

ENTRANCE RAMP DETAILS

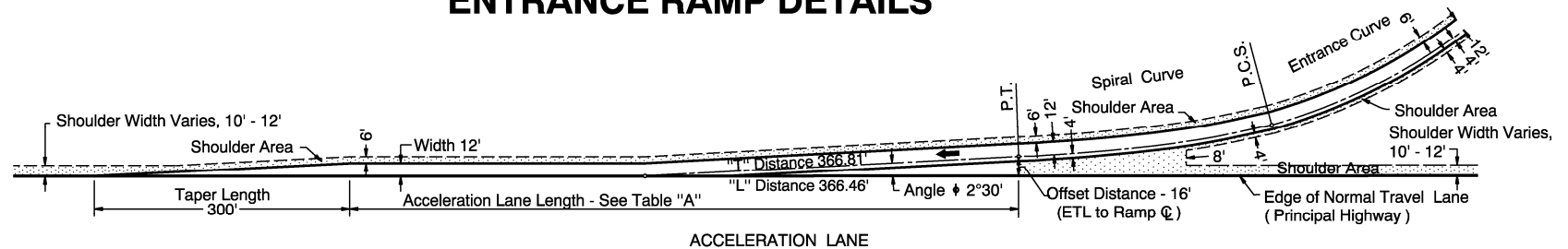


TABLE "A"
MINIMUM ACCELERATION LANE LENGTHS

Design Speed of Entrance Curve (mph)	25	30	35	40	45	50+
Minimum Curve Radius (ft.)	160	230	320	430	555	695
Design Speed of Highway (mph)	TOTAL LENGTH OF ACCELERATION LANE (WITHOUT TAPER) Length (ft.)					
40	540	540	540	540	540	540
45	540	540	540	540	540	540
50	550	540	540	540	540	540
55	780	670	550	540	540	540
60	1020	910	800	550	540	540
65	1220	1120	1000	770	*600	*540
70	1420	1350	1230	1000	820	*580

* Desirable length is **750'**, this allows additional decision time for picking gaps.

ENTRANCE CURVES & SPIRALS

Ramp Design Speed (mph)	Degree of Curve	Radius (ft)	e (%)	Spiral Length (ft.)	Spiral Parts	
					"a" Value	"S" Value
70	1° 00'	5729.58	3.5	200	0.5	1.0
	2° 00'	2864.79	6.5	200	1.0	2.0
	3° 00'	1909.86	8	240	1.25	3.6
65	4° 00'	1432.39	9	240	1.667	4.8
60	5° 00'	1145.92	9.5	250	2.0	6.25
55	6° 00'	954.93	10	240	2.5	7.2
50	7° 00'	818.51	10.5	240	2.917	8.4
	8° 00'	716.20	10.5	250	3.2	10.0
45	10° 00'	572.96	11	250	4.0	12.5
40	12° 00'	477.46	11.5	240	5.0	14.4
	14° 00'	409.26	11.5	200	7.0	14.0
35	16° 00'	358.10	12	200	8.0	16.0
	18° 00'	318.31	12	200	9.0	18.0
30	20° 00'	286.48	12	200	10.0	20.0
	24° 00'	238.73	12	200	12.0	24.0
25	30° 00'	190.99	12	200	15.0	30.0
	36° 00'	159.15	12	200	18.0	36.0

TABLE "B"
RATIO OF LENGTH OF ACCELERATION LANES
ON MAINLINE GRADES TO LENGTH ON LEVEL

Design Speed of Highway (mph)	Design Speed of Turning Roadway (mph)						ALL Speeds
	25	30	35	40	45	50	
3% to 5% Upgrade							3% to 5% Down
40	1.30	1.30	1.20	1.00	1.00	1.00	0.70*
45	1.30	1.35	1.30	1.00	1.00	1.00	0.65*
50	1.35	1.40	1.40	1.40	1.35	1.00	0.65*
55	1.40	1.45	1.45	1.45	1.45	1.00	0.65*
60	1.45	1.50	1.50	1.50	1.55	1.60	0.60*
65	1.50	1.55	1.55	1.60	1.65	1.70	0.60*
70	1.55	1.60	1.65	1.70	1.75	1.80	0.60*
5% and over Upgrade							5% and over Down
40	1.50	1.50	1.50	1.00	1.00	1.00	0.60*
45	1.55	1.60	1.65	1.00	1.00	1.00	0.60*
50	1.60	1.70	1.80	1.90	1.45	1.00	0.55*
55	1.70	1.80	1.90	2.05	2.15	1.00	0.55*
60	1.80	1.90	2.05	2.20	2.35	2.50	0.50*
65	1.95	2.05	2.20	2.40	2.60	2.75	0.50*
70	2.10	2.20	2.40	2.60	2.80	3.00	0.50*

* If the ratio from Table "B" yields a length less than 540', use 540' as the minimum acceleration lane length. The desirable length is 750', this allows additional decision time for picking gaps.

EXAMPLE:

Find: Adjusted Acceleration Lane Length
Given: Principal Highway design speed 70 mph
Turning Highway design speed 30 mph
Meeting on a 5% upgrade

Solution: From Table "A" acceleration lane length = 1350'
From Table "B" ratio on upgrade = 2.20
Adjusted acceleration lane length = 1350' x 2.20 = 2970'

Note: If adjusted acceleration lane length appears impractical, a merge analysis should be performed. Lengthening of acceleration lane length may be necessary due to high truck volumes.

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING UNIT

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HIGHWAY DESIGN MANUAL

Figure 9-11: Entrance Ramp Details