CITY OF CHARLOTTE SM

# Charlotte Land Development Standards Manual

(CLDSM)

Revision No. 24

January 31, 2024

**Charlotte Land Development Standards Manual (CLDSM)**

# Purpose Statement

The City of Charlotte ensures that new, improved, and modified infrastructure to be used by the public complies with adopted ordinances, meets technical requirements, and is suitable for City maintenance (where applicable). This manual provides standardized information to be used for design, review, approval, and implementation of construction plans. All design details provided in this manual are approved for use within the City of Charlotte and its extraterritorial jurisdiction unless otherwise noted.

The use of the term "standard" means the most common way to design a given feature, not a minimum performance requirement. Non-standard designs may be proposed, subject to the review and approval of appropriate City staff. The developer or designer must provide the supporting details and rationale that the non-standard design meets or exceeds the intent of the standard design(s).

This manual is frequently used as a design reference for the City's Capital Improvement Program (CIP) projects to facilitate the design process. CIP projects frequently use a combination of standard and non-standard designs, subject to review by City staff, to best meet the needs of the public infrastructure implementation.

This manual is periodically updated to ensure that the provided standard construction details satisfy the City's requirements.

# CHARLOTTE LAND DEVELOPMENT STANDARDS MANUAL
# SPECIFICATIONS AND SPECIAL PROVISION NOTES
# Includes ETJ

The following specifications and special provisions are intended to be used in conjunction with Charlotte Land Development Standard Drawings, NCDOT Roadway Standard Drawings, and NCDOT Standard Specifications for Roads and Structures for all development within the City of Charlotte and the City of Charlotte ETJ unless otherwise directed by the City.

## I. STREETS

### A. GENERAL NOTES

1. All work and materials shall conform to the latest edition of the North Carolina Department of Transportation Standard Specifications for Roads and Structures *unless otherwise specified in this manual.*

2. All asphalt cuts shall be made with a saw when preparing street surfaces for patching or widening strips.

3. Paper joints shall be used to seal the ends of an asphalt pour so that future extensions can be made without causing rough joints.

4. When placing asphalt against existing surfaces, a straight edge shall be used to prevent "humping" at that location.

5. Stone shall be primed if paving is not complete within seven days following stone base approval.

6. Surfaces shall be tacked when asphalt is being placed over existing asphalt streets or adjoining concrete, storm drain and sanitary sewer structures.

7. In rolling and hilly terrains, sweeping of the stone base and/or application of a tack coat may be required near intersections. These requirements will be established by the City Inspector based on field conditions.

8. ALL concrete used for streets, curb and gutter, sidewalks and drainage structures, etc. shall have a minimum compressive strength of 3600 PSI at 28 days. This requirement shall be met regardless of any lesser compressive strength specified in the North Carolina Department of Transportation Standard Specifications for Roads and Structures. The contractor shall prepare concrete test cylinders in accordance with Section 1000 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures at the direction of the project inspector. All equipment and cylinder molds shall be furnished by the contractor. It shall be the responsibility of the contractor to protect the cylinders until such time as they are transported for testing. Testing for projects shall be performed by an independent testing lab, at no cost to the City. The contractor shall provide equipment and perform tests on concrete for a maximum slump and air content as defined in Section 1000 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures. These tests shall be performed at a frequency established by the inspector. Materials failing to meet specifications shall be removed by the contractor.

9. All concrete shall be cured with 100% Resin Base, white pigmented curing compound which meets ASTM Specifications C-309, Type 1, applied at a uniform rate at one (1) gallon to 400 square feet within 24 hours of placement of the concrete.

10. All curb and gutter shall be backfilled with soil approved by the Inspector within 48 hours after construction to prevent erosion.

11. All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means and the material shall have no tendency to flow or behave in a plastic manner under the tamping blows or proof rolling.

12. Materials deemed by the Inspector as unsuitable for backfill purposes shall be removed and replaced with select backfill material.

13. All trenches in the street right-of-way shall be backfilled with suitable material immediately after the pipe is laid. The fill around all pipe shall be placed in layers not to exceed six (6) inches and each layer shall be compacted thoroughly. For Storm Drainage see Backfill under Storm Drainage section.

14. Under no circumstances shall water be permitted to rise in un-backfilled trenches after the pipe has been placed.

15. Compaction requirements shall be attained using mechanical compaction methods. Each six (6) inch layer of backfill shall be placed loose and thoroughly compacted into place.

16. Straight forms shall not be used for forming curb and gutter in curves.

17. All excess concrete on the front edge (lip) of gutter shall be removed when curb and gutter is poured with a machine.

18. All subgrade shall be compacted to 100% of the maximum density obtainable with the Standard Proctor Test to a depth of eight (8) inches, and a density of 95% Standard Proctor for depths greater than eight (8) inches. All tests shall be performed by developer at no cost to the City.

19. A canvas cover or other suitable cover shall be required for transporting plant mix asphalt during cool weather when the following conditions are present:

    a. Air temperature is below 60 degrees F.
    b. Length of haul from plant to job is greater than five (5) miles.
    c. Other occasions at the Inspector's discretion when a combination of factors indicates that material should be covered in order to assure proper placement temperature.

20. Concrete or asphalt shall not be placed until the air temperature measured at the location of the paving operation is at 35 degrees F and rising by 10:00 a.m. Concrete or paving operations should be suspended when the air temperature is 40 degrees F and descending. The contractor shall protect freshly placed concrete or asphalt in accordance with Sections 420 (Concrete Structures), 600 (Asphalt Bases and Pavements), and 700 (Concrete Pavements and Shoulders) of the North Carolina Department of Transportation Standard Specifications when the air temperature is at or below 35 degrees F and the concrete has not obtained an age of 72 hours.

21. The contractor shall always maintain two-way traffic when working within existing streets. The contractor shall place and maintain signs, danger lights, and barricades and furnish watchmen or flagmen to direct traffic in accordance with the latest edition Work Area Traffic Control Handbook (WATCH), Work in the right-of-way of State System Streets may require additional traffic control provisions.

22. The contractor shall do that which is necessary to control erosion and to prevent sedimentation damage to all adjacent properties and streams in accordance with the appropriate City of Charlotte Erosion and Sedimentation Control Ordinance.

## B. STANDARDS OF STREET DESIGN

Note: Use of Hilly Terrain criteria is NOT permitted without PRIOR approval of the Director of Transportation.

Note: Design standards that apply for the ETJ are taken from the July 2020 edition of the NCDOT Subdivision Manual. Any revisions to Subdivision Manual will supersede the design standards given in the Charlotte Land Development Standards for ETJ streets. However, under no circumstances shall an NCDOT/ETJ standard be less restrictive than what is required by the City of Charlotte.

1. STREETS (PUBLIC and PRIVATE):

| | ALL LOCAL STREETS (Except Industrial & Collector) | | LOCAL INDUSTRIAL AND COLLECTOR ONLY | |
|---|---|---|---|---|
| | Level/Rolling | Hilly | Level/Rolling | Hilly |
| a. Terrain Classification | 0%-15% | 15%+ | 0%-15% | 15%+ |
| b. Maximum Grade | 10% | 12% | 8% | 10%+ |
| c. Design Speed (mph) | 25 | 20 | 30 | 25 |
| d. Minimum Radius (ft.) | | | | |
| Public Street | 150 | 90 | 250 | 175 |
| Private Street | 50 | 50 | 150 | 150 |

| | ALL LOCAL STREETS (Except Industrial & Collector) | | LOCAL INDUSTRIAL AND COLLECTOR ONLY | |
|---|---|---|---|---|
| | Level/Rolling | Hilly | Level/Rolling | Hilly |
| e. Min. Tangent between Horizontal Reverse Curves (ft.) | 50 | 50 | 100 | 100 |
| f. K Value (CREST/SAG) | 20/20 | 15/20 | 28/35 | 20/20 |
| K Value (STOP Condition) | 9 | 5 | 14 | 9 |

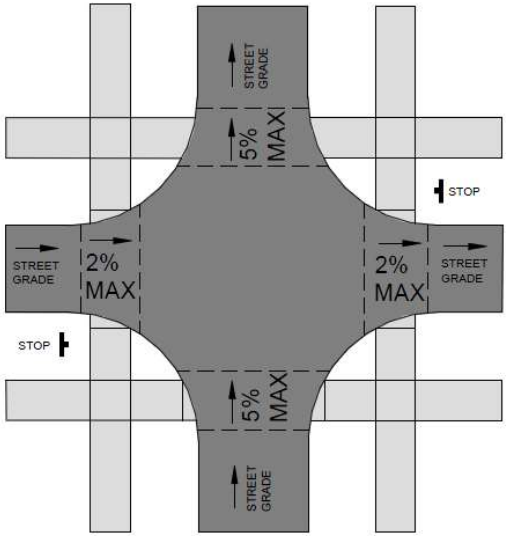
Note: K=Rate of Vertical Curvature for Minimum Sight Distance. Provisions of adequate stopping sight distance may require use of larger K values than the minimums listed above. The Charlotte Department of Transportation, under Section 19-245 of City Code, reserves the right to prescribe more stringent sight distance standards and/or means to achieve adequate sight distance than these listed above.

2. INTERSECTIONS:

a. Maximum Street Grade at Intersections [a,b]

STOP or YIELD Condition: Vertical alignment is 2% maximum through the crosswalk areas (marked or unmarked). Outside of the crosswalk areas the vertical alignment is 5% maximum within 100 feet of an intersection [c]

THROUGH MOVEMENT Condition: Vertical alignment is 5% maximum through the crosswalk areas. Where feasible, it is recommended that the vertical alignment for a through-movement street also be set at 2% maximum through the crosswalk areas (marked or unmarked). Outside of the crosswalk areas, see B.1.b for maximum grade.




b. Midblock Pedestrian Street Crossings: At midblock crossings, the cross slope of the pedestrian street crossing is allowed to equal the street grade

c. Minimum Angle of Intersection is 75 degrees

d. See Charlotte Unified Development Ordinance Section 31.3.D for intersection sight distance requirements.

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a Preferred option: Design intersections with a max. 2% street grade through the crosswalk area of all legs of the intersection. This will provide a level intersection where the required sidewalks, curb ramps, and street crossings can be constructed with the use of CLDSM standard details included in the plans. Special attention to drainage design is warranted to ensure that these intersections drain properly. For intersections with street grades greater than 2% in any direction it is strongly recommended that the sidewalks, curb ramps, and street crossings be included as part of the design process and site-specific details of the designs and any alternate layouts shall be included in plans as appropriate.

b Refer to Charlotte Unified Development Ordinance Section 31.1.D regarding potential modification of required street spacing and stub street requirements in areas of steep slopes.

c 100' is the standard for Level/Rolling Terrain. In areas classified as Hilly Terrain, 100' is preferred length, but 40' minimum may be approved by the Director of Transportation. This only applies within the City of Charlotte limits and not in the ETJ, where NCDOT vertical alignment criteria would govern.

(Please note: Modifications to standards as noted in [b] and [c] or the use of "Hilly Terrain" street alignment criteria are typically requested via a subdivision sketch plan submittal. The sketch plan submittal must contain sufficient information to support the request for modified standards. For example, modification requests based upon topographical constraints should include existing and proposed street profiles.)

e. Minimum Curb & R/W Radius = Taken from Appendix C (Curb Return Radii Guidelines) of USDG

**Table 4 - Curb Radii for Local Street Intersections**

| From/To | R/Medium | R/Wide | C/Narrow | C/Wide | Industrial |
|---|---|---|---|---|---|
| R/Medium | 15 | | | | |
| R/Wide | 15 | 10 | | | |
| C/Narrow | 15 | 25 | 35 | | |
| C/Wide | 15 | 15 | 30 | 10 | |
| Industrial | 25 | 15 | 40 | 25 | 50 |
| R=Residential | | | | | |
| C=Commercial | | | | | |

f. Minimum Intersection Separation.

| | |
|---|---|
| Along local streets | 125 feet |
| Along collector streets | 200 feet |
| Along arterials/Uptown Streets | To be determined by CDOT |

Intersection offsets/separation from a thoroughfare, at signalized intersections, or at intersections that may become signalized in the future may need to be greater that these minimums and will be determined by CDOT on a case by case basis.

3. Design criteria for arterial streets shall be established by the Director of the Department of Transportation on a case by case basis using the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highway and Streets and/or NCDOT Roadway Design Manual.

4. Intersection corner – A minimum 50’ x 50’ sight triangle (measured along back of curb or edge of pavement) shall be provided at each intersection corner. An additional 10’ x 70’ sight triangle shall be provided at intersections connecting to NCDOT maintained roadways. Other sight distance requirements may be required by the NCDOT or CDOT per the Charlotte Unified Development Ordinance (UDO) Section 31.3.D.

5. Refer to the NCDOT Subdivision Roads Minimum Construction Manual for development criteria for sites located within the City of Charlotte Extraterritorial Jurisdiction (ETJ) within these areas governed by Charlotte Land Development Standards Manual and the NCDOT Subdivision Roads Minimum Construction Standards Manual. The more restrictive standard shall apply.

C. GRADING

1. Proposed street rights-of-way shall be graded to their full width for ditch type streets and a minimum of eight (8) feet behind the curb for curb and gutter sections.

2. Fill embankments shall be formed of suitable material placed in successive layers not to exceed more than six (6) inches in depth for the full width of the cross-section, including the width of the slope area. No stumps, trees, brush, rubbish or other unsuitable materials or substances shall be placed in the embankment. Each successive six (6) inch layer shall be thoroughly compacted by the sheepsfoot tamping roller, 10-ton power roller, pneumatic-tired roller, or other methods approved by the City. Embankments over and around all pipe culverts shall be of select material, placed, and thoroughly tamped and compacted as directed by the City.

D. ROADWAY BASE

1. All roadways shall be constructed with a base course as described on the appropriate Charlotte Land Development Standard Detail Drawing.

2. The material for stone base course shall conform to the requirements of Section 1010, Aggregate for Non-Asphalt Flexible Type Base, and Section 520, Aggregate Base course of the North Carolina Department of Transportation Standard Specifications for Roads and Structures.

3. The stone base shall be compacted to 100% of the maximum density obtainable with the Modified Proctor Test (AASHTO-T180) by rolling with ring or tamping roller or with a pneumatic tired roller with a minimum weight of ten tons. When completed, the base course shall be smooth, hard, dense, unyielding and well bonded.

4. A bituminous concrete base course, as specified on the Standard Detail Drawing may be substituted in lieu of a stone base course.

5. Asphalt base course will only be allowed within widening strips less than five (5) feet in width.

E. ROADWAY INTERMEDIATE AND SURFACE COURSE

1. All public roadways shall be constructed with an intermediate and surface course as described on the appropriate City of Charlotte Land Development Standard Detail Drawing.

2. Plant mixed asphalt shall conform in all respects to Section 610 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures.

3. The final (1) one inch lift of asphalt surface course for Residential Subdivision Streets shall be withheld until a minimum of (75%) Seventy-Five Percent of the Development is occupied (occupied means a certificate of occupancy has been issued) or at least (1) one year has lapsed from the application of the intermediate course layer (All documentation to be provided by the developer and approved by the City Inspector). All known base failures shall be repaired prior to application of the final one inch lift of asphalt surface course.

4. The City inspector shall be given a (24) twenty-four-hour notification to inspect the intermediate course deficiencies. All deficiency repairs are to be monitored by a City Inspector and accepted prior to application of final layer.

5. City inspectors shall be notified prior to using recycled plant mixes.

6. Failure to meet the above requirements may result in the delay or prevention of street acceptance by the City of Charlotte or NCDOT.

F. SIDEWALKS, RAMPS, AND DRIVEWAYS

1. Where sidewalks and pedestrian routes within street crossings (including marked and unmarked crosswalks) are provided, they must be constructed so they are accessible to all potential users, including those with disabilities.

   The July 26, 2011 "Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way" was written by the US Access Board and is also known as the Public Right-of-Way Accessibility Guidelines or PROWAG. PROWAG provides more specific information than the existing Americans with disabilities Act Accessibilities Guidelines (ADAAG) for transportation facilities within the right-of-way including pedestrian access routes, signals, and parking facilities. The PROWAG requirements are currently in the development and adoption process and have not been officially adopted by the Department of Justice; however, the Federal Highway Administration has issued guidance that the draft version of the PROWAG "are currently recommended best practices, and can be considered the state of the practice that could be followed for areas not fully addressed" in the existing ADAAG requirements.

   Due to the widespread acceptance of the PROWAG, and their pending adoption in the future, the standards in this manual are based upon the PROWAG requirements. The designer is encouraged to reference the complete PROWAG document for additional information (www.accessboard.gov).Buildings and other structures not covered by PROWAG must comply with the applicable requirements of the ADAAG.

2. Sidewalks shall be constructed of not less than 3600 P.S.I. concrete and shall be four (4) inches thick, constructed on an adequately graded base, except where a sidewalk crosses a driveway it shall be six (6) inches thick. Subgrade shall be compacted to 95% of the maximum density obtainable with the Standard Proctor Test. The surface of the sidewalk shall be steel trowel and light broom finished and cured with an acceptable curing compound. Tooled joints shall be provided at intervals of not less than five (5) feet and expansion joints at intervals of not more than forty-five (45) feet. The sidewalk shall have a desired lateral slope of 1.5% (2.00% maximum).

| EXAMPLE SIDEWALK CONSTRUCTION DIMENSIONS: | | |
|---|---|---|
| WIDTH | RISE | CROSS-SLOPE |
| 4' | ¾" | 1.56% |
| 5' | 1" | 1.67% |
| 6' | 1-1/8" | 1.56% |
| 8' | 1-½" | 1.56% |

3. Planting strip adjacent to sidewalk shall be graded to ¼ inch per foot (min.) up to 1 ¼ inch per foot (max.), except where excessive natural grades make this requirement impractical. In such cases, the City may authorize a suitable grade.

4. Sidewalk widths shall be a minimum of five (5) feet unless otherwise specified. Where necessary, a 5' x 5' sidewalk is required at least every 200' as required by PROWAG for a passing zone unless otherwise provided by residential driveways, intersecting sidewalk, etc.

5. Approval of sidewalk construction plans must be obtained as part of the plan review process. Except in unusual circumstances, sidewalk must be located a minimum of (8) eight feet from the back of the curb or at the back of the right-of-way. A recorded public sidewalk easement is required for all sidewalk located outside public right-of-way; the width shall be equal to the distance from the right-of-way line to the back of the sidewalk plus two feet or to the face of building, whichever is less. The sidewalk easement must be recorded with the Mecklenburg County Register of Deeds prior to issuance of a certificate of occupancy for the corresponding building(s).

6. Running slope of all ramps shall be up to 7.5% (8.33% maximum). Ramp length is not required to exceed 15' regardless of the resulting slope, which shall be uniform for the length of the ramp. Curb ramps are required where sidewalks intersect curbing at any street intersection and at Type III driveway connections.

7. For City projects only: On CLDS# 10.24A/B/C, 10.25(A/B/C/D only), and 10.27A/B, the curb and gutter across the front of the driveway shall be measured and paid for separately under Curb and Gutter (either 2'-0" valley gutter, vertical curb, or standard 2'-6" curb and gutter as specified on the details). The curb and gutter is to be measured per linear foot along the surface of the top of the curb. The concrete driveway apron is to be measured per square yard.

8. Refer to the WATCH Manual, MUTCD (latest edition), and the Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) for construction zone pedestrian routes and signalization and controls for actuators. Curb ramps shall be designed and constructed in accordance with the American Disability Act.

9. Where pedestrian routes are contained within a street or right-of-way, the grade of pedestrian access routes shall not exceed the general grade established for the adjacent street or highway.

## II. **STORM DRAINAGE**

### A. GENERAL NOTES

1. Unless otherwise specifically set forth herein, all materials, methods of construction and workmanship for the work covered in reference to stormwater infrastructure construction shall conform to the most recent Standards and Specifications of the North Carolina Department of Transportation (NCDOT).
2. Refer to NCDOT Pipe Material Selection Guide for allowable pipe fill heights and specifications. For fill heights less than 2' (measured from top of pipe to bottom of pavement structure) Class IV/Class V Reinforced Concrete Pipe (RCP) will be required. Designs outside of the selection guide will be approved at the discretion of Charlotte Storm Water Services.
3. All pipes must be sourced through an NCDOT approved producer/supplier and they must participate in the NCDOT QA/QC program for each respective pipe material.
4. Reinforced Concrete Pipe (RCP) may be used in all storm drainage and culvert applications.
5. High Density Polyethylene (HDPE) Pipe may be substituted for pipe diameters of 48" or less but shall not be allowed in culvert applications or installations within an arterial street Right of Way maintained by the City of Charlotte.
6. Corrugated Aluminized Metal Pipe (CAMP) or Corrugated Aluminum Alloy Pipe (CAAP) may only be used in roadway culvert applications requiring 60" or larger pipe diameters. Culverts are defined as open-ended conduits passing through roadway embankments. CAMP and/or CAAP shall not be used in piped storm drainage collection systems that connect to drainage structures, multiple systems, system outlets, etc.

7. Pipes shall have a minimum diameter of fifteen (15) inches (eighteen (18) inches minimum on culverts).
8. The maximum allowable pipe slope is 10 percent.
9. All pipes, regardless of material shall have all joints wrapped with a geotextile fabric (NCDOT Section 1056 – Type 2). Geotextile must extend 12" past each side of joint and edges of bands. Geotextile must be secured to the outside of pipe by methods indicated by engineer.
10. All concrete used for drainage structures shall have a minimum compressive strength of 3600 PSI at 28 days. This requirement shall be provided regardless of any lesser compressive strength specified in the North Carolina Department of Transportation Standard Specifications for Roads and Structures.
11. Prior approval by Charlotte Storm Water Services shall be required for the construction of any endwall that is not a NCDOT Roadway Standard Drawing.
12. All graded creek banks and cut/fill slopes shall be at a maximum of two (2) feet horizontal to one (1) foot vertical (2:1) and not to exceed 10' without terracing or the slopes shall be designed by a Professional Geotechnical Engineer and approved by Charlotte Storm Water Services on a case-by-case basis.

B. STANDARDS FOR DESIGN

1. In accordance with Charlotte Unified Development Ordinance Articles 24 and 25, Charlotte Storm Water Services shall review the drainage plan for compliance with the standards contained in the current edition of the Charlotte Land Development Standards Manual, the Charlotte-Mecklenburg Storm Water Design Manual and all other relevant and appropriate standards established by the City.

2. All storm drainage design shall conform to the standards and specifications as provided in the Charlotte-Mecklenburg Storm Water Design Manual, North Carolina Department of Transportation Standards Specifications for Roads and Structures, and the Charlotte Land Development Standards Manual. In the event of conflicting standards, the more restrictive shall apply.

3. The NCDOT Roadway Standard Drawings have been accepted as approved standards for Land Development projects in the City of Charlotte and City of Charlotte ETJ. See standard #20.00A, B, and C of this manual for a table listing the standards accepted. These standard drawings shall be referenced by NCDOT number or shown on all plans submitted to the City of Charlotte for approval.

4. Culverts must be long enough to accommodate the proposed roadway section with a 2:1 fill slope, or flatter, measured from shoulder point and/or back of grade bench to the toe of slope. Extend the pipe to allow the endwall to be placed at the toe of slope. See CLDSM 10.36A.

5. Endwalls or other end treatments are required on all culverts and at the outlet end of all closed pipe systems. Endwalls are required for pipes 36" and larger.

6. Construct endwalls perpendicular to the centerline of the pipe unless specific site conditions warrant construction of an endwall parallel to the roadway.

7. Sub-surface drainage shall be provided where the ground water level is likely to be near the surface. In capillary soils, the water level should be four (4) to six (6) feet below the surface to prevent the rise of moisture into the subgrade. Subdrains shall be used to lower ground water in low areas in the street.

C. PIPE INSTALLATION

1. All pipe materials referenced herein shall be installed pursuant to Section 300 of the current version of the NCDOT Standard Specifications for Roads and Structures, Pipe installation and 300.01 of the NCDOT Roadway Standard Drawings for method of pipe installation.
2. Storm drainage pipe shall be placed in a straight alignment at uniform grade. All pipes shall be laid with the bell or groove upgrade and the joint entirely interlocking.
3. No changes in alignment shall be allowed except at catch basins, manholes, or other junctions that provide appropriate clean out access. The maximum length between access points is 300 linear feet.
4. Each run of pipe (structure to structure) shall be a single type, class, and material.
5. An NCDOT standard pipe collar or drainage structure is required where pipes from differing manufacturers or materials are joined. Pipes should be on the same grade and alignment and have the same internal diameter where a pipe collar is specified.
6. Lift holes, if present on Reinforced Concrete Pipe, are to be repaired per 300-6 (A) of the NCDOT Standard Specifications for Roads and Structures. Alternate repair methods must be submitted to Storm Water for approval prior to construction. Repair must meet or exceed acceptable leakage rates for the pipe joints.
7. All installations of storm drainage infrastructure associated with the subdivision ordinance, unified development ordinance and/or any system conveying runoff into or from a public right of way will require a Closed-Circuit Television (CCTV) inspection and/or Confined Space Entry (CSE) to verify infrastructure was installed correctly and is free of defects and excessive deflection. This inspection should occur after backfilling is completed to final grade but prior to completion of paving operations. See City of Charlotte *Post Installation Inspection and Repair of Storm Drainage Pipes and Culverts* for additional information.
8. All flexible pipe, reinforced concrete box culverts, and arch culvert installations require third-party inspection. All inspections shall be performed by a licensed, competent third-party inspection firm and the inspections shall be directed or performed by a North Carolina Professional Engineer. Inspections shall be completed as described in the most recent version of the City of Charlotte Storm Water Services document *Third-Party Inspection for Pipe Installation.*

D. BACKFILL

1. Backfilling of pipe trenches and excavations for drainage structures shall be in accordance with NCDOT standards. Layers shall not exceed six (6) inches loose and each layer shall be compacted thoroughly to the required density of 95% standard proctor density.
2. All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means to the required density and the material shall have no tendency to flow or behave in a plastic manner under the tamping blows or proof rolling.
3. Materials deemed by the Engineer as unsuitable for backfill purposes shall be removed and replaced with select backfill material.
4. Backfilling of trenches shall be accomplished immediately after the pipe is laid. Do not operate heavy equipment over any pipe or culvert until the pipe or culvert has been properly backfilled and covered with at least three (3) feet of an approved material.
5. Under no circumstances shall water be permitted to rise in un-backfilled trenches after the pipe has been placed.

E. STANDARD PIPE MATERIAL REQUIREMENTS

1. Reinforced Concrete Pipe – RCP
   a. Pipe shall be manufactured in accordance with AASHTO M-170 and/or ASTM C-76. Class of pipe and wall thickness shall be in accordance with the most recent version of the NCDOT Pipe Material Selection Guide. Pipe shall have 8-foot standard joint lengths. Unless a leak resistant joint is specified, preformed joint sealant conforming to ASTM C-990 shall be used.
      i. Installation of Class IV or higher concrete pipe shall be identified on the design plans. The City inspector shall be given documentation and notification of this information prior to construction. Registered professional shall note on As-Builts that the appropriate class/type of pipe was installed.

F. ALTERNATIVE PIPE MATERIALS AND DESIGN SPECIFICATIONS

1. Performance Pipe Joints - Where reinforced concrete pipes (RCP) and/or culverts are subject to operating under pressure during the design storm event, as defined within the Charlotte Mecklenburg Storm Water Design Manual, an upgraded performance joint design will be required.
   a. Leak Resistant Joint – Limited leakage is acceptable.

i. All joints shall be bell and spigot type, with a rubber gasket conforming to ASTM C-443. Pipe shall be manufactured in accordance with AASHTO M-170 and/or ASTM C-76. Class of pipe and wall thickness shall be in accordance with the current version of the NCDOT Pipe Material Selection Guide.

b. Special Design Joint – Limited leakage is not acceptable.
   i. Manufacture provided design will be required.

2. Corrugated Aluminized Steel Pipe and Corrugated Aluminum Alloy Pipe
   a. Aluminum coated (Type 2) steel pipe shall comply with AASHTO M-274 for the coating and AASHTO M-36 for the pipe fabrication. Aluminum alloy pipe shall comply with AASHTO M-196 for material and fabrication.
   b. Where velocities within the pipe exceed 5 ft/sec for the 2-year storm, field pave a 4-inch-thick reinforced concrete invert, 2/5 of the height of the culvert or .5' above the flow height of the 2-year event, whichever is more restrictive. Allowable velocities for the design storm event shall not exceed 10 feet/sec. Invert shall not be constructed until pipe backfill is completed.
   c. Prior to installation, pH, and resistivity testing of the proposed backfill material is required at two or more locations along the proposed pipe alignment.
      - At a minimum, for CAMP and CAAP to be considered, soil and stream-side pH and resistivity values must be within a range of $5.0 < pH < 9.0$ and resistivity of $r > 1500$ ohm-cm.
      - Submit manufactures specifications showing that the selected CAMP or CAAP is suitable based on the results of the physical testing of pH and resistivity.
   d. Minimum wall thickness is 10 gage.
   e. Each pipe section shall be joined to the next by a coupling band with a minimum of one corrugation overlap at each edge. The coupling bands shall have a minimum of two annular corrugations and fully engage, over the entire pipe periphery, one corrugation on each pipe. Bands shall be fabricated from the same material as the pipe. The minimum band gauges for aluminum pipe and aluminized pipe shall be as specified in AASHTO M-196 and AASHTO M-274, respectively.
   f. Gaskets that provide a leak resistant joint are required and shall be either sleeve type or O-ring type and shall meet the requirements for gaskets as specified in AASHTO M-36, Section 9.3
   g. Where Aluminum or Aluminized metal pipe is in direct contact with concrete a barrier coating must be applied. See NCDOT Thermal Spray Coatings Program for acceptable treatments.

3. Corrugated Aluminized Steel and Corrugated Aluminum Alloy Arches and/or Plate
    a. Corrugated aluminum alloy structural plate pipe, pipe arches and arches shall consist of aluminum plates and galvanized bolts and nuts of the size, shape and thickness as shown on the approved plans. These structures shall conform to the requirements of AASHTO M-219.
    b. Where velocities within the pipe/arch exceed 5 ft/sec for the 2-year storm, the walls of the culvert should be protected from abrasion by applying a 4-inch-thick reinforced concrete barrier, 2/5 of the height of the culvert or .5' above the flow height of the 2-year event, whichever is more restrictive. Allowable velocities for the design storm event shall not exceed 10 feet/sec. Barrier shall not be constructed until pipe backfill is completed.
    c. Prior to installation, pH, and resistivity testing of the proposed backfill material is required at two or more locations along the proposed pipe alignment.
        i. At a minimum, for CAMP and CAAP to be considered, soil and stream-side pH and resistivity values must be within a range of $5.0 < pH < 9.0$ and resistivity of $r > 1500$ ohm-cm.
        ii. Submit manufactures specifications showing that the selected CAMP or CAAP is suitable based on the results of the physical testing of pH and resistivity.
    d. Minimum wall thickness is 10 gage.
    e. Gaskets that provide a leak resistant joint are required and shall be either sleeve type or O-ring type and shall meet the requirements for gaskets as specified in AASHTO M-36, Section 9.3.
    f. Where Aluminum or Aluminized metal pipe is in direct contact with concrete a barrier coating must be applied. See NCDOT Thermal Spray Coatings Program for acceptable treatments.

4. High Density Polyethylene Pipe - HDPE
    a. This type of pipe shall comply with AASHTO M-294, Type S for pipe manufacturing.
    b. The bell and spigot joint shall have an O-ring gasket meeting ASTM F477 with the gasket factory installed, placed on the spigot end of the pipe. Pipe joints shall meet all requirements of AASHTO M294.
    c. The minimum length of HDPE pipe permitted for use shall be four (4) feet

5. Reinforced Concrete Box Culverts (RCBC)
    a. All RCBC must have direct access points into the culvert. Catch Basins, Manholes or Junctions that connect to the culvert via small diameter pipes will not be considered acceptable access points.
    b. ALL RCBC must be designed with leak resistant joints. A preformed joint sealant used with an external sealing band is acceptable.

6. Bottomless/Arch Culverts
    a. All bottomless/arch culvert must be designed with leak resistant joints. A preformed joint sealant used with an external sealing band is acceptable.
    b. If shallow, non-erosive bedrock is found three feet or less below the streambed, proposal of a bottomless (three-sided) culvert may be considered.

i. A geotechnical report signed and sealed by a North Carolina Professional Engineer stating that the entire length of the culvert will be bedded on non-erosive bedrock is required.
ii. Reinforced concrete footings designed by a North Carolina Professional Engineer tied to the bedrock are required.

G. DRAINAGE STRUCTURES

1. All structures and associated frames, grates and lids must comply with current NCDOT standard details and specifications.
2. All storm drain structures over three (3) feet and six (6) inches in height must have steps which comply with NCDOT 840.66.
3. The interior surfaces of all storm drainage structures shall be pointed up and smoothed to an acceptable standard using mortar mixed to manufacturer's specifications. All pipes shall be cut flush within the interior structure wall.
4. All frames, grates, rings, covers, etc., must conform to the standards set forth in this manual. Supply covers with a minimum of two and a maximum of six 1" diameter vent holes.
5. No Blind/Inaccessible structures will be allowed.
6. Waffle and knockout boxes are prohibited on storm drainage systems within and/or conveying runoff from the public right-of-way. Boxes with pre-cast openings shall be used.
7. Joints/Sections of pre-cast structures shall use flexible sealants meeting ASTM C990 or rubber gaskets meeting ASTM C443. Sealant type should meet or exceed allowable leakage rates for pipe joints.
8. Drainage structures accepting flexible pipes (HDPE, CAMP, CAAP, etc) must provide a resilient connection conforming to ASTM C923 and ASTM C1478.
9. Where Aluminum or Aluminized metal pipe is in direct contact with concrete a barrier coating must be applied. See NCDOT Thermal Spray Coatings Program for acceptable treatments.

H. END TREATMENTS:

1. Endwalls are to be NCDOT standard precast concrete, brick masonry with reinforced concrete footings, or cast-in place, reinforced concrete with reinforced concrete footings.
2. No metal or plastic end treatments are allowed.
3. Where Aluminum or Aluminized metal pipe is in direct contact with concrete a barrier coating must be applied. See NCDOT Thermal Spray Coatings Program for acceptable treatments.

I. NON-STANDARD STRUCTURES

1. Any non-standards structures must have prior approval by Charlotte Storm Water Services and will require a sealed design by a North Carolina Professional Engineer.

## III. PLAN REQUIREMENTS

A. GENERAL NOTES

1. All erosion control measures shall conform to the standards set forth in the Charlotte Land Development Standards Manual, State of North Carolina Erosion and Sediment Control Planning and Design Manual, or the more restrictive of any standards that conflict.

2. All storm drainage design shall conform to the standards and specifications as provided in the Charlotte-Mecklenburg Storm Water Design Manual, Charlotte Land Development Standards Manual, or the more restrictive of any standards that conflict.

3. The following note shall be placed on all site plans, grading plans, and plats.

    a. The purpose of the Storm Drainage Easement (SDE) is to provide storm water conveyance. Buildings are not permitted in the easement area. Any other objects which impede storm water conveyance or system maintenance are also prohibited.

4. Cite all appropriate standard detail numbers for any structures or specifics used within the plans in reference to the most current copy of the Charlotte Land Development Standards Manual.

5. In areas where the Floodway Regulations are applicable, the Future Conditions Flood Fringe Line, FEMA Flood Fringe Line, Community Encroachment Line, and FEMA Encroachment Line shall be shown on the preliminary plan and the final plat. An application for a Floodplain Development Permit shall be submitted to Mecklenburg County Land Use and Environmental Services (LUESA) in accordance with the requirements set forth in the City/County Floodplain Regulations.

B. EASEMENTS

1. Storm Drainage Easements (SDE) shall be provided for all storm drainage pipes and channels that are installed and/or modified by a developer (builder, property owner, etc.) and convey runoff into or from a public right of way. See CLDSM 20.30 for additional information.

2. Overlapping of storm drainage easements shall be approved at the discretion of Charlotte Storm Water Services.

3. Storm Drainage Easements shall include all end treatments and energy dissipators, lengthen or widen as needed.

C. SUBDIVISIONS -PRELIMINARY PLAN

1. The preliminary plan must include, at a minimum, the information described in Sections 30.4 and 30.6 of the City of Charlotte Unified Development Ordinance.

D. BOND POLICY – SUBDIVISION IMPROVEMENTS

1. Release of the final subdivision plat will not occur until the improvements required for the area of the final plat are constructed and a final inspection has been performed and found to be in conformance with the plans approved by the Charlotte-Mecklenburg Planning Commission., or a security has been posted with the Land Development Bond Coordinator of the applicable department and all required documents are received in their entirety.

2. The security shall be posted and remain in force until the construction is complete and found to be in conformance with the plans approved by the Charlotte-Mecklenburg Planning Commission. The security will be reevaluated after one year from the date of posting.

3. The Applicant shall notify the City that construction is complete according to the appropriate subdivision ordinance and the Charlotte Land Development Standards Manual before any security will be released. A final inspection will be made to check completeness of the project upon notification.

4. One type of security may be replaced by another type of security in certain situations. The amount of the replacement security will be based on the City's estimate of the work remaining. If the estimate of work results in a lower amount, the replacement security will be treated as a reduction. Certain situations will require an increase in a security and in such cases the replacement security shall be required to equal the higher amount.

5. A one-time reduction in security will be allowed if requested in writing by the principal party of the security. However, the security shall never be less than $10,000 for the City of Charlotte unless approved by the City.

## IV. APPROVED PLANT SPECIES

The following list of trees and shrubs represent the approved plant species that may be used to comply the City of Charlotte Unified Development Ordinance ("Tree Ordinance" section) of the City of Charlotte Code.

### Other species may be allowed with staff approval

List subject to change

* - Not allowed for required city planting.

**- Not reccomended for required city planting.

† - Cultivars under 15' tall only.

‡- Trees <25' mature height can be planted directly under power lines.

Trees 25'- 40' mature height can be planted at least 20' from power lines.

**Trees**

| Common Name | Scientific Name | City Tree Ordinance Approved | CIP/ROW Approved | City Zoning Approved (**L**arge or **S**mall Maturing) | Duke Transmission Zone(**T**) or Distribution line(**D**) Approved | | Shade Tolerant | Tolerates Poor Drainage | Native | Blooming | Foliage (**D**eciduous, **S**emi-deciduous, or **E**vergreen) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LARGE MATURING (50'+ H)** | | | | | | | | | | | |
| **Arborvitae, 'Green Giant'** | **Thuja 'Green Giant'** | | x | | | | | x | | | E |
| **Ash, Green** | **Fraxinus pennsylvanica** | | | L | | | x | | x | | D |
| **Ash, White** | **Fraxinus americana** | x | | L | | | | | x | | D |
| **Baldcypress** | **Taxodium distichum** | x | x | L | | | | x | x | | D |
| **Beech, American** | **Fagus grandiflora** | x | x | L | | | | | x | | D |
| **Birch, River** | **Betula nigra** | x | x | L | | | x | x | x | | D |
| **Black Gum** | **Nyssa sylvatica** | x | x | L | | | | | x | | D |
| **Cedar, Deodar** | **Cedrus deodara** | x | x | L | | | | | | | E |
| **Cedar, Eastern Red** | **Juniperus virginiana** | | x | L | | | | | x | | E |
| **Cryptomeria, Japanese** | **Cryptomeria japonica** | x | x | | | | | x | | | E |

## Trees

| Common Name | Scientific Name | City Tree Ordinance Approved | CIP/ROW Approved | City Zoning Approved (**L**arge or **S**mall Maturing) | Duke Transmission Zone(**T**) or Distribution line(**D**) Approved | | Shade Tolerant | Tolerates Poor Drainage | Native | Blooming | Foliage (**D**eciduous, **S**emi-deciduous, or **E**vergreen) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LARGE MATURING (50'+ H) cont...** | | | | | | | | | | | |
| Dawn Redwood | Metasequoia glyptostroboides | x | x | | | | | | | | S |
| Elm, Princeton | Ulmus americana 'Princeton' | | x | | | | | | | | D |
| Elm, Lacebark | Ulmus parvifolia | x | x | L | | | x | x | | | D |
| Gingko ‡ | Gingko biloba | x | x | L | | | x | x | | | D |
| Hackberry, Common | Celtis occidentalis | x | | L | | | x | x | x | | D |
| Hackberry, Sugar | Celtis laevigata | x | | | | | x | x | x | | D |
| Hemlock, Eastern | Tsuga canadensis | | | L | | | x | | x | | E |
| Hickory, Bitternut | Carya cordiformis | | | L | | | | | x | | D |
| Hickory, Pignut | Carya glabra | | | L | | | | | x | | E |
| Hickory, Shagbark | Carya ovata | | | L | | | | | x | | E |
| Holly, American | Ilex opaca | x | x | S | | | x | | x | | E |
| Honeylocust, Shademaster** | Gleditsia tricanthos inermis 'Shademaster' | | | | | | | | x | | D |
| Hornbeam, European | Carpinus betulus | x | x | S | | | x | x | | | D |
| Kentucky Coffeetree | Gymnocladus dioicus | x | x | | | | x | | x | | D |
| Linden, Little Leaf | Tilia cordata | x | | | | | x | x | | x | D |
| Magnolia, Cucumber | Magnolia acuminata | | x | | | | | | x | x | D |
| Magnolia, Southern | Magnolia grandiflora | x | x | L | | | | x | x | x | E |
| Maple, Freeman | Acer x fremanii | x | x | | | | x | | x | | D |
| Maple, Red * | Acer rubrum | | x | L | | | x | x | x | | D |
| Maple, Sugar | Acer saccharum | x | x | L | | | x | | x | | D |
| Oak, Black | Quercus velutina | | | L | | | x | | x | | D |
| Oak, Fastigiante English | Quercus robur 'Fastigiata' | | x | | | | | | | | D |

## Trees

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **LARGE MATURING (50'+ H) cont...** | | | | | | | | | | | |
| Oak, Laurel | Quercus laurifolia | x | | L | | | x | | x | | D |
| Oak, Live | Quercus virginiana | x | x | L | | | x | x | x | | E |
| Oak, Northern Red* | Quercus rubra | | | L | | | x | | x | | D |
| Oak, Nuttall | Quercus nuttalii | x | x | | | | x | | x | | D |
| Oak, Overcup | Quercus lyrata | x | x | | | | x | x | x | | D |
| Oak, Scarlet** | Quercus coccinea | | | L | | | | | x | | D |
| Oak, Shumard | Quercus shumardii | x | x | L | | | x | | x | | D |
| Oak, Southern Red | Quercus falcata | x | x | L | | | x | | x | | D |
| Oak, Swamp White | Quercus bicolor | | x | L | | | x | x | x | | D |
| Oak, Water | Quercus nigra | | x | L | | | | x | x | | D |
| Oak, White | Quercus alba | | x | L | | | x | | x | | D |
| Oak, Willow | Quercus phellos | x | x | L | | | x | x | x | | D |
| Pecan | Carya illinoensis | | | L | | | | | x | | D |
| Persimmon | Diospyros virginiana | | | L | | | x | | x | | D |
| Pine, Austrian | Pinus nigra | x | | L | | | | x | | | E |
| Pine, Japanese Black | Pinus thunbergi | | | L | | | | | | | E |
| Pine, Loblolly | Pinus taeda | x | x | L | | | | x | x | | E |
| Pine, Shortleaf | Pinus echinata | | x | L | | | | | x | | E |
| Pine, Virginia | Pinus virginiana | x | x | L | | | | | x | | E |
| Poplar, Tulip | Liriodendron tulipfera | x | x | L | | | x | x | x | x | D |
| Sweetgum, Fruitless | Liquidambar styraciflua 'Rotundiloba' | x | x | L | | | x | x | x | | D |
| Sweetgum, Slender | Liquidambar styraciflua 'Slender Silhouette' | | x | | | | x | x | x | | D |
| Zelkova, Japanese * | Zelkova serrata | | | L | | | x | | | | D |

## Trees

| Common Name | Scientific Name | City Tree Ordinance Approved | CIP/ROW Approved | City Zoning Approved (**L**arge or **S**mall Maturing) | Duke Transmission Zone(**T**) or Distribution line(**D**) Approved | | Shade Tolerant | Tolerates Poor Drainage | Native | Blooming | Foliage (**D**eciduous, **S**emi-deciduous, or **E**vergreen) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MEDIUM MATURING (30'-50'H)** | | | | | | | | | | | |
| Arborvitae, American † | Thuja occidentalis | | x | | D | | | x | x | | E |
| Carolina Silverbell | Halesia carolina | x | x | S | | | x | | x | x | D |
| Chinese Pistache | Pistacia chinensis | x | x | | | | x | x | | | D |
| Crape Myrtle (Biloxi, Natchez)* | Lagerstroemia | | x | | | | | | | | D |
| Dogwood, Flowering ‡ | Cornus florida | x | x | S | D | | x | | x | x | D |
| Dogwood, Kousa ‡- | Cornus kousa | x | x | S | D | | x | | x | x | D |
| Fringetree, Chinese | Chionanthus retusus | x | | | | | x | | | x | D |
| Golden Raintree | Koelreuteria paniculata | | x | S | | | | | | x | D |
| Hawthorne, Green | Crataegus viridis 'Winter King' | x | x | | | | | x | x | x | D |
| Holly, 'Emily Brunner' | Ilex X 'Emily Brunner' | | x | | | | x | | | | E |
| Holly, 'Nellie R. Stevens' | Ilex X 'Nellie R. Stevens' | | x | | | | x | | | | E |
| Holly, Savannah | Ilex X attenuata 'Savannah' | | x | S | | | | x | x | | E |
| Hornbeam, American | Carpinus caroliniana | x | x | S | | | x | x | x | | D |
| Maple, Hedge | Acer campestre | | x | S | | | | x | | | D |
| Maple, Paperbark | Acer griseum | | x | | | | | | | | D |
| Maple, Trident | Acer buergeranum | x | x | | | | x | | | | D |
| Redbud, Chinese ‡ | Cercis chinensis | x | x | | D | | x | | | x | D |
| Sourwood | Oxydendrum arboreum | | | S | | | x | | x | x | D |

## Trees

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **SMALL MATURING (UP-25'H)** | | | | | | | | | | | |
| Arborvitae, Emerald Green | Thuja occidentalis 'Emerald Green' | | x | | | | | | | | E |
| Buckeye, Bottlebrush † | Aesculus parviflora | x | x | | T | | x | | x | x | D |
| Camellia, Sasanuqa | Camellia sasanqua | | x | S | | | x | | | x | E |
| Cherry, Kwanzan | Prunus serrulata 'Kwanzan' | x | | S | | | | | | x | D |
| Cherry, Snowgoose | Prunus serrulata 'Snowgoose' | | x | | | | | | | x | D |
| Cherry, 'Okame' | Prunus X 'Okame' | x | x | | | | | | | x | D |
| Cherry, Weeping | Prunus subhirtella pendula | | | S | | | | | | x | D |
| Cherry, Yoshino | Prunus X yedoensis | x | x | S | D | | | | | x | D |
| Cherrylaurel, Carolina | Prunus caroliniana | | | S | | | x | x | x | x | E |
| Crabapple, Japanese Flowering † | Malus floribunda | | x | S | D | | | | | x | D |
| Crape Myrtle | Lagerstroemia | | x | | | | | | | | D |
| Dogwood, redtwig † | Cornus sericea f. baileyi | | x | | D | | | x | x | x | D |
| Dogwood, Rutger's Hybrid | Cornus kousa X florida | | x | | D | | x | x | | x | D |
| Filbert, American | Corylus americana | x | x | | T,D | | x | | x | | D |
| Fringetree | Chionanthus virginiana | | x | | | | | x | x | x | D |
| Hawthorne, Washington | Crataegus phaenopyrum | x | x | S | | | | x | x | x | D |
| Holly, Foster | Ilex X attenuata 'Fosteri' | x | x | S | | | | x | x | | E |
| Holly, Yaupon | Ilex vomitoria | | x | S | | | x | | x | | E |
| Magnolia, Star † | Magnolia stellata | x | x | S | D | | | x | x | x | D |

## Trees

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **SMALL MATURING (UP-25'H)** | | | | | | | | | | | |
| **Magnilia, Lily Flowered** | **Magnolia liliiflora** | | x | | | | x | | | x | D |
| **Magnolia, 'Little Gem'** | **Magnolia grandiflora 'Little Gem'** | x | x | | | | | x | x | x | E |
| **Magnolia, 'Merrill'** | **Magnolia X loebneri 'Merrill'** | | x | | | | | x | x | x | D |
| **Magnolia, Saucer** | **Magnolia X soulangiana** | x | x | S | D | | | x | x | x | D |
| **Maple, Armur 'Flame' †** | **Acer tataricum ginnala 'Flame'** | x | x | | D | | | x | | | D |
| **Maple, Japanese** | **Acer palmatum** | x | x | | | | x | | | | D |
| **Maple, Purplebow/Shantung** | **Acer truncatum** | | x | | | | | | | | D |
| **Plum, Purpleleaf** | **Prunus cerasifera 'Atropurpurea'** | x | x | S | | | | | | x | D |
| **Redbud, Eastern** | **Cercis canadensis** | x | x | S | D | | x | x | x | x | D |
| **Serviceberry** | **Amelanchier arborea** | x | x | | | | | | x | x | D |
| **Serviceberry, Shadbush †** | **Amelanchier canadensis** | x | x | S | T | | x | | x | x | D |
| **Waxmyrtle** | **Myrica cerifera** | x | | S | | | | x | | | E |

**SHRUBS**

| Common Name | Scientific Name |
|---|---|
| Burford holly * | Ilex cornuta burfordi |
| Camellia * | Camellia japonica |
| Convex Japanese holly * | Ilex crenata `convexa' |
| Dwarf burford holly * | Ilex cornuta burfordi nana |
| Emily brunner holly * | Ilex "Emily Brunner" |
| English holly * | Ilex aquifolium |
| Evergreen euonymus * | Euonymus japonicus |
| Flowering quince | Chaenomeles speciosa |
| Forsythia | Forsythia intermedia |
| Glenn dale azalea * | Azalea hybrida |
| Glossy abelia * | Abelia grandiflora |
| Hetzi Japanese holly * | Ilex crenata `hetzi' |
| Hetzi jumper * | Jumperus chinesis hetzi |
| Indian azalea * | Azalea indica |
| Inkberry holly * | Ilex glabra |
| Japanese aucuba * | Aucuba japonica |
| Kaempferi azalea * | Azalea obtusum Kaempferi |
| Laurel * | Laurus nobilis |
| Loropetalum * | Loropetalum chinense |
| Lusterleaf holly * | Ilex latifolia |
| Oakleaf hydrangea | Hydrangea quercifolia |
| Perny holly * | Ilex pernyi |
| Pfitzer juniper * | Juniperus chinensis pfitzeriana |

| Common Name | Scientific Name |
|---|---|
| Roundleaf Japanese holly * | Ilex crenata `rotundifolia' |
| Sasanqua Camellia * | Camellia sasanqua |
| Witch-hazel | Hammamelis virginiana |
| Yaupon holly * | Ilex vomitoria |
| Wax myrtle * | Myrica cerifera |
| Wild olive * | Osmanthus americana |
| Chinese photinia * | Photinia serrulata |
| Mountain andromeda * | Pieris floribunda |
| Japanese andromeda * | Pieris japonica |
| Pittosporum * | Pittosporum tobira |
| English laurel * | Prunus laurocerasus |
| Podocarpus * | Podocarpus macrophyllus maki |
| Narrow leafed English laurel * | Prunus laurocerasus angustifolia |
| Scarlet firethorn | Pyracantha coccinea |
| Yeddo-hawthorn * | Raphiolepis umbellata |
| Reeves spirea | Spirea cantoniensis |
| Thunberg spirea | Spirea thunbergii |
| Bridalwreath spirea | Spirea prunifolia plena |
| Vanhoutte spirea | Spirea vanhouttei |
| Japanese yew * | Taxus cuspidata |
| Leatherleaf viburnum * | Viburnum rhytidophyllum |
| Laurestinus viburnum * | Viburnum tinus |

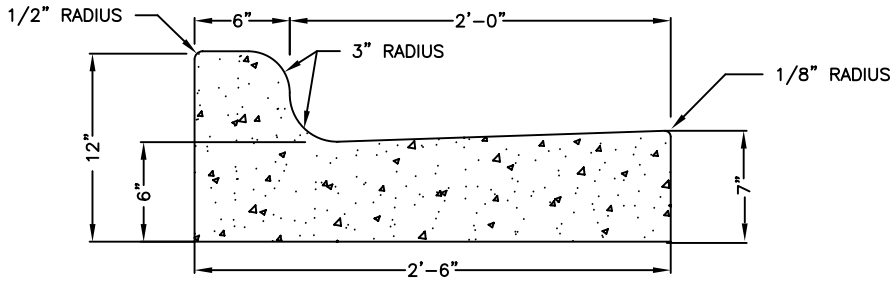
* denotes evergreen

**Other species may be allowed with staff approval**

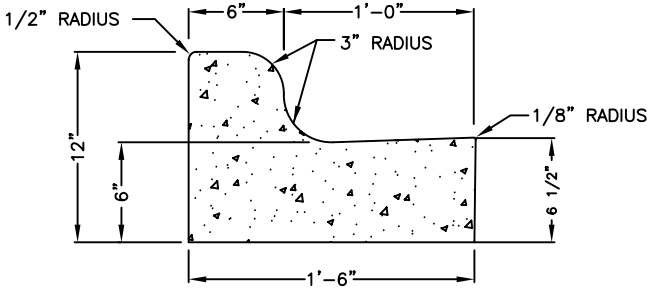
List subject to change

**REFERENCES**

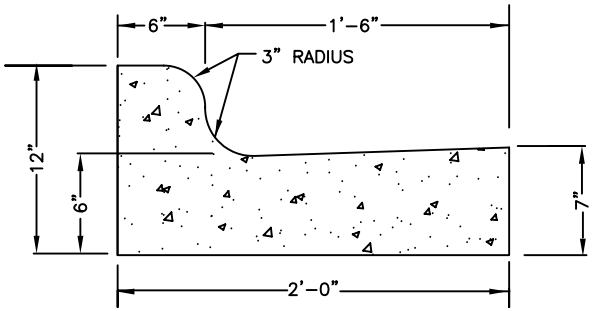

1. North Carolina Department of Transportation, Standard Specifications for Roads and Structures, latest edition.
2. North Carolina Department of Transportation, Roadway Standards Drawings, latest edition.
3. City of Charlotte Department of Transportation, Work Area Traffic Control Handbook (WATCH), latest edition.
4. City of Charlotte and Mecklenburg County Storm Water Services, Charlotte-Mecklenburg Storm Water Design Manual, latest edition.
5. American Association of State Highway and Transportation Officials most recent edition, A Policy on Geometric Design of Highways and Streets.
6. North Carolina Department of Transportation, Roadway Design Manual, latest edition.
7. NCDEQ -Division of Energy, Mineral, and Land Resources, Erosion and Sediment Control Planning and Design Manual, latest edition.
8. NCDEQ, Storm Water Best Management Practices, latest edition.
9. Charlotte-Mecklenburg SCM Design Manual, latest edition.
10. City of Charlotte, CDOT Pavement Marking Standards, latest edition.
11. The City of Charlotte Urban Street Design Guidelines, adopted by City Council October 22, 2007.
12. Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD), latest edition.
13. United States Access Board, Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG), latest edition.
14. City of Charlotte, Charlotte Streets Manual
15. City of Charlotte, Post Installation Inspection and Repair of Storm Drainage Pipes and Culverts, latest edition.
16. Charlotte Storm Water Services, Third-Party Inspection for Pipe Installations, latest edition.



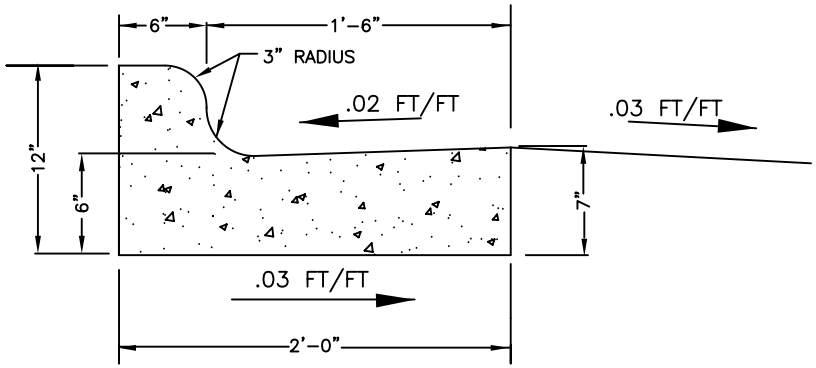

STANDARD 2'-6" CURB AND GUTTER




1'-6" STANDARD CURB AND GUTTER




2'-0" STANDARD CURB & GUTTER




SLOPE FOR VARIABLE
SUPERELEVATION RATES

NOT TO SCALE

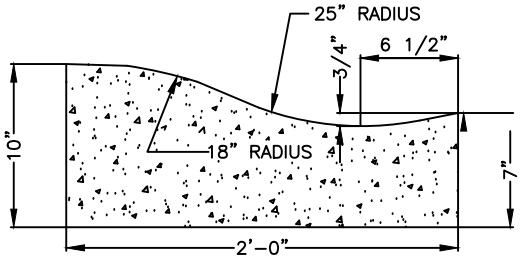
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# STANDARD CURB AND GUTTER

| STD. NO. | REV. |
|---|---|
| 10.17A | |

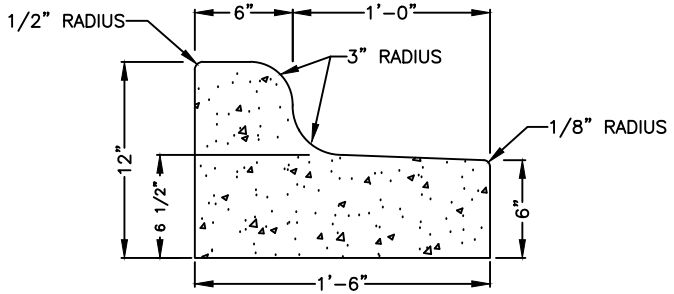
## 2'–0" VALLEY GUTTER




## 1'–6" MEDIAN CURB AND GUTTER**

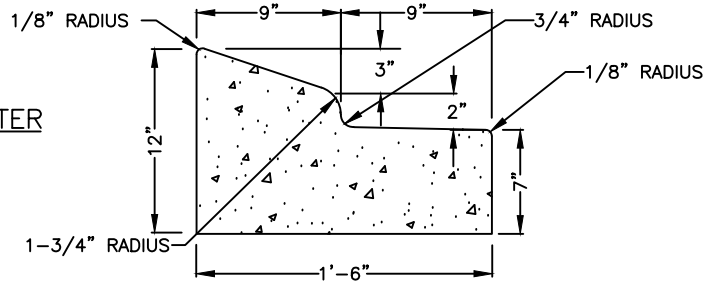
TO BE USED IN MEDIANS WHEN LANES ARE SLOPED FROM ISLAND OR AS SPECIFIED BY THE APPROPRIATE CITY DEPT.

**ONLY FOR USE ON MEDIANS WITHIN CITY–MAINTAINED STREETS.




## 1'–6" MOUNTABLE CURB AND GUTTER

TO BE USED IN MEDIANS OR TRUCK APRONS ONLY; WHEN SPECIFIED BY THE APPROPRIATE CITY DEPT.



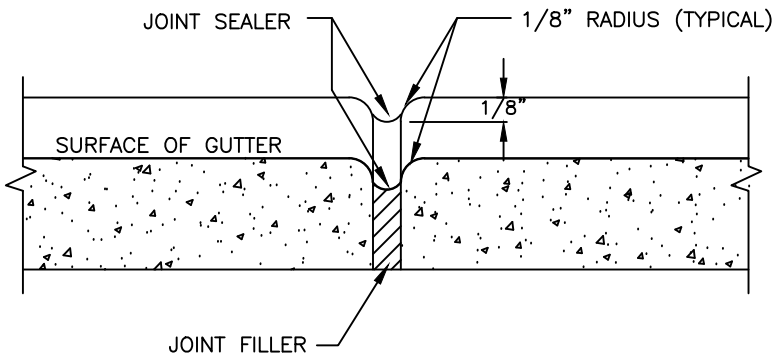

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CURB AND GUTTER

| STD. NO. | REV. |
|---|---|
| 10.17B | 20 |




## TRANSVERSE EXPANSION JOINT

## NOTES:

1. CONTRACTION JOINTS SHALL BE SPACED AT 10–FOOT INTERVALS. FOR VALLEY GUTTER, A 10–FOOT SPACING MAY BE USED WHEN A MACHINE IS USED. JOINT SPACING MAY BE ALTERED BY THE CITY 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 EXPANSION JOINTS SHALL BE SPACED AT 90–FOOT INTERVALS, AND ADJACENT TO ALL RIGID OBJECTS. JOINTS SHALL MATCH LOCATIONS WITH JOINTS IN ABUTTING SIDEWALK.
4. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 P.S.I. IN 28 DAYS.
5. CURB SHALL BE DEPRESSED AT INTERSECTIONS TO PROVIDE FOR FUTURE ACCESSIBLE RAMPS.
6. TOP 6" OF SUBGRADE BENEATH THE CURB AND GUTTER SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
7. FOR CURB AND GUTTER INSTALLATIONS THE ETJ, NCDOT REQUIRES THAT ALL JOINTS MUST BE FILLED WITH JOINT SEALER PER NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, SECTION 846–3 (C).

NOT TO SCALE

CHARLOTTE.

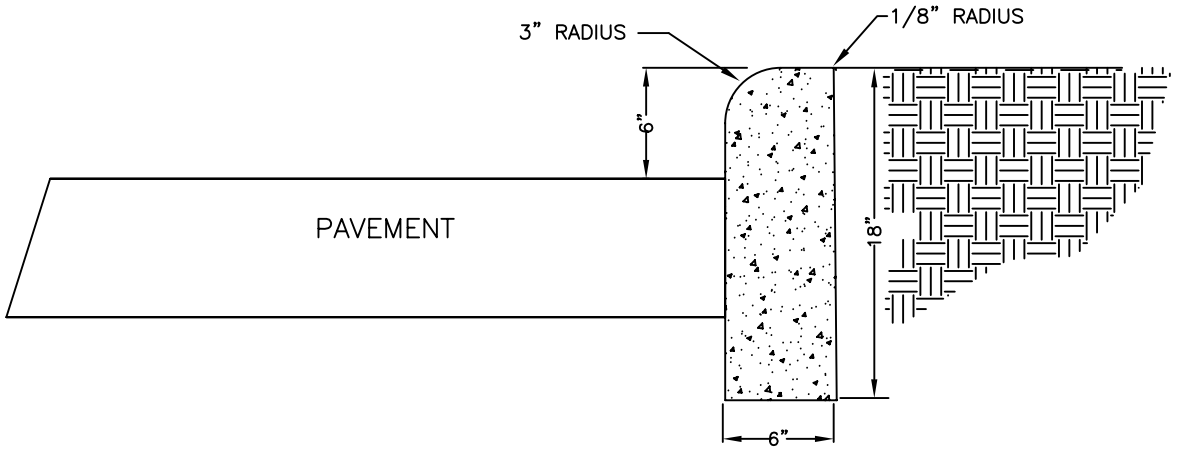
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CURB AND GUTTER

| STD. NO. | REV. |
|---|---|
| 10.17C | 21 |

NOTES:

1. CONTRACTION JOINTS SHALL BE SPACED AT 10–FOOT 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 EXPANSION JOINTS SHALL BE SPACED AT 90–FOOT INTERVALS, AND ADJACENT TO ALL RIGID OBJECTS. JOINTS SHALL MATCH LOCATIONS WITH JOINTS IN ABUTTING SIDEWALK.
4. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 P.S.I. IN 28 DAYS.
5. CURB SHALL BE DEPRESSED AT INTERSECTIONS TO PROVIDE FOR FUTURE ACCESSIBLE RAMPS.
6. TOP 6" OF SUBGRADE BENEATH THE CURB SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
7. DETAIL MAY BE USED FOR PRIVATE DRIVES, PARKING LOTS, AND INTERIOR CIRCULATION DRIVE.



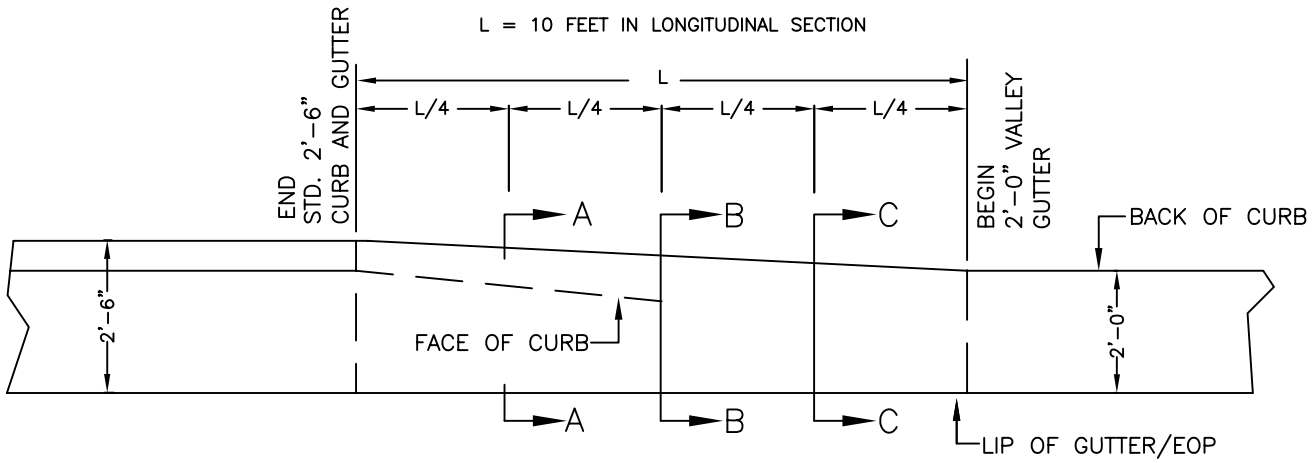

NOT TO SCALE

CHARLOTTE.

