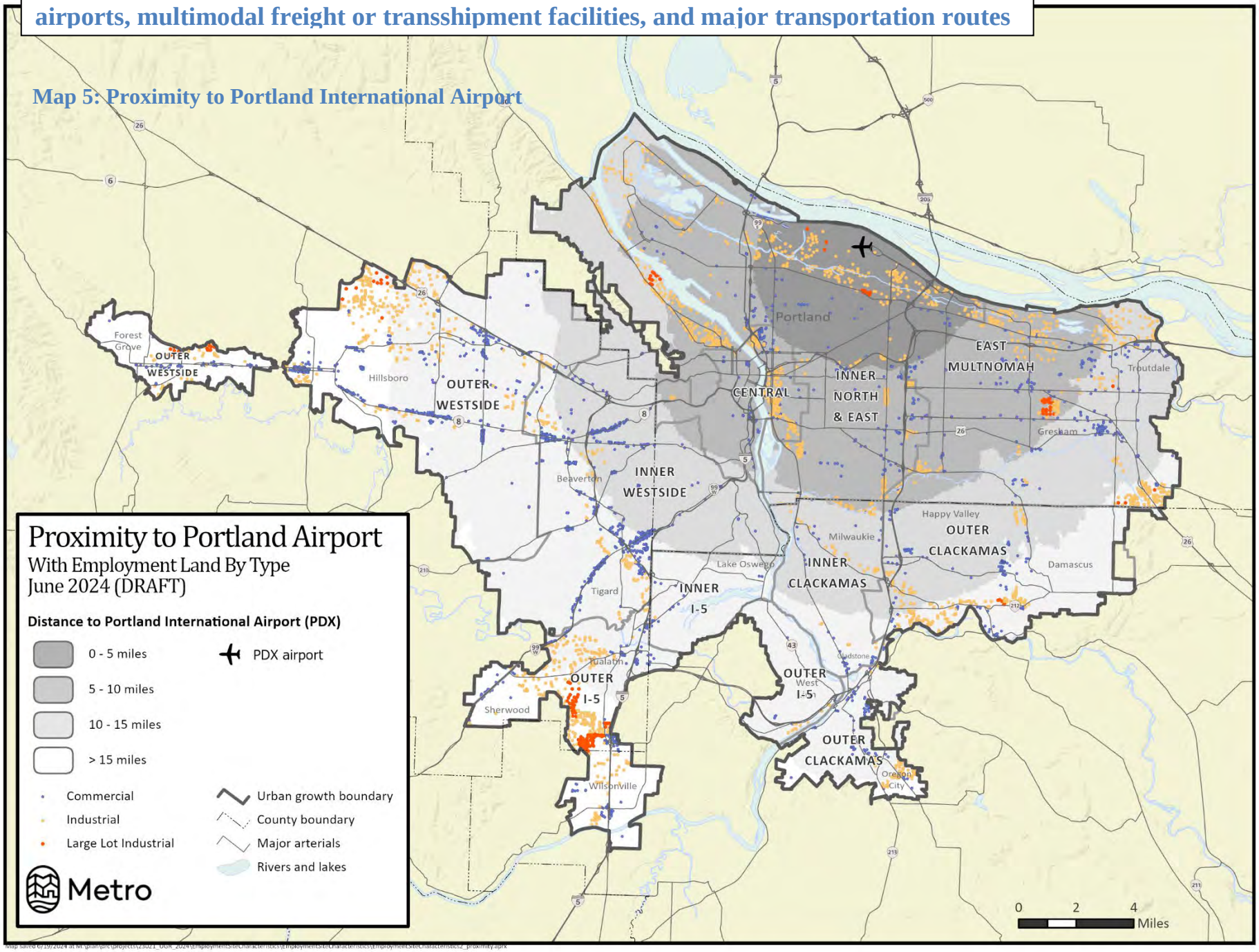
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

Map 4: Proximity to any airport



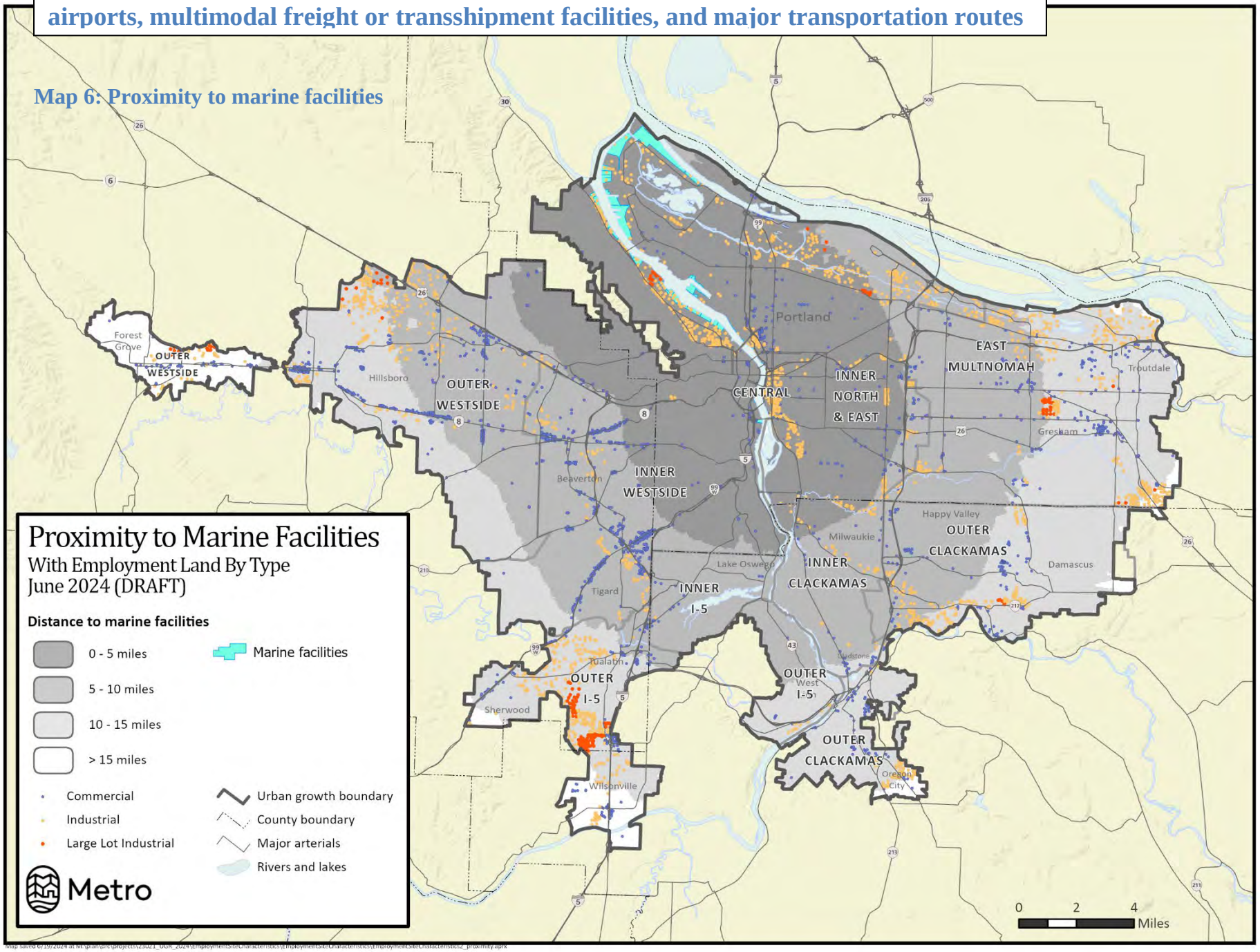
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

Map 5: Proximity to Portland International Airport



Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

Map 6: Proximity to marine facilities



Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory

The methodology used for the buildable land inventory removes environmentally constrained acres.

Table 3: Environmentally constrained acres removed from buildable land inventory

Market Subarea	Gross Acres	Unconstrained Acres	Constrained Acres
Central	**156.3**	**140.9**	**15.5**
Commercial	44.0	41.0	3.0
Industrial	112.3	99.8	12.5
East Multnomah	**3,103.8**	**2,183.6**	**920.2**
Commercial	386.9	303.3	83.6
Industrial	2,418.7	1,745.4	673.4
Large Lot Industrial	298.1	134.9	163.2
Inner Clackamas	**277.9**	**250.5**	**27.4**
Commercial	18.8	18.2	0.6
Industrial	259.2	232.4	26.8
Inner I-5	**26.6**	**23.2**	**3.3**
Commercial	20.2	18.6	1.6
Industrial	6.3	4.6	1.7
Inner North & East	**3,946.1**	**3,424.0**	**522.1**
Commercial	93.6	80.1	13.5
Industrial	3,514.5	3,077.8	436.7
Large Lot Industrial	338.0	266.1	71.9
Inner Westside	**1,085.6**	**899.2**	**186.5**
Commercial	710.5	555.2	155.3
Industrial	375.1	343.9	31.2
Outer Clackamas	**1,492.2**	**1,191.0**	**301.2**
Commercial	361.0	222.9	138.1
Industrial	1,097.7	934.7	163.0
Large Lot Industrial	33.5	33.5	0.0
Outer I-5	**2,693.9**	**2,213.7**	**480.2**
Commercial	304.8	223.0	81.8
Industrial	1,965.6	1,645.9	319.7
Large Lot Industrial	423.5	344.8	78.8
Outer Westside	**4,635.9**	**4,138.2**	**497.6**
Commercial	793.6	646.6	147.0
Industrial	3,143.2	2,837.3	305.9
Large Lot Industrial	699.1	654.3	44.8
Grand Total	**17,418.3**	**14,464.4**	**2,953.9**

Table 3 describes constraints from slopes. Areas with slopes over 25 percent are removed from the buildable land inventory. For this site characteristics analysis, areas with slopes over 7% are identified.

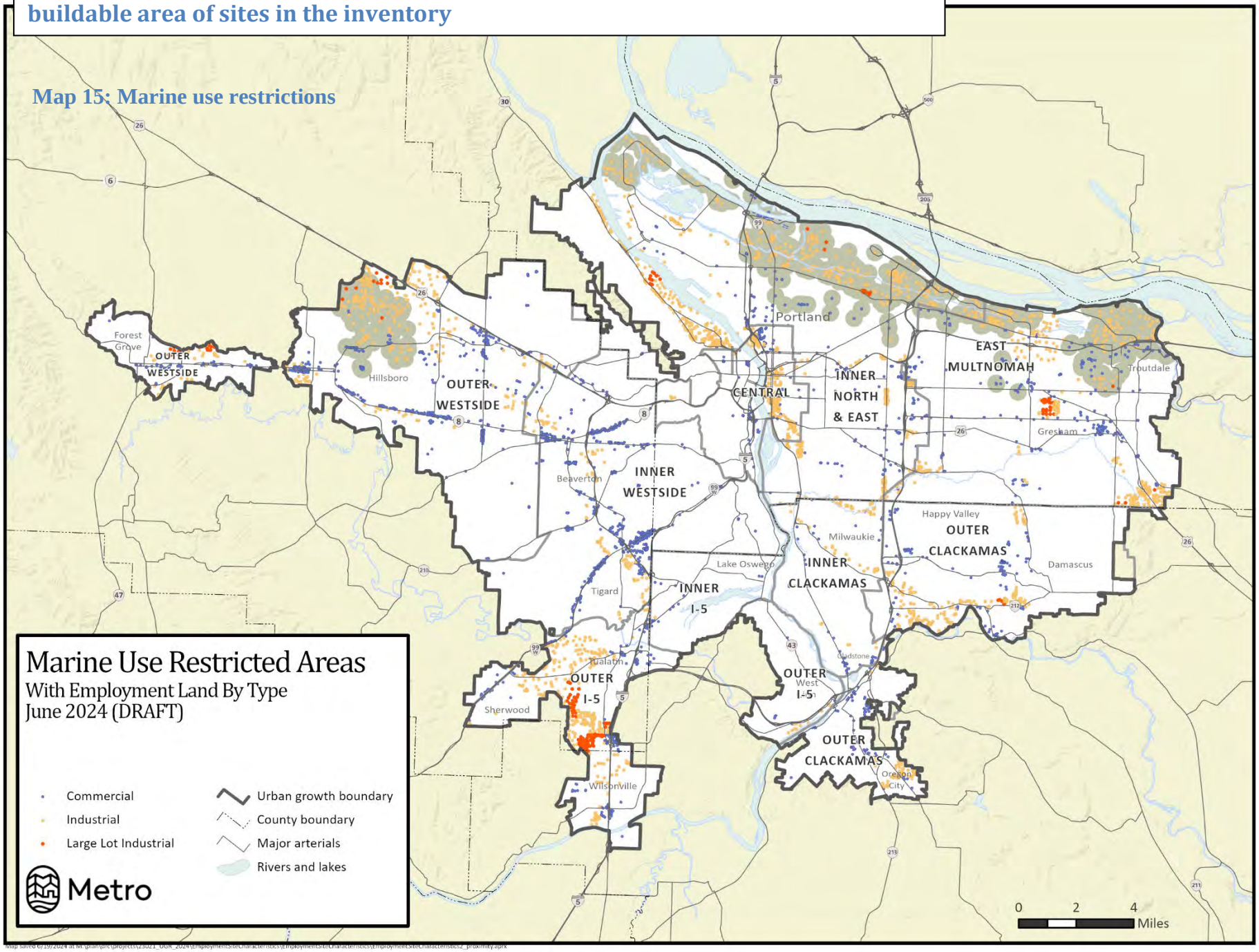
- Unconstrained: 10% or less of the tax lot has steep slopes
- Partially Constrained: 10.01% to 50% of the tax lot has steep slopes
- Constrained: 50 to 89.99% of the lot has steep slopes
- Heavily Constrained: Greater than 90% of the site has steep slopes

Table 4: Steep (>7%) slope constraints (slopes over 25% are removed from buildable land inventory (10% for Industrial))

	Unconstrained		Partially Constrained		Constrained		Heavily Constrained		Total	
Market Subarea	**Parcels**	**Acres**	**Parcels**	**Acres**	**Parcels**	**Acres**	**Parcels**	**Acres**	**Parcels**	**Acres**
Central	**346**	**9.6**	**49**	**2.6**	**52**	**2.0**	**33**	**1.3**	**480**	**15.5**
Commercial	92	5.4	13	1.2	14	0.3	15	0.6	134	7.5
Industrial	254	4.2	36	1.4	38	1.8	18	0.6	346	8.0
East Multnomah	**335**	**508.9**	**180**	**606.8**	**94**	**202.7**	**37**	**19.2**	**646**	**1,337.5**
Commercial	163	88.1	37	54.1	23	61.6	21	3.6	244	207.3
Industrial	170	346.2	131	501.1	61	136.3	12	14.6	374	998.2
Large Lot Industrial	2	74.6	12	51.6	10	4.8	4	1.0	28	132.0
Inner Clackamas	**71**	**3.7**	**30**	**55.2**	**17**	**2.8**	**9**	**0.3**	**127**	**61.9**
Commercial	44	1.2	3	0.0	6	0.5	3	0.0	56	1.8
Industrial	27	2.5	27	55.2	11	2.2	6	0.2	71	60.1
Inner I-5	**13**	**2.0**	**3**	**0.1**	**1**	**0.2**	**6**	**0.4**	**23**	**2.7**
Commercial	12	0.7	3	0.1	1	0.2	5	0.4	21	1.4
Industrial	1	1.3					1	0.0	2	1.3
Inner North & East	**637**	**385.2**	**241**	**565.7**	**124**	**60.5**	**132**	**13.8**	**1,134**	**1,025.2**
Commercial	146	6.9	26	5.7	17	1.6	31	0.6	220	14.9
Industrial	485	310.2	208	485.3	106	58.0	100	11.1	899	864.6
Large Lot Industrial	6	68.1	7	74.7	1	0.8	1	2.1	15	145.7
Inner Westside	**294**	**23.9**	**196**	**63.3**	**104**	**18.7**	**70**	**5.4**	**664**	**111.4**
Commercial	266	10.7	161	39.5	84	6.2	66	4.3	577	60.7
Industrial	28	13.2	35	23.8	20	12.5	4	1.2	87	50.6
Outer Clackamas	**179**	**227.7**	**133**	**232.8**	**80**	**121.5**	**60**	**8.5**	**452**	**590.6**
Commercial	87	16.1	57	17.5	39	9.9	50	5.7	233	49.2
Industrial	92	211.7	76	215.3	36	89.5	10	2.8	214	519.3
Large Lot Industrial					5	22.2			5	22.2
Outer I-5	**179**	**342.7**	**180**	**426.2**	**95**	**165.1**	**40**	**9.9**	**494**	**943.9**
Commercial	70	4.1	48	12.5	20	18.2	17	3.4	155	38.3
Industrial	84	242.0	115	365.8	62	103.5	19	4.9	280	716.1
Large Lot Industrial	25	96.6	17	47.9	13	43.4	4	1.6	59	189.5
Outer Westside	**644**	**1,281.3**	**158**	**455.0**	**44**	**38.0**	**8**	**0.2**	**854**	**1,774.5**
Commercial	428	57.2	68	28.8	20	13.7	5	0.1	521	99.8
Industrial	197	785.8	85	306.7	23	24.1	3	0.1	308	1,116.7
Large Lot Industrial	19	438.4	5	119.4	1	0.2			25	557.9
Grand Total	**2,698**	**2,785.0**	**1,170**	**2,407.7**	**611**	**611.5**	**395**	**59.0**	**4,874**	**5,863.2**

Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory

Map 15: Marine use restrictions



Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory

Map 16: Aviation overlay zones

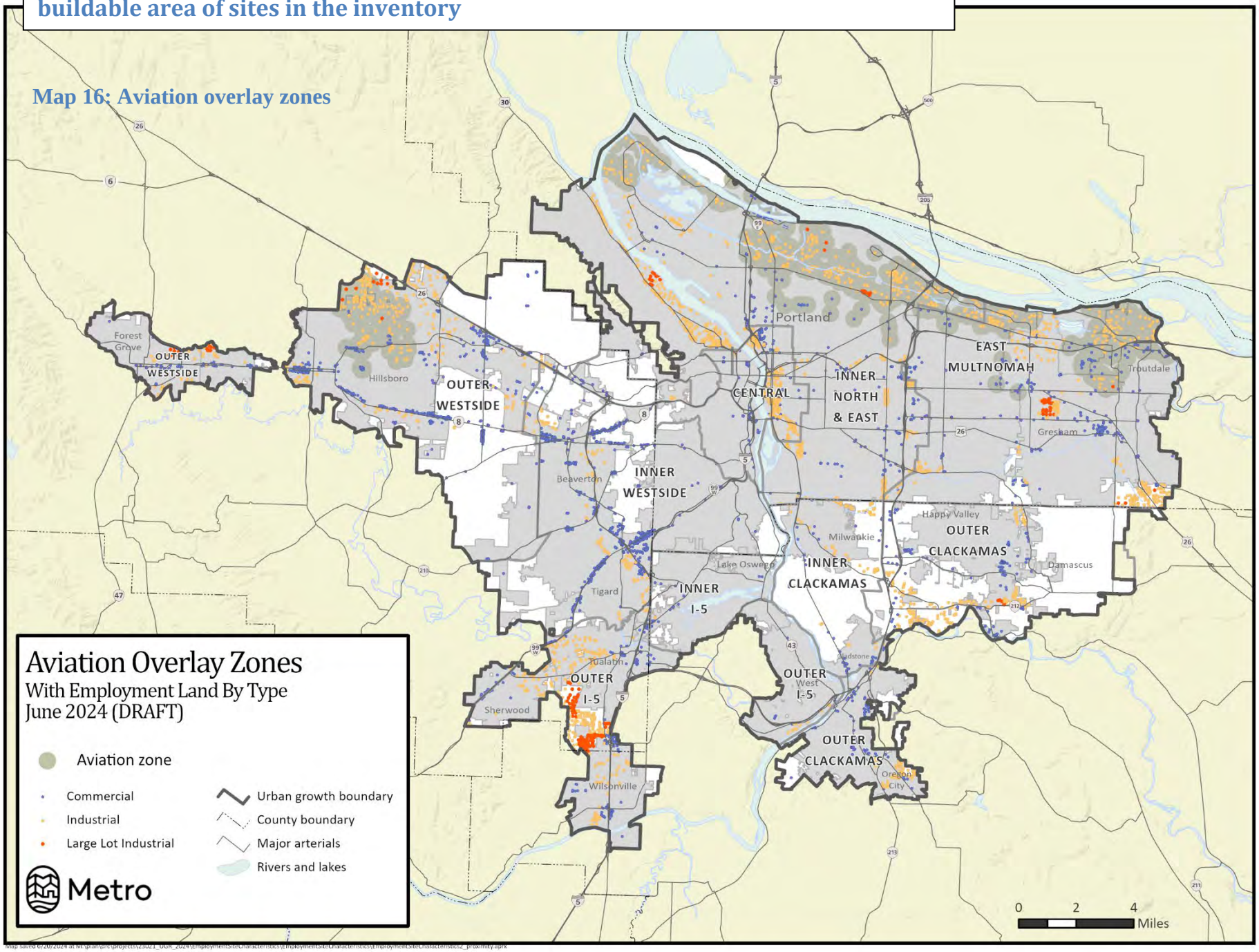
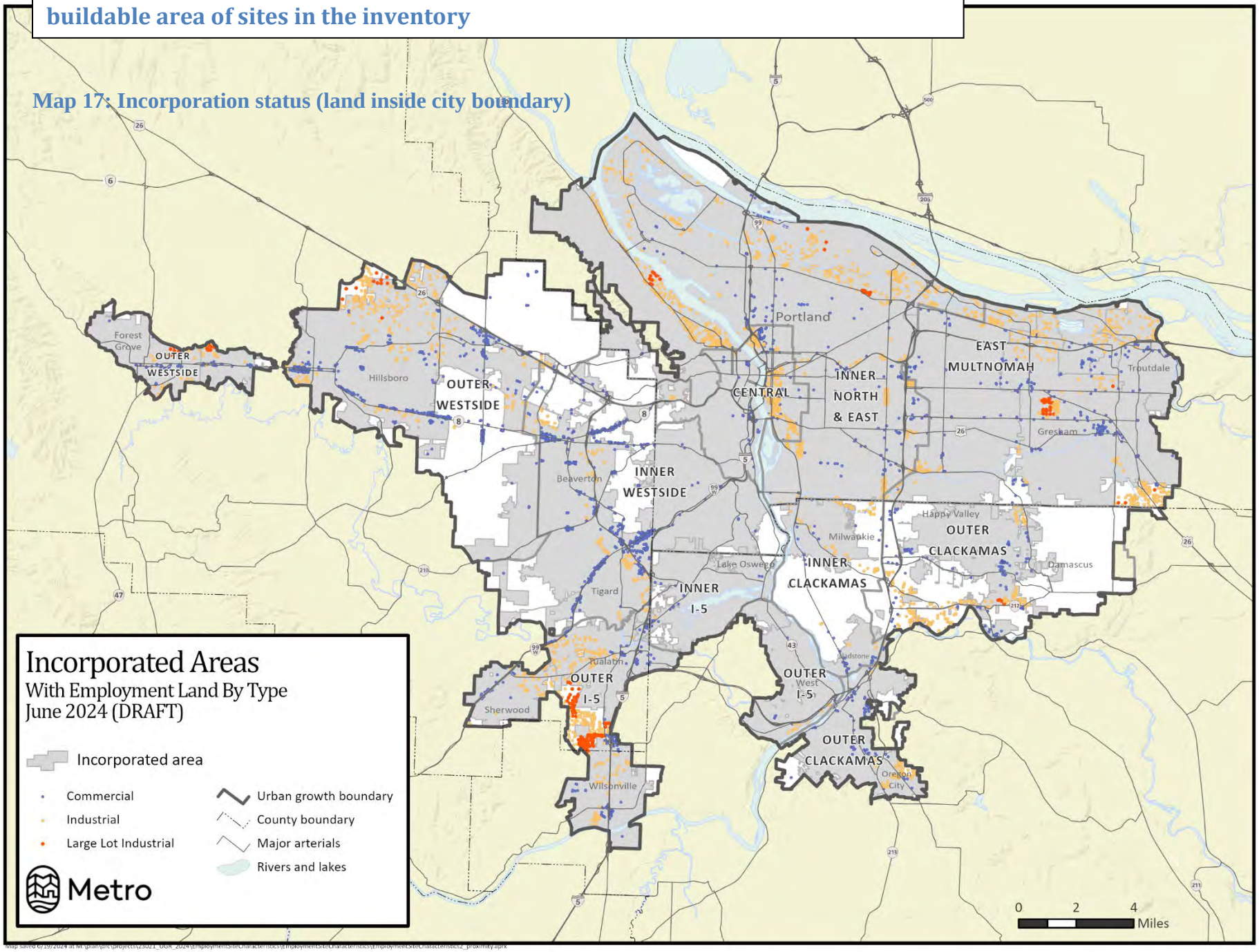


Table 5: Incorporation status (land inside city boundary)

	Incorporated Area		Unincorporated Area		Total	
Market Subareas	**Parcels**	**Acres**	**Parcels**	**Acres**	**Parcels**	**Acres**
Central	**480**	**15.5**			**480**	**15.5**
Commercial	134	7.5			134	7.5
Industrial	346	8.0			346	8.0
East Multnomah	**527**	**965.6**	**119**	**371.9**	**646**	**1,337.5**
Commercial	229	162.1	15	45.2	244	207.3
Industrial	273	748.9	101	249.3	374	998.2
Large Lot Industrial	25	54.6	3	77.3	28	132.0
Inner Clackamas	**71**	**48.1**	**56**	**13.8**	**127**	**61.9**
Commercial	37	1.0	19	0.8	56	1.8
Industrial	34	47.0	37	13.1	71	60.1
Inner I-5	**22**	**2.7**	**1**	**0.0**	**23**	**2.7**
Commercial	21	1.4			21	1.4
Industrial	1	1.3	1	0.0	2	1.3
Inner North & East	**1,131**	**1,025.1**	**3**	**0.0**	**1,134**	**1,025.2**
Commercial	220	14.9			220	14.9
Industrial	896	864.6	3	0.0	899	864.6
Large Lot Industrial	15	145.7			15	145.7
Inner Westside	**566**	**87.1**	**98**	**24.2**	**664**	**111.4**
Commercial	489	53.4	88	7.3	577	60.7
Industrial	77	33.7	10	16.9	87	50.6
Outer Clackamas	**280**	**397.1**	**172**	**193.5**	**452**	**590.6**
Commercial	182	38.6	51	10.6	233	49.2
Industrial	93	336.4	121	182.9	214	519.3
Large Lot Industrial	5	22.2			5	22.2
Outer I-5	**327**	**483.7**	**167**	**460.2**	**494**	**943.9**
Commercial	150	29.4	5	9.0	155	38.3
Industrial	169	431.9	111	284.2	280	716.1
Large Lot Industrial	8	22.4	51	167.1	59	189.5
Outer Westside	**646**	**1,031.4**	**208**	**743.1**	**854**	**1,774.5**
Commercial	409	78.6	112	21.3	521	99.8
Industrial	225	813.9	83	302.9	308	1,116.7
Large Lot Industrial	12	139.0	13	419.0	25	557.9
Grand Total	**4,050**	**4,056.3**	**824**	**1,806.8**	**4,874**	**5,863.2**

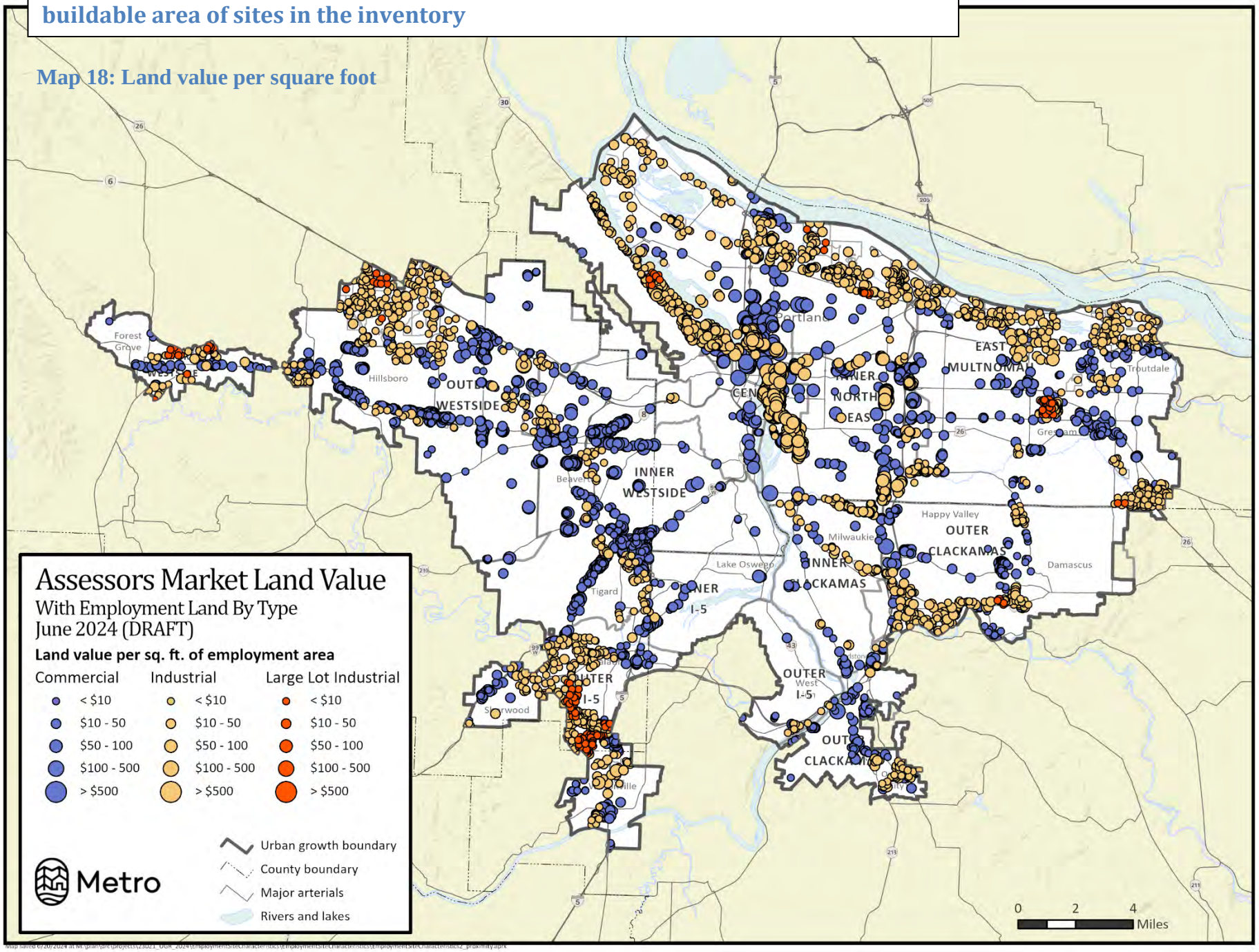
Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory

Map 17: Incorporation status (land inside city boundary)



Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory

Map 18: Land value per square foot

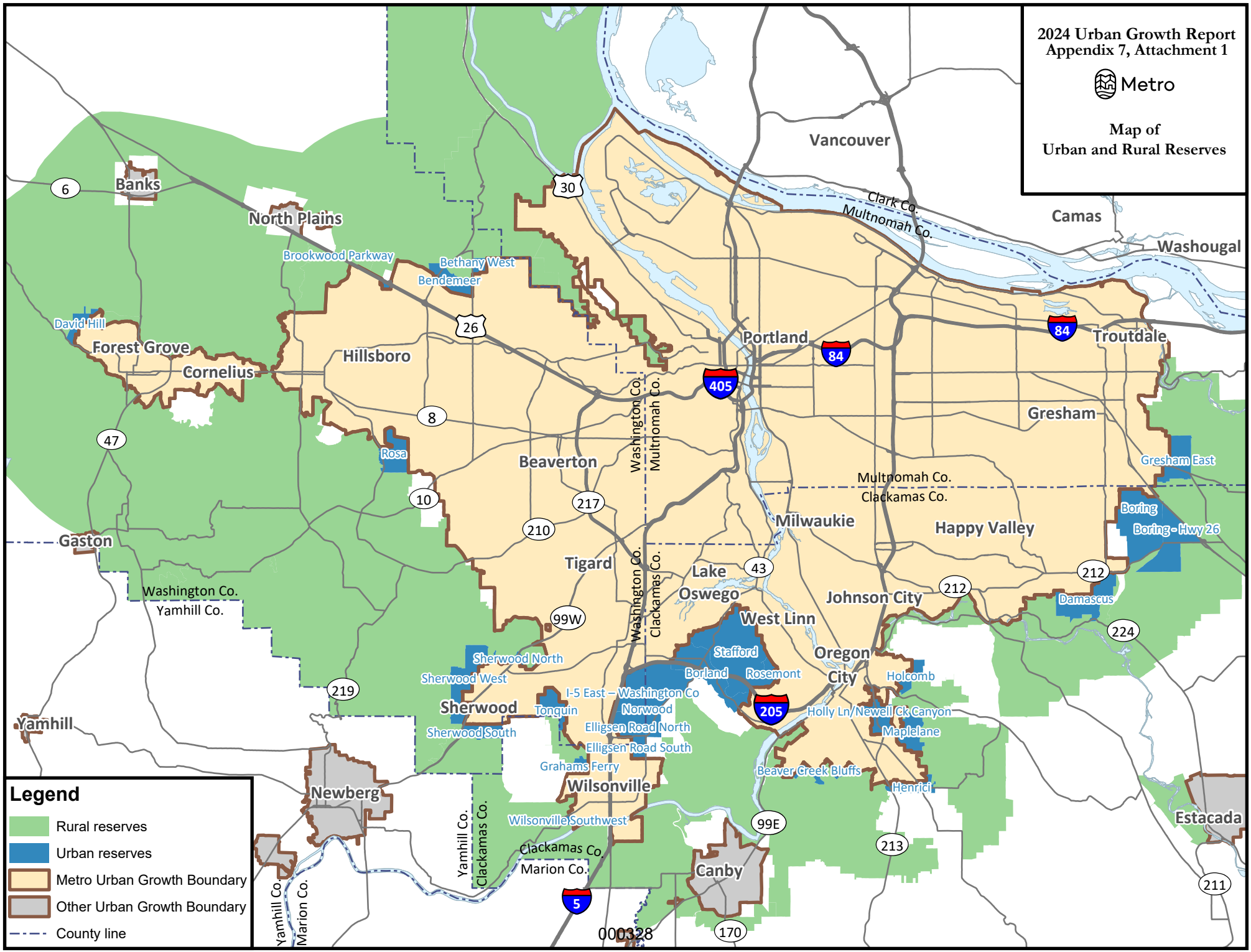


Appendix 7
to 2024 Urban Growth Report

Goal 14 Boundary Location Factors
Analysis of UGB Expansion Candidate Areas

APPENDIX 7 – LIST OF CONTENTS

- **Introduction and Methodology**
- **Attachment 1:** Map of Urban and Rural Reserves
- **Attachment 2:** Goal 14 Boundary Location Factors Analysis Narratives (27, with maps)
- **Attachment 3:** Goal 14 Boundary Location Factors Analysis Results
- **Attachment 4:** Mackenzie Utility Analysis Report


2024 Urban Growth Report
Appendix 7, Attachment 1
Metro
Map of
Urban and Rural Reserves
Vancouver
Clark Co.
Multnomah Co.
Camas
Washougal
Banks
North Plains
Brookwood Parkway
Bethany West
Bendemeer
David Hill
Forest Grove
Cornelius
Hillsboro
Portland
Troutdale
Gresham
Gresham East
Rosa
Beaverton
Multnomah Co.
Clackamas Co.
Milwaukie
Happy Valley
Boring
Boring - Hwy 26
Gaston
Washington Co.
Yamhill Co.
Tigard
Lake Oswego
Johnson City
Damascus
West Linn
Stafford
Borland
Rosemont
Oregon City
Holcomb
Holly Ln/Newell Ck Canyon
Maplelane
Sherwood North
Sherwood West
Sherwood
Sherwood South
Tonquin
I-5 East – Washington Co
Norwood
Elligsen Road North
Elligsen Road South
Grahams Ferry
Wilsonville
Wilsonville Southwest
Beaver Creek Bluffs
Henrici
Yamhill
Newberg
Clackamas Co.
Marion Co.
Canby
Estacada
6
30
26
84
405
8
47
10
217
210
43
212
99W
224
219
205
99E
213
211
5
170
Legend
Rural reserves
Urban reserves
Metro Urban Growth Boundary
Other Urban Growth Boundary
County line

GOAL 14 BOUNDARY LOCATION FACTORS
ANALYSIS OF UGB EXPANSION CANDIDATE AREAS

INTRODUCTION

The Metro Council considers how to accommodate the Metro region's forecasted 20-year population and employment growth in the Council's 2024 growth management decision. One option the Council has for accommodating forecasted growth is an amendment to Metro's urban growth boundary (UGB). A decision to amend the UGB must be supported by a comparative analysis of alternative locations for expanding the UGB, if an expansion is needed to accommodate future growth projected in the 2024 Urban Growth Report. The alternative locations that are analyzed are Metro's 27[1] urban reserves.

Both Statewide Planning Goal 14, as well as provisions of the Metro Code, identify factors that analysis must consider. The alternatives analysis in two parts: Part 1, which considers the factors of Goal 14; and Part 2, which considers the factors in the Metro Code.

The results of this Goal 14 boundary location factors analysis described here in Appendix 7 ultimately identify seven of the 27 urban reserves as unsuitable for urbanization in the short term. Those seven areas are therefore not considered further in the Metro Code Factors analysis in Appendix 7A.

Statewide Planning Goal 14

Statewide Planning Goal 14, *Urbanization*, lists four factors that must be considered to determine the location of, and changes to, the UGB:

Factor 1 – Efficient accommodation of identified land needs

Factor 2 – Orderly and economic provision of public facilities and services

Factor 3 – Comparative environmental, energy, economic and social consequences

Factor 4 – Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

While the Goal 14 boundary location factors are evaluated separately in this analysis, each factor is not necessarily as important as the others for determining the appropriate UGB location; the analysis weights certain factors above others and provides an overall assessment of the suitability of each urban reserve to accommodate future growth.

[1] The 27 analyzed urban reserves, listed on Page 18, do not include Urban Reserve 8A located between the cities of North Plains and Hillsboro, because the approximately 35-acre area is comprised only of Hwy 26 right-of-way and connecting onramps and offramps to and from NW Jackson School Rd. It therefore is not capable of accommodating any new urban residential or employment uses if included in the UGB.

Contributors

As was done with previous growth management decisions, Metro staff completed the majority of the Goal 14 analysis, assessing each reserve according to Factors 1, 3, and 4 above.

The "public facilities and services" referred to in Factor 2 include water, sanitary sewer, stormwater, and transportation services. Metro staff completed the transportation element of the Factor 2 analysis following a review of local transportation system plans and consultation with transit service providers, including TriMet; the methodologies used in the transportation-related analysis are detailed further in Pages 7-10. Metro also contracted with Mackenzie, Inc., a Pacific Northwest multidisciplinary design firm with expertise in civil and structural engineering, land use planning, and architecture, to assist with background research on water, sanitary sewer, and stormwater system capacities and needs; Mackenzie's assumptions and methodology are detailed in Attachment 4.

BUILDABLE LAND ASSESSMENT

The analyses for Goal 14 Factors 1 and 2 were based on assumptions of each reserve's potential future urban development, which began with an assessment of the amount of "buildable" (i.e., developable) land.

The buildable land assessment followed general procedures used for most buildable lands studies: vacant portions of the study areas (i.e., the urban reserves) are first identified; those vacant portions that are unbuildable due to topographical or environmental constraints, such as steep slopes, flood hazards, and wetlands, are then removed from vacant lands inventory; specific categories of public and other tax-exempt lands that are unlikely to be developed for residential or employment uses are also considered unbuildable and are therefore removed from the inventory; and, finally, the inventory is further reduced to account for future streets and public facilities needed to accommodate urbanization.

Most tabular data used in this analysis has been generated from Geographic Information Systems (GIS). In GIS, digital, coordinate-based spatial data layers are used to represent real world features, such as tax lots, wetlands, floodplains, and zoning areas. All the GIS data used in this analysis are from Metro's Research Center.

Of course, electronic data representing real world features are rarely perfect. Data representing features such as floodplains and tax lots will have some positional inaccuracies, which, in turn, will be reflected in numbers representing them. In addition, much of the assessment information that is included in Metro's Regional Land Information System (RLIS) database and used to identify tax-exempt lands comes directly from county assessment offices, where local updates may be conducted at different intervals. For a variety of reasons such as these, this Goal 14 boundary location factors analysis helps to illustrate *general patterns* and to make *overall comparisons* of each reserve's potential suitability for urban development using consistent methodology, but cannot be expected to be highly precise at small levels of geography, especially prior to comprehensive local planning.

Additional details on the various steps used to conduct the buildable land assessment follow below.

Step 1: Determine "vacant" lands

The first step in conducting the buildable lands assessment is to determine which lands within the study areas (i.e., the 27 urban reserves) are vacant and available for new urban development following inclusion in the UGB. It is understood that some existing uses, such as high-value rural residences, will remain even as an area is urbanized; however, whether a rural land use is discontinued to accommodate new urban development is generally dependent on a property owner's personal and unpredictable interests, so it is not practicable to determine with meaningful certainty which existing rural uses in each reserve would actually remain or for how long. Therefore, for the purposes of this higher-level Goal 14 analysis, *all* land in each urban reserve is assumed at first to be "vacant", with the working supposition that even existing rural land uses in the urban reserves would *most likely* redevelop with urban uses, at least eventually.

There are approximately **20,212 acres** considered "vacant", equal to the total combined area of all 27 analyzed urban reserves.

Step 2: Subtract topographically and environmentally constrained areas

Lands that are considered vacant may not necessarily be buildable for new urban land uses. Therefore, the next step in a buildable lands assessment is to subtract those areas from the vacant lands inventory that are topographically or environmentally constrained. The following constrained areas were not considered buildable in this analysis and were removed from the vacant lands inventory:

1. Urban Growth Management Functional Plan (UGMFP) Title 3, *Water Quality and Flood Management Areas*, consisting of:
    - Flood hazard areas (e.g., FEMA "100-year" floodplains and 1996 flood inundation areas)
    - Wetlands (e.g., from an enhanced National Wetlands Inventory and local wetlands inventories)
    - Wetland areas, measured 50 feet from the edge of a wetland or up to 200 feet from the edge of wetland located adjacent to slopes greater than 25 percent
    - Vegetated corridors between 15 feet and 200 feet in width, depending on the area drained by the water feature and the slope of the land adjacent to the water feature
2. UGMFP Title 13, *Nature in Neighborhoods*, areas identified as riparian habitat Class I and II and upland habitat Class A and B on the Metro Regionally Significant Fish and Wildlife Habitat Inventory Map

3. Areas with slopes greater than 25 percent

Metro's Title 13 regulations do not preclude all development within inventoried areas, so an additional step described below (Step 5) recognizes that some limited development will likely occur even in these locations. Additionally, in almost all circumstances, the identified Title 13 significant riparian and upland habitats already encompass the Title 3 Water Quality and Flood Management Areas, meaning areas removed from the vacant lands inventory for having a Title 3 classification are typically the same areas that would otherwise be removed for having a Title 13 classification.

The requirements of Titles 3 and 13 apply only to areas within the Metro service district (i.e., jurisdictional) boundary. Some of the urban reserves analyzed are currently located outside of the boundary, but would be annexed in when they are added to the UGB.[2] The Title 13 Regionally Significant Fish and Wildlife Habitat Inventory already extends beyond the jurisdictional boundary and shows environmental constraints in all urban reserves. Metro has also compiled a supplemental data layer representing Title 3 protections for urban reserves outside the jurisdictional boundary to understand how much land in each reserve could potentially be constrained; however, as noted above, these Title 3 areas are generally already encompassed in the Title 13 areas.

In total, approximately **6,741 acres** were removed from the vacant lands inventory due having topographic or environmental constraints.

Step 3: Subtract other areas not considered buildable

Certain urban reserve lands considered "vacant" and not constrained by topographic or environmental features are nonetheless highly unlikely to (re)develop with urban uses and, therefore, also warrant being removed from the vacant lands inventory.

Tax-exempt lands (e.g., federal-, state-, county-, and city-owned properties, school properties, and places of worship) identified from the tax assessment database were removed from the inventory, as it is reasonable to assume such properties would not be readily available for development with urban residential or employment land uses if included in the UGB. Lands already occupied by cemeteries, golf courses, parks, home owners association (HOA) owned common areas, existing road rights-of-way, and tax lots smaller than 1,000 square feet were removed for similar reasons.

Step 3 removes a total of approximately **3,134 additional acres** from the vacant lands inventory.

Step 4: Add back some Title 13 constrained land

Metro's Title 13 data layer was created almost 20-years ago at the regional scale, largely relying on aerial imagery available at that time. A key step in planning for areas added to the UGB is the

[2] ORS 268.390(3)(b)

development of an *updated* environmentally constrained land data layer, using current GIS tools and other resources that allow for a more accurate assessment of the localized landscape and the riparian and upland wildlife habitat areas. As documented in recent UGB expansion area plans, the natural resource protected areas identified by the refined mapping analysis often differs from the areas originally mapped by Metro. In addition, experience has shown that it is not uncommon for some of the originally mapped upland habitat areas to have been degraded through forestry practices and other rural land use activities prior to inclusion in the UGB, potentially resulting in additional unconstrained (i.e., buildable) land. Furthermore, Title 13 provides that development may sometimes encroach into even still-existing natural habitat, depending on the specific circumstances of the site and the development proposal.

Recognizing the expected change in mapped habitat areas and the possibility of encroachment, 10 percent of the mapped Metro Title 13 constrained land (**363 acres**) is added back into the vacant lands inventory.

Resulting gross vacant buildable land

Table 1 below shows the results of Steps 1-4 above, as applied to the 27 analyzed urban reserves. The table shows that there are approximately **10,700 acres of gross vacant buildable land** in Metro's urban reserves that are available for urban development when added to the UGB.

Table 1 – Gross Vacant Buildable Urban Reserve Land

Step #	Land Type	Acres
Step 1	Urban reserves (i.e., "vacant")	20,212
Step 2	Topographically/environmentally constrained	6,741 (-)
Step 3	Otherwise constrained (e.g., tax-exempt, ROW)	3,134 (-)
Step 4	10% of Title 13 areas	363 (+)
	Total Gross Vacant Buildable Land:	**10,700 acres**

Step 5: Subtract lands needed for certain future land uses

As urbanization proceeds, some gross vacant buildable land will be used for different types of new public facilities, such as streets/roads, parks, and schools, as well as for other non-residential and non-employment uses, such as places of worship and assembly. Estimates of future land needed to accommodate these uses, listed in Table 2 below, are therefore subtracted from the gross vacant buildable land. The reduction estimates are the same as the reductions used in Metro's 2010, 2018, and 2023 Goal 14 analyses. Refined acreage needs will be developed through the concept planning requirements of UGMFP Title 11, *Planning for New Urban Areas*.

The calculations in Table 2 demonstrate that approximately **7,971 acres** of land in all of Metro's 27 analyzed urban reserves could potentially accommodate new urban residential and employment land uses, referred to as "net buildable land".

Table 2 – Portion of Gross Vacant Buildable Land Subtracted for Future Land Uses		
Subtracted Future Land Use	**Percent**	**Acres**
Streets/roads	18.5	1,980
Parks	2.2	235
Schools	2.9	310
Places of worship/assembly	1.9	203
Total Subtracted for Future Land Uses:	**25.5**	**2,729 (rounded)**
Total Net Buildable Land in Analyzed Urban Reserves (Gross Vacant Buildable Land – Total Subtracted for Future Land Uses):		**7,971 acres**

EXPLANATION OF GOAL 14 BOUNDARY LOCATION FACTORS

Following is an explanatory summary of how each of the four Goal 14 boundary location factors were applied to Metro's urban reserves. The results of the analysis for each urban reserve can be found in Attachment 3.

Factor 1: Efficient accommodation of identified land needs

The 27 urban reserves were analyzed for how efficiently they could accommodate an identified land need, based on a number of considerations.

Some primary considerations were the overall amount of gross and net buildable land in each reserve, and whether that land is cohesive or dispersed in disconnected pockets/sub-areas.

Parcelization (i.e., the number of tax lots), tax lot sizes and locations, existing development patterns and their assessed value, and potential transportation connections to the existing UGB were considered as well. Tax lot data was sourced in February 2024. Given the potential for discrepancies between, and regular updates to, surveys, county tax maps, and GIS layers, and inevitable shifts in geodetic controls over time, tax lots that were observed to have less than five percent of their area in an urban reserve, and tax lots smaller than 1,000 square feet with less than 10 percent of their area in an urban reserve, were not considered to be located within an urban reserve at all for purposes of this evaluation.

The analysis for Factor 1 also considered whether each urban reserve is located near existing/planned residential or employment areas, major transportation corridors (e.g., highways), schools, or parks, trails, or other recreational facilities that could support residential and/or employment land uses.

However, the primary consideration in evaluating whether an urban reserve could efficiently accommodate an identified land need is whether it has an adopted concept plan under Title 11 of Metro's Urban Growth Management Functional Plan. The purpose of concept planning is to ensure that there is a detailed local plan for future urban development, including estimated costs

of infrastructure and potential methods for financing, prior to an area being added to the UGB. Also, having a concept plan that has been formally adopted by local officials following public engagement indicates a local willingness to urbanize and significantly increases the likelihood that the reserve will develop and efficiently accommodate identified land needs within a reasonable timeframe. As noted in the following pages, only one urban reserve, the Sherwood West Urban Reserve, has a locally-adopted concept plan. Accordingly, in the analysis of which urban reserve demonstrates the highest likelihood of efficiently accommodating the identified land needs under Factor 1, the Sherwood West Urban Reserve rises to the top of the list.

Factor 2: Orderly and economic provision of public facilities and services

For the purposes of Factor 2, and consistent with Oregon Administrative Rules (OAR) chapter 660, division 24, "public facilities and services" means water, sanitary sewer, stormwater management, and transportation facilities and services. The analysis under this factor requires an evaluation and comparison of the relative costs, advantages, and disadvantages of alternative UGB expansion areas with respect to the provision of these public facilities and services as needed to urbanize alternative boundary locations. The evaluation and comparison considers:

1. The impacts to existing water, sanitary sewer, stormwater, and transportation facilities that serve nearby areas already inside the Metro UGB;
2. The capacity of existing public facilities and services to serve areas already inside the UGB as well as areas proposed for addition to the UGB;
3. The need for new transportation facilities such as highways and other roadways, interchanges, arterials and collectors, additional travel lanes, other major improvements on existing roadways and the provision of public transit service; and
4. Whether there is a locally-adopted concept plan for the expansion area that identifies how water, sanitary sewer, stormwater management, and transportation facilities could be extended to serve urban development and how such facilities and services could be financed, as such a preliminary plan will facilitate the orderly and economic provision of these facilities and services in the future.

As noted earlier, Metro contracted with Mackenzie for background research (Attachment 4) that was needed to address the first two topics above for water, sanitary sewer, and stormwater management services, including development of preliminary cost estimates for providing these services to urban residential and employment land needs. The water, sanitary sewer, and stormwater analysis focused on the larger components of the systems and preliminary cost estimates for the urban services addressed, at a minimum, the following:

- For water service, availability of source, availability of treatment capacity, storage, pump station and transmission line requirements, and existing local system improvements;
- For sanitary sewer service, availability of treatment capacity, trunk line and pump station requirements, and existing local system improvements; and

- For stormwater management service, existing local system improvements, including a need for sub-regional systems.

Metro staff completed the transportation-related components of Factor 2. Preliminary conceptual future arterial/collector level road networks that may be needed to serve urban development of each reserve were developed based on a review of local jurisdictions' plans, topography, existing rights-of-way, and the connectivity standards in the Regional Transportation Plan (RTP). The preliminary road networks recognize that the ideal spacing for arterials is one mile apart, and that the ideal spacing for collectors is one-half mile from another collector or arterial, as this spacing can provide significant benefits to the multimodal transportation network by spreading out motor vehicle traffic on multiple roadways and providing options for walking, biking, and transit connectivity. Arterials were assumed to be an 80-foot-wide roadway within a 120-foot-wide right-of-way; collectors were assumed to be a 50-foot-wide roadway within an 80-foot-wide right-of-way.

The preliminary road network was also used to develop rough cost assumptions for future roadway system improvements in each urban reserve, though more detailed estimating (e.g., during comprehensive planning following addition to the UGB) will of course be necessary to determine exact costs and phasing of construction. The roadway cost assumptions in this analysis are only for the arterials and collectors and do not include local roads that are assumed to be paid for by future developers.

The roadway cost assumptions are per mile and include construction of surface elements for a "complete street" (i.e., sidewalks, bike lanes, curbs, and gutters) and right-of-way acquisition, but do not include stormwater pipes, as stormwater system costs were calculated separately by Mackenzie and included with the stormwater services analyses. Each arterial was assumed as either a four-lane divided roadway or five-lane roadway, 80 feet in width within a 120-foot-wide right-of-way; each collector was assumed as either a two-lane divided roadway or a three-lane roadway, 50 feet in width within an 80-foot-wide right-of-way. The assumed roadway costs are expressed in ranges ("normal" expected costs and "high" expected costs) in Table 3 on the next page; higher per-mile costs were assumed for elements that traverse steeper topography or water bodies. The per-mile costs in the table are the same as used in Metro's Goal 14 boundary location factors analysis in 2018, but with an additional 40 percent to account for increased construction/materials costs and general inflation. This approach is consistent with the project cost inflation factoring used for the 2023 RTP. The proposed road network and a summary of the expected transportation costs for each separate urban reserve can be found in Attachment 2.

Table 3 – Roadway Per-Mile Cost Assumptions[3]			
Arterials			
	Surface Elements	ROW Acquisition	**Total Cost**
Normal:	$35,280,000	$26,040,000	**$61,320,000**
High:	$108,780,000	$26,040,000	**$134,820,000**
Collectors			
	Surface Elements	ROW Acquisition	**Total Cost**
Normal:	$22,540,000	$17,360,000	**$39,900,000**
High:	$58,380,000	$17,360,000	**$75,740,000**

Additional elements of the Goal 14 transportation analysis concern: the capacity of the existing transportation system to serve areas already inside the UGB; the capacity of that existing transportation system to serve urban development of each reserve; and impacts of each reserve's urbanization on existing transportation facilities.

Metro's 2018 Goal 14 analysis addressed these factors primarily by considering the peak evening two-hour volume-to-capacity ratio ("V/C ratio") targets adopted in the 2018 RTP for roadways near and connected to each urban reserve.[4] Notably, the 2018 RTP failed to meet its V/C-based mobility targets, particularly for the region's throughway system, prompting Metro and the Oregon Department of Transportation (ODOT) to consider alternative approaches for measuring mobility in the region.

From 2019 to 2023, Metro and ODOT worked together to develop a new regional mobility policy that no longer uses the V/C ratio to measure adequacy of the transportation system. Adopted in Chapter 3 of the 2023 RTP, the new policy identifies three mobility performance measures:

1. Vehicle miles traveled (VMT) per capita;
2. System completion for all modes (including transportation demand management and transportation system management and operations); and
3. Throughway reliability using travel speed.

The new policy is a critical step toward developing more housing, jobs, and services in designated growth areas across the region and ensuring those areas and existing communities have improved access to safe and affordable transportation options. The policy represents an important advancement in measuring mobility for all modes and reliability of the region's

[3] The per mile cost assumptions are a range of potential costs, from a typical estimated cost per mile to higher-end per-mile estimates. The actual per-mile costs are expected to vary due to location-specific factors, such as existing development, environmental impacts, complexity of design, and other engineering issues.

[4] The V/C ratio is a measure of vehicle congestion on roads and at intersections, specifically the number of motor vehicles relative to the motor vehicle capacity of a given roadway during peak travel times (e.g., 4:00-6:00 PM on weekdays).

interstates and major highways. The policy also prioritizes the development of a complete and well-connected transportation system that gives people safe and reliable transportation options and helps reduce the region's climate pollution.

The Factor 2 assessment in this 2024 Goal 14 analysis applies the new 2023 RTP mobility policy rather than the 2018 RTP V/C ratio in the analysis of the transportation system's adequacy. Consistent with the 2023 RTP mobility policy, the assessment considers whether urban development of each reserve would increase home-based VMT per capita of the area, the availability of transportation options, existing safety deficiencies, and the reliability of the throughway system in the area.

Home-based VMT per capita is limited when people are able to meet their daily needs closer to where they live; therefore, evaluating the capacity of the existing transportation system warrants considering whether a given urban reserve and areas adjacent to it do/can contribute to more "complete" communities, with their own mixture of residential, employment, institutional, and recreational uses. The amount of VMT per capita is further limited when multiple transportation options are available (e.g., transit service, bike lanes, sidewalks, crosswalks, and trails). Generally, areas along the "urban edge" are often the least likely to have a mixture of land uses and well-connected network of multimodal transportation options to serve daily needs of the people living and working there. Some urban reserves are also not close to urban centers or higher density development and some are also too small, fragmented, and/or constrained by topography or other environmental features to likely develop as, or contribute to, a "complete" community. Accordingly, many reserves do not score high on this factor. However, it is worth noting there is typically less road congestion at the urban edge, and urbanization of an urban reserve is unlikely to create additional motor vehicle traffic that causes travel on nearby throughways and other roadways to slow below performance standards.

A variety of data sources were used to assess transportation system adequacy and potential impacts for Factor 2, including maps of the following from Chapter 4 of the 2023 RTP:

- Existing regional network gaps in: the planned regional transit service; the planned regional pedestrian and bicycle facilities, and trails; and the planned regional motor vehicle network;
- Existing regional high injury corridors and intersections; and
- Existing throughway reliability performance (2019).

Aerial photos from 2022 and GIS data layers showing existing roadways, on-street bike and sidewalk facilities, off-street trails, transit lines, and transit stops were also used.

TriMet and South Metro Area Regional Transit (SMART), which are the transit agencies that may potentially serve the analyzed urban reserves, completed preliminary evaluations of the feasibility and potential costs of providing future transit service to urban development of each reserve. The findings of those evaluations were incorporated in the assessments under Factor 2. These are only high-level, preliminary findings are intended as a tool for policymakers to

understand, to some degree, the feasibility and costs associated with providing additional transit service to each of the analysis areas; they do not guarantee transit service to any particular area in the future. Ultimately, any investment in new transit service will depend on the actual level of development that occurs in an area and the corridors leading up to it, as well as other variables.

Only one urban reserve, the Sherwood West Urban Reserve, has a locally-adopted concept plan. That plan identifies how water, sanitary sewer, stormwater management, and transportation facilities could be extended to serve urban development of the reserve and how such facilities and services could be financed.

Factor 3: Comparative environmental, social, energy, and economic consequences

Factor 3 requires an assessment of the long-term environmental, social, energy, and economic (ESEE) consequences that could result from urbanization of land considered for inclusion within the UGB. The four ESEE consequences must be evaluated for each urban reserve and the results of this ESEE analysis help to inform which lands should be selected for inclusion in the UGB.

Statewide Planning Goal 2, *Land Use Planning*, suggests that, when considering the conversion of land from rural to urban uses, the ESEE analysis should consider the positive and negative effects of urbanization on the study areas and the advantages and disadvantages of urbanizing a particular site versus another site. The analysis must demonstrate that, on balance, the lands being considered for inclusion in the UGB are no worse than other areas under consideration for urbanization.

The four ESEE consequences were all evaluated in this Goal 14 boundary location factor analysis, but only the environmental consequence is reported out separately in Attachment 2, as it is more quantitative in nature, whereas the other three consequences are more qualitative and merit being reported together. Outlined below are general descriptions of the expected ESEE consequences and the expected consequences to each factor because of urbanization.

Environmental

Environmental features such as streams and wetlands can be relatively easily identified and their characteristics (e.g., size, proximity) can be quantified, which helps in determining their importance and in assessing the potential effects of urbanization on those features. Additionally, there are often regulatory programs in place to ensure that urbanization will occur in a regionally consistent manner through required protection standards.

UGMFP Title 3, for example, provides performance standards to protect and improve water quality and to reduce the risk and impacts of flooding. Land added to the UGB is subject to the requirements of Title 3 through the concept planning and comprehensive planning requirements of UGMFP Title 11. UGMFP Title 13 provides performance standards to protect, maintain, enhance, and restore significant fish and wildlife habitat through a comprehensive approach that includes voluntary, incentive-based,

educational, and regulatory elements. Land brought into the UGB is also subject to the requirements of Title 13 through the concept planning and comprehensive planning requirements of Title 11.

However, even with protection requirements, urbanization may still impact natural resources through the degradation of water quality and wildlife habitat, the loss of floodplain functions, and increased instability of steep slopes. Urbanization can also affect the function of these areas when vegetated corridors are reduced, and when impervious surfaces are increased and lead to additional storm sewer runoff that impacts stream water quality.

Still, inclusion of land into the UGB and subsequent urbanization do not necessarily mean greater negative impacts to natural resources. Indeed, *rural* uses can impact natural resources in ways that are not allowed in an urban setting. For instance, in many places, agricultural activities occur right up to the edge of a stream corridor, effectively providing no natural riparian habitat. In an urban context, however, the same stream would typically have a required vegetative riparian corridor where development could not occur, with urbanization thereby resulting in a positive impact on the longer-term health of that stream. In other words, lands included in the UGB can be subject to greater natural resource productions than land outside the UGB.

Social

There can be both positive and negative social consequences of urbanizing a previously rural area, due to changes to the built environment, the natural landscape, and the area's demographics. Urbanization can also positively and negatively impact the lifestyles of current residents and employees of the area, as well as cultural and historic resources valued by both those living both inside and outside the UGB.

For example, development of a new urban area can create new social, commercial, recreational, and educational opportunities for both current and new residents of the area and for nearby established residential communities already inside the UGB. This is particularly so when there is a more compact urban form with mixed-use areas that are part of a planned "complete community" because, in these areas, people can live closer to and more easily access jobs, businesses, needed services, recreational opportunities, places of worship, and other social gathering places. Such proximity can also increase the feasibility and attractiveness of active transportation (e.g., walking and bicycling) and the use of transit, which can have their own social benefits.

However, urbanization can also degrade the rural character of the area, which is a negative social impact at least on those who desire preservation of rural lifestyles and environments. Those currently engaged in farming nearby land may also feel pressure from encroaching urbanization to curtail their farming activities.

Energy

Statewide Planning Goal 13, *Energy Conservation*, states:

> "Priority consideration in land use planning should be given to methods of analysis and implementation measures that will assure achievement of maximum efficiency in energy utilization".

Depending on density, mix of land uses, roadway layout, availability of transit and active transportation facilities, and other factors, urbanization can increase VMT and increased VMT, particularly by internal combustion engine vehicles, can increase energy consumption. Maintaining a compact urban form, providing both service and employment opportunities near residential development, and increasing density along high-capacity transportation corridors will result in smaller increases in energy consumption than disjointed, unplanned large-lot development.

OAR 660-023-0190(1) states that energy sources, for the purposes of Goal 5, may include naturally occurring locations, accumulations, or deposits of one or more of the following resources used for the generation of energy: natural gas, surface water (i.e., dam sites), geothermal, solar, and wind areas. Energy sources applied for or approved through the Oregon Energy Facility Siting Council (EFSC) or the Federal Energy Regulatory Commission (FERC) are deemed to be significant energy sources that could be impacted by urbanization of the surrounding area. Protection of energy sources necessitates adopting comprehensive plan provisions and implementing land use regulations that both limit new conflicting uses within the impact area of the site, and that authorize future development or use of the energy source of the site. There are no known sources of energy in the urban reserves as defined in OAR 660-023-0190(1), although some areas contain easements for electric power, petroleum, and natural gas transmission facilities.

Economic

The land in Metro's urban reserves is currently being used for rural uses that include farming and forestry activities, larger-lot single-family residential uses, schools, places of worship, and limited commercial and industrial uses. Permitted commercial uses are generally confined to wholesale and retail sales of farming and forestry related products, as well as other incidental uses, including convenience stores, or service-based businesses, under prescribed conditions. Industrial uses are mainly related to farm crop and timber processing and wholesaling and other resource-based industries, such as sand and gravel mining and equipment storage.

Urbanization allows for a concentration of residential, commercial, industrial, and office uses that benefit from economies of scale. As land is brought into the UGB, the range of uses and development types increase. The resulting diversified urban economy will serve both the current and new residents of the area, as well as the nearby established residential communities already inside the UGB.

Inclusion in the UGB, and the addition of public facilities and infrastructure, can increase the economic value of the land by providing the opportunity to divide and sell off property and to develop it with new uses. These development options would not be available without inclusion of the land in the UGB and the subsequent urban services that are provided.

However, as land values increase with urbanization, activities that are land-intensive, such as agriculture, forestry, and equipment storage, may be preferred less and even be less economical. As mentioned above, urbanization can also put pressures on nearby commercial agriculture to curtail their farming practices.

Oregon's agriculture industry continues to be a major component of the state's economy, so these impacts are worth considering. According to the Oregon Department of Agriculture (ODA), there were 37,200 farms in Oregon in 2020, with a value per crop land acre of $3,120. The top five agricultural commodities based on value of production that year were: greenhouse and nursery products ($1.19 billion); cattle and calves ($588 million); hay ($569 million); milk ($557 million); and grass seed ($458 million). Oregon has been one of highest-ranking states in the nation, if not the highest, for production of hazelnuts, onions, potatoes, pears, blueberries, cherries, cranberries, hops, nursery stock, Christmas trees, and many types of peas, clover, and seed.[5]

Urbanization of land that is currently in agricultural production, particularly nursery stock, hay, and caneberry (e.g., raspberry and blackberry) production, which is common in the three-county Metro region, could be economically significant. Loss of agricultural land to urbanization can also adversely impact agricultural processors (e.g., wineries) and agri-tourism.

Timber harvesting and related forest product activities have been important components of Oregon's economy as well. According to the Oregon Forest Resources Institute, in 2019, Oregon was the top softwood lumber-producing state in the country, as well as the top plywood-producing state, and Oregon had more than 61,000 forest sector jobs.[6] In fiscal year 2022, the Oregon Department of Forestry harvested approximately 198 board feet of timber, generating $95 million in net revenue; 36,900 (nearly 20 percent) of those board feet were harvested in Clackamas and Washington Counties.[7] Loss of productive timber lands to urbanization, and pressures of urbanization on forestry practices, can have adverse consequences on the state's and Metro region's forestry-related economy.

As also noted previously, there can be greater regulatory protections on the natural environment inside the UGB than in rural areas. When environmental protections of an area are increased by including the area in the UGB, that can be perceived as a loss of

[5] Oregon Agricultural Statistics, October 2021: https://www.nass.usda.gov/Statistics_by_State/Oregon/Publications/facts_and_figures/facts_and_figures.pdf

[6] https://site.oregonforests.org/sites/default/files/2021-01/OFRI_2021ForestFacts_WEB3.pdf

[7] https://www.oregon.gov/odf/Documents/workingforests/cftlc-annual-report-2022.pdf

some development/use potential. But this perceived loss must be balanced with the value – including economic value – of protecting open spaces and wildlife habitat. Metro's Goal 5 Phase 1 ESEE Analysis explains in detail how the ecological functions of fish and wildlife habitat provide ecosystem services that have economic value and benefit society. Based on this information, it is considered cost effective to concentrate development in areas where impacts to natural resources can be minimized and to avoid impacts that would require expensive restoration and mitigation.

The vast majority of mining sites in Oregon are aggregate mines. Aggregate is the main ingredient in concrete and asphalt pavement and is used as a base on which roads and buildings are placed. Other important uses include gravel roads, dams, landscaping, drainage control, and railroad ballast. Due to the finite nature of aggregate and the limited supply of aggregate mines located in the region, its value is expected to increase. Moreover, because of high transportation costs, it is most economical for the construction industry to use resources that are closest to where development is occurring. The value of the aggregate resource, the importance of this resource to the construction industry, and the costs involved with extraction and transportation underscore the economic importance of preserving aggregate mining. Furthermore, aggregate resource extraction uses are temporary in nature, due to the limited supply of the resource within a mining site; once a site is no longer economically viable, it can be reclaimed for a number of uses including recreation, open space, or general development. The presence of mineral and aggregate resource sites in reserves is noted as appropriate.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

The fourth Goal 14 factor requires an analysis of the compatibility of proposed urban land uses (e.g., urban residential and employment-related development) with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The methodology for the analysis in this factor is the same as that which accompanied the legislative amendments to the UGB in previous years, including in 2018 and 2023.

The ODA's January 2007 study titled "*Identification and Assessment of the Long-term Commercial Viability of Metro Region Agricultural Lands*"[8] expands on the needs for edges and buffers to protect and moderate adverse impacts between agriculture and other non-compatible land uses, and is useful in helping to identify those transition areas between urban and rural uses. In addition, in 2014 and 2015, Washington County completed issue papers that addressed natural buffers and compatibility between urban uses and agricultural practices that provide additional

[8] https://www.oregon.gov/aviation/AVB/Documents/2019/10_30/Read%20Ahead%20Materials/Board%20Packet%201%20of%202/Agenda%20Item%2020/12_City%20of%20Aurora%2010.1%20to%2010.4.2019/Comments%20from%20City%20of%20Aurora%2010.1.2019/20.%20Foundation%20Ag%20Land.pdf

information for determining compatibility between the two uses. The concepts and importance of buffering support the methodology used in this analysis.

Resource Land Zoning Data

The analysis in Factor 4 requires a review of certain land use activity on rural lands outside the UGB. Counties designate these lands as either resource land (farm and/or forest land) or "exception land" through their comprehensive planning processes, and their designations must be acknowledged by Oregon Department of Land Conservation and Development (DLCD). The term "exception land" refers to rural lands that have been granted an exception to the requirements in Statewide Planning Goals 3, *Agricultural Lands*, and 4, *Forest Lands*, for protection of lands for farming and forestry activities; exception lands are generally used for rural residential, rural commercial, or rural industrial purposes. Counties must go through a formal process of having these exception lands acknowledged. For purposes of Factor 4, farm and forest lands are those natural resource lands that are not exception lands.

Metro has identified these lands according to local zoning, which was obtained from regularly updated county records in Metro's RLIS. The zoning types and associated labels used differ from county to county. The resource land zoning designations shown in Table 4 below were used for this analysis.

Table 4 – County Resource Land Designations

County	Resource Land Designations
Clackamas	Exclusive Farm Use (EFU)
	Ag/Forest (AG/F)
	Timber (TBR)
Multnomah	Exclusive Farm Use (EFU)
	Multiple Use Forest (MUF)
	Commercial Forest Use (CFU, CFU-1, CFU-2, CFU-3, CFU-4, and CFU-5)
Washington	Exclusive Farm Use (EFU)
	Agriculture and Forest (AF20)
	Exclusive Forest and Conservation (EFC)

Agricultural and Forest Activities

Agricultural and forest activities occurring on these resource lands outside the UGB were interpreted from computerized aerial photographs taken in the year 2022. Metro recognizes that, depending on the season and the weather patterns of when a particular area's aerial images was taken, some crops may be young and difficult to identify. Agricultural crops that were observed were generally grouped into broad categories of

nursery stock, orchards, Christmas tree farms, row crops (e.g., corn, vineyards, caneberries, etc.), and field crops (e.g., grasses and grains).

Commercial forestry activities are particularly difficult to detect from aerial photos that represent a snapshot in time due to the very long timber harvest cycle, but some timber lots are nonetheless discernible from tax assessor ownership records and historic aerials. Metro recognizes that this evaluation may not precisely identify all commercial forestry activities.

Considering "Compatibility"

When evaluating the compatibility of urban land uses with agricultural and forestry activities, the following were considered:

- Increased traffic resulting from urbanization that may impede the movement of farm or forestry equipment and hinder the transport of agricultural goods to market.
- Urbanization may result in the isolation of certain agricultural areas from the greater farming community. This may hinder normal practices of sharing equipment and knowledge among farmers.
- Nuisance conflicts may arise between urban residents/business and rural farmers/foresters due to the dust, noise, and odors generated from and pesticides/chemicals used in farming and forestry practices.
- An increase in impervious surface generates additional stormwater runoff that can impact the water quality of streams, prevent ground water infiltration and re-charge, and scour streambeds that nearby agricultural activities are dependent upon.

The agricultural practices used in the production of the identified crop categories can generate different levels and kinds of impacts. In addition, a farmer's crops may change over time to reflect market conditions, changes in weather trends, and other factors. For these reasons, the intensity of the agricultural uses occurring within the surrounding areas and the degree to which active farming of these crops may be hindered by nearby urban development was not ranked. Metro staff simply noted when the potential for such conflicts existed. The base assumption was that areas that support intensive and uninterrupted agricultural uses would be most impacted by the proximity of new urban development.

RESULTS

A table summarizing the results of the Goal 14 boundary location factors analysis of all 27 urban reserves can be found in Attachment 3. The analysis clearly identifies the following seven urban reserves as unsuitable for urbanization in the short term:

- Boring
- Boring – Highway 26
- Damascus
- Norwood
- Rosemont
- Stafford
- Tonquin

These urban reserves are therefore not further evaluated for possible inclusion in the UGB in the Metro Code Factors analysis in Appendix 7A.

There are significant infrastructure hurdles that would need to be addressed prior to urban services, such as water and sanitary sewer services, being available for new urban development in the seven urban reserves listed above. For instance, the closest sanitary sewer services to the Boring and Damascus urban reserves is well over a mile away and sanitary sewer service for the Rosemont and urban reserves would need to flow through the Borland Urban Reserve, thus requiring the Borland urban reserve to be urbanized first.

As noted, the Goal 14 analysis's preliminary cost estimates for providing water, sanitary sewer, stormwater, and transportation services to new urban development in the 27 urban reserves were estimated using very general assumptions on future growth expectations. Detailed concept plans consistent with the requirements UGMFP Title 11 will develop refined cost estimates that better reflect the expected development pattern and uses and that take into consideration costs for infrastructure materials at the expected time of construction, which may be a number of years ahead.

ATTACHMENTS

Attachment 1: Map of Urban and Rural Reserves

Attachment 2: Goal 14 Boundary Location Factor Analysis Narratives (27, with maps):

- Beaver Creek Bluffs
- Bendemeer
- Bethany West
- Boring
- Boring – Highway 26
- Borland
- Brookwood Parkway (8B)
- Damascus
- David Hill
- Elligsen Road North
- Elligsen Road South
- Grahams Ferry
- Gresham East
- Henrici
- Holcomb
- Holly Lane – Newell Creek Canyon
- I-5 East – Washington County
- Maplelane
- Norwood
- Rosa
- Rosemont
- Sherwood North
- Sherwood South
- Sherwood West
- Stafford
- Tonquin
- Wilsonville Southwest

Attachment 3: Goal 14 Boundary Location Factors Analysis Results

Attachment 4: Mackenzie Utility Analysis Report

BEAVER CREEK BLUFFS URBAN RESERVE

Total Reserve Area	228 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	224 acres
Gross Vacant Buildable Area	142 acres
Net Vacant Buildable Area	**106 acres**

The Beaver Creek Bluffs Urban Reserve is located along the bluffs south of Oregon City and is comprised of three disconnected "sub-areas". The western sub-area (approximately 163 acres) lies on both sides of S Central Point Road, above Beaver Creek to the south and the UGB to the north. This western sub-area is bisected by multiple powerline easements. The central sub-area (approximately 43 acres) sits between Mud Creek and a tributary of Beaver Creek, and is bounded by S Leland Road to the east, bluffs to the south and west, and the UGB to the north. A single three-acre tax lot separated from the rest of the central sub-area is located at the end of S McCord Road. The eastern sub-area (approximately 22 acres) is made up of one tax lot at the southwest end of S Century Drive and three other tax lots at the southwest end of Nobel Road. Of the roughly 228 total acres within these three sub-areas, 31 are constrained by steep slopes of 25 percent or greater. The remainder of the reserve is generally flat.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Beaver Creek Bluffs Urban Reserve is comprised of 43 tax lots, which have a combined area of approximately 224 acres within the reserve. According to aerial images, most of the smaller tax lots have rural residential uses or other structures that are at least 20 years old, and some of the larger tax lots do appear from aerial images to have minor agricultural activities. As noted above, the entire reserve contains 142 gross vacant buildable acres and 106 net vacant buildable acres.

This reserve is not a cohesive unit of land, but rather is composed of the three disconnected sub-areas described above. The eastern sub-area contains four tax lots that are entirely within the reserve and range in size from three to eight acres each. The central sub-area contains at least a portion of 17 tax lots, with the in-reserve portion of all but one of these tax lots less than five acres in area. The reserve's remaining tax lots in the western sub-area are nearly entirely within the reserve and range from less than one acre in area to nearly 40 acres. Twenty-six of the reserve's tax lots have improvements, with a median assessed value of those tax lots' improvements being nearly $307,000; 17 of the tax lots have improvements assessed at more than $250,000. There are three sets of powerlines running through the western sub-area and crossing through six tax lots.

Several streets within the UGB stub or otherwise connect to the reserve, including S Central Point Road, Kolar Drive, S White Lane, Cypresswood Street, S Century Drive, and Nobel Road. The nearest transit stop and employment areas to the reserve are about a mile from the eastern sub-area. The nearest highway, Highway 213, is more than a mile away and the nearest interstate, I-205, is several miles away. Wesley Lynn Park is approximately a quarter mile from the central sub-area.

The Mahonia Land Trust Conservancy owns a large parcel immediately adjacent to the eastern edge of the western sub-area.

Given the relatively small size of the three sub-areas, their location on a flatter "bench" at the top edge of a steep-sloped area, their proximity of parks and natural areas and distance from highways, and their location adjacent to existing residential development and street stubs, this reserve is considered able to efficiently accommodate a residential land need, but not an employment land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Beaver Creek Bluffs Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Oregon City serves lands within their corporate boundary. Lands within the jurisdiction of Clackamas County are served by Clackamas River Water (CRW). Both Oregon City and the CRW South System receive water from the South Fork Water Board (SFWB). SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. There are currently no known major treatment system deficiencies.

The existing city and CRW water distribution facilities are understood to have capacity to serve areas already inside the UGB. Under existing conditions, the Boynton, Henrici, and Mountainview reservoirs have a combined storage surplus of 5.89 MG and the Mountainview Pump Station has a surplus of 3,409 GPM. According to the Oregon City Master Plan, the existing Oregon City distribution system performs adequately, with fire flow deficiencies generally isolated to small diameter or dead-end pipes. There are plans to construct a backbone connecting the South System to the North System and the CRW water treatment plant in the future.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

CRW has done planning for service to the area of the Beaver Creek Bluffs Urban Reserve, and most the reserve is in CRW's service area. However, CRW will not likely be the service provider once the reserve is annexed to a city (i.e., Oregon City) and urbanized. Rather, when Oregon City annexes the reserve, the city will likely take ownership of any water related infrastructure within the area, except potentially for facilities that are needed to go beyond the annexed area, such as large-scale transmission lines. Accordingly, CRW, like many water service providers, may be cautious about investing in improvements for currently rural areas that may one day be annexed to cities. While there is some surplus storage and pumping capacity that could be available to serve

urban development of the reserve, once annexed to the city, that surplus is likely insufficient and additional storage and pumping facilities may be necessary. The existing distribution system, however, may be adequate to serve development of the reserve, with fire flow deficiencies generally isolated to small diameter or dead-end pipes.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, there are distribution networks in place for the wider area that are expected to be able to serve the reserve without significant upgrades; however, it is likely that Oregon City will need to provide new facilities for storage and pumping.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0.91 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$4.06 million
Storage	$0.15 million
Total:	**$5.12 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,418**

Sanitary Sewer Services

With regard to sanitary sewer services, the Beaver Creek Bluffs Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Oregon City provides sanitary sewer service to properties within its corporate limits, as well as to some properties near the reserve that are already in the UGB but still in unincorporated Clackamas County. Wastewater flows to the Tri-City Sewer District (TCSD) trunks, interceptors, and, eventually, the Tri-City Water Resource Recovery Facility (WRRF), all of which are owned and operated by Water Environment Services (WES).

Some surcharging, ranging from minor to severe, exists throughout the existing city collection system. There are also known capacity deficiencies in several locations in the WES system. Two of the 12 existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity. The Parish Road Pump Station has a total capacity of 760 GPM and a future demand of 535 GPM, leaving a surplus of 225

GPM. The Nobel Ridge Pump Station has a total capacity of 140 GPM and a future demand of 55 GPM, leaving a surplus of 85 GPM. There are several locations within the existing system that have predicted flooding under future conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Additional growth beyond the current UGB is going to challenge the existing sanitary sewer system due to the existing deficiencies and limited capacity of major treatment and conveyance facilities. While the Parish Road Pump Station and the Nobel Ridge Pump Station have capacity surpluses, these surpluses are likely not significant enough to serve urban development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Development of the reserve is expected to contribute to further surcharging. New pumping facilities will also likely be needed.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$3.93 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$1.26 million
Force mains	$1.61 million
Total:	**$6.8 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,216**

Stormwater Management Services

With regard to stormwater management services, the Beaver Creek Bluffs Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Oregon City's 2019 Stormwater Master Plan identifies certain system issues related to flooding, infrastructure, maintenance, or natural channels. An undersized conveyance system in the vicinity of Central Point Road is further complicated by a series of irregular flow patterns and structure connections. There are concerns about the ongoing capacity of the Coffee Creek area near Hazelwood Drive. The Plan also identifies a need for an upsized conveyance system in the South End Basin to support future development and expansion of South End Road. Capital improvement projects are identified to address these issues.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The system issues noted above could be exacerbated if future Beaver Creek Bluffs urban development is connected to that system. However, capital improvement projects are planned for that existing system and stormwater from Beaver Creek Bluffs urban development may be conveyed, treated, and disposed of within the reserve itself; therefore, it is not anticipated that existing facilities would necessarily be utilized or further challenged.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Stormwater will likely be detained and treated within the reserve and, based on topography, outfall directly to Mud Creek and tributaries of Beaver Creek; therefore, no impacts to the existing stormwater infrastructure in the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$3.2 million
24-inch pipe	$1.74 million
30-inch pipe	$0
Water quality/dentition	$1.13 million
Total:	**$6.07 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,870**

Transportation Services

With regard to transportation services, the Beaver Creek Bluffs Urban Reserve is given a "low-medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Beaver Creek Bluffs Urban Reserve had a home-based VMT per capita in 2020 that was significantly above the regional average.

Metro's adopted 2040 Growth Concept Map designates a regional center in the adjacent City of Oregon City. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal

street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. The Oregon City Regional Center aligns with the 2040 Growth Concept Map designation.

The City of Oregon City's plans for the Oregon City Regional Center include mixed-use development, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. The regional center currently has a drug store, restaurants, and other retail commercial uses, banks, medical/dental facilities, community centers, government offices, and auto-oriented uses. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

There are also employment uses, including industrial uses, grocery stores, and other commercial uses, as well as education and medical facilities, government offices, and parks, closer to the reserve in the Red Soils area near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road.

Growth in and near the regional center and other employment areas will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs and find employment opportunities with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Four TriMet bus lines serve Oregon City, all of which generally focus on the regional center and the central portion of the city along Molalla Avenue. Service is provided to Clackamas Community College and the employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road; however, large portions of the City, including a roughly three-square-mile residential area in the UGB north of the reserve, are not served by TriMet. Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent regional transit service network along certain routes in the UGB near the reserve, including along Leland Road, S Meyers Road, and South End Road.

Oregon City has at least 29 miles of dedicated bike lanes and 3.5 miles of established bikeways, with most of them located in the "up-top" section (southern end) of the City. The Park Place neighborhood is also fairly well served and Highway 213 has dedicated

bike lanes. Most of the downtown streets are classified as "bike with caution" streets and the South End neighborhood has minimal bike facilities. There are dedicated bike facilities along most of Beavercreek Road and Molalla Avenue, as well as on a few streets in the UGB nearer to the reserve, including Frontier Parkway, S Meyers Road, and South End Road. Those existing bike facilities on Beavercreek Road, Molalla Avenue, S Meyers Road, South End Road, and others in the City are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies gaps in the planned regional network in areas near the reserve and areas closer to the regional center.

The regional center is well served by sidewalks, as are employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road. Much of the residential areas in the UGB near to the reserve also have sidewalks. However, there are a number of pockets of older subdivisions that do not yet have sidewalks. Of the roads in the UGB near the reserve, S Finnegans Way, S Impala Lane, South End Road, and Wheeler Farm Road have sections lacking complete sidewalks on both sides. Chapter 4, Figure 4.4 of the 2023 RTP identifies gaps in the planned regional pedestrian network along S Central Point Road, Leland Road, and South End Road. There are also gaps in the planned regional trail network in the UGB near the reserve, as indicated in Chapter 4, Figure 4.6 of the 2023 RTP.

Figure 4.14 in Chapter of the 2023 RTP identifies Molalla Avenue inside the UGB as a high injury corridor.

The sections of Highway 99E, Highway 213, and I-5 in Oregon City are identified as a throughways Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that these highway sections currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 213 is the nearest RTP-designated throughway to the reserve, but is more than one mile away. As noted above, the section of the highway in the City currently meets travel speed reliability performance thresholds. Considering the distance of the reserve to this highway, and the relatively small size of the reserve, development of the reserve is not expected to jeopardize the throughway reliability of the highway.

There is currently no TriMet bus service to the reserve. The nearest stop is on Molalla Avenue, roughly one mile from the eastern sub-area of the reserve; the nearest stop to the western sub-area is nearly two miles away on Warner Milne Road.

There are no existing dedicated bike facilities on roads adjacent to the reserve. The closest bike lanes to any of the reserve's sub-areas are on Frontier Parkway, Leland Road, S Meyers Road, and South End Road, each generally about a quarter of a mile from

a reserve sub-area. Central Point Road has been classified as a "bike with caution" street.

Many of the local residential streets stubbing to the reserve have sidewalks, including Cypresswood Street, Derringer Drive, Kolar Drive, Myrtlewood Way, Nobel Road, and Parrish Road. White Lane, stubbing to the western sub-area, appears to have sidewalks only on one side. However, there are gaps in the pedestrian connections between the adjoining residential neighborhoods and other areas of the City.

It was noted in response to Factor 1 that the reserve is not likely to be able to efficiently accommodate an employment land need, but could support a small residential land need. However, the regional center is approximately three miles to the reserve via either S Central Point Road or S Leland Road, and then by S Linn Avenue and the eastern sub-area is roughly a mile from the commercial uses on Molalla Avenue. Considering the distance between the reserve and areas where future residents could access daily services and employment opportunities, and considering the lack of direct transit service and connecting bike facilities, it is likely that future residents will rely primarily on private motor vehicle transportation.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

S Central Point Road, S Century Drive, Leland Road, S McCord Road, Molalla Avenue, Myrtlewood Way, Nobel Road, and Orchard Grove Drive would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

As noted above, future residents of the reserve will likely rely primarily on private motor vehicle transportation to access their daily needs and employment opportunities. However, in part given the relatively small size of the reserve, it is not expected that development of the reserve would significantly increase home-based VMT per capita of the area. Considering the distance of the reserve to Highway 213, development of the reserve is also not expected to jeopardize this highway's throughway reliability. Any additional motor vehicle traffic on Molalla Avenue resulting from development of the reserve, however, may exacerbate its high-crash conditions.

d. Need for major transportation facility improvements and associated costs

A preliminary analysis's illustration of road network improvements potentially needed to serve urban development of the reserve is included in a following map. A roughly 0.26-mile section of S Central Point Road and a 0.31-mile length of Parrish Road may need to be improved to urban collector standards to serve the western sub-area, including with acquisition of some additional right-of-way for each road. The needed Parrish Road improvements are considered half-street improvements in this analysis, as a portion of the relevant roadway section is already inside the UGB. A new collector, extending south from Parrish Road through the western sub-area and ultimately arcing west through the UGB to connect with S South End Road, may also be needed; the nearly

half-mile-long portion of this new collector's length within/adjacent to the reserve is figured in the costs below. Some of the transportation facility improvement costs will be higher than normal on a per-mile basis due in part to topography.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$6.99 million
Collectors, existing/improved half street	$7.78 million
Collectors, new	$23.41 million
Total:	**$38.18 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$18,043**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. Actual service will depend, in part, on the level of development in the reserve and in the corridors leading to it. Nonetheless, in TriMet's review of planned and conceptual roads in the reserve, and the dispersed natured of the reserve, they determined that transit service may not be supportable. There are few corridors into/around the reserve and on the adjacent lands that would be required to support transit service.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Approximately 327 feet of Mud Creek flows through a ravine on the edge of the eastern sub-area of the Beaver Creek Bluffs Urban Reserve. About 2,100 feet of an unnamed stream also flows south through the western sub-area; a 900-foot segment of this stream, including an associated 1.5-acre National Wetland Inventory wetland, is located on the flat portion of the sub-area above the bluff. Riparian and upland habitat are identified along both stream segments.

Urbanization may impact the stream, wetland, and upland habitat areas on the flatter portion of the western sub-area, but the remainder of the unnamed stream flows through a wooded sloped area and would be minimally impacted by urbanization of the western sub-area. Mud Creek and its associated habitat areas would be less impacted by urbanization, in part because the stream is located over 200 feet from the flat portion of the eastern sub-

area were development would likely occur. There are no currently identified streams or wetlands in or near the central sub-area.

Inclusion in the UGB will provide some increased protection for streams, habitat areas, and floodplains, but there may be some impacts. Overall, development of this urban reserve is considered to have comparatively low environmental consequences, particularly for the streams and wetlands described above. Additional environmental consideration, however, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Beaver Creek Bluffs Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

As noted above, this reserve is made up of three very small and disconnected sub-areas. Over half of the reserve is adjacent to existing urban residential subdivisions, with much of the remaining reserve's area adjacent or nearly adjacent to undeveloped urban land zoned largely for low density residential uses. The primary land use in this rural reserve is rural residential development, with the majority of tax lots already having improvements. Existing urban streets provide access to the reserve's tax lots. Urbanization of the reserve will not cause significant changes for current residents of the reserve or for the wider area. Indeed, the small sub-areas are, in some senses, already more urban than rural due to their existing development and proximity to urban development.

As detailed more fully in response to Factor 2, it is likely that future residents of the reserve will rely primarily on private motor vehicle transportation, which will have some energy consequences.

There are comparatively minimal agricultural activities occurring in this reserve and urbanization would result in a relatively small loss of farm-related economic activity.

This analysis finds that, in part because of the reserve's small buildable area, there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Beaver Creek Bluffs Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

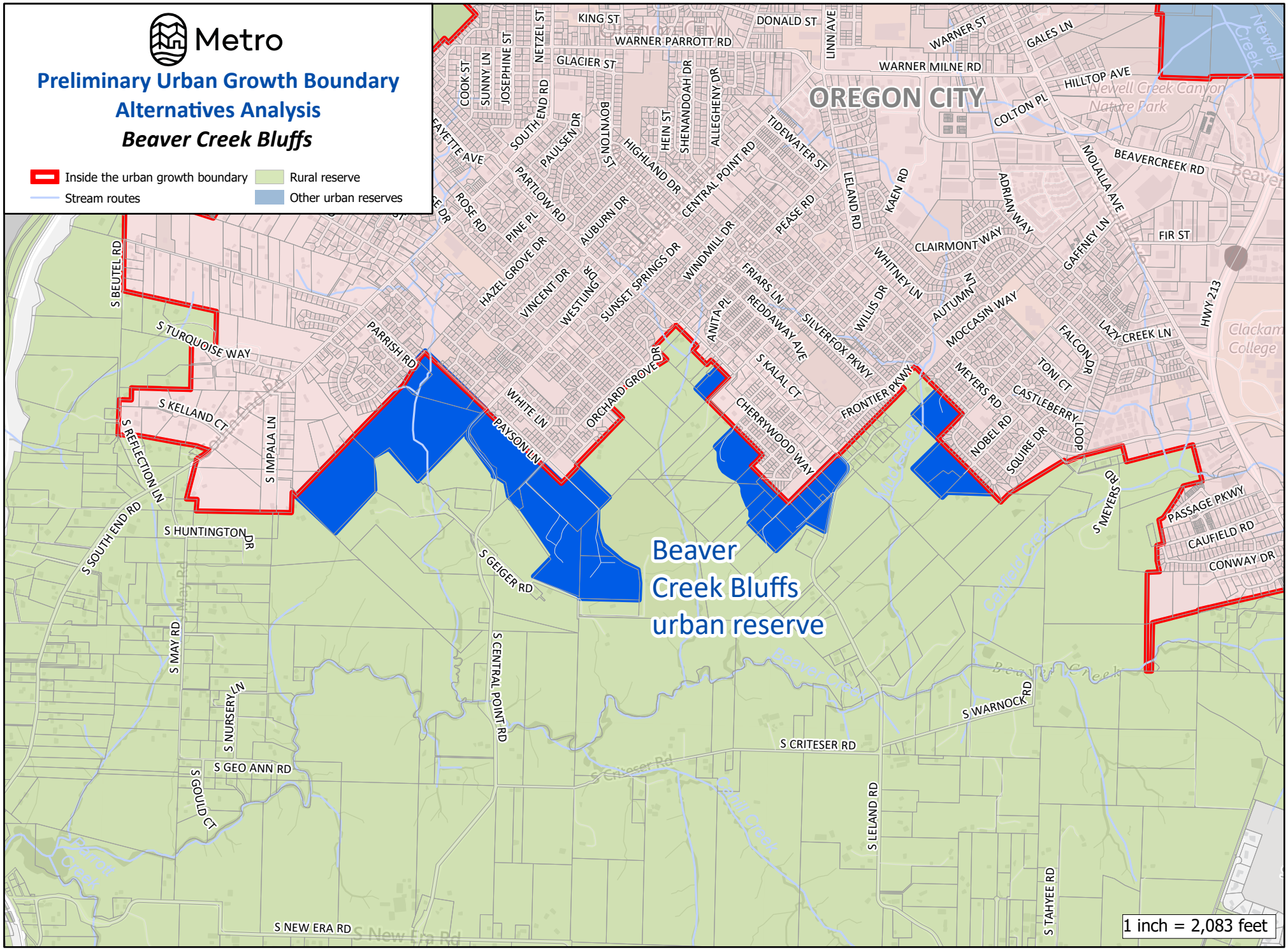
Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

All of the land outside of the UGB adjacent to the Beaver Creek Bluffs Urban Reserve has Goal 3 or 4 resource land zoning by Clackamas County for agricultural and forest activities, specifically with Exclusive Farm Use (EFU) or Timber (TBR) designations. There are significant slopes along almost the entire southern edge of the reserve's sub-areas; these slopes are generally forested, except

where abutting a powerline easement. Neighboring EFU-zoned land located between the western sub-area and Beaver Creek contains pockets of forest, some rural residences, and very limited agricultural activities consisting of largely of pastureland. Beaver Creek itself provides a natural boundary between a larger tract of EFU-zoned land to the south that also appears to include nursery operations. The majority of the TBR-zoned land adjacent to the reserve drops steeply to the south away from the reserve's sub-areas. Most of these TBR-zoned tax lots include rural residences and streams, including Mud and Canfield Creeks.

Due to the limited nature of the nearby agricultural and forest activities, the number of existing rural residences spread throughout the resource lands, the relatively small developable area of the reserve, and the natural barrier created by topography and water bodies, urban uses of the reserve would have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land.

The Beaver Creek Bluffs Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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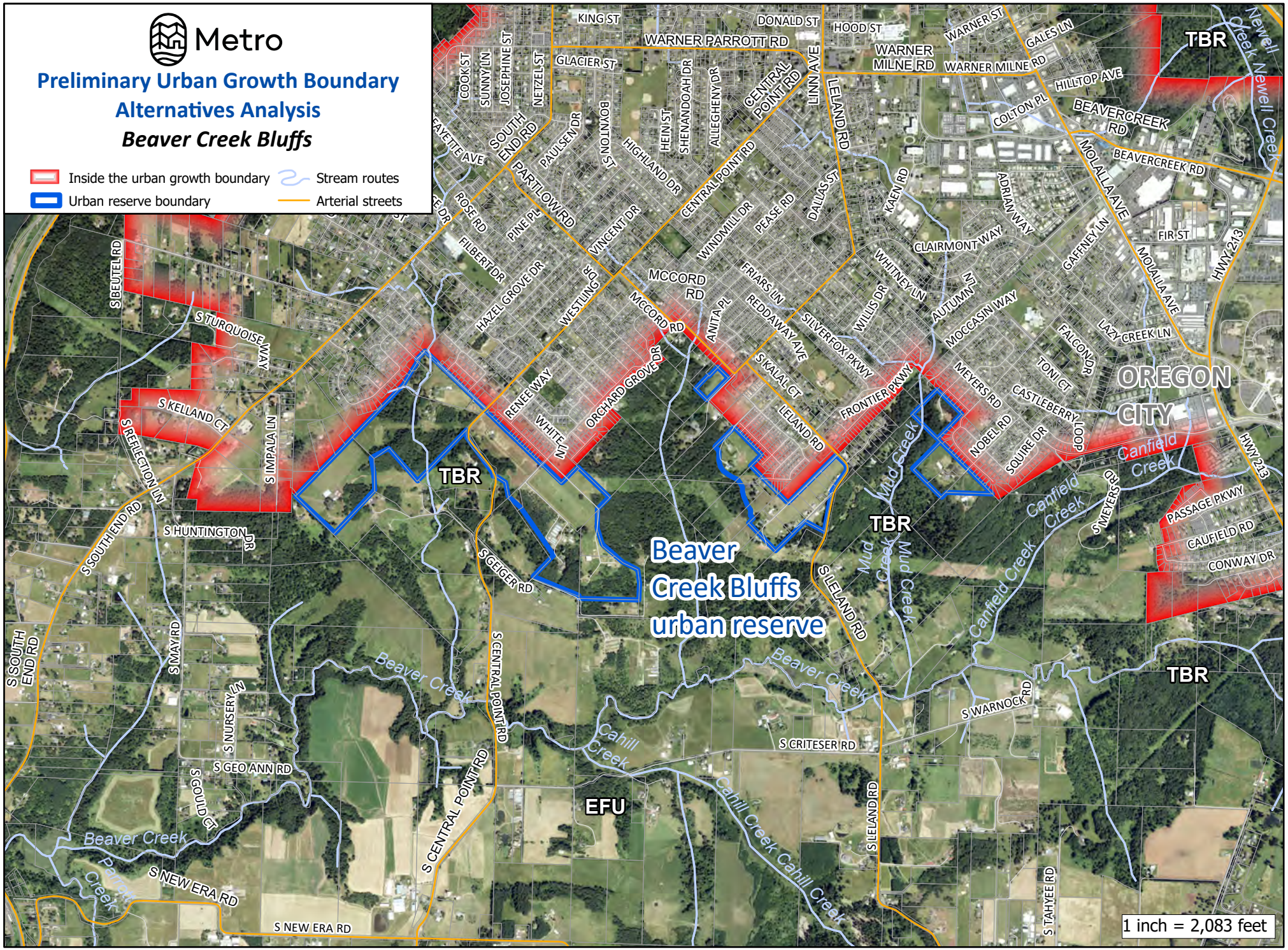

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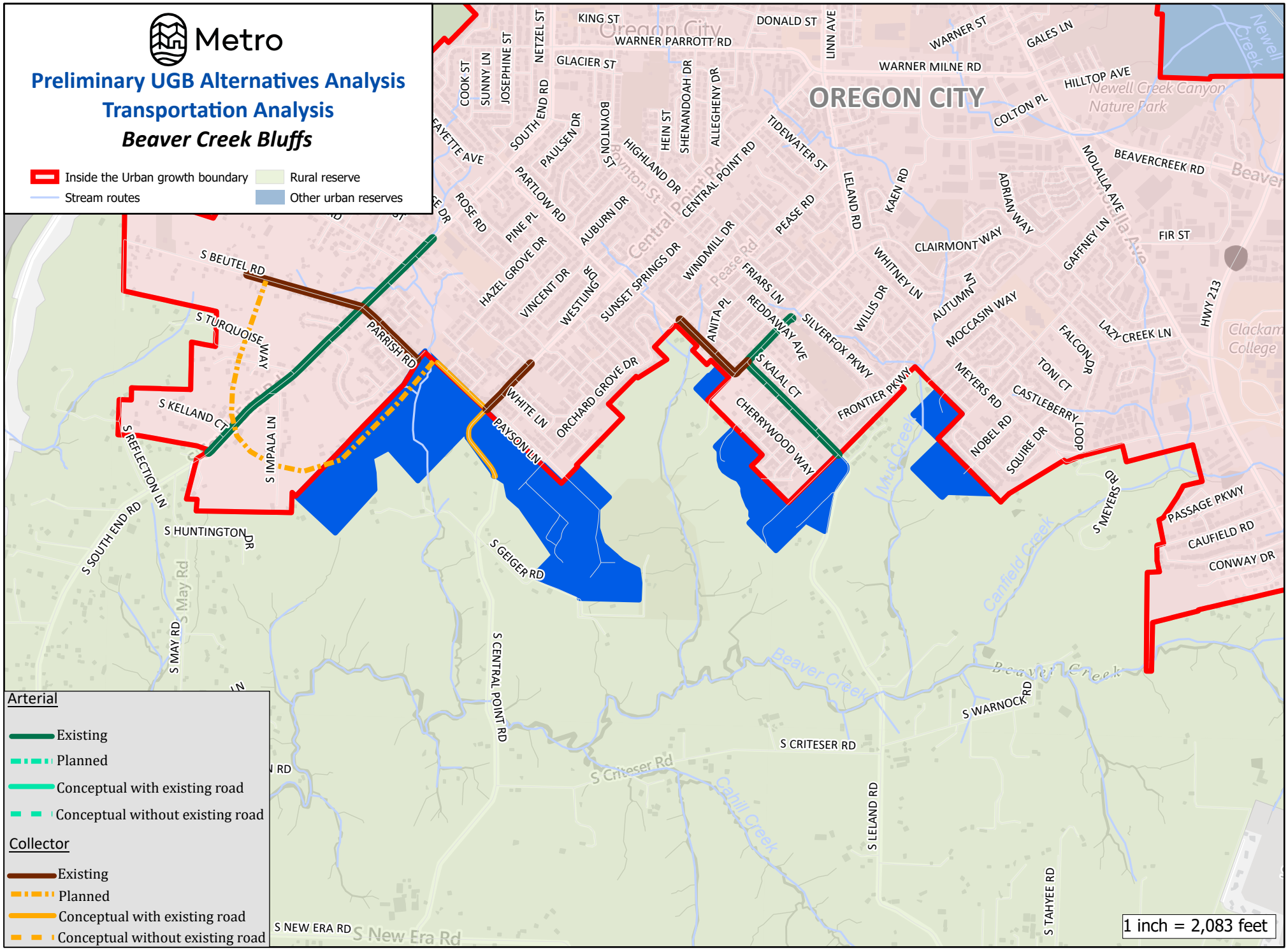

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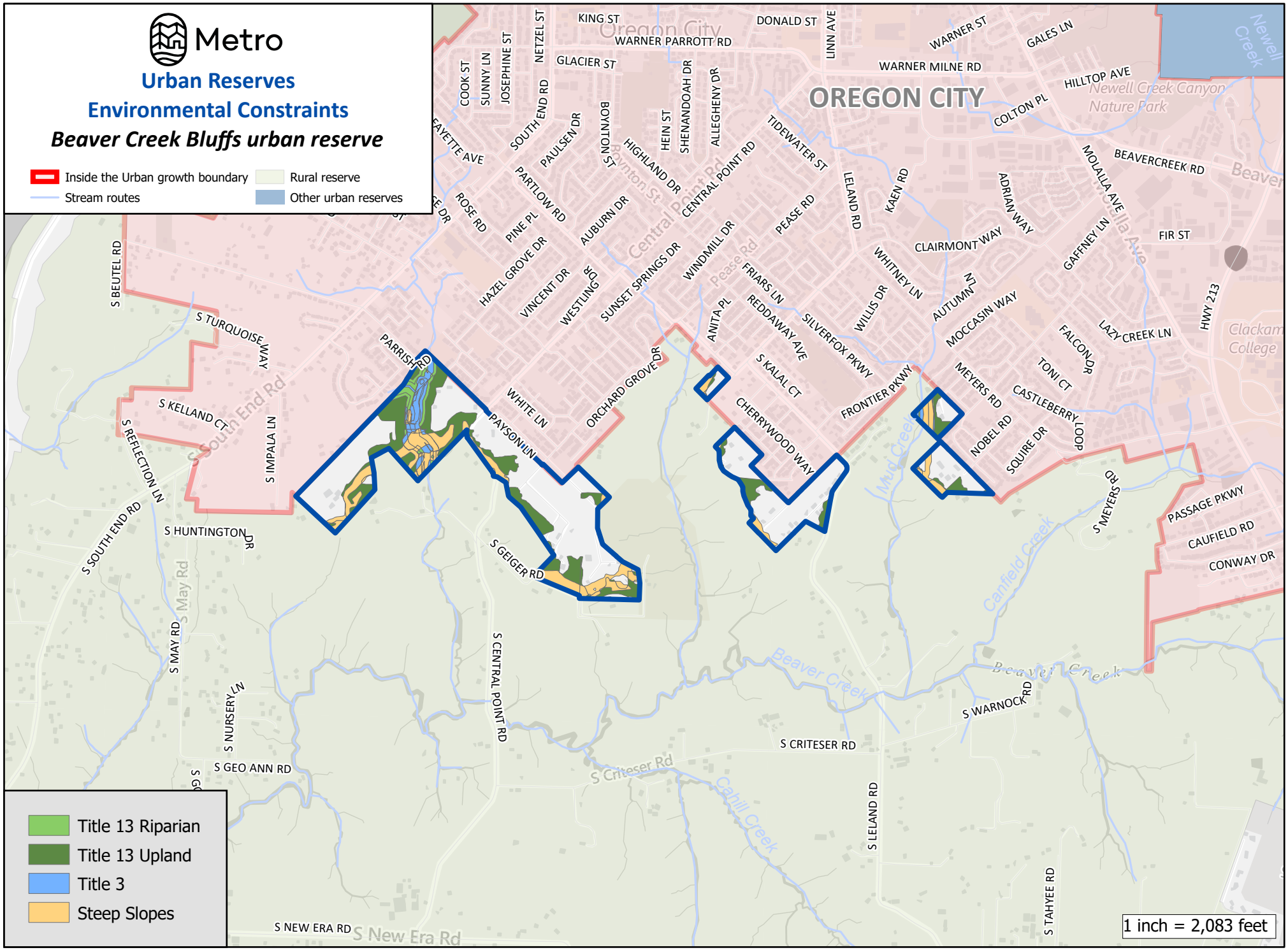

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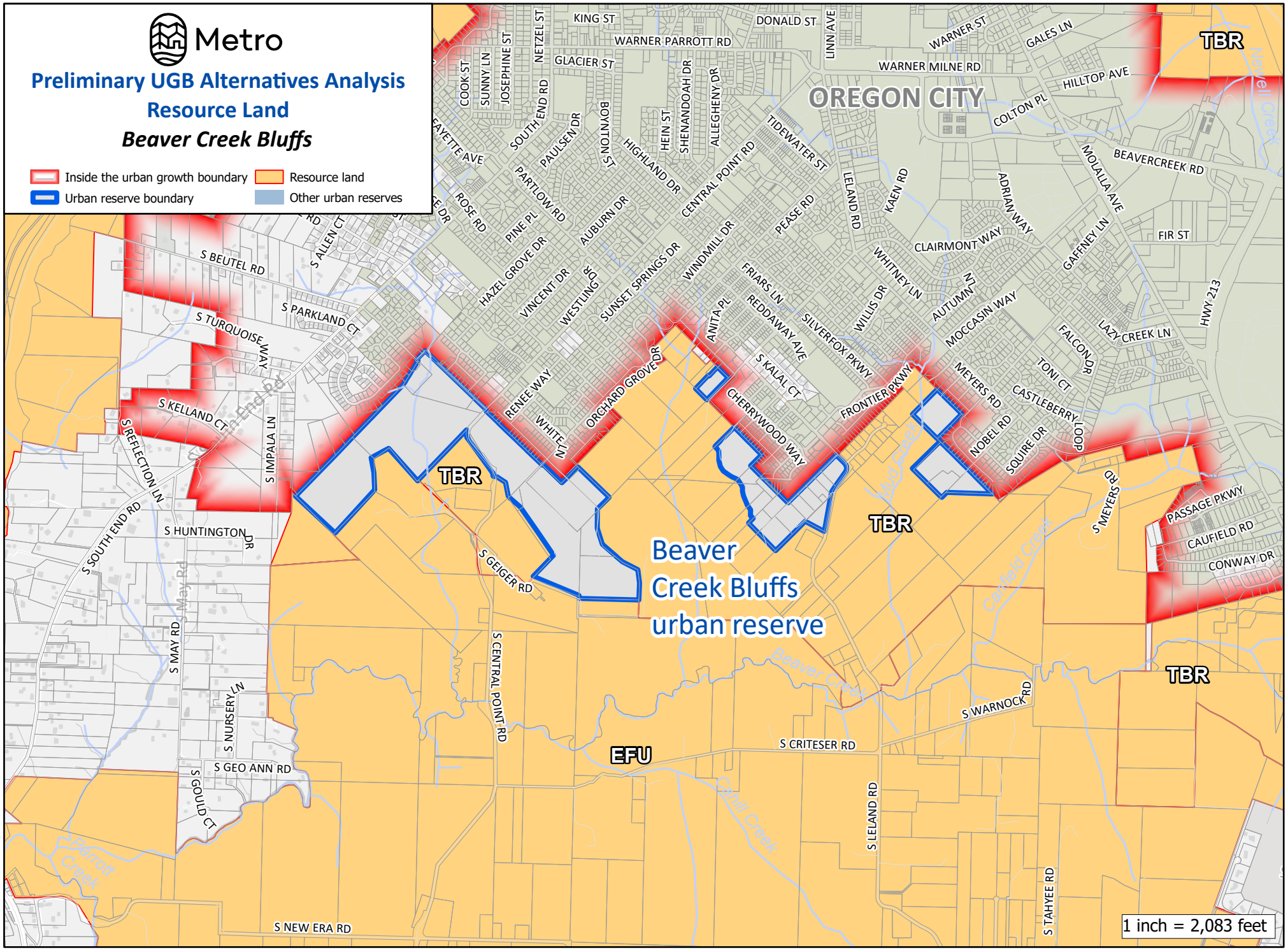

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BENDEMEER URBAN RESERVE

Total Reserve Area	573 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	545 acres
Gross Vacant Buildable Area	318 acres
Net Vacant Buildable Area	**237 acres**

The Bendemeer Urban Reserve is north of NW West Union Road between NW Bendemeer Road and NW 185th Avenue. The UGB is the reserve's eastern and southern boundaries and rural reserves are to the west and north. Most of the adjacent land within the UGB is in the corporate limits of the City of Hillsboro, while the remainder is in unincorporated Washington County. Holcomb Creek and Holcomb Lake form a portion of the northern edge of the reserve. Access to the reserve is provided by NW West Union Road, NW Cornelius Pass Road, and NW 185th Avenue.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Bendemeer Urban Reserve is comprised of 73 contiguous tax lots, all but four of which are entirely within the reserve. Of those tax lots entirely within the reserve, nearly 60 percent are less than two acres, more than 80 percent are less than five acres, four are larger than 40 acres, and one is nearly 120 acres. The four tax lots only partially within the reserve each have area within the reserve ranging from nearly four acres to 30 acres. The combined tax lot area for the whole reserve is approximately 545 acres. As noted above, the reserve contains 318 gross vacant buildable acres and 237 net vacant buildable acres.

The western portion of the reserve between NW Bendemeer Road and NW Cornelius Pass Road is developed with rural residences on smaller wooded tax lots, though aerial imagery indicates a few tax lots in this area are engaged in agricultural activity. The area between NW Cornelius Pass Road and NW 185th Avenue, however, is almost entirely in agricultural use, with the exception of a local retail commercial use at its southeast and sections with natural resources (e.g., wetlands and riparian habitat), including a 32-acre Metro-owned tax lots reserved as a natural area along Holcomb Creek. Assessment records suggest that this Metro-owned property may be the only publicly-owned tax lot in the reserve. Overall, 58 of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements exceeding $560,000.

At its south, the reserve abuts existing urban low density residential development, multifamily housing, utility facilities, and commercial and industrial uses. Liberty High School, Westview High School, and Lenox Elementary School are all about half a mile of the reserve and the Portland Community College Rock Creek Campus is located on the opposite side of NW 185th Avenue. Bethany Lake Park, Northwest Park, the Rock Creek Country Club, other recreational facilities are also within half a mile of the reserve. Highway 26 is less than a mile away via NW Cornelius Pass

Road. TriMet Route 52 has a stop at the reserve's southeast corner at the intersection of NW West Union Road and NW 185th Avenue.

East of NW Cornelius Pass Road, stream corridors dissect the reserve into a few large locations of relatively flat land that could accommodate residential and employment development. Residential development could be supported by nearby schools, recreational uses, and commercial uses and could be cohesive with the nearby existing residential uses. Employment uses could benefit from the relatively close access to the highway and transit, and could potentially develop on the tax lots that are larger than 30 acres. Therefore, this area is considered able to accommodate both residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Bendemeer Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the Tualatin Valley Water District (TVWD), which purchases water from the Portland Water Bureau (PWB) and the Joint Water Commission (JWC). According to TVWD, the water from PWB currently accounts for nearly three-quarters of TVWD's supply; this water primarily comes from the Bull Run watershed, is piped to a 50-million gallon storage reservoir on Powell Butte on the east side of Portland, and is treated with chlorine and ammonia. PWB also obtains water from wells and aquifers in the Columbia South Shore Wellfield. JWC, which is jointly owned by TVWD and the Cities of Hillsboro, Beaverton, and Forest Grove, obtains water from Hagg Lake (Scoggins Reservoir) and the Barney Reservoir released into the upper portion of the Tualatin River. When flows are available, water from the Tualatin River is used. It is then withdrawn and filtered through the JWC water treatment plant. Chlorine and pH adjustments are added before leaving the plant, where chlorine and pH adjustments are added to the water. TVWD is working on a new Willamette River sourced water supply system; that expanded system is expected to be online in 2026 and will allow TVWD to transition off its PWB supply, though an emergency connection to the PWB system will remain in the event of a regional water emergency.

According to TVWD, they: maintain more than 700 miles of pipe and 12 pumping stations; have a gravity line capacity of 42.3 MGD, with another 10 MGD available from JWC; can access emergency standby pumping with a capacity of 20 MGD when needed to back up the gravity flow main; and utilize a storage system with 22 active covered reservoirs with a combined storage capacity of about 65 million gallons.

TVWD has indicated that there is sufficient capacity in terms of water supply, treatment, storage, and piping to serve areas that are both within the current UGB and in their service district.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

TVWD is understood to have the system capacity to serve urban development of the Bendemeer Urban Reserve, though some local pipe upsizing may be necessary.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

It does not appear at this time that TVWD's water facilities already inside the UGB will experience marked impacts resulting from being connected to new urban development in the Bendemeer Urban Reserve, though, as noted above and depending on specific future urban land uses and other regional development patterns, there may be some pipe and other facility upsizing needed to ensure not adverse impacts to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$3.31 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.32 million
Total:	**$3.63 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$698**

Sanitary Sewer Services

With regard to sanitary sewer services, the Bendemeer Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Clean Water Services (CWS) provides sewer service in the adjacent areas of the UGB in unincorporated Washington County. The City of Hillsboro has existing facilities that extend near the intersection of NW West Union Road and NW Cornelius Pass Road, which feed into the CWS system. CWS provides wastewater treatment at the Rock Creek Wastewater Treatment Plant. The treatment plant is understood to have sufficient capacity to serve lands already inside the UGB. An existing 24-inch sanitary trunk line

running parallel to Rock Creek, a likely point of connection for development in the Bendemeer Urban Reserve, is also believed to have adequate capacity.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The topography of the reserve suggests that sewer from development of the reserve will likely flow from the eastern portion of the reserve toward the existing 24-inch CWS Rock Creek trunk line. Development in the western portion of the reserve, however, may flow toward NW Cornelius Pass Road. As noted above, the City of Hillsboro has existing sewer pipes near the intersection of NW West Union Road and NW Cornelius Pass Road.; these pipes range in size from eight inches to 18 inches in diameter and ultimately to the CWS trunk line. The additional capacity within the existing pipes is not fully known at this time, but it is believed to be adequate to serve development of the Bendemeer Urban Reserve. CWS has previously indicated that there is additional capacity at the Rock Creek treatment plant as well.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Impacts to the treatment plant are expected to be minimal with no anticipated major upgrades needed due to the possible amount of development from the relatively small amount of buildable land in the reserve. The amount of upsizing, if any, that would be needed is not fully known at this time, but CWS is expected to address infrastructure needs to accommodate planned growth.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$3.82 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$1.44 million
Force mains	$1.02 million
Total:	**$5.85 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,233**

Stormwater Management Services

With regard to stormwater management services, the Bendemeer Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development in adjacent areas inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater related to new development in the Bendemeer Urban Reserve is expected to be conveyed, treated, and disposed of within the reserve itself and/or outfall directly to nearby creeks, rather than relying on existing facilities already in the UGB.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the Bendemeer Urban Reserve is expected to be conveyed, treated, and disposed of within the reserve itself and/or outfall directly to nearby creeks, rather than relying on existing facilities already in the UGB. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$3.44 million
24-inch pipe	$1.45 million
30-inch pipe	$0
Water quality/dentition	$8.94 million
Total:	**$13.83 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,917**

Transportation Services

With regard to transportation services, the Bendemeer Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Bendemeer Urban Reserve had average, above average, and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates two regional centers and separate town centers in the City of Hillsboro, as well as a town center in unincorporated Washington County within the UGB and near to the reserve. Regional

centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Bethany Town Center in unincorporated Washington County and the Tanasbourne/Amber Glen Regional Center in Hillsboro are the closest 2040 Growth Concept designated centers to the Bendemeer Urban Reserve.

The Bethany Community Plan calls for a mix of local retail and small community-based office uses in the Bethany Town Center that provide a community village atmosphere. The town center is almost completely built out with a mixture of housing types, a grocery store, banks, restaurants, an athletic club, a library, a place of worship, and a small amount of other employment/institutional uses, including a Providence medical facility. The town center scored very high in Metro's 2017 State of the Centers Atlas for parks access and sidewalk and bike route density.

The Tanasbourne/Amber Glen Regional Center is a mixture of higher density residential uses, a grocery store and multiple department stores, banks, and medical facilities, including a Kaiser Permanente hospital and an Oregon Health Sciences University research facility. Metro's 2017 State of the Centers Atlas showed a high level of employees and total population, slightly higher dwelling units per acre, and an average population density compared with other regional centers.

There are also employment uses, including industrial uses and commercial uses, as well as school uses inside the UGB near the reserve on the west side of NE Cornelius Pass Road north of Highway 26. Further still, there is a grocery store and other commercial uses in the UGB at the northeast corner of NW West Union Road and NW 185th Avenue.

Growth in and near these 2040 Growth Concept centers and employment areas near the reserve will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Six TriMet bus routes provide service to Hillsboro and/or nearby unincorporated Washington County, mainly along the arterial streets in the central portion of the city, focusing on the Hillsboro and Tanasbourne/Amber Glen Regional Centers, the Orenco Town Center, and employment areas. There is generally more minimal transit service to the southern and northern portions of the city. However, TriMet Route 52 provides service in the portion of the UGB near the reserve, connecting the area to Rock Creek Elementary School, Westview High School, and the Tanasbourne/Amber Glen Regional Center via NW 185th Avenue. Route 52, as well as Route 67, also connect areas within the UGB near the reserve to the Portland Community College (PCC) Rock Creek campus.

The MAX Light Rail Blue Line stops at nine stations within Hillsboro, connecting Hillsboro to Beaverton and Portland. Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent transit service along certain routes in the UGB near the reserve, including along NW 185th Avenue and NW Springville Road.

Hillsboro has over 54 miles of dedicated bike lanes, more than 24 miles of established bikeways, and numerous streets considered "bike friendly" that, together, create a fairly well-connected system that is focused mostly on the central portion of the city and its two regional centers, including the Tanasbourne/Amber Glen Regional Center. Within the UGB and near the reserve, there are dedicated bike facilities along NW 185th Avenue, NW Cornelius Pass Road, NW Jacobson Street, NW Springville Road, and NW West Union Road. In addition, there are some local trails that provide key connections to the greater bike network. The existing bike facilities on NW 185th Avenue and NW Cornelius Pass Road are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies gaps in the planned network in other areas in the UGB near the reserve.

A large proportion of the residential neighborhoods in Hillsboro, including those in the UGB near the reserve, have sidewalks, although there are other residential areas of the city that do not have sidewalks. The Tanasbourne/Amber Glen Regional Center and the Bethany Town Center have sidewalks, as do the employment areas around NE Cornelius Pass Road near the reserve. Trails, such as the Rock Creek Trail, provide additional pedestrian opportunities. Several existing pedestrian routes in the UGB near the reserve are identified in Chapter 4, Figure 4.4 of the 2023 RTP as in the regional pedestrian network, though there are also gaps, including along NW West Union Road.

Figure 4.14 in Chapter of the 2023 RTP identifies a number of high injury corridors in the area already inside the UGB near the reserve and in Hillsboro, including NW 185th Avenue and NW Cornelius Pass Road. The figure also identifies the intersection of NW 185th Avenue and NE Evergreen Parkway, as well as other intersections in the area, as high injury intersections.

Highway 26 within the UGB near the reserve is identified as a throughway Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that this section of Highway 26 currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26, an RTP-designated throughway, is approximately one mile away from the reserve via NW 185th Avenue. As noted above, the section of the highway near the reserve currently meets travel speed reliability performance thresholds.

There is currently no transit service into the reserve itself, though TriMet Routes 52 has stops along NW 185th Avenue adjacent to the southeast corner of the reserve and

connect to Rock Creek Elementary School, Westview High School, and the Tanasbourne/Amber Glen Regional Center. Route 67 has stops on NW Springwille Road near the east side of the reserve, connecting to the PCC Rock Creek Campus, and the Bethany Town Center.

There is a dedicated bike lane on NW 185th Avenue adjacent to a portion of the reserve that extend south past Westview High School and Rock Creek Elementary. NW Springville Road, which extends from the reserve's east, has bike facilities that connect to the PCC Rock Creek Campus and to transit stops. The Rock Creek Trail, which runs east for over two miles and west for over a mile, intersects with NW 185th Avenue. The Waterhouse Trail connects to the Rock Creek Trail, providing a north-south route that extends to Highway 26. NW West Union Road has a short section of a dedicated bike lane on either side of the 185th Avenue intersection. The remainder of NW West Union Road is classified as "bike with caution".

There are sidewalks on NW West Union Road east of the 185th Avenue intersection that extend for approximately one mile with direct connections to the Rock Creek Trail and the Waterhouse Trail. Sidewalks on NW 185th Avenue extend north from NW West Union Road to NW Springville Road on one side and south past Westview High School and Rock Creek Elementary school to south of Highway 26 on both sides of the road. There are a couple of sidewalk connections to the residential neighborhoods south of NW West Union Road, two of which ultimately connect to the Rock Creek Trail. Otherwise, the sidewalks provide internal circulation for the neighborhood. Painted crossings at the intersection of NW 185th Avenue and NW Springville Road lead to sidewalks that connect to the PCC Rock Creek campus. There are also painted crossings at the intersection of NW West Union Road and NE Cornelius Pass Road, and at the intersection of NW West Union Road and NW 185th Avenue, that lead to sidewalks connected to these areas' existing employment uses.

The proximity of existing residential, employment, institutional uses to the reserve, as well as the existing transit services and bike and pedestrian amenities to them, could allow for development of the reserve without significantly increasing home-based VMT per capita.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

NW 185th Avenue, NW Cornelius Pass Road, NW Springville Road, and NW West Union Road would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

As noted above, the proximity of existing residential, employment, institutional uses to the reserve, as well as the existing transit services and bike and pedestrian amenities to them, could allow for development of the reserve without significantly increasing home-based VMT per capita. Moreover, if the reserve were to be developed with both

residential and employment uses, as considered possible in response to Factor 1, residents could meet more of their daily needs, and employees could potentially find housing, within the reserve without having to travel longer distances.

With these considerations, development of the reserve may result in only minor impacts to the performance of Highway 26 as a throughway. Any additional motor vehicle traffic on NW 185th Avenue and NW Cornelius Pass Road resulting from development of the reserve, however, may exacerbate these roadways' high-crash conditions.

d. Need for major transportation facility improvements and associated costs

NW Cornelius Pass Road, NW West Union Road, and NW 185th Avenue north of NW Springville Road will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. NW West Union Road and the portion of NW 185th Avenue are considered to be half-street improvements in the costs below, as the other half of the roadway will be inside the UGB. A new, nearly half-mile-long arterial is likely needed between NW West Union Road and NW 185th Avenue at NW Springville Road. A new, roughly 0.87-mile-long collector is also likely needed between NW West Union Road and NW Cornelius Pass Road to provide access to the middle of the reserve.

Facilities	Cost
Arterials, existing/improved full street	$26.07 million
Arterials, existing/improved half street	$50.95 million
Arterials, new	$31.27 million
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$37.22 million
Total:	**$145.51 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$30,705**

e. Provision of public transit service

TriMet evaluated the Bendemeer Urban Reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service will depend on the level of development in the reserve and in the corridors leading to it. Nearby transit services are expected to be improved by 2045 and could be extended to provide 30-minute off-peak headways, and 15-minute peak service for weekdays, with 30- and 60-minute services on weekends. Two new vehicles would be required with zero-emission bus capital costs being approximately $2,000,000 – $3,000,000 (recurs every 12 years). Annual service cost is $736,320 and grows with inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will

be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Holcomb Creek flows into the Bendemeer Urban Reserve just north of NW Old Pass Road before crossing under NW Cornelius Pass Road and heading southeast for approximately 3,200 feet into Holcomb Lake. Rock Creek enters the reserve just prior to joining Holcomb Creek on the east side of Holcomb Lake and flows south through a Metro-owned natural area for approximately 4,500 feet to NW West Union Road. Two unnamed tributaries to Rock Creek flow through the eastern portion of the reserve for approximately one mile, before ultimately joining Rock Creek at the southern end of the Metro-owned property. Two unnamed streams flow through the middle portion of the reserve and join and flow north into Holcomb Lake; these two streams total approximately 4,900 feet.

There are two wetlands identified on a 1998 National Wetlands Inventory (NWI) that are located in the eastern portion of the reserve. The first, approximately 32 acres in area, is associated with Rock Creek and is mostly on the Metro property; the second, nearly three acres in area, is associated with a tributary of Rock Creek. Additional NWI wetlands associated with Holcomb Creek and Holcomb Lake are located along the northern edge of the reserve and would need to be formally delineated prior to development.

There is riparian and upland habitat associated with the stream corridors and wetlands noted above. Inclusion in the UGB will provide some increased protection for streams, habitat areas, and floodplains; however, given how the stream corridors form four distinct pockets of unconstrained land, significant impacts to the habitat areas may occur depending on street connectivity requirements. Metro ownership of certain property in the reserve can limit east–west street connections in the reserve, leading to additional environmental protections. Overall, urbanization of this reserve may have comparatively moderate to high impacts on stream corridors and habitat areas, though the layout of the urban road system will be a key determinant in the level of environmental impact. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Bendemeer Urban Reserve is given a “low” score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The western portion of the reserve contains numerous rural residences on tax lots that are generally between half an acre and four acres in size. While the larger tax lots provide some opportunity for additional residential development, the amount of infill would not be

significant and would likely occur over a longer period of time. These rural residential uses are already proximate to urban industrial, commercial, and residential uses as well, so urbanization of this area is not expected to cause significant changes in residents' sense of place or in degradation of an existing rural lifestyle. Moreover, urbanization of the reserve could bring new social, educational, and recreational opportunities for existing residents. There are only a few residences in the remainder of the reserve east of NW Cornelius Pass Road.

As noted previously, the reserve also already contains some commercial uses and the reserve is adjacent to substantial urban development. As detailed more fully in response to Factor 2, additional VMT and, therefore, related energy impacts from urbanization would not be significant.

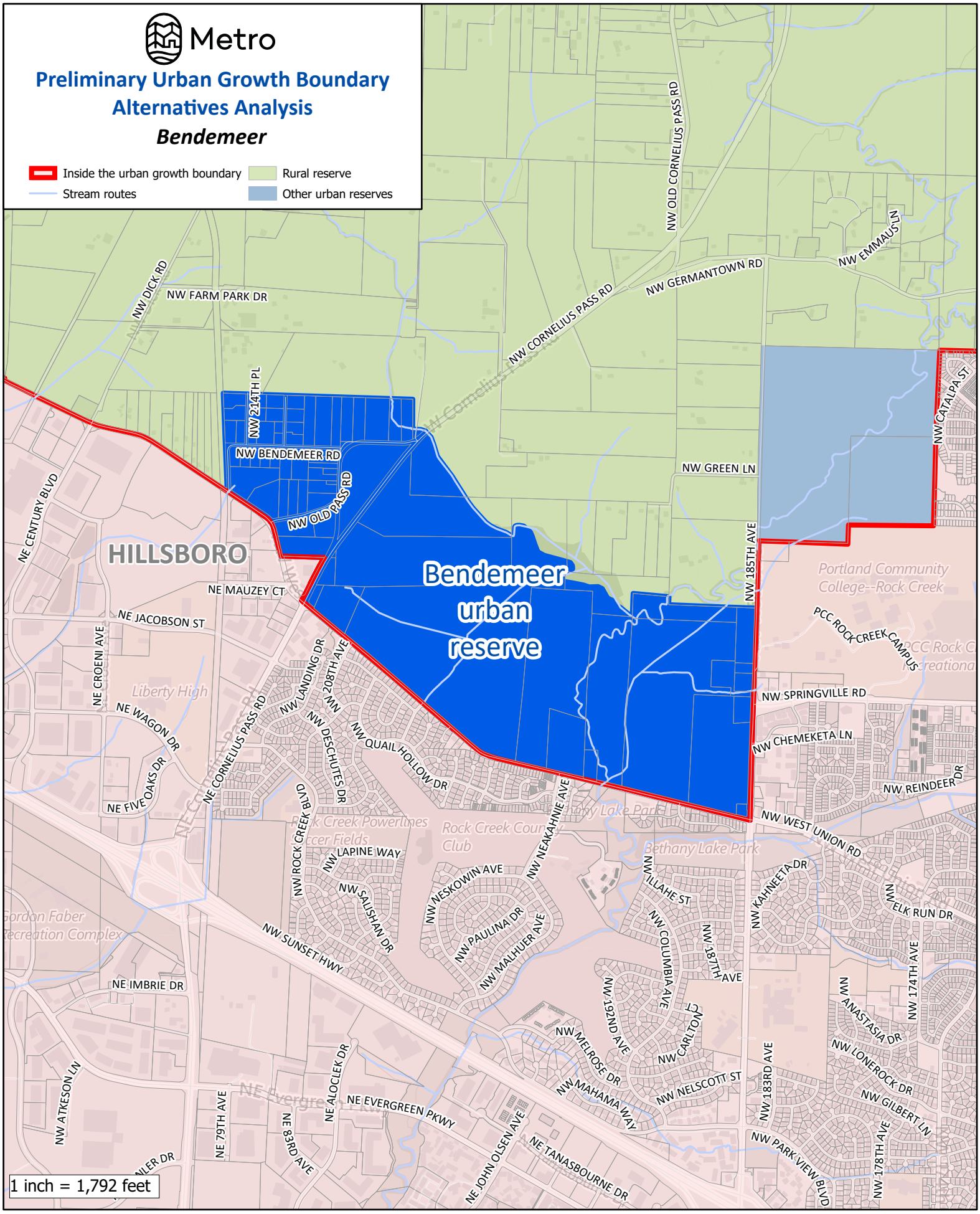
There are about half a dozen sections of agricultural activity occurring in the reserve, with a combined area of about 210 acres. These sections are generally separated from each other by stream corridors, forested areas, and publicly-owned land that is unlikely to be urbanized. So, urbanization of one agricultural area will not necessarily have significant adverse impacts on another. Moreover, the economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential and/or employment development of the reserve.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Bendemeer Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Washington County, border the Bendemeer Urban Reserve to the north and extend further into unincorporated areas for a number of miles. This land is mostly in nursery and field crop production, though there is some rural residential development and stands of trees. Holcomb Creek, Holcomb Lake, and Rock Creek, as well as their associated habitat areas, provide a large buffer to most of the agricultural activities occurring east of NW Cornelius Pass Road. A forested patch, along with some rural residences, provide a buffer for most of the agricultural activities occurring west of NW Cornelius Pass Road. The 100-foot railroad right-of-way along the western edge of the reserve also provides a buffer for the agricultural activities occurring northwest of the area near NW Dick Road. Urbanization of the reserve would increase traffic on NW Cornelius Pass Road and NW 185th Avenue, which could impact the movement of farm goods to Highway 26. Overall, the proposed urban uses have medium to high compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.

The Bendemeer Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location factor.



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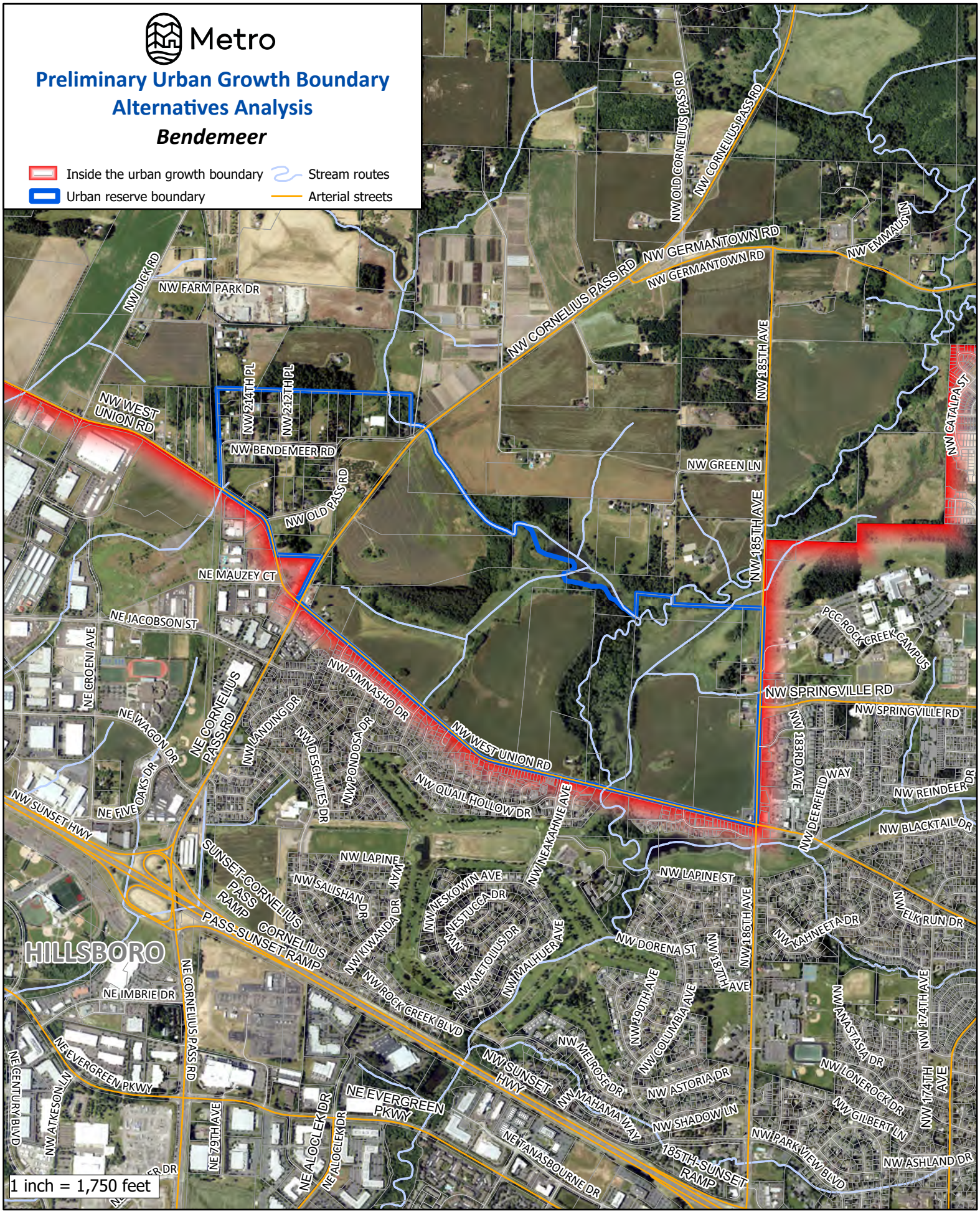

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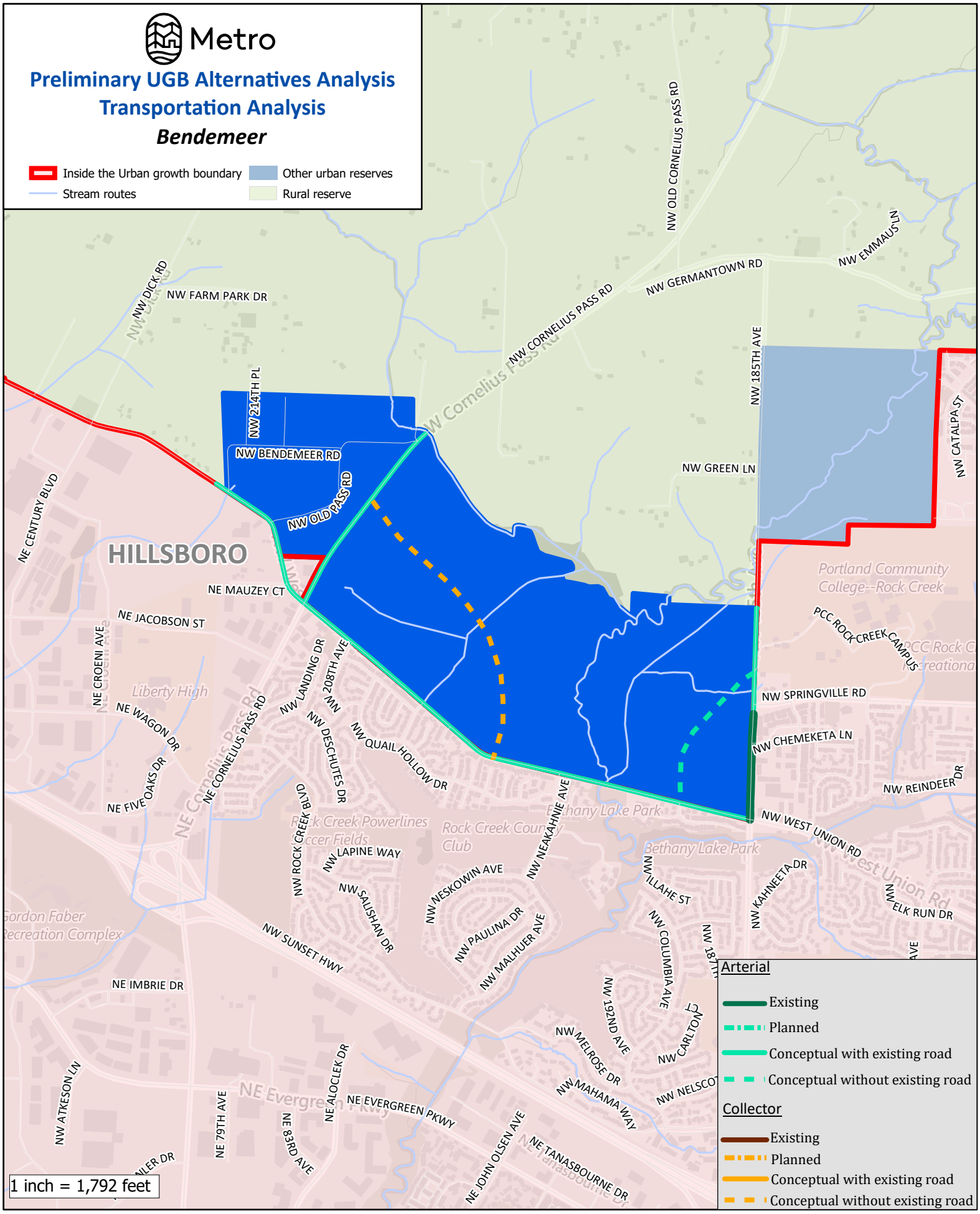

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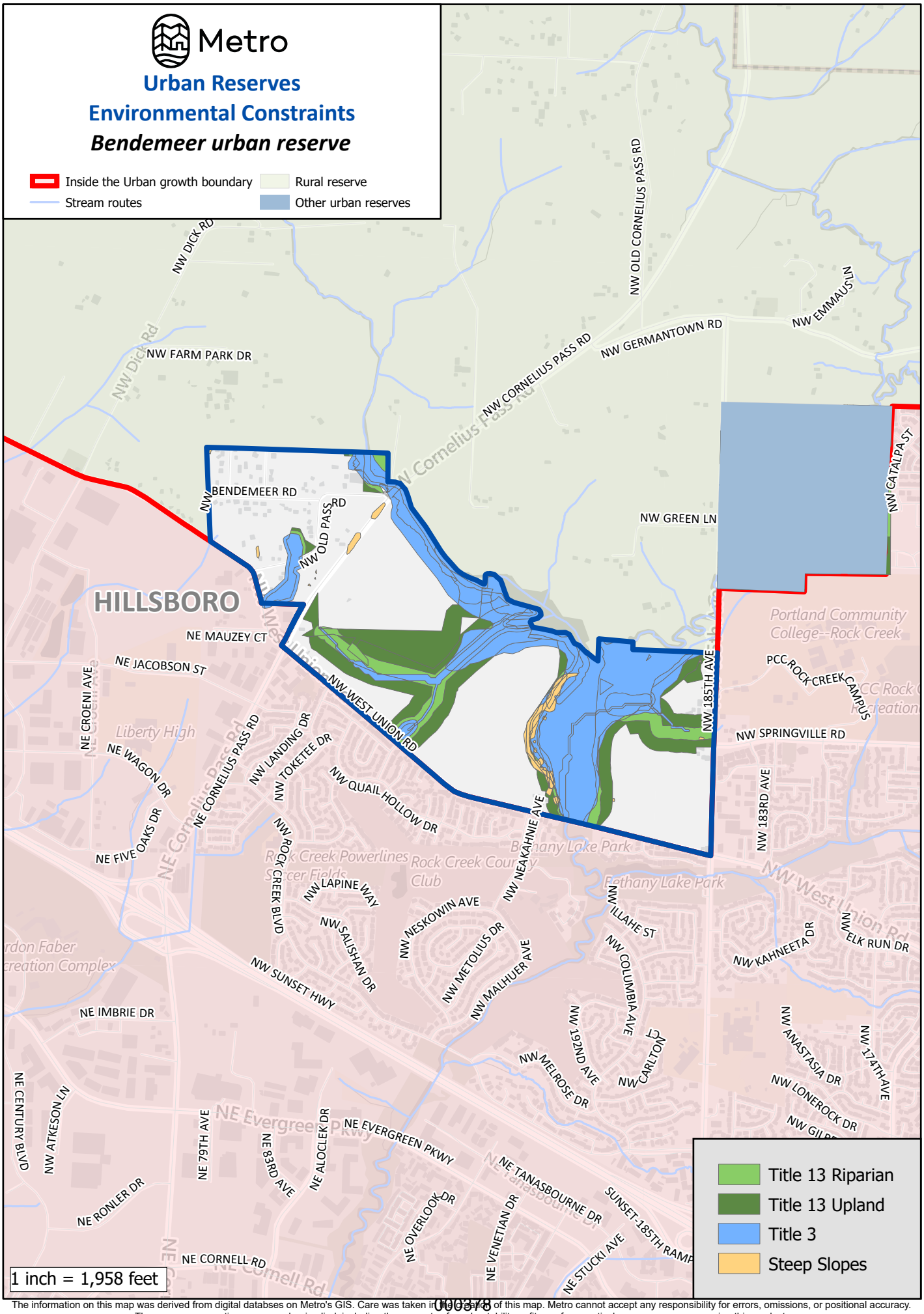

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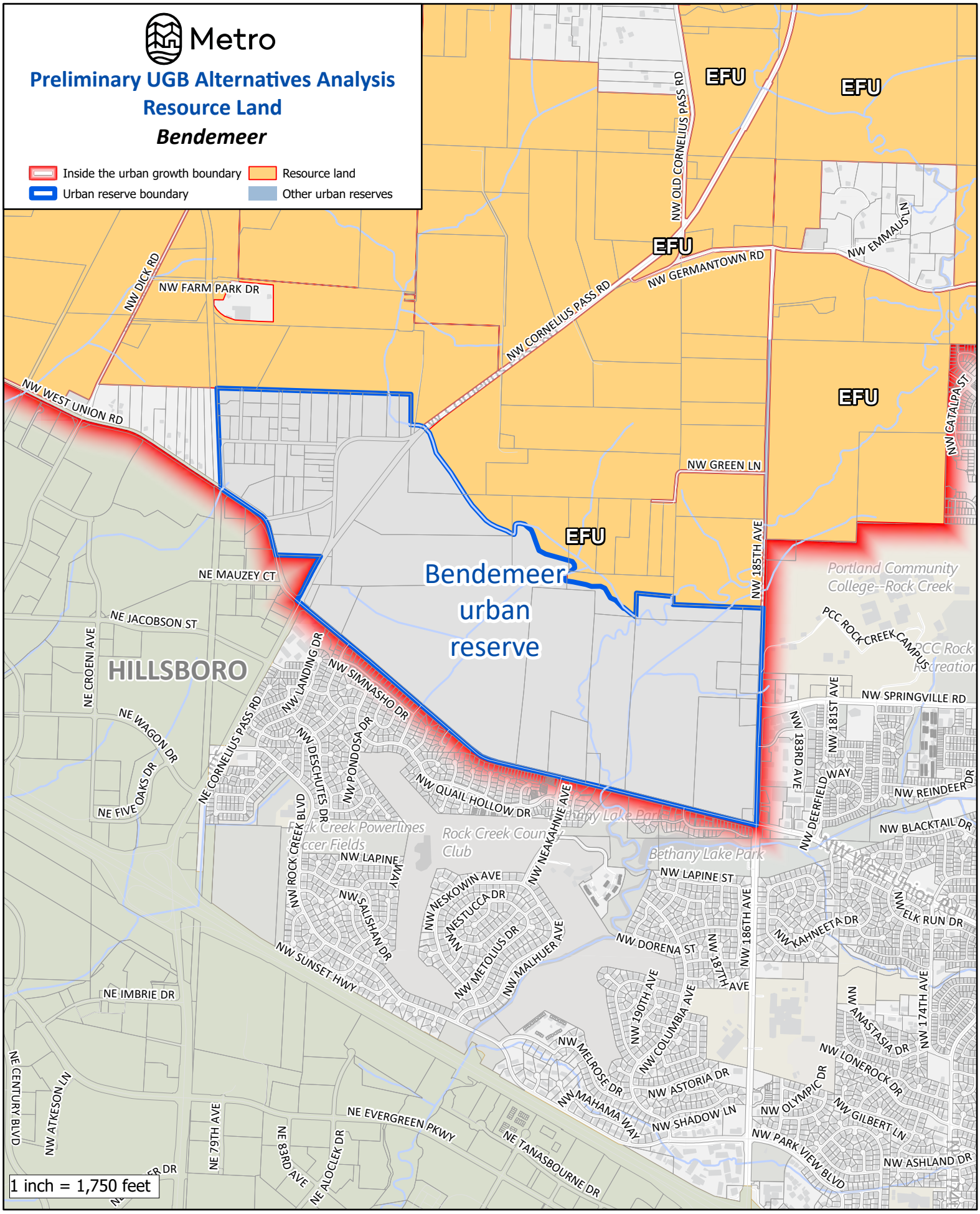

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BETHANY WEST URBAN RESERVE

Total Reserve Area	168 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	167 acres
Gross Vacant Buildable Area	60 acres
Net Vacant Buildable Area	**44 acres**

The Bethany West Urban Reserve is a relatively small, nearly square area on the north side of the Portland Community College Rock Creek campus. The UGB is the reserve's southern and eastern boundaries, while rural reserves are adjacent to the west and north. Access to the urban reserve is provided by NW 185th Avenue and NW Shackelford Road in the community of North Bethany.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Bethany West Urban Reserve contains the entirety of one privately-owned 127-acre tax lot and nearly 40 acres of a 203-acre tax lot owned by Portland Community College (PCC). As noted above, the reserve has 60 gross vacant buildable acres and 44 net buildable acres.

According to aerial imagery and tax assessment records, the reserve is essentially undeveloped, except for powerlines crossing both tax lots and some minor agriculture-related structures. Approximately half of the reserve's area is used for field agriculture, while the other half includes Rock Creek and vegetated areas.

There is existing low density residential development to the east of the reserve and the PCC Rock Creek campus neighbors to the south. Springville Elementary School is less than half a mile away and various recreational facilities, including sports fields at the PCC campus, are within one mile of the reserve.

Multiple urban roads, including NW Shackelford Rd and NW Antonio St, stub to the reserve's eastern boundary. Highway 26 is approximately two miles to the south. There is no existing transit service to the reserve, though TriMet Route 67 has stops on the neighboring PCC Rock Creek Campus.

Given the proximity of existing residential uses, as well as educational and residential facilities, the reserve is considered appropriate for accommodating a small residential land need. However, given the relatively flat topography of the portions currently and agricultural uses, the minimal parcelization, the powerlines, and the possibility that employment uses may be a more appropriate buffer to rural land uses to the north and west, the reserve may be suitable for employment uses as well. This reserve is therefore considered able to accommodate both residential and employment land uses.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Bethany West Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the Tualatin Valley Water District (TVWD), which purchases water from the Portland Water Bureau (PWB) and the Joint Water Commission (JWC). According to TVWD, the water from PWB currently accounts for nearly three-quarters of TVWD's supply; this water primarily comes from the Bull Run watershed, is piped to a 50-million gallon storage reservoir on Powell Butte on the east side of Portland, and is treated with chlorine and ammonia. PWB also obtains water from wells and aquifers in the Columbia South Shore Wellfield. JWC, which is jointly owned by TVWD and the Cities of Hillsboro, Beaverton, and Forest Grove, obtains water from Hagg Lake (Scoggins Reservoir) and the Barney Reservoir released into the upper portion of the Tualatin River. When flows are available, water from the Tualatin River is used. It is then withdrawn and filtered through the JWC water treatment plant. Chlorine and pH adjustments are added before leaving the plant, where chlorine and pH adjustments are added to the water. TVWD is working on a new Willamette River sourced water supply system; that expanded system is expected to be online in 2026 and will allow TVWD to transition off its PWB supply, though an emergency connection to the PWB system will remain in the event of a regional water emergency.

According to TVWD, they: maintain more than 700 miles of pipe and 12 pumping stations; have a gravity line capacity of 42.3 MGD, with another 10 MGD available from JWC; can access emergency standby pumping with a capacity of 20 MGD when needed to back up the gravity flow main; and utilize a storage system with 22 active covered reservoirs with a combined storage capacity of about 65 million gallons.

TVWD has indicated that there is sufficient capacity in terms of water supply, treatment, storage, and piping to serve areas that are both within the current UGB and in their service district.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

TVWD is understood to have the system capacity to serve urban development of the Bethany West Urban Reserve, though some local pipe upsizing may be necessary.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

It does not appear at this time that TVWD's water facilities already inside the UGB will experience marked impacts resulting from being connected to new urban development in the Bethany West Urban Reserve, though, as noted above and depending on specific

future urban land uses and other regional development patterns, there may be some pipe and other facility upsizing needed to ensure not adverse impacts to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0.93 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.06 million
Total:	**$0.99 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,112**

Sanitary Sewer Services

With regard to sanitary sewer services, the Bethany West Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Clean Water Services (CWS) provides sewer service in the adjacent areas of the UGB in unincorporated Washington County. CWS provides wastewater treatment at the Rock Creek Wastewater Treatment Plant. An existing 24-inch sanitary sewer trunk crosses the reserve along the north side of Rock Creek; that trunk is believed to have adequate capacity to meet current demands. Flows continue via gravity through the CWS trunk and interceptor sewer lines and reach the treatment plant, which is understood to have sufficient capacity to serve lands already inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The existing 24-inch sewer trunk line that, as noted above, already crosses the reserve is believed to have capacity to serve the limited amount of additional urban development this relatively small reserve would provide. CWS has previously indicated that there is additional capacity at the Rock Creek treatment plant as well.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Impacts to the treatment plant are expected to be minimal with no anticipated major upgrades needed due to the possible amount of development from the relatively small amount of buildable land in the reserve. The amount of upsizing, if any, that would be

needed is not fully known at this time, but CWS is expected to address infrastructure needs to accommodate planned growth.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0.69 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0
Force mains	$0
Total:	**$0.69 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$772**

Stormwater Management Services

With regard to stormwater management services, the Bethany West Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development in adjacent areas inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater related to new development in the Bethany West Urban Reserve is expected to be conveyed, treated, and disposed of within the reserve itself and/or outfall directly to Rock Creek, rather than relying on existing facilities already in the UGB. It is expected that Rock Creek will be able to accommodate this stormwater.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the Bendemeer Urban Reserve is expected to be conveyed, treated, and disposed of within the reserve itself and/or outfall directly to Rock, rather than relying on existing facilities already in the UGB. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$1 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$1.83 million
Total:	**$2.83 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,180**

Transportation Services

With regard to transportation services, the Bethany West Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Bethany West Urban Reserve had above average and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates two regional centers and separate town centers in the City of Hillsboro, as well as a town center in unincorporated Washington County within the UGB and near to the reserve. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Bethany Town Center in unincorporated Washington County and the Tanasbourne/Amber Glen Regional Center in Hillsboro are the closest 2040 Growth Concept designated centers to the Bethany West Urban Reserve.

The Bethany Community Plan calls for a mix of local retail and small community-based office uses in the Bethany Town Center that provide a community village atmosphere. The town center is almost completely built out with a mixture of housing types, a grocery store, banks, restaurants, an athletic club, a library, a place of worship, and a small amount of other employment/institutional uses, including a Providence medical

facility. The town center scored very high in Metro's 2017 State of the Centers Atlas for parks access and sidewalk and bike route density.

The Tanasbourne/Amber Glen Regional Center is a mixture of higher density residential uses, a grocery store and multiple department stores, banks, and medical facilities, including a Kaiser Permanente hospital and an Oregon Health Sciences University research facility. Metro's 2017 State of the Centers Atlas showed a high level of employees and total population, slightly higher dwelling units per acre, and an average population density compared with other regional centers. There are also employment uses, including a grocery store and other commercial uses, less than a mile south of the reserve in the UGB at the northeast corner of NW West Union Road and NW 185th Avenue.

Growth in and near these 2040 Growth Concept centers and employment areas near the reserve will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Six TriMet bus routes provide service to Hillsboro and/or nearby unincorporated Washington County, mainly along the arterial streets in the central portion of the city, focusing on the Hillsboro and Tanasbourne/Amber Glen Regional Centers, the Orenco Town Center, and employment areas. There is generally more minimal transit service to the southern and northern portions of the city. However, TriMet Route 52 provides service in the portion of the UGB approximately half a mile from the reserve, connecting the area to Rock Creek Elementary School, Westview High School, and the Tanasbourne/Amber Glen Regional Center via NW 185th Avenue. Route 52, as well as Route 67, also connect areas within the UGB near the reserve to the Portland Community College (PCC) Rock Creek campus. The MAX Light Rail Blue Line stops at nine stations within Hillsboro, connecting Hillsboro to Beaverton and Portland. Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent transit service along certain routes in the UGB near the reserve, including along NW 185th Avenue and NW Springville Road.

Hillsboro has over 54 miles of dedicated bike lanes, more than 24 miles of established bikeways, and numerous streets considered "bike friendly" that, together, create a fairly well-connected system that is focused mostly on the central portion of the city and its two regional centers, including the Tanasbourne/Amber Glen Regional Center. There are dedicated bike facilities on NW Shackelford Road in the UGB adjacent to the east side of the reserve. Within the UGB and less than a mile from the reserve, there are also dedicated bike facilities along NW 185th Avenue and NW Springville Road. In addition, there are some local trails that provide key connections of the area further south to the greater bike network. The existing bike facilities on NW 185th Avenue are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However,

the figure also identifies gaps in the planned network in other areas in the UGB near the reserve.

A large proportion of the residential neighborhoods in Hillsboro, including those in the UGB near the reserve, have sidewalks, although there are other residential areas of the city that do not have sidewalks. The Tanasbourne/Amber Glen Regional Center and the Bethany Town Center have sidewalks. Trails, such as the Rock Creek Trail, provide additional pedestrian opportunities. Existing portions of NW Springville Road in the UGB near the reserve are identified in Chapter 4, Figure 4.4 of the 2023 RTP as in the regional pedestrian network, though there are also gaps, including along NW 185th Avenue and NW Shackelford Road leading to the reserve.

Figure 4.14 in Chapter of the 2023 RTP identifies a number of high injury corridors in the area already inside the UGB near the reserve and in Hillsboro, including NW 185th Avenue and NW Cornelius Pass Road. The figure also identifies the intersection of NW 185th Avenue and NE Evergreen Parkway, as well as the intersection of NW West Union Road and NW Laidlaw Road, as high injury intersections.

Highway 26 within the UGB, nearly two miles south of the reserve, is identified as a throughway Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that this section of Highway 26 currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26, an RTP-designated throughway, is approximately two miles away from the reserve via NW 185th Avenue. As noted above, the section of the highway near the reserve currently meets travel speed reliability performance thresholds.

There is currently no transit service into the reserve itself, though TriMet Routes 52 has stops along NW 185th Avenue approximately half a mile from the southwest corner of the reserve and connect to Rock Creek Elementary School, Westview High School, and the Tanasbourne/Amber Glen Regional Center. Route 67 has stops on NW Springwille Road within a mile of the reserve, connecting to the PCC Rock Creek Campus, and the Bethany Town Center.

There are dedicated bike lanes on NW Shackelford Road stubbing to the east side of the reserve that lead through the adjoining residential areas. There are also dedicated bike facilities on NW 185th Avenue approximately half a mile south of the reserve that extend south to the employment uses at the corner of NW West Union Road and NW 185th Avenue and past Westview High School and Rock Creek Elementary. Nearby NW Springville Road has bike facilities that connect to the PCC Rock Creek Campus and to transit stops. The Rock Creek Trail, which runs east for over two miles and west for over a mile, intersects with NW 185th Avenue roughly one mile south of the reserve. The

Waterhouse Trail also then connects to the Rock Creek Trail, providing a north-south route that extends to Highway 26. NW West Union Road has a short section of a dedicated bike lane on either side of the 185th Avenue intersection. The remainder of NW West Union Road is classified as "bike with caution".

The residential development to the east of the reserve includes local streets with sidewalks that stub to the reserve. There are no sidewalks on the portion of NW 185th Avenue adjacent to the west side of the reserve; however, there are sidewalks on NW 185th Avenue approximately half a mile to the south near the intersection with NW Springville Road that lead to the employment uses at the corner of NW West Union Road and NW 185th Avenue. Painted crossings at the intersection of NW 185th Avenue and NW Springville Road lead to sidewalks that connect to the PCC Rock Creek campus.

The proximity of existing residential, employment, institutional uses to the reserve, as well as the existing nearby transit services and bike and pedestrian amenities to them, could allow for development of the reserve without significantly increasing home-based VMT per capita. Bike and pedestrian facilities will need to be extended on NW 185th Avenue to the reserve in order to provide complete connections.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

NW 185th Avenue, NW Antonio Street, NW Shackelford Road, NW Springville Road, and NW West Union Road would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

As noted above, the proximity of existing residential, employment, institutional uses to the reserve, as well as the existing transit services and bike and pedestrian amenities to them, could allow for development of the relatively small reserve without significantly increasing home-based VMT per capita. Moreover, if the reserve were to be developed with both residential and employment uses, as considered possible in response to Factor 1, residents could meet more of their daily needs, and employees could potentially find housing, within the reserve without having to travel longer distances.

With these considerations, development of the relatively small reserve may result in only minor impacts to the performance of Highway 26 as a throughway, roughly two miles south of the reserve. Any additional motor vehicle traffic on NW 185th Avenue resulting from development of the reserve, however, may exacerbate its high-crash conditions.

d. Need for major transportation facility improvements and associated costs

The roughly half-mile length of NW 185th Avenue along the west side of the reserve will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. A new half-mile-long collector road will also likely be needed to connect NW 185th Avenue to NW Shackleford Road in the North Bethany area.

Facilities	Cost
Arterials, existing/improved full street	$32.06 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$23.18 million
Total:	**$55.24 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$62,067**

e. Provision of public transit service

TriMet evaluated the Bethany West Urban Reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service will depend on the level of development in the reserve and in the corridors leading to it. Nearby transit services are expected to be improved by 2045 and could be extended to provide 30-minute off-peak headways, and 15-minute peak service, every day, with two additional zero-emission buses at an approximate capital cost of $1,500,000 per bus (recurs every 12 years). Annual service cost is $936,000 and grows with inflation year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Rock Creek flows in a southwest direction through wooded and open land in the Bethany West Urban Reserve for 4,700 feet. A second unnamed stream that is located south of Rock Creek also flows in the same direction for approximately 3,180 feet, mostly in open fields. Both streams are located within a large floodplain. Two National Wetland Inventory (NWI) wetlands that are 0.8 and 2.3 acres in area and one PCC-identified 12.5-acre wetland are associated with the stream corridors. There is riparian and upland habitat associated with the streams and floodplain area. Inclusion in the UGB provides some increased protection for streams, habitat areas, and floodplains. When also considering the location of the stream corridors and the powerlines in the southern portion of the reserve adjacent to the PCC Rock Creek campus which will preclude some development, urbanization of this reserve is expected to be able to occur with comparatively minimal impact to stream corridors, wetlands, and habitat areas. Additional environmental consideration, specifically regarding

avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Bethany West Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

This relatively small reserve does not appear to have any existing residences, so there are no residents of the reserve that are expected to be affected by its urbanization. Considering the urban residential development adjacent to the reserve has streets stubbing to the reserve, eventual urbanization of the reserve appears to be expected.

As detailed more fully in response to Factor 2, additional traffic and, therefore, related energy impacts from urbanization would not be significant.

Because the reserve has only about 70 acres (42 percent) of land in agricultural use, the economic loss in farming activity from urbanization is not considered significant; indeed, the economic benefits of residential and/or employment development of the reserve, particularly near to the PCC Rock Creek Campus, may outweigh this loss.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this small reserve. The Bethany West Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

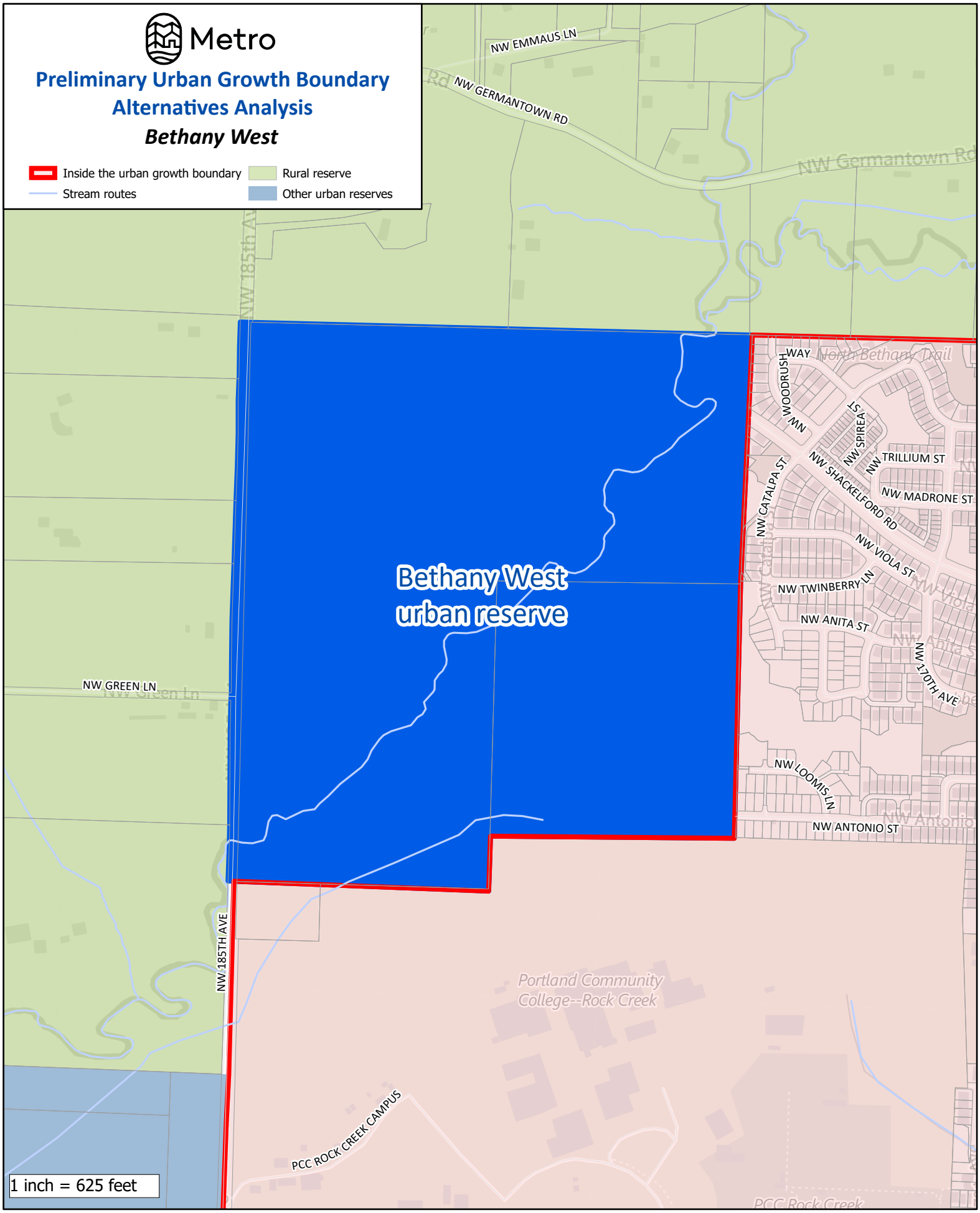
Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Washington County, border the Bethany West Urban Reserve to the north and west.

The EFU-zoned land directly to the north appear to have some agricultural activities, including field crops and Christmas tree plantings, as well as some small forested patches and rural residential development. The forested patches are mostly in riparian habitat or near to the residential development, which may limit their use for commercial timber harvesting. Urbanization of the reserve would result in new development directly adjacent to active farm uses, which could result in land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. Urbanization would also increase traffic on NW 185th Avenue, which could impact the movement of both farm equipment and goods, although most of the traffic would be expected to move south towards Highway 26 away from the agricultural activities. Generally however, the proposed urban uses are considered incompatible with the directly-adjacent agricultural activities occurring to the north.

To the west of the reserve on the opposite side of NW 185th Avenue is a tract of EFU-zoned land that extends for quite a distance and includes field and row crops, nursery production, and some small

stands of trees. The land directly adjacent to the reserve includes a forested tax lot and a few rural residences with some associated agricultural activities. NW 185th Avenue itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer, although the forested areas and rural residential development could help to provide some buffer. The improvement of NW 185th Avenue to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on NW 185th Avenue, which could impact the movement of both farm equipment and goods, although most of the traffic would be expected to move south towards Highway 26 away from the neighboring agricultural activities. In addition, most of the agricultural activities occurring further west gain access from NW Cornelius Pass Road, rather than NW 185th Avenue. Therefore, the proposed urban uses are somewhat compatible with the agricultural activities occurring on the EFU-zoned land west of NW 185th Avenue, though impact mitigation measures may still be warranted.

Overall, the proposed urban uses are considered to have medium compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The Bethany West Urban Reserve is given a “medium” score in Attachment 3 for this Goal 14 boundary location factor.



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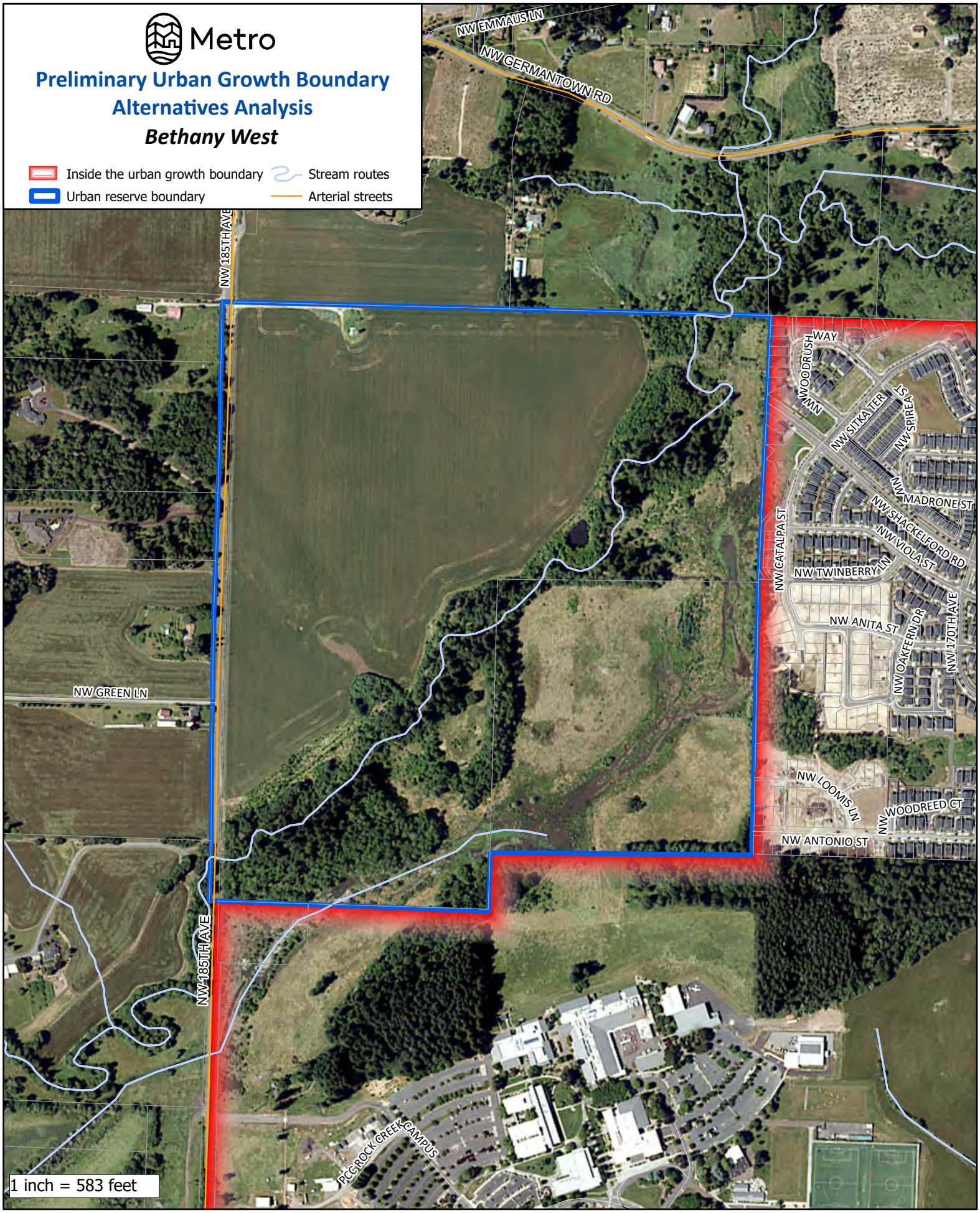

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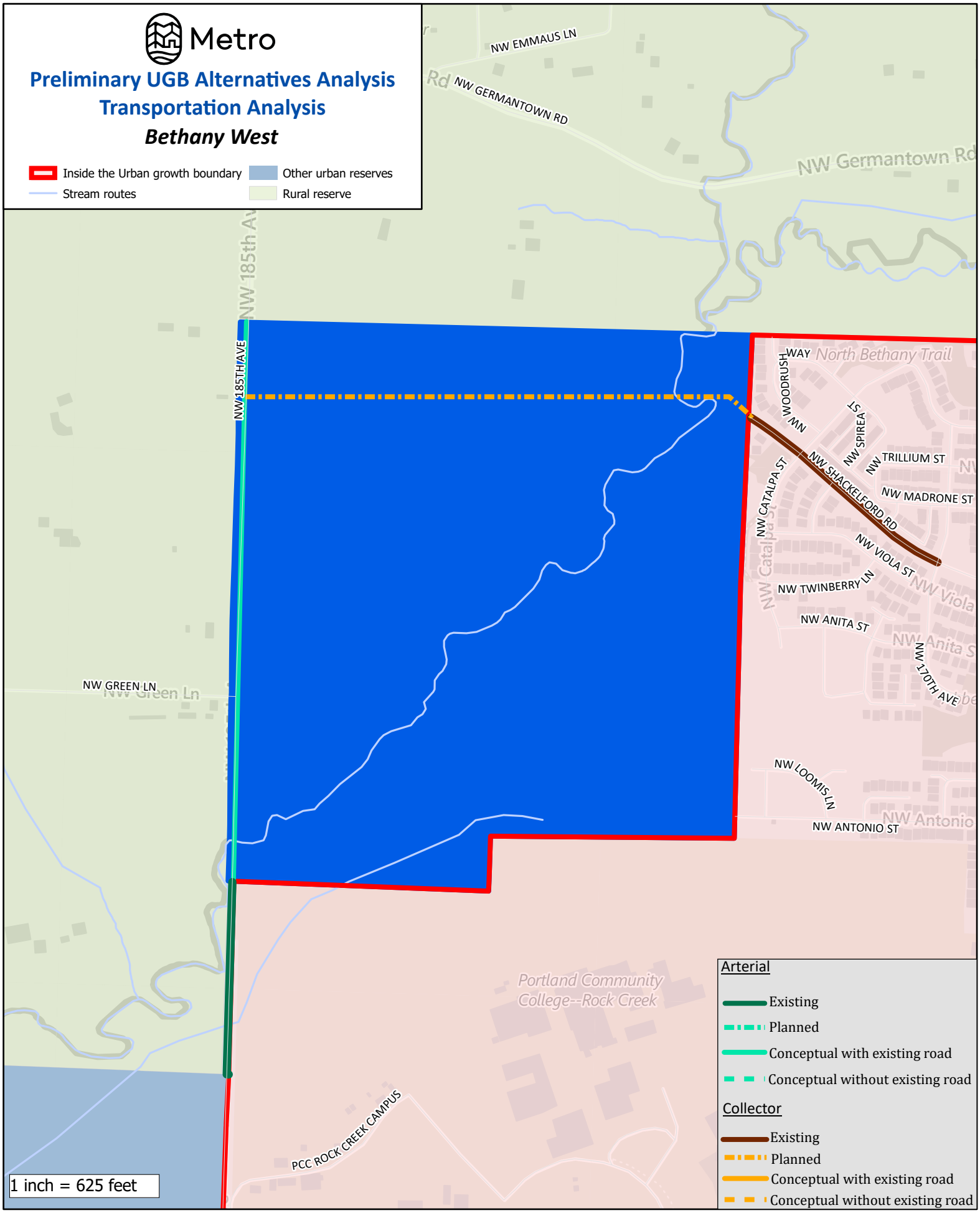

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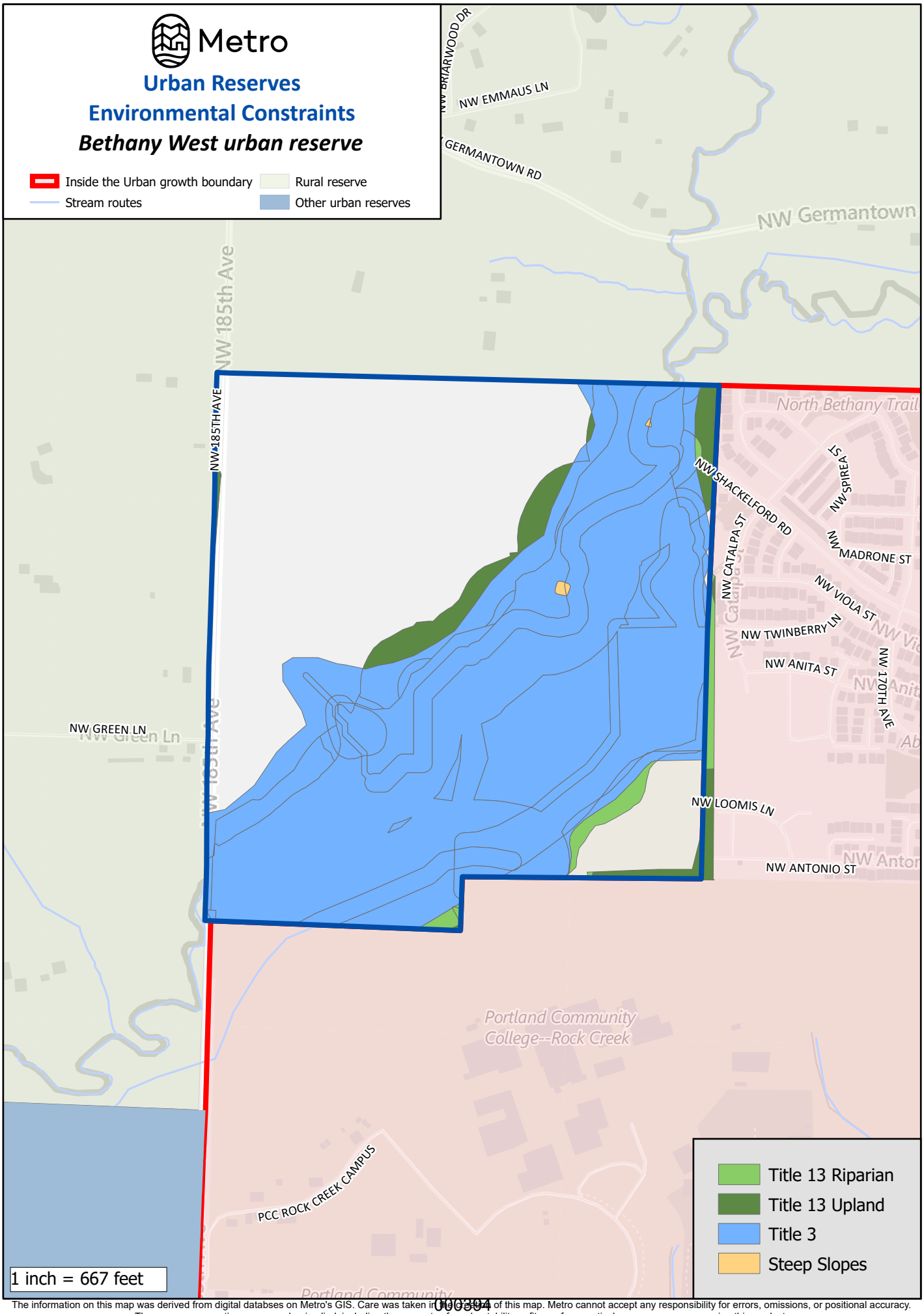

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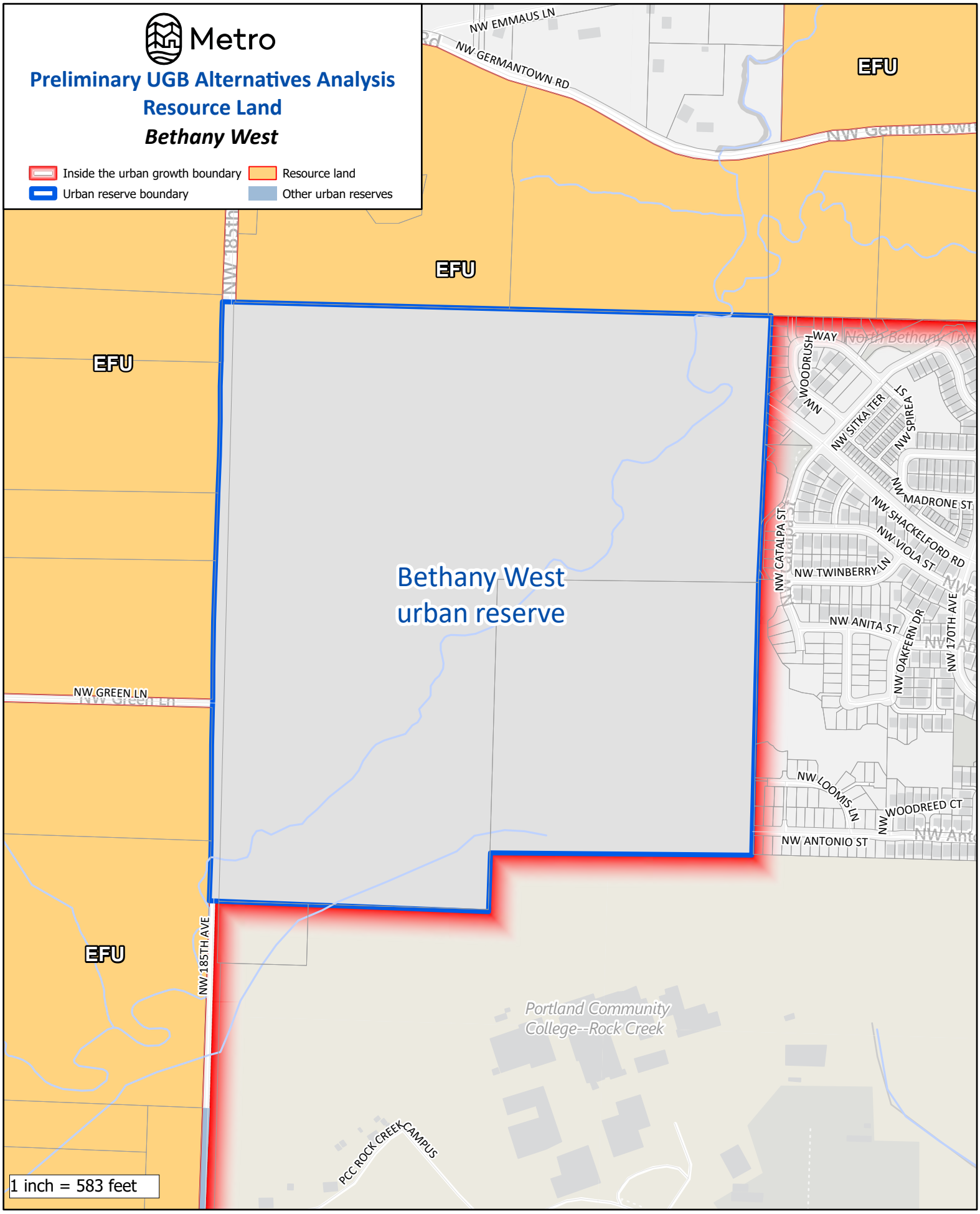

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BORING URBAN RESERVE

Total Reserve Area	2,727 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	2,564 acres
Gross Vacant Buildable Area	1,279 acres
Net Vacant Buildable Area	**953 acres**

The Boring Urban Reserve, which includes some of the business district of the community of Boring, is an irregularly shaped area west of Highway 26 and bounded by SE Rugg Road to the north, SE Kelso Road to the south, SE 242nd Avenue to the west. The UGB is the reserve's northern boundary. The separate "Boring – Highway 26 Urban Reserve" is adjacent to the reserve, on the east side of SE 282nd Avenue and north of Highway 212 and undesignated rural lands removed from the UGB in 2023 border to the west, and nearly four acres undesignated rural lands neighbor to the northwest. The reserve is otherwise entirely surrounded by rural reserve lands.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Boring Urban Reserve is comprised of 1,053 contiguous tax lots, all but 21 of which are entirely within the reserve. Of those tax lots entirely within the reserve, more than 65 percent are less than two acres, roughly 90 percent are less than five acres, and only five are larger than 20 acres, with the largest tax lot being less than 50 acres. The 21 tax lots only partially within the reserve have area within the reserve ranging from less than one acre to 53 acres. The combined tax lot area within the reserve is approximately 2,564 acres. As noted above, the entire reserve contains 1,279 gross vacant buildable acres and 953 net vacant buildable acres.

The reserve is bisected by the Springwater Corridor and Cazadero Trails, SE Telford Road, Highway 212, SE Church Road, and North Fork Deep Creek. The reserve is also adjacent to Highway 212 and includes a roughly 1,500-foot section of Highway 26, but access to the highway is about a third of a mile from the reserve's north end via SE Rugg Road, SE 267th Avenue, and SE Stone Road. There is access to the highway about two-thirds of a mile from the reserve's south end via Highway 212, as well. There is currently to transit service to or near the reserve.

Five distinct land uses define the reserve: rural residential development on larger and often forest tax lots on the buttes; small- to mid-sized rural residential development between SE 282nd Avenue and the Springwater Corridor Trail; pockets of agricultural land; golf course lands at the southwest along SE Kelso Road, and the community of Boring, which includes both residential and a variety of employment uses (e.g., a grocery store, auto-oriented retail, landscaping and construction related businesses, and self-storage facilities). Overall, 886 of the reserve's tax lots have assessed improvements, with the median value of those tax lots' improvements being just over $350,000.

The reserve includes: a Clackamas County Water Environment Services (WES) Sanitary Sewer Treatment Facility along SE Richey Road; a PGE substation between the Springwater Corridor Trail and SE 282nd Avenue; two Boring Water District storage facilities; one two-acre tax lot owned by

Sunrise Water Authority at the reserve's west. The reserve also includes the Boring Middle School, Naas Elementary School, and Hoodview Adventist School, as well as several places of worship and the majority of the Mountain View Golf Course. The Springwater Corridor and Cazadero Trails are on land owned by the City of Portland and Clackamas County, and powerlines run along portions of these trails. Metro owns three contiguous tax lots between North Fork Deep Creek and SE Richey Road, with a combined area of approximately two acres.

The western portion of the reserve north of Highway 212 includes two forested buttes, "Tower" and "Zion. Relatively flat areas are located south of Highway 212 and west of SE 282nd Avenue. An intrusion of rural reserve land follows the Springwater Corridor in the North Fork Deep Creek canyon from SE 262nd Avenue/SE Kelso Road to the center of the business district. North Fork Deep Creek, along with a few tributaries, generally flow west towards the canyon area along the Springwater Corridor Trail. A few tributaries to Johnson Creek flow north and west through the area north of Highway 212.

Generally, much of the reserve is either developed or otherwise constrained by natural features, such as steep slopes. Most of the central area of the Boring community is also already built out; however, there is some underdeveloped land in the commercial/business area that could provide additional employment uses. There are also two large pockets of agricultural land near SE Kelso Road that provide an opportunity for either residential or employment uses. While an employment use in these locations would be at the edge of the future urbanized area, such uses could benefit from proximity to Highway 26 and may provide a better buffer than residential uses between new urban development and nearby agricultural activity. There are two areas along SE Haley Road west of SE 282nd Avenue that are better suited to residential uses, considering their smaller tax lots and adjacent existing uses. There are other pockets of land throughout the reserve that could also provide for future residential uses, depending on availability of urban services. The proximity of existing schools, retail commercial uses, and recreational facilities could support residential uses.

The Boring Urban Reserve is considered able to accommodate both residential end employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Boring Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Most of the land near to the Boring Urban Reserve that is already inside the UGB is not currently served by public water services, except for a roughly 70-acre area north of Highway 212 and west of SE 257th Avenue, which is served by the Boring Water District. Sunrise Water Authority provides water service to some of the nearby land within the UGB as well, although the district boundary is about two miles from the Boring Urban

Reserve. The Boring Water District also already provides service to most of the unincorporated community of Boring, which includes some of the Boring Urban Reserve.

The Boring Water District has four wells in the deep Troutdale Aquifer and has been granted water rights by Oregon Water Resources Department (OWRD) to withdraw up to 5.8 MGD. Existing storage is provided by three tanks: two tanks are located at Meier Dairy, one of which is sized at 352,000 gallons and another at 443,000 gallons; the other tank is located at SE Wally Road at the top of Polivka Hills and has a capacity of 100,000 gallons. There are no definitive determinations of an existing supply deficit for service to lands already in the UGB. While the Boring Water District's distribution system may be adequate to meet current demands, aged piping may eventually need to be replaced. As of 2009, there was not sufficient storage capacity to provide for peak day demands as well as fire requirements and efforts to improve that capacity are not currently known.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Existing supply and storage facilities are not currently available to meet the demands of urbanization of the Boring Urban Reserve. Urbanization of the reserve would require system-level increases in supply and storage capacity that are not entirely known and therefore not fully included in the costs listed below.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, the Boring Water District only serves a small area that is already inside the UGB. However, the district's supply and storage facilities would need to be expanded to serve urban development in the reserve without creating or exacerbating any deficits. Aging/undersized pipes may also need to be replaced/upgraded.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$0
16-inch pipe	$11.55 million
Pumping	$0
Storage	$1.32 million
Total:	**$12.87 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$675**

Sanitary Sewer Services

With regard to sanitary sewer services, the Boring Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no existing public sanitary sewer service within the UGB near the Boring Urban Reserve. Rather, this portion of the UGB is currently served by private septic systems. Clackamas Water Environment Services (WES) provides service in the UGB, but its service district boundary in the UGB is nearly five miles to the west. WES also operates a sewer treatment plant (the Boring Water Resource Recovery Facility, or WRRF) in the unincorporated community Boring, outside the UGB. Boring WRRF consists of lagoons and a sand filter to provide tertiary treatment for up to 20,000 gallons per day, which is believed to be just nearly adequate to continue serving existing customers. Considerations have been given to abandoning the Boring WRRF and to have wastewater pumped to another facility for treatment, perhaps in Sandy, Gresham, or another WES facility. Any additional treatment facility costs, and extended distribution system costs, that may be needed to accommodate this service, which are likely to be significant, are not included in the below costs.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The existing treatment plant and facilities are not adequate to serve the Boring Urban Reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Because there is no existing public sanitary sewer service within the UGB near the Boring Urban Reserve, there are no existing facilities necessarily to be impacted. However, as noted above, existing facilities outside the UGB do not have capacity to serve the Boring Urban Reserve.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0
12-inch pipe	$0
21-inch pipe	$19.04
Pump station	$16.56 million
Force mains	$0
Total:	**$35.60 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,868**

Stormwater Management Services

With regard to stormwater management services, the Boring Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

No public stormwater management facilities exist to serve the adjacent area already inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

No public stormwater management facilities exist.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Because there is no existing public stormwater service within the UGB near the Boring Urban Reserve, there are no existing facilities necessarily to be impacted. Stormwater conveyance, water quality, and detention for roadways would be developed during construction. Based on topography, it seems likely that stormwater could outfall directly to North Fork Deep Creek.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$9.60 million
24-inch pipe	$5.48 million
30-inch pipe	$2.75 million
Water quality/dentition	$19.22 million
Total:	**$37.05 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,944**

Transportation Services

With regard to transportation services, the Boring Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis

zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the Boring Urban Reserve had significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates numerous walkable, higher-density, mixed-use centers of employment, housing, cultural and recreational activities, and transit service across the region in the UGB. Those centers are intended to grow the economy, provide affordable housing, and promote vibrant and distinctive communities that minimize transportation costs and allow people to meet their daily needs without having to utilize a private motor vehicle. There are no 2040 Growth Concept centers that have been planned for urban uses within three miles of the reserve; residents of areas already within the UGB near the reserve therefore have to travel several miles to reach a 2040 Growth Concept Center that has been planned for urban uses. Areas already inside the UGB near to the reserve are also about three miles from major commercial uses (e.g., grocery store and other retail uses) in the UGB.

Furthermore, because there are currently no on-road bike facilities and no sidewalks within the UGB near to the reserve, and because there is only limited bus service (i.e., every few hours) on the Sandy Area Metro (SAM) connecting these areas to commercial areas in Damascus and Clackamas, residents of these areas are particularly reliant on private motor vehicle transport to get to services within the UGB. The Springwater Corridor Trail, however, does connect areas within the UGB adjacent to the north side of the reserve with Gresham and its 2040 Growth Concept regional center approximately 2.5 miles to the north.

Figure 4.14 in Chapter of the 2023 RTP identifies several high injury corridors inside the UGB in the areas of Gresham, Happy Valley, and Pleasant Valley, including Foster Road, Powell Boulevard, and sections of Highway 212. The figure also identifies the intersection of SE 242nd Avenue and SE Hoffmeister Road, as well as the intersection of Highway 26 and SE 282nd Avenue, as high injury intersections.

Highway 26 and Highway 212 are identified as throughways in Figure 4.7 in Chapter of the 2023 RTP. Figure 4.8 of the chapter indicates that these routes currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate these facilities' reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26 and Highway 212 run adjacent to and/or through the reserve. As noted above, these throughways currently meet travel speed reliability performance thresholds.

There is currently no frequent transit service, on-road bike facilities, or sidewalks connecting the reserve to areas already inside the UGB. The Springwater Corridor Trail does, however, run through the reserve and connects the reserve to Gresham to the

north. SAM also provides occasional bus service from the reserve to commercial areas of Damascus and Clackamas. There are sidewalks within the reserve on Highway 212 from about SE Grange Street nearly to SE Jons Lane, as well as along SE 282nd Avenue for about 300 feet northward from the intersection with Highway 212. This intersection also has a dedicated bike lane.

As noted in response to Factor 1, the reserve already contains some commercial uses, including a grocery store, school uses, places of worship, and some residential development. A post office is just across Highway 212 in the separate Boring – Highway 26 Urban Reserve. These existing non-residential uses could support new residential uses in the reserve and help to limit the need for new residents to travel far to access their daily needs. Similarly, if the reserve were to be developed with additional employment uses, those uses could provide nearby employment opportunities to existing residents of the reserve and neighboring areas already inside the UGB, with limited commutes.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Portions of Highway 26, Highway 212, SE Telford Road, and SE 282nd Avenue already within the UGB would be expected to see additional private vehicle traffic from development of the reserve. Indeed, the reserve is several miles from the nearest 2040 Growth Concept center and currently lacks frequent transit service, bike, and pedestrian facilities to commercial areas in Damascus and Gresham, suggesting the need for private motor vehicle use on these roadways. However, as noted in response to Factor 1 and above, the reserve already has a mixture of uses and is considered able to accommodate new residential and employment uses in the future. If the reserve itself were to be developed with a mixture of uses, future residents could get more of their daily needs met locally without having to drive as much on roads already in the UGB. The existing school uses in the reserve will also help to limit driving by new residents on roads already in the UGB. Moreover, nearby residences in the current UGB could provide housing to employees of the reserve, and new employment uses in the reserve could provide jobs for nearby residents of the current UGB, further limiting new traffic impacts on roads already in the UGB.

With these considerations, development of the reserve may result in only moderate impacts to home-based VMT per capita in nearby areas already inside the UGB and the performance of Highway 26 and Highway 212 as throughways. Any additional motor vehicle traffic on Foster Road or Highway 212 resulting from development of the reserve, however, may exacerbate these roadways' high-crash conditions.

Urban development of the reserve would result in greater use of the Springwater Corridor Trail and the existing sidewalks and bike facility already inside the reserve.

d. Need for major transportation facility improvements and associated costs

In order to serve urban development, a 1.39-mile section of SE 282nd Avenue and a 0.58-mile section SE Highway 212 at the east of the reserve will likely need to be improved to urban arterial standards. Both of these roadway sections' improvements are considered to be a half-street improvements in this analysis, as their eastern and northern sides, respectively, would be improved within the urbanization of the separate Boring – Highway 26 Urban Reserve. Another roughly 1.5 miles of SE Highway 212 west of SE 282nd Avenue, as well as 0.83 miles of SE Richey Road and 1.13 miles of SE Kelso Road, will also likely need to be improved/extended to urban arterial standards, including with acquisition of additional right-of-way. It is expected that the following roadway sections will need to be improved to urban collector standards, with acquisition of additional right-of-way: 0.80 miles of SE Church Road; 0.54 miles of SE 257th Avenue; 0.74 miles of SE Stewart Lane; 0.2 miles of SE Fireman Way; 0.26 miles of SE Gillespie Court/SE Zion Hill Drive; 0.28 miles of SE School Avenue; 0.84 miles of SE 272nd Avenue; 1.97 miles of SE Sunshine Valley Road/SE Victoria Street; 0.83 miles of SE 258th Place/SE 257th Drive; 1.09 miles of SE Telford Road; and 0.67 miles of SE Haley Road. In addition, four new collectors with a combined length of approximately 2.81 miles will need to be built. Some sections of these new and improved roadways may need to traverse areas of steeper topography and/or water bodies; therefore, some per-mile costs are higher than normal.

Facilities	Cost
Arterials, existing/improved full street	$166.76 million
Arterials, existing/improved half street	$52.90 million
Arterials, new	$0
Collectors, existing/improved full street	$278.45 million
Collectors, existing/improved half street	$0
Collectors, new	$156.20 million
Total:	**$149.31 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$34,329**

e. Provision of public transit service

The reserve's area was withdrawn from the TriMet service district; thus, no analysis of future/additional transit service was completed by TriMet. As described above, SAM currently serves the reserve.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

North Fork Deep Creek flows westward near the unincorporated community of Boring for nearly a mile in the Boring Urban Reserve, mostly within an intact riparian corridor. About 1.5 total miles of very small tributaries also flow in this area, generally through rural residential development, though about 1,600 feet of these tributaries flow through agricultural land. Riparian habitat is identified along the stream corridors, with some upland habitat near the eastern edge of the reserve.

Two additional tributaries to North Fork Deep Creek, with combined lengths of approximately 6,100 feet, flow south through the southwest corner of the reserve on the north side of Highway 212. These streams cross pastureland and wooded tax lots. Riparian habitat is identified along the stream corridors with some upland habitat identified along the wooded surroundings of the streams. A 2.5-acre wetland identified through the National Wetland Inventory (NWI) is located along North Fork Deep Creek at the eastern edge of the reserve.

The riparian corridors of North Fork Deep Creek and of the tributaries described above, as well as wetlands, floodplains, and upland habitat, could receive enhanced regulatory protections as a result of adding the reserve to the UGB.

The area between SE 282nd Avenue and the Springwater Corridor contains a few tributaries to Johnson Creek that flow north and that have a combined length of approximately two miles. Significant portions of these small streams flow through a forested riparian corridor and the remaining portions generally traverse open fields. Riparian habitat is identified along the stream corridors with some upland habitat identified along the wooded areas near the streams. In several locations, it appears that the streams have been altered to create ponds. Inclusion of the area in the UGB may result in greater protections and even enhancements of the existing forested riparian corridor due to increased urban water quality and habitat regulations.

A 2,000-foot section of stream in the vicinity of SE Sunshine Valley Road and SE 250th Place flows west out of the reserve to connect with other streams and ultimately join Johnson Creek to the north. This stream is in forested portions of large rural residential tax lots and has been identified as having associated riparian and upland habitat.

Urbanization of the flat, less vegetated, developable land near the streams within the reserve could have some impacts water bodies. However, restoration of degraded stream edges and enhancement of wetland buffers would provide protection from urbanization. The tributaries that mostly flow through the rural residential areas may be impacted by future development, as they generally flow through the remaining developable portions of the properties; however, the existing housing pattern and lot consolidation concerns may reduce options for impact reduction measures. Urbanization of the agricultural lands provides the opportunity to restore and enhance the riparian corridor of the streams that

flow along the edges of the fields. There are some significant locations of upland habitat identified in the butte areas, although most of it is also located on slopes greater than 25 percent, which would limit the amount of urbanization that could occur.

This analysis finds that urbanization of the reserve could occur with moderate to high impacts to the stream corridors, habitat areas, and wetlands, but impacts will depend in part on building and lot consolidation patterns and the opportunities to enhance riparian corridors on agricultural lands.

Considering the comparative environmental consequences of urbanization, the Boring Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The relatively large Boring Urban Reserve has a variety of land uses that would be impacted differently by urbanization.

There is somewhat urban-like development, including residential, commercial, industrial, and institutional uses, in the unincorporated community of Boring around the intersection of Highway 212 and SE 282nd Avenue. Given the levels of existing development and parcelization, new urban development here would be expected to occur more slowly and have less of a noticeable impact on the existing character of the area.

There are also substantial amounts of rural residential development on smaller tax lots near the Mountain View Golf Course. The golf course is not considered buildable land and urban redevelopment of the nearby rural residential areas is likely to occur very slowly, and thereby cause comparatively less change in the character of the area.

The forested buttes north of Highway 212 and west of SE Telford Road are less developed and have more of a rural character, in part because they are not as close to the unincorporated community of Boring and are nearer to more rural and undeveloped areas. Nonetheless, there are a number of rural residences in this area, as well and platted rural residential subdivisions. That existing development, as well as topography and natural resources, may encourage a less dense, smaller-scale urban redevelopment patters that are not as likely to generate a significant change in sense of place or degradation of rural lifestyle for existing residents.

While urbanization may have generate some changes to the character of the area over time, it could also could foster new civic, recreational, and social opportunities for the reserve's existing residents, particularly if it features a mixture of uses.

As detailed more fully in response to Factor 2, urbanization of the reserve may only have moderate impacts on VMT, thereby limiting adverse energy consequences.

While there is the potential for loss of some existing jobs through redevelopment of the existing commercial/employment center of Boring, the potential to generate a significant

number of new jobs with urban employments uses may be a positive for the area. The agricultural activity within the reserve is not insignificant; however, the economic benefits of urban residential development and employment uses may outweigh the economic costs from a loss in farming activity.

Overall, there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The Boring Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

There are three locations where lands outside the UGB but contiguous to the Boring Urban Reserve have Goal 3 or 4 resource land zoning for agricultural and forest activities.

The first location is land along SE 282nd Avenue on the opposite side of Highway 26 from the reserve. This land is zoned Exclusive Farm Use (EFU) by Clackamas County and, while generally lacking in trees, is in active agriculture use. Additional traffic along SE 282nd Avenue to and from Gresham caused by development of the reserve could impede the movement of farm equipment. SE 282nd Avenue itself would not provide an appropriate buffer between urban and agricultural uses; indeed, there could be land use conflicts in this location related to safety, liability, and vandalism and complaints of noise, odor, dust, and the use of pesticides and fertilizer.

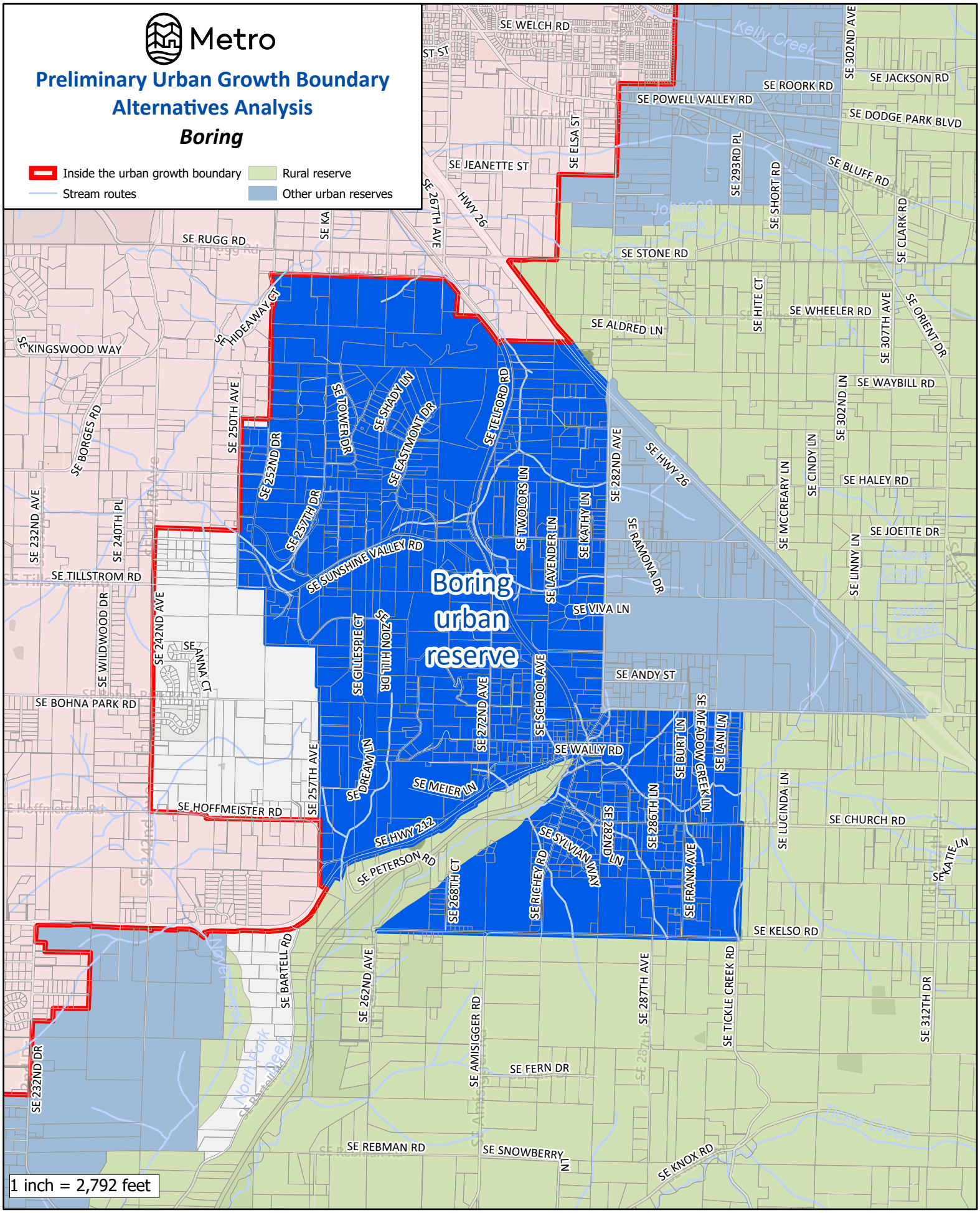
The second location is east of SE 282nd Avenue in the vicinity of SE Viva Lane and consists of one 80-acre tax lot that is part of the larger commercial nursery operation to the east. Additional traffic along SE 282nd Avenue to and from Gresham caused by urbanization of the reserve could impede the movement of farm equipment in this location; however, since this 80-acre tax lot has field access from the remainder of the nursery that is headquartered off Highway 212, there are alternative ways to move equipment. Even though the frontage of the EFU land along SE 282nd Avenue is not very long, the right-of-way width would not provide an appropriate buffer between urban and agricultural uses, and land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer could still occur in this location.

The third location is an extensive tract of EFU-zoned land south of SE Kelso Road and east of the urban reserve along both sides of SE Church Road. The agricultural land south of SE Kelso Road is in nursery production and extends over a mile south in some locations. Additional traffic along SE Kelso Road to and from Highway 26 could impede the movement of farm equipment and goods as that is the most direct route to the highway from this extensive agricultural area. This is especially true if the large tax lots in the reserve are developed with residential uses. SE Kelso Road would not provide an appropriate buffer to between urban and agricultural uses and issues related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer could still occur. The EFU-zoned land adjacent to SE Church Road is in nursery and field crop use and is also more intermixed with pockets of residences. However, there is some large single-owner operations that could be impacted by increased traffic on SE Church Road, which also

provides good access for agricultural activities to Highway 26. Most of the EFU land directly adjacent to the reserve is in residential use and would provide a bit of a buffer between the new urban area and the agricultural activities further east.

The nearby agricultural activities occurring on farm and forest land would be impacted by urbanization of the reserve, especially in the southern portion of the area. Therefore, the proposed urban uses (i.e., urban development of the reserve) would be considered to have low compatibility with the nearby agricultural and forest activities occurring on farm and forest land.

The Boring Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor.



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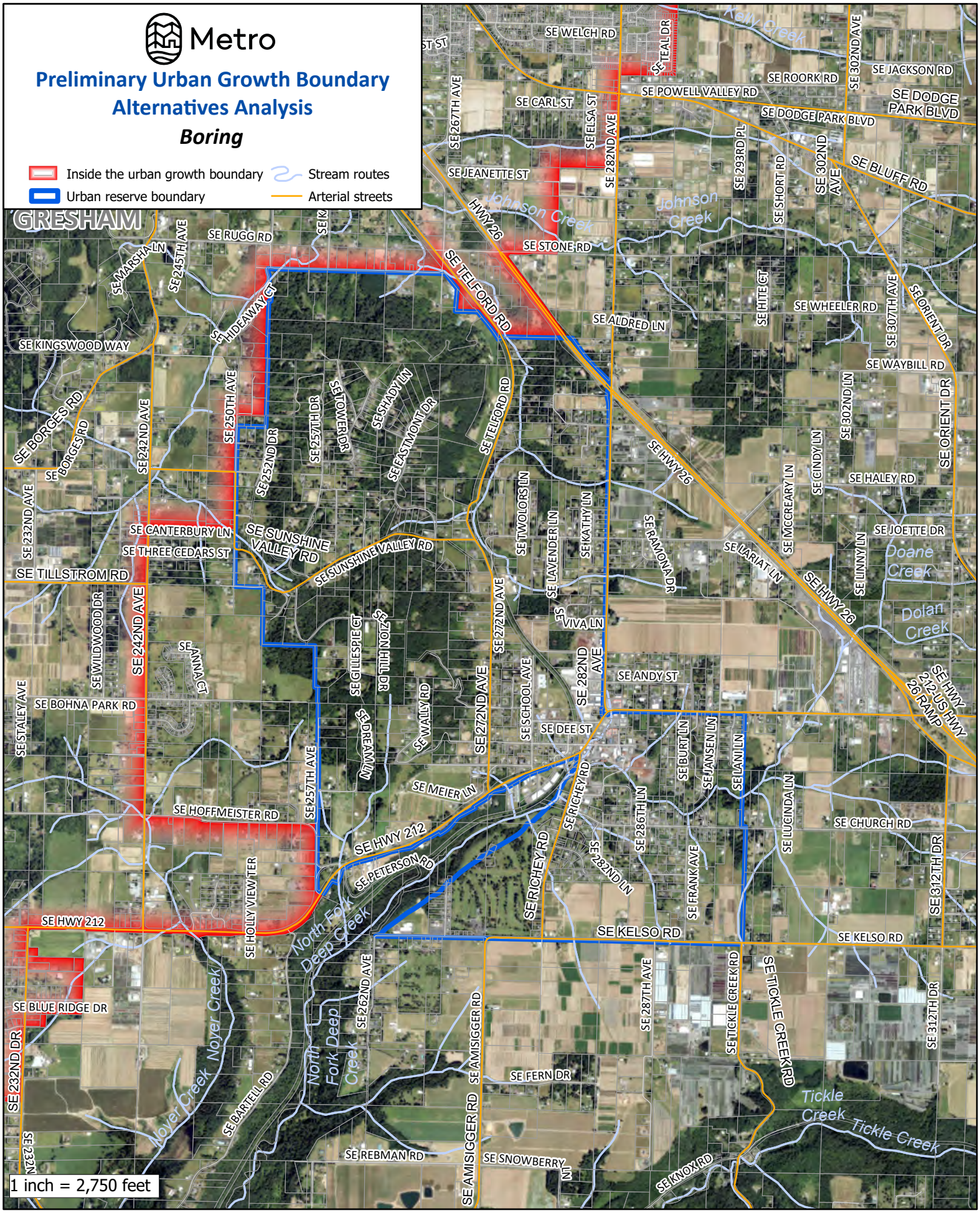

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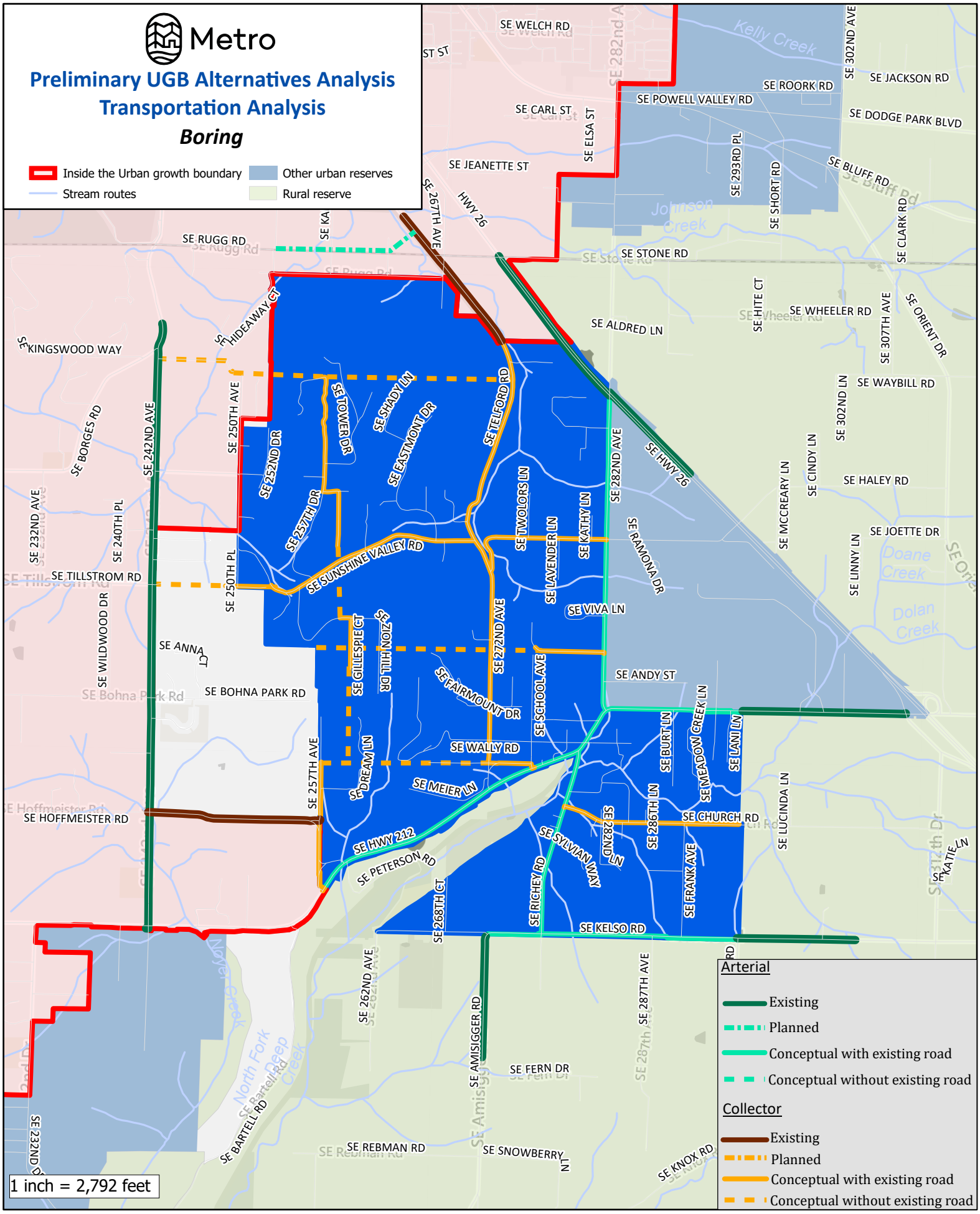

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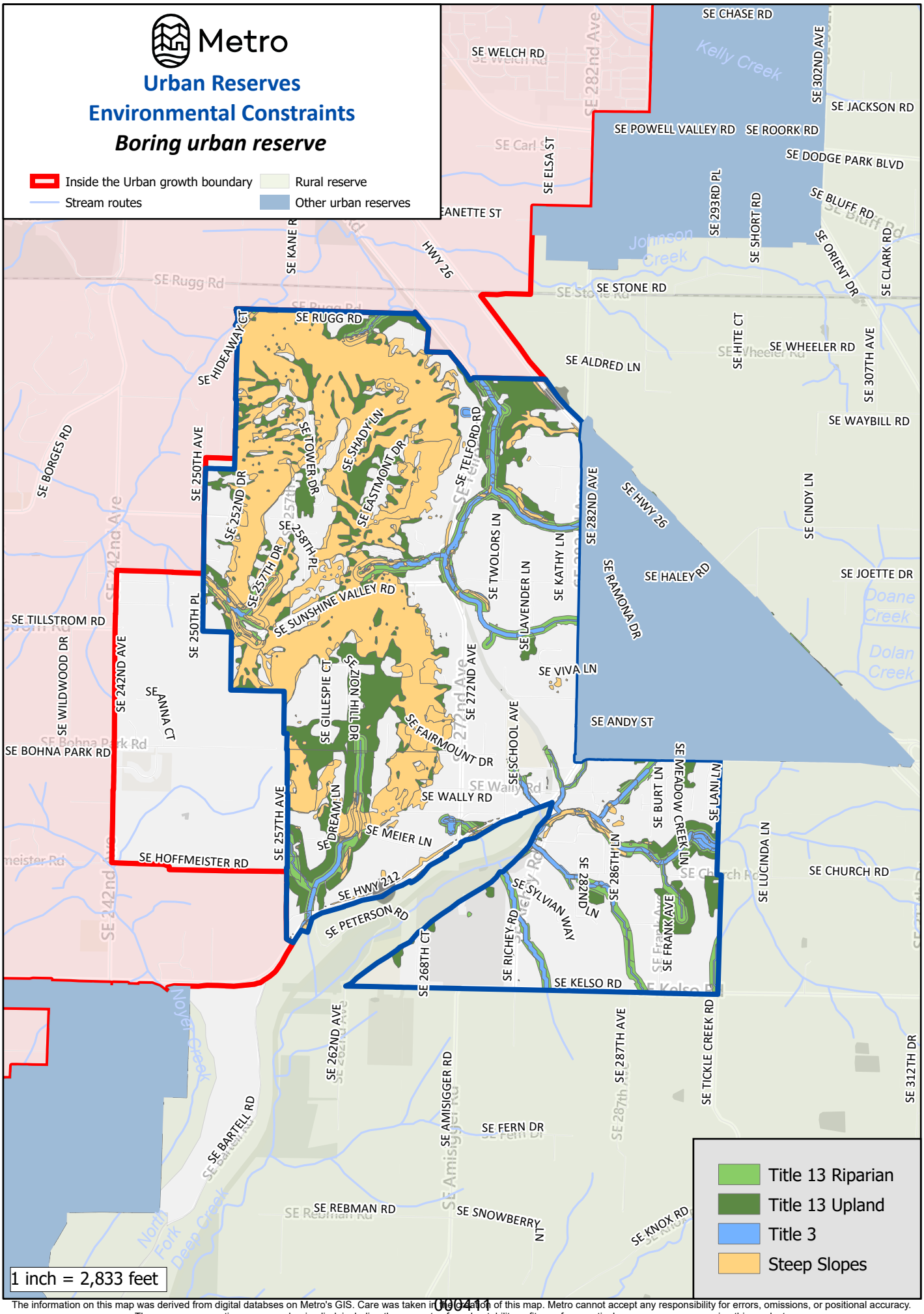

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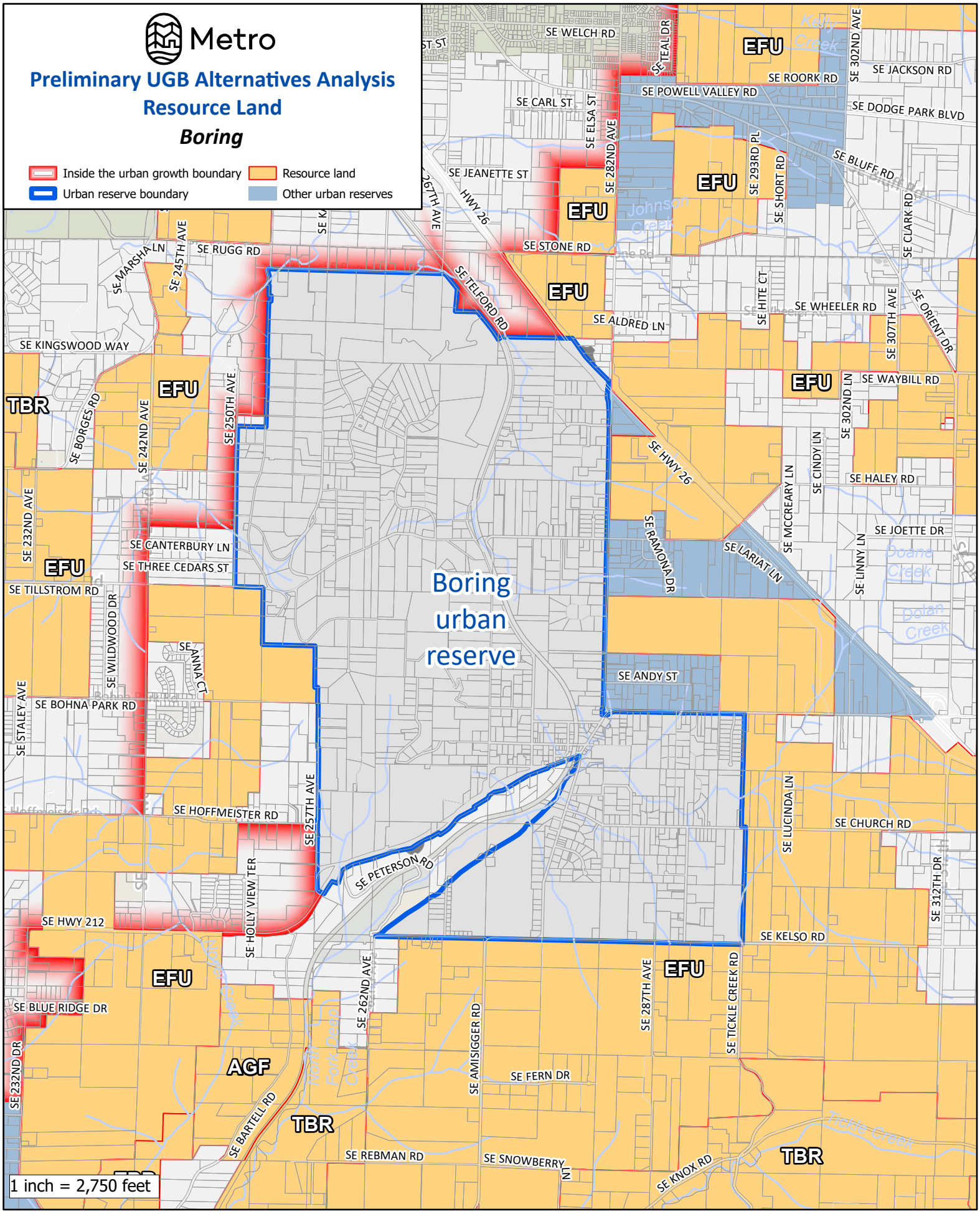

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BORING – HIGHWAY 26 URBAN RESERVE

Total Reserve Area	671 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	591 acres
Gross Vacant Buildable Area	503 acres
Net Vacant Buildable Area	**375 acres**

The Boring – Highway 26 Urban Reserve is a triangular-shaped area with Highway 26 along its northeast side, SE 282nd Avenue along its west side, and Highway 212 along its south side. Uniquely, the Boring – Highway 26 Urban reserve is not immediately adjacent to the UGB, but rather is separated from it by the "Boring Urban Reserve" on the opposite side of SE 282nd Avenue and Highway 212. Rural reserve lands are on the other side of Highway 26 and the east end of Highway 212.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Boring – Highway 26 Urban Reserve is comprised of 150 contiguous tax lots, but one of those tax lots, owned by the State of Oregon, is occupied by Highway 26 on- and off-ramps. Of the other 149 tax lots, two-thirds are smaller than two acres each, 85 percent are smaller than five acres each, and 12 are 10 acres or larger, including one that is nearly 80 acres. The combined tax lot area within the reserve is approximately 591 acres. As noted above, the entire reserve contains 503 gross vacant buildable acres and 375 net vacant buildable acres.

Four distinct land uses define the reserve: rural residential pockets along SE Haley Road and SE Andy Street; two significant tracts of agricultural land; a section of the business district of the community of Boring; and wholesaling/industrial uses near the Highway 212 interchange with Highway 26. Along Highway 212, the reserve contains a post office on a 2.7-acre tax lot and a fire district facility on a 4.3-acre tax lot. The Good Sheppard Community Church and School is on a 30-acre tract of land in the center of the reserve along SE Haley Road, and includes a mile-long secondary access from Highway 212 through the John Holmlund Nursery property. Overall, 146 of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being approximately $271,000.

Naas Elementary School, Boring Elementary School, and the Springwater Corridor Trail are less than half a mile from the southwest corner of the reserve via Highway 212 and SE School Avenue. The Mountain View Golf Course is within two miles.

In addition to frontage along Highway 212, the reserve contains two access points to Highway 26, which leads to the City of Gresham just two miles to the north and to the City of Sandy approximately three miles to the south. There is currently no transit service to the reserve.

The reserve is primarily flat, though North Fork Deep Creek flows south through the southeast corner of the reserve and two tributaries of Johnson Creek flow west through the central and northern portion of the reserve.

With its direct highway access, existing commercial and industrial land uses, and relatively large and flat agricultural properties, the reserve is considered able to accommodate an employment need, particularly near to Highway 26, SE Haley Road, and the commercial center of Boring. Close proximity of schools, recreational uses, and commercial services would also benefit residential uses and such uses may be compatible with existing residential development on smaller lots. Therefore, the reserve is considered able to accommodate both a residential and employment land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Boring – Highway 26 Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Most of the land near to the Boring – Highway 26 Urban Reserve that is already inside the UGB is not currently served by public water services, except for a roughly 70-acre area north of Highway 212 and west of SE 257th Avenue, which is served by the Boring Water District. Sunrise Water Authority provides water service to some of the nearby land within the UGB as well, although the district boundary is about two miles from the Boring – Highway 26 Urban Reserve. The Boring Water District also already provides service to most of the unincorporated community of Boring, which includes most of the Boring – Highway 26 Urban Reserve.

The Boring Water District has four wells in the deep Troutdale Aquifer and has been granted water rights by Oregon Water Resources Department (OWRD) to withdraw up to 5.8 MGD. Existing storage is provided by three tanks: two tanks are located at Meier Dairy, one of which is sized at 352,000 gallons and another at 443,000 gallons; the other tank is located at SE Wally Road at the top of Polivka Hills and has a capacity of 100,000 gallons. There are no definitive determinations of an existing supply deficit for service to lands already in the UGB. While the Boring Water District's distribution system may be adequate to meet current demands, aged piping may eventually need to be replaced. As of 2009, there was not sufficient storage capacity to provide for peak day demands as well as fire requirements and efforts to improve that capacity are not currently known.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Existing supply and storage facilities are not currently available to meet the demands of urbanization of the Boring – Highway 26 Urban Reserve. Urbanization of the reserve

would require system-level increases in supply and storage capacity that are not entirely known and therefore not fully included in the costs listed below.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, the Boring Water District only serves a small area that is already inside the UGB. However, the district's supply and storage facilities would need to be expanded to serve urban development in the reserve without creating or exacerbating any deficits. Aging/undersized pipes may also need to be replaced/upgraded.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$3.19 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.50 million
Total:	**$3.69 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$492**

Sanitary Sewer Services

With regard to sanitary sewer services, the Boring – Highway 26 Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no existing public sanitary sewer service within the UGB near the Boring – Highway 26 Urban Reserve. Rather, this portion of the UGB is currently served by private septic systems. Clackamas Water Environment Services (WES) provides service in the UGB, but its service district boundary in the UGB is more than five miles to the west. WES also operates a sewer treatment plant (the Boring Water Resource Recovery Facility, or WRRF) in the unincorporated community Boring, outside the UGB. Boring WRRF consists of lagoons and a sand filter to provide tertiary treatment for up to 20,000 gallons per day, which is believed to be just nearly adequate to continue serving existing customers. Considerations have been given to abandoning the Boring WRRF and to have wastewater pumped to another facility for treatment, perhaps in Sandy, Gresham, or another WES facility. Any additional treatment facility costs, and extended distribution system costs, that may be needed to accommodate this service, which are likely to be significant, are not included in the below costs.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The existing treatment plant and facilities are not adequate to serve the Boring – Highway 26 Urban Reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Because there is no existing public sanitary sewer service within the UGB near the Boring – Highway 26 Urban Reserve, there are no existing facilities necessarily to be impacted. However, as noted above, existing facilities outside the UGB do not have capacity to serve the Boring – Highway 26 Urban Reserve.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$2.83 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0
Force mains	$0.50 million
Total:	**$3.69 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$485**

Stormwater Management Services

With regard to stormwater management services, the Boring – Highway 26 Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

No public stormwater management facilities exist to serve the adjacent area already inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

No public stormwater management facilities exist.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Because there is no existing public stormwater service within the UGB near the Boring – Highway 26 Urban Reserve, there are no existing facilities necessarily to be impacted.

Stormwater conveyance, water quality, and detention for roadways would be developed during construction.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$2.16 million
24-inch pipe	$1.06 million
30-inch pipe	$0
Water quality/dentition	$12.41 million
Total:	**$15.63 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,086**

Transportation Services

With regard to transportation services, the Boring – Highway 26 Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB nearest to the Boring – Highway 26 Urban Reserve had significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates numerous walkable, higher-density, mixed-use centers of employment, housing, cultural and recreational activities, and transit service across the region in the UGB. Those centers are intended to grow the economy, provide affordable housing, and promote vibrant and distinctive communities that minimize transportation costs and allow people to meet their daily needs without having to utilize a private motor vehicle. There are no 2040 Growth Concept centers that have been planned for urban uses within three miles of the reserve; residents of areas already within the UGB near the reserve have to travel several miles to reach a 2040 Growth Concept Center that has been planned for urban uses. Areas already inside the UGB near to the reserve are also more than three miles from major commercial uses (e.g., grocery store and other retail uses) in the UGB.

Furthermore, because there are currently no on-road bike facilities and no sidewalks within the UGB near to the reserve, and because there is only limited bus service (i.e., every few hours) on the Sandy Area Metro (SAM) connecting these areas to commercial areas in Damascus and Clackamas, residents of these areas are particularly reliant on

private motor vehicle transport to get to services within the UGB. The Springwater Corridor Trail, however, does connect areas within the UGB near to the north side of the reserve with Gresham and its 2040 Growth Concept regional center approximately three miles to the north.

Figure 4.14 in Chapter of the 2023 RTP identifies several high injury corridors inside the UGB in the areas of Gresham, Happy Valley, and Pleasant Valley, including Foster Road, Powell Boulevard, and sections of Highway 212. The figure also identifies the intersection of SE 242nd Avenue and SE Hoffmeister Road, as well as the intersection of Highway 26 and SE 282nd Avenue, as high injury intersections.

Highway 26 and Highway 212 are identified as throughways in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of the chapter indicates that these routes currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate these facilities' reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26 and Highway 212 run adjacent to and/or through the reserve. As noted above, these throughways currently meet travel speed reliability performance thresholds.

There is currently no frequent transit service, on-road bike facilities, or sidewalks connecting the reserve to areas already inside the UGB. The Springwater Corridor Trail, however, which is less than 1,000 feet from the southwest corner of the reserve, connects to Gresham to the north. SAM also provides occasional bus service from the reserve to commercial areas of Damascus and Clackamas. There are sidewalks within the reserve for about 1,600 feet on Highway 212, as well as along SE 282nd Avenue for about 300 feet northward from the intersection with Highway 212. This intersection also has a dedicated bike lane.

As noted in response to Factor 1, the reserve already contains some commercial uses, school uses, places of worship, a post office, and some residential development. A grocer story is just across Highway 212 in the separate Boring Urban Reserve. These existing non-residential uses could support new residential uses in the reserve and help to limit the need for new residents to travel far to access their daily needs. Similarly, if the reserve were to be developed with additional employment uses, those uses could provide nearby employment opportunities to existing residents of the reserve and neighboring areas already inside the UGB, with limited commutes.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Portions of Highway 26, Highway 212, SE Telford Road, and SE 282nd Avenue already within the UGB would be expected to see additional private vehicle traffic from development of the reserve. Indeed, the reserve is several miles from the nearest 2040

Growth Concept center and currently lacks frequent transit service, bike, and pedestrian facilities to commercial areas in Damascus and Gresham, suggesting the need for private motor vehicle use on these roadways. However, as noted in response to Factor 1 and above, the reserve already has a mixture of uses and is considered able to accommodate new residential and employment uses in the future. If the reserve itself were to be developed with a mixture of uses, future residents could get more of their daily needs met locally without having to drive as much on roads already in the UGB. The existing school uses in the reserve will also help to limit driving by new residents on roads already in the UGB. Moreover, nearby residences in the current UGB could provide housing to employees of the reserve, and new employment uses in the reserve could provide jobs for nearby residents of the current UGB, further limiting new traffic impacts on roads already in the UGB.

With these considerations, development of the reserve may result in only moderate impacts to home-based VMT per capita in nearby areas already inside the UGB and the performance of Highway 26 and Highway 212 as throughways. Any additional motor vehicle traffic on Foster Road or Highway 212 resulting from development of the reserve, however, may exacerbate these roadways' high-crash conditions.

Urban development of the reserve would result in greater use of the Springwater Corridor Trail and the existing sidewalks and bike facility already inside the reserve.

d. Need for major transportation facility improvements and associated costs

In order to serve urban development, a 1.39-mile section of SE 282nd Avenue and a 1.2-mile section SE Highway 212 at along the western and southern edges of the reserve will likely need to be improved to urban arterial standards. Both of these roadway sections' improvements are considered to be a half-street improvements in this analysis, as their western and southern sides, respectively, would be improved within the urbanization of the separate Boring Urban Reserve. A 0.61-mile section of SE Haley Road would likely need to be improved to urban collector standards, and a new 0.75-mile-long collector is expected to be needed to SE Highway 212 to SE Haley Road. Given the relatively flat topography, most of the new and improved facilities would have normal per-mile costs, though there are some potential stream crossings that could increase per-mile costs in a few areas.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$75.78 million
Arterials, new	$0
Collectors, existing/improved full street	$17.72 million
Collectors, existing/improved half street	$0
Collectors, new	$29.93 million
Total:	**$123.43 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$16,471**

e. Provision of public transit service

The reserve's area was withdrawn from the TriMet service district; thus, no analysis of future/additional transit service was completed by TriMet. As described above, SAM currently serves the reserve.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

North Fork Deep Creek flows south through the southeast corner of the Boring – Highway 26 Urban Reserve for approximately 2,290 feet. About half of this creek length is in or along the edge of a parking lot, while the other length flows through an open lot that is associated with a nursery before crossing under Highway 212. There are sporadic locations of trees along the stream, but no continuous natural riparian corridor.

A tributary of Johnson Creek, with approximately 2,900 feet within the reserve, flows westward from the central area of the reserve mostly through open fields but also through a couple forested areas. There is no vegetated riparian corridor associated with most of the stream length. A more northerly tributary of Johnson Creek flows through a nursery and consists of two segments that form a "Y". The lower main segment is about 2,800 feet in length and mostly flows through cleared land, although there is a 500-foot segment that is forested. The upper segment is about 950 feet in length and flows through cleared land. Riparian habitat is identified along all the stream corridors.

There are two wetlands in the reserve identified through the National Wetland Inventory (NWI). The first wetland is a 0.6-acre pond located on a commercial property that includes some limited adjacent buffer vegetation. The second wetland, about 5.7 acres in size, is located on a vacant tax lot and appears to have been significantly altered. The proximity of flat, open, developable land adjacent to all the streams and wetlands indicates potential impact from urbanization of this area, except for the forested segment of the Johnson Creek tributary. Required restoration of degraded stream edges and enhancement of the wetland buffer to meet required urban riparian habitat and water quality needs will provide some level of protection from urbanization.

This analysis finds that urbanization of the reserve could occur with comparatively low to moderate impacts to the stream corridors and wetlands, depending on urban street connectivity. Nonetheless, there is the potential with urbanization to significantly improve

the riparian corridors given the increased natural resource protection requirements on land inside the UGB.

Considering the comparative environmental consequences of urbanization, the Boring – Highway 26 Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The Boring – Highway 26 Urban Reserve, located along two highways, is generally made up of three different land uses: rural residential areas; commercial and industrial uses; and two significant tracts of agricultural lands, largely for nursery stock. The reserve also has a post office, several places of worship, and a fire station. Residential, commercial, industrial, and institutional development is mostly along SE Haley Road and Highway 212. While it is expected that urbanization will result in new development replacing some of these existing rural residences and other existing development, more immediate, larger-scale new development is mostly likely to occur on the larger agricultural tax lots. Considering the unincorporated community of boring already has a semi-urban character, urbanization is less likely to contribute to a change in sense of place for existing residents or degradation of a rural lifestyle. Additionally, new development, particularly if it features a mixture of uses, could foster new civic, recreational, and social opportunities for existing residents. It should also be noted that the adjacent Boring Urban Reserve would likely need to be urbanized before this reserve; so, by the time this reserve is urbanized, the overall character of the Boring community will have already become more urban.

As detailed more fully in response to Factor 2, urbanization of the reserve may generate only moderate VMT, with only moderate energy consequences.

There are approximately 46 acres of rural industrial land with excellent access to Highway 26. While there is the potential for loss of the current rural industrial jobs, the potential to generate a significant number of new jobs with urban employments uses may be a positive for the area. There are two large locations of nursery activity within the reserve. The loss of the economic impact from these agricultural uses may be considerable; however, the potential economic impact of urbanizing these large relatively flat lands would likely outweigh this loss, especially considering potential employment uses.

Overall, there would be comparatively low to moderate social, energy, and economic consequences from urbanization of this reserve. The Boring – Highway 26 Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

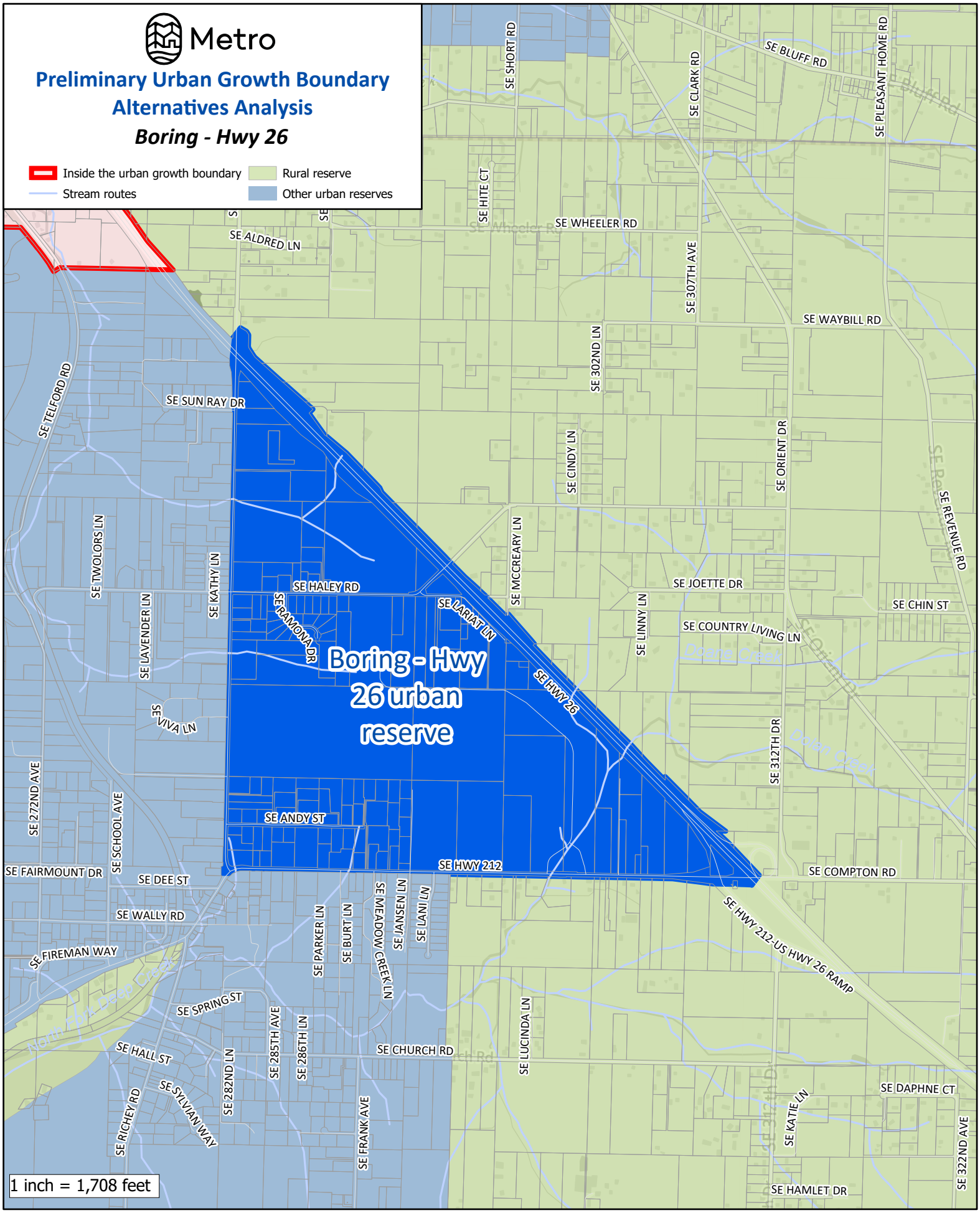
There are three locations where lands outside the UGB but contiguous to the Boring – Highway 26 Urban Reserve have Goal 3 or 4 resource land zoning for agricultural and forest activities.

The first location is a tract of land zoned Exclusive Farm Use (EFU) by Clackamas County, situated on the opposite (east) side of Highway 26 between SE 282nd Avenue and SE Haley Road and adjacent to the northern portion of the reserve. While this area has active agricultural activities and some stands of trees, the more than 200-foot-wide right-of-way of Highway 26 will serve as a buffer between natural resource activities on in this area and development of the reserve. Additional traffic along SE 282nd Avenue to and from Gresham that results from urbanization of the reserve, however, could impede the movement of farm equipment. There is less possibility of traffic impacts along SE Haley Road, however, as most of the increased traffic would not likely continue east into the rural area but rather head along Highway 26.

South of Highway 212, there are two locations where EFU-zoned land abuts the south side of the urban reserve. One of these locations, just east of the rural residential subdivision along SE Lani Lane, has four EFU-zoned tax lots with a 750-foot-long stretch of frontage along Highway 212 adjoining the reserve. These four tax lots don't appear to have any agricultural uses and have relatively few tress, none of which appear to be planted for timber harvesting. The tax lots have residential uses and three are smaller than three acres. The other location, at the southeast corner of the reserve on the opposite side of Highway 212, has two EFU-zoned tax lots with less than 500 feet adjoining the reserve. Neither of these tax lots appear to have agricultural uses or trees being raised for timber production.

In summary, Highway 26 could serve as an effective buffer between urban development of the reserve and agricultural and forest activities occurring on the opposite side of the highway, and there is existing residential development and lack of agricultural and forest activities on the small number of EFU-zoned properties adjoining the reserve south of Highway 212. However, additional traffic along SE 282nd Avenue could impede the movement of farm equipment. Therefore, the proposed urban uses (i.e., urbanization of the reserve) would be considered to have medium to high compatibility with the nearby agricultural and forest activities occurring on farm and forest land.

The Boring – Highway 26 Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location factor.



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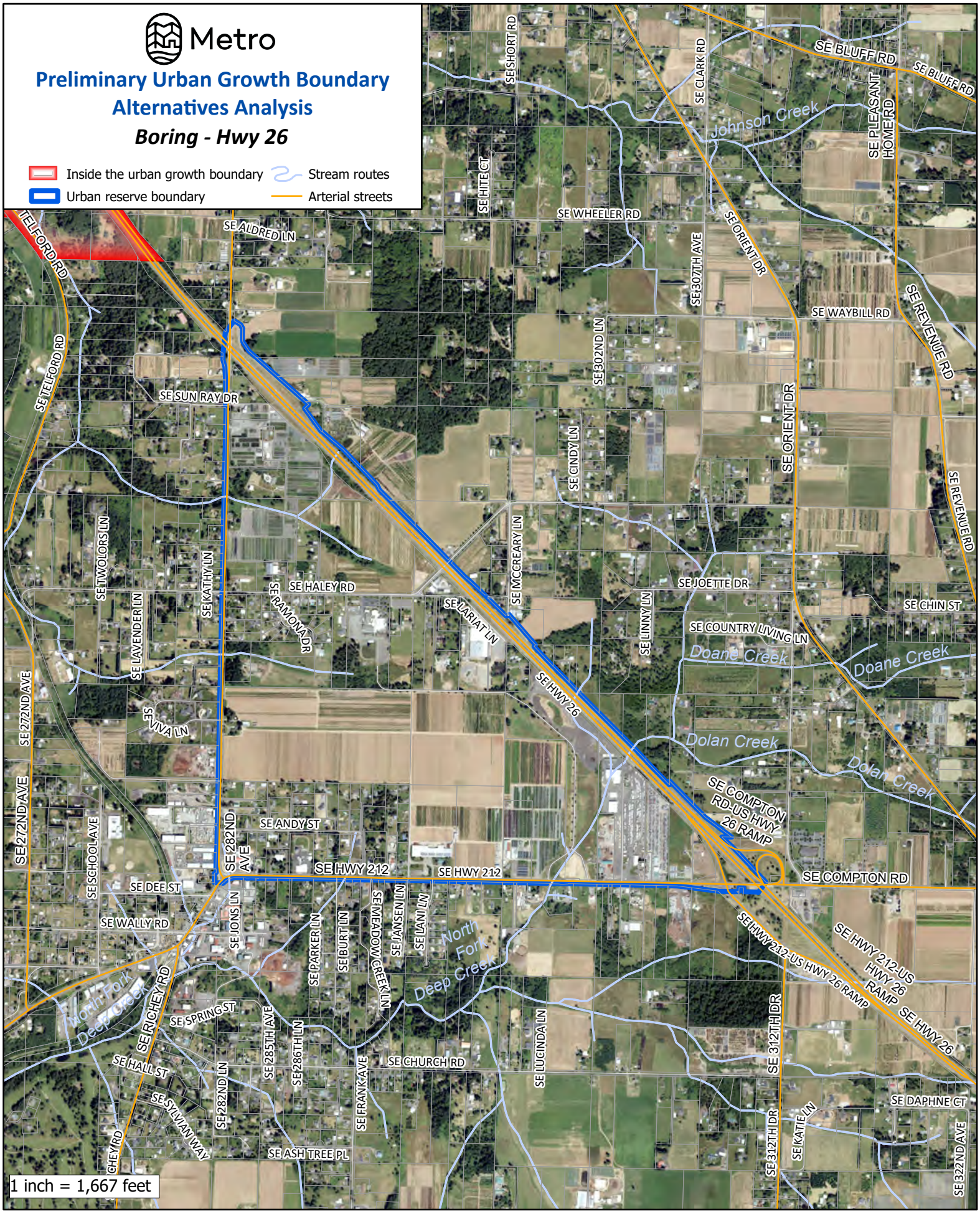

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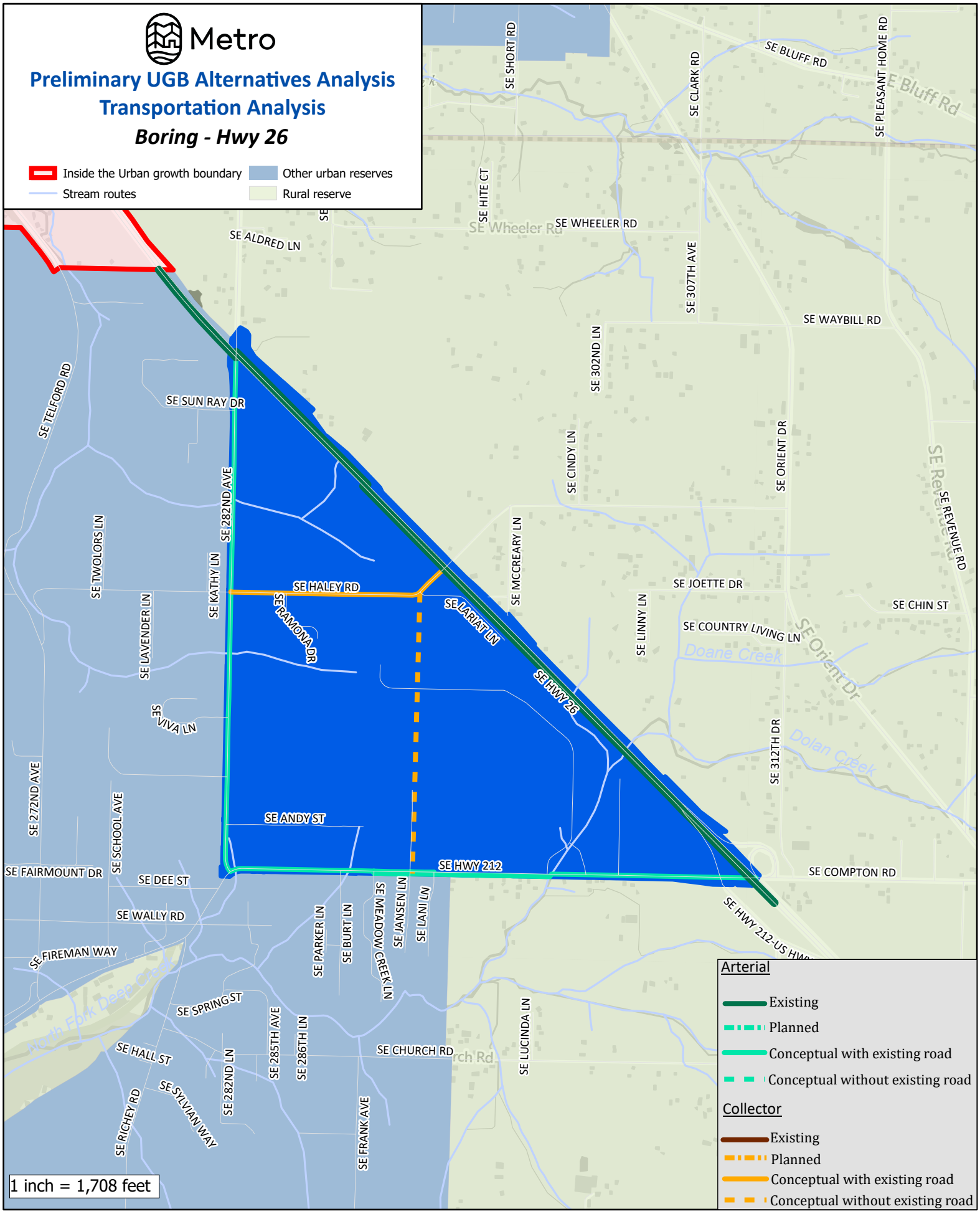

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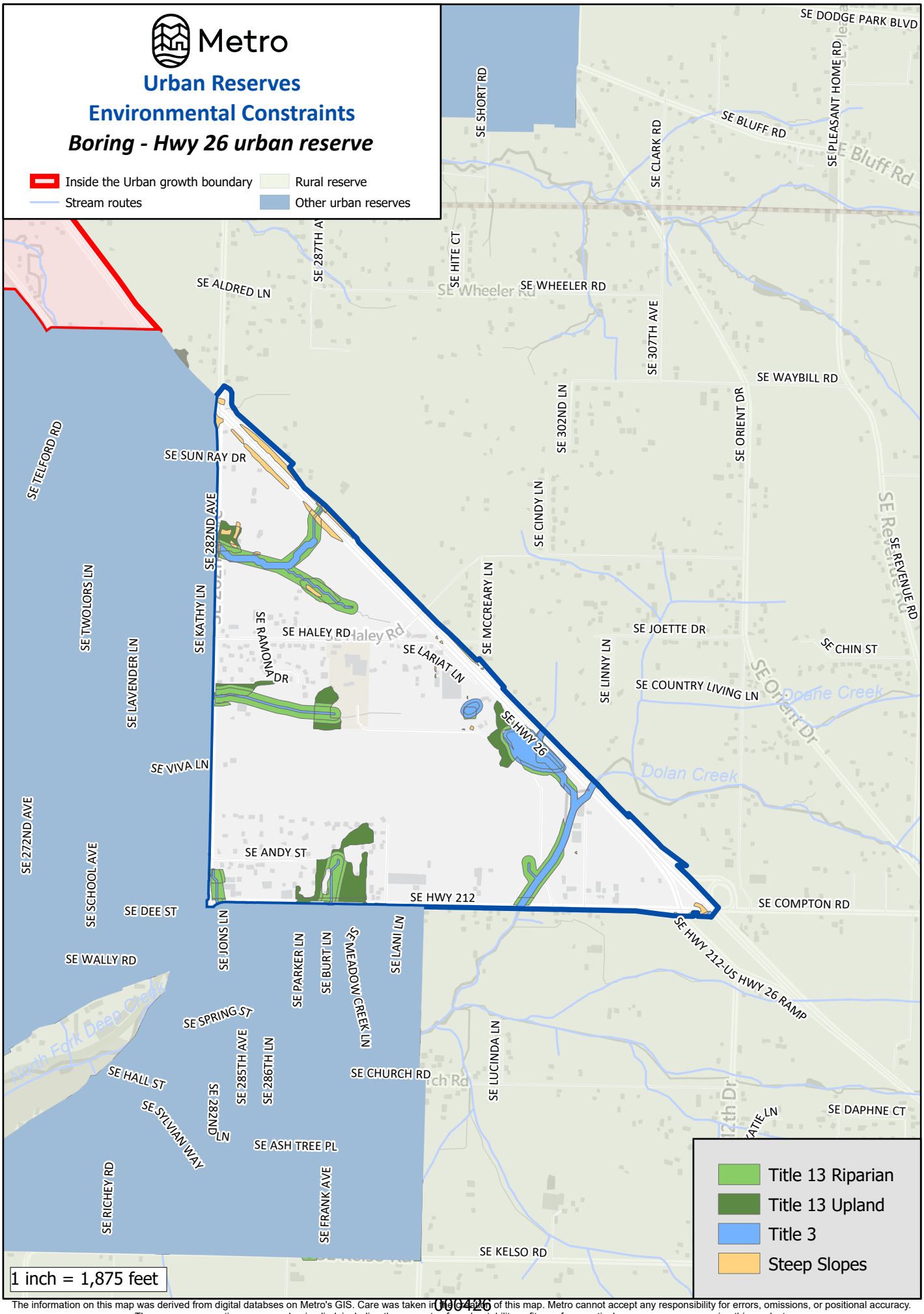

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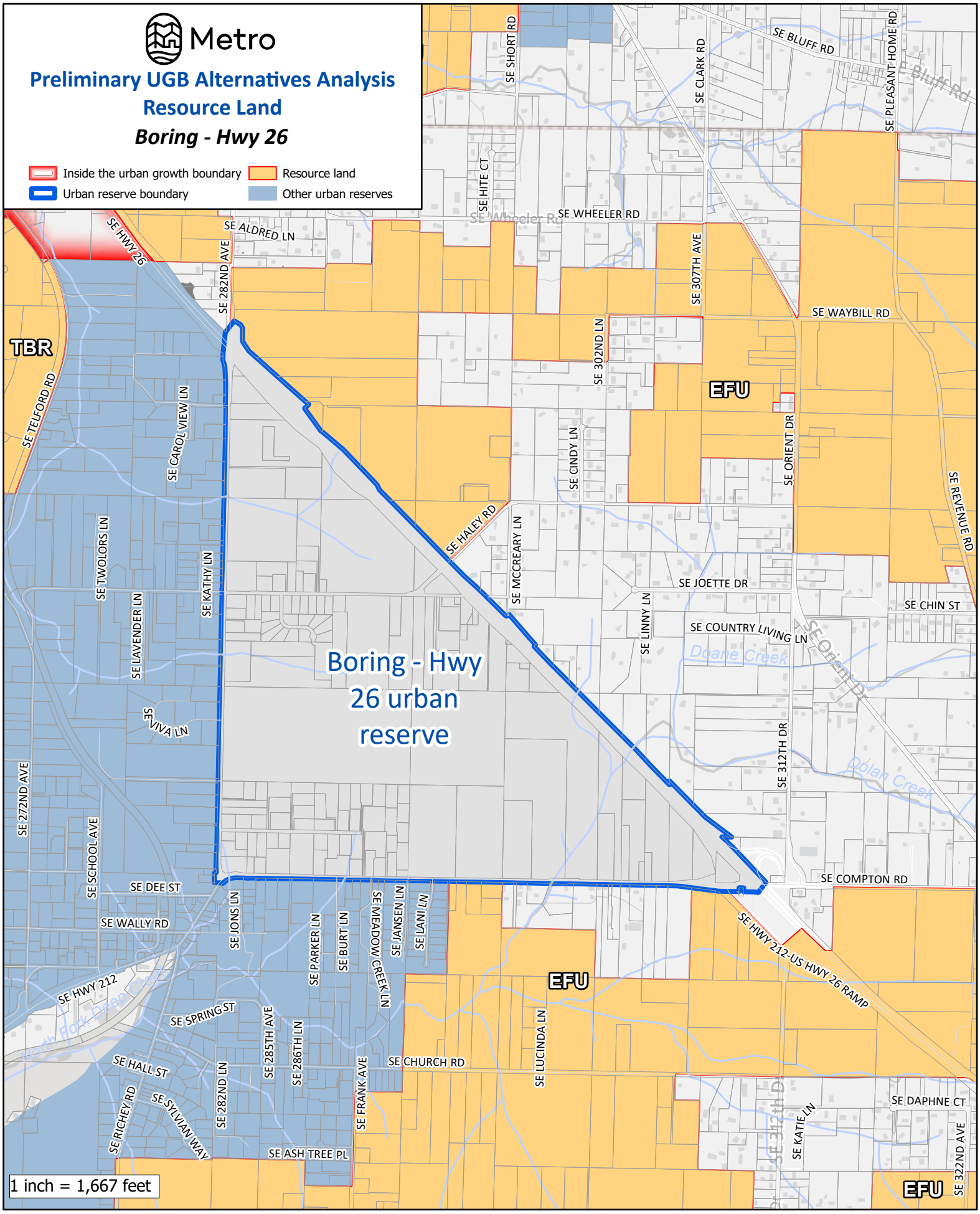

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BORLAND URBAN RESERVE

Total Reserve Area	1,359 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	1,170 acres
Gross Vacant Buildable Area	537 acres
Net Vacant Buildable Area	**400 acres**

The Borland Urban Reserve is a long, somewhat linearly shaped area on both sides of I-205 along SW Borland Road. The reserve's northwestern and southeastern ends are adjacent to the UGB and, respectively, the cities of Tualatin and West Linn. The Tualatin River is the reserve's northern boundary. Land north of the Tualatin River, as well as land south and west of SW Stafford Road, are in other designated urban reserves. Athey Creek and Fields Creek, along with numerous other streams, flow north through the reserve to the Tualatin River. The reserve is generally flat, though there are some slopes greater than 10 percent along the stream corridors and some minor areas of slopes greater than 25 percent. Access to the area is provided by SW Borland Road, SW Ek Road, SW Halcyon Road, SW Stafford Road, and SW Ulsky Road.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Borland Urban Reserve is comprised of 343 contiguous tax lots, all of which are entirely within the reserve. The combined area of the reserve's tax lots is approximately 1,170 acres. More than half of the tax lots are smaller than two acres, and nearly 70 percent of those are smaller than one acre. Just 19 tax lots are larger than 10 acres and they include properties owned by Metro, the West Linn – Wilsonville School District (Stafford Primary School and Riverside High School), Clackamas County, and various places of worship. As noted above, the entire reserve contains 537 gross vacant buildable acres and 400 net vacant buildable acres.

According to aerial imagery and assessment records, the reserve is characterized by pockets of rural residential uses, agriculture, schools, and places of worship, and a stretch of rural commercial uses (e.g., a lumber supply store, a landscape supply store, a tavern, and a dog training center) along SW Borland Road. Overall, 269 tax lots have improvements, and the median assessed value of those tax lots' improvements exceeds $383,000.

In addition to the aforementioned primary school and high school within the reserve, Athey Creek Middle School, is essentially adjacent to the south end of the reserve on the opposite side of the Tualatin River across Willamette Falls Drive from Fields Bridge Park. Low density residential development abuts to the north end of the reserve. The nearest 2040 Growth Concept designated Centers, the Willsonville Town Center and the Willamette Town Center, are nearly two miles away. There is currently no transit service directly to the reserve, though, as noted later in response to Factor 2, TriMet is expected to provide an hourly connection of the reserve to Oregon City via Route 76 in the fall of 2024.

Riparian, connecting upland habitat areas, some slopes greater than 10 percent, and the I-205 corridor generally divide the reserve into multiple separate pockets of potentially developable land. Existing development, public ownership, and ownership by places of worship reduce the development opportunities of unconstrained land. Nonetheless, some properties near the SW Borland Road and SW Stafford Road intersection may be large enough to accommodate an employment land need and the I-205 interchange in the middle of the reserve could help to support traffic to small-scale employment uses. School uses within and near to the reserve and existing residential uses could support or be compatible with new residential land uses. This analysis finds that the reserve is able to accommodate residential and employment land needs.

However, regarding the "efficient" accommodation of identified land needs, it is important to note that the cities adjacent to the "Stafford Triangle" area, which includes the Borland Urban Reserve, have for decades opposed UGB expansions in that area, and those cities' elected officials have taken steps to restrict any city's ability to plan for the accommodation of future urban development. In 2019, the cities of Lake Oswego, Tualatin, and West Linn entered into an agreement that prohibits any of those cities from completing a concept plan for any part of the Borland, Rosemont, and Stafford Urban Reserve areas until, at the earliest, December 31, 2028. This restriction and the ongoing opposition of the three adjacent cities to planning, annexing, and developing the Borland Urban Reserve weighs heavily against this area regarding its ability to efficiently accommodate the identified needs for residential or employment land under Factor 1.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Borland Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Tualatin provides water service to the adjacent areas inside the UGB to the west of the Borland Urban Reserve. Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is then delivered through a 36-inch supply line from the Washington County Supply Line. The reserve might be in Pressure Zone B. According to the city's March 2023 Water System Master Plan, the zone has a storage surplus under current conditions, but may have a storage deficit under UGB buildout conditions. The Martinazzi and Boones Ferry Pump Stations previously serving Zone B have reached the end of their usable lives and do not currently operate, and Zone B is now served by the Boones Ferry flow control valve/pressure reducing valve. There are also existing transmission deficiencies in Zone B.

The City of West Linn serves the adjacent areas inside the UGB to the east. The West Linn Water System receives potable water from the South Fork Water Board (SFWB), with a treatment plant in Oregon City jointly owned by the Cities of West Linn and

Oregon City. SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. The water treatment plant was upgraded in October 2016. There are currently no known major treatment system deficiencies. An emergency supply of water is water is potentially available from the City of Lake Oswego Water Treatment Plant. The SFWB system also includes intake facilities and a transmission pipeline to a pump station located in Oregon City. There are no known storage capacity deficits with the system in West Linn under current, normal (non-emergency) conditions or under UGB buildout conditions; however, it is unclear whether there is sufficient pumping and distribution system capacity to fully serve buildout conditions, at least without system improvements.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Water could be provided from Tualatin, West Linn, or both. Treatment plant upgrades may be needed for either or both cities to serve urban development of the Borland Urban Reserve, depending in part on the amount of development each city would serve. Additional storage capacity, as well as transmission line and pumping system improvements, would also likely be needed. Because service from West Linn would require a new line crossing the Tualatin River, the costs listed below are assume service is provided only by Tualatin.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional treatment plant, storage, and distribution system capacity may be needed to serve urban development of the Borland Urban Reserve while avoiding negative impacts to service to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$9.56 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.56 million
Total:	**$10.12 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,265**

Sanitary Sewer Services

With regard to sanitary sewer services, the Borland Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from nearby lands to the west in the City of Tualatin is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF), which is owned and operated by Clean Water Services (CWS) and understood to have sufficient capacity to meet current needs within the UGB. CWS is also responsible for the system's gravity sewers over 24 inches in size, pump stations, and force mains. Borland Urban Reserve development's likely connection point to the Tualatin system would be either the Orchard Hill Pump Station or the Borland Pump Station, both in the Nyberg Basin. There appears to be surplus capacity at these pump stations under current conditions, but there are sections of the Nyberg Trunk line that may have limited remaining additional capacity.

The City of West Linn provides service to nearby lands in the UGB to the east. If urban development to the reserve were to connect to the West Linn system, it would likely be to an existing gravity sanitary main in Willamette Falls Drive in the Willamette Town Basin. From this point of connection, sewage flows southeast toward the Willamette River and the Willamette Pump Station owned by Clackamas Water Environment Services (WES). The Willamette Falls force main follows I-205 and the Willamette River. At the downstream end of the City of West Linn system are WES-owned pumps and force mains. Sewage ultimately gets pumped to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River. There do not appear to be any capacity issues downstream of the assumed point of connection to the city of West Linn infrastructure under existing conditions, but there are identified deficiencies under UGB buildout conditions. Those deficiencies occur in gravity piping near where the city system crosses the Willamette River. There is a WES capital improvement project currently in the design phase to increase capacity of the Willamette Pump Station to meet future wet weather flows, with expected completion in 2027. It is not clear what the current capacity is or what increased capacity would be provided by the project. The 2019 WES Master Plan identifies an expansion of the existing treatment plant within the 2020-2040 timeframe to increase its capacity.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Sewage from the western portion of the reserve could be routed into the CWS system. While the treatment plant may have sufficient capacity now, additional flows could require plant improvements, particularly if another urban reserve was added to the UGB and connected to the system beforehand. Pump station and trunk line improvements would also likely be needed.

The eastern portion of the reserve may connect to an existing City of West Linn sewer located in Willamette Falls Drive. The city has previously indicated that the treatment plant would likely need some upgrades to accommodate additional flow. The existing piping and pumping deficiencies mentioned above would need to be addressed in order for the system to potentially have sufficient capacity to serve the Borland Urban Reserve. A crossing of the Tualatin River would also be needed.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As explained above, treatment plant improvements and pumping and piping capacity improvements will likely be needed to avoid negative impacts to service within the existing UGB. Potential treatment plant improvement costs and other system-wide costs are not included in the below figures.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0
12-inch pipe	$2.80 million
15-inch pipe	$0
Pump station	$2.52 million
Force mains	$2.36 million
Total:	**$7.68 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$960**

Stormwater Management Services

With regard to stormwater management services, the Borland Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of major capacity issues with existing stormwater facilities that serve the adjacent land inside the UGB. Based on topography, at least some stormwater from development of the Borland Urban Reserve would likely discharge directly to Saum Creek; the City of Tualatin's 2019 Stormwater Master Plan did not identify the Saum Creek Basin as currently facing capacity challenges. Stormwater could also directly outfall to the Tualatin River.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

At least some stormwater will be conveyed, treated, and disposed of within the reserve and discharge to Saum Creek, rather than connecting to existing facilities in the UGB.

Saum Creek is believed to have sufficient capacity to serve development in the reserve. Stormwater could also directly outfall to the Tualatin River.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, at least some stormwater could be conveyed, treated, and disposed of within the reserve and discharge to Saum Creek, rather than connecting to existing facilities in the UGB. Saum Creek is believed to have sufficient capacity. Stormwater could also directly outfall to the Tualatin River without impacting existing facilities in West Linn. Therefore, no adverse impacts to existing facilities are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$5.04 million
24-inch pipe	$2.55 million
30-inch pipe	$0
Water quality/dentition	$10.61 million
Total:	**$18.20 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,276**

Transportation Services

With regard to transportation services, the Borland Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to and near the Borland Urban Reserve had average and above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining cities of Tualatin and West Linn. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit.

The roughly 300-acre Tualatin Town Center aligns with this 2040 Growth Concept Map area. The Tualatin Town Center Plan envisions a mixed-use live, work, and play center that integrates natural resources, like the Tualatin River, with civic, social, economic,

and cultural functions in a walkable community. Metro's 2017 State of the Centers Atlas shows that the Tualatin Town Center has a low number of dwelling units per acre and a much higher total number of employees compared with other town centers in the region. The town center has a very high "access to parks" score in the atlas, due in part to the numerous open space/natural areas and the Tualatin Community Park along the Tualatin River nearby. The town center also includes grocery stores and other retail commercial uses, medical/dental facilities, a post office, and multi-family housing, but also storage facilities, auto-oriented uses, and large parking lots. Within the UGB and adjoining the town center are Title 4 designated Industrial Area and Employment Area lands, as well as low- and medium-density residential uses.

Seven TriMet bus lines and the Westside Express Service (WES) Commuter Rail serve Tualatin. The routes are spread out along the major roadways including Highway 99W, SW Tualatin-Sherwood Road, and SW Boones Ferry Road, providing service to the town center and employment areas. WES connects the town center with Beaverton to the north and Wilsonville to the south. Figure 4.3 in Chapter 4 of the 2023 RTP does identify gaps in the planned regional transit network along SW Boones Ferry Road, SW Tualatin – Sherwood Road, and elsewhere in the city.

Nonetheless, the Tualatin Town Center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near this town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs with relatively short trips. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact home-based VMT per capita in the future, for similar reasons.

The Tualatin Town Center is more than a mile away from areas in the UGB adjacent to the reserve, and these areas are on the opposite side of I-5 from the reserve. I-5 also separates residential uses in the UGB to the west of the reserve from the town center further to the west; there are just two overpasses that connect these residential uses to the town center, limiting connectivity. Residents of these areas, where there are also fewer bus routes, may be more reliant on private motor vehicle transportation to get to the town center and areas to the west.

Tualatin has a fairly well-established bike route system, with approximately 25 miles of dedicated bike lanes, seven miles of established bikeways, and local trails that connect the employment areas and town center to the residential areas. There are two bike lane connections across I-5 to provide access to the eastern portion of the city. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Tualatin as a part of the planned regional bike network, including facilities on SW Boones Ferry Road, SW Nyberg Street, and SW Tualatin-Sherwood Road. There are identified gaps in planned regional bike facilities in the southwest and east of the city.

The Tualatin Town Center has a well-established pedestrian network that also includes access to some trails. Most of the residential areas of Tualatin also have sidewalks, but there are fewer exiting pedestrian facilities in employment areas outside of the town center. The Tualatin River Greenway Trail connects the town center to parks in Durham and Tigard to the north, as well as to Browns Ferry Park along the Tualatin River on the east side of I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of existing streets in Tualatin as in the regional pedestrian network, including sections of SW Boones Ferry Road, SW Borland Road, and SW Tualatin – Sherwood Road. The figure identifies gaps in the future regional pedestrian network, however, in the south and east of the city.

There is also a town center in neighboring West Linn that aligns with the 2040 Growth Concept Map, the Willamette Town Center. The Willamette Historic District is within the town center. The town center area includes local retail commercial uses, medical facilities, school uses, police and fire stations, and some residential uses. Growth in and near this town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs with relatively short trips.

Two TriMet bus lines serve West Linn, including Route 35, which runs along Willamette Drive, and Route 154, which runs along Willamette Falls Drive. They provide transit service to the Willamette Town Center and other portions of West Linn. Figure 4.3 in Chapter 4 of the 2023 RTP shows these existing routes as in the regional transportation network.

There are more than nine miles of dedicated bike lanes and five miles of bikeways in West Linn, including on portions of Blankenship Road and Willamette Falls Drive that help connect western ends of West Linn to the Willamette Town Center. Figure 4.5 in Chapter 4 of the 2023 RTP shows some existing bike facilities in West Linn, including along Salamo Road, as in the regional bike network. However, there are gaps in the planned regional bike network in the city, such as along Willamette Falls Drive.

Large portions of West Linn are well served by sidewalks, especially in areas that have been developed more recently. There are sidewalks on the SW Borland Road bridge over the Tualatin River that join sidewalks on Brandon Place and Dollar Street in the UGB near to the reserve that connect with the Fields Bridge Park, Athey Creek Middle School, and, eventually, the Willamette Town Center. The Willamette Falls Drive Streetscape Project improved pedestrian accessibility in the historic Willamette neighborhood. The Rosemont and Salamo Trails provide pedestrian connection routes along Rosemont and Salamo Roads and that tie the lower and upper portions of West Linn together on the west side. Figure 4.4 in Chapter 4 of the 2023 RTP shows that there are some gaps in the planned regional pedestrian network in West Linn.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road in Tualatin as a high injury corridor. The intersection of SW Tualatin-Sherwood Road and

SW Boones Ferry Road, as well as the intersection of SW Martinazzi Avenue and SW Boones Ferry Road, are identified in Figure 4.14 as top five percent high injury intersections. There are no high injury corridors or high injury intersections in West Linn's portion of the UGB identified on Figure 4.14.

The portions of I-5 and I-205 that cross through Tualatin, and the portion of I-205 that crosses through West Linn, are identified as throughways in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of the chapter indicates that the portions of these interstates that cross through these cities currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The reserve is bisected by I-205 and includes and interchange with I-205 at SW Stafford Road. The portion of I-205 that crosses through the reserve, Tualatin, and West Linn are expected to continue to meet RTP travel speed reliability performance thresholds at least to the year 2045. Town centers, other commercial/employment areas, school uses, and parks are within two miles of both ends of the reserve and accessible with off-interstate roads. There are also commercial uses, school uses, and places of worship within and adjacent to the reserve already. As noted elsewhere, TriMet will begin bus service through the reserve in the fall of 2024. With these conditions, urban development of the reserve is unlikely to generate sufficient traffic on I-205 to cause it to no longer meet performance thresholds. Future residents of the reserve, even if reliant on private motor vehicles for transportation, could use roadways other than these interstates to access employment opportunities and to meet their daily needs closer to home.

TriMet Route 76 runs along SW Borland Road and TriMet plans to extend this route through the reserve in fall of 2024. TriMet Route 154 serving West Linn is approximately two-thirds of a mile from the reserve via Willamette Falls Drive.

A portion of SW Borland Road in Tualatin has a dedicated bike lane; however, it ends approximately 1,000 feet from the west end of the reserve. There also is a bike facility gap between SW 65th Avenue and SW 61st Terrace. SW 50th Avenue and SW Nyberg Lane also have dedicated bike lanes, but do not completely connect with the rest of Tualatin. The Tualatin River Greenway Trail is located fairly close to the reserve and follows a similar route as the bike lane on SW Nyberg Lane. There is a dedicated bike lane on Dollar Street that connects to the Tualatin River Greenway Trail in West Linn and the sidewalks on the bride across the Tualatin River along SW Borland Road/Willamette Drive. There are dedicated bike lanes along portions of SW Borland Road and SW Stafford Road within the reserve as well.

The residential subdivision in Tualatin that is nearest the reserve has sidewalks, although there are numerous gaps along SW Borland Road that connect to other parts of Tualatin. The Tualatin River Greenway Trail, which is close to the reserve, extends along the river to the west side of I-5 with potentially one short gap that may yet to be completed. A small portion of the adjacent residential subdivisions in West Linn contain sidewalks and, as noted above, there are sidewalks along the SW Borland Road bridge that crosses the Tualatin River; however, there are not yet sidewalks leading up to the bridge structure from within the reserve. A short section of the Tualatin River Greenway Trail is nearby, but does not extend beyond Fields Bridge Community Park.

The existing school, park, and employment uses, as well as the medical facilities (e.g., Meridian Park Hospital) already in or within a mile of the reserve could be accessed by future residents of the reserve without significant driving distances. The planned transit service connection through the reserve, and nearby existing transit services and bike and pedestrian facilities, can provide for some alternative modes of transportation. The analysis in Factor 1 noted that the reserve could potentially accommodate both residential and employment uses; if the reserve were to develop with employment uses, residents of nearby existing neighborhoods and Tualatin and West Linn could find employment opportunities in the reserve that don't necessitate long commutes.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Boreland Road, SW Ek Road, and SW Stafford Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, TriMet plans to extend transit service through the reserve, as described further below, which can help to limit new private motor vehicle traffic. Moreover, if the reserve were to be developed with a mix of residential and employment uses and if gaps in bike and pedestrian facility connections were to be completed, there could be even less additional traffic on these roadways. Providing the bike and pedestrian facility connections would lead to more use of the existing facilities within the UGB.

Given the distance of SW Tualatin-Sherwood Road from the reserve, development of the reserve is not expected to exacerbate the road's existing high-crash conditions. As future residents of the reserve would be able to use roadways other than I-205 to access nearby schools, parks, places of worship, medical facilities, and employment uses, and with the planned TriMet service route extension and existing nearby bike and pedestrian facilities, development of the reserve is not expected to cause I-205 to no longer meet throughway reliability thresholds.

d. Need for major transportation facility improvements and associated costs

To serve urban development, roughly one mile of SW Stafford Road and 3.31 miles of SW Borland Road would likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. Approximately 0.88 miles of SW Ek Road would also likely need to be improved to urban collector standards, including with acquisition of additional right-of-way. While the costs below consider that some of

the topography these improved roadways would cross has steeper slopes, the costs do not reflect a likely need for new enhanced crossings (e.g., under- and/or overpasses) on SW Stafford Road or SW Borland Road, as determining the appropriate improvements and their costs with any meaningful accuracy is beyond the scope of this preliminary analysis.

Facilities	Cost
Arterials, existing/improved full street	$198.61 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$24.73 million
Collectors, existing/improved half street	$0
Collectors, new	$0
Total:	**$223.34 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$27,928**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet is expected to begin hourly service along Borland Road to Oregon City beginning in the fall of 2024 via Route 76, although, due to land use and population factors, service will deviate south at Stafford to use I-205. There would be no additional cost to serve this reserve if/when it is added to the UGB, as Route 76 is already slated for service. As density and development increases, TriMet may reevaluate routing to be entirely local along Borland Road.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

There are six main stream corridors that flow through the Borland Urban Reserve. Saum Creek meanders along the western edge of the reserve for just over a mile. Wetlands, identified in the Tualatin local wetland inventory, coincide with the stream corridor and total approximately 7.1 acres in area. The creek and wetlands are located on wooded portions of smaller rural residential tax lots that are also identified as riparian and upland habitat and contain some areas of slopes greater than 25 percent. In addition, a portion of the northwest corner of the reserve where Saum Creek joins the Tualatin River is within the "100-year" floodplain. The increased protection levels for streams, wetlands, steep slopes, and habitat areas within the UGB will lessen any potential impacts to these environmental

features from urban development. Given the relatively small size of the reserve's tax lots and that so many of them already contain residences, there may be limited amounts of new development that could jeopardize the stream corridors and habitat areas.

