



Statewide Noise Analysis Quality Plan

Environmental Section
Oregon Department of Transportation

September 2024

Statewide Noise Analysis Quality Plan

ODOT is an Equal Employment Opportunity and Affirmative Action Employer.

This information can be made available in alternative format by contacting the ODOT Environmental Section at ENVAdminsupport@odot.oregon.gov.

ODOT does not discriminate on the basis of disability in admission or access to our programs, services, activities, hiring and employment practices. Questions: 1-877-336-6368 (EEO-ODOT) or through Oregon Relay Service at 7-1-1.

Oregon Department of Transportation

Statewide Project Delivery Branch – Engineering & Technical Services Branch

Project Delivery QA/QC Program

4040 Fairview Industrial Dr. SE

Salem, Oregon 97302-1142

503-986-7130

ODOTQualityProgram@odot.oregon.gov

[Website](#)

Table of Contents

Table of Contents.....	ii
1. Noise Analysis Quality Management.....	4
2. Quality and Technical Standards	5
3. Roles and Responsibilities	6
3.1. ODOT Work Products	6
3.2. Outsourced Work Products	7
4. Quality Control	8
4.1. Quality Control Milestones.....	8
4.2. Quality Control Reviews.....	8
4.2.1 QC Process for Internally Produced Noise Technical Reports and Noise Barrier Technical Memoranda	9
4.2.2 QC Process for Noise Technical Reports and Noise Barrier Technical Memoranda Produced by Consultants.....	9
4.3. Authority of the Reviewer	10
4.4. Software, Tool, and Data Validation	10
4.5. Quality Control Documentation	10
4.6. QC Communications	11
5. Quality Assurance	12
5.1. Quality Assurance Review Process	12
5.2. Quality Assurance Documentation (reserved)	12
5.3. QA Communications (reserved)	12
Appendix A - Glossary.....	13

Statewide Noise Analysis Quality Plan

Revision History (the current revision is first entry)

Release Date	Change made by	Section(s) Updated	Summary of what, why changed
9/13/2024	Daniel Burgin, Noise Program coordinator	All	Initial version.

1. Noise Analysis Quality Management

Quality in noise analysis is the degree to which the results and documentation of the analysis are accurate and conform to methodologies and procedures described in the ODOT Noise Manual. Clarity and understandability of documentation is also an important part of quality.

Quality is the result of a cooperative partnership between the providers of project development services (engineering services and technical reports) and quality assurance. Those providing noise analysis services must implement quality control (QC) to ensure that products and services meet customer requirements and expectations. Those responsible for quality assurance (QA) review the process to ensure the quality management efforts are achieving desired results.

The quality management efforts foster continuous improvement in the ongoing quest to meet customer expectations, provide high quality engineering and technical services, and make efficient use of resources.

2. Quality and Technical Standards

Noise Technical Reports and Noise Barrier Design Technical Memoranda must meet requirements of the [ODOT Noise Manual](#) and [23 CFR 772](#).

The [ODOT Project Delivery QA/QC Program website](#) provides an overview of the ODOT Project Delivery QA/QC Program, access to the quality standards of practice. The Project Delivery Statewide Quality Management Program Manual can be found there, as well as a listing of the quality plans and guidance documents, including the region technical center quality plans, the technical discipline quality plans, and the transportation project management statewide quality plan. There is also a listing of the associated quality forms and checklists.

3. Roles and Responsibilities

The roles and responsibilities for implementing noise analysis quality management are described in this section.

3.1. ODOT Work Products

Table 1: Noise Analysis Quality Roles and Responsibilities

Roles	Responsibilities
Analyst	Perform noise analysis and prepare Noise Technical Report or Noise Barrier Design Technical Memorandum.
ODOT Noise Program coordinator	- Provides primary technical review for Noise Technical Reports and Noise Barrier Technical Memoranda. - Maintains working knowledge of highway noise analysis and abatement and serves as ODOT's primary subject matter expert for noise. - On some projects, the analyst role may be performed by the ODOT Noise Program coordinator.
ODOT Air Quality Program coordinator (professional engineer)	- Provides a peer review and serves as final approver for Noise Technical Report or Noise Barrier Technical Memoranda. - Applies professional engineer Stamp to indicate documentation of formal quality control review

3.2. Outsourced Work Products

Table 2. Noise Analysis Quality Roles and Responsibilities for Outsourced Work Products