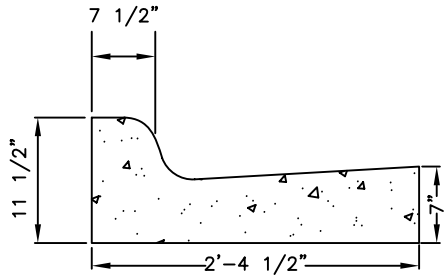
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# 18" VERTICAL CURB

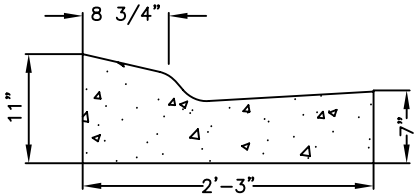
| STD. NO. | REV. |
|---|---|
| 10.18 | |



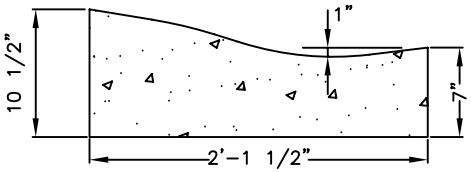

PLAN VIEW




SECTION A–A




SECTION B–B




SECTION C–C

NOTES:

1. TRANSITION IS NOT TO BE LOCATED WITHIN THE CURB RADIUS.

NOT TO SCALE

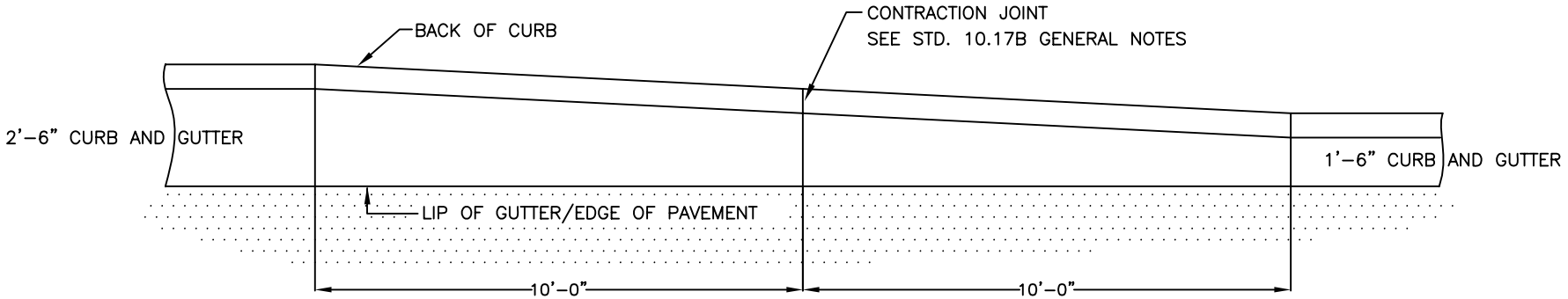
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CURB TRANSITION

## 2'6" CURB AND GUTTER TO 2'–0" VALLEY GUTTER

| STD. NO. | REV. |
|---|---|
| 10.19 | |




PLAN VIEW

NOTES:

1. TRANSITION TO BE ALONG BACK OF CURB.

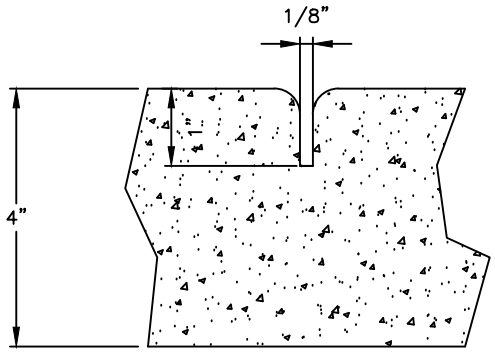
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CURB TRANSITION
# 2'–6" CURB AND GUTTER TO 1'–6" CURB AND GUTTER

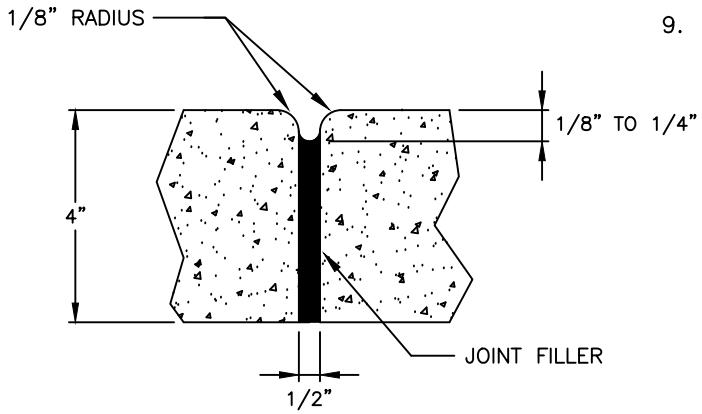
| STD. NO. | REV. |
|---|---|
| 10.20 | |




GROOVE JOINT IN SIDEWALK

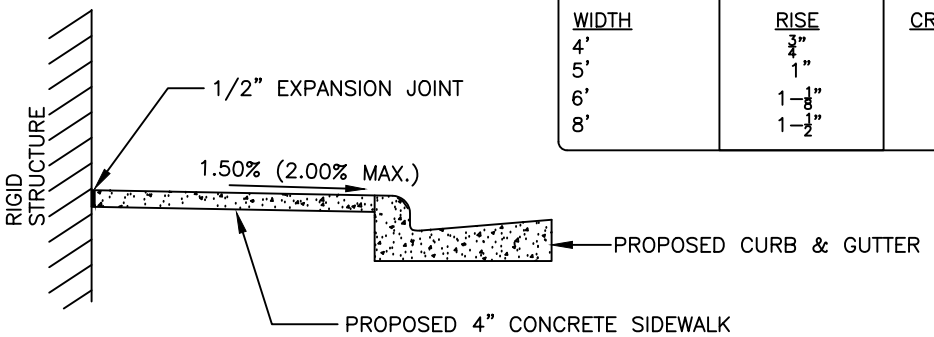
## GENERAL NOTES:

1. A GROOVE JOINT 1" DEEP WITH 1/8" RADII SHALL BE REQUIRED IN THE CONCRETE SIDEWALK WITH JOINT SPACING EQUAL TO THE WIDTH OF SIDEWALK, UP TO 10' WIDTH. WIDER THAN 10' REQUIRES SPECIAL DESIGN (SEE DETAIL #10.42 FOR MULTI-USE PATH).
2. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT INTERVALS OF NOT MORE THAN 45' AND MATCHING EXPANSION/CONSTRUCTION JOINT IN ADJACENT CURB. A SEALED 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.
3. SIDEWALK AT DRIVEWAY ENTRANCES TO BE 6" THICK.
4. WIDTH OF SIDEWALK ON ARTERIALS SHALL BE BASED ON THE STREETS MAP TYPICAL SECTION. WIDTH OF SIDEWALKS ON UPTOWN STREETS WILL BE BASED ON TABLE 33-6 OF THE UDO.
5. WIDTH OF SIDEWALKS ON NON-ARTERIALS SHALL BE BASED ON TYPICAL SECTION, OR AS SHOWN ON THE STREETS MAP WHEN A SHARED USE PATH IS SHOWN. SIDEWALK/SUP OF REQUIRED WIDTH TO BE POURED TO END OF RADIUS AT INTERSECTING STREETS.
6. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 PSI. IN 28 DAYS.
7. ZONING CONDITIONS MAY REQUIRE ADDITIONAL WIDTH SIDEWALKS WHICH SHALL SUPERSEDE THESE STANDARD DIMENSIONS SHOWN.
8. LIDS FOR JUNCTION BOXES AND UTILITY VAULTS SHALL BE NON-SKID AS SPECIFIED BY ENGINEER.
9. JOINT MATERIALS SHALL LIMIT SHRINK/SWELL SO POST CONSTRUCTION INSTALLATION RESULTS IN A MAXIMUM OF 1/4" FROM FLUSH.




TRANSVERSE EXPANSION JOINT IN SIDEWALK

| EXAMPLE SIDEWALK CONSTRUCTION DIMENSIONS: | | |
|---|---|---|
| WIDTH | RISE | CROSS-SLOPE |
| 4' | $\frac{3}{4}$" | 1.56% |
| 5' | 1" | 1.67% |
| 6' | $1-\frac{1}{8}$" | 1.56% |
| 8' | $1-\frac{1}{2}$" | 1.56% |




DETAILS SHOWING EXPANSION JOINTS IN CONCRETE SIDEWALK

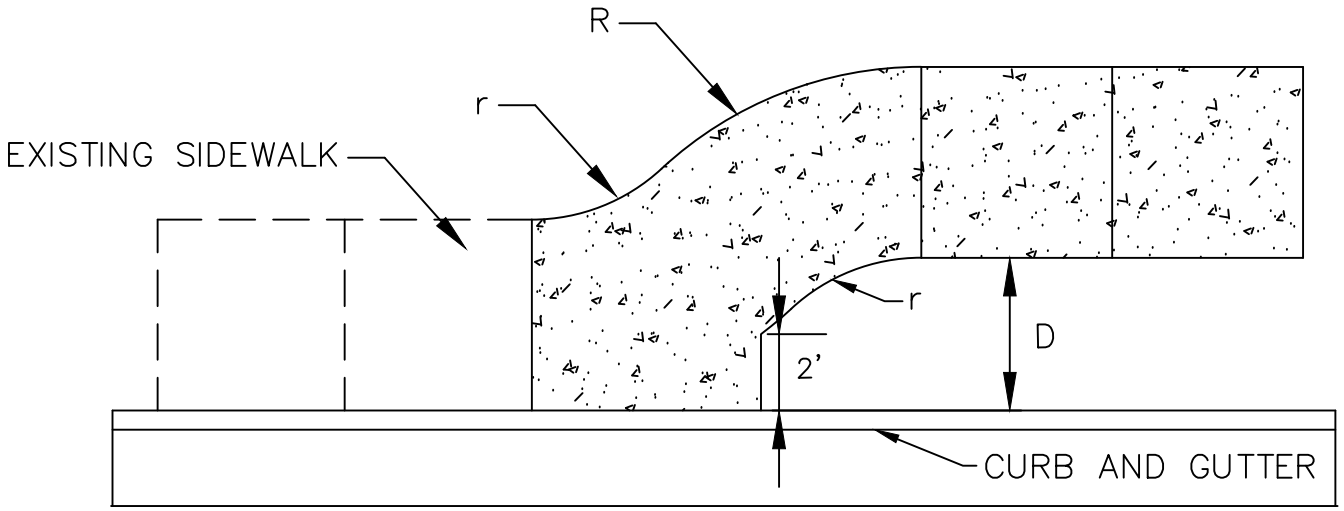
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CONCRETE SIDEWALKS

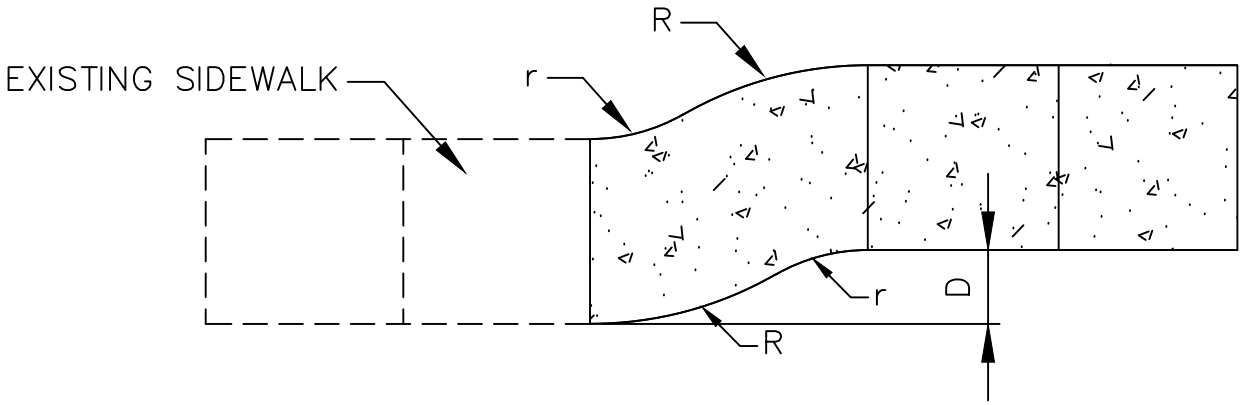
| STD. NO. | REV. |
|---|---|
| 10.22 | 23 |




SIDEWALK TRANSITION DETAIL AT BACK OF CURB
Not to scale

KEY

| D | R | r |
|---|---|---|
| 0'–2.9' | 10' | 4' |
| 3'–7.9' | 25' | 19' |
| 8'+ | 50' | 44' |




SIDEWALK TRANSITION DETAIL (PLANTING STRIP BOTH SIDES)
Not to scale

CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SIDEWALK TRANSITION

| STD. NO. | REV. |
|---|---|
| 10.23 | 18 |

## NOTES:

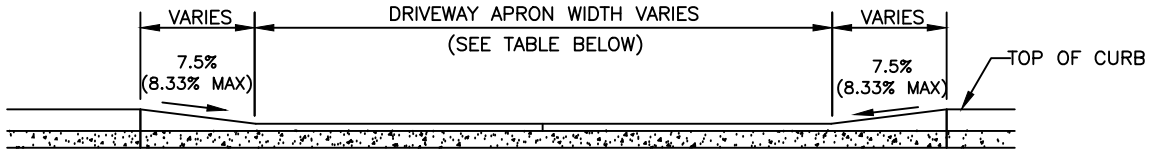
1. 1/2" EXPANSION JOINTS REQUIRE INSTALLATION OF ONE 1/2" THICK PIECE OF BITUMINOUS FIBER THROUGH THE ENTIRE SLAB. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
2. TO LIMIT STORM WATER FLOW DOWN DRIVEWAYS, USE STANDARD 10.24C FOR DRIVEWAYS NEAR LOW POINTS.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. REFER TO CHAPTER 32 OF THE UDO FOR MODIFICATIONS RELATED TO TREE PRESERVATION OR CONSTRAINED SPACES.

## GENERAL NOTES:

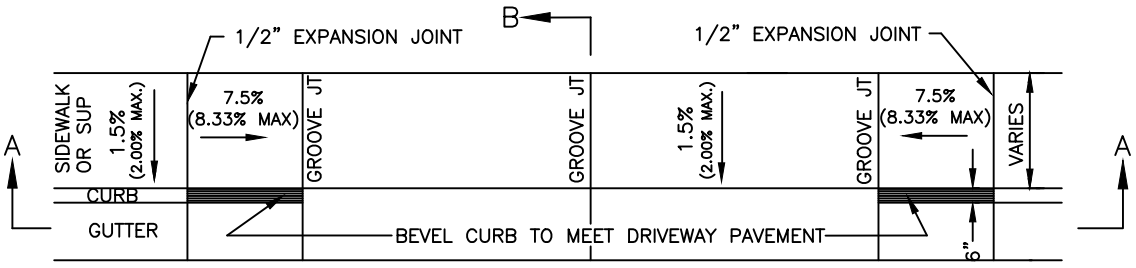
- ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
- ALL CURB, CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED.
- SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
- SEE STD. NO 10.17B FOR DETAIL OF EXPANSION JOINT AND GROOVE JOINT.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| TYPE DRIVEWAY | MINIMUM | MAXIMUM |
| TYPE I–RESIDENTIAL: | | |
| LOCAL/COLLECTOR | 10' | 24' |
| ARTERIAL * | 15' | 24' |
| ONE–WAY TYPE II COMMERCIAL | 20' | 30' |
| TWO–WAY TYPE II COMMERCIAL | 26' | 50' |

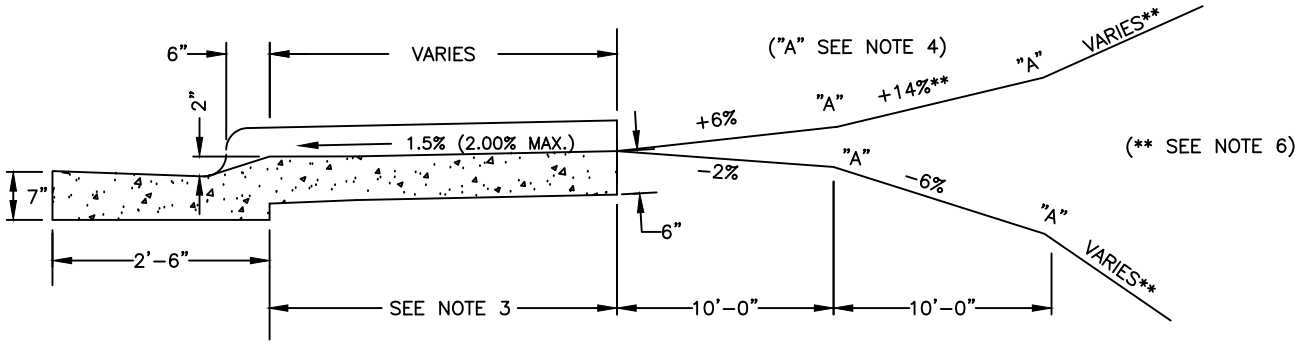
* MUST PROVIDE ON–SITE TURNAROUND




SECTION A – A




PLAN




SECTION B – B

NOT TO SCALE

CHARLOTTE.

**CITY OF CHARLOTTE**
**LAND DEVELOPMENT STANDARDS**
**INCLUDES CHARLOTTE ETJ**

# COMMERCIAL TYPE II AND RESIDENTIAL TYPE I DROP CURB DRIVEWAY WITH SIDEWALK ABUTTING CURB (2'–6" CURB AND GUTTER)

| STD. NO. | REV. |
|---|---|
| 10.24A | 24 |

## NOTE:

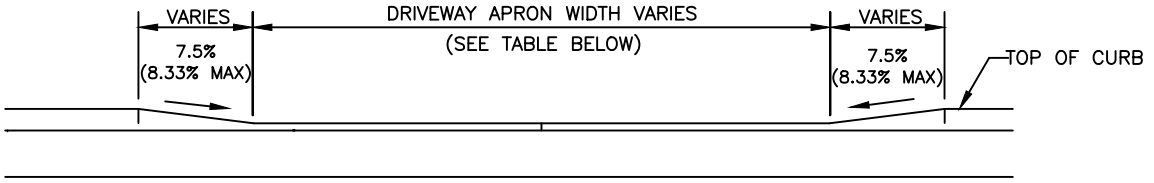
1. 1/2" EXPANSION JOINTS REQUIRE INSTALLATION OF ONE 1/2" THICK PIECE OF BITUMINOUS FIBER THROUGH THE ENTIRE SLAB. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
2. TO LIMIT STORM WATER FLOW DOWN DRIVEWAYS, USE STANDARD 10.24C FOR DRIVEWAYS NEAR LOW POINTS.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. REFER TO CHAPTER 32 OF THE UDO FOR MODIFICATIONS RELATED TO TREE PRESERVATION OR CONSTRAINED SPACES.

## GENERAL NOTES:

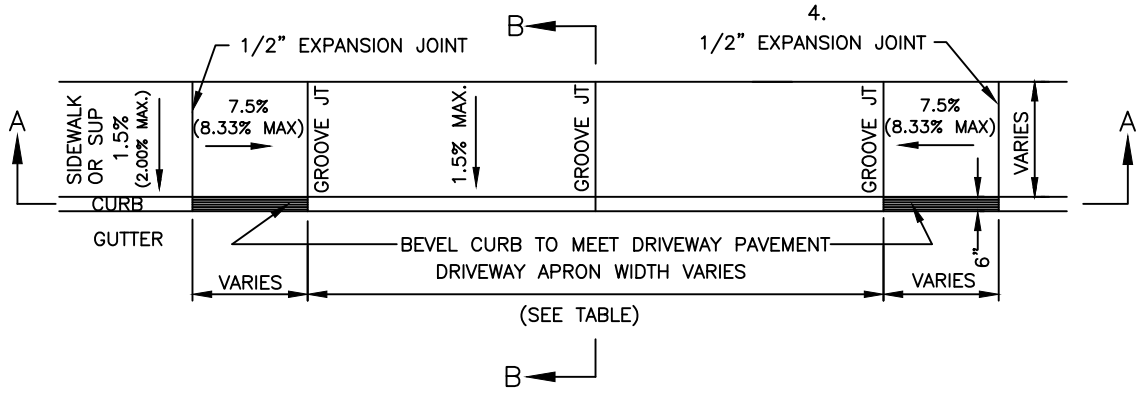
- ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
- ALL CURB, CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED.
- SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
- SEE STD. NO 10.17B FOR DETAIL OF EXPANSION JOINT AND GROOVE JOINT.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| TYPE DRIVEWAY | MINIMUM | MAXIMUM |
| TYPE I–RESIDENTIAL | | |
| LOCAL/COLLECTOR | 10' | 24' |
| ARTERIAL * | 15' | 24' |
| ONE–WAY TYPE II COMMERCIAL | 20' | 30' |
| TWO–WAY TYPE II COMMERCIAL | 26' | 50' |

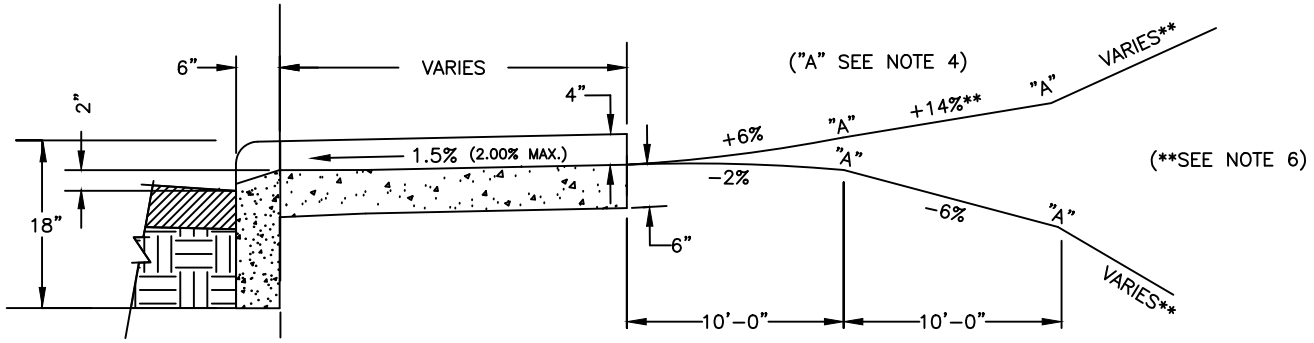
* MUST PROVIDE ON–SITE TURNAROUND




SECTION A – A




PLAN




SECTION B – B

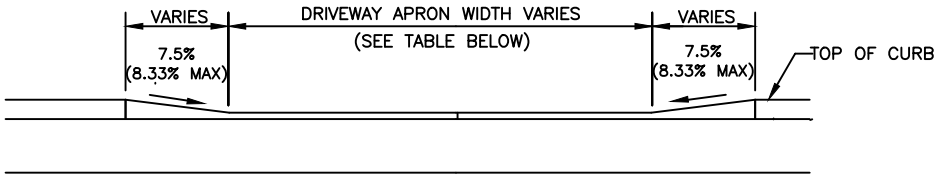
NOT TO SCALE

CHARLOTTE.

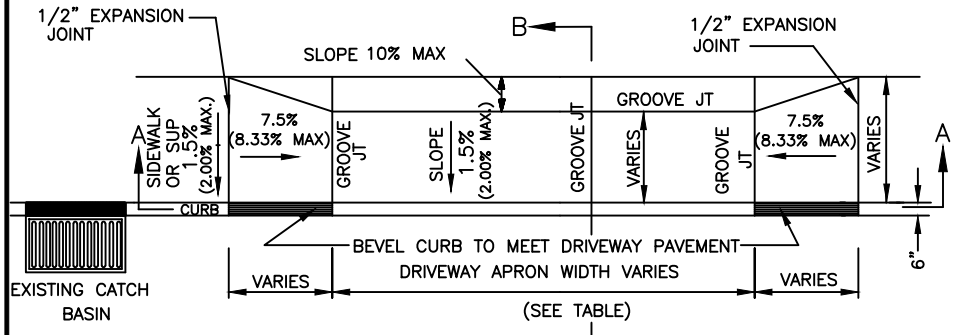
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# COMMERCIAL TYPE II AND RESIDENTIAL TYPE I DROP CURB DRIVEWAY WITH SIDEWALK ABUTTING CURB (6" X 18" VERTICAL CURB)

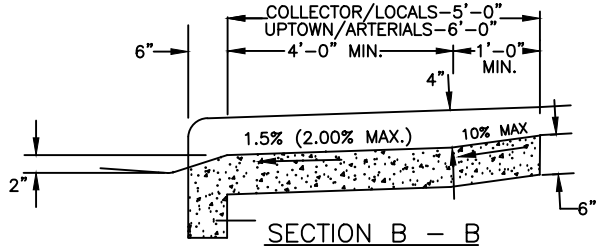
| STD. NO. | REV. |
|---|---|
| 10.24B | 24 |




SECTION A – A



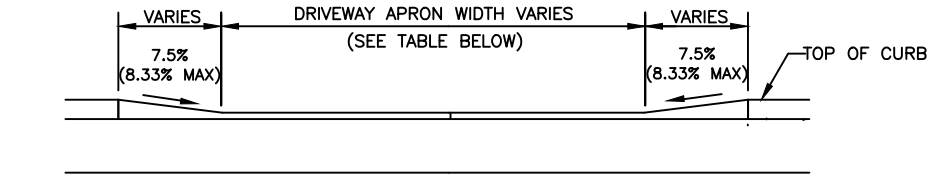

PLAN



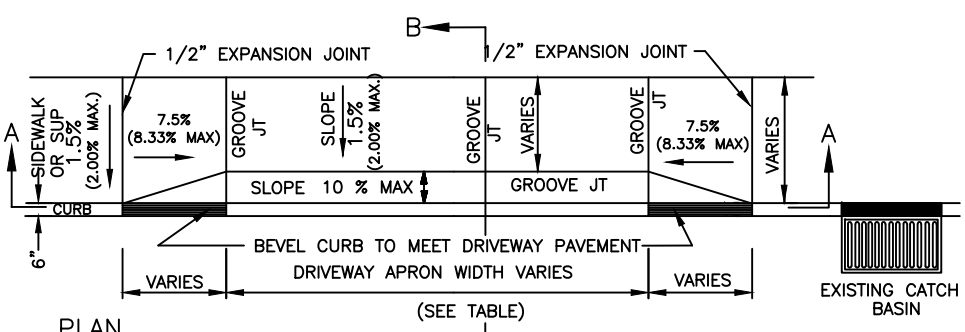

SECTION B – B

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| TYPE DRIVEWAY | MINIMUM | MAXIMUM |
| TYPE I–RESIDENTIAL: | | |
| LOCAL/COLLECTOR | 10' | 24' |
| ARTERIAL * | 15' | 24' |
| ONE–WAY TYPE II COMMERCIAL | 20' | 30' |
| TWO–WAY TYPE II COMMERCIAL | 26' | 50' |

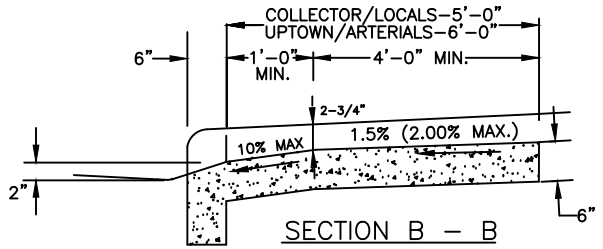
* MUST PROVIDE ON–SITE TURNAROUND




SECTION A – A




PLAN




SECTION B – B

## NOTES

1. USED AT LOW POINTS IN ROADWAYS WITH 2'–6" CURB AND GUTTER OR 6" X 18" CURB AS DIRECTED BY THE CITY.
2. SEE STANDARDS 10.24A & 10.24B FOR ADDITIONAL DETAILS.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.

NOT TO SCALE

CHARLOTTE.

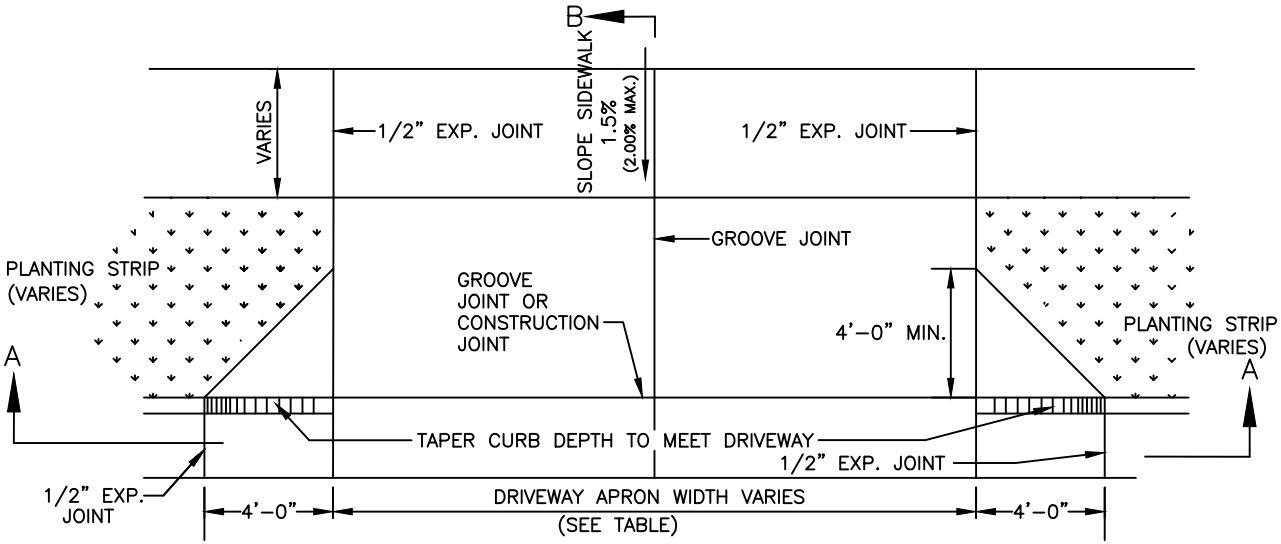
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# COMMERCIAL TYPE II AND RESIDENTIAL TYPE I DROP CURB DRIVEWAY WITH SIDEWALK ABUTTING CURB 6" X 18" (VERTICAL CURB)

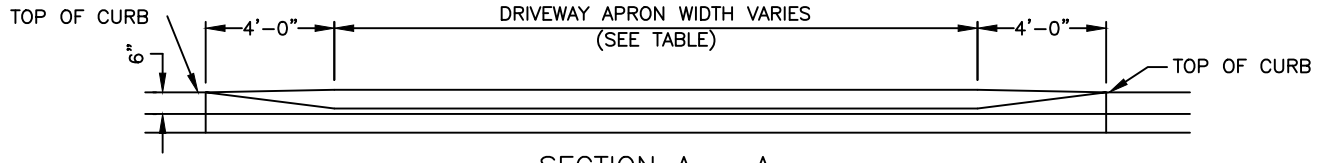
| STD. NO. | REV. |
|---|---|
| 10.24C | 24 |

NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO. 10.17 FOR JOINT DETAIL.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.



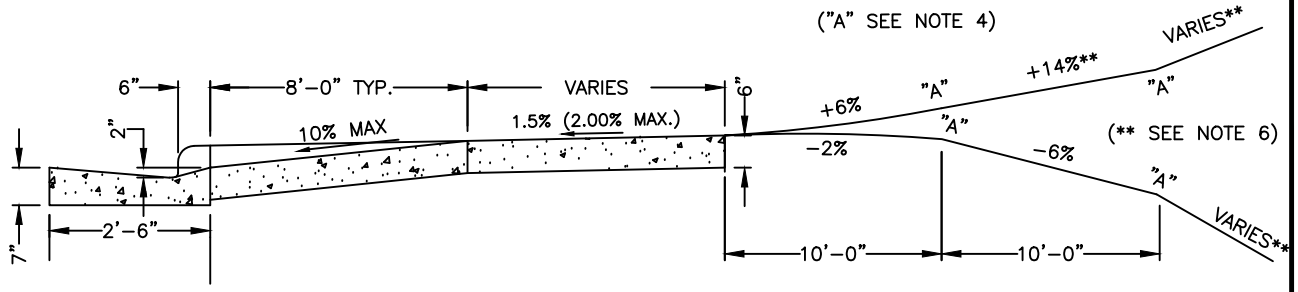

PLAN VIEW




SECTION A – A

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| DRIVEWAY TYPE | MINIMUM | MAXIMUM |
| LOCAL/COLLECTOR | 10' | 24' |
| ARTERIAL * | 15' | 24' |

* MUST PROVIDE ON-SITE TURNAROUND




SECTION B – B

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RESIDENTIAL DROP CURB TYPE I DRIVEWAY WITH PLANTING STRIP (2'-6" CURB AND GUTTER)

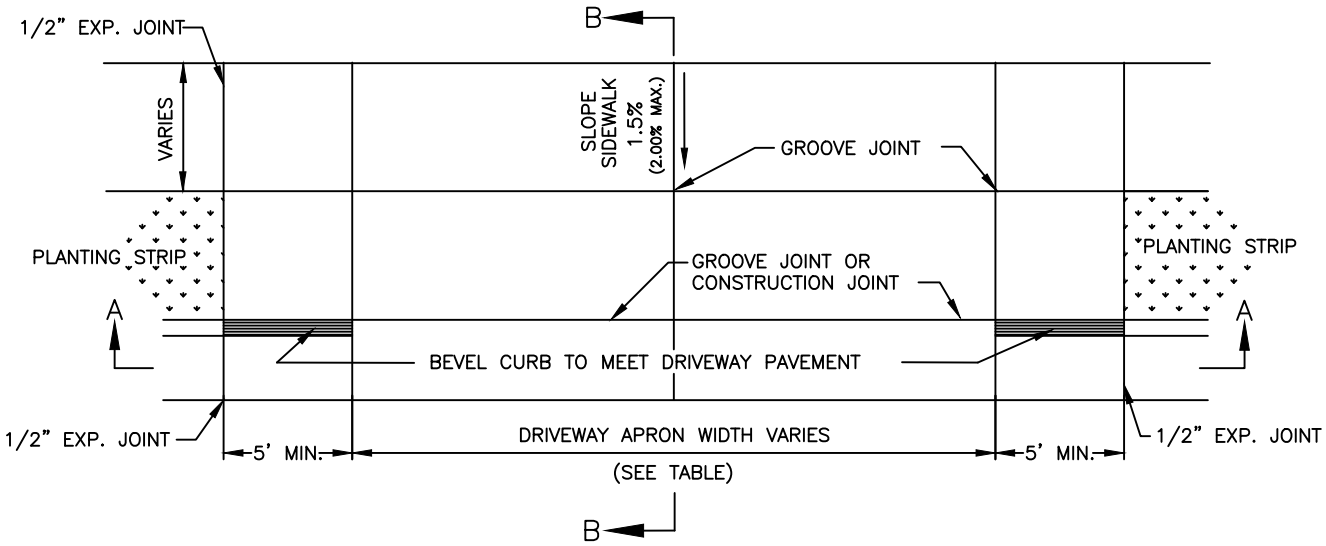
| STD. NO. | REV. |
|---|---|
| 10.25A | 24 |

NOTES:

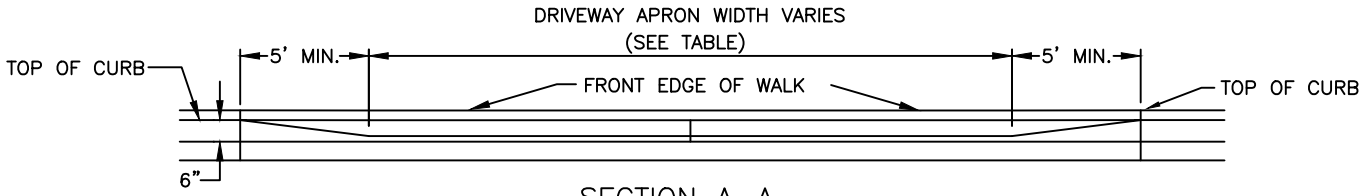
1. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
2. AT ALL DRIVEWAYS, SIDEWALKS TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO. 10.17 FOR JOINT DETAIL.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" BREAKOVER SHALL BE 8% OR LESS (A=ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING THE GRADES SHOWN ON THIS DETAIL.
6. **PER NC IFC SECTION D103.2, FIRE APPARATUS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
8. THIS DETAIL IS ONLY FOR USE WHEN PLANTING STRIP IS 6' OR LESS IN WIDTH. USE TYPE II–MODIFIED DRIVEWAY 10.25E WITH LARGER PLANTING STRIP.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| TYPE DRIVEWAYS | MINIMUM | MAXIMUM |
| ONE–WAY TYPE II – COMMERCIAL | 20' | 30' |
| TWO–WAY TYPE II – COMMERCIAL | 26' | 50'* |

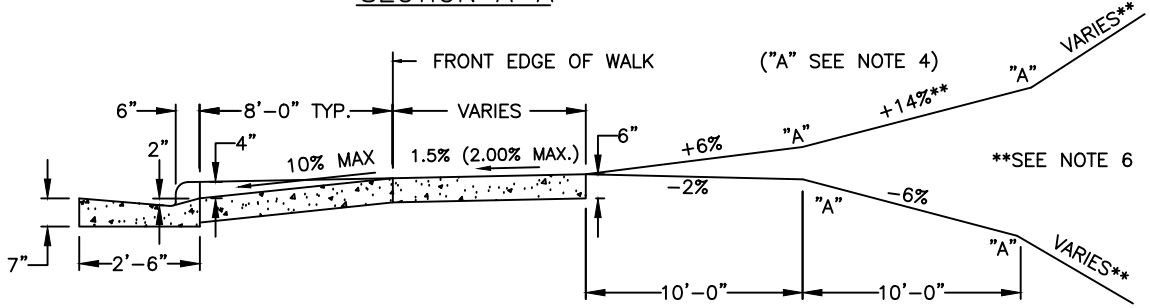
* NEED MORE THAN ONE CONTRACTION JOINT IN CENTER.




PLAN VIEW




SECTION A–A




SECTION B–B

NOT TO SCALE

CHARLOTTE.

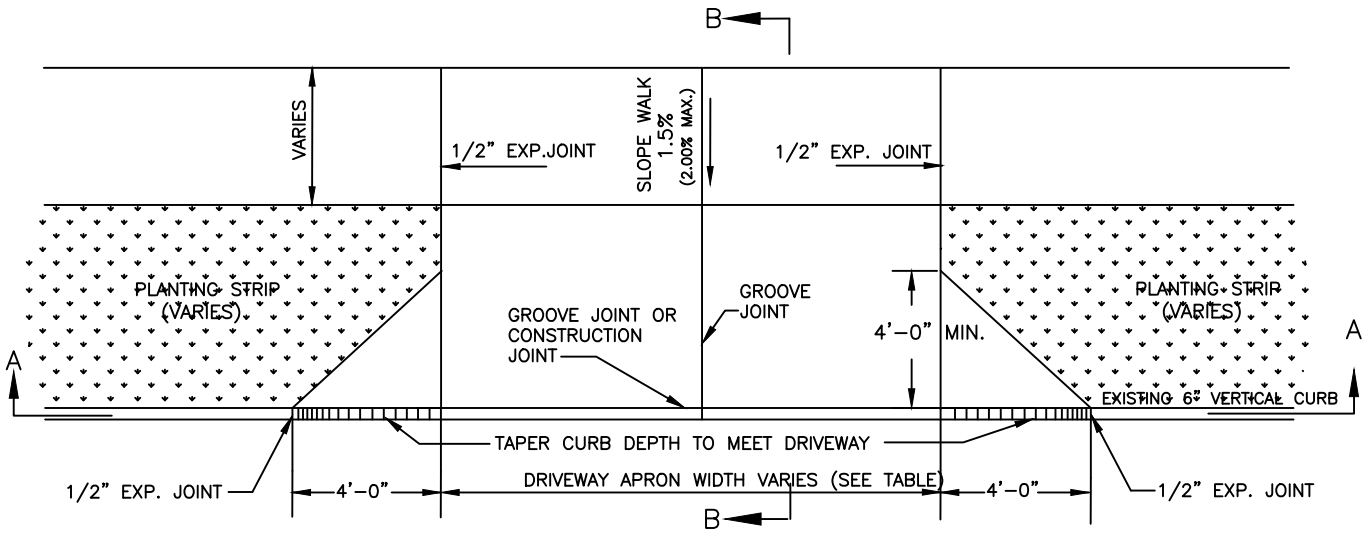
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# COMMERCIAL DROP CURB TYPE II DRIVEWAY WITH PLANTING STRIP (2'–6" CURB AND GUTTER)

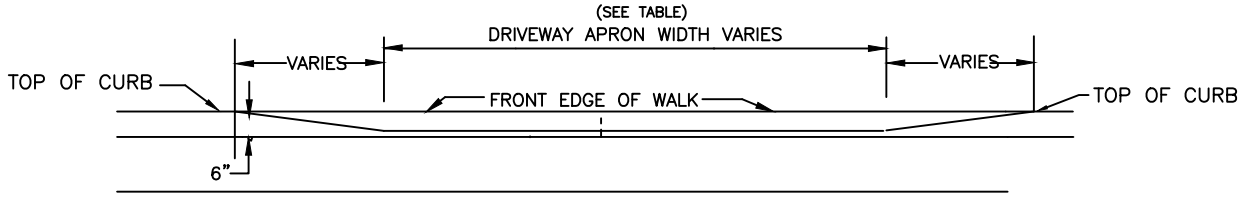
| STD. NO. | REV. |
|---|---|
| 10.25B | 23 |

## NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALK ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO. 10.17 FOR JOINT DETAIL.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" BREAKOVER SHALL BE 8% OR LESS.
5. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.



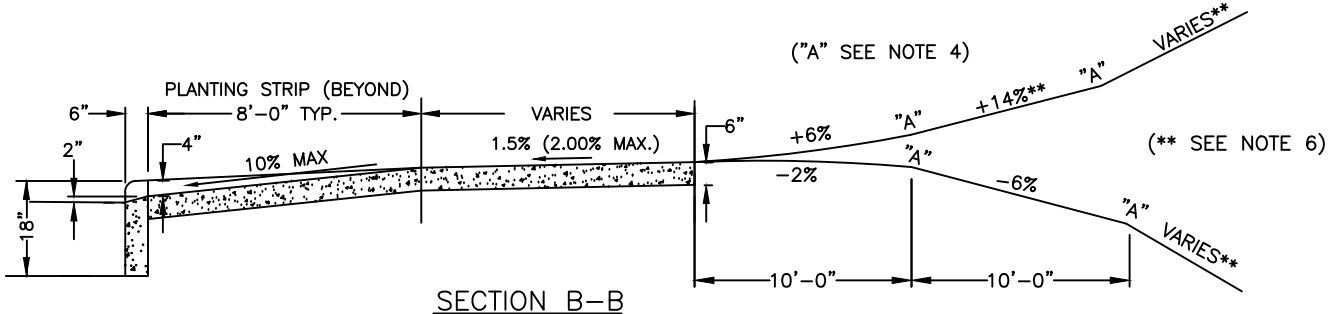

PLAN VIEW




SECTION A–A (ALONG FLOW LINE)

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| DRIVEWAY TYPE | MINIMUM | MAXIMUM |
| LOCAL/COLLECTOR | 10' | 24' |
| ARTERIAL * | 15' | 24' |

* MUST PROVIDE ON–SITE TURNAROUND




SECTION B–B

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RESIDENTIAL DROP CURB TYPE I DRIVEWAY WITH PLANTING STRIP (6" X 18" VERTICAL CURB)

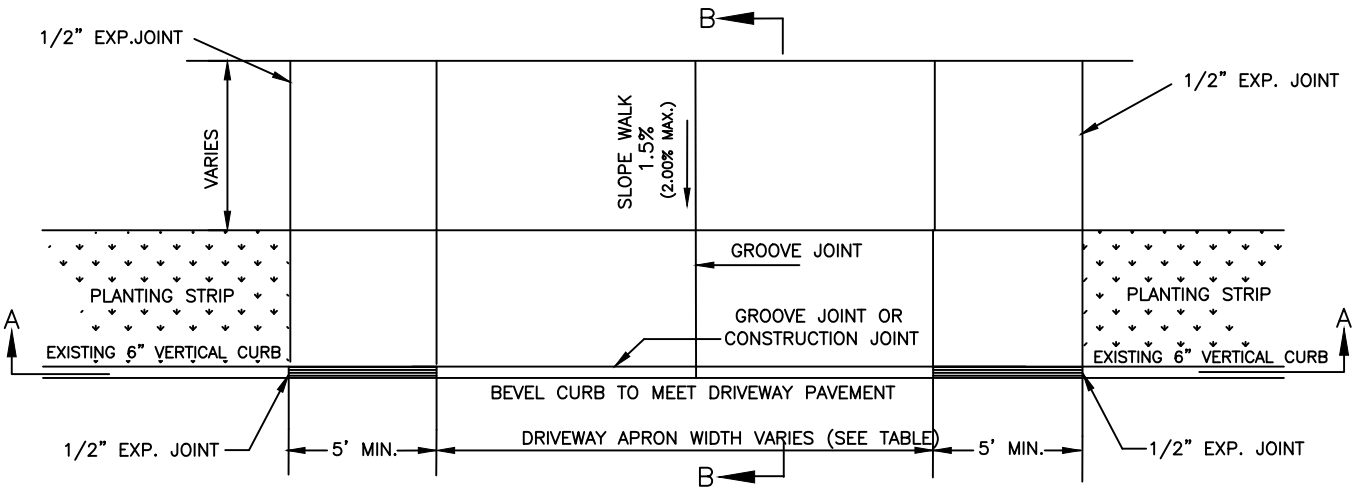
| STD. NO. | REV. |
|---|---|
| 10.25C | 24 |

NOTES:

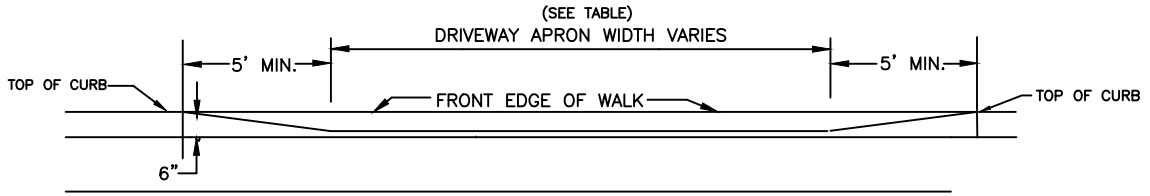
1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALK ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO. 10.17 FOR JOINT DETAIL.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" BREAKOVER SHALL BE 8% OR LESS. (A=ALGEBRAIC DIFFERENCE)
5. PRIOR APPROVAL IS REQUIRED BY CDOT FOR GRADES EXCEEDING THE GRADES SHOWN ON THIS DETAIL
6. **PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE FLUSH WITH CONCRETE.
8. THIS DETAIL IS ONLY FOR USE WHEN PLANTING STRIP IS 6' OR LESS IN WIDTH. USE TYPE II–MODIFIED DRIVEWAY 10.25E WITH LARGER PLANTING STRIP.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| TYPE DRIVEWAYS | MINIMUM | MAXIMUM |
| ONE–WAY TYPE II–COMMERCIAL | 20' | 30' |
| TWO–WAY TYPE II–COMMERCIAL | 26' | 50'* |

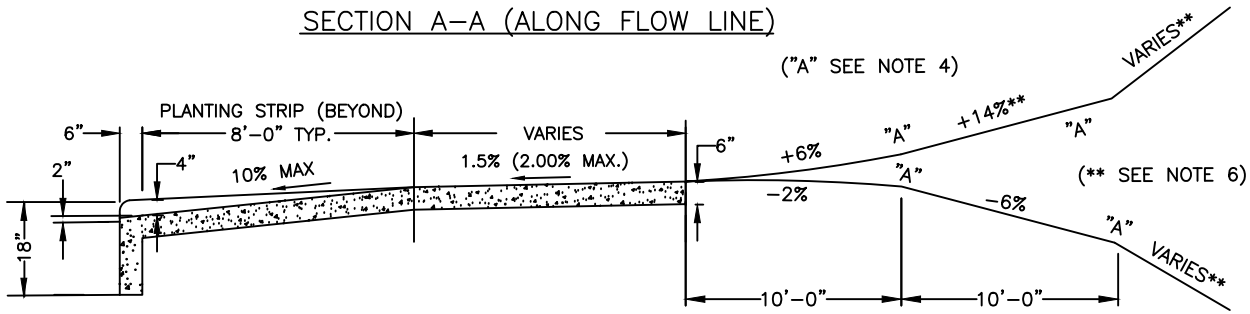
* NEED MORE THAN ONE CONTRACTION JOINT IN CENTER




PLAN VIEW




SECTION A–A (ALONG FLOW LINE)




SECTION B–B

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

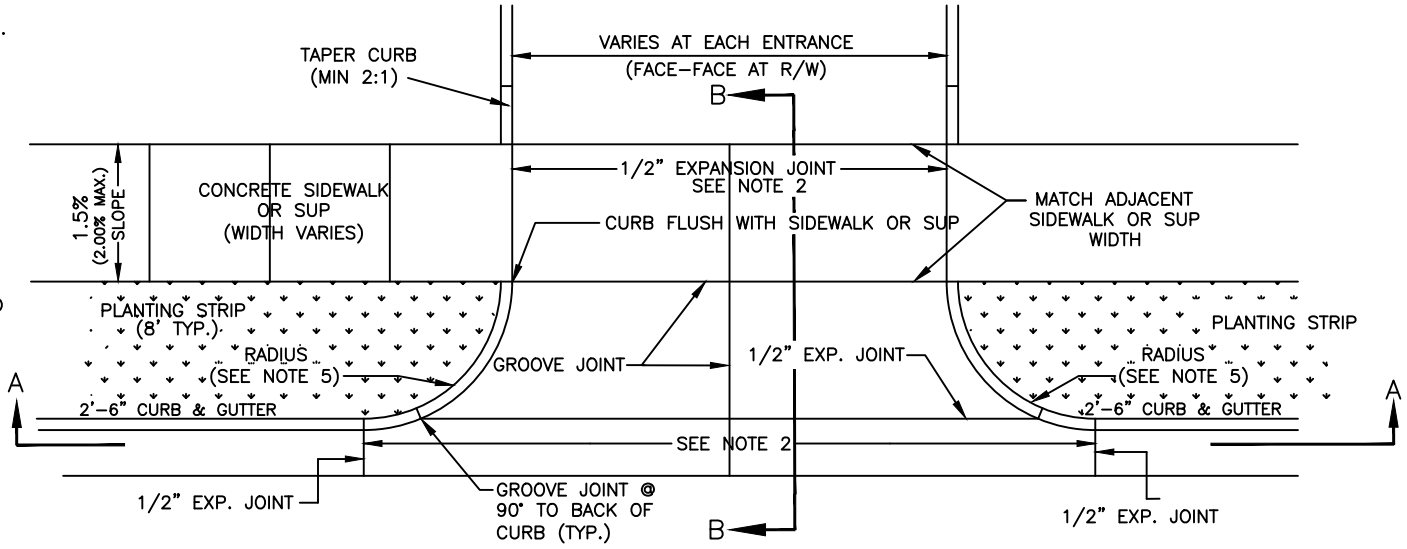
# COMMERCIAL DROP CURB TYPE II DRIVEWAY WITH PLANTING STRIP (6" X 18" VERTICAL CURB)

| STD. NO. | REV. |
|---|---|
| 10.25D | 23 |

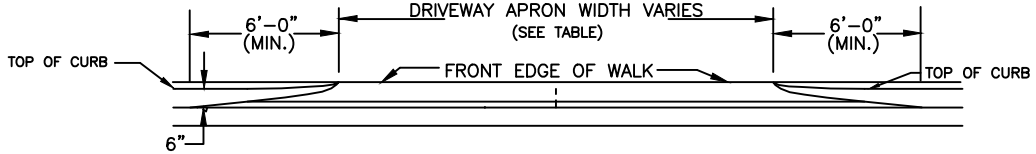
NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
2. AT ALL DRIVEWAYS, SIDEWALKS TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE CLDSM STD. #10.17 FOR JOINT DETAIL. PAY LIMITS FOR WORK DONE UNDER CITY OF CHARLOTTE CONTRACTS ARE FROM EXPANSION JOINT TO EXPANSION JOINT, FROM LIP OF CURB TO BACK OF SIDEWALK.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. ALGEBRAIC DIFFERENCE IN GRADE ("A") BETWEEN SLOPES SHALL BE 8% OR LESS.
5. RADII MUST BE MINIMUM 8 FEET OR THE WIDTH OF THE PLANTING STRIP, WHICHEVER IS GREATER. RADII GREATER THAN THESE MINIMUMS MAY BE REQUIRED BY CDOT ON A CASE-BY-CASE BASIS. FOR RADII GREATER THAN 8 FEET, THE RADII ARE TO CONTINUE AS A BAND AT-GRADE THROUGH THE SIDEWALK.
6. PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. PAVERS USED IN DRIVEWAY MUST HAVE A THICKNESS OF 3 INCHES.
8. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
9. THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
10. FOR STREETS WITH 2'-0" VALLEY GUTTER, PROVIDE TRANSITION ON EACH SIDE OF DRIVEWAY APRON FROM VALLEY GUTTER TO 2'-6" STANDARD CURB AND GUTTER USING CLDSM STD. DETAIL #10.19.

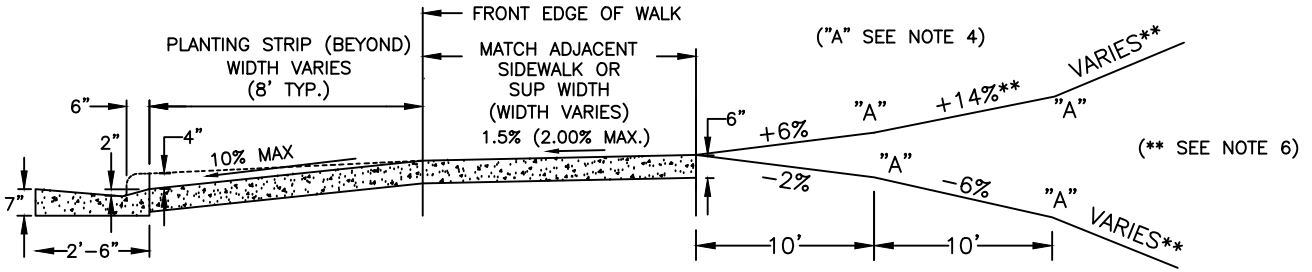
| DRIVEWAY APRON DIMENSIONS | | |
|---|---|---|
| OPERATION/RADIUS | MINIMUM | MAXIMUM |
| ONE-WAY WITH 6-12 FT. RADII | 20' | 30' |
| ONE-WAY WITH 13+ FT. RADII | 15' | 25' |
| TWO-WAY WITH 6-12 FT. RADII | 26' | 50' |
| TWO-WAY WITH 13+ FT. RADII | 22' | 40' |




PLAN VIEW




SECTION A-A (ALONG FLOW LINE)




SECTION B-B

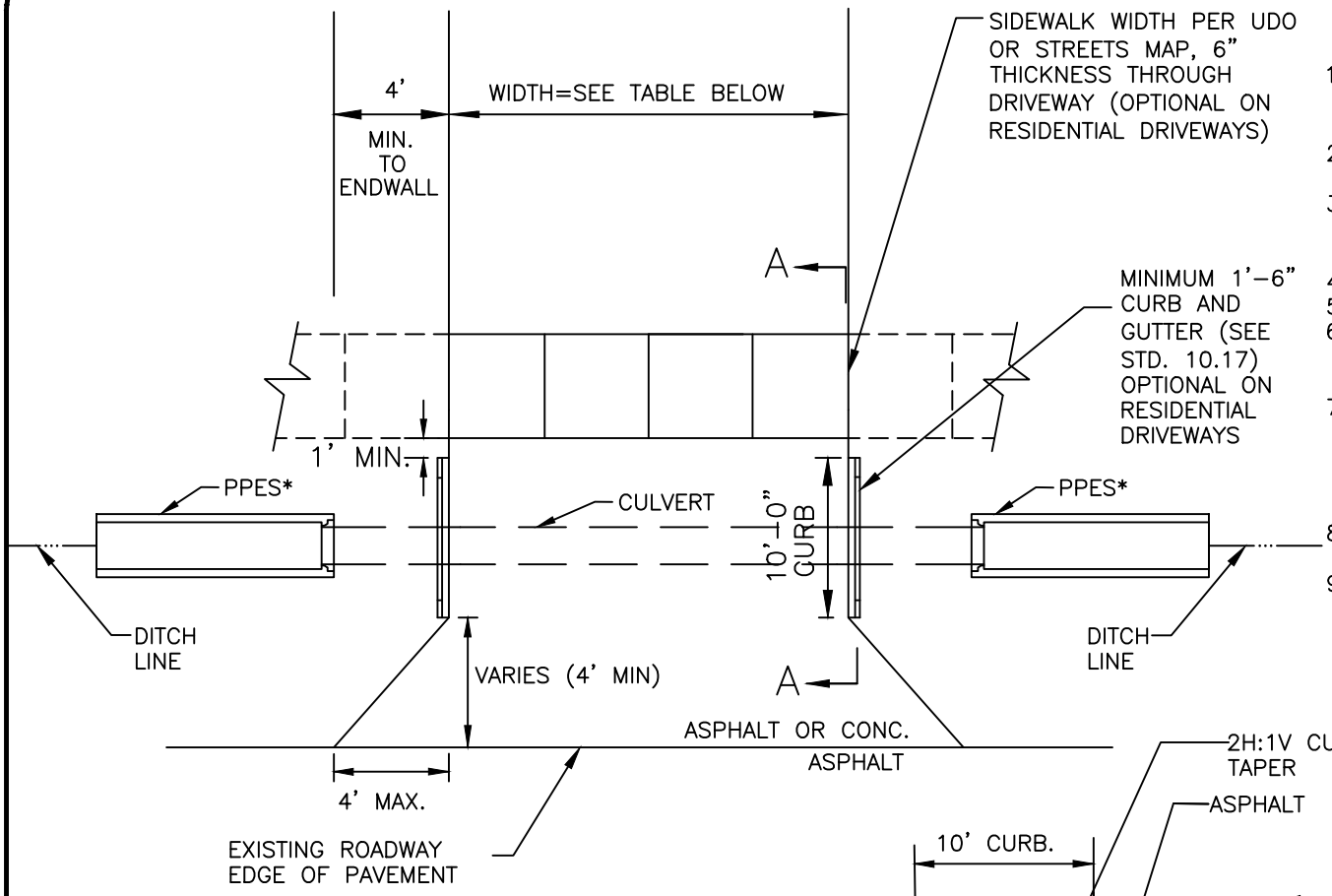
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TYPE II-MODIFIED DRIVEWAY DETAIL WITH WIDE PLANTING STRIP AND STANDARD CURB

| STD. NO. | REV. |
|---|---|
| 10.25E | 23 |

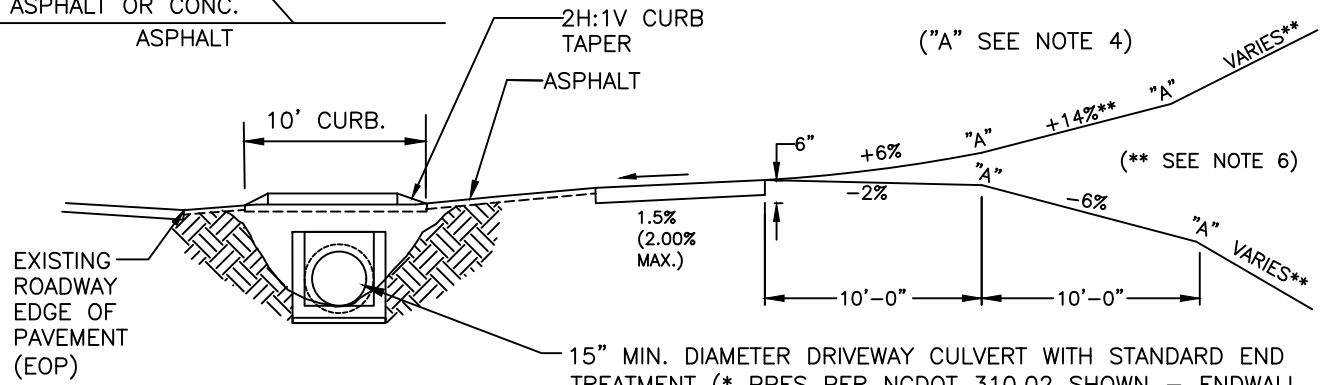



## NOTES:

1. TO BE USED ON ROADS WITHOUT CURB AND GUTTER AND WHERE CURB AND GUTTER IS NOT BEING INSTALLED. (MUST MEET BOTH CRITERIA)
2. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
3. THIS STANDARD IS TYPICALLY FOR COMMERCIAL APPLICATION – IT IS AN OPTION FOR RESIDENTIAL DRIVEWAY CONSTRUCTION.
4. "A" BREAKOVER SHALL BE 8% OR LESS.
5. ALL CONCRETE TO BE 3600 P.S.I.
6. ** PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
8. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.
9. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| DRIVEWAY TYPE | MINIMUM | MAXIMUM |
| RESIDENTIAL: | | |
| LOCAL/COLLECTOR | 10' | 24' |
| ARTERIAL * | 15' | 24' |
| ONE-WAY COMMERCIAL | 20' | 30' |
| TWO-WAY COMMERCIAL | 26' | 50' |

* MUST PROVIDE ON-SITE TURNAROUND




SECTION A-A

15" MIN. DIAMETER DRIVEWAY CULVERT WITH STANDARD END TREATMENT (* PPES PER NCDOT 310.02 SHOWN – ENDWALL OR FES CAN BE USED ON CITY-MAINTAINED STREETS ONLY).

NCDOT TO APPROVE FOR USE ON NCDOT SYSTEM ROAD

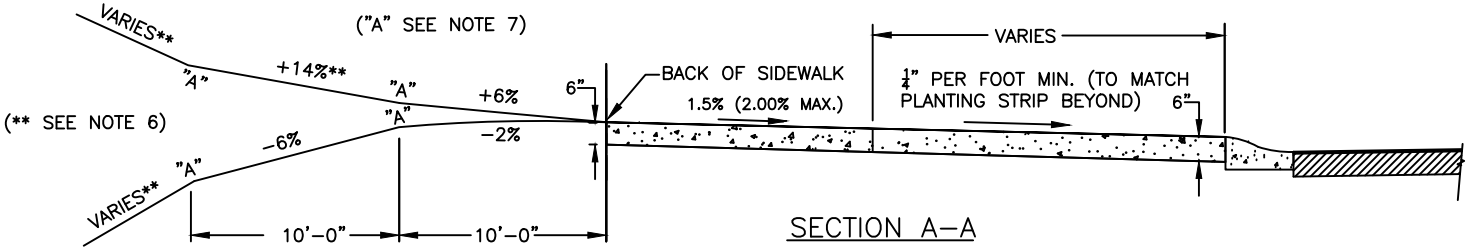
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TYPE IV DRIVEWAY

NOT TO SCALE

| STD. NO. | REV. |
|---|---|
| 10.25F | 24 |



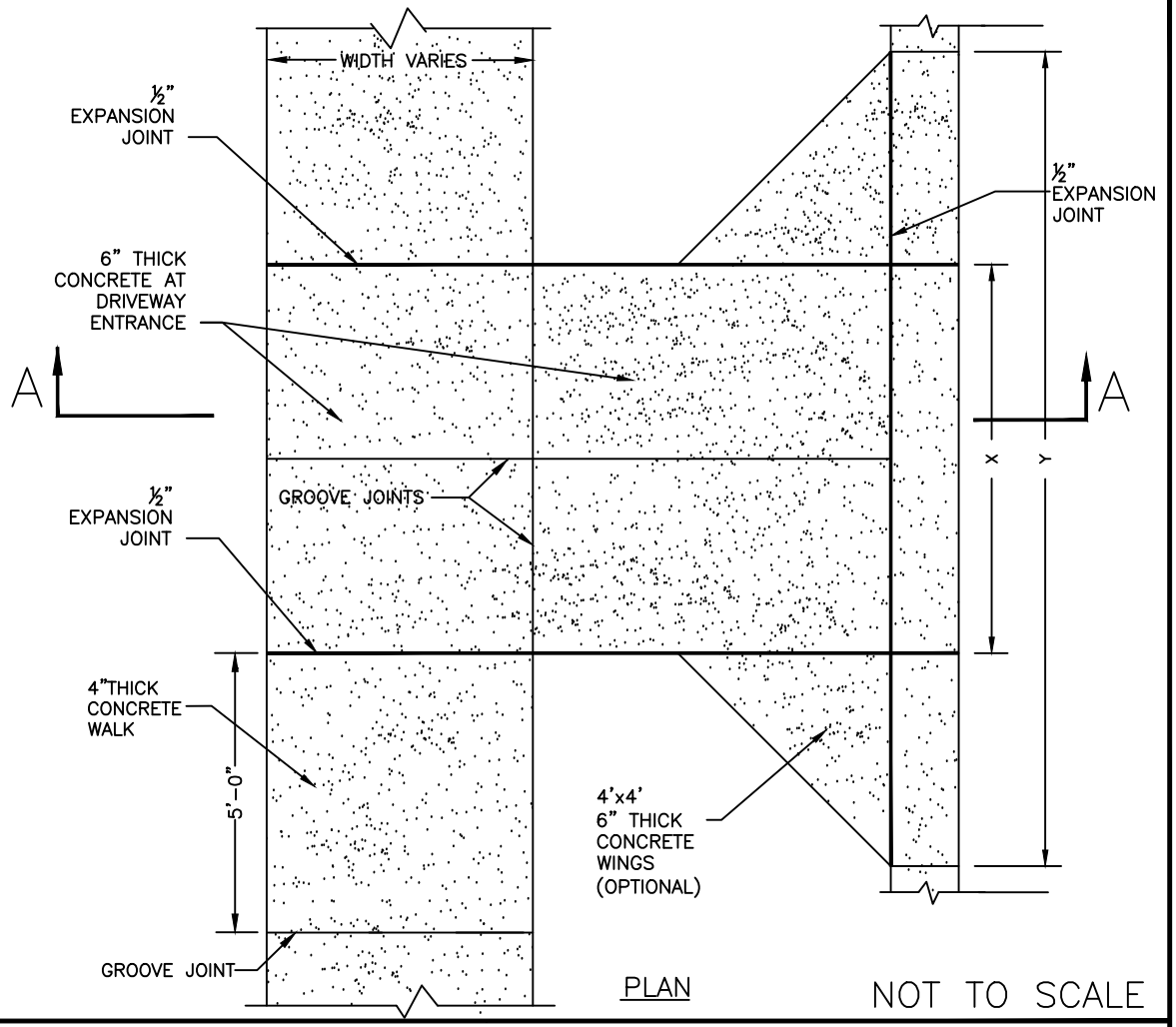

SECTION A–A

## NOTES:

1. THE ELEVATION OF THE SIDEWALK SHALL BE NOT LESS THAN SIX INCHES OR MORE THAN EIGHTEEN INCHES ABOVE THE ROADWAY CROWN. THIS ELEVATION DIFFERENTIAL SHALL BE CONSISTENT WITHIN EACH BLOCK.
2. ALL CONCRETE TO BE 3600 PSI STRENGTH.
3. ALL CONSTRUCTION PRACTICES, INCLUDING COMPACTION, CURING, FINISHING, ETC. SHALL BE IN ACCORDANCE WITH THE CHARLOTTE LAND DEVELOPMENT STANDARDS.
4. PLANTING STRIP SHALL BE GRADED WITH A CROSS SLOPE BETWEEN 1/4 IN. PER FOOT AND 1 1/4 IN. PER FOOT EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, THE CITY ENGINEER MAY AUTHORIZE A SUITABLE GRADE
5. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS, INCLUDING BUT NOT LIMITED TO SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
6. **PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. "A" BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
8. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| | X | Y |
| TYPE I–RESIDENTIAL: | | |
| LOCAL/COLLECTOR | 10' MIN. | 30' MAX.*** |
| ARTERIAL * | 15' MIN. | 30' MAX.*** |

* MUST PROVIDE ON–SITE TURNAROUND
*** MAXIMUM WIDTH INCLUDES OPTIONAL WINGS




PLAN

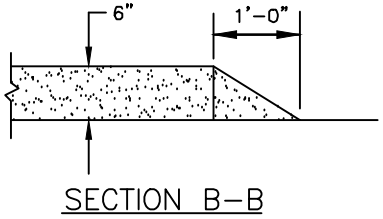
NOT TO SCALE

CHARLOTTE.