Two short tributaries to Saum Creek, both approximately 1,500 feet in length, are located along the western edge of the reserve, one north of I-205 and one south of it. The stream on the north side flows through wooded portions of a few larger tax lots, including the Arbor School of Arts and Sciences property, and includes riparian and upland habitat. The stream south of I-205 flows through a wooded ravine that has slopes greater than 25 percent and also includes a 0.44-acre wetland identified on the National Wetland Inventory (NWI). This stream also has adjacent riparian and upland habitat identified along the corridor, which would receive new protections once the land was added to the UGB. Based on the increased protection levels for streams, wetlands, steep slopes, and habitat areas for streams inside the UGB, these two stream segments could be minimally impacted by future urbanization.

Athey Creek and a small tributary flow north through the reserve for approximately 1.3 miles. The portion of the creek that is south of I-205 flows mostly through a privately-owned cleared area and then is piped under I-205. The portion of the creek north of I-205 flows mainly through a wooded ravine that contains slopes greater than 25 percent. There is a 2.8-acre wetland that coincides with the stream corridor identified in the NWI and an additional pond. Riparian and upland habitat is identified along the stream corridor. In addition, the area where Athey Creek joins the Tualatin River is within the "100-year" floodplain. Most of the tax lots Athey Creek flows through are large enough to be subdivided and the stream corridor would complicate additional east-west transportation connections. However, the location of the public schools on the eastern side of the stream reduces the likelihood of new east-west street connections north of SW Borland Road and the land that is east of Athey Creek and south of SW Borland Road has an existing access point on SW Stafford Road. Again considering the increased protection levels for streams, wetlands, steep slopes, and habitat areas that come with inclusion in the UGB, urbanization could occur with minimal impacts to Athey Creek, depending on local street connection requirements.

The third stream flows north through the area where SW Borland Road crosses under I-205 for approximately 3,100 feet before draining into the Tualatin River. The stream flows mainly through forested portions of tax lots that either contain rural residences or are vacant. Riparian habitat is identified along the stream corridor with some upland habitat identified on the more forested parcels near I-205. There are small locations where the adjacent slopes are greater than 25 percent. A small area of "100-year" floodplain is located where the stream meets the Tualatin River. Most of the stream flows along edges of developed rural residential properties and would not be further impacted by urbanization of the area. However, there are a couple of locations where the stream could be impacted by future development, depending on the density and design of the development and street connection requirements. A second stream or drainage area flows within the I-205 right-of-way and appears to join the first stream on the north side of the highway. Given the

locations of the stream corridors, the increased protection levels for streams and habitat areas on land inside the UGB, urbanization of the area could occur with minimal impact to the streams and habitat areas depending on local street connection requirements.

The fourth stream flows north through the area, just east of the intersection of SW Borland Road and SW Ek Road. This stream flows mainly along the side and back portions of rural residential properties for approximately 2,650 feet. The stream is mainly within a forested canopy and both riparian and upland habitat is identified along the stream corridor. This area is mostly developed with single-family homes on lots that are between one and three acres in size. Impacts to the stream would be minimal given the increased protection level for streams and habitat areas for land inside the UGB.

The fifth stream flows north through the area near the intersection of SW Borland Road and SW Turner Road. This stream corridor flows between two rural residential properties and then through an undeveloped tax lot owned by the Lake Oswego Corporation before it drains into the Tualatin River. Similar to above, the stream is mainly within a forested canopy and both riparian and upland habitat is identified along the stream corridor. In addition, there is an area of "100-year" floodplain where the stream meets the Tualatin River. Given the location of the stream within a narrow location of the reserve and the presence of slopes greater than 25 percent at the "back" of the tax lots that would limit additional development, urbanization could occur with no or very limited impacts to the stream corridor.

Finally, Fields Creek flows through the very eastern portion of the reserve in the vicinity of SW Bosky Dell Lane and SW Elderberry Lane for approximately 2,000 feet. Similar to the other streams, Fields Creek also flows along forested edges of one- to three-acre tax lots that contain rural residences and has riparian and upland habitat identified along the stream corridor. In addition, there is an area of "100-year" floodplain where the stream meets the Tualatin River. Redevelopment of the land near the stream could be challenging and would likely take place over a longer period of time. There are a few locations near SW Bosky Dell Lane where minor impacts on the stream corridor could occur, depending on density and design of the development. The tax lots along SW Elderberry Lane and SW Alderwood Drive are less than one acre each and additional development will also be challenging. Impacts to the stream would be minimal given the increased protection level for streams and habitat areas for land inside the UGB. There is a small 820-foot tributary to Fields Creek that also flows along forested edges of parcels at the end of SW Alderwood Drive. Similarly, redevelopment of the tax lots in this area would be somewhat difficult.

Overall, urbanization of the reserve could occur with comparatively minimal to moderate consequences to the stream corridors and habitat areas. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Borland Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There are already numerous rural residences on smaller tax lots in the Borland Urban Reserve, as well as schools, places of worship, and commercial uses. Major roadways, including I-205, SW Stafford Road, and SW Borland Road, already cross through the reserve. The reserve is also near to existing urban development in neighboring Tualatin and West Linn, though somewhat separated from these developments by natural features. There are no rural reserves adjacent to this urban reserve. Urban development of the reserve is, therefore, not expected to cause a significant change in sense of place or degradation of rural lifestyle for the existing residents of the reserve. Moreover, the level of existing development and parcelization could help to slow new development and therefore slow the loss of sense of place and rural lifestyle. Urbanization of the reserve could also bring new social, educational, and recreational opportunities for existing residents.

As more fully detailed in response to Factor 2, urbanization of the reserve will not necessarily result in significant increases in VMT, particularly if the reserve were to be developed with a mixture of uses that allow residents to access more of their daily needs in close proximity. Indeed, as noted above, the reserve already has a mixture of uses, including schools, places of worship, and some commercial uses. Limiting VMT result in limits to energy consequences.

The reserve is primarily in non-agricultural uses and there are only a few sites of commercial agricultural activity in the reserve that are larger than 10 acres each. While there would be economic consequences from urbanization in terms of a loss in these farming activities in the reserve, that loss may be outweighed by the economic benefits of residential and employment development. Moreover, farmlands in the reserve are somewhat separated from each other by I-205, existing development, and natural areas, so urbanization of one area may not necessarily impact agricultural activity that continues to occur on other farmlands until they too are ready to develop.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Borland Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

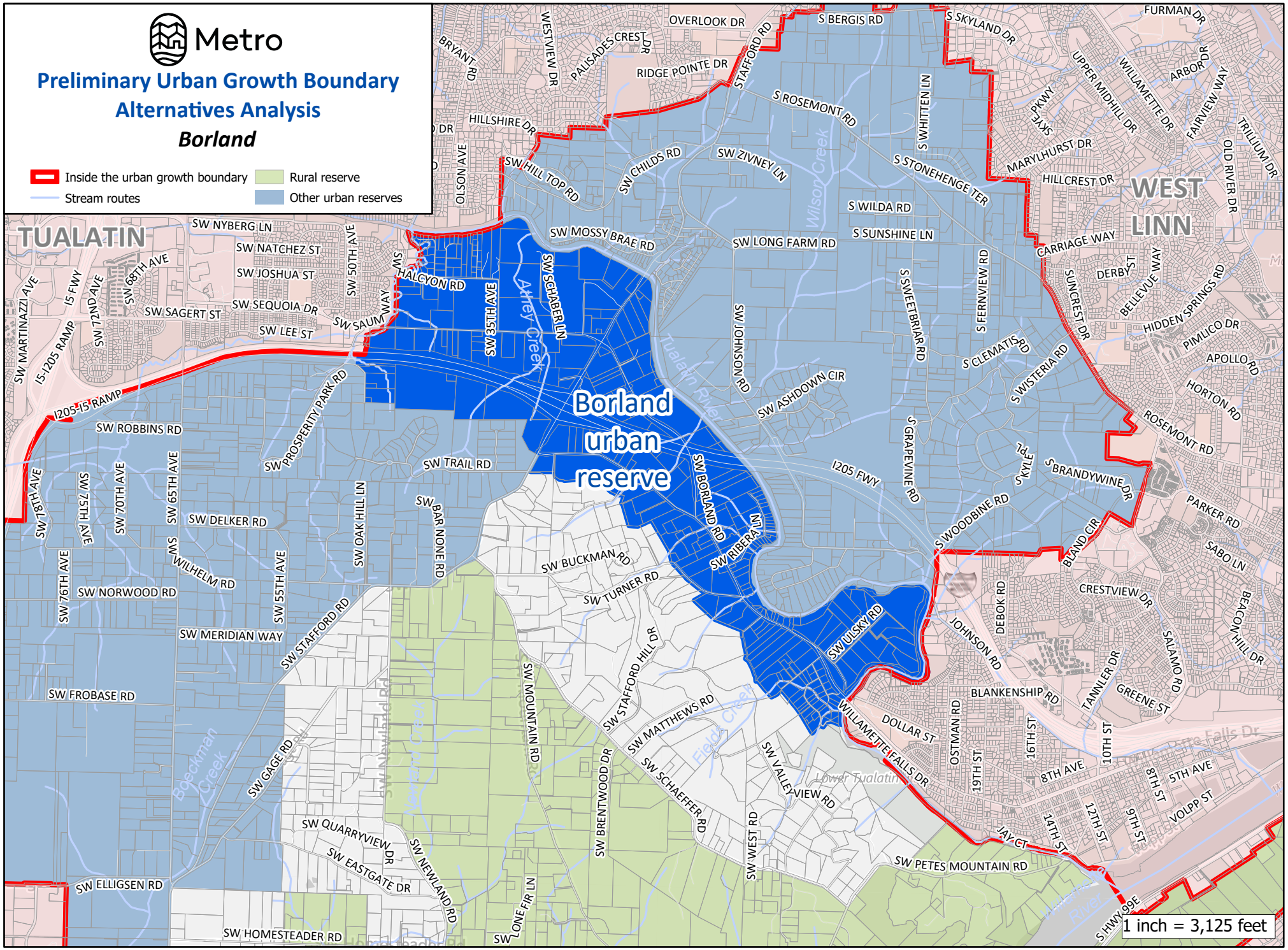
There are two locations where lands outside the UGB but contiguous to the reserve have Goal 3 or 4 resource land zoning for agricultural and forest activities.

The first location is on the north side of the reserve on the opposite side of the Tualatin River, in the vicinity of SW Johnson Road. The land in this area is zoned Exclusive Farm Use (EFU) by Clackamas

County. Only a small portion of this land closest to the river appears to be in agricultural use, with the remainder being forested or developed with rural residential uses. The river, including the riparian habitat along both its banks, provides an adequate buffer between urban development of the reserve and the limited agricultural activities in this area. The forested portions of these EFU-zoned areas are not directly accessible via the reserve.

A roughly 1.1-mile portion of the southern edge of the reserve borders lands zoned Timber (TBR) by Clackamas County. These TBR-zoned lands, located near SW Turner Road, are on a bluff overlooking the reserve and do not appear to have agricultural activity. Most of the tax lots in this TBR-zoned area have high value homes, though some are vacant and forested. Timber harvesting of these vacant tax lots could occur, but forestry operations could use access roads that don't go through the reserve. Topography would also help to limit conflicts between any commercial timber operations and urban development of the reserve.

Overall, the proposed urban uses are considered to have medium to high compatibility with nearby agricultural and forest activities occurring on farm and forest land. The Borland Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location factor.



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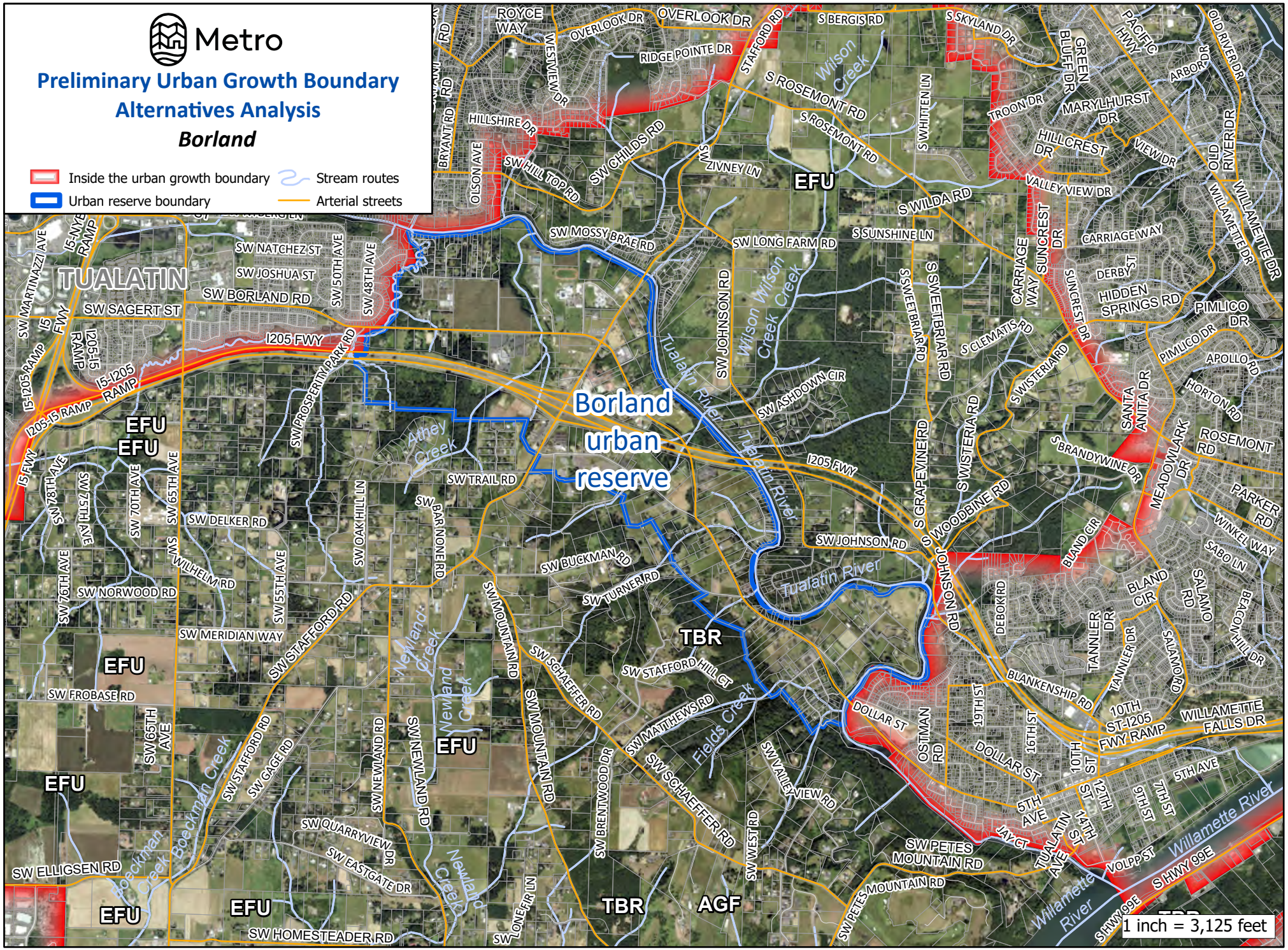

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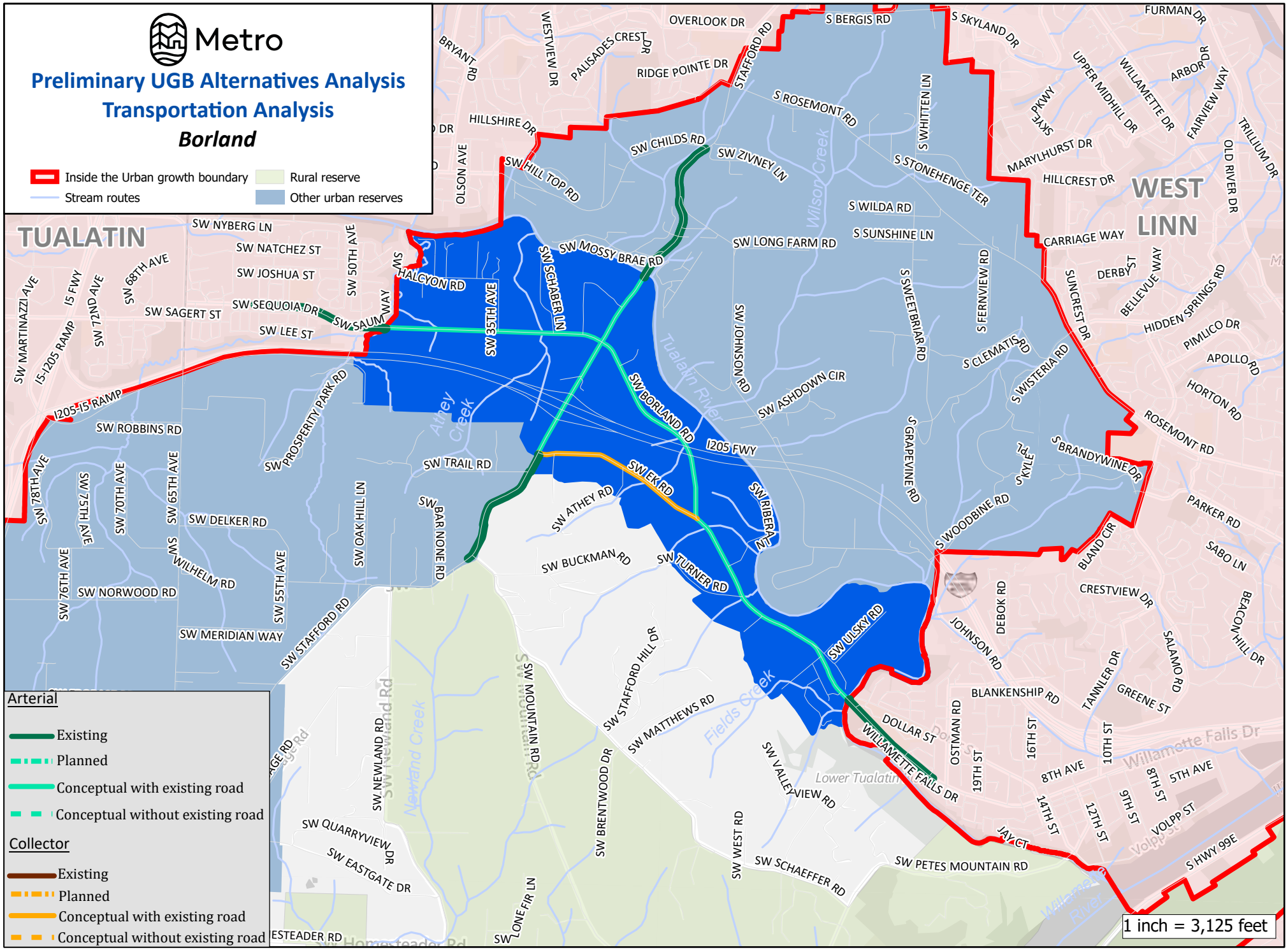

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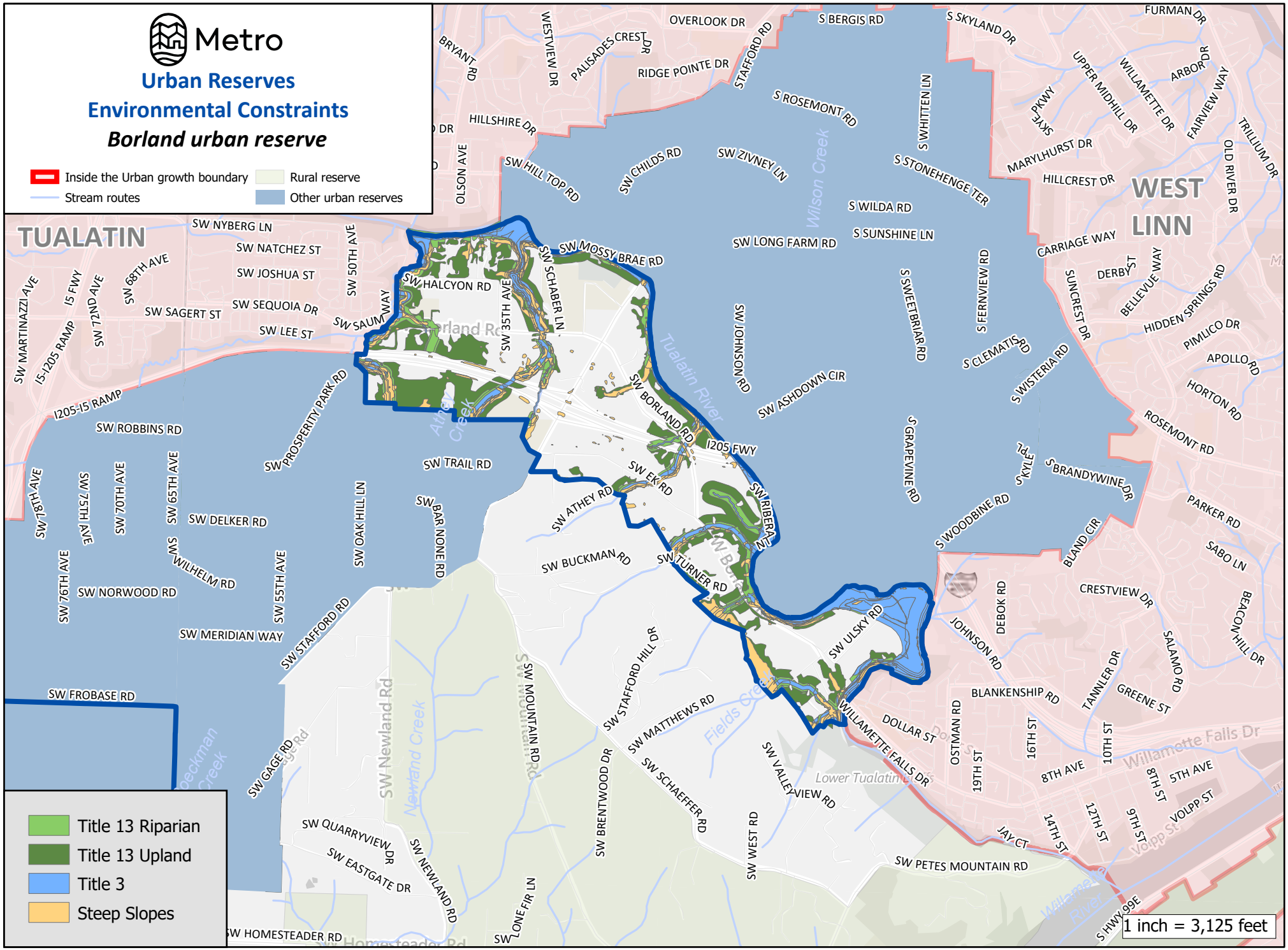

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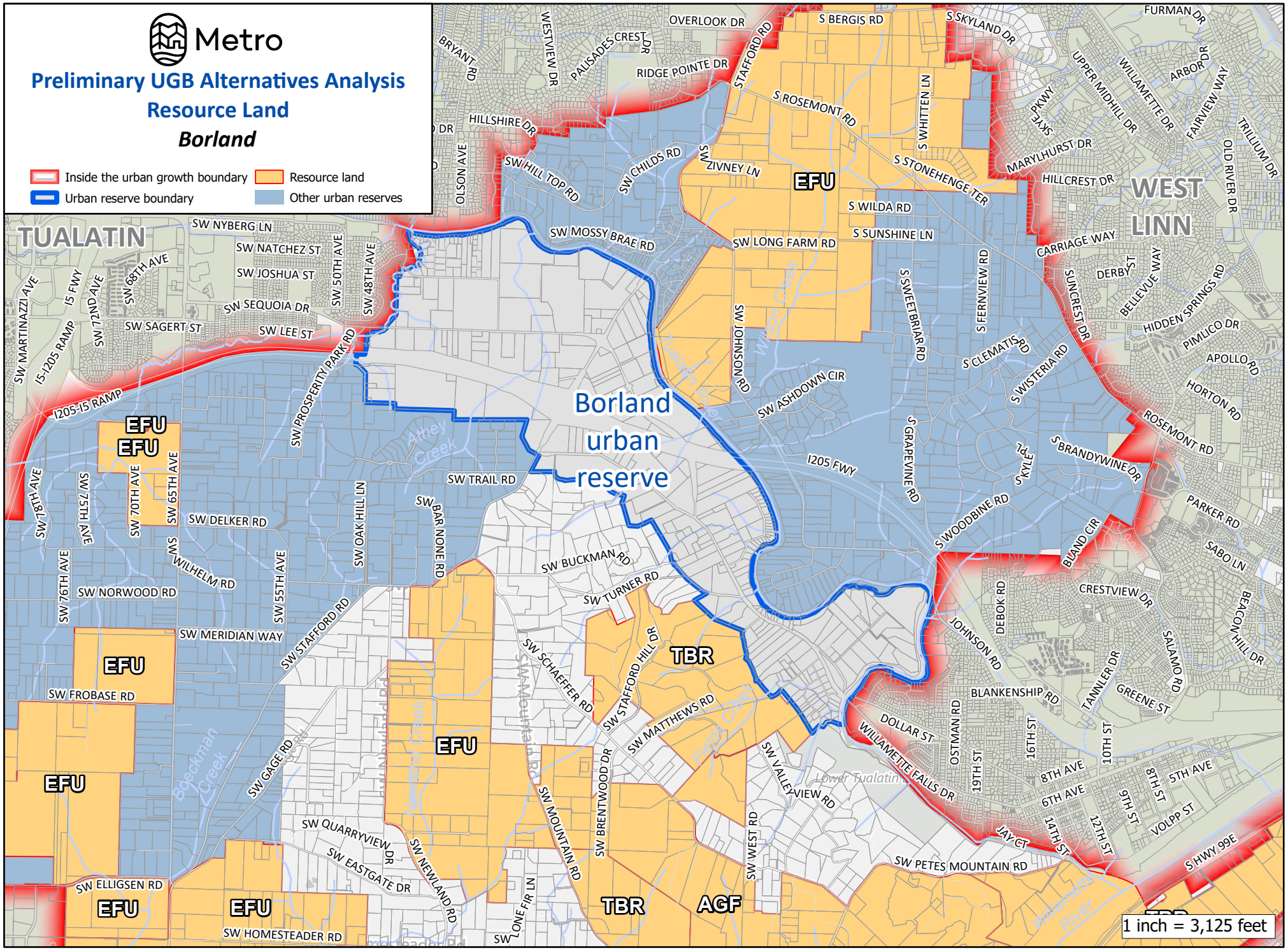

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BROOKWOOD PARKWAY URBAN RESERVE

Total Reserve Area	62 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	38 acres
Gross Vacant Buildable Area	32 acres
Net Vacant Buildable Area	**24 acres**

The Brookwood Parkway Urban Reserve is a relatively small area on the north side of Hillsboro at the Brookwood Parkway/Highway 26 interchange. Except for its north side, the reserve is entirely surrounded by the UGB and the corporate limits of the City of Hillsboro; Highway 26 occupies and forms the edge to the northern portion of the reserve. Access to the area is provided by NW Meek Road, NW Oak Drive, and NW Birch Ave.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Brookwood Parkway Urban Reserve is comprised of 24 contiguous tax lots, all of which are entirely within the reserve. More than 80 percent of the tax lots are smaller than two acres and only one tax lot is larger than five acres; no tax lot in the reserve is larger than 10 acres. The combined tax lot area within the reserve is approximately 38 acres. As noted above, the entire reserve contains 32 gross vacant buildable acres and 24 net vacant buildable acres.

The reserve is characterized by rural residential development, though aerial imagery suggests there is some very limited agricultural activity. Assessment records indicate the North Hillsboro Congregation of Jehovah's Witnesses owns a 3.46-acre tax lot in the reserve's southeast. All but three of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being just under $300,000.

A parking lot for a large-scale industrial use neighbors the reserve to the south. Other industrial uses and undeveloped land zoned for industrial uses neighbor to the west. The Topgolf golfing facility is just across NE Brookwood Parkway to the southeast. On the opposite side of Highway 26 but within one mile of the reserve, there are existing retail commercial uses and the West Union Elementary School. The reserve is adjacent to – indeed, includes a portion of – a Highway 26 interchange with NE Brookwood Parkway. TriMet Route 46 has a stop at the intersection of NE Evergreen Parkway and NE Brookwood Parkway less than a mile to the south of the reserve.

Despite the proximity of existing employment land uses, urban industrial zoning, and the highway, the small size of the reserve's tax lots and their existing residential development make it less likely to be able to accommodate new employment land uses. Rather, the reserve is considered able to accommodate a small residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Brookwood Parkway Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Hillsboro. The city owns and operates two municipal drinking water systems, the City System, which is the primary system, and the Upper System, which is a secondary system. It utilizes wholesale water purchased from the Joint Water Commission (JWC). JWC, which is jointly owned by the Tualatin Valley Water District (TVWD) and the Cities of Hillsboro, Beaverton, and Forest Grove, obtains water from Hagg Lake (Scoggins Reservoir) and the Barney Reservoir released into the upper portion of the Tualatin River. When flows are available, water from the Tualatin River is used. It is then withdrawn and filtered through the JWC water treatment plant. Chlorine and pH adjustments are added before leaving the plant, where chlorine and pH adjustments are added to the water. The city is working with TVWD on development of a new water supply system that will draw water from the Willamette River in order to, among other goals, better accommodate growth in the city and surrounding areas. The project is expected to be completed in 2026. There are also plans to an upgrade of the JWC Water Treatment Plant. In the meantime, it is assumed there is generally sufficient treatment, storage, and transmission capacity to meet existing demands, though additional storage may be needed for areas within the existing UGB during regional supply shortage events and to accommodate full buildout.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The City of Hillsboro has previously indicated there is or will be adequate water supply to serve the reserve as it develops, but capacity availability will ultimately depend on specific land uses in the reserve and the timing of any other urban development connected to the system. Additional supply capacity (e.g., from the WWSS project planned for completion in 2026), additional storage capacity, and pipe upsizing may be needed. Connections to existing water lines are potentially available in NE Brookwood Parkway and NE Starr Boulevard. If the reserve were to be connected to new storage facilities on the north side of Highway 26, infrastructure would need to cross the highway.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional supply and storage capacity, as well as pipe upsizing, may be needed in order to avoid adversely impacting existing facilities in areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$0
18-inch pipe	$2.03 million
Pumping	$0
Storage	$0.04 million
Total:	**$2.07 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$4,908**

Sanitary Sewer Services

With regard to sanitary sewer services, the Brookwood Parkway Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

In adjacent areas already in the UGB, the City of Hillsboro provides sanitary sewer services that feed into the regional sanitary sewer system operated by Clean Water Services (CWS). CWS treats wastewater at the Rock Creek Wastewater Treatment Plant. Capacity is believed to be adequate to meet current demand, though CWS is in the process of developing the West Basin Master Plan (WBMP), which, when completed as early as 2025, will identify projects needed to accommodate redevelopment and new development in the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

There is an 18-inch sewer line at Brookwood Parkway where future development of the reserve could potentially connect to; alternatively, it may be possible to connect to a 24-inch sewer in Huffman Road. Depending on the type of development that occurs in the reserve, these lines may be sufficient or else upsizing will be needed. The forthcoming WBMP will help to identify projects needed to accommodate development in and beyond the existing UGB. In the meantime, no significant facility improvements are assumed.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

If existing lines where service is connected to are insufficient, upsizing will be needed to avoid adverse impacts to existing facilities already inside the UGB. The WBMP will help to identify projects needed to accommodate development beyond the existing UGB

while maintaining adequate service elsewhere. In the meantime, no significant facility improvements are assumed.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0
Force mains	$0
Total:	**$0**
Per dwelling unit at 20 units per net vacant buildable acre:	**$0**

Stormwater Management Services

With regard to stormwater management services, the Brookwood Parkway Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development in adjacent areas inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Based on topography, stormwater related to new development in the Brookwood Parkway Urban Reserve could potentially discharge directly to Waibel Creak via private and public outfalls, without connecting to other existing stormwater infrastructure.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the Brookwood Parkway Urban Reserve could potentially discharge directly to Waibel Creak via private and public outfalls, without connecting to other existing stormwater infrastructure. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$1.20 million
24-inch pipe	$0.30 million
30-inch pipe	$0
Water quality/dentition	$0.77 million
Total:	**$2.27 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$5,379**

Transportation Services

With regard to transportation services, the Brookwood Parkway Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Brookwood Parkway Urban Reserve had below average and above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates two regional centers and separate town centers in the City of Hillsboro adjacent to the reserve. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Orenco Town Center and the Tanasbourne/Amber Glen Regional Center in Hillsboro are the closest 2040 Growth Concept designated centers to the Brookwood Parkway Urban Reserve.

The Orenco Town Center is essentially fully built out with a mixture of housing types and retail commercial uses. There's also a nearby grocery store, medical facilities, and educational uses. The center was developed as a transit-oriented development surrounding the Orenco Light Rail Station. Metro's 2017 State of the Centers Atlas shows it has a higher-than-average total population, population density, and a much higher than average number of dwelling units per acre compared with other town centers in the region. Orenco also scored very high in the atlas with regard to parks access and sidewalk and bike route density.

The Tanasbourne/Amber Glen Regional Center is a mixture of higher density residential uses, a grocery store and multiple department stores, banks, and medical facilities, including a Kaiser Permanente hospital and an Oregon Health Sciences University research facility. Metro's 2017 State of the Centers Atlas showed a high level of employees and total population, slightly higher dwelling units per acre, and an average population density compared with other regional centers.

Growth in and near these 2040 Growth Concept will not necessarily cause a significant increase in home-based VMT per capita in the future, in part because area residents will be able to access some daily needs with relatively short trips. The transit service and bike and pedestrian facilities that serve these centers, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Six TriMet bus routes provide service to Hillsboro and/or nearby unincorporated Washington County, mainly along the arterial streets in the central portion of the city, focusing on the Hillsboro and Tanasbourne/Amber Glen Regional Centers, the Orenco Town Center, and employment areas. There is generally more minimal transit service to the southern and northern portions of the city. TriMet Routes 46 and 47 respectively have stops approximately three-quarters of a mile and 1.5 miles from the southeast corner of the reserve. The MAX Light Rail Blue Line stops at nine stations within Hillsboro, connecting Hillsboro to Beaverton and Portland. Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent transit service along certain routes in the UGB near the reserve, including along NE Brookwood Parkway and NW Evergreen Road.

Hillsboro has over 54 miles of dedicated bike lanes, more than 24 miles of established bikeways, and numerous streets considered "bike friendly" that, together, create a fairly well-connected system that is focused mostly on the central portion of the city and its two regional centers, including the Tanasbourne/Amber Glen Regional Center. Within the UGB and near the reserve, there are dedicated bike facilities along NE Brookwood Parkway, NE Evergreen Road, NE Huffman Street, NE Jacobson Street, and NE Starr Boulevard. In addition, there are some local trails that provide key connections to the greater bike network. The existing bike facilities on NE Brookwood Parkway and NE Evergreen Road are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies gaps in the planned network in other areas in the UGB near the reserve.

A large proportion of the residential neighborhoods in Hillsboro have sidewalks, although there are other residential areas of the city that do not have sidewalks. The Orenco Town Center and Tanasbourne/Amber Glen Regional Center have sidewalks, as do the employment areas adjacent to the reserve. Trails, such as the Rock Creek Trail, provide additional pedestrian opportunities. A pedestrian route along a section of NE Brookwood Parkway in the UGB near the reserve is identified in Chapter 4, Figure 4.4 of the 2023 RTP as in the regional pedestrian network, though there are also gaps,

including along NE Brookwood Parkway north of Highway 26 and along NE Huffman Street.

Figure 4.14 in Chapter of the 2023 RTP identifies a number of high injury corridors in the area already inside the UGB near the reserve and in Hillsboro, including NE Brookwood Parkway north of Highway 26 and NE Evergreen Road east of NE Brookwood Parkway. The figure also identifies the intersection of NE Brookwood Parkway and NE Cornell Road as a high injury intersection.

Highway 26 within the UGB adjacent to the reserve is identified as a throughway Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that this section of Highway 26 currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26, an RTP-designated throughway, is adjacent to – indeed, crosses through – the reserve. As noted above, the section of the highway near the reserve currently meets travel speed reliability performance thresholds.

There is currently no transit service into the reserve itself, though TriMet Routes 46 and 47 respectively have stops approximately three-quarters of a mile and 1.5 miles from the southeast corner of the reserve.

There is a dedicated bike lane on NE Brookwood Parkway adjacent to the reserve that connects to a dedicated bike lane on NW Jacobsen Road, north of the Highway 26 interchange; this bike lane extends east through an employment area to NW Cornelius Pass Road. An established bikeway also runs south from the southern edge of the reserve on NE Brookwood Parkway to south of NE Evergreen Parkway. A dedicated bike lane on NE Huffman Street connects to a dedicated bike lane on NE Starr Boulevard that is just west of the western edge of the reserve. The dedicated bike lane on NE Huffman Road that is east of NE Brookwood Parkway runs through an employment area and connects to the Gordon Faber Recreation Complex via NE Bennett Street. This bike lane continues south on NE Century Boulevard to connect with numerous other bike facilities.

Sidewalks on NE Brookwood Parkway connect the reserve to employment areas to the east on NE Huffman Street and to the south of NE Evergreen Road. There is a short, roughly 250-foot gap in sidewalks on the west side of NE Brookwood Parkway adjacent to the east side of the reserve north of NW Meek Road. There are painted pedestrian crossings at the intersection of NE Brookwood Parkway and the Highway 26 on- and off-ramps. Currently, there are no sidewalks along NW Meek Road leading to the north end of the reserve, nor are there sidewalks within the reserve itself.

As noted in response to Factor 1, the reserve is considered able to efficiently accommodate a small residential land need but not necessarily an employment land need. Future residential development would be very close to industrial uses, where future residents may find employment opportunities that do not require a significant commute. Existing bike and pedestrian facilities to/near the reserve would facilitate access to nearby employment uses and to existing transit stops further to the south. However, the reserve is moderately distant from the Orenco Town Center, the Tanasbourne/Amber Glen Regional Center, and to other areas where future residents could meet more of their daily needs (e.g., a grocery store, schools, medical facilities). Without current direct transit service, it is expected that future residents of the reserve would be somewhat reliant on private motor vehicle transportation.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

NE Brookwood Parkway, NE Huffman Street, NE Jacobson Street, and NE Evergreen Road would be expected to see additional private motor vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use. However, with such a relatively small buildable area, the amount of development from this reserve is not likely to meaningfully impact home-based VMT per capita or have major impacts to the performance of Highway 26 as a throughway. Any additional motor vehicle traffic on NE Brookwood Parkway or NE Evergreen Road resulting from development of the reserve, however, may exacerbate these roadways' high-crash conditions.

d. Need for major transportation facility improvements and associated costs

No major transportation facility improvements (i.e., new or improved urban arterial or collector roads) are expected to be needed to serve urban development of the Brookwood Parkway Urban Reserve.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$0
Total:	**$0**
Per dwelling unit at 20 units per net vacant buildable acre:	**$0**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet determined that it could provide services to the reserve, although there is no guarantee of service. Actual service will depend on the level of development in the reserve and in the corridors

leading to it. Nearby transit services are expected to be improved by 2045, with future Route 66 traveling along Evergreen Road less than a mile from the southern portion of the reserve. There would be no additional cost to serve this reserve in the future.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Waible Gulch flows in a southerly direction through the northwest corner of the Brookwood Parkway Urban Reserve for approximately 1,120 feet. The stream crosses both cleared land and a small wooded section of a residential tax lot and is located within a mapped floodplain. There is riparian habitat associated with the stream, but there are no currently identified wetlands in the reserve. The stream isolates a small corner of the reserve; however, since the land to the west is within the UGB, this isolated corner can likely be accessed from the west without the need to provide a stream crossing for connectivity. Given the increased protection levels for streams, habitat areas, and floodplains within the UGB, and the ability to provide access from the west to the isolated corner, urbanization of the area can occur with comparatively minimal impact to this stream corridor and habitat areas. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Brookwood Parkway Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

It is expected that urbanization of the Brookwood Parkway Urban Reserve will result in new housing replacing at least some of the reserve's existing rural residences. However, the small amount of vacant land and the small size of the reserve's tax lots may slow the redevelopment process and thereby slow any change in sense of place and degradation of rural lifestyle. Indeed, this small rural pocket is already adjacent to Highway 26 and has

developed or developing land inside the UGB to the west, south, and east, all of which already limits the reserve's rural character.

As detailed more fully in response to Factor 2 and due in part to the reserve's small size, additional VMT and, therefore, related energy impacts from urbanization would be relatively minimal.

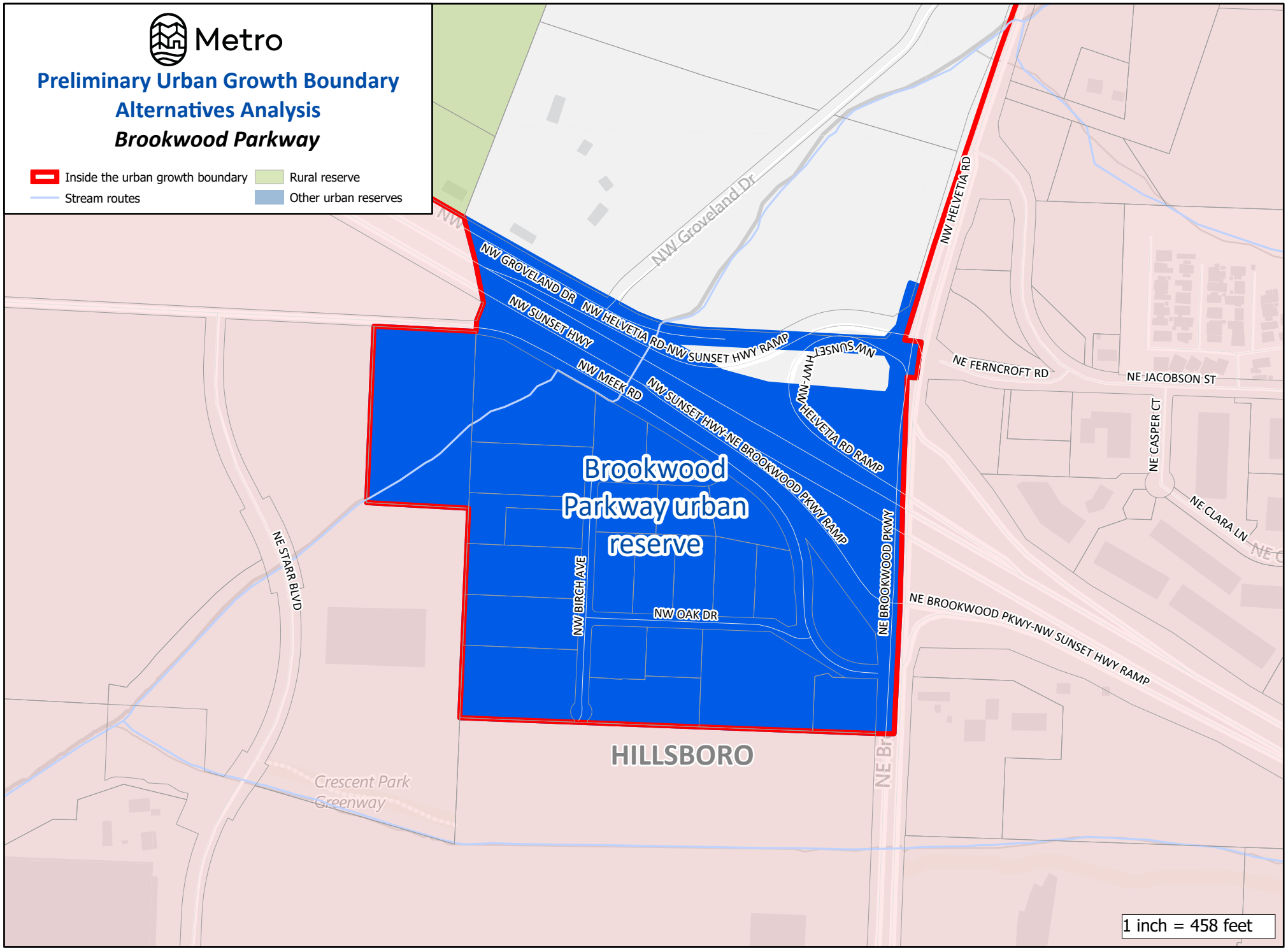
The reserve does not appear to have any commercial agricultural occurring, so urbanization would not have economic consequences as a result of a loss of farming activity in the reserve.

Overall, there would be comparatively low social, energy, and economic consequences from urbanization of this small reserve. The Brookwood Parkway Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Washington County, border the Brookwood Parkway Urban Reserve to the north, on the opposite side of Highway 26 from the developable portions of the reserve. This EFU-zoned land is mostly in field croup production; however, the 300-foot-wide Highway 26 right-of-way and the Waible Gulch stream corridor provide an adequate buffer between the reserve and these agricultural activities and urban development of the relatively small reserve is unlikely to result in land use conflicts with agricultural activity. Therefore, the proposed urban uses are considered to have high compatibility with the nearby agricultural and forest activities occurring on the farmland outside the UGB.

The Brookwood Parkway Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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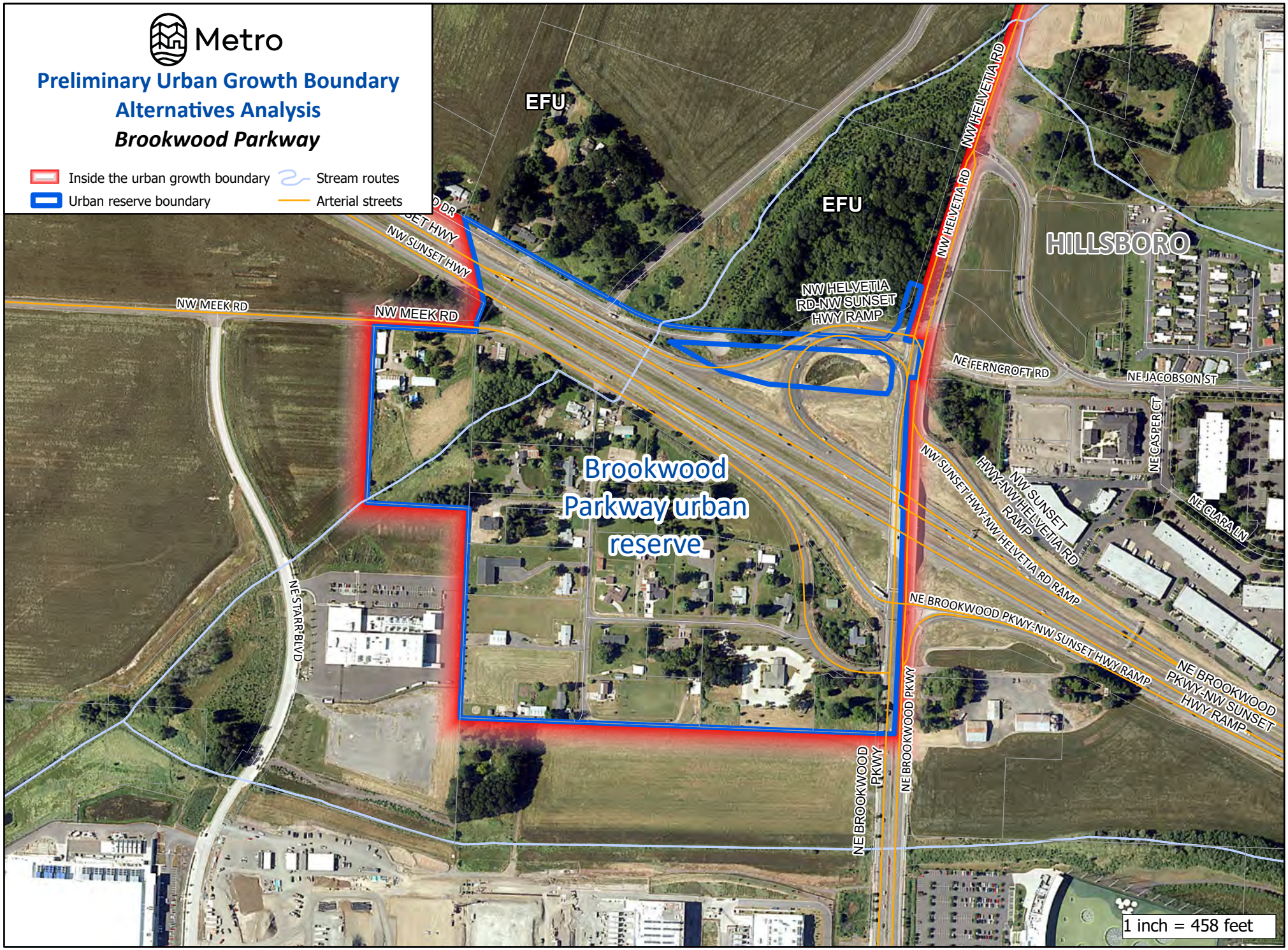

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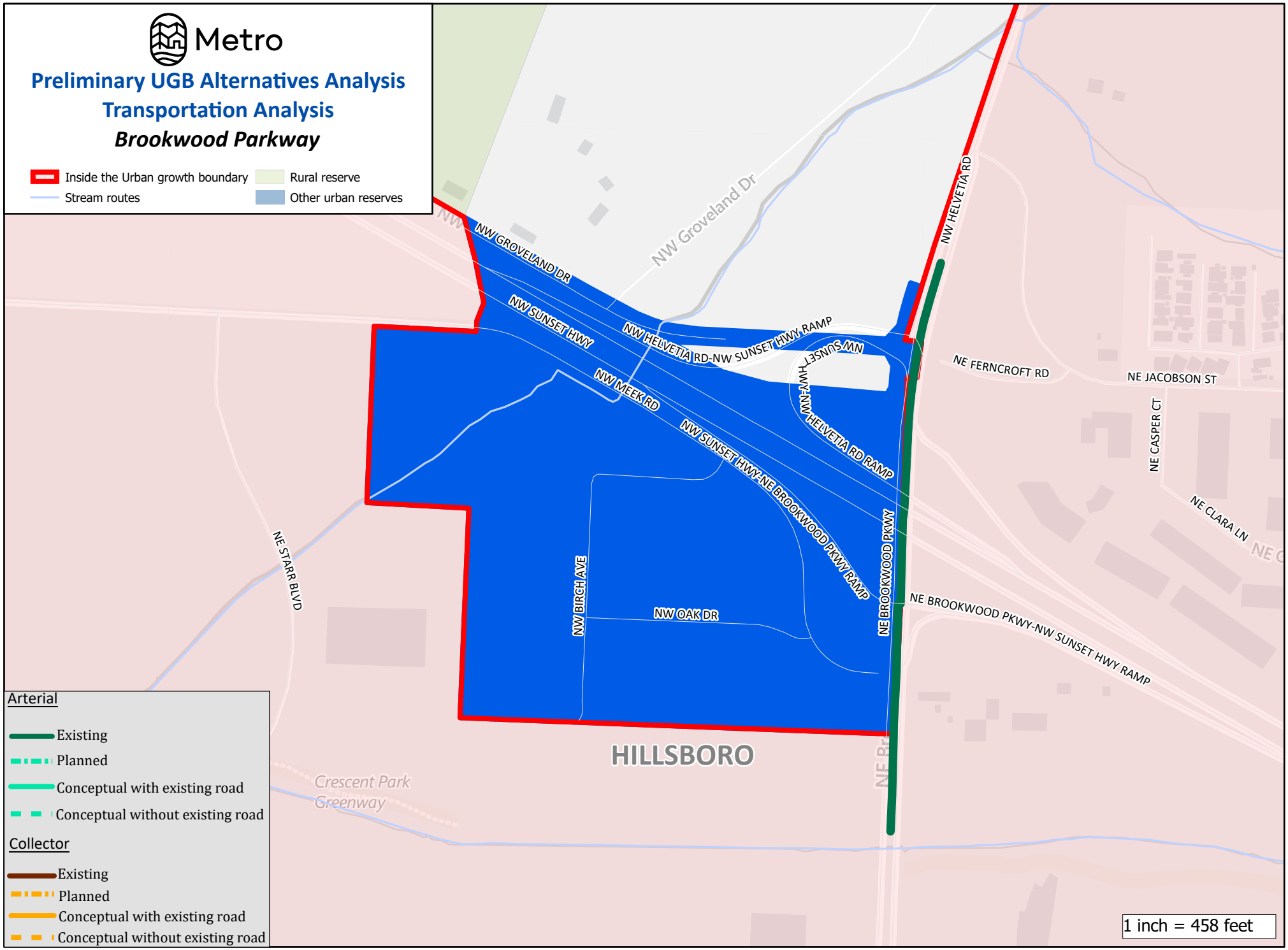

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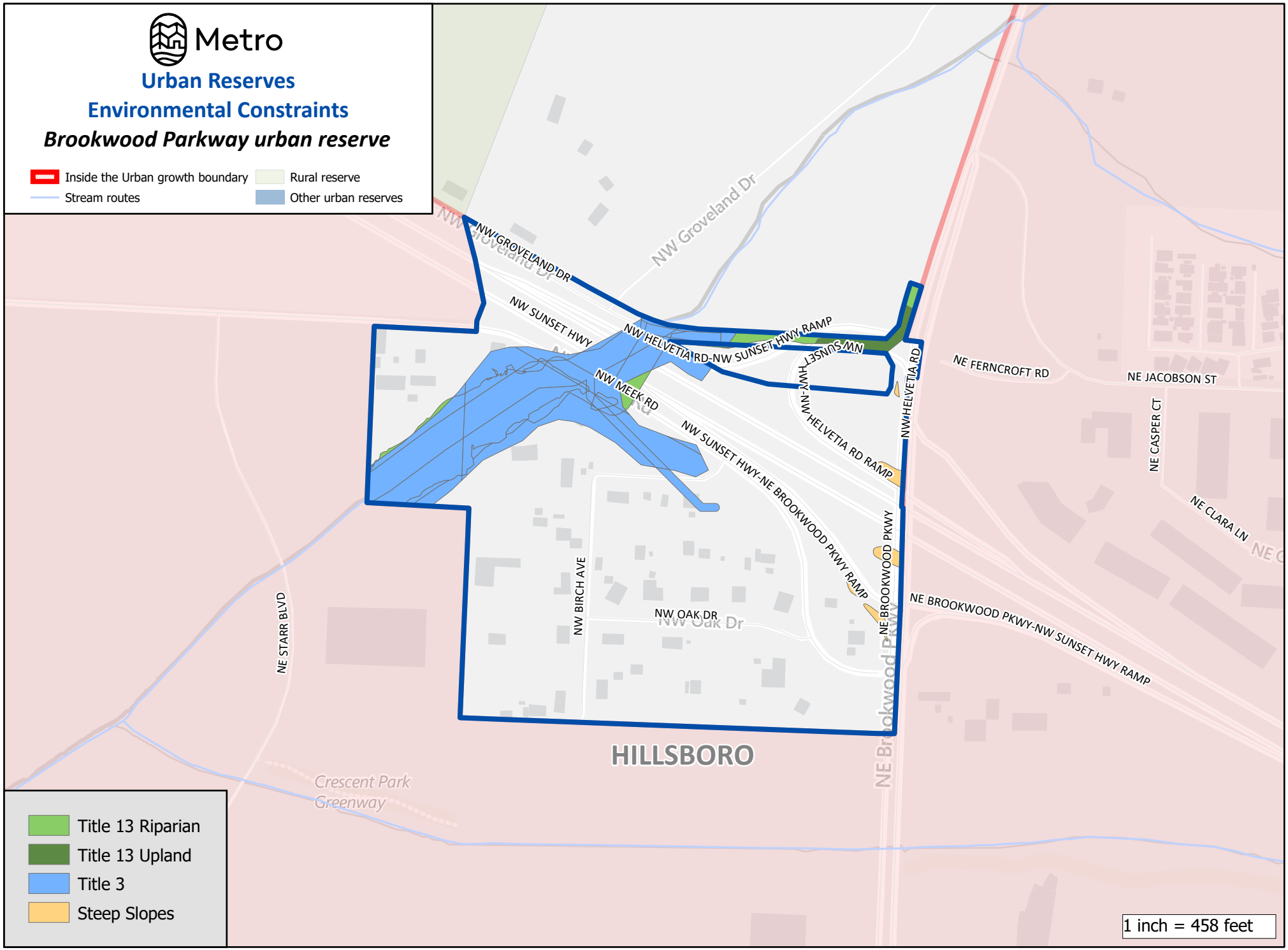

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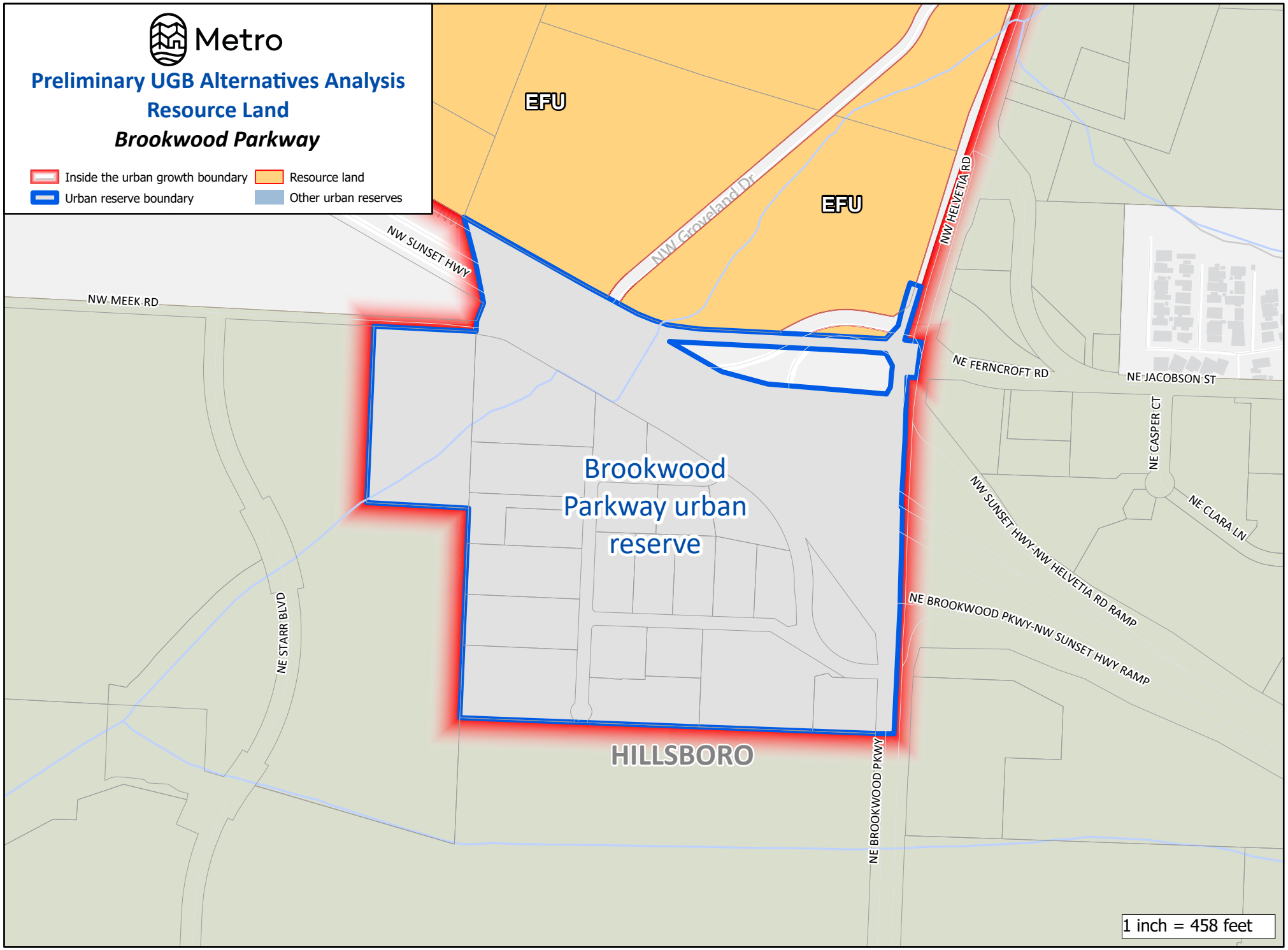

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DAMASCUS URBAN RESERVE

Total Reserve Area	1,239 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	1,208 acres
Gross Vacant Buildable Area	801 acres
Net Vacant Buildable Area	**596 acres**

The Damascus Urban Reserve is comprised of two disconnected "sub-areas". The western sub-area is less than seven acres in size; it is located on the north side of Highway 224 and the east side of SE Tong Road, approximately a quarter mile east of current City of Happy Valley city limits. The northern portion of the western sub-area is relatively flat, while its southern portion near Highway 224 has slopes of 25 percent or greater. The UGB is the western sub-area's western boundary and the sub-area is otherwise entirely surrounded by rural reserve lands. The remaining 1,232 acres of the Damascus Urban Reserve is in its eastern sub-area, more than a mile east of the western sub-area and approximately half a mile from current City of Happy Valley city limits, roughly between Highways 212 and 224, west of Noyer Creek and east of SE Dolphin Road and SE Walgren Road. SE 232nd Drive and SE Royer Road both bisect the eastern sub-area. The UGB forms the northern boundary of the eastern sub-area and a small segment of its western boundary; the eastern sub-area is otherwise entirely surrounded by rural reserve lands, except for a 500-foot-long section in the area of Noyer Creek and a 330-foot-long section near to Highway 212 where it borders undesignated rural lands. The eastern sub-area is characterized by a mixture of flat agricultural lands, rural residences on its smaller tax lots, some rolling hills, and steeper slopes along Noyer Creek and nearer to Highway 224.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

As noted above, the combined area of all of the Damascus Urban Reserve's tax lots is approximately 1,208 acres, though the reserve has only about 801 of gross vacant buildable acres and 596 net vacant buildable acres.

While the reserve has two disconnected "sub-areas", the 6.4-acre western sub-area accessed by SE Tong Road is comprised of just one tax lot, which has one dwelling, accessory uses, and a stand of trees on the steep slope above Highway 224 to the south. The tax lot's improvements are assessed at $660,000. Other properties neighboring this tax lot are of a similar or smaller size and are also generally developed with rural residential uses. The Richardson Creek Natural Area and is just on the opposite side of the highway from the sub-area's tax lot. Werne A Duncan Elementary School and Adrienne C Nelson High School are about a mile and a half away. Commercial uses in Carver are roughly a mile to the west, and commercial uses in the unincorporated community of Damascus are nearly two miles to the northeast. With its smaller size, existing and surrounding residential development, sloping terrain, and distance from commercial areas, the western sub-area is considered able to accommodate only a very small residential land need and no employment land need.

The eastern sub-area, however, has 215 contiguous tax lots fully within the Damascus Urban Reserve. Approximately 44 percent of these tax lots are smaller than two acres each and approximately 70 percent are smaller than five acres each. Slightly more than 10 percent are larger than 10 acres each, including four that are larger than 40 acres each. The eastern sub-area is characterized by agriculture lands, particularly near Highway 212, as well as rural residences and forested areas closer to Highway 224 and Noyer Creek. St. Paul Damascus Lutheran Church owns a nearly eight-acre tax lot in the eastern sub-area. More than 80 percent of the eastern sub-area's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being nearly $400,000.

The eastern sub-area is adjacent to Highway 212 and includes a portion of Highway 224. TriMet Route 30 has a stop on Highway 224 in the southeastern end of the eastern sub-area at the intersection with SE Royer Road. The eastern sub-area is served by a number of existing through- and dead-ending streets, and SE Ceielo Court in the UGB stubs to the edge of sub-area.

The Deep Creek – Damascus K-8 School occupies a 20-acre tax lot in the north end of the reserve's eastern sub-area. Lewis & Clark Montessori Charter School is outside of the reserve, but less than 1,000 feet from the north end of the eastern sub-area, on the opposite side of Highway 212. The Gresham-Barlow School District also owns more than 50 acres of undeveloped land outside of but adjacent to the reserve along SE 232nd Drive, across from the Deep Creek – Damascus K-8 School. The Barton Natural Area is less than 500 feet from the southeastern end of the eastern sub-area, and Barton Park is approximately 1.5 miles away. Existing commercial retail uses of unincorporated Damascus at the intersection of Highway 212, SE Sunnyside Road, and SE Foster Road are about 1.5 miles west of the northern end of the eastern sub-area via Highway 212.

The larger tax lots, vacant lands, and areas already cleared and in agricultural use, generally near to Highway 212, provide the opportunity for efficient urbanization, while the smaller-acreage rural residential pockets on steeper terrain closer to Highway 224 lend themselves to a less efficient level of urbanization. The areas near Highway 212, which are also closer to existing schools, vacant land near to school-district-owned property, and the Damascus commercial area provide an opportunity for employment or residential use. Employment uses in this area would also have better access to Highway 26 through the community of Boring. Therefore, this sub-area is considered able to accommodate both residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Damascus Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Sunrise Water Authority currently serves portions of the UGB generally east of I-205 and north of the Clackamas River, including Happy Valley. They will also serve Pleasant

Valley and Carver as they are annexed into Happy Valley and developed with urban uses. Sunrise Water Authority uses two types of sources for drinking water: surface water drawn from the Clackamas River, which is treated at one of three treatment plants; and ground water extracted from wells. There are no known major water system deficiencies at this time. Sunrise Water Authority has a 20-year CIP that includes the necessary investments to serve the district's service area for the current planning horizon.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Sunrise Water Authority is planning on serving the future needs of the Damascus area. System improvements, including pumping, treatment, storage, and transmission facility improvements, would be needed to serve urban development of the Damascus Urban Reserve. The full cost of these improvements is not currently known but could be significant.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The pumping, treatment, storage, and transmission facility improvements noted above would be needed to avoid negatively impacting services to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$8.31 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.78 million
Total:	**$9.09 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$762**

Sanitary Sewer Services

With regard to sanitary sewer services, the Damascus Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no existing public sanitary sewer service within the UGB near the Damascus Urban Reserve. Rather, this portion of the UGB is currently served by private septic systems. The nearest sanitary district is operated by Clackamas Water Environment Services (WES).

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

As noted above, there is no existing public sanitary sewer service within the UGB near the Damascus Urban Reserve. WES is the logical future provider, due to proximity, topography, and location within Clackamas County; however, WES does not have settled plans to extend service to Damascus and there may be limitations on adding significant new flows to the Clackamas River Basin. If services come from WES, it is likely that new trunk lines and pipe upsizing would be needed.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Because there is no existing public sanitary sewer service within the UGB near the Damascus Urban Reserve, there are no existing facilities necessarily to be impacted. However, if WES is to eventually serve the area, upsizing of existing WES pipes may be necessary to avoid adverse impacts.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$8.31 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$7.02 million
Force mains	$2.88 million
Total:	**$18.44 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,546**

Stormwater Management Services

a. Capacity of existing facilities to serve areas already inside the UGB

No public stormwater management facilities exist to serve the adjacent area already inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

No public stormwater management facilities exist.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Because there is no existing public stormwater service within the UGB near the Damascus Urban Reserve, there are no existing facilities necessarily to be impacted. Stormwater conveyance, water quality, and detention for roadways would be developed

during construction and would likely be used to handle the public sector runoff. Private property runoff would likely need to be treated onsite.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$5.64 million
24-inch pipe	$1.19 million
30-inch pipe	$0
Water quality/dentition	$7.85 million
Total:	**$14.68 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,230**

Transportation Services

With regard to transportation services, the Damascus Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the Damascus Urban Reserve had above average and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates numerous walkable, higher-density, mixed-use centers of employment, housing, cultural and recreational activities, and transit service across the region in the UGB. Those centers are intended to grow the economy, provide affordable housing, and promote vibrant and distinctive communities that minimize transportation costs and allow people to meet their daily needs without having to utilize a private motor vehicle. The nearest 2040 Growth Concept center that has been planned for urban uses is the Happy Valley Town Center, approximately two miles of the reserve; residents of areas already within the UGB near the reserve therefore have to travel about this distance to reach a 2040 Growth Concept Center that has been planned for urban uses.

Nonetheless, there are major commercial uses, including a grocery store and banking services, as well as medical services in the area around the intersection of Highway 212 and SE Sunnyside Road, an area in the UGB that is envisaged in the 2040 Growth Concept as a future town center, but has not yet been planned for urban land uses. This area is closer to the reserve than the Happy Valley Town Center and can provide some

services to the surrounding residents in the UGB. There are also some commercial uses, including restaurants, in the Carver area of the UGB, approximately one mile from the small western sub-area.

There are no dedicated bike facilities or sidewalks within the UGB near to the reserve. There is limited bus service (i.e., every few hours) on the Sandy Area Metro (SAM) connecting the areas of the UGB near the eastern sub-area to the Damascus commercial area and Clackamas via Highway 212. TriMet Route 30 also provides bus service along Highway 224, connecting areas of the UGB near the western sub-area to Carver and Clackamas. Highway 212 does have fairly wide and shoulders, which can provide some space for bicyclists. There are a couple of painted pedestrian crossings of Highway 212 at SE 232nd Drive and SE 242nd Drive. There are also dedicated bike lanes, painted pedestrian crossings, and sidewalks along Highway 212 in the Damascus commercial area, as well as small sections of sidewalk and painted pedestrian crossings at the intersection of Highway 224 and Springwater Road in Carver.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies several high injury corridors inside the UGB in the areas of Happy Valley, including sections of Highway 212. The figure also identifies the intersection of SE 242nd Avenue and SE Hoffmeister Road as a high injury intersection.

Highway 212 and Highway 224 are identified as throughways in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of the chapter indicates that these routes currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate the facilities' reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highways 212 and 224 run adjacent to the eastern sub-area, and Highway 224 is adjacent to the western sub-area. As noted above, these throughways currently meet travel speed reliability performance thresholds.

There is currently dedicated bike facilities or sidewalks connecting the reserve to areas already inside the UGB. There are also no bike facilities or sidewalks within the reserve itself. As noted above, SAM provides occasional bus along Highway 212 to the Damascus commercial area and Clackamas, but there are currently no stops on the highway near to the reserve. TriMet Route 30 has stops in the southern end of the eastern sub-area on Highway 2025, providing limited service to Carver and Clackamas.

The eastern sub-area already contains a school use; if this portion of the reserve were to be urbanized with residential uses in close proximity, those residents could potentially access the school without significant private motor vehicle trips. However, there are very few other public services or commercial uses in and near the reserve today. Indeed, the areas of the UGB near to the reserve have not yet even been planned for urban land uses. Unless the reserve and surrounding areas were to be developed with a mixture of

residential uses and uses that could allow those future residents to meet their daily needs, residents will most likely be travelling by private motor vehicle to access them elsewhere (e.g., in the Damascus commercial area, Carver, Happy Valley, and Clackamas).

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Portions of Highway 212, Highway 224, SE 232nd Drive, 242nd Avenue, SE Sunnyside Road, and SE Tong Road already within the UGB would be expected to see additional private vehicle traffic from development of the reserve, in part due to the distance of the reserve from commercial areas, the limited transit service connections, and lack of bike and pedestrian facilities. However, if the reserve itself were to be developed with a mixture of uses, future residents could get more of their daily needs met locally without having to drive as much on roads already in the UGB. The existing school uses in the reserve will also help to limit driving by new residents on roads already in the UGB. Moreover, nearby residences in the current UGB could provide housing to employees of the reserve, and new employment uses in the reserve could provide jobs for nearby residents of the current UGB, further limiting new traffic impacts on roads already in the UGB.

With these considerations, development of the reserve may result in only moderate impacts to home-based VMT per capita in the future in nearby areas already inside the UGB and the performance of Highways 212 and 224 as throughways. Any additional motor vehicle traffic on Highway 212 resulting from development of the reserve, however, may exacerbate existing high-crash conditions.

d. Need for major transportation facility improvements and associated costs

To serve urban development, roughly 0.40 miles of SE 232nd Avenue that border the reserve north of SE Georgia Lee Lane will likely need to be improved to urban arterial standards. These lengths' improvements are considered half-street improvements for the purposes of this analysis, as the west side is already inside the UGB. An additional 1.15 miles of SE 232nd Avenue will likely need to be improved to full-street urban arterial standards, including acquisition of additional right-of-way. Approximately 1.43 miles of SE Royer Road could need to be improved to urban collector standards, with acquisition of additional right-of-way, and two new collectors with a combined length of 1.73 miles are expected to be needed in the eastern portion of the reserve. Given the topography, most of the new and improved roadway sections are expected to have normal per-mile costs.

Facilities	Cost
Arterials, existing/improved full street	$70.98 million
Arterials, existing/improved half street	$9.66 million
Arterials, new	$0
Collectors, existing/improved full street	$44.74 million
Collectors, existing/improved half street	$0
Collectors, new	$73.33 million
Total:	**$198.71 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$16,659**

e. Provision of public transit service

Much of the reserve was withdrawn from the TriMet service district; thus, no analysis of future/additional transit service was completed by TriMet. The reserve straddles the TriMet district boundary. As described above, both SAM and TriMet currently serve along the northern and southern borders of the reserve, respectively.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Two segments of Noyer Creek flow south along the eastern edge of the Damascus Urban Reserve for a total length of approximately 2,200 feet. Two small tributaries also connect to Noyer Creek along the reserve's eastern edge and have a combined length of approximately 3,200 feet. All four stream lengths are located in wooded ravines that could help provide protection from future urbanization.

A third tributary to Noyer Creek flows northeasterly through the edge of the large tract of agricultural land near Highway 212 for approximately 3,125 feet. A portion of the stream in this location is redirected under a loading area for a nursery. This stream section is susceptible to impacts from urbanization given its location, already altered state, and lack of an existing vegetated riparian corridor. However, restoration of this degraded stream edge, including the altered section, would provide protection for the water body.

Two tributaries to Richardson Creek flow north through the western portion of the eastern sub-area of the reserve for approximately 4,450 feet. A little more than half of the tributaries' lengths flow through pastureland and the remaining portions flow through locations of sporadic trees and shrubs, with no continuous vegetated riparian corridor. However, there is some riparian and upland habitat identified along the stream corridors.

These two streams are susceptible to impacts of future urbanization and, given their location near SE Royer Road, impacts to the upland habitat would be likely.

A 2,100-foot segment of Deep Creek and a 450-foot segment of Noyer Creek form the southern boundary of the eastern sub-area near Highway 224. There is a riparian buffer between 50 and 100 feet along the creeks, with limited ability to develop additional land given their location at the edge of the reserve.

An unnamed stream flows south along SE 232nd Drive for approximately 3,000 feet before flowing into Noyer Creek near the confluence with Deep Creek. The stream is mostly located in steep sloped wooded areas of rural residential tax lots and would be less impacted by urbanization due to steep slope protection measures.

There are two National Wetland Inventory (NWI) wetlands identified in the reserve. The first wetland is a 6,000-square-foot pond located on a rural residential property that is isolated from any stream corridor and includes both tree and shrub buffer vegetation. The isolated nature of this wetland may or may not make it susceptible to impacts from urbanization, depending on the ultimate redevelopment of this residential pocket. The second wetland, about 0.6 acres in size, is located along one of the tributaries to Richardson Creek adjacent to a residence. The wetland does have some significant adjacent tree canopy that continues along the stream corridor, which is identified as riparian habitat. The location of this wetland along a stream corridor with riparian habitat may make the wetland less susceptible to impact given the required protection levels for stream, wetland, and habitat areas within the UGB. There is also a pond located near the intersection of Highway 224 and SE 232nd Drive that may require habitat protection in the future.

There are areas near SE Royer Road and SE 232nd Drive that may have upland wildlife habitat considerations. A significant portion of these areas also contain slopes greater than 25 percent that would limit the impacts of future development; however, impacts to some upland habitat areas would be likely.

Overall, urbanization of the reserve could occur with comparatively low to moderate impacts to the natural resources; most stream corridors and wetlands would be protected by existing naturally-occurring buffers in ravines and steep slopes, as well as by increased stream and wetland protection requirements on land added the UGB. The identified upland habitat areas will need to be evaluated for future protection levels.

Considering the comparative environmental consequences of urbanization, the Damascus Urban Reserve is given a “medium-high” score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The very small western sub-area, which is constrained by slopes and existing development, will not be able to accommodate new development that will have a meaningful social impact on the surrounding area, which is already largely developed with residential uses. Its

urbanization will also not generate significant energy impacts or result in the loss of commercial farming activity on the site.

The large eastern sub-area is characterized by rural residential development on rolling hills at the south, and a significant tract of agricultural activity near Highway 212. It is expected that urbanization of this sub-area would, over time, result in new housing replacing some of the existing rural residences, which could contribute to a loss in sense of place for area residents. Areas along SE Forest Hill Drive, SE Weatherly Lane, and SE Cielo Court, as well as portions of SE Royer Road, would probably see more limited new development due to the existing levels of development, parcelization, topography, and habitat areas.

The portions of the eastern sub-area from SE Curtis Road to east of SE Royer Road, as well as south and east of the Deep Creek – Damascus K-8 School, have large tax lots with far fewer constraints on development. These areas could potentially accommodate wide-scale urban development that would have a significant impact on the overall character of the area and would likely contribute to a loss of sense of place and a degradation of rural lifestyle for existing area residents. However, urbanization could also could foster new civic, recreational, and social opportunities for the reserve's existing residents, particularly if it features a mixture of uses.

As detailed more fully in response to Factor 2, urbanization of the reserve may only generate moderate levels of VMT, if the reserve were to be developed as a complete community with a mixture of uses that allowed residents to meet more of their daily needs closer to home. This would help to limit adverse energy impacts from urbanization as well.

There is a significant amount of commercial agricultural activity occurring in the reserve and urbanization of the reserve's farmland could have considerable adverse economic consequences. However, these economic losses may be outweighed by economic benefits of urban residential development and new urban employment opportunities.

This analysis finds there would be comparatively moderate to high social, energy, and economic consequences from urbanization of this reserve. The Damascus Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

The Damascus Urban Reserve is almost entirely surrounded by lands that have Goal 3 or 4 resource land zoning for agricultural and forest activities. Most of these lands adjoining the reserve but outside the UGB are zoned Timber (TBR) by Clackamas County, though some adjacent to the west end of the eastern sub-area are zoned Exclusive Farm Use (EFU) by the County and others adjacent to the east end of the eastern sub-area around Noyer Creek and its canyon are zoned Ag/Forest (AG/F) by the County.

There are two TBR-zoned tax lots adjacent to the western sub-area, each of which are smaller than five acres. While both largely forested, these trees are on steep slopes and one has residential uses. Given their small size, topography, and existing development, as well as their limited local road access, they are unlikely to be suitable for major commercial timber operations. Neither of these tax lots appears to have commercial agricultural activity. Therefore, urban development of the small western sub-area will not adversely impact agricultural or forest activities on these tax lots.

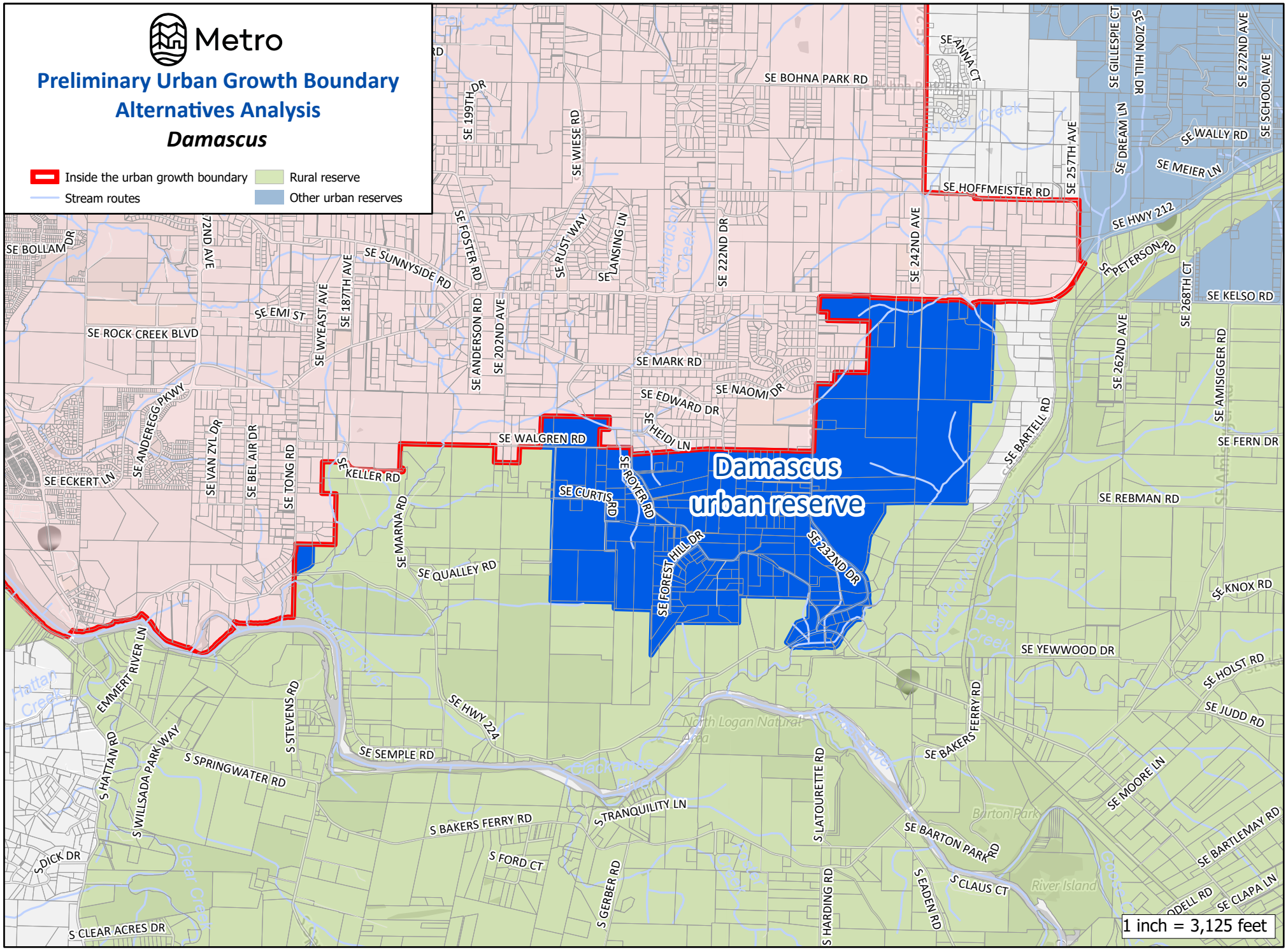
The EFU-zoned land adjacent to the west end of the eastern sub area, located south of SE Walgren Road and west of SE Dolphin Road, has agricultural activities, including productive fields and pasture lands, as well as stands of trees. Within the reserve and directly adjacent to one of the agricultural areas is the Alpha Broadcasting property that, if it stayed in its current use with broadcasting antennas, would provide a buffer between the agricultural activities and future urban development. SE Dolphin Road would not provide a satisfactory buffer between urban development and the agricultural and forested areas and conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer could occur. Additional traffic along SE Dolphin Road may impact the movement of farm or forestry equipment, but since most of the future traffic would be expected to travel east towards SE 232nd Drive, the impact would likely be minimal.

The TBR-zoned land to adjoining to the south of the reserve's eastern sub-area is mostly forested, though there is some rural development on smaller tax lots. There is no apparent commercial agricultural activity in this area. While there could be commercial harvesting of trees, the topography slopes somewhat steeply down away from the reserve to Highway 224; timber harvesting here would be fairly isolated from development above in the reserve to the north. Moreover, one of the adjacent TBR-zoned properties, while forested, is owned by Metro and therefore not likely to be used for commercial timber harvesting.

Lands to the east of the reserve's eastern sub-area are zoned either TBR or AG/F. Those that are adjacent to the reserve in this area are generally forested, but they are along Noyer Creek and in the creek's canyon. Smaller adjoining tax lots have rural residences and limited apparent commercial agricultural activity. The canyon itself provides a very good buffer for the agricultural activities in this area. If urbanization occurred right up to the edge of the TBR-zoned land, it would not be compatible with any forestry activities that might occur, although restrictions on logging adjacent to Noyer Creek reduces the likelihood that the canyon area would be harvested.

Due to the limited nature of nearby agricultural and forest activities occurring on adjoining farm and forest land, the presence of the Noyer Creek, the functions of the creek's canyon as a buffer, Metro ownership of a large tax lot, and existing rural residential development, the proposed urban uses (i.e., urban development of the reserve) would be considered to have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land.

The Damascus Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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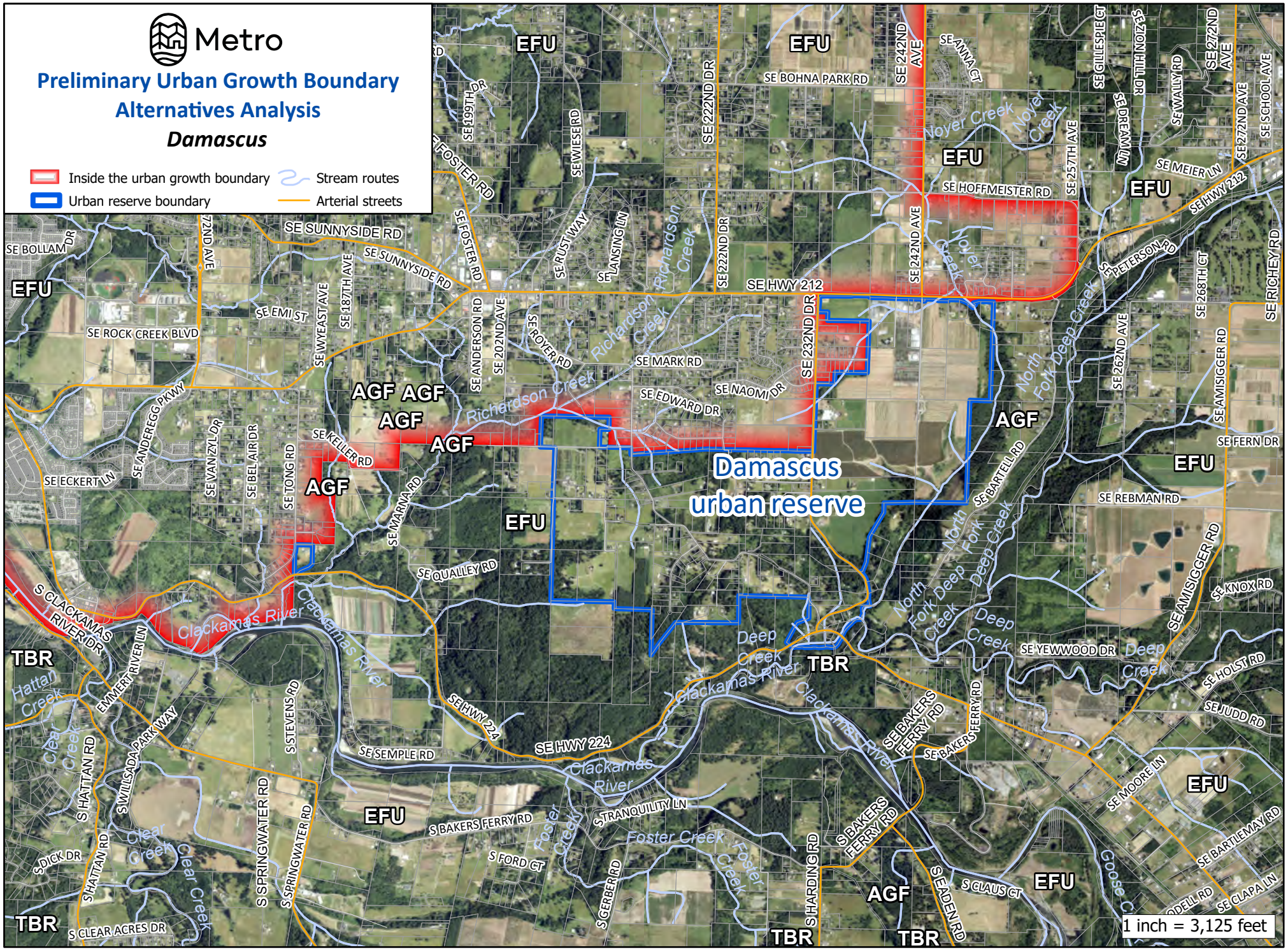

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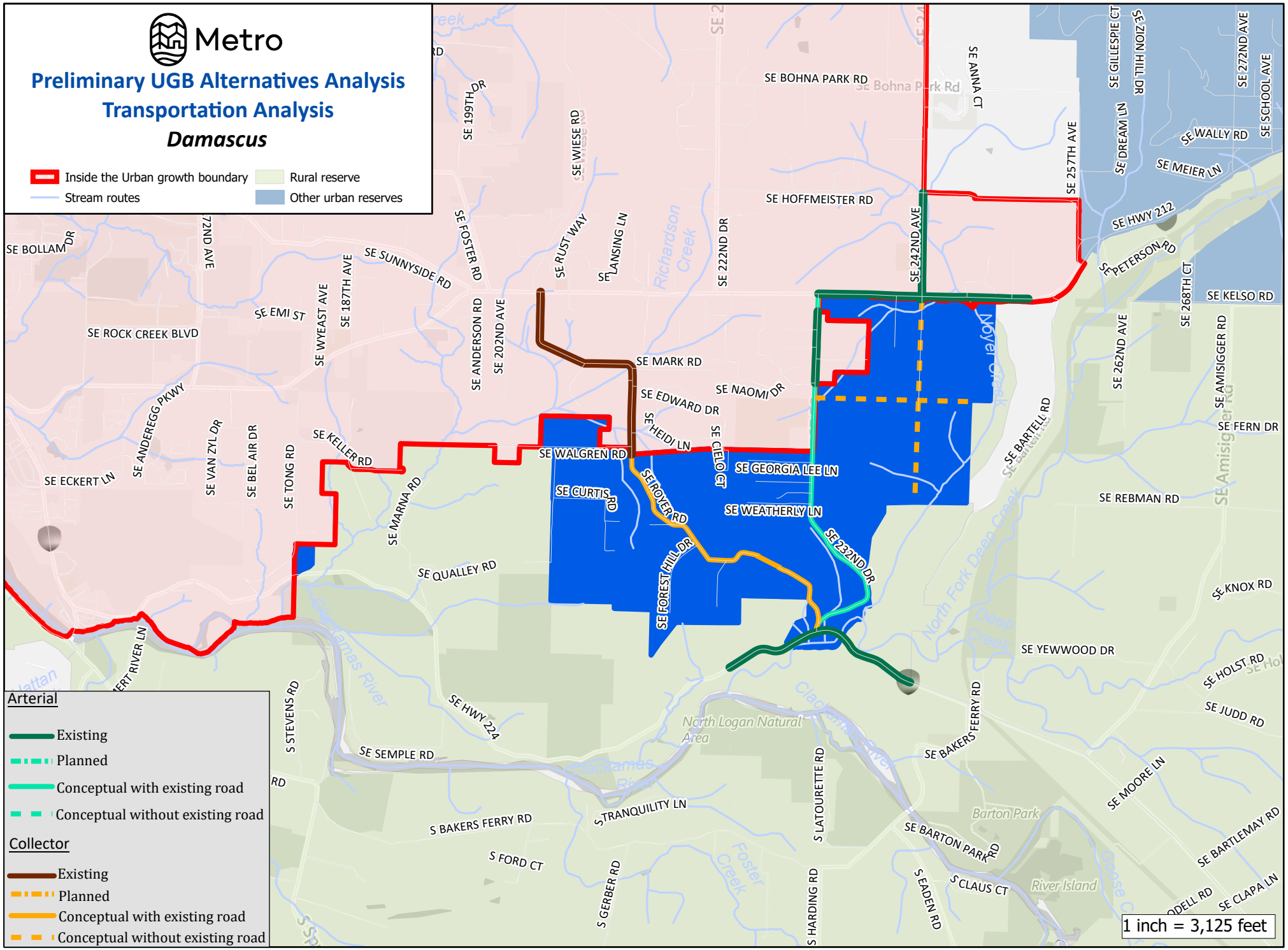

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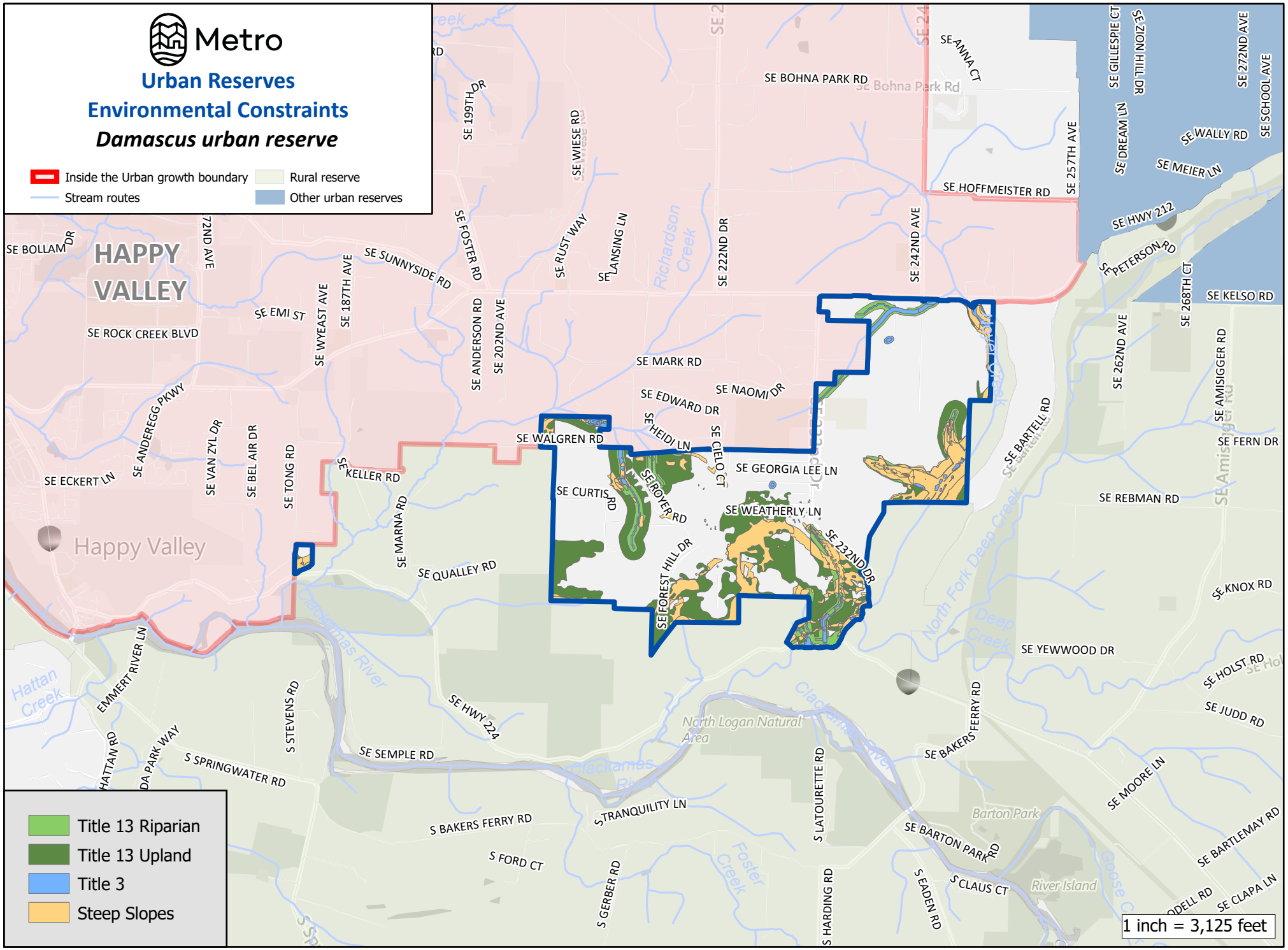

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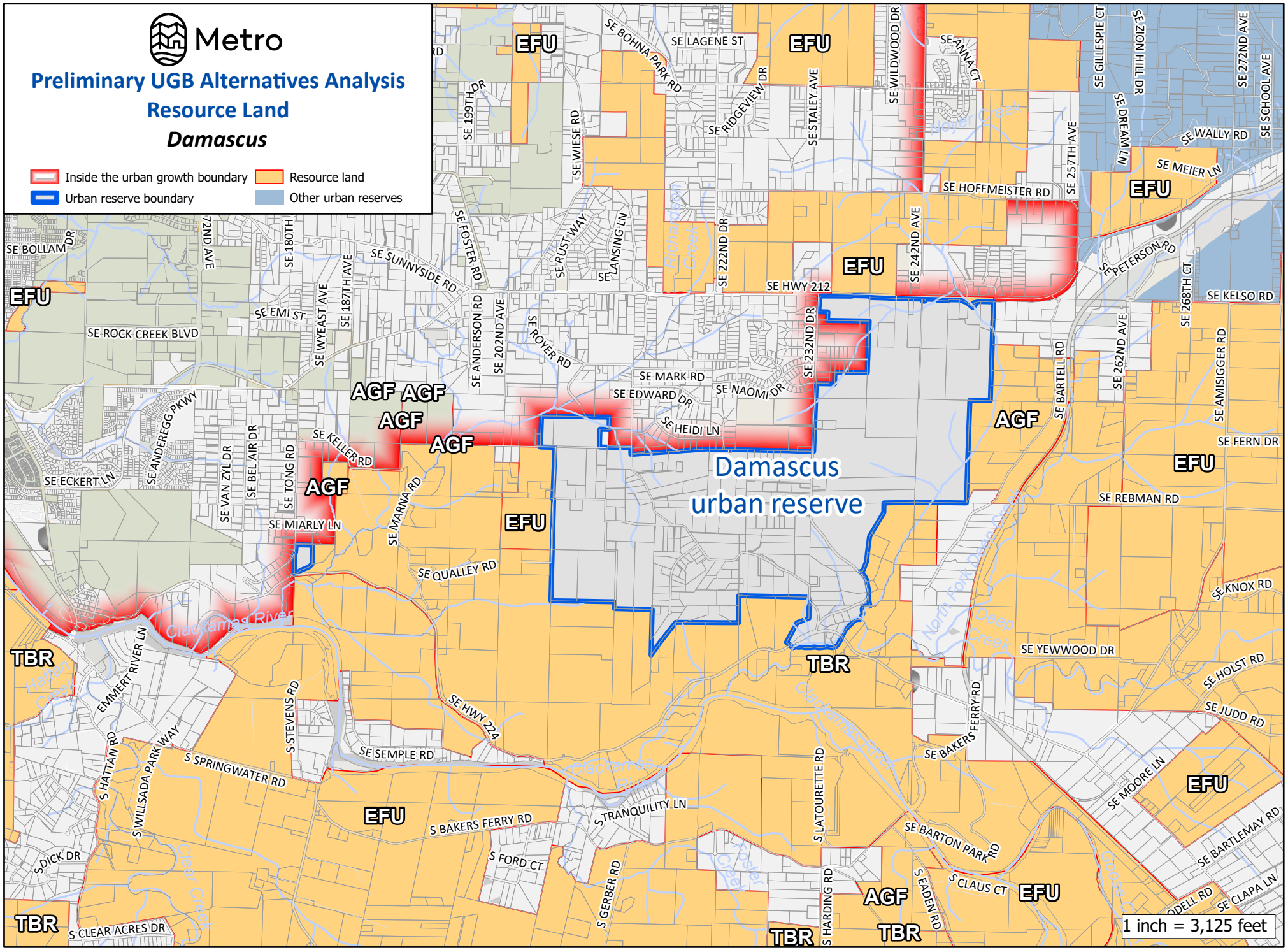

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DAVID HILL URBAN RESERVE

Total Reserve Area	320 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	313 acres
Gross Vacant Buildable Area	172 acres
Net Vacant Buildable Area	**128 acres**

The David Hill Urban Reserve is an irregularly shaped area on the northwest edge of Forest Grove in the vicinity of NW David Hill Road. The UGB forms the reserve's eastern boundary and rural reserve land is to the west, north, and south. The high point of the reserve is near NW David Hill Road, with the land sloping down to the south towards NW Gales Creek Road and east towards NW Thatcher Road, dropping 440 and 360 feet, respectively. Access to the reserve is provided by NW David Hill Road, NW Gales Creek Road, and NW Thatcher Road.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The David Hill Urban Reserve is comprised of 23 tax lots, which have a combined area of approximately 313 acres within the reserve. Nearly half of the tax lots have area within the reserve larger than 10 acres and 70 percent have area within the reserve larger than five acres. As noted above, the entire reserve contains 172 gross vacant buildable acres and 128 net vacant buildable acres.

According to aerial imagery, the reserve contains rural residences, tree plantations and groves, and some field agriculture. A 0.88-acre tax lot is owned by the City of Forest Grove and used for a water service facility. Overall, 18 of the reserve's tax lots have improvements, with a median assessed value of those tax lots' improvements exceeding $345,000.

Thatcher Park is less than a mile away from the reserve via NW David Hill Road and Forest Glen Park is less than half a mile away via Gales Creek Road. Forest Gove High School is more than a mile away to the east. The nearest transit stop is more than two miles away; the nearest highway, Highway 26, is more than seven miles away.

Nearly all of the land in the reserve has slopes greater than 10 percent. There are also some locations with slopes greater than 25 percent. Given this topography and the distance of the reserve from a highway and transit, the reserve is not considered suitably able to accommodate an employment land need. It could, however, accommodate a residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the David Hill Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Forest Grove. The city's water is a combination of city-sourced supply and water from the Joint Water Commission (JWC). The water treatment plant is owned and operated by the city and provides finished water to a city-owned five million gallon reservoir. The city is generally considered to have sufficient supply and treatment capacity, and sufficient finished water transmission capacity, to serve lands already inside the UGB under current conditions. There is also some surplus storage and pumping capacity under current conditions. The city has previously indicated that most piping within the current UGB is adequate; however, some piping in undeveloped areas within the UGB may need upsizing to serve new development. If so, these improvements would likely be completed by the developers, as that development occurs.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Urban development in the reserve is expected to result in supply, storage, and pumping deficits if current sources and facilities are not improved/expanded. The City of Forest Grove Water System Master Plan (2022) proposes the addition of a 0.5 MG reservoir to serve the 710 pressure zone. The city's capital improvement plan has also identified several projects related to water supply and pumping that would be needed to development of the reserve. As noted above, some existing piping in undeveloped areas already within the UGB may need to be upsized.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The supply, storage, pumping, and piping capacity improvements noted above would be needed to avoid development of the reserve negatively impacting services to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$2.93 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$1.75 million
Storage	$0.16 million
Total:	**$4.84 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,887**

Sanitary Sewer Services

With regard to sanitary sewer services, the David Hill Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Forest Grove operates a local sanitary sewer utility that feeds into the regional sanitary sewer system operated by Clean Water Services (CWS). The city

facilities generally flow eastward through the city toward CWS trunk line running parallel to Council Creek. CWS provides wastewater treatment through the Rock Creek Wastewater Treatment Plant. The treatment plant is understood to have sufficient capacity to serve lands already inside the UGB; however, there are capacity concerns (e.g., potential surcharging) with some sewer main line infrastructure.

CWS is currently developing the West Basin Master Plan (WBMP), which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at two Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development. Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions.

The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The topography of the reserve is expected to limit the density of new development, potentially placing a smaller burden on the existing system. Development in northern areas will contribute to existing sewer lines, which have been analyzed and have sufficient capacity; southern areas will contribute to a different existing trunk sewer system. Downstream trunk sewers have been sized to accommodate residential growth in this reserve. Both areas are tributary to the existing 36-inch diameter Council Creek Trunk Sewer, which has limited downstream capacity immediately upstream from the Hillsboro WRRF. Plans are underway to construct capacity relief. The existing downstream capacity limitations are expected to be resolved within approximately five years. Any existing main line surcharging would become more significant with development of the David Hill Urban Reserve if left unaddressed.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, any existing main line surcharging would become more significant with development of the David Hill Urban Reserve if left unaddressed. The Council Creek Trunk Sewer, which is downstream of the David Hill Urban Reserve, has limited capacity and planning is currently underway to provide additional capacity that will be needed to serve the reserve without negative impacts to the existing system.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0
12-inch pipe	$7.09 million
15-inch pipe	$0
Pump station	$0
Force mains	$0
Total:	**$7.09 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,764**

Stormwater Management Services

With regard to stormwater management services, the David Hill Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development inside the UGB. However, additional development within the UGB under current zoning may require new facilities or facility improvements.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater related to new development in the David Hill Urban Reserve is expected to be conveyed, treated, and disposed of within the reserve itself and/or outfall directly to Gales Creek, rather than relying on existing facilities already in the UGB.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the David Hill Urban Reserve is expected to be conveyed, treated, and disposed of within the reserve itself

and/or outfall directly to Gales Creek, rather than relying on existing facilities already in the UGB.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$4.40 million
24-inch pipe	$1.91 million
30-inch pipe	$0
Water quality/dentition	$3.69 million
Total:	**$10.00 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,901**

Transportation Services

With regard to transportation services, the David Hill Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the David Hill Urban Reserve had a significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Forest Grove. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Forest Grove Town Center aligns with this 2040 Growth Concept Map area. It encompasses the city's historic downtown, which itself includes transit-oriented mixed-use development, cultural amenities, retail commercial uses, civic buildings, and the main campus of Pacific University, but also some detached single-family dwellings, underdeveloped properties, and parking lots. TriMet Route 57 connects the town center to Cornelius, Hillsboro, and the MAX light rail line. GroveLink, a public transportation network for the Forest Grove community, also provides transit services in and around the town center and connects the town center with other parts of Forest Grove and to TriMet Route 57. WestLink is another public transportation service to the Town Center, connecting it with Hillsboro in the UGB, as well as to Banks and North Plains.

The town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future.

However, the town center is more than two miles away from the areas in the UGB adjacent to the reserve. Those areas in the UGB near the reserve are primarily zoned for low density residential development rather than for employment uses; they generally lack transit service and do not have services for meeting residents' daily needs, such as grocery stores, medical facilities, or banks. Under these conditions, growth in these areas will likely continue to rely significantly on private motor vehicle transportation.

Forest Grove has about 10 miles of dedicated bike lanes, four or more miles of established bikeways, and a handful of streets considered "bike friendly". Most of these facilities are either focused on the Town Center and Pacific University or provide routes along the edge of the city paralleling Highway 47, though there are also designated bike facilities on NW Gales Creek Road or Sunset Drive. Significant portions of the city do not have bike facilities, including its employment areas. Figure 4.5 in Chapter 4 of the 2023 RTP identifies some gaps in the planned on-street regional bike network, along NW Thatcher Road and NW Willamina Avenue.

Most of the residential neighborhoods in Forest Grove, including both older historic neighborhoods, more recent residential development projects, and areas near the reserve, have sidewalks. The Town Center is well served by sidewalks, though other employment areas are not. There are no sidewalks along stretches of NW Gales Creek Road in the west of the city, which Figure 4.4 in Chapter 4 of the 2023 RTP identifies as a gap in the planned regional pedestrian network. There are also no sidewalks along NW David Hill Road within the UGB near to the reserve. The Gales Creek Trail and the Highway 47 Trail connect the outer edges of Forest Grove with some nearby residential areas.

Figure 4.14 in Chapter of the 2023 RTP identifies Pacific Avenue east of Highway 47 as a high injury corridor, and an intersection of Highway 47 and Maple Street as a high injury intersection. However, Figure 4.14 does not identify any high injury corridors or high injury intersections in the UGB near the reserve.

The portion of Highway 47 within the UGB is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of Chapter 4 indicates that it currently meets travel speed reliability performance thresholds, with no more than four hours per day below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The nearest RTP-designated throughway, Highway 47, is several miles from the reserve. As noted above, Highway 47 currently meets travel speed reliability performance

thresholds. Urban development of the reserve is unlikely to generate sufficient traffic on the highway to cause it to no longer meet those performance thresholds.

There is currently no transit service near to the reserve. The closest TriMet bus stop is well over two miles away at B Street and 19th Avenue. GroveLink stops approximately three-quarters of a mile from the reserve at Watercrest Road and Forest Gale Drive.

There are no dedicated bike facilities on the sections of NW Gales Creek Road or NW David Hill Road connecting to the reserve. However, the Emerald Necklace Trail, which can be accessed off Ridge Pointe Drive, runs through Forest Glen Park to NW Gales Creek Road, where it connects to a dedicated bike lane that runs almost the entire way to downtown. Still, the only way to access the trail from the reserve at this time is to follow local neighborhood streets for three-quarters of a mile due to steep slopes and the development pattern of the adjacent homes within the UGB.

The sidewalks within the nearby residential neighborhoods do not connect to the reserve and, given the existing development pattern, it would be difficult to connect to them in the future, with the exception of one location closer to NW David Hill Road. There are no sidewalks along NW Gales Creek Road. There are no sidewalks in the limited number of roadways in the reserve itself.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

NW Gales Creek Road, NW David Hill Road, NW Thatcher Road, and Forest Gale Drive would see additional private motor vehicle traffic as a result of urbanization of the reserve. Indeed, the reserve is some distance from the Forest Grove Town Center and other employment areas and currently lacks transit service, bike facilities, and complete pedestrian facilities to these areas were future residents of the reserve could shop, access services, or be employed. Therefore, future residents are likely to require private motor vehicle transportation on these and other roadways, potentially impacting home-based VMT per capita in the future.

However, traffic from urbanization of the reserve is unlikely to jeopardize the reliability of Highway 47 as a throughway, or to meaningfully contribute to an increase in injuries on the highway or Pacific Avenue, given these facilities' distance from the reserve and the relatively small net vacant buildable area.

The bike lane on NW Gales Creek Road is the only bike facility that may see observable additional use because of development of the reserve, especially if the bike lane is extended the 3,000 feet to the reserve itself. The existing sidewalks within the nearby residential neighborhoods, which are not connected to the reserve, would not be impacted.

d. Need for major transportation facility improvements and associated costs

A roughly 0.41-mile length of NW Gales Creek Road at the south end of the reserve will likely need to be improved to urban arterial standards, including with acquisition of

additional right-of-way. A nearly half-mile length of NW David Hill Road will also likely need to be improved to urban collector standards and four new collectors totaling approximately 1.87 miles are needed to provide access to the central portion of the area and additional connections to the east. Much of these facility improvement costs will be higher than normal on a per-mile basis due in part to topography.

Facilities	Cost
Arterials, existing/improved full street	$47.73 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$24.64 million
Collectors, existing/improved half street	$0
Collectors, new	$98.63 million
Total:	**$171 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$66,693**

e. Provision of public transit service

The David Hill Urban Reserve is outside the TriMet Service District. TriMet staff evaluated the reserve for providing transit service and determined that future service would be better provided by another entity, such as GroveLink. Actual service depends on the level of development in, and in the corridors leading to, the reserve.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Two different sections of a stream flow south along the eastern edge of the David Hill Urban Reserve for approximately 2,585 feet. All but 460 feet of the stream section is located within an area of slopes greater than 25 percent and is mostly wooded. There is riparian habitat associated with the stream sections along with a few small locations of identified upland habitat. There are no wetlands or floodplains identified in the reserve. The land east of the stream already inside the UGB is either owned by the City of Forest Grove and designated as open space or is developed with single family homes oriented away from the reserve with no likely potential for connection to the reserve. These conditions eliminate the ability or need for any east-west road connections that would impact the stream corridor.

Given the increased protection levels for streams, habitat areas, and steep slopes that are provided when lands area added to the UGB, and considering the adjacent land uses to the

east and already inside the UGB, urbanization of the reserve can occur with comparatively minimal impact to this stream corridor and habitat areas. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the David Hill Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

This relatively small reserve has a mixture of forested areas, rural residences, and agricultural activities on a hill that descends 400 feet from the high to the low point. Much of the land is on slopes greater than 25 percent that would result in a less dense development pattern. These conditions could reduce the overall impact of urbanization on the small number of existing residents in terms of loss of sense of place and degradation of rural lifestyle.

Directly to the east of the reserve is an urban low density residential area, but it is somewhat separated from the reserve by open space tracts and there are no direct local road connections between it and the reserve. Also adjacent to the reserve is a large area of land that, while is inside the UGB, is currently undeveloped. Therefore, current residents of the reserve are somewhat separated from urban areas and urban development of the reserve itself could be a more noticeable change.

As detailed more fully in response to Factor 2, future residents of this reserve are likely to be reliant on private motor vehicle transportation and VMT could have adverse energy consequences. However, given the relatively small developable area in the reserve, traffic impacts from urbanization are not expected to be particularly significant.

The reserve has some agricultural uses, as well as tree stands that may be intended for future commercial harvesting. The economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development, and timber could be harvested as a part of urbanization, though not necessarily replanted. On a per-unit basis, the costs of protecting natural resource areas in the reserve from urbanization and establishing new/improved roadways to serve a residential development could be considerable.

This analysis finds that there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The David Hill Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Nearly all of the land outside of the UGB adjacent to the David Hill Urban Reserve has Goal 3 or 4 resource land zoning by Washington County for agricultural and forest activities, specifically with Agriculture and Forest (AF20) and Exclusive Farm Use (EFU) designations.

To the south of the reserve on the opposite side of NW Gales Creek Road is a large tract of EFU zoned land that extends into unincorporated areas for a number of miles. All the land that abuts the south side of NW Gales Creek Road is in field crop production. NW Gales Creek Road itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. In addition, the improvement of NW Gales Creek Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on NW Gales Creek Road, which could impact the movement of both farm equipment and goods; however, the amount of additional traffic generated from urbanization is not expected to be significant given this reserve's limited buildable area. Nonetheless, the proposed urban uses would be considered generally incompatible with the extensive nearby agricultural activities occurring on the farmland to the south and impact mitigation measures would warranted.

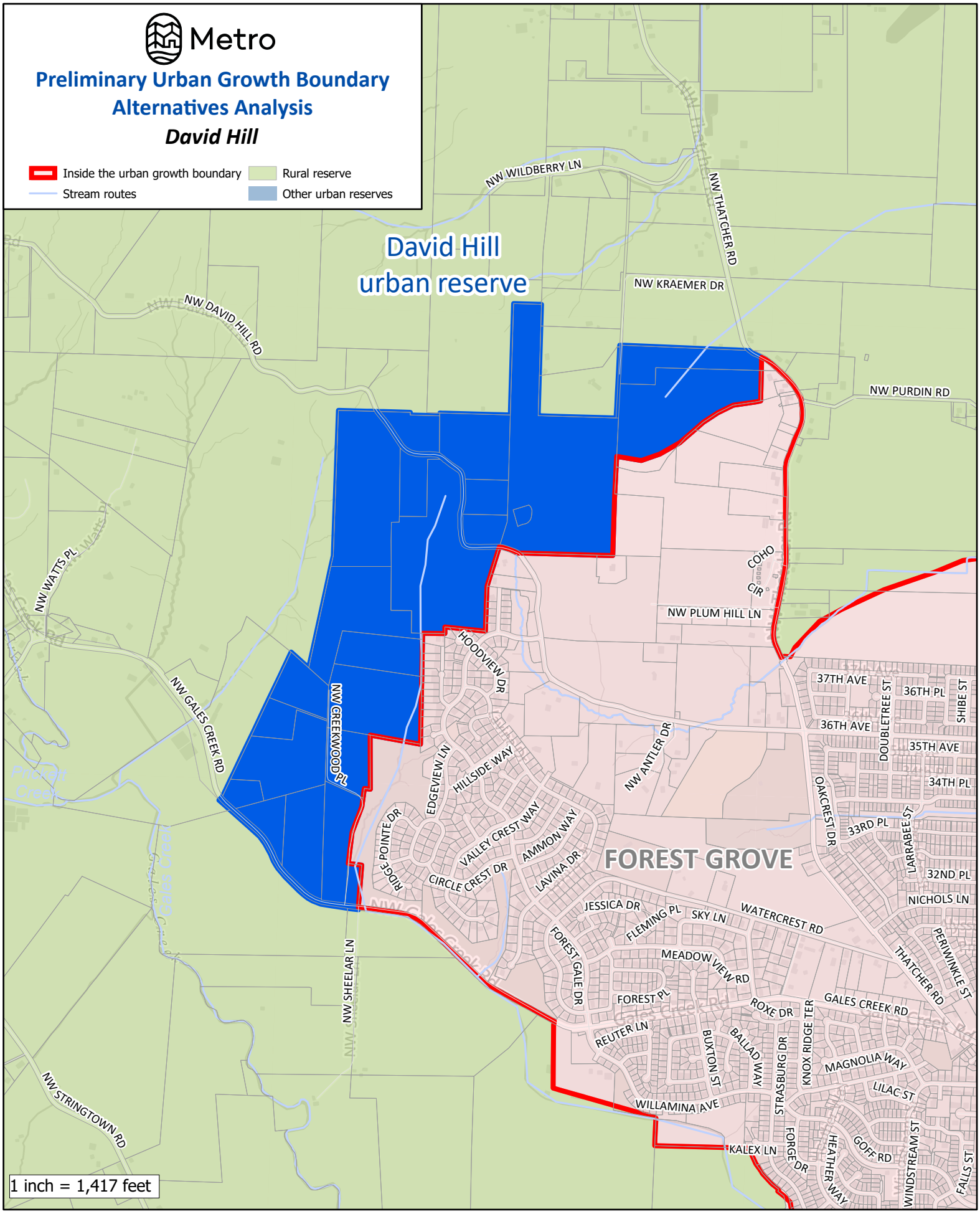
To the west of the reserve, between NW Gales Creek Road and NW David Hill Road, is another large tract of resource lands. These lands are zoned AF20 and are mostly forested, with some sporadic locations of agricultural activities including the David Hill Vineyards and Winery. An unnamed stream flows in a forested ravine along the western edge of the reserve, buffering the vineyard from the reserve to some degree. There does not appear to be any active commercial forestry activities occurring to the west. Considering the stream and ravine, the apparent lack of forestry activities on these adjacent lands, and the limited amount of development this relatively small reserve is expected to provided, the proposed urban uses would be considered compatible with nearby agricultural and forest activities in this location.

There is also small area of AF20-zoned land on the north side of the reserve in the vicinity of NW David Hill Road. There are some agricultural activities occurring in this area and it appears that some of this land has been logged in the past. In addition, directly north is land zoned Exclusive Forest and Conservation (EFC) that is owned by Stimson Lumber, with evidence of recent logging. While it is conceivable that the trees will be harvested here again in the future, it is not known what the timing would be given the long-term cycle of forest harvesting. Urbanization of the reserve would increase traffic on NW David Hill Road, which could impact the movement of farm and forestry equipment and goods. But again, the timing of future timber harvesting activities in this area is unknown. Thus, the proposed urban uses are considered moderately compatible with the nearby agricultural and forest activities occurring on the AF20 and EFC-zoned land in this location in the near-term, but conflicts may occur in the longer-term.

There is a tract of EFU-zoned land along NW Thatcher Road that extends for a number of miles to the north/northeast. The EFU-zoned land directly adjacent to the reserve in this area is in agricultural production and includes mainly nursery crops. Urbanization of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. Impact mitigation measures on this short northern edge may be warranted. To the east of NW Thatcher Road is a significant tract of nursery and field crops that extend north to NW Kemper Road and east to Highway 47. This area of agricultural activity could be impacted by the increase in traffic on NW Thatcher Road, although, as noted above, the amount of increased traffic from this reserve is not expected to be significant. Much of the area east of the reserve that is already inside the UGB is still dedicated to rural land uses. Once this area urbanizes, overall impacts to the agricultural activities in this location will increase, especially as more traffic moves north to access Highway 47.

In summary, the proposed urban uses are considered moderately compatible with nearby agricultural and forest activities occurring on farm and forest land outside the UGB to the west and north of the reserve. As noted above, there may be compatibility issues with the forestry lands to the north at some point in the future if and when those lands are harvested and replanted. The proposed urban uses are not considered compatible with the agricultural activities occurring on the farmland to the south and impact mitigation measures on the urban land will likely be warranted.

The David Hill Urban Reserve is given a “medium” score in Attachment 3 for this Goal 14 boundary location factor.



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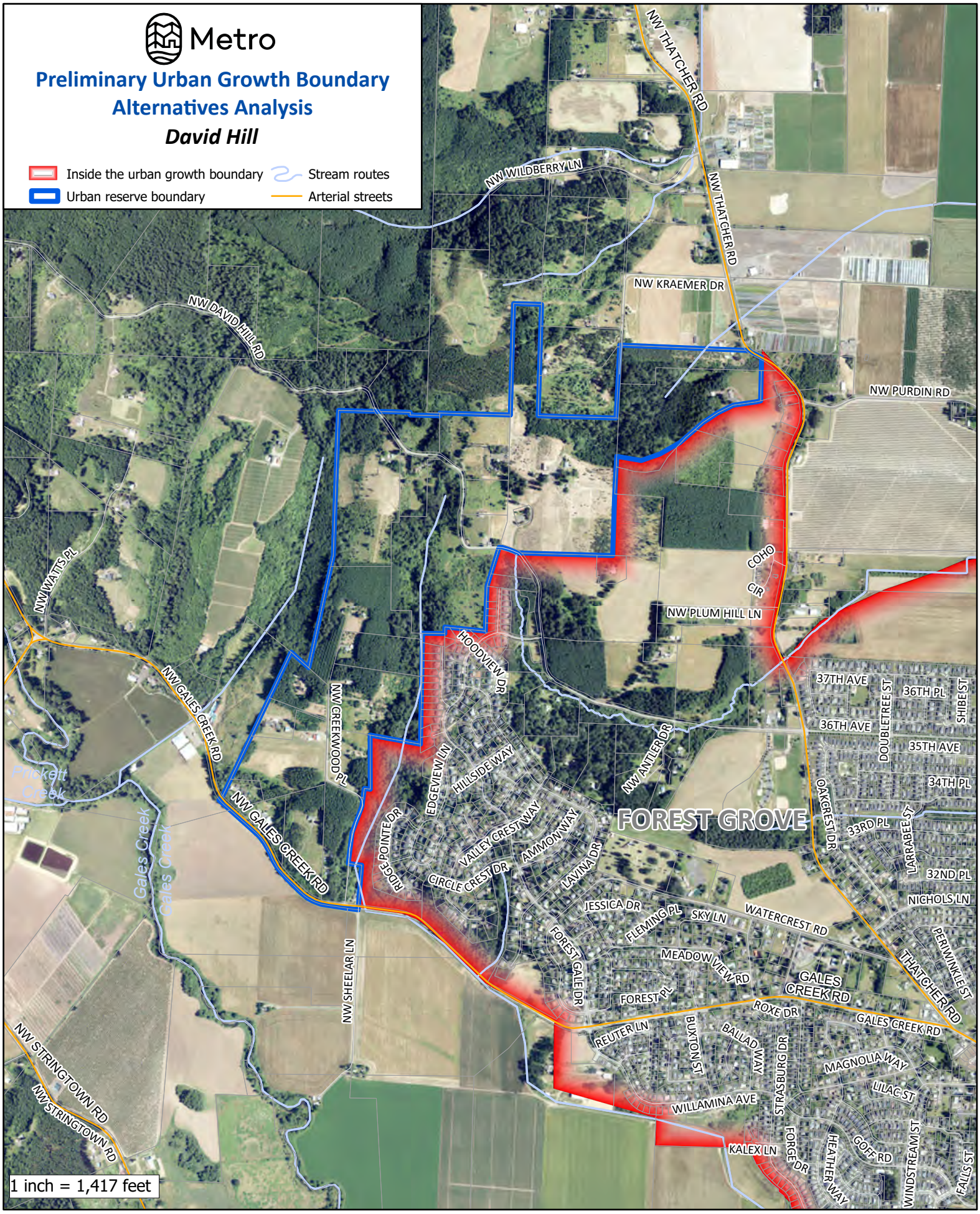

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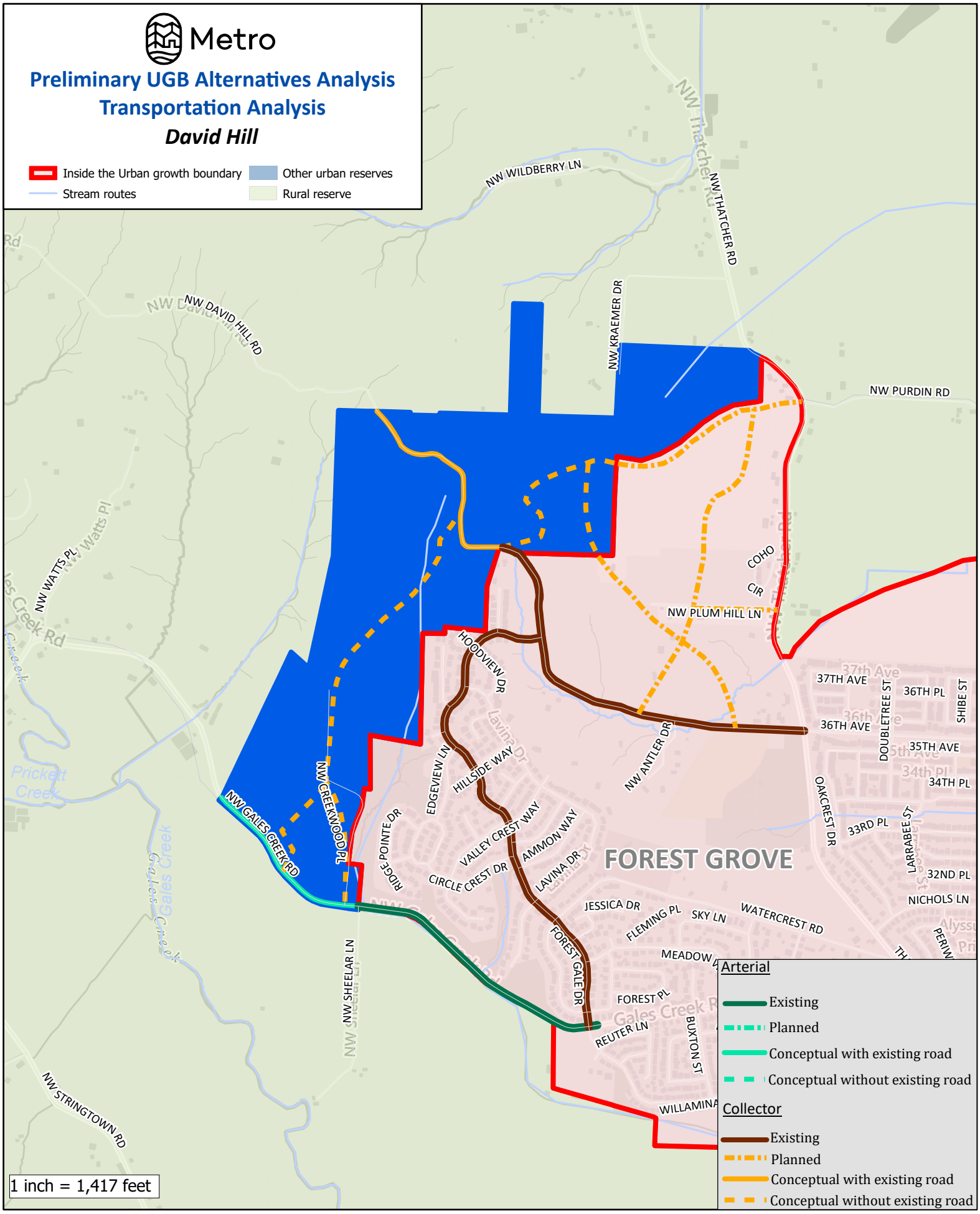

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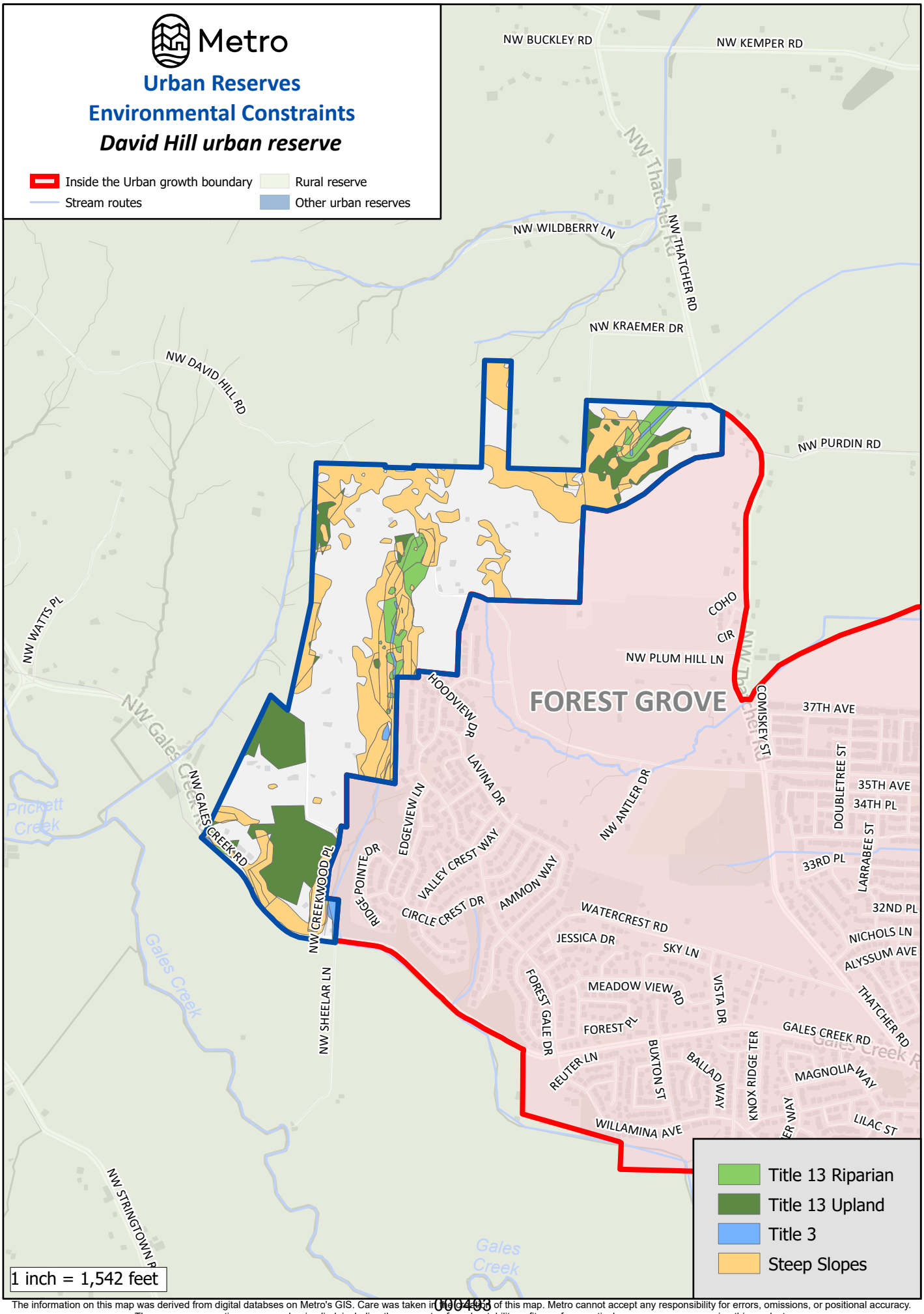

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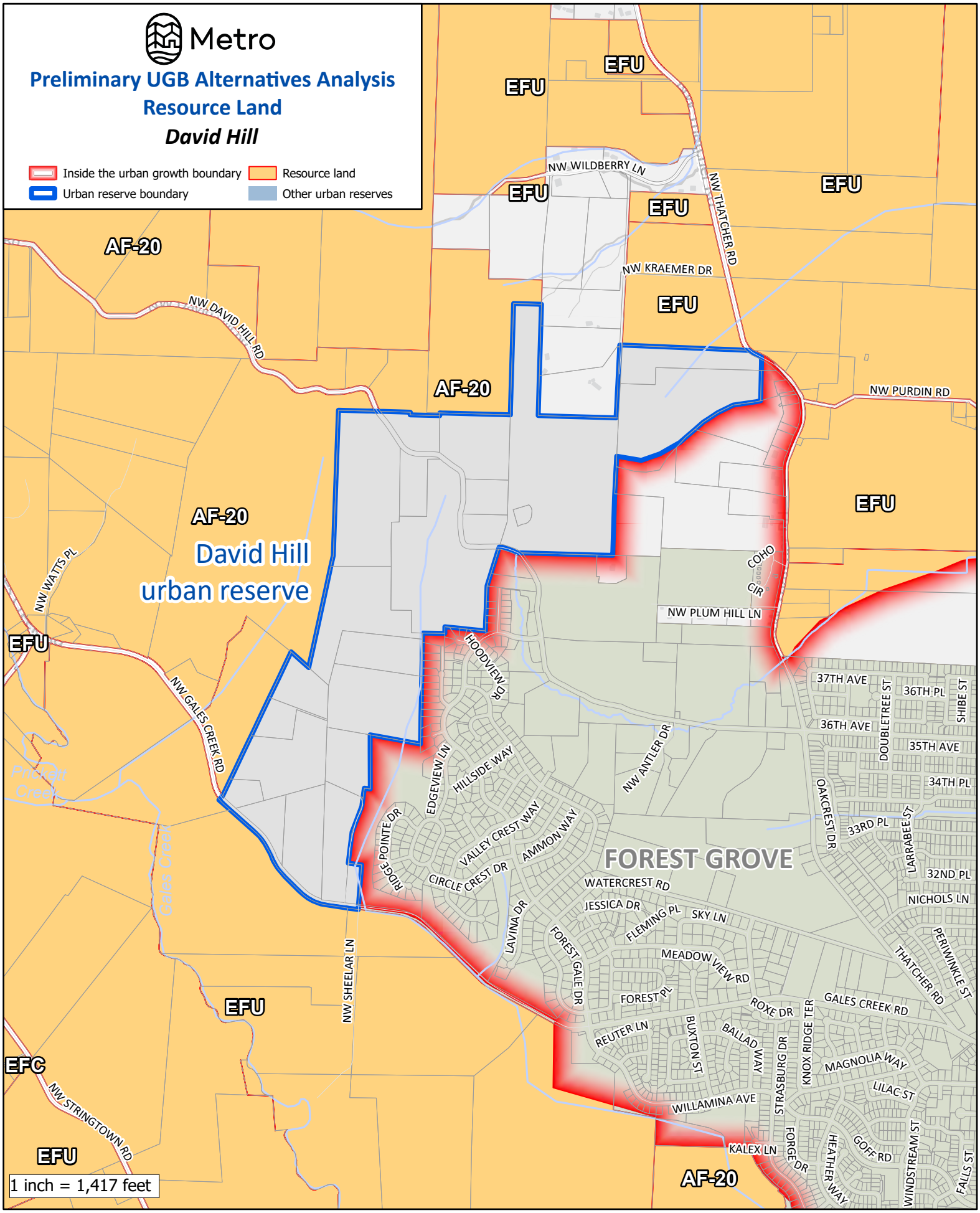

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ELLIGSEN ROAD NORTH URBAN RESERVE

Total Reserve Area	621 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	588 acres
Gross Vacant Buildable Area	442 acres
Net Vacant Buildable Area	**329 acres**

The Elligsen Road North Urban Reserve is a somewhat rectangularly shaped area adjacent to both the City of Tualatin and the City of Wilsonville. It is located north of SW Elligson Road, west of SW 65th Avenue, and south of SW Frobase Road. The UGB is the western and southern boundary of the reserve, and it is otherwise entirely surrounded by other urban reserves. I-5 also parallels a portion of the western edge of the reserve. A tributary to Boeckman Creek flows south from the middle of the reserve and then along SW Elligsen Road before crossing underneath the road to the farmland further south. The reserve contains a series of moderately steep hills with some slopes greater than 10 percent through the middle of the area. Access to the reserve is provided by SW Elligsen Road, SW 65th Avenue, SW 82nd Avenue, and SW Frobase Road.

GOAL 14 BOUNDARY LOCATIONAL FACTORS

Factor 1: Efficient accommodation of identified land needs

The Elligsen Road North Urban Reserve is comprised of 58 contiguous tax lots, all of which are entirely within the reserve. The combined area of the reserve's tax lots is approximately 588 acres. Nearly half of the tax lots are five acres in size or larger. Nearly a quarter are larger than 10 acres and two are larger than 80 acres. As noted above, the entire reserve contains 442 gross vacant buildable acres and 329 net vacant buildable acres.

According to aerial imagery, there are rural residences and a 1.6-acre cemetery along SW 65th Avenue and the remainder of the reserve is generally in agricultural use. There are also some small stands of trees, as well as an RV park in the reserve's southwest corner on SW Elligsen Rd. Two water reservoirs are at the high point of the reserve, one for the City of Tualatin and another for the City of Wilsonville. Overall, 37 of the reserve's 58 tax lots have improvements, with a median assessed value of those tax lots' improvements exceeding $880,000.

Tualatin High School, Horizon Christian High School, and Edward Byrom Elementary School are within a mile of the reserve "as the crow flies", but on the opposite side of I-5. Meridian Creek Middle School and Wilsonville High School are on the same side of I-5 as the reserve, but slightly further away via SW 65th Avenue. Canyon Creek Park is approximately half a mile from the reserve. Employment uses, including commercial land uses, border to the southwest. The reserve includes a portion of I-5 and is essentially adjacent to its interchange with SW Elligsen Road. South Metro Area Regional Transit (SMART) operates a bus route along SW Elligsen Road and a medical shuttle route along SW 65th Avenue.

There is a significant amount of land in the middle and southern portions of the reserve with slopes greater than 10 percent that may limit employment uses; however, there is a roughly 100-acre section of land adjacent to SW Frobase Road that is generally flat that could be used for employment purposes benefiting from the easy access to I-5. Given the concentration of existing high-value homes along SW 65th Avenue, a residential use may be a more appropriate use for the reserve.

This reserve is considered able to accommodate both a residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Elligsen Road North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary locational factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Wilsonville. The city's primary supply comes from the Willamette River. There is a single water treatment plant, the Willamette River Water Treatment Plant, that serves the city and is in shared ownership with Tualatin Valley Water District. The treatment plant is understood to be capable of processing 15 MGD, and a planned improvement will bring capacity to 20 MGD in order to serve development in the existing UGB through the year 2036. There are currently no significant known storage, pumping, or distribution system deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The ty is believed to have ample water rights for the long term, so water supply to urban development of the reserve is likely not an issue. The planned expansion of the treatment plant should provide sufficient capacity for development of the reserve. Existing storage tanks, however, do not have capacity to serve development outside of the existing UGB. A pump station will also be required to serve urban development of the reserve. The size of existing pipe trunks is adequate for future buildout.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional storage capacity, as well as a pump station, will be needed to avoid negative impacts to service in the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$10.22 million
16-inch pipe	$1.40 million
Pumping	$0.61 million
Storage	$0.44 million
Total:	**$12.67 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,925**

Sanitary Sewer Services

With regard to sanitary sewer services, the Elligsen Road North Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary locational factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from adjacent lands in the City of Wilsonville is conveyed in a city-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP), which was upgraded in 2014 to a capacity of 4.0 MGD, resulting in excess capacity. That excess capacity is believed to be able to accommodate growth in the Frog Pond areas recently added to the UGB. The city is planning to planning on necessary system upgrades to meet future needs. The existing system, including its piping and pump stations, is not known to have any hydraulic deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Depending on the timing of additional development in the UGB, planned treatment plant upgrades may be needed sooner in order for the system to also serve new development in the Elligsen Road North Urban Reserve. Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve the reserve, and there are several trunk line extensions that would be needed as well.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, pump station improvements, trunk line extensions, and, depending on timing of other growth, treatment plant facilities upgrades, are needed in order for Elligsen Road North Urban Reserve development to not negatively impact service to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0.74 million
12-inch pipe	$1.51 million
15-inch pipe	$0
Pump station	$3.96 million
Force mains	$0
Total:	**$6.21 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$943**

Stormwater Management Services

With regard to stormwater management services, the Elligsen Road North Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary locational factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Wilsonville Stormwater Master Plan (2012) identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The identified problem areas were isolated and there were no serious flooding issues identified under existing conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography, portions of the reserve could outfall directly to a tributary of Boeckman Creek. However, the southwest quadrant flows southwest toward I-5; stormwater fromt his area would likely connect to existing city infrastructure near Elligsen Road and generally flow south and either outfall to Boeckman Creek or Coffee Lake Creek, before flowing south to the Willamette River. The city's assessment of problem areas does not appear to include any stormwater infrastructure between the reserve and either creek.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The Master Plan does not indicate capacity issues in the stormwater infrastructure that the southwest portion of the reserve would connect to; however, this does not contemplate the addition of stormwater from a portion of the reserve. It is unclear whether existing pipes have the capacity to serve the reserve if it is added to the UGB.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$4.00 million
24-inch pipe	$2.64 million
30-inch pipe	$0
Water quality/dentition	$9.20 million
Total:	**$15.84 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,407**

Transportation Services

With regard to transportation services, the Elligsen Road North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary locational factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the Elligsen Road North Urban Reserve had an above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Wilsonville. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The roughly 100-acre and centrally-located Wilsonville Town Center aligns with this 2040 Growth Concept Map area. The City of Wilsonville's Town Center Plan envisions it as vibrant, walkable destination that inspires people to come together and socialize, shop, live, and work. The town center, as well as nearby employment areas on the opposite (west) side of I-5, include grocery and drug stores, a library, medical and dental offices, banks, and restaurants. These areas also contain and are adjacent to residential uses, including higher-density residential uses. The town center is located a short distance from the terminus of the TriMet's Westside Express Service (WES) Commuter Rail line, which provides service up to Beaverton.

South Metro Area Regional Transit (SMART), the City of Wilsonville's bus service, provides transit services to the city through seven bus lines; Routes 2X, 4, and 6 provide service to the portions of Wilsonville east of I-5 and connect to the town center.

The town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB

near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs through modes other than private motor vehicle transport. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact home-based VMT per capita in the future.

The town center is about two miles away from areas in the UGB adjacent to the reserve. There are other commercial/employment areas that include grocery stores, other retail commercial uses, and industrial uses and that are closer to the residential uses, including apartments, in the UGB adjacent to the reserve. Growth in areas in the UGB near the reserve may continue to rely on private motor vehicle transportation, though existing transit service and bike and pedestrian infrastructure can provide alternatives and the relatively close proximity of a mixture of uses could keep vehicle trips for daily needs and employment relatively short.

In addition to routes described above, SMART also provides Wilsonville with medical transport services, a Villebois shopping shuttle, and connections to Keizer and Woodburn. The vast majority of the city's developed areas are within a quarter of a mile of a transit stop. Figure 4.3 in Chapter 4 of the 2023 RTP does, nonetheless, identify a gap in planned frequent transit service along SW Canyon Creek Road and other locations in the north of the city.

Wilsonville has a well-defined bike network of at least 19 miles of dedicated bike lanes and at least eight miles established bikeways that connect neighborhoods, schools, parks, community centers, business districts, and natural resource areas. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Wilsonville as a part of the planned regional bike network, including facilities on SW Canyon Creek Road. There is identified gap in planned regional bike facilities on SW Elligsen Road and SW Stafford Road.

The city also has a fairly well-defined pedestrian network in its town center and residential neighborhoods, though with less pedestrian amenities in some industrial and employment areas. I-5 generally provides a barrier for east-west pedestrian connections, but there are sidewalks along both sides of SW Wilsonville Road as it crosses under I-5; there are no sidewalks on SW Boeckman Road over I-5 of SW Norwood Road over I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of existing streets in Wilsonville as in the regional pedestrian network, including SW Canyon Creek Road. The figure identifies gaps in the future regional pedestrian network along SW Boeckman Road east of I-5, SW Elligsen Road, and SW Stafford Road.

Figure 4.6 in Chapter 4 of the 2023 RTP identifies a number of trails in the south and west of Wilsonville as in the planned regional trail network. There is a gap in the planned trail network along SW Stafford Road.

There are no high injury corridors or high injury intersections in Wilsonville's portion of the UGB identified on Figure 4.14 in Chapter 4 of the 2023 RTP.

The portion of I-5 bisecting Wilsonville is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 in Chapter 4 of the RTP indicates that it currently meets RTP travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability of this section of I-5 will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

An interchange with the nearest RTP-designated throughway, I-5, is practically adjacent to the reserve. As noted above, I-5 through Wilsonville currently meets travel speed reliability performance thresholds. Given the proximity of the town center and other commercial/employment areas to the reserve, and the reserve's size, urban development of the reserve is unlikely to generate sufficient traffic on the highway to cause it to no longer meet those performance thresholds.

Currently, there is no regular SMART service with stops directly at the reserve. Route 2X, however, runs adjacent to the southwest corner of the reserve on SW Elligsen Road and then on to SW Canyon Creek Road. Route 6 also runs along SW Canyon Creek Road.

There is a 825-foot length of SW Elligsen Road adjacent to the southwest corner of the reserve with dedicated bike lanes and sidewalks on both sides. SW Parkway Center Drive and SW Canyon Creek Road also have dedicated bike lanes and sidewalks. Another 225-foot-long section of SW Elligsen Road has sidewalks on its south side, opposite of the reserve. No other roads to or within the reserve currently have bike facilities or sidewalks. There are no established regional trails connected to the reserve.

The reserve is adjacent to Title 4 designated Industrial Area and Employment Area lands and commercial retail uses. Canyon Creek Park is approximately half a mile from the reserve. Future residents of the reserve could access these existing uses without lengthy travel by private motor vehicle; however school uses are more than a mile away. As noted in response to Factor 1, the reserve could potentially accommodate future employment uses, providing employment opportunities with a short commute for residents of adjacent multi-family housing on the opposite side of SW Elligsen Road.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Canyon Creek Road, SW Elligsen Road, SW Parkway Center Drive, and SW Stafford Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, given the proximity commercial/employment uses, and the potential for the reserve to include a mixture of uses, additional traffic is not likely to be significant. Nearby bike and pedestrian facilities on SW Canyon Creek Road, SW Elligsen Road, and SW Parkway Center Drive would see some amount of additional use.

Development of this reserve is unlikely to cause facilities in Wilsonville to become high injury corridors or intersections, jeopardize the throughway reliability of I-5, or cause significant increases in the area's home-based VMT per capita.

d. Need for major transportation facility improvements and associated costs

Urbanizing the reserve will likely require that the 0.59 miles of SW Elligsen Road and 0.83 miles of SW 65th Avenue that border the reserve be improved to urban arterial standards. Both roadway sections' improvements are mostly considered to be half-street improvements, as development of the adjacent Elligsen Road South Urban Reserve and the land inside the UGB would see to the improvement of the other halves. A new arterial extending from SW Elligsen Road to SW Day Road is also likely to be needed, and the 0.62-mile roadway's costs are included below. Furthermore, a 0.86-mile-long section SW Frobase Road would need to be improved to urban collector standards and three new collectors with a combined length of just over two miles are expected to be needed to provide access to the remainder of the reserve. Normal per-mile costs are expected for most of these new and improved roadways, though traversing some areas of steeper topography and some water bodies could lead to higher per-mile costs in specific locations.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$58.91 million
Arterials, new	$48.31 million
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$13.42 million
Collectors, new	$89.91 million
Total:	**$210.55 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$31,998**

e. Provision of public transit service

Though the Elligsen Road North Urban Reserve is in the TriMet Service District, SMART evaluated the reserve for providing transit service. SMART could potentially provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in, and in the corridors leading to, the reserve. Service could be provided weekdays at 30-minute headways with one additional bus at a capital cost of $450,000 (recurs every eight – 12 years). Bus capital costs reflect the purchase of an electric Category C vehicle as SMART plans to provide services with a zero-emission fleet. Annual service cost of adding fixed-route and complementary paratransit service would be $70,000 in addition to services already being provided. This annual service cost would increase with the cost of inflation each year. Because the reserve is within the TriMet service boundary, SMART would need to negotiate with TriMet to provide bus service to the area.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is

required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

A 3,400-foot segment of a tributary to Boeckman Creek flows south through the middle of the Elligsen Road North Urban Reserve. The majority of the stream segment has been manipulated to flow along the edge of agriculture fields and then along SW Elligsen Road before crossing under the road to the south. Riparian habitat has been identified along the stream corridor along with some upland habitat in the steeper-sloped sections of the reserve. A 15,000-square-foot wetland identified on the National Wetland Inventory (NWI) is located in the northeastern portion of the reserve and a man-made pond, presumably used for irrigation purposes, is located on farmland in the center of the reserve. Given the increased protection levels for streams, wetlands, and habitat areas within the UGB, urbanization could occur with minimal to moderate impacts to the stream tributary, depending on east-west road connections.

This analysis finds that urbanization of the area could occur with comparatively low impacts to natural resources. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Elligsen Road North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary locational sub-factor.

Social, energy, and economic consequences

The Elligsen Road North Urban Reserve has some rural residential development, mostly along SW 65th Avenue, as well as well as an RV park on SW Elligsen Road. As noted in response to Factor 1, 37 of the reserve's 58 tax lots have improvements, with a median assessed value of those tax lots' improvements exceeding $880,000. These areas, with generally smaller parcel sizes, are unlikely to be part of a large-scale redevelopment, at least not in the near-term. However, there is also a considerable amount of cleared agricultural land that could accommodate larger-scale urban development. Such development could have more noticeable and more immediate impacts on reserve residents' sense of place and their rural lifestyle. Residents closer to existing urban employment areas adjacent to the reserve may experience less of a change, and preserved natural areas crossing the reserve may help to buffer existing rural residences from new urban development. Moreover, urbanization of the reserve could bring new social, educational, and recreational opportunities for existing residents.

As detailed more fully in response to Factor 2, urbanization of the reserve is not expected to result in significant increases in VMT, particularly if the reserve is developed with a mix of uses. Adverse energy impacts are therefore also not expected to be significant.

Aerial imagery suggests there may be about 200 acres of agricultural activity occurring in the reserve, largely field crops and pastureland and not row crops or nurseries. The reserve does include an equestrian center as well. There may also be some timber stands intended for future commercial harvesting. While there would be economic consequences from urbanization in terms of a loss in farming activity in the reserve, that loss may be outweighed by the economic benefits of residential and/or employment development. Timber could also be harvested a part of urbanization, though not necessarily replanted.

Overall, there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The Elligsen Road North Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary locational sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Washington County, border the Elligsen Road North Urban Reserve in areas outside the UGB to the north and south.

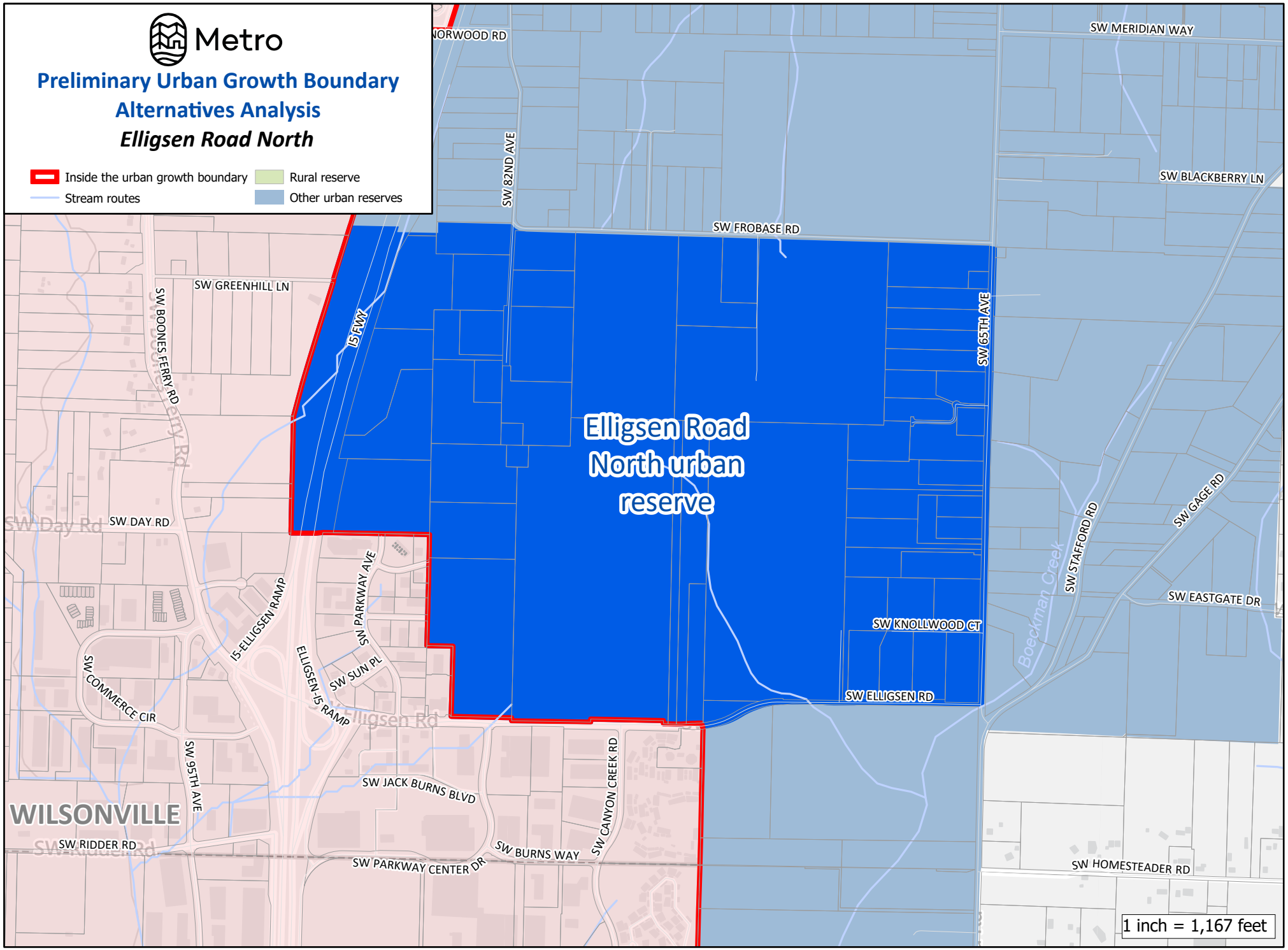
The more than 100 acres of EFU-zoned land to the north on the opposite side of SW Frobase Road is nearly entirely in agricultural production, mostly for field crops Christmas trees. The tract does have some small stands of trees as well, but they are generally along Saum Creek, which may inhibit harvesting for timber. There is a rural residence centered within the farm fields. SW Frobase Road separates the reserve from these EFU-zoned lands, but the road itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. The improvement of SW Frobase Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on SW Frobase Road and SW 65th Avenue, which could impact the movement of both farm equipment and goods. Therefore, proposed urban uses are considered incompatible with the nearby agricultural activities occurring on the EFU-zoned land to the north.

The EFU-zoned land across SW Elligsen Road to the south also appears to have active farm uses, but also includes rural residential development. SW Elligsen Road would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. In addition, the improvement of SW Elligsen Road to would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. Urbanization would

increase traffic on SW Elligsen Road, which could impact the movement of both farm equipment and goods. The proposed urban uses are considered incompatible with the nearby agricultural activities occurring on farmland to the south.

This analysis finds that the proposed urban uses would not be compatible with nearby agricultural and forest activities occurring on farm and forest land outside the UGB to the north and the south. Land use conflict mitigation measures would be warranted.

The Elligsen Road North Urban Reserve is given a “low” score in Attachment 3 for this Goal 14 boundary locational factor.



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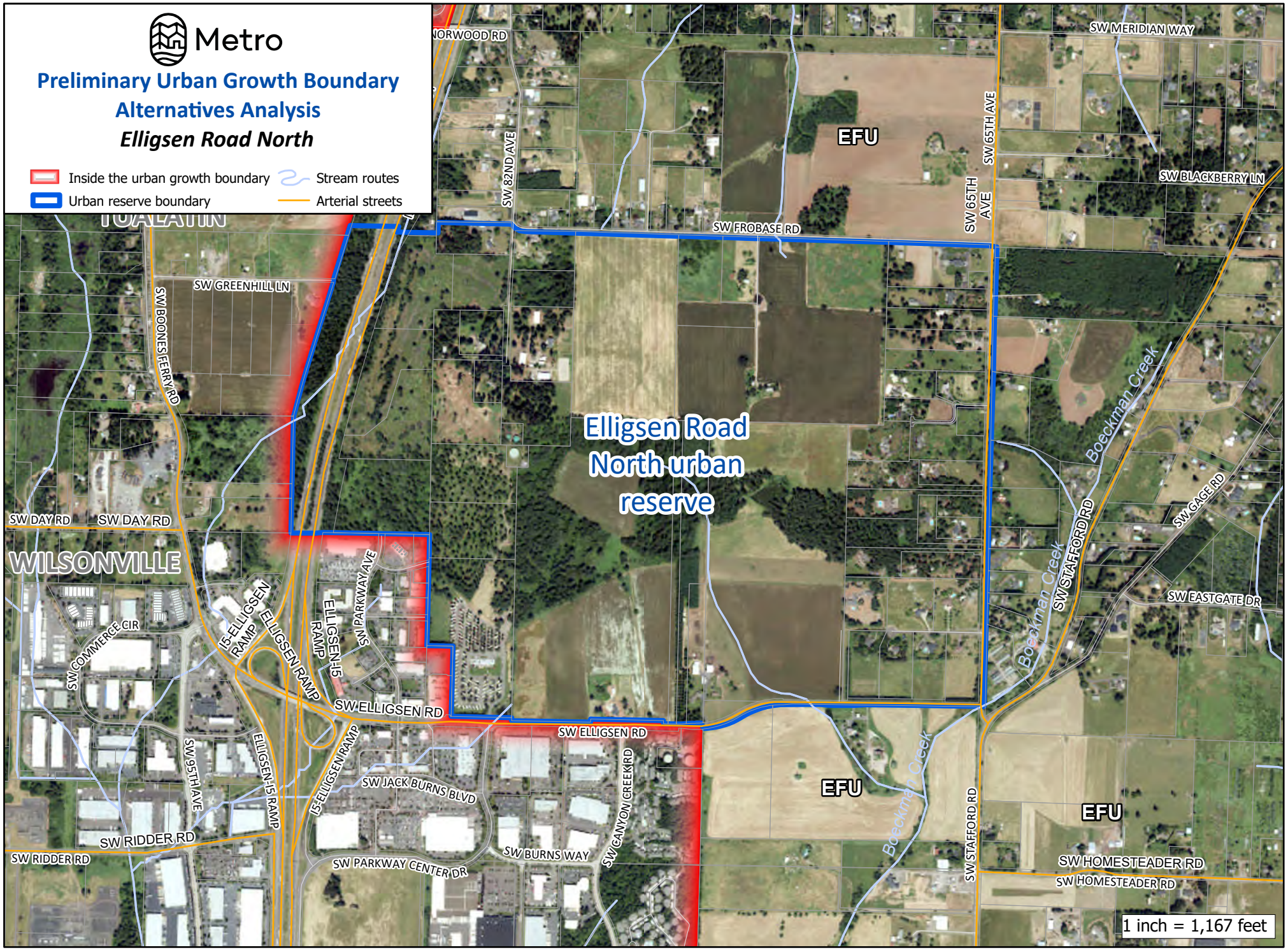

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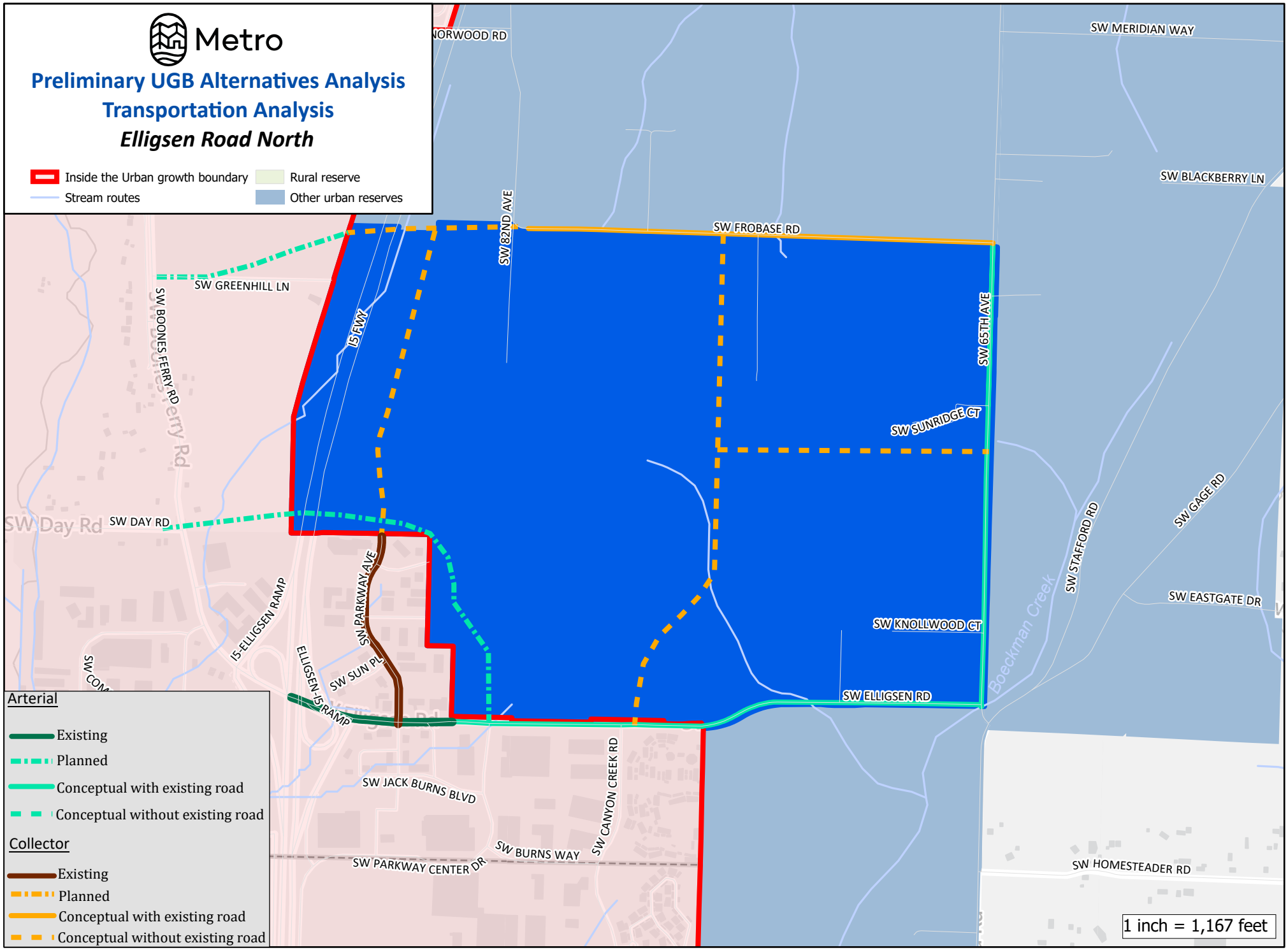

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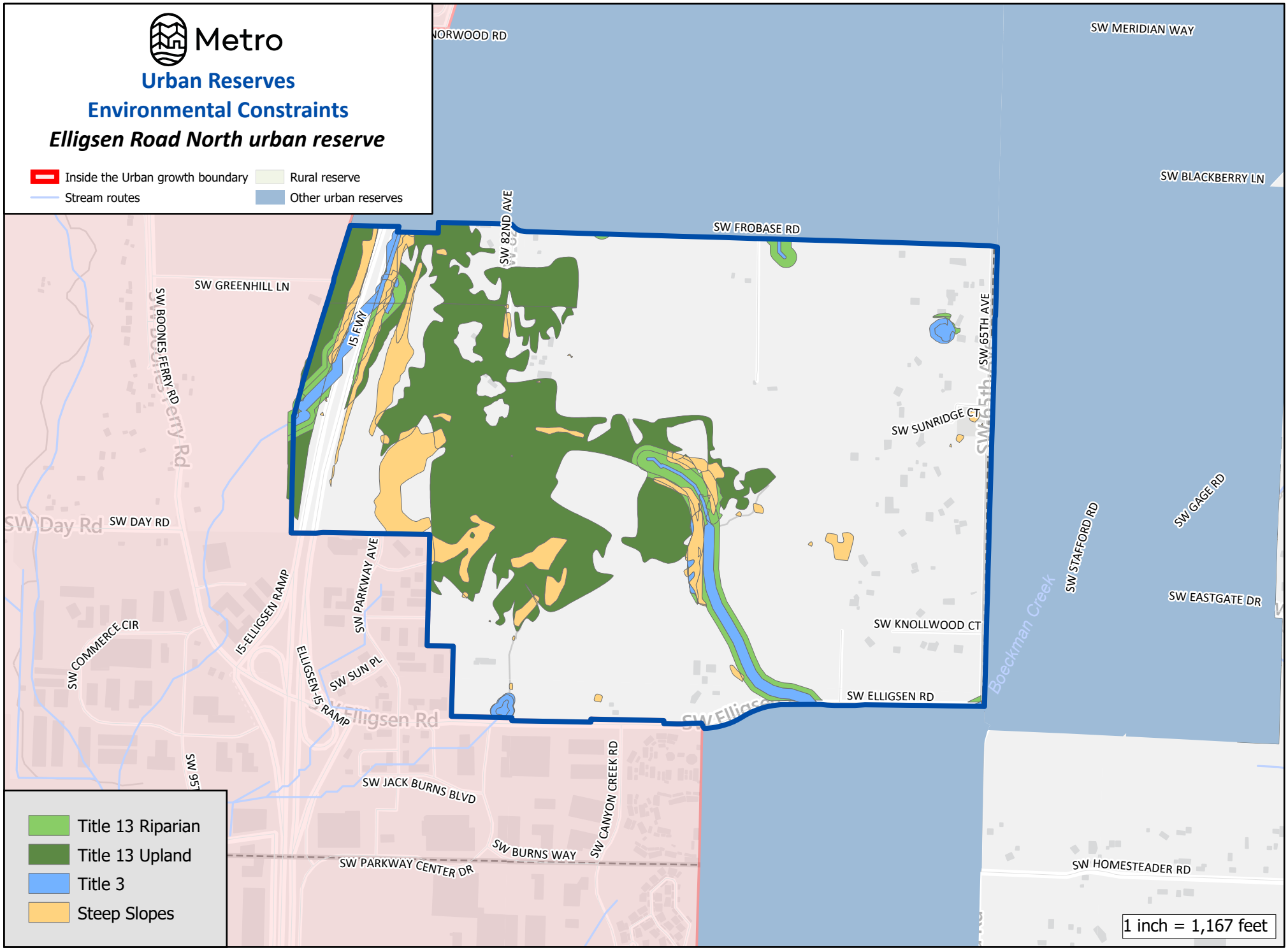

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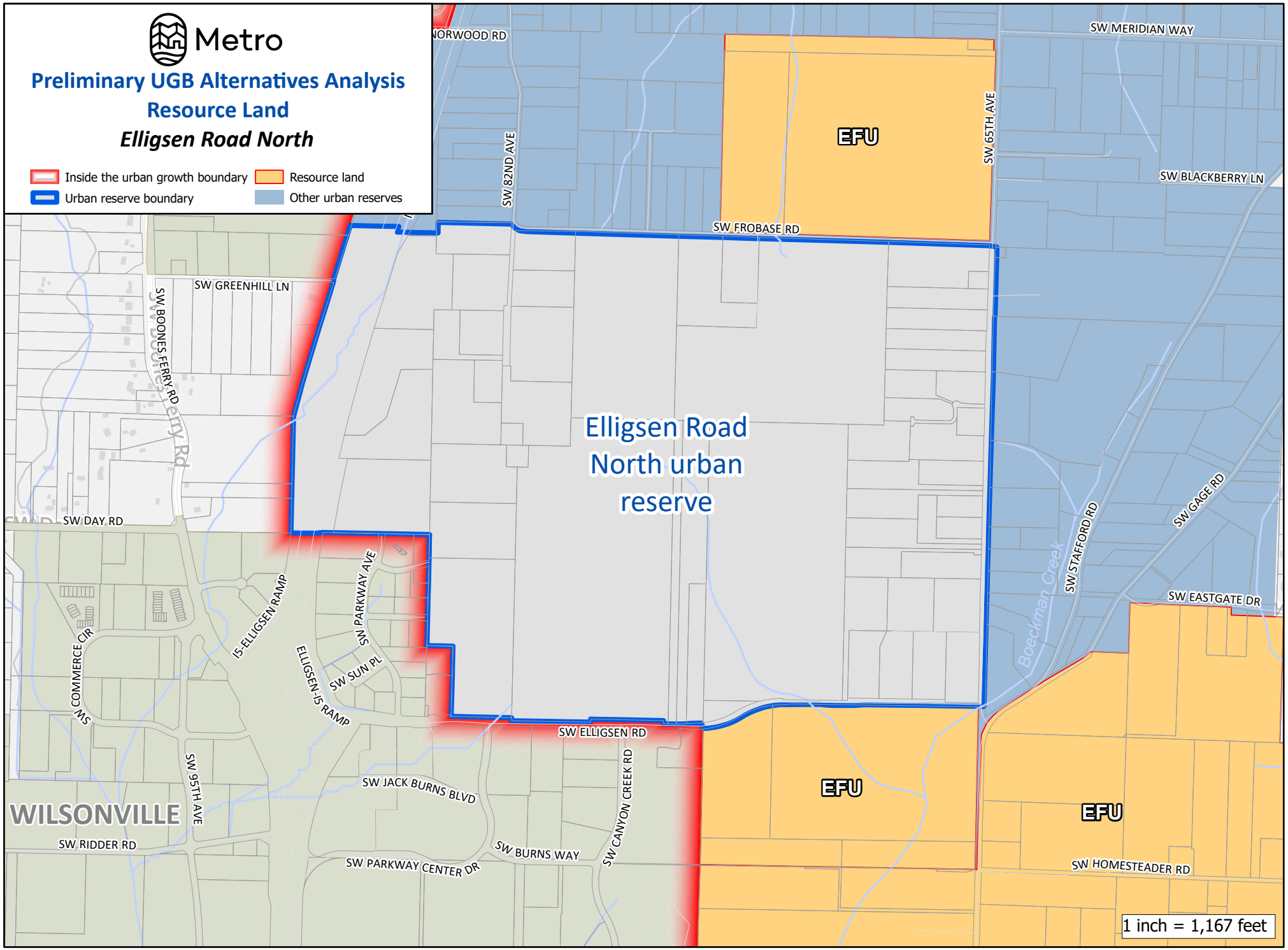

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ELLIGSEN ROAD SOUTH URBAN RESERVE

Total Reserve Area	254 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	250 acres
Gross Vacant Buildable Area	213 acres
Net Vacant Buildable Area	**158 acres**

The Elligsen Road South Urban Reserve is a generally rectangular area south of SW Elligsen Road and west of SW Stafford Rd. The UGB and Wilsonville city limits are the reserve's western and southern boundaries. Boeckman Creek, which flows diagonally through the center of the urban reserve, splits the area into two roughly evenly sized sections. The land is mostly flat, except for some slopes greater than 10 percent along Boeckman Creek. Access to the area is provided by SW Elligsen Road, SW Elligsen Road, and SW Homesteader Road.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Elligsen Road South Urban Reserve is comprised of 12 contiguous tax lots, all of which are entirely within the reserve. The combined area of the reserve's tax lots is approximately 250 acres. Half of the tax lots are each smaller than five acres, while the other half are each larger than 10 acres, with two that are larger than 50 acres. As noted above, the entire reserve contains 213 gross vacant buildable acres and 158 net vacant buildable acres.

According to aerial imagery, the reserve is predominantly comprised of agricultural uses and associated rural residences. Eight of the reserve's tax lots have assessed improvements, with a median assessed value of those tax lots' improvements exceeding $420,000. Powerline easements cross the northern and southern portions of the reserve.

In addition to fronting along SW Elligsen Road and SW Stafford Road, rights-of-way for new residential local streets already within the UGB stub to the south of the reserve and the reserve is less than a mile from an interchange with I-5. South Metro Area Regional Transit (SMART) operates a bus route along SW Elligsen Road and a medical shuttle route along SW Stafford Road.

The reserve is adjacent to Title 4 designated Employment Area lands, multifamily housing, and the new Frog Pond area residential development. It is approximately 1.5 miles away from a 2040 Growth Concept designated corridor along SW Parkway Avenue via SW Stafford Road and SW Boeckman Road, less than a mile from Meridian Creek Middle School and Frog Pond Primary School, and within a mile of several existing and planned parks.

This reserve is generally flat with some sloped land along Boeckman Creek that, in combination with the powerline easements mentioned above, divides the area into smaller potentially developable pockets. Some of the pockets are likely large and flat enough to accommodate employment uses and, given the powerlines that pass through the reserve, the proximity to I-5 and existing employment areas, employment uses here may be suitable as well. However, the proximity

of schools, parks, and existing residential development may support or be cohesive with residential development of the reserve. Therefore, this reserve is considered able to accommodate both a residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Elligsen Road South Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Wilsonville. The city's primary supply comes from the Willamette River. There is a single water treatment plant, the Willamette River Water Treatment Plant, that serves the city and is in shared ownership with Tualatin Valley Water District. The treatment plant is understood to be capable of processing 15 MGD, and a planned improvement will bring capacity to 20 MGD in order to serve development in the existing UGB through the year 2036. There are currently no significant known storage, pumping, or distribution system deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The city is believed to have ample water rights for the long term, so water supply to urban development of the reserve is likely not an issue. The planned expansion of the treatment plant should provide sufficient capacity for development of the reserve. Existing storage tanks, however, do not have capacity to serve development outside of the existing UGB. A pump station will also be required to serve urban development of the reserve. Future system infrastructure as shown in the City of Wilsonville Water System Master Plan is adequately sized for required fire flow and operating pressures.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional storage capacity, as well as a pump station, will be needed to avoid negative impacts to service in the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0.47 million
12-inch pipe	$3.91 million
16-inch pipe	$0
Pumping	$0
Storage	$0.20 million
Total:	**$4.58 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,444**

Sanitary Sewer Services

With regard to sanitary sewer services, the Elligsen Road South Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from adjacent lands in the City of Wilsonville is conveyed in a city-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP), which was upgraded in 2014 to a capacity of 4.0 MGD, resulting in excess capacity. That excess capacity is believed to be able to accommodate growth in the Frog Pond areas recently added to the UGB. The city is planning to planning on necessary system upgrades to meet future needs. The existing system, including its piping and pump stations, is not known to have any hydraulic deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Depending on the timing of additional development in the UGB, planned treatment plant upgrades may be needed sooner in order for the system to also serve new development in the Elligsen Road South Urban Reserve. Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve the reserve, and there are several trunk line extensions that would be needed as well.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, pump station improvements, trunk line extensions, and, depending on timing of other growth, treatment plant facilities upgrades, are needed in order for Elligsen Road South Urban Reserve development to not negatively impact service to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$3.47 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$1.80 million
Force mains	$0
Total:	**$5.27 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,662**

Stormwater Management Services

With regard to stormwater management services, the Elligsen Road South Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Wilsonville Stormwater Master Plan (2012) identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The identified problem areas were isolated and there were no serious flooding issues identified under existing conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography, it seems likely that stormwater management for the development of Elligsen Road South Urban Reserve would occur within the development area and outfall directly to Boeckman Creek, without connecting to an existing public stormwater system. The aforementioned master plan included several areas of observed erosion along Boeckman Creek, generally caused by incorrectly constructed or poorly maintained outfalls. While it would not necessarily be the responsibility of Elligsen Road South development to correct these outfalls, any new outfalls would need to be properly designed and constructed to avoid addition erosion.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

If stormwater outfalls directly to Boeckman Creek via private outfalls from development areas and public outfalls from roadways, and if such outfalls were properly designed

and constructed to avoid additional erosion, there would be no impacts to existing stormwater facilities.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$1.84 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$4.53 million
Total:	**$6.37 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,011**

Transportation Services

With regard to transportation services, the Elligsen Road South Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the Elligsen Road South Urban Reserve had an above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Wilsonville. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The roughly 100-acre and centrally-located Wilsonville Town Center aligns with this 2040 Growth Concept Map area. The City of Wilsonville's Town Center Plan envisions it as vibrant, walkable destination that inspires people to come together and socialize, shop, live, and work. The town center, as well as nearby employment areas on the opposite (west) side of I-5, include grocery and drug stores, a library, medical and dental offices, banks, and restaurants. These areas also contain and are adjacent to residential uses, including higher-density residential uses. The town center is located a short distance from the terminus of the TriMet's Westside Express Service (WES) Commuter Rail line, which provides service up to Beaverton.

South Metro Area Regional Transit (SMART), the City of Wilsonville's bus service, provides transit services to the city through seven bus lines; Routes 2X, 4, and 6 provide service to the portions of Wilsonville east of I-5 and connect to the town center.

The town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs through modes other than private motor vehicle transport. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact home-based VMT per capita in the future.

The town center is about two miles away from areas in the UGB adjacent to the reserve. There are other commercial/employment areas that include grocery stores, other retail commercial uses, and industrial uses and that are closer to the residential uses, including apartments, in the UGB adjacent to the reserve. Growth in areas in the UGB near the reserve may continue to rely on private motor vehicle transportation, though existing transit service and bike and pedestrian infrastructure can provide alternatives and the relatively close proximity of a mixture of uses could keep vehicle trips for daily needs and employment relatively short.

In addition to routes described above, SMART also provides Wilsonville with medical transport services, a Villebois shopping shuttle, and connections to Keizer and Woodburn. The vast majority of the city's developed areas are within a quarter of a mile of a transit stop. Figure 4.3 in Chapter 4 of the 2023 RTP does, nonetheless, identify a gap in planned frequent transit service along SW Canyon Creek Road and other locations in the north of the city.

Wilsonville has a well-defined bike network of at least 19 miles of dedicated bike lanes and at least eight miles established bikeways that connect neighborhoods, schools, parks, community centers, business districts, and natural resource areas. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Wilsonville as a part of the planned regional bike network, including facilities on SW Canyon Creek Road. There is identified gap in planned regional bike facilities on SW Elligsen Road and SW Stafford Road.

The city also has a fairly well-defined pedestrian network in its town center and residential neighborhoods, though with less pedestrian amenities in some industrial and employment areas. I-5 generally provides a barrier for east-west pedestrian connections, but there are sidewalks along both sides of SW Wilsonville Road as it crosses under I-5; there are no sidewalks on SW Boeckman Road over I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of existing streets in Wilsonville as in the regional pedestrian network, including SW Canyon Creek Road. The figure identifies gaps in the future regional pedestrian network along SW Boeckman Road east of I-5, SW Elligsen Road, and SW Stafford Road.

Figure 4.6 in Chapter 4 of the 2023 RTP identifies a number of trails in the south and west of Wilsonville as in the planned regional trail network. There is a gap in the planned trail network along SW Stafford Road.

There are no high injury corridors or high injury intersections in Wilsonville's portion of the UGB identified on Figure 4.14 in Chapter 4 of the 2023 RTP.

The portion of I-5 bisecting Wilsonville is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 in Chapter 4 of the RTP indicates that it currently meets RTP travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability of this section of I-5 will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

An interchange with the nearest RTP-designated throughway, I-5, is less than a mile from the reserve. As noted above, I-5 through Wilsonville currently meets travel speed reliability performance thresholds. Given the proximity of the town center and other commercial/employment areas to the reserve, and the reserve's size, urban development of the reserve is unlikely to generate sufficient traffic on the highway to cause it to no longer meet those performance thresholds.

Currently, there is no regular SMART service all the way to the reserve. The closest existing bus routes, Routes 2X and 6 and 2X, are on SW Canyon Creek Road, which is 800 feet from the reserve. Route 4 on SW Wilsonville Road and SW Advance Road is one-half mile from the reserve. The WES Wilsonville station is more than two miles from the reserve.

There are no bike facilities adjacent to the reserve. The closest complete facility are dedicated bike lanes that runs north-south on SW Canyon Creek Road, which is approximately one-third of a mile from the center of the reserve along SW Elligsen Road. There is a small segment of bike lane on the south side of SW Elligsen Road that stops about 225 feet from the northwest corner of the reserve. There are no existing bike facilities in the reserve itself.

There are no sidewalks or trails connected to the reserve. There are sidewalks on both sides of SW Canyon Creek Road, and a sidewalk on the south side of SW Elligsen Road that that stops about 225 feet from the northwest corner of the reserve. A portion of SW Elligsen Road near SW parkway Center Drive has sidewalks on both sides of the street. There are no existing sidewalks in the reserve itself.

The reserve is adjacent to Title 4 designated Employment Area lands and less than a mile from school uses, commercial retail uses, and industrial uses. Future residents of the reserve could access these existing uses without lengthy travel by private motor vehicle. Moreover, as noted in response to Factor 1, the reserve could potentially accommodate future employment uses, providing employment opportunities with a short commute for residents of adjacent multi-family housing and the developing Frog Pond area.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Canyon Creek Road, SW Elligsen Road, and SW Stafford Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, given the proximity of schools and commercial/employment uses, and the potential for the reserve to include a mixture of uses, additional traffic is not likely to be significant. Nearby bike and pedestrian facilities would see some amount of additional use.

Development of this reserve is unlikely to cause facilities in Wilsonville to become high injury corridors or intersections, jeopardize the throughway reliability of I-5, or cause significant increases in the area's home-based VMT per capita.

d. Need for major transportation facility improvements and associated costs

The portions of SW Elligsen Road and SW Stafford Road that border the reserve and that have a combined length of approximately 1.31 miles will likely need to be improved to urban arterial standards. The SW Elligsen Road improvements are considered half-street improvements, as development of the separate Elligsen Road North Urban Reserve would include improvement of the roadway's northern half. Two new collectors with a combined length of approximately 1.33 miles are likely needed provide access to the middle of the reserve. Considering topography, normal per-mile costs are expected for most of these new and improved roadways, though there may be some higher per-mile costs in certain locations, including crossings of Boeckman Creek.

Facilities	Cost
Arterials, existing/improved full street	$44.75 million
Arterials, existing/improved half street	$12.70 million
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$58.80 million
Total:	**$116.25 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$36,707**

e. Provision of public transit service

The Elligsen Road South Urban Reserve is outside the TriMet Service District. SMART evaluated the reserve for providing transit service. SMART could potentially provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in, and in the corridors leading to, the reserve. Service could be provided at 15-minute headways peak weekday and 30-minute headways off-peak weekday and Saturday, with one additional bus at a capital cost of $850,000 (recurs every 12-15 years). Bus capital costs reflect the purchase of a Category A/B electric vehicle as SMART plans to provide services with a zero-emission fleet. Annual service cost of adding fixed-route and complementary paratransit service

would be $330,000 in addition to services already being provided. This annual service cost would increase with the cost of inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Boeckman Creek flows diagonally through the Elligsen Road South Urban Reserve in a northeast-to-southwest direction for just over a mile. The northern portion flows mostly through agricultural fields while the southern portion flows within a forested riparian corridor with some slopes greater than 25 percent. Riparian habitat has been identified along the stream corridor and most of the forested section is identified as wetland (5.8 acres of a larger 22-acre wetland) on the Wilsonville local inventory. In addition, there is an additional 0.2-acre wetland identified on the National Wetland Inventory (NWI) along the stream corridor. Given the increased protection levels for streams, wetlands, habitat areas, and steep slopes for areas added to the UGB, urbanization could occur without significant impacts to Boeckman Creek. However, the creek and powerlines divide the reserve into pockets of land, which could require street connections that impact natural habitat/features. Internal street connections would be more necessary if the reserve were to be developed with residential uses. All to say, some impacts to Boeckman Creek and habitat areas may occur through urbanization of the reserve depending on the design and level of street connectivity needs.

A tributary of Boeckman Creek flows south through the northern portion of the reserve for approximately 1,490 feet between agricultural land and a farmstead before joining Boeckman Creek. This stream also appears to drain into a couple of ponds, one of which, approximately 0.1 acres in area, has been identified as a NWI wetland. This stream also has riparian habitat identified along its corridor. Given the increased protection levels for streams, wetlands, and habitat areas within the UGB, urbanization could occur without significant impacts to this stream corridor. Nevertheless, this small stream corridor, along with Boeckman Creek, isolates a small land area from the remainder of the reserve, which could require stream-impacting street connections, especially for residential development. Therefore, some impacts to the stream and habitat area may occur through urbanization of the reserve, depending on the type of urban development and needs for new street connectivity.

A tributary flows southwest through the southern portion of the reserve, mostly through agricultural land, and appears to flow into a pond. The small stream section, which is within a forested patch, also is identified as a 0.25-acre wetland and includes riparian habitat. Given the required protection levels for streams, wetlands, and habitat areas within the

UGB, urbanization could occur without significant impacts to this stream corridor. Consistent with the other streams in the area, impacts related to street connectivity needs, especially serving new residential uses, could occur. Therefore, some impacts to the stream and habitat area may occur through urbanization of the area, again depending on types of future development and level of street connectivity needs.

Boeckman Creek and the southern tributary also flow within powerline easements in the reserve. These easements provide a level of protection for the water bodies, due to the inability to urbanize at a high level within the easements. However, if employment uses occurred in this area, the stream corridors could be susceptible to impacts from allowable parking facilities within the easement. Overall, urbanization of the area could occur with comparatively moderate to high impacts to the natural resources, depending on street connectivity needs and other site needs, such as parking or storage for to non-residential uses. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Elligsen Road South Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There are only a few rural residences in the Elligsen Road South Urban Reserve. The reserve is also already adjacent, or in relatively close proximity, to urban residential uses, employment uses, and major roadways. Therefore, urban development of the reserve is not expected to cause a significant change in sense of place or degradation of rural lifestyle for the existing residents of the reserve. The reserve's stream corridors and habitat areas that will require protection when added to the UGB can also help to reduce or at least slow the loss of sense of place and rural lifestyle. Urbanization of the reserve could also bring new social, educational, and recreational opportunities for existing residents.

As detailed more fully in response to Factor 2, and due in part to the reserve's proximity to a mix of existing urban uses and the opportunity to itself develop with a mix of new uses, urbanization of the reserve is not expected to cause significant increases in VMT. The energy impacts from urbanization of the reserve would also therefore be relatively minimal.

Aerial imagery suggests there may be more than 150 acres of commercial agriculture occurring in the reserve, but that appears to be largely pastureland and field crops and not row crops or nursery stock. While there would be economic consequences from urbanization in terms of a loss in farming activity in the reserve, that loss may be outweighed by the economic benefits of residential and/or employment development. Moreover, farmlands in the reserve are somewhat separated from each other by streams, natural areas, powerlines, and rural residential uses and urbanization of one area may not

necessarily impact agricultural activity that continues to occur on other farmlands until they too are ready to develop.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Elligsen Road South Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

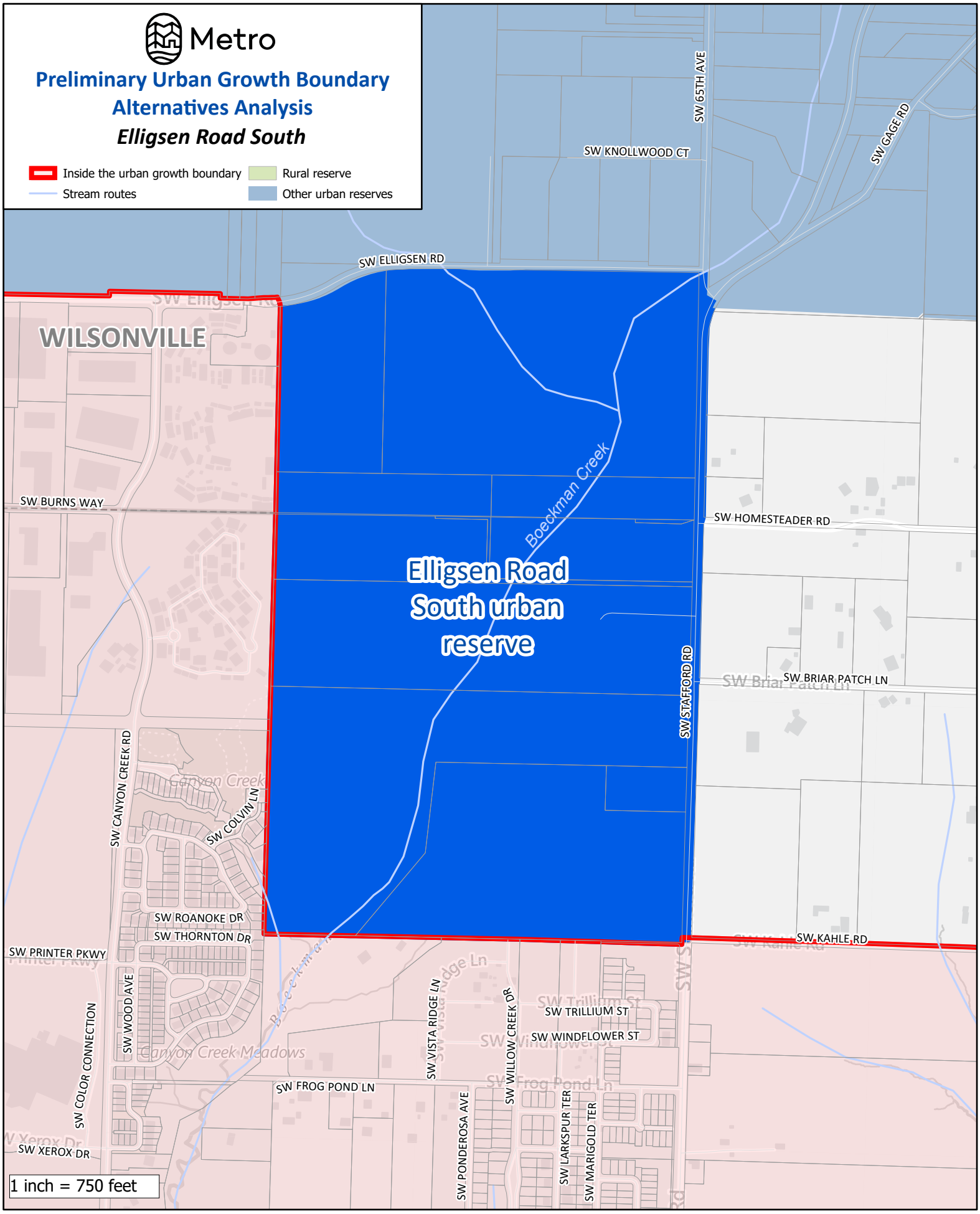
Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Clackamas and Washington Counties, border the Elligsen Road South Urban Reserve in areas outside the UGB to the east and north, respectively.

Most of the EFU-zoned land to the east is in agricultural production and includes field crops and nursery and pastureland, with a few rural residences. SW Stafford Road separates the reserve from these EFU-zoned lands, but the road itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. The improvement of SW Stafford Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on SW Stafford Road, which could impact the movement of both farm equipment and goods. Therefore, proposed urban uses are considered incompatible with the nearby agricultural activities occurring on the EFU-zoned land to the east.

The small section of EFU-zoned land adjacent to the north is being actively farmed with field crops and includes one residence. SW Elligsen Road separates the reserve from these farmlands, but the road itself would not provide an adequate buffer between urban development and agricultural activity. Conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer could still occur. In addition, the improvement of SW Elligsen Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. The limited frontage between the reserve and the EFU-zoned lands to the north should help reduce potential conflicts. However, urbanization would increase traffic on SW Elligsen Road, which could impact the movement of both farm equipment and goods. The proposed urban uses are, therefore, considered generally incompatible with the nearby agricultural activities occurring on the small portion of farmland to the north.

Overall, the proposed urban uses would have low compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB to the east and to a lesser extent to the north. Land use conflict mitigation measures would be warranted on the urban side of the boundary.

The Elligsen Road South Urban Reserve is given a “low” score in Attachment 3 for this Goal 14 boundary location factor.



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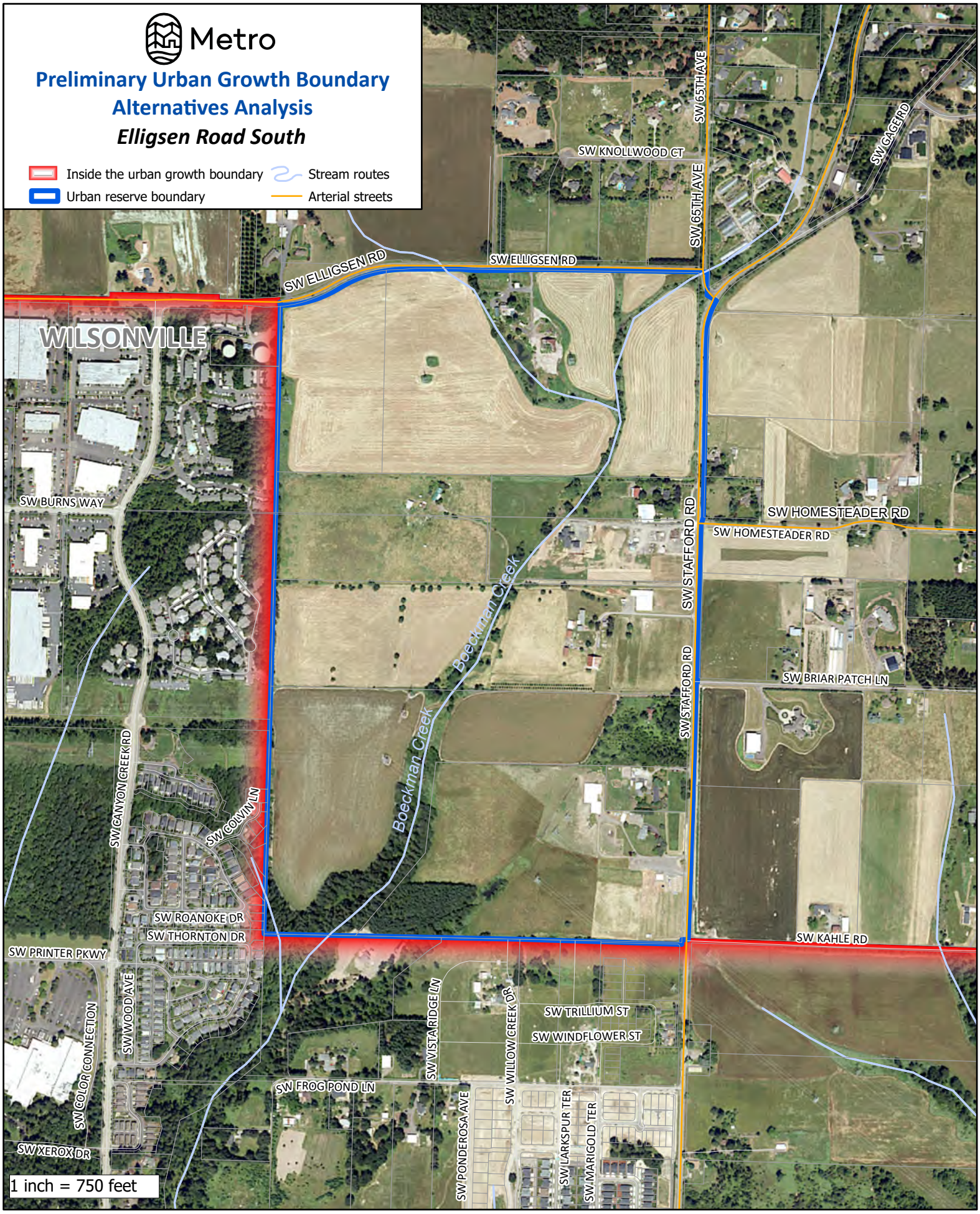

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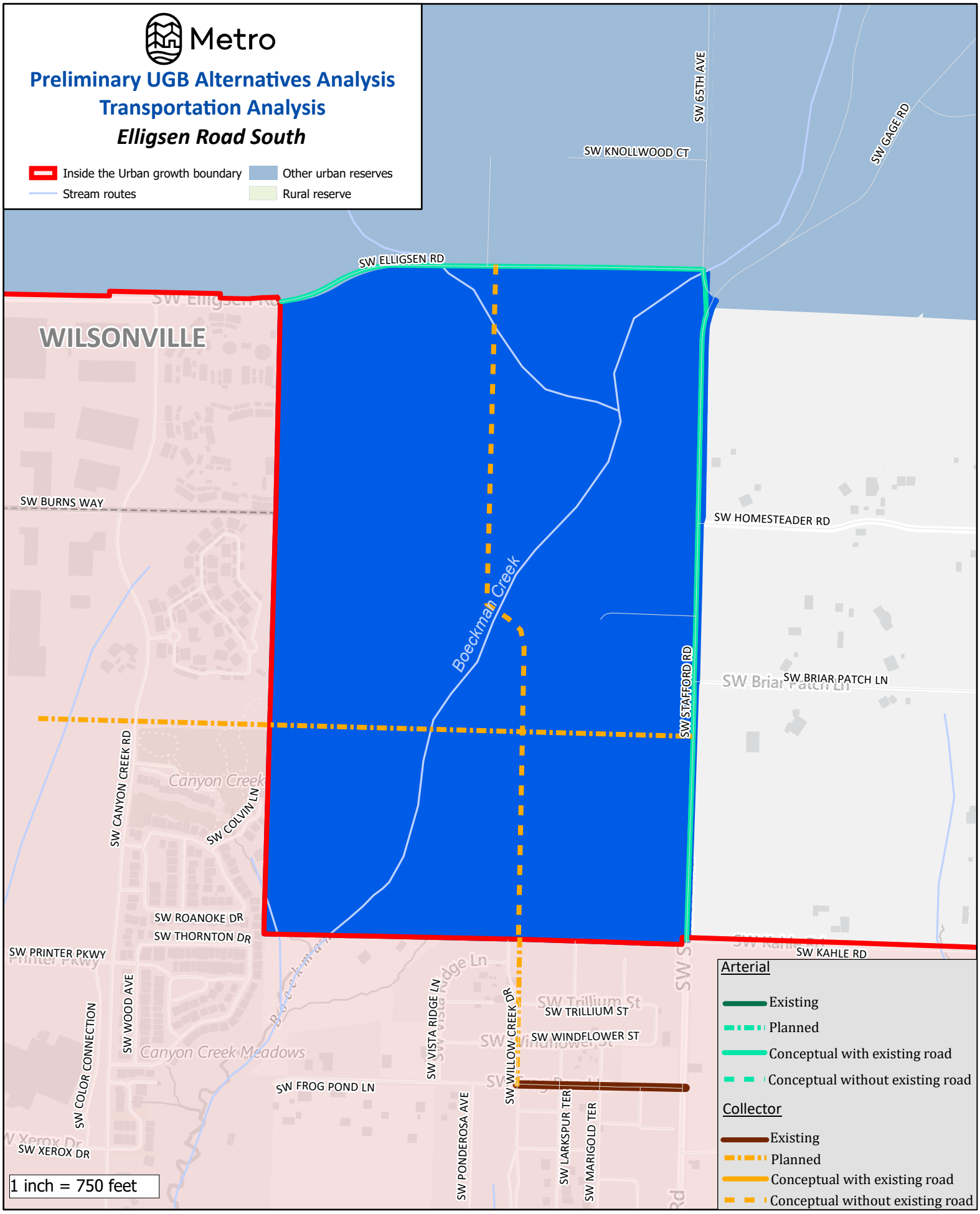

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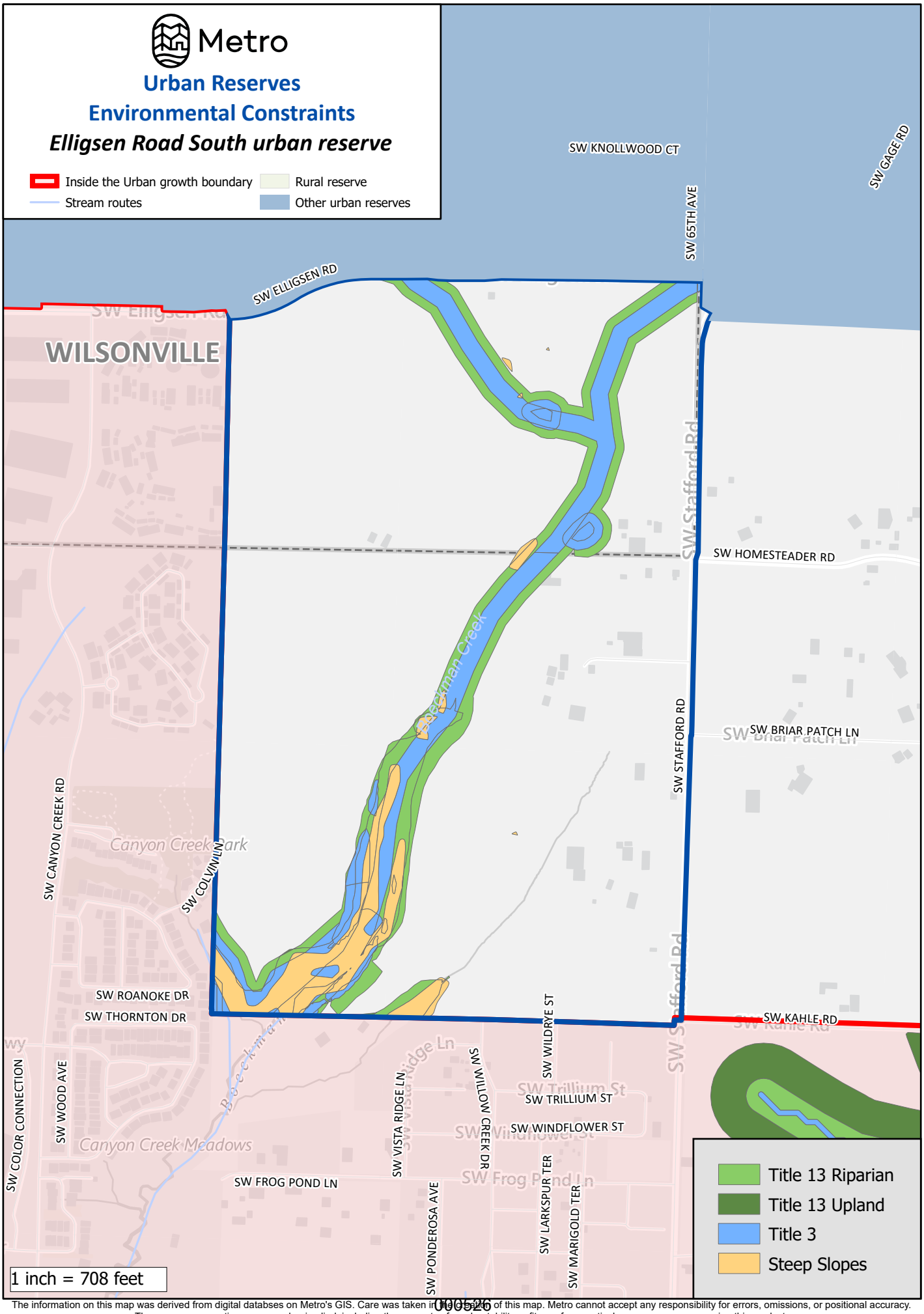

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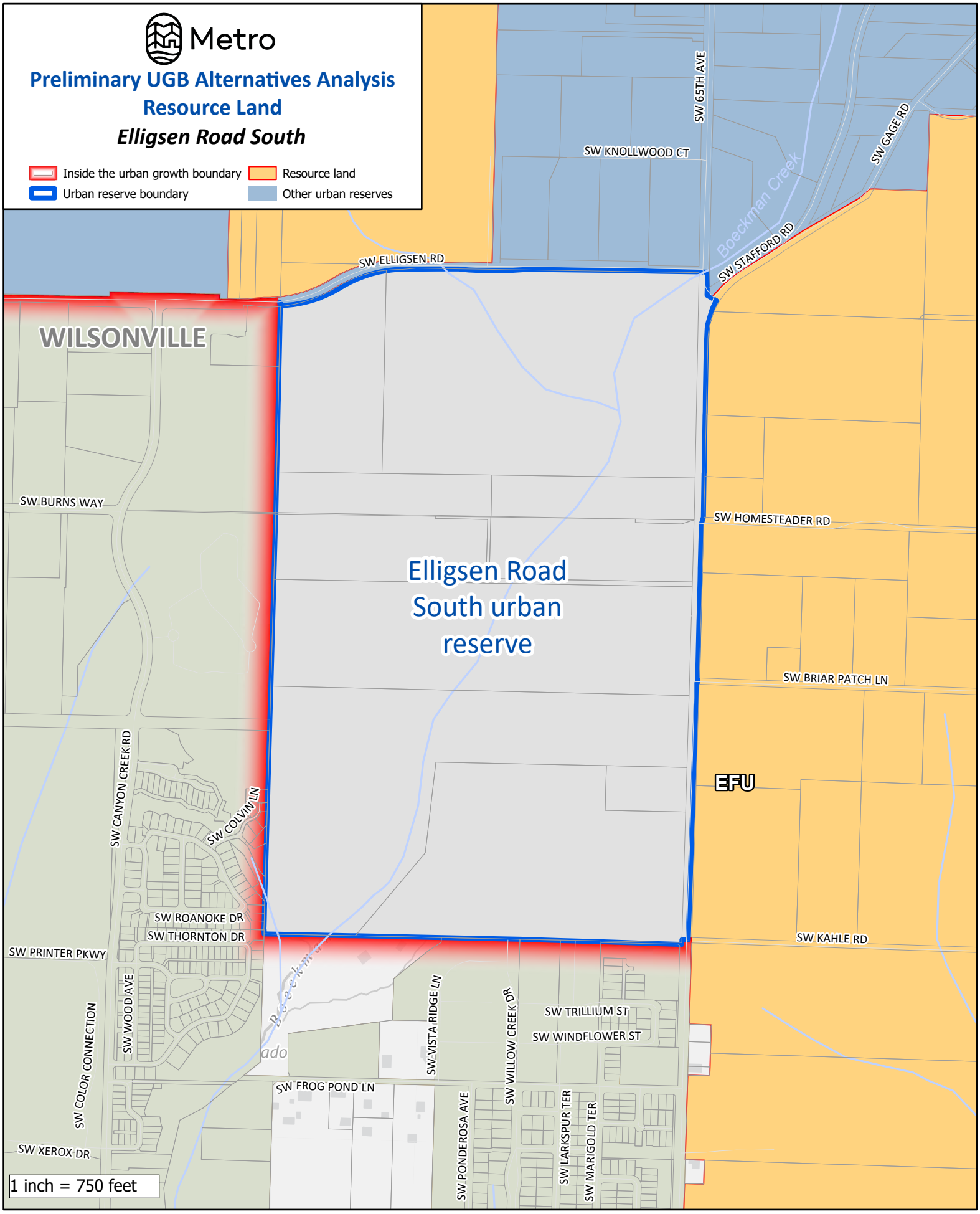

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GRAHAMS FERRY URBAN RESERVE

Total Reserve Area	203 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	200 acres
Gross Vacant Buildable Area	92 acres
Net Vacant Buildable Area	**68 acres**

The Grahams Ferry Urban Reserve is a relatively compact area east of SW Grahams Ferry Road and north of SW Tooze Road. The UGB and Wilsonville city limits are the southern and eastern boundaries of the reserve, while rural reserve lands border to the north and northwest. The Metro-owned Coffee Lake Wetlands natural area is adjacent to the reserve's eastern side within the UGB.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Grahams Ferry Urban Reserve is comprised of 24 contiguous tax lots, all of which are entirely within the reserve. The combined area of the reserve's tax lots is approximately 200 acres. More than 70 percent of the tax lots are smaller than five acres. Five tax lots are larger than 10 acres, with one being approximately 60 acres. As noted above, the entire reserve contains 92 gross vacant buildable acres and 68 net vacant buildable acres.

According to aerial imagery, the majority of the reserve is comprised of pastureland, groves of trees, small agricultural uses, some rural residential land uses. Twenty of the reserve's tax lots have improvements, with the median assessed value of those tax lots' improvements being more than $306,000; the aforementioned 60-acre tax lot has improvements assessed at more than $470,000 and a 2.7-acre tax lot has improvements assessed at more than $1.4 million.

The existing low density Villebois residential development is directly across SW Tooze Road from the reserve. Lowrie Primary School and Carinthia Park are approximately half a mile to the southeast, while Tracodero Park, Sparrow Creek Community Center, and a dog park are even closer. An interchange with I-5 is slightly more than two miles away via SW Grahams Ferry Road, SW Ridder Road, and SW Boones Ferry Road. A 2040 Growth Concept designated corridor along SW Parkway Avenue is approximately 1.5 miles via SW Tooze Road and Boeckman Road and on the opposite side of I-5. A Westisde Express (WES) rail stop is also about 1.5 miles away.

The reserve is relatively flat, but there are a couple of locations with slopes greater than 10 percent. The five largest tax lots are adjacent to each other and form a 155-acre contiguous area. However, there are some significant natural resources located on these tax lots that will direct development to the western portion of the reserve where tax lots are much smaller and where there is existing residential development, further away from the existing employment centers in Wilsonville. Moreover, Metro's ownership of the Coffee Lake Wetlands tract bordering the reserve to east effectively eliminates the opportunity for future new roadway connections between the reserve and industrial uses to the east within the UGB along SW 95th Avenue and SW Boones Ferry Road. With

these factors, and the proximity of parks, schools, and existing residential development, the area is considered suitable to accommodate a residential land need and not an employment land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Grahams Ferry Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Wilsonville. The City's primary supply comes from the Willamette River. There is a single water treatment plant, the Willamette River Water Treatment Plant, that serves the city and is in shared ownership with Tualatin Valley Water District. The treatment plant is understood to be capable of processing 15 MGD, and a planned improvement will bring capacity to 20 MGD in order to serve development in the existing UGB through the year 2036. There are currently no significant known storage, pumping, or distribution system deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The city is believed to have ample water rights for the long term, so water supply to urban development of the reserve is not a concern. The planned expansion of the treatment plant should provide sufficient capacity for development of the reserve. Existing storage tanks, however, do not have capacity to serve development outside of the existing UGB. Based on topography, the reserve could be served by gravity from the Elligsen Reservoirs (i.e., not require pumping). Future system infrastructure as shown in the City of Wilsonville Water System Master Plan is adequately sized for required fire flow and operating pressures.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Greater storage capacity may be needed to avoid negative impacts to service in the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0.99 million
12-inch pipe	$1.6 million
16-inch pipe	$0
Pumping	$0
Storage	$0.10 million
Total:	**$2.69 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,964**

Sanitary Sewer Services

With regard to sanitary sewer services, the Grahams Ferry Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from adjacent lands in the City of Wilsonville is conveyed in a city-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP), which was upgraded in 2014 to a capacity of 4.0 MGD, resulting in excess capacity. That excess capacity is believed to be able to accommodate growth in the Frog Pond areas recently added to the UGB. The city is planning to planning on necessary system upgrades to meet future needs. The existing system, including its piping and pump stations, is not known to have any hydraulic deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Depending on the timing of additional development in the UGB, planned treatment plant upgrades may be needed sooner in order for the system to also serve new development in the Grahams Ferry Urban Reserve. No pumps are likely needed to serve development of the reserve. However, there are trunk line extensions that will be needed to serve the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The above-mentioned trunk line extensions will be needed to serve the reserve and avoid negative impacts to existing services in the Villebois basin.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$1.24 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0
Force mains	$0
Total:	**$1.24 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$905**

Stormwater Management Services

With regard to stormwater management services, the Grahams Ferry Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Wilsonville Stormwater Master Plan (2012) identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The identified problem areas were isolated and there were no serious flooding issues identified under existing conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography, it seems likely that stormwater management for the development of Grahams Ferry Urban Reserve would occur within the development area and outfall directly to Coffee Creek, without connecting to an existing public stormwater system. The aforementioned master plan does not indicate issues in Coffee Creek downstream of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

If stormwater outfalls directly to Coffee Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$0.32 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$2.76 million
Total:	**$3.08 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,251**

Transportation Services

With regard to transportation services, the Grahams Ferry Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the Grahams Ferry Urban Reserve had an above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Wilsonville. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The roughly 100-acre and centrally-located Wilsonville Town Center aligns with this 2040 Growth Concept Map area. The City of Wilsonville's Town Center Plan envisions it as vibrant, walkable destination that inspires people to come together and socialize, shop, live, and work. The town center, as well as nearby employment areas on the opposite (west) side of I-5, include grocery and drug stores, a library, medical and dental offices, banks, and restaurants. These areas also contain and are adjacent to residential uses, including higher-density residential uses. The town center is located a short distance from the terminus of the TriMet's Westside Express Service (WES) Commuter Rail line, which provides service up to Beaverton.

South Metro Area Regional Transit (SMART), the City of Wilsonville's bus service, provides transit services to the city through seven bus lines; Route 7 "Villebois Line" connects the town center to areas in the western portion of Wilsonville's UGB, including the Villebois neighborhood in the UGB adjacent to the reserve.

The town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs through modes other than private motor vehicle transport. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact home-based VMT per capita in the future.

The town center is about a mile away from the areas in the UGB adjacent to the reserve, on the opposite side of I-5. There are closer employment areas, including industrial areas near the east of the reserve on the other side of the Coffee Lake Wetlands and commercial areas on the same side of I-5 as the reserve. The Villebois neighborhood, which includes medium-density residential uses, parks, and school uses, is across SW Tooze Road from the reserve. Growth in areas in the UGB near the reserve may continue to rely on private motor vehicle transportation, though existing transit service and bike and pedestrian infrastructure can provide alternatives and the relatively close proximity of a mixture of uses could keep vehicle trips relatively short.

Indeed, in addition to routes described above, SMART also provides medical transport services, a Villebois shopping shuttle, and connections to Keizer and Woodburn. The vast majority of the city's developed areas are within a quarter of a mile of a transit stop. Figure 4.3 in Chapter 4 of the 2023 RTP does, nonetheless, identify a gap in planned frequent transit service along SW Boones Ferry Road and other locations in the north of the city.

Wilsonville has a well-defined bike network of at least 19 miles of dedicated bike lanes and at least eight miles established bikeways that connect neighborhoods, schools, parks, community centers, business districts, and natural resource areas. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Wilsonville as a part of the planned regional bike network, including facilities on SW Boekman Road and SW Wilsonville Road. There is identified gap in planned regional bike facilities on SW Stafford Road.

The city also has a fairly well-defined pedestrian network in its town center and residential neighborhoods, though with less pedestrian amenities in some industrial and employment areas. I-5 generally provides a barrier for east-west pedestrian connections, but there are sidewalks along both sides of SW Wilsonville Road as it crosses under I-5; there are no sidewalks on SW Boeckman Road over I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of streets in Wilsonville as in the regional pedestrian network, including SW Wilsonville Road, SW Barber Street, and SW Boeckman Road west of I-5. The figure identifies gaps in the future regional pedestrian network along SW Boeckman Road east of I-5.

Figure 4.6 in Chapter 4 of the 2023 RTP identifies a number of trails in the south and west of Wilsonville as in the planned regional trail network.

There are no high injury corridors or high injury intersections in Wilsonville's portion of the UGB identified on Figure 4.14 in Chapter 4 of the 2023 RTP.

I-5, bisecting Wilsonville, is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of the chapter indicates that it currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

An interchange with the nearest RTP-designated throughway, I-5, is slightly more than two miles away from the reserve via SW Grahams Ferry Road, SW Ridder Road, and SW Boones Ferry Road. As noted above, I-5 currently meets travel speed reliability performance thresholds. Given its relatively small size, urban development of the reserve is unlikely to generate sufficient traffic on the highway to cause it to no longer meet those performance thresholds.

Currently, there is no regular SMART service all the way to the reserve. SMART's Route 7 has a stop about one-half mile from the reserve and provides limited connecting service to the SMART Central Station for WES trains. The Route 7 Villebois Shopper Shuttle provides connection the town center. The WES Wilsonville station is a little over one mile away from the reserve.

The majority of SW Tooze Road and SW Boeckman Road adjacent to the reserve have dedicated bike lanes. These facilities extend east across I-5, south to Villebois, and through employment areas around SW 95th Avenue. SW Grahams Ferry Road also has some dedicated bike lanes, but only a short 250-foot-long section of the road has bike facilities adjacent to the reserve. Significant natural areas border the east side of the reserve, which could limit more direct bike access from the reserve to SW Boeckman Road.

A majority of SW Tooze Road and SW Boeckman Road have a sidewalk on at least one side, and sidewalks are present in all of the developed portions of Villebois. There are no existing sidewalks within the reserve. The natural areas bordering the east side of the reserve could limit direct pedestrian access to SW Boeckman Road. Access to the nearby Ice Age Tonquin Trail is in Villebois, which extends south through Graham Oaks Nature Park to the Willamette River.

Lowrie Primary School and Carinthia Park are approximately half a mile to the southeast in Villebois, while Tracodero Park, Sparrow Creek Community Center, and a dog park are even closer. Future residents of the reserve could access these school and park uses in Villebois, as well as the SMART Route 7 stops, without travel by private motor vehicle. The bike and pedestrian facilities along SW Tooze Road and SW Boeckman Road could also help to support active transportation to nearby employment areas, the town center, and the WES station.

c. *Impacts to existing facilities that serve nearby areas already inside the UGB*

SW Boones Ferry Road, SW Grahams Ferry Road, and SW Tooze Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, given the small size of the reserve, the proximity of schools, parks, the town center, and employment uses, and the availability of bike and pedestrian facilities, additional traffic is not likely to be significant. The nearby bike and pedestrian facilities and the Ice Age Tonquin Trail would see some amount of additional use.

Development of this reserve is unlikely to cause facilities in Wilsonville to become high injury corridors or intersections, jeopardize the throughway reliability of I-5, or cause significant increases in the area's home-based VMT per capita.

d. *Need for major transportation facility improvements and associated costs*

The roughly 0.61-mile-long portion of SW Grahams Ferry Road along the west of the reserve will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. A slightly more than half-mile-long collector is also likely needed north of SW 110th Avenue through the middle of the reserve and connecting to SW Grahams Ferry Road. These facility improvements are assumed to have normal per-mile costs, given the relatively flat topography.

Facilities	Cost
Arterials, existing/improved full street	$31.30 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$21.15 million
Total:	**$52.45 million**
Per assumed unit:	**$38,341**

e. *Provision of public transit service*

The Grahams Ferry Urban Reserve is outside the TriMet Service District. SMART evaluated the reserve for providing transit service. SMART could potentially provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in, and in the corridors leading to, the reserve. Service could be provided at 60-minute headways weekday, with one additional bus at a capital cost of $450,000 (recurs every eight – 12 years). Bus capital costs reflect the purchase of a Category C electric vehicle as SMART plans to provide services with a zero-emission fleet. Annual service cost of adding fixed-route and complementary paratransit service would be $45,000 in addition to services already being provided. This annual service cost would increase with the cost of inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Coffee Lake Creek flows south along the northern edge of the Grahams Ferry Urban Reserve and then continues south through the eastern portion of the reserve for approximately 1,260 feet. A 44-acre portion of a much larger wetland system identified on the local Wilsonville inventory is located west of the portion of Coffee Lake Creek that flows through the area. The wetland appears to contain some irrigation ponds and an irrigation channel. This wetland extends south and east to connect with the wetland that is located on the Metro-owned open space within the UGB to the east, surrounding the very eastern portion of the reserve. A substantial amount of riparian habitat is identified along the wetland and stream, more or less encompassing the entire east side of the reserve. Given that all of the natural resources are located in the eastern portion of the reserve, urbanization of the western section could occur with no impacts to the stream and wetland areas.

Overall, urbanization of the area could occur with comparatively minimal impacts to the stream corridor and the wetland area, assuming future development is focused away from the wetland and stream complex. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, Grahams Ferry Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

Natural resources and public ownership of lands will limit the amount of urban development the Grahams Ferry Urban Reserve can accommodate and will focus that development in certain locations, generally in the southwest corner of the reserve nearer to existing urban development already inside the UGB. There are already a number of rural residences in this location of the reserve; because of that existing development and its proximity to urban areas, development is not expected to cause a significant change in sense of place or degradation of rural lifestyle for the area's existing residents. That existing development and parcelization can also slow the speed of development and therefore the pace of noticeable change.

As detailed more fully in response to Factor 2, there may be additional vehicle traffic generated from urbanization of the reserve, but increased VMT and related energy impacts would be relatively small.

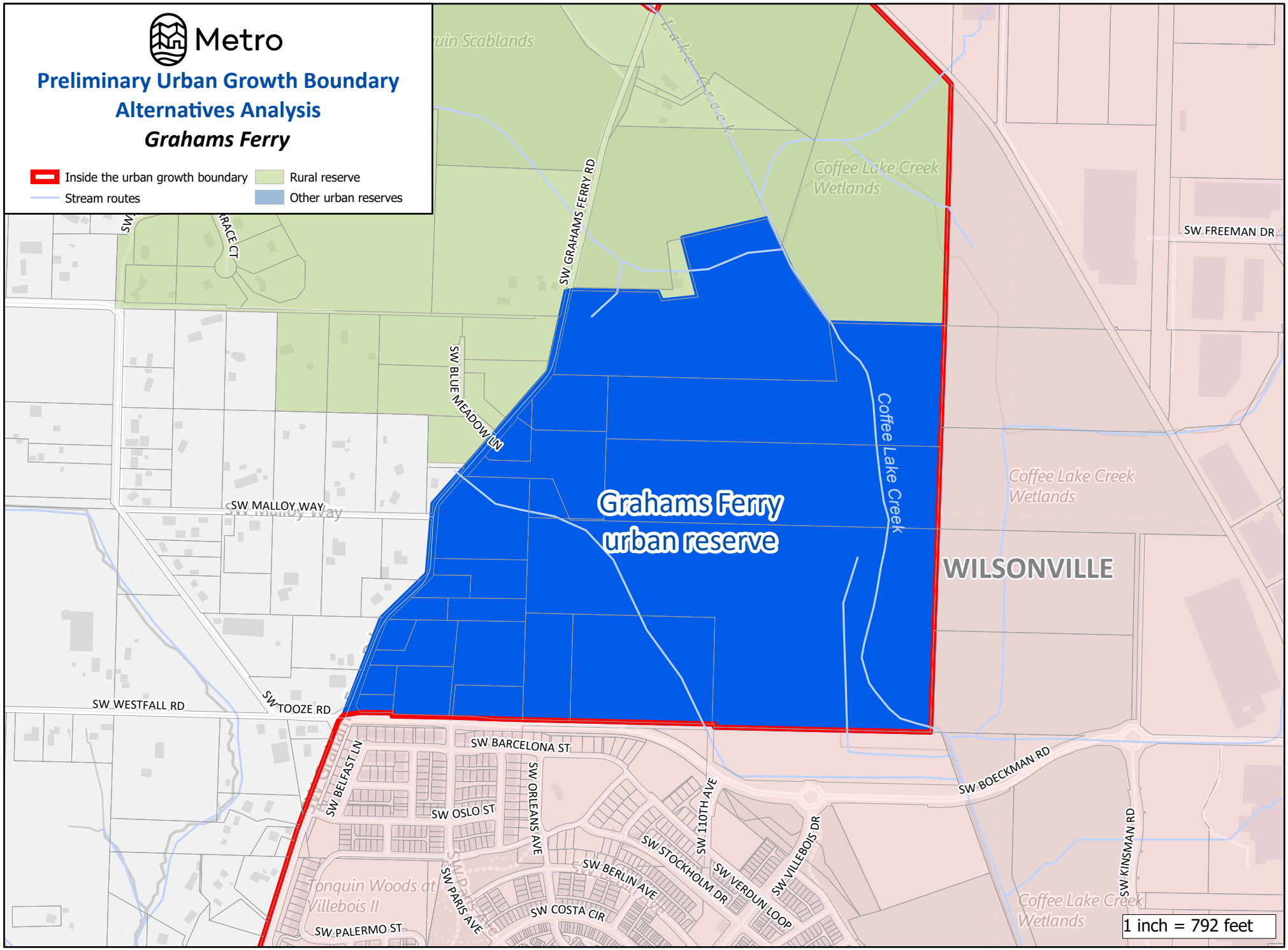
There are fewer than 30 acres of commercial agriculture occurring within the reserve and the economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Grahams Ferry Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Lands outside the UGB bordering the north side of the Grahams Ferry Urban Reserve have Goal 3 zoning, specifically Exclusive Farm Use (EFU) zoning by Clackamas County. These lands do not have agricultural activities and, while there are some forested areas, the lands are owned by Metro and therefore unlikely to be used for commercial forestry. The EFU zoning extends west of SW Grahams Ferry Road, but these areas don't have agricultural activities either and some of these areas tax lots are also owned by Metro. A nearby forested tax lot is a privately-owned open space tract of a homeowners association. Considering the lack of the agricultural activities occurring on the adjacent EFU zoned land and Metro and homeowners association ownership, the proposed urban uses would be considered to have high compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.

The Grahams Ferry Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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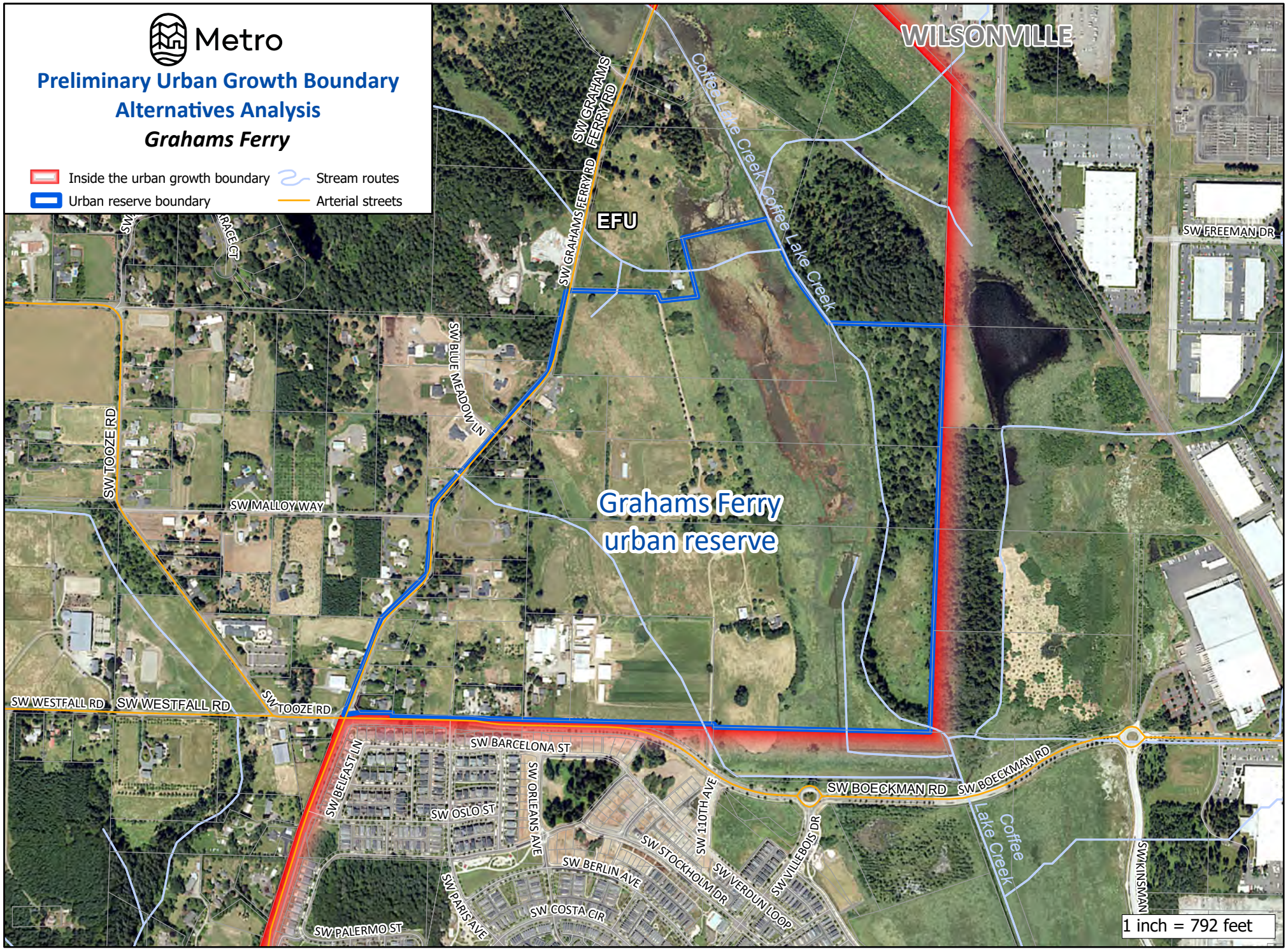

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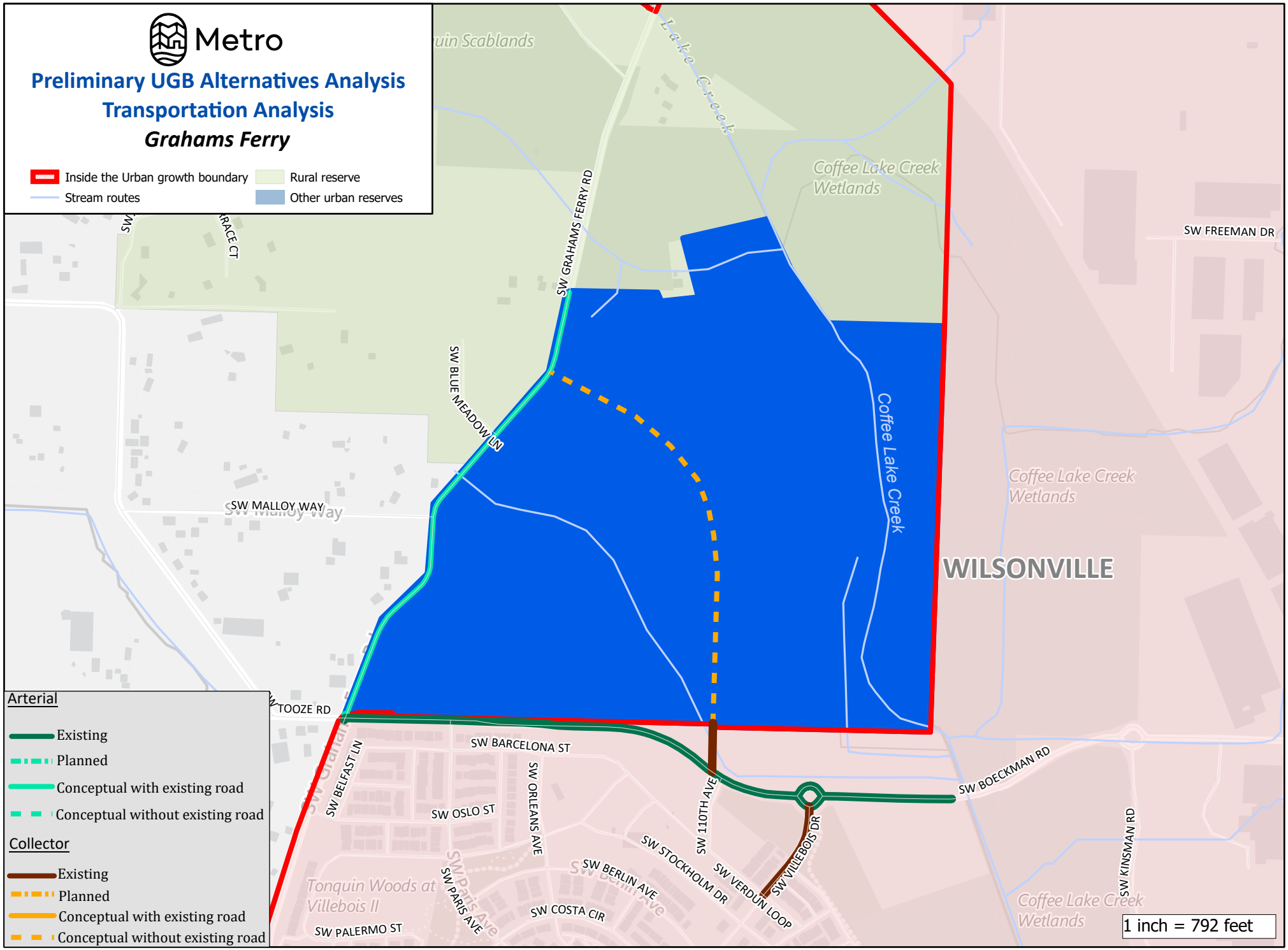

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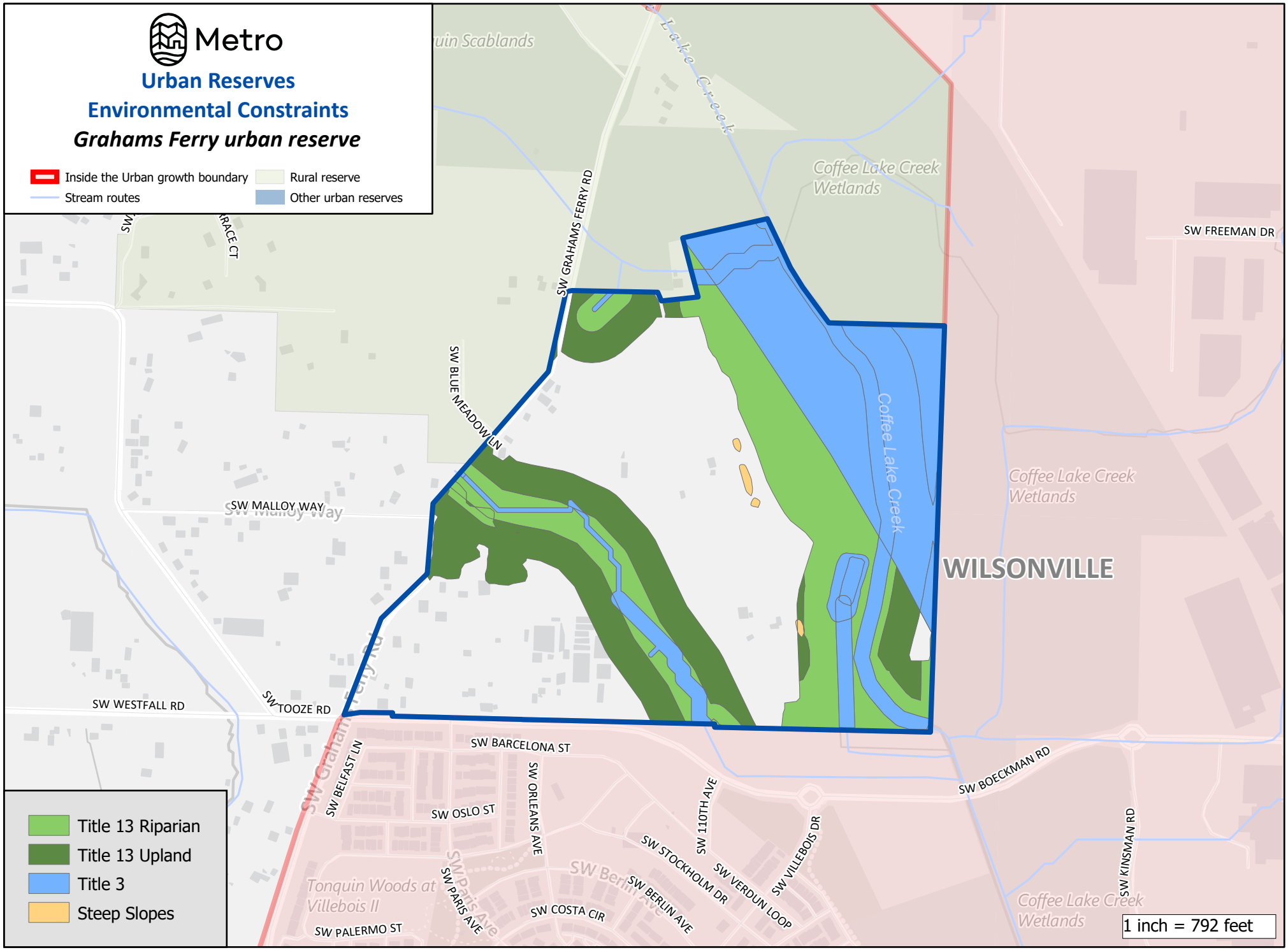

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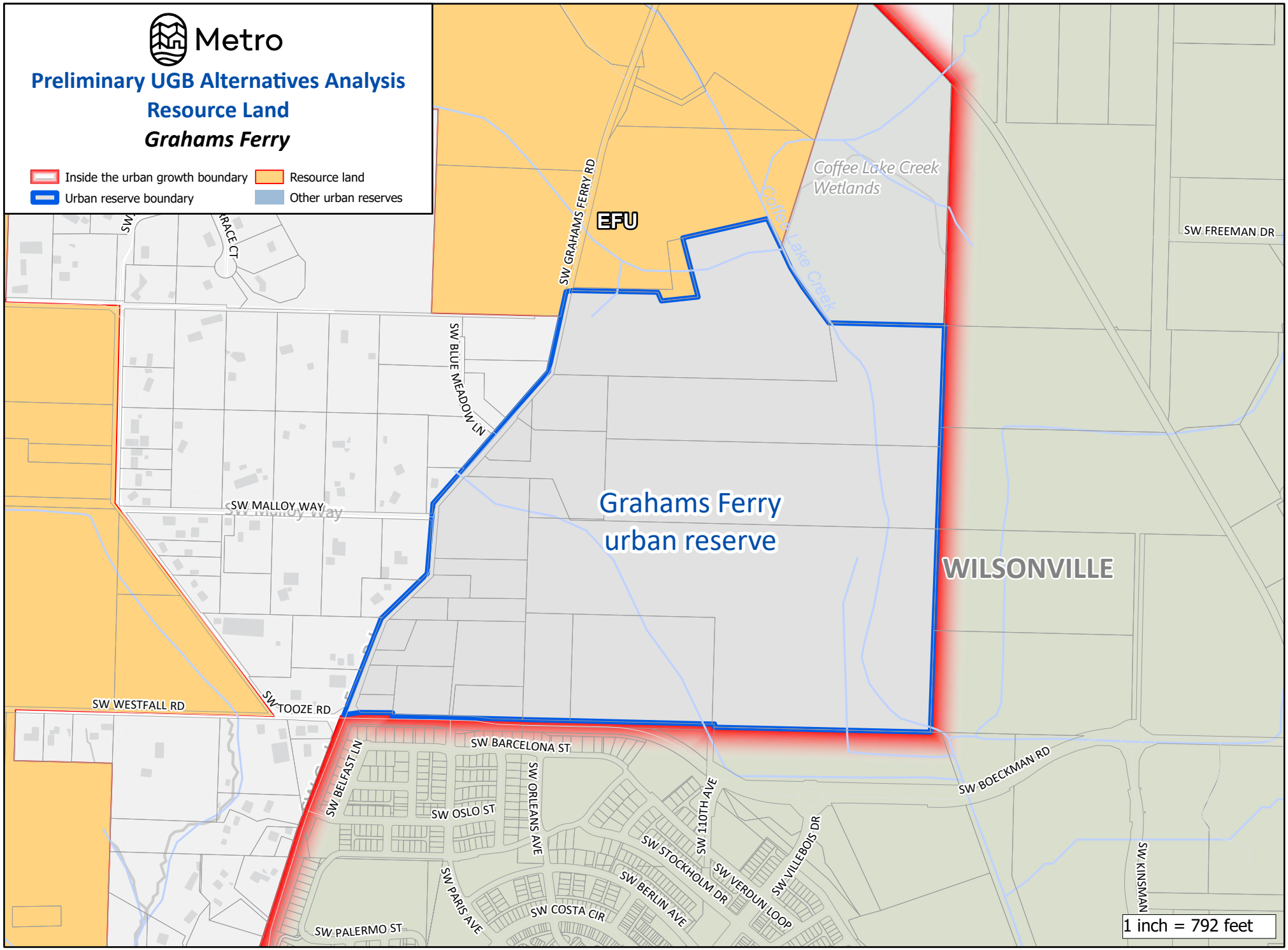

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GRESHAM EAST URBAN RESERVE

Total Reserve Area	857 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	799 acres
Gross Vacant Buildable Area	630 acres
Net Vacant Buildable Area	**469 acres**

The Gresham East Urban Reserve is a boot-shaped area adjacent to the east side of Gresham. The reserve is bounded by SE Lusted Road to the north, SE 302nd Avenue to the east, and the riparian areas of Johnson Creek to the south. The UGB is the reserve's western boundary, while the remainder of the reserve is bordered by rural reserves. Gresham East Urban Reserve is bisected by SE Orient Drive, SE Dodge Park Boulevard, SE Powell Valley Road, and SE Chase Road. The reserve is primarily flat, with all slopes over 25 percent only located along three of the four drainages that flow generally westward through the area.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Gresham East Urban Reserve is comprised of 230 contiguous tax lots, all of which are practically entirely within the reserve and have a combined area of approximately 799 acres. More than 80 percent of the tax lots are five acres or less in size; more than 60 percent are smaller than two acres and only three tax lots, including one owned by a school district and another by the East Multnomah Soil and Water Conservation District, are greater than 20 acres. As noted above, the entire reserve contains 630 gross vacant buildable acres and 469 net vacant buildable acres.

According to aerial imagery, the area is predominantly in agriculture use, but intermixed with some rural residential uses as well as commercial land uses primarily along SE Dodge Park, SE Powell Valley Road, and SE Orient Drive. About 61 acres of the reserve are owned/occupied by the Gresham-Barlow School District facilities, including Sam Barlow High School, West Orient Middle School, East Orient Elementary School, and associated uses (e.g., sports fields). A 0.85-acre tax lot is owned by the City of Gresham and is used for a water service facility. Overall, 201 (87 percent) of the reserve's tax lots have improvements, with a median assessed value of those tax lots' improvements exceeding $316,000, even when excluding those tax lots that are publicly owned.

Highway 26 is less than a mile away from the south end of the reserve via SE 282nd Avenue and SE Stone Road. "As the crow flies," the nearest interstate, I-84, is nearly five miles away, Oxbow Regional Park is nearly three miles away, and Southeast Community Park is about a third of a mile away. TriMet Route 84 already has a stop adjacent to the west side of the reserve at the intersection of S Orient Drive and SE 282nd Avenue.

Limited commercial or employment development may be appropriate in some areas of the reserve, such as in the vicinity of SE Powell Valley Road, SE Dodge Park Boulevard, and SE Orient Drive, given these areas' relatively flat topography, existing commercial uses, and proximity to Highway 26 and existing transit. More significant residential development, however, could occur on the

reserve's agricultural lands in relatively close proximity to existing schools and other urban residential development. Some of the agricultural lands could also provide employment capacity, especially those that are closer to Gresham's Springwater Corridor Industrial area. Therefore, this area is considered capable of efficiently accommodating residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Gresham East Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The nearby lands in the UGB are also in the City of Gresham, which currently receives most of its water supply from Portland Water Bureau (PWB) Bull Run conduits. The remainder comes from groundwater through the Rockwood Water Public Utility District (RWPUD). The City of Gresham and RWPUD plan to transition away from purchasing water from PWB to local groundwater supply by the time their contract with the City of Portland expires in 2026. As a result, there are wells at various stages of planning and construction, with sufficient supply capacity to meet projected 2026 maximum daily demand (MDD) and two planned future wells to provide supply capacity to meet demands through 2050. Storage and pumping capacity are sufficient to meet current demands, but additional storage capacity will likely be needed to meet build-out to 2050 within the existing UGB. Pumping capacity and the piping network are considered adequate.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Lusted Water District currently services most of Gresham East Urban Reserve; however, the district does not have the capacity to serve the area at urban densities. Gresham also does not have existing supply and storage capacity to serve the reserve. Gresham's Powel and Barnes Pump Stations may have surplus capacity sufficient to serve urban development of the reserve. There are two planned mainline improvements in roadways near the reserve: a 16-inch diameter pipe in SE Orient Drive and a 12-inch diameter pipe in near the southern end of the URA boundary. Both of these service extensions are intended to serve the future Springwater service level, but it isn't clear whether they are sized adequately to provide service to the reserve as well; therefore, costs associated with upsizing this extension, if needed, are not included in the below figures.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The supply and storage capacity improvements noted above would be needed to avoid negatively impacting services to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$7.40 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.62 million
Total:	**$8.02 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$854**

Sanitary Sewer Services

With regard to sanitary sewer services, the Gresham East Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Gresham's wastewater treatment facility, pipe network, and pump stations are generally considered appropriately sized to provide services to the area inside the UGB, including the Springwater area which is not yet annexed to the city. However, the City of Gresham 2019 Public Works Standards specify a rainfall derived infiltration and inflow (RDII) design rate of 1,000 gallons per net acre per day for new systems. The existing flow conditions for the five-year storm event is 4,070 gallons per net acre per day, indicating existing capacity deficiencies in the Upper Kelly Creek Basin Trunk.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Gresham's sanitary sewer master plan only covers full build-out within the current UGB and the wastewater treatment plant and pump stations have not been evaluated for their ability to serve areas outside the UGB. Nonetheless, if urban development of the Gresham East Urban Reserve were added to Kelly Creek Basin without appropriate improvements, there are presumed to be further capacity issues.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Full impacts to the existing facilities are unknown at this time. However, the capacity deficiencies in the Upper Kelly Creek Basin Trunk are not addressed, those deficiencies could be exacerbated by connecting urban development of the reserve and result in adverse impacts to existing facilities.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$7.98 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$5.58 million
Force mains	$0.71 million
Total:	**$14.27 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$905**

Stormwater Management Services

With regard to stormwater management services, the Gresham East Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of capacity issues with existing stormwater facilities that serve the land inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Development/redevelopment of impervious surfaces in the City of Gresham requires on-site stormwater management (i.e., water quality and flow control). Gresham East Urban Reserve contains portions of Johnson Creek, Kelly Creek, and Beaver Creek tributary. Based on topography, stormwater could likely be managed and discharge to these waterways without needing connection to public infrastructure. Because flow control would be required by future development, the capacity of the waterways themselves to receive stormwater from the urban development in the reserve should be adequate.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater is expected to be conveyed, treated, and disposed of within the reserve; therefore, no impacts to existing facilities in the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$4.44 million
24-inch pipe	$2.47 million
30-inch pipe	$0
Water quality/dentition	$7.70 million
Total:	**$14.61 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,555**

Transportation Services

With regard to transportation services, the Gresham East Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the City of Gresham's portion of the UGB adjacent to the Gresham East Urban Reserve had above average and significantly above average home-based VMT per capita in 2020. Other areas of Gresham had average, below average, and significantly below average VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a regional center and a separate town center in Gresham. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Gresham Regional Center, comprised of Gresham's Historic Downtown and its Civic Neighborhood, and the Rockwood Town Center align with these Growth Concept intentions.

The city's "One Gresham" initiative aims to have these centers serve as foci for commerce, public services/events, healthcare, placemaking, entertainment, and denser, mixed-use, vertical development. These centers are already largely built out and include grocery stores, other retail commercial uses, banks, large office tenants, healthcare facilities, mixed-use housing, and other residential uses. The regional center includes the Gresham Central Transit Center at the eastern terminus of the MAX Light Rail Blue

Line; the Blue Line has other stops in Gresham as well, including at the town center, and continues on to Portland. Numerous TriMet bus routes, including frequent bus routes, connect the regional center to other parts of Gresham and the region. Two largely-developed 2040 Growth Concept centers connected to other areas of Gresham and the region via light rail and bus service, the city's priorities in its "One Gresham" initiative, and the availability of bike lanes and sidewalks as detailed below demonstrate that growth in the Gresham portion of the current UGB will not necessarily cause a significant increase in home-based VMT per capita in the future.

As noted above, the MAX Blue Line has multiple stops in the adjoining Gresham portion of the UGB, with stops in the regional and town centers and in other neighborhoods. Gresham is also served by nearly a dozen TriMet bus routes, including several routes that are classified as having frequent or regular service. TriMet Route 84 connects the regional center to the edge of the UGB at the intersection of SE 282nd Ave and SE Orient Drive. Nonetheless, Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent transit service along certain north-south streets, such as 162nd and 181st Avenues.

Gresham has a well-defined bike network in the UGB that consists of a variety of bike facilities. There are approximately 48 miles of dedicated bike lanes and 16 miles of bikeways, such as the Springwater Corridor and the Gresham to Fairview Trail. Still, Figure 4.5 in Chapter 4 shows that there are gaps in the planned regional bike network along Burnside Street, Division Street, Orient Drive, and other areas.

Gresham also has a fairly well-defined pedestrian network in its regional and town centers and residential areas, although there a few neighborhoods of post-war housing where there are no sidewalks. Some employment and butte areas have less of an established pedestrian network as well. Figure 4.4 in Chapter 4 of the RTP indicates there are gaps in the planned regional pedestrian network along Division Street and Orient Drive.

The Springwater Trail is an existing regional trail that connects Gresham to other areas currently inside and outside the UGB. There are other regional trail sections in Gresham identified in Figure 4.6 in Chapter 4 of the RTP.

Figure 4.14 in Chapter of the 2023 RTP identifies several high injury corridors in the area already inside the UGB in Gresham, including Burnside Road, Division Street, Orient Drive, Powell Boulevard, and Stark Street. The figure also identifies the intersection of Stark Street and 275th Avenue, as well as intersections along Burnside Street and Highway 26, as high injury intersections within the UGB and within about five miles of the reserve.

Burnside Street/Highway 26 is also already inside the UGB, running through the City of Gresham. The route is identified as a throughway Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that it currently meets travel speed reliability

performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26, an RTP-designated throughway, is less than a mile away from the south end of the reserve via SE 282nd Avenue and SE Stone Road. As noted above, the portion of the highway near the reserve currently meets travel speed reliability performance thresholds.

There is currently no transit service into the reserve itself, though TriMet Route 84 connects Gresham's regional center to the western edge of the reserve at the intersection of SE 282nd Ave and SE Orient Drive.

While the Springwater Corridor Trail is just under a mile away from the reserve, but on the opposite side of Highway 26. There are also no bike facilities adjacent to or within the reserve itself. SE Chase, SE 302nd Avenue, and SE Short Road have been considered "helpful connections" and SE Lusted Road, SE Dodge Park Boulevard, and SE Orient Drive have been considered "bike with caution" routes.

Some residential subdivisions adjacent to the northwest of the reserve have sidewalks along their roads, including one, SE Teal Drive, that stubs directly to the reserve. Otherwise, there are no other sidewalks connecting to the reserve.

If the reserve were to be developed with employment uses, as considered possible in response to Factor 1, existing urban residential uses adjacent to the reserve could provide close-proximity housing to those uses' employees, helping somewhat to limit home-based VMT per capita. Having existing school facilities in and near the reserve could help to limit future residents' VMT as well. However, without additional transit connections, and unless the reserve is developed with employment and other service uses, the reserve's future residents will likely have to rely on private motor vehicles to access employment opportunities and their daily needs.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Portions of SE Lusted Road, SE Chase Road, SE Orient Drive, and SE 282nd Avenue within the UGB would be expected to see additional private vehicle traffic from development of the reserve. Indeed, the reserve is moderately distant from the regional center and currently lacks frequent transit service, bike, and pedestrian facilities to it, suggesting the need for private motor vehicle use on these roadways. However, as noted in response to Factor 1, the reserve is considered able to accommodate both residential and employment uses. If the reserve itself were to be developed with a mixture of uses, future residents could get more of their daily needs met locally without having to drive as much on roads already in the UGB. The existing school uses in the reserve will also help to limit driving by new residents on roads already in the UGB. Moreover, nearby

residences in the current UGB could provide housing to employees of the reserve, and new employment uses in the reserve could provide jobs for nearby residents of the current UGB, further limiting traffic impacts on roads already in the UGB.

With these considerations, development of the reserve may result in only moderate impacts to home-based VMT per capita in nearby areas already inside the UGB and the performance of Highway 26 as a throughway. Any additional motor vehicle traffic on Burnside Road, Division Street, Orient Drive, Powell Boulevard, and Stark Street resulting from development of the reserve, however, may exacerbate these roadways' high-crash conditions.

The dedicated bike lane on SE Powell Valley Road may see additional use if the portion of SE Lusted Road within the reserve is upgraded to urban standards with connecting bike facilities; however, there still will be a half-mile-long gap between SE Powell Valley Road and the improved SE Lusted Road, potentially limiting the existing bike lane's use.

The sidewalks in neighboring low density residential subdivisions in the UGB may see additional use with development of the reserve.

d. Need for major transportation facility improvements and associated costs

A roughly 0.88-mile-long portion of SE Lusted Road at the north of the reserve, as well as a 0.41-mile-long portion of and SE 282nd Avenue at the west of the reserve, will likely need to be improved to urban arterial standards, including with acquisition of some additional right-of-way. SE 282nd Avenue improvements are considered for the purposes of this preliminary analysis to be half-street improvements, as property on some of its west side is already within the UGB. A 1.04-mile-long portion of SE Orient Drive, which crosses through the southern half of the reserve, would also likely need to be improved to urban arterial standards. A 0.11-mile-long portion of SE Chase Road crossing through the northern half of the reserve, and a 1.4-mile-long portion of SE 302nd Avenue would be improved to urban collector standards. Because the terrain where much of these transportation facility improvements would be located is relatively flat, normal per-mile costs are mostly expected.

Facilities	Cost
Arterials, existing/improved full street	$86.59 million
Arterials, existing/improved half street	$11.37 million
Arterials, new	$0
Collectors, existing/improved full street	$60.05 million
Collectors, existing/improved half street	$0
Collectors, new	$0
Total:	**$158.02 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$16,829**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in, and in the corridors leading to, the reserve. Service could be provided at 30-minute headways through a route change to a conceptual service in TriMet's 2045 Network Vision with three additional buses at a capital cost of $3,000,000 – $4,500,000 (recurs every 12 years). The additional annual service cost is $1,254,240 and grows with inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

There are four streams that flow west through the Gresham East Urban Reserve. In the north, two tributaries to Beaver Creek have forested riparian habitat along the majority of their stream corridors, as well as some upland habitat identified near the stream closest to Sam Barlow High School. Similarly, Kelley Creek, which flows through the middle of the reserve, is entirely within a forested riparian habitat corridor. The fourth small stream in the southern part of the reserve flows into Johnson Creek, which travels through Gresham and Portland to the Willamette River. This stream has less riparian habitat when compared to the other three streams. It also flows through some agricultural lands and appears to be piped in a few locations.

No "100-year" floodplains are identified within the reserve. There is one small National Wetland Inventory (NWI) wetland of approximately a quarter acre in size just south of SE Orient Drive along the Johnson Creek tributary.

The proximity of flat, developable land adjacent to all four streams within the reserve indicates meaningful potential impact from urbanization of reserve, especially if there are new north-south transportation connections. Addition to the UGB does bring enhanced protection for streams, wetlands, and habitat areas, and the presence of a significant existing vegetated riparian corridor along Kelley Creek and the northern tributaries may help reduce the potential impacts of urban development. Restoration of degraded stream edges could improve the environmental conditions for the portion of the southern stream that flows through active farmland.

This analysis finds, however, that urbanization of this reserve would have comparatively moderate to high impact on the stream corridors and habitat areas, depending on needed transportation connections. Additional environmental consideration, specifically regarding

avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Gresham East Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

While there are a number of rural residences in the Gresham East Urban Reserve, including those in a few small platted rural residential subdivisions, they are generally clustered in certain areas, such as near school and rural commercial land uses. There is adjacent urban residential development to the west of the reserve, but there are few connections to that development from the reserve itself. Urbanization, particularly larger-scale developments on the flatter agricultural lands of the reserve, could cause some change in sense of place for the reserve's existing residents and some degradation of a more rural lifestyle. However, existing development and smaller parcel sizes in some areas may slow that development in certain locations. Moreover, urbanization of the reserve could bring new social, educational, and recreational opportunities for existing residents.

Of the three schools located in the urban reserve, the elementary and middle schools generally serve the surrounding rural area while the third, Sam Barlow High School, serves the urban and rural area. Urbanization may enhance the opportunity for Sam Barlow High School to become more of a community focal point, while the elementary and middle schools may be negatively impacted if they are not sized to serve an urban population. At the same time, urbanization may provide the opportunity for these two smaller school facilities to be enhanced.

As detailed more fully in response to Factor 2, urbanization of the reserve may not necessarily cause significant increases in VMT, particularly if the reserve were to be developed with a mixture of uses that allows existing and future residents to access daily needs closer to home. Limiting VMT will also help to limit adverse energy consequences.

There is a substantial amount of agricultural activity occurring in the reserve, including large commercial nursery operations and field and row crops. The economic consequences from urbanization in terms of a loss in farming activity in the reserve could be considerable; however, that loss may be outweighed by the economic benefits of residential and/or employment development, which could also be considerable given the amount relatively flat and easily developable land.

Overall, there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The Gresham East Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location sub-factor.

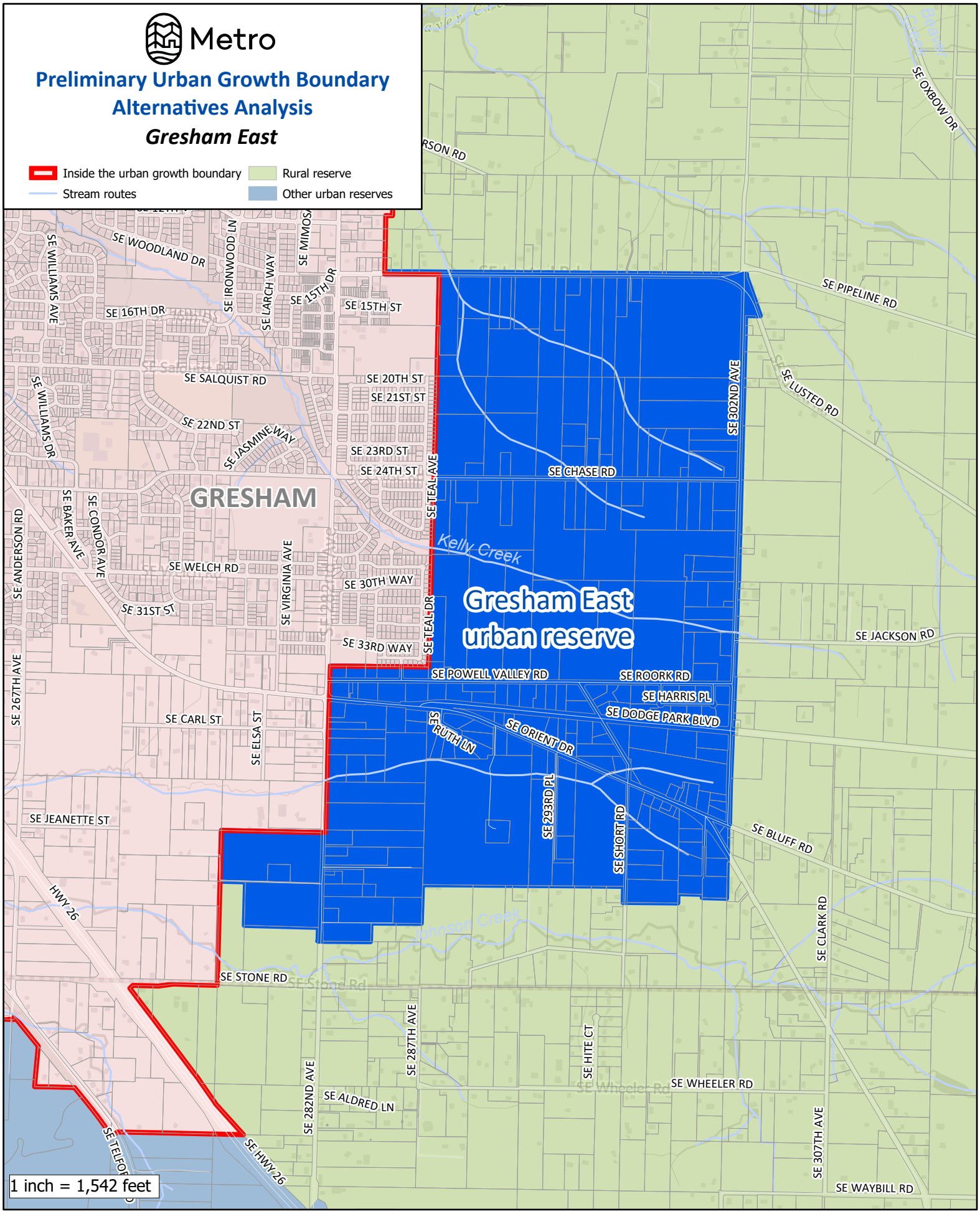
Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Multnomah County, border the Gresham East Urban Reserve in three locations outside the UGB.

The first location is to the east of the reserve on the opposite side of SE 302nd Avenue, where EFU-zoned lands border the reserve for approximately 2,500 feet near the intersection with SE Chase Road. These EFU-zoned lands are nearly entirely in agricultural production for field crops and nursery stock, though there are a couple of rural residences. There are no significant stands of trees in this location. The proposed urban uses would not be compatible with these agricultural activities, in part because 302nd Avenue does not provide an adequate buffer between the two uses and conflicts related to safety, liability and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer could occur. The improvement of SE 302nd Avenue to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on SE 302nd Avenue and SE Chase Road, which could impact the movement of both farm equipment and goods. Therefore, proposed urban uses are considered incompatible with the nearby agricultural activities occurring on the EFU-zoned land to the east.

The second and third locations are at the south of the reserve where there are EFU-zoned lands along Johnson Creek. Here, there are two pockets, each smaller than 10 acres, of agricultural activities occurring on the land north of Johnson Creek. A portion of the western pocket west of SE 282nd Avenue is in the same ownership as agricultural land inside the reserve. It may not be economically viable for this small pocket to continue in agricultural production if the land under the same ownership to the north and in the reserve is urbanized. The majority of the agricultural activity in this area occurs south of Johnson Creek and north of Highway 26 and will not be directly impacted by urbanization of the reserve. However, increased traffic along SE Stone Road will probably have some adverse effects, as SE Stone Road provides access to Highway 26. The proposed urban uses are mostly compatible with the agricultural activities occurring on this farmland, with the exception of the one small pocket north of Johnson Creek that would warrant buffering from the urban uses.

This analysis finds that the proposed urban uses are considered to have low compatibility with the nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The Gresham East Urban Reserve is given a “low” score in Attachment 3 for this Goal 14 boundary location factor.



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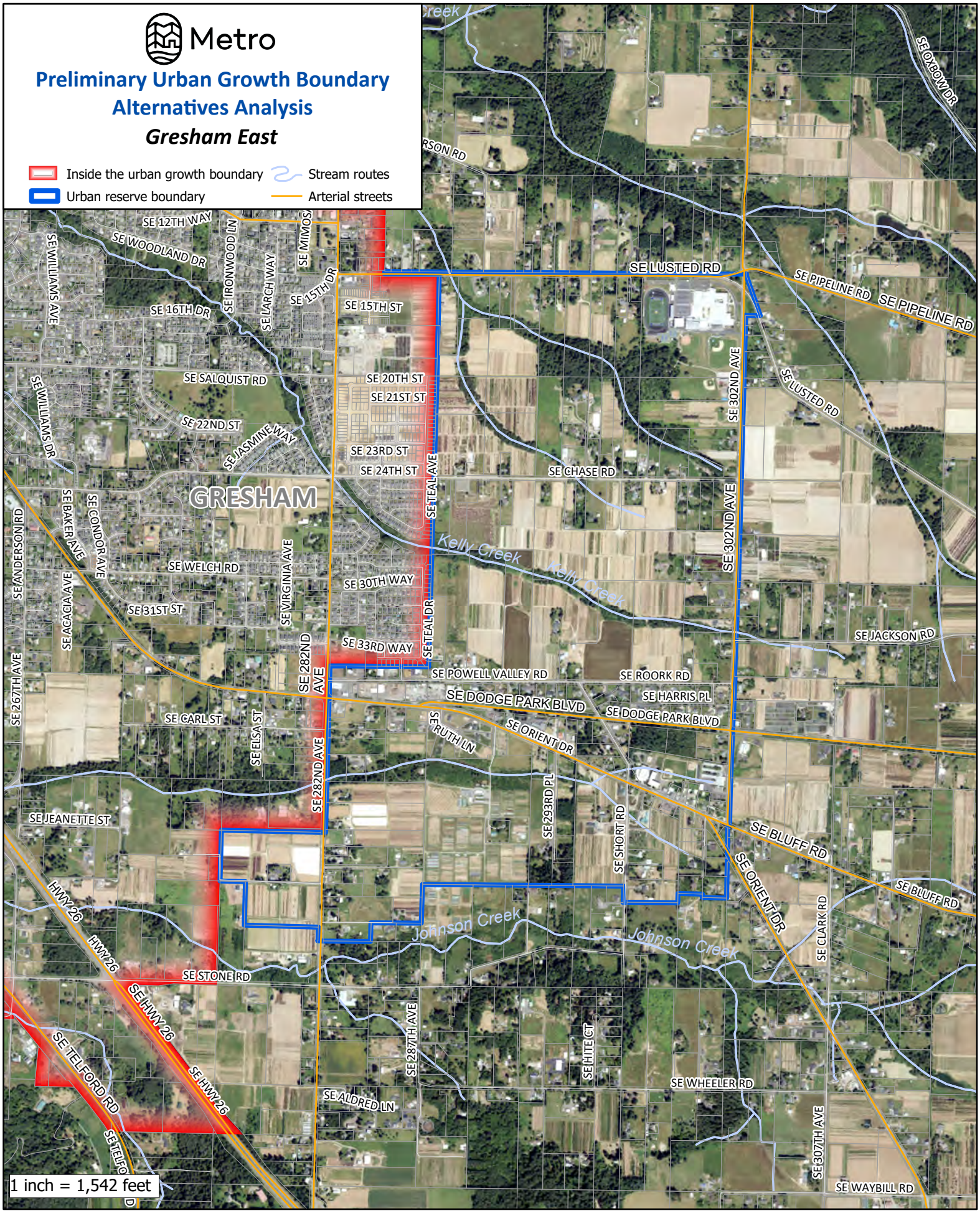

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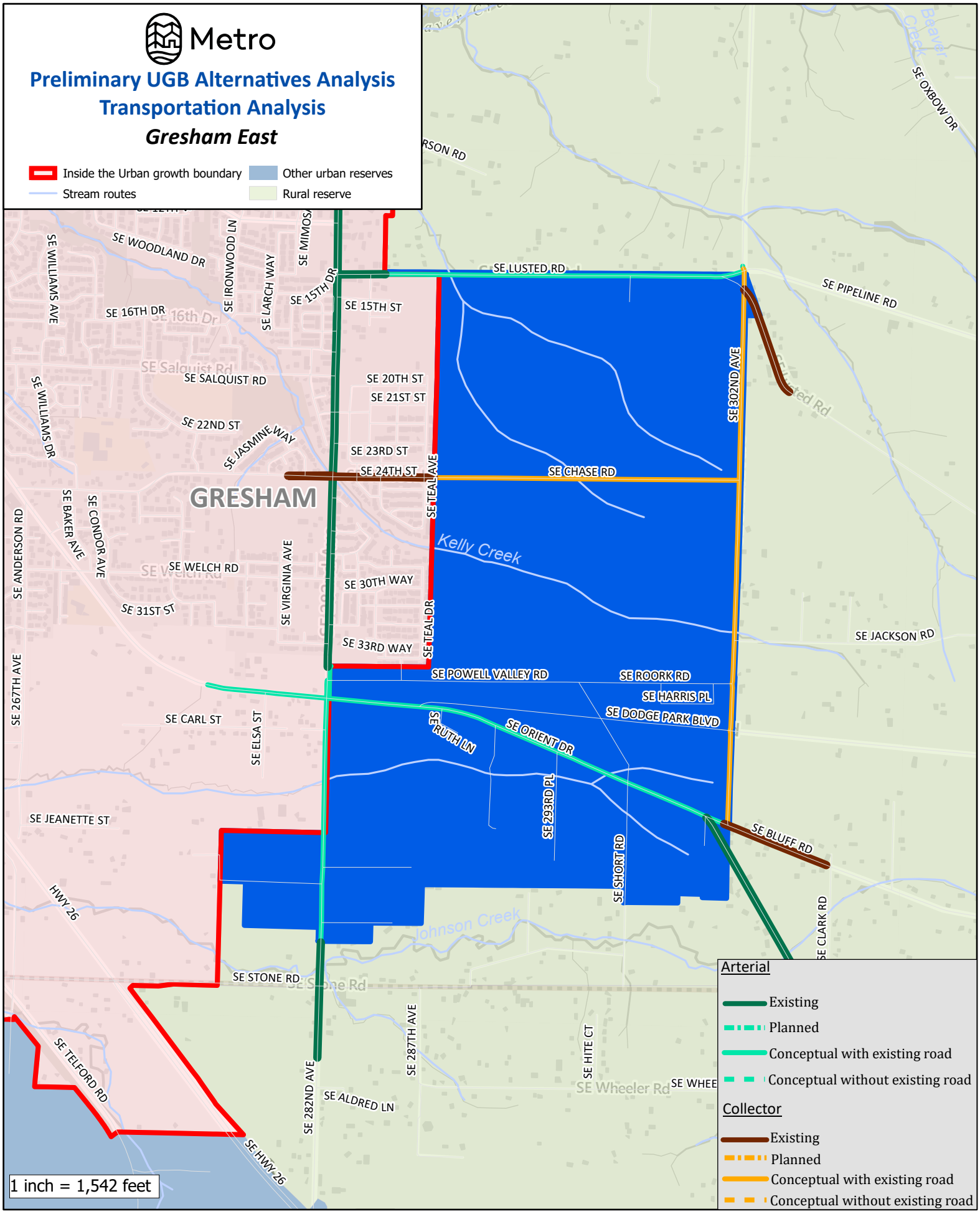

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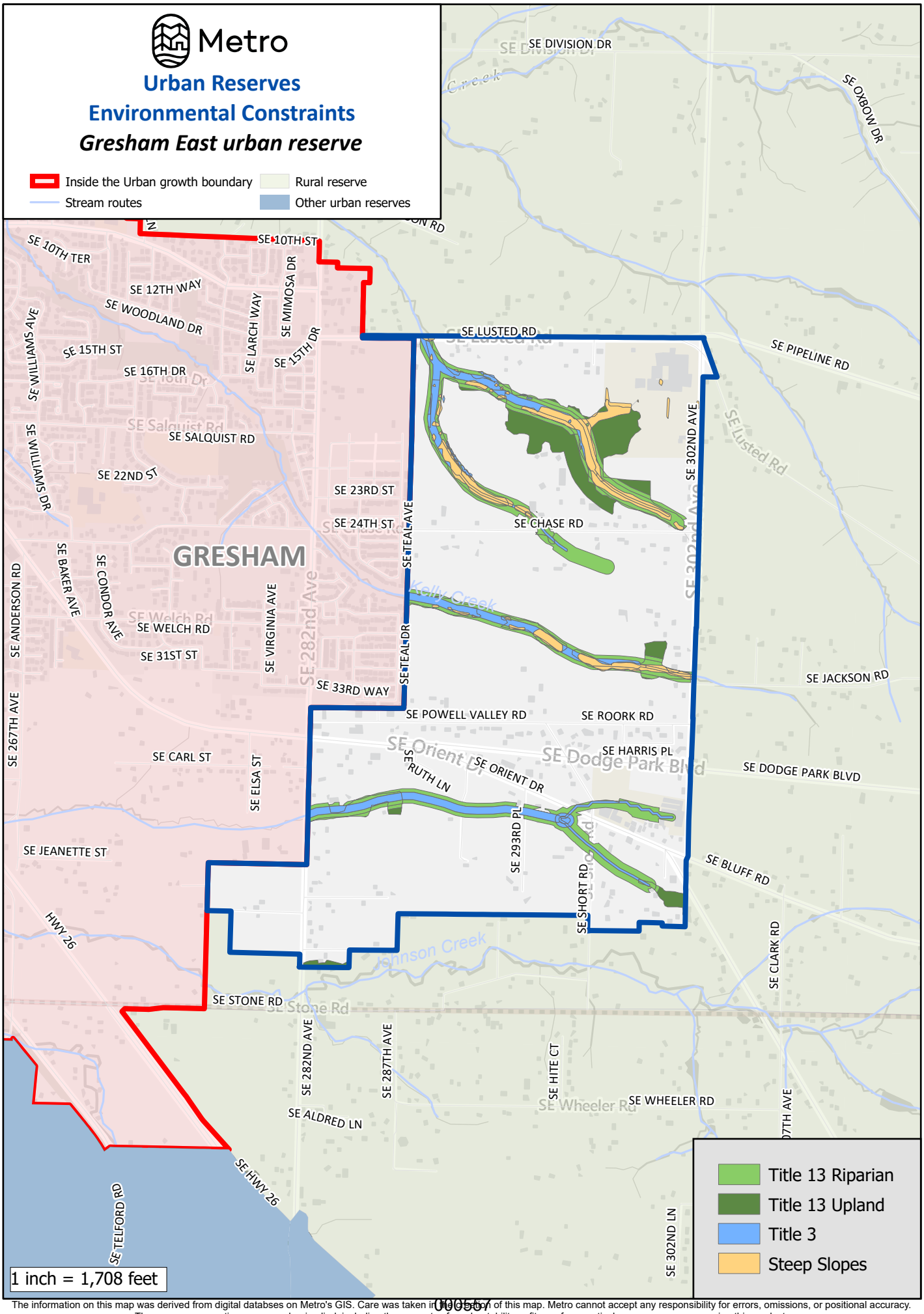

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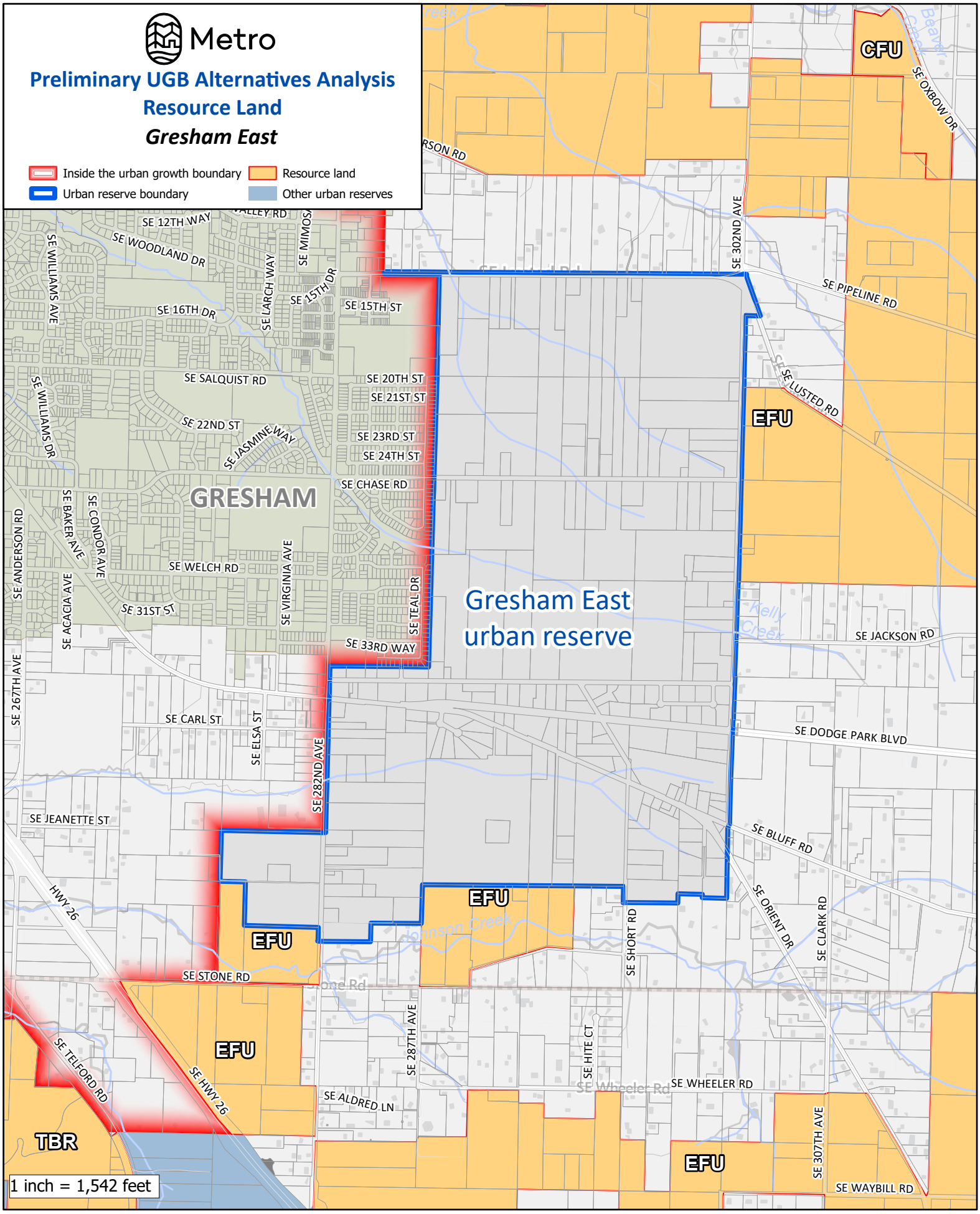

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HENRICI URBAN RESERVE

Total Reserve Area	422 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	395 acres
Gross Vacant Buildable Area	301 acres
Net Vacant Buildable Area	**224 acres**

The Henrici Urban Reserve is a somewhat rectangularly shaped area adjacent to the southeast end of Oregon City. The reserve is bisected by S Henrici Road, S Beavercreek Road, and Highway 213, and its northern boundary is the UGB. The reserve is primarily flat, with the exception of its very western edge and its the northeast corner, areas which contain forested steep slopes above Beaver Creek and Thimble Creek, respectively.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Henrici Urban Reserve is comprised of 354 tax lots, all of which are practically entirely within the reserve and have a combined area of approximately 395 acres. Roughly 75 percent of the reserve's tax lots are less than one acre in size; 14 are greater than five acres, and three are greater than 10 acres. As noted above, the entire reserve contains 301 gross vacant buildable acres and 224 net vacant buildable acres. The reserve is entirely contiguous, except for one 1.13-acre tax lot that is disconnected from the rest of the reserve and located west of Highway 213 near its intersection with Edgemont Drive.

According to aerial imagery, most of the reserve's tax lots are developed with rural residential land uses, though a few appear to have minor agricultural activities. There are also a few places of worship on tax lots totaling more than 20 acres, as well as water storage facilities owned by the City of Oregon City and Clackamas River Water (CRW) and, at the corner of S Henrici Road and Highway 213, a 0.81-acre tax lot owned by the State of Oregon. The Oregon City School District owns three tax lots totaling more than 16 acres in the vicinity of S Meadow Avenue and S Old Acres Lane. The Beavercreek Cooperative Telephone Company offices are located on a 2.5-acre tax lot along S Henrici Road and the El Paso Natural Gas Company owns a half-acre tax lot for one of its facilities at the corner of Highway 213 and S Henrici Road. Overall, 308 of the tax lots in the reserve have assessed improvements, with a median assessed value of those tax lots' improvements exceeding $279,000.

