



FACILITY	DESIGN WARRANTS						EXIT TERMINAL FROM HIGHWAY (SEE FIGURE E-1.3)								ENTRANCE TERMINAL TO HIGHWAY (SEE FIGURE E-1.2)									
	MAINLINE SPEED		CONTROLLING RADIUS				SPEED AT GORE (11m OFFSET) (km/h)	DESIGN CRITERIA (NORMAL) (m)			DESIGN CRITERIA FOR GRADIENTS OVER 3% (m)					SPEED AT 2m OFFSET (km/h)	DESIGN CRITERIA (NORMAL) (m)			DESIGN CRITERIA FOR GRADIENTS OVER 3% (m)				
	DESIGN SPEED	TYPICAL POSTED SPEED	DESIRABLE RADIUS FOR RAMP	MINIMUM RADIUS FOR RAMP	DESIRABLE RADIUS FOR LOOP	MINIMUM RADIUS FOR LOOP		GRADE -3% TO +3%	-3% TO -5%	-5%	+3% TO +5%	+5%	DESIRABLE RUNNING SPEED 8km/h LESS THAN RUNNING SPEED	GRADE -3% TO +3%	-3% TO -5%		-5%	+3% TO +5%	+5%					
60	50	60	90	55	55	55	48	165@15:1	42.0	60	220 @ 20:1	20:1	15:1	15:1	60	52	200@20:1	94	75	200 @ 20:1	20:1	25:1	30:1	
80	70	80	190	55	55	55	64	220@20:1	56.0	80	275 @ 25:1	25:1	20:1	15:1	79	71	≥ R90 200@20:1	94	75	250 @ 20:1	20:1	≥ R90 30:1	≥ R90 35:1	
100	90	100	250	90	90	55	80	220@20:1	56.0	80	275 @ 25:1	25:1	20:1	15:1	95	88	≥ R130 350@35:1	164.5	131.25	350 @ 35:1	35:1	≥ R130 50:1	≥ R130 60:1	
110	100	109	340	130	90	55	87	275@25:1	70.0	100	330 @ 30:1	35:1	25:1	20:1	102	94	≥ R160 500@50:1	235	187.5	400 @ 40:1	40:1	≥ R160 550@55:1	258.5	206.25
120	100	112.5	440	130	90	70	90	275@25:1	70.0	100	330 @ 30:1	35:1	25:1	20:1	109	101	≥ R190 500@50:1	235	187.5	500 @ 50:1	40:1	≥ R70-R190 600@60:1	282	225
130	110	116	440	190	90	90	93	330@30:1	84.0	120	385 @ 35:1	440@40:1	30:1	25:1	116	108	≥ R215 500@50:1	235	187.5	500 @ 50:1	40:1	≥ R90-R215 600@60:1	282	225

NOTE:
WEAVING LENGTH IS MEASURED FROM A POINT WHERE LANE EDGES AT THE MERGE ARE 0.5m APART TO WHERE LANE EDGES AT THE DIVERGE ARE 3.7m APART, AS ILLUSTRATED ABOVE. AN AUXILIARY LANE TO ACCOMMODATE WEAVING MAY BE ADDED WHERE REQUIRED. GENERALLY AUXILIARY LANES ARE USED WHERE THE WEAVING LENGTH IS LESS THAN 1000m.