Roles	Responsibilities
Analyst (consultant team)	- Perform noise analysis and prepare Noise Technical Report or Noise Barrier Design Technical Memorandum. - Must meet training requirements described for Lead Noise analyst in the ODOT Noise Manual, but not necessarily the experience requirement.
Reviewer (consultant team)	- Provides primary technical review for Noise Technical Report or Noise Barrier Design Technical Memorandum aspects of the project to catch and correct mistakes, oversights or logic errors. - Must meet all requirements for lead noise analyst as described in the ODOT Noise Manual. - Cannot be the same person as the analyst
ODOT Noise specialist	- Responsible for primary review of Noise Technical Reports and Noise Barrier Design Technical Memoranda prepared by analyst. - Has received training in traffic noise analysis and maintains working knowledge of highway noise analysis and abatement - Signs QC form 734-5279 when Noise Technical Report or QC form 734-5280 when Noise Barrier Design Technical Memoranda is in acceptable final form.
ODOT Noise Program coordinator	- Responsible for quality assurance for all noise analysis work products. - Provide training for analysts and reviewers - Maintains working knowledge of highway noise analysis and abatement and serves as ODOT's primary subject matter expert for noise. - Note: on some projects, the ODOT Noise specialist role will be performed by the ODOT Noise Program coordinator.
Professional engineer (consultant team)	- Maintains a Professional Engineer license in the State of Oregon as well as basic technical knowledge of highway noise analysis - Reviews the Noise Technical Report or Noise Barrier Design Technical Memo before it's submitted to ODOT. - After the QC form has been signed by all parties, applies a Professional Engineer stamp to Noise Technical Report or Noise Barrier Design Technical Memorandum. - May be the same person as the analyst or the reviewer.

4. Quality Control

4.1. Quality Control Milestones

For clarity, the ODOT project delivery process is broken down into a series of milestones or phases. The following table details the phases where review is warranted.

Table 3: QC Milestones

Deliverable	Type	Phase Due
Noise Technical Report	Primary Deliverable	DAP
Form 734-5279 – Noise Technical Report QC Checklist	Additional Consultant Deliverable	DAP
Noise Barrier Design Technical Memorandum	Primary Deliverable	No later than PS&E
Form 734-5280 – Noise Barrier Design Technical Memorandum QC Checklist	Additional Consultant Deliverable	No later than PS&E

There are two kinds of noise analyses that require formal QC. Noise Technical Reports should be completed prior to DAP. Noise Barrier Design Technical Memorandum is not tied to a specific milestone but must be completed prior to construction.

For more information about this process, refer to the ODOT Noise Manual.

4.2. Quality Control Reviews

Quality control reviews are undertaken to assist the development of documents that are free of errors and mistaken assumptions. The reviews are also intended to assure consistency of the documents with applicable standards and guidance and consistency between calculation results

and recommendations. Lastly, quality reviews should verify that previous QC review comments have been understood and addressed.

For expediency and consistency, the review is assisted by a variety standard templates and checklists. The development and implementation of these templates and checklists is intended to assist designers and reviewers in completing their mission and to provide reminders of applicable guidance and standards. It is important to note that the use of these tools is not intended to replace sound professional judgement nor to relieve the reviewer from their personal responsibilities. Information about all disciplines of ODOT's Environmental Quality Control Program can be found at this [webpage](#).

4.2.1 QC Process for Internally Produced Noise Technical Reports and Noise Barrier Technical Memoranda

- Review by Noise Program leader and a professional engineer with knowledge of noise modeling. The professional engineer role is usually fulfilled by the ODOT Air Quality Program coordinator
- The stamp and signature of the professional engineer on the Noise Technical Report or Noise Barrier Design Technical Memorandum serves as documentation of the formal QC.

4.2.2 QC Process for Noise Technical Reports and Noise Barrier Technical Memoranda Produced by Consultants

- Consultant staff member with noise expertise greater than or equal to the analyst, the reviewer, performs initial quality control review prior to submission of the Noise Technical Report to ODOT to check calculations and verify that requirements of the ODOT Noise Manual and 23 CFR 772 are met.
 - The consultant reviewer should use the appropriate QC form
 - For Noise Technical Reports use ODOT form 734-5279.
 - For Noise Barrier Design Technical Memoranda use ODOT form 734-5280.
- When the consultant reviewer is satisfied that the work is error-free, the document and QC form (signed by analyst and reviewer) is submitted to ODOT for review
- An ODOT Noise specialist performs additional quality control review.
 - If there are no ODOT comments and the report is in acceptable final form, the QC checklist will be signed by the ODOT Noise specialist
 - If ODOT has comments, they will be provided to the consultant. Consultant will then revise the report for resubmission.

- Each time a consultant resubmits a draft for ODOT review, it must be reviewed by the consultant reviewer.
- Each draft resubmitted for ODOT review must be accompanied by a QC form signed by the analyst and reviewer. This must include the date of the draft and the draft revision number.
- Additionally, a professional engineer in the same consulting firm which prepared the report must stamp the final document after an ODOT Noise specialist has signed the QC form.
- Upon final approval of the report or memorandum, a copy of the signed QC checklist and final report with PE stamp is to be provided to the ODOT Noise Program coordinator.

4.3. Authority of the Reviewer

ODOT Noise specialists are tasked with the responsibility of ensuring the federal requirements in 23 CFR 772 and the ODOT Noise Manual are appropriately followed and consistently applied for all projects across the state.

Reviewers on a consultant team are responsible for conducting a thorough review and working with the analyst to resolve quality issues to the extent possible before a Noise Technical Report or Noise Barrier Design Technical Memorandum is submitted to ODOT.

The professional of record is the professional engineer who stamps the Noise Technical Report or Noise Barrier Design Technical Memorandum.

4.4. Software, Tool, and Data Validation

Reviewing a noise analysis includes checking the TNM input and output data and assumptions as well as the model validation. All TNM files and spreadsheets used for the analysis must always be included with submittals of a Noise Technical Report or Noise Barrier Design Technical Memorandum.

4.5. Quality Control Documentation

As project QC work is done, quality records are created that provide reviewable evidence documenting that quality work was done. These quality records also provide the basis for QA reviews and/or audits (performed by professional auditors).

Documentation needs to occur as the QC work is being completed and must not be postponed to the end of the project. Each draft of every submittal of a Noise Technical Report or Noise Barrier Design Technical Memorandum must be accompanied by a Noise Technical Report QC checklist (ODOT form 734-5279) or Noise Barrier Design Technical Memorandum QC checklist (ODOT form 734-5280).

Review comments and notes should be written/recorded to the greatest extent possible to promote good communication and minimize misunderstandings. In addition, reviewers should have a conversation with the person who created the work product or task to go over their comments. This establishes a personal relationship that helps to lessen possible conflicts of ego. Reviewers' comments should be retained in ProjectWise.

To the extent reasonable to document the process of deciding on the final approach, unsealed drafts of professional deliverables should be retained within the project file. Electronic version control should be in accordance with file naming convention detailed elsewhere in this manual. Drafts should be retained for significant projects with multiple iterations.

Quality records in ProjectWise are stored in their regular discipline or milestone directory, with either "QC" or "QA" in the document title or description, to facilitate searches for quality documentation. A set of quality files from each discipline or milestone folder in ProjectWise will be created in the ProjectWise "7_quality" folder. The set naming convention for Noise will be as follows:

EZ_K#####_##

Electronic signatures are sufficient on a Noise Technical Report QC Checklist or a Noise Barrier Design Technical Memorandum QC checklist.

4.6. QC Communications

The process described by this section defines the minimum level of communication and collaboration necessary to meet the requirements of the ODOT Noise Analysis Quality Plan. Members of the project team are encouraged to freely communicate throughout the life of the project in order to assure a high level of service and quality and reduce significant amounts of rework, errors, or omissions.

Analysts preparing noise analyses are encouraged to bring up any questions about methodologies or application of the ODOT Noise Manual as early in the process as possible. These should be communicated to the ODOT Noise Program coordinator by phone or email. Phone calls where questions about methodology are answered should be followed up by an email to document the communication. Resolving questions early leads to fewer issues that need to be addressed during QC review.

Email is generally the primary method of communication to coordinate QC reviews of noise analyses, but it can often be helpful to have a phone call or meeting to discuss comments, especially if the comments include questions that may lead to more comments. Any time a situation such as this exists, effort should be made by the analyst, reviewer, and the ODOT Noise specialists to resolve the questions by phone, email or meeting before submission of another draft of the document.

5. Quality Assurance

Quality assurance (QA) is a system undertaken to maximize the effectiveness of the quality program. The QA process will assist in measuring the effectiveness of the quality efforts in order to provide input into continuous improvement of the work and assist in identifying technical development needs.

5.1. Quality Assurance Review Process

The ODOT Noise Program coordinator is responsible for Quality Assurance for the ODOT Noise Program. In most circumstances, the ODOT Noise Program coordinator is already involved in the QC process for each project, but even if QC duties were performed by another ODOT Noise specialist, the ODOT Noise Program coordinator is still responsible for checking for completeness of QC documentation in ProjectWise for projects which had a Noise Technical Report and/or Noise Barrier Design Technical Memorandum.

5.2. Quality Assurance Documentation

(Reserved)

5.3. QA Communications

(Reserved)

Appendix A - Glossary

Table A-2: Glossary of Terms, Titles, and Acronyms

Term	Explanation
DAP	Design acceptance package; statewide phase gate project delivery milestone.
PS&E	Plans, specifications and estimates; statewide phase gate project delivery milestone.
QC	Quality control, focused on the product fulfilling quality requirements as it is developed.
QA	Quality assurance, focused on the process and assurances that quality requirements are being fulfilled. • Verifying that QC was done following the quality processes. • Reviews of QC and QA processes, supporting continuous improvement. • Project and program level QA reviews.
Quality Management	Policies, processes, activities, and responsibilities that ensure the overall quality of tasks and deliverables in project delivery. Quality management is implemented by means such as quality planning, quality control, quality assurance, and continuous improvement within the system.
Quality Verification (QV)	Review process to ensure technical sufficiency of all deliverables, verify performance of all quality tasks, and to document the completion of those tasks.
POR	Professional of record
Technical sufficiency	Reviewing a deliverable for technical sufficiency means technical review, checking that the deliverable is in compliance with all applicable laws, rules, regulations, technical standards, guidance, policies and procedures, suitable for the milestone. An initial check of key elements can be used to decide whether additional review is warranted.
TNM	FHWA Traffic Noise Model. A software used for noise studies.



ODOT provides a safe and reliable multimodal transportation system that connects people and helps Oregon's communities and economy thrive.

www.oregon.gov/ODOT