The reserve is served by Highway 213, but is approximately five miles from the nearest interstate, I-205. Clackamas Community College and Oregon City High School are less than a mile away, and the reserve is adjacent to the Oregon City Golf Club. The reserve is generally flat with only two locations of slopes greater than 25 percent located at the reserve's edges. While this topography might provide the opportunity for employment land uses, the large number of small parcels and existing residential and institutional development, as well as the reserve's distance from I-205, reduce the attractiveness of the area for new employment uses. The existing rural residential

development pattern and nearby school and recreational uses could be consistent with and support future residential development, and the school district's property within the reserve could provide a focal point for the neighborhood whenever developed with a new school use. Therefore, this area is able to accommodate a residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Henrici Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Oregon City serves lands within their corporate boundary, while lands within the jurisdiction of Clackamas County are served by Clackamas River Water (CRW). Both Oregon City and the CRW South System receive water from the South Fork Water Board (SFWB). SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. There are currently no known major treatment system deficiencies.

The city has annexed the Beavercreek UGB expansion area to the southwest. While the City is adequately served elsewhere, they may lack water storage necessary to fully serve urban development of these annexed areas. CRW is considered to have adequate capacity to serve lands still within the jurisdiction of Clackamas County in this vicinity and other customers; though the Beavercreek service area showed a storage deficiency of 0.31 MG in 2019 in the interim of building the new Beavercreek reservoir, it is anticipated to bring on sufficient storage. Under current conditions, there is a segment of distribution line identified with high head loss, indicating deficient pipe capacity. There are no known pumping deficiencies in the area.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

CRW has done planning for service to the area of the urban reserve, and the Henrici Urban Reserve is in CRW's service area. However, CRW will not likely be the service provider once the reserve is annexed to a city (i.e., Oregon City) and urbanized. Rather, when Oregon City annexes the reserve, the city will likely take ownership of any water related infrastructure within the area, except potentially for facilities that are needed to go beyond the annexed area, such as large-scale transmission lines. Accordingly, CRW, like many water service providers, may be cautious about investing in improvements for currently rural areas that may one day be annexed to cities. CRW is expected to build a new storage reservoir in the near future, which result in a storage surplus. Oregon City has plans to build reservoirs that could serve urban reserves, but no timeline is available at this time. While there is some surplus pumping capacity that could be

available to serve urban development of the reserve, once annexed to the city, that surplus may be insufficient and additional pumping facilities may be necessary. The distribution system may also continue to experience head loss challenges if not addressed.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, new facilities for storage and pumping facilities will likely be needed to avoid system capacity deficits.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$5.18 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$8.7 million
Storage	$0.3 million
Total:	**$14.18 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,162**

Sanitary Sewer Services

With regard to sanitary sewer services, the Henrici Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Oregon City provides sanitary sewer service to properties within its corporate limits, as well as to some properties that are already in the UGB but still in unincorporated Clackamas County. Wastewater flows to the Tri-City Sewer District (TCSD) trunks, interceptors, and, eventually, the Tri-City Water Resource Recovery Facility (WRRF), all of which are owned and operated by Water Environment Services (WES).

Some surcharging, ranging from minor to severe, exists throughout the existing City collection system. There are also known capacity deficiencies in several locations in the WES system. Two of the 12 existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity; however, there are no pump stations currently serving or needed to serve Pressure Zone B, which includes the area of the Henrici Urban Reserve.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Additional growth beyond the current UGB is going to challenge the existing sanitary sewer system due to the existing deficiencies and limited capacity of major treatment and conveyance facilities.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Development of the reserve is expected to contribute to further surcharging. Additional interceptor capacity could be required to serve urban development of the reserve in order to reduce potential adverse impacts to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$5.12 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0.54 million
Force mains	$0.21 million
Total:	**$5.87 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,308**

Stormwater Management Services

With regard to stormwater management services, the Henrici Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

While the City of Oregon City's 2019 Stormwater Master Plan identifies certain system issues related to flooding, infrastructure, maintenance, or natural channels, the Beaver Basin, which includes the area around the Henrici Urban Reserve, does not contain any existing stormwater infrastructure, as the topography allows for flows to go south away from city limits toward Beaver Creek, which then flows west and outfalls to the Willamette River. There are no known capacity deficiencies with this area's stormwater management system.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The system issues noted above could be exacerbated if future Henrici Urban Reserve development is connected to that system. However, capital improvement projects are planned for that existing system and stormwater from Henrici Urban Reserve

development would likely outfall directly to Beaver Creek and thus not impact that existing system infrastructure.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Stormwater will likely be detained and treated within the reserve and, based on topography, outfall directly to Beaver Creek; therefore, no impacts to the existing stormwater infrastructure in the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$0.56 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$5.96 million
Total:	**$6.52 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,453**

Transportation Services

With regard to transportation services, the Henrici Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Henrici Urban Reserve had above average and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a regional center in the adjacent City of Oregon City. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. The Oregon City Regional Center aligns with the 2040 Growth Concept Map designation.

The City of Oregon City's plans for the Oregon City Regional Center include mixed-use development, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to

Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. The regional center currently has a drug store, restaurants, and other retail commercial uses, banks, medical/dental facilities, community centers, government offices, and auto-oriented uses. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

There are also employment uses, including industrial uses, grocery stores, and other commercial uses, as well as education and medical facilities, government offices, and parks, closer to the reserve in the Red Soils area near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road.

Growth in and near the regional center and other employment areas will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs and find employment opportunities with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Four TriMet bus lines serve Oregon City, all of which generally focus on the regional center and the central portion of the city along Molalla Avenue. Service is provided to Clackamas Community College and the employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road; however, large portions of the city lack TriMet service. Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent regional transit service network along certain routes in the UGB near the reserve, including Beavercreek Road south of Glen Oak Road and S Meyers Road.

Oregon City has at least 29 miles of dedicated bike lanes and 3.5 miles of established bikeways, with most of them located in the "up-top" section (southern end) of the city. The Park Place neighborhood is also fairly well served and Highway 213 has dedicated bike lanes. Most of the downtown streets are classified as "bike with caution" streets and the South End neighborhood has minimal bike facilities. There are dedicated bike facilities along most of Beavercreek Road and Molalla Avenue, as well as on much of Glen Oak Road. Those existing bike facilities on Beavercreek Road, Molalla Avenue, S Meyers Road, South End Road, and others in the city are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies a gap in the planned network along Glen Oak Road nearer to the reserve and areas closer to the regional center.

The regional center is well served by sidewalks, as are employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road. Much of the residential areas in the UGB near to the reserve also have sidewalks, though some small adjacent pockets of residential development, such as along S Timbersky Way, do not currently have sidewalks. There some sections of Beavercreek Road in the UGB south of Meyers Road and north of Timbersky Way lack sidewalks. The gaps on Beavercreek Road are identified in Chapter 4, Figure 4.4 of the 2023 RTP as a gap in the planned regional pedestrian network. There are also gaps in the planned regional trail network in the UGB near the reserve, as indicated in Chapter 4, Figure 4.6 of the 2023 RTP.

Figure 4.14 in Chapter of the 2023 RTP identifies Molalla Avenue inside the UGB as a high injury corridor.

The sections of Highway 99E, Highway 213, and I-5 in Oregon City are identified as a throughways Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that these highway sections currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 213, an RTP-designated throughway, crosses through the west end of the reserve. As noted above, the section of the highway in the city currently meets travel speed reliability performance thresholds and RTP models, which include the reserve, indicate this reliability will continue at least to the year 2045.

There is currently no TriMet bus service to the reserve. The nearest stop is for Route 32 on Glen Oak Road, roughly three-quarters of a mile north via Beavercreek Road from the reserve by Oregon City High School. Route 32 provides service to Clackamas Community College, as well as to near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road.

Beavercreek Road and Highway 213 have dedicated bike lanes that extend to the reserve and connect to bike facilities on Glen Oak Road and to other areas of the city. There are no bike facilities on S Henrici Road.

As noted above, the residential areas already in the UGB adjacent to the reserve mostly have sidewalks. The sidewalks of these neighborhoods' local streets, such as those along Coquille Drive, Homesteader Drive, and Woodglen Way, generally stop at the edge of the UGB and do no extend into the reserve, even if the streets themselves extend into the reserve. Therefore, urban development of the reserve may warrant sidewalk installations, even along existing roadways. Beavercreek Road does not have sidewalks where it connects to the reserve; however, there are painted pedestrian crossings at the intersection of Beavercreek Road and Henrici Road. The portion of Highway 213 that is

closest to the reserve does have sidewalks, but there is a significant gap between Conway Drive and Meyers Road, where the trails at Clackamas Community College connect to Highway 213.

It was noted in response to Factor 1 that the reserve is not likely to be able to efficiently accommodate an employment land need, but could support a residential land need. With the reserve being moderately close to Oregon City High School, Clackamas Community College, and employment areas where future residents of the reserve could meet some of their daily needs and find employment opportunities, future residents' private motor vehicle trips may not be significant. Existing bike facilities connected to the reserve could also provide transportation alternatives.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Beavercreek Road, Henrici Road, Highway 213, and Homesteader Drive would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

With the lack of direct transit service and complete sidewalks connecting to the reserve, future residents will likely rely primarily on private motor vehicle transportation to access their daily needs and employment opportunities. However, the moderate proximity of educational and employment uses, including commercial uses, and the existing bike facilities connecting to the reserve could help to limit any major increase in home-based VMT per capita. Development of the reserve is also not expected to jeopardize this highway's throughway reliability. Any additional motor vehicle traffic on Molalla Avenue resulting from development of the reserve, however, may exacerbate its high-crash conditions.

d. Need for major transportation facility improvements and associated costs

A roughly quarter-mile-long portion of Highway 213, a one-third-mile-long portion of S Beavercreek Road, and a 1.56-mile-long portion of S Henrici Road, all of which pass through the reserve, will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. A 0.13-mile-long portion of S Meadow Avenue at the southeast of the reserve will likely need to be improved to urban collector standards, and four new collector road sections, with a combined length of just over one mile will also likely be needed to provide necessary street connectivity to urban development of the reserve.

Facilities	Cost
Arterials, existing/improved full street	$113.45 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$3.78 million
Collectors, existing/improved half street	$0
Collectors, new	$37.29 million
Total:	**$154.52 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$34,468**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in the reserve and in the corridors leading to it. Service could be provided at 30-minute headways for all day service, seven days a week, by extending Route 31 with two additional zero-emission buses at a capital cost of $1,500,000 - $2,000,000 (recurs every 12 years). The additional annual service cost is $798,720 and grows with inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

A 1,100-foot section of Thimble Creek flows north through the northeast corner of the Henrici Urban Reserve. This stream segment is located at the base of a forested slope, some 100 feet below the rural residential subdivision on S Danny Court. Due to development constraints related to steep slopes and the already developed nature of these narrow and deep subdivision lots, this section of Thimble Creek will not likely be impacted by new urban development of the reserve. Significant upland habitat has been identified on the forested hillsides that run down to Thimble Creek. The steep slopes in this area would limit the amount of the residential development that can occur, thereby providing some protections to the upland habitat.

A second stream flows west through some cleared land and the rural residential subdivision centered on S Wilshire Circle for approximately 2,600 feet, ultimately joining Beaver Creek outside of the reserve. The 750-foot section of the stream that meanders through the middle of cleared land west of the rural subdivision is susceptible to impacts from future development, depending on design and roadway connections. The stream segment that is

east of the rural subdivision is located on the Evangelical Lutheran Church property and is less susceptible to future impacts as the property is developed. The remaining portion of the stream flows through backyards of developed home sites and would most likely not be further impacted by urbanization of the reserve. In addition, portions of this segment have already been channelized or possibly piped. Riparian habitat is only identified along the western open land section and required restoration of the riparian corridor would occur as the result of urbanization.

A third stream segment is located in the western portion of the reserve, east and west of S Highway 213. The stream flows through a forested section of land on the north side of S Henrici Road for approximately 650 feet and appears to drain into the State-owned water retention facility that is located at the intersection of S Henrici Road and S Highway 213. The stream then resurfaces on the west side of S Highway 213 and flows 580 feet through cleared land to the end of the reserve boundary, ultimately joining Beaver Creek. Both of these stream segments have identified riparian and upland habitat and could be susceptible to limited impacts from urbanization, depending on the development pattern and new street connections. Increased natural resource protection that comes with inclusion in the UGB will help reduce the overall impacts, however. There are no inventoried wetlands within the reserve.

This analysis finds that urbanization of the reserve could occur with comparatively minimal impacts to the stream corridors and the riparian and upland habitat areas. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Henrici Urban Reserve is given a “high” score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The Henrici Urban Reserve already has numerous rural residences on smaller tax lots, as well as platted subdivisions, some of which are extensions of subdivisions in adjacent areas of the UGB. There are also larger places of worship, utility facilities, and major roadways in and near the reserve. Furthermore, the reserve is in relatively close proximity to urban employment areas. Therefore, urbanization of the reserve is not expected to cause a significant change in sense of place or degradation of rural lifestyle for existing residents of the reserve. Existing levels of development and parcelization could also slow the process of urbanization and mean that change comes to the area more gradually over time.

As detailed more fully in response to Factor 2, future residents of the reserve may be fairly reliant on private motor vehicle transportation. However, the proximity of a variety or urban land uses and modes of transportation could help limit significant increases in VMT and, therefore, related energy impacts from urbanization of this reserve.

There is minimal commercial agriculture occurring within the reserve and the economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development.

Overall, there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Henrici Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

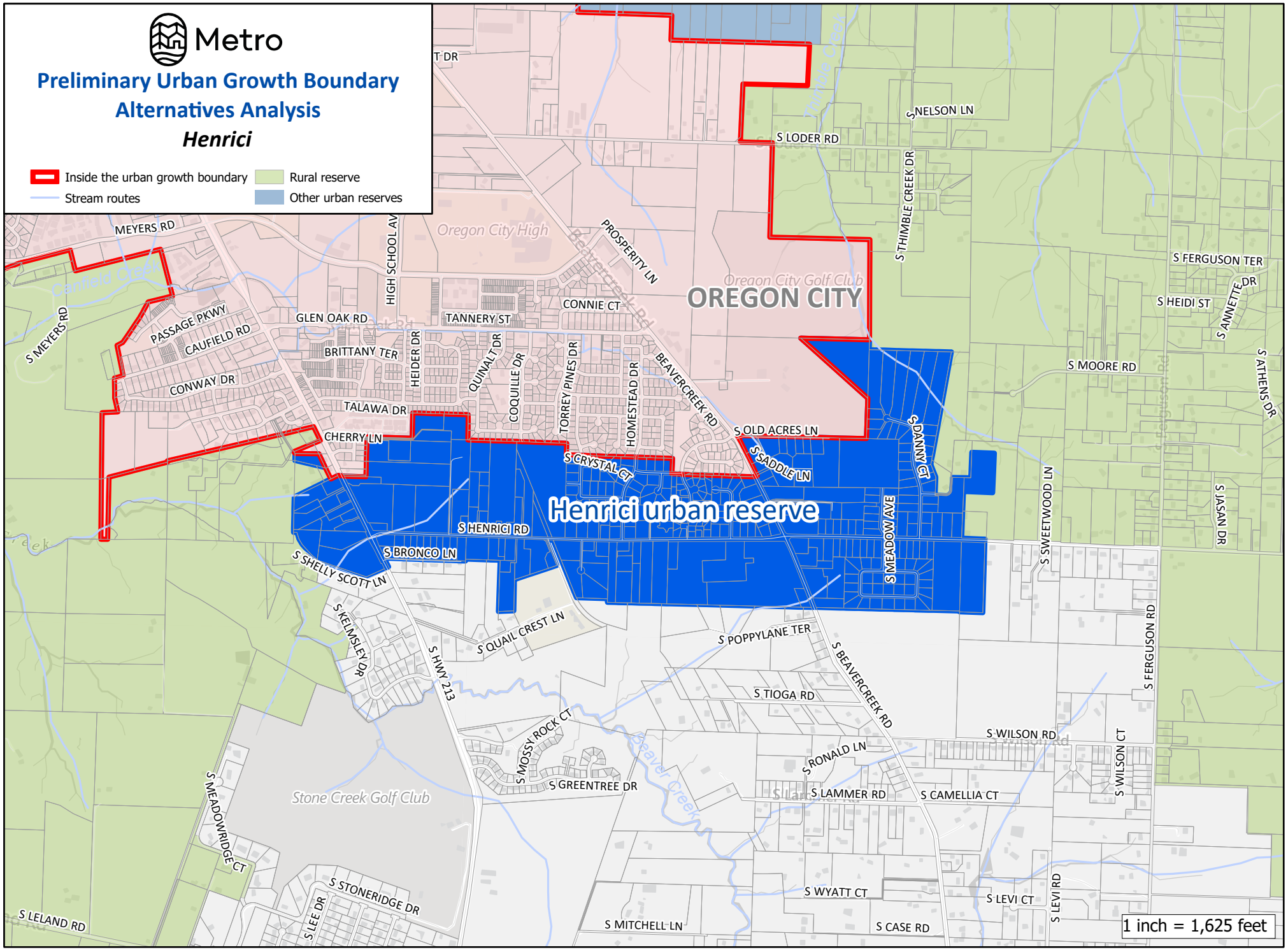
Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

There are two locations where lands outside the UGB but contiguous to the Henrici Urban Reserve have Goal 3 or 4 resource land zoning for agricultural and forest activities.

The first location consists of one tax lot at the northeast corner of the reserve, north of S Danny Court. This 27-acre tax lot, zoned Timber (TBR) by Clackamas County, is on the opposite side of Thimble Creek from the reserve. It is forested, but does not have agricultural activities and is accessed via S Thimble Creek Drive, rather than via the reserve lands. It is also under the same ownership as an adjacent tax lot with residential uses. Contiguous tax lots inside the reserve are already developed with little to no additional development expected due to the steep slope that runs down to Thimble Creek. Therefore, the proposed urban use (i.e., urban development of the reserve) are not expected impact agricultural or forest activities that occur on this adjacent forest land outside the UGB to the northeast of the reserve.

The second location is along the western edge of the reserve, west of S Highway 213, where the reserve is adjacent to two tax lots that are also zoned TBR. While both have forested portions, neither appears to have agricultural uses. Both tax lots have residential uses and one has powerlines. Neither of the two tax lots are currently accessed by roads going through the reserve itself. The land in these reserves slopes downward away from the reserve toward Beaver Creek, so any future development of the reserve would be at the top of a hill, away from agricultural and timber activities below. The likelihood of timber harvesting on these tax lots is small, given the residences, streamside protection requirements along Beaver Creek, and powerlines. Therefore, the proposed urban uses (i.e., urban development of the reserve) would be considered compatible with nearby agricultural and forest activities in this location.

This analysis finds that the proposed urban uses (i.e., urban development of the reserve) would have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land. The Henrici Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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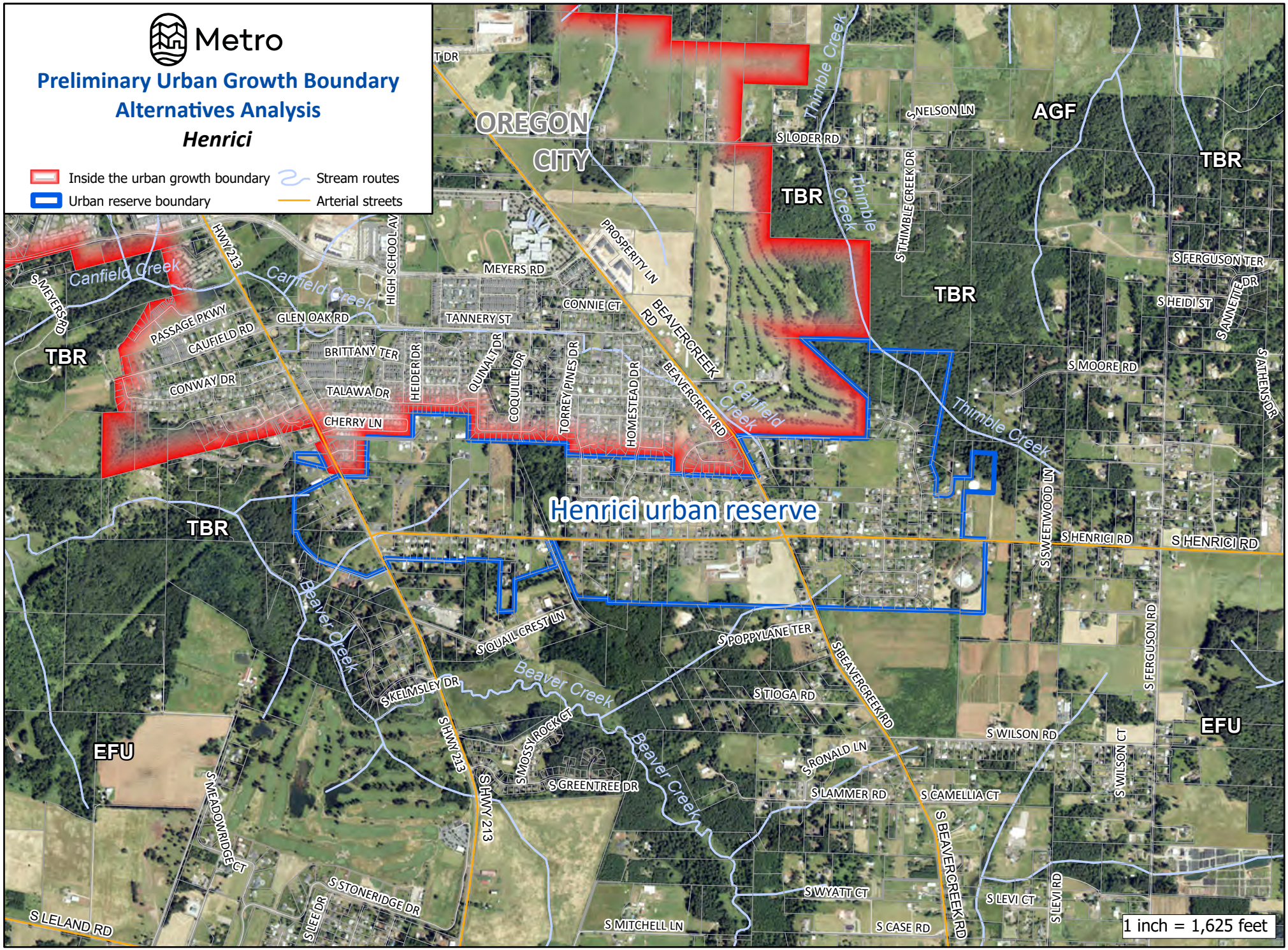

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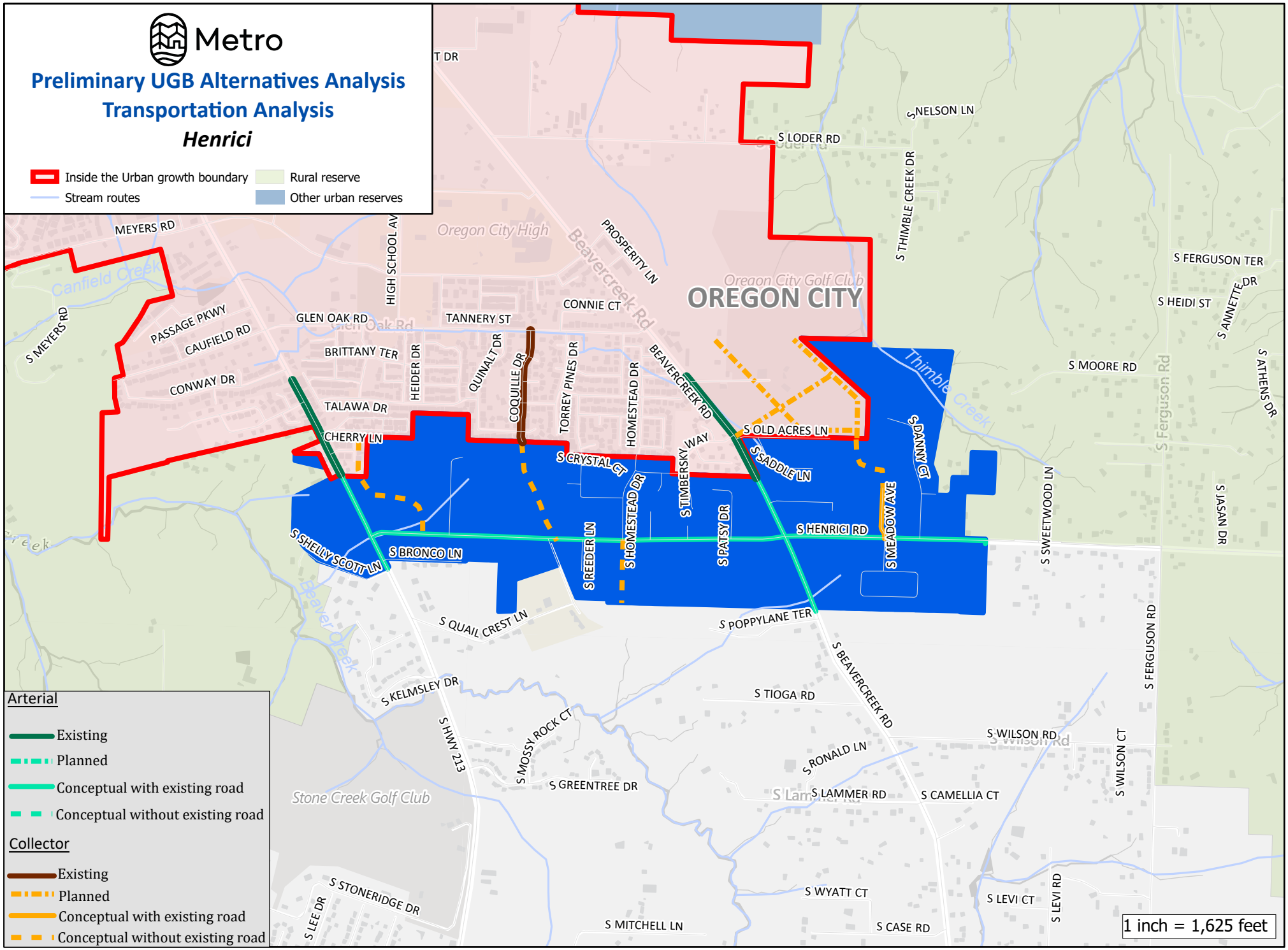

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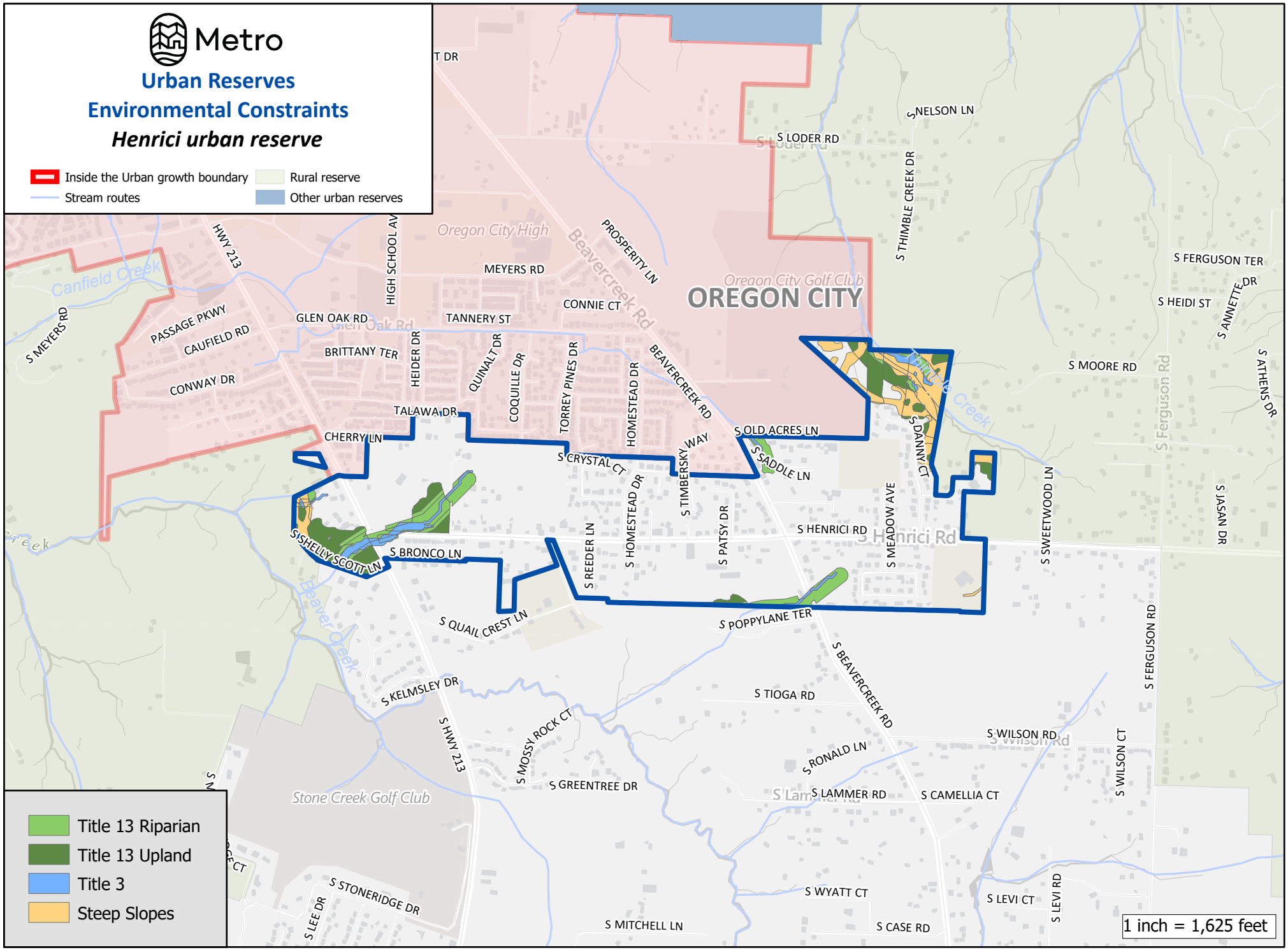

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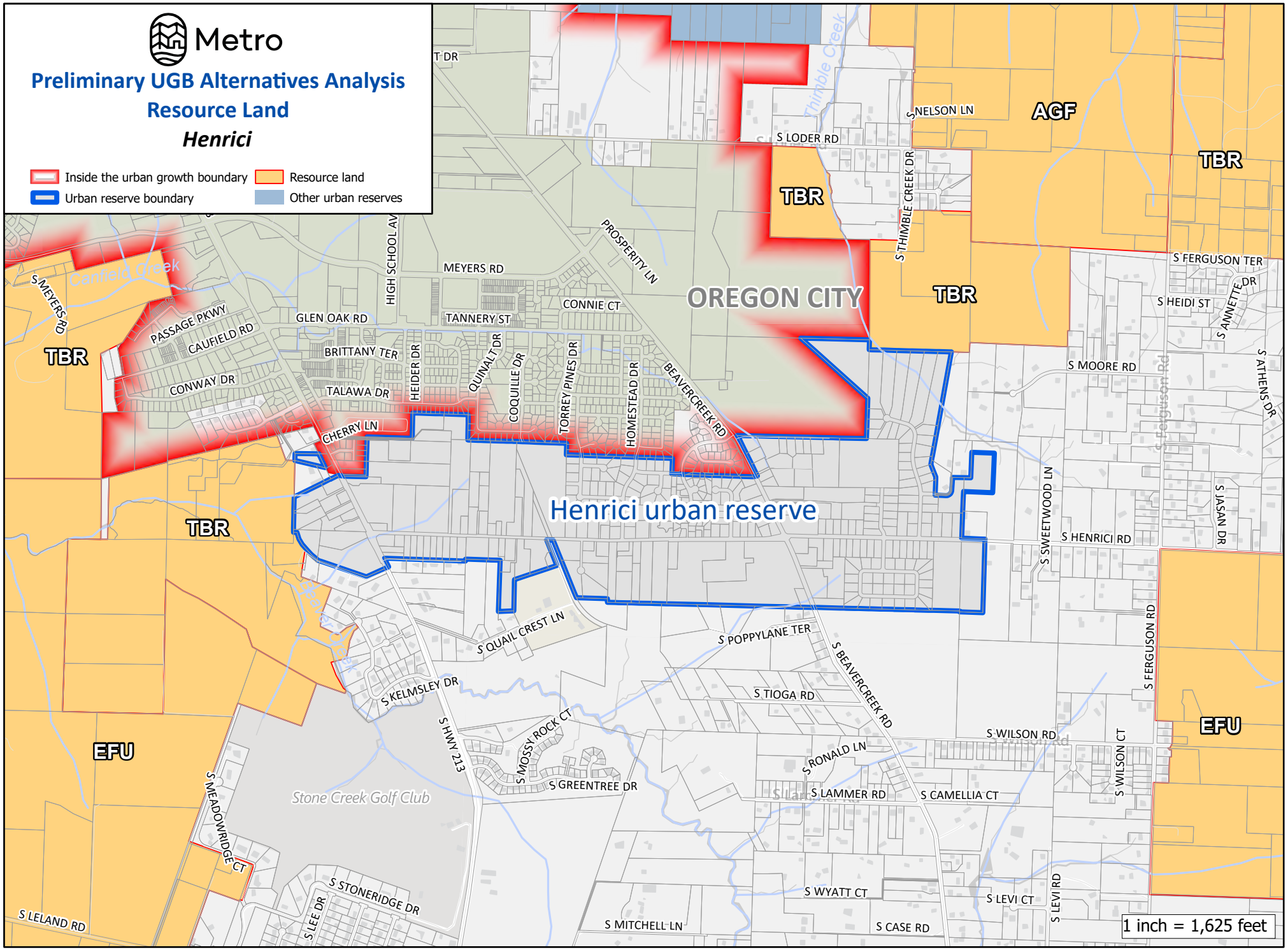

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HOLCOMB URBAN RESERVE

Total Reserve Area	321 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	314 acres
Gross Vacant Buildable Area	215 acres
Net Vacant Buildable Area	**160 acres**

The Holcomb Urban Reserve is an irregularly shaped area adjacent to the east side of Oregon City. Its northern end is bisected by S Holcomb Boulevard. The northern end is also served by S Stoltz Road and S Hilltop Road, while its southern end is connected to S Kraeft Road. The reserve has a mix of forested tax lots, very minor agricultural activities, and rural residential development. The area north of S Holcomb Boulevard is generally flat and represents the high point, with the remainder dropping by about 350 feet in elevation from S Holcomb Boulevard down to the southern edge of the reserve. A tributary of Holcomb Creek flows south through the lower portion of the reserve, joining the creek south of S Redland Road.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Holcomb Urban Reserve is comprised of 99 contiguous tax lots, which have a combined area of approximately 314 acres. All but four tax lots are entirely within the reserve. The portions of the reserves' tax lots that are in the reserve range in size from roughly a third of an acre to nearly 44 acres. Approximately 80 percent of the tax lots have area within the reserve equaling five acres or less in size; roughly half have portions in the reserve smaller than two acres and only two tax lots have portions in the reserve greater than 20 acres. As noted above, the entire reserve contains 215 gross vacant buildable acres and 160 net vacant buildable acres.

According to aerial imagery, the reserve is mainly composed of rural residential development and groves of trees, with some agricultural activity on the largest tax lots. Holcomb Outlook Water owns a nearly one-acre property with a water storage facility at the high point of the urban reserve, north of S Holcomb Boulevard. Clackamas County owns one 0.36-acre tax lot off of S Kraeft Road that may primarily serve as an access way for other adjacent developed properties. Overall, 91 of the 99 tax lots in the reserve have improvements, with a median assessed value of those tax lots' improvements exceeding $360,000.

The reserve is bisected by S Holcomb Boulevard. Several local roads within the UGB stub to the reserve, including S Barlow Drive, Jada Way, and S Wright Flyer Lane. The nearest interstate, I-205, is approximately two miles away. Upper Holcomb Creek Natural Area is only a third of a mile "as the crow flies" from the north end of the reserve, but not directly accessible to it. Holcomb Elementary School is less than a mile away via S Holcomb Boulevard. Tumwata Middle School is approximately 1.25 miles away via S Kraeft Road, S Redland Road, S Holy Lane, and S Donovan Road.

The portion of the reserve north of S Holcomb Boulevard contains the most flat and unconstrained land and is the high point of the area. This topography could accommodate both residential and employment uses; however, employment uses in this location would not be practical due to the somewhat isolated nature of the area up on the hill. There is also currently only one two-lane access point along S Holcomb Boulevard through an existing urban residential area and the reserve is relatively far from existing employment centers of Oregon City and I-205. A significant portion of the land south of S Holcomb Boulevard has slopes greater than 10 percent that would limit development opportunities for employment uses. Considering these conditions, the proximity of schools, and the fact that half of the tax lots are smaller than two acres, this area is best suited to accommodate residential land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Holcomb Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Oregon City serves lands within their corporate boundary, while lands within the jurisdiction of Clackamas County are served by Clackamas River Water (CRW). Both Oregon City and the CRW South System receive water from the South Fork Water Board (SFWB). SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. There are currently no known major treatment system deficiencies.

The city has annexed the Beavercreek UGB expansion area to the southwest. While the city is adequately served elsewhere, they may lack water storage necessary to fully serve urban development of these annexed areas. CRW is considered to have adequate storage and pumping capacity to serve lands still within the jurisdiction of Clackamas County in the vicinity of Holcomb Urban Reserve and other customers.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

CRW has done planning for service to the area of the urban reserve, and the Holcomb Urban Reserve is in CRW's service area. However, CRW will not likely be the service provider once the reserve is annexed to a city (i.e., Oregon City) and urbanized. Rather, when Oregon City annexes the reserve, the city will likely take ownership of any water related infrastructure within the area, except potentially for facilities that are needed to go beyond the annexed area, such as large-scale transmission lines. Accordingly, CRW, like many water service providers, may be cautious about investing in improvements for currently rural areas that may one day be annexed to cities. Under CRW's future (2038) projections, there is a storage capacity surplus of 0.59 MG in their Redland

Service Area, and a slight storage capacity deficit of 0.02 MG in their Holcomb Service Area. CRW's 2038 projections show a pumping capacity surplus of 301 GPM in their Redland Service Area, and a pumping capacity deficit of 619 GPM in their Holcomb Service Area. Therefore, additional pumping capacity may be needed to accommodate future growth in the area of the Holcomb Urban Reserve. Oregon City has plans to build reservoirs that could serve urban reserves, but no timeline information is available at this time.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, new facilities for storage and pumping may be needed to avoid system capacity deficits.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$5.06 million
12-inch pipe	$0
15-inch pipe	$0
Pumping	$6.38 million
Storage	$0.22 million
Total:	**$11.66 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,640**

Sanitary Sewer Services

With regard to sanitary sewer services, the Holcomb Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Oregon City provides sanitary sewer service to properties within its corporate limits, as well as to some properties that are already in the UGB but still in unincorporated Clackamas County. Wastewater flows to the Tri-City Sewer District (TCSD) trunks, interceptors, and, eventually, the Tri-City Water Resource Recovery Facility (WRRF), all of which are owned and operated by Water Environment Services (WES). Both the Oregon City Master Plan and the WES Master Plan identify segments of the conveyance system that are predicted to surcharge or flood during the design storm event. The Country Village Interceptor in Redland Road, however, does not appear to have any predicted surcharging or flooding under existing conditions, which indicates it has sufficient capacity to serve areas already inside the UGB near the Holcomb Urban Reserve. Moreover, Oregon City's Infrastructure Master Plan includes planned

improvements and funding necessary to support expected growth within the existing UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The Country Village Interceptor in Redland Road does not extend far enough to serve the Holcomb Urban Reserve, but the City of Oregon City Master Plan includes a capital improvement project to extend this interceptor east, far enough to serve the reserve. The area immediately west of Holcomb is currently undeveloped and identified in Oregon City Master Plan as the Park Place Concept Area; it is not clear whether the proposed Country Village Interceptor extension is sized with enough capacity to serve both the Park Place Concept Area and Holcomb Urban Reserve and increased capacity may be necessary. There are no pump stations required downstream of the reserve. Development in the reserve is nonetheless expected to require major infrastructure improvements and investments, in part due to topography.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional capacity of the Country Village Interceptor could be required in order to serve urban development of the Holcomb Urban Reserve while reducing impacts to areas already inside the UGB. System improvements could require major construction in landslide-prone areas.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$2.97 million
12-inch pipe	$1.26 million
21-inch pipe	$1.62 million
Pump station	$0
Force mains	$0
Total:	**$5.85 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,825**

Stormwater Management Services

With regard to stormwater management services, the Holcomb Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The Oregon City Stormwater Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas:

the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the two-year storm event. Capital improvement projects to address capacity issues described above are presented in the Master Plan.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater will be conveyed, treated, and disposed of within the reserve (i.e., outfall to Holcomb Creek, which flows to Abernethy Creek); therefore, it is not anticipated that existing stormwater facilities would be utilized. Stormwater will nonetheless be complex, given this reserve's infrastructure would be at the upstream edge of the surrounding basins, but stormwater is expected to be manageable.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater will likely be detained and treated within the reserve and, based on topography, outfall directly to Holcomb Creek; therefore, no impacts to the existing stormwater infrastructure in the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$2.8 million
24-inch pipe	$1.7 million
30-inch pipe	$0
Water quality/dentition	$2.96 million
Total:	**$7.46 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,330**

Transportation Services

With regard to transportation services, the Holcomb Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Holcomb Urban Reserve had above average and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a regional center in the adjacent City of Oregon City. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. The Oregon City Regional Center aligns with the 2040 Growth Concept Map designation.

The City of Oregon City's plans for the Oregon City Regional Center include mixed-use development, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. The regional center currently has a drug store, restaurants, and other retail commercial uses, banks, medical/dental facilities, community centers, government offices, and auto-oriented uses. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

There are also employment uses, including industrial uses, grocery stores, and other commercial uses, as well as education and medical facilities, government offices, and parks in the Red Soils area near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road.

Growth in and near the regional center and other employment areas will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs and find employment opportunities with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Four TriMet bus lines serve Oregon City, all of which generally focus on the regional center and the central portion of the city along Molalla Avenue. Service is provided to Clackamas Community College and the employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road; however, large portions of the city lack TriMet service. Route 154 provides service along Abernethy Road and Holcomb Boulevard between the regional center and up to about S Longview Way. Some of this existing route is identified as part of the frequent regional transit network in Chapter 4, Figure 4.3 of the 2023 RTP, though there are also gaps in planned frequent transit service along certain routes in the UGB near the reserve and elsewhere in the city as well.

Oregon City has at least 29 miles of dedicated bike lanes and 3.5 miles of established bikeways, with most of them located in the "up-top" section (southern end) of the city. The Park Place neighborhood is also fairly well served, and Highway 213 has dedicated bike lanes. Most of the downtown streets are classified as "bike with caution" streets and the South End neighborhood has minimal bike facilities. There are dedicated bike facilities along most of Beavercreek Road and Molalla Avenue, as well as on much of Front Avenue, Holcomb Boulevard, S Redland Road, and Swan Avenue nearer to the reserve. Those existing bike facilities on Beavercreek Road, Holcomb Boulevard, Molalla Avenue, and S Redland Road are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies a gap in the planned network along S Holly Lane nearer to the reserve and areas closer to the regional center.

The regional center is well served by sidewalks, as are employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road. Much of the residential areas in the UGB adjacent to the reserve also have sidewalks. Holcomb Boulevard has sidewalks on at least one side most of the way from the inner edge of the UGB to the intersection of Abernethy Road and S Redland Road, though there are some sections without sidewalks. Chapter 4, Figure 4.4 of the 2023 RTP identifies gaps in the planned regional pedestrian network along Holcomb Boulevard and S Redland Road. There are also gaps in the planned regional trail network in the UGB near the reserve, as indicated in Chapter 4, Figure 4.6 of the 2023 RTP.

Figure 4.14 in Chapter of the 2023 RTP identifies Molalla Avenue inside the UGB as a high injury corridor.

The sections of Highway 99E, Highway 213, and I-5 in Oregon City are identified as a throughways Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that these highway sections currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 213 is the nearest RTP-designated throughway to the reserve, but is nearly two miles away. As noted above, the section of the highway in the city currently meets travel speed reliability performance thresholds. Considering the distance of the reserve to this highway and RTP reliability forecasts, development of the reserve is not expected to jeopardize the throughway reliability of the highway.

There is currently no TriMet bus service all of the way to the reserve. The nearest stop is for Route 154 just off Holcomb Boulevard, roughly three-quarters of a mile west of the north end of the reserve. There is no transit service near the south end of the reserve.

The adjacent residential subdivisions within the city that are north of Holcomb Boulevard have sidewalks that stub to the northwest of the reserve. Portions of Holcomb Boulevard also have sidewalks, including S Barlow Drive, Jada Way, and S Wright Flyer Lane, but there are gaps along Holcomb Boulevard and the southern end of the reserve is not connected to existing sidewalks. Sidewalks are lacking in the reserve itself. There are no trails that serve or connect to the reserve, either.

It was noted in response to Factor 1 that the reserve is not likely to be able to efficiently accommodate an employment land need, but could support a residential land need. The regional center is approximately two miles from the reserve via S Holcomb Boulevard and, as noted above, not fully connected to the reserve by transit, bike facilities, or pedestrian facilities. The employment uses along Beavercreek Road, Highway 213, and Molalla Avenue are even further away. It is therefore likely that future residents of the reserve would be particularly reliant on private motor vehicle transportation.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Holcomb Boulevard, S Kraeft Road, and S Redland Road would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

With the lack of direct transit service and complete bike facilities and sidewalks connecting to the reserve, future residents will likely rely primarily on private motor vehicle transportation to access their daily needs and employment opportunities more than two miles away, potentially impacting home-based VMT per capita. Development of the reserve is, however, not expected to jeopardize Highway 213's throughway reliability or necessarily cause additional motor vehicle traffic on Molalla Avenue that exacerbates its high-crash conditions.

d. Need for major transportation facility improvements and associated costs

To accommodate urban development, a 0.4-mile section of S Holcomb Boulevard would likely need to be improved to urban arterial standards, including acquisition of additional right-of-way. S Edenwild Lane and S Kraeft Road, which currently are private streets, would also likely need to become public streets and improved to urban collector standards with a combined length of slightly more than half a mile. It is assumed that a 0.32-mile section of S Hilltop Road will need to be improved to urban collector standards, with acquisition of additional right-of-way, and three new collectors with a combined length of about 1.09 miles would be needed to provide necessary street connectivity. An approximately 0.07-mile section of one of the new collectors is expected to have higher per-mile costs because of a stream crossing.

Facilities	Cost
Arterials, existing/improved full street	$19.32 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$9.66 million
Collectors, existing/improved half street	$0
Collectors, new	$67.94 million
Total:	**$96.92 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$30,259**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in the reserve and in the corridors leading to it. Potential service could be provided at 30-minute headways for weekdays, and 60-minute headways on weekends, by extending an existing route after "Forward Together 2.0" improvements are implemented, with no additional cost.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

A tributary to Holcomb Creek flows south through the southern portion of the Holcomb Urban Reserve for just shy of half a mile, mostly through an intact riparian habitat corridor. The stream is located in a fairly steep portion of the reserve where most of the slopes are greater than 25 percent, limiting potential development near the stream. There are some significant locations of riparian and upland habitat identified in the southern portion of the reserve, although most of it is also located on slopes greater than 25 percent, which would limit the amount of urbanization that could occur and thereby limit adverse impacts of urbanization.

This analysis finds that urbanization of the reserve could occur with comparatively minimal impacts to the stream corridor and most of the upland habitat areas due to topography that limits development opportunities. Future east-west transportation connections in this southern area, however, could impact the natural resources, if extended across the stream corridor. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Holcomb Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The Holcomb Urban Reserve already has numerous rural residences on smaller tax lots in certain in certain areas, as well as platted subdivisions, some of which are extensions of subdivisions in adjacent areas outside of the reserve. The north end of the reserve is also adjacent to urban residential development with urban local streets that stub directly to the reserve. Therefore, urbanization of the reserve is not expected to cause a significant change in sense of place or degradation of rural lifestyle for existing residents of these locations of the reserve. However, the southern end of the reserve is less developed, not adjacent to urban levels of development, and characterized by more rural land uses; urbanization here could happen more quickly and be more noticeable and socially impactful to the area's residents.

Nonetheless, the steep slopes that divide the area south of S Holcomb Boulevard are generally forested and could provide separation between different areas of the reserve that develop at different times. The existing rural residences along S Kraeft Road are all high-value homes that are unlikely to be removed quickly upon urbanization. These factors can slow the pace of noticeable change.

As detailed more fully in response to Factor 2, future residents of the reserve will likely rely primarily on private motor vehicle transportation to access their daily needs and employment opportunities more than two miles away. The resulting VMT could have adverse energy impacts.

There is minimal commercial agriculture occurring within the reserve and the economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development.

Overall, there would be comparatively low to moderate social, energy, and economic consequences from urbanization of this reserve. The Holcomb Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

There are two locations where lands outside the UGB but contiguous to the Holcomb Urban Reserve have Goal 3 or 4 resource land zoning for agricultural and forest activities.

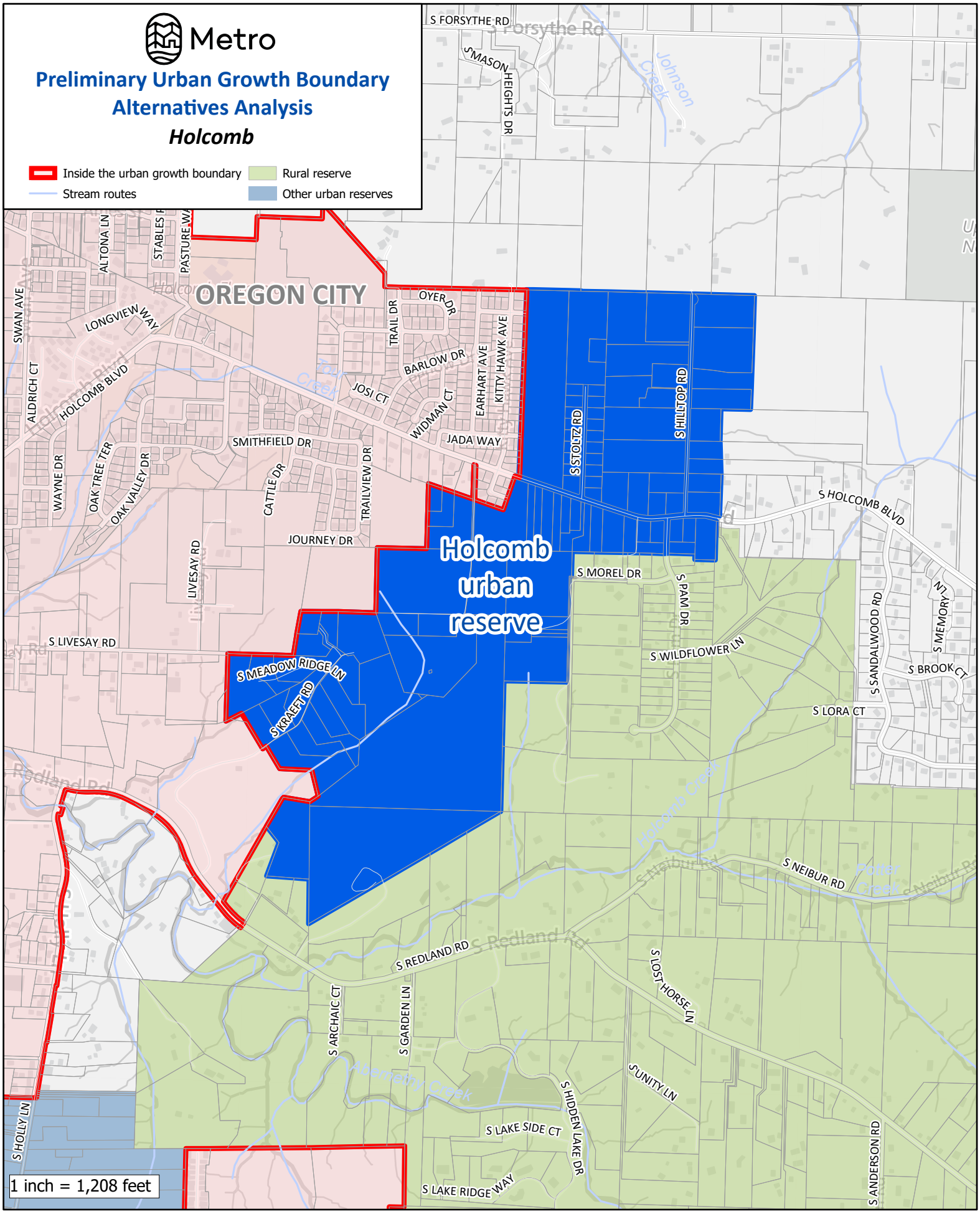
The first location is a small tract of land zoned Exclusive Farm Use (EFU) by Clackamas County at the northern edge of the reserve at the north end of S Hilltop Road. Aerial imagery indicates there are very minor agricultural activities occurring on one of these EFU-zoned tax lots, including pasture land and an orchard, but also a large residential use. This tax lot is accessed by S Hilltop

Road, which could see additional traffic if the reserve is urbanized, although the movement of farm equipment on S Hilltop Road from these limited agricultural activities would be minor and likely not impacted by such additional traffic. EFU-zoned tax lots adjoining the reserve in this location do have some trees, but there is no indication from aerial imagery that they are stands for commercial timber harvesting.

The second location is a small tract of land with three tax lots zoned Timber (TBR) by Clackamas County along the northeast corner of the reserve. Two of the tax lots contain fairly large homes surrounded by trees. Due to the location of the homes, the prospect of commercial forest activities occurring on them is small. The third TBR-zoned tax lot is 30 acres in size and slopes away from the reserve. It does not contain any structures, is divided by powerlines, and appears to have been cleared of trees somewhat recently, without evidence of re-planting. Urbanization of the reserve could generally be compatible with future forest activities occurring on this tax lot due to the change in elevation. However, access to this tax lot is by S Hilltop Road and urbanization of the reserve may make future access to the forest lands for machinery and trucks slightly more difficult, if trees were to be replanted and eventually harvested.

This analysis finds that the nearby agricultural and forest activities occurring on farm and forest land would not likely be significantly impacted by urbanization of the reserve. Therefore, the proposed urban uses (i.e., urban development of the reserve) is considered to have moderate to high compatibility with the nearby agricultural and forest activities occurring on farm and forest land.

The Holcomb Urban Reserve is given a “medium-high” score in Attachment 3 for this Goal 14 boundary location factor.



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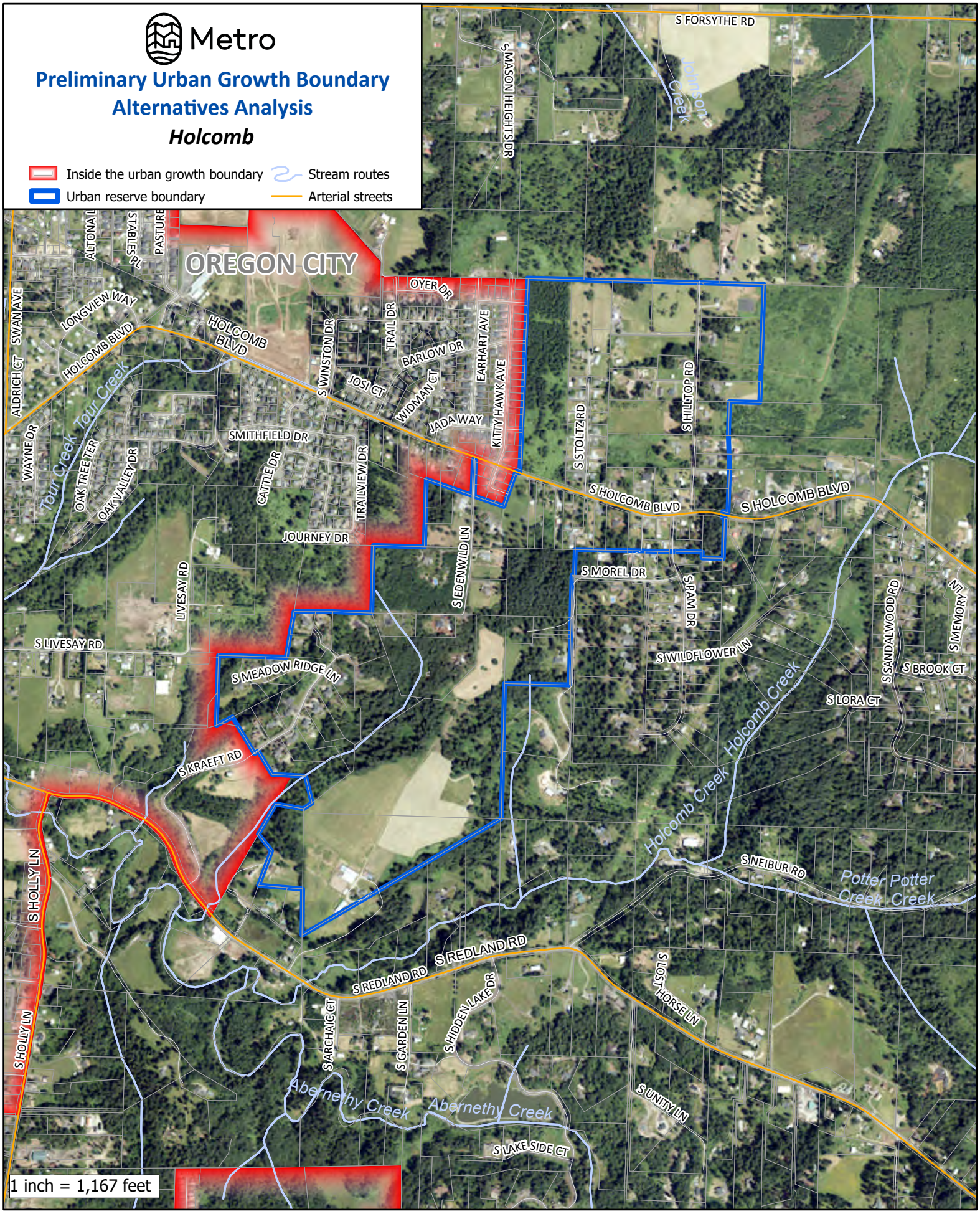
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Holcomb

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



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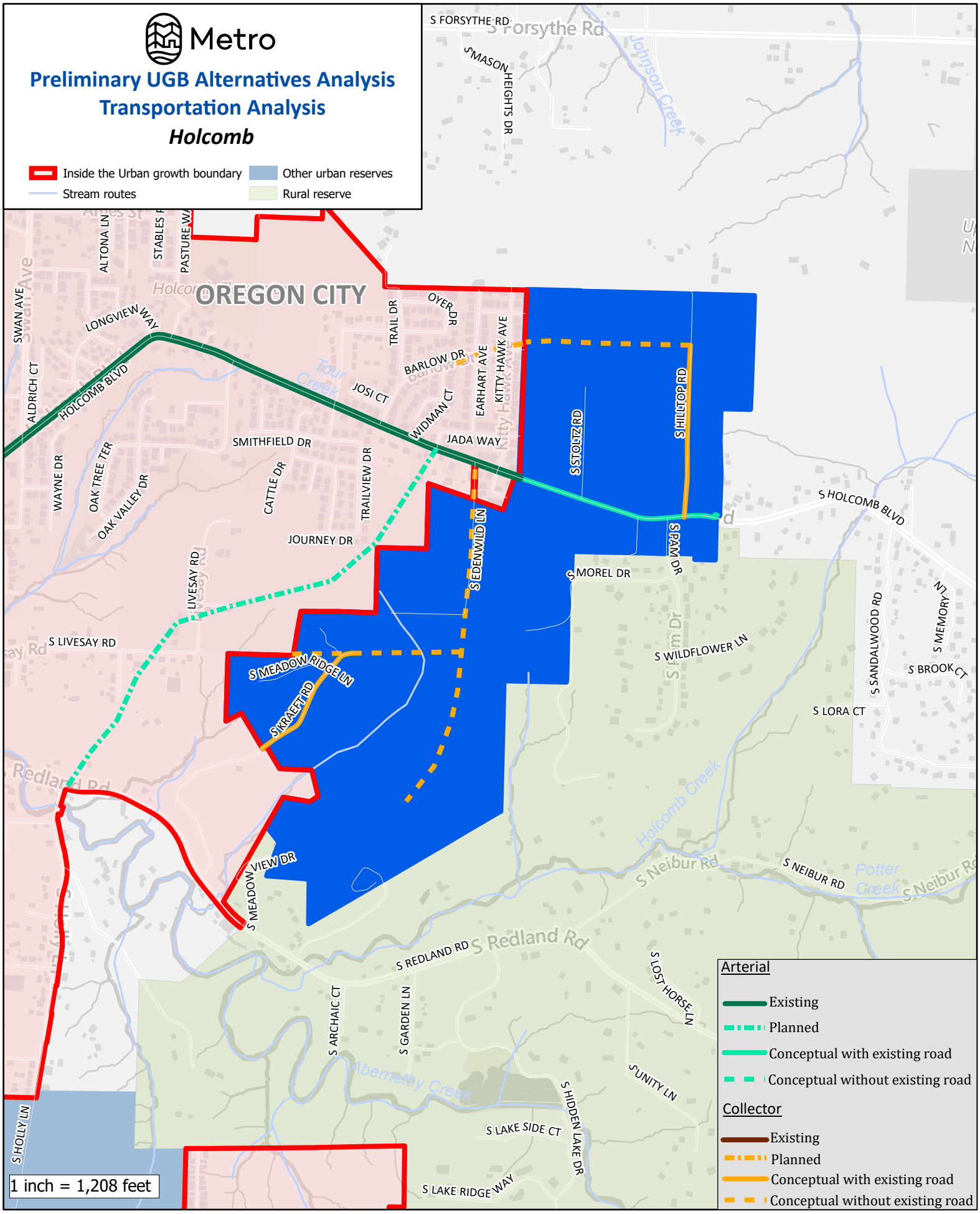

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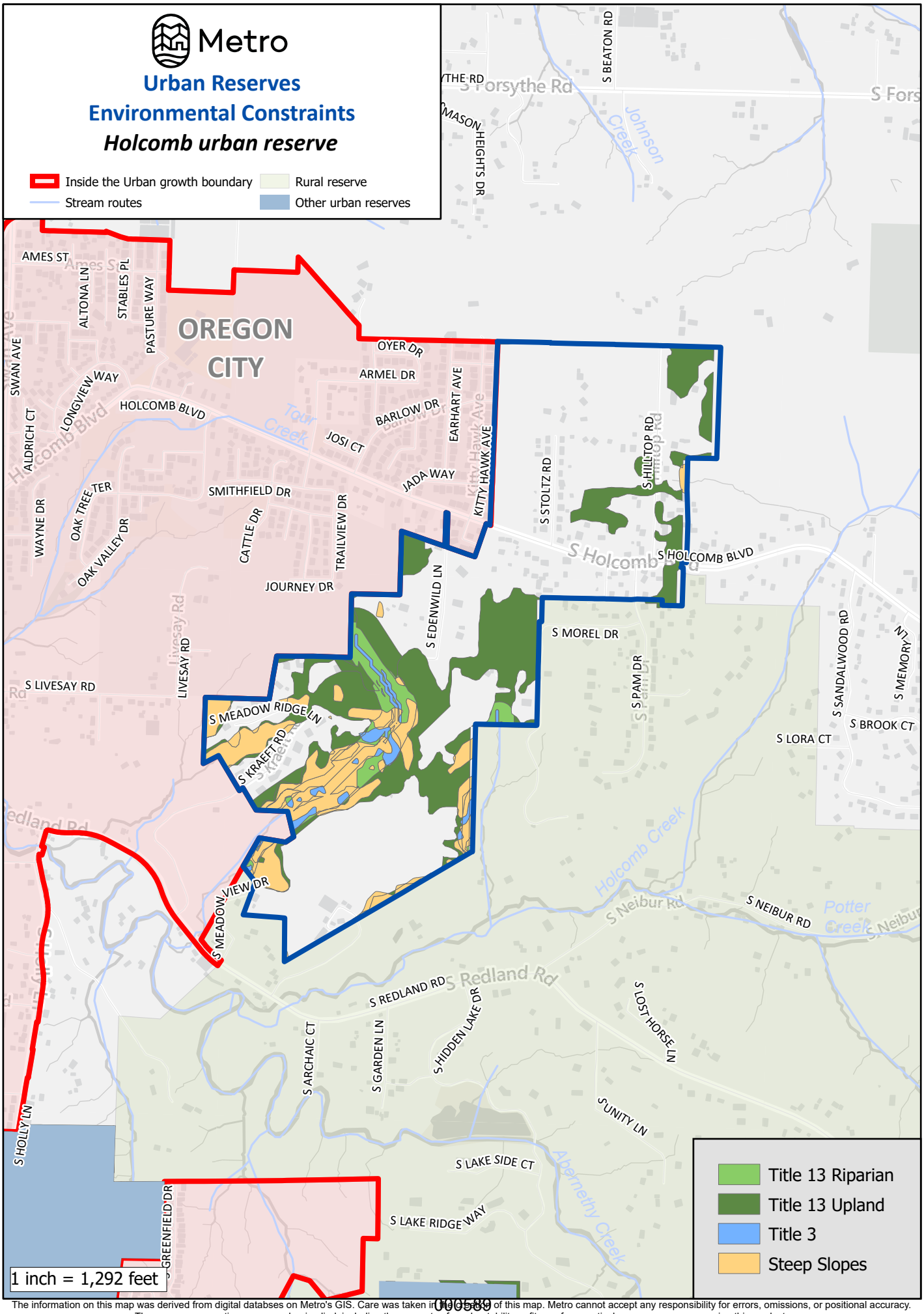

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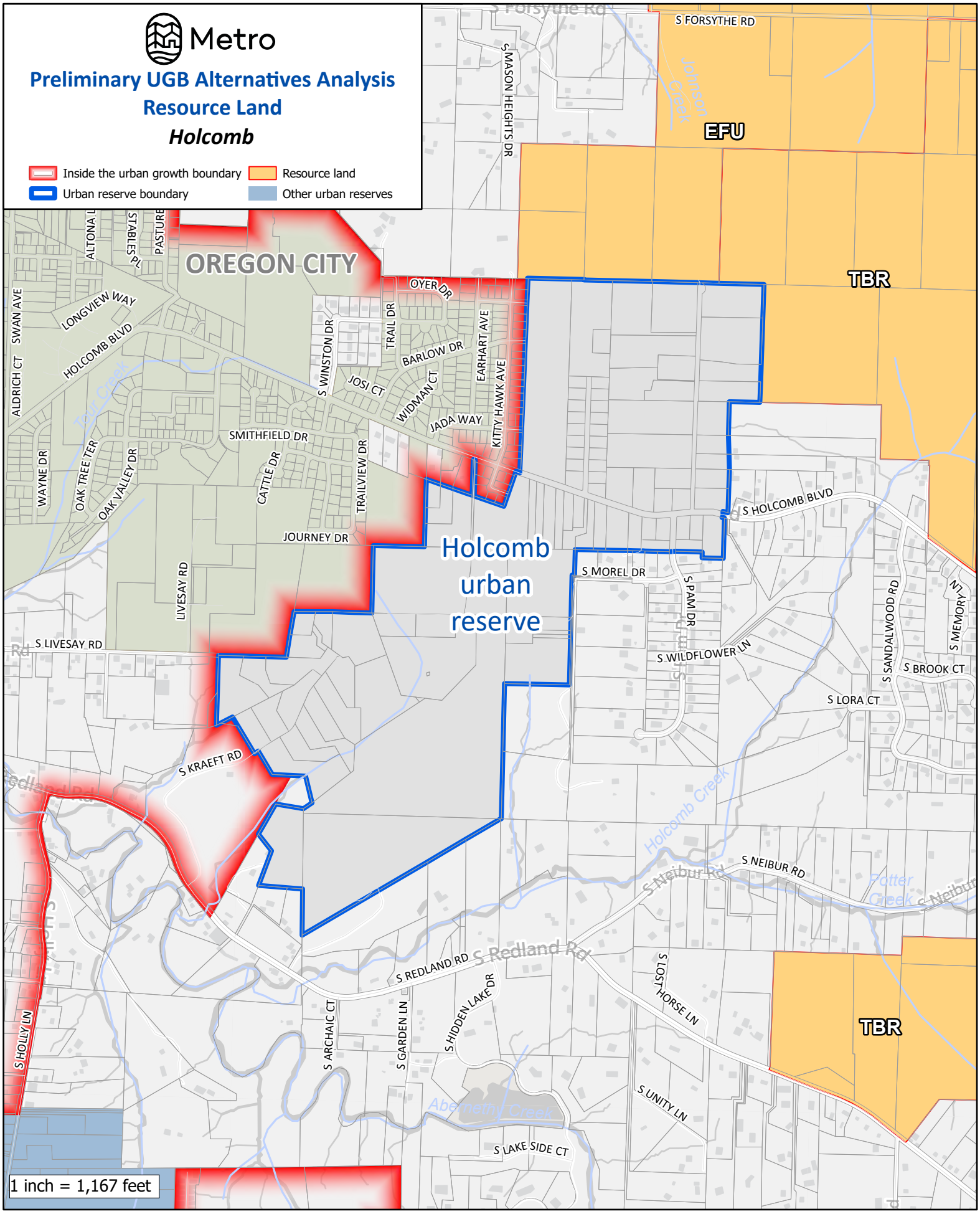

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HOLLY LANE – NEWELL CREEK CANYON URBAN RESERVE

Total Reserve Area	695 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	591 acres
Gross Vacant Buildable Area	175 acres
Net Vacant Buildable Area	**131 acres**

The Holly Lane – Newell Creek Canyon Urban Reserve is an irregularly shaped area adjacent to the east side of Oregon City. The reserve straddles Highway 213 between S Redland Road to its north and S Maplelane Road to its south. The reserve's eastern side is also largely bisected by S Holly Lane; its western side is connected to S Davis Road, S Morton Road, and unimproved right-of-way leading to S Division Street. The reserve is almost entirely surrounded by land inside the UGB, with only an approximately 370-yard border with a rural reserve and a 330-yard border with rural exception lands in its northeast corner.

The reserve is largely a mix of publicly owned forested tax lots along Highway 213 and private rural residences along S Holly Lane. Newell Creek flows northward through the reserve on both sides of Highway 213, joining Abernethy Creek at the reserve's northern boundary.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Holly Lane – Newell Creek Canyon Urban Reserve is comprised of 157 contiguous tax lots, which have a combined area of approximately 591 acres. All but two of these tax lots are entirely within the reserve. More than 80 percent of the tax lots have area within the reserve that are five acres or less in size; more than half have area within the reserve smaller than two acres and only five tax lots have area within the reserve greater than 20 acres. As noted above, the entire reserve contains 175 gross vacant buildable acres and 131 net vacant buildable acres.

A significant portion of the area, 203 acres, is land owned by Metro that is part of the larger 236-acre Newell Creek Canyon Nature Park that opened in 2021. The remainder of the area is composed of highway and road right-of-way, rural residential development with a few locations of very small-scale agricultural activity, and one 61-acre tax lot of forested land owned by Earthscapes of Oregon, LLC. Three power lines cross through the southern portion of the urban reserve. Overall, 101 of the 157 tax lots have improvements, with a median assessed value of those tax lots' improvements exceeding $229,000.

The reserve is adjacent to Tumwata Middle School and is less than a mile from the Oregon City School District Jackson Campus and Pioneer Memorial Stadium. Clackamas Community College is less than one mile away. The reserve is divided by Highway 213 and S Holly Lane, and its north end is approximately one mile from I-205.

With nearly all of the reserve has slopes greater than 10 percent, except for portions of some along S Holly Lane, the reserve's topography is generally not suitable for new employment uses. The

lands east of S Holly Lane and in the vicinity of S Alden Street on the west side of the reserve have slopes greater than 25 percent, which limit residential development opportunities in this location as well. Roughly one-third of the land area of the reserve is in public ownership. Therefore, this reserve is likely able to accommodate a small residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Holly Lane – Newell Creek Canyon Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Oregon City serves lands within their corporate boundary, while lands within the jurisdiction of Clackamas County are served by Clackamas River Water (CRW). Both Oregon City and the CRW South System receive water from the South Fork Water Board (SFWB). SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. There are currently no known major treatment system deficiencies.

The City has annexed the Beavercreek UGB expansion area to the southwest. While the City is adequately served elsewhere, they may lack water storage necessary to fully serve urban development of these annexed areas. CRW is considered to have adequate capacity to serve lands still within the jurisdiction of Clackamas County in this vicinity and other customers; though the Beavercreek service area showed a storage deficiency of 0.31 MG in 2019 in the interim of building the new Beavercreek reservoir, it is anticipated to bring on sufficient storage.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

CRW has done planning for service to the area of the urban reserve, and the Holly Lane – Newell Creek Canyon Urban Reserve is in CRW's service area. However, CRW will not likely be the service provider once the reserve is annexed to a city (i.e., Oregon City) and urbanized. Rather, when Oregon City annexes the reserve, the City will likely take ownership of any water related infrastructure within the area, except potentially for facilities that are needed to go beyond the annexed area, such as large-scale transmission lines. Accordingly, CRW, like many water service providers, may be cautious about investing in improvements for currently rural areas that may one day be annexed to cities. CRW is expected to build a new storage reservoir in the near future, which result in a storage surplus. Oregon City has plans to build reservoirs that could serve urban reserves, but no timeline is available at this time. While there is some projected surplus pumping and storage capacity that could be available to serve urban development of the reserve, once annexed to the City, those surpluses may be

insufficient and additional pumping and storage facilities may be necessary. The existing distribution system may also experience capacity challenges if it is determined to be undersized and not upgraded.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, new facilities for storage and pumping will likely be needed to avoid system capacity deficits. The distribution system in the area may also need to be upgraded.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$0
15-inch pipe	$0
Pumping	$2.32 million
Storage	$0.08 million
Total:	**$2.4 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$919**

Sanitary Sewer Services

With regard to sanitary sewer services, the Holly Lane – Newell Creek Canyon Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Oregon City provides sanitary sewer service to properties within its corporate limits, as well as to some properties that are already in the UGB but still in unincorporated Clackamas County. Wastewater flows to the Tri-City Sewer District (TCSD) trunks, interceptors, and, eventually, the Tri-City Water Resource Recovery Facility (WRRF), all of which are owned and operated by Water Environment Services (WES). Both the Oregon City Master Plan and the WES Master Plan identify segments of the conveyance system that are predicted to surcharge or flood during the design storm event. The Newell Creek Interceptor south of Redland Road has predicted surcharging or flooding under existing conditions, which indicates it does not necessarily have fully sufficient capacity to serve the nearby areas already inside the UGB. Relevant master plans include a capital improvement project to upside a portion of the Newell Creek Interceptor south of Redland Road, but it is not clear how much additional capacity this will provide.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The Newell Creek Interceptor has capacity challenges and it is unknown whether a planned upsizing could accommodate urban development of the Holly Lane – Newell Creek Canyon Urban Reserve. However, no pump stations are likely needed downstream of the reserve to accommodate urban development.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Without sufficient upsizing of the Newell Creek Interceptor, urban development of the reserve could exacerbate existing capacity challenges.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$2.89 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0
Force mains	$0
Total:	**$2.89 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,105**

Stormwater Management Services

With regard to stormwater management services, the Holly Lane – Newell Creek Canyon Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The Oregon City Stormwater Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas: the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the two-year storm event. Capital improvement projects to address capacity issues described above are presented in the Master Plan.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater will be conveyed, treated, and disposed of within the reserve (i.e., outfall to Newell Creek); therefore, it is not anticipated that existing stormwater facilities would be utilized. Stormwater will nonetheless be complex, given this reserve's infrastructure would be at the upstream edge of the surrounding basins, but manageable.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater will likely be detained and treated within the reserve and, based on topography, outfall directly to Newell Creek; therefore, no impacts to the existing stormwater infrastructure in the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$0
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$2.91 million
Total:	**$2.91 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,114**

Transportation Services

With regard to transportation services, the Holly Lane – Newell Creek Canyon Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 household-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Holly Lane – Newell Creek Canyon Urban Reserve had average, above average, and significantly above average household-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a regional center in the adjacent City of Oregon City. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. The Oregon City Regional Center aligns with the 2040 Growth Concept Map designation.

The City of Oregon City's plans for the Oregon City Regional Center include mixed-use development, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of

housing, public spaces, habitat restoration, education, and employment opportunities. The regional center currently has a drug store, restaurants, and other retail commercial uses, banks, medical/dental facilities, community centers, government offices, and auto-oriented uses. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The City's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

There are also employment uses, including industrial uses, grocery stores, and other commercial uses, as well as education and medical facilities, government offices, and parks in the Red Soils area near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road. Additionally, there are major medical facilities and an assisted living facility east of S Division Street between Davis Road and Gilman Drive and employment uses around the intersection of Abernethy Road and S Redland Road.

Growth in and near the regional center and other employment and medical center areas will not necessarily cause a significant increase in household-based VMT per capita in the future, as area residents will be able to access some daily needs and find employment opportunities with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact household-based VMT per capita.

Four TriMet bus lines serve Oregon City, all of which generally focus on the regional center and the central portion of the city along Molalla Avenue. Service is provided to Clackamas Community College and the employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road; however, large portions of the City lack TriMet service. Route 154 provides service along Abernethy Road and Holcomb Boulevard between the regional center and up to about S Longview Way. Route 32 provides service along S Division Street and along Beavercreek Road, connecting the regional center with employment uses along Beavercreek Road, Oregon City High School, and Clackamas Community College. Some of these existing routes are identified as part of the frequent regional transit network in Chapter 4, Figure 4.3 of the 2023 RTP, though there are also gaps in planned frequent transit service along certain routes in the UGB near the reserve and elsewhere in the City as well.

Oregon City has at least 29 miles of dedicated bike lanes and 3.5 miles of established bikeways, with most of them located in the "up-top" section (southern end) of the City. The Park Place neighborhood is also fairly well served and Highway 213 has dedicated bike lanes. Most of the downtown streets are classified as "bike with caution" streets

and the South End neighborhood has minimal bike facilities. There are dedicated bike facilities along most of Beavercreek Road and Molalla Avenue, as well as on much of Front Avenue, Holcomb Boulevard, S Redland Road, and Swan Avenue nearer to the reserve. Portions of S Anchor Way and S Division Street have bike facilities. The existing bike facilities on Beavercreek Road, Holcomb Boulevard, Molalla Avenue, and S Redland Road are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies a gap in the planned network along S Holly Lane and areas closer to the regional center.

The regional center is well served by sidewalks, as are employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road. The medical center complex on S Division Street and much of the residential areas in the UGB adjacent to the reserve also have sidewalks. Holcomb Boulevard has sidewalks on at least one side most of the way from the inner edge of the UGB to the intersection of Abernethy Road and S Redland Road, though there are some sections without sidewalks. The portions of S Maplelane Road and S Thayer Road in the UGB lack sidewalks on both sides and have lengths with no sidewalks at all, though there are painted pedestrian crossings at the intersection of S Maplelane Road and S Beavercreek Road. Chapter 4, Figure 4.4 of the 2023 RTP identifies gaps in the planned regional pedestrian network along Holcomb Boulevard and S Redland Road. There are also gaps in the planned regional trail network in the UGB near the reserve, as indicated in Chapter 4, Figure 4.6 of the 2023 RTP.

Figure 4.14 in Chapter of the 2023 RTP identifies Molalla Avenue inside the UGB as a high injury corridor.

The sections of Highway 99E, Highway 213, and I-5 in Oregon City are identified as a throughways Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that these highway sections currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 213 is the nearest RTP-designated throughway to the reserve. Indeed, the highway bisects the reserve, but does not include direct access to it; the closest accesses would be via S Redland Road, approximately half a mile from the north end of the reserve or via S Maplelane Road, approximately three-quarters of a mile from the south end of the reserve. As noted above, the section of the highway in the City currently meets travel speed reliability performance thresholds. Considering the relatively small buildable area of the reserve and RTP reliability forecasts, development of the reserve is not expected to jeopardize the throughway reliability of the highway.

TriMet Route 32 has stops on S Division Street, essentially adjacent to the northwest corner of the reserve. There are also Route 32 stops at the intersection of Beavercreek Road and Highway 213, approximately three-quarters of a mile from the southeast corner of the reserve. Route 32 provides access to the regional center, as well as to employment uses along Molalla Avenue and Beavercreek Road, as well as to Clackamas Community College and Oregon City High School. Route 154, which has stops at the intersection of Abernethy Road, Holcomb Boulevard, and S Redland Road, provides service between the City of West Linn and along Holcomb Boulevard, with stops in the regional center. There are no TriMet stops along S Holly Lane.

While there are no roads directly connecting to the reserve that have bike facilities, short sections of S Anchor Way and S Division Street near to the north of the reserve, as well as Abernethy Road and S Redland Road, have bike facilities. There are also bike facilities on S Maplelane Road, but they stop about 500 feet from the southeast corner of the reserve. There are no bike facilities along S Holly Lane.

The roads withing and along the residential neighborhoods and the medical facility complex adjacent to the northwest of the reserve mostly have sidewalks, as does much of the length of S Maplelane Rd adjacent to the south end of the reserve. There are no sidewalks along Morton Road or Willamette Street stubbing to the northwest of the reserve, along S Donovan Road between the reserve and Tumwata Middle School, or along S Holly Lane running through the reserve.

It was noted in response to Factor 1 that the reserve is not likely to be able to efficiently accommodate an employment land need, but could potentially support a small residential land need. The north and northwest of the reserve are relatively close and accessible to employment uses, school uses, medical facilities, and the regional center, has nearby transit service and bike and pedestrian facilities. Future residents of this portion of the reserve could access their daily needs and employment opportunities without significant travel by private motor vehicle. The east side of the reserve, however, is much further from employment, school uses, medical facilities, and the regional center, and is not as close to transit service, though the northeast of the reserve is adjacent to Tumwata Middle School. Future resents of the east side of the reserve will likely be more reliant on private motor vehicle transportation to access their daily needs and employment opportunities.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

S Anchor Way, Davis Road, S Division Street, Gilman Drive, S Holly Lane, S Maplelane Road, Morton Road, S Redland Road, and Willamette Street would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

As noted above, future residents of the north and northwest of the reserve could access their daily needs and employment opportunities without significant travel by private

motor vehicle and, therefore, would not likely increase the area's household-based VMT per capita. The small buildable area of this portion of the reserve would also mean that additional traffic impacts on existing streets would be minimal. The east side of the reserve, however, could support more residential development and is further away from areas where future residents could access their daily needs and employment opportunities. The east side is also generally less well served by transit and bike and pedestrian facilities. Future residents of these areas will likely drive more often and farther on average than future residents in the northwest of the reserve, with greater traffic impacts on nearby roadways.

Development of the reserve is, however, not expected to jeopardize Highway 213's throughway reliability or necessarily cause additional motor vehicle traffic on Molalla Avenue that exacerbates its high-crash conditions.

d. Need for major transportation facility improvements and associated costs

Urbanization of the reserve is expected to warrant improvement of a 1.22-mile-long portion of S Holly Lane crossing through the reserve to urban arterial standards, which will require acquisition of additional right-of-way.

Facilities	Cost
Arterials, existing/improved full street	$64.50 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$0
Total:	**$64.50 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$24,694**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in the reserve and in the corridors leading to it. Conceptual road layouts for the reserve do not provide enough roadway network to make service feasible. However, potential services described within TriMet's "2045 Network Vision" could be rerouted with future roadway development at no additional cost.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Newell Creek flows north through the middle of the Holly Lane – Newell Creek Canyon Urban Reserve for approximately 1.9 miles. This stretch of the creek is on land owned by either Metro or Oregon Department of Transportation, and these lands are not likely to be urbanized.

Three tributaries of Newell Creek also flow through Metro-owned land for approximately 0.7 miles. Two of these tributaries first flow through undeveloped private land that contains numerous areas of steep slopes for approximately 0.6 miles. Urbanization of these steep slope areas will be difficult and likely minimal and therefore may not have significant impacts on these stream corridors.

A tributary to Abernethy Creek flows north in a ravine along the eastern edge of the reserve for approximately half a mile. The stream is about 100–200 feet below the main developable portions of the tax lots along S Holly Lane and, therefore, would not be impacted by future development occurring on the flatter portions of the area. A half-acre wetland identified on the National Wetland Inventory (NWI) is located in the southern portion of the area within the powerline easement. Limitations for residential development in powerline easements will provide their own protections on the wetlands from development.

There are some significant locations of upland habitat adjacent to both stream corridors and the tributaries. Again, due to the public ownership pattern and slopes greater than 25 percent that limit the amount of the residential development that can occur, urbanization of the area will have minimal impacts on the identified upland habitat.

Overall, urbanization of the area could occur with comparatively minimal impacts to the stream corridors, wetlands, and upland habitat due to topography and public ownership. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Holly Lane – Newell Creek Canyon Urban Reserve is given a “high” score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There is not a lot of developable land in the Holly Lane – Newell Creek Canyon Urban Reserve when considering the amount of vacant lands that are in public ownership or are constrained by topography or natural features. There are only a few rural residences west of Highway 213 and they are adjacent to and practically a part of the urban development of Oregon City, so urbanization of this area is unlikely to result in a significant change in sense of place or degradation of a more rural lifestyle for these residents. There are also already

numerous residences along S Holly Lane on the east side of Highway 213, and they are proximate to urban subdivisions, large manufactured home parks, commercial areas, and public school complexes; urbanization of this area is therefore also unlikely to result in a significant change in sense of place or degradation of a more rural lifestyle for these residents either.

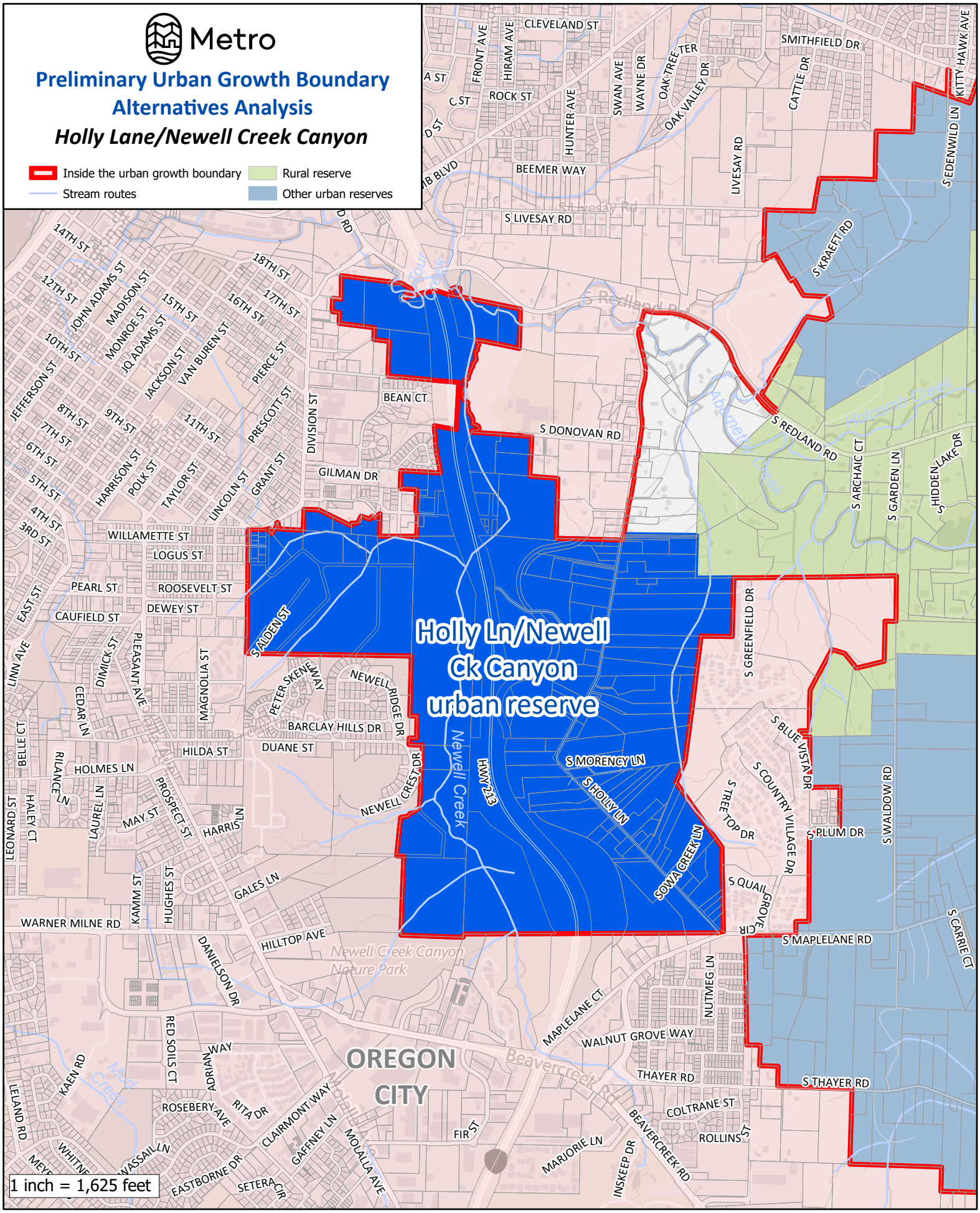
As detailed more fully in response to Factor 2, the proximity of a variety or urban land uses and modes of transportation, as well as the relatively small amount of buildable area, could help limit significant increases in VMT and related energy impacts from urbanization of the north and northwest of the reserve. Urbanization of the east side of the reserve could have higher rates of VMT, but, given the amount of parcelization and existing development in this area, new development here would occur slowly. The larger and less developed tax lots in the southeast of the reserve may be developed sooner, and they are closer to existing urban services and other modes of transportation.

There is minimal commercial agriculture occurring within the reserve and the economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Holly Lane – Newell Creek Canyon Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

There are no locations where lands outside the UGB but contiguous with the Holly Lane – Newell Creek Canyon Urban Reserve have Goal 3 or 4 resource land zoning for agricultural or forest activities. Therefore, the proposed urban uses are considered to have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land. The reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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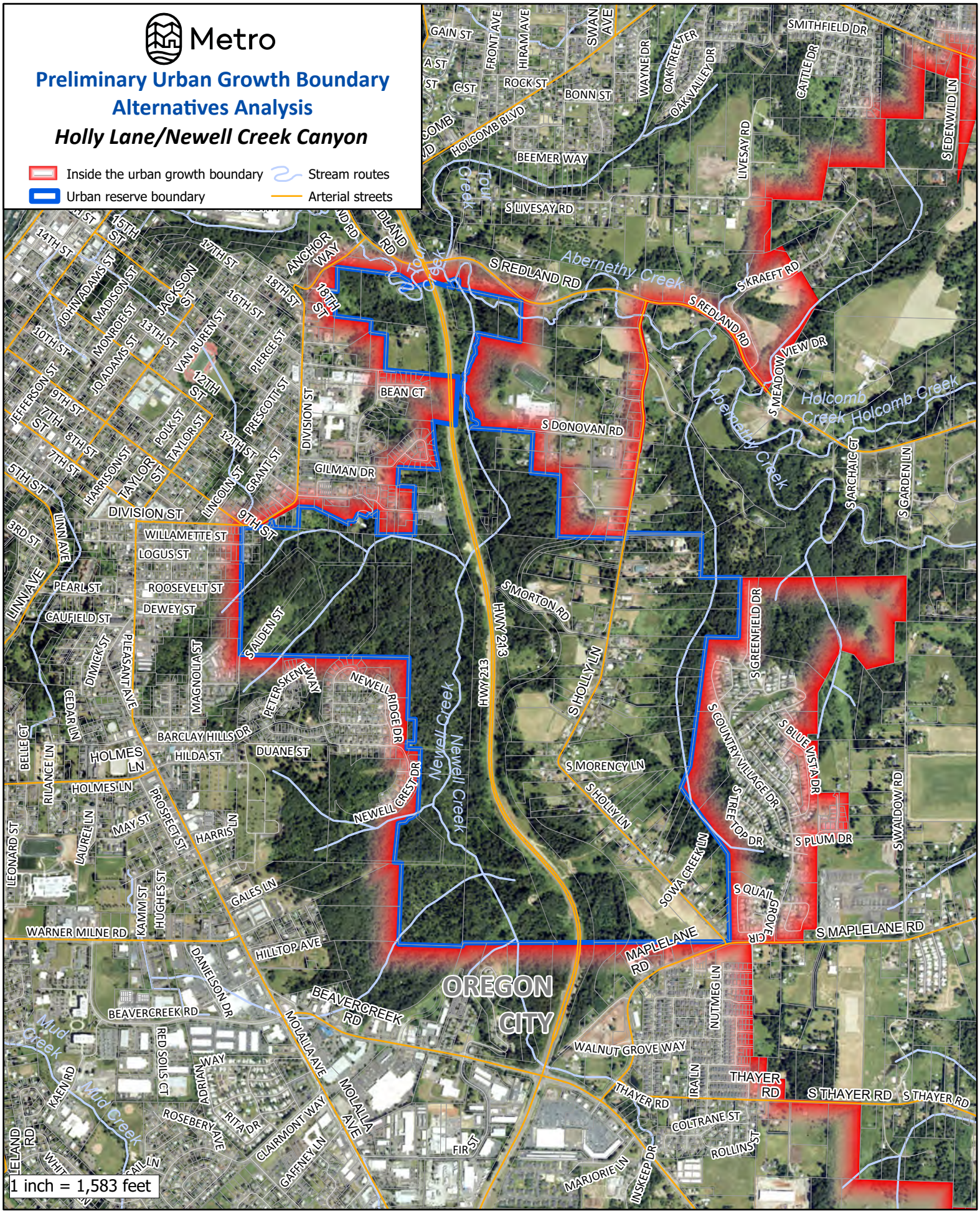
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Holly Lane/Newell Creek Canyon

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



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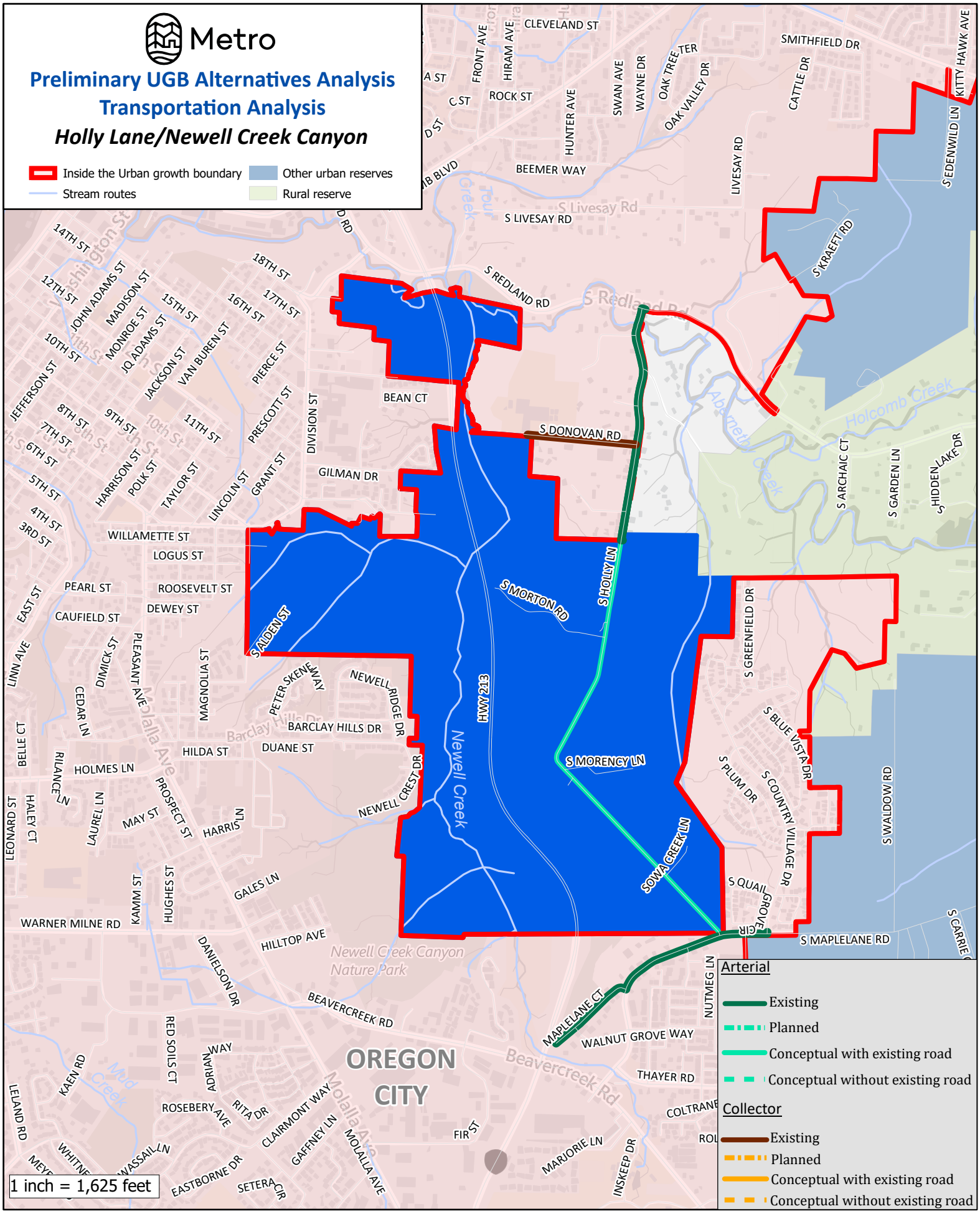

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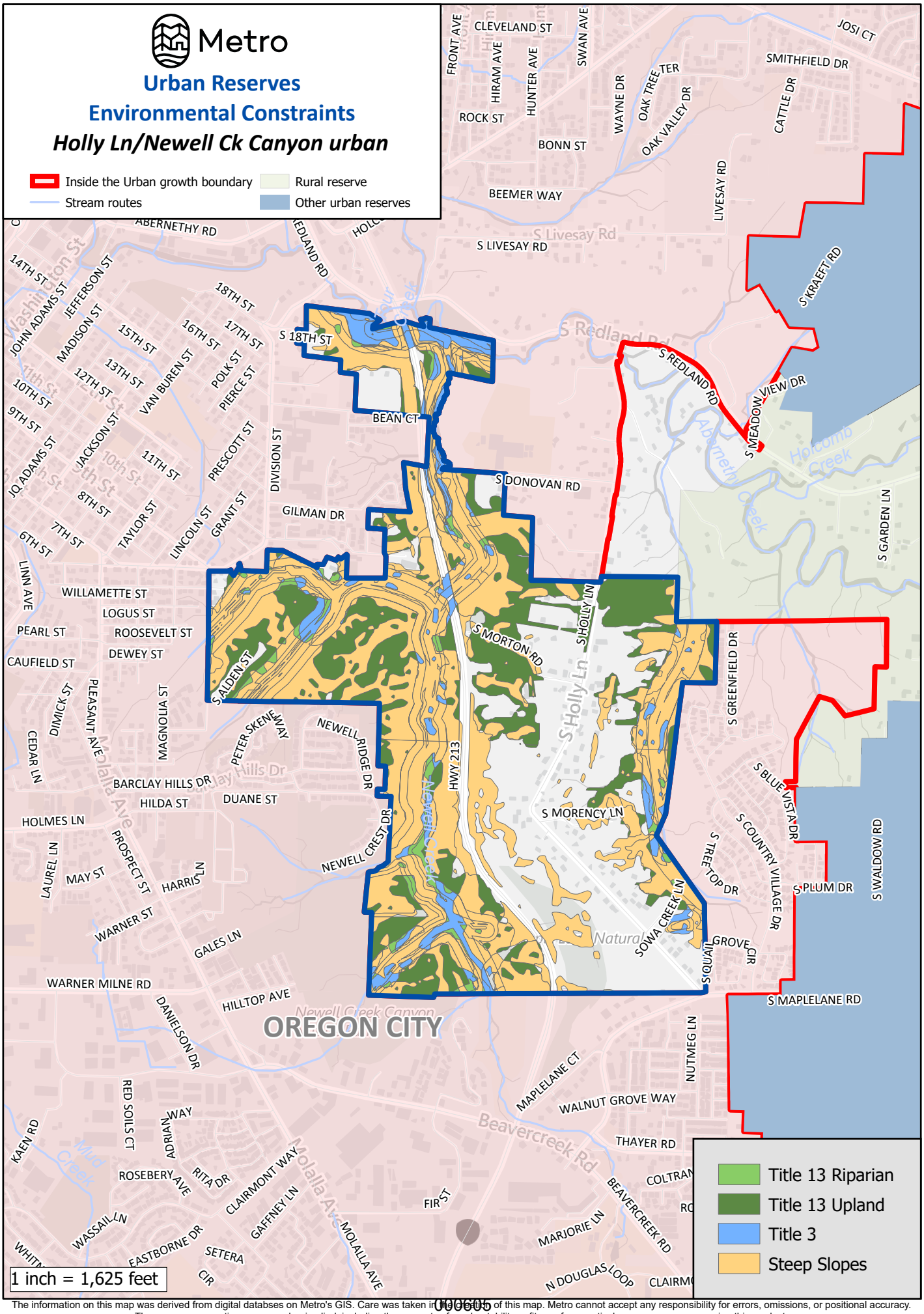

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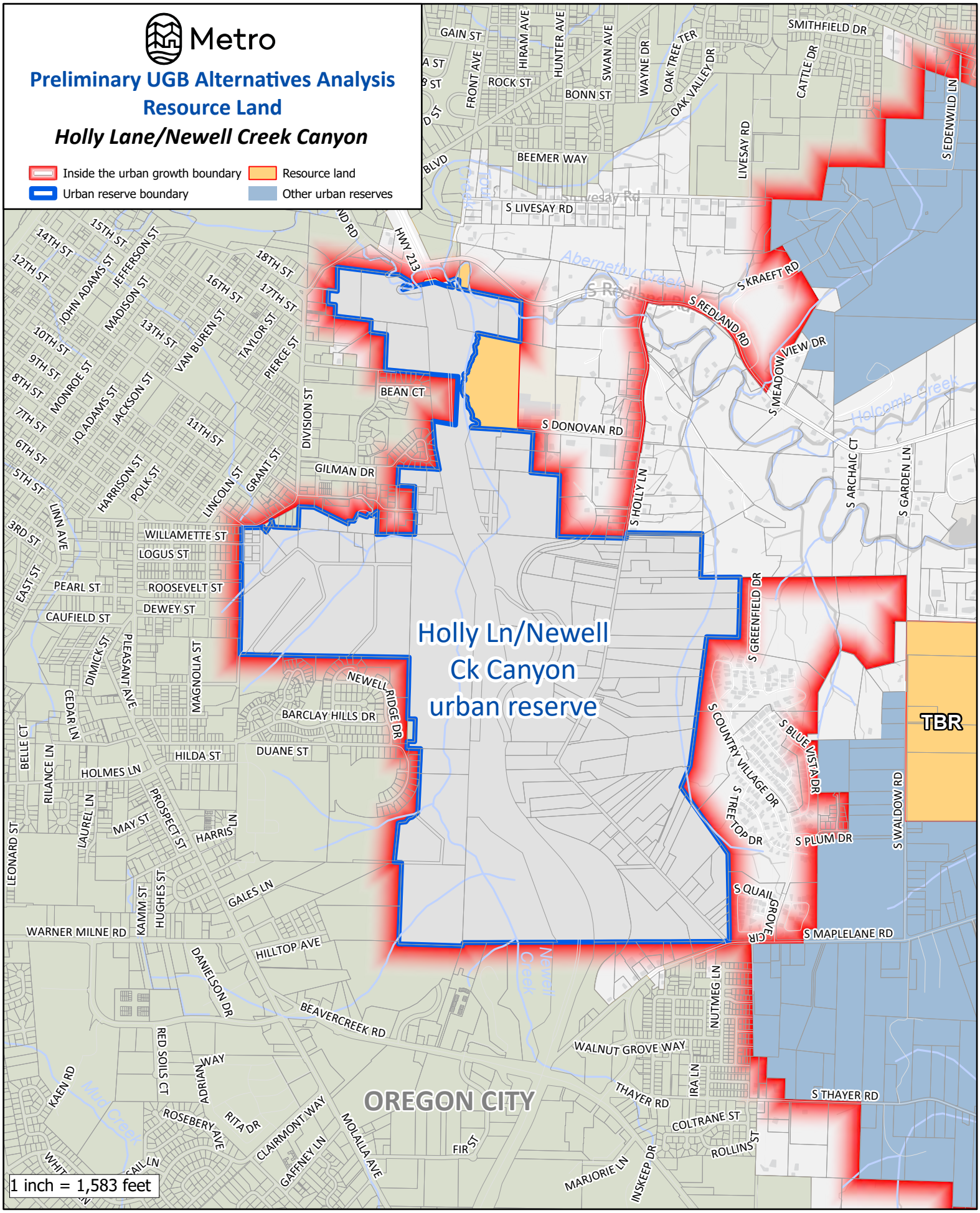

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I-5 EAST – WASHINGTON COUNTY URBAN RESERVE

Total Reserve Area	851 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	740 acres
Gross Vacant Buildable Area	500 acres
Net Vacant Buildable Area	**372 acres**

The I-5 East – Washington County Urban Reserve is a somewhat rectangularly shaped area on the east side of I-5, south of I-205, north of SW Frobase Road, and west of SW 65th Avenue. The UGB, which more or less follows I-5 and I-205, forms the western and northern boundaries of the reserve, while the Norwood Urban Reserve and the Elligsen Road North Urban reserve bound it to the east and south, respectively. Saum Creek flows north through the center of the reserve and several tributaries join the creek prior to it crossing under I-205. The south end of the reserve is approximately 270 feet higher than its north end and there are numerous slopes greater than 10 percent throughout the reserve, primarily along Saum Creek and its tributaries. Access to the area is provided by SW Frobase Road, SW Norwood Road, SW 65th Avenue, and SW 82nd Avenue.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The I-5 East – Washington County Urban Reserve is comprised of 160 contiguous tax lots entirely within the reserve. The combined area of these tax lots is approximately 740 acres. More than 70 percent of the tax lots are smaller than five acres; five are larger than 10 acres, with two larger than 60 acres. As noted above, the entire reserve contains 500 gross vacant buildable acres and 372 net vacant buildable acres.

According to aerial imagery, the 160 tax lots are predominantly in agricultural and rural residential use and 142 have assessed improvements. The median assessed value of these tax lots' improvements is more than $330,000.

While the reserve is adjacent to – indeed, includes portions of – I-5 and I-205, the nearest interchanges to both highways are more than a mile away via existing roads. Tualatin High School and Horizon Christian High School are both within a mile of the reserve, and the nearest TriMet bus stop is approximately half a mile away, though these facilities are on the opposite side of I-5 from the developable portions of the reserve. The Chieftain/Dakota Greenway Trailhead is also on the opposite side of I-5. The nearest 2040 Growth Concept designated corridor is more than a mile away.

There are slopes greater than 10 percent dispersed throughout the middle of the reserve, mainly along the numerous stream corridors that divide the reserve into smaller potentially-developable sections. Given the considerable number of tax lots under five acres with existing residences, the natural features that divide the reserve into smaller sections, and the distance to highway interchanges, this area is not considered appropriate for employment land needs. However, it is able to accommodate a residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the I-5 East – Washington County Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Tualatin. The city's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line. There are two pressure zones that would likely serve the I-5 East – Washington County Urban Reserve, Pressure Zones B and C. According to the city's March 2023 Water System Master Plan, both zones have storage surpluses under current conditions, but may have storage deficits under UGB buildout conditions. Under normal pumping conditions, the Norwood Pump Station serving Zone C has surplus capacity, though the Martinazzi and Boones Ferry Pump Stations previously serving Zone B have reached the end of their usable lives and do not currently operate, so Zone B is now served by the Boones Ferry flow control valve/pressure reducing valve. There are existing industrial deficiencies in Zone B and residential deficiencies in Zone C. Existing transmission line capacity is deficient in both zones.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Assuming the I-5 East – Washington County Urban Reserve is added to the UGB after full buildout of the areas already within the UGB, and assuming storage facilities are not expanded, development of the reserve would cause a greater storage capacity deficit. Projected surpluses of the Norwood Pump Station could serve the reserve, but the Martinazzi and Boones Ferry Pump Stations both require upgrades to be operational. Transmission line improvements are identified in the Master Plan capital improvement projects. These improvements would provide resiliency to the existing water system as well as additional capacity to serve future growth in the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional storage capacity, as well as potentially pump station upgrades, will be needed to avoid negative impacts to service in the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$6.76 million
12-inch pipe	$0 million
16-inch pipe	$0
Pumping	$14.5 million
Storage	$0.50 million
Total:	**$21.76 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,922**

Sanitary Sewer Services

With regard to sanitary sewer services, the I-5 East – Washington County Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from adjacent lands in the City of Tualatin is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF), which is owned and operated by Clean Water Services (CWS). CWS is also responsible for the system's gravity sewers over 24 inches in size, pump stations, and force mains. Eight of the nine CWS-owned pump stations have surplus capacity under existing conditions. While there may be some pipe capacity issues in the Teton and Tualatin Reservoir Basins, these capacity issues they may not be significant.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

It is unclear whether a capacity increase to the Saum Creek Pump Station proposed in the Master Plan would have the capacity to also serve the reserve. Current and planned piping is likely to be insufficient to serve development of the reserve. The treatment plant is a large facility with a broad service area; however, the cumulative addition of multiple urban reserves to the UGB could result in a need for some expansion in order to handle additional load.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional pumping and piping capacity are potentially needed to serve urban development of the reserve while avoiding negative impacts to service within the existing UGB. Additionally, and as noted above, cumulative addition of multiple urban reserves to the UGB could result in a need for some treatment plant expansion in order

to handle additional load while avoiding negative impacts to service within the existing UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$3.91 million
12-inch pipe	$4.20 million
15-inch pipe	$0
Pump station	$4.50 million
Force mains	$0
Total:	**$12.61 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,693**

Stormwater Management Services

With regard to stormwater management services, the I-5 East – Washington County Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of major capacity issues with existing stormwater facilities that serve the adjacent land inside the UGB. Based on topography, stormwater from development of the I-5 East – Washington County Urban Reserve would discharge directly to Saum Creek; the city's 2019 Stormwater Master Plan did not identify the Saum Creek Basin as currently facing capacity challenges.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater will be conveyed, treated, and disposed of within the reserve and discharge to Saum Creek, rather than connecting to existing facilities in the UGB. Saum Creek is believed to have sufficient capacity to serve development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater will be conveyed, treated, and disposed of within the reserve and discharge to Saum Creek, rather than connecting to existing facilities in the UGB. Saum Creek is believed to have sufficient capacity. Therefore, no adverse impacts to existing facilities are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$1.80 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$2.65 million
Total:	**$4.45 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$597**

Transportation Services

With regard to transportation services, the I-5 East – Washington County Urban Reserve is given a "low-medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the I-5 East – Washington County Urban Reserve had below average, average, and above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Tualatin. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The roughly 300-acre Tualatin Town Center aligns with this 2040 Growth Concept Map area. The city's Tualatin Town Center Plan envisions a mixed-use live, work, and play center that integrates natural resources, like the Tualatin River, with civic, social, economic, and cultural functions in a walkable community. Metro's 2017 State of the Centers Atlas shows that the Tualatin Town Center has a low number of dwelling units per acre and a much higher total number of employees compared with other town centers in the region. The town center has a very high "access to parks" score in the atlas, due in part to the numerous open space/natural areas and the Tualatin Community Park along the Tualatin River nearby. The town center also includes grocery stores and other retail commercial uses, medical/dental facilities, a post office, and multi-family housing, but also storage facilities, auto-oriented uses, and large parking lots. Within the UGB and adjoining the town center are Title 4 designated Industrial Area and Employment Area lands, as well as low- and medium-density residential uses.

Seven TriMet bus lines and the Westside Express Service (WES) Commuter Rail serve Tualatin. The routes are spread out along the major roadways including Highway 99W, SW Tualatin-Sherwood Road, and SW Boones Ferry Road, providing service to the town center and employment areas. WES connects the town center with Beaverton to the north and Wilsonville to the south. Figure 4.3 in Chapter 4 of the 2023 RTP does identify gaps in the planned regional transit network along SW Boones Ferry Road, SW Tualatin – Sherwood Road, and elsewhere in the city.

Nonetheless, the town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs through modes other than private motor vehicle transport. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact home-based VMT per capita in the future.

The town center is less than half a mile away from areas in the UGB adjacent to the reserve, but these areas are on the opposite side of I-5 and I-205 from the reserve. I-5 also separates residential uses in the UGB to the north of the reserve from the town center to the west; there are just two overpasses that connect these residential uses to the town center, limiting connectivity. Residents of these areas, where there are also fewer bus routes, may be more reliant on private motor vehicle transportation to get to the town center and areas to the west.

Tualatin has a fairly well-established bike route system, with approximately 25 miles of dedicated bike lanes, seven miles of established bikeways, and local trails that connect the employment areas and town center to the residential areas. There are two bike lane connections across I-5 to provide access to the eastern portion of the city. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Tualatin as a part of the planned regional bike network, including facilities on SW Boones Ferry Road, SW Nyberg Street, and SW Tualatin-Sherwood Road. There are identified gaps in planned regional bike facilities in the southwest and east of the city.

The town center has a well-established pedestrian network that also includes access to some trails. Most of the residential areas of Tualatin also have sidewalks, but there are fewer exiting pedestrian facilities in employment areas outside of the town center. The Tualatin River Greenway Trail connects the town center to parks in Durham and Tigard to the north, as well as to Browns Ferry Park along the Tualatin River on the east side of I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of existing streets in Tualatin as in the regional pedestrian network, including sections of SW Boones Ferry Road, SW Borland Road, and SW Tualatin – Sherwood Road. The figure identifies gaps in the future regional pedestrian network, however, in the south and east of the city.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road in the UGB as a high injury corridor. The intersection of SW Tualatin-Sherwood Road and

SW Boones Ferry Road, as well as the intersection of SW Martinazzi Avenue and SW Boones Ferry Road, are identified in Figure 4.14 as top five percent high injury intersections. There are no other high injury corridors or high injury intersections in Tualatin's portion of the UGB identified on Figure 4.14.

The portions of I-5 and I-205 that cross through Tualatin are identified as throughways in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of the chapter indicates that these portions of both interstates currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

While the reserve is adjacent to – indeed, includes portions of – I-5 and I-205, the nearest interchanges to both highways are more than a mile away via existing roads. As noted above, the portions of these highways in Tualatin currently meet travel speed reliability performance thresholds. Given the proximity of the town center and other commercial/employment areas to the reserve, the reserve's size, and the distance between highway interchanges and the reserve, urban development of the reserve is unlikely to generate sufficient traffic on either interstate to cause them to no longer meet those performance thresholds.

Currently, there is no transit service to the reserve. TriMet Route 76, which provides access to the town center, is approximately a third of a mile from the reserve via SW 65th Avenue, on the opposite side of I-205. TriMet Route 96, which also provides access to the town center, as well as to Portland and Wilsonville, is approximately two-thirds of a mile from the reserve via SW Norwood Road, on the opposite side of I-5.

There is a dedicated bike lane on SW 65th Avenue that is approximately one-tenth of a mile north of the reserve, on the opposite side of I-205. This bike lane connects to a bike lane on SW Sagert Street, which provides a connection to the west side of I-5, the town center, and employment areas. The small gap on SW 65th Avenue needs to be completed to connect to the reserve. There is an established bikeway and dedicated bike lane on SW Norwood Road that connects to the reserve and provides access to Horizon Christian School. This bikeway connects to another bikeway on SW Boones Ferry Road that extends south to the bike facility network in Wilsonville. It also connects to a bike lane that extends north on SW Boones Ferry Road to the bike facility network in Tualatin and Tualatin High School. There are no other existing bike facilities connected to or within the reserve.

The Saum Creek Greenway Trail is approximately 800 feet north of the reserve on the opposite side of I-205 via SW 65th Avenue; the trail connects to sidewalks on SW 65th Avenue and SW Sagert Street. The 800-foot gap needs to be completed in order to directly connect to reserve. The Norwood Trail is approximately 500 feet from the

reserve along SW Norwood Road. This trail connects to sidewalks in the residential area located just west of I-5 and extends quite some distance to the north through the residential neighborhoods and to Tualatin High School. The 500-foot gap needs to be completed to connect to the reserve. There are no sidewalks along SW 65th Avenue adjacent to the reserve, or on any existing streets within the reserve.

There are no urban residential or employment uses within a mile of the reserve and on the same side of I-5 or I-205 and, as noted above, there are only two nearby interstate crossings with gaps in bike and pedestrian facilities. There is also no existing transit service to the reserve. Therefore, without facility improvements and service extensions, and unless the reserve itself is developed with a mixture of uses, future residents of the reserve will likely be reliant on private motor vehicle transport to access their daily needs and employment, and employees of future employment uses in the reserve will need to commute by private motor vehicle from their homes located elsewhere. The analysis in Factor 1 indicated that the reserve would not be able to efficiently accommodate an employment land need.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW 65th Avenue and SW Norwood Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, if the reserve were to be developed with a mix of residential and employment uses, if transit service were to be extended to the reserve, and if gaps in bike and pedestrian facility connections were to be completed, there would be less additional traffic on these roadways. Providing the bike and pedestrian facility connections would lead to more use of the existing facilities within the UGB.

Given the proximity of the town center and other employment areas to the reserve, and given the distance of highway interchanges, development of the reserve is unlikely to jeopardize the throughway reliability of I-5 or I-205. Any additional motor vehicle traffic on SW Tualatin-Sherwood Road resulting from development of the reserve, however, may exacerbate the road's high-crash conditions.

d. Need for major transportation facility improvements and associated costs

SW 65th Avenue would likely need to be improved to urban arterial standards, but its improvements are considered a half-street improvements in this analysis, as the eastern half would be attributable to the urban development of the Norwood Urban Reserve. SW Frobase Road, SW 82nd Avenue, and SW Norwood Road would likely need to be improved to urban collector standards. The improvements to SW Frobase Road are considered half-street improvements in this analysis, as the southern half would be attributable to the Elligsen Road North Urban Reserve. Additional right-of-way would be required to develop each of these roads to their respective urban standards. In most cases, per-mile costs are expected to be normal, given the topography of the reserve land the roadways cross.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$43.83 million
Arterials, new	$0
Collectors, existing/improved full street	$47.08 million
Collectors, existing/improved half street	$13.11 million
Collectors, new	$0
Total:	**$104.02 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$13,972**

e. Provision of public transit service

Though the I-5 East – Washington County Urban Reserve is within the TriMet Service District, when TriMet evaluated the reserve for providing transit service for this analysis, it determined service to the reserve is unlikely to occur.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Saum Creek flows north through the middle of the I-5 East – Washington County Urban Reserve for nearly two miles. Seven tributaries, with approximately three miles in combined length, join the creek. The vast majority of these water bodies are within established riparian buffers, some with adjacent steep slopes that would limit nearby future development. Five wetlands on the National Wetland Inventory (NWI) are located along the tributaries, ranging in size from 0.4 to 1.4 acres each, and with a total area of approximately 4.7 acres. Seven additional ponds not identified as wetlands on the inventory are located along the tributary stream corridors. There are significant areas of riparian and upland habitat identified along all the stream corridors. The stream corridors and habitat areas divide the reserve into numerous small sections of developable land. As a result, some of the land areas are isolated from one another and transportation connections between them could potentially have adverse impacts on the stream corridors and habitat areas. However, the increased protection levels on streams, wetlands, and habitat areas within the UGB will lessen the potential impacts.

Still, urbanization of the reserve could occur with comparatively moderate to significant impacts to the natural resources, depending on the level of transportation connectivity and general urban design factors. Additional environmental consideration, specifically

regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the I-5 East – Washington County Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There are a number of rural residences throughout the I-5 East – Washington County Urban Reserve, but somewhat dispersed by stream corridors, habitat areas, and the agricultural uses described below. As noted in response to Factor 1, the vast majority of the reserve's tax lots have assessed improvements. Land uses in the reserve are somewhat separated from existing urban development by I-5, I-205, agricultural uses, stream corridors, and habitat areas, so urban development in the reserve may be more impactful on the current sense of place and rural lifestyle. However, existing development, parcelization, and the natural resources will likely slow urbanization and lead it to develop in more isolated sections, reducing the pace of change. Moreover, urbanization of the reserve could bring new social, educational, and recreational opportunities for existing residents.

As detailed more fully in response to Factor 2, future residents of the reserve are expected to be fairly reliant of private motor vehicle transportation, which could lead to VMT levels with adverse energy consequences. However, VMT could be limited under certain circumstances, including if the reserve were to be developed with a mix of land uses that allows future residents to access their daily needs closer by.

There is both small- and larger-scale agricultural activity occurring the reserve, including field and row crops, pastureland, and Christmas tree farms and Lee Farms, which hosts farm-related events and activities. While there would be economic consequences from urbanization in terms of a loss in farming activity in the reserve, that loss may be outweighed by the economic benefits of residential and/or employment development.

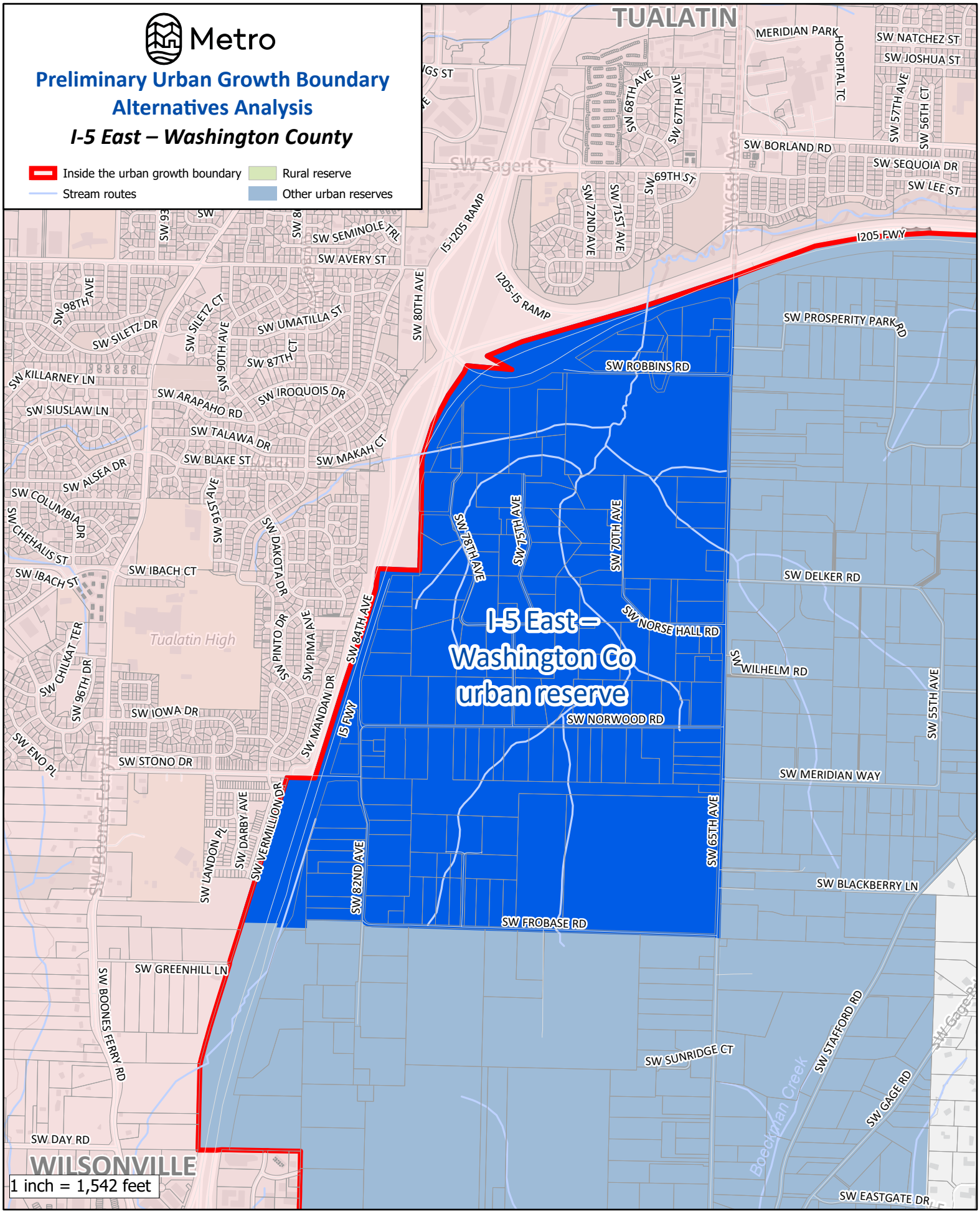
Overall, there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The I-5 East – Washington County Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Washington County, border the I-5 East – Washington County Urban Reserve in areas outside the UGB to south, on the opposite side of SW Frobase Road. These EFU-zoned lands have agricultural activity, including field crops, Christmas tree farms, and pasture land. There are also patches of forest, but generally in stream riparian areas, which may limit harvesting potential. The EFU-zoned lands also contact some small amounts of rural residential development. SW Frobase Road separates the reserve from these EFU-zoned lands, but the road itself would not provide an adequate buffer between urban

development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. The improvement of SW Frobase Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on SW Frobase Road and SW 65th Avenue, which could impact the movement of both farm equipment and goods. Therefore, proposed urban uses are considered incompatible with the nearby agricultural activities occurring on the EFU-zoned land to the south.

The proposed urban uses would not be compatible with nearby agricultural and forest activities occurring on farm and forest land outside the UGB to the south. Land use conflict mitigation measures would be warranted. The I-5 East – Washington County Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor.



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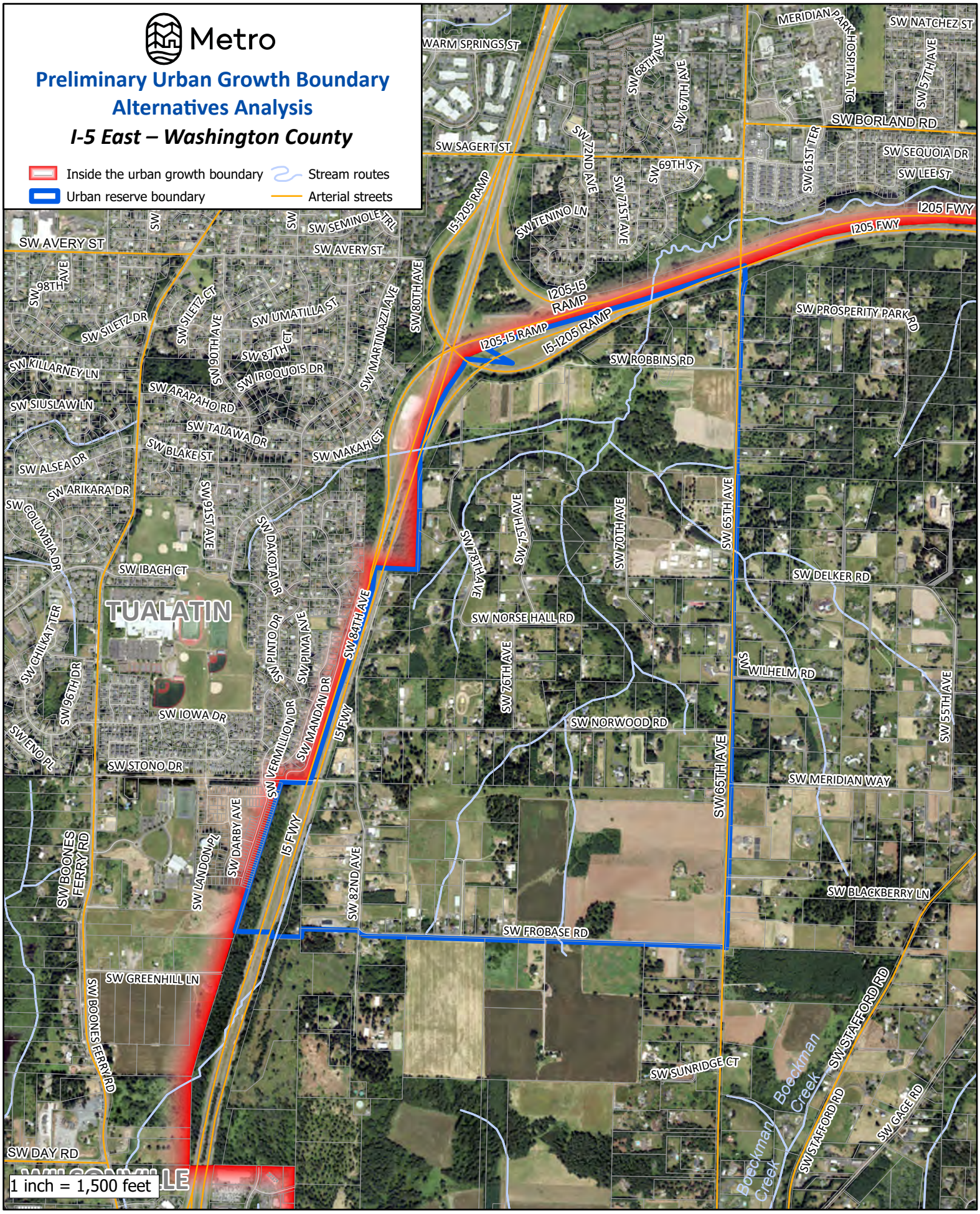
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

I-5 East – Washington County

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



1 inch = 1,500 feet

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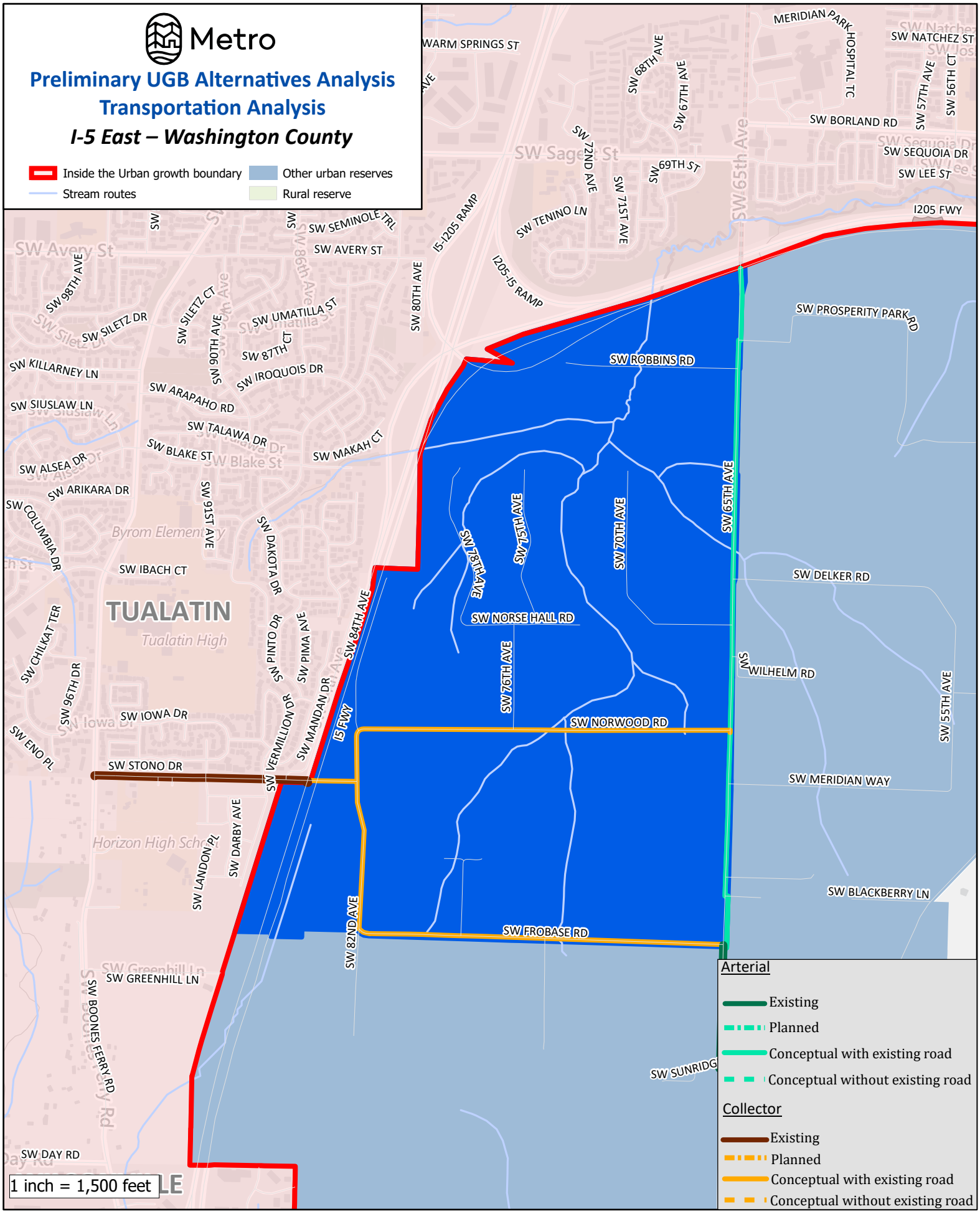

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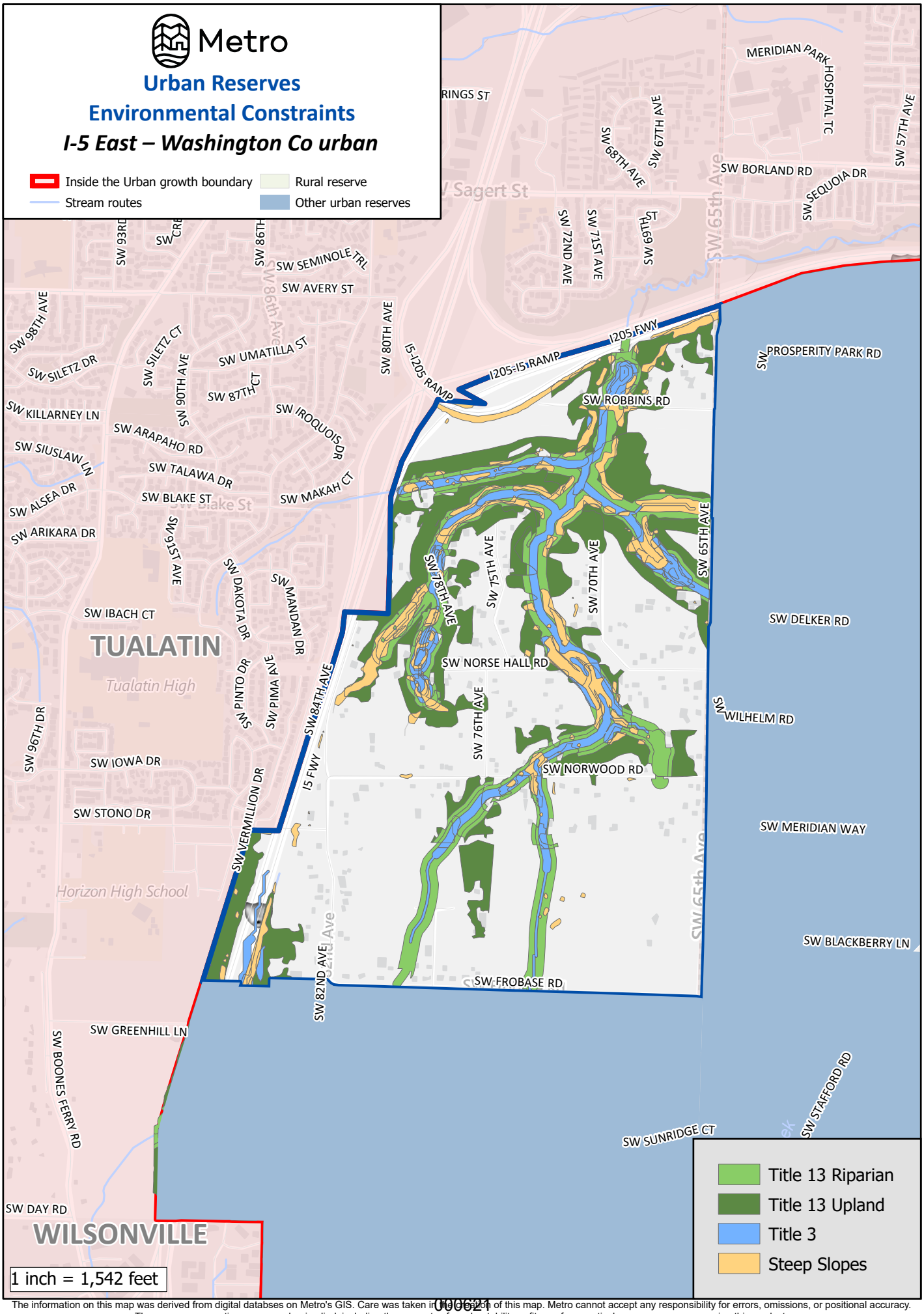

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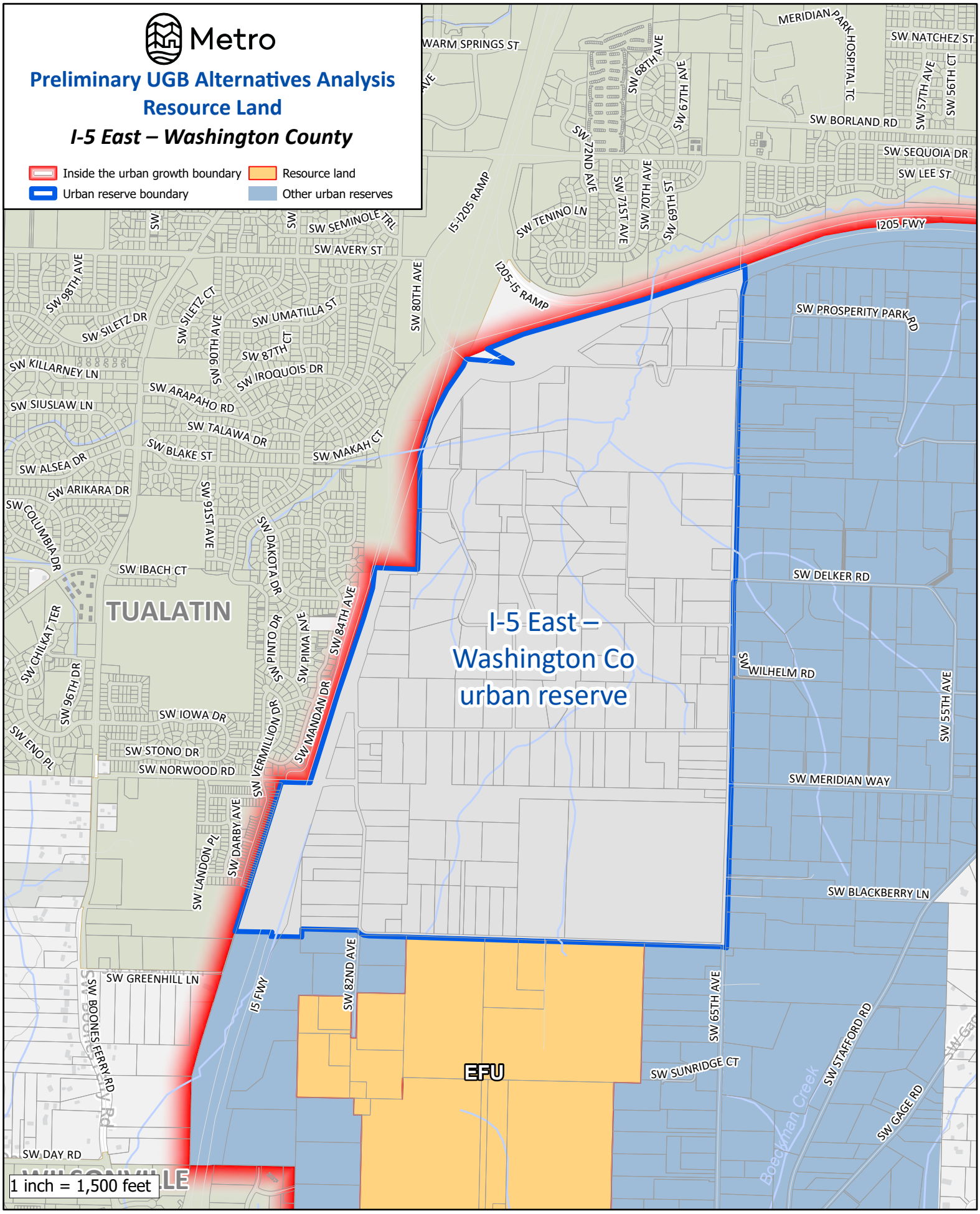

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MAPLELANE URBAN RESERVE

Total Reserve Area	569 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	556 acres
Gross Vacant Buildable Area	341 acres
Net Vacant Buildable Area	**254 acres**

The Maplelane Urban Reserve is an irregularly shaped area adjacent to the east side of Oregon City. The reserve is roughly divided between north and south by S Maplelane Road. In addition to S Maplelane Road, the reserve is connected to S Waldow Road and S Thayer Road. The UGB forms the reserve's western and southern boundaries. The reserve is primarily flat, with the exception of some small areas of steep slopes along the stream corridors and within the forested northeastern corner of the reserve. Abernethy Creek flows northward, just outside of the reserve to the east. A tributary to Abernethy Creek flows eastward through the northern portion of the reserve, and three tributaries to Thimble Creek flow eastward through the southern portion.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Maplelane Urban Reserve is comprised of 167 contiguous tax lots, which have a combined area of approximately 556 acres. All but one tax lot is entirely in the reserve. Of those tax lots that are entirely in the reserve, more than 40 percent are less than one acre in size, 80 percent are smaller than five acres, and only four are larger than 10 acres. As noted above, the entire reserve contains 341 gross vacant buildable acres and 254 net vacant buildable acres.

According to aerial imagery, most of the reserve's tax lots are developed with rural residential uses, though some larger tax lots appear to have agricultural uses and/or groves of trees. Oregon City School District owns a 57-acre tax lot in the northern portion of the reserve. Portland General Electric (PGE) and the federal government also together own about 50 acres of land in the reserve, including tax lots occupied by electrical substations and large powerlines. Overall, 148 of the reserve's tax lots have improvements, with a median assessed value of those tax lots' improvements exceeding $315,000.

S Maplelane Road and S Thayer Road run roughly east-west through the reserve. S Plumb Drive, a local residential street within the UGB, stubs to the west side of the north end of the reserve. The nearest bus stop is on S Beavercreek Road, approximately half a mile away via S Thayer Road. The nearest interstate, I-205, is more than two miles from the north end of the reserve. Clackamas Community College and Oregon City High School are about half a mile away from the south end of the reserve.

The reserve is generally flat with only a few locations, mainly at the edges of the reserve and along stream corridors, having slopes greater than 10 percent. While flatter topography would be easier for development of employment uses, the number of small parcels and the distance of the reserve from I-205 reduce the attractiveness for employment uses. In addition, there is an existing

employment and commercial node at Highway 213 and S Beavercreek Road, and additional vacant industrial-zoned land inside the UGB nearby, further reducing the need for additional employment land in this location. New residential development would be more cohesive with the existing rural residential development pattern and the school district's property could provide a focal point for residential neighborhoods once a school was built there. Therefore, this area is considered best able to accommodate a residential land need and not an employment land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Maplelane Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Oregon City serves lands within their corporate boundary, while lands within the jurisdiction of Clackamas County are served by Clackamas River Water (CRW). Both Oregon City and the CRW South System receive water from the South Fork Water Board (SFWB). SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. There are currently no known major treatment system deficiencies.

The city has annexed the Beavercreek UGB expansion area to the southwest. While the city is adequately served elsewhere, they may lack water storage necessary to fully serve urban development of these annexed areas. CRW is considered to have adequate capacity to serve lands still within the jurisdiction of Clackamas County in this vicinity and other customers; though the Beavercreek service area showed a storage deficiency of 0.31 MG in 2019 in the interim of building the new Beavercreek reservoir, it is anticipated to bring on sufficient storage. The Henrici reservoirs are understood to have capacity surpluses.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

CRW has done planning for service to the area of the urban reserve, and the Maplelane Urban Reserve is in CRW's service area. However, CRW will not likely be the service provider once the reserve is annexed to a city (i.e., Oregon City) and urbanized. Rather, when Oregon City annexes the reserve, the city will likely take ownership of any water related infrastructure within the area, except potentially for facilities that are needed to go beyond the annexed area, such as large-scale transmission lines. Accordingly, CRW, like many water service providers, may be cautious about investing in improvements for currently rural areas that may one day be annexed to cities. While there is some surplus storage capacity that could be available to serve urban development of the

reserve, once annexed to the city, that surplus may be insufficient for full urbanization of the reserve and addition storage facilities may be necessary.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, new storage facilities will likely be needed to avoid system capacity deficits.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$3.64 million
12-inch pipe	$0
15-inch pipe	$0
Pumping	$0
Storage	$0.34 million
Total:	**$3.98 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$784**

Sanitary Sewer Services

With regard to sanitary sewer services, the Maplelane Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Oregon City provides sanitary sewer service to properties within its corporate limits, as well as to some properties that are already in the UGB but still in unincorporated Clackamas County. Wastewater flows to the Tri-City Sewer District (TCSD) trunks, interceptors, and, eventually, the Tri-City Water Resource Recovery Facility (WRRF), all of which are owned and operated by Water Environment Services (WES). Surcharging, ranging from minor to severe, exists throughout the xity collection system. There are also capacity deficiencies in several locations in WES portions of the system. The Newell Creek Interceptor, which may need to serve the Maplelane Urban Reserve, has existing capacity issues. Relevant master plans include a capital improvement project to upside a portion of the Newell Creek Interceptor south of Redland Road, but it is not clear how much additional capacity this will provide.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The Newell Creek Interceptor has capacity challenges and it is unknown whether a planned upsizing could accommodate urban development of the Maplelane Urban Reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Without sufficient upsizing of the Newell Creek Interceptor, urban development of the reserve could exacerbate existing capacity challenges.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0
12-inch pipe	$5.43 million
15-inch pipe	$0
Pump station	$3.06 million
Force mains	$2.64 million
Total:	**$11.13 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,190**

Stormwater Management Services

With regard to stormwater management services, the Maplelane Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The Oregon City Stormwater Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas: the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the two-year storm event. Capital improvement projects to address capacity issues described above are presented in the Master Plan.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater will be conveyed, treated, and disposed of within the reserve (i.e., outfall to Abernethy Creek); therefore, it is not anticipated that existing stormwater facilities would be utilized.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater will likely be detained and treated within the reserve and, based on topography, outfall directly to Abernethy Creek; therefore, no impacts to the existing stormwater infrastructure in the UGB are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$4.88 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$4.84 million
Total:	**$9.72 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,914**

Transportation Services

With regard to transportation services, the Maplelane Urban Reserve is given a "low-medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Maplelane Urban Reserve had an above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a regional center in the adjacent City of Oregon City. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. The Oregon City Regional Center aligns with the 2040 Growth Concept Map designation.

The City of Oregon City's plans for the Oregon City Regional Center include mixed-use development, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. The regional center currently has a drug store, restaurants, and other retail commercial uses, banks, medical/dental facilities, community centers, government offices, and auto-oriented uses. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional

centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

There are also employment uses, including industrial uses, grocery stores, and other commercial uses, as well as education and medical facilities, government offices, and parks, in the Red Soils area near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road.

Growth in and near the regional center and other employment areas will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs and find employment opportunities with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Four TriMet bus lines serve Oregon City, all of which generally focus on the regional center and the central portion of the city along Molalla Avenue. Service is provided to Clackamas Community College and the employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and Beavercreek Road; however, large portions of the city lack TriMet service. Route 32 provides service along Beavercreek Road, connecting the regional center with employment uses along Beavercreek Road, Oregon City High School, and Clackamas Community College. Some of this existing route is identified as part of the frequent regional transit network in Chapter 4, Figure 4.3 of the 2023 RTP, though there are also gaps in planned frequent transit service along certain routes in the UGB near the reserve and elsewhere in the city as well.

Oregon City has at least 29 miles of dedicated bike lanes and 3.5 miles of established bikeways, with most of them located in the "up-top" section (southern end) of the city. The Park Place neighborhood is also fairly well served and Highway 213 has dedicated bike lanes. Most of the downtown streets are classified as "bike with caution" streets and the South End neighborhood has minimal bike facilities. There are dedicated bike facilities along most of Beavercreek Road and Molalla Avenue, as well as a roughly half-mile section of S Maplelane Road in the UGB extending from those on S Beavercreek Road. A painted shoulder serves as a bike facility on one side of S Country Village Drive, in the UGB across S Maplelane Road from the reserve. The existing bike facilities on S Beavercreek Road, S Maplelane Road, and Molalla Avenue are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023 RTP. However, the figure also identifies a gap in the planned network along S Thayer Road in the UGB near to the reserve and along roadways closer to the regional center.

The regional center is well served by sidewalks, as are employment areas near the intersection of Beavercreek Road and Molalla Avenue and between Highway 213 and

Beavercreek Road. A residential area in the UGB adjacent to the reserve's west also has sidewalks, but not the Country Village Estates manufactured home park also adjacent to the reserve. The portions of S Maplelane Road and S Thayer Road in the UGB lack sidewalks on both sides and have lengths with no sidewalks at all, though there are painted pedestrian crossings at the intersection of S Maplelane Road and S Beavercreek Road. Chapter 4, Figure 4.4 of the 2023 RTP identifies gaps in the planned regional pedestrian network along S Beavercreek Road and S Maplelane Road. There are also gaps in the planned regional trail network in the UGB near the reserve, as indicated in Chapter 4, Figure 4.6 of the 2023 RTP.

Figure 4.14 in Chapter of the 2023 RTP identifies Molalla Avenue inside the UGB as a high injury corridor.

The sections of Highway 99E, Highway 213, and I-5 in Oregon City are identified as a throughways Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that these highway sections currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 213 is the nearest RTP-designated throughway to the reserve, nearly one mile away via S Maplelane Road and S Beavercreek Road. As noted above, the section of the highway in the city currently meets travel speed reliability performance thresholds. Considering RTP reliability forecasts, development of the reserve is not expected to jeopardize the throughway reliability of the highway.

There is currently no TriMet bus service all of the way to the reserve. The nearest stop is for Route 32 on S Beavercreek Road, roughly two-thirds of a mile west of the reserve via S Maplelane Road or about half a mile away via S Thayer Road.

The bike facilities on S Maplelane Road stop about 1,000 feet from the west of the reserve and there are incomplete bike facilities on S Thayer Road.

The adjacent residential subdivision within the city between S Maplelane Road and S Thayer Road has nearly a dozen local streets with sidewalks that stub to west of the reserve, including at Blue Blossom Way, Sourwood Street, and Sugarpine Street, which lead out to S Maplelane Road and S Thayer Road. However, as noted above, S Maplelane Road and S Thayer Road lack sidewalks on both sides and have some gaps. Sidewalks are lacking in the reserve itself. There are no trails that serve or connect to the reserve, either.

It was noted in response to Factor 1 that the reserve is not likely to be able to efficiently accommodate an employment land need, but could support a residential land need. The regional center is approximately three miles from the reserve and, as noted above, not

fully connected to the reserve by transit, bike facilities, or pedestrian facilities. The employment uses along Beavercreek Road, Highway 213, and Molalla Avenue and Clackamas Community College, however, are roughly within a mile of the west side of the reserve, providing closer opportunities for future resents of the reserve to meet their daily needs and find employment opportunities. Nonetheless, without direct transit service and complete bike and pedestrian facilities linking these areas to the reserve, it is likely that future residents of the reserve would be reliant on private motor vehicle transportation.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

S Beavercreek Road, S Thayer Road, S Maplelane Road, and S Waldo Road would be expected to see additional private vehicle traffic from development of the reserve. Existing bike and pedestrian facilities nearby would also be expected to see additional use.

With the lack of direct transit service and complete bike facilities and sidewalks connecting to the reserve, future residents will likely rely primarily on private motor vehicle transportation to access their daily needs and employment opportunities. However, employment uses, including commercial uses, Clackamas Community College, are within about a mile of the reserve, potentially limiting any increase home-based VMT per capita. Development of the reserve is not expected to jeopardize Highway 213's throughway reliability. Any additional motor vehicle traffic on Molalla Avenue caused by development of the reserve could exacerbate the road's high-crash conditions.

d. Need for major transportation facility improvements and associated costs

To serve urban development of the reserve, more than a mile of S Maplelane Road would likely need to be improved to urban arterial standards, and the sections of S Waldow Road and S Thayer Road passing through the reserve (approximately 1.3 miles in combined length) would likely need to be improved to urban collector standards. Improvements to these roads would require acquisition of extra right-of-way. In addition, three new collectors totaling approximately 0.86 miles in length are likely needed to provide necessary street connectivity. Some lengths of the facility improvements could require higher than average per-mile costs due to topography and stream crossings.

Facilities	Cost
Arterials, existing/improved full street	$67.60 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$56.38 million
Collectors, existing/improved half street	$0
Collectors, new	$36.46 million
Total:	**$160.44 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$31,601**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in the reserve and in the corridors leading to it. Conceptual road layouts for the reserve do not provide enough roadway network to make service feasible. However, service could potentially be provided with adjusted layouts and by extending Route 79 after "Forward Together" improvements are completed, with three additional zero-emission buses at a capital cost of $3,000,000 – $4,500,000 (recurs every 12 years). Annual service cost is $668,824 and grows with inflation year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

A tributary of Abernethy Creek flows east through the Maplelane Urban Reserve for approximately 0.6 miles on the north side of S Maplelane Road, east of S Waldow Road. Just over half of the stream length flows through cleared land and includes two National Wetland Inventory (NWI) wetlands, each measuring just less than an acre in area, and identified riparian habitat. The remaining length flows through a forested area with slopes greater than 25 percent. The length of the stream flowing through the cleared landscape is located in such a manner that could allow for the protection of the stream corridor, wetlands, and habitat areas consistent with urban protection levels, while allowing for future development opportunities on the remaining portion of the relevant tax lots. The forested section would also be impacted minimally from urbanization due to development constraints related to steep slopes. In addition, a significant portion of the upland habitat adjacent to the stream is located on school district property, which would not be impacted by the development of future school facilities given steep slope constraints.

Three tributaries to Thimble Creek flow generally east through the southern portion of the reserve on the south side of S Thayer Road. The main tributary flows in an arcing pattern from the southern edge of the reserve and then east for 0.6 miles before joining Thimble Creek just outside the reserve, ultimately draining into Abernethy Creek. About half of this stream lengths flows through semi-forested or forested land that provides a fairly healthy riparian corridor. The remaining portion of the stream is located adjacent to S Thayer Road, away from the developable portions of the relevant tax lots. While this allows for development of the tax lots without impacting the stream corridor, road improvements to bring S Thayer Road up to urban standards could impact the stream's riparian habitat in this location. There are some significant locations of upland habitat adjacent to the stream corridor that could also be impacted, as access to this portion of the reserve would need to come from S Thayer Road, unless access came from S Loder Road to the south that is already inside the UGB. The steep slopes along the stream corridors would limit the amount of the residential development that can occur to a degree, therefore protecting some portions of upland habitat. Natural resource protection requirements for land added to the UGB will help reduce the overall impacts; however, significant impacts would be expected given the stream's location near S Thayer Road, the need to access the parcels to the south, and other potential transportation connection needs.

A minor, 600-foot-long tributary joins the main tributary in the southwest corner of the reserve. About half of this stream length is located on land owned by the US government; this ownership, as well as some powerlines, will likely restrict urban development and thereby result in certain environmental protections from such development. The remaining length flows through an identified and intact riparian habitat. Impacts to the habitat areas could occur, depending on the design of the future development and new transportation connections.

The third tributary appears to originate from a pond not included in the NWI on the north side of S Thayer Road and flows for about a third of a mile before joining the main tributary south the roadway. This stream flows mostly through forested areas and a second pond, also not identified as a wetland on the NWI, is located along the stream route. There is both riparian and upland habitat identified along this stream segment. Impacts to the habitat areas could occur depending on the design of the future development and new transportation connections.

This analysis finds that urbanization of the reserve could occur with comparatively moderate to high impacts to the stream corridors, wetland, and the upland habitat areas. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Maplelane Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The Maplelane Urban Reserve already contains numerous rural residences, including a subdivision with more than 30 homes and a manufactured dwelling park, as well as a large electrical utility facility and powerlines. The reserve is also adjacent to urban residential development with a number of urban local streets already stubbing to the reserve and is close to some more major urban commercial retail areas. Therefore, urbanization of the reserve is not expected to cause a significant change in sense of place or degradation of rural lifestyle for residents of the reserve. Moreover, because the powerlines, as well as steep slopes, natural resources, and publicly owned lands, in some sense divide the reserve into sections of developable land, development of one section will not necessarily cause significant changes for other sections of the reserve.

As detailed more fully in response to Factor 2, the proximity of a variety or urban land uses and modes of transportation could help limit significant increases in VMT and, therefore, related energy impacts from urbanization of this reserve.

There is minimal commercial agriculture occurring within the reserve and the economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this reserve. The Maplelane Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

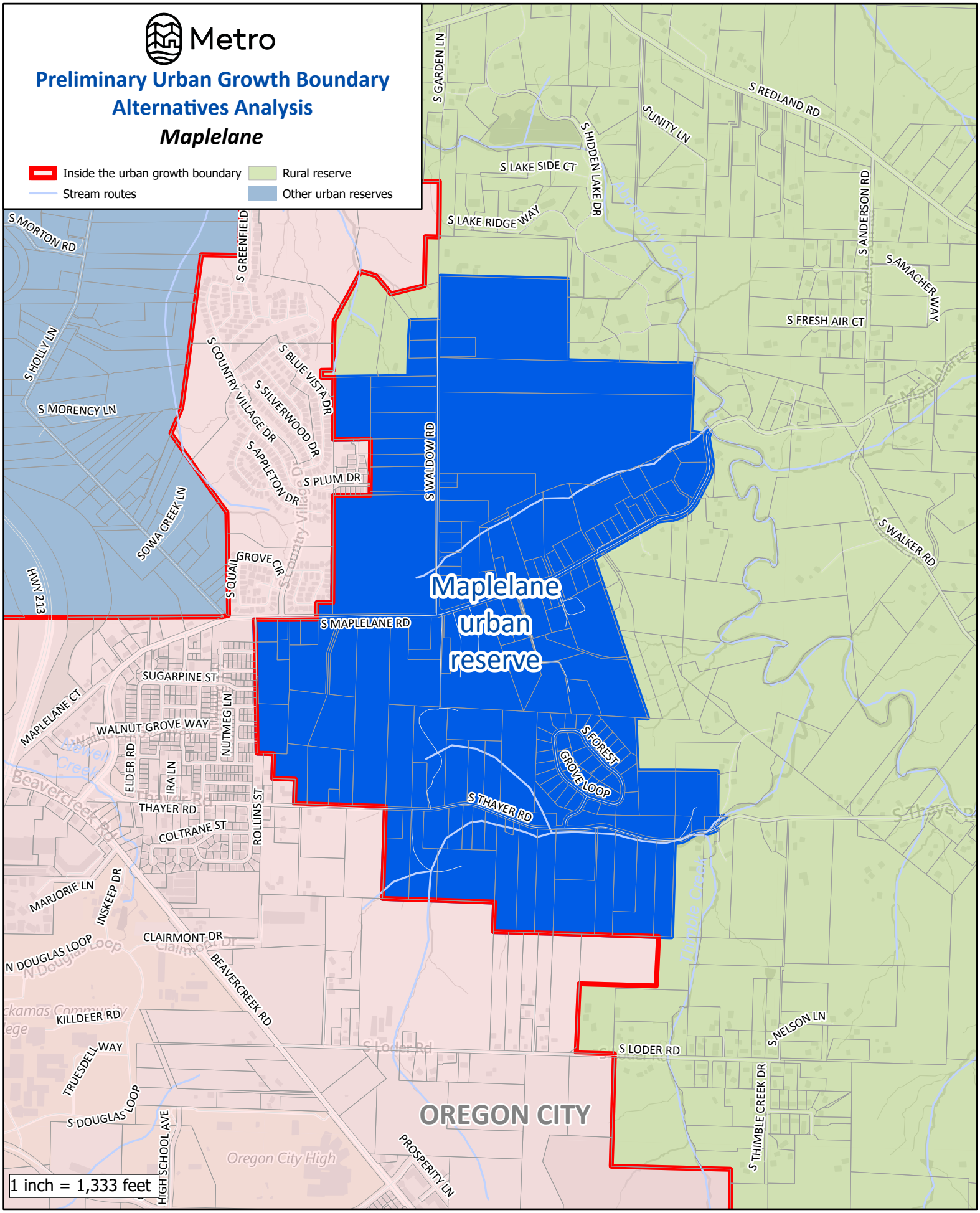
There are three locations where lands outside the UGB but contiguous to the Maplelane Urban Reserve have Goal 3 or 4 resource land zoning for agricultural and forest activities.

The first location is a single 15-acre tax lot zoned Timber (TBR) by Clackamas County at the north end of S Waldo Road with a single-family residence. This tax lot does not appear to be in active agricultural or forestry use. It is adjacent to rural residential development with some very large homes on one- to three-acre tax lots. Due to the current residential use of this and nearby properties, the likelihood of commercial agriculture or timber activities on this property is small; thus, the proposed urban uses of the adjacent reserve would be considered compatible with nearby agricultural or forest activities in this location.

The second location is a single eight-acre tax lot zoned TBR by Clackamas County that shares a 170-foot edge with the northeast corner of the reserve. This tax lot contains a portion of Abernethy Creek and, according to assessment records, is in the same ownership as an adjacent tax lot that is part of the rural residential subdivision with very large homes. Considering these conditions, the likelihood of commercial agricultural or timber activities on this property is small; thus, the urban development of the reserve would be considered compatible with agricultural and forest activities in this location.

The third location is near S Thayer Road, adjacent to the southeast corner of the reserve where three tax lots are zoned TBR by Clackamas County. The tax lots have residential uses and have very minimal amounts of trees available to commercial timber operations and no apparent commercial agricultural activities. Therefore, urban development of the reserve would be considered compatible with agricultural and forest activities occurring on these adjacent lands.

Overall, the proposed urban uses (i.e., urban development of the reserve) would be considered to have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land. The Maplelane Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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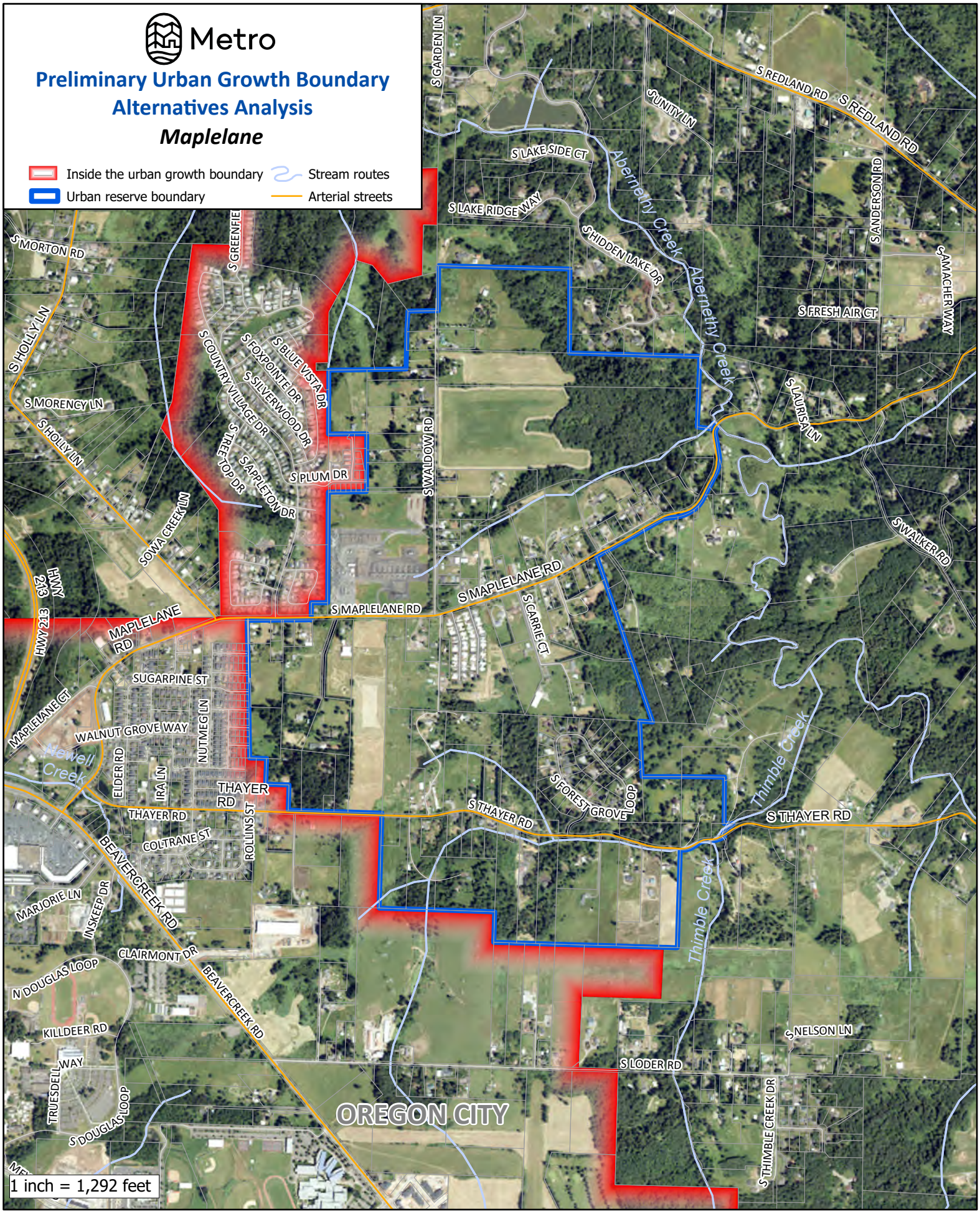

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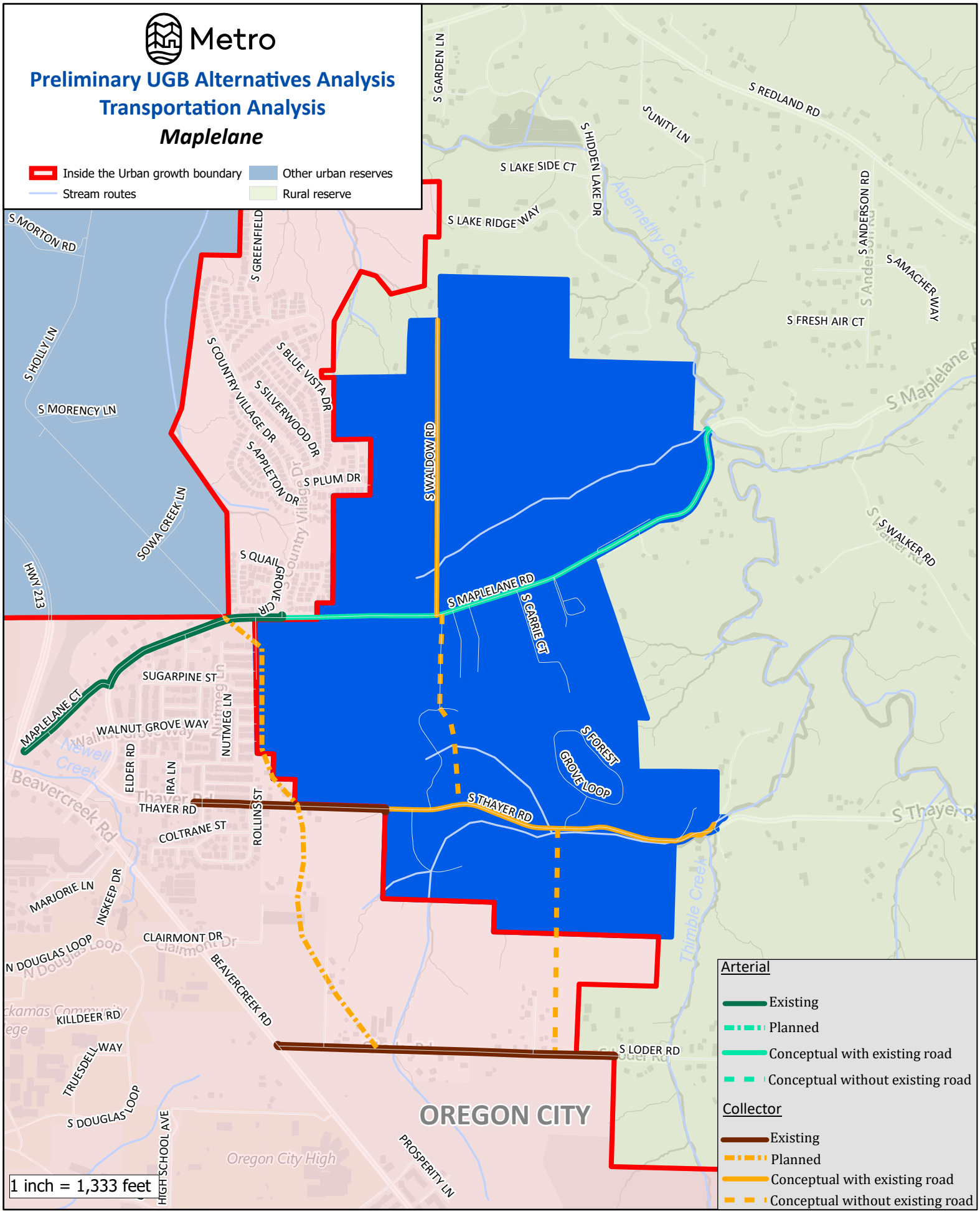

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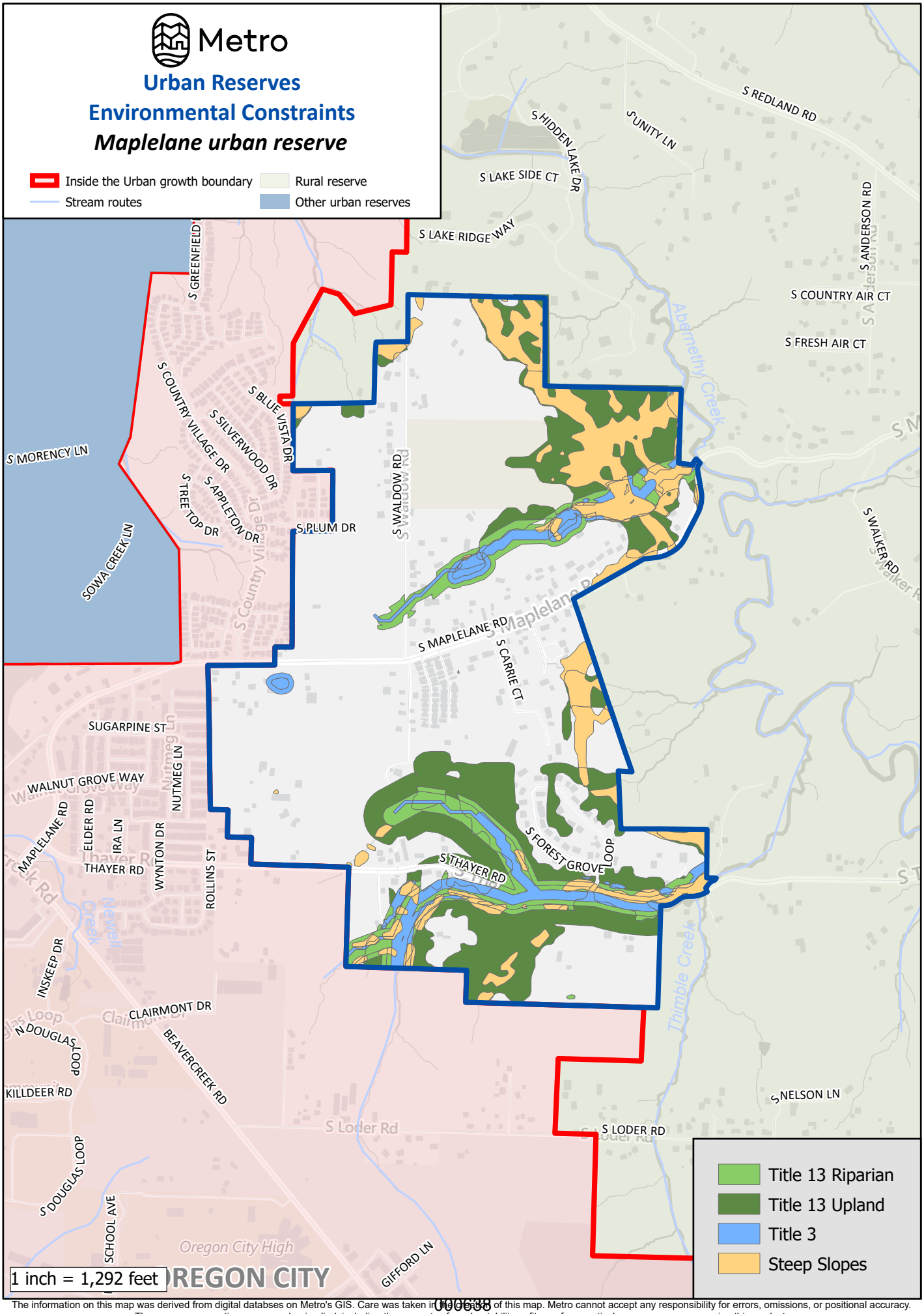

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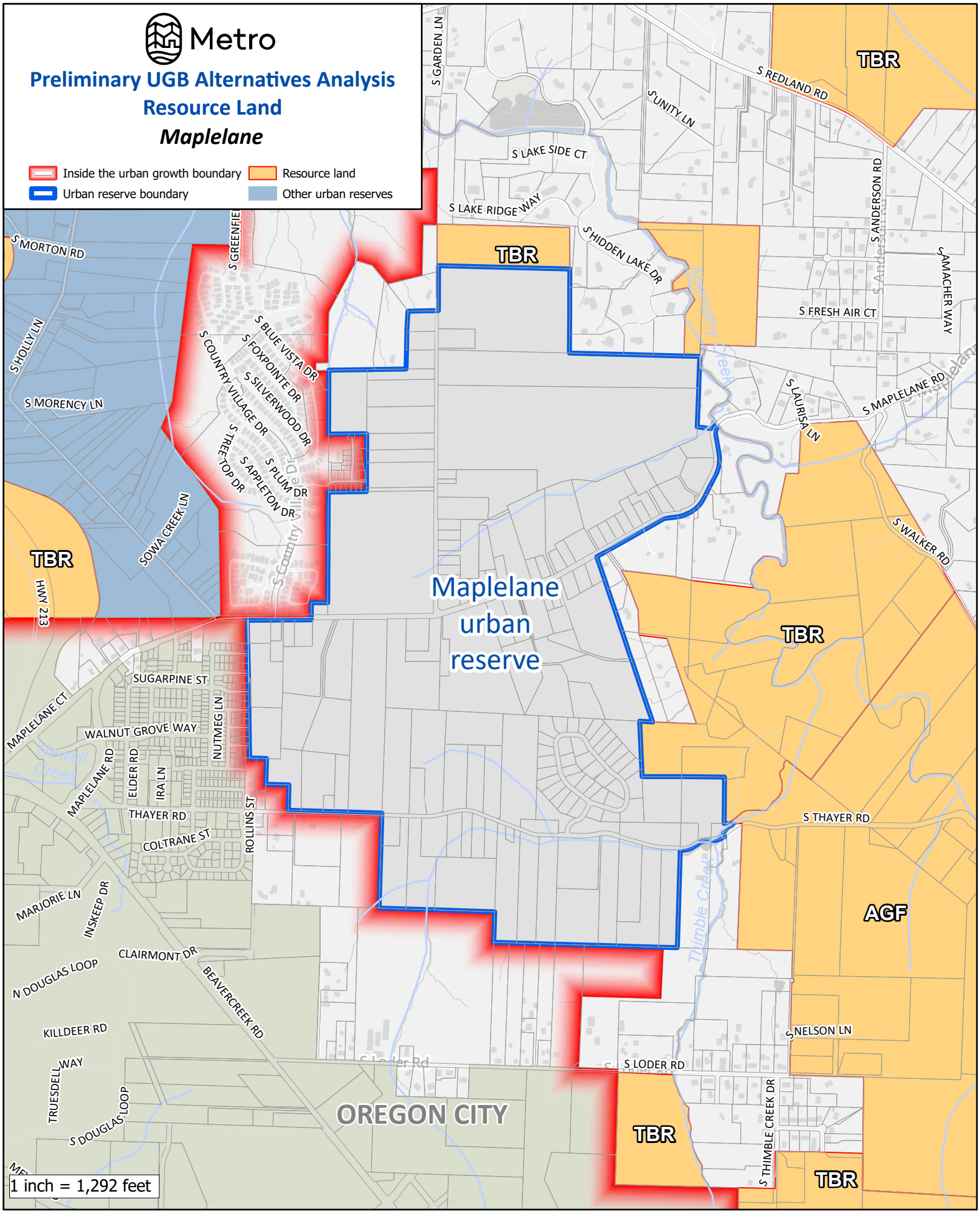

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NORWOOD URBAN RESERVE

Total Reserve Area	1,539 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	1,451 acres
Gross Vacant Buildable Area	1,040 acres
Net Vacant Buildable Area	**775 acres**

The Norwood Urban Reserve is located in Clackamas County, east of SW 65th Avenue, south of I-205, and mostly west of SW Stafford Road, on the opposite side of I-205 from the east end of current Tualatin city limits. The UGB forms a portion of the reserve's northern boundary, with urban reserve land (the I-5 East – Washington County, Elligsen Road North, and Elligsen Road South Urban Reserves) to the west and additional urban reserve land (the "Borland" Urban Reserve) to the north. The reserve otherwise borders undesignated and rural reserve land to the east and south. Boeckman Creek and a small portion of a tributary to Newland Creek flow south, and tributaries to Saum Creek flow north, through the center of the reserve. Athey Creek also flows north through the northeastern corner of the reserve. Large portions of the reserve, particularly in its north and south, have slopes greater than 10 percent.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Norwood Urban Reserve is a contiguous area that contains the entirety of 364 tax lots and a 14,000-square-foot piece of one more tax lot disconnected from the remainder of that tax lot by SW Stafford Road. Of the tax lots that are entirely in the reserve, slightly more than a quarter a smaller than two acres each, more than two-thirds are smaller than five acres each, and nine are larger than 10 acres, with the largest being about 36 acres. The State of Oregon owns four tax lots in the reserve totaling nearly 11 acres in area and Verizon Northwest owns two tax lots totaling just over one acre in area. As noted above, the entire reserve contains 1,040 gross vacant buildable acres and 775 net vacant buildable acres.

The reserve is largely characterized by rural residential and accessory uses, with some agricultural uses in its south and forested areas in its north. Nearly 90 percent of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements exceeding $660,000.

The reserve is largely surrounded by rural residential and agricultural uses. The Stafford Academy is adjacent to the reserve's northeast corner, while Bridgeport Elementary School and Athey Creek Middle School are within a mile of the northern end of the reserve but on the opposite side of I-205. Atfalati Park in Tualatin is also on the opposite side of I-205.

The SW Stafford Road interchange with I-205 is approximately a quarter mile from the northwest corner of the reserve, and a SW Elligsen Road interchange with I-5 is approximately 1.25 miles from the reserve's southern end. The nearest TriMet bus stop is on the opposite side of I-205 on SW 65th Avenue.

As noted above, the reserve has relatively steep topography in its north and south, as well as multiple streams.

Despite the reserve's proximity to interchanges with two highways, this steep topography, as well as its smaller tax lot sizes, large amount of higher-value existing residential development, and surrounding rural residential land uses, make it unsuitable for accommodating an employment land need. However, the reserve is considered able accommodate a residential land.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Norwood Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Lands to the north inside the UGB are served by the City of Tualatin. Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is then delivered through a 36-inch supply line from the Washington County Supply Line. The reserve might be in Pressure Zone B. According to the city's March 2023 Water System Master Plan, the zone has a storage surplus under current conditions, but may have a storage deficit under UGB buildout conditions. The Martinazzi and Boones Ferry Pump Stations previously serving Zone B have reached the end of their usable lives and do not currently operate, and Zone B is now served by the Boones Ferry flow control valve/pressure reducing valve. There are also existing flow deficiencies in Zone B. Water service to the Norwood Urban Reserve could require another reserve (e.g., the I-5 East – Washington County Urban Reserve) to first be added to the UGB and developed.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Assuming the Norwood Urban Reserve is added to the UGB after full buildout of the areas already within the UGB, and assuming storage facilities are not expanded, development of the reserve would cause a greater storage capacity deficit. It is likely that existing pipes do not have the capacity to serve urban development of the reserve and would need to be upgraded. As noted above, service to the reserve could require prior development of another adjacent urban reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional storage capacity will likely be needed to avoid negative impacts to service in the UGB. Without addressing undersized pipes, the number and severity of the existing flow deficiencies could increase if the reserve is added to the UGB and its development is connected.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$13.51 million
12-inch pipe	$0 million
15-inch pipe	$0
Pumping	$0
Storage	$1.08 million
Total:	**$14.59 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$941**

Sanitary Sewer Services

With regard to sanitary sewer services, the Norwood Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from nearby lands to the north in the City of Tualatin is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF), which is owned and operated by Clean Water Services (CWS) and understood to have sufficient capacity to meet current needs. CWS is also responsible for the system's gravity sewers over 24 inches in size, pump stations, and force mains. The Boreland Pump Station has surplus capacity under existing conditions and there are no modeled pipe deficiencies in the Nyberg Basin under existing conditions.

The south end of the reserve is only about half a mile from the City of Wilsonville. Wastewater in Wilsonville is conveyed in a City of Wilsonville-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP), which was upgraded in 2014 to a capacity of 4.0 MGD, resulting in excess capacity. That excess capacity is believed to be able to accommodate growth in the Frog Pond areas recently added to the UGB. Wilsonville is planning on necessary system upgrades to meet future needs. The existing system, including its piping and pump stations, is not known to have any hydraulic deficiencies.

The eastern portion of the reserve is about two miles from the City of West Linn, located on the opposite side of the Tualatin River. The downstream end of the West Linn system includes a Clackamas Water Environment Services (WES) owned pumps and force mains, which direct sewage to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River. West Linn's 2019 Sanitary Sewer System Master plan identified potential system capacity deficiencies for relevant

modeled pipes in both existing and buildout scenarios. The 2019 WES Master Plan identifies an expansion of the existing treatment plant within the 2020-2040 timeframe to increase its capacity.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Based on the varying topography throughout the reserve and the reserve's proximity to multiple jurisdictions, it's possible that its urban development is served by a combination of providers, such as CWS, the City of West Linn, and the City of Wilsonville.

The western portion of the site could, for example, be routed to the CWS system. While the treatment plant may have sufficient capacity now, wastewater treatment for development the relatively large Norwood Urban Reserve – and development of the I-5 East -Washington County Urban Reserve, which may preclude development of the Norwood Urban Reserve – could require plant improvements. It is unclear from either Tualatin's 2019 Sewer Master Plan or CWS's 2019 Master Plan whether relevant pumps have sufficient capacity to serve the Norwood Urban Reserve (and other urban reserves). The Nyberg Basin's pipes may not have sufficient capacity to serve the reserve(s) either. In order to connect to the CWS system, a new sewer line crossing I-205 could be required.

The eastern portion of the site may connect to an existing City of West Linn sewer located in Willamette Falls Drive. The city has previously indicated that the treatment plant would likely need some upgrades to accommodate additional flow. The available capacities of relevant pump stations and pipes to serve the Norwood Urban Reserve are unknown. The Borland Urban Reserve would likely need to be added to the UGB and developed before sanitary sewer service from West Linn can be connected to development in the Norwood Urban Reserve.

The southern portion of the site may most readily be served by the City of Wilsonville. In order to serve this portion of the reserve, the Elligsen North Urban Reserve would likely need to be urbanized first. Depending on the timing of additional development in Wilsonville, planned treatment plant upgrades may be needed sooner in order for the system to also serve new development in the Elligsen Road North Urban Reserve. Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve the Elligsen Road North Urban Reserve, and there are several trunk line extensions that would be needed as well.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Considering that other reserves may need to be urbanized before the Norwood Urban Reserve can be served with sanitary sewer services, treatment plant improvements and pumping and piping capacity improvements will likely be needed to avoid negative impacts to service within the existing UGB. Potential treatment plant improvement costs are not included in the below figures.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$5.45 million
12-inch pipe	$3.78 million
15-inch pipe	$0
Pump station	$1.44 million
Force mains	$2.26 million
Total:	**$12.93 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,389**

Stormwater Management Services

With regard to stormwater management services, the Norwood Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of major capacity issues with existing stormwater facilities that serve the adjacent land inside the UGB. Based on topography, stormwater from development of the Norwood Urban Reserve would discharge directly to Saum Creek; the City of Tualatin's 2019 Stormwater Master Plan did not identify the Saum Creek Basin as currently facing capacity challenges.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater will be conveyed, treated, and disposed of within the reserve and discharge to Saum Creek, rather than connecting to existing facilities in the UGB. Saum Creek is believed to have sufficient capacity to serve development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater will be conveyed, treated, and disposed of within the reserve and discharge to Saum Creek, rather than connecting to existing facilities in the UGB. Saum Creek is believed to have sufficient capacity. Therefore, no adverse impacts to existing facilities are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$7.08 million
24-inch pipe	$6.38 million
30-inch pipe	$5.00 million
Water quality/dentition	$18.59 million
Total:	**$37.05 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,389**

Transportation Services

With regard to transportation services, the Norwood Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to and near the Norwood Urban Reserve had below average and average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Tualatin. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The roughly 300-acre Tualatin Town Center aligns with this 2040 Growth Concept Map area. The city's Tualatin Town Center Plan envisions a mixed-use live, work, and play center that integrates natural resources, like the Tualatin River, with civic, social, economic, and cultural functions in a walkable community. Metro's 2017 State of the Centers Atlas showed that the Tualatin Town Center had a low number of dwelling units per acre and a much higher total number of employees compared with other town centers in the region. The town center had a very high "access to parks" score in the atlas, due in part to the numerous open space/natural areas and the Tualatin Community Park along the Tualatin River nearby. The town center also includes grocery stores and other retail commercial uses, medical/dental facilities, a post office, and multi-family housing, but also storage facilities, auto-oriented uses, and large parking lots. Within the UGB and adjoining the town center are Title 4 designated Industrial Area and Employment Area lands, as well as low- and medium-density residential uses.

Seven TriMet bus lines and the Westside Express Service (WES) Commuter Rail serve Tualatin. The routes are spread out along the major roadways including Highway 99W, SW Tualatin-Sherwood Road, and SW Boones Ferry Road, providing service to the town center and employment areas. WES connects the town center with Beaverton to the north and Wilsonville to the south. Figure 4.3 in Chapter 4 of the 2023 RTP does identify gaps in the planned regional transit network along SW Boones Ferry Road, SW Tualatin – Sherwood Road, and elsewhere in the city.

Nonetheless, the town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as residents will be able to access some daily needs through modes other than private motor vehicle transport. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact home-based VMT per capita in the future.

The town center is less than a mile away from areas in the UGB adjacent to the reserve, but these areas are on the opposite side of I-5 and I-205 from the reserve. I-5 also separates residential uses in the UGB to the north of the reserve from the town center to the west; there are just two overpasses that connect these residential uses to the town center, limiting connectivity. Residents of these areas, where there are also fewer bus routes, may be more reliant on private motor vehicle transportation to get to the town center and areas to the west.

Tualatin has a fairly well-established bike route system, with approximately 25 miles of dedicated bike lanes, seven miles of established bikeways, and local trails that connect the employment areas and town center to the residential areas. There are two bike lane connections across I-5 to provide access to the eastern portion of the city. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Tualatin as a part of the planned regional bike network, including facilities on SW Boones Ferry Road, SW Nyberg Street, and SW Tualatin-Sherwood Road. There are identified gaps in planned regional bike facilities in the southwest and east of the city.

The town center has a well-established pedestrian network that also includes access to some trails. Most of the residential areas of Tualatin also have sidewalks, but there are fewer exiting pedestrian facilities in employment areas outside of the town center. The Tualatin River Greenway Trail connects the town center to parks in Durham and Tigard to the north, as well as to Browns Ferry Park along the Tualatin River on the east side of I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of existing streets in Tualatin as in the regional pedestrian network, including sections of SW Boones Ferry Road, SW Borland Road, and SW Tualatin – Sherwood Road. The figure identifies gaps in the future regional pedestrian network, however, in the south and east of the city.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road in the UGB as a high injury corridor. The intersection of SW Tualatin-Sherwood Road and

SW Boones Ferry Road, as well as the intersection of SW Martinazzi Avenue and SW Boones Ferry Road, are identified in Figure 4.14 as top five percent high injury intersections. There are no other high injury corridors or high injury intersections in Tualatin's portion of the UGB identified on Figure 4.14.

The portions of I-5 and I-205 that cross through Tualatin are identified as throughways in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 of the chapter indicates that these portions of both interstates currently meet travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

While the reserve is adjacent to I-205, the nearest interchange, located at SW Stafford Road, is approximately a quarter mile from the northwest corner of the reserve. The SW Elligsen Road interchange with I-5 is approximately 1.25 miles from the reserve's southern end. As noted above, the portions of these highways in Tualatin currently meet travel speed reliability performance thresholds. Given the proximity of the town center and other commercial/employment areas to the reserve, including employment areas in Wilsonville on the same side of I-5 as the reserve, urban development of the reserve is unlikely to generate sufficient traffic on either I-5 or I-205 to cause them to no longer meet those performance thresholds. Future residents of the reserve, even if reliant on private motor vehicles for transportation, could use roadways other than these interstates to access employment opportunities and to meet their daily needs closer to home.

Currently, there is no transit service to the reserve. TriMet Route 76, which provides access to the Tualatin Town Center, is approximately one-third of a mile from the northwest corner of the reserve via SW 65th Avenue, on the opposite side of I-205. No other bus lines are close to the reserve.

There is a dedicated bike lane on SW 65th Avenue that is approximately one-tenth of a mile north of the northwest corner of the reserve, also on the opposite side of I-205. This bike lane connects to a bike lane on SW Sagert Street, which in turn provides a connection to the west side of I-5, the town center, and employment areas. The small gap on SW 65th Avenue needs to be completed in order to directly connect to the reserve. For the most part, there are no other dedicated bike facilities near to or within the reserve. However, portions of SW Stafford Road adjacent to the east side of the reserve have wide painted shoulders and there are designated bike lanes on a nearly half-mile section of SW Stafford Road beginning at the northeast corner of the reserve. This bike-lane section leads to others on the north side of I-205, but with some gaps.

The Saum Creek Greenway Trail is approximately 800 feet north of the reserve via SW 65th Avenue and connects to sidewalks on SW 65th Avenue and SW Sagert Street. The

sidewalks do not connect across I-5 and, therefore, provide only limited access to other parts of Tualatin. The 800-foot gap needs to be completed in order to directly connect to the reserve. Generally, there are no other sidewalks near to or within the reserve. There are painted crosswalks at the northeast corner of the reserve at the intersection of SW Stafford Road and SW Ek Road, both those sidewalks do not current connect to complete sidewalks.

There are no urban residential or employment uses within a mile of the reserve and on the same side of I-5 or I-205. The one adjacent interstate crossing of SW 65th Avenue has gaps in bike and pedestrian facilities. There is also no existing transit service to the reserve. Therefore, without facility improvements and service extensions, and unless the reserve itself is developed with a mixture of uses, which may not be practicable for reasons addressed in response to Factor 1, future residents of the reserve will likely be reliant on private motor vehicle transport to access their daily needs and employment, and employees of future employment uses in the reserve will need to commute by private motor vehicle from their homes located elsewhere. The analysis in Factor 1 indicated that the reserve would not be able to efficiently accommodate an employment land need.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW 65th Avenue, SW Elligsen Road, and SW Stafford Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, if transit service were to be extended to the reserve and if gaps in bike and pedestrian facility connections were to be completed, there would be less additional traffic on these roadways. Providing the bike and pedestrian facility connections would lead to more use of the existing facilities within the UGB.

Given the proximity of the town center and other employment areas to the reserve. development of the reserve is unlikely to jeopardize the throughway reliability of I-5 or I-205. Any additional motor vehicle traffic on SW Tualatin-Sherwood Road resulting from development of the reserve, however, may exacerbate the road's high-crash conditions.

d. Need for major transportation facility improvements and associated costs

To serve urban development, a section of SW Stafford Road at the east and south of the reserve and a section of SW 65th Avenue at the west of the reserve, with a combined length of more than five miles, will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. The SW 65th Avenue section is considered a half-street improvement, as the western side of the road would be developed as an arterial with the urbanization of the adjacent I-5 East – Washington County Urban Reserve. Sections of SW Prosperity Park Road, SW Delker Road, SW 55th Avenue, SW meridian Way, and SW Trail Road, with a combined length of more than three miles, will also likely need to be improved to urban collector standards, including with acquisition of additional right-of-way. Six new collectors with a combined length of

approximately 2.5 miles are assumed to be needed to provide sufficient connectivity throughout the reserve. Improved existing and new roadways would need to traverse some steeper topography and waterbodies, resulting in some expected higher per-mile costs.

Facilities	Cost
Arterials, existing/improved full street	$197.99 million
Arterials, existing/improved half street	$65.01 million
Arterials, new	$0
Collectors, existing/improved full street	$112.26 million
Collectors, existing/improved half street	$0
Collectors, new	$97.00 million
Total:	**$472.26 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$30,464**

e. Provision of public transit service

Though the Norwood Urban Reserve is within the TriMet Service District, when TriMet evaluated the reserve for providing transit service for this analysis, it determined service to the reserve is unlikely to occur.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Boeckman Creek and a small tributary flow south through the southwestern portion of the Norwood Urban Reserve for just over 0.8 miles. The streams flow through cleared fields and forested areas mostly adjacent to rural residences. Riparian habitat is identified along the stream corridors. It appears Boeckman Creek has been altered in certain locations as it flows through the residential area. There is one small wetland on the National Wetland Inventory (NWI) located near the tributary that is approximately 5,500 square feet in area. The location of Boeckman Creek between SW Stafford Road and SW 65th Avenue could lead to impacts related to future local street connections. The increased protection levels for streams, wetlands, and habitat areas added to the UGB will help lessen any potential impacts.

A very short segment of a tributary to Newland Creek flows south through the southeastern corner of the reserve for approximately 1,150 feet. This stream length is along a wooded area that forms the eastern edge of the reserve. There is riparian habitat identified along the

stream corridor that could receive regulatory protections once the land is added to the UGB. Indeed, considering the increased protection levels for streams and habitat areas that come with addition to the UGB, and considering the land to the east is in a rural reserve and therefore has limited development opportunities, this stream segment would not be impacted by future urbanization.

Athey Creek and a small tributary flow north through the northeastern corner of the reserve for approximately 2,900 feet. Athey Creek flows through private open space that is either wooded or a mixture of open field with scattered tree canopy. This portion of the stream would be protected from future urbanization. The tributary also flows through private open space with a very small section in open field and wooded portions of residential tax lots. Riparian habitat is identified along both stream segments. Increased protection levels for habitat areas inside the UGB will provide additional protection to the stream section that is not on the designated open space land; thus, urbanization would have minimal impact on these two streams.

There are two sets of tributaries to Saum Creek that flow north through the central and western portions of the reserve. Those in the western set, which is composed of two stream corridors, flow mainly through rural residential areas with a small section located in open fields that appear to be tilled. There is one roughly 14,600-square-foot wetland identified on the NWI located along one of the stream corridors. In numerous locations, the stream has been altered with manmade ponds. Riparian habitat has been identified along both stream corridors. The majority of the two stream segments flow along edges of developed rural residential properties and could be impacted by urbanization, depending on the density and design of the development.

The central tributary is also composed of a 1.5-mile-long main stem and a second, 2,820-foot-long stream that flow mainly through forested portions of rural residential tax lots, some open fields, and a forested private open space. There is one 6,289-square-foot wetland identified on the NWI located along the main stream corridor and another pond not identified on the inventory. There are several significant sections of steep slopes in the forested areas along both streams. Riparian habitat is identified along the two stream corridors with upland habitat identified in the forested areas. There are a couple of locations where the streams could be impacted by future urbanization; however, the majority of the two stream segments flow along edges of tax lots within canyons or gullies and the level of impact by urbanization of the area would depend on the design of the development and necessary road connections. An east-west connection between SW Prosperity Park Road and SW Trail Road could impact a significant amount of habitat.

This analysis finds that, given the location of the stream corridors adjacent to steep slopes, the increased protection levels for streams, wetlands, and habitat areas on land inside the UGB, and the existing pattern of the rural residential development, urbanization of the reserve could occur with comparatively minimal to moderate impact to the streams, wetlands, and habitat areas, depending on road connections and urban form.

Considering the comparative environmental consequences of urbanization, the Norwood Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

The Norwood Urban Reserve has a significant amount of rural residences. As noted in response to Factor 1, Nearly 90 percent of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements exceeding $660,000. There are high-value homes in multiple platted subdivisions and on smaller-sized tax lots. The reserve is adjacent to I-205. Given the level of existing development and parcelization, as well as the stream and habitat corridors that divide up the area, rapid, large-scale redevelopment is not likely; urbanization of the reserve may cause some, but not necessarily significant, changes in residents' sense of place or in degradation of an existing rural lifestyle.

As detailed more fully in response to Factor 2, future residents of the reserve will likely be reliant on private motor vehicle transportation, which will have adverse energy consequences.

There is essentially no large-scale commercial agricultural activity in the reserve. What agricultural activity there is generally limited to maximum two-acre sites scattered throughout the reserve and generally associated with its rural residential development. The economic consequences of a loss in farming activity in the reserve would likely be outweighed by the economic benefits of urban residential development.

Overall, there would be comparatively low to moderate social, energy, and economic consequences from urbanization of this reserve. The Norwood Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Clackamas and Washington Counties, border the Norwood Urban Reserve in areas outside the UGB to the south, southeast, and west.

The EFU-zoned land to the south is part of a sizeable stretch of farmland that extends to the Willamette River. The EFU-zoned land directly adjacent to the reserve's south in the area north of SW Homesteader Road appears to be in agricultural use, including for field crops and pastureland, though there are some rural residential uses. There is no topographic or built (e.g., road right-of-way) separation between these farm uses and the reserve. Development of the reserve could, therefore, lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. Urbanization of the reserve would increase traffic on SW Stafford Road, which could impact the movement of both farm equipment and goods.

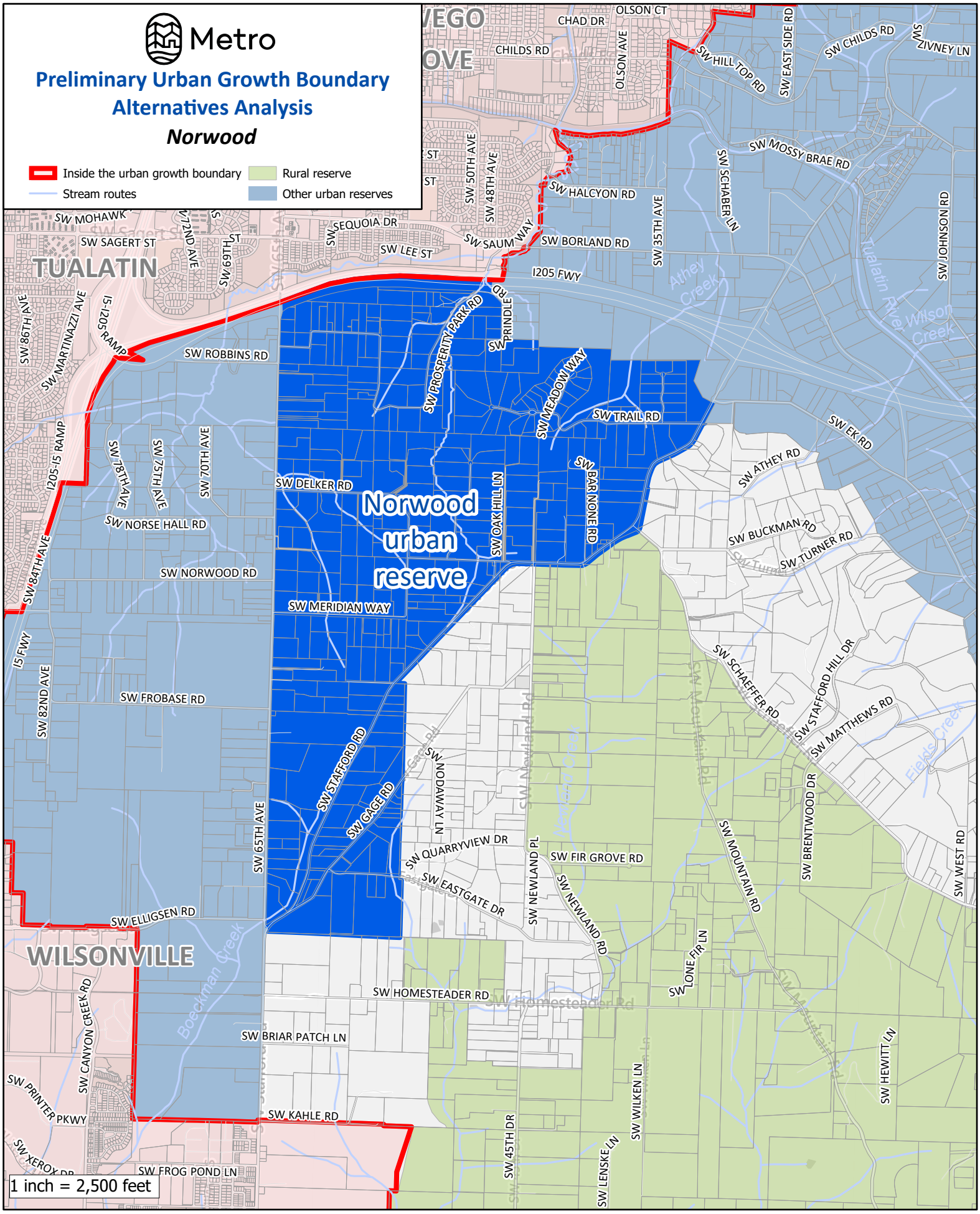
Therefore, proposed urban uses are considered incompatible with the nearby agricultural activities occurring on the EFU-zoned land to the south.

The EFU-zoned land to the southeast of the reserve, in the vicinity of SW Mountain Road, is part of a large tract of EFU land that extends over a mile to the south. Most of the EFU-zoned land directly adjacent to the reserve is in agricultural production, including field crops and pastureland, although the West Linn-Wilsonville School District Administrative office is also located on this farmland and there are some small tax lots with rural residential development. SW Stafford Road would not itself provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. The improvement of SW Stafford Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on SW Stafford Road, which could impact the movement of both farm equipment and goods taking the most direct route to I-5 and I-205. Therefore, proposed urban uses are considered incompatible with the nearby agricultural activities occurring on the EFU-zoned land to the southeast.

There are two pockets of EFU-zoned land to the west of the reserve, on the opposite side of SW 65th Avenue. The first is a more than 100-acre tract on the north side of SW Frobase Road at the intersection with SW 65th Avenue. This area is nearly entirely in agricultural production, mostly for field crops Christmas trees. The tract does have some small stands of trees as well, but they are generally along Saum Creek, which may inhibit harvesting for timber. There is a rural residence centered within the farm fields. The second location is a roughly 100-acre tract of EFU-zoned land south of SW Robbins Road adjacent to SW 65th Avenue. This is the location of Lee Farms, which is a family-owned business that includes Christmas tree plantings, a pumpkin patch, berries, and a county store. Lee Farms hosts various farm-related events, as well. There are also field crops in the northern part of this section of EFU land, but presumably not associated with Lee Farms. The forested patches in these areas are generally around Saum Creek, which may limit their ability to be harvest for commercial timber.

SW 65th Avenue separates the reserve from these EFU-zoned lands to the west, but the road itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve near here could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. The improvement of SW 65th Avenue to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though, as noted above, the impacts of urban roadways on adjacent agricultural activity may be minimized through road design.

This analysis finds that the proposed urban uses are considered to have low compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. Land use conflict mitigation measures would be warranted. The Norwood Urban Reserve is given a “low” score in Attachment 3 for this Goal 14 boundary location factor.



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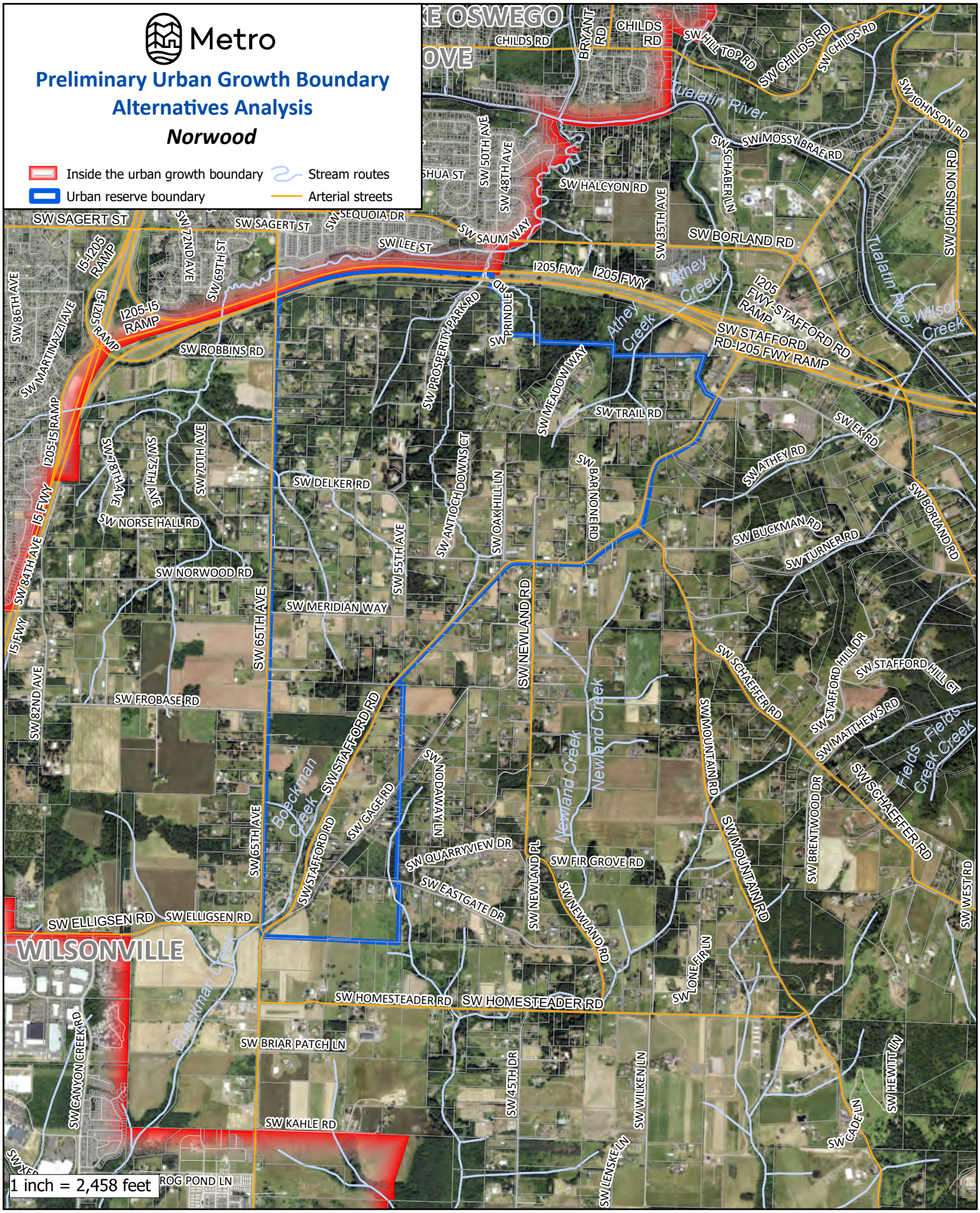

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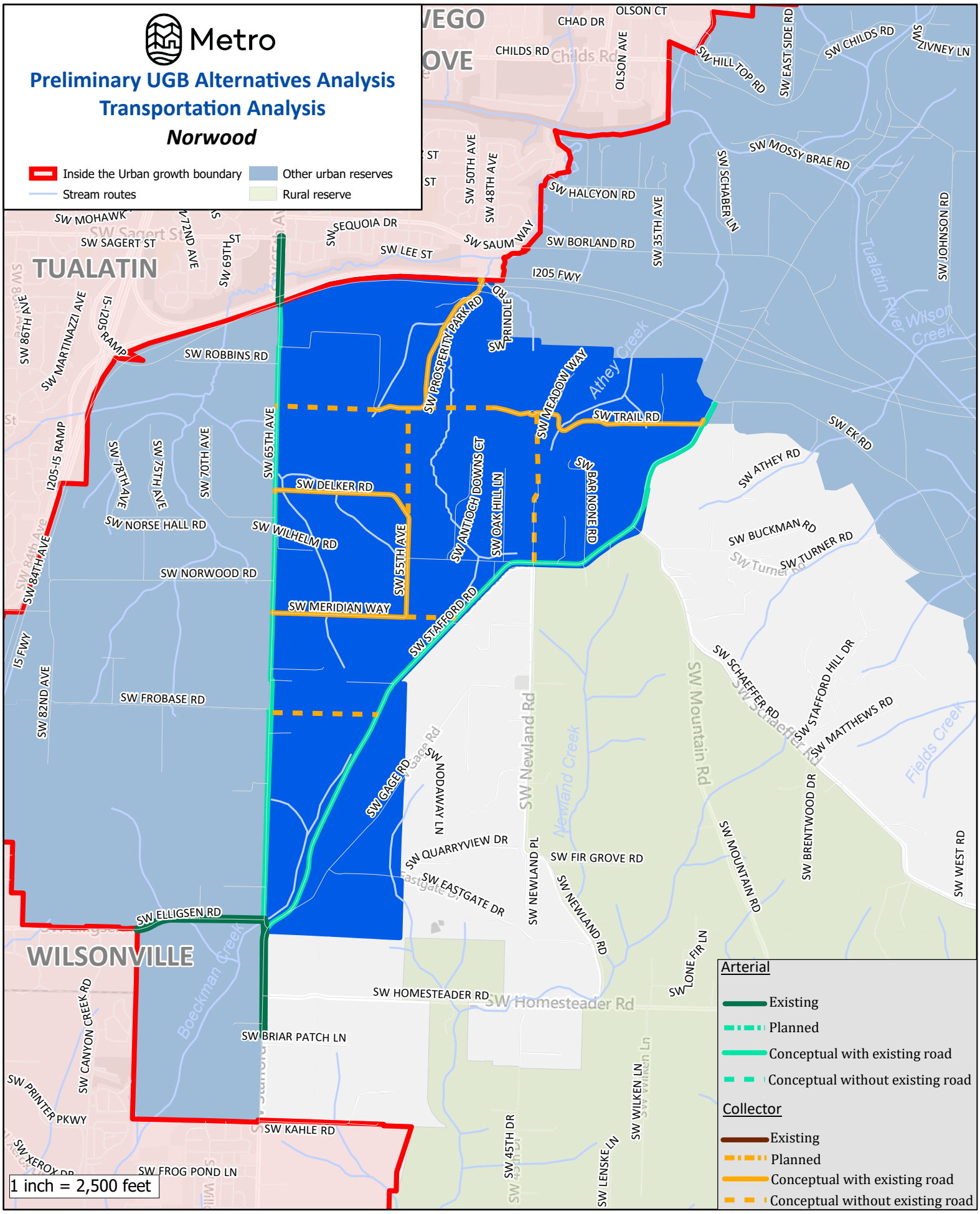

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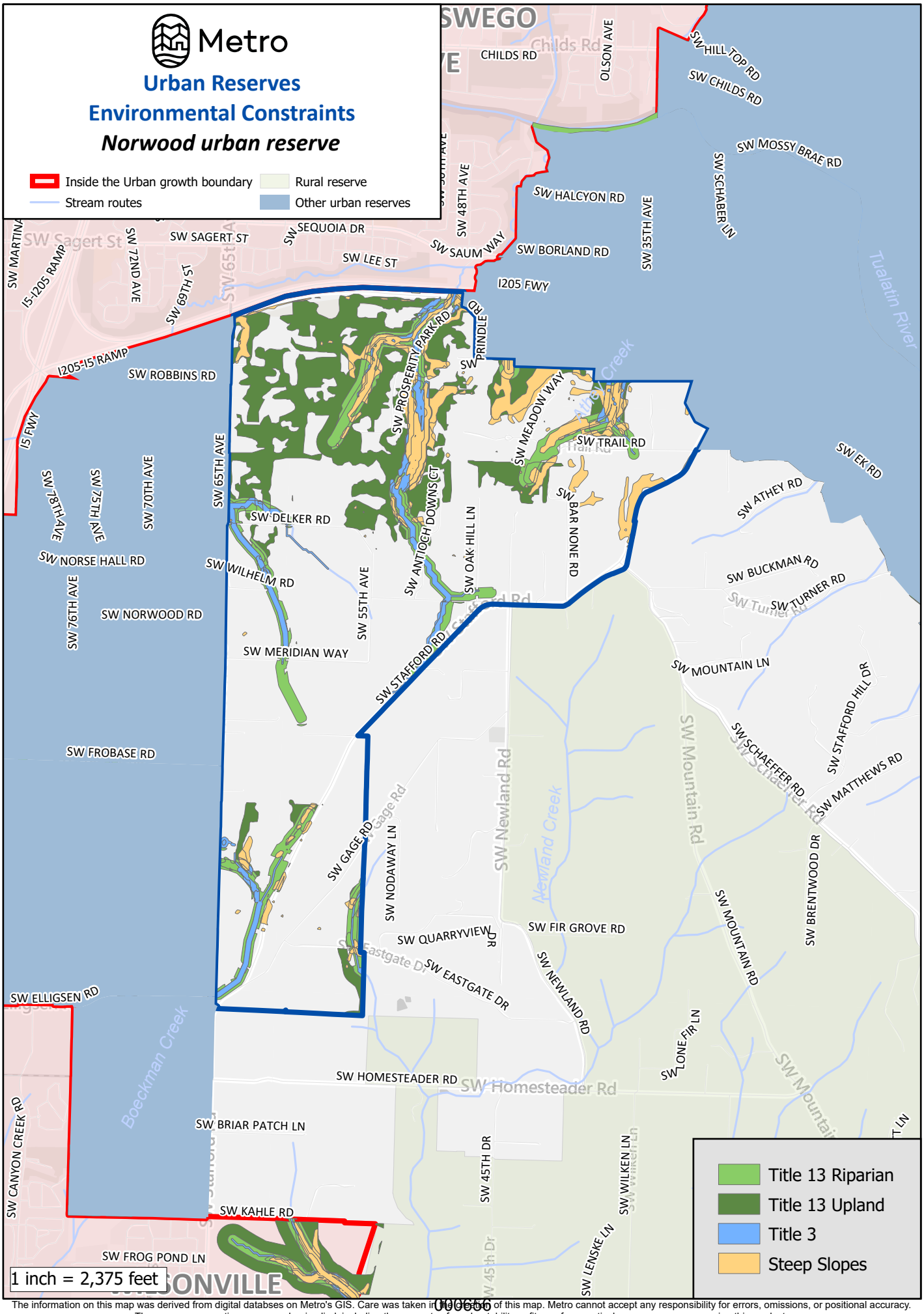

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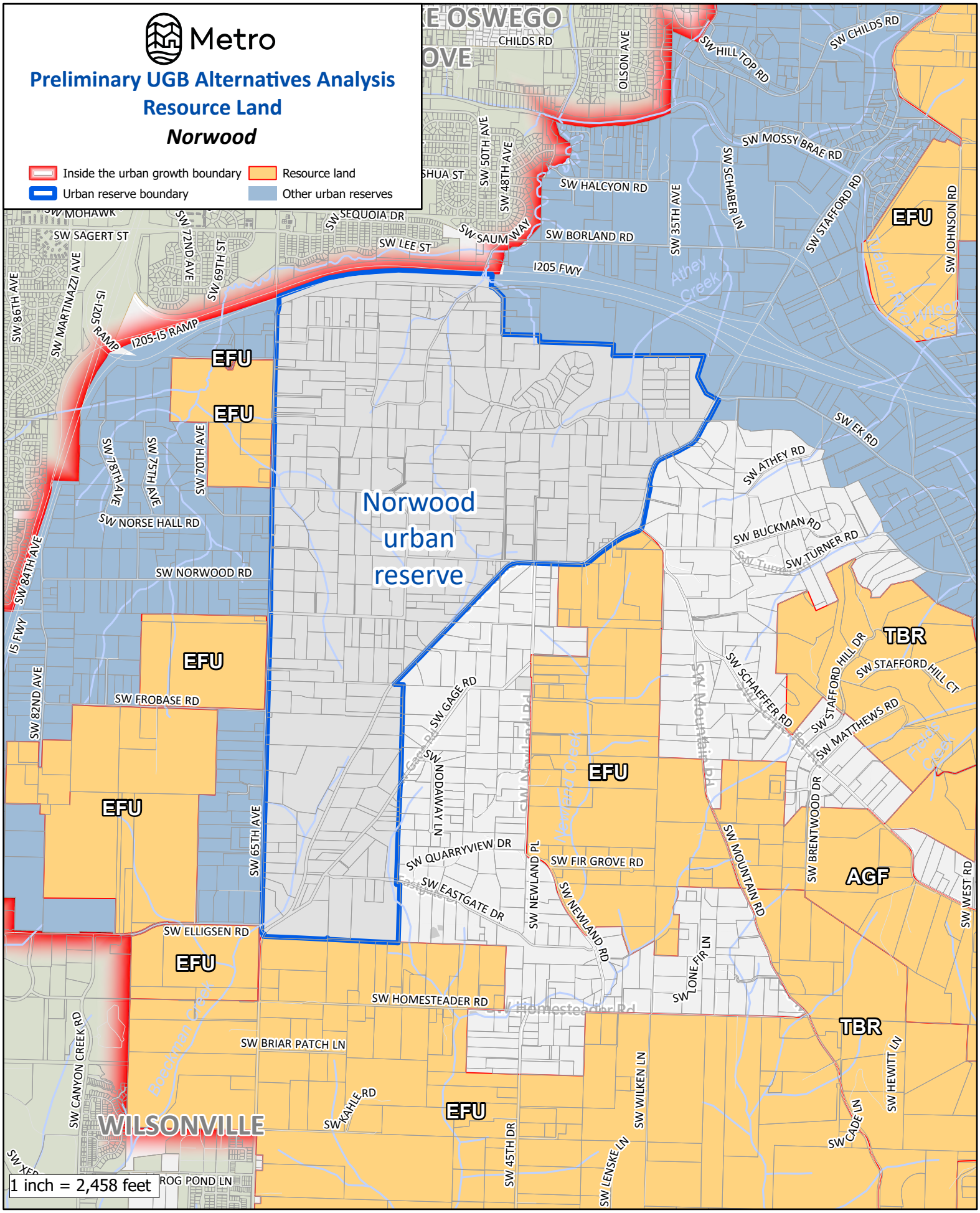

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ROSA URBAN RESERVE

Total Reserve Area	789 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	769 acres
Gross Vacant Buildable Area	288 acres
Net Vacant Buildable Area	**210 acres**

The Rosa Urban Reserve, which is the remainder of the former "South Urban Reserve" after a portion was added to the UGB in 2018, is on the south side of Hillsboro, north of SW Rosedale Road between SW River Road and SW 229th Avenue. It is adjacent to the UGB on its east and north, while rural reserve land is to the south and west. The reserve is relatively flat with some minor slopes near its stream corridors. Access is provided by SW Rosedale Road, SW River Road, and SW 229th Avenue. SW Rosa Road bisects the southern portion of the reserve in an east-west direction.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Rosa Urban Reserve is comprised of the entirety or portions of 97 contiguous tax lots. Of the 79 tax lots entirely in the reserve, roughly a third are smaller than two acres each, another third are between two and five acres each, and six are greater than 30 acres each, with one being 221 acres in area. The tax lots that are only partially within the reserve have portions in the reserve that are generally less than two acres, though a few have portions in the reserve between six and nine acres. The combined tax lot area within the reserve is approximately 769 acres. As noted above, the entire reserve contains 288 gross vacant buildable acres and 210 net vacant buildable acres.

Three tax lots, with a total area of 310 acres (approximately 40 percent of the reserve's area), are occupied by "The Reserve Vinyard and Golf Club", which feature golf courses and accessory commercial uses. The other tax lots are characterized by rural residential development, smaller-scale agricultural uses, and groves of trees. Of all the tax lots entirely or partially within the reserve, 77 (roughly 80 percent) have assessed improvements, with the median assessed value of those tax lots' improvements being nearly $310,000.

The only existing urban residential development directly adjacent to the reserve adjoins the golf course property, though residential and commercial development is planned for neighboring areas already inside the UGB. Rosedale Elementary School and South Meadows Middle School are both within one mile of the of the reserve. The planned Sohi Community Park is adjacent to the reserve's east, on the opposite side of SE Century Boulevard and the Meriwether National Golf Course is just to the west. The Tualatin Valley Highway is approximately two miles away via SW River Road and SE Witch Hazel Road, and Highway 26 is further away. The closest TriMet bus stops are on Tualatin Valley Highway.

This reserve is generally flat, with some minor slopes along the stream corridors that divide the area into two tracts. The northern tract contains the golf course, which is considered "developed land" in Metro's buildable lands inventory methodology. While there are a few sizeable and

relatively flat tax lots in the southern portion of the reserve, they are more than five miles from Highway 26. The proximity of educational and recreational uses, and existing and planned residential development, means the reserve is best suited to accommodating a residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Rosa Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Hillsboro. The city owns and operates two municipal drinking water systems, the city's System, which is the primary system, and the Upper System, which is a secondary system. It utilizes wholesale water purchased from the Joint Water Commission (JWC). JWC, which is jointly owned by the Tualatin Valley Water District (TVWD) and the cities of Hillsboro, Beaverton, and Forest Grove, obtains water from Hagg Lake (Scoggins Reservoir) and the Barney Reservoir released into the upper portion of the Tualatin River. When flows are available, water from the Tualatin River is used. It is then withdrawn and filtered through the JWC water treatment plant. Chlorine and pH adjustments are added before leaving the plant, where chlorine and pH adjustments are added to the water. The city is working with TVWD on development of a new water supply system that will draw water from the Willamette River in order to, among other goals, better accommodate growth in the city and surrounding areas. The project is expected to be completed in 2026. There are also plans to an upgrade of the JWC Water Treatment Plant. In the meantime, it is assumed there is generally sufficient treatment, storage, and transmission capacity to meet existing demands, though additional storage may be needed for areas within the existing UGB during regional supply shortage events and to accommodate full buildout.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The City of Hillsboro has previously indicated there is or will be adequate water supply to serve the reserve as it develops, but capacity availability will ultimately depend on specific land uses in the reserve and the timing of any other urban development connected to the system. Additional supply capacity (e.g., from the WWSS project planned for completion in 2026) and pipe upsizing may be needed, and additional storage capacity is likely necessary.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional supply and storage capacity, as well as pipe upsizing, may be needed in order to avoid adversely impacting existing facilities in areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$9.44 million
18-inch pipe	$0
Pumping	$0
Storage	$0.28 million
Total:	**$9.72 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,316**

Sanitary Sewer Services

With regard to sanitary sewer services, the Rosa Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

In adjacent areas already in the UGB, the City of Hillsboro provides sanitary sewer services that feed into the regional sanitary sewer system operated by Clean Water Services (CWS). CWS treats wastewater at the Rock Creek Wastewater Treatment Plant. Capacity is believed to be adequate to meet current demand, though CWS is in the process of developing the West Basin Master Plan (WBMP), which, when completed as early as 2025, will identify projects needed to accommodate redevelopment and new development in the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The forthcoming WBMP will help to identify projects needed to accommodate development in and beyond the existing UGB. Nonetheless, CWS has indicated that it is likely development of the Rosa Urban Reserve would require a new pump station that would pump sewage direct to the Rock Creek treatment plant.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The WBMP will help to identify projects needed to accommodate development beyond the existing UGB while maintaining adequate service elsewhere. As noted above, CWS has indicated that it is likely development of the Rosa Urban Reserve would require a new pump station.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$5.17
12-inch pipe	$0
15-inch pipe	$0
Pump station	$2.52
Force mains	$0
Total:	**$7.69**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,833**

Stormwater Management Services

With regard to stormwater management services, the Rosa Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development in adjacent areas inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Based on topography, stormwater related to new development in the Rosa Urban Reserve could potentially discharge to Butternut Creek or Gordon Creek via private and public outfalls, without connecting to other existing stormwater infrastructure.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the Rosa Urban Reserve could potentially discharge to Butternut Creek or Gordon Creek via private and public outfalls, without connecting to other existing stormwater infrastructure. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated. It is also expected that stormwater will be treated and detained onsite, thereby limiting impacts to these creeks.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$3.00 million
24-inch pipe	$2.21 million
30-inch pipe	$0
Water quality/dentition	$9.38 million
Total:	**$14.59 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,476**

Transportation Services

With regard to transportation services, the Rosa Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Rosa Urban Reserve had above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates two regional centers and separate town centers in the City of Hillsboro, as well as a town center in nearby unincorporated Washington County. Regional centers are generally meant to: serve populations of hundreds of thousands of people; surround high-quality transit service and multi-modal street networks; and offer larger commercial uses, healthcare facilities, local government services, and public amenities. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Hillsboro Regional Center in Hillsboro and the Aloha Town Center in Washington County are the closest 2040 Growth Concept designated centers to the Rosa Urban Reserve.

The Hillsboro Regional Center includes historic downtown Hillsboro and a large surrounding area that encompasses a wide variety of residential, employment, institutional/public uses. The center includes grocery stores, restaurants, medical facilities, government offices, school uses, parks, and a variety of housing types. Metro's 2017 State of the Centers Atlas showed that this large regional center has an average population density and dwelling units per acre, and a slightly lower number of businesses per acre, when compared with the other regional centers in the region.

The Aloha Town Center is located along Tualatin Valley Highway in unincorporated Washington County. In 2017, Washington County completed the Aloha Tomorrow Plan for the town center area to integrate land use changes, transportation improvements, and policies that support affordable housing and economic development. The center includes grocery stores, other retail commercial uses, medical offices, a preschool, places of worship, and a variety of housing types. Metro's State of the Centers Atlas showed that the town center has a high total population and dwelling units per acre, but a very low number of total businesses and employees, when compared with other town centers in the region.

The South Hillsboro Community Plan area, which is in the UGB and adjacent to the reserve to the east, is expected to develop with a higher-density mixed-use town center ("Reed's Crossing") along Tualatin Valley Highway and a smaller-scale village center south of Butternut Creek. While these two centers are not formally designated 2040 Growth Concept centers, they are expected to have similar purposes and characteristics.

Growth in and near these 2040 Growth Concept centers, Reed's Crossing, and the village center will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs with relatively short trips. The transit service and bike and pedestrian facilities that serve these areas, described further below, can also help to ensure that additional growth nearby does not adversely impact home-based VMT per capita.

Six TriMet bus routes provide service to Hillsboro and/or nearby unincorporated Washington County, mainly along the arterial streets in the central portion of the city, focusing on the Hillsboro and Tanasbourne/Amber Glen Regional Centers, the Orenco Town Center, and employment areas. There is generally more minimal transit service to the southern and northern portions of the city. However, TriMet Route 57 provides service along Tualatin Valley Highway and connects the Hillsboro Regional Center with Aloha Town Center. The MAX Light Rail Blue Line stops at nine stations within Hillsboro, connecting the city to Beaverton and Portland. Figure 4.3 in Chapter of the 2023 RTP indicates that there are gaps in planned frequent transit service along certain routes in the UGB near the reserve, including along SE Cornelius Pass Road and SE Century Boulevard.

Hillsboro has over 54 miles of dedicated bike lanes, more than 24 miles of established bikeways, and numerous streets considered "bike friendly" that, together, create a fairly well-connected system that is focused mostly on the central portion of the city and its two regional centers, including the Hillsboro Regional Center. There are dedicated bike facilities on SE River Road, SE Davis Road west of SE Brookwood Avenue, and the roughly 1,000 feet of SE Davis Road leading up to SE Century Boulevard, in the area of the UGB near the reserve. There are also dedicated bike facilities along the developing SE Butternut Creek Parkway, which will serve that area's new development and its prospective village center. The existing bike facilities on Tualatin Valley Highway are identified as part of the regional bike network on Figure 4.5 in Chapter 4 of the 2023

RTP. However, the figure also identifies gaps in the planned network in other areas in the UGB near the reserve, including along SE Davis Road.

A large proportion of the residential neighborhoods in Hillsboro, including those in the UGB near the reserve, have sidewalks, although there are other residential areas of the city that do not have sidewalks. The Hillsboro Regional Center and Aloha Town Center have sidewalks, as does the developing South Hillsboro Community Plan area. Trails, such as the Butternut Creek Trail to the east of the reserve and the Rock Creek Trail, provide additional pedestrian opportunities. However, large sections of Tualatin Valley Highway lack sidewalks and sections of SE Brookwood Avenue and SE Davis Road in the UGB lack sidewalks on both sides. There are also no sidewalks along SE River Road south for most of the length south of SE Oakhurst Street. Chapter 4, Figure 4.4 of the 2023 RTP identifies the missing sidewalks on Tualatin Valley Highway, SE Brookwood Avenue, and SE River Road as gaps in the planned regional pedestrian network.

Figure 4.14 in Chapter of the 2023 RTP identifies a number of high injury corridors in the area already inside the UGB near the reserve and in Hillsboro, including Tualatin Valley Highway and SE River Road. The figure also identifies a number of intersections along Tualatin Valley Highway and SE River Road in the UGB near the reserve as high injury intersections.

Highway 26 within the UGB near Hillsboro is identified as a throughway Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of that chapter indicates that this section of Highway 26 currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Highway 26, an RTP-designated throughway, is more than four miles away from the reserve. As noted above, the section of the highway in the UGB near Hillsboro currently meets travel speed reliability performance thresholds.

There is currently no transit service into the reserve itself. TriMet Route 57, which travels on Tualatin Valley Highway between Forest Grove and the Beaverton Transit Center, is just shy of a mile from the eastern edge of the reserve along SE 67th Avenue and just over a half mile from the middle of the reserve along SE Brookwood Avenue.

There is a dedicated bike lane on north of the reserve on SE/SW River Road that connects to a bike lane on SE Davis Road 1,000 feet to the north that provides access to nearby South Meadows Middle School and Witch Hazel Elementary School. It appears the bike lane on SE Davis Road will be extended to the east as the area develops, given the fact that there are bike lanes on those portions of SE Davis with new homes. The bike lane on SE/SW River Road also extends south into the reserve to SW Rosedale Road. There are bike lanes and bikeways in South Hillsboro Community Plan area and it is expected that these facilities will continue to be built as development progresses.

There is one directly adjacent residential development that has sidewalks. However, this development is next to the golf course portion of the reserve and currently the sidewalks do not connect to the reserve itself. It is unclear as to whether they will be connected in the future.

As noted in response to Factor 1, the reserve may not be able to efficiently accommodate employment uses and instead would best accommodate residential uses, meaning future residents may have to travel outside of the reserves for daily services and employment opportunities. This Hillsboro Regional Center is located approximately 2.5 miles from the reserve via Tualatin Valley Highway or SE River Road. The Aloha Town Center is located about 3.5 miles to the east of the reserve along Tualatin Valley Highway. Without direct transit service, and without direct and complete bike and pedestrian facilities leading to transit on Tualatin Valley Highway, it is likely that future residents of the reserve will need to rely on private motor vehicle transportation to access their daily needs and employment opportunities in these centers. The "center-like" mixed use development in the nearby South Hillsboro Community Plan area could offer closer services.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SE 67th Avenue, SE River Road, SE Brookwood Avenue, and Tualatin Valley Highway would be expected to see additional private vehicle traffic from development of the reserve. The few existing bike and pedestrian facilities nearby would also be expected to see additional use. Considering the distance between the reserve and the 2040 Growth Concept designated centers, the lack of direct transit service, the limited bike and pedestrian facilities, and the size of the reserve, the reserve could generate more private motor vehicle traffic on roadways already inside the UGB than other reserves. Any additional motor vehicle traffic on Tualatin Valley Highway or SE River Road may exacerbate their high-crash conditions. However, in part because Highway 26 is more than four miles from the reserve, development of the reserve is not expected to impact the performance of Highway 26 as a throughway.

d. Need for major transportation facility improvements and associated costs

Urbanizing the reserve will likely require an approximately 0.91-mile section of SW River Road in the west of the reserve to be improved to urban arterial standards, including acquisition of additional right-of-way. It is also likely that the following roadways would need to be improved to urban collector standards, with acquisition of additional right-of-way: a 0.92-mile section of SW Rosa Road; a 0.91-mile section of SW Rosedale Road; and a 1.05-mile section of SE Century Boulevard. The SW Rosedale Road improvements are considered half-street improvements for the purposes of this analysis, as the southern half of the roadway may be outside of the UGB. SE Century Boulevard improvements are also considered half-street improvements because the eastern half of the roadway would be inside the current UGB. Two new collectors with a combined length of approximately 1.27 miles are likely needed to serve central portions

of the reserve. Most of these new and improved roadways' per-mile costs are expected to be normal, though a few stream crossings could lead to higher-than-normal costs in specific locations.

Facilities	Cost
Arterials, existing/improved full street	$70.50 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$29.67 million
Collectors, existing/improved half street	$34.04 million
Collectors, new	$52.10 million
Total:	**$186.32 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$44,404**

c. Provision of public transit service

The Rose Urban Reserve is almost entirely within the TriMet District, but the area to the west of SW River Road is outside of the district. Conceptual road layouts for the reserve indicate that future transit service may not be feasible. However, TriMet nonetheless evaluated the reserve for providing transit service and determined they could reroute a potential new bus line proposed in TriMet's 2045 Network Vision that would operate along Roy Rogers Road. An analysis determined that the service would not create significant, additional costs. TriMet could potentially provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in the reserve and in the corridors leading to it.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Gordon Creek flows west through the golf course in the northern portion of the Rosa Urban Reserve for approximately 1,830 feet. Wetlands identified on the National Wetland Inventory (NWI) are associated with the entire stream length and total 5.8 acres. Riparian habitat is identified along the stream and wetlands. The golf course is considered developed land so no urbanization here is expected; therefore, the stream, wetland, and habitat areas on the golf course would not be impacted by future urbanization of the reserve.

Butternut Creek flows diagonally through the southern portion of the reserve for approximately 1.4 miles. The entire stream is within a floodplain and 26.5 acres of NWI

wetlands are identified along the entire length. There are a few locations with slopes greater than 25 percent near the western edge of the reserve.

Two small tributaries flow into Butternut Creek near the eastern edge of the reserve and combined total 2,400 feet. All three of the streams flow through forested riparian corridors. There is a significant amount of riparian and upland habitat identified along the corridors.

Butternut Creek bisects the southern portion of the reserve, and any north-south connection developed with urbanization would impact habitat areas, floodplain, and wetlands. However, given the increased protection levels for, streams, wetlands, steep slopes, and habitat areas on lands added to the UGB, urbanization of the area can occur without impacting this stream corridor and habitat areas, especially if a north-south road connection is not made.

Overall, urbanization of the reserve could occur with comparatively moderate impacts to the stream corridors and habitat areas, depending on north-south roadway connections and ultimate urban form. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Rosa Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

This Rosa Urban Reserve has three primary land uses: the Reserve Vineyards and Golf Course; rural residences on forested tax lots; and agricultural activities mostly occurring in the southern portion of the reserve. The golf course, which is not considered developable, mostly separates the developable portions of the reserve from areas from existing development already in the UGB, somewhat isolating the currently rural areas of the reserve. However, urban development on lands to the northwest and east of the reserve is likely in the near future and that development will impact the rural character of the wider area. The number of existing rural residences is relatively small and are generally clustered along SW River Rd on smaller tax lots. This existing development and parcelization, as well as nearby natural features, will limit opportunities for new development in this area of the reserve. Larger-scale urban development would instead likely occur first in the southeast corner of the reserve where lands are cleared and flatter, away from most existing residences. Butternut Creek and the tributary to the Tualatin River and their associated habitat and floodplain areas also divide the reserve into smaller sections that would result in a less dense urban development pattern and could help to buffer urban development for other areas of the reserve until they urbanize.

As detailed more fully in response to Factor 2, future residents of the reserve are likely to be reliant on private motor vehicle transportation, which will have some adverse energy impacts.

There is agricultural activity in the south of the reserve, primarily field crops and Christmas tree farming. The economic consequences of a loss in farming activity in the reserve may be outweighed by the economic benefits of residential development.

This analysis finds that there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The Rosa Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

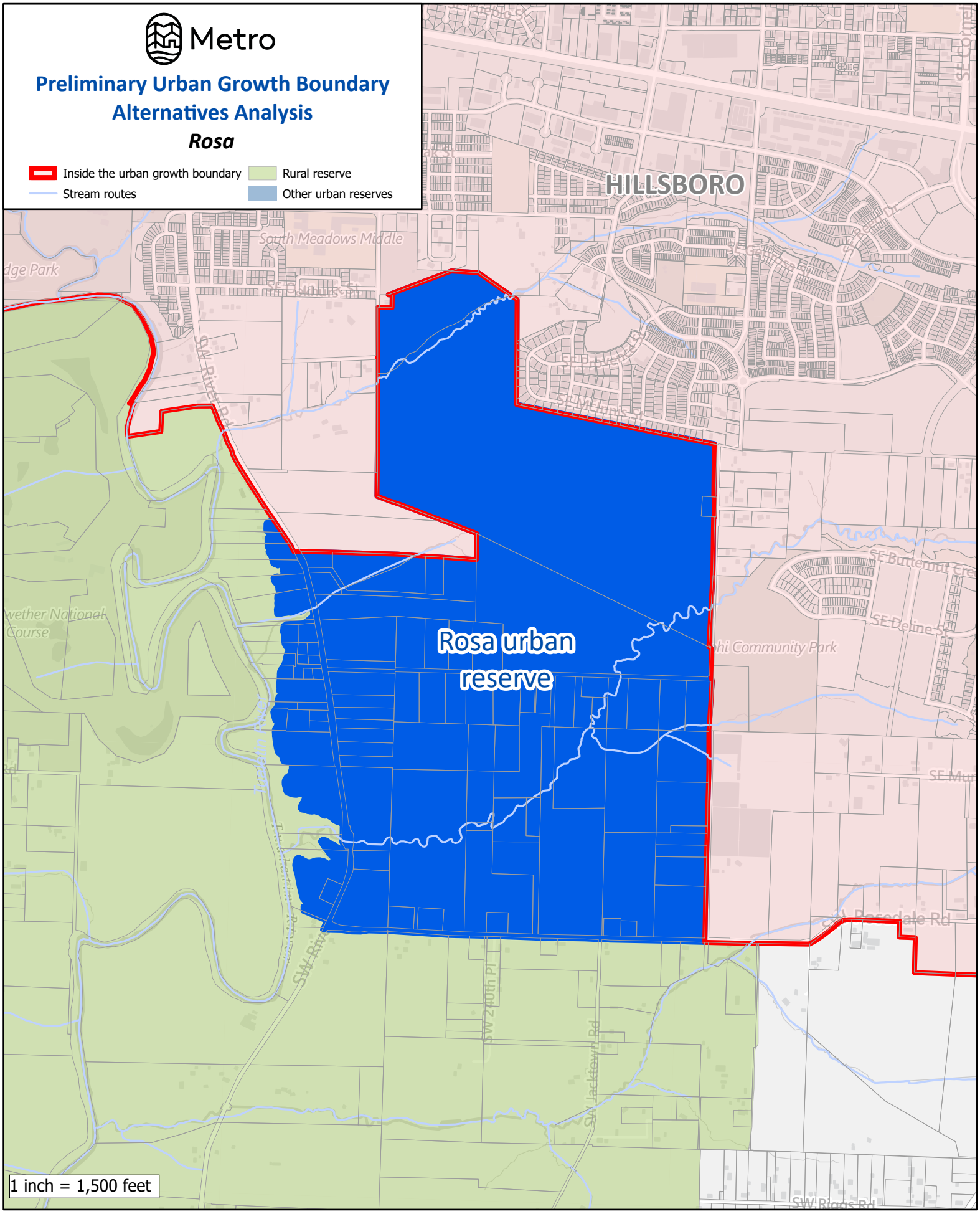
Goal 3 agricultural lands, specifically lands zoned Exclusive Farm Use (EFU) by Washington County, border the Rosa Urban Reserve to the south and west.

The EFU-zoned lands bordering to the south extend into unincorporated areas for a number of miles. Nearly all of the EFU-zoned land directly adjacent to the reserve on the south side of SW Rosedale Road is in agricultural production and include field crops, row crops, and orchards. There is also one roughly four-acre stand of trees near to some rural residential development. SW Rosedale Road itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. In addition, the improvement of SW Rosedale Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization of the reserve would increase traffic on SW Rosedale Road, which could impact the movement of both farm equipment and goods, although the amount of traffic may be limited as Butternut Creek isolates the southern portion of the reserve and SW 229th Avenue and SW River Road provide more direct routes to the existing urban area. The proposed urban uses are considered mostly incompatible with the extensive nearby agricultural activities occurring on the farmland to the south and mitigation measures on the urban land will be necessary. While there is the aforementioned four-acre stand of trees on the adjacent EFU-zoned land in this area, the stand is not significant enough to attract large-scale timber operations that would be in conflict with urban development of the reserve.

The Tualatin River and its associated forested riparian corridor provide a buffer for the vast majority of the EFU land to the west. In addition, the some of the EFU-zoned land west of the river in this location is composed of the Meriwether National Golf Course and not actually in agricultural use. The tax lots at the southwest corner of the reserve are divided by the reserve boundary and the portions of these tax lots outside the reserve are zoned EFU. A very minor portion of this land, approximately two and a half acres in area, is currently in agricultural production along with the portion of the tax lot that is within the reserve. Given the location of this very small area between the Tualatin River and the reserve boundary, and the lack of an easy access point for farm equipment when urbanization occurs, the expectation is that, if the area urbanized, the agricultural activities on these remnants of land would not continue and the potential for land use conflicts

between urban development and agricultural activity would be further reduced. Therefore, the proposed urban uses would be considered compatible with nearby agricultural activities in this location.

In summary, the proposed urban uses are generally compatible with nearby agricultural and forest activities occurring on farm and forest land outside the UGB to the west, but not compatible with the agricultural activities occurring on the farmland to the south where mitigation measures on the urban land could be warranted. Overall, the proposed urban uses have moderate compatibility with the nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The Rosa Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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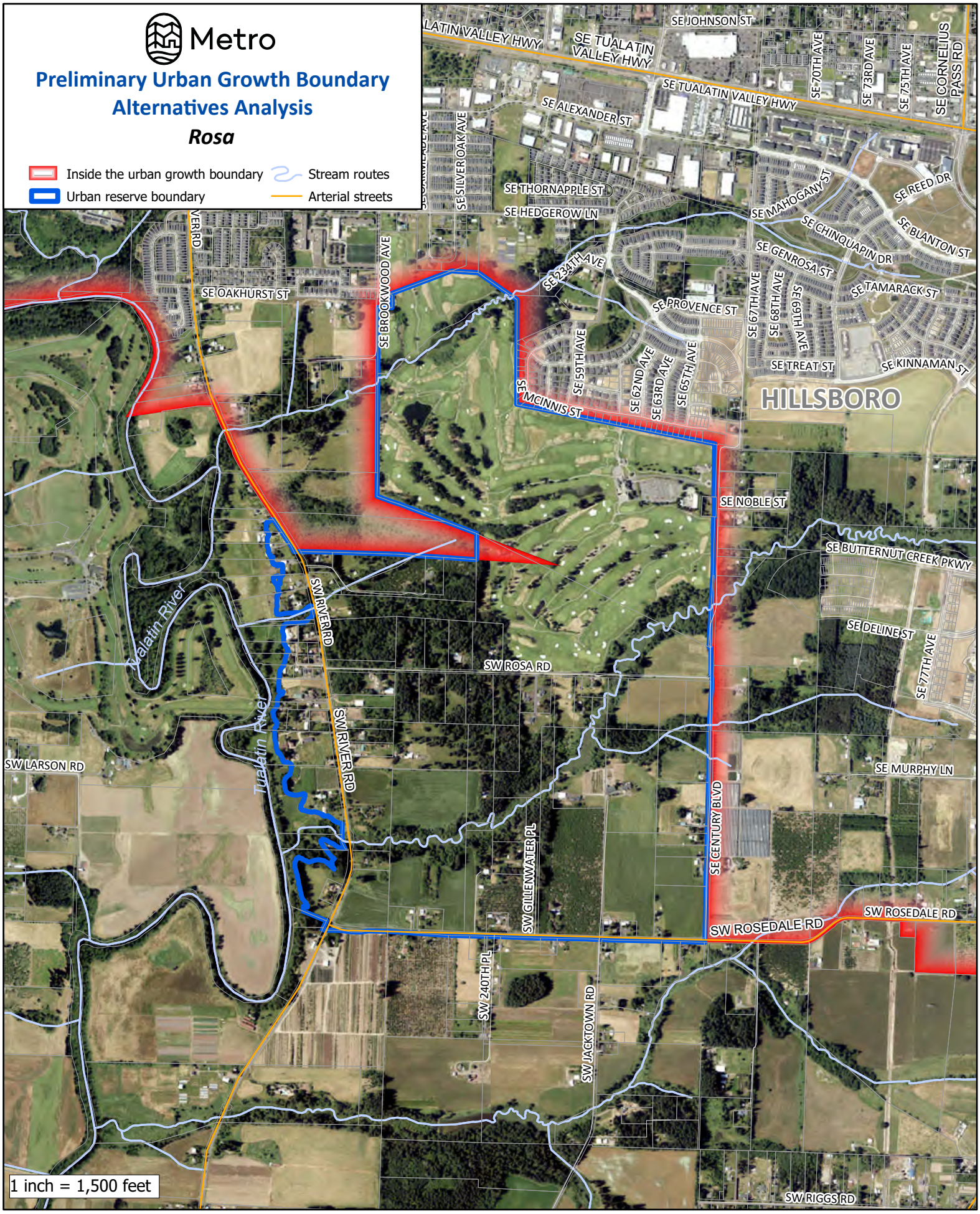
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Rosa

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



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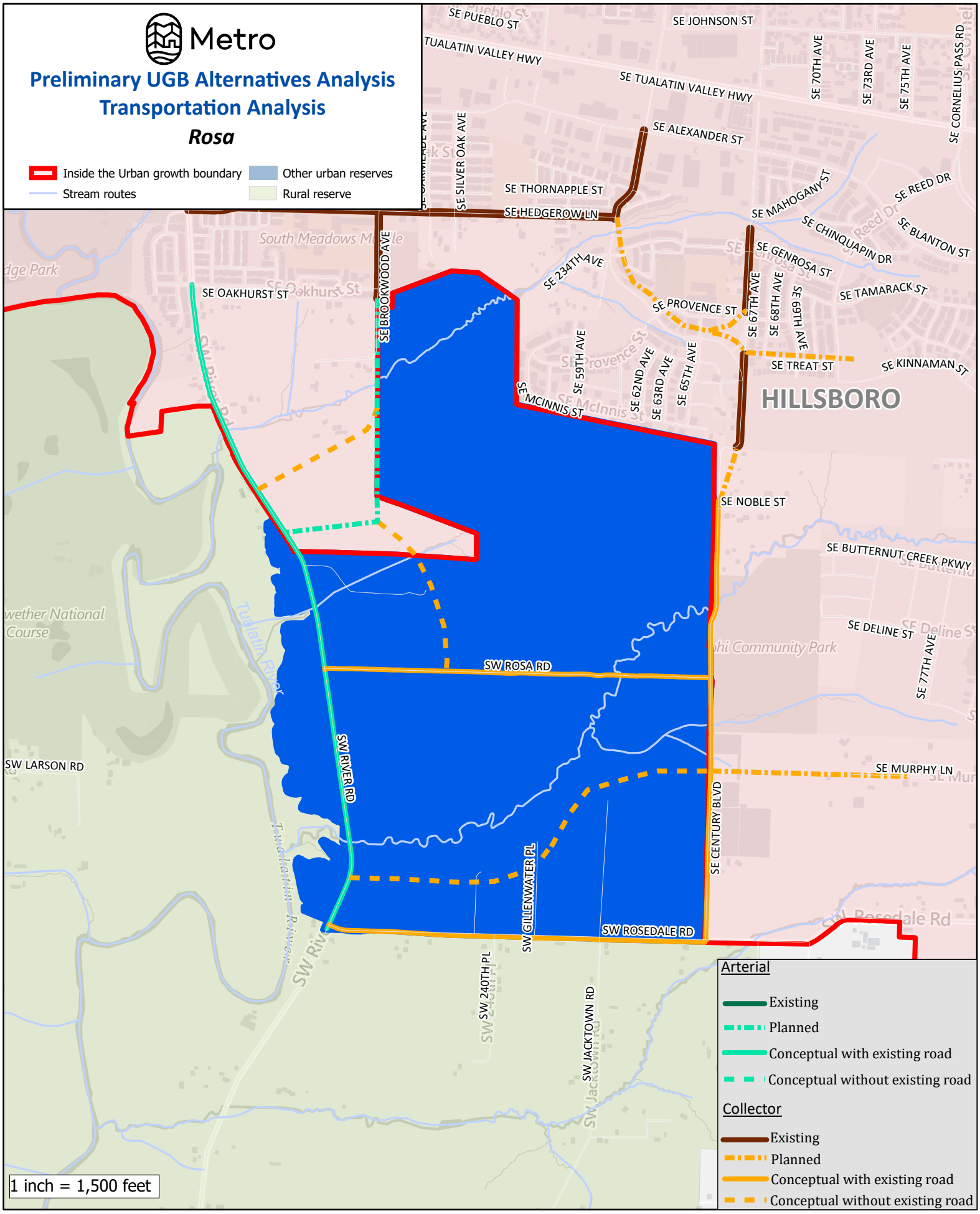

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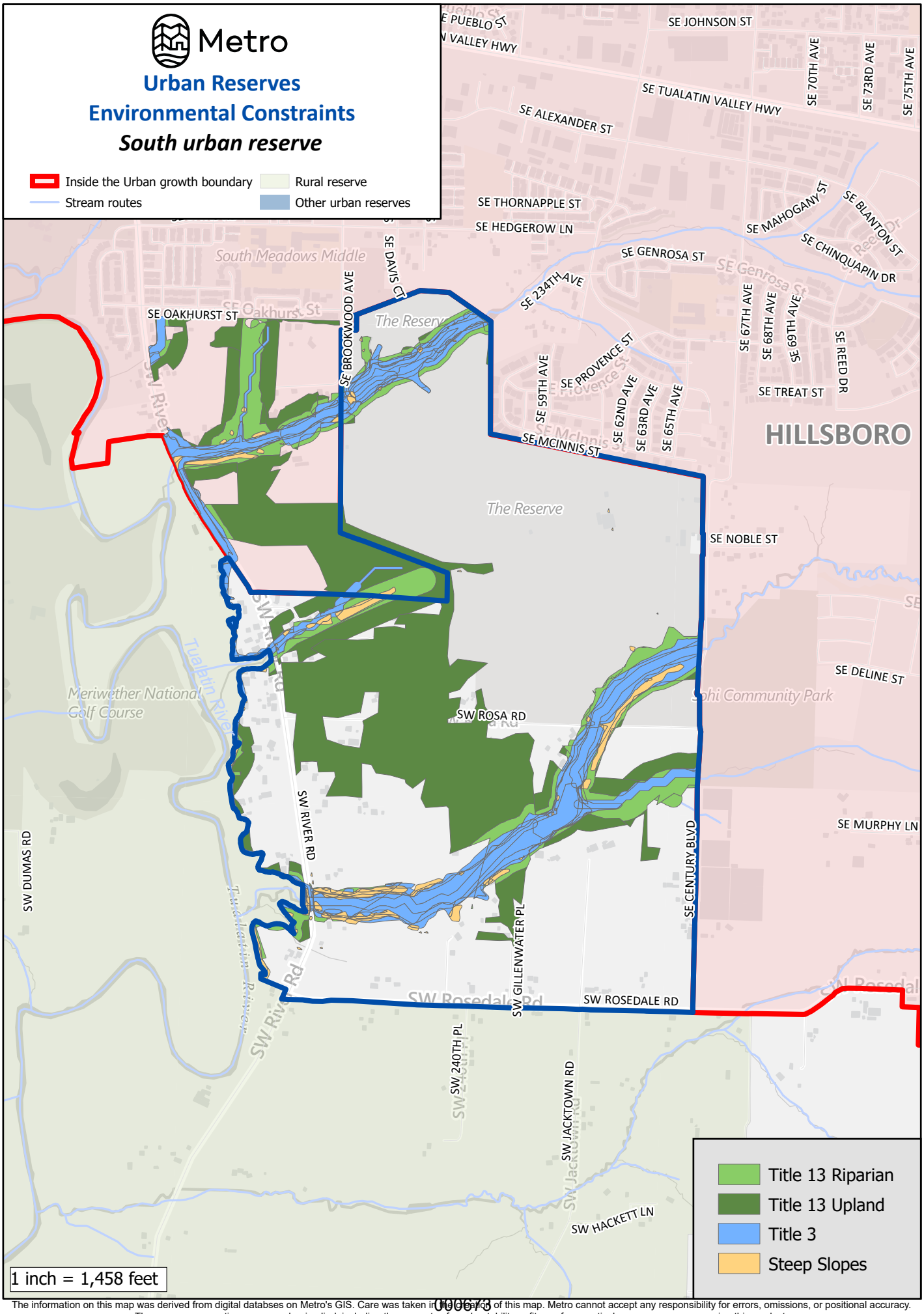

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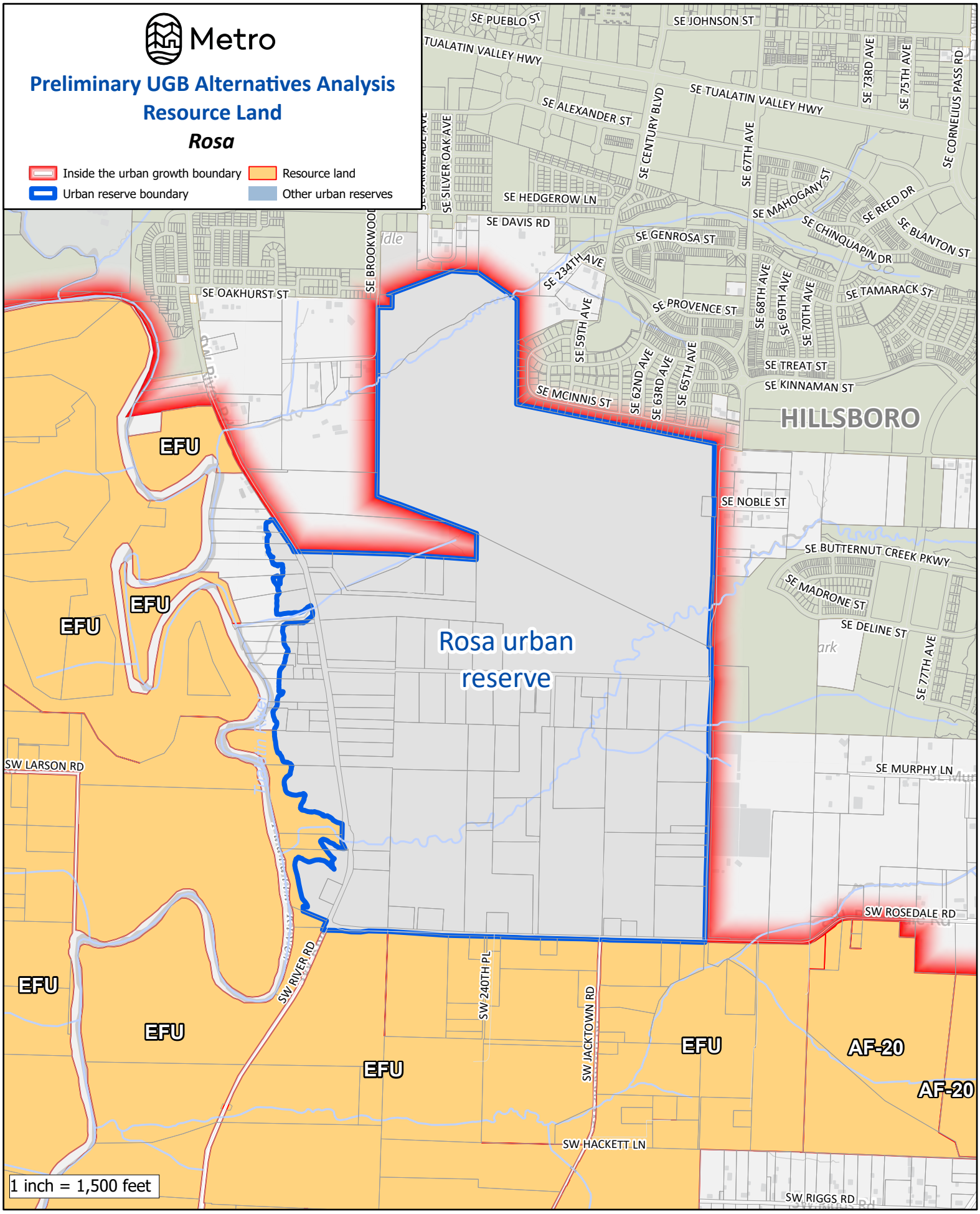

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ROSEMONT URBAN RESERVE

Total Reserve Area	128 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	127 acres
Gross Vacant Buildable Area	112 acres
Net Vacant Buildable Area	**83 acres**

The Rosemont Urban Reserve is a relatively small area on the opposite side of S Rosemont Road from West Linn city limits. The UGB forms the reserve's northern and western boundaries, and the reserve is otherwise entirely surrounded by the separate Stafford Urban Reserve. The reserve is generally flat, with a bench along S Rosemont Road that gently slopes to the south and west. There are some slopes greater than 10 percent mainly along the reserve's other edges and in its center.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Rosemont Urban Reserve contains 19 contiguous tax lots, all of which are entirely within the reserve. All but seven of the tax lots are larger than five acres each; one tax lot is more than 13 acres in area and another is more than 38 acres in area. One of the reserve's tax lots appears to only be a private access drive.

Roughly 70 percent of the reserve's tax lots are developed with rural residences and accessory uses. Aerial imagery indicates there is some minor agricultural activity (e.g., Christmas tree farming) in the reserve, as well as some forested patches. In total, 13 of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being more than $1 million.

Rosemont Ridge Middle School and the West Linn Adult Community Center are directly adjacent to the reserve, and Trillium Creek Primary School is across S Rosemont Road. The reserve is also adjacent to urban low density residential development. Commercial and mixed-use developments, including a grocery store and medical offices, and a disc golf course are within a quarter mile of the east side of the reserve.

Access to the reserve is provided by S Rosemont Road, S Wisteria Road, and Salamo Road. The nearest highway interchange is the interchange of 10th Street with I-205, nearly two miles away via Salamo Road. There are no existing TriMet bus stops within a mile of the reserve.

Considering the reserve's overall small size, its limited highway access, slopes, large number of high value existing residences, and surrounding residential development, the reserve is not considered suitable for accommodating an employment land need. However, the existing and surrounding residential uses and the proximity of schools and recreational and commercial uses, could support and/or be cohesive with residential land uses. This reserve is considered able to accommodate a small residential land need.

However, regarding the "efficient" accommodation of identified land needs, it is important to note that the cities adjacent to the "Stafford Triangle" area, which includes the Rosemont Urban Reserve, have for decades opposed UGB expansions in that area, and those cities' elected officials have taken steps to restrict any city's ability to plan for the accommodation of future urban development. In 2019, the cities of Lake Oswego, Tualatin, and West Linn entered into an agreement that prohibits any of those cities from completing a concept plan for any part of the Borland, Rosemont, and Stafford Urban Reserve areas until, at the earliest, December 31, 2028. This restriction and the ongoing opposition of the three adjacent cities to planning, annexing, and developing the Rosemont Urban Reserve weighs heavily against this area regarding its ability to efficiently accommodate the identified needs for residential or employment land under Factor 1.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Rosemont Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of West Linn serves the adjacent areas inside the UGB to the north and east. The West Linn Water System receives potable water from the South Fork Water Board (SFWB), with a treatment plant in Oregon City jointly owned by the Cities of West Linn and Oregon City. SFWB's water treatment process includes flocculation, sedimentation, filtration, and chlorination of raw water from the Clackamas River to remove harmful bacteria. The water treatment plant was upgraded in October 2016. There are currently no known major treatment system deficiencies or relevant pressure zone storage deficiencies. However, it is unclear whether there is sufficient pumping and distribution system capacity to fully serve buildout conditions, at least without system improvements.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Storage, transmission line, and pumping system improvements may be needed for West Linn to serve urban development of the Rosemont Urban Reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional storage, pumping, and distribution system capacity may be needed to serve urban development of the Rosemont Urban Reserve while avoiding negative impacts to service to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0.67 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$2.9 million
Storage	$0.10 million
Total:	**$3.67 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,204**

Sanitary Sewer Services

With regard to sanitary sewer services, the Rosemont Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of West Linn provides service to nearby lands in the UGB to the north and east. At the downstream end of the City of West Linn system are WES-owned pumps and force mains. Sewage ultimately gets pumped to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River. The Rosemont area would be part of the WES Willamette Basin, which flows to the Willamette Pump Station and then to the West Linn Interceptor. The WES Master Plan identifies an expansion of the existing treatment plant within the 2020-2040 timeframe, taking it from its existing 78.3 MGD capacity to 104 MGD capacity. The city's 2019 Sanitary Sewer Master Plan has identified potential system capacity deficiencies for modeled pipes in both existing and buildout scenarios. There are no deficiencies identified in the city system downstream of the likely Rosemont Urban Reserve connection point under existing conditions, but there may be deficiencies under buildout conditions downstream of the system near the Willamette River. The WES Master Plan identifies hydraulic deficiencies for future dry weather flow, groundwater infiltration, and rainfall derived infiltration and inflow.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Whether the development of the Rosemont Urban Reserve would strain the capacity of existing city system or WES facilities depends in part on the timing of its development and other development in and around the city. It's possible that sewage from the Rosemont Urban Reserve would need to flow toward the Stafford Urban Reserve on its way to the treatment plant; if so, sewer lines will be needed through this adjacent reserve potentially requiring its inclusion in the UGB as well. Existing piping and hydraulic deficiencies may also need to be addressed. The planned expansion of the

treatment plant should provide additional capacity that could help support development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As explained above, treatment plant improvements and piping and hydraulic capacity improvements will likely be needed to avoid negative impacts to service within the existing UGB. Potential treatment plant improvement costs and other system-wide/adjacent reserve development costs are not included in the below figures.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$1.43 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0.90 million
Force mains	$1.12 million
Total:	**$3.45 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,072**

Stormwater Management Services

With regard to stormwater management services, the Rosemont Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of major capacity issues with existing stormwater facilities that serve the adjacent land inside the UGB. Based on topography, at stormwater from development of the Rosemont Urban Reserve would likely be conveyed, treated, and detained within the reserve and discharge directly to Fritchie Creek, which does not have any identified capacity issues.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Fritchie Creek is believed to have sufficient capacity to serve development in the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Stormwater from development of the Rosemont Urban Reserve would likely be conveyed, treated, and detained within the reserve and discharge directly to Fritchie

Creek, without connecting to any existing City of West Linn Stormwater infrastructure. Fritchie Creek is believed to have sufficient capacity. Therefore, no adverse impacts to existing facilities are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$0
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$1.53 million
Total:	**$1.53 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$920**

Transportation Services

With regard to transportation services, the Rosemont Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to and near the Rosemont Urban Reserve had an above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of West Linn. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. West Linn's Willamette Town Center, which includes the Willamette Historic District, aligns with the 2040 Growth Concept Map. The town center area includes local retail commercial uses, medical facilities, school uses, police and fire stations, and some residential uses. Within the UGB but within half a mile of the reserve there is a grocery store, other retail commercial uses, banks, school uses, places of worship, a community center, medical services, multifamily housing, parks, and the West Linn City Hall. Growth in and near the town center and areas in the UGB near the reserve will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs with relatively short trips.

Two TriMet bus lines serve West Linn, including Route 35, which runs along Willamette Drive, and Route 154, which runs along Willamette Falls Drive. They provide transit

service to the Willamette Town Center and other portions of West Linn. Figure 4.3 in Chapter 4 of the 2023 RTP shows these existing routes as in the regional transportation network. There are currently no TriMet bus stops in the UGB within a mile of the reserve.

There are more than nine miles of dedicated bike lanes and five miles of bikeways in West Linn, including on portions of Blankenship Road and Willamette Falls Drive that help connect western ends of West Linn to the Willamette Town Center. Parker Road Rosemont Road, Salamo Road, and Santa Anita Drive, which are in the UGB near the reserve, all have dedicated bike lanes. Figure 4.5 in Chapter 4 of the 2023 RTP shows some existing bike facilities in West Linn, including those along Salamo Road, as in the regional bike network. However, there are gaps in the planned regional bike network in the city, such as along Willamette Falls Drive.

Large portions of West Linn are well served by sidewalks, especially in areas that have been developed more recently. There are sidewalks on the SW Borland Road bridge over the Tualatin River that join sidewalks on Brandon Plance and Dollar Street in the UGB that connect with the Fields Bridge Park, Athey Creek Middle School, and, eventually, the Willamette Town Center. The Willamette Falls Drive Streetscape Project improved pedestrian accessibility in the historic Willamette neighborhood. The Rosemont and Salamo Trails provide pedestrian connection routes along Rosemont Road and Salamo Road and that tie the lower and upper portions of West Linn together on the west side. There are also sidewalks along Bay Meadows Drive, Furlong Drive, Hidden Springs Road, Hoodview Avenue, Noble Lane, and Santa Anita Drive in the UGB near the reserve connecting to schools, commercial and civic uses, residential areas, and parks. Figure 4.4 in Chapter 4 of the 2023 RTP shows that there are some gaps in the planned regional pedestrian network in West Linn.

There are no high injury corridors or high injury intersections in West Linn's portion of the UGB identified on Figure 4.14 in Chapter 4 of the 2023 RTP.

The section of I-205 that crosses through the UGB near the reserve is identified as a throughway in Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of the chapter indicates that the interstate section currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The nearest highway interchange to the reserve is the interchange of 10th Street with I-205, nearly two miles away via Salamo Road. The section of I-205 near the reserve connecting Tualatin and West Linn is expected to continue to meet RTP travel speed reliability performance thresholds at least to the year 2045.

The Willamette Town Center is just over a mile from the reserve but, as noted above, there are other areas with commercial uses, including a grocery store, as well as civic and school uses, medical service, parks, and places of worship within half a mile of the reserve where future residents of the reserve could access daily needs without traveling a long distance (i.e., without increasing home-based VMT per capita). Indeed, Rosemont Ridge Middle School and the West Linn Adult Community Center are adjacent to the reserve and Trillium Creek Primary School is only about 500 feet away. As detailed below, these uses are already connected to the reserve by designated bike facilities and sidewalks, which reduces the need for future residents of the reserve to rely on private motor vehicle transportation to access them.

There is currently no transit service near to the reserve. The closest bus stop is on Willamette Drive, about 1.5 miles away via Santa Anita Drive and Pimlico Drive. However, as explained below, TriMet has plans to provide hourly service along Rosemont Road sometime in the future. In the meantime, there are dedicated bike facilities on Rosemont Road and Salamo Road adjacent to the reserve, as well as on Hidden Springs Road, Parker Road, and Santa Anita Drive leading to the reserve. These roads, as well as almost all of the nearby neighborhood streets, also have sidewalks and the Rosemont Trail along Rosemont Road provides access to the reserve. Past the nearby neighborhoods, there are some gaps in sidewalks or pedestrian facilities along the major streets that limits pedestrian movement.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Hidden Springs Road, Parker Road, Rosemont Road, Salamo Road, Santa Anita Drive, and S Wisteria Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. However, the existing bike and pedestrian facilities adjacent to the reserve, future transit service along Rosemont Road, and the close proximity of schools, civic and commercial uses, medical facilities, parks, and places of worship could help to minimize that additional roadway traffic. Moreover, as future residents of the reserve would be able to use roadways other than I-205, as well as existing bike and pedestrian facilities, to access these uses/services, development of the relatively small reserve is not expected to cause I-205 to no longer meet throughway reliability thresholds.

d. Need for major transportation facility improvements and associated costs

To serve urban development, the half-mile-long portion of Rosemont Road adjacent to the northwest side of the reserve will likely need to be improved to urban arterial standards and the 0.36-mile-long portion of S Wisteria Road will likely need to be improved to urban collector standards, including with acquisition of additional right-of-way in both cases. These roadway improvements are considered half-street improvements for the purposes of this analysis, as the other halves would be improved to urban standards with the development of the adjacent Stafford Urban Reserve or are otherwise in the UGB.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$15.33 million
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$8.74 million
Collectors, new	$0
Total:	**$24.07 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$14,474**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service; actual service will depend on the level of development in, and in the corridors leading to, the reserve. Future service is proposed in TriMet's 2045 Network Vision and would bring service through the northern portion of the reserve along Rosemont Road. Service could be provided at 60-minute headways for all day service, five days per week.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Approximately 350 feet of an unnamed stream that ultimately flows into the Tualatin River is located adjacent to S Wisteria Road near the intersection with S Clematis Road. The stream flows through an open field and riparian habitat that is identified along the stream corridor. The stream would not necessarily be impacted by development of the are due to its location at the edge of the Rosemont Urban Reserve; however, any required improvements to S Wisteria Road to upgrade it to urban standards would have an impact on the stream. Therefore, urbanization of the reserve could result in comparatively low to moderate environmental consequences, depending on the impact from the road improvements. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Rosemont Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

It is expected that urbanization of the Rosemont Urban Reserve will result in new housing replacing at least some of the existing rural residences over time, though many of these are higher-value homes, so their replacement and any resulting change in sense of place and degradation of rural lifestyle would likely be slow. Indeed, the close proximity of urban uses, including schools and commercial retail uses, already limits the rural character for the area.

As detailed more fully in response to Factor 2, there may be additional vehicle traffic generated from urbanization of the reserve, but increased VMT and related energy impacts would be relatively minimal.

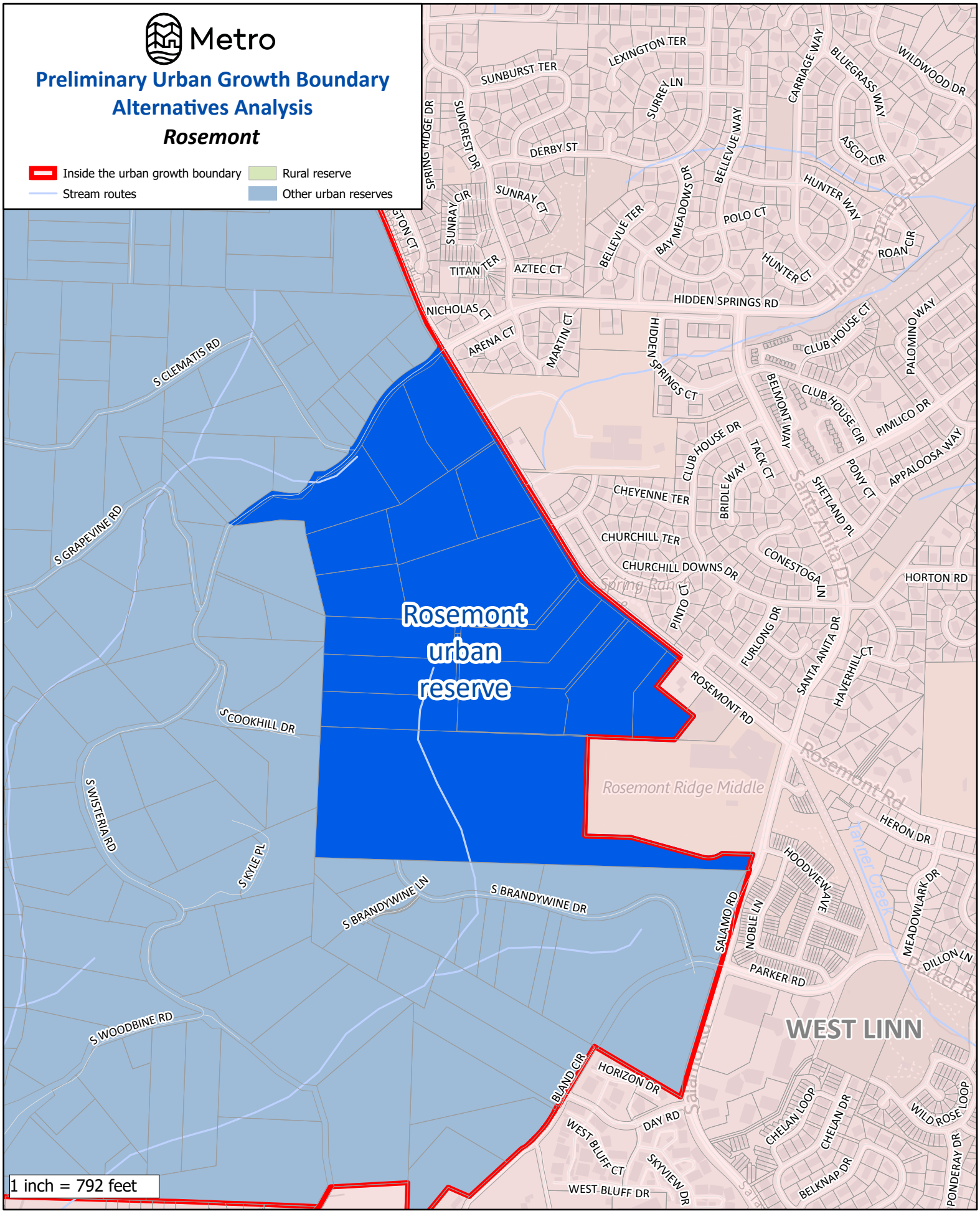
There may be fewer than 30 acres of agricultural activity occurring in the reserve, so the economic impacts of a loss in farming activity would likely be minimal; the economic benefits of residential development of the reserve may even outweigh this loss.

Overall, there would be comparatively low social, energy, and economic consequences from urbanization of this small reserve. The Rosemont Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

There are no locations where lands outside the UGB but contiguous with the Rosemont Urban Reserve have Goal 3 or 4 resource land zoning for agricultural or forest activities. Therefore, the proposed urban uses are considered to have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land.

