

IF THE STOPPING SIGHT DISTANCE, S, AND THE RADIUS TO THE CENTER OF THE INSIDE LANE, R, ARE KNOWN, THE DISTANCE, M, IS FOUND BY THE FOLLOWING EQUATION:
 $M = R[1 - \cos(28.65 S/R)]$

IF THE RADIUS, R, AND THE DISTANCE, M, ARE TENTATIVELY SELECTED, THEN THE LENGTH, L, OF THE ARC IN THE MIDDLE OF THE INSIDE LANE MAY BE FOUND BY THE FOLLOWING EQUATION:
 $L = (R/28.65) \arccos[(R-M)/R]$

IF THE LENGTH, L, IS LESS THAN THE STOPPING SIGHT DISTANCE FOR THE DESIRED DESIGN SPEED, EITHER THE RADIUS, R, OR THE DISTANCE, M, MUST BE INCREASED.

DESIGN SPEED MPH	25	30	35	40	45	50
STOPPING SIGHT DISTANCE, S, (FT.) AS MEASURED ALONG THE PATH OF THE VEHICLE	155	200	250	305	360	425

VIEW OBSTRUCTIONS FOR HORIZONTAL CURVES

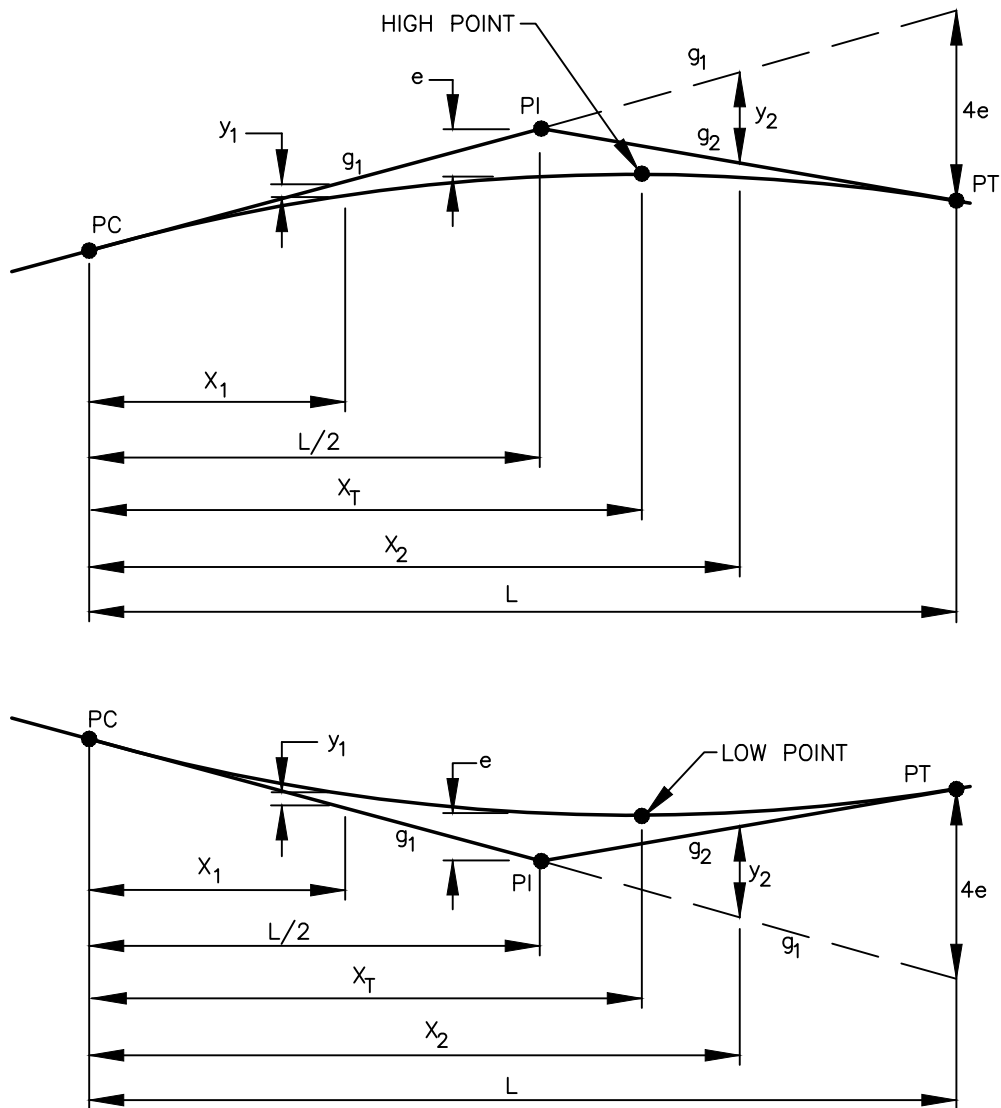


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T04-01



NOTES:

THE FOLLOWING EQUATIONS ARE FOR PARABOLIC, VERTICAL CURVES. THE GRADES g_1 AND g_2 MUST BE USED WITH THEIR ALGEBRAIC SIGNS (+ OR -). IF g_1 AND g_2 ARE EXPRESSED AS PERCENTAGES, L AND X MUST BE EXPRESSED IN STATIONS. IF g_1 AND g_2 ARE EXPRESSED AS FEET PER FOOT, L AND X MUST BE EXPRESSED IN FEET. THE SYMBOLS ARE DEFINED BY THE ABOVE DIAGRAMS.

$$A = g_1 - g_2 \quad G = g_1 - g_2 \quad e = LG/8 \quad y = 4e(X/L)^2 = (A/sL)X^2$$

THE EQUATION BELOW PROVIDES THE LOCATION, X_T , OF THE CURVE TURNING POINT WHICH IS THE HIGH POINT OR LOW POINT ON THE CURVE. THIS EQUATION IS ONLY APPLICABLE WHEN g_1 AND g_2 ARE NOT OF THE SAME SIGN, ALGEBRAICALLY.

$$X_T = (g_1 L) / (g_1 - g_2)$$

VERTICAL CURVE RELATIONSHIPS

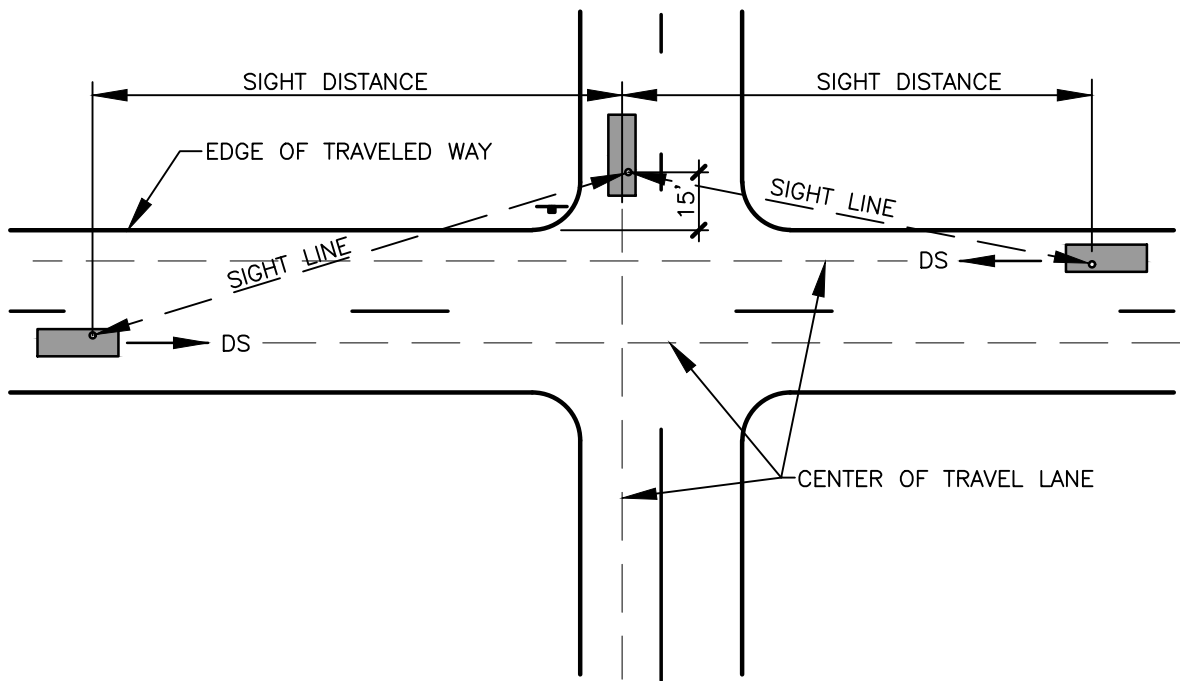


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CONTROLLED INTERSECTION	
DESIGN SPEED (DS) (MPH)	SIGHT DISTANCE (FT.)
25	250
30	300
35	350
40	400
45	450
50	500

DS= DESIGN SPEED ON THE THROUGH HIGHWAY

NOTES:

1. FOR CONTROLLED INTERSECTIONS, STREETS SHALL HAVE MINIMUM CORNER SIGHT DISTANCES, AS MEASURED FROM A HEIGHT OF 3.5 FEET ABOVE THE CONTROLLED STREET, PER VMC 11.80.140.
2. PUBLIC, PRIVATE STREET INTERSECTIONS AND COMMERCIAL DRIVEWAYS ON ARTERIAL STREETS SHALL HAVE AN UNOBSTRUCTED SIGHT DISTANCE TRIANGLE MEASURED IN THE SAME FASHION AS CONTROLLED INTERSECTIONS.
3. IF THE STREETS ARE NOT LEVEL, FOLLOW WSDOT DESIGN MANUAL TO CONSIDER GRADE.
4. "DESIGN SPEED" SHALL BE THE POSTED SPEED OR THE 85% PERCENTILE OF THE PREVAILING SPEED WHICHEVER IS HIGHER.
5. FOR UNCONTROLLED INTERSECTIONS USE THE LATEST AASHTO MANUAL REQUIREMENTS FOR SIGHT DISTANCE.



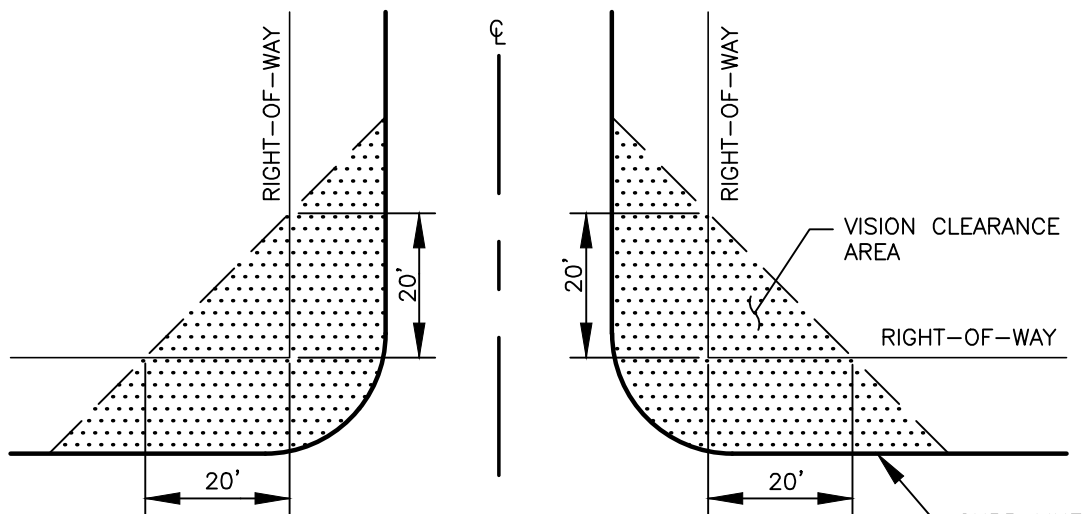
SIGHT DISTANCE REQUIREMENTS FOR CONTROLLED INTERSECTIONS ONLY

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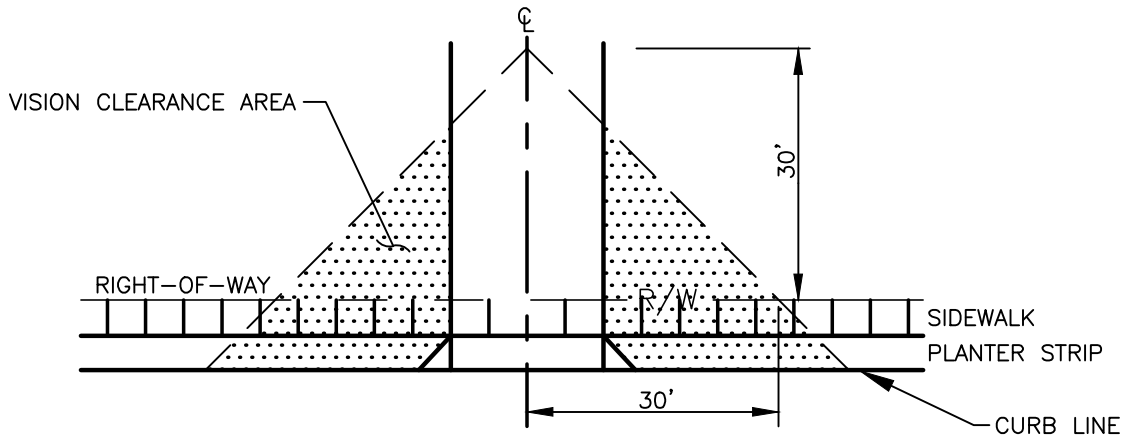
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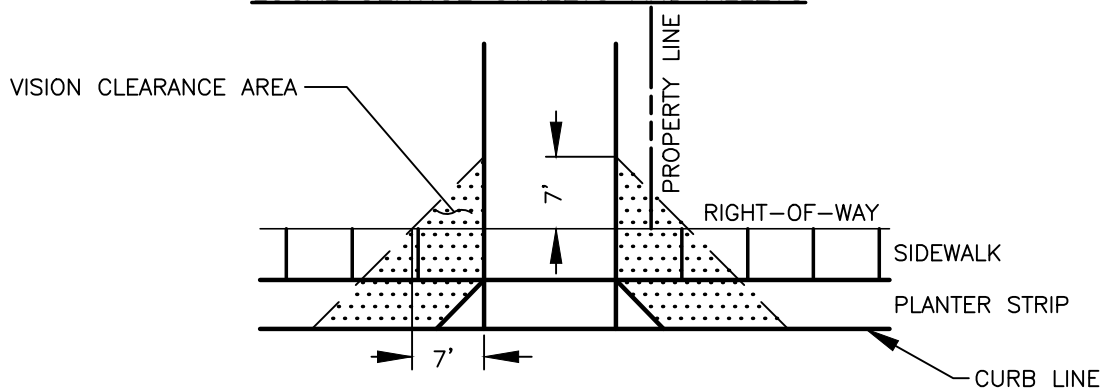
T04-03



STREET INTERSECTION



COMMERCIAL DRIVEWAYS, PRIVATE STREETS, MULTI FAMILY DWELLINGS, LOCAL SERVICE STREETS AND ALLEYS



RESIDENTIAL DRIVEWAYS AND SINGLE FAMILY DWELLINGS

NOTES:

1. THERE SHALL BE NO SIGHT OBSTRUCTION WITHIN THE TRIANGULAR VISION CLEARANCE AREA BETWEEN 30-INCHES AND 10-FEET ABOVE THE STREET GRADE, PER VMC 20.985.
2. NO STREET TREES THAT WILL GROW BEYOND 12" DIAMETER SHALL BE PLACED WITHIN THE VISION CLEARANCE TRIANGLES, SEE VMC 20.925.060 FOR ADDITIONAL INFORMATION ON STREET TREES.
3. IN ADDITION TO VISION CLEARANCE TRIANGLE, STREET INTERSECTIONS SHALL COMPLY WITH SIGHT DISTANCE PROVISIONS DEFINED IN THE "INTERSECTION CHAPTER" OF THE AASHTO'S POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS. THE INTERSECTION SIGHT DISTANCE AND SIGHT LINE SHALL BE SHOWN ON PLAN SUBMITTALS.



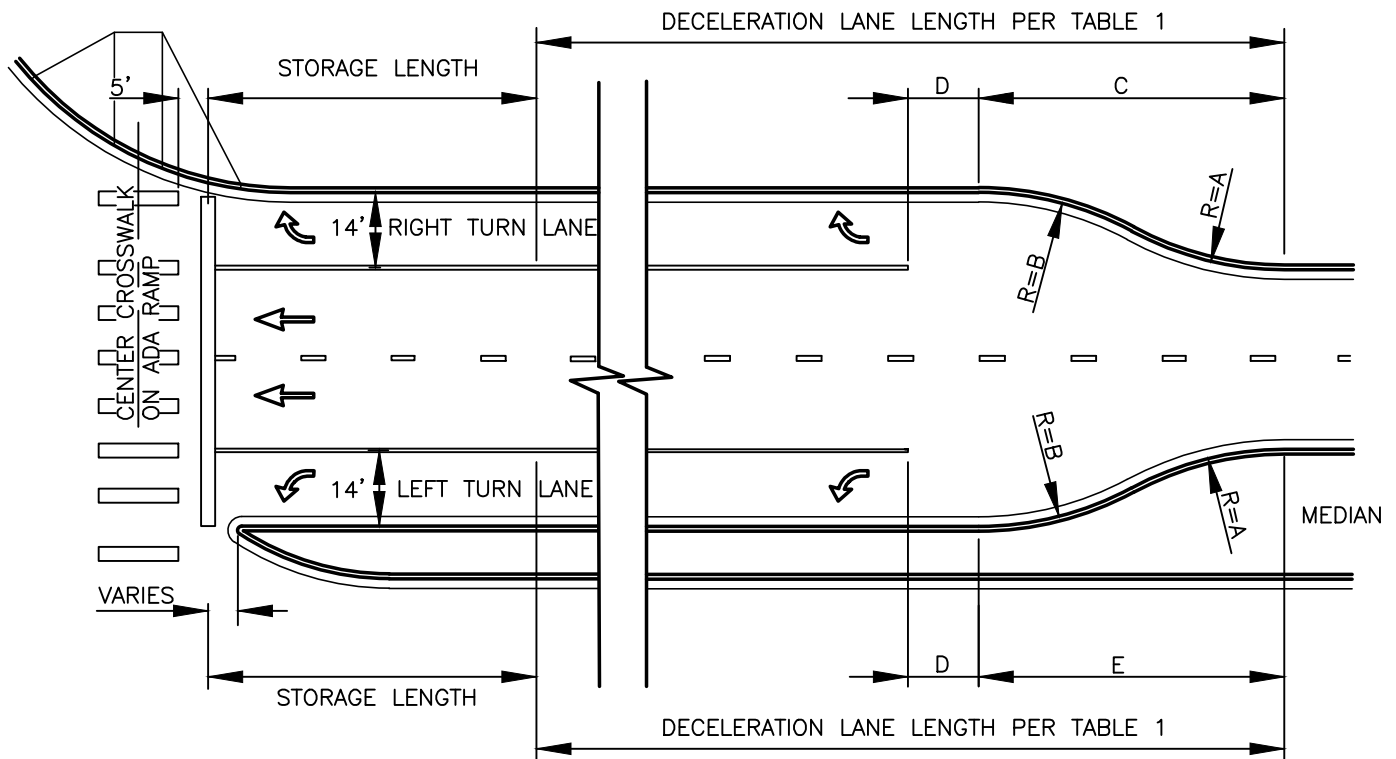
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VISION CLEARANCE TRIANGLES

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T04-04



**TABLE 1 (DECELERATION LENGTH)
DESIGN SPEED DIMENSIONS IN FT.**

30 MPH	160
35 MPH	220
40 MPH	275
45 MPH	350
50 MPH	425

DESIGN SPEED	DIMENSIONS IN FT.			
	A(RAD.)	B(RAD.)	C	D
DS > 35 MPH	150	150	86	50
DS ≤ 35 MPH	50	50	49	50

DESIGN SPEED	DIMENSIONS IN FT.	
	E	
DS > 45 MPH	300	
DS ≤ 45 MPH	150	

NOTES:

1. VEHICLE STORAGE LENGTHS DEPEND ON LOCAL TRAFFIC NEEDS AS DEMONSTRATED IN THE APPROVED TRAFFIC STUDY.
2. DIMENSIONS ASSUME SINGLE LEFT TURN LANE WITH A CURBED MEDIAN.
3. FOR ADDITIONAL INFORMATION, REFER TO THE CURRENT AASHTO MANUAL.
4. PRIOR TO USING ANY OTHER OPTION FOR TURN LANE TAPERS, APPROVAL FROM THE CITY ENGINEER IS REQUIRED.

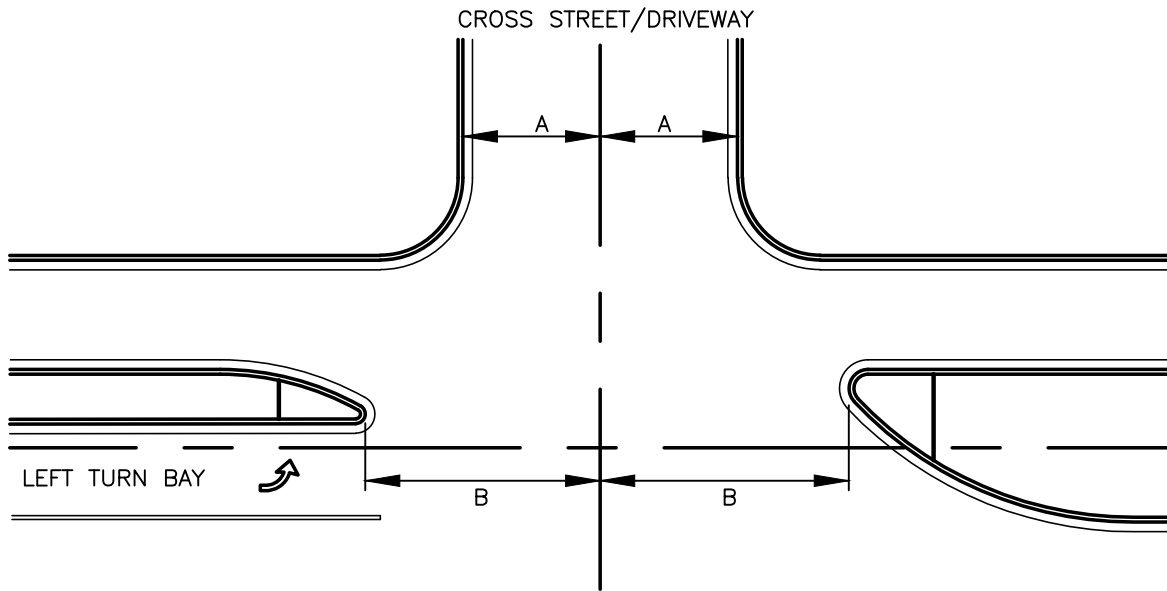
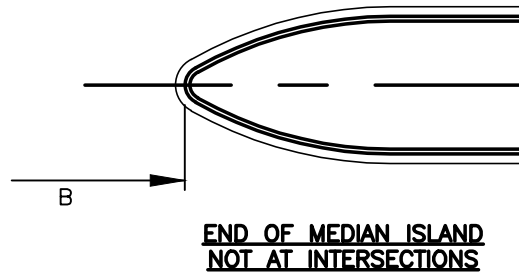


AUXILIARY LANES

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NOTE:

1. THIS SKETCH IS FOR A THREE-LEG INTERSECTION. IF THE INTERSECTION HAS FOUR LEGS, THE RIGHT SIDE WILL ALSO HAVE AN AUXILIARY LANE FOR LEFT TURNS, AND THE MEDIAN ON THE RIGHT SIDE WILL HAVE THE SAME CONFIGURATION AS THE ONE ON THE LEFT SIDE ROTATED 180 DEGREES.
2. $B = A + 14' (40' \text{ MIN.})$



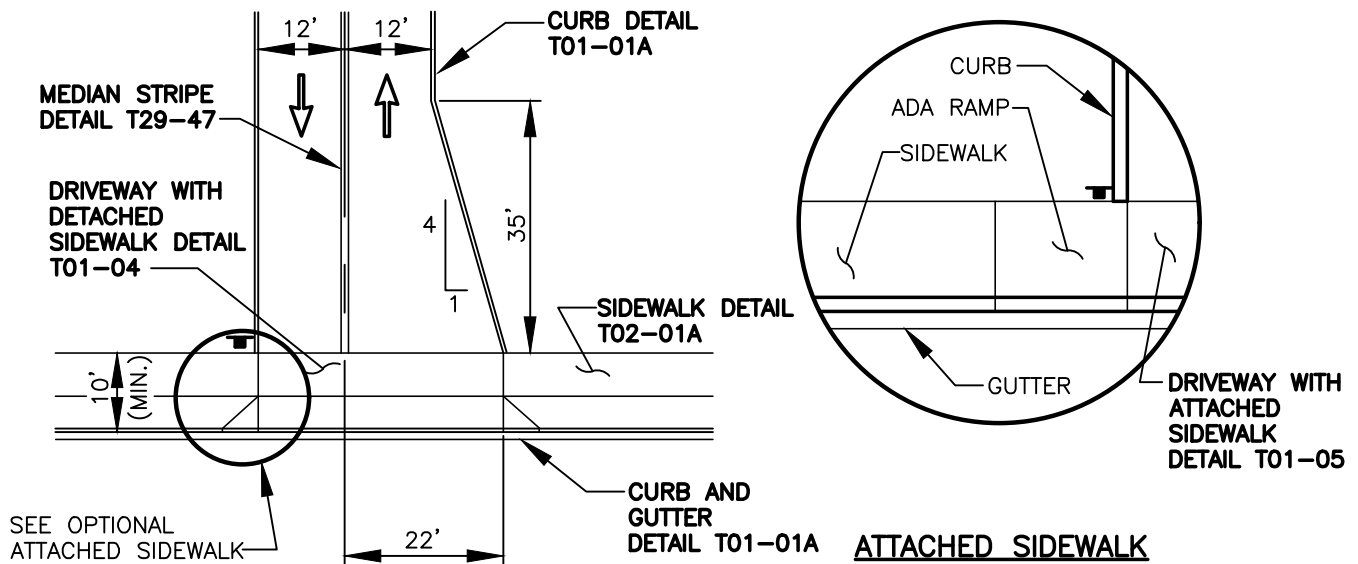
MEDIAN OPENINGS FOR INTERSECTIONS

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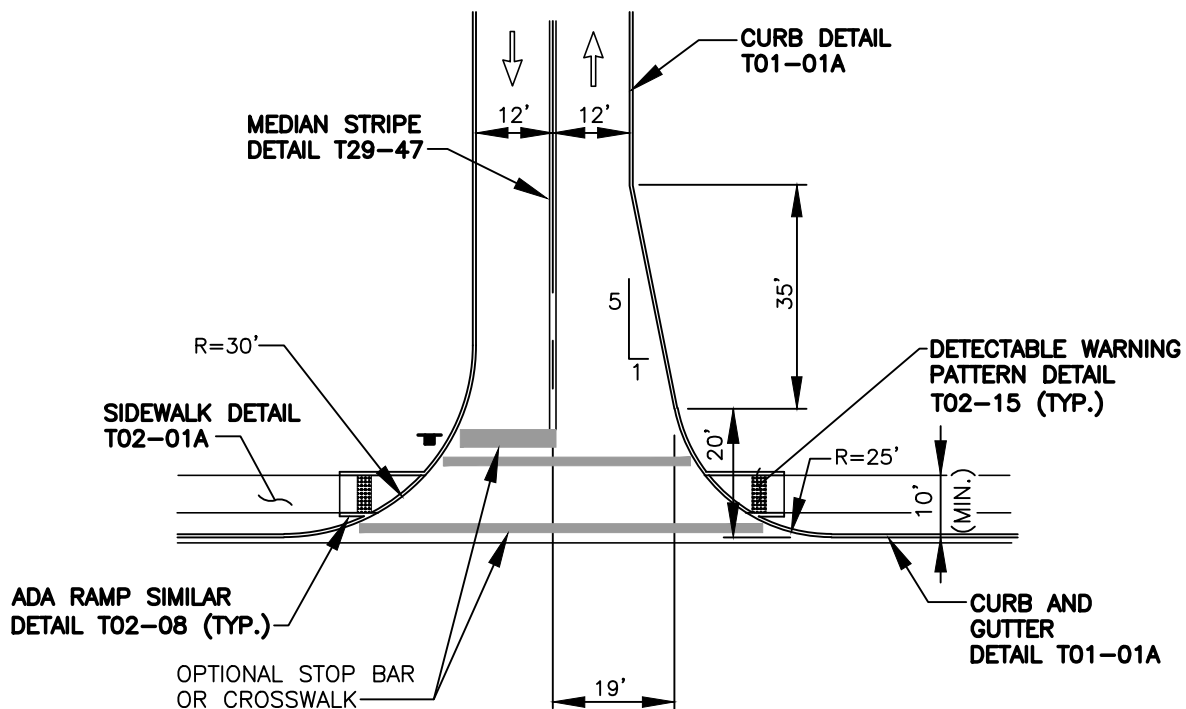
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T04-06



MULTI-FAMILY UNITS LOW VOLUME (M-1)



MULTI-FAMILY UNITS HIGH VOLUME (M-2)

NOTES:

1. MINIMUM DRIVE LENGTH IS 20 FEET, MEASURED FROM THE BACK OF SIDEWALK TO THE ENTRANCE OF THE OFF STREET PARKING AREA.
2. DIMENSIONS MAY VARY WITH ANALYSIS OF THE TURNING MOVEMENTS OF THE TYPICAL VEHICLE.



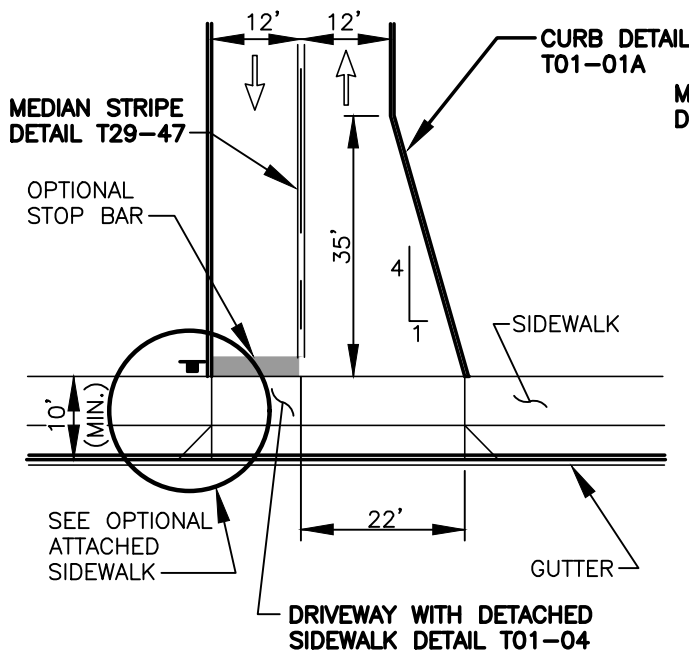
RESIDENTIAL DRIVEWAYS

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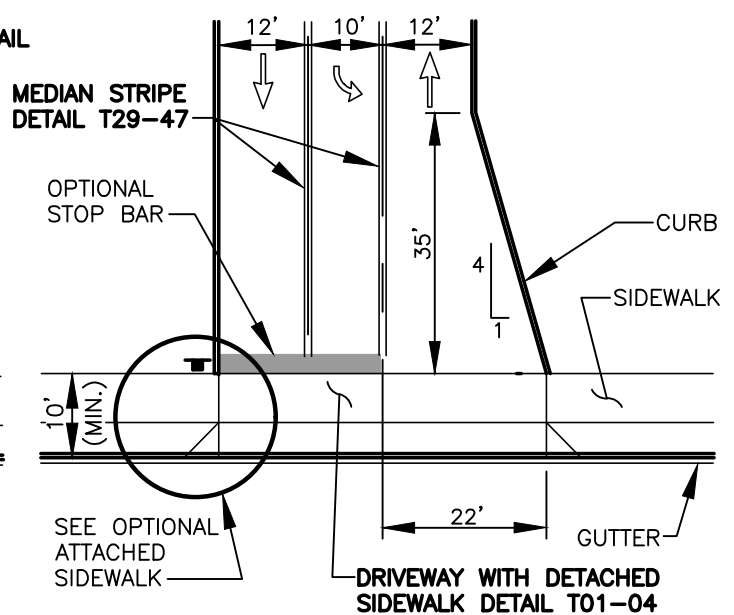
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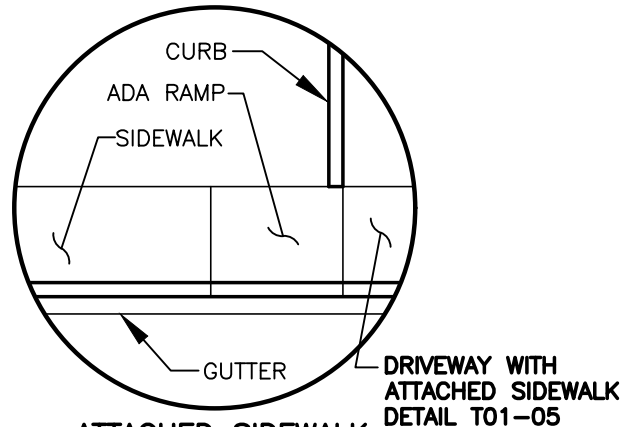
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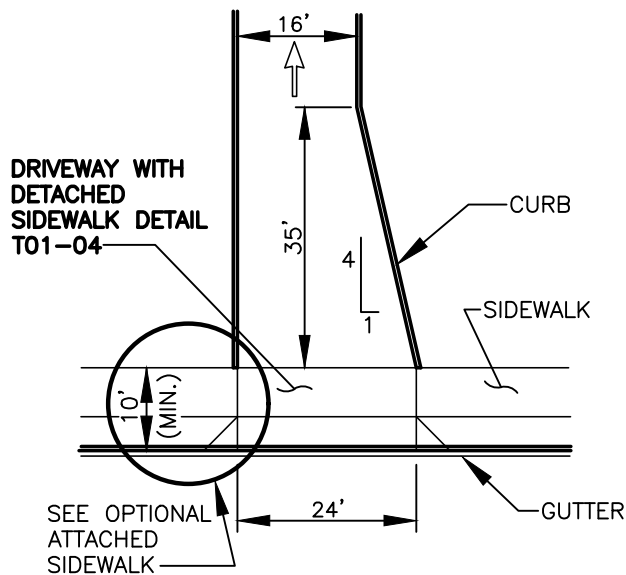
TWO-WAY INGRESS (CL-1)



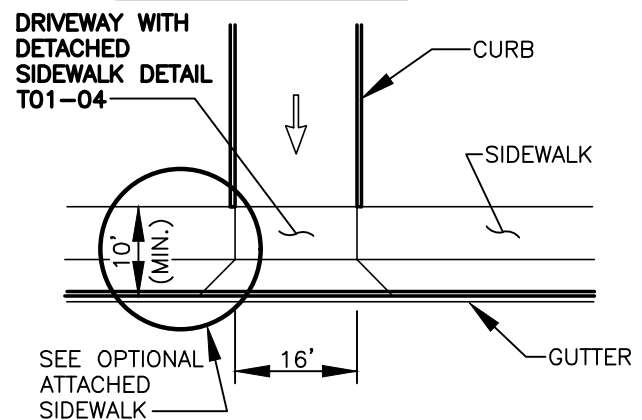
TWO-WAY TWO EGRESS LANES (CL-2)



ATTACHED SIDEWALK



ONE-WAY INGRESS (CL-3)



ONE-WAY EGRESS (CL-4)

NOTES:

1. MINIMUM DRIVE LENGTH IS 20 FEET, MEASURED FROM THE BACK OF SIDEWALK TO THE ENTRANCE OF THE OFF STREET PARKING AREA.
2. DIMENSIONS MAY VARY WITH ANALYSIS OF THE TURNING MOVEMENTS OF THE TYPICAL VEHICLE.



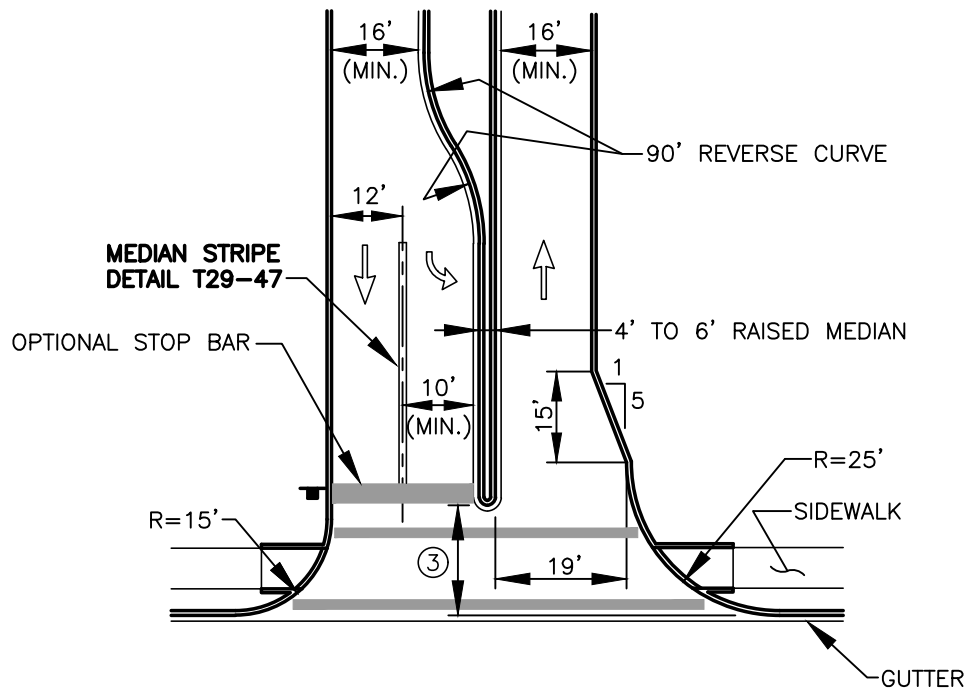
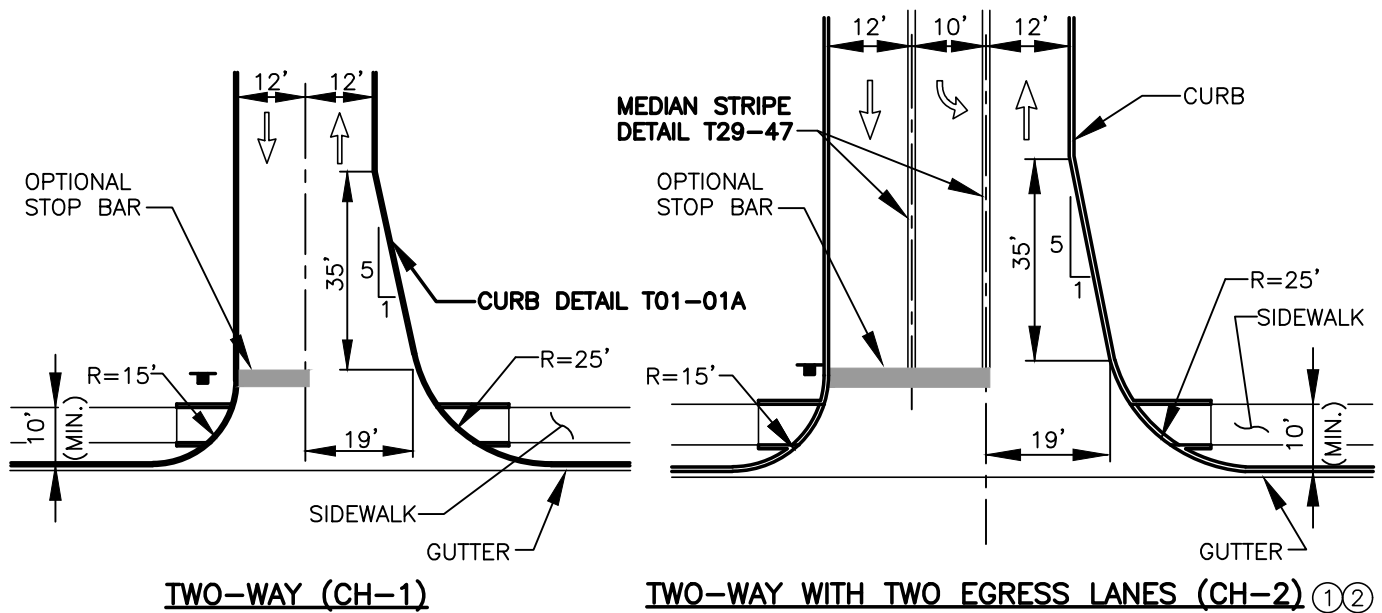
COMMERCIAL / LOW VOLUME DRIVEWAYS

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T04-08



- ① PREFERRED TWO-WAY DRIVE OPPOSITE MEDIAN OPENINGS.
- ② PREFERRED TWO WAY DRIVE FOR INDUSTRIAL USES ON HIGH VOLUME STREETS.
- ③ RAISED MEDIAN SET BACK FROM STREET TO ALLOW PEDESTRIAN TRAFFIC.

NOTES:

1. MINIMUM DRIVE LENGTH IS 20 FEET, MEASURED FROM THE BACK OF SIDEWALK TO THE ENTRANCE OF THE OFF STREET PARKING AREA.
2. DIMENSIONS MAY VARY WITH ANALYSIS OF THE TURNING MOVEMENTS OF THE TYPICAL VEHICLE.



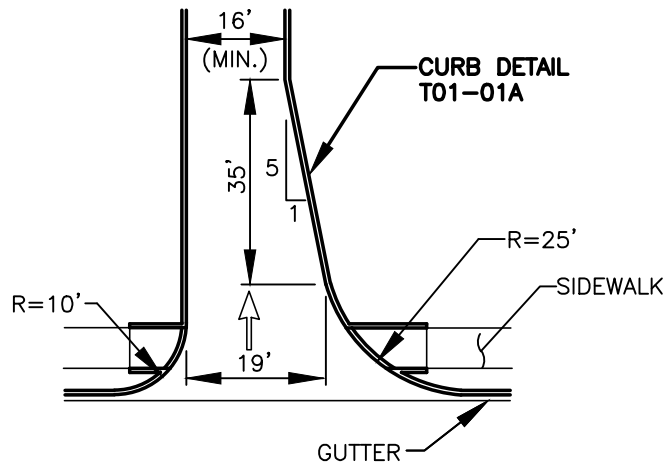
COMMERCIAL / HIGH VOLUME TWO-WAY DRIVEWAYS

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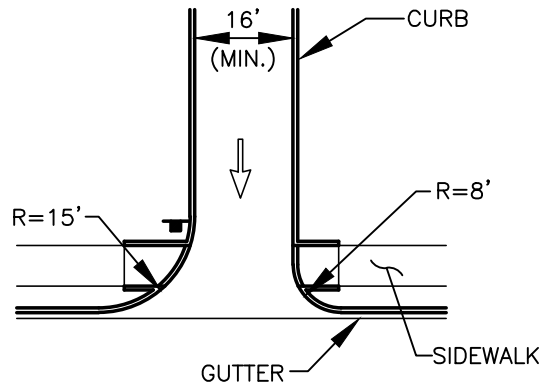
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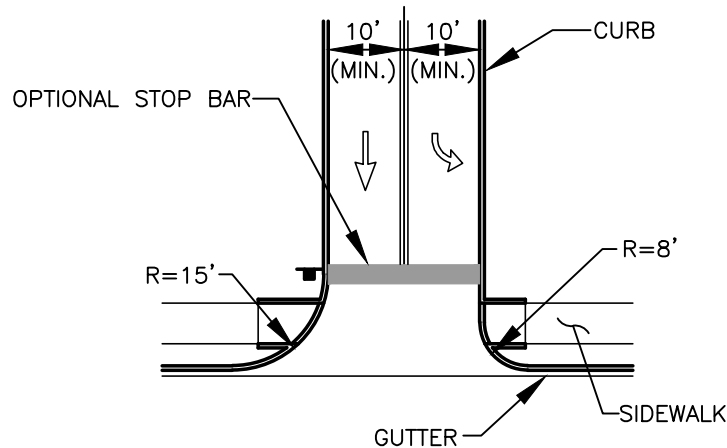
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ONE-WAY INGRESS (CI-1)



ONE-WAY EGRESS (CI-2)



TWO LANES ONE-WAY EGRESS (CI-3)

NOTES:

1. MINIMUM DRIVE LENGTH IS 20 FEET, MEASURED FROM THE BACK OF SIDEWALK TO THE ENTRANCE OF THE OFF STREET PARKING AREA.
2. DIMENSIONS MAY VARY WITH ANALYSIS OF THE TURNING MOVEMENTS OF THE TYPICAL VEHICLE.



COMMERCIAL / HIGH VOLUME ONE-WAY DRIVEWAYS

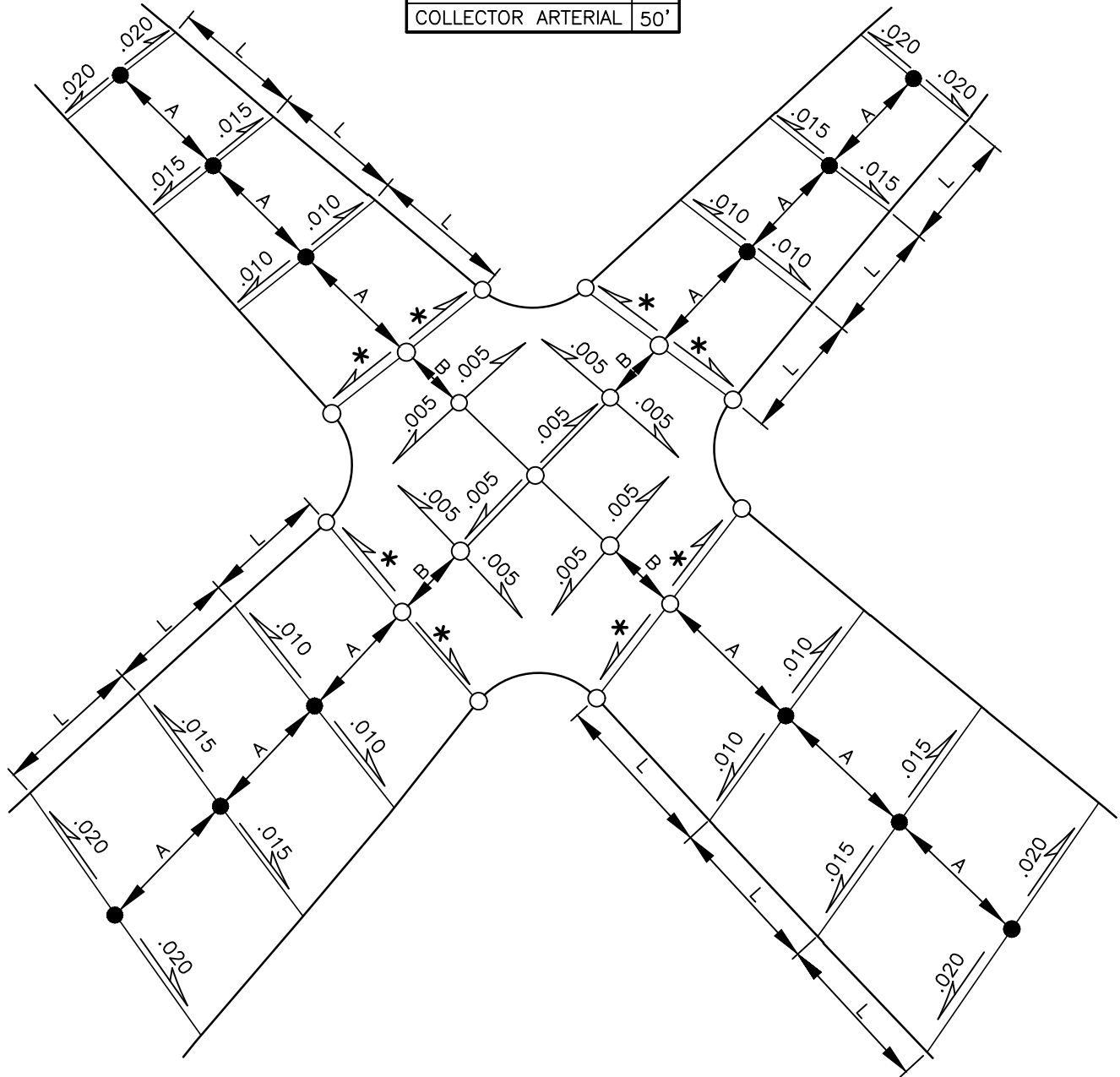
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T04-10

STREET TYPE	L
MAJOR ARTERIAL	50'
MINOR ARTERIAL	40'
COLLECTOR ARTERIAL	50'



LEGEND:

- = AS REQUIRED TO MATCH PROPORTIONATE CHANGE
- = NORMAL CENTERLINE GRADE
- = NOT TO EXCEED .005 IN EITHER DIRECTION
- = GRADE BREAK GREATER THAN .01 MAY REQUIRE VERTICAL CURVE
- = GRADE BREAK NOT TO EXCEED .01

NOTE:

SLOPES ARE EXPRESSED IN FT./FT.



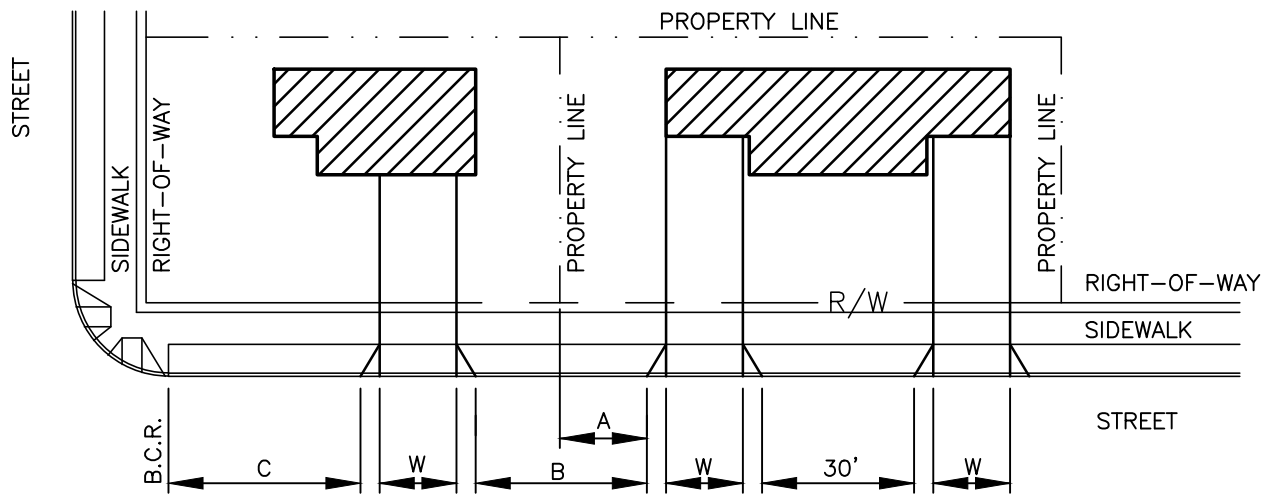
INTERSECTION CROSS SLOPES AND CROWN RUN-OFF

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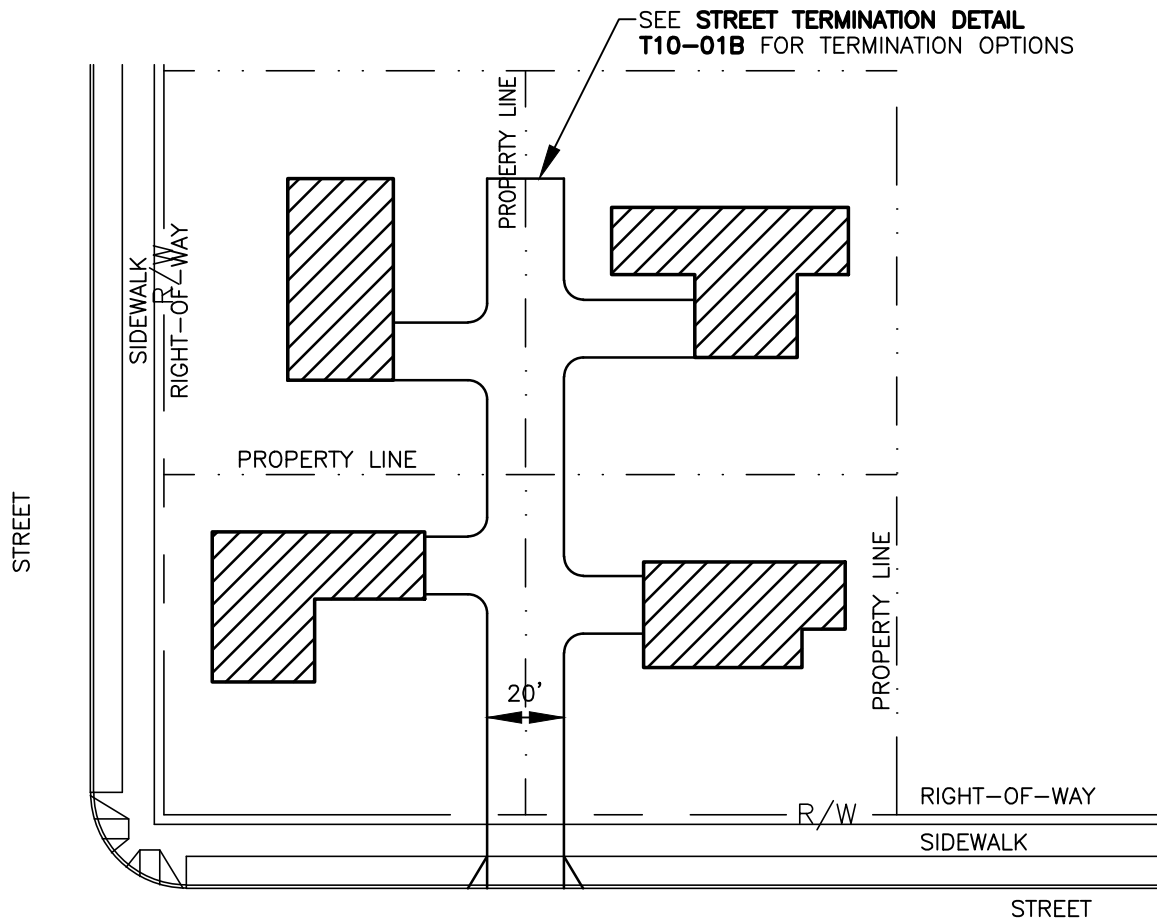
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	MINIMUM DISTANCE
A	5 FEET
B	10 FEET
C	30 FEET
W	DRIVEWAY WIDTH

NON-ARTERIAL STREETS – RESIDENTIAL POLICY
REGULATIONS FOR CURB OPENING AND DRIVEWAYS



NON-ARTERIAL STREETS – RESIDENTIAL POLICY
FLAG-STEM AND SHARED DRIVEWAYS



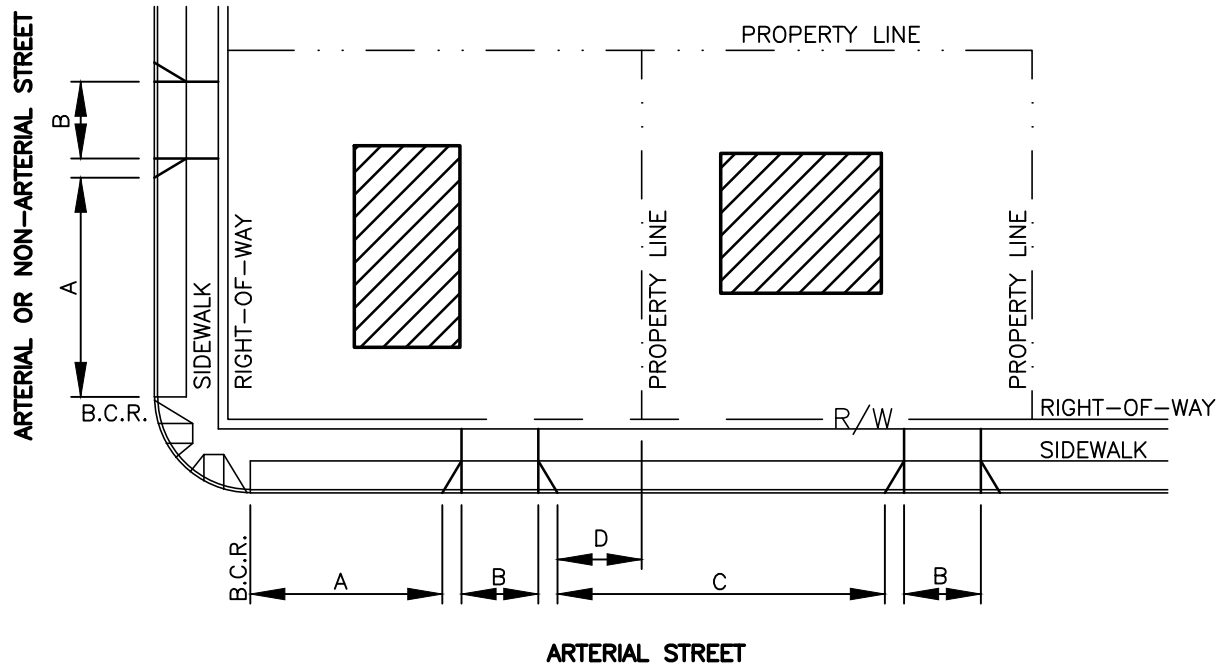
NON-ARTERIAL STREET DRIVEWAY POLICY

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TYPE OF ARTERIAL	A	B ^③	C	D ^②
PRINCIPAL	115'	30'①	115'	20'
MINOR	75'	30'	75'	15'
COLLECTOR	50'	25'	50'	10'

LEGEND:

- ① IF 3 LANES ARE PROPOSED, DRIVEWAY WIDTH MAY BE 40'.
- ② SHARED DRIVEWAYS AT PROPERTY LINES ARE ENCOURAGED.
- ③ SEE VMC 11.90.110.A FOR ADDITIONAL INFORMATION.

A = DISTANCE FROM CORNER BACK-OF-CURB-RETURN TO DRIVEWAY.

B = DRIVEWAY WIDTH. DISTANCE BETWEEN DRIVEWAYS.

C = DISTANCE BETWEEN DRIVEWAYS.

D = DISTANCE FROM PROPERTY LINE.

RESIDENTIAL/COMMERCIAL DRIVEWAY WIDTHS FOR ARTERIAL STREETS



ARTERIAL STREETS RESIDENTIAL / COMMERCIAL DRIVEWAY WIDTHS

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