CONTROLLING RADIUS - BASED ON DESIGN SPEED OF TURNING ROADWAY AND MAINLINE ROADWAY

"A" PARAMETER REQUIREMENTS - FOR EXIT AND ENTRANCE TERMINALS

40 km/h	45 km/h	50 km/h	55 km/h	60 km/h	65 km/h	70 km/h	75 km/h	80 km/h	90 km/h	100 km/h	110 km/h	120 km/h	130 km/h
MINIMUM R55	MINIMUM R70	MINIMUM R90	MINIMUM R110	MINIMUM R130	MINIMUM R160	MINIMUM R190	MINIMUM R215	MINIMUM R250	MINIMUM R340	MINIMUM R440	MINIMUM R600	MINIMUM R750	MINIMUM R950
e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06	e+0.06
P+3.205 0+32.345 Lc+64.430 Ls+65.455	P+2.154 0+29.993 Lc+59.860 Ls+60.357	P+1.801 0+31.125 Lc+62.166 Ls+62.500	P+1.629 0+32.744 Lc+65.422 Ls+65.682	P+1.242 0+31.094 Lc+62.149 Ls+62.308	P+1.016 0+31.210 Lc+62.394 Ls+62.500	P+0.889 0+31.812 Lc+63.605 Ls+63.684	P+0.869 0+33.461 Lc+66.904 Ls+66.977	P+1.024 0+39.168 Lc+78.314 Ls+78.400	P+0.694 0+37.632 Lc+75.253 Ls+75.294	P+0.706 0+43.161 Lc+86.313 Ls+86.350	P+0.587 0+45.973 Lc+91.939 Ls+91.963	P+0.525 0+48.593 Lc+97.182 Ls+97.200	P+0.420 0+48.940 Lc+97.877 Ls+97.889
A=60	A=65	A=75	A=85	A=90	A=100	A=110	A=120	A=140	A=160	A=195	A=235	A=270	A=305
P+5.874 0+35.589 Lc+86.520 Ls+89.091	P+3.799 0+35.741 Lc+79.187 Ls+80.357	P+3.328 0+35.371 Lc+70.619 Ls+71.111	P+2.764 0+46.340 Lc+92.548 Ls+93.007	P+2.103 0+44.882 Lc+89.684 Ls+90.000	P+1.481 0+41.054 Lc+82.066 Ls+82.237	P+1.196 0+39.258 Lc+78.488 Ls+78.605	P+0.960 0+44.393 Lc+90.981 Ls+90.000	P+1.348 0+44.951 Lc+89.870 Ls+90.000	P+1.608 0+45.513 Lc+90.981 Ls+90.000	P+1.348 0+44.951 Lc+89.870 Ls+90.000	P+1.608 0+45.513 Lc+90.981 Ls+90.000	P+1.348 0+44.951 Lc+89.870 Ls+90.000	P+1.608 0+45.513 Lc+90.981 Ls+90.000
A=70	A=75	A=80	A=85	A=90	A=100	A=110	A=120	A=140	A=160	A=195	A=235	A=270	A=305
A=85	A=90	A=95	A=100	A=110	A=120	A=125	A=130	A=140	A=160	A=195	A=235	A=270	A=305
A=95	A=100	A=110	A=120	A=125	A=130	A=140	A=150	A=160	A=195	A=235	A=270	A=305	A=305
A=100	A=110	A=120	A=125	A=130	A=140	A=150	A=160	A=195	A=235	A=270	A=305	A=305	A=305
A=125	A=130	A=140	A=150	A=160	A=195	A=235	A=270	A=305	A=305	A=305	A=305	A=305	A=305

DUPLICATE THE LONG DISTANCES REQUIRED FOR ACCELERATION. CONSIDERATION SHOULD BE GIVEN TO REDUCING MAINLINE GRADIENT, OR PROVIDING A PARALLEL ACCELERATION LANE, SUCH THAT VEHICLES OBTAIN A MINIMUM SPEED OF 8km/h LESS THAN RUNNING SPEED OF THE MAINLINE BEFORE MERGING. SEE CHAPTER D OF THIS MANUAL FOR TYPICAL VEHICLE PERFORMANCE CHARACTERISTICS.

ASSUMED SPEED PROFILE AT EXIT TERMINALS (ALBERTA)

DESIGN SPEED km/h	NORMAL TAPER RATIO	85th PERCENTILE RUNNING SPEED (ALBERTA) km/h	SPEED AT 3.7m OFFSET km/h	LENGTH OF TAPER AVAILABLE FOR DECELERATION (7.3m x RATIO)	SPEED AT 11m OFFSET (GORE) (20% REDUCTION)	SPIRAL	CONTROLLING RADIUS
60	15:1	60	60	109.5	48	VEHICLES ARE EXPECTED TO BRAKE COMFORTABLY ON SPIRALS PRECEDING LOOPS.	RUNNING SPEED SHOULD BE LESS THAN DESIGN SPEED OF CONTROLLING RADIUS CURVE.
80	20:1	80	80	146	64		
100	20:1	100	100	146	80		
110	25:1	109	109	182	87		
120	25:1	112.5	112.5	182	90		
130	30:1	116	116	219	93		

IT IS ASSUMED THAT VEHICLES EXITING THE HIGHWAY WILL MAINTAIN THE MAINLINE SPEED (85th PERCENTILE RUNNING SPEED) UNTIL THE POINT WHERE THE TAPERED LANE IS 3.7m WIDE. AT THE GORE POINT (11.0m OFFSET), IT IS ASSUMED THAT VEHICLES HAVE SLOWED DOWN TO 80% OF THE MAINLINE SPEED. THIS DECELERATION RATE IS VERY GRADUAL AND CAN GENERALLY BE ACHIEVED BY STANDARD TRANSMISSION VEHICLES IN GEAR WITHOUT BRAKES BEING APPLIED. THE SPIRAL LENGTHS ARE DESIGNED TO ALLOW A COMFORTABLE TRANSITION TO THE CONTROLLING SPEED OF THE CIRCULAR CURVE, GENERALLY ON RAMP WHERE THE RAMP DESIGN SPEED EXCEEDS 70 km/h. THE REDUCTION IN SPEED ON THE TRANSITION IS VERY GRADUAL AND CAN BE ACHIEVED WITHOUT BRAKING. HOWEVER, WHERE CONSTRAINTS EXIST, FOR EXAMPLE AT LOOP EXITS WITH DESIGN SPEEDS LESS THAN 70 km/h, THE DESIGN LENGTH PROVIDES FOR COMFORTABLE BRAKING. ALTHOUGH SOME BRAKING IS REQUIRED ON APPROACHES TO LOOPS, THE RATE OF DECELERATION IS GENERALLY LESS THAN HALF THAT REQUIRED ON THE APPROACH TO TURNING ROADWAYS AT CHANNELIZED INTERSECTIONS AND IS WELL WITHIN THE RANGE OF COMFORTABLE BRAKING.

No.	REVISIONS	BY	DATE
1	WEAVE LENGTH AND RAMP SHOULDER	BK	12/06
2	REVISED DIMENSIONS	T6	07/99
3	REVISED NOTE	TBN	06/98

Alberta
INFRASTRUCTURE AND TRANSPORTATION

FIGURE E-1.1
Date: APRIL 1995

DESIGN STANDARDS OF EXIT & ENTRANCE TERMINALS FOR DIVIDED HIGHWAYS AT INTERCHANGES

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*NOTES:
1. THE AVERAGE 85th PERCENTILE RUNNING SPEED RECORDED FOR PASSENGER VEHICLES ON FOUR LANE DIVIDED HIGHWAYS IN ALBERTA IN 1989 WAS 116 km/h WHERE THE POSTED SPEED WAS 110 km/h IN DAYTIME. THE CORRESPONDING SPEED WAS 109 km/h WHERE THE POSTED SPEED WAS 100 km/h.

2. FOR TYPICAL PAVEMENT MARKINGS FOR INTERCHANGE RAMP REFER TO THE TRAFFIC CONTROL STANDARDS MANUAL. A RUNNING SPEED OF 112.5 km/h IS USED HERE IN CONJUNCTION WITH A 120 km/h DESIGN SPEED IN ORDER TO PROVIDE SOME INTERMEDIATE VALUES.