The Rosemont Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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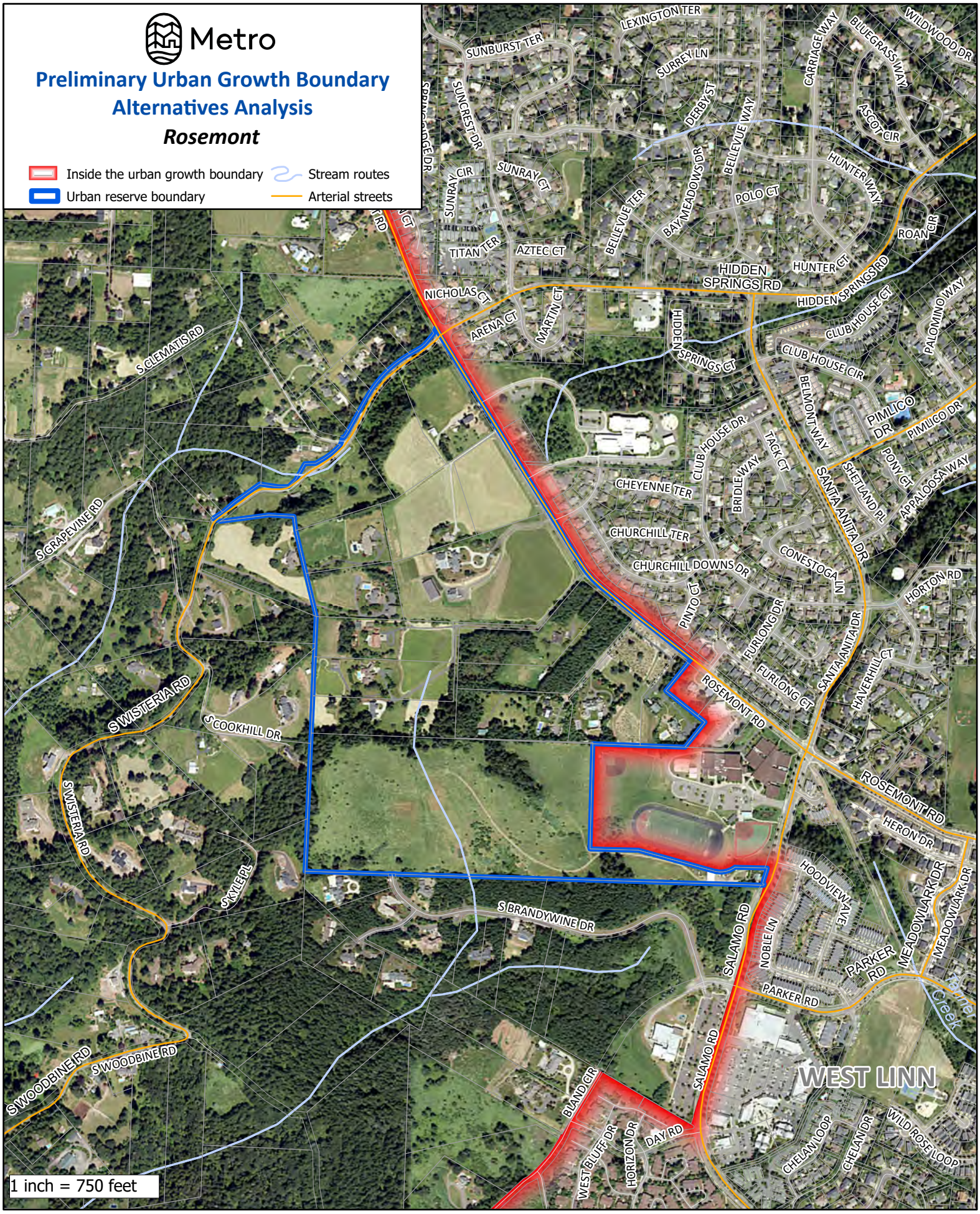
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Rosemont

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



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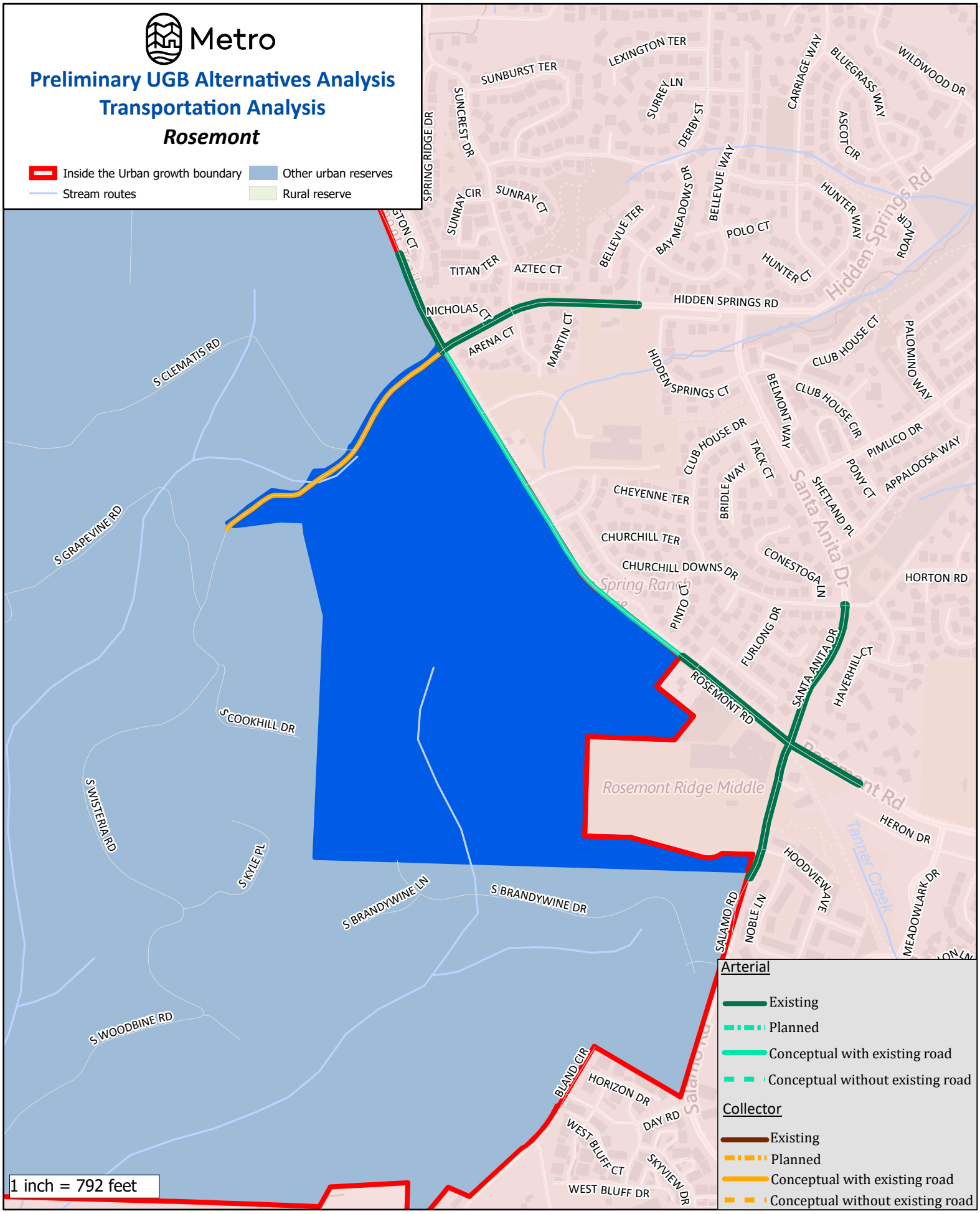

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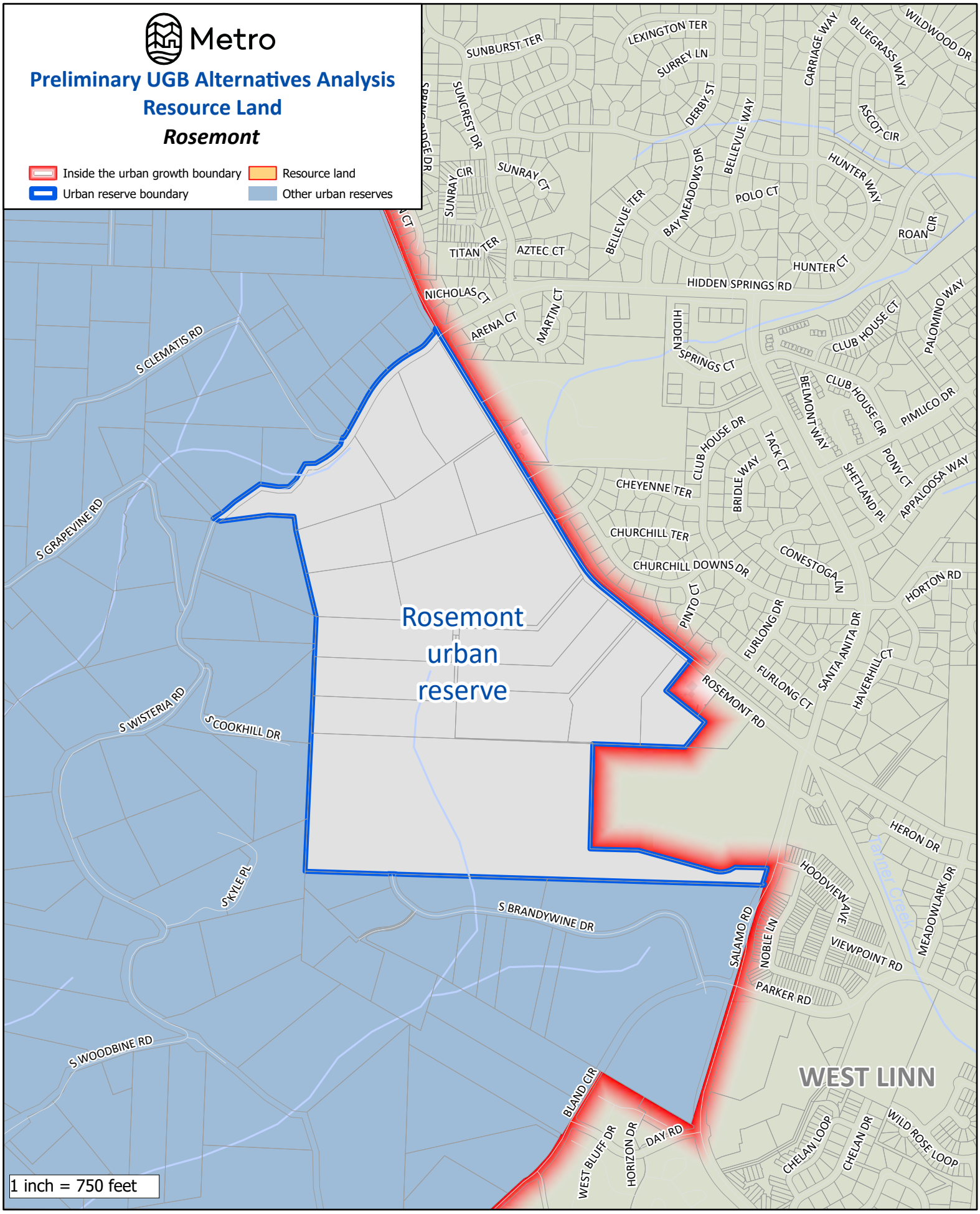

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SHERWOOD NORTH URBAN RESERVE

Total Reserve Area	123 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	113 acres
Gross Vacant Buildable Area	62 acres
Net Vacant Buildable Area	**46 acres**

The Sherwood North Urban Reserve is located on the north side of Sherwood on both sides of Highway 99W (Pacific Highway). It is comprised of three disconnected and relatively thin "sub-areas". The 100-year floodplain and rural reserve lands form the northern boundary of all three sub-areas. The eastern sub-area is located north of SW Galbreath Drive, is accessible by SW Gerda Lane and SW Cipole Road, and is approximately 35 acres in size. The central sub-area is bisected by Highway 99W, is potentially accessible by SW Langer Farms Parkway, and is approximately 57 acres in size. The western sub-area is north of SW Seely Lane and is approximately 31 acres in size.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

As noted above, the Sherwood North Urban Reserve has three disconnected sub-areas. The western sub-area is comprised of portions of 11 tax lots; only one of those tax lots has area in the reserve larger than five acres and several of the tax lots are publicly-owned (e.g., by Washington County or the federal government). The central sub-area is comprised of portions of five tax lots, including one owned by Portland General Electric (PGE) and another by a national home improvement retail chain; all portions of the central sub-area's tax lots within the reserve are larger than five acres, with three larger than 10 acres. The eastern sub-area is comprised of portions of seven tax lots, four of which are owned by the federal government; the portions of the eastern-sub area's tax lots within the reserve range in size from less than an acre to more than 11 acres. The combined area of all portions of the reserve's 23 tax lots within the reserve is approximately 113 acres. However, the reserve has just 62 gross vacant buildable acres and 46 net buildable acres.

According to aerial imagery: the western sub-area is comprised of groves of trees, some cleared land, and a few rural residential structures; the central sub-area is primarily agricultural land with a few rural structures; and the eastern sub-area is also primarily agricultural land, but with more rural development and a forested section at its southern end. Powerline easements cross portions of each sub-area. Overall, eight of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being more than $284,000.

The central sub-area is bisected by Highway 99W, which is a 2040 Growth Concept designated corridor, while the western sub-area is within half a mile of the highway and the eastern sub-area approximately one mile away. All three sub-areas adjoin existing or planned employment uses and are within a mile of the Sherwood Town Center. The western sub-area is adjacent to existing low-density residential development already within the UGB, and local streets SW Seely Lane and SW Borchers Drive stub to the sub-area. There are existing TriMet bus stops within 1,000 feet of the

central and eastern sub-areas, and within about half a mile of the eastern sub-area on the opposite side of Highway 99W. The nearest public schools are approximately one mile away from each sub-area.

While each relatively flat, the three sub-areas contain only small amounts of fully buildable land due to the numerous power line easements. In addition, the majority of the urban reserve land is on tax lots that also include non-urban-reserve land (e.g., rural reserve land), which could complicate development. The irregular shape of the three sub-areas further reduces the ability to provide a well-connected residential development pattern and the western sub-area's "protrusion" into a rural reserve limits a secondary access from the north. Public ownership of the much of the reserve could also limit redevelopment potential. However, the existing street stubs to the western sub-area and the close proximity of Highway 99W and utility services could support some development. Indeed, the middle and eastern sub-areas being adjacent to existing employment uses provides the opportunity for extensions of these existing uses. This area is considered able to accommodate a very small portion of a residential and/or employment land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Sherwood North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are provided with water service by the City of Sherwood. The city obtains the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the city of Wilsonville, with the remainder coming from four groundwater wells in city limits. The city also maintains an emergency connection and transmission piping to a supply main serving Tualatin from Portland. The city's water distribution system includes three service zones served by three storage reservoirs and two pumping stations. The majority of Sherwood customers are served from the 380 Pressure Zone, which is supplied by gravity from the city's Sunset Reservoirs. The 535 Pressure Zone serves the area around the Sunset Reservoirs, supplied with constant pressure by the Sunset Pump Station, while the 455 Pressure Zone serves higher elevation customers on the city's western edge by gravity from the Kruger Reservoir. The Sherwood North Urban Reserve would likely become part of the 380 Pressure Zone.

Supply, storage, pumping, and distribution piping are considered sufficient to meet maximum daily demand of current development within the city's portion of the UGB; however, according to the city's 2015 Water System Master Plan, additional supply and storage capacity may be needed for full buildout. Efforts, including capital improvement projects, are planned to increase treatment plant capacity to satisfy buildout demand.

No pump stations are currently needed to serve the 380 Pressure Zone. Very few distribution deficiencies are identified in the Master Plan for either existing or buildout maximum daily demand (MDD) conditions and no additional deficiencies are identified in the Plan under peak hour demand conditions. New large diameter water lines will likely need to be extended through the currently underdeveloped Brookman Addition and Tonquin Employment Area to serve additional development.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Urbanization of this relatively small reserve should not itself require upgrades to the water treatment plant; however, buildout of the existing UGB and development of one more other urban reserves (e.g., the Sherwood West Urban Reserve) prior to development of the Sherwood North Urban Reserve could warrant the planned treatment plant improvements in order for it to be provided with adequate water service. There are several existing eight-inch sewer lines that extend from existing development near the reserve's southern boundary. The western sub-area of the reserve would likely be served by the Sherwood Trunk Line, while the eastern sub-area will likely be served by the Rock Creek Trunk Line, which are presumed to have adequate capacity to serve the Sherwood North Urban Reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

With any preceding significant new development in current city limits and new urban development in one more other urban reserves (e.g., the Sherwood West Urban Reserve), additional treatment plant and storage capacity may be needed to also serve the Sherwood North Urban Reserve while avoiding adverse impacts to existing facilities in areas already inside the UGB. Those potential treatment system improvement costs and the full costs of new storage facilities also serving areas already inside the UGB are not included in the below figures.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$2.52 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.60 million
Total:	**$2.58 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,780**

Sanitary Sewer Services

With regard to sanitary sewer services, the Sherwood North Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood and Clean Water Services (CWS) together provide sanitary sewer services in adjacent areas already in the UGB. Two CWS sanitary sewer trunk lines connect to the local, city-maintained components of the system, including the 24-inch "Sherwood Trunk", which conveys sewage from the Cedar Creek sewage collection basin, and the 18-inch "Rock Creek Trunk", which conveys sewage from the Rock Creek sewage collection basin, to a CWS-owned pump station. Sewage is then directed to the Durham Advanced Wastewater Treatment Plant via the Upper Tualatin Interceptor, also owned by CWS.

The City of Sherwood updated its Sanitary Sewer Master Plan in 2016. The Master Plan includes areas within Sherwood city limits, as well as the Tonquin Employment Area (TEA) and the Brookman Addition, which are within the UGB. The Master Plan indicates that there is sufficient conveyance, pump station, and treatment plant capacity for existing development in areas already inside the UGB. However, at full buildout of the UGB, there may be deficiencies with the Sherwood and Rock Creek Trunk Lines, the Sherwood Pump Station, and the Upper Tualatin Interceptor. The city and CWS both have capital improvement projects planned to address these capacity issues. Responsibility for upsizing the Sherwood and Rock Creek Trunk Lines may be shared between city and CWS.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The existing treatment plant is assumed to have the capacity to serve future urban development of this relatively small reserve as well as development already in the UGB. There are several existing eight-inch sewer lines that extend from the adjacent developments near the reserve's southern boundary. The western sub-area would likely be served by the Sherwood Trunk Line, while the eastern sub-area will be served by the Rock Creek Trunk Line. The trunk line, pump station, and interceptor improvement projects mentioned above may be needed to provide sufficient capacity to urban development of the reserve, particularly in addition to buildout of areas already in the UGB; the full costs of these system-level improvements are not included in the figures below.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The trunk line, pump station, and interceptor improvement projects mentioned above may be needed in order to avoid adverse impacts to service to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$1.54 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0.54 million
Force mains	$0
Total:	**$2.08 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,241**

Stormwater Management Services

With regard to stormwater management services, the Sherwood North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development in adjacent areas inside the UGB.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Based on topography, stormwater from development of the reserve could likely outfall directly to Chicken Creek, Rock Creek, and their tributaries. Per CWS and city of Sherwood stormwater standards for new development, water quality and quantity should be provided on private property before outfalling to these water bodies; therefore, the existing facilities would not be impacted by the development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the reserve could likely outfall directly to Chicken Creek, Rock Creek, and their tributaries, without connecting to other existing stormwater infrastructure. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated. It is also expected that stormwater will be treated and detained onsite, thereby limiting impacts to these water bodies.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$0
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$0.71 million
Total:	**$0.71 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$760**

Transportation Services

With regard to transportation services, the Sherwood North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone. According to that figure, areas in the UGB adjacent to the Sherwood North Urban Reserve had average (11.32) and above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Sherwood less than half a mile from the reserve. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Langer Drive Commercial District of the City of Sherwood's 2013 "Sherwood Town Center Plan" generally aligns with the geography of the town center area on the Growth Concept Map. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed that, in the area of the Langer Drive Commercial District, there was a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. According to aerial imagery, much of the area is already built out with commercial retail uses, including a grocery store, restaurants, and medical/dental offices, though there are numerous parking lots that may be able to accommodate redevelopment. Near to the Langer Drive Commercial District is a police station, the Sherwood Ice Arena, and other public/quasi-public land uses, as well as some undeveloped and underdeveloped tax lots. Sherwood is served by TriMet Route 94, which runs along Highway 99W, and Route 97, which runs along SW Tualatin-Sherwood Road; both routes include stops at the town center. The town center plan, its existing land uses and transit service, and some availability for new development in and

near the town center demonstrate that growth in the current UGB near to the Sherwood North Urban Reserve will not necessarily cause a significant increase in home-based VMT per capita in the future.

As noted above, TriMet Routes 94 and 97 both serve areas already in the UGB in the adjacent City of Sherwood. Currently, however, those routes only connect to the northern and central portions of the city and not to the city's south and west. Figure 4.3 in Chapter 4 of the 2023 RTP also shows a gap in "frequent transit service" in Sherwood's portion of the planned regional transit network.

Sherwood has more than 10 miles of dedicated bike lanes and established bikeways, including along major roadways, that connect with some other bike-friendly streets, as well as residential and employment uses, schools, and the town center. However, there are gaps in bike facility connections to some of the residential areas south of the railroad. Figure 4.5 in Chapter 4 of the 2023 RTP identifies existing bike facilities along Highway 99W and SW Tualatin-Sherwood Road as part of the planned regional on-street bike network and facilities in the central portion of the city as part of the planned regional off-street bike network, though there is a short network gap along SW Tualatin-Sherwood Road west of the highway and other gaps in the west, east, and south of the city.

Most developed neighborhoods in Sherwood, including the town center, have sidewalks. Figure 4.4 in Chapter 4 of the 2023 RTP identifies existing sidewalk facilities along SW Tualatin-Sherwood Road, SW Sunset Boulevard, and SW Main Street as part of the planned regional on-street pedestrian network, though there are network gaps along Highway 99W in the north of the city, along SW Brookman Road in the south of the city, and along SW Elwert Rd in the west of the city.

The Cedar Creek Trail in Sherwood is identified as an existing regional trail in Figure 4.6 in Chapter 4 of the 2023 RTP. The figure identifies gaps in connections of this trail to other regional trails in the planned regional trial network.

Construction has commenced on a pedestrian bridge over Highway 99W that, when completed, will connect Sherwood High School with the YMCA and surrounding neighborhoods. Goals of the project include: reducing vehicle/pedestrian conflicts and exposure; minimizing out of direction travel for pedestrians; and providing crossing opportunities that accommodate all pedestrians and bicyclists.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road as a high injury corridor. The road, which is already inside the UGB, is less than a quarter mile from each of Sherwood North Urban Reserve's three sub-areas. There are no other RTP-designated high injury corridors in Sherwood's portion of the UGB.

Highway 99W is also already inside the UGB and generally bisects the city. Highway 99W is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 in Chapter 4 of the RTP indicates that it currently meets RTP travel speed reliability

performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The reserve's central sub-area is close to existing major roadways. Highway 99W bisects the central portion of the reserve and SW Tualatin-Sherwood Road is less than 1,000 feet from the eastern sub-area. As noted above, Highway 99W, an RTP-designated throughway in Sherwood, currently meets RTP travel speed reliability performance thresholds, though SW Tualatin-Sherwood Road is identified in the RTP as a high injury corridor.

TriMet Route 94 travels through the central sub-area along Highway 99W and there is a transit stop less than half a mile from the western sub-area. Route 97 has a transit stop about 800 feet from the eastern sub-area along SW Tualatin-Sherwood Road.

Highway 99W and most of SW Roy Rogers Road have dedicated bike lanes providing access to the western and central sub-areas. There is a 1,000-foot segment of SW Roy Rogers Road between Highway 99W and SW Borchers Drive that does not have a bike lane. There is an established bikeway along SW Tualatin-Sherwood Road that is about 800 feet from the eastern sub-area. These facilities provide connections to the town center.

Sidewalks connect to the western sub-area along SW Borchers Drive and SW Seely Lane. Sidewalks connect to the central sub-area along Highway 99W. There are sidewalks on SW Tualatin-Sherwood Road and SW Gerda Lane that stop approximately 600 feet short of the eastern sub-area. These facilities provide connections to the town center. There are no existing regional trails connected to the reserve.

Existing urban residential uses adjacent to the reserve could provide housing to future employees of the reserve, and nearby existing employment uses could provide employment opportunities to future residents of the reserve, helping to limit VMT. However, the existing nearby housing is relatively low in density and, as noted in response to Factor 1, the reserve is unlikely to provide significant residential development opportunities; therefore, future employees of the reserve may still mostly have to commute from further away.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Roy Rogers Road, SW Langer Farms Parkway, and Highway 99W would see some additional private vehicle traffic with urban development of the reserve. However, considering the relatively small size of the reserve, the reserve's proximity to the Sherwood Town Center and its employment/public uses, and the availability of existing transit service and bike and pedestrian facilities near to the reserve, urban development of the reserve is not expected to significantly increase home-based VMT per capita in

nearby areas already in the UGB or jeopardize Highway 99W's ability to continue to meet throughway reliability thresholds. Nearby existing transit service and bike and pedestrian facilities would be expected to see additional use with development of the reserve.

d. Need for major transportation facility improvements and associated costs

No major transportation facility improvements (i.e., new or improved urban arterial or collector roads) are expected to be needed to serve urban development of the Sherwood North Urban Reserve.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$0
Total:	**$0**
Per dwelling unit at 20 units per net vacant buildable acre:	**$0**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service upon urbanization and determined that no additional service would necessary. Future service is proposed in TriMet's "2045 Network Vision" that would bring two new routes within half a mile of the reserve. Additionally, Route 94 already serves Sherwood and travels along the 99W corridor, which divides the reserve's central sub-area.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

No streams or inventoried wetlands are located within the Sherwood North Urban Reserve, but a "100-year" floodplain forms the northern edge of all three sub-areas. There are sizeable locations of riparian or upland habitat identified in the eastern and western sub-areas associated with the location of the floodplain and the nearby Tualatin River National Wildlife Refuge. Some of the identified habitat is in locations that are currently in agricultural production, and a refined analysis required upon inclusion in the UGB will determine if those identified habitats warrant protection from urban development. In addition, some of the identified habitat in the western sub-area is located within powerline easements, which would provide some level of protection due to the inability to urbanize at a high level. The majority of the central sub-area is free of inventoried habitat areas. Some of the reserve's inventoried habitat is located on land owned by the federal government or Washington County and would not likely be urbanized.

Overall, urbanization of the reserve could occur with comparatively minimal to moderate impacts to the habitat areas, depending on the type and form of urban uses the reserve is developed with and the results of an updated habitat inventory conducted upon inclusion in the UGB. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Sherwood North Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There are fewer than 10 residences in this relatively small reserve. Much of the land is in public or corporate ownership. Some of the land is also impacted by powerline easements that reduces the opportunity for urban development. The reserve's sub-areas already border urban residential and employment uses, as well as Highway 99W. Therefore, urbanization of the reserve would result in minimal change in sense of place or degradation of rural lifestyle for existing residents of the reserve. Moreover, urbanization of the reserve with a mixture of uses could bring new social and recreational opportunities for existing residents.

As detailed more fully in response to Factor 2 and due in part to the reserve's small size, additional VMT and related energy impacts from urbanization would be relatively minimal.

It appears that there are fewer than 20 acres of land in the reserve being used for commercial agriculture, so the adverse economic consequences from the loss of farming activity in the reserve would also be minimal; indeed, the economic benefits of residential and/or employment development of the reserve may outweigh this loss.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this small reserve. The Sherwood North Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

All of the land outside of the UGB adjacent to the Sherwood North Urban Reserve has Goal 3 or 4 resource land zoning by Washington County for agricultural and forest activities, specifically with Agriculture and Fores (AF20) and Exclusive Farm Use (EFU) designations.

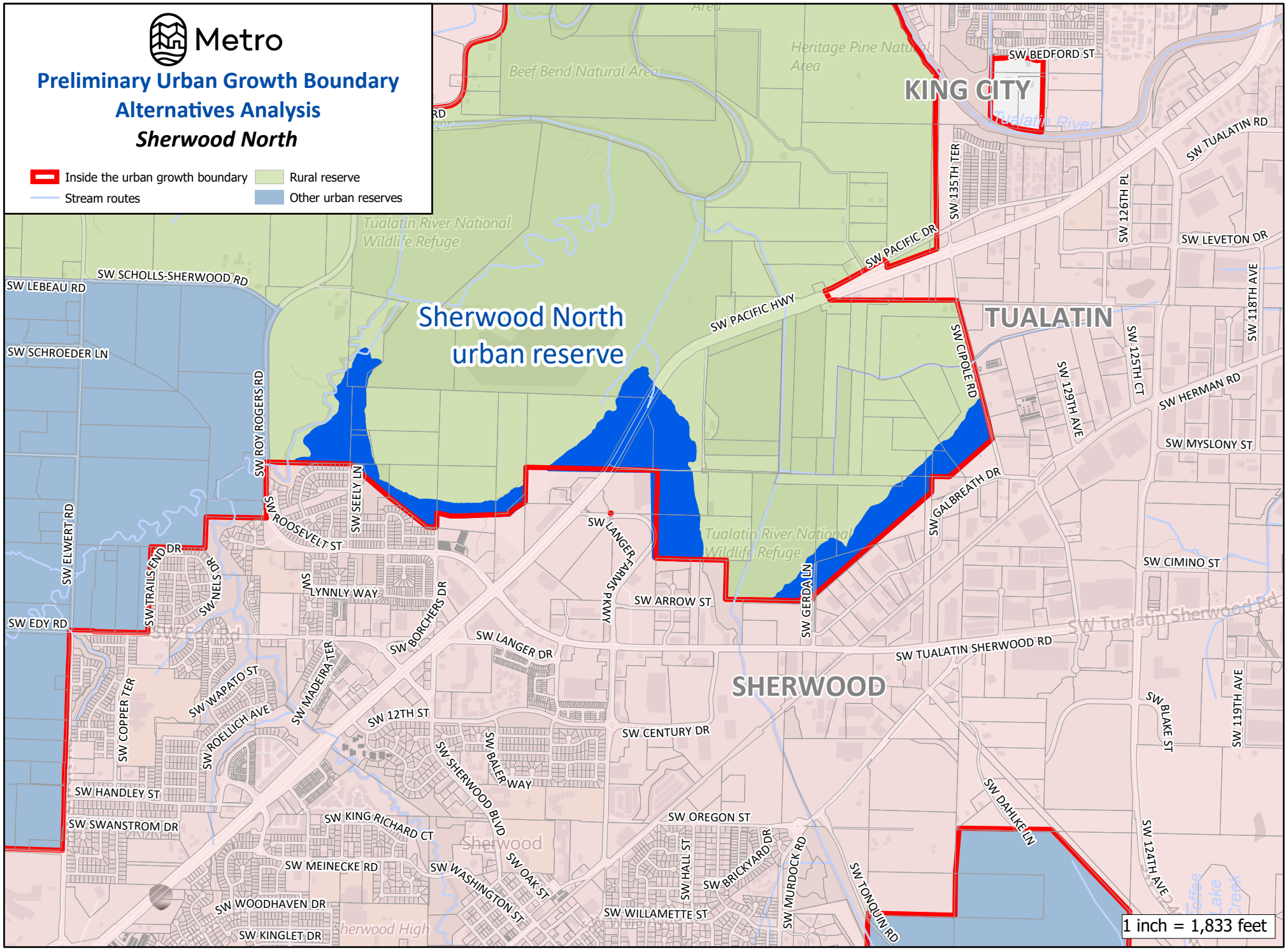
The lands outside the UGB and adjacent to the western sub-area area zoned EFU. However, it appears that no significant agricultural activity is occurring on these adjacent lands. The Chicken Creek riparian area provides a buffer on the west side of this sub-area and the land on the east and north side contains small patches of trees, scrub shrubs, powerlines, and only about five areas of cleared fields. Much of this location is in a flood hazard area. Considering these factors, urban

development of the western sub-area would be generally compatible with the nearby agricultural and forest activities occurring on this farm and forest land.

The land adjacent to the central sub-area is zoned EFU as well. The EFU land on the north side of SW Pacific Highway is not being farmed and appears to contain areas of standing water for significant portions of the year as part of the wildlife refuge operations. The EFU land to the south of SW Pacific Highway contains some limited agricultural activities including field crops, orchards, and pastureland. Urbanization of this portion of the sub-area may impact these agricultural activities; however, since the amount of development that could occur would be relatively small and could take access away from farmed areas, the impacts would not be significant. Therefore, the urban development of the central sub-area would generally be compatible with the nearby agricultural activities occurring on this farm and forest land as well.

Most of the land adjacent to the eastern sub-area is zoned EFU and there is a tract AF20-zoned land adjacent to the portion of eastern sub-area near SW Cipole Road. The majority of this resource land contains some level of agricultural activity, including field crops and pastureland. Urbanization of this portion of the sub-area may impact these agricultural activities; however, since the amount of development that could occur would again be relatively small and would also take access away from the farmed areas, the impact would still not be significant.

Overall, proposed urban uses in the reserve are considered to have high compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The Sherwood North Urban Reserve is given a “high” score in Attachment 3 for this Goal 14 boundary location factor.



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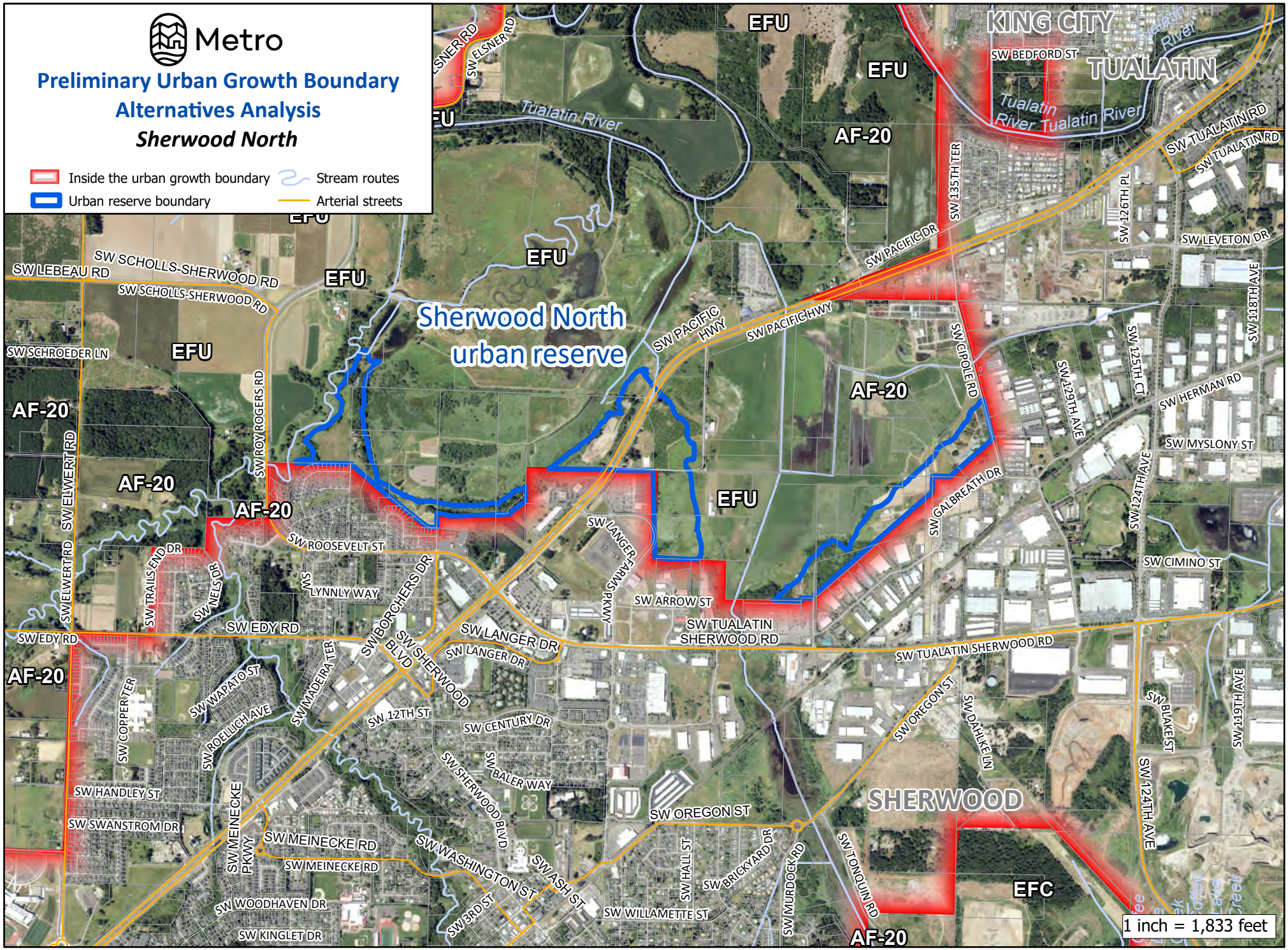

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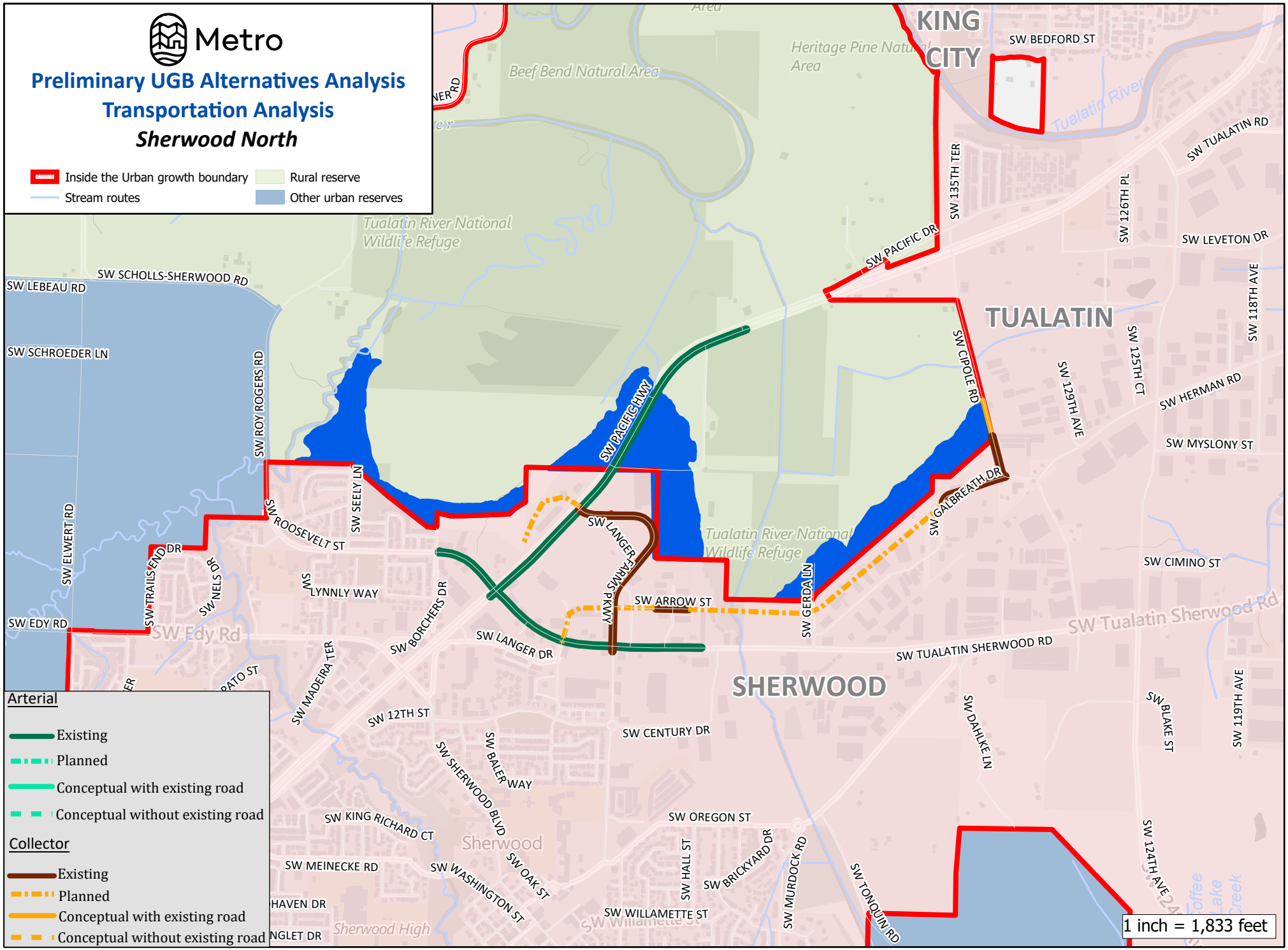

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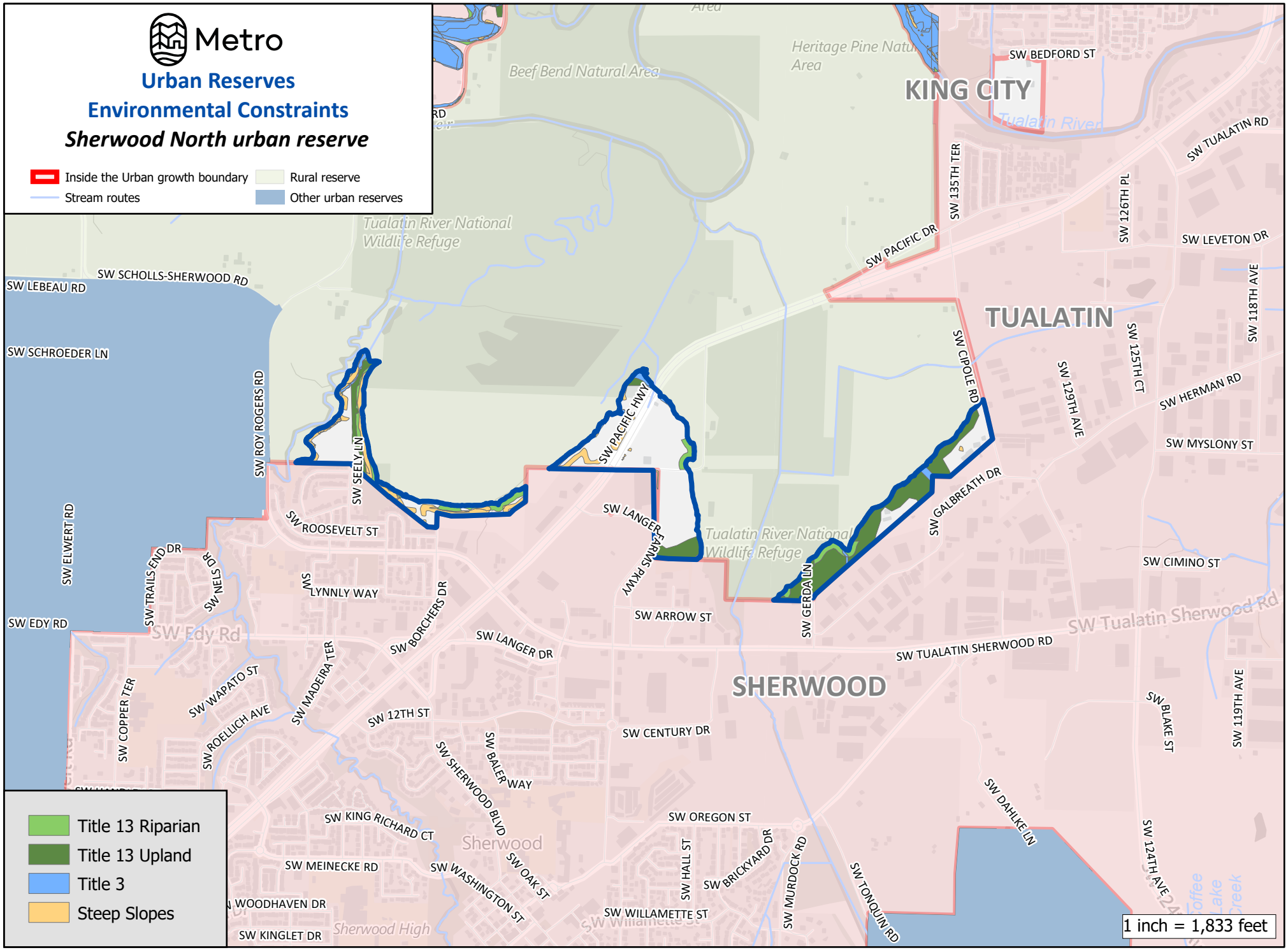

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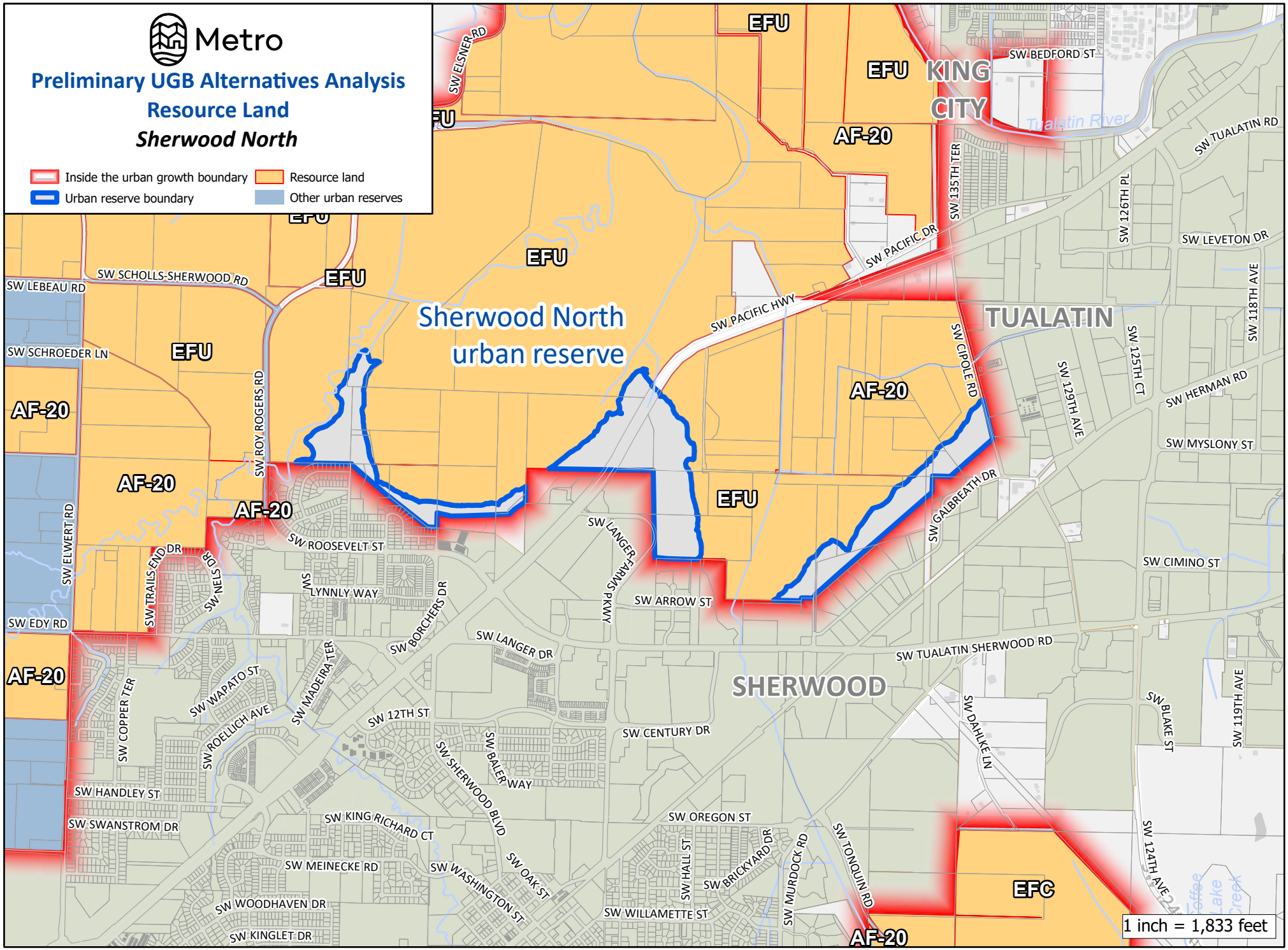

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SHERWOOD SOUTH URBAN RESERVE

Total Reserve Area	448 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	424 acres
Gross Vacant Buildable Area	207 acres
Net Vacant Buildable Area	**155 acres**

The Sherwood South Urban Reserve is a rectangularly shaped area on the south side of Sherwood, south of SW Brookman Road and east of Highway 99W. The UGB forms the northern boundary and the Clackamas-Washington County line forms the eastern boundary; rural reserves are adjacent to the west and south. The reserve is served by SW Brookman Road, SW Middleton Road, and SW Oberst Road. The reserve has five streams, including the confluence of Goose and Cedar Creeks.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Sherwood South Urban Reserve is comprised of 71 contiguous tax lots, all but one of which are entirely within the reserve. The combined land area of the 71 tax lots actually within the reserve is approximately 424 acres. Of the 70 tax lots entirely in the reserve, 77 percent are larger than two acres, 42 percent are larger than five acres, seven are larger than 10 acres, and one is larger than 50 acres. The one tax lot that is not entirely within the reserve nonetheless has more than 27 acres of territory in the reserve. As noted above, the entire reserve contains 207 gross vacant buildable acres and 155 net vacant buildable acres.

According to aerial imagery, there reserve includes rural residential development, forested lands, and limited agricultural activity, mostly pastureland, Christmas tree farms, and orchards. The area The Timberline Baptist Church is located on an 8.3-acre tax lot in the northwest corner of the reserve on SW Old Highway 99W and a Northwest Natural Gas facility is located on a 0.6-acre tax lot across the road. Overall, more than 90 percent of the reserve's tax lots have assessed improvements, with the median value of those tax lots' improvements exceeding $322,000.

Highway 99W runs along the western edge of the reserve and. Existing urban low density residential development and associated local streets lie directly across SW Brookman Road to the north. Some small rural commercial uses (e.g., retail food services, RV repair businesses) are outside of the reserve on the opposite side of the highway to the west. Middleton Elementary School is less than half a mile to the north of the reserve; Sherwood High School is about a mile away, but on the opposite side of Highway 99W. A half-mile section of Portland and Western Railroad track runs through the reserve's western portion. The nearest existing TriMet bus stop is approximately two miles away to the north via Highway 99W.

The reserve is a mixture of relatively flat areas, with some small hills and steeper slopes primarily near the streams that flow north towards Sherwood. Most of the flatter areas are near SW Old Highway 99W and SW Middleton Road and are made up of smaller tax lots that would likely need to be combined to provide opportunities for meaningful employment uses. Additionally, the limited

number of smaller and flatter sites in the reserve are more than a couple miles from Sherwood's existing employment lands. For these reasons, the reserve is not considered able to efficiently accommodate an employment land need, despite the proximity to Highway 99W. The existing rural residential development pattern and the agricultural lands in the reserve, the adjacent urban low density residential development, and nearby school uses provide the opportunity for future residential development. Thus, the area is able to accommodate a residential land need.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Sherwood South Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are provided with water service by the City of Sherwood. The City obtains the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville, with the remainder coming from four groundwater wells in city limits. The City of Sherwood also maintains an emergency connection and transmission piping to a supply main serving Tualatin from Portland. The Sherwood's water distribution system includes three service zones served by three storage reservoirs and two pumping stations. The majority of Sherwood customers are served from the 380 Pressure Zone, which is supplied by gravity from the Sherwood's Sunset Reservoirs. The 535 Pressure Zone serves the area around the Sunset Reservoirs, supplied with constant pressure by the Sunset Pump Station, while the 455 Pressure Zone serves higher elevation customers on the city's western edge by gravity from the Kruger Reservoir. At least part of the Sherwood South Urban Reserve would likely become part of the 380 Pressure Zone.

Supply, storage, pumping, and distribution piping are considered sufficient to meet maximum daily demand of current development within the city's portion of the UGB; however, according to the city's 2015 Water System Master Plan, additional supply and storage capacity may be needed for full buildout. Efforts, including capital improvement projects, are planned to increase treatment plant capacity to satisfy buildout demand. No pump stations are currently needed to serve the 380 Pressure Zone. Very few distribution deficiencies are identified in the Master Plan for either existing or buildout maximum daily demand (MDD) conditions and no additional deficiencies are identified in the Plan under peak hour demand conditions. New large diameter water lines will likely need to be extended through the currently underdeveloped Brookman Addition and Tonquin Employment Area to serve additional development.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Full buildout of the existing UGB and development of Sherwood South Urban Reserve could warrant the planned treatment plant improvements in order for the reserve to be provided with adequate water service. Additional storage capacity, distribution capacity, and some pumping capacity will also likely be needed.

Potential treatment system improvement costs, water main extension costs, and the full costs of new storage facilities also serving areas already inside the UGB are unknown and not included in the below figures. Sherwood's 2015 Water System Master Plan does not address urban water service to this reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Full buildout of the existing UGB and development of Sherwood South Urban Reserve could warrant the planned treatment plant improvements in order for the reserve to be provided with adequate water service. Additional storage, piping, and pumping capacity are also likely needed. Those potential treatment system improvement costs and the full costs of improved storage facilities also serving areas already inside the UGB are not included in the below figures.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$4.94 million
12-inch pipe	$3.32 million
16-inch pipe	$0
Pumping	$13.34 million
Storage	$0.20 million
Total:	**$21.80 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$7,051**

Sanitary Sewer Services

With regard to sanitary sewer services, the Sherwood South Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood and Clean Water Services (CWS) together provide sanitary sewer services in adjacent areas already in the UGB. Two CWS sanitary sewer trunk lines

connect to the local, city-maintained components of the system, including the 24-inch "Sherwood Trunk", which conveys sewage from the Cedar Creek sewage collection basin, and the 18-inch "Rock Creek Trunk", which conveys sewage from the Rock Creek sewage collection basin, to a CWS-owned pump station. Sewage is then directed to the Durham Advanced Wastewater Treatment Plant via the Upper Tualatin Interceptor, also owned by CWS.

The City of Sherwood updated its Sanitary Sewer Master Plan in 2016. The Master Plan includes areas within the City of Sherwood city limits, as well as the Tonquin Employment Area (TEA) and the Brookman Addition, which are within the UGB. The Master Plan indicates that there is sufficient conveyance, pump station, and treatment plant capacity for existing development in areas already inside the UGB. However, at full buildout of the UGB, there may be deficiencies with the Sherwood and Rock Creek Trunk Lines, the Sherwood Pump Station, and the Upper Tualatin Interceptor. The city and CWS both have capital improvement projects planned to address these capacity issues. Responsibility for upsizing the Sherwood and Rock Creek Trunk Lines may be shared between the city and CWS.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The city's 2016 Sanitary Sewer Master Plan does not plan for urban development of the Sherwood South Urban Reserve, so information on the existing system's capacity to serve the reserve is limited. However, given the size of the reserve, it is possible that the existing treatment plant would be insufficient to serve both full buildout of the current UGB and development of the reserve. Trunk line and pumping capacity are also likely insufficient. Currently, sewer service does not extend to the reserve, and a sewer line would need to be constructed through the Brookman Addition inside the UGB to serve the reserve's development. Costs associated with increasing the capacity of the treatment plant, as well as sewer lines and pumping systems outside the reserve, to levels necessary to serve both full buildout of the current UGB and the reserve are unknown and are not included in the below figures. However, those costs are likely to be significant.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The treatment system, sewer line, and pumping system improvements noted above are likely needed in order to avoid adverse impacts to service to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$5.78 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0
Force mains	$0
Total:	**$5.78 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,868**

Stormwater Management Services

With regard to stormwater management services, the Sherwood South Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood's 2016 Stormwater Master Plan states that, overall, the existing stormwater network for areas inside the UGB is in good condition, though there are some isolated deficiencies. There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development specifically in areas of the UGB adjacent to the reserve.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Based on topography, stormwater from development of the reserve could likely outfall directly to Cedar Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity should be provided on private property before outfalling to these water bodies; therefore, the existing facilities would not be impacted by the development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the reserve could likely outfall directly to Cedar Creek and its tributaries, without connecting to other existing stormwater infrastructure. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated. It is also expected that stormwater will be treated and detained onsite, thereby limiting impacts to these water bodies.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$4.00 million
24-inch pipe	$2.10 million
30-inch pipe	$0
Water quality/dentition	$6.56 million
Total:	**$12.77 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$4,132**

Transportation Services

With regard to transportation services, the Sherwood South Urban Reserve is given a "low-medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to the Sherwood South Urban Reserve had above average and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Sherwood. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Langer Drive Commercial District of the City of Sherwood's 2013 "Sherwood Town Center Plan" generally aligns with the geography of the town center area on the Growth Concept Map. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed that, in the area of the Langer Drive Commercial District, there was a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. According to aerial imagery, much of the area is already built out with commercial retail uses, including a grocery store, restaurants, and medical/dental offices, though there are numerous parking lots that may be able to accommodate redevelopment. Near to the Langer Drive Commercial District is a police station, the Sherwood Ice Arena, and other public/quasi-public land uses, as well as some undeveloped and underdeveloped tax lots. Sherwood is served by TriMet Route 94, which runs along Highway 99W, and Route 97, which runs along SW Tualatin-Sherwood Road; both routes include stops in the town center. The city's adopted town center plan, its existing land uses and transit

service, and some availability for new development in and near the town center demonstrate that growth in the current UGB will not necessarily cause a significant increase in home-based VMT per capita in the future. However, the area already in the UGB and adjacent to the Sherwood South Urban Reserve is approximately two miles from the town center.

As noted above, TriMet Routes 94 and 97 both serve areas already in the UGB in the adjacent City of Sherwood. Currently, however, those routes only connect to the northern and central portions of the city and not to the city's south and west. Figure 4.3 in Chapter 4 of the 2023 RTP also shows a gap in "frequent transit service" in Sherwood's portion of the planned regional transit network.

Sherwood has more than 10 miles of dedicated bike lanes and established bikeways, including along major roadways, that connect with some other bike-friendly streets, as well as residential and employment uses, schools, and the town center. However, there are gaps in bike facility connections to some of the residential areas south of the railroad near the Sherwood South Urban Reserve. Figure 4.5 in Chapter 4 of the 2023 RTP identifies existing bike facilities along Highway 99W and SW Tualatin-Sherwood Road as part of the planned regional on-street bike network and facilities in the central portion of the City as part of the regional off-street bike network, though there is a short network gap along SW Tualatin-Sherwood Road west of the highway and other gaps in the west, east, and south of the City, including along Highway 99W in the UGB near the Sherwood South Urban Reserve.

Most developed neighborhoods in Sherwood, including the town center, have sidewalks. Figure 4.4 in Chapter 4 of the 2023 RTP identifies existing sidewalk facilities along SW Tualatin-Sherwood Road, SW Sunset Boulevard, and SW Main Street as part of the planned regional on-street pedestrian network, though there are network gaps along Highway 99W in the north of the city, along SW Brookman Road in the south of the city adjacent to the Sherwood South Urban Reserve, and along SW Elwert Rd in the west of the city.

The Cedar Creek Trail in Sherwood is identified as an existing regional trail in Figure 4.6 in Chapter 4 of the 2023 RTP. The figure identifies gaps in connections of this trail to other regional trails in the planned regional trail network.

Construction has commenced on a pedestrian bridge over Highway 99W that, when completed, will connect Sherwood High School, which is in the UGB, with the YMCA and surrounding urban neighborhoods. Goals of the project include: reducing vehicle/pedestrian conflicts and exposure; minimizing out of direction travel for pedestrians; and providing crossing opportunities that accommodate all pedestrians and bicyclists.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road as a high injury corridor. The road, which is already inside the UGB, is more than two miles

from the Sherwood South Urban Reserve. There are no other RTP-designated high injury corridors within Sherwood's portion of the UGB.

Highway 99W is also already inside the UGB, bisecting the City of Sherwood. Highway 99W is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 in Chapter 4 of the RTP indicates that it currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The reserve is adjacent to Highway 99W. As noted above, Highway 99W, an RTP-designated throughway, currently meets travel speed reliability performance thresholds.

There is currently no transit service near to the reserve. The closest transit stop, for TriMet Route 94, is over one mile away.

There are dedicated bike lanes on Highway 99W at the SW Brookman Road intersection, though the bike lanes on Highway 99W may not be the most comfortable environment for all bicyclists. There is a small 650-foot bike lane section on SW Ladd Hill Road between SW Sunset Boulevard and SW Willow Drive; however, this bike lane does not connect to any other bike facilities and is over half a mile from the reserve.

SW Sunset Boulevard has sidewalks, as do the residential neighborhoods south of the road; however, these sidewalks only provide connections internal to the subdivisions. SW Ladd Hill Road has as sidewalk on one side that extends to SW Brookman Road, which is just shy of half a mile from the reserve. Sidewalks will be provided with the residential development that is occurring on the north side of SW Brookman Road opposite of the reserve. The pedestrian bridge noted above that is currently being constructed over Highway 99W is nearly a mile from the closest point of the reserve. There are no existing regional trails connected to the reserve.

As noted in response to Factor 1, the reserve is unlikely to efficiently accommodate employment uses. There are also no significant employment uses within the UGB near to the reserve. Therefore, future residents of the reserve will likely have to commute multiple miles to get to employment.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Brookman Road and Highway 99W would see additional private vehicle traffic from urbanization of the reserve. Indeed, considering the reserve's distance from the Sherwood Town Center, the unlikelihood of the reserve itself being able to accommodate employment land uses (e.g., commercial uses), the lack of nearby transit service, and gaps in connections to existing nearby bike, pedestrian, and trail networks, development of the Sherwood South Urban Reserve is likely to rely significantly on

private motor vehicle transportation in the future. Resulting traffic may impact home-based VMT per capita in nearby areas already inside the UGB and the performance of Highway 99W as a throughway, though the number of new dwelling units the reserve is likely to accommodate is relatively low.

The dedicated bike lanes on Highway 99W could see additional use, though, as noted above, they are not particularly comfortable for all cyclists. The small bike lane section on SW Ladd Hill Road would most likely not see any additional use as it does not connect to any other bike facilities. The sidewalk on SW Ladd Hill Road and the sidewalks on SW Sunset Boulevard could see additional use once the gap from SW Brookman Road is completed, as that would provide a (somewhat long) connection north of SW Sunset Boulevard along SW Main Street to the town center. The sidewalks in the new residential areas to the north would be expected to see some additional use, although the railroad tracks provide a barrier to connecting to the remainder of the city.

d. Need for major transportation facility improvements and associated costs

To serve urban development of the reserve, more than a mile of SW Brookman Road will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. However, this improvement of SW Brookman Road is considered a half-street improvement for the purposes of this analysis, as the north side of the future road is already included in the UGB. Sections of W Middleton Road, SW Labrousse Road, and SW Oberst Road, with a combined length of approximately 1.68 miles will also likely need to be improved to urban collector standards, including with acquisition of additional right-of-way. Two new collectors with a combined length of just over a mile are expected to be needed as well. The new and improved roadways would need to traverse areas with steeper topography and waterbodies, so some associated per-mile costs are estimated to be higher than normal costs.

Facilities	Cost
Arterials, existing/improved full street	$0
Arterials, existing/improved half street	$36.52 million
Arterials, new	$0
Collectors, existing/improved full street	$61.42 million
Collectors, existing/improved half street	$0
Collectors, new	$45.76 million
Total:	**$143.70 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$46,490**

e. Provision of public transit service

The Sherwood South Urban Reserve is outside the TriMet Service District. TriMet evaluated the reserve for providing transit service and determined they could reroute a potential new bus line along Roy Rogers Road, slated for Forward Together 2.0 improvements. Analysis determined that the service would not create significant,

additional costs. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in, and in the corridors leading to, the reserve. An on-route, pantograph-style fast charger at a capital cost of approximately $1,000,000 – $1,500,000 would be required to provide this service.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Five streams flow through the Sherwood South Urban Reserve, including Goose Creek, Cedar Creek, and unnamed tributaries to Cedar Creek. Goose Creek flows south through a predominately wooded area for approximately 1,400 feet to join Cedar Creek in the middle of the reserve. Cedar Creek enters the reserve in its southwest corner and flows northeast for approximately 3,930 feet to its confluence with Goose Creek. This section of Cedar Creek flows mainly through a wooded riparian area that is well-established and located away from existing development and also contains an associated 3.1-acre wetland identified on the National Wetland Inventory (NWI). Cedar Creek continues flowing northeast for approximately 2,100 feet, again through a mostly wooded riparian corridor. This section of the creek also has an adjacent half-acre NWI wetland. There is a considerable amount of floodplain associated with these two streams that would help protect the riparian corridors due to floodplain development limitations.

Three tributaries to Cedar Creek flow north through the eastern portion of the reserve. The two most eastern streams flow through wooded areas with total lengths of approximately 4,650 feet. A half-acre NWI wetland has been identified along the easternmost stream and a small pond not identified as a wetland is along the other stream. The third stream flows through a mostly cleared landscape of pastureland and land with farm-related structures, before crossing through a wooded area with rural residences. The total length of this stream section is approximately 2,180 feet and also includes a fairly large irrigation pond.

Both riparian and upland wildlife habitat have been identified along all of the stream corridors. The five streams and associated wildlife habitat essentially break up the reserve into smaller sections of unconstrained land. In order for these sections to urbanize the area in a well-connected manner with necessary transportation options, numerous stream crossings would be required; these crossings would most likely negatively impact the stream corridors. If urbanization occurs with less roadway connectivity, then impacts to the natural resources can be reduced. It should be noted that the City of Sherwood has preserved the Cedar Creek riparian area that currently is within the city limits by

integrating the stream corridor into the urban fabric, resulting in a natural amenity for the public.

This analysis finds that urbanization of the reserve could occur with comparatively moderate to significant impacts to the stream corridors and habitat areas, depending on the urban form and extent of road connections. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Sherwood South Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There are a number of rural residences on smaller tax lots in the Sherwood South Urban Reserve, as well as agricultural uses, a place of worship, and forested and other natural areas. Becaause natural areas would receive some protections from urbanization when added to the UGB, and because existing development and parcelization may limit or slow opportunities for new development, likely levels of urbanization of the reserve may not result in significant changes in residents' sense of place or in degradation of an existing rural lifestyle. However, the reserve does border rural reserves on two sides, and undeveloped lands on its other sides; the residents of this reserve are somewhat separated from urban development and any levels of growth may be a perceptible change.

As detailed more fully in response to Factor 2, future residents of the reserve may be fairly reliant on private motor vehicle transportation. However, given the somewhat limited buildable area of the reserve, overall increases in VMT and, therefore, adverse energy consequences, may be minimal to moderate.

Aerial imagery suggests there are a few locations of larger-scale agricultural activity within the reserve, primarily Christmas tree farming, ranching, and some pastureland, as well as some smaller-scale agriculture on tax lots with rural residences. The economic consequences of a loss in these agricultural activities may be outweighed by the economic benefits of residential development of the reserve.

Overall, there would be comparatively low to moderate social, energy, and economic consequences from urbanization of this reserve. The Sherwood South Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

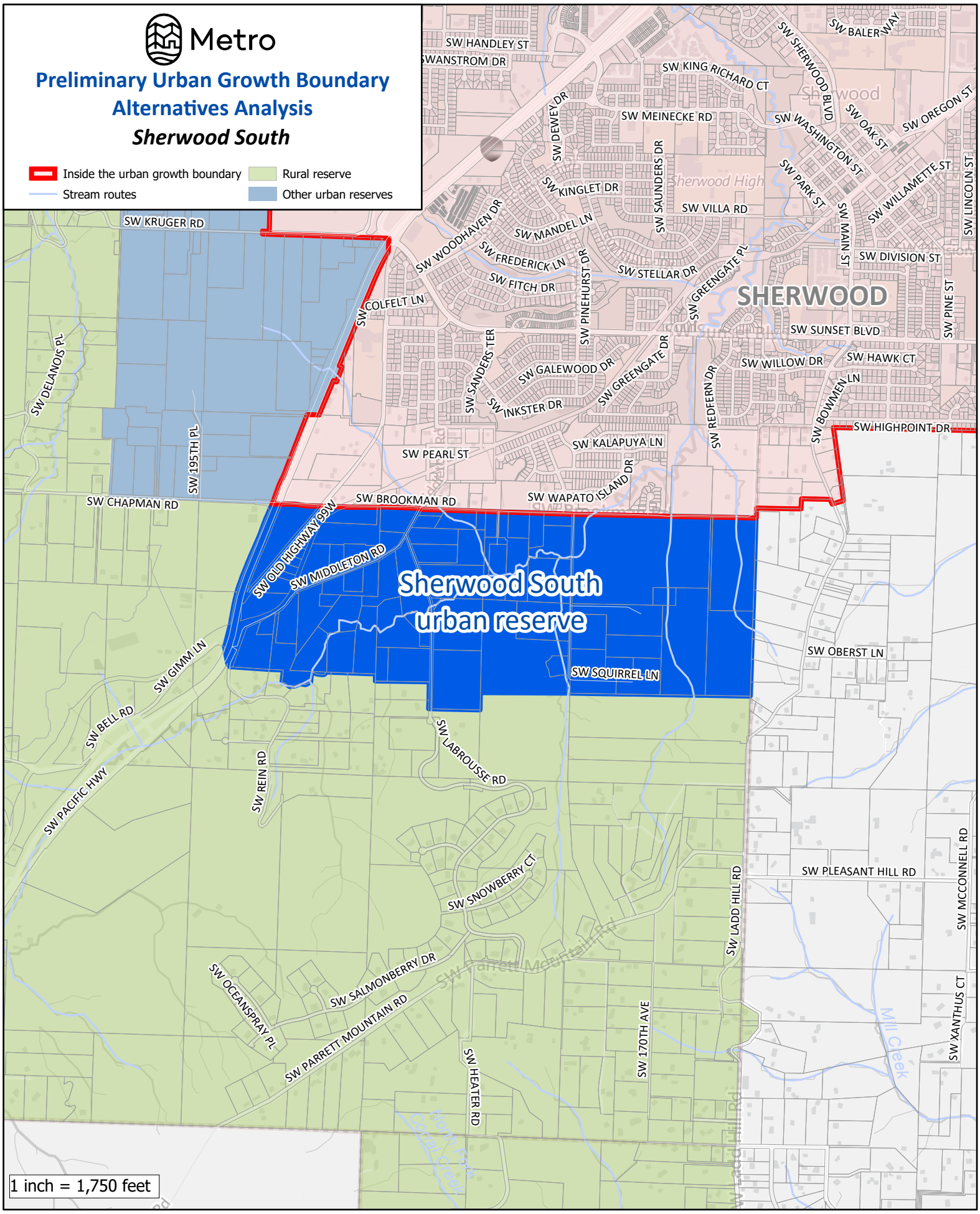
Goal 3 agricultural lands or Goal 4 forest lands, specifically lands zoned Agriculture and Forest (AF20) by Washington County, border the Sherwood South Urban Reserve to the north and west.

There is a 127-acre tract of AF20-zoned land directly south of the reserve between SW Ladd Hill Road and SW Labrousee Road. The majority of this land is forested with just some rural residences and a very small amount of agricultural activity. Two unnamed tributaries to Cedar Creek flow in deep ravines north through the forested portion; timber harvesting may already be limited in this area due to topography, riparian habitat protections, and nearby rural residential development. Given the limited nature of agricultural activities, that there is no indication of commercial timber activities already occurring in this area, practical constraints on timber harvesting in the future, and that access is available through roads other than those going through the reserve, the proposed urban uses are considered compatible with the nearby agricultural and forest activities occurring in this location.

A second tract of AF20-zoned land is located west of the reserve, on the west side of Highway 99W between SW Chapman Road and SW Gimm Lane, and extends approximately one and a half miles to the Washington County – Yamhill County line. Agricultural activities near Highway 99W include orchard and field crops and a 44-acre equestrian center. There are also a few rural residences in this location, as well as some smaller-scale commercial activities, some of which are agricultural-related. The Highway 99W right-of-way, which is approximately 150 feet wide, provides a meaningful buffer between the reserve and agricultural activities in this location. In addition, the equestrian center site, with its large, constructed facilities, as well as rural residential uses and stands of trees along the highway provide additional buffering from the agricultural activities that occur further to the west. Traffic from urban development of the reserve is not likely to adversely impact roadways to the west of Highway 99W. For these reasons, the proposed urban uses are considered compatible with the nearby agricultural activities occurring on the farm and forest land to the west of the reserve.

A third, nearly 450-acre tract of AF20-zoned land is located approximately a quarter of a mile south of the reserve along SW Rein Road. This land is approximately 100 feet higher in elevation than the reserve and is separated from the reserve by several rural residences. Considering that this land is not directly adjacent to the reserve, that traffic from urbanization of the reserve is unlikely to adversely impact this area, the differences in topography, and that there are already a number of rural residences located on the slope between the two areas, the proposed urban uses are considered to be compatible with nearby agricultural or forest activities occurring on this farm or forest land as well.

This analysis finds that proposed urban uses of this reserve are considered to have high compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The Sherwood South Urban Reserve is given a “high” score in Attachment 3 for this Goal 14 boundary location factor.



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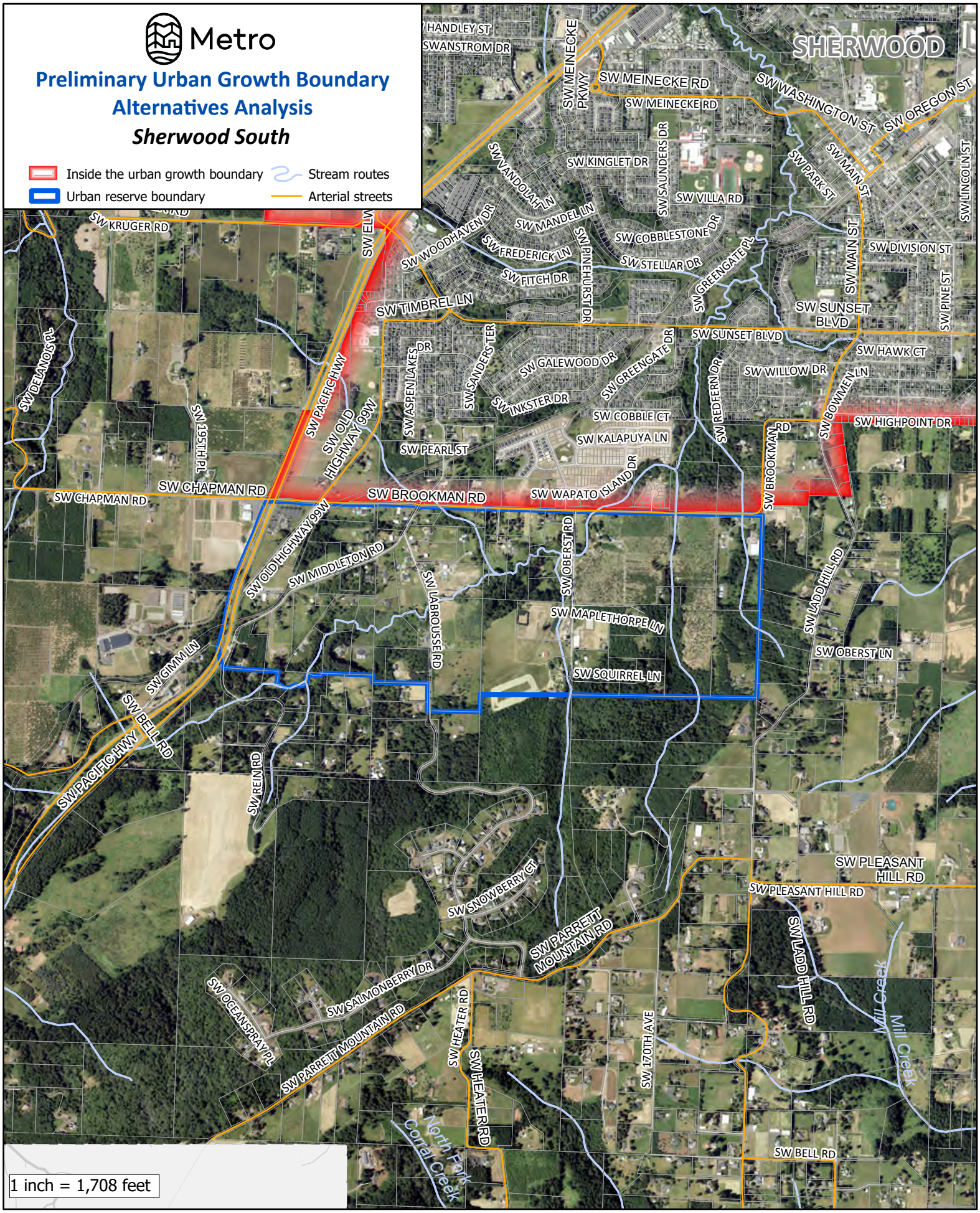

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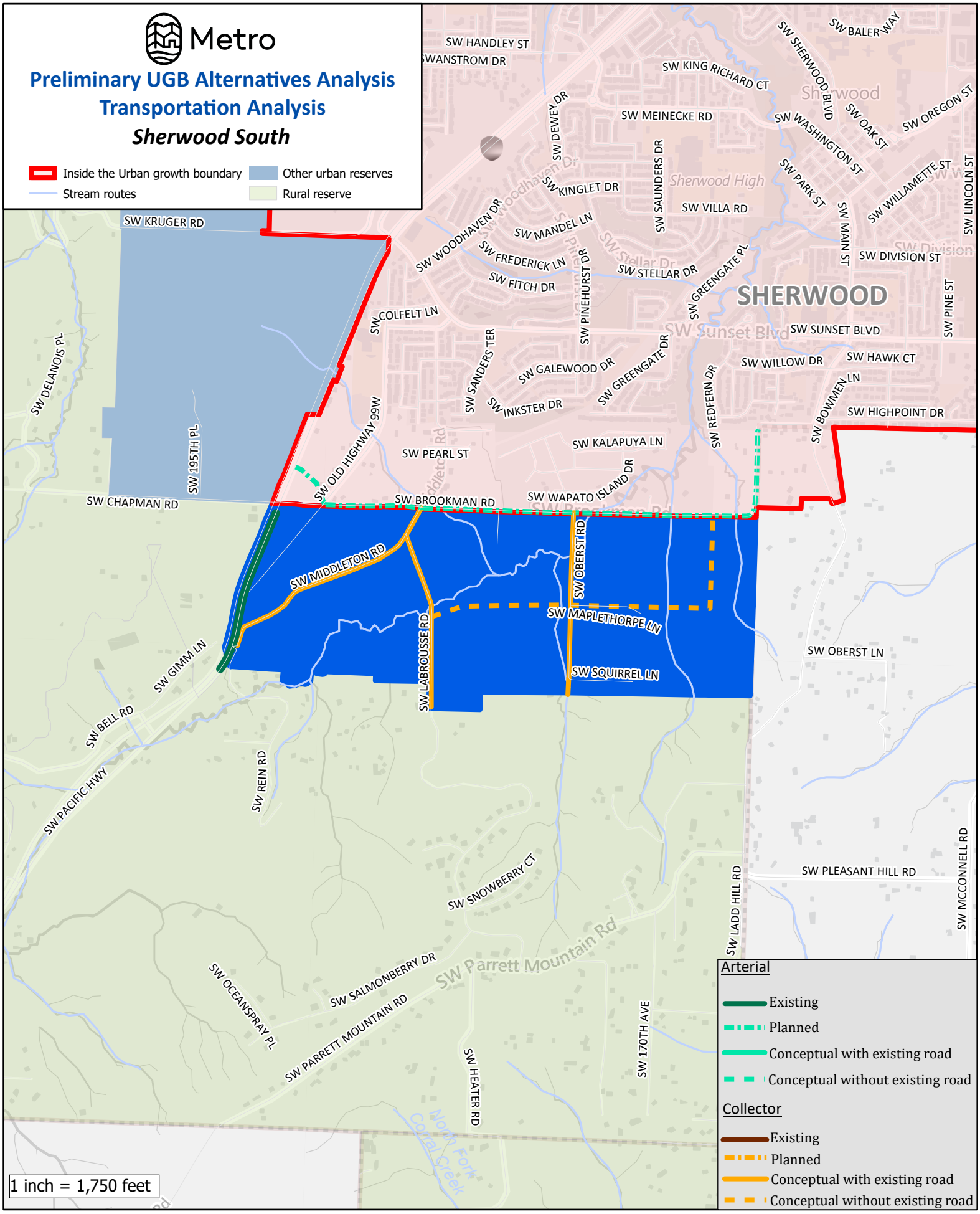

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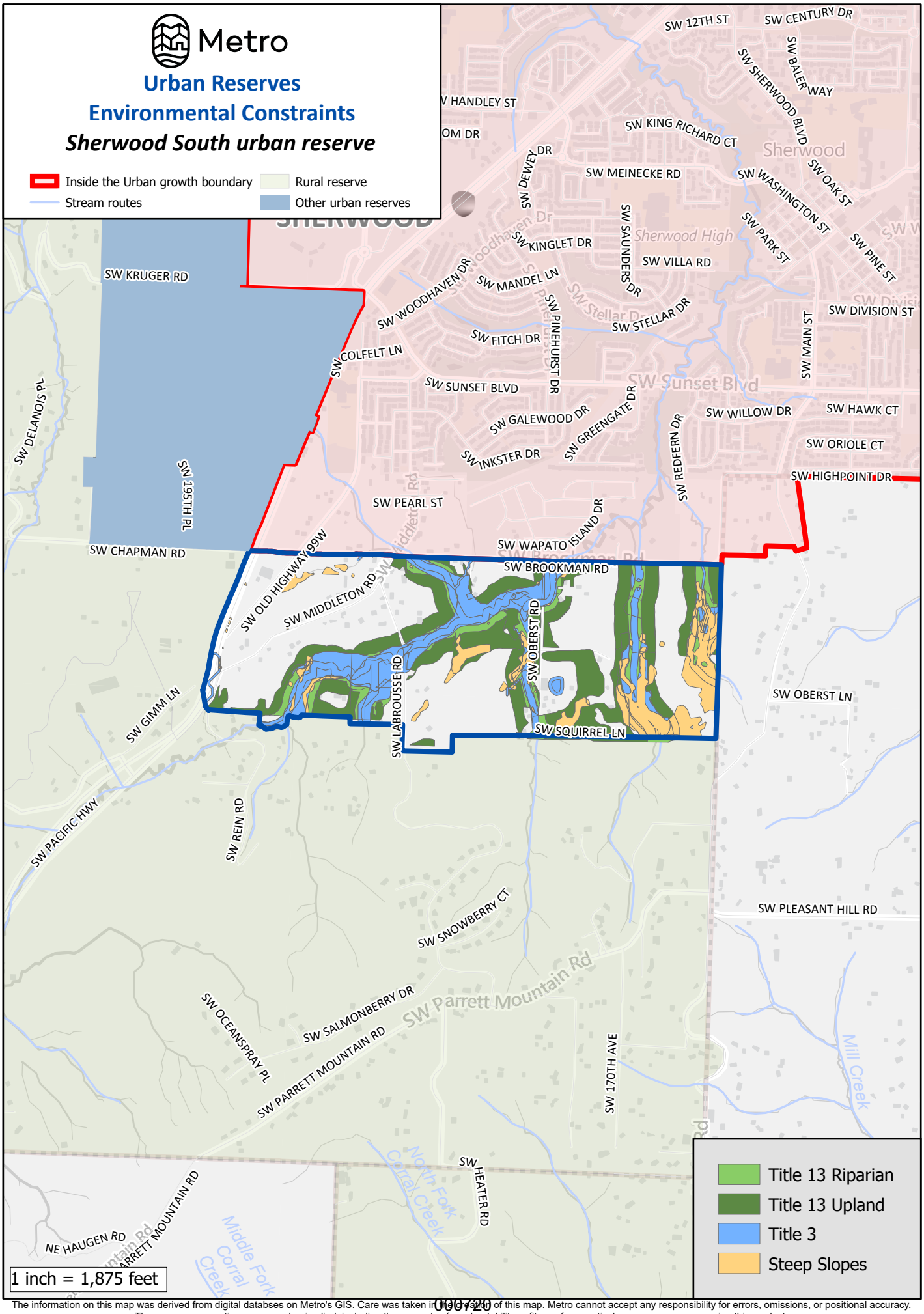

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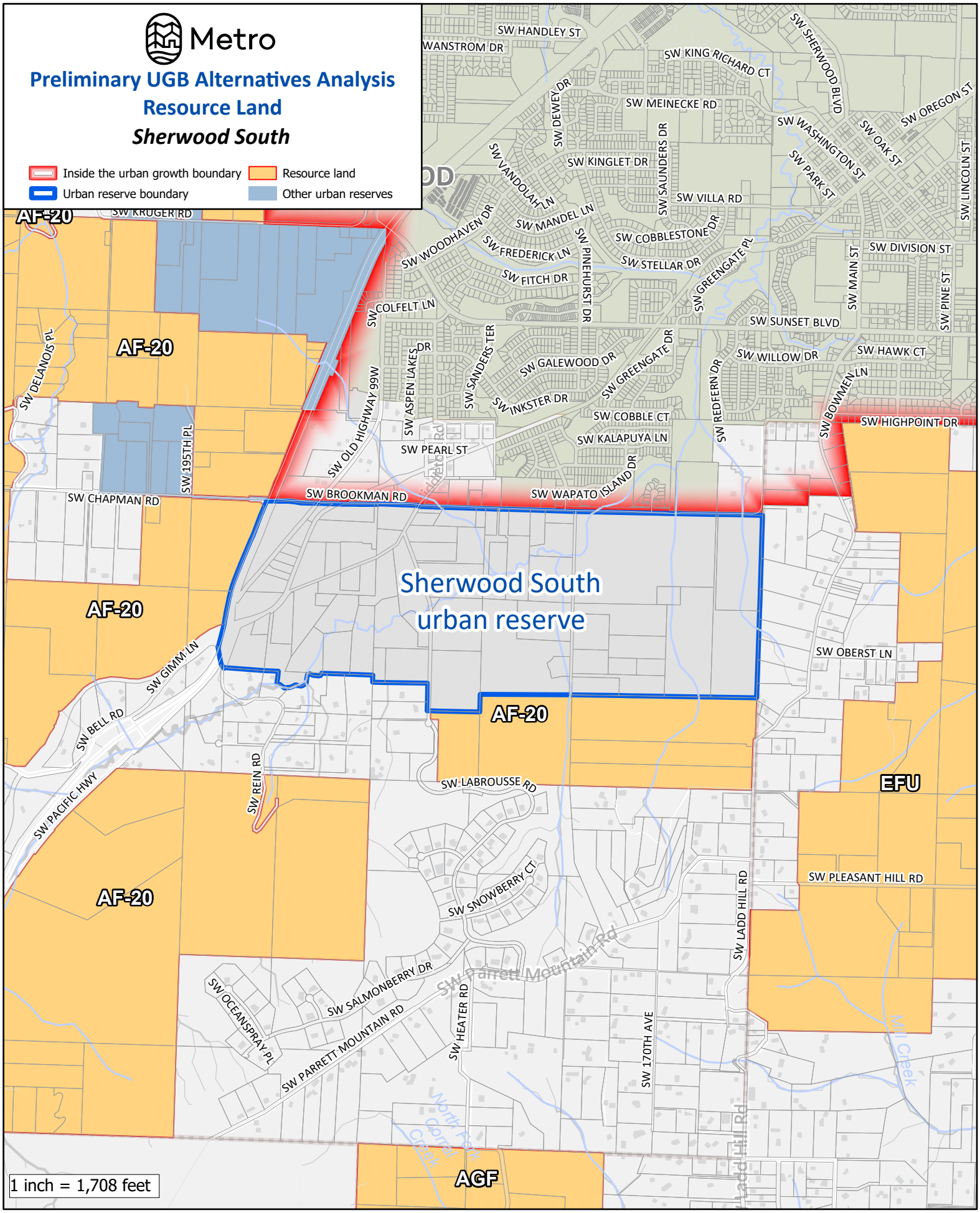

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SHERWOOD WEST URBAN RESERVE

Total Reserve Area	1,205 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	1,157 acres
Gross Vacant Buildable Area	797 acres
Net Vacant Buildable Area	**594 acres**

The Sherwood West Urban Reserve is located on the west side of Sherwood and stretches from SW Lebau Road and SW Scholls-Sherwood Road in the north to SW Chapman Road in the south. The UGB constitutes most of the urban reserve's eastern boundary. Those portions of the urban reserve not bordering the UGB are adjacent to rural reserves. Sherwood West generally slopes uphill from east to west, with the highest elevations in the reserve's southwest portion. Chicken Creek flows toward the northeast through the central portion of the reserve and has several tributaries. Access to the reserve north of Chicken Creek is provided by SW Roy Rogers Road, SW Scholls-Sherwood Road, and SW Elwert Road. Access to the area south of Chicken Creek is provided by SW Elwert Road, SW Edy Road, SW Kruger Road, and SW Chapman Road. The southern portion of the reserve is adjacent to and includes sections of Highway 99W.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Sherwood West Urban Reserve is comprised of 126 contiguous tax lots. The combined land area of those tax lots is roughly 1,157 acres. Approximately 20 percent of the reserve's tax lots are smaller than two acres, while more than 60 percent are larger than five acres. Nearly a quarter are larger than 10 acres, including 12 tax lots larger than 20 acres and two larger than 50 acres. As noted above, the entire reserve contains 797 gross vacant buildable acres and 594 net vacant buildable acres.

The reserve is generally characterized by rural residential uses, pockets of agricultural uses, and forested tracts. Overall, 75 percent of the tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being approximately $384,000. Assessment records also indicate that the Free Methodist Church of North America owns a nearly 10-acre tax lot in the central portion the reserve along SW Edy Road and that the Countryside Community Church owns a 4.3-acre tax lot in the south of the reserve across from Sherwood High School. The City of Sherwood owns two tax lots in the reserve with a combined area of about 14 acres; one of the City-owned tax lots is used for a water storage facility. Two sets of powerlines run through the reserve, one cutting diagonally across the very northern section of the reserve and the second generally paralleling Chicken Creek.

The southern half of the reserve wraps around the Sherwood High School campus and is adjacent to Middleton Elementary on the opposite side of Highway 99W. Ridges Elementary School is less than half a mile from the central portion of the reserve and the Saint Paul Lutheran Church and Preschool is within 500 feet of the northern half of the reserve. The Sherwood Regional Family

YMCA, which features a swimming pool, sports court, climbing wall, and dance/gymnastics studio space, is directly across Highway 99W from the reserve and planned to be connected with a future pedestrian bridge over the highway.

The central portion of the reserve abuts existing urban residential development. The northern and central portions of the reserve are only about half a mile from the Sherwood Town Center and its commercial development via SW Roy Rogers Road and SW Edy Road, respectively. The southern portion of the reserve is more than a mile away from the town center via Highway 99W. The southern portion of the reserve fronts along Highway 99W and the northern portion of the reserve is less than a mile from the highway via SW Roy Rogers Road. There are currently no transit connections between the reserve and the town center.

The reserve has a mixture of relatively flat land along its eastern edge and moderately sloped hills to its west. There are areas with slopes greater than 10 percent where employment-related land uses would be limited; however, there are also some fairly large tracts of flat land as well.

The proximity of the highway to the reserve and the availability of some larger and relatively flat tax lots suggest the reserve could accommodate employment land uses. At the same time, the reserve's existing and nearby residential development, and the proximity of schools and recreational facilities, could be cohesive with and supportive of residential land uses. Therefore, this reserve is considered able to help serve both employment and residential land needs.

As noted in the Introduction and Methodologies section of Appendix 7, as well as in Attachment 3, the Sherwood West Urban Reserve is the only urban reserve to have an adopted concept plan for its future urbanization. This concept plan indicates that the City of Sherwood is committed to urbanizing the reserve and has a plan in place to do so. The concept plan significantly increases the likelihood that the reserve will actually develop and be able to efficiently accommodate the identified need for residential and employment land within a reasonable timeframe.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Sherwood West Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below. The reserve has an adopted concept plan addressing future water services to the area.

a. Capacity of existing facilities to serve areas already inside the UGB

Lands adjacent to the reserve inside the UGB are provided with water service by the City of Sherwood. The city obtains the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville, with the remainder coming from four groundwater wells in city limits. The city also maintains an emergency connection and transmission piping to a supply main serving Tualatin from Portland. The city's water distribution system includes three service zones served by

three storage reservoirs and two pumping stations. The majority of Sherwood customers are served from the 380 Pressure Zone, which is supplied by gravity from the city's Sunset Reservoirs. The 535 Pressure Zone serves the area around the Sunset Reservoirs, supplied with constant pressure by the Sunset Pump Station, while the 455 Pressure Zone serves higher elevation customers on the city's western edge by gravity from the Kruger Reservoir. The reserve might be part of Pressure Zones 380 and 455 when urbanized.

Supply, storage, pumping, and distribution piping are considered for the purposes of this analysis to be sufficient to meet maximum daily demand of current development within the city's portion of the UGB; however, according to the City's 2015 Water System Master Plan, additional supply and storage capacity may be needed for full buildout. Efforts, including capital improvement projects, are planned to increase treatment plant capacity to satisfy buildout demand. No pump stations are currently needed to serve the 380 Pressure Zone, though additional pumping capacity may be needed to serve other areas at full buildout. Very few distribution deficiencies are identified in the Master Plan for either existing or buildout maximum daily demand (MDD) conditions and no additional deficiencies are identified in the Plan under peak hour demand conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The city's 2015 Sherwood Water System Master Plan, and the Sherwood West Concept Plan formally adopted by the city in 2023 and updated in 2024, consider water service to the reserve. The concept plan will have costs associated with water services that may differ from those listed in (d) below. This can be due in part to differences in costing methodology, in what facility improvements are attributed to the reserve's development, and in assumptions of future densities.

According to the concept plan, initial anticipated urban development of Sherwood West is expected to be served by extending the existing 380 and 455 Pressure Zone distribution mains. Future customers along the ridge north and south of the existing Kruger Reservoir could potentially be served by constant pressure from the proposed Kruger Pump Station at the existing reservoir site. Some future customers in the reserve may need to be served through a Pressure Relief Valve (PRV)-controlled sub-zone or through individual PRVs on each service in order to maintain required service pressures. A small area on the western edge of the reserve, along Edy Road near Eastview Road, is likely too high in elevation to receive adequate service pressure from the adjacent 380 Pressure Zone; this area could instead potentially be served by constant pressure from the proposed Edy Road Pump Station. An additional pump station would potentially be needed to serve this area. Some large-diameter mains will also likely be needed to expand the city's water service area to supply water to the reserve as development occurs.

Full buildout of the areas already in Sherwood, plus full urban development of reserve, is expected to require treatment plant improvements in order for the reserve to be provided with adequate water service. Additional water storage capacity will also likely be needed.

However, potential treatment system improvement costs, water main extension costs, and the full costs of new storage facilities also serving areas already inside the UGB are currently unknown and not included in the below figures. Additional information on costs of water service will be prepared during the comprehensive planning of the reserve when added to the UGB.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, full buildout of the areas in the existing UGB, plus full urban development of the reserve, is expected to require the planned treatment plant improvements in order for the reserve to be provided with adequate water service. Additional storage, piping, and pumping capacity are also likely needed. Those potential treatment system improvement costs and the full costs of improved storage facilities also serving areas already inside the UGB are not included in the below figures.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$14.62 million
16-inch pipe	$0
Pumping	$13.34 million
Storage	$0.78 million
Total:	**$28.74 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,421**

Sanitary Sewer Services

With regard to sanitary sewer services, the Sherwood West Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below. The reserve has an adopted concept plan addressing future sanitary sewer services to the area.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood and Clean Water Services (CWS) together provide sanitary sewer services in adjacent areas already in the UGB. Two CWS sanitary sewer trunk lines connect to the local, city-maintained components of the system, including the 24-inch

"Sherwood Trunk", which conveys sewage from the Cedar Creek sewage collection basin, and the 18-inch "Rock Creek Trunk", which conveys sewage from the Rock Creek sewage collection basin to a CWS-owned pump station. Sewage is then directed to the Durham Advanced Wastewater Treatment Plant via the Upper Tualatin Interceptor, also owned by CWS.

The city updated its Sanitary Sewer Master Plan in 2016. The Master Plan includes areas within the Sherwood city limits, as well as the Tonquin Employment Area (TEA) and the Brookman Addition, which are within the UGB. The Master Plan indicates that there is sufficient conveyance, pump station, and treatment plant capacity for existing development in areas already inside the UGB. However, at full buildout of the UGB, there may be deficiencies with the Sherwood and Rock Creek Trunk Lines, the Sherwood Pump Station, and the Upper Tualatin Interceptor. The city and CWS both have capital improvement projects planned to address these capacity issues. Responsibility for upsizing the Sherwood and Rock Creek Trunk Lines may be shared between city and CWS.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The Sherwood West Concept Plan formally adopted by the city in 2023 and updated in 2024 contemplates service to the Sherwood West Urban Reserve. The concept plan will have costs associated with sanitary sewer services that may differ from those listed in (d) below, in part due to differences in costing methodology, in what facility improvements are attributed to the reserve's development, and in assumptions of future densities.

According to the concept plan, development of the reserve north of Haide Road is expected to be served by the proposed Chicken Creek Pump Station and Force Main, while development to the south of Haide Road is expected to be served by the Sherwood Trunk line via the Brookman Trunk line, which has already been partially extended through the Brookman Addition as part of residential subdivisions occurring in the area. The city and CWS expect to extend the trunk line from its current terminus in the Brookman Addition to Sherwood High School, located adjacent to the reserve. A portion of the Chicken Creek Force Main is being installed as part of the Roy Rogers Road widening project. Required sewer upgrades to serve urban development of the reserve are expected to be completed by 2029.

Given the size of the reserve, it is possible that the existing treatment plant would be insufficient to serve both full buildout of the current UGB and development of the reserve, warranting treatment plant upgrades. Costs associated with increasing the capacity of the treatment plant, as well as sewer lines and pumping systems outside the reserve, to levels necessary to serve both full buildout of the current UGB and the reserve are unknown and are not included in the below figures. However, those costs could be significant.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The treatment system, sewer line, and pumping system improvements noted above may be needed in order to avoid adverse impacts to service to areas already inside the UGB. Additional information on costs of sanitary sewer service will be prepared during the comprehensive planning of the reserve when added to the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0.77 million
12-inch pipe	$0
15-inch pipe	$1.39 million
Pump station	$7.02 million
Force mains	$0
Total:	**$9.18 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$773**

Stormwater Management Services

With regard to stormwater management services, the Sherwood West Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below. The reserve has an adopted concept plan addressing future stormwater management services to the area.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood's 2016 Stormwater Master Plan represents that, overall, the existing stormwater network for areas inside the UGB is in good condition, though there are some isolated deficiencies. There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development specifically in areas of the UGB adjacent to the reserve.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The Sherwood West Concept Plan formally adopted by the city in 2023 and updated in 2024 addresses stormwater services to future urban development in the Sherwood West Urban Reserve.

According to the concept plan, as development occurs, stormwater would likely be discharged into the floodplains of the adjacent creeks (e.g., Chicken and Cedar Creeks) and tributaries flowing to the north and south of the high school site that drains the middle part of the reserve. The city requires that all stormwater facilities meet the requirements of CWS Design and Construction Standards for conveyance, water quality

treatment, hydromodification, and water quantity treatment. The city has also indicated that, where possible, they would prefer to use regional stormwater facilities with Low Impact Development Approaches (LIDA), and proprietary treatment. Per CWS and city stormwater standards for new development, water quality and quantity should be provided on private property before outfalling directly to an adjacent water body; therefore, the existing facilities are not expected to be impacted by the development of the reserve.

The concept plan will have costs associated with stormwater services that may differ from those listed in (d) below, in part due to differences in costing methodology, in what facility improvements are attributed to the reserve's development, and in assumptions of future impervious surfaces.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the reserve could likely outfall directly an adjacent water body, without connecting to other existing stormwater infrastructure. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated. It is also expected that stormwater will be treated and detained onsite, thereby limiting impacts to these water bodies.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$3.24 million
24-inch pipe	$1.70 million
30-inch pipe	$0
Water quality/dentition	$13.64 million
Total:	**$18.58 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,565**

Transportation Services

With regard to transportation services, the Sherwood West Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below. The reserve has an adopted concept plan addressing future transportation services.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 household-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to that figure,

areas in the UGB adjacent to the Sherwood West Urban Reserve had average and above the regional average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Sherwood. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Langer Drive Commercial District of the City of Sherwood's 2013 "Sherwood Town Center Plan" generally aligns with the geography of the town center area on the Growth Concept Map. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed that, in the area of the Langer Drive Commercial District, there was a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. According to aerial imagery, much of the area is already built out with commercial retail uses, including a grocery store, restaurants, and medical/dental offices, though there are numerous parking lots that may be able to accommodate redevelopment. Near to the Langer Drive Commercial District is a police station, the Sherwood Ice Arena, and other public/quasi-public land uses, as well as some undeveloped and underdeveloped tax lots. Sherwood is served by TriMet Route 94, which runs along Highway 99W, and Route 97, which runs along SW Tualatin-Sherwood Road; both routes include stops at the town center. The City's adopted town center plan, its existing land uses and transit service, and some availability for new development in and near the town center demonstrate that growth in the current UGB will not necessarily cause a significant increase in home-based VMT per capita in the future. The area already in the UGB and adjacent to the north end of the Sherwood West Urban Reserve is approximately half a mile from the town center; the area already in the UGB and adjacent to the south end of the reserve is approximately two miles away.

As noted above, TriMet Routes 94 and 97 both serve areas already in the UGB in the adjacent city of Sherwood. Currently, however, those routes only connect to the northern and central portions of the city and not to the city's south and west. Figure 4.3 of the 2023 RTP also shows a gap in "frequent transit service" in Sherwood's portion of the planned regional transit network.

Sherwood has more than 10 miles of dedicated bike lanes and established bikeways, including along major roadways, that connect with some other bike-friendly streets, as well as residential and employment uses, schools, and the town center. However, there are gaps in bike facility connections to some of the residential areas south of the railroad. Figure 4.5 in Chapter 4 of the 2023 RTP identifies existing bike facilities along Highway 99W and SW Tualatin-Sherwood Road as part of the regional on-street bike network and facilities in the central portion of the city as part of the planned regional off-street bike network. However, there is a short network gap along SW Tualatin-Sherwood Road west of the highway and other gaps in the west, east, and south of the City, including along Highway 99W in the UGB near the reserve.

Most developed neighborhoods in Sherwood, including the town center, have sidewalks. Figure 4.4 in Chapter 4 of the 2023 RTP identifies existing sidewalk facilities along SW Tualatin-Sherwood Road, SW Sunset Boulevard, and SW Main Street as part of the planned regional on-street pedestrian network. Again, however, there are network gaps along Highway 99W in the north of the City, along SW Brookman Road in the south of the City adjacent to the Sherwood South Urban Reserve, and along SW Elwert Rd in the west of the City.

The Cedar Creek Trail in Sherwood is identified as an existing regional trail in Figure 4.6 of Chapter 4 of the 2023 RTP. The figure identifies gaps in connections of this trail to other regional trails in the planned regional trail network.

Construction has commenced on a pedestrian bridge over Highway 99W that, when completed, will connect Sherwood High School, which is in the UGB and adjacent to the reserve, with the YMCA and surrounding urban neighborhoods. Goals of the project include: reducing vehicle/pedestrian conflicts and exposure; minimizing out of direction travel for pedestrians; and providing crossing opportunities that accommodate all pedestrians and bicyclists.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road as a high injury corridor. The road, which is already inside the UGB, is approximately three quarters of a mile from the northern end of the reserve and more than two miles from the south end of the reserve. There are no other RTP-designated high injury corridors in Sherwood's portion of the UGB.

Highway 99W is also already inside the UGB and generally bisects the city of Sherwood. Highway 99W is identified as a throughway in Chapter 4's Figure 4.7 of the 2023 RTP. Figure 4.8 of that same chapter indicates that the highway currently meets travel speed reliability performance thresholds, with no more than four hours per day below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The reserve is adjacent to – indeed, includes a small length of – Highway 99W. As noted above, Highway 99W, an RTP-designated throughway in Sherwood, currently meets travel speed reliability performance thresholds.

The reserve currently lacks a transit service connection. The closest transit stop to the north end of the reserve, which is for TriMet Route 94, is nearly one mile away and the south end of the reserve is even further away from existing stops.

There are dedicated bike lanes on Highway 99W at the SW Kruger Road intersection. These bike lanes connect to other bike lanes on SW Meinecke Parkway, which provide access to the middle school, "Old Town", and the town center. There is also a dedicated bike lane on SW Sunset Boulevard that runs for approximately half a mile before

connecting to a trail. There are bike lanes on SW Roy Rogers Road that extend north into rural lands and south into the city, but these bike lanes stop short of connecting to the bike lanes on Highway 99W.

There are sidewalks on SW Kruger Road and SW Haide Road that would provide easy pedestrian access from the central portion of the reserve to the Sherwood High School campus. As noted above, a pedestrian bridge is also being constructed to provide pedestrian access from the high school are to the YMCA and other urban development on the other side of Highway 99W. Sidewalks on SW Sunset Boulevard, across Highway 99W from SW Kruger Road, connect with numerous residential areas and "Old Town" via SW Main Street. Additionally, there are sidewalks on SW Handley Street and SW Swanstrom Drive that connect to the sidewalks on SW Meinecke Parkway, which provides additional pedestrian access to the schools, "Old Town", and the town center. Sidewalks on SW Edy Road provide access to Edy Ridge Elementary School and sidewalks on SW Roy Rogers Road connect to the northern portion of the city. Sidewalks along SW Roy Rogers Road provide some pedestrian connection to the northern end of the reserve, but the southern end has no nearby pedestrian connections.

No existing regional trails are connected to the reserve. However, a trail running through green space connects the north end of the reserve at SW Roy Rogers Road to SW Seely Lane and there are trails through greenspace connecting the central portion of the reserve on SW Elwert Road to SW Copper Terrace and Ridges Elementary School.

The Sherwood West Urban Reserve was determined in response to Factor 1 to be able to accommodate both residential and employment land uses. Existing residential and public (e.g., school) uses in the UGB adjacent and near to the reserve could provide housing and educational services to future employees and residents of the reserve and thereby help to limit home-based VMT per capita.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Kruger Road, SW Haide Road, SW Elwert Road, SW Edy Road, and Highway 99W would all be expected to see additional private traffic as a result of urbanizing the reserve. Indeed, the reserve is moderately distant from the Sherwood Town Center and currently lacks transit service to it. However, there are existing and developing bike and pedestrian facilities that provide connections to the town center, as well as to schools and recreational facilities. Additionally, and as detailed in response to Factor 1, the reserve is considered able to accommodate both residential and employment land uses, allowing for the possibility that future residents of the reserve and nearby areas in the UGB could access at least some services and employment opportunities within the reserve itself. For these reasons, urban development of the reserve may result in only moderate impacts to home-based VMT per capita in nearby areas already inside the UGB and to the performance of Highway 99W as a throughway. However, any additional motor vehicle traffic on SW Tualatin-Sherwood Road resulting from development of the north end of the reserve may exacerbate the road's high-crash conditions.

The dedicated bike lanes on Highway 99W at the SW Kruger Road intersection would be expected to see increased use from urbanization of the reserve, although the highway is not the most comfortable environment for all bicyclists and some may be deterred from using it. The bike lanes on SW Meinecke Parkway would also be expected to see additional use as they provide access to schools, "Old Town", and the Town Center. This route, however, requires a three-quarter-mile ride along the highway, which, as noted, may have conditions that limit or reduce the number of users. The bike lane on SW Roy Rogers Road would also be expected to see additional use.

The sidewalks around the high school campus, as well as the developing pedestrian bridge over Highway 99W, would see more use if the central portion of the reserve were to be urbanized. The sidewalks on SW Sunset Boulevard across Highway 99W from SW Kruger Road would also be expected to see additional use, as they connect to numerous residential areas and eventually "Old Town" via SW Main Street. The sidewalks on SW Handley Street and SW Swanstrom Drive that connect to the sidewalks on SW Meinecke Parkway would likely see additional use from development of the central portion of the reserve, as they provide access to schools, "Old Town", and the town center. Likewise, the sidewalks on SW Edy Road that provide access to Edy Ridge Elementary School and the sidewalks on SW Roy Rogers Road would be expected to see additional use. The trail between SW Roy Rogers Road and SW Seely Lane would see more use with the development of the northern section of the reserve.

d. Need for major transportation facility improvements and associated costs

The adopted Sherwood West Concept Plan includes several potential future street layouts conceived of by the city and addresses associated costs, though these layouts and cost predictions may change during comprehensive planning of the reserve if/when added to the UGB. In order to compare each of Metro's 27 urban reserves with each other for the purposes of Factor 2, the same assumptions and methodologies used in the preliminary analyses of the other reserves' transportation facility improvement needs and costs are employed here in the preliminary analysis of the Sherwood West Urban Reserve.

According to those assumptions and methodologies, urbanization of the reserve would require the following to be improved to urban arterial standards, including acquisition of additional right-of-way: a 1.63-mile section of SW Elwert Road; a 0.57-mile section of SW Roy Rogers Road; a 0.57-mile section of SW Scholls Sherwood Road; and a 0.23-mile section and SW Lebeau Road. Portions of SW Elwert Road and SW Roy Rogers Road sections are considered for the purposes of this analysis to be half-street improvements, as their other halves would be in the current UGB. The following is also expected to be improved to urban collector standards, with acquisition of additional right-of-way: a 0.26-mile section of SW Conzelmann Road; a 0.8-mile section of SW Edy Road; a 0.4-mile section of SW Kruger Road; and a 0.45-mile section SW Chapman Road. Two new collectors with a combined length of nearly 2.5 miles may be needed to provide access to the center of the reserve between SW Chapman Road and SW Edy Road and to extend

SW Conzelmann Road east from SW Elwert Road to SW Roy Rogers Road. Due to topography and water crossings, some sections of new and improved roadways are expected to have higher than normal per-mile costs.

Facilities	Cost
Arterials, existing/improved full street	$126.45 million
Arterials, existing/improved half street	$23.22 million
Arterials, new	$0
Collectors, existing/improved full street	$66.54 million
Collectors, existing/improved half street	$0
Collectors, new	$103.26 million
Total:	**$319.47 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$26,912**

e. Provision of public transit service

The reserve is currently outside the TriMet Service District. Nonetheless, TriMet evaluated the reserve for the possibility of providing transit service in the future and determined they could reroute a potential new bus line along Roy Rogers Road that is slated for "Forward Together 2.0" improvements to serve the reserve. An analysis determined that such service would not create significant, additional costs. While TriMet could provide services to the reserve, there is no guarantee of service. Actual service will depend on the level of development in the reserve and in the corridors to it. If service were to be provided, an on-route, pantograph-style fast charger at a capital cost of approximately $1,000,000 – $1,500,000 could be required.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Chicken Creek runs northeastward through the northern half of the reserve for more than two miles, eventually flowing through the Tualatin River National Wildlife Refuge and to the Tualatin River. There are four linear wetlands that are identified on the National Wetland Inventory (NWI) and associated with Chicken Creek that total at least 30 acres and encompass a significant portion of the creek's riparian area. Much of the wetlands are forested, as is most of the stream corridor that is outside of the wetlands. In addition, there are a few locations of "100-year" floodplain along the stream corridor outside of the wetland areas. There are significant areas of riparian and upland habitat associated with Chicken Creek and its wetlands, much of which are also within a powerline easement that runs through this portion of the reserve. Considering that floodplains, wetlands, streams, and inventoried habitat areas receive additional regulatory protections when added to the UGB, and considering that the powerline easement could reduce buildability and thereby limit urbanization that could adversely impact environmental features, urbanization in this area may be able to occur without significant impacts to the Chicken Creek riparian corridor. Moreover, the size of the associated habitat areas could make new road crossings

in the area comparatively expensive; if those road crossings aren't built to a large scale, adverse impacts from new street connectivity could also be limited. However, if new road crossings were to be built through the habitat areas, then the impacts could be significant.

There are two unnamed tributaries to Chicken Creek that flow into the stream from the central portion of the reserve. The first tributary is approximately 2,000 feet long, flows along the forested edge of agricultural lands and open space, and also has a small NWI wetland associated with it. The second tributary is a short, roughly 480-foot stream section near the corner of SW Edy and SW Elwert Roads that also is within a 1.7-acre NWI wetland and the "100-year" floodplain.

A nearly 1,500-foot section of the West Fork Chicken Creek also flows through the northern end of the reserve and joins Chicken Creek near SW Elwert Road. This stream also flows within the "100-year" floodplain. Additionally, there is a 1,600-foot tributary to West Fork Chicken Creek north of the intersection of SW Edy Road and SW Eastview Road; this stream flows through a forested ravine with slopes greater than 25 percent, which, given the difficulty in developing on steep slopes, will likely provide an additional level of protection for the stream corridor. Similar to the main stem of Chicken Creek described above, there are areas of riparian and upland habitat associated with these stream corridors and wetland. Given the increased protection levels for floodplains, wetlands, streams, and habitat areas within the UGB, urbanization of the reserve could occur without significant impacts to the various tributaries to Chicken Creek.

Finally, a nearly 1,500-foot headwater section of Goose Creek flows south through the southeastern portion of the reserve into current Sherwood city limits on the opposite side of Highway 99W. This creek section has NWI wetland associated with it and flows mainly through forested land, which has been identified as riparian and upland habitat. The stream corridor has associated inventoried habitat areas, which may be impacted by urbanization, particularly new street crossings serving development in the area.

In summary, urbanization of the reserve could occur with comparatively minimal or moderate impacts to the natural resources. If numerous and/or sizeable road crossings are constructed to serve new development, then the impacts to natural resources could be more significant. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Sherwood West Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

Existing rural residential development in the reserve is relatively sparse and evenly distributed, though there is more existing development on smaller tax lots in the central portion of the reserve and along SW Edy Road near the reserve's western edge. This

parcelization and existing development, which includes some higher-value homes, can discourage rapid redevelopment and help maintain a more rural character for the area for a longer period of time. These areas are somewhat separated from other portions of the reserve by stream and habitat corridors and powerlines, which can help buffer them from urban development that may happen more quickly and at a larger scale on bigger and less developed tax lots elsewhere in the reserve.

These areas that may be more readily available are closer to existing urban development, including the Sherwood High School campus and urban residential development around Ridges Elementary School. Urbanization in these areas of the reserve might support the schools being more central community focal points. And, while urban development could contribute to a loss of sense of place or degradation of a more rural lifestyle for some existing residents of the reserve, it could also bring them new civic, social, and recreational opportunities.

As detailed more fully in response to Factor 2, urbanization of the reserve may lead to moderate levels of VMT. Developing the reserve with a mix of uses would allow existing and future residents the opportunity to access daily needs closer to home, there by limiting adverse energy consequences of urbanization.

There are agricultural uses occurring throughout the reserve, primarily Christmas tree farms, pastureland, orchards, and field crops, though there are some tracts of row crops as well. There are also stands of timber that may be intended for future harvesting. Urbanization of the reserve would result in a loss in farming activity, which could have adverse economic consequences. However, those consequences may be outweighed by the economic benefits of new residential development and urban employment opportunities. Timber stands could also be harvested as a part of urbanization, though not necessarily replanted. Levels of urban density will determine whether, on a per-unit basis, the costs of extending urban services and protecting natural resource areas will be moderate or more considerable.

This analysis finds there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The Sherwood West Urban Reserve is given a “medium” score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Goal 3 agricultural lands or Goal 4 forest lands, specifically lands zoned Agriculture and Forest (AF20) or Exclusive Farm Use (EFU) by Washington County, border the reserve in four locations.

The first location is near the north of the reserve where reserve lands border an extensive tract of EFU-zoned land on the opposite side of SW Scholls Sherwood Road. The EFU-zoned land appears to be entirely in agricultural use, with the exception of some rural residential development, a food truck, and some agricultural-related commercial activity closer to SW Roy Rogers Road. Lands

along the bank of the Tualatin River are also not in agricultural production and are instead generally forested. Agricultural activities near the north of the reserve include field and row crops, pastureland, and orchards. SW Scholls Sherwood Road separates these agricultural activities from the reserve; however, the road itself would not provide an adequate buffer between urban development and agricultural activity. Development of the reserve in this location could lead to land use conflicts related to safety, liability, and vandalism and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. In addition, the improvement of SW Scholls Sherwood Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design. Urbanization could significantly increase traffic on SW Scholls Sherwood Road and SW Roy Rogers Road and that additional traffic could impact the movement of both farm equipment and goods. Urban development of the reserve is therefore considered incompatible with the nearby agricultural activities occurring on EFU-zoned lands to the north of the reserve.

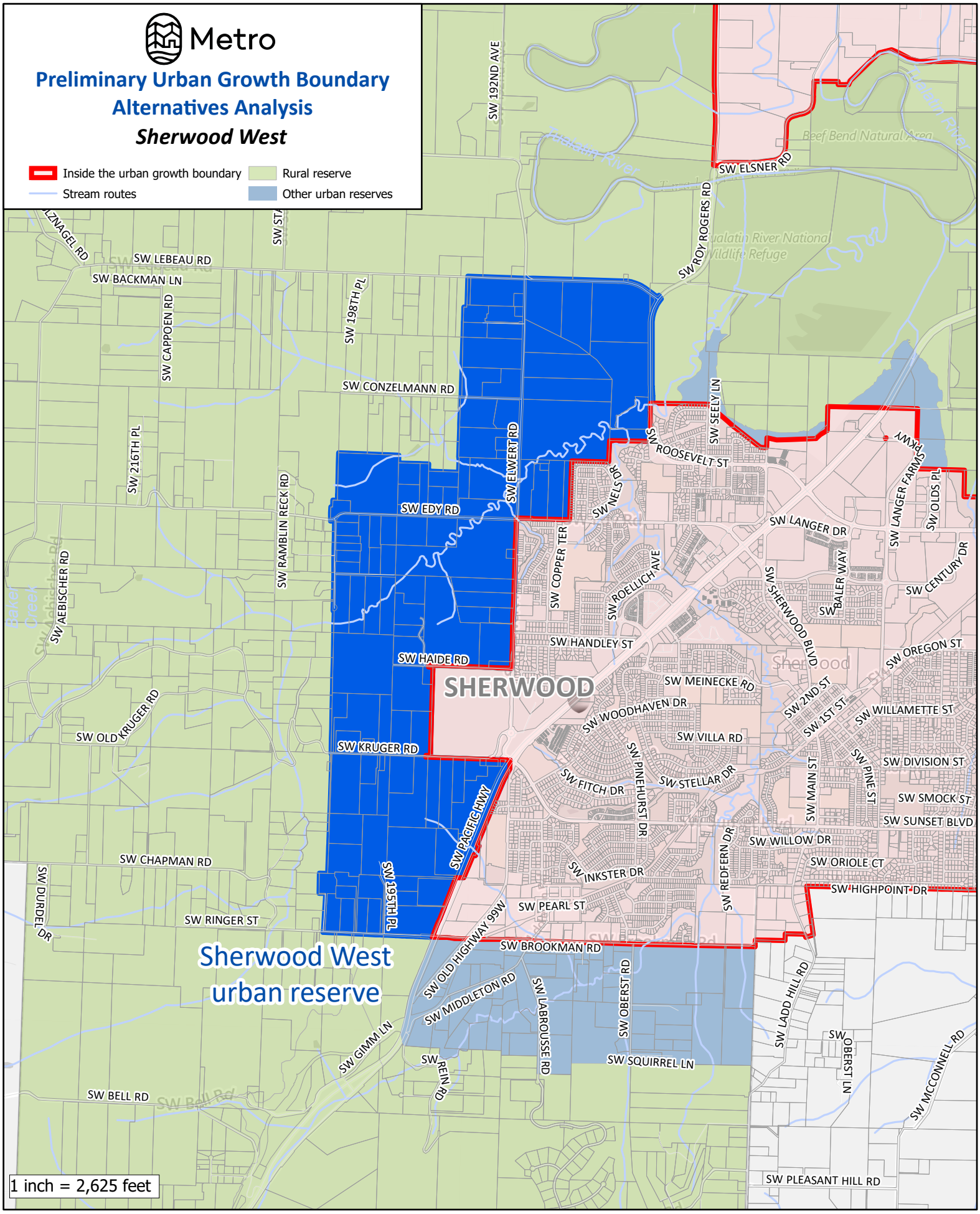
The second location is a roughly 335-acre tract of AF20-zoned land located north of SW Edy Road in the vicinity of SW Conzelmann Road. This area has a mixture of agricultural activities, forested areas, and rural residential development. The forested portions could buffer some of the agricultural activities from development of the reserve, as may the stream corridor located north of the intersection of SW Edy Road and SW Eastview Road. The forested areas do not appear to be in commercial timber production, and riparian habitat productions and nearby residential development may practically limit the potential for larger-scale commercial harvesting. Urban development of the reserve would have fewer traffic-related impacts on the sections of SW Edy Road and SW Conzelmann Road in this area. Therefore, the proposed urban uses are considered to be generally compatible with the nearby agricultural and forest activities occurring on this tract of farm and forest land.

The third location is a large tract of AF20-zoned land on the southwest side of the reserve between SW Kruger Road and SW Chapman Road. This area is characterized by a mixture of agricultural activity, tasting rooms and other commercial activity, stretches of forest generally along Chicken Creek, and rural residential development, including some large, high-value homes. Chicken Creek flows north through this area in a ravine that is approximately 120 feet lower in elevation than the western edge of the reserve. The forested areas in along Chicken Creek and its ravine, the associated topography, and existing residential development would provide a meaningful buffer between urban development in the reserve and agricultural activity to the west. There is no indication that the forested areas in this location are stands for commercial timber harvesting; indeed, the topography, riparian habitat protections, and existing residential development could practically limit commercial forestry opportunities. Urban development of the reserve is unlikely to generate significant additional traffic on roadways in these adjacent AF20-zoned lands as urban traffic will primarily head eastward toward Highway 99W rather than westward. Therefore, the proposed urban uses are considered compatible with the nearby agricultural and forest activities occurring in this location of farm and forest land.

The fourth location is at the south of the reserve on the opposite side of SW Chapman Road. Here, there are AF20-zoned tax lots adjacent to the reserve which have agricultural activity, including Christmas tree farms and row and field crops. There also some rural residences as well as the Red Berry Barn, which is an agriculturally-associated commercial use that includes a garden center, bakery, and country store and that hosts various farm-related seasonal events, such as a harvest festival. These uses are separated from the previously-mentioned equestrian center to the south by stands of mature trees. Urbanization of the southern portion of the reserve would result in new development adjacent to a small amount of actively farmed land, which could result in land use conflicts related to safety, liability, vandalism, and complaints due to noise, odor, dust, and the use of pesticides and fertilizer. SW Chapman Road itself would not provide an adequate buffer for the agricultural activities on the opposite side of the road from the reserve. Improvement of SW Chapman Road to urban standards, and associated street light illumination and bicycle and pedestrian movements, may further jeopardize the compatibility of the two uses, though the impacts of urban roadways on adjacent agricultural activity may be minimized through road design.

Overall, without impact mitigation measures, urban development in the northern and southern portions of the reserve would be considered incompatible with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. Urbanization of the middle portion of the reserve, however, would be considered compatible with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. Therefore, reserve-wide, the proposed urban uses have a moderate compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.

The Sherwood West Urban Reserve is given a “medium” score in Attachment 3 for this Goal 14 boundary location factor.



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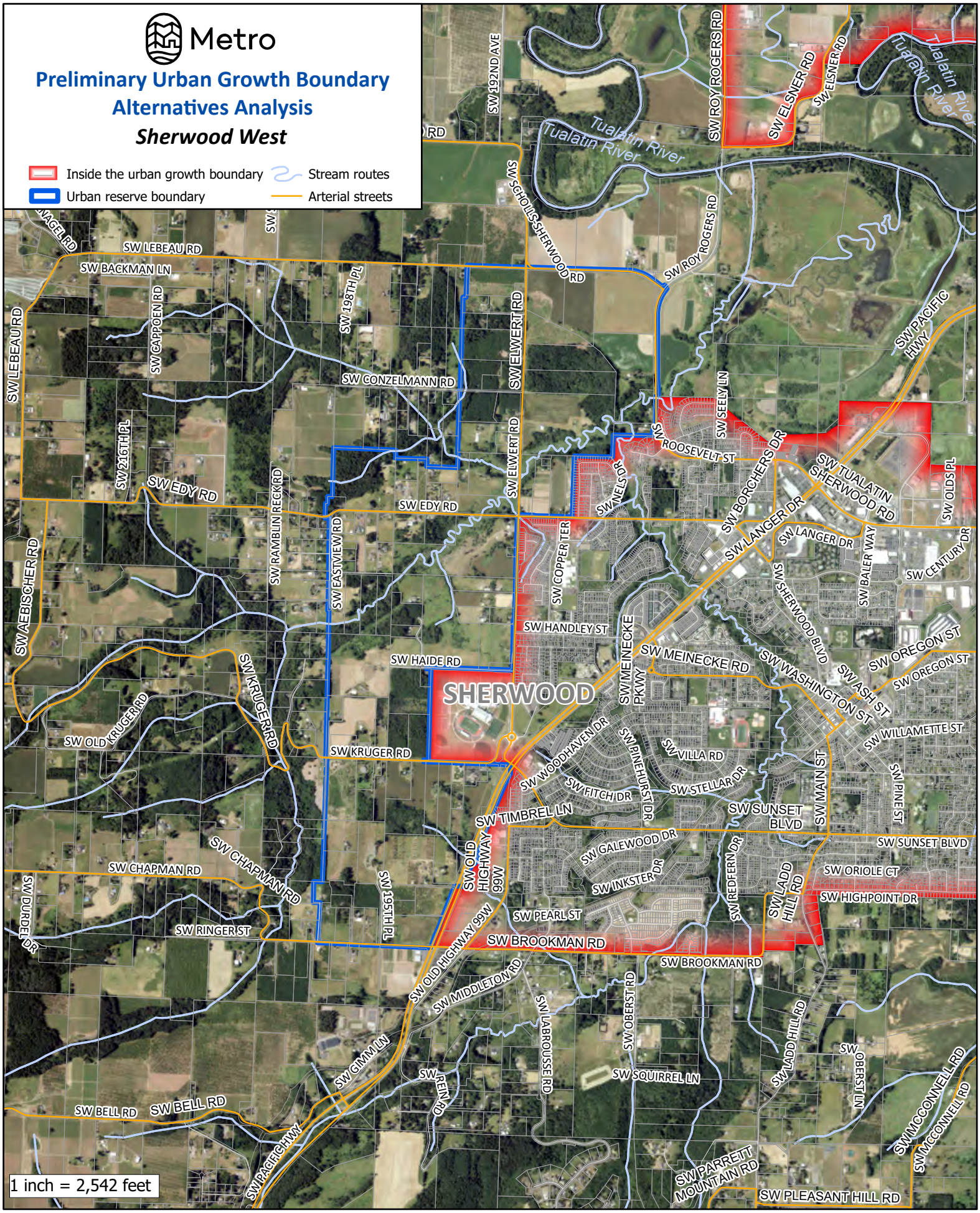

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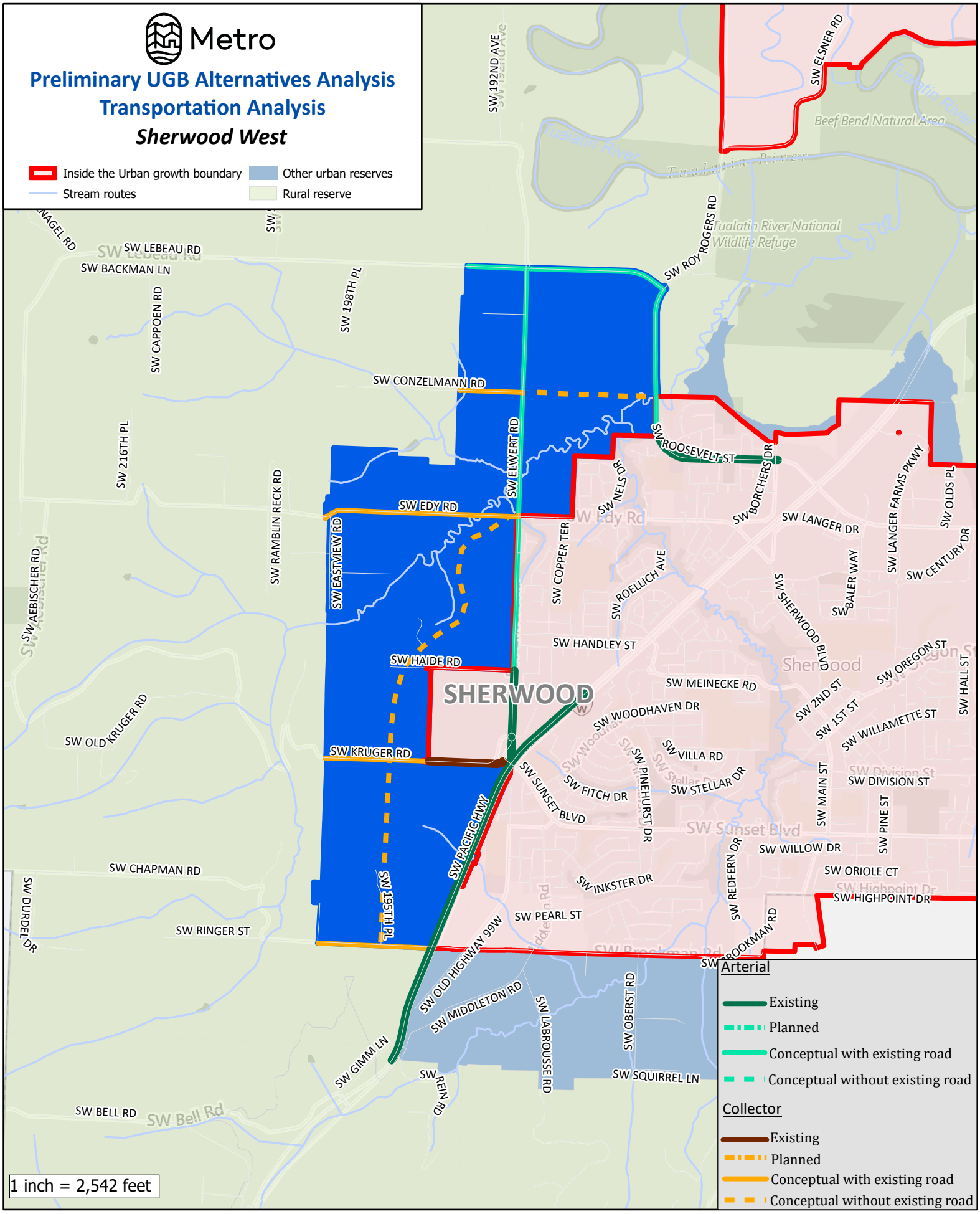

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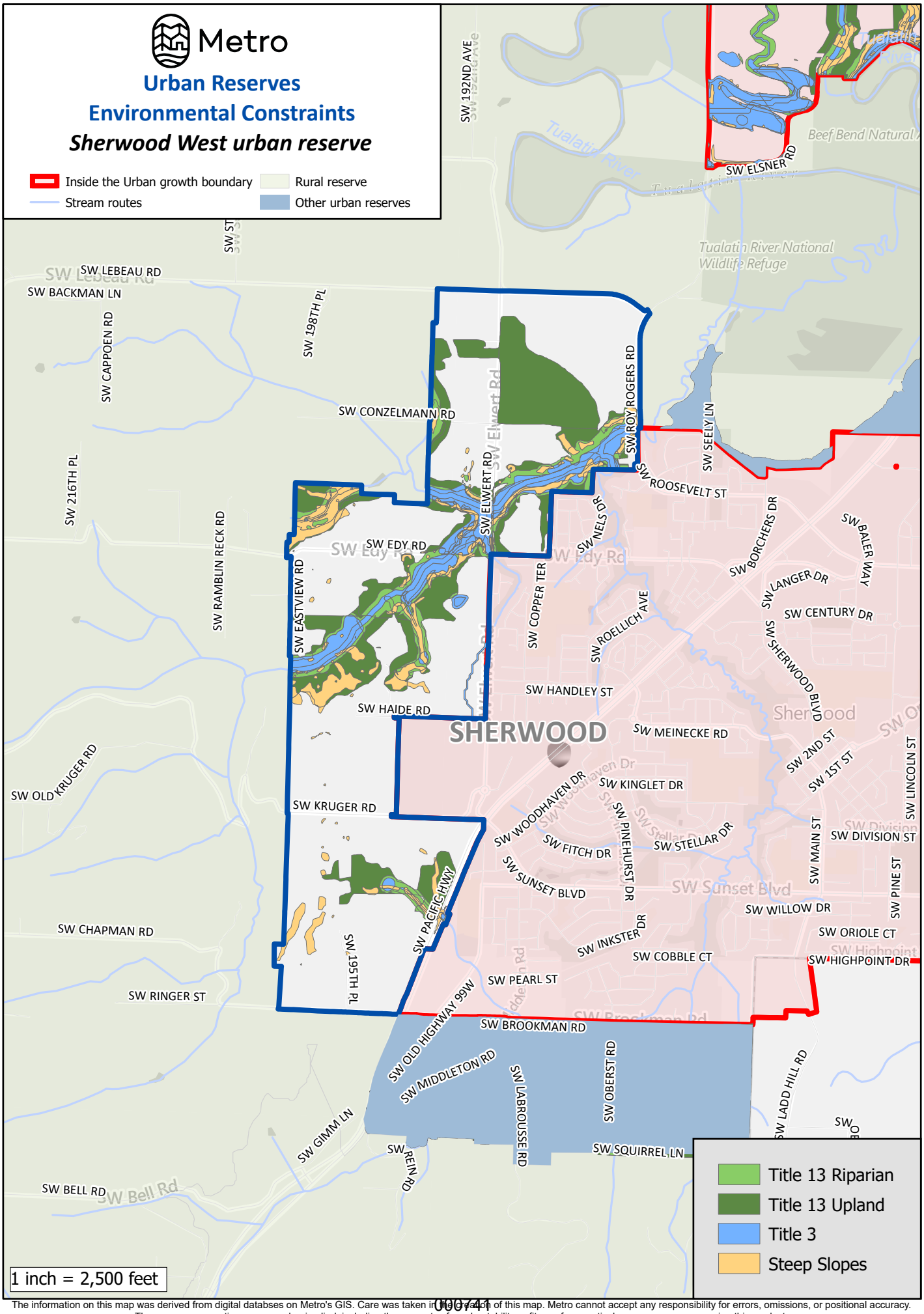

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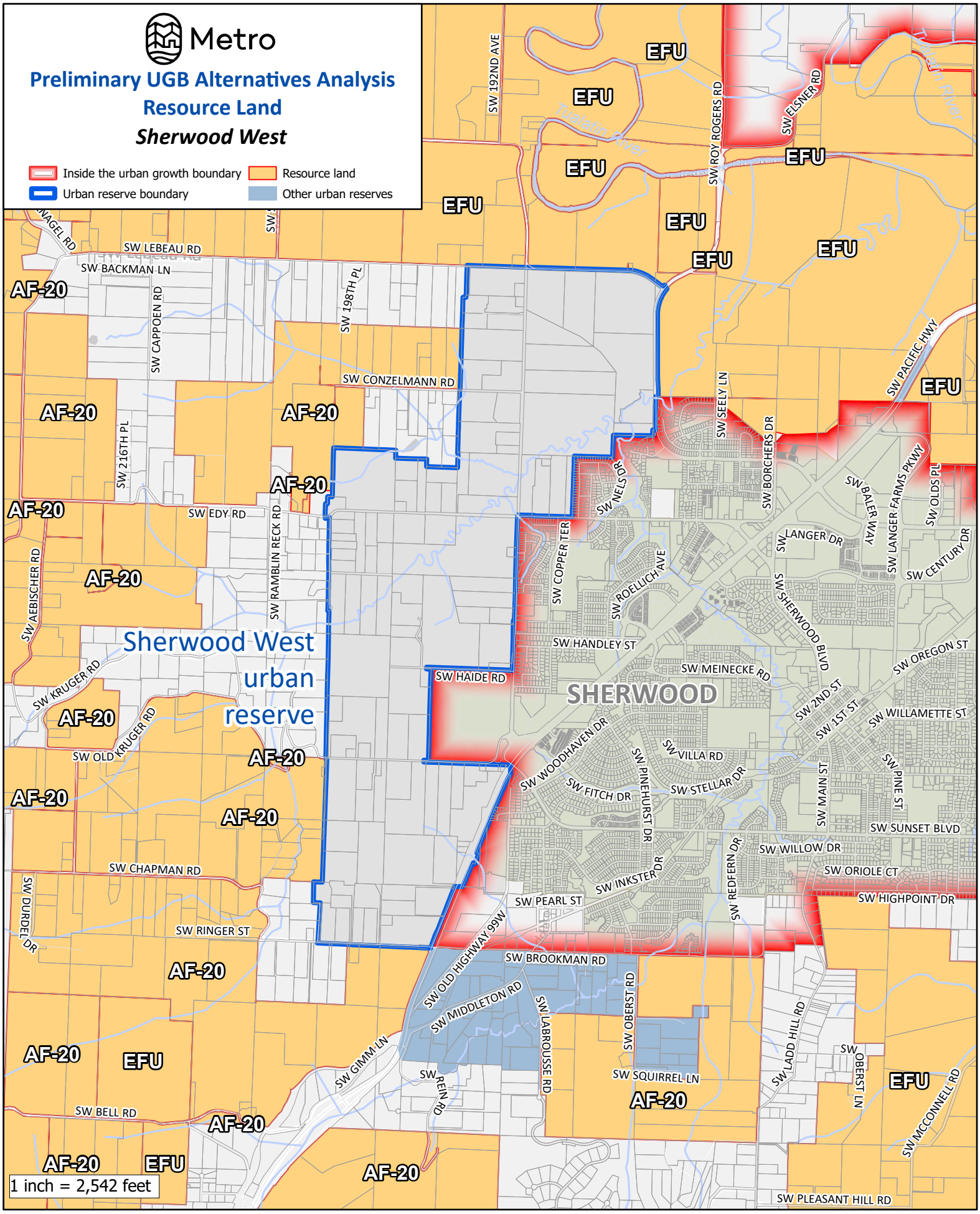

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STAFFORD URBAN RESERVE

Total Reserve Area	3,200 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	2,964 acres
Gross Vacant Buildable Area	1,258 acres
Net Vacant Buildable Area	**937 acres**

The Stafford Urban Reserve is adjacent to the east end of the City of Tualatin, the south side of the City of Lake Oswego, and the west side of the City of West Linn. The UGB forms the reserve's northern boundary and most of its eastern boundary, the Tualatin River is its southern boundary, and the separate Rosemont Urban Reserve neighbors to the east. I-205 crosses through the southern portion of the reserve. There are numerous streams that flow through the southern portion of the reserve as well toward the Tualatin River, including Pecan Creek and Wilson Creek. The reserve's topography slopes down from north to south, dropping over 500 feet from S Bergis Road to the Tualatin River. A significant amount of the reserve has slopes greater than 10 percent, with slopes greater than 25 percent along many of the stream corridors. Access to the reserve is provided by S Rosemont Road, SW Johnson Road, SW Childs Road, and SW Stafford Road.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Stafford Urban Reserve includes 799 contiguous tax lots, all but two of which are entirely in the reserve. Slightly more than half of the reserve's tax lots are smaller than two acres each and about 80 percent are smaller than 50 acres each. There are 19 tax lots that are larger than 20 acres each, including three that are each between 50 and 80 acres in area and one that is nearly 170 acres in area. The 170-acre tax lot, as well as multiple others, appear from assessment records to be open space tracts owned by a private homeowners association as part of existing residential subdivisions. The City of Lake Oswego owns 15 tax lots in the reserve with a combined area of nearly 150 acres; this area includes the public Luscher Farm featuring gardens, demonstration farming, a sports field, and park amenities and activities. Clackamas County owns 18 tax lots in the reserve with a combined area of more than 30 acres, Metro owns nine tax lots in the reserve with a combined area of nearly 99 acres, and the State of Oregon owns six tax lots with a combined area of 3.5 acres. PGE-owned tax lots with a combined area of 22 acres have substation facilities and two water service providers, Mossy Brae Water District and Sunny Slope Water District, also have facilities in the reserve. Willamette Christian Church, located on S Brandywine Drive, is on a 31-acre tract. As noted above, the entire reserve contains 1,258 gross vacant buildable acres and 937 net vacant buildable acres.

The reserve is characterized by rural residences and accessory uses, some agricultural activity, large forested areas, steep slopes, and numerous stream corridors. In total, nearly three-quarters of the reserve's tax lots have assessed improvements, with the median assessed value of those tax lots' improvements being more than $450,000.

The east side of the reserve is within 1,000 feet of Trillium Creek Primary School and just over half a mile from Rosemont Ridge Middle School and West Linn Adult Community Center. Stafford Primary School and Ahthey Creek Middle School are just on the opposite side of the Tualatin River from the west end of the reserve. The reserve contains the Luscher Farms complex, as noted above, and is less than a quarter mile from Lake Oswego Golf Course.

The reserve is mostly surrounded by rural and urban residential uses. Commercial and mixed-use development, including a grocery store and medical offices, are on the opposite side of Salamo Road from the reserve's eastern end. The SW Stafford Road interchange with I-205 is less than a mile to the southwest, on the other side of the Tualatin River.

Despite the proximity of the highway and the reserve's overall larger area, the reserve's steep topography, numerous streams, large tracts of public- and homeowners-association-owned lands, and existing residential development limit opportunities for employment uses. However, the existing and surrounding residential uses and the proximity of schools and recreational and commercial uses, could support and/or be cohesive with residential land uses. This reserve is considered able to accommodate a residential land need, but not an employment land need.

However, regarding the "efficient" accommodation of identified land needs, it is important to note that the cities adjacent to the "Stafford Triangle" area, which includes the Stafford Urban Reserve, have for decades opposed UGB expansions in that area, and those cities' elected officials have taken steps to restrict any city's ability to plan for the accommodation of future urban development. In 2019, the cities of Lake Oswego, Tualatin, and West Linn entered into an agreement that prohibits any of those cities from completing a concept plan for any part of the Borland, Rosemont, and Stafford Urban Reserve areas until, at the earliest, December 31, 2028. This restriction and the ongoing opposition of the three adjacent cities to planning, annexing, and developing the Stafford Urban Reserve weighs heavily against this area regarding its ability to efficiently accommodate the identified needs for residential or employment land under Factor 1.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Stafford Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Lake Oswego provides service to the adjacent areas inside the UGB to the north and west of the Stafford Urban Reserve, while the City of West Linn provides water service to the adjacent areas inside the UGB to the east of the reserve.

Lake Oswego's water source is the Clackamas River. In 2017, construction of five new major water facilities was completed in partnership with the City of Tigard to increase capacity of drinking water from the Clackamas River to Lake Oswego and Tigard. The

construction included a new river intake pump station in Gladstone, a water treatment plant in West Linn, a 3.5 MG reservoir in Lake Oswego, and a pump station in Tigard, as well as more than 10 miles of large diameter backbone piping. The new Lake Oswego-Tigard Water Partnership water service area includes a portion of the Stafford Urban Reserve in its plans for buildout. It is believed that, following these upgrades, there is sufficient supply, pumping, storage, and piping capacity to provide adequate service to existing development currently within the Lake Oswego's portion of the UGB.

The primary water source for City of West Linn is also the Clackamas River, provided by the South Fork Water Board (SFWB) water treatment plant in Oregon City that was upgraded in 2016. Emergency supply may also be available from the Lake Oswego Water Treatment Plant, though the SFWB plant is understood to be adequate to serve areas already in the UGB. The adjacent West Linn UGB areas are in the Horton, Rosemont, and Willamette Pressure Zones. It is believed that, under normal (non-emergency) conditions, existing storage and piping capacity is adequate to serve existing development, but it is not entirely clear from master plans whether these facilities, or the treatment plant, are sufficient to serve full UGB buildout.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Both cities have previously indicated the ability to provide potable water to new development in the reserve, but it is not known just how much development in the reserve could be accommodated with existing treatment plant capacity. Transmission line, water storage, and pumping capacity may also be limited. Potential connection points exist at Laurel Street and Erickson Street, where access is made to the Bergis Reservoir for transmission. There is a 16-inch waterline in Rosemont Road that could be used to serve the reserve as well. Additional storage may need to be created in the reserve itself. A pump station at McVey and Oak Street is available, but will likely need expansion. There will be several pressure zones within the reserve and new water tanks may be needed to provide both adequate storage and pressure.

Only limited knowledge is available at this time regarding the amount of facility improvements that would be needed to serve urban development of the reserve. The full costs of these improvements can't yet be known so are not included in the below figures. The Borland Urban Reserve may need to precede urbanization of this reserve, as doing so would allow for location of water facilities and the related distribution network.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional treatment plant, storage, pumping, and distribution system capacity, as well as potentially urbanization of the adjacent Borland Urban Reserve, may be needed to serve urban development of the Stafford Urban Reserve while avoiding negative impacts to service to areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0
12-inch pipe	$0
16-inch pipe	$35.5
Pumping	$0
Storage	$1.24 million
Total:	**$36.74 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,960**

Sanitary Sewer Services

With regard to sanitary sewer services, the Stafford Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Lake Oswego provides service to the adjacent areas inside the UGB to the north and west of the Stafford Urban Reserve, while the City of West Linn provides water service to the adjacent areas inside the UGB to the east of the reserve.

The cities send their sewer in different directions. Lake Oswego sends sewer to the City of Portland's facility at the Tryon Creek Wastewater Treatment Plant; there are no known major deficiencies with the plant's capacity to serve existing development already in the UGB. Based on topography, connection points to the City of Lake Oswego infrastructure would be in SW Childs Road in the Canal Basin and SW Stafford Road in the South Shore Basin. Lake Oswego's Wastewater Master Plan, as amended in 2020, identifies several deficiencies for the 25-year storm event under existing conditions; these deficiencies are all downstream of the likely points of connection, generally occur in large diameter trunk lines, and have associated improvement projects in the master plan to address them.

The serving West Linn is provided by the Tri-City Service District made up of West Linn, Oregon City, and Gladstone and is managed by Clackamas Water Environment Services (WES). Improvements are planned at the treatment plant, which will provide sufficient capacity to meet current UGB needs. The gravity sewer line downstream of the Johnson Pump Station, a likely connection point for Stafford Urban Reserve to the West Linn System, has two identified deficiencies, including system capacity issues that may cause backwatering in the collection system under existing and buildout conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Lake Oswego could potentially serve the reserve, but system upgrades and additions to facilities within the UGB may be necessary. Connection points to the system that might facilitate such service can be found at: Atherton Road near Stafford Road; Childs Road near SW 35th Court; and via the Bryant Road Pump Station at Bryant Road and Cardinal Drive. The City of West Linn has previously indicated that the wastewater treatment plant may need to be expanded in order to provide capacity for development in the Stafford Urban Reserve, and there is understood to be space for expansion at the treatment plant. An alternative to consider could be to construct a pre-treatment plant within the Stafford Urban Reserve itself. In addition, existing pump stations would likely require upgrades. Existing pipe capacities are not fully known and significant further analysis would be required to determine the extent of necessary trunk line upgrades. Trunk lines and pumps stations may need to be developed within the reserve itself. Considering topography, West Linn may be the logical provider of sewer services to the Stafford Urban Reserve, but sewer might need to flow through the Borland Urban Reserve to connect to the existing gravity line in Willamette Falls Drive; therefore, the Borland Urban Reserve may need to be added to the UGB and urbanized first.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As explained above, treatment plant improvements and pumping and piping capacity improvements could be needed to avoid negative impacts to service within the existing UGB. Potential treatment plant improvement costs and other system-wide costs are not included in the below figures.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$1.29 million
12-inch pipe	$13.58 million
15-inch pipe	$0
Pump station	$1.80 million
Force mains	$1.86 million
Total:	**$18.53 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$989**

Stormwater Management Services

With regard to stormwater management services, the Stafford Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

There is no indication of major capacity issues with existing stormwater facilities that serve the adjacent land inside the UGB. Based on topography, the majority of stormwater from development of the Stafford Urban Reserve would likely flow toward the Tualatin River and not need to connect to any existing infrastructure.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Stormwater will likely mostly be conveyed, treated, and disposed of within the reserve and discharge to the Tualatin River, rather than connecting to existing facilities in the UGB.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater will likely mostly be conveyed, treated, and disposed of within the reserve and discharge to the Tualatin River, rather than connecting to existing facilities in the UGB. Therefore, no adverse impacts to existing facilities are anticipated.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$10.88 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$23.08 million
Total:	**$33.96 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$1,812**

Transportation Services

With regard to transportation services, the Stafford Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to Figure 4.36, areas in the UGB adjacent to and near the Stafford Urban Reserve had above average and significantly above average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining cities of Lake Oswego and West Linn. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit.

The 2040 Growth Concept Map's Lake Oswego Town Center includes Downtown Lake Oswego. The town center is approximately one mile from those areas in the UGB adjacent to the reserve. The town center includes multiple grocery stores, other retail commercial uses, school uses, child services, multifamily housing, and recreational uses. Growth in and near the town center will not necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs with relatively short trips.

Five TriMet bus routes serve Lake Oswego along the major roadways of the city, including Country Club Road, Boones Ferry Road, Kruse Way, Highway 43, and South Shore Boulevard. These bus routes connect the Lake Oswego Town Center to transit centers and downtown Portland. Figure 4.3 in Chapter 4 of the 2023 RTP shows gaps in the planned frequent service regional transit network along Highway 43, Iron Mountain Road, and McVey Avenue.

Lake Oswego has more than 10 miles of dedicated bike lanes and seven miles of established bikeways, though not all connect to other bike facilities which results in gaps in the system. While there are dedicated bike facilities along Country Club Road and a section of Highway 43 in the south of the city, the town center is generally not well served by bike facilities and Figure 4.5 in Chapter 4 of the 2023 RTP shows gaps in the planned regional bike network on Iron Mountain Road, South Shore Boulevard, SW Boones Ferry Road, and Highway 43 in the north of the city.

A significant portion of Lake Oswego's roads do not have sidewalks, including those in many residential areas in the UGB nearer to the reserve. There are sidewalks in the town center, as well as along a major portion of SW Boones Ferry Road. Figure 4.4 in Chapter 4 of the 2023 RTP shows gaps in the planned regional pedestrian network along McVey Avenue and South Shore Boulevard in the south of the city. The Kruse Way Trail, the Stafford Trail, and the William Stafford Pathway along the Willamette River provide some longer pedestrian connections, however.

West Linn's Willamette Town Center, which includes the Willamette Historic District, aligns with the 2040 Growth Concept Map as well. This town center area is approximately one mile from the east end of the reserve, and includes local retail commercial uses, medical facilities, school uses, police and fire stations, and some residential uses. Additionally, within a quarter mile of the reserve's east end is a grocery store, other retail commercial uses, banks, school uses, places of worship, a community center, medical services, multifamily housing, parks, and the West Linn City Hall. Growth in and near the town center and areas in the UGB near the reserve will not

necessarily cause a significant increase in home-based VMT per capita in the future, as area residents will be able to access some daily needs with relatively short trips.

Two TriMet bus lines serve West Linn, including Route 35, which runs along Willamette Drive, and Route 154, which runs along Willamette Falls Drive. They provide transit service to the Willamette Town Center and other portions of West Linn. Figure 4.3 in Chapter 4 of the 2023 RTP shows these existing routes as in the regional transportation network. There are currently no TriMet bus stops in the UGB within a mile of the reserve.

There are more than nine miles of dedicated bike lanes and five miles of bikeways in West Linn, including on portions of Blankenship Road and Willamette Falls Drive that help connect western ends of West Linn to the Willamette Town Center. Parker Road Rosemont Road, Salamo Road, and Santa Anita Drive, which are in the UGB near the reserve, all have dedicated bike lanes. Figure 4.5 in Chapter 4 of the 2023 RTP shows some existing bike facilities in West Linn, including those along Salamo Road, as in the regional bike network. However, there are gaps in the planned regional bike network in the city, such as along Willamette Falls Drive.

Large portions of West Linn are well served by sidewalks, especially in areas that have been developed more recently. There are sidewalks on the SW Borland Road bridge over the Tualatin River that join sidewalks on Brandon Plance and Dollar Street in the UGB that connect with the Fields Bridge Park, Athey Creek Middle School, and, eventually, the Willamette Town Center. The Willamette Falls Drive Streetscape Project improved pedestrian accessibility in the historic Willamette neighborhood. The Rosemont and Salamo Trails provide pedestrian connection routes along Rosemont Road and Salamo Road and that tie the lower and upper portions of West Linn together on the west side. There are also sidewalks along Bay Meadows Drive, Furlong Drive, Hidden Springs Road, Hoodview Avenue, Noble Lane, and Santa Anita Drive in the UGB near the reserve connecting to schools, commercial and civic uses, residential areas, and parks. Figure 4.4 in Chapter 4 of the 2023 RTP shows that there are some gaps in the planned regional pedestrian network in West Linn.

There are no high injury corridors or high injury intersections in wither Lake Oswego's or West Linn's portions of the UGB identified on Figure 4.14 in Chapter 4 of the 2023 RTP.

The section of I-205 that crosses through the UGB near the reserve is identified as a throughway in Chapter 4, Figure 4.7 of the 2023 RTP. Figure 4.8 of the chapter indicates that the interstate section currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The SW Stafford Road interchange with I-205 is less than a mile from the reserve to the southwest, on the other side of the Tualatin River. There is also an interchange at 10th Street, nearly two miles away via Salamo Road. The section of I-205 near the reserve connecting Tualatin and West Linn is expected to continue to meet RTP travel speed reliability performance thresholds at least to the year 2045.

The Lake Oswego Town Center is roughly a mile from the north end of the reserve. There is a grocery store on McVey Avenue that is closer to the north end of the reserve, but few other commercial uses in this area to mee the daily needs of future residents of the reserve's north. The areas of the UGB to the north and west of the reserve are generally characterized by low density residential development with incomplete sidewalks and no bike facilities. The Stafford Trail and marked crosswalks on SW Stafford Road at Atheron Drive do provide some pedestrian connections to the west of the reserve and there are about a quarter mile of designated bike facilities on SW Stafford Road leading to the other side of the Tualatin River.

The Willamette Town Center is just over a mile from the east end of the reserve but, as noted above, there are closer areas with commercial uses, civic and school uses, medical service, parks, and places of worship where future residents of the reserve's east end could access daily needs without traveling a long distance (i.e., without increasing home-based VMT per capita). Indeed, Trillium Creek Primary School, Rosemont Ridge Middle School, and the West Linn Adult Community Center are within a quarter mile of the reserve's east end. As detailed below, these uses are already connected to the reserve by designated bike facilities and sidewalks, which reduces the need for future residents of the reserve's east to rely on private motor vehicle transportation to access them.

There is currently no transit service near to the reserve and the vast majority of the reserve is two or three miles from a bus route. There is a bus stop on Willamette Drive, about 1.5 miles away from the east edge of the reserve via Santa Anita Drive and Pimlico Drive. TriMet Route 36, which runs along South Shore Boulevard in Lake Oswego, is approximately one mile from the north of the reserve via SW Stafford Road. However, as explained below, TriMet has plans to provide hourly service along Rosemont Road sometime in the future.

In the meantime, there are dedicated bike facilities on Rosemont Road and Salamo Road adjacent to the reserve's east. These roads, as well as almost all of the nearby neighborhood streets, also have sidewalks and the Rosemont Trail along Rosemont Road provides access to the east end of the reserve. Past the nearby neighborhoods, there are some gaps in sidewalks or pedestrian facilities along the major streets that limits pedestrian movement.

As explained in response to Factor 1, the reserve is unlikely to efficiently accommodate employment uses. Therefore, without robust transit service, and considering the lack of existing commercial uses and bike and pedestrian facilities near to the reserve's west and north, future residents of the reserve are likely to be reliant on private motor vehicle traffic to meet their daily needs.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Hidden Springs Road, Parker Road, Rosemont Road, Salamo Road, Santa Anita Drive, SW Bergis Road, SW Johnson Road, SW Stafford Road, and SW Sweetbriar Road would see additional private motor vehicle traffic as a result of urbanization of the reserve. The existing bike and pedestrian facilities adjacent to the east end of the reserve, future transit service along Rosemont Road, and the close proximity of schools, civic and commercial uses, medical facilities, parks, and places of worship could help to minimize that additional roadway traffic on some roadways but, as noted above, future residents of the reserve are likely to be reliant on private motor vehicle traffic to meet their daily needs. Nonetheless, because future residents of the reserve would be able to use roadways other than I-205 to access these uses/services, development of the relatively small reserve is not expected to cause I-205 to no longer meet throughway reliability thresholds.

d. Need for major transportation facility improvements and associated costs

To serve urban development, the following will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way: a 1.28-mile section of SW Stafford Road; a 2.14-mile section S Rosemont Road; a 0.37-mile section of SW Johnson Road; a 0.36-mile section of SE Long Farm Road; a 0.36-mile section of S Sunshine Lane; and a 0.34-mile section of S Station Lane. Of the S Rosemont Road section improvements, approximately 0.28 miles are considered half-street improvements for the purposes of this analysis, as the other half of the roadway section is inside the UGB. One new 0.14-mile arterial is assumed to be needed to connect SW Long Farm Road to S Sunshine Lane. The following will likely need to be improved to urban collector standards, including with acquisition of additional right-of-way: a 0.66-mile section of S Bergis Road; a 0.41-mile section of S Whitten Road; a 1.83-mile section of S Sweetbriar Road; a 0.7-mile section of S Clematis Road; a 1.25-mile section of S Wisteria Road; and a 2.31-mile section of SW Johnson Road. Two new collectors are expected to be needed, one 0.85-mile collector between SW Johnson Road and S Sweetbriar Road and a 0.44-mile collector between S Whitten Lane and S Bergis Road. Some of these new and improved roadways will need to traverse areas of steeper topography and water bodies, leading to higher-than-normal per-mile costs.

Facilities	Cost
Arterials, existing/improved full street	$283.71 million
Arterials, existing/improved half street	$8.59 million
Arterials, new	$12.26 million
Collectors, existing/improved full street	$268.26 million
Collectors, existing/improved half street	$0
Collectors, new	$58.28 million
Total:	**$631.10 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$33,673**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service. TriMet could provide services to the reserve, although there is no guarantee of service; actual service will depend on the level of development in, and in the corridors leading to, the reserve. Future service is proposed in TriMet's 2045 Network Vision and would bring service through the northern portion of the reserve along Rosemont Road. Service could be provided at 60-minute headways for all day service, five days per week.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, will be required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

There are seven stream corridors that flow south through the Stafford Urban Reserve and ultimately drain into the Tualatin River.

One stream flows along the western edge of the reserve for 1,370 feet through five rural residential properties. The stream includes a wooded riparian canopy with slopes greater than 25 percent and there is riparian and some upland habitat identified along the stream corridor. The portion of the reserve where this stream joins the Tualatin River is within the "100-year" floodplain. The increased protection levels for streams, wetlands, steep slopes, and habitat areas for areas added to the UGB will help to limit potential impacts from urbanization. Considering the relatively small size of tax lots in this area, and the fact that they abut existing residences in Lake Oswego and thereby will be less likely to have new urban road connections with development of the reserve, any impacts on the stream corridor and habitat areas in this area from reserve development could be comparatively minor.

Pecan Creek flows through the western portion of the reserve as well, for 1.2 miles west of SW Stafford Road and SW Pattulo Way. Over 3,000 feet of the creek flows through land

either owned by Metro and committed as open space, by the City of Lake Oswego for use as park land, or by Portland General Electric; these lands are unlikely to be developed with urban uses that could significantly impact the natural environment. Other lengths of the creek flow along the back edges of rural residential tax lots that are generally wooded. A significant portion of lower Pecan Creek is adjacent to steep slopes and there is riparian and upland habitat identified along the stream corridor. The area where Pecan Creek joins the Tualatin River is within the "100-year" floodplain. There are two tributaries to Pecan Creek, totaling 3,600 feet in length, that primarily flow along the wooded edges of residential tax lots as well. The western tributary runs mainly through an area where the slopes are greater than 25 percent and that topography reduces opportunities for development. In addition, an 850-foot portion of the northern tributary runs through land owned by the City of Lake Oswego. The two tributaries also have adjacent riparian and upland habitat identified along the corridors. Considering the increased protection levels for streams, steep slopes, and habitat areas in areas added to the UGB, and the fact that significant portions of the streams are on publicly owned land that is unlikely to see significant amounts of urban development, impacts to Pecan Creek and its tributaries from future urbanization of the reserve would be minor.

A small stream flows south through the Shadow Wood Park neighborhood on the east side of SW Stafford Road for approximately 2,900 feet. A significant portion of the stream flows through Clackamas County owned land, Shadow Park Homeowners Association land, or platted street right-of-way that is not constructed. This stream corridor also contains slopes greater than 25 percent, where development is unlikely. The northern portion of the stream is within a very large tax lot that could very well be developed in the future and would be susceptible to impacts from that urbanization. There is riparian and upland habitat identified along the stream corridor and "100-year" floodplain where the stream meets the Tualatin River. Nonetheless, when again considering the increased protection levels for streams, steep slopes, and habitat areas inside the UGB, as well as public and homeowners association ownership of certain lands, urbanization in this area can occur without major impacts to this stream, except for that length north of SW Johnson Road, which could see moderate impacts, depending on the design of the future urban development.

Wilson Creek flows south through the central portion of the reserve for approximately 2.3 miles before draining into the Tualatin River. A 0.88-acre wetland identified on the National Wetland Inventory (NWI) is located at the headwaters of the stream and "100-year" floodplain is identified where the stream meets the Tualatin River. Almost the entire length of the stream flows through forested portions of tax lots that either contain rural residences or are vacant. Approximately 4,520 feet of Wilson Creek is on land owned by the City of Lake Oswego or Metro or is private open space land. There are slopes greater than 25 percent along the stream corridor, mostly occurring on the Metro or private open space land. The entire length of the Wilson Creek corridor has been identified as riparian habitat with numerous locations of upland habitat also identified. In several locations, the stream is located such that urbanization of the area would not impact the stream corridor; however, there are a few large vacant tax lots where impacts could occur if the area was developed to

urban densities and standard transportation connections are made. There are five tributaries to Wilson Creek that range in length from 1,200 feet to just over one mile and total 3.1 miles in length. A 0.35-acre wetland identified on the NWI is located along one stream and numerous ponds not identified as wetlands are also present. The smallest tributary is located on private open space and a portion of another tributary is on Metro-owned land. About half of the stream corridors flow through forested areas with the remaining half in open fields. Riparian habitat is identified along the stream corridors with some upland habitat identified in areas that are forested. There are significant stretches where the streams could be impacted by future development, though the extent of the impact will depend on the need for transportation connections to serve future urban development. Considering the increased protection levels for streams and habitat areas on land inside the UGB, public ownership of lands in the area, and the private open space land, there will be some protections from impacts of urbanization on the stream corridors. However, as Wilson Creek runs lengthwise through the center of the reserve and its tributaries spread out mainly to the east through some large vacant and developable tax lots, the opportunity for impacts to the stream and habitat areas from urbanization, especially through needed transportation connections, is significant.

Another stream flows south from the S Sweetbriar Road area for approximately 1.3 miles before draining into the Tualatin River near where I-205 crosses the river. About 2,500 feet of the stream flows through private open space land, with the remaining portion flowing along forested sections of rural residential tax lots. There are slopes greater than 25 percent along a significant length of the stream and riparian and upland habitat is identified along the entire length of the stream. Under these conditions, and again considering the increased protection level for streams, habitat areas, and steep slopes for land inside the UGB, urbanization could occur with minimal impacts to the stream corridor.

The sixth stream flows south from the S Clematis Road area for approximately 1.3 miles before draining into the Tualatin River near SW Johnson Road. The stream flows between S Grapevine Road and S Wisteria Road, along the back edges of the rural residential tax lots that front onto the two roads. A significant portion of the stream is within a forested ravine and riparian and upland habitat is identified along its entire length. A small second stream that flows from the I-205 area appears to meet this stream at the Tualatin River. This stream is piped in some locations and has four wetlands identified on the NWI that are located in the general area. In addition, there is a considerable area of “100-year” floodplain where the streams meet the Tualatin River. Given the location of the stream between the tax lots described above, the presence of steep slopes, and the increased protection level for riparian and upland habitat, wetlands, and floodplain inside the UGB, urbanization could occur with minimal impacts to the stream corridors.

Finally, the seventh stream flows south from the S Brandywine Drive area for just over one mile before flowing into the City of West Linn and draining into the Tualatin River. Roughly half of the stream flows through vacant forested tax lots that have some large areas of slopes greater than 25 percent. The remainder of the stream is located on the back portion

of rural residential properties. Similar to the other streams mentioned above, there is riparian and upland habitat identified along the stream corridor. The steep slopes and habitat areas on the vacant tax lots will limit the amount of development that can occur, thereby reducing the impacts of urbanization on the stream and habitat areas. In addition, the rural residential properties contain high value homes that will also deter future redevelopment of those properties further reducing opportunities for urbanization to no impact this stream corridor.

This analysis finds that urbanization of the reserve could occur with moderate or high impacts to the streams, wetlands, and habitat areas, depending on the overall design of the development and, most importantly, on future road connections.

Considering the comparative environmental consequences of urbanization, the Stafford Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

It is expected that urbanization of the Stafford Urban Reserve would, over time, result in new housing replacing some existing rural residences, which could contribute to a loss of sense of place. However, given the amount of existing rural development, including a large number of high-value homes, and levels of parcelization, urbanization of more developed areas will be slow and piecemeal. Other lands in the reserve are in public ownership or constrained by steep slopes, stream corridors, and habitat areas; these dynamics can act to limit and also isolate new urban development. More immediately developable areas are closer to the current UGB and existing development, where urbanization may have less of a dramatic effect on sense of place character of the area. Large and relatively flat agricultural lands may be able to accommodate more significant urban development that could degrade the rural lifestyle for nearby residents.

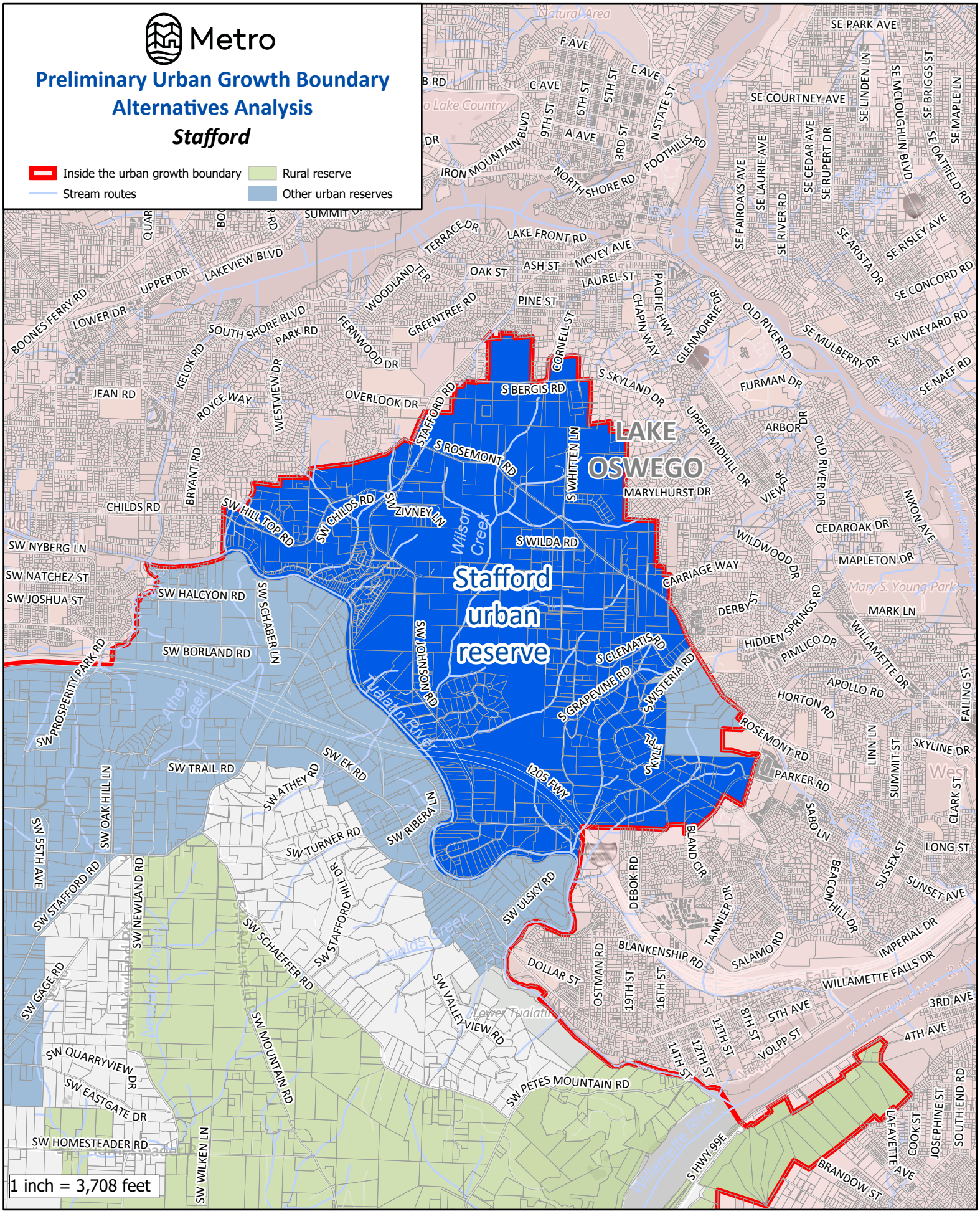
As detailed more fully in response to Factor 2, future residents of the reserve are expected to be particularly reliant on private motor vehicle transportation, which could have some adverse energy consequences.

There are large tracts of agricultural land in the reserve, particularly along SW Johnson Road and Rosemont Road and east of SW Stafford Road. Much of these lands are for field crops and pastureland, though there are some large vineyards and nursery operations. The City of Lake Oswego owns Luscher Farm and operates it as a park; this property, while in agricultural use, is not likely to urbanize. There would be adverse economic consequences from loss in farming activity with urbanization of the other agricultural lands, though these losses may be outweighed by the economic benefits of urban development.

This analysis finds that there would be comparatively moderate social, energy, and economic consequences from urbanization of this reserve. The Stafford Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

There are no locations where lands outside the UGB but contiguous with the Stafford Urban Reserve have Goal 3 or 4 resource land zoning for agricultural or forest activities. Therefore, the proposed urban uses are considered to have high compatibility with the nearby agricultural and forest activities occurring on farm and forest land. The Stafford Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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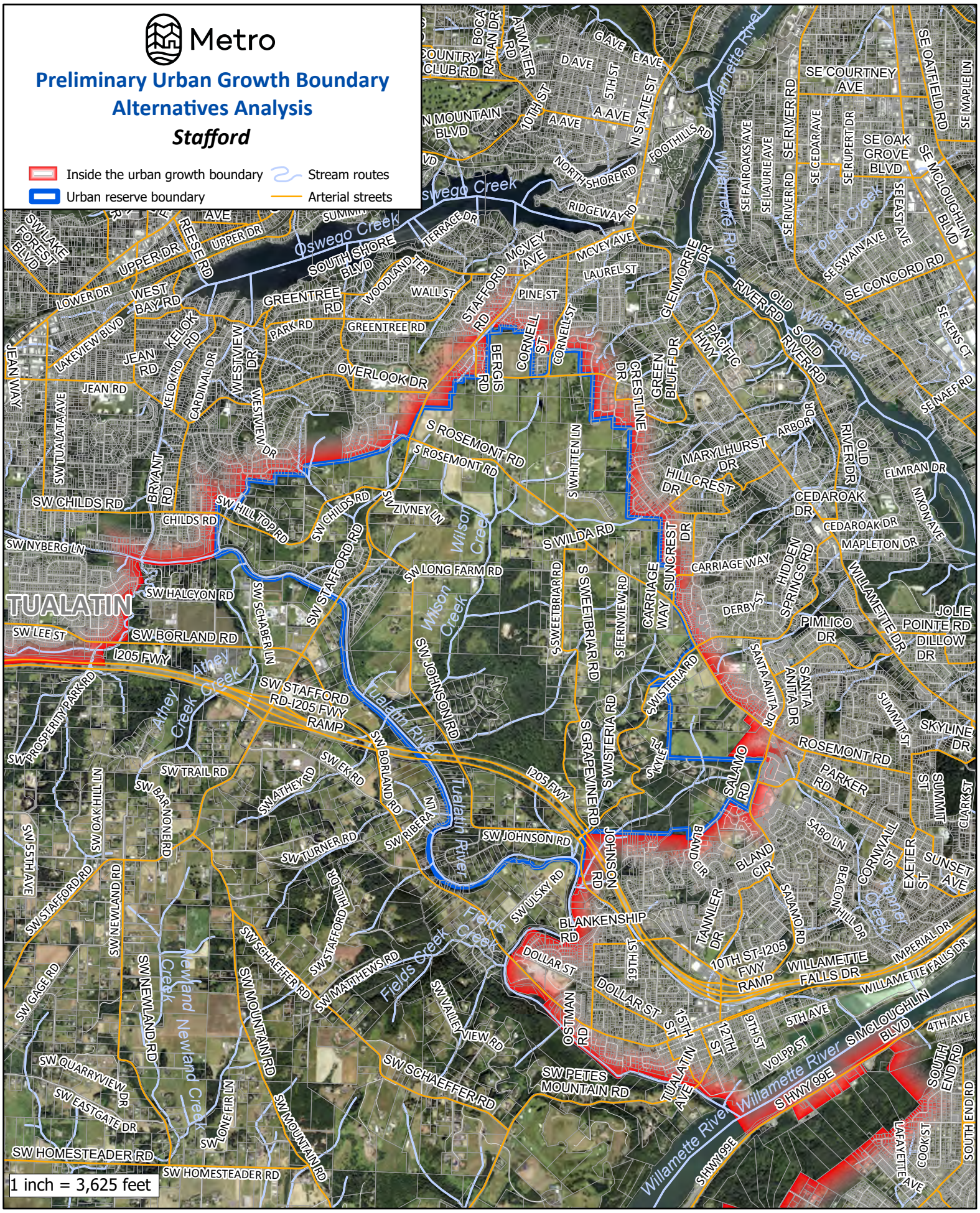

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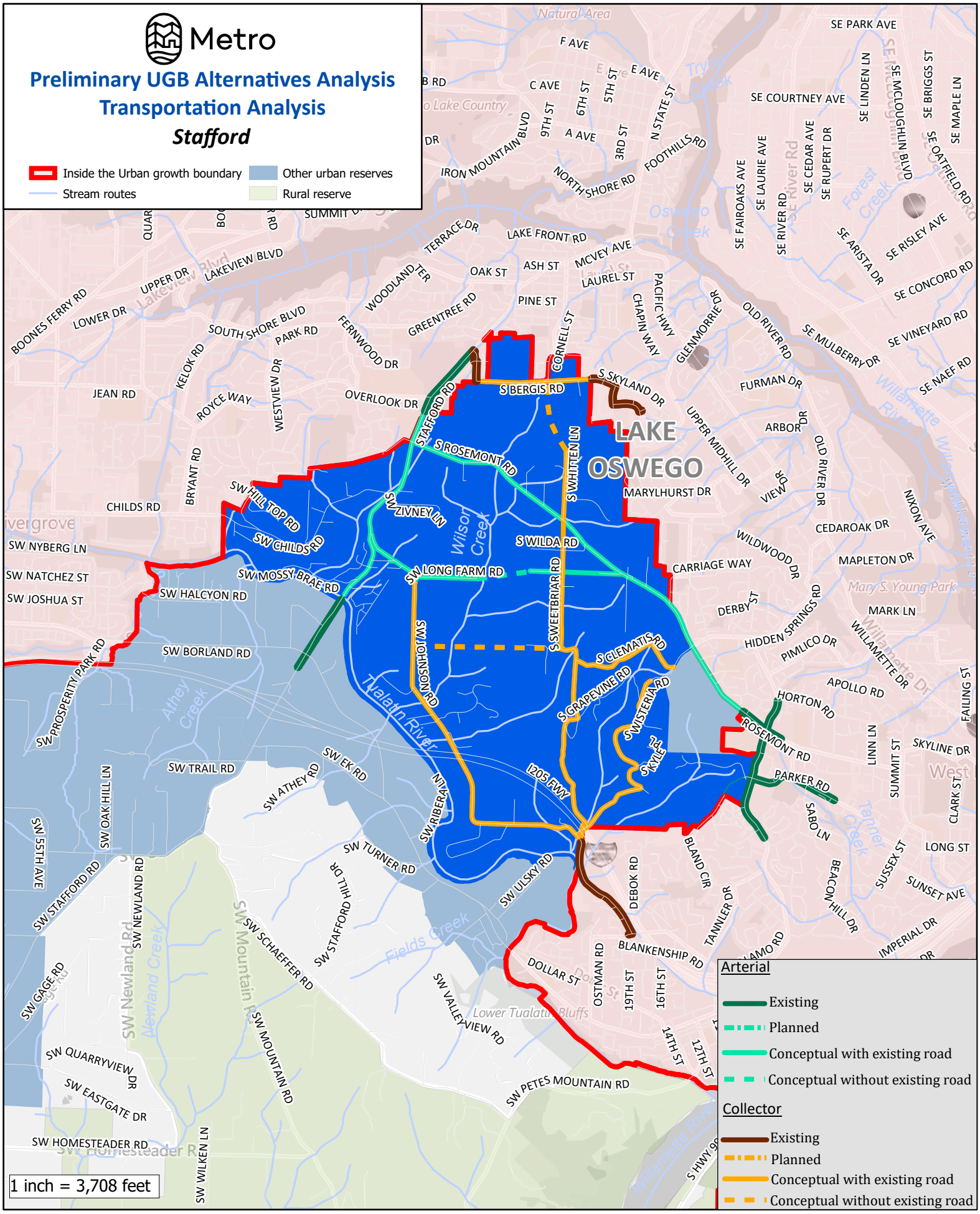

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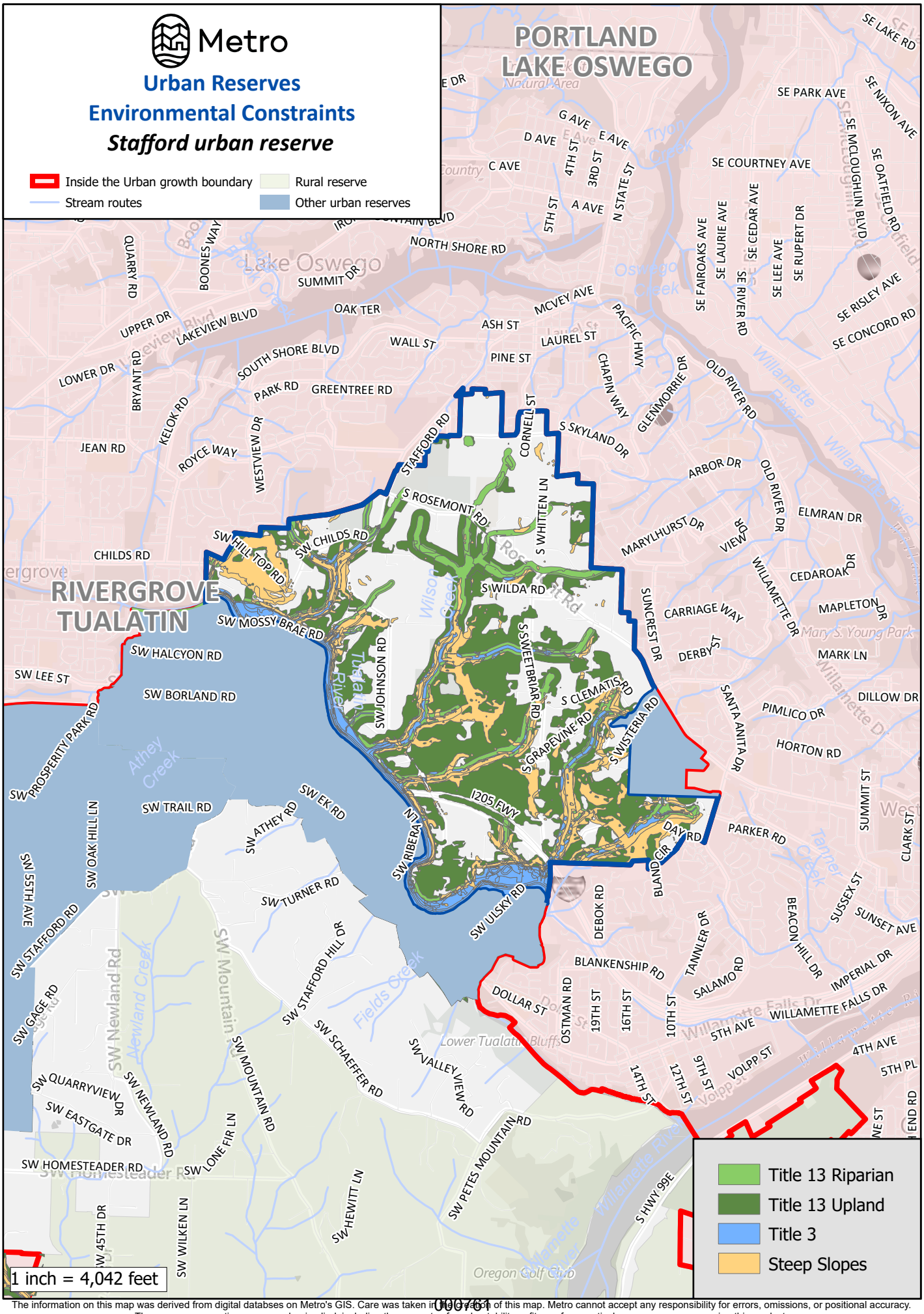

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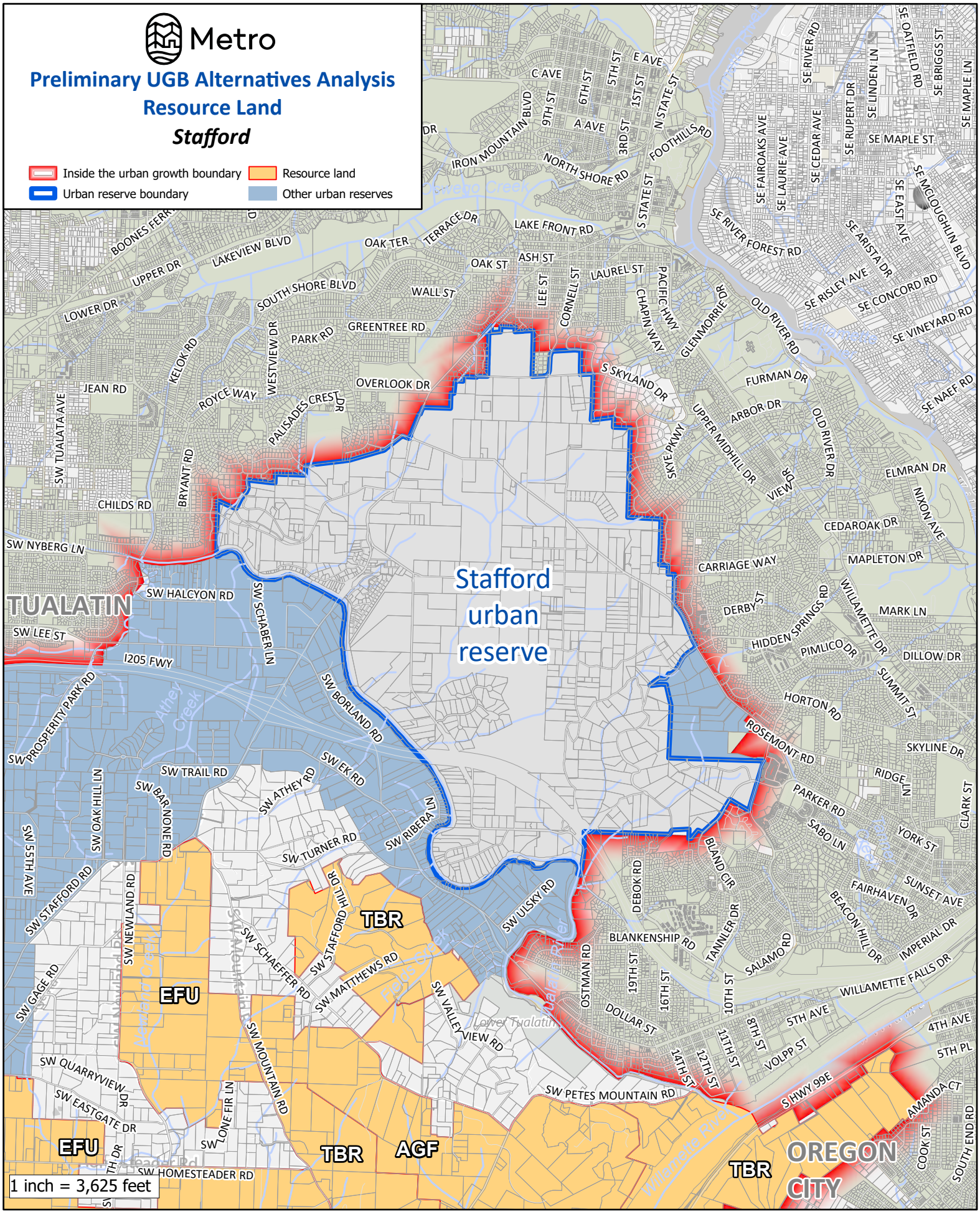

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TONQUIN URBAN RESERVE

Total Reserve Area	572 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	560 acres
Gross Vacant Buildable Area	168 acres
Net Vacant Buildable Area	**125 acres**

The Tonquin Urban Reserve is adjacent to the east side of the City of Sherwood, and about a quarter mile from the city limits of Tualatin and Wilsonville. The UGB generally forms the northern, western, and eastern edge of the reserve, with undesignated and rural reserve lands to the south. SW Tonquin Road runs from the reserve's northwest corner to its east and divides the reserve in to two roughly equal areas. On the west side of the road, Rock Creek flows from the south of the reserve to the northwest on its way to the Tualatin River.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Tonquin Urban Reserve is comprised of 31 contiguous tax lots, all but three of which are entirely within the reserve. Of those tax lots entirely within the reserve, only five are less than two acres each, 19 are greater than five acres each, eight are larger than 20 acres each, and one is more than 160 acres. The three tax lots only partially within the reserve have area within the reserve ranging from less than one acre to nearly 60 acres. The combined tax lot area within the reserve is approximately 560 acres. As noted above, the entire reserve contains 168 gross vacant buildable acres and 126 net vacant buildable acres.

Significant portions of the reserve are occupied by quarry sites. A firearm training facility, a gun club shooting range, a 19-acre fire department facility, and a kennel also occupy sizeable portions of the other lands in the reserve. The federal government owns more than 60 acres in the reserve, which are part of the Rock Creek Unit of the Tualatin River National Wildlife Refuge, and Metro owns a 3,500-square-foot tax lot in the reserve that serves as an access to the adjacent North Coffee Lake Creek Wetlands area. Aerial imagery suggests there are few rural residences in the south end of the reserve. Overall, 12 of the tax lots that are wholly or partially in the reserve have assessed improvements, with the median assessed value of those tax lots' improvements exceeding $250,000.

The west side of the reserve neighbors existing and developing urban low density residential development, with an urban local street, SW McKinley Drive, stubbing to this west side. The north end and east side of the reserve neighbor existing and developing industrial uses, powerlines, and quarry sites.

Hawks View Elementary School, St Francis Catholic School, and commercial retail uses in the Sherwood Town Center are all within two miles of the north end of the reserve via SW Tonquin Rd, SW Oregon St, and SW Sherwood Boulevard.

An interchange with I-5 is approximately two miles from the south end of the reserve via SW Tonquin Rd, Basalt Creek Parkway, SW Day Road, and SW Elligsen Road. Highway 99W is also about two miles away from the north end of the reserve via SW Tonquin Road, SW Oregon Street, SW Langer Farms Parkway, and SW Tualatin-Sherwood Road. TriMet Route 97 has bus stops about 1.5 miles to the north of the reserve on SW Tualatin Sherwood Road.

The existing land uses and ownership patterns of the reserve constrain its ability to efficiently accommodate new urban land needs. As noted above, a significant portion of the area is currently being used for quarry operations and once a quarry is no longer being mined, a reclamation plan must be implemented. Thus, any re-use of the quarry areas will be well in the future, possibly even beyond the 20-year timeframe for this analysis. The area also contains a large amount of natural resources that greatly reduce the ability to accommodate a significant amount of residential or employment land need. The Ice Age Tonquin Trail is planned to bisect the area diagonally connecting Sherwood with both Tualatin and Wilsonville.

Nonetheless, the reserve has a few sizable undeveloped tax lots, is near to both existing residential and employment land uses, schools, and commercial uses, and is within relatively close proximity to two highways (I-5 and Highway 99W). This reserve is considered able accommodate a very limited amount of residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Tonquin Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are provided with water service by the City of Sherwood. Sherwood obtains the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville, with the remainder coming from four groundwater wells in city limits. Sherwood also maintains an emergency connection and transmission piping to a supply main serving Tualatin from Portland. Sherwood's water distribution system includes three service zones served by three storage reservoirs and two pumping stations. The majority of Sherwood customers are served from the 380 Pressure Zone, which is supplied by gravity from the city's Sunset Reservoirs. The 535 Pressure Zone serves the area around the Sunset Reservoirs, supplied with constant pressure by the Sunset Pump Station, while the 455 Pressure Zone serves higher elevation customers on the city's western edge by gravity from the Kruger Reservoir. The Tonquin Urban Reserve would likely become part of the 380 Pressure Zone.

Supply, storage, pumping, and distribution piping are considered sufficient to meet maximum daily demand of current development within the city's portion of the UGB;

however, according to the city's 2015 Water System Master Plan, additional supply and storage capacity may be needed for full buildout. Efforts, including capital improvement projects, are planned to increase treatment plant capacity to satisfy buildout demand. No pump stations are currently needed to serve the 380 Pressure Zone. Very few distribution deficiencies are identified in the Master Plan for either existing or buildout maximum daily demand (MDD) conditions and no additional deficiencies are identified in the Plan under peak hour demand conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Full buildout of the existing UGB and development of Tonquin Urban Reserve could warrant the planned treatment plant improvements in order for the reserve to be provided with adequate water service. Additional storage capacity is also likely needed. There is currently no water main connected to the reserve, so one will need to be extended to it, likely through the adjacent, but as yet underdeveloped, Tonquin Employment Area (TEA). Potential treatment system improvement costs, water main extension costs, and the full costs of new storage facilities also serving areas already inside the UGB are unknown and not included in the below figures. However, given the size of the Tonquin Urban Reserve, they are presumed to be significant. The city's 2015 Water System Master Plan does not address urban water service to this reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, additional treatment plant and storage capacity may be needed to serve full buildout of the UGB as well as new development in the Tonquin Urban Reserve, while avoiding adverse impacts to existing facilities in areas already inside the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$5.29 million
12-inch pipe	$0
16-inch pipe	$0
Pumping	$0
Storage	$0.16 million
Total:	**$5.45 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,174**

Sanitary Sewer Services

With regard to sanitary sewer services, the Tonquin Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood and Clean Water Services (CWS) together provide sanitary sewer services in adjacent areas already in the UGB. Two CWS sanitary sewer trunk lines connect to the local, city-maintained components of the system, including the 24-inch "Sherwood Trunk", which conveys sewage from the Cedar Creek sewage collection basin, and the 18-inch "Rock Creek Trunk", which conveys sewage from the Rock Creek sewage collection basin, to a CWS-owned pump station. Sewage is then directed to the Durham Advanced Wastewater Treatment Plant via the Upper Tualatin Interceptor, also owned by CWS.

The City of Sherwood updated its Sanitary Sewer Master Plan in 2016. The Master Plan includes areas within the City of Sherwood city limits, as well as the TEA and the Brookman Addition, which are within the UGB. The Master Plan indicates that there is sufficient conveyance, pump station, and treatment plant capacity for existing development in areas already inside the UGB. However, at full buildout of the UGB, there may be deficiencies with the Sherwood and Rock Creek Trunk Lines, the Sherwood Pump Station, and the Upper Tualatin Interceptor. The city and CWS both have capital improvement projects planned to address these capacity issues. Responsibility for upsizing the Sherwood and Rock Creek Trunk Lines may be shared between city and CWS.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The city's 2016 Sanitary Sewer Master Plan does not plan for urban development of the Tonquin Urban Reserve, so information on the existing system's capacity to serve the reserve is limited. However, given the size of the reserve, it is possible that the existing treatment plant would be insufficient to serve both full buildout of the current UGB and development of the reserve. Trunk line and pumping capacity are also likely insufficient. Currently, sewer service does not extend to the reserve, and a sewer line would need to be constructed through the TEA inside the UGB to serve the reserve's development. New lines will also need to be extended throughout the reserve. Costs associated with increasing the capacity of the treatment plant, as well as sewer lines and pumping systems outside the reserve, to levels necessary to serve both full buildout of the current UGB and the reserve are unknown and are not included in the below figures. However, those costs are likely to be significant.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

The treatment system, sewer line, and pumping system improvements noted above are likely needed in order to avoid adverse impacts to service to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$7.65 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0.54 million
Force mains	$1.55 million
Total:	**$9.74 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$3,885**

Stormwater Management Services

With regard to stormwater management services, the Tonquin Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Sherwood's 2016 Stormwater Master Plan states that, overall, the existing stormwater network for areas inside the UGB is in good condition, though there are some isolated deficiencies. There is no indication of significant challenges with existing stormwater management facilities being able to serve existing development specifically in areas of the UGB adjacent to the reserve.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Based on topography, stormwater from development of the reserve could likely outfall directly to Rock Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity should be provided on private property before outfalling to these water bodies; therefore, the existing facilities would not be impacted by the development of the reserve.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, stormwater related to new development in the reserve could likely outfall directly to Rock Creek and its tributaries, without connecting to other existing stormwater infrastructure. Therefore, no adverse impacts to existing facilities serving areas already inside the UGB are anticipated. It is also expected that stormwater will be treated and detained onsite, thereby limiting impacts to these water bodies.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$1.16 million
24-inch pipe	$1.66 million
30-inch pipe	$0
Water quality/dentition	$4.23 million
Total:	**$7.05 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,812**

Transportation Services

With regard to transportation services, the Tonquin Urban Reserve is given a "low" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based VMT per capita by Metro transportation analysis zone, with average VMT considered 11.32. According to Figure 4.36 in Chapter 4, areas in the UGB adjacent to the Tonquin Urban Reserve had average and above average home-based VMT per capita in 2020.

Metro's 2040 Growth Concept Map designates a town center in the adjoining City of Sherwood. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The Langer Drive Commercial District of the City of Sherwood's 2013 "Sherwood Town Center Plan" generally aligns with the geography of the town center area on the Growth Concept Map. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed that, in the area of the Langer Drive Commercial District, there was a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. According to aerial imagery, much of the area is already built out with commercial retail uses, including a grocery store, restaurants, and medical/dental offices, though there are numerous parking lots that may be able to accommodate redevelopment. Near to the Langer Drive Commercial District is a police station, the Sherwood Ice Arena, and other public/quasi-public land uses, as well as some undeveloped and underdeveloped tax lots. Sherwood is served by TriMet Route 94, which runs along Highway 99W, and Route 97, which runs along SW Tualatin-Sherwood Road; both routes include stops at the town center. The town center plan, its existing land uses and transit service, and some availability for new

development in and near the town center demonstrate that growth in the current UGB will not necessarily cause a significant increase in home-based VMT per capita in the future. However, areas already in the UGB and adjacent to the Tonquin Urban Reserve are more than a mile from the town center.

As noted above, TriMet Routes 94 and 97 both serve areas already in the UGB in the adjacent City of Sherwood. Currently, however, those routes only connect to the northern and central portions of the city and not to the city's south and west. Figure 4.3 in Chapter 4 of the 2023 RTP also shows a gap in planned "frequent transit service" in Sherwood's portion of regional transit network.

Multiple TriMet bus routes and the Westside Express Service (WES) Commuter Rail also serve the nearby City of Tualatin. These routes are spread out along the major roadways, including Highway 99W, SW Tualatin-Sherwood Road, and SW Boones Ferry Road, providing service to the Tualatin Town Center and nearby employment and residential areas.

Sherwood has more than 10 miles of dedicated bike lanes and established bikeways, including along major roadways, that connect with some other bike-friendly streets, as well as residential and employment uses, schools, and the town center. However, there are gaps in bike facility connections to some of the residential areas south of the railroad. Figure 4.5 in Chapter 4 of the 2023 RTP identifies bike facilities along Highway 99W and SW Tualatin-Sherwood Road as in the regional on-street bike network and facilities in the central portion of the city as in the regional off-street bike network, though there is a short network gap along SW Tualatin-Sherwood Road west of the highway and other gaps in the west, east, and south of the city, including along SW Tonquin Road in the UGB near Tonquin Urban Reserve.

Tualatin has around 25 miles of dedicated bike lanes, seven miles of established bikeways, and local trails that connect the employment areas and Tualatin Town Center to the Tualatin's residential areas. There are two bike lane connections across I-5 to provide access to the eastern portion of the city.

Most developed neighborhoods in Sherwood, including its town center, have sidewalks. Figure 4.4 in Chapter 4 of the 2023 RTP identifies sidewalk facilities along SW Tualatin-Sherwood Road, SW Sunset Boulevard, and SW Main Street as in the planned regional on-street pedestrian network, though there are network gaps along Highway 99W in the north of Sherwood and along SW Tonquin Road in the UGB near Tonquin Urban Reserve.

Construction has commenced on a pedestrian bridge in Sherwood over Highway 99W that, when completed, will connect Sherwood High School with the YMCA and surrounding urban neighborhoods. Goals of the project include: reducing vehicle/pedestrian conflicts and exposure; minimizing out of direction travel for

pedestrians; and providing crossing opportunities that accommodate all pedestrians and bicyclists.

Most of the residential areas of nearby Tualatin have sidewalks, but there are fewer pedestrian connections in the city's employment areas. The Tualatin Town Center has a fairly well-established pedestrian network that includes access to some trails as well. The Tualatin River Greenway Trail, for example, connects the Town Center to parks in Durham and Tigard to the north as well as to Browns Ferry Park along the Tualatin River on the east side of I-5.

Figure 4.14 in Chapter 4 of the 2023 RTP identifies the SW Tualatin-Sherwood Road as a high injury corridor. The road, which is already inside the UGB, is less than a mile from the northern end of the Tonquin Urban Reserve. There are no other RTP-designated high injury corridors in Sherwood's or Tualatin's portions of the UGB. The intersection of SW Tualatin-Sherwood Road and SW Boones Ferry Road, as well as the intersection of SW Martinazzi Avenue and SW Boones Ferry Road, are within the UGB and approximately 3.5 miles from the reserve; both of these intersections are identified in Figure 4.14 of the RTP as top five percent high injury intersections.

Highway 99W is also already inside the UGB, bisecting the City of Sherwood. Highway 99W is identified as a throughway in Chapter 4's Figure 4.7 of the 2023 RTP. Figure 4.8 in Chapter 4 of the RTP indicates that it currently meets travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The reserve is about two miles from Highway 99W. As noted above, Highway 99W, an RTP-designated throughway, currently meets travel speed reliability performance thresholds.

There is currently no transit service near to the reserve. The closest TriMet bus route is Route 97, which provides service between Sherwood and Tualatin during the morning and afternoon commute times along SW Tualatin-Sherwood Road. All other bus routes are over a mile away. The WES Commuter Rail tracks are only about a quarter of a mile away, but the closest station is about four miles away in Tualatin.

The closest bike facility is the dedicated bike lane on SW Oregon Street in Sherwood that is approximately one-third of a mile from the reserve via SW Tonquin Road. This bike lane is approximately half a mile long, running from the roundabout to just short of SW Tualatin-Sherwood Road. The bike lane doesn't yet provide a connection point to other dedicated bike facilities.

There are complete sidewalks on SW McKinley Drive, which stubs to the west side of the reserve. These sidewalks wind through residential areas before ultimately connecting to

the Town Center. There are also sidewalks along SW Oregon Street, approximately one-third of a mile away from the north end of the reserve. These sidewalks connect to the sidewalks along SW Tualatin-Sherwood Road to the north that extend towards the Town Center and employment areas. There is a one-third-mile gap in sidewalks to the south that leads to Sherwood's "Old Town".

There are no existing regional trails connected to the reserve.

Existing urban residential uses adjacent to the reserve could provide housing to future employees of the reserve, and nearby existing employment uses could provide employment opportunities to future residents of the reserve, helping to limit home-based VMT per capita. However, the existing nearby housing is relatively low in density and, as noted in response to Factor 1, the reserve is unlikely to provide significant residential development opportunities; therefore, future employees of the reserve may still mostly have to commute from further away.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW McKinley Dr, Basalt Creek Parkway, and SW 124th Avenue would be expected to see additional private vehicle traffic from development of the reserve. Indeed, the reserve is moderately distant from the Sherwood Town Center and currently lacks direct transit service to it. However, there are existing and developing bike and pedestrian facilities that provide connections to the town center, as well as to schools and recreational facilities. Additionally, as detailed in response to Factor 1, the reserve is considered able to accommodate a small amount of both residential and employment land uses, allowing for the possibility that its future residents of the reserve and nearby areas in the UGB could access at least some services and employment opportunities within the reserve itself. Nearby residences could provide housing to employees of the reserve, and new employment uses in the reserve could provide jobs for nearby residents. For these reasons, development of the reserve may result in only moderate impacts to home-based VMT per capita in nearby areas already inside the UGB and the performance of Highway 99W as a throughway. Any additional motor vehicle traffic on SW Tualatin-Sherwood Road resulting from development of the reserve, however, may exacerbate the road's high-crash conditions.

The dedicated bike lane on SW Oregon Street in Sherwood would be expected to see additional use; however, the one-third-mile gap on the portion of SW Tonquin Road that is already inside the UGB and the larger gap on SW Oregon Street would need to be addressed to reach maximum potential future use.

The sidewalks along SW Oregon Street would be expected to see additional use, though gap in SW Tonquin Road noted above would need to be addressed to make the important connection to "Old Town".

d. Need for major transportation facility improvements and associated costs

To serve urban development, approximately 1.32 miles SW Tonquin Road would likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. A 1.5-mile-long new collector would also need to be built to connect SW Dahlke Lane and the east side of the reserve to SW Tonquin Road. These new and improved roadways would need to traverse some areas of relatively steep topography as well as water bodies; therefore, some associated per-mile costs are higher than normal.

Facilities	Cost
Arterials, existing/improved full street	$97.01 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$52.78 million
Total:	**$149.79 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$59,773**

e. Provision of public transit service

TriMet evaluated the reserve for providing transit service and determined that an extension of conceptual routes would be the most effective way to serve future development in this area. TriMet could provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development in, and in the corridors leading to, the reserve. TriMet's 2045 Network Vision could reroute conceptual line W10 before terminating in Basalt Creek. This service could operate at 60-minute headways, with a capital cost of $2,000,000 – $3,000,000 for two additional zero-emission buses and an additional annual operating cost for the route extension at $1,216,800 and grows with inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

Rock Creek and a tributary flow north through the western portion of the Tonquin Urban Reserve for just over one mile. Approximately two-thirds of the stream corridor is on federal land that is part of the Tualatin River National Wildlife Refuge. The non-federal land that contains Rock Creek is, as of July 2020, included in the Refuge's Rock Creek Unit acquisition boundary, indicating a desire for the Refuge to purchase the land in the future. There are two National Wetland Inventory (NWI) wetlands associated with Rock Creek,

each approximately 11 acres in size, that are also on federal land. There is a significant amount of riparian and upland habitat associated with Rock Creek. Two additional NWI wetlands have been identified that total 1.4 acres in area. The riparian corridor and adjacent upland habitat on the Refuge land will not be impacted by urbanization of the reserve. However, urbanization of the land between the Refuge properties may impact the stream corridor resulting in negative effects downstream, unless the Refuge is successful in purchasing this land that is within the acquisition boundary.

Coffee Lake Creek flows south through the eastern portion of the reserve for approximately 1.5 miles. The northern portion of the stream flows through cleared land under powerlines and forested areas of sportsmen's club property, prior to draining into a pond associated with a quarry operation. An 8.9-acre NWI wetland is associated with this portion of the stream corridor. The remaining portion of the stream is manipulated by a series of quarry operations before leaving the reserve. Numerous NWI wetlands, totaling approximately 18 acres, are identified on the various quarry lands. As expected, there is no evidence of habitat on the quarry sites. It is not practically possible to assess the impacts urbanization may have on the stream and wetlands prior to the quarry reclamation plan being developed.

This analysis finds that urbanization of the reserve could occur with comparatively low to moderate impacts to the stream corridors, wetlands, and upland habitat areas, depending on the ability of the Wildlife Refuge to purchase additional land and the components of the reclamation plans for the individual quarry sites.

Considering the comparative environmental consequences of urbanization, the Tonquin Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

There are only a handful of rural residences in the Tonquin Urban Reserve. Much of the reserve is instead dedicated to quarry operations, a private gun club, commercial dog kennels, and publicly owned natural areas. The reserve is nearly entirely surrounded by urban land uses, quarry operations, powerline easements, and a moderately-size vehicle dismantling and/or junk yard operation. Urbanization of this reserve is not expected to cause significant changes in the reserve residents' sense of place or in degradation of an existing rural lifestyle. Indeed, urbanization of the reserve could bring at least some new social, educational, and recreational opportunities for existing residents.

As detailed more fully in response to Factor 2, urbanization of the reserve is expected to result in, at most, moderate VMT, so the resulting energy consequences would also not be significant.

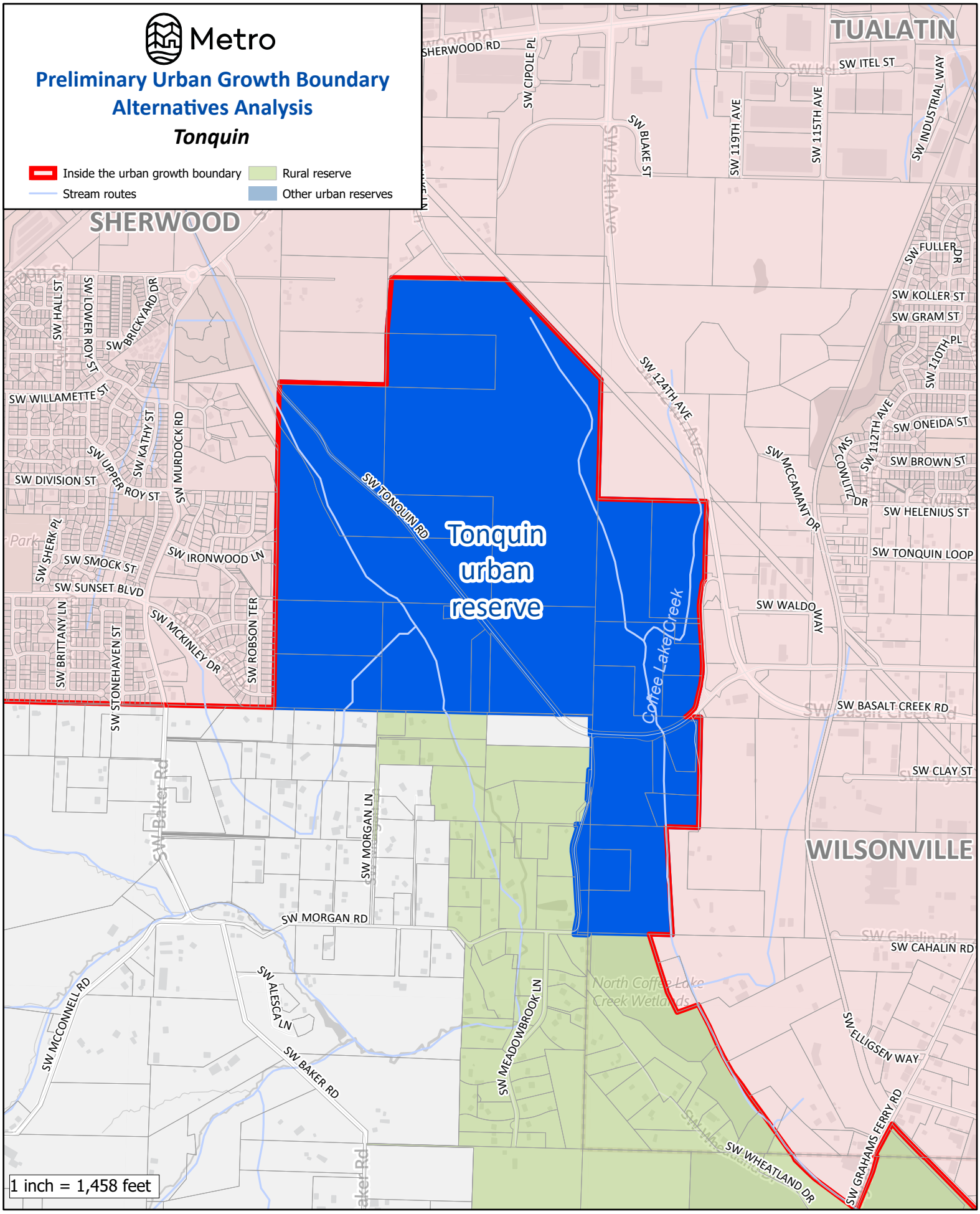
While there does not appear to be any commercial agricultural uses in the reserve, quarry activity within the reserve is significant; the adverse economic consequences of stopping this extraction prior to the resource being exhausted could be considerable. There could also be adverse economic consequences in discontinuing the gun club and dog kennel uses

in the reserve in order to accommodate new urban development, though that economic benefits of urban development may outweigh those consequences.

Overall, there would be comparatively low to moderate social, energy, and economic consequences from urbanization of this reserve, largely depending on the timing of completion of quarry operations. The Rosa Urban Reserve is given a "medium-high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Only the southern edge of the Tonquin Urban Reserve is *not* defined by the UGB and the vast majority of the adjacent land is zoned for rural residential use. There is one very small tract of adjacent land with Goal 3 zoning, specifically Exclusive Farm Use (EFU) zoning by Clackamas County, located outside the UGB at the reserve's southwestern corner. This land, comprised of just two tax lots, contains rural residences and no apparent agricultural activities. While there are some stands of trees on these tax lots, they are small and the existing development could limit harvesting potential. Moreover, access to these tax lots are not accessed via the reserve. Therefore, the proposed urban uses are considered to have high compatibility with nearby agricultural and forest activities occurring on farm and forest land outside the UGB. The Tonquin Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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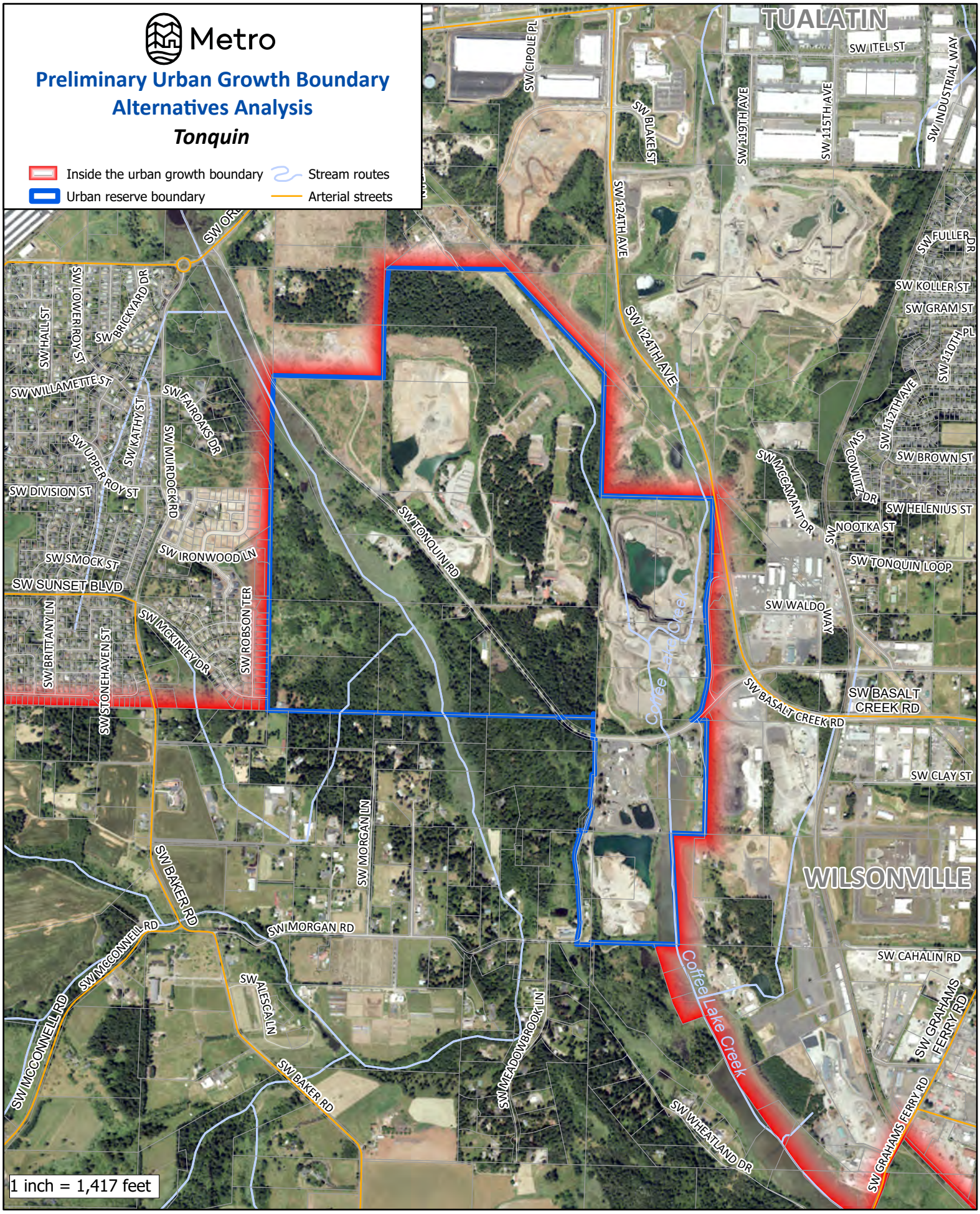

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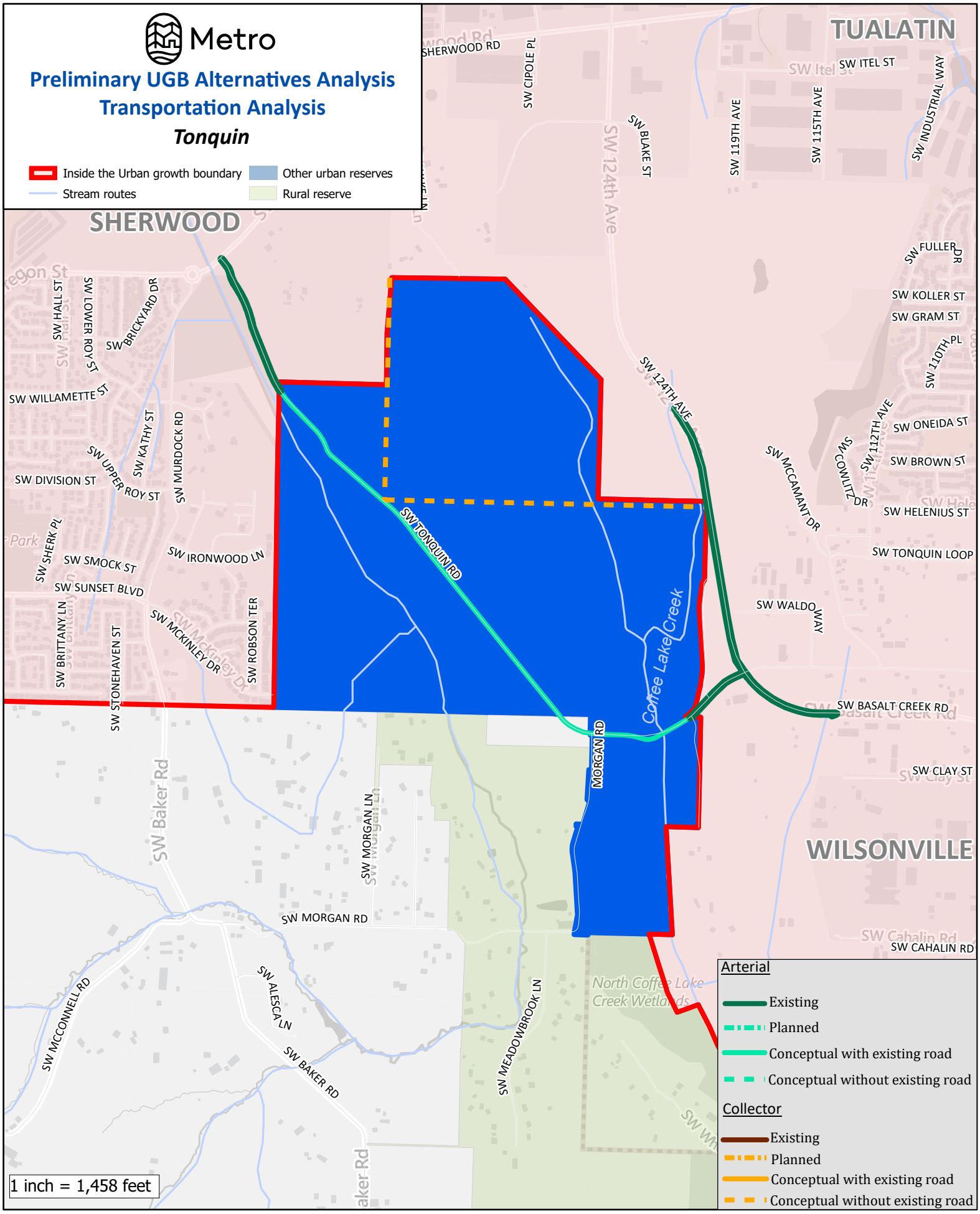

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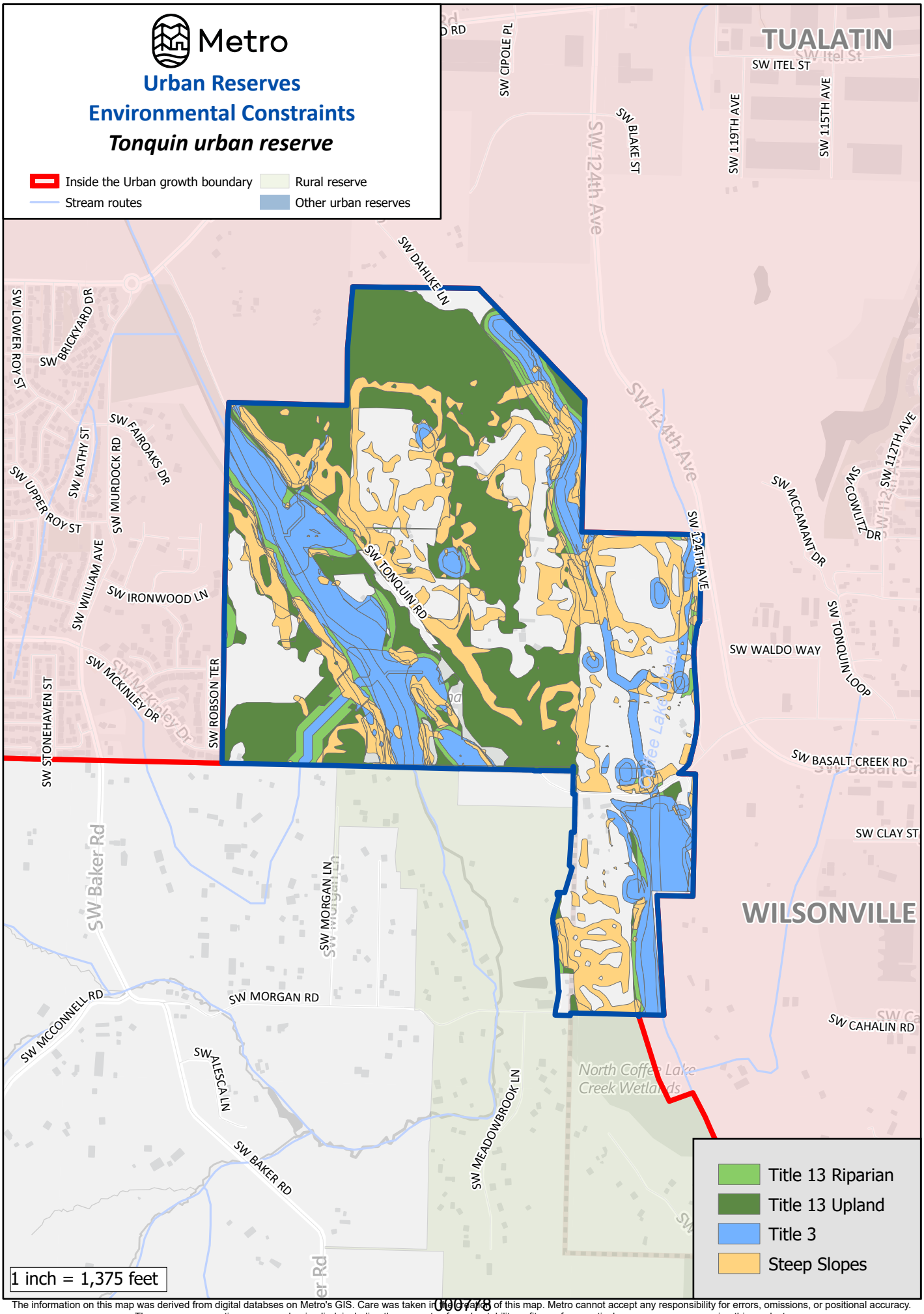

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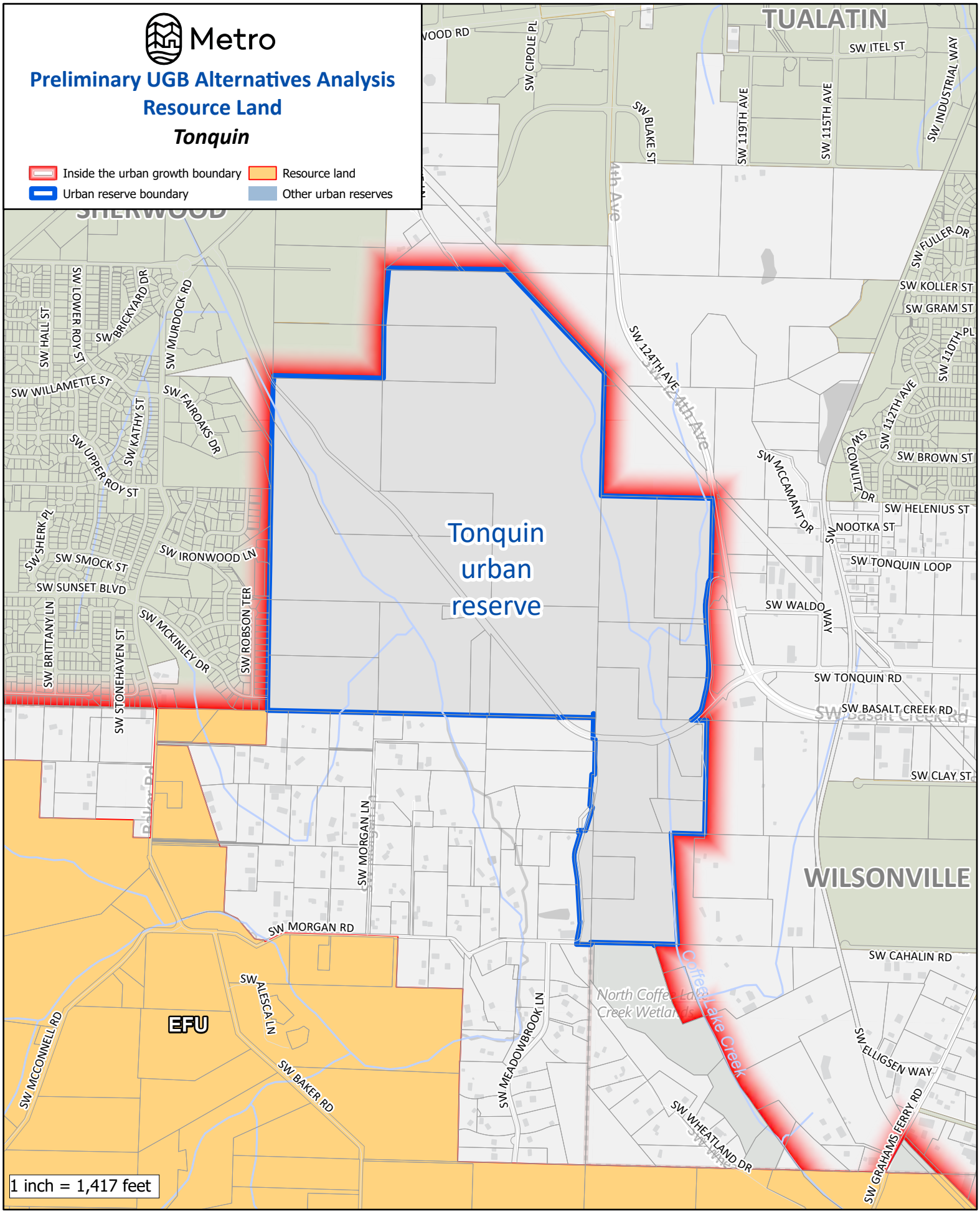

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WILSONVILLE SOUTHWEST URBAN RESERVE

Total Reserve Area	67 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	64 acres
Gross Vacant Buildable Area	27 acres
Net Vacant Buildable Area	**20 acres**

The Wilsonville Southwest Urban Reserve is a somewhat triangularly shaped area on the south side of SW Wilsonville Road and only about 250 feet northwest of the Willamette River. The east side of the reserve is adjacent to the UGB and Wilsonville city limits and the reserve is otherwise entirely surrounded by rural reserve lands, which include the Metro-owned Graham Oaks Nature Park directly to the north across SW Wilsonville Road.

GOAL 14 BOUNDARY LOCATION FACTORS

Factor 1: Efficient accommodation of identified land needs

The Wilsonville Southwest Urban Reserve is comprised of just four tax lots, all of which are entirely within the reserve and are contiguous. The combined area of these tax lots is 64 acres. Three of the tax lots are between two and six acres in area; the other tax lot is larger than 50 acres. As noted above, the entire reserve contains 27 gross vacant buildable acres and 20 net vacant buildable acres.

According to aerial imagery, the reserve has only a few rural residences and the vast majority of the land is in agricultural use. Three of the tax lots have assessed improvements, with a median assessed value of those tax lots' improvements exceeding $833,000.

The reserve is adjacent to Corral Creek Natural Area and the Graham Oaks Nature Park and is less than 1,000 feet from River Fox Park. Boones Ferry Primary School and Inza R. Wood Middle School are about a quarter mile away via SW Wilsonville Road. The reserve is separated from existing urban low density residential development to the east by Willamette Way, a local street. The nearest interstate, I-5, is approximately 1.5 miles away. Existing employment uses along SW Boones Ferry Road and SW Bailey St, are also within 1.5 miles. South Metro Area Regional Transit (SMART) has a bus stop directly across SW Wilsonville Road from the reserve.

Large sections of the reserve have slopes greater than 10 percent, though the northernmost portion of the reserve near SW Wilsonville Road is generally flat. These flatter areas, with nearby transit service and relatively direct access to I-5, could potentially accommodate employment uses. The remainder of the reserve closer to the Willamette River and still near to schools and recreational facilities are more suitable to residential land uses.

In general, this reserve is considered able to accommodate both residential and employment land needs.

Factor 2: Orderly and economic provision of public facilities and services

Water Services

With regard to water services, the Wilsonville Southwest Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Adjacent lands inside the UGB are served by the City of Wilsonville. The city's primary supply comes from the Willamette River. There is a single water treatment plant, the Willamette River Water Treatment Plant, that serves the city and is in shared ownership with Tualatin Valley Water District. The treatment plant is understood to be capable of processing 15 MGD, and a planned improvement will bring capacity to 20 MGD in order to serve development in the existing UGB through the year 2036. There are currently no significant known storage, pumping, or distribution system deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The city is believed to have ample water rights for the long term, so water supply to urban development of the reserve is likely not an issue. The planned expansion of the treatment plant should provide sufficient capacity for development of the reserve. Existing storage tanks, however, do not have capacity to serve development outside of the existing UGB. Based on topography, the reserve could be served by gravity from the Elligsen Reservoirs (i.e., not require pumping). Future system infrastructure as shown in the City of Wilsonville Water System Master Plan is adequately sized for required fire flow and operating pressures.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

Additional storage capacity will be needed to avoid negative impacts to service in the UGB.

d. Estimated water service-related costs for reserve development

Water piping, pumping, and storage costs	Cost
10-inch pipe	$0.81 million
12-inch pipe	$0
16-inch pipe	$1.1 million
Pumping	$0
Storage	$0.02 million
Total:	**$1.93 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$4,789**

Sanitary Sewer Services

With regard to sanitary sewer services, the Wilsonville Southwest Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Wastewater from adjacent lands in the City of Wilsonville is conveyed in a city-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP), which was upgraded in 2014 to a capacity of 4.0 MGD, resulting in excess capacity. That excess capacity is believed to be able to accommodate growth in the Frog Pond areas recently added to the UGB. The city is planning to planning on necessary system upgrades to meet future needs. The existing system, including its piping and pump stations, is not known to have any hydraulic deficiencies.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

Depending on the timing of additional development in the UGB, planned treatment plant upgrades may be needed sooner in order for the system to also serve new development in the Willsonville Southwest Urban Reserve. There are currently no capacity issues with any of the three pumps that may serve the reserve; however, they are all reaching the end of their useful service and the city has identified capital improvement projects to rehabilitate them within the next 20 years. Based on topography, a new pump station will be required to connect sanitary lines for the reserve to the existing system. This pump station is identified in the City of Wilsonville Wastewater Master Plan.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

As noted above, aging pump stations will likely need to be rehabilitated and, depending on timing of other growth, treatment plant facilities upgraded, in order for Wilsonville Southwest development to not negatively impact service to areas already inside the UGB.

d. Estimated sanitary sewer service-related costs for reserve development

Sanitary sewer piping and pumping costs	Cost
10-inch pipe	$0.45 million
12-inch pipe	$0
15-inch pipe	$0
Pump station	$0.18 million
Force mains	$0.21 million
Total:	**$0.84 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$2,109**

Stormwater Management Services

With regard to stormwater management services, the Wilsonville Southwest Urban Reserve is given a "medium" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(d) below.

a. Capacity of existing facilities to serve areas already inside the UGB

The City of Wilsonville Stormwater Master Plan (2012) identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The identified problem areas were isolated and there were no serious flooding issues identified under existing conditions.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography, it seems likely that stormwater management for the development of Wilsonville Southwest would occur within the development area and outfall directly to Corral Creek, which drains directly to the Willamette River without connecting to an existing public stormwater system. The aforementioned master plan does not indicate any problem areas in the short portion of Corral Creek between the Wilsonville Southwest Urban Reserve and the Willamette River.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

If stormwater outfalls directly to Corral Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.

d. Estimated stormwater service-related costs for reserve development

Stormwater piping and water quality/detention	Cost
18-inch pipe	$0.92 million
24-inch pipe	$0
30-inch pipe	$0
Water quality/dentition	$0.87 million
Total:	**$1.79 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$4,453**

Transportation Services

With regard to transportation services, the Wilsonville Southwest Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor, for the reasons detailed in (a)-(e) below.

a. Capacity of existing facilities to serve areas already inside the UGB

Figure 4.36 in Chapter 4 of the 2023 Regional Transportation Plan (RTP) displays 2020 home-based vehicle miles traveled (VMT) per capita by Metro transportation analysis zone, with average VMT per capita considered 11.32. According to that figure, areas in the UGB adjacent to the Wilsonville Southwest Urban Reserve had an above the regional average home-based VMT per capita in 2020.

Metro's adopted 2040 Growth Concept Map designates a town center in the adjoining City of Wilsonville. Town centers are meant to: serve populations of tens of thousands of people; offer more locally-focused retail uses and public amenities; and be well served by transit. The roughly 100-acre and centrally-located Wilsonville Town Center aligns with this 2040 Growth Concept Map area. The City of Wilsonville's Town Center Plan envisions it as vibrant, walkable destination that inspires people to come together and socialize, shop, live, and work. The town center, as well as nearby employment areas on the opposite (west) side of I-5, include grocery and drug stores, a library, medical and dental offices, banks, and restaurants. These areas also contain and are adjacent to residential uses, including higher-density residential uses. The town center is located a short distance from the terminus of the TriMet's Westside Express Service (WES) Commuter Rail line, which provides service up to Beaverton.

South Metro Area Regional Transit (SMART), the City of Wilsonville's bus service, provides transit services to the city through seven bus lines; Route 4 "Wilsonville Road Line" connects the town center to areas in the western portion of Wilsonville's UGB, such as the Graham Oak Nature Park, and to development in the east of the city along SW Wilsonville Road.

The town center's existing land uses and transit service, and some availability for new development in and near the town center, demonstrate that growth in the current UGB near the town center will not necessarily cause a significant increase in VMT per capita, as residents will be able to access some daily needs through modes other than private motor vehicle transport. Growth in other areas of the city where residential uses surround schools and parks are is also unlikely to significantly impact VMT per capita.

However, the town center and its adjacent employment areas are more than a mile away from the areas in the UGB adjacent to the reserve. Those areas in the UGB near the reserve are primarily zoned for low density residential development rather than for employment uses, and the transit service to these areas is limited. Under these conditions, growth in these areas in the UGB near the reserve may continue to rely on

private motor vehicle transportation, though existing transit service and bike and pedestrian infrastructure can provide alternatives.

Indeed, in addition to routes described above, SMART also provides medical transport services, a Villebois shopping shuttle, and connections to Keizer and Woodburn. The vast majority of the city's developed areas are within a quarter of a mile of a transit stop. Figure 4.3 in Chapter 4 of the 2023 RTP does, nonetheless, identify a gap in frequent transit service along SW Boones Ferry Road and other locations in the north of the city.

Wilsonville has a well-defined bike network of at least 19 miles of dedicated bike lanes and at least eight miles established bikeways that connect neighborhoods, schools, parks, community centers, business districts, and natural resource areas. Figure 4.5 in Chapter 4 of the 2023 RTP shows several existing bike facilities in Wilsonville as a part of the planned regional bike network, including facilities on SW Boekman Road and SW Wilsonville Road. There is identified gap in regional bike facilities on SW Stafford Road.

The city also has a fairly well-defined pedestrian network in its town center and residential neighborhoods, though with less pedestrian amenities in some industrial and employment areas. I-5 generally provides a barrier for east-west pedestrian connections, but there are sidewalks along both sides of SW Wilsonville Road as it crosses under I-5; there are no sidewalks on SW Boeckman Road over I-5. Figure 4.4 in Chapter 4 of the 2023 RTP shows a number of streets in Wilsonville as on the regional pedestrian network, including SW Wilsonville Road, SW Barber Street, and SW Boeckman Road west of I-5. The figure identifies gaps in the planned regional pedestrian network along SW Boeckman Road east of I-5.

Figure 4.6 in Chapter 4 of the 2023 RTP identifies a number of trails in the south and west of Wilsonville as in the planned regional trail network.

There are no high injury corridors or high injury intersections in Wilsonville's portion of the UGB identified on Figure 4.14 in Chapter 4 of the 2023 RTP.

The portion of I-5 bisecting Wilsonville is identified as a throughway in Figure 4.7 in Chapter 4 of the 2023 RTP. Figure 4.8 in Chapter 4 of the RTP indicates that it currently meets RTP travel speed reliability performance thresholds, with no more than four hours per day when travel speeds fall below the identified minimum speed. RTP models indicate this reliability of this section of I-5 will continue at least to the year 2045.

b. Capacity of existing facilities to serve areas proposed for addition to the UGB

The nearest RTP-designated throughway, I-5, is about 1.5 miles from the reserve. As noted above, I-5 through Wilsonville currently meets RTP travel speed reliability performance standards. Given its relatively small size, urban development of the reserve is unlikely to generate sufficient traffic on the highway to cause it to no longer meet those performance thresholds.

SMART's Route 4 already serves the Graham Oaks Nature Park that is across SW Wilsonville Road from the reserve. SW Wilsonville Road also has a dedicated bike lane and Graham Oaks Nature Park has an established bikeway that connects to Villebois and other bike facilities. Also nearby is an established bikeway along the Ice Age Tonquin Trail that connects to the Willamette River east of the reserve. SW Wilsonville Road and some has sidewalks, and a crosswalk across SW Wilsonville Road provides access to the Graham Oaks Nature Park and Villebois to the north and the Ice Age Tonquin Trial and the Willamette River to the south and east of the reserve. However, some of the local streets in the adjoining residential neighborhood in the UGB lack sidewalks, including much of Willamette Way along the east side of the reserve.

School uses (Boones Ferry Primary School and Inza R. Wood Middle School) are only about a quarter mile from the reserve, and are connected to it by the bike and pedestrian facilities along SW Wilsonville Road noted above, allowing the opportunity for future residents of the reserve to access these schools without travel by private motor vehicle. The facilities along SW Willsonville Road and the SMART transit service would also provide some alternatives to private motor vehicle use for future residents accessing the nearby town center and surrounding employment uses.

c. Impacts to existing facilities that serve nearby areas already inside the UGB

SW Wilsonville Road would see some additional private motor vehicle traffic as a result of urbanization of the reserve. However, given the small size of the reserve, the proximity of schools, parks, the town center, and employment uses, and the direct availability of transit service and bike and pedestrian facilities, additional traffic is likely to be minimal. The bike and pedestrian facilities and nearby trails would see some amount of additional use.

Development of this small reserve is unlikely to cause facilities in Wilsonville to become high injury corridors or intersections, jeopardize the throughway reliability of I-5, or cause significant increases in the area's home-based VMT per capita.

d. Need for major transportation facility improvements and associated costs

To serve urban development, approximately 0.38 miles of SW Wilsonville Road at the north of the reserve will likely need to be improved to urban arterial standards, including with acquisition of additional right-of-way. The terrain the improved roadway would cross is moderately flat and no stream-crossings are necessary; therefore, normal per-mile costs are expected.

Facilities	Cost
Arterials, existing/improved full street	$18.35 million
Arterials, existing/improved half street	$0
Arterials, new	$0
Collectors, existing/improved full street	$0
Collectors, existing/improved half street	$0
Collectors, new	$0
Total:	**$18.35 million**
Per dwelling unit at 20 units per net vacant buildable acre:	**$45,647**

c. Provision of public transit service

SMART evaluated the reserve for providing transit service. SMART could potentially provide services to the reserve, although there is no guarantee of service. Actual service depends on the level of development and the feasibility of a navigable turnaround for Category A buses. Service could be provided at 15- to 30-minute headways weekdays and Saturdays. Annual service cost of adding fixed-route and complementary paratransit service would be $55,000 in addition to services already being provided. This annual service cost would increase with the cost of inflation each year.

Prior to land being included in the UGB, a more detailed concept plan, consistent with the requirements of Metro's Urban Growth Management Functional Plan Title 11, is required. This concept plan process will develop more refined public facility and service needs and cost estimates.

Factor 3: Comparative environmental, social, energy, and economic consequences

Environmental consequences

There are no stream corridors or wetlands within the Wilsonville Southwest Urban Reserve. Corral Creek is located just south of the reserve on Metro-owned land that is unlikely to be developed. Some riparian and upland habitat associated with Corral Creek is identified in the southern portion of the reserve. Mapped upland habitat extends into what appear to actually be orchards in the reserve, but orchards would not be included in a natural resource protection program adopted prior to urbanization because they are for agriculture. Urbanization could likely avoid the identified natural resources located in the southern portion of the reserve, with no impacts to the habitat areas. Therefore, urbanization of the reserve is expected to have comparatively low environmental consequences. Additional environmental consideration, specifically regarding avoidance of conflict between urban development and regionally significant fish and wildlife habitat, is provided in the Metro Code Factors Analysis (Appendix 7A).

Considering the comparative environmental consequences of urbanization, the Wilsonville Southwest Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Social, energy, and economic consequences

Relative to other reserves, the Wilsonville Southwest Urban Reserve is quite small and future urbanization of the reserve will be minor in scale. While any development will impact the few existing residences in the reserve, these residences' location already close to an established urban neighborhood of Wilsonville, a primary school, a middle school, and the Grahams Oak Nature Park will mean that development will not lead to significant changes in the area's character. Moreover, urbanization of the reserve with a mixture of uses could bring new social and recreational opportunities for existing residents.

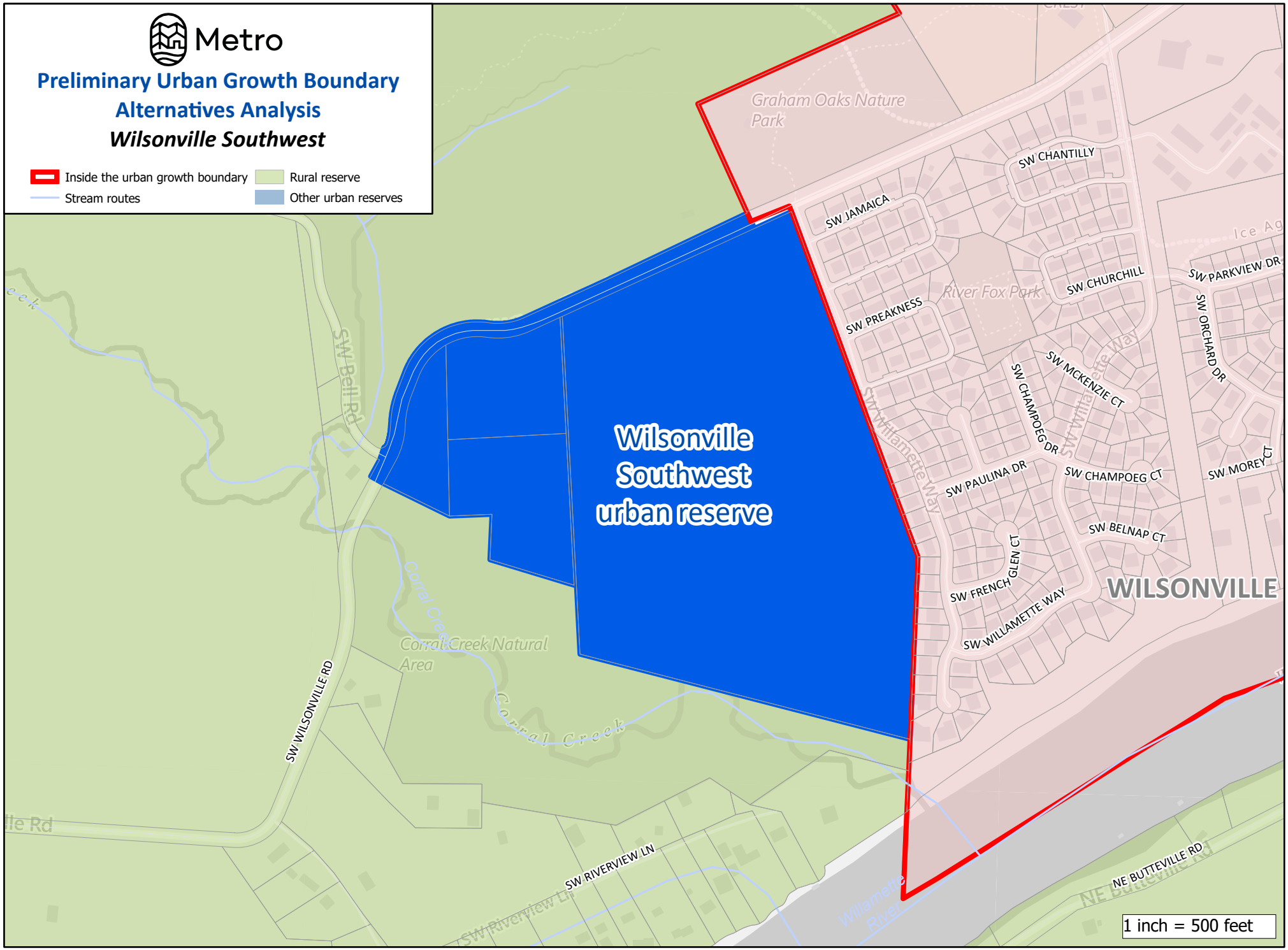
SW Wilsonville Road provides an easy connection to commercial and employment areas in the City of Wilsonville, bike facilities, the WES commuter line, and I-5, which, as detailed more fully in response to Factor 2, could help limit increased VMT from urbanization. In addition, given the modest amount of development that would occur, the increase in traffic would not be great and would not lead to significant energy consequences.

The agricultural acreage within the reserve is minimal at only about 40 acres, so the economic impact from the loss of agricultural activity would not be considerable; indeed, the economic benefits of residential and/or employment development of the reserve may outweigh this loss.

This analysis finds that there would be comparatively low social, energy, and economic consequences from urbanization of this small reserve. The Wilsonville Southwest Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location sub-factor.

Factor 4: Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

All of the lands bordering the Wilsonville Southwest Urban Reserve outside of the UGB have Goal 3 zoning, specifically Exclusive Farm Use (EFU) zoning by Clackamas County. There are no apparent agricultural activities occurring on these adjoining EFU lands and, while some are forested, nearly all of it is owned by Metro and therefore not likely to be used for commercial forestry. One small adjoining EFU-zoned tax lot at the intersection of SW Wilsonville Road and SW Bell Road has a rural residence. Considering these conditions and the fact that the relatively small reserve could accommodate only minimal development, the proposed urban uses (i.e., urban development of the reserve) is considered to have high compatibility with nearby agricultural activities occurring on farm and forest land outside the UGB. The Wilsonville Southwest Urban Reserve is given a "high" score in Attachment 3 for this Goal 14 boundary location factor.



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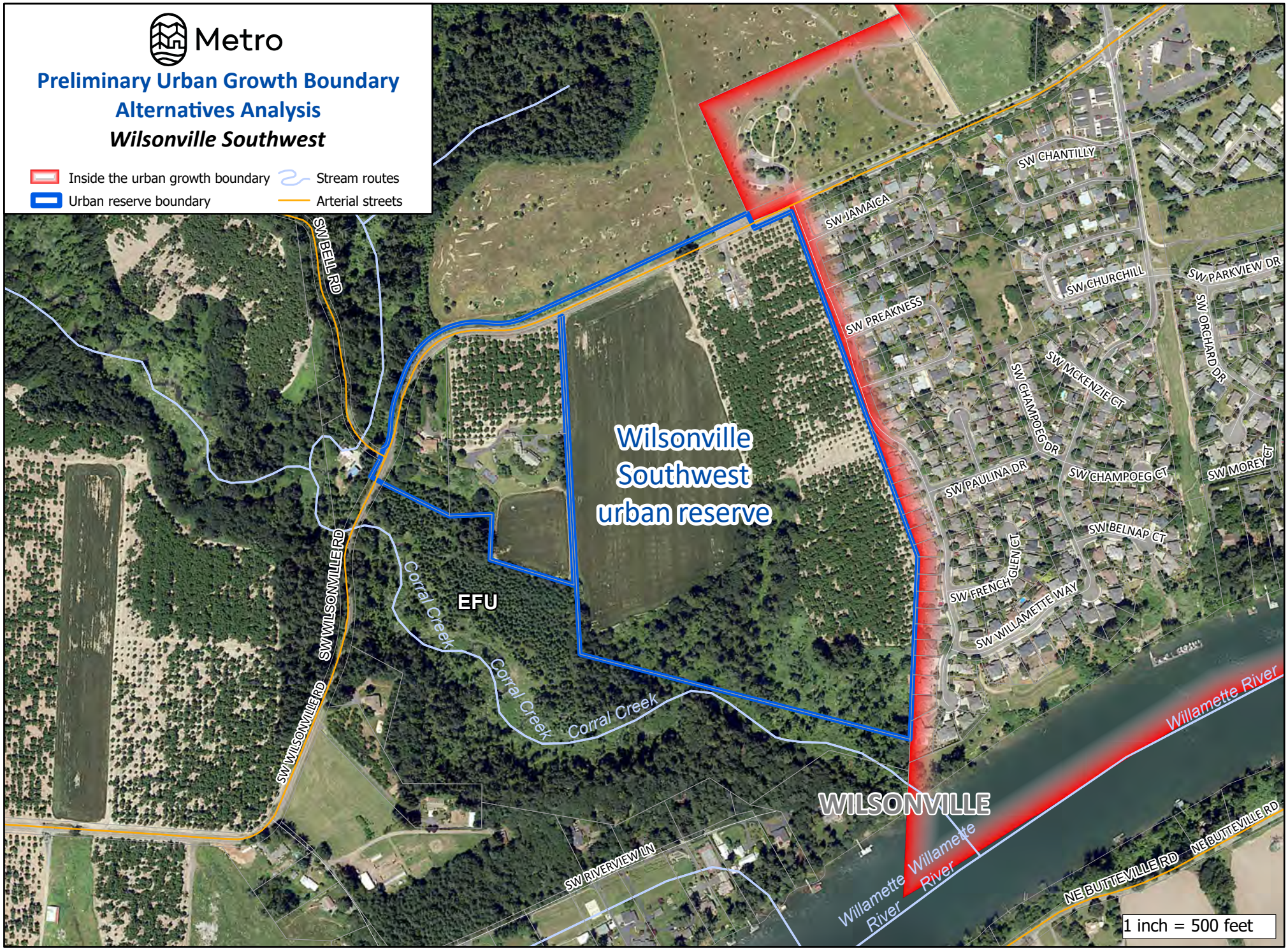

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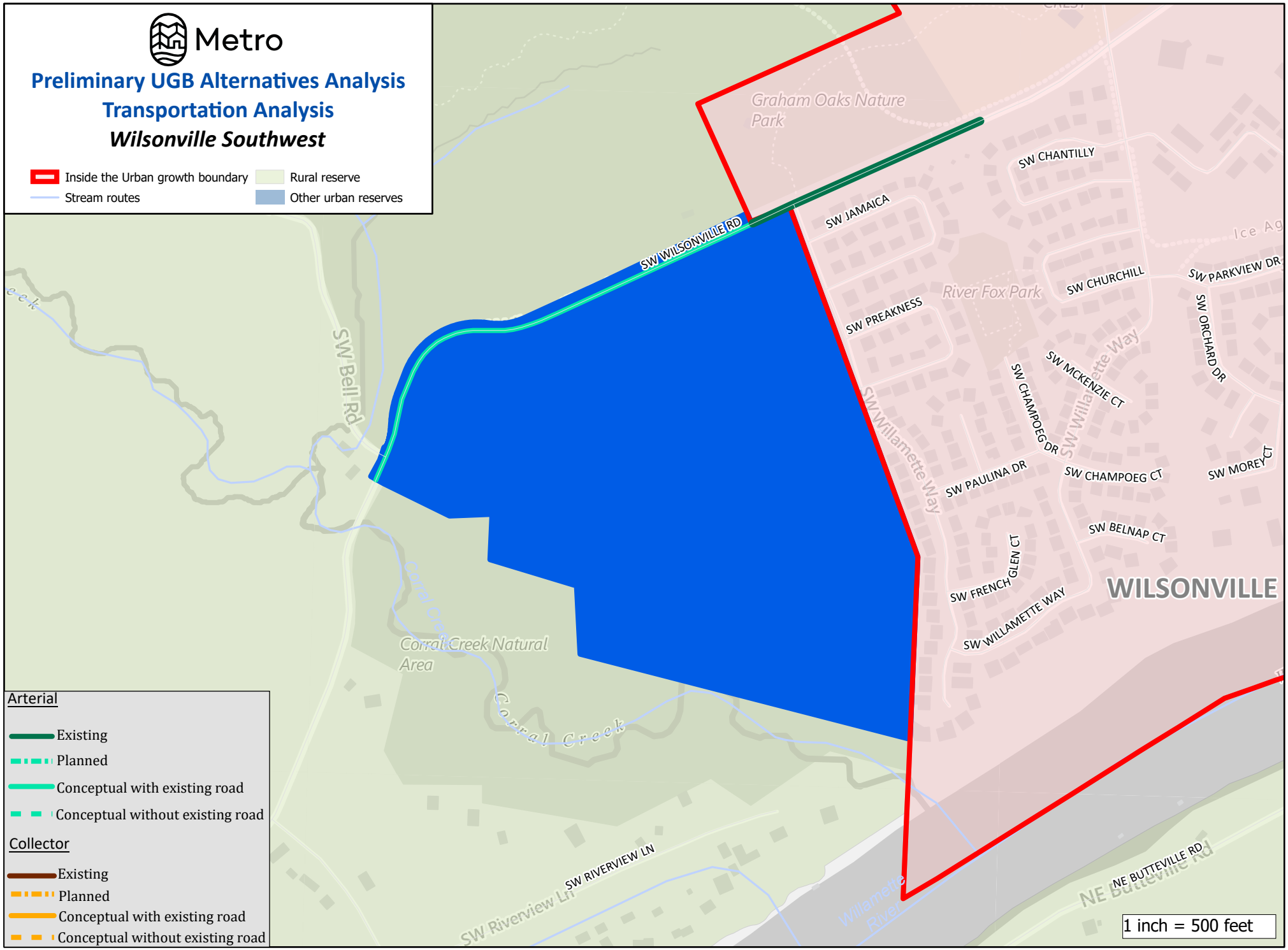

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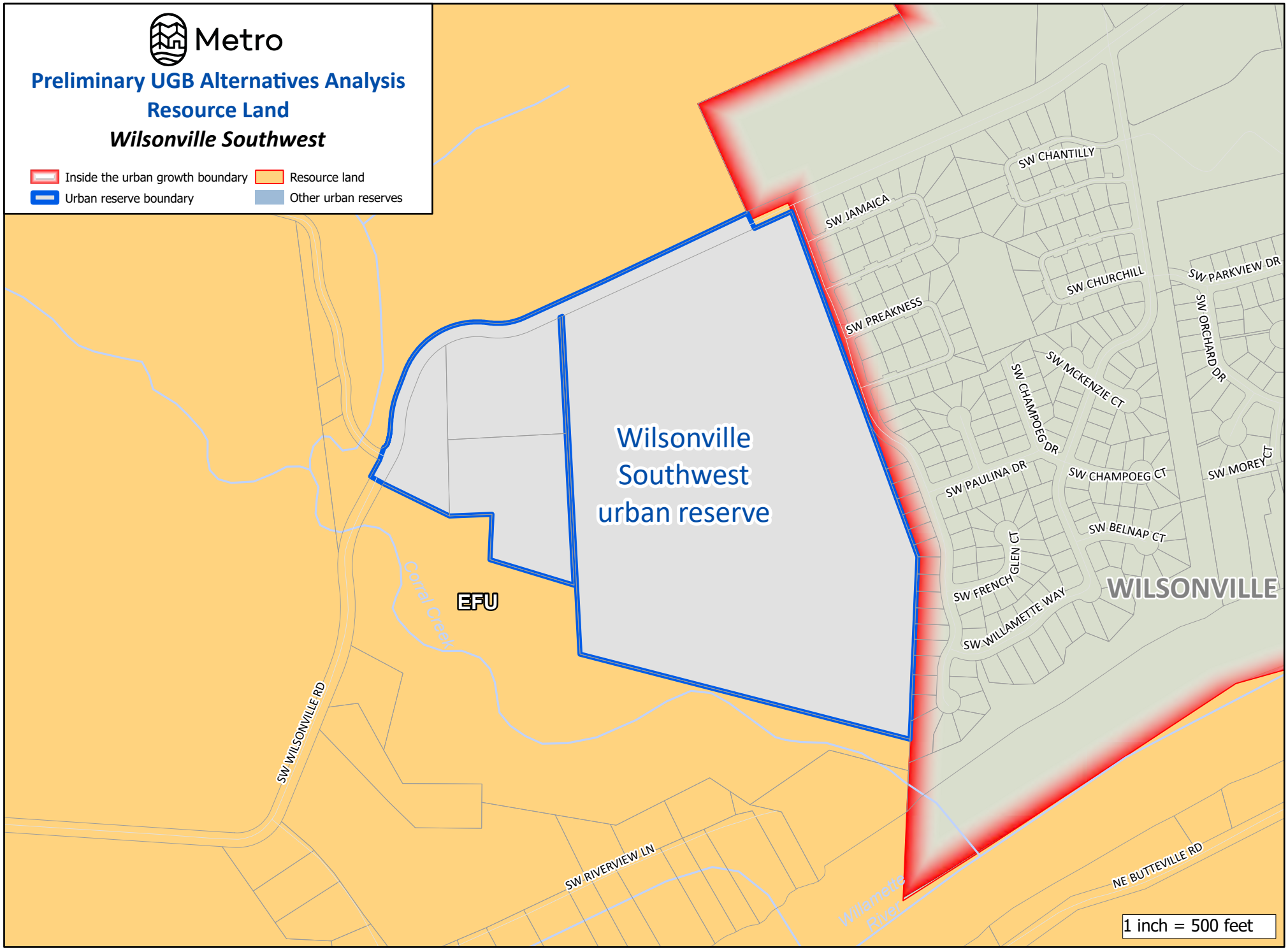

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Appendix 7, Attachment 3: Goal 14 Boundary Location Factors Analysis Results (Page 1 of 2)
2024 Urban Growth Report

	Factor 1	Factor 2				Factor 3		Factor 4
Urban Reserve	**Accommodation of Land Need[1]**	**Water Services**	**Sanitary Sewer Services**	**Stormwater Management Services**	**Transportation Services**	**Environmental Consequences[2]**	**Social/Energy/ Economic Consequences[2]**	**Compatibility with Ag and Forest Activities**
Beaver Creek Bluffs	Yes (R)	Medium	Low	Medium	Low-Medium	Low (High)	Low (High)	High
Bendemeer	Yes (R) (E)	High	High	Medium	Medium-High	Medium-High (Low)	Low (High)	Medium-High
Bethany West	Yes (R) (E)	High	High	Medium	Medium	Low (High)	Low (High)	Medium
Boring	Yes (R) (E)	Low	Low	Medium	Low	Medium-High (Low)	Medium	Low
Boring – Highway 26	Yes (R) (E)	Low	Low	Medium	Low	Low (High)-Medium	Low (High)-Medium	Medium-High
Borland	Yes[3] (R) (E)	Medium	Low	Medium	Medium	Low (High)-Medium	Low (High)	Medium-High
Brookwood Parkway	Yes (R)	Medium	High	High	Medium	Low (High)	Low (High)	High
Damascus	Yes (R) (E)	Medium	Low	High	Low	Low (High)-Medium	Medium-High (Low)	High
David Hill	Yes (R)	Medium	Medium	Low	Low	Low (High)	Medium	Medium
Elligsen Road North	Yes (R) (E)	High	Low	Medium	High	Low (High)	Medium	Low
Elligsen Road South	Yes (R) (E)	High	Low	Medium	Medium	Medium-High (Low)	Low (High)	Low
Grahams Ferry	Yes (R)	Medium	Medium	Medium	High	Low (High)	Low (High)	High
Gresham East	Yes (R) (E)	Medium	Low	High	Medium	Medium-High (Low)	Medium	Low
Henrici	Yes (R)	Low	Medium	Medium	Medium	Low (High)	Low (High)	High
Holcomb	Yes (R)	Low	Low	Medium	Low	Low (High)	Low (High)-Medium	Medium-High
Holly Lane – Newell Creek Canyon	Yes (R)	Medium	Medium	Medium	Medium	Low (High)	Low (High)	High

Appendix 7, Attachment 3: Goal 14 Boundary Location Factors Analysis Results (Page 2 of 2)
2024 Urban Growth Report

	Factor 1	Factor 2				Factor 3		Factor 4
Urban Reserve	**Accommodation of Land Need[1]**	**Water Services**	**Sanitary Sewer Services**	**Stormwater Management Services**	**Transportation Services**	**Environmental Consequences[2]**	**Social/Energy/ Economic Consequences[2]**	**Compatibility with Ag and Forest Activities**
I-5 East – Washington County	Yes (R)	Low	Medium	High	Low-Medium	Medium-High (Low)	Medium	Low
Maplelane	Yes (R)	Medium	Low	Medium	Low-Medium	Medium-High (Low)	Low (High)	High
Norwood	Yes (R)	Low	Low	Medium	Low	Low (High)-Medium	Low (High)-Medium	Low
Rosa	Yes (R)	Medium	Medium	Medium	Low	Low (High)-Medium	Medium	Medium
Rosemont	Yes[3] (R)	Medium	Low	High	Medium-High	Low (High)	Low (High)	High
Sherwood North	Yes (R) (E)	High	Medium	High	High	Low (High)-Medium	Low (High)	High
Sherwood South	Yes (R)	Low	Low	Low	Low-Medium	Medium-High (Low)	Low (High)-Medium	High
Sherwood West	Yes[4] (R) (E)	Medium[4]	Medium[4]	High[4]	Medium-High[4]	Low (High)– Medium	Medium	Medium
Stafford	Yes[3] (R)	Medium	Low	Medium	Low	Medium-High (Low)	Medium	High
Tonquin	Yes (R) (E)	Low	Low	Medium	Low	Low (High)-Medium	Low (High)-Medium	High
Wilsonville Southwest	Yes (R) (E)	Medium	Medium	Medium	High	Low (High)	Low (High)	High

Notes:

1: (R) = Can accommodate a *residential* land need; (E) = Can accommodate an *employment* land need

2: Goal 14 Factor 3 reports on the consequences of urbanizing an area. Therefore, a "low" consequence receives a "high" score, while a "high" consequence receives a "low" score.

3: In 2019, the cities of Lake Oswego, Tualatin, and West Linn entered into an agreement that prohibits any one of those cities from completing a concept plan for any part of the Borland, Rosemont, and Stafford Urban Reserve areas until, at the earliest, December 31, 2028, which weighs heavily against these reserves regarding their ability to efficiently accommodate identified needs for residential or employment land under Goal 14 Factor 1.

4: The Sherwood West Urban Reserve is the only reserve with an adopted concept plan, which, as detailed in the *Introduction and Methodologies* section of Appendix 7, is a primary consideration in whether the reserve can efficiently accommodate an identified land need under Goal 14 Factor 1 and will facilitate the orderly and economic provision of public facilities and services in the future under Goal 14 Factor 2.

MACKENZIE.

METRO RESERVES GOAL 14 – UTILITY ANALYSIS

To
Metro

Dated
June 3, 2024

Project Number
2230233.00

MACKENZIE
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PROJECT PURPOSE

The goal of this project is to complete a comparative analysis of Metro's urban reserves to identify land suitable for addition to the Urban Growth Boundary (UGB). The analysis must comply with Oregon Administrative Rules (OAR) Chapter 660, which requires an evaluation and comparison of the relative costs, advantages, and disadvantages of alternative UGB expansion areas with respect to the provision of public facilities and services (water, sanitary sewer, stormwater management, and transportation facilities) that would be needed for urban development of those alternative locations. Mackenzie has completed the water, sanitary sewer and stormwater components in this report.

The purpose of this project is to analyze:

- The capacity of the existing public water, sanitary sewer, and stormwater facilities to serve areas already inside the UGB.
- The capacity of the existing water, sanitary sewer, and stormwater facilities to serve areas that may be proposed for addition to the UGB (i.e. the 27 Metro urban reserves).
- The impacts to existing water, sanitary sewer, and stormwater facilities that serve nearby areas already inside the UGB.

The Metro Goal 14 Utility Analysis was divided into 6 tasks:

Task 1: Kickoff meeting and refinement of work program. The project began with a meeting to clarify and refine the work program, define the format of the products, and finalize data needs to be provided by Metro. It was also discussed whether the analysis should assume only urban residential development or other urban uses (e.g. commercial, industrial, or institutional uses). Metro provided maps, acreage, base maps, assumed number of dwelling units and preliminary arterial and collector roadway networks for all 27 urban reserves.

Tasks 2-4: Assessment of the capacity of existing water, sanitary sewer and stormwater facilities to serve areas already inside the UGB, areas proposed for addition to the UGB, and the impacts that serving areas proposed for addition to the UGB to areas currently inside the UGB. Mackenzie used the data and documents provided by Metro, as well as publicly available GIS information to analyze the size and location of existing public water, sanitary sewer, and stormwater infrastructure. In addition, jurisdictional master plans were reviewed, and for some sites, contact was made with City or County staff when information was absent or incomplete.

Task 5: Development of preliminary cost estimates for providing water, sanitary sewer, and stormwater services to each of the 27 urban reserves. Mackenzie put together Cost Estimate Tables for each of the 27 urban reserves based on utility demands as calculated for the assumed dwelling units per net acre provided by Metro.

Task 6: Final report. A draft report was provided to Metro for comments and questions, which were incorporated into the final report. The final report includes Utility Analysis Maps and Cost Estimate Tables.

ASSUMPTIONS

- All buildable land will be developed as residential, at a rate of 20 dwelling units per residential acre (as provided by Metro). Mackenzie has reviewed the capacity needs for this level of residential development versus non-specific commercial, industrial, and institutional development and their typical lot or area coverage. In general, environmental constraints have equal impact across all development types, with the expectation that residential may have higher potential on greater slopes. For water, sanitary sewer, and stormwater utility service needs, the assumption of residential development provides sufficient comparison for comparison to other uses.
- Franchise utilities such as natural gas, electricity, and telecommunications were not included in the study. In general, these utilities install infrastructure on demand as development occurs. This is not to suggest that these utilities do not need to plan for future growth and expansion of their distribution systems; however, since they are not public agencies, their long-range planning objectives may not be publicly available. In our experience, coordination with franchise utility providers is an important step for new development, and public infrastructure improvements – roadways in particular – should consider providing franchise utility easements or other access to the infrastructure backbone.
- Residents per dwelling unit: 2.2 (as provided by Metro)
- Residential water demand = 150 gallons per capita per day (gpcpd)
- Residential sanitary demand = residential water demand

COST DETERMINATION

Cost estimates presented in this analysis have been developed at a planning level. Unit costs for water, sewer, and storm drainage system upgrades are based on linear feet of pipe through a development area and are meant to reflect construction of the various parts of the overall conveyance system such as pipe, manholes, inlets, valves, etc. The cost estimates do not include soft costs such as design, permitting, and system development charges. Construction cost updates have been estimated based on cost factors reported by RS Means, Engineering News Record, local utility master plans, and recent bid tabulations. The following tables summarize the unit costs used for this study.

General Cost Determination Assumptions:

- Large diameter pipes will be located in existing and planned arterials and collectors within the urban reserve area (URA) as shown in the Preliminary Urban Growth Boundary Transportation Analysis provided by Metro. For some sites where a master plan has already indicated a size and location for large diameter pipes, those are shown in lieu of placing within the arterials and collectors. Construction for on-site utilities, such as private water, sewer, and storm drainage piping or treatment facilities, is not included in the study methodology and cost estimate.

- Costs associated with capital improvement projects identified in jurisdictional master plans outside the URA boundary and required to provide service to URAs are included unless the project is identified as currently funded.

- Required improvements to existing jurisdictional facilities outside the URA may be discussed in the narrative, but costs are not included in the Cost Estimate Tables.

Water

- Storage Reservoirs – It is assumed each URA will be required to provide additional storage (unless surplus capacity is identified in jurisdictional master plans as specifically serving URAs in this report) and is calculated based on number of dwelling units as provided by Metro assuming the required storage volume is for a 24-hour period. Additional storage could be an expansion of an existing facility or a new facility depending on when development of URAs occur and other development occurring outside the URA at the same time. For this reason, storage is not shown on the Utility Analysis Maps.

- Pump Stations – Costs for pump stations are included for URAs that are projected to be served by pressure zones that require pumping as indicated in jurisdictional master plans and is calculated based on number of dwelling units as provided by Metro.

- Water Mains – Located in existing and planned arterials and collectors within the URA.

Table 1: Water Construction Unit Costs		
Item	**Units**	**Unit Cost**
10” Pipe	Linear Feet (LF)	$350
12” Pipe	Linear Feet (LF)	$400
15” Pipe	Linear Feet (LF)	$500
Pump Station	Million Gallons/Day (MGD)	$5,800,000
Storage Reservoir	Million Gallons (MG)	$200,000

Sanitary Sewer

- Locations for sanitary mains are identified based on topography and shown in existing or proposed arterials and collectors where possible.

- Pump Stations – where topography indicates a need, pumps and force mains are shown on the Utility Analysis Maps and included in Cost Estimate Tables. Proposed force mains are combined into one unit cost; force main sizing considers several design factors and is beyond the scope of this analysis.

Table 2: Sanitary Sewer Construction Unit Costs		
Item	**Units**	**Unit Cost**
10” Pipe	Linear Feet (LF)	$275
12” Pipe	Linear Feet (LF)	$350
15” Pipe	Linear Feet (LF)	$375
Force Main	Linear Feet (LF)	$310
Pump Station	Million Gallons/Day (MGD)	$1,800,000

Stormwater

- Locations for storm mains are identified based on topography and shown in existing or proposed arterials and collectors where possible. Outfalls are strategically located to convey presumably treated storm runoff to local creeks and tributaries in as few locations as required to reduce the number of concentrated flows introduced to the watershed.

- Water quality/detention – calculated using a sizing factor based on linear feet of roadway as given by Metro in the Preliminary Urban Growth Boundary Transportation Analysis which gives locations for existing and proposed arterials and collectors in and around the Urban Reserve Areas. For the calculation, it is assumed that the width of a collector is 24-feet and the width of an arterial is 48-feet.

Table 3: Stormwater Construction Unit Costs		
Item	**Units**	**Unit Cost**
18” Pipe	Linear Feet (LF)	$400
24” Pipe	Linear Feet (LF)	$425
30” Pipe	Linear Feet (LF)	$500
Water Quality/Detention	Square Feet (SF)	$150

UTILITY ANALYSIS

BEAVER CREEK BLUFFS

Water

The Beaver Creek Bluffs URA would likely be served by Oregon City and Clackamas River Water (CRW) as it is located adjacent to existing Oregon City limits/service area and partially within existing service/planning area for CRW. Beaver Creek Bluffs is adjacent to Oregon City Upper Pressure Zone which serves the CRW Meyers Pressure Zone. The Oregon City Upper Pressure Zone is supplied by the Boynton Reservoir (served by the Mountainview Pump Station) and Henrici Reservoir (no pump station).

Both Clackamas River Water (South System) and Oregon City receive water from the South Fork Water Board (SFWB), with plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant in the future.

The following assessment is based on information from the City of Oregon City Water Distribution System Master Plan, dated January 2012. The Clackamas River Water - Water System Master Plan, South System, dated April 2019, does not discuss the Meyers Pressure Zone as it is small and contains mostly undeveloped land. For the assessment, buildout conditions for Oregon City are within the existing UGB only and do not include development of the Beaver Creek Bluffs URA.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Based on the following information, the existing water facilities have capacity to serve areas already inside the UGB (within the Upper Pressure Zone).

- Storage – Under existing conditions, the Boynton, Henrici and Mountainview Reservoirs have a combined surplus of 5.89 MG.
- Pump – the Mountainview Pump Station has a surplus of 3,408 gpm under existing conditions.
- Distribution – according to the Oregon City Master Plan, the existing Oregon City distribution system performs adequately with fire flow deficiencies generally isolated to small diameter or dead-end pipes.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Based on the following information, there is some surplus capacity available to serve areas proposed for addition to the UGB within the Upper Pressure Zone, however the surplus is not enough to support the development of the entire Beaver Creek Bluffs URA.

- Storage – the Boynton and Henrici Reservoirs have a combined surplus of 0.38 MG under buildout conditions.
- Pump – The Mountainview Pump Station has a surplus of 236 gpm under buildout conditions.
- Distribution – according to the Oregon City Master Plan, the future Oregon City distribution system performs adequately with fire flow deficiencies generally isolated to small diameter or dead-end pipes.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Oregon City reservoirs and pump station that would serve the Beaver Creek Bluffs URA all have surplus capacity under full buildout conditions however the calculated demand of the URA exceeds the surplus available. The existing system would experience storage and pumping deficits if additional capacity were not provided at the time of development.

Sanitary Sewer

The Beaver Creek Bluffs URA would likely be served by the City of Oregon City based on proximity. Based on topography, which generally flows south away from existing City infrastructure, sanitary for this URA will need to be pumped north to join existing Oregon City infrastructure. Due to the shape of the Beavercreek Bluffs URA, there are various connections points to the existing infrastructure along the City limits. Based on these points of connection, this URA will be served by the Parish Road and Nobel Ridge Pump Stations.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Resource Recovery Facility (WRRF), all of which is owned and operated by Water Environment Services (WES).

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014 and Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019. The Master Plan considers the future condition to include development areas at the boundaries of the City's UGB, expected development within City limits (considered by the City to be developable), and individual parcels within City limits with redevelopment potential. Beaver Creek Bluffs URA is not included in the future condition.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Surcharging (ranging from minor to severe) exists throughout the existing City collection system. There are also capacity deficiencies in several locations in the WES system.

Two of the twelve existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

There are several locations within the existing system that have predicted flooding under future conditions.

Neither pump station that would serve the Beaver Creek Bluffs URA have capacity issues under future conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Some of the surcharged pipes indicated in the master plan are downstream of the Beaver Creek Bluffs URA. Development of this URA will contribute to further surcharging of these pipes if they aren't corrected.

The Parish Road Pump Station has a total capacity of 760 gpm and a future demand of 535 gpm, leaving a surplus of 225 gpm. The Nobel Ridge Pump Station has a total capacity of 140 gpm and a future demand of 55 gpm, leaving a surplus of 85 gpm. These surpluses are not significant enough to serve the development of the Beaver Creek Bluffs URA in its entirety and additional pump capacity will be needed to avoid creating a pumping deficit for the existing system.

Storm

City of Oregon City is the likely provider for Beaver Creek Bluffs URA, as it is located within the Beaver Basin and is adjacent to the City service area boundary. The Beaver Basin does not contain any existing stormwater infrastructure and based on topography generally flows south away from City limits toward Beaver Creek, which flows west and outfalls to the Willamette River.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from City of Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

The Master Plan identifies problem areas within the existing stormwater system, categorized as issues related to flooding, infrastructure, maintenance or natural channels.

As described above, Beaver Creek Bluffs URA would likely join City infrastructure near the existing City limits. Infrastructure downstream of these connection points appear to potentially occur within the South End, Central Point, Mud, Coffee, and Amanda Court basins. These basins contain several identified problem areas in all four categories, with capital improvement projects identified to address these issues. The following is a summary of capacity issues in relevant basins:

- Central Point Basin has an undersized conveyance system in the vicinity of Central Point Road that is further complicated by a series of irregular flow patterns and structure connections.
- The Coffee Creek area near Hazelwood Drive is an ongoing capacity concern that impacts private properties.
- The South End Basin will need an upsized conveyance system to support future development and expansion of South End Road.

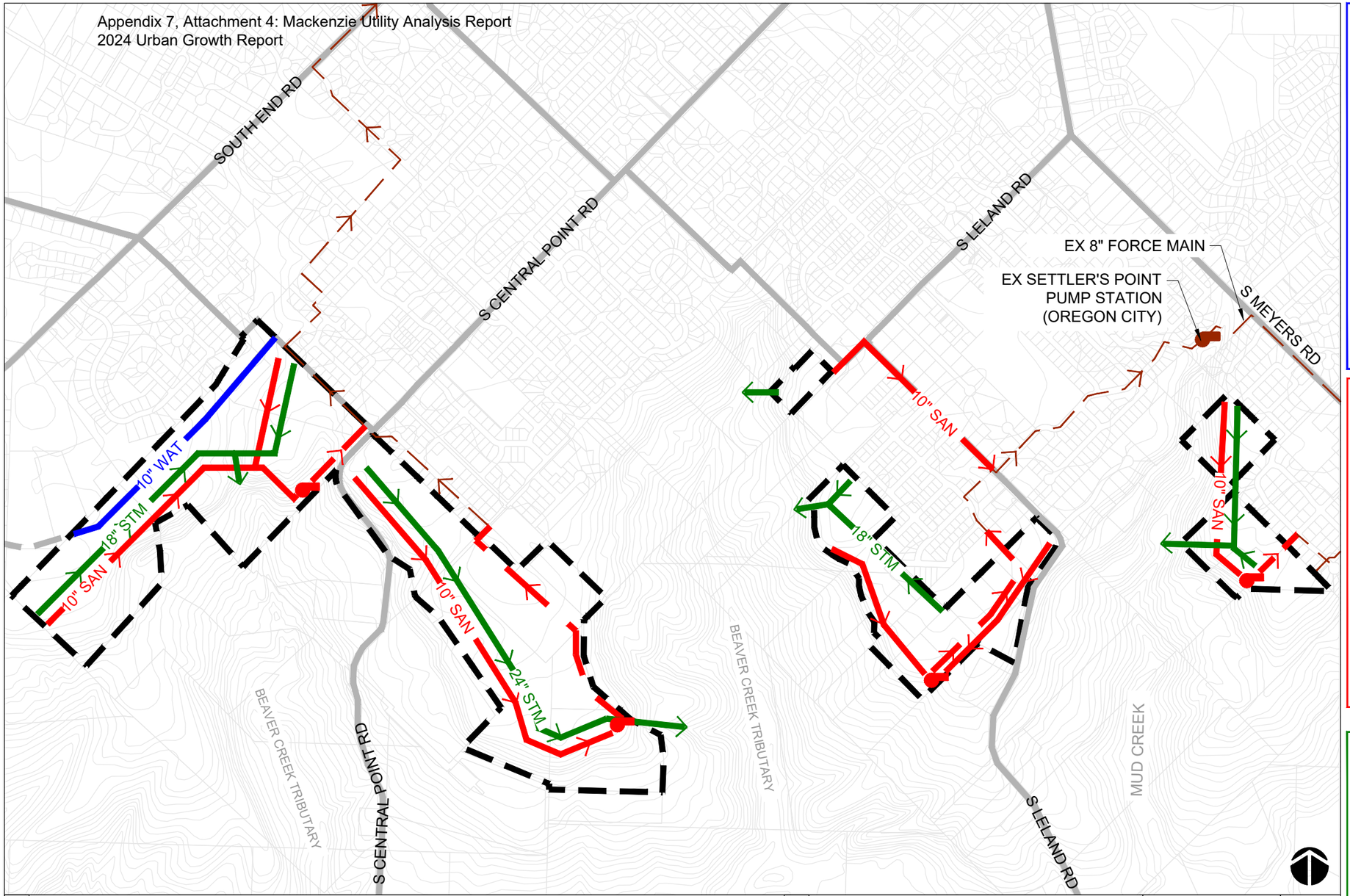
Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

There are several problem areas (as defined by the Master Plan) under existing conditions for infrastructure downstream of the URA connections points. Adding stormwater from areas outside the UGB will likely contribute to these existing problems and potentially cause additional problem areas if they are not addressed.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Beaver Basin as it drains to Beaver Creek) during a 25-year storm event.

Based on topography the Beaver Creek Bluffs URA would likely outfall directly to Mud Creek and tributaries of Beaver Creek and thus would not connect to existing City storm infrastructure. The addition of the Beaver Creek Bluffs URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: OREGON CITY/CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: UPPER (OREGON CITY)/MEYERS (CRW)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,600	$350	$910,000
12" PIPE (LF)	0	$400	0
16" PIPE (LF)	0	$500	0
PUMP STATION (MGD)	0.7	$5,800,000	$4,060,000
STORAGE RESERVOIR (MG)	0.7	$200,000	$146,000
TOTAL			$5,116,000

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

ZONE: SOUTH/CENTRAL

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,300	$275	$3,932,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.7	$1,800,000	$1,260,000
SAN FORCE (LF)	5,200	$310	$1,612,000
TOTAL			$6,804,500

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: BEAVER CREEK

PROPOSED IMPROVEMENTS

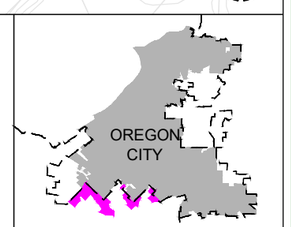
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	8,000	$400	$3,200,000
24" PIPE (LF)	4,100	$425	$1,742,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	7,540	$150	$1,131,000
TOTAL			$6,073,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

CRW	CLACKAMAS RIVER WATER
EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BEAVER CREEK BLUFFS

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BENDEMEER

Water

Bendemeer URA would most likely be served by Tualatin Valley Water District (TVWD) as it is adjacent to their existing service area boundary and City of Hillsboro facilities do not extend north of Highway 26. TVWD does not have a publicly available Master Plan.

The following assessment is based on information provided by a TVWD Development Services Engineer, with specific regard to the Bendemeer site and assuming residential development at a density of 20 units per acre.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

TVWD's existing water facilities have adequate capacity to serve customers in areas already inside the UGB.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Based on current development projections for areas already inside the UGB, and assuming a density of 20 units per acre within the URA, TVWD's existing water facilities have adequate capacity to serve the URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It does not appear at this time that TVWD's water facilities already inside the UGB will experience marked impacts resulting from adding the URA, assuming a density of 20 units per acre. Changes in densities or development types within the URA could introduce or increase impacts that may require water facility upgrades.

Sanitary Sewer

Clean Water Services (CWS) is the likely provider for the Bendemeer URA as there is existing CWS sanitary sewer infrastructure south of NW West Union Road and running through the southeast corner of the URA near Rock Creek.

The Master Plan for the Clean Water Services (West Basin) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

CWS did not indicate whether the existing sanitary sewer system as a whole had the capacity to serve areas already inside the UGB. They did provide information related to the likely point of connection for the Bendemeer URA specifically (an existing 24-inch sanitary trunk running parallel to Rock Creek), which has adequate capacity to serve the addition of the Bendemeer URA to the UGB, which presumably means it has capacity to serve existing areas.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Bendemeer URA. Full development of areas inside the UGB does not happen prior to the addition of the URA into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in the URA added to the UGB. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bendemeer URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bendemeer URA.

Storm

Bendemeer URA would be served by the City of Hillsboro and Clean Water Services. Bendemeer is included in the planning area of the City of Hillsboro Master Plan (Rock Creek Basin). Bendemeer is currently unincorporated Washington County, and the City of Hillsboro has not yet started the long-term planning for this area.

The following assessment is based on information from the City of Hillsboro Stormwater Master Plan, dated 2021. The study area in the Master Plan includes the incorporated City, portions of the UGB where the City has adopted plans for development, and portions of the UGB where the City intends to begin planning in the next several years (including the Bendemeer URA).

