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## SUMMARY OF STREET STANDARDS

<u>STREET CLASSIFICATIONS</u>	<u>CROSS SECTION</u>	<u>EASEMENT / ROW</u>	<u>PAVEMENT WIDTH (B/B)</u>	<u>AVERAGE DAILY TRAFFIC</u>
PRIVATE STREET	CURB	40' EASEMENT	24'	< 400
	DITCH	60' EASEMENT	20'	< 400
STANDARD RESIDENTIAL	CURB	50'	28'	< 1,500
	DITCH	60'	22'	< 1,500
COLLECTOR	CURB	60'	36'	1,500 - 3,500
	DITCH	70'	34'	1,500 - 3,500
PLANNED INDUSTRIAL	DITCH	80'	28'	N/A
MINOR THOROUGHFARE	CURB	80'	65'	5,000 - 10,000
MAJOR THOROUGHFARE	CURB	100'+	VARIABLE	10,000 +
	<u>STD. C&amp;G</u>	<u>ROLL C&amp;G</u>	<u>NON CURB &amp; GUTTER</u> (outside urban core, single family only)	
MIN. LONGITUDINAL SLOPE	0.3%	0.5%	0.5% (channel flow line) 0.5% (street center line)	
MAX. DEPTH OF FLOW				
THOROUGHFARE	0.3 ft	N/A	N/A	
NON-THOROUGHFARE	0.5 ft	0.3 ft	2 ft	
MIN. DRIVEWAY CULVERT SIZE	N/A	N/A	15"	

### NOTES:

- The minimum longitudinal grade for channel sections may be reduced for cross drainage and at some isolated locations with the approval of the City Engineer. The City Engineer shall have the option of requiring piping for channel's less than 0.8% slope.
- Minimum driveway separation along non-curb and gutter streets shall be 100 feet center to center as measured along the edge of pavement. A shared culvert configuration may be utilized pursuant to standards 422.01 thru 422.07, if the required spacing cannot be obtained.
- Driveways, along standard curb and gutter streets, shall conform to the Driveway Ordinance which requires removal of the complete section of the curb and gutter in lieu of breaking off the backs of curb.
- Driveway culvert sizes for each single family lot shall be determined at time of construction plan approval and shall be recorded on the final plat for each lot.
- The maximum 10-year storm headwater depth for driveway culverts shall not exceed 1.2D or the elevation of the driveway, whichever is less.
- All required channel linings and velocity control devices shall be designed and installed in accordance with the Soil Erosion and Sedimentation Control Ordinance and the North Carolina Erosion and Sediment Control Planning and Design Manual.
- Any street to be City-maintained shall have "Record Drawings" submitted and approved prior to scheduling of the pre-final street acceptance inspection. All "Record Drawings" for streets and storm drainage infrastructure shall include, but not necessarily limited to, the information as identified in the *Street and Storm Drainage "Record Drawings" Submittal Requirements*.



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## SUMMARY OF STREET STANDARDS

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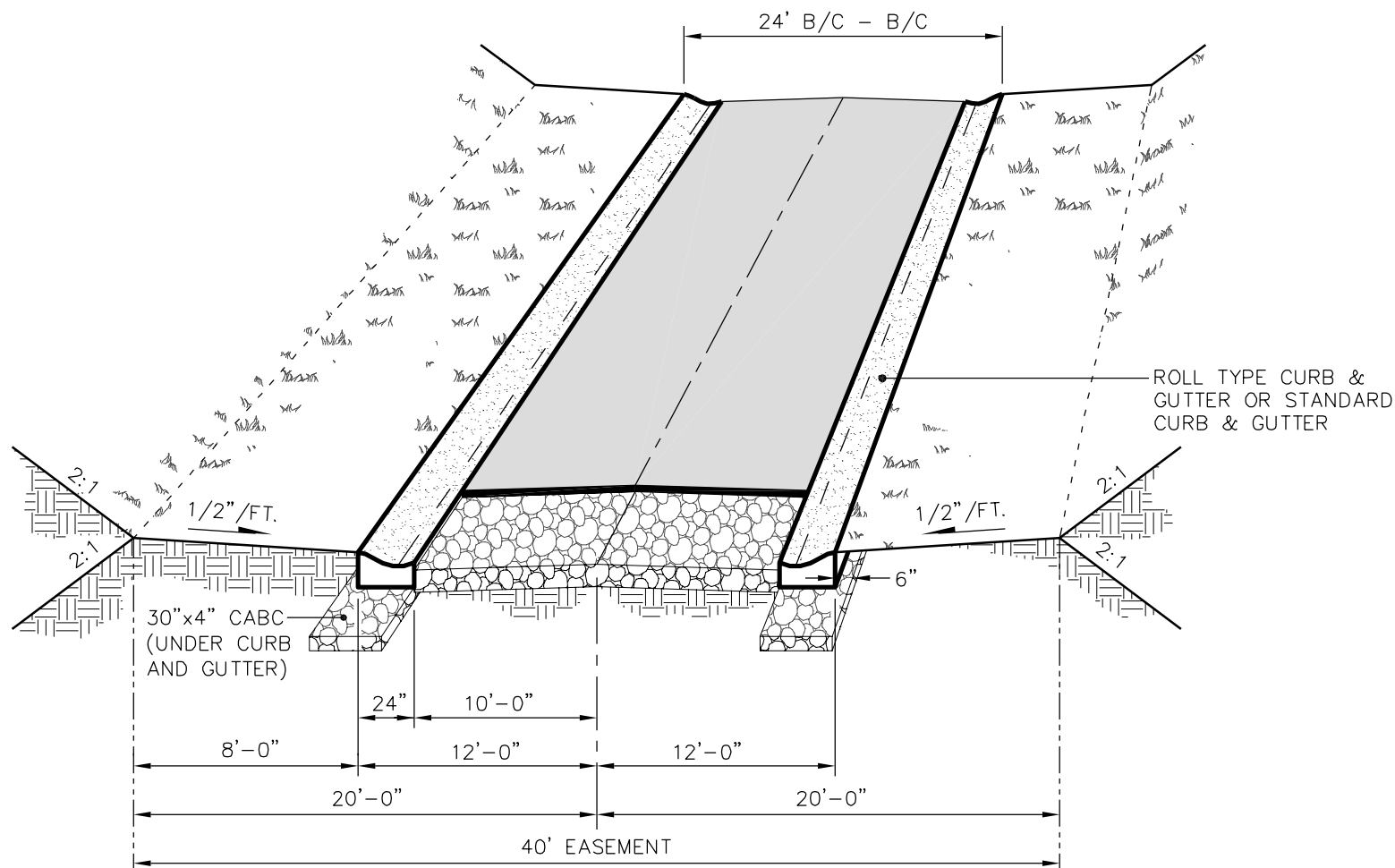
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### TYPICAL CROSS SECTION

"PRIVATE STREET"  
(CURB & GUTTER)

#### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. May only be used in cases where projected traffic volumes will not exceed 400 ADT based on trip generation factors shown on Std. detail No. 491.02.



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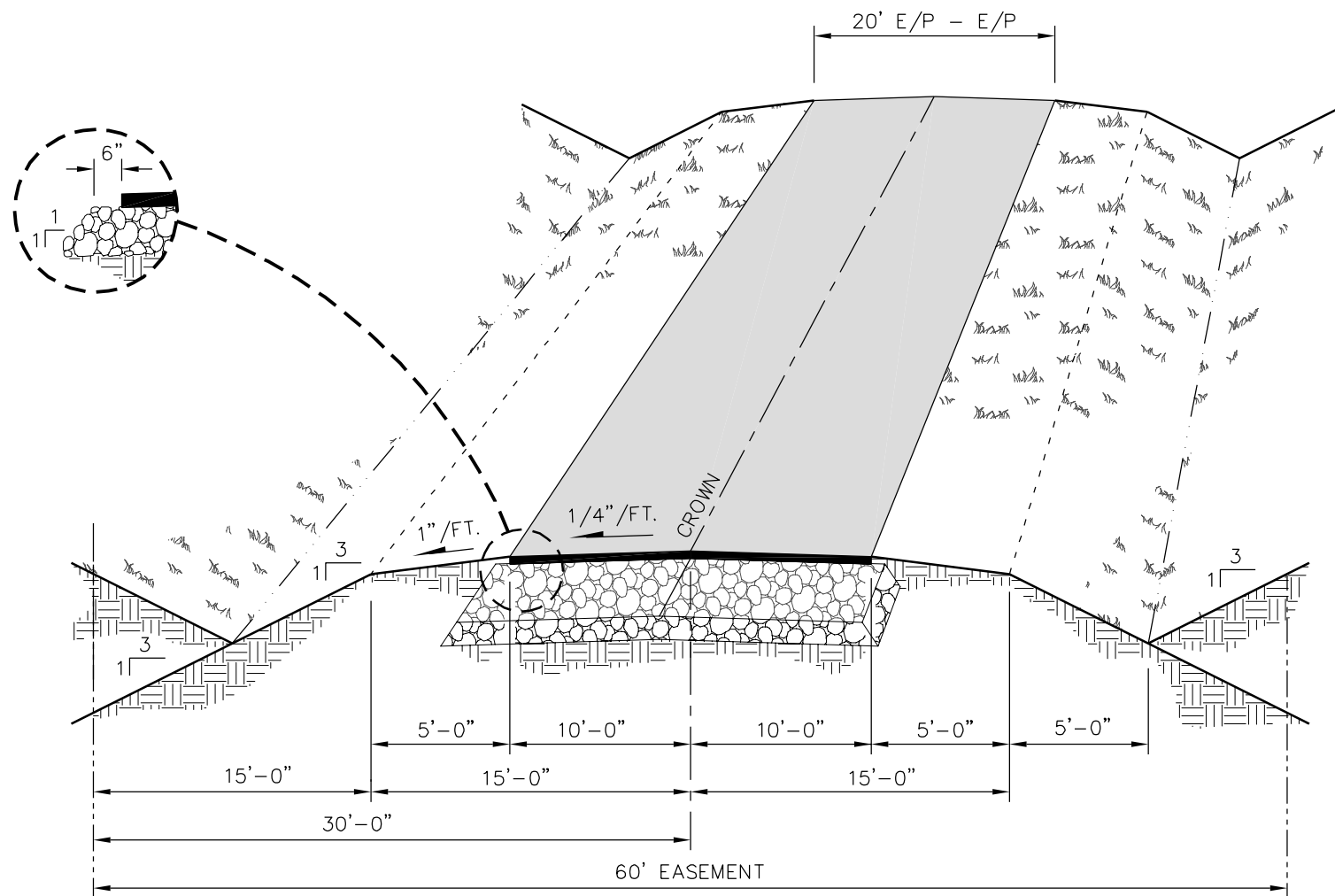
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**PRIVATE STREET (CURB & GUTTER)**



### TYPICAL CROSS SECTION

"PRIVATE STREET"  
(NON-CURB & GUTTER)

#### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. May only be used in cases where projected traffic volumes will not exceed 400 ADT based on trip generation factors shown on Std. detail No. 491.02.



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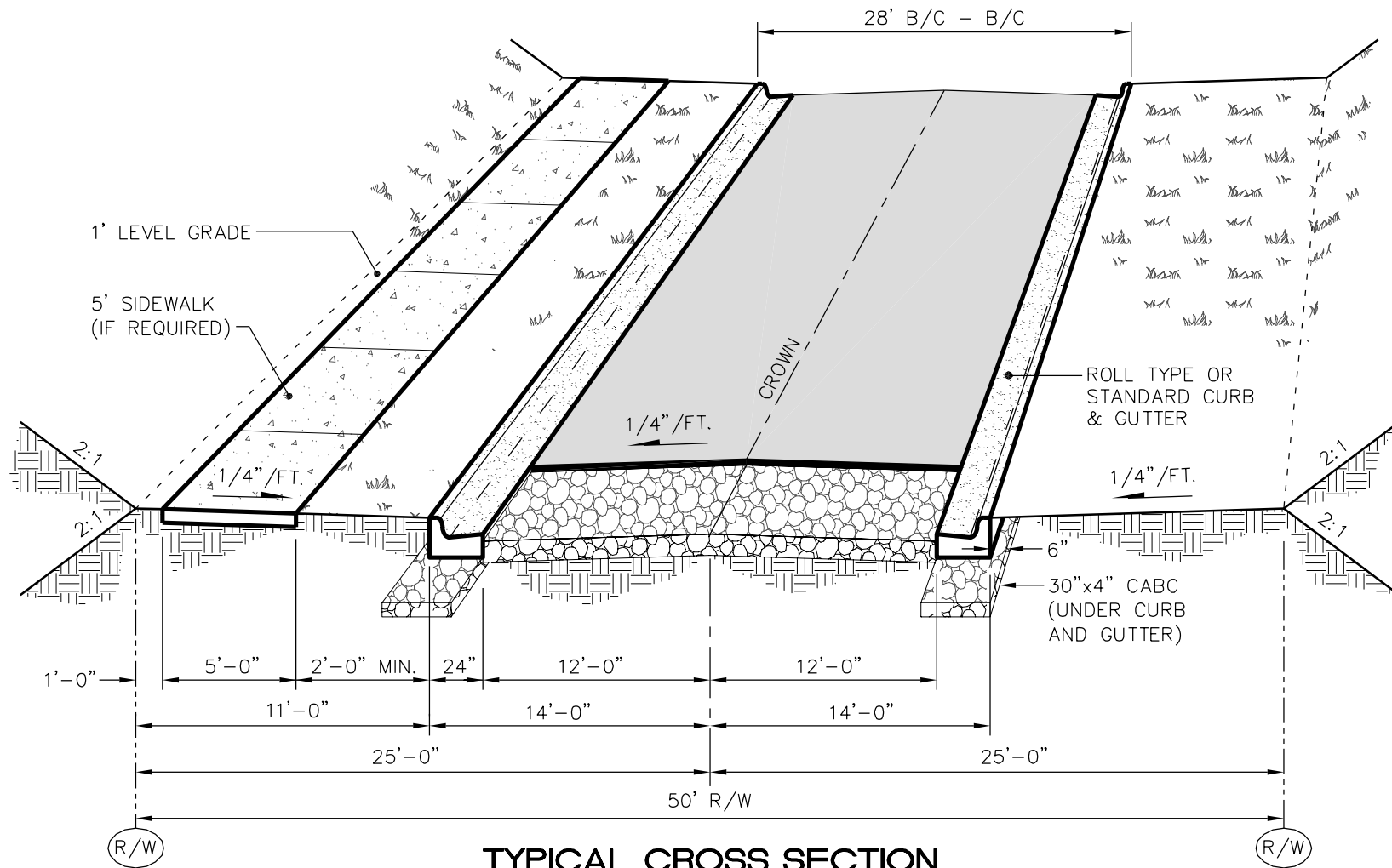
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**PRIVATE STREET (NON-CURB & GUTTER)**



### TYPICAL CROSS SECTION

"STANDARD RESIDENTIAL STREET"  
(CURB & GUTTER)

#### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. May only be used in cases where projected traffic volumes will not exceed 1500 ADT based on trip generation factors shown on Std. detail No. 491.02.



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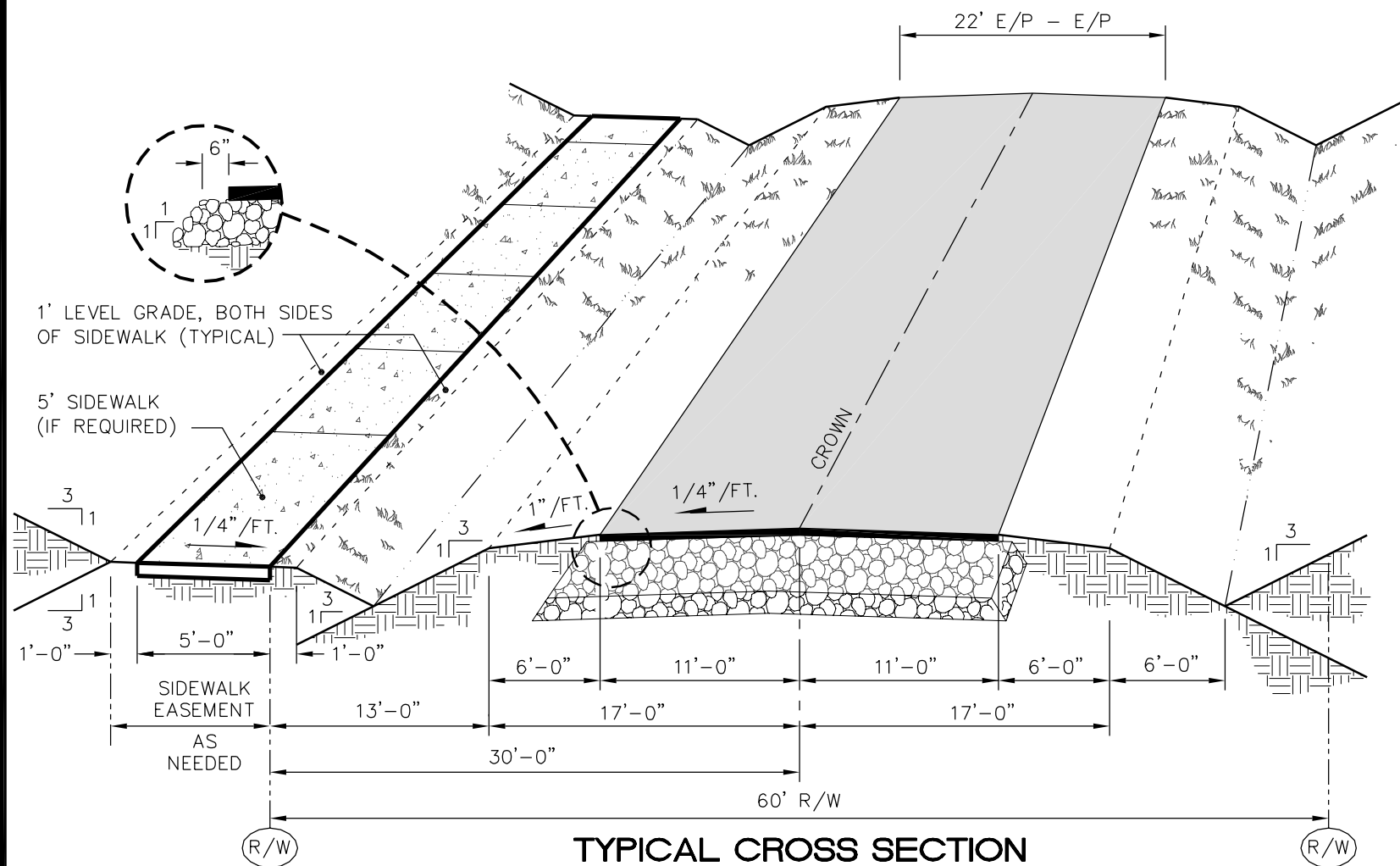
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**STANDARD RESIDENTIAL STREET (CURB & GUTTER)**



## TYPICAL CROSS SECTION

"STANDARD RESIDENTIAL STREET"  
(NON-CURB & GUTTER)

### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. May only be used in cases where projected traffic volumes will not exceed 1500 ADT based on trip generation factors shown on Std. detail No. 491.02.
3. Tie-in slopes may be shallower, however all drainage must be maintained within R/W.



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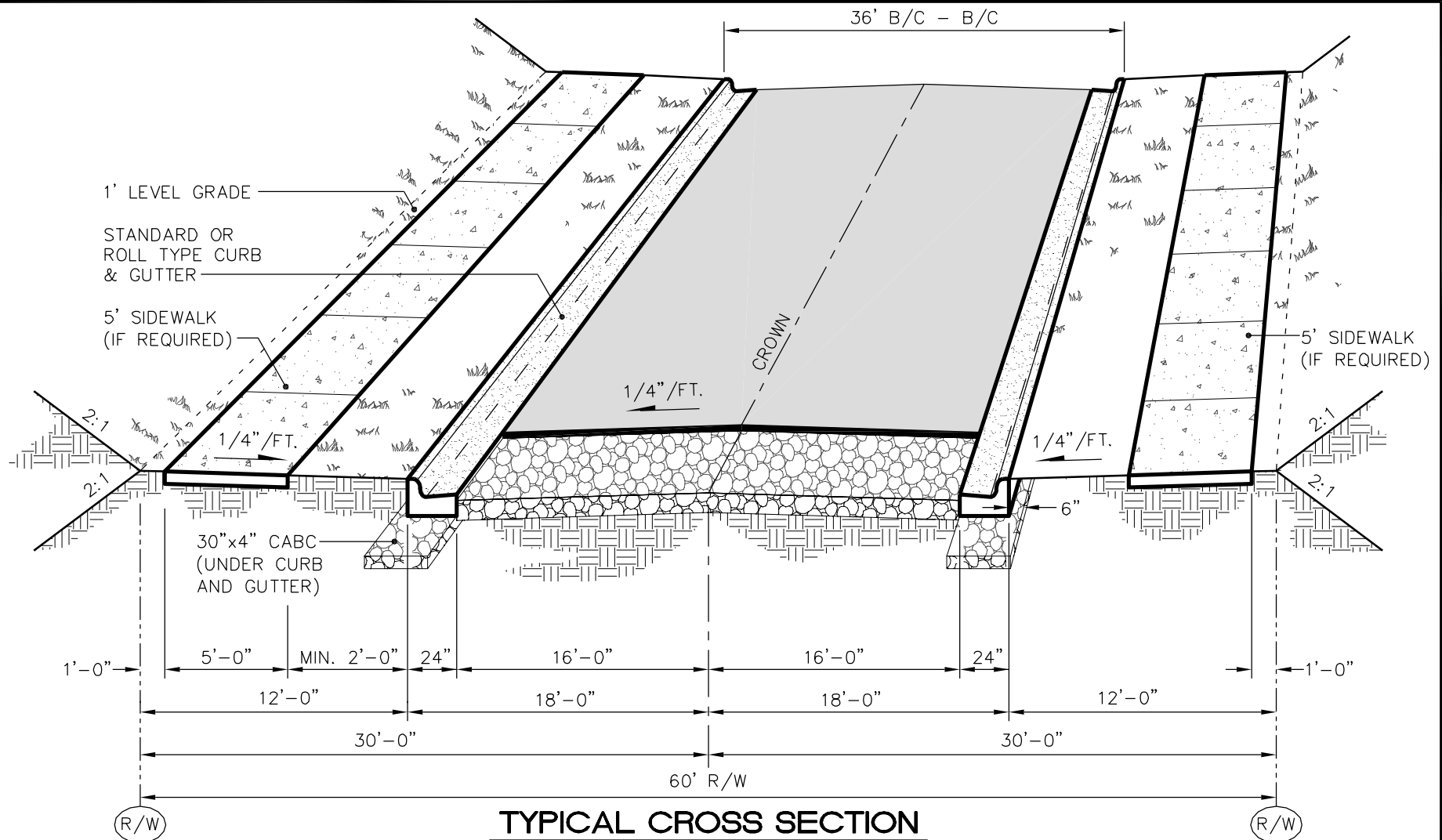
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**STANDARD RESIDENTIAL STREET (NON-CURB & GUTTER)**



### TYPICAL CROSS SECTION

"COLLECTOR STREET"  
(CURB & GUTTER)

#### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. May only be used in cases where projected traffic volumes will not exceed 1500 - 3500 ADT based on trip generation factors shown on Std. detail No. 491.02.



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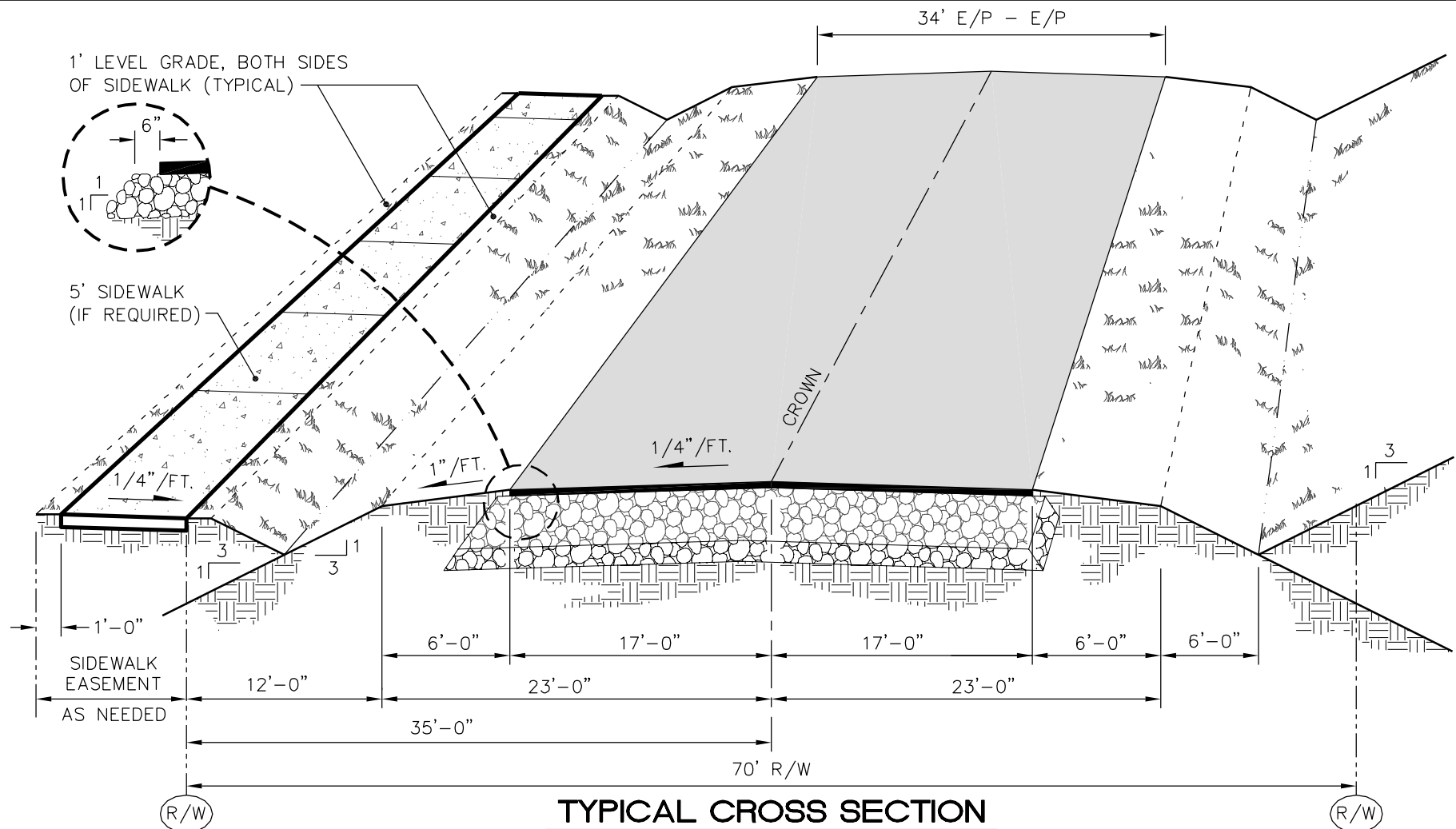
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**COLLECTOR STREET (CURB & GUTTER)**





### TYPICAL CROSS SECTION

"COLLECTOR STREET"  
(NON-CURB & GUTTER)

#### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. May only be used in cases where projected traffic volumes will not exceed 1500 - 3500 ADT based on trip generation factors shown on Std. detail No. 491.02.
3. Tie-in slopes may be shallower, however all drainage must be maintained within R/W.



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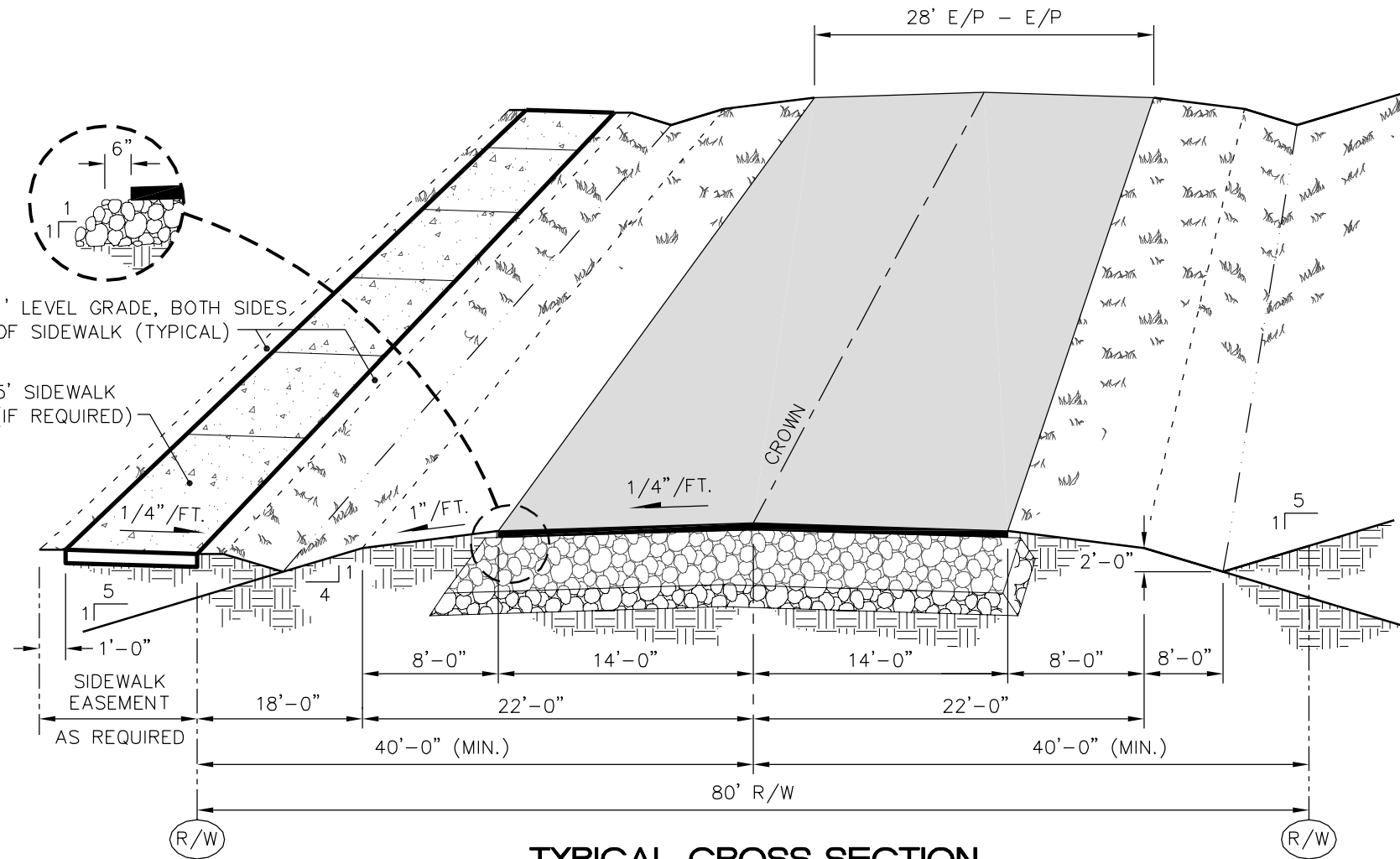
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**COLLECTOR STREET (NON-CURB & GUTTER)**



## TYPICAL CROSS SECTION

"PLANNED INDUSTRIAL STREET"  
(NON-CURB & GUTTER)

### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.



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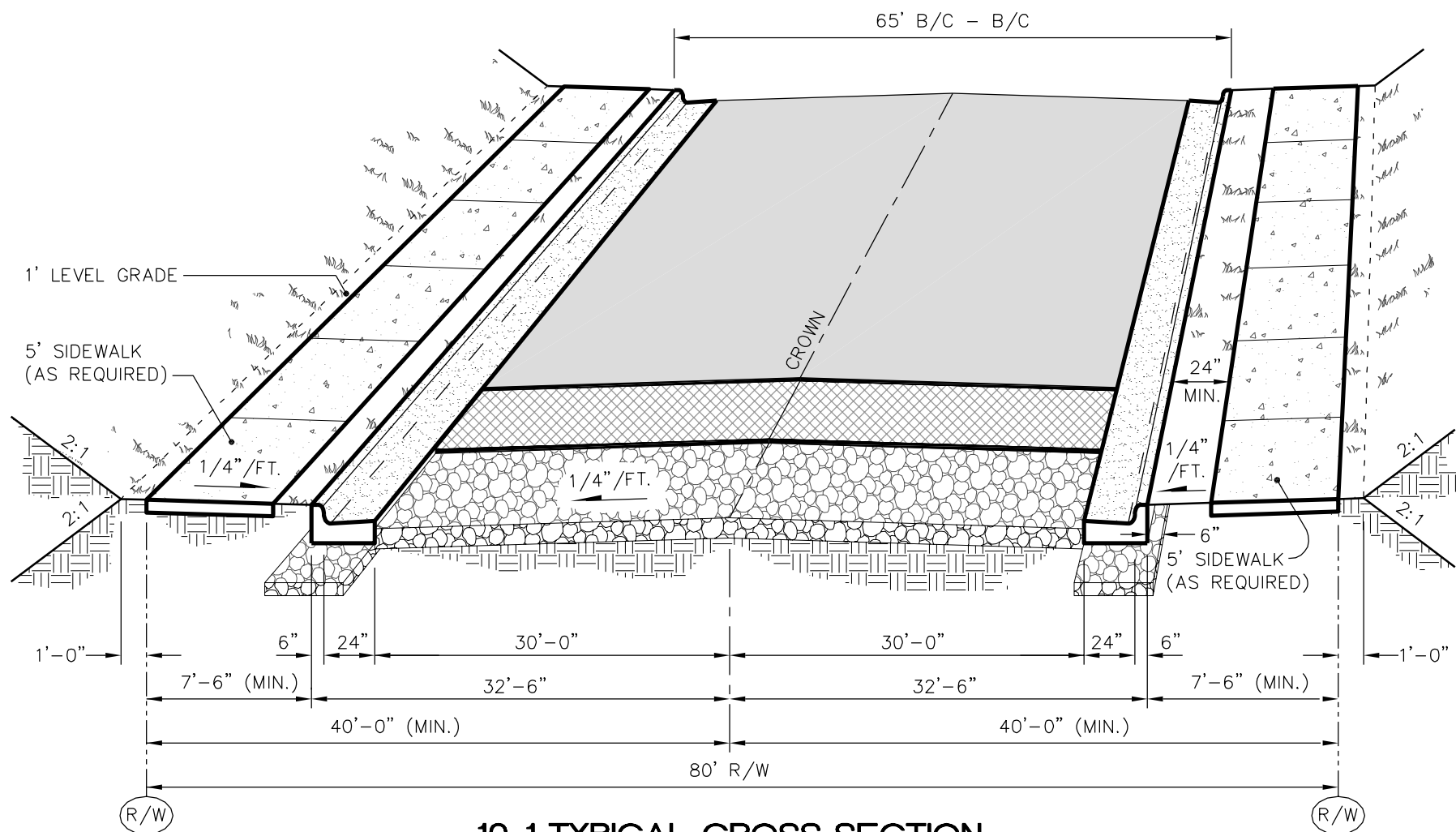
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**PLANNED INDUSTRIAL STREET (NON-CURB & GUTTER)**



**10-1 TYPICAL CROSS SECTION**  
**"MINOR THOROUGHFARE"**

### NOTES:

1. Pavement design to be according to procedure described in Std. detail No. 490.01.
2. Pavement markings to be determined as part of the review process & must comply with MUTCD.



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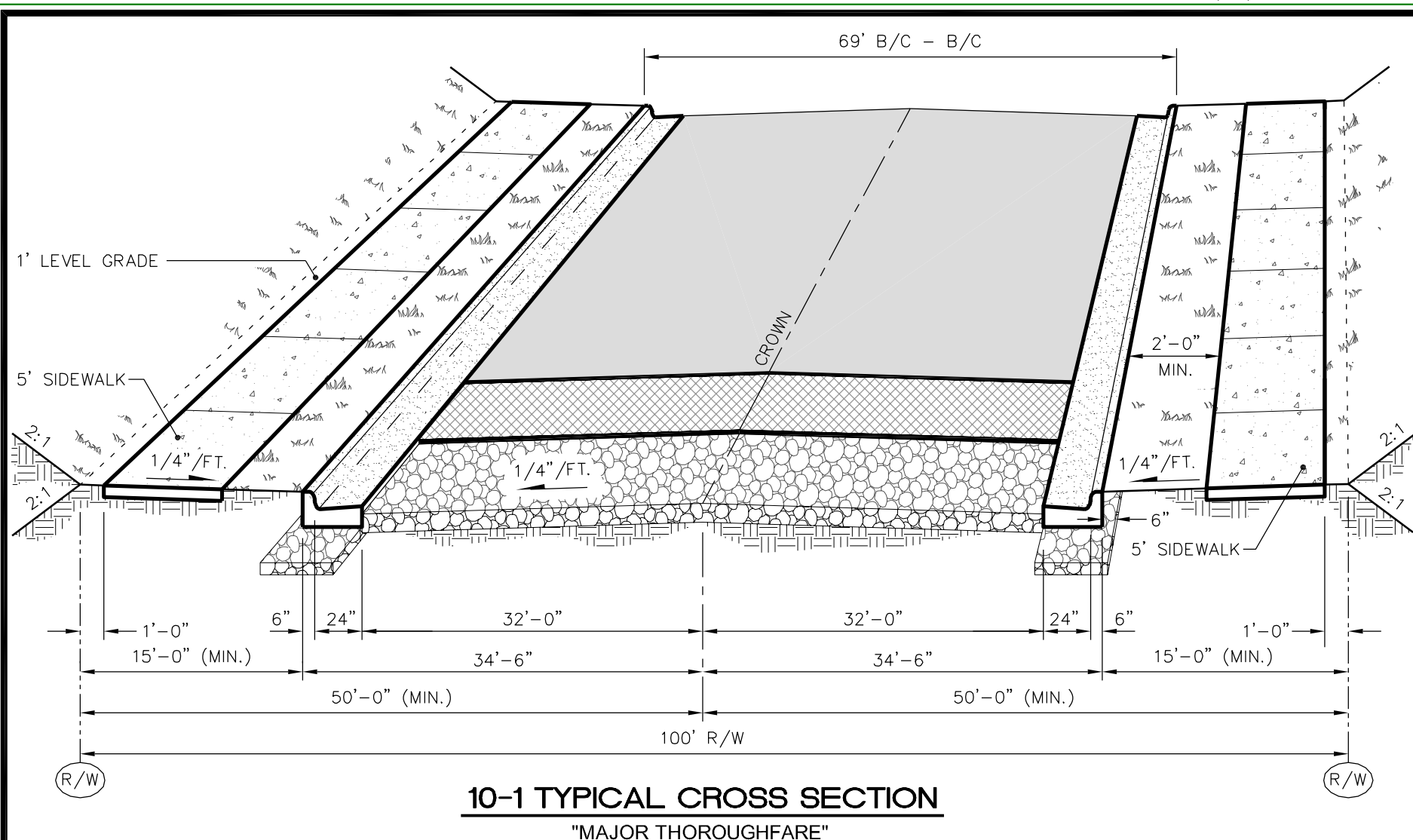
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**STANDARD TYPICAL SECTION - MINOR THOROUGHFARE**

**NOTES:**

1. Pavement schedule to be determined by the City Engineering Department.



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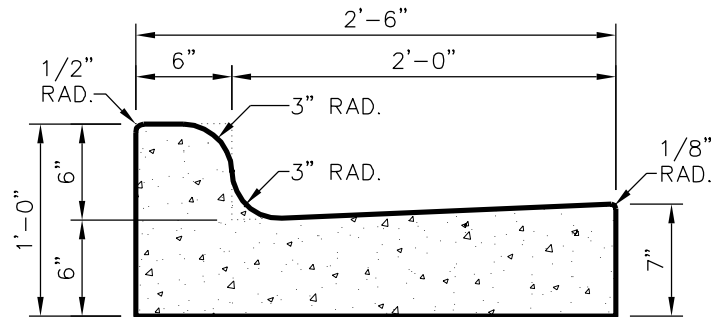
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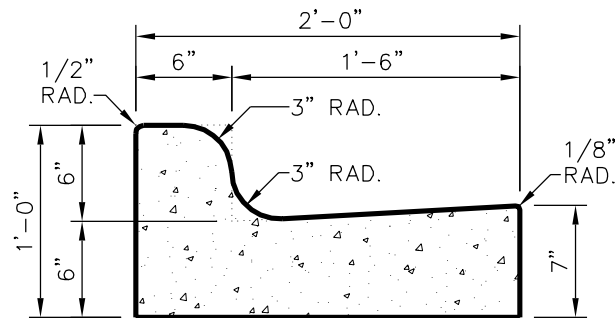
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**STANDARD TYPICAL SECTION - MAJOR THOROUGHFARE**



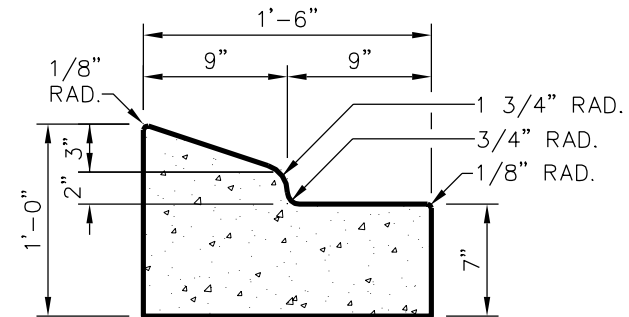
### 2'-6" CURB AND GUTTER

30" CURB AND GUTTER SHALL BE PLACED IN NCDOT R/W.



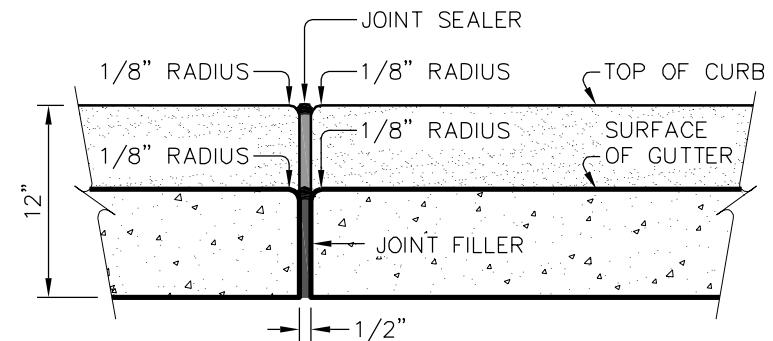
### 2'-0" CURB AND GUTTER

24" CURB AND GUTTER SHALL BE PLACED IN RESIDENTIAL DEVELOPMENTS OR AS PROVIDED IN SEC. 490 OF THIS MANUAL.



### 1'-6" CURB AND GUTTER

(TO BE USED IN MEDIANS ONLY)



### TRANSVERSE EXPANSION JOINT IN CURB AND GUTTER

## NOTES:

1. Contraction joints shall be placed at 10' intervals, except that 15' spacing may be used when a machine is used or when satisfactory support for the face form can be obtained without the use of templates at 10' intervals. Joint spacing may be altered by the engineer to prevent uncontrolled cracking.
2. Contraction joints may be installed by the use of templates or formed by other approved methods. Where such joints are not formed by templates, a minimum depth of 1 1/2" shall be obtained.
3. All contraction joints shall be filled with joint filler.
4. Expansion joints shall be spaced at 90' intervals, and adjacent to all rigid objects.
5. All curb and gutters are to be poured with class "A" concrete (3,000 PSI).
6. Flexible forms are to be used when radius is less than 200'.



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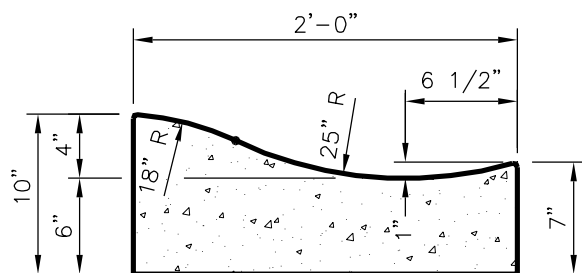
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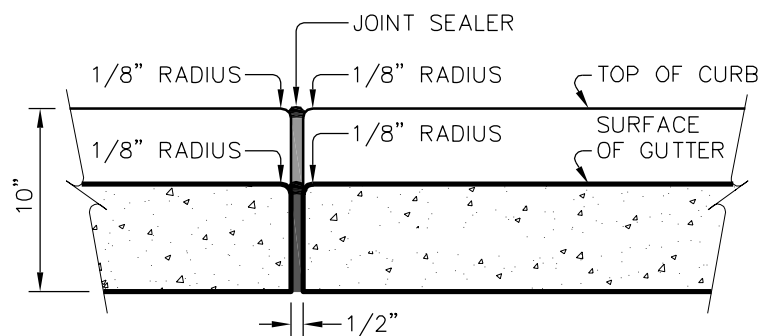
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## STANDARD CURB & GUTTER



**ROLL TYPE CURB AND GUTTER**



**TRANSVERSE EXPANSION  
JOINT IN CURB AND GUTTER**

### NOTES:

1. Contraction joints shall be placed at 10' intervals, except that 15' spacing may be used when a machine is used or when satisfactory support for the face form can be obtained without the use of templates at 10' intervals. Joint spacing may be altered by the engineer to prevent uncontrolled cracking.
2. Contraction joints may be installed by the use of templates or formed by other approved methods. Where such joints are not formed by templates, a minimum depth of 1 1/2" shall be obtained.
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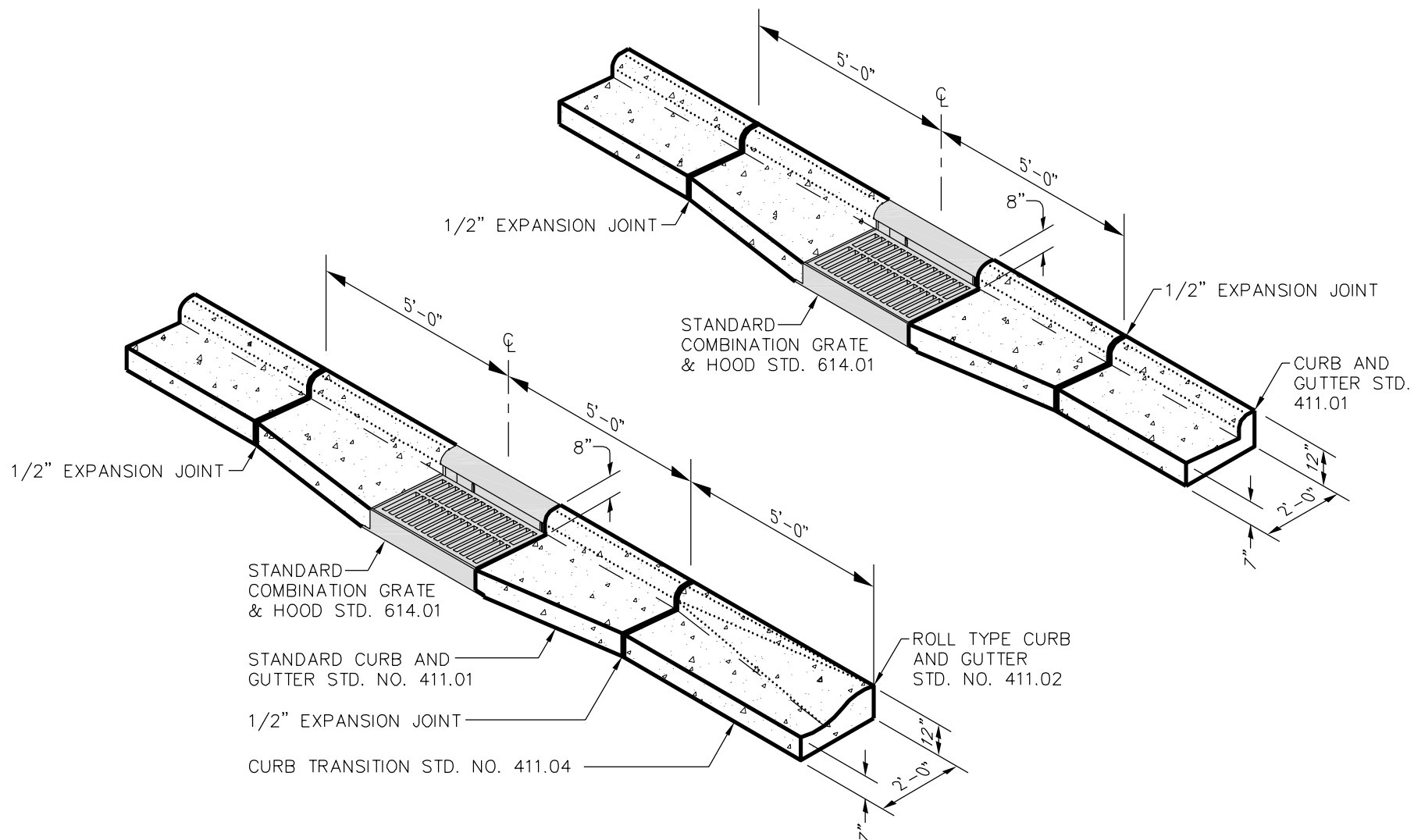
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**STANDARD ROLL-TYPE CURB AND GUTTER**



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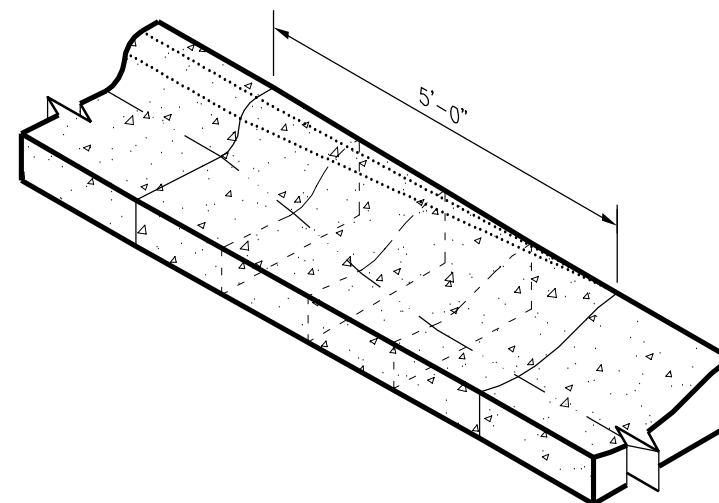
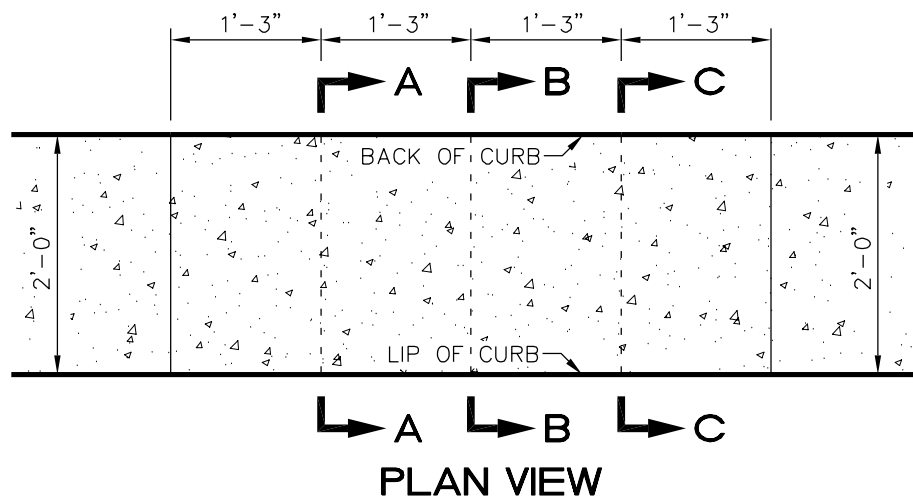
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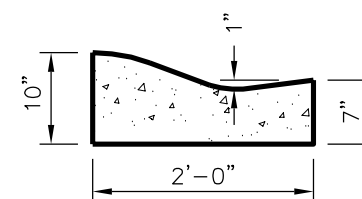
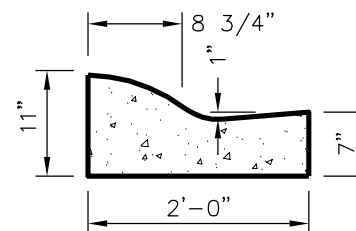
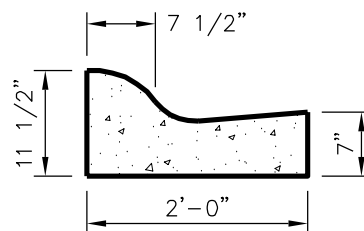
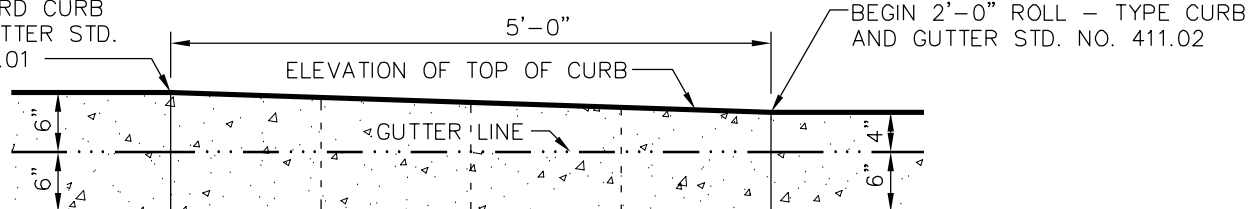
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**STANDARD CATCH BASIN FRAME 2'-0" IN CURB AND GUTTER**



STANDARD CURB  
AND GUTTER STD.  
NO. 411.01



## NOTES:

1. Transition is NOT to be located within the curb radius.



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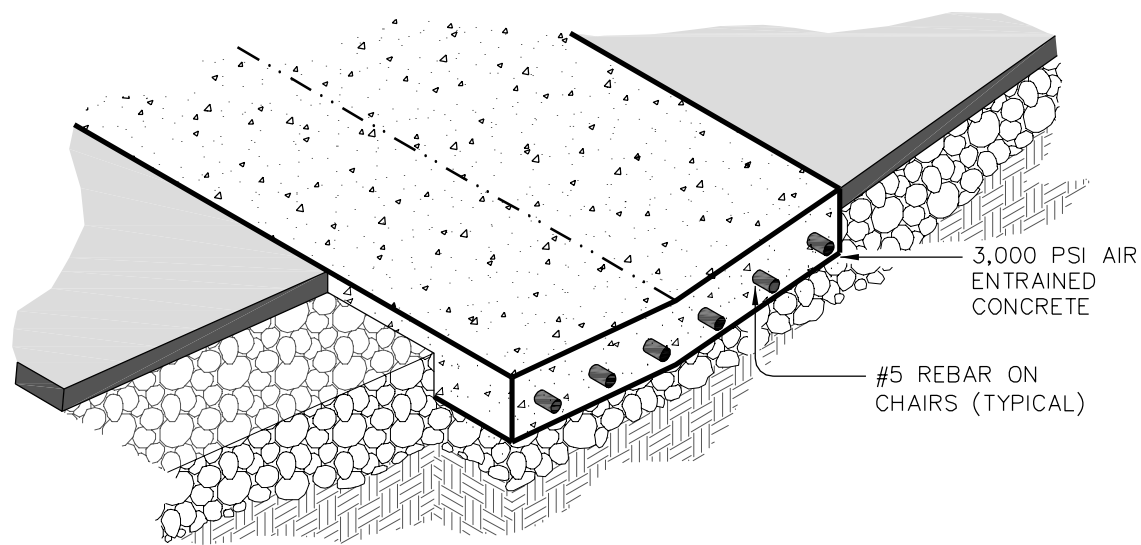
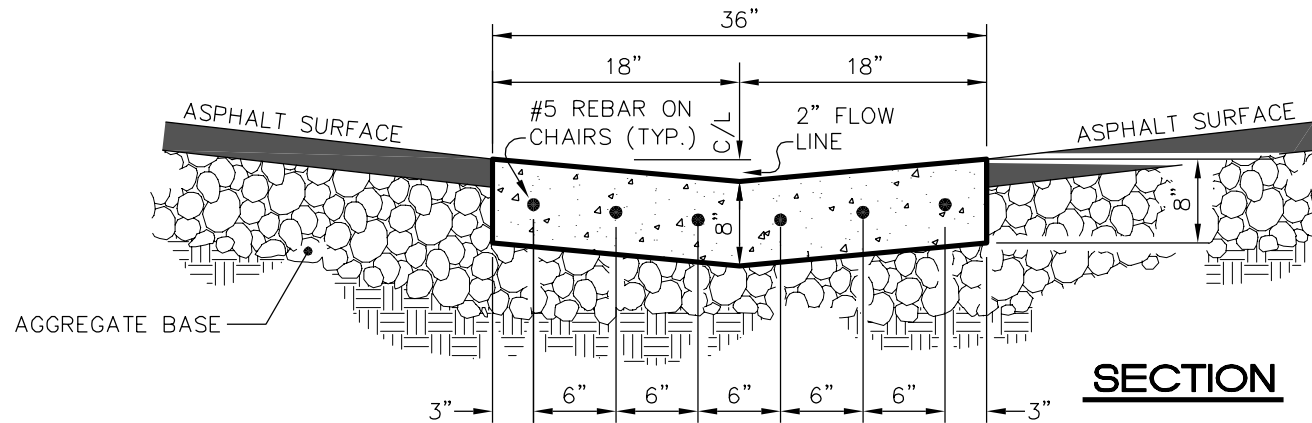
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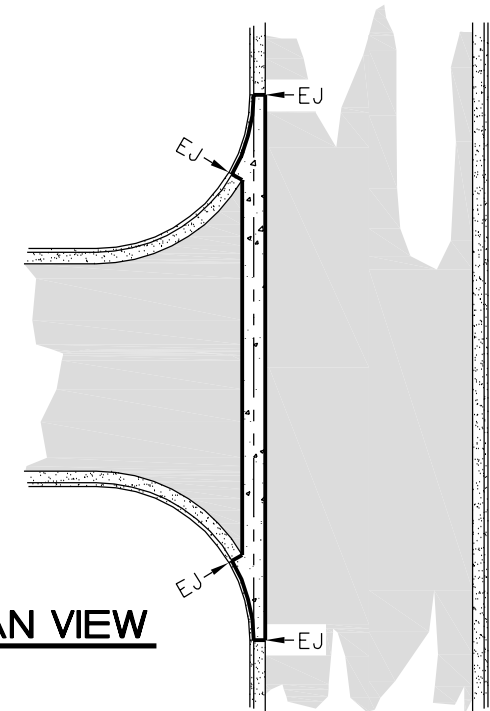
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**CURB TRANSITION - 2'-0" C&G TO 2'-0" ROLL TYPE C&G**





PLAN VIEW



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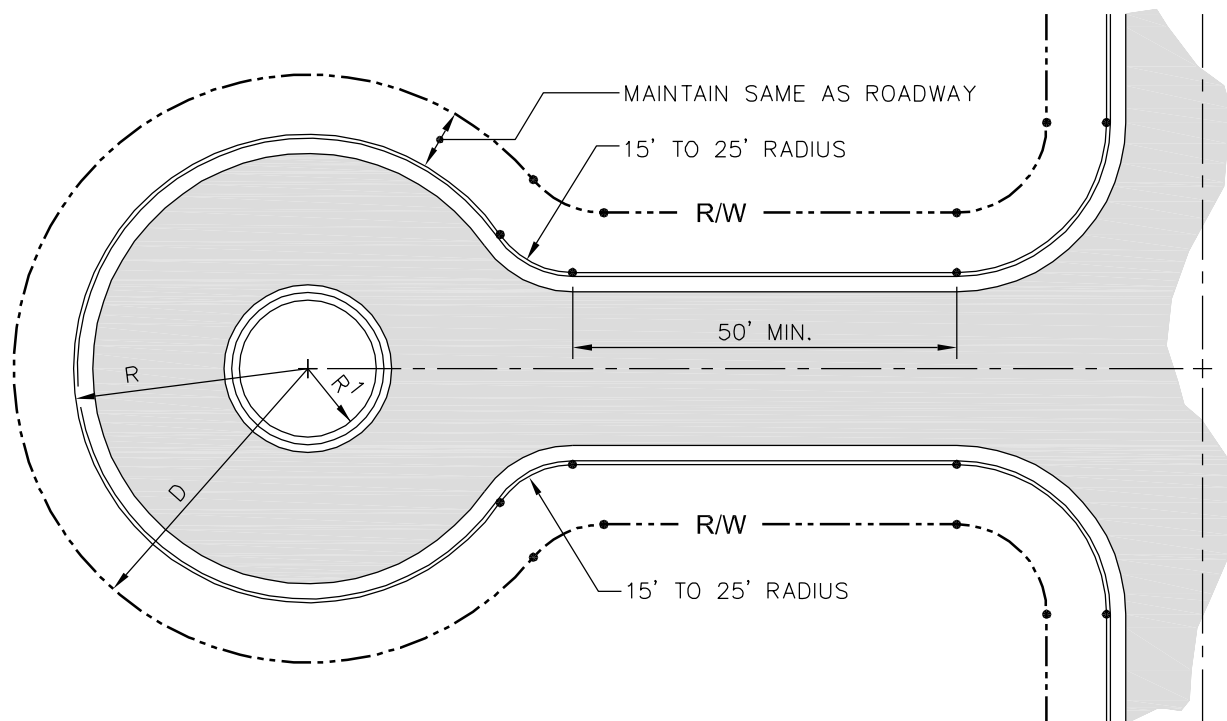
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**CONCRETE VALLEY GUTTER**



## NOTES:

1. Interior island is NOT required.
2. Island is NOT part of R/W (Common Space).
3. Island to be maintained by HOA.
4. No parking in cul-de-sac.
5. Mountable curb on island.
6. Vegetation within island to be reviewed & approved by City Engineer.
7. All dead end access roads in excess of 150 feet shall be provided with a proper fire apparatus turnaround as approved in Appendix D of the latest edition of the North Carolina Fire Code.

R	48.5' TO BACK OF CURB
R <sup>1</sup>	0' TO 15' TO BACK OF CURB
D	VARIES
CUL-DE-SAC MAY BE OFFSET FROM CENTERLINE OF STREET.	



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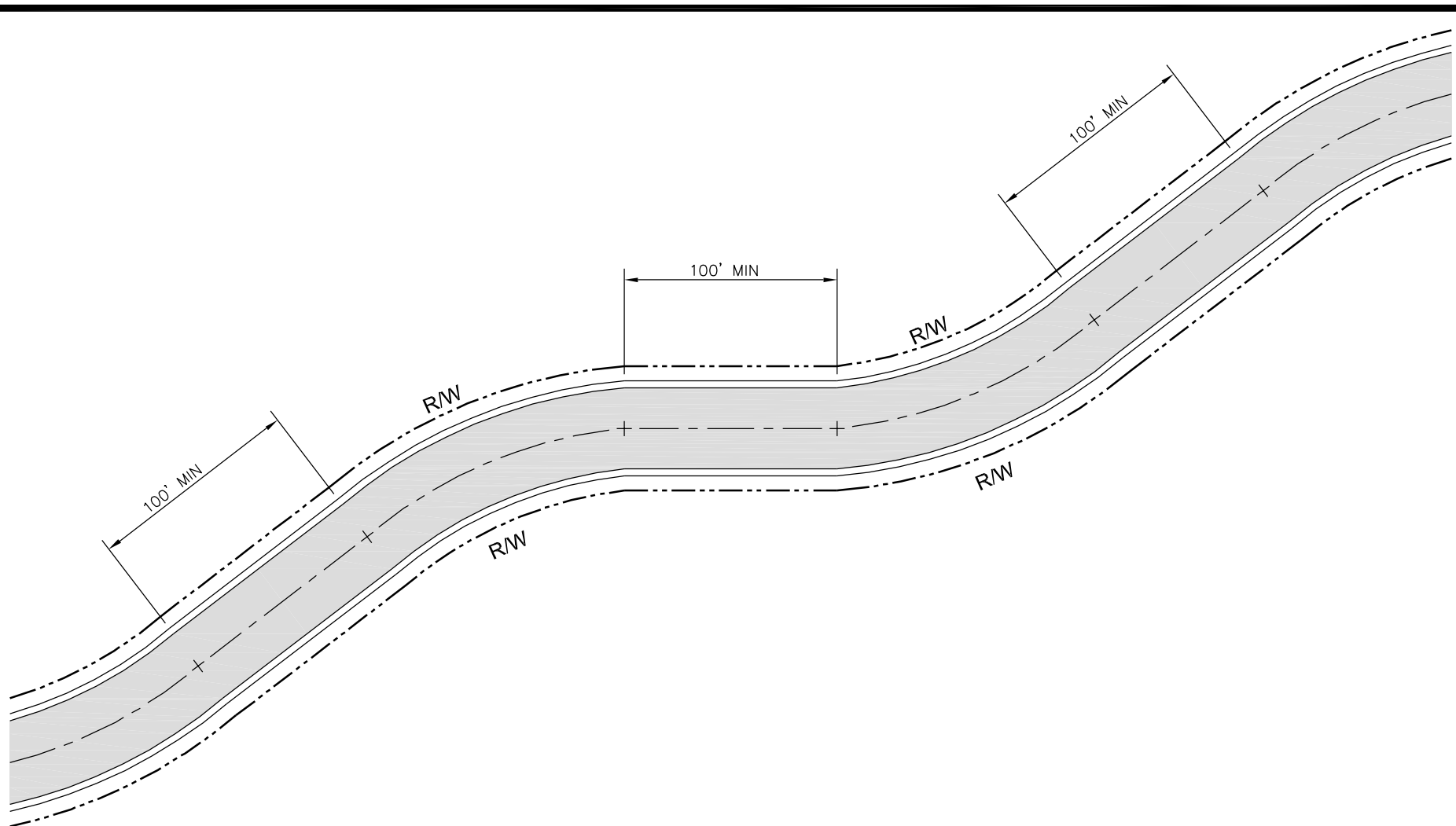
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**STANDARD CUL-DE-SAC**



### NOTES:

1. A minimum of 100 ft. tangent distance is required between reverse curves on residential, collector streets and on all thoroughfares.



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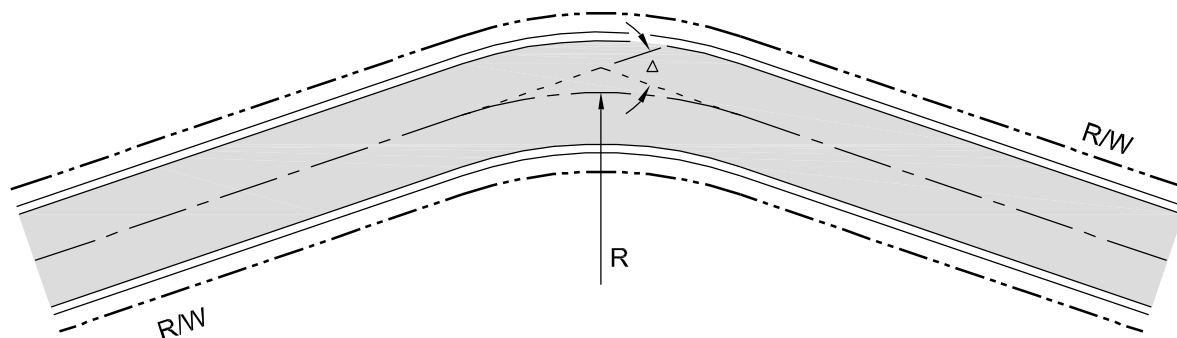
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**TANGENT DISTANCES AT REVERSE CURVES**



## NOTES:

1. When connecting street centerlines deflect from each other at any one point by more than five degrees, ( $\Delta > 5^\circ$ ), they shall be connected by a curve with a radius of not less than 100 feet ( $R \geq 100'$ ) for residential streets. For collector streets and thoroughfares, the radius should be sufficient to ensure a sight distance adequate for visibility and safety, considering the character of the street and the types and speed of traffic anticipated, but in no case shall such radius be less than 200 feet ( $R \geq 200'$ ).



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**CURVE RADIUS AT DEFLECTING STREET LINES**

## VERTICAL CURVE TABLE

DESIGN SPEED (mph)	MIN. STOPPING SIGHT DISTANCE (ft)	MIN. C/L RADIUS (ft)	K (crest) (deg)	K (sag) (deg)	K (stop) (deg)
25	155	150	26	26	12
30	200	230	37	37	19
35	250	340	49	49	29
40	305	475	64	64	44
45	360	640	79	79	61
50	425	825	96	96	84
55	495	1050	115	115	114



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## VERTICAL CURVE DESIGN TABLE

**NOTES:**

1. Construct the walking surface of the detectable domes with slip resistance and a 70% contrasting color to the sidewalk.
2. Crosswalk widths and configuration vary but must conform to traffic design standards.
3. Provide curb ramps at locations as shown on the plans or as directed by the engineer. Locate curb ramps as directed by the engineer where existing light poles, fire hydrants, drop inlets, etc. affect placement. Where two ramps are installed place not less than 2 feet of full height curb between the ramps. Place dual ramps as near perpendicular to the travel lane being crossed as possible.
4. Do not exceed 0.08 ft./ft. (12:1) slope on the curb ramp in relationship to the grade of the street.
5. Construct curb ramps a minimum of 48" wide (4'-0"); Greater for dual ramps.
6. Use class "B" concrete with a sidewalk finish in order to obtain a rough non-skid type surface.
7. Place a 1/2" expansion joint where the concrete curb ramp joins the curb.
8. Place the inside pedestrian crosswalk lines no closer in the intersection than would be established by bisecting the intersection radii, with an allowance of a 4'x4' maneuvering space (2003 ICC/ANSI a117 Commentary. Fig. C406.6 & 406.10) in the vehicular travel way when one ramp is installed.
9. Coordinate the curb cut and the pedestrian crosswalk lines so the floor of the curb ramp will fall within the pedestrian crosswalk lines. Place diagonal ramps with flared sides so 24" of the full height curb falls within the crosswalk markings on each side of the flares.
10. Construct the pedestrian crosswalk a minimum width of 6 feet. A crosswalk width of 10 feet or greater is required for all thoroughfares.
11. Use stop lines, normally perpendicular to the lane lines, where it is important to indicate the point behind which vehicles are required to stop in compliance with a traffic signal, stop sign or other legal requirement. An unusual approach skew may require the placement of the stop line to be parallel to the intersecting roadway.
12. Place all pavement markings in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration and the North Carolina Supplement to the MUTCD.
13. Other detectable warning materials may be considered from that shown, but require City Engineer's written approval prior to installation.



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## STANDARD CROSSWALK & CURB RAMP NOTES

**NOTES:**

14. For all roads with radius 25' or less. Only one curb ramp is required. Curb ramps to be placed as per traffic design standards to ensure pedestrians enter & exit without entering travel lanes.
15. Terminate parking a minimum of 20 feet back of pedestrian walk.
16. A 4'x4' maneuvering space is required at the bottom of the curb ramp and must be within the crosswalk.
17. Drop curb width (4'-0" min.) x 4' long landing required at top of curb ramp
18. North Carolina General Statute 136-44.14 requires that all street curbs being constructed or reconstructed for maintenance procedures, traffic operations, repairs, correction of utilities or altered for any reason after September 1, 1973 shall provide curb ramps for the physically disabled at all intersections where both curb and gutter and sidewalks are provided and at other points of pedestrian flow.  
In addition, section 228 of the 1973 Federal Aid Highway Safety Act requires provision of curb ramps on any curb construction after July 1, 1976 whether a sidewalk is proposed initially or is planned for a future date.  
The Americans with Disability Act (ADA) of 1990 extends to individuals with disabilities. Comprehensive civil rights protections similar to those provided to persons on the basis of race, sex, national origin and religion under the Civil Rights Act of 1964. These curb ramps have been designed to comply with the current ADA standards.
19. Construct all ramp surfaces to comply with sections R301 and R303.3.3 of the revised ADA guidelines.
20. Construct all ramps and sidewalks with a 2% cross slope.



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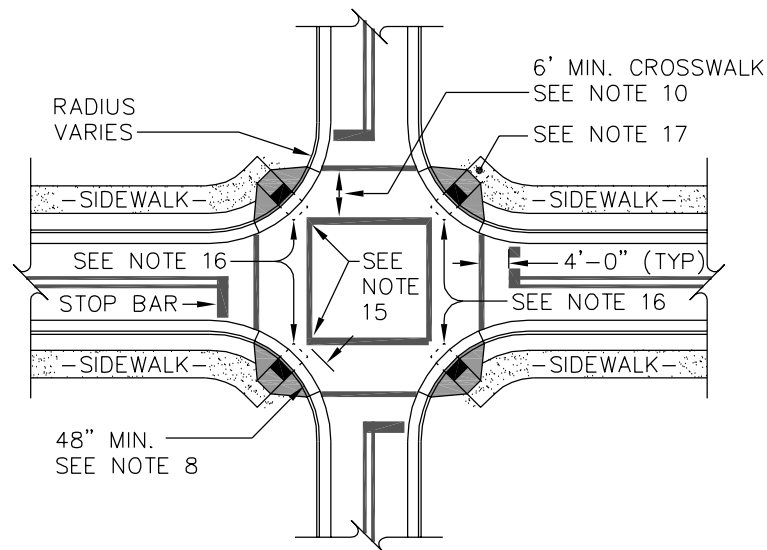
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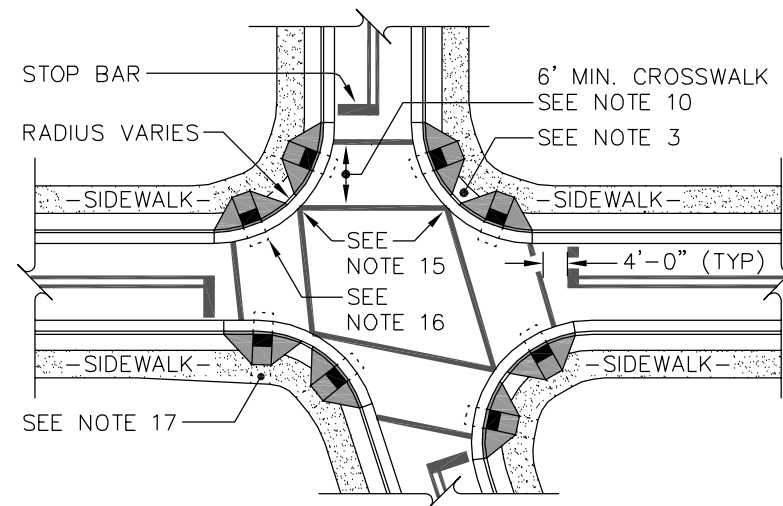
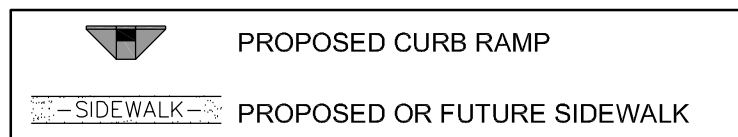
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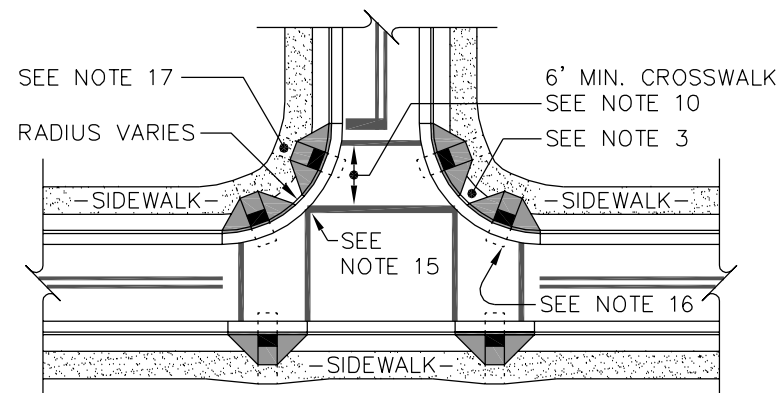
## STANDARD CROSSWALK & CURB RAMP NOTES



DETAIL SHOWING TYPICAL LOCATION OF SINGLE CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS  
**FOR CROSSING INTERSECTIONS**



DETAIL SHOWING TYPICAL LOCATION OF DUAL CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS  
**FOR CROSSING INTERSECTIONS**



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS  
**FOR TEE INTERSECTIONS**



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**STANDARD DETAIL CURB RAMP PLACEMENT**



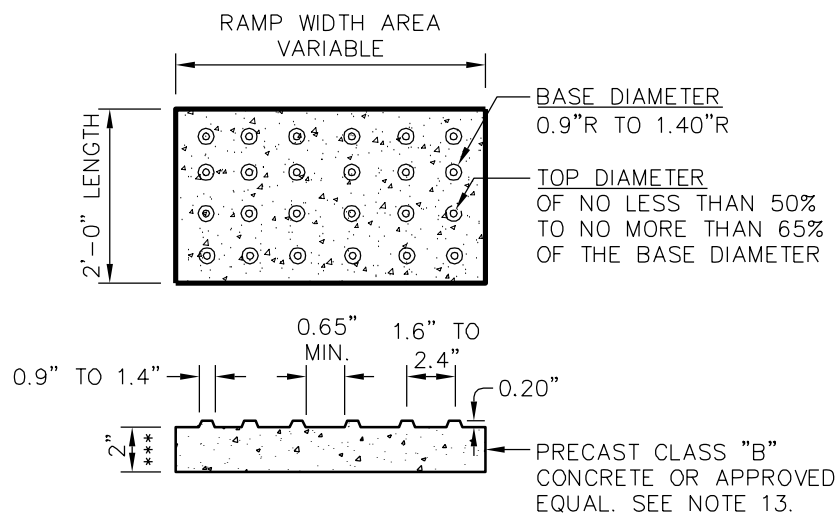


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## STANDARD DETAIL CURB RAMP



## DETECTABLE WARNING DOMES

$$B = X - (A + 9")$$

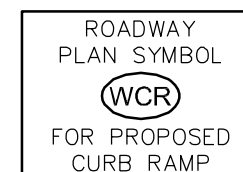
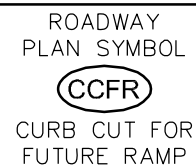
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.

\* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.

\*\* BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.

\*\*\* THICKNESS MAY VARY FOR APPROVED EQUAL PRECAST MATERIAL

W	A	W + A + 9"	X	B
5'	0.0'	5.8'	5.8'	5.0' *
6'	0.0'	6.8'	6.8'	6.0' **
7'	0.0'	7.8'	7.3'	6.5' **
8'	0.0'	8.8'	7.3'	6.5' **
5'	1.5'	7.3'	7.5'	5.2'
5'	2.0'	7.8'	7.8'	5.0'
5'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.3'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'



### NOTES:

- Detectable warning domes shall cover 2'-0" length and full width of the ramp floor as shown on the details.
- The entire ramp shall be Black in color or any color with a 70% contrast ratio and approved by City Engineer.



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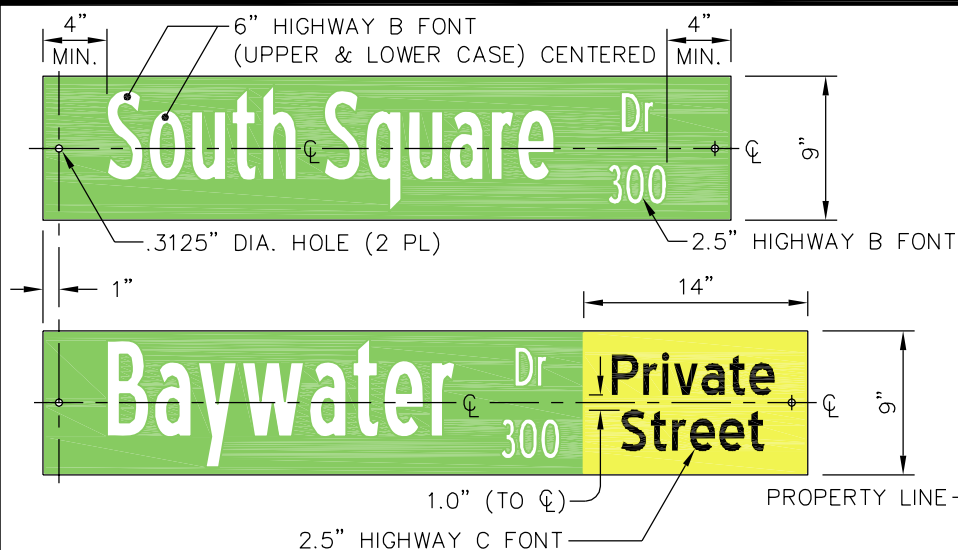
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**STANDARD CURB RAMP**

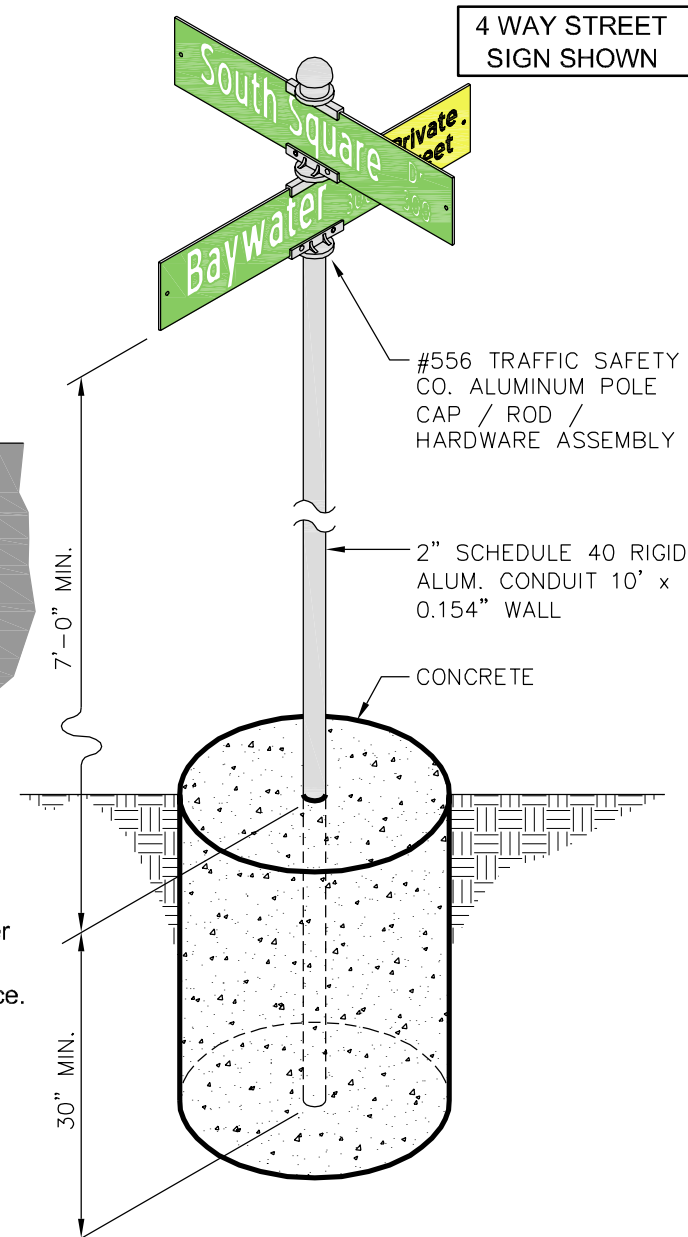


## NOTES:

1. 6" letters to be series "B" (FHWA)
2. 2 1/2" letters to be series "B" (FHWA)  
All letters and background materials to be "Scotchlite" or an approved equal and meet I.T.E. Specifications on reflectivity.
3. Sign appearance shall be green background with white letters and white border.
4. Fabricate sign as follows: Base sheeting shall be Hi-Intensity Prismatic (or equal). Overlay letter mask using translucent EC green film. Allow a 0.50" border to show.
5. Aluminum sign blank materials to be 0.080" thick with 1.5" radius corners, 2-blanks per sign face.

## RECOMMENDED INSTALLATION

1. Street name sign to be one-foot from property line if said lines were extended.
2. Sign blades not to extend past back of curb into road.
3. Sign location to be placed on low side of block numbering.
4. Any exceptions shall be approved by the City Engineer.
5. Developer responsible for installation of all street signs.



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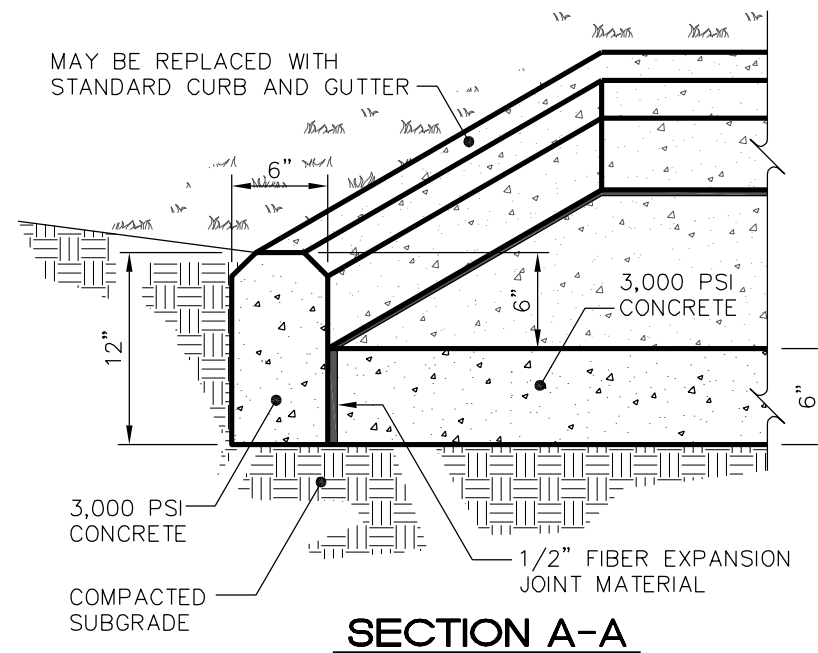
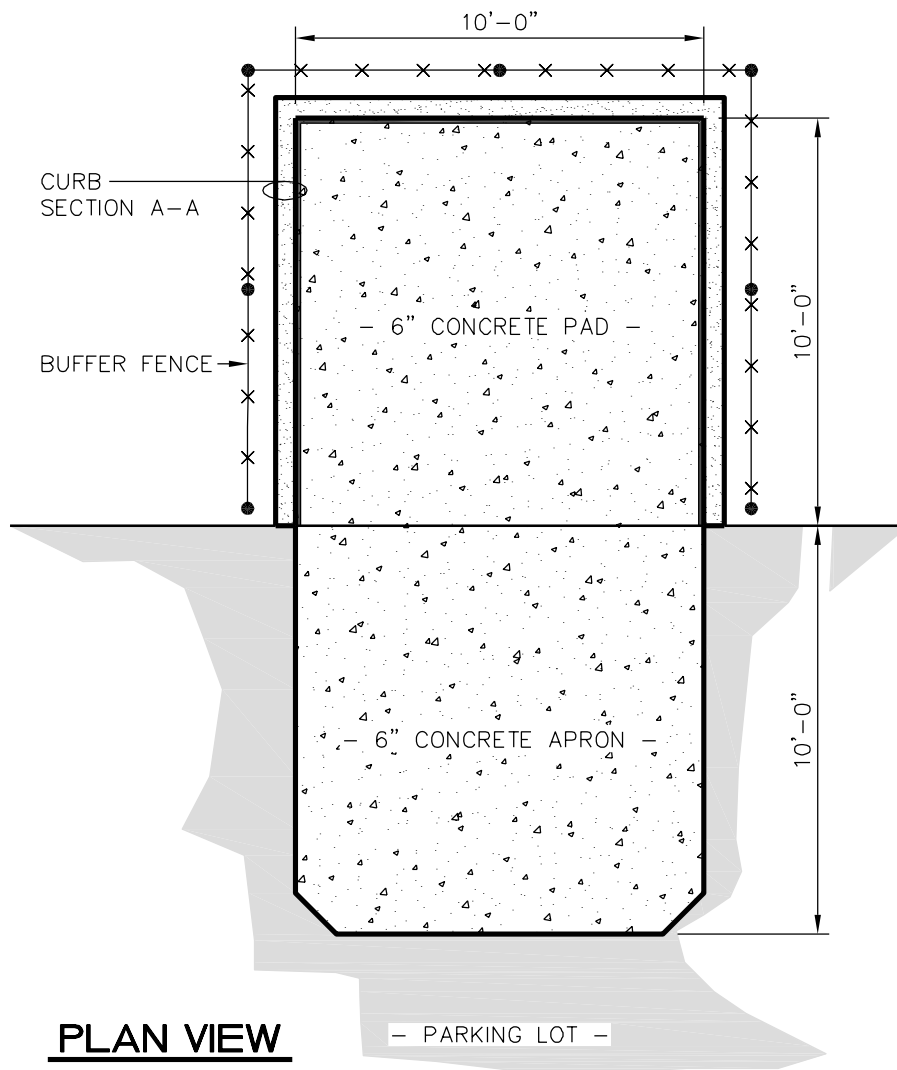
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**STREET NAME SIGNS - 9" SIGN HEIGHT**

**NOTES:**

1. Container pad must be flush with parking lot pavement.



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**DUMPSTER PAD DETAIL**