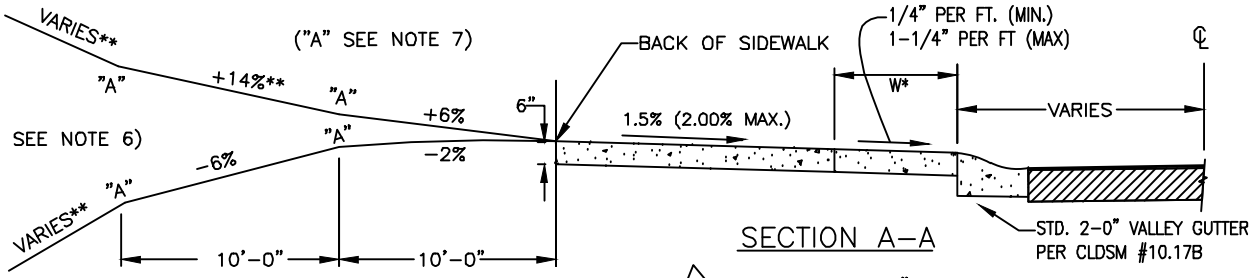
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RESIDENTIAL DRIVEWAY (TYPE I) FOR 2'–0" VALLEY GUTTER

| STD. NO. | REV. |
|---|---|
| 10.27A | 24 |




SECTION B–B

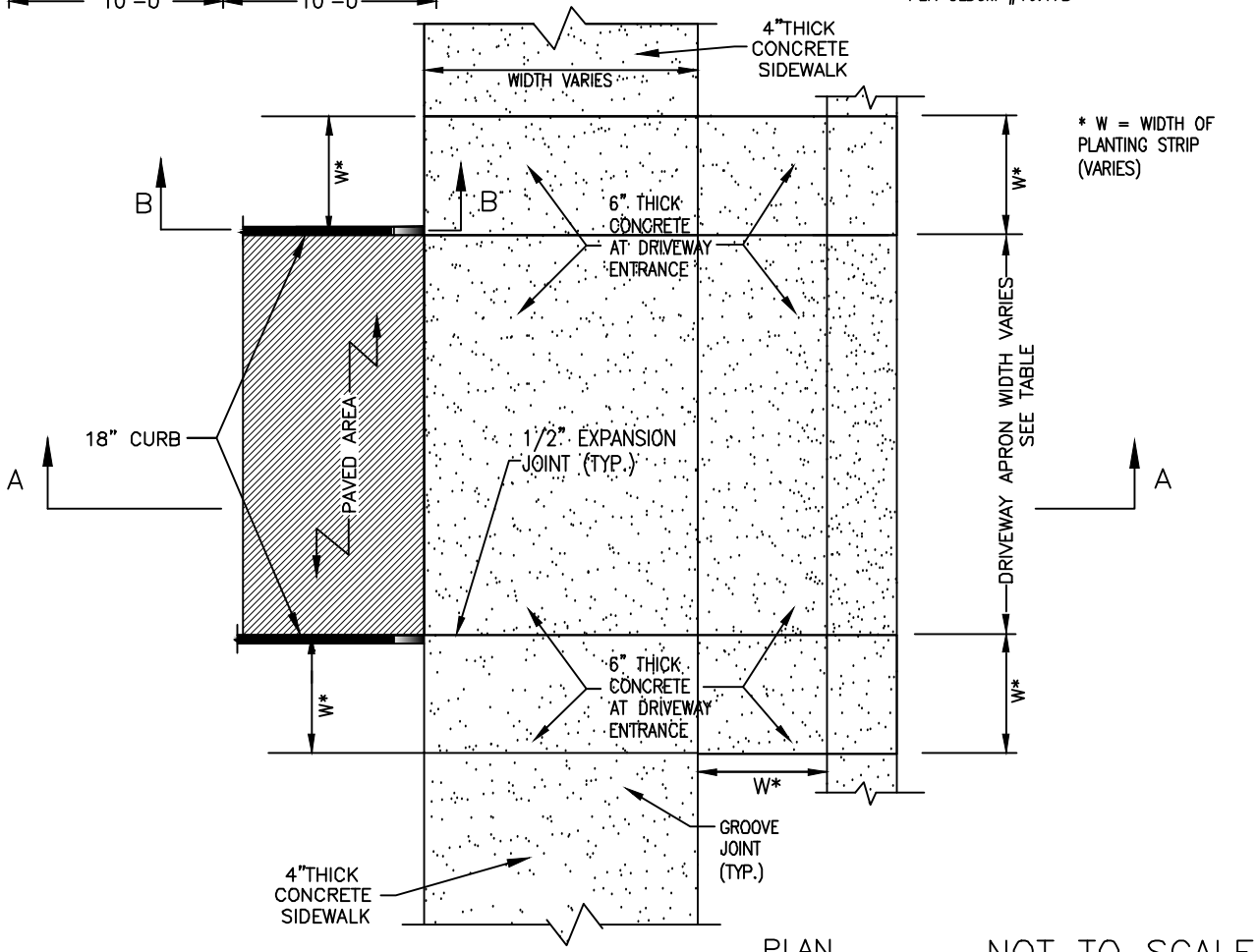



SECTION A–A

NOTES:

1. THE ELEVATION OF THE SIDEWALK SHALL BE NOT LESS THAN SIX INCHES OR MORE THAN EIGHTEEN INCHES ABOVE THE ROADWAY CROWN. THIS ELEVATION DIFFERENTIAL SHALL BE CONSISTENT WITHIN EACH BLOCK.
2. ALL CONCRETE TO BE 3600 PSI STRENGTH.
3. ALL CONSTRUCTION PRACTICES, INCLUDING COMPACTION, CURING, FINISHING, ETC. SHALL BE IN ACCORDANCE WITH THE CHARLOTTE LAND DEVELOPMENT STANDARDS.
4. PLANTING STRIP SHALL BE GRADED WITH A CROSS SLOPE BETWEEN 1/4 IN. PER FOOT AND 1 1/4 IN. PER FOOT EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, THE CITY ENGINEER MAY AUTHORIZE A SUITABLE GRADE
5. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS, INCLUDING BUT NOT LIMITED TO SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
6. PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. "A" BREAKOVER SHALL BE 8% OR LESS (A=ALGEBRAIC DIFFERENCE).
8. PRIOR APPROVAL IS REQUIRED BY CDOT ON GRADES EXCEEDING WHAT ARE SHOWN.

| DRIVEWAY APRON WIDTH | | |
|---|---|---|
| TYPE DRIVEWAY | MINIMUM | MAXIMUM |
| ONE–WAY TYPE II COMMERCIAL | 20' | 30' |
| TWO–WAY TYPE II COMMERCIAL | 26' | 50' |




PLAN

NOT TO SCALE

CHARLOTTE

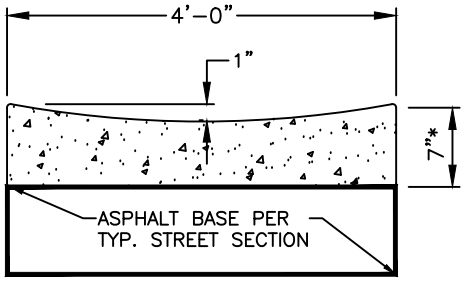
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# COMMERCIAL TYPE II DRIVEWAY FOR 2'–0" VALLEY GUTTER

| STD. NO. | REV. |
|---|---|
| 10.27B | 23 |

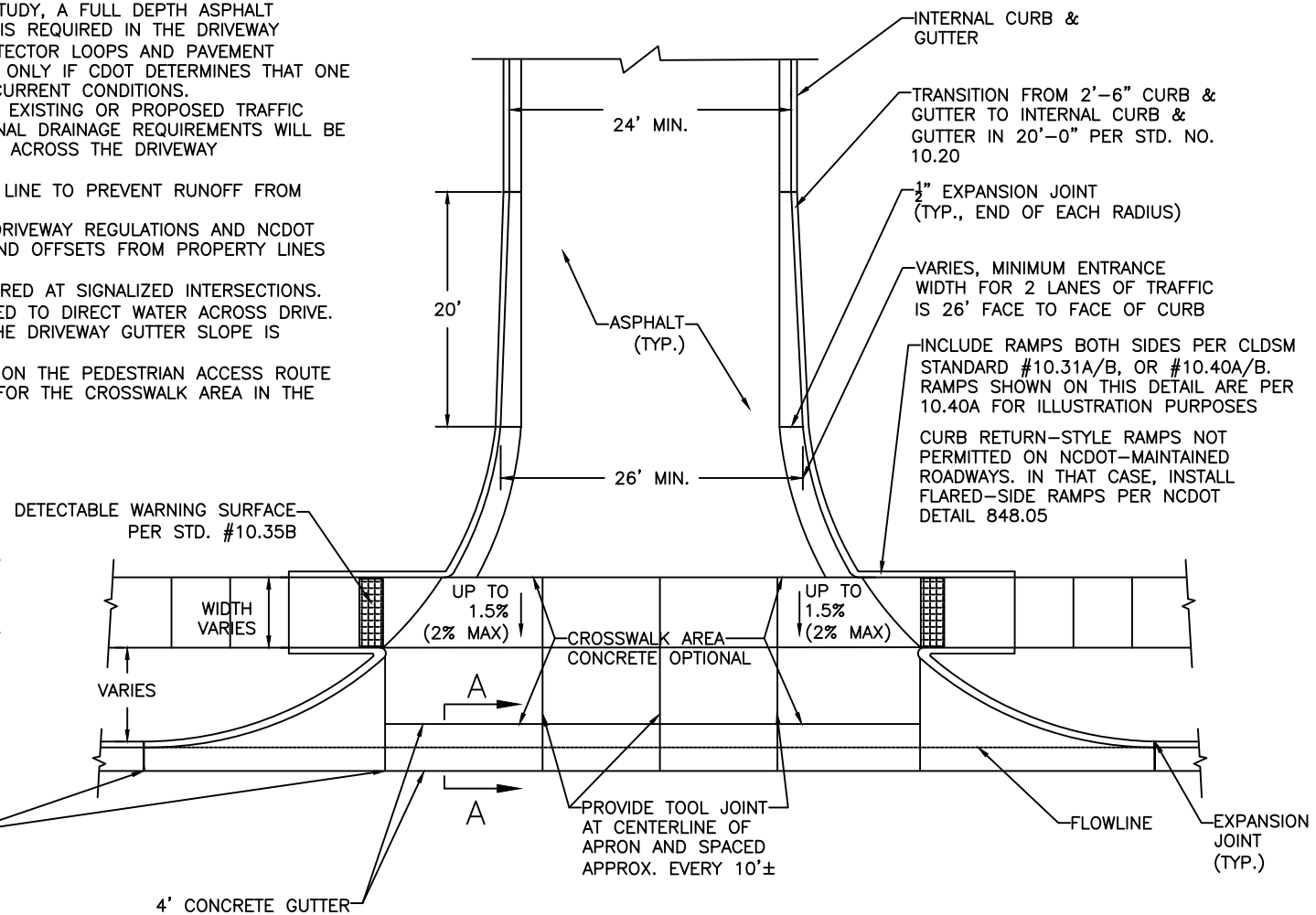
## NOTES:

1. WHERE A TYPE III DRIVEWAY IS APPROVED BY THE CHARLOTTE DEPARTMENT OF TRANSPORTATION (CDOT) THAT CONNECTS TO AN EXISTING SIGNALIZED INTERSECTION, OR AT A LOCATION WHERE A TRAFFIC SIGNAL INSTALLATION IS PROPOSED BY CDOT BASED ON A TRAFFIC IMPACT/SIGNAL WARRANT STUDY, A FULL DEPTH ASPHALT PAVEMENT IS REQUIRED. THIS PAVEMENT DESIGN IS REQUIRED IN THE DRIVEWAY EASEMENT (100–FOOT MINIMUM) TO MAINTAIN DETECTOR LOOPS AND PAVEMENT MARKINGS. A TRAFFIC SIGNAL WILL BE INSTALLED ONLY IF CDOT DETERMINES THAT ONE IS NECESSARY BASED ON A TRAFFIC STUDY OF CURRENT CONDITIONS.
2. A CONCRETE GUTTER IS TO BE USED EXCEPT AT EXISTING OR PROPOSED TRAFFIC SIGNAL LOCATIONS. AT THESE LOCATIONS ADDITIONAL DRAINAGE REQUIREMENTS WILL BE NECESSARY TO ELIMINATE THE NEED FOR GUTTER ACROSS THE DRIVEWAY CONNECTIONS.
3. THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
4. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
5. TWO (2) CURB RAMPS PER CURB RETURN REQUIRED AT SIGNALIZED INTERSECTIONS.
6. FOUR (4) FOOT GUTTER AND WINGS ARE REQUIRED TO DIRECT WATER ACROSS DRIVE. GUTTER AND WINGS MAY NOT BE REQUIRED IF THE DRIVEWAY GUTTER SLOPE IS GREATER THAN 2%.
7. MAINTAIN UP TO 1.5% (MAX. 2%) CROSS–SLOPE ON THE PEDESTRIAN ACCESS ROUTE BETWEEN CURB RAMPS. CONCRETE IS OPTIONAL FOR THE CROSSWALK AREA IN THE DRIVEWAY.




SECTION A–A

* TRANSITION CONCRETE DEPTH FROM 7" AT LIP TO 10" AT 4' CONCRETE GUTTER CONSTRUCTION JOINT IF NO ASPHALT BASE INSTALLED. IF ASPHALT BASE IS USED, 7" CONCRETE DEPTH CAN BE CARRIED THROUGH THE 4' CONCRETE GUTTER.



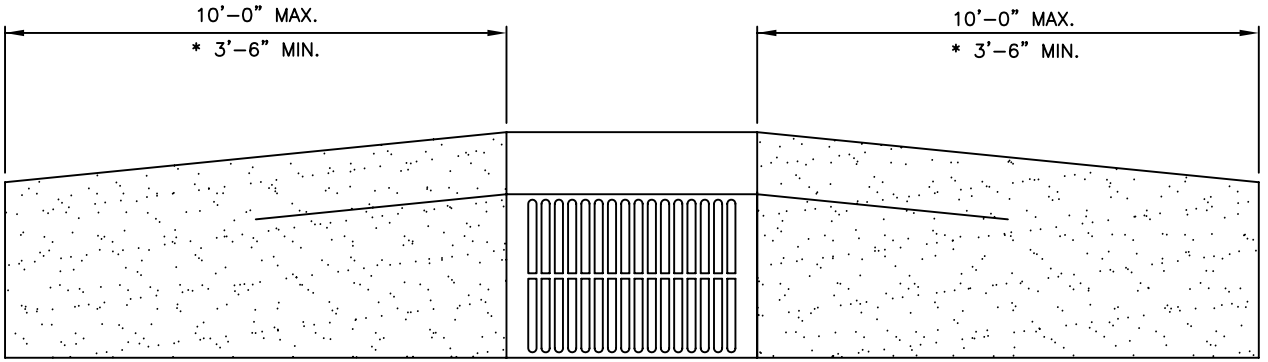

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TYPE III DRIVEWAY ENTRANCE

| STD. NO. | REV. |
|---|---|
| 10.28 | 23 |




PLAN

NOTE:

* TRANSITION FROM 2'–6" STANDARD CURB TO VALLEY CURB AT A DRAINAGE INLET ONLY.
SEE STANDARD 10.19 FOR CROSS SECTION GEOMETRY.

NOT TO SCALE

CHARLOTTE.

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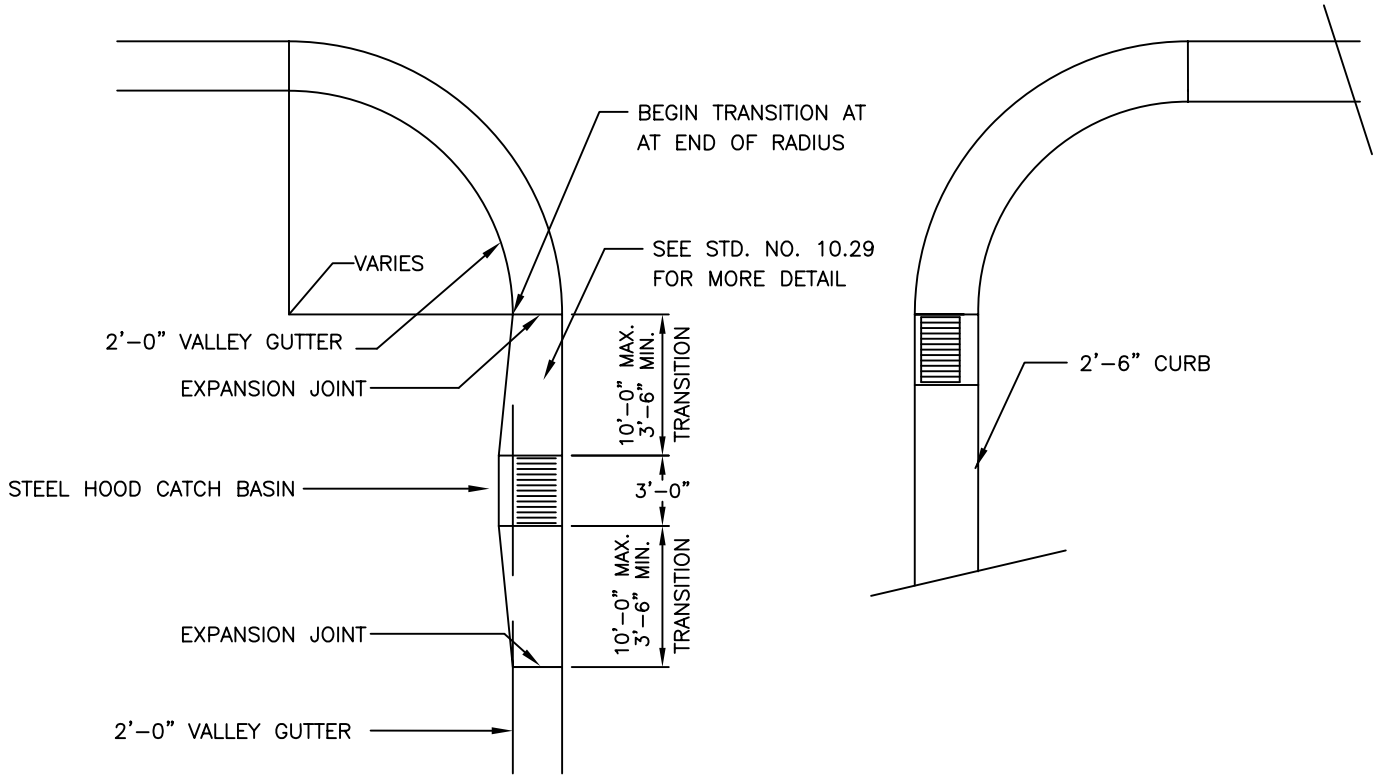
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CATCH BASIN FRAME IN VALLEY GUTTER

| STD. NO. | REV. |
|---|---|
| 10.29 | |




NOTE:

1. WHERE 2'–6" CURB AND GUTTER IS USED, CATCH BASINS MAY BE LOCATED AT END OF RADIUS.
2. RADIUS AT INTERSECTION MAY VARY.

NOT TO SCALE

CHARLOTTE.

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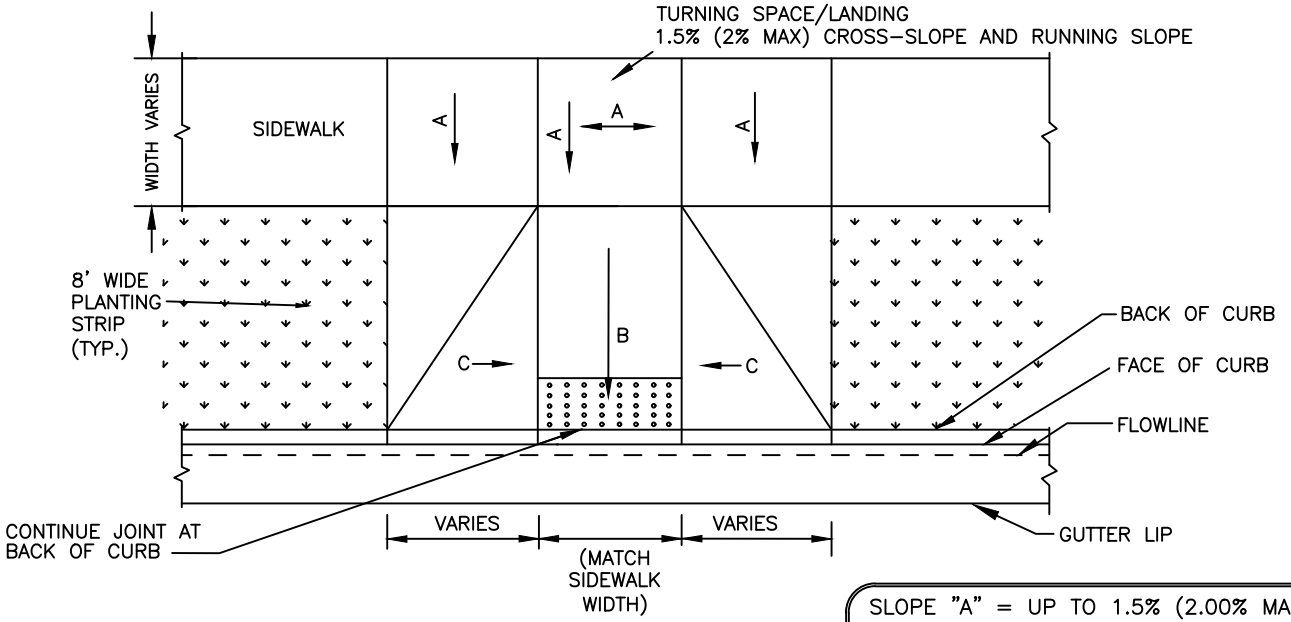
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CATCH BASIN PLACEMENT AT INTERSECTIONS

| STD. NO. | REV. |
|---|---|
| 10.30 | |

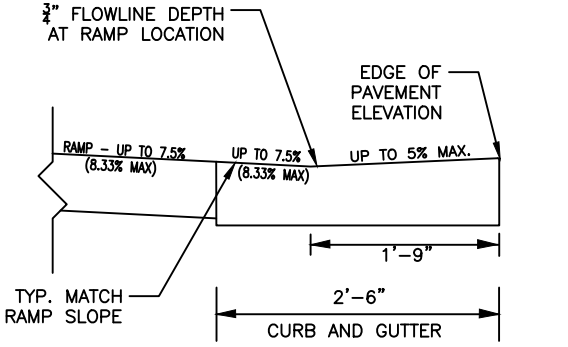
NOTES:

1. ENSURE FLUSH CONDITIONS AT CURB RAMP TO GUTTER TRANSITION.
2. TYPICALLY, THE SIDEWALK RUNNING SLOPE SHALL NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT STREET.
3. IF THE SLOPE FROM FLOWLINE TO BACK OF CURB AT RAMP IS LESS THAN 8.33%, THEN THE SLOPE FROM LIP TO FLOWLINE AT RAMP MAY EXCEED 5% AS LONG AS THE ALGEBRAIC DIFFERENCE BETWEEN THESE TWO SLOPES IS LESS THAN 13.33%.



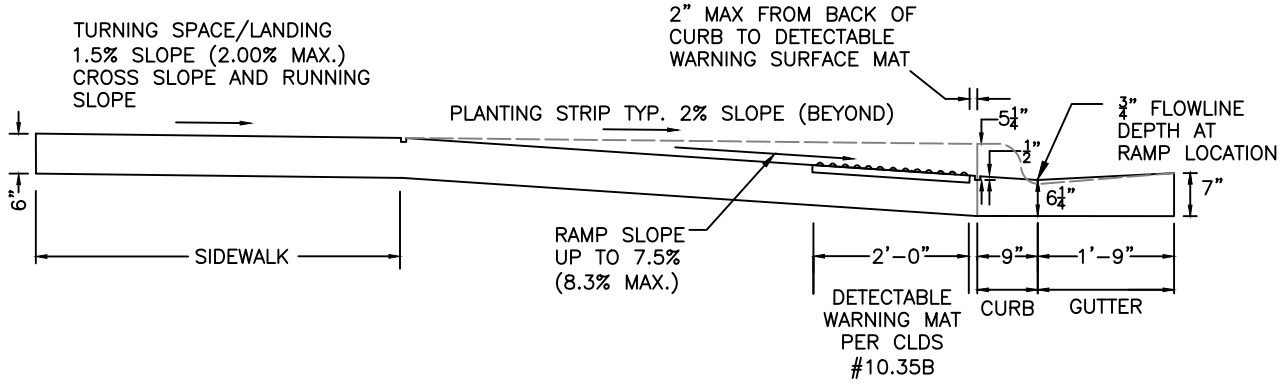

| |
|---|
| SLOPE "A" = UP TO 1.5% (2.00% MAX) |
| SLOPE "B" = UP TO 7.5% (8.33% MAX) |
| SLOPE "C" = UP TO 10% MAX |

PLAN VIEW




2'-6" CURB AND GUTTER RAMP DETAIL

MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT RAMPS




TYPICAL RAMP SECTION AT CENTERLINE

NOT TO SCALE

CHARLOTTE.

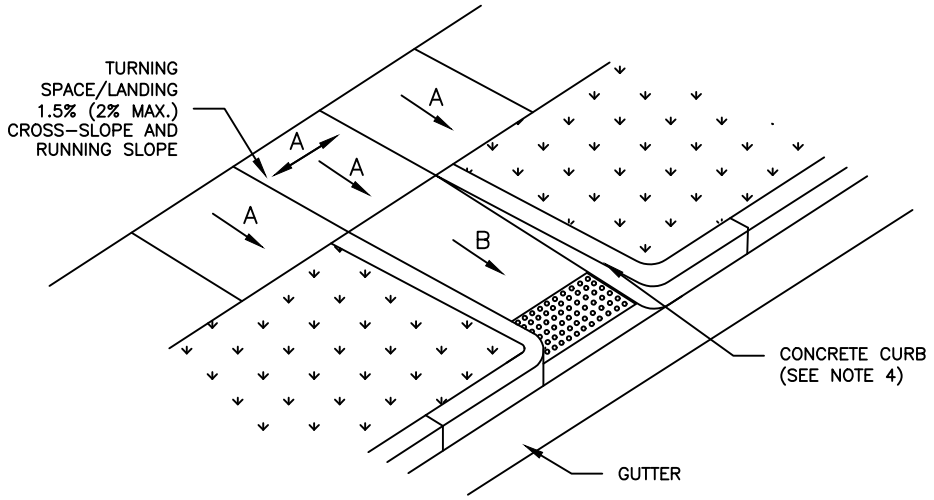
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PERPENDICULAR CURB RAMP WITH 2'-6" CURB AND GUTTER

| STD. NO. | REV. |
|---|---|
| 10.31A | 23 |

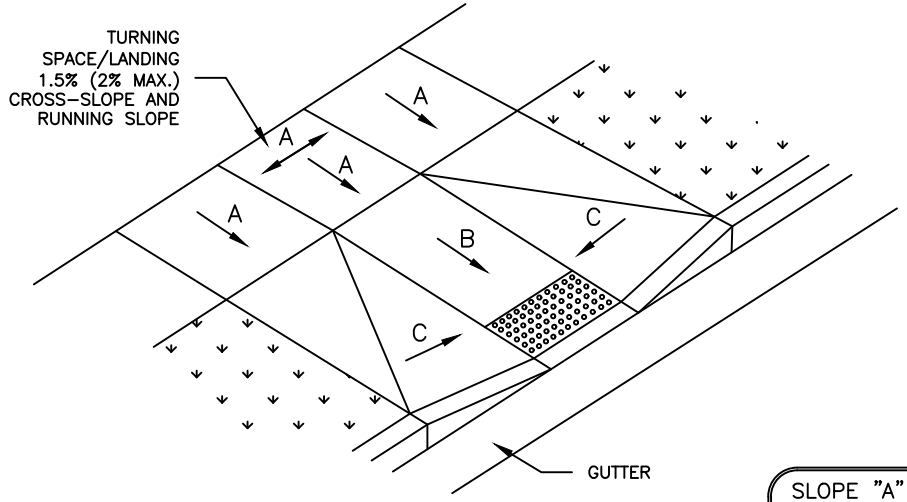
NOTES:

1. THIS DETAIL PRESENTS ALTERNATIVE TREATMENTS FOR THE SIDES OF THE RAMP – RETURNED CURBS, RECTANGULAR WINGS, AND ANGLED WINGS.
2. ENSURE FLUSH CONDITIONS AT CURB RAMP TO GUTTER TRANSITION.
3. TYPICALLY, THE SIDEWALK RUNNING SLOPE SHALL NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT STREET.
4. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT TYPICALLY WALK ACROSS THE RAMP, THE ADJACENT SURFACE IS PLANTING OR OTHER NON–WALKING SURFACE, OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.

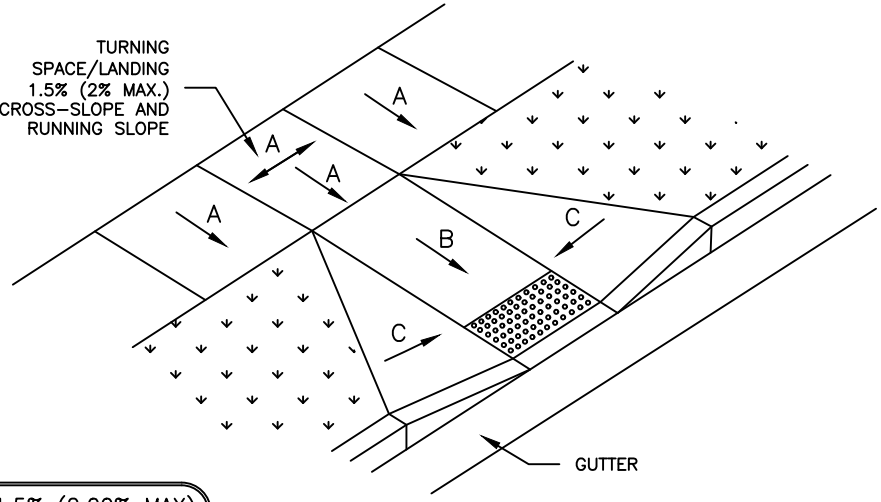



ALTERNATIVE 1: RETURNED CURBS

(SEE NOTE 4)




ALTERNATIVE 2: RECTANGULAR FLARES




ALTERNATIVE 3: ANGLED FLARES

| |
|---|
| SLOPE "A" = UP TO 1.5% (2.00% MAX) |
| SLOPE "B" = UP TO 7.5% (8.33% MAX) |
| SLOPE "C" = UP TO 10% MAX |

NOT TO SCALE

CHARLOTTE.

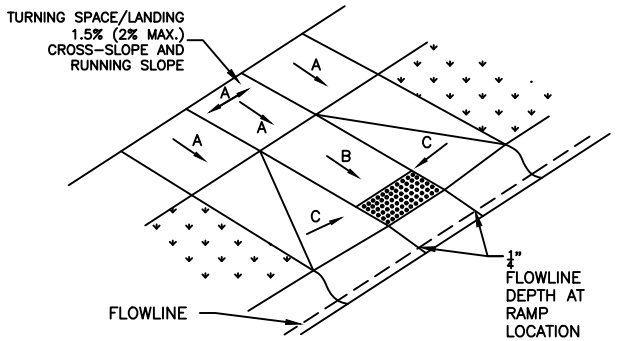
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PERPENDICULAR CURB RAMP WITH 2'–6" CURB AND GUTTER

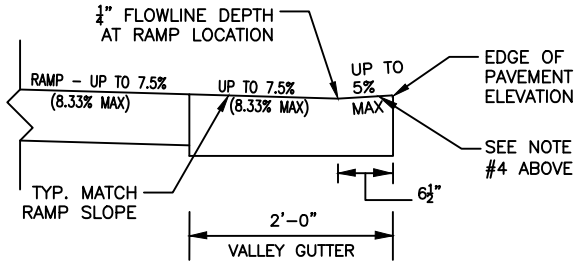
| STD. NO. | REV. |
|---|---|
| 10.31B | 20 |

NOTES:

1. ENSURE FLUSH CONDITIONS AT CURB RAMP TO GUTTER TRANSITION.
2. TYPICALLY, THE SIDEWALK RUNNING SLOPE SHALL NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT STREET.
3. MAINTAIN POSITIVE DRAINAGE ALONG THE LIP OF GUTTER IN RAMP. IN FLAT AREAS, ADDITIONAL CATCH BASINS MAY BE REQUIRED ON THE SIDES OF THE RAMP TO MINIMIZE STANDING WATER AT THE RAMP LOCATION.
4. IF THE SLOPE FROM FLOWLINE TO BACK OF CURB AT RAMP IS LESS THAN 8.3%, THEN THE SLOPE FROM LIP TO FLOWLINE AT RAMP MAY EXCEED 5% AS LONG AS THE DIFFERENCE BETWEEN THESE TWO SLOPES IS LESS THAN 13.3%.

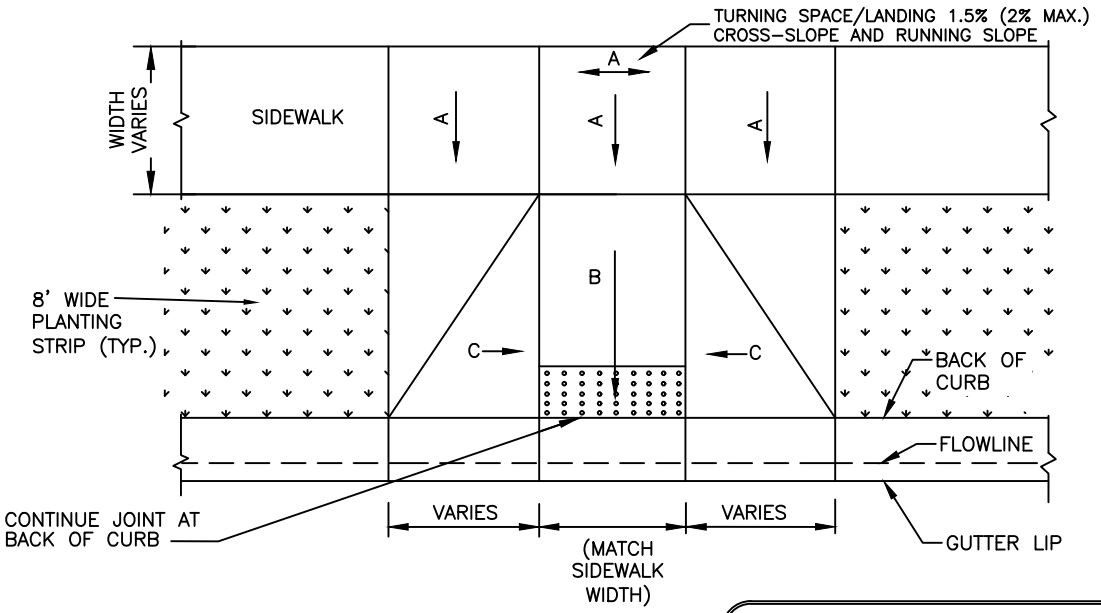



ISOMETRIC VIEW




2'-0" VALLEY GUTTER RAMP DETAIL

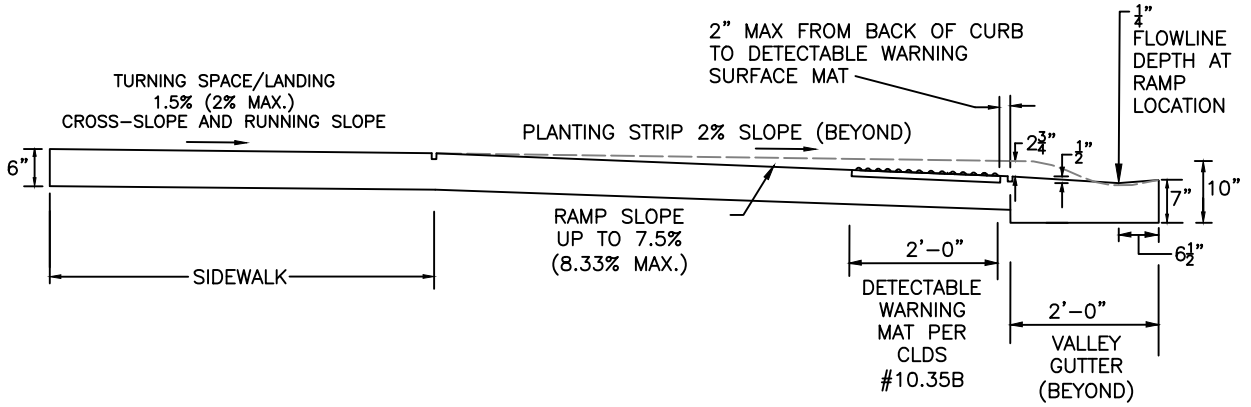
MAXIMUM SLOPES FOR VALLEY GUTTER DEPRESSION AT RAMPS




PLAN VIEW

NOT TO SCALE

| |
|---|
| SLOPE "A" = UP TO 1.5% (2.00% MAX) |
| SLOPE "B" = UP TO 7.5% (8.33% MAX) |
| SLOPE "C" = UP TO 10% MAX |




TYPICAL RAMP SECTION AT CENTERLINE

NOT TO SCALE

CHARLOTTE.

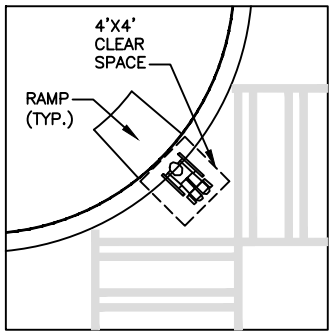
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PERPENDICULAR CURB RAMP WITH 2'-0" VALLEY GUTTER

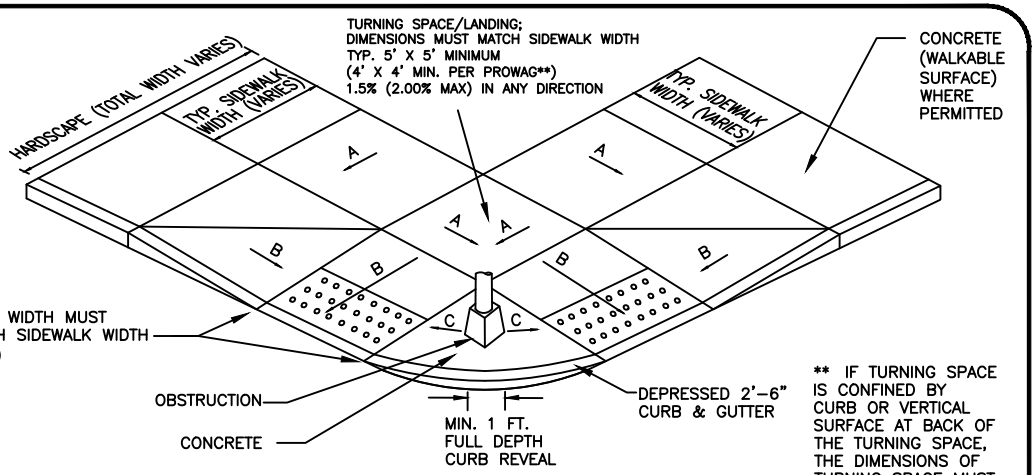
| STD. NO. | REV. |
|---|---|
| 10.33 | 23 |

## NOTES:

1. MAINTAIN A MINIMUM OF 0.5% SLOPE ON ALL CONCRETE SURFACES TO PROMOTE SURFACE DRAINAGE TOWARD CURB.
2. GUTTER FLOW LINE AND PLAN PROFILE SHALL BE MAINTAINED THROUGH THE RAMP AREA.
3. THE SURFACE OF THE RAMP SHALL BE FLUSH WITH THE FLOWLINE OF THE CURB AND GUTTER.
4. THE WING AND RAMP SURFACES SHALL BE 3600 PSI CONCRETE WITH A SIDEWALK FINISH IN ACCORDANCE WITH CURRENT EDITION NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
5. DRAINAGE STRUCTURES, MAST ARMS, LIGHT POLES AND OTHER OBSTRUCTIONS SHALL NOT BE PLACED IN LINE WITH RAMPS. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF OBSTRUCTIONS EXCEPT WHERE EXISTING OBSTRUCTIONS ARE BEING UTILIZED IN THE NEW CONSTRUCTION.
6. SEE STANDARD DRAWING 10.35B FOR DETECTABLE WARNING INSTALLATION.
7. SEE USDG INTERSECTION DIAGRAMS I–1 THROUGH I–3 FOR TYPICAL RAMP PLACEMENT AND INTERSECTION LAYOUTS.
8. CURB RAMPS SHALL HAVE A SEGMENT OF STRAIGHT CURB AT LEAST 24 INCHES LONG LOCATED ON EACH SIDE OF THE WING SLOPE AND WITHIN THE CROSSWALK MARKINGS.
9. FOR ALL RAMPS AT MARKED CROSSWALKS THE RAMP OPENING (AT THE FULLY DEPRESSED CURB) SHALL BE LOCATED WITHIN THE PARALLEL BOUNDARIES OF CROSSWALK MARKINGS.
10. IF A SINGLE DIAGONAL RAMP ON A CORNER IS USED (TYP. ONLY IN RETROFITS), THE RAMP CENTERLINE SHALL BE LOCATED AT THE CORNER RADIUS CENTERLINE UNLESS OTHERWISE DIRECTED BY THE ENGINEER. A MIN. 4'X4' CLEAR SPACE BEYOND THE CURB FACE MUST BE WHOLLY OUTSIDE OF THE PARALLEL VEHICLE TRAVEL LANE (SEE DIAGRAM BELOW):



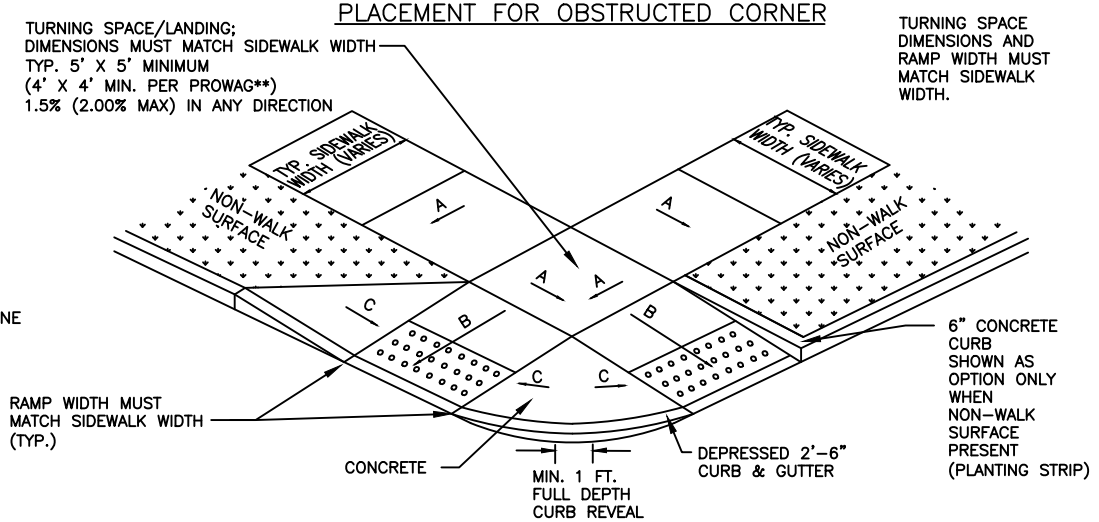

CLEAR SPACE:
- 4' X 4' MINIMUM
- BEYOND BOTTOM GRADE BREAK
- WITHIN PEDESTRIAN STREET CROSSING
- OUTSIDE PARALLEL VEHICLE TRAVEL LANE




PLACEMENT FOR OBSTRUCTED CORNER

** IF TURNING SPACE IS CONFINED BY CURB OR VERTICAL SURFACE AT BACK OF THE TURNING SPACE, THE DIMENSIONS OF TURNING SPACE MUST BE 5'X5' MINIMUM.

TURNING SPACE DIMENSIONS AND RAMP WIDTH MUST MATCH SIDEWALK WIDTH.




| |
|---|
| SLOPE "A" 1.5% (2.00% MAX) |
| SLOPE "B" 7.5% (8.33% MAX) |
| SLOPE "C" 10% MAX |

PLACEMENT FOR SMALL CORNER RADIUS

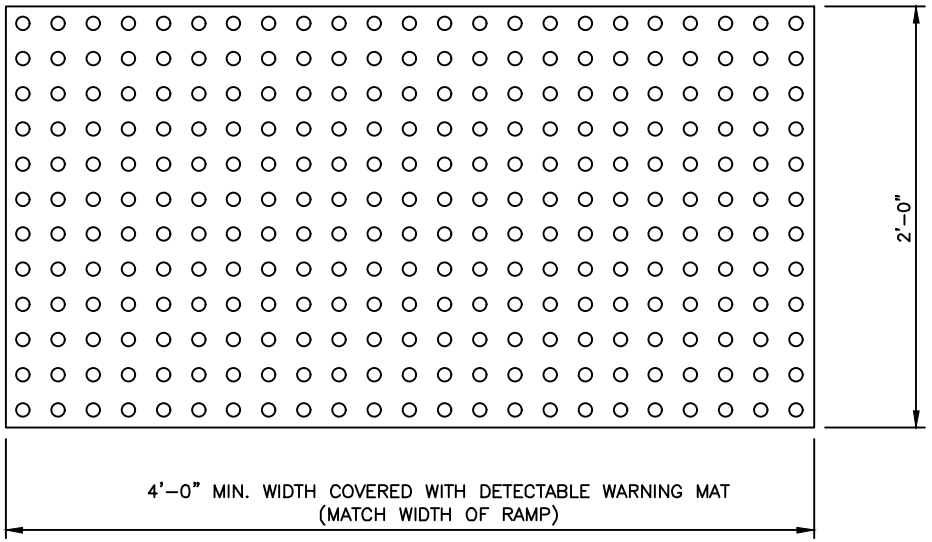
NOT TO SCALE

CHARLOTTE.

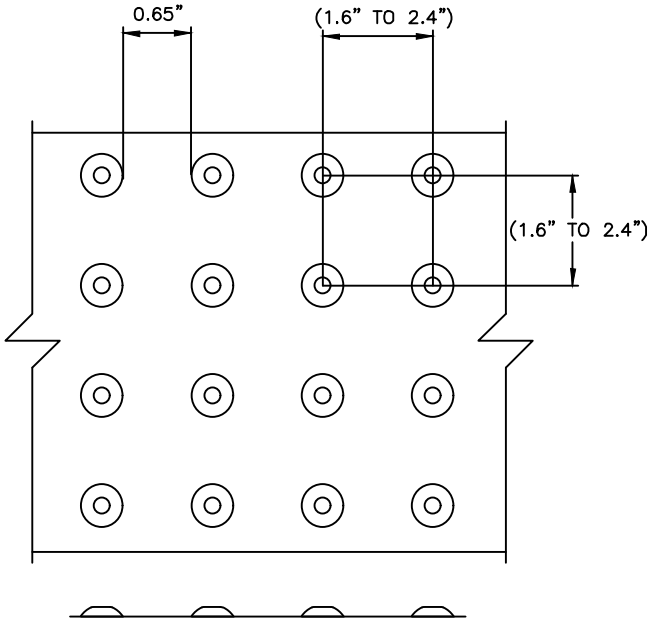
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PLACEMENT OF CURB RAMPS AT OBSTRUCTED OR SMALL CORNER RADIUS

| STD. NO. | REV. |
|---|---|
| 10.35A | 17 |



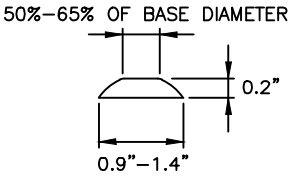

TRUNCATED DOME PLAN VIEW




TRUNCATED DOME SPACING

NOTES:

1. ALL DETECTABLE WARNING DEVICES USED IN NEW CONSTRUCTION SHALL BE OF A RIGID PRECAST OR EMBEDDED PRODUCT APPROVED BY THE CITY ENGINEER. RETROFIT MATS WILL ONLY BE ALLOWED ON EXISTING RAMPS WITH PRIOR APPROVAL OF THE CITY ENGINEER FOR MATERIAL TYPE AND INSTALLATION (IE. RESURFACING).
2. RAMP AND DETECTABLE WARNING AREA SHALL BE A MINIMUM OF 4 FEET IN WIDTH, BUT NOT LESS THAN THE WIDTH OF SIDEWALK LEADING TO BACK OF RAMP.
3. DETECTABLE WARNING SURFACES SHALL EXTEND 2.0 FT MINIMUM IN THE DIRECTION OF PEDESTRIAN TRAVEL.
4. DETECTABLE WARNING AREA CAN BE PLACED SQUARE WHERE USED IN A CURB RADIUS.
5. THE ROWS OF TRUNCATED DOMES IN DETECTABLE WARNING SURFACES SHOULD BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET. WHERE DETECTABLE WARNING SURFACES ARE PROVIDED ON A SURFACE WITH A SLOPE THAT IS LESS THAN 5 PERCENT, DOME ORIENTATION IS LESS CRITICAL.
6. DECTECTABLE WARNING AREA SHALL CONTRAST VISUALLY WITH ADJACENT GUTTER, STREET OR HIGHWAY, OR PEDESTRIAN ACCESS ROUTE SURFACE; EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT. ON THE TRYON STREET MALL, FRENCH GRAY IS TO BE USED.
7. IF PAVERS ARE TO BE USED, PAVERS SHALL BE MINIMUM 8000 PSI CONCRETE WITH A 2-INCH MINIMUM THICKNESS, SET ON A THIN-SET MORTAR ON TOP OF 4" THICK 3600 PSI CONCRETE BASE.
8. MATS ARE TO BE RIGID WITH TURNED-DOWN EDGES EMBEDDED IN CONCRETE TO ELIMINATE TRIP HAZARD.
9. DIMENSIONS PER NCDOT 848.06




TRUNCATED DOME SECTION

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TRUNCATED DOMES
# PLAN AND CROSS-SECTION

| STD. NO. | REV. |
|---|---|
| 10.35B | 15 |

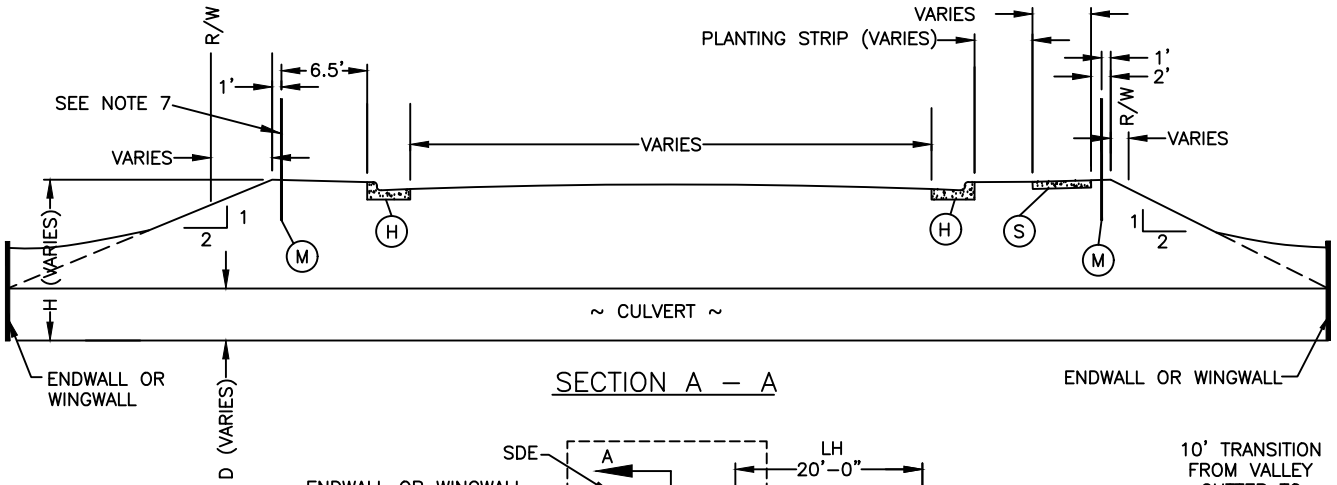
(H) 2'–6" OR 2'–0" STANDARD CURB AND GUTTER, STD. PER 10.17A

(M) SAFETY RAIL, STD. 50.04A & 50.04B

(S) CONCRETE SIDEWALK, STD. 10.22 OR SHARED USE PATH, STD. 10.42

(H1) 2'–0" VALLEY GUTTER. STD. 10.17B

(H2) CURB TRANSITION STANDARD CURB AND GUTTER TO 2'–0" VALLEY GUTTER, STD. 10.19

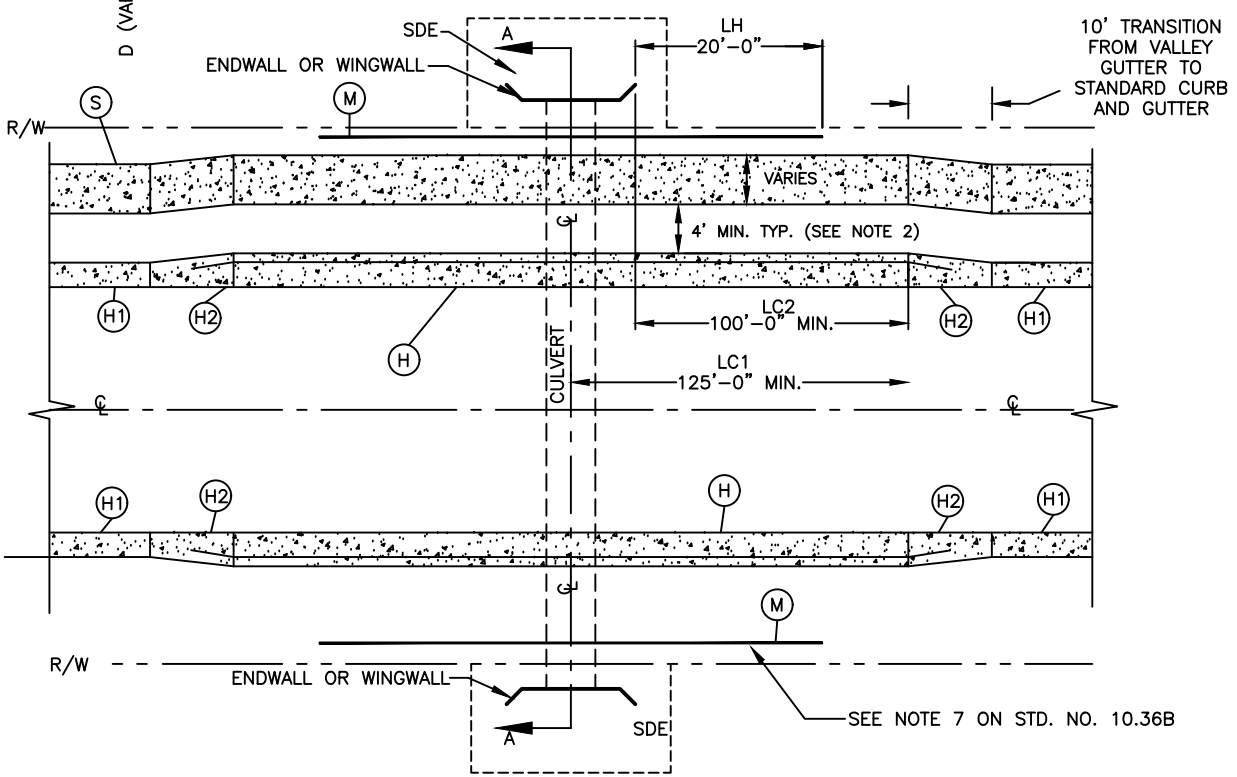



SECTION A – A

LH = DISTANCE FROM END OF WINGWALL TO END OF SAFETY RAIL.

LC1 = DISTANCE FROM ℄ OF CULVERT TO END OF 2'–6" CURB AND GUTTER GUTTER.

LC2 = DISTANCE FROM END OF WINGWALL TO END OF 2'–6" CURB AND GUTTER.




NOTES:

1. SEE STD. NO. 10.36B FOR GENERAL NOTES AND CLEAR ZONE DISTANCES.
2. AN ALTERNATIVE FOR STREETS WITH WIDER PLANTING STRIPS AND SIDEWALKS: IN LIEU OF A PLANTING STRIP ALONG THE CULVERT CROSSING, PROVIDE A MINIMUM 8–FOOT WIDE SIDEWALK LOCATED AT THE BACK OF CURB, FOR LENGTH "LC1" ON EITHER SIDE OF THE CULVERT CENTERLINE.

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CULVERT CROSSINGS ON RESIDENTIAL AND COMMERCIAL STREETS

| STD. NO. | REV. |
|---|---|
| 10.36A | 24 |

GENERAL NOTES:

1. UNLESS OTHERWISE DETERMINED BY THE CITY, THE MEASURES ILLUSTRATED SHALL BE USED WHEN CULVERT DIAMETER, D, IS GREATER THAN OR EQUAL TO 24 INCHES AND WHEN THE DIFFERENCE IN ELEVATION BETWEEN THE CULVERT INVERT AND THE TOP OF SLOPE, H, IS GREATER THAN OR EQUAL TO 5 FEET.
2. INSTALLATION OF 2'–6" CURB AND GUTTER MAY NOT BE REQUIRED WHEN AN ADEQUATE CLEAR ZONE IS PROVIDED FOR VEHICLES WITH A MAXIMUM OF 6:1 SLOPE (SEE TABLE 1).
3. INSTALLATION OF SAFETY RAIL MAY NOT BE REQUIRED WHEN A 10–FOOT PEDESTRIAN CLEAR ZONE IS PROVIDED BEHIND THE SIDEWALK WITH A MAXIMUM OF 6:1 SLOPE. WHERE NO SIDEWALK IS REQUIRED, INSTALLATION OF SAFETY RAIL MAY NOT BE REQUIRED WHEN A 15–FOOT PEDESTRIAN CLEAR ZONE IS PROVIDED BEHIND THE CURB WITH A MAXIMUM OF 6:1 SLOPE.
4. FOR CULVERT CROSSINGS WITHOUT ENDWALLS, LH AND LC2 SHALL BE MEASURED FROM THE OUTSIDE OF THE NEAREST WALL OF THE CULVERT BARREL.
5. FOR MULITIPLE BARREL CULVERT CROSSINGS, LC1 SHALL BE MEASURED FROM THE CENTERLINES OF THE OUTBOARD CULVERT BARRELS.
6. WHEN NECESSARY, AS DETERMINED BY THE CITY, ADDITIONAL MEASURES MAY BE REQUIRED.
7. INSTALLATION OF SAFETY RAIL IS REQUIRED ON BOTH SIDES OF STREET IF SIDEWALK IS REQUIRED ON BOTH SIDES.
8. INSTALLATION OF SAFETY RAIL IS REQUIRED ON BOTH SIDES OF STREET IF NO SIDEWALK IS REQUIRED EXCEPT WHEN A 15–FOOT PEDESTRIAN CLEAR ZONE IS PROVIDED BEHIND THE CURB WITH A MAXIMUM OF 6:1 SLOPE.
9. INSTALLATION OF SAFETY RAIL IS REQUIRED ON THE SIDEWALK SIDE OF STREET IF SIDEWALK IS ONLY REQUIRED ON ONE SIDE OF STREET. INSTALL EITHER SAFTEY RAIL OR 15–FT CLEAR ZONE ON SIDE WITHOUT SIDEWALK.
10. DESIGN ADT IS CALCULATED ASSUMING A TRIP GENERATION OF 10 DAILY TRIPS PER SINGLE FAMILY DWELLING UNIT.

TABLE 1.
CLEAR ZONE DISTANCES
LOCAL, COLLECTOR, AND COMMERCIAL STREETS

| DESIGN ADT | CLEAR ZONE FROM EDGE OF PAVEMENT | |
|---|---|---|
| | TANGENT SECTION | CURVE (WITHIN 125' OF CULVERT) |
| UNDER 750 | 10' | 15' |
| 750 – 1500 | 12' | 18' |
| 1501 – 6000 | 14' | 21' |
| OVER 6000 | 16' | 24' |

SEE STD. NO. 10.36A FOR PLAN AND CROSS SECTIONAL SCHEMATICS.

NOT TO SCALE

CHARLOTTE.

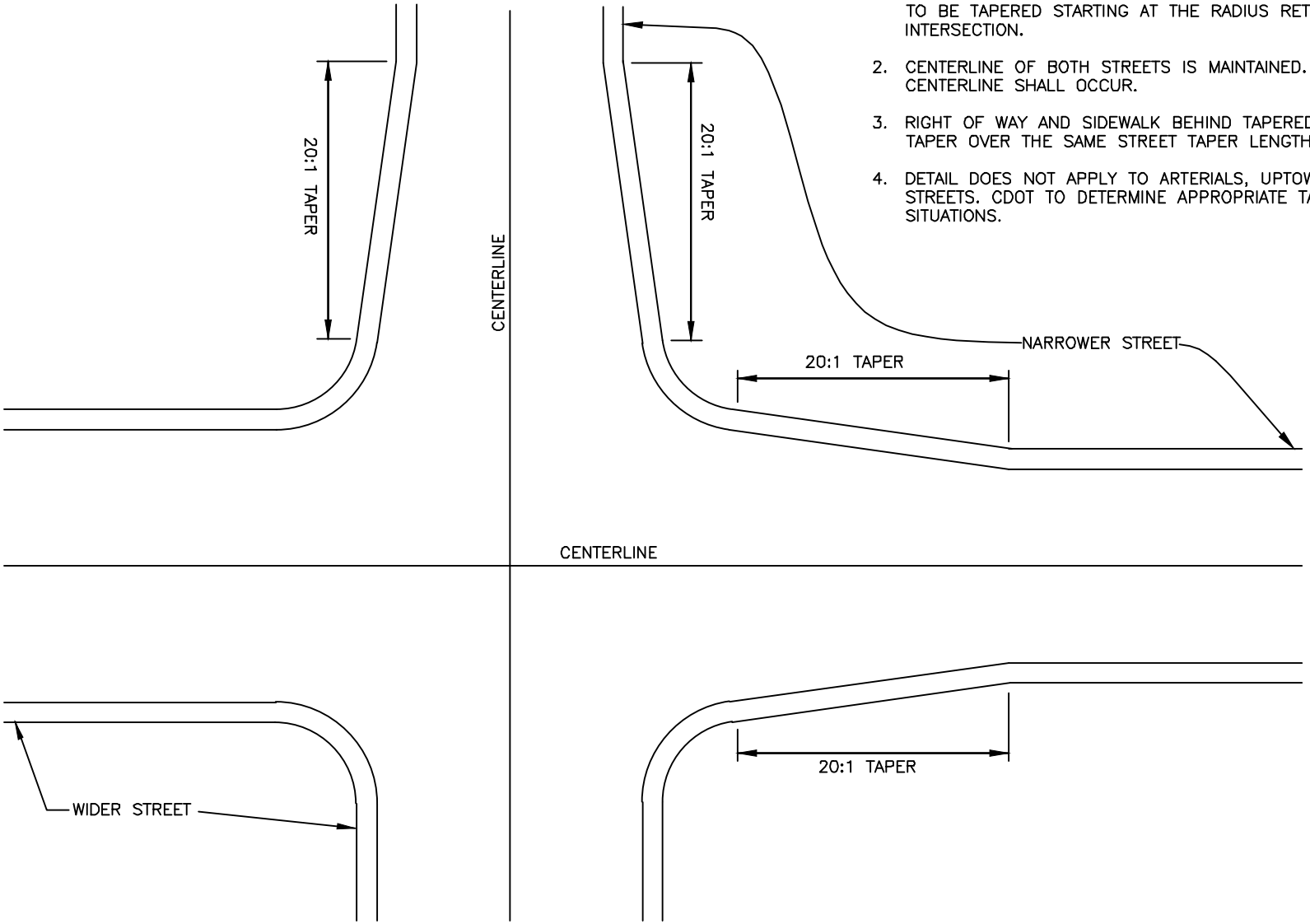
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CULVERT CROSSINGS ON RESIDENTIAL AND COMMERCIAL STREETS

| STD. NO. | REV. |
|---|---|
| 10.36B | 23 |

## GENERAL NOTES:

1. ALL TAPERS ARE 20:1 AND OCCUR ON BOTH SIDES OF THE ROAD TO BE TAPERED STARTING AT THE RADIUS RETURN AFTER THE INTERSECTION.
2. CENTERLINE OF BOTH STREETS IS MAINTAINED. NO SHIFTING OF THE CENTERLINE SHALL OCCUR.
3. RIGHT OF WAY AND SIDEWALK BEHIND TAPERED STREET SECTION TO TAPER OVER THE SAME STREET TAPER LENGTH.
4. DETAIL DOES NOT APPLY TO ARTERIALS, UPTOWN STREETS, OR MAIN STREETS. CDOT TO DETERMINE APPROPRIATE TAPERS IN THOSE SITUATIONS.



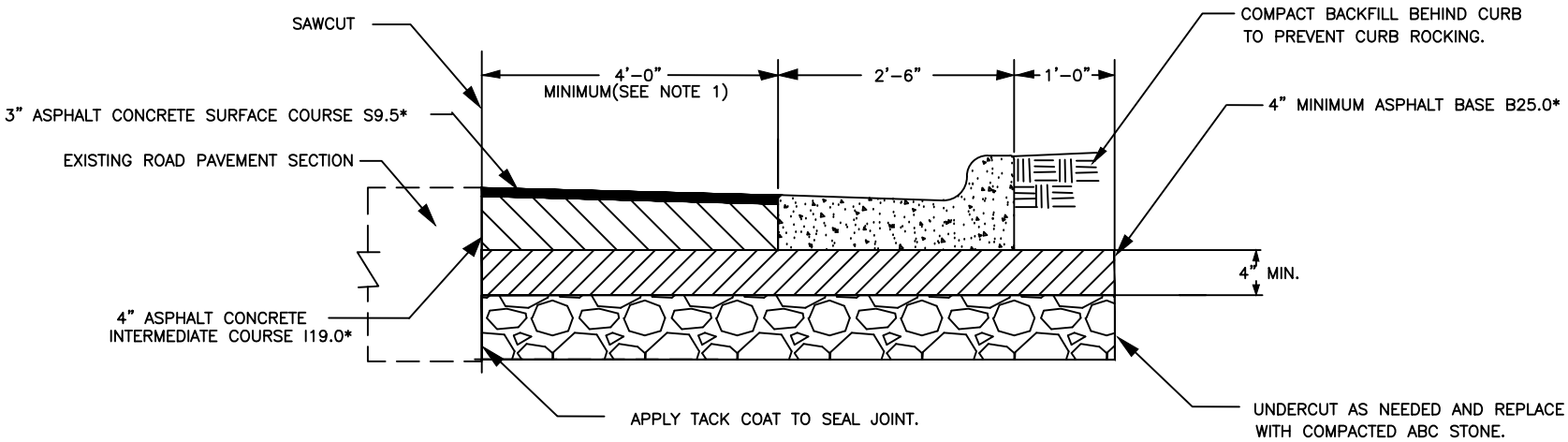

NOT TO SCALE

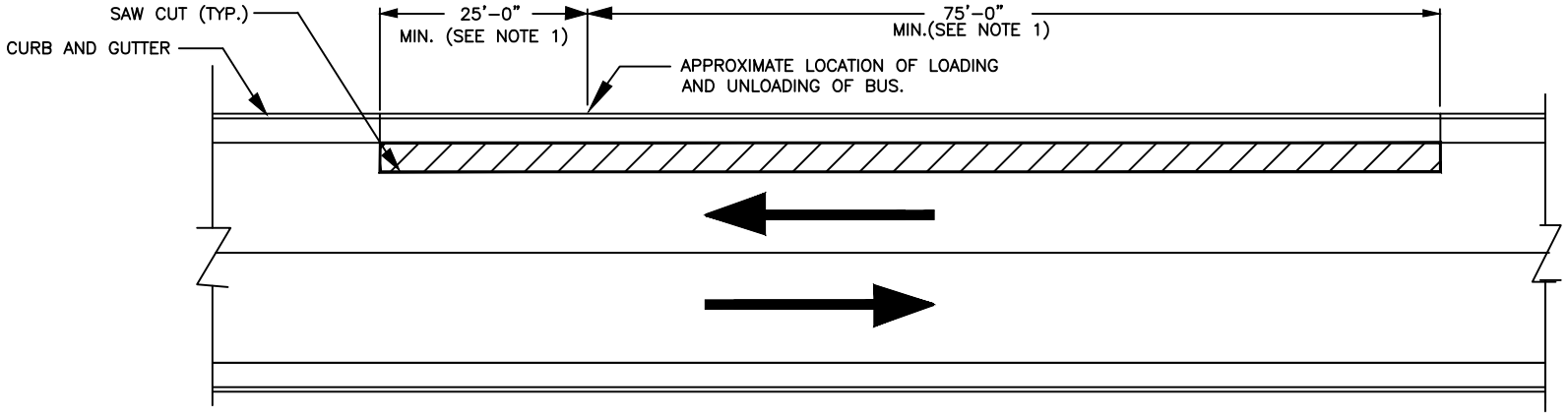
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TYPICAL WIDER STREET TO NARROWER STREET TAPER

| STD. NO. | REV. |
|---|---|
| 10.37 | 23 |




NOTES:
1. ACTUAL SITE CONDITIONS MAY REQUIRE ADDITIONAL LIMITS OF CONSTRUCTION TO BE DETERMINED BY THE CITY (MINIMUM SHOWN).
2. SEE APPROPRIATE CURB DETAIL FOR CURB INSTALLATION.
3. CONCRETE SHALL BE A MINIMUM OF 3600 PSI.
4. ASPHALT TYPE (*) TO MATCH SPECIFIED STREET DETAIL STANDARD PAVEMENT STRUCTURE OR AS DIRECTED BY CITY ENGINEER (SEE STREET TYPICAL DETAIL STANDARD).
5. RESURFACING LIMITS ON NCDOT–MAINTAINED ROADS TO BE DETERMINED BY NCDOT.

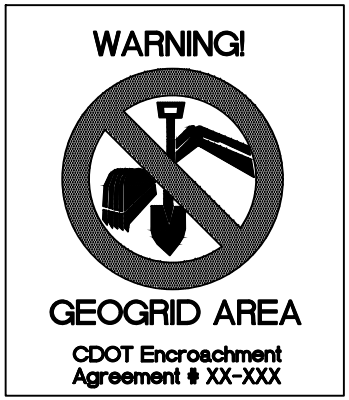
NOT TO SCALE

CHARLOTTE.

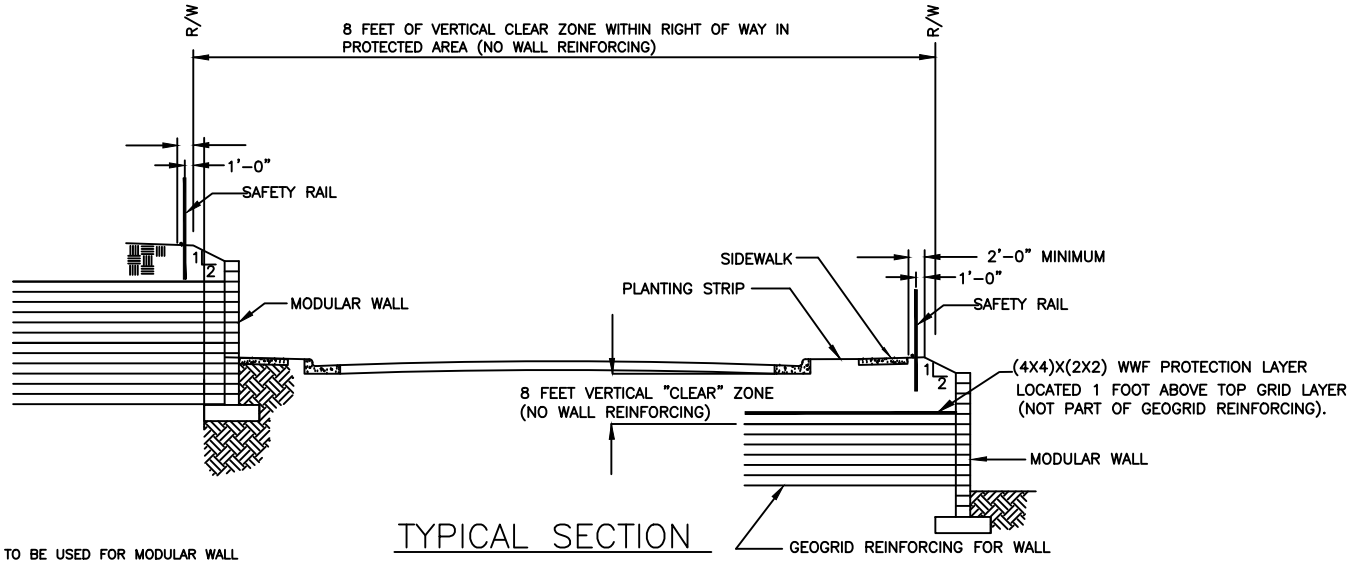
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CURB REPAIRS AT EXISITING BUS STOPS

| STD. NO. | REV. |
|---|---|
| 10.38 | 23 |



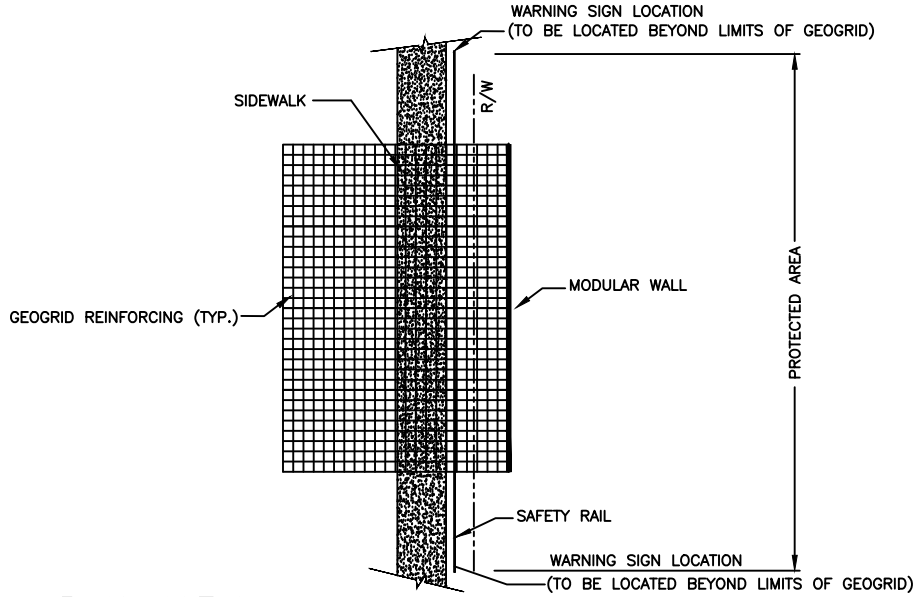

WARNING SIGN DETAIL




TYPICAL SECTION

## NOTES

1. THIS DRAWING ILLUSTRATES THE CONCEPTS TO BE USED FOR MODULAR WALL INSTALLATIONS REGARDING WARNING SIGN PLACEMENT, CLEAR SPACE REQUIREMENTS, GEOGRID PROTECTION, AND THE NEED TO OBTAIN AN ENCROACHMENT AGREEMENT PRIOR TO CONSTRUCTION. THIS DETAIL DOES NOT CONSTITUTE A STRUCTURAL DESIGN. FULL CONSTRUCTION PLANS FOR RETAINING WALLS MUST BE SEALED BY A PROFESSIONAL ENGINEER LICENSED IN NORTH CAROLINA AND SUBMITTED TO THE CITY DURING THE PLAN REVIEW PROCESS.
2. PLACEMENT OF ANY PORTION OF A MODULAR RETAINING WALL IN THE RIGHT-OF-WAY (R/W) SHALL REQUIRE AN ENCROACHMENT AGREEMENT TO BE EXECUTED WITH CDOT PRIOR TO CONSTRUCTION.
3. SAFETY RAILS SHALL EXTEND THROUGH THE PROTECTED AREA AND WARNING SIGNS SHALL BE ATTACHED TO THE SAFETY RAIL AT EACH END OF THE PROTECTED AREA.
4. ADDITIONAL MEASURE(S) MAY BE REQUIRED BY CDOT.
5. THIS DETAIL APPLIES ONLY TO STREETS MAINTAINED (OR TO-BE-MAINTAINED) BY THE CITY OF CHARLOTTE. THIS DETAIL IS NOT PERMITTED FOR USE ON NEW OR EXISTING NCDOT-MAINTAINED ROADWAYS.
6. CDOT PREFERS CAST-IN-PLACE REINFORCED CONCRETE WALLS WITH NO GEO-GRID OR TIEBACKS FOR WALLS IN OR NEAR THE PUBLIC RIGHT-OF-WAY.
7. CDOT PREFERS THAT ALL RETAINING WALLS AND APPURTENANCES BE LOCATED OUTSIDE OF THE R/W IN ORDER TO PROVIDE ADEQUATE SPACE FOR UTILITES (AERIAL AND UNDERGROUND), LANDSCAPING, SIDEWALKS, AND OTHER ITEMS.
8. GEOGRID IS NOT PERMITTED IN STORM DRIANAGE EASEMENTS OR CLT WATER EASEMENTS, NOR IN THE PROXIMITY OF STORM DRAIN PIPES, OR WATER OR SEWER UTILITY LINES.




PLAN VIEW

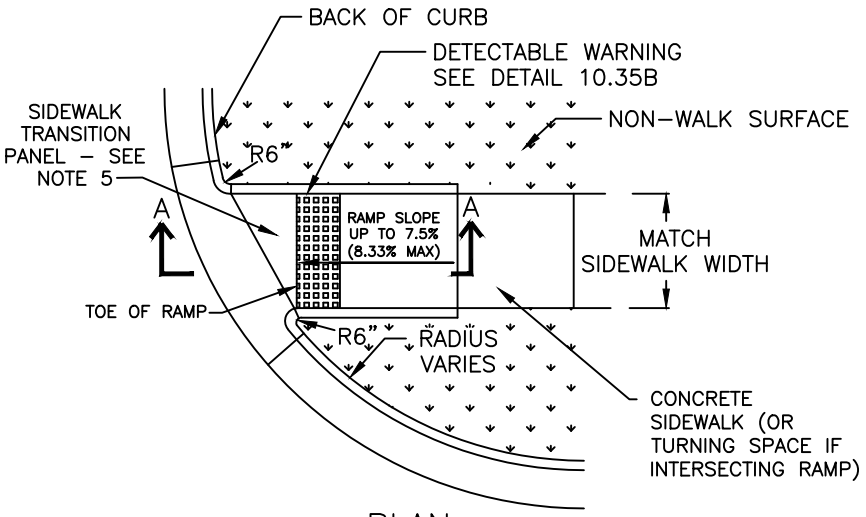
NOT TO SCALE

CHARLOTTE.

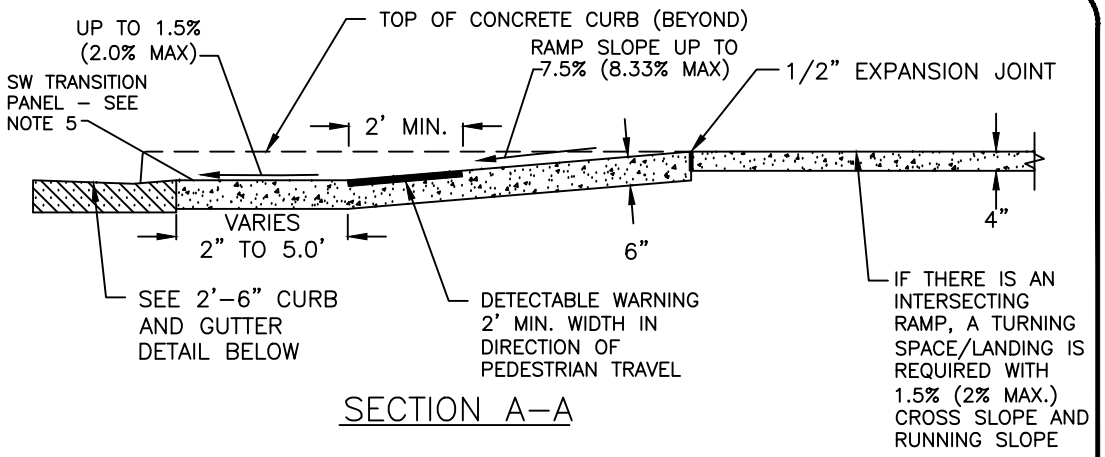
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# MODULAR RETAINING WALLS USING GEOGRID IN THE RIGHT-OF-WAY

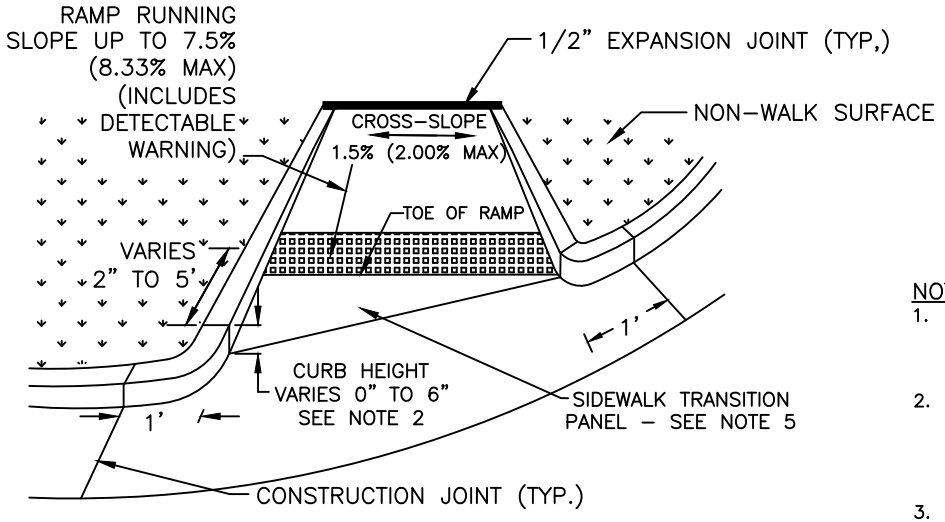
| STD. NO. | REV. |
|---|---|
| 10.39 | 24 |



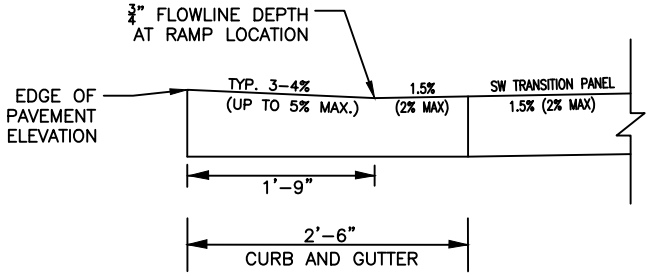

PLAN




SECTION A-A




PERSPECTIVE




2'-6" CURB AND GUTTER DETAIL

MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT DIRECTIONAL RAMPS

NOTES:

1. USE THIS DETAIL ONLY UNDER THE FOLLOWING CIRCUMSTANCES:
   - 5-FOOT SIDEWALKS WITH CURB RADII OF 35 FEET OR LESS
   - 6-FOOT SIDEWALKS WITH CURB RADII OF 30 FEET OR LESS
   - 8-FOOT SIDEWALKS WITH CURB RADII OF 25 FEET OR LESS
2. DIRECTIONAL RAMPS WITH RETURNED CURBS AS SHOWN MAY BE USED WHEN A PLANTING STRIP (NON-WALK SURFACE) IS PROVIDED. DO NOT USE THIS DETAIL IF THERE IS HARDSCAPE (WALKABLE SURFACE) INSTEAD OF A PLANTING STRIP. IF A WALKABLE SURFACE IS ADJACENT TO RAMP CONSTRUCT CONCRETE FLARES WITH SLOPES UP TO 10% MAX, INSTEAD OF RETURNED CURBS.
3. ALL CONCRETE SHALL BE AT LEAST 3600 PSI.
4. ENSURE FLUSH CONDITIONS AT RAMP TO GUTTER TRANSITION.
5. SIDEWALK TRANSITION PANEL: PREFERRED DESIGN IS 1.5% (2.0% MAX) IN ALL DIRECTIONS IN FRONT OF GRADE BREAK & DRAIN TO FLOW LINE. RUNNING SLOPE OF THIS AREA MUST NOT EXCEED 2%. CROSS-SLOPE MAY MATCH STREET GRADE AT BACK OF CURB WHEN STREET GRADE >2%. TRANSITION TO 1.5% (2.0% MAX) CROSS-SLOPE AT TOE OF RAMP.

THIS DETAIL IS NOT FOR USE IN ETJ, OR ON NCDOT-MAINTAINED STREETS.

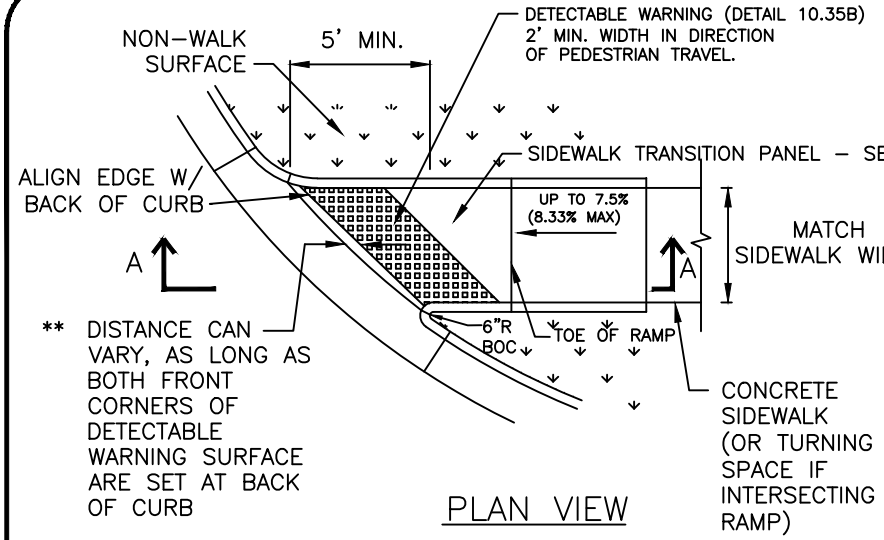
NOT TO SCALE

CHARLOTTE

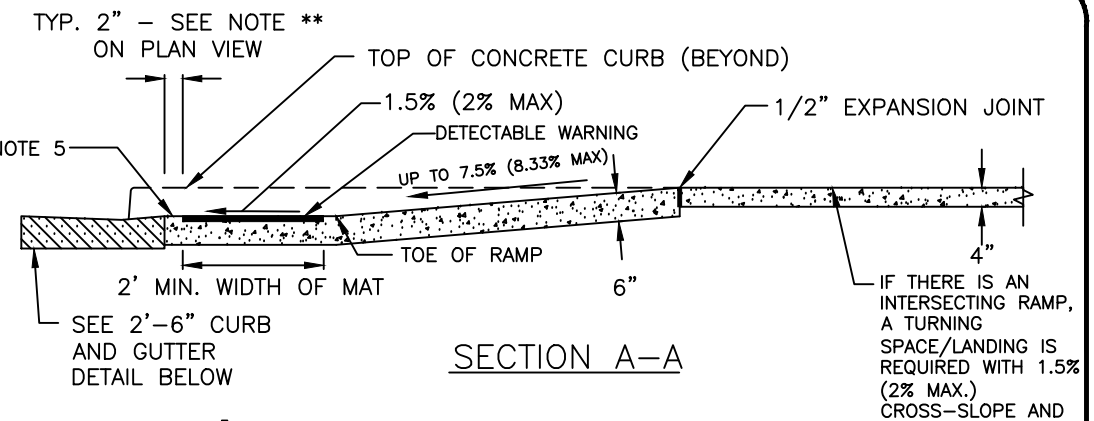
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# DIRECTIONAL CURB RAMP WITH SMALL/MEDIUM CURB RADII

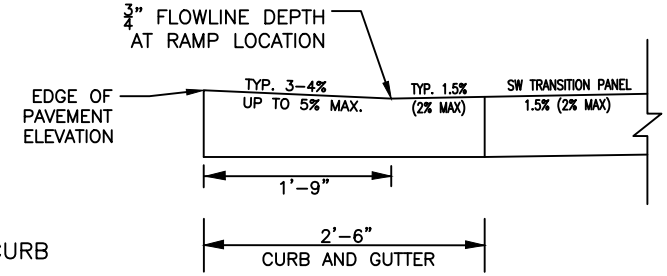
| STD. NO. | REV. |
|---|---|
| 10.40A | 17 |




PLAN VIEW

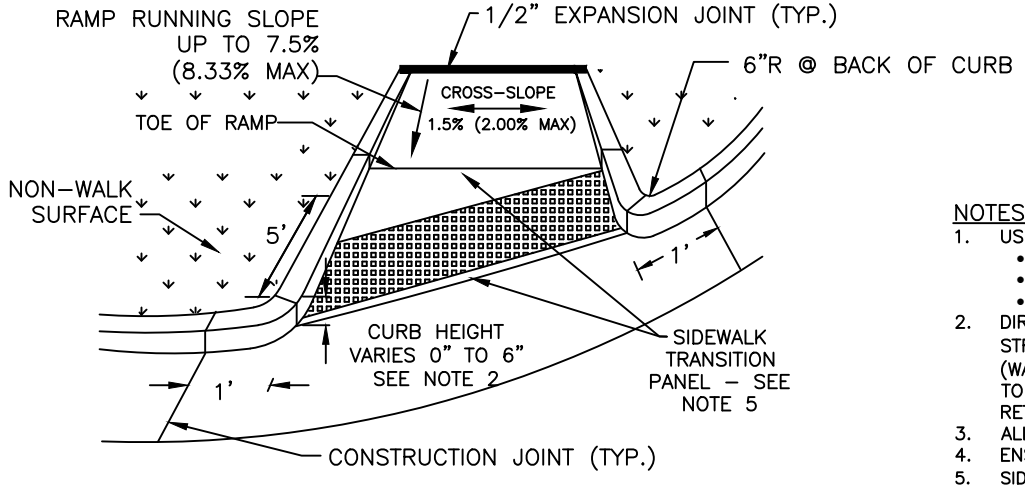



SECTION A–A




2'–6" CURB AND GUTTER DETAIL

MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT DIRECTIONAL RAMPS




PERSPECTIVE

NOTES:

1. USE THIS DETAIL ONLY UNDER THE FOLLOWING CIRCUMSTANCES:
   - 5–FOOT SIDEWALKS WITH CURB RADII GREATER THAN 35 FEET
   - 6–FOOT SIDEWALKS WITH CURB RADII GREATER THAN 30 FEET
   - 8–FOOT SIDEWALKS WITH CURB RADII GREATER THAN 25 FEET
2. DIRECTIONAL RAMPS WITH RETURNED CURBS AS SHOWN MAY BE USED WHEN A PLANTING STRIP (NON–WALK SURFACE) IS PROVIDED. DO NOT USE THIS DETAIL IF THERE IS HARDSCAPE (WALKABLE SURFACE) INSTEAD OF A PLANTING STRIP. IF A WALKABLE SURFACE IS ADJACENT TO RAMP CONSTRUCT CONCRETE FLARES WITH SLOPES UP TO 10% MAX, INSTEAD OF RETURNED CURBS.
3. ALL CONCRETE SHALL BE AT LEAST 3600 PSI.
4. ENSURE FLUSH CONDITIONS AT RAMP TO GUTTER TRANSITION.
5. SIDEWALK TRANSITION PANEL: PREFERRED 1.5% (2.0% MAX) IN ALL DIRECTIONS IN FRONT OF GRADE BREAK AND DRAIN TO FLOW LINE. RUNNING SLOPE OF THIS AREA MUST NOT EXCEED 2%. CROSS–SLOPE MAY MATCH STREET GRADE AT BACK OF CURB WHEN STREET GRADE >2%. TRANSITION TO 1.5% (2.0% MAX) CROSS–SLOPE AT TOE OF RAMP.

THIS DETAIL IS NOT FOR USE IN ETJ, OR ON NCDOT–MAINTAINED STREETS.

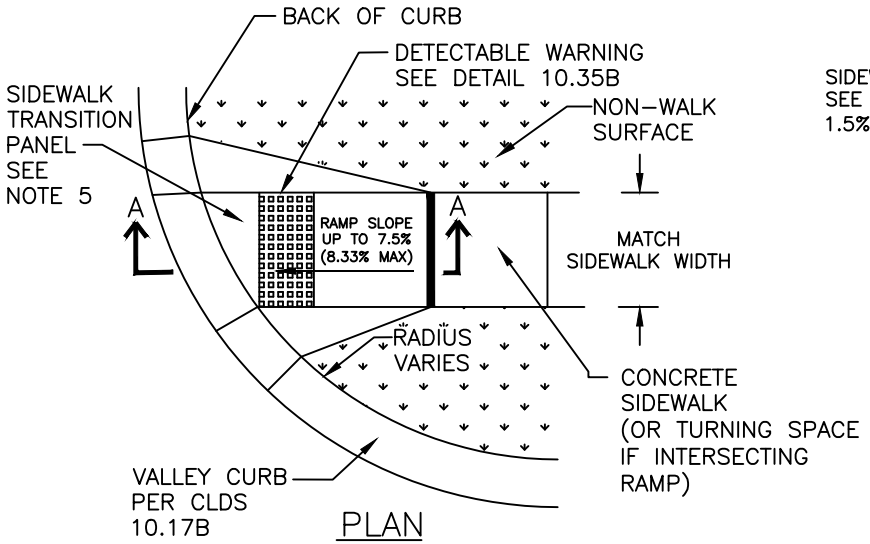
NOT TO SCALE

CHARLOTTE.

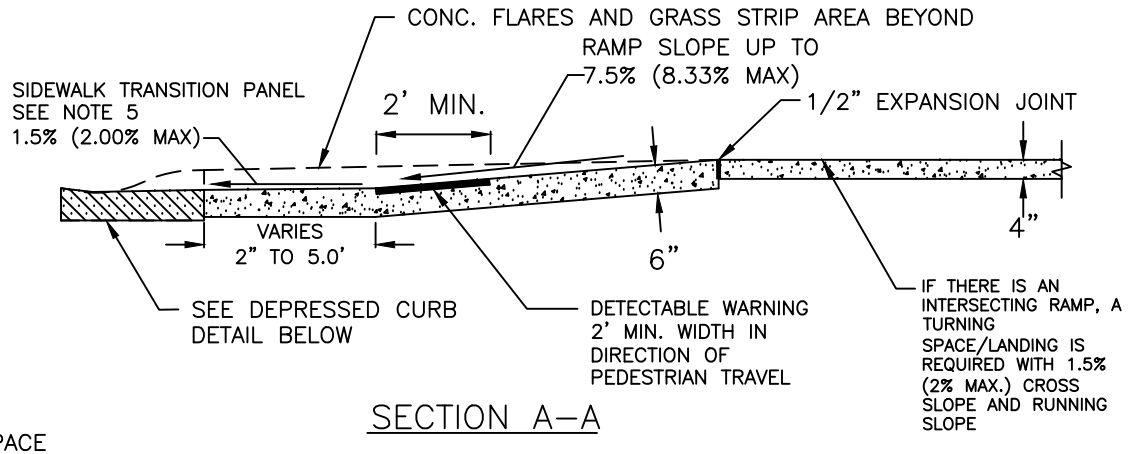
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# DIRECTIONAL CURB RAMP WITH LARGE CURB RADIUS

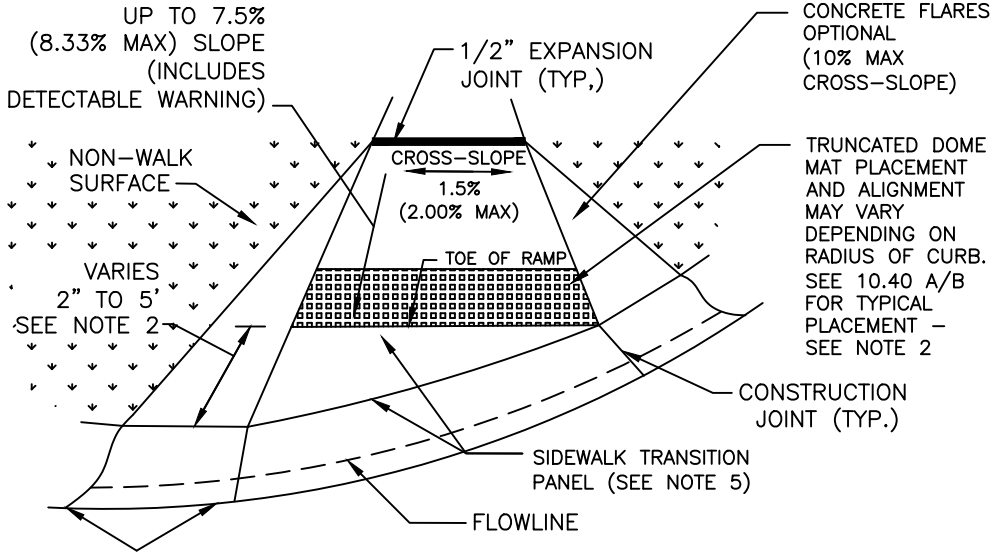
| STD. NO. | REV. |
|---|---|
| 10.40B | 20 |



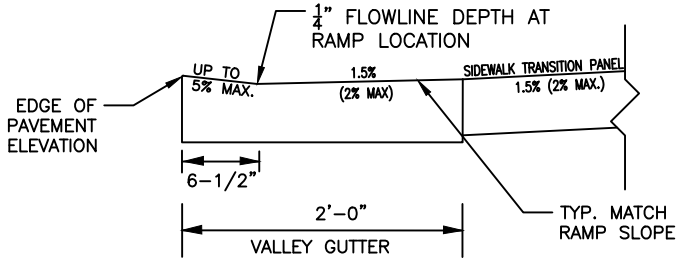

PLAN




SECTION A–A




PERSPECTIVE




DEPRESSED CURB DETAIL

MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT RAMPS

NOTES:

1. USE THIS DETAIL ONLY UNDER THE FOLLOWING CIRCUMSTANCES:
   - 5–FOOT SIDEWALKS WITH CURB RADII OF 35 FEET OR LESS
   - 6–FOOT SIDEWALKS WITH CURB RADII OF 30 FEET OR LESS
   - 8–FOOT SIDEWALKS WITH CURB RADII OF 25 FEET OR LESS
2. IF CURB RADIUS EXCEEDS THOSE LISTED ABOVE, REFER TO DETAIL 10.40B FOR DETECTABLE WARNING SURFACE MAT PLACEMENT.
3. ALL CONCRETE SHALL BE AT LEAST 3600 PSI.
4. ENSURE FLUSH CONDITIONS AT RAMP TO GUTTER TRANSITION.
5. SIDEWALK TRANSITION PANEL: PREFERRED 1.5% (2.0% MAX) IN ALL DIRECTIONS IN FRONT OF GRADE BREAK AND DRAIN TO FLOW LINE. RUNNING SLOPE OF THIS AREA MUST NOT EXCEED 2%. CROSS–SLOPE MAY MATCH STREET GRADE AT BACK OF CURB WHEN STREET GRADE >2%. TRANSITION TO 1.5% (2.0% MAX) CROSS–SLOPE AT TOE OF RAMP.

NOT TO SCALE

CHARLOTTE

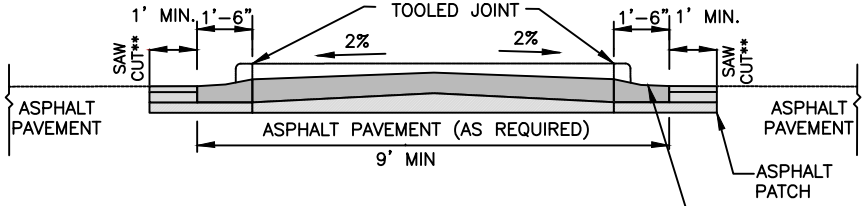
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# DIRECTIONAL CURB RAMP WITH VALLEY GUTTER

| STD. NO. | REV. |
|---|---|
| 10.40C | 17 |

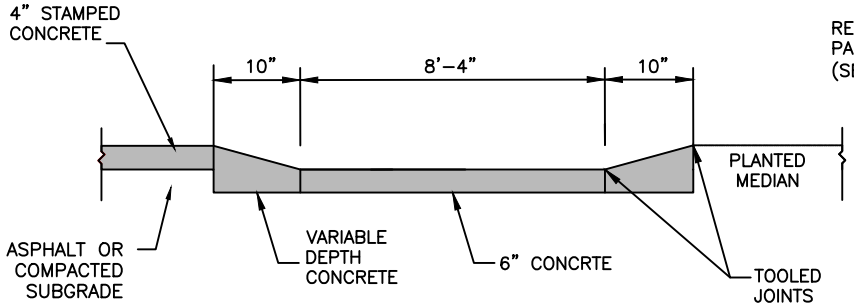
** = SAWCUT AS NEEDED IF INSTALLED IN EXISTING PAVEMENT

NOTE:
1. THIS DETAIL MAY BE USED ON NCDOT–MAINTAINED STREETS ONLY WITH APPROVAL FROM NCDOT.
2. PROPOSED ASPHALT PATCH LAYER THICKNESS WILL VARY AS REQUIRED BY CDOT OR NCDOT.
3. ENSURE PEDESTRIAN PASS–THRU HAS ADEQUATE SLOPE DRAINAGE AND DOES NOT POND WATER.
4. STAMPED CONCRETE PATTERN MAY BE ALTERED WITH CDOT APPROVAL.
5. THIS DETAIL MAY BE USED TO PROVIDE A PEDESTRIAN REFUGE PASS–THRU IN AN EXISTING MEDIAN WITH 1'–6" CURB & GUTTER.
6. FOR 1'–6" CURB AND GUTTER, USE CLDSM 10.17A FOR CITY STREETS OR NCDOT 846.01 FOR NCDOT STREETS.
7. NCDOT REQUIRES MILLING AND OVERLAY TO SEAL JOINT AT SAWCUTS SHOWN. FOR CITY STREETS MILLING AND OVERLY MAY BE REQUIRED.
8. NCDOT REQUIRES 1' OFFSET FROM EDGE OF PAVEMENT ALONG CURBLINE TO LANE LINE.
9. NCDOT REQUIRES THAT ALL JOINTS IN THE ISLAND MUST BE SEALED PER NCDOT STANDARD.
10. USE "QWICK KURB L104 REFLECTIVE YELLOW PADDLE" OR EQUIVALENT.

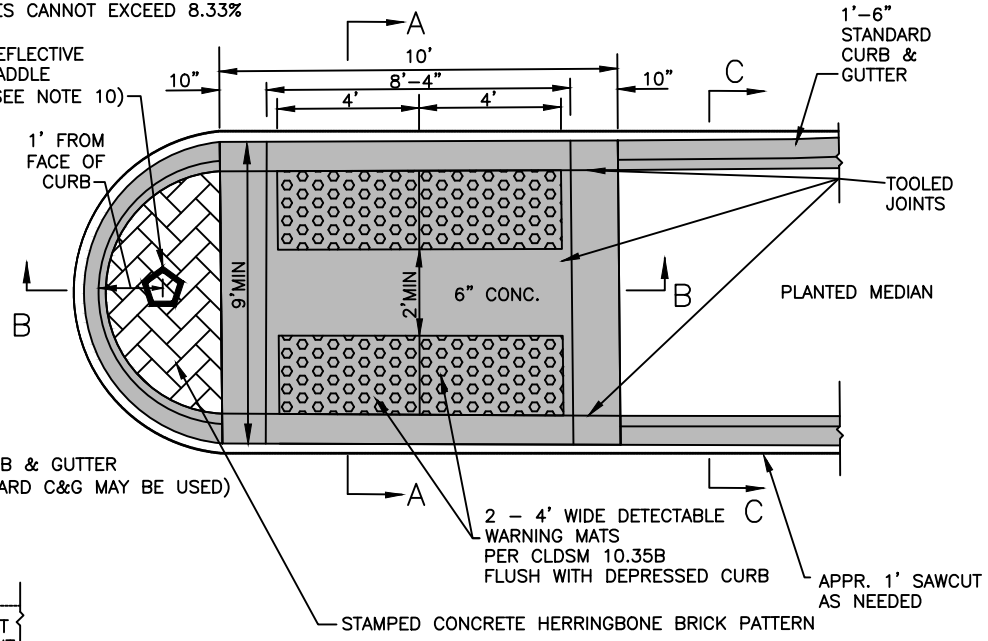



SECTION A–A

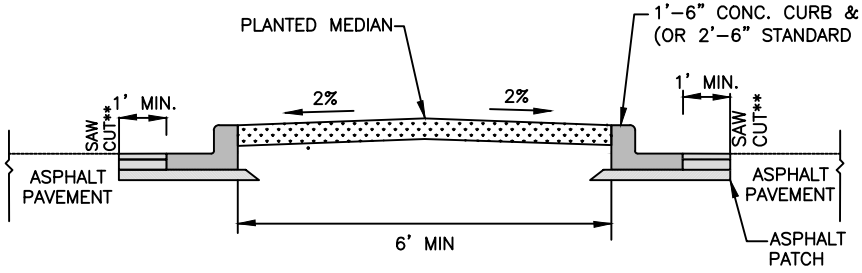
SLOPE ON DEPRESSED CURB AT DOMES CANNOT EXCEED 8.33%




SECTION B–B




PLAN




SECTION C–C

NOT TO SCALE

CHARLOTTE.

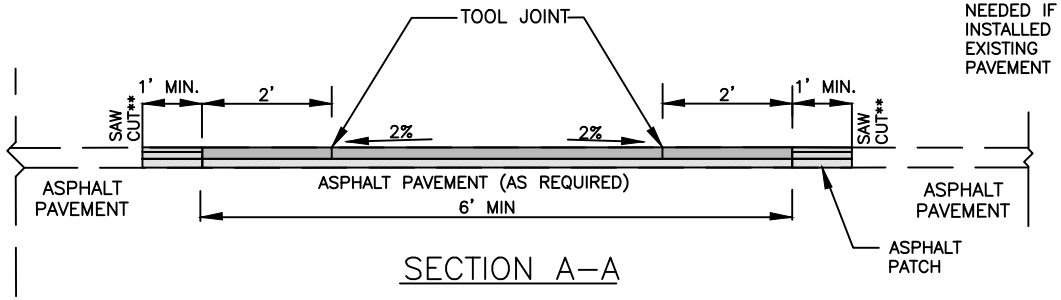
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PEDESTRIAN REFUGE (WITH 1'–6" CURB & GUTTER)

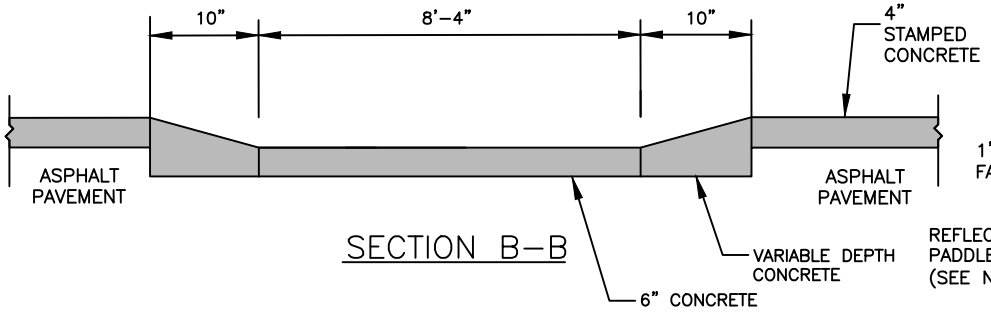
| STD. NO. | REV. |
|---|---|
| 10.41A | 23 |

** = SAWCUT AS NEEDED IF INSTALLED IN EXISTING PAVEMENT

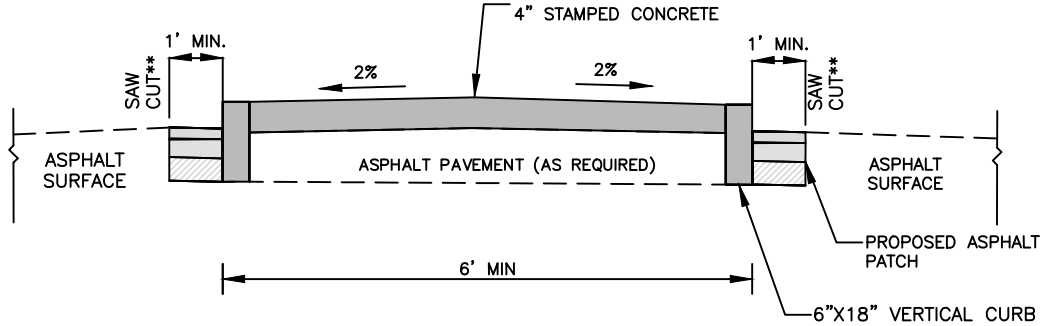
NOTES:
1. THIS DETAIL IS APPROVED FOR CITY MAINTAINED STREETS ONLY.
2. PROPOSED ASPHALT PATCH LAYER THICKNESS WILL VARY AS REQUIRED BY CDOT.
3. ENSURE PEDESTRIAN PASS–THRU HAS ADEQUATE SLOPE DRAINAGE AND DOES NOT POND WATER.
4. STAMPED CONCRETE PATTERN MAY BE ALTERED WITH CDOT APPROVAL.
5. THIS DETAIL MAY BE USED TO PROVIDE A PEDESTRIAN REFUGE PASS–THRU IN AN EXISTING MEDIAN WITH VERTICAL CURB.
6. MILLING AND OVERLAY MAY BE REQUIRED TO SEAL JOINTS AT SAWCUT LOCATIONS.
7. USE "QWICK KURB L104 REFLECTIVE YELLOW PADDLE" OR EQUIVALENT.



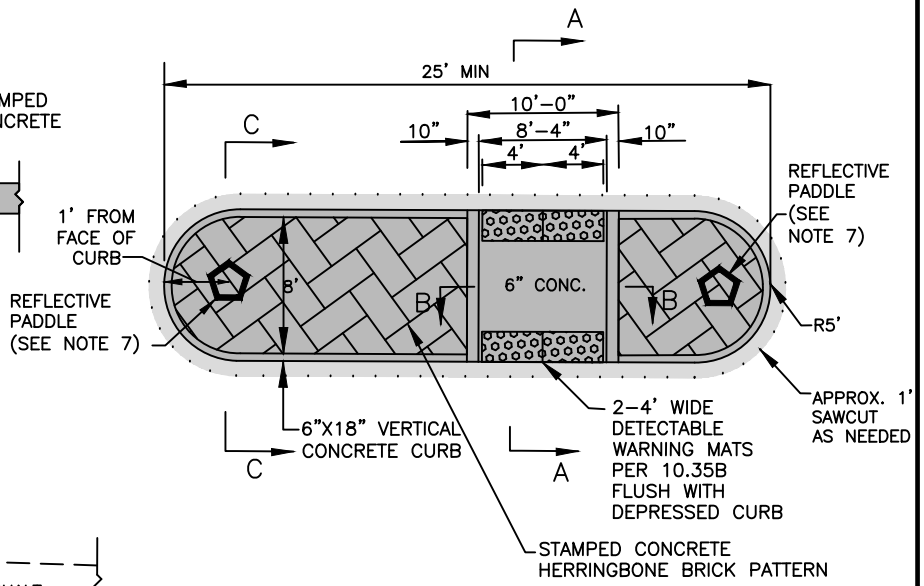

SECTION A–A




SECTION B–B




SECTION C–C




PLAN

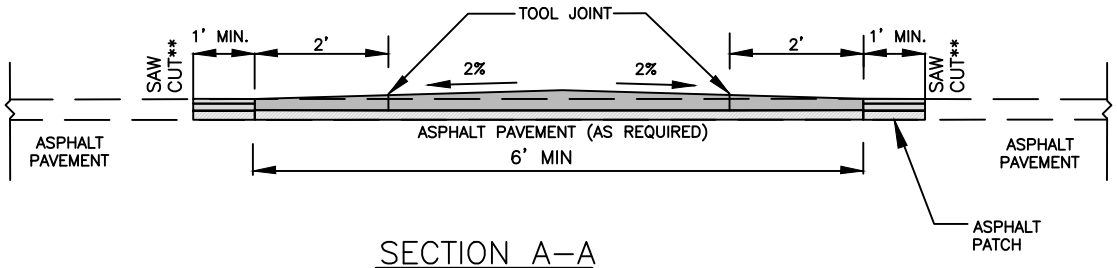
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# PEDESTRIAN REFUGE (WITH VERTICAL CURB)

| STD. NO. | REV. |
|---|---|
| 10.41B | 23 |

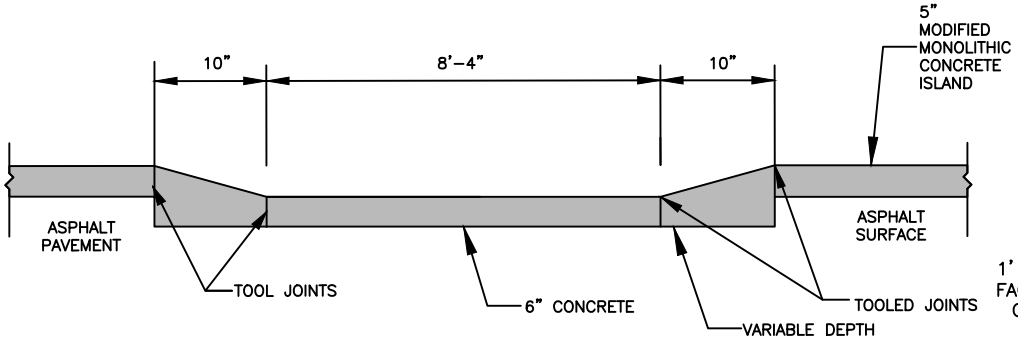



** = SAWCUT AS NEEDED IF INSTALLED IN EXISTING PAVEMENT

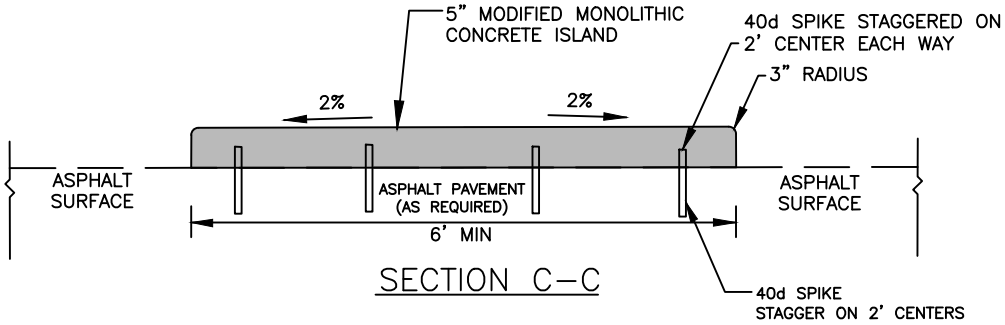
SECTION A–A

NOTES:

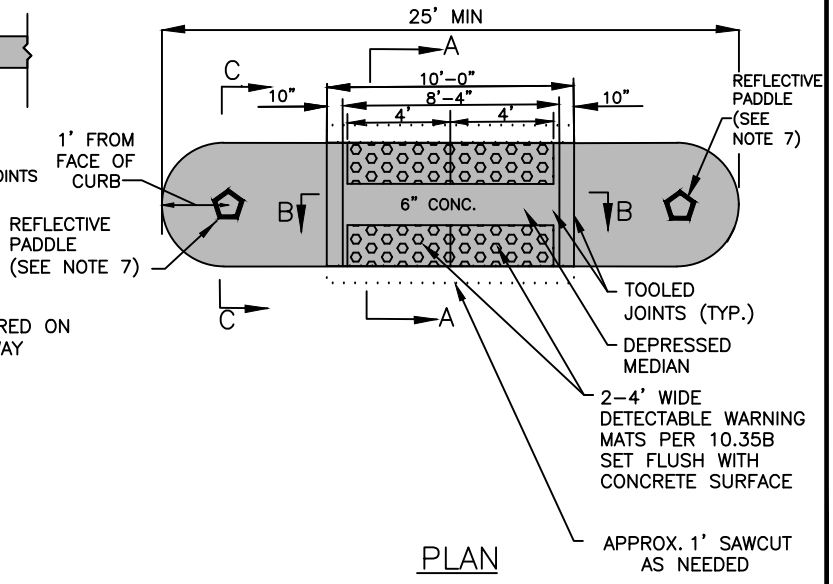
1. THIS DETAIL CAN ONLY BE USED WITH APPROVAL FROM CDOT OR NCDOT. 1'–6" CURB & GUTTER OR VERTICAL CURB PEDESTRIAN REFUGE DETAILS ARE PREFERRED.
2. PROPOSED ASPHALT PATCH LAYER THICKNESS WILL VARY AS REQUIRED BY CDOT OR NCDOT.
3. ENSURE PEDESTRIAN PASS–THRU HAS ADEQUATE SLOPE DRAINAGE AND DOES NOT POND WATER.
4. NCDOT REQUIRES MILLING AND OVERLAY TO SEAL JOINT AT SAWCUTS SHOWN. FOR CITY STREETS MILLING AND OVERLY MAY BE REQUIRED.
5. NCDOT REQUIRES 1' OFFSET FROM EDGE OF PAVEMENT ALONG CURBLINE TO LANE LINE.
6. NCDOT REQUIRES THAT ALL JOINTS BE SEALED PER NCDOT STANDARD.
7. USE "QWICK KURB L104 REFLECTIVE YELLOW PADDLE" OR EQUIVALENT.




SECTION B–B




SECTION C–C




PLAN

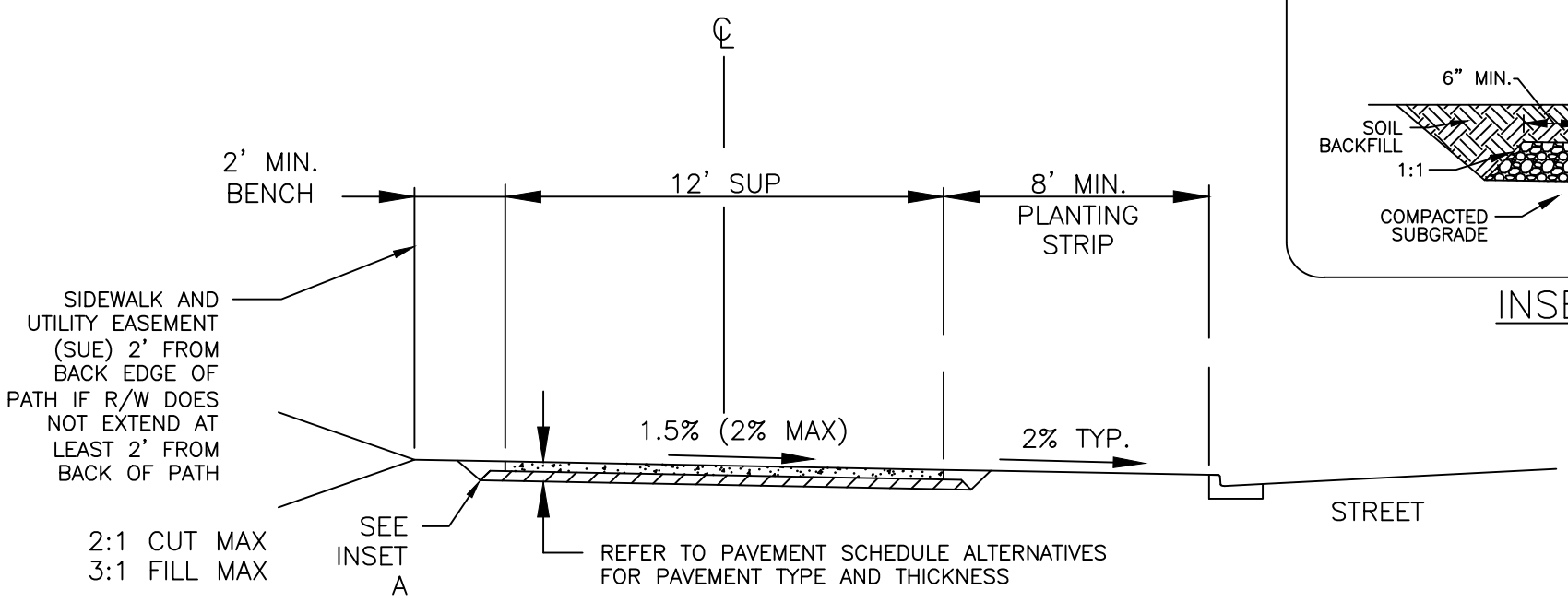
NOT TO SCALE

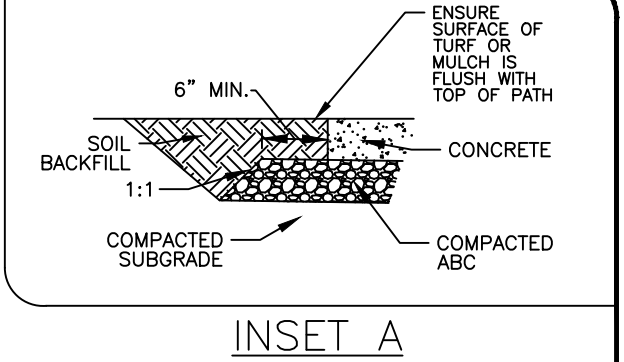
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PEDESTRIAN REFUGE (MODIFIED MONOLITHIC)

| STD. NO. | REV. |
|---|---|
| 10.41C | 23 |




INSET A

NOTES:

1. AT INTERSECTIONS WITH STREETS OR DRIVEWAYS, RAMP WIDTH MUST MATCH SHARED-USE PATH WIDTH.
2. IF SHARED-USE PATHS ARE NOT PART OF OR PARALLEL TO A ROADWAY, THE PAVEMENT SCHEDULE ALT 1 SHALL BE USED.
3. CONTRACTOR MUST SEAL ALL JOINTS. SEAL MUST BE NON-SHRINKING AND FLUSH WITH FINISHED GRADE OF THE CONCRETE PATH.
4. ALL CONCRETE SHALL BE AT LEAST 3600 PSI COMPRESSIVE STRENGTH.
5. JOINTS MUST BE SAWCUT A MINIMUM OF $\frac{1}{4}$ DEPTH OF CONCRETE DEPTH, BUT NO MORE THAN $\frac{1}{2}$ OF CONCRETE DEPTH.
   - TRANSVERSE JOINTS MUST BE SAWCUT EVERY 6 FEET WHEN PAVEMENT SCHEDULE ALT 1 OR ALT 3 ARE USED.
   - TRANSVERSE JOINTS MUST BE SAWCUT EVERY 10 FEET FOR PAVEMENT SCHEDULE ALT 2.
   - CONSTRUCTION JOINTS MUST BE EVERY 40 FEET.
6. UTILIZE THIS DETAIL FOR OFF-STREET PATHS. INCLUDE 2' MINIMUM WIDTH BENCH AT 1.5% CROSS-SLOPE PRIOR TO THE START OF CUT/FILL SLOPE, APPLY MAXIMUM CUT/FILL SLOPES, AND 2' SUE REQUIREMENTS TO BOTH SIDES OF PATH.

PAVEMENT SCHEDULE ALTERNATIVES

| ALTERNATIVE | DESCRIPTION |
|---|---|
| ALT 1 (PREFERRED) | 6" CONCRETE |
| | 3" COMPACTED AGGREGATE BASE COURSE (ABC) |
| | COMPACTED SUBGRADE |
| ALT 2 | 6" CONCRETE |
| | COMPACTED SUBGRADE |
| ALT 3 | 4" CONCRETE |
| | 3" COMPACTED AGGREGATE BASE COURSE (ABC) |
| | COMPACTED SUBGRADE |

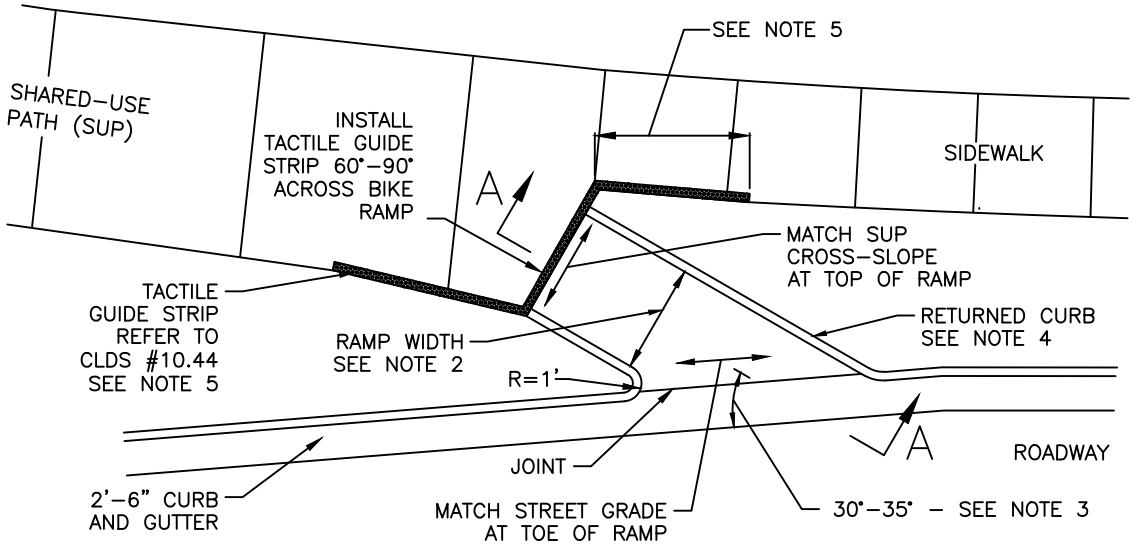
NOT TO SCALE

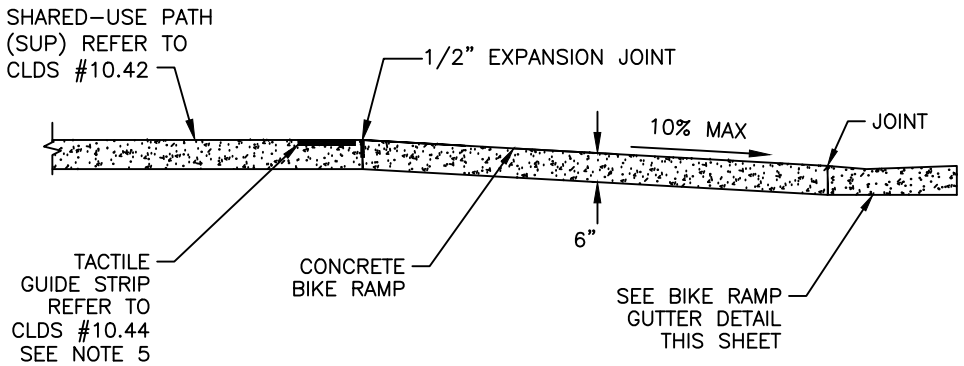
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SHARED-USE PATH (SUP) AND OFF-STREET PATH

| STD. NO. | REV. |
|---|---|
| 10.42 | 23 |

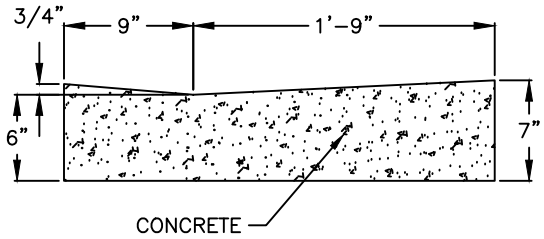



SECTION A–A

## NOTES:

1. BIKE RAMP ALLOWS BICYCLE RIDERS TO TRANSITION FROM AN ON–STREET BICYCLE FACILITY TO/FROM AN OFF–STREET FACILITY.
2. FOR ONE–WAY FACILITIES, BIKE RAMP WIDTH IS 6'. FOR TWO–WAY BIKE FACILITIES, BIKE RAMP WIDTH SHALL MATCH THE WIDTH OF THE SHARED–USE PATH, WITH A MINIMUM WIDTH OF 10'.
3. BIKE RAMP SHALL BE PLACED AT A MINIMUM OF 30° AND A MAXIMUM OF 35° TO THE ROADWAY. BIKE RAMPS SHOULD BE PLACED ENTIRELY WITHIN THE PLANTING STRIP BETWEEN THE SHARED–USE PATH/SIDEWALK AND THE ROADWAY.
4. ON CITY–MAINTAINED STREETS, INSTALL A RETURNED VERTICAL CURB ALONG THE SIDES OF THE BIKE RAMP AS SHOWN, TAPER TO 0" DEPTH AT MUP. ON NCDOT–MAINTAINED STREETS, INSTALL CONCRETE FLARES ALONG THE SIDES OF THE BIKE RAMP.
5. INSTALL 2 TACTILE GUIDE STRIP MODULES ALONG PEDESTRIAN FACILITY.
6. FOLLOW "NCHRP 672 ROUNDABOUTS: AN INFORMATION GUIDE" (CURRENT EDITION) FOR BIKE RAMP PLACEMENT AT ROUNDABOUTS.




BIKE RAMP GUTTER DETAIL

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BIKE RAMP AT SHARED USE PATH

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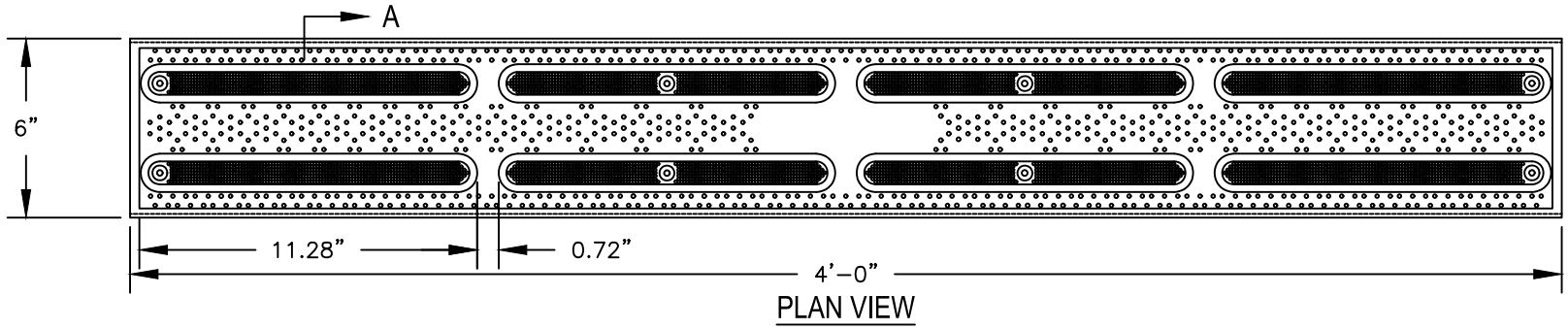
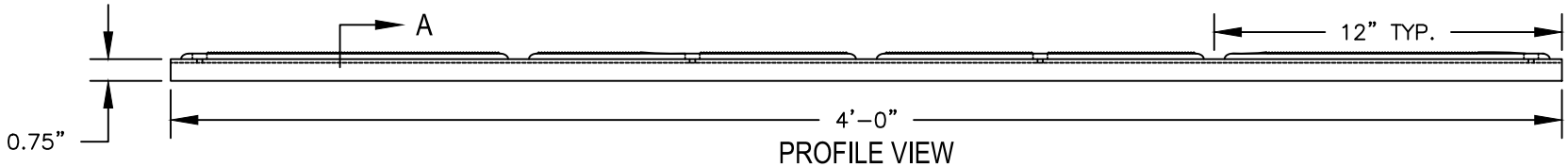
|---|---|
| 10.43 | 23 |



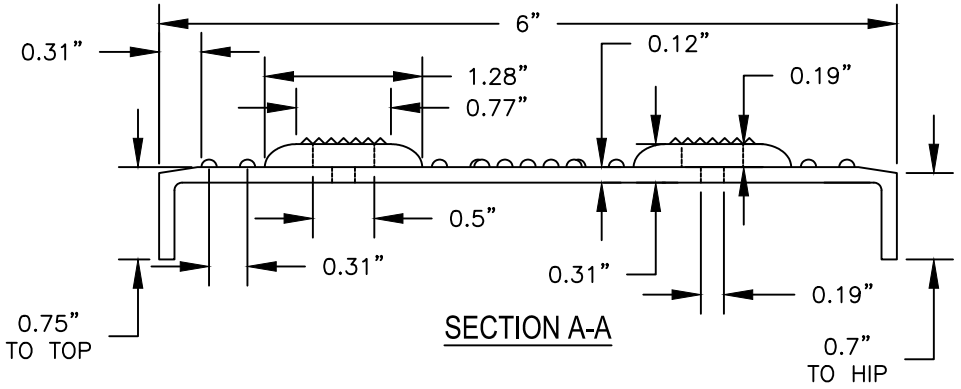

PLAN VIEW




PROFILE VIEW

NOTES:

1. SUBMIT TACTILE GUIDE STRIP SHOP DRAWINGS TO CITY FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
2. INSTALL TACTILE GUIDE STRIP PER MANUFACTURER'S DIRECTIONS.
3. THE COLOR OF THE TACTILE GUIDE STRIP SHALL MEET PROWAG REQUIREMENTS FOR CONTRAST WITH THE SURROUNDING PAVEMENT/SIDEWALK. FEDERAL YELLOW #33538 PROVIDES THE REQUIRED LEVEL OF CONTRAST AND SHALL BE USED, UNLESS:
   - 3.A. THE PAVEMENT/SIDEWALK IS A COLOR THAT DOES NOT PROVIDE SUFFICIENT CONTRAST WITH FEDERAL YELLOW #33538, OR
   - 3.B. AN ADOPTED STREETSCAPE, PEDSCAPE, OR SIMILAR PLAN PRESCRIBES A COLOR PALETTE TO USE (E.G., TRYON STREET MALL)
4. SUBMIT SHOP DRAWINGS OF ANY COLOR OTHER THAN FEDERAL YELLOW #33538 TO THE CITY FOR REVIEW AND APPROVAL BY CDOT PRIOR TO INSTALLATION. COMPLIANCE WITH THE COLOR–CONTRAST REQUIREMENTS OF PROWAG SHALL SUPERSEDE ANY CONFLICTING PROVISION IN A PRESCRIBED COLOR PALETTE.
5. MATERIAL SHALL BE FIBERGLASS–REINFORCED VITRIFIED POLYMER COMPOSITE.
6. IF CUTTING OF A TILE IS NECESSARY, CUT ONLY IN WHOLE ONE–FOOT INCREMENTS.




SECTION A-A

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TACTILE GUIDE STRIP

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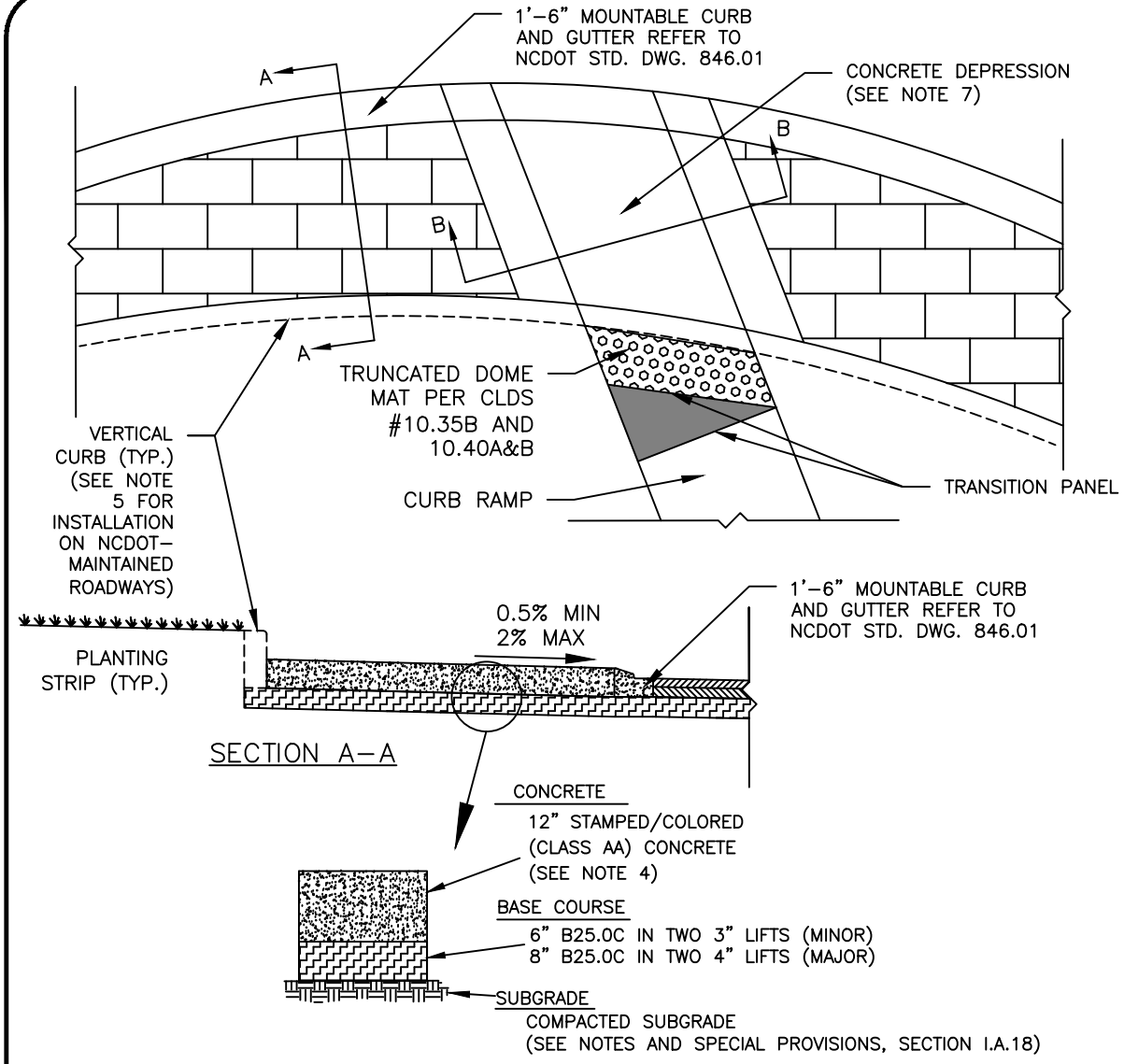
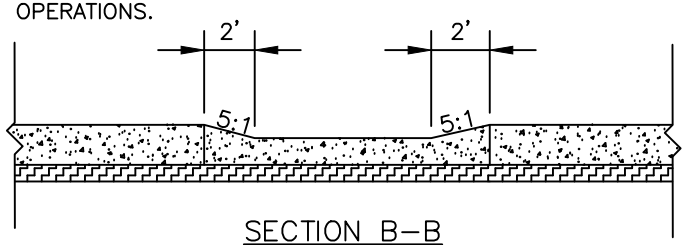
| 10.44 | 21 |




TYPICAL TRUCK APRON PAVEMENT SECTION

## NOTES:

1. THIS DETAIL CAN BE USED ON NCDOT AND CITY OF CHARLOTTE STREETS WITH PRIOR NCDOT AND CDOT APPROVAL.
2. WIDTH OF THE TRUCK APRON SHALL ACCOMMODATE A DESIGN VEHICLE AS DETERMINED BY CDOT/NCDOT.
3. TRUCK APRON SHALL BE CONCRETE AND STAMPED WITH A BRICK PATTERN.
4. ON NCDOT–MAINTAINED FACILITIES, CONCRETE FOR TRUCK APRONS SHALL USE A RED BRICK ADMIXTURE. SURFACE STAINS SHALL NOT BE USED. COLOR SUBMITTALS AND FIELD SAMPLES WILL BE REQUIRED FOR COLOR APPROVAL BY NCDOT. ON CITY–MAINTAINED FACILITIES, CONCRETE SHALL BE NATURALLY COLORED.
5. ON NCDOT–MAINTAINED FACILITIES, INSTALL 1'–6" SPILL CURB AND GUTTER BEHIND THE TRUCK APRON INSTEAD OF VERTICAL CURB AS SHOWN. THE GUTTER SPILL SLOPE MUST MATCH THE SLOPE OF THE ADJACENT TRUCK APRON. ON CITY–MAINTAINED STREETS, INSTALL VERTICAL CURB AS ILLUSTRATED.
6. ENSURE POSITIVE DRAINAGE THROUGHOUT THE APRON. AVOID STORM DRAINAGE STRUCTURES WITHIN THE MOUNTABLE CURB AND GUTTER.
7. PROVIDE FLUSH TRANSITIONS THROUGHOUT CONCRETE DEPRESSION AREA AND ENSURE RUNNING SLOPE AND CROSS SLOPE OF 2% MAX. FOR ALTERATIONS OF EXISTING CROSSINGS, CROSS SLOPE MAY MATCH ROAD GRADE.
8. AT SIGNALIZED INTERSECTIONS, ACCESSIBLE PEDESTRIAN SIGNALS (APS) WILL BE REQUIRED FOR ALL CROSSINGS TO & FROM CORNERS WITH TRUCK APRONS. ENGINEER TO COORDINATE WITH CDOT IMPLEMENTATION ON PLACEMENT, APS FEATURES, AND OPERATIONS.




SECTION B–B
CONCRETE DEPRESSION

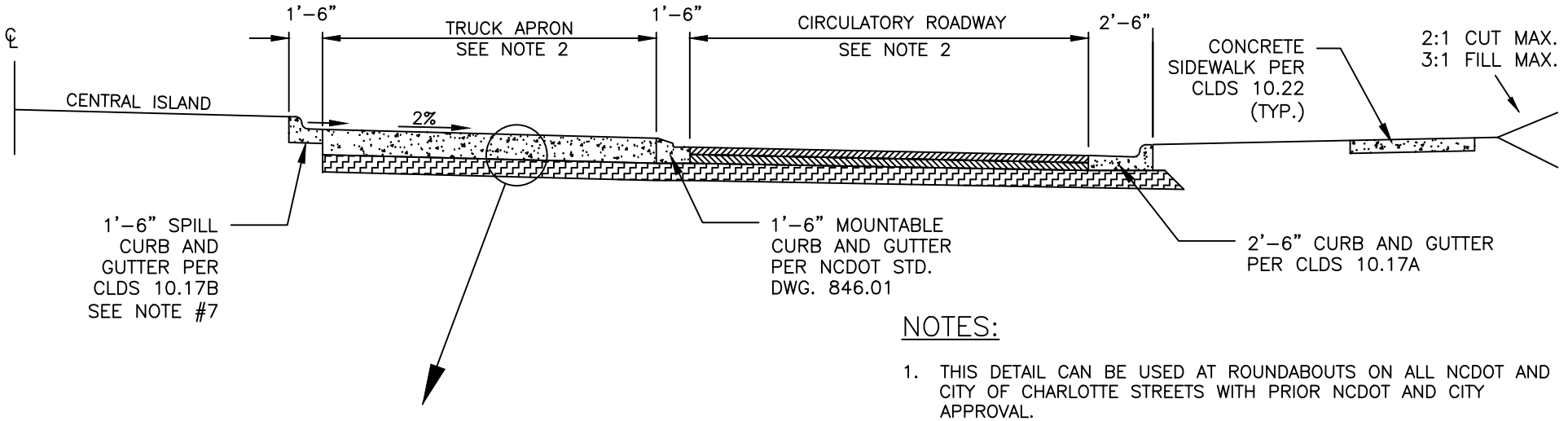
NOT TO SCALE

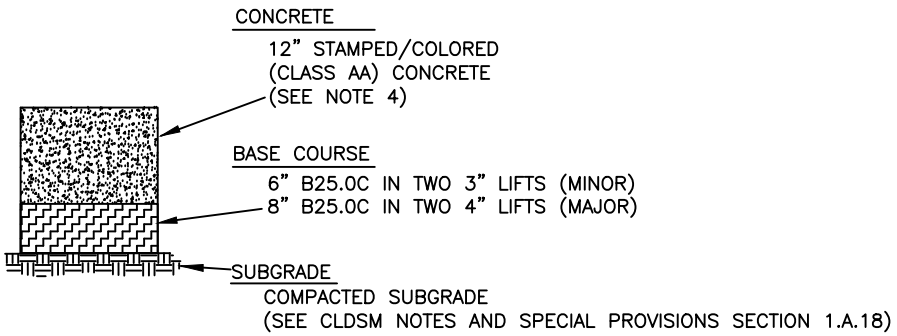
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TRUCK APRON AT INTERSECTION

| STD. NO. | REV. |
|---|---|
| 10.45A | 23 |




TYPICAL TRUCK APRON PAVEMENT SECTION

## NOTES:

1. THIS DETAIL CAN BE USED AT ROUNDABOUTS ON ALL NCDOT AND CITY OF CHARLOTTE STREETS WITH PRIOR NCDOT AND CITY APPROVAL.
2. WIDTH OF TRUCK APRON AND CIRCULATORY ROADWAY TRAVEL LANE SHALL BE IN ACCORDANCE TO CURRENT "NCHRP 672 ROUNDABOUTS: AN INFORMATION GUIDE" (CURRENT EDITION).
3. TRUCK APRON SHALL BE CONCRETE AND STAMPED WITH A BRICK PATTERN.
4. ON NCDOT–MAINTAINED FACILITIES, CONCRETE FOR TRUCK APRONS SHALL USE A BRICK RED ADMIXTURE. SURFACE STAINS SHALL NOT BE USED. COLOR SUBMITTALS AND FIELD SAMPLES WILL BE REQUIRED FOR COLOR APPROVAL BY NCDOT. ON CITY–MAINTAINED FACILITIES, CONCRETE SHALL BE NATURALLY COLORED.
6. ENSURE POSITIVE DRAINAGE THROUGHOUT THE APRON. AVOID STORM DRAINAGE STRUCTURES WITHIN THE MOUNTABLE CURB AND GUTTER.
7. INSTALL "SPILL" CURB AND GUTTER BETWEEN THE TRUCK APRON AND THE CENTER OF THE ROUNDABOUT. THE GUTTER SPILL SLOPE MUST MATCH THE SLOPE OF THE ADJACENT TRUCK APRON.

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TRUCK APRON AT ROUNDABOUT

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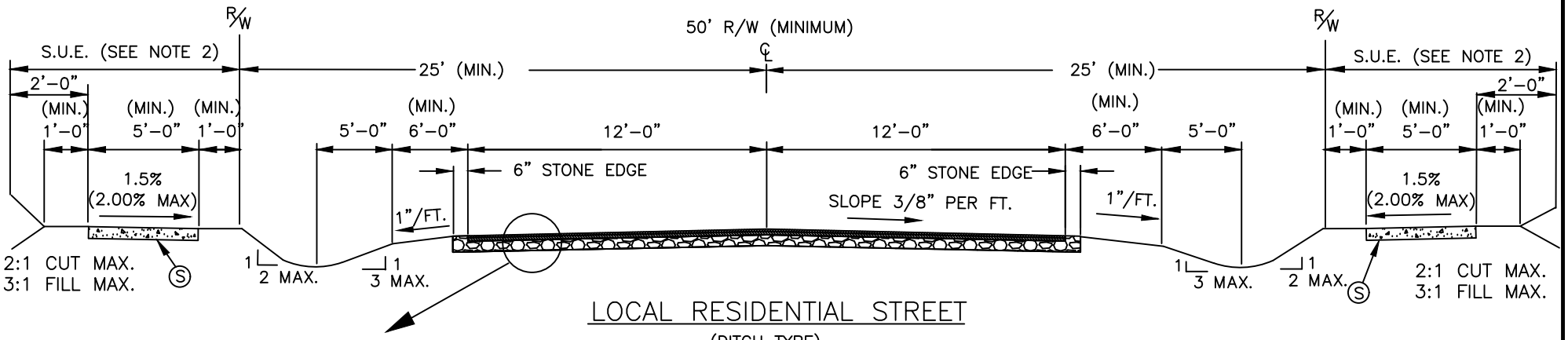
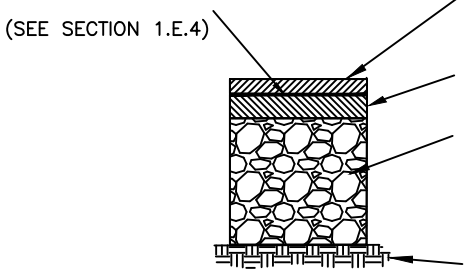
| 10.45B | 23 |




## LOCAL RESIDENTIAL STREET
(DITCH TYPE)




SURFACE COURSE
1" S9.5B
FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE
1-1/2" S9.5C OR S9.5B

BASE COURSE
8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE
COMPACTED SUBGRADE (SEE CLDS SPECIFICATIONS AND SPECIAL PROVISIONS SECTION 1.A.18)

## TYPICAL PAVEMENT SECTION

NOTES:

1. SIDEWALK SHALL BE ON BOTH SIDES OF STREET AND LOCATED ON LOT SIDE OF DITCH.
2. SIDEWALK OR SHARED-USE PATH (SUP) LOCATED OUTSIDE OF STREET RIGHT OF WAY SHALL BE LOCATED IN A PERMANENT SIDEWALK AND UTILITY EASEMENT (SUE) EXTENDING 2' BEHIND BACK OF SIDEWALK OR SUP.
3. APPROVAL BY THE CITY IS REQUIRED PRIOR TO USING DITCH TYPE SECTION.

KEY

Ⓢ = 4" CONCRETE SIDEWALK

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL RESIDENTIAL
# TYPICAL DITCH TYPE STREET SECTION

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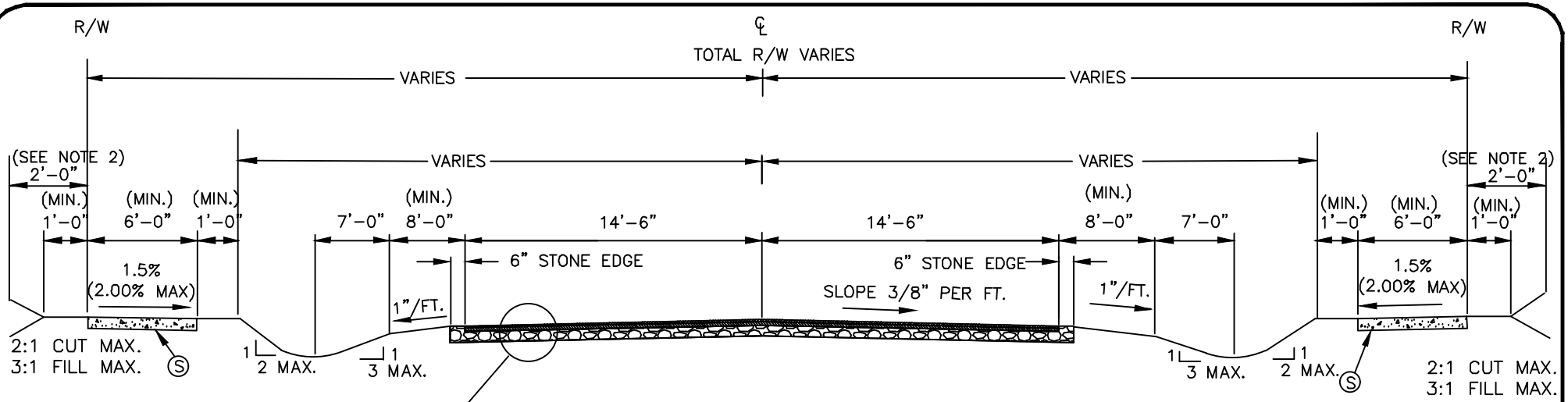
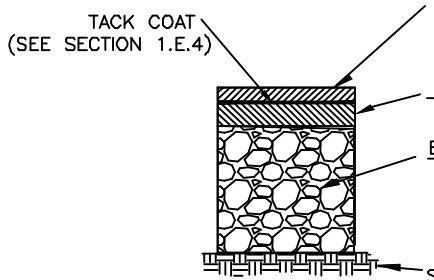



# RESIDENTIAL COLLECTOR STREET




SURFACE COURSE
1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE
1 1/2" S9.5C OR S9.5B

BASE COURSE
8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE
COMPACTED SUBGRADE (SEE CLDS SPECIFICATIONS AND SPECIAL PROVISIONS SECTION 1.A.18)

TYPICAL MINIMUM PAVEMENT SECTION
(SEE NOTE 4.)

NOTES:

1. SIDEWALK SHALL BE ON BOTH SIDES OF STREET AND LOCATED ON LOT SIDE OF DITCH.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W
3. APPROVAL BY THE CITY IS REQUIRED PRIOR TO USING ANY DITCH TYPE SECTION.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.

KEY

Ⓢ 4" CONCRETE SIDEWALK

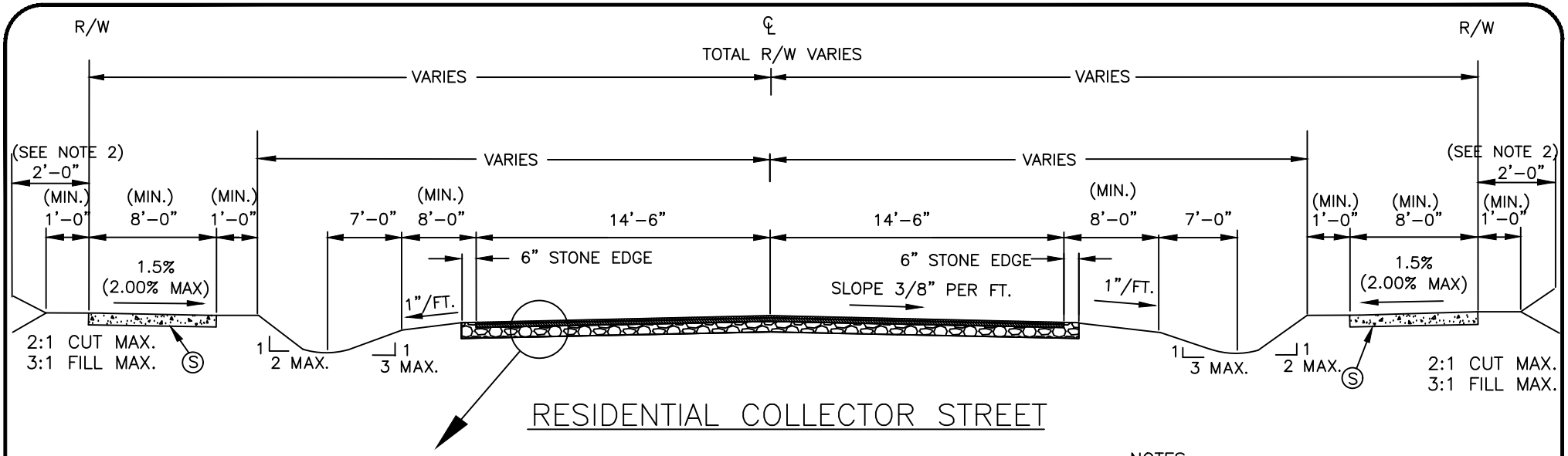
NOT TO SCALE

CHARLOTTE.

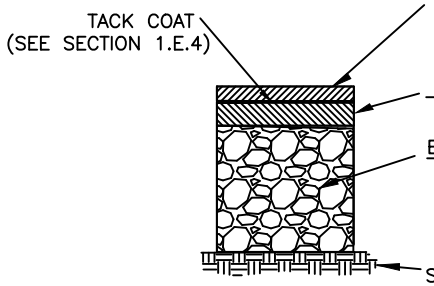
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

RESIDENTIAL COLLECTOR STREET DITCH TYPE STREET TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| 11.07A | 23 |




## RESIDENTIAL COLLECTOR STREET




SURFACE COURSE
1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE
1 1/2" S9.5C OR S9.5B

BASE COURSE
8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE
COMPACTED SUBGRADE (SEE CLDS SPECIFICATIONS AND SPECIAL PROVISIONS SECTION 1.A.18)

TYPICAL MINIMUM PAVEMENT SECTION
(SEE NOTE 4.)

NOTES:

1. SIDEWALK SHALL BE ON BOTH SIDES OF STREET AND LOCATED ON LOT SIDE OF DITCH.
2. 2' BUFFER CAN BE SIDEWALK & UTILITY EASEMENT (SUE) OR ADDITIONAL R/W.
3. APPROVAL BY THE CITY IS REQUIRED PRIOR TO USING DITCH TYPE SECTION.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.

KEY

Ⓢ 4" CONCRETE SIDEWALK

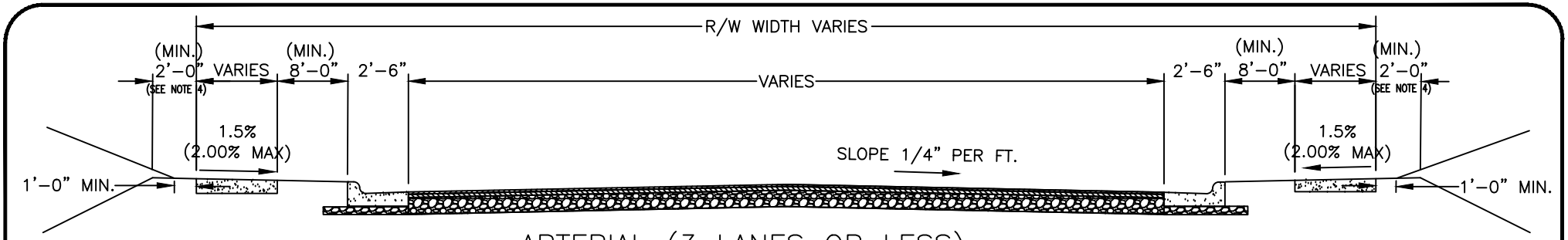
NOT TO SCALE

CHARLOTTE.

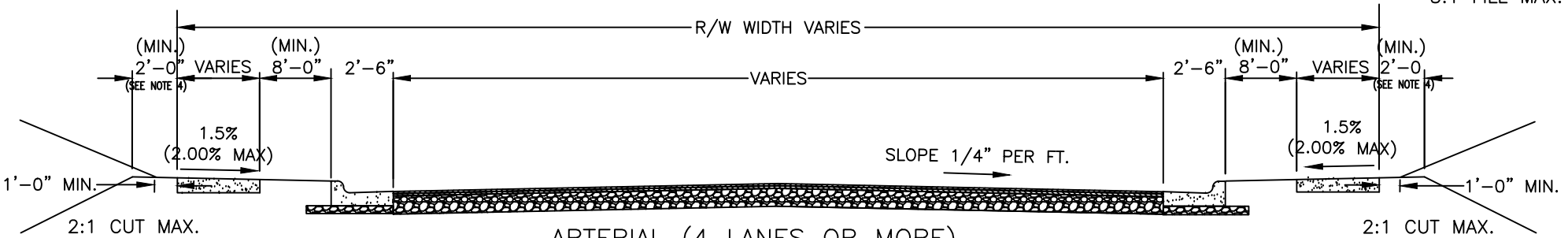
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RESIDENTIAL COLLECTOR STREET DITCH TYPE STREET TYPICAL SECTION (8' SIDEWALK)

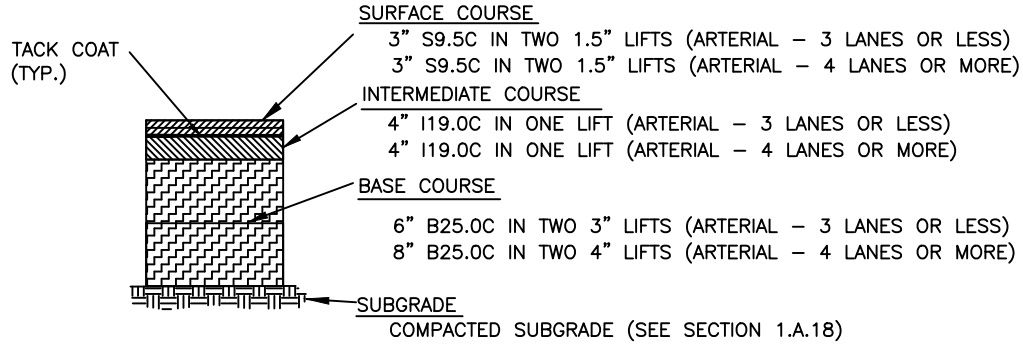
| STD. NO. | REV. |
|---|---|
| 11.07B | 23 |




ARTERIAL (3 LANES OR LESS)




ARTERIAL (4 LANES OR MORE)




TYPICAL MINIMUM PAVEMENT SECTION
(SEE NOTE 3.)

NOTES:

1. SIDEWALKS SHALL BE PROVIDED IN ACCORDANCE WITH THE APPLICABLE ORDINANCE(S).
2. DITCH TYPE STREET IS TO BE USED ONLY WHEN APPROVED BY CITY.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

NOT TO SCALE

CHARLOTTE.

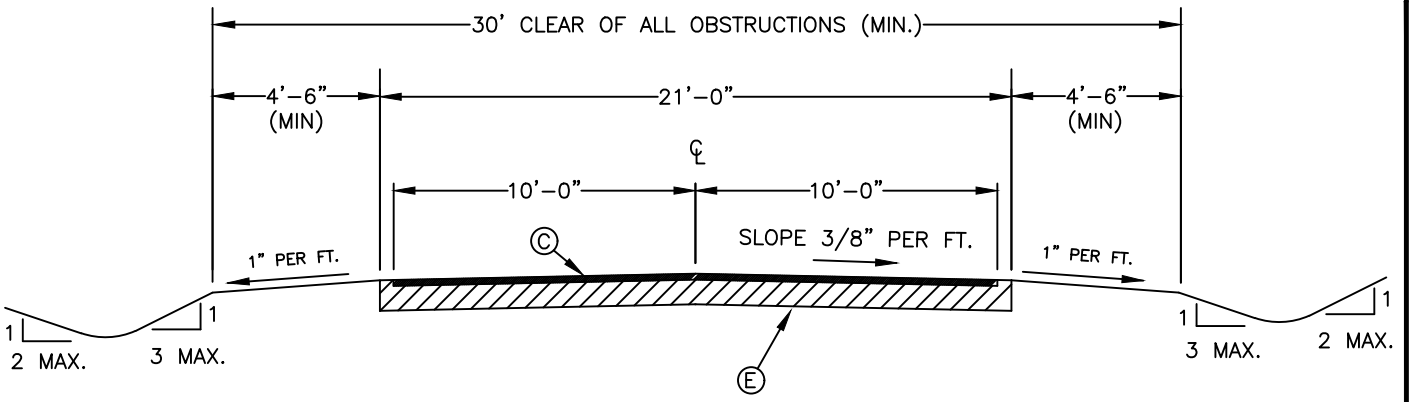
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# ARTERIAL STREET TYPICAL SECTIONS

| STD. NO. | REV. |
|---|---|
| 11.09 | 23 |

## NOTES:

1. DETAILS SHOWN SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY STANDARDS.
2. DITCH TYPE STREET REQUIRES APPROVAL OF CITY.
3. MINIMUM CURB RADIUS ON INTERIOR DRIVES AND PARKING AREAS IS 10'
4. THIS DETAIL IS NOT TO BE USED TO MEET INTERNAL/EXTERNAL CONNECTIVITY REQUIREMENTS OF THE SUBDIVISION ORDINANCE AND ZONING ORDINANCE.




DITCH TYPE

## GUIDELINES FOR PRIVATE STREET DESIGN:

1. INTERNAL STREET ALIGNMENT:
   MAXIMUM GRADE: 10%
   MINIMUM VERTICAL CURVE "K" VALUES: 10/20 (CREST/SAG)
   MINIMUM HORIZONTAL CURVE CENTERLINE RADIUS: 50 FT.
2. INTERSECTION WITH PUBLIC STREET:
   SAME AS FOR PUBLIC STREET. SEE GENERAL NOTES, SECTION I.B.2.

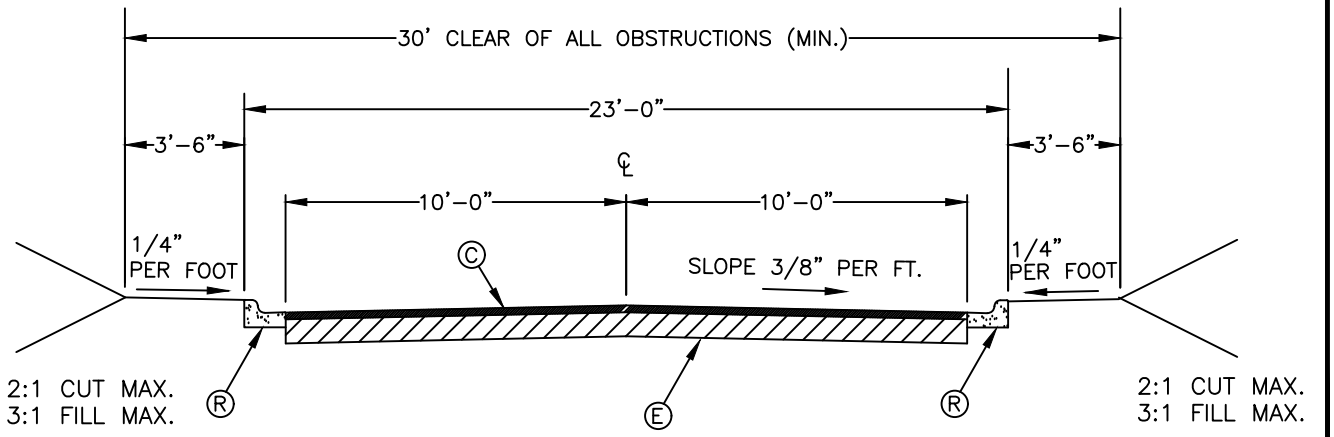
   NOTE: VARIATIONS ON THESE GUIDELINES WILL BE REVIEWED ON A CASE BY CASE BASIS BY CITY STAFF.

## PAVEMENT SCHEDULE

Ⓒ 1.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE S9.5B

Ⓔ 6" COMPACTED AGGREGATE BASE COURSE OR 4" BITUMINOUS CONCRETE BASE COURSE, TYPE B25.0C

Ⓡ CURB AND GUTTER (REFERENCE 10.17A AND B)




CURB AND GUTTER

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PRIVATE STREET TYPICAL SECTIONS

| STD. NO. | REV. |
|---|---|
| 11.13 | 23 |

## NOTES:

1. CURB RETURN RADIUS DIMENSIONS AT INTERSECTIONS MAY VARY DEPENDING ON MEDIAN WIDTH AND WILL BE REVIEWED ON A CASE BY CASE BASIS.
2. FOR ADDITIONAL LANES ADD 10'(MINIMUM) OF PAVEMENT PER LANE.
3. 2'–0" VALLEY GUTTER MAY BE USED WITH APPROVAL OF THE CITY.
4. MONOLITHIC CONCRETE MEDIANS WITH BEVELED EDGES AND MINIMUM WIDTH OF 4 FEET CAN BE USED IN LIEU OF LANDSCAPE MEDIANS.

## GUIDELINES FOR PRIVATE STREET DESIGN:

1. INTERNAL STREET ALIGNMENT:
   MAXIMUM GRADE: 10%
   MINIMUM VERTICAL CURVE "K" VALUES: 10/20 (CREST/SAG)
   MINIMUM HORIZONTAL CURVE CENTERLINE RADIUS: 50 FT.
2. INTERSECTION WITH PUBLIC STREET:
   SAME AS FOR PUBLIC STREET. SEE CLDS SPECIFICATIONS AND SPECIAL PROVISIONS SECTION I.B.2.

NOTE: VARIATIONS ON THESE GUIDELINES WILL BE REVIEWED ON A CASE BY CASE BASIS BY CITY STAFF.

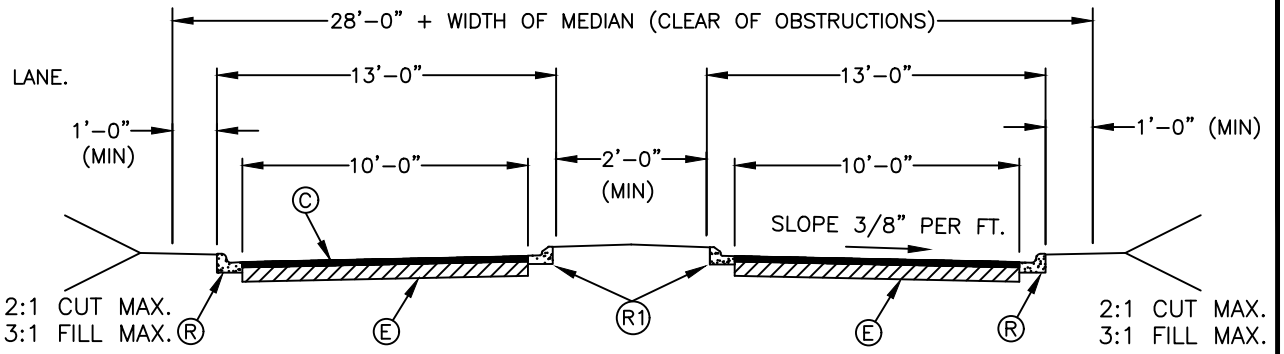
## PAVEMENT SCHEDULE

Ⓒ 1.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE S9.5B

Ⓔ 6" COMPACTED AGGREGATE BASE COURSE OR 4" BITUMINOUS CONCRETE BASE COURSE, TYPE B25.0C

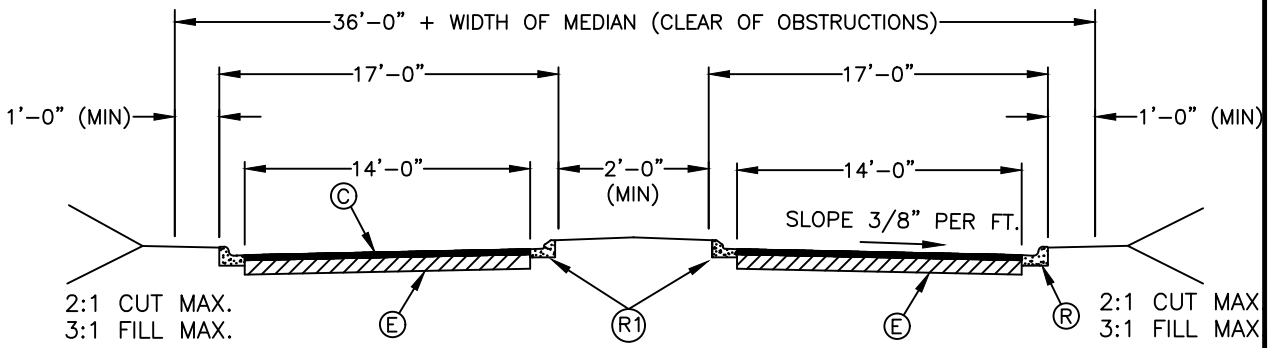
Ⓡ CURB AND GUTTER (REFERENCE 10.17A & B).

Ⓡ1 1'–6" MOUNTABLE CURB




DIVIDED PRIVATE STREET

(INTERNAL)




DIVIDED PRIVATE STREET

(AT INTERSECTION WITH A PUBLIC STREET
FOR 150' OR LENGTH OF MEDIAN WHICHEVER IS GREATER)

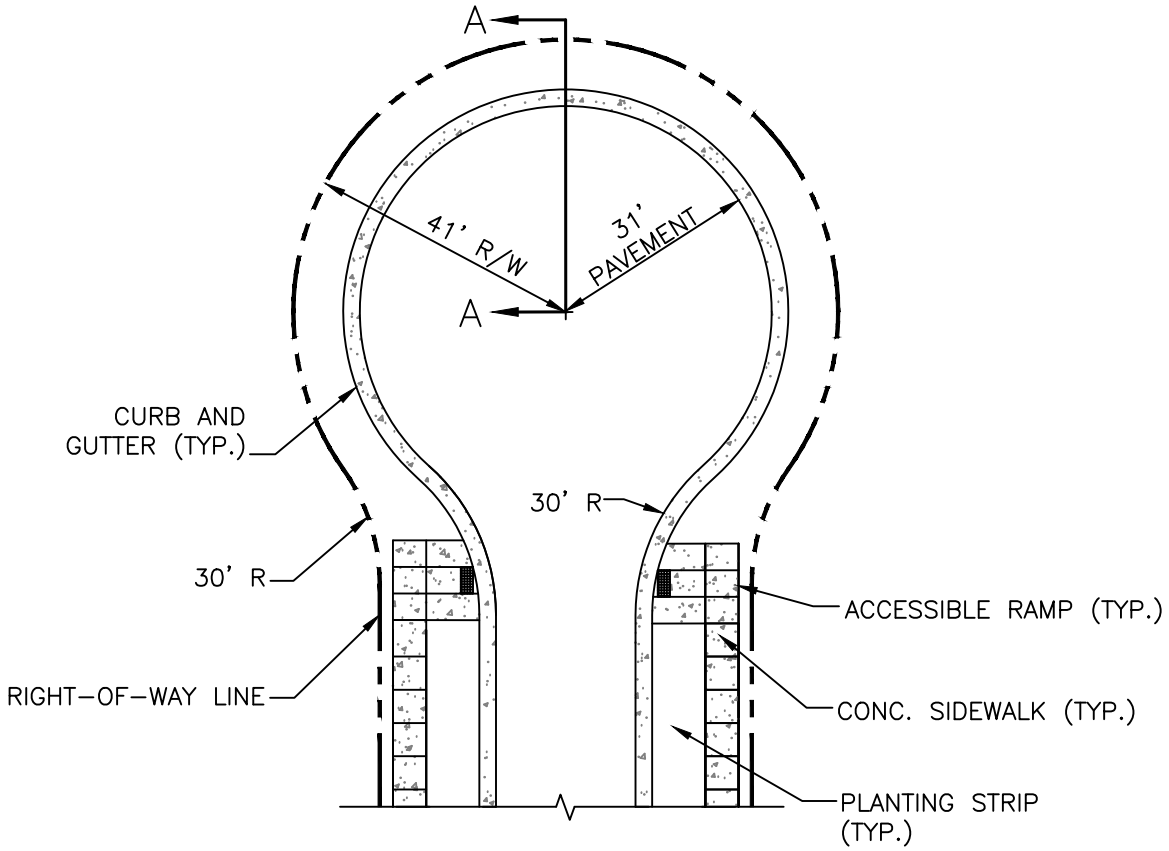
NOT TO SCALE

CHARLOTTE.

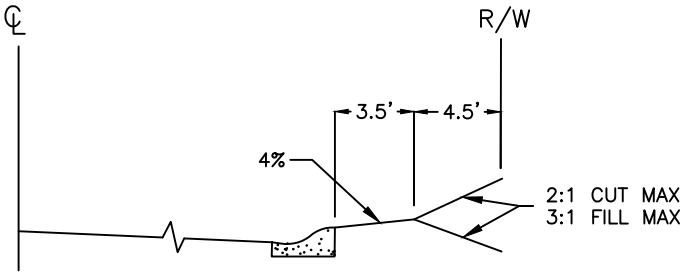
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# DIVIDED PRIVATE STREET TYPICAL SECTIONS

| STD. NO. | REV. |
|---|---|
| 11.14 | 23 |




STANDARD CUL-DE-SAC




SECTION A-A

APPLICABLE WHEN NO SIDEWALK PRESENT.
PLEASE NOTE: DRIVEWAY STANDARD
MAX. SLOPES AND BREAKOVERS APPLY

NOTES:

1. ALTERNATIVE CUL-DE-SAC DESIGNS, INCLUDING ISLANDS SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL.
2. THE CROWN FOR PAVEMENT SHALL BE 1/4" PER FT FROM THE CENTER OF THE CUL-DE-SAC.
3. REFER TO NCDOT STANDARDS FOR DITCH TYPE STREETS IN ETJ.
4. SIDEWALK MAY BE REQUIRED TO EXTEND AROUND CUL-DE-SAC BULB WHERE PARKS OR SCHOOLS HAVE FRONTAGE TO THE END OF THE CUL-DE-SAC.

NOTE: THIS DETAIL IS NOT FOR USE IN ETJ, OR ON NCDOT-MAINTAINED STREETS. REFER TO NCDOT SUBDIVISION ROADS MINIMUM CONSTRUCTION STANDARDS MANUAL.

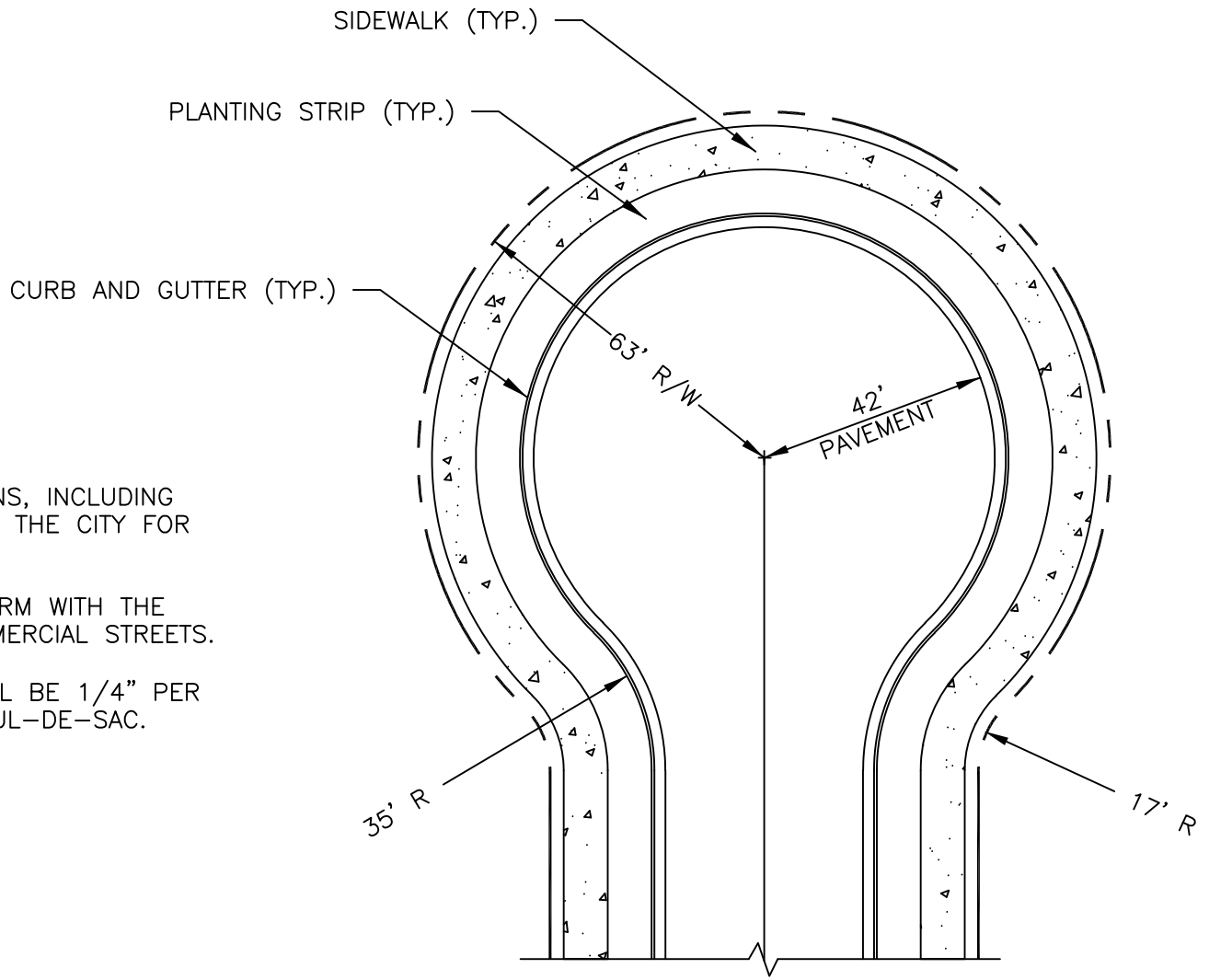
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# CITY OF CHARLOTTE RESIDENTIAL CUL-DE-SAC DETAIL

| STD. NO. | REV. |
|---|---|
| 11.16 | 23 |




## NOTES:

1. ALTERNATIVE CUL–DE–SAC DESIGNS, INCLUDING ISLANDS SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL.
2. PAVEMENT SECTION SHALL CONFORM WITH THE DESIGN REQUIREMENTS FOR COMMERCIAL STREETS.
3. THE CROWN FOR PAVEMENT SHALL BE 1/4" PER FT FROM THE CENTER OF THE CUL–DE–SAC.

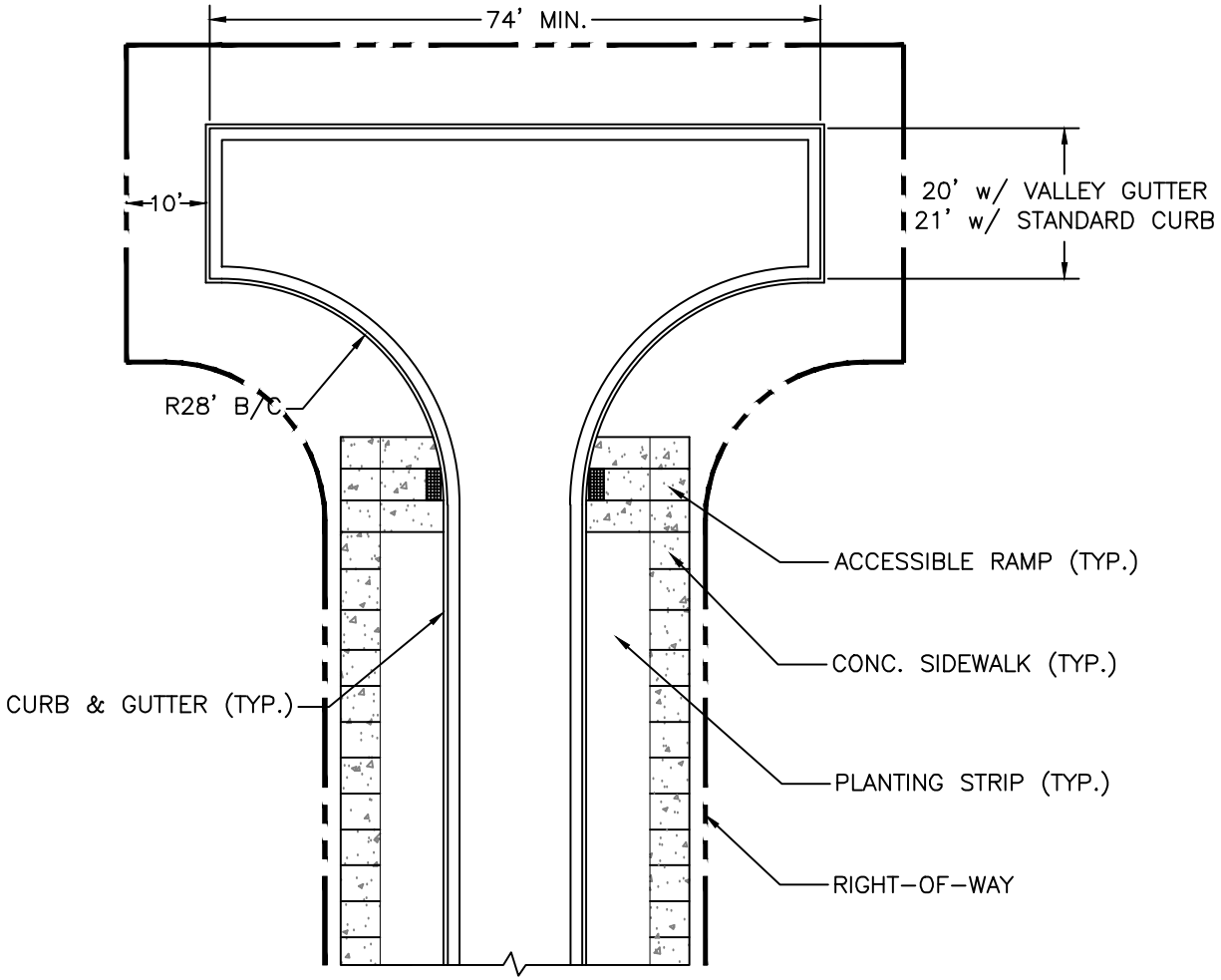
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# OFFICE / COMMERCIAL / INDUSTRIAL CUL–DE–SAC DETAIL

| STD. NO. | REV. |
|---|---|
| 11.17 | 23 |




NOTES

1. THIS DESIGN ACCOMMODATES SINGLE-UNIT TRUCK BUT NOT A CHARLOTTE FIRE DEPARTMENT LADDER TRUCK. TO DESIGN FOR A LADDER TRUCK REQUIRES A HAMMERHEAD OF 120 FEET IN LENGTH.
2. VARIATIONS ON THIS DESIGN (E.G., WYES, TURNAROUNDS IN THE STEM, ROTATION OF ENTRY POINT, ETC.) CAN BE SUBMITTED TO CDOT FOR REVIEW AND APPROVAL ON A CASE-BY-CASE BASIS.
3. SIDEWALK MAY BE REQUIRED TO EXTEND AROUND THE HAMMERHEAD WHERE PARKS OR SCHOOLS HAVE FRONTAGE TO THE END OF THE HAMMERHEAD.

NOTE: THIS DETAIL IS NOT FOR USE IN ETJ, OR ON NCDOT-MAINTAINED STREETS. REFER TO NCDOT SUBDIVISION ROADS MINIMUM CONSTRUCTION STANDARDS MANUAL.

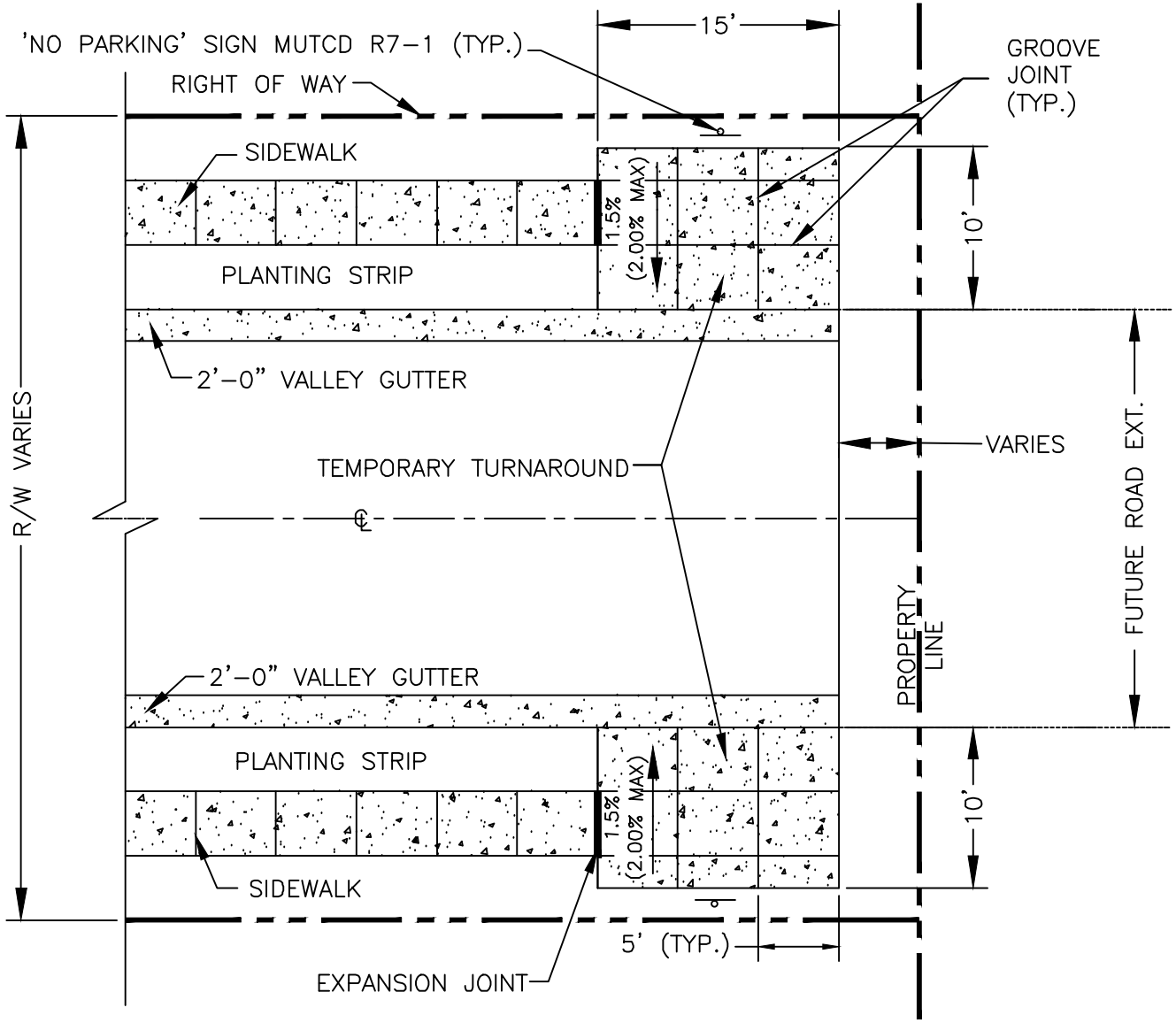
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# RESIDENTIAL HAMMERHEAD DETAIL

| STD. NO. | REV. |
|---|---|
| 11.18A | 13 |




## NOTES

1. TEMPORARY TURNAROUND MATERIAL SHALL BE MIN. 3600 PSI CONCRETE, 6" THICK.

2. TEMPORARY INSTALLATION ONLY – TO BE REMOVED WHEN FUTURE DEVELOPMENT CONNECTS TO STREET. "SIDEWALK" PORTION OF TURNAROUND MAY BE LEFT IN PLACE IF NOT DAMAGED.

3. NOT TO BE USED AS A PRIVATE DRIVEWAY.

4. DEAD END STREET BARRICADE AND END OF ROADWAY MARKER PER CLDSM #50.07A&B AND #50.08A, B, & C ARE REQUIRED.

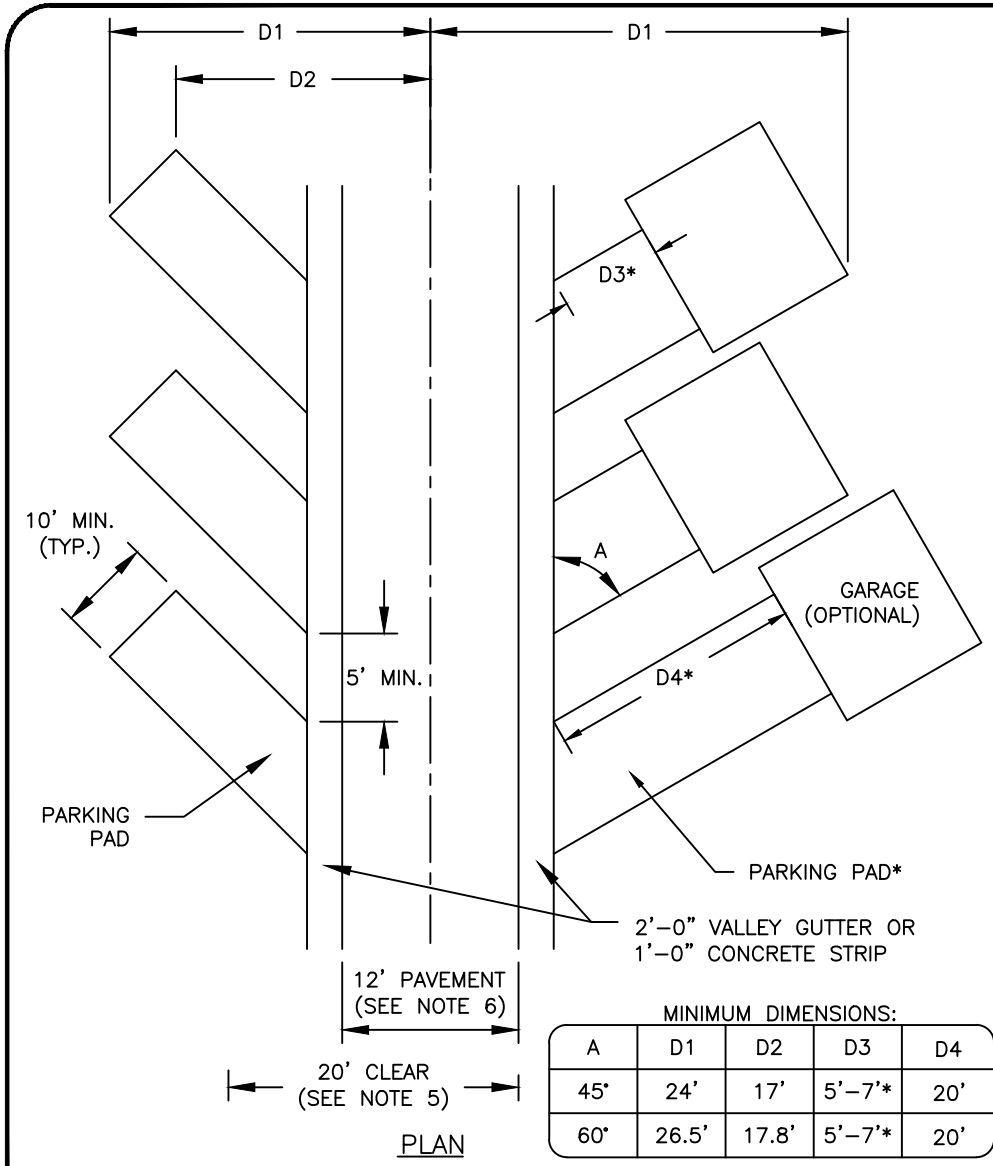
SCALE 1"=10'

CHARLOTTE.

**CITY OF CHARLOTTE**
**LAND DEVELOPMENT STANDARDS**
**INCLUDES CHARLOTTE ETJ**

# TEMPORARY TURNAROUND
## LOCAL RESIDENTIAL STREET
## (OPTIONAL)

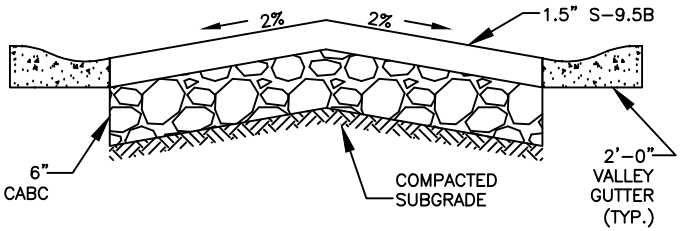
| STD. NO. | REV. |
|---|---|
| 11.18B | 13 |



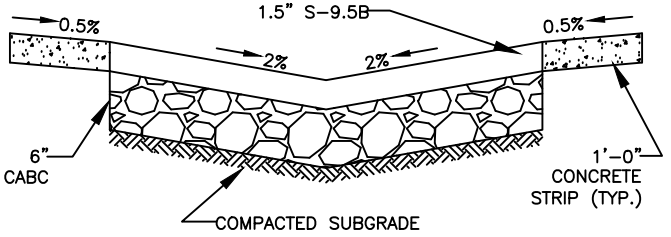

PLAN

MINIMUM DIMENSIONS:

| A | D1 | D2 | D3 | D4 |
|---|---|---|---|---|
| 45° | 24' | 17' | 5'-7'* | 20' |
| 60° | 26.5' | 17.8' | 5'-7'* | 20' |




ALLEY WITH NORMAL CROWN




ALLEY WITH INVERSE CROWN

NOTES:

1. SUBGRADE SHALL BE COMPACTED TO PUBLIC STREET STANDARDS.
2. STORM DRAINAGE (NOT SHOWN) SHALL BE PROVIDED AS NECESSARY.
3. ALLEYS SHALL BE CONSIDERED PRIVATE EASEMENTS AND WILL NOT BE ACCEPTED FOR MAINTENANCE BY THE CITY OF CHARLOTTE.
4. DRIVEWAYS SHALL BE SEPARATED BY AT LEAST 5 FEET, OR GREATER IF REQUIRED BY PLANNING (LOT SIZE) REQUIREMENTS AND/OR N.C. BUILDING CODE.
5. DETAIL APPLIES TO SINGLE- OR DOUBLE-LOADED ALLEYS. FOR SINGLE-LOADED ALLEYS, THERE SHALL BE A 20-FOOT CLEAR ZONE FREE OF CUT SLOPES, OBSTRUCTIONS, HEDGES, ETC. FROM THE LOADED SIDE EDGE OF PAVEMENT.
6. MINIMUM 20' WIDE PAVEMENT REQUIRED IF ALLEY IS TO BE CONSIDERED A "FIRE APPARATUS ACCESS ROAD" PER NC FIRE CODE.

* WITH NO PARKING PAD, DIMENSION D3 IS REQUIRED TO BE MINIMUM 5' BUT NO GREATER THAN 7'. WITH PARKING PAD, DIMENSION D4 IS REQUIRED TO BE A MINIMUM OF 20'.

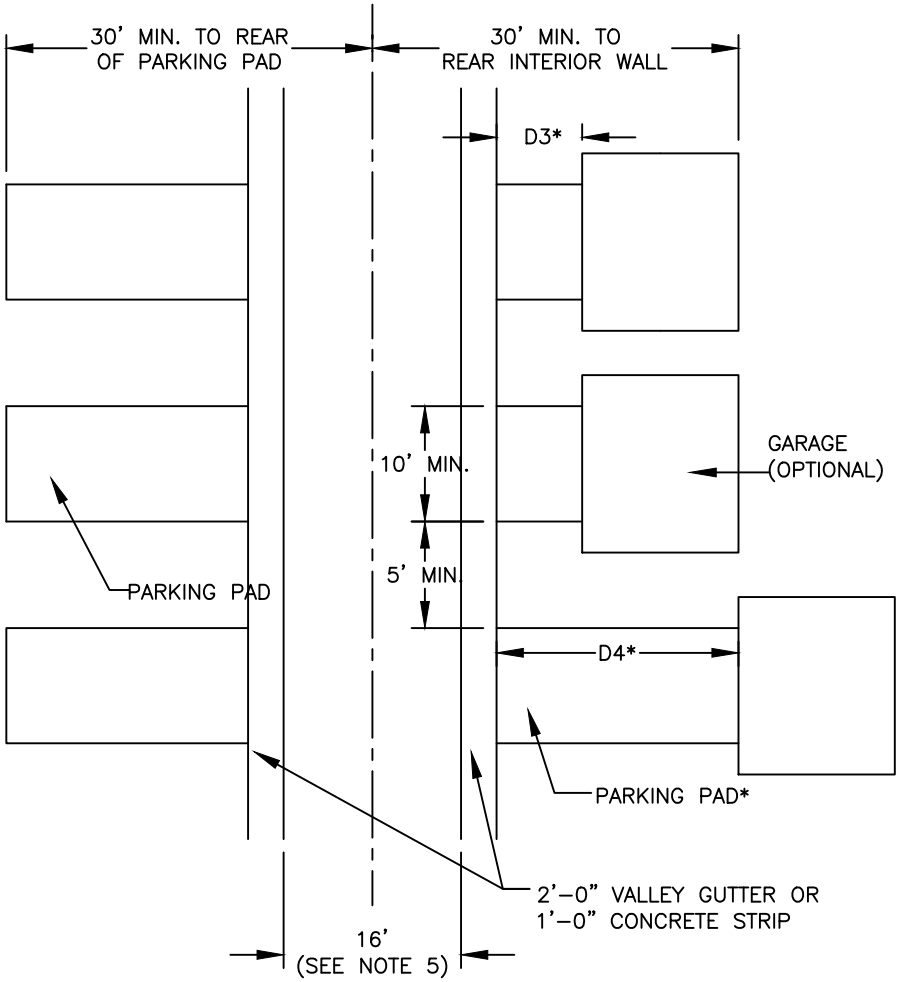
NOT TO SCALE

CHARLOTTE.

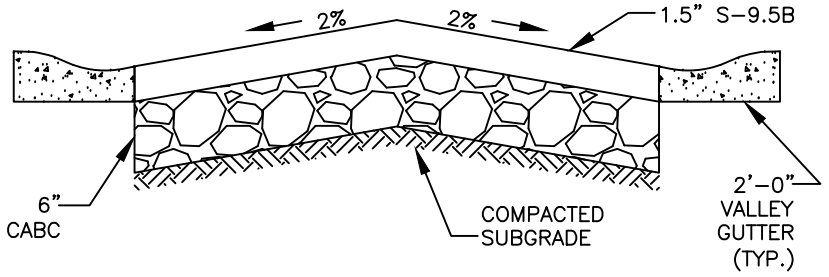
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RESIDENTIAL ALLEY DETAIL
# ONE-WAY OPERATION

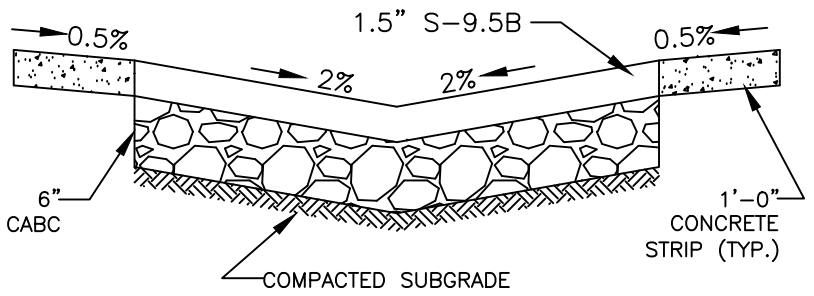
| STD. NO. | REV. |
|---|---|
| 11.19A | 17 |




PLAN




ALLEY WITH NORMAL CROWN




ALLEY WITH INVERSE CROWN

NOTES:

1. SUBGRADE SHALL BE COMPACTED TO PUBLIC STREET STANDARDS.
2. STORM DRAINAGE (NOT SHOWN) SHALL BE PROVIDED AS NECESSARY.
3. ALLEYS SHALL BE CONSIDERED PRIVATE EASEMENTS AND WILL NOT BE ACCEPTED FOR MAINTENANCE BY THE CITY OF CHARLOTTE.
4. DRIVEWAYS SHALL BE SEPARATED BY AT LEAST 5 FEET, OR GREATER IF REQUIRED BY PLANNING (LOT SIZE) REQUIREMENTS AND/OR N.C. BUILDING CODE.
5. MINIMUM 20' WIDE PAVEMENT REQUIRED IF ALLEY IS TO BE CONSIDERED A "FIRE APPARATUS ACCESS ROAD" PER NC FIRE CODE.

* WITH NO PARKING PAD, DIMENSION D3 IS REQUIRED TO BE MINIMUM 5' BUT NO GREATER THAN 7'. WITH PARKING PAD, DIMENSION D4 IS REQUIRED TO BE A MINIMUM OF 20'.

NOT TO SCALE

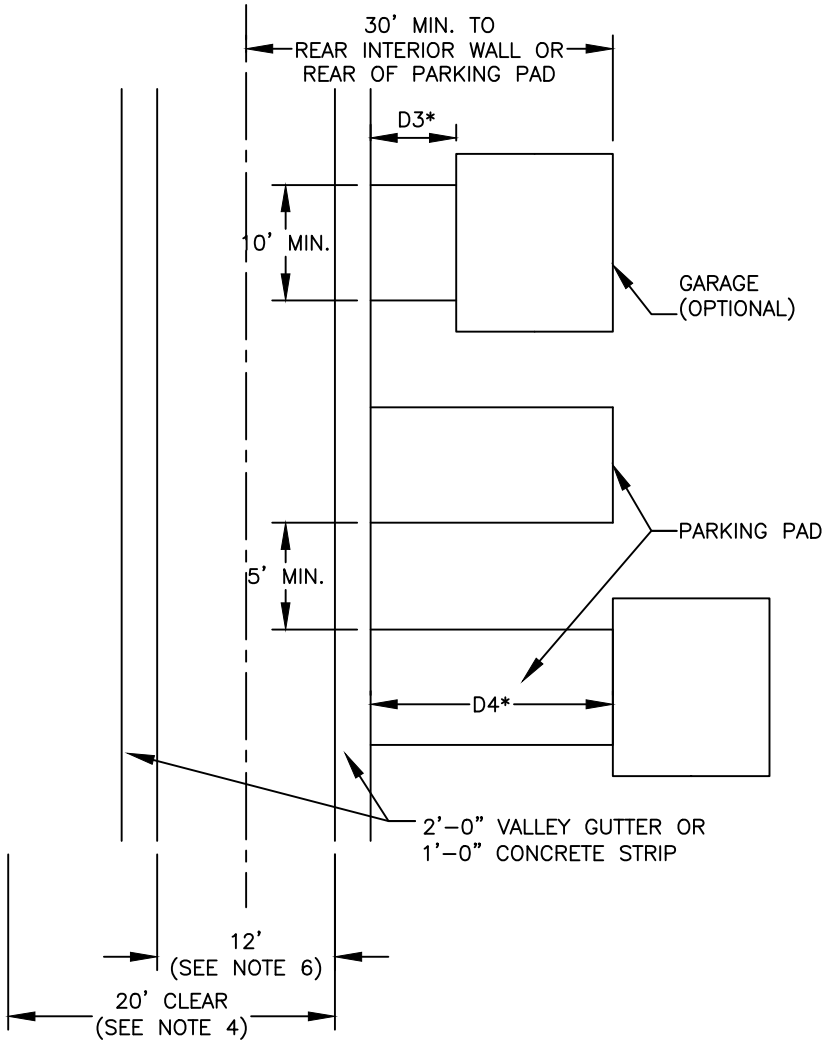
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

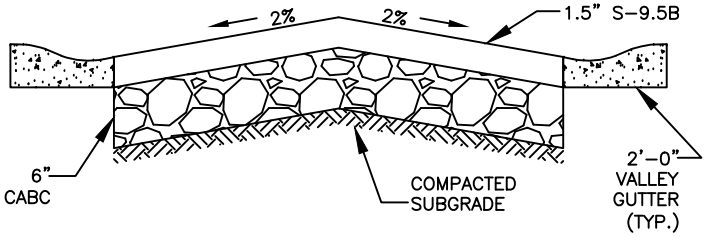
# RESIDENTIAL ALLEY DETAIL

## DOUBLE LOADED W/ TWO-WAY OPERATION

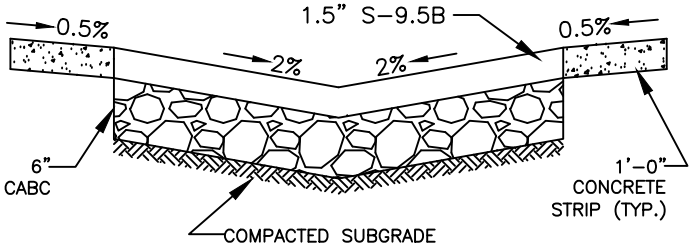
| STD. NO. | REV. |
|---|---|
| 11.19B | 17 |




PLAN




ALLEY WITH NORMAL CROWN




ALLEY WITH INVERSE CROWN

NOTES:

1. SUBGRADE SHALL BE COMPACTED TO PUBLIC STREET STANDARDS.
2. STORM DRAINAGE (NOT SHOWN) SHALL BE PROVIDED AS NECESSARY.
3. ALLEYS SHALL BE CONSIDERED PRIVATE EASEMENTS AND WILL NOT BE ACCEPTED FOR MAINTENANCE BY THE CITY OF CHARLOTTE.
4. NO CUT SLOPES, OBSTRUCTIONS, HEDGES, ETC. ON NON-LOADED SIDE OF ALLEY WITHIN 20 FEET OF LOADED SIDE EDGE OF PAVEMENT.
5. DRIVEWAYS SHALL BE SEPARATED BY AT LEAST 5 FEET, OR GREATER IF REQUIRED BY PLANNING (LOT SIZE) REQUIREMENTS AND/OR N.C. BUILDING CODE.
6. MINIMUM 20' WIDE PAVEMENT REQUIRED IF ALLEY IS TO BE CONSIDERED A "FIRE APPARATUS ACCESS ROAD" PER NC FIRE CODE.

* WITH NO PARKING PAD, DIMENSION D3 IS REQUIRED TO BE MINIMUM 5' BUT NO GREATER THAN 7'. WITH PARKING PAD, DIMENSION D4 IS REQUIRED TO BE A MINIMUM OF 20'.

NOT TO SCALE

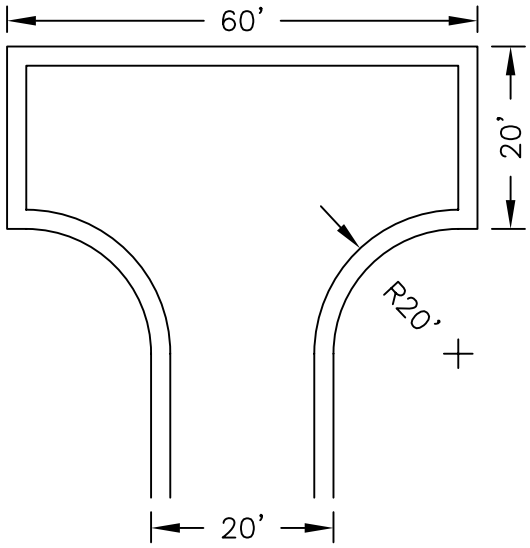
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

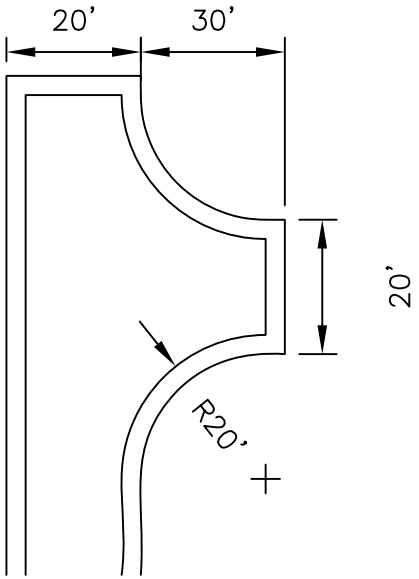
# RESIDENTIAL ALLEY DETAIL

## SINGLE LOADED W/ TWO-WAY OPERATION

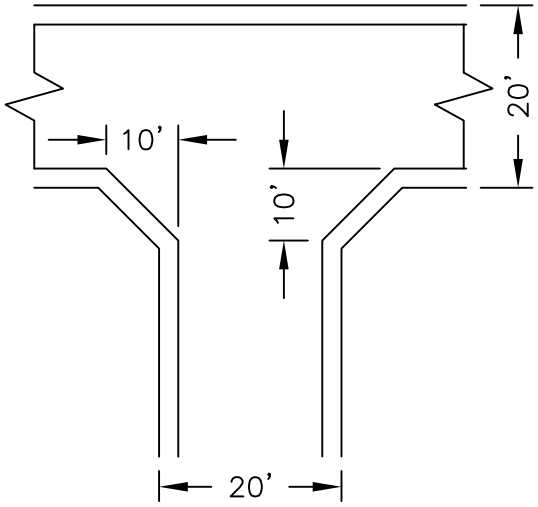
| STD. NO. | REV. |
|---|---|
| 11.19C | 17 |




STANDARD HAMMERHEAD




ROTATED HAMMERHEAD




STANDARD INTERSECTION

NOTES:

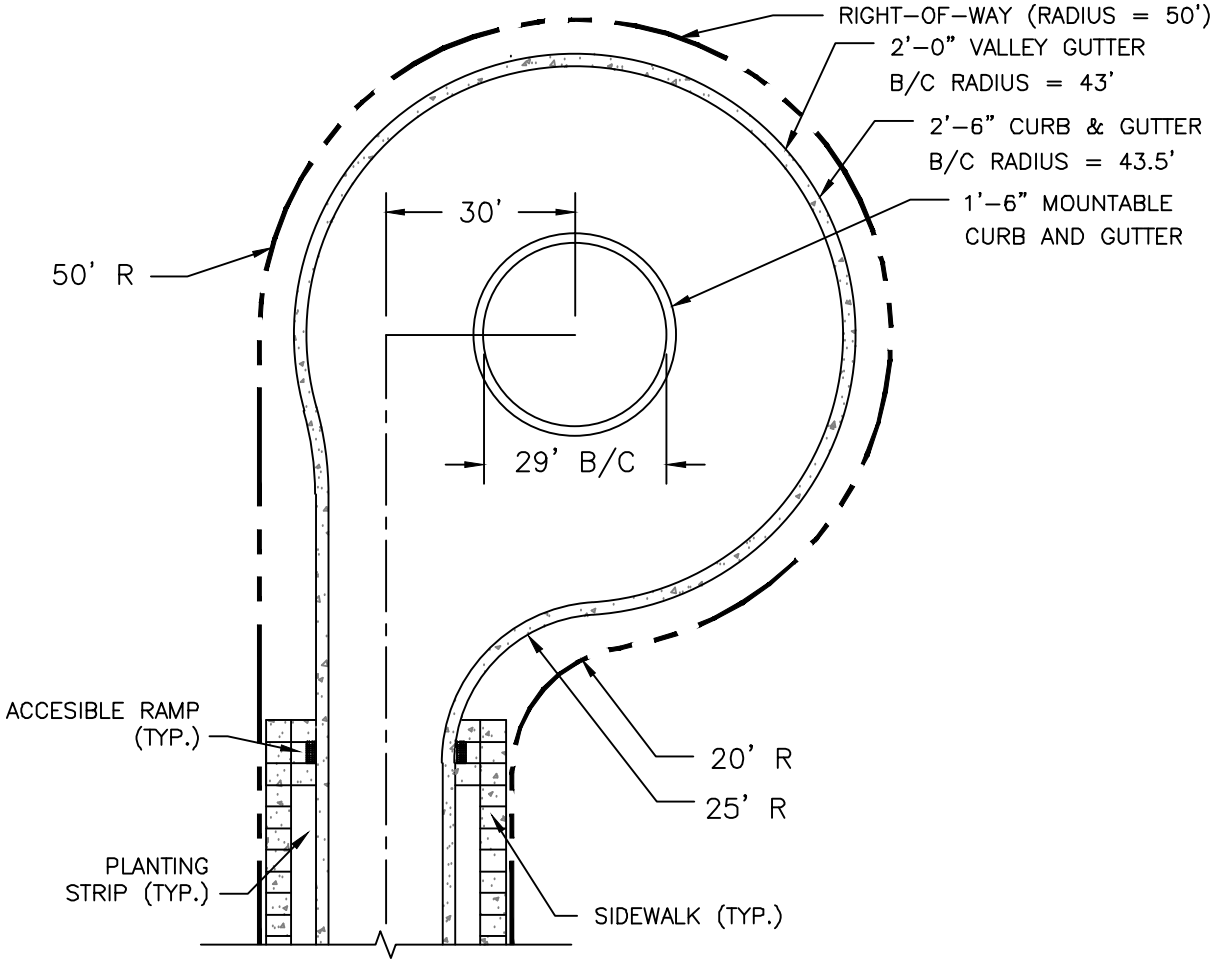
1. SEE DETAILS 11.19A–B FOR ALLEY DESIGN STANDARDS.
2. HAMMERHEAD DETAILS APPLY ONLY FOR TWO–WAY ALLEYS. ONE–WAY ALLEYS MUST CONNECT TO A PUBLIC STREET OR ANOTHER ALLEY.
3. FOR INTERSECTIONS WITH A LEAST ONE (1) ONE–WAY ALLEY, THE BACK–OF–CURB TO BACK–OF–CURB WIDTH CAN BE 16 FEET ON THE APPROPRIATE LEG(S) INSTEAD OF THE 20 FEET SHOWN.
4. OTHER INTERSECTION DESIGNS WILL BE APPROVED BY CDOT ON A CASE–BY–CASE BASIS.
5. THIS DETAIL DOES NOT ACCOMMODATE COMMERCIAL VEHICLES OR CHARLOTTE FIRE DEPARTMENT DESIGN FIRE TRUCK.
6. ADEQUATE STOPPING SIGHT DISTANCE (SSD) SHALL BE PROVIDED AT EACH INTERSECTION. MINIMUM SSD SHALL BE 50 FEET ASSUMING AN OPERATIONAL SPEED OF 10 MPH.

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RESIDENTIAL ALLEY HAMMERHEADS AND INTERSECTIONS

| STD. NO. | REV. |
|---|---|
| 11.20 | |




NOTE: THIS DETAIL IS NOT FOR USE IN ETJ, OR ON NCDOT–MAINTAINED STREETS. REFER TO NCDOT SUBDIVISION ROADS MINIMUM CONSTRUCTION STANDARDS MANUAL.

NOTES:

1. THE CENTRAL ISLAND SHALL BE PUBLIC RIGHT–OF–WAY.
2. THE CENTRAL ISLAND WILL NOT BE MAINTAINED BY THE CITY OF CHARLOTTE. A PROPERTY OWNERS' ASSOCIATION OR PRIVATE ENTITY WILL BE RESPONSIBLE FOR MAINTENANCE OF THE ISLAND.
3. ONLY GRASS, FLOWERS, GROUND COVER, ETC., WITH A MATURE HEIGHT OF 30 INCHES OR LESS WILL BE ALLOWED TO BE PLANTED IN THE CENTRAL ISLAND WITHOUT AN ENCROACHMENT AGREEMENT. ANY NONSTANDARD ITEM, E.G., BENCHES, IRRIGATION, ETC., PLACED IN THE ISLAND REQUIRES AN ENCROACHMENT AGREEMENT PRIOR TO INSTALLATION. CDOT REVIEWS EACH ENCROACHMENT REQUEST ON A CASE–BY–CASE BASIS AND MAY NOT APPROVE ENCROACHMENTS FOR ALL ITEMS REQUESTED.
4. WHERE NECESSARY, A SIDEWALK EASEMENT SHALL BE PROVIDED FOR ALL SIDEWALK LOCATED OUTSIDE THE PUBLIC RIGHT–OF–WAY. THE EASEMENT SHALL EXTEND FROM THE RIGHT–OF–WAY LINE TO TWO (2) FEET BEHIND THE BACK OF SIDEWALK, OR TO THE FACE OF BUILDING, WHICHEVER IS LESS.
5. SIDEWALK SHALL BE PROVIDED AS REQUIRED BY APPLICABLE ORDINANCE(S).
6. CUL–DE–SAC CAN BE OFFSET LEFT, OFFSET RIGHT, OR SYMMETRIC.
7. SIDEWALK MAY BE REQUIRED TO EXTEND AROUND CUL–DE–SAC BULB WHERE PARKS OR SCHOOLS HAVE FRONTAGE TO THE END OF THE CUL–DE–SAC.
8. ALL CURB RADII SHOWN ARE DIMENSIONED TO BACK–OF–CURB

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# OVERSIZED RESIDENTIAL CUL–DE–SAC WITH RAISED PLANTER ISLAND

| STD. NO. | REV. |
|---|---|
| 11.21 | 13 |

| DWG | SHEET TITLE | SPECIAL REQUIREMENTS AND NOTES |
|---|---|---|
| 300.01 | METHOD OF PIPE INSTALLATION | |
| 310.02 | PARALLEL PIPE END SECTION–PRECAST CONCRETE FOR 15" TO 24" PIPE | REQUIRED IN RIGHT OF WAY WITHIN THE ETJ |
| 310.03 | CROSS PIPE END SECTION–PRECAST CONCRETE FOR 18" TO 30" PIPE | REQUIRED IN RIGHT OF WAY WITHIN THE ETJ |
| 310.10 | DRIVEWAY PIPE CONSTRUCTION USING NO SPECIAL END SECTIONS | ONLY AT LOCATIONS APPROVED BY THE CITY |
| 815.03 | PIPE UNDERDRAIN AND BLIND DRAIN | |
| 838.01 | CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS | NOTE 1 |
| | 15" THRU 48" PIPE 90' SKEW | NOTE 1 |
| 838.02 | CONCRETE ENDWALL AND SLUICE GATE 15" THRU 36" PIPE–90' SKEW | NOTE 1 |
| 838.04 | CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS | NOTE 1 |
| | 17"X13"THRU 71"X47" PIPE ARCH 90' SKEW | NOTE 1 |
| 838.05 | CONCRETE "L" ENDWALL FOR SINGLE PIPE CULVERTS 15" THRU 48" PIPE | NOTE 1 |
| 838.06 | CONCRETE "L" ENDWALL FOR SINGLE PIPE CULVERTS 17"X13" THRU 71"X47" | NOTE 1 |
| | 71"X47" ARCH PIPE | NOTE 1 |
| 838.07 | CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS | NOTE 1 |
| | 40"X31" THRU 66"X51" PIPE ARCH 90'SKEW | NOTE 1 |
| 838.08 | CONCRETE "L" ENDWALL FOR SINGLE PIPE CULVERTS 40"X32" | NOTE 1 |
| | THRU 66"X51" PIPE ARCH | NOTE 1 |
| 838.10 | CONCRETE ENDWALL FOR OUTFALL 4'–6" OR 8" PIPE | NOTE 1 |
| 838.11 | BRICK ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS | NOTE 1 |
| | 15" THRU 48" 90' SKEW | NOTE 1 |
| 838.14 | BRICK ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS 17"X31" | NOTE 1 |
| | THRU 71"X47" 90' SKEW | NOTE 1 |
| 838.15 | BRICK "L" ENDWALL FOR SINGLE PIPE CULVERTS 15" THRU 48" PIPE | NOTE 1 |
| 838.16 | BRICK "L" ENDWALL FOR SINGLE PIPE CULVERTS 17"X13" THRU | NOTE 1 |
| | 71"X47" PIPE ARCH | NOTE 1 |
| 838.17 | BRICK ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS 40"X31" | NOTE 1 |
| | THRU 66"X51" PIPE ARCH 90'SKEW | NOTE 1 |
| 838.18 | BRICK ENDWALL FOR SINGLE PIPE CULVERTS 40"X31" THRU | NOTE 1 |
| | 66"X51" PIPE ARCH 90' SKEW | NOTE 1 |
| 838.20 | BRICK ENDWALL FOR OUTFALL 4", 6" AND 8" PIPE | NOTE 1 |
| 838.21 | REINFORCED CONCRETE ENDWALL FOR SINGLE 54" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.22 | REINFORCED CONCRETE ENDWALL FOR DOUBLE & TRIPLE 54" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.27 | REINFORCED CONCRETE ENDWALL FOR SINGLE 60" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.28 | REINFORCED CONCRETE ENDWALL FOR DOUBLE & TRIPLE 60" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.33 | REINFORCED CONCRETE ENDWALL FOR SINGLE 66" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.34 | REINFORCED CONCRETE ENDWALL FOR DOUBLE & TRIPLE 66" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.39 | REINFORCED CONCRETE ENDWALL FOR SINGLE 72" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| 838.40 | REINFORCED CONCRETE ENDWALL FOR DOUBLE & TRIPLE 72" PIPE 90' SKEW | NOTE 1; SEE CLDS 20.17 FOR SPLASH PAD |
| | | |

NOTE 1: FOR ALL STRUCTURES – ALL CONCRETE USED FOR DRAINAGE STRUCTURES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3600 PSI AT 28 DAYS. THIS REQUIREMENT SHALL BE PROVIDED REGARDLESS OF ANY LESSER COMPRESSIVE STRENGTH SPECIFIED IN THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

| DWG | SHEET TITLE | SPECIAL REQUIREMENTS AND NOTES |
|---|---|---|
| 838.45 | NOTES FOR REINFORCED CONCRETE ENDWALL STANDARD DRAWINGS | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| | 838.21 THRU 838.40 | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.51 | REINFORCED BRICK ENDWALL FOR SINGLE 54" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.52 | REINFORCED BRICK ENDWALL FOR DOUBLE & TRIPLE 54" PIPE 90'SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.57 | REINFORCED BRICK ENDWALL FOR SINGLE 60" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.58 | REINFORCED BRICK ENDWALL FOR DOUBLE & TRIPLE 60" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.63 | REINFORCED BRICK ENDWALL FOR SINGLE 66" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.64 | REINFORCED BRICK ENDWALL FOR DOUBLE & TRIPLE 66" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.69 | REINFORCED BRICK ENDWALL FOR SINGLE 72" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.70 | REINFORCED BRICK ENDWALL FOR DOUBLE & TRIPLE 72" PIPE 90' SKEW | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.75 | NOTES FOR REINFORCED BRICK ENDWALL STANDARD DRAWINGS 838.51 THRU 838.70 | NOTE 1 SEE CLDS 20.17 FOR SPLASH PAD |
| 838.80 | PRECAST CONCRETE ENDWALL FOR SINGLE 12" THRU 72" PIPE 90' SKEW | |
| 840.00 | CONCRETE BASE PAD FOR DRAINAGE STRUCTURES | |
| 840.01 | BRICK CATCH BASIN 15" THRU 54" PIPE | |
| 840.02 | CONCRETE CATCH BASIN 12" THRU 54" PIPE | |
| 840.03 | FRAME, GRATE BASIN 12" THRU 54" PIPE | TYPE F AND G GRATES ARE OPTIONAL WITHIN THE CITY LIMITS |
| 840.04 | CONCRETE OPEN THROAT CATCH BASIN 12" THRU 48" PIPE | NOTE 1; OPENINGS PERMITTED IN 4 SIDES OUTSIDE OF STREET R/W MANHOLE RING AND COVER REQUIRED IN TOP SLAB SEE 840.55 |
| 840.05 | BRICK OPEN THROAT CATCH BASIN 15" THRU 48" PIPE | NOTE 1; OPENINGS PERMITTED IN 4 SIDES OUTSIDE OF STREET R/W MANHOLE RING AND COVER REQUIRED IN TOP SLAB SEE 840.55 |
| 840.14 | CONCRETE DROP INLET 12" THRU 30" PIPE | NOTE 1 |
| 840.15 | BRICK DROP INLET 12" THRU 30' PIPE | NOTE 1 |
| 840.16 | DROP INLET FRAME AND GRATE FOR USE WITH DWGS. 840.14 & 840.15 | NOTE 1 |
| 840.17 | CONCRETE GRATED DROP INLET TYPE "A" 12" THRU 72" PIPE | NOTE 1 |
| 840.18 | CONCRETE GRATED DROP INLET TYPE "B" 12" THRU 36" PIPE | NOTE 1 |
| 840.19 | CONCRETE GRATED DROP INLET TYPE "D" 12" THRU 36" PIPE | NOTE 1 |
| 840.20 | FRAMES AND WIDE SLOT FLAT GRATES | NOT FOR USE IN PEDESTRIAN/BICYCLE AREAS |
| 840.22 | FRAMES AND WIDE SLOT SAG GRATES | NOT FOR USE IN PEDESTRIAN/BICYCLE AREAS |
| 840.24 | FRAMES AND NARROW SLOT SAG GRATES | |
| 840.25 | ANCHORAGE FOR FRAMES BRICK OR CONCRETE | |
| 840.26 | BRICK GRATED DROP INLET TYPE "A" 12" THRU 72" PIPE | |
| 840.27 | BRICK GRATED DROP INLET TYPE "B" 12" THRU 36" PIPE | |
| 840.28 | BRICK GRATED DROP INLET TYPE "D" 12" THRU 36" PIPE | |
| 840.29 | FRAMES AND NARROW SLOT FLAT GRATES | |
| 840.30 | DRIVEWAY DROP INLET | |
| 840.39 | BICYCLE SAFE STEEL FRAME AND GRATE | |

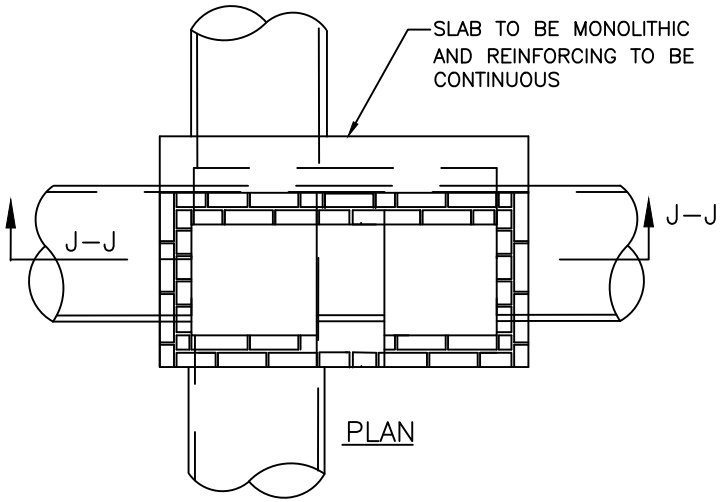
NOTE 1: FOR ALL STRUCTURES – ALL CONCRETE USED FOR DRAINAGE STRUCTURES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3600 PSI AT 28 DAYS. THIS REQUIREMENT SHALL BE PROVIDED REGARDLESS OF ANY LESSER COMPRESSIVE STRENGTH SPECIFIED IN THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

| DWG | SHEET TITLE | SPECIAL REQUIREMENTS AND NOTES |
|---|---|---|
| 840.31 | CONCRETE JUNCTION BOX (WITH OPTIONAL MANHOLE) 12" THRU 66" PIPE | NOTE 1; OPTIONAL MANHOLE IS REQUIRED |
| 840.32 | BRICK JUNCTION BOX 12" THRU 66" PIPE | NOTE 1; OPTIONAL MANHOLE IS REQUIRED |
| 840.34 | TRAFFIC BEARING JUNCTION BOX FOR USE WITH PIPES 42" AND UNDER | NOTE 1; OPTIONAL MANHOLE IS REQUIRED; AS MEASURED FROM BOTTOM OF TOP SLAB -- FOR JUNCTION BOX HEIGHT 0'-4'8" USE 8" THICK WALL, FROM 4'8" HEIGHT TO 10' HEIGHT, USE 12" THICK WALL. IF PROPOSED STRUCTURE EXCEEDS 12'-0" HEIGHT A SPECIAL DESIGN WILL BE REQUIRED |
| 840.35 | TRAFFIC BEARING DROP INLET FOR CAST IRON DOUBLE FRAME AND GRATES | |
| 840.36 | TRAFFIC BEARING DROP INLET FOR STEEL (840.37) DOUBLE FRAME AND GRATES | NOT FOR USE IN PEDESTRIAN AREAS |
| 840.37 | STEEL GRATE AND FRAME | NOT FOR USE IN PEDESTRIAN AREAS |
| 840.41 | SPRING BOX CONCRETE OR BRICK | |
| 840.45 | PRECAST DRAINAGE STRUCTURE (SOLID AND WAFFLE WALL) | WAFFLE WALL IS NOT PERMITTED IN ROADWAY, PLANTING STRIPS, OR MEDIANS. ALL OPENINGS SHALL BE PRE-CAST |
| 840.46 | TRAFFIC BEARING PRECAST DRAINAGE STRUCTURE | |
| 840.51 | BRICK MANHOLE 12" 36" PIPE | |
| 840.52 | PRECAST MANHOLE 4', 5' AND 6' DIAMETER 12" THRU 48" PIPE | IF USED AS A CATCH BASIN SUPPORTING NCDOT 840.03 FRAME, GRATE, AND HOOD - THE FLAT TOP SLAB ONLY ACCEPTABLE WHEN A 12" VERTICAL RISER CAN BE ACCOMMODATED ON TOP OF THE STRUCTURE (BETWEEN THE TOP OF FLAT TOP SLAB AND BOTTOM OF FRAME/GRATE) |
| 840.53 | PRECAST MANHOLE WITH MASONRY BASE 12" THRU 42" PIPE | IF USED AS A CATCH BASIN SUPPORTING NCDOT 840.03 FRAME, GRATE, AND HOOD - THE FLAT TOP SLAB ONLY ACCEPTABLE WHEN A 12" VERTICAL RISER CAN BE ACCOMMODATED ON TOP OF THE STRUCTURE (BETWEEN THE TOP OF FLAT TOP SLAB AND BOTTOM OF FRAME/GRATE) |
| 840.54 | MANHOLE FRAME AND COVER | ALL COVERS SHALL BE SUPPLIED WITH A MINIMUM OF TWO AND A MAXIMUM OF SIX 1-INCH DIAMETER VENT HOLES. |
| 840.55 | MANHOLE FRAME AND COVER (FLUSH WITH SLAB FOR OPEN THROAT CB) | ALL COVERS SHALL BE SUPPLIED WITH A MINIMUM OF TWO AND A MAXIMUM OF SIX 1-INCH DIAMETER VENT HOLES. |
| 840.66 | DRAINAGE STRUCTURE STEPS | |
| 840.71 | CONCRETE AND BRICK PIPE PLUG | |
| 840.72 | PIPE COLLAR | |
| 850.01 | CONCRETE PAVED DITCHES | |
| 852.04 | METHODS FOR PLACEMENT OF DROP INLETS IN GRASSED MEDIAN (USING 1'-6" CURB AND GUTTER) | |
| 852.05 | MEDIAN CURB FOR CATCH BASIN (FOR USE WITH 1'-6" CURB AND GUTTER) | |
| 852.06 | METHOD OF PLACEMENT OF DROP INLETS IN CONCRETE ISLANDS | |
| 876.01 | RIP RAP IN CHANNELS | |
| 876.02 | GUIDE FOR RIP RAP AT PIPE OUTLETS | |
| 876.03 | DRAINAGE DITCHES WITH CLASS "A" RIP RAP | |
| 876.04 | DRAINAGE DITCHES WITH CLASS "B" RIP RAP | |
| | | |
| | | |
| | | |
| | | |

NOTE 1: FOR ALL STRUCTURES - ALL CONCRETE USED FOR DRAINAGE STRUCTURES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3600 PSI AT 28 DAYS. THIS REQUIREMENT SHALL BE PROVIDED REGARDLESS OF ANY LESSER COMPRESSIVE STRENGTH SPECIFIED IN THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

GENERAL NOTES:

1. NOT FOR USE ON NCDOT–MAINTAINED ROADWAYS OR WITHIN THE CITY OF CHARLOTTE ETJ.
2. SEE NCDOT STANDARD 840.01 FOR DETAILS BASED ON PIPE SIZE PER CROSS SECTION.
3. CONSTRUCT TWO SINGLE BASINS PER NCDOT STANDARD WITH DOUBLE INTERIOR WALL.
4. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.
5. BASE SLAB SHALL BE MONOLITHIC.
6. SEE CLDSM STANDARDS #10.29 AND #10.30 FOR PLACEMENT OF CATCH BASIN.
7. PIPE SECTION D2 CONNECTING CATCH BASINS SHALL HAVE A MINIMUM DIAMETER SAME AS OF OUTLET PIPE D3.
8. ALL REINFORCING STEEL SHOWN ON NCDOT STANDARDS IS TO BE PROVIDED AS CONTINUOUS MEMBERS. (NO LAPS, USED AS A SINGLE CONTINUOUS BAR IN THE SLAB)
9. WEEP HOLES SHALL BE PLACED IN BACK WALL WITH FILTER FABRIC OR STONE ON BACK SIDE

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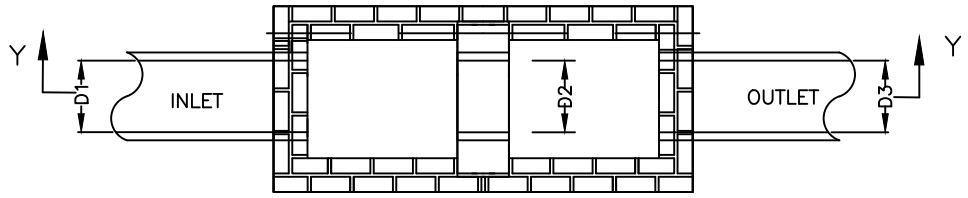


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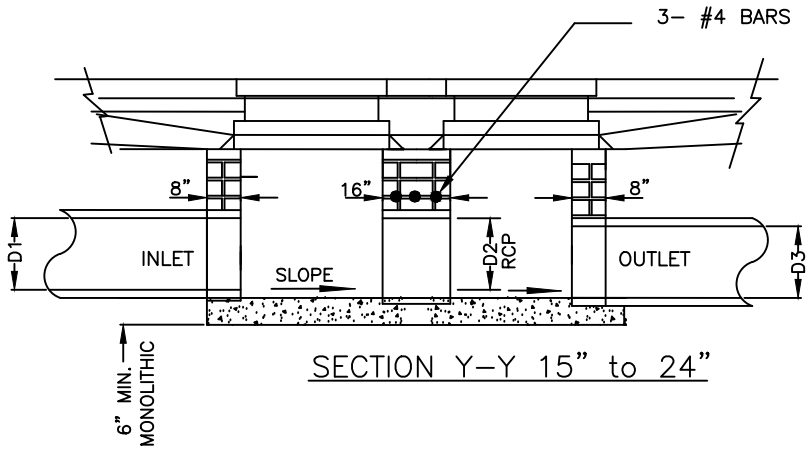
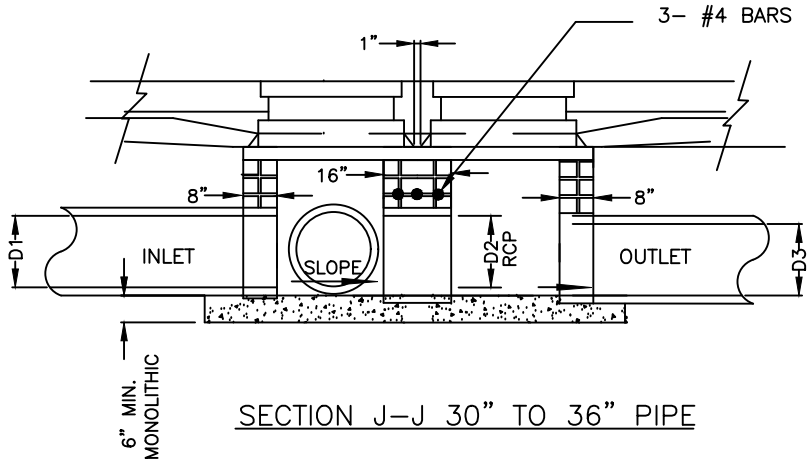



SECTION Y–Y 15" to 24"




SECTION J–J 30" TO 36" PIPE

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

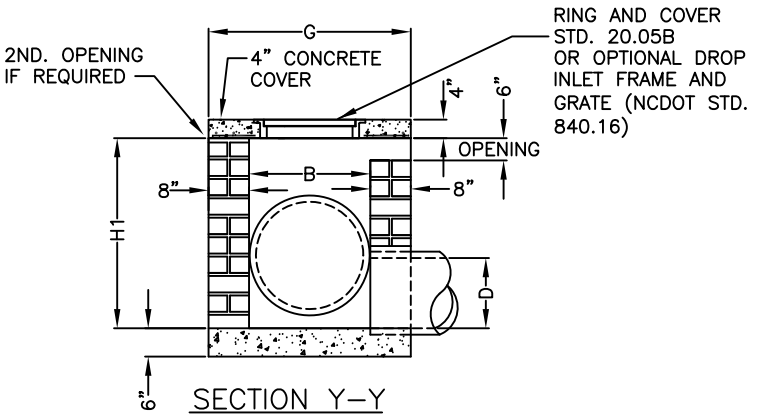
# BRICK DOUBLE CATCH BASIN 15" THRU 36" PIPE

| STD. NO. | REV. |
|---|---|
| 20.03 | 20 |

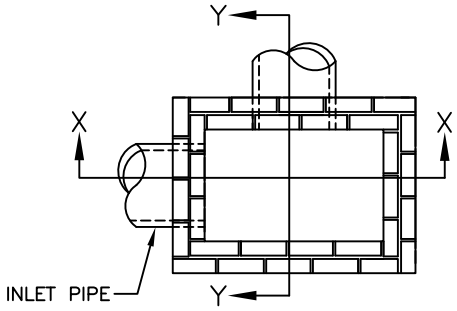
## GENERAL NOTES:

1. MORTAR JOINTS SHOULD BE BETWEEN 3/8" AND 5/8" THICK.
2. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.
3. THE 6" OPENING SHOWN MAY BE INCREASED TO 8" MAX. IF DEEMED TO BE NECESSARY BY THE ENGINEER.
4. ALL CATCH BASIN OVER 3'–6" IN DEPTH SHALL BE PROVIDED WITH STEPS 1'–2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 20.12.
5. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK.
6. JUMBO BRICK WILL BE PERMITTED.
7. FOR 8'–0" IN HEIGHT OR LESS USE 8" WALL. OVER 8'–0" IN HEIGHT USE 12" WALL TO 6'–0" FROM TOP OF WALL, AND 8" WALL FOR THE REMAINING 6'–0".
8. ALL EXPOSED JOINTS WILL BE CONCAVE TOOLED.
9. ALL PIPE IN STORM DRAIN STRUCTURE SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
10. WEEP HOLES SHALL BE PLACED IN BACK WALL WITH FILTER FABRIC OR STONE ON BACK SIDE.
11. THIS CATCH BASIN IS NOT TO BE USED WITHIN STREET RIGHT OF WAY UNLESS OTHERWISE APPROVED BY CITY ENGINEER.

| DIMENSIONS OF BOX AND PIPE | | | | REINFORCING | | | | | COVER DIMENSION | |
|---|---|---|---|---|---|---|---|---|---|---|
| PIPE | SPAN | WIDTH | HEIGHT | BARS – X | | BARS – Y | | TOTAL | | |
| D | A | B | H1(MIN.) | NO. | LENGTH | NO. | LENGTH | LBS. | F | G |
| 15" | 3'–6" | 2'–3" | 2'–7" | 2 | 3'–4" | 7 | 4'–7" | 26 | 4'–10" | 3'–7" |
| 18" | 4'–0" | 2'–8" | 2'–11" | 2 | 3'–9" | 8 | 5'–1" | 33 | 5'–4" | 4'–0" |
| 24" | 4'–0" | 2'–8" | 3'–5" | 2 | 3'–9" | 8 | 5'–1" | 33 | 5'–4" | 4'–0" |
| 30" | 4'–0" | 3'–6" | 3'–11" | 2 | 4'–7" | 9 | 5'–1" | 37 | 5'–4" | 4'–10" |
| 36" | 4'–0" | 3'–6" | 4'–6" | 2 | 4'–7" | 9 | 5'–1" | 37 | 5'–4" | 4'–10" |
| 42" | 4'–0" | 3'–6" | 4'–11" | 2 | 4'–7" | 9 | 5'–1" | 37 | 5'–4" | 4'–10" |
| 48" | 4'–6" | 4'–0" | 5'–5" | 2 | 5'–1" | 10 | 5'–7" | 45 | 5'–10" | 5'–4" |




SECTION Y–Y

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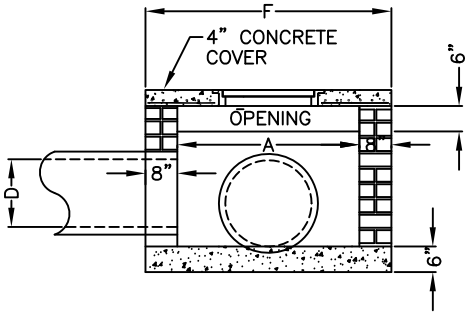


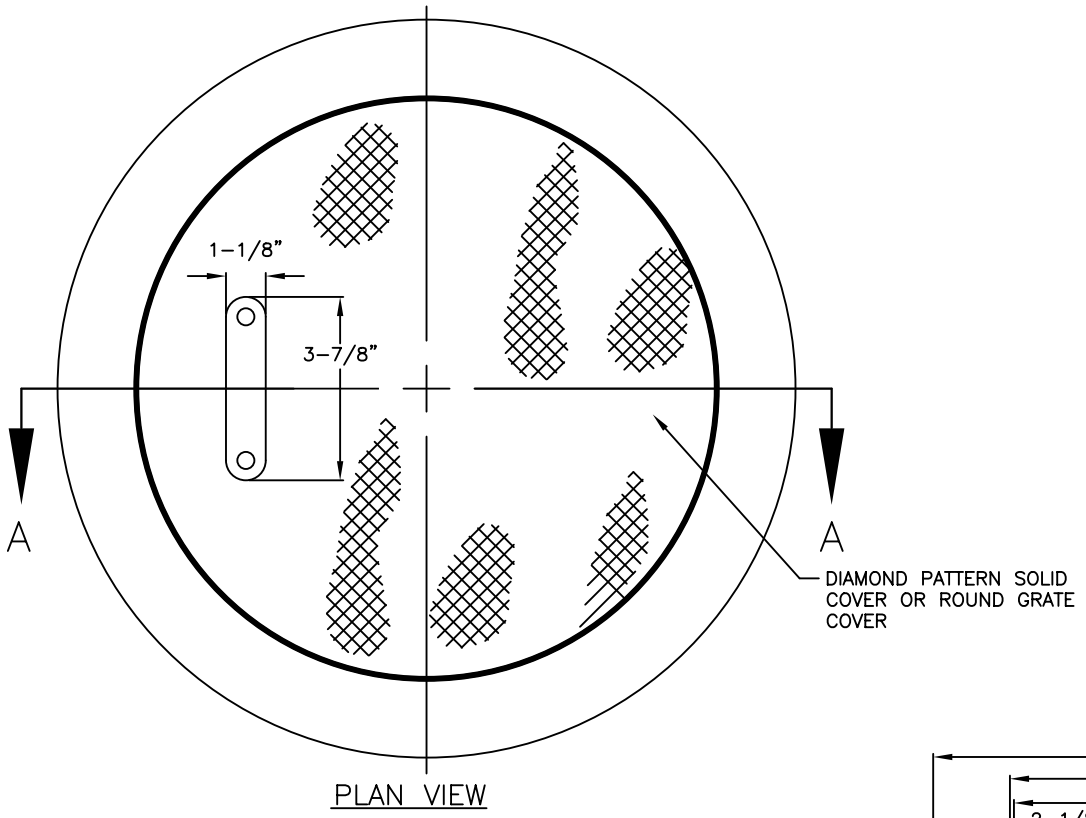

SECTION X–X

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

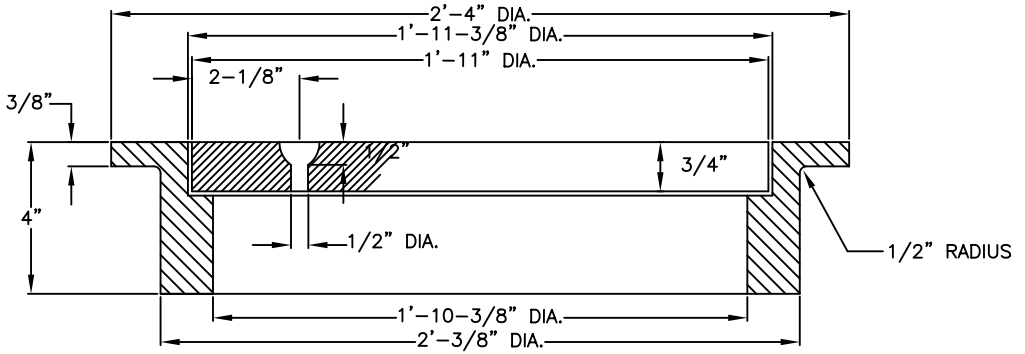
# SLAB TYPE CATCH BASIN 15" THRU 48" PIPE

| STD. NO. | REV. |
|---|---|
| 20.05A | 7 |




PLAN VIEW

| MINIMUM WEIGHT | |
|---|---|
| RING | 96 LBS |
| COVER | 86 LBS |




SECTION A-A

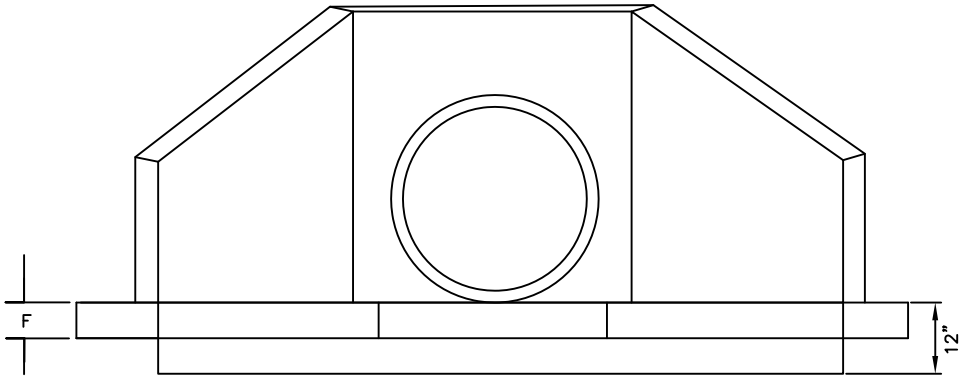
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# MANHOLE RING AND COVER FOR SLAB TYPE CATCH BASIN

| STD. NO. | REV. |
|---|---|
| 20.05B | 5 |

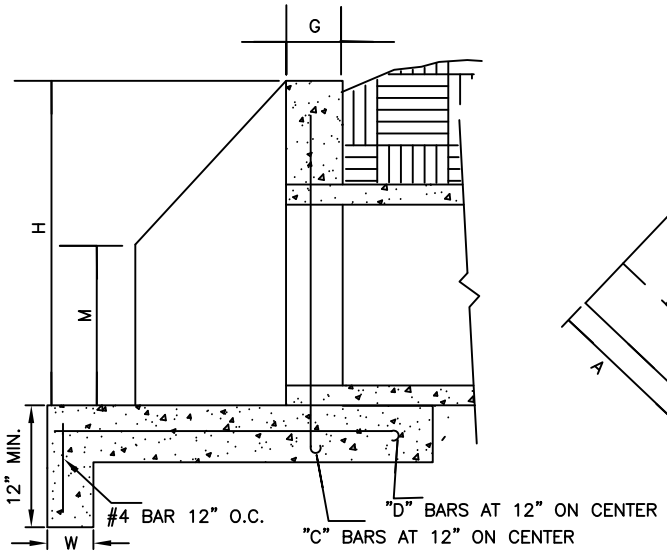
| CONCRETE PIPE | | | DIMENSIONS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WALL THK. | OUT DIA. | IN DIA. | H | A | B | C | E | F | G | W | K | M |
| 2 1/4" | 19 1/2" | 15" | 27 1/2" | 20" | 24" | 8" | 7 1/2" | 4" | 4" | 8" | 17" | 10" |
| 2 1/2" | 23" | 18" | 31" | 20" | 24" | 8" | 9" | 4" | 4" | 8" | 17" | 12" |
| 3" | 30" | 24" | 38" | 20" | 30" | 8" | 12" | 4" | 4" | 8" | 21" | 15" |
| 3 1/2" | 37" | 30" | 45" | 20" | 44" | 12" | 15" | 6" | 8" | 8" | 31" | 18" |
| 4" | 44" | 36" | 52" | 32" | 44" | 12" | 18" | 6" | 8" | 8" | 31" | 22" |
| 4 1/2" | 51" | 42" | 59" | 32" | 48" | 12" | 21" | 6" | 8" | 8" | 34" | 26" |
| 5" | 58" | 48" | 66" | 32" | 48" | 12" | 24" | 6" | 8" | 8" | 34" | 29" |
| 5 1/2" | 65" | 54" | 73" | 32" | 54" | 12" | 27" | 6" | 8" | 8" | 38" | 33" |
| 6" | 72" | 60" | 80" | 36" | 66" | 12" | 30" | 8" | 12" | 12" | 46" | 36" |
| 6 1/2" | 79" | 66" | 87" | 36" | 72" | 12" | 33" | 8" | 12" | 12" | 51" | 40" |
| 7" | 86" | 72" | 94" | 36" | 78" | 12" | 36" | 8" | 12" | 12" | 56" | 43" |



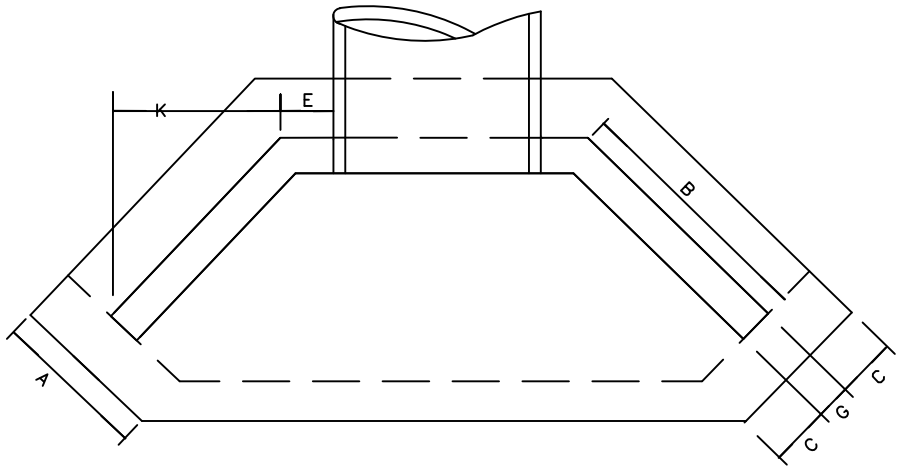

FRONT VIEW

REINFORCING

| DIA. | "C" BAR | | "D" BAR | |
|---|---|---|---|---|
| | NO. | LGT. | NO. | LGT. |
| 15" | 4 | 2'-0" | 4 | 1'-11" |
| 18" | 4 | 2'-3" | 4 | 2'-2" |
| 24" | 4 | 2'-9" | 4 | 2'-8" |
| 30" | 4 | 3'-3" | 4 | 3'-2" |
| 36" | 4 | 3'-9" | 4 | 3'-8" |
| 42" | 4 | 4'-3" | 4 | 4'-2" |
| 48" | 4 | 4'-9" | 4 | 4'-8" |
| 54" | 4 | 5'-3" | 4 | 5'-2" |
| 60" | 4 | 5'-9" | 4 | 5'-8" |
| 66" | 4 | 6'-3" | 4 | 6'-2" |
| 72" | 4 | 6'-9" | 4 | 6'-8" |




SIDE VIEW




TOP VIEW

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CONCRETE WINGWALL WITH SPLASH PAD

| STD. NO. | REV. |
|---|---|
| 20.17A | 8 |

## GENERAL NOTES:

1. ALL CORNERS TO BE CHAMFERED 1" IF CONCRETE.
2. THE CONTRACTOR WILL BE REQUIRED TO PLACE 2–#6 BARS "Y" IN THE TOP OF ALL ENDWALL FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.
3. FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
4. WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED ONLY IN COMPUTING ENDWALL QUANTITIES.
5. IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, AND POURS BASE SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.
6. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.

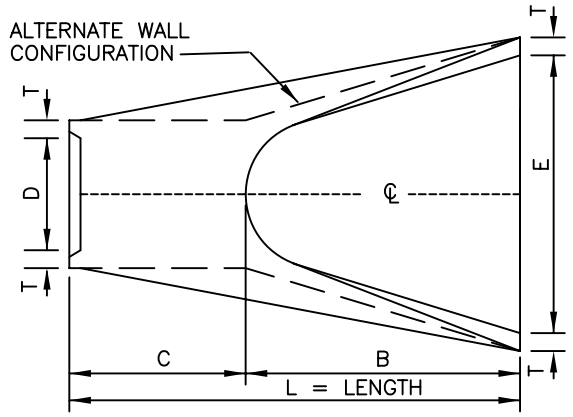
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CONCRETE WINGWALL WITH SPLASH PAD

| STD. NO. | REV. |
|---|---|
| 20.17B | |

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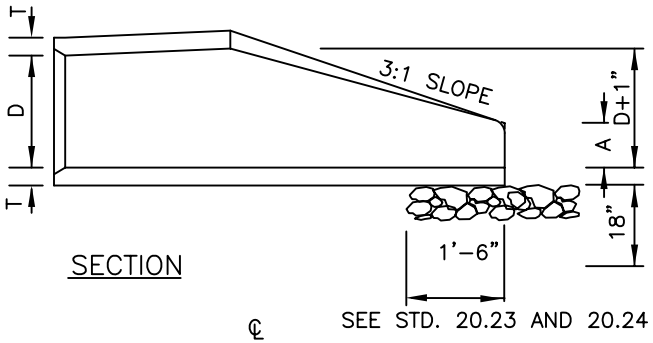
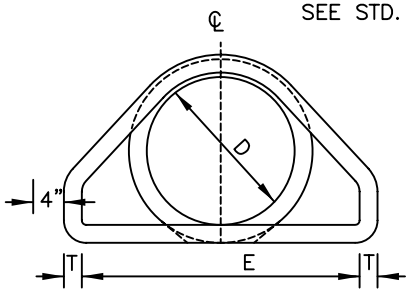



SECTION

SEE STD. 20.23 AND 20.24




END VIEW

| TABLE OF DIMENSIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| D | T | A | B | C | E | L | WT. |
| 12" | 2–1/4" | 4" | 2'–0" | 4'–1" | 2'–0" | 6'–1" | 730 |
| 15" | 2–1/4" | 6" | 2'–3" | 3'–10" | 2'–0" | 6'–1" | 730 |
| 18" | 2–1/2" | 9" | 2'–3" | 3'–10" | 3'–0" | 6'–1" | 1190 |
| 24" | 3" | 10" | 3'–8" | 2'–6" | 4'–0" | 6'–2" | 1770 |
| 30" | 3–1/2" | 1'–0" | 4'–6" | 1'–8" | 5'–0" | 6'–2" | 2380 |
| 36" | 4" | 1'–3" | 5'–3" | 2'–11" | 6'–0" | 8'–2" | 5320 |
| 42" | 4–1/2" | 1'–9" | 5'–3" | 2'–11" | 6'–6" | 8'–2" | 5920 |
| 48" | 5" | 2'–0" | 6'–0" | 2'–2" | 7'–0" | 8'–2" | 7470 |
| 54" | 5–1/2" | 2'–3" | 5'–6" | 2'–10" | 7'–6" | 8'–4" | 8810 |
| 60" | 6" | 2'–6" | 5'–0" | 3'–3" | 8'–0" | 8'–3" | 11180 |
| 66" | 6–1/2" | 3'–0" | 6'–0" | 2'–3" | 8'–6" | 8'–3" | 12530 |
| 72" | 7" | 3'–0" | 6'–6" | 1'–9" | 9'–0" | 8'–3" | 13980 |
| | | | | | | | |

## GENERAL NOTES:

1. SEE FORMER NCDOT STANDARD 310.01 FOR DETAILS.
2. REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF REINFORCED CONCRETE PIPE OF LIKE DIAMETER PER AASHTO M170, TABLE 2, WALL B.
3. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.
4. PROVIDE TONGUE OR SPIGOT JOINT AT INLET END SECTION.
5. PROVIDE GROOVE OR BELL JOINT AT OUTLET END SECTION.
6. THE DIMENSIONS FOR END SECTIONS SHALL SUBSTANTIALLY AGREE WITH THE TABLE. MINOR VARIATIONS WILL BE PERMITTED BASED ON THE MANUFACTURER'S STANDARD FORMS AND TEMPLATES.
7. NOT TO BE USED IN NCDOT MAINTAINED RIGHT OF WAY.

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# FLARED END SECTION
# 12" THRU 72" PIPE

| STD. NO. | REV. |
|---|---|
| 20.22 | 1 |

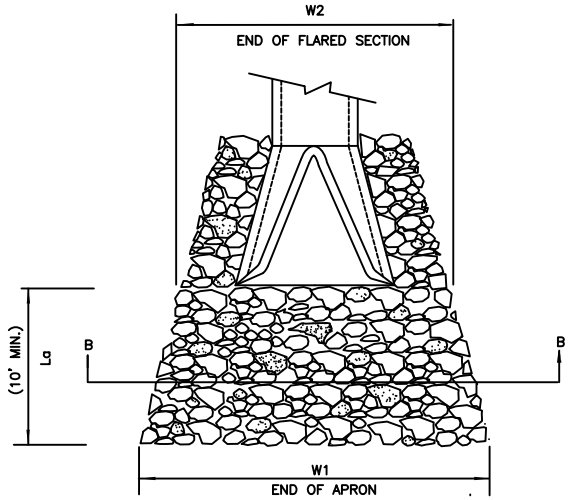
NOTES:

1. CLASS OR MEDIAN SIZE OF RIPRAP AND LENGTH, WIDTH AND DEPTH OF APRON TO BE DESIGNED BY THE ENGINEER.
2. REFER TO THE CHARLOTTE MECKLENBURG STORM WATER DESIGN MANUAL FOR RIPRAP APRON DESIGN STANDARDS.
3. RIPRAP SHOULD EXTEND UP BOTH SIDES OF THE APRON AND AROUND THE END OF THE PIPE OR CULVERT AT THE DISCHARGE OUTLET AT A MAXIMUM SLOPE OF 2:1 AND A HEIGHT NOT LESS THAN TWO THIRDS THE PIPE DIAMETER OR CULVERT HEIGHT.
4. THERE SHALL BE NO OVERFLOW FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIPRAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF OR TOE WALL AT THE DOWNSTREAM END.
5. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1
6. ALL SUBGRADE FOR STRUCTURE TO BE COMPACTED TO 95% OR GREATER.
7. THE PLACING OF FILL, EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.
8. NO BENDS OR CURVES IN THE HORIZONTAL ALIGNMENT OF THE APRON WILL BE PERMITTED.
9. FILTER FABRIC SHALL BE INSTALLED ON COMPACTED SUBGRADE PRIOR TO PLACEMENT OF RIP RAP.
10. ANY DISTURBED AREA FROM END OF APRON TO RECIEVING CHANNEL MUST BE STABILIZED.

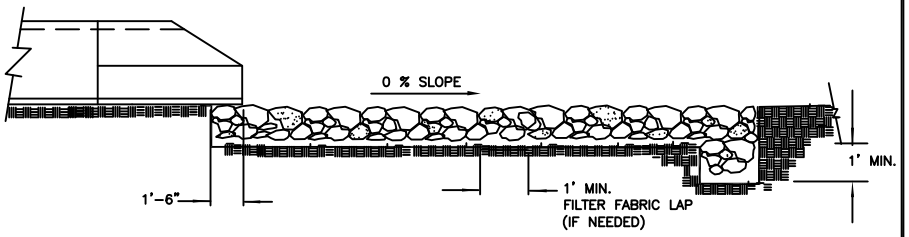
USE USDA NOMOGRAPH FROM NC SEDIMENT AND EROSION CONTROL MANUAL OR CHARLOTTE MECKLENBURG STORM WATER DESIGN MANUAL FOR DESIGN DATA.

| OUTLET | La | W1 | W2 | *T | H |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

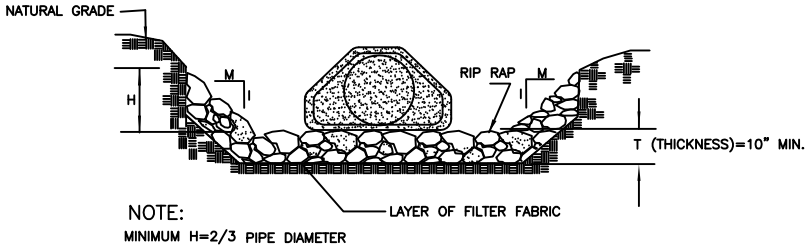
* d50 (see fig 8.06 a&b "NC SEDIMENT AND EROSION CONTROL MANUAL"
dmax = 1.5 x d50
T = 1.5 X dmax.
T(min.)=10"




PLAN




ELEVATION




NOTE:
MINIMUM H=2/3 PIPE DIAMETER

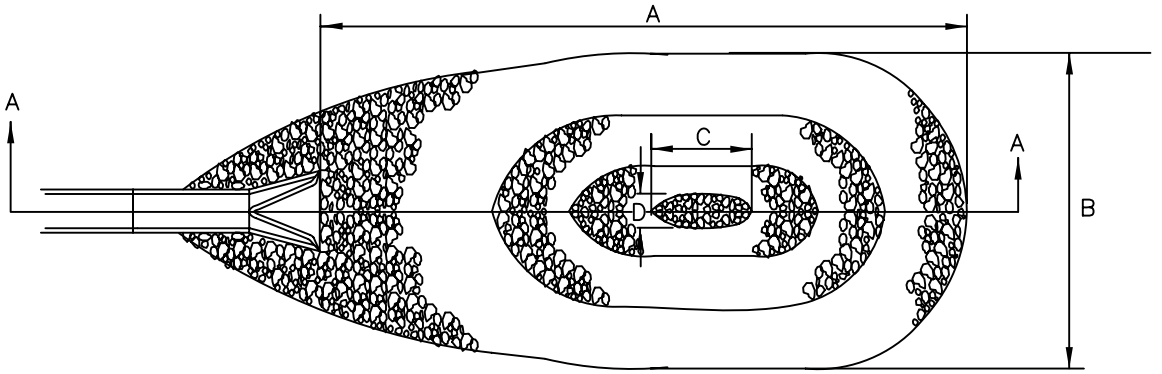
SECTION B–B

CHARLOTTE.

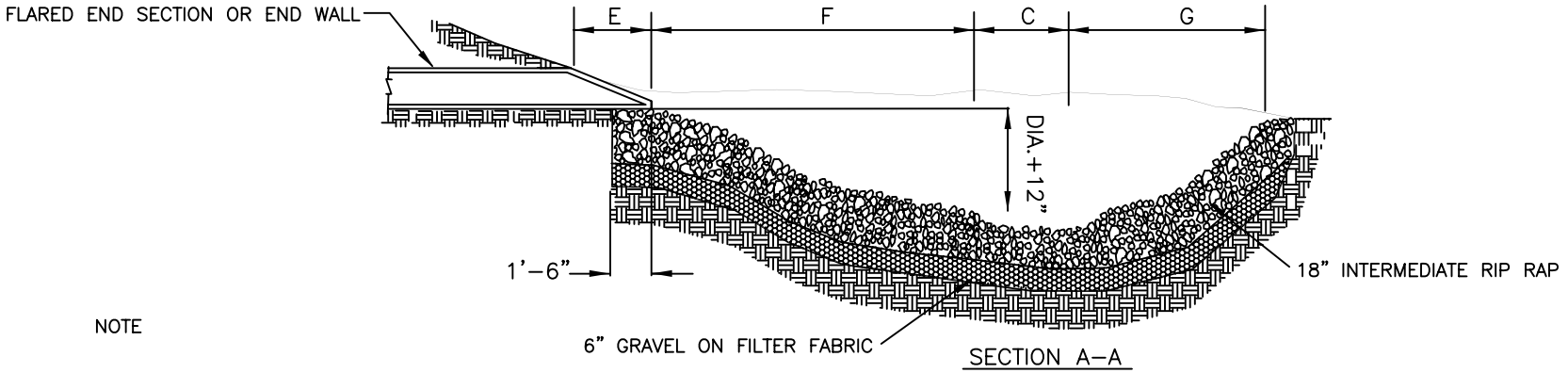
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RIPRAP APRON AT PIPE OUTFALLS OTHER THAN AT SWIM

| STD. NO. | REV. |
|---|---|
| 20.23 | 7 |




PLAN




SECTION A-A

NOTE

1. THIS DETAIL IS TO ONLY BE USED WHEN OUTFALL HAS A CONTINUOUS FLOW OF WATER AND WITH PRIOR APPROVAL OF THE CITY ENGINEER.

| PIPE SIZE | A | B | C | D | E | F | G | WT. RIP RAP IN TONS |
|---|---|---|---|---|---|---|---|---|
| 15" | 10' | 7' | 1 1/2' | 1' | 1' | 4 1/2' | 3' | 6 |
| 18" | 12' | 8' | 2' | 1' | 1' | 5' | 4' | 8 |
| 21" | 15' | 9' | 2 1/2' | 1 1/2' | 1' | 7' | 4 1/2' | 12 |
| 24" | 17' | 10' | 2 1/2' | 1 1/2' | 1' | 8' | 5 1/2' | 15 |
| 30" | 20' | 13' | 3' | 2' | 2' | 9' | 6' | 22 |
| 36" | 24' | 16' | 3 1/2' | 2' | 2' | 9 1/2' | 7' | 33 |

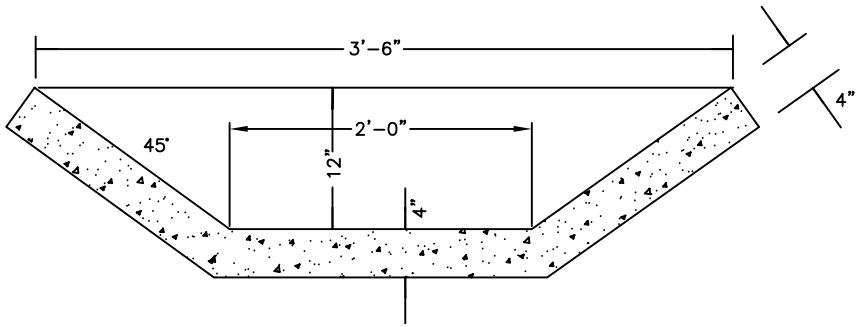
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# RIP RAP PLUNGE POOL

| STD. NO. | REV. |
|---|---|
| 20.24 | |



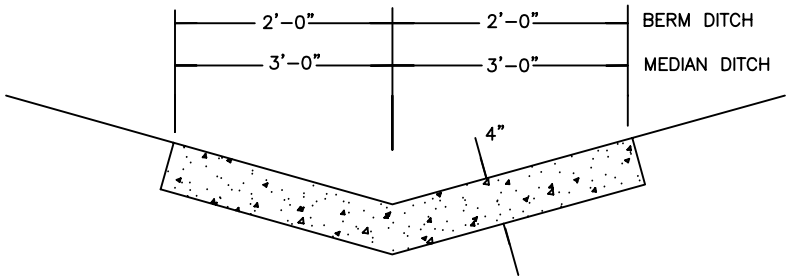

SLOPE DRAIN, BASE DITCH OR BERM DRAINAGE OUTLET DITCH

## GENERAL NOTES:

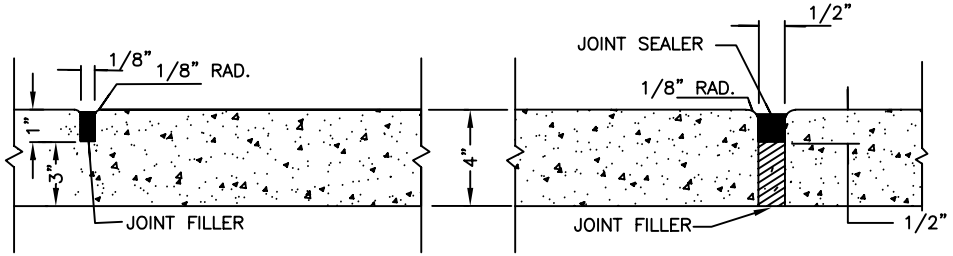
IN THE 4" CONCRETE PAVED DITCHES PLACE 1/2" EXPANSION JOINT AT 30 FT INTERVALS AND AT ALL OTHER POINTS WHERE PROPOSED DITCHES ABUT RIGID OBJECTS. PLACE GROOVED JOINTS 1" DEEP AT 10' INTERVALS BETWEEN EXPANSION JOINTS.

WIDTH AND SHAPE OF PROPOSED 4" CONCRETE PAVED DITCHES SHALL BE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.

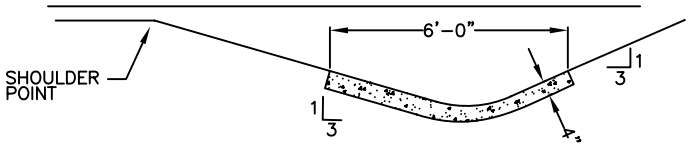



MEDIAN OR BERM DITCH

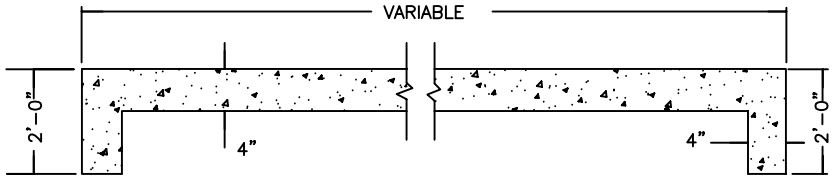



SHOWING GROOVED JOINT

SHOWING EXPANSION JOINT




SIDE DITCH




LONGITUDINAL SECTION OF PAVED DITCH

SHOWING 2'-0" CURTAIN WALL REQUIRED AT EACH END

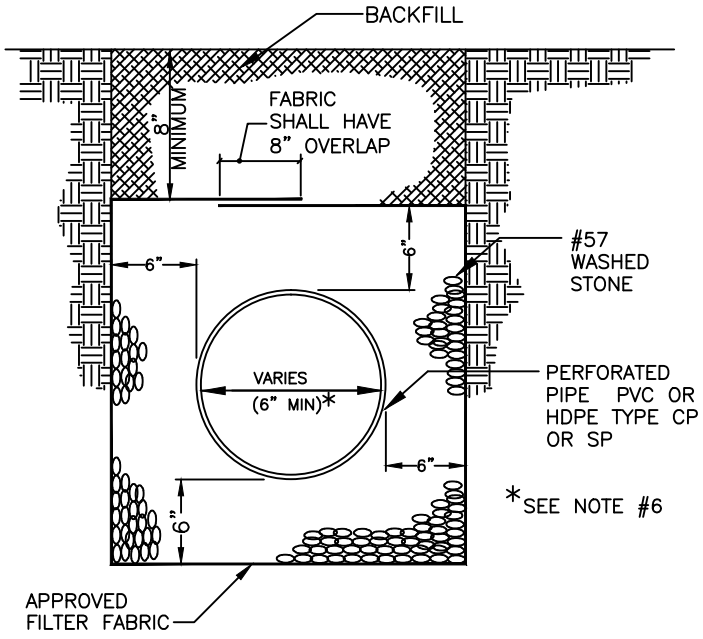
NOT TO SCALE

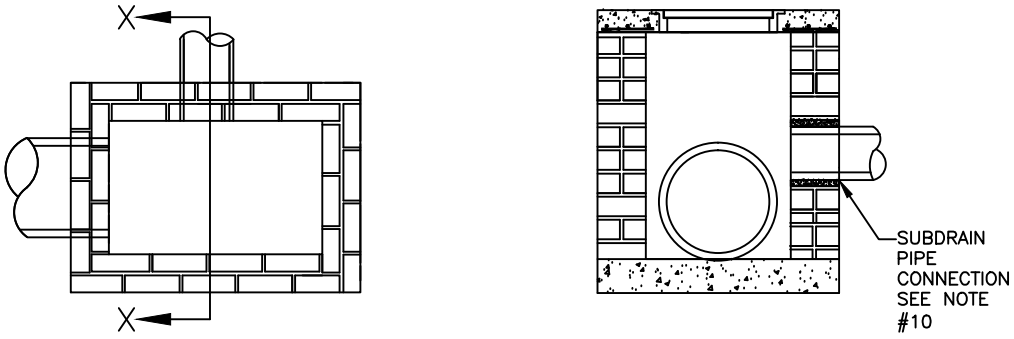
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CONCRETE PAVED DITCHES

| STD. NO. | REV. |
|---|---|
| 20.26 | |




PLAN VIEW

SECTION X–X

CONNECTION AT DRAINAGE STRUCTURE

NOTE: STRUCTURE SHOWN FOR REPRESENTATION PURPOSES ONLY.

NOTES:

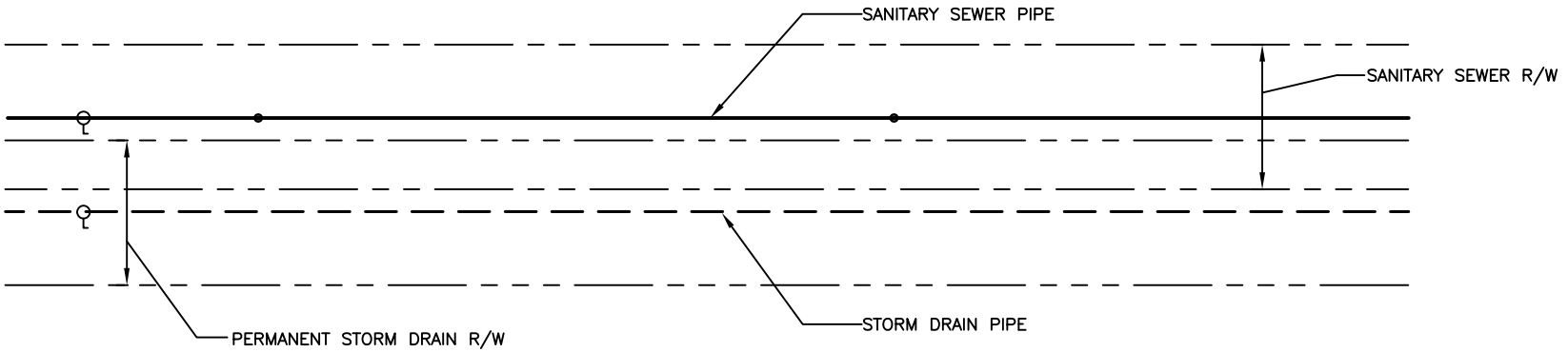
1. A MINIMUM OF 6" FROM OUTSIDE DIAMETER OF PIPE TO SIDE OF TRENCH MUST BE ALLOWED FOR WASHED STONE. THE METHOD OF COMPACTING BACKFILL MATERIAL IS SUBJECT TO APPROVAL BY THE CITY ENGINEER. AN APPROVED FILTER FABRIC SHALL BE PLACED AROUND STONE AND OVERLAPPED 8" AT TOP WITHIN STREET RIGHT OF WAY.
2. SUBDRAIN IS TO BE A MINIMUM 6" DIAMETER PERFORATED PIPE; USE SCHEDULE 40 PVC PER ASTM D1785 OR HDPE PER AASHTO M252, TYPE CP (SINGLE–WALL, CORRUGATED) OR TYPE SP (DOUBLE–WALL, SMOOTH INTERIOR).
3. OUTLET PIPE FROM SUBDRAIN SHALL BE NON–PERFORATED UNDER PAVEMENT (INCLUDING SIDEWALKS AND DRIVEWAYS). SEE SITE PLAN FOR SLOPE OF SUBDRAIN AND TIE IN TO STORM DRAINAGE.
4. THE OUTLET PIPES SHALL BE SCHEDULE 40 (MIN.) PVC PER ASTM D2665 OR HDPE PER AASHTO M252, TYPE S (DOUBLE WALL, SMOOTH INTERIOR) UNDER ROADWAYS.
5. FILTER FABRIC SHALL BE AN APPROVED, TYPE 2 WATER PERMEABLE, SYNTHETIC FABRIC.
6. A MINIMUM 4" DIAMETER SUBDRAIN MAY BE USED IN PLANTING AREAS AS DESCRIBED IN THE CLDSM 4000 SERIES.
7. CLEAN–OUTS ARE RECOMMENDED AT ALL PIPE INTERSECTIONS AND AT A 100' MAXIMUM SEPARATION.
8. SUBDRAIN INVERTS AT CATCH BASINS SHOULD BE INSTALLED ABOVE THE BOTTOM TO AVOID SURCHARGE OF SUBDRAIN SYSTEM.
9. ALL SUBDRAINS WILL TIE INTO A STANDARD DRAINAGE STRUCTURE OR DAYLIGHT TO THE SURFACE WHERE APPROPRIATE, AND NOT DIRECTLY INTO A PIPE.
10. ONLY REMOVE NECESSARY MASONRY UNITS TO INSTALL PIPE INTO BASIN WALL. PRECAST STRUCTURES WILL BE CORE DRILLED 2 INCHES LARGER THAN PIPE DIAMETER TO PROVIDE FOR INSTALLATION OF PIPE IN WALL.
11. ALL PIPE IN STORM DRAIN STRUCTURE SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
12. PIPE INSTALLATION PER SECTION 300 NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
13. SUBDRAINS WILL BE INSTALLED AT A DRAINAGE STRUCTURE AND THIS CONNECTION WILL NEED TO BE INSPECTED BY CITY STAFF PRIOR TO BACKFILLING.
14. SCHEDULE 40 PVC (NON–PERFORATED) SHALL BE USED TO MAKE THE CONNECTION TO THE STORM DRAINAGE SYSTEM. CONNECTION WILL BE WITHIN THE RIGHT–OF–WAY UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
15. PREFABRICATED DRAINAGE MAY BE USED WITH APPROVAL OF CITY ENGINEER
16. MAXIMUM OF TWO SUBDRAIN PENETRATIONS PER WALL OF DRAINAGE STRUCTURE.

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

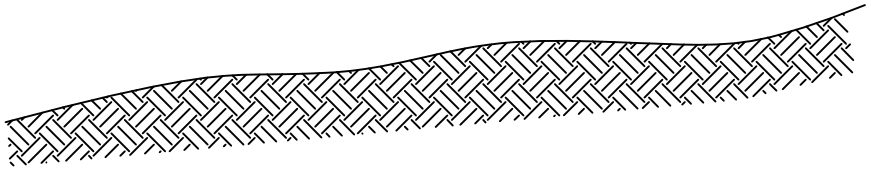
# SUBDRAIN DETAIL

| STD. NO. | REV. |
|---|---|
| 20.28 | 12 |

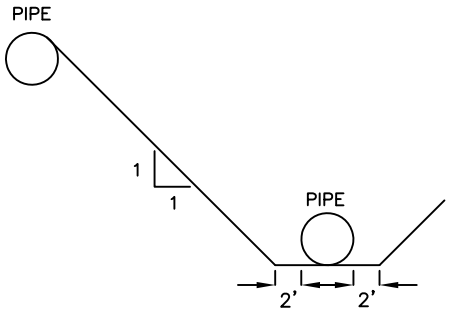



THE SANITARY SEWER AND STORM DRAINAGE RIGHTS OF WAY MAY OVERLAP; HOWEVER THE PIPE AND ASSOCIATED STRUCTURES MUST NOT BE IN THE OTHER UTILITY'S RIGHT OF WAY. THE SANITARY SEWER RIGHT OF WAY WIDTHS SHALL BE AS OUTLINED IN C.M.U.D.'S DESIGN MANUAL. THIS DETAIL DOES NOT APPLY TO STORM DRAINAGE UTILIZING OPEN CHANNEL FLOW.

## PLAN VIEW



THE VERTICAL SEPARATION GUIDELINE WILL BE USED UP TO THE POINT WHERE THE TWO RIGHTS OF WAY ADJOIN EACH OTHER.




THE SANITARY SEWER AND STORM DRAINAGE PIPES MUST BE NO CLOSER TOGETHER HORIZONTALLY THAN THE VERTICAL DISTANCE BETWEEN THE TOP OF THE HIGHER PIPE AND THE BOTTOM OF THE LOWER PIPE. A MAINTENANCE CREW MUST BE ABLE TO DIG DOWN TO THE LOWER PIPE SLOPING THE DITCH ON A 1:1 SLOPE UP FROM THE REQUIRED TRENCH BOTTOM WIDTH AND NOT EXPOSE THE HIGHER PIPE.

## PROFILE VIEW

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# OVERLAPPING STORM DRAINAGE/SANITARY SEWER EASEMENTS

| STD. NO. | REV. |
|---|---|
| 20.29 | 9 |

## GENERAL NOTES:

1. FOR STREAMS CARRYING 500 ACRES OR MORE OF SURFACE RUNOFF, THE EASEMENT REQUIREMENT IS TO BE THE WIDTH OF THE STREAM FROM TOP OF BANK TO TOP OF BANK, PLUS (+)10' ON EACH SIDE OF STREAM. (40' MINIMUM WIDTH)

2. FOR OPEN CHANNELS THE MINIMUM EASEMENT MUST CONTAIN THE WIDTH OF THE STREAM FROM TOP OF BANK TO TOP BANK.

3. WIDER EASEMENT WIDTHS MAY BE REQUIRED FOR PIPE DEPTHS GREATER THAN TEN FEET.

4. PIPE SYSTEMS AND OPEN CHANNELS ON PRIVATE PROPERTY SHALL BE PLACED IN A STORM DRAINAGE EASEMENT.

5. PIPE SYSTEMS SHALL TYPICALLY BE PLACED ALONG THE CENTERLINE OF THE STORM DRAINAGE EASEMENT

6. WHERE DUAL PIPES ARE PROPOSED, ½ OF THE STANDARD WIDTH FOR THE RESPECTIVE PIPE SIZE SHALL BE OFFSET FROM THE CENTERLINE OF EACH BARREL.

Easement Requirements for
Open Storm Drainage Channels

| Area in Acreage | Easement Requirement |
|---|---|
| 0–45 ac. | 20' |
| 45–120 ac. | 30' |
| 120–500 ac. | 40' |
| 500 ac.+ | see note |

Easement Requirements for Storm Drain Pipe

| Pipe Size | Easement Requirement |
|---|---|
| 15" | 15' |
| 18" | 15' |
| 24" | 15' |
| 30" | 20' |
| 36" | 20' |
| 42" | 25' |
| 48" | 25' |
| 54"+ | 30'MIN (VARIES) |

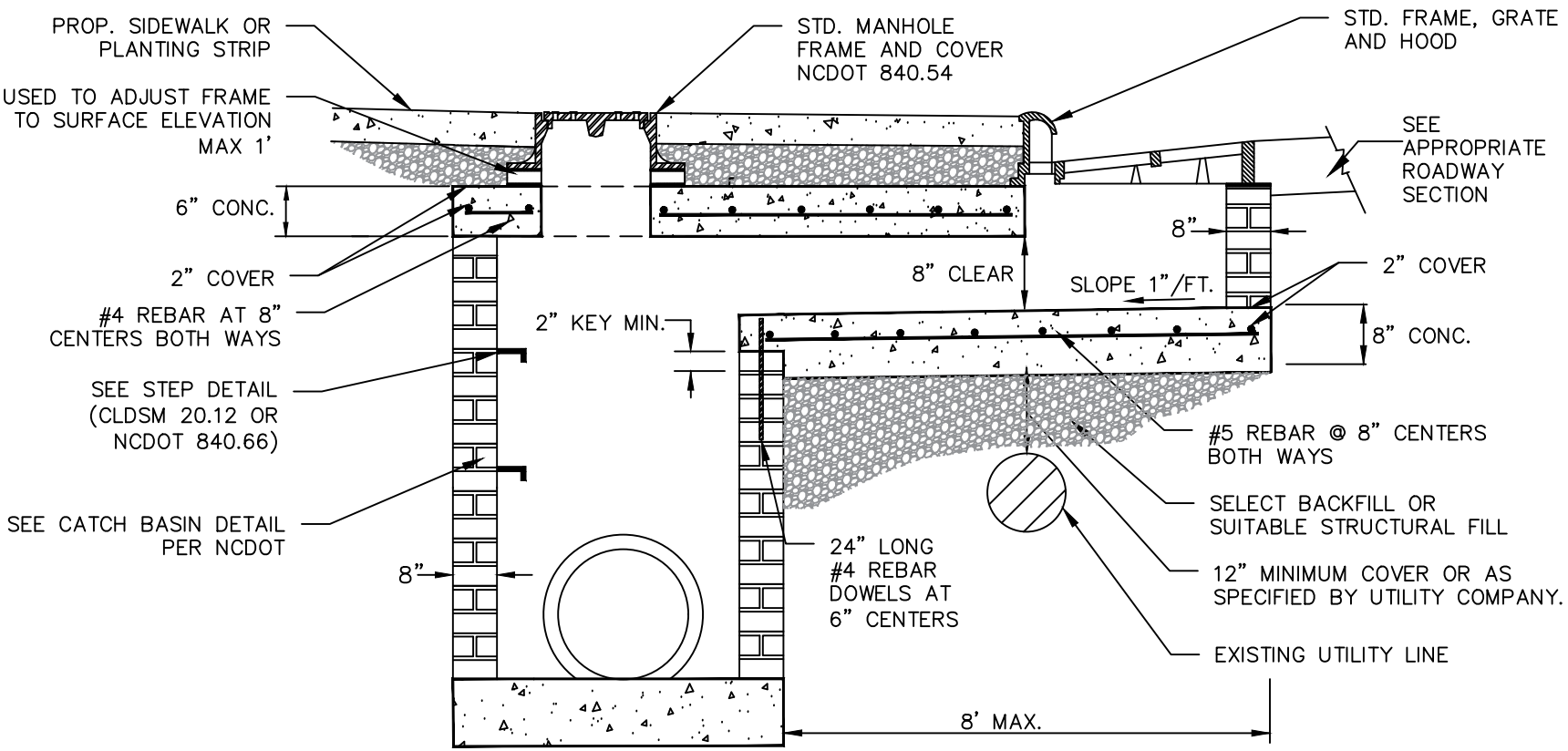
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# MINIMUM DRAINAGE EASEMENT REQUIREMENTS FOR STORM DRAIN PIPES AND OPEN CHANNELS

| STD. NO. | REV. |
|---|---|
| 20.30 | 24 |




NOTES:

1. PRIOR APPROVAL FROM THE CITY ENGINEER IS REQUIRED FOR USE.
2. THIS STRUCTURE IS TO ONLY BE USED ON CITY MAINTAINED STREETS AND ONLY ON NCDOT–MAINTAINED STREETS WITH SPECIAL NCDOT PERMISSION.
3. SEE NCDOT DETAIL 840.01 FOR MAXIMUM PIPE SIZE ALLOWABLE

OFFSET CATCH BASIN
FOR USE W/ EXISTING UTILITY CONFLICT

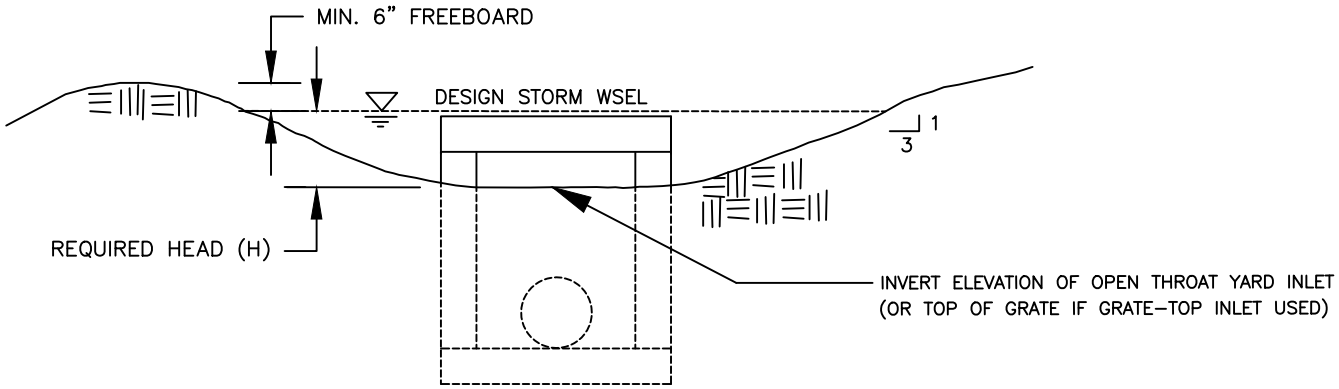
NOT TO SCALE

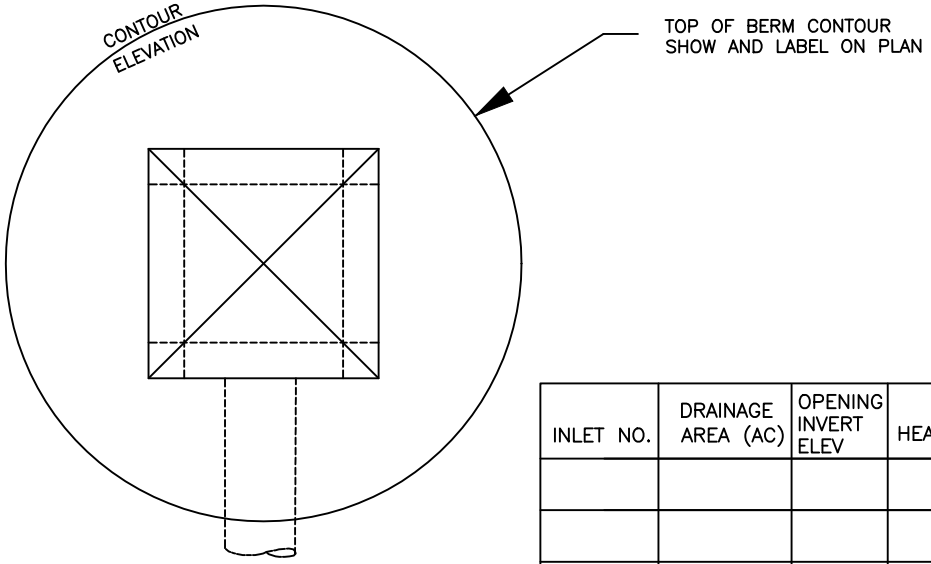
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# OFFSET CATCH BASIN

| STD. NO. | REV. |
|---|---|
| 20.34 | 19 |




| INLET NO. | DRAINAGE AREA (AC) | OPENING INVERT ELEV | HEAD H (FT) | TOP OF BERM ELEV. | FREE–BOARD (FT) | COMMENT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# GRADING AT YARD/DROP INLET

NOT TO SCALE

| STD. NO. | REV. |
|---|---|
| 20.35 | 17 |

NOTES:

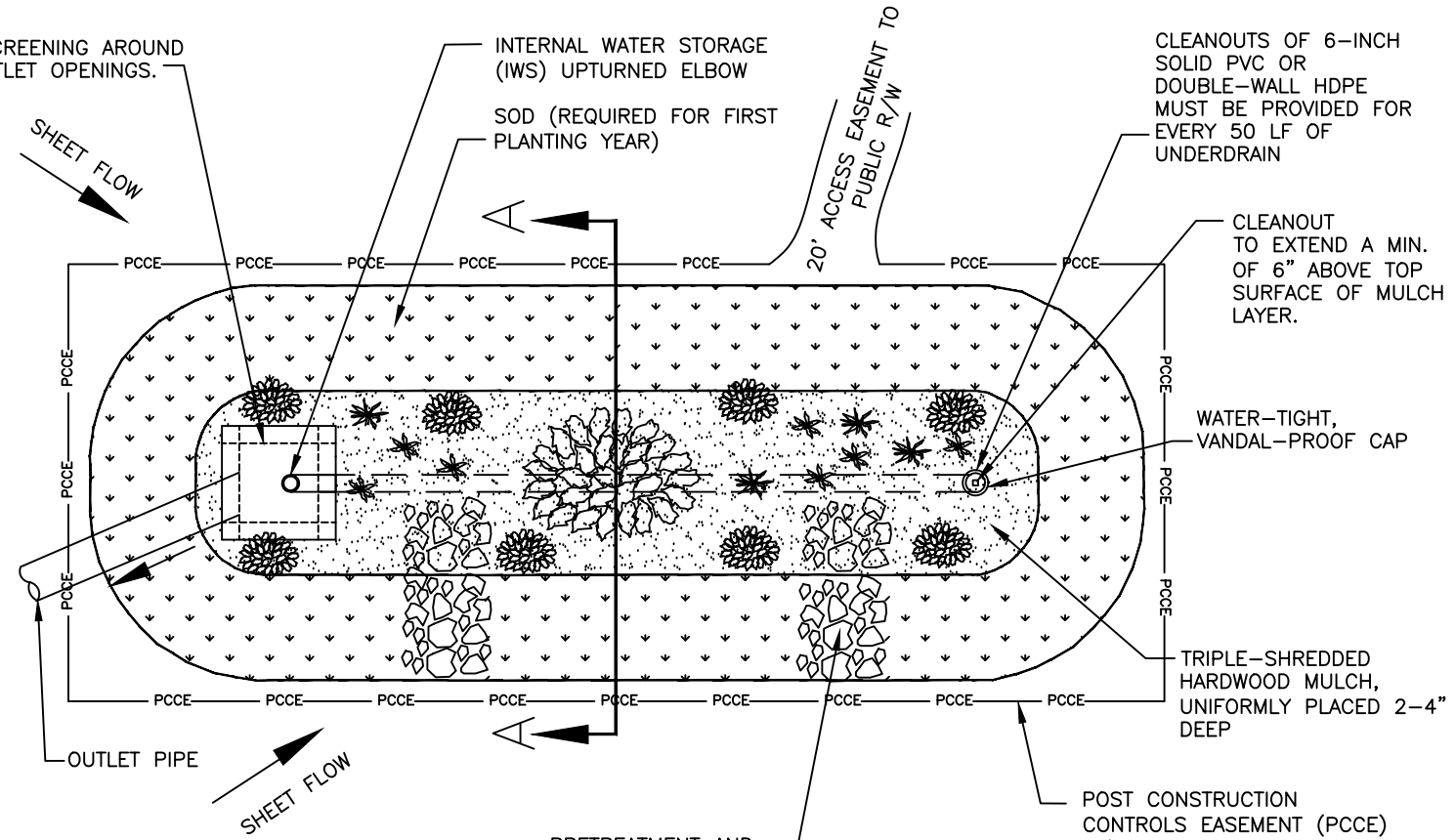
1. ALL BIORETENTION SHALL HAVE A MINIMUM 20 FOOT ACCESS EASEMENT CONNECTING TO A DEDICATED PUBLIC RIGHT OF WAY. ACCESS ROAD SHALL HAVE MIN. 12' STABILIZED WIDTH, MAX. LONG. GRADE OF 15%, MAX. CROSS-SLOPE 5%.

2. ALL DRAINAGE AREAS TO A BIORETENTION FACILITY ARE TO BE STABILIZED PRIOR TO INSTALLATION OF AMENDED SOILS, MULCH OR PLANTINGS.

3. AMENDED SOIL WILL ONLY BE PERMITTED WITH A VALID SOIL ANALYSIS REPORT.

4. INSTALL WIRE SCREENING AROUND ALL OUTLET OPENINGS TO PREVENT LOSS OF MULCH.

5. PLANTING PLAN REQUIREMENTS:
   A. SODDED BIORETENTION CELLS ONLY:
      USE NON-CLUMPING DEEP ROOTED SPECIES
   B. VEGETATION OTHER THAN SOD:
      AFTER 5 YEARS OF PLANTING PLANTING PLAN SHOULD ACHIEVE MIN. OF 75% OF PLANT COVERAGE. MAX COVERAGE WITH TREE OR SHRUB CANOPY IS 50%.




NOT TO SCALE

CHARLOTTE.

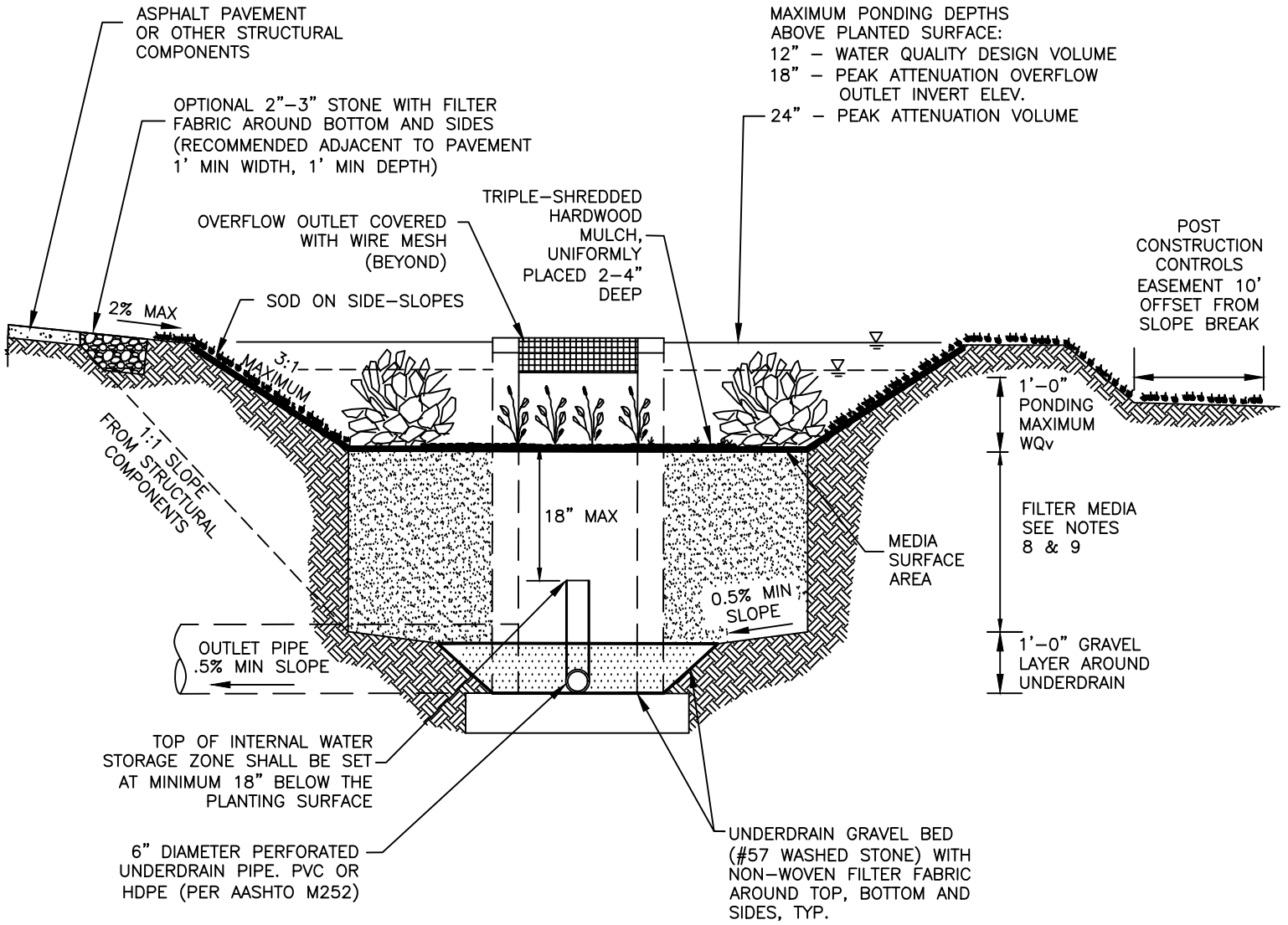
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BIORETENTION PLAN

| STD. NO. | REV. |
|---|---|
| 21.00 | 24 |

NOTES:

1. ALL BIORETENTION FACILITIES SHALL HAVE A MINIMUM 20 FOOT ACCESS EASEMENT CONNECTING TO A DEDICATED PUBLIC RIGHT OF WAY. ACCESS ROAD SHALL HAVE MIN. 12' STABILIZED WIDTH, MAX. LONG. GRADE OF 15%, MAX. CROSS-SLOPE 5%.
2. ALL DRAINAGE AREAS TO A BIORETENTION FACILITY ARE TO BE STABILIZED PRIOR TO INSTALLATION OF AMENDED SOILS, MULCH OR PLANTINGS.
3. AMENDED SOIL WILL ONLY BE PERMITTED WITH A VALID SOIL ANALYSIS REPORT. NO AMENDED SOIL SHALL BE ALLOWED ON THE SIDE SLOPES.
4. INSTALL WIRE SCREENING AROUND ALL OUTLET OPENINGS TO PREVENT LOSS OF MULCH.
5. PVC UNDERDRAIN PIPE SHOULD HAVE 3/8" PERFORATIONS SPACED AT 6" CENTERS, MIN. 4 HOLES PER ROW. MAX SPACING OF UNDERDRAIN PIPE IS 10 FEET ON CENTER. HDPE SHALL ADHERE TO AASHTO M252 SPECS.
6. UNDERDRAIN CLEANOUTS SHOULD EXTEND A MIN. OF 6" ABOVE TOP SURFACE OF MULCH LAYER.
7. ONLY SMALL MATURING TREES ARE ALLOWED TO BE PLANTED IN THE AMENDED SOILS.
8. THE MINIMUM DEPTH OF THE MEDIA DEPENDS ON THE DESIGN OF THE CELL AS FOLLOWS:
   A. ALL CELLS WITH TREES AND SHRUBS: 36 INCHES
   B. CELLS WITHOUT TREES AND SHRUBS:
      - WITH NO INTERNAL WATER STORAGE: 24 INCHES
      - WITH INTERNAL WATER STORAGE: 30 INCHES
9. MEDIA SPECIFICATION – HOMOGENEOUS SOIL MIX ENGINEERED MEDIA BLEND WITH APPROXIMATE VOLUMES OF:
   A) 75-85% MEDIUM TO COARSE WASHED SAND (ASTM C33, AASHTO M 6/M 80, ASTM C330, AASHTO M195, OR THE EQUIVALENT);
   B) 8-15% FINES (SILT AND CLAY); AND
   C) 5-10% ORGANIC MATTER (SUCH AS PINE BARK FINES).




SECTION A-A

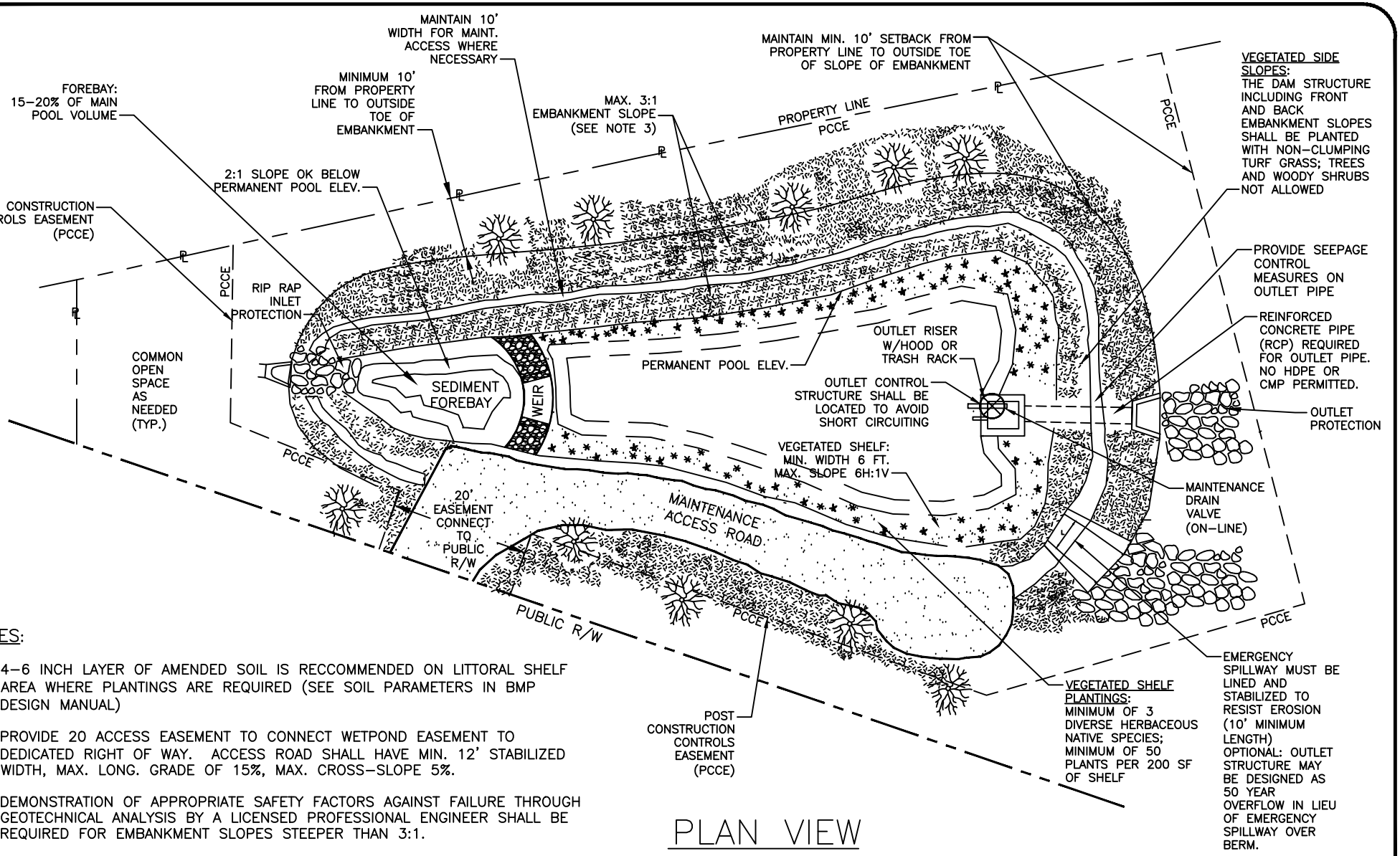
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BIORETENTION CROSS-SECTION

| STD. NO. | REV. |
|---|---|
| 21.01 | 24 |




PLAN VIEW

NOTES:

1. 4–6 INCH LAYER OF AMENDED SOIL IS RECCOMMENDED ON LITTORAL SHELF AREA WHERE PLANTINGS ARE REQUIRED (SEE SOIL PARAMETERS IN BMP DESIGN MANUAL)
2. PROVIDE 20 ACCESS EASEMENT TO CONNECT WETPOND EASEMENT TO DEDICATED RIGHT OF WAY. ACCESS ROAD SHALL HAVE MIN. 12' STABILIZED WIDTH, MAX. LONG. GRADE OF 15%, MAX. CROSS–SLOPE 5%.
3. DEMONSTRATION OF APPROPRIATE SAFETY FACTORS AGAINST FAILURE THROUGH GEOTECHNICAL ANALYSIS BY A LICENSED PROFESSIONAL ENGINEER SHALL BE REQUIRED FOR EMBANKMENT SLOPES STEEPER THAN 3:1.
4. WATER–TIGHT SEAL MUST BE PROVIDED BETWEEN ALL RISER AND PIPE JOINT CONNECTIONS.

NOT TO SCALE

CHARLOTTE.

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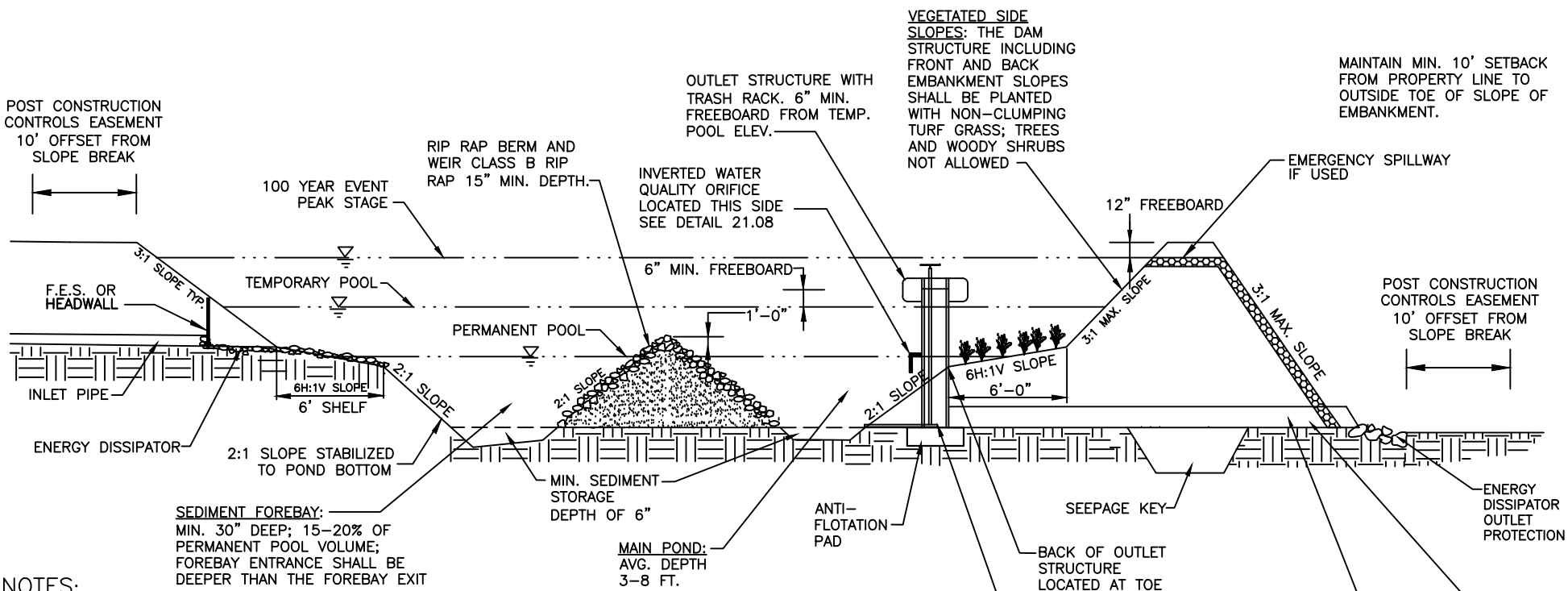
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# WETPOND PLAN

| STD. NO. | REV. |
|---|---|
| 21.05 | 24 |




NOTES:

1. 4-6 INCH LAYER OF AMENDED SOIL IS RECCOMMENDED ON LITTORAL SHELF AREA WHERE PLANTINGS ARE REQUIRED (SEE SOIL PARAMETERS IN SCM DESIGN MANUAL)
2. PROVIDE 20 ACCESS EASEMENT TO CONNECT WETPOND EASEMENT TO DEDICATED RIGHT OF WAY. ACCESS ROAD SHALL HAVE MIN. 12' STABILIZED WIDTH, MAX. LONG. GRADE OF 15%, MAX. CROSS-SLOPE 5%.
3. DEMONSTRATION OF APPROPRIATE SAFETY FACTORS AGAINST FAILURE THROUGH GEOTECHNICAL ANALYSIS BY A LICENSED PROFESSIONAL ENGINEER SHALL BE REQUIRED FOR EMBANKMENT SLOPES STEEPER THAN 3:1.
4. WATER-TIGHT SEAL MUST BE PROVIDED BETWEEN ALL RISER AND PIPE JOINT CONNECTIONS.

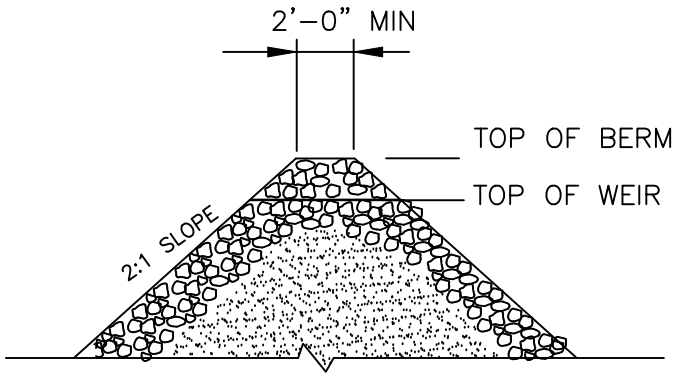
NOT TO SCALE

CHARLOTTE.

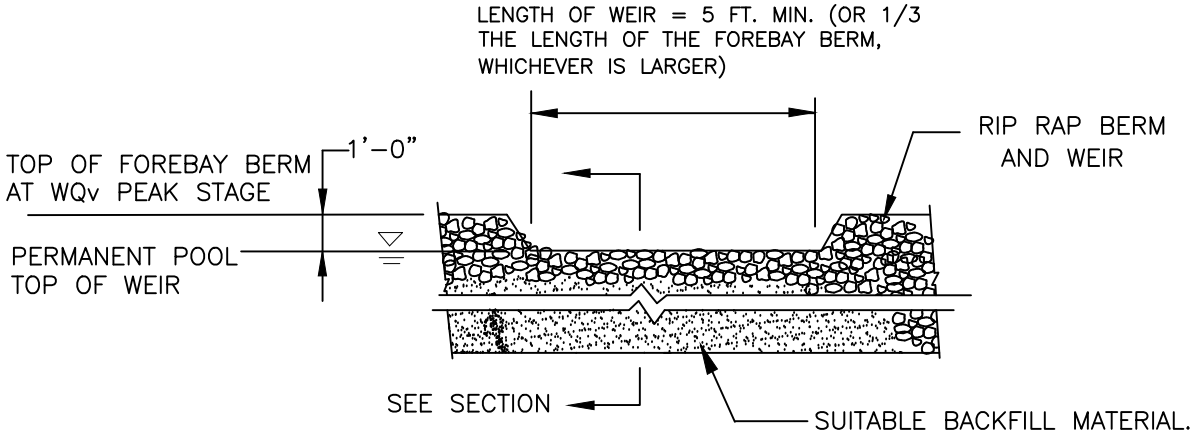
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# WETPOND PROFILE

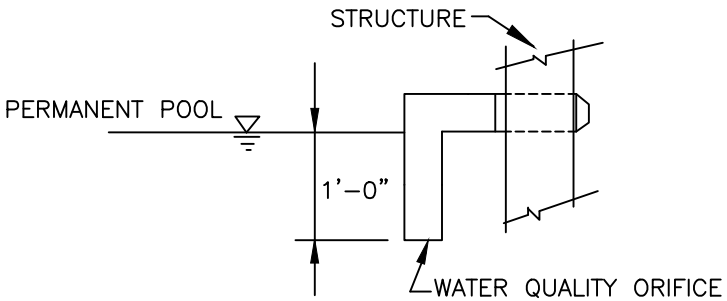
| STD. NO. | REV. |
|---|---|
| 21.06 | 24 |



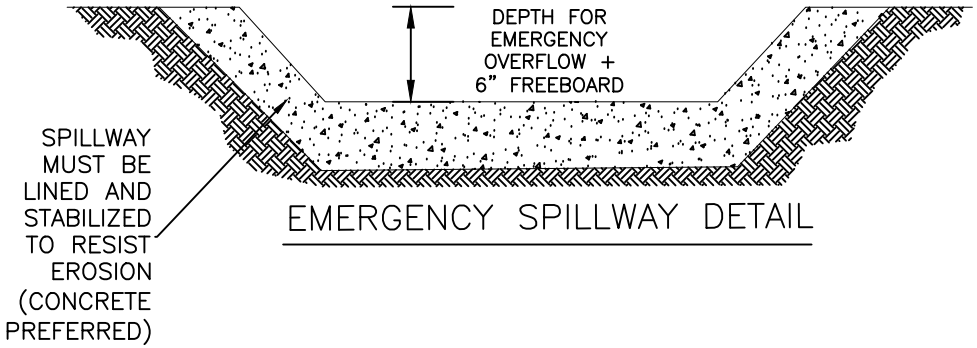

FOREBAY BERM AND WEIR SECTION




FOREBAY BERM AND WEIR DETAIL




WATER QUALITY ORIFICE DETAIL




EMERGENCY SPILLWAY DETAIL

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# WETPOND DETAILS

| STD. NO. | REV. |
|---|---|
| 21.08 | 20 |

NOTES:

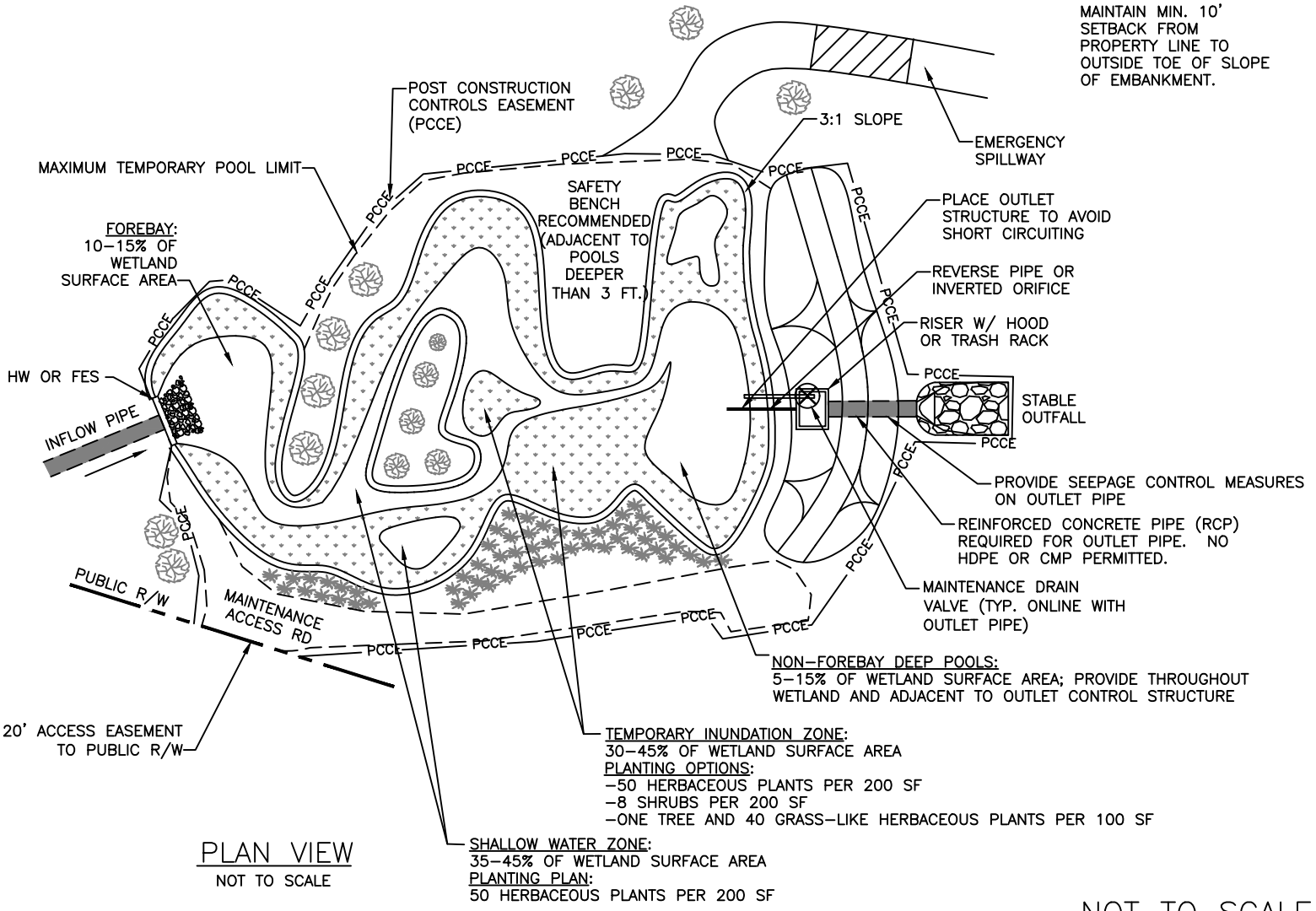
1. THE PH, COMPACTION, AND OTHER ATTRIBUTES OF THE FIRST 12" DEPTH OF SOIL SHALL BE ADJUSTED IF NECESSARY TO PROMOTE PLAN ESTABLISHMENT AND GROWTH. (SEE SOIL PARAMETERS IN SCM DESIGN MANUAL)

2. PROVIDE 20' ACCESS EASEMENT TO CONNECT WETLAND EASEMENT TO DEDICATED RIGHT OF WAY.

3. ALL WETLANDS SHALL HAVE A MINIMUM 20 FOOT ACCESS EASEMENT CONNECTING TO A DEDICATED PUBLIC RIGHT OF WAY. ACCESS ROAD SHALL HAVE MIN. 12' STABILIZED WIDTH, MAX. LONG. GRADE OF 15%, MAX. CROSS-SLOPE 5%.

3. DEMONSTRATION OF APPROPRIATE SAFETY FACTORS AGAINST FAILURE THROUGH GEOTECHNICAL ANALYSIS BY A LICENSED PROFESSIONAL ENGINEER SHALL BE REQUIRED FOR EMBANKMENT SLOPES STEEPER THAN 3:1.

4. WATER-TIGHT SEAL MUST BE PROVIDED BETWEEN ALL RISER AND PIPE JOINT CONNECTIONS.




PLAN VIEW
NOT TO SCALE

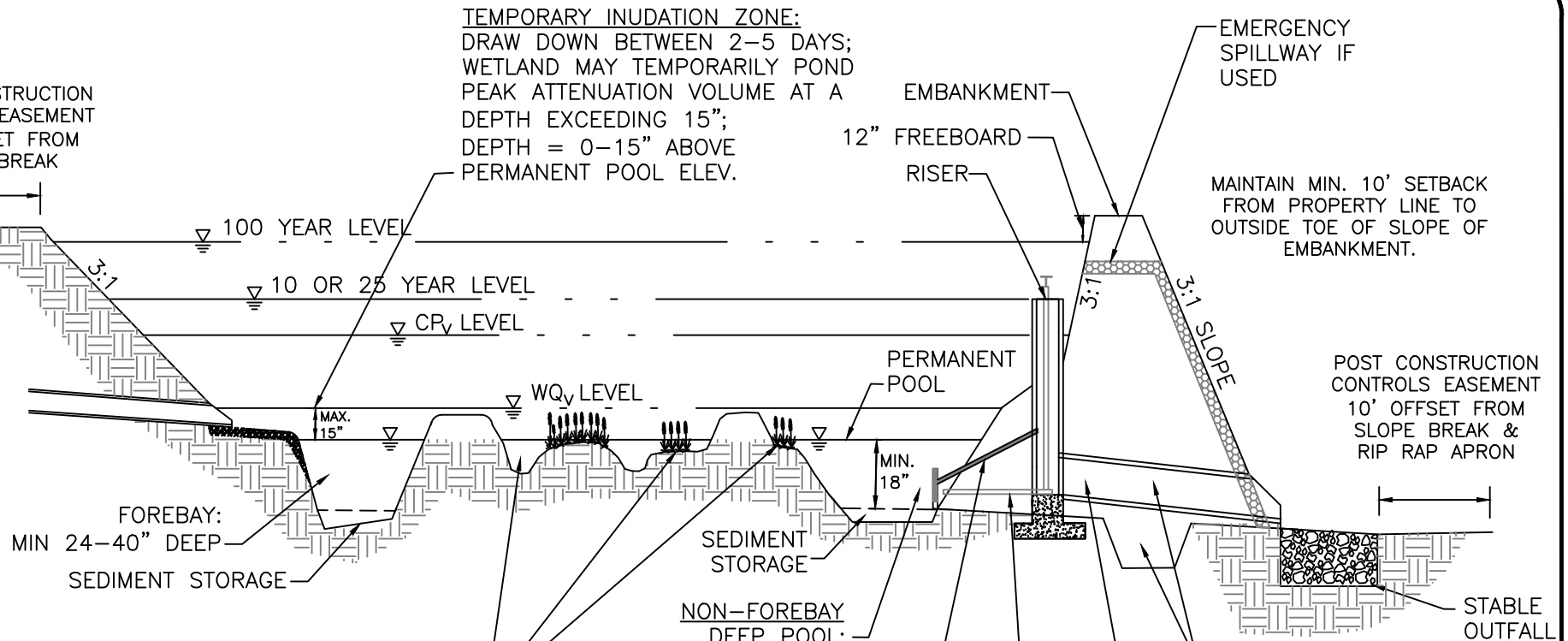
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# WETLAND PLAN

| STD. NO. | REV. |
|---|---|
| 21.10 | 24 |




PROFILE
NOT TO SCALE

NOTES:

1. THE PH, COMPACTION, AND OTHER ATTRIBUTES OF THE FIRST 12" DEPTH OF SOIL SHALL BE ADJUSTED IF NECESSARY TO PROMOTE PLAN ESTABLISHMENT AND GROWTH. (SEE SOIL PARAMETERS IN SCM DESIGN MANUAL)
2. DEMONSTRATION OF APPROPRIATE SAFETY FACTORS AGAINST FAILURE THROUGH GEOTECHNICAL ANALYSIS BY A LICENSED PROFESSIONAL ENGINEER SHALL BE REQUIRED FOR EMBANKMENT SLOPES STEEPER THAN 3:1.
3. WATER–TIGHT SEAL MUST BE PROVIDED BETWEEN ALL RISER AND PIPE JOINT CONNECTIONS.

NOT TO SCALE

CHARLOTTE.

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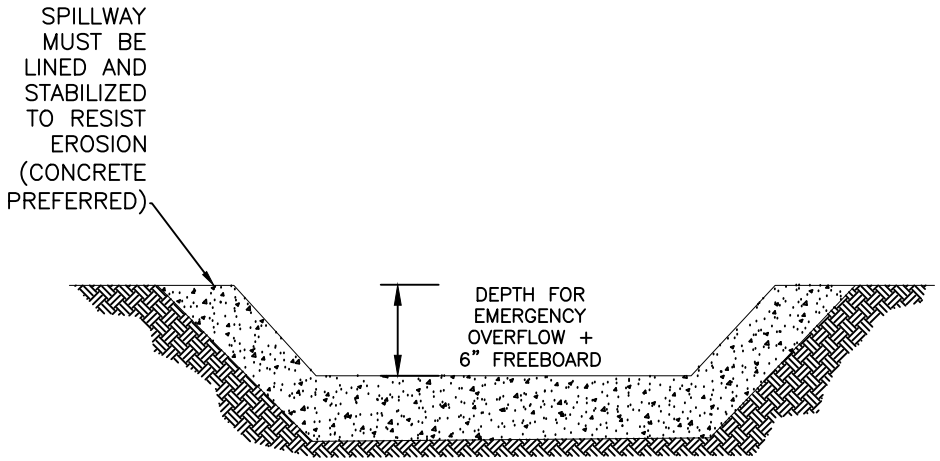
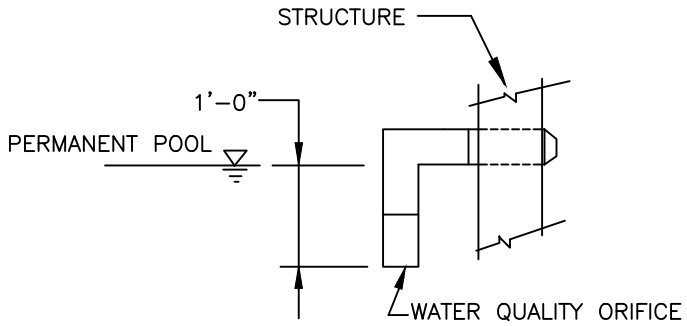
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# WETLAND PROFILE

| STD. NO. | REV. |
|---|---|
| 21.11 | 24 |




EMERGENCY SPILLWAY DETAIL




WATER QUALITY ORIFICE DETAIL

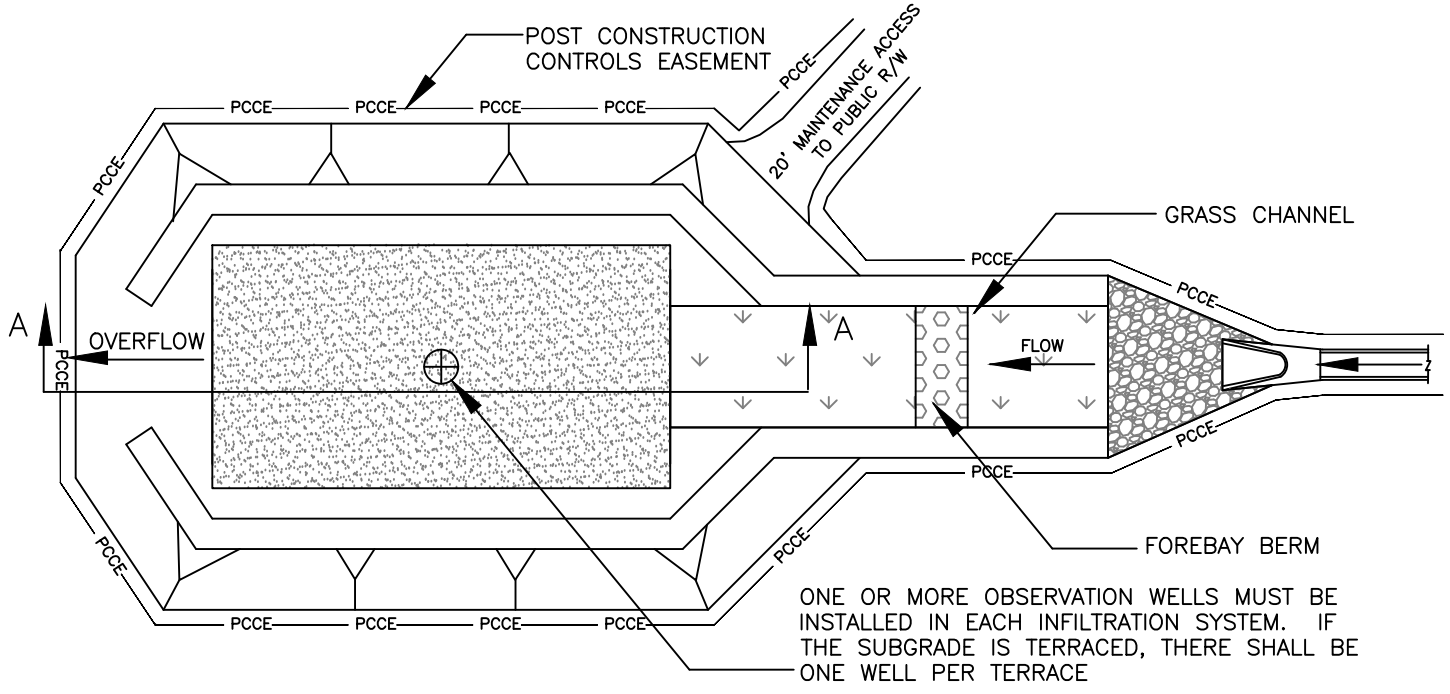
NOT TO SCALE

CHARLOTTE.

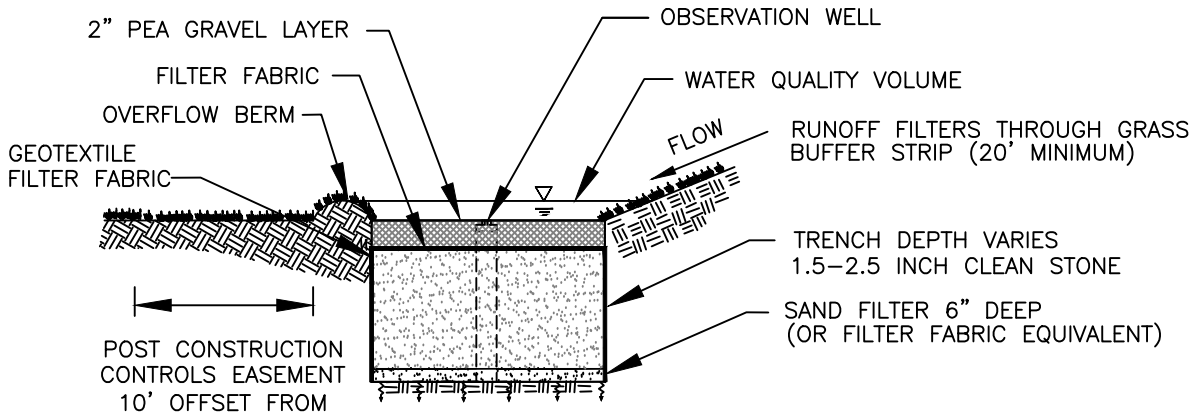
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# WETLAND DETAILS

| STD. NO. | REV. |
|---|---|
| 21.13 | 18 |




PLAN
NOT TO SCALE




SECTION A–A
NOT TO SCALE

## NOTES:

1. CONNECT INFILTRATION TRENCH EASEMENT TO A DEDICATED PUBLIC RIGHT OF WAY WITH A 20–FOOT ACCESS EASEMENT.

2. LINE THE SIDES AND TOP OF THE TRENCH WITH AN APPROPRIATE GEOTEXTILE FILTER FABRIC THAT PREVENTS SOIL PIPING BUT HAS GREATER PERMEABILITY THAN THE PARENT SOIL. THE TOP LAYER OF THE FILTER FABRIC IS SPACED 2–6 INCHES FROM THE TOP OF THE SYSTEM AND SERVES TO PREVENT SEDIMENT FROM PASSING INTO THE STONE AGGREGATE.

NOT TO SCALE

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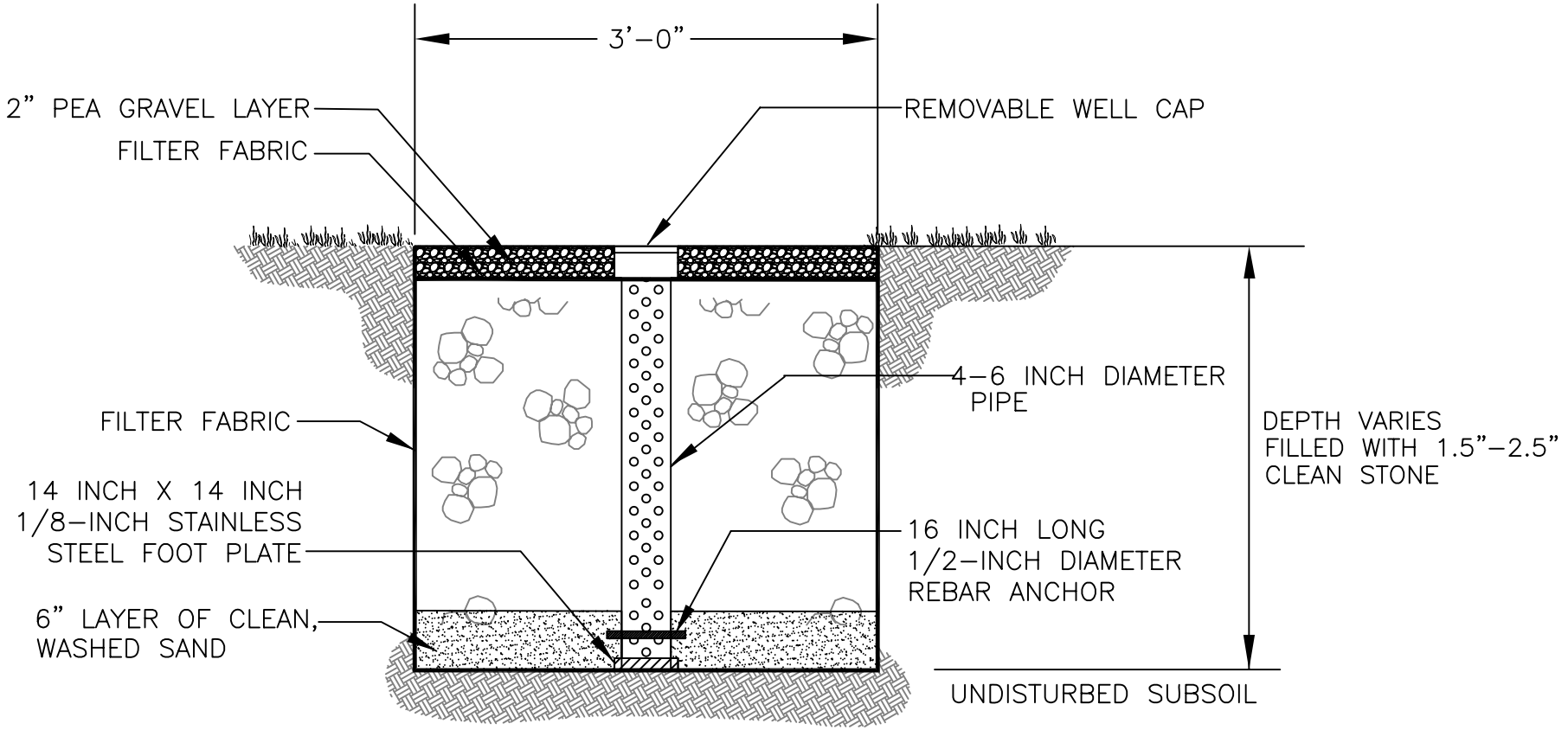
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# INFILTRATION TRENCH

| STD. NO. | REV. |
|---|---|
| 21.19 | 24 |




PERFORATION HOLES TO BE 1/2 INCH DIAMETER
AT 3 INCH MINIMUM VERTICAL SPACING

NOT TO SCALE

CHARLOTTE.

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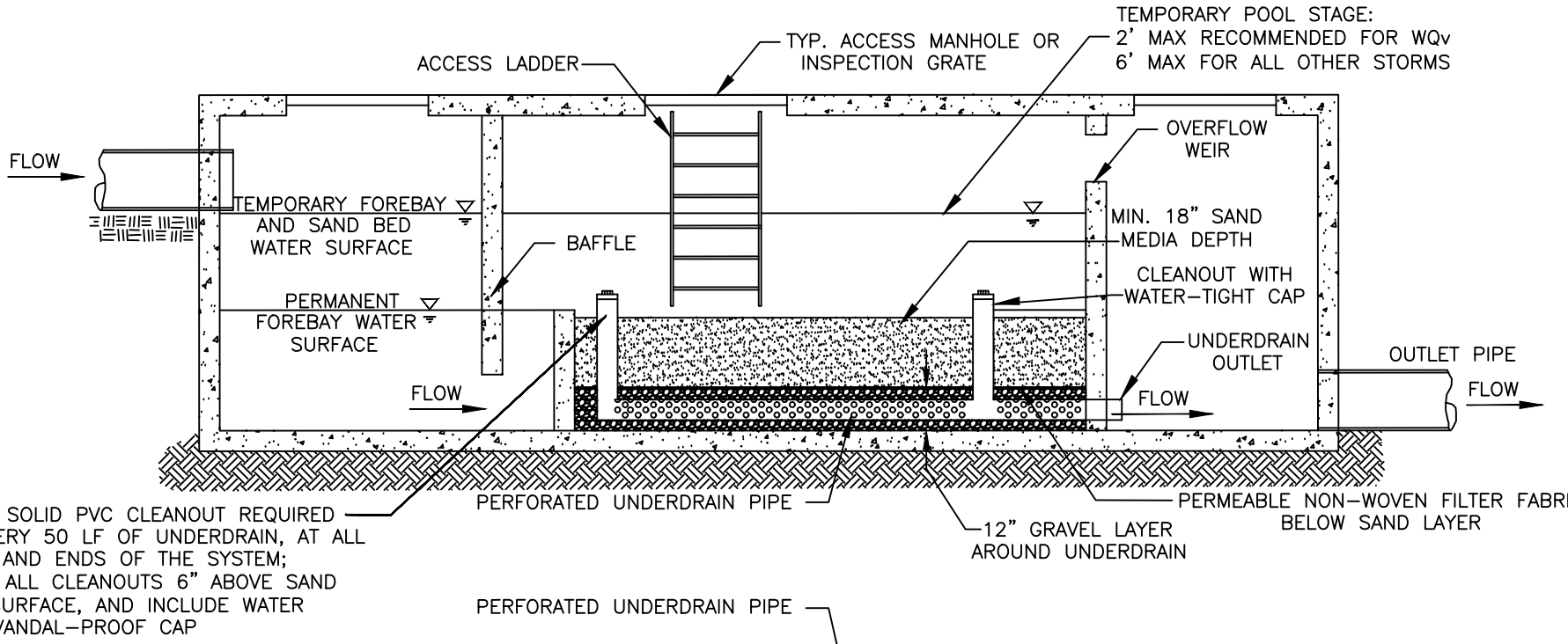
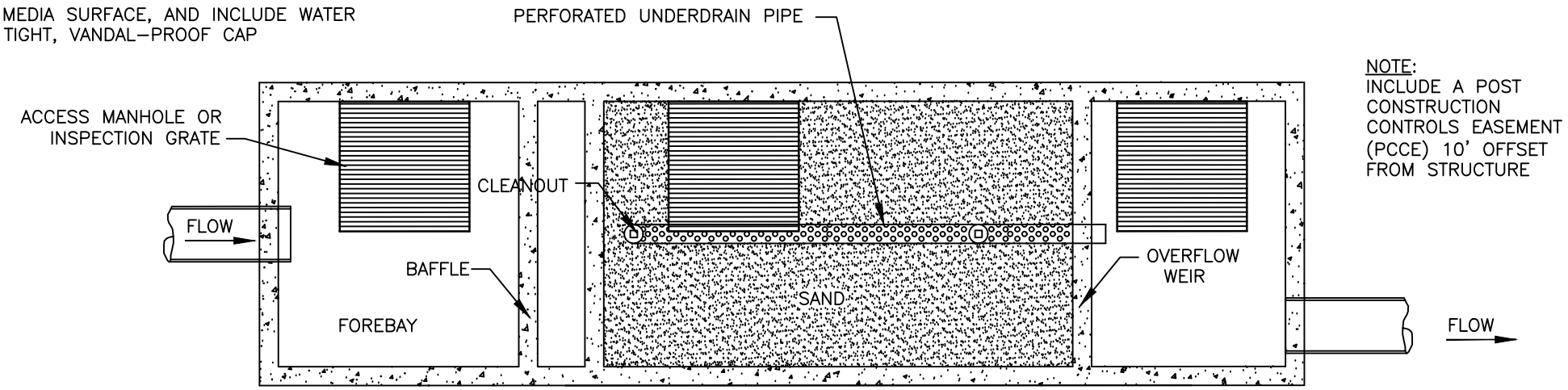
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# OBSERVATION WELL

BMP FIG. 4.6.3

| STD. NO. | REV. |
|---|---|
| 21.20 | 2 |




NOTE:
INCLUDE A POST CONSTRUCTION CONTROLS EASEMENT (PCCE) 10' OFFSET FROM STRUCTURE

CHARLOTTE.

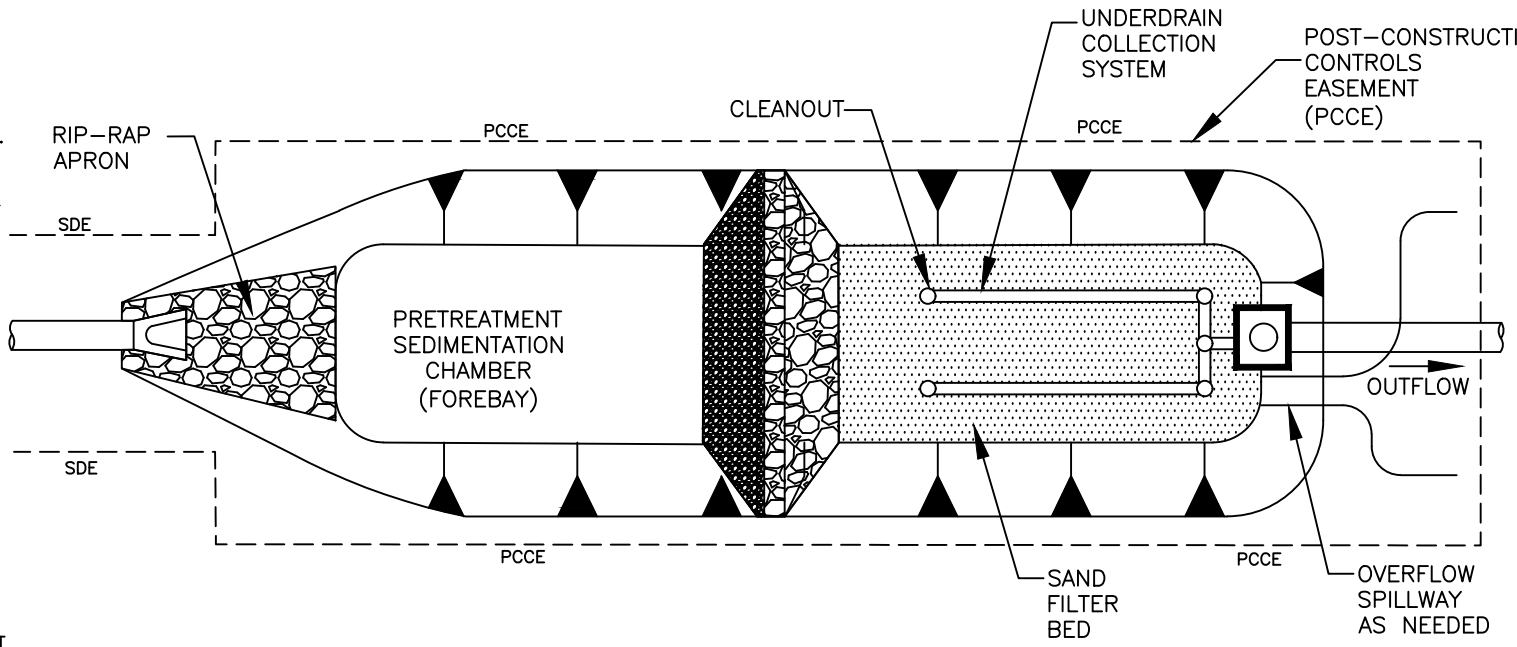
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# UNDERGROUND SAND FILTER

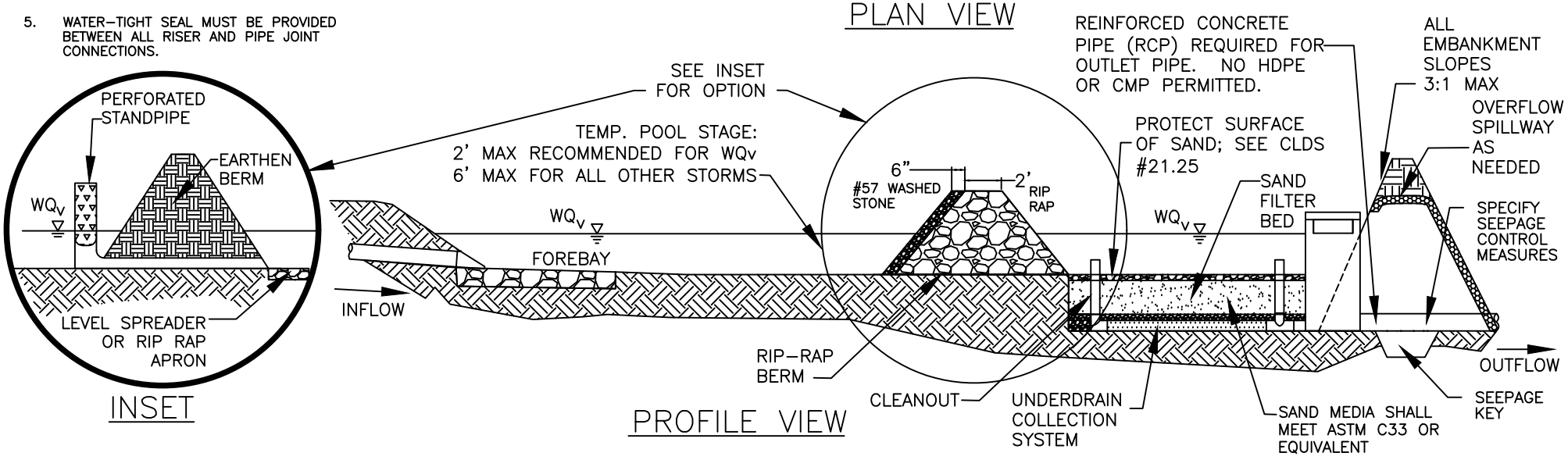
| STD. NO. | REV. |
|---|---|
| 21.23 | 24 |

NOTES:

1. ALL SAND FILTERS SHALL HAVE A MINIMUM 20 FOOT ACCESS EASEMENT CONNECTING TO A DEDICATED PUBLIC RIGHT OF WAY. ACCESS ROAD SHALL HAVE MIN. 12' STABILIZED WIDTH, MAX. LONG. GRADE OF 15%, MAX. CROSS-SLOPE 5%. IN ADDITION, A 10-FOOT WIDE PERMANENT MAINTENANCE ACCESS EASEMENT MUST BE PROVIDED AROUND THE PERIMETER OF ALL BMPS TO ALLOW FOR ADEQUATE MAINTENANCE AND REPAIR.
2. ALL DRAINAGE AREAS TO A SAND FILTER FACILITY ARE TO BE STABILIZED PRIOR TO INSTALLATION OF SAND.
3. CLEAN OUTS IN THE UNDERDRAIN SYSTEM ARE TO BE PROVIDED EVERY 50' MINIMUM, AT ALL BENDS, AND ENDS OF THE SYSTEM FOR MAINTENANCE PURPOSES. CLEAN OUTS SHALL HAVE WATER TIGHT, VANDAL-PROOF CAPS AND EXTEND 6" ABOVE THE SURFACE.
4. DEMONSTRATION OF APPROPRIATE SAFETY FACTORS AGAINST FAILURE THROUGH GEOTECHNICAL ANALYSIS BY A LICENSED PROFESSIONAL ENGINEER SHALL BE REQUIRED FOR EMBANKMENT SLOPES STEEPER THAN 3:1.
5. WATER-TIGHT SEAL MUST BE PROVIDED BETWEEN ALL RISER AND PIPE JOINT CONNECTIONS.




PLAN VIEW




PROFILE VIEW




INSET

CHARLOTTE.

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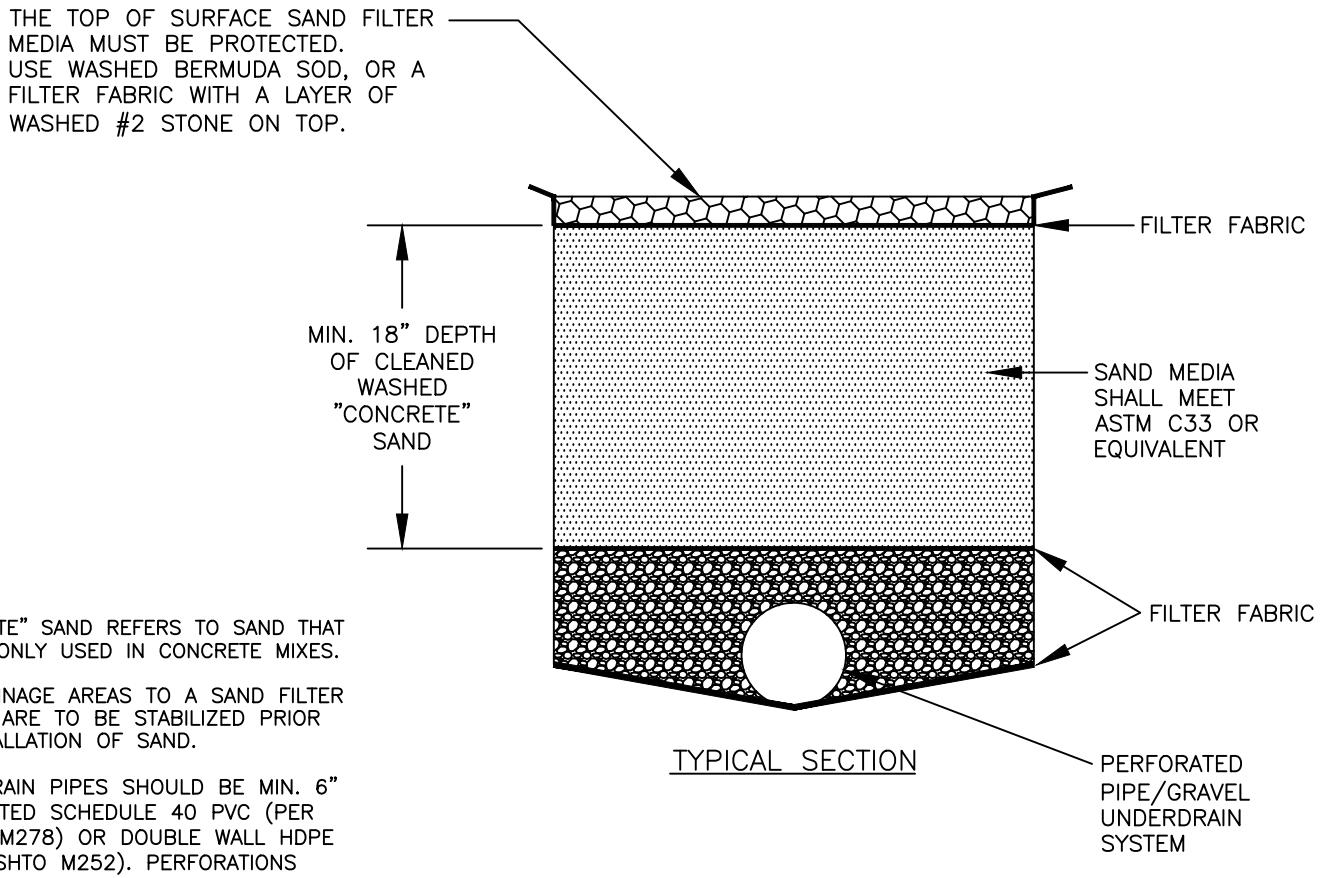
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SURFACE SAND FILTER

NOT TO SCALE

| STD. NO. | REV. |
|---|---|
| 21.24 | 24 |




TYPICAL SECTION

NOTES:

1. "CONCRETE" SAND REFERS TO SAND THAT IS COMMONLY USED IN CONCRETE MIXES.
2. ALL DRAINAGE AREAS TO A SAND FILTER FACILITY ARE TO BE STABILIZED PRIOR TO INSTALLATION OF SAND.
3. UNDERDRAIN PIPES SHOULD BE MIN. 6" PERFORATED SCHEDULE 40 PVC (PER AASHTO M278) OR DOUBLE WALL HDPE (PER AASHTO M252). PERFORATIONS SHOULD BE ⅜" SPACED 3" ON CENTER ALONG 4 LONGITUDINAL ROWS SPACED 90° APART.

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# SURFACE SAND FILTER SECTION

| STD. NO. | REV. |
|---|---|
| 21.25 | 24 |

| CLDS # | NAME | REFERENCE FOR MAINT. NOTES |
|---|---|---|
| 30.00 | SPECIAL EROSION CONTROL REQUIRMENTS & NOTES | N/A |
| 30.01 | TEMPORARY SEDIMENT TRAP | 6.60.5 |
| 30.02A | SKIMMER SEDIMENT BASIN | 6.64.9 |
| 30.02B | SKIMMER | 6.64.9 |
| 30.03A | SEDIMENT BASIN | 6.61.8 |
| 30.03B | GENERAL NOTES–SEDIMENT BASINS | N/A |
| 30.04 | FLEXIBLE PIPE SLOPE DRAIN | 6.32.3 |
| 30.05 | TEMPORARY SILT DITCH | 6.20.3 / 6.30.4 |
| 30.06A | TEMPORAY SILT FENCE | 6.62.7 |
| 30.06B | HIGH HAZARD TEMPORARY SILT FENCE | SEE CLDS 30.06B DETAIL |
| 30.06C | SILT FENCE OUTLET | SEE CLDS 30.06C DETAIL |
| 30.06D | SUPER SILT FENCE | SEE CLDS 30.06D DETAIL |
| 30.07 | BLOCK AND GRAVEL STONE INLET PROTECTION | 6.52.2 |
| 30.08 | STONE INLET PROTECTION | 6.55.3 |
| 30.09 | HARDWARE CLOTH AND GRAVEL INLET PROTECTION | 6.51.2 |
| 30.10A | TEMPORARY ROCK CHECK DAM | 6.83.3 |
| 30.10B | TEMPORARY ROCK CHECK DAM W MATTING & PAM | 6.83.3 / 6.86.5 |
| 30.10C | TEMPORARY WATTLE CHECK DAM W MATTING | N/A |
| 30.10D | TEMPORARY WATTLE CHECK DAM W MATTING & PAM | N/A |
| 30.11A | STABILIZED CONSTRUCTION ENTRANCE | 6.06.2 |
| 30.11B | CONSTRUCTION ENTRANCE TIRE WASH | 6.06.2 |
| 30.11C | CONSTRUCTION ENTRANCE SINGLE FAMILY LOT | 6.06.2 |
| 30.12 | GRAVEL AND RIP RAP FILTER BERM BASIN | 6.63.5 |
| 30.13 | EROSION CONTROL DEWATERING | N/A |
| 30.14 | TEMPORARY STREAM CROSSING | 6.70.6 |
| 30.15 | CATCH BASIN INLET PROTECTION | SEE CLDS 30.15 DETAIL |
| 30.16 | SLOPE STABILITY | 6.02.3 |
| 30.17 | TEMPORARY SEEDING SCHEDULE | 6.10.3 |
| 30.18 | TEMPORARY ASPHALT DIVERSION BERM | SEE CLDS 30.18 DETAIL |
| 30.19 | BAFFLE INSTALLATION | 6.65.6 |
| 30.20 | EMBANKMENT MATTING DETAIL | 6.17.12 |
| 30.21 | BRICK STORM STRUCTURE W TEMPORARY PIPE | N/A |
| 30.22A | BYPASS PUMPING | N/A |
| 30.22B | SUSPENDED BYPASS PIPE | N/A |
| 30.22C | PIPED DIVERSION | N/A |
| 30.23 | TURBIDITY CURTAIN | SEE CLDS 30.23 DETAIL |

THE NCDEQ MAINTENANCE REFERENCES INDICATED ARE FROM THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL (NCESCPDM, LATEST EDITION) PREPARED BY NC DEPT. OF ENVIRONMENTAL QUALITY (NCDEQ); ALSO REFERENCE NCDOT ROADWAY STANDARD DRAWINGS, LATEST EDITION.

CHARLOTTE.

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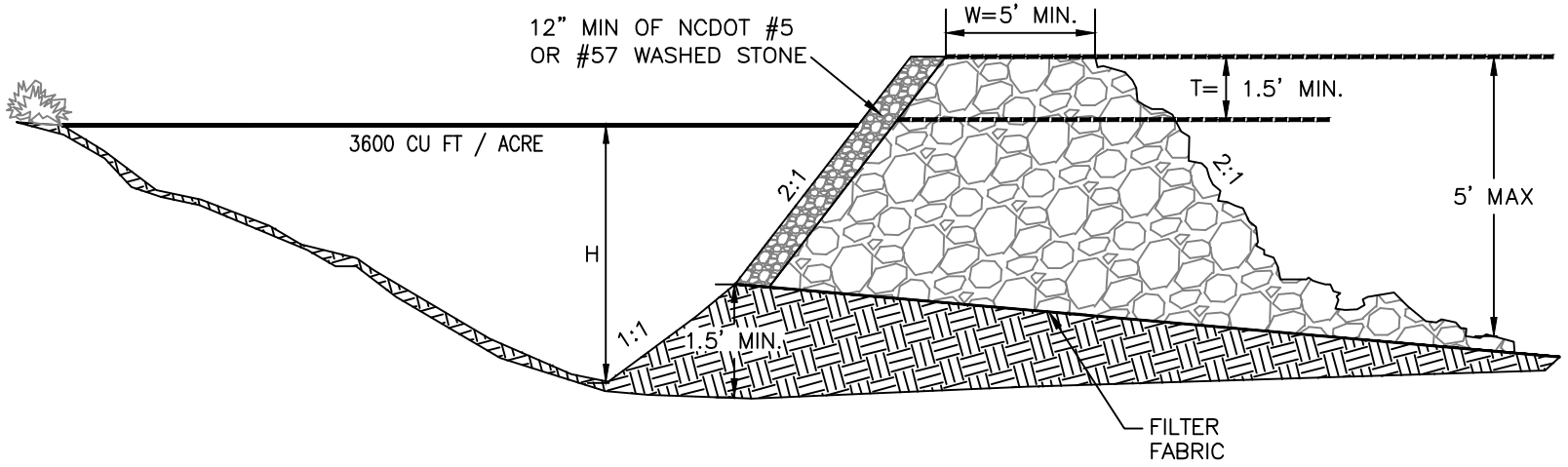
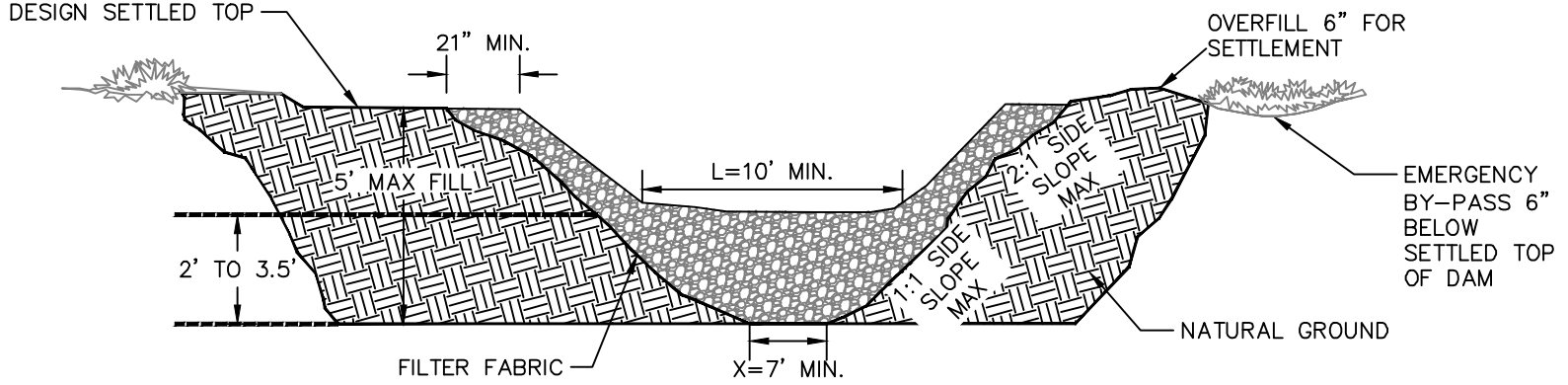
# EROSION CONTROL STANDARDS LIST & MAINTENANCE REFERENCES

| STD. NO. | REV. |
|---|---|
| 30.00 | 24 |

| TEMPORARY SEDIMENT TRAP DESIGN CRITERIA | |
|---|---|
| DRAINAGE AREA (ACRES) | < 1 AC. |
| MIN. LENGTH TO WIDTH RATIO | 2:1 |
| MIN. VOLUME REQUIRED | 3600 (CU. FT. PER AC. DISTURBED) |
| SURFACE AREA REQUIRED | 435 (SQ. FT. PER CFS Q10) |




NOTES:

1. REFER TO NCESCPDM SECTION #6.60 FOR ADDITIONAL DESIGN SPECIFICATIONS REGARDING TEMPORARY SEDIMENT TRAPS.
2. REFER TO CLDS STANDARD #30.19 FOR BAFFLE SPACING

NOT TO SCALE

DATA BLOCK

| TRAP NO. | DRAINAGE AREA (ACRES) | DENUDED AREA (ACRES) | $Q_{10}$ | TRAP VOLUME | | TRAP SURFACE AREA | | CLEANOUT DEPTH (FT.) H/2 | H (FEET) | L (FEET) | T (FEET) | W (FEET) | X (FEET) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | REQUIRED (CUBIC FT.) | PROVIDED (CUBIC FT.) | REQUIRED (SQ FT.) | PROVIDED (SQ FT.) | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

CHARLOTTE

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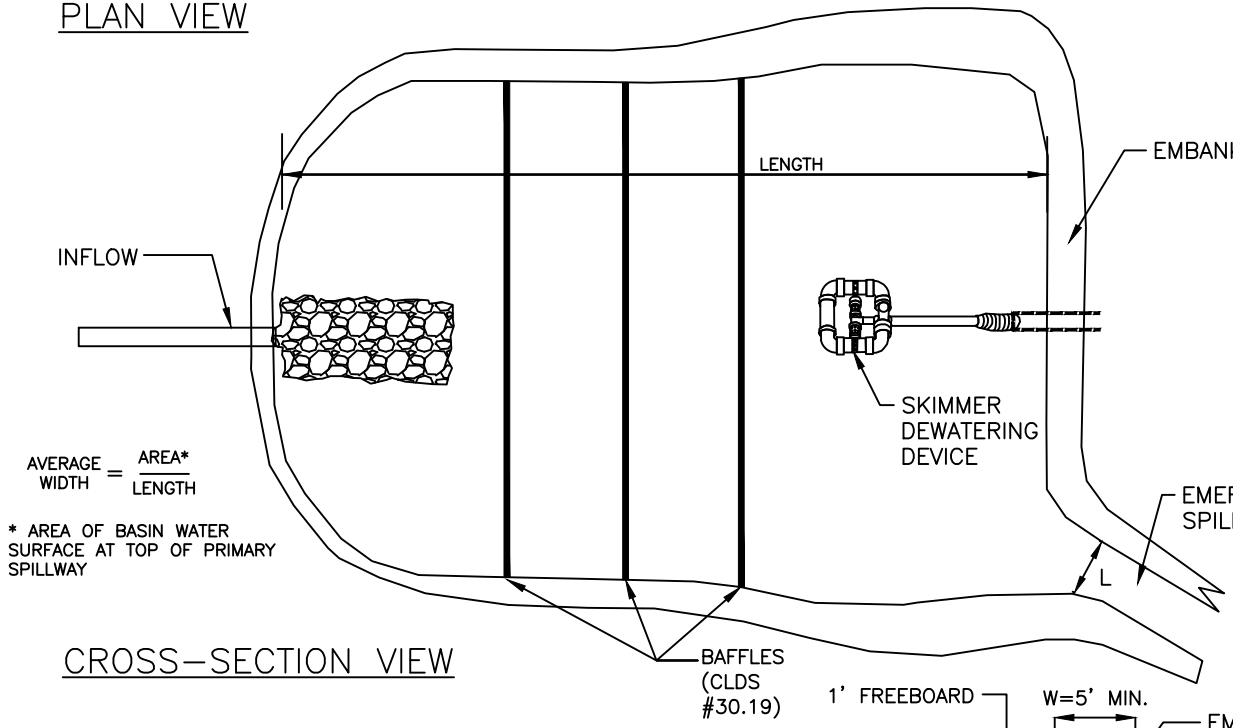
# TEMPORARY SEDIMENT TRAP

| STD. NO. | REV. |
|---|---|
| 30.01 | 15 |

| SKIMMER SEDIMENT BASIN DESIGN CRITERIA | |
|---|---|
| DRAINAGE AREA (ACRES) | < 10 AC. |
| MIN. LENGTH TO WIDTH RATIO | 2:1 |
| MAX. LENGTH TO WIDTH RATIO | 6:1 |
| MIN. VOLUME REQUIRED | 1800 (CU. FT. PER AC. DISTURBED) |
| SURFACE AREA REQUIRED | 325 (SQ. FT. PER CFS Q10) |

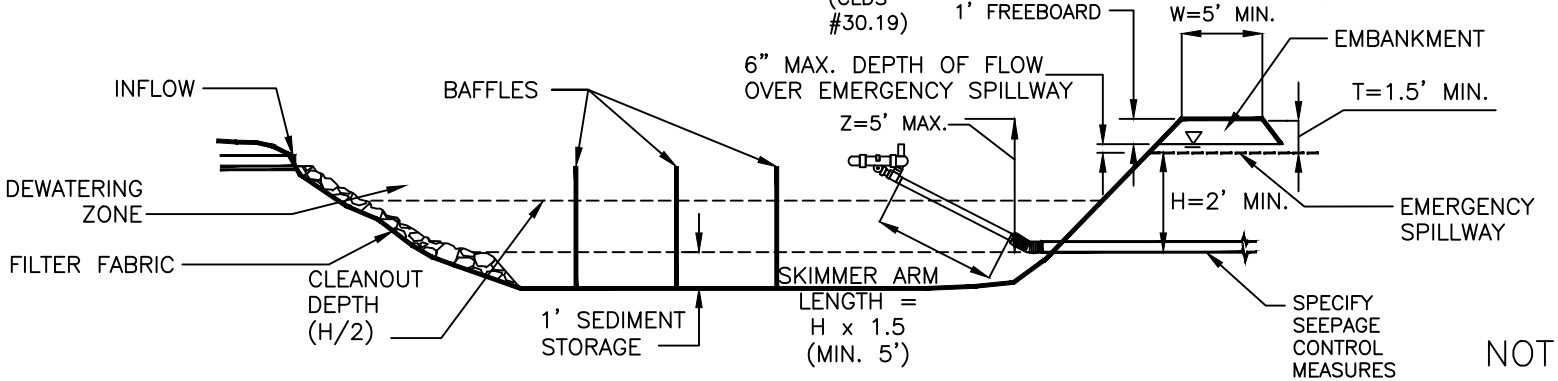
## PLAN VIEW




$$\text{AVERAGE WIDTH} = \frac{\text{AREA*}}{\text{LENGTH}}$$

* AREA OF BASIN WATER SURFACE AT TOP OF PRIMARY SPILLWAY

## CROSS–SECTION VIEW




NOTES:

1. REFER TO NCESCPDM SECTION #6.64 FOR ADDITIONAL DESIGN SPECIFICATIONS REGARDING SKIMMER SEDIMENT BASINS.
2. REFER TO STD. #30.19 FOR BAFFLE SPACING AND INSTALLATION
3. TURBIDITY CURTAIN (CLDS #30.23) MAY BE USED IN LIEU OF POROUS BAFFLES (CLDS #30.19).
4. SKIMMER INVERT ELEVATION = BASIN BOTTOM + 1' MIN.
5. H = SPILLWAY ELEVATION – SKIMMER INVERT ELEVATION

NOT TO SCALE

DATA BLOCK

| BASIN | DRAINAGE AREA (ACRES) | DENUDED AREA (ACRES) | $Q_{10}$ | BASIN VOLUME | | BASIN SURFACE AREA | | CLEANOUT DEPTH (FT.) H/2 | H (FEET) | Z (FEET) | L (FEET) | T (FEET) | W (FEET) | SKIMMER PIPE DIAMETER | SKIMMER ORIFICE DIAMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | REQUIRED (CUBIC FT.) | PROVIDED (CUBIC FT.) | REQUIRED (SQ FT.) | PROVIDED (SQ FT.) | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

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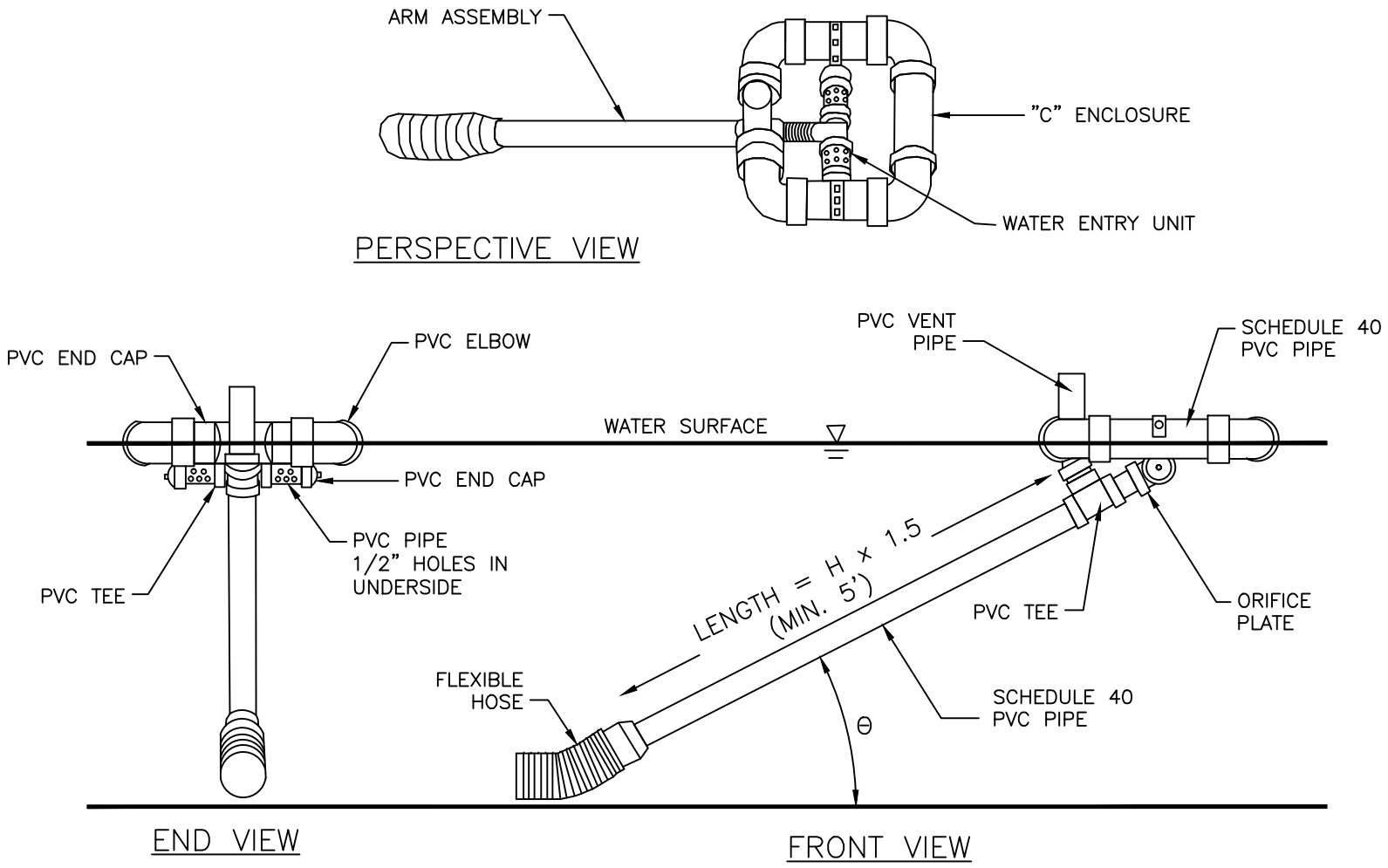
# SKIMMER SEDIMENT BASIN

| STD. NO. | REV. |
|---|---|
| 30.02A | 22 |




SCHEMATIC OF SKIMMER TAKEN FROM PENNSYLVANIA EROSION AND SEDIMENT POLLUTION CONTROL MANUAL, MARCH 2000.

"H" REFERS TO THE HEIGHT FROM INVERT OF FLEXIBLE HOSE ON SKIMMER TO THE INVERT OF THE PRIMARY SPILLWAY.

NOT TO SCALE

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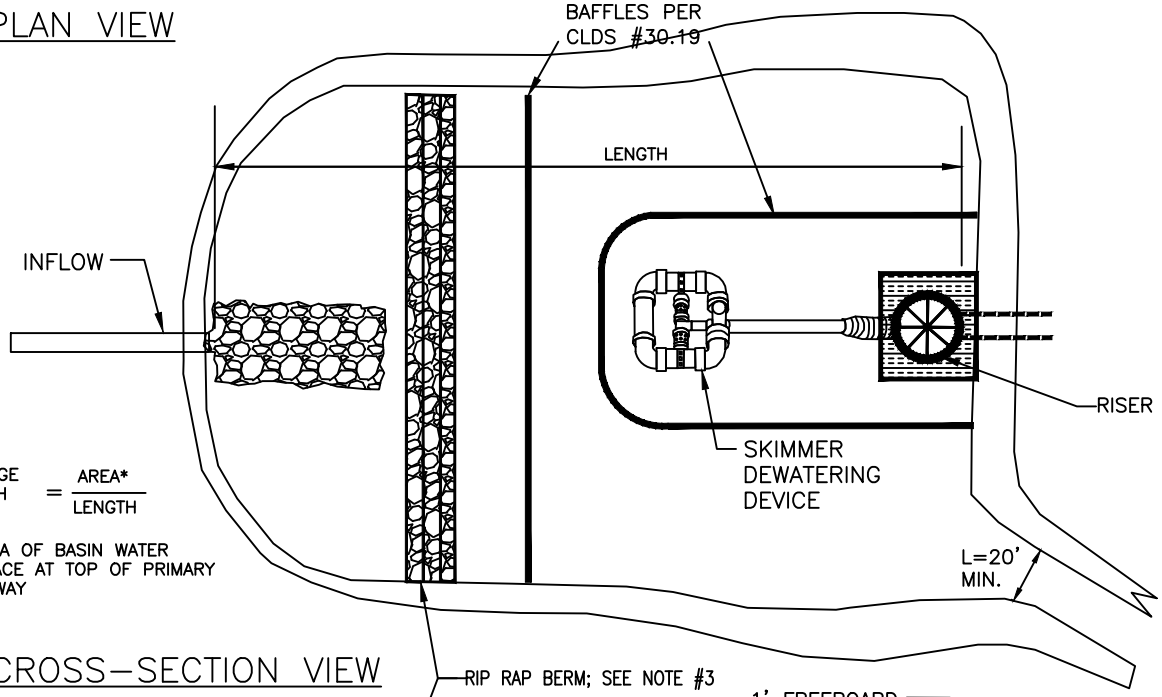
# SKIMMER

| STD. NO. | REV. |
|---|---|
| 30.02B | 12 |

| SEDIMENT BASIN DESIGN CRITERIA | |
|---|---|
| DRAINAGE AREA (ACRES) | >10 AC. <100 AC. |
| MIN. LENGTH TO WIDTH RATIO | 2:1 |
| MAX. LENGTH TO WIDTH RATIO | 6:1 |
| MIN. VOLUME REQUIRED | 1800 (CU. FT. PER AC. DISTURBED) |
| SURFACE AREA REQUIRED | 435 (SQ. FT. PER CFS Q10) |

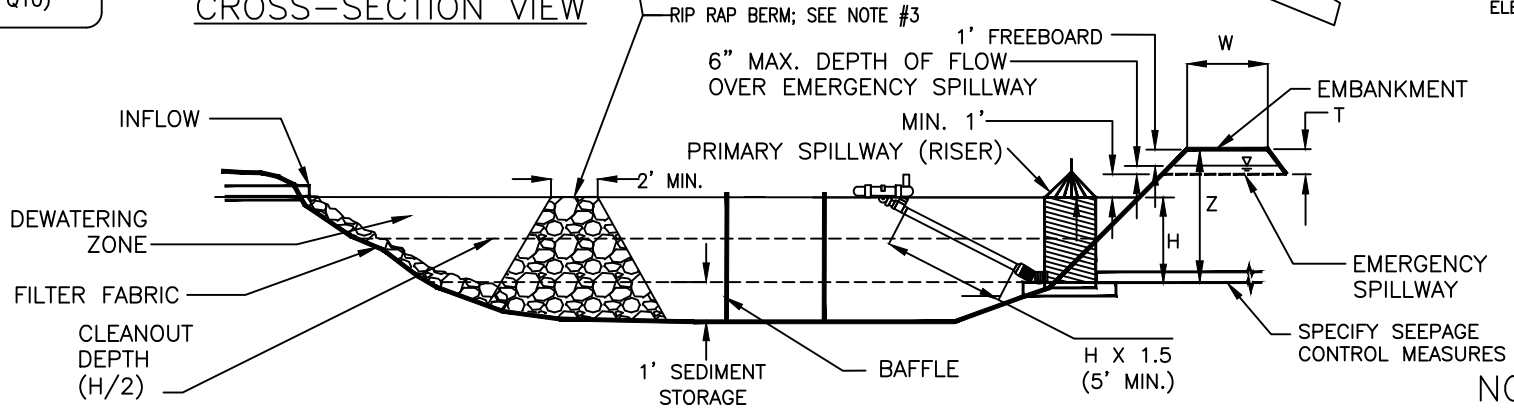
## PLAN VIEW




AVERAGE WIDTH = AREA* / LENGTH

* AREA OF BASIN WATER SURFACE AT TOP OF PRIMARY SPILLWAY

## CROSS-SECTION VIEW




NOTES:

1. REFER TO NCESCPDM SECTION #6.61 FOR ADDITIONAL DESIGN SPECIFICATIONS REGARDING SEDIMENT BASINS.
2. REFER TO STD. #30.19 FOR BAFFLE SPACING AND INSTALLATION.
3. FIRST BAFFLE IS TO BE CONSTRUCTED OF RIP-RAP. WITH A MIN. HEIGHT OF 3' AND MIN. TOPWIDTH OF 2'.
4. TURBIDITY CURTAIN (CLDS #30.23) MAY BE USED IN LIEU OF POROUS BAFFLES (CLDS #30.19).
5. FLASHBOARD RISER NOT PERMITTED FOR USE IN THE CITY OF CHARLOTTE
6. SKIMMER INVERT ELEVATION = BASIN BOTTOM + 1' MIN.
7. H = SPILLWAY ELEVATION – SKIMMER INVERT ELEVATION

NOT TO SCALE

## DATA BLOCK

| BASIN | DRAINAGE AREA (ACRES) | DENUDED AREA (ACRES) | $Q_{10}$ | BASIN VOLUME | | BASIN SURFACE AREA | | CLEANOUT DEPTH (FT.) H/2 | H (FEET) | Z (FEET) | L (FEET) | T (FEET) | W (FEET) | SKIMMER PIPE DIAMETER | SKIMMER ORIFICE DIAMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | REQUIRED (CUBIC FT.) | PROVIDED (CUBIC FT.) | REQUIRED (SQ FT.) | PROVIDED (SQ FT.) | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

CHARLOTTE.

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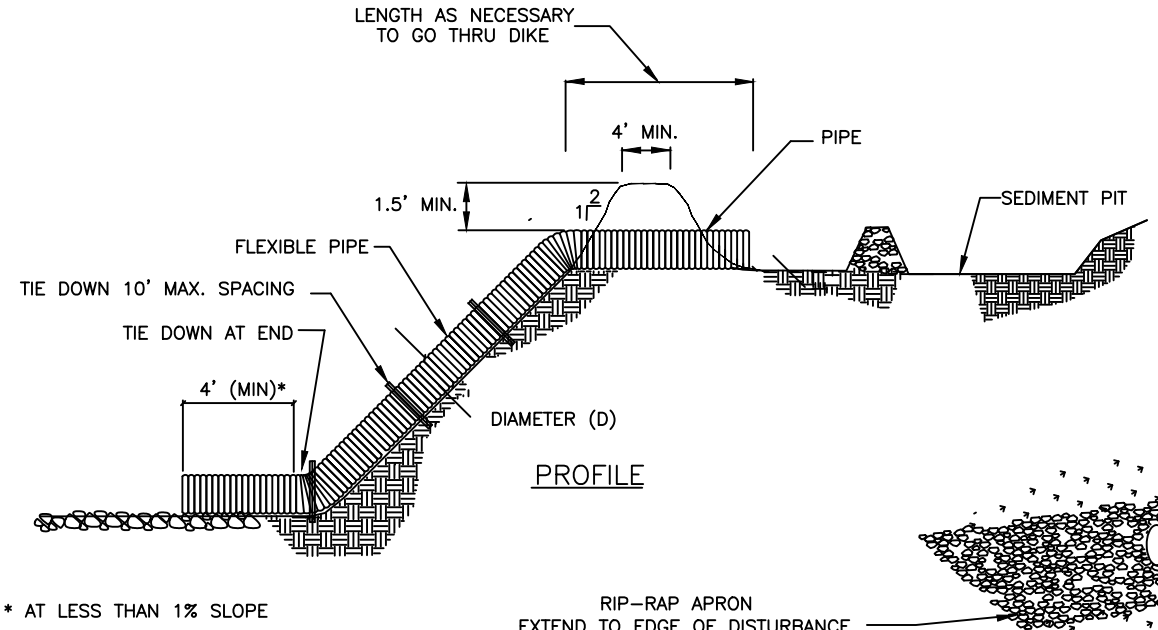
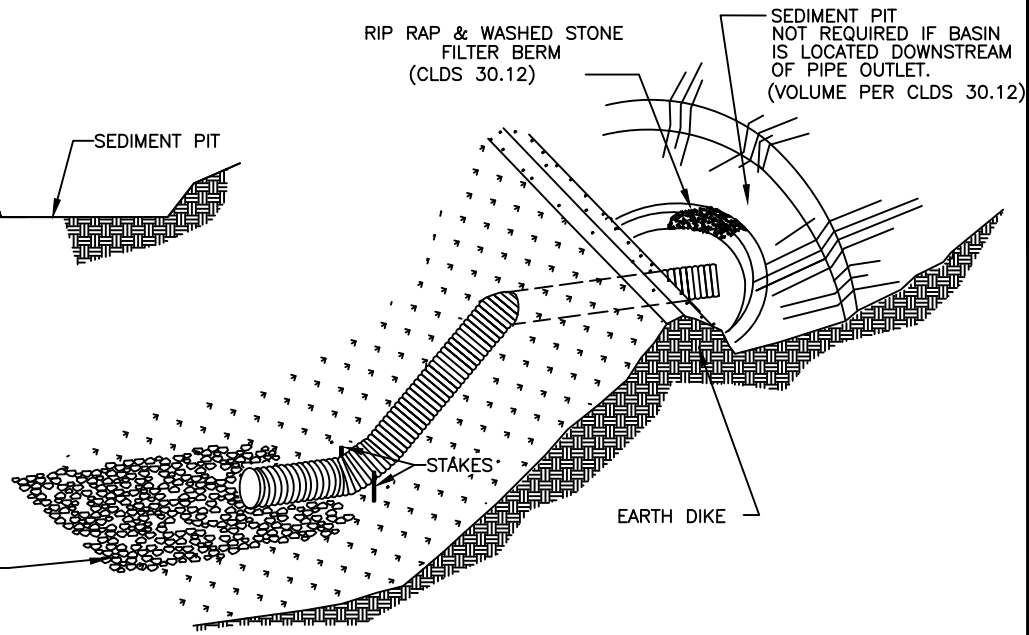
# SEDIMENT BASIN

| STD. NO. | REV. |
|---|---|
| 30.03A | 22 |

## GENERAL NOTES:

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ANY VEGETATION AND ROOT MATERIAL. THE BASIN AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVERSIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE BEING CONSTRUCTED. SPILLWAYS SHOULD NOT BE CONSTRUCTED THROUGH FILL SECTIONS. ALL SPILLWAYS SHOULD BE LINED AND/OR RIPRAPPED.
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO A DEPTH SHOWN ON STANDARD. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA IN SUCH A MANNER THAT IT WILL NOT ERODE.
4. THE BASIN SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NECESSARY.
5. ALL SEDIMENT BASIN SLOPES SHALL BE 3:1 OR FLATTER, UNLESS CERTIFIED BY REGISTERED GEOTECHICAL ENGINEER.
6. SEDIMENT BASIN EMBANKMENTS SHOULD BE PROVIDED WITH EROSION CONTROL AND STABILIZATION.
7. STORAGE AREA MAY BE CONSTRUCTED IN ANY SHAPE PROVIDED THE MINIMUM STORAGE VOLUME REQUIREMENT IS MET. THE BASIN SHOULD ALSO BE ORIENTED SUCH THAT THE FILTER AND THE MAIN FLOW OF WATER AND SEDIMENT ARE ON OPPOSITE ENDS ON THE LONGER BASIN DIMENSIONS.
8. THE LENGTH OF THE STONE OUTLET (SPILLWAY) IS TO BE BASED ON A 10 YEAR STORM.
9. WHENEVER TOPOGRAPHY ALLOWS, THE BASIN LENGTH SHOULD BE TWICE (2X) THE BASIN WIDTH, TO ALLOW FOR SETTLING. BAFFLES SHALL BE INSTALLED IN ALL BASINS.
10. CLEANOUT STAKES SHALL BE PLACED IN ALL SEDIMENT BASINS AT THE LOW POINT IN THE BASIN. THE STAKES SHALL BE MARKED SHOWING THE HALF FULL, CLEANOUT POINT, OF THE BASIN.
11. FOR DESIGN OF SEDIMENT BASINS, REFER TO THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
12. FOR SLOPES GREATER THAN 10' IN LENGTH AND PROTECTED BY SILT FENCE AT THE TOE OF THE SLOPE, SLOPE TERRACING WILL BE REQUIRED.
13. THE BERM ON SEDIMENT BASINS SHALL BE SEEDED ONCE FINAL GRADE HAS BEEN REACHED. THE SILT FENCE MAY BE REMOVED IF PERMISSION HAS BEEN GRANTED BY THE CITY LAND DEVELOPMENT INSPECTOR AFTER THE GRASS HAS GERMINATED AND STABLE GROUND HAS BEEN ESTABLISHED.




## CONSTRUCTION SPECIFICATIONS:

1. THE TOP OF THE EARTH DIKE OVER THE INLET PIPE AND THOSE DIKES CARRYING WATER TO THE PIPE SHALL BE AT LEAST 1.5 FEET HIGHER AT ALL POINTS THAN THE TOP OF THE INLET PIPE.
2. THE PIPE SHALL BE FLEXIBLE WITH WATER TIGHT CONNECTING BANDS. FLEXIBLE PIPE SHOULD BE STAKED ON EITHER SIDE.
3. A RIP RAP APRON SHALL BE PROVIDED AT THE OUTLET, IF EMPTYING INTO A DISTURBED AREA.
4. THE SOIL AROUND AND UNDER THE INLET PIPE AND ENTRANCE SECTION SHALL BE HAND TAMPED IN 4" LIFTS TO THE TOP OF THE EARTH DIKE.
5. FOLLOW-UP INSPECTION AND ANY NEEDED MAINTENANCE SHALL BE PERFORMED AFTER EACH STORM BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT.
6. OUTLET PIPE SHOULD BE TAKEN OVER OR THROUGH ANY SILT FENCE, TAKING CARE NOT TO VOID THE EFFECTIVENESS OF THE SILT FENCE.

UNLESS THEY ARE INDIVIDUALLY DESIGNED, SIZE THE DRAINS AS FOLLOWS:

| MAXIMUM DRAINAGE AREA PER PIPE (ACRES) | PIPE DIAMETER (INCHES) |
|---|---|
| 0.5 | 12 |
| 0.75 | 15 |
| 1.00 | 18 |
| >1.00 | AS DESIGNED |

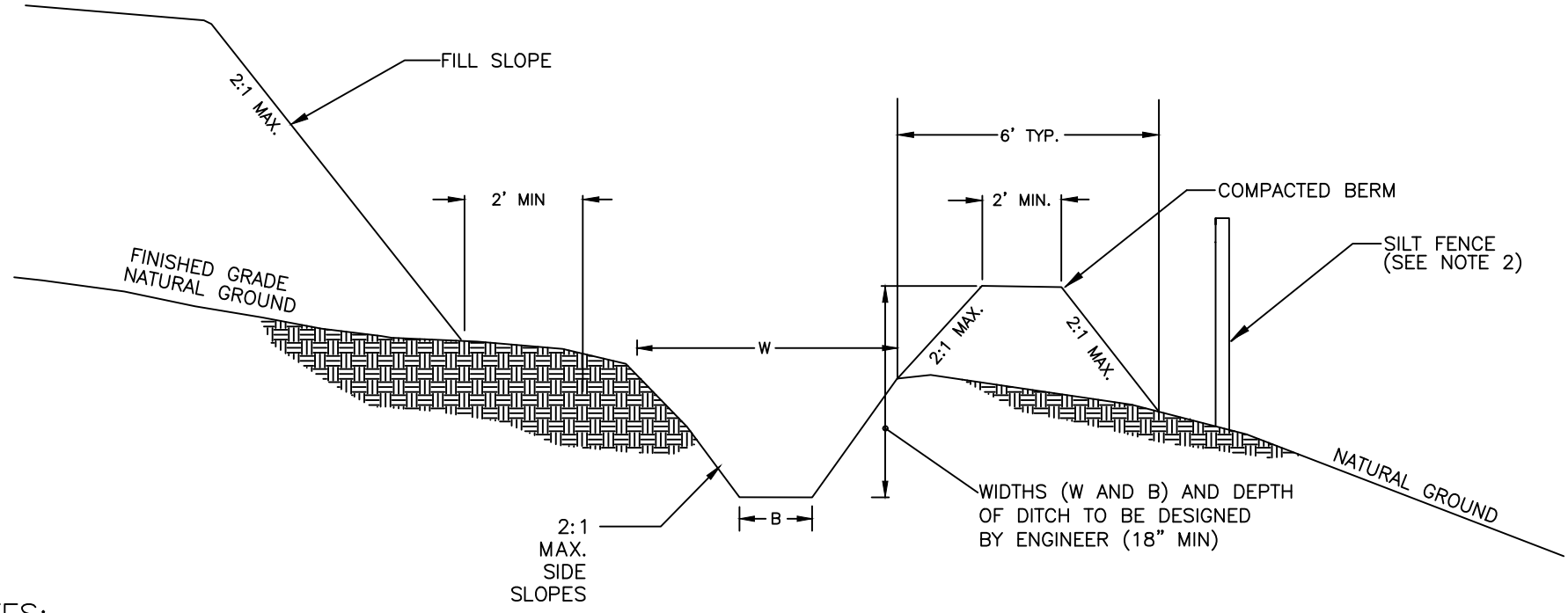
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# FLEXIBLE PIPE SLOPE DRAIN

| STD. NO. | REV. |
|---|---|
| 30.04 | 20 |




## NOTES:

1. DITCH SHOULD HAVE LONGITUDINAL SLOPE OF 1%.
2. SILT FENCE MAY BE REQUIRED BEHIND BERM
3. DITCHES SHOULD BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION REQUIREMENTS OF THE NCG010000 PERMIT.
4. WHERE DESIGN VELOCITIES EXCEED 2 FT/SEC, A CHANNEL LINER IS NECESSARY TO PREVENT DITCH EROSION.

| DITCH NO. | AREA(AC.) | DEPTH* | W(FT) | B(FT) | $VELOCITY_{10}$ | ROLLED EROSION CONTROL PRODUCT / LINING TYPE |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

* = DEPTH INCLUDES 6" FREEBOARD
W = WIDTH AT TOP OF DITCH
B = WIDTH AT BOTTOM OF DITCH

NOT TO SCALE

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