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

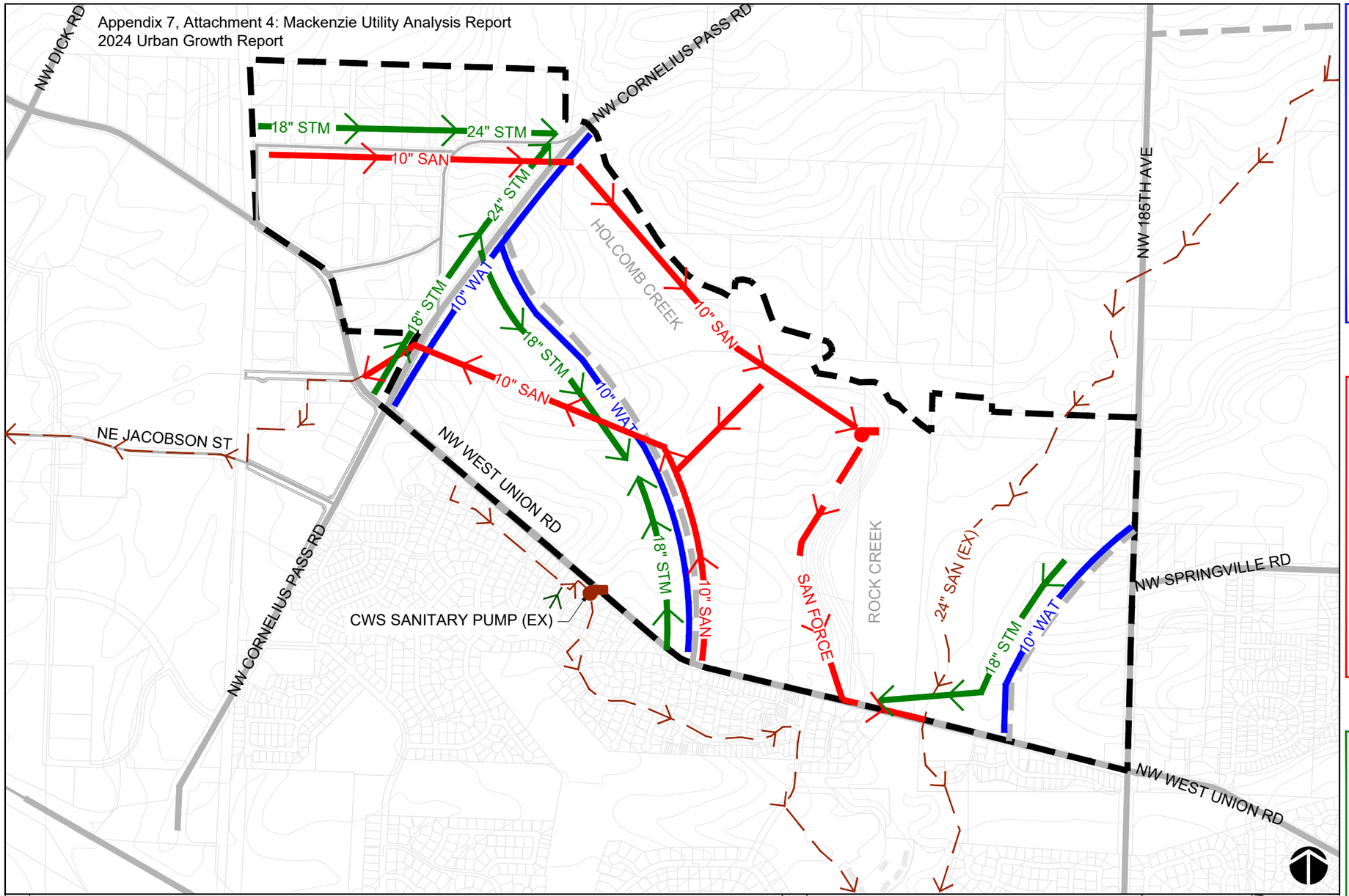
The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Rock Creek and would not impact the capacity of existing stormwater infrastructure. Per CWS, it is expected that treatment and detention be provided on development sites so that discharge to Holcomb Creek and Rock Creek does not have any negative impacts.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Rock Creek and would not impact the capacity of existing stormwater infrastructure. Per CWS, it is expected that treatment and detention be provided on development sites so that discharge to Holcomb Creek and Rock Creek does not have any negative impacts.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Clean Water Services standards require on-site detention for expansion areas, which includes the Bendemeer URA. Based on topography, the Bendemeer URA would discharge directly to Holcomb Creek and Rock Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to or impact any of the existing City of Hillsboro infrastructure.



WATER

WATER PROVIDER: TUALATIN VALLEY WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	9,450	$350	$3,307,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.6	$200,000	$320,000
TOTAL			$3,627,500

SANITARY

SANITARY PROVIDER: CLEAN WATER SERVICES

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	12,300	$275	$3,382,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.8	$1,800,000	$1,440,000
SAN FORCE (LF)	3,300	$310	$1,023,000
TOTAL			$5,845,500

STORM

STORM PROVIDER: CITY OF HILLSBORO

WATERSHED: ROCK CREEK-TUALATIN RIVER

SUB-WATERSHED: UPPER ROCK CREEK

PROPOSED IMPROVEMENTS

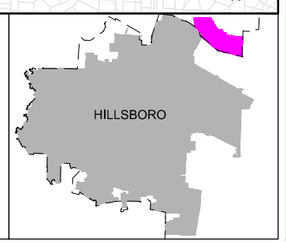
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	8,600	$400	$3,440,000
24" PIPE (LF)	3,400	$425	$1,445,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	59,600	$150	$8,940,000
TOTAL			$13,825,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BENDEMEER

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BETHANY WEST

Water

Bethany West URA would most likely be served by Tualatin Valley Water District (TVWD) as it partially within and otherwise adjacent to their existing service area boundary. TVWD does not have a publicly available Master Plan.

The following assessment is based on information provided by a TVWD Development Services Engineer, with specific regard to the Bethany West site and assuming residential development at a density of 20 units per acre.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

TVWD's existing water facilities have adequate capacity to serve customers in areas already inside the UGB.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Based on current development projections for areas already inside the UGB, and assuming a density of 20 units per acre within the URA, TVWD's existing water facilities have adequate capacity to serve the URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It does not appear at this time that TVWD's water facilities already inside the UGB will experience marked impacts resulting from adding the proposed URAs, assuming a density of 20 units per acre. Changes in densities or development types within the URA could introduce or increase impacts that may require water facility upgrades.

Sanitary Sewer

Clean Water Services (CWS) is the likely provider for the Bethany West URA as there is an existing 24-inch CWS sanitary sewer main running northeast to southwest through the site (adjacent to Rock Creek).

The Master Plan for the Clean Water Services (West Basin) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

CWS did not indicate whether the existing sanitary sewer system as a whole had the capacity to serve areas already inside the UGB. They did provide information related to the likely point of connection for the Bethany West URA specifically (an existing 24-inch sanitary trunk running parallel to Rock Creek), which has adequate capacity to serve the addition of the Bethany West URA to the UGB, which presumably means it has capacity to serve existing areas.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Bethany West URA. Full development of areas inside the UGB does not happen prior to the addition of URAs into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in URA added to the UGB. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bendemeer URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bethany West URA.

Storm

Clean Water Services (CWS) is the likely storm provider for the Bethany West URA based on topography it would outfall to Rock Creek which generally flows south through CWS service area until it reaches the Tualatin River.

Clean Water Services standards require on-site detention for expansion areas, which includes the Bethany West URA. Based on topography, the Bethany West URA would discharge directly to Rock Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing CWS infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

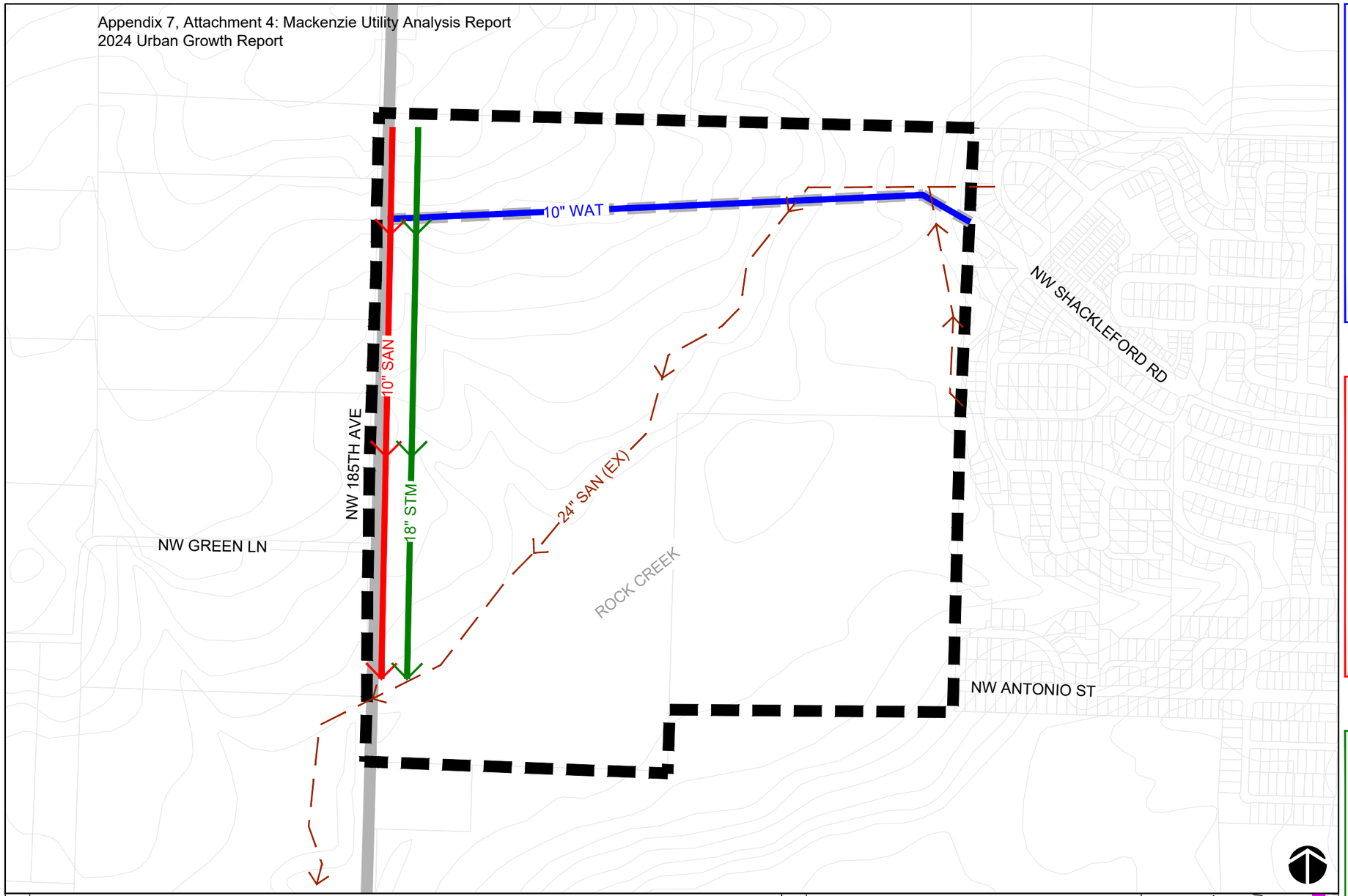
CWS did not indicate whether the existing stormwater system had the capacity to serve areas already inside the UGB.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Based on topography, the Bethany West URA would discharge directly to Rock Creek. CWS requires that stormwater from development areas be treated and detained on-site therefore having no negative impacts on the existing system.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

CWS requires that stormwater from development areas be treated and detained on-site so as not to negatively impact the existing system.



WATER

WATER PROVIDER: TUALATIN VALLEY WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,655	$350	$929,250
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.3	$200,000	$60,000
TOTAL			$989,250

SANITARY

SANITARY PROVIDER: CLEAN WATER SERVICES

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,500	$275	$687,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$687,500

STORM

STORM PROVIDER: CLEAN WATER SERVICES
WATERSHED: ROCK CREEK-TUALATIN RIVER
SUB-WATERSHED: UPPER ROCK CREEK

PROPOSED IMPROVEMENTS

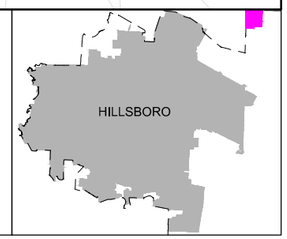
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	2,500	$400	$1,000,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	12,200	$150	$1,830,000
TOTAL			$2,830,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BETHANY WEST

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BORING

Water

The Boring URA would likely be served by the Boring Water District based on proximity.

The Boring Water District has four wells in the deep Troutdale Aquifer and has been granted water rights by Oregon Water Resources Department (OWRD) to withdraw up to 5.8 MGD. Existing storage is provided by three tanks. Two tanks are located at Meier Dairy, one at 352,000 gallons and another at 443,000 gallons. The other tank is located at SE Wally Road at the top of Polivka Hills with a capacity of 100,000 gallons.

The following assessment is based on information from Boring Water District Water System Master Plan, dated April 2003 and the Boring Water District System Master Plan Update, dated November 2009. The Master Plan Update indicates that development of urban reserve areas is planned for a 50-year time horizon and are not included in future demands calculations.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – the total pumping capacity being drawn from the wells is 1.69 MGD. The Master Plan cites the source capacity as the total capacity from all wells assuming the highest producing well is offline. The Marx well is the highest producing well and draws 0.65 MGD. With the Marx well offline, there is an existing deficit of 0.18 MGD. This is a conservative approach presented in the Master Plan Update for calculating capacity and does not actually indicate there is a supply deficit for existing facilities.
- Storage –Total storage capacity is 895,000 gallons (0.895 MG) and existing demand (as of 2009) is 1.55 MG, creating a deficit of 0.655 MG. This deficit indicates there is not sufficient storage capacity to provide for peak day demands and fire requirements.
- Distribution – the Boring Water District distribution network provides sufficient delivery of water for existing demands (as of 2009).

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – There is a future deficit from the wells of 120 gpm (0.17 MGD) assuming that the largest well, the Marx well, is offline (conservative approach presented in the Master Plan Update for calculating capacity). According to the Master Plan, the future deficit is not within the range of accuracy of the estimates and describes a reasonable expectation that future peak demand can be met without the Marx well, but only if additional wells are drilled, developed and reliably productive. This applies to the development of Boring URA.
- Storage – Current storage is 0.895 MG and estimated future storage (2029) is 2.55 MG, resulting in a storage deficit of 1.65 MG.
- Distribution – According to the Master Plan Update, the Boring Water District distribution network provides sufficient delivery of water for future 2029 demands.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – A future supply deficit exists without considering the development of Boring URA. Without additional supply, there will be negative impacts on the existing system.
- Storage – A future storage deficit exists without considering the development of Boring URA. Without additional storage, there will be negative impacts on the existing system.
- Distribution – It is unclear whether the future 2029 demands from the Master Plan include the capacity to serve Boring URA.

Sanitary Sewer

The Boring URA would likely be served by Clackamas County Water Environment Services (WES) based on proximity and a southern portion of the Boring URA falls within the WES Rate Zone 2. This portion of area routes sanitary from 60 households and businesses to the Boring Water Resource Recovery Facility (Boring WRRF) for treatment. The Boring WRRF consists of lagoons and a sand filter to provide tertiary treatment for up to 20,000 gallons per day (0.02 MGD).

The following assessment is based on information from the Water Environment Services (WES) Capital Improvement Plan Fiscal Years 2024/25-2028/29 and the Boring WRRF Facilities Plan Technical Memorandum, dated August 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

According to a study summarized in the Boring WRRF Facilities Plan, the design capacity of the Boring WRRF is 0.018 MGD and the existing (2018) average annual flow is 0.019 MGD. The WRRF can therefore adequately serve the current service area, with no capacity for future development.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Boring WRRF struggles to meet treatment requirements for existing demands, let alone additional demands from future urban reserve areas. The report summarized in the Boring WRRF Facilities Plan advises that the Boring WRRF be abandoned, and wastewater be pumped to another facility for treatment, either a town of Sandy facility or other WES facility.

The closest WES sewer main connection point would be at the intersection of Hwy 212 and Hwy 224. The sewer mainline extension would follow Hwy 212 to Boring, and it would be approximately 8.5 miles of pipeline to extend to the URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The existing sanitary sewer infrastructure does not have the capacity to serve additional area. Extensive improvements (as described above), including approximately 8.5 miles of sanitary piping, would be required to serve the Boring URA.

Storm

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring as it remains an unincorporated community in Clackamas County. The nearest adjacent stormwater management area is Water Environment Services (WES) which borders Boring to the west.

The following assessment is based on information from communication with a Clackamas County Principal Planner.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

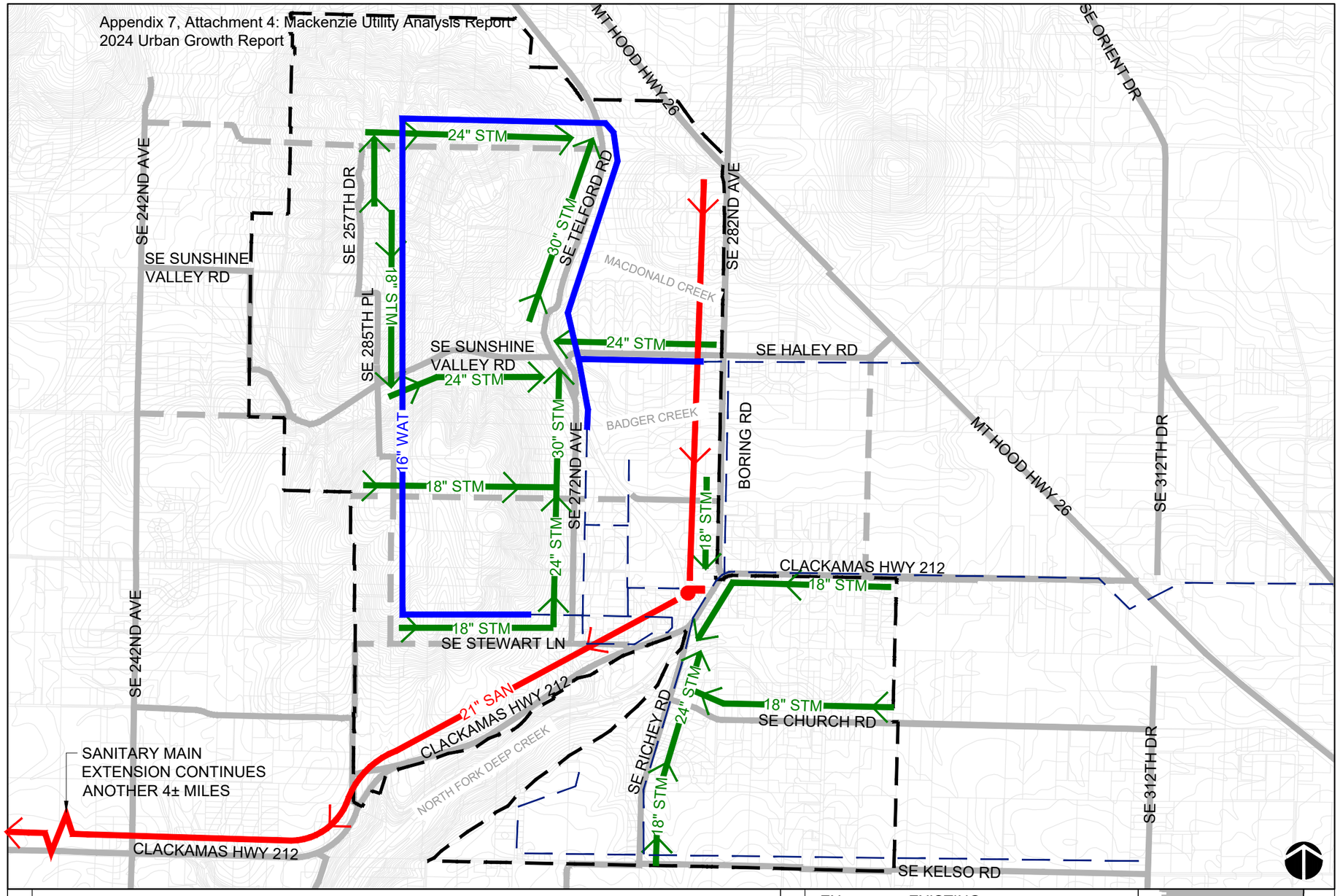
It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon. Based on existing topography, it seems likely that the Boring URA could outfall directly to North Fork Deep Creek and not impact any existing stormwater infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon. Based on existing topography, it seems likely that the Boring URA could outfall directly to North Fork Deep Creek and not impact any existing stormwater infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon. Based on existing topography, it seems likely that the Boring URA could outfall directly to North Fork Deep Creek and not impact any existing stormwater infrastructure.



WATER

WATER PROVIDER: BORING WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	23,100	$500	$11,550,000
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	6.6	$200,000	$1,320,000
TOTAL			$12,870,000

SANITARY

SANITARY PROVIDER: CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

ZONE: RATE ZONE 2

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	0	$350	$0
21" PIPE (LF)	44,800	$425	$19,040,000
PUMP STATION (MGD)	9.2	$1,800,000	$16,560,000
SAN FORCE (LF)	0	$0	$0
TOTAL			$35,600,000

STORM

STORM PROVIDER: CLACKAMAS COUNTY

WATERSHED: JOHNSON CREEK, LOWER CLACKAMAS RIVER

SUB-WATERSHED: UPPER JOHNSON CREEK, NORTH FORK DEEP CREEK

PROPOSED IMPROVEMENTS

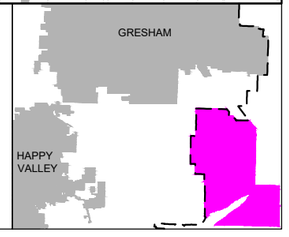
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	24,000	$400	$9,600,000
24" PIPE (LF)	12,900	$425	$5,482,500
30" PIPE (LF)	5,500	$500	$2,750,000
WATER QUALITY & DETENTION	128,150	$150	$19,222,500
TOTAL			$37,055,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BORING

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BORING – HIGHWAY 26

Water

The Boring – Highway 26 URA would likely be served by the Boring Water District based on proximity.

The Boring Water District has four wells in the deep Troutdale Aquifer and has been granted water rights by Oregon Water Resources Department (OWRD) to withdraw up to 5.8 MGD. Existing storage is provided by three tanks. Two tanks are located at Meier Dairy, one at 352,000 gallons and another at 443,000 gallons. The other tank is located at SE Wally Road at the top of Polivka Hills with a capacity of 100,000 gallons.

The following assessment is based on information from Boring Water District Water System Master Plan, dated April 2003 and the Boring Water District System Master Plan Update, dated November 2009. The Master Plan Update indicates that development of urban reserve areas is planned for a 50-year time horizon and are not included in future demands calculations.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – the total pumping capacity being drawn from the wells is 1.69 MGD. The Master Plan cites the source capacity as the total capacity from all wells assuming the highest producing well is offline. The Marx well is the highest producing well and draws 0.65 MGD. With the Marx well offline, there is an existing deficit of 0.18 MGD. This is a conservative approach presented in the Master Plan Update for calculating capacity and does not actually indicate there is an existing supply deficit for existing facilities.
- Storage – Total storage capacity is 895,000 gallons (0.895 MG) and existing demand (as of 2009) is 1.55 MG, creating a deficit of 0.655 MG. This deficit indicates there is not sufficient storage capacity to provide for peak day demands and fire requirements.
- Distribution – the Boring Water District distribution network provides sufficient delivery of water for existing demands (as of 2009).

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – There is a future deficit from the wells of 120 gpm (0.17 MGD) assuming that the largest well, the Marx well, is offline. According to the Master Plan, the future deficit is not within the range of accuracy of the estimates and describes a reasonable expectation that future peak demand can be met without the Marx well, but only if additional wells are drilled, developed and reliably productive. This applies to the development of Boring – Highway 26 URA.
- Storage – Current storage is 0.895 MG and estimated future storage (2029) is 2.55 MG, resulting in a storage deficit of 1.65 MG.
- Distribution – According to the Master Plan Update, the Boring Water District distribution network provides sufficient delivery of water for future 2029 demands.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – A future supply deficit exists without considering the development of Boring – Highway 26 URA. Without additional supply, there will be negative impacts on the existing system.
- Storage – A future storage deficit exists without considering the development of Boring – Highway 26 URA. Without additional storage, there will be negative impacts on the existing system.
- Distribution – It is unclear whether the future 2029 demands from the master plan include the capacity to serve Boring – Highway 26 URA.

Sanitary Sewer

The Boring – Highway 26 URA would likely be served by Clackamas County Water Environment Services (WES) based on proximity and a southern portion of the Boring – Highway 26 URA falls within the WES Rate Zone 2. This portion of area routes sanitary from 60 households and businesses to the Boring Water Resource Recovery Facility (Boring WRRF) for treatment. The Boring WRRF consists of lagoons and a sand filter to provide tertiary treatment for up to 20,000 gallons per day (0.02 MGD).

The following assessment is based on information from the Water Environment Services (WES) Capital Improvement Plan Fiscal Years 2024/25-2028/29 and the Boring WRRF Facilities Plan Technical Memorandum, dated August 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

According to a study summarized in the Boring WRRF Facilities Plan, the design capacity of the Boring WRRF is 0.018 MGD and the existing (2018) average annual flow is 0.019 MGD. The WRRF can therefore adequately serve the current service area, with no capacity for future development.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Boring WRRF struggles to meet treatment requirements for existing demands, let alone additional demands from future urban reserve areas. The report summarized in the Boring WRRF Facilities Plan advises that the Boring WRRF be abandoned, and wastewater be pumped to another facility for treatment, either a town of Sandy facility or other WES facility.

The closest WES sewer main connection point would be at the intersection of Hwy 212 and Hwy 224. The sewer mainline extension would follow Hwy 212 to Boring, and it would be approximately 8.5 miles of pipeline to extend to the URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The existing sanitary sewer infrastructure does not have the capacity to serve additional area. Extensive improvements (as described above), including approximately 8.5 miles of sanitary piping, would be required to serve the Boring – Highway 26 URA.

Storm

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring as it remains an unincorporated community in Clackamas County. The nearest adjacent stormwater management area is Water Environment Services (WES) which borders Boring to the west.

The following assessment is based on information from communication with a Clackamas County Principal Planner.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

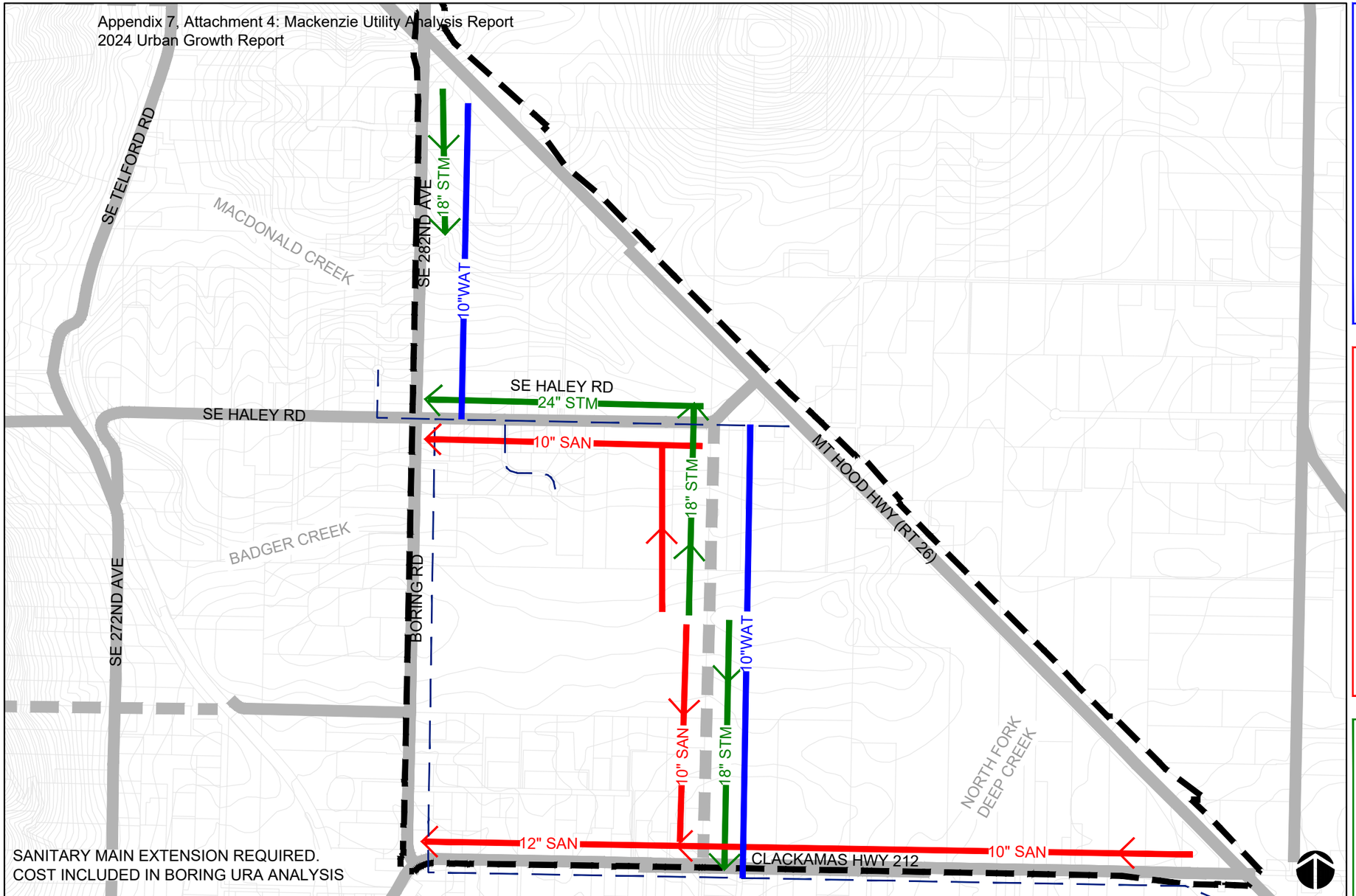
It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon.



WATER

WATER PROVIDER: BORING WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	9,100	$350	$3,185,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	2.5	$200,000	$500,000
TOTAL			$3,685,000

SANITARY

SANITARY PROVIDER: CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

ZONE: RATE ZONE 2

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,300	$275	$2,832,500
12" PIPE (LF)	2,300	$350	$805,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$3,637,500

STORM

STORM PROVIDER: CLACKAMAS COUNTY

WATERSHED: JOHNSON CREEK, LOWER CLACKAMAS RIVER

SUB-WATERSHED: UPPER JOHNSON CREEK, NORTH FORK DEEP CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	5,400	$400	$2,160,000
24" PIPE (LF)	2,500	$425	$1,062,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	82,750	$150	$12,412,500
TOTAL			$15,635,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- STORM LINE
- SANITARY LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BORING HWY 26

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BORLAND

Water

The Borland URA would most likely be served by the City of Tualatin based on proximity and would be part of the B pressure zone. Pressure zone B is served by two storage reservoirs, a 2.2 MG reservoir (B-1) and 2.8 MG reservoir (B-2) which were previously supplied by the Martinazzi and Boones Ferry Pump Stations. Both of these pump stations have reached the end of their usable lives and do not currently operate. Pressure zone B is now supplied by the Boones Ferry flow control valve/pressure reducing valve.

The City of Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line.

The following assessment is based on information from City of Tualatin Water System Master Plan, dated March 2023. Buildout conditions in the City of Tualatin Master Plan include the existing service area and defined expansion areas, of which Norwood is not included.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – there is a storage surplus of 0.19 MG for pressure zone B under current (2020) conditions.
- Distribution – There are existing industrial deficiencies in pressure zone B. Existing transmission line capacity is also deficient in pressure zone B.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage deficit of 1.0 MG for pressure zone B under buildout conditions.
- Distribution – new customers requiring large fire flows in pressure zone B are required to install fire flow pumps.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – while there is a storage surplus under existing conditions, there is a deficit under the full buildout condition. Assuming adding Borland URA to the UGB would occur after full buildout of the areas already within the UGB, incorporation of Borland would cause a greater deficit without the addition or expansion of storage facilities.
- Distribution – transmission line improvements are identified in the Master Plan capital improvement projects.

Sanitary Sewer

The Borland URA would most likely be served by the City of Tualatin and/or City of West Linn based on proximity and topography. The likely point of connection to the City of Tualatin infrastructure would be either the Orchard Hill Pump Station or the Borland Pump Station (both in the Nyberg basin). The likely connection point to the City of West Linn infrastructure would be an existing gravity sanitary main in Willamette Falls Drive (in the Willamette Town basin).

Downstream of the likely point of connection to the City of Tualatin sanitary infrastructure is the Nyberg Trunk which eventually flows to the Durham Advanced Wastewater Treatment Facility (AWWTF). The City of Tualatin's sewage is treated at the Durham Advanced Wastewater Treatment Facility which is owned and operated by Clean Water Services. Clean Water Services is also responsible for gravity sewers over 24-inches in size, pump stations and force mains.

From the likely point of connection at Willamette Falls Drive, sanitary flows southeast toward the Willamette River toward the Willamette Pump Station (owned by Water Environment Services). The Willamette Falls force main follows Interstate 205 and the Willamette River toward. At the downstream end of the City of West Linn sanitary system as Clackamas County Water Environment Services (WES) owned pumps and force mains. Sanitary ultimately gets pumped to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River.

The following assessment is based on information from City of Tualatin Sewer Master Plan, dated August 2019, the Clean Water Services East Basin 2019 Master Plan Project, dated June 2021, the City of West Linn Sanitary Sewer Master Plan Update, dated September 2019, and the Water Environment Services Sanitary Sewer System Master Plan, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Tualatin

Both the Borland and Orchard Hill Pump Stations have surplus capacity under existing (2020) conditions (per CWS). Per the City of Tualatin Master Plan, there are several sections of the Nyberg Trunk with no remaining capacity under existing conditions.

West Linn

There do not appear to be any capacity issues downstream of the assumed point of connection to the City of West Linn infrastructure under existing conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Tualatin

The Borland and Orchard Hill Pump Stations have a surplus capacity through 2040 (based on estimated peak hour flows) per CWS. By 2075 the Borland pump station has a deficiency of 1.8 MGD. Per the City of Tualatin Master Plan, under buildout conditions there are several sections of the Nyberg Trunk with deficient capacity where backwatering occurs.

West Linn

There are two identified deficiencies downstream of the assumed point of connection to the City of West Linn infrastructure under buildout conditions. They both occur in gravity piping near where the City system crosses the Willamette River. There is a WES capital improvement project currently in the design phase to increase capacity of the Willamette Pump Station to meet future wet weather flows, with an expected completion in 2027. The Master Plan does not address what the current or increased capacity would be.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Tualatin

According to CWS Master Plan, there is surplus capacity of 0.3 MG at the Orchard Hill Pump Station through 2075, and a surplus capacity of 0.1 MG at the Borland Pump Station through 2040. Based on preliminary calculations, this surplus capacity would not be enough to serve the entire Borland URA, so additional capacity will be needed. There are several pipe capacity deficiencies in the Nyberg basin under buildout conditions. The addition of the Borland URA would further contribute to these deficiencies.

West Linn

The Willamette Pump Station improvements discussed above will increase capacity to meet future wet weather flows, however the amount of additional capacity and whether it could serve the Borland URA is not clear and is dependent on when development occurs.

Storm

Borland URA would likely be served by the City of West Linn and City of Tualatin for stormwater based on proximity and topography. A majority of the Borland URA flows northeast toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

The following assessment is based on information from the City of Tualatin Stormwater Master plan, dated April 2019 and the City of West Linn Storm Drainage Master Plan, dated September 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

Tualatin

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows.

West Linn

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. There are four high priority capital improvement projects recommended in the Master Plan to address capacity related issues, all of which occur at the downstream end of the stormwater system near the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Tualatin

The same capacity issues identified in the Master Plan for existing conditions are problematic when considering serving areas outside the existing service area and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. A small portion of the Borland URA is within the Saum Creek Basin which does not have any identified capacity related issues.

West Linn

The same capacity issues identified in the Master Plan for the existing service area are problematic when considering serving additional areas and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The Borland URA is does not fall within any of the currently defined City of West Linn basins.

Because the Borland URA is outside both City of West Linn and City of Tualatin City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Borland URA flows northeast toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

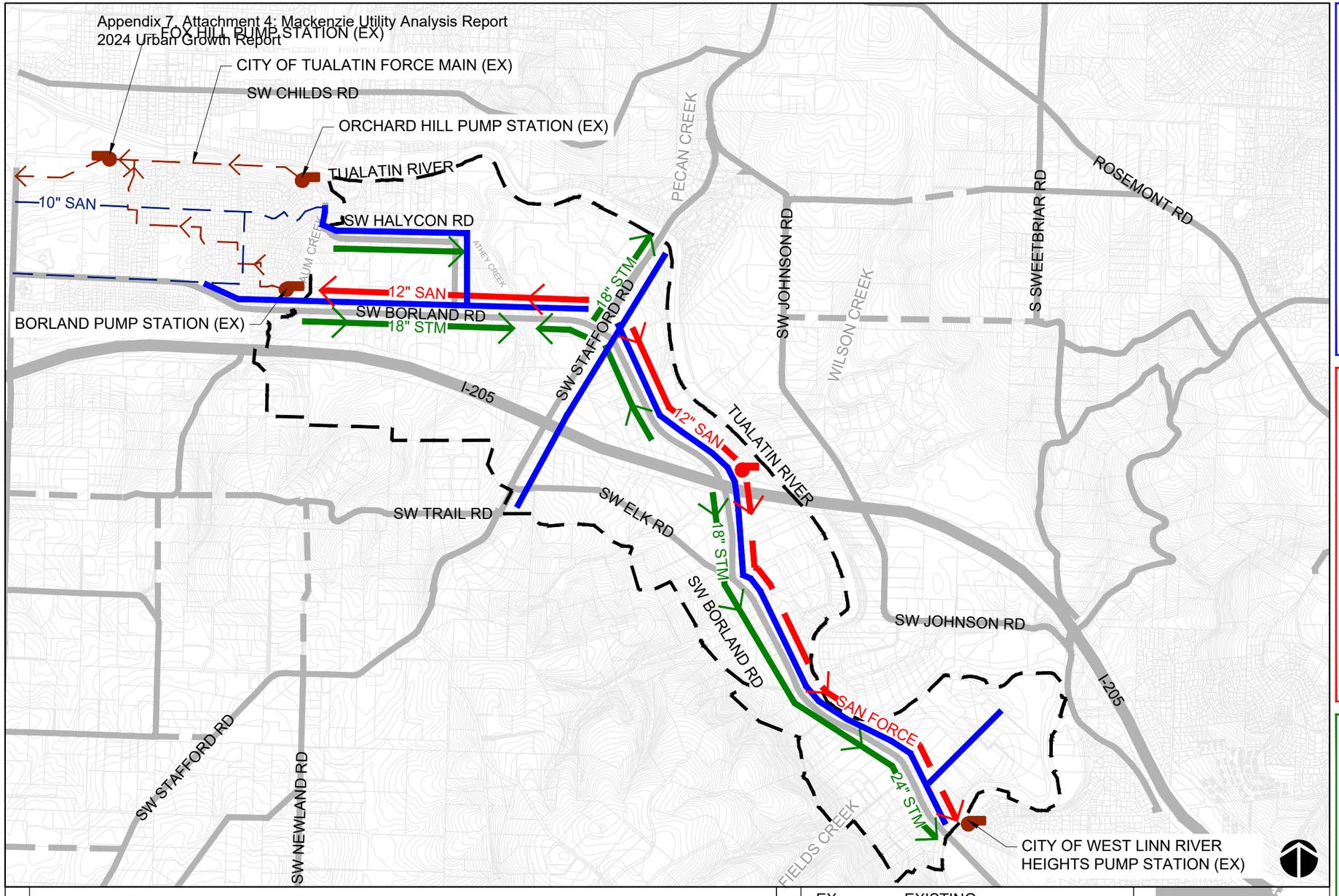
Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Tualatin

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the Borland URA would discharge directly to tributaries of the Tualatin River via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

West Linn

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding Borland URA land to the UGB. Based on topography, the Borland URA could discharge directly to the Tualatin River and thus not connect to or impact any existing City of West Linn stormwater infrastructure.



WATER

WATER PROVIDER: CITY OF TUALATIN

PRESSURE ZONE: B

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	27,300	$350	$9,555,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	2.8	$200,000	$560,000
TOTAL			$10,115,000

SANITARY

SANITARY PROVIDER: CITY OF TUALATIN AND/OR CITY OF WEST LINN

ZONE: NYBERG (TUALATIN), 9D/10A (WEST LINN)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	8,000	$350	$2,800,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.4	$1,800,000	$2,520,000
SAN FORCE (LF)	7,600	$310	$2,356,000
TOTAL			$7,676,000

STORM

STORM PROVIDER: CITY OF TUALATIN, CITY OF WEST LINN

WATERSHED: FANNO CREEK-TUALATIN RIVER

SUB-WATERSHED: SAUM CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

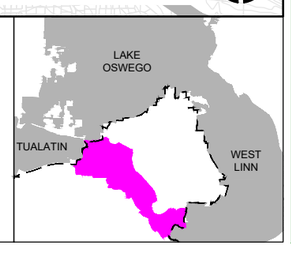
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	12,600	$400	$5,040,000
24" PIPE (LF)	6,000	$425	$2,550,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	70,750	$150	$10,612,500
TOTAL			$18,202,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BORLAND

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BROOKWOOD PARKWAY

Water

Brookwood Parkway would most likely be served by the City of Hillsboro based on proximity. Brookwood Parkway is located between the future North Hillsboro service area and an area served by Tualatin Valley Water. The City of Hillsboro Water Master Plan includes the evaluation of distribution system and storage system under both existing and projected future water demand, which includes Brookwood Parkway as a future growth area (FGA).

The City of Hillsboro owns and operates two municipal drinking water systems, City System (primary) and Upper System (secondary), served by wholesale water purchased from Joint Water Commission (JWC). The City also provides wholesale water to City of Cornelius, City of Gaston and LA Water Cooperative. The City of Hillsboro and Tualatin Valley Water District are developing the Willamette Water Suply System (WWSS), a new water supply system from the Willamette River, to address rapid growth in City of Hillsboro City System and City of Cornelius. The expected completion for this project is June 2026. There is also a planned upgrade for the existing JWC Water Treatment Plant.

The following assessment is based on information from City of Hillsboro Water Master Plan, dated June 2019. Full buildout in the Master Plan includes the existing service area, as well as new areas being developed (referred to as “SoHi”, “NoHi”, and “Future Growth Areas (FGA)” and is assumed to occur by 2070.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – The WWSS has sufficient capacity to meet demands within the existing service area.

- Storage – additional storage of 6.4 MG is needed for areas within the existing UGB to provide the desired level of service during a regional supply outage.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – without the WWSS, capacity is insufficient to meet projected buildout demands. The WWSS can likely serve a portion of the additional demands for areas outside the current UGB, however available capacity is dependent on the type of development that occurs as part of the buildout scenario.

- Storage – at a minimum, an additional 17.8 MG of storage is needed for any expansion beyond the current UGB, i.e. Brookwood Parkway URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – the WWSS is required to provide additional supply for expansion outside the UGB. With full buildout of the WWSS, a total supply (including JWC supply) of 77.95 MGD would be available. The peak daily demand of the existing service area is 45.1 MGD, leaving 32.85 MGD for future expansion outside the UGB. This supply surplus would be sufficient to serve Brookwood Parkway URA assuming other developments did not occur prior that significantly reduce the surplus.

- Storage – Areas outside the existing UGB cannot be served without additional storage capacity.

Sanitary Sewer

The City of Hillsboro and Clean Water Services work together to manage the sanitary sewer system near the Brookwood Parkway URA. The primary point of connection for this URA would likely be a Clean Water Services main in NW Meek Road.

The Master Plan for the Clean Water Services (West Basin, which includes City of Hillsboro) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Brookwood Parkway URA. Full development of areas inside the UGB does not happen prior to the addition of URA into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in URA added to the UGB.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands.

Storm

Brookwood Parkway would most likely be served by the City of Hillsboro based on proximity. The Brookwood Parkway URA is included in the planning area of the City of Hillsboro Master Plan and is part of the McKay Creek Basin.

The following assessment is based on information from the City of Hillsboro Stormwater Master Plan, dated 2021. The study area included in the Master Plan is the incorporated City, portions of the UGB where the City has adopted plans for development, and portions of the UGB where the City plans to begin planning in the next several years (including the Brookwood Parkway URA).

City of Hillsboro and Clean Water Services standards require on-site detention for expansion areas identified in the City of Hillsboro Stormwater Master Plan, which includes the Brookwood Parkway URA.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

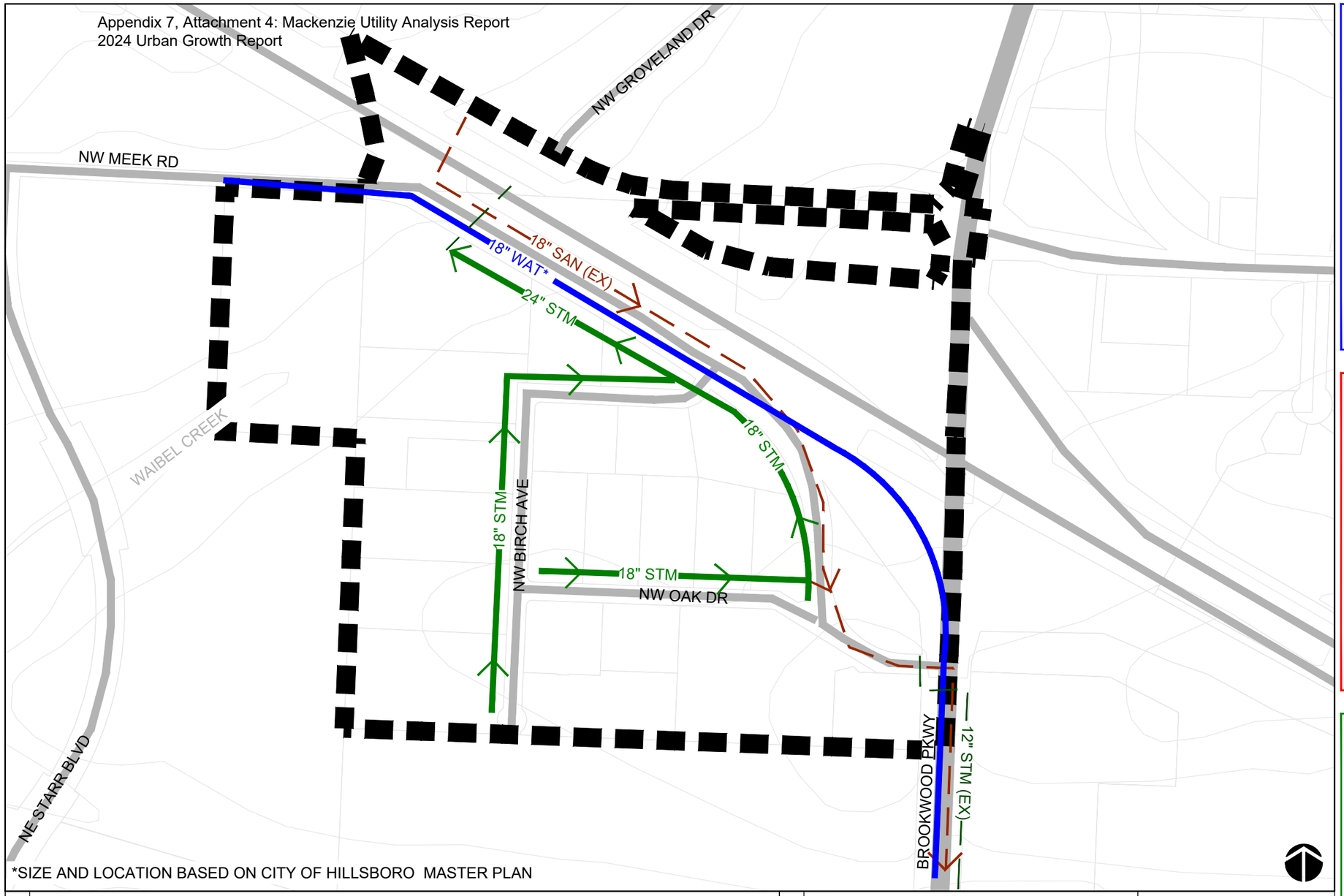
The Master Plan identifies and categorizes 475 known issues in the existing system. Of the 475 issues identified, 14% were related to water quantity, i.e. pipe, outfall and culvert capacity issues. None of the issues are immediately adjacent to the Brookwood Parkway URA.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Based on topography, the Brookwood Parkway URA would discharge directly to Waibel Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Hillsboro infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography, the Brookwood Parkway URA would discharge directly to Waibel Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to or impact any of the existing City of Hillsboro infrastructure.



*SIZE AND LOCATION BASED ON CITY OF HILLSBORO MASTER PLAN

WATER

WATER PROVIDER: CITY OF HILLSBORO

SERVICE AREA: NORTH HILLSBORO (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
18" PIPE (LF)	3,125	$650	$2,031,250
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.2	$200,000	$40,000
TOTAL			$2,071,250

SANITARY

SANITARY PROVIDER: CITY OF HILLSBORO/CLEAN WATER SERVICES (CWS)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$0

STORM

STORM PROVIDER: CITY OF HILLSBORO/CLEAN WATER SERVICES (CWS)

WATERSHED: DAIRY CREEK

SUB-WATERSHED: LOWER MCKAY CREEK

PROPOSED IMPROVEMENTS

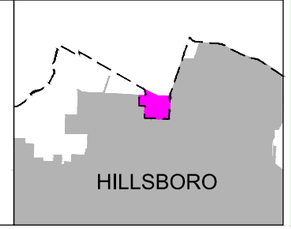
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	3,000	$400	$1,200,000
24" PIPE (LF)	700	$425	$297,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY & DETENTION	5,150	$150	$772,500
TOTAL			$2,270,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BROOKWOOD PARKWAY

000835

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DAMASCUS

Water

The Damascus URA would be served by Sunrise Water Authority as it is currently within their rural area as part of the Sunridge pressure zone.

The following is based on information provided by Sunrise Water Authority District Engineer.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Existing water facilities are able to serve the existing customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Water system improvements would be needed if the Damascus area were to expand by customer addition. Sunrise is planning on serving the future needs of this area as it grows.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Water system improvements would be needed if the Damascus area were to expand by customer addition, which includes the Damascus URA. The Sunrise Water Authority 20-Year Capital Improvement Plan (dated November 2017) identifies several storage, pumping, transmission line and treatment projects that would be required to serve the Damascus URA without negatively impacting their existing service area.

Sanitary Sewer

The Damascus area within the existing UGB is currently served by private septic systems and there is no existing public sanitary sewer infrastructure. The nearest sanitary district to the Damascus area is Clackamas Water Environment Services (WES) service rate Zone 2.

To serve the Damascus URA with public sanitary sewer infrastructure rather than private septic systems, a sewer trunk line would need to be installed. The closest sanitary sewer point of connection is at the intersection of Highway 212 and Highway 224. The sanitary sewer trunk would likely follow Highway 212 to the Damascus area, resulting in approximately 6 miles of pipe.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

There are no existing public sanitary sewer facilities near the Damascus URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are no existing public sanitary sewer facilities near the Damascus URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

There are no existing public sanitary sewer facilities near the Damascus URA.

Storm

According to a Clackamas County Principal Planner, it is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the Damascus area. The nearest adjacent stormwater management area is Water Environment Services (WES) which borders Damascus to the west.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

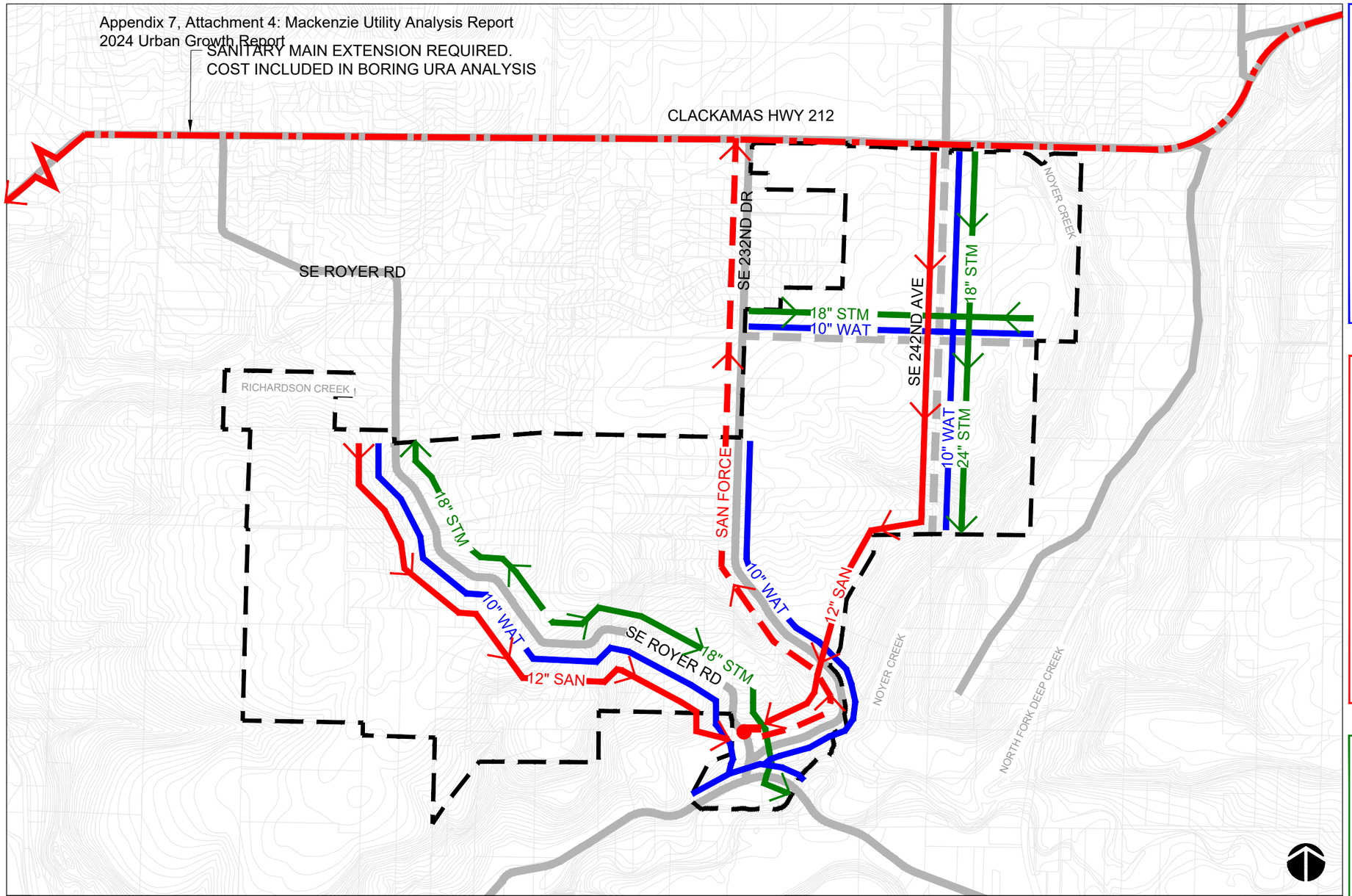
It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Damascus, Oregon.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Damascus, Oregon.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Damascus, Oregon.



WATER

WATER PROVIDER: SUNRISE WATER AUTHORITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	23,750	$350	$8,312,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	3.9	$200,000	$780,000
TOTAL			$9,092,500

SANITARY

SANITARY PROVIDER: CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

RATE ZONE: 2

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	24,400	$350	$8,540,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	3.9	$1,800,000	$7,020,000
SAN FORCE (LF)	9,300	$310	$2,883,000
TOTAL			$18,443,000

STORM

STORM PROVIDER: CLACKAMAS COUNTY

WATERSHED: LOWER CLACKAMAS RIVER

SUB-WATERSHED: NORTH FORK DEEP CREEK

PROPOSED IMPROVEMENTS

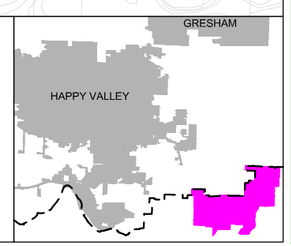
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	14,100	$400	$5,640,000
24" PIPE (LF)	2,800	$425	$1,190,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY & DETENTION	52,300	$150	$7,845,000
TOTAL			$14,675,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY EXTENSION FROM BORING URA
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

DAMASCUS

000838

MACKENZIE.

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DAVID HILL

Water

David Hill URA would likely be served by the City of Forest Grove as it is included in the City of Forest Grove Master Plan's study area and spans the existing 435 and 540 pressure zones and future 710 and 880 pressure zones. The 435 and 540 pressure zones are supplied by the 1.0 MG David Hill Reservoir, which is served by the David Hill and Watercrest Pump Stations.

The City of Forest Grove's water supply is a combination of City supply and water from the Joint Water Commission (JWC), seasonally dependent. The water treatment plant is City owned and operated and supplies finished water to a City owned 5 MG reservoir.

The following assessment is based on information from City of Forest Grove Water System Master Plan, dated May 2022. In this assessment, future expansion refers to infill development within the existing City limits and select expansion areas, including the David Hill URA. Future development of the David Hill URA is assumed to occur after 2041.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – the City has sufficient capacity in raw water supply, treatment capacity, and finished water transmission.
- Storage – There is a storage surplus of 0.21 MG for the 435 and 540 pressure zones under current conditions.
- Pump – There is a pump capacity surplus of 373 MG for the Watercrest and David Hill Pump Stations under current conditions.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – There will be a supply deficit of 0.20 MG by 2041 and a deficit of 0.55 MG by 2071 for the 435 and 540 pressure zones. The David Hill URA is assumed to be developed after 2041, so this deficit indicates that additional supply will be needed to develop David Hill.
- Storage – System storage for all zones will be deficient in the next five years (from date of Master Plan). The City of Forest Grove Master Plan proposes the addition of a 0.5 MG reservoir to serve the 710 pressure zone.
- Pump – The existing 540 pump stations (David Hill and Watercrest) have sufficient capacity for future expansion.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – The City's capital improvement plan has identified several projects related to water supply that would be needed to provide adequate supply to this expansion without negative impacts to existing water systems.
- Storage – Storage for the 435 and 540 pressure zones becomes deficient by 2041 (it is assumed in the Master Plan that David Hill URA development would occur after 2041). Incorporation of the David Hill URA into the UGB is included in the future conditions of the City Master Plan, so additional storage will be required once this occurs. The City has capital improvement projects identified to provide this additional storage once expansion occurs.
- Pump – Without the construction of additional pumps, the Watercrest and David Hill Pump Stations, which serve existing pressure zones 435 and 540 as well as future zones 710 and 880, have a capacity deficit of 163 gpm by 2071. The City's capital improvement plan also identifies an upgrade to the existing Watercrest Pump Station to help serve the David Hill URA.

Sanitary Sewer

City of Forest Grove and Clean Water Services (CWS) are the likely providers for the David Hill URA as it is adjacent to existing Forest Grove service area and sanitary infrastructure. The City of Forest Grove facilities generally flow east through the City toward Clean Water Services trunk line running parallel to Council Creek.

The Master Plan for the Clean Water Services (West Basin) is currently in development. The following assessment is based on information from the City of Forest Grove Wastewater System Master Plan, dated November 2007, the Forest Grove West Side Development – Sanitary Sewer Capacity Memorandum, dated January 2022, the City of Forest Grove Westside Planning Program Refinement Plan, dated August 2017, as well as communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The City of Forest Grove Master Plan analyzes the sanitary sewer conveyance system under existing (2010) demands and identified four areas of immediate concern. The one most closely related to the David Hill URA is the Brooke Street sewer main, is the suggested point of connection for the NW David Hill Road and NW Thatcher Road extensions per the City of Forest Grove Westside Refinement Plan. Modeling suggests some surcharging in the Brooke Street line, indicating a capacity issue.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Brooke Street surcharging as described above would become more significant with the development of the David Hill URA. The Westside Refinement Plan suggests that this line be monitored during wet weather flows to further determine capacity issues.

This area is acknowledged as part of the WBMP study area but has not been examined in detail. Sewer planning for this area was contemplated during the previous UGB expansion in northwest Forest Grove. The topography of the area will limit the density of development. Northern areas will contribute to existing sewer lines which have been analyzed and have sufficient capacity. Southern areas will contribute to a different existing trunk sewer system. Downstream trunk sewers have been sized to accommodate residential growth in this area.

Both areas are tributary to the existing 36-inch diameter Council Creek Trunk Sewer which has limited downstream capacity immediately upstream from the Hillsboro Water Resource Recovery Facility (WRRF). Plans are underway to construct capacity relief for the existing downstream deficiency. The existing downstream capacity limitations are expected to be resolved within approximately five years.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Brooke Street surcharging as described above would become more significant with the development of the David Hill URA.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands.

The Council Creek Trunk Sewer, which is downstream of the David Hill URA, has limited capacity and planning is currently underway to provide additional capacity that will be needed to serve the David Hill URA without negative impacts to the existing system.

Storm

City of Forest Grove and Clean Water Services are the likely providers for the David Hill URA based on proximity and topography. Stormwater from the David Hill URA generally flows south toward Highway 8 where it would discharge to an unnamed City maintained creek that runs southeast along the City boundary until it merges with Gales Creek near the south end of Forest Grove.

The following assessment is based on information from the City of Forest Grove Storm Drainage Master Plan, dated November 2007.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The City of Forest Grove Master Plan identifies nine capital improvement projects that were determined to be immediate needs to address capacity issues in the existing system based on modeling of the current city zoning and a percentage of basin buildout for the 5-year, 24-hour storm event.

Based on topography the David Hill URA would outfall directly to Gales Creek and would thus not connect to existing City storm infrastructure.

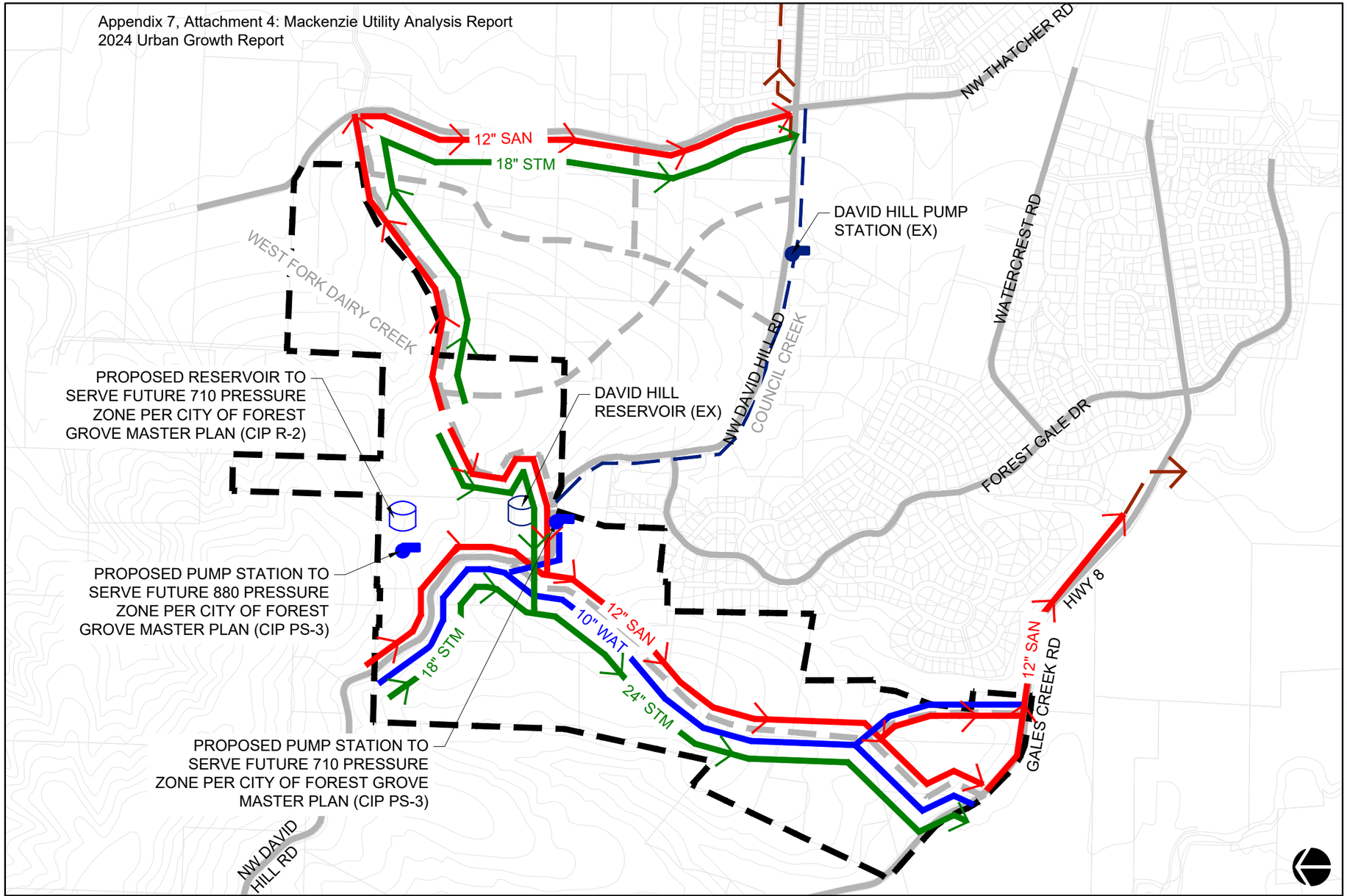
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The City of Forest Grove Master Plan identifies nine capital improvement projects that were determined to be immediate needs to address capacity issues based on modeling the buildout condition for the 25-year, 24-hour storm event.

Based on topography the David Hill URA would outfall directly to Gales Creek and would thus not connect to existing City storm infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography the David Hill URA would outfall directly to Gales Creek and would thus not connect to or impact existing City storm infrastructure.



WATER PROVIDER: CITY OF FOREST GROVE

PRESSURE ZONE: 435/540 (EXISTING), 710/880 (FUTURE)

WATER — PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	8,370	$350	$2,929,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	*	$5,800,000	$1,750,000
STORAGE RESERVOIR (MG)	0.8	$200,000	$160,000
TOTAL			$4,839,500

*CITY OF FOREST GROVE DOES NOT GIVE A TOTAL STORAGE VOLUME, SO COST IS PER THE MASTER PLAN

SANITARY PROVIDER: CITY OF FOREST GROVE, CLEAN WATER SERVICES (CWS)

SANITARY — PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	20,250	$350	$7,087,500
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$7,087,500

STORM PROVIDER: CITY OF FOREST GROVE, CLEAN WATER SERVICES (CWS)

WATERSHED: GALES CREEK, DAIRY CREEK

SUB-WATERSHED: LOWER GALES CREEK, COUNCIL CREEK, LOWER WEST FORK DAIRY CREEK

STORM — PROPOSED IMPROVEMENTS

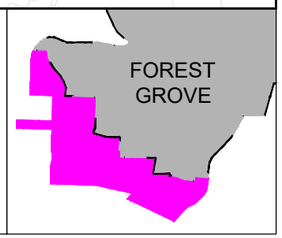
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	11,000	$400	$4,400,000
24" PIPE (LF)	4,500	$425	$1,912,500
30" PIPE (LF)	0	$500	0
WATER QUALITY/ DETENTION (SF)	24,600	$150	$3,690,000
TOTAL			$10,002,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- WATER PUMP STATION (EX)
- WATER RESERVOIR
- WATER RESERVOIR (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

DAVID HILL

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ELLIGSEN ROAD NORTH

Water

Elligsen Road North URA would likely be served by the City of Wilsonville as it is partially included in their Master Plan study area. According to the City of Wilsonville Water System Master Plan, Elligsen Road North would be part of pressure zones C and D, served by the 'C' Level Reservoir.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City, which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, including Elligsen Road North URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Wilsonville Southwest is assumed residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of residential areas (including Elligsen Road North) is not projected to occur until 2045, so additional storage will be needed for its development.
- Pumping – A new pump station will be required to serve future development in the northeast portion of the study area, which includes Elligsen Road North.
- Distribution – the size of existing pipe trunks is adequate for future buildout.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of the Elligsen Road North URA into the UGB.

The Zone D Booster Station at C Level Tank is required to provide adequate pumping capacity to serve Elligsen Road North and is identified as a capital improvement project in the Master Plan. Without the addition of this pump, the existing system may experience pump capacity issues.

Sanitary Sewer

The Elligsen Road North URA would likely be served by the City of Wilsonville based on proximity. The majority of the Elligsen Road North Urban Reserve Area is included in the study area of the Master Plan, with the exception of the northeast corner. Elligsen Road North URA falls within the Coffee Creek, Canyon Creek and Boeckman sewer basins. Canyon Creek and Boeckman sewer basins are served by Canyon Creek and Memorial Park pump stations, respectively. There are no pump stations serving the Coffee Creek basin.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has no known hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve future planning areas. The City of Wilsonville has capital improvement projects identified for both, with an estimated time frame of 6-10 years for Memorial Park and 11-20 years for Canyon Creek (relative to the report dated 2014).

There are also several trunk line extensions required to serve future development areas, including the Elligsen Road North URA. The design and costs for these improvements are included in the Master Plan and are shown on the Utility Analysis Map and included in the cost tables of this report.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Additional pump capacity and trunk line extensions are needed to serve this URA without negative impacts to existing sanitary sewer infrastructure within the Coffee Creek, Canyon Creek and Boeckman Basins.

Storm

City of Wilsonville is the likely provider for Elligsen Road North URA, as it is located partially within the Boeckman Creek and Coffee Lake Creek Basins and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

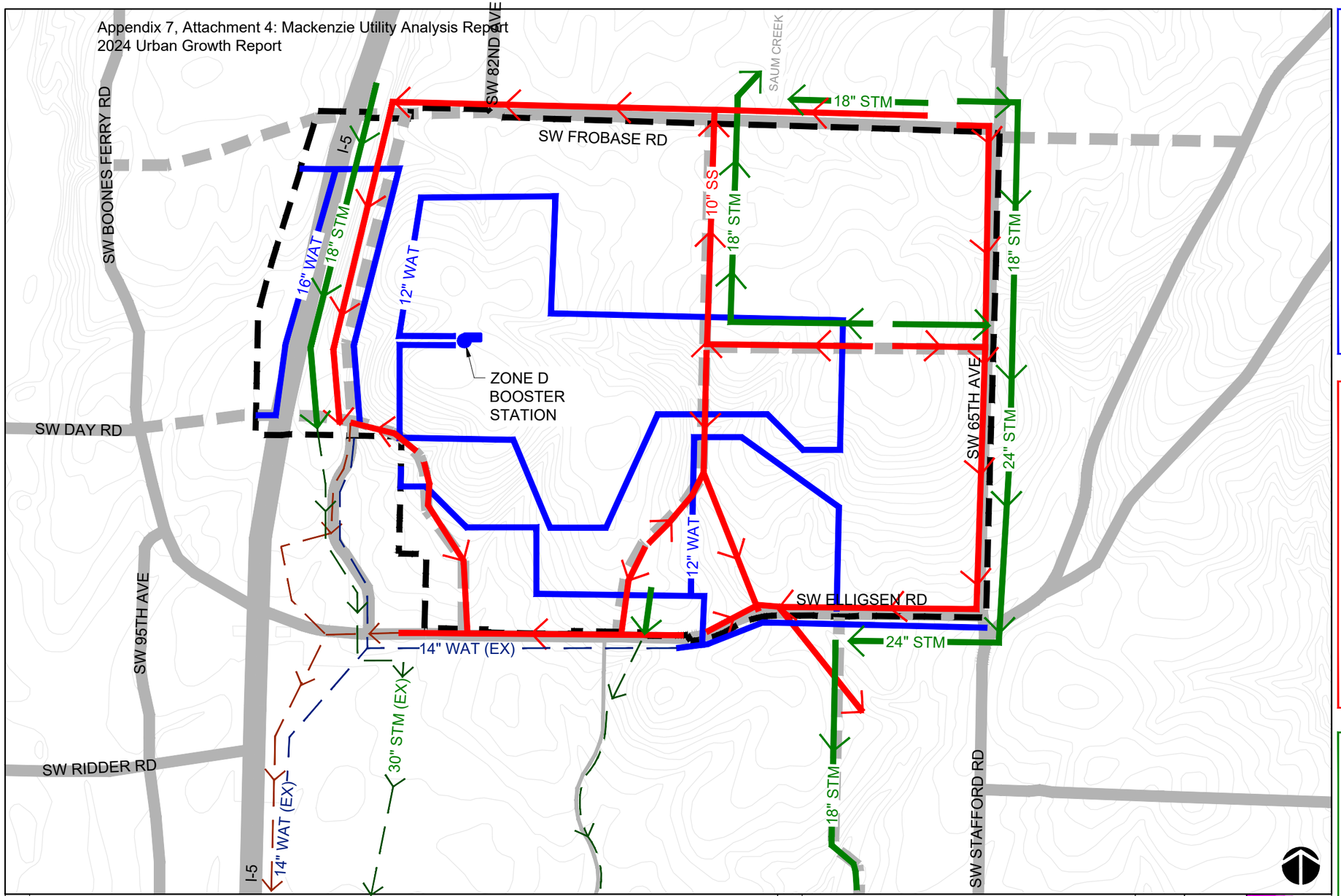
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography, portions of the Elligsen Road North URA could outfall directly to a tributary of Boeckman Creek, however the southwest quadrant flows southwest toward Interstate 5. Stormwater from this area would likely connect to existing City infrastructure near Elligsen Road and generally flow south and either outfall to Boeckman Creek or Coffee Lake Creek before flowing south to the Willamette River. The City's assessment of problem areas does not appear to include any stormwater infrastructure between the URA and either Creek.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Master Plan does not indicate capacity issues in the stormwater infrastructure that the southwest portion of the site would connect to, however this does not contemplate the addition of stormwater from a portion of this URA. It is unclear whether existing pipes have the capacity to serve the URA if added to the UGB.

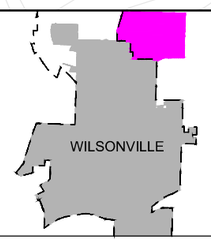


LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: C/D

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	25,550	$400	$10,220,000
16" PIPE (LF)	2,800	$500	$1,400,000
PUMP STATION (MGD)	*	$5,800,000	$609,000
STORAGE RESERVOIR (MG)	2.2	$200,000	$440,000
TOTAL			$12,669,000

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

BASIN: COFFEE CREEK/CANYON CREEK/BOECKMAN

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,700	$275	$742,500
12" PIPE (LF)	4,300	$350	$1,505,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	2.2	$1,800,000	$3,960,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$6,207,500

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: COFFEE LAKE CREEK-WILLAMETTE RIVER

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	10,000	$400	$4,000,000
24" PIPE (LF)	6,200	$425	$2,635,000
30" PIPE (LF)	0	$500	0
WATER QUALITY/ DETENTION (SF)	61,350	$150	$9,202,500
TOTAL			$15,837,500

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ELLIGSEN ROAD NORTH

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ELLIGSEN ROAD SOUTH

Water

Elligsen Road South URA would likely be served by the City of Wilsonville as it is included in their Master Plan study area. According to the Master Plan, Elligsen Road South would be part of pressure zones B and C, served by the Elligsen Reservoirs (two reservoirs with a total capacity of 5 MG) and C Level Reservoir (2 MG capacity) respectively. The Elligsen Reservoirs received water via gravity flow, while the C Level Reservoir receives water via the B to C Booster Station.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City, which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, including Elligsen Road South URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Elligsen Road South is assumed residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of residential areas (including Elligsen Road South) is not projected to occur until 2045, so additional storage will be needed for its development.
- Pumping – A pump station will be required to serve future development in the northeast portion of the study area, which includes Elligsen Road South.
- Distribution – Future system infrastructure as shown in the City of Wilsonville master plan is adequately sized for required fire flow and operating pressures.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of this URA into the UGB.

The Zone D Booster Station at C Level Tank is required to provide adequate pumping capacity to serve Elligsen Road South and is identified as a capital improvement project in the Master Plan. Without the addition of this pump, the existing system may experience pump capacity issues.

Sanitary Sewer

The Elligsen Road South URA would likely be served by the City of Wilsonville based on proximity. Elligsen Road South is included in the study area of the Master Plan and falls within the Canyon Creek and Boeckman sewer basins. Canyon Creek basin is served by the Canyon Creek Pump Station, and Boeckman basin is served by the Memorial Park Pump Station.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014. The study area for the Master Plan includes current service area within the UGB and urban reserve areas, which includes Elligsen Road South.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has no known hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve Elligsen Road So. The City of Wilsonville has capital improvement projects identified for both, with an estimated time frame of 6-10 years for Memorial Park and 11-20 years for Canyon Creek (relative to the report dated 2014).

There are also several trunk line extensions required to serve the Elligsen Road South URA. The design and costs for these improvements are included in the Master Plan and are shown on the Utility Analysis Map and included in the cost tables of this report.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Additional pump capacity and trunk line extensions are needed to serve the Elligsen Road South URA without negative impacts to existing sanitary infrastructure within the Canyon Creek and Boeckman basins.

Storm

City of Wilsonville is the likely provider for Elligsen Road South URA, as it is located primarily within the Boeckman Creek Basin and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

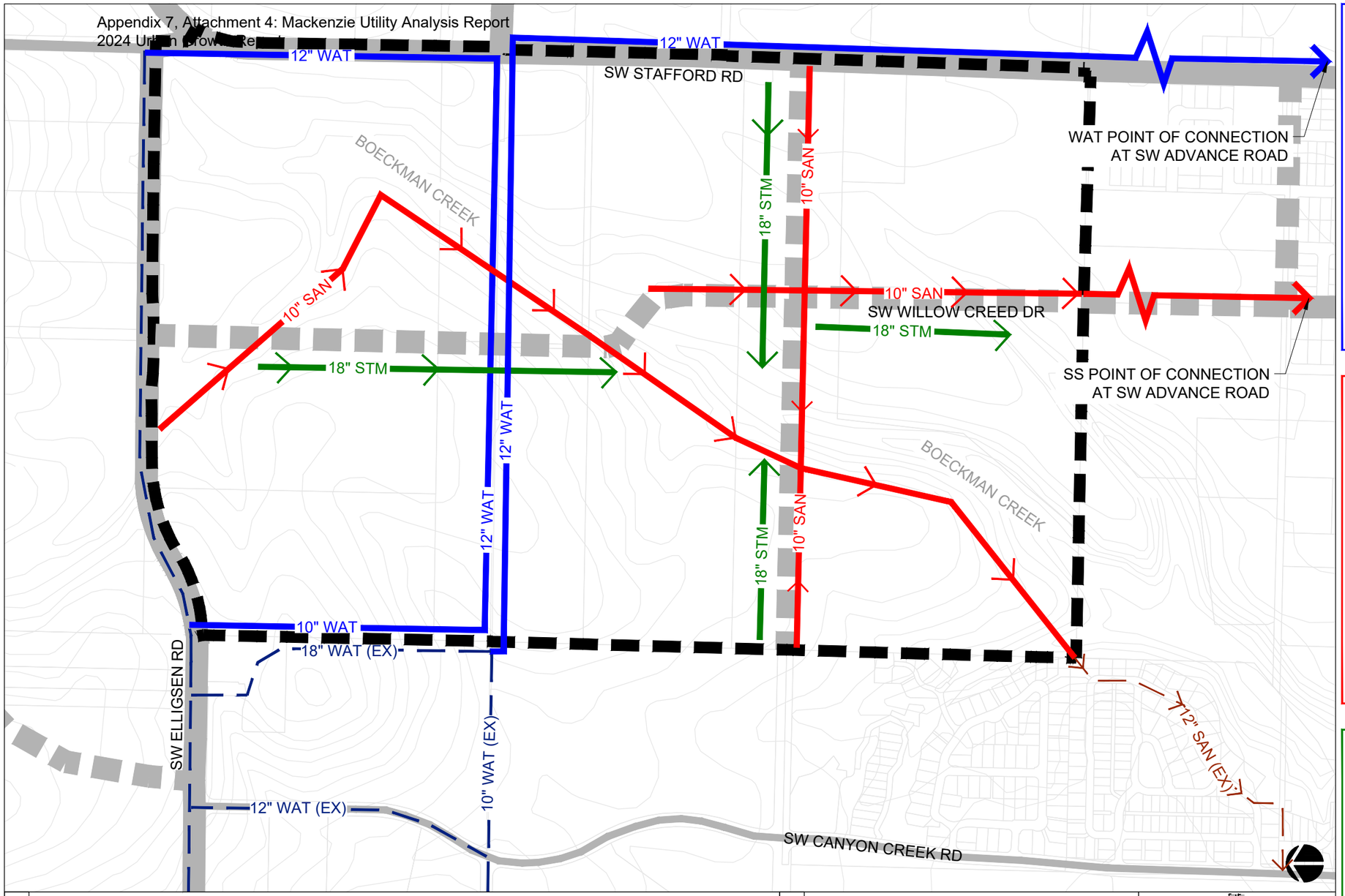
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography it seems likely that stormwater management for the development of Elligsen Road South would occur within the development area and outfall directly to Boeckman Creek without connecting to an existing public stormwater system. The City's assessment of problem areas included several areas of observed erosion along Boeckman Creek generally caused by incorrectly constructed or poorly maintained existing outfalls. While it is not the responsibility of Elligsen Road South development to correct these outfalls, any new outfalls should be properly designed and constructed to avoid additional erosion.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If Elligsen Road South outfalls directly to Boeckman Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: B/C

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	1,330	$350	$465,500
12" PIPE (LF)	9,770	$400	$3,908,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.0	$200,000	$200,000
TOTAL			$4,573,500

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

BASIN: CANYON CREEK/BOECKMAN

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	12,600	$275	$3,465,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.0	$1,800,000	$1,800,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$5,265,000

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: COFFEE LAKE CREEK-WILLAMETTE RIVER

PROPOSED IMPROVEMENTS

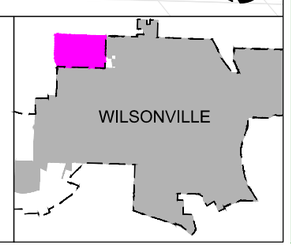
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	4,600	$400	$1,840,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	30,200	$150	$4,530,000
TOTAL			$6,370,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP
ELLIGSEN ROAD SOUTH

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GRAHAMS FERRY

Water

Grahams Ferry URA would likely be served by the City of Wilsonville as it is included in their Master Plan study area. According to the Master Plan, Grahams Ferry would be part of pressure zone B which is served by the Elligsen Reservoirs (two reservoirs with a total capacity of 5 MG). The Elligsen Reservoirs received water via gravity flow.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City, which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, including Grahams Ferry URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Grahams Ferry is assumed residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of the study area is assumed in the Master Plan to occur in 2036 for non-residential areas and in 2045 for residential areas (Grahams Ferry is included in residential development).
- Pumping – there are no pumping facilities serving pressure zone B. Based on topography, Grahams Ferry could be served by gravity from the Elligsen Reservoirs that serve the rest of pressure zone B.
- Distribution – Future system infrastructure as shown in the City of Wilsonville master plan is adequately sized for required fire flow and operating pressures.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of Grahams Ferry URA into the UGB.

Sanitary Sewer

The Grahams Ferry URA would likely be served by the City of Wilsonville based on proximity. Grahams Ferry is included in the study area of the Master Plan and falls within the Villebois sewer basin, which does not contain any public pump stations.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has no known hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are no pumps required to serve this URA.

There are also several trunk line extensions required to serve future development areas, including the Grahams Ferry URA. The design and costs for these improvements are included in the Master Plan and are shown on the Utility Analysis Map and included in the cost tables of this report.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Additional trunk line extensions are needed to serve this URA without negative impacts to existing sanitary infrastructure within the Villebois basin.

Storm

City of Wilsonville is the likely provider for Grahams Ferry URA, as it is located primarily within the Boeckman Creek Basin and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

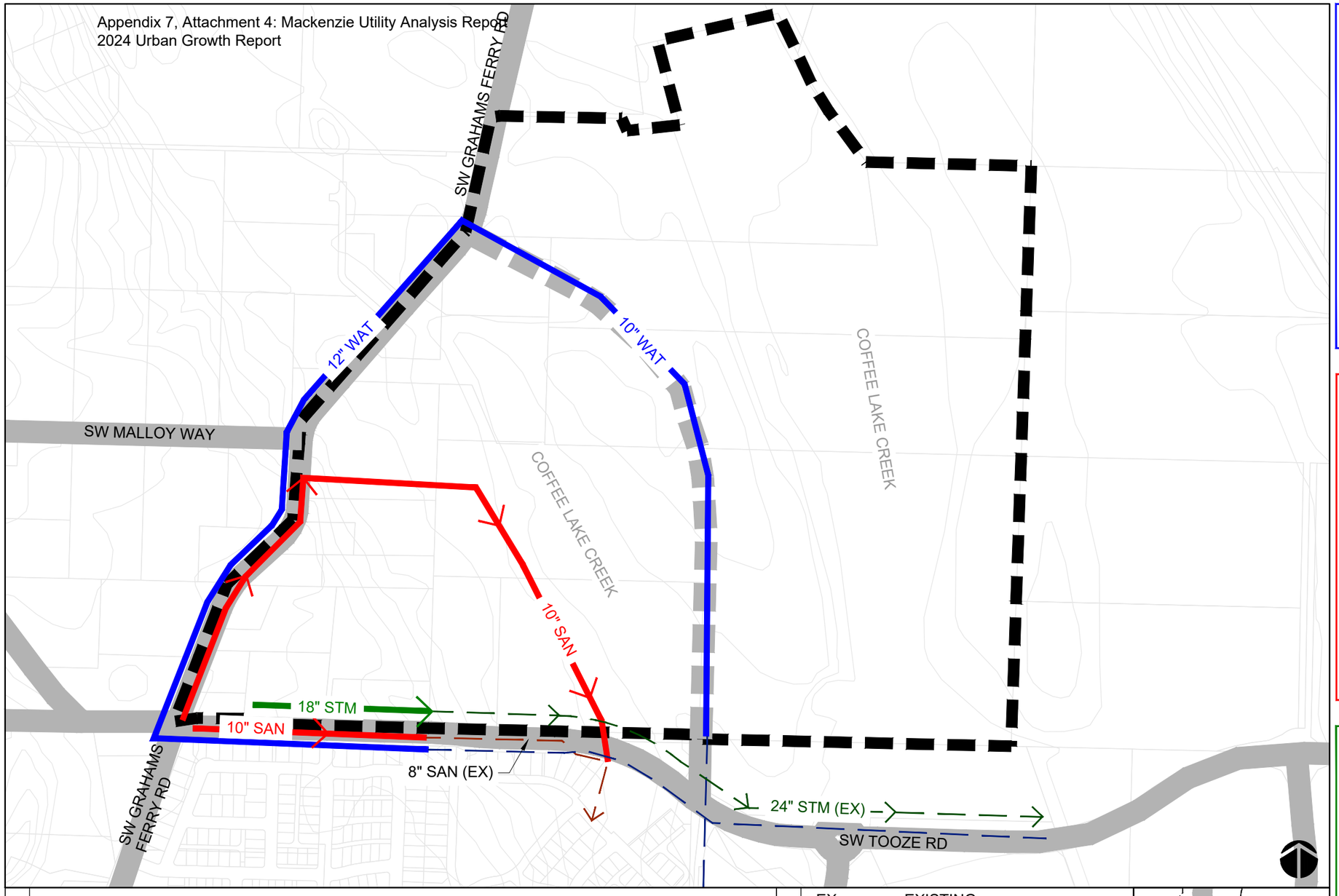
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography it seems likely that stormwater management for the development of Grahams Ferry would occur within the development area and outfall directly to Coffee Creek without connecting to an existing public stormwater system. The City's assessment of problem areas did not indicate issues in Coffee Creek downstream of the Grahams Ferry URA.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If Grahams Ferry outfalls directly to Coffee Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: B

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,820	$350	$987,000
12" PIPE (LF)	4,000	$400	$1,600,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.5	$200,000	$100,000
TOTAL			$2,687,000

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

ZONE: VILLEBOIS

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	4,500	$275	$1,237,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$1,237,500

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: COFFEE LAKE CREEK-WILLAMETTE RIVER

PROPOSED IMPROVEMENTS

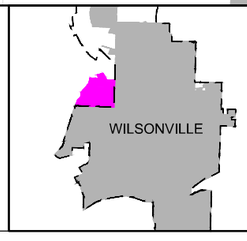
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	800	$400	$320,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	18,400	$150	$2,760,000
TOTAL			$3,080,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

GRAHAMS FERRY

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GRESHAM EAST

Water

The City of Gresham is the likely provider for Gresham East URA, as it is located adjacent to the existing City of Gresham city limits and service area boundaries. If the City of Gresham did serve the Gresham East urban reserve, it would most likely become part of the Wheeler service level due to proximity.

The City of Gresham currently receives most of its water supply from Portland Water Bureau's Bull Run conduits. The remainder comes from groundwater through the Rockwood Water Public Utility District (RWPUD). The City of Gresham and RWPUD plan to transition away from purchasing water from PWB to local groundwater supply by the time their contract with the City of Portland expires in 2026. As a result, there are wells at various stages of planning and construction with sufficient capacity to meet projected 2026 maximum daily demand (MDD), with two planned future wells to provide capacity to meet demands through 2050.

The following assessment is based on information from City of Gresham Water System Master Plan, dated March 2022. City of Gresham master planning considers a full build-out condition for land within current service areas, with full build-out being the development to ultimate capacity according to current land use and zoning designations. While master planning does include a few expansions areas (Pleasant Valley and Springwater), Gresham East URA is not one of these.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Within the Wheeler service level under existing conditions (2020) the required storage (1.28 MG) is less than the existing effective storage (2.03 MG) resulting in a storage surplus of 0.75 MG.
- Pumping – Under existing (2020) conditions the required pump capacity (670 gpm) for the Wheeler service area is less than the total pump capacity for the Salquist and Powell & Barnes Pump Stations (1,900 gpm) resulting in a surplus of 1,230 gpm.
- Distribution – under existing maximum daily demand conditions, the distribution system maintains an adequate minimum service pressure of at least 35 psi in all service levels.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – within the Wheeler service level there is a storage deficit of approximately 0.76 MG by 2050 (not including the urbanization of Gresham East) and the addition of a 2.0 MG reservoir (North Wheeler Reservoir) is recommended to provide storage capacity for future build-out. The addition of the North Wheeler Reservoir would address storage deficiencies in the existing system as a whole, so there is no surplus available to serve the Gresham East URA, and additional storage would likely be needed.
- Pumping – the Wheeler service level is served by the Salquist and Powell & Barnes pump stations, which have a total pump capacity of 1,900 gpm and a required pump capacity of 1,020 gpm for the 2050 building. This leaves a surplus of 880 gpm that is not otherwise allocated in the master plan that has potential to serve the Gresham East URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – Without consideration of serving the Gresham East URA, there is a predicted future storage deficit for the Wheeler service level. To avoid further storage capacity deficit, additional storage would be needed for the development of the Gresham East URA.
- Pumping – pumping capacity is adequate through the 2050 buildout (does not include Gresham East URA), therefore the City has no plans to add capacity to the system in the near future. Additional pumping capacity will likely be needed to serve the Gresham East URA.
- Distribution – there are two planned mainline improvements in roadways near the Gresham East URA; a 16-inch diameter pipe in SE Orient Drive and a 12-inch diameter pipe in near the southern end of the URA boundary (shown on Utiilty Analysis Map for reference). Both of these service extensions are intended to serve the future Springwater service level and it isn't clear whether they are sized adequately to provide service outside the Springwater expansion area.

Sanitary Sewer

The City of Gresham is the likely provider for Gresham East URA, as it is located adjacent to the existing City of Gresham city limits and service area boundaries. The Gresham East URA would most likely be served by the Kelly Creek basin based on proximity and topography.

The following assessment is based on information from City of Gresham Wastewater Collection System Master Plan, dated June 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The City of Gresham Public Works Standards (2019) specify an RDII design rate of 1,000 gpnad for new systems. The existing flow conditions for the 5-year storm event is 4,070 gpnad, indicating existing capacity deficiencies in the Upper Kelly Creek Basin Trunk.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Kelly Creek basin has capacity issues under the 2040 flow condition design storm peak flow without consideration of additional flows from Gresham East URA. There are future trunk improvements recommended to address capacity issues for both existing and future services, however it is unclear whether the improvements provide additional capacity for future expansion outside the existing UGB.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

There are existing capacity issues for both the existing and future Kelly Creek basin for areas currently within the UGB. If the Gresham East URA were added to this basin without appropriate improvements, this would cause further capacity issues, negatively impacting the areas currently served within this basin, particularly as the Gresham East URA is at the upper end of the basin.

Storm

The City of Gresham is the likely provider for Gresham East URA, as it is located adjacent to the existing City of Gresham city limits and parts of the URA are already included in three of the existing stormwater basins: Kelly/Burlingame Creek, Beaver Creek, and Johnson Creek.

The following assessment is based on information from City of Gresham City-wide Stormwater Master Plan, dated June 2022. City master planning includes the build-out of areas within the study area and planning districts - Gresham East URA is not included in these areas.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

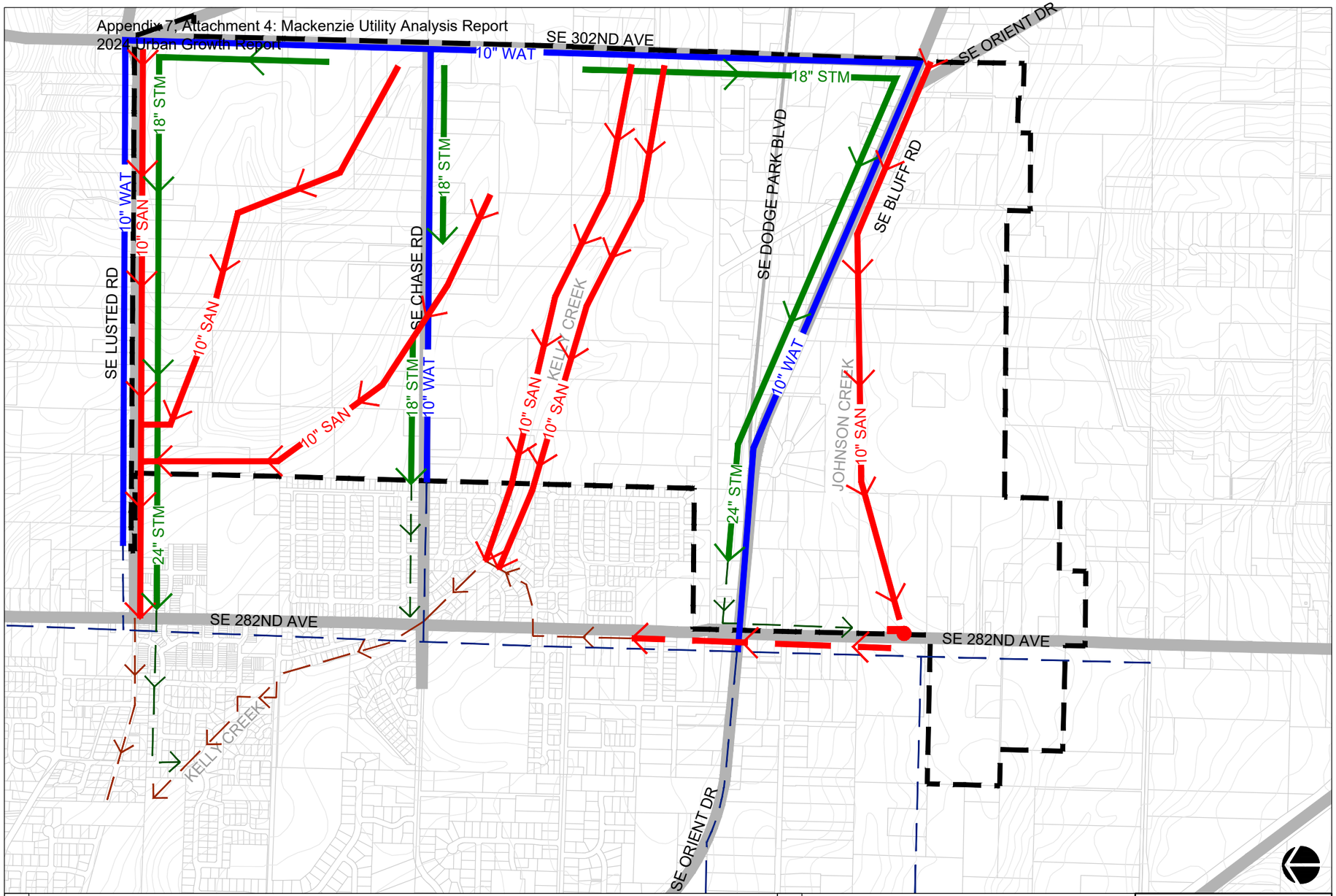
There is no predicted flooding under existing conditions in either the Kelly Creek or Johnson Creek basins for stormwater infrastructure in the area adjacent to Gresham East. The Beaver Creek basin was not modeled as it does not contain a significant amount of infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

There is no predicted flooding under future conditions (not including urbanization of Gresham East) in either the Kelly Creek or Johnson Creek basins for stormwater infrastructure in the area adjacent to Gresham East. The Beaver Creek basin was not modeled as it does not contain a significant amount of infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Development/redevelopment of impervious surfaces in the City of Gresham requires on-site stormwater management (water quality and flow control). Gresham East URA contains portions of Johnson Creek, Kelly Creek and Beaver Creek tributary. Based on topography, stormwater could likely be managed and discharge to these waterways without needing connection to public infrastructure. Because flow control would be required by future development, the capacity of the waterways themselves to receive stormwater from the URA should be adequate.



WATER

WATER PROVIDER: CITY OF GRESHAM

PRESSURE ZONE: WHEELER

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	21,130	$350	$7,395,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	3.1	$200,000	$620,000
TOTAL			$8,015,500

SANITARY

SANITARY PROVIDER: CITY OF GRESHAM

BASIN: KELLY CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	29,000	$275	$7,975,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	3.1	$1,800,000	$5,580,000
SAN FORCE (LF)	2,300	$310	$713,000
TOTAL			$14,268,000

STORM

STORM PROVIDER: CITY OF GRESHAM

WATERSHED: LOWER SANDY RIVER, JOHNSON CREEK

SUB-WATERSHED: BEAVER CREEK-SANDY RIVER, UPPER JOHNSON CREEK

PROPOSED IMPROVEMENTS

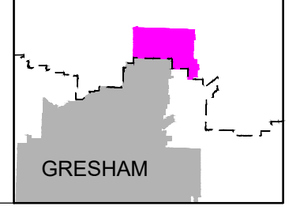
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	11,100	$400	$4,440,000
24" PIPE (LF)	5,800	$425	$2,465,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	51,300	$150	$7,695,000
TOTAL			$14,600,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

GRESHAM EAST

000860

MACKENZIE.

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HENRICI

Water

The Henrici URA would likely be served by Clackamas River Water (CRW) as it is included in the existing planning area as part of the Beavercreek pressure zone. The Beavercreek pressure zone is supplied by the Beavercreek Reservoirs which are served by the Glen Oak Pump Station.

Clackamas River Water (South System) receives water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant.

The following assessment is based on information from Clackamas River Water - Water System Master Plan, South System, dated April 2019. The Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. The Henrici URA is included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Under current conditions (2019), there is a storage capacity deficit of 0.31 MG in the Beavercreek Reservoirs.
- Pumping – Under current conditions (2019), within the Beavercreek pressure zone, there is a pumping capacity surplus of 508 gpm.
- Distribution – under current conditions there is a segment of distribution line identified with high head loss within the Henrici URA area of Beavercreek, indicating deficient pipe capacity.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage capacity surplus of 0.34 MG in the Beavercreek Reservoirs under future projections (2038).
- Pumping – there is a pumping capacity surplus of 80 gpm in the Beavercreek service area under future projections (2038).
- Distribution – under future projections (2038) there is a portion of distribution line identified with high head loss within the Henrici URA area of Beavercreek.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Pumping – future projections (2038) indicate a pumping surplus of 80 gpm, however this is less than predicted demand for the Henrici URA. Without additional pumping capacity, existing pump capacity will be exceeded.
- Storage – future projections (2038) indicate a storage surplus of 0.34 MG, however this is less than predicated demand for the Henrici URA. Without additional storage, existing storage capacity will be exceeded.

Sanitary Sewer

Henrici URA would likely be served by City of Oregon City based on proximity. Based on topography, it appears the Henrici URA would flow west toward the existing Clackamas County Water Environment Services (WES) Newell Creek Interceptor in Highway 213.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014, and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Surcharging (ranging from minor to severe) exists throughout the existing City collection system. There are also capacity deficiencies in several locations in the WES system.

Two of the twelve existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Clackamas County WES Master Plan identifies hydraulic deficiencies in the existing system (which includes the Newell Creek Interceptor) during the design storm event, mostly from high rainfall derived infiltration and inflow (RDI/I).

There are no pump stations currently serving or required to serve pressure zone B, which includes Henrici.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Clackamas County WES Master Plan identifies a capital improvement project to increase the size of the Newell Creek Interceptor, however it does not provide an estimate for what the increased capacity is or whether a surplus exists for future expansion. Additional capacity of the Newell Creek Interceptor could be required to serve the Henrici URA to reduce impacts to areas already inside the UGB.

Storm

City of Oregon City is the likely provider for Henrici URA, as it is located within the Beaver Basin and is adjacent to the City service area boundary. The Beaver Basin does not contain any existing stormwater infrastructure and based on topography generally flows south away from City limits toward Beaver Creek, which flows west and outfalls to the Willamette River.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the city. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues within the modeled basins (the Beaver Basin was not modeled as it does not contain any existing infrastructure). Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

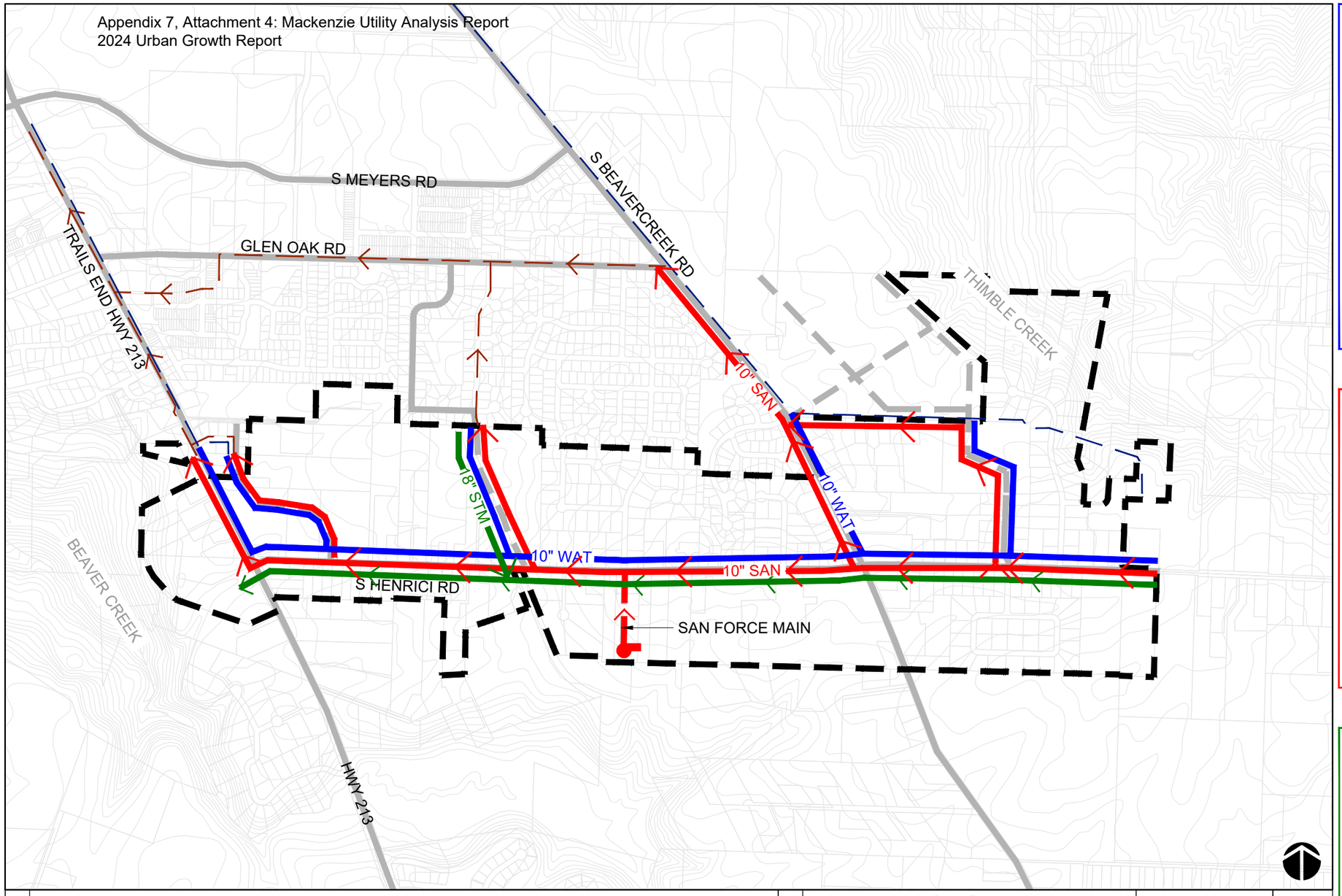
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

There are several problem areas (as defined by the Master Plan) under existing conditions for infrastructure downstream of the URA connections points. Adding stormwater from areas outside the UGB will likely contribute to these existing problems and potentially cause additional problem areas if they are not addressed.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Beaver Basin as it drains to Beaver Creek) during a 25-year storm event.

Based on topography the Henrici URA would likely outfall directly to Beaver Creek and would thus not connect to or impact existing City storm infrastructure. The addition of the Henrici URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: BEAVERCREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,790	$350	$5,176,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	1.5	$5,800,000	$8,700,000
STORAGE RESERVOIR (MG)	1.5	$200,000	$300,000
TOTAL			$14,176,500

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	18,600	$275	$5,115,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.3	$1,800,000	$540,000
SAN FORCE (LF)	670	$310	$207,700
TOTAL			$5,862,700

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

OUTFALL: BEAVER CREEK, ABERNETHY CREEK

PROPOSED IMPROVEMENTS

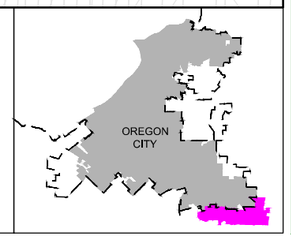
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	1,400	$400	$560,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	39,700	$150	$5,955,000
TOTAL			$6,515,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

HENRICI

MACKENZIE.

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HOLCOMB

Water

The Holcomb URA would likely be served by Clackamas River Water (CRW) and is included in the existing planning area as part of the Holcomb and Redland pressure zones. The Holcomb pressure zone is supplied by the Hunter Heights Reservoir and Barlow Crest Reservoirs (both served by the Barlow Crest Pump Station) and the Redland pressure zone is supplied by the Redland Reservoir (served by the Redland Pump Station).

Clackamas River Water (South System) receives water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant.

The following assessment is based on information from Clackamas River Water - Water System Master Plan, South System, dated April 2019. The Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. The Holcomb URA is included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Under current conditions (2019), within the Redland service area, there is a storage capacity surplus of 0.76 MG and within the Hunter Heights service area there is a storage capacity surplus of 0.33 MG.
- Pumping – Under current conditions (2019), within the Redland service area, there is a pumping capacity surplus of 898 gpm and within the Hunter Heights service area, there is a pumping capacity deficit of 615 gpm.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage capacity surplus of 0.59 MG in the Redland service area, and a slight deficit of 0.02 MG in the Holcomb Service area under future projections (2038).
- Pumping – there is a pumping capacity surplus of 301 gpm in the Redland service area, and a deficit of 619 gpm in the Hunter Heights service area, under future projections (2038).

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – there is an overall surplus for storage capacity under future projections, which includes the development of Holcomb URA. Based on this surplus, there should be no negative impacts to nearby areas already inside the UGB as a result of developing Holcomb URA.
- Pumping – there is an overall deficit for pumping capacity under future projections, therefore additional pumping capacity will be needed to develop this URA.

Sanitary Sewer

The Holcomb URA would likely be served by the City of Oregon City and Clackamas County Water Environment Services (WES) based on proximity. Based on topography, the Holcomb URA generally flows south and intercepts the existing WES Country Village Interceptor in South Redland Road.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant which are owned and operated by WES.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014, and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Both the Oregon City Master Plan and the WES Master Plan identify segments of the conveyance system that are predicted to surcharge or flood during the design storm event. The Country Village Interceptor does not appear to have any predicted surcharging or flooding under existing conditions which indicates it has sufficient capacity to serve areas already inside the UGB.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Country Village Interceptor in Redland Road does not extend far enough to serve the Holcomb URA. The City of Oregon City Master Plan includes a capital improvement project to extend this interceptor east, far enough to serve the Holcomb URA. The area immediately west of Holcomb is currently undeveloped and identified in Oregon City Master Plan as the Park Place Concept Area – it is not clear whether the proposed Country Village Interceptor extension is sized with enough capacity to serve both the Park Place Concept Area and Holcomb URA.

There are no pump stations currently required downstream of the Holcomb URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The City of Oregon City Master Plan includes a capital improvement project to extend the Country Village Interceptor, but it is not clear whether the proposed extension is sized with enough capacity to serve both the Park Place Concept Area and Holcomb URA. Additional capacity of the Country Village Interceptor could be required to serve the Holcomb URA to reduce impacts to areas already inside the UGB.

Storm

City of Oregon City is the likely provider for Holcomb URA, as it is located within the Abernathy Basin and is adjacent to the City service area boundary. The Abernathy Basin has very little existing stormwater infrastructure. Based on topography, the Holcomb URA generally flows south toward Redland Road. The south end of Holcomb URA is adjacent to Holcomb Creek, which discharges to Abernathy Creek south of Redland Road. Abernathy Creek runs west until it outfalls to the Willamette River.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

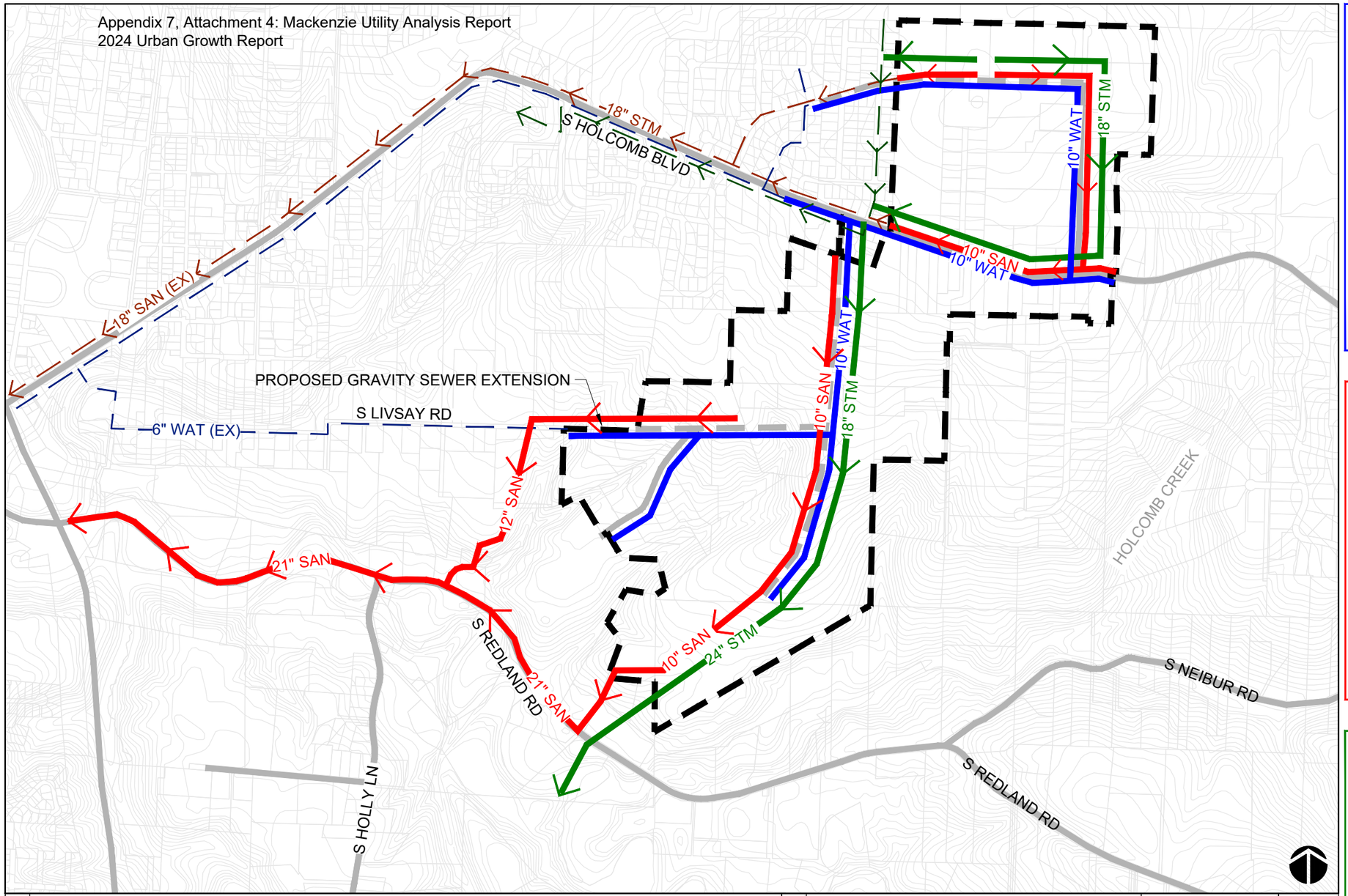
The Master Plan identifies capacity issues within the modeled basins (the Beaver Basin was not modeled as it does not contain any existing infrastructure). Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Abernathy Basin as it drains to Abernathy Creek) during a 25-year storm event.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography the Holcomb URA would likely outfall directly to Holcomb Creek (which flows to Abernathy Creek) and would thus not connect to existing City storm infrastructure. The addition of the Holcomb URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: REDLAND & HOLCOMB

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,450	$350	$5,057,500
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	1.1	$5,800,000	$6380000
STORAGE RESERVOIR (MG)	1.1	$200,000	$220,000
TOTAL			$11,657,500

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY/
CLACKAMAS RIVER WATER (CRW)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,800	$275	$2,970,000
12" PIPE (LF)	3,600	$350	$1,260,000
21" PIPE (LF)	3,800	$425	$1,615,000
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	0
TOTAL			$5,845,000

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: ABERNETHY CREEK

PROPOSED IMPROVEMENTS

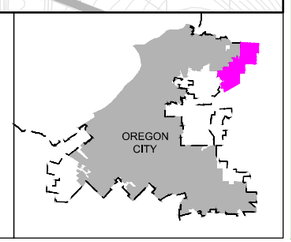
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	7,000	$400	$2,800,000
24" PIPE (LF)	4,000	$425	$1,700,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	19,750	$150	$2,962,500
TOTAL			$7,462,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

HOLCOMB

000868

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HOLLY LANE – NEWELL CREEK CANYON

Water

The Holly Lane – Newell Creek Canyon URA would like be served by Clackamas River Water (CRW) and City of Oregon City as it falls partially within CRW Beavercreek pressure zone and partially adjacent to Oregon City Intermediate and Upper zones. The Intermediate Zone is supplied by the Barlow Crest Reservoir (served by the Hunter Avenue Pump Station) and the Mountainview Reservoir (served by the Division Street Pump Station, which is owned/operated by SFWB). The Upper Zone is served by the Henrici Reservoir (gravity fed) and Boynton Reservoir (gravity fed or manually pumped for fire flow and emergency flow only).

Both CRW (South System) and Oregon City receive water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant. Oregon City conveys treated water via a 30" transmission line and SFWB Division Street Pump Station or 42" transmission line and the City Hunter Avenue Pump Station. SFWB also provides water to Clackamas River Water (CRW) and the City of West Linn, so their demands are considered in overall analysis.

The following assessment is based on information from City of Oregon City Water Distribution System Master Plan, dated January 2012 and Clackamas River Water - Water System Master Plan, South System, dated April 2019. The CRW Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. The Holly Lane – Newell Creek Canyon URA is partially included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Clackamas River Water

- Storage – there is a storage capacity deficit of 0.31 mg in the Beavercreek service area under current conditions (2019).
- Pumping – there is a pumping capacity surplus of 508 gpm in the Beavercreek service area under current conditions (2019).

Oregon City

- Storage – the Boynton, Henrici, Mountainview (No. 1 and No. 2), and Barlow Crest Reservoirs have c combined surplus of 4.99 MG under existing conditions.
- Pumping – the Mountainview and Hunter Avenue Pump Stations have a combined surplus of 4,463 gpm of pumping capacity under existing conditions.
- Distribution – peak hour flows and maximum day demands plus fire flow can be delivered within an acceptable pressure under existing conditions.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Clackamas River Water

- Storage – there is a storage capacity surplus of 0.34 MG in the Beavercreek service area under future projections (2038).
- Pumping – there is a pumping capacity surplus of 80 gpm in the Beavercreek service area under future projections (2038).

Oregon City

Buildout conditions are within the Oregon City existing UGB only and do not include expansion into any of the URA areas.

- Storage – Boyton, Henrici, and Mountainview (No. 2) Reservoirs have a combined storage surplus of 0.38 MG, Mountainview (No. 1) Reservoir has a storage deficit of 2.41 MG, and Barlow Crest has a storage deficit of 1.75 MG under buildout conditions.
- Pumping – The Mountainview Pump Station has a pumping capacity surplus of 236 gpm, the Hunter Avenue Pump Station has a pumping capacity surplus of 248 gpm and the Barlow Crest Pump Station has a pumping capacity deficit of 874 gpm under buildout conditions.
- Distribution – Due to undersized pipes, there are areas where available fire flow was less than the required fire flow under a maximum day demand plus fire flow analysis.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Clackamas River Water

There is an overall surplus for both storage and pumping capacity under future projections, which partially includes the development of Holly Lane – Newell Creek Canyon URA. Based on this surplus, there should be no negative impacts to nearby areas already inside the UGB as a result of developing Holly Lane – Newell Creek Canyon URA.

Oregon City

Storage, pumping and distribution systems have capacity issues under future planning conditions, which does not include the development of Holly Lane – Newell Creek Canyon URA. Addition of this URA to the UGB would cause further capacity deficits if additional storage, pumping and upsizing of pipes did not occur as part of development.

Sanitary Sewer

The Holly Lane – Newell Creek Canyon URA would likely be served by City of Oregon City and Clackamas County Water Environment Services (WES) based on proximity. Based on topography, it appears the Holly Lane – Newell Creek Canyon URA would flow east and west and connect to the existing Clackamas County Water Environment Services (WES) Newell Creek Interceptor in Highway 213.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014 and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Both the Oregon City Master Plan and the WES Master Plan identify segments of the conveyance system that are predicted to surcharge or flood during the design storm event. The Newell Creek Interceptor south of Redland Road has predicted surcharging or flooding under existing conditions which indicates it does not have sufficient capacity to serve areas already inside the UGB.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are existing capacity issues in the Newell Creek Interceptor which indicates it does not have the capacity to serve areas proposed for addition to the UGB.

There are no pump stations currently required downstream of the Holly Lane – Newell Creek Canyon URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The City of Oregon City Master Plan includes a capital improvement project to upsize a portion of the Newell Creek Interceptor south of Redland Road, but it is not clear how much additional capacity this will provide or whether it could serve the Holly Lane – Newell Creek Canyon URA specifically. Additional capacity of the Newell Creek Interceptor could be required to serve the Holly Lane – Newell Creek Canyon URA.

Storm

City of Oregon City is the likely provider for Holly Lane – Newell Creek Canyon URA, as it is located primarily within the Newell Basin and is adjacent to the City service area boundary.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

This URA is generally divided into two sections – area east of Highway 213 and area west of Highway 213. On both the west and east side of Highway 213 there are tributaries of Newell Creek which are generally the low points within this URA. Newell Creek runs north and flows into Abernathy Creek, which runs west until it outfalls to the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

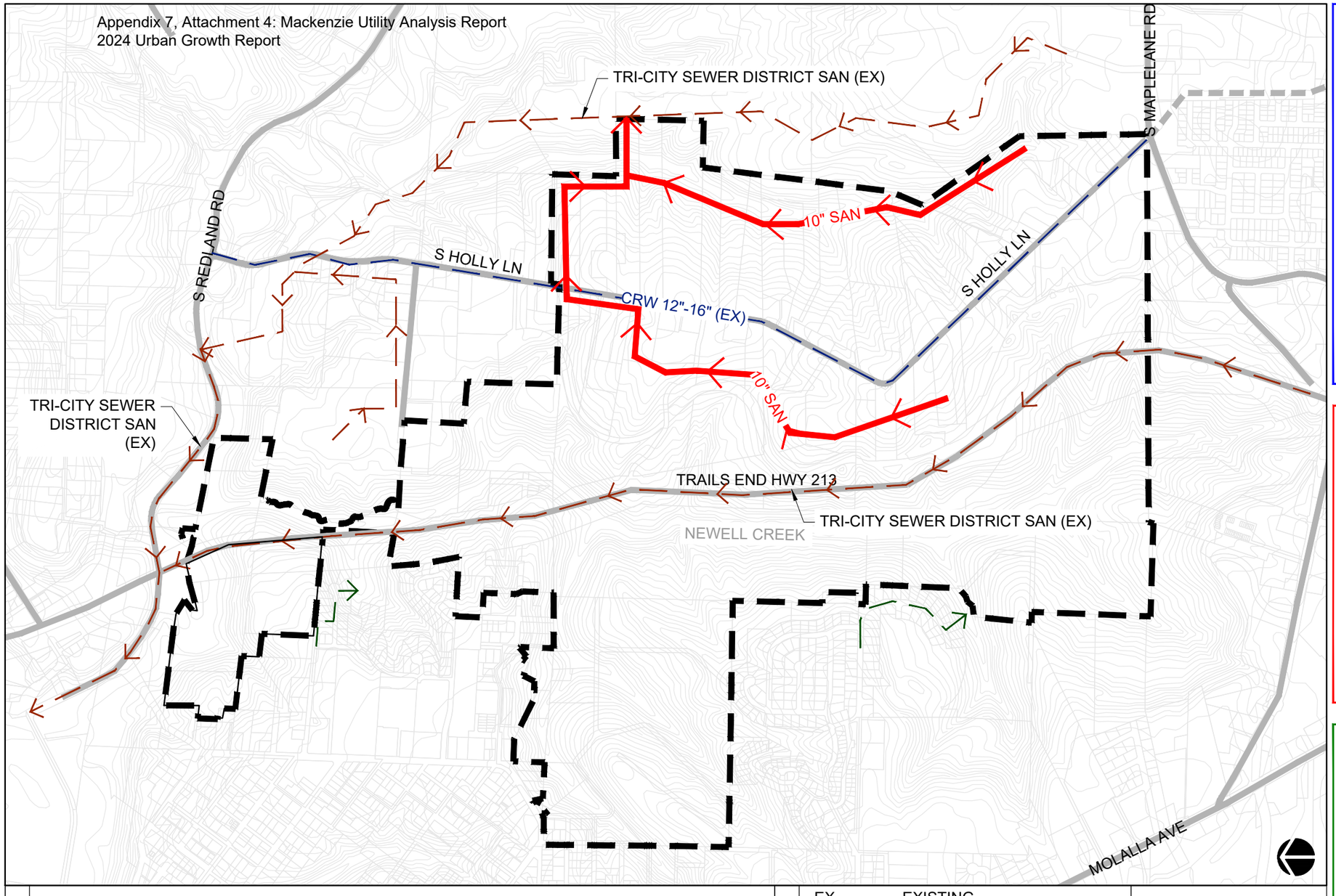
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Newell Basin as it drains to Abernathy Creek) during a 25-year storm event.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on this topography, this URA would likely outfall directly to Newell Creek and would thus not connect to existing City storm infrastructure. The addition of the Holly Lane – Newell Creek Canyon URA to the UGB would thus have no impacts to existing stormwater facilities.

Appendix 7, Attachment 4: Mackenzie Utility Analysis Report
2024 Urban Growth Report



WATER

WATER PROVIDER: CITY OF OREGON CITY/ CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: INTERMEDIATE AND UPPER (OREGON CITY) / BEAVERCREEK (CRW)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0.4	$5,800,000	$2,320,000
STORAGE RESERVOIR (MG)	0.4	$200,000	$80,000
TOTAL			$2,400,000

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,500	$275	$2,887,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$2,887,500

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: ABERNETHY CREEK

PROPOSED IMPROVEMENTS

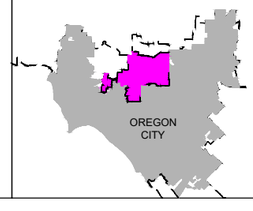
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	0	$400	$0
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	19,400	$150	$2,910,000
TOTAL			$2,910,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

HOLLY LANE - NEWELL CREEK CANYON

000873

MACKENZIE.

0 500 1000

I-5 EAST

Water

The I-5 East URA would most likely be served by the City of Tualatin based on proximity and would be part of the B and C pressure zones. Pressure zone B is served by two storage reservoirs, a 2.2 MG reservoir (B-1) and 2.8 MG reservoir (B-2) which were previously supplied by the Martinazzi and Boones Ferry Pump Stations. Both of these pump stations have reached the end of their usable lives and do not currently operate, and pressure zone B is now supplied by the Boones Ferry flow control valve/pressure reducing valve. Pressure zone C is served by a 0.8 MG reservoir (C-1) which is supplied by the Norwood Pump Station.

The City of Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line.

The following assessment is based on information from City of Tualatin Water System Master Plan, dated March 2023. The City of Tualatin existing service area includes areas within City limits and areas within the UGB at the time of the Master Plan. The study area of the Master Plan includes the existing service area as well as planned expansion areas, which does not include I-5 East URA.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – there is a storage surplus of 0.19 MG for service area B and a surplus of 0.51 MG for service area C under current (2020) conditions.
- Pumping – Under normal pumping conditions, the Norwood Pump Station (serving pressure zone C) has a surplus capacity of 1.33 MGD under existing conditions. The Martinazzi and Boones Ferry Pump Stations (serving pressure zone B) have reached the end of their usable lives and do not currently operate.
- Distribution – There are existing industrial deficiencies in the B service area and residential deficiencies in the C service area. Existing transmission line capacity is also deficient in both B and C levels.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Buildout conditions in the City of Tualatin Master Plan include the existing service area and defined expansion areas, of which I-5 East is not included.

- Storage – there is a storage deficit of 1.0 MG for service area B and a deficit of 0.32 MG for service area C under buildout conditions.
- Pumping – Under normal pumping conditions, the Norwood Pump Station (serving pressure zone C) has a surplus capacity of 0.58 MGD under buildout conditions.
- Distribution – new customers requiring large fire flows in the B level service are required to install fire flow pumps. Further development within the C level will result in the system not being able to meet demand without pumping during fire flow or increased transmission. Additional distribution line capacity will be required to develop this URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – while there is a storage surplus under existing conditions, there is a deficit under the full buildout condition. Assuming adding I-5 East URA to the UGB would occur after full buildout of the areas already within the UGB, incorporation of I-5 East would cause a greater deficit without the addition or expansion of storage facilities.
- Pumping – after full buildout, the Norwood Pump Station (serving pressure zone C) has a capacity surplus (0.58 MGD, which could potentially serve the I-5 East URA. The Martinazzi and Boones Ferry Pump Stations (serving pressure zone B) both require upgrades to be operational.
- Distribution – transmission line improvements are identified in the Master Plan capital improvement projects. These improvements would provide resiliency to the existing water system as well as additional capacity to serve future growth outside the Master Plan study area.

Sanitary Sewer

The I-5 East URA would most likely be served by the City of Tualatin based on proximity. Based on topography, the I-5 East URA flows primarily north where it could connect to the existing City of Tualatin system by either crossing I-205 to the west (Martinazzi Basin) or the north (Nyberg Basin). If it connected to in the Nyberg Basin, it would be served by the Saum Creek Pump Station, which connects to a CWS owned 24-inch pipe that heads west toward the Lower Tualatin Interceptor.

The City of Tualatin's sewage is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF) which is owned and operated by Clean Water Services. Clean Water Services is also responsible for gravity sewers over 24-inches in size, pump stations and force mains.

The following assessment is based on information from City of Tualatin Sewer Master Plan, dated August 2019 and the Clean Water Services East Basin 2019 Master Plan Project, dated June 2021.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Eight of the nine existing CWS owned pump stations have surplus capacity under existing conditions and are therefore adequately serving areas within the existing UGB.

Under existing conditions (2017) there are pipe capacity issues identified in the Teton and Tualatin Reservoir Basins. These capacity issues did not result in any recommended capital improvement projects as they were not identified as they did not qualify as high priority based on the Master Plan deficiency rankings.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions in the City of Tualatin Master Plan include infill of the existing service area as well as two planning areas (does not include I-5 East URA). If the I-5 East URA connected to the City of Tualatin system to the north (Nyberg Basin), it would be served by the Saum Creek Pump Station. The City of Tualatin Master Plan indicates that there is a proposed project that would increase the capacity of the Saum Creek Pump Station but does not specify what the increased capacity is or whether the entire capacity increase is needed for the buildout condition. If the I-5 East URA connected to the City of Tualatin system to the west (Martinazzi Basin), there is no pump station currently serving that basin.

Under buildout conditions, six of the eight basins contain pipe with deficient capacity. Both the Nyberg and Martinazzi Basins contain pipe with deficient capacity under buildout conditions, therefore it can be assumed that the existing sanitary sewer pipes do not have the capacity to serve the I-5 East URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If the I-5 East URA connected to the City of Tualatin system to the north (Nyberg Basin), it is unclear whether the proposed capacity increase to the Saum Creek Pump Station would have the capacity to serve the I-5 East URA. There are pipe deficiencies in both the Martinazzi and Nyberg basins under buildout conditions, which does not include the I-5 East URA. The addition of the I-5 East URA to either of these basins would further contribute to these deficiencies and increased pipe capacity will likely be needed to serve its development.

Storm

The I-5 East URA would most likely be served by the City of Tualatin based on proximity and topography. Based on topography the I-5 East URA generally flows toward Saum Creek which flows north/south through the URA. Saum Creek flows north until it crosses under Interstate 205 where it continues east/north until it reaches the Tualatin River.

The majority of the City of Tualatin drainage basins discharge to the Tualatin River and its tributaries, including Nyberg Creek, Hedges Creek, Cummins Creek, and Saum Creek. The City's infrastructure consists of more small dispersed systems that discharge to these receiving waters rather than large trunk lines.

The following assessment is based on information from the City of Tualatin Stormwater Master plan, dated April 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. Capacity issues were identified at six locations, none of which are in the Saum Creek Basin.

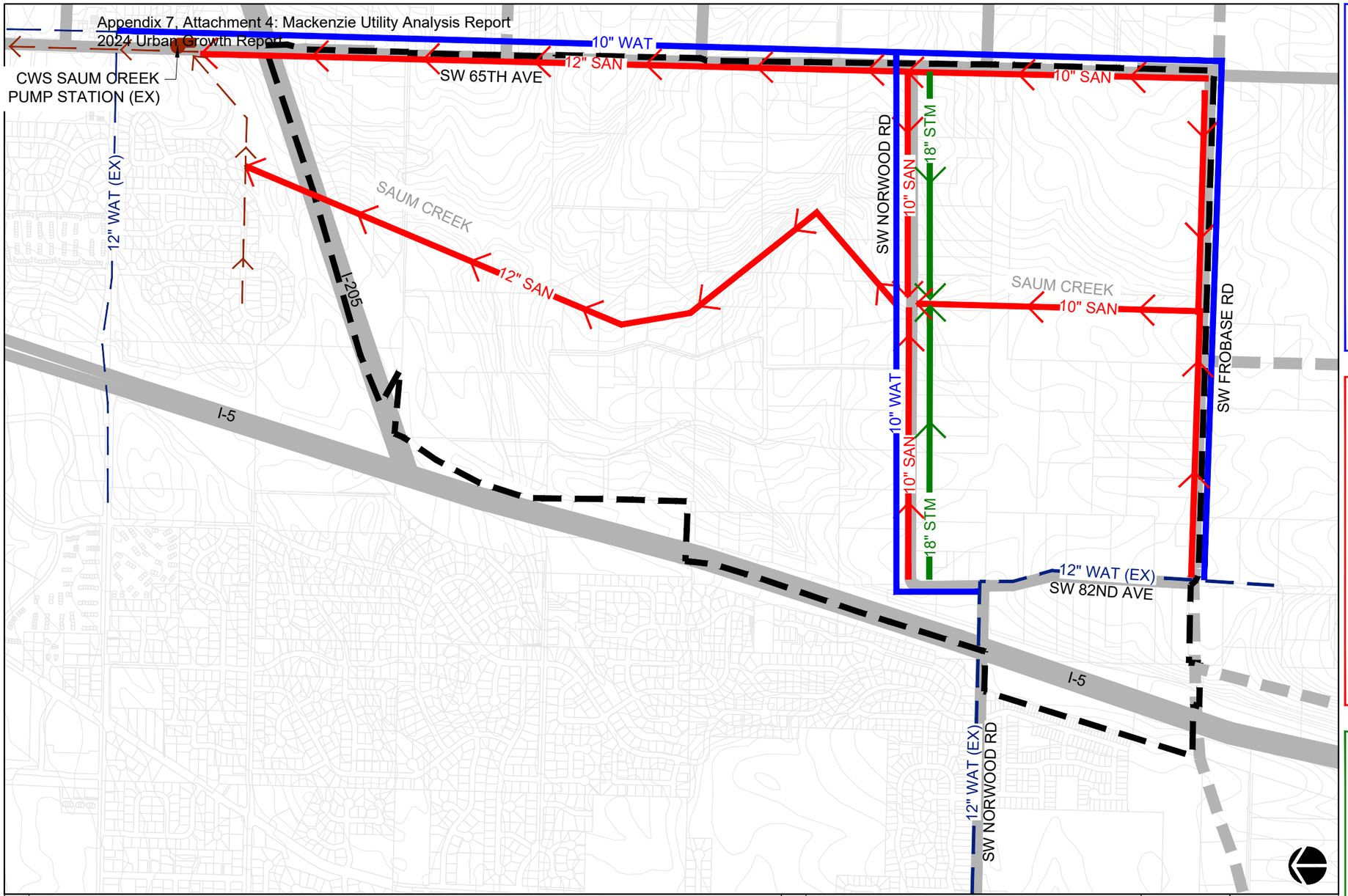
Based on topography, the I-5 East URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The same capacity issues identified in the Master Plan for existing conditions are problematic when considering serving areas outside the existing service area and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The I-5 East URA is within the Saum Creek Basin which does not have any identified capacity related issues.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the I-5 East URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure, therefore existing facilities would not be impacted.



WATER

WATER PROVIDER: CITY OF TUALATIN

PRESSURE ZONE: B/C

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	19,300	$350	$6,755,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	2.5	$5,800,000	$14,500,000
STORAGE RESERVOIR (MG)	2.5	$200,000	$500,000
TOTAL			$21,755,000

SANITARY

SANITARY PROVIDER: CITY OF TUALATIN

BASIN: NYBERG OR MARTINAZZI

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,200	$275	$3,905,000
12" PIPE (LF)	12,000	$350	$4,200,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	2.5	$1,800,000	$4,500,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$12,605,000

STORM

STORM PROVIDER: CITY OF TUALATIN

WATERSHED: FANNO CREEK-TUALATIN RIVER

SUB-WATERSHED: SAUM CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

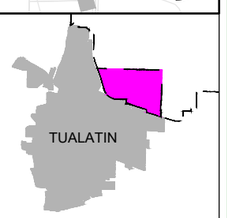
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	4,500	$400	$1,800,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	17,650	$150	$2,647,500
TOTAL			$4,447,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

I-5 EAST

MACKENZIE.

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MAPLELANE

Water

The Maplelane URA would likely be served by Clackamas River Water (CRW) as it is included in the existing CRW planning area as part of the Henrici pressure zone. The Henrici pressure zone is supplied by the Beavercreek pressure zone (served by the Henrici Reservoirs). There is currently no pump station required to serve the Henrici pressure zone.

Clackamas River Water (South System) receives water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant.

The following assessment is based on information from Clackamas River Water - Water System Master Plan, South System, dated April 2019. The Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. A majority of the Maplelane URA is included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Under current conditions (2019), the Henrici Reservoirs have a storage capacity surplus of 0.29 MG indicating there is adequate storage capacity to serve areas already inside the UGB.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Under future projections (2038) there is a storage capacity surplus of 0.60 MG in the Henrici Reservoirs, thus there is additional capacity available to serve areas proposed for addition to the UGB, depending on their demand.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

There is an overall surplus for storage capacity under future projections, however it is not an adequate surplus to serve the entire Maplelane URA. Additional storage capacity will be needed to develop this URA without causing a deficit for the existing system.

Sanitary Sewer

Maplelane URA would likely be served by Oregon City based on proximity. Based on topography, it appears the Maplelane URA would flow east away from existing Oregon City and Clackamas County sanitary infrastructure. It will therefore need to be pumped west to join the existing City of Oregon City infrastructure located in Beavercreek Road, which flows to the Clackamas County Water Environment Services (WES) Newell Creek Interceptor located in Highway 213.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Surcharging (ranging from minor to severe) exists throughout the existing City collection system. There are also capacity deficiencies in several locations in the WES system.

Two of the twelve existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are existing capacity issues in the Newell Creek Interceptor which indicates it does not have the capacity to serve areas proposed for addition to the UGB.

There are no pump stations currently required downstream of the Maplelane URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Clackamas County WES Master Plan identifies a capital improvement project to increase the size of the Newell Creek Interceptor, however it does not provide an estimate for what the increased capacity is or whether a surplus exists for future expansion. Additional capacity of the Newell Creek Interceptor could be required to serve the Maplelane URA to reduce impacts to areas already inside the UGB.

Storm

City of Oregon City is the likely provider for Maplelane URA, as it is located within the Abernathy and Thimble Basins and is adjacent to the City service area boundary. Based on topography, the Maplelane URA generally flows east towards tributaries of the Abernathy Creek, which eventually runs west and outfalls to the Willamette River. Topography suggests that this URA would likely outfall directly to Abernathy Creek and would thus not connect to existing City storm infrastructure.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

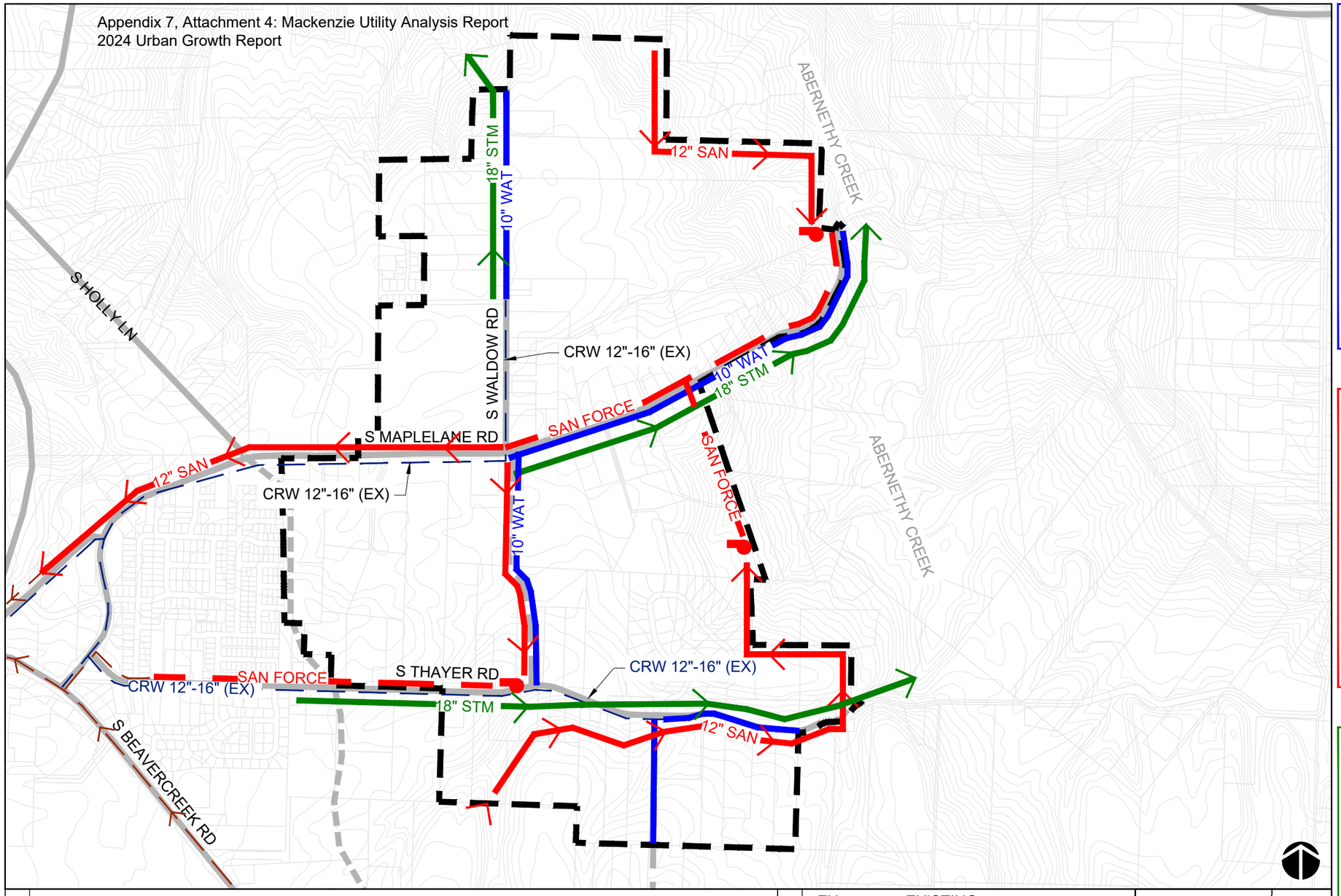
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

There are several problem areas (as defined by the Master Plan) under existing conditions for infrastructure downstream of the URA connections points. Adding stormwater from areas outside the UGB will likely contribute to these existing problems and potentially cause additional problem areas if they are not addressed.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Thimble and Abernathy Basins as they drain to Abernathy Creek) during a 25-year storm event.

Based on topography the Maplelane URA would likely outfall directly to Abernathy Creek and would thus not connect to existing City storm infrastructure. The addition of the Maplelane URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: HENRICI

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,400	$350	$3,640,000
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.7	$200,000	$340,000
TOTAL			$3,980,000

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	15,500	$350	$5,425,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.7	$1,800,000	$3,060,000
SAN FORCE (LF)	8,500	$310	$2,635,000
TOTAL			$11,120,000

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: ABERNETHY CREEK

PROPOSED IMPROVEMENTS

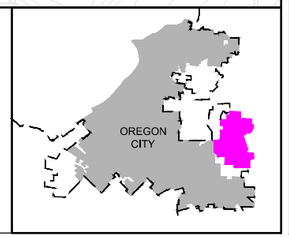
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	12,200	$400	$4,880,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	32,250	$150	$4,837,500
TOTAL			$9,717,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

MAPLELANE

000882

MACKENZIE.

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NORWOOD

Water

The Norwood URA would most likely be served by the City of Tualatin based on proximity and would be part of the B pressure zone. Pressure zone B is served by two storage reservoirs, a 2.2 MG reservoir (B-1) and 2.8 MG reservoir (B-2) which were previously supplied by the Martinazzi and Boones Ferry Pump Stations. Both pump stations have reached the end of their usable lives and do not currently operate. Pressure zone B is now supplied by the Boones Ferry flow control valve/pressure reducing valve.

The City of Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line.

The following assessment is based on information from City of Tualatin Water System Master Plan, dated March 2023. Buildout conditions in the City of Tualatin Master Plan include the existing service area and defined expansion areas, of which Norwood is not included.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – there is a storage surplus of 0.19 MG for service area B under current (2020) conditions.
- Distribution – There are existing industrial deficiencies in the B service. Existing transmission line capacity is also deficient.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage deficit of 1.0 MG for service area B under buildout conditions. Additional areas outside the current UGB could not be served without increasing storage capacity.
- Distribution – there are existing flow deficiencies within service area B, which can be corrected by upsizing pipes. To serve areas proposed for addition to the UGB, it is likely these undersized pipes will need to be addressed.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – while there is a storage surplus under existing conditions, there is a deficit under the full buildout condition. Assuming adding Norwood URA to the UGB would occur after full buildout of the areas already within the UGB, incorporation of Norwood would cause a greater deficit without the addition or expansion of storage facilities.
- Distribution – without addressing undersized pipes, the number and severity of the existing flow deficiencies could increase if URA land were added to the UGB.

Sanitary Sewer

The Norwood URA would most likely be served by the City of Tualatin based on proximity. Based on topography, the Norwood URA flows primarily north where it would cross I-205 and join the existing City of Tualatin sewer system in the Nyberg Basin. Norwood URA would likely be served by the Borland Pump Station, which connects to a CWS owned 24-inch pipe that heads west toward the Lower Tualatin Interceptor.

The City of Tualatin's sewage is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF) which is owned and operated by Clean Water Services. Clean Water Services is also responsible for gravity sewers over 24-inches in size, pump stations and force mains.

The following assessment is based on information from City of Tualatin Sewer Master Plan, dated August 2019 and the Clean Water Services East Basin 2019 Master Plan Project, dated June 2021.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- The Borland Pump Station has a surplus of 155 gpm under existing conditions.
- There are no modeled pipe deficiencies (based on HGL criteria outlined in the Master Plan) in the Nyberg basin under existing conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions in the City of Tualatin Master Plan include infill of the existing service area as well as two planning areas (does not include I-5 East URA).

- The Borland Pump Station has surplus capacity under existing conditions, however it is not clear in either the City of Tualatin or Clean Water Services Master Plans whether it has capacity under buildout conditions.
- The Nyberg basin contains deficient pipe (based on HGL criteria outlined in the Master Plan) under buildout conditions.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- It is unclear whether the Borland Pump Station has the capacity to serve additional area.
- There are pipe deficiencies in the Nyberg basin under buildout conditions. The addition of the Norwood URA would further contribute to these deficiencies.

Storm

The Norwood URA would most likely be served by the City of Tualatin based on proximity. Based on topography, the Norwood URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

The majority of the City of Tualatin drainage basins discharge to the Tualatin River and its tributaries, including Nyberg Creek, Hedges Creek, Cummins Creek, and Saum Creek. The City's infrastructure consists of more small dispersed systems that discharge to these receiving waters rather than large trunk lines.

The following assessment is based on information from the City of Tualatin Stormwater Master plan, dated April 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. Capacity issues were identified at six locations, none of which are in the Saum Creek Basin.

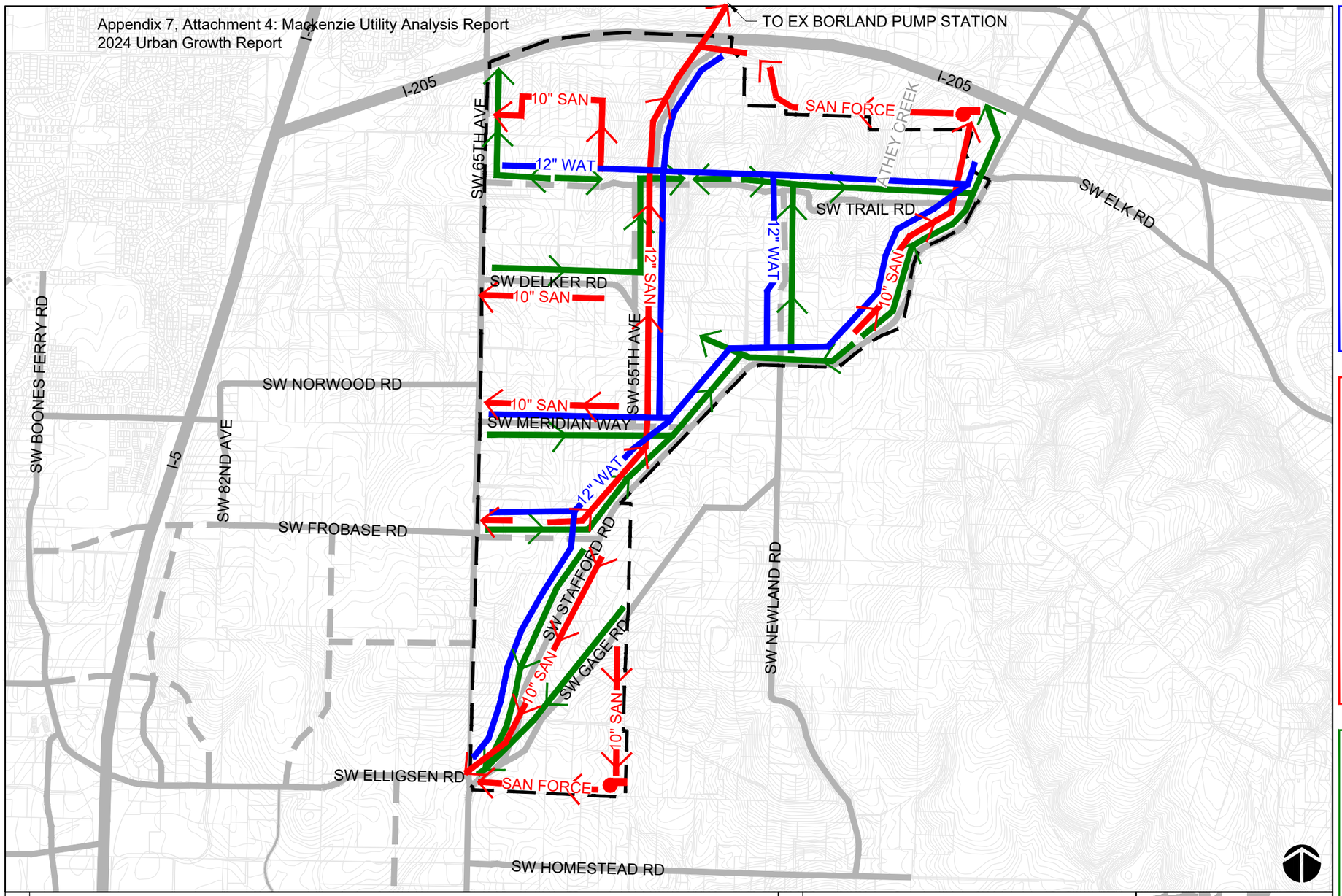
Based on topography, the Norwood URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The same capacity issues identified in the Master Plan for existing conditions are problematic when considering serving areas outside the existing service area and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The Norwood URA is within the Saum Creek Basin which does not have any identified capacity related issues.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the Norwood URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

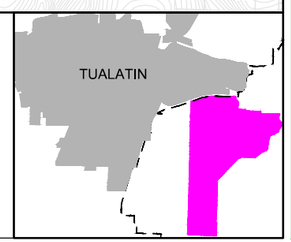


LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



WATER

WATER PROVIDER: CITY OF TUALATIN

PRESSURE ZONE: SERVICE AREA B (NEAREST)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	38,600	$350	$13,510,000
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	5.4	$200,000	$1,080,000
TOTAL			$14,590,000

SANITARY

SANITARY PROVIDER: CITY OF TUALATIN

BASIN: NYBERG

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	19,800	$275	$5,445,000
12" PIPE (LF)	10,800	$350	$3,780,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.8	$1,800,000	$1,440,000
SAN FORCE (LF)	7,300	$310	$2,263,000
TOTAL			$12,928,000

STORM

STORM PROVIDER: CLEAN WATER SERVICES (CWS)

WATERSHED: FANNO CREEK-TUALATIN RIVER

SUB-WATERSHED: SAUM CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	17,700	$400	$7,080,000
24" PIPE (LF)	15,000	$425	$6,375,000
30" PIPE (LF)	10,000	$500	$5,000,000
WATER QUALITY/ DETENTION (SF)	123,900	$150	$18,585,000
TOTAL			$37,040,000

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

NORWOOD

MACKENZIE.

0 1000 2000

ROSA

Water

Rosa would most likely be served by the City of Hillsboro based on proximity. Rosa is located south of the existing City System service area and west of the future South Hillsboro service area and is included in the Master Plan as a future growth area (FGA). The Master Plan includes the evaluation of distribution system and storage system under both existing and projected future water demand, which includes future growth areas (FGA).

The City of Hillsboro owns and operates two municipal drinking water systems, City System (primary) and Upper System (secondary), served by wholesale water purchased from Joint Water Commission (JWC). The City also provides wholesale water to City of Cornelius, City of Gaston and LA Water Cooperative. The City of Hillsboro and Tualatin Valley Water District are developing the Willamette Water Suply System (WWSS), a new water supply system from the Willamette River, to address rapid growth in City of Hillsboro City System and City of Cornelius. The expected completion for this project is June 2026. There is also a planned upgrade for the existing JWC Water Treatment Plant.

The following assessment is based on information from City of Hillsboro Water Master Plan, dated June 2019.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – The WWSS has sufficient capacity to meet demands within the existing service area.
- Storage – additional storage of 6.4 MG is needed for areas within the existing UGB to provide the desired level of service during a regional supply outage.
- Distribution – with the exception of some locations with dead-end pipe segments smaller than 6-inches in diameter, the required fire flow is available City-wide. The system transmission capacity is also generally good.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – without the WWSS, capacity is insufficient to meet projected buildout demands within the current UGB. The WWSS can likely serve a portion of the additional demands for areas outside the current UGB, however available capacity is dependent on the type of development that occurs.
- Storage – an additional 17.8 MG of storage is needed for expansion beyond the current UGB, i.e. to serve the Rosa URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – the WWSS is required to provide additional supply for expansion outside the UGB. With full buildout of the WWSS, a total supply (including JWC supply) of 77.95 MGD would be available. The peak daily demand of the existing service area is 45.1 MGD, leaving 32.85 MGD for future expansion outside the UGB. This is sufficient supply to serve the Rosa URA.

- Storage – Areas outside the existing UGB cannot be served without additional storage capacity.

Sanitary Sewer

Rosa URA would likely be served by the City of Hillsboro and Clean Water Services who work together to manage the sanitary sewer system near the Rosa URA. The primary point of connection for this URA would likely be a City of Hillsboro sanitary main located in SE River Road, which connects to a Clean Water Services pump station near the intersection of SE River Road and SE David Road.

The Master Plan for the Clean Water Services (West Basin, which includes City of Hillsboro) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Rosa URA. Full development of areas inside the UGB does not happen prior to the addition of URAs into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in URAs added to the UGB.

Clean Water Services has indicated that it is likely the development of Rosa URA would require a new pump station that would pump directly to the Rock Creek WRRF.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands.

Because CWS plans to pump the Rosa URA directly to the Rock Creek WRRF via a new pump station, there won't be negative impacts to the existing sanitary sewer facilities.

Storm

The Rosa URA would be served by the City of Hillsboro and Clean Water Services. Rosa is included in the planning area of the City of Hillsboro Master Plan as part of the Tualatin River Basin. The Tualatin River basin drains directly to the Tualatin River or indirectly through smaller creeks including Gordon Creek and Butternut Creek.

The following assessment is based on information from the City of Hillsboro Stormwater Master Plan, dated 2021. The study area included in the Master Plan is the incorporated City, portions of the UGB where the City has adopted plans for development, and portions of the UGB where the City plans to begin planning in the next several years (including the Rosa URA).

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

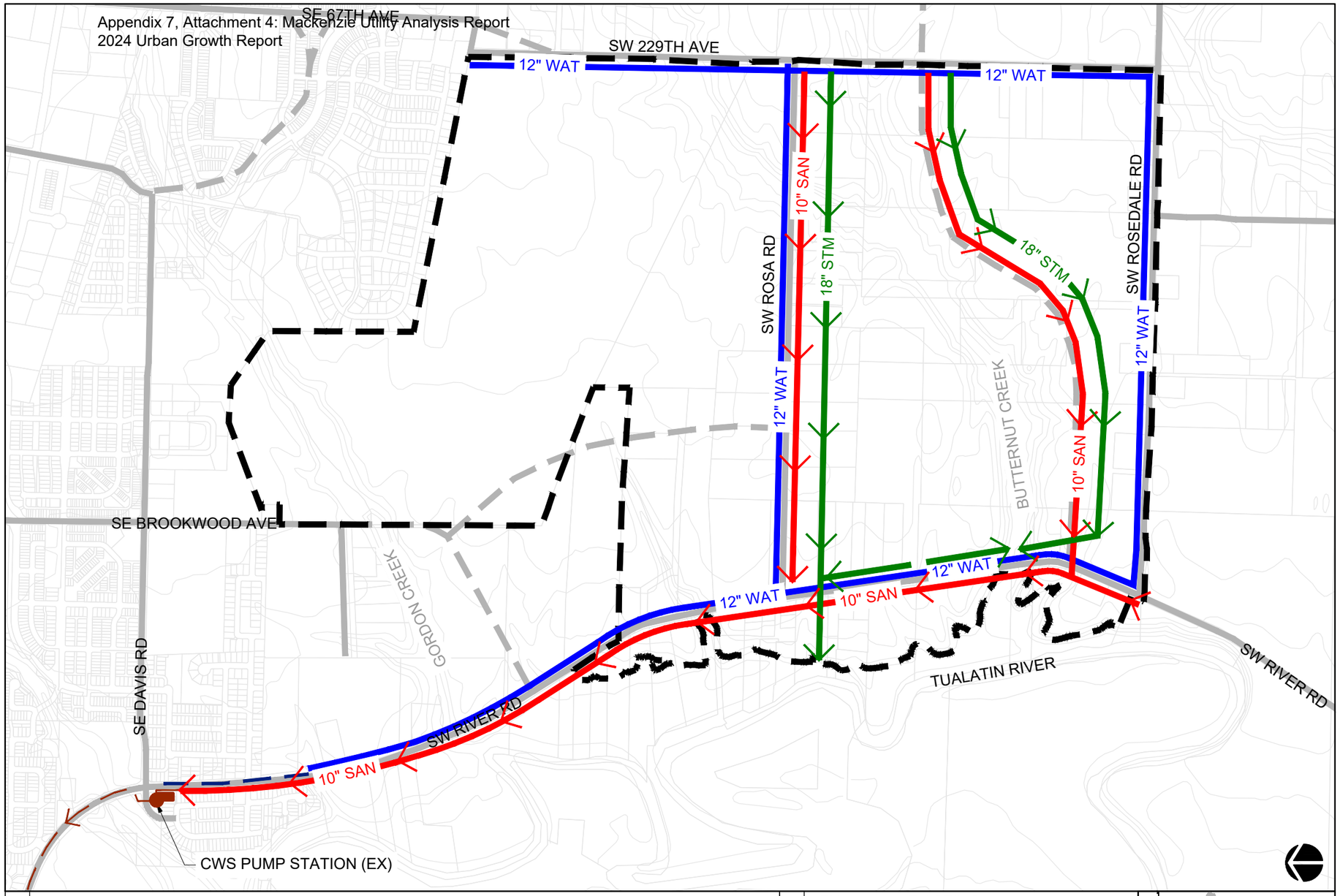
The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Gordon Creek or Butternut Creek and would not impact the capacity of existing stormwater infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Gordon Creek or Butternut Creek and would not impact the capacity of existing stormwater infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

City of Hillsboro and Clean Water Services standards require on-site detention for expansion areas identified in the City of Hillsboro Stormwater Master Plan, which includes the Rosa URA. Based on topography, the Rosa URA would discharge directly to Butternut Creek or Gordon Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Hillsboro infrastructure. CWS expects that stormwater will be treated and detained on development sites so that there are no negative impacts to Butternut Creek.



WATER

WATER PROVIDER: HILLSBORO WATER DISTRICT

PRESSURE ZONE: MAIN (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	23,600	$400	$9,440,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.4	$200,000	$280,000
TOTAL			$9,720,000

SANITARY

SANITARY PROVIDER: CLEAN WATER SERVICES

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	18,800	$275	$5,170,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.4	$1,800,000	$2,520,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$7,690,000

STORM

STORM PROVIDER: CITY OF HILLSBORO

WATERSHED: ROCK CREEK-TUALATIN RIVER

SUB-WATERSHED: DAVIS CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

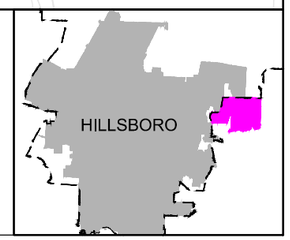
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	7,500	$400	$3,000,000
24" PIPE (LF)	5,200	$425	$2,210,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	62,500	$150	$9,375,000
TOTAL			$14,585,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ROSA

000890

MACKENZIE.

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ROSEMONT

Water

The Rosemont URA would likely be served by the City of West Linn based on proximity and would be part of the Rosemont pressure zone. The Rosemont pressure zone is served by the Rosemont Reservoir which is filled by the Horton Pump Station and View Drive Pump Station.

The primary water source for City of West Linn is from the South Fork Water Board (SFWB) water treatment plant located in Oregon City, with an emergency supply from City of Lake Oswego Water Treatment Plant.

The following assessment is based on information from City of West Linn Water System Master Plan, dated November 2008. The buildout scenario in the City of West Linn Master Plan is defined as saturation development of all land within the existing UGB that the City has determined to be economically and physically developable.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – Under normal (non-emergency) conditions, there is a supply deficit of 3.8 MG in the Rosemont pressure zone.
- Storage – under normal (non-emergency) conditions there is not currently a storage deficit in the Rosemont pressure zone.
- Distribution – Master Plan modeling analysis revealed deficiencies during fire flow events under existing conditions in all six pressure zones.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – under normal (non-emergency) conditions there is a deficit of 3.4 MG for the saturation development (build-out) scenario in the Rosemont pressure zone.
- Storage – under normal (non-emergency) conditions there is no storage deficit for the saturation development scenario in the Rosemont pressure zone.
- Pumping – The Master Plan identifies a deficiency in pumping capacity to the Rosemont pressure zone under buildout conditions.
- Distribution – Master Plan modeling analysis revealed deficiencies during fire flow events under saturation development conditions in all six pressure zones.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply/Storage – the Master Plan proposes the construction of a new reservoir and booster pump station to supply the Rosemont pressure zone and address its current deficiency. The reservoir, Bland Reservoir No. 2, would have a capacity of 0.3 MG and be located adjacent to the existing Bland Reservoir near Crestview Drive. The booster station would have a pumping capacity of 1,800 gpm. According to City of West Linn Public Works website, this project applied for a conditional use permit in 2012 and was appealed. Based on aerial imagery it does not appear the project was constructed. It is unclear from the Master Plan whether these improvements would provide surplus capacity that could be used to serve Rosemont URA.
- Pumping – The Master Plan recommends the construction of a third pump station to serve the Rosemont pressure zone.
- Distribution – approximately 79,000 feet of piping improvements were identified in the Master Plan as needing to be completed to address deficiencies in existing and saturation development scenarios. Ten of the projects are within the Rosemont pressure zone.

Sanitary Sewer

Rosemont URA would likely need to be served by the City of West Linn for sanitary sewer based on proximity and topography. The site generally flows west/southwest away from existing City sanitary infrastructure and toward currently undeveloped land. Assuming the land south of the URA were not developed prior to the development of Rosemont, a pump would be required to connect sanitary sewer from this URA to existing City infrastructure. This connection would likely occur within Basin 9E.

At the downstream end of the City of West Linn sanitary system as Clackamas County Water Environment Services (WES) owned pumps and force mains. Sanitary ultimately gets pumped to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River. The Rosemont site would be part of the WES Willamette Basin which flows to the Willamette Pump Station, then the West Linn Interceptor.

The following assessment is based on information from City of West Linn Sanitary Sewer Master Plan Update, dated September 2019, and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019. The study area of the Master Plan is the existing service area, which coincides with both the City limits and UGB.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The City Master Plan has identified potential system capacity deficiencies for modeled pipes both the existing and buildout scenarios. There are no deficiencies identified in the City system downstream of the Rosemont URA connection point under existing conditions.

The existing WES system has the capacity to convey both the dry weather flow and groundwater infiltration associated with winter conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The buildout scenario in the West Linn Master Plan assumes all properties within the study area will be developed and connected to the sanitary sewer collection system, including decommissioning of private septic systems and connecting them to the City's collection system.

The City Master Plan has identified potential system capacity deficiencies for modeled pipes both the existing and buildout scenarios. There are three deficiencies identified in the City system downstream of the Rosemont URA connection point under buildout conditions. They occur downstream in the sanitary system near the Willamette River.

The WES Master Plan identifies hydraulic deficiencies for future dry weather flow, groundwater infiltration and rainfall derived infiltration and inflow.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Whether the development of the Rosemont URA would cause capacity issues to the existing City sanitary sewer system or WES facilities is dependent on the timing of its development and other development in and around the City.

The WES Master Plan identifies an expansion of the existing Treatment Plant within the 2020-2040 timeframe, taking it from its existing 78.3 MGD capacity to 104 MGD capacity.

Storm

The Rosemont URA would most likely be served by the City of West Linn, as it is adjacent to their existing City Limits and falls mostly within the Fritchie Creek watershed. Tributaries of Fritchie Creek originate in the Rosemont URA and flow southwest toward the Willamette River. Based on topography, the Rosemont URA could discharge directly to the Fritchie Creek tributaries and thus not connect to any existing City of West Linn stormwater infrastructure.

The following assessment is based on information from the City of West Linn Storm Drainage Master Plan, dated September 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

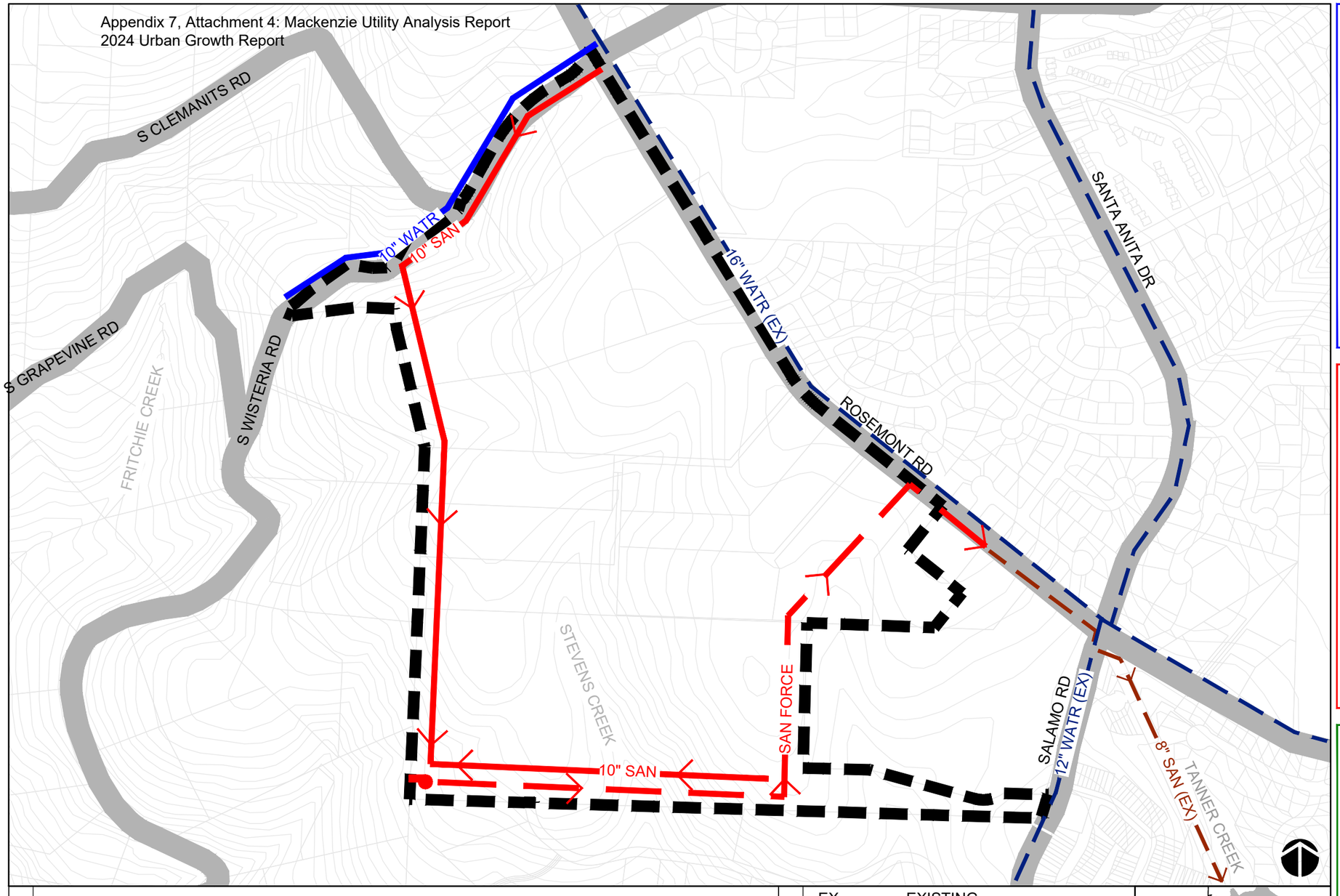
The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. There are four high priority capital improvement projects recommended in the Master Plan to address capacity related issues, all of which occur at the downstream end of the stormwater system near the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The same capacity issues identified in the Master Plan for the existing service area are problematic when considering serving additional areas and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The Rosemont URA is within the Fritchie Creek Basin which has limited existing stormwater infrastructure and does not have any identified capacity related issues.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the Rosemont URA could discharge directly to the Fritchie Creek tributaries and thus not connect to any existing City of West Linn stormwater infrastructure.



WATER

WATER PROVIDER: CITY OF WEST LINN

PRESSURE ZONE: ROSEMONT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	1,900	$350	$665,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0.5	$5,800,000	$2,900,000
STORAGE RESERVOIR (MG)	0.5	$200,000	$100,000
TOTAL			$3,665,000

SANITARY

SANITARY PROVIDER: CITY OF WEST LINN/CLACKMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

BASIN: 9E

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	5,200	$275	$1,430,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.5	$1,800,000	$900,000
SAN FORCE (LF)	3600	$310	$1,116,000
TOTAL			$3,446,000

STORM

STORM PROVIDER: CITY OF WEST LINN

WATERSHED: TUALATIN RIVER

SUB-WATERSHED: FRITCHIE CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

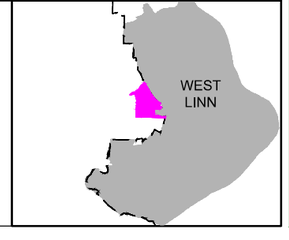
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	0	$400	$0
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	10,200	$150	$1,530,000
TOTAL			$1,530,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ROSEMONT

000895

MACKENZIE.

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SHERWOOD NORTH

Water

Sherwood North URA would most likely be served by the City of Sherwood based on proximity as it is falls along the northern limits of the City of Sherwood proposed 2034 water service area. The Sherwood North URA would most likely become part of the 380 pressure zone, which is served by the Sunset Reservoir. There are no pumps serving the 380 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015. The study area of the Master Plan includes the current City limits as well as three expansion areas (which does not include Sherwood North).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial, and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

The Master Plan defines buildout as when all vacant, developable land within the planning area has been developed to the maximum zoning density with some allowance for in-fill of existing developed properties. Improvements recommended in capital improvement projects are sized for the buildout scenario. The buildout scenario does not include the development of Sherwood North URA.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for buildout for areas within the City of Sherwood 2034 water service area, thus the existing water supply is not sufficient for the development of Sherwood North URA.
- Storage – the buildout condition causes a deficit of 0.61 MG within the 380 pressure zone.
- Pumping – There are no pump stations needed in the 380 pressure zone.
- Distribution – very few deficiencies exist for either existing or projected future (buildout) MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full buildout demand with some remaining capacity that could potentially serve the Sherwood North URA, depending on timing of its development and other future development within and around the City.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Sherwood North URA.

Sanitary Sewer

Sherwood North URA would likely be served by City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Sherwood North URA would be part of the City of Sherwood Cedar Creek and Rock Creek basins based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021. The Master Plan Study Area includes the current City limits and two expansion areas, which does not include the Sherwood South URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions are defined in the Master Plan as full development with sanitary sewer service of all vacant parcels within the UGB. Under buildout conditions the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under buildout conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Sherwood North URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Sherwood North URA, as it is located within the Chicken Creek and Rock Creek basins and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.
The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

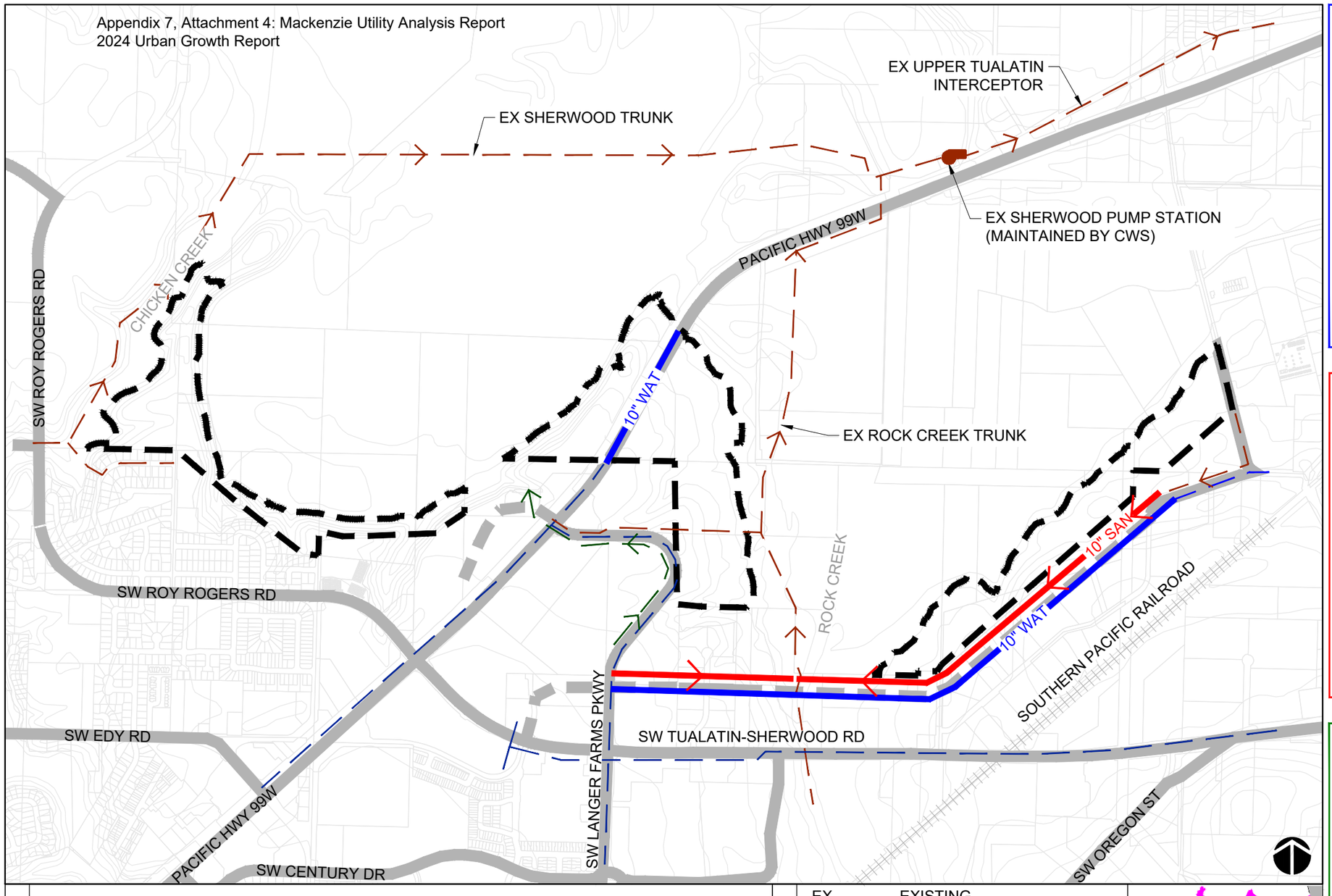
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Sherwood North URA, stormwater from developed areas could likely outfall directly to Chicken Creek, Rock Creek and their tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood North.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Sherwood North URA, stormwater from developed areas could likely outfall directly to Chicken Creek, Rock Creek and their tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood North.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	7,200	$350	$2,520,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.3	$200,000	$60,000
TOTAL			$2,580,000

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: CEDAR CREEK/ROCK CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	5,600	$275	$1,540,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.3	$1,800,000	$540,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$2,080,000

STORM

STORM PROVIDER: CITY OF SHERWOOD

WATERSHED: TUALATIN RIVER

SUB-WATERSHED: ROCK CREEK, CHICKEN CREEK

PROPOSED IMPROVEMENTS

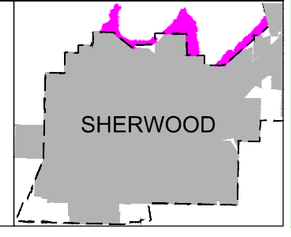
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	0	$400	$0
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	4,700	$150	$705,000
TOTAL			$705,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION (EX)
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

SHERWOOD NORTH

000900

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SHERWOOD SOUTH

Water

Sherwood South URA would most likely be served by the City of Sherwood based on proximity as it is falls along the southern limits of the City of Sherwood proposed 2034 water service area (south of the proposed Brookman Annexation). The Sherwood South URA would most likely become part of the 380 and 400 pressure zone. The 400 pressure zone is served by the Sunset Reservoir and there are no pumps serving the 380 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015. The study area of the Master Plan includes the current City limits as well as three expansion areas (which does not include Sherwood South.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

The Master Plan defines buildout as when all vacant, developable land within the planning area has been developed to the maximum zoning density with some allowance for in-fill of existing developed properties. Improvements recommended in capital improvement projects are sized for the buildout scenario. The buildout scenario does not include the development of Sherwood South URA.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for buildout for areas within the City of Sherwood 2034 water service area.
- Storage – the buildout condition causes a deficit of 0.61 MG within the 380 pressure zone.
- Pumping – There are no pump stations needed in the 380 pressure zone. The firm capacity of the Sunset Pump Station (serving pressure zone 400) allows for future buildout with zero surplus or deficit. Any area outside the planning area added to the the 400 pressure zone will therefore need to increase the capacity of the Sunset Pump Station.
- Distribution – very few deficiencies exist for either existing or projected future MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full build-out demand with some remaining capacity that could potentially serve the Sherwood South URA, depending on timing of its development and other future development within and around the City.
- Storage – adding Sherwood South URA to the UGB would cause a storage deficit in the 380 and 400 pressure zones.
- Pumping – The Sunset Pump Station, which serves the 400 pressure zone, has the capacity for the full buildout condition, however this does not include the Sherwood South URA. There is zero surplus after full build-out, so the development of Sherwood South would cause a deficit in pumping capacity.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Sherwood South URA.

Sanitary Sewer

Sherwood South URA would likely be served by City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Sherwood South URA would be part of the City of Sherwood Cedar Creek basin based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021. Future expansion areas identified in the Master Plan do not include the Sherwood South URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions are defined in the Master Plan as full development with sanitary sewer service of all vacant parcels within the UGB. Under buildout conditions the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under build-out conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Sherwood South URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Sherwood South URA, as it is located within the Cedar Creek basin and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

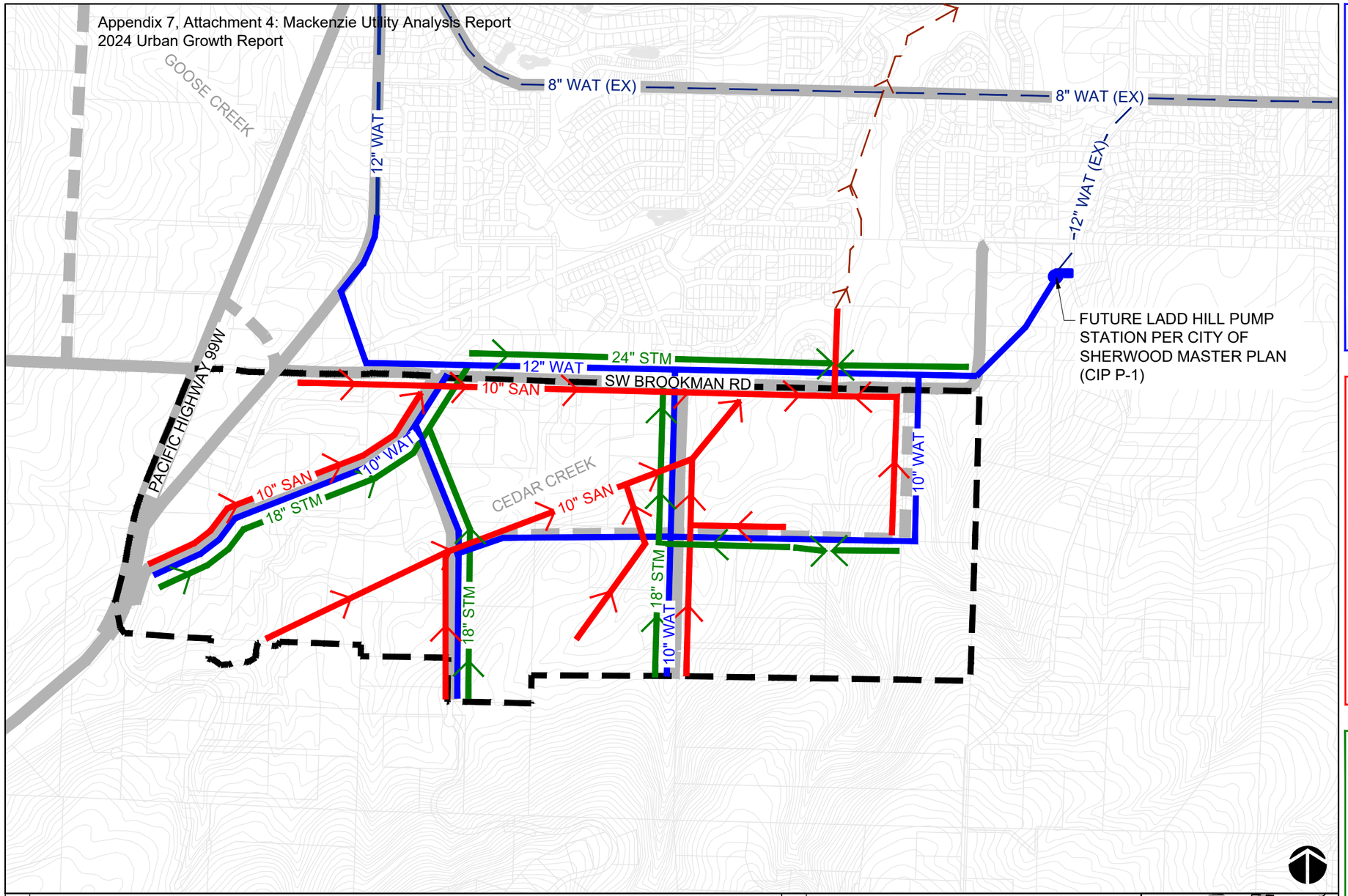
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Sherwood South URA, stormwater from developed areas could likely outfall directly to Cedar Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood South.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Sherwood South URA, stormwater from developed areas could likely outfall directly to Cedar Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood South.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380/400

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,100	$350	$4,935,000
12" PIPE (LF)	8,300	$400	$3,320,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	2.3	$5,800,000	$13,340,000
STORAGE RESERVOIR (MG)	1.0	$200,000	$200,000
TOTAL			$21,795,000

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: CEDAR CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	21,000	$275	$5,775,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$5,775,000

STORM

STORM PROVIDER: CITY OF SHERWOOD

WATERSHED: CHICKEN CREEK-TUALATIN RIVER

SUB-WATERSHED: CEDAR CREEK

PROPOSED IMPROVEMENTS

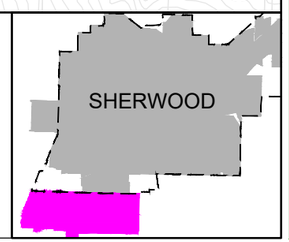
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	10,000	$400	$4,000,000
24" PIPE (LF)	5,200	$425	$2,210,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	43,750	$150	$6,562,500
TOTAL			$12,772,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

SHERWOOD SOUTH

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SHERWOOD WEST

Water

Sherwood West URA would most likely be served by the City of Sherwood as it is included in the City of Sherwood Master Plan proposed 2034 water service area. The Sherwood West URA would be part of the existing pressure zones 380 (supplied by the Sunset Reservoir) and 455 and proposed pressure zones 475 and 630. There are no pumps serving the 380 pressure zone and the 455 pressure zone is served by the Wyndham Ridge Pump Station. The Sunset Reservoir supplies water for the existing 380 pressure zone and future 475 pressure zone. The Kruger Reservoir supplies water for the existing 455 pressure zone and future 630 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for buildout for areas within the City of Sherwood 2034 water service area which includes Sherwood West. Because Sherwood West is included in the buildout scenario, the additional 4 MGD (or some portion of) is needed for its development.
- Storage – Per the Master Plan, which includes Sherwood West URA, both the Kruger and Sunset Reservoirs have adequate capacity to meet storage criteria through the 2034 buildout.
- Pumping – There are no pump stations needed in the 380 pressure zone. Firm capacity of the Wyndham Ridge Pump Station for the buildout scenario (which includes Sherwood West) exceeds the required capacity. A future pump station (Edy Road Pump Station) is required to serve the future 475 pressure zone and is included in the Master Plan.
- Distribution – very few deficiencies exist for either existing or projected future MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full build-out demand with some remaining capacity that could potentially serve the Sherwood North URA, depending on timing of its development and other future development within and around the City.
- Storage – adding Sherwood West URA to the UGB would cause a storage deficit in both the Sunset and Kruger Reservoir during the full build-out condition.
- Pumping – There are no pump stations needed in the 380 pressure zone. Firm capacity of the Wyndham Ridge Pump Station for the buildout scenario (which includes Sherwood West) exceeds the required capacity. A future pump station (Edy Road Pump Station) is required to serve the future 475 pressure zone and is included in the Master Plan.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Sherwood West URA.

Sanitary Sewer

Sherwood West URA would likely be served by the City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Sherwood South URA would be part of the City of Sherwood Cedar Creek basin based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Under buildout conditions (which includes the Sherwood West URA) the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under buildout conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Sherwood West URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Sherwood West URA, as it is located within the Cedar Creek and Chicken Creek basins and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

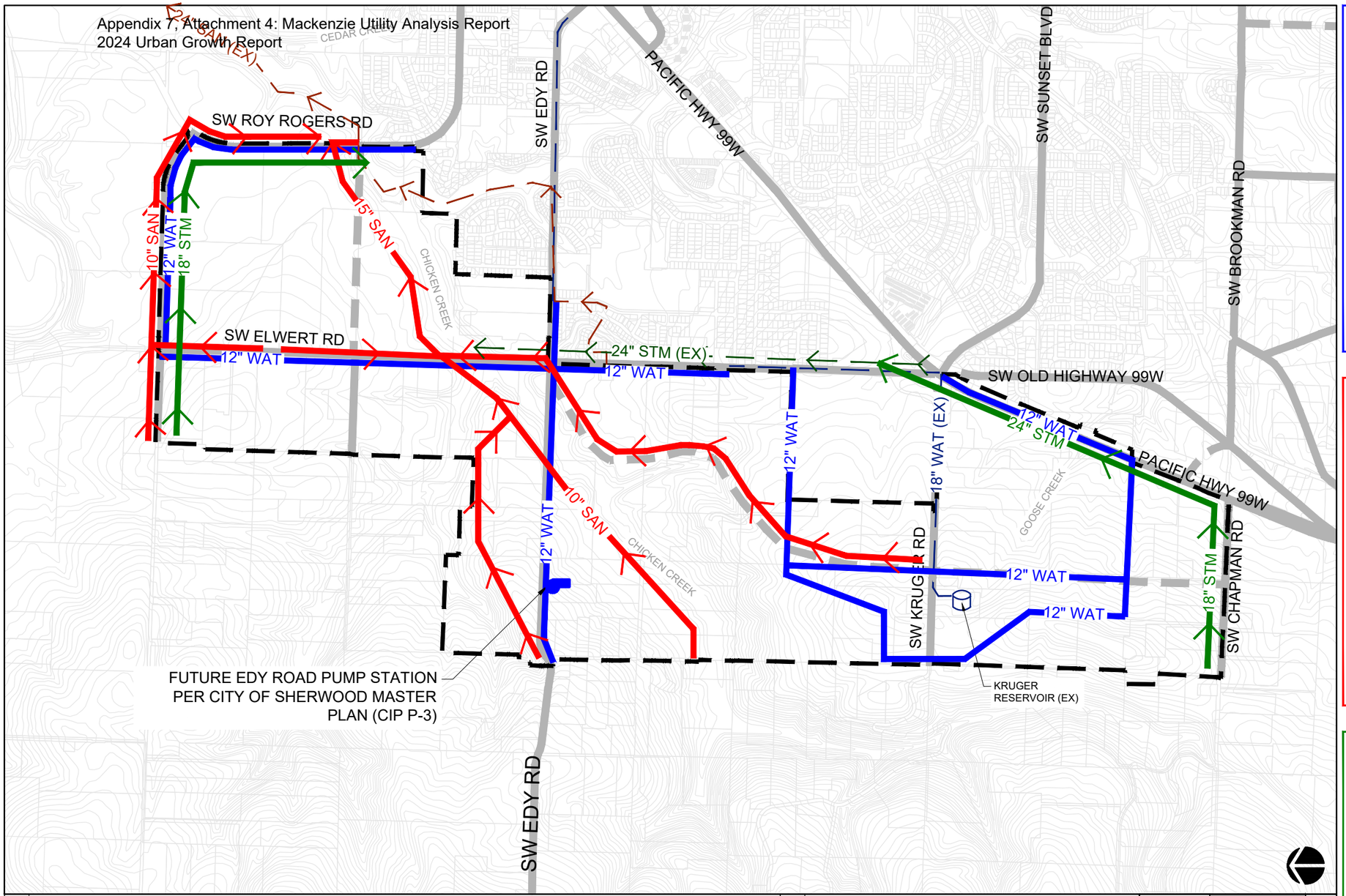
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Sherwood West URA, stormwater from developed areas could likely outfall directly to Chicken Creek. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood West.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Sherwood West URA, stormwater from developed areas could likely outfall directly to Chicken Creek. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood West.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380/455 (EXISTING), 475/630 (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	36,550	$400	$14,620,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	2.3	$5,800,000	$13,340,000
STORAGE RESERVOIR (MG)	3.9	$200,000	$780,000
TOTAL			$28,740,000

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: CEDAR CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,800	$275	$770,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	3,700	$375	$1,387,500
PUMP STATION (MGD)	3.9	$1,800,000	$7,020,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$9,177,500

STORM

STORM PROVIDER: CITY OF SHERWOOD

BASIN: CHICKEN CREEK-TUALATIN RIVER

OUTFALL: CHICKEN CREEK, GOOSE CREEK

PROPOSED IMPROVEMENTS

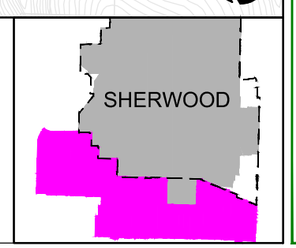
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	8,100	$400	$3,240,000
24" PIPE (LF)	4,000	$425	$1,700,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	90,950	$150	$13,642,500
TOTAL			$18,582,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- WATER RESERVOIR (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

SHERWOOD WEST

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STAFFORD

Water

The Stafford URA would likely be served by both City of West Linn and City of Lake Oswego based on proximity. Stafford is adjacent to the City of West Linn Horton, Rosemont, and Willamette pressure zones, and is adjacent to the City of Lake Oswego service area including small portions of the URA which fall adjacent to the Rivergrove Water District and Skylands Water Cooperative.

The City of Lake Oswego's water source is the Clackamas River. In 2017 construction of five new major water facilities was completed in partnership with the City of Tigard to increase capacity of drinking water from the Clackamas River to Lake Oswego and Tigard. The construction included a new river intake pump station in Gladstone, a water treatment plan in West Linn, a 3.5 MG reservoir in Lake Oswego and a pump station in Tigard as well as more than 10 miles of large diameter backbone piping. The new Lake Oswego-Tigard Water Partnership water service area includes a portion of the Stafford URA in its plans for buildout.

The primary water source for City of West Linn is from the South Fork Water Board (SFWB) water treatment plant located in Oregon City, with an emergency supply from City of Lake Oswego Water Treatment Plant. Stafford URA would likely be part of the City of West Linn Horton, Rosemont, and Willamette pressure zones based on proximity. The City of West Linn does not include the Stafford URA in their master planning study areas.

The following assessment is based on information from City of West Linn Water System Master Plan, dated November 2008 and City of Lake Oswego Water Management and Conservation Plan, dated January 2010 and information from the Lake Oswego-Tigard Water Partnership.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Lake Oswego

Based on the City of Lake Oswego Master Plan, during the peak season, City of Lake Oswego supply intake, treatment plant and transmission mains must all operate at maximum installed capacity but can meet existing peak demands (note this is before the improvements as described above were completed).

West Linn

- Supply – Under normal (non-emergency) conditions, current demand is 8.6 MG and capacity is 9.5 MG, resulting in a surplus of 0.9 MG.

- Storage – Under normal (non-emergency) conditions storage capacity is adequate.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Lake Oswego

Based on the City of Lake Oswego Master Plan, during the peak season, City of Lake Oswego supply intake, treatment plant and transmission mains must all operate at maximum installed capacity to meet existing peak demands. The Master Plan has not been updated since the construction of the facilities outlined above, which were to provide additional capacity. It is not clear whether those improvements provided any surplus capacity that could be used for the development of Stafford URA.

West Linn

- Supply – Under normal (non-emergency) conditions there is a supply deficit of 1 MGD for the saturation development scenario.
- Storage – There is a 0.8 MG storage deficit in the Willamette pressure zone, a 0.7 MG storage deficit in the Horton pressure zone, and a 0.8 MG storage deficit in the Rosemont pressure zone under saturation development conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Lake Oswego

It is not clear whether the improvements to the existing City of Lake Oswego water infrastructure provided any surplus capacity that could be used for the development of Stafford URA. The ability of the Lake Oswego-Tigard Water Partnership to serve Stafford without negative impacts to the existing system is also dependent on timing on development.

West Linn

Under saturation development conditions in the City of West Linn, there are both supply and storage deficits. If the Stafford URA were developed, additional sources of supply and storage would be required to not create further deficits for the existing system.

Sanitary Sewer

Based on proximity and topography, Stafford URA would likely be served by the City of West Linn and/or City of Lake Oswego for sanitary sewer.

The portion of the Stafford URA that slopes toward Lake Oswego basins has been included in the Master Plan future flow (the Master Plan calculates this as approximately 22% of the total URA area). Based on topography, connection points to the City of Lake Oswego infrastructure would be in SW Childs Road (in the Canal basin) and SW Stafford Road (in the South Shore basin).

The remaining area of the Stafford URA generally flows south/southwest toward Interstate 205 where it would likely connect to the City of West Linn existing infrastructure at the Johnson Pump Station located near SW Johnson Road and Interstate 205.

The following assessment is based on information from City of West Linn Sanitary Sewer Master Plan Update, dated September 2019, the City of Lake Oswego Wastewater Master Plan, dated March 2013, and the 2019 Amendment to the City of Lake Oswego Wastewater Master Plan, dated February 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Lake Oswego

Several deficiencies are identified for the 25-year storm event under existing conditions. These deficiencies are all downstream of the likely point of connection and generally occur in large diameter trunk lines. The Master Plan recommends improvement projects to address these deficiencies.

West Linn

The gravity sewer line downstream of the Johnson Pump Station (likely connection point for Stafford URA) has two identified deficiencies, i.e. system capacity issues that may cause backwatering in the collection system, under existing conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Lake Oswego

Several deficiencies are identified for the 25-year storm event under buildout conditions. A cluster of deficiencies occur in the Canal Trunk and L5 Trunk directly downstream of the likely point of connection at SW Childs Road. Very few deficiencies are identified in the system downstream of the SW Stafford Road point of connection. Without correction, these deficiencies will experience further negative impacts if flows from the Stafford URA are added.

West Linn

The gravity sewer line downstream of the Johnson Pump Station (likely connection point for Stafford URA) has two identified deficiencies, i.e. system capacity issues that may cause backwatering in the collection system, under buildout conditions. Without correction, these deficiencies will experience further negative impacts if flows from the Stafford URA are added.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Lake Oswego

Because deficiencies already exist in the sanitary infrastructure downstream of the Stafford URA assumed point of connection, additional flow from this URA will cause further negative impacts if pipe sizes aren't increased.

West Linn

The gravity sewer line downstream of the Johnson Pump Station (likely connection point for Stafford URA) has two identified deficiencies, i.e. system capacity issues that may cause backwatering in the collection system, under both existing and buildout conditions. Additional flow from this URA will cause further negative impacts if pipe sizes aren't increased.

Storm

Stafford URA would likely be served by the City of West Linn and City of Lake Oswego for stormwater based on proximity and topography. A majority of the Stafford URA flows south/southwest toward the Tualatin River and would likely not need to connect to any existing City infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

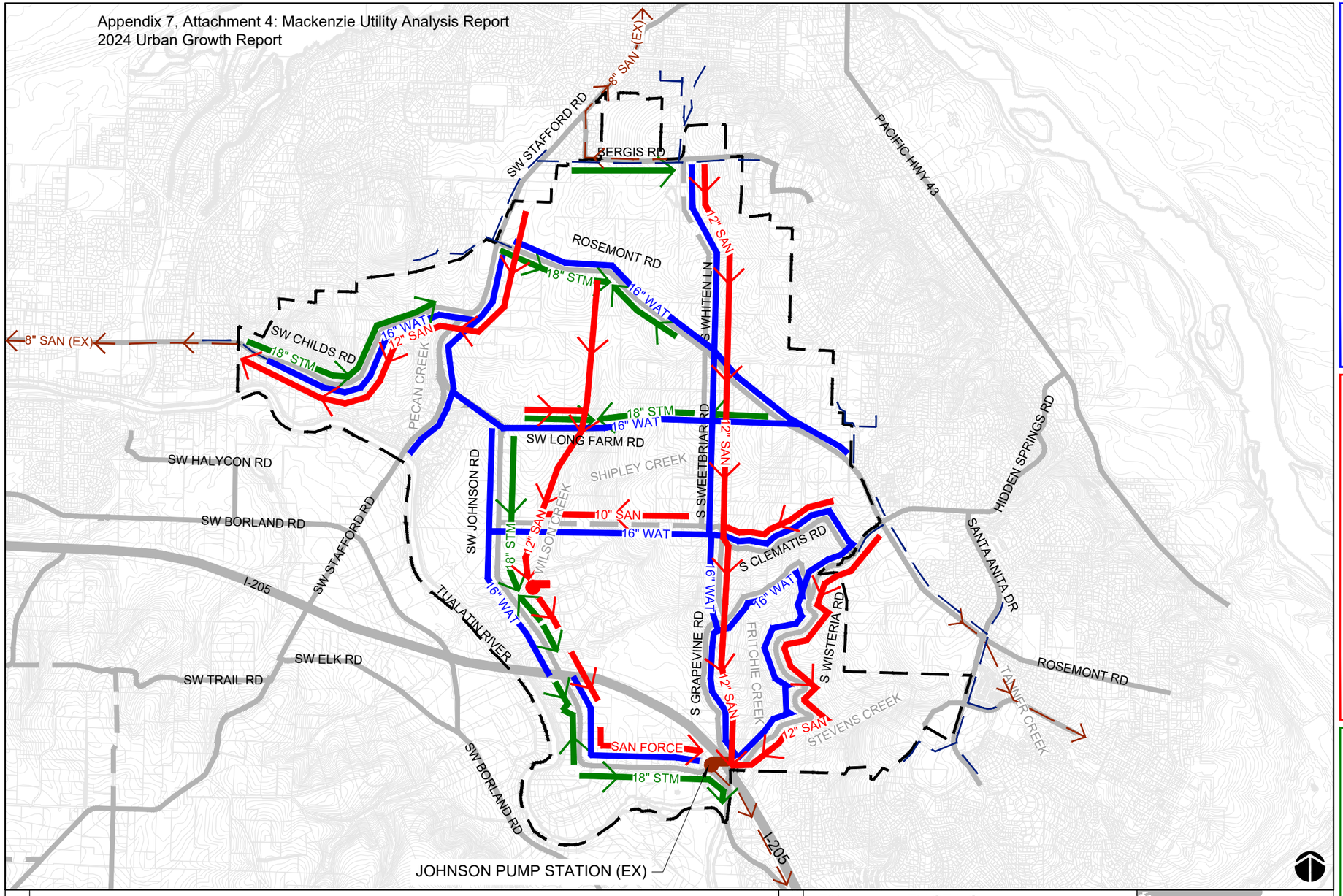
Because the Stafford URA is outside both City of West Linn and City of Lake Oswego City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Stafford URA flows south/southwest toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Because the Stafford URA is outside both City of West Linn and City of Lake Oswego City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Stafford URA flows south/southwest toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because the Stafford URA is outside both City of West Linn and City of Lake Oswego City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Stafford URA flows south/southwest toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

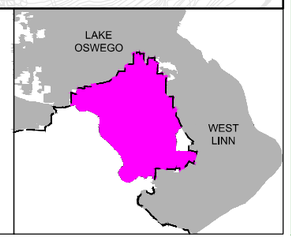


LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



WATER

WATER PROVIDER: WEST LINN / LAKE OSWEGO

PRESSURE ZONE: HORTON/ROSEMONT/WILLAMETTE (WEST LINN) , N/A (LAKE OSWEGO)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	71,000	$500	$35,500,000
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	6.2	$200,000	$1,240,000
TOTAL			$36,740,000

SANITARY

SANITARY PROVIDER: WEST LINN / LAKE OSWEGO

BASIN: 2B (WEST)/3A/3D (WEST LINN), MARYLHURST (LAKE OSWEGO)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	4,700	$275	$1,292,500
12" PIPE (LF)	38,800	$350	$13,580,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.0	$1,800,000	$1,800,000
SAN FORCE (LF)	6,000	$310	$1,860,000
TOTAL			$18,532,500

STORM

STORM PROVIDER: WATER ENVIRONMENT SERVICES

BASIN: TUALATIN RIVER, OSWEGO LAKE

OUTFALL: PECAN CREEK, WILSON CREEK, FRITCHIE CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	27,200	$400	$10,880,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	153,850	$150	$23,077,500
TOTAL			$33,957,500

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

STAFFORD

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TONQUIN

Water

Tonquin URA would most likely be served by the City of Sherwood based on proximity as it is falls along the eastern limits of the City of Sherwood 2034 proposed water service area. Based on proximity, the Tonquin URA would most likely become part of the 380 pressure zone, which is served by the Sunset Reservoir. There are no pumps serving the 380 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015. The study area of the Master Plan includes the current City limits as well as three expansion areas (which does not include Tonquin URA).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

The Master Plan defines buildout as when all vacant, developable land within the planning area has been developed to the maximum zoning density with some allowance for in-fill of existing developed properties. Improvements recommended in capital improvement projects are sized for the buildout scenario. The buildout scenario does not include the development of Tonquin URA.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for build-out for areas within the City of Sherwood 2034 water service area, thus the existing water supply is not sufficient for the development of Tonquin URA.
- Storage – the buildout condition causes a deficit of 0.61 MG at the Sunset Reservoir, therefore there is not available capacity to serve areas outside the UGB.
- Pumping – There are no pump stations needed in the 380 pressure zone.
- Distribution – very few deficiencies exist for either existing or projected future (buildout) MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full build-out demand with some remaining capacity that could potentially serve the Tonquin URA, depending on timing of its development and other future development within and around the City.
- Storage – Depending on when the Tonquin URA was developed in relation to other development projects within the 380 pressure zone, storage in the Sunset Reservoir may be insufficient.
- Pumping – There are no pump stations needed in the 380 pressure zone.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Tonquin URA.

Sanitary Sewer

Tonquin URA would likely be served by City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Tonquin URA would be part of the City of Sherwood Rock Creek basin based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021. The Master Plan Study Area includes the current City limits and two expansion areas, which does not include the Tonquin URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions are defined in the Master Plan as full development with sanitary sewer service of all vacant parcels within the UGB. Under buildout conditions the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under buildout conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Tonquin URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Tonquin URA, as it is located within the Rock Creek basin and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

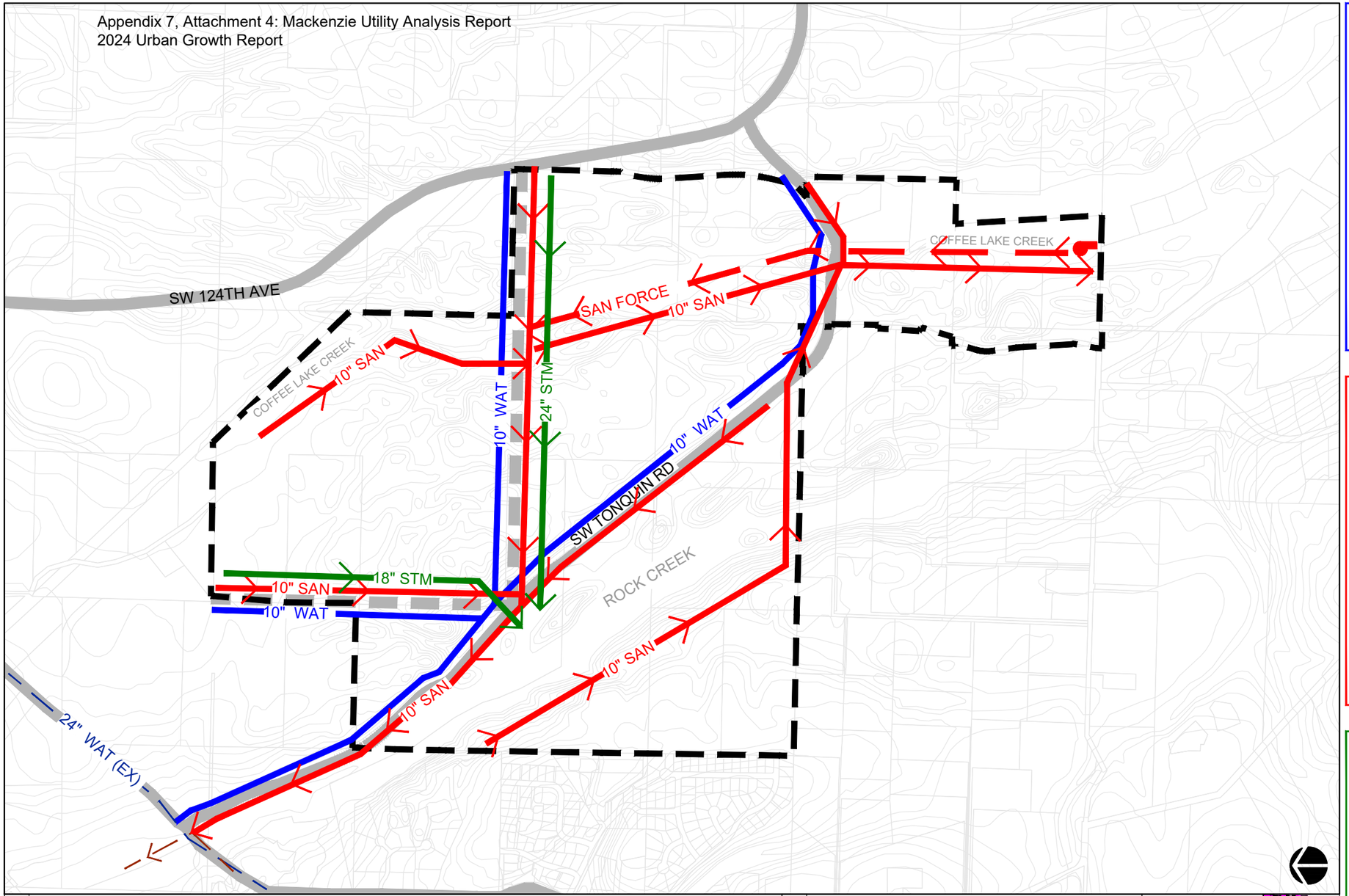
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Tonquin URA, stormwater from developed areas could likely outfall directly to Rock Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Tonquin.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Tonquin URA, stormwater from developed areas could likely outfall directly to Rock Creek. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Tonquin.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	15,110	$350	$5,288,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.8	$200,000	$160,000
TOTAL			$5,448,500

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: ROCK CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	27,800	$275	$7,645,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.3	$1,800,000	$540,000
SAN FORCE (LF)	5,000	$310	$1,550,000
TOTAL			$9,735,000

STORM

STORM PROVIDER: CITY OF SHERWOOD

WATERSHED: FANNO CREEK-TUALATIN RIVER

SUB-WATERSHED: ROCK CREEK

PROPOSED IMPROVEMENTS

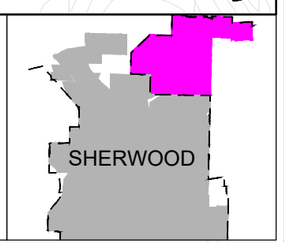
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	2,900	$400	$1,160,000
24" PIPE (LF)	3,900	$425	$1,657,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	28,200	$150	$4,230,000
TOTAL			$7,047,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

TONQUIN

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WILSONVILLE SOUTHWEST

Water

Wilsonville Southwest URA would likely be served by the City of Wilsonville as it is included in their Master Plan study area. According to the Master Plan, Wilsonville Southwest would be part of pressure zone B which is served by the Elligsen Reservoirs (two reservoirs with a total capacity of 5 MG). The Elligsen Reservoirs received water via gravity flow.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, which includes Wilsonville Southwest URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Wilsonville Southwest is assumed non-residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of non-residential areas (including Elligsen Road North) is not projected to occur until 2036, so additional storage will be needed for its development.
- Pumping – there are no pumping facilities serving pressure zone B. Based on topography, Wilsonville Southwest could be served by gravity from the Elligsen Reservoirs that serve the rest of pressure zone B.
- Distribution – Future system infrastructure as shown in the City of Wilsonville master plan is adequately sized for required fire flow and operating pressures.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of this URA into the UGB.

Sanitary Sewer

The Wilsonville Southwest URA would likely be served by the City of Wilsonville based on proximity.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014. Grahams Ferry is included in the study area of the Master Plan and falls within the Wood School sewer basin, which is served by the Corral Creek, Rivergreen and Moreys Landing Pump Stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has zero hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are no capacity of other existing issues with any of the three pumps that may serve this URA, however they are all reaching the end of their useful service and the City has identified capital improvement projects to rehabilitate them within the next 20 years. Based on topography, a new pump station will be required to connect sanitary lines for Wilsonville Southwest URA to the existing public sewer system. This pump station is identified in the City of Wilsonville Wastewater Master Plan and is shown on the Utility Analysis Map.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Besides non-capacity related improvements to the Corral Creek and Rivergreen Pump Stations as discussed above, there are no downstream capacity issues identified by the Master Plan.

Storm

Wilsonville Southwest URA would likely be served by the City of Wilsonville as it is located primarily within the Boeckman Creek Basin and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

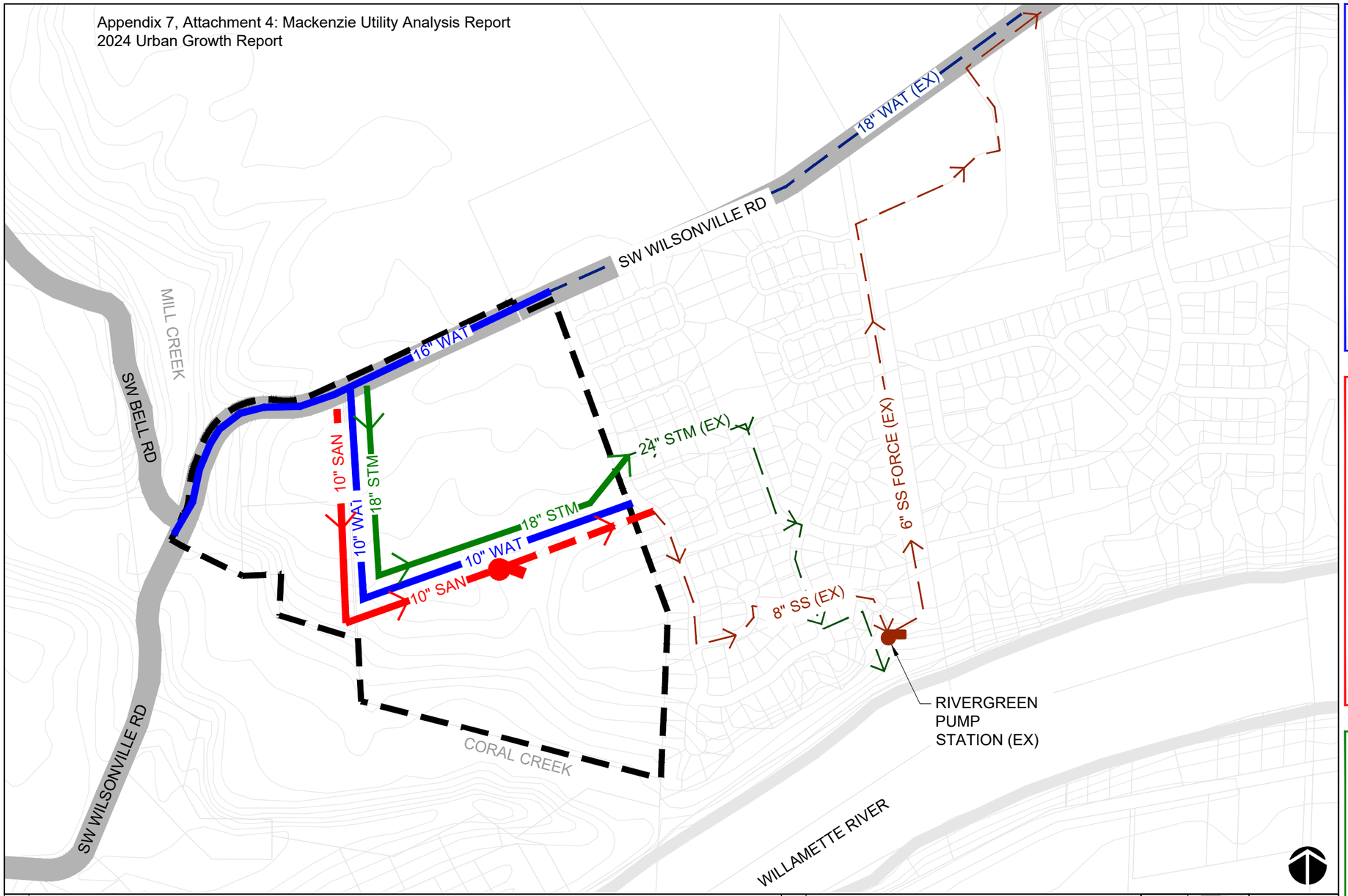
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography it seems likely that stormwater management for the development of Wilsonville Southwest would occur within the development area and outfall directly to Corral Creek, which drains directly to the Willamette River without connecting to an existing public stormwater system. The Master Plan does not indicate any problem areas in the short portion of Corral Creek between the Wilsonville Southwest URA and the Willamette River.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If Wilsonville Southwest outfalls directly to Corral Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: B

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,300	$350	$805,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	2,200	$500	$1,100,000
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.1	$200,000	$20,000
TOTAL			$1,925,000

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

BASIN: WOOD SCHOOL

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	1,650	$275	$453,750
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.1	$1,800,000	$180,000
SAN FORCE (LF)	690	$310	$213,900
TOTAL			$847,650

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: CORRAL CREEK

PROPOSED IMPROVEMENTS

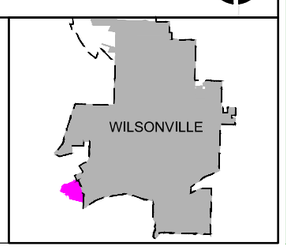
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	2,300	$400	$920,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	5,800	$150	$870,000
TOTAL			$1,790,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

WILSONVILLE SOUTHWEST

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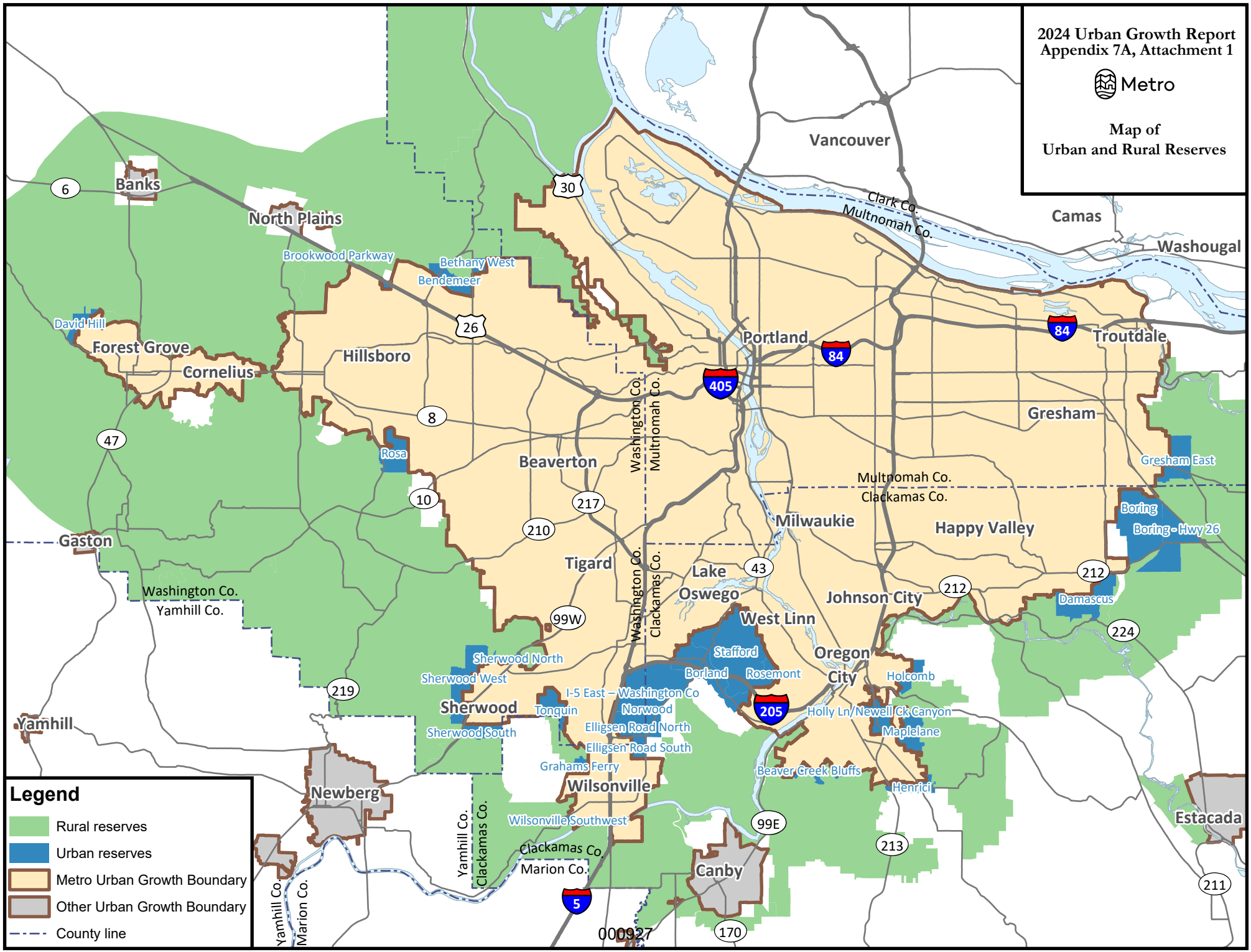
Appendix 7A
to 2024 Urban Growth Report

Metro Code Factors
Analysis of UGB Expansion Candidate Areas

APPENDIX 7A – LIST OF CONTENTS

- **Introduction and Methodology**
- **Attachment 1:** Map of Urban and Rural Reserves
- **Attachment 2:** Metro Code Factor Analysis Narratives (20, with maps)
- **Attachment 3:** Metro Code Factors Analysis Results


2024 Urban Growth Report
Appendix 7A, Attachment 1
Metro
Map of
Urban and Rural Reserves
Vancouver
Clark Co.
Multnomah Co.
Camas
Washougal
Banks
North Plains
Brookwood Parkway
Bethany West
Bendemeer
David Hill
Forest Grove
Cornelius
Hillsboro
Portland
Troutdale
Gresham
Gresham East
Rosa
Beaverton
Multnomah Co.
Clackamas Co.
Milwaukie
Happy Valley
Boring
Boring - Hwy 26
Gaston
Washington Co.
Yamhill Co.
Tigard
Lake Oswego
Johnson City
Damascus
West Linn
Stafford
Borland
Rosemont
Oregon City
Holcomb
Holly Ln/Newell Ck Canyon
Maplelane
Sherwood North
Sherwood West
Sherwood
Sherwood South
Tonquin
I-5 East – Washington Co
Norwood
Elligsen Road North
Elligsen Road South
Grahams Ferry
Wilsonville
Wilsonville Southwest
Beaver Creek Bluffs
Henrici
Yamhill
Newberg
Clackamas Co.
Marion Co.
Canby
Estacada
6
30
26
84
405
8
47
10
217
210
43
212
99W
224
219
205
99E
213
211
5
170
Legend
Rural reserves
Urban reserves
Metro Urban Growth Boundary
Other Urban Growth Boundary
County line
000927

METRO CODE FACTORS
ANALYSIS OF UGB EXPANSION CANDIDATE AREAS

INTRODUCTION

As part of the Metro Council's growth management decision in 2024, the Council considers how to accommodate the region's forecasted 20-year population and employment growth, while supporting the region's six desired outcomes listed below.

1. **Vibrant communities** – People live, work, and play in vibrant communities where their everyday needs are easily accessible.
2. **Economic prosperity** – Current and future residents benefit from the region's sustained economic competitiveness and prosperity.
3. **Safe and reliable transportation** – People have safe and reliable transportation choices that enhance their quality of life.
4. **Leadership on climate change** – The region is a leader in minimizing contributions to global warming.
5. **Clean air and water** – Current and future generations enjoy clean air, clean water, and healthy ecosystems.
6. **Equity** – The benefits and burdens of growth and change are distributed equitably.

In support of the growth management decision, Metro completed a two–part assessment of the suitability of the region's urban reserves to meet a projected land need. Part 1 of the assessment, included as Appendix 7, is an analysis of all 27 urban reserves and their comparative ability to accommodate future growth according to four Statewide Planning Goal 14 boundary location factors. Seven of the 27 urban reserves – Boring, Boring-Highway 26, Damascus, Norwood, Rosemont, Stafford, and Tonquin – were determined in that Goal 14 analysis to be the least suitable for future urbanization. These seven urban reserves are therefore not included the analysis in Part 2, which is this further evaluation of the remaining 20 urban reserves and their comparative suitability for accommodating future urban land needs according to factors in the Metro Code.

The Metro Code factors are outlined in Urban Growth Management Functional Plan (UGMFP) Title 14, *Urban Growth Boundary*, specifically in Subsection 3.07.1425(c). Four of the nine Metro Code factors listed in this subsection are the same as the Goal 14 factors reviewed in Part 1, and do not warrant being addressed again here in Part 2. The other five Metro Code factors are in Subsections 3.07.1425(c)(5)-(9), listed here below in the order they are address in this analysis:

- Clear transition between urban and rural lands, using natural and build factures to mark the transition;
- Protection of farmland that is most important for the continuation of commercial agriculture in the region;

- Avoidance of conflict with regionally significant fish and wildlife habitat;
- Contribution to the purposes of Centers and Corridors; and
- Equitable and efficient distribution of housing and employment opportunities throughout the region.

Similar to the Goal 14 boundary location factors, the Metro Code factors are not independent criteria of equal weight. When the factors are applied to compare alternative boundary locations and to determine where best to expand the UGB, all of the factors must be considered as a whole, with some factors weighted as more important than others.

EXPLANATION OF FACTORS AND METHODOLOGY

An explanation of the Metro Code factors, and a summary of the methodology used by Metro to apply those factors, is outlined below. Individual summary reports with the factors applied to each urban reserve follow this introduction and methodologies section.

Clear transition between urban and rural lands, using natural and built features to mark the transition

It is generally desirable to have defined separation between urban and rural lands, in part to protect both of those areas' land uses from competing adverse impacts. That separation can be provided with natural features such as rivers or streams, forested areas, steep slopes, or undevelopable floodplains, by protected public lands (e.g., parks), or by "built" features, such as some roadways or golf courses. For this Metro Code factor, the presence or absence of these features along the perimeters of each reserve was determined using Geographic Information Systems (GIS) data layers and 2023 aerial photos.

It should be noted that not all roadway types are considered effective transitional buffers between urban and rural lands. A highway, such as I-5 or Highway 26, may provide a useful buffer due to its very large right-of-way and the lack of pedestrian and bike facilities that bring people directly adjacent to rural lands. Highways are also often more difficult to cross. Other types of roadways, however, such as local roads, are less effective in serving as a transitional buffer, even when already located at the edge of an urban reserve, as they have narrower rights-of-way and are easier to cross. Indeed, in almost all cases, roads "near" the edge of an urban reserve are actually in the urban reserve itself; therefore, if the reserve is added to the UGB, the road will likely be redeveloped to urban standards consistent with the local jurisdiction's requirements, including with urban amenities, such as sidewalks, bike lanes, and street lighting. These amenities would bring people directly adjacent to rural lands. When roadways other than highways form the edge of an urban reserve, more appropriate buffers may need to be incorporated into the planning and design of the area when it's urbanized.

The analysis for this particular Metro Code factor does not consider the actual current uses of rural lands near to each urban reserve. The analysis only considers the presence or absence of a

transitional buffer and the potential need for additional buffers, no matter the current use of the rural land (e.g., for active farming, rural residential use, or some other use).

Protection of farmland that is most important for the continuation of commercial agriculture in the region

The urban and rural reserves adoption process designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation of an area as an urban reserve means farmland within this reserve area is not the most important for the continuation of commercial agriculture in the region compared to farmland located elsewhere. Therefore, protection of farmland within in any of the urban reserves is not, for the purposes of responding to this Metro Code factor, considered important for the continuation of commercial agriculture in the region. Each reserve fully satisfies (i.e., scores highly on) this factor.

Avoidance of conflict with regionally significant fish and wildlife habitat

UGMFP Title 13, *Nature in Neighborhoods*, provides performance standards to protect, maintain, enhance, and restore significant fish and wildlife habitat through a comprehensive approach that includes voluntary, incentive based, educational, and regulatory elements. Title 13 is not a "no touch" natural resource protection program and does allow for some impacts to inventoried regionally significant fish and wildlife habitat areas. Land brought into the UGB is subject to the requirements of Title 13 through the concept planning and comprehensive planning requirements of UGFMP Title 11, *Planning for New Urban Areas*. Metro's Title 13 'Regionally Significant Fish and Wildlife Habitat Inventory' considers the urban reserves outside the UGB. The inventory identifies riparian habitat (Classes I and II) and upland habitat (Classes A and B) for that must be addressed in a local jurisdiction's Title 13-compliant resource protection program.

All the cities and counties in the Metro region already have riparian habitat (Classes I and II) protection requirements in place that are compliant with Title 13. These riparian habitat protection programs can easily be extended to the riparian habitat areas within the urban reserve lands, if/when the land is added to the UGB. However, protection of upland wildlife habitat (Classes A and B) is not required under Title 13 for land within the UGB prior to 2005. Therefore, most Metro jurisdictions do not yet have an upland habitat protection program and will need to develop one that is compliant with Title 13 and apply it to urban reserve lands added to the UGB going forward.

Each urban reserve was evaluated for the presence of riparian and upland wildlife habitat through Metro's Regionally Significant Fish and Wildlife Habitat Inventory GIS data layer. The analysis focused on the habitat areas that are not already constrained by steep slopes greater than 25 percent or by public ownership. The remaining habitat areas were evaluated to determine whether urbanization could occur in a way that avoided the habitat areas. The need for future transportation connections within the urban reserves and to adjacent land within the UGB presents the greatest potential conflicts with regionally significant fish and wildlife habitat. A narrative of the potential impact to habitat areas for each urban reserve is included in Attachment 2.

Contribution to the purposes of Centers and Corridors

The '2040 Growth Concept', adopted by the Metro Council in 1995, is the long-range vision for development of the region's urban form. The '2040 Growth Concept Map' is the geographic expression of that vision. Both the 2040 Growth Concept and Map are no incorporated in the Regional Framework Plan (RFP) adopted by the Metro Council in 1997 and are the unifying bases for the RFP's various regional policies, such as those concerning land use.

The 2040 Growth Concept's underlying philosophy is to "*preserve our access to nature and build better communities for the people who live here today and who will live here in the future*". In support of this philosophy, the Growth Concept foresees numerous walkable, higher-density, mixed-use centers and corridors of employment, housing, cultural and recreational activities, and transit service across the region, with those centers and corridors helping to grow the economy, provide affordable housing, and promote vibrant and distinctive communities that reduce the need for sprawl and minimize transportation costs and contributions to climate change.

"Centers", which are identified on the 2040 Growth Concept Map, include:

- The **Central City**, which itself includes areas such as Downtown Portland, Old Town/Chinatown, the Pearl, Goose Hollow, South Waterfront, the Lloyd District, Lower Albina, and the Central Eastside, and is the region's business and cultural hub, indeed the primary center for finance, commerce, government, retail, tourism, arts, and entertainment with the most intensive development of housing and employment;

- Eight **Regional Centers**, each serving hundreds of thousands of people in major urban areas outside the Central City and surrounding high-quality transit service, multi-modal street networks, and nodes of regional through-routes. Regional centers are typically characterized by two- to four-story employment and housing development, larger commercial uses, healthcare facilities, and local government services; and

- 32 **Town Centers**, which are smaller than regional centers and serve populations of tens of thousands of people. They offer more locally-focused retail uses, like restaurants, cafes, brewpubs, child care facilities, cinemas, and dry cleaners and public amenities like libraries and community halls. Town centers are typified by one- to three-story buildings for employment and housing, as well as a strong sense of community identity. Town centers vary greatly in character across the region.

Numerous "Corridors" are also identified on the 2040 Growth Concept Map, and include streets that serve as major transportation routes for people and goods, such as: Tualatin Valley Highway and 185th Avenue in Washington County; Powell Boulevard in Portland Gresham; and McLoughlin Boulevard in Portland and Clackamas County.

Metro completed a 'State of the Centers Report' in 2009, which was intended to initiate a regional discussion regarding the uniqueness of Centers and their relative health. Two comparative tools, the activity spectrum and typologies, were included in the report to assist communities in understanding and discussing their community aspirations. The second edition of the report,

published in 2011, helped measure local progress in achieving desired outcomes and illustrating the kind of investments that contribute to a successful center. In 2017, Metro finalized an online version, now titled the 'State of the Centers Atlas', which displays data for regional and town centers that help measure a center's performance at that time in achieving local aspirations and regional goals, and allowing for comparison between Center types.

Using the information from the State of the Centers Atlas, along with numerous locally-adopted plans and visions for the designated Centers and Corridor areas, transit and sidewalk GIS data layers, Metro's 2023 Transit Oriented Development (TOD) Strategic Plan, and 2023 aerial imagery, staff evaluated whether or not urbanization of reserve areas would support or contribute to the local and regional visions for nearby Centers or Corridors.

Equitable and efficient distribution of housing and employment opportunities throughout the region

The equitable distribution aspect of this factor is intended to help ensure that housing and employment opportunities are shared equitably throughout the region, and not always clustered entirely in one location. However, this goal has generally been given the least amount of weight in deciding where to expand the UGB, largely due to the policy shift undertaken at the direction of the regional Urban Growth Readiness Task Force to apply an outcomes-based approach to growth management decisions considering specific UGB expansion proposals submitted by cities. That policy shift also resulted in amendments to the Metro Code that place an emphasis on choosing locations for UGB expansions where there is a city that has an adopted concept plan for a possible expansion area and, thereby, demonstrates greater readiness to do more detailed comprehensive planning for that area, to annex it, and ultimately to regulate its urbanization.

Indeed, concept planning for urban development and identifying associated urbanization issues in advance, and having local officials formally adopt that concept plan following public engagement, significantly increases the likelihood that the area will actually develop and be able to efficiently provide residential and employment land opportunities within a reasonable timeframe. When an area lacks a concept plan for its future urban development, it is less likely to result in any practical distribution of new housing and employment opportunities. Accordingly, having an adopted concept plan continues to be considered more important than selecting an expansion location based on a desire to distribute housing and employment opportunities equitably throughout the region.

Only one urban reserve, the Sherwood West Urban Reserve, has a locally-adopted concept plan, so only the Sherwood West Urban Reserve is considered to satisfy this Metro Code factor and no additional analysis for this factor is warranted. The Sherwood West concept plan describes: the City of Sherwood's and other agencies' capacity to extend urban services to urban development in the reserve if added to the UGB; a projected range of future dwelling units; opportunities for employment land development; conceptual transportation facility layouts; locations for new parks and trails; and an approach to protection of natural resources.

RESULTS

A summary table of results for the Metro Code factors analysis can be found in Attachment 3.

The table shows that only eight of the 20 analyzed reserves merited a "high" score for more than one of the Metro Code factors.

Those same eight reserves were the only reserves given a "high" score for the Metro Code factor seeking a clear transition between urban and rural lands using natural and built features. Seven reserves were given a "medium" score for this factor, and the remaining five were scored "low".

As explained above, all 20 urban reserves received a "high" ranking for the Metro Code factor related to protection of farmland for commercial agriculture, because all areas are urban reserves that, by definition, have been deemed appropriate for urbanization, while land important for commercial agriculture has already been designated as rural reserve.

The Brookwood Parkway, Grahams Ferry, Holly Lane – Newell Creek Canyon, and Wilsonville Southwest Urban Reserves received a "high" score for the Metro Code factor related to avoidance of conflict with regionally significant fish and wildlife habitat.

All of the analyzed urban reserves – with the exception of Sherwood West – received a "low" score for the Metro Code factor related to contribution to the purposes of centers and corridors, primarily due to the distance between the urban reserves and the closest designated center or corridor, lack of direct connections and transit service, the character of the land uses between the two locations and the availability, including vacant or redevelopable land – for new development. As in the Metro Code factors analyses in 2018 and 2023, Sherwood West received a slightly higher score on this factor because, compared with the other urban reserves: Sherwood West is somewhat closer, and has a fairly direct connection, to a designed center or corridor, specifically the Sherwood Town Center; the town center has some underdeveloped land that could accommodate new development; and, importantly, the reserve is of a significant size and the large amount of new development that the reserve's buildable area might accommodate could have a population that helps to encourage and contribute to greater activity in the town center.

ATTACHMENTS

Attachment 1: Map of Urban and Rural Reserves

Attachment 2: Metro Code Factor Analysis Narratives (20, with maps):

- Beaver Creek Bluffs
- Bendemeer
- Bethany West
- Borland
- Brookwood Parkway (8B)
- David Hill
- Elligsen Road North
- Elligsen Road South
- Grahams Ferry
- Gresham East
- Henrici
- Holcomb
- Holly Lane – Newell Creek Canyon
- I-5 East – Washington County
- Maplelane
- Rosa
- Sherwood North
- Sherwood South
- Sherwood West
- Wilsonville Southwest

Attachment 3: Metro Code Factors Analysis Results for Draft 2024 Urban Growth Report

BEAVER CREEK BLUFFS URBAN RESERVE

Total Reserve Area	228 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	224 acres
Gross Vacant Buildable Area	142 acres
Net Vacant Buildable Area	**106 acres**

The Beaver Creek Bluffs Urban Reserve is located along the bluffs south of Oregon City and is comprised of three disconnected "sub-areas". The western sub-area (approximately 163 acres) lies on both sides of S Central Point Road, above Beaver Creek to the south and the UGB to the north. This western sub-area is bisected by multiple powerline easements. The central sub-area (approximately 43 acres) sits between Mud Creek and a tributary of Beaver Creek, and is bounded by S Leland Road to the east, bluffs to the south and west, and the UGB to the north. A single three-acre tax lot separated from the rest of the central sub-area is located at the end of S McCord Road. The eastern sub-area (approximately 22 acres) is made up of one tax lot at the southwest end of S Century Drive and three other tax lots at the southwest end of Nobel Road. Of the roughly 228 total acres within these three sub-areas, 31 are constrained by steep slopes of 25 percent or greater. The remainder of the reserve is generally flat.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The UGB forms the northern edge of the three irregularly shaped sub-areas of the Beaver Creek Bluffs Urban Reserve. The forested slope along the southern edge of the reserve's sub-areas, along with Beaver Creek, its tributaries, as well as Mud and Canfield Creeks, would provide a clear transition between urban and rural lands using natural features.

The Beaver Creek Bluffs Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Beaver Creek Bluffs Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Beaver Creek Bluffs Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Oregon City, which is the expected governing body for the Beaver Creek Bluffs Urban Reserve, once urbanized, has adopted a riparian habitat protection program that is compliant with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover about 50 acres of land in the reserve, with most of the riparian habitat occurring along an unnamed tributary to Beaver Creek that flows northward through the middle of the western sub-area. There is a 1.5-acre wetland and a small pond along this stream corridor as well. A smaller amount of riparian habitat is located along a section of Mud Creek in the eastern sub-area. Regionally significant upland habitat occurs primarily along the steeper slopes of the bluffs that form the southern boundary of the reserve, although there are some larger pockets on the flatter portions of the sub-areas.

Urbanization of the reserve sub-areas can occur with moderate disturbance of the regionally significant fish and wildlife habitat, depending mainly on any needed transportation connections across the tributary to Beaver Creek in the western sub-area and the larger pockets of upland habitat. However, given the relatively small size of the western sub-area and adjacent existing streets and street stubs, it is possible that a new transportation connection crossing inventoried habitat will not be needed.

The Beaver Creek Bluffs Urban Reserve is given a “medium” score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

In terms of travel distance, Oregon City Regional Center is the closest 2040 Growth Concept designated center to the Beaver Creek Bluffs Urban Reserve. The regional center serves Oregon City, Clackamas County, and some neighboring cities to the south. The regional center is approximately three miles to the reserve via either S Central Point Road or S Leland Road, and then by S Linn Avenue. There is no transit service connecting the regional center to the reserve.

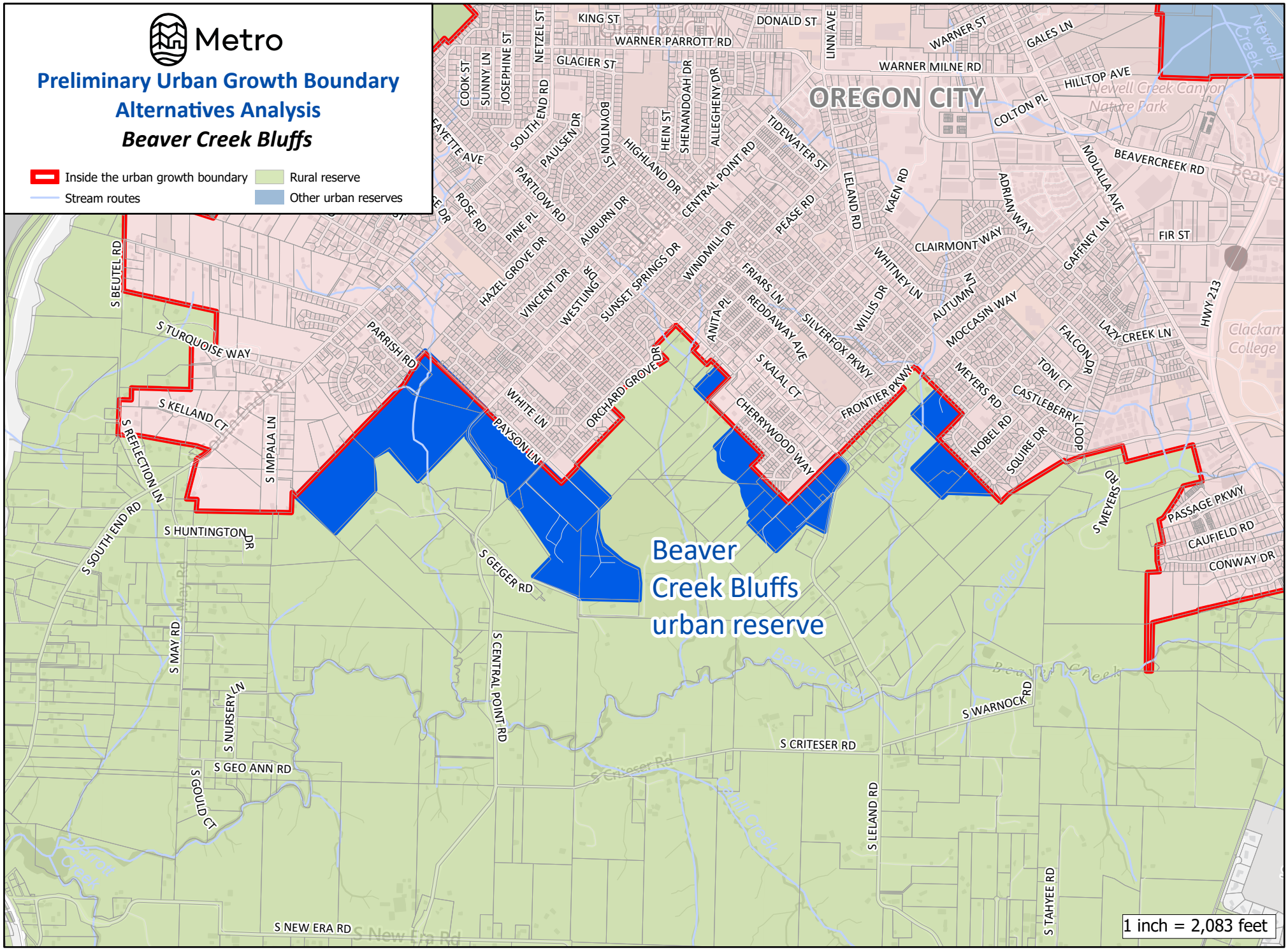
The city's plans for the Oregon City Regional Center include mixed-use development on the vacant parcels in the northern section of the center, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. Metro’s 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000

people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

The Beaver Creek Bluffs Urban Reserve is too small and too disconnected from the Oregon City Regional Center to meaningfully increase the center's level of activity. Therefore, urbanization of the reserve is not considered to be a future contributor to the vision or the purpose of the regional center.

In addition to the regional center itself, there is a 2040 Growth Concept designated corridor that connects the regional center in the north to Clackamas Community College in the south, running along 7th Street and Molalla Avenue. However, the corridor is already mostly built out with a mixture of low density residential development, small commercial businesses, and larger retail commercial uses. The corridor is about two miles away from the middle sub-area of the reserve via a series of local streets. There is no transit service between the reserve and the corridor. Again considering the small size of the reserve and its disconnection, urbanization of the reserve is not expected to impact the corridor. Indeed, there is underdeveloped land already within the city, as well just outside the city in the current UGB, that, given closer proximity and availability of urban services, would provide a better opportunity for new urban development that supports both the regional center and corridor.

The Beaver Creek Bluffs Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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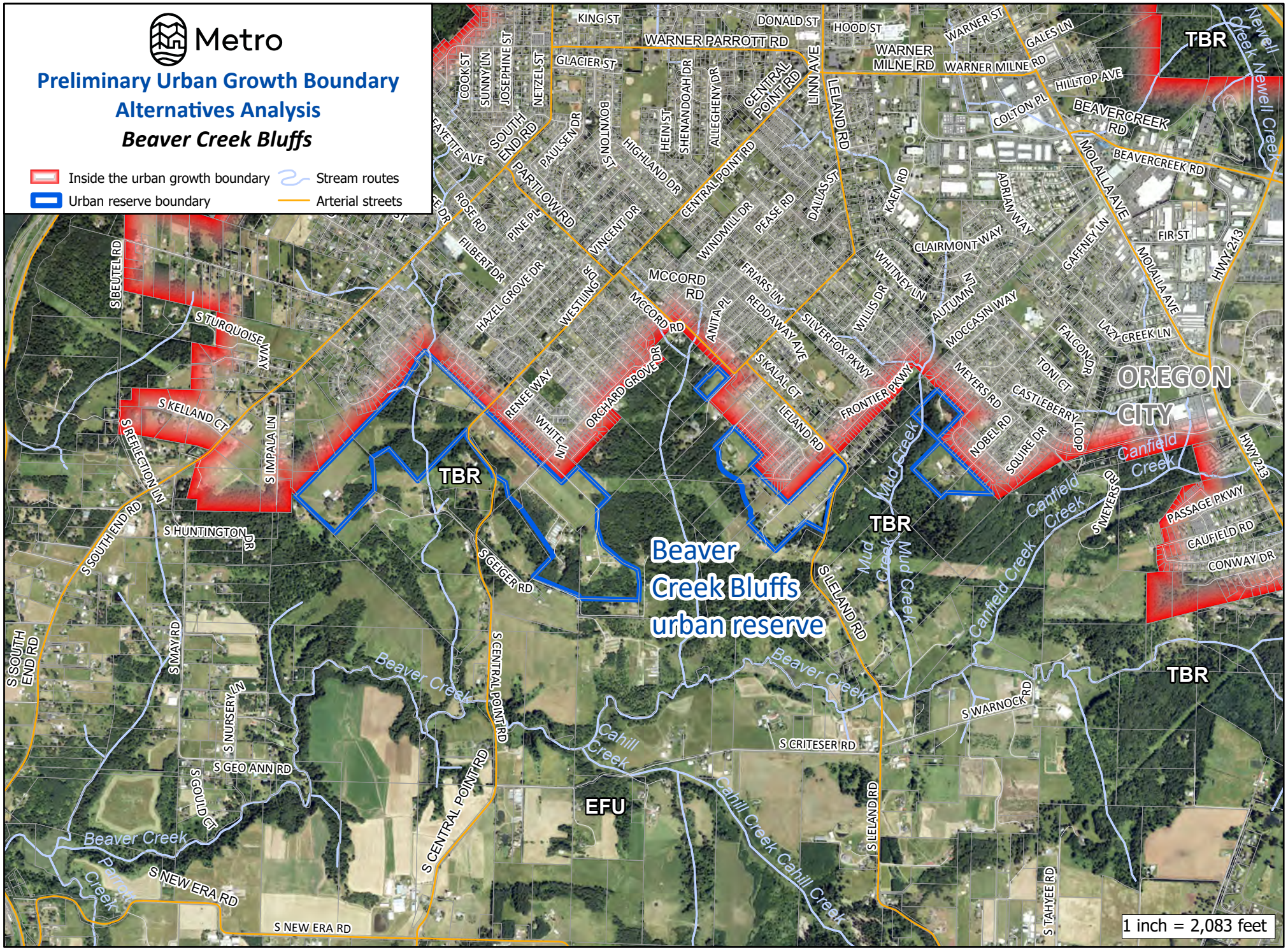

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BENDEMEER URBAN RESERVE

Total Reserve Area	573 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	545 acres
Gross Vacant Buildable Area	318 acres
Net Vacant Buildable Area	**237 acres**

The Bendemeer Urban Reserve is north of NW West Union Road between NW Bendemeer Road and NW 185th Avenue. The UGB is the reserve's eastern and southern boundaries and rural reserves are to the west and north. Most of the adjacent land within the UGB is in the corporate limits of the City of Hillsboro, while the remainder is in unincorporated Washington County. Holcomb Creek and Holcomb Lake form a portion of the northern edge of the reserve. Access to the reserve is provided by NW West Union Road, NW Cornelius Pass Road, and NW 185th Avenue.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

Holcomb Creek, Holcomb Lake, and Rock Creek would provide a natural feature that marks the transition between urbanized and rural lands for roughly three-quarters of the northern boundary of the reserve, between NW Cornelius Pass Road and NW 185th Ave. There is no natural or built feature along the remaining portion of the northern edge of the reserve to provide a transition zone between urban and rural lands. Along the western edge of the reserve, there is a 100-foot-wide tax lot that is owned by the Oregon Department of Transportation. This tax lot could provide a transitional buffer between urban and rural lands if it stays vegetated and in a natural state, or if it was transformed to a trail or multiuse path corridor. Overall, there are natural features that would provide a transition between urbanized and rural land for the majority of the urban-rural edge of the reserve.

The Bendemeer Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Bendemeer Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Bendemeer Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Hillsboro, which is the expected governing body for the Bendemeer Urban Reserve, once urbanized, has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 92 acres of the reserve, mainly along Holcomb Creek, Holcomb Lake, and Rock Creek. Additional habitat areas are located along four unnamed tributaries to the two creeks, which divide the reserve into smaller developable sections of land.

Metro ownership of an undeveloped tax lot in the center of the reserve will provide a high level of protection for some of the habitat along Rock Creek and also limit future transportation connections (e.g., urban roadways) through that habitat area. The habitat areas along Holcomb Creek, Holcomb Lake, and a portion of Rock Creek that are located along the northern edge of the reserve would less susceptible to impacts from future urbanization, as the land to the north is rural reserve and no urban development transportation connections are needed to the north. The divided nature of the urban reserve does make some of the habitat areas along the tributaries more susceptible to impacts due to the likely need for future urban transportation connections.

Overall, urbanization can avoid some regionally significant riparian and upland habitat, depending on the design of the development and the need for east-west transportation connections across the stream corridors.

The Bendemeer Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Bethany Town Center and the Tanasbourne/Amber Glen Regional Center are the closest 2040 Growth Concept designated centers to the Bendemeer Urban Reserve. The Bethany Town Center is approximately 1.25 miles away via NW West Union Road and NW Laidlaw Road, and the Tanasbourne/Amber Glen Regional Center is also about 1.25 miles away via NW 185th Avenue. Both centers are connected to the eastern portion of the reserve and to other areas of the region by TriMet bus lines; the regional center is served by the MAX light rail, but the light rail does not extend to the reserve. There is a paved trail connection (the Rock Creek Trail and Stoller Creek Greenway) from the Bethany Town Center that runs within 600 feet of the reserve.

The Bethany Community Plan calls for a mix of local retail and small community-based office uses in the Bethany Town Center that provide a community village atmosphere. The town center is almost completely built out with a mixture of housing types, retail commercial uses, and a small amount of other employment/institutional uses, including a Providence medical facility. Metro's

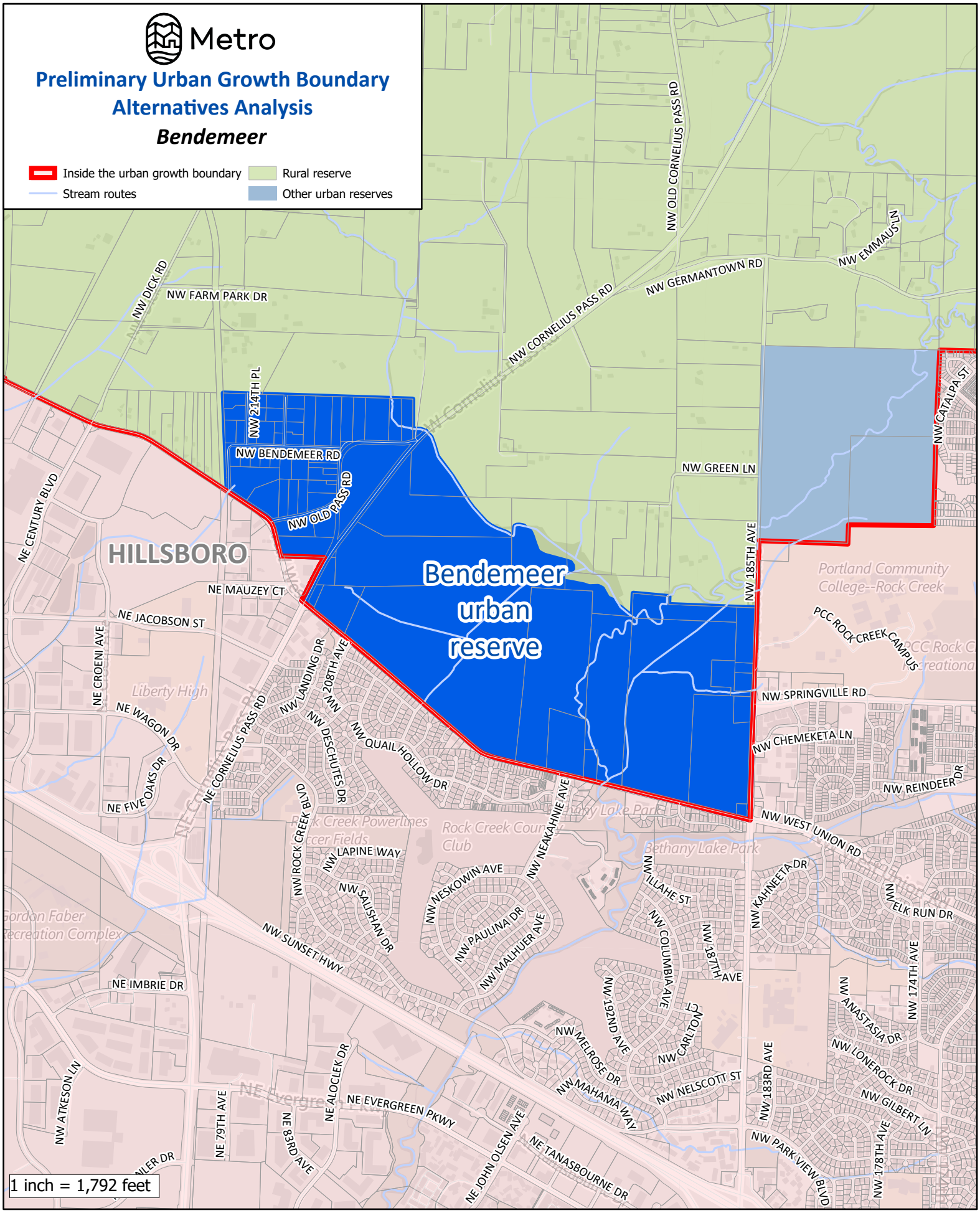
2017 State of the Centers Atlas showed the town center as having an average population density and a slightly higher than average number of dwelling units per acre when compared with other town centers in the region. The town center also scored very high in the atlas for parks access and sidewalk and bike route density.

The Tanasbourne/Amber Glen Regional Center, located on the opposite (south) side of Highway 26 from the reserve, is a mixture of higher density residential, retail commercial, and other employment/institutional uses, including a Kaiser Permanente hospital and an Oregon Health Sciences University research facility. Metro's 2017 State of the Centers Atlas showed a high level of employees and total population, slightly higher dwelling units per acre, and an average population density compared with other regional centers.

Urbanization of the Bendemeer Urban Reserve is not expected to meaningfully contribute to new development of either center consistent with their vision and purpose, in part because of the reserve's limited buildable area, the centers already being mostly built out, and the distance of the centers from the reserve.

There are two 2040 Growth Concept designated corridors adjacent to the reserve. The first corridor is along NW 185th Avenue from NW Springville Road south to Highway 26. This corridor is composed mainly of single-family residences and two schools, Westview High School, and Rock Creek Elementary School. The second corridor is along NW Springville Road between NW 185th Avenue and NW Kaiser Road. It too is composed mainly of single-family homes with a few multi-family developments and the Portland Community College Rock Creek campus. Urbanization of the reserve is not expected to contribute to new development consistent with the purpose of the two corridors, as they are already built out with residences and institutional uses.

The Bendemeer Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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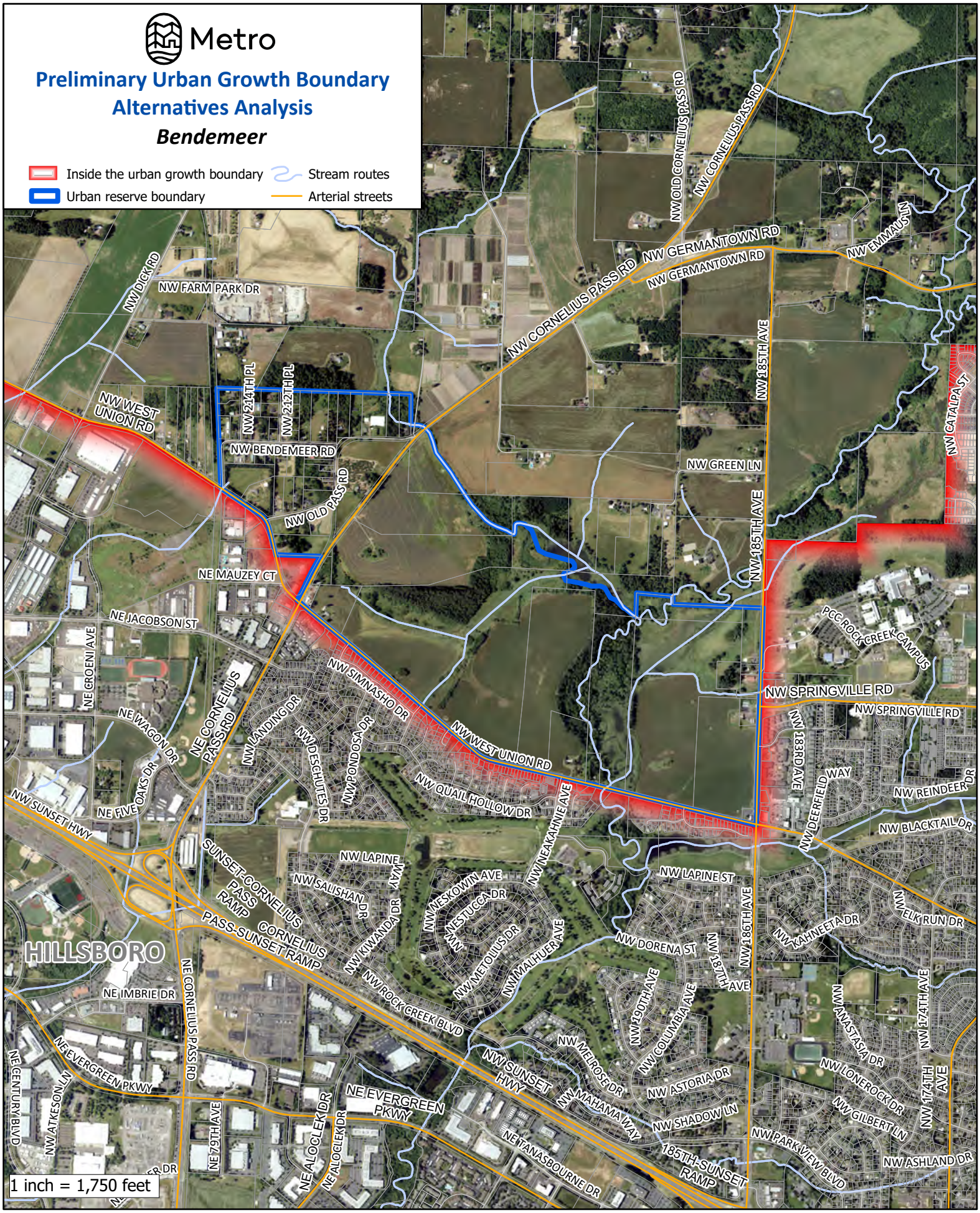

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BETHANY WEST URBAN RESERVE

Total Reserve Area	168 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	167 acres
Gross Vacant Buildable Area	60 acres
Net Vacant Buildable Area	**44 acres**

The Bethany West Urban Reserve is a relatively small, nearly square area on the north side of the Portland Community College Rock Creek campus. The UGB is the reserve's southern and eastern boundaries, while rural reserves are adjacent to the west and north. Access to the urban reserve is provided by NW 185th Avenue and NW Shackelford Road in the community of North Bethany.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

NW 185th Avenue divides the Bethany West Urban Reserve from rural land to the west. Even assuming that NW 185th Avenue develops as an arterial roadway in the future, the road itself will not provide a clear transition area between future urban and rural uses. There are no natural or built features to mark the transition of urban and rural land to the north. Additional buffers will need to be incorporated into the design and planning of the reserve's development along both of these edges.

The Bethany West Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Bethany West Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Bethany West Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

Washington County, the current governing body for the Bendemeer Urban Reserve, as well as the City of Hillsboro, which is the nearest incorporated city, have both adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. An upland habitat protection program will need to be developed for any area added

to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover about 70 acres of the reserve and is focused on Rock Creek and an unnamed tributary. Nearly all but the northwest corner of the reserve is within this habitat area, which is largely riparian habitat.

Some of the habitat area is on land owned by Portland Community College, and that ownership should result in extra environmental protection as the land is less likely to be developed. Because the riparian and upland habitat is concentrated in one section of the reserve, urbanization can occur in the remaining area while avoiding the significant habitat, with the exception of an expected extension of currently dead-ending NW Shackelford Road that will need to cross Rock Creek.

The Bethany West Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Bethany Town Center and the Tanasbourne/Amber Glen Regional Center are the closest 2040 Growth Concept designated centers to the Bethany West Urban Reserve. The Bethany Town Center is approximately two miles away via NW 185th Ave, NW West Union Road, and NW Laidlaw Road, and the Tanasbourne/Amber Glen Regional Center is also about two miles away via NW 185th Avenue. There is no transit service directly connecting the reserve to either center, though there is a TriMet bus stop about half a mile from the reserve with service to the regional center. Both centers do have bus service extending to other areas of the region and the regional center has MAX Light Rail service.

The Bethany Community Plan calls for a mix of local retail and small community-based office uses in the Bethany Town Center that provide a community village atmosphere. The town center is almost completely built out with a mixture of housing types, retail commercial uses, and a small amount of other employment/institutional uses, including a Providence medical facility. Metro's 2017 State of the Centers Atlas showed the town center as having an average population density and a slightly higher than average number of dwelling units per acre when compared with other town centers in the region. The town center also scored very high in the atlas for parks access and sidewalk and bike route density.

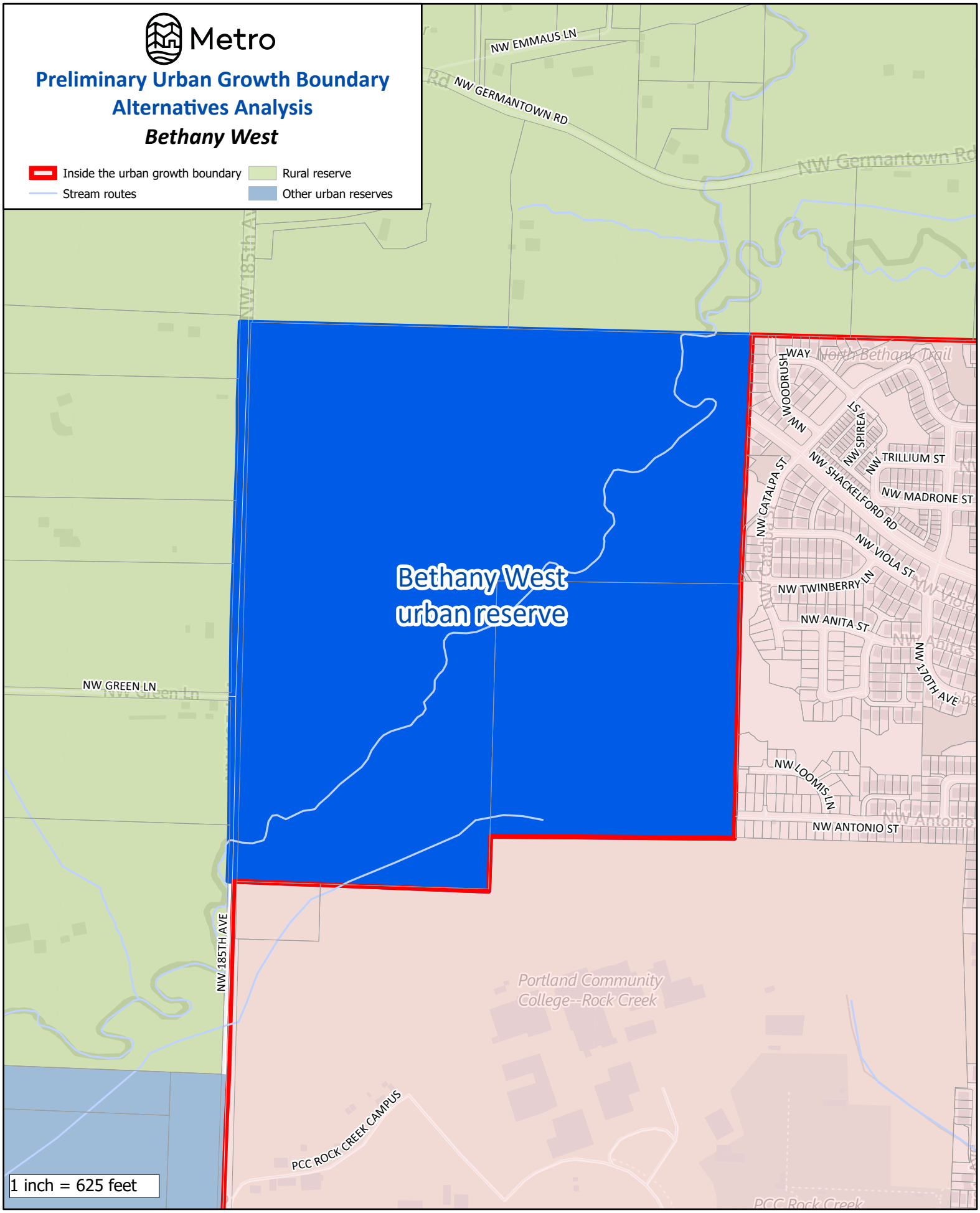
The Tanasbourne/Amber Glen Regional Center, located on the opposite (south) side of Highway 26 from the reserve, is a mixture of higher density residential, retail commercial, and other employment/institutional uses, including a Kaiser Permanente hospital and an Oregon Health Sciences University research facility. Metro's 2017 State of the Centers Atlas showed a high level of employees and total population, slightly higher dwelling units per acre, and an average population density compared with other regional centers.

Urbanization of the Bethany West Urban Reserve is not expected to meaningfully contribute to new development of either center consistent with their vision and purpose, in part because of the

reserve's relatively small buildable area, the centers already being mostly built out, and the distance of the centers from the reserve.

There are two 2040 Growth Concept designated corridors adjacent to the reserve. The first corridor is along NW 185th Avenue from NW Springville Road south to Highway 26. This corridor is composed mainly of single-family residences and two schools, Westview High School, and Rock Creek Elementary School. The second corridor is along NW Springville Road between NW 185th Avenue and NW Kaiser Road. It too is composed mainly of single-family homes with a few multi-family developments and the Portland Community College Rock Creek campus. Urbanization of the reserve is not expected to contribute to new development consistent with the purpose of the two corridors, as they are already built out with residences and institutional uses.

The Bethany West Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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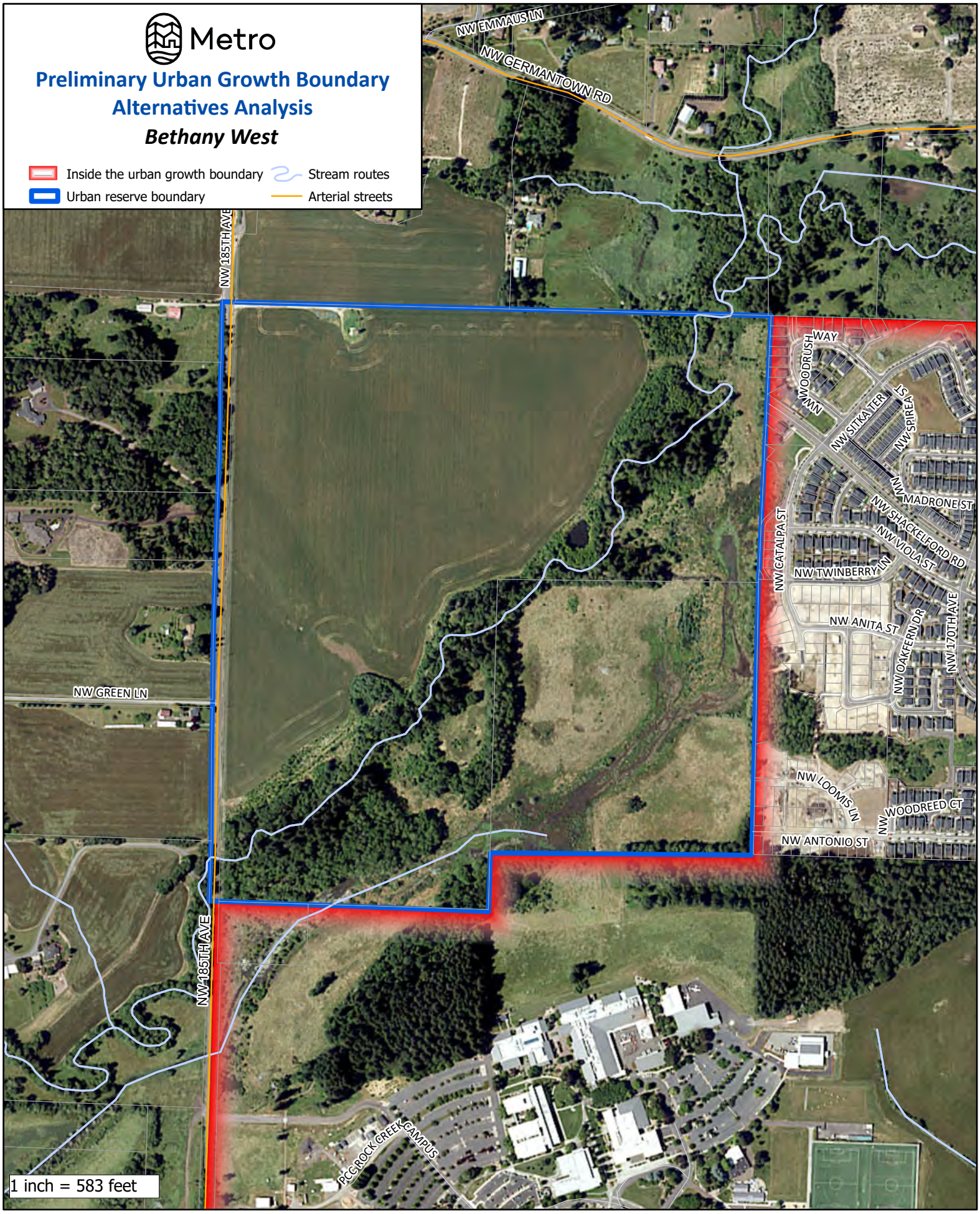
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Bethany West

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



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BORLAND URBAN RESERVE

Total Reserve Area	1,359 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	1,170 acres
Gross Vacant Buildable Area	537 acres
Net Vacant Buildable Area	**400 acres**

The Borland Urban Reserve is a long, somewhat linearly shaped area on both sides of I-205 along SW Borland Road. The reserve's northwestern and southeastern ends are adjacent to the UGB and, respectively, the cities of Tualatin and West Linn. The Tualatin River is the reserve's northern boundary. Land north of the Tualatin River, as well as land south and west of SW Stafford Road, are in other designated urban reserves. Athey Creek and Fields Creek, along with numerous other streams, flow north through the reserve to the Tualatin River. The reserve is generally flat, though there are some slopes greater than 10 percent along the stream corridors and some minor areas of slopes greater than 25 percent. Access to the area is provided by SW Borland Road, SW Ek Road, SW Halcyon Road, SW Stafford Road, and SW Ulsky Road.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The Tualatin River is a natural feature that would separate urbanized and rural lands on the north side of the Borland Urban Reserve. A combination of steep forested slopes and private homeowner association land would also provide a transition between urban and rural lands for almost the entire southern edge of the reserve. Many of the adjacent rural residences in this southern location are 200-300 feet above the reserve. While additional buffers will need to be incorporated into the planning and design of the reserve's development in a few locations along the southern edge to provide a clear transition from urban to rural uses, there are natural features along the vast majority of the urban-rural edge to mark the transition between urban and rural lands.

The Borland Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Borland Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Borland Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Tualatin and the City of West Linn are the expected governing bodies for the Borland Urban Reserve when it is urbanized. The City of Tualatin has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The City of West Linn has adopted a riparian habitat protection program that has been deemed to be in substantial compliance with Title 13, as well. Both cities will need to develop upland habitat protection programs for any areas under their jurisdiction that are added to the UGB after December 28, 2005; those programs will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 230 acres of the reserve. The habitat areas are focused along the Tualatin River and the numerous stream corridors that flow north through the reserve to the river. The locations of these streams generally divide the reserve into smaller unconstrained areas of land.

Some of the stream corridors have adjacent steep slopes, which will provide an additional level of protection for the riparian habitat areas from urbanization. However, the stream corridors will be susceptible to impacts from transportation connections (e.g., roads) needed to link the different sections of unconstrained land in the reserve together. Overall, urbanization could occur with low to moderate avoidance riparian and upland habitat, depending on the number of needed transportation connections.

The Borland Urban Reserve is given a "low-medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The eastern portion of the Borland Urban Reserve is just over a mile from the West Linn Willamette Town Center via Willamette Falls Drive. This 2040 Growth Concept designated center is mostly built out, with only a few underdeveloped tax lots primarily on the north side of I-205 away from the main commercial retail corridor along Willamette Falls Drive. The Willamette Historic District is within the town center. Metro's 2017 State of the Centers Atlas shows a low total population, total employees, people per acre, and dwelling units per acre compared with other town centers in the region. This is consistent with how the town center has developed with a main commercial street and single-family residences.

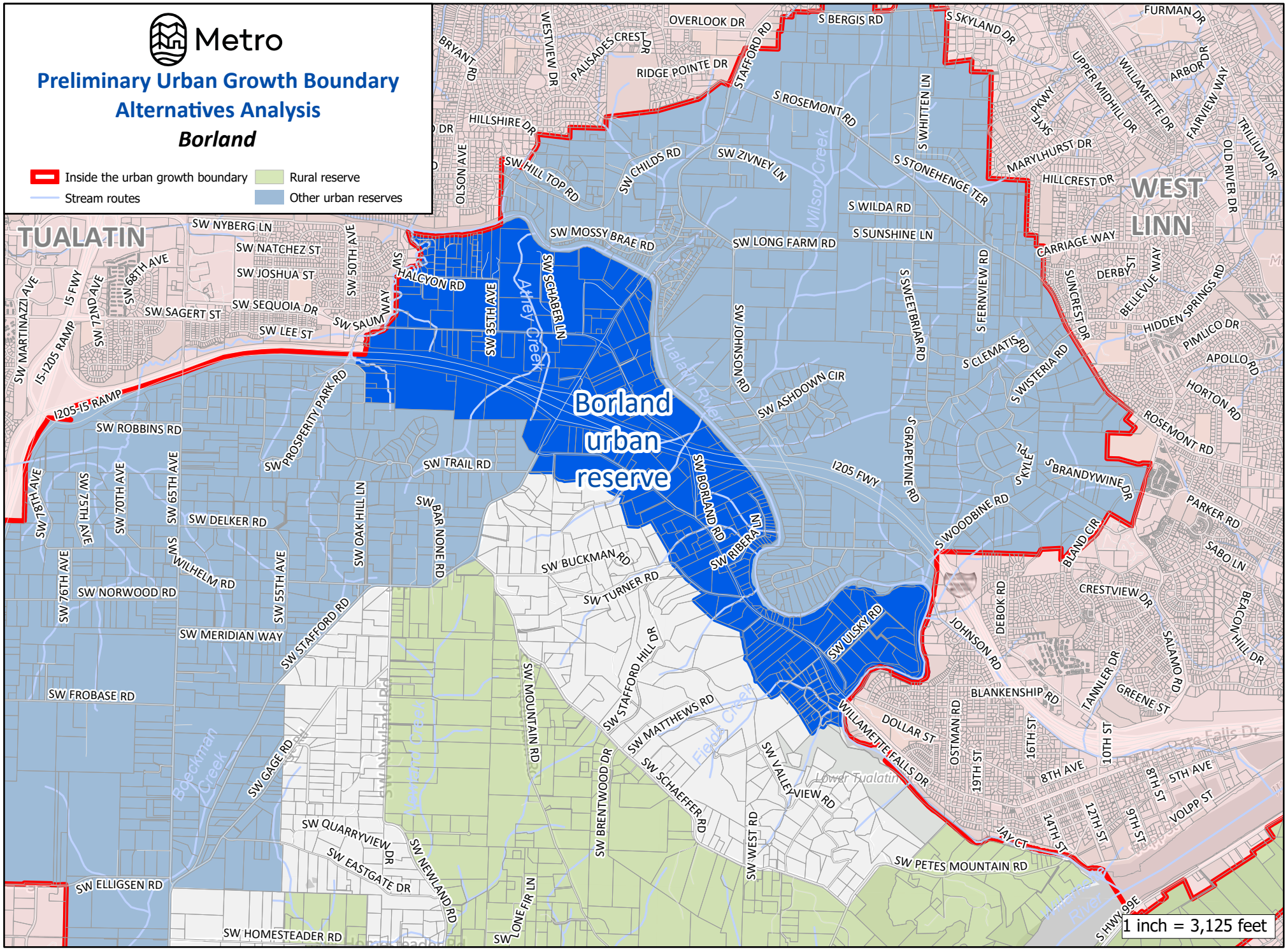
The Tualatin Town Center is approximately 2.25 miles from the western portion of the reserve via SW Borland Road, SW Sager Street, and SW Boones Ferry Road. This other 2040 Growth Concept designated center primary feature is the "Lake at the Tualatin Commons" development that includes residences, offices, and commercial uses surrounding a public plaza and walkway circling a manmade lake. The remainder of the town center is developed with numerous apartment complexes and a significant amount of auto-oriented and large-scale retail commercial uses.

Metro's 2017 State of the Centers Atlas shows a higher population and a much higher number of employees when compared to other town centers in the region. The dwelling units per acre in 2017 was about average, and the people per acre was low when compared to other town centers.

The closest 2040 Growth Concept designated corridor to the reserve is SW Boones Ferry Road in the Tualatin Town Center.

Urbanization of the reserve is not expected to meaningfully contribute to new development in and the purpose of the Willamette Town Center, given the current success of the commercial street, the historic district designation on a portion of the town center land, and a potential desire to maintain the current development pattern. Likewise, urbanization of the reserve is not expected to contribute to development or the purpose of the Tualatin Town Center, or to the SW Boones Ferry Road corridor, given the distance between the two locations.

The Borland Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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Metro

Preliminary Urban Growth Boundary Alternatives Analysis

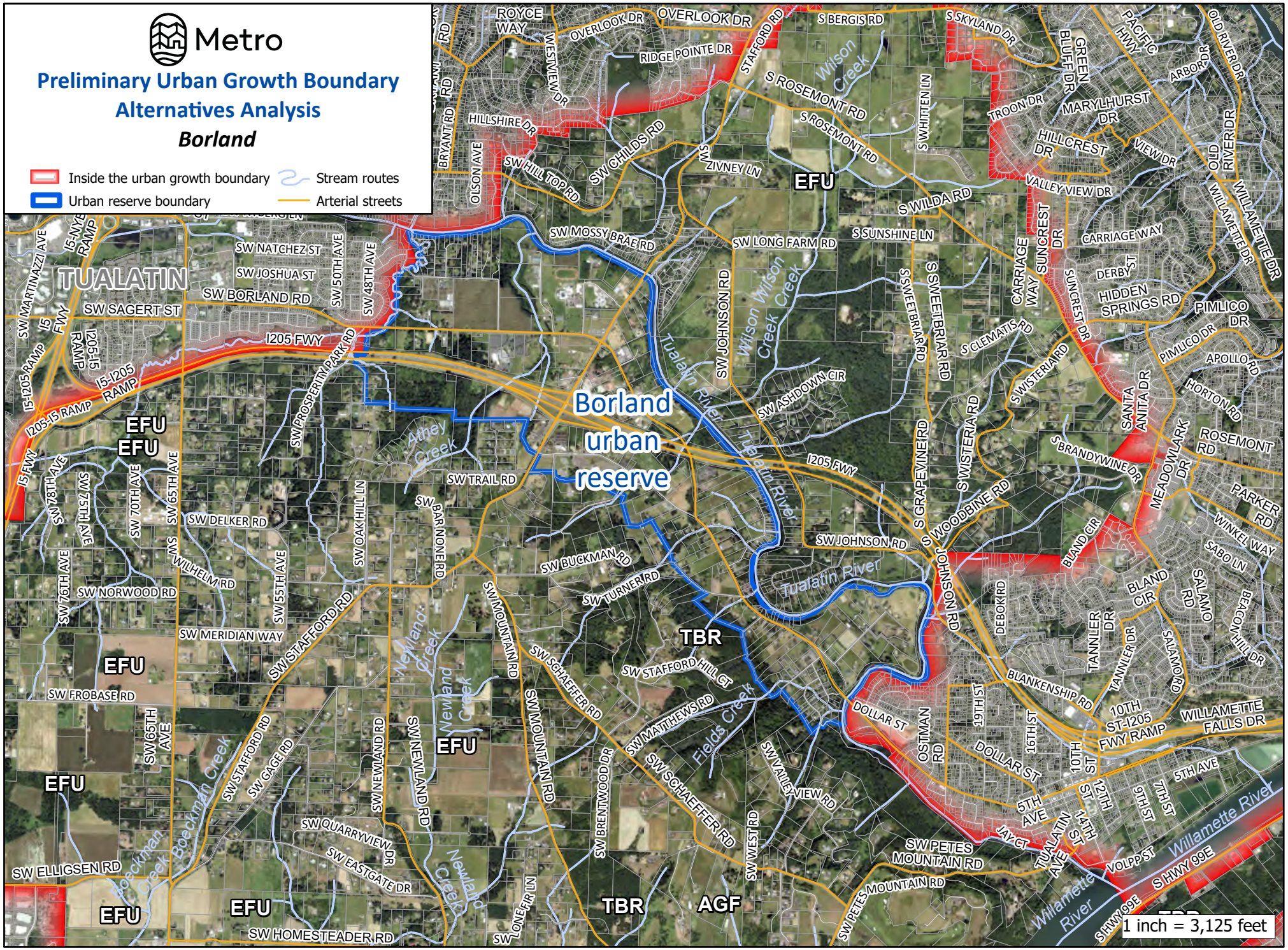
Borland

Inside the urban growth boundary

Urban reserve boundary

Stream routes

Arterial streets



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BROOKWOOD PARKWAY URBAN RESERVE

Total Reserve Area	62 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	38 acres
Gross Vacant Buildable Area	32 acres
Net Vacant Buildable Area	**24 acres**

The Brookwood Parkway Urban Reserve is a relatively small area on the north side of Hillsboro at the Brookwood Parkway/Highway 26 interchange. Except for its north side, the reserve is entirely surrounded by the UGB and the corporate limits of the City of Hillsboro; Highway 26 occupies and forms the edge to the northern portion of the reserve. Access to the area is provided by NW Meek Road, NW Oak Drive, and NW Birch Ave.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The roughly 300-foot-wide right-of-way of Highway 26 and parallel roadways would provide a built feature that marks a clear transition between urbanized and rural lands at the north of the Brookwood Parkway Urban Reserve.

The Brookwood Parkway Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, any farmland within the Brookwood Parkway is not the most important for the continuation of commercial agriculture in the region.

The Brookwood Parkway Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Hillsboro, which is the expected governing body for the Brookwood Parkway Urban Reserve, once urbanized, has adopted riparian habitat protection measures that, as part of the

Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*.

Regionally significant riparian habitat not constrained by steep slopes or in public ownership cover approximately 4.5 acres of the reserve, generally along Waible Gulch, which flows through the northwest corner of the reserve. While the waterbody separates that northwest corner from the remainder of the reserve, the area is still accessible from lands already in the UGB and a future crossing over the waterbody may not be necessary. Upland wildlife habitat was originally inventoried in the reserve, but 2022 aerial images suggest those mapped areas have been developed or otherwise cleared.

Due to the isolated location of the habitat and the expected protection measures that will be in place prior to development, urbanization is expected to be able to occur while avoiding the regionally significant riparian habitat.

The Brookwood Parkway Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Orenco Town Center is the closest 2040 Growth Concept designated center to the Brookwood Parkway Urban Reserve, approximately two miles away via NE Brookwood Parkway, NE Shute Road, and NE Butler Street. The Tanasbourne/Amber Glen Regional Center, another 2040 Growth Concept designated center, is just shy of three miles away via NE Brookwood Parkway and NE Evergreen Parkway.

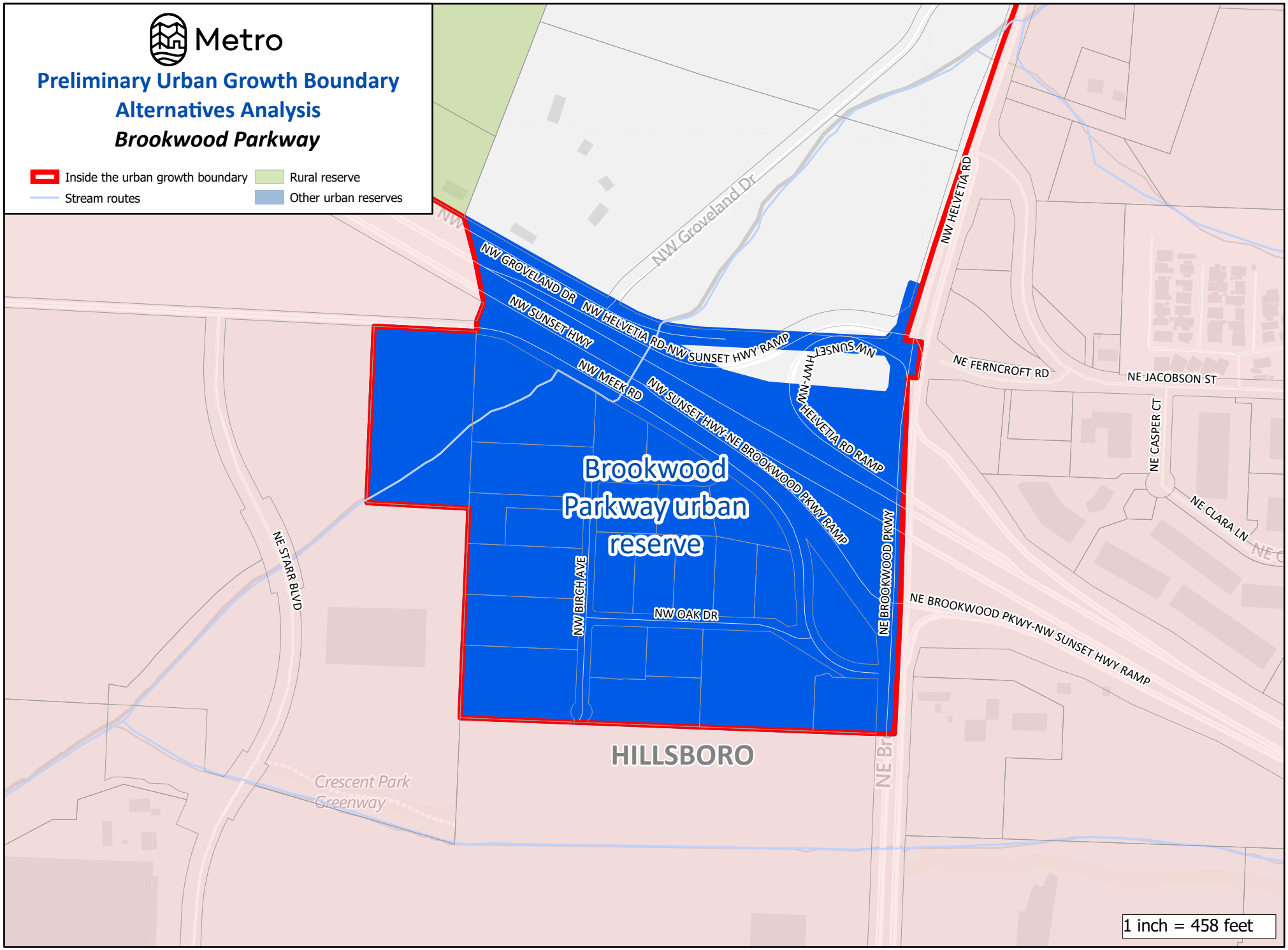
The Orenco Town Center is essentially fully built out with a mixture of housing types and retail commercial uses. The center was developed as a transit-oriented development surrounding the Orenco Light Rail Station. Metro's 2017 State of the Centers Atlas shows it has a higher-than-average total population, population density, and a much higher than average number of dwelling units per acre compared with other town centers in the region. Orenco also scored very high in the atlas with regard to parks access and sidewalk and bike route density. The Tanasbourne/Amber Glen Regional Center is a mixture of higher density residential, employment, retail commercial, and institutional uses, including a Kaiser Permanente hospital and an Oregon Health Sciences University research facility. The 2017 State of the Centers Atlas shows a high level of employees and total population, slightly higher dwelling units per acre, and average population density when compared to other regional centers in the region. Both the town center and the regional center are well served by transit, including numerous TriMet bus lines and MAX Light Rail that connect the centers with other areas of the region. However, there are no transit connections between the centers and the urban reserve.

The closest 2040 Growth Concept designated corridor is along NE Evergreen Parkway, about 1.5 miles away via NE Brookwood Parkway and NE Evergreen Parkway. A second corridor runs south along NE Century Boulevard from NE Evergreen Parkway. Both of these corridors contain employment uses including Intel's Ronler Acres Campus along NE Century Boulevard.

Given that the urban reserve is adjacent to the North Hillsboro Industrial Sanctuary and Highway 26, development of the area with employment uses would be expected. Urbanization of the reserve with employment uses with minimal residential uses is not expected to meaningfully contribute to the vision and purpose of the Orenco Town Center or the Tanasbourne/Amber Glen Regional Center.

Due to the very small size of the reserve, the significant amount of employment land near the two centers, the distance between the reserve and the centers, and the fact that the centers are already largely built out, urbanization of the reserve even with residential uses is not expected to contribute to new development consistent within the town or regional centers consistent with their intended purposes. For similar reasons, urbanization of the reserve is not expected to contribute to new development consistent with the purpose of nearby corridors.

The Brookwood Parkway Urban Reserve is given a “low” score for this Metro Code factor in Attachment 3.



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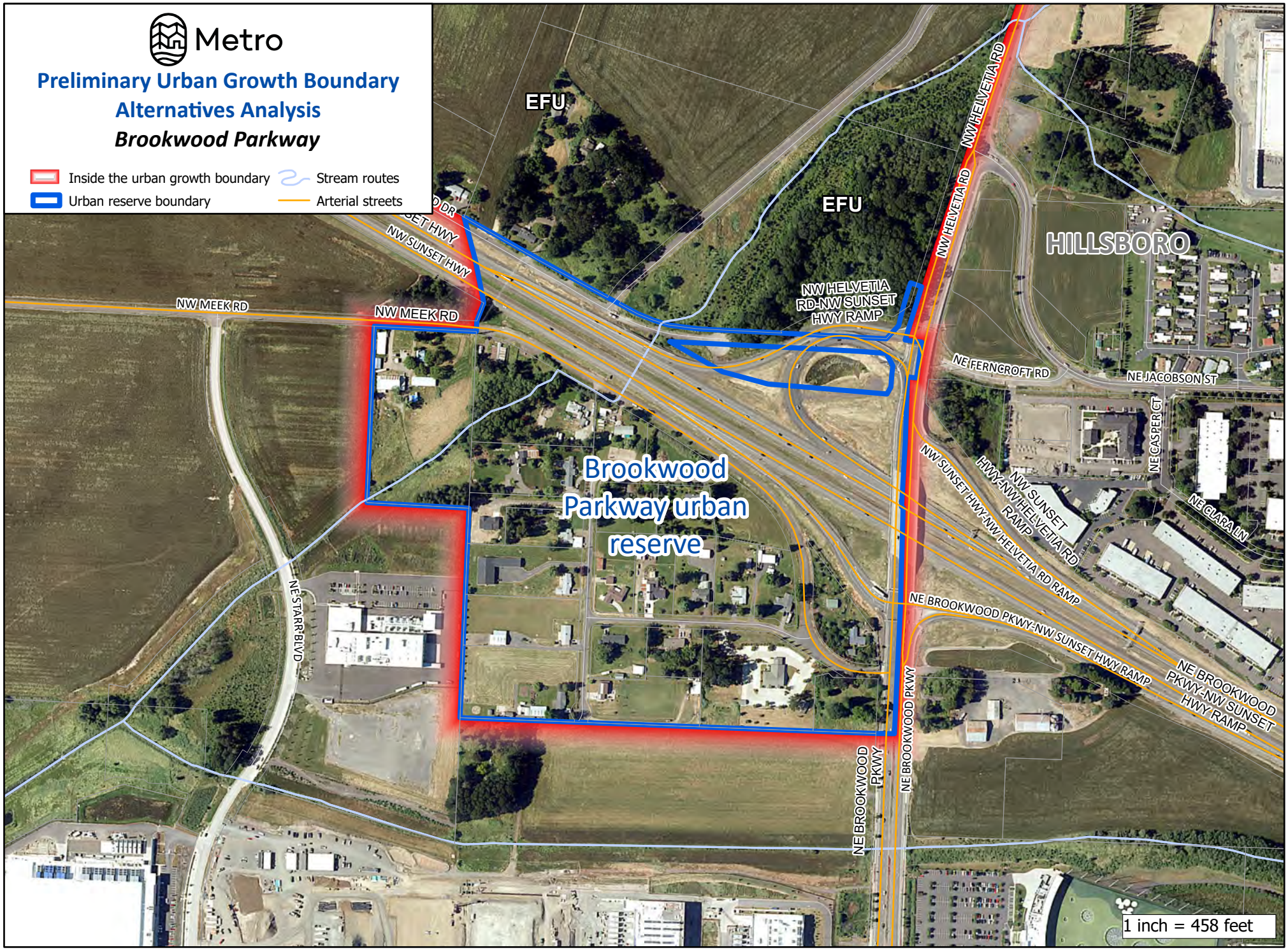

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DAVID HILL URBAN RESERVE

Total Reserve Area	320 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	313 acres
Gross Vacant Buildable Area	172 acres
Net Vacant Buildable Area	**128 acres**

The David Hill Urban Reserve is an irregularly shaped area on the northwest edge of Forest Grove in the vicinity of NW David Hill Road. The UGB forms the reserve's eastern boundary and rural reserve land is to the west, north, and south. The high point of the reserve is near NW David Hill Road, with the land sloping down to the south towards NW Gales Creek Road and east towards NW Thatcher Road, dropping 440 and 360 feet, respectively. Access to the reserve is provided by NW David Hill Road, NW Gales Creek Road, and NW Thatcher Road.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The steep slopes along the northern, western, and southern edges of the David Hill Urban Reserve (i.e., the edges that are not otherwise the existing UGB) would provide natural feature transition zones between the urban uses and the rural lands in these locations.

The David Hill Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the David Hill Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The David Hill Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Forest Grove, which is the expected governing body for the David Hill Urban Reserve, once urbanized, has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program

will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 46 acres of the reserve, with most of the habitat areas located along two unnamed streams. A significant portion of the riparian habitat is adjacent to steep slopes mainly at the edge of the reserve, although one stream does extend northward through the reserve's northern center. The location of the streams near the edge of the reserve, combined with the nearby steep slopes, are expected to provide some additional level of protection from urbanization for that portion of the habitat area. Toward the southern portion of the reserve, there are two fairly large pockets of designated upland wildlife habitat that, together, total about 30 acres; however, 2023 aerial imagery suggests that some of these pockets may actually be tree farms and not native habitat.

Generally, urbanization of the reserve can occur with a medium level of avoidance of regionally significant riparian and upland habitat, depending on the design of the new urban development, the need for transportation connections to NW Gales Creek Road, and the determination of significance for some of the mapped upland habitat areas (e.g., the areas that may actually be tree farms).

The David Hill Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Forest Grove Town Center is the closest 2040 Growth Concept designated center to the David Hill Urban Reserve. The town center is approximately 2.5 miles away via NW Gales Creek Road, E Street, B Street, and 19th Avenue. The town center encompasses the city's historic downtown, which itself includes transit-oriented mixed-use development, cultural amenities, retail commercial uses, civic buildings, and the main campus of Pacific University, but also some detached single-family dwellings, underdeveloped properties, and parking lots. TriMet Route 57 connects the town center to Cornelius, Hillsboro, and the MAX light rail line, but there is no TriMet service to the reserve itself; the nearest TriMet stop is more than two miles away. GroveLink, a public transportation network for the Forest Grove community, provides transit services in and around the town center and connects the town center with other parts of Forest Grove and to TriMet Route 57, but not to the reserve.

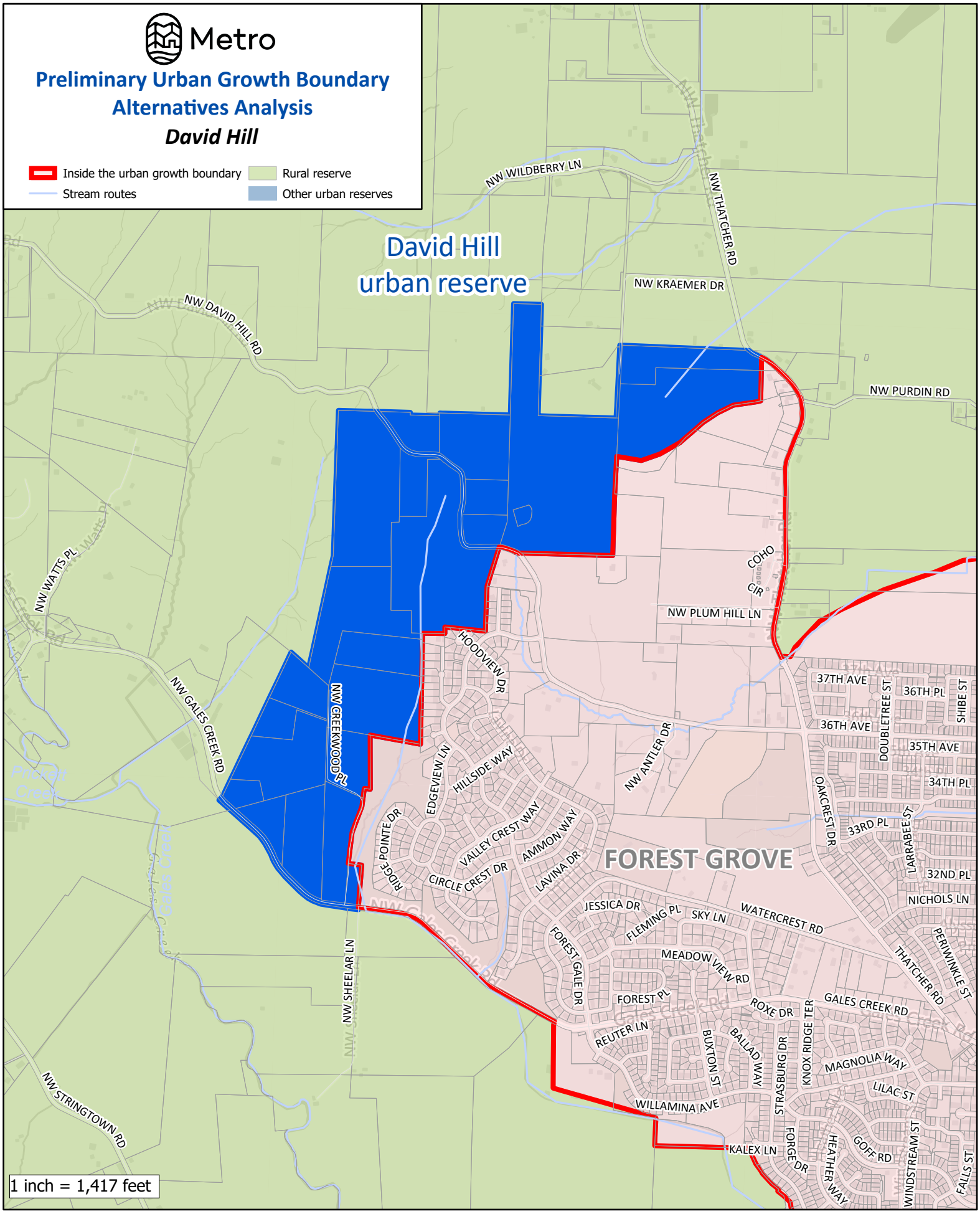
Metro's 2017 State of the Centers Atlas showed less than 800 people living in the town center, but a population density (25.5 people per acre) that exceeded the 2017 average for all centers in the region. The relatively higher density can likely be attributed to Pacific University students. The town center also had a higher rate of businesses per acre in 2017 than other centers in the region, but a less than half the average of dwelling units per acre.

Urbanization of the reserve is not expected to contribute to new development within the Forest Grove Town Center consistent with the vision for the center, due to the distance between the center and the reserve, the lack of transit service between the two areas, and the substantial amount of

underdeveloped land inside the UGB that is in closer proximity to the town center. Redevelopment of these closer-in areas would have more of an impact on the growth of the town center.

In addition to the town center itself, there is a 2040 Growth Concept designated corridor that connects the town center with Cornelius along Pacific Avenue. The corridor mostly contains a mix of retail commercial uses, with a small amount of residential uses and some undeveloped land near the Highway 47 intersection. Urbanization of the reserve is not expected to meaningfully contribute to the purpose of the corridor due to the distance between the reserve and the corridor, the lack of connecting transit service, and the greater potential for the underdeveloped land already in the UGB closer to the corridor to be developed first.

The David Hill Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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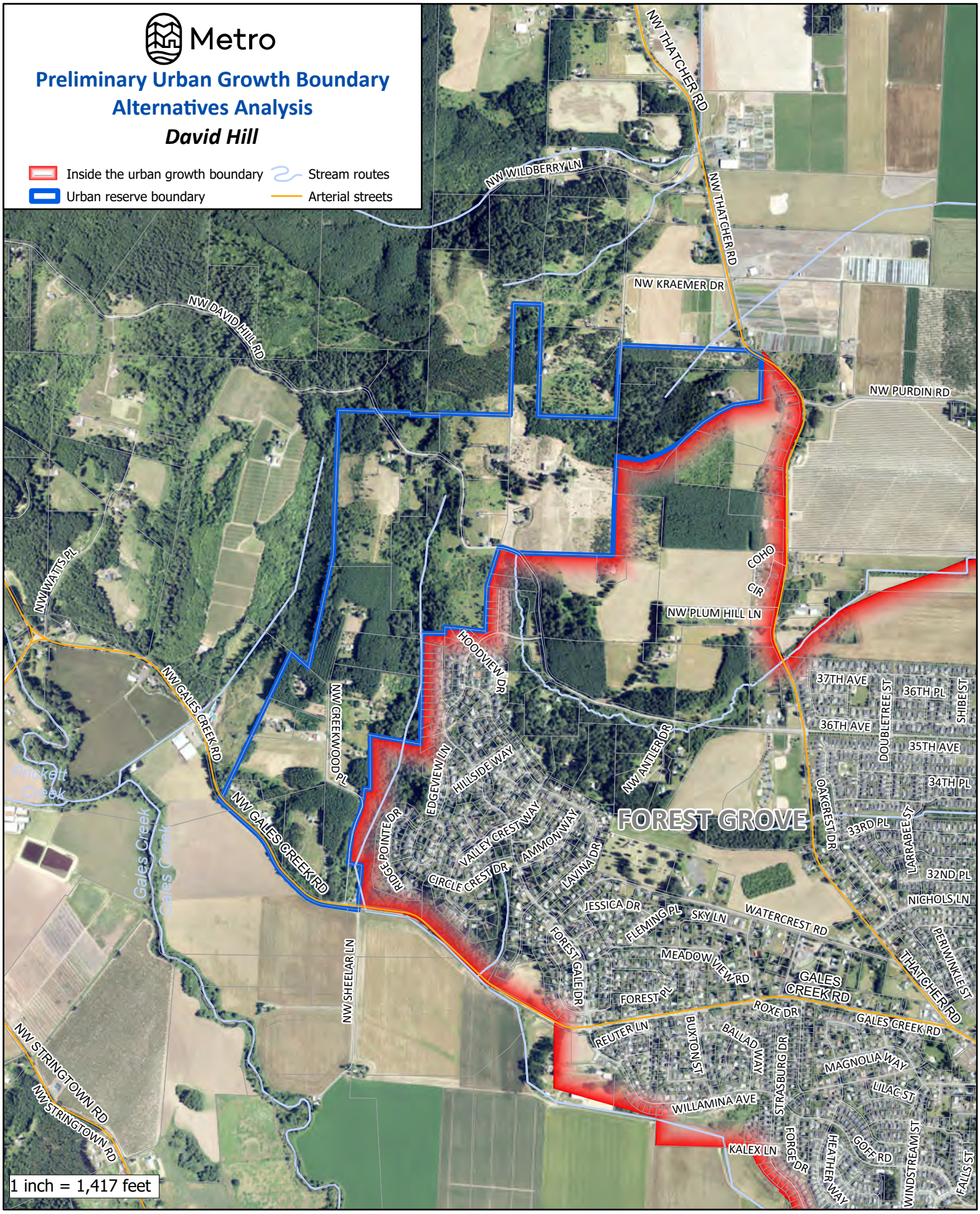
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

David Hill

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



1 inch = 1,417 feet

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ELLIGSEN ROAD NORTH URBAN RESERVE

Total Reserve Area	621 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	588 acres
Gross Vacant Buildable Area	442 acres
Net Vacant Buildable Area	**329 acres**

The Elligsen Road North Urban Reserve is a somewhat rectangularly shaped area adjacent to both the City of Tualatin and the City of Wilsonville. It is located north of SW Elligson Road, west of SW 65th Avenue, and south of SW Frobase Road. The UGB is the western and southern boundary of the reserve, and it is otherwise entirely surrounded by other urban reserves. I-5 also parallels a portion of the western edge of the reserve. A tributary to Boeckman Creek flows south from the middle of the reserve and then along SW Elligsen Road before crossing underneath the road to the farmland further south. The reserve contains a series of moderately steep hills with some slopes greater than 10 percent through the middle of the area. Access to the reserve is provided by SW Elligsen Road, SW 65th Avenue, SW 82nd Avenue, and SW Frobase Road.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

There are no natural or built features that would mark a clear transition between urban development in the Elligsen Road North Urban Reserve and the rural lands north of SW Frobase Road or east of SW 65th Avenue. Similarly, there are no natural or built features that would mark a clear transition between future urban development and the rural lands south of SW Elligsen Road. Even assuming SW Frobase Road develops as a collector and SW Elligsen Road and SW 65th Ave develop as arterials in the future, the roads themselves will not provide a clear transition area between urban and rural uses. Additional buffers will therefore need to be incorporated into the planning and design of the urban development along all of these edges. However, the rural lands along all three of these edges are also designated as urban reserves and may themselves be included in the UGB in the future. Therefore, any buffers that are incorporated into the planning and design of the Elligsen Road North Urban Reserve should consider the potential for making urban form connections to the other adjacent urban reserves. Nonetheless, there are generally no existing natural or built features that would provide a clear transition between urban and rural lands.

The Elligsen Road North Urban Reserve is given a “low” score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Elligsen Road North Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Elligsen Road North Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Wilsonville, which is the expected governing body for the Elligsen Road North Urban Reserve, once urbanized, has adopted a riparian habitat protection program that has been deemed to be in substantial compliance with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 118 acres of the reserve, with the vast majority (about 107 acres) being upland wildlife habitat that is composed of forested slopes in the reserve's central-western portion. Almost all of the riparian habitat is on relatively flat land that is already impacted by active agricultural activities and could easily be impacted by future development as well. However, future urbanization also provides the opportunity for restoration of some of the impacted riparian habitat areas.

As most of the identified habitat is on relatively flat land (i.e., land that may be easier to develop) and the upland habitat portion occupies a significant amount of area in the reserve, some impact on the regionally significant fish and wildlife habitat would be expected to occur from urbanization of the reserve. An urban transportation network in the reserve providing road connectivity will likely need to disturb habit.

The Elligsen Road North Urban Reserve is given a "low-moderate" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Wilsonville Town Center is the is the closest 2040 Growth Concept designated center to the Elligsen Road North Urban Reserve, located about a couple miles away to the south via ether SW Stafford Road and SW Wilsonville Roa, or I-5 through the SW Elligsen Road interchange. The town center is east of I-5, is about 100 acres in size, and primarily serves the City of Wilsonville. The town center is a short distance from the terminus of the WES Commuter Rail line. SMART, the City of

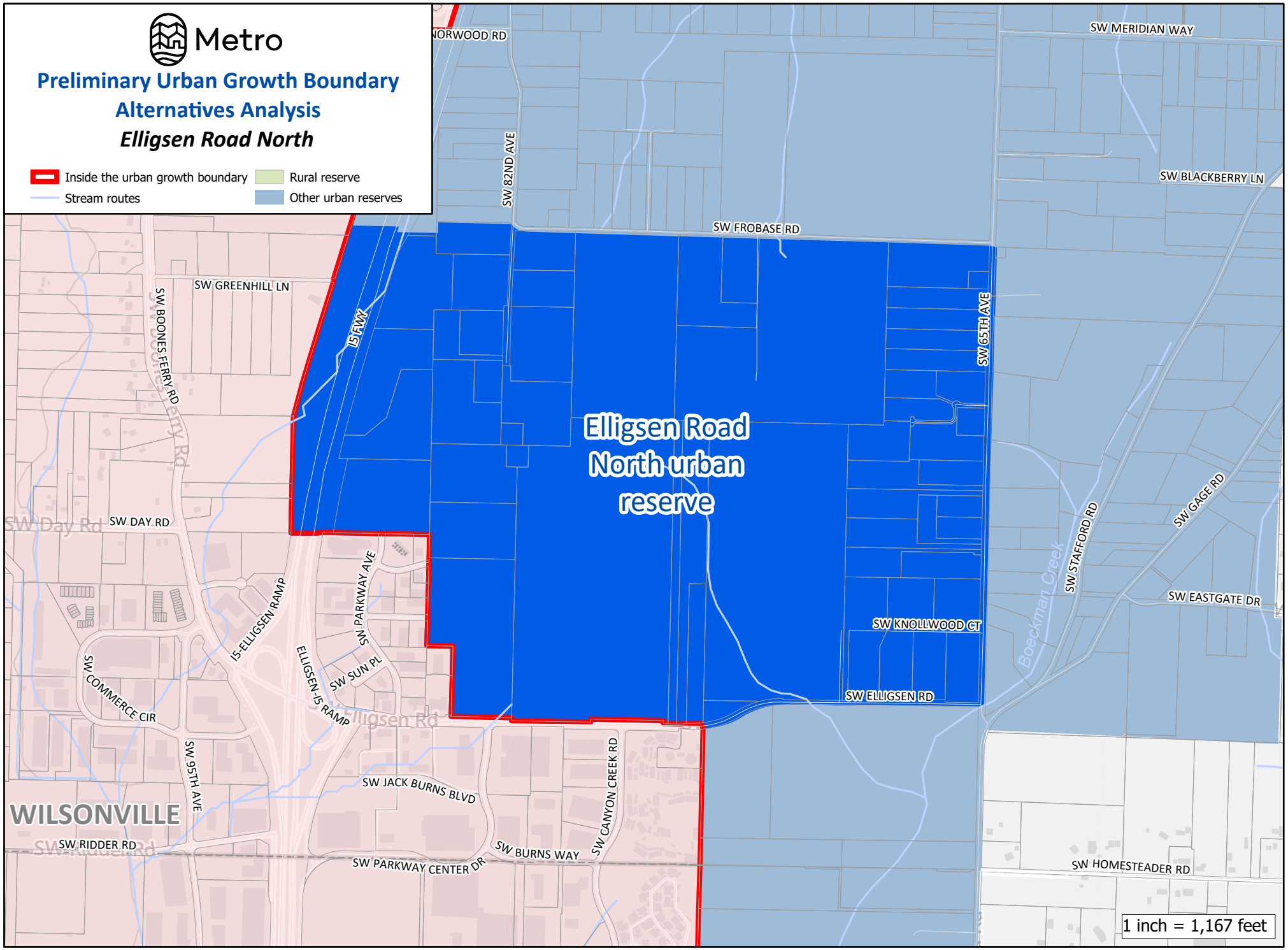
Wilsonville's bus service, provides service on the Route 2X Barbour line between the town center and the Argyle Square Shopping Center, which is just on the other side of SW Elligsen Road from the southern end of the reserve.

The City of Wilsonville's Town Center Plan envisions a vibrant walkable destination that inspires people to come together and socialize, shop, live, and work. Metro's 2017 State of the Centers Atlas shows a higher-than-average jobs to housing ratio, but fewer people and dwellings per acre, compared with the other town centers in the region. The town center is considered in the atlas to have high access to parks.

The Elligsen Road North Urban Reserve was identified by Wilsonville as a location for long-term future urbanization. The city's 2007 '20 Year Look' process identified the reserve for a potential mixture of employment and residential uses in the future. Urbanization of the reserve, however, is not expected to contribute to the purpose and vision of the town center due to the distance between the two areas and the location of the Argyle Square Shopping Center adjacent to the reserve.

There is one 2040 Growth Concept designated corridor in Wilsonville that runs along SW Elligsen Road west of I-5 and then south along SW Parkway Avenue parallel to I-5 to the Wilsonville Town Center. The corridor is mostly built out with retail commercial or employment uses and some single-family and multi-family residential uses near the town center. The corridor is less than 600 feet away from the reserve along SW Elligsen Road. Nonetheless, urbanization of the reserve is not expected to have a meaningful impact on new development of the corridor consistent with the corridor's purpose, as the corridor is already mostly developed and would compete with the Argyle Square Shopping Center adjacent to the reserve.

The Elligsen Road North Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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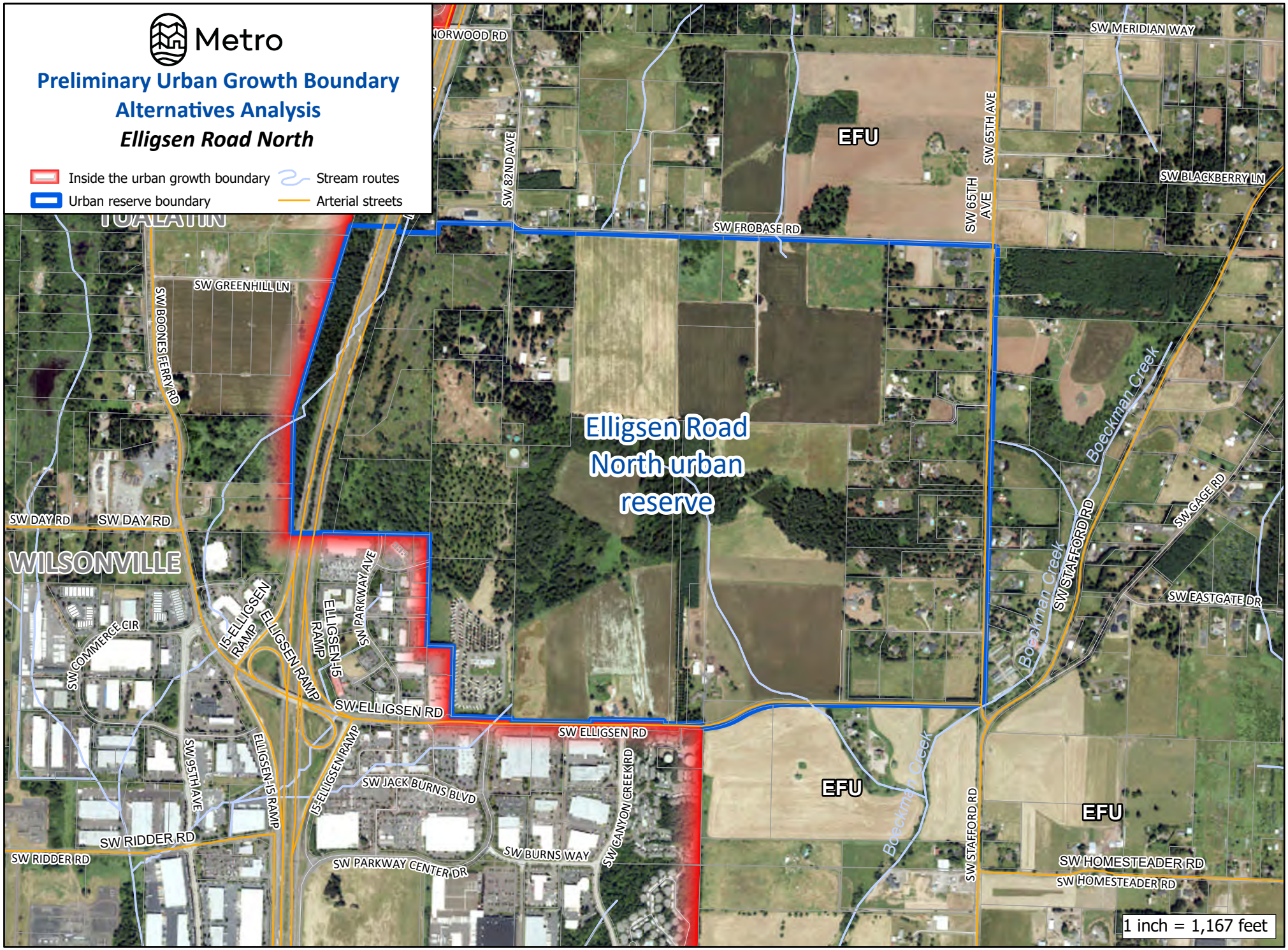

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ELLIGSEN ROAD SOUTH URBAN RESERVE

Total Reserve Area	254 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	250 acres
Gross Vacant Buildable Area	213 acres
Net Vacant Buildable Area	**158 acres**

The Elligsen Road South Urban Reserve is a generally rectangular area south of SW Elligsen Road and west of SW Stafford Rd. The UGB and Wilsonville city limits are the reserve's western and southern boundaries. Boeckman Creek, which flows diagonally through the center of the urban reserve, splits the area into two roughly evenly sized sections. The land is mostly flat, except for some slopes greater than 10 percent along Boeckman Creek. Access to the area is provided by SW Elligsen Road, SW Elligsen Road, and SW Homesteader Road.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

There are no natural or built features that would mark a clear transition between urban development of the Elligsen Road South Urban Reserve and the rural lands to the north of SW Elligsen Road. Similarly, there are no natural or built features that would mark a clear transition between the urban development of the reserve and the rural lands to the east of SW Stafford Road. Even assuming both SW Elligsen Road and SW Stafford Road develop as arterials in the future, the roads themselves will not provide a clear transition area between urban and rural uses. Additional buffers will need to be incorporated into the planning and design of the urban development along both of these edges. However, the rural lands north of SW Elligsen Road are included in the Elligsen Road North Urban Reserve and may be included in the UGB in the future. Therefore, any buffers that are incorporated into the planning and design of future development should consider the potential for making urban form connections in this location. Nonetheless, there are generally no existing natural or built features that would provide a clear transition between urban and rural lands.

The Elligsen Road South Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Elligsen Road South Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Elligsen Road South Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Wilsonville, which is the expected governing body for the Elligsen Road South Urban Reserve when it is eventually urbanized, has adopted a riparian habitat protection program that has been deemed to be in substantial compliance with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian habitat not constrained by steep slopes or in public ownership cover about 16 acres of land all focused on Boeckman Creek and three tributaries. Steep slopes along the lower 1,700 feet of Boeckman Creek, along with power line easements, provide additional restrictions on development along this portion of the stream.

The city's natural resource protection program will provide protection for the majority of the habitat areas, but some impact from urbanization is expected. particularly given the central location of the stream and the need for a transportation network to provide connectivity within the reserve and to adjacent lands already inside the UGB.

The Elligsen Road South Urban Reserve is given a "low-moderate" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Wilsonville Town Center is the is the closest 2040 Growth Concept designated center to the Elligsen Road South Urban Reserve, located about two miles away to the south via either SW Stafford Road and SW Wilsonville Road, or I-5 through the SW Elligsen Road interchange. The town center is east of I-5, is about 100 acres in size, and primarily serves the City of Wilsonville. The town center is a short distance from the terminus of the WES Commuter Rail line. SMART, the City of Wilsonville's bus service, provides service on the Route 2X Barbour line between the town center and the Argyle Square Shopping Center, which is approximately half a mile from the reserve.

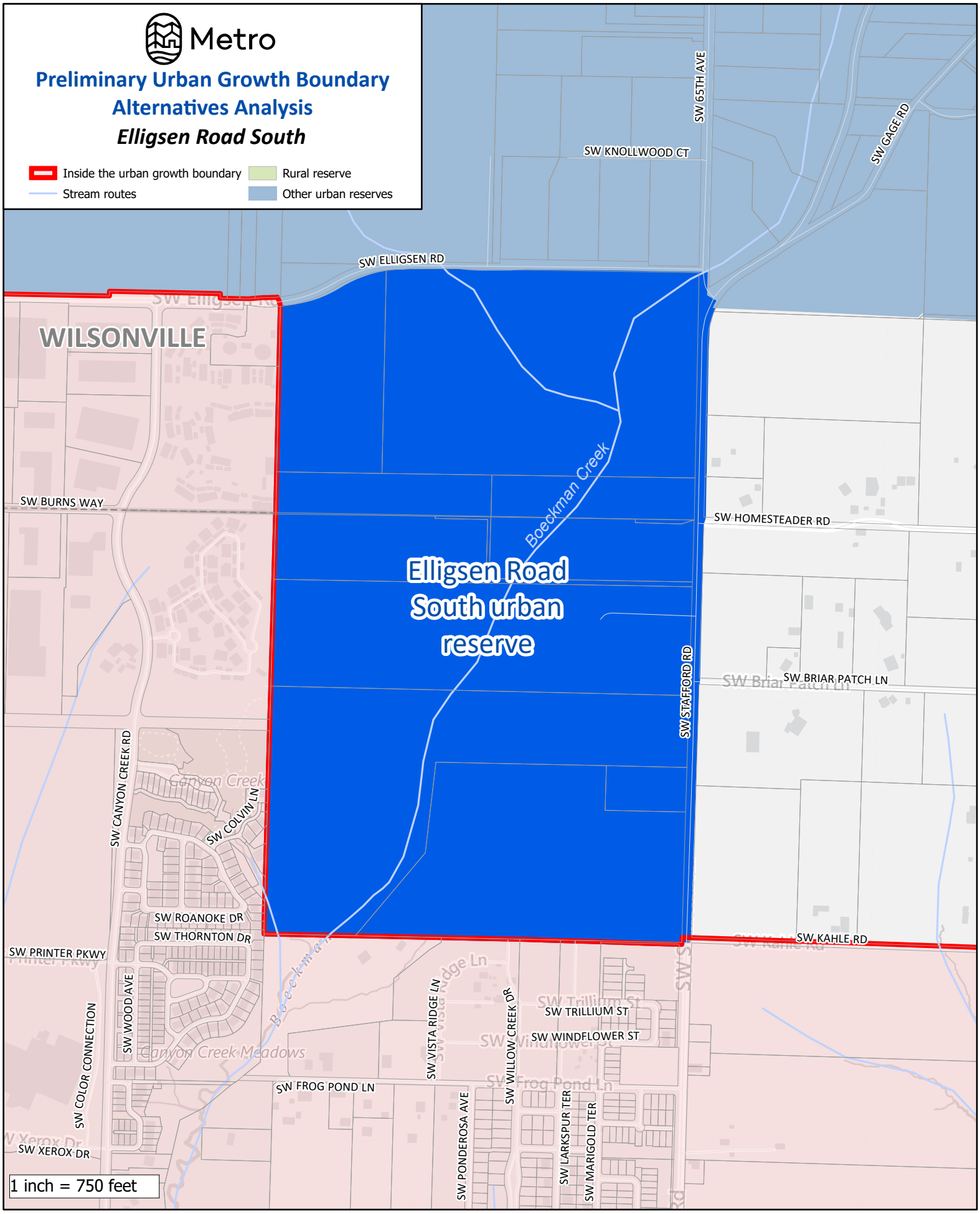
The City of Wilsonville's Town Center Plan envisions a vibrant walkable destination that inspires people to come together and socialize, shop, live, and work. Metro's 2017 State of the Centers Atlas shows a higher-than-average jobs to housing ratio, but fewer people and dwellings per acre, compared with the other town centers in the region. The town center is considered in the atlas to have high access to parks.

The Elligsen Road South Urban Reserve was identified by Wilsonville as a location for long-term future urbanization. The City's 2007 '20 Year Look' process identified the reserve for potential residential uses in the future. Urbanization of the reserve, however, is not expected to contribute to

the purpose and vision of the town center due to the distance between the two areas and the proximity of the Argyle Square Shopping Center to the reserve.

There is one 2040 Growth Concept designated corridor in Wilsonville that runs along SW Elligsen Road west of I-5 and then south along SW Parkway Avenue parallel to I-5 to the Wilsonville Town Center. The corridor is mostly built out with retail commercial or employment uses and some single-family and multi-family residential uses near the town center. The corridor is only about half a mile away from the reserve along SW Elligsen Road. Nonetheless, urbanization of the reserve is not expected to have a meaningful impact on new development of the corridor consistent with the corridor's purpose, given that the corridor is already mostly developed and that there are other employment and retail uses closer to the reserve.

The Elligsen Road South Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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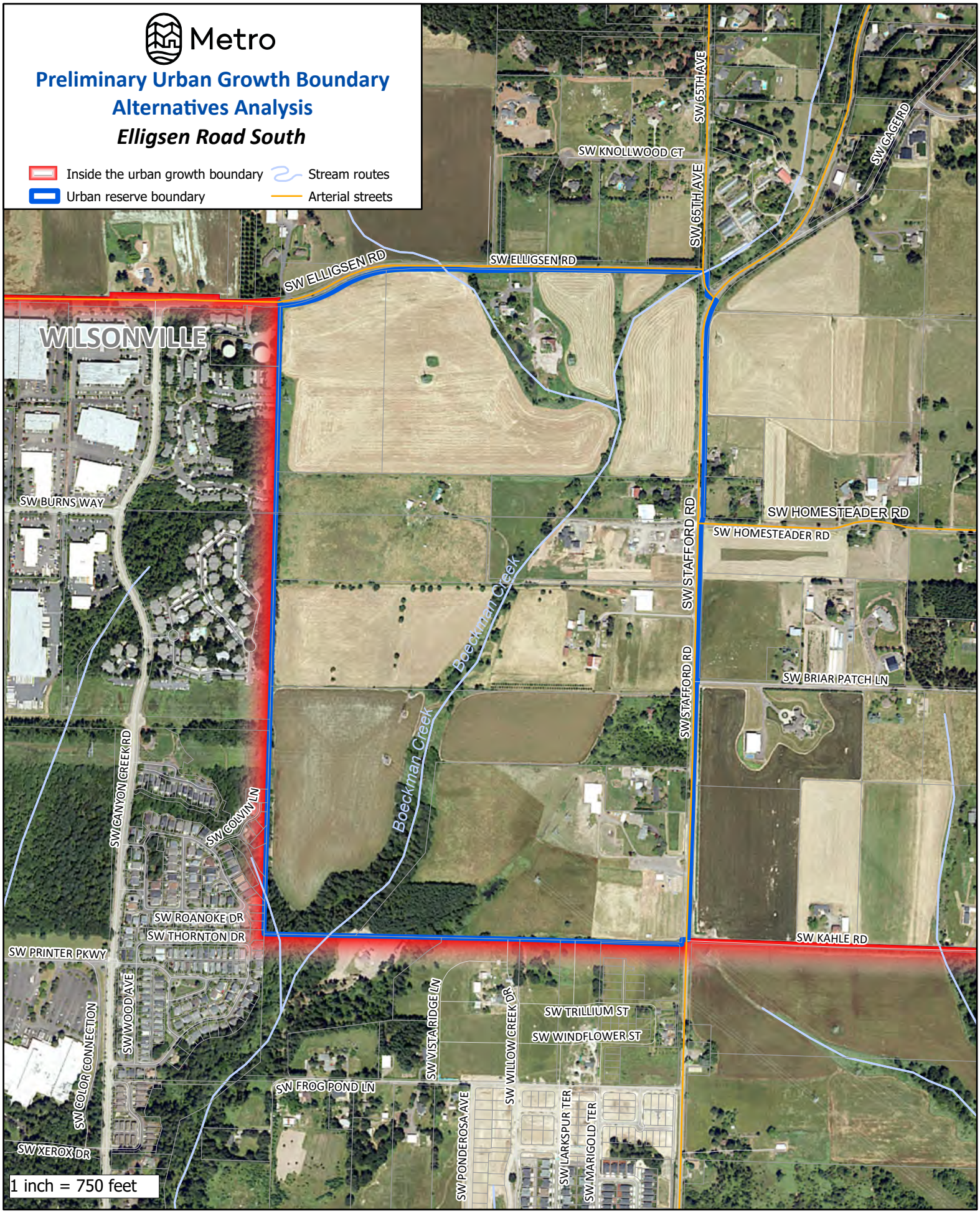

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GRAHAMS FERRY URBAN RESERVE

Total Reserve Area	203 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	200 acres
Gross Vacant Buildable Area	92 acres
Net Vacant Buildable Area	**68 acres**

The Grahams Ferry Urban Reserve is a relatively compact area east of SW Grahams Ferry Road and north of SW Tooze Road. The UGB and Wilsonville city limits are the southern and eastern boundaries of the reserve, while rural reserve lands border to the north and northwest. The Metro-owned Coffee Lake Wetlands natural area is adjacent to the reserve's eastern side within the UGB.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

Coffee Lake Creek, its associated floodplain, and nearby forested areas would provide a natural transition between the urban development of the Grahams Ferry Urban Reserve and the rural lands to the north and northwest. SW Grahams Ferry Road forms the western edge of the reserve. Even if SW Grahams Ferry Road were to be improved to urban arterial standards, the road itself would not provide a sufficient transitional buffer between urban development in the reserve and rural lands; additional buffers will need to be incorporated into the planning and design of the urban development to provide a clear transition from urban to rural uses along this western edge. Therefore, there is a natural feature transition area between urban and rural lands for approximately half of the reserve area's urban-rural edge.

The Grahams Ferry Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Grahams Ferry Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Grahams Ferry Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Wilsonville, which is the expected governing body for this reserve when it is eventually urbanized, has adopted a riparian habitat protection program that has been deemed to be in substantial compliance with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 67 acres of the reserve, with most of the habitat associated with the Coffee Lake Creek stream corridor along the reserve's eastern edge. The reserve also has a 100-year floodplain associated with this stream. There is both riparian and upland habitat identified in the south-central portion of the reserve, although it appears that the stream has been tiled or piped and that the habitat area is being actively farmed. Adjacent to the east of the reserve is a large, roughly 200-acre tract of Metro-owned natural area that is part of the Coffee Lake Wetlands complex.

The city's habitat protection program, combined with the limited development potential within the 100-year floodplain along the stream corridor, creates a buffer that can minimize the impacts future urbanization will have on regionally significant fish and wildlife habitat at the eastern edge of the reserve. The majority of the habitat area identified in the south-central portion of the reserve has been removed through agricultural activity and alteration of the stream corridor. Urbanization in this portion of the area will provide the opportunity to restore some of the habitat and stream corridor functions. It is expected that future urbanization can occur while avoiding the regionally significant habitat associated with Coffee Lake Creek and that urbanization can provide the opportunity for restoring some lost habitat.

The Grahams Ferry Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

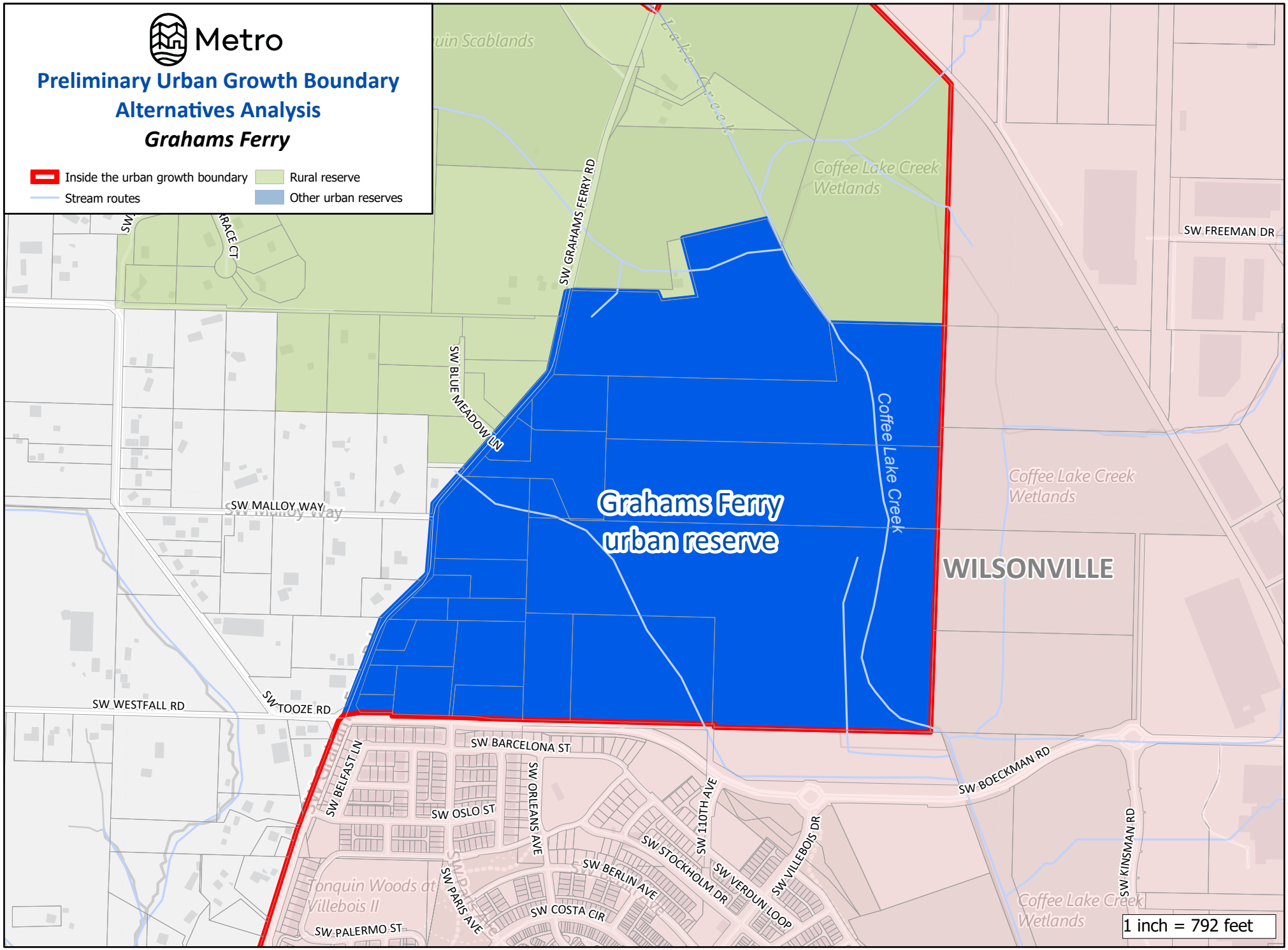
The Wilsonville Town Center is the is the closest 2040 Growth Concept designated center to the Grahams Ferry Urban Reserve, located approximately one mile away as the crow flies to the southeast on the opposite (eastern) side of I-5. The town center is approximately 100 acres in size and primarily serves Wilsonville. The town center is a short distance from the terminus of the WES Commuter Rail line and is indirectly linked to the reserve by a series of arterial roads. The Route 7 "Villebois Line" of SMART, the City of Wilsonville's bus service, provides service between the town center and the Villebois neighborhood south of the reserve.

The City of Wilsonville's Town Center Plan envisions a vibrant walkable destination that inspires people to come together and socialize, shop, live, and work. Metro's 2017 State of the Centers Atlas shows a higher-than-average jobs to housing ratio, but fewer people and dwellings per acre, compared with the other town centers in the region. The town center is considered in the atlas to have high access to parks.

The Grahams Ferry Urban Reserve was identified by Wilsonville as a location for long-term future urbanization. The City's 2007 '20 Year Look' process identified the reserve primarily for future industrial uses, building on existing development within the Coffee Creek industrial area and taking advantage of planned infrastructure additions. The area could also provide some residential use if demand warrants. However, urbanization of the reserve is unlikely to contribute to the purpose and vision of the Wilsonville Town Center due to distance from the Town Center, its separation from the town center by I-5, its relatively small buildable area, and the reserve's potential industrial uses.

There is one 2040 Growth Concept designated corridor in Wilsonville that runs along SW Elligsen Road west of I-5 and then south along SW Parkway Avenue parallel to I-5 to the Wilsonville Town Center. The corridor is mostly built out with retail commercial or employment uses and some single-family and multi-family residential uses near the town center. Urbanization of the reserve is not expected to have a meaningful impact on new development of the corridor consistent with the corridor's purpose, given that the corridor is already mostly developed and the distance of the reserve from the corridor.

The Grahams Ferry Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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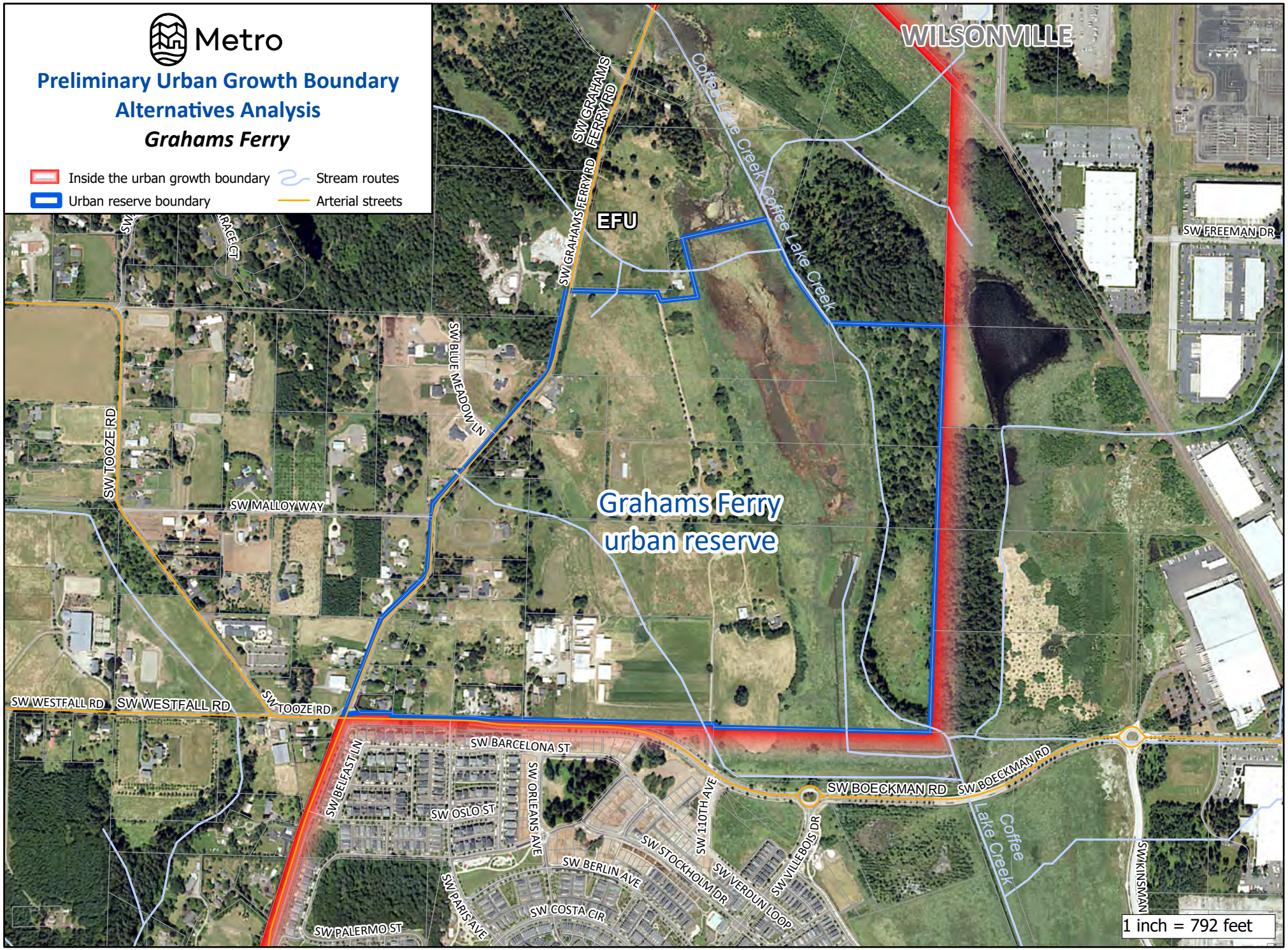

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GRESHAM EAST URBAN RESERVE

Total Reserve Area	857 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	799 acres
Gross Vacant Buildable Area	630 acres
Net Vacant Buildable Area	**469 acres**

The Gresham East Urban Reserve is a boot-shaped area adjacent to the east side of Gresham. The reserve is bounded by SE Lusted Road to the north, SE 302nd Avenue to the east, and the riparian areas of Johnson Creek to the south. The UGB is the reserve's western boundary, while the remainder of the reserve is bordered by rural reserves. Gresham East Urban Reserve is bisected by SE Orient Drive, SE Dodge Park Boulevard, SE Powell Valley Road, and SE Chase Road. The reserve is primarily flat, with all slopes over 25 percent only located along three of the four drainages that flow generally westward through the area. About 45 acres of the reserve are owned by the Gresham-Barlow School District and occupied by Sam Barlow High School and associated uses (e.g., sports fields).

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The Middle and South Forks of Beaver Creek are located just north and east of the reserve and, along with their sloping riparian topography, would provide clear transitions between the urban development of the Gresham East Urban Reserve and the rural lands further to the north and northeast. There are rural residences along the north side of SE Lusted Road (the northern boundary of the reserve); however, there are also some slight changes in topography in this area that would help provide a small buffer between the reserve's urbanization and these residences. Johnson Creek is located just south of the reserve. While Johnson Creek itself is not within a ravine per se, the stream corridor, combined with a hill south of SE Stone Road, would provide a clear transition area between the reserve's urban development and adjacent rural lands to the south. There are no natural or built features to mark a transition between urban and rural lands east of SE 302nd Avenue other than the relatively narrow (25-foot-wide travel surface) road itself. Even assuming that SE 302nd Avenue is developed into an urban collector level road in the future, the at-grade roadway pavement would not provide a clear transition area between future urban and rural uses; additional buffers will need to be incorporated into the planning of the reserve to provide a clear transition from urban to rural uses along this east edge. Nonetheless, about half of the urban-rural edge has a natural feature that would provide a clear transition between urban and rural lands.

The Gresham East Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Gresham East Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Gresham East Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Gresham, which is the expected governing body for the Gresham East Urban Reserve, once urbanized, has adopted a riparian habitat protection program that is compliant with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 60 acres of the reserve, with the majority (about 40 acres) being riparian wildlife habitat along the four main stream corridors that flow through the reserve. According to aerial imagery, a portion of the southernmost stream corridor runs through and adjacent to active agricultural operations and a segment of the stream may be channelized. Most of the regionally significant upland habitat occurs around the northernmost of the four stream corridors and partially within the school district property, factors which should limit new urban development from adversely impacting this habitat. Elsewhere, however, the proximity of habitat areas to flat, easily developable land in the reserve area could create a conflict between future urbanization and the protection of fish and wildlife habitat, depending mostly on needed north-south transportation connections through the middle of the reserve. Therefore, urbanization could occur with low to moderate avoidance of regionally significant fish and wildlife habitat, depending on future transportation connection needs.

The Gresham East Urban Reserve is given a "low-medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Gresham Regional Center is the closest 2040 Growth Concept designated center to the Gresham East Urban Reserve. The regional center serves Gresham and a portion of eastern Multnomah County, and is the eastern terminus of the MAX Light Rail Blue Line. The regional center is approximately three miles to the reserve via Highway 26/SE Orient Drive and 2.6 miles away via SE Powell Valley Road/SE Lusted Road. There is no transit service through the reserve, but TriMet

Route 84 connects the regional center to the western edge of the reserve at the intersection of SE 282nd Ave and SE Orient Drive.

The City of Gresham describes its "One Gresham" initiative as its economic, urban redevelopment, and social strategy to strengthen and link the City's three commercial centers: its Historic Downtown, its Civic Neighborhood, and the Rockwood Town Center. The first two of those commercial centers are located within the regional center, while Rockwood Town Center is approximately five miles from the reserve.

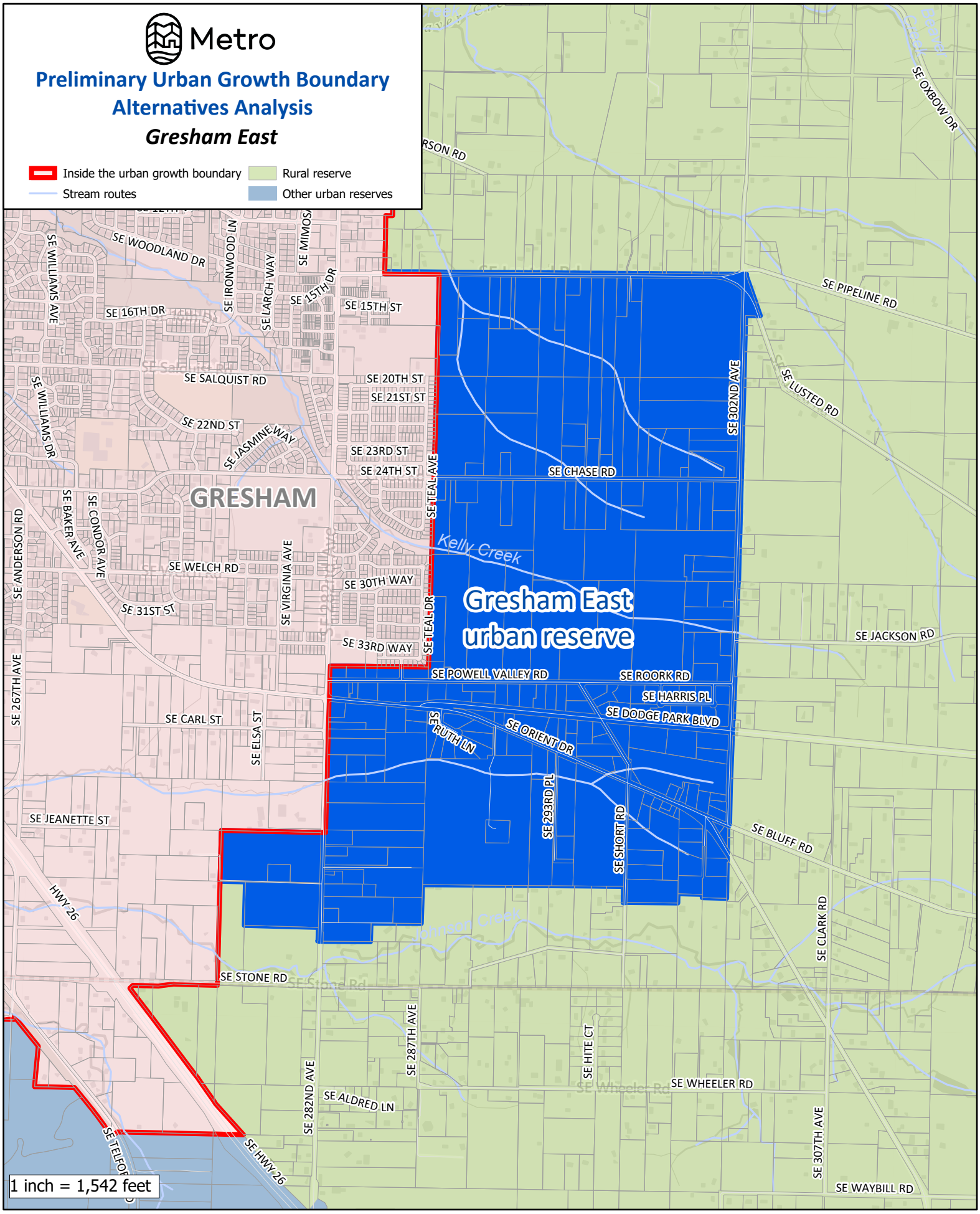
The City's vision for Historic Downtown is an old-fashioned main street with locally owned and operated businesses, public events, and year-round activities. It is intended to feature mixed-use housing, place-making amenities, entrepreneurial opportunities, and commercial, office, and entertainment spaces. The Civic Neighborhood includes Gresham Station, a shopping center with retail commercial, medical, and office tenants and housing. The vision for the Civic Neighborhood includes mixed-use housing, large office tenants, a community plaza and other place-making amenities, a grocery store, and entertainment venues. The vision for the Rockwood Town Center includes healthcare facilities, a marketplace for local vendors, and additional education, creative space on job training opportunities.

Metro's 2017 State of the Centers Atlas showed the Gresham Regional Center with a slightly lower population, number of employees, and people per acre than the average of all regional centers, but a slightly higher number of dwelling units per acre.

Urbanization of Gresham East Urban Reserve is not expected to meaningfully contribute to the vision or purpose of the Gresham Regional Center, due to the distance between the two areas and the substantial amount of underdeveloped land inside the UGB that is in closer proximity to the regional center.

In addition to the regional center itself, there are two 2040 Growth Concept designated corridors that meet at the intersection of SE Burnside Road and E Powell Boulevard, southeast of the regional center. Both corridors are mostly built out with large and small auto-oriented uses (e.g., car dealerships, car rental services, auto parts stores), large-footprint commercial uses (e.g., grocery stores), fast food restaurants, strip malls, and other retail uses. This intersection is about two miles from the reserve. Given this distance, and the level and type of existing development along the corridors, it is unlikely urbanization of the reserve will meaningfully contribute to further development of the corridors consistent with their intended purposes.

The Gresham East Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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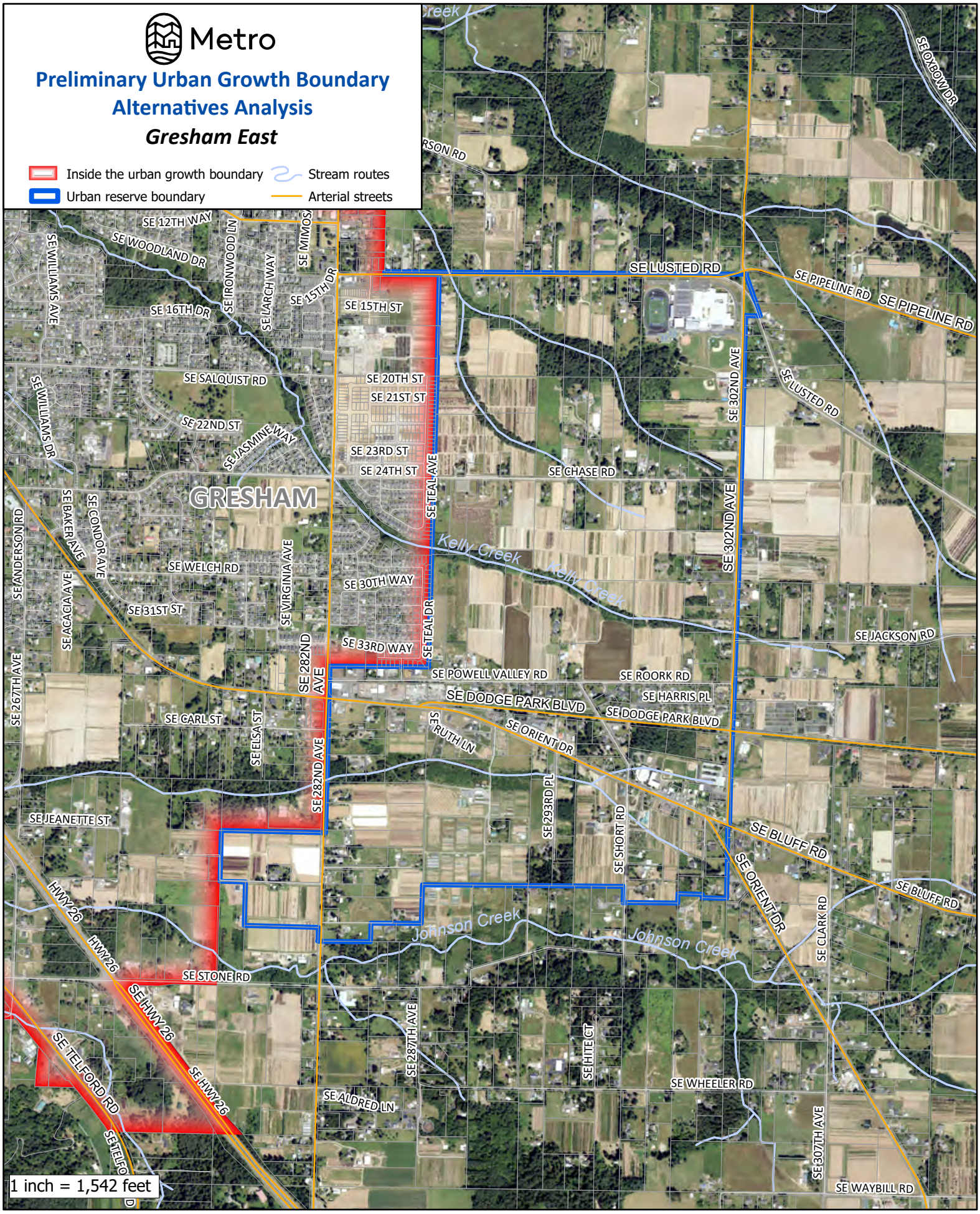

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HENRICI URBAN RESERVE

Total Reserve Area	422 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	395 acres
Gross Vacant Buildable Area	301 acres
Net Vacant Buildable Area	**224 acres**

The Henrici Urban Reserve is a somewhat rectangularly shaped area adjacent to the southeast end of Oregon City. The reserve is bisected by S Henrici Road, S Beavercreek Road, and Highway 213, and its northern boundary is the UGB. The reserve is primarily flat, with the exception of its very western edge and its the northeast corner, areas which contain forested steep slopes above Beaver Creek and Thimble Creek, respectively. The reserve is nearly entirely contiguous, except for one 1.13-acre tax lot that is disconnected from the rest of the reserve and located west of Highway 213 near its intersection with Edgemont Drive.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The UGB is the northern boundary of the Henrici Urban Reserve. Beaver Creek is a natural feature that could mark a transition between future urban development in the reserve and rural lands along its western boundary. Headwaters of Thimble Creek and nearby steep slopes could also mark a transition between urban and rural lands at the northeast corner of the reserve. A small tributary to Beaver Creek and the nearby steep forested slopes provide a natural feature to mark the transition between urban and rural lands for a small portion of the southern edge of the reserve just west of S Beavercreek Road. East of S Beavercreek Road, there is no natural or built feature to provide a transition along the southern and eastern edge of the reserve. There also is no natural or built feature between Highway 213 and the small tributary to Beaver Creek to provide a buffer for a small pocket of rural land. Therefore, buffers will need to be included in the design and planning of urban development in these locations. Overall, there would be a natural feature transition area between urban and rural lands for just over half of the urban-rural edges of the reserve.

The Henrici Urban Reserve is given a “medium” score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the ‘Introduction and Methodology’ section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Henrici Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Henrici Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Oregon City, which is the expected governing body for the Henrici Urban Reserve, once urbanized, has adopted a riparian habitat protection program that is compliant with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not already constrained by steep slopes or in public ownership cover about 32 acres of the reserve, with most of the riparian habitat occurring along tributaries to Beaver Creek and Caufield Creek. Additional riparian habitat is located along Thimble Creek that flows through the steeply sloped northeast corner of the reserve. There is upland wildlife habitat associated with Thimble Creek as well as the tributary to Beaver Creek near Highway 213.

The riparian and upland habitat associated with Thimble Creek is not considered susceptible to impacts from urbanization due to the large horizontal width of adjacent steep slopes. The riparian habitat associated with Caufield Creek and the small tributary to Beaver Creek that is near S Beavercreek Road, however, are likely susceptible to impacts from urbanization, although the location of the habitat near the edges of the reserve may lessen the potential for impacts. The tributary to Beaver Creek near S Henrici Road and Highway 213 is more susceptible to impacts related to urbanization given its location near the road intersection, but a portion of this habitat area is a stormwater detention facility. Generally, urbanization will be able to occur with a moderate to high level of avoidance of significant fish and wildlife habitat, depending on necessary improvements to S Henrici Road.

The Henrici Urban Reserve is given a "medium-high" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Oregon City Regional Center is the closest 2040 Growth Concept designated center to the Henrici Urban Reserve. The regional center serves Oregon City, Clackamas County, and some neighboring cities to the south. The regional center is approximately 3.5 miles from the reserve via Molalla Avenue and 7th Street, or about 4.5 miles via Highway 213. There is no transit service between the regional center and the reserve area, although there is transit service between the regional center and Clackamas Community College, which is just shy of a mile away.

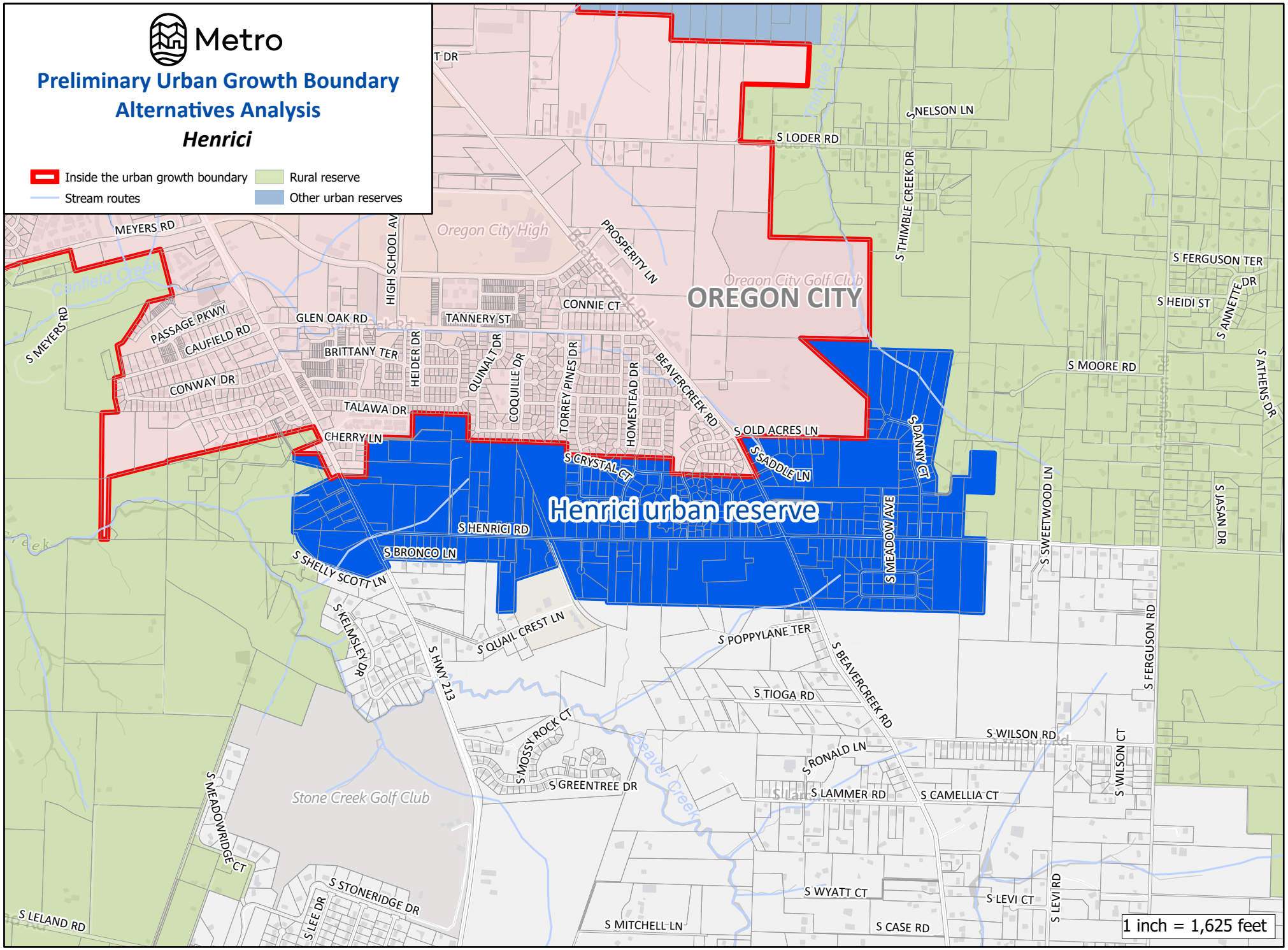
The city's plans for the Oregon City Regional Center include mixed-use development on the vacant parcels in the northern section of the center, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to

connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

The Henrici Urban Reserve is too small and too disconnected from the Oregon City Regional Center to meaningfully increase the center's level of activity. Therefore, urbanization of the reserve is not considered to be a future contributor to the vision or the purpose of the regional center.

In addition to the regional center itself, there is a 2040 Growth Concept designated corridor that connects the regional center in the north to Clackamas Community College in the south, running along 7th Street and Molalla Avenue. However, the corridor is already mostly built out with a mixture of low density residential development, small commercial businesses, and larger retail commercial uses. The corridor is less than a mile away from the western end of reserve, but not connected to it with existing transit. Because of the level of existing development along the corridor, the relatively small size of the reserve, and the lack of transit between the two areas, urbanization of the reserve is not expected to have a significant impact on additional corridor development.

The Henrici Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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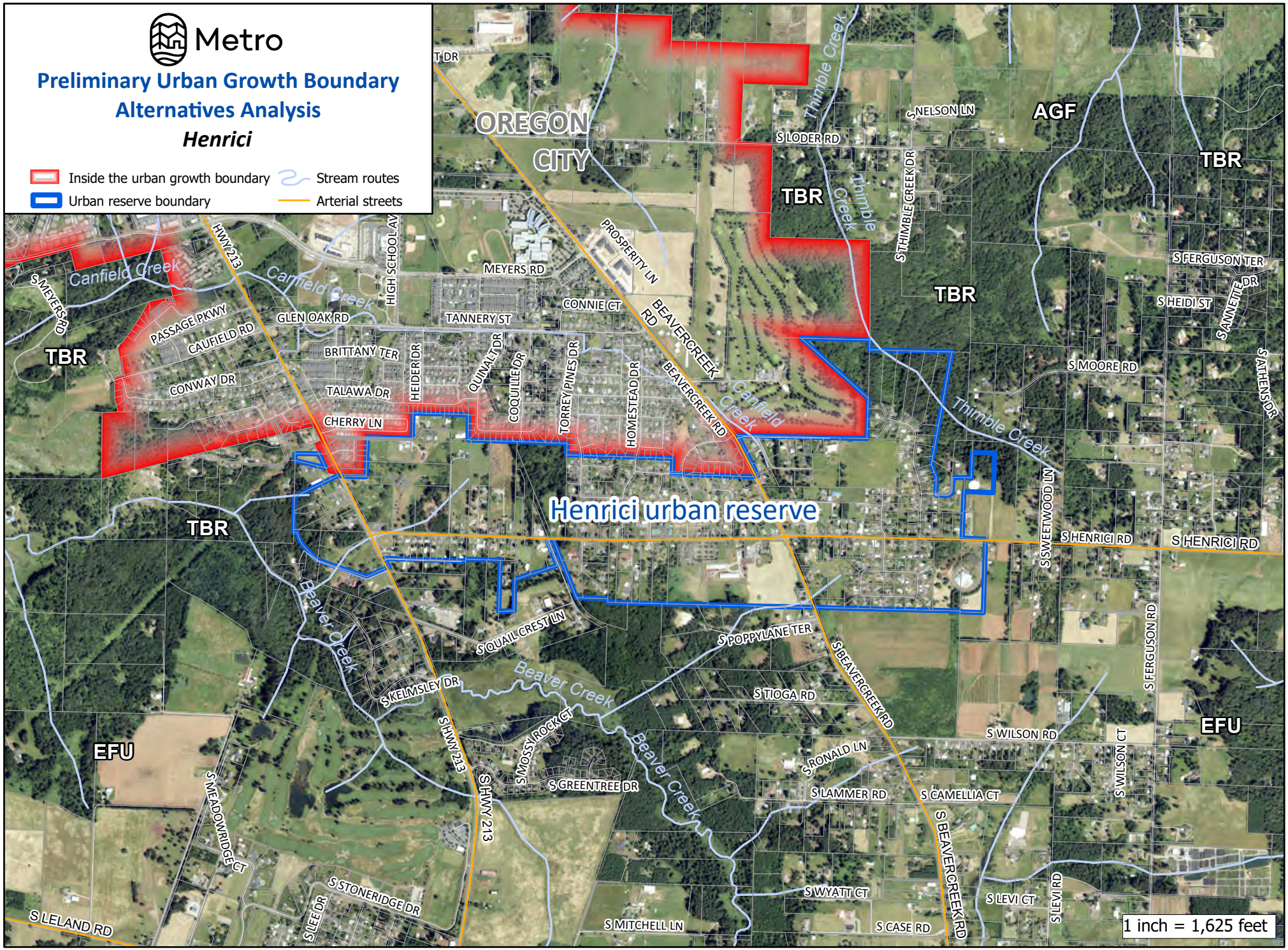

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HOLCOMB URBAN RESERVE

Total Reserve Area	321 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	314 acres
Gross Vacant Buildable Area	215 acres
Net Vacant Buildable Area	**160 acres**

The Holcomb Urban Reserve is an irregularly shaped area adjacent to the east side of Oregon City. Its northern end is bisected by S Holcomb Boulevard. The northern end is also served by S Stoltz Road and S Hilltop Road, while its southern end is connected to S Kraeft Road. The reserve has a mix of forested tax lots, very minor agricultural activities, and rural residential development. The area north of S Holcomb Boulevard is generally flat and represents the high point, with the remainder dropping by about 350 feet in elevation from S Holcomb Boulevard down to the southern edge of the reserve. A tributary of Holcomb Creek flows south through the lower portion of the reserve, joining the creek south of S Redland Road.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The UGB is the western boundary of the Holcomb Urban Reserve. There are no natural or built features to mark a clear transition between urban and rural lands to the north, or along the northern portion of the eastern edge of the reserve; additional buffers will, therefore, need to be incorporated into the planning and design of the reserve's urban development in order to provide a clear transition from urban to rural uses in these locations. However, steep slopes and Holcomb Creek are natural features that could mark the transition between urban and rural lands for the remainder of the eastern edge and the southern edge of the reserve. Approximately half of the urban-rural edge of the reserve has a natural feature that would provide a clear transition between urban and rural lands.

The Holcomb Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Holcomb Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Holcomb Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Oregon City, which is the expected governing body for the Holcomb Urban Reserve, once urbanized, has adopted a riparian habitat protection program that is compliant with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover about 71 acres of Holcomb Urban Reserve, with the vast majority of the riparian habitat associated with a tributary to Holcomb Creek that flows south through the reserve's lower portion. There is a significant amount of upland habitat associated with this stream corridor that stretches across the reserve. There are also a few pockets of upland habitat north of S Holcomb Boulevard, although most of those habitats appear to be in agricultural use.

A large portion of the significant riparian and upland habitat occurs on steep slopes, which will provide additional protection for the habitat areas. However, there is riparian and upland habitat that is susceptible to impacts, especially the habitat areas south of S Edenwild Lane and along the eastern edge of the reserve. The amount of impact will depend on needed east-west and north-south road connections and on the level of development that occurs along the eastern edge of the reserve. Overall, urbanization could occur with moderate avoidance of significant riparian and upland wildlife habitat, depending on necessary road connections and intensity of development along the eastern edge of the reserve.

The Holcomb Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Oregon City Regional Center is the closest 2040 Growth Concept designated center to the Holcomb Urban Reserve. The regional center serves Oregon City, Clackamas County, and some neighboring cities to the south. The regional center is approximately two miles from the reserve via S Holcomb Boulevard. There is no transit service between the regional center all the way to the reserve, although TriMet Stop 1541 on Route 154 is about three quarters of a mile away up S Holcomb Boulevard.

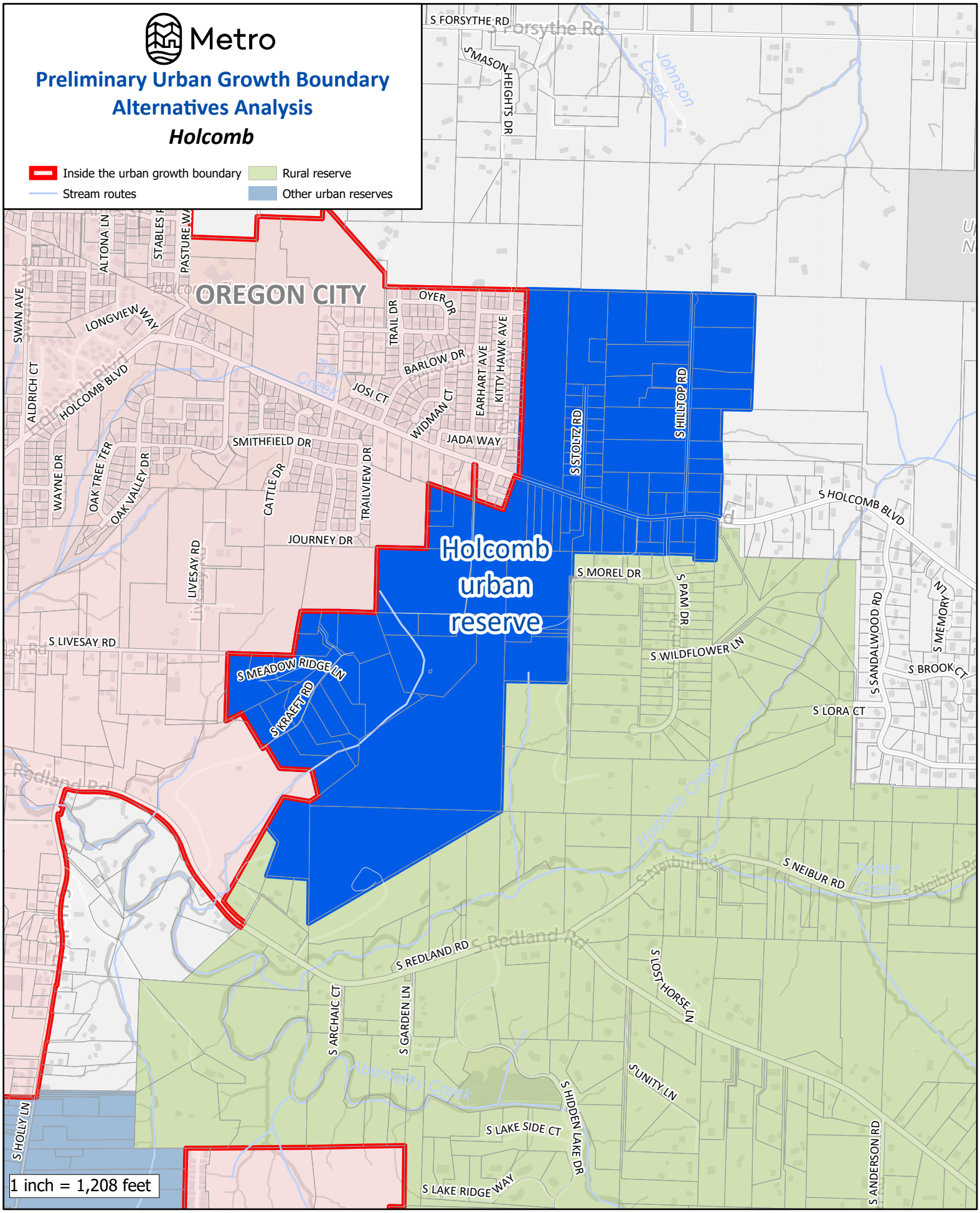
The city's plans for the Oregon City Regional Center include mixed-use development on the vacant parcels in the northern section of the center, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract

more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

The Holcomb Urban Reserve is too small and, without direct transit service, too disconnected from the Oregon City Regional Center to meaningfully increase the center's level of activity. Therefore, urbanization of the reserve is not considered to be a future contributor to the vision or the purpose of the regional center.

In addition to the regional center itself, there is a 2040 Growth Concept designated corridor that connects the regional center in the north to Clackamas Community College in the south, running along 7th Street and Molalla Avenue. However, the corridor is already mostly built out with a mixture of low density residential development, small commercial businesses, and larger retail commercial uses. The corridor is also over three miles away from the reserve via a series of local streets. Because of the level of existing development along the corridor, the relatively small size of the reserve, and the lack of transit between the two areas, urbanization of the reserve is not expected to have a significant impact on additional corridor development.

The Holcomb Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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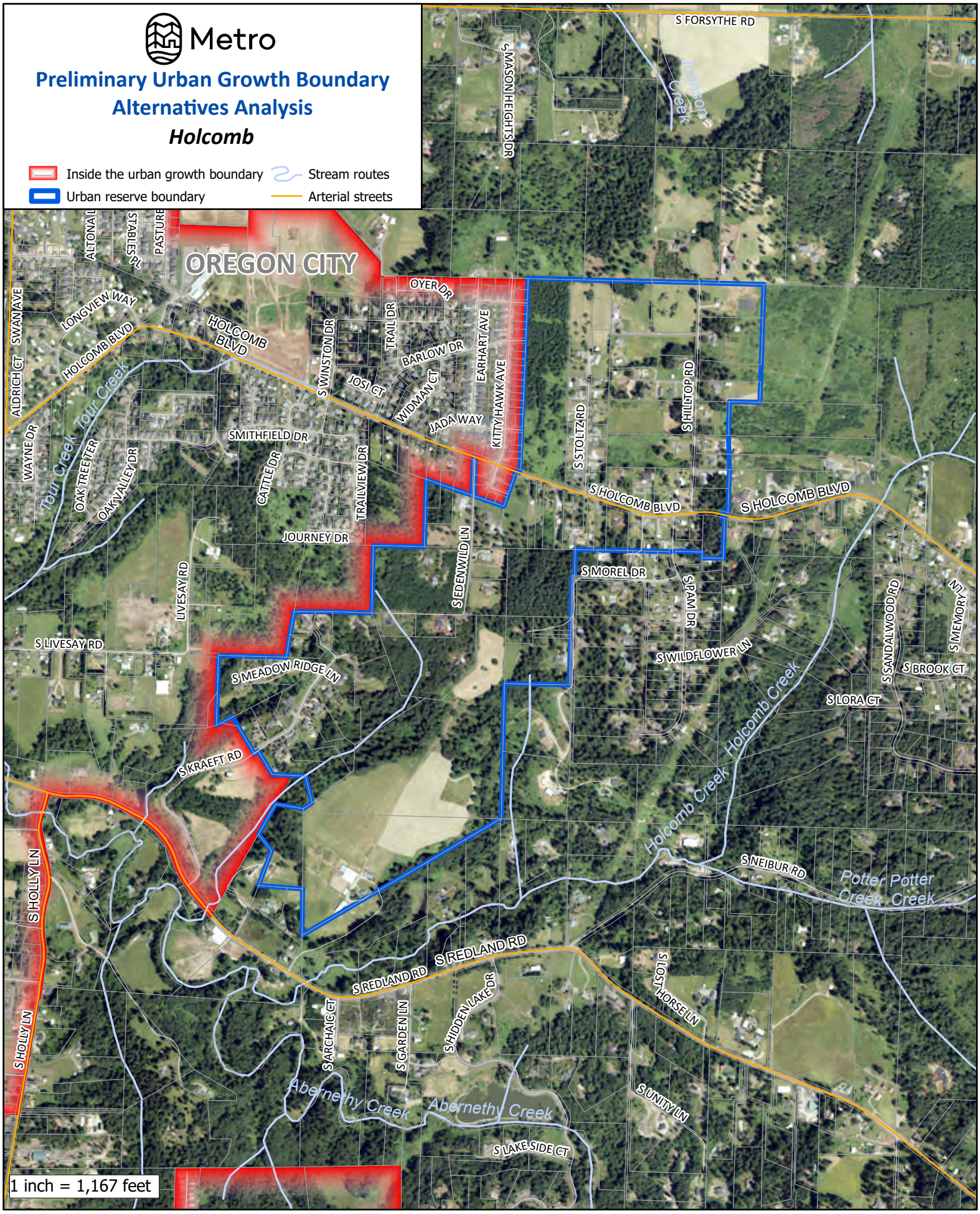
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Holcomb

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



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HOLLY LANE – NEWELL CREEK CANYON URBAN RESERVE

Total Reserve Area	695 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	591 acres
Gross Vacant Buildable Area	175 acres
Net Vacant Buildable Area	**131 acres**

The Holly Lane – Newell Creek Canyon Urban Reserve is an irregularly shaped area adjacent to the east side of Oregon City. The reserve straddles Highway 213 between S Redland Road to its north and S Maplelane Road to its south. The reserve's eastern side is also largely bisected by S Holly Lane; its western side is connected to S Davis Road, S Morton Road, and unimproved right-of-way leading to S Division Street. The reserve is almost entirely surrounded by land inside the UGB, with only an approximately 370-yard border with a rural reserve and a 330-yard border with rural exception lands in its northeast corner.

The reserve is largely a mix of publicly owned forested tax lots along Highway 213 and private rural residences along S Holly Lane. Newell Creek flows northward through the reserve on both sides of Highway 213, joining Abernethy Creek at the reserve's northern boundary.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The Holly Lane – Newell Creek Canyon Urban Reserve is essentially surrounded by the UGB, except for a small segment of rural land south of S Redland Road where steep slopes and Abernethy Creek would mark a transition between urban and rural lands.

The Holly Lane – Newell Creek Canyon Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Holly Lane – Newell Creek Canyon Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Holly Lane – Newell Creek Canyon Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Oregon City, which is the expected governing body for the Holly Lane – Newell Creek Canyon Urban Reserve, once urbanized, has adopted a riparian habitat protection program that is compliant with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover about 75 acres of the reserve, with most of the habitat being upland habitat associated with a tributary to Abernethy Creek that flows along the eastern edge of the reserve. Additional riparian and upland habitat is located along tributaries to Newell Creek in the area south of S Division Street. Most of this habitat is within a steeply sloped forested area. Metro owns over 200 acres of open space that includes Newell Creek; therefore, it is assumed that urbanization can occur while largely avoiding regionally significant riparian and upland habitat.

The Holly Lane – Newell Creek Canyon Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Oregon City Regional Center is the closest 2040 Growth Concept designated center to the Holly Lane – Newell Creek Canyon Urban Reserve. The regional center serves Oregon City, Clackamas County and some neighboring cities to the south. The reserve is only about a quarter mile from the regional center at its closest point, via S 18th St, Anchor Way, and S Redland Road, but the primary road connection between the reserve's western side and the regional center would be further away via S Davis Road. The eastern side of the reserve is about 1.5 miles from the regional center via S Holly Lane and S Redland Road. TriMet Route 32 stops at the intersection of S Division Street and S Selma St, connecting the far west of the reserve to the regional center less than a mile away. There is also transit service along S Beavercreek Road, including to Highway 213, just over a half-mile from the southern edge of the reserve, as well as transit service along Abernethy Road and its intersection with S Redland Road, about 1.5 miles from the northern boundary of the reserve. There is no readily accessible transit service to the reserve east of Highway 213.

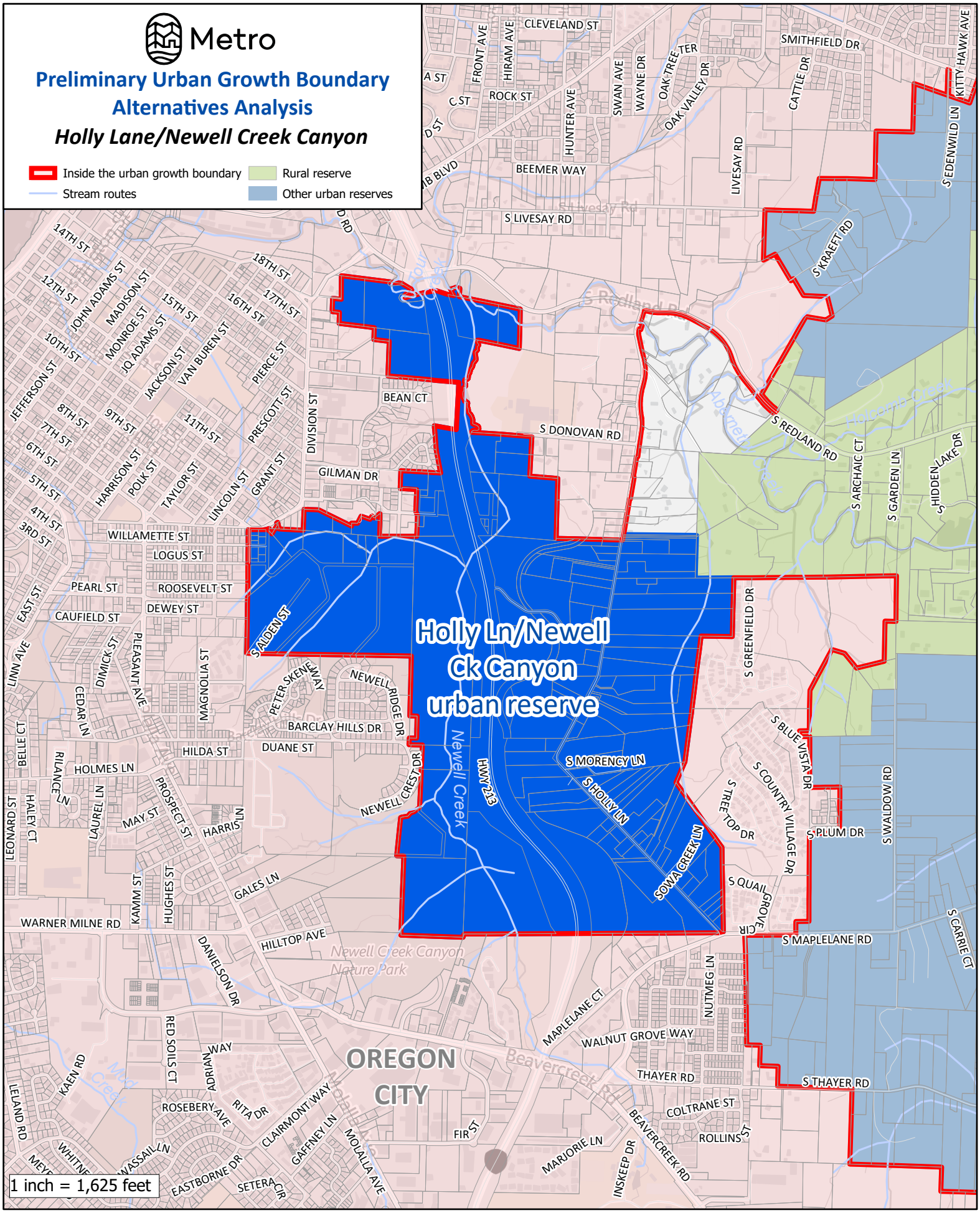
The city's plans for the Oregon City Regional Center include mixed-use development on the vacant parcels in the northern section of the center, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. Metro's 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract

more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

The developable, privately-owned portions of the Holly Lane – Newell Creek Canyon Urban Reserve are too small and isolated from the regional center to meaningfully increase the center's level of activity. Therefore, urbanization of the reserve is not considered to be a future contributor to the vision or the purpose of the regional center.

In addition to the regional center itself, there is a 2040 Growth Concept designated corridor that connects the regional center in the north to Clackamas Community College in the south, running along 7th Street and Molalla Avenue. However, the corridor is already mostly built out with a mixture of low density residential development, small commercial businesses, and larger retail commercial uses. The corridor is also about a mile and half away from the reserve via Maplelane and Beavercreek Roads. Because of the level of existing development along the corridor, the relatively small size of the buildable portions of the reserve, and the limited transit between the two areas, urbanization of the reserve is not expected to have a significant impact on additional corridor development.

The Holly Lane – Newell Creek Canyon Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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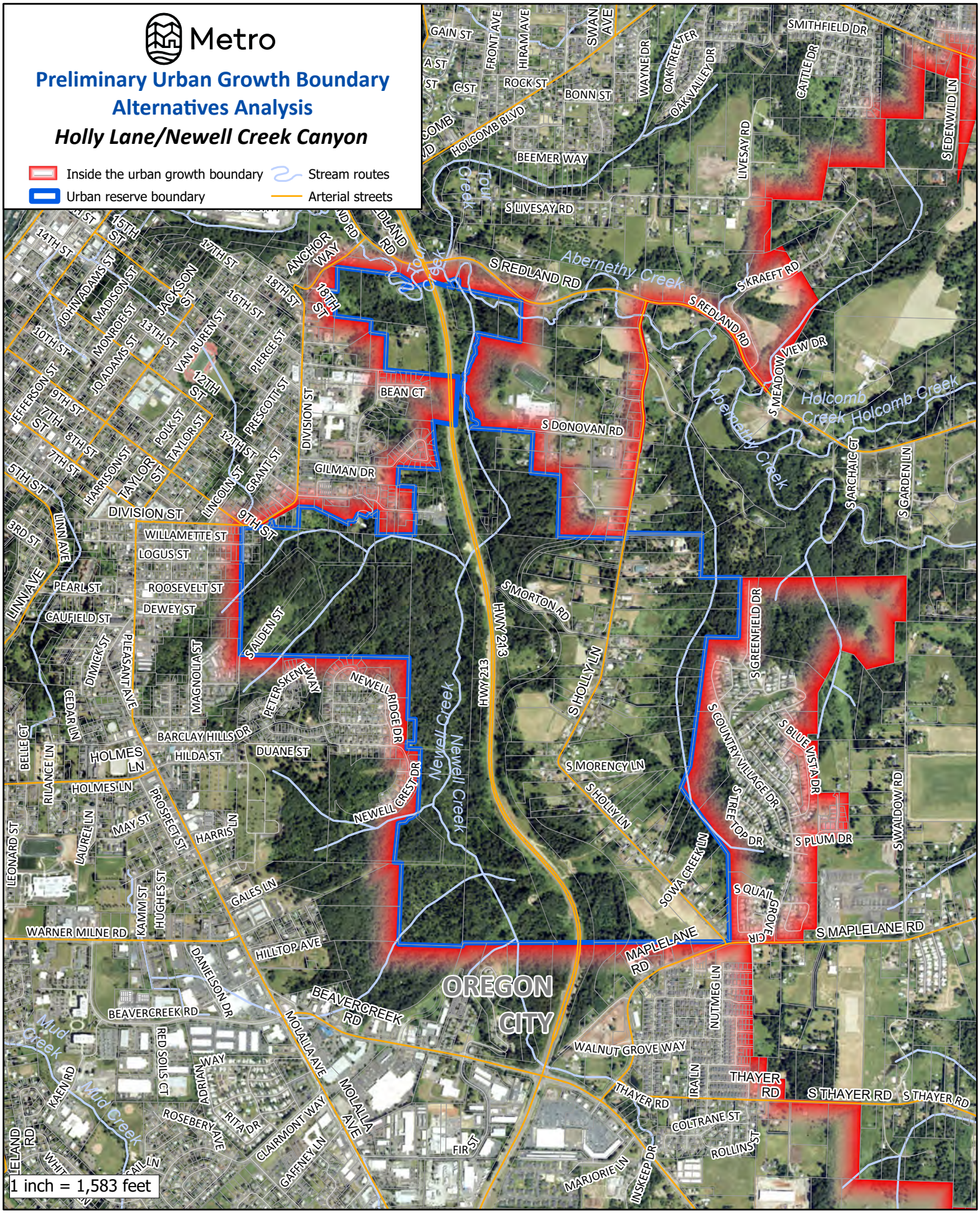

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I-5 EAST – WASHINGTON COUNTY URBAN RESERVE

Total Reserve Area	851 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	740 acres
Gross Vacant Buildable Area	500 acres
Net Vacant Buildable Area	**372 acres**

The I-5 East – Washington County Urban Reserve is a somewhat rectangularly shaped area on the east side of I-5, south of I-205, north of SW Frobase Road, and west of SW 65th Avenue. The UGB, which more or less follows I-5 and I-205, forms the western and northern boundaries of the reserve, while the Norwood Urban Reserve and the Elligsen Road North Urban reserve bound it to the east and south, respectively. Saum Creek flows north through the center of the reserve and several tributaries join the creek prior to it crossing under I-205. The south end of the reserve is approximately 270 feet higher than its north end and there are numerous slopes greater than 10 percent throughout the reserve, primarily along Saum Creek and its tributaries. Access to the area is provided by SW Frobase Road, SW Norwood Road, SW 65th Avenue, and SW 82nd Avenue.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

SW Frobase Road and SW 65th Avenue would provide the edges between urban and rural land to the south and east. Even assuming these two roads develop as a collector and arterial roadway, respectively, in the future, the roads themselves will not provide a clear transition area between future urban and rural uses. Additional buffers will need to be incorporated into the design and planning of the reserve's urban development. The rural lands east of SW 65th Avenue and to the south of SW Frobase Road are included in the Norwood and Elligsen Road North Urban Reserve and may themselves be included in the UGB at some point. Therefore, any buffers that are incorporated into the design and planning for the reserve should consider the potential for making urban form connections in these locations. For the most part, there are no natural or built features along the urban-rural edge of the I-5 East – Washington County Urban Reserve that would mark a clear transition between urban and rural lands (i.e, between it and the other adjacent urban reserves).

The I-5 East – Washington County Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an

urban reserve means, by definition, that farmland within the I-5 East – Washington County Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The I-5 East – Washington County Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Tualatin, which is the expected governing body for the I-5 East – Washington County Urban Reserve when it is eventually urbanized, has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover about 175 acres of the reserve, largely focused on Saum Creek and its numerous tributaries. Saum Creek flows north through the middle of the reserve and there are large blocks of associated upland wildlife habitat along and between the stream corridors. There are also some large steeply sloped areas adjacent to some of the stream corridor segments that will provide additional protection to the habitat areas from future urban development. A portion of the riparian habitat in the south of the reserve is already impacted by active agricultural activities and urbanization would provide the opportunity to restore the riparian corridor in these locations. However, the riparian habitat, particularly in the north of the reserve, is susceptible to impacts from future stream crossings that may be necessary to provide transportation connectivity. Urbanization poses a higher risk to the upland habitat, which occurs generally on gentler slopes between the stream corridors. Overall, providing connections between new urban development in the reserve would likely necessitate impacting regionally significant fish and wildlife habitat.

The I-5 East – Washington County Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

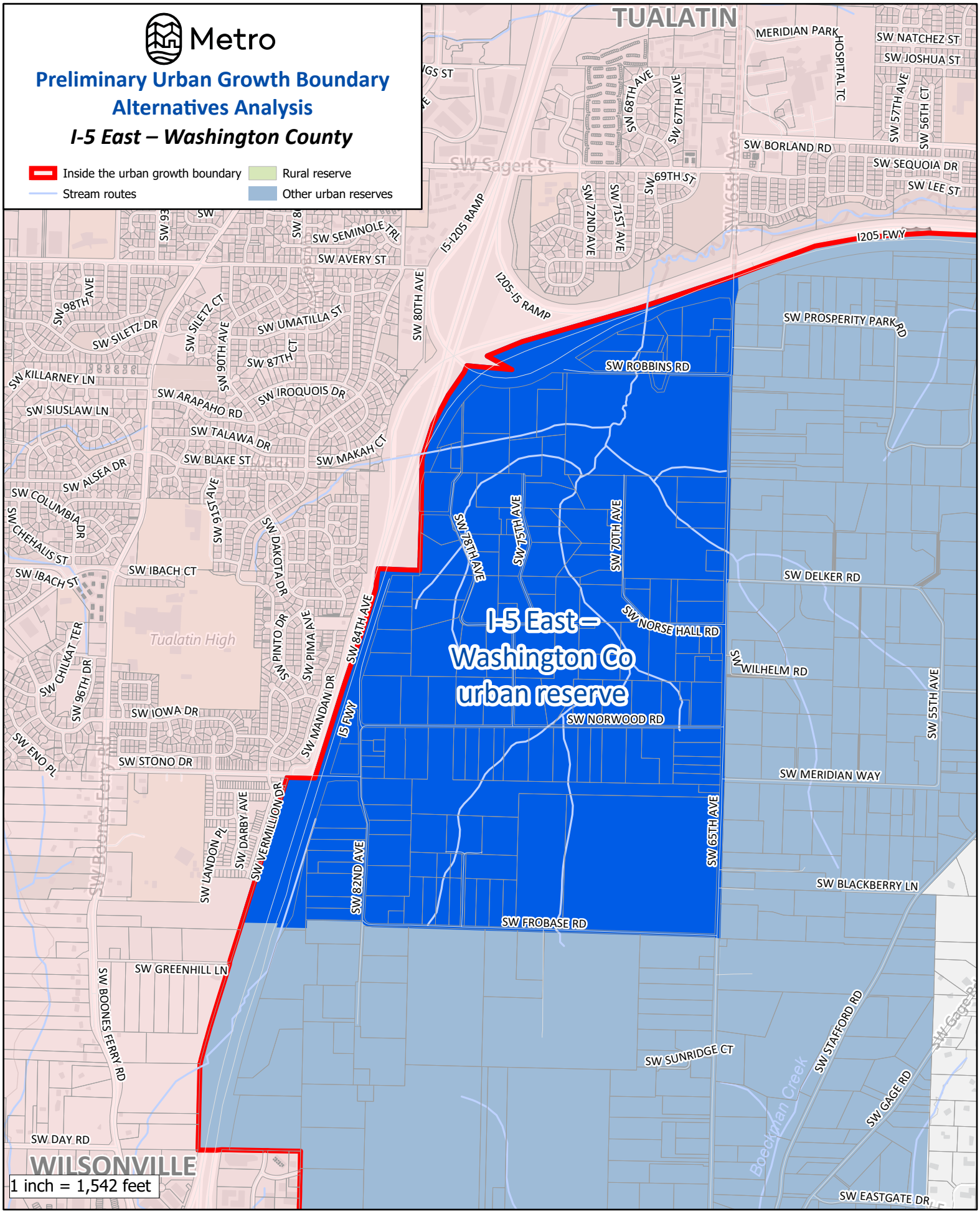
The Tualatin Town Center is the closest 2040 Growth Concept designated center to the I-5 East – Washington County Urban Reserve. It is more than 300 acres in area, and primarily serves the surrounding residential and commercial areas in the City of Tualatin. The reserve is approximately 1.5 miles from the Tualatin Town Center via either SW 65th Avenue and SW Sagert Street or via SW Nyberg Street, although I-5 and I-205 present significant visual and connectivity barriers between the reserve and town center. There is no TriMet service connecting the town center and the reserve area directly, but Route 76 from the town center stops at SW 65th Avenue and SW Sagert Street, about a quarter mile north of the reserve on the other side of I-205.

The city's Tualatin Town Center Plan envisions a mixed-use live, work, and play center that integrates natural resources, like the Tualatin River, with civic, social, economic, and cultural functions in a walkable community. Metro's 2017 State of the Centers Atlas shows that the Tualatin Town Center has a low number of dwelling units per acre and a much higher total number of employees compared with other town centers in the region. The town center has a very high "access to parks" score in the atlas, due in part to the numerous open space/natural areas and the Tualatin Community Park along the Tualatin River nearby.

However, urbanization of the I-5 East – Washington County Urban Reserve is not expected to contribute to the vision or purpose of the Tualatin Town Center, given the how disconnected the reserve is from the town center by I-5 and I-205 and the lack of direct transit service. Indeed, urbanization of the reserve could draw residential development *away from* the center by creating a large market for a range of housing units.

The closest 2040 Growth Concept designated corridor to the reserve is along SW Boones Ferry Road just north of Wilsonville. The corridor crosses I-5 and extends south along SW Parkway Avenue to the Wilsonville Town Center. The nearest portion of the corridor to the reserve, just over 1.5 miles away, is developed with auto-oriented commercial uses, large-scale retail, and lodging typical of development near highway interchanges. Urbanization of the reserve is not expected to contribute to new development of the corridor consistent with the corridor's purpose, due to the distance between the two areas and the amount of existing uses that serve a larger geographic area and the travelling public.

The I-5 East – Washington County Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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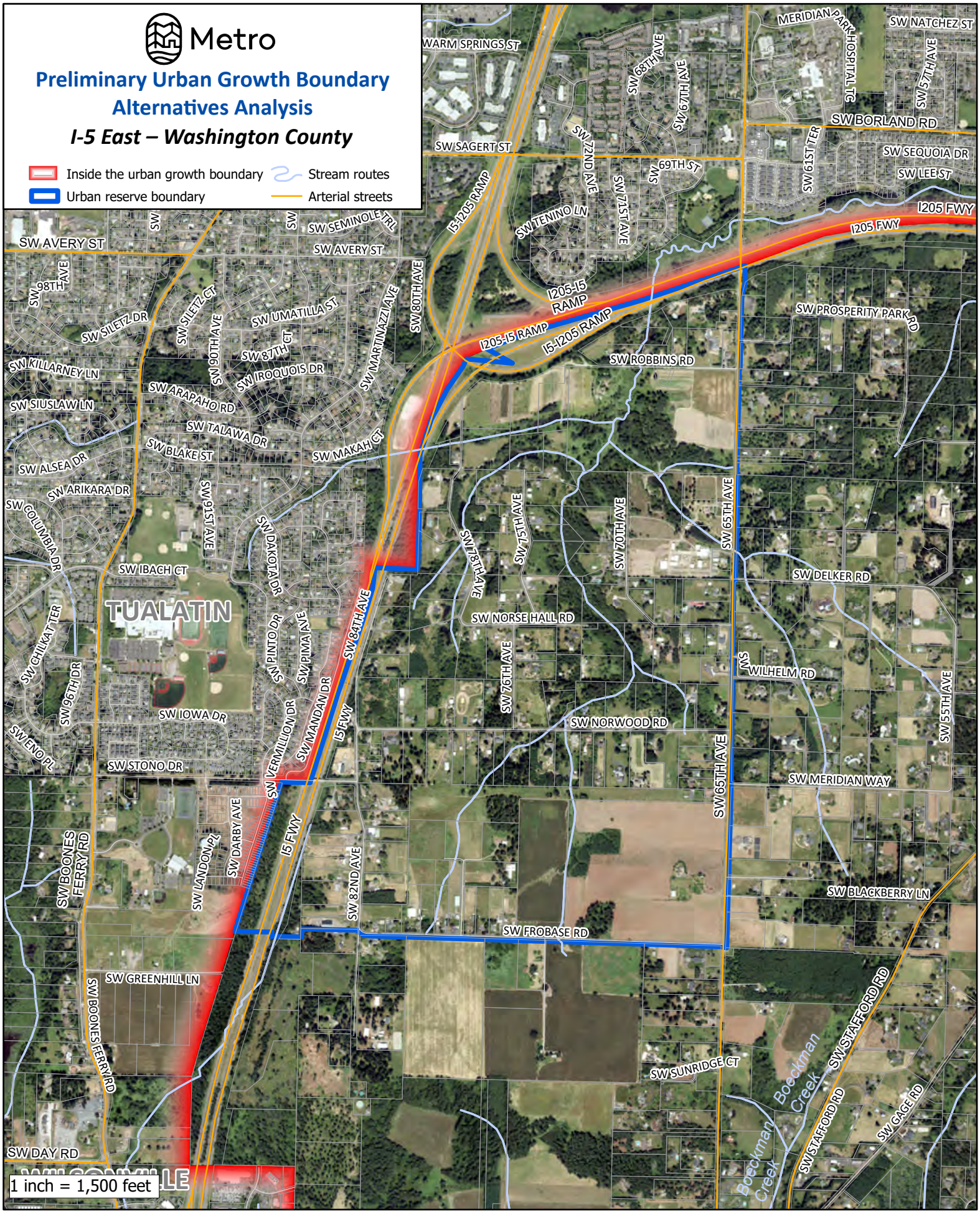
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

I-5 East – Washington County

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



1 inch = 1,500 feet

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MAPLELANE URBAN RESERVE

Total Reserve Area	569 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	556 acres
Gross Vacant Buildable Area	341 acres
Net Vacant Buildable Area	**254 acres**

The Maplelane Urban Reserve is an irregularly shaped area adjacent to the east side of Oregon City. The reserve is roughly divided between north and south by S Maplelane Road. In addition to S Maplelane Road, the reserve is connected to S Waldow Road and S Thayer Road. The UGB forms the reserve's western and southern boundaries. The reserve is primarily flat, with the exception of some small areas of steep slopes along the stream corridors and within the forested northeastern corner of the reserve. Abernethy Creek flows northward, just outside of the reserve to the east. A tributary to Abernathy Creek flows eastward through the northern portion of the reserve, and three tributaries to Thimble Creek flow eastward through the southern portion.

Oregon City School District owns a 57-acre tax lot in the northern portion of the reserve. Portland General Electric (PGE) and the federal government also together own about 50 acres of land in the reserve, including tax lots occupied by electrical substations and large powerlines.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

Abernethy Creek and a small portion of Thimble Creek, along with extensive steep forested slopes, some of which are within the Maplelane Urban Reserve itself, provide natural features that would mark a clear transition between urban and rural lands to the east. Steep forested slopes would provide a clear transition between urban and rural lands to the north. Overall, there are natural features that would provide a clear transition between urban and rural lands for the entire urban-rural edge of the reserve.

The Maplelane Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Maplelane Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Maplelane Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Oregon City, which is the expected governing body for the Maplelane Urban Reserve, once urbanized, has adopted a riparian habitat protection program that is compliant with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover approximately 88 acres of the reserve. The riparian habitat occurs along an unnamed tributary to Abernethy Creek that flows through the northern portion of the reserve, and along the three tributaries to Thimble Creek that flow through the southern portion. One of the tributaries to Thimble Creek flows along S Thayer Road. The upland habitat extends out of the riparian areas and along the steep slopes of the eastern edge of the reserve. There is a sizeable amount (about 20 acres) of upland habitat on the Oregon City School District property.

The significant riparian habitat that is along S Thayer Road is susceptible to impacts related to future improvement of S Thayer Road to urban standards. The significant habitat adjacent to the steep slopes and PGE/publicly-owned land is less susceptible to impacts from urbanization, as these areas are not likely to be developed with urban residential or employment uses. Urbanization can occur with low to moderate avoidance of the regionally significant fish and wildlife habitat depending on the level of impacts related to road improvements on S Thayer Road and other necessary road connections.

The Maplelane Urban Reserve is given a “low-medium” score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Oregon City Regional Center is the closest 2040 Growth Concept designated center to the Maplelane Urban Reserve. The regional center serves Oregon City, Clackamas County and some neighboring cities to the south. The regional center is about three miles from the reserve via S Maplelane Road and Highway 213. TriMet Route 32 runs from the regional center to Clackamas Community College, approximately two-thirds of a mile from the reserve, but there is no transit service directly to the reserve.

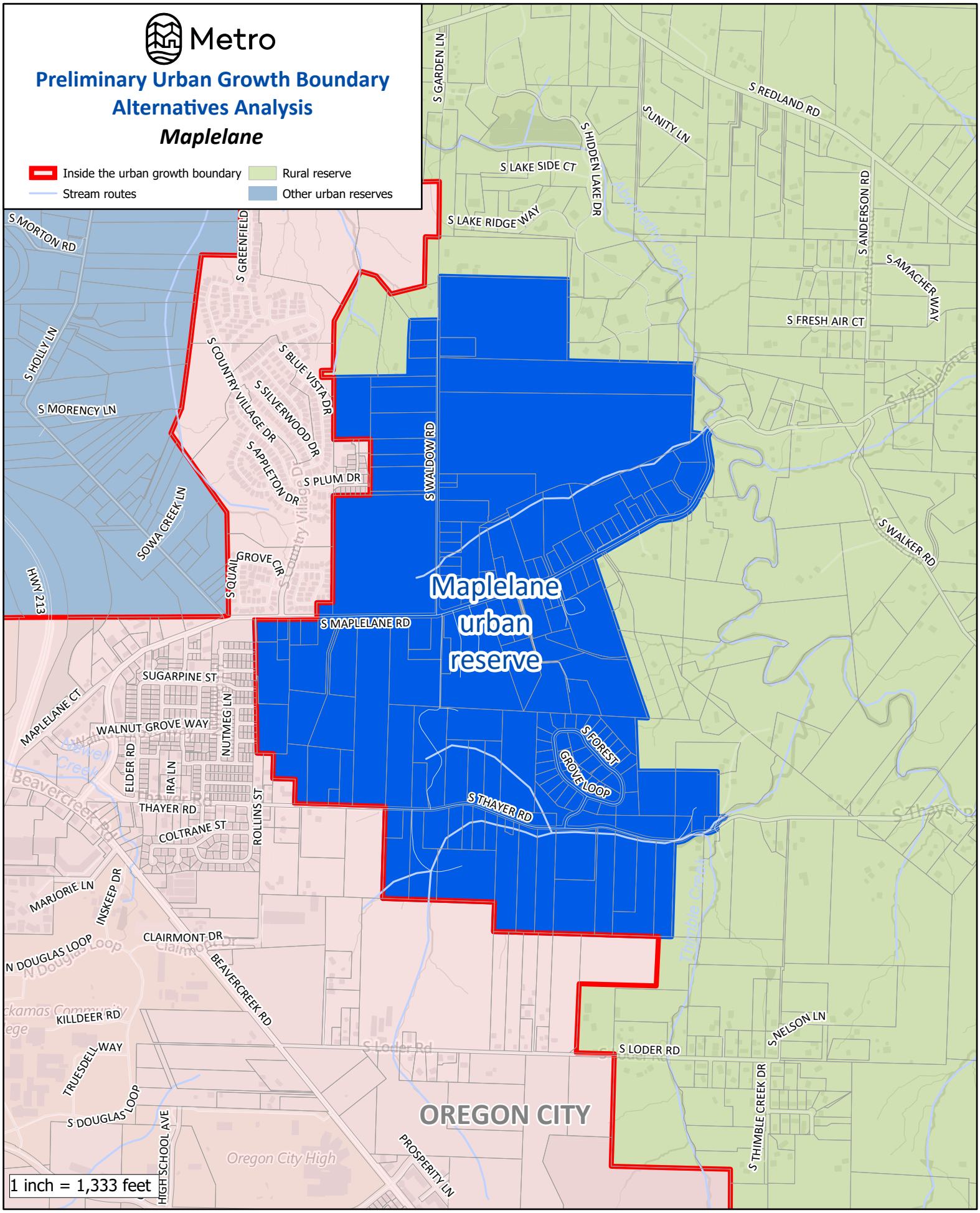
The city's plans for the Oregon City Regional Center include mixed-use development on the vacant parcels in the northern section of the center, enhancements to the main street, and the creation of new open spaces that will provide direct connections to the river. The regional center is also home to Willamette Falls and the Willamette Falls Legacy Project, a public/private partnership working to connect the Falls to Downtown Oregon City through the development of housing, public spaces, habitat restoration, education, and employment opportunities. Metro’s 2017 State of the Centers Atlas showed less than 400 people living in the regional center, as well as a low population density (5.2 people per acre), low total employees, and low dwelling unit density compared with other

regional centers; in fact, the average population of all regional centers in 2017 was more than 6,000 people and the average population density was 22.8 people per acre. The city's vision to attract more housing and employees to the regional center will elevate it to the activity spectrum levels comparable to other regional centers in the region.

The reserve is too isolated from the regional center to meaningfully increase the center's level of activity. Therefore, urbanization of the reserve is not considered to be a future contributor to the vision or the purpose of the regional center.

In addition to the regional center itself, there is a 2040 Growth Concept designated corridor that connects the regional center in the north to Clackamas Community College in the south, running along 7th Street and Molalla Avenue. However, the corridor is already mostly built out with a mixture of low density residential development, small commercial businesses, and larger retail commercial uses. The corridor is also about a mile and half from the nearest portion of the reserve. Because of the level of existing development along the corridor and the distance from the corridor to the reserve, urbanization of the reserve is not expected to have a significant impact on additional corridor development.

The Maplelane Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Maplelane

Inside the urban growth boundary
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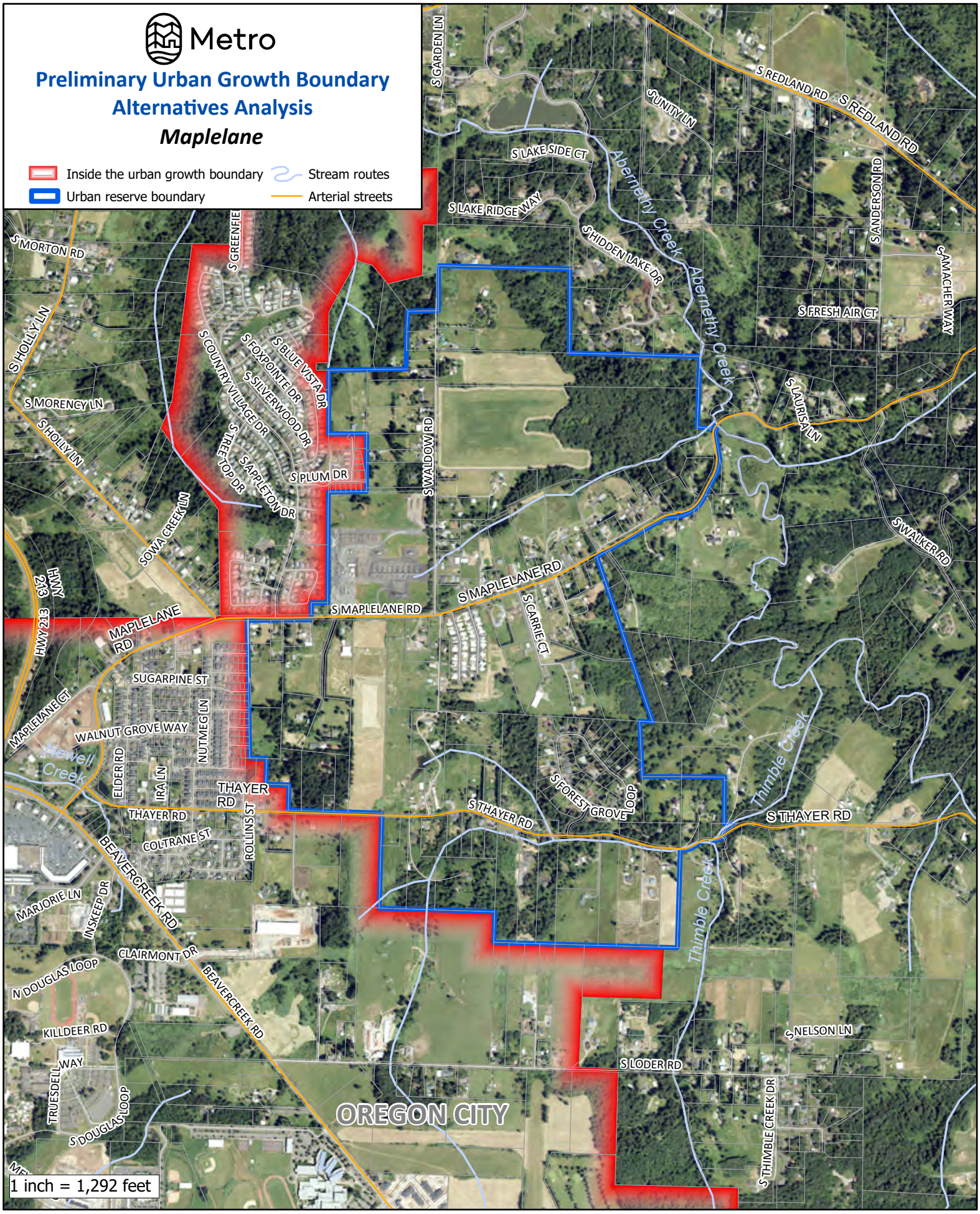

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ROSA URBAN RESERVE

Total Reserve Area	789 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	769 acres
Gross Vacant Buildable Area	288 acres
Net Vacant Buildable Area	**210 acres**

The Rosa Urban Reserve, which is the remainder of the former "South Urban Reserve" after a portion was added to the UGB in 2018, is on the south side of Hillsboro, north of SW Rosedale Road between SW River Road and SW 229th Avenue. It is adjacent to the UGB on its east and north, while rural reserve land is to the south and west. The reserve is relatively flat with some minor slopes near its stream corridors. Access is provided by SW Rosedale Road, SW River Road, and SW 229th Avenue. SW Rosa Road bisects the southern portion of the reserve in an east-west direction.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The UGB forms the eastern, northern, and a small portion of the western boundaries of the Rosa Urban Reserve; the Tualatin River and the Meriwether National Golf Club would provide a natural and built feature transition zone between urban land and rural lands for the remainder of the western edge. There are no natural or built features that mark a clear transition between the reserve and the rural lands to the south of SW Rosedale Road. Even assuming SW Rosedale Road develops as a collector in the future, the road itself will not provide a clear transition area between urban and rural uses. Additional buffers will need to be incorporated into the planning and design of urban development along the southern edge. Overall, there is a built and/or natural feature that would provide a clear transition area between urban and rural lands for over half of the reserve's urban-rural edge.

The Rosa Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Rosa Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Rosa Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Hillsboro, which is the expected governing body for the Rosa Urban Reserve, once urbanized, has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 142 acres of land in the reserve, mainly focused on Butternut Creek and a small tributary to the Tualatin River. The reserve's buildable acreage total does not include any riparian and upland habitat along Gordon and Butternut Creeks on the Reserve Vineyards & Golf Club property, as the golf course itself is considered exempt land in Metro's buildable land analysis. A significant amount of upland habitat is mapped north of Butternut Creek on both sides of SW Rosa Road. There is well-established riparian habitat along Butternut Creek through the southern portion of the reserve.

As most of the habitat areas are on relatively flat land that is easily developed and located in the central portion of the reserve, some impacts to the habitat area would be expected from future urbanization. Impacts are more likely if urban transportation connections (e.g., roadways) are made through the center of the reserve where a large segment of upland habitat is located. Overall, future urbanization could occur with a low to moderate level of avoidance of regionally significant fish and wildlife habitat areas, depending on the layout of urbanized areas and necessary transportation connections.

The Rosa Urban Reserve is given a "low-medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Hillsboro Regional Center is the closest 2040 Growth Concept designated center to the Rosa Urban Reserve, located approximately 2.5 miles away via Tualatin Valley Highway or SE River Road. The Aloha Town Center, another 2040 Growth Concept designated center, is located about 3.5 miles to the east along Tualatin Valley Highway. Tri-Met Route 57 runs along Tualatin Valley Highway and connects the two centers, but there is not transit service connecting either of the centers to the reserve.

The South Hillsboro Community Plan area, which is adjacent to the reserve to the east, is expected to develop with a higher-density mixed-use town center ("Reed's Crossing") along Tualatin Valley Highway and a smaller-scale village center south of Butternut Creek. While these two centers are not formally designated 2040 Growth Concept centers, they are expected to have similar purposes and characteristics.

The Hillsboro Regional Center includes historic downtown Hillsboro and a large surrounding area that includes a wide variety of residential, employment, and institutional/public uses. Metro's 2017

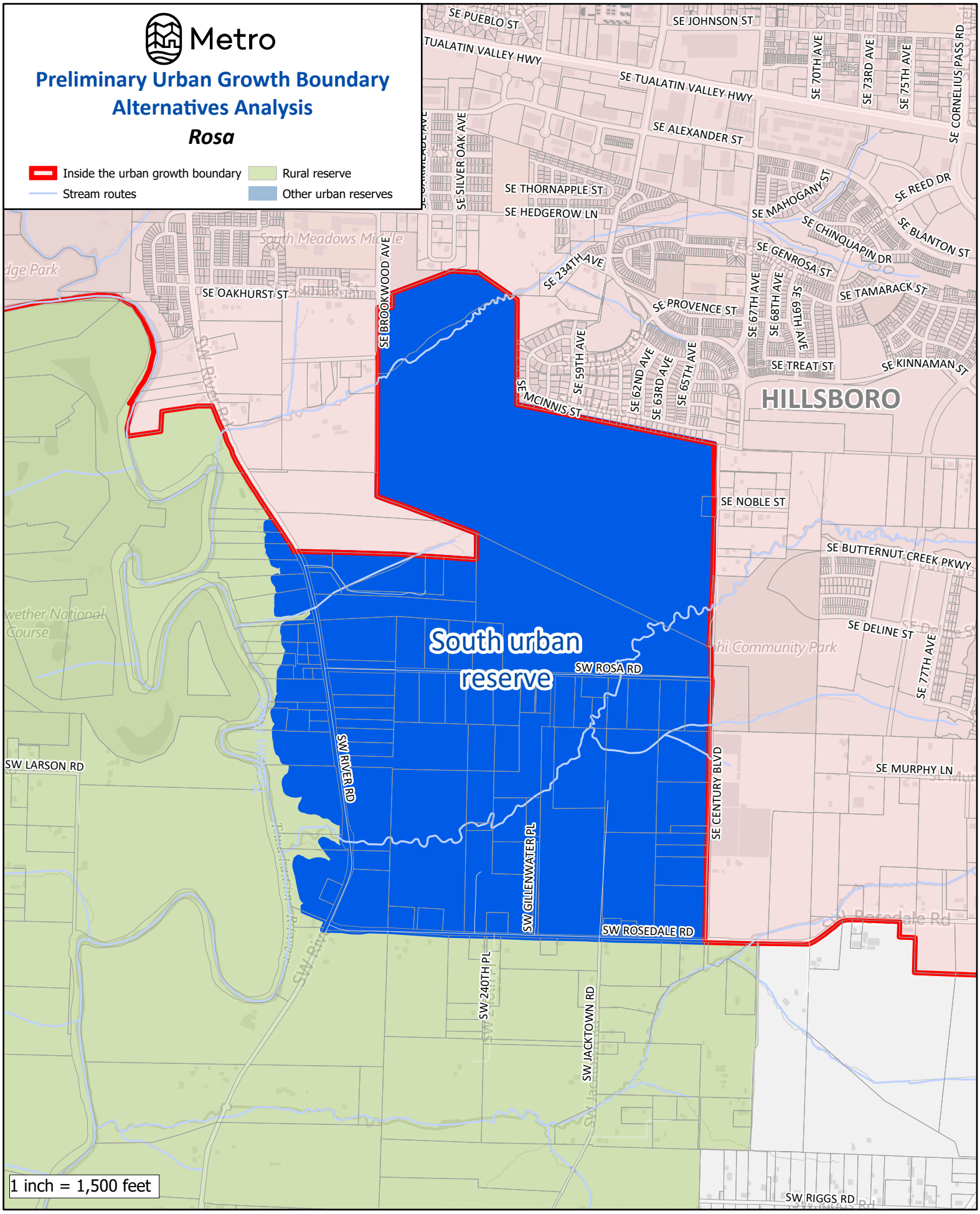
State of the Centers Atlas showed that this large regional center has an average population density and dwelling units per acre, and a slightly lower number of businesses per acre, when compared with the other regional centers in the region.

The Aloha Town Center is located along Tualatin Valley Highway in unincorporated Washington County. In 2017, Washington County completed the Aloha Tomorrow Plan for the town center area to integrate land use changes, transportation improvements, and policies that support affordable housing and economic development. Metro's State of the Centers Atlas showed that the town center has a high total population and dwelling units per acre, but a very low number of total businesses and employees, when compared with other town centers in the region.

Urbanization of the Rosa Urban Reserve is unlikely to meaningfully contribute to new development of either the Hillsboro Regional Center of the Aloha Town Center due to the distance between the reserve and these centers and the lack of connecting transit service. Urbanization of the reserve would more likely support the development of denser, mixed-use "centers" in closer-by South Hillsboro.

Tualatin Valley Highway is the closest 2040 Growth Concept designated corridor and the areas of the reserve not already occupied by an active golf course are about two miles away. The closest portion of the corridor is a mixture of small-scale industrial uses on the south side and small commercial retail uses and some single-family homes on the north side. Urbanization of the reserve is not expected to meaningfully contribute to the purpose of the corridor, due to the distance of non-exempt areas from the corridor, the corridor's current zoning for industrial and commercial uses focused on a larger geographical area, and the vehicle traffic levels and flow along Tualatin Valley Highway.

The Rosa Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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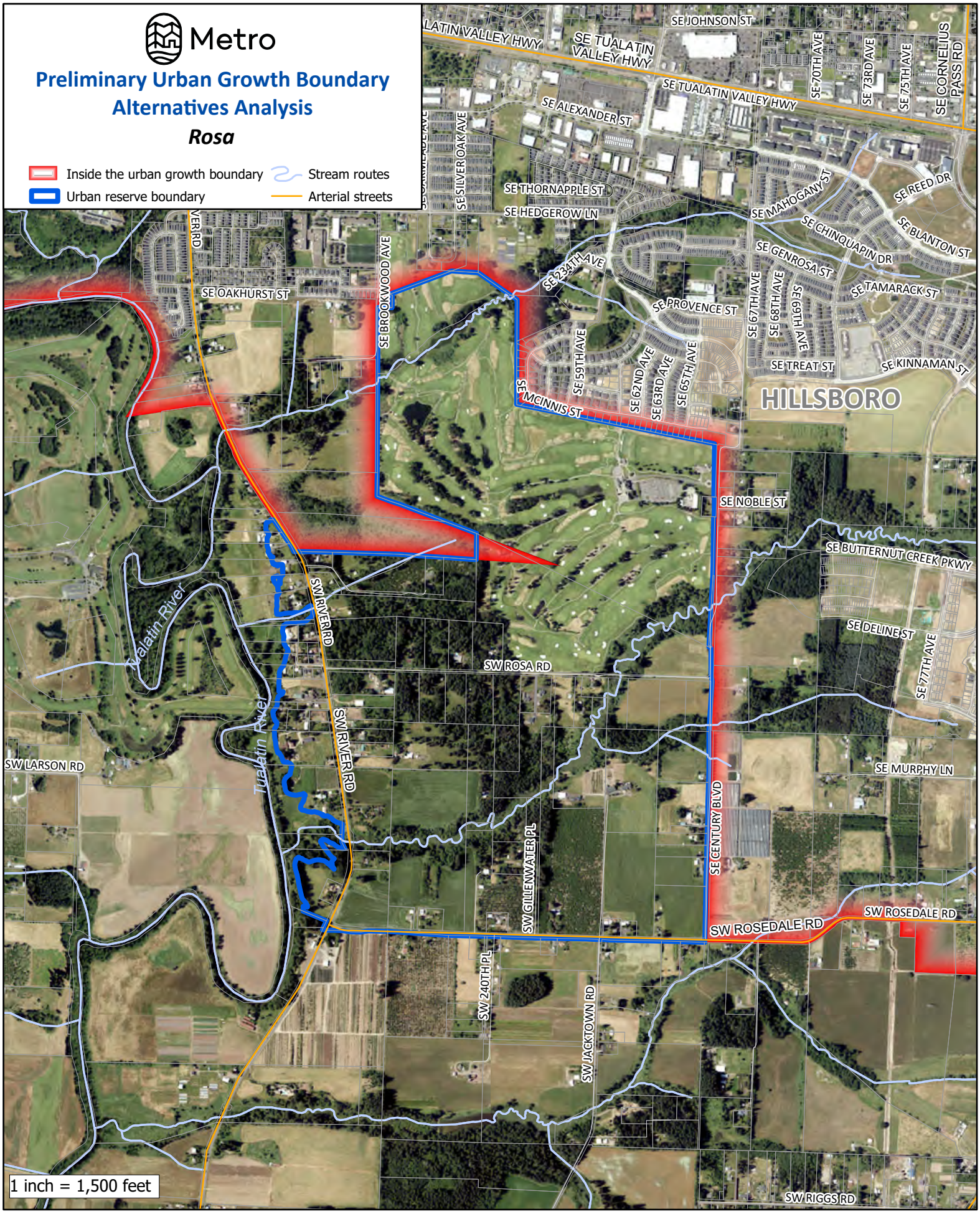

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SHERWOOD NORTH URBAN RESERVE

Total Reserve Area	123 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	113 acres
Gross Vacant Buildable Area	62 acres
Net Vacant Buildable Area	**46 acres**

The Sherwood North Urban Reserve is located on the north side of Sherwood on both sides of Highway 99W (Pacific Highway). It is comprised of three disconnected and relatively thin "sub-areas". The 100-year floodplain and rural reserve lands form the northern boundary of all three sub-areas. The eastern sub-area is located north of SW Galbreath Drive, is accessible by SW Gerda Lane and SW Cipole Road, and is approximately 35 acres in size. The central sub-area is bisected by Highway 99W, is potentially accessible by SW Langer Farms Parkway, and is approximately 57 acres in size. The western sub-area is north of SW Seely Lane and is approximately 31 acres in size.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The UGB forms the southern edge of all three of the Sherwood North Urban Reserve's sub-areas, as well as the eastern edge of the eastern sub-area. The Chicken Creek riparian corridor would serve as a natural feature transition zone along the western edge of the western sub-area, which would be a very small portion of the subject urban-rural edge. Generally, there are no natural or built features that would mark a clear transition for the remainder of the urban-rural edges in the sub-areas.

The Sherwood North Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within Sherwood North Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Sherwood North Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Sherwood is the expected governing body for the Sherwood North Urban Reserve, once urbanized. The city has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover about 24 acres of the reserve, with the majority of the habitat areas located in the western and eastern sub-areas. The habitat areas are an extension of the floodplain and streams located in the adjacent Tualatin River National Wildlife Refuge.

Urbanization of the western and eastern sub-areas is unlikely to occur without some impact to riparian and upland wildlife habitat, given the amount of habitat space included in these sub-areas and their narrow dimensions. A large portion of the central sub-area, the largest of the three sub-areas, can likely be urbanized while avoiding significant riparian and upland wildlife habitat.

The Sherwood North Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Sherwood Town Center is the closest 2040 Growth Concept designated center to the Sherwood North Urban Reserve. It is a relatively small town center of approximately 88 acres, located to the southwest of the reserve at the intersection of the Highway 99W and SW Tualatin-Sherwood Road. The center serves the community of Sherwood and the surrounding rural areas at the southwest edge of the region. The land just outside the town center contains a significant amount of housing.

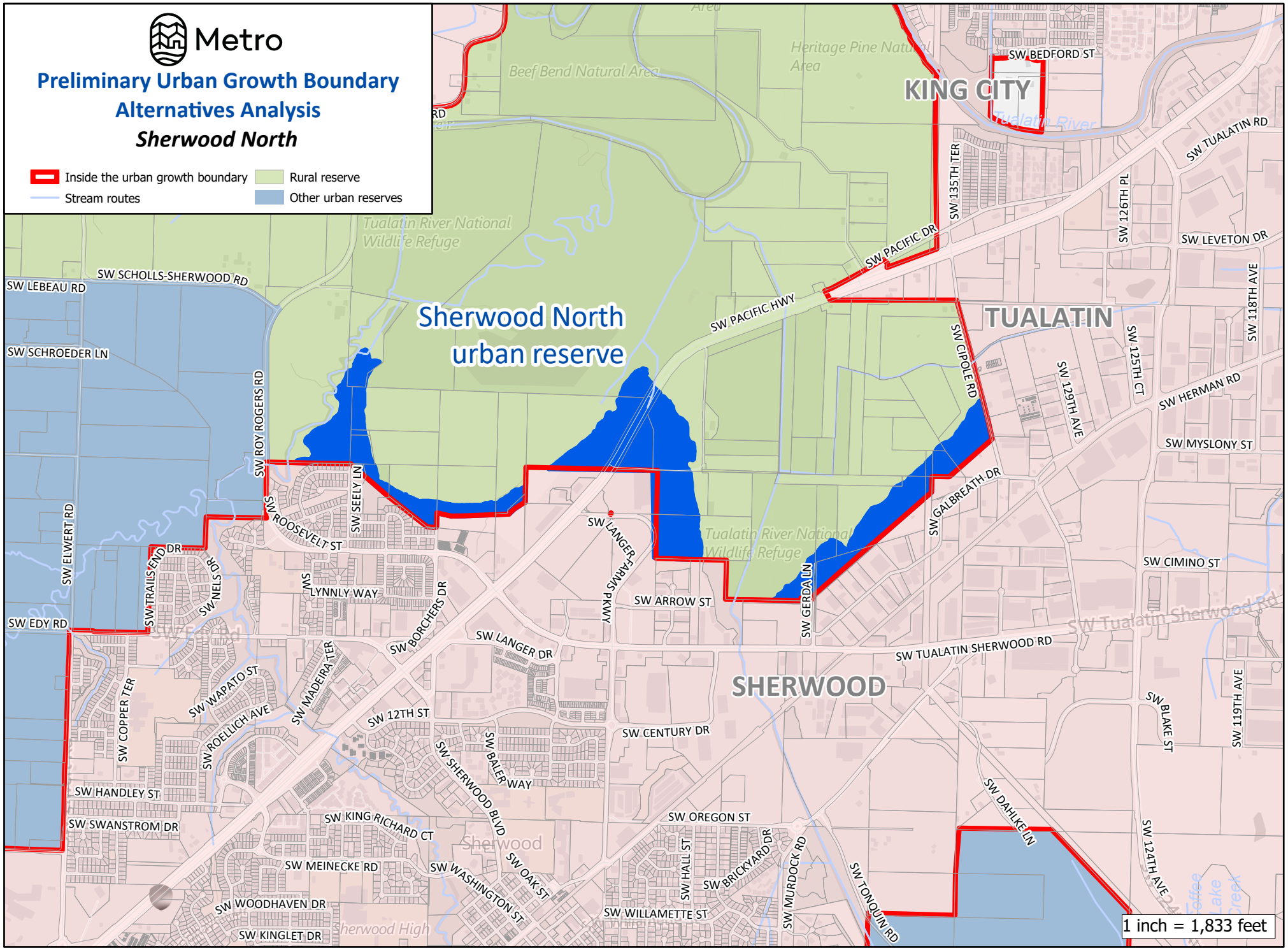
The three sub-areas of the reserve are about half a mile to one mile from the town center via Highway 99W, SW Tualatin-Sherwood Road, or SW Roy Rogers Road. TriMet Route 94 runs through the middle of the central sub-area along Highway 99W directly to the town center, and Route 97 running along SW Tualatin-Sherwood Road to the town center has a stop approximately 850 feet south of the eastern sub-area.

The city's "Sherwood Town Center Plan", completed in 2013, encompasses an area larger than currently designated in the 2040 Growth Concept; the Langer Drive Commercial District portion of the plan area most closely aligns with the Metro designated area. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. Much of the town center is already built out with auto-oriented and large commercial retail uses, though there are numerous parking lots that may be able to accommodate redevelopment.

Urbanization of the urban reserve sub-areas themselves is not expected to have a significant impact on the development of the town center area as a walkable and active shopping district, due to the very small amount of development expected to occur within the sub-areas and the likelihood that the central (largest) sub-area along Highway 99W could develop with employment rather than residential land uses in the future.

There is a 2040 Growth Concept designated corridor along Highway 99W that extends north of the town center to the central sub-area. This portion of the corridor contains a few professional services and commercial uses and has power lines cutting across the roadway from a Portland General Electric substation. Urbanization of the reserve is not expected to meaningfully contribute to new development of the corridor consistent with its purpose, as there is very little developable land within the reserve and the corridor is already mostly developed, with only a couple of parcels that could be redeveloped.

The Sherwood North Urban Reserve is given a “low” score for this Metro Code factor in Attachment 3.



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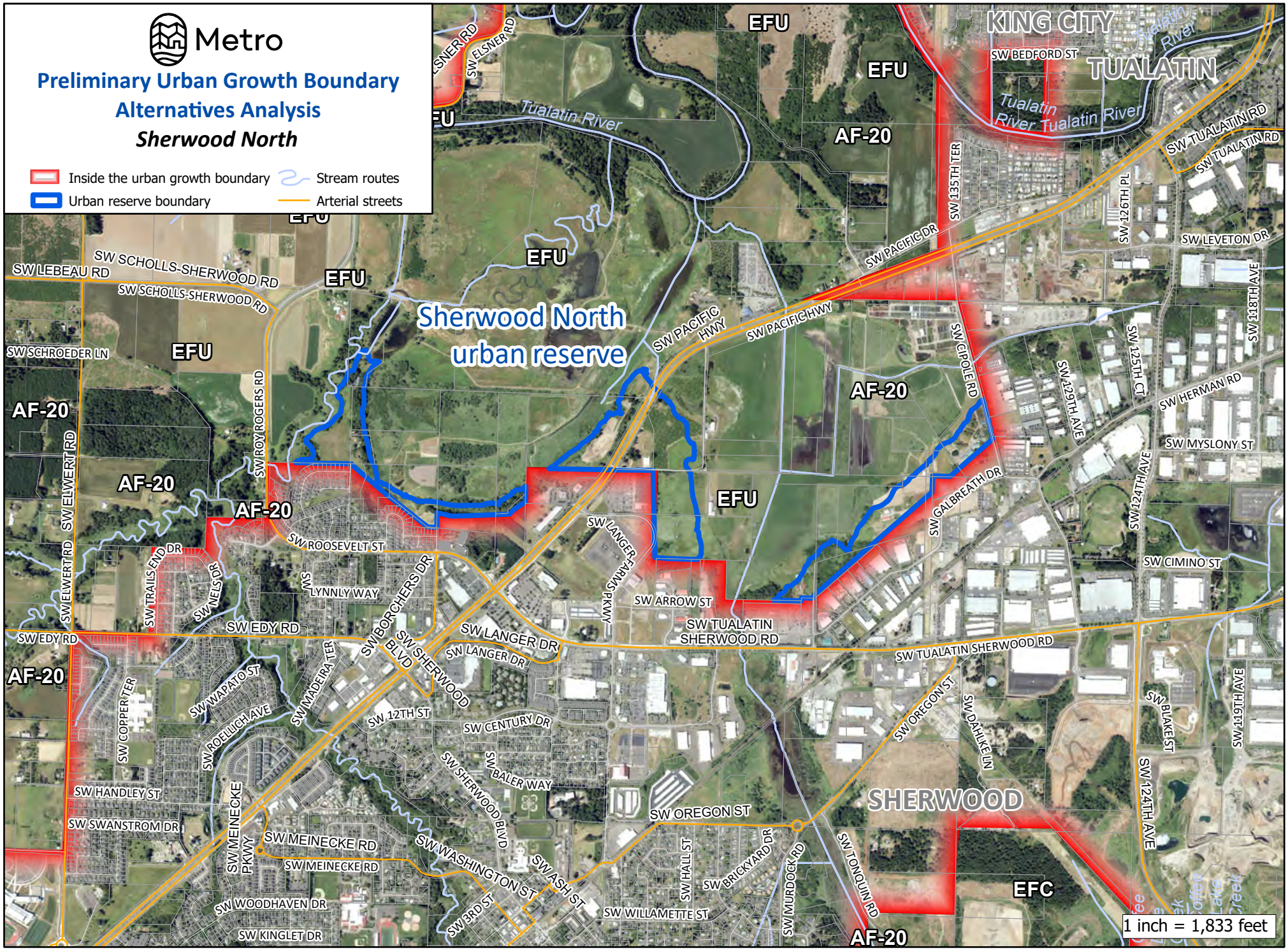

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SHERWOOD SOUTH URBAN RESERVE

Total Reserve Area	448 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	424 acres
Gross Vacant Buildable Area	207 acres
Net Vacant Buildable Area	**155 acres**

The Sherwood South Urban Reserve is a rectangularly shaped area on the south side of Sherwood, south of SW Brookman Road and east of Highway 99W. The UGB forms the northern boundary and the Clackamas-Washington County line forms the eastern boundary; rural reserves are adjacent to the west and south. The reserve is served by SW Brookman Road, SW Middleton Road, and SW Oberst Road. The reserve has five streams, including the confluence of Goose and Cedar Creeks.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

Along the shorter eastern edge of the Sherwood South Urban Reserve, there is a change in elevation of around 100 feet up to SW Ladd Hill Road that would provide some natural transition between urban and rural lands. This sloped area includes rural residences on mostly forested lots and the headwaters of a small tributary to Cedar Creek that flows within the reserve. There is also a significant change in elevation of approximately 800 feet along most of the southern edge of the reserve up to SW Parrett Mt. Road. There are a number of rural residences located in this area, as well as a significant amount of private open space associated with Parrett Mountain View Estates. The combination of the change in elevation and private open space can provide a transition between urban and rural lands using a natural feature. The remaining portion of the reserve's southern edge includes the Cedar Creek riparian area and a tributary stream that would form another kind of natural transition between urban and rural lands. The right-of-way of Highway 99W (between about 120 and 150 feet wide) would provide a built feature transition area between urban and rural uses along the western edge of the urban reserve. Therefore, there would be a clear transition between urban and rural lands, using both natural and built features, for essentially the entire urban-rural edge of the reserve.

The Sherwood South Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an

urban reserve means, by definition, that farmland within the Sherwood South Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Sherwood South Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Sherwood is the expected governing body for the Sherwood South Urban Reserve, once urbanized. The city has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland habitat not constrained by steep slopes or in public ownership cover about 111 acres of the reserve, mainly along Cedar and Goose Creeks, as well as the three smaller tributaries to Cedar Creek. The numerous stream corridors divide the reserve into smaller dispersed pockets of developable land.

Steep slopes along portions of the stream corridors will provide some additional protection for some of the habitat; however, the likely need for transportation connections between the dispersed developable pockets could result in meaningful impacts to significant habitat areas.

The Sherwood South Urban Reserve is given a "low-medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

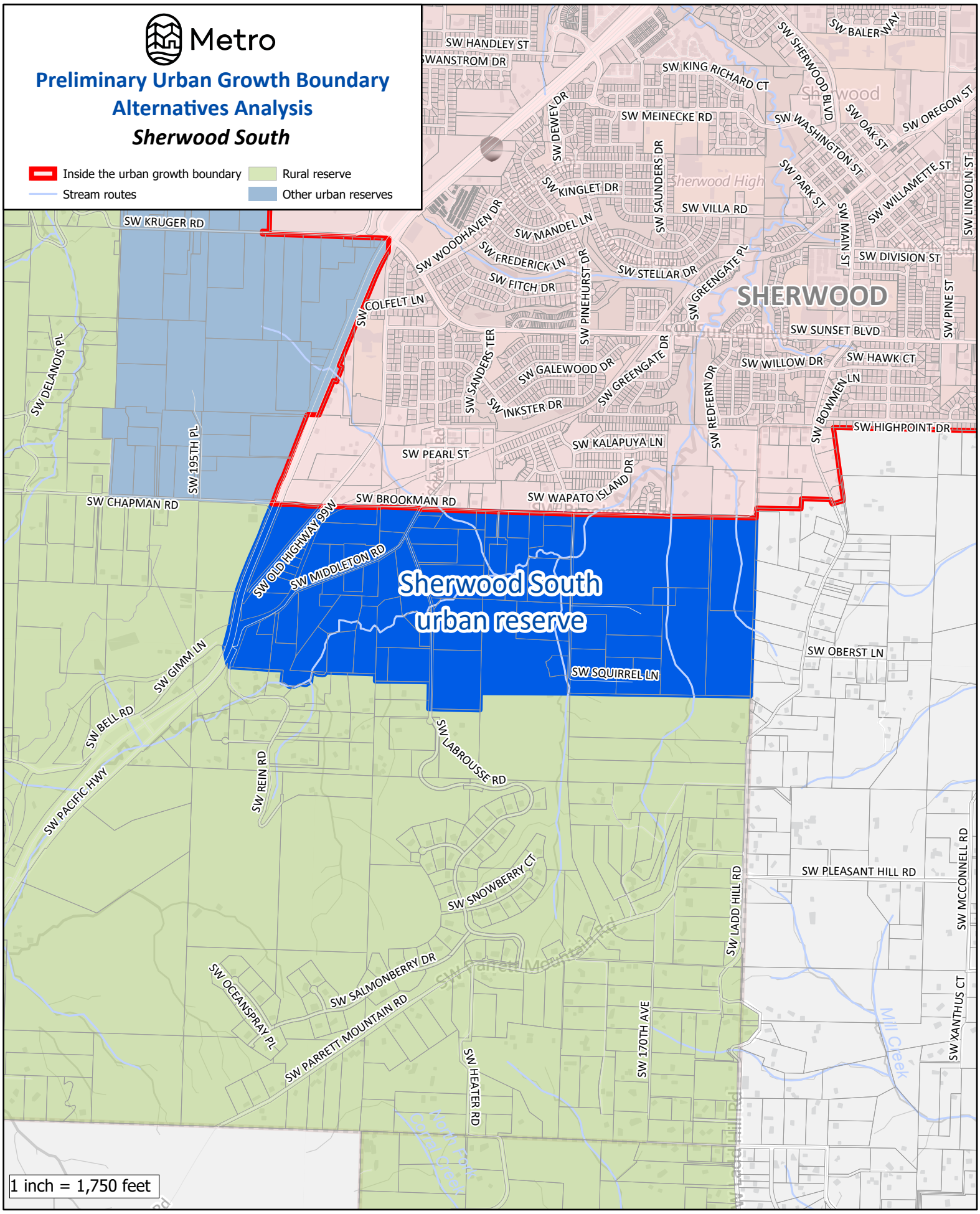
The Sherwood Town Center is the closest 2040 Growth Concept designated center to the Sherwood South Urban Reserve. It is a relatively small town center of approximately 88 acres, located to the southwest of the reserve at the intersection of the Highway 99W and SW Tualatin-Sherwood Road. The center serves the community of Sherwood and the surrounding rural areas at the southwest edge of the region. The land just outside the town center contains a significant amount of housing.

The city's "Sherwood Town Center Plan", completed in 2013, encompasses an area larger than currently designated in the 2040 Growth Concept; the Langer Drive Commercial District portion of the plan area most closely aligns with the Metro designated area. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. Much of the town center is already built out with auto-oriented and large commercial retail uses, though there are numerous parking lots that may be able to accommodate redevelopment.

The Sherwood South Urban Reserve is about two miles from the town center via Highway 99W. There are currently no transit connections between the two locations; indeed, the nearest transit stop to the reserve is more than a mile away. Due in part to this distance and the lack of transit service, urbanization of the reserve is not expected to meaningfully contribute to new pedestrian- and transit-oriented development in the town center.

The closest 2040 Growth Concept designated corridor is in the "Old Town" portion of Sherwood along SW Railroad Street/SW Oregon Street, more than a mile from the reserve via SW Brookman Rd, SW Ladd Hill Road, and SW Main Street. The corridor is developed with small retail commercial and institutional uses and low- and medium-density residential uses. Urbanization of the reserve is not expected to contribute to new development along the corridor consistent with its purpose. The Old Town area is already functioning as a walkable area with its numerous and varied uses. Moreover, the distance and hilly topography between the corridor and the reserve will likely limit active transportation between them.

The Sherwood South Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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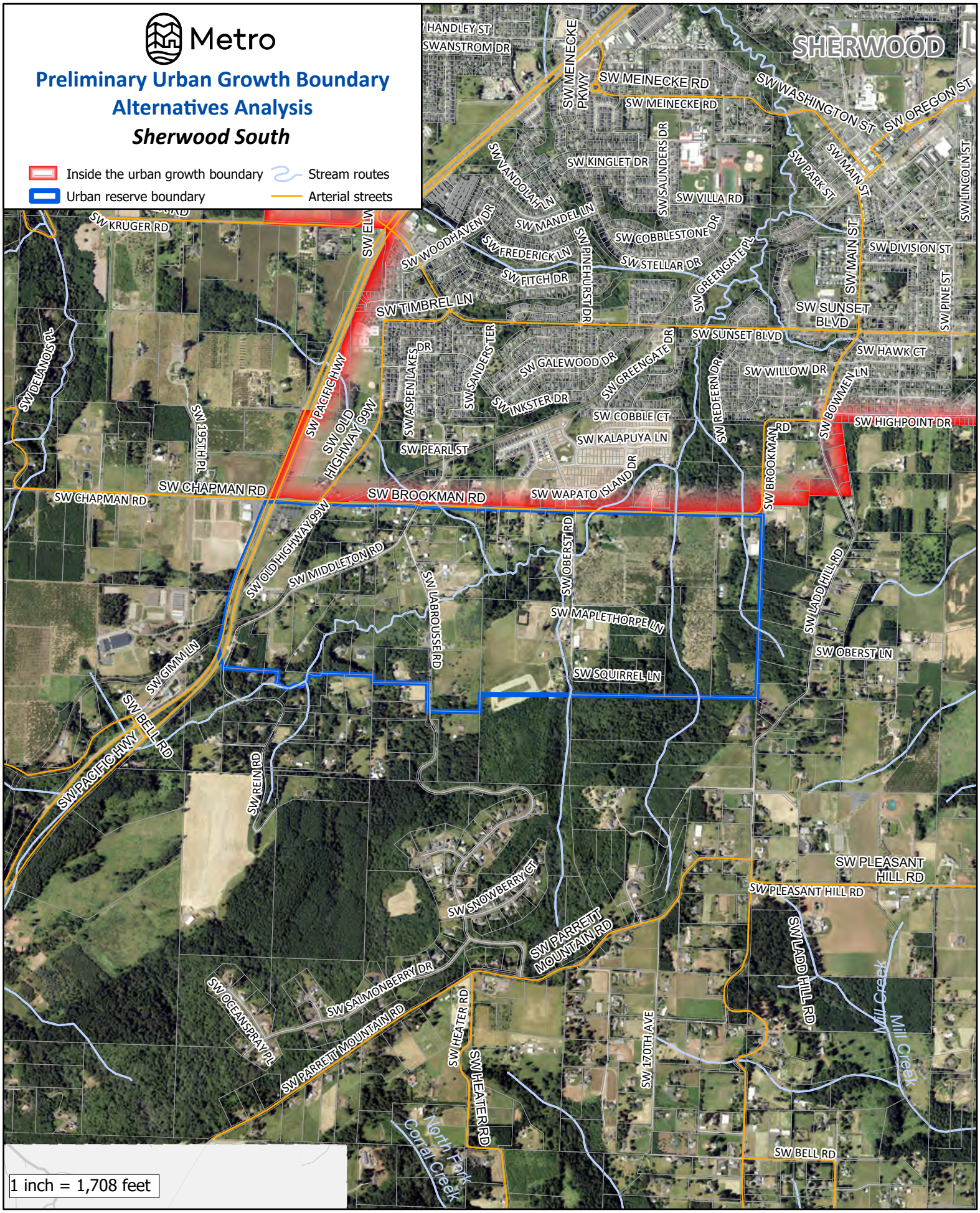

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SHERWOOD WEST URBAN RESERVE

Total Reserve Area	1,205 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	1,157 acres
Gross Vacant Buildable Area	797 acres
Net Vacant Buildable Area	**594 acres**

The Sherwood West Urban Reserve is located on the west side of Sherwood and stretches from SW Lebau Road and SW Scholls-Sherwood Road in the north to SW Chapman Road in the south. The UGB constitutes most of the urban reserve's eastern boundary. Those portions of the urban reserve not bordering the UGB are adjacent to rural reserves. Sherwood West generally slopes uphill from east to west, with the highest elevations in the reserve's southwest portion. Chicken Creek flows toward the northeast through the central portion of the reserve and has several tributaries. Access to the reserve north of Chicken Creek is provided by SW Roy Rogers Road, SW Scholls-Sherwood Road, and SW Elwert Road. Access to the area south of Chicken Creek is provided by SW Elwert Road, SW Edy Road, SW Kruger Road, and SW Chapman Road. The southern portion of the reserve is adjacent to and includes sections of Highway 99W.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The UGB forms the entire eastern boundary of the Sherwood West Urban Reserve, with the exception of the roughly half-mile portion of that runs along SW Roy Rogers Road between Sherwood city limits and SW Scholls-Sherwood Road. There is no natural or built feature along this section of SW Roy Rogers Road or along the northern edge of the reserve that, under this analysis, would be considered to provide a transitional buffer between urbanized and rural lands. Even assuming SW Scholls-Sherwood Road, SW Lebeau Road, and SW Roy Rogers Road are developed to urban arterial standards, the roads themselves would not provide a clear transition area between urban and rural uses. Additional buffers may warrant being incorporated into the planning and design of future development along these roadways.

Chicken Creek and a tributary's riparian corridors, as well as some steeper topography, are natural features that would serve as transitional buffer areas along the majority of the western edge of the reserve. However, there is a grouping of rural residences south of SW Edy Road that abuts the reserve with no transition zone. There is also no natural feature that would provide a complete transitional buffer between the reserve and adjacent rural lands to the south; nonetheless, an established equestrian center that is about a quarter mile south of the reserve could function as a kind of partial buffer for the rural uses further south, as this built facility is larger than typical rural development. Additional (new) buffers between rural lands and future urban development could therefore be warranted along the pocket of rural residences south of SW Edy Road and, to a lesser extent, along the southern edge of the reserve.

Overall, there are natural or built features that would provide a transition between urban and rural lands for just over half of the reserve's edges.

The Sherwood West Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the 'Introduction and Methodology' section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within the Sherwood West Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Sherwood West Urban Reserve and the other 19 urban reserves are given a "high" score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Sherwood is the expected governing body for this reserve, once urbanized. The city has adopted riparian habitat protection measures that, as part of the Tualatin Basin Natural Resource Coordinating Committee's protection program, comply with applicable requirements of UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover approximately 229 acres of the reserve. The large majority of these habitat areas is associated with Chicken Creek, which flows northeast through the center of the reserve. It appears from 2023 aerial imagery that some of the mapped upland habitat – including portions of a 70-acre mapped upland habitat area in the northern portion of the reserve connecting to Chicken Creek and near to Goose Creek in the southern portion of the reserve – has been removed since the habitat inventory was completed in the early 2000s.

There is also a significant amount of riparian and upland wildlife habitat associated with West Fork Chicken Creek, which generally flows southeastward to join Chicken Creek north of SW Edy Road near to SW Elwert Road. Portions of both the Chicken Creek and West Fork Chicken Creek corridors have adjacent steep slopes, though the latter water body has a larger amount of adjacent steep slopes. The habitat areas associated with West Fork Chicken Creek are less susceptible to impacts from urban development, as they are more isolated and contain more adjacent steep-sloped areas.

The aforementioned 70-acre upland habitat in the northern portion of the reserve, however, is very susceptible to impacts from urbanization; its size, location, and flatter topography could make it more attractive for development, including with new road connections.

A power line easement roughly parallels the Chicken Creek corridor through the reserve. The easement can provide some additional level of protection for the habitat resources because development opportunities would be limited in the easement. In addition, the habitat corridor along Chicken Creek ranges in width from 500 feet to well over 1,000 feet, a distance which may discourage new urban connections across the stream.

The smaller habitat area associated with Goose Creek is also susceptible to impacts from urbanization, depending on the layout of future development, including roadways.

Generally, urban development of most of the mapped regionally significant fish and wildlife habitat areas could be avoided; however, some impacts would be expected to the large upland habitat area in the north of the reserve and possibly the habitat associated with Goose Creek.

The Sherwood West Urban Reserve is given a "medium" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Sherwood Town Center is the closest 2040 Growth Concept designated center to the reserve. It is a relatively small town center of approximately 88 acres, located to the southwest of the reserve area at the intersection of the Highway 99W and SW Tualatin-Sherwood Road. The center serves the community of Sherwood and the surrounding rural areas at the southwest edge of the region. The land just outside the town center contains a significant amount of housing.

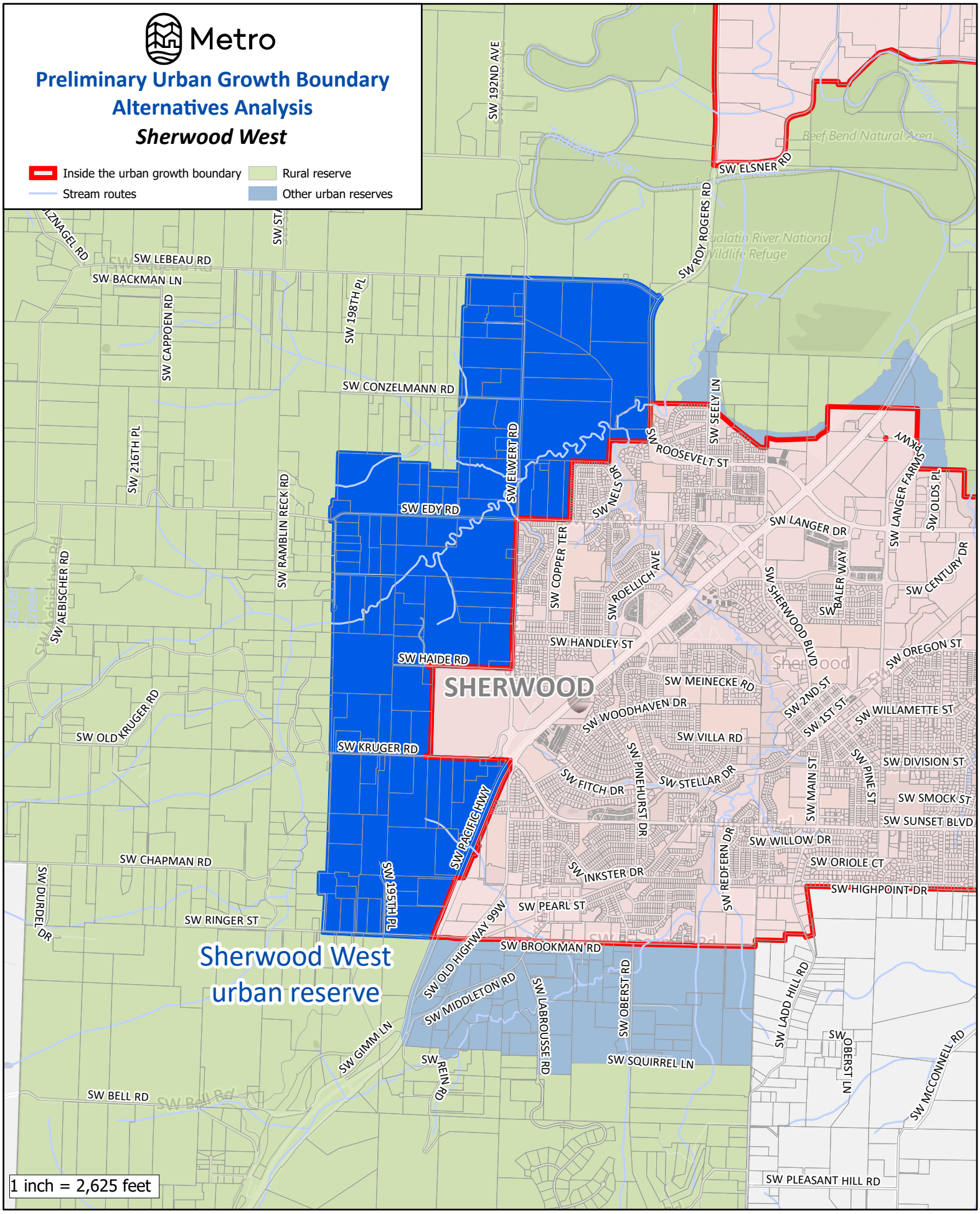
The northern and central portions of the reserve are only about half a mile from the town center via SW Roy Rogers Road and SW Edy Road, respectively. The southern portion of the reserve is more than a mile away via Highway 99W. There are currently no transit connections between the reserve and the town center.

The city's "Sherwood Town Center Plan", completed in 2013, encompasses an area larger than currently designated in the 2040 Growth Concept; the Langer Drive Commercial District portion of the plan area most closely aligns with the Metro designated area. The Langer Drive Commercial District is envisioned as a walkable and active shopping district complete with more pedestrian-oriented buildings. Metro's 2017 State of the Centers Atlas showed a very high jobs-to-housing ratio and a very low number of dwelling units per acre compared to other town centers in the region. Much of the town center is already built out with auto-oriented and large commercial retail uses, though there are numerous parking lots that may be able to accommodate redevelopment.

Urbanization of the reserve may contribute to some new development of the town center, given the size of the reserve and the proximity of its northern and central portions to the town center.

There is a 2040 Growth Concept designated corridor adjacent to the reserve along SW Edy Road between SW Elwert Road and SW Nursery Way. This relatively small corridor is less than 2,000 feet in length and is largely already built out with single-family homes. Urbanization of the reserve is therefore not anticipated to bring a significant contribution of new development of the corridor consistent with its purpose.

The Sherwood West Urban Reserve is given a "low-medium" score for this Metro Code factor in Attachment 3.



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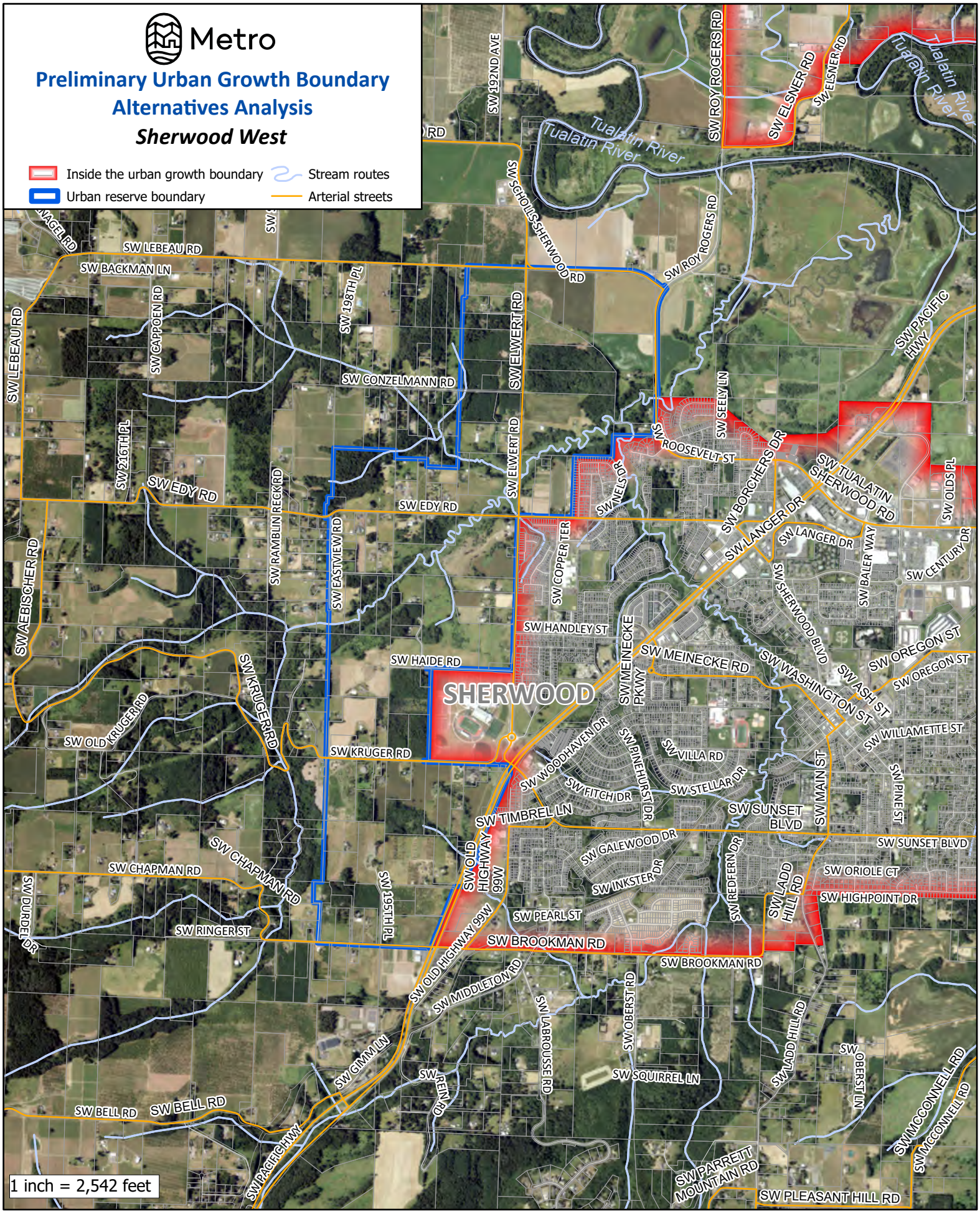
Metro

Preliminary Urban Growth Boundary Alternatives Analysis

Sherwood West

Inside the urban growth boundary
Urban reserve boundary
Stream routes
Arterial streets



1 inch = 2,542 feet

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WILSONVILLE SOUTHWEST URBAN RESERVE

Total Reserve Area	67 acres
Total Tax Lot Area in Reserve (without Right-of-Way)	64 acres
Gross Vacant Buildable Area	27 acres
Net Vacant Buildable Area	**20 acres**

The Wilsonville Southwest Urban Reserve is a somewhat triangularly shaped area on the south side of SW Wilsonville Road and only about 250 feet northwest of the Willamette River. The east side of the reserve is adjacent to the UGB and Wilsonville city limits and the reserve is otherwise entirely surrounded by rural reserve lands, which include the Metro-owned Graham Oaks Nature Park directly to the north across SW Wilsonville Road.

METRO CODE FACTORS

Clear transition between urban and rural lands, using natural and built features to mark the transition

The Corral Creek and Mill Creek riparian corridors on the west side of SW Wilsonville Road would provide a natural buffer between urban development of the Wilsonville Southwest Urban Reserve and rural land to the west. The Corral Creek riparian corridor would also provide a natural transition between urban and rural lands along the southern edge of the reserve. Even if SW Wilsonville Road were to be improved to urban arterial standards, the road itself will not provide the needed transition area between urban and rural lands to the north. Additional buffers will need to be incorporated into the planning and design of urban development along the northern edge to provide a clear transition from urban to rural uses. Overall, more than half of the urban-rural edge has a natural feature that would provide a transition between urban and rural lands.

The Wilsonville Southwest Urban Reserve is given a “medium” score for this Metro Code factor in Attachment 3.

Protection of farmland that is most important for the continuation of commercial agriculture in the region

As noted earlier in the ‘Introduction and Methodology’ section of this analysis, the urban and rural reserves adoption process already designated the most important land for commercial agriculture as rural reserves, and the most suitable land for urbanization as urban reserves. Designation as an urban reserve means, by definition, that farmland within Wilsonville Southwest Urban Reserve is not the most important for the continuation of commercial agriculture in the region.

The Wilsonville Southwest Urban Reserve and the other 19 urban reserves are given a “high” score for this Metro Code factor in Attachment 3.

Avoidance of conflict with regionally significant fish and wildlife habitat

The City of Wilsonville, which is the expected governing body for the Wilsonville Southwest Urban Reserve when it is eventually urbanized, has adopted a riparian habitat protection program that has been deemed to be in substantial compliance with UGMFP Title 13, *Nature in Neighborhoods*. The city will need to develop an upland habitat protection program for any area added to the UGB after December 28, 2005; that program will need to comply with upland habitat protection requirements of Title 13, which do allow for some impacts to habitat.

Regionally significant riparian and upland wildlife habitat not constrained by steep slopes or in public ownership cover approximately 32 acres of the reserve. However, it appears that the mapped upland habitat (about 28 acres in area) is in agricultural use. The remaining four acres are riparian habitat associated with Corral Creek along the southern edge of the reserve. The city's habitat protection program, the location of the habitat on the southern edge of the reserve, and some areas of steep slopes above the stream corridor will help protect the significant riparian habitat from urbanization.

The Wilsonville Southwest Urban Reserve is given a "high" score for this Metro Code factor in Attachment 3.

Contribution to the purposes of Centers and Corridors

The Wilsonville Town Center is the is the closest 2040 Growth Concept designated center to the Wilsonville Southwest Urban Reserve, located on the opposite (east) side of I-5 approximately 1.5 miles away from the reserve via SW Wilsonville Road. The town center, which primarily serves the city, is about 100 acres in size and is located a short distance from the terminus of the WES Commuter Rail line. The Route 4 "Wilsonville Road Line" of SMART, the City of Wilsonville's bus service, connects the town center to the Graham Oak Nature Park on the other side of SW Wilsonville Road from the reserve.

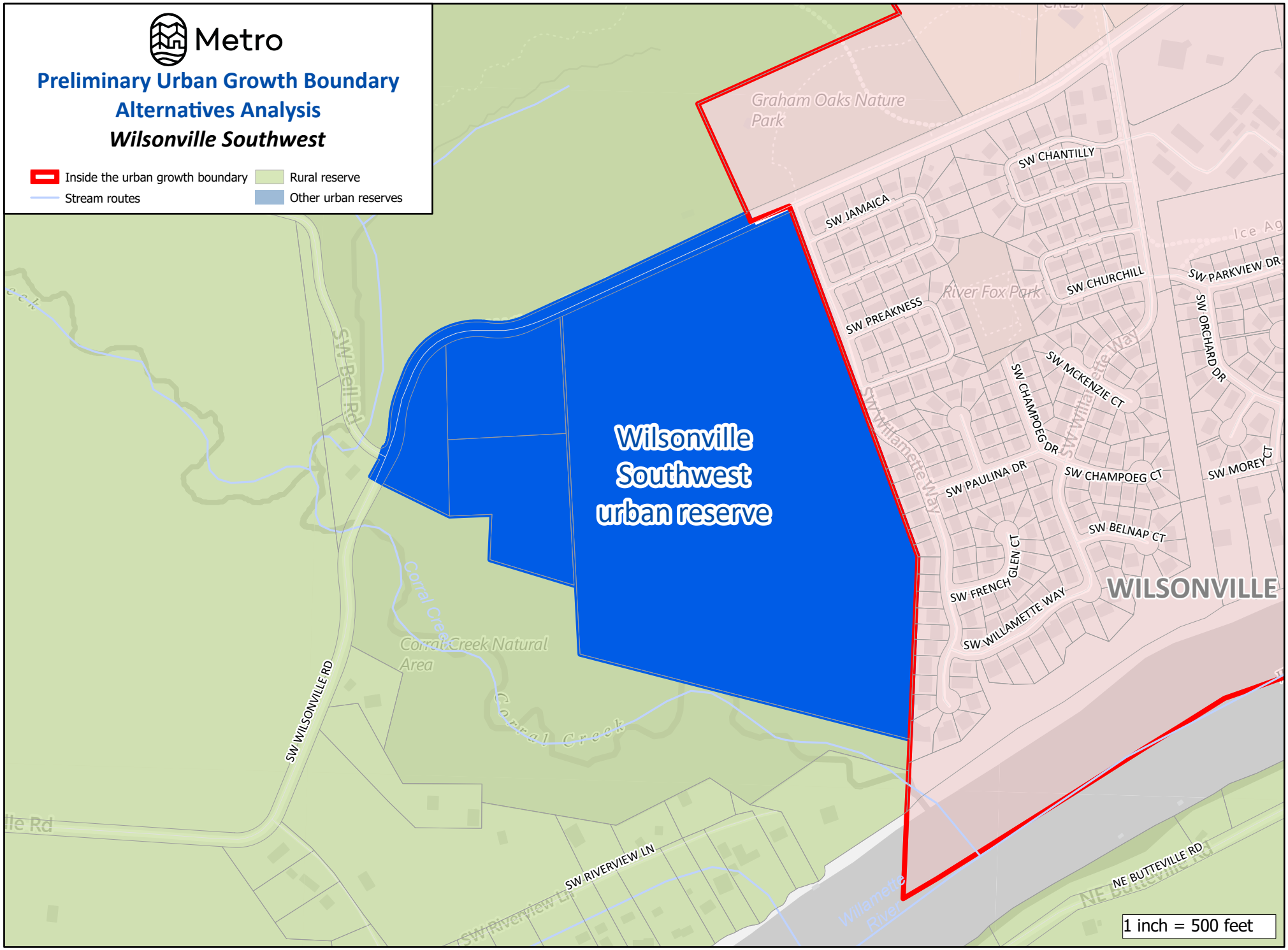
The City of Wilsonville's Town Center Plan envisions a vibrant, walkable destination that inspires people to come together and socialize, shop, live, and work. Metro's 2017 State of the Centers Atlas shows a higher-than-average jobs to housing ratio, but fewer people and dwellings per acre, compared with the other town centers in the region. The town center is considered in the atlas to have high access to parks.

The Wilsonville Southwest Urban Reserve was identified by Wilsonville as a location for long-term future urbanization. The city's 2007 '20 Year Look' process identified the reserve for potential residential uses. However, urbanization of the is not expected to contribute to the purpose and vision of the Wilsonville Town Center due to the distance between the two areas, the barrier of I-5, and the relatively small number of new households that could be developed in this reserve.

There is one 2040 Growth Concept designated corridor in Wilsonville that runs along SW Elligsen Road west of I-5 and then south along SW Parkway Avenue parallel to I-5 to the Wilsonville Town Center. The corridor is mostly built out with retail commercial or employment uses and some single-family and multi-family residential uses near the town center. Urbanization of the reserve is

not expected to have a meaningful impact on new development of the corridor consistent with the corridor's purpose, given the distance between the two areas and the small size of the urban reserve.

The Wilsonville Southwest Urban Reserve is given a "low" score for this Metro Code factor in Attachment 3.



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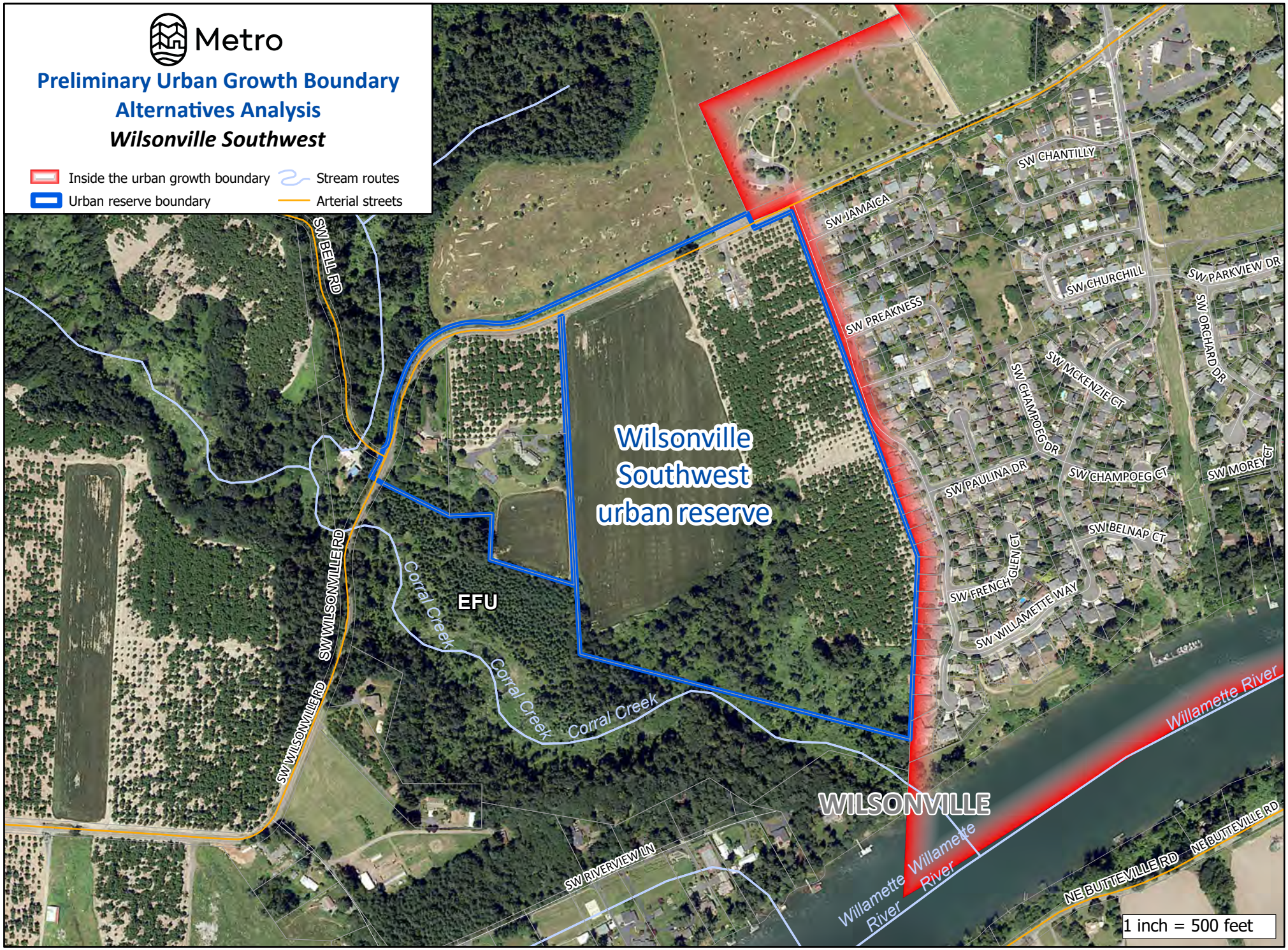

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Appendix 7A, Attachment 3: Metro Code Factors Analysis Results
2024 Urban Growth Report

	Metro Code 3.07.1425(c)(9)	Metro Code 3.07.1425(c)(7)	Metro Code 3.07.1425(c)(8)	Metro Code 3.07.1425(c)(6)
Urban Reserve	**Transition between urban and rural lands using natural and built features**	**Protection of farmland that is most important for continuation of commercial agriculture in the region**	**Avoidance of conflict with regionally significant fish and wildlife habitat**	**Contribution to the purposes of Centers and Corridors**
Beaver Creek Bluffs	High	High	Medium	Low
Bendemeer	High	High	Medium	Low
Bethany West	Low	High	Medium	Low
Borland	High	High	Low-Medium	Low
Brookwood Parkway (8B)	High	High	High	Low
David Hill	High	High	Medium	Low
Elligsen Road North	Low	High	Low-Medium	Low
Elligsen Road South	Low	High	Low-Medium	Low
Grahams Ferry	Medium	High	High	Low
Gresham East	Medium	High	Low-Medium	Low
Henrici	Medium	High	Medium-High	Low
Holcomb	Medium	High	Medium	Low
Holly Lane – Newell Creek Canyon	High	High	High	Low
I-5 East – Washington County	Low	High	Low	Low
Maplelane	High	High	Low-Medium	Low
Rosa	Medium	High	Low-Medium	Low
Sherwood North	Low	High	Low-Medium	Low
Sherwood South	High	High	Low-Medium	Low
Sherwood West	Medium	High	Medium	Low-Medium
Wilsonville Southwest	Medium	High	High	Low

APPENDIX 8 – Housing Needs Analysis (HNA)

Background

Detailed household characteristics are needed to forecast housing affordability, the willingness (or ability) of different households to acquire housing, and the tenure and type of housing that each kind of household might consider as a viable housing alternative. The material presented in this appendix offers a high-level overview of the methodology behind the housing needs analysis, including a supportive narrative describing key elements of the regional household forecast. Additional socioeconomic profiles of households are used in this HNA methodology and for the estimation of housing demand required by recent changes in housing statutes. New analytics have been incorporated into the 2024-44 Urban Growth Report (UGR) to meet the new regulatory requirements.

Additional information which specifies the forecasted number of households by household size (i.e., the number of persons in a household); income bracket of the household; and age bracket of the householder (i.e., the age of the head of household as defined by the US Census) are used in formulating the housing demand outlooks for this HNA. Typically, this data is commonly referred to as the Metro HIA forecast, where “H” stands for household size, “I” for income, and “A” for age. The HIA forecast are a series of three-way contingency tables that consist of a cross-classification of the three categorical variables.

We estimate a 2024 base-year of households by HIA, a forecast horizon-year of 2044 and every five years beginning with 2030 through 2050. There are three housing demand outlooks based on the details of the HIA.

The HIA forecast is a product derived from the Metro MSA 2024-44 regional forecast, representing a life-cycle evolution of existing householders as well as the addition of new householders to the region. US Census American Community Survey (ACS) annual regional demographic estimates and ACS Public Use Microsample (PUMS) 2020 5-year estimates of the MSA region are primary sources that inform the details to the socio-economic relationships of members of the households. Metro has been routinely producing the HIA forecast since 1995 for the Regional Transportation Plan (RTP) and travel demand modeling but has only recently in this UGR deployed this information for housing needs analysis.

What’s New?

- Oregon HB 2003 (adopted in 2019) – Relevant to Metro’s HNA, this bill adds specificity for the household income groups that should be considered when assessing needed housing. It also adds “middle housing” to the list of needed housing types.
- Oregon HB 2001 (adopted in 2019) –This bill fundamentally shifts Oregon's approach to housing planning by requiring cities and counties to allow "missing middle" housing in zones that allow detached single-unit housing.) [This HNA therefore considers an array of possible scenarios that will fundamentally shift the Metro region’s mix of future housing.] This bill also requires that Metro estimate existing and future housing. Assessment of existing housing needs (historic underproduction and housing for people experiencing houselessness) is a new provision and is described in more detailed in Appendix 8A.
- The 2024 UGR adds middle housing as another residential archetype in the HNA. The three housing types are 1-unit structures (i.e., single-family detached housing), middle housing (e.g., duplexes, triplexes, quadplexes, townhouses/rowhouses, accessory dwelling units (ADU), and

cottage clusters) (see RLIS meta data for more definitions of each archetypes: https://www.arcgis.com/sharing/rest/content/items/819b261a943b4e5a9a2e60a4be4c19f1/info/metadata/metadata.xml?format=default&output=html)

- Housing Demand: the Metro HIA forecast is used to inform and relate the demand for future housing by rent and price ranges for 5 different household segments based on HUD (Housing and Urban Development) categories of area median income (AMI), i.e., 30% AMI, 30-50% AMI, 50-80% AMI, 80-120% AMI, and over 120% AMI. Demand profiles for affordability and a willingness to pay stem from Metro's HIA forecast by relating selected HIA categories of households by size and income to the 3 housing archetypes in this HNA.
- Housing Supply: the Metro estimate of housing supply (derived from Metro's Buildable Land Inventory – BLI) has been revamped to use a pro forma real estate model to project single family, middle housing, and multifamily housing options (see BLI Appendix for additional details). The pro forma model estimates the highest and best use (HBU) possible for every vacant buildable tax lot and each existing site eligible for redevelopment. Residential types now include middle housing as a development option. Outdated redevelopment assumptions are replaced with the real estate pro forma model and a stabilized set of economic assumptions, evaluating feasible market alternatives and choosing the HBU on only the viable sites. This HNA incorporates this newer data into the capacity estimates to calculate need (i.e., a surplus or deficit).
- Housing Supply Range: this HNA considers alternating development density assumptions and possible end uses in the residential BLI to create a range on the supply-side which can be used in creating a range for the residential gap analysis. A mix of the three housing types is considered which creates a range of housing supply alternatives in addition to other variables.
- New information from Metro's Land Development Monitoring System (LDMS) informs these fundamental shifts in density assumptions from the change in future mixes of shares of housing archetypes. (see Residential Development Indicators Appendix for historical details).
- Housing Demand Range: past UGR's have created a range by assessing the housing demand using roughly 1 (and up to 2) standard deviation(s) from the baseline forecast. The HNA in this 2024 UGR assumes a slightly narrower range – an error band of +/- 20 percent from the baseline forecast of housing demand. Additional forecast range is instilled into the housing demand forecast by varying the housing preferences/choices of future households (i.e., changing the mix/share of single-family detached, middle housing, and multifamily which in itself creates a range of housing need scenarios).

Development of the HIA forecast (methodology overview)

The MSA forecast sets the expectation for the total number of people and households projected in the twenty-year forecast. This is derived as regular output of Metro's regional economic model. More specifically, the derivation of the regional household forecast is a product of a projection of age-specific household headship rates and a population forecast by age cohorts. (For more information about the regional forecast, please see the Regional Economic Forecast appendix.)

Additional information from the Census is folded into the regional MSA forecast to compute the necessary HIA forecast data. There are two main inputs and several key components in each which feed into the generation of the 20-year HIA forecast:

1. Metro MSA forecast:

   a. Population forecast by age
   b. Household forecast by age of householder
   c. Personal income forecast for the region
2. Census ACS data:
   a. H: ACS 1-year, Table B1101 (Households Type by Householder Size)
   b. I: ACS 1-year, Table B19001 (Household Income in the past 12 months, nominal dollars)
   c. A: ACS 1-year, Table B25007 (Tenure by Age of Householder)
   d. IA: ACS 1-year, Table B19037 (Age of Householder by Household Income)
   e. HIA: ACS 2020 PUMS 5-year Table

The HIA forecast is a statistical tabulation which describes future changes in characteristics of households which are key to impacting the taste and preferences of future housing demand. This is shown in a three-variable contingency table or cross-tabulation matrix for the base year (Census year 2020) and future years in 5-year increments. 2024 and 2044 are needed interpolated years for the UGR. These three variables in the contingency table are (H) household size, (I) household income bracket and (A) householder age, hence the name HIA forecast. These variables are known to be highly correlated with housing affordability, willingness/ ability to pay for different forms of shelter, tenure (i.e., own or rent), and structure type size (e.g., single family domiciles or multifamily rental units), as well as other attributes that form individual housing preferences for every subgroup of households.

Current and historical estimates of HIA data can be tabulated from Census PUMS survey data for the Portland MSA, but projections or forecasts are unavailable. However, combining the Metro forecast and current year household characteristics available from the Census allows us to produce the necessary forecast information. The methodology for producing future year HIA contingency tables, i.e. the HIA forecasts, begins with Census HIA data which then extrapolate summary level characteristics of each variable into future years using a statistical technique called “iterative proportional fitting” (IPF) or “matrix scaling.” The IPF procedure adjusts (or forecasts) a known distribution from one data set (in our case the HIA base year data given by ACS PUMS) using (sub)totals reported in another data set (in our case it is the Metro regional forecast).

A table nearby illustrates the categories for household size, income and age. The reader should note that these are not the HIA tables. They are merely summary tabulations of the more complex statistical tables.

Household Size Categories							(excludes pop in GQ)
	1 person	2-person	3-person	4-person	5 or more		average HH size
2020	27.2%	36.0%	15.4%	12.9%	8.5%	100.0%	2.52
2030	30.1%	35.8%	16.5%	12.5%	5.1%	100.0%	2.32
2040	31.3%	35.6%	16.9%	12.4%	3.9%	100.0%	2.25
2050	32.0%	35.5%	17.1%	12.2%	3.1%	100.0%	2.21

Household Income Brackets									
	under $15,000	$15,000 - $24,999	$25,000 - $34,999	$35,000 - $49,999	$50,000 - $74,999	$75,000 - $99,999	$100,000 - $149,999	$150,000 and over	
2020	7.5%	5.9%	6.6%	10.3%	16.8%	13.8%	19.1%	20.0%	100.0%
2030	8.3%	6.9%	7.5%	11.5%	16.1%	12.7%	18.1%	19.0%	100.0%
2040	8.6%	7.4%	7.9%	12.1%	15.9%	12.2%	17.7%	18.4%	100.0%
2050	8.8%	7.6%	8.1%	12.4%	15.7%	11.9%	17.4%	18.1%	100.0%

Household Age Brackets (Head of Household)									
	under 25	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 to 84	85 & over	
2020	3.3%	16.9%	19.9%	17.9%	17.8%	15.0%	6.6%	2.6%	100.0%
2030	3.3%	14.1%	18.5%	18.2%	16.7%	14.8%	10.2%	4.4%	100.0%
2040	3.4%	13.3%	16.6%	17.6%	17.3%	15.0%	10.9%	6.0%	100.0%
2050	3.3%	12.6%	15.5%	16.6%	17.3%	15.8%	11.8%	7.3%	100.0%

Figure 1: Truncated summary tables of the three variables contained in the HIA forecast for the Portland MSA (note: not HIA contingency tables)

The table set, above, tabulate the subtotals reported from the Metro HIA forecast. The standard HIA forecast includes 5-year forecast increments, beginning in 2020. HIA data are interpolated for the base year and the twenty-year forecast (i.e., 2024 and 2044) for this UGR. The tables are expressed as percentages of total households so the reader may see how the marginal distributions of each data concept changes over time. (The figures may be reverted to the original set of numbers by multiplying the share in each by the number of total households in each year.)

A household consists of related or unrelated individuals residing in the same domicile. In general, the average household size in the MSA is expected to lower incrementally each year in the forecast, declining from a regional average of 2.5 persons per household in 2020 to 2.2 persons per household in 2050. This is consistent with our expectation of fewer births and a rising number of families delaying child rearing until they are older. Most households are made up of a single person or a couple, with a plurality being a two-person household. It is also notable that the MSA forecast anticipates a much steeper drop off in larger families (i.e., households of 5 or more people).

The nearby table also shows income brackets of households delineated per US Census categories. The Census data differ from HUD income brackets as HUD (Housing and Urban Development) shows data for family income brackets as percentile of area median income statistics by persons in a family, a somewhat different measurement than what is provided by Census data for the region. The Census household income brackets can be raked up or down to approximate the area median income limits prescribed by HUD. (This is done in a later step in the methodology.) Census delineation fit with our methodology for forecasting households and income brackets. The IPF approach is the chosen method we use to forecast future HIA data for the region.

The HIA forecast of real income (set at year 2020 purchasing power) for households making less than $50,000 shows the number of households in the 4 lowest income brackets, rising in this forecast, with the share of households in 2020 at 30.3% and creeping higher to 36.9% by 2050. The average household income of the richest income bracket (i.e., $150,000 and over) is calculated at $870,300 and rising to $1.3 million by 2050. Please note that this is an average for just the highest Census income bracket and since it is an average is distorted by very high earners; a median value for this bracket would be more representative, but we are unable to calculate that statistic because of the confidential nature imposed on Census information. Without being accused of being too pedantic, we note that since the share of lower income households is on the rise, then the share of higher income households is necessarily on the decline and to the degree to which some in this subset are very high earners it does indeed distort the perception of average wealth for the highest income earners in the highest bracket.

It has been widely noted that population growth is slowing and that the median age of people residing in the MSA is on the rise. Reflective of this aging demographic trend, the share of householders in the MSA in retirement and post-retirement age cohorts is on the rise too. In 2020, fewer than 1 in 4 households were in these two retirement-age cohorts. By 2050, the share of older householders is expected to grow to over 1 in 3, more than a 10-percentage point swing higher.

The full HIA contingency tables are much too large and complex to be shown in a printed appendix. Instead, we offer a stylized illustration of what an HIA forecast might look like. In this illustration, it represents a table of households for 8 income bracket and 5 household sizes and for 5 different household age cohorts.

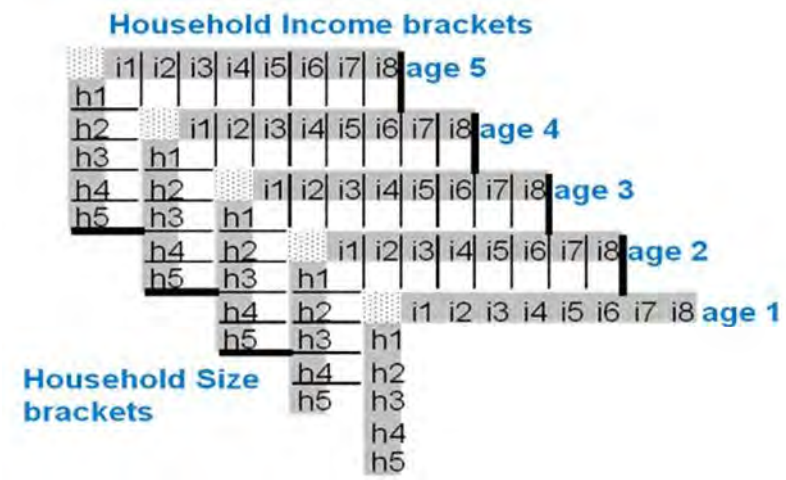


Figure 2: Truncated illustration of the HIA contingency table for a single forecast year.

Projecting Housing Demand from the HIA forecast (methodology overview)

Census data is the foundation by which Metro projects the HIA forecast and housing demand. Some definitional adjustments in the Census data are required to harmonize with state regulations which rely on HUD income limits to prescribe needed housing. Initial projections of housing demand are based on households assumed to spend a certain percent of their income on shelter costs using current trend information. Scenarios or alternative growth projections on housing demand will assume to alter these current trends.

Forecast steps of projecting household HIA brackets into initial housing demand:

1. Collect the HIA brackets of household size and age into household life stages
2. Divide the number of households in the region into the separate life stages (from step 1) and estimate the likely tenure of each (i.e., rent or own)
3. Split and combine the real household income bracket projections (Census definitions) to HUD's AMI limits
4. Reconcile the life stages and household income brackets with HUD AMI limits (from step 2 and 3)
5. Summarize the historical affinity of renters to affordable housing choices (i.e., market rate housing vs. subsidized housing final demand forecast) (from step 4)
6. Summarize the historical affinity of owners to affordable housing choices (i.e., market rate vs. subsidized housing choices final demand forecast) (from step 4)
7. Assign historic structure type preferences by tenure, life cycle and HUD AMI income groups (initial baseline derivation from historic final demand data) (from step 5 and 6)
8. Alter future preferences (create alternate scenarios of housing available) subject to current and expected regulatory production limits (i.e., availability of buildable supply, type of housing entitlements, i.e., zoning codes, and state/ Metro land use regulations). This step alters the historic structure type preferences (in step 7) to meet anticipated entitlement regulations, the state's Metropolitan housing rule (i.e., at least 50% multifamily or attached housing), and state housing regulations requiring allowances for middle housing.

Household Life Stage Assumptions

The HIA forecast underlies the tabulation of households into separate life cycle stages. The HIA data is a tabular array of 5 household size brackets (1-person to 5 or more person households), 8 income brackets (constant 2020 dollar purchasing power), and 5 age brackets. The cross-tabulation of these household characteristics creates a data array of 320 unique household types (320 = 5 x 8 x 5). Each of the 320 household types will have varying degrees of affinity to tenure and structure type, which we call preferences. The majority preference type for each individual housing type, though unique, are not so different that they can't be simplified and summarized by life cycle. The methodology exploits our understanding of the usual aging process of households and the adjacency of HIA categories that share nearly the same degree of and life cycle characteristics in order to streamline both the concept and the actual computational load of estimating and forecasting housing preferences.

HIA household characteristics

household sizes	income brackets	age brackets
1-person	under $15,000	under 25 years old
2-person	$15,000 - $24,999	25 to 44 years old
3-person	$25,000 - $34,999	45 to 54 years old
4-person	$35,000 - $49,999	55 to 64 years old
5 or more	$50,000 - $74,999	65 years or older
	$75,000 - $99,999	
	$100,000 - $149,999	
	$150,000 and over	

Figure 3: Definition of the HIA household and individual attribute levels

The close affinities of some household types and the historic majority preferences of these similar household types are streamlined (i.e., collapsing of categories) by household size, age and other life cycle considerations into just seven life cycle cohorts. Naming of the seven life cycle cohorts are shown in a nearby table. Interpolation of the HIA income brackets is then computed, splitting and rearranging the Census derived income brackets to better match to latter calculation of households by HUD AMI limits. Conceptually, the HIA household forecast reveals the aging of households and the alterations we anticipate happening to them as they age through the various life stages. We show the Metro MSA changes to these life cycles in a nearby table which has households as percentage shares of the entire region.

Base year, 2024 Life Cycle of Households in the MSA

2024: MSA estimate = 1,073,400 total households

Income Category	Young Households, under 25 years old	Adults 25-44 without kids	Families 25-44 with kids	Single adults, 45-64	Adults 45-64 in 2+ person household	Older (65+) single adult household	Older (65+) couples and multigenerational households	Total
< $20K	0.6%	1.5%	1.0%	2.3%	1.2%	3.7%	0.8%	**11.2%**
$20K to $39K	0.7%	1.9%	1.9%	1.8%	1.9%	4.1%	1.9%	**14.2%**
$40K to $59K	0.7%	2.6%	2.2%	1.6%	2.6%	2.1%	2.6%	**14.4%**
$60K to $99K	0.7%	4.8%	4.1%	1.8%	5.2%	1.8%	4.1%	**22.5%**
$100K to $149K	0.3%	3.7%	3.8%	0.9%	6.2%	0.7%	2.9%	**18.4%**
$150K to $199K	0.03%	1.6%	2.0%	0.4%	3.6%	0.2%	1.3%	**9.2%**
≥ $200K	0.05%	1.2%	2.4%	0.3%	4.6%	0.3%	1.2%	**10.1%**
Total	**3.2%**	**17.2%**	**17.4%**	**9.1%**	**25.4%**	**12.8%**	**14.8%**	100%

Figure 4: Tabulation of 2024 MSA HIA estimate by life cycle

Forecast, 2044 Life Cycle of Households in the MSA

2044: MSA forecast = 1,276,900 total households

Income Category	Young Households, under 25 years old	Adults 25-44 without kids	Families 25-44 with kids	Single adults, 45-64	Adults 45-64 in 2+ person household	Older (65+) single adult household	Older (65+) couples and multigenerational households	Total
< $20K	0.7%	1.3%	0.9%	2.5%	1.3%	4.7%	1.0%	**12.4%**
$20K to $39K	0.8%	1.7%	1.7%	1.8%	2.1%	5.2%	2.5%	**15.7%**
$40K to $59K	0.8%	2.3%	1.9%	1.7%	2.7%	2.6%	3.2%	**15.1%**
$60K to $99K	0.7%	3.8%	3.3%	1.7%	5.0%	2.0%	4.6%	**21.0%**
$100K to $149K	0.3%	3.1%	3.1%	0.8%	6.1%	0.8%	3.4%	**17.6%**
$150K to $199K	0.03%	1.3%	1.7%	0.4%	3.6%	0.2%	1.5%	**8.7%**
≥ $200K	0.04%	1.0%	2.0%	0.3%	4.5%	0.3%	1.4%	**9.5%**
Total	**3.3%**	**14.5%**	**14.4%**	**9.1%**	**25.2%**	**15.9%**	**17.5%**	100%

Figure 5: Tabulation of 2044 MSA forecast by HIA households by life cycle.

The two tables succinctly illustrate the distributional changes we anticipate in the composition and types of households between 2024 and 2044. As a household's age, income, and the number of dependents changes for a household, the household moves from one phase into another. The housing affinity, that is the preference to own or rent and the type and size of a structure, is determined by these characteristics and then altered as events in a household adjust to new additions or subtractions within the household. As households age, these changes could be brought about by having more/less income, more/fewer individuals add/subtracted to/from the household, and the inevitable aging of the household. Through different life stages, we can approximate the housing preferences of the region, at least an initial baseline determined by historical data and observed final demand statistics.

Tenure calculations and assumptions

A projected shift in tenure is thus produced by the underlying HIA forecast. The tenure rate assumption for households residing in the MSA in 2024 is estimated at 61% owners and 39% renters. These rates are projected to change in 2044 to be 62% owners and 38% renters. This is a relatively small change in projected tenure and will likely induce only a small shift in future housing preferences, other things being equal. The alteration in tenure splits is due primarily to the underlying shift implied by the demographics and socioeconomic projections embedded in the HIA forecast. However, this mild conclusion is before housing regulations and the availability of housing supplies are considered. The shift in the final demand of housing preference will likely be altered considerably when preferences are balanced against available housing supply and prevailing housing regulations.

Among renters we see a greater proportion that are in the lower income brackets. Those earning below $60,000 dollars in 2024 represent 57% of households that rent. In 2044, that share edges higher to 60.7% of renters. Nearly half of all renters in 2024 are between the ages of 25 and 44, with or without kids. In 2044, the share of renters between the ages of 25 and 44 slips lower to 41.6% from 47.9% of all renters.

Base year (2024) and Forecast (2044): Households by Life Cycle and HUD AMI limits

Renters, 2024

	Renters							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, renters in 2024**
< $20K	1.6%	3.2%	2.1%	4.1%	1.7%	5.3%	0.6%	18.6%
$20K to $39K	1.8%	4.0%	4.0%	2.8%	2.3%	4.4%	0.9%	20.3%
$40K to $59K	1.8%	5.4%	3.5%	1.9%	2.5%	1.9%	1.0%	18.0%
$60K to $99K	1.7%	8.6%	4.9%	1.7%	3.9%	1.4%	1.1%	23.3%
$100K to $149K	0.7%	5.0%	3.0%	0.6%	3.0%	0.5%	0.5%	13.3%
$150K to $199K	0.04%	1.9%	0.7%	0.2%	0.7%	0.0%	0.2%	3.8%
≥ $200K	0.1%	1.1%	0.5%	0.2%	0.5%	0.2%	0.2%	2.7%
Total	**7.6%**	**29.2%**	**18.7%**	**11.6%**	**14.7%**	**13.7%**	**4.5%**	**100.0%**
							% all renters in 2024:	39%

Renters, 2044

	Renters							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, renters in 2044**
< $20K	1.7%	2.9%	1.9%	4.5%	1.8%	6.9%	0.8%	20.6%
$20K to $39K	2.0%	3.8%	3.6%	2.8%	2.6%	5.8%	1.2%	21.8%
$40K to $59K	1.9%	4.9%	3.1%	2.1%	2.6%	2.4%	1.3%	18.3%
$60K to $99K	1.7%	7.1%	4.0%	1.6%	3.8%	1.6%	1.3%	21.0%
$100K to $149K	0.7%	4.3%	2.6%	0.6%	3.0%	0.5%	0.6%	12.3%
$150K to $199K	0.04%	1.6%	0.6%	0.2%	0.7%	0.0%	0.2%	3.5%
≥ $200K	0.1%	0.9%	0.4%	0.1%	0.5%	0.2%	0.2%	2.5%
Total	**8.1%**	**25.4%**	**16.1%**	**12.0%**	**15.2%**	**17.5%**	**5.6%**	**100.0%**
							% all renters in 2044:	38%

Figure 6: renter households in 2024 and 2044

Owners, 2024

	Owners							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, owners in 2024**
< $20K	0.1%	0.4%	0.3%	1.1%	0.9%	2.7%	0.9%	6.4%
$20K to $39K	0.1%	0.5%	0.5%	1.2%	1.6%	3.9%	2.6%	10.3%
$40K to $59K	0.1%	0.7%	1.3%	1.4%	2.6%	2.2%	3.6%	12.0%
$60K to $99K	0.1%	2.3%	3.6%	1.9%	6.1%	2.0%	6.0%	22.0%
$100K to $149K	0.1%	2.9%	4.2%	1.0%	8.3%	0.8%	4.4%	21.7%
$150K to $199K	0.02%	1.4%	2.9%	0.5%	5.5%	0.3%	2.0%	12.6%
≥ $200K	0.04%	1.3%	3.7%	0.5%	7.3%	0.4%	1.8%	14.9%
Total	**0.4%**	**9.5%**	**16.6%**	**7.5%**	**32.4%**	**12.3%**	**21.4%**	**100%**
							% all owners in 2024:	61%

Owners, 2044

	Owners							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, owners in 2044**
< $20K	0.1%	0.3%	0.3%	1.2%	0.9%	3.3%	1.1%	7.3%
$20K to $39K	0.1%	0.5%	0.4%	1.1%	1.7%	4.9%	3.3%	12.0%
$40K to $59K	0.1%	0.6%	1.1%	1.4%	2.7%	2.7%	4.4%	13.1%
$60K to $99K	0.1%	1.8%	2.8%	1.7%	5.7%	2.2%	6.7%	21.0%
$100K to $149K	0.1%	2.3%	3.4%	1.0%	8.0%	0.9%	5.1%	20.8%
$150K to $199K	0.02%	1.2%	2.3%	0.4%	5.4%	0.3%	2.3%	12.0%
≥ $200K	0.04%	1.0%	2.9%	0.4%	7.0%	0.4%	2.1%	13.9%
Total	**0.4%**	**7.7%**	**13.3%**	**7.3%**	**31.4%**	**14.9%**	**24.9%**	**100%**
							% all owners in 2044:	62%

Figure 7: owner households in 2024 and 2044

Of the 6 in 10 households that choose to own, those having income below $60,000 represent 28.7% of households that own their own home in 2024. This share in 2044 edges a bit higher to 32.3% of owners

in the future. Young adult households (below 45 years of age) have a lower propensity to own, which is understandable because housing prices are very high relative to their generally lower earning potential. As householders exceed 45 years old, the propensity to own is considerably higher. Older households are more likely to include more people in them (i.e., more dependents), have greater earning potential, more accumulated wealth and thus have a greater affinity to own.

Income and Housing Affordability

Housing is essential and everyone should have a place to live, but housing is also a scarce resource. Supply and demand determine the price of housing. Those with more income generally buy more housing than those with less. Households who can't afford to buy tend to rent. This is borne out in Census data which was discussed in a previous section.

There is also a phenomenon that wealthier households generally spend less of their income on housing. This is true with other goods too. The logic behind this becomes clear when one considers that households, despite having more income, will limit their housing expenditure when their need for housing becomes sated. Regardless of wealth, a household can only consume a limited amount of housing before the marginal propensity to consume more housing soon hits its limit and encounters diminishing returns/ benefits.

The percent of income spent on housing varies by tenure, household income, and life cycle (a combination of age and household size). Generally, renters spend proportionally more than owners. Younger households also spend proportionally more than older households. Lower income households generally spend a proportionally more on housing. The Census data finds each data axis highly correlated in some fashion with housing expenditure and housing choice. The tables nearby detail the summary relationships between income spent and household income; note the details of these percentages differ slightly when broken out by life cycle (i.e., household age and family size composition).

Percent Income Spent on Housing, All household tenures

	[0%, 15%)	[15%, 20%)	[20%, 25%)	[25%, 30%)	[30%, 35%)	[35%, 40%)	[40%, 45%)	[45%, 50%)	[50%, 100%]
< $20K	6%	3%	3%	6%	3%	2%	3%	2%	71%
$20K to $39K	16%	4%	3%	4%	6%	7%	8%	9%	43%
$40K to $59K	19%	3%	8%	12%	16%	13%	9%	6%	13%
$60K to $99K	24%	12%	21%	18%	10%	6%	4%	2%	3%
$100K to $149K	32%	28%	22%	11%	4%	2%	1%	1%	0%
$150K to $199K	51%	28%	14%	4%	2%	1%	0%	0%	0%
≥ $200K	77%	15%	5%	2%	1%	0%	0%	0%	0%
Total	**32%**	**14%**	**13%**	**10%**	**6%**	**5%**	**3%**	**3%**	**14%**

Figure 8

Percent Income Spent on Housing, Renter households

	[0%, 15%)	[15%, 20%)	[20%, 25%)	[25%, 30%)	[30%, 35%)	[35%, 40%)	[40%, 45%)	[45%, 50%)	[50%, 100%]
< $20K	1%	2%	3%	7%	2%	2%	2%	2%	80%
$20K to $39K	1%	2%	3%	5%	8%	10%	10%	12%	50%
$40K to $59K	2%	3%	11%	18%	22%	18%	11%	6%	9%
$60K to $99K	6%	18%	32%	23%	11%	5%	3%	1%	2%
$100K to $149K	27%	40%	23%	8%	2%	0%	0%	0%	0%
$150K to $199K	57%	32%	8%	3%	1%	0%	0%	0%	0%
≥ $200K	86%	10%	3%	0%	0%	0%	0%	0%	0%
Total	12%	13%	14%	12%	9%	7%	5%	4%	24%

Figure 9

Percent Income Spent on Housing, Owner households

	[0%, 15%)	[15%, 20%)	[20%, 25%)	[25%, 30%)	[30%, 35%)	[35%, 40%)	[40%, 45%)	[45%, 50%)	[50%, 100%]
< $20K	16%	6%	5%	6%	4%	2%	3%	2%	55%
$20K to $39K	37%	6%	5%	4%	3%	4%	5%	4%	32%
$40K to $59K	38%	4%	5%	6%	9%	8%	7%	6%	17%
$60K to $99K	36%	8%	14%	15%	10%	7%	4%	2%	3%
$100K to $149K	35%	22%	22%	12%	5%	2%	1%	1%	1%
$150K to $199K	50%	27%	15%	5%	2%	1%	0%	0%	0%
≥ $200K	76%	16%	6%	2%	1%	0%	0%	0%	0%
Total	45%	15%	12%	8%	5%	3%	2%	2%	8%

Figure 10

The tables above summarize what economist denote as “willingness to pay”. It factors in what is observed in the current trends of real estate markets in the MSA region.

Reconciling HUD income limits, household income and age brackets

Harmonizing Census household income, age and size brackets with HUD income limits required extensive interpolation of various categories. Many of the Census income brackets spanned across the AMI limits for HUD, see nearby table for a brief definition of these limits. The results of interpolating Census income brackets with HUD AMI limits are shown in the body of the following illustration, where extremely low income (ELI) (<30% AMI), very low income (VLI) (30-50% AMI), low income (LI) (50-80% AMI), moderate income (80-120% AMI), and above moderate (>120% AMI). Housing for households earning less than 80 percent area median income is generally understood to require government assistance. Accordingly, households with low income, very low income, and extremely low income depicted in Figure 11 would require government assistance.

	1 person	2 person	3 person	4 person	5+ person
Less than $10,000	ELI	ELI	ELI	ELI	ELI
$10,000 to $14,999	ELI	ELI	ELI	ELI	ELI
$15,000 to $19,999	ELI	ELI	ELI	ELI	ELI
$20,000 to $24,999	ELI / VLI	ELI	ELI	ELI	ELI
$25,000 to $29,999	VLI	ELI / VLI	ELI	ELI	ELI
$30,000 to $34,999	VLI	VLI	ELI / VLI	ELI / VLI	ELI
$35,000 to $39,999	VLI / LI	VLI	VLI	VLI	ELI
$40,000 to $44,999	LI	VLI	VLI	VLI	ELI / VLI
$45,000 to $49,999	LI	VLI / LI	VLI	VLI	VLI
$50,000 to $59,999	LI	LI	VLI / LI	VLI / LI	VLI
$60,000 to $74,999	LI/Mod	LI/Mod	LI	LI	VLI / LI
$75,000 to $99,999	Mod / Above Mod	Mod	LI/Mod	LI/Mod	LI
$100,000 to $124,999	Above Mod	Mod / Above Mod	Mod / Above Mod	Mod	LI/Mod
$125,000 to $149,999	Above Mod	Above Mod	Above Mod	Mod / Above Mod	Mod
$150,000 to $199,999	Above Mod	Above Mod	Above Mod	Above Mod	Mod / Above Mod
$200,000 or more	Above Mod	Above Mod	Above Mod	Above Mod	Above Mod

Figure 11: conversion of Census income brackets into HUD household income categories

Housing demand and household characteristics from the HIA forecast

Housing demand projections, though computationally sophisticated, are conceptually fairly straight forward as a verbal explanation. Household fall into observable stages in a household life cycle. In each category we understand how old a householder will be, the projected incomes of these households, and include a forecast of future household sizes. Applying what we observe of typical households in each life cycle category, their income and their willingness to pay, it is straight forward to extrapolate housing preferences from current house trends, that is 1) ownership/ rental, 2) percentage afforded – rent levels or home price, and structure type – single family, middle housing or multifamily.

Assume renter households spending historically observed percent of their income

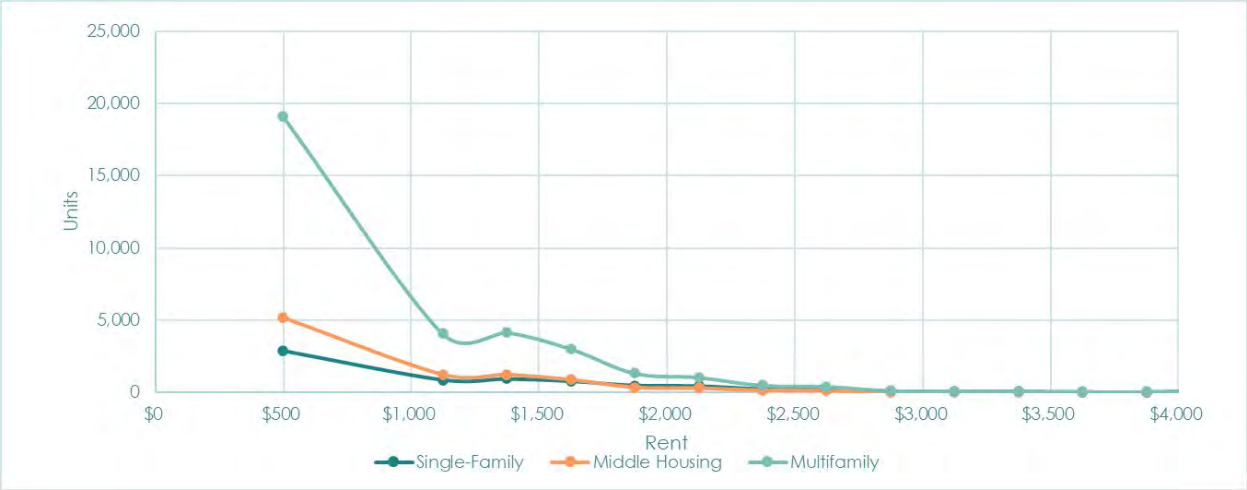


Figure 12

The chart above shows the 2024-44 forecast of renter household's greatest shelter choice is predominantly multifamily – a structure that has 5 or more units. This is followed by a middle housing choice that is a hybrid structure that is seen as generally more affordable than a 1-unit detached structure. The middle housing option is a cross-between a single-family structure and an apartment due to the fact that it is often constructed as a structure with attached units which share walls with another tenant. It said to include duplexes, triplexes, quadplexes, rowhouses and townhouses, and cottage clusters. There are considerably fewer single-family homes for rent as most are generally not purpose-built solely as rental units. The renters forecast has 14% of households in single-family rental choices, 19% in middle housing options, and 67% falling into multi-family units.

An examination of the rental market from a renting cost perspective and taking into account willingness to pay, in particular, reveals a housing market that is likely to yield significant economic dislocations, other things being equal. Over half of this market in the future can only afford housing below $1000 per month based on current conditions. It's unlikely that a future market might improve, so this estimate is likely to look worse.

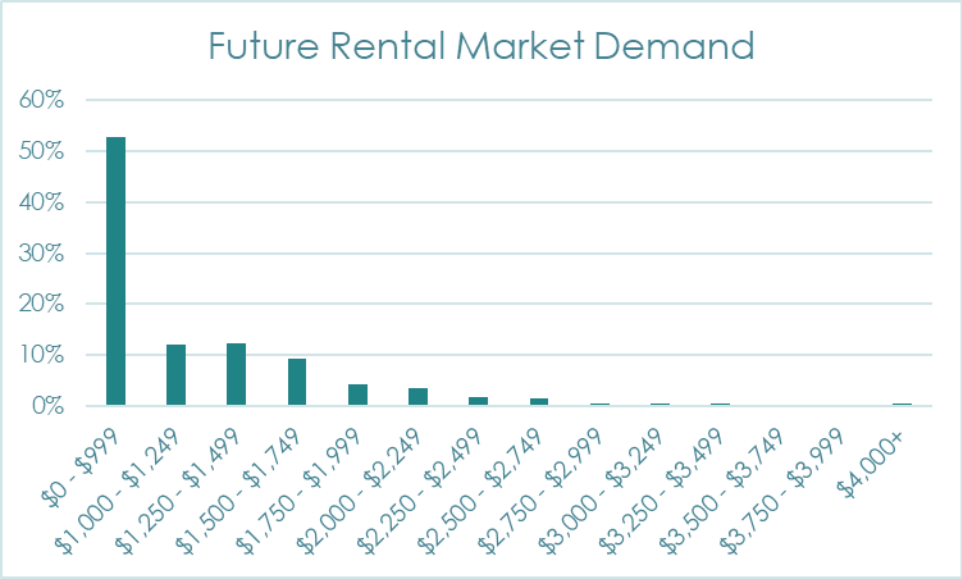


Figure 13

The next chart illustrates the baseline forecast of owner housing choices. In the owner market, 88% of households choose single-family homes, 8% in middle housing alternatives, and 5% in multi-family housing (i.e., condos).

Assume owner households spending historically observed percent of their income



Figure 14

Future households will be financially challenged or unable to purchase homes with current median sales price at roughly today's $550,000. 81% of future households will find it difficult to afford to own such a median house, based on demand calculations seen here. The implication is that future housing tenure choices are not likely to match the past.

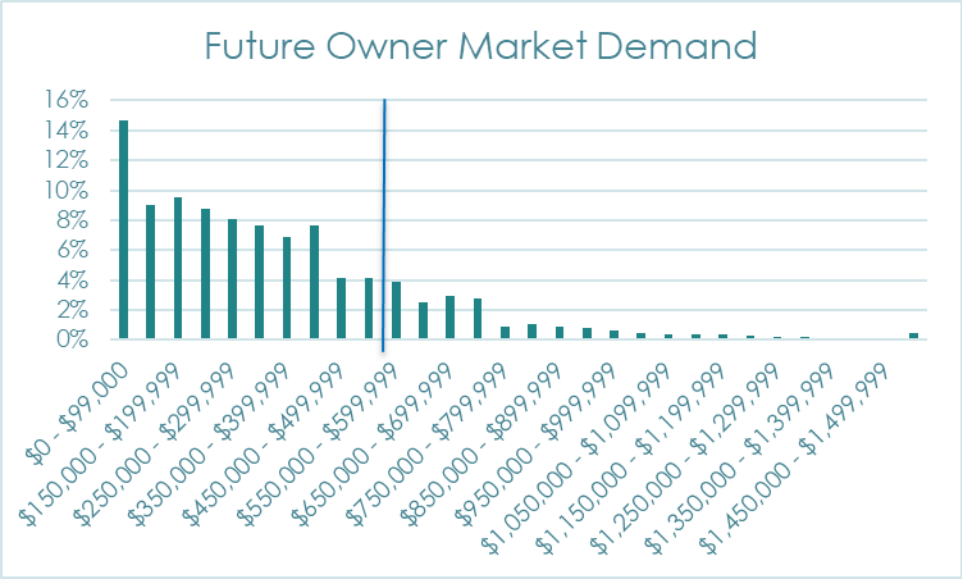


Figure 15

At this stage, housing demand is summarized by structure type only because zoning codes – which guide our capacity determinations – only control housing structure types, not housing tenure (rent vs. own), housing costs, who lives in the housing, or other specific housing characteristics.

Per ORS 197A.350, Metro estimates regional housing needs for the purpose of determining whether there are sufficient buildable lands within the UGB. The level of detail included in this housing needs analysis is responsive to that purpose. To avoid implying false precision and scale the effort appropriately for its purpose, this regional analysis folds more specific housing needs into broader categories. Likewise, there are specific "needed" housing types that require generalization because they are allowed more broadly in local zoning codes.

For comparison with land capacity, the forecast of housing demand is rolled up into three categories: single family housing, middle housing options, and multifamily housing. Expected densities within these categories vary widely depending on the specific zoning classification and building prototype. As described in Appendix 2, densities range from 8 to 400 units per acre.

The "needed housing" types listed in ORS 197A.348 are considered as follows:

1. U.S. Department of Housing and Urban Development income levels: Census household income groups have been categorized according to HUD income levels in Figure 11 and described in preceding pages.
    a. Single-unit detached housing (single-family) is described as such in this analysis; single-unit attached housing is included in middle housing per 197A.420; middle housing is described as such in this analysis; multi-unit attached housing (multifamily) is described as such in this analysis. As noted above, tenure (rent vs. own) is estimated on the demand side but cannot be estimated on the capacity side since it is not controlled by zoning. Any of the three general types of housing structures could be rented or owned.

b. Government assisted housing is understood to be any housing that meets the needs of households earning less than 80 percent area median income (AMI). This could take the form of any of the three housing structure types (single-unit detached, middle housing, and multi-unit attached housing). Consequently, this analysis describes housing demand for various income groups, including households earning less than 80 percent AMI, but is unable to meaningfully establish a regional housing capacity or capacity deficit for this income group since pricing is dependent on market conditions.
c. Mobile home or manufactured dwelling parks are allowed according to the local needs established by cities and counties. In some instances, local jurisdictions allow these parks in residential zones. In other cases, local jurisdictions have adopted specific zoning categories for them. As noted below, manufactured housing describes a construction technique. For the purposes of determining the adequacy of buildable lands inside the UGB, land demand for these homes is functionally similar to single-unit detached and middle housing. Whether land demand from manufactured homes will be (or should be) addressed on fee simple lots or in a manufactured home park is a detail that goes beyond what we can objectively estimate in a regional analysis.
d. "Manufactured" describes a construction technique, not a distinct housing type with unique land capacity needs. Consequently, manufactured housing is subsumed into single-unit detached housing. Per ORS 197.478, manufactured homes are allowed in all single-family zones.

HNA Results of Renters and Owners by Life Cycle and rent / home price

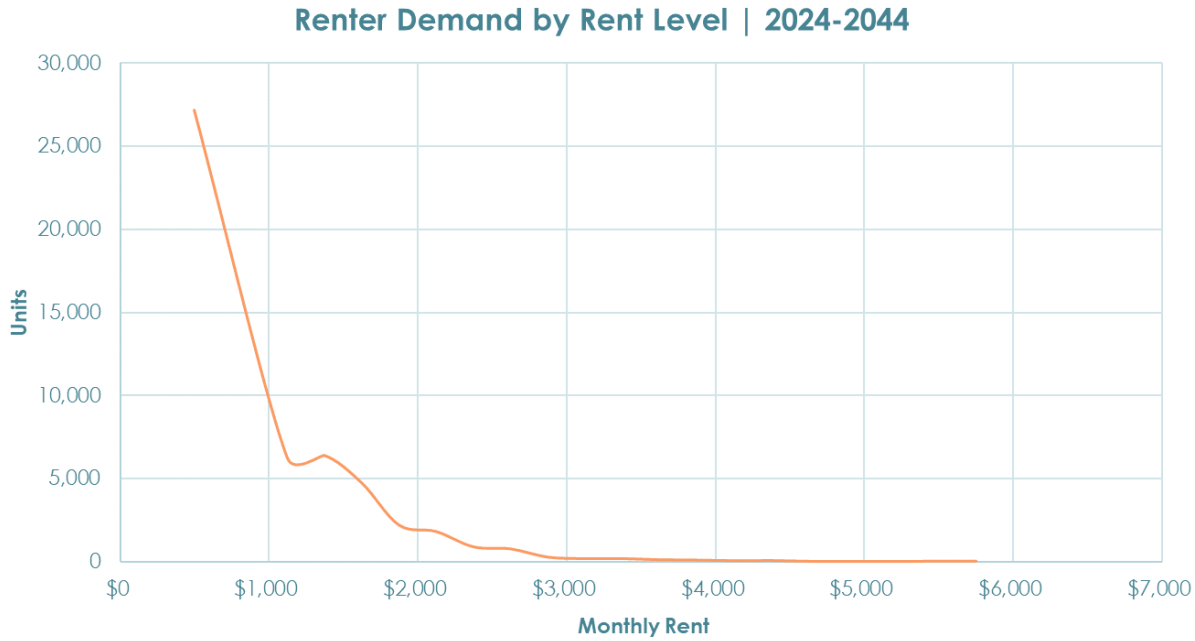


Figure 16: Assumes households spend a percentage of their income on housing based on current trends

The chart above shows the forecast of renters by life cycle and expected rent levels, if households spend a percentage of their income on housing based on current trends. This means that households,

particularly lower-income households, will likely spend over the 30% threshold of household income that is commonly used as a metric of affordability. Assuming that this is the case in the future, young householders, single adults and older residents are more likely to be renters and have lower household earning potential and therefore fall into the lower rent need spectrum in which many will need some form of government assisted housing (i.e., rent subsidy). Of renters, the forecast under these assumed conditions is quite stark, projecting fewer than 10% of renters in future years (2024-44) will have the financial ability to afford market-rate rents given their household income. (Note: this analysis may somewhat overstate willingness to pay due to limitations on not being able to account for the accumulation of wealth, particularly retirees who may be on fixed incomes but have amassed a lifetime of savings for their retirement. Affordability in these cases based on annual earnings and income may be supplemented by other assets to pay for monthly shelter expenditures.)

The chart below shows the forecast of owners by life cycle and expected home purchase prices, if households spend a percentage of their income on housing based on current trends. The majority of future market-rate housing demand will likely fall to a generation of more mature residents according to extrapolation of current trends. Older adult households (greater than 45 years old) make up nearly all market-rate home demand between 2024 and 2044, but over half are expected to need some form of housing subsidy unless personal savings or other financial resources are brought or a sizable down payment is made available. Still it makes sense that the vast majority of home buyers in the future are older households that have the financial wherewithal to make up the ownership market for homes.

It’s unsurprising that young adult households and households in their “root-setting” years will experience home buying affordability problems. The home demand projections for these younger household life cycle cohorts suggest very few will be in the home buying market. There are several reasons for this: 1) younger households generally earn less; 2) are unable to qualify for mortgages; 3) don’t have enough saved up for a down payment; 4) and the demographics in the future lean toward proportionally fewer younger households in the region as there will be fewer due to declining birth rates and thus lower household formation rates.

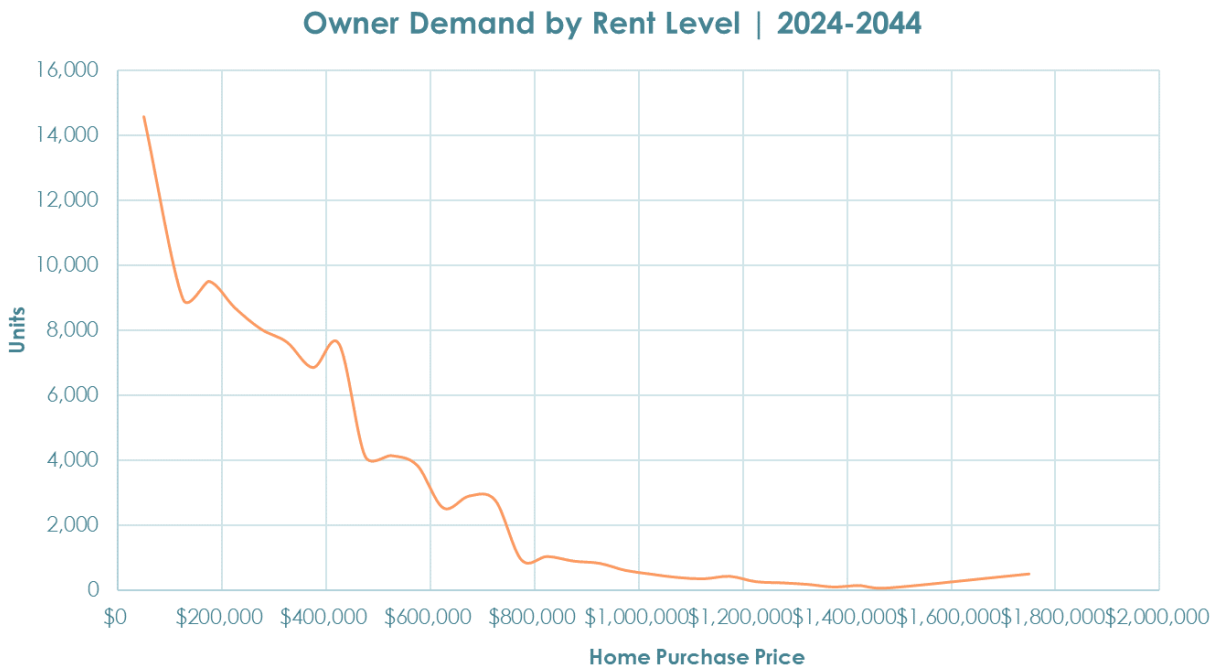


Figure 17: Assumes households spend a percentage of their income on housing based on current trends

In summary, both charts derive from Metro's HIA forecast and rely on further calculations employing HUD's AMI limits and Census housing characteristics are computed into the HIA forecast. Current housing conditions underly the renter and ownership projections in the last two charts. Recent Census ACS data are applied to the tenure splits to modify the HIA forecast into owner and renter projections for the twenty-year forecast. The seven life cycles are tabulated from the more detailed breakdown of HIA households. Then HUD income limits are interpolated from the income brackets to modify the HIA forecast of household by life cycle and tenure. The next to final step is computing the willingness to pay of renters and owners to estimate affordability of the three structure types.

Residential Gap Analysis: Analyzing (3) housing demand scenarios by structure type and (4) housing supply scenarios by structure type

The HNA considers three housing archetypes in this gap analysis: 1) single-family detached housing; 2) middle housing alternatives; 3) multi-family units. This analysis of residential demand includes a range of plausible housing demand scenarios, which are based on the range population forecast for which high, baseline and low growth alternatives are produced. The supply-side includes plausible alternatives to future capacity that are linked to the scenario for demand. Additional assumptions of redevelopment capacity, alternative entitlement assumptions, and the degree to which middle housing is an acceptable substitute for single family housing offers more flexibility in estimating a range for residential capacity going forward.

Final demand, which is the expression of market need after consumers have weighed their supply and demand options, is dependent on the supply of goods (and in this case it is housing) available, relative prices of those goods as well as the income and characteristics of the household to want the good. Supplies of needed housing are thus dependent on demand because producers don't build housing unless there are willing buyers. Price and rent signals tell the supplier how much more/less to build and

those same price signals inform households what they can afford to buy or in others how much rents shall be. Determination of final demand or need is thus the market interaction through price signals that inform how much housing of each is consumed and how much supply to build of each archetype.

Going forward, both real and nominal home prices are expected to outpace growth in household incomes in most U.S. metropolitan areas, making home purchases potentially less affordable and less accessible to the median home buyer. Recent state regulations have spurred the market and local entitlements to provide smaller and denser middle housing alternatives that are nominally less expensive to own. Middle housing serves as a substitute for traditional detached single-family structures while at the same time meeting achieving densities like some multifamily housing. Bottom line: the addition of middle housing as an allowed housing type means that there are limits to the use of recent housing trends as a meaningful basis for forecasting regional housing supply (and demand).

In order to assess possible future housing conditions, three demand scenarios were considered in the draft HNA:

1. Low growth forecast/following in footsteps

2. Baseline growth forecast/new normal

3. High growth forecast/strong urban markets

The 2024 urban growth management decision relies on the baseline growth forecast/new normal demand scenario. The housing mix expected under this scenario considers the mix of housing on the ground today, housing production trends over the last decade, and the impacts of future growth rates and demographic shifts related to age, household size, and income. Table 1 compares the current housing mix with the mix of new housing built over the last decade and the scenario that is the basis for the 2024 growth management decision.

We expect the single-unit detached share of housing to be lower than what is on the ground today (52% of housing) because of affordability considerations and a shift towards smaller households and fewer children, but somewhat higher than in the past decade due to ongoing shifts towards older households, which are more likely to live in single-detached housing than younger households.

Multifamily housing made up a 57% majority of new housing built in the UGB over the last decade, though it represents only 35% of the housing on the ground today. We expect multifamily housing demand to be strong in the future because it best addresses the anticipated housing needs of smaller households with lower household incomes. Likewise, addressing current housing needs, including historic underproduction (see Appendix 8A) and houselessness, translates to additional need for multifamily housing. However, we do not expect that the future share of multifamily housing will match the 57% share of the last decade. This is because multifamily housing production typically occurs during periods of high population growth, such as what was observed over the last decade with elevated migration of younger households into the region. In addition, the demographic trends expected over the next 20 years will mean less demand from younger households that account for a large share of the demand for multifamily housing today. With the baseline population growth forecast and an aging population, we expect a slight moderation in multifamily housing needs compared to recent trends, even after accounting for affordability.

Lastly, we expect that middle housing will represent a larger share of future housing demand than it has over the last decade and a larger share than is on the ground today because of recent policy changes that remove barriers to middle housing development across the region. Pro forma modeling conducted for the purpose of estimating growth capacity finds that middle housing is often financially feasible (see Appendix 2). Likewise, middle housing may offer more affordable ownership options for smaller households that make up a substantial portion of expected household growth.

Table 1: current total, recent trend, and future mix of new housing (Metro UGB)

	Single-unit detached	**Middle housing**	**Multifamily**
Current total housing mix	52%	7%	35%
New housing built 2013-2022	30%	10%	57%
Assumed scenario	33%	21%	46%

Note: current and historic housing shares don't total 100% because Metro also tracks "other" housing types that are not listed here, for instance dormitories, floating homes, and retirement facilities. Those "other" housing types are not specifically forecasted for future housing demand.

To produce a combined analysis of both future residential capacity and future demand, Metro staff paired the three housing demand scenarios with an array of alternative residential supply scenarios. The combined analysis incorporates several alternative future residential supply scenarios, which are informed by whether growth is assumed to be slower or faster. In a future of faster demographic growth rates, with the concomitant assumption that more growth will torque prices higher and faster, this scenario prompts a supply response to build less expensive, smaller and denser units. In a slower growth scenario, the demand for housing is eased and this outlook assumes tastes and preferences are likely to resemble historic patterns of housing consumption (though not identical because of a rapidly aging population and shifts in demography).

The two baseline supply scenarios bracket an unknown market uptake for middle housing. Although some type of middle housing production (e.g., duplexes and townhouses) has existed for a long while, it is a hybrid housing product that straddles aspects of multifamily housing with its inherent higher carrying capacity while on the consumer end, middle housing offers features in the unit that resemble characteristics inherent of a single-family structure. Because housing costs are expected to continue rising even in real dollar terms, there is uncertainty whether middle housing will become a viable archetype, gaining widespread consumer acceptance. Hence, we have a pair of baseline scenarios that bookend a low vs. a high uptake of middle housing. The 2024 urban growth management decision relies on a baseline capacity scenario with lower uptake of middle housing.

The following descriptions provide a brief summary of the scenarios considered in the housing needs analysis.

Residential demand scenarios:

1. (Low growth forecast/following in footsteps) – Metro UGB low regional household growth forecast & generally following in the footsteps of previous generations' housing preferences and willingness to pay.

2. (Baseline growth forecast/new normal) – Metro UGB baseline regional household growth forecast & adjusted for the addition of middle housing entitlements.
3. (High growth forecast/strong urban markets) – Metro UGB high regional household growth forecast & fundamental shift in housing preferences due to a combination of regulation, entitlements, affordability and demographic shift in market tastes and preferences.

Residential supply scenarios:

1. Weak growth/ weak market conditions
2. Baseline housing supply outlook w/ greater market penetration of middle housing products
3. Baseline housing supply w/ marginally greater detached single-family housing
4. Stronger growth outlook & demand for higher density

Residential components for each residential supply scenario:

Vacant land	Redevelopment	Concept Plans of UGB adds	Other Redevelopment	Office to Residential Conversion	ADU & middle housing conversion
Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
SFR Heavy	Market Recovery			Low	Low
Pro forma	Market Erosion			High	High

Figure 18: Residential gap scenarios.

Different combinations of the elements of the mix of 6 supply components make up an individual residential supply scenario. The supply scenario is then matched up against the appropriate demand scenario (low to low, baseline to baseline, high to high). Demand scenarios include estimates of existing housing needs, which are described in more detail in Appendix 8A.

At the final capacity gap calculation stage, middle housing and single-unit detached housing capacity surpluses or deficits are combined because both are allowed in the same residential zones. It will be the market, not Metro's UGR calculations, that determine what mix of middle housing and single-unit detached housing gets build on those residentially zoned lands. Importantly, Metro has no recourse for specifically addressing a single-unit detached housing deficit since any UGB expansion area would have to also allow middle housing and multifamily housing in order that the city can remain in compliance with HB 2001 and the Metropolitan Housing Rule.

In these scenarios, it is assumed that the share of future 7-county MSA households that locate in the Metro UGB will resemble the historic trend. This share is referred to as the UGB "capture rate." As depicted in Figure 19, from 2010 to 2022, 70.5 percent of the MSA's new households located in the Metro UGB. This longer period is chosen so that it is not unduly influenced by the 2008 housing bubble and Great Recession, the circa-2015 period of heightened urban demand, or the more recent urban population losses associated with the pandemic. Generally, it appears that there has been a long-term increase in the UGB capture rate. Consistent with that trend, the 2024 urban growth management decision assumes a UGB capture rate of 70.7%.

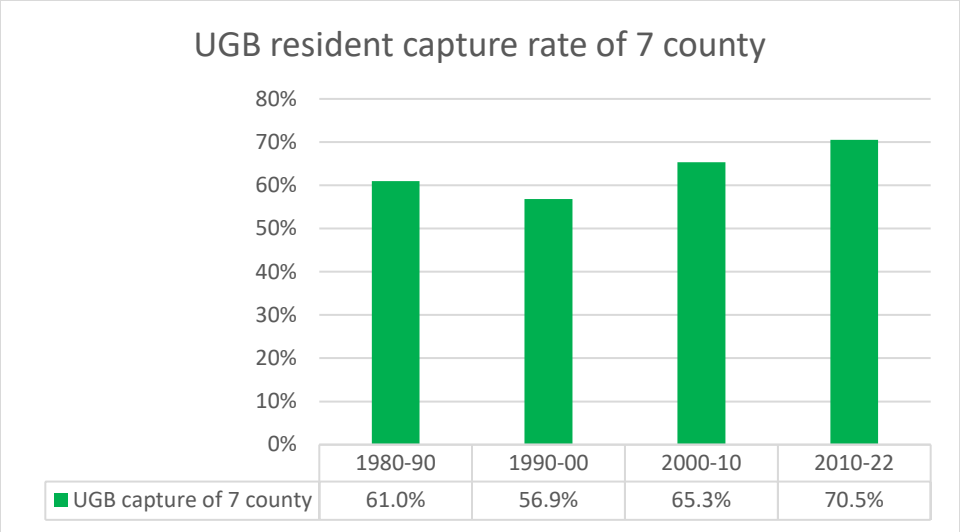


Figure 19: Historic Metro UGB residential capture rate

Selected scenario (basis for 2024 residential growth management decision): Baseline population forecast; 70.7% UGB capture rate, & lower-end penetration of middle housing

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	SFR heavy	34,944	13,228	42,970	91,142
Redevelopment	Baseline	12,292	11,727	24,382	48,400
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Baseline	-	-	1,000	1,000
ADUs & middle housing conv.	Low	-	4,955	-	4,955
Total		**56,466**	**36,744**	**82,320**	**175,530**
		32%	21%	47%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Baseline	57,400	33,250	60,450	151,100
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**59,200**	**37,100**	**81,700**	**178,000**
		33%	21%	46%	100%
Surplus/(Deficit)		(2,700)	(400)	600	(2,500)
Surplus/(Deficit) with SFR and MH combined			(3,100)	600	(2,500)

Scenario Notes:

"Baseline growth" – most likely population growth trend; a new normal in housing preferences reinforced by allowances for middle housing. A UGB capture rate of 70.7% is assumed based on the rationale that adding Sherwood West to the UGB creates additional opportunities to attract households that may otherwise locate elsewhere in the 7-county MSA (other scenarios assume a 70% UGB capture rate).

"SFR Heavy" – more SFR detached units are produced than middle housing options. A step-down in market acceptance of middle housing options, w/ SFR still prevailing.

"Baseline redevelopment" – a baseline scenario of market-rate redevelopment (pro forma)

"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.

"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.

“Baseline office to residential conversion” – assumes a couple office high-rises or a few mid-rise office buildings are converted to residential apartment uses.
“ADU’s & middle housing conversions” – based on a period of “average” ADU and middle housing conversions in the last 10 years. Lower assumption is consistent with this scenario’s assumption about demand for single-unit detached housing on vacant lands as well as a recent slowdown in ADU production and uncertainty around future middle housing infill.

Scenario Low: Slow demographic growth, 70% UGB capture rate, easing residential market

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	SFR Heavy	34,944	13,228	42,970	91,142
Redevelopment	Market erosion	8,978	6,360	13,950	29,288
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Low	-	-	250	250
ADUs & middle housing conv.	Low	-	4,955	-	4,955
Total		**53,153**	**31,377**	**71,138**	**155,668**
		34%	20%	46%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Low growth	57,539	16,000	46,136	119,675
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**59,337**	**19,898**	**67,392**	**146,628**
		40%	14%	46%	100%
Surplus/(Deficit)		(6,184)	11,479	3,746	9,041
Surplus/(Deficit) with SFR and MH combined			5,295	3,746	9,041

Scenario Notes:
"Low growth" – a forecast scenario that assumes a lower amount of population than the baseline.
"SFR Heavy" – more SFR detached units are produced than middle housing options. In low growth forecast scenario, there is less pressure to build higher density and the taste and preference of the single-family market is assumed to be more easily met in this scenario.
"Market erosion redevelopment" – assumes a modest erosion of market-rate redevelopment (pro forma) in residential redevelopment estimate; assumes residential pricing is 5% lower across all parcels because of a low population growth scenario (lower demand equates to lower prices)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.
"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
"Low office to residential conversion" – assumes fewer units are converted from office buildings.

"Low ADU's & middle housing conversions" – based on a period of "average" ADU and middle housing conversions in the last 10 years. Lower assumption is consistent with a recent slowdown in ADU production and uncertainty around future middle housing infill.

Scenario Baseline "A": Baseline population forecast, 70% UGB capture rate, & higher-end market penetration of middle housing

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	Expected Density	26,197	33,486	39,621	99,304
Redevelopment	Baseline	12,292	11,727	24,382	48,400
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Baseline	-	-	1,000	1,000
ADUs & middle housing conv.	Baseline	-	8,692	-	8,692
Total		**47,719**	**60,738**	**78,971**	**187,429**
		25%	32%	42%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Baseline	56,846	32,911	59,838	149,594
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**58,644**	**36,809**	**81,093**	**176,546**
		33%	21%	46%	100%
Surplus/(Deficit)		(10,925)	23,930	(2,122)	10,882
Surplus/(Deficit) with SFR and MH combined			13,005	(2,122)	10,882

Scenario Notes:
"Baseline growth" – most likely population growth trend; a new normal in housing preferences reinforced by allowances for middle housing.
"Expected Density" – generally asserts a future development density in cities closer to the top-end of what current entitlement regulations permit.
"Baseline redevelopment" – a baseline scenario of market-rate redevelopment (pro forma)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.
"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
"Baseline office to residential conversion" – assumes a couple office high-rises or a few mid-rise office buildings convert to residential apartment uses.

"ADU's & middle housing conversions" – based on a period of "average" ADU and middle housing conversions in the last 10 years.

Scenario Baseline "B": Baseline population forecast, 70% UGB capture rate, & lower-end penetration of middle housing

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	SFR heavy	34,944	13,228	42,970	91,142
Redevelopment	Baseline	12,292	11,727	24,382	48,400
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Baseline	-	-	1,000	1,000
ADUs & middle housing conv.	Low	-	4,955	-	4,955
Total		**56,466**	**36,744**	**82,320**	**175,530**
		32%	21%	47%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Baseline	56,846	32,911	59,838	149,594
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**58,644**	**36,809**	**81,093**	**176,546**
		33%	21%	46%	100%
Surplus/(Deficit)		(2,178)	(65)	1,227	(1,017)
Surplus/(Deficit) with SFR and MH combined			(2,243)	1,227	(1,017)

Scenario Notes:
"Baseline growth" – most likely population growth trend; a new normal in housing preferences reinforced by allowances for middle housing.
"SFR Heavy" – more SFR detached units are produced than middle housing options. A step-down in market acceptance of middle housing options, w/ SFR still prevailing.
"Baseline redevelopment" – a baseline scenario of market-rate redevelopment (pro forma)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.

“Baseline other redevelopment” – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
“Baseline office to residential conversion” – assumes a couple office high-rises or a few mid-rise office buildings are converted to residential apartment uses.
“ADU’s & middle housing conversions” – based on a period of “average” ADU and middle housing conversions in the last 10 years. Lower assumption is consistent with this scenario’s assumption about demand for single-unit detached housing on vacant lands as well as a recent slowdown in ADU production and uncertainty around future middle housing infill.

Scenario High: Higher growth population forecast, 70% UGB capture rate

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	Expected Density	26,197	33,486	39,621	99,304
Redevelopment	Market Recovery	16,175	18,951	37,397	72,522
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	High	-	-	1,500	1,500
ADUs & middle housing conv.	High	-	11,716	-	11,716
Total		**51,602**	**70,986**	**92,487**	**215,075**
		24%	33%	43%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	High Growth	44,878	39,493	95,142	179,513
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**46,677**	**43,391**	**116,398**	**206,465**
		23%	21%	56%	100%
Surplus/(Deficit)		4,926	27,595	(23,911)	8,610
Surplus/(Deficit) with SFR and MH combined			32,521	(23,911)	8,610

Scenario Notes:
"High growth" – a forecast scenario that assumes a greater amount of population than the baseline.
"Expected Density" – generally asserts a future development density in cities closer to the top-end of what current entitlement regulations permit.
"Market-recovery Redevelopment" – assumes a modest improvement in market-rate redevelopment (pro forma) in residential redevelopment; assumes residential pricing is 5% higher across all parcels because of higher population growth (higher demand equates to higher prices)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.
"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
"High office to residential conversion" – assumes a couple office high-rises or a few mid-rise office buildings convert to residential apartment uses.

"ADU's & middle housing conversions" – based on a period of "above-average" ADU and middle housing conversions in the last 10 years.

Scenario Discussion

Population range forecast – The baseline population forecast represents the most likely growth outlook and population outcome for this region. The population forecast is then translated into households, using headship rates. Headship rates are observed statistical rates at which populations (by age cohort) form into household units. These headship rates are extrapolated for future years, assuming that household sizes on average in the future will see further decreases as birth rates fall and child rearing is delayed to older age cohorts.

A 5% vacancy rate is included in the high, baseline and low growth household scenarios to factor up to a projected demand for housing.

A household range forecast is based on + / - 20% from the baseline household forecast, forming "bookends" that describe the high-end and low-end household growth forecast in the set of HNA scenarios. This equates roughly to a standard z-score of about 0.5 standard deviation from the mean in a range forecast assumed to be normally distributed.

Note: the population range forecast assumed an error range of 2 standard deviations, which encompasses roughly 95% of the probability, chance of that growth will fall between the lines of the high or lower population projections. Staff, with consultant advice, deemed that 2 standard deviations was too wide an error band, encompassing portions of the high-end and low-end of the household forecast range that was too unlikely to consider for reasonable policy evaluations.

Vacant Land Supply / Capacity – For additional information, please see the BLI appendix for methods and additional details.

Note: the HNA scenarios do not utilize the "pro forma" approach of estimating the capacity of vacant land supply inside the UGB.

HNA scenarios contemplate two capacity alternatives for the vacant land supply calculations. Both alternatives rely on the "expected density" method of computing vacant land capacity in the existing UGB. A second version of the expected density approach asserts more of the supply of vacant tax lots will turn to production of detached single family units.

Redevelopment Capacity – For additional information, please see the BLI appendix for methods and additional details.

The HNA scenarios consider 3 residential redevelopment capacity estimates. The baseline redevelopment alternative is derived from the Metro real estate pro forma model. There are two other alternatives to redevelopment capacity – "market erosion" and "market recovery" scenarios. The each pivot from the baseline redevelopment scenario. The main difference in the three scenarios are as follows:

- Baseline redevelopment is derived from a "stabilized" home price surface based on updated home prices and a "stabilized" rent surface for the region, also updated.
- Market erosion assumes a 5% across the region decrease in home and rent price surfaces. The basis for this assumption is linked to the low growth scenario in which there are fewer

consumers chasing market-rate housing and thus price/ rent is shifted lower, other things being equal.
- Market recovery assumes the opposite – 5% increase across the region.

Concept Plan Areas & Other Planned Development (Vacant) – Residential densities and subsequent total yield on capacity is either given by local jurisdictions or available from published concept plans that illustrate the long-term development capability of vacant lands included in recent UGB expansions. Typically, these are areas added to the UGB since 2018.

Other Planned Development (Redevelopment) – These are corrections to the BLI. The capacity changes represent amendments to the existing BLI and pro forma capacity calculations. They generally came about because post-BLI review and further input from local jurisdictions made it clear that development was already substantially underway and/ or the estimated redevelopment rate was incorrectly applied to these tax lots.

Office-to-Residential conversion – see Appendix 2.

ADUs & middle housing conversion – see Appendix 2.

ECOnorthwest

DATE:	July 8, 2024
TO:	Ted Reid, Metro
FROM:	Becky Hewitt, Madeline Miller Baron, and Justin Sherrill, ECOnorthwest
SUBJECT:	METRO RESIDENTIAL READINESS – TASK 8 EXISTING HOUSING NEEDS – REVISED

Introduction

Following recent changes to state law, Metro is required to account for existing housing needs in its 2024 Urban Growth Report (UGR) as part of determining whether there is adequate land for housing within the region's urban growth boundary. This statutory requirement is new since the last UGR.

As part of related legislation referred to as the Oregon Housing Needs Analysis (OHNA), the state is also transforming how housing needs are projected and planned for, and working to incorporate planning for existing housing needs into local housing planning efforts. However, statewide rules and methodology are still being established, and will not be complete in time to provide a basis for the 2024 UGR. The legislative history and relevant bills are summarized at the end of this memo for context.

Metro contracted with ECOnorthwest to help respond to these recent changes in state law, as well as to more deeply integrate market realities, infrastructure, governance needs, and equity into its 2024 Urban Growth Management Decision. ECOnorthwest and Metro staff developed an estimate of existing need based on the most recent, but not yet finalized, methodology that is appropriate for the Metro region and its unique planning context. This memorandum provides an estimate of existing need for the Metro region, describes the methodology behind the estimate, and expands on dome of the differences between this methodology and the OHNA methodology. The first iteration of the OHNA methodology is expected to be released in summer 2024 and will be finalized by December 31, 2024.

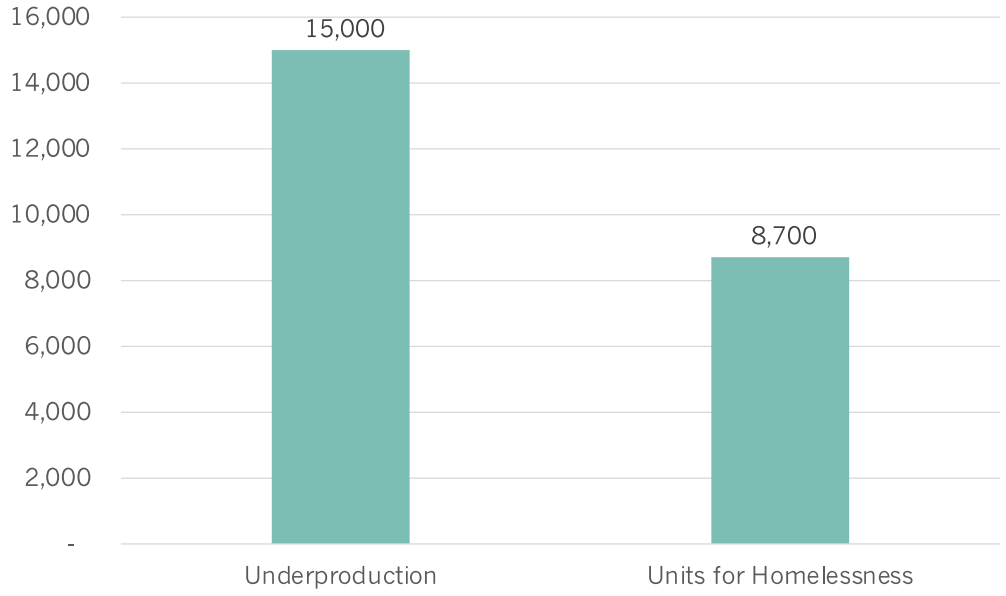
Estimated Existing Housing Needs for Metro's 2024 Urban Growth Report

Metro has a need for approximately 23,700 housing units to address current unmet housing needs. This estimate includes approximately:

- 15,000 units needed to address current housing underproduction
- 8,700 units needed for people experiencing homelessness

This is illustrated in Figure 1.

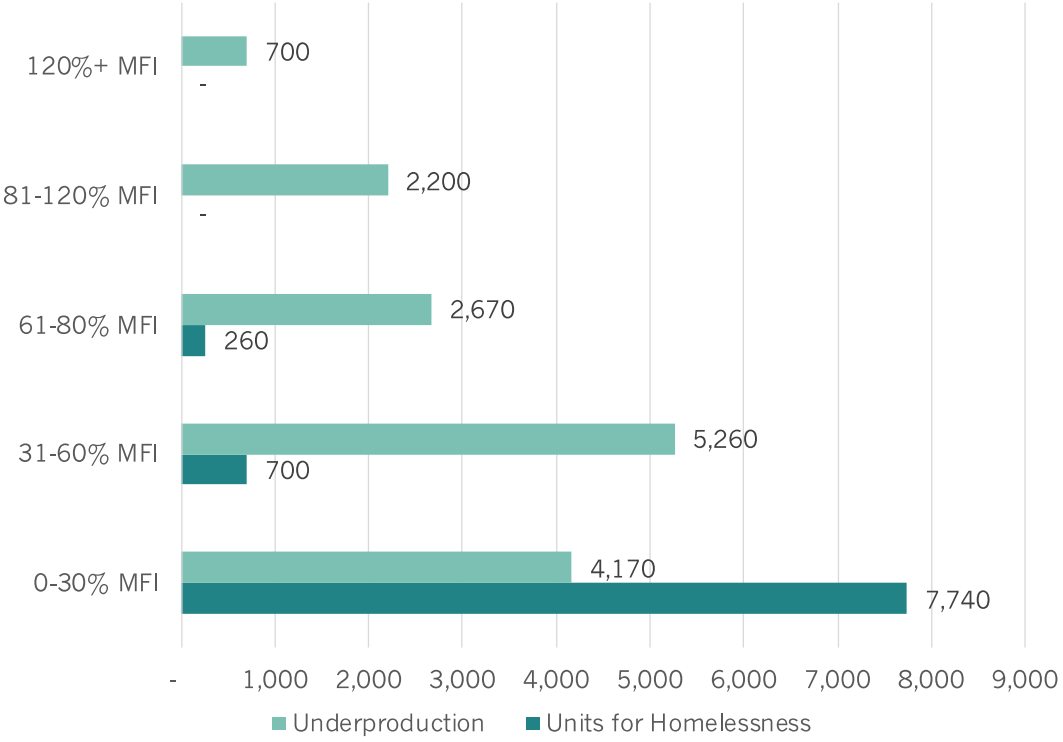
Figure 1. Metro UGB Existing Housing Need by Component (Rounded)



Source: ECOnorthwest analysis

Almost two-thirds of these housing units are needed for households earning the lowest incomes (less than 60% of the area median income), as shown in Figure 2.

Figure 2. Metro Existing Housing Need by Income Level (Rounded)



Source: ECOnorthwest analysis

Accounting for Second and Vacation Homes

Another new component of planning for housing need under the OHNA is accounting for units that will be lost to second and vacation homes during the planning horizon as the stock of those units grows.

Based on long-term (20-year) trends in growth in second and vacation homes, the Metro region will need to add roughly 3,300 units to make up for units lost to second and vacation homes over the next 20 years.

Summary of Data Sources and Methods

This section provides a summary of the data sources and methodology used to create these estimates. A more complete description of the Underproduction methodology is provided at the end of the memo.

Data Sources

Figure 3. Data Sources by Component

COMPONENT	DATA INPUT	SOURCE
Current Housing Underproduction	Total households, missing households, total housing units, second and vacation homes, uninhabitable units, regional rate of cost burdening (to allocate units to income levels)	Census PUMS
Units for People Experiencing Homelessness	Homeless Point-in-Time Counts	Portland State University[1]
	Estimate of doubled-up homeless population	McKenny-Vento Data from U.S. Department of Education
	Average number of children per household by region	Census PUMS
Second and Vacation Homes	Change second and vacation homes between 2000 and 2020 compared to change in all housing units	Census PUMS
Allocation to income categories	Area Median Income Limits	Census and OHCS

[1] Zapata, et al. 2024. "2023 Point in Time Findings Report: Count of People Experiencing Homelessness in Clackamas, Multnomah, and Washington Counties, Oregon" https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1047&context=hrac_pub

Underproduction

Underproduction is calculated as the target number of housing units a market should have compared to the actual number of units that market has available for year-round occupancy. While housing underproduction is an important contributor to homelessness, the need for housing specifically related to people experiencing homelessness is addressed separately below. The underproduction estimate methodology is adopted from the Up for Growth Organization.

Figure 4. Up for Growth Housing Underproduction Methodology



As illustrated in Figure 4, the calculation has two main steps:

1. Calculate target number of housing units:
    a. Identify total current households based on Census data.
    b. Estimate "missing households"—the number of households that would have formed had housing been more available—using age cohorts and headship rates (the share of the population in a given age cohort that is listed as the "head of household" in the Census survey) to approximate.
    c. Multiply by 1.05 to factor in a healthy amount of market vacancy (5 percent).
2. Calculate the actual housing stock available for year-round occupancy:
    a. Identify total existing housing units in the region (based on Census data).
    b. Subtract second and vacation homes (based on Census data).
    c. Subtract uninhabitable units (based on Census data).

Units Needed for People Experiencing Homelessness

As noted above, housing underproduction is interrelated with and contributes to homelessness. However, because the methodology for estimating underproduction does not specifically capture people experiencing homelessness (due to its reliance on Census data), a separate estimate is included based on available data focused on homelessness. The OHNA methodology for estimating housing units needed for people experiencing homelessness is being refined in summer 2024. In the absence of the refined approach,

Metro staff provided direction on the desired approach to estimating need for housing for those experiencing homelessness for purposes of the 2024 UGR. The approach includes two main components:

- Sheltered and unsheltered households based on Point in Time count and county Homeless Management Information Systems (HMIS): This estimate uses sheltered and unsheltered household counts from an April 2024 Portland State University (PSU) report on findings on the 2023 Point in Time (PIT) Count for the three-county area (Zapata, 2024). The PSU report differs from the PIT Count data collected by Oregon Housing and Community Services (OHCS) and reported to the U.S. Department of Housing and Urban Development (HUD) in that it incorporates administrative data HMIS about people in need of homeless services, which has been deduplicated with the point in time count, to provide a refined estimate. Even with these refinements, the PSU report acknowledges the limitations of the PIT counts and reasons why the PIT often undercounts people experiencing homelessness:
  - It is impossible to find and count everyone sleeping outside.
  - The count is conducted on a single night so does not capture every experience or episode of homelessness.
  - The U.S. Department of Housing and Urban Development definition of homelessness does not include people who are "doubled up" with other households.
- Doubled-up households based on McKinney-Vento data on students experiencing homelessness: The McKinney-Vento data comes from the U.S. Department of Education, which works with state coordinators and local liaisons to collect data on students experiencing homelessness. The data records the number of school-aged children who live in shelters or hotels/motels and those who are doubled up, unsheltered, or unaccompanied. Students identified as sheltered, unsheltered, and unaccompanied are assumed to be captured in the PIT count data. However, because the PIT count and HMIS data do not identify households who are doubled-up, the McKinney-Vento data is the best available way to identify such households. This data on doubled-up students is converted to households by dividing by the average number of children per household in the Metro region, which is calculated using 2022 PUMS 1-year data.

These methods result in the following estimates by component for the Tri-County area:

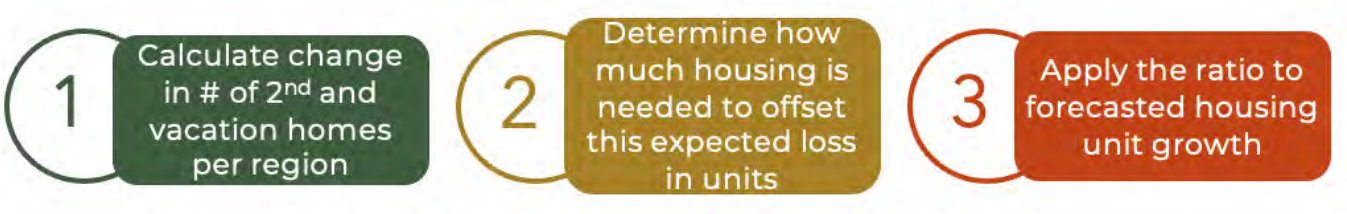
- 5,774 sheltered and unsheltered homeless households based on the PIT count and HMIS data from the 2024 PSU report
- Approximately 3,100 doubled-up households from the McKinney-Vento data

Based on the Metro UGB's share of the tri-county population, 97.5% of the housing for these households (roughly 8,700 units) is assumed to be needed within the Metro UGB.

Second and Vacation Homes

The approach to estimating need for housing due to growth in second and vacation homes is illustrated in Figure 5.

Figure 5. Process of Identifying Second and Vacation Homes



First, the model calculates the change in the number of second and vacation homes for each region between the years 2000 and 2020. The growth in second and vacation homes is then contextualized by the number of all housing units added for each region between 2000 and 2020. The ratio of second and vacation homes added compared to the total housing production is calculated for each region. This ratio is effectively an approximation of how much additional production would be required to offset the loss in units to second and vacation home demand over the 20-year planning period.

Allocation to Income Categories

The methodology uses the same income categories and same methodology as the OHNA to allocate the existing needed housing units to income levels.

Units needed to address underproduction are allocated to income categories based on the rate of cost burdened renter households in each region. Cost burdening is the best proxy available to estimate the current need for housing. Because underproduction in a market leads to cost -burdening by limiting choice and reducing overall affordability, the impacts of underproduction are most acutely felt by lower-income renter households who currently need access to affordable housing. The distribution for the Metro region is shown in Figure 6.

Figure 6: Share of Underproduction Units by Income Category

INCOME CATEGORY	SHARE OF UNITS
0-30% MFI	28%
31-60% MFI	35%
61-80% MFI	18%
81-120% MFI	15%
120%+ MFI	5%

Housing units needed for people experiencing homelessness are distributed by income based on information provided from the Oregon Housing and Community Services Department (OHCS), which comes from administrative data from Community Action Agencies that receive state Emergency Housing Assistance (EHA) and State Housing Assistance Program (SHAP) funds. The data are statewide and from 2020; OHCS plans to update the data going forward. The distribution is shown in Figure 7.

Figure 7: Share of Units for People Experiencing Homelessness by Income Category

INCOME CATEGORY	SHARE OF UNITS
0-30% MFI	89%
31-60% MFI	8%
61-80% MFI	3%
81-120% MFI	-
120%+ MFI	-

Metro Share

The OHNA methodology calculates the Metro Regional housing need based on the three counties. The estimates provided in this memorandum are scaled to the Metro Urban Growth Boundary. The scalar is 97.5% which accounts for the UGB's share of the Tri-County region's underproduction based on the number of jobs and people.

Full Underproduction Methodology

This methodology is based on the OHNA Interim Methodology as of June 2024, which is likely to change before it is finalized and implemented for the first time in January 2025.

TARGET NUMBER OF HOUSING UNITS

The estimate of the target number of housing units starts with the Census Bureau's estimate of total households and then estimates the number of "missing households" that have not formed in a market compared to historical formation rates in 2000.

Household formation is influenced by the housing stock available—when a market does not build sufficient housing, prices rise and vacancy falls, affecting the likelihood of households to form (roommates splitting up, children moving out, etc.). This measure estimates the number of households that would have formed had enough housing been available, and as such, are a component of current demand.

"Missing households" are calculated based on changes in the headship rate (the percentage of persons who are heads of households) for different age cohorts between 18 and 44. The lack of housing availability and affordability is not the only reason that explains reduced household formation rates—other cost increases (e.g., student loans, car ownership and

healthcare costs) and societal/demographic trends are also contributors. Therefore, the age cohorts are limited to between 18 and 44 as the most likely ages where this occurs, but also to acknowledge the nature of the estimate as an overcount. Limiting the age cohorts helps compensate for the nature of the overcount–essentially that housing is not the only factor contributing to decreased household formation rates.

The year 2000 is used as a baseline headship rate for all cohorts. This year was chosen because 2000 Decennial Census data affords us the most recent statistically reliable estimate of a housing market that was more in balance. Headship rates were also generally stable between 1980 and 2000, so going back further would not have a large impact on the baseline headship rate. The model compares the most recent headship rate (based on 2022 PUMS data) against the 2000 baseline for each age cohort. If a cohort has a lower headship rate in the most recent year compared to the baseline, it indicates that fewer households formed. The total estimate of "missing households" is the sum of reduced household formation from cohorts aged 44 years and younger. Should there be negative missing households (more households formed compared to the baseline rate), they are netted out to zero.

The estimate of missing households is added to the current total number of households to approximate the total number of households that would be seeking housing in unconstrained market conditions. The model then applies a five percent target vacancy rate to estimate the total number of housing units a region should have to accommodate current need and have a healthy level of vacancy. Five percent vacancy is the 75th percentile of the national vacancy rate between 1980 and 2000 and is meant to represent unconstrained market conditions. It is also backed by industry stakeholder outreach and some research and is used in other methodologies of estimating housing need and underproduction.

ACTUAL UNITS AVAILABLE FOR YEAR-ROUND OCCUPANCY

The estimate of the actual number of units available for year-round occupancy starts with the Census Bureau's estimate of total housing units and removes uninhabitable units and second and vacation homes that are not available for year-round occupancy from the stock. Uninhabitable units are identified in the Census PUMS data as those that lack indoor plumbing and complete kitchens, and that have been vacant for at least a year. Vacation homes are identified in the Census data as those that are used for "seasonal or recreational purposes."

By removing uninhabitable units and second and vacation homes from the estimate of the current housing stock, the methodology attempts to calculate each region's total housing stock available for year-round occupancy as a more accurate reflection of current housing supply.



Legislative History

Legislation related to addressing existing housing needs and changing the state's approach to planning for housing began in 2019, but methodological details are still in flux, and will be the subject of additional rulemaking and potentially additional clarifying legislation through 2025. The relevant legislative history is summarized below.

- In 2019, House Bill 2001 amended state law to require that jurisdictions analyze "existing and projected" housing need.[2] Metro has interpreted this to mean that its 2024 Urban Growth Report and Management Decision must include an estimate of "existing housing need" in addition to future housing need over the 20-year planning period.
- In 2019, House Bill 2003 directed the Oregon Housing and Community Services Department (OHCS) to develop a pilot methodology for an Oregon RHNA (subsequently renamed the OHNA) to estimate statewide housing need under several need categories and incomes. OHCS and the Oregon Department of Land Conservation and Development (DLCD) each produced summary reports[3,4] on the pilot methodology in 2021.
- In 2021, House Bill 5006 directed DLCD and OHCS to revisit the pilot methodology and offer recommendations to the Legislature on how to improve the methodology and implement the OHNA into the existing land use planning system. This work culminated in a Recommendations Report to the Legislature in December 2022.[5]
- In 2023, House Bill 2001 directed DLCD, OHCS, and the Department of Administrative Services (DAS) to implement the OHNA into existing land use planning systems. The bill does not address specific methodology. DAS is responsible for finalizing the methodology, but DLCD's oversight body (the Land Conservation and Development Commission, LCDC) and OHCS must "assist" and "may study and recommend methodological changes to DAS to improve its functions and suitability." When these provisions take effect, Metro will calculate the Metro region's housing need estimates using the principles of the OHNA, but the state will allocate need to cities within the Urban Growth Boundary (UGB). A follow-up bill later in 2023 (House Bill 2889) included several adjustments to the new OHNA laws, including some

[2] Section 5 of House Bill 2001 (2019) amended ORS 197.296(3)(b) to read: "Conduct an analysis of existing and projected housing need by type and density range, in accordance with all factors under ORS 197.303 and statewide planning goals and rules relating to housing, to determine the number of units and amount of land needed for each needed housing type for the next 20 years." (Boldface language added.) No further definitions of "existing" housing need were included with this legislation; other sections of the bill describe using population projections to estimate housing need, but do not address existing need.
[3] OHCS Report: https://www.oregon.gov/ohcs/about-us/Documents/RHNA/02-21-2021-ECONW-OHCS.pdf
[4] DLCD Report: https://www.oregon.gov/lcd/UP/Documents/20210301_DLCD_RHNA_Assessment_Report.pdf
[5] OHNA Recommendations Report: https://www.oregon.gov/lcd/UP/Documents/20221231_OHNA_Legislative_Recommendations_Report.pdf

applicable to Metro, but not to the specific methodology addressed in this memorandum. Both sets of changes have since been codified into statute.[6]

- The OHNA rulemaking process is currently underway along with the process to finalize the methodology. DLCD is responsible for writing the rules and will not be complete until the end of 2025. DAS is responsible for finalizing the methodology and will not be complete until late 2024. Additional legislation in the 2025 regular session could further change the OHNA.

[6] Oregon Revised Statutes (ORS) Chapters 197A and 185 contain most of the new statutory requirements related to the OHNA.

ECOnorthwest

June 2024

Sherwood West UGB Assessment

Oregon Metro

Prepared for: Oregon Metro

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Acknowledgments

ECOnorthwest prepared this report with support from the guidance and input of several partners, including members, staff, and leadership of the **Metro.** Most notably we are appreciative of the involvement and input of **David Tetrick** and **Ted Reid**. Other firms, agencies, and staff contributed to other research that this report relied upon, specifically **Mackenzie Engineering**. This work was financially supported by **Metro**.

That assistance notwithstanding, ECOnorthwest is responsible for the content of this report. The staff at ECOnorthwest prepared this report based on their general knowledge of the economics of recreation, amenities, and regional economies. ECOnorthwest staff contributing to this study included **Chris Blakney** and **Katherine Buck**. ECOnorthwest also relied on information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. ECOnorthwest has not independently verified the accuracy of all such information and makes no representation regarding its accuracy or completeness. Any statements nonfactual in nature constitute the authors' current opinions, which may change as more information becomes available.

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Executive Summary

Project background and understanding

The City of Sherwood has submitted an expansion of the Portland Metro urban growth boundary (UGB) for Sherwood West, which would include annexing 1,291 acres from the Urban Reserve area west of Sherwood. The Sherwood West Concept Plan includes land for housing, schools and civic facilities, park space, and 265 net acres for employment uses that would support about 4,500 new jobs. There could be an economic benefit to including additional large industrial sites in the UGB. ECOnorthwest explored regional and local data trends to assess whether an increase in employment land in Sherwood West would support economic growth for the Metro region.

Market supply as a tool to grow economic benefits for the Metro region

A diverse regional market supply of sites is essential to maintaining an equilibrium in market pricing and to supporting a broad range of industries. Therefore, the first component of the analysis is to understand the regional market supply of industrial and employment sites and to assess if the portfolio of sites has the characteristics necessary to attract the range of industries that are growing in the region. The analysis determined that there is a very low supply of larger industrial sites.

Site competitiveness to retain economic benefits in the Metro region

The second component of the analysis is to assess whether the land in the Sherwood West North District Mixed Employment Area (MEA) has characteristics that can better accommodate the growing industries than other parcels in Sherwood or the Metro region, which will support regional economic and business growth. Scoring higher than other regional land, the land within the MEA has characteristics that would appeal to industrial development, including 40-to-50-acre parcels, minimal site aggregation, slopes under 5 percent, and access to the highway. There have already been regional shifts with industrial companies locating in Sherwood and developers building new industrial space in Sherwood.

Findings

Based on the assessment of the market supply and the evaluation of the MEA, there are low vacancy rates in existing industrial buildings in the region and a lack of suitable land to support industrial uses, while there is a growing demand for industrial space in the region. Sherwood West would be well suited to capture the new and expanding demand for industrial space.

1. Sherwood West Concept Plan

The Sherwood West Concept Plan

The Metro Council reviews the regional 20-year land supply urban growth boundary (UGB) every six years and is currently reviewing the UGB in 2024. The City of Sherwood has requested a UGB expansion to include all or part of Sherwood West in 2024.

The Sherwood West Concept Plan, which was last updated March 2024, designates 265 net acres for employment uses across commercial (seven acres), mixed-use (25 acres), hospitality (63 acres), schools (40 acres), and mixed employment (130 acres), which is projected to create about 4,500 new jobs. The North District of Sherwood West—located south of Scholls-Sherwood Road, north of Chicken Creek, and west of Elwert Road— has the Mixed Employment Area (MEA), which would be the employment center for Sherwood West because it would contain 53 percent of the jobs and 49 percent of the employment acres proposed in the Sherwood West Concept Plan. Based on the Concept Plan, there could be about 18 jobs/ net acre for a total of 2,398 jobs in the MEA. Land in the northeast of this district is mostly flat, has large parcels, and has easy transportation to SW Roy Rogers Road, which is why the plan designated this area to support industry and employment.

The MEA is envisioned to include space for commercial, light industrial, and flex uses. The office space would be a minor component of the development program and would likely support mixed employment, campus, and/or mixed-use developments. The office space would likely be no more than 20,000 square feet with surface parking, and target tenants would be tech, medical, and service-oriented office space, or a “hub and spoke” or satellite office. Most of the employment uses for the MEA would be for light industrial and flex uses. The plan defines flex space as “a building that provides for a combination of uses, typically including a mix of warehouse, light industrial, office, and/or retail space." The MEA has an employment focus, but there would also be a mix of housing north of Chicken Creek and a 13-acre community park.

The approach to the Sherwood West Concept Plan is to create a vision that can be implemented over time, as it is expected that development will happen incrementally. The goal would be to create a zoning system that works both in the short term and long term, and regulations should be designed to be flexible and adaptable to changing conditions. Development is anticipated to take five or six years for development to start occurring in Sherwood West after the site is brought into the UGB, and a full build-out of the region would take several decades.[1]

[1] Sherwood West Concept Plan. March 5, 2024.

2. Regional Industrial Market Supply

To support economic and business growth in the Metro region, it is important to have the supply of sites to foster business growth and expansion. A regional market supply of sites can maintain an equilibrium in market pricing and help to buildout a portfolio of sites with characteristics that attract a broad range of growing industries. The North District Mixed Employment Area (MEA) could expand the supply of suitable sites to support industry growth. The review of industrial space also includes the square footage and trends of flex space in the region.

Metro region industrial square footage

Within the Metro region, industrial buildings were analyzed for the following cities: Forest Grove, Cornelius, Hillsboro, Beaverton, Tigard, King City, Durham, Tualatin, Sherwood, Wilsonville, Rivergrove, Lake Oswego, Portland, Milwaukie, West Linn, Gladstone, Oregon City, Johnson City, Happy Valley, Maywood Park, Gresham, Fairview, Troutdale. The cities of Rivergrove, Johnson City, King City, and Maywood did not have any existing industrial buildings. There are 4,806 industrial buildings in the Metro region and almost two-thirds of the buildings are in the City of Portland. Sherwood currently has 88 industrial buildings and two percent of the industrial buildings in the Metro region (Exhibit 1).

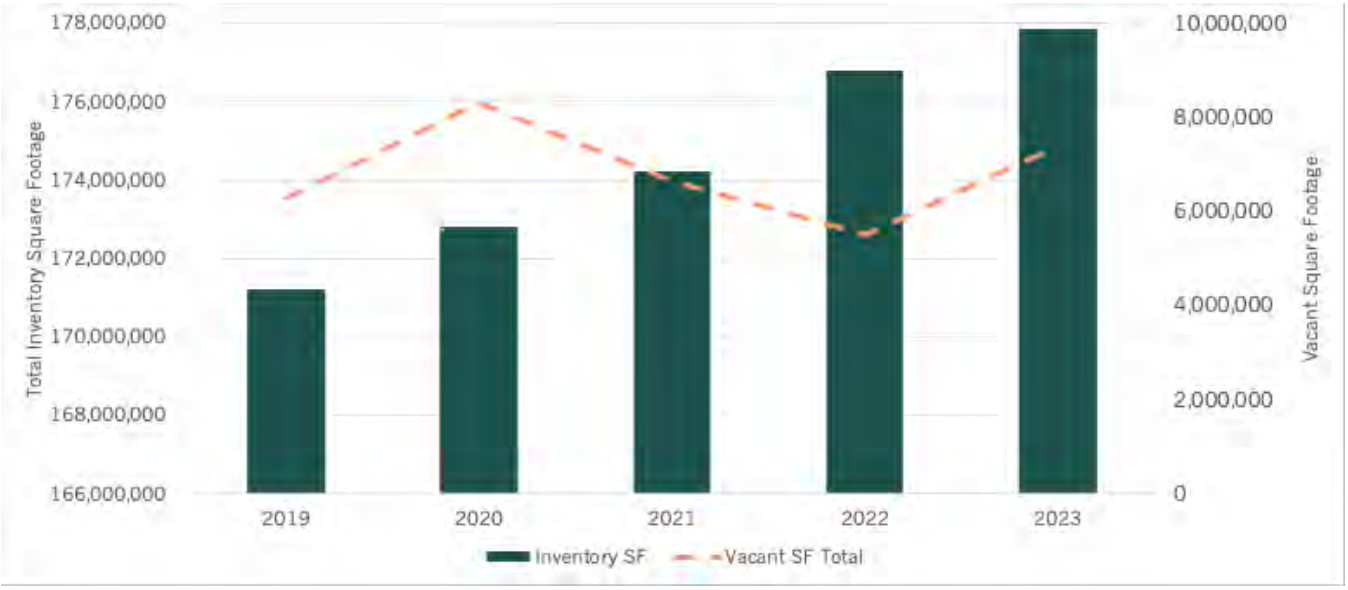
Exhibit 1. Number of Industrial Buildings in the Metro Region by City, 2024

City	Number of Industrial Buildings	Percent of Regional Industrial Buildings
Portland	3,153	65.6%
Hillsboro	318	6.6%
Tualatin	317	6.6%
Beaverton	148	3.1%
Milwaukie	118	2.5%
Wilsonville	107	2.2%
Gresham	102	2.1%
Oregon City	90	1.9%
Tigard	90	1.9%
Sherwood	88	1.8%
Troutdale	77	1.6%
Forest Grove	61	1.3%
Lake Oswego	54	1.1%
Cornelius	32	0.7%
Fairview	23	0.5%
Gladstone	11	0.2%
West Linn	8	0.2%
Happy Valley	7	0.1%
Durham	2	0.0%
Metro Region Total	4,806	100%

Source: CoStar

There has been a four percent increase in the amount of industrial square footage in the region with a total of about 178 million square feet of industrial space in 2023. During this time, the amount of vacant space peaked in 2020 and decreased over time until 2023 (Exhibit 2).

Exhibit 2. Total Industrial Space and Vacant Industrial Space in Metro Region, 2019-2023



Source: CoStar

The Metro region vacancy rate for industrial space has remained consistently under 5 percent since 2019 and was 4.1 percent for 2023. During this time, industrial rents have steadily increased from $8.24 per square foot in 2019 to $10.38 per square foot in 2023 (Exhibit 3).

Exhibit 3. Industrial Rent and Vacancy in Portland Metro Region, 2019-2023

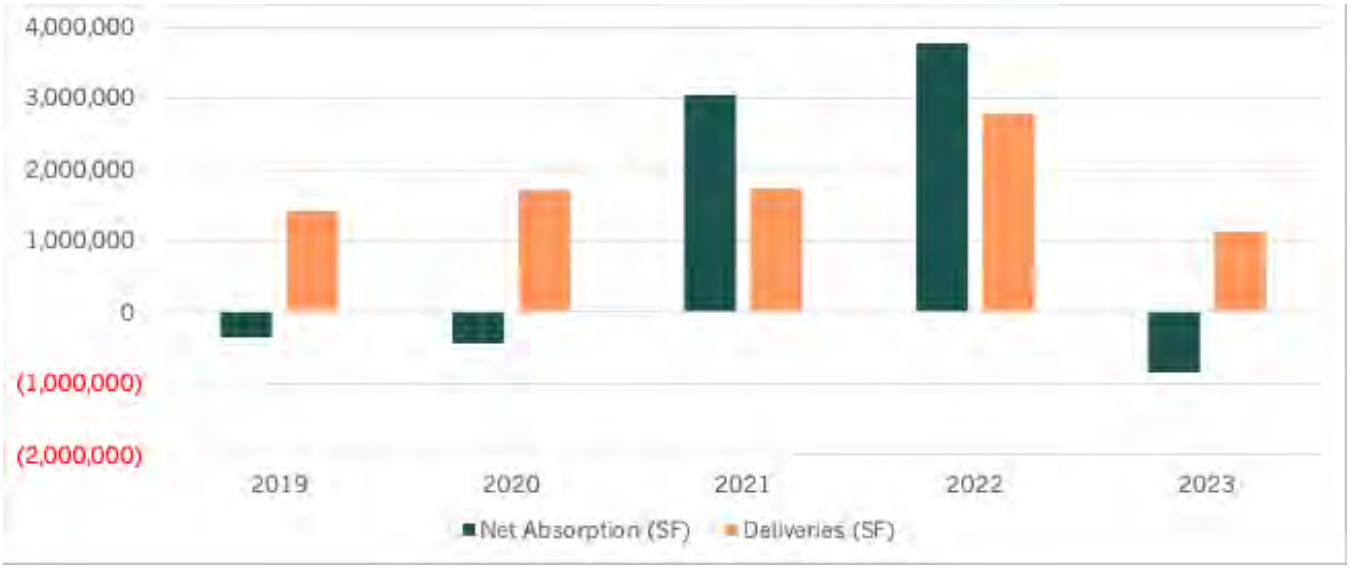


Source: CoStar

Since 2019, almost nine million square feet of industrial space has been developed in the Metro region across 84 buildings. In 2022, there was the largest share of industrial deliveries (2.8 million square feet). Net absorption for the Metro region—which is measured by the total square feet occupied minus the total space vacated—has fluctuated between

being negative and positive. However, the negative absorption has been less than 500,000 square feet in 2019 and 2020, and less than one million in 2023, which could represent 1 or 2 leases ending. In 2021 and 2022, net absorption was over three million square feet per year, which indicates that three million more industrial square footage was being leased per year than becoming vacant, even as 4.5 million square feet was developed in 2021 and 2022 (Exhibit 4).

Exhibit 4. Industrial Absorption and Deliveries in the Metro Region, 2019-2023



Source: CoStar

When looking specifically at industrial buildings that are 100,000 square feet or larger, there is a much smaller share of these buildings in the Metro Region. Of the 4,806 industrial buildings in the region, only 8 percent of buildings (391) are 100,000 square feet or more. Over half of the larger industrial buildings are in Portland, and Sherwood has 3 percent (11 buildings) that are 100,000 square feet or larger (Exhibit 5).

Exhibit 5. Number of Large Industrial Buildings in the Metro Region by City, 2024

City	Number of Industrial Buildings ≥ 100,000 SF	Percent of Regional Large Industrial Buildings
Portland	215	55%
Hillsboro	43	11%
Tualatin	28	7%
Milwaukie	23	6%
Wilsonville	19	5%
Beaverton	17	4%
Sherwood	11	3%
Gresham	10	3%
Fairview	7	2%
Tigard	6	2%
Forest Grove	4	1%
Troutdale	4	1%
Cornelius	2	1%
Lake Oswego	2	1%
Metro Region Total	391	100%

Source: CoStar

The vacancy rate for industrial buildings in the Metro region that are greater than 100,000 square feet has remained under 5 percent since 2021. Since 2019, the average triple net rent for larger industrial buildings have increase by 23 percent ($1.58 per square foot) and were $8.45 per square foot in 2023 (Exhibit 6). While the average rent for larger buildings is less than the average rent for all buildings, this is likely due to economies of scale of leasing a larger building with more square footage.

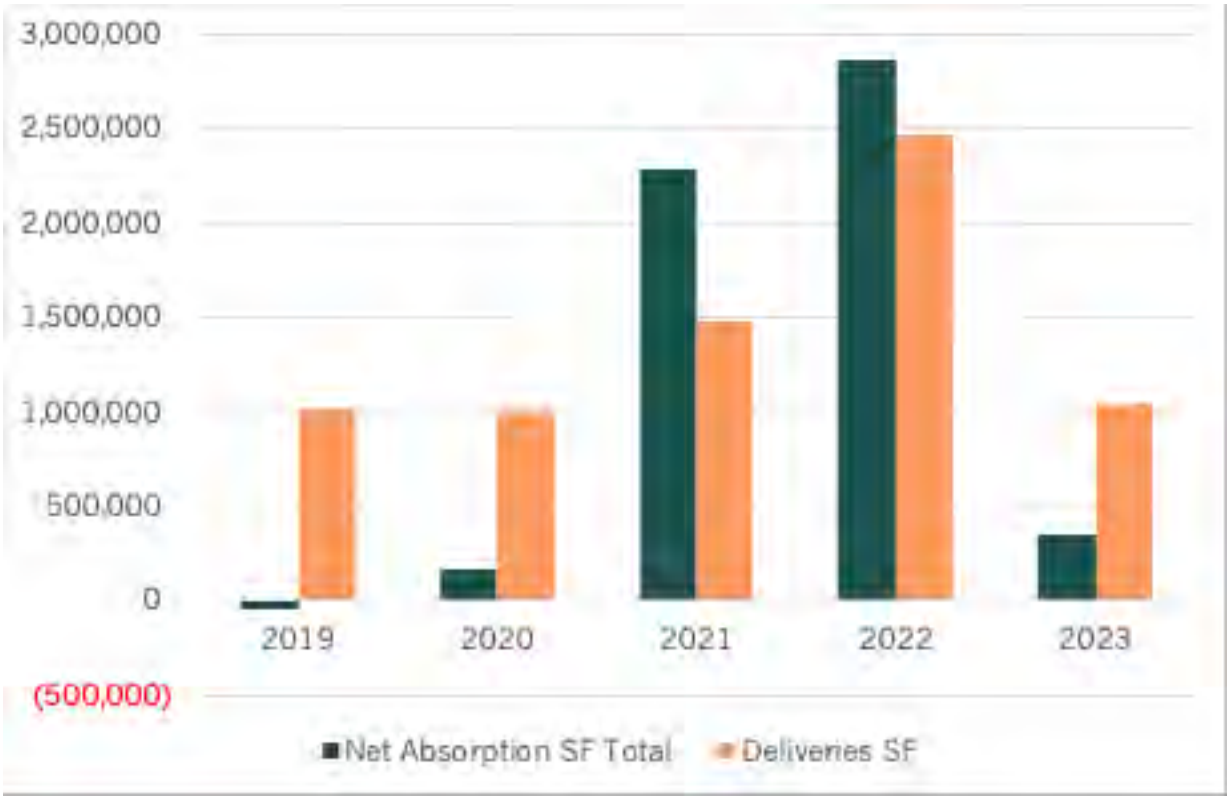
Exhibit 6. Industrial Rent and Vacancy Rates for Large Buildings in the Metro Region, 2019-2023



Source: CoStar

Between 2019 and 2023, 7 million square feet of industrial buildings (sized 100,000 square feet or larger) were developed in the region across 33 buildings. This indicates that 39 percent of the industrial buildings built between 2019 and 2023 equal or are greater to 100,000 square feet, which shows the trend towards new industrial companies needing larger spaces. Absorption for larger buildings was negative in 2019, and positive between 2020 and 2023 even while absorption for all buildings was negative, showing the importance of larger industrial product for the region.

Exhibit 7. Large Building Industrial Absorption and Deliveries in Metro Region, 2019-2023



Source: CoStar

Low vacancy for existing industrial space in Washington County

In 2023, Washington County had almost 64 million square feet of industrial space, a 6 percent increase (3.8 million square feet) of total industrial supply since 2019. The amount of vacant square footage of industrial space has peaked in 2020 at just over 2.48 million square feet (Exhibit 8).

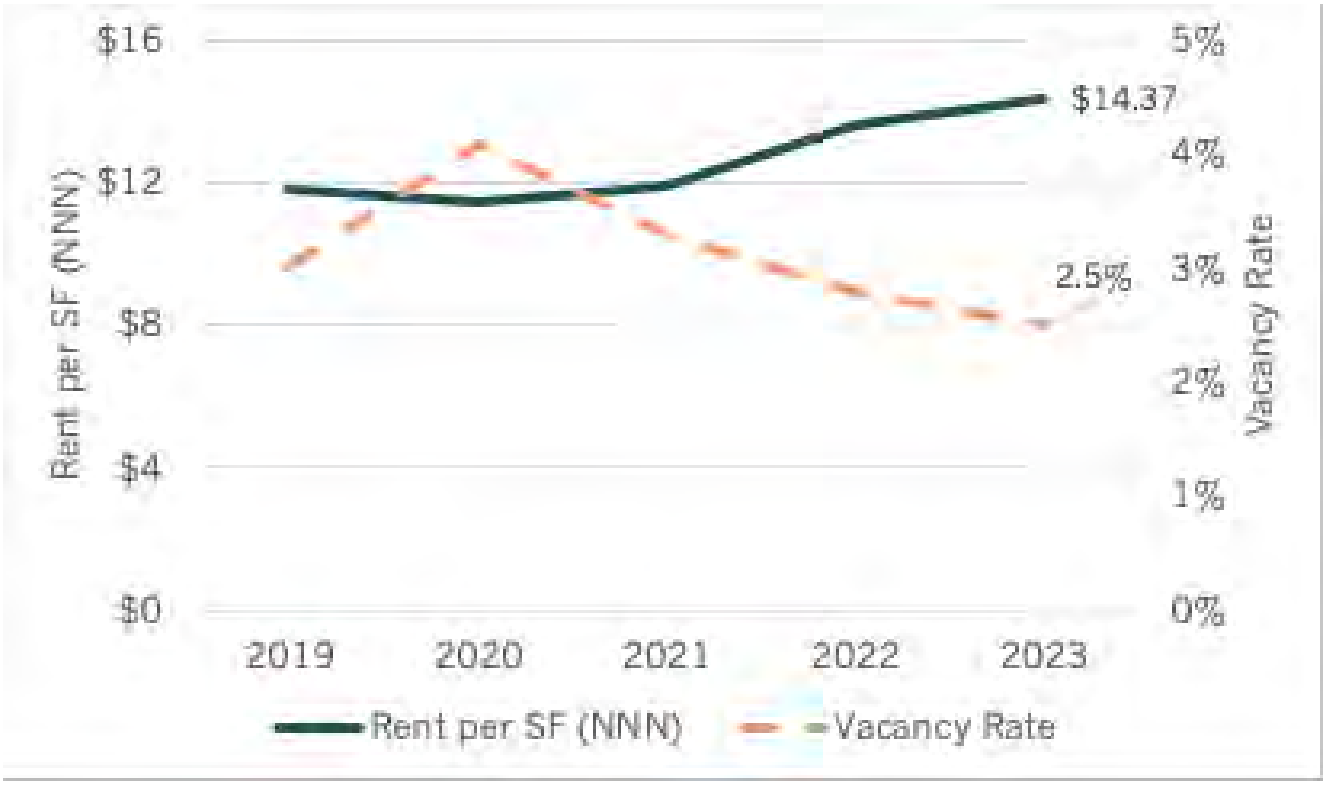
Exhibit 8. Total Industrial Space and Vacant Industrial Space in Washington County, 2019-2023



Source: CoStar

In Washington County, the triple net rent per square foot (a lease agreement in which the tenant is responsible for all expenses) has steadily increased over the last five years while vacancy rates have remained below 5 percent during this time frame, indicating a strong industrial market in the county. Between 2019 and 2023 rents increased by 21 percent ($2.54) per square foot. During the same timeframe, the vacancy rate peaked at 4.1 percent in 2020 and dropped to 2.5 percent for 2023 (Exhibit 9).

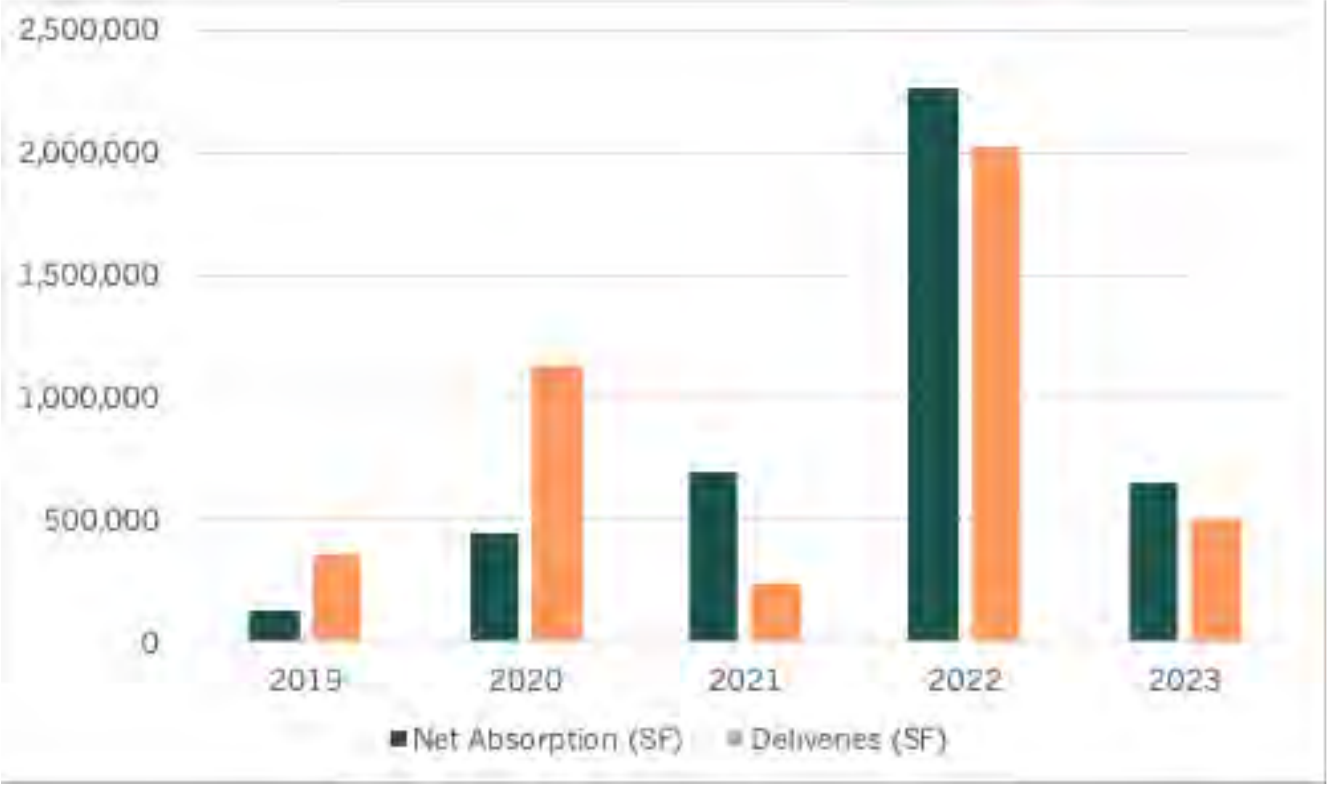
Exhibit 9. Industrial Rent and Vacancy in Washington County, 2019-2023



Source: CoStar

Since 2019, there has been over 4.4 million square feet of new industrial and flex space delivered in Washington County across 43 industrial and flex buildings. Net absorption—which is measured by total square feet occupied minus the total space vacated—was positive between 2019 and 2023 and indicates that more industrial square footage was being leased than becoming vacant even as new industrial developments were built (Exhibit 10). The cool down in the market with space absorption and deliveries is likely a reflection of national development trends.

Exhibit 10. Industrial & Flex Absorption and Deliveries in Washington County, 2019-2023

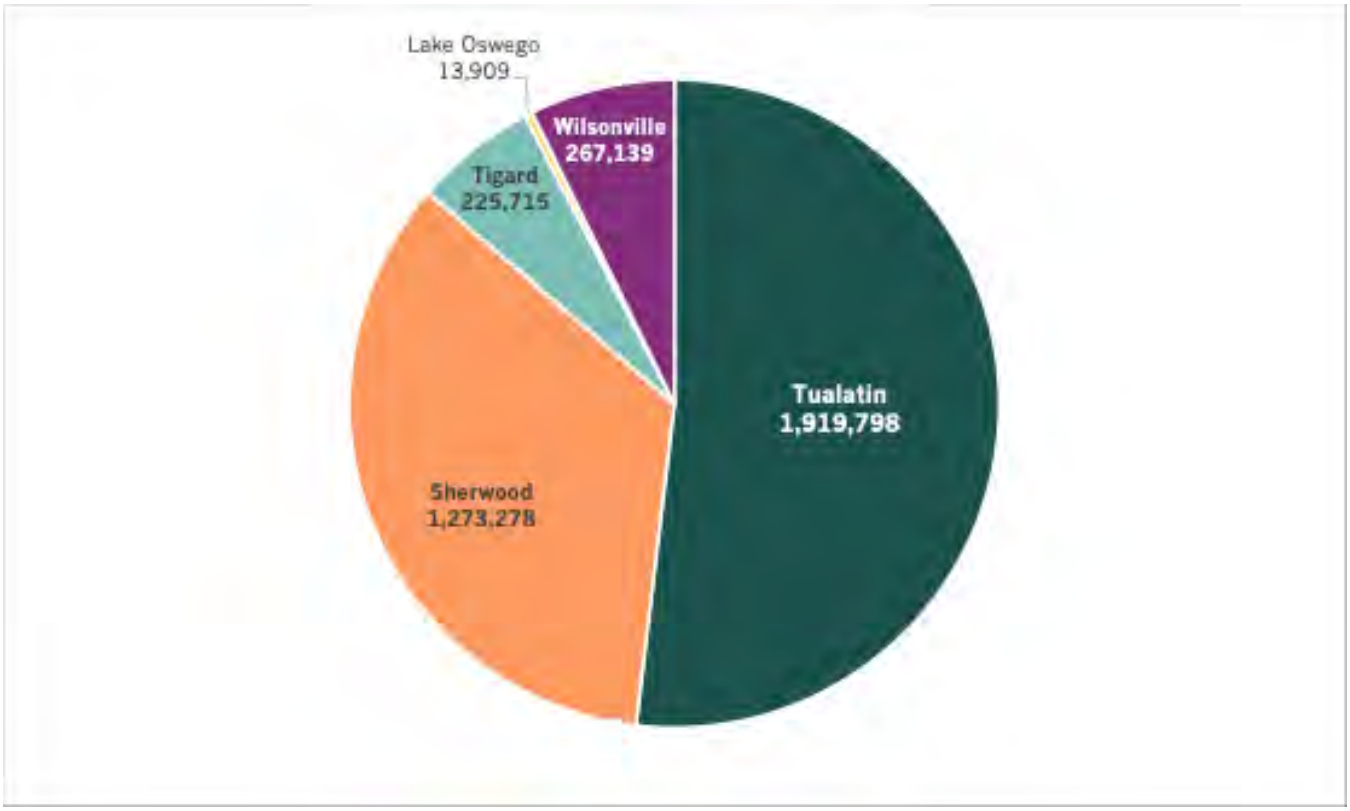


Source: CoStar

Industrial and flex building characteristics in the South Metro Region

Within the South Metro Region, including Sherwood, Tualatin, Tigard, Wilsonville, and Lake Oswego, there is just under 3.7 million square feet of industrial and flex space. About 52 percent of the industrial and flex space is in Tualatin, followed by 34 percent of the space in Sherwood. The remaining industrial and flex square footage in the South Metro Region is in Wilsonville (7 percent), Tigard (6 percent), and Lake Oswego (0.4 percent) (Exhibit 11).

Exhibit 11. Total Industrial & Flex Square Footage in South Metro Region, 2024 YTD

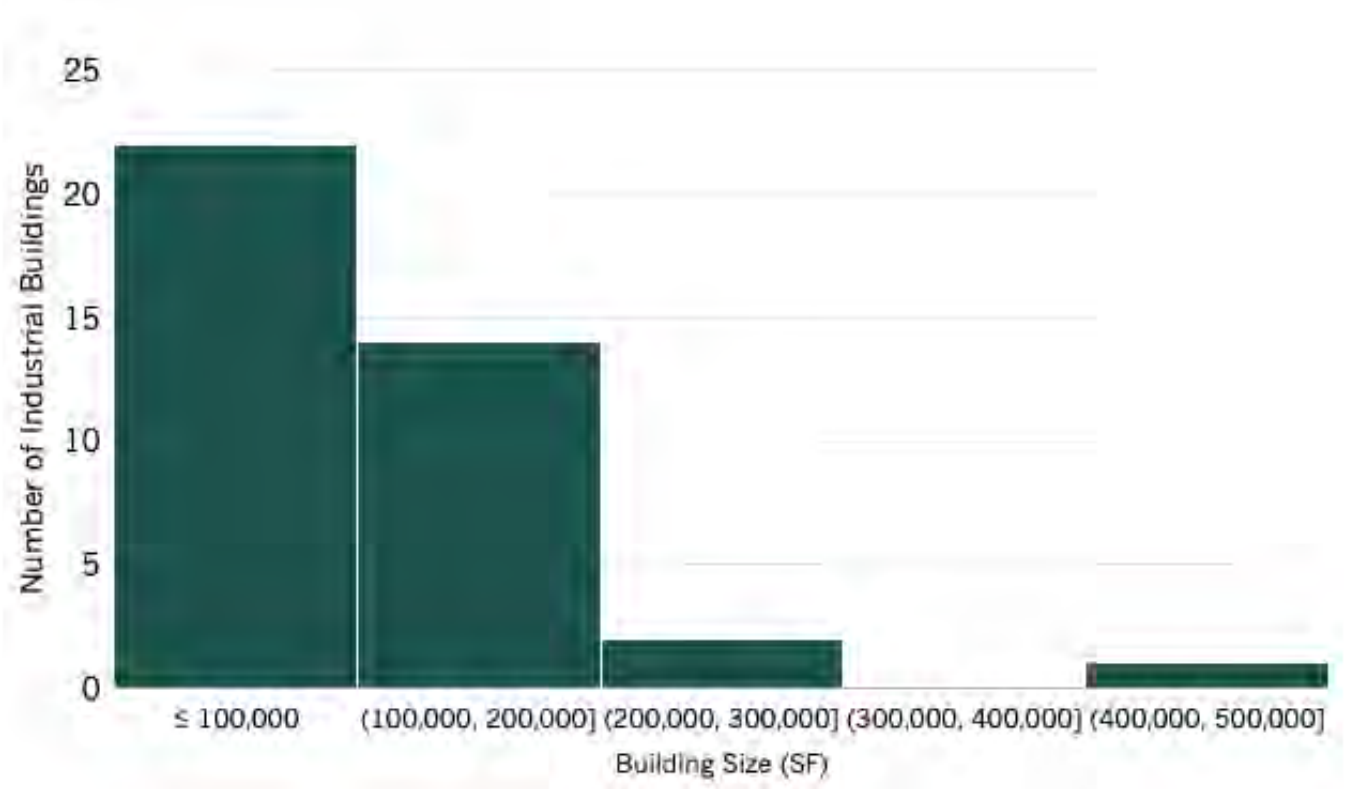


Source: CoStar

Size of industrial product in the South Metro Region

In the past five years, the typical size of industrial buildings constructed in the South Metro Region has been under 100,000 square feet (22 buildings). Fourteen buildings were between 100,000-200,000 square feet, and only three developments in the past five years have exceeded 200,000 square feet (Exhibit 12).

Exhibit 12. Size of Industrial Buildings Built in the South Metro Region, 2019-2024



Source: CoStar

Type of industrial product built since 2019

Within the industrial product type, CoStar delineates the properties into a secondary type based on their use, size, and amenities to industrial users. CoStar utilizes the following definitions for the secondary types of industrial space:

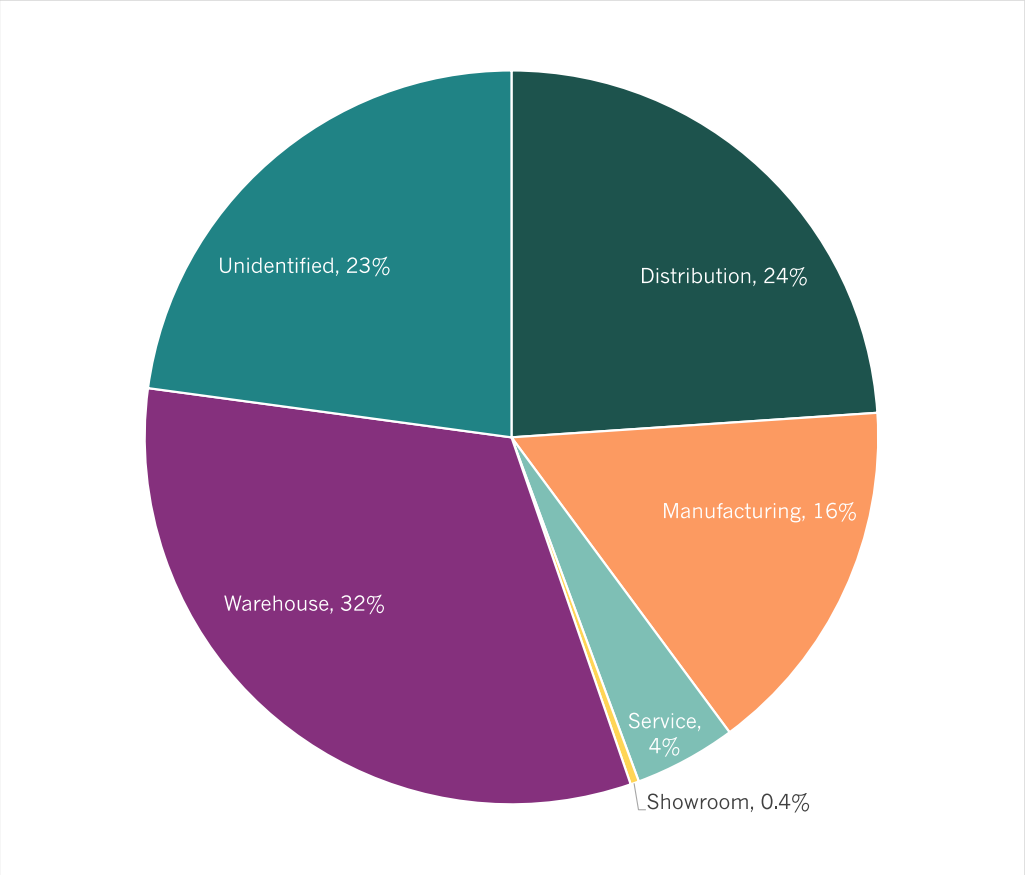
- Distribution–Spaces used for warehousing and distribution of inventory, that are typically 200,000 square feet or more, have clear heights of 28 feet, are less than 5 percent office space, and have site coverage that can be up to 40 percent.
- Warehouse–Buildings that are 25,000 square feet or greater, are up to 20 percent office area, have clear heights of 22 feet or greater, and have site coverage up to 50 percent.
- Manufacturing–Buildings that are typically 300,000 square feet or greater with an office area up to 50 percent.
- Service–Buildings designated for vehicle repair.
- Showroom–Buildings that displays merchandise and can range from 25,000 square feet to 150,000 square feet with office areas up to 30 percent.[2]

In the South Metro Region, 56 percent of the industrial space built since 2019 and proposed through 2026 is distribution and warehouse space. About 23 percent of the space

[2] CoStar Glossary

was not identified by a secondary type and 16 percent of the space supports manufacturing (Exhibit 13).

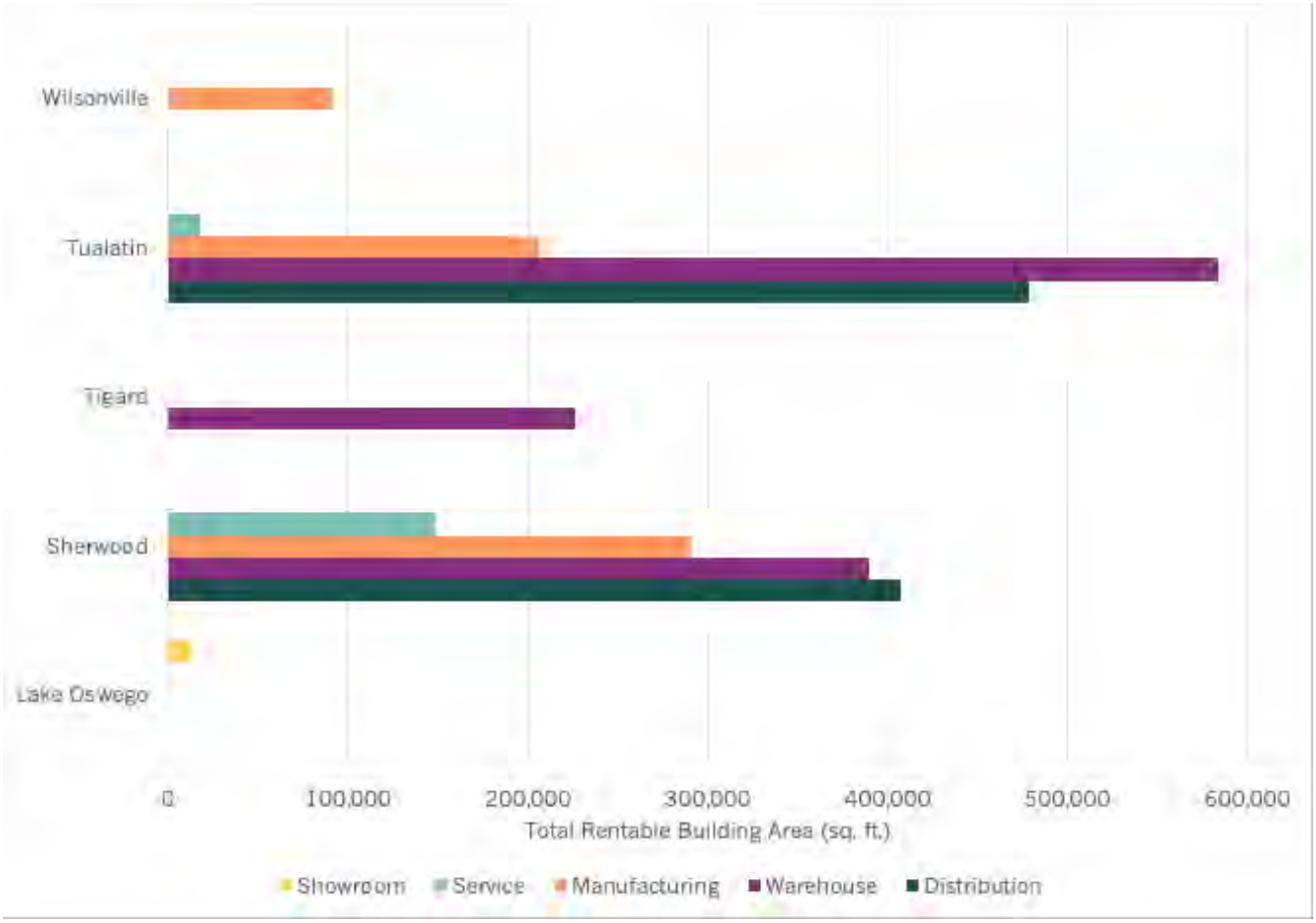
Exhibit 13. Secondary Industrial Space Built in Region, 2019-2026



Source: CoStar

Since 2019, warehouse space (followed by distribution space) was the most common type of industrial space built in this region. Within their city limits, Tualatin and Sherwood have distribution, warehouse, manufacturing, and service industrial space built since 2019 within their city limits. Sherwood had over 291,000 square feet of manufacturing space built since 2019 and proposed through 2026, which is more manufacturing square footage than the other cities during this time frame (Exhibit 14).

Exhibit 14. Secondary Industrial Space Built in Region, 2019-2026



Source: CoStar

Across the South Metro Region, there are eight industrial properties that are identified as manufacturing. These properties are in Sherwood, Tualatin, and Wilsonville; Sherwood has the highest rentable building area (RBA) in square footage and the most acres of land devoted to manufacturing (Exhibit 15). Sherwood has been attracting manufacturing to its city.

Exhibit 15. Size of Manufacturing Properties Built or Proposed in South Metro Region, 2019-2026

Location	No of Buildings	Total RBA	Average RBA per Building	Total Land Area (AC)	Average Building Lot Size (AC)	Minimum Lot Size (AC)	Maximum Lot Size (AC)
Sherwood	3	291,141	97,047	62	21	1	30
Tualatin	4	206,375	51,594	17	4	2	5
Wilsonville	1	91,773	91,773	6	6	6	6
All Locations	**8**	**589,289**	**73,661**	**85**	**11**	**1**	**30**

Source: CoStar

Sherwood Industrial Supply

Since 2019, the City of Sherwood has seen an 18 percent increase in the amount of industrial and flex space within the city limits, a gain of 393,200 square feet. The amount

of vacant square footage peaked in 2020 at about 162,000 square feet and has since declined even as the new space is introduced to the market (Exhibit 16).

Exhibit 16. Total Industrial Space and Vacant Industrial Space in Sherwood, 2019-2023



Source: CoStar

The triple net industrial and flex rents in Sherwood steadily declined between 2019 and 2022, but they drastically increased by 47 percent (by $4.75 per square foot) between 2019 and 2023. The current triple net lease rates are $14.84 per square feet. During this timeframe, the industrial and flex industrial vacancy rate peaked in 2020 at 7.1 percent but remained under 5 percent between 2021 and 2023. For 2023, the vacancy rate is 2.8 percent (Exhibit 17). The increasing rents and stabilized vacancy under 5 percent indicate a strong industrial market in Sherwood and could attract new industrial development.

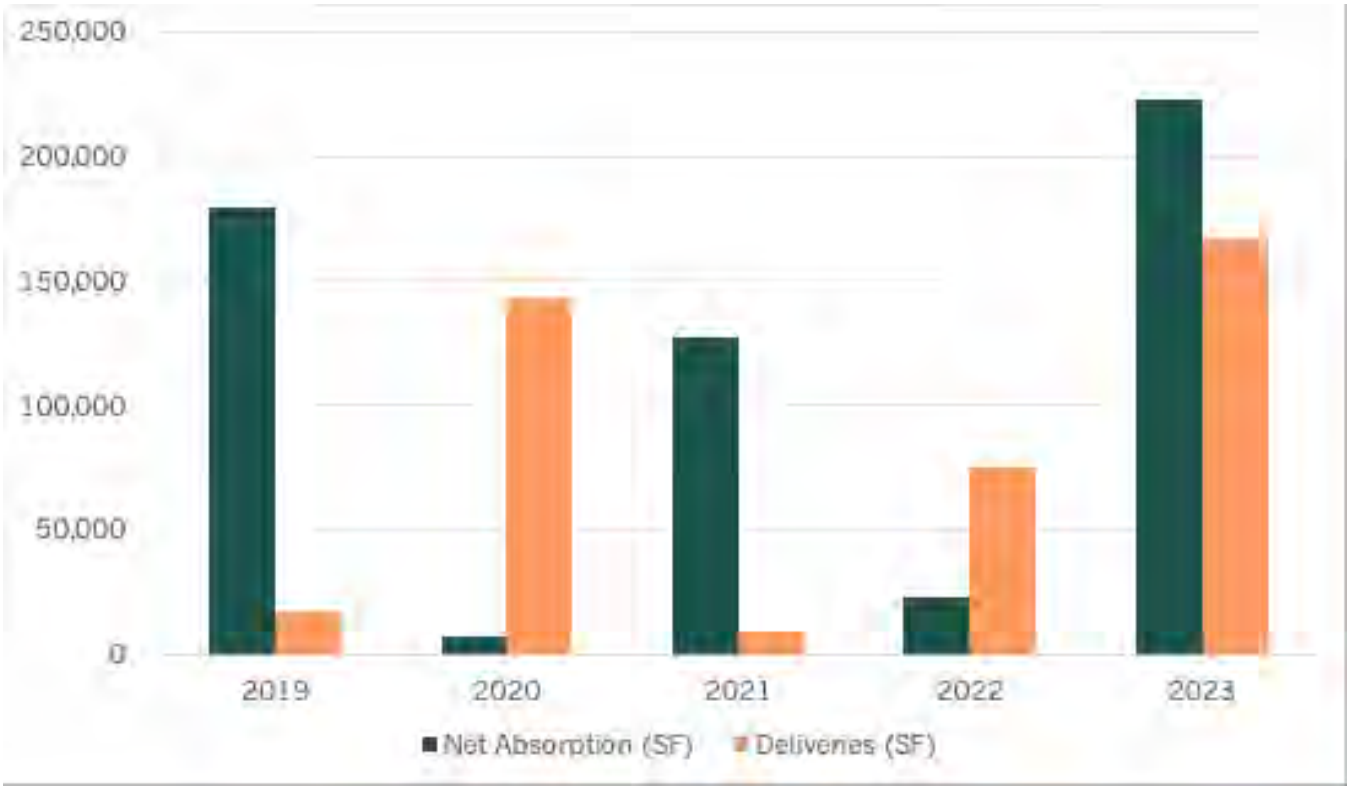
Exhibit 17. Industrial & Flex Rents and Vacancy in Sherwood, 2019-2023



Source: CoStar

Over the past five years, there have been seven new industrial and flex buildings delivered to the Sherwood market, adding 410,000 square feet of new industrial space between 2019 through 2023. Companies are leasing this new space as the net absorption remained positive between 2019 and 2023 (Exhibit 18).

Exhibit 18. Industrial & Flex Absorption and Deliveries in Sherwood, 2019-2023

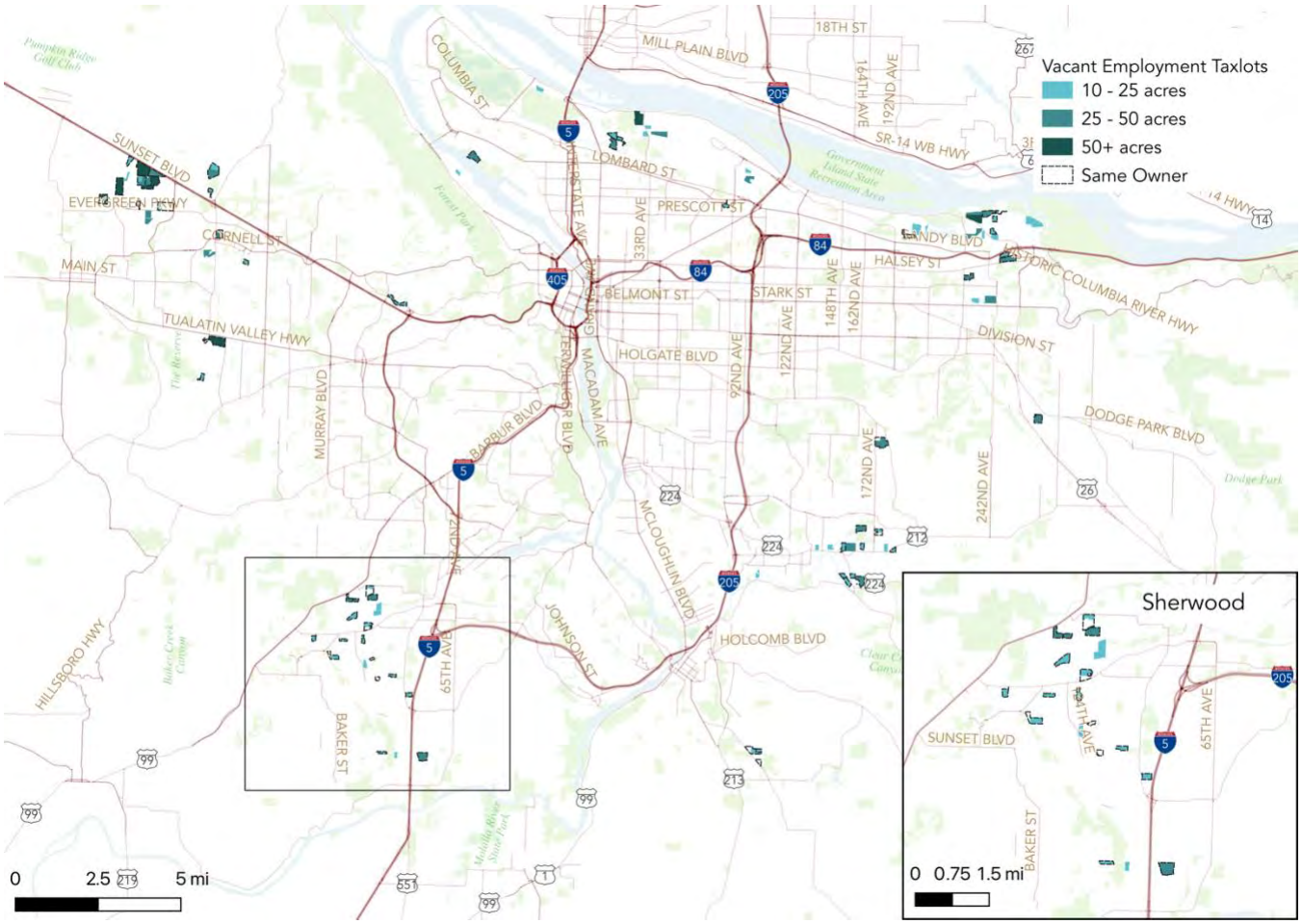


Source: CoStar

3. Regional Land Supply for Industrial Uses

When looking at land that could be suitable for industrial uses in the greater Metro region, Mackenzie created a Large Lot Inventory (LLI) to support the Buildable Lands Inventory (BLI) in 2018. The LLI identified employment capacity from vacant land and potential redevelopment. When looking at the Metro region, there are some scattered vacant taxlots that can accommodate new employment uses. The map below shows there are 104 vacant sites that are larger than 10 acres and are zoned for commercial, industrial, or mixed-use (Exhibit 19). However, ten acres may be too small for some of the industrial users when looking for land and may require assemblage of parcels, and parcels with the dashed box indicate the same owner which could facilitate assembling parcels.

Exhibit 19. Vacant Employment Taxlots Larger than 10 Acres in the Metro Region, 2018

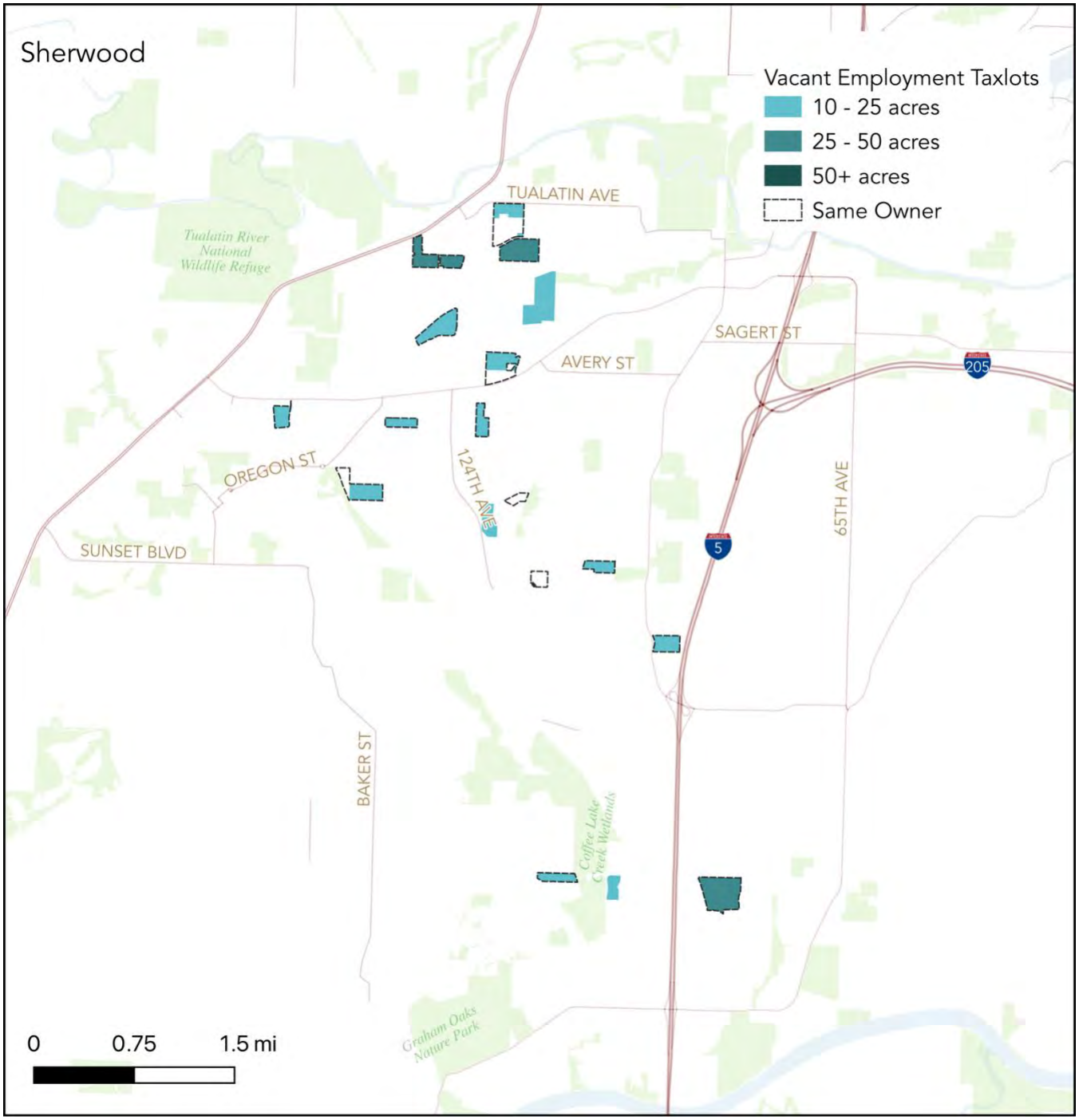


Source: Mackenzie (2018), ECOnorthwest (2024)

Parcel size in Sherwood

When looking at existing vacant taxlots to serve employment uses that were identified in the BLI, there are some taxlots between 10 and 49 acres, however there are no taxlots that are 50 acres or greater. Only three of the taxlots are greater than 25 acres (Exhibit 20).

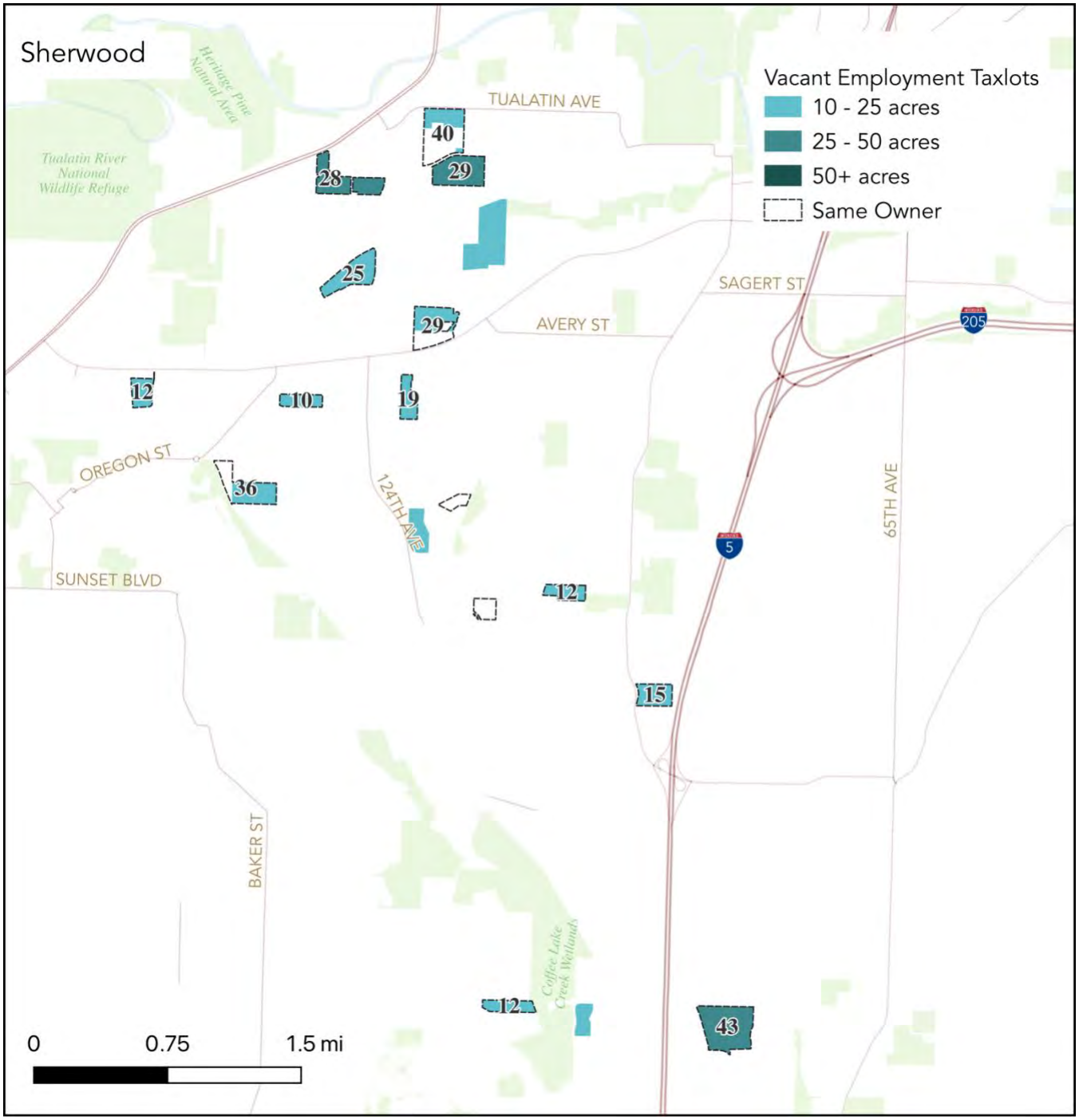
Exhibit 20. Vacant Employment Taxlots in Sherwood by Size, 2018



Source: ECOnorthwest (2024)

While many of the existing sites would be too small to support many industrial users, it is possible that some of the sites could be assembled to create larger lots. Land assemblage is easier when the lots have the same ownership. When reviewing whether any of the sites could be assembled with adjacent sites with the same owner, there are a few opportunities to assemble sites into a larger parcel. However, none of the assembled parcels are greater than 50 acres (Exhibit 21).

Exhibit 21. Vacant Employment Taxlots in Sherwood by Site Aggregation, 2018



Source: ECOnorthwest (2024)

Parcel slope constraints of regional land

When looking at the regional land and its ability to support industrial uses, the slope of the site has an impact of the suitably to support employment uses. The BLI removes sites that have slopes over 25 percent and for this site characteristics analysis, areas with slopes over 7 percent are identified.

- Unconstrained: 10 percent or less of the tax lot has steep slopes
- Partially Constrained: 10.01 percent to 50 percent of the tax lot has steep slopes
- Constrained: 50 to 89.99 percent of the lot has steep slopes
- Heavily Constrained: Greater than 90 percent of the site has steep slopes

Of the BLI sites, about 55 percent of the sites and 44 percent of the acres, fall into the unconstrained slope category, which would be the most feasible sites to develop for industrial uses. About one quarter of the parcels (24 percent) are partially constrained sites that could support some industrial uses. Twenty-one percent of the parcels are constrained or heavily constrained with over half of the lot having a steep slope; these parcels are not suitable for supporting industrial uses (Exhibit 22).

Exhibit 22. BLI Taxlots by Slope Site Constraints, 2018

Market Subarea	Unconstrained		Partially Constrained		Constrained		Heavily Constrained		Total	
	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Central	**346**	**10**	**49**	**3**	**52**	**2**	**33**	**2**	**480**	**16**
Commercial	92	5	13	1	14	0	15	1	134	8
Industrial	254	4	36	2	38	2	18	1	346	9
East Multnomah	**335**	**481**	**180**	**706**	**94**	**290**	**37**	**30**	**646**	**1,507**
Commercial	163	88	37	54	23	62	21	4	244	207
Industrial	170	349	131	593	61	224	12	25	374	1,192
Large Lot Industrial	2	44	12	58	10	5	4	1	28	108
Inner Clackamas	**71**	**4**	**30**	**69**	**17**	**4**	**9**	**1**	**127**	**79**
Commercial	44	1	3	-	6	1	3	-	56	2
Industrial	27	3	27	69	11	4	6	1	71	77
Inner I-5	**13**	**2**	**3**	**0**	**1**	**0**	**6**	**0**	**23**	**3**
Commercial	12	1	3	0	1	0	5	0	21	1
Industrial	1	1					1	-	2	1
Inner North & East	**637**	**389**	**241**	**605**	**124**	**73**	**132**	**22**	**1,134**	**1,089**
Commercial	146	7	26	6	17	2	31	1	220	15
Industrial	485	314	208	518	106	70	100	20	899	922
Large Lot Industrial	6	69	7	81	1	1	1	2	15	153
Inner Westside	**295**	**52**	**196**	**65**	**104**	**24**	**70**	**8**	**665**	**148**
Commercial	267	39	161	40	84	6	66	4	578	89
Industrial	28	13	35	25	20	18	4	4	87	59
Outer Clackamas	**179**	**232**	**133**	**252**	**80**	**157**	**60**	**15**	**452**	**655**
Commercial	87	16	57	18	39	10	50	6	233	49
Industrial	92	216	76	234	36	117	10	9	214	577
Large Lot Industrial					5	30			5	30
Outer I-5	**180**	**351**	**180**	**504**	**95**	**273**	**40**	**20**	**495**	**1,148**
Commercial	71	9	48	13	20	18	17	3	156	43
Industrial	84	245	115	437	62	178	19	11	280	871
Large Lot Industrial	25	97	17	54	13	76	4	6	59	234
Outer Westside	**644**	**1,318**	**158**	**504**	**44**	**48**	**8**	**0**	**854**	**1,871**
Commercial	428	57	68	29	20	14	5	0	521	100
Industrial	197	825	85	350	23	34	3	0	308	1,210
Large Lot Industrial	19	436	5	125	1	0			25	561
Grand Total	**2,700**	**2,840**	**1,170**	**2,706**	**611**	**870**	**395**	**99**	**4,876**	**6,515**
	55%	**44%**	**24%**	**42%**	**13%**	**13%**	**8%**	**2%**	**100%**	**100%**

Source: Metro, ECOnorthwest

4. Employment Trends

To understand future demand for space to support employment growth, an analysis of the Quarterly Census of Employment and Wages (QCEW) was conducted for Washington, Clackamas, and Yamhill Counties. The data is analyzed by industries identified by the North American Industry Classification System (NAICS), which federal agencies use as the standard to collect and analyze the business economy.

The analysis includes the employment growth trends between 2017 and 2022 for all sectors and the growth trends for the NAICS codes of sectors that utilize industrial land. Since most of the employment land in the Sherwood West Concept Plan is part of the MEA, which identifies primarily serving flex and light industrial uses, it is important to understand the employment trends for the industrial space users. The typical NAICS codes and industries that utilize industrial space include:

- 22 Utilities: This sector has businesses that provide: electrical power, natural gas, steam supply, water supply, and sewage treatment and disposal.
- 23 Construction: This sector includes construction of buildings or engineering projects.
- 31–33 Manufacturing: This sector comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products.
- 42 Wholesale Trade: This sector includes establishments that participate in wholesaling merchandise (typically without transformation) and rendering services incidental to the sale of merchandise. The merchandise includes the outputs of agriculture, mining, and manufacturing, and it can include information industries, such as publishing.
- 48–49 Transportation and Warehousing: This sector includes industries that provide transportation for passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation, including transport by air, rail, water, road, and pipeline.[3]

Regional employment growth between 2017 and 2022

Between 2017 and 2022, there has been fluctuations in regional employment by industry with an overall net loss of 2 percent of employees (1,829) for an annual average growth rate (AAGR) of -0.4 percent. The construction industry had the highest AAGR of any industry at 3.4 percent, with a total increase in employment of 18 percent (1,620) between 2017 and 2022. The natural resources sector lost 40 percent of its employees (62) and had the lowest AAGR of -9.7 percent This region is seeing strength in the industrial sectors and a decline in the service sectors.

[3] North American Industry Classification System. US Census Bureau. https://www.census.gov/naics/?99967

When looking at the employment trends for industrial space users, including construction, manufacturing, transportation, warehousing, utilities, and wholesale trade, they all had a positive AAGR, indicating an increase in employees over the past five years. These industries had a 9 percent increase in employment between 2017 and 2022, which shows a positive trajectory for employment in industries that utilize industrial space (Exhibit 23), and the proposed plan for the MEA is to support industrial uses. Within the industrial space users, there is an interest in increasing the number of manufacturing jobs as these jobs typically offer higher wages than other industrial space users.

Exhibit 23. Regional Employment Growth by Industry, 2017-2022

Sector	Number of Employees						Change 2017-2022		
	2017	2018	2019	2020	2021	2022	Number	Percent	AAGR
Construction	8,987	9,378	10,020	9,303	9,485	10,607	1,620	18%	3.4%
Education & Health	12,276	12,081	12,463	12,179	12,448	12,620	344	3%	0.6%
Financial Activities	6,420	6,407	6,367	6,358	5,567	5,031	-1,389	-22%	-4.8%
Information	1,609	1,632	1,780	1,702	1,896	1,758	149	9%	1.8%
Leisure & Hospitality	9,207	9,578	9,665	7,365	7,787	8,407	-800	-9%	-1.8%
Manufacturing	15,623	16,429	16,209	15,353	15,624	16,464	841	5%	1.1%
Natural Resources	155	95	103	94	109	93	-62	-40%	-9.7%
Other Services	3,091	3,246	3,414	2,739	2,734	2,702	-389	-13%	-2.7%
Professional & Business	20,508	18,705	18,057	16,863	17,569	18,572	-1,936	-9%	-2.0%
Public Administration	1,613	1,589	1,600	1,607	1,546	1,576	-37	-2%	0.5%
Retail Trade	13,761	13,869	13,267	12,337	12,917	12,892	-869	-6%	-1.3%
Transportation, Warehousing, Utilities	3,254	3,232	3,244	3,478	3,702	3,707	453	14%	2.6%
Wholesale Trade	8,417	7,983	8,258	8,452	8,291	8,663	246	3%	0.6%
Total	**104,921**	**104,224**	**104,447**	**97,830**	**99,675**	**103,092**	**-1,829**	**-2%**	**-0.4%**

Source: QCEW

Sherwood employment growth between 2017 and 2022

Between 2017 and 2022, there was an 18 percent increase in employees (1,104) in the City of Sherwood across all sectors. The construction sector saw the largest increase in employment (460) and had an AAGR of 13 percent. Eleven sectors saw net gains in employment. Only two sectors lost a small share of jobs; the financial activities sector lost 64 jobs and had an AAGR of -7 percent, while the leisure and the hospitality sector lost 7 jobs and had an AAGR of -0.1 percent (Exhibit 24). The industrial uses remained strong in Sherwood, while the services sectors had small employment losses.

Exhibit 24. Sherwood Employment Growth by Sector, 2017-2022

Sector	Year						Change 2017-2022		
	2017	2018	2019	2020	2021	2022	Number	Percent	AAGR
Construction	539	615	672	719	781	999	460	85%	13.1%
Education & Health	1,100	1,074	1,110	1,127	1,208	1,218	118	11%	2.1%
Financial Activities	210	193	189	145	145	146	-64	-30%	-7.0%
Information	36	44	42	25	51	53	17	47%	8.0%
Leisure & Hospitality	1,066	1,111	1,147	921	962	1,059	-7	-1%	-0.1%
Manufacturing	691	773	780	734	752	782	91	13%	2.5%
Natural Resources	7	2	4	8	12	12	5	71%	11.4%
Other Services	303	345	395	309	332	336	33	11%	2.1%
Professional & Business	475	506	507	522	537	586	111	23%	4.3%
Public Administration	141	138	145	149	149	155	14	10%	1.9%
Retail Trade	1,074	1,105	1,108	1,207	1,279	1,216	142	13%	2.5%
Transportation, Warehousing, Utilities	222	234	245	220	225	307	85	38%	6.7%
Wholesale Trade	312	319	351	365	423	411	99	32%	5.7%
Total	**6,176**	**6,459**	**6,695**	**6,451**	**6,856**	**7,280**	**1,104**	**18%**	**3.3%**

Source: QCEW

When looking at the sectors that use industrial and flex space, these sectors all had net gains in employment between 2017 and 2022 with a cumulative increase of 525 new jobs and an AAGR of 6 percent. Manufacturing had a 13 percent increase in jobs between 2017 and 2022 in Sherwood (Exhibit 25). These sectors all had double-digit gains in employment, indicating strong job growth.

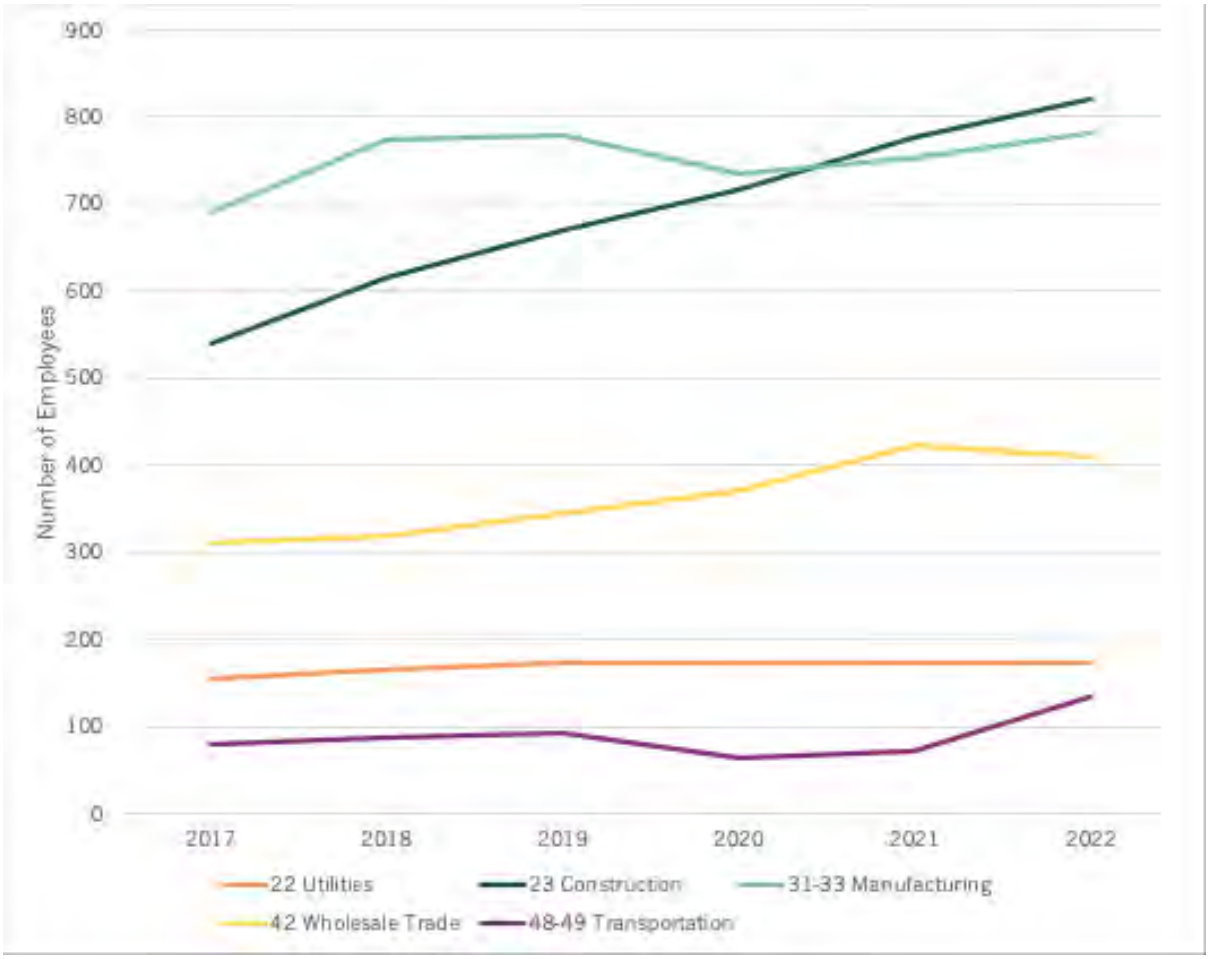
Exhibit 25. Sherwood Employment Growth by Industrial Space Users, 2017-2022

Sector	Number of Employees						Change 2017-2022		
	2017	2018	2019	2020	2021	2022	Number	Percent	AAGR
Construction	539	614	670	716	777	821	282	52%	8.8%
Manufacturing	691	773	780	734	752	782	91	13%	2.5%
Transportation, Warehousing, Utilities	80	87	92	63	71	133	53	66%	10.7%
Wholesale Trade	312	319	344	372	423	411	99	32%	5.7%
Total	**1,622**	**1,793**	**1,886**	**1,885**	**2,023**	**2,147**	**525**	**32%**	**5.8%**

Source: QCEW

Since 2017, the construction sector has seen a steady positive increase in the number of employees. Manufacturing, wholesale trade, and transportation have had minor fluctuations in the number of employees, but all three sectors have seen a net gain in employment over 2017 (Exhibit 26). There are higher numbers of employment in manufacturing and construction than other industrial uses in Sherwood.

Exhibit 26. Sherwood Job Growth in Industrial Sectors, 2017-2022



Source: QCEW

If Sherwood West moves ahead as planned, then the build out of the plan will support construction jobs that have annual wage of $79,200 per year, which is higher than the average wage for 2022 across all sectors, ($63,100). Assuming the Sherwood West site is built out with industrial uses that support manufacturing, the site could provide jobs that pay an average annual salary of $77,900.

Size of industrial employers

When looking at the size and number of firms in Sherwood between 2017 and 2022, the highest growth rate was in firms with fewer than 49 employees. Firms in Sherwood that employ between 10 and 19 employees had the highest annual average growth rate (AAGR) at 17 percent. Firms with 20 to 49 employees had an AAGR of 10 percent (Exhibit 27).

Exhibit 27. Firm Size in Sherwood, 2017-2022

Firm Size by Number of Employees	2017	2018	2019	2020	2021	2022	AAGR
1 to 4	22	24	22	36	30	28	5%
5 to 9	52	38	41	40	64	54	1%
10 to 19	32	75	93	76	80	71	17%
20 to 49	118	145	158	137	212	187	10%
50 to 99	113	120	121	115	57	121	1%
100 to 249	354	119	345	330	309	321	-2%
250 to 499		252					

Source: QCEW

Employment density

The number of employees that work on a parcel of land depends on the industry. Within the manufacturing industry (NAICS 31-33), there is an average of 19 employees per acre of land.[4] If the buildout of the 130 acres of the MEA occurred as planned, this could bring about 2,444 jobs to the region. Additionally, based on the Concept Plan, there could be about 18 jobs/ net acre for a total of 2,398 jobs in the MEA. With a full build out, the MEA could support around 2,400 manufacturing jobs which would pay an annual salary of $79,200.

[4] https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/26252/CRohan_ExitProj_Final.pdf?sequence=1&isAllowed=y

5. Sherwood West Site Competitiveness

The North District Mixed Employment Area (MEA) of the Sherwood West Concept Plan has site characteristics that make the land better suited to accommodate the industries that are growing and expanding in the Portland Metro region. Also, there could also be existing aging industrial and employment centers in the Portland Metro region that do not appeal to the current users or that are more expensive so they do not appeal to many industries.

Site characteristics

The MEA is expected to primarily support light industrial/flex uses while providing a smaller share of space for commercial uses. These types of companies have specific needs when looking at properties. The industrial/flex use needs criteria are derived from Mackenzie's Infrastructure Finance Authority Industrial Development Competitiveness Matrix that the company prepared for the State of Oregon in 2015[5] (Exhibit 28).

Exhibit 28. Evaluation of the Site Characteristics of the MEA

SITE CHARACTERISTIC	INDUSTRIAL/ FLEX USE NEEDS	MEA EVALUATION	SCORE
Site Size	♦ Industrial/flex uses look for large parcels for their operations, which may include the need for the storage/yard space and for truck staging.	♦ The parcel sizes are primarily greater than 10 acres, with 50-acre parcels as well, so the North District parcels could appeal to a wide range of industrial/flex uses (Exhibit 29).	
Ownership	♦ Industrial/flex uses prefer large parcels, rather than needing to assemble many smaller parcels to reach the ideal size.	♦ The parcels are managed by larger ownership, which would require less parcel assemblage and appeal to industrial/flex developers.	
Competitive Slope	♦ Most industrial/flex uses need parcels with slopes under 5% to successfully run their operations.	♦ The MEA sites have slopes less than 3-5%, so these sites would appeal to industrial/flex uses.	
Utilities/ Infrastructure	♦ Industrial and flex requirements for water, sewer, natural gas, electricity, and telecommunications vary by type of industrial use	♦ New infrastructure will be placed as part of the Sherwood West Concept Plan so adequate infrastructure could be included in the North District that meets the requirements of the targeted industries.	

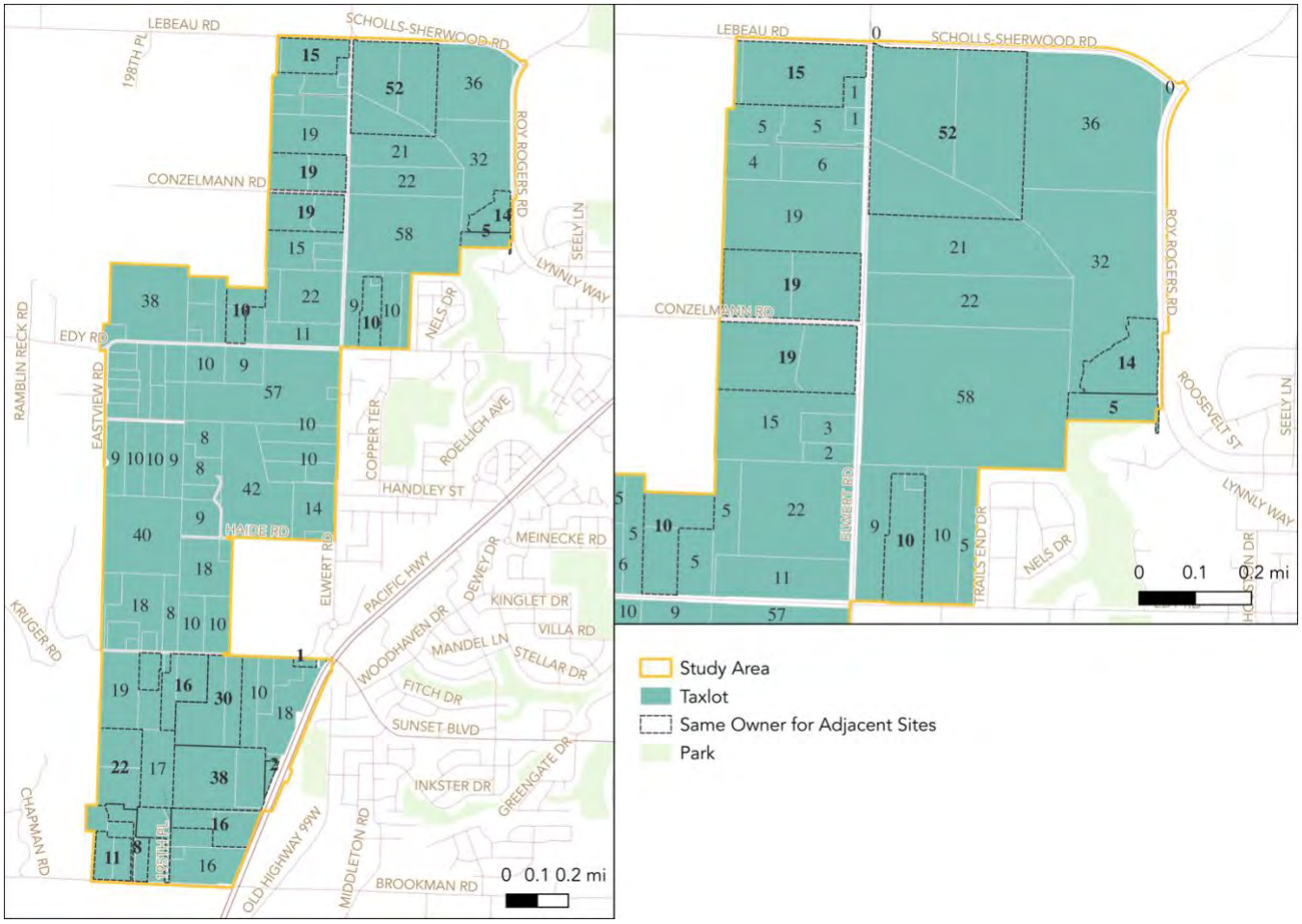
[5] Mackenzie. Infrastructure Finance Authority Industrial Development Competitiveness Matrix. State of Oregon (2015).

	but typically have very high utility demands.	♦ Sherwood West has been included in the current Water System Master Plan (2015). ♦ Sherwood West was neither included in the Sanitary Sewer Master Plan (2016) nor the Stormwater Master Plan (2016).	
Environmental Considerations	♦ Environmental considerations, including wetlands, Habitat Conservation Areas, and floodplains, determine where space can be developed.	♦ The North District is an "Upland Class A Habitat," so it must meet baseline requirements set forth in Metro Title 13 to protect, conserve, and restore the wildlife habitat resources.	

Source: Mackenzie (2015); ECOnorthwest

The parcel map of Sherwood West shows relatively large parcels over 10 acres. Some of the parcels have the same owner, which would facilitate the assembly of parcels to create large sites (Exhibit 29).

Exhibit 29. Parcel Size in Sherwood West and the MEA



Source: RLIS Taxlot Data, ECOnorthwest, 2024

There are site selection criteria regarding the proximate uses and access that industrial and flex users like to see that make a site more competitive for new development. The MEA scores high against the criteria in three categories and scores medium against the criteria in two categories (Exhibit 30).

Exhibit 30. Evaluation of the Site Proximities of the MEA

SITE CHARACTERISTIC	INDUSTRIAL/ FLEX USE NEEDS	MEA EVALUATION	SCORE
Transportation Access to Interstate or Principal Arterial	♦ Industrial/flex users like convenient transportation access to major interstates or principal arteries, and actual distances vary by industry. ♦ Heavy industrial/ manufacturing and high-tech/clean-tech manufacturing prefer to be within 10 miles of the interstate. ♦ Value-added manufacturing and light manufacturing can be within 20 or 30 miles of the interstate.	♦ The North District is not adjacent to I-5 but can access I-5 by SW Roy Rogers Road (about 7 miles). ♦ The site is 2 miles from Highway 99W and about 9 miles from the intersection of 99W and I-5. ♦ The Concept Plan proposes adding a street to connect SW Elwert Road to SW Roy Rogers Road, which would run south of SW Scholls-Sherwood Road. ♦ The plan identifies SW Elwert Road as an "Employment Area Parkway" in the North District, including truck-turning considerations and fewer curb cuts. ♦ The County is planning to expand SW Roy Rogers Road into a five-lane roadway that will have two travel lanes in each direction and a center turn lane between Sherwood and Highway 99W.	
Proximity to Regional Infrastructure Rail/Port/Airport	♦ Industrial and flex uses prefer to locate in reasonable proximity to the railroads, ports, and airports to move their goods for distribution.	♦ The MEA is ~26 miles from Portland International Airport and ~27 miles from the Port of Portland. The site is convenient to the rail lines in the Metro region.	
Proximity to Labor Force	♦ Industrial and flex uses like to locate in proximity to their labor force. Some industries require labor with specialized skills, training, or education. Research & Development uses like to locate in proximity to higher education facilities.	♦ The Concept Plan is planning for thousands of housing units, including multifamily, middle housing, medium-density, and low-density neighborhoods, near the MEA. ♦ It is unclear whether the new residents would have the relevant skills needed for jobs in the MEA.	

Surrounding Uses	♦ Industrial and flex uses like to locate away from residential areas, and these uses can be sensitive to the externalities of the surrounding land uses.	♦ The MEA does not have residential uses nearby, except some planned multifamily, middle housing, and medium-density residential uses on the south end. ♦ There is minimal development to the north, east, and west of the MEA, so there may be minimal externalities from neighboring uses. ♦ There is also a park buffer between the MEA and the Far West District of the Concept Plan.	
Proximity to Goods	♦ For value-added manufacturing, businesses like to be close to the raw materials.	♦ The MEA is in close proximity to the wine region and agricultural land.	

Source: Mackenzie (2015); ECOnorthwest

Site Competitiveness for the Semiconductor Industry

The semiconductor industry provides a key opportunity for the state to promote advanced manufacturing, enhance their traded sector, and support a good jobs pipeline. Since Congress passed the $52 billion CHIPS Act in July 2022, there has been a renewed focus on promoting the national semiconductor industry though manufacturing and research and design. The initiative provides $40 billion in grants for semiconducting manufacturing and $10 billion for investments in research over five years. The Metro Region already has a strong cluster for semiconductors in Hillsboro with Intel's Gordon Moore Park at Ronler Acres Research Campus, which creates 1,000 patents a year. This existing strength in semiconductor manufacturing can position the region to capture other semiconductor activities, and semiconductors are half of the state's annual exports. The semiconductor boom in the 1990s was precipitated by the state having 2000 acres of industrial land, which led to billions of dollars of investment and doubling the industrial employee count.

To prepare for the next influx of semiconductor activity, the region will need to have a supply of industrial land to support business growth and expansion. The Semiconductor Task Force's Industrial Lands Subcommittee found that the key site characteristics that the semiconductor prefers is a location near other semiconductor businesses and labor, parcels of at least 25 acres, and sites that have infrastructure in place to support development that can begin within 6 months to three years. The subcommittee identified a lack of land that met these criteria.

The national focus around semiconductors and regional semiconductor momentum around Hillsboro positions the Metro Region to capture a larger share of semiconductor activities. The Semiconductor Task Force acknowledged losing a major semiconductor investment opportunity because the state did not have a parcel at the needed size with proximity to the labor force and supply chain. In May 2024, Business Oregon was working with Project

Fabrik to identify a location for a semiconductor manufacturing plant that needed between 120 and 140 acres for the semiconductor plant. The project would have included a 1.6 million square foot industrial building and would have created between 400 and 600 jobs. The business could not find the right parcel to locate their semiconductor plan.

The importance of having vacant industrial land, and large parcels are extremely important to supporting the regional semiconductor industry to support economic growth for the region and state. The growth of the semiconductor cluster in Oregon is a priority of the State, and the MEA would be competitive in attracting semiconductor companies. In understanding the site's competitiveness for semiconductors, the Industrial Lands Subcommittee found the following key characteristics for the semiconductor industry. The MEA scores well for large parcels, but scores moderately for clustering and site readiness as the site will take years to build out the infrastructure to support industrial uses (Exhibit 31).

Exhibit 31. Evaluation of the Semiconductor Characteristics of the MEA

SITE CHARACTERISTIC	SEMICONDUCTOR NEEDS	MEA EVALUATION	SCORE
Clustering	♦ The semiconductor industry likes to cluster near talent, other companies in the supply chain. ♦ The semiconductor industry likes to cluster near public and private utilities. ♦ This leads to a cluster of semiconductor industries in one area.	♦ There is a current cluster of semiconductor activities in Hillsboro. ♦ There has already been momentum of semiconductor companies "moving south" of Hillsboro. Lam Research currently operates factories in both Sherwood and Tualatin.	
Large parcels	♦ This industry likes to identify parcels that are 25+ acres.	♦ The MEA has large parcels with the same ownership and could fill the gap for providing large parcels in the Metro Region that could support semiconductor businesses.	
Site Readiness	♦ Companies like properties that are Tier 1 or "development ready", which indicates that they have infrastructure in place and development can begin within six months. ♦ Tier 2 properties may require significant permitting and infrastructure improvements and could	♦ The infrastructure build out of the MEA still needs to happen and will take a few years to build out. ♦ Although the MEA may not support semiconductor industries looking to locate in the next few years, having this site ready could support the project pipeline for the future.	

	be developed within three years.		

Source: Semiconductor Task Force (2022); ECOnorthwest (2024)

The MEA could support the semiconductor industry as these businesses look for new locations and could provide expansion opportunities for the semiconductor industry. Currently, this industry is clustered in Hillsboro, but the Sherwood West site is still proximate to the cluster. The current vacancy rate for industrial properties in Hillsboro is 1.4 percent, lower than the region's vacancy rate (4.1 percent), and industrial space costs $12.70 per square foot which is greater than the average rent for the region ($10.38 per square foot)[6]. The Hillsboro area has low availability of space and buildings rent for higher costs, which could keep out some semiconductor businesses that may be looking for an alternate regional market. There has also been some semiconductor activity south of Hillsboro, including LAM Research in Sherwood and Tualatin. Assuming the semiconductor build out happens for the MEA, these industries could bring jobs that pay an average of $110,000 per year, supporting good jobs for the community.

Site Competitiveness for Key Industries of Growth

The Sherwood West Concept Plan forecasts additional employment land and prioritizes job growth and expansion of the City's tax base, as directed by the Sherwood City Council. A better future jobs-to-housing ratio in the future will provide Sherwood residents the opportunity to work in the city, rather than having to commute elsewhere for work. The City's current jobs-to-housing ratio is 0.9, so there are nine jobs for every 10 households in the city there are 9 jobs. The Concept Plan also states that 92 percent of Sherwood residents work outside of the city limits.

The plan determined that the City may be able to attract tech clusters, as Sherwood is located between existing tech clusters in Wilsonville and the Sunset Corridor. Advanced manufacturing firms are also of interest to the City, and there has been momentum on this front; since 2021, Sherwood has attracted advanced manufacturing companies including Lam Research, NSI Manufacturing, and Olympus Controls.

As part of the 2021 Sherwood Economic Opportunities Analysis (EOA), the City identified the following sectors that are expected to drive economic growth in the current and subsequent cycles based on the economic landscape in Sherwood and Washington County:

- Manufacturing
  - Technology and Advanced Manufacturing
  - Machinery Manufacturing
  - Clean Tech
- Professional and Business Services

[6] CoStar (2024)

    - Software and Media
    - Clean Tech
    - Athletics and Outdoors
    - Other Services
- Wholesale
- Services for Visitors
- Services for Residents
    - Medical Services
    - Legal Services
    - Financial Services
    - Retail
    - Personal Services
    - Restaurants[7]

The MEA would be competitive in attracting these uses as they do not require being directly adjacent to the highway, like distribution and warehousing would be. Additionally, these sectors do not have as many community externalities, such as noise, truck traffic, and air pollution, so they would fit well into the Sherwood West Concept Plan which also has residential uses and park land in the North District.

Industrial clustering

Many industrial sectors, including semiconductors, like to cluster or locate near other similar businesses to be near the supply chain and the labor force. When looking where large industrial buildings (100,000 square feet or greater) are locating, Sherwood had the second highest percentage increase in new large industrial buildings after Cornelius that had a modest increase from 1 to 2 industrial buildings (Exhibit 32). This could demonstrate that there is a growing cluster of large industrial buildings in Sherwood, which would likely attract other industrial users to locate near the cluster as well.

[7] https://www.sherwoodoregon.gov/planning/page/2023-economic-opportunities-analysis-update

Exhibit 32. Count of industrial buildings 100,000+ square feet by city, 2010-2024 YTD

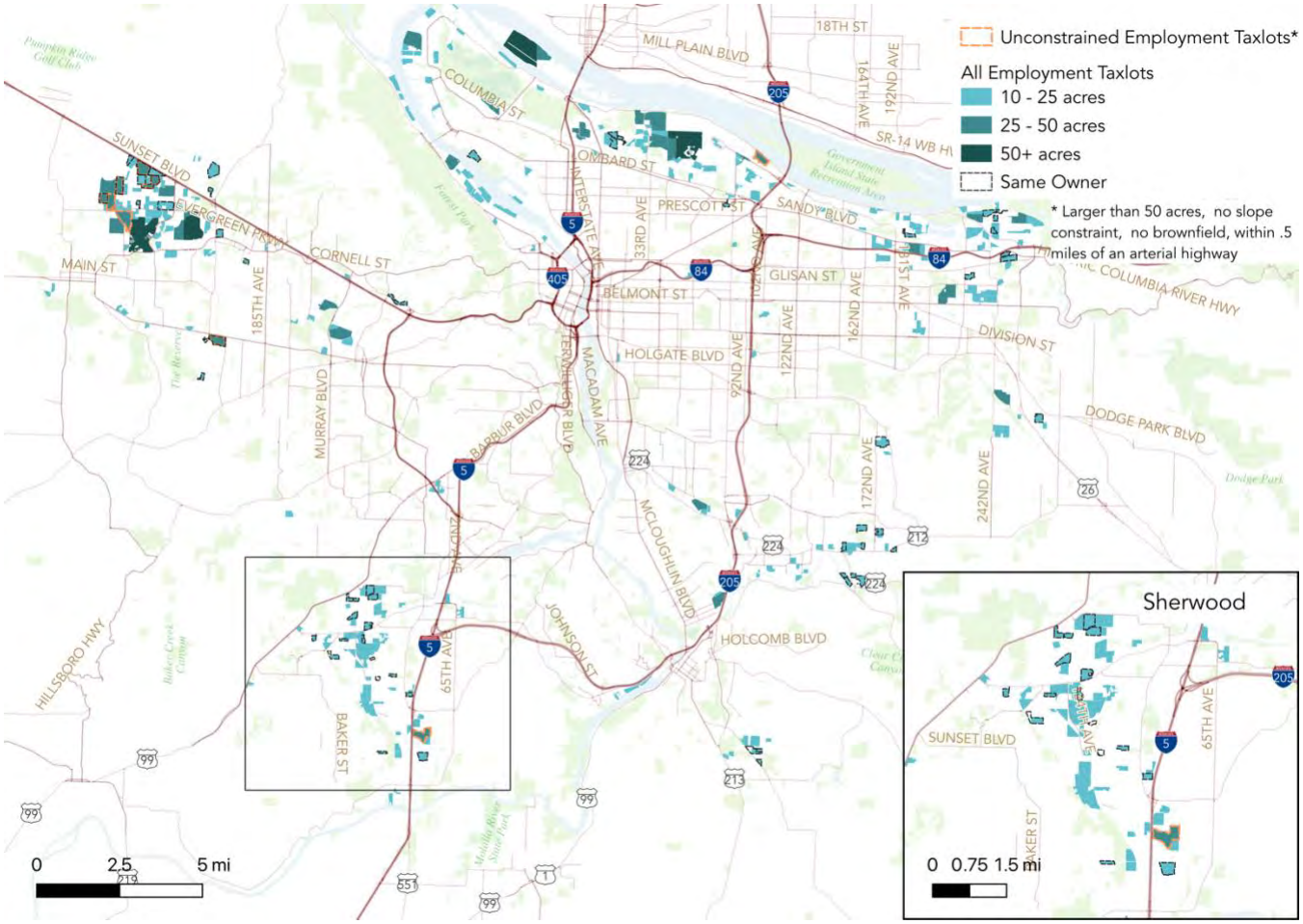
City	2019	2020	2021	2022	2023	2024 YTD
Beaverton	17	17	17	17	17	17
Cornelius	1	1	1	1	1	2
Fairview	6	6	7	7	7	7
Forest Grove	4	4	4	4	4	4
Gresham	9	9	9	10	10	10
Hillsboro	37	38	39	43	43	43
Milwaukie	23	23	23	23	23	23
Portland City	202	205	209	211	213	214
Troutdale	4	4	4	4	4	4
Lake Oswego	2	2	2	2	2	2
Sherwood	6	7	7	7	8	11
Tigard	6	6	6	6	6	6
Tualatin	23	23	23	27	28	28
Wilsonville	18	18	18	19	19	19
TOTAL	**358**	**363**	**369**	**381**	**385**	**390**

Source: CoStar

Site evaluation of regional land

The BLI identifies vacant employment parcels, which are parcels that are vacant, larger than 10 acres, and have a current zoning of commercial, industrial, or mixed use, and the Metro region currently has 104 parcels that meet these criteria. However, not all of the 104 parcels are suitable to support industrial employment, as identified by the site characteristics included in Exhibit 28 and Exhibit 30. To assess the feasibility of industrial development on the vacant employment parcels identified in the BLI, parcels were filtered out to leave behind only the unconstrained parcels that were larger than 50 acres, had no slope constraint (slope >7 percent), were not brownfields, and were within 0.5 miles of an arterial. Only eight parcels in the Metro region met these additional criteria to be considered as unconstrained parcels (Exhibit 33). The eight remaining unconstrained parcels do not provide much opportunity for economic and business growth in the region.

Exhibit 33. Unconstrained Parcels for Industrial Development in the Metro Region, 2018



Source: Mackenzie (2018), ECOnorthwest (2024)

On the 2024 Large Lot Inventory, only 10 lots are 50 acres or greater. Two of the 10 sites have use restrictions on them for marine industrial and airport uses, indicating that only 8 large sites remain for all users. When looking at the large lot inventory between 2017 and 2024, 15 sites have been developed during this time frame. Four of the developed sites were parcels larger than 50 acres and two of these sites were over 70 acres.

Site readiness

In order to understand the site readiness of the MEA, the Concept Plan reviewed the utilities and infrastructure needs required for development to occur in Sherwood West. In the North District, transportation projects are forecasted to be the most expensive infrastructure projects, including the improvement of Elwert Road and Scholls-Sherwood Road. Extending water and storm improvements along Elwert Road in the North District will also be crucial for supporting development.

The concept plan reviewed and provided the following analysis of opportunities and constraints for utilities regarding the MEA:

- **Water:** The 2015 Water System Master Plan considered all areas within Sherwood city limits, UGB, and Sherwood West. Initial anticipated growth in Sherwood West will be served by extending the existing 380 and 455 Zone distribution mains. The North District will be served by an extension of a looped 12-inch system. There is a Preliminary Infrastructure Funding Strategy with cost estimates for extending infrastructure to the North District, and it notes that the water and transportation projects have the highest projected costs for the North District.
- **Sanitary Sewer:** Sherwood West was not considered as part of the 2016 Sanitary Sewer Master Plan. Within Sherwood West, development north of Haide Road is expected to be served by the proposed Chicken Creek Pump Station and Force Main. As part of the Roy Rogers Road widening project in 2025, part of the Chicken Creek Force Main will be installed. It is expected that all of the required sewer upgrades for Sherwood West will be completed by 2028-2029, which would coincide with the completion of Comprehensive Planning of the area.
- **Stormwater:** The 2016 Stormwater Master Plan did not include Sherwood West. Sherwood West is primarily served by the Chicken Creek Drainage Basin that flows north and northeast along Chicken Creek. The Environmental Protection Agency (EPA) has designated the vicinity of Cheick Creek as a riparian corridor, upland wildlife habitat, and aquatic impact area because the creek is a habitat for an anadromous fish that is listed as threatened. There is no stormwater infrastructure planned for Sherwood West, except for the Sherwood High School site, and the area will utilize natural streams, channels, and roadside ditches. The City would prefer the use of regional stormwater facilities to service Sherwood West.

Cost of services

For the MEA to reach its full development capacity, there will need to be a significant investment in infrastructure. Mackenzie completed a North District Concept Plan Refinement and conducted a high-level cost estimate for the North District. The total estimated cost of infrastructure needs for the North District is about $103,990,000 for development of the entire district (Exhibit 34).

Exhibit 34. High-Level Infrastructure Cost Estimate for the North District, 2024

CATEGORY	ESTIMATED COST (2024 $)	KEY PROJECTS
Public Water	♦ $10,745,000	♦ Approximately 11,400 LF of water line installation is necessary to support a water line loop through the North District.
Public Sanitary Sewer	♦ $18,162,500	♦ Pump station, force main, and 15-inch sewer line. ♦ Additional improvements will be needed with adjacent site development.

Public Storm Drain	♦ $10,932,500	♦ Storm improvements are likely to be needed alongside initial site development and roadway construction.
Public Roadways	♦ $64,150,000	♦ SW Elwert Road/SW Scholls-Sherwood Road intersection improvements. ♦ Widening of SW Elwert Road, including bike and pedestrian amenities. ♦ Designate roadway connections west of SW Elwert Road. ♦ Designate new Collector roads running east/west in TSP update. ♦ Improve the SW Elwert Road intersections with SW Scholls-Sherwood Road, Conzelmann Road, and East-West Collector with an intersection with signalization or roundabout.

Source: Mackenzie Engineering, 2024

Company relocations in the region

Sherwood has experienced new industrial park development since 2020, and these new larger spaces have attracted regional companies to relocate and expand or consolidate their operations in the city. Many of the projects were fully leased before opening. Some of the industrial developments, and the tenants they attracted, include:

- **Cipole Industrial Park:** 240,000 SF of new speculative industrial park space in three buildings and the project was fully leased prior to completion.
    - **Lam Research:** A leader in semiconductor processes that produces essential products needed by leading chip makers. They leased approximately 45,000 SF in 2021 and created 300 jobs. The company wanted to be close to their base of operations in the Portland Metro region and had difficulties locating larger space in the region.
- **Tualatin-Sherwood Corporate Park (TSCP):** Three speculative industrial buildings consisting of approximately 478,000 SF in the Tonquin Employment Area (TEA). The project was fully leased prior to completion. Current tenants include:
    - **NSI Manufacturing/Nuance Systems:** The company relocated from approximately 13,000 SF in Tigard to 62,000 SF in the TSCP in 2023 to consolidate their footprint and expand their operations.
    - **DWFritz Precision Automation.** The company creates automation solutions for manufacturing industries and they moved from Wilsonville to an 80,000 SF space in the TSCP.
    - **Lam Research:** In 2023-2024, the company leased an additional 271,000 SF in the TSCP to consolidate their logistics operations from various constrained sites in the region.

- **Sherwood Commerce Center (SCC).** Phase I consists of 445,000 SF across 3 multi-tenant buildings in Sherwood's TEA. The developer will be submitting their plans for Phase II for an additional 464,000 SF within 3 new speculative multitenant buildings, and there are plans for a Phase III with an additional 85,800 SF of spec space. Once completed, SCC will provide around 1 million SF of industrial space, which can serve about 30 companies.
    - **Olympus Controls:** This is a robotics/automation engineering company that is currently relocating from a small building in Tualatin to a new 70,000-SF-space in the SCC, allowing the firm to double its employee count.
    - **Gaylord Marine:** This company designs and produces hoods/ventilator control systems for the US Navy and relocated from a home business to a small manufacturing space in Sherwood and is now leasing a larger space in the Sherwood Commerce Center to accommodate their business expansion.
- **Rock Creek Corporate Center.** A new industrial park in the Tonquin Employment Area that will be 400,000+ SF and is expected to start construction in May 2024.

There have also been companies that own their buildings and have been expanding in Sherwood, including:

- **Treske Precision:** A precision machining company which is completing a new 35,000 SF addition to their existing building.
- **AFP Systems.** This company designs, fabricates and installs fire protection systems and recently acquired a 9-acre site in Sherwood, which allows them to expand from a small site in Tualatin.

There have also been regional shifts in where industrial businesses are locating in the Metro region, and manufacturing companies have relocated to Sherwood for larger footprints that allow them to consolidate their operations and expand their businesses.

- **PPM Technologies:** The company produces equipment needed by the food industry, including Quaker Oats and Frito-Lay. They recently expanded their operations into Sherwood from Newberg because they were space constrained, and they are currently working on their second expansion in Sherwood.
- **Greenridge Solar.** This company is moving to Sherwood from a very constrained space in Tualatin.

Sherwood has already been successful in capturing new industrial and manufacturing job growth in the region, and new industrial parks have leased well. These moves could indicate a clustering of industrial development and manufacturing happening in the Sherwood market.

6. Key Findings and Conclusions

Based on the data analysis, there are some key findings to determine whether Sherwood West would support the regional economy.

Regional industrial market supply

- **Industrial vacancy and absorption in the Metro region.** The 2023 vacancy rate for industrial space in the Metro region is 4.1 percent. For industrial buildings over 100,000 square feet, the vacancy rate has remained under 5 percent since 2021 and was 4.7 percent in 2023. Between 2019 and 2023, rents increased for all industrial buildings and for larger industrial buildings. Since 2019, almost 9 million square feet of industrial space has been developed and about 39 percent of this space is in buildings over 100,000 square feet. As new space has entered the market, the net absorption for larger industrial buildings has remained positive.
- **Industrial vacancy and absorption in Washington County.** There are extremely low industrial vacancy rates in Washington County. In 2023, Washington County had almost 64 million square feet of industrial space and just under 1.6 million square feet of vacant industrial space, for a current vacancy rate of 2.5 percent. The vacancy rate has remained under five percent since 2019. Even as new industrial product comes to market, the buildings are leasing. Between 2019 and 2023 net absorption in Washington County was positive, indicating that more industrial square footage was being leased than becoming vacant.
- **Industrial space in the South Metro Region.** There is 3.7 million square feet of industrial and flex space in Sherwood, Tualatin, Tigard, Wilsonville, and Lake Oswego. Tualatin has over half of this space (52 percent) and Sherwood has 34 percent of this space. Industrial and flex space in the South Metro Region has the following characteristics:
  - Under 180,000 square feet
  - Over 50 percent are multitenant buildings
  - 56 percent of the industrial and flex space is for distribution and warehouse, and 16 percent is for manufacturing space.
- **Manufacturing space in the South Metro Region.** Sherwood captured 49 percent of new manufacturing space built in the South Metro region, a greater share than any other city in the region. The average rentable building area for a manufacturing building in Sherwood is about 97,000 square feet on an average lot size of 21 acres, greater than the average industrial building and lot size in the region.
- **Industrial space in Sherwood.** Within Sherwood, the supply of industrial and flex space increased by 18 percent between 2019 and 2024 YTD. Even as new product comes to market, the industrial vacancy rate is low, remaining under 5 percent since 2021.

During this timeframe, triple net rents per square foot have increased by 47 percent, indicating a strong industrial market in Sherwood. Even as new industrial space is delivered, net absorption of new space was positive between 2019 and 2023, indicating the companies are leasing new industrial space.

Regional Land for Industrial Uses

- **Regional large parcels.** As part of the Large Lot Inventory of the BLI, there are 104 vacant sites that are larger than 10 acres and are zoned for commercial, industrial, or mixed-use, although sites 10-49 acres may not be sufficient for some of the industrial users.
- **Regional parcel slopes.** Of the 4,876 parcels included in the BLI sites, about 55 percent of the sites have minimal constraints from steep slopes on the lot and would be especially feasible to support industrial uses. However, 13 percent of the parcels are constrained by steep slopes covering between 51-89 percent of the lot and 8 percent of the parcels have steep slopes over 90 percent of the lot; some of these parcels may not be suitable for supporting industrial uses and feasibility and it would likely depend on the size of the parcel and location of the slopes.
- **Sherwood parcel sizes.** The BLI identifies only three parcels that are greater than 25 acres in Sherwood BLI. There are no parcels 50 acres or greater, and even with assemblage of parcels that have the same ownership, a 50-acre parcel cannot be assembled.

Employment trends

- **Employment growth in the region.** The Quarterly Census of Employment and Wages (QCEW) data for Washington, Clackamas, and Yamhill Counties between 2017 and 2022 shows a loss of 1,829 employees, for an annual average growth rate of -0.4 percent. However, of the industries that use industrial space, there has been a regional AAGR of 1.7 percent and a net gain of 9 percent of employees (3,160).
- **Employment growth in Sherwood.** Within the City of Sherwood, there has been an 18 percent increase in employees between 2016 and 2022 (1,104), for an AAGR of 3.3 percent. Of sectors that uses industrial spaces, there was an AAGR of 5.8 percent with a total increase of 32 percent of employees (525).
- **Manufacturing job growth.** Manufacturing had an AAGR of 1.1 percent in the region and 2.5 percent in Sherwood between 2017 and 2022. Sherwood is capturing manufacturing jobs which will provide an economic benefit to the region as the average annual wage of a manufacturing job was $77,900, higher than the average wage for 2022 across all sectors ($63,100).

MEA competitiveness for new industrial uses

- **Industrial site criteria.** Based on Mackenzie's site criteria for industrial use, the MEA scores:

  - **High:** Site Size, Ownership, and Competitive Slope
  - **Medium**: Utilities/infrastructure, Environmental considerations
- **Industrial proximity criteria.** Based on the proximity considerations for industrial use, the MEA scores:
  - **High:** Proximity to Regional Infrastructure Rail/Port/ Airport, Surrounding Uses, Proximity to Goods
  - **Medium**: Transportation Access to Interstate or Principal Arterial, Proximity to Labor Force
- **Semiconductors.** The semiconductor industry likes to locate in proximity to other semiconductor businesses and their employees and needs sites of 25+ acres, so the MEA could provide this critical land. While there is an existing semiconductor cluster is Hillsboro, the 2023 vacancy rate for industrial properties was 1.4 percent and average triple net rents were $12.70 per square foot, which could be barriers for new semiconductor businesses wanting to locate in the region. If the MEA does support semiconductor uses, then these businesses will add new jobs to the region that pay an average of $110,000 per year.
- **2021 EOA identified sectors.** The 2021 Sherwood Economic Opportunities Analysis includes advanced manufacturing goals. The MEA would be competitive in attracting these uses as they do not require being directly adjacent to the highway like distribution and warehousing would be. Additionally, these sectors do not have as many community externalities, such as noise, truck traffic, and air pollution, so they would fit well into the Sherwood West Concept Plan which also has residential uses and park land in the North District.
- **Sherwood's capture of regional industrial business shifts.** Sherwood has captured industrial shifts from users in the region who are looking for more space to consolidate or expand their operations. Since 2020, the Cipole Industrial Park, Tualatin-Sherwood Corporate Park (TSCP), and Sherwood Commerce Center (SCC) opened in Sherwood, bringing brand new industrial space to the market. Since opening, there have been 6 companies who previously operated in the region that have relocated to these buildings to expand or consolidate their operations.
- **Site evaluation of BLI land.** Of the 104 vacant parcels over 10 acres included in the BLI, many of the parcels have further constraints for industrial employment uses. When filtering out parcels with a slope greater than 7 percent and parcels under 50 acres, there are eight parcels in the region.

Conclusions

- **Market Supply:** There is a lack of industrial space:
  - Over the past 5 years, industrial vacancy rates for Sherwood, Washington County, and the Metro region have been below 5 percent. Even though new

industrial buildings have been developed during this time, net absorption has remained positive indicating that the supply of buildings is leasing.

- Very low industrial vacancy rates in the region could be a barrier to attracting new companies or supporting company expansion.
- There is a small share of vacant land in the region that would be suitable for industrial uses, indicating a developer would have to assemble parcels which could be a barrier to new development.
- Job growth in the region has been in the industrial sectors. Between 2017 and 2022, there has been a net loss of employees across all sectors in the Washington-Clackamas-Yamhill region; however, the sectors that use industrial space have had positive gains in employment.

- **Site Competitiveness –** Sherwood West would be well suited to capture the new and expanding demand for industrial space.
  - The MEA would be competitive for new industrial development because of its favorable parcel size, ownership, and low slopes; however, access to I-5 may be a concern for some users. There are few parcels in the BLI that have as many favorable conditions, which could hinder businesses from locating in the region.
  - Sherwood has seen growth in the amount of industrial and flex space since 2019. It has seen the largest amount of manufacturing space in the South Metro region. Even as new space comes to market, the product is being leased and vacancy rates remain low. The MEA provides opportunities to attract the semiconductor industry.
  - There may be an insufficient supply of larger industrial sites to support goals for growing the semiconductor industry, however the MEA provides an opportunity to add to the supply of land suitable. If the site is successful in attracting semiconductor uses, then these businesses will add new jobs to the region that pay an average of $110,000 per year. The MEA could provide an alternate location with large parcels outside of Hillsboro.
  - Sherwood has also captured industrial shifts from users in the region who are looking for more space to consolidate or expand their operations. The space in Sherwood allows them to stay in the Metro region. Industrial users, including manufacturing, have been locating in Sherwood. Sherwood is capturing excess capacity in the region that this site could accommodate.
  - The typical in-demand size for industrial space would be around 50 acres, so these properties are not likely to appeal to new industrial users without lot assemblage, which brings its own set of challenges by trying to get neighboring landowners to sell their land.

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DATE: December 22, 2022
TO: Ted Reid, Dennis Yee, Metro
FROM: Mike Wilkerson, Becky Hewitt, Madeline Baron, James Kim, Jolie Brownell, ECONorthwest
SUBJECT: METRO RESIDENTIAL READINESS PROJECT – TASK 4: HOUSING MARKET FILTERING MEMORANDUM - REVISED

Background and Purpose

The Metro Regional Government (Metro) has contracted with ECONorthwest to assist in revising some of its regional housing planning and growth management approaches, data, and processes. This project will set the stage for upcoming growth management decisions (particularly the 2024 urban growth management decision) and help Metro more deeply integrate market realities, infrastructure, governance needs, and equity into those decisions.

The outcomes of this effort will help provide a fuller accounting of trade-offs of growth management alternatives and recognize the factors beyond land availability that influence the region's ability to accommodate growth in ways that meet a full spectrum of needs. It will also help Metro implement upcoming changes to statewide requirements related to housing needs and equitable regional housing allocations.

As Metro considers how the anticipated prices and rents of new housing stock that could be built across the region align (or do not align) with the region's overall housing needs by income, it is important to consider all the ways in which new housing supply relates to housing affordability, and how that can change over time. This includes, but is not limited to, "filtering" and depreciation of older housing stock, how new supply impacts the rate of filtering, impacts on price escalation due to the balance between supply and demand (elasticity), and the potential for localized increases in market demand that could cause gentrification and displacement.

This memorandum describes these concepts and market functions, summarizes relevant literature evaluating these impacts, and incorporates local data and examples to illustrate how these factors are playing out in the Metro region. It draws on published literature; a recent, relevant housing market primer prepared by ECONorthwest; and local market data. It is beyond the scope of this effort to conduct a full regression analysis or detailed longitudinal study of home prices and rents regionwide, but ECONorthwest did analyze available rent and home sales data from the Metro region for patterns that suggest whether and to what extent these impacts are occurring in the region. The memorandum also includes several examples of housing in the region to illustrate how these trends and patterns can play out for a specific property.

Introduction

What Drives Housing Markets and Property Value?

Property values are driven by the balance between supply and demand. Prices tend to rise when demand exceeds supply. The pace of price changes depends on the availability of alternatives (e.g., prices rise faster when there are few desirable units to choose from) and changes in demand preferences (e.g., unit types or locations).

Housing markets are subject to the laws of supply and demand, though they are greatly influenced by government interventions. Price reflects buyers' and sellers' willingness to pay and the amount of housing that is demanded and supplied at a given time.[1]

To understand how new housing supply affects the value of existing housing and how property values and affordability change over time, it is important to understand that the value of real estate is a combination of the value of the structure (which tends to depreciate over time and requires maintenance and repair) and the value of the land/location (which can change over time with localized and regional/national trends). The value and desirability of a given residential property at any given time will depend on how old the structure is and how it has been maintained or modified since it was built, how well the structure meets current household needs and preferences, and how desirable the location is, among other factors.

What is Filtering?

Filtering is "the process by which housing ages and depreciates in value relative to newer housing so that it becomes affordable to moderate- and low-income households over time."[2] New construction starts the process of filtering through a "migration chain" where newly constructed units "create vacancies in the existing housing stock and expand housing options for those looking to relocate."[3] When subsequent households relocate, they create new vacancies for other households, thus creating a chain of vacancy and migration. The longer the migration chain continues, the more likely it is for the older housing supply to filter down and become available to lower-income occupants.

The filtering process "is critically important to a functional housing market that meets the needs of a range of households and allows for some housing choice for current and new residents of a community."[4] The addition of new housing in a regional housing market allows the migration chain to continue and creates opportunities for households with moderate-incomes or low-incomes to live in units that were once new and priced at the top end of the market. In contrast, when there are no new housing units built in a region, filtering often does not occur and fewer units become more affordable through the filtering process. When demand exceeds supply,

[1] HDR and ECONorthwest, *Oregon Transportation and Housing Study* (Oregon: Oregon.gov, 2020), https://www.oregon.gov/odot/Planning/documents/TransitHousing_PrimerWithGlossary.pdf

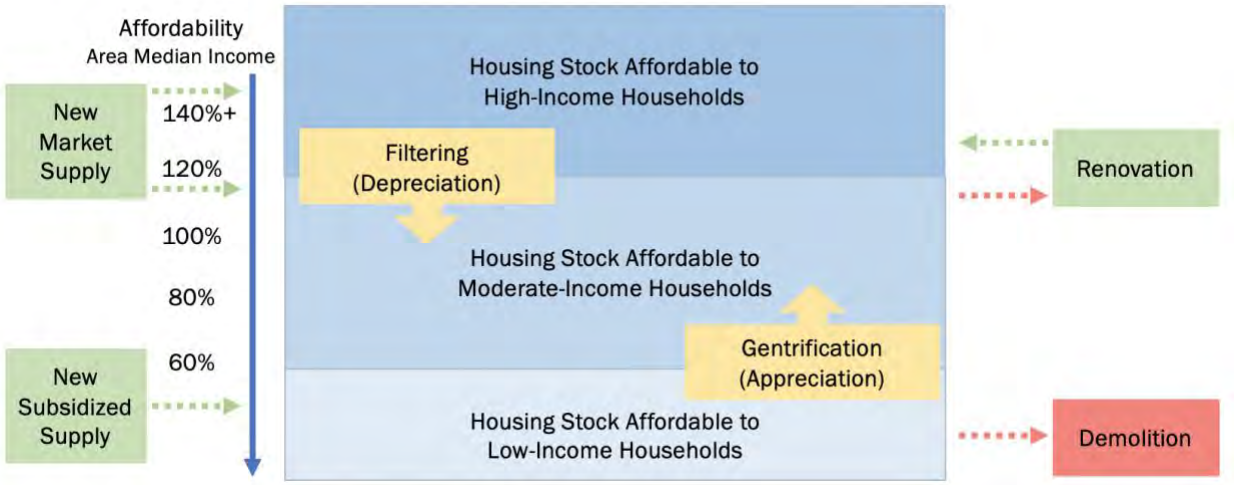
[2] *Ibid*.

[3] *Ibid*.

[4] *Ibid*.

filtering can also occur in reverse. Reverse filtering or upward filtering occurs when "low-cost housing occupied by lower-income households is bought and renovated to meet the demand from higher-income households."[5] This is illustrated in Figure 1.

Figure 1. Filtering vs. Reverse Filtering
Source: ECONorthwest



Notes: Filtering is when new, more expensive housing becomes relatively more affordable over time. Gentrification is when older, less expensive housing becomes relatively less affordable due to increased demand from higher-income households.

Literature Summary

Effects of Filtering on Affordability

The main debate within the filtering literature is broader than filtering itself; the key question is whether filtering is enough to achieve better affordability overall, particularly for lower-income households.[6] Recent studies [7, 8] and the larger research literature, including ECONorthwest's previous work, demonstrate that "**the filtering process is insufficient to create an adequate supply of stable, safe, affordable housing for low-income households** – this part of the housing stock requires ongoing, meaningful investments in subsidized or regulated[9] affordable housing as well as public-private-partnerships with mission-oriented housing developers."[10]

[5] HDR and ECONorthwest, 2020.

[6] Josh Lehner, "Housing Does Filter," *Oregon Office of Economic Analysis*, May 25, 2016, https://oregoneconomicanalysis.com/2016/05/25/housing-does-filter/

[7] Miriam Zuk and Karen Chapple, "Housing Production, Filtering and Displacement: Untangling Relationships," (Urban Displacement Project, University of California, Berkeley, 2016), https://escholarship.org/uc/item/7bx938fx

[8] Chapple et al., 2022.

[9] 'Subsidized or regulated affordable housing' refers to housing that has deed or other financial requirements to restrict the rents or sales prices at the property, or to restrict the incomes of residents who live at the property, so that the unit is affordable to households with incomes in a specified range of the area median income.

[10] HDR and ECONorthwest, 2020.

This is because filtering takes time, as discussed in the next section, does not reach the lowest levels of affordability in a housing market, and can be reversed when demand exceeds supply. Also, the filtering migration chain can break or end due to increases in demand from "household formation, a unit being used as a second home, out-of-metro migration," or from "landlords not reducing rents enough to fully fill vacancies."[11]

In addition, "when a market is undersupplied and demand outpaces supply (marked by rapidly rising prices), filtering can operate in reverse, resulting in the gentrification of places and displacement of low-income residents. In this case, low-cost housing occupied by lower-income households is bought and renovated to meet the demand from higher-income households."[12] Filtering does not guarantee protection from gentrification (or upward filtering) and displacement.[13]

Because the effects of filtering are not easily observable until decades or generations later, many people question the effectiveness of filtering in ensuring the availability of housing that is affordable.[14, 15] Additionally, some worry that the housing that does filter down may have deteriorated too much to be habitable.

Filtering Rates and the Impact of Supply at a Regional Scale

To understand how filtering works and contributes to housing market dynamics, many researchers have studied how quickly housing units filter down or depreciate relative to real incomes. To do so, they measured the percentage difference in the incomes between previous and new occupants after controlling for differences in housing quality, local amenities, and inflation.

While some studies[16,17] show that filtering can begin to occur within five years of new housing construction, "**the filtering process can take decades, or even generations**" due to the long lifespan of residential construction.[18]

The most well-documented study of filtering showed that housing in the U.S. depreciates (relative to new units) at a rate of 0.49 percent to 0.58 percent per year for ownership units and

[11] Mast, 2019.

[12] HDR and ECONorthwest, 2020.

[13] Chapple et al., 2022.

[14] *Ibid*.

[15] Josh Lehner, "Construction, Housing Supply, and Affordability," *Oregon Office of Economic Analysis*, February 15, 2022, https://oregoneconomicanalysis.com/2022/02/15/construction-housing-supply-and-affordability/

[16] Evan Mast, "The Effect of New Market-Rate Housing Construction on the Low-Income Housing Market" (Upjohn Institute Working Paper No. 19-307, Upjohn Institute, Kalamazoo, MI, 2019), http://dx.doi.org/10.2139/ssrn.3426103

[17] Karen Chapple et al., "Housing Market Interventions and Residential Mobility in the San Francisco Bay Area" (Federal Reserve Bank of San Francisco Community Development Working Paper No. 2022-1, San Francisco, CA 2022), https://www.frbsf.org/community-development/wp-content/uploads/sites/3/housing-market-interventions-and-residential-mobility-in-the-san-francisco-bay-area.pdf

[18] HDR and ECONorthwest, 2020.

2.37 percent to 2.71 percent per year for rental units.[19] The study evaluated national panel data from the American Housing Survey (AHS) between 1985 and 2011, including properties built before 1985, and concluded that most of filtering occurs within the first 40 years of construction. The filtering rates are lower in New England, the Middle Atlantic, and the Pacific regions, and the author explains "the regional differences in house price inflation contributes to differences in filtering rates."[20] In other words, **filtering rates are lower in places where housing prices have grown faster and housing underproduction or supply challenges persist**.

Another study confirmed that fast-growing regions like California with higher housing prices have lower filtering rates. Researchers found that **a median-income housing unit in California could take roughly 15 years to filter down to occupants at 80 percent of the median income and almost 50 years to filter down to occupants at 50 percent of the median income**. The same fundamentals are at play affecting high prices and lower filtering rates: a lack of new supply.[21]

An international study based in Finland also concluded that filtering could occur in the near-term.[22] The researchers found greater filtering rates in Finland and explained that the difference in filtering rates between Finland and the U.S. is likely related to greater socioeconomic gaps, income inequality, and residential segregation.

Filtering (and Reverse Filtering) at a Neighborhood Scale

While most research (as summarized above) shows that adding housing moderates price increases at a regional scale, there is some question as to how new housing supply affects filtering and reverse filtering (with potential for gentrification and displacement) in the area immediately surrounding the new housing. This is described in the introduction to a recent study:

> *There's a growing debate among housing advocates over the neighborhood-level impacts of market-rate housing development. On one side are those who think new market-rate units — unsubsidized homes whose price often places them beyond the reach of lower- and middle-income households — make nearby housing more affordable by increasing availability and relieving pressure on the existing housing stock. This is known as the "supply effect." An opposing view, however, is that new housing only attracts more wealthy households, brings new amenities to the neighborhood (including the housing*

[19] Stuart S. Rosenthal, "Are Private Markets and Filtering a Viable Source of Low-Income Housing? Estimates from a 'Repeat Income' Model," *American Economic Review* 104, no. 2 (2014): 687-706, https://www.aeaweb.org/articles?id=10.1257/aer.104.2.687

[20] *Ibid*.

[21] Zuk and Chapple, 2016.

[22] Cristina Bratu et al., "City-wide effects of new housing supply: Evidence from moving chains" (VATT Institute for Economic Research Working Paper No. 146, VATT Institute for Economic Research, Helsinki, Finland, 2021), https://www.doria.fi/handle/10024/181666

itself), and sends a signal to existing landlords that they should raise their rents. This "amenity effect" or "demand effect" thus makes housing less affordable.[23]

This study, a synthesis of other recent papers, notes that five of six recent relevant studies find evidence that new market-rate housing makes nearby rental housing more affordable across the income distribution, with one study finding mixed results.[24]

One study found that new market-rate buildings in large cities[25] decreased rents of nearby units by 5 to 7 percent relative to units slightly farther away.[26, 27] Filtering began the same year the construction was completed and continued for at least another three years.

Another recent study shows the potential for both filtering and reverse filtering to occur across and within smaller geographical spheres. The study estimated the filtering rates across and within six metropolitan statistical areas (MSAs)[28] and found great variation in filtering rates, including "rapid downward filtering in Chicago and Detroit to upward filtering in Washington, D.C. and Los Angeles." [29] Moreover, the researchers found that the filtering rates *within* MSAs vary substantially more than the filtering rates across MSAs. Thus, even within MSAs that, on average, are experiencing upward filtering, some neighborhoods are seeing downward filtering creating more affordable housing options. The study, using data from 1993 to 2018, found that upward filtering occurred in areas closest to city centers and that neighborhoods seeing downward filtering were outside of city centers.[30] Given the timing, this likely reflects a trend of increasing demand for urban living during this period.

[23] Shane Phillips, et al. (2021). "Research Roundup: The Effect of Market-Rate Development on Neighborhood Rents." UCLA: The Ralph and Goldy Lewis Center for Regional Policy Studies. Retrieved from https://escholarship.org/uc/item/5d00z61m

[24] Phillips, et al., 2021

[25] The study included a sample of 1,483 buildings constructed between 2010-2019 in 11 cities: Atlanta, Austin, Chicago, Denver, Los Angeles, New York City, Philadelphia, Portland, San Francisco, Seattle, and Washington, D.C.

[26] Brian J. Asquith et al., "Supply Shock Versus Demand Shock: The Local Effects of New Housing in Low-Income Areas," (Upjohn Institute Working Paper No. 19-316, Upjohn Institute, Kalamazoo, MI, 2019), https://doi.org/10.17848/wp19-316

[27] Nearby units are defined in the study as units within 250 meters (roughly one or two city blocks) and units further away are defined as those within 600 meters (slightly over a third of a mile and 8 to 10 minutes by walking).

[28] Atlanta, Chicago, Detroit, Los Angeles, Minneapolis, and Washington, D.C.

[29] Liyi Liu and Doug McManus and Elias Yannopoulos, "Geographic and Temporal Variation in Housing Filtering Rates," *Regional Science and Urban Economics 93*, no. C (2020), https://www.aeaweb.org/conference/2021/preliminary/paper/GebsZrYS

[30] *Ibid*.

Local Data: Filtering in the Metro Region

Filtering of Rental Units in the Portland Metro Area

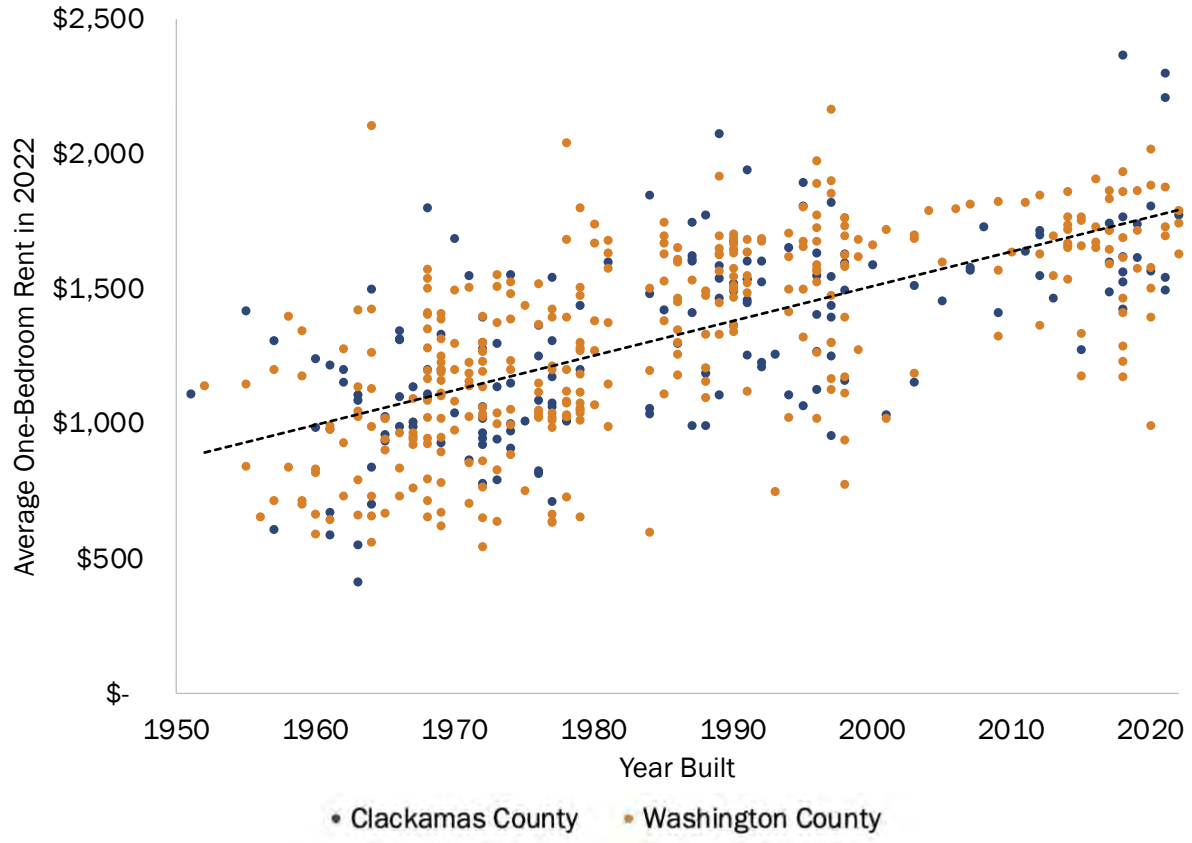
Regional Patterns

To identify long-term price effects of filtering in the Portland metropolitan area, ECONorthwest compared the relative affordability of housing built in different years using building-level rent data and recent sales transactions. If filtering is occurring, older units should have lower rents (and sales prices) on average. The lower rents/sales prices, in turn, would be more affordable to households in the region. However, this approach does not control for changes in building quality for housing built during different time periods due to shifts in the demand for onsite amenities and more stringent building codes. The analysis separates suburban areas (using Clackamas and Washington Counties as a proxy) from more urban areas (using Portland's Central City Plan District as a proxy) to test for differences in different parts of the region.

ECONorthwest's analysis shows a general downward trend in rents relative to building age in Clackamas County and Washington County: one-bedroom units have higher average monthly rents in newly built multifamily buildings than in older buildings (see Figure 2).

Figure 2. Average Multifamily One-Bedroom Monthly Rents by Year Built in Clackamas County and Washington County, Year Built Since 1951

Source: ECONorthwest, CoStar

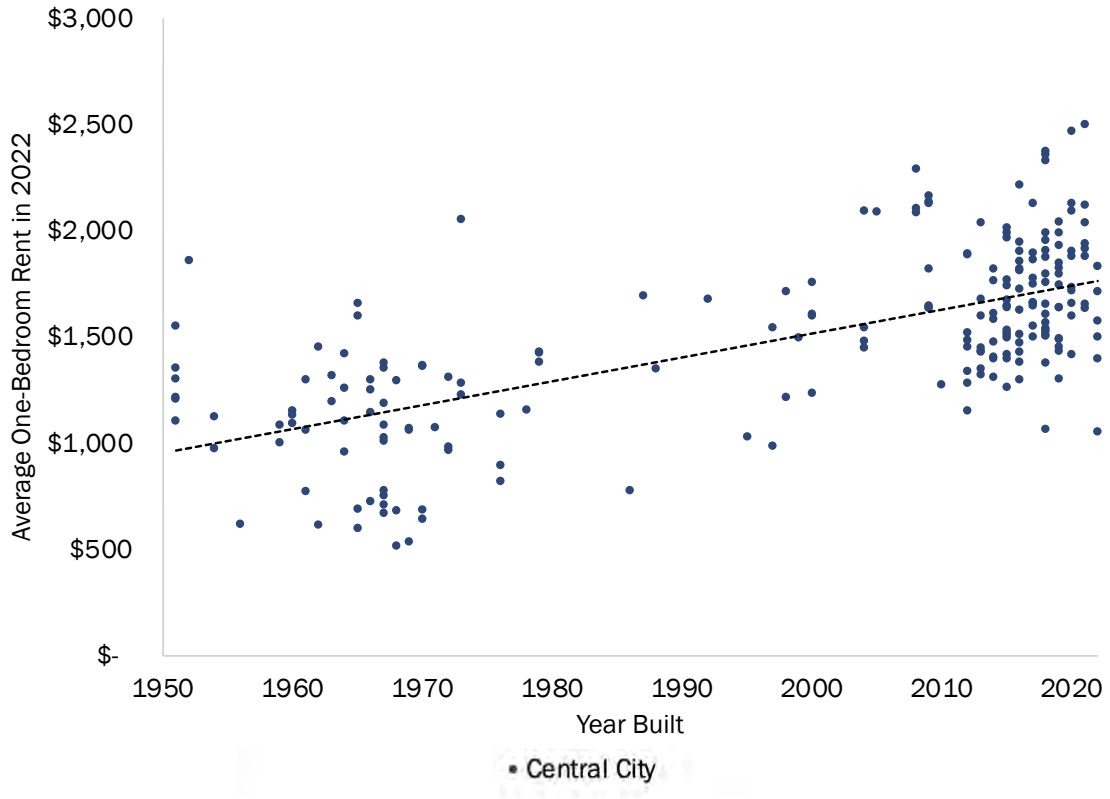


As the figure demonstrates, each decade of a building's age is associated with about $125 lower one-bedroom monthly rents, without controlling for other factors.[31] It also shows that rents vary across building ages as some older buildings have higher rents than newer buildings. Building age is just one of many factors influencing the price of rent, along with other considerations like location, amenities, size, or accessibility to employment and locational amenities.

In Portland's Central City Plan District (Figure 3), the data shows each decade of a building's age is associated with about $106 lower one-bedroom monthly rents,[32] when looking only at buildings constructed since 1951 (for consistency with the Washington County and Clackamas County analysis).

Figure 3. Average Multifamily One-Bedroom Monthly Rents by Year Built in Portland Central City Plan District, Year Built Since 1951

Source: ECONorthwest, CoStar

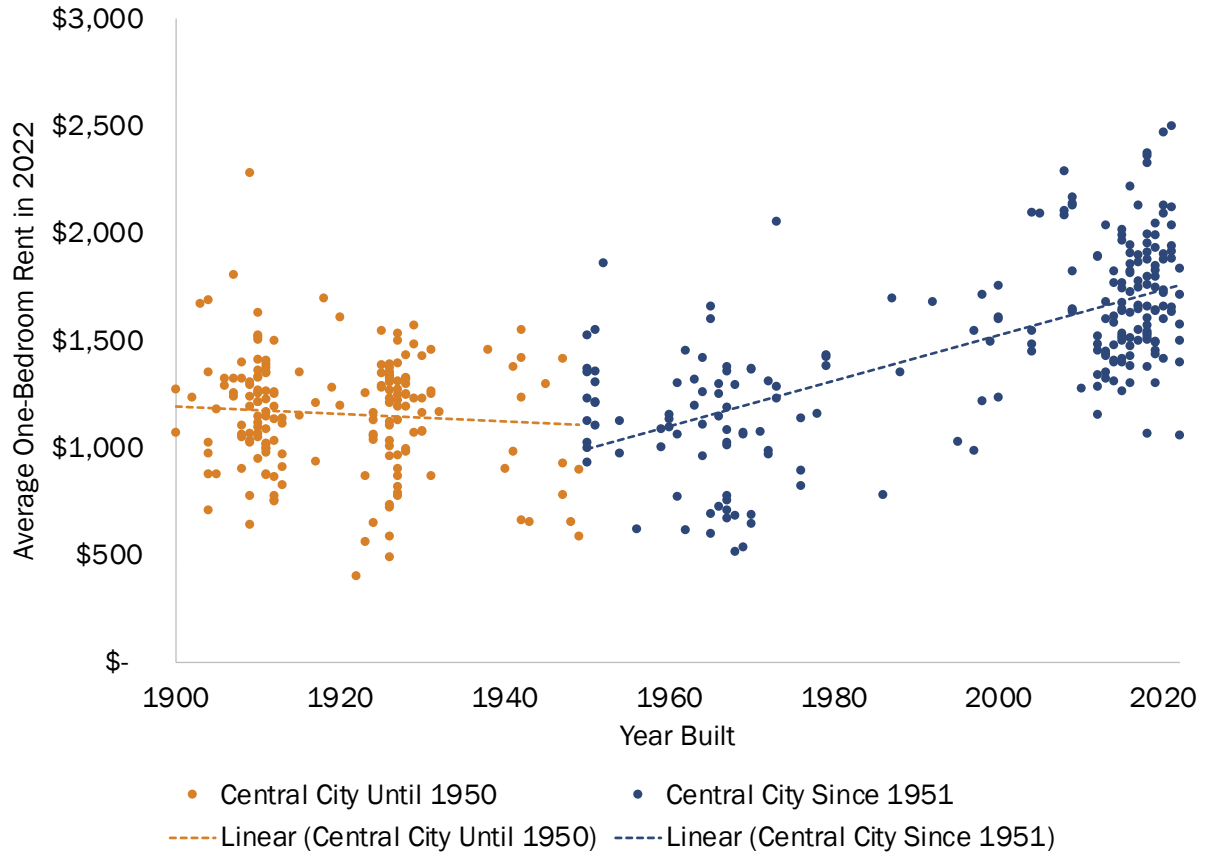


[31] The analysis does not account for variation in construction types across the observed sample; trends in finish qualities and expectations, which can impact rent levels; neighborhood amenities such as transit access; school districts; difference in local property tax rates; and many other factors that could be accounted for in a multivariate regression. The regression analysis in the figure shows that building age explains about 42 percent of the variation in one-bedroom rents.

[32] The analysis does not account for variation in construction types across the observed sample; trends in finish qualities and expectations, which can impact rent levels; neighborhood amenities such as transit access; school districts; difference in local property tax rates; and many other factors that could be accounted for in a multivariate regression. The bivariate regression analysis in the figure shows that building age explains about 43 percent of the variation in one-bedroom rents.

The pattern observed in the data above applies only to apartments that were built since the 1950s and have not been demolished. Looking at older buildings in the Central City Plan District (built in 1950 or earlier), there is almost no difference in average one-bedroom rents across building age, as shown in Figure 4. (The same analysis is not repeated for Clackamas County and Washington County because there were too few properties built earlier than 1950.) There are several possible explanations for this. First, older properties that had depreciated are more likely to have been demolished because building upkeep and renovation costs were too high, leaving only the most desirable properties that are worth reinvestment and can attract reasonable rents. Second, older properties can remain in the market at relatively competitive rent levels due to architectural or historical significance. The demand from a narrow segment of renters and investors and efforts to retain such buildings may outweigh the effects of building age and deterioration on rent levels.

Figure 4. Average Multifamily One-Bedroom Monthly Rents by Year Built in Portland Central City Plan District
Source: ECONorthwest, CoStar



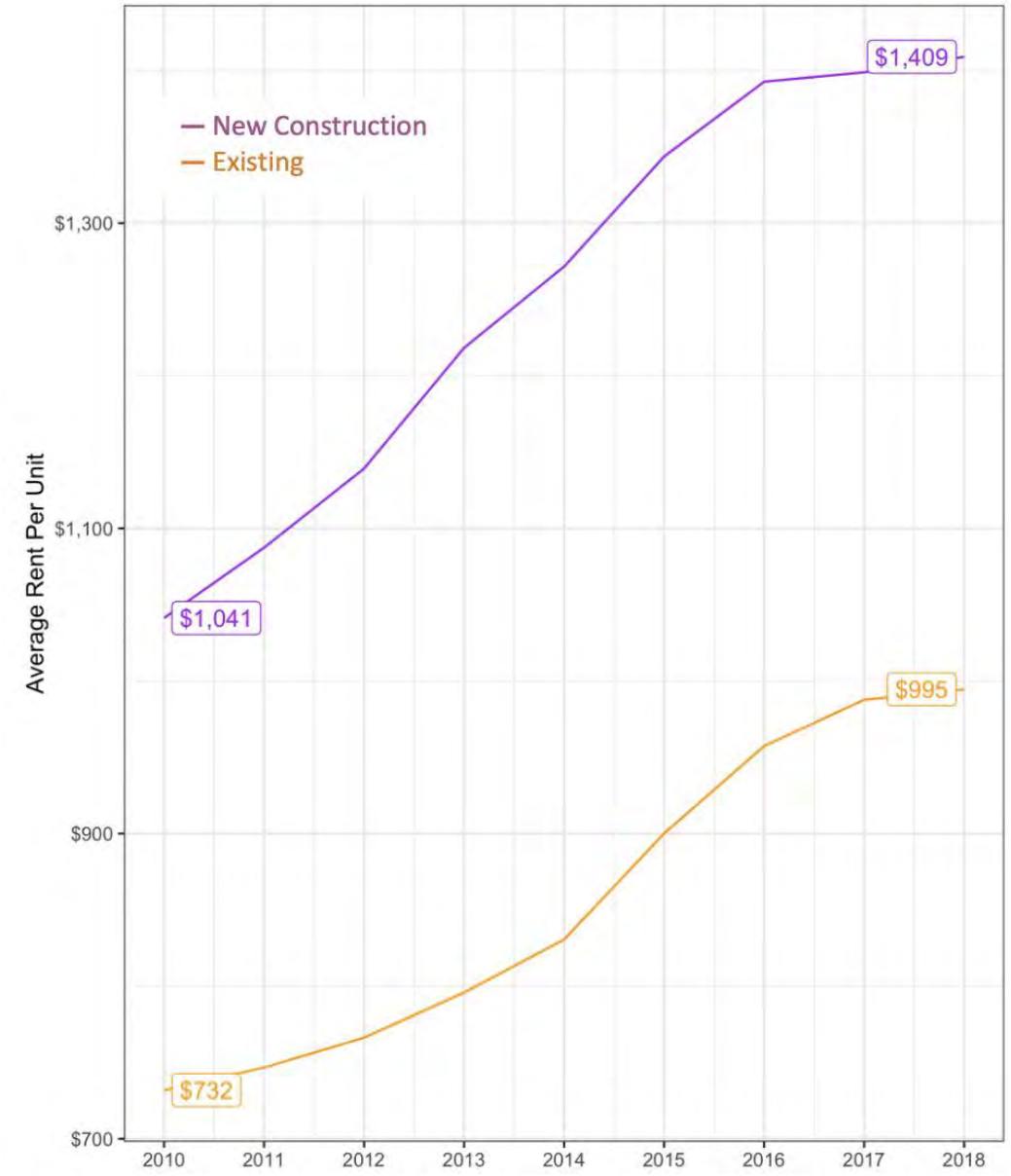
Rent Premium Over Time

Due to data limitations, it is more difficult to track rents for particular buildings longitudinally (over time) at a regional scale. However, an analysis by ECONorthwest for the City of Beaverton in 2018 looked at rent trends over time for apartments in the Metro region, separating

new construction from older housing stock. The analysis showed that rents for both new construction and older housing stock grew at about 4 percent per year and showed a relatively consistent rent premium of about 42 percent for new construction between 2010 and 2018 (see Figure 5).[33]

Figure 5. Multifamily Rent Premium and Trends for New Construction vs. Existing Apartments, 2010-2018

Source: ECONorthwest using data from CoStar[34]



Note: Rent amounts are reported in nominal dollar values and are not adjusted for inflation.

[33] ECONorthwest memorandum to City of Beaverton: "Beaverton Vertical Housing Development Zone Displacement Analysis," June 15, 2018

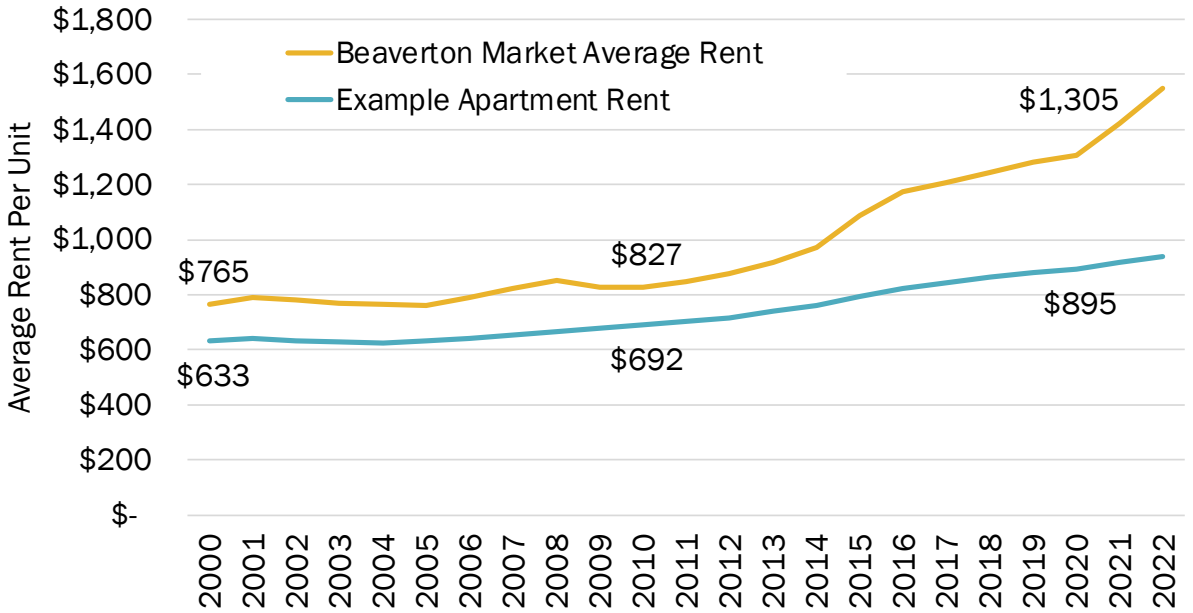
[34] *Ibid*.

Illustrative Examples of Filtering for Rental Housing

Looking at an example apartment built in 1998 illustrates how rents can change over time relative to the market. The example property in Beaverton was relatively affordable even when it was new, with a rent circa 2000 that was 18 percent below the Beaverton market average rent[35]. This gap was sustained through 2010. However, the difference between the example property and the market average grew during the 2010s. The addition of new apartments with higher rent premiums into the existing housing stock pushed the market average rent 58 percent higher between 2020 and 2010. Meanwhile, the average rent for the example property grew only 29 percent. By 2020, the average rent for the example property was 31 percent below the market average rent in Beaverton.

Figure 6. Average Rents at Example Apartment Property Over Time Compared to Beaverton Market, 2000 to 2022

Source: CoStar



[35] The market average rent for Beaverton apartments is for a subset of apartments that CoStar categorizes as having 2, 3, or 4 stars on its 5-star rating system to indicate building quality. It captures the price of typical apartments (including new construction) while excluding extremely high-quality or extremely low-quality ones.

Filtering Observed in Single-Family Home Sales Prices

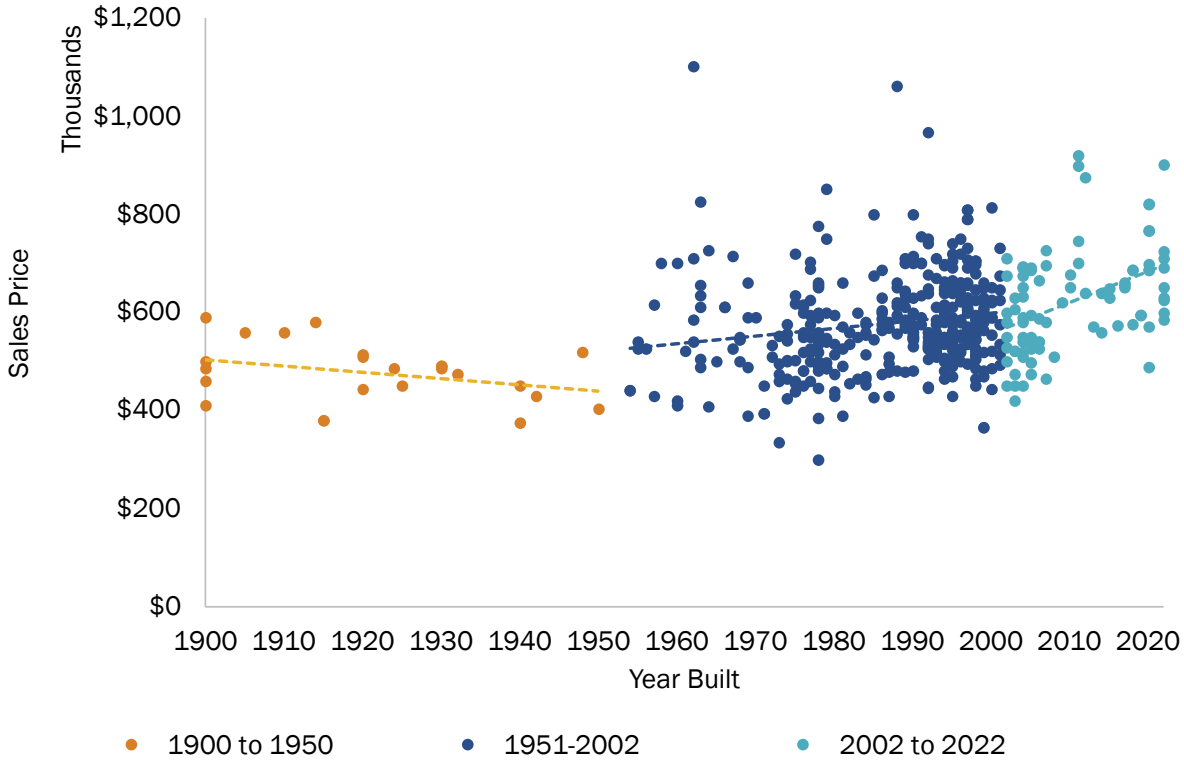
ECONorthwest analyzed relative prices across single-family homes built in different years and identified illustrative examples comparing pairs of similar homes built at different times. If filtering is occurring, sales prices should be lower in older units on average than in newly built units. Lower-priced units are more likely to be purchased by lower-income households.

Regional Patterns

Outside the City of Portland, the relationship between single-family home sales prices and the year built depends on the decades the units were built in, as shown in Figure 7. For units built in 1950 or earlier, there is a very weak but slightly negative relationship (i.e., the sales prices are *lower* for new units on average). For units built between 1951 and 2002, there is a very weak but slightly positive relationship (i.e., the sales prices are *higher* for newer units on average). Finally, for units built in the last 20 years, there is a stronger and positive relationship: each decade of building age is associated with about $63,000 lower sales price.[36]

Figure 7. Recent Sales Prices of Single-Family Homes Outside of Portland*

Sources: ECONorthwest, Metro Regional Land Information System (RLIS)



* Notes: The data is a subset of sales prices recorded in RLIS. Filters are 3 or 4 bedrooms, unit size of 1,500 to 2,500 sq. ft., lot size of 4,500 to 9,000 sq. ft., and sales transaction in September, October, or November of 2022.

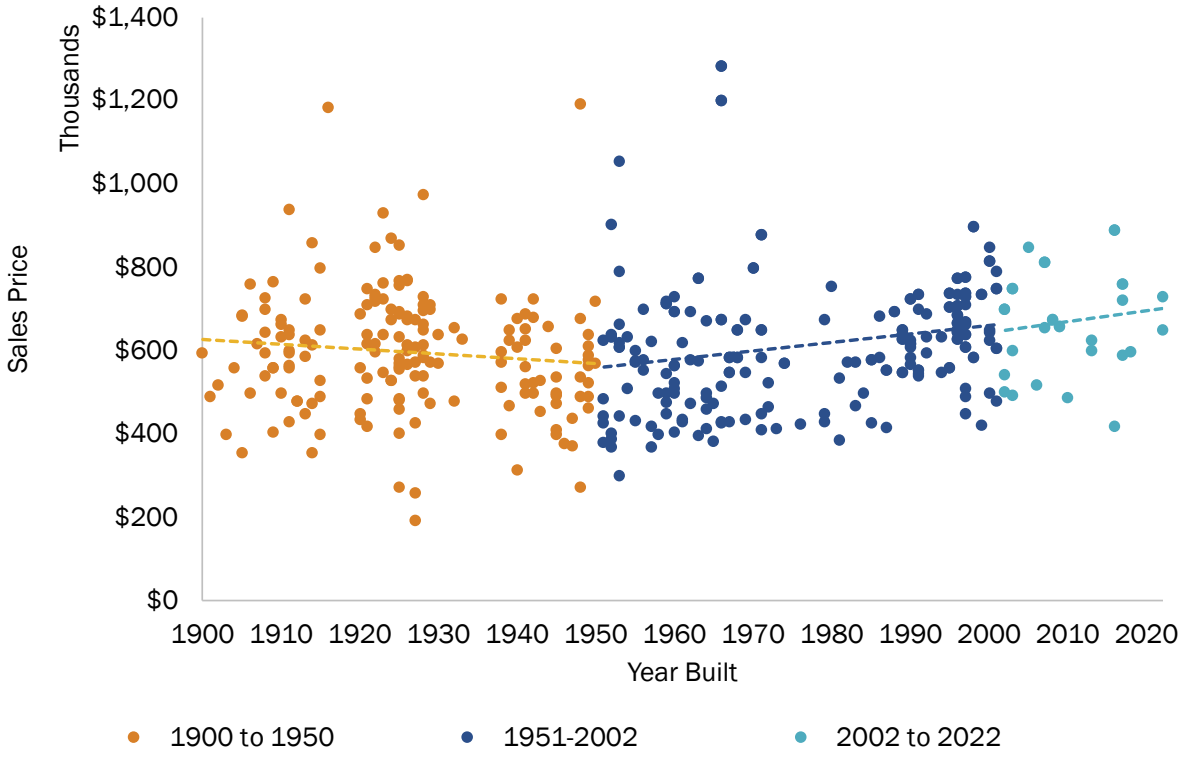
The findings diverge for Portland, as shown in Figure 8. Similar to outside of Portland, there is a very weak but slightly negative relationship for units built in 1950 or earlier and there is a very

[36] The building age in the most recent two decades explains about 19 percent of the variation in sales prices.

weak but slightly positive relationship for units built between 1951 and 2002; the relationship between sales price and year built is not noticeably different for units built in the last 20 years.

Figure 8. Recent Sales Prices of Single-Family Homes in Portland*

Sources: ECONorthwest, Metro Regional Land Information System (RLIS)



* Notes: The data is a subset of sales prices recorded in RLIS. Filters are 3 or 4 bedrooms, unit size of 1,500 to 2,500 sq. ft., lot size of 4,500 to 9,000 sq. ft., and sales transaction in September, October, or November of 2022.

The data suggests that single-family sales prices decline (on average) over time relative to overall market prices, but the effect is limited (without controlling for other factors) and disappears for housing that is more than 70 years old.

Illustrative Examples of Filtering in Single-Family Homes

To find illustrative examples of filtering, ECONorthwest used a matched-pairs approach using data from Zillow on the prices of detached single-family units that were constructed and sold in 2022 and prices of older homes that sold in the past 12 months and at least once before. To attempt to mitigate some of the differences in neighborhood characteristics, ECONorthwest considered the distance between the comparison units, primary school district boundaries, and major roadways that could divide a part of a neighborhood from another. To mitigate some of the differences in building characteristics, ECONorthwest considered unit size, building height, façade, heating and cooling features, and garage size (i.e., number of vehicles that a garage can accommodate).[37] ECONorthwest also excluded renovated units based on information available

[37] A more robust analysis that requires a level of effort beyond the amount needed for the illustrative examples in this section could involve a statistical method (such as a multiple linear regression analysis) that controls for a variety of building and neighborhood characteristics.

from unit images and descriptions. Still, the illustrative examples are not perfect comparisons. Examples include both units in Urban Growth Boundary (UGB) expansion areas and units in infill areas.

For each example unit, ECONorthwest calculated the ratio between the sales price and average market price to gauge *relative affordability*. The average market prices are from Zillow Home Value Index (ZHVI) Single-Family Homes Time Series, which are available monthly and by ZIP Code. Calculating this affordability metric allows a comparison of housing prices in different years. If the metric is above 1.0, then the sales price is above the market average. If the metric is below 1.0, then the sales price is below the market average. This metric does not indicate a unit's affordability to a household because it does not compare the sales prices to a measurement of household income such as the area median income, and because the affordability of ownership units depends not only on the housing price and household income but also on mortgage payment terms and interest rate, which vary over time.

Example 1: Aloha

The two comparison units in Aloha on the next page are similarly sized, detached single-family units located within a mile of one another. In this example, the newer unit carries a price premium relative to the older unit (relative affordability of 1.21 for the newer unit vs. 0.97 for the older unit compared to the zip code overall as of the most recent sale), despite having much higher Homeowners Association (HOA) dues, which would tend to constrain how much a buyer would be willing and able to pay. Although the older unit appreciated about 63 percent from 2006 to late 2021, it became relatively affordable compared to other housing prices in the same area (relative affordability of 1.06 in 2006 vs. 0.97 in 2021).

Figure 9. Aloha Units

Source: Zillow



Newer Unit
Built Year: 2020
Unit Size: 1,825 sq. ft. (4 beds, 3 baths)
Parcel Size: 2,613 sq. ft.
Garage Spaces: 2
HOA Dues: $667 per year

Last Sales Date: March 21, 2022
Last Sales Price: $622,000 ($341 per sq. ft.)
Last Sales Price Relative Affordability: 1.21



Older Unit
Built Year: 2005
Unit Size: 1,815 sq. ft. (3 beds, 3 baths)
Parcel Size: 2,613 sq. ft.
Garage Spaces: 2
HOA Dues: $0 or no data

Last Sales Date: December 30, 2021
Last Sales Price: $475,000 ($262 per sq. ft.)
Last Sales Price Relative Affordability: 0.97

Previous Sales Date: July 3, 2006
Previous Sales Price: $292,000 ($161 per sq. ft.)
Previous Sales Price Relative Affordability: 1.06

Example 2: Tigard

The two comparison units in Tigard are located in residential neighborhoods, about 1.5 miles from each other. They are about equally close to the local elementary and middle schools. The newer unit carries a price premium relative to the older unit (relative affordability of 1.22 for the newer unit vs. 1.02 for the older unit compared to the zip code overall as of the most recent sale). The older unit did not start more affordable (relative affordability of 1.27 in 2005) but became more affordable over time (relative affordability of 1.01 in 2021).

Figure 10. Tigard Units

Source: Zillow



Newer Unit
Built Year: 2022
Unit Size: 2,153 sq. ft. (4 beds, 2 baths)
Parcel Size: 6,528 sq. ft.
Garage Spaces: 2
HOA Dues: $1,008 per year

Last Sales Date: March 15, 2022
Last Sales Price: $788,582 ($366/sq. ft.)
Last Sales Price Relative Affordability: 1.22



Older Unit
Built Year: 2004
Unit Size: 2,295 sq. ft. (3 beds, 3 baths)
Parcel Size: 7,405 sq. ft.
Garage Spaces: 2
HOA Dues: $175 per year

Last Sales Date: July 14, 2022
Last Sales Price: $675,000 ($294/sq. ft.)
Last Sales Price Relative Affordability: 1.01

Previous Sales Date: February 25, 2005
Previous Sales Price: $365,000 ($159/sq. ft.)
Previous Sales Price Relative Affordability: 1.27

Example 3: Oregon City

The two example properties are less than 1 mile from each other. In this example, the newer unit is more expensive than the older unit (relative affordability of 1.28 vs. 1.06), despite the fact that the older unit is slightly larger and on a slightly larger parcel. However, the older unit became relatively less affordable over time (relative affordability of 1.06 in 2022 compared to 0.88 in 2006).

Figure 11. Oregon City Units

Source: Zillow



Newer Unit
Built Year: 2022
Unit Size: 2,583 sq. ft. (4 beds, 3 baths)
Parcel Size: 6,534 sq. ft.
Garage Spaces: 2
HOA Dues: $0 or no data

Last Sales Date: October 14, 2022
Last Sales Price: $769,950 ($298/sq. ft.)
Last Sales Price Relative Affordability: 1.28



Older Unit
Built Year: 2006
Unit Size: 2,819 sq. ft. (4 beds, 3 baths)
Parcel Size: 7,405 sq. ft.
Garage Spaces: 2
HOA Dues: $0 or no data

Last Sales Date: June 3, 2022
Last Sales Price: $660,000 ($234/sq. ft.)
Last Sales Price Relative Affordability: 1.06

Previous Sales Date: June 26, 2006
Previous Sales Price: $295,330 ($105/sq. ft.)
Previous Sales Price Relative Affordability: 0.88

Example 4: Roseway Neighborhood in NE Portland

The two example properties in northeast Portland are located just under 1 mile from each other. The older property is closer to NE Sandy Boulevard and thus has slightly better access to commercial uses, though the two properties are about equal distance from a grocery store. In this example, both units are more affordable than the average market price for the area, and the older unit is more affordable than the newer unit at the most recent sale (relative affordability of 0.83 for the older unit vs. 0.90 for the newer unit). However, the older unit appreciated significantly from 2007 to 2021 (about an 87 percent increase in value) and became relatively less affordable than it had been (relative affordability of 0.83 vs. 0.76 when built).

Figure 12. Roseway Units

Source: Zillow



Newer Unit
Built Year: 2022
Unit Size: 1,520 sq. ft. (3 beds, 3 baths)
Parcel Size: 2,500 sq. ft.
Garage Spaces: 1
HOA Dues: $0 or no data

Last Sales Date: August 30, 2022
Last Sales Price: $550,000 ($362/sq. ft.)
Last Sales Price Relative Affordability: 0.90



Older Unit
Built Year: 2008
Unit Size: 1,502 sq. ft. (3 beds, 3 baths)
Parcel Size: 2,613 sq. ft.
Garage Spaces: 1
HOA Dues: $0 or no data

Last Sales Date: June 28, 2021
Last Sales Price: $471,000 ($314/sq. ft.)
Last Sales Price Relative Affordability: 0.83

Previous Sales Date: November 16, 2007
Previous Sales Price: $252,500 ($168/sq. ft.)
Previous Sales Price Relative Affordability: 0.76

Example 5: Southwest Neighborhood in Gresham

The two example properties in Gresham's Southwest Neighborhood (south of Powell Boulevard / Route 26) are about 0.6 miles from each other. The older home is more affordable than the newer home (relative affordability of 1.22 for the older home vs. 1.29 for the newer home). Although the price of the older unit more than doubled since 2000, it became relatively affordable over time when compared to other housing prices in the same area (relative affordability of 1.32 when new vs. 1.22 after 20 years).

Figure 13. Southwest Gresham Units

Source: Zillow



Newer Unit
Built Year: 2022
Unit Size: 2,214 sq. ft. (4 beds, 3 baths)
Parcel Size: 7,840 sq. ft.
Garage Spaces: 3
HOA Dues: $0 or no data

Last Sales Date: April 8, 2022
Last Sales Price: $673,000 ($304/sq. ft.)
Last Sales Price Relative Affordability: 1.29



Older Unit
Built Year: 2000
Unit Size: 2,205 sq. ft. (4 beds, 3 baths)
Parcel Size: about 10,000 sq. ft.
Garage Spaces: 3
HOA Dues: $0 or no data

Last Sales Date: September 22, 2022
Last Sales Price: $630,000 ($286/sq. ft.)
Last Sales Price Relative Affordability: 1.22

Previous Sales Date: September 25, 2002
Previous Sales Price: $295,500 ($118/sq. ft.)
Previous Sales Price Relative Affordability: 1.32

Conclusion

There is relatively strong evidence that filtering does occur in housing markets, though it varies based on local conditions and can sometimes occur in reverse, potentially resulting in gentrification, when older properties become more valuable. Adding new housing to a regional housing market creates opportunities for higher-income households to move into newer units while older units "filter" down to households with lower incomes. This process occurs over a long period of time, though there are studies suggesting short-term effects as well. Filtering occurs more slowly in places where housing markets are undersupplied, and strong demand has pushed prices upward. Filtering through deterioration and age reverses when there are renovations and other significant upgrades to older properties.

Many recent studies also conclude that new housing supply does more to alleviate upward pressure on rents in the vicinity of the new development than to increase that pressure. However, filtering alone is not enough to provide housing affordable to the lowest-income households, and does not protect from future market pressures.

Housing market patterns and trends within the Metro region show potential evidence of filtering (older units have lower rents and sales prices on average, at least over the first 70 years after construction) and of premiums for new construction. However, construction quality has also increased over time, which could account for some of this effect. As the literature would suggest, filtering appears to be slower where housing prices are higher and housing price/rent growth has been greater (e.g., Portland's central city). Moreover, the effects of filtering appear to disappear after a certain building age, possibly due to significant reinvestments in more desirable properties, demolition of less desirable properties, or a value premium associated with architectural or historical significance of an aged building.

Taken together, this suggests that new construction helps mitigate price and rent increases at a regional and neighborhood level and can allow older units to become relatively more affordable, but filtering provides only modest increases in relative affordability (at best) for new housing over the course of a 20-year planning horizon.

SEIZING OPPORTUNITY

Initial Report and Subcommittee Findings

Oregon Semiconductor Competitiveness Task Force

August 2022

Semiconductor Competitiveness Task Force Members

Co-Chairs		
Ron Wyden	Senator	US Senate
Kate Brown	Governor	State of Oregon
Maria Pope	President & CEO	Portland General Electric

Task Force		
Rukaiyah Adams	Chief Investment Officer	Meyer Memorial Trust
Adrien Bennings	President	Portland Community College
Suzanne Bonamici	Congresswoman	United States House of Representatives
Sam Brooks	Founder & Chairman of the Board	Oregon Association of Minority Entrepreneurs
Steve Callaway	Mayor	City of Hillsboro
Robert Camarillo	Executive Secretary	Oregon Building Trades Council
Matt Chapman	Civic Leader	
Sophorn Cheang	Executive Director	Business Oregon
Monique Claiborne	President & CEO	Greater Portland, Inc.
Pat Daniels	Executive Director	Constructing Hope
David Drinkward	President & CEO	Hoffman Construction
Monica Enand	CEO & Founder	Zapproved
Ed Feser	Provost & Executive Vice President	Oregon State University
Tim Knopp	Republican Leader	Oregon Legislature
Jeff Merkley	Senator	US Senate
Mark Mitsui	President Emeritus	Portland Community College
Nagi Naganathan	President	Oregon Institute of Technology
Steve Percy	President	Portland State University
Lynn Peterson	President	Metro Council
Dan Rayfield	Speaker of the House	Oregon Legislature
Sue Richards	Global Head of Printing	HP
Curtis Robinhold	Executive Director	Port of Portland
Lisa Skari	President	Mt. Hood Community College
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Executive Summary

Semiconductor industry expansion presents Oregon with an extraordinary opportunity to intentionally create the kind of jobs and investment the state needs for us to emerge from the pandemic with a stronger, more deliberately equitable economy.

The global semiconductor industry is investing billions to fill a worldwide chip shortage. And the U.S. Government is taking strong action to secure our nation's semiconductor supply chain. In July 2022 Congress passed the $52 billion CHIPS Act to boost domestic semiconductor manufacturing and design. This creates a huge opportunity to solidify Oregon's position as a world leader in semiconductor innovation, dramatically expanding our base of semiconductor design and manufacturing.

The benefits in equitable economic development will be transformational. Billions in capital investment will create tens of thousands of high-paying construction jobs, many of them held by black, indigenous and people of color. Once the facilities are operational -- thousands of additional semiconductor manufacturing and supply chain jobs will be created, where nearly 50% of positions require no more than high school or community college training. The public revenues generated will be in the billions, providing needed financial resources to support critical community priorities such as homelessness, affordable housing, and education.

The Semiconductor Task Force was convened to develop a strategy to secure this once-in-a-generation opportunity for all Oregonians. The Task Force organized five subcommittees to explore and make recommendations on key factors influencing the industry's growth in Oregon. These are the subcommittees' findings and broad recommendations to date:

- **R&D Strength:** Semiconductor research and development is Oregon's competitive advantage. Our strategy to secure chip investment should focus on solidifying a world-class innovation ecosystem around chip research and production.
- **Talent:** Premier access to talent and a robust, private sector-led innovation ecosystem separates Oregon from others. To preserve this advantage, Oregon needs to invest across the talent continuum, from entry-level positions to PhDs.
- **Land:** To attract and retain semiconductor research and development and manufacturers, we need more buildable industrial land proximate to infrastructure, talented workers, and specialized suppliers. Oregon's land use system and infrastructure investment programs need urgent legislative attention and investment to address this need.
- **Incentives**: Other states offer incentive packages that are both larger and more specifically tailored to the semiconductor industry than Oregon. We need to preserve and strengthen existing tools and consider new ones such as a research tax credit and workforce training incentive programs to spark new investment and generate additional public revenue.
- **Regulation**: When it comes to permits and environmental regulations for new facilities, the semiconductor industry tells us it wants a strong partnership to aggressively pursue greenhouse gas reductions and other planet-friendly measures. They point out that other states offer a more streamlined approach that is more in sync with the speed of the market.

Oregon has a once-in-a-generation opportunity to advance our vision for equitable economic prosperity. We need to act quickly to preserve and grow our global leadership in this important industry that anchors Oregon's economy.

Introduction

In early February 2022, Senator Ron Wyden, Senator Jeff Merkley, Governor Kate Brown, and Representative Suzanne Bonamici, and Portland General Electric CEO Maria Pope announced the formation of the Oregon Semiconductor Competitiveness Taskforce. The task force charge was to analyze the state of the semiconductor industry in Oregon and how this important industry can continue to thrive, grow, and help produce prosperity and opportunity for a broad cross-section of Oregonians.

The task force organized itself into five subcommittees to address issues that it identified as critical to the growth of the semiconductor industry in Oregon. The full task force and individual committees reached out to the industry to learn its perspective about Oregon's strengths and weakness in each of these areas.

What quickly emerged is that Oregon has an extraordinary and immediate opportunity to grow in the semiconductor sector, which would lead to far reaching benefits for our state. However, the task force also identified significant barriers that must be overcome for this opportunity to be realized. This report highlights both the opportunity and our challenges.

The first section of this report provides an overview of key trends in the semiconductor sector and describes Oregon's current position in it. It highlights how Oregon can sustain itself as a world leader in the industry and identifies the steps needed to achieve that position.

The sections that follow are the findings and recommendations of the subcommittees. Each are in different stages of development. In some cases, committees have identified and already acted on opportunities. For example, we have seen great progress over the past few months in strengthening Oregon's resources for research in the semiconductor sector. In other cases, the challenges have been identified, but more work and more dialogue will be required to refine the recommendations. In all cases, the findings provide a roadmap for further work ahead.

Oregon secured its current position as a world leader in semiconductor design and manufacturing through the extraordinary leadership and innovation of the companies located here, combined with decades of support from state and local officials. We stand on the shoulders of those who came before.

It is now time to step up again. This report provides a roadmap for the work ahead.

The Opportunity

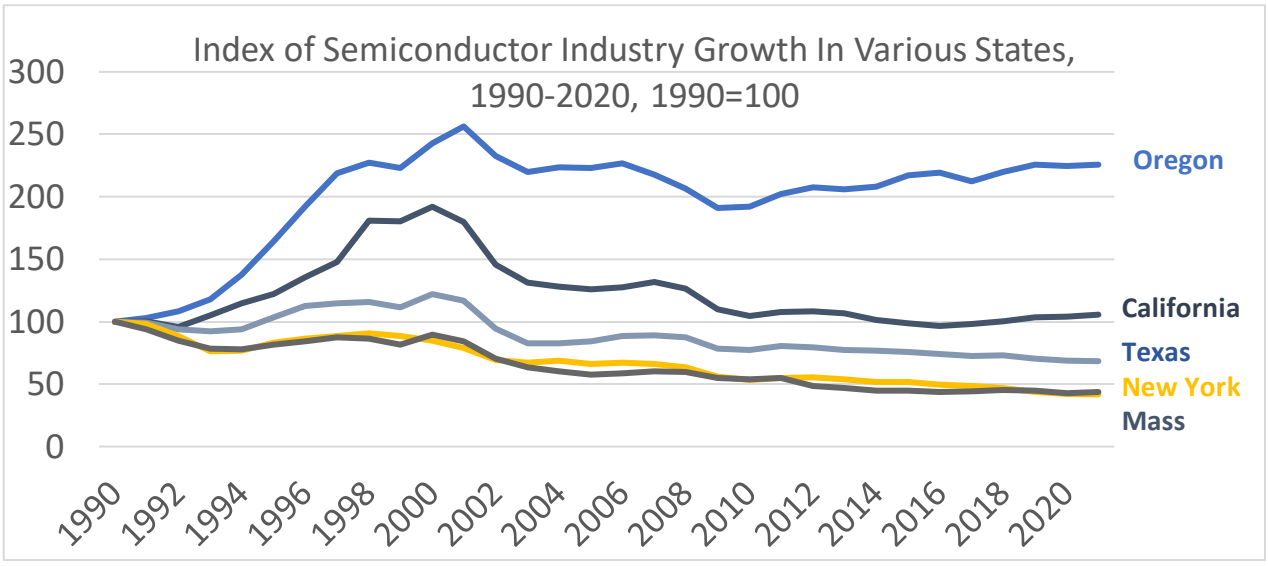
Semiconductors are the foundational technology of the digital era, serving as the "brains of modern electronics."[i] They are required in every digital device from microwaves to cars to computers to phones. In short, semiconductors power the modern the world.

A fact that may surprise many Oregonians is that Oregon is home to one of the world's leading clusters of semiconductor makers, with perhaps the world's top concentration of leading talent and expertise. Intel's Gordon Moore Park at Ronler Acres Research Campus in Hillsboro is one of the global centers of semiconductor research and development, on par with Taiwan (TSMC), and South Korea (Samsung). Spectacularly, Intel's Gordon Moore Research Campus is responsible for the creation of 1,000 patents a year – a level of R&D and innovation that exceeds the patent output of more than 21 U.S. states. So immense is our semiconductor patent activity that Oregon ranks 5th in the nation in patents per capita[ii].

The impact of that technological leadership and impact is evident across the state. Semiconductors represent nearly half of Oregon exports. And we know that export-sector businesses bring-in wealth that circulates through our communities and expands state and local budgets.

Where we are today is a product of a massive surge in the 1990s, helped along greatly by government leadership and support best encapsulated in the passage of the Strategic Investment Program – an extremely valuable incentive program for large capital investments.

We – and the U.S. broadly – are on course for another surge of chip investment and employment, spurred on by global semiconductor shortages and federal interest in securing the nation's long-term domestic chip supply. Indeed, Congress recently passed a $52 billion piece of legislation – the CHIPS Act – to encourage more U.S. chip manufacturing and R&D. Over five years it provides $40 billion in grants for manufacturing and $10 billion for investments in research. It also creates a 25% investment tax credit for equipment and facilities used to produce semiconductors or semiconductor manufacturing tools. Of the $10 billion for research, $2 billion is reserved for the formation of a National Semiconductor Technology Center. Intel has developed a proposal for an Advanced Lithography Center to be located in Oregon and funded under the NSTC. If successful, regional location of an advanced lithography focused NSTC hub would draw billions of federal investments to Oregon and serve to significantly increase the level of industry interest and investment here.



Nationwide the investment surge could total nearly $280 billion over 10 years, a portion of which would be induced by the passage of the federal CHIPS Act.[iii] For Oregon, home to 15%[iv] of the national semiconductor workforce, this opportunity could mean $40 billion of investment in the state over the next ten years, generating tens of thousands of jobs in the chip companies, their suppliers, and in construction contractors building out the facilities.

What would this investment be worth to Oregonians? Per research from ECONorthwest (see Appendix 1), $40 billion of semiconductor investment could generate more than $1.5 billion in state and local tax revenues. And that figure doesn't include the impacts of employment gains on income tax revenues. This represents a significant opportunity for a state in need of more resources to fight homelessness, to increase affordable housing, and to support K12 and higher education access.

$40 billion of semiconductor investment could generate $2-3 billion in state and local tax revenues.

$40 billion in investment would also significantly advance shared prosperity more widely. We tend to think of semiconductor manufacturing as a high-wage field dominated by engineers and scientists with many advanced degrees. Nearly 44% of the semiconductor workforce holds only high school or two-year post-secondary degrees.[v] Intel alone has hired 1,900 workers this year, many of whom needed no more than a high school degree to earn well-above average paychecks. Including the construction jobs created for facility build-outs, this is a real opportunity to create many thousands of middle-class pathways for Oregonians, particularly those experiencing long term systemic economic disparities.

But this assessment of the opportunity doesn't include the boom that a surge in chip investment and innovation could create in industries that would benefit from locating near the best chip R&D ecosystem in the country. Imagine electric and autonomous vehicles, biotech, clean tech and others doing research and advanced manufacturing here, multiplying the above-mentioned benefits. In short, acting now could spark a boom that lasts another 30 years.

If this all sounds fanciful, please think again. According to Business Oregon, at the time of this writing, three major semiconductor companies are considering investments ranging from $6-$8 billion in the state. These investments would create several thousand permanent semiconductor industry jobs, thousands more along the supply chain and thousands more still in construction to build the new facilities. The total new employment impact could be well-above 10,000. And using the ECONorthwest research referenced above, these investments could generate more than $500 million in state and local tax revenues over a five-year period.

But these projects need help to get across the finish line. Analysis done by one of these companies shows that it costs more to build and operate in Oregon than the other locations they are considering. Based on the strength of Oregon's ecosystem – particularly its robust pool of talent – we need only narrow that gap with the strategic use of incentives to close these deals.

And this says nothing of the opportunities we are missing. As this report was being written, Oregon lost a major semiconductor investment opportunity. Unfortunately, Oregon lacked a parcel of the size and proximity to the key workers and suppliers required.

The bottom line is, we have a uniquely strong cluster here, but we have reached a ceiling. According to the findings of the subcommittees, we have run out of buildable/shovel ready industrial land in the

locations the industry requires. Our incentive offerings have fallen behind other states even as the cost to build and operate here has outstripped other states. Our state clean air permitting processes are long and uncertain. We need more investment in the research mission of our research universities.

Simple math demonstrates this fact: the chip industry has invested roughly $90 billion in the U.S. over the last year and a half. Only a small portion of that, including the thousands of middle-class jobs and hundreds of millions in tax revenues, has found its way into Oregon. If we do not act boldly and with urgency, as we did in the 1990s, we will miss the lion's share of this once-in-a-generation opportunity and risk decline in this vital industry sector as the industry concentrates in alternative locations.

So how will we be successful? By building (and solidifying) our position as a world-class semiconductor innovation ecosystem with key nodes extending south from Portland to Corvallis and Eugene and east to Bend.

Our cluster of companies largely focuses on advancing the extremely research-and innovation-intensive effort of fitting ever-more transistors on a single-chip – the very innovation that has allowed us to have powerful computers in our pockets. Having access to the best talent in the world is central to this work. As one company that spoke to the Task Force said, talent is the number one factor it looks at when identifying locations to invest in. The ability of companies to tap into (and depend on) an abundant supply of diverse, world-class talent, connecting to specialized and cutting-edge suppliers, and access the research apparatus of leading research universities is a highly compelling mix for an innovation-focused chip outfit.



Sustaining that advantage in talent and innovation requires additional **investment in our talent and workforce development** systems to build the nation's best pipeline of semiconductor talent from technicians to PhDs. It also requires more collaboration and alignment with our K-12, community college, local government and community-based organizations to recruit, train and retain a diverse, reliable workforce and increase economic mobility for our communities. Doing so also requires investment in post-secondary certifications and degrees and the **research capacity of our universities.**

But to innovate in this industry anchor companies often require large parcels of **industrial land** and proximity to both talent and partnering suppliers or customers who also need adequate size sites. The 1990s chip investment surge that secured Oregon's moniker as the "silicon forest" required large parcels of land totaling 2,000+ acres in aggregate. Today, per the work of the Industrial Lands Subcommittee, we only have two parcels (82 acres combined) with site criteria that match the industry's needs that would be "shovel ready" in only a six-month timespan. In short, we significantly lack enough buildable industrial land in the locations required to catalyze transformational growth.

Chipmaking is also an extremely expensive endeavor. In 2022 Intel expects to invest $27 billion[vi] in capital expenditures. That's more than the sum of Oregon's *biennial* general fund budget. That makes chipmakers extremely sensitive to differences in building and operating costs between locations. And chipmakers that spoke before the Task Force testified to higher building and operating costs in Oregon compared to elsewhere, which includes other state's use of tax and incentives. Thus, the Tax and Incentives Subcommittee found that strategically using **incentives** to narrow this cost gap while encouraging more R&D and manufacturing will be essential to success.

Markets and market opportunities develop quickly. First movers often secure the greatest rewards. The states that can meet industry's imperative of moving quickly will have an advantage in all markets but especially in semiconductor. Oregon companies need faster, more certain clean air **permitting** processes.

Success means capturing tens of billions of semiconductor investment, tens of thousands of equitable jobs across the state, and dramatically strengthening an industry to power our economy for generations. But success requires urgent action along each step mentioned above.

The reports below describe each subcommittee's assessment of the opportunities, challenges and actions needed to develop and solidify our position as a world-class semiconductor innovation ecosystem.

University-Industry Partnerships Subcommittee

The most competitive states in the semiconductor industry are those with the most advanced innovation ecosystems. These require coordination across colleges, universities, government, trade organizations, and workforce partners to provide the services, programming, and talent the industry needs.

Universities help provide two critical ecosystem services: producing research and engineering talent from baccalaureates to PhDs and providing basic and applied research in support of industry research priorities. This committee found several ways in which Oregon universities can improve their support of industry needs, and ways in which universities can be empowered to do so.

Questions Sub-Committee Addressed

A. What are the Oregon semiconductor industry's research priorities, what capacity exists to meet them, and what specific investments and other steps are required to build an ecosystem that helps the sector capture opportunities?
B. What R&D funding opportunities do the CHIPS Act and other related initiatives offer and how can a significant share of this funding be channeled to Oregon?
C. What actions and investments are needed to strengthen Oregon universities' role in helping to meet the industry's workforce development needs, through undergraduate education, graduate education (masters and PhD.), and partnering in the development of innovative alternative credentials, flexible pathways to knowledge and skills, and professional training?

What We've Learned

A. Unlike many other states, Oregon is playing catch-up on forging the kind of deep and sustained industry-university-government (state and local) partnerships and trust that are necessary to move swiftly when opportunities like the CHIPS Act and National Science Foundation initiatives arise. There is a need for a convening body or organization focused on the semiconductor cluster that would build and maintain that capacity over time.
B. There are several significant federal funding opportunities that Oregon should pursue to support the state's innovation ecosystem for semiconductors and related industries. These include the proposed CHIPS Act and its call for the National Semiconductor Technology Center, the National Science Foundation's Regional Innovation Engines initiative, and Business Oregon's Center for Innovation Excellence initiative. These efforts would require leadership from Oregon's research universities and close partnership with industry and government.
C. Oregon's vision for post-secondary education does not explicitly recognize the distinctive missions of the state's different universities: two national R1 research universities (OSU and UO); an urban-serving R2 research university (PSU); a public polytechnic university (OIT); and three comprehensive regional universities (WOU, SOU, EOU). Research and innovation are not a focus and priority in Oregon post-secondary education coordination and investment. This weakens Oregon's research and innovation ecosystem relative to other states with large semiconductor footprints such as California, Ohio, Washington, Texas, New York, and North Carolina.

D. There is a significant need to increase the number of graduates from Oregon universities at all levels from undergraduate through PhD in the fields of engineering, computer science, and other specialties supporting the semiconductor industry. This more specialized workforce must complement efforts to expand the technical workforce that is a priority target of the Future Ready Oregon initiative.
E. There is a need for a thorough assessment of Oregon's university R&D and workforce development ecosystem, especially compared to those in other states. Notably, Oregon needs to increase the number and racial, ethnic, and gender diversity of graduates earning advanced STEM degrees.
F. A close look at the success of the Center for Semiconductor Research in Albany, NY, a key model for how Oregon should seek to develop its chip-related innovation ecosystem, suggested the following lessons:
    a. The center was premised on the principle that, for this sector, leading with R&D would generate manufacturing activity.
    b. The key in New York was a sustained commitment of elected officials (five governors have invested to date), industry leaders, and higher education leaders. It took five years to establish a truly differentiated capacity and ten years to achieve a status of among the best in the world. This capacity has put the state and region in a very strong position to respond to opportunities like the CHIPS Act.
    c. An anchor industry tenant—IBM, which provides a lot of direction and stability—and universities are critical. On the latter, recruiting and retaining top faculty are key, but also important is a high level of agility in addressing the needs of industry, flexible management of IP, and support facilities for R&D activity and education. Any investments to support industry also included investments in research universities.
    d. The state's nimbleness in setting up the deal and willingness to "move at the speed of industry" was also important to New York's success.

Recommendations

A. **Capture Immediate Opportunities**. The state should move collaboratively and aggressively right now to respond to opportunities. These include the National Science Foundation's Regional Innovation Engine initiative call for proposals, Business Oregon's Center for Innovation Excellence call for proposals, and opportunities that arise via the CHIPS Act, specifically Intel's Advanced Lithography Center proposal for a National Semiconductor Technology Center. Informed primarily by industry needs and aspirations for the sector in Oregon, industry, university, and government partners must come to an agreement on how to approach these opportunities to avoid internal confusion and competition.

    As one example of this work, recently Oregon State University submitted a concept paper—*Securing America's Semiconductor Technology Future and Growing Regional Economic Prosperity*—in response to the National Science Foundation's Regional Innovation Engine call. If this initial proposal advances, the engine will take advantage of the unprecedented alignment in research capabilities, lab-to-market translational resources, strategic partnerships with industry, state and local government and workforce development entities to drive the development of a northwest regional technology innovation engine. A strong and committed coalition will be needed to ensure success.

B. **Increase Capacity for Sustained Collaboration.**

- Leverage Business Oregon's Centers of Innovation Excellence (CIE) to create a center dedicated to cooperation around innovation and academic research that will lead to commercialization pathways. This will include our statewide network of universities, colleges and community colleges with industry and government entities working together to develop a pragmatic, academic and industry-led applied research and development program.
- Create a Higher Education Center that: serves as a regular convener of industry, university, community college, and government partners; acts as a catalyst for collaborative activities and actions that position Oregon as a leading state for semiconductor innovation and manufacturing; monitors the growth and needs of the semiconductor cluster; and provides grant writing, marketing, and public relations capacity necessary to respond quickly to opportunities emerging at the federal level. Provide sustained state funding for the center to ensure it can build the kind of deep networks and sector knowledge necessary to be an effective convener as opportunities arise.

C. **Invest in Oregon's Public Research Universities.** Top-flight research universities—and the mission of research and innovation they advance—are essential to the success of the semiconductor industry in every state in which the sector has a significant presence. Oregon has two strong R1 research universities (Oregon State University and the University of Oregon) and an R2 urban research university (Portland State University). All three contribute to Oregon's semiconductor R&D strengths in both unique and complementary ways. All three are also committed to inclusion and diversifying the STEM pipeline. However, none are ranked among the top tier of public research universities in the country and they are not presently funded at a level necessary to bring them to a premier level. Delivering both undergraduate and advanced degrees, taught in state-of-the-art labs tailored to keep pace with industry research and innovation trends, requires a level of state investment that recognizes the research mission of these institutions.

The result is that Oregon is lagging badly behind states like Ohio, Georgia, Texas, California, Washington, and Florida that have actively propelled their institutions to among the top public research universities in the country. Those states are doing so by investing in recruiting exceptional faculty and graduate students, building advanced facilities, leveraging industry and philanthropic support, and innovating in academic program delivery. Such states are also investing in diversifying the STEM pipeline. It is time for Oregon to do the same and aspire for its research universities to be among the best in the country. This priority should not result in less support for other Oregon universities, which also have important missions.

- ***Establish and fund a bold faculty recruitment initiative to attract 25 new leading engineering and computer science faculty*** to the state's research universities, with the universities collaborating in building interinstitutional clusters and affinity groups aimed at supporting research that advances semiconductor industry needs. Create shared branding to support the recruitment that positions Oregon as a national leader in semiconductor research and innovation and highlights the commitment of industry, universities, and government to partner in supporting R&D in this area.

- ***Create a fund to support STEM faculty start-up packages.*** Faculty start-up packages—which include non-recurring support for lab upgrades, equipment, and initial graduate student recruitment—can make a tremendous difference in attracting the best and most diverse research faculty to Oregon, supporting the academic goals of Oregonians of all backgrounds, and recruiting diverse undergraduate and graduate students to the state. Such packages can run from $1 to 2 million per faculty member, but the payoff is the subsequent federally funded research brought to the state.

- ***Support state investments for facilities and comprehensive initiatives that accelerate university research, innovation and technology and align with the industries' needs:*** As an example, OSU's Collaborative Innovation Complex, a 150,000 square foot, $166 million building housing advanced research infrastructure, including a supercomputer and clean room—will significantly improve Oregon's capacity to support the needs of the semiconductor industry. OSU has raised over $100 million in philanthropy for the building and is seeking $75 million in state-paid bonds to support its construction. The OSU project is one of several important initiatives across the state's public universities that will facilitate partnership with the semiconductor sector and advance efforts to expand and increase the mix of STEM faculty and students.

- ***Develop a multi-year strategy to increase the most highly trained workers needed for the sector's success, placing a specific focus on diversifying the pipeline of students with the goal of ensuring that economic investments benefit traditionally underserved communities.*** Partner with industry, university, and government leaders in the creation of a multi-year strategy to increase bachelors, masters, and Ph.D. graduates critical to the industry's success. Highlight and recognize the Oregon Institute of Technology as one of the nation's top producers of bachelor's graduates in applied technical fields and OSU, UO, and PSU's roles in graduating large numbers of undergraduate, graduate and Ph.D. scientists and engineers. Leverage existing programs such as the National GEM Consortium, an organization that partners with universities and industry to increase the participation of underrepresented students at the master's and doctoral levels in engineering and science.

Subcommittee Co-Chairs:

- Ed Feser, Provost and Executive Vice President, Oregon State University
- Sue Richards, Global Head of Printing, HP

Staff Lead:

- Julie Brandis, College of Engineering, Executive Director of Strategic Partnerships, Oregon State University

Talent and Workforce Subcommittee

The success of Oregon's semiconductor industry depends on building and attracting a world-class workforce in research, engineering, and manufacturing. Indeed, several semiconductor firms that spoke to the Task Force called out talent as the top factor driving decisions of where to invest. Talent is a significant advantage for Oregon. We boast one of the most concentrated bases of diverse semiconductor talent in the world, with workers ranging from skilled technicians to advanced PhDs.

Even so, as is discussed below, we found that talent shortages are a serious constraint for Oregon semiconductor manufacturers, with a particularly urgent need for technicians and operators. Fortunately, this problem is not unique to Oregon as the semiconductor industry faces a significant talent shortage across the country. But this fact creates significant opportunity for Oregon: the state that can create the most robust talent pipeline will have a potent competitive advantage going forward.

We must build new strategic relationships between industry and education and expand access to successful models of technology education that build a skilled, diverse workforce.

To meet the talent and workforce needs of Oregon's semiconductor industry, we must build new strategic relationships between industry, education, community organizations, and local government and expand access to successful models of technology education that build a sustainable, skilled, diverse workforce.

Committee Analysis

The Talent and Workforce Subcommittee was charged with assessing the industry's most pressing talent needs and developing recommendations to address them. Subcommittee staff held interviews and focus groups with semiconductor industry executives to better understand their needs. Those efforts yielded the following insights:

- Oregon is home to 15 percent of the national semiconductor workforce and has a higher concentration of the industry's skilled workers than any other state.
- Oregon employs a diverse mix of engineers and production workers across its design, chip manufacturing, and fab equipment manufacturing functions.
- Shortages in technology talent are a serious production constraint for Oregon semiconductor manufacturers, in particular for equipment operators and for technicians with maintenance, repair, and production process skills.
- For every PhD doing high-level product design and production engineering, the industry needs a substantial multiple of technology workers at the baccalaureate, associate, and certificate level to produce products and to support production equipment and processes.
- Entry-level technicians are a particular need, as well as a growing challenge because of projected new-job growth and retirements in the next 5-10 years. This role is also becoming more important in semiconductor manufacturing with increasing scale and innovation in production processes.
- Oregon's education systems are producing tech-savvy, skilled graduates, and there are some outstanding programs and models, but there are not enough of them, and they lack the capacity and alignment to meet the industry's large and growing demand.

- Engineering and design drives strong need for four-year engineering and technology degree holders, many hired in Oregon. Research and design require graduate degrees, most often recruited from out of state and frequently globally.
- There is a lack of awareness and understanding of semiconductor and manufacturing careers. Providing middle and high school career exploration opportunities and clearer pathways to post-secondary certification is key to building a semiconductor workforce pipeline. Data shows an increase in wages and economic mobility for those who receive a short-term credential or associate's degree.
- Industry, community, and education leaders are effectively collaborating on a local level to address workforce challenges and create pathways that meet and anticipate industry needs on an ongoing basis and this work needs to be elevated to regional and state efforts.
- The industry wants to forge partnerships with historically underserved communities to 1) connect more diverse young people with industry career opportunities, and 2) increase the number of women, people of color, veterans, and other priority populations to livable wage careers in this sector by removing barriers to access, including tuition support, childcare, and transportation.
- Future Ready Oregon provides an ideal opportunity to invest in a semiconductor industry workforce education consortium to tackle the talent challenge.

Recommendations

With the vision of establishing Oregon as a leader for cultivating high-quality semiconductor talent in the U.S. in mind, we recommend the following actions:

1. Create a statewide semiconductor industry consortium to build robust, strategic partnerships among industry, education, workforce, and community-based organizations focused on communicating and meeting industry education and workforce needs.
    - Use Future Ready Oregon investment funds to develop the statewide semiconductor consortium on the successful model developed by the Hillsboro Advanced Manufacturing Workforce Consortium.
    - At the same time, also use Future Ready Oregon investment funds to expand the regional capability and impact of the Hillsboro Advanced Manufacturing Workforce Consortium.
2. Working with the statewide semiconductor industry consortium noted above, develop a comprehensive semiconductor workforce investment package for the 2023 Legislature that includes investments across the PK-20 education continuum.
3. Use Future Ready Oregon investments to address the industry's talent needs by building infrastructure and expanding access to successful models of technology education.
    - Increase opportunities for apprenticeships to strengthen a diverse pipeline of talent.
    - Address the immediate need to expand the supply of operators and technicians.
    - Invest in community college capacity to recruit, retain, upskill and graduate students from the large and diverse population of low-wage working adults.

- Work with industry and universities to identify and address opportunities to improve and expand the supply of semiconductor-related engineering and technology talent.

4. Strengthen interest in and access to semiconductor career pathways.
    - Strengthen student engagement in STEM education across the continuum, in particular among students historically underrepresented in STEM fields.
    - Invest in the development of a campaign to raise awareness of career opportunities in Oregon's semiconductor sector and of education pathways to those opportunities.
    - Partner with community-based organizations to expand culturally and linguistically relevant engagement with historically underrepresented communities in Oregon's semiconductor workforce.

5. Enhance the industry's access to highly skilled global talent, by removing restrictions and increasing the efficiency of the immigration system.
    - Support the bipartisan EAGLE Act (H.R. 3648) to reform per-country caps on green cards, which have created a significant backlog for immigrants with technology credentials.
    - Support passage of the America COMPETES Act immigration provisions (HR 4521, section 80303) to exempt science, technology, engineering, and math PhDs from annual green card limits.

Subcommittee Co-Chairs:

- Dr. Lisa Skari, President, Mt. Hood Community College
- Dr. Nagi Naganathan, President, Oregon Institute of Technology

Staff Leads:

- Kyle Ritchey-Noll, Director, Education and Workforce Policy, Oregon Business Council
- John Tapogna, Economic and Fiscal Analysis Consultant, Oregon Business Council

Taxes and Incentives Subcommittee

Companies weigh many factors when considering where to locate their chip-making and R&D operations. As companies stated at the Task Force's second meeting, access to the best possible talent is often the most important factor companies consider when choosing where to invest. Our talent strength places Oregon high on the list of worldwide locations to locate due to our exceptionally high concentration of leading semiconductor talent. Many companies are willing to accept higher-cost operating environments in exchange for proximity to this critical advantage.

However, this subcommittee has discovered that it is meaningfully more expensive to build and operate semiconductor fabs in Oregon compared to key competing states. One company that spoke to the Task Force placed the premium at 10% to 15%, which includes taxes and incentives, compared to competing states. Willingness to accept slightly higher construction and operating costs to locate near strong talent has limits. The gap identified here is large enough (for some companies at least) to erode the advantage of locating near Oregon's talent and innovation ecosystem.

Access to the best possible talent is often the most important factor companies consider when choosing where to invest.

Therefore, incentives play a critical role in the Task Force's overall strategy to retain and attract semiconductor investment, serving to *protect and build on* our competitive advantage in talent and workforce by narrowing our cost disadvantages.

The Tax and Incentives Subcommittee set out to examine how we can most efficiently and effectively narrow our cost disadvantage while encouraging the greatest amount of economic activity across all Oregon industries, manufacturing or otherwise.

Work Done

In support of the subcommittee, Business Oregon retained consultant Smart Incentives (see Appendix 2) to present a competitive analysis of other states' offerings and incentives policy, including in-depth proposals on actual projects by other states. The Oregon Business Council also commissioned analysis from ECONorthwest (Appendix 1) of the potential fiscal impacts of semiconductor industry investment. The Subcommittee also heard from companies directly on the strengths and weaknesses of Oregon's incentives. The findings below emerged:

- Semiconductor industry growth could produce a substantial return for state and local tax revenues. Analysis from ECONW found that every $1 billion in semiconductor capital investment generates $44 million in public revenues and 7,000 construction-related jobs, and that every 2,000 permanent chip jobs created generates $57 million in *annual* public revenues and creates another 4,000 jobs. According to Business Oregon, three companies are considering capital investments worth up to $6-$8 billion with 2,000 chip jobs created. ECONW's analysis suggests such an investment could create tens of thousands of jobs spread across the state and be worth more than $500 million to state and local governments over a five-year period.
- Oregon's renowned property tax abatements – the Strategic Investment Program, along with its companion Gain Share, and Enterprise Zones – and the single sales factor for corporate income taxes continue to be essential to industry expansions in the state. Nevertheless, other states' programs and tax structures now more than negate what Oregon provides. Our vaunted

property tax abatements no longer separate Oregon, but rather allow us simply to remain relevant.

- Tax incentives alone are insufficient. Smart Incentives underscored how forgivable loans, grants and other upfront resources are increasingly indispensable, being used to buy down the total cost of development and production related to land, construction, infrastructure, and equipment in the semi-conductor industry. Oregon has grant programs, but they are not in the same league as other locations.
- In addition, competing states deploy a range of incentive strategies to attract semi-conductor investment, such as refundable or cashable tax credits and substantial public investment in land or infrastructure development and workforce. Both financial and institutional support for workforce development can be the linchpin with major projects that would create many quality jobs.
- Given our commitment to innovation across industries, and the state's unique strength in semiconductor research and development, one glaring omission in our toolbox is an R&D tax credit. Conversations with companies also identified other tools, namely, employment- and training-based incentives as missing pieces.

Recommendations

As we seek to make Oregon more cost-competitive for semiconductor and related activity, we must consider what specifically to incentivize. Two answers continue to arise. First, deepening our R&D strength and encouraging more innovation here should be a priority as we seek to position ourselves as a global center of semiconductor research and innovation. Second, we need to encourage semiconductor and related input manufacturing. Semiconductor manufacturing creates thousands of jobs, at well above area average wages, often without requiring more than H.S. or two-year degrees. Encouraging more manufacturing here is thus a critical strategy for equitable job growth in the state.

Therefore, the Subcommittee's recommendations focus on encouraging more R&D and manufacturing by lowering the costs to do both and while addressing known gaps in our incentive offerings. The tools in the package below complement each other, creating a whole greater than the sum of its parts.

- **Bolster and add to existing forgivable loan programs, including Governor's Strategic Reserve Fund and Business Expansion Program**. Program's purpose is to help lower the total cost of construction and operations in Oregon for very large projects. The loan would be funded by a portion of the increased tax revenues resulting from the investment, and loan amounts would be progressively forgiven relative to satisfaction of criteria in performance agreement.
- **Workforce Training Incentive Program for Advanced Manufacturing**. The nature of work is changing as manufacturing adopts to ever-evolving, more advanced technologies (i.e. "Industry 4.0") and companies face immediate needs to increase their employees' technical proficiency. Special funds and dedication of higher education infrastructure would be used for a customized response to certain major project opportunities anywhere in Oregon, to not only help the company in adapting to the rapidly changing workforce needs for doing more in Oregon, but also to reduce the cost of employee training and the higher cost of labor in Oregon.
- **Research Activities Tax Credit**. Unlike a former Oregon credit, this would include non-corporate companies and could have special features for small or disadvantaged innovators. Found in nearly all states, such a credit offsets state taxes based on a percentage of increased annual

spending inside Oregon under federal definitions of R&D. It would emphasize substantial benefits up to a point for businesses performing the R&D with mechanisms (e.g., partial refund) to ensure usability.

- **Family-Wage Tax Credit.** A family-wage tax credit stimulates a key outcome of economic development: the creation of well-paying jobs, by providing an offset or other return to businesses proportional to their payroll expenses arising from an increase in the number of good jobs over several years.
- **Investment Tax Credit for Advanced Manufacturing.** Like the SIP and Enterprise Zones programs, an investment tax credit would also induce more capital expenditure in Oregon – i.e., the investment in plant and equipment. Such a program could plug holes between the property tax abatement programs in certain cases and is a common type of incentive that businesses look for based on a percentage of their investment costs, to be claimed or used over several years.
- **Maintain essential existing tools like SIP and enterprise-zone property tax abatements, and state policy on Single Sales Factor for corporate income taxes**. Without them Oregon would be completely uncompetitive from a cost of construction/operation perspective, for which businesses require reasonable predictability. As such, the 2023 Legislature is urged to address the future of enterprise zone programs well before 2025 sunset date.

Subcommittee Co-Chairs:

- Matt Chapman, Civic Leader
- Monique Clairborne, President and CEO, Greater Portland, Inc.

Staff Leads:

- Andrew Desmond, Policy Analyst, Oregon Business Council
- Colin Sears, Regional Development Officer, Clackamas, Multnomah, and Washington Counties, Business Oregon
- Scott Bruun, Director of Tax, Fiscal, and Manufacturing Policy, Oregon Business and Industry

Industrial Land Subcommittee

A major component of economic competitiveness is the time it takes to assemble the baseline ingredient of development: industrial land and infrastructure. In many states and countries this isn't a challenge, but in Oregon, it has become a serious barrier in achieving our goals surrounding shared economic prosperity.

As established in this report's "Opportunity" section, Oregon is on the cusp of a 1990s-like semiconductor boom when billions were invested and industry employment more than doubled. That boom was facilitated by 2,000+ acres of industrial land.

As discussed below, this subcommittee found that Oregon faces a serious shortage of available, development-ready large industrial sites relative to 1990s-like demand. If left unaddressed, the shortage presents a critical threat to Oregon's semiconductor industry competitiveness.

Furthermore, the passage of the federal CHIPS Act is likely to ignite a rush of near-term investment activity: the bill disburses $52 billion in incentives over five years but is heavily front loaded with nearly half the funds spent in the first two years. As a leading job creator and generator of critical tax revenue to fund state and local government, a growth strategy for the semiconductor sector will require bold new approaches in planning and investment.

Summary of Work Completed and Findings

The Industrial Lands Subcommittee interviewed semiconductor site selection experts, reviewed and updated past industrial land inventories in the Metro region, and reviewed the suitability of sites therein based on industry requirements. Below are insights and ultimate recommendations drawn from these analyses.

The Metro region is the key to continued growth and development of the semiconductor sector.

The semiconductor industry is especially prone to clustering and is predominantly located in urban locations. The U.S. semiconductor industry is primarily concentrated in Silicon Valley; Portland; Austin; Dallas; Phoenix; Orlando; Boise; Albany, NY.

Clustering is driven by multiple factors, including the ability to attract talent and a technical workforce, and the need for close proximity to suppliers.

- Access to talent is the most important factor driving location decisions for many semiconductor firms. Companies need to be where the workers are. Professionals in this field often move from one job to another between companies and suppliers. It is a dynamic employment ecosystem.
- Semiconductor fabs are highly complex manufacturing facilities that involve efficient operation of large pieces of equipment that require skilled maintenance by the equipment makers. Down time for equipment failure can equate to millions of dollars of lost product potential. This places a premium on proximity to certain suppliers who can respond within minutes for equipment issues.
- The R&D process of semiconductor fabrication is a highly collaborative effort between the fabricator and the suppliers of key process equipment. Semiconductor makers and their suppliers often collocate to conduct joint R&D.

- An often-overlooked aspect of clustering is the importance of public and private utilities such as electricity, water and wastewater systems. Cities that are home to concentrations of semiconductor-related companies have invested over decades in highly efficient, reliable and redundant systems.

For all these reasons, the semiconductor industry is highly likely to continue clustering in the Metro region, with smaller but significant nodes of supplier-related activity in the Willamette Valley such as Salem, Corvallis, Eugene, in Central Oregon cities of Bend and Redmond and south into the Rogue Valley.

The semiconductor industry is poised for a 1990s-like growth surge. Though the Metro region has thousands of acres of industrial land, its lacks supply of development-ready large industrial sites (25-plus buildable acres) the semiconductor industry needs to grow.

The surge of semiconductor activity in the 1990s required 2,000+ acres of industrial land. There is reason to believe today's boom could be even larger. If we use the 1990s analog to gain a rough sense of possible demand today, we find that we are in significant shortage of development-ready industrial land.

At an aggregate level, the Metro region shows thousands of acres designated as industrial property over a 20-year planning cycle. However, a closer look at this land shows very few sites of appropriate size that development-ready and suitable for major manufacturing investment, especially semiconductor R&D and manufacturing.

Since 2012, the Metro region has studied land readiness to gain a sense for the number of large sites that are development ready, ranked by tiers, and to understand pathways toward moving sites to Tier 1 (ready) status. A 2022 review of the available inventory of large industrial sites reveals that the inventory has fallen sharply since 2017. In that year the Metro region had 47 industrial sites with more than 25 acres. Today, that inventory has fallen by 40% to only 28 sites.

Most troubling is the paucity of large sites that are "Tier 1" or "development ready", meaning they have infrastructure in place and development can begin within six months or less. The Metro region currently has only two development ready sites totaling 82 acres. There are only six sites in the Tier 2 category, meaning they require significant permitting and infrastructure improvements to be developed within three years. This subcommittee determined that only three of those six sites and 352 acres would meet the industry's site requirements (including those listed above and other factors like site grade).

Notably, there are no development ready sites of the size needed to attract a major semiconductor investment, or to support larger size suppliers**.**

Oregon lacks both adequate funding for infrastructure, and tools for land aggregation to make large lots development ready to respond to strategic opportunities.

The Metro region has developed an industrial lands toolkit[vii] to provide guidance, case studies, and best practices for local governments interested in readying land for industrial development. Most local governments lack the resources necessary to fund the core elements of getting land development-ready, including investing in infrastructure, and both tools and funding to assemble smaller properties into large lots. As the toolkit demonstrates, significant development barriers place the private return on

investment in the negative for industrial land purposes, requiring local or state government action to prepare these sites. This is often not the case for residential development, which can demand prices that allow private developers to achieve a greater ROI.

The Metro regional government has grant funding for cities to conduct concept plans for both proposed urban growth boundary (UGB) expansions and for areas already inside the UGB. But most cities lack up-front funding to acquire sites and provide core infrastructure such as roads and water/sewer pipes to and on site. Cities also face costs to incorporate and annex lands, and to establish proper zoning required before industrial development can occur.

Portland Metro Inventory of Large Industrial Sites

	2011 Inventory	2014 Inventory	2017 Inventory	2022 Inventory
Tier 1	9	14	10	2
Tier 2	16	17	11	6
Tier 3	31	23	26	20
Total	56 sites	54 sites	47 sites	28 sites

Recommendations

Short Term

There is no quick, comprehensive fix to such a multifaceted challenge. It is critical that we deepen our analysis and report back in Fall 2022 with a short term "strategic site" map, including an outline for bringing sites to readiness. The analysis will be done under the subcommittee and coordinated by the staff team. There is urgency to this work, as it is necessary to form a more detailed approach heading into the 2023 legislative session. The consultant work scope will include:

- Engaging local jurisdictions within Portland Metro and Willamette Valley to determine land availability and site readiness for semiconductor expansion in their respective communities.
- Reviewing responses against criteria to create an updated map of sites of significance for semiconductor expansion both inside and outside the Urban Growth Boundary based on planning documents and community interest.
- Creating an updated map to identify sites most suitable for semiconductor expansion during this industry investment cycle, including the following, keeping in mind demand could exceed these needs:
    - Two sites of 500+ acres each to accommodate large-scale semiconductor R&D and/or production fabrication operations.
    - Four sites of 50-100 acres suitable for integrated device manufacturers or major semiconductor equipment manufacturers.
    - At least eight sites of 15-35 acres to enable key suppliers to the semiconductor cluster to locate and expand.
- Summarize development constraints and cost estimates to bring sites to Tier 1.

The above work scope will allow the subcommittee to generate specific legislative recommendations around the following topics:

1. Site availability, site readiness funding and investment
2. Expedited permitting and planning necessary to move sites forward
3. Public developer role including staff and consultant funding

Medium-Long Term

The semiconductor opportunity should be viewed as a catalyst for long-term change. Beyond meeting immediate needs, we face a larger challenge. Our lack of industrial land is a chronic problem that has been vividly exposed by the surge interest in semiconductor expansion. Year in and year out Oregon misses significant opportunities. Oregon needs a 21st century advanced manufacturing strategy that plays to our strengths in innovation and incorporates industrial land availability and site readiness as a key part of inclusive statewide economic development. We need a nimble land use system that can anticipate and quickly respond to economic opportunities.

Subcommittee Chair:

- Travis Stovall, Mayor, City of Gresham

Staff Leads:

- Keith Leavitt, Chief Trade and Equitable Development Officer, Port of Portland

Environmental Regulations Subcommittee

Oregon's Department of Environmental Quality (DEQ) has a long, successful history of partnering with businesses to meet their needs while developing some of the most innovative and stringent air quality regulations in the country. Businesses are reporting that recent rulemaking is eroding predictability and increasing uncertainty in regulatory compliance and permit review times, which is significantly lengthening permit review times.

As semiconductor firms race to invest, the resulting uncertainty challenges the ability of interested companies to invest quickly. The current regulations and regulatory environment in Oregon diminishes Oregon's competitiveness and needs improvement.

The Governor and her office convened businesses from the semiconductor and other industries to identify the root of the challenges and their solutions. What follows is what emerged from those discussions.

Problem	Potential Solution (Best Practices)
Problem #1: Need to better understand overarching permitting timeline in order for businesses to make decisions around timing, funding, breaking ground and investments	Ohio sits down with businesses at the beginning of the process and walks them through the fixed timeline, milestones and requirements. They also adhere to a 45-day review (through rule) of a draft permit once submitted.
Problem #2: Historically, DEQ rules have been understandable and reasonable. However, new programs have made them complex and challenging. DEQ engages in periodic rule updates which upends the process for businesses who feel like they understand and can comply with current rules but rule updates provide uncertainty that they cannot easily adjust to. These also seem to come at random times.	A yearly or biennial calendar that outlines when DEQ will be under rulemaking, why and for which program and a commitment not to do all programs at once. OR a moratorium on rulemaking that is not for a new program needing legislative implementation
Problem #3: Other states have an "off ramp" for de minimis environmental impacts that are identified up front, providing a path to focus on areas of concern instead of spending time and money on impacts that will not have a significant impact.	Implement off ramps. Review Washington's process and see what is transferable to our process and if it can be done through rule or needs a statutory change.
Problem #4: Oregon has a complex air toxics program that would benefit from clear guidance and clear timelines. The complex system may lead to focusing on toxics that do not have significant impacts. DEQ currently operates a toxic-by-toxic review as part of the permitting process.	Ohio has a toxics program that has triggers on a toxic-by-toxic basis and has a model that identifies if emissions are above x, those need to be added into the modeling. If they do not trigger the threshold, they are omitted as a risk.

Problem #5: Timeline is unpredictable and at the discretion of available staff. There is not an upfront touch point with the agency that walks through processes and expectations.	Similar to #1, define predictable timelines, dedicate staff to an applicant or a project so they can work with them through the entire process and ensure the team is fully staffed at all times.
Problem #6: A better understanding of who businesses should be working with on the local level would be helpful.	A posted roadmap of local contacts on the DEQ website.
Problem #7: There is not an initial touch point for new/smaller businesses who are looking to start a DEQ process.	Have a joint point of contact with Business Oregon and DEQ to help direct businesses at the very beginning of the process, similar to the Small Business Navigator role.

The environmental regulations subcommittee identified these challenges and solutions. Most solutions can be addressed through rule-making or administrative policies.

In addition to these specific challenges, the subcommittee recognized that DEQ needs adequate resources to implement its regulatory programs and does not currently have all the resources it needs. Future state budgets and legislative priorities should include adequate staffing for administrative agencies, particularly DEQ, to meet its statutory charge.

Subcommittee Chair:

- Governor Kate Brown

Staff Lead:

- Jason Minor, Natural Resources Policy Director, Office of the Governor, State of Oregon

Acknowledgments

The Task Force wishes to thank the staff team that supported this effort. This remarkable group, drawn from several organizations, came together quickly and with great professionalism. The team includes:

- Julie Brandis, College of Engineering, Executive Director of Strategic Partnerships, Oregon State University, Oregon State University
- Scott Bruun, Director of Tax, Fiscal, and Manufacturing Policy, Oregon Business and Industry
- Chris Cummings, Assistant Director, Economic Development Division, Business Oregon
- Andrew Desmond, Lead Staff for the Semiconductor Task Force, Policy Analyst, Oregon Business Council
- Dan Dias, Economic and Community Development Director, City of Hillsboro
- Bart Eberwein, retired Executive, Hoffman Construction
- Chris Edmonds, Principal, Coastline PR
- Erica Fitzgerald, Senior Economic Development Specialist, City of Gresham
- Leah Horner, Deputy Chief of Staff and Infrastructure Director, Office of the Governor, State of Oregon
- Tim Leahy, Outreach Director, Office of Senator Ron Wyden
- Keith Leavitt, Chief Trade and Equitable Development Officer, Port of Portland
- Jason Minor, Natural Resources Policy Director, Office of the Governor, State of Oregon
- Jim Riley, Senior Economic Development Manager, City of Hillsboro
- Kyle Ritchey-Noll, Director of Education and Workforce Policy, Oregon Business Council
- Colin Sears, Regional Development Officer, Business Oregon
- Doug Smith, International Business Development Manager, Port of Portland
- John Tapogna, Consultant, Oregon Business Council
- Kristi Wilson, Workforce Development Manager, City of Hillsboro

The Task Force and its subcommittees benefited greatly from numerous conversations with Semiconductor executives throughout this process. In particular, we wish to thank the following individuals who provided their insights before the full taskforce:

- Renée J. James, Founder/Chairman & CEO, Ampere Computing
- Ann Kelleher, Executive Vice President, General Manager of Technology Development, Intel
- Dan Malinaric, State Operations Director, Microchip
- Dave Robertson, Vice President of Engineering & Senior Tech Fellow, Analog Devices Inc
- Richard Sheehy, retired Director of Site Selection, CH2M Hill/Jacobsen
- Sesha Varadajan, Senior Vice President, LAM Research

Appendix 1

ECONorthwest
ECONOMICS • FINANCE • PLANNING

DATE: 6 June 2022
TO: Duncan Wyse & Andrew Desmond, Oregon Business Council
FROM: Joel Ainsworth, ECONorthwest
SUBJECT: Calculating the economic and fiscal contribution of new semiconductor investments in Oregon

Overview

The Oregon Business Council (OBC) requested a high-level analysis of how an expansion of the state's semiconductor industry could affect economic and fiscal conditions in Oregon. The state is well-positioned to pursue opportunities for public and private investment opportunities given the state's long history of semiconductor manufacturing and depth of the state's skilled workforce ready to expand the state's capacity for production.

As part of OBC's strategy for pursuing opportunities within the incentive program, they asked ECONorthwest to calculate high-level estimate of adding additional investment in Oregon's semiconductor industry. Because specifics of the growth opportunity are unknown, ECONorthwest evaluated economic and fiscal impacts associated with scalable construction and operational assumptions (i.e., per $1 billion of construction and per 1,000 employees during operations). Additionally, ECONorthwest applied information from its prior research into the semiconductor sector in Oregon to refine the estimates of local and non-local spending used in the input-output model.

Calculating the economic effect of new investments

For this analysis, we consider the economic and fiscal effects of a $1 billion capital investment—assumed to take place in a calendar year. Previous work by ECONorthwest has shown that only a small proportion of that capital purchases stay within the state due to the need for specialized services, equipment, and materials which are not produced within Oregon. While that proportion can certainly vary due to the design specifications and other supply constraints that may affect how the facilities are constructed. For the purposes of this analysis, we assume that 59 percent of construction spending would occur within Oregon.

The assumptions about ongoing operations are simpler. We assume that a new facility would support an additional 2,000 jobs, all of which would work and reside within the Portland Metropolitan area. We assume that labor compensation is like the overall industry average for semiconductor manufacturing in Oregon.

We then apply multipliers from IMPLAN and scale the secondary effects based on the existing economic relationships in the Portland Metro economy during 2019. Although we acknowledge that there is uncertainty about whether these new facilities would have similar supply chain linkages compared to existing plants, we believe that using existing information about local industry linkages is more appropriate than disaggregating from national estimates.

Summary Results

Based on the assumptions describe above, along with the derived multipliers for the Portland Metropolitan area, we calculate that a $1 billion investment in capital investment for the semiconductor industry in Oregon would support almost 7,000 job years and $647.7 million in gross state product over the lifecycle of the project. Additionally, the construction project could support an additional $44.1 million in state and local taxes over the lifecycle of the project.

Figure 1. Economic contribution of $1 billion in additional investment in the semiconductor industry

	Direct	Indirect	Induced	Total
Job Years	4,294	840	1,856	6,990
Labor Income ($M)	$350.7	$65.1	$105.0	$520.9
Gross State Product ($M)	$346.4	$102.9	$188.3	$637.7
Output ($M)	$1,000.0	$190.6	$311.2	$1,501.7

Note: Dollar values are expressed in millions of current US$
Source: ECONorthwest calculations using IMPLAN

After the completion of the facility construction, we assume that 2,000 permanent jobs would be added to the Semiconductor Manufacturing sector, which pays well above the median income for the Portland Metropolitan area. That additional income for workers, along with increased business purchases could increase the overall productive capacity of the Metro area. Based on known relationships about labor and supply chain spending within the sector, we calculate that an additional 2,000 jobs could support over 4,000 jobs in other sectors of the economy and an additional $830 million in Gross State Product. Based on the additional employment and business activity, sector could support another $56.9 million in state and local tax revenues per year.

Figure 2. Economic contribution of operations in the semiconductor industry

	Direct	Indirect	Induced	Total
Job Years	2,000	2,063	2,107	6,170
Labor Income ($M)	$279.4	$184.9	$119.3	$583.7
Gross State Product ($M)	$355.0	$258.2	$214.3	$827.6
Output ($M)	$999.0	$442.4	$354.0	$1,795.4

Note: Dollar values are expressed in millions of current US$
Source: ECONorthwest calculations using IMPLAN

A quick note about "job-years"

Because jobs are often used as an important talking point when discussing the economic development potential of a new investment, it's worth taking a moment to describe how to interpret the way jobs are calculated in IMPLAN. The jobs calculated in IMPLAN are in terms of full-year-equivalents (FYE), which are known as "job-years". One FYE equals work over twelve months in a studied industry (this is the same definition used by the federal Bureau of Labor Statistics).

A FYE job can be full-time or part-time, seasonal, or permanent and two jobs that each last six months would together count as one FYE job. Because the results are calculated for the lifecycle of the project, the results represent the total FYE for the construction period. For example, if someone had a part-time, temporary job for 2 years as part of the fabrication plant construction, they would be counted as 2 job-years by IMPLAN. To estimate the change in job positions, job-years should be divided by the number of construction years to obtain the average annual job-years.

This average annual job-year figure should not be interpreted as the total employment gains and losses but can be used to estimate the changes in long-term positions during the study period.

Appendix 2

Competitive Analysis – State Incentive Offers

ELLEN HARPEL

OREGON SEMICONDUCTOR TASKFORCE,
TAXES AND INCENTIVES SUBCOMMITTEE

JUNE 2022

Strategic approach to incentives

Business Oregon's *Strategic Assessment of Incentives* examined how a set of legacy incentive programs align with current economic development priorities.

- Adapt the incentives toolkit to a changing competitive and economic environment
- Communicate how Oregon's incentives support the state's strategic priorities

We use incentives to achieve our state's economic development objectives.

Incentives are not about winning a deal or completing a transaction. Smart incentive use is always connected to a larger economic development strategy.

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National context for semiconductor incentive conversations

Incentives that lower the total cost of ownership
- Reduce up front capital expenditures on land, construction, infrastructure, and equipment
- "Temper" operating expenses, including labor and utilities

Build on strengths in talent and existing ecosystems

Taxation matters but is not the driver
- "The US can be competitive on taxation in some cases because of an effective tax rate that is significantly lower than the nominal corporate tax rate, as well as substantial reductions in state and local taxes in some locations.
- However, these state and local government incentives fall significantly short of **grants and direct cash** incentives provided by other national governments."

Source: Government Incentives and US Competitiveness in Semiconductor Manufacturing, BCG and SIA, 2020.

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Grants and refundable tax credits

Grants
- AZ Competes Fund - TSMC grant not made public; largest prior grant was $5m
- California Competes - Applied Materials: $30m grant
- New York - Wolfspeed: $500m in performance-based, capital grants for a portion of the cost of construction (part of prior commitment to develop the site for previous failed effort)
- JobsOhio
  - Up to $150m for economic and workforce development grants; largest prior workforce grant was $5m
  - $600m onshoring incentive grant
- Texas Enterprise Fund and Local 4(a) grants
  - Samsung: eligible for $27m from Texas Enterprise Fund + local 4(a) grant
  - Texas Instruments Richardson - $5m TEF award; none for new Sherman facility
  - Largest TEF grant in recent years was $25m

Refundable tax credits
- AZ Quality Jobs and Qualified Facilities tax credits
  - Intel AZ: Up to $90m in refundable Qualified Facility tax credits (through 2030)
- NY Excelsior Jobs Tax Credits
  - Wolfspeed NY: $1m. $400m offered to Samsung; program allows benefits up to 10 years
- OH Job Creation Tax Credits
  - Intel: $650m refundable job creation tax credits over 30 years based on withholding once jobs are created
  - Tax credits available to suppliers

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Land and infrastructure

Land
- TSMC AZ bought land at a state auction
- Wolfspeed NY is subleasing SUNY-owned land from Mohawk Valley EDGE
  - State is advertising 4 shovel ready sites with infrastructure, workforce, R&D assets too
- Intel OH
  - New Albany Co. (MBJ Holdings) purchased parcels
  - Site annexed and rezoned and designated Community Reinvestment Area
- Applied Materials TX (pending)
  - Hutto "megasite" includes 400 acres owned by the Hutto EDC, with options on 1000 additional acres

Infrastructure
- TSMC AZ: $205m in Phoenix city funds for roads and water improvements
- Intel AZ: special agreement for power purchase for Ocotillo campus
- Intel OH: $691m for investments in water, sewer, roadwork, water reclamation
- Applied Materials TX: $80m city incentives over 10 years for infrastructure reimbursements (proposed)
- TI TX: Sherman had previously spent $30m to expand water treatment facility
- Samsung TX: state committed $67m state for road construction; water deal facilitated by local leaders

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Property tax abatements and other cost reductions

Personal property (equipment) is not taxed in OH or NY

Manufacturing machinery and equipment sales and use tax exemptions in AZ, CA, NY, OH and TX

Wolfspeed NY: $280m (est.) in local incentives
- Sales tax exemptions for construction materials and equipment
- Payment in lieu of taxes (PILOT) to local taxing jurisdictions, with $50m going back to the company

Samsung NY: (offer)
- $289.7m local sales tax exemption
- $696m savings via PILOT to abate real property taxes

Intel OH:
- 100% property tax abatements on buildings for 30 years (city)
- Exemptions for certain equipment sales from the commercial activity tax (CAT)
- Sales tax exemption on construction materials, R&D equipment, and other certain manufacturing items

TI TX:
- 90% tax abatement for 10 years (city), estimated value $148m for first fab
- 90% abatement for 30 years (county)
- $182m in tax savings over 10 years (est.)(Ch 313, school district)

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Workforce and talent

Technician Training

- Maricopa Community College (AZ) as a model
  - Workforce Pipeline 450 and Quick Start Program
  - Strategic partnership with Intel; state and foundation funding
  - Arizona Advanced Manufacturing Institute; AZ Office of Economic Opportunity, other community colleges, other semiconductor company partners
- CA Employment Training Panel program – training reimbursements
- NY has proposed $350m for workforce development for semiconductor and advanced manufacturing
- Columbus, OH region will model its workforce efforts on Maricopa

Higher Education Partnerships

- Arizona State University Core Facilities
- Albany NanoTech Complex
- Ohio State Semiconductor Education and Research Program

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State incentive package examples

New York $1.89b offer to Samsung (not successful)

- $400m Excelsior refundable tax credits
- $25m infrastructure investment
- $360m estimated savings for special NYPA utilities contract
- $115.5m estimated savings for discounted land to be acquired from Genesee County
- $289.7m local sales tax exemption
- $695.8m real property tax abatement (personal property is not taxed)
- No corporate income tax for manufacturers

Ohio $2b offer to Intel

- $600m cash grant ($300m for each fab)
- $691 infrastructure investment
- $650m job creation tax credits
- $150m Economic development and workforce training grants
- 100% local property tax abatement on buildings for 30 years (tangible personal property is not taxed)
  - Site annexed and rezoned and designated Community Reinvestment Area
  - State law changed to allow 30 year abatement
- CAT and sales and use tax exemptions
- Workforce initiatives with Ohio State and community and technical colleges
- Research initiative with Ohio State

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National incentives: CHIPS and FABS

Federal incentives in the CHIPS Act
- To incentivize investment in facilities and equipment in US
- Funding still to be determined (est. $39b, FY22-26)
- Companies will apply for the incentives
  - State and local incentives will be part of application
  - Commitments to worker training and community investment
  - Will be clawback terms

Substantial research (est. $10b) and National Semiconductor Technology Consortium (est. $2b) money

FABS Act
- Semiconductor manufacturing investment tax credit
- 25% tax credit for qualified investment in manufacturing equipment and construction of manufacturing facilities

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For consideration

Bringing together and scaling up state and local programs to create a compelling, unified incentive package

Leveraging funds and programs in CHIPS and FABS Acts

Pursuing R&D and investment/jobs tax credits

Investing in Oregon as well as the company

Considering incentives built around people/talent

Communicating what Oregon wants to incentivize and why

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[i] https://www.semiconductors.org/semiconductors-101/industry-impact/
[ii] https://fredblog.stlouisfed.org/2021/05/the-distribution-of-patents-across-u-s-states/
[iii] https://www.semiconductors.org/wp-content/uploads/2021/10/CHIPS-FABS-Hill-handout-oct-2021.pdf
[iv] https://www.semiconductors.org/wp-content/uploads/2021/05/SIA-Impact_May2021-FINAL-May-19-2021_2.pdf
[v] https://www.semiconductors.org/wp-content/uploads/2021/05/SIA-Impact_May2021-FINAL-May-19-2021_2.pdf
[vi] https://www.intel.com/content/www/us/en/newsroom/news/intel-highlights-2022-long-term-growth-strategy-investor-meeting.html#gs.522i97
[vii] https://www.oregonmetro.gov/sites/default/files/2020/11/10/employment-lands-site-readiness-toolkit-20201110.pdf

Findings of Fact and Conclusions of Law

Ordinance No. 24-1520 accepts the recommendation of Metro's Chief Operating Officer (COO) to expand the Urban Growth Boundary (UGB) to add approximately 1,291 acres of land in the Sherwood West planning area in order to provide an adequate supply of land for housing and employment growth in the Metro region over the next 20 years. These findings of fact and conclusions of law explain how the Metro Council decision complies with state and regional land use laws and policies.

Section A of these findings describes some of the history leading to this decision, and summarizes the approach applied by Metro in the preparation of the 2024 Urban Growth Report (UGR) and the Metro Council's decision to expand the UGB. Section B of these findings describes compliance with requirements in Statewide Planning Goal 2 and regional policies regarding coordination with other local governments in the region. Section C describes compliance with requirements in Statewide Planning Goal 1 and regional policies regarding citizen involvement. Section D describes compliance with state and regional requirements regarding urban growth boundary decisions, including Statewide Planning Goals 14 and 10 and ORS 197A.350. Section E describes compliance with all other Statewide Planning Goals.

A. History and Framework for Decision

This 2024 growth management decision applies the same approach that was first used by Metro in 2018, an approach that was over a decade in the making. The journey began in 2007 when the Oregon Legislature adopted Senate Bill 1011, authorizing Metro and the three counties to designate urban and rural reserves. The designation of urban reserves in 2011 established the maximum footprint for urban growth boundary expansions over the next 50 years and removed hundreds of thousands of acres of valuable farm and forest land from potential urbanization.

In 2010, the Metro Council adopted a policy of taking an outcomes-based approach to future growth management decisions. This policy is based in part on Metro's experience with prior UGB expansions into areas where there was no existing plan for governance, development, or financing of needed infrastructure; unfortunately, those areas have often failed to develop. The history of Metro UGB expansions over the last 20 years clearly demonstrates that land readiness is more important than land supply for addressing housing needs and job growth. In order to increase the likelihood that development will actually occur in new UGB expansion areas, Metro now requires advance planning for areas that cities want to annex and urbanize. In 2010, Metro adopted amendments to Title 11 of the Urban Growth Management Functional Plan requiring cities to adopt concept plans for urban reserve areas prior to those areas being added to the UGB.

In November 2015 the Metro Council adopted the 2014 UGR, concluding that there was sufficient capacity within the existing UGB to provide a 20-year supply of land for housing and employment growth. As part of that ordinance, the Council directed Metro planning staff to work with regional partners to explore possible improvements to the growth management process and to produce a new UGR within three years, rather than six.

Responding to that directive, in May 2016 Metro convened an Urban Growth Readiness Task Force comprised of 17 public and private sector representatives to develop recommendations for improving the growth management process. The Task Force met five times between May 2016 and February 2017 and ultimately presented a set of recommendations to the Metro Council for improvements, which were accepted by the Metro Council via Resolution No. 17-4764. Those recommendations included three core concepts: (1) create expectations for cities to propose modest residential UGB expansions into concept planned urban reserves; (2) seek greater flexibility for addressing regional housing needs; and (3) seek greater flexibility when choosing among concept planned urban reserves for UGB expansions.

The Task Force recommended that Metro adopt changes in its decision-making processes to implement the three core concepts by making future growth management decisions based on specific UGB expansion proposals submitted by cities. Metro staff worked with the Metro Technical Advisory Committee (MTAC) to prepare and refine proposed amendments to the Metro Code to implement the directives from the Task Force and the Metro Council. Those code amendments were approved by the Metro Policy Advisory Committee (MPAC) and adopted by the Metro Council via Ordinance No. 17-1408 on December 14, 2017.

This 2024 UGB decision is the second application of Metro's new approach to UGB expansions. Consistent with the directives of the Task Force and the Metro Council, in 2017 Metro staff created a process where interested cities may submit proposals for UGB expansions. In 2018, four cities submitted proposals; however, in 2024 only the City of Sherwood submitted a concept plan proposal to Metro by the May 31, 2024 deadline. Sherwood's proposal was reviewed by Metro staff and by the Metro Technical Advisory Committee (MTAC), the Metro Policy Advisory Committee (MPAC), the Metro Committee on Racial Equity (CORE), and the Urban Growth Roundtable, and city staff made a presentation to the Metro Council regarding the proposal at a work session on May 28, 2024.

Metro staff released the draft UGR on July 9, 2024, providing an analysis of the regional buildable land supply, a 20-year population and employment growth forecast, and an analysis of a number of potential scenarios testing different permutations of residential growth-related assumptions. The draft UGR concluded that the Metro Council has the latitude to determine whether there is a regional need to expand the UGB as proposed. There are two components to the UGR: a 61-page narrative and the 11 attached appendices. The actual technical analysis that comprises the UGR is included in the appendices, and the UGR narrative provides a descriptive summary of the information included in the appendices. The UGR and its appendices have been revised and finalized since release of the draft in July 2024.

Metro held a 45-day public comment period on the draft UGR from July 9, 2024 through August 22, 2024. After reviewing the draft UGR and the public comments, the Metro COO issued her recommendation on August 26, 2024, recommending that Sherwood West should be added to the UGB with conditions of approval designed to ensure an adequate supply and mix of housing, affordability, and protection of two 50-acre parcels for large-lot industrial use. The COO recommendation was endorsed by MPAC on September 25, 2025, with three additional recommendations from the committee to the Metro Council. After taking testimony regarding the city's proposals and the COO recommendation at a public hearing on September 26, 2024, the

Metro Council held a work session on October 8, 2024, at which time the Metro Council endorsed the COO recommendation regarding adding Sherwood West to the UGB and directed Metro staff to prepare an ordinance and proceed with finalizing the planning and analysis to support expanding the UGB in Sherwood West.

B. Coordination with Local Governments and State Agencies

This section addresses the coordination requirements of Statewide Planning Goal 2 and Regional Framework Plan (RFP) Policies 1.11.3, and 1.14. In preparing and adopting the UGR, Metro has coordinated extensively with the cities and counties in the region and relevant state agencies over the last two years. This includes significant coordination in the development of the technical elements of the UGR, discussed further in Section C below, and engagement at MPAC and MTAC as described in this section.

Metro and the City of Sherwood have also coordinated with the Sherwood School District. Cities are required under Title 11 of the Urban Growth Management Functional Plan to coordinate with school districts as they complete concept plans for urban reserves. Sherwood included school district representatives in its planning efforts. School districts also have representatives on both MTAC and MPAC, providing them with a means to stay informed and comment on the urban growth management decision. Lastly, lands owned by school districts, which are often zoned for residential use, are excluded from the buildable land inventory documented in UGR Appendix 2.

Since 2023, topics related to this growth management decision have been extensively reviewed and discussed by MPAC, which is an advisory committee to the Metro Council consisting of elected officials from cities, counties and special districts throughout the region, as well as citizens and representatives of TriMet and the Department of Land Conservation and Development (DLCD). At its meeting on September 25, 2024, MPAC voted to recommend that the Metro Council accept the COO recommendations and add the 1,291-acre Sherwood West area to the UGB. As described in more detail below, the UGR has been an agenda item before MTAC in at least 17 of its meetings since 2023, and before MPAC in at least 16 meetings since 2023. MTAC includes 35 representatives from local governments and service providers across the region as well as ODOT, housing and development stakeholders, environmental advocacy groups, land use advocacy organizations, and DLCD.

MTAC has discussed aspects of this growth management decision on the following occasions:

MTAC meeting date	Topic
2-15-23	Work program update regarding 2024 urban growth management decision
3-15-23	Development outcomes in urban centers in past UGB expansions
5-17-23	Middle housing potential and affordability
6-21-23	Housing filtering, gentrification and displacement trends
7-19-23	Public engagement plan
9-20-23	Update on BLI approach
11-15-23	BLI update; HNA approach

12-20-23	Sherwood West concept plan
1-17-24	Economic and demographic trends; work from home trends
2-21-24	Regional growth forecast
3-20-24	Preliminary capacity range estimates
4-17-24	Preliminary housing needs
5-15-24	Sherwood West concept plan
6-26-24	Employment land analysis
7-17-24	Review of draft Urban Growth Report
8-28-24	Metro COO recommendations
9-18-24	Metro COO recommendations; vote and recommendations to MPAC

Since 2023, MPAC has devoted many meetings to discussing residential and employment trends and the region's economic outlook, reviewing the City of Sherwood's UGB expansion proposal, reviewing the draft UGR, and generally preparing to make a growth management recommendation to the Metro Council. MPAC meetings related to the urban growth management decision include the following:

MPAC meeting date	**Topic**
2-22-23	Work program update regarding 2024 urban growth management decision
3-22-23	Development outcomes in urban centers in past UGB expansions
5-24-23	Oregon Housing Needs Analysis update
6-28-23	Middle housing potential and affordability
7-26-23	Public engagement plan; housing filtering; gentrification and displacement trends
11-8-23	UGB capacity estimation approach
12-13-23	UGB capacity update; Sherwood West concept plan
1-24-24	Economist and demographer forecasting panel
2-28-24	Draft regional forecast
3-27-24	Preliminary capacity range estimates
4-24-24	Preliminary housing needs
5-22-24	Sherwood West concept plan
6-26-24	Employment land analysis
7-24-24	Draft Urban Growth Report
9-11-24	Metro COO recommendations
9-25-24	Metro COO recommendations; vote and recommendations to Metro Council

At its meeting on September 25, 2024, MPAC voted to recommend that the Metro Council accept the COO recommendations and expand the UGB to include Sherwood West, but with an additional recommendation that the Metro Council adopt the high growth forecast rather than the baseline forecast.

C. Citizen Involvement

These findings address Statewide Planning Goal 1 and Regional Framework Plan (RFP) Policy 1.13. Metro began the process of preparing the UGR in 2023 and has worked closely with key stakeholders and residents of the region from the beginning.

The UGR is a reflection of the expert knowledge of many stakeholders from around the region. Throughout the development of the draft UGR, staff engaged outside expertise from the public and private sectors. This work also builds on previous technical engagement activities. From mid-2023 through mid-2024, staff sought review and collaboration on a number of topics:

- The Land Use Technical Advisory Group (LUTAG), a working group of approximately 20 public and private sector experts provided advice on the methods used for estimating the region's buildable land inventory (UGR Appendix 2), with a particular emphasis on how to estimate redevelopment potential. LUTAG also conducted a review of the preliminary buildable land inventory results.

- All cities and counties in the region were given the opportunity to review a preliminary buildable land inventory at the tax lot level, as well as jurisdiction-level estimates of growth capacity for housing and jobs. All comments received by Metro were incorporated into the inventory used in the UGR. In response to additional comments received after the release of the draft UGR, minor corrections have been made to the inventory.

- A peer review group of four economists and demographers advised on the assumptions built into the seven-county population and employment forecast (UGR Appendix 1), the forecast results, and sources of uncertainty in the forecast. The expert review panel summary is attached to the UGR as Appendix 1A.

- In September 2023, the Metro COO convened the Urban Growth Roundtable, which was comprised of private and public sector representatives with the goal of lending more transparency to Metro's regional growth management analyses and processes. The Roundtable met twelve times from September 2023 through July 2024, covering all aspects of the regional growth management process and the UGR. Metro staff incorporated feedback from the Roundtable into the UGR.

- In September 2023, Metro also convened a Youth Cohort to provide Metro staff with youth perspectives on urban planning and growth management in the context of the 2024 growth management decision. The Youth Cohort met eight times from September 2023 through July 2024; their comments and perspectives are summarized by topic and described in the corresponding sections of the UGR.

In addition to the above-described collaboration with public and private sector stakeholders, the public process involved in adopting the UGR has provided considerable opportunities for citizen involvement and engagement. In addition to the MTAC and MPAC meetings regarding the UGR detailed above, all of which were public meetings, the Metro Council has held nine public

meetings in 2024 alone on topics involving the UGR, including public hearings on September 26, 2024, October 3, 2024, and November 21, 2024. A 45-day public comment period on the draft UGR was held open from July 9, 2024 through August 22, 2024. Public comments were summarized in a report that was provided to MPAC and the Metro Council and posted on Metro's website.

D. Urban Growth Management Statutes and Rules

These findings address Statewide Planning Goals 10 and 14, ORS 197A.350 – 197A.362, and OAR chapter 660 divisions 7 and 24.

Metro's obligation to complete an inventory of buildable lands and analysis of housing need for purposes of ensuring a 20-year supply of land inside the UGB arises out of ORS 197A.350. That statute directs Metro to undertake the required inventory and analysis not later than six years after completion of the previous analysis. Metro's previous UGR and growth management decision were adopted six years ago in 2018.

1. Buildable Land Inventory

The first step in the process required under ORS 197A.350(3)(a) is to undertake an inventory of the supply of buildable residential land inside the UGB. The applicable Goal 14 rules provide that local governments "must inventory land inside the UGB to determine whether there is adequate development capacity to accommodate 20-year needs" for both residential and employment land. OAR 660-024-0050(1). This section of the findings focuses on Metro's analysis of the residential component of the inventory.

For purposes of the inventory required under ORS 197A.350(3)(a), buildable land is defined to include vacant and partially vacant land planned or zoned for residential use, land that may be used for mixed residential and employment uses under existing planning or zoning, and land that may be used for residential infill or redevelopment. ORS 197A.350(4)(a). The buildable land inventory informs the calculation of the capacity of the UGB to accommodate future growth.

The analysis is guided in part by ORS 197A.350(5)(a), which provides that the determination of housing capacity must be based on data collected since Metro's last UGR analysis, and that the data must include:

> (A) The number, density and average mix of housing types of urban residential development that have actually occurred;
>
> (B) Trends in density and average mix of housing types of urban residential development;
>
> (C) Market factors that may substantially impact future urban residential development; and
>
> (D) The number, density and average mix of housing types that have occurred on the buildable lands described in subsection (4)(a) of this section.

The information required by ORS 197A.350(5)(a) is provided in Appendix 5A of the UGR, which also describes the performance measures identified in ORS 197A.370 (formerly ORS 197.301).

Metro's methodology for calculating the region's buildable land inventory is described in Appendix 2 of the UGR and summarized on pages 30-33 of the UGR. The methodology began by analyzing detailed aerial photos of all land inside the UGB and applying current local plan and zoning designations. The methodology also applied the specific inventory requirements set forth in ORS 197A.350(4)(a)-(b). See Appendix 2, page 19. One of the more complicated aspects of creating an inventory of buildable land is determining how to accurately predict whether land that is already developed might be redeveloped in the next 20 years, as required under ORS 197A.350(4)(D). To assist in estimating the developable and redevelopable land in the region, Metro staff worked closely with an independent land use technical advisory group (LUTAG) consisting of representatives from cities, counties, the state, private sector development experts, and the Homebuilding Association of Metropolitan Portland. The group reviewed and updated the assumptions and methodologies that were applied in the 2018 buildable land inventory. Those methodologies are described in Appendix 2 of the UGR.

As noted above, predicting whether and when property that is already developed will be redeveloped for multifamily and mixed-use purposes is probably the most challenging aspect of the BLI analysis. For the 2024 UGR, Metro sought to improve upon the methods previously used in the 2018 UGR and to account for newer state law requirements allowing the development of middle housing in all single-family zones. Metro teamed with Johnson Economics to develop a pro forma model that estimates future development for individual properties over the next 20 years based on comparing existing and potential property values to identify properties that are financially feasible for development. Consistent with ORS 197A.350(5)(a), which requires that the housing capacity determination must be based on data collected since Metro's last UGR analysis, Metro reviewed past development data to estimate the likelihood that development would actually occur on the subset of financially feasible properties. This methodology was used to create a regional estimate of growth capacity.

The buildable land inventory results are shown on Table 9 of the UGR. After applying the methodologies described in Appendix 2 and taking input from cities and counties on a preliminary draft of the inventory, the analysis concludes that the existing UGB has an inventory of buildable land that can provide 175,500 housing units of various types including single unit detached, middle housing, and multi-unit housing.

2. Housing Need

The next step in the process required under ORS 197A.350(3)(b) is to analyze existing and projected housing need by type and density range to determine the number of units and amount of land needed inside the UGB for each needed housing type for the next 20 years. The core part of the need analysis has always been to forecast what types of housing will be needed over the next 20 years. However, since the adoption of House Bill 2003 in 2019, Metro's analysis must also include need projections based on additional factors identified in ORS 197A.348(2) for identifying more "current" household needs. The factors listed in ORS 197A.348(2) for Metro to

analyze are as follows:

(a) Projected needed housing units over the next 20 years;
(b) Current housing underproduction;
(c) Housing units needed for people experiencing homelessness; and
(d) Housing units projected to be converted into vacation homes or second homes during the next 20 years.

First, to identify future housing needs over the next 20 years, Metro prepares a regional population and employment forecast, which is provided in Appendix 1 of the UGR and summarized on pages 15-21 of the UGR narrative. As with the buildable land inventory, Metro convened a peer review group consisting of economists and demographers to help create the 2044 forecast. As described in Appendix 8 of the UGR and summarized on pages 33-38 of the UGR narrative, the regional forecast is an input for the regional housing needs analysis.

The UGR describes the 20-year housing need forecast for the region in terms of three possible residential demand scenarios: low growth, baseline growth, and high growth. The baseline growth forecast provides the best estimate of what future growth in the region will be and is the basis for the Metro Council's decision.

The baseline population forecast estimates that there will be about 315,000 additional people in the seven-county Metropolitan Statistical Area (MSA) by 2044. UGR narrative, page 18. That equates to about 203,500 new households. UGR narrative, page 35.

The next step involves estimating what percentage of the total number of forecasted household units in the seven-county MSA will locate within the Metro UGB by applying a capture rate. Metro applied a 70.7 percent capture rate, which generally represents a historical average of Metro's capture rate from 2010 to 2022. This identifies a need for 143,900 new household units. Applying a five percent vacancy rate to that number to account for an average number of vacancies at any given time equates to a need for 151,100 new dwelling units in the Metro UGB by 2044. UGR narrative, page 35. Adding the current housing need estimate based on the required factors in ORS 197A.348(2)(b)-(d) results in a total of 178,000 units of total housing need. UGR narrative, table 14.

Projected growth is then assigned to different housing types based on household life stage (*e.g.*, age, income, number of people per household). The three housing types considered in the UGR analysis are single family detached housing, middle housing alternatives, and multifamily units. This analysis is described in detail in Appendix 8 of the UGR at pages 17-18 and the three resulting future demand scenarios are depicted in Figure 14 of the UGR.

The UGR then pairs the three residential demand scenarios depicted in Figure 14 (low, baseline, and high) with an array of alternative residential supply scenarios. The two sets of scenarios are inherently related because, under basic economic principles, higher growth and demand for housing will cause the market to respond by increasing supply. These scenarios are described in more detail in Appendix 8 and are generally informed by whether the demand for housing and the resulting supply is slower/weaker or faster/stronger.

The combined analysis results in four alternative residential growth scenario outcomes that are described on page 39 of the 2024 UGR. The four scenarios generally correlate to low, baseline, and high growth forecasts but with a market supply for middle housing that is more difficult to predict. The scenarios therefore include a high growth forecast with a stronger urban market, a baseline growth forecast with an increased trend toward middle housing, a baseline growth forecast with a trend toward single-family housing, and a low growth forecast with weaker market conditions resulting in housing choices remaining static based on past preferences.

The Metro Council accepts the recommendation of the Metro COO and staff to plan for the baseline "new normal" scenario as described in the 2024 UGR, combined with an assumption that vacant land will trend more toward being developed with single unit detached homes rather than middle housing. This is generally described on page 39 of the UGR as Scenario 3 and a more data-driven description of the scenario is provided in Appendix 8 at page 19. Based on the detailed and extensive evidence and analysis provided by staff and described in the UGR, the Metro Council finds that Scenario 3 provides the most reasonable estimate of the amount and type of future growth that the region can expect over the next 20 years.

The analysis regarding "current" housing needs under the additional factors required to be considered under ORS 197A.348(2)(b)-(d) is summarized on pages 33-35 of the 2024 UGR. The methods used for estimating those needs are described in more detail in Appendix 8A. An analysis regarding other types of "needed housing" as described in the definition of that term under ORS 197A.348(1) is provided in Appendix 8 of the UGR at pages 15-16. As described there, specific housing types such as government assisted housing and manufactured dwellings are subsets of the three broader housing types that Metro is tasked with analyzing for purposes of determining whether there will be a sufficient supply of buildable land inside the existing UGB over the next 20 years: single family housing, middle housing, and multifamily housing. Government assisted housing could take the form of any of those three housing types. Similarly, manufactured homes are essentially a construction technique, most often for single unit detached or middle housing, not a specific housing type with its own particular land capacity needs that may be assessed for purposes of determining future regional land need. Agricultural workforce housing is allowed under ORS 197A.395 in any residential or commercial zone that allows housing; accordingly, Metro's assessment of housing capacity and needs addresses farmworker housing in the same way that it addresses housing needs for all types of workers. Similarly, under ORS 197A.430(2), single room occupancies must be allowed in all local single-family and multifamily residential zones, which means that Metro's analysis of capacity and need for the more general housing types includes needs for SROs, a specific tenure-based designation that is more relevant to city and county housing regulations for local housing needs than the regional 20-year land need determination that Metro is tasked with adopting.

As described in Appendix 8, the core analysis required of Metro is to determine whether there will be a need for more buildable land in the next 20 years. This is fundamentally a question of land capacity and what the demand for varying densities of future housing types will be, based largely on what types are allowed under local zoning codes. Metro's future need analysis is necessarily focused on the three basic structure types because those housing types are quantifiable under the local zoning codes of the 24 cities and three counties in the Metro region.

Other more specific types of housing described in the "needed housing" definition of ORS 197A.348(1) such as government assisted housing, affordable housing, manufactured homes, and farmworker housing, could be any of the types of housing analyzed by Metro depending on how the building is designed and built. Accordingly, they are folded into the broader categories for purposes of identifying a 20-year land need for housing. Assessing needs for the more specific types of housing identified in ORS 197A.348(1) becomes relevant when cities and counties are adopting their own local housing needs analyses and adopting local zoning codes that are responsive to specifically identified local needs as required under state law.

Table 15 of the UGR provides the results of combining the Scenario 3 projected need with the current need estimate, and then comparing the total need against the UGB capacity data provided in table 9. The outcome is a regional capacity deficit for single unit detached and middle housing that totals approximately 3,100 units.

The concept plan adopted by the Sherwood City Council for Sherwood West indicates that it can provide a total of 3,120 single family, middle housing, and multifamily units. This ordinance includes a condition of approval requiring the city to plan for either 3,120 housing units in the expansion area or an average density of 9.2 units per net acre in residentially zoned areas. The Metro Council finds that expanding the UGB to include the Sherwood West urban reserve area will provide sufficient buildable land acreage to meet existing and future housing needs over the next 20 years.

3. Employment Land Analysis

In addition to the statutory and rule requirements addressed above regarding provision of a sufficient amount of residential land for needed housing, Goal 14 also requires Metro to ensure there is adequate development capacity inside the UGB to accommodate needs for employment land over the next 20 years. However, unlike the statutory needed housing requirements, which require Metro to undertake a UGR analysis at least every six years and include highly proscriptive requirements regarding the applicable methodologies, there are not similarly detailed state requirements that apply to Metro's employment land need analysis and resulting conclusions.

Metro's analysis begins with a buildable land inventory, which "must include suitable vacant and developed land designated for industrial or other employment use." OAR 660-024-0050(1). That rule provides that the inventory should be conducted in accordance with the Goal 9 rule at OAR 660-009-0015, which requires a description of all employment land sites, including site characteristics and development constraints, within each zoning district.

The approach utilized by Metro to comply with the requirements of the Goal 9 rule was developed in consultation with DLCD and is set forth in Appendix 6 of the UGR. Relevant site characteristics and data points are described in Table 1, and those characteristics are reviewed and applied to particular areas and employment land types as shown on the maps and tables in the rest of Appendix 6.

The methodology utilized by Metro in making its capacity calculations for vacant and redevelopable employment land is described in Appendix 2 of the UGR along with the residential inventory. As with the residential inventory, the methodologies for developing the inventory of employment capacity were developed by a technical working group consisting of representatives from public and private sector organizations.

The results of the employment land inventory are summarized in Table 18 of the 2024 UGR. A more detailed description broken down by jurisdiction is provided in the table on page seven of Appendix 2. The adjusted capacity figures show an inventory of 514 acres of land available for commercial employment use and 5,331 acres for industrial use.

However, the aggregate acreage of all industrial sites in the Metro region does not tell the entire story of industrial site availability. As described in the UGR at pages 55 to 58, most of the region's industrial land supply consists of smaller parcels with an average lot size of 3.8 acres and a median lot size of 1.7 acres, and there is a shortage of larger industrial sites that are in demand for industrial expansion and recruitment.

As part of Metro's 2018 growth management decision, Metro partnered with the Mackenzie consulting firm, Greater Portland, NAIOP, the Portland Business Alliance, PGE, and the Port of Portland to produce the 2017 Regional Industrial Site Readiness Inventory, which specifically examined the supply of large industrial sites in the Metro region that were available to accommodate existing and future employers. The resulting report broke down available 25+ acre sites into three tiers based primarily on how long the site could be ready for development, with Tier 1 sites being potentially ready within 180 days and Tier 3 sites requiring 30 months or longer. The 2017 report found a shortage of Tier 1 sites larger than 50 acres and noted that "if this regional issue is not addressed, the Portland region will experience lost opportunities for new game-changer business locations and expansions."

The 2017 regional inventory of large industrial sites was updated for the Semiconductor Task Force in 2022. As described in the UGR narrative, since the 2017 Regional Inventory of large industrial sites, 15 large sites have developed and six of those are over 50 acres, leaving only eight remaining available sites over 50 acres inside the UGB. A map of those sites is provided in Figure 24 of the UGR narrative. Two of the sites are owned by the Port of Portland and carry zoning restrictions for marine or airport use, leaving only six sites over 50 acres inside the UGB that are available to the general industrial market.

In 2022, Oregon's two U.S. Senators, Governor Brown, Representative Suzanne Bonamici, and the CEO of Portland General Electric created the Semiconductor Task Force in order to develop a strategy for Oregon to secure potentially billions of dollars in capital investments by the federal government and the semiconductor industry to fill a worldwide chip shortage. The Task Force produced a detailed report concluding, in part, that Oregon is on the cusp of a semiconductor industry boom similar to the 1990s – a boom that was facilitated in part by 2,000+ plus acres of available industrial land in the western part of the Metro region. The Task Force concluded that Oregon, and particularly the Metro region, faces a serious shortage of available, development-ready large industrial sites to accommodate valuable economic growth that will be spurred by the $52 billion in incentives being made available by the federal CHIPS Act.

The Semiconductor Task Force report is attached to the UGR as Appendix 11, which is adopted and incorporated as part of this ordinance. That report notes that the Metro region is the key to continued growth and development of the semiconductor sector, and states the importance of clustering to that industry, concluding that semiconductor businesses are highly likely to continue the type of clustering that has historically occurred on the west side of the Metro region. The report identifies a short-term need for four sites of 50-100 acres that would be suitable for integrated device manufacturers or major semiconductor equipment manufacturers. The Metro Council concurs with and adopts these conclusions.

As described in the 2024 UGR, there are currently only six available sites within the UGB that are 50 acres or larger with slopes under seven percent that could be available for industrial uses of the type identified by the Semiconductor Task Force. As depicted on the map at Figure 24 of the UGR, four of those sites are not sufficiently proximate to existing high-tech clusters in the west side of the region to accommodate the need for large sites for high-tech manufacturing uses. Although there are two large 50+ acre sites in the vicinity of Forest Grove and Hillsboro, those two sites are insufficient to address the need for four sites of 50-100 acres identified by the Task Force.

The City of Sherwood's concept plan for Sherwood West proposes to provide 130 net acres of land on the north end of the expansion area that will be designated for employment uses and would be available to accommodate the type of high-tech industrial and flex building uses identified by the Task Force. That 130-acre area includes two potential sites that are larger than 50 acres, nearly flat, and proximate to high-tech clusters on the west side.

To better understand the availability of industrial sites in the Metro region in the context of Sherwood's proposal, Metro contracted with ECONorthwest to conduct a survey of regional and local data trends regarding employment needs and site availability, and to consider whether the proposed Sherwood West expansion area has site characteristics that could accommodate identified industrial land needs. The ECONorthwest report is included in the UGR as Appendix 9. That report concludes, in part, that there is a very short supply of large industrial sites in the Metro region, and that industrial space is in high demand. The report notes that over the past five years, industrial vacancy rates in the Metro region have been at 4.1 percent, and the vacancy rate for Washington County in 2023 was a mere 2.5 percent. These extremely low vacancy rates create a barrier to the region's ability to attract new companies and to expand existing companies.

The region's lack of large industrial sites for new companies is also described in correspondence to Metro from Greater Portland Inc. (GPI) dated November 8, 2024. In that letter GPI provides a table showing business recruitment data for the Metro region, specifically inquiries from and outcomes for businesses looking for sites larger than 40 acres since the third quarter of 2021. That letter explains that of the 12 potential projects that did not end up locating in the Metro region, five were lost as the direct result of the region's lack of available large lot sites. Those projects were seeking sites for clean technology, computer and electronics, and advanced manufacturing companies.

Regarding the proposed Sherwood West expansion area, the ECONorthwest report concludes that, based on its survey of regional industrial trends and site availability, the Sherwood West employment area provides specific site characteristics that would meet the regional need for large 50-acre parcels with slopes under seven percent, minimal need for site aggregation, and proximity to transportation facilities and existing semiconductor companies. This assessment indicates that Sherwood West has characteristics that are more suitable for needed high-tech industrial growth than other lands inside the existing UGB. Making the two 50-acre sites in Sherwood West available for high-tech manufacturing use would help address the existing shortage of such sites for regional economic development.

Further evidence in support of adding two 50+ acre sites in Sherwood West is provided in a memorandum from Metro staff to the Metro Council dated November 26, 2024. That memo provides more detailed information about the eight existing 50+ acre industrial sites currently inside the UGB and about the specific characteristics that make the Sherwood sites more suitable to meet the need for large-lot high-tech industrial use. Specifically, the memo indicates that, compared to other sites inside the UGB, the two Sherwood West sites are comparatively closer to the existing cluster of semiconductor industries on the west side of the Metro region, using the Intel Ronler Acres site as the point from which distances are measured. Although there is one other 50+ acre site at Coffee Creek that is only slightly further away, the Sherwood West sites are more suitable because they are comparatively flat and include larger parcels that include tax lots in common ownership, making site aggregation comparatively easier. As noted in the Metro staff memo, the Coffee Creek site consists of 20 separate tax lots under ten acres that are in 12 different ownerships. The Metro Council finds that, in addition to lacking the same proximity provided by the Sherwood West sites, the Coffee Creek site includes slopes of greater than seven percent and presents site aggregation challenges that make it less likely to be developable for large-lot industrial use within a reasonable timeframe.

The Metro Council also finds that testimony submitted via letter from the City of Sherwood dated November 27, 2024 provides compelling evidence in support of the suitability of the two Sherwood West sites for industrial use. That letter notes four particular advantages of the Sherwood West sites. First, regarding proximity to Hillsboro's semiconductor cluster, the city notes that Sherwood West "benefits from close access to major semiconductor companies, including Intel, Qorvo, Lattice Semiconductor, and Jireh Semiconductor. Notably, Sherwood West is only 4 miles from Lam Research, a leading global semiconductor supplier and the second-larges private employer in the Portland Metro area located on the Sherwood-Tualatin border."

Second, the city's letter describes specific supply chain advantages provided by the Sherwood West sites, notably reduced transportation times and costs for equipment and material deliveries, and efficient access to key suppliers. Third, the city describes benefits that would be provided by existing skilled workforce readiness in the City of Sherwood for future high-tech manufacturing jobs, relying in part on data provided in the city's 2023 Economic Opportunities Analysis and a U.S. Census Bureau survey indicating that approximately 15 percent of Sherwood residents are employed in advanced manufacturing, high-tech, or semiconductor-related sectors. Finally, the city notes that Sherwood West is directly accessible via multiple transportation routes that offer

freight and commuter access to existing high-tech hubs in Washington County, and that it benefits from close proximity to existing utilities.

Contrary to assertions made by opponents, the requirements of Metro Title 13 will not be a hindrance to assembling two 50-acre flat buildable parcels in the northern part of Sherwood West. The existing Title 13 inventory for the area is from 2005 and is outdated; because the area is currently outside of Metro, Title 13 does not create habitat protection requirements that are binding until it is added to the UGB and to Metro's jurisdictional boundary. When this area is added to the UGB, Title 13 requires the city and Metro to update the inventory to reflect any changes in conditions that have occurred since 2005, including the removal of a substantial number of trees that has occurred since that time. The city's new comprehensive plan and land use regulations for the area will need to comply with Title 13; however, under Metro Code, compliance can mean allowing some encroachment even into inventoried habitat.

Further, Ordinance No. 24-1520 includes a condition of approval requiring that the city will adopt local land use regulations, annexation procedures or other means to ensure that there will be two industrial sites of at least 50 acres or larger that will be protected from division.

Considering and weighing all the evidence in the record, the Metro Council finds there is a shortage of large-lot industrial sites in the region of the type described by the Semiconductor Task Force and the ECONorthwest report, and that adding Sherwood West will provide two new 50-acre sites to the regional employment inventory that will be able to absorb new or expanding high-tech manufacturing businesses that are looking for sites with proximity to existing high-tech clusters on the west side. Based on all of the evidence described above, the Council finds that the Sherwood West sites provide specific characteristics that make them more suitable for high-tech industrial use than other sites inside or outside the existing Metro UGB.

Regarding commercial employment land, applying the baseline growth forecast, the 2024 UGR identifies a capacity of 514 acres inside the existing UGB and a demand for approximately 800 acres, leaving a deficit of approximately 286 acres. The city's concept plan provides that 135 acres will be planned for a commercial zone in the southern portion of the Sherwood West area. As noted in Appendix 3 of the UGR, some commercial employment categories may be accommodated within industrial areas. The very minor remaining commercial land deficit of about 150 acres represents less than half of one percent of the existing inventory of 5,331 acres of industrial land inside the existing UGB. The Metro Council finds that the mathematically insignificant deficit of about 150 commercial acres may be accommodated within the region's existing inventory of 5,331 acres of industrial land over the next 20 years.

4. Locational Alternatives Analysis

Statewide Planning Goal 14 directs local governments, including Metro, to consider four locational factors as part of any decision to expand the UGB:

- Factor 1 – Efficient accommodation of identified land needs;
- Factor 2 – Orderly and economic provision of public facilities and services;
- Factor 3 – Comparative environmental, energy, economic and social consequences;

- Factor 4 – Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.

Metro's analysis of the four locational factors is governed by OAR 660-024-0060, which provides that when considering a UGB amendment, "Metro must determine which land to add by evaluating alternative urban growth boundary locations," consistent with the priority of lands specified in ORS 197A.355. The highest priority of land available under ORS 197A.355 is urban reserve. Because all expansion areas are designated urban reserve, OAR 660-024-0060(1)(b) directs Metro to apply the location factors of Goal 14 to the urban reserve areas to choose which land in that priority to include in the UGB.

Metro's application of the urban reserve factors to all 27 urban reserve areas in the Metro region is set forth in Appendix 7 to the UGR. As described in that analysis, Metro undertook a two-step process by first applying the Goal 14 factors and other locational requirements in OAR 660-024-0060 to all urban reserve areas (Appendix 7). Next, based on the outcome of the initial analysis, Metro applied the separate Metro Code location factors to a smaller set of 20 urban reserve areas that were determined to be potentially suitable under the Goal 14 factors. That analysis is in Appendix 7A.

Seven of the urban reserve areas were determined to be the least suitable for urbanization based on the Goal 14 analysis: Boring, Boring-Highway 26, Damascus, Stafford, Rosemont, Norwood and Tonquin. The summary rankings for all 27 areas under each factor are shown in the table at the end of Appendix 7 (Attachment 3). These seven areas all share significant infrastructure hurdles that would need to be addressed prior to services such as sanitary sewer and water being available. For instance, the closest sanitary sewer services to the Damascus or the Boring urban reserves is well over a mile away and sanitary sewer service for Stafford and Rosemont needs to flow through the Borland urban reserve area, requiring the Borland urban reserve area to be urbanized first.

A second group of urban reserves were determined to rate low for one or more types of public facilities and services. While the obstacles may not be as significant as in the areas noted above, these areas do face infrastructure difficulties related to large swaths of adjacent undeveloped land inside the UGB, undetermined service providers, current need for improvements to meet existing demand, and high costs for future needed improvements. In addition, most of these areas rated high for environmental consequences due in part to the number and location of potential stream crossings. This includes Beaver Creek Bluffs, Borland, David Hill, Ellingsen Road North, Elligsen Road South, Gresham East, Henrici, Holcomb, I-5 East, Maplelane, Rosa, and Sherwood South.

The remaining urban reserve areas rated reasonably well for public facilities and services as well as the other Goal 14 factors. This group includes Bendemeer, Bethany West, Brookwood Parkway, Grahams Ferry, Holly Lane, Sherwood North, Sherwood West, and Wilsonville Southwest. These areas rated at medium or high for the four different locational factors.

However, of the eight areas that did not have at least one low rating, five of them are too small or otherwise would not provide sufficient buildable land to meet the identified need for both

housing and employment (Brookwood Parkway, Grahams Ferry, Holly Lane, Sherwood North and Wilsonville Southwest). Another, Bethany West, is more than a mile away from the closest city, which is the preferred provider of urban services in Washington County per the Urbanization Forum agreement between Washington County and the cities within the county. This limits its ability to be urbanized in time to efficiently accommodate the identified land needs.

In undertaking this review of alternative urban reserve areas, the Metro Council is cognizant of the region's history of expanding the UGB into areas that have failed to develop, or have developed very slowly, due to a lack of governance and/or planning for development. Therefore, in its evaluation of the relative merits of the urban reserve areas under the factors in Goal 14 and the Metro Code, the Metro Council is exercising its discretion to place greater weight on the two factors that are impacted by the existence of adjacent cities with locally adopted concept plans for the relevant urban reserve area. Those two factors are: (1) efficient accommodation of identified land needs, and (2) orderly and economic provision of public facilities and services. A city's adoption of a concept plan that meets the requirements of UGMFP Title 11 demonstrates that the city has a plan for future development and is willing and able to efficiently accommodate the identified land need and provide public facilities and services within a time frame that will be considerably faster than other areas that do not have a concept plan.

The 2024 UGR concludes that the region needs more housing production to keep up with population growth and employment land for high-tech industrial uses. In order to better meet these identified needs, the Metro Council is choosing to prioritize the consideration of an urban reserve area with an adopted concept plan, because that area is more likely to produce development sooner and thereby more efficiently accommodate the identified need than other reserve areas that are not already planned. The concept plan also describes the city's plan for future development and paying for infrastructure, thereby making it more likely that Sherwood West can provide public facilities and services in an orderly and economic manner.

In 2018, Metro utilized this same approach in its Goal 14 locational analysis that supported a UGB expansion into four different urban reserve areas. Metro's 2018 analysis was reviewed and approved by DLCD and by LCDC, and described by the Oregon Court of Appeals as follows:

> "In the staff report, DLCD further explained, with regard to a recent expansion of the metropolitan area UGB, Metro gave 'decisive weight' to whether a concept plan had been adopted by various cities in determining whether to add land near those cities to the UGB, and that that methodology was approved by LCDC:
>
> > "In January 2020, [LCDC] approved a 2,100 acre Metro UGB expansion which utilized Metro's methodology. The commission found that the methodology, as applied by Metro, was consistent with Goal 14, relevant state statutes, and Metro's own code and Regional Framework Plan. Metro received four applications from cities within its boundaries (Beaverton, Hillsboro, King City, and Wilsonville) for a UGB expansion for which that city would take responsibility. All four cities submitted concept plans providing details on the proposed urban communities that would result.

> Metro also completed a technically sufficient analysis under Goal 14 of all of its urban reserve areas, * * * but gave decisive weight to the adoption of the concept plans by these four cities as demonstrating that lands within these concept plan areas were best suited for UGB expansion."

Marks v. Land Conservation & Dev. Comm'n, 327 Ore. App. 708, 716 (2023).

The methodology that was previously used by Metro in 2018 and approved by LCDC is the same methodology used in this decision. In its considering and weighing of the locational factors under Goal 14 and the Metro Code, the Metro Council is giving greater weight to Sherwood West under the first two factors, because Sherwood West is the only urban reserve area that has been concept planned.

The expansion area being approved in this ordinance is the Sherwood West urban reserve area. As described in Appendix 7 and 7A, Sherwood West ranked comparatively high under the Goal 14 factors and the Metro Code factors and has the benefit of completed concept planning by a city that is eager to annex, urbanize, and govern the areas. The Sherwood West concept plan describes the city's ability to provide and pay for urban services, expected housing types and number of units, natural resource protection needs and governance issues. Identifying and planning for these issues in advance dramatically increases the likelihood that these urban reserve areas will be able to efficiently accommodate the identified residential land need within a reasonable timeframe and will provide public facilities and services in an orderly and economic manner. Therefore, the Metro Council finds that the Sherwood West urban reserve area will better accommodate the identified land need and more readily provide urban services under the first two locational factors in both Goal 14 and the Metro Code.

Application of the non-redundant locational factors in the Metro Code to the remaining 20 urban reserve areas is provided in Appendix 7A of the UGR. As noted in Attachment 3 to Appendix 7A, all urban reserve areas received a high ranking for factor 2 regarding protection of farmland for commercial agriculture, since all areas are urban reserves that by definition are appropriate for urbanization. All of the urban reserve areas except Sherwood West received a low ranking under factor 4 regarding contribution to the purposes of centers and corridors, primarily due to the distance between the urban reserve areas and the closest designated center, lack of direct connections and transit service, and the character of the land uses in between; also, most of the other urban reserve areas are comparatively small, which means those areas would have fewer residents and therefore make smaller contributions to center and/or corridor development.

Turning to the remaining two Metro Code factors, four urban reserve areas (Brookwood Parkway, Grahams Ferry, Holly Lane, and Wilsonville Southwest) received high rankings for avoidance of regionally significant fish and wildlife habitat and high or medium rankings for transition between urban and rural lands. However, all of those areas have features that make them unable and/or less efficient for accommodating the identified land needs. Brookwood Parkway is very small at 62 gross acres and is heavily parcelized with rural residential development – it contains 24 separate tax lots and all but three are developed, leaving only 24 net vacant buildable acres. As explained in the Goal 14 analysis, "the small size of the reserve's tax lots and their existing residential development make it less likely to be able to accommodate new

employment land uses. Rather, the reserve is considered able to accommodate a small residential land need." The locational characteristics of Brookwood Parkway significantly limit its ability to provide land to accommodate the land needs identified by the Metro Council.

Similarly, the Wilsonville Southwest urban reserve area is very small at 67 gross acres and does not provide enough land to accommodate the identified needs for residential and employment land. Although the area is largely undeveloped and primarily in agricultural use, it contains only 20 net vacant buildable acres.

The Grahams Ferry urban reserve area is larger than Brookwood Parkway and Wilsonville Southwest at 203 gross acres; however, this area still does not provide enough land to accommodate the identified need, and the Goal 14 analysis concludes that the area is not suitable to accommodate an employment land need, due in part to the lack of potential roadway connections. The area is heavily parcelized and developed, with more than 70 percent of its 24 tax lots being smaller than five acres; it currently contains only 68 net vacant buildable acres. Twenty of the 24 tax lots are developed, with the median assessed value of those improvements being more than $306,000, and one 2.7-acre lot has improvements assessed at more than $1.4 million. These factors significantly limit the likelihood of future urbanization and contribute to the inability of the Grahams Ferry area to accommodate the identified needs for residential and employment land within a reasonable timeframe.

The Holly Lane – Newell Creek Canyon urban reserve area contains 695 gross acres. It is irregularly shaped and is nearly an island that is surrounded by the UGB except for a 1,100-foot rural edge. The area has a state highway (Hwy 213) running through the middle of it. A significant amount of the acreage, 203 acres, is owned by Metro and is part of the Newell Creek Canyon Nature Park. Almost all of this reserve areas has slopes greater than 10 percent. The main amount of buildable land is along one north-south road, South Holly Lane, which contains numerous rural residences and has limited potential connections to land inside the UGB to the east due to steep slopes and significant natural resources. Due to the steep slopes and other site constraints, the Goal 14 analysis concludes that this urban reserve area could only accommodate a small residential land need and could not accommodate employment needs. The Metro Council finds that, although this area has high scores regarding three of the Metro Code factors, those advantages are outweighed by factors 1, 2, and 3 under Goal 14 – the topography, parcelization, protected areas, environmental consequences, and difficulty of providing urban services to the area make it less able to efficiently accommodate the identified land needs or to provide public facilities and services in an orderly and economic manner.

On balance, considering and weighing the locational factors under both Goal 14 and the Metro Code, the Metro Council finds that the Sherwood West urban reserve area received among the highest rankings when all the factors are considered together. As described above, the Council is exercising its discretion to provide greater weight to the first and second factors under both Goal 14 and the Metro Code regarding efficient accommodation of identified land needs and orderly and efficient provision of public facilities and services. The fact that the City of Sherwood has adopted a concept plan for Sherwood West describing how the area will be planned and developed indicates that the land in Sherwood West can accommodate the need for housing and employment within a significantly shorter time frame than any other reserve areas. Under this

analysis and based on the evidence and findings provided in Appendix 7 and Appendix 7A regarding application of the factors to all 27 urban reserve areas, the Metro Council finds that Sherwood West provides the best location for this UGB expansion.

One opponent, the West of Sherwood Farm Alliance, asserts that Metro's analysis incorrectly applies factor seven under the Metro Code, which requires a comparative evaluation of urban reserve areas based on "protection of farmland that is most important for the continuation of commercial agriculture in the region." Metro Code § 3.07.1425(c)(7). Metro's analysis in Appendix 7A considered and applied this factor to all 20 relevant urban reserve areas, and reached a conclusion that all urban reserve areas score highly regarding this factor, because the decision made by Metro and the three counties in 2011 to designate these areas as urban reserve necessarily made them the most appropriate for urbanization under state law. In other words, all urban reserve areas are equally less important for protecting commercial agriculture than Goal 3 farmland that is not an urban reserve. Since all urban reserve areas are designated as potentially the next areas that will be added to a UGB and urbanized, there is no basis to rank some higher than others in terms of protecting farmland. Potential urbanization of each urban reserve area and its compatibility with nearby agricultural activities occurring on Goal 3 protected farmland outside the UGB was evaluated in Appendix 7 under Goal 14 factor 4, and those rankings are in Attachment 3 to Appendix 7.

The Metro Council is afforded deference in the interpretation of its own code provisions. The Council finds that the analysis of Metro Code section 3.07.1425(c)(7) provided in Appendix 7A and described above is consistent with the purpose and intent of that section. Further, the Metro Council finds that there is insufficient evidence in the record to support a conclusion that urbanization of Sherwood West would have significantly greater impacts on commercial agriculture than in other urban reserve areas. Finally, even if there are potential impacts on current commercial agriculture activities in Sherwood West, that factor under the Metro Code is outweighed by the fact that there is an adopted concept plan for Sherwood West, which provides greater weight in favor of that location under the first two factors of Goal 14 and Metro Code 3.07.1425(c). For these reasons, the Metro Council finds that even if impacts to agricultural activities exist and are considered, such impacts are outweighed by the ability of Sherwood West to efficiently accommodate the identified land need and provide orderly and economic public facilities and services; accordingly, Sherwood West still provides the best location for this UGB expansion when all of the factors are considered, weighed, and balanced.

5. Additional Factors for UGB Expansion Proposals

In 2017 the Metro Council adopted amendments to Metro Code section 3.07.1425 identifying certain other factors to be considered in determining which urban reserve areas being proposed by cities for a UGB expansion will better meet an identified need for housing. Those factors are considered and applied in this section. The Metro Council finds that because the purpose of this code section is to choose between urban reserve areas being proposed for addition to the UGB by cities, only the area being proposed for an expansion should be considered. The Council also notes that in adopting these factors, the expressly stated intent was not to create criteria that must be satisfied, but factors to be considered and weighed, in the manner of the Goal 14 locational factors.

The first factor is whether the urban reserve area is adjacent to a city with an acknowledged housing needs analysis that is coordinated with the Metro regional growth forecast. Sherwood West has an adopted and acknowledged housing needs analyses that has been coordinated with Metro.

The second factor is whether the area has been concept planned consistent with Title 11 of the UGMFP. The City of Sherwood has an adopted concept plan for Sherwood West that the city submitted to Metro as part of its proposal to expand the UGB in that area, and the Metro Council finds that the city's concept plan is consistent with the requirements of Title 11.

The third factor is whether the city that prepared the concept plan has demonstrated progress toward the actions described in Metro Code section 3.07.620 in its existing urban areas. That section of Title 6 provides that in order to be eligible for a regional investment in a Center, Corridor, Station Community, or Main Street, a city must adopt a map showing boundaries for those areas and adopt a plan of actions and investments. The Metro Council finds that the City of Sherwood has demonstrated progress toward the Title 6 requirements. The city adopted its Town Center Plan on September 17, 2013. Metro's 2017 State of the Centers Atlas indicates that the Sherwood Town Center scores above average for park access, average for private amenities, bike route density, sidewalk density, and people per acre, and below average for transit access and block size compared to other Metro designed Centers. Since adoption of the Town Center Plan, the city has taken actions and made investments that demonstrate progress toward the objectives of Title 6, including:

- Allowing high-density multi-family development as a permitted use in all commercial zones
- Providing a complete waiver of parking requirements for Old Town and most development within the Town Center in conformance with Climate Friendly and Equitable Communities standards for parking reform near frequent transit
- Approval of all housing-related variances for multi-family housing within the Town Center since adoption
- City-funded sidewalk and bicycle improvements the entire length of Larger Farms Parkway
- City-funded construction/reconstruction of the sidewalks, pathways, and alleyways in Old Town to be multipurpose sidewalks
- Reconfiguration of streets in Old Town to encourage greater walkability and interconnectedness with the Town Center
- Installing wayfinding monuments to facilitate greater awareness of the unique characteristics of the Town Center as described in the Town Center Plan's policies
- Construction of a performing arts center, library, city hall, parking, and Cannery Square
- Funding and construction of the Cedar Creek/Tonquin Trail identified in the Sherwood Town Center Plan's Bike/Pedestrian Improvement List
- Bicycle improvements on Highway 99W at the Meinecke and Sherwood Boulevard intersections in conjunction with private multifamily or mixed-use development.

The fourth factor is whether the city that prepared the concept plan has implemented best practices for preserving and increasing the supply and diversity of affordable housing in its existing urban areas, including multifamily housing types that are more affordable than traditional detached single family dwellings. The city has also adopted amendments to its land use regulations that comply with DLCD's Climate Friendly and Equitable Communities (CFEC) rules, which reduce obligations to provide costly off-street parking for residential development. In 2021 the city adopted a new comprehensive plan that includes a policy that the city will provide opportunities for "a variety of housing types in locations and at price points that meet the needs of current and future residents." The city has also completed a Housing Needs Analysis for the 2019-2039 planning period that estimates housing needs by all income levels. The results of the HNA provide the city with the technical and factual background relating to current and future housing needs including the projected need for housing at 80% of the median family income of Washington County. The Metro Council finds that the City of Sherwood has demonstrated success in increasing the supply and diversity of housing types in its existing urban areas and taken steps toward increasing the supply of affordable housing.

The fifth factor is whether the city that prepared the concept plan has taken actions to advance Metro's six desired outcomes in the Regional Framework Plan. First, as noted above, it is important to underscore that this is a factor to be considered by the Metro Council, and not an approval criterion. Next, opponents argue that the City of Sherwood's *concept plan* for the Sherwood West area does not further the six desired outcomes. However, the applicable factor to be considered by the Metro Council is not whether the concept plan for the proposed expansion area itself furthers the six desired outcomes – the relevant question is whether the city has generally taken actions to advance the six desired outcomes.

The Metro Council finds that the city has demonstrated progress toward the six outcomes, for the reasons explained by the city in Attachment B to its Sherwood West concept plan submittal to Metro dated April 3, 2024, and as described in the following findings regarding each of the six outcomes.

a. People live, work and play in vibrant communities where their everyday needs are easily accessible.

A vibrant community is a complete community where housing, industry, commerce, education and recreation come together to meet the needs of its residents. In 2013, Sherwood developed a Town Center Plan, which includes three districts in Sherwood's existing urban area. The Sherwood Town Center Plan designates and lays out a plan for a walkable urban center that meets regional planning objectives and guides future growth and development. The Town Center includes the Old Town Overlay District as well as centrally located large format retail centers. This mixture of small scale and large format retail provides opportunities for Sherwood residents to meet their everyday needs without driving long distances or driving at all. The Old Town District provides restaurants, wine tasting, hair and beauty services, tax and accounting services, among other commercial services. The large format retail centers provide grocery shopping and other commercial retail opportunities that are less compatible with historic buildings and small spaces.

Sherwood has been successful in reducing regulatory and other barriers to mixed-use, pedestrian-friendly, and transit-supportive development in its Town Center and Old Town in recent years. The City reduced parking requirements (prior to CFEC) to provide flexibility in the design of multi-family and mixed-use development within Old Town, and increased building height limits to allow for mid-level multi-family and mixed-use development. The City encouraged the use of planned unit developments to transfer densities among multiple sites to allow for denser mid-rise residential construction. More recently the City has further reduced parking requirements in accordance with CFEC regulations for all properties within the Town Center.

In addition to policy changes to encourage a walkable community, the city invested in sidewalk and bicycle improvements along the length of Langer Farms Parkway, which spans the Town Center north to south along its eastern edge. The City also reconfigured and redeveloped streets in the Old Town core to encourage greater walkability and interconnectedness with other districts of the Town Center. Recent planning efforts have focused on extending the local and regional trail system into and out of the Town Center with extensions into Sherwood West. A portion of the Cedar Creek / Ice Age Trail was completed in 2022 which will provide an off-street connection between Highway 99W in the north and Old Town in the south.

Sherwood is currently constructing a new pedestrian bridge over Highway 99W. The highway creates a clear physical barrier between Sherwood West and current city limits, and the pedestrian bridge will provide a safe and convenient pedestrian crossing of the highway to serve new residents in Sherwood West. The City is also partnering with Clean Water Services to plan and construct needed sewer improvements to serve the area. Appendix N of the concept plan provides details regarding infrastructure investments that are currently underway. Opponents offer no evidence to support their contention that adding Sherwood West to the UGB will require federal funding or other major infrastructure grants pulling public investment dollars away from the broader region and disproportionately aiding Sherwood alone.

Shifting the focus to the Sherwood West expansion area, which is not actually the focus of the relevant Metro Code factor, the Sherwood West concept plan calls for a mixture of land uses to help make everyday needs accessible, including for residents without a vehicle. The Sherwood West area is adjacent to and a part of Sherwood's network of streets that carry both local and regional traffic. The concept plan proposes a connected network of streets in Sherwood West that will tie existing and new growth together to create livable and walkable neighborhoods, and mitigating impacts of regional through-traffic. The concept plan proposes a mixture of employment uses that are intended to enhance and strengthen the city's Town Center by offering complementary uses to encourage more housing and visitors.

The Metro Council finds that the city has demonstrated progress toward this desired outcome.

b. Current and future residents benefit from the region's sustained economic competitiveness and prosperity.

In 2021 the city adopted its 2040 comprehensive plan – one of the six core components of that plan is to provide for a thriving and diversified economy. As described in the city's UGB expansion proposal, in recent years the city has focused on attracting living wage jobs that take

advantage of the region's existing economic advantages. The city has outperformed Washington County in terms of employment growth over the last decade. The average annual growth rate from 2010 through 2020 was 3.1 percent for the city compared to a countywide average of 1.9 percent during the same period.

As described in the city's UGB expansion proposal, a key area of job growth in the city is Sherwood's Tonquin Employment Area which sits along the city's eastern edge on Tualatin-Sherwood Rd. The Tonquin Employment Area has seen strong employment growth within the last six years, as 195 acres of land have been annexed into the City for development and 1.6 million square feet of Employment Industrial zoned land has received site plan approval for development. Recent developments include T-S Corporate Park and the Sherwood Commerce Center, which house all traded-sector employers, including LAM Research, DW Fritz, Rahi, NSI, and Olympus Controls. These trends contribute to the success of traded company sectors within the Portland region and provide the opportunity for more Sherwood residents to live and work in the community.

The city adopted an Economic Opportunities Analysis in 2023, which indicates that the city has a highly educated population: 95.5 percent of adult residents hold a high school diploma or higher, and 43 percent have bachelor's degrees. Additionally, according to the U.S. Census Bureau's American Community Survey (ACS, 2018-2022), approximately 15 percent of the city's residents are employed in advanced manufacturing, high-tech, or semiconductor-related sectors. These current residents will benefit from the proposed urbanization of Sherwood West. The mixed-employment zone is designed to be the primary employment area for Sherwood West and will accommodate office, light industrial, and flex employment uses. The zone will create the opportunity for technology and traded sector businesses to grow in the region – providing a space for stable, high paying jobs. The mixed-employment zone has been planned with anticipation of new development occurring in the SW Roy Rogers Rd. and SW 175th Ave. corridor in Washington County. The addition of Sherwood West can provide local job opportunities for current and future residents, reduce commuting times, and strengthen the regional workforce pipeline.

The Metro Council finds that the city has demonstrated progress toward this desired outcome.

c. People have safe and reliable transportation choices that enhance their quality of life.

Sherwood is located on the southwest border of the Portland metropolitan region. Choices for transportation in and out of the city are primarily by private vehicles via Highway 99W, Tualatin-Sherwood Road, and Roy Rogers Road. Tualatin-Sherwood Road is developed as a multi-modal street with sidewalks and bike lanes its entire length from Tualatin to Sherwood, where it terminates at Highway 99W.

TriMet operates transit service into Sherwood with two routes that provide people with transportation options to other areas in the Portland Metro Region. Sherwood is located on the southwestern boundary of the TriMet service district. Route 94 originates in Tigard and terminates in Sherwood's Old Town Transit Center, and Route 97 originates in Tualatin and

terminates on Langer Drive and 99W in Sherwood. TriMet provides safe and reliable public transportation options for Sherwood residents, workers, and visitors.

The city's adopted 2040 Comprehensive Plan includes a chapter on Coordinated and Connected Infrastructure. The first two adopted goals in that chapter are: (1) Plan and implement a transportation system that is forward-looking, responsive and innovative to maximize capacity and ensure safety, efficiency and retention of Sherwood's livability and small-town character; and (2) Create and enhance safe and viable transportation options for travel between destinations locally and regionally with particular attention to connecting the areas of Sherwood east and west of Highway 99W, Old Town, and the Tualatin National Wildlife Refuge. The plan includes an adopted policy to prioritize use of street design features to promote safe and comfortable travel by pedestrians, cyclists, emergency responders, transit users and motorists.

As described in the city's UGB expansion proposal, the city provides an interconnected system of walking and biking trails. There are 6.5 miles of paved multi-use trails within the City's open space system. These trails provide connections through Sherwood's open space and parks, providing important connections between neighborhoods, schools, parks, Sherwood's Historic Old Town, and other services. The city is also in progress of constructing a pedestrian bridge over Highway 99W which will connect existing city limits to the new Sherwood High School and larger Sherwood West planning area. The bridge is expected to be completed in Fall 2025 and will offer a safe, reliable active transportation for generations of future students and residents in Sherwood. The bridge will connect the primary commercial and mixed-use center within Sherwood West with the off-street trail system that ultimately connects Sherwood's Historic Old Town and designated Town Center. The pedestrian bridge is expected to enhance the safety and quality of life of existing and future residents by providing a safe crossing of Highway 99W while offering views of the surrounding foothills and valley.

The Metro Council finds that the city has demonstrated progress toward this desired outcome.

d. The region is a leader in minimizing contribution to global warming.

As described in the city's UGB expansion proposal, the city has made investments aimed at reducing carbon emissions, including installation of solar panels, electric car charging stations, and replacing all city streetlights with energy-efficient LED lights. The city also reduced parking requirements (prior to CFEC) to provide flexibility in the design of multi-family and mixed-use development within Old Town, and increased building height limits to allow for mid-level multi-family and mixed-use development. The city has encouraged the use of planned unit developments to transfer densities among multiple sites to allow for denser mid-rise residential construction. More recently the city has further reduced parking requirements in accordance with CFEC regulations for all properties within the Town Center. As described in the expansion proposal, the city has also invested in a system of interconnected walking/biking trails and is working on the design and construction of a new off-street multi-modal trail that runs through the city along Cedar Creek and connecting to Metro's Ice Age Tonquin Trail.

Opponents have suggested that the addition of new roads within Sherwood West will necessarily increase vehicle miles travelled, which translates into greater carbon emissions. As explained in

the city's UGB expansion proposal, Sherwood West is planned to provide a complete community, including a system of sidewalks and bike lanes allowing future residents to reduce reliance on vehicles. The city's proposal to add between 3,117 -5,582 new housing units, 50 percent or more of which is multifamily, is intended to provide housing opportunities for individuals and families that might otherwise locate to surrounding cities or unincorporated Washington and Yamhill counties instead of Sherwood due to the limited supply of housing in Sherwood. The range of housing choices anticipated for the proposed expansion area is intended to reduce spillover growth from Sherwood to surrounding areas.

The Metro Council finds that the city has demonstrated progress toward this desired outcome.

e. Current and future generations enjoy clean air, clean water, and healthy ecosystems.

As described in Metro's 2023 Compliance Report for the Urban Growth Management Functional Plan, Sherwood is in compliance with Metro's requirements in Title 3 (Water Quality and Flood Management) and Title 13 (Nature in the Neighborhoods). The city is a program partner in the Tualatin Basin Fish & Wildlife Habitat Program, which implements Titles 3 and 13 for Sherwood and other Tualatin Basin jurisdictions. Clean Water Services programs (Healthy Streams, Storm Water Management Plan, new Design and Construction Standards) implement Titles 3 and 13 in Sherwood along with regulations and requirements in the Sherwood zoning code that require street trees and tree canopy standards for new development.

The city's adopted comprehensive plan and development code also require protection of wetland, habitat, and other identified natural resources, consistent with requirements in Clean Water Services, Division of State Lands, and US Army Corps of Engineers regulations. As described in the city's UGB expansion proposal, the city code standards for protection of upland wildlife habitat and riparian habitat extend beyond the boundaries of the floodplain or Clean Water Services buffer standards. The Sherwood code provides protection for all trees and woodlands when associated with a development application by requiring that trees and woodlands be protected to the maximum extent feasible and that mitigation take place when trees must be removed. The city's development code also includes tree removal standards that apply to properties that are not subject to a land use application or action.

The city has a capital improvement program for natural resources protection, as well as park and trail acquisition and development. The park and natural areas acquisition program is implemented through a Five-year Capital Improvement Program, which includes actions such as the planning, funding, and development of the Cedar Creek Trail/Tonquin Ice Age Trail.

Regarding the Sherwood West concept plan, one of the goals and associated evaluation criteria for the Sherwood West design was that it incorporate development that protects and provides access to nature. Of the 1,291 acres of the proposed expansion area, nearly 500 acres, approximately 40 percent of the area would be designated creek corridor open space, general open space, and parks. In the proposed design, the stream corridor buffers reflect community priorities for natural feature protection, recreation, and connectivity. One of the design options realigns Elwert Road, an arterial road in the proposed expansion area, to cross two Chicken

Creek tributary streams at the narrowest points to reduce the road expansion's impact on the creek corridor. The Sherwood West Concept plan was developed to provide current and future generations with clean air, clean water, and healthy ecosystems.

The Metro Council finds that the city has demonstrated progress toward this desired outcome.

f. The benefits and burdens of growth and change are distributed equitably.

With the adoption of the Strategic Plan to Advance Racial Equity, Diversity, and Inclusion in 2016 and the creation of the 2015 Equity Baseline Report, Metro has committed to addressing barriers experienced by people of color and improving equity outcomes for historically disadvantaged groups. According to the city's adopted 2019-2039 Housing Needs Analysis, Sherwood's population is becoming more ethnically diverse. About six percent of Sherwood's population is Latino, an increase from 4.7 percent in 2000. Growth in the Hispanic and Latino population will affect Sherwood's housing needs in a variety of ways. The HNA also indicates that Sherwood's population is growing older. The aging of the population will result in increased demand for smaller single-family housing, multifamily housing, and housing for seniors.

As described in the city's UGB expansion proposal, during the city's 2040 Comprehensive Plan update, the city partnered with the School District Share Center, CASA of Oregon, local area churches, and the Sherwood Senior Center to engage senior and Spanish-speaking and Latino(a) populations in the city planning efforts. In addition, Sherwood became a member of the WHO/AARP network of age-friendly communities in 2024. The City Council's commitment to equity and inclusivity is expressed in Resolution No. 2022-07, Adopting a City of Sherwood Diversity, Equity, Inclusion, and Accessibility (DEIA) statement that provides: "The City of Sherwood expressly supports and endorses a culture of appreciation for the inherent value of all persons in the community." These efforts indicate that the city is demonstrating progress toward providing more meaningful engagement and promoting diversity, equity, inclusion, and accessibility within the city, and toward more equitably distributing the benefits and burdens of growth and change.

As described in the city's UGB expansion proposal, Sherwood West's design features a variety of housing options, new employment opportunities, parks, and active transportation choices. The city's stated intent is that providing additional opportunities for housing, parks, jobs, and transportation in Sherwood West will provide a platform for an equitable distribution of positive outcomes that would benefit communities of color in the greater area. Sherwood West will provide walkable and bikeable amenities and transportation safety improvements for residents on the city's east side as the Highway 99W pedestrian overcrossing project ties Sherwood High School to the YMCA, community skatepark and trail system. In addition to housing choices, the city's plan to designate employment land and attract living wage jobs are intended to further equity outcomes. The mixed-employment zone in Sherwood West will target the manufacturing sector, which would include more living wage jobs compared to other industries.

The Metro Council finds that the city has demonstrated progress toward this desired outcome. The Council also reiterates that, in adopting the factors in section 3.07.1425 of the Metro Code,

the Council's expressly stated intent was not to create criteria that must be satisfied, but factors to be considered and weighed, in the manner of the Goal 14 locational factors. The Council finds that the city has demonstrated progress toward each of the six desired outcomes and toward the other factors that must be considered under section 3.07.1425 of the Metro Code.

6. Ethics Complaint

The West of Sherwood Farm Alliance asserts that Metro Councilor Gonzalez made a public endorsement of the Sherwood West UGB expansion prior to the conclusion of the public process that "violates the spirit" of Goal 1 and Metro's public engagement principles. The Farm Alliance does not identify the statement or when it was made, and does not attempt to explain why a public statement by an elected official in support of a legislative proposal is legally improper or should require recusal. The Metro Council finds no basis for this claim.

E. Statewide Planning Goals

Goal 1 (Citizen Involvement): See findings in Section C above.

Goal 2 (Adequate Factual Base): Findings regarding the coordination element of Goal 2 are set forth above in Section B. The Metro Council finds that the UGR and the information it relies upon provide an adequate factual base for these findings and the adoption of the UGR. The Metro Council concludes that adoption of Ordinance No. 24-1520 complies with Goal 2.

Goal 3 (Farmland): Under OAR 660-024-0020(1) Goal 3 is not applicable.

Goal 4 (Forestland): Under OAR 660-024-0020(1) Goal 4 is not applicable.

Goal 5 (Natural Resources): The Metro Council finds that adoption of Ordinance No. 24-1520 does not impact any inventoried Goal 5 resources and is therefore consistent with Goal 5 and its implementing rules.

Goal 6 (Air, Water and Land Quality): The Metro Council finds that the adoption of Ordinance No. 24-1520 does not impact any comprehensive plan designations or land use regulations that relate to protection of air, water and land quality. Ordinance No. 18-1427 does not authorize any particular uses of property with environmental impacts, and therefore does not implicate Goal 6.

Goal 7 (Natural Hazards): The Metro Council finds that adoption of Ordinance No. 24-1520 does not impact any existing local plans, polices, or inventories regarding natural hazards and does not authorize any particular uses of property in natural hazard areas; therefore, this decision does not implicate Goal 7.

Goal 8 (Recreation): The Metro Council finds that adoption of Ordinance No. 24-1520 does not involve recreation planning or destination resort siting; therefore, this decision does not implicate Goal 8.

Goal 9 (Economy): Although Goal 9 does not apply to Metro, the Metro Council concludes that adoption of Ordinance No. 24-1520 does not impact local comprehensive plans, policies or inventories regarding economic development.

Goal 10 (Housing): See findings in Section D above.

Goal 11 (Public Facilities and Services): Metro does not provide public facilities or services and does not adopt public facility plans; Metro is responsible for coordinating public facility planning by cities and counties. The Metro Council finds that adoption of Ordinance No. 24-1520 does not impact the planning for or provision of public facilities and services; therefore, this decision does not implicate Goal 11.

Goal 12 (Transportation): Under OAR 660-024-0020(1) the Goal 12 requirements in the Transportation Planning Rule do not apply to a UGB amendment that does not involve amendment of the local planning designation for the expansion areas allowing development.

Goal 13 (Energy): The Metro Council finds that the adoption of Ordinance No. 24-1520 promotes a compact urban form and the efficient use of energy within the UGB. To the extent Goal 13 applies, the Metro Council concludes that this decision is consistent with Goal 13.

Goal 14 (Urbanization): See findings in Section D above.

Goal 15 (Willamette River Greenway): The Metro Council finds that adoption of Ordinance No. 24-1520 has no impact on the Willamette River Greenway; therefore, this decision does not implicate Goal 15.

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Trends Ecol Evol. 2006 Nov 20;22(2):95–102. doi: 10.1016/j.tree.2006.11.001

Urbanization and the ecology of wildlife diseases

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PMCID: PMC7114918 PMID: 17113678

Abstract

Urbanization is intensifying worldwide, with two-thirds of the human population expected to reside in cities within 30 years. The role of cities in human infectious disease is well established, but less is known about how urban landscapes influence wildlife–pathogen interactions. Here, we draw on recent advances in wildlife epidemiology to consider how environmental changes linked with urbanization can alter the biology of hosts, pathogens and vectors. Although urbanization reduces the abundance of many wildlife parasites, transmission can, in some cases, increase among urban-adapted hosts, with effects on rarer wildlife or those living beyond city limits. Continued rapid urbanization, together with risks posed by multi-host pathogens for humans and vulnerable wildlife populations, emphasize the need for future research on wildlife diseases in urban landscapes.

Introduction

Urbanization is increasing at a global scale, with ecological consequences that extend beyond city boundaries (Box 1). Defined as growth in the area and numbers of people inhabiting cities, urbanization generates landscapes dominated by built-up structures for human use 1, 2. Most studies of the ecological

impact of urbanization focus on patterns of biodiversity loss, with declines in species richness from rural areas towards the urban core documented across multiple taxonomic groups 3, 4. More recently, ecologists have begun to explore the mechanisms by which urbanization affects biodiversity, including processes related to resource competition, altered trophic interactions and disease 2, 5.

Box 1. The scope and study of urbanization.

Over 65% of the human population worldwide will reside in cities by 2025 and those areas will double in land coverage over the same period [49]. Most of this shift will occur in the developing world (Figure I), where the urban population is expected to grow to four billion by 2030 [49]. Urban population growth and movement into cities closely mirrors social and economic reforms, such that shifts in human populations worldwide from rural to urban areas often reflect changes in employment opportunities, access to education and healthcare, and environmental degradation outside of cities.

Figure I.



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The urban sprawl of Rio de Janeiro, Brazil.

The spread of urban centers results in rapid and dramatic landscape-level changes that are relatively permanent over ecologically significant time periods. Thus, urbanization signifies a drastic form of land conversion typified by dense human habitation, transportation, industry and associated infrastructure. In addition to greater human population density, changes that occur along urban–rural gradients include the loss of biota and natural habitat, increased densities of roads, buildings and other impervious surfaces, and microclimatic shifts (e.g. heat island effects).

Urban ecologists examine the interactions and feedbacks between human activities and ecological systems in urban landscapes 1, 2. One major challenge involves the need to categorize land-use types consistently based on quantifiable patterns that are relevant to ecological processes [50]. Often, urbanized areas are classified subjectively using terms such as urban, suburban, exurban and rural (see Ref. [50] for discussion). From a quantitative perspective, human population density and impervious surface coverage are commonly used to quantify the degree of urbanization and facilitate among-site comparisons. Census data on socioeconomic conditions at study sites can provide additional information relevant to underlying ecosystem processes. For example, higher family incomes and older buildings were strong predictors of plant species diversity in the Phoenix metropolitan area in Arizona, USA [51]. This association is probably related to higher priority placed on gardening and landscaping among families with higher incomes, and was also a significant predictor of wildlife biodiversity in some taxonomic groups.

An important consideration in urban landscape studies is the appropriate spatial scale for analysis. Conducting analyses at multiple scales is essential for detecting the relative importance of key landscape variables. In the case of infectious disease risk, host abundance and diversity, vector activity and pathogen survival in the environment will probably be affected by urban landscape measures at different spatial scales [52]; these scaling patterns will further depend on host dispersal abilities, host and vector habitat preferences, and the mode of parasite transmission.

An increasing number of studies point to links between human activity and the emergence of wildlife diseases 6, 7, 8, yet only a few address how wildlife–pathogen interactions respond to urban land use. However, urbanization can influence shifts in host geographical ranges and densities [9], interspecific interactions [5] and contamination of the environment with pathogens [10]. For example, across 176 foraging sites for wading birds in coastal Florida, a highly pathogenic nematode occurred only at sites disturbed by stream engineering and nutrient fluxes [10]. Many of the above processes have been studied in the context of agricultural land use or forest edge habitats, and are also relevant to pathogen spread in urbanized landscapes.

Here, we identify key hypotheses concerning the role of urbanization in the transmission and impacts of infectious diseases in wildlife populations. To capture a range of mechanisms and changes in their intensity, we consider patterns that occur across the urban–rural gradient (Box 1), in some cases focusing on wildlife species that inhabit both the urban core and surrounding suburban and rural areas. Understanding the ecology of wildlife pathogens in urban environments will become increasingly

important for managing disease risks to wildlife and, in some cases, humans. Indeed, many pathogens are capable of infecting multiple host species 11, 12, and some pose serious threats to human health and already vulnerable wildlife populations [13]. Finally, we emphasize several priorities for future research, including identifying those pathogens for which urbanization is likely to have the greatest impact.

Wildlife communities in urban environments

Urbanization dramatically alters the composition of wildlife communities, leading to biodiversity loss 3, 14 and increases in the abundance of species that thrive in urban areas. Indeed, one recent study exploring the patterns and causes of 'biotic homogenization' found a negative relationship among human population size, urban land use and species richness across all major taxonomic groups in North America [15]. This effect is due, in large part, to simplified habitat structures [2], increased resource availability [4] and altered trophic interactions [5].

Many animal species disappear from cities altogether, occur at low abundance, or are restricted to parks, forest fragments and other less intensely used areas. Because most wildlife parasites (especially those restricted to one or a few host species) will also be missing from urban centers, an important consideration is how relevant urbanization is to the ecology of wildlife diseases. The answer involves at least three crucial processes (Table 1). First, for diseases such as toxoplasmosis or rabies, which affect urban-adapted wildlife species, infection dynamics can change across a gradient of habitats, in some cases leading to increased prevalence in urban or suburban environments. Second, rarer wildlife species, such as many wood warblers or flying squirrels and other small rodents, which persist within city parks or surrounding natural areas, can be affected negatively by pathogens maintained in urban-adapted hosts (Box 2). The increased dominance of a few key host species, and conditions that favor interspecific contact rates, could cause declines of rarer wildlife through competition mediated by multi-host parasites 12, 16. Third, reduced biodiversity of urban wildlife can influence the transmission of some vector-borne diseases through a process termed the 'dilution effect' 17, 18, 19. Here, high host species richness can lower parasite transmission if vectors feed on multiple host species varying in competence with respect to contracting, amplifying and transmitting the pathogen. The reverse situation could occur in urbanized areas if low host diversity increases the proportional abundance of key reservoir hosts.

Table 1.

Examples and mechanisms illustrating effects of urbanization on the ecology of wildlife–parasite interactions

Host	Pathogen[a]	Locality	Effects on host or parasite biology	Refs
Biodiversity loss and the dilution effect				
White footed mouse *Peromyscus leucopus*	*Borrelia burgdorferi* (Lyme disease)	Northeast North America	Forest fragmentation, often near suburbs, linked with greater densities of infected ticks and white-footed mice; can result from loss of predators and less-competent hosts	18, 20
Passeriformes and other vertebrate hosts	WNV	North America	Seroprevalence in wild songbirds higher in areas densely populated by humans; non-passerine bird diversity associated with lower infection rates in mosquitoes and humans	21, 64
Resource provisioning and contact rates within urban-adapted species				
Raccoon *Procyon lotor*	*Baylisascaris procyonis* (raccoon roundworm); other endoparasites	Northeast USA	Higher raccoon abundance and birth rates in urban–suburban areas; clumped resources increase within-species contact rates, leading to higher parasite richness and	9, 23

Host	Pathogen[a]	Locality	Effects on host or parasite biology	Refs
			increased *B. procyonis* prevalence	
House finch *Carpodacus mexicanus*	*Mycoplasma gallisepticum* (mycoplasmal conjunctivitis)	East North America	Hosts more abundant in regions of high human population density; aggregation at bird feeding stations could increase contact rates and pathogen transmission	[65]
Red fox *Vulpes vulpes*	*Echinococcus multilocularis* (tapeworm)	European cities	Shifts in dietary behavior and lack of suitable intermediate hosts reduces prevalence in foxes inhabiting urban centers; risk to humans could increase owing to encounters with urban-dwelling foxes	24, 26
Mule deer *Odocoileus hemionus*	CWD	CO, USA	Disease more prevalent in highly developed and residential areas, possibly owing to host crowding and aggregated food resources	[66]
Interactions with reservoir hosts in or surrounding urbanized habitats				
Gray fox *Urocyon cinereoargenteus*	CPV	San Francisco, CA, USA	Greater seroprevalence in wild canids captured in urban zone surrounding park; could be caused by direct or	[28]

Host	Pathogen[a]	Locality	Effects on host or parasite biology	Refs
			indirect contact with domesticated dogs	
Allegheny woodrat *Neotoma magister*	*B. procyonis*	East North America	Declines in woodrat from fatal *B. procyonis* infections linked with exposure to raccoon feces; exposure could increase at the periphery of urban–suburban development	[46]
Red squirrel *Sciurus vulgaris*	Squirrel paramyxovirus	UK	Non-native gray squirrels introduced highly lethal virus; food provisioning in urban–suburban environments could increase squirrel contact rates and influence pathogen-mediated declines	54, 56
Environmental contaminants, host stress, and susceptibility to infection				
Southern sea otter *Enhydra lutris nereis*	*Toxoplasma gondii* (meningoencephalitic disease)	West coast of USA	Infections higher in areas of maximum freshwater runoff associated with regions of high human density or activity; probably owing to exposure to cat feces via sewage contamination	[31]
Great tit *Parus major*	Stress biomarkers (no specific pathogen)	Southwest Sweden	Measure of oxidative stress affected by air pollution increased from rural–urban	[67]

Host	Pathogen[a]	Locality	Effects on host or parasite biology	Refs
			locations; greater stress and reduced plumage condition could be associated with susceptibility to disease	
European blackbird *Turdus merula*	Acute stress response (no specific pathogen)	Munich, Germany	City-born hosts showed reduced acute stress response relative to forest-born conspecifics; indicates that species capable of evolutionary adaptation might thrive in urban environments and could be less affected by infectious diseases	[68]

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[a]Abbreviations: CPV, canine parvovirus; CWD, chronic wasting disease; WNV, West Nile virus

Box 2. Red squirrel–gray squirrel paramyxovirus in the UK.

The populations of red squirrels *Sciurus vulgaris* (Figure Ia) throughout the UK have declined following the introduction of gray squirrels *Sciurus carolinensis* (Figure Ib), a species endemic to North America [53]. Although reductions in red squirrel populations can result from direct competition for resources between the two species [53], gray squirrels also introduced a squirrel paramyxovirus that is highly lethal to red squirrels (but causes no discernible pathology in gray squirrels; [54]).

Figure I.



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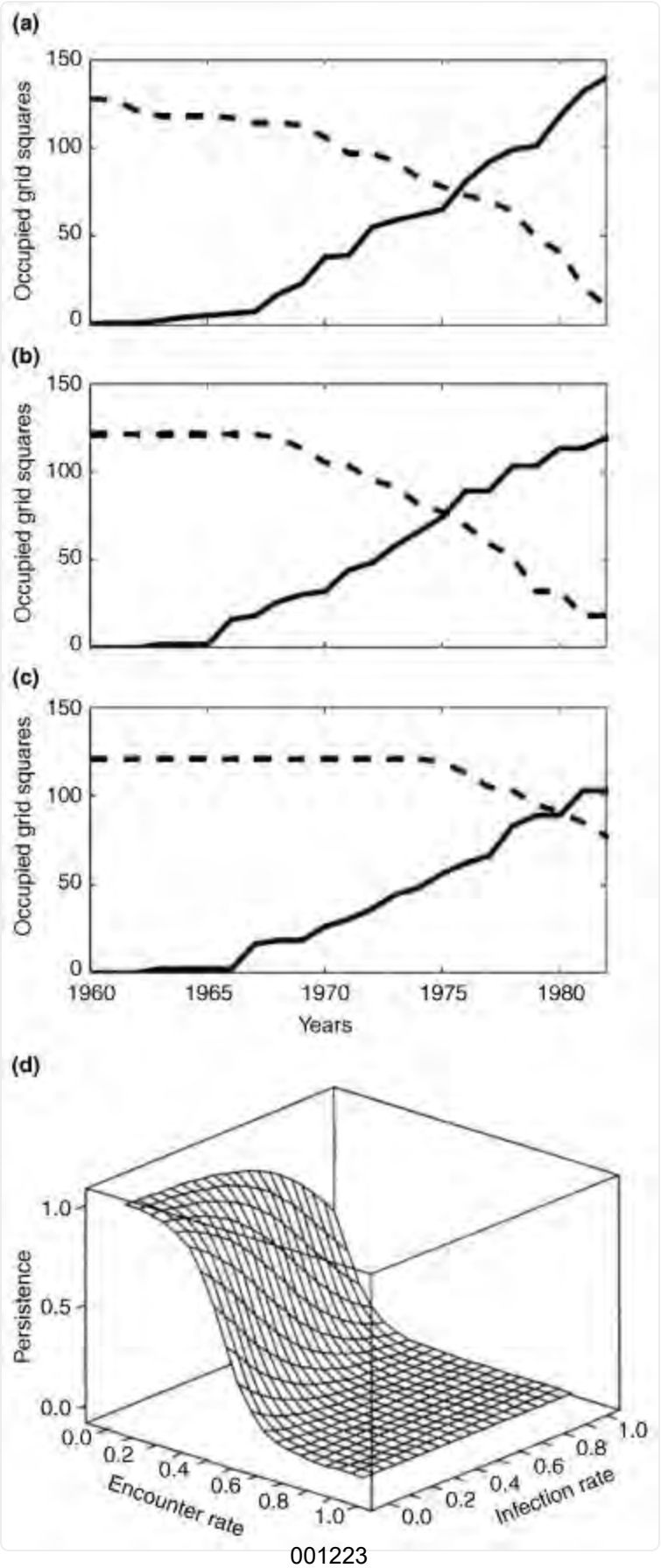
Red squirrels **(a)** versus gray squirrels **(b)** in the UK.

Results from a model developed by Tompkins *et al.* [55] support the conclusion that observed red squirrel declines are consistent with both direct and indirect competition with gray squirrels (Figure IIa–c). Using a stochastic individual-based model and applying this model to real landscapes, Rushton *et al.* [56] explored the role of the paramyxovirus virus in red squirrel population reductions. The results indicate that apparent competition between red and gray squirrels led to local loss of red squirrels under a large range of parameter values and assuming low levels (10%) of infection in gray squirrels. The population-level effects of the pathogen were most strongly influenced by interspecific encounter rates (Figure IId), suggesting that

increased contact between infected and healthy individuals could raise the risk of disease-mediated population loss. Such encounter rates could increase around urban areas if food provisioning leads to greater contacts within and between host species. The introduction of this urban-adapted animal species and the subsequent spread of paramyxovirus in red squirrels illustrates the potential synergistic effects of urbanization and pathogen-mediated competition on the abundance of more vulnerable wildlife hosts.

Figure II.


(a)
(b)
(c)
(d)
Occupied grid squares
150
100
50
0
1960
1965
1970
1975
1980
Years
Persistence
1.0
0.5
0.0
Encounter rate
Infection rate
0.2
0.4
0.6
0.8

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The number of 5-km grid squares occupied by gray (solid line) and red (dashed line) squirrels between 1960 and 1982 in Norfolk, UK **(a)** Observed data adapted from Reynolds (1985). **(b)** Model predictions incorporating direct and indirect interspecies competition. **(c)** Model predictions assuming only direct competition. Model results shown in (ii) more closely replicate the field data both in timing and amplitude, providing evidence for the role of infectious disease in the population dynamics of both species. Model simulations **(d)** indicate that the persistence of red squirrels declines with increasing encounter rates between squirrel individuals and the rate of infection given an encounter occurs. Reproduced with permission from Ref. [55] (b) and Ref. [56] (c).

Lyme disease, caused by the bacterium *Borrelia burgdorferi*, is the best studied example of the dilution effect. This pathogen is transmitted by *Ixodes scapularis* ticks that feed on a large number of mammal species. Studies in suburban environments of northeastern USA, characterized by high forest-edge and low mammalian biodiversity, indicate that a greater proportional abundance of the most competent reservoir for *B. burgdorferi* (the white-footed mouse, *Peromyscus leucopus*) is linked to increased infection prevalence in ticks, mice and humans 18, 20. Reduced host species diversity probably has a similar role in other wildlife pathogens (Table 1) such as West Nile virus (WNV) [21], although it is also possible that low host diversity in the extreme urban core could exclude competent reservoir hosts or vectors [22]. Further studies are needed to assess the general importance of the dilution effect and its significance for pathogens in urbanized areas.

Resource provisioning, host contact rates and susceptibility to infection

Many urban-adapted species occur at much higher densities in urban and suburban environments than in less-disturbed areas [4]. Abundant resources not prone to seasonal fluctuations, either through accidental (e.g. household waste) or intentional (e.g. bird feeders) provisioning, support these populations. Such high population densities can elevate contact rates within and among wildlife species, and favor the transmission of parasites spread by direct contact or oral–fecal routes (Table 1). In response to resource provisioning, increased birth rates among urban-adapted species could provide further opportunities for parasite transmission by increasing the abundance of susceptible juvenile hosts (e.g. Ref. [9]).

The spatial distribution of resources also influences host aggregation and contact patterns. One study of macroparasite infections in wild raccoons *Procyon lotor* showed that experimentally clumping resources resulted in elevated host densities and increased prevalence of the raccoon roundworm *Baylisascaris procyonis,* particularly among juvenile animals [23]. This approach also provided evidence for greater parasite species richness per individual host under the clumped resource treatment, supporting a direct effect of aggregated resource distributions on within-species contact rates and parasite transmission.

Concentrated resources also influence host migration into urban landscapes and among-species contact rates, including contact between humans and wildlife hosts. One example is provided by the increasing number of red foxes *Vulpes vulpes* in European cities (Figure 1) [24]. Red foxes are the primary sylvatic reservoir of *Echinococcus multilocularis*, a tapeworm that causes liver disease in humans. The parasite is transmitted to intermediate hosts (typically rodents) by the ingestion of eggs deposited in fox feces. Although human cases are widely restricted to rural areas in northern Europe, where outdoor work and pet ownership are significant risk factors [25], migrations of infected foxes into urban areas might elevate human infection risk in cities. Current evidence suggests that there is little impact to humans living in urban areas; however, because *E. multilocularis* has a long incubation period (decades in some patients), long-term surveillance will be required to assess shifts in human infections associated with fox movements. The red fox–*E. multilocularis* system further emphasizes that multiple mechanistic drivers associated with urbanization can influence patterns of infectious disease risk. One recent study showed that, although fox populations are increasing in Zurich, Switzerland, the prevalence of *E. multilocularis* within those populations is not [26]. Transmission of *E. multilocularis* could decline if foxes consume fewer intermediate hosts (as prey) in favor of human-generated resources in cities.

Figure 1.



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Many wildlife species can be attracted to urban centers, potentially bringing infectious disease with them. The European red fox, the major sylvatic host for *Echinococcus multilocularis*, has become increasingly urban-adapted in cities such as Zurich and Geneva, Switzerland. Many factors, including primary and intermediate host densities and host dietary behaviors, influence the prevalence of infection in urban centers, and infection risks for domestic animals and humans. These young European red foxes were born and raised in a residential garden in the south of England, an area outside of the endemic region for *E. multilocularis*. Reproduced with permission from Paul Cecil, University of Sussex, UK.

Resource provisioning in urban environments also affects host susceptibility and responses to both existing and introduced pathogens, mediated through effects on physical condition and immune defenses. For example, animals that are malnourished owing to low protein intake can become immunosuppressed, shedding more parasite eggs in feces and suffering higher rates of mortality following infection [27]. Thus, although elevated food resources for urban-adapted species could increase contact rates and pathogen transmission, supplemental feeding might also improve host condition, increase immunity to infection and decrease pathogen impacts on host survival and reproduction.

Pathogen exposure, pollution, and stress

Cities serve as significant hubs of pathogen introductions (Box 3) and as sources of infection for wildlife that exist at the periphery of urban centers 28, 29. For example, infectious oocytes of the protozoan parasite *Toxoplasma gondii*, the causative agent of toxoplasmosis, are shed in the fecal material of domesticated and wild felids. This pathogen also causes infections in other mammals associated with both urban landscapes and more natural habitats (e.g. Ref. [30]). For example, *Toxoplasma* infections have been linked to southern sea otter *Enhydra lutris nereis* mortalities off the coast of California, USA [31]. Infection rates in otter populations were three times higher in areas of maximum freshwater runoff along the Californian shoreline, most of which were associated with regions of high human density. This association is probably a result of water contamination by cat feces and parasite amplification by benthic filter feeders that comprise a major component of sea otter diets [31].

Box 3. Exotic hosts, translocations, and commerce.

As centers of transportation and trade, cities can function as 'first points of entry' for novel pathogens and, in some cases, might provide new opportunities for cross-species transmission. Anthropogenic introductions have expanded the geographical ranges of pathogens such as WNV in humans and wildlife [57], amphibian chytridiomycosis [58] and *Phytophthora ramorum*, the causative agent of sudden oak death [59]. Among wildlife populations, the 1999 introduction of WNV into New York City was particularly significant. The strain isolated from this outbreak belongs to the more virulent 1a clade of WNV and most closely resembles virus circulating in Israel, suggesting that human activity facilitated the movement of this agent into North America [60]. Once established around New York City, the virus spread rapidly across the continent and has caused >2800 cases of human disease and tens of thousands wild bird mortalities 57, 61.

Cities also bring wildlife and their products in close proximity to humans and domesticated animals through live animal markets and the wildlife trade [62]. Examples of disease emergence events linked with the wildlife trade and live animal markets, including SARS-associated coronavirus [63], emphasize that as global commerce and travel increase, documenting pathogen introductions and the contacts among novel host species will become a more pressing concern in public health management. As such, periodic surveillance centered on cities with large human populations and commerce in wildlife products could represent a useful approach for detecting novel transmission events.

Changes in stress and pollution along the urban–rural gradient could also affect host susceptibility to infectious diseases (Table 1). Among vertebrate animals, chronic stress can lower resistance to infection and intensify the harmful effects of pathogens through effects on the host immune system 32, 33, mediated, in part, by glucocorticoid hormones, such as cortisol. Increased interspecific competition in urban environments [34] has been linked to chronically elevated stress indices in wild bird populations, although further research is needed to evaluate associations among urbanization, immunity and stress in wildlife populations.

Furthermore, some heavy metal and pesticide pollutants become concentrated in the environment around developed areas and can be detrimental to vertebrate immune function 35, 36. A five-year field study of two amphibian species, the marine toad *Bufo marinus* and whistling frog *Eleutherodactylus*

johnstonei, found high levels of copper, cadmium and a byproduct of DDT decomposition in tissues samples, and further documented a decrease in B cell-mediated immunity and an increase in helminth infections [37]. More generally, however, the effects of environmental pollutants on host resistance to infectious diseases in wild animals are not well understood, and this area of research will become increasingly important as air, soil and water pollutants continue to accumulate around areas of human activity.

Changes mediated by climate and seasonality

Research conducted in major metropolitan centers such as Tel Aviv, Israel and Phoenix, AZ, USA indicates that urban microclimates are typically warmer than outlying areas 38, 39. The urban heat island results from the increased retention of solar heat by impervious surfaces, radiant heat trapped by smog and a lack of shade vegetation. Several vector-borne diseases might respond to temperature changes associated with urbanization, particularly as these areas can also provide irrigated regions necessary for vector reproduction [2]. Specifically, more moderate winters and the dampened seasonality of urban centers could increase the survival, breeding success and activity of arthropod vectors that are essential for the transmission of many pathogens. In Stockholm, Sweden, for example, such conditions have lengthened the period of activity in the tick *Ixodes ricinus*, coinciding with an elevated incidence of tick-borne encephalitis in rodents and humans [40]. However, other factors could also have a role in this pattern, including human outdoor activity and higher rodent host densities; few studies have examined heat island effects on the ecology of vector-borne diseases.

Reduced seasonality in urban areas could also affect the persistence of parasite transmission stages in the environment [41] and could favor the migration into cities of animals that serve as reservoir hosts for pathogens affecting humans [42]. Reduced seasonality can also increase population growth rates of some wildlife hosts by lengthening their breeding season, an effect that has been demonstrated for dark-eyed juncos *Junco hymenalis* inhabiting an urban site in California [43]. In such cases, a longer recruitment period could increase the probability of epidemics for pathogens that depend on susceptible hosts produced via new births [44]. By contrast, milder winter climates might reduce the individual-level impacts of infectious disease, especially if infected animals in harsher seasonal climates frequently die of secondary causes, such as exposure or starvation. Thus, similar to the effects of food provisioning, changes in the urban microclimate have multiple and, in some cases, opposite effects on pathogens affecting wildlife hosts.

Consequences for wildlife conservation and public health

Although habitat loss and overexploitation are widely recognized as major causes of wildlife population declines, infectious diseases have become increasingly significant to animal conservation 6, 7. Beyond the direct impacts of urbanization on biodiversity, epidemiological processes altered by urban habitats can generate further challenges for wildlife populations. Of particular importance are multi-host pathogens that affect animals living at low population densities through interactions with other host species (Box 2; Table 1). For example, Cooper's hawks *Accipiter cooperii* nesting in urban areas experienced more than double the nest failure rate of hawks nesting in the suburbs. Most nestling mortalities were caused by trichomoniasis, a protozoan disease that can be transmitted through feeding on infected pigeons and doves [45]. Efforts targeted at lowering transmission among urban-adapted species (such as vaccination, treatment with anti-parasitic drugs or reducing supplemental food resources) could therefore limit pathogen transmission to less-abundant wildlife hosts.

Many wildlife species are absent from urban centers, and species that survive well in cities generally do not warrant conservation concern. However, several examples in Table 1 emphasize that processes occurring in cities and suburbs influence remnant wildlife populations within cities and can reach beyond the city limits. In at least one case, environmental contamination with *B. procyonis* by infected raccoons is directly linked to population declines in an endangered host species, the Allegheny woodrat *Neotoma magister* [46]. Decreasing risks to wildlife for this and other pathogens might require limiting the build up of environmental pathogen pollution, or reducing the population densities of reservoir hosts and tracking their movements from urban to more rural areas.

A better understanding of processes that impact wildlife–pathogen dynamics in urban landscapes should also point towards new approaches for limiting the risk of human exposure to zoonotic diseases. For example, information about population densities, contact rates and movements of skunks and raccoons have been used to predict urban sites at high risk for rabies outbreaks [47]. Similar information for foxes harboring *E. multilocularis* can suggest strategies for concentrating urban disease control efforts, including baited vaccines or chemotherapy targeted at urban foxes (e.g. Ref. [48]) and limiting resource accumulation where animals might congregate near human dwellings.

Finally, urban planning represents a potential tool for altering habitats in ways that might reduce disease risks for both humans and wildlife hosts. Efforts to decrease impervious surface coverage, such as urban reforestation projects, could lower the potential for heat island effects on host reproduction, vector breeding and pathogen transmission. Because high wildlife biodiversity might reduce the net transmission of some multi-host vector-borne pathogens [19], increasing native vegetation and creating habitat corridors to facilitate reintroductions could also reduce pathogen prevalence and limit the risk of human exposure. We are not aware of any such strategies in use in urban settings to mitigate disease

risk, but this represents an avenue for future collaboration among urban planners, veterinary biologists and wildlife ecologists.

Challenges for future research

As human populations continue to migrate into cities and urban areas expand (Box 1), managing disease threats for humans and wildlife will depend on future research at the interface of two rapidly growing disciplines: urban ecosystem studies and infectious disease ecology. Surveillance programs targeted towards zoonotic agents would improve the ability of scientists to detect new agents entering cities and to document infections of pre-existing pathogens in novel host species. Also needed are studies that identify host–pathogen systems restricted to wildlife for which urbanization has significant impacts. Often overlooked for zoonotic diseases, these pathogens can have important consequences for animal species already threatened by other factors 13, 16.

Perhaps most importantly, experimental and modeling approaches are needed to move beyond associational patterns and to tease apart the complex mechanisms by which urbanization affects hosts, pathogens and vectors. For example, to what degree do air pollution, noise and other environmental stressors influence wildlife susceptibility to infection, and are these effects counterbalanced by increased food resources or milder winter climates in cities? How does host immunity interact with physical landscape characteristics that alter host contact rates? In terms of vector-borne diseases, better information is needed regarding how biting arthropods are influenced by the heat island effect, distribution of breeding sites and shifts in host-species availability across urban–rural gradients.

To address these and other questions, manipulative field studies will become increasingly important for investigating wildlife–pathogen interactions in urban environments. Within the past decade, two cities in the USA were added to the Long-Term Ecological Research site network (http://www.lternet.edu/ ; funded by the National Science Foundation): Baltimore, MD and Phoenix, AZ [1]. Together with urban research sites in Europe, Asia and Latin America, these cities can serve as grounds for testing hypotheses concerning the effects of host species diversity, food provisioning and environmental variables on the spread of wildlife diseases 20, 22. In turn, studies replicated across multiple locations can begin to explore how factors such as wildlife community composition, pollution and urban microclimates are affected by human population density, socioeconomic variables and land-use patterns.

Concluding remarks

Our goal here was to identify key hypotheses concerning how wildlife–pathogen interactions will respond to urbanization and to highlight several examples that best illustrate these processes. Unlike other land-use changes that can influence wildlife disease emergence (e.g. forest fragmentation or agricultural intensification), the extreme changes that accompany urbanization probably cause declines or losses of most wildlife species and their associated parasites. However, the debate over positive versus negative effects of urbanization on the prevalence and impacts of wildlife diseases is likely to intensify as more research is published. Better understanding of the types of wildlife pathogens that do persist in urbanized areas, and mechanisms that cause increases in prevalence or impacts, can point to new strategies for limiting the risk of human and wildlife exposure in urban centers, and will improve our understanding of the ecological drivers behind spatial variation in pathogen occurrence.

Acknowledgements

We thank A. Davis, J. de Roode, E. Lindsey, A. Pedersen, P. Rohani, H. Wearing, S. White and four anonymous referees for helpful comments on the article. This work was supported, in part, by a University of Georgia graduate fellowship to C.A.B. and a research grant from the Southeastern Center for Emerging Biological Threats (Atlanta, GA, USA).

References

1. Grimm N.B. Integrated approaches to long-term studies of urban ecological systems. Bioscience. 2000;50:571–584. [Google Scholar]

2. Shochat E. From patterns to emerging processes in mechanistic urban ecology. Trends Ecol. Evol. 2006;21:186–191. doi: 10.1016/j.tree.2005.11.019. [DOI] [PubMed] [Google Scholar]

3. McKinney M.L. Urbanization, biodiversity, and conservation. Bioscience. 2002;52:883–890. [Google Scholar]

4. Marzluff J.M. Worldwide urbanization and its effects on birds. In: Marzluff J.M., editor. Avian Ecology and Conservation in an Urbanizing World. Kluwer Academic Publishers; 2001. pp. 19–38. [Google Scholar]

5. Faeth S.H. Trophic dynamics in urban communities. Bioscience. 2005;55:399–407. [Google Scholar]

6. Daszak P. Emerging infectious diseases of wildlife: threats to biodiversity and human health. Science. 2000;287:443–449. doi: 10.1126/science.287.5452.443. [DOI] [PubMed] [Google Scholar]

7. Lafferty K.D., Gerber L.R. Good medicine for conservation biology: the intersection of epidemiology and conservation theory. Conserv. Biol. 2002;16:593–604. [Google Scholar]

8. Patz J.A. Unhealthy landscapes: policy recommendations on land use change and infectious disease emergence. Environ. Health Perspect. 2004;112:1092–1098. doi: 10.1289/ehp.6877. [DOI] [PMC free article] [PubMed] [Google Scholar]

9. Prange S. Demographic factors contributing to high raccoon densities in urban landscapes. J. Wildl. Manage. 2003;67:324–333. [Google Scholar]

10. Coyner D.F. Epizootiology of Eustrongylides ingotus in Florida: distribution, density, and natural infections in intermediate hosts. J. Wildl. Dis. 2002;38:483–499. doi: 10.7589/0090-3558-38.3.483. [DOI] [PubMed] [Google Scholar]

11. Cleaveland S. Diseases of humans and their domestic mammals: pathogen characteristics, host range and the risk of emergence. Phil. Trans. R. Soc. B. 2001;356:991–999. doi: 10.1098/rstb.2001.0889. [DOI] [PMC free article] [PubMed] [Google Scholar]

12. Woolhouse M.E.J. Population biology of multihost pathogens. Science. 2001;292:1109–1112. doi: 10.1126/science.1059026. [DOI] [PubMed] [Google Scholar]

13. Woolhouse M.E.J., Gowtage-Sequeria S. Host range and emerging and reemerging pathogens. Emerg. Infect. Dis. 2005;11:1842–1847. doi: 10.3201/eid1112.050997. [DOI] [PMC free article] [PubMed] [Google Scholar]

14. Pauchard A. Multiple effects of urbanization on the biodiversity of developing countries: the case of a fast-growing metropolitan area (Concepcion, Chile) Biol. Conserv. 2006;127:272–281. [Google Scholar]

15. Olden J.D. Forecasting faunal and floral homogenization associated with human population geography in North America. Biol. Conserv. 2006;127:261–271. [Google Scholar]

16. de Castro F., Bolker B. Mechanisms of disease-induced extinction. Ecol. Lett. 2005;8:117–126. [Google Scholar]

17. Schmidt K.A., Ostfeld R.S. Biodiversity and the dilution effect in disease ecology. Ecology. 2001;82:609–619. [Google Scholar]

18. LoGiudice K. The ecology of infectious disease: effects of host diversity and community composition on Lyme disease risk. Proc. Natl. Acad. Sci. U. S. A. 2003;100:567–571. doi: 10.1073/pnas.0233733100. [DOI] [PMC free article] [PubMed] [Google Scholar]

19. Keesing F. Effects of species diversity on disease risk. Ecol. Lett. 2006;9:485–498. doi: 10.1111/j.1461-0248.2006.00885.x. [DOI] [PubMed] [Google Scholar]

20. Allan B.F. Effect of forest fragmentation on Lyme disease risk. Conserv. Biol. 2003;17:267–272. [Google Scholar]

21. Ezenwa V.O. Avian diversity and West Nile virus: testing associations between biodiversity and infectious disease risk. Proc. R. Soc. Lond. B. Biol. Sci. 2006;273:109–117. doi: 10.1098/rspb.2005.3284. [DOI] [PMC free article] [PubMed] [Google Scholar]

22. Kilpatrick A.M. West Nile virus epidemics in North America are driven by shifts in mosquito feeding behavior. PLoS Biol. 2006;4:e82. doi: 10.1371/journal.pbio.0040082. [DOI] [PMC free article] [PubMed] [Google Scholar]

23. Wright A.N., Gompper M.E. Altered parasite assemblages in raccoons in response to manipulated resource availability. Oecologia. 2005;144:148–156. doi: 10.1007/s00442-005-0018-3. [DOI] [PubMed] [Google Scholar]

24. Deplazes P. Wilderness in the city: the urbanization of Echinococcus multilocularis. Trends Parasitol. 2004;20:77–84. doi: 10.1016/j.pt.2003.11.011. [DOI] [PubMed] [Google Scholar]

25. Gottstein B. Is high prevalence of Echinococcus multilocularis in wild and domestic animals associated with disease incidence in humans? Emerg. Infect. Dis. 2001;7:408–412. doi: 10.3201/eid0703.010307. [DOI] [PMC free article] [PubMed] [Google Scholar]

26. Fischer C. Echinococcus multilocularis infections of rural, residential and urban foxes (Vulpes vulpes) in the canton of Geneva, Switzerland. Parasite. 2005;12:339–346. doi: 10.1051/parasite/2005124339. [DOI] [PubMed] [Google Scholar]

27. Ezenwa V.O. Interactions among host diet, nutritional status and gastrointestinal parasite infection in wild bovids. Int. J. Parasitol. 2004;34:535–542. doi: 10.1016/j.ijpara.2003.11.012. [DOI] [PubMed] [Google Scholar]

28. Riley S.P.D. Exposure to feline and canine pathogens in bobcats and grey foxes in urban and rural zones of a national park in California. J. Wildl. Dis. 2004;40:11–22. doi: 10.7589/0090-3558-40.1.11. [DOI] [PubMed] [Google Scholar]

29. Suzan G., Ceballos G. The role of feral mammals on wildlife infectious disease prevalence in two nature reserves within Mexico city. J. Zoo Wildl. Med. 2005;36:479–484. doi: 10.1638/04-078.1. [DOI] [PubMed] [Google Scholar]

30. Dubey J.P. Molecular and biologic characteristics of Toxoplasma gondii isolates from wildlife in the United States. J. Parasitol. 2004;90:67–71. doi: 10.1645/GE-110R. [DOI] [PubMed] [Google Scholar]

31. Miller M.A. Coastal freshwater runoff is a risk factor for Toxoplasma gondii infection of southern sea otters (Enhydra lutris nereis) Int. J. Parasitol. 2002;32:997–1006. doi: 10.1016/s0020-7519(02)00069-3. [DOI] [PubMed] [Google Scholar]

32. McCabe P. Animal models of disease. Physiol. Behav. 2000;68:501–507. doi: 10.1016/s0031-9384(99)00203-6. [DOI] [PubMed] [Google Scholar]

33. Padgett D., Glaser R. How stress influences the immune response. Trends Immunol. 2003;24:444–448. doi: 10.1016/s1471-4906(03)00173-x. [DOI] [PubMed] [Google Scholar]

34. Ruiz G. Hematological parameters and stress index in rufous-collared sparrows dwelling in urban environments. Condor. 2005;104:162–166. [Google Scholar]

35. Bernier J. Immunotoxicity of heavy metals in relation to Great Lakes. Environ. Health Perspect. 1995;103:23–34. doi: 10.1289/ehp.95103s923. [DOI] [PMC free article] [PubMed] [Google Scholar]

36. Krzystyniak K. Approaches to the evaluation of chemical-induced immunotoxicity. Environ. Health Perspect. 1995;103:17–22. doi: 10.1289/ehp.95103s917. [DOI] [PMC free article] [PubMed] [Google Scholar]

37. Linzey D.W. Role of environmental pollutants on immune functions, parasitic infections and limb malformations in marine toads and whistling frogs from Bermuda. Int. J. Environ. Health Res. 2003;13:125–148. doi: 10.1080/0960312031000098053. [DOI] [PubMed] [Google Scholar]

38. Saaroni H. Spatial distribution and microscale characteristics of the urban heat island in Tel-Aviv. Israel. Lands. Urban Plan. 2000;48:1–18. [Google Scholar]

39. Baker L. Urbanization and warming of Phoenix (Arizona, U.S.A.): impacts, feedbacks and mitigation. Urban Ecol. 2002;6:183–203. [Google Scholar]

40. Lindgren E., Gustafson R. Tick-borne encephalitis in Sweden and climate change. Lancet. 2001;358:16–18. doi: 10.1016/S0140-6736(00)05250-8. [DOI] [PubMed] [Google Scholar]

41. Louis V.R. Temperature-driven Campylobacter seasonality in England and Wales. Appl. Environ. Microbiol. 2005;71:85–92. doi: 10.1128/AEM.71.1.85-92.2005. [DOI] [PMC free article] [PubMed] [Google Scholar]

42. Parris K.M., Hazell D.L. Biotic effects of climate change in urban environments: the case of the grey-headed flying-fox (Pteropus poliocephalus) in Melbourne, Australia. Biol. Conserv. 2005;124:267–276. [Google Scholar]

43. Yeh P.J., Price T.D. Adaptive phenotypic plasticity and the successful colonization of a novel environment. Am. Nat. 2004;164:531–542. doi: 10.1086/423825. [DOI] [PubMed] [Google Scholar]

44. Altizer S. Seasonality and the dynamics of infectious diseases. Ecol. Lett. 2006;9:467–484. doi: 10.1111/j.1461-0248.2005.00879.x. [DOI] [PubMed] [Google Scholar]

45. Boal C.W., Mannan R.W. Comparative breeding ecology of Cooper's hawks in urban and exurban areas of southeastern Arizona. J. Wildl. Manage. 1999;63:77–84. [Google Scholar]

46. LoGuidice K. Trophically transmitted parasites and the conservation of small populations: raccoon roundworms and the imperiled Allegheny woodrat. Conserv. Biol. 2003;17:258–266. [Google Scholar]

47. Broadfoot J.D. Raccoon and skunk population models for urban disease control planning in Ontario, Canada. Ecol. Appl. 2001;11:295–303. [Google Scholar]

48. Hegglin D. Anthelmintic baiting of foxes against urban contaminations with Echinococcus multilocularis. Emerg. Infect. Dis. 2003;9:1266–1272. doi: 10.3201/eid0910.030138. [DOI] [PMC free article] [PubMed] [Google Scholar]

49. United Nations Department of Economic and Social Affairs (2003) *World Population Prospects*, United Nations

50. Theobald D.M. Placing exurban land-use change in a human modification framework. Front. Ecol. Environ. 2004;2:139–144. [Google Scholar]

51. Hope D. Socioeconomics drive urban plant diversity. Proc. Natl. Acad. Sci. U. S. A. 2003;100:8788–8792. doi: 10.1073/pnas.1537557100. [DOI] [PMC free article] [PubMed] [

Google Scholar]

52. Ostfeld R.S. Spatial epidemiology: an emerging (or re-emerging) discipline. Trends Ecol. Evol. 2005;20:328–336. doi: 10.1016/j.tree.2005.03.009. [DOI] [PubMed] [Google Scholar]

53. Wauters L.A., Grunell J. The mechanism of replacement of red by grey squirrels: a test of the interference competition hypothesis. Ethology. 1999;105:1053–1071. [Google Scholar]

54. Tompkins D. Parapoxvirus causes a deleterious disease of red squirrels associated with UK population declines. Proc. R. Soc. B. 2002;269:529–533. doi: 10.1098/rspb.2001.1897. [DOI] [PMC free article] [PubMed] [Google Scholar]

55. Tompkins D.M. Ecological replacement of native red squirrels by invasive greys driven by disease. Ecol. Lett. 2003;6:189–196. [Google Scholar]

56. Rushton S.P. Modeling the spatial dynamics of parapoxvirus disease in red and grey squirrels: a possible cause of the decline in the red squirrel in the United Kingdom? J. Appl. Ecol. 2000;37:1–18. [Google Scholar]

57. Marra P.P. West Nile virus and wildlife. Bioscience. 2004;54:393–402. [Google Scholar]

58. Rachowicz L.J. The novel and endemic pathogen hypotheses: competing explanations for the origin of emerging infectious diseases of wildlife. Conserv. Biol. 2005;19:1441–1448. [Google Scholar]

59. Rizzo D.M., Garbelotto M. Sudden oak death: endangering California and Oregon forest ecosystems. Front. Ecol. Environ. 2003;1:197–204. [Google Scholar]

60. Lanciotti R.S. Complete genome sequences and phylogenetic analysis of West Nile virus strains isolated from the United States, Europe, and the Middle East. Virology. 2002;298:96–105. doi: 10.1006/viro.2002.1449. [DOI] [PubMed] [Google Scholar]

61. Peterson L.R., Hayes E.B. Westward ho? The spread of West Nile virus. N. Engl. J. Med. 2004;351:2257–2259. doi: 10.1056/NEJMp048261. [DOI] [PubMed] [Google Scholar]

62. Karesh W.B. Wildlife trade and global disease emergence. Emerg. Infect. Dis. 2005;11:1000–1001. doi: 10.3201/eid1107.050194. [DOI] [PMC free article] [PubMed] [Google Scholar]

63. Xu R.H. Epidemiologic clues to SARS origin in China. Emerg. Infect. Dis. 2004;10:1030–1037. doi: 10.3201/eid1006.030852. [DOI] [PMC free article] [PubMed] [Google Scholar]

64. Gibbs S.E.J. Factors affecting the geographic distribution of West Nile virus in Georgia, USA.: 2002–2004. Vector-borne Zool. Dis. 2006;6:73–82. doi: 10.1089/vbz.2006.6.73. [DOI] [PubMed] [Google Scholar]

65. Dhondt A.A. Dynamics of a novel pathogen in an avian host: Mycoplasmal conjunctivitis in house finches. Acta Trop. 2005;94:77–93. doi: 10.1016/j.actatropica.2005.01.009. [DOI] [PubMed] [Google Scholar]

66. Farnsworth M.L. Human land use influences Chronic Wasting Disease prevalence in Mule Deer. Ecol. Appl. 2005;15:119–126. [Google Scholar]

67. Isaksson C. Plasma glutathione and carotenoid coloration as potential biomarkers of environmental stress in Great Tits. EcoHealth. 2005;2:138–146. [Google Scholar]

68. Partecke J. Stress and the city: urbanization and its effects on the stress physiology in European blackbirds. Ecology. 2006;87:1945–1952. doi: 10.1890/0012-9658(2006)87[1945:satcua]2.0.co;2. [DOI] [PubMed] [Google Scholar]

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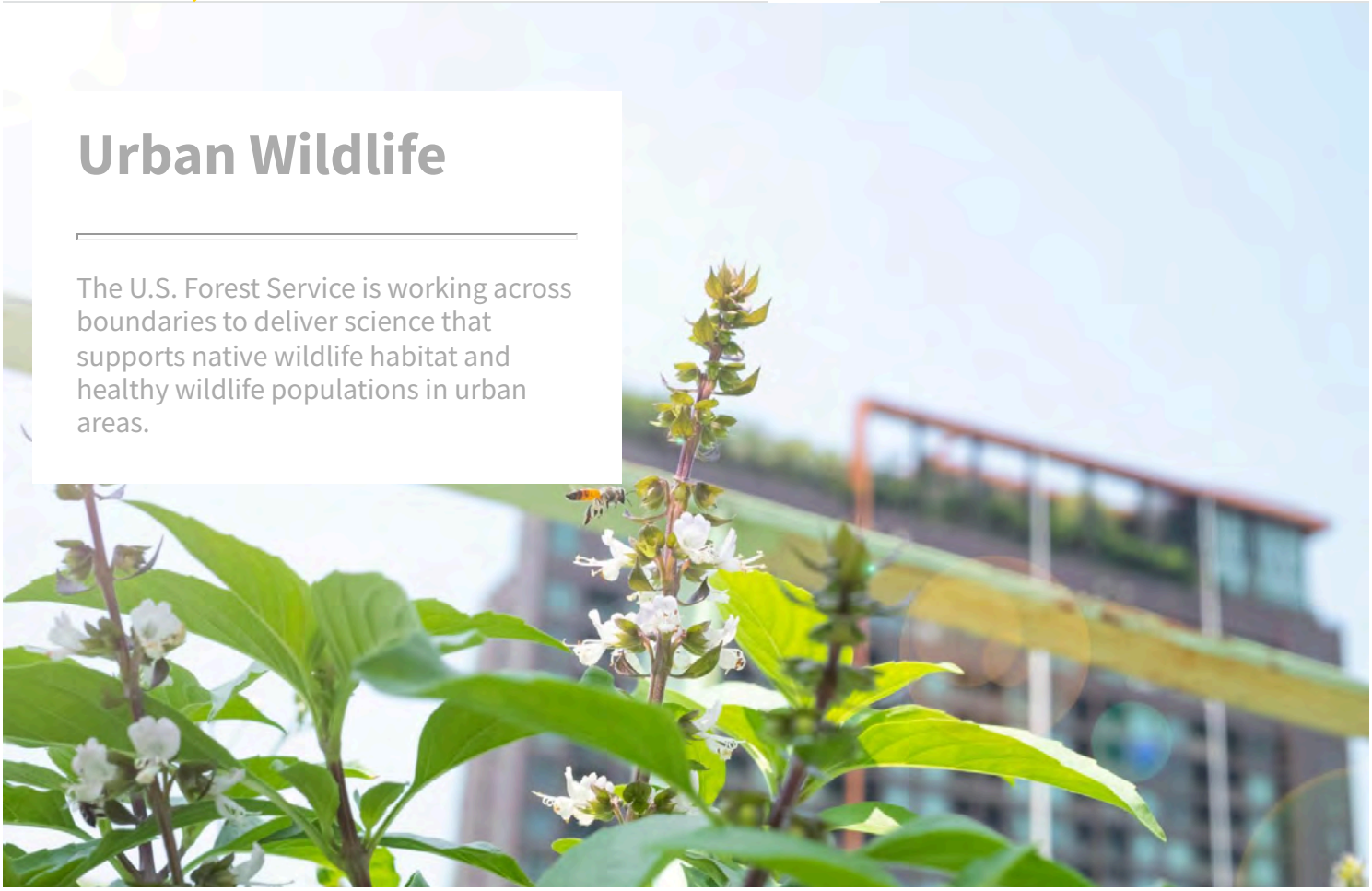


Urban Wildlife

The U.S. Forest Service is working across boundaries to deliver science that supports native wildlife habitat and healthy wildlife populations in urban areas.

Urban Wildlife

Topics
Climate Change
Ecology
Environment and People
Urban Forestry
Urban Wildlife
Outdoor Recreation
Tribal Values and Engagement
Fish and Wildlife

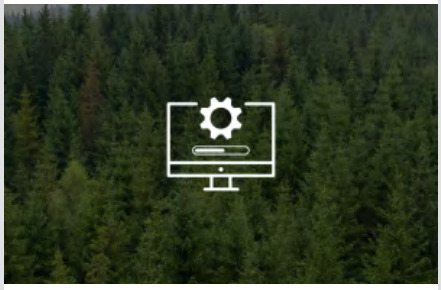
Worldwide – on land, air, and water – species are in a state of perilous decline. Changes caused by human activity, including urbanization, climate change, and the conversion of forests to cropland, mean there are fewer habitats to support plants and animals. Creating and supporting native habitats in urban areas – in public spaces and your own yard – is essential to combatting biodiversity loss.

Humans are profoundly reliant on healthy plant and animal populations for our own wellbeing – though we may not even be aware of the many ways this is so. Healthy native plant populations support native pollinators that are critical to sustaining the multi-billion dollar agriculture industry in the United States, including the food you eat. Other flora and fauna help purify air and water, regulate climate, control the spread of pests and diseases, sustain human health and wellbeing, and provide humans with a sense of connection, beauty, and purpose.

The USDA Forest Service is working across boundaries to deliver science that supports native habitats and wildlife populations in cities and suburbs. Our nation's forests and grasslands, as well as parks and preserves, are known for sustaining habitats to support healthy plant and wildlife populations. But those spaces and the connectivity among them is limited. Urban and suburban spaces provide habitat and support migratory pathways and stopovers that link populations and places. Landscape connectivity is also critically important as species struggle to adapt to climate change and, in some cases, migrate to more suitable habitats. Our science demonstrates the many ways that urban and suburban areas – including even the simple choices that we make about what to plant and how often to mow our own yards – are critically important to combatting species and biodiversity loss while enhancing people's quality of life.

Tools for Habitat Suitability

Tool



i-Tree

Related Research Projects Across the Forest Service

Project



Residential Lawn Management and Pollinators
Station: Northern Research Station

Project



Restoring with Culturally Significant Plants to Strengthen Food Webs for Pollinators and Tribal Community Well-Being
Station: Northern Research Station

Program



Communities and Landscapes of the Urban Northeast
Station: Northern Research Station

Program

Project



[Restoration and Conservation of Rural and Urban Forests]

Station: Northern Research



[The Stewardship Mapping Project (STEW-MAP)]

Research Highlights



[Residential Yards and Gardens Can Expand Wildlife Habitat in Cities]



[What Do I See? What Do I Hear? Tying Bird Classification to These Questions Has Potential to Change Yard Management]



[In-Filling Reduces the Urban Forest to the Detriment of Humans and Wildlife Habitat]



[Models for Ecological Restoration in Urban Areas: Lessons From the USA and Europe]



[It's the City Life for Me! Spring Peepers in Urban Areas have Lower Rates of Fungal Infection]

Managing Urban Greenspaces

Effective management and planning in urban and suburban areas can be complex due to social, economic, cultural, regulatory, and many other factors. While big cities like New York and Chicago may

not have many homes with yards, most cities and suburbs actually have a huge amount of land in the form of private property, such as people's lawns, gardens, and yards. The cumulative impact of what people chose to do on these parcels has huge implications – either positive or negative – for biodiversity. Common yard and turf management practices, like maintaining grass lawns and using pesticides and herbicides, create anemic habitats and greatly reduce biodiversity. On the other hand, planting native trees and plants, converting turf grass to native habitat, and re-examining traditional lawn care approaches, can all support improvements in biodiversity and wildlife population sizes.

For example, our research has demonstrated that less-frequent mowing (every two weeks) resulted in more lawn flowers and more bees.. Mowing less frequently is a time and cost savings for residents, can help negate habitat loss for pollinators, and reduces carbon emissions compared to weekly mowing.

- Christopher A. Lepczyk, Myla F. J. Aronson, Karl L. Evans, Mark A. Goddard, Susannah B. Lerman, J. Scott MacIvor. 2017. Biodiversity in the City: Fundamental Questions for Understanding the Ecology of Urban Green Spaces for Biodiversity Conservation
- Myla F.J. Aronson, Christopher A. Lepczyk, Karl L. Evans, Mark A. Goddard, Susannah B. Lerman, J. Scott MacIvor, Charles H. Nilon, Timothy Vargo. 2017. Biodiversity in the city: key challenges for urban green space management
- Susannah B. Lerman, Alexandra R. Contosta, Joan Milam, Christofer Bang. 2018. To mow or to mow less: Lawn mowing frequency affects bee abundance and diversity in suburban yards
- T. J. Clark-Wolf, Philip G. Hahn, Eric Brelsford, Jaleen Francois, Nicolette Hayes, Beau Larkin, Philip Ramsey, Dean E. Pearson. 2022. Preventing a series of unfortunate events: Using qualitative models to improve conservation
- Susannah B. Lerman, Desirée L. Narango, Meghan L. Avolio, Anika R. Bratt, Jesse M. Engebretson, Peter M. Groffman, Sharon J. Hall, James B. Heffernan, Sarah E. Hobbie, Kelli L. Larson, Dexter H. Locke, Christopher Neill, Kristen C. Nelson, Josep Padullés Cubino, Tara L. E. Trammell. 2021. Residential yard management and landscape cover affect urban bird community diversity across the continental USA

Last updated January 12, 2024

Public comment report

Public comments on city expansion proposals for the 2018 growth management decision

August 2018

APPENDIX C: COMMENTS RECEIVED, SURVEY RESPONSES

Q2 Comment: General comments

Answered: 67 Skipped: 108

#	RESPONSES	DATE
1	--For the ranking, which is higher, 1 or 5??? I don't know how to rank the questions without that information. --I attended CPO 6 meeting a few months ago in which the Beaverton UGB expansion project manager could not answer the question about how properties get annexed into Beaverton. But the expansion document stated that there was already an IGA between Washington County and Beaverton that would allow Beaverton to annex urban reserve areas that were pulled into the UGB. Why were the attendees not told that? --A followup question asked what additional services would be provided to current residents if Beaverton annexed the area. There was effectively no answer--except that current residents would have an additional $4.50 or so per thousand added to their tax bill. Is a good part of the proposed annexation supposed to be funded on the backs of the current residents of that area? --Traffic is already bad; the proposal does not seem to be aligned with Washington County statements on traffic priorities. My observation is that different jurisdictions (city, county, state) don't play well together when it comes to roads (orphaned roads, for example) to the detriment of all citizens in the area. --It seems that Beaverton expects the Progress Ridge shopping area to serve the as yet to be built proposed new homes--but parking there at peak times is very limited. How will thousands of more shoppers even access those stores? Not everyone can bike or walk there. --A general comment on density. Although these plans address many complex issues and populations, one population that I don't see as being addressed is the elderly population. Is that not growing in this area? Those folks may or may not need less expensive housing, but one thing that they will need is single floor living in order to remain in their homes--a requirement that I've never seen addressed in any documentation--perhaps because it decreases density? Please address this issue in the metro guidelines. --I've read the proposals from the cities, and I've watched the houses spring up in Tigard around Scholls Ferry and Roy Rogers. Those homes are so dense that there is little room for kids to play and grow, much less room to plant a full-sized tree. Trading density for livability is a long-term losing proposition for this area. Ease up on the density and assure a more long-term, livable area.	7/9/2018 5:03 PM
2	Assuming 1 is highest	7/9/2018 4:39 PM
3	Since it's not explicitly stated for the above question, I'm assuming that the ranking is 1-poor ranking to 5-high ranking. For Beaverton in particular, recent expansions do not take into account a range of housing densities that meet a variety of expectations. Not all people want to live in high density apartments or on postage-stamp yards with out any way for our kids to play outside on our own property. In my mind it is much more desirable for adequate recreational space in in local yards than having to walk or drive to communal parks that may or may not be maintained safely. Recent development has also not taken into account the increased traffic congestion due to high density development. Don't expand development areas until the traffic issues are dealt with.	7/9/2018 3:31 PM
4	Roadways need to be expanded prior to or at least early in the development process. Drastic traffic improvements required for the current hills, so mtn Tigard expansion. Need to add the west side bypass	7/9/2018 2:51 PM
5	A large portion of the Cooper Mountain reserve area already has developed neighborhoods, introducing new high density neighborhoods will create a patchwork of developments in this area. how will the utilities & infrastructure be paid for in a scenario like this? We do not want to be a part of Beaverton as they have nothing to offer us except higher taxes & fees.	7/9/2018 2:43 PM
6	UGB expansion should NOT be done at the expense of quality of life. We do NOT need to become the next US metro area suffering from suburban sprawl and the traffic that comes with it.	7/9/2018 1:37 PM
7	The City of Beaverton is not looking @ the whole picture for their expansion ideas. They need to slow down & do the process properly.	7/9/2018 12:32 PM
8	Rediculous planning. zero consideration on roads. this dumb ass density with no road expansion or highway creation is flat out irresponsible!!! Metro has to be abolished! I am a native Oregonian! Sick of it!!!	7/9/2018 12:18 PM

9	Other than Beaverton, the other 3 cities' proposals have done a good job at meeting the above goals. I propose: "Let's create specific evaluation metrics by which to objectively measure the expansion proposals against Metro goals. Let's truly plan for the future and look at creating welcoming family communities for all age groups and ethnicities in a very wide range of socio-economic situations. These new communities should be near rail line/mass transit routes which are expandable and where most of the absorption should be focused, not on the fringes where infrastructure is not able to support that kind of population pressure. We have a great resource of strategic planners in our communities who could partner with Metro to design and develop these communities of the future. There's still time. Lets create communities which truly reflect all 6 of the goals and objectives of Metro and what Oregon really is: a healthy, clean, green, welcoming place with growth opportunities for all. KEEP OREGON CLEAN & GREEN."	7/9/2018 12:12 PM
10	We need express roads built to connect to I-5 and US 26. Build a road from Cornelius Pass to Clark Hill Road in Beaverton.	7/9/2018 10:36 AM
11	Increased supply and reduced barriers will help everyone in the area regardless of color or income level.	7/9/2018 9:33 AM
12	Cooper mountain should not be annexed into Beaverton. Should be left alone	7/9/2018 7:09 AM
13	There are two other factors I think should be considered in deciding where to expand: 1) How will the expansion affect SNA (Significant Natural Areas, riparian areas and wildlife corridors. 2) How is the development likely to contribute to existing traffic congestion.	7/8/2018 11:25 PM
14	Cities that have significant undeveloped land previously added within the UGB should not add any more. Also, a proven ability to fund and develop the needed infrastructure should be shown by a city before adding more land.	7/8/2018 10:04 PM
15	The is very little infrastructure in the South Cooper mountain area. Tri met won't send busses upon that way because of the roads. There is not a good way to travel North to south	7/8/2018 9:29 PM
16	The problem I see with the expansion plan is that metro and the city of Beaverton have not coordinated on how the roads will be impacted. For those of us living on 175th, getting out of our driveways and down either side of the mountain will be GREATLY diminished by the number of new homes planned. Traffic will be a nightmare unless Tile Flat or another access road is put in or expanded to handle the huge increase in traffic.	7/8/2018 9:23 PM
17	The Beaverton proposal is to take the land on top of Cooper Mountain and turn half of it into homes eventually. I see several problems with building up there: 1. Only half the land is developable. Of the 1200 acres only 600 is buildable. It will create a patchwork of small neighborhoods with houses that will be worth a small fortune each, definitely not affordable. And there is no access to the types of services that would be required for low income residents anywhere near the site. 2. There are no stores or shops up there and no plans for any. So, the residents of the 3700 new homes would have to get in their cars to go somewhere else every time they needed to shop. With the steep grades and winter weather it is not feasible to add all this traffic. 3. The top of Cooper Mountain is a snow zone, and in the winter there there are about twice the snow and ice days and precipitation thickness that the valley floor sees. Every resident auto is required to carry and use traction devices in the winter, definitely a hardship for residents of affordable housing. 4. According to the Oregon Department of Geology Statewide Landslide Information there is a large landslide in the East Hills section of the site that crosses 175th Ave. Last year, Washington Co. had to fix the road due to the slippage cracking the pavement. 5. If extra land is needed in the UGB, please give it to King City and Wilsonville, where the land is not on top of a mountain. Beaverton will not be able to digest South Cooper Mountain in the next decade and they certainly will have difficulty incorporating the top of Cooper Mountain into their city.	7/8/2018 9:12 PM
18	These questions have no relevance to the issue of annexation of Cooper Mountain. There will be no multi-use affordable low income housing on Cooper Mountain. The only people of color in new houses on Cooper Mountain will be affluent people of color. The main road, 175th is already overburdened with commuters, not residents. The only reason to add this area to the UGB is to provide more tax revenue to the City of Beaverton. I say no.	7/8/2018 9:02 PM
19	Right now the city of beaverton cannot keep up with the current expansion with transportaion, access, affordability and livability... adding more housing without infrastructure ahead of time to meet the needs... not after .... is irresponsible!	7/8/2018 8:43 PM
20	I'm surprised at this survey since it's been clear for a long time that our governing bodies, especially METRO, don't actually consider 'public input' when making decisions and go ahead no matter what the people have to say. Please don't approve expansion of the UGB and ultimate annexation to Beaverton of the Urban Reserve Area on Cooper Mt. as the infra-structure is strained to the gills now with already approved building barely begun!	7/8/2018 8:26 PM
21	My ranking considers 1 high---5 low.	7/8/2018 7:17 PM

22	I find there is very little consideration for flora, fauna or children. Talking to a developer at a meeting for Cooper mt area, he told me there was NO room for trees in his development. A metro council member told me in a meeting with several dozen people that children DON'T play in their back yards any more. Guess that is why housing developments in the Cooper mt area are five ft apart with no back yards. Nice future....good job council members. The deer that were so fun to watch passing thru our yards are having a tough time or are killed on 175th. Beaverton use to be a desired area as those of us who raised our kids there. Now, you are making it ugly with massive building developments and as I said earlier with no care for children, wildlife or plants. This is not what I saw for my grandchildren's future. Now just ugliness.	7/8/2018 6:55 PM
23	development feasibility and preservation of open and natural areas should be the first consideration	7/8/2018 4:38 PM
24	I live on Cooper Mt. where the city of Beaverton is proposing an expansion, and have seen the traffic increase tremendously. Because some of the property is not in the urban growth boundary, the roads cannot be improved. Beaverton has come up with a good plan to provide a diverse mix of housing, green spaces, improved transportation and a coherent plan for the entire area. Delaying the expansion would cause costs to increase even more, making affordable housing even further out of reach for many people. Because housing is so expensive, many people are moving further and further away from town, increasing the congestion on our roads and increasing transportation costs for many people.	7/8/2018 3:28 PM
25	None of these questions deal with concerns about viable transportation and preservation of natural areas. That is a critical deficiency in this survey process and shows bias in favor of expansion at the expense of proper transportation routes and natural resources and wildlife habitats.	7/8/2018 2:40 PM
26	Why should I care what the city has done in its downtown core when considering expansion? The question is how does the area under consideration outside the UGB currently lend itself to affordable housing, transportation, natural areas, etc. … which the top of Cooper Mountain fails in all important aspects as far as development is concerned. It has lots of forest which would go away with expansion.	7/8/2018 10:51 AM
27	Our roads are overcrowded and we need new roads FIRST,, hault all developing until our roads in Beaverton can handle the increased traffic . We need more north south roads	7/7/2018 9:36 PM
28	One of the most important factors has been left out of the above. I would rank preservation of natural areas and wildlife habitat and ecological concerns (wetlands as an example) either number one or number two. It seem s that existing infrastructure such as roadways sewer water and other utilities should also be a major element in considering the appropriateness of adopting expanded urban growth areas	7/7/2018 2:32 PM
29	As president of the King City Highlands, I spearheaded annexation of the Highlands to the City of King City and my desire is to see the King City grow stronger.	7/7/2018 11:11 AM

30	Thank you for taking comments on this process and I hope you will consider my family's concerns in making your decision. I live in the proposed expansion area for Hillsboro and have absolutely no interest in coming into the expansion area. I know of a few others that also aren't interested in joining either. Beyond my personal lack of interest in joining, I have a few other concerns. The first is that Hillsboro has just started to build out South Hillsboro, which is supposed to have 8,000 homes and even though the city thinks people that people who live there will somehow not drive, it is going to make traffic on TV Hwy even more unbearable. If they were to look at increased housing in Hillsboro it would seem to make much more sense to put it closer to highway 26 which was recently expanded. TV Hwy has businesses, railroad tracks and housing on both sides and seems to have already been expanded as fully as possible. In looking at the housing needs analysis there is also a large margin of error that on the low side of the estimate doesn't justify the need for any more housing. Conveniently, the city left the housing needs analysis that they were basing the whole project on from the planning department meeting so that the community didn't have access until after the meeting was done and decision made. A member of the community pointed this out during the meeting and one of the commission members incorrectly cited the wrong document and then said the right one was available. Sometime later in the meeting, when he noticed the community member was going to correct him, he did admit to referencing the wrong document and said the other one had been removed from the website. If this is the level of attention to detail and review the planning commission took towards the project; metro should be concerned. This should be reflected in the meeting minutes of the planning commission. Additionally, this lack of available information prevents those in the community from commenting completely and seems a necessary due process step. At the very least because of this lack of necessary information, Metro should make the city submit in future rounds so the planning commission meeting includes the housing needs analysis and the communities impacted actually have the same data. An additional concern is that it seems the analysis is assuming that some of the housing will go to people with jobs in Portland; however, putting housing in Hillsboro for jobs in Portland seems like poor planning as well as putting unnecessary strain on roads that already can't handle the traffic. In looking at the other cities' proposals it would seem to make much more sense for the housing to be built closer to Portland. For example, the size of the proposal for Beaverton would also seem to go much further in addressing housing needs due to its size. As someone who looked for housing in Beaverton, due to a job and commute daily into Portland; there wasn't anything we could find so ended up back in Hillsboro. Thank you for considering our concerns.	7/7/2018 8:01 AM
31	Serious current transportation issues cannot support additional residents.	7/6/2018 11:31 AM
32	My name is Roger C. Henderson and I have lived at 17565 SW Cooper Mountain Lane for 26 years. I urge you to stand against the inclusion of our Urban Reserve into the Urban Growth Boundary. Please be reminded that not all of your constituents are human. For the past 26 years there has been a whittling away of what was once mixed farm country and wooded acreage. Our Urban Reserve stands as a remaining island of habitat for species that called this area home. What is to be gained by expanding the UGB into area? More high density housing, more traffic jams and accidents on what has now become the default Westside bypass? All in pursuit of the almighty dollar with no thought given to the native raccoons, owls, woodpeckers and many other varieties of birds. Other species that are counting on your mercy are squirrels, chipmunks, deer, and yes even the coyote. I pray that you will show compassion to these critters, and leave this sanctuary island of Urban Reserve outside of the UGB as a refuge from over development. Thank You.	7/6/2018 9:44 AM
33	The priority needs to be on improving density and connectivity; sprawl/expansion should be the last resort and we are not there yet. Everyone complains about worsening traffic; adding to the sprawl only exacerbates it. Some people who live in the suburbs say "I have no choice but to drive everywhere. I want other options but it's not possible where I live." Emphasize TOD and mixed use, build up and not out, reduce parking minimum requirements, and ensure that there is adequate infrastructure to support a car-light lifestyle in these communities FIRST.	7/3/2018 3:15 PM
34	The city of Beaverton and the UGB has missed identifying the integration what best identifies the natural qualities of the area and conserving them for future generations. Preservation of the green areas and incorporation of those into the living spaces is missing. We are beginning to look like another LA and are losing the urban reserves	7/3/2018 1:16 PM
35	Cooper Mountain exemplifies few of the factors above and would be a poor add to the UGB. Central Cooper Mountain is already used as a bypass for 217 and Murray Blvd with traffic backing up on 175th and others flying over Grabhorn. Moreover, those two streets specifically do not have any east/west exit points besides Kemmer/Scholls FY and Scholls/Gassner respectively. Blind hills, lack of sidewalks and no tri met service further complicate traffic patterns and the area currently has no walkable features. Furthermore, historical housing prices on Cooper Mountain are far above what supports a heterogeneous population.	7/3/2018 1:03 PM
36	Does Beaverton WANT to ruin the Cooper Mountain Nature Park and surrounding landscapes? Are they trying on purpose to create an island of habitat instead of a corridor?	7/2/2018 12:14 PM

37	The city is doing a horrible job with trying to maintain Cooper mountain in its Beaty. Our neighborhoods have lots of space to roam and we moved here not to be in a jam packed area. You are destroying the integrity of Cooper mountain with trying to expand up into a developed area instead of looking at other options such as doing down Roy Rogers or tile flat and not impose on existing neighborhoods and investments. Many love the peacefulness of Cooper mountain and the nature park and beautiful tall trees. Shame on the city for destroying all of the natural beauty! This area does not need anymore homes! If you annex off part of the natural areas and vineyards for building purposes you are destroying the area! Repurpose old neighborhoods and bring people into those existing homes. There is a way to have growth without destroying the area that we all love so much	7/1/2018 1:54 PM
38	If the housing needs assessment was done well, social equity and diversity should be part of that. If by breaking out the diversity and equity piece, it means they were not part of the housing needs assessment, then the assessment is inadequate.	7/1/2018 6:34 AM
39	The urban growth boundary is a boundary. To increase it to accommodate additional people only facilitates urban sprawl and rural degradation...the two conditions the boundary was created to prevent. These lands outside the boundary should be developed if, AND ONLY IF, all measures for densification within the existing boundary have already been undertaken and a housing need still exists. This is clearly not the case: for example: all the cities which have submitted proposals do not have any high rise housing structures like Portland does and have plenty of areas within their city limits which are substandard and should be developed to accommodate mixed-use, affordable and economical diverse housing and business near existing transportation.	6/30/2018 3:19 AM
40	Having land ready for development is imperative.	6/29/2018 4:47 PM
41	Please rezone SW Beaverton-Hillsdale Highway, SW Canyon Road, TV Highway, and other "auto row" eyesores. Many grocery stores have closed around West Slope and Raleigh Hills. Please make a road diet on SW Scholls Ferry Road between SW Raleighwood Lane and the very big retaining wall to the south of SW Humphrey Blvd. Please reroute bus 56 to give service to the West Hills and the Oregon Zoo.	6/27/2018 8:53 PM
42	Great for the future of King City...it is well thought and planned with input and considerations from and for the people and the City! Councilman, Dr. Smart Ocholi, City of King City, OR	6/27/2018 7:51 PM
43	Area is hilly and not suited for high density houses and of no ADEQUATE road structure . therefore you will end up with $ 600,000 plus row houses homes	6/27/2018 4:19 PM
44	It would be significantly beneficial to describe the ranking - that I'm being asked to rank from 1 - 5 (1 being my highest priority) to 5. I'm going to assume that is what you want... The city, in this case King City has not done a sufficient job on any of the bottom four. Especially describing how funding will support the aspirations.	6/27/2018 3:42 PM
45	somewhat ambiguous factors...and none of these mention prohibitive transportation constraints over and/or around the Cooper Mountain area or protection of Natural Resources as important. I'm a native oregonian and live on Cooper mountain. I know there must be progress and things can't stay as they are...but why develop such a beautiful mountain that has already proven to have an abundant natural habitat and needs to be protected to some degree? Why not build directly on or closer to max lines and/or major highways? i really don't think that Beaverton has mine or for that matter any Metro area tax payer's interests in mind with their proposal. I believe it is entirely a "land grab" for increased taxes and fees (water/sewer, etc) in their jurisdiction. I was so pleased with what was developed in Progress Ridge area, but now this is already at peak capacity for retail,parking, etc and we are not seeing any expansion to this needed resource in the planning....just more homes/townhomes/apartments.	6/27/2018 1:49 PM
46	King City seems to have a plan that will serve the needs of a growing SW metro area responsibly and with consideration to what are Oregon values.	6/26/2018 8:33 PM
47	I feel the city or cities have not met the criteria of looking at transportation or natural areas needs already. They must address this first considering the additional growth that is occurring, before even thinking about expanding the urban growth boundary.	6/26/2018 8:07 PM
48	Need homes. Expand. If multi unit is built make sure it includes parking.	6/26/2018 7:35 PM
49	They need to have more housing in the city and not keep moving out to the farm land.	6/26/2018 12:58 PM
50	5=best King City is in an excellent position to provide land and infrastructure to ensure affordable, equitable and viable housing and business development. As a resident of King City I am strongly in favor of the proposal to expand the UGB and bring the UGR into King City’s city limits. We have dedicated leadership who I entrust to properly manage the area.	6/26/2018 11:40 AM
51	The plans show great planning consideration for livability and forward planning of land use and needs of people.	6/26/2018 10:43 AM

52	While I recognize the need for affordable housing in our area, I strongly oppose sacrificing wetlands, nature reserves and forested areas.	6/26/2018 10:29 AM
53	I hate to see more green space taken away when there are areas within the city that could be converted to high-density housing. Maybe the city could look at grant projects to convert existing properties to high-density housing. Beaverton has done a terrible job of creating walkable neighborhoods. That needs to change.	6/25/2018 10:28 PM
54	Oregon needs to make these developers pay for the new schools and improved roads that are needed with all of this new development!	6/25/2018 5:22 PM
55	There needs to be funding for infrastructure development for areas already brought into the UGB. Gresham's annexed Pleasant Valley is still waiting for sewer service to start development. The development that has taken place is from a "temporary" pump system to reach existing sewer. One developer is responsible for almost all PV development based on the temporary pumping system. A revolving account that can be tapped into by cities and paid back with SDC fees that are collected with development would keep Metro from having to add land to the UGB now.	6/25/2018 1:28 PM
56	Wilsonville and Hillsboro are the only proposals that will actually work as planned. King City and Beaverton must be rejected.	6/22/2018 8:20 PM
57	Roads need to be improved before development. Farmington is becoming a parking lot and development has just begun. The roads cannot handle the proposed growth. The standard of living is decreasing every year due to traffic congestion. BUILD ROADS!	6/14/2018 6:40 PM
58	We need more housing in the metro area and the only two city's that are working hard and has proven them selfs are King City and Beaverton. The proposal by wilsonville is poorly done.	6/14/2018 12:38 PM
59	Urban growth boundary expansions should be contingent on ensuring existing built-up areas (particularly downtowns, main streets and other areas close to frequent transit, commercial areas and employment centers) are prioritized for mixed-use and walkable development first. Once those areas have been built-out, local cities should be allowed to consider growth boundary expansions (note that reducing barriers to high density, mixed-use, walkable development is not enough; the areas should be built-out with high density, mixed-use, walkable development first). If that condition is met, any UGB expansion should be prioritized in (1) areas with low-quality soils that cannot be used for farming; (2) areas with limited or no slopes to reduce development costs, minimize natural hazards, and reduce pedestrian and bicycle barriers; (3) areas where groundwater/soil contamination and/or runoff will not harm water quality to ensure the protection of our region's water supply (drinking and non-drinking water) and to preserve the health of streams (including the animals and plants that live within or alongside those streams); (4) areas that are contiguous and well connected to existing built-up areas so that infrastructure costs remain low and large new roadways are not required to accommodate the new growth areas; and (5) areas that can easily/efficiently be served by fixed-route transit that is well integrated to the rest of the TriMet/SMART/C-Tran network(s).	6/13/2018 8:08 PM
60	These cities should only be allowed to expand once a plan is in place to provide alternative means of transportation (not 18400 more cars on the road)	6/13/2018 8:03 AM
61	I see so many vacant lots and vacant commercial space in existing urban areas. I would like to see a much more concerted effort to make use of unused space within current cities before expanding to precious farmland and nature areas.	6/13/2018 7:50 AM
62	Please allow more land for homes. We need more housing options and I don't want to live in a small condo.	6/12/2018 6:19 PM
63	Rankings above given: 1 is lowest importance, 5 is highest importance.	6/11/2018 11:46 AM
64	Please ensure that existing urban areas have flexible zoning that allow for many types of infill development prior to considering UGB expansion. It is frustrating to see us consider expanding the UGB when our municipalities (including Portland) have large swaths of highly restrictive zoning that allow only for detached homes on relatively large lot sizes. Minimum parking requirements and disconnected suburban-style streets further restrict the ability of our existing urban areas to serve our housing and transportation needs. These zoning restrictions mandate auto-oriented sprawl and undercut the goals of the UGB. Thank you!	6/11/2018 9:27 AM
65	all should be considered, but my number 1 choice essential	6/11/2018 8:56 AM
66	I don't believe any of the cities are required to provide new housing for the people who are "projected" to move here, if the current residents don't believe that's a good idea. Growth, at any cost, is not a desirable goal.	6/11/2018 7:14 AM
67	This factors don't include protection of environmentally sensitive inside and outside the UGB. I would make this number 2 or 3.	6/8/2018 11:40 AM

Q4 Comment: Beaverton

Answered: 53 Skipped: 122

#	RESPONSES	DATE
1	We live in the "Urban reserve area" and have NO interest in being annexed into the city of Beaverton OR the Urban Growth Boundary. Our property is NOT for sale for development.	7/9/2018 8:43 PM
2	See comments on previous survey page.	7/9/2018 5:04 PM
3	Beaverton has not adequately addressed traffic issues in this area. Ideas such as "straightening the kink" on 175th makes little sense when it just makes for a steeper grade on an already steep hill in an area prone to icing. Also increasing traffic due to development already underway is leading to increasing congestion. These are country roads on hilly terrain; it is not possible to fill them up with end-to-end traffic and expect any satisfied road user. I do not support including this area inside the Urban Growth Boundary until the long term traffic issues are addressed and any road improvements are completed and are proven to resolve congestion and flow problems.	7/9/2018 3:47 PM
4	Beaverton ignores the concerns of the local residents who are subject to their "empire building". No cooperation with the Save 175th ave .org neighborhood group...we need to be heard by Metro.	7/9/2018 2:51 PM
5	LOVE that this would be growth within the existing city limits and that it includes multi-family residential development.	7/9/2018 1:39 PM
6	A lot of this land is not buildable. Maybe only the south western part of the Urban Reserve area could be moved in to the UGB which is mostly flat.	7/9/2018 12:38 PM
7	NORTH COOPER: 1. Try and keep this area less dense than what is shown as "planned" in the Urban Reserve Area. 2. Forget the short-cut bypass from 185th to Kemmer Road. You are impacting too many established neighborhoods (SW Heightsview Ct.). Tax dollars wasted. The bypass will only save 1 minute off commute time. Consider just rounding off corners (Gassner > SW 190th & 190th > Kemmer). That scenario has less negative impact. 3. There is also a small wetland area on the bypass route. It would be nice to avoid that too 4. Long term plan should be to avoid any major arterial going over Cooper Mountain due to inclement weather during winter months (snow and ice buildup on steep roads (South on 185th over Cooper & South on 175th over Cooper). A Cooper Mountain Bypass plan has been popping around which seems like a good idea URBAN RESERVE AREA: 1. Please don't not put Compact & Urban Neighborhoods in. Cooper Mountain is not the place to try and get high density housing areas placed. There are better areas off of the mountain to do this. The Compact Neighborhood north of Winkelman Park doesn't make sense due to density and extra traffic load that will place on 175th (inclement weather issue again).	7/9/2018 12:26 PM
8	The Cooper Mountain Urban Reserve Area comprises a set of riparian areas around various streams stemming from the Cooper Mountain Nature Park and lands to the east of that. The area has also historically been part of the county Significant Natural Area (SNA) and a wildlife corridor. The SNA and the wildlife corridor was an extension of such areas that went over the top of Cooper Mountain to the NE down the Beaverton Johnson Creek's headwaters. That area was already significantly compromised with the development of Renaissance Pointe I&II 10-15 years ago. Further denigrating these SNA through developing the Urban Reserve Area may make Cooper Mountain Nature Park a Nature Park in name only. A second matter, there is already significant local concern on Cooper Mountain about the volume of traffic that will come across Cooper Mountain from the South Cooper Mountain and Tigard developments south of Scholls Ferry Road. Adding another 3760 units in an area with traffic constraints and no public transit (and in a snow zone) is only going to make the situation worse.	7/8/2018 11:42 PM
9	Beaverton has not shown the ability to develop the infrastructure needed for the North Cooper Mountain and South Cooper areas. More infrastructure and development work should be done for those areas before adding any more land within their UGB.	7/8/2018 10:07 PM
10	There is a need to address public transportation and access to safe sidewalks. Also consider natural resources and wildlife .	7/8/2018 9:39 PM
11	The roads do not support this level of development. Traffic is already horrendous.	7/8/2018 9:30 PM

12	Too many homes for the existing roads! Even with the so called "improvements" to 175th Ave, traffic is going to be a nightmare for those of us already living on the mountain.	7/8/2018 9:26 PM
13	See my comments to first question. Same criticism applies.	7/8/2018 9:03 PM
14	The above is a bunch of bullshit! We live on cooper mountain... and have lived with 2 years of construction detours, roads paved, only to be ripped up again, no adequate water supply for the new housing. If $500,000 is the price range you are looking for houses then you are in the right place. if not... the new houses are overpriced.... that even or your kids might not be able to afford it! check out the pricing. There is no buses to these areas. even the multi- housing is expensive. And look at the amount of houses planned. Traffic is horrible. Schools are overcrowded, even the new ones especially with more growth. Homelessness has increased due to rising rent. give some other area growth, and let south cooper mountain recover first.	7/8/2018 8:53 PM
15	By far the weakest of all of the plans submitted to metro. Current growth has already exceeded peak travel time capacity for roads in this area. The proposal keeps on mentioning 'puzzle piece' making it clear this is more of a land grab than anything. Realistically the surrounding area is not well served by Beaverton in the first place, and their 'concept plan' doesn't address the transportation needs of this area. Build the roads like the 'around the mountain' proposal, don't try to 'fix' 175th and make it into something it can't be. The funniest argument by far was the suggestion of mass septic system failures. Folks in this area are not interested in (eventually) becoming part of Beaverton, the benefits just aren't there.	7/8/2018 8:18 PM
16	Since I live in the massive building area and have for 40 yrs, I have been to many, many meetings and of developers. I have yet to see real affordable housing in the plans of the south Cooper mt area. I have also found that council members whether be county, metro or local school districts put out these surveys and generally don’t care what the public thinks. They do what they want.	7/8/2018 7:03 PM
17	Including the central urban reserve area makes a lot of sense, as Beaverton has done a very nice plan to encompass north, south and central Cooper Mountain, and not expanding into this area makes it impossible to carry out their plan and create a more integrated neighborhood and transportation.	7/8/2018 3:31 PM
18	All of Cooper mountain should be in the urban area to all for proper planning of roadway between north and south cooper mountain.	7/8/2018 3:26 PM
19	STOP The growth until you built more roads. Sw 175th cannot handle all the north south traffic !!!!	7/7/2018 9:38 PM
20	The terrain in this area and existing urban reserve protected areas make it a poor candidate for development. Any plan to include this area should necessarily encompass a thorough review of not just available services but also the difficulties and challenges of providing the necessary sewer system (which is limited in this area with much of the proposed growth area not being serviced at all.) Additional transportation options must also be included, and in place before development occurs. The trafficincreased over the last few years in large numbers and the new developments underway presently will do nothing more then add to an already exceedingly difficult situation.	7/7/2018 2:33 PM
21	No, I disagree with the UGB moved into this area as the “East Hills” already have established neighborhoods, this will create a patchwork of high density developments with no services or transportation infrastructure. Beaverton does not listen to the current residents including “Save 175th ave.org” who are trying to keep this area livable by moving the major arterial around the mountain. Beaverton’s only interest is an increased tax base & this reeks like their attempted annexation of Nike property. WE WILL FIGHT ANNEXATION OF THIS AREA.	7/7/2018 10:33 AM
22	They	7/6/2018 2:53 PM
23	Utilize North Cooper Mountain first	7/6/2018 11:32 AM
24	Just what the area needs, more McMansions around Cooper Mountain Nature Park. Building yet more housing out there will seriously impact the way that the park is managed. I don't imagine these homeowners being too thrilled about controlled burns for instance...	7/2/2018 12:17 PM
25	We need to be careful about over expanding. Traffic and congestion is already getting heavy in these areas as noted at rush hour 4-6pm around Scholls and Roy Rogers as well as 175th and Weir.	7/2/2018 9:13 AM
26	People with million dollar properties do not want to be crammed in. We bought next to an urban reserve so it wouldn’t be developed.	7/1/2018 1:56 PM

27	It appears the area the City of Beaverton wishes to develop is forested/agricultural land, near a nature preserve, not at all walkable to the city center or necessary amenities, and would add 3760 housing units with no access to efficient mass transit. In light of the Oregon Warming Commission's report* detailing the State's complete projected failure to achieve it's near term 2020, mid term 2035, and longer term 2050 carbon reduction goals...largely due to transportation emissions and the current management of forested lands...then shouldn't Oregon be doing everything it can to increase housing/business development near transportation centers and preserve its existing tree cover? The city of Beaverton is nothing but an example of single story, urban sprawl with plenty of opportunities for densification within its existing city boundaries. Further, couldn't the City annex already [poorly] developed areas with the UGB in unincorporated Washington County (in the Aloha area for instance), and improve them rather than cut down trees and build more mega HOA complexes? Where in Beaverton are all the green-built, high-performance, mixed-use high rises IAW Governor Brown's BEEWG mandates which could easily provide 12,300 housing units? The only building Beaverton has built is The Rise which is a paltry 3.5 stories high with only 78 market-rate apartments, nine live/work units, and 2,300 square feet of ground floor commercial space. And, it still has several vacant units for residents and businesses. If the City of Beaverton looked at all like the City of Portland in terms of inner city housing and business infrastructure and still had a demonstrated need for additional housing, then incorporating additional land for development would make sense. Even then, however, there are additional semi-developed/developed lands closer to transportation infrastructure which are not pristine/rural/forested areas which could be annexed and improved for everyone's mutual benefit. *https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/59dd4984a8b2b090a38f07a1/1507674513035/2017-OGWC-Legislative-Report.pdf	6/30/2018 4:31 AM
28	transportation nightmare.no new arterial roads, no new transit. horrific impact to natural resources. no fix to why North Cooper Mountain ALREADY inside UGB has NOT DEVELOPED yet	6/28/2018 10:57 AM
29	South Cooper Mountain would be a great area for Beaverton to grow. With our current housing crisis, especially for affordable homes, I support moving forward making more land available to relieve pressure.	6/28/2018 8:43 AM
30	Beaverton needs to ban the new construction of car dealerships, drive-thrus, car parts stores, and they need to severely limit the amount of car parking allowed for new development of any kind. The South Cooper Mountain neighborhood needs a rerouted bus 56 and bus 92.	6/27/2018 8:56 PM
31	I think this is the best proposal. It is close to schools, jobs, and is near parks.	6/27/2018 5:04 PM
32	I'm a native Oregonian (50 years) and live on Cooper mountain. I know there must be progress and things can't stay as they are...but why develop such a beautiful mountain that has already proven to have an abundant natural habitat and needs to be protected to some degree? Why not build directly on or closer to max lines and/or major highways? i really don't think that Beaverton has mine or for that matter any Metro area tax payer's interests in mind with their proposal. I believe it is entirely a "land grab" for increased taxes and fees (water/sewer, etc) in their jurisdiction. I was so pleased with what was developed in the Progress Ridge area within the last decade, but now this is already at peak capacity for retail,parking, etc and we are not seeing any expansion to this needed resource in the planning....just more homes/townhomes/apartments. Why can't washington county have "forest park" like setting/habitat as does multnomah county?	6/27/2018 1:54 PM
33	It has been stated in this article that Metro was incorrect with their 2015 projection and needs to be reevaluated - I then believe that Beaverton's Concept plan developed in 2014 is also outdated and needs to be re-evaluated.	6/26/2018 8:25 PM
34	The road improvements proposed are not adequate. 175th is the main arterial. With improvements it is still a two lane road that will have to carry far more vehicles.	6/26/2018 2:58 PM
35	We already have housing in the area on the map. The city doen't need to include this area except to collect more taxes. So I am opposed to the city annexing the area in the map. It won't help us that already live in the area.	6/26/2018 1:00 PM
36	As a current resident of South Cooper Mountain, I am disheartened by this proposal and seriously considering relocating to a different part of the state because of it. We moved to the area specifically because we could be out of the city a bit, but still close enough to take advantage of its conveniences. We also very much appreciated the proximity to local farms and the produce/goods they have to offer. If farmland continues to be turned into developments, we lose a primary defining resource of the Portland area. Portland is rightfully known for and proud of its promotion of local, seasonal, sustainable foods. Over-developing is in direct contradiction to those amazing statutes we are known for.	6/26/2018 11:00 AM
37	The city of Beaverton doesn't care what the citizens have to say. This is just checking a box that says you asked for citizen input.	6/26/2018 8:23 AM
38	Please do not build here! Leave the land the way it is. Let those who do live here enjoy the scenery and parks.	6/26/2018 7:53 AM

39	Need a north-south major thoroughfare west of 175th Ave and east of Cooper Mountain Nature Park connecting Kemmer Rd and Scholls Ferry Road. Also, need an east-west major thoroughfare in addition to Alvord Lane extension, and placed north of Alvord Lane and south of Cooper Mountain Nature Park. Lastly, there should be no Low Density or Single-Family along SW 175th Avenue as Fig. ES-3 shows. This will be a major thoroughfare ideal for transit and so in turn denser housing.	6/25/2018 10:36 PM
40	The issue with moving all of these people to major arterial roads and serving them with groceries should be considered. As it stands, 170th, Hart, and Farmington carry a tremendous load of traffic, and can get clogged easily during the commute times. Alternative transportation routes must be planned and encouraged.	6/25/2018 9:21 PM
41	Horrible idea. Not enough roads to support the proposed new housing.	6/25/2018 7:22 PM
42	Looks to me like Beaverton wants to annex all the expensive, rich neighborhoods and leave those less advantaged to hang out to dry.	6/25/2018 6:33 PM
43	I live in the North Cooper Mountain area. The traffic situation is already becoming completely ridiculous and all the scheduled development out this way isn't even done. There are just not enough roads to accommodate cars from another 12,000 homes if the UGB is extended to include South Cooper Mountain. Please help us maintain a reasonable quality of life out here by keeping the current UGB in place around Cooper Mountain.	6/25/2018 4:19 PM
44	I live on 175th and strongly oppose adding the Cooper Mountain Urban Reserve area to the UGB	6/24/2018 2:20 PM
45	How about redeveloping land already with infrastructure and transit access for those who already work in the area. Why build housing for millionaires only from out of state?	6/19/2018 3:31 PM
46	Wonderful plan on paper. It won't matter what development you do downtown if the people living on Cooper Mountain can't get to downtown Beaverton due to unbearable traffic congestion. Farmington and Scholls Ferry are too congested. Farmington needs to be 5 lanes all the way to 209th at minimum, to River Road would be forward thinking. Another large n/s corridor needs developed as well, like punching Cornelius Pass from TV Highway to Scholls Ferry. Road development needs to be planned BEFORE housing development, not after. BUILD ROADS!	6/14/2018 6:56 PM
47	We need more affordable housing in the metro area. Beaverton would like to add 3,760 homes. This is a good start. They also have current developable land in the city limits that they can work with.	6/14/2018 12:42 PM
48	I reviewed the Beaverton proposal, and I think it may be the most thorough of the four. I like that trails are included in the initial planning as well as wildlife corridors. This expansion is into precious natural areas and should be carefully thought out. I am concerned that there is no public transit to this area. What I don't like seeing is people moving farther & farther from their workplaces, commuting by car, and complaining about traffic. This behavior negatively impacts existing inner neighborhoods. I don't want to see street expansion and noise increase in my neighborhood because people are encouraged to move farther out. Also I saw the addition of affordable housing in this plan, but yet there is no access to public transit and little to no food access. Does this not perpetuate the divide between rich and poor?	6/13/2018 8:04 AM
49	This looks like a great and natural area for expanding more homes.	6/12/2018 6:19 PM
50	do not approve this expansion - don't believe this meets regional planning goals	6/11/2018 11:26 PM
51	Please reject this proposal unless Beaverton adjusts its zoning to allow for more housing types, including duplexes, triplexes, and fourplexes across the city, with no minimum off-street parking requirements. If Beaverton follows through on this plan, it will create 6.3 homes per acre, which is typical for U.S. suburbs. This represents a tremendous waste of land and undercuts the UGB.	6/11/2018 9:32 AM
52	You need to ensure that some parcels inside this boundary are less expensive to develop (ie, have fewer parks/open space requirements and lower SDCs) so that affordable housing targeting homeowners AT median income (not below and therefore not subsidized) can be constructed by builders.	6/11/2018 8:53 AM
53	Stream and wetland protections are inadequate to preserve viable wildlife corridors. These lands should be protected before expansion occurs.	6/8/2018 11:41 AM

Q5 Comment: Hillsboro

Answered: 21 Skipped: 154

#	RESPONSES	DATE
1	This makes good planning sense. I approve!	7/9/2018 3:08 PM
2	Great Proposal - location, use of land, ease of providing services.	7/9/2018 2:30 PM
3	Hillsboro is contributing to suburban sprawl in our region - I do NOT need to see the Portland Metro area become the next sprawling metro area of the USA...we should learn from horrible decisions made in cities as far and wide as Minneapolis, Chicago, Dallas, Houston, LA, Seattle.	7/9/2018 1:40 PM
4	1. Consider punching SW 229th Ave; south to connect up with Clark Hill Road 2. Keep higher density areas nearer to TV Highway for better access to mass transit	7/9/2018 12:40 PM
5	Although the South Hillsboro area has many years of development still to do, Hillsboro is showing with that area that they are able to get infrastructure in place.	7/8/2018 10:09 PM
6	Strongest proposal, build homes where people work! Not where they have to travel from the other side of Portland or from Tualatin/Wilsonville.	7/8/2018 8:19 PM
7	Thank you for taking comments on this process and I hope you will consider my family's concerns in making your decision. I live in the proposed expansion area for Hillsboro and have absolutely no interest in coming into the expansion area. I know of a few others that also aren't interested in joining either. Beyond my personal lack of interest in joining, I have a few other concerns. The first is that Hillsboro has just started to build out South Hillsboro, which is supposed to have 8,000 homes and even though the city thinks people that people who live there will somehow not drive, it is going to make traffic on TV Hwy even more unbearable. If they were to look at increased housing in Hillsboro it would seem to make much more sense to put it closer to highway 26 which was recently expanded. TV Hwy has businesses, railroad tracks and housing on both sides and seems to have already been expanded as fully as possible. In looking at the housing needs analysis there is also a large margin of error that on the low side of the estimate doesn't justify the need for any more housing. Conveniently, the city left the housing needs analysis that they were basing the whole project on from the planning department meeting so that the community didn't have access until after the meeting was done and decision made. A member of the community pointed this out during the meeting and one of the commission members incorrectly cited the wrong document and then said the right one was available. Sometime later in the meeting, when he noticed the community member was going to correct him, he did admit to referencing the wrong document and said the other one had been removed from the website. If this is the level of attention to detail and review the planning commission took towards the project; metro should be concerned. This should be reflected in the meeting minutes of the planning commission. Additionally, this lack of available information prevents those in the community from commenting completely and seems a necessary due process step. At the very least because of this lack of necessary information, Metro should make the city submit in future rounds so the planning commission meeting includes the housing needs analysis and the communities impacted actually have the same data. An additional concern is that it seems the analysis is assuming that some of the housing will go to people with jobs in Portland; however, putting housing in Hillsboro for jobs in Portland seems like poor planning as well as putting unnecessary strain on roads that already can't handle the traffic. In looking at the other cities' proposals it would seem to make much more sense for the housing to be built closer to Portland. For example, the size of the proposal for Beaverton would also seem to go much further in addressing housing needs due to its size. As someone who looked for housing in Beaverton, due to a job and commute daily into Portland; there wasn't anything we could find so ended up back in Hillsboro. Thank you for considering our concerns.	7/7/2018 8:01 AM
8	It seems like Hillsboro is turning its back on the people that have long-lived there, in favor of wealthy workers in the tech industry. Regular people need and deserve places to live as well. Making decisions with only the thought of improving your income tax base is short-sited. What happens when Intel leaves?	7/2/2018 12:20 PM
9	This area is becoming overwhelmed with traffic. We don't need more homes. We need people to move out!	6/29/2018 9:11 AM

10	The people of Hillsboro don't want more housing. We need better roads. No one wanted the 8000 homes that already got approved in South Hillsboro. Another 800 houses is not needed. We don't want this growth. The roads are all already too full. Homes should come with bigger lots; not stacked on top of each other. Hillsboro doesn't have enough houses with big lots. Hillsboro's needs more parks and recreation for the families who already live here. Not just parks that get built as part of this expansion. More parks now in the existing boundary. People are leaving Hillsboro because it has grown too much; too fast. This expansion is not wanted!!!!!! The only people who want it are the ones who are going profit off of it. The rest of us don't want more house and people here. Consider one of the other areas for growth. Hillsboro just got an expansion and doesn't deserve another one. Don't expand the boundary. I've gone to all of the city meetings on this issue. The city is pushing forward even though people don't want it. The city is pretending everyone wants this but we don't!!! The city has fudged their data to make it look like more homes are needed but they aren't. This area has protected wetlands and wildlife. Bald eagles that will be displaced.	6/29/2018 6:34 AM
11	South Hillsboro has already been a huge undertaking and the planning has become overwhelming. The impact on areas between TV hwy and 26 have been studied, but in reality are yet to be seen. Witch Hazel Village South is an unnecessary use of natural areas. It is clearly an after thought. Those that feel they missed out on a huge economic opportunity in South Hillsboro are capitalizing on the nearest small portion of land, not already managed by the golf course. Keep the urban growth boundary. Do not expand or further development Brookwood. The schools and homes along it are further endangered by too fast traffic trying to cut through, to an area it shall not reach. It would endanger the urban reserve and over flood river road with unnecessary extra traffic. The stretch marks on our community from greedy over expansion so fast will not be easy to heal. It is an action of greed, not intended for the improvement of Hillsboro.	6/28/2018 10:58 PM
12	Further collapses TV Highway, at least transit is in place now. Is this really needed with South Hillsboro developing?	6/28/2018 10:58 AM
13	Flip the Low Density and Medium Density Residential east-west from how concept plan Fig. 1 shows it. It makes sense to have the greater density closer to Portland than Beaverton and along the existing major thoroughfare (SW Brookwood Pkwy) that connects due north towards the MAX and OR Hwy 8. Also, having the lower density meeting SW River Road, a rural road that borders a rural reserve, makes much more sense.	6/25/2018 10:42 PM
14	I live within the 150 acres and do NOT support this expansion plan. I do not want to be part of the city limits. I think it is completely unnecessary. I enjoy the quiet county setting and the abundant wildlife and wetlands. This expansion will negatively affect our neighborhood. The expansion is unwanted!!!!!!!! The roads (TV highway, Cornelius pass and Brookwood) are already overfilled and backed up too much. Traffic is a major problem. The south Hillsboro expansion is going to make the traffic situation much worse and I don't think more homes in this area is a good idea. Plus Hillsboro just got an expansion so I don't think another one is needed this soon. Choose a different city to expand the boundary in instead.	6/23/2018 12:51 PM
15	How about redeveloping land already with infrastructure and transit access for those who already work in the area. Why build housing for millionaires only from out of state?	6/19/2018 3:31 PM
16	TV Hwy and Farmington are too congested to support the proposed development. Farmington needs to be expanded to a 5 lane hwy out to River Rd. Rosedale needs to be improved as well. Cornelius Pass needs to go at least to Farmington, but forward thinking would take it to Scholls Ferry. Build the roads BEFORE development. The standard of living is being compromised due to unbearable traffic congestion. BUILD ROADS!	6/14/2018 7:17 PM
17	The thought to trails seemed very minimal in this plan. I did not see much about public transit in this plan. We need to make an effort to encourage alternate transportation in the future so that having people moving farther from urban centers and workplaces does not just add to traffic load on interior streets.	6/13/2018 8:08 AM
18	This area looks very good to add more homes.	6/12/2018 6:20 PM
19	absolutely do NOT approve! Hillsboro has plenty of new land they are developing with no jobs in the area and promises that people will commute via bike. South Hillsboro should never have be approved, don't make the same mistake again!	6/11/2018 11:27 PM
20	Please reject this proposal unless Hillsboro adjusts its zoning to allow for more housing types, including duplexes, triplexes, and fourplexes across the city with no minimum off-street parking requirements.	6/11/2018 9:33 AM
21	Stream and wetland protections are inadequate to preserve and enhance wildlife corridors. These functions, values and sensitive areas should be protected before expansion occurs and enhanced and restored as part of urban development.	6/8/2018 11:42 AM

Q6 Comment: King City

Answered: 18 Skipped: 157

#	RESPONSES	DATE
1	King City has a fantastic proposal. Nice planning.	7/9/2018 3:08 PM
2	Best proposal of all, this city knows how to provide good housing choices at reasonable prices.	7/9/2018 2:30 PM
3	Better this than Hillsboro expansion	7/9/2018 1:41 PM
4	Very compelling that King City has largely developed its existing land inventory. Supply of adequate land is essential to meet Metro's other goals for these urban expansions: mix and diversity of affordable housing, higher density in downtown areas, and access to residents at all income levels and communities of color. City residents support the expansion. For a small community, the commitment to its planning effort is significant and commendable. The community gives every indication of being ready to accommodate the desired growth while maintaining its livibility and small-town culture.	7/9/2018 9:43 AM
5	This looks like a reasonable addition to the UGB, in an area that currently has little developable land within the UGB.	7/8/2018 10:11 PM
6	Love that the plan includes modular homes and other ideas for single-family homes that others leave out. Supporting other home-grown businesses can help get housing built faster than stick-built with the current builders wrapped up with so many other projects. Also, getting affordable housing built for seniors where there is already infrastructure is ideal.	7/8/2018 8:24 PM
7	King City has big dreams but no means. King City’s public works department is a joke. It consists of one employee with a pickup truck. Even simple tasks such as replacing a damaged street sign requires negotiating with the city of Tigard to perform the repairs. ALL maintenance of city-owned property and public property is contracted to outside agencies. King City is dependent upon the city of Tigard for its water source (including projected water needs for development within URA-6D). Tigard has neither budgeted for nor made plans to extend water service to URA-6D development. King City has big dreams but no means.	7/4/2018 11:08 AM
8	Missing is FREEWAY access.	6/28/2018 10:58 AM
9	Great plans to accommodate the growth and development of the City!	6/27/2018 7:52 PM
10	My biggest beef with Beef Bend is avoiding yet another southwest metro Portland gigantic superblock. Do revise the plan to either -- or both -- bridge SW 137th Avenue over the Tualatin River to U.S. 99W at Cipole Road and bridge SW 150th Avenue over the river to the highway. Otherwise, the only north-south connections will be U.S. 99W over the river at the east or Roy Rogers Rd at the west, miles apart from each other. I favor this even if it means shaving off an eastern slice of the Heritage Pines Natural Area.	6/25/2018 10:46 PM
11	I live in Washington County outside of Sherwood. Driving through King City to and from work I encourage King city to build out and improve its infrastructure. I am so disappointed the Sherwood is not joining this growth and hope Metro overrides their decision.	6/25/2018 11:16 AM
12	How about redeveloping land already with infrastructure and transit access for those who already work in the area. Why build housing for millionaires only from out of state?	6/19/2018 3:32 PM
13	King city is in need of positive growth and I believe that they have proven them selfs to be able to grow and develop affordable housing for the regional needs. King city is also out of developable land with in the city limits. This is why I am asking you to approve the King City - Beef Bend South expansion.	6/14/2018 12:48 PM
14	This is a beautiful area along the river. The level of expansion surprised me. I hope that every effort is taken to preserve a good barrier for natural areas. We now have more scientific knowledge about what is needed for healthy wetlands and waterways. Let's make sure we preserve that. Water is our most precious resource.	6/13/2018 8:09 AM

15	How does King City propose these new residents get around? Highway 99 is already at full capacity 12 hours out of each day.	6/13/2018 8:04 AM
16	I think king city could use more homes but this looks very difficult to get going in this location.	6/12/2018 6:20 PM
17	this proposal deserves further study and best option presented	6/11/2018 11:28 PM
18	Please reject this proposal unless King City adjusts its zoning to allow for more housing types, including duplexes, triplexes, and fourplexes across the city with no minimum off-street parking requirements. While King City claims it is amenable to many types of housing types, the fact that they expect the new area to provide only 8 homes per acre indicates that an expansion is not warranted.	6/11/2018 9:40 AM

Q7 Comment: Wilsonville

Answered: 12 Skipped: 163

#	RESPONSES	DATE
1	Meh. At least it appears to be better than So Hillsboro development.	7/9/2018 1:42 PM
2	Wilsonville has demonstrated its ability to complete a years-long collaborative effort reaching among its citizens, businesses, development community and other stakeholders in adopting the Frog Pond Area Plan, and more recently, the Frog Pond West Master Plan. Adopted less than a year ago, it is already experiencing multiple subdivision applications that will lead to new homes within the next year. The new Frog Pond expansion under consideration is already Area Planned, with an infrastructure finance plan model already conceived and approved for Frog Pond West. The City has long demonstrated its commitment to support of multiple housing types and densities, as well as live-work space, and housing developments affordable to a variety of owners and renters in a range of income levels. Metro can expect to meet all of its expansion goals with approval of the Frog Pond East and South reserves.	7/9/2018 10:04 AM
3	Wilsonville has done an excellent job of managing growth, particularly with the Villebois development. This proposed addition to the UGB looks well thought out.	7/8/2018 10:13 PM
4	Great place to in-fill and get some more housing close to existing freeways to minimize stress on surface streets.	7/8/2018 8:26 PM
5	Best of proposals, actually has transit and service housing for mental health support.	6/28/2018 10:59 AM
6	First, 1,325 homes across 192 buildable acres is 6.9 homes per acre. That's too low for even a bus to pass every half hour, or 7 or 8 units per acre. I fear 6.9 would too easily fall lower as construction happens over the decades. Second, some areas are so sprawling as to make the plan the galling one among the four concept plans. There simply must not be any R-10 Large Lot SF or Future R-8 Single-Family zoning anywhere as Fig. 12 shows. Lot sizes of 8,000-12,000 and 7,000-9,000 s.f. are sprawling, a waste of land to be in the UGB, and only encourages suburban mischievous development at the expense of Portland and suburbs building starter houses, townhouses, and duplexes. We need more housing like Villebois, not the Stafford area! More personally, Wilsonville is one of the few areas where I might be reasonably able to buy a decent, new construction house in a nice area in a few years. How is that supposed to remain likely for me, priced out of Portland, when Wilsonville is allowed de facto rural estate housing in the UGB? Screw that market; those buyers can buy in Stafford or Dunthorpe. I don't need a rural McMansion to swallow what would've been four starter houses of which one could've been mine. Third, Fig. 12 shows street connections non-existent west to Canyon Creek Road and too few south to Boeckman Road. There's a difference between environmental conversation and stream fetishization. Regional street connections trump streams. And, a connection can be a narrow bridge with 20 feet of pavement, not a giant major thoroughfare, for those concerned about wetlands along streams. How is anyone, including myself, supposed to drive calmly when the damn street system is so sparse that there is basically one, maybe two routes from point A to B? It's already bad enough for Wilsonville. The city already grafted itself to I-5 and yet bisected a growing city into two. Aggravating the sparse connections on the east side will only make it more difficult to get to the few roads that get to the freeway and create more double-back driving. I expect better from Wilsonville, especially with the whining about traffic, traffic, traffic. Yet they want rural estates?! Make 'em walk the talk about compact development. Say no to UGB inclusion until Wilsonville gets serious and revises and adopts a serious concept plan.	6/25/2018 11:04 PM
7	How about redeveloping land already with infrastructure and transit access for those who already work in the area. Why build housing for millionaires only from out of state?	6/19/2018 3:32 PM
8	Please preserve barriers for natural areas and wildlife. It would be nice to see incentives to keep farmland in production as well.	6/13/2018 8:10 AM
9	This too looks like a great and natural location to expand housing.	6/12/2018 6:20 PM
10	don't believe this expansion is truly warranted	6/11/2018 11:29 PM

11	We have way more people commuting to Wilsonville, than live here. We need to provide more housing, but in the form of single-family dwelling units, or duplexes that are affordable. It seems we have plenty of apartments available. Our family (residents of Wilsonville) see Apartment Vacancy signs around town, very frequently!	6/11/2018 11:49 AM
12	Please reject this proposal unless Wilsonville adjusts its zoning to allow for more housing types, including duplexes, triplexes, and fourplexes across the city with no minimum off-street parking requirements. If Wilsonville follows through on this plan, it will create 7 homes per acre. This indicates that an expansion of the UGB is not warranted.	6/11/2018 9:42 AM

Q13: Additional comments about this issue or this survey

Answered: 78 Skipped: 97

#	RESPONSES	DATE
1	Please do not extend the Urban Growth Boundary just hoping residents will sell out to big developers with deep pockets! We are not interested in paying higher city property taxes or being forced out of our home.	7/9/2018 8:45 PM
2	We have a housing crisis. All of the proposals should be accepted to help alleviate the need for more housing of all types.	7/9/2018 2:31 PM
3	Please do not let the City of Beaverton do what they did with North Cooper Mtn - getting it in the UGB. They have done nothing with it & will only look for a zoning change.	7/9/2018 12:42 PM
4	Thank you!	7/9/2018 12:42 PM
5	The first (ranking) question is very confusing - I had at least 5 people ask me what it meant and others who didn't fill in the survey because they couldn't figure it out. The question seems stilted in the direction toward someone who knows specifically what they are looking for - to me, this seemed an unnecessary question and assumes that everyone has read all proposals as well as the Metro Urban Growth Report (which only came out on 03 July!). At the very least, a better explanation of this question was needed (such as only one #1, one #2 - and that these goals are only as they apply to the proposals - not to the responder's own personal priorities). The items to be ranked were rephrased & combined in such as way so they did not match directly to Metro Expansion Goals & Objectives and 2 Goals were missing from this list - which is why I mention that the question was then biased.	7/9/2018 12:24 PM
6	Your considerations in this planning is worthless of my input. This agency cares nothing about planning just regulate and pack people in with ZERO consideration of quality of life.	7/9/2018 12:20 PM
7	King City has worked very hard to come up with a thoughtful and comprehensive plan for the future. We need more housing options and this is the only way to do that.	7/9/2018 11:47 AM
8	Do NOT add all 1,232 acres that Beaverton wants to develop in the Cooper Mtn. Urban Reserve. 3,760 homes in addition to the planned communities around Mountainside High School and King City's growth will inundate the intersection at Scholls Ferry Road and Roy Rogers Road. Traffic pushes north up 800-foot Cooper Mountain where dangerous winter weather patterns exist above 500 feet and steeply-sloped terrain. A connector road from Scholls Ferry Rd. toward Orenco Station and on to US 26 is needed around Cooper Mtn. NOW as traffic is overloading existing commuter roads. Don't compound the misery of overloaded roads. The June 7, 2018, CPO6 meeting had these two Q and A questions: Q: "How is it that there are no freeways to get people into Portland faster; where is traffic going from Roy Rogers Road into Beaverton/Hillsboro; and why is there [already] too much traffic on SW 175th, SW 170th, SW 185th, Farmington, and TV Hwy?" A: "A survey is coming out Winter 2018 to answer this question." AND Q: "What about using a route from Cornelius Pass to Clark Hill Rd.?" A: "We can't touch the GREEN highlighted areas or TAN or PURPLE without getting an exception approved." Answers were given from Wash. Co. Transportation planners. See how the new communities around Mountainside H.S. impact the roads and infrastructure first. Then look at new land for housing. You are moving too fast on housing in Beaverton to realize the impact you are going to have on transportation. King City's 538 acres, Hillsboro's 150 acres, and Wilsonvilles' 27l acres will all have difficult transportation issues. So, don't allow all the 1,232 acres that Beaverton wants to add in the Urban Reserve. So, obviously, residents at CPO6 meeting are very frustrated at the overuse of roads as it is. NO MORE HOMES WITHOUT HIGHWAYS to accommodate such growth! Widening existing arterials is not good enough. Wildlife corridors are shrinking and wildlife is leaving as land is cleared and housing goes up. Where is the accountability for wildlife habitat? Why is there such a small 50-foot allowance of buildings to greenspace and so little emphasis on edge habitat? Greenspace is needed for our quality of life because it soaks up air pollution and wildlife corridors encourage animals and birds to remain.	7/9/2018 11:23 AM

9	I'd like to express my support for King City's proposed UGB expansion for the following reasons: 1. The City is expected to grow significantly in coming decades but has only 3 acres of buildable land available for new housing and commercial development. King City's Concept Plan provides a long-term vision for growth in this part of the Metro region by providing a mix of new residential and commercial development. 2. King City's plan accommodates a range of housing types that are suitable to a diverse range of age and income groups. 3. Finally, King City has demonstrated it's commitment to inclusiveness and equity though this plan and through past actions and their plan best represents the needs of the Metro region in future decades.	7/9/2018 8:32 AM
10	With current development have seen little expansion to main roadways or alternatives. Concern with Cooper Mtn. Expansion Scholls Ferry is the only way out. Very high density development. Huge loss of trees, wetlands, no new parks planned is very disappointing. Also Beaverton has a history of over crowding schools in relation to new development (Bethany). Would like to see better planning and funding than current taxpayers having to support another bond to alleviate over crowding at neighborhood schools. Seems development should support new schools and infrastructure.	7/9/2018 8:24 AM
11	Please consider movements in roads first before houses are built . Travel times are ridiculous	7/9/2018 7:11 AM
12	Please make sure that your plans are not monopolized by those that would directly profit from UGB additions. That has certainly been true often in the past.	7/8/2018 10:15 PM
13	Concerned about where all these people will fit with one main thoroughfare up and over the mountain. How will some access the outside world when hemmed in by traffic. What about emergencies?	7/8/2018 9:43 PM
14	This survey was a waste of time because it was biased in favor of annexing Cooper Mountain into the UBG and Beaverton to increase Beaverton number of residents and tax revenue.	7/8/2018 9:05 PM
15	letting cooper mountain recover and regain its livability for the next 5 years will not hurt anything and only help. Stop the ugb from moving as the City of Beaverton as reqested.	7/8/2018 8:58 PM
16	I believe that extending the UGB on Cooper Mountain would allow way too much development of an area which now includes many beautiful natural spaces. It is a common opinion among current residents that the City of Beaverton is 'tax greedy' and infrastructure poor! Let them deal with what is already being built out before adding more prospective mass development to their plan!! Cooper Mt roads are inherently dangerous and often impassable in winter. Adding more traffic and congestion will severely negatively impact the safety and livability of the area for the current residents and any future residents as well.	7/8/2018 8:46 PM
17	Beaverton proposal the weakest of those submitted, Hillsboro the strongest.	7/8/2018 8:28 PM
18	I am strongly opposed to the expansion of the UGB to include any more area of Cooper Mountain at this time. We need to assess the impact of the thousands of new homes to be built in So. Cooper Mountain area, River Terrace, etc. before allowing more high density housing in an area still being used for farming and timber growth, and possessing abundant wild life. To date, no governing body has shown any effective plan to deal with the impact of increased traffic and congestion to the livability of the area that will surely occur when all the now approved homes are built and occupied.	7/8/2018 7:38 PM
19	Very disappointed that money is more important that teaching our children about the wildlife, importance of plants and playing outside. guess they can look at pictures of animals and plants in books or on their computers as no play to play either. Great future for our children.	7/8/2018 7:10 PM
20	Consider the build ability of the area. Consider the value and benefit of natural areas. Make sure that transportation projects are feasible and practical for the area.	7/8/2018 4:43 PM
21	Transportation remains a huge issue, as well as affordable housing. By not integrating the entire Cooper Mountain neighborhood, it delays any improvements in transportation that Beaverton is attempting to provide. Please consider transportation as well as housing when considering the urban growth boundary expansion. Our area is growing so quickly, any delay will only cause increased costs and make our traffic problems worse because they cannot be addressed while areas are outside the boundary	7/8/2018 3:34 PM
22	Question #1 is really poor. 3 of the 5 items to be rated have little or no bearing on expansion.	7/8/2018 10:54 AM
23	Stop the growth on cooper mtn until there is a north south route built! Sw 175th is dangerously over trafficked already! Add new roads first	7/7/2018 9:40 PM

24	My final comment would be that the Cooper mountain area has been proposed by the city of Beaverton. This will mean annexation into Beaverton for all residents and property owners in the affected area. I personally am opposed to such an excision and thereby would be opposed to the addition of the area into the urban growth boundary. I know that many of my friends and neighbors are of the same feelings, and hope that they will express these thoughts to you in the same way that I have. Thank you for the opportunity to have my opinions recorded. I hope they help	7/7/2018 2:35 PM
25	I believe expansion of the UGB is essential to the continuing development of King City and the plan has been meticulously thought out.	7/7/2018 11:46 AM
26	Beaverton’s land grab is not required or justified. They have shown total disregard for the opinions of residents that live here. Total disregard for what funds are required to develop an area that already has established neighborhoods & no large parcels of land left. We do not want to be a part of the UGB & subsequent annexation in to Beaverton!	7/7/2018 10:46 AM
27	Thank you for taking comments on this process and I hope you will consider my family’s concerns in making your decision. I live in the proposed expansion area for Hillsboro and have absolutely no interest in coming into the expansion area. I know of a few others that also aren't interested in joining either. Beyond my personal lack of interest in joining, I have a few other concerns. The first is that Hillsboro has just started to build out South Hillsboro, which is supposed to have 8,000 homes and even though the city thinks people that people who live there will somehow not drive, it is going to make traffic on TV Hwy even more unbearable. If they were to look at increased housing in Hillsboro it would seem to make much more sense to put it closer to highway 26 which was recently expanded. TV Hwy has businesses, railroad tracks and housing on both sides and seems to have already been expanded as fully as possible. In looking at the housing needs analysis there is also a large margin of error that on the low side of the estimate doesn't justify the need for any more housing. Conveniently, the city left the housing needs analysis that they were basing the whole project on from the planning department meeting so that the community didn't have access until after the meeting was done and decision made. A member of the community pointed this out during the meeting and one of the commission members incorrectly cited the wrong document and then said the right one was available. Sometime later in the meeting, when he noticed the community member was going to correct him, he did admit to referencing the wrong document and said the other one had been removed from the website. If this is the level of attention to detail and review the planning commission took towards the project; metro should be concerned. This should be reflected in the meeting minutes of the planning commission. Additionally, this lack of available information prevents those in the community from commenting completely and seems a necessary due process step. At the very least because of this lack of necessary information, Metro should make the city submit in future rounds so the planning commission meeting includes the housing needs analysis and the communities impacted actually have the same data. An additional concern is that it seems the analysis is assuming that some of the housing will go to people with jobs in Portland; however, putting housing in Hillsboro for jobs in Portland seems like poor planning as well as putting unnecessary strain on roads that already can’t handle the traffic. In looking at the other cities’ proposals it would seem to make much more sense for the housing to be built closer to Portland. For example, the size of the proposal for Beaverton would also seem to go much further in addressing housing needs due to its size. As someone who looked for housing in Beaverton, due to a job and commute daily into Portland; there wasn’t anything we could find so ended up back in Hillsboro. Thank you for considering our concerns.	7/7/2018 8:01 AM
28	Don't expand the UGB!	7/6/2018 11:33 AM
29	We should leave islands of less dense development for other creatures as we expand our footprint across the land, don't you think. Thank You.	7/6/2018 9:47 AM
30	I believe that development in the Cooper Mountain Urban Reserve has property owners who are interested in being added to the urban growth boundary to allow development of great new neighborhoods. These neighborhoods would provide housing to meet the demand in the Beaverton area and the region.	7/5/2018 2:48 PM
31	As a resident of King City I am with the majority of current residents that do NOT want to expand. King City fought our petition that showed almost 90-percent of residents are against the plan of our current (soon to be replaced) City Manger and volunteer mayor. King City has big dreams but no means. Please reject their proposal.	7/4/2018 11:11 AM
32	We need to focus on maintaining what is the most important quality of the region, conservation of our natural resources, waterways and green spaces for future generations	7/3/2018 1:18 PM
33	You area already destroying the area enough. Annexing the natural reserve would not be an ok answer to the city’s growth needs	7/1/2018 1:58 PM
34	In this conversation about density and growth management I would like to see more information about and proposals involving Trimet and other public transit	6/30/2018 6:25 PM
35	Please respect the existing UGB. Thank you.	6/30/2018 4:32 AM

36	I grew up in Hillsboro and I was born in Tuality hospital. Hillsboro is becoming overly populated and the expansion, in my mind, is a terrible idea! Traffic is absolutely horrible now and what happened to going for a drive on the "back roads" to enjoy this amazing and beautiful city we used to live in? Now those same roads are just as bad as hw 217. There is a thread on FB in the Hillsboro Free classifieds from a lady who is a realtor trying to get her name out here so she can sell homes in the new development by tv highway and Cornelius pass. You should take a moment, find that, and read all of the comments and see hiw many people can't wait to move out of Hillsboro because of what it's becoming. So many native locals are disgusted with this area and the future plans for Hillsboro. We want our smaller town, tight knit community back. Not thousands of more homes over the next 20 + years. I have a family to raise and this is not the Hillsboro I grew up in and I don't want to raise my kids here. We are looking to purchase around a 400k to 500k home in a small community with less than 35k people. Maybe even smaller. I wish we could stay in this area and raise my family where my family has been for a few generations. My grandparents had 40 acres up off pumpkin ridge and another plot off skyline and keiser. My other grandma grew up in Roy and my family has been in this surrounding area for a very long time. I would love to stick around show my kids our family heritage and where we are from but I'm afraid the time has come to find another small town to raise my family in a smaller community that we have always known and appreciated. I'm not the only local true native who feels this way. Open your eyes and see what this has done to the families who have lived here for generations! Please.	6/29/2018 9:36 AM
37	Don’t expand in Hillsboro!	6/29/2018 6:35 AM
38	The other development plans listed- Cooper mtn, bull run... They add more housing and are in areas that are not as clearly tacked on to the South Hillsboro expansion. There is no need yet to expand this huge project when it is in this early stage.	6/28/2018 11:00 PM
39	We are not in favor of the witch hazel expansion.	6/28/2018 10:37 PM
40	Beaverton failed miserably with Goal 1 compliance in South Cooper Mountain, and as that was the planning vehicle for the Urban Reserve Area, upset neighbors were managed, and not integrated in the planning process. Mis-set expectations are plentiful as the modifications to the comp plan further stretch the promises implied by the community plan. Example: Community Plan suggested minimum lot density would be 3,500 sq ft, and now we see 3k sq ft lots without ANY NEW ROAD CAPACITY.	6/28/2018 11:04 AM
41	Washington County needs to ban the new construction of car dealerships, drive-thrus, car parts stores, and they need to severely limit the amount of car parking allowed for new development of any kind.	6/27/2018 8:57 PM
42	Great progress for the City of King City, OR and future generations to come! Councilman Dr. Smart Ocholi, City of King City, OR	6/27/2018 7:54 PM
43	I'm disappointed to see that Beaverton is willing to sacrifice the Cooper Mountain Nature Park in this proposal. While I assume the actual Park would not be given up, developing the land around this area would dramatically affect the wildlife (flora and fauna) that thrive in and around this area.	6/27/2018 6:53 PM
44	The only way you really solve the affordable housing is thru urban sprawl. where you can building low cost housing. This is not politically possible in Oregon so all these surveys are useless nonsense.. keep the apartment building and the traffic grid lock look at schools ferry and roy rogers rd. and you call it planning. All those row houses and only one road in and out.	6/27/2018 4:28 PM
45	Poorly explained survey objective and methodology. I think the ranking system being used is inappropriate and individual topics should be ranked - not comparatively. The process being used could lead to mis-informed support (like having to rank something #2 that is as poorly done as #5) and incomplete data findings.	6/27/2018 3:45 PM
46	I support King City's proposal to expand.	6/27/2018 2:09 PM
47	thanks for the opportunity to give my opinion. ;-)	6/27/2018 2:06 PM
48	At this time I feel it is too soon to add any more land inside the city of Beaverton until more thought is put into how it can handle transportation needs like "Around the Mountain" which would help keep people off the mountain during winter and provide a safer route to Hillsboro, Tigard, and Sherwood then the blind hills and curves that exist. Also the need to protect more of the mountains nature and all the ecosystems that live here which are already highly impacted by the development occurring. It does not need to be a Mountain full of houses!	6/26/2018 8:35 PM
49	Pass all the proposals. We need homes	6/26/2018 7:37 PM

50	We are not looking forward to the heavy traffic on the roads on and around Cooper Mt.	6/26/2018 3:01 PM
51	We already have housing in the area on the map. The city doen't need to include this area except to collect more taxes. So I am opposed to the city annexing the area in the map. It won't help us that already live in the area.	6/26/2018 1:01 PM
52	This is an excellent opportunity for King City.	6/26/2018 11:41 AM
53	King City should move forward with the speed possible without being pressured.	6/26/2018 10:44 AM
54	I like the idea of going 'back' to smaller homes on smaller parcels. If we can do that well, affordability will follow and with affordable homes (not apartments and condos), integrated communities that foster mutual respect and support can happen. I like the King City plan for its honest acknowledgement of where it's been and how it wants to evolve. Location by the river and proximity to the wildlife preserve is a wonderful bonus for future residents.	6/26/2018 10:18 AM
55	None other than thanks for having it particularly for the UGB expansion review and the four candidate urban reserves. I'm glad to be able to comment on development in areas I visit, drive through, shop in, and visit friends in -- when I don't live there and so can't nag a city council for a suburb about shirking its duty and expecting most everyone (other than those who want and can buy a rural estate) to move to Portland. Second, I'm interested in Metro publishing aggregate responses and publicizing when that happens. Third, I want to see how the results actually influence what Metro and the four suburbs do -- and don't do.	6/25/2018 11:09 PM
56	Please stop building in the Cooper Mountain area, there is too much traffic on Scholls Ferry. I would prefer to see growth in Wilsonville or King City.	6/25/2018 9:49 PM
57	Would love to see the forest remain as a forest.	6/25/2018 9:21 PM
58	Do not move the UGB and stop building houses on top of each other!	6/25/2018 5:23 PM
59	Please leave the current UGB in place around Cooper Mountain until someone figures out what to do about the traffic problems in this area. We need more roads before more housing is built.	6/25/2018 4:21 PM
60	We need to plan for roads ahead of development. Study other areas around the country that do a good job of moving people using cars. Parking is also needed in planning, even along transit corridors.	6/25/2018 1:32 PM
61	The city and county have the power to determine the methodology for accommodating change, without available land traffic will get worse. There is a tremendous support for growth and change and bring revenue into these cities.	6/25/2018 11:22 AM
62	Big surprise: How about redeveloping land already with infrastructure and transit access for those who already work in the area. Why build housing for millionaires only from out of state? We are 20,000 units short of housing for folks who make less than 60K in family income. new land homes start about $500,000 ea	6/19/2018 3:34 PM
63	Our jurisdictions are so fouled up in the Portland Metro areas. We new development to support our growing communities. I just don't understand how city council approves expansions only to be shot down by a few anti-development neighbors.	6/18/2018 10:47 AM
64	BUILD ROADS!	6/14/2018 7:18 PM
65	Please put personal issues aside and plan for the Metro region.	6/14/2018 12:50 PM
66	Based on the amount of single-family and under-developed properties already in built-up parts of the Portland metro area, I don't think any of these UGB expansions are necessary. Many corridors, even in denser parts of Portland, are still under-developed. The only place we should be expanding the UGB is internally: on parking lots, built-up areas that are prime for development and re-development, in close-in low-density neighborhoods, and on street corners of low-density neighborhoods in areas further from the core and in suburban areas.	6/13/2018 8:12 PM
67	I’m strongly in favor of the King City expansion. I believe it will add walkability for our community and provide assistance for the ever-growing housing crisis	6/13/2018 3:31 PM

68	Overall my concerns are for the environment and for equity. We need to preserve natural areas, wildlife corridors, and waterways. We need to make sure they have an appropriate barrier to be healthy. We need to make the co-habitation between wildlife and humans is as good as it can be as we expand into their territory. Wildlife provides many benefits to us. And water is our most precious resource, so keep that clean and open, not covering it up, and having natural ways for water to remain in the environment should be a high priority. I'm also concerned that as expansion goes out, it perpetuates the divide between rich/poor and white/PoC. A progressive look towards the future to include all and to move transportation away from one car/one person is vital. The suburban model that we've been living for decades needs to be tossed out. We should not keep embracing the drive everywhere concept.	6/13/2018 8:22 AM
69	These cities should provide public transportation improvements before building more houses.	6/13/2018 8:05 AM
70	Please open up suburban areas for more homes. I dont want to live in a crowded downtown environment. thank you	6/12/2018 6:22 PM
71	Please Stop building houses	6/12/2018 8:02 AM
72	I'm unconvinced that another expansion of the UGB is needed and will do anything but line the pockets of developers and people selling their land.	6/11/2018 11:31 PM
73	When selecting which communities are given the opportunity to expand, do what you can to see that each community that's applied gets included, at least partially, in their expansion proposals. I'm sure we all have room and needs to expand!	6/11/2018 11:52 AM
74	Thanks for all you do!	6/11/2018 9:42 AM
75	our rapid population growth requires we are more savvy in our land use. Old models of how we slowly expanded need to be discarded and thoughtful and quicker approaches to address need for industrial land, as well as housing, needs to occur. If cities are willing to add the infrastructure, let's move faster.	6/11/2018 8:59 AM
76	I would have liked to comment on all the proposals.	6/11/2018 8:54 AM
77	Growth almost never pays for itself, but imposes costs, both fiscal & physical, on the current population. All these cities, plus Portland, should have to improve their social and physical infrastructure to a point where it adequately serves the existing population, before they start planning for future residents. And they clearly have not done that. Adding more housing only exacerbates every current urban problem, and solves none for the people who live here NOW.	6/11/2018 7:20 AM
78	There needs to be a greater focus on protection and enhancement of environmentally sensitive lands for people, wildlife, water quality and overall watershed health. They are part of a complete community and the tools and mechanisms for their preservation and provision are inadequate and inadequately represented in this survey.	6/8/2018 11:44 AM

Hillsboro
Community Development

November 26, 2024

Metro
600 NE Grand Avenue
Portland, OR 97232

RE: Metro Ordinance No. 24-1520 Testimony

Dear Metro Councilors,

The City of Hillsboro is submitting testimony on the 2024 Urban Growth Report (Exhibit E with associated Appendices in Ordinance Number 24-1520) as it does not serve as an adequate findings document and policy basis to support many parts of the region in addition to the Sherwood West urban reserve area. The 2024 Urban Growth Report has implications for local government planning processes beyond Metro Council's current UGB expansion decision. Metro's distributed forecasts, to be identified based on these documents, inform local Housing Capacity Analyses, Housing Production Strategies, Economic Opportunities Analyses, and Regional Transportation Plan modeling.

The City of Hillsboro wants to emphasize to Metro Council that local adopted housing needs and employment aspirations are not reflected in the 2024 Urban Growth Report and should have been. The 2024 Urban Growth Report's reliance on the baseline population growth forecast, rather than the high population growth forecast, will not allow our region and state to be nimbler in addressing housing and employment needs over the next two decades.

The 2024 Urban Growth Report does not sufficiently identify the methodological details that Metro used to arrive at its employment forecast numbers. Metro should have incorporated additional factors important for economic planning including opportunities and demand for traded and service sectors, diversification beyond the current economic base, and the wages and types of jobs created.

The 2024 Urban Growth Report employment forecast is tied to the baseline population growth forecast. The assumption that lower population growth will mean slower economic growth, because access to labor will be the constraining factor, could be a self-fulfilling prophecy. Workforce is mobile. Capital is mobile. Development capacity is not. If the region has the land capacity for businesses to expand then workers will migrate to the region. If the region does not have the land capacity, then economic growth will be constrained.

Mail 150 E Main Street, 4th Floor, Hillsboro, Oregon 97123 Phone 503.681.6153 Fax 503.681.6245 Web www.hillsboro-oregon.gov

The City of Hillsboro recognizes the 2024 Urban Growth Report has implications to the Sherwood West urban reserve area and acknowledge this community's efforts to grow their local housing and economic base.

Sincerely,

Steve Callaway, Mayor
City of Hillsboro

Cc: Robby Hammond, Hillsboro City Manager
Rahim Harji, Hillsboro Deputy City Manager
Dan Dias, Hillsboro Economic and Community Development Director
Dan Rutzick, Hillsboro Long Range Planning Manager
Juan Carlos González, Metro Councilor District 4
Catherine Ciarlo, Metro Director of Planning, Development and Research
Eryn Kehe, Metro Urban Policy and Development Manager
Ted Reid, Metro Principal Regional Planner

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Chair Lynn Peterson and Metro Council
Metro
600 NE Grand Ave
Portland, OR 97232

November 27, 2024

RE: Additional Sherwood West Testimony on Industrial Land

Dear Chair Peterson and Metro Councilors,

The City of Sherwood respectfully submits this letter as additional testimony for the Urban Growth Boundary expansion record. This letter directly addresses the acute shortage of large industrial sites within the Metro region and how Sherwood West offers two out of four needed 50-acre sites in the short-term, as identified in Semiconductor Task Force Report (2022). With two contiguous 50-acre parcels, Sherwood West offers a strategic opportunity to bolster the semiconductor industry on the west side, leveraging its proximity to Hillsboro, access to a skilled workforce, and well-positioned infrastructure.

The Regional Challenge: Limited Industrial Land Availability

As detailed in the Oregon Semiconductor Task Force Report (2022, p. 20-23) the Metro region faces a critical shortage of large, development-ready industrial sites. Despite the 2024 Urban Growth Report's (UGR) estimated inventory of 5,331 acres zoned for industrial use, very few parcels meet the stringent requirements for high-tech industries like semiconductor manufacturing. Only six sites larger than 50 acres remain available for general industrial use, and several face constraints such as zoning restrictions or site preparation challenges (UGR, 2024, Figure 24).

Without proactive action, Metro risks missing opportunities spurred by the federal CHIPS Act, which has allocated $52 billion to drive domestic semiconductor investment. This once-in-a-generation opportunity underscores the urgency of adding suitable industrial land, especially in strategic locations close to existing semiconductor clusters.

Sherwood West: A Strategic Solution

Sherwood West presents an exceptional solution to these challenges. The area includes two nearly flat, contiguous 50-acre parcels that meet or exceed the

criteria outlined in the Semiconductor Task Force Report for large-lot industrial development and are within the westside's semiconductor cluster identified in the report. While other 50-acre sites are available within the region, they do not share the same advantages that exist in Sherwood West. Relative to the other available 50-acre sites identified in the Task Force Report, Sherwood West's advantages are driven by location and underscored by its:

1. Proximity to Hillsboro's Semiconductor Cluster

Located just 17 miles (30 minutes by truck) from Intel's Gordon Moore Park at Ronler Acres, Sherwood West is ideally positioned to support Washington County's semiconductor hub. The area benefits from close access to major semiconductor companies, including Intel, Qorvo, Lattice Semiconductor, and Jireh Semiconductor. Notably, Sherwood West is only 4 miles from Lam Research, a leading global semiconductor supplier and the second-largest private employer in the Portland Metro area located on the Sherwood - Tualatin border.

2. Supply Chain Advantages

Proximity to Hillsboro's and Washington County's semiconductor cluster reduces transportation times and costs for equipment and raw material deliveries, a critical factor for high-tech manufacturing. Efficient access to key suppliers ensures timely repairs and maintenance for manufacturing equipment, minimizing costly downtime. Sherwood West's location can easily integrate into the region's established supply chain, driving additional operational efficiencies and fostering innovation.

3. Skilled Workforce Readiness

As documented in the Economic Opportunities Analysis (EOA, 2023), Sherwood has a highly educated population: 95.5% of adult residents hold a high school diploma or higher, 43% have bachelor's degrees. Additionally, according to the U.S. Census Bureau's American Community Survey (ACS, 2018-2022), approximately 15% of Sherwood residents are employed in advanced manufacturing, high-tech, or semiconductor-related sectors. Expanding the UGB to include Sherwood West would provide local job opportunities, reduce commuting times, and strengthen the regional workforce pipeline.

4. Infrastructure and Accessibility

Sherwood West is directly accessible via multiple transportation routes, including Highway 99W, Roy Rogers Road, and Tualatin-Sherwood Road. These routes offer freight and commuter access to the high-tech hubs of Washington County. Furthermore, the area benefits from proximity to established utilities, including water and electricity, which can be rapidly scaled to meet industrial demands (*Sherwood EOA, 2023, Infrastructure Section*). Its nearly flat terrain makes it development-ready, reducing preparation costs and timelines.

A Balanced Assessment of Regional Sites

While Sherwood West offers unique advantages, we recognize the importance of considering all regional sites to meet industrial land needs. For example, the Wilsonville industrial sites (Basalt and Coffee Creek) is another large-lot area near Sherwood. However, it faces challenges and likely lacks the readiness needed for immediate development. Despite efforts over 20 years to plan and develop this area by the City of Wilsonville, the challenge of assembling sites (90+tax lots) with very few tools is overwhelming. This makes Sherwood West a more practical short-term option for high-tech and semiconductor-related investments identified by the Task Force Report.

Additionally, compared to east-side sites outlined in Figure 24 of the Urban Growth Report, Sherwood West's west-side location reduces transportation costs and supply chain inefficiencies, aligning with the semiconductor industry's preference for clustering near established hubs.

Conclusion

Sherwood West represents a vital opportunity to address the region's industrial land shortage and support the continued growth of Oregon's semiconductor industry.

Thank you for considering this as additional evidence in the record.

Sincerely,

Erik Adair
Economic Development Manager
City of Sherwood

Memo

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Date: November 26, 2024
To: Metro Council
From: David Tetrick, Economic Development Planner
Subject: Regional inventory of large industrial sites for high-tech manufacturing

This memorandum provides additional information about the suitability and adequacy of large industrial sites currently inside the Metro urban growth boundary (UGB) to meet future needs for available semiconductor manufacturing sites in the Metro region. This memorandum also considers the comparative suitability of the two potential industrial sites in Sherwood West, and supplements the information provided in the June 2024 Sherwood West UGB Assessment that is attached to the 2024 Urban Growth Report as Appendix 9. As noted in Appendix 9, the report issued by the Oregon Semiconductor Task Force in August 2022 identified a need for four sites of 50-100 acres in size to support the semiconductor manufacturing ecosystem in our region. As explained in Appendix 9, there are currently two large sites inside the UGB that have site characteristics that are suitable to support semiconductor manufacturing, leaving a deficit of two large sites.

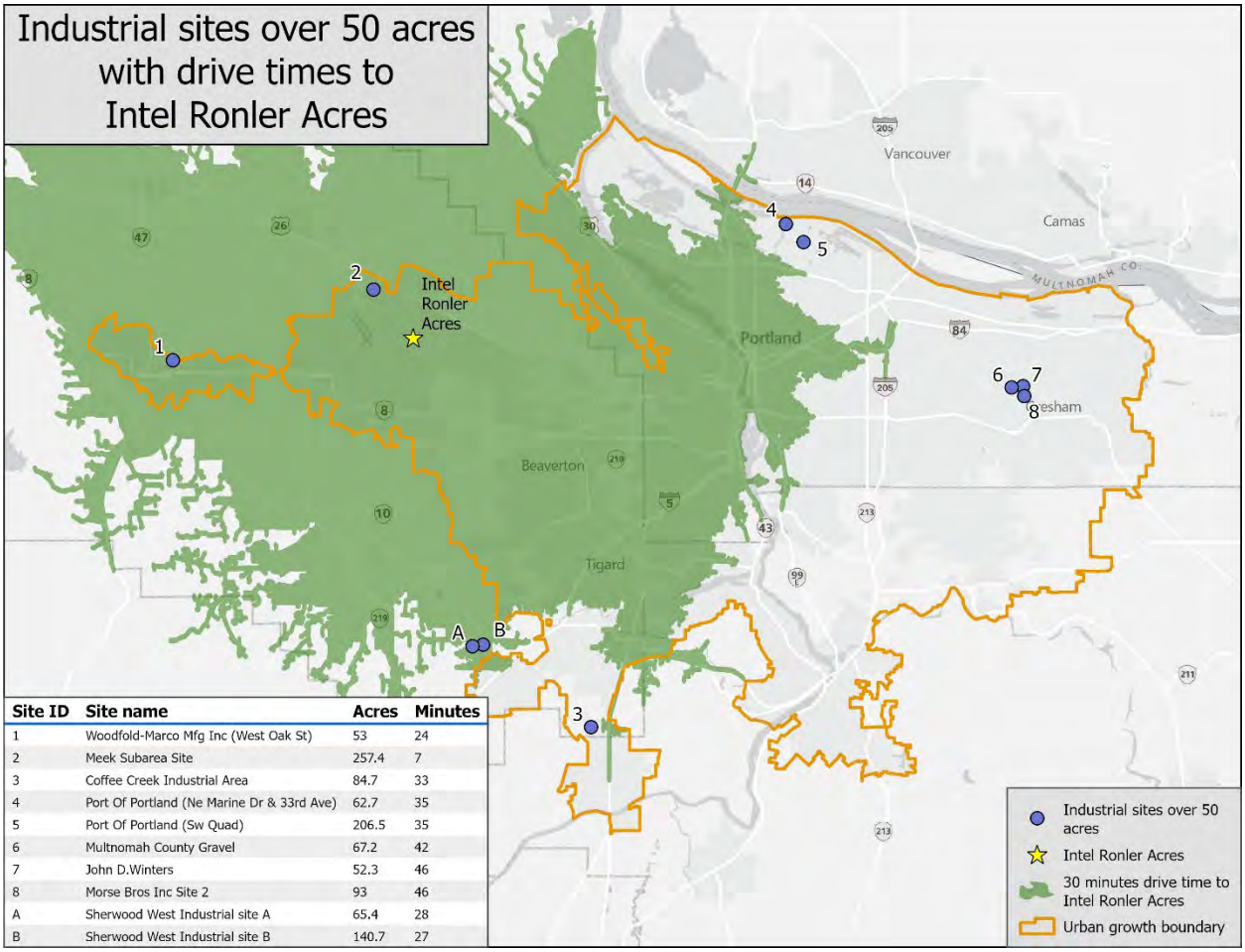
Current inventory of large industrial sites inside the UGB

There are currently eight sites over 50 buildable acres in size in the region's industrial land inventory. These sites are identified as contiguous parcels of industrial land totaling at least 50 acres within the UGB, but the individual parcels may not share common ownership and can have a variety of other barriers to development, including steep slopes. Those eight sites are depicted on the attached maps, labeled sites one through eight.

The August 2022 report of the Semiconductor Task Force explains that the Metro region is the key to continued growth and development of the semiconductor sector, and describes the importance of clustering to that industry, concluding that semiconductor businesses are highly likely to continue the type of clustering that has historically occurred on the west side of the Metro region.

A key suitability characteristic for this type of high-tech manufacturing site is reasonable proximity to other semiconductor companies, particularly large manufacturers but also other supply chain companies, to take advantage of our region's skilled workforce and help their business models succeed. Figure 1 depicts the travel distance between available 50+ acre industrial sites and the existing regional semiconductor manufacturing cluster in Hillsboro. The drive times depicted in Figure 1 were determined by Metro staff using Esri's Network Analyst in ArcGIS Pro and cross-checked against driving directions using Google Maps.

As shown in Figure 1, there are two sites inside the existing UGB within close proximity to the main semiconductor cluster: the Woodfold-Marco Site and the Meek Subarea Site (sites 1 and 2 on the attached maps, respectively).



Site ID	Site name	Acres	Minutes
1	Woodfold-Marco Mfg Inc (West Oak St)	53	24
2	Meek Subarea Site	257.4	7
3	Coffee Creek Industrial Area	84.7	33
4	Port Of Portland (Ne Marine Dr & 33rd Ave)	62.7	35
5	Port Of Portland (Sw Quad)	206.5	35
6	Multnomah County Gravel	67.2	42
7	John D.Winters	52.3	46
8	Morse Bros Inc Site 2	93	46
A	Sherwood West Industrial site A	65.4	28
B	Sherwood West Industrial site B	140.7	27

Figure 1: Proximity of large industrial sites to existing high-tech manufacturing cluster

As shown in Figure 1, the Coffee Creek Industrial Area (site 3) is further away from the existing west side semiconductor cluster than the two sites in Sherwood West. The Coffee Creek site also has other site characteristics that make it less suitable for large-lot industrial use – the potentially developable portion of the site consists of 20 separate tax lots of between 0.8 acres and 10 acres that are in 12 different ownerships, making it difficult to aggregate all of the smaller lots into one larger development opportunity. Also, the five lots in the northwestern portion of the Coffee Creek site include slopes of greater than seven percent.

The Port of Portland site (site 4) (NE Marine Drive & 33rd Ave) is impacted by wetlands, does not have proximity to the semiconductor cluster, and is restricted to marine use under local zoning, making semiconductor companies unable to utilize this site.

The other Port of Portland site (site 5) (SW Quad) is similarly impacted by wetlands, is restricted to aviation uses under local zoning, and does not have proximity to the semiconductor cluster, making semiconductor companies unable to utilize the site.

The Multnomah County Gravel site (site 6) does not have proximity to the semiconductor cluster and is a gravel quarry with a significant portion of the site including slopes of over 25 percent.

The John D. Winters site (site 7) is also a quarry with a significant portion of the site including slopes over 25 percent; the site is also on the east side of the region with no proximity to the semiconductor cluster.

A third quarry is Morse Bros Inc. Site 2 (site 8 on the maps) – like the other two east side quarry sites it also includes slopes over 25 percent and lacks proximity to the existing semiconductor manufacturing cluster.

Proposed UGB expansion area sites

The two sites in the proposed expansion area are Sherwood West industrial sites A and B (shown on attached maps). These sites are relatively flat and include larger parcels that include tax lots in common ownership, making site aggregation significantly easier. Site B includes approximately 140 acres, comprised of only seven tax lots in four separate ownerships. The most likely location for a high-tech manufacturing site on Site B is the northern portion of the site, where there are four lots totaling 88.5 acres in just two ownerships. Site A includes approximately 65 acres in 11 tax lots, including three large lots on the south end of the site totaling about 30 acres in just two ownerships. These characteristics plus relative proximity to existing semiconductor companies on the west side make them more suitable for future high-tech use than other larger industrial sites in the region.



Industrial sites over 50 acres

Site 1: Woodfold-Marco Mfg Inc (West Oak St)

Site boundary
Contours - 5 ft.
Taxlots
floodway
floodplain
slope >25%
slope >7% and <25%
Title 3
001274





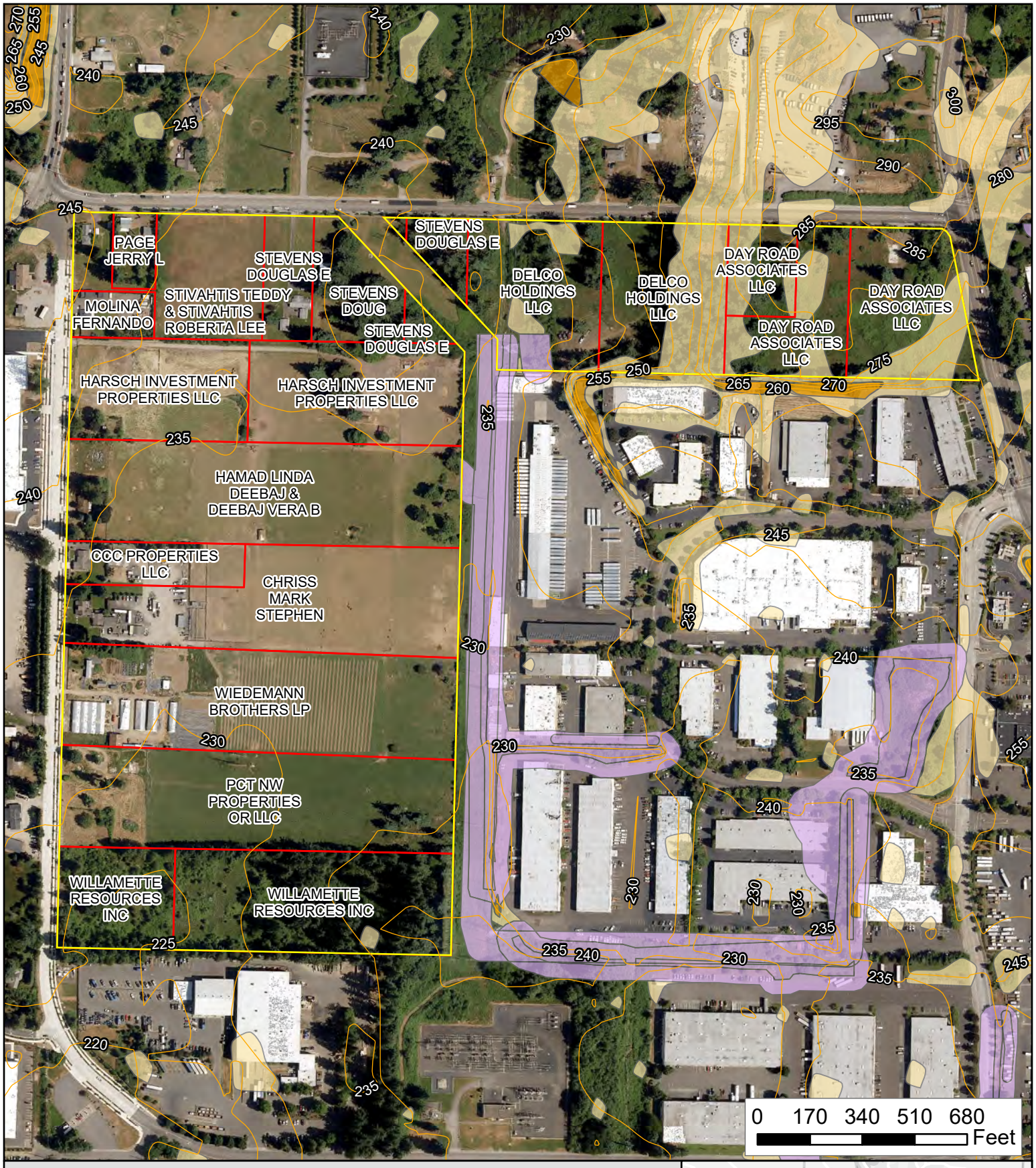
Industrial sites over 50 acres

Site 2: Meek Subarea Site

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001275



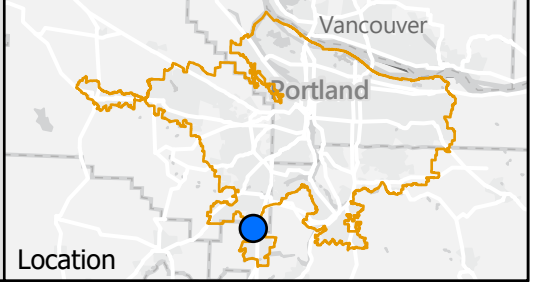


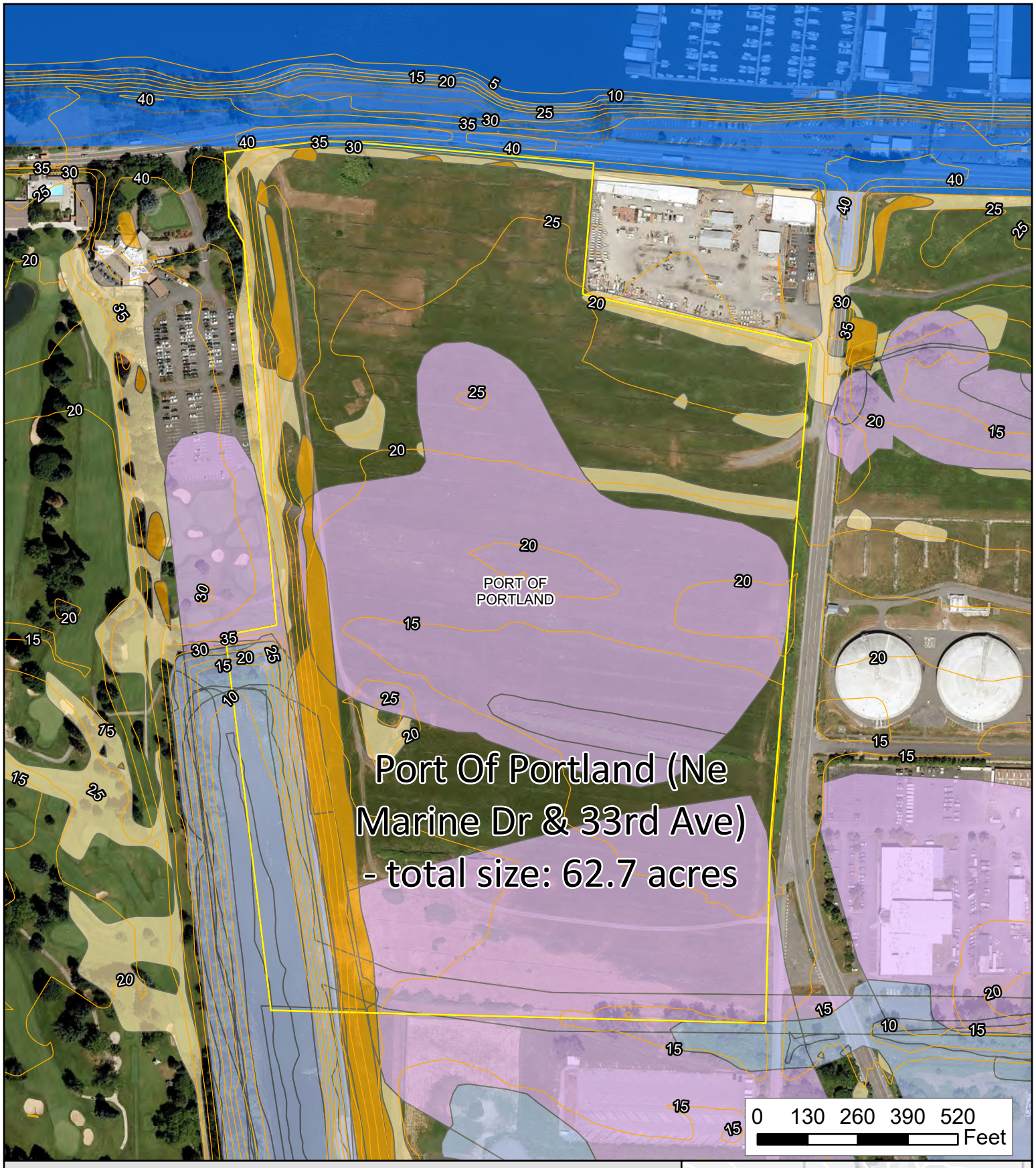
Industrial sites over 50 acres

Site 3: Coffee Creek Industrial Area

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001276



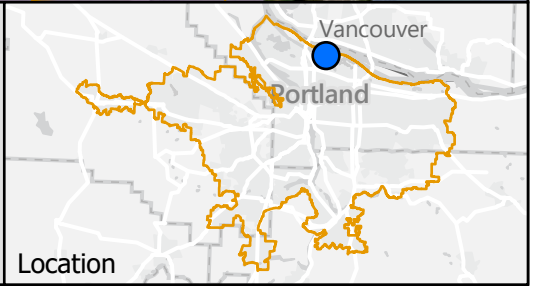


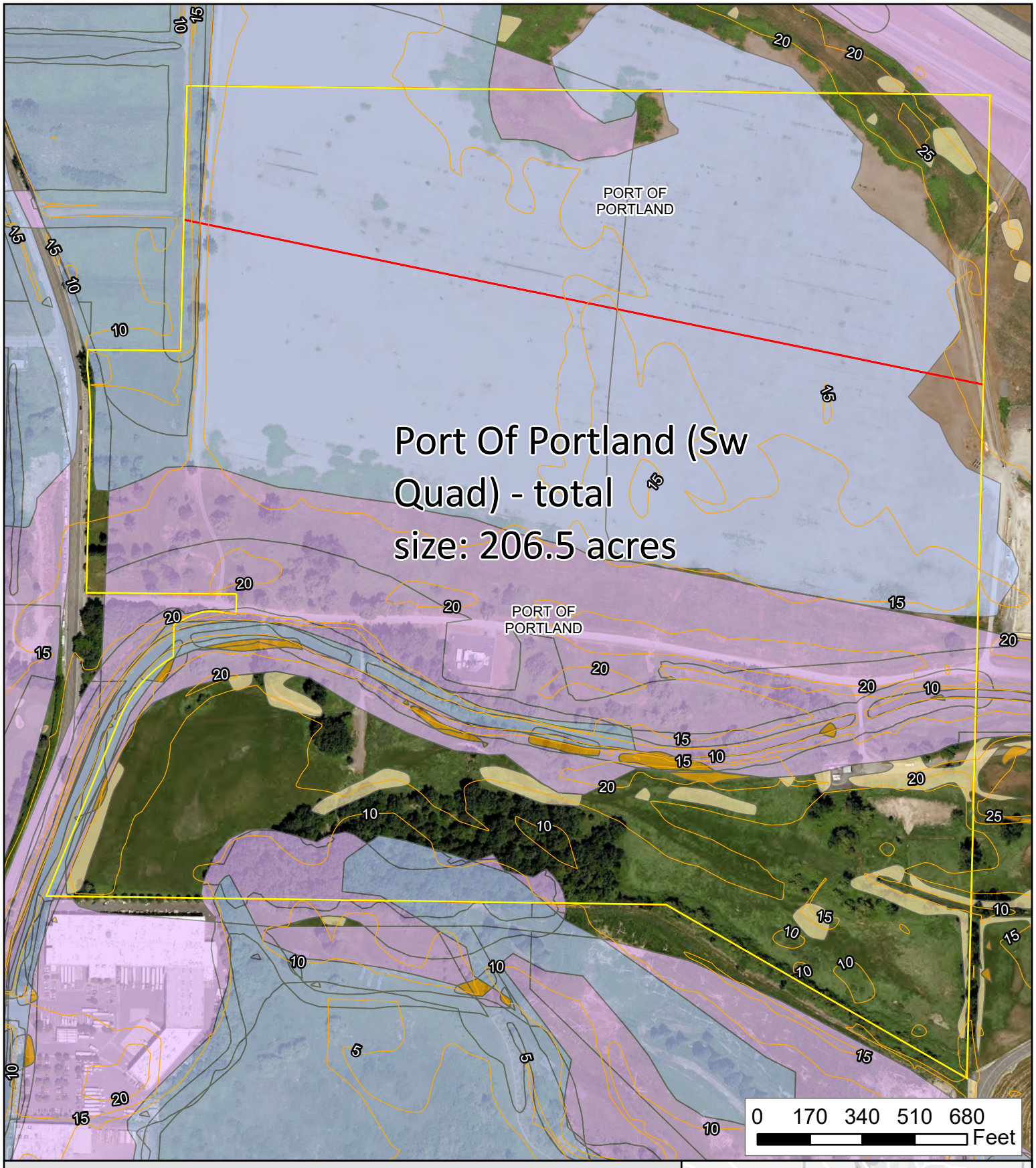
Industrial sites over 50 acres

Site 4: Port Of Portland (Ne Marine Dr & 33rd Ave)

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001277





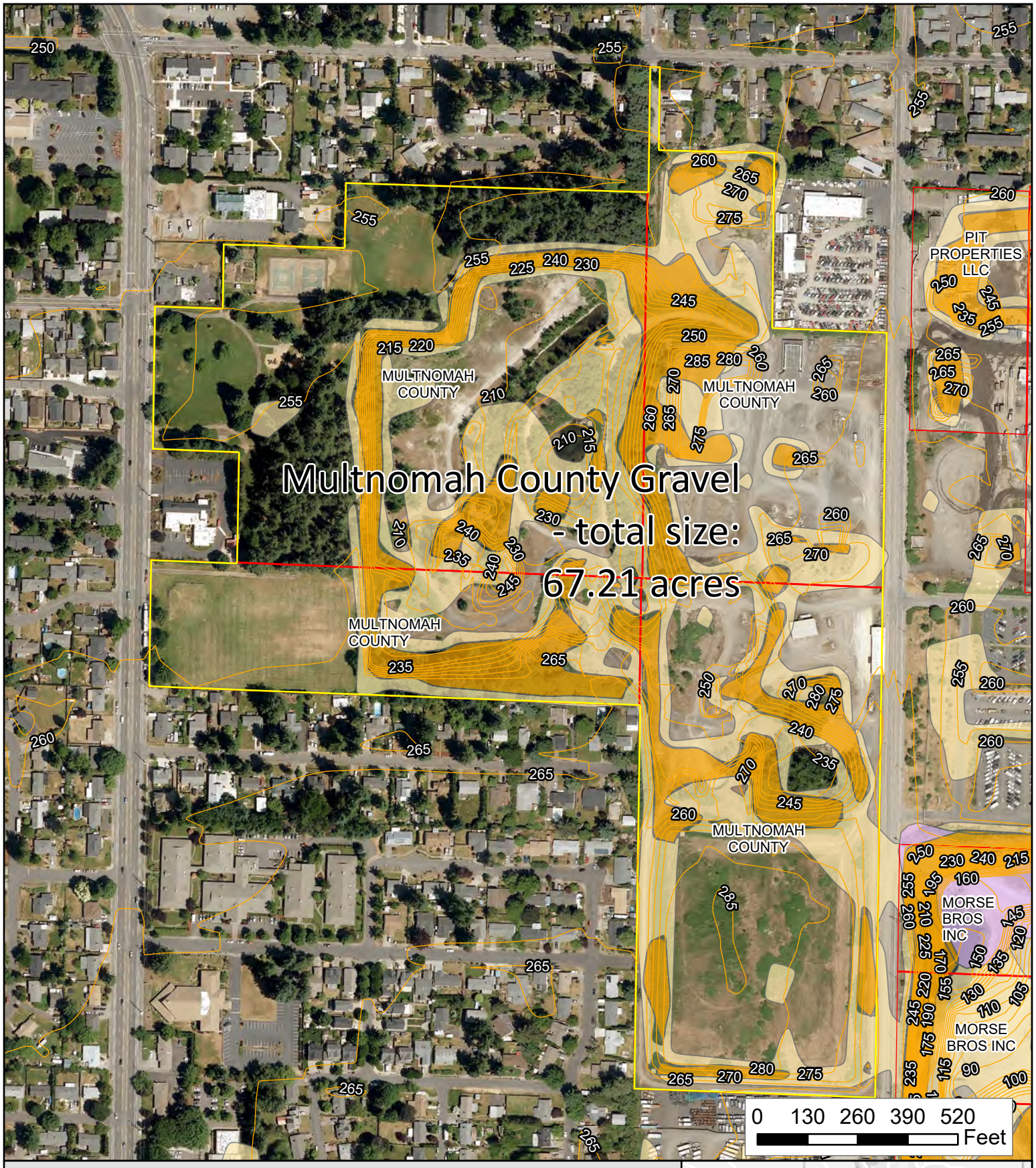
Industrial sites over 50 acres

Site 5: Port Of Portland (Sw Quad)

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001278



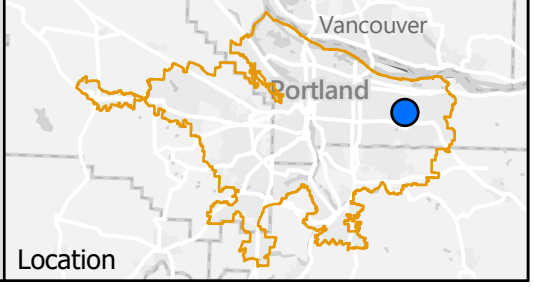


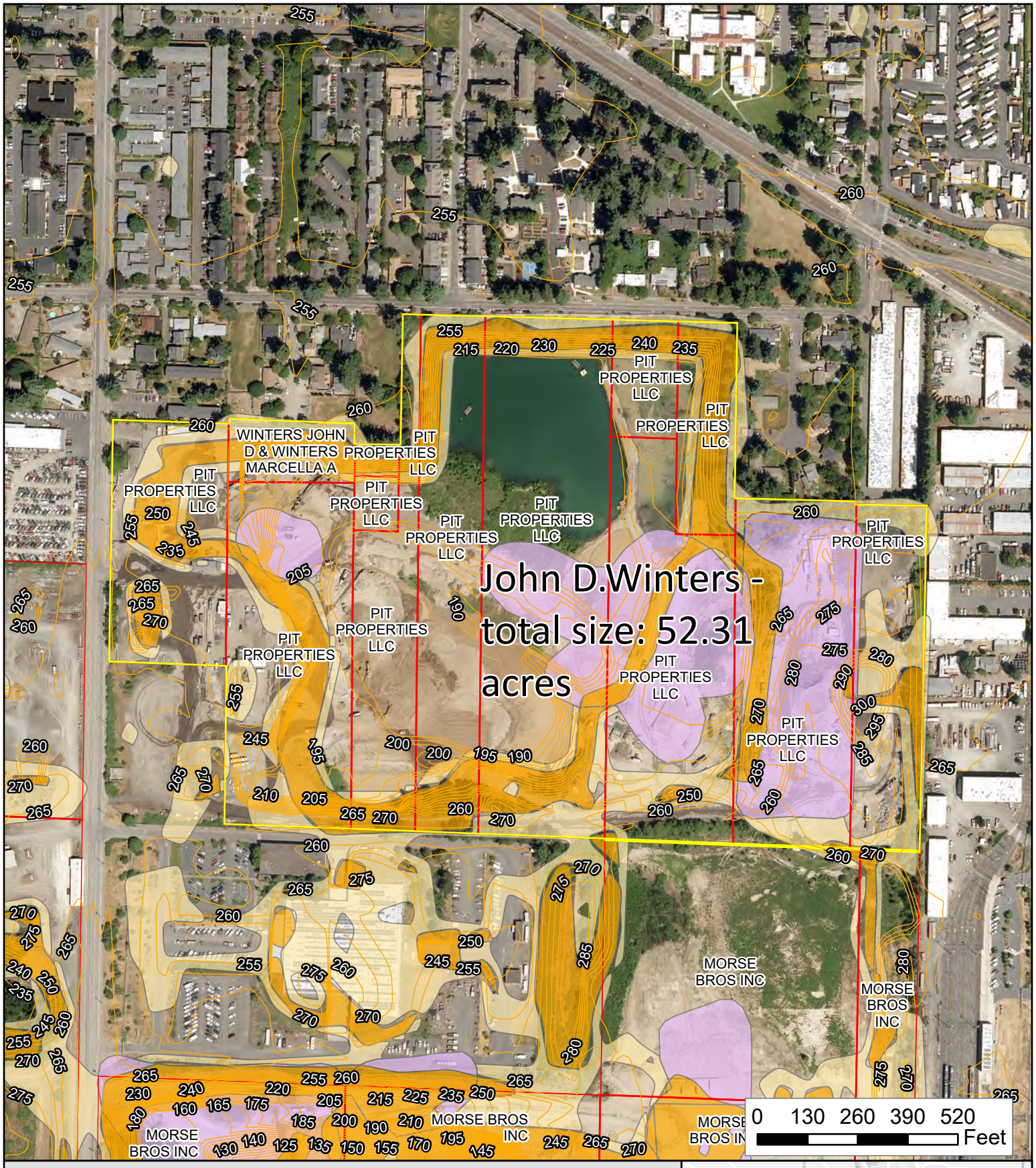
Industrial sites over 50 acres

Site 6: Multnomah County Gravel

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001279



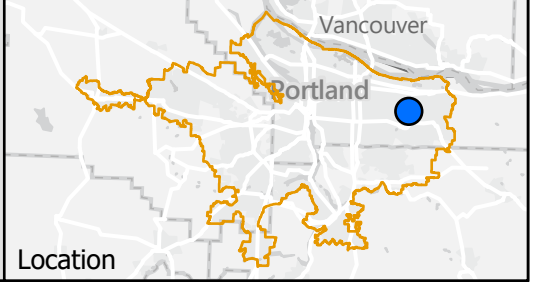


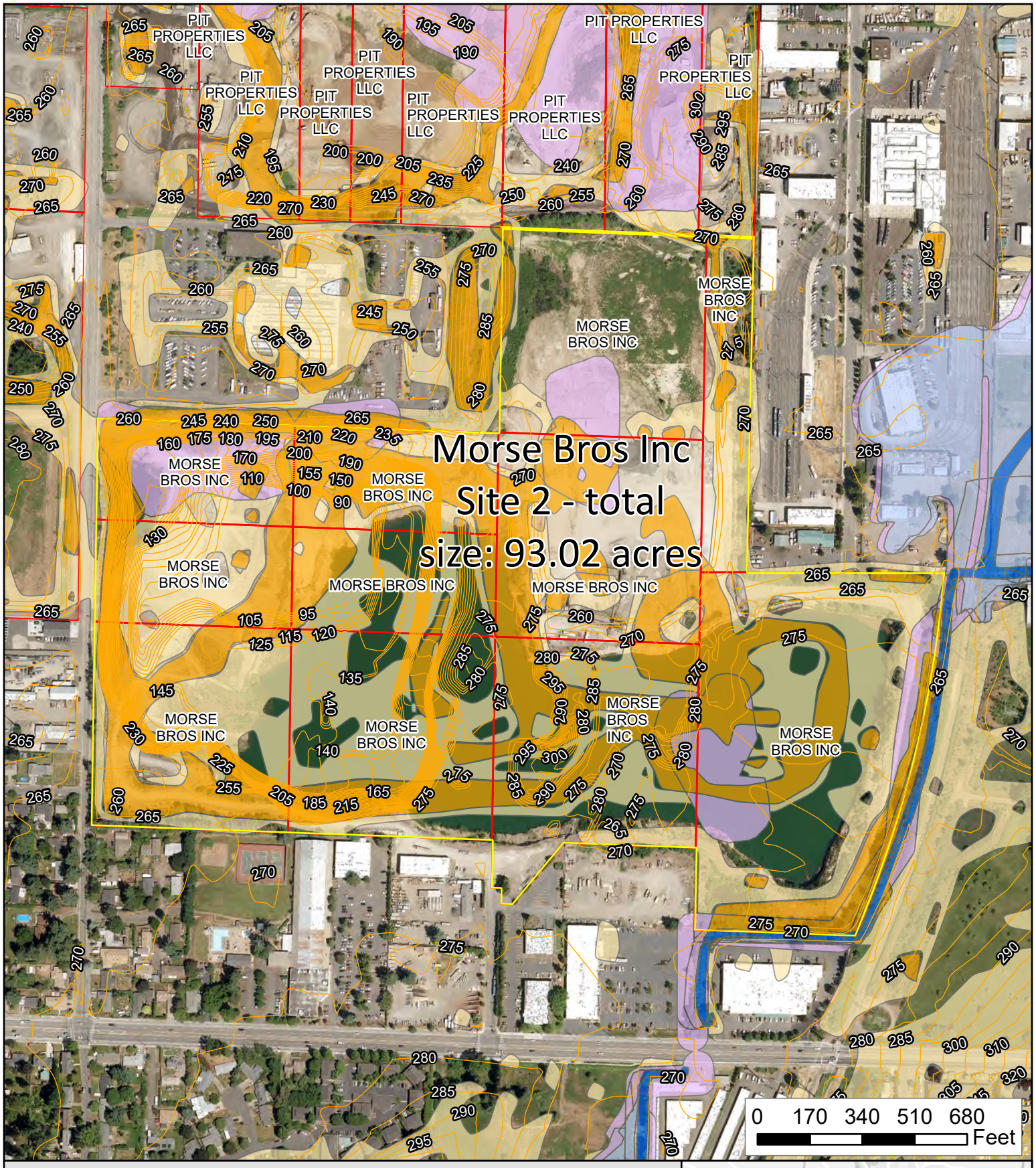
Industrial sites over 50 acres

Site 7: John D.Winters

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001280



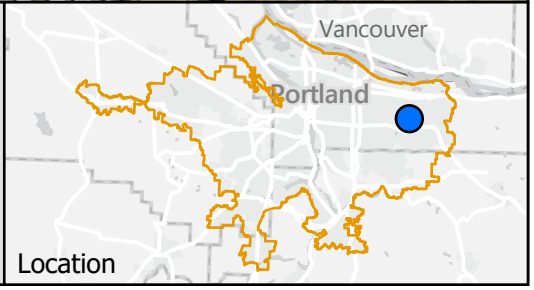


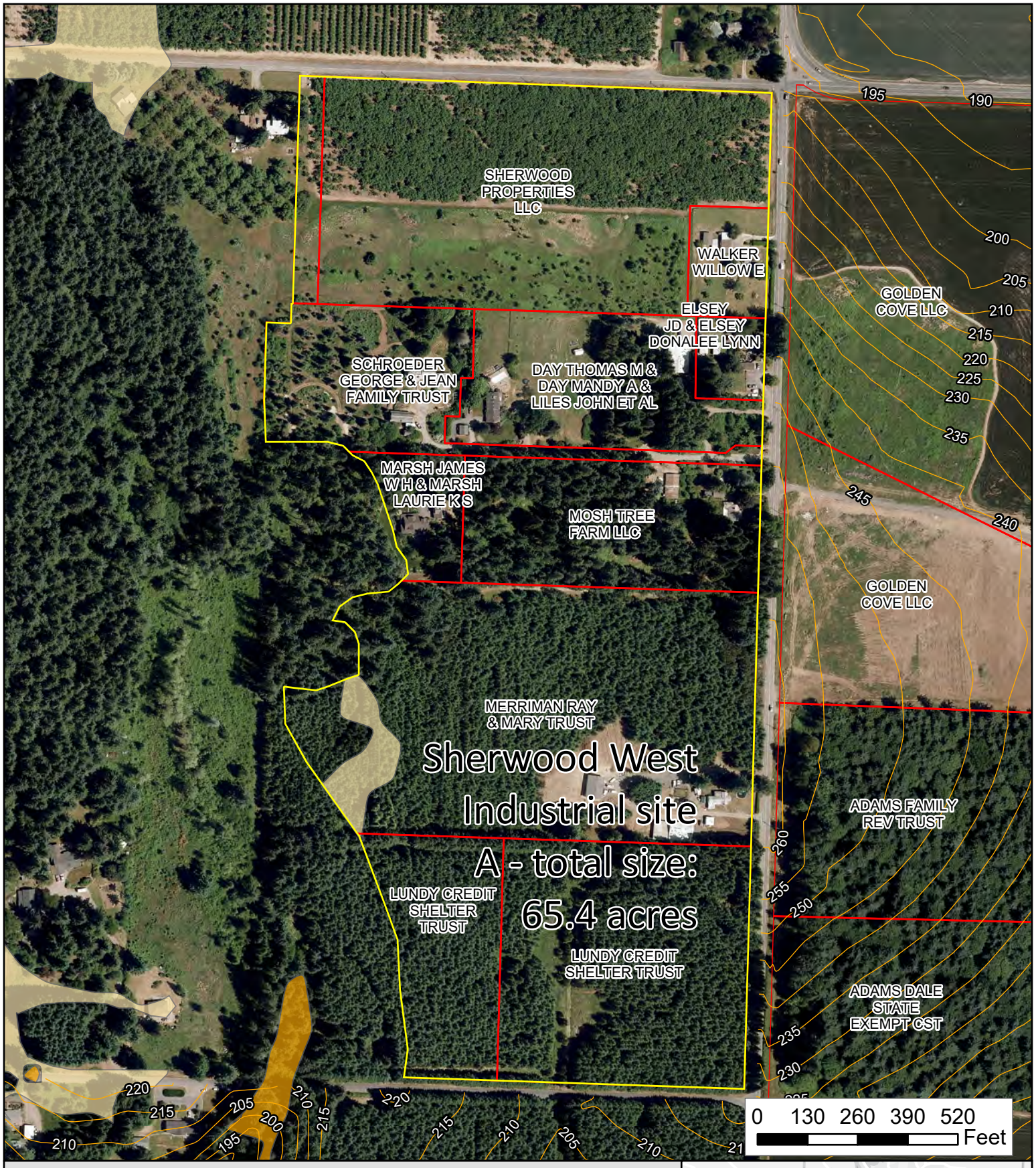
Industrial sites over 50 acres

Site 8: Morse Bros Inc Site 2

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001281





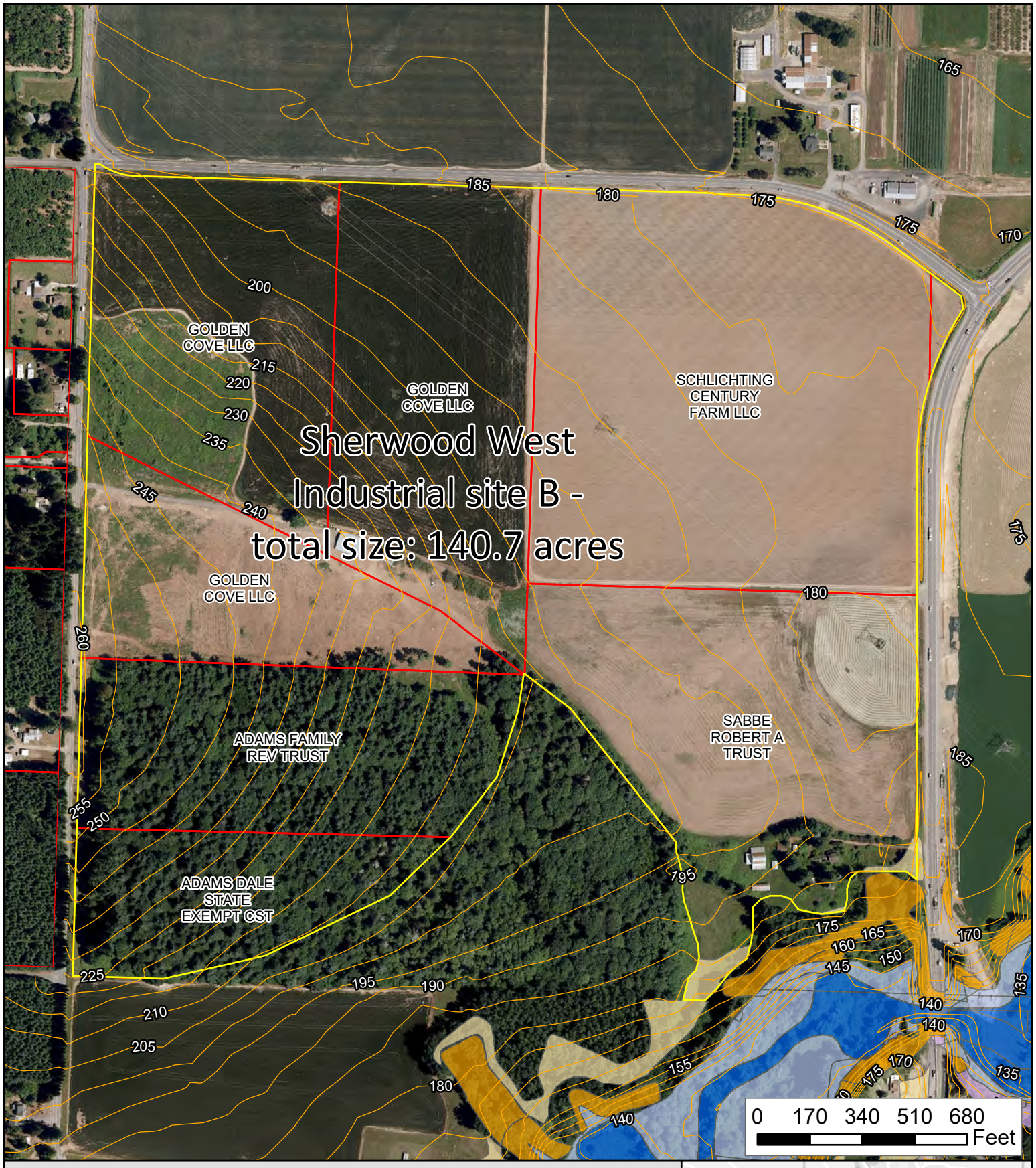
Industrial sites over 50 acres

Site A: Sherwood West Industrial site A

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001282





Industrial sites over 50 acres

Site B: Sherwood West Industrial site B

- Site boundary
- Contours - 5 ft.
- Taxlots
- floodway
- floodplain
- slope >25%
- slope >7% and <25%
- Title 3

001283



Georgia Langer

From: Hella Betts <hella@cascadewestern.com>
Sent: Friday, November 22, 2024 10:17 AM
To: Legislative Coordinator
Subject: [External sender]Sherwood West UGG

CAUTION: This email originated from an **External source**. Do not open links or attachments unless you know the content is safe.

Dear Sir,

As a resident living in the proposed Sherwood West area I strongly oppose the Sherwood Farm Alliance opposition to oppose getting into the UBG, in my opinion they have some miss guided information.

We in Sherwood West area residents are dependent on Washington County police and with the school traffic and other issues Sherwood Police cannot react as quickly as they want , they share jurisdiction with Washington County police. This was noted on a Sherwood Police Advisory Board Meeting. This area is off Hwy 99 and needs closer scrutiny that Washington County cannot service as quickly.

Thank you, I am in favor of Metro voting Sherwood West in:)

Hella Betts
19945 SW Kruger Road
Sherwood, Or 97202

JOHN A. RANKIN, LLC.
Attorney/Consultant
Kruse Mercantile Professional Suites
4248 Galewood St.
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42194 Calle Corriente
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Direct/Text 503-329-9292
Fax (951-677-8480)
email: john@johnrankin.com

November 27, 2024

VIA EMAIL ONLY

Metro Council
c/o Ms. Marissa Madrigal
Chief Operating Officer
Metro Services District
600 NE Grand Ave
Portland, OR 97232
Marissa.Madrigal@oregonmetro.gov
2040@oregonmetro.gov

Re: Fourth and Final Letter of Support For Metro Council's 2024 UGB Decision For the Entire Sherwood West Concept Plan Area.

Dear Councilors Peterson, Simpson, Lewis, Rosenthal, Gonzalez, Nolan, and Hwang:

To quote the "late and (most would say) great" Bob Stacey on Metro Council's unanimous approval of the 2018 UGB Decision (as reported on December 13, 2018 in Metro News by Nick Christensen):

> **"I'm no enthusiast for urban growth boundary expansions," said Metro Councilor Bob Stacey. "But if you gotta do it, and I think we do this time, then you should be doing it right, and I think we're doing it right this time."**

As a respectful contemporary of Bob, I sincerely believe that if he were still with us, he would make that same statement about the Sherwood West Ask which is before you now.

Please accept this letter as our fourth and final written testimony on behalf of our Sherwood West property owner clients and friends and the residents and small businesses of the Sherwood Community in which we are summarizing our three previous testimony letters dated

April 1, 2024, July 30, 2024 and October 3, 2024 summarizing the following factors and characteristics and issues which clearly support your decision to expand the Metro/Sherwood UGB to include the entire Sherwood West Area:

1. The City of Sherwood and the surrounding Sherwood Community (Sherwood) has been consistently working on what has become this Sherwood West "Ask" since 2011 when the need for a meaningful jobs/housing balance was identified and then since 2015 when the original Sherwood West Concept Plan was conceived.

2. Sherwood has coordinated closely with Metro staff, Washington County, all relevant local and state agencies and all interested parties during that same 13-year period.

3. Over that 10 years and including its current "Ask", Sherwood has more completely demonstrated compliance with and successfully addressed all applicable criteria for Metro Council's approval than I wager any of the "Asks" in recent history.

4. This "Ask" has been thoroughly vetted and approved over the last 10 years through at least three or four exhaustive public and citizen input processes (original concept planning, comprehensive visioning and planning, master and infrastructure planning and final local decisions) by:

    a. The overwhelming majority of Impacted Sherwood property owners,
    b. Sherwood staff members
    c. Washington County staff and agencies
    d. Sherwood Citizen and Technical Advisory Committees
    e. The Sherwood public
    f. All interested parties and entities (i.e. from Sherwood School District to Tualatin Riverkeepers)
    g. Planning Commissions
    h. City Councils
    i. Metro staff members – Staff Reports & Approval Recommendations
    j. Metro Chief Operating Officer – Urban Growth Report - Approval
    k. MTAC – Recommendations to MPAC Approval
    l. MPAC – Recommendations to Metro Council - Approval

5. Because Sherwood has worked so hard and accepted and is willing to address the reasonable proposed conditions by Metro, the remaining opponents appear to have been reduced to:

    a. Residents of an older rural neighborhood which appears to have been created before current restrictions on rural developments, and whose primary objection is common and understandable – they don't want new development disrupting their existing rural lifestyle.

Partial response: Sherwood has done such a good job of preserving the existing natural resources, open space and rural uses that Sherwood West will not look and feel like the typical urban development but more like the rural ambiance that currently exists.

b. 1,000 Friends of Oregon – which I am personally surprised has appeared in opposition after all of Sherwood's efforts to create a truly balanced and comprehensively planned UGB Ask, and after 1,000 Friends' deep involvement in the rural and urban reserve designation process. As you know, all of Sherwood West is currently designation Urban Reserve.

c. Opponents on various legal issues who may or may not have valid objections, but who are making "the record", so that those issues can and will only be decided on appeal to LUBA and the appellate court system, out of which so much of our new and refinements to land use policies have come over the years.

On December 5, 2024, Metro Council can only make a decision based on the findings of fact and conclusions of law and the approval relevant criteria which have all been comprehensively addressed and approved all the way to your final decision.

Thank you for the opportunity to present this final letter of support on behalf of all of us who live and/or work in the Sherwood and in the Sherwood West Planning Area.

We continue to look forward to your approval decision to expand Sherwood's UGB to include the entire Sherwood West Planning Area and give the City the ability to create and implement Sherwood West as a great addition to the City and the Sherwood Community as well as to the greater Portland Metro Area.

Finally, a profound thanks to you all and your staff's help and support of the City's long-term efforts to create the Sherwood West Plan.

Very truly yours,

John A. Rankin

JAR/bhs
Enc: Sherwood West Map
Pc: Gerritt Rosenthal, District 3 Councilor
Via email: gerritt.rosenthal@oregonmetro.gov
Eric Rutledge City of Sherwood
Community Development Director
Via email: rutledgee@sherwoodoregon.gov
Clients and Former Clients via email

Georgia Langer

From: Jon Kraxberger <boxwoodworld@icloud.com>
Sent: Friday, November 22, 2024 9:54 AM
To: Legislative Coordinator
Subject: [External sender]20050 SW Kruger 14 aces IN LIMBO

CAUTION: This email originated from an External source. Do not open links or attachments unless you know the content is safe.

I am wanting our property in the boundary We have been requesting this for a few years We are on the line and the other side is metro controlled .
This 38 acres makes sense to put in your plan. There is 25 of the 38 controlled by metro That leave 14 acres that is going to be in limbo.
I understand this is the 11th hour
Please consider
Thank you
Jon Kraxberger land owner
Kraxberger Fitch LLC
503 849 7322

Intel will sell 150-acre campus in California, assessing future of 50-acre Hillsboro site

Intel is reducing its real estate holdings around the world as it works to cut $10 billion in spending.J

The Oregonian

- **Mike Rogoway | The Oregonian/OregonLive**
- Updated: Nov. 23, 2024, 9:06 a.m.
- |Published: Nov. 22, 2024, 12:50 p.m.

Intel plans to sell its 150-acre campus in Folsom, California, part of a broad effort to cut costs amid flagging sales. The chipmaker said it is also evaluating the future of its 50-acre Hawthorn Farm property and working to consolidate its footprint at its Silicon Valley headquarters.

"We are shifting our global real estate strategy to focus on fewer, more populated locations and eliminate underutilized space," Intel said in a statement Friday. "This approach will foster greater in-person collaboration at our largest sites while also delivering cost savings for the company."

Intel isn't closing its Folsom site near Sacramento, one of its major operating hubs with around 5,000 employees. It says it wants to make more efficient use of the property, which consists of seven buildings and 1.6 million square feet of offices and labs.

"We are exploring more cost-effective space usage options for Intel's Folsom site, including a partial lease back of our current space," Intel said in its statement.
Sales and leasebacks are common ways that businesses seek to extract value from their real estate holdings, especially when the companies need cash.

Intel is struggling on multiple fronts. It lost its technological lead in computer chip production to Taiwan Semiconductor Manufacturing Co., and the market for Intel's microprocessors in PCs and data centers has waned.

Meanwhile, Intel has made little headway in artificial intelligence, technology's hottest sector. Nvidia dominates that market.

Intel's sales have fallen by a third since 2021 and the company reported a nearly $17 billion loss last quarter. The company did raise its forecast for the last part of the year, though, and said it is making progress toward financial stability.

Intel eliminated 15,000 jobs this fall through buyouts and layoffs, part of a plan to shave $10 billion in costs.

Those cuts included 272 Folsom layoffs last month and 1,300 in Oregon, where Intel employed about 23,000 at the start of the year.

Intel is cutting back on property holdings around the world to reduce its spending. The company told employees it wants to consolidate operations at its headquarters in Santa Clara, California, but it hasn't announced specific changes.

Hawthorn Farm is the smallest of Intel's four Oregon campuses. Intel says it formally opened in 1981 but some historical records indicate the company began operating there in 1978. It now consists of office and lab space, focused on researching technology for motherboards. Intel laid off 124 employees at the site during last month's cutbacks. Intel has been encouraging employees to move to more densely occupied Oregon sites but indicated it has no immediate plans to sell the property.

Biden administration will trim Intel's $8.5 billion CHIPS Act grant, NYT reports Nov. 24, 2024, 10:12 p.m.

Cost of Constructing a Home- 2022

February 1, 2023
By: Eric Lynch
Economics & Housing Policy
National Association of Home Builders (NAHB)

Introduction

Over the years, NAHB has periodically conducted "construction cost surveys" to collect information from builders on the various components that go into the sales price of a typical newly-built single-family home. NAHB's most recent Construction Cost survey (conducted in the Fall of 2022) shows that, on average, 60.8 percent of the sales price is due to construction costs and 17.8 percent to finished lot costs. On average, builder profit is 10.1 percent of the sales price. The following sections describe the methodology of the survey and discuss the results in more detail.

Caveats

The NAHB Construction Cost Survey is designed to show percentage cost breakdowns for a typical home built by a subset of NAHB builders. It is not designed to capture representative characteristics of the average home built during a particular year. Characteristics such as the size or price of homes in the sample may therefore differ significantly from averages reported in the Census Bureau's Survey of Construction (SOC), which is based on a much larger sample and is designed to produce such averages. Because the NAHB survey does not control for year-to-year differences in the builders or homes in the sample, users should be cautious when comparing results across multiple years and defer to the published SOC data for this purpose when possible.

The survey results published here are national averages; as the survey sample is not large enough for a geographic breakdown. Building practices, the cost of labor, the cost of land, and to some extent the cost of materials can vary from place to place and depend on the nature of the specific home being built. Each category includes all the costs paid by a builder that go into a particular item, including labor costs paid directly by the general contractor, the cost of hiring subcontractors, and the cost of materials, however they are purchased.

Although the survey can provide a broad idea of construction costs for the average new single-family home, it is not a perfect tool for estimating costs for a particular house in a particular location. Companies that provide more specific cost estimating, usually for a fee, include RSMeans and Marshall & Swift.

Methodology

NAHB's 2022 Construction Cost survey was conducted by emailing a questionnaire to a representative sample of 3,891 home builders. The sample was stratified by the size of the builder (based on the number of 2021 single-family starts) and by region of the country (the sample being proportional to housing starts in each of the four principal Census regions).

Over the years, NAHB has modified the survey and its methodology. In 2009, the survey methodology changed to provide a better, more representative sample of single-family construction across the country. In 2013, NAHB developed a different construction cost breakdown that more closely resembles the steps that builders take when building a home. Prior to 2013, the breakdown had 29 sections. In 2013, NAHB created eight subcategories for each of the major stages of construction, with a total of 36 sections grouped under the appropriate construction stage. The new format simplified data collection, greatly reducing the number of follow-up calls needed to clarify and verify builder responses.

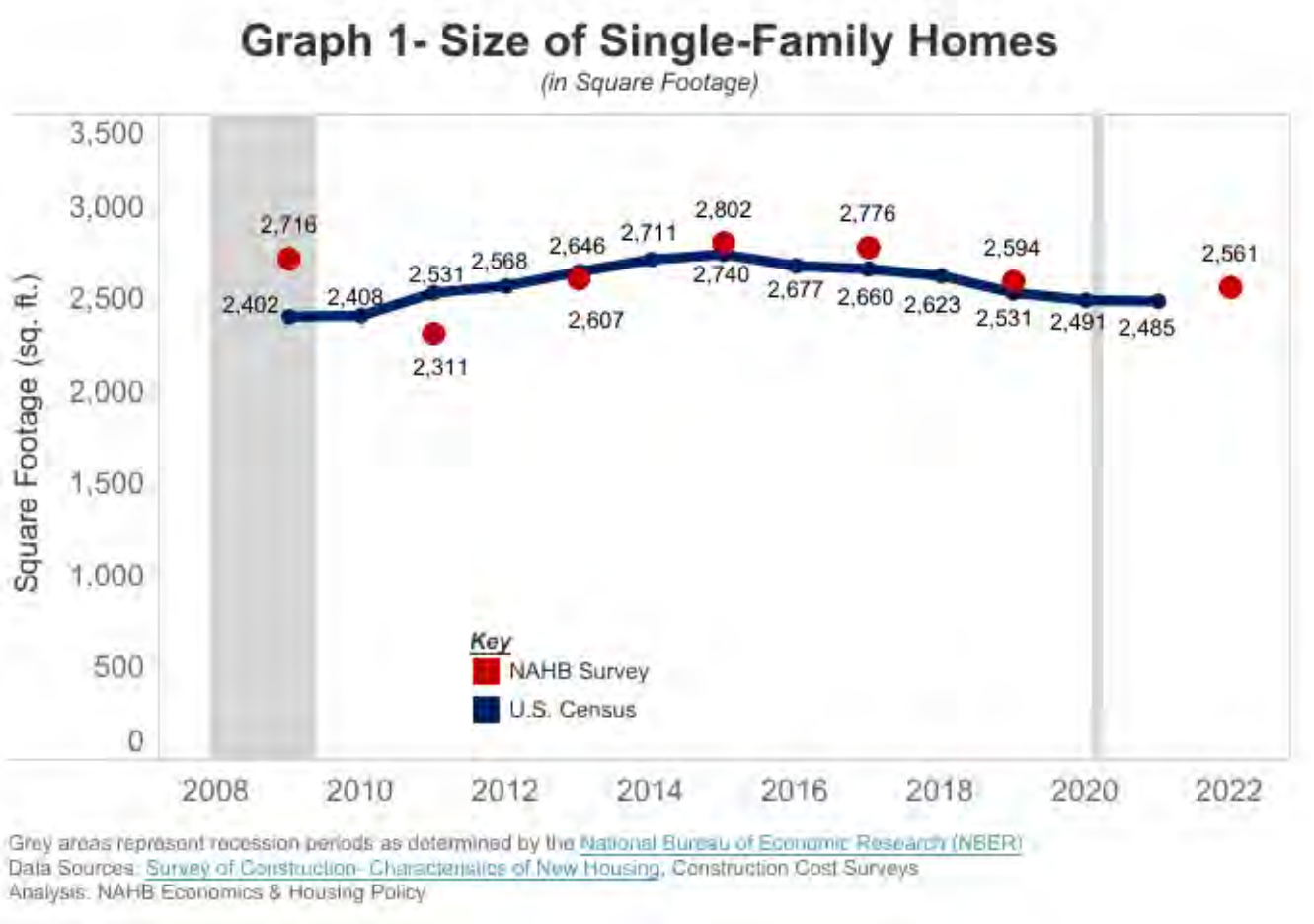
Respondents were asked to provide information about the typical single-family home built by their firms during 2022. After examining the data and performing an outlier analysis, usable responses were received from 49 builders. Table 1 shows the detailed results of the 2022 Construction Cost survey.

Table 1. SINGLE-FAMILY PRICE AND COST BREAKDOWNS 2022 National Results		
	Average Lot Size:	17,218
	Average Finished Area:	2,561
I. Sale Price Breakdown	**Average**	**Share of Price**
A. Finished Lot Cost (including financing cost)	$114,622	17.8%
B. Total Construction Cost	$392,241	60.8%
C. Financing Cost	$12,192	1.9%
D. Overhead and General Expenses	$32,979	5.1%
E. Marketing Cost	$4,268	0.7%
F. Sales Commission	$23,080	3.6%
G. Profit	$65,369	10.1%
Total Sales Price	$644,750	100.0%
II. Construction Cost Breakdown	**Average**	**Share of Construction Cost**
I. Site Work (sum of A to E)	**$29,193**	**7.4%**
A. Building Permit Fees	$8,292	2.1%
B. Impact Fee	$5,208	1.3%
C. Water & Sewer Fees Inspections	$5,800	1.5%
D. Architecture, Engineering	$4,724	1.2%
E. Other	$5,169	1.3%
II. Foundations (sum of F to G)	**$43,086**	**11.0%**
F. Excavation, Foundation, Concrete, Retaining walls, and Backfill	$39,731	10.1%
G. Other	$3,355	0.9%
III. Framing (sum of H to L)	**$80,280**	**20.5%**
H. Framing (including roof)	$60,831	15.5%
I. Trusses (if not included above)	$11,479	2.9%
J. Sheathing (if not included above)	$5,383	1.4%
K. General Metal, Steel	$1,168	0.3%
L. Other	$1,419	0.4%
IV. Exterior Finishes (sum of M to P)	**$46,108**	**11.8%**
M. Exterior Wall Finish	$19,746	5.0%
N. Roofing	$11,496	2.9%
O. Windows and Doors (including garage door)	$13,158	3.4%
P. Other	$1,709	0.4%
V. Major Systems Rough-ins (sum of Q to T)	**$70,149**	**17.9%**
Q. Plumbing (except fixtures)	$22,706	5.8%
R. Electrical (except fixtures)	$23,892	6.1%
S. HVAC	$21,845	5.6%
T. Other	$1,707	0.4%
VI. Interior Finishes (sum of U to AE)	**$94,300**	**24.0%**
U. Insulation	$6,530	1.7%
V. Drywall	$13,184	3.4%
W. Interior Trims, Doors, and Mirrors	$12,727	3.2%
X. Painting	$8,793	2.2%
Y. Lighting	$4,502	1.1%
Z. Cabinets, Countertops	$17,775	4.5%
AA. Appliances	$6,263	1.6%
AB. Flooring	$13,019	3.3%
AC. Plumbing Fixtures	$5,166	1.3%
AD. Fireplace	$1,608	0.4%
AE. Other	$4,733	1.2%
VII. Final Steps (sum of AF to AJ)	**$23,065**	**5.9%**
AF. Landscaping	$9,123	2.3%
AG. Outdoor Structures (deck, patio, porches)	$2,178	0.6%
AH. Driveway	$8,775	2.2%
AI. Clean Up	$2,280	0.6%
AJ. Other	$709	0.2%
VIII. Other	**$6,059**	**1.5%**
Total	**$392,241**	**100.0%**

Home and Lot Size

The average single-family home size in the 2022 NAHB Construction Cost Survey is 2,561 sq. ft. of finished floor space, the smallest square footage since 2011. Historically, average square footage in the NAHB survey has tended to move in the same direction as in the Census Bureau's series with a lag, and with wider fluctuations, as you would expect from the smaller sample size.

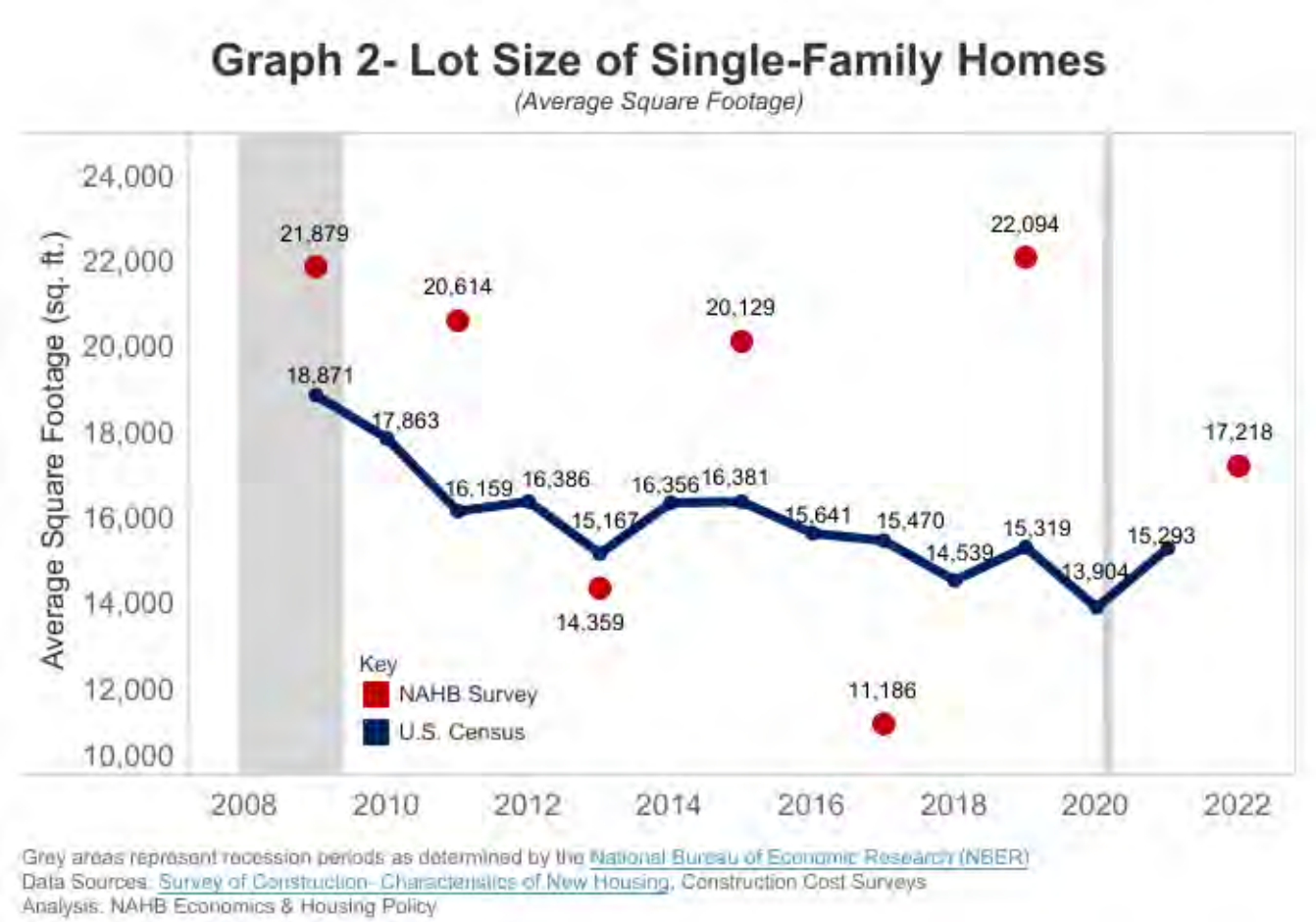
The average home size dropped from 2,716 sq. ft. in 2009 to 2,311 sq. ft. in 2011, as demand eroded after the Great Recession. As the economy recovered, it rose steadily and peaked at 2,802 sq. ft. in 2015. Since then, the average square footage has trended downward, dropping to 2,776 sq. ft. in 2017, 2,594 sq. ft. in 2019, and 2,561 sq. ft. in 2022 (Graph 1). Data from the Census Bureau corroborates this trend: the average size of new homes completed for-sale peaked in 2015 at 2,740 sq. ft., but has declined every year since then. In 2021, the average size fell to 2,485 sq. ft., which is the lowest level since 2010. The smaller square footage in recent years is evidence that builders have shifted toward the production of more entry-level homes to meet demand for more affordable homes.



The average lot size in the 2022 NAHB Construction Cost Survey is 17,218 sq. ft., or less than a half-acre (1 acre is equivalent to 43,560 sq. ft.). There have been high levels of volatility in average lot size over

the years. It exceeded 20,000 sq. ft. in both 2009 and 2011, , dropped to 14,359 sq. ft. in 2013, rebounded to 20,129 sq. ft. in 2015, but dropped again to 11,186 sq. ft. in 2017 (the smallest lot size since the inception of the survey). In 2019, average lot size jumped up to 22,094 sq. ft., the largest lot size recorded in this series.

In general, lot size in the NAHB survey has tended to move in the same direction as the Census series, but as mentioned previously, with increased volatility from year to year (Graph 2). The Census data show a downward trend in lot size between 2009 and 2013, dropping from an average of 18,871 sq. ft. to a low of 15,167 sq. ft. in 2013. It rebounded to 16,381 sq. ft. in 2015, dropped steadily from 2016 to 2018, before see-sawing during the last three years. In 2021, the average lot size of homes completed for sale was 15,293 sq. ft..



Sales Price

The average single-family home sales price in the 2022 NAHB Construction Cost Survey is $644,750, the highest average sales price (not adjusted for inflation) in the survey's history. The Census Bureau's series shows the average price for new single-family homes sold increasing steadily after the Great Recession,

going from $267,900 in 2011 to $385,000 in 2018, dropping slightly in 2019, before rising again in 2020 and 2021 – when it reached $464,200 (Graph 3). The surge in demand for housing during the COVID-19 pandemic, which exacerbated the shortage of the current housing supply, helps to explain the most recent price increases seen post-2020.

Compared to the Census series, the NAHB survey shows a similar upward trend, but with generally higher prices. The $644,750 reported by NAHB in 2022 in particular is roughly $180,000 higher than the latest average price reported by the Census Bureau. Recall that the NAHB survey is not designed to generate a national average home price. For one thing, the NAHB survey does not control for the number of homes a builder builds, which gives more weight to smaller builders who may tend to build higher-priced homes. Timing is also a factor in the spread between the average prices reported by NAHB and the Census Bureau. The NAHB survey was conducted toward the end of 2022. The latest annual average price of $464,200 available from the Census Bureau is for calendar year 2021. Subsequent monthly data from the Census Bureau show the average price rising to $543,600 as of November 2022.

Graph 3- Sales Price of Single-Family Sold Homes

(in Thousands of Nominal Dollars)



Grey areas represent recession periods as determined by the National Bureau of Economic Research (NBER)
Data Sources: Survey of Construction- Characteristics of New Housing, Construction Cost Surveys
Analysis: NAHB Economics & Housing Policy

Sales Price Breakdown

A key feature of the NAHB survey is that it asks builders to break down the sales price of their homes into seven categories: finished lot cost, total construction cost, financing cost, overhead and general expenses, marketing costs, sales commission, and profit. Table 2 contains historical information on the sales price breakdown of a single-family home. It is important to remind readers to use caution when comparing data across years in Table 2, as trends may be affected by the survey's sample size limitations and the fact that a different set of builders responds to the survey each time.

On average in the 2022 NAHB survey, 60.8 percent of the final house price was attributable to construction costs, 17.8 percent to the cost of the finished lot, 5.1 percent to overhead and general expenses, 3.6 percent to sales commissions, 1.9 percent to financing costs, 0.7 percent to marketing costs, leaving 10.1 percent for profit (prior to taxes). Since 1998, the long-run average in the pre-tax profit share stands at 9.7%.

No component category experienced a larger than 1 percentage point change between 2019 and 2022. As a share of the average sales price, finished lot cost dropped from 18.5% in 2019 to 17.8% in 2022, followed by total construction cost (61.1% to 60.8%), marketing cost (1.0% to 0.7%), and sales commission (3.7% to 3.6%). Average profit rose from 9.1% in 2019 to 10.1% in 2022, followed by overhead and general expenses (4.9% to 5.1%) and financing cost (1.7% to 1.9%).

Table 2. SINGLE-FAMILY HOMES SALES PRICE BREAKDOWN HISTORY

Sale Price Breakdown	1998	2002	2004	2007	2009	2011	2013	2015	2017	2019	2022
1. Finished Lot Cost	23.6%	23.5%	26.0%	24.5%	20.3%	21.7%	18.6%	18.2%	21.5%	18.5%	17.8%
2. Total Construction Cost	54.8%	50.8%	51.7%	48.1%	58.9%	59.3%	61.7%	61.8%	55.6%	61.1%	60.8%
3. Financing Cost	1.9%	2.1%	1.8%	2.4%	1.7%	2.1%	1.4%	1.3%	1.8%	1.7%	1.9%
4. Overhead and General Expenses	5.7%	5.5%	5.8%	7.0%	5.4%	5.2%	4.3%	5.6%	5.1%	4.9%	5.1%
5. Marketing Cost	1.4%	2.4%	1.9%	2.5%	1.4%	1.5%	1.1%	0.8%	1.2%	1.0%	0.7%
6. Sales Commission	3.4%	3.7%	3.0%	4.3%	3.4%	3.3%	3.6%	3.2%	4.1%	3.7%	3.6%
7. Profit	9.2%	12.0%	9.8%	11.2%	8.9%	6.8%	9.3%	9.0%	10.7%	9.1%	10.1%
8. Total Sales Price ($)	**$ 226,680**	**$ 298,412**	**$ 373,349**	**$ 454,906**	**$ 377,624**	**$ 310,619**	**$ 399,532**	**$ 468,318**	**$ 427,892**	**$ 485,128**	**$ 644,750**

Source: NAHB Construction Cost Surveys, 1998-2022

Construction Costs

The average construction cost of a typical single-family home in the 2022 survey is $392,241 (Table 3), or about $153 per square foot – the highest in the history of this series. The cost of construction per square foot was $80 in 2011, $95 in 2013, $103 in 2015, $86 in 2017, and $114 in 2019.

Of the 8 major stages of construction, interior finishes, at 24.0%, accounts for the largest share of construction costs, followed by framing (20.5%), major system rough-ins (17.9%), exterior finishes (11.8%), foundations (11.0%), site work (7.4 percent), final steps (5.9%), and other costs (1.5 percent) (See Table 3 for a full breakdown).

Major system rough-ins and framing had the largest percentage point increases from 2019 to 2022, rising from 14.7% to 17.9% and from 17.4% to 20.5%, respectively. On the other hand, exterior finishes experienced the largest percentage point decrease from 2019 to 2022, falling from 14.1% to 11.8%.

Of the detailed items (i.e., subcomponents) in the NAHB survey, framing (including roofing), at 15.5%, and excavation, foundation, concrete, retaining walls, and backfill, at 10.1%, had the largest shares of construction costs. Together, these two subcomponents account for just over a quarter (25.6%) of 2022's construction costs, slightly up from the 25.0% they represented in 2019. Based on the latest analysis of the Producer Price Index (PPI) from NAHB, lumber and ready-mix concrete prices were extremely volatile and experienced high peaks in 2022, which can help to explain these subcomponent increases from the previous year's survey.

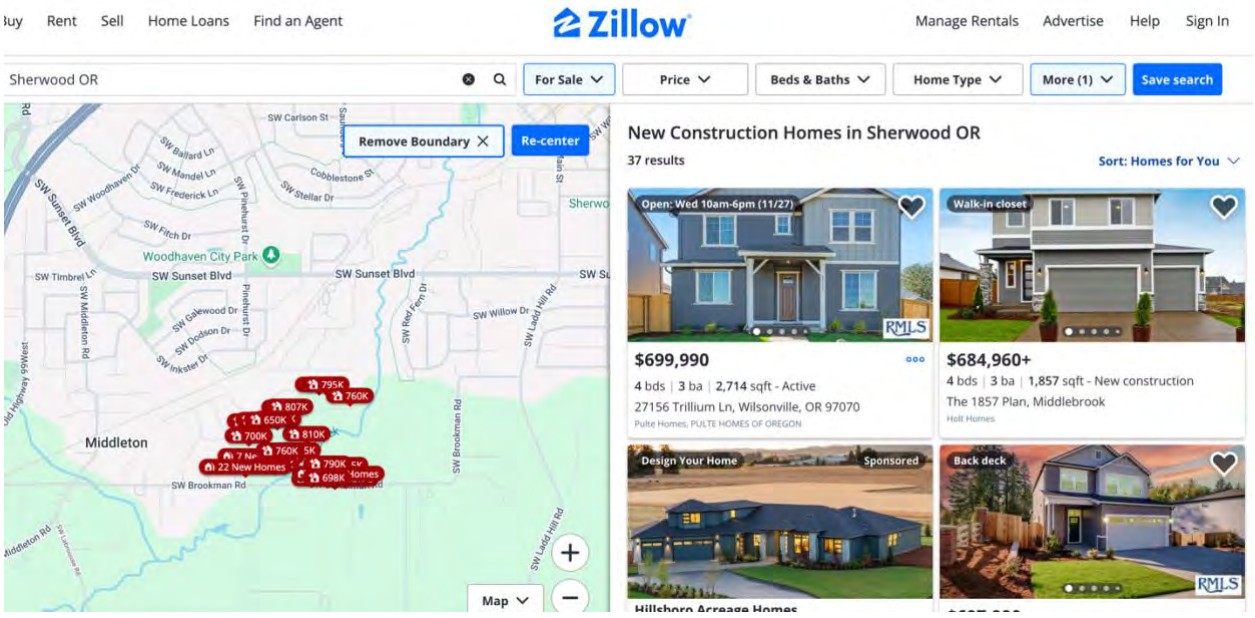
Table 3. SINGLE-FAMILY CONSTRUCTION COST BREAKDOWN HISTORY

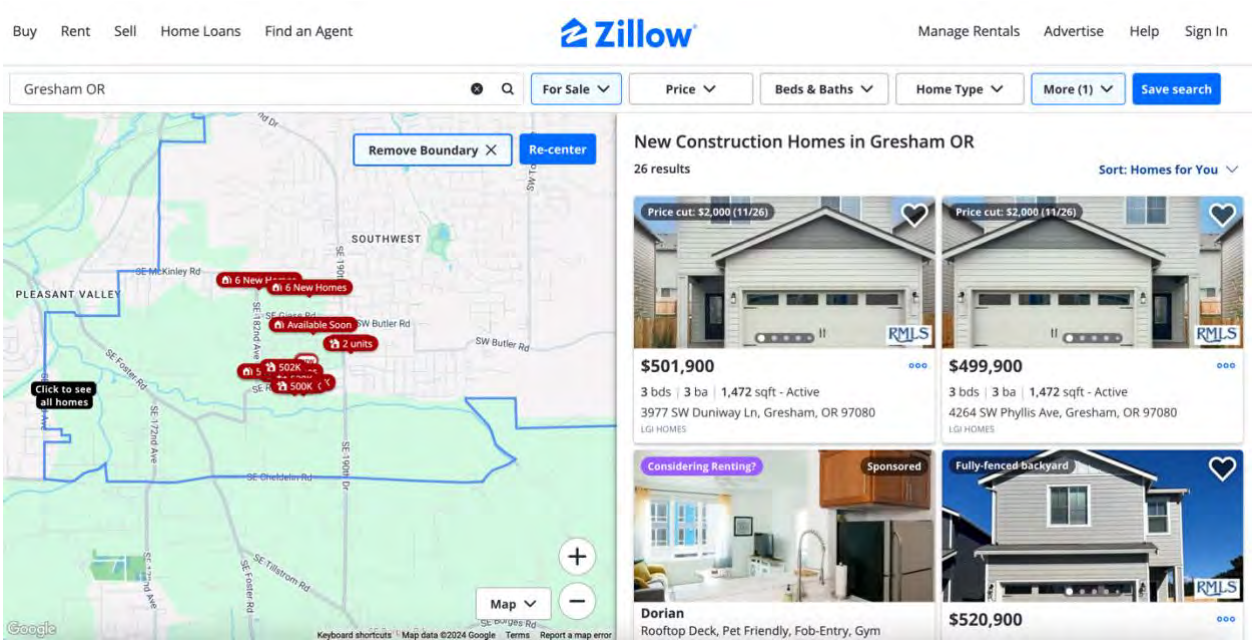
Construction Cost Breakdown	1998	2002	2004	2007	2009	2011	2013	2015	2017	2019	2022
I. Site Work (sum of A to E)							**6.8%**	**5.6%**	**6.7%**	**6.2%**	**7.4%**
A. Building Permit Fees	0.9%	1.3%	0.8%	1.7%	1.9%	1.7%	1.5%	1.2%	1.7%	1.7%	2.1%
B. Impact Fee	1.0%	1.6%	1.1%	1.4%	1.4%	1.5%	1.3%	0.6%	0.9%	1.3%	1.3%
C. Water & Sewer Fees Inspections	1.0%	1.4%	1.2%	1.6%	1.7%	1.6%	1.8%	1.4%	2.0%	1.5%	1.5%
D. Architecture, Engineering							1.5%	1.6%	1.4%	1.5%	1.2%
E. Other							0.7%	0.7%	0.7%	0.2%	1.3%
II. Foundations (sum of F to G)							**9.5%**	**11.6%**	**10.8%**	**11.8%**	**11.0%**
F. Excavation, Foundation, Concrete, Retaining walls, and Backfill	9.6%	6.9%	9.9%	7.0%	7.1%	9.3%	9.3%	11.3%	10.7%	11.3%	10.1%
G. Other							0.2%	0.3%	0.1%	0.5%	0.9%
III. Framing (sum of H to L)							**19.1%**	**18.0%**	**17.3%**	**17.4%**	**20.5%**
H. Framing (including roof)	20.2%	18.4%	21.3%	15.8%	15.6%	13.5%	14.8%	15.4%	15.0%	13.7%	15.5%
I. Trusses (if not included above)							2.2%	1.3%	1.6%	2.1%	2.9%
J. Sheathing (if not included above)	NA	0.9%	1.4%	1.6%	1.7%	1.2%	0.9%	0.4%	0.3%	1.1%	1.4%
K. General Metal, Steel	1.1%	0.8%	0.3%	0.8%	0.7%	0.5%	0.7%	0.4%	0.3%	0.3%	0.3%
L. Other							0.5%	0.3%	0.1%	0.2%	0.4%
IV. Exterior Finishes (sum of M to P)							**14.4%**	**15.0%**	**13.9%**	**14.1%**	**11.8%**
M. Exterior Wall Finish							6.8%	7.2%	6.5%	6.5%	5.0%
N. Roofing	2.6%	2.6%	2.2%	3.2%	3.8%	2.9%	3.2%	3.5%	3.3%	3.4%	2.9%
O. Windows and Doors (including garage door)							4.1%	4.2%	3.9%	4.0%	3.4%
P. Other							0.2%	0.2%	0.3%	0.2%	0.4%
V. Major Systems Rough-ins (sum of Q to T)							**13.4%**	**13.1%**	**13.8%**	**14.7%**	**17.9%**
Q. Plumbing (except fixtures)	5.9%	5.4%	5.3%	5.4%	5.3%	6.0%	4.8%	4.3%	4.6%	5.0%	5.8%
R. Electrical (except fixtures)	3.8%	3.3%	3.4%	3.9%	3.7%	4.4%	4.0%	4.2%	4.2%	4.6%	6.1%
S. HVAC	4.1%	4.2%	3.7%	3.9%	4.0%	4.8%	4.5%	4.4%	4.7%	4.8%	5.6%
T. Other							0.1%	0.3%	0.2%	0.3%	0.4%
VI. Interior Finishes (sum of U to AE)							**29.3%**	**29.6%**	**28.6%**	**25.4%**	**24.0%**
U. Insulation	1.4%	1.6%	1.4%	1.6%	1.5%	1.8%	1.9%	2.2%	2.2%	1.7%	1.7%
V. Drywall	5.5%	5.3%	4.9%	5.1%	5.1%	4.4%	3.8%	4.1%	4.4%	3.6%	3.4%
W. Interior Trims, Doors, and Mirrors							4.3%	4.3%	4.6%	3.6%	3.2%
X. Painting	3.8%	3.6%	3.6%	3.4%	3.4%	3.3%	3.4%	3.1%	3.0%	2.8%	2.2%
Y. Lighting	1.0%	0.8%	0.9%	1.0%	1.1%	1.2%	1.2%	1.2%	1.3%	1.2%	1.1%
Z. Cabinets, Countertops	5.0%	4.3%	6.6%	5.7%	5.6%	5.6%	5.2%	5.5%	5.0%	4.6%	4.5%
AA. Appliances	1.3%	1.2%	1.3%	1.7%	1.6%	2.0%	1.7%	1.5%	1.5%	1.6%	1.6%
AB. Flooring	4.8%	4.3%	4.2%	5.0%	5.1%	4.5%	5.0%	4.6%	4.3%	4.0%	3.3%
AC. Plumbing Fixtures							1.7%	1.5%	1.3%	1.4%	1.3%
AD. Fireplace							0.8%	1.0%	0.6%	0.6%	0.4%
AE. Other							0.2%	0.5%	0.4%	0.3%	1.2%
VII. Final Steps (sum of AF to AJ)							**6.6%**	**6.8%**	**7.0%**	**6.8%**	**5.9%**
AF. Landscaping	1.8%	2.5%	2.6%	2.8%	3.2%	3.5%	2.3%	2.1%	2.5%	2.2%	2.3%
AG. Outdoor Structures (deck, patio, porches)	0.7%	0.7%	1.0%	0.7%	0.9%	1.0%	1.2%	1.5%	1.3%	1.2%	0.6%
AH. Driveway	1.5%	1.6%	1.3%	1.4%	1.4%	1.5%	1.5%	2.2%	1.9%	2.2%	2.2%
AI. Clean Up							0.9%	0.7%	1.1%	1.0%	0.6%
AJ. Other							0.7%	0.3%	0.3%	0.1%	0.2%
VIII. Other							**0.9%**	**0.5%**	**2.0%**	**3.8%**	**1.5%**
TOTAL	**$124,276**	**$151,671**	**$192,846**	**$219,015**	**$222,511**	**$184,125**	**$246,453**	**$289,415**	**$237,760**	**$296,792**	**$392,241**

Source: NAHB Construction Cost Surveys, 1998-2022

TO: Ted Reid, Roger Alfred
FROM: Robert Liberty
DATE: November 27, 2024
RE: Illustration of Lower New Construction Home Prices in Gresham Relative to Sherwood, for inclusion in the record of Metro's UGR proceeding.

This screen captures from Zillow were created today.





	Preliminary Estimate July 1, 2024	Revised Population Estimate July 1, 2023	Revised Population Estimate July 1, 2022	Revised Population Estimate July 1, 2021	Revised Population Estimate July 1, 2020
Oregon	**4,259,132**	**4,246,688**	**4,230,711**	**4,216,137**	**4,236,615**
BAKER	16,671	16,776	16,731	16,678	16,711
BENTON	97,663	97,473	96,904	95,506	95,241
CLACKAMAS	426,500	424,245	421,641	419,673	421,542
CLATSOP	41,779	41,600	41,381	41,255	41,174
COLUMBIA	53,638	53,261	52,898	52,609	52,741
COOS	65,263	65,290	64,999	64,835	64,934
CROOK	26,366	26,080	25,705	25,275	24,912
CURRY	23,593	23,669	23,601	23,511	23,462
DESCHUTES	207,747	205,609	203,021	200,982	199,061
DOUGLAS	111,047	111,279	111,305	111,231	111,377
GILLIAM	2,063	2,059	2,045	2,037	2,020
GRANT	7,126	7,202	7,219	7,228	7,247
HARNEY	7,463	7,476	7,477	7,506	7,505
HOOD RIVER	24,349	24,159	24,044	23,867	23,995
JACKSON	220,981	220,913	221,895	222,112	223,097
JEFFERSON	25,436	25,209	24,904	24,674	24,560
JOSEPHINE	87,416	87,533	87,497	87,879	88,135
KLAMATH	69,828	69,923	69,955	69,745	69,569
LAKE	8,217	8,233	8,225	8,219	8,179
LANE	382,641	382,260	381,315	380,503	382,628
LINCOLN	51,122	50,984	50,732	50,433	50,457
LINN	130,474	129,806	128,868	128,569	128,776
MALHEUR	31,379	31,545	31,558	31,338	31,619
MARION	346,824	346,831	346,006	345,010	346,034
MORROW	12,293	12,299	12,260	12,267	12,224
MULTNOMAH	800,178	799,240	798,824	798,827	812,716
POLK	88,771	88,586	88,417	87,808	87,507
SHERMAN	1,906	1,905	1,909	1,883	1,882
TILLAMOOK	27,464	27,426	27,392	27,395	27,408
UMATILLA	80,900	80,617	80,020	79,763	80,145
UNION	26,005	26,009	26,046	26,067	26,198
WALLOWA	7,452	7,480	7,518	7,486	7,462
WASCO	26,410	26,561	26,585	26,490	26,659
WASHINGTON	611,153	606,908	602,424	598,341	600,165
WHEELER	1,433	1,438	1,440	1,452	1,455
YAMHILL	109,581	108,804	107,950	107,683	107,818

Prepared by Population Research Center
College of Urban and Public Affairs, Portland State University
November 15, 2024

Incorporated City/Town	Preliminary Estimate July 1, 2024	Revised Estimate July 1, 2023	Revised Estimate July 1, 2022	Revised Estimate July 1, 2021	Revised Estimate July 1, 2020
Adair Village	1,365	1,365	1,358	1,305	1,094
Adams	398	402	393	395	389
Adrian	153	154	156	155	157
Albany	57,544	57,390	56,747	56,703	56,470
Amity	1,835	1,833	1,833	1,832	1,786
Antelope	35	36	37	37	37
Arlington	666	668	663	652	642
Ashland	21,579	21,490	21,485	21,405	21,374
Astoria	10,131	10,130	10,129	10,155	10,208
Athena	1,214	1,213	1,213	1,212	1,209
Aumsville	4,025	4,092	4,146	4,186	4,230
Aurora	1,073	1,094	1,106	1,119	1,131
Baker City	10,104	10,098	10,083	10,074	10,074
Bandon	3,592	3,591	3,503	3,407	3,390
Banks	1,864	1,864	1,787	1,803	1,832
Barlow	139	140	138	131	133
Bay City	1,454	1,442	1,434	1,415	1,401
Beaverton	99,843	99,764	99,090	97,650	97,522
Bend	104,089	102,558	100,987	100,081	99,278
Boardman	4,291	4,163	4,103	4,033	3,879
Bonanza	421	423	402	403	404
Brookings	6,829	6,918	6,828	6,771	6,746
Brownsville	1,830	1,823	1,832	1,698	1,697
Burns	2,693	2,705	2,708	2,730	2,731
Butte Falls	425	423	431	442	441
Canby	19,114	18,835	18,534	18,371	18,183
Cannon Beach	1,508	1,502	1,498	1,493	1,491
Canyon City	667	665	665	667	665
Canyonville	1,639	1,654	1,648	1,646	1,646
Carlton	2,414	2,391	2,311	2,267	2,222
Cascade Locks	1,404	1,399	1,398	1,390	1,390
Cave Junction	2,103	2,102	2,101	2,097	2,083
Central Point	19,363	19,165	19,115	19,105	19,045
Chiloquin	756	760	765	767	768
Clatskanie	1,791	1,765	1,755	1,717	1,716
Coburg	1,385	1,350	1,318	1,312	1,249
Columbia City	1,946	1,935	1,946	1,935	1,935
Condon	724	715	716	712	707
Coos Bay	16,093	16,090	16,002	15,986	15,985
Coquille	4,018	4,018	4,012	4,011	4,011
Cornelius	14,490	13,835	13,642	12,721	12,704
Corvallis	60,408	60,217	59,826	58,397	59,993
Cottage Grove	10,879	10,878	10,703	10,691	10,584
Cove	627	624	625	625	620
Creswell	5,735	5,685	5,673	5,631	5,644
Culver	1,645	1,644	1,628	1,613	1,599
Dallas	17,924	17,779	17,423	17,185	16,854
Dayton	2,665	2,695	2,694	2,689	2,678
Dayville	138	140	136	134	132

Incorporated City/Town	Preliminary Estimate July 1, 2024	Revised Estimate July 1, 2023	Revised Estimate July 1, 2022	Revised Estimate July 1, 2021	Revised Estimate July 1, 2020
Depoe Bay	1,547	1,546	1,536	1,528	1,517
Detroit	167	160	144	111	203
Donald	1,079	989	1,003	1,010	1,007
Drain	1,163	1,168	1,166	1,170	1,175
Dufur	632	631	632	632	631
Dundee	3,249	3,245	3,242	3,241	3,241
Dunes City	1,423	1,422	1,429	1,430	1,426
Durham	1,873	1,889	1,898	1,911	1,939
Eagle Point	9,866	9,759	9,744	9,725	9,690
Echo	601	614	625	622	629
Elgin	1,806	1,806	1,744	1,715	1,716
Elkton	197	197	184	184	185
Enterprise	2,107	2,107	2,106	2,096	2,078
Estacada	5,454	5,240	5,017	4,501	4,433
Eugene	177,155	176,993	176,248	174,854	176,759
Fairview	10,473	10,436	10,437	10,427	10,426
Falls City	1,122	1,110	1,097	1,127	1,054
Florence	9,598	9,567	9,547	9,522	9,404
Forest Grove	26,916	26,779	26,242	25,746	26,413
Fossil	442	443	443	447	448
Garibaldi	841	815	824	825	830
Gaston	656	658	661	665	674
Gates	573	565	552	478	547
Gearhart	1,905	1,888	1,888	1,863	1,839
Gervais	2,724	2,770	2,728	2,600	2,589
Gladstone	11,944	12,013	11,997	11,989	11,987
Glendale	859	861	861	862	861
Gold Beach	2,396	2,389	2,364	2,359	2,350
Gold Hill	1,345	1,339	1,337	1,336	1,330
Granite	31	32	32	32	32
Grants Pass	39,572	39,518	39,413	39,328	39,249
Grass Valley	156	155	156	150	150
Greenhorn	3	3	3	3	3
Gresham	115,233	115,212	114,151	114,052	114,281
Haines	377	377	369	368	370
Halfway	346	343	346	346	348
Halsey	960	953	951	961	961
Happy Valley	27,637	26,237	25,633	24,609	23,941
Harrisburg	3,670	3,665	3,661	3,661	3,654
Helix	184	187	190	191	193
Heppner	1,163	1,171	1,170	1,186	1,190
Hermiston	20,177	20,061	19,727	19,500	19,440
Hillsboro	111,006	109,867	108,467	107,420	106,503
Hines	1,659	1,661	1,655	1,655	1,652
Hood River	8,574	8,503	8,410	8,333	8,327
Hubbard	3,385	3,382	3,409	3,439	3,476
Huntington	483	491	495	495	498
Idanha	150	151	152	154	156
Imbler	247	246	247	251	247

Incorporated City/Town	Preliminary Estimate July 1, 2024	Revised Estimate July 1, 2023	Revised Estimate July 1, 2022	Revised Estimate July 1, 2021	Revised Estimate July 1, 2020
Independence	10,056	10,014	10,010	10,045	9,831
Ione	331	331	334	339	339
Irrigon	2,045	2,045	2,033	2,017	2,013
Island City	1,119	1,119	1,125	1,142	1,143
Jacksonville	3,066	3,056	3,057	3,052	3,024
Jefferson	3,515	3,402	3,355	3,351	3,328
John Day	1,617	1,645	1,658	1,661	1,667
Johnson City	515	518	516	526	538
Jordan Valley	128	129	130	129	130
Joseph	1,152	1,151	1,162	1,166	1,164
Junction City	7,410	7,205	6,873	6,866	6,792
Keizer	39,249	39,180	39,174	39,133	39,442
King City	4,810	4,818	4,841	4,873	5,171
Klamath Falls	22,108	22,098	22,085	21,881	21,855
La Grande	12,818	12,817	12,869	12,813	13,029
La Pine	3,110	2,978	2,804	2,630	2,549
Lafayette	4,541	4,539	4,439	4,435	4,425
Lake Oswego	41,129	41,086	40,924	40,652	40,711
Lakeside	1,921	1,921	1,905	1,900	1,902
Lakeview	2,403	2,419	2,420	2,438	2,424
Lebanon	19,936	19,763	19,177	18,747	18,559
Lexington	226	237	233	237	237
Lincoln City	10,103	10,032	9,930	9,852	9,842
Lonerock	25	25	25	25	25
Long Creek	170	173	172	172	173
Lostine	237	240	242	243	243
Lowell	1,261	1,235	1,218	1,188	1,193
Lyons	1,210	1,196	1,196	1,186	1,205
Madras	7,982	7,954	7,833	7,664	7,558
Malin	725	729	729	731	732
Manzanita	635	632	616	605	604
Maupin	435	429	431	425	426
Maywood Park	780	787	794	800	822
McMinnville	34,774	34,734	34,099	33,946	34,447
Medford	88,352	86,937	86,885	86,598	85,910
Merrill	826	825	819	824	822
Metolius	1,004	1,000	976	978	977
Mill City	2,063	2,068	1,998	2,009	1,997
Millersburg	3,139	3,074	3,028	2,985	2,921
Milton-Freewate	7,289	7,206	7,180	7,060	7,158
Milwaukie	21,408	21,206	21,191	21,186	21,180
Mitchell	137	137	138	138	138
Molalla	10,489	10,216	10,192	10,174	10,202
Monmouth	11,516	11,456	11,355	10,954	11,487
Monroe	703	703	703	646	646
Monument	110	114	115	115	115
Moro	371	371	372	368	369
Mosier	485	478	478	467	467
Mt. Angel	3,594	3,542	3,486	3,407	3,404

Incorporated City/Town	Preliminary Estimate July 1, 2024	Revised Estimate July 1, 2023	Revised Estimate July 1, 2022	Revised Estimate July 1, 2021	Revised Estimate July 1, 2020
Mt. Vernon	535	546	545	547	549
Myrtle Creek	3,509	3,501	3,497	3,495	3,485
Myrtle Point	2,490	2,488	2,475	2,474	2,475
Nehalem	290	278	274	274	273
Newberg	26,249	25,731	25,514	25,340	25,152
Newport	10,623	10,565	10,558	10,472	10,363
North Bend	10,434	10,433	10,391	10,303	10,298
North Plains	3,815	3,655	3,451	3,447	3,444
North Powder	497	499	499	504	504
Nyssa	3,290	3,285	3,286	3,236	3,233
Oakland	940	939	937	932	932
Oakridge	3,167	3,199	3,198	3,196	3,193
Ontario	11,874	11,871	11,755	11,666	11,655
Oregon City	38,029	38,013	37,590	37,578	37,572
Paisley	242	246	248	248	250
Pendleton	16,996	16,929	16,837	17,145	17,124
Philomath	5,644	5,637	5,636	5,600	5,350
Phoenix	4,413	4,281	4,250	4,247	4,459
Pilot Rock	1,316	1,315	1,308	1,306	1,322
Port Orford	1,162	1,146	1,150	1,148	1,146
Portland	639,448	638,624	639,126	639,230	652,498
Powers	710	715	714	709	711
Prairie City	830	830	837	839	842
Prescott	83	83	83	83	82
Prineville	11,466	11,351	11,126	10,957	10,814
Rainier	1,939	1,929	1,920	1,914	1,912
Redmond	36,309	35,906	35,351	34,658	33,728
Reedsport	4,368	4,318	4,317	4,318	4,312
Richland	158	161	162	163	164
Riddle	1,216	1,215	1,213	1,210	1,215
Rivergrove	557	552	554	550	544
Rockaway Beacl	1,492	1,489	1,487	1,469	1,459
Rogue River	2,419	2,410	2,441	2,441	2,409
Roseburg	23,876	23,817	23,820	23,729	23,713
Rufus	274	274	271	269	270
Salem	177,567	177,361	177,192	175,942	175,648
Sandy	12,933	12,911	12,683	12,660	12,643
Scappoose	8,231	8,179	8,038	8,011	8,013
Scio	952	948	953	963	955
Scotts Mills	434	432	426	424	423
Seaside	7,268	7,234	7,174	7,128	7,092
Seneca	166	170	164	164	165
Shady Cove	3,070	3,071	3,070	3,070	3,081
Shaniko	21	21	30	30	30
Sheridan	6,277	6,018	6,156	6,277	6,400
Sherwood	20,781	20,657	20,484	20,464	20,447
Siletz	1,215	1,214	1,217	1,219	1,223
Silverton	10,882	10,861	10,548	10,528	10,494
Sisters	3,738	3,658	3,451	3,264	3,106

Incorporated City/Town	Preliminary Estimate July 1, 2024	Revised Estimate July 1, 2023	Revised Estimate July 1, 2022	Revised Estimate July 1, 2021	Revised Estimate July 1, 2020
Sodaville	348	348	350	354	365
Spray	138	139	140	141	141
Springfield	62,996	62,377	62,262	61,973	61,857
St. Helens	14,492	14,383	14,223	14,238	14,067
St. Paul	430	431	429	428	433
Stanfield	2,295	2,268	2,244	2,174	2,153
Stayton	8,176	8,172	8,295	8,281	8,241
Sublimity	3,094	3,083	3,083	3,055	2,979
Summerville	115	116	117	119	119
Sumpter	198	199	201	201	202
Sutherlin	8,679	8,670	8,617	8,564	8,554
Sweet Home	10,088	10,052	10,021	9,884	9,839
Talent	6,411	6,092	6,051	6,021	6,285
Tangent	1,196	1,191	1,197	1,210	1,229
The Dalles	16,103	16,087	16,048	15,962	16,014
Tigard	56,392	54,935	54,848	54,729	54,549
Tillamook	5,198	5,232	5,218	5,254	5,190
Toledo	3,631	3,629	3,581	3,546	3,546
Troutdale	15,790	15,786	15,777	15,752	16,162
Tualatin	27,753	27,625	27,775	27,789	27,858
Turner	2,669	2,714	2,698	2,614	2,521
Ukiah	270	233	231	241	237
Umatilla	8,256	8,069	7,859	7,532	7,404
Union	2,162	2,155	2,156	2,155	2,148
Unity	40	40	40	40	40
Vale	1,837	1,888	1,883	1,874	1,894
Veneta	5,259	5,246	5,224	5,220	5,212
Vernonia	2,433	2,404	2,403	2,378	2,375
Waldport	2,339	2,337	2,307	2,275	2,250
Wallowa	795	801	801	804	803
Warrenton	6,446	6,410	6,321	6,322	6,304
Wasco	419	420	422	419	420
Waterloo	213	213	214	219	222
West Linn	27,568	27,511	27,475	27,477	27,379
Westfir	253	255	255	257	258
Weston	671	682	691	695	703
Wheeler	422	421	420	420	422
Willamina	2,237	2,241	2,234	2,239	2,243
Wilsonville	27,048	26,822	26,828	26,793	26,684
Winston	5,666	5,667	5,664	5,684	5,652
Wood Village	4,388	4,420	4,420	4,397	4,388
Woodburn	28,861	27,543	26,511	26,062	26,014
Yachats	990	986	990	991	994
Yamhill	1,199	1,198	1,197	1,197	1,164
Yoncalla	1,057	1,057	1,030	1,034	1,029

Metro

600 NE Grand Ave.
Portland, OR 97232-2736
oregonmetro.gov

Metro

Minutes

Thursday, December 5, 2024

10:30 AM

Metro Regional Center, Council chamber,
https://zoom.us/j/615079992 (Webinar ID: 615079992) or
888-475-4499 (toll free)

Council meeting

This meeting will be held electronically and in person at the Metro Regional Center Council Chamber.
You can join the meeting on your computer or other device by using this link: https://zoom.us/j/615079992 (Webinar ID: 615 079 992)

1. Call to Order and Roll Call

Council President Peterson called the Metro Council Meeting to order at 10:32 a.m.

Present: 7 - Council President Lynn Peterson, Councilor Christine Lewis, Councilor Juan Carlos Gonzalez, Councilor Mary Nolan, Councilor Gerritt Rosenthal, Councilor Duncan Hwang, and Councilor Ashton Simpson

2. Public Communication

Public comment may be submitted in writing. It will also be heard in person and by electronic communication (video conference or telephone). Written comments should be submitted electronically by emailing legislativecoordinator@oregonmetro.gov. Written comments received by 4:00 p.m. the day before the meeting will be provided to the council prior to the meeting.

Those wishing to testify orally are encouraged to sign up in advance by either: (a) contacting the legislative coordinator by phone at 503-813-7591 and providing your name and the agenda item on which you wish to testify; or (b) registering by email by sending your name and the agenda item on which you wish to testify to legislativecoordinator@oregonmetro.gov. Those wishing to testify in person should fill out a blue card found in the back of the Council Chamber. Those requesting to comment virtually during the meeting can do so by using the "Raise Hand" feature in Zoom or emailing the legislative coordinator at legislativecoordinator@oregonmetro.gov. Individuals will have three minutes to testify unless otherwise stated at the meeting.

Council President Peterson opened the meeting to members of the public wanting to testify on non-agenda items.

Art Lewellan, MRC: Testified in opposition to several regional infrastructure projects.

There being no further testimony, Council President

Peterson closed the public hearing on non-agenda items.

3. Presentations

3.1 Regional Supportive Housing Services And Affordable Housing Funding: Governance And Accountability

Attachments: Staff Report
Attachment 1

Council President Peterson opened the presentation on Governance and Accountability for Regional Supportive Housing Services and Affordable Housing Funding.

Staff pulled up the "Regional Housing and Supportive Services Funding: Governance" slides to present to Council.

Presentation

Council President Peterson described the key themes from feedback on Supportive Housing Services (SHS) funding as urgency, stability, and accountability. Council President Peterson outlined four guiding strategies for improving governance around SHS: 1) building a truly regional program, 2) improving accountability, 3) addressing the full scope of need, and 4) demonstrating outcomes.

Council Discussion

Topic No. 1: Regionalism

Councilor Simpson advised against recreating the current structure and highlighted the importance of improving metrics and data collection standards across the region.

Councilor Lewis expressed support for a single-body oversight committee structure that continues the vision of the Tri-County Planning Body.

Councilor Rosenthal emphasized the role of the three counties in implementing housing services and expressed that the proposed oversight body HHPAC should not be modelled on JPACT.

Councilor Gonzalez remarked on the technical challenges of aligning the region with local governments and recommended pursuing more formal engagement efforts.

Councilor Lewis distinguished between JPACT's goal of spending federal resources and advised that the new system focus on regional priorities.

Council President Peterson conveyed the expectation for the regional system to move people out of homelessness and into supportive services as quickly as possible. Council President Peterson noted the lack of detailed information around lived experiences of those within the current system and emphasized that coordination efforts should balance expertise and the ability to move agency and funds.

Topic No. 2: Accountability

Council President Peterson reviewed the proposals from Resolution No. 24-5436, including transitioning oversight to HHPAC to establish regional SHS standards.

Councilor Rosenthal remarked that HHPAC would have a predictive role and need to include project funders.

Councilor Lewis stated that the corrective action process needs to be collaborative, and accountability is critical.

Councilor Simpson advised clear authority with access to regional data and program monitoring.

Councilor Hwang expressed that the appointment process should ensure involvement does not seek to maximize profits but to improve the regional system.

Councilor President Peterson asked Councilors to comment on the desired role of the Metro Council in HHPAC to provide guidance for staff.

Councilor Lewis clarified that concurrence does not enable rapid response and more transparency is necessary.

Councilor Nolan recommended that certain decisions, such as the appropriation of funds, should be made by the bodies accountable to voters.

Councilor Rosenthal concurred with Councilor Nolan's remarks and suggested that corrective actions and data gathering could be delegated to HHPAC, while other areas could be addressed by Council.

Council President Peterson expressed that HHPAC would not be strictly advisory and would have decision-making power.

Councilor Gonzalez noted "advisory" as a complicated term in discussions and raised the issue of independent review.

Council President Peterson suggested an independent oversight committee to handle specific requests from external auditors as an option.

Topic No. 3: Scope

Councilor Lewis conveyed that affordable housing is the priority and regional coordination needs to be intentional.

Councilor Rosenthal concurred with Councilor Lewis on

improving community coordination at the regional level.

Councilor Simpson emphasized the need for clarity regarding scope.

Councilor Gonzalez added that the scope needs to address housing affordability at deeper levels.

Councilor Hwang expressed support for the direction and recommended setting a clear review period regarding stable base allocation.

Council President Peterson suggested re-evaluation every five or six years and defining Metro's role.

Councilor Nolan proposed a review every three years to establish a clear timeframe. Councilor Nolan emphasized an approach that removes financial interest and balances expertise with lived experience.

Councilor Hwang advised staggering the review process from Regional Transportation Plan (RTP) and Urban Growth Management (UGM) assessments.

COO Madrigal noted that establishing ethics was a key theme from stakeholders for assembling the committee.

Topic No. 4: Demonstrating Outcomes

Councilor Nolan expressed that achieving functional zero homeless is the desired outcome and the performance metrics reflect the process, not the outcome.

Councilor Simpson conveyed the need to set timeframes for goals and outcomes, an escalation process if decisions are stalled, and commitment to progress on regional priorities.

Councilor Rosenthal advised that the Council consider whether HHPAC would require dedicated staff.

Council President Peterson stated the intent would be for existing SHS program staff and planning staff to support HHPAC.

Councilor Gonzalez identified the lack of common definitions for program data across the regional system as a fundamental issue of streamlining governance.

Councilor Lewis expressed that it is necessary to have access to the raw data and outcomes must be viewed in context of the funds.

COO Madrigal summarized the proposed changes in governance as well as the need for data and analysis, common definitions, corrective action strategies, and outcomes in context.

Council President Peterson concluded with a list of proposed elements for the SHS measure.

Councilor Gonzalez acknowledged the window of opportunity to broaden engagement on the SHS.

Seeing no further discussion, Council President Peterson moved on to the next agenda item.

4. Ordinances (Second Reading and Vote)

4.1 **Ordinance No. 24-1520** For the Purpose of Expanding the Urban Growth Boundary to Provide Capacity for Housing and Employment to the Year 2044 and Amending the Metro Code to Conform

Attachments: Ordinance No. 24-1520
Staff Report
Attachment A
Exhibit A
Exhibit B
Exhibit C
Exhibit D
Exhibit E
Exhibit E Appendix 1
Exhibit E Appendix 1A
Exhibit E Appendix 2
Exhibit E Appendix 3
Exhibit E Appendix 4
Exhibit E Appendix 5A
Exhibit E Appendix 5B
Exhibit E Appendix 6
Exhibit E Appendix 7
Exhibit E Appendix 7A
Exhibit E Appendix 8
Exhibit E Appendix 8A
Exhibit E Appendix 9
Exhibit E Appendix 10
Exhibit E Appendix 11
Exhibit F

Council President Peterson stated that the first reading and public hearing for Ordinance No. 24-1520 For the Purpose of Expanding the Urban Growth Boundary to Provide Capacity for Housing and Employment to the Year 2044 and Amending the Metro Code to Conform took place on November 21, 2024.

Council President Peterson announced that Planning, Development, and Research staff were available to answer questions related to Ordinance No. 24-1520.

There were none.

Council Discussion

Councilor Rosenthal thanked staff and the City of Sherwood for their work.

Councilor Gonzalez thanked staff for their work and noted the multiple recommendations to proceed.

Councilor Nolan conveyed that staff did not meet basic procedural elements and raised concerns over shortcomings with the Sherwood Concept Plan.

Councilor Lewis reflected on the planning process and commended staff for Tribal Consultation and habitat preservation efforts. Councilor Lewis acknowledged the importance of cities for the health of the region.

Councilor Hwang expressed appreciation for staff, data modeling, and the City of Sherwood.

Council President Peterson thanked Metro staff, the City of Sherwood, and residents for their participation in the process.

Seeing no further discussion, Council President Peterson called for a motion to approve Ordinance No. 24-1520.

A motion was made by Councilor Rosenthal and seconded by Councilor Gonzalez.

The motion was carried by the following vote:

Aye: 6 - Council President Peterson, Councilor Lewis, Councilor Gonzalez, Councilor Rosenthal, Councilor Hwang, and Councilor Simpson

Nay: 1 - Councilor Nolan

5. Chief Operating Officer Communication

Marissa Madrigal provided an update on the following events or items:

- Thanked the Council for productive budget preparation discussions.

6. Councilor Communication

Councilors provided updates on the following meetings and events:

- There were none.

7. Adjourn

There being no further business, Council President Peterson adjourned the Metro Council Meeting at 12:47 p.m.

Respectfully submitted,

Emma McIntosh

Emma McIntosh, Legislative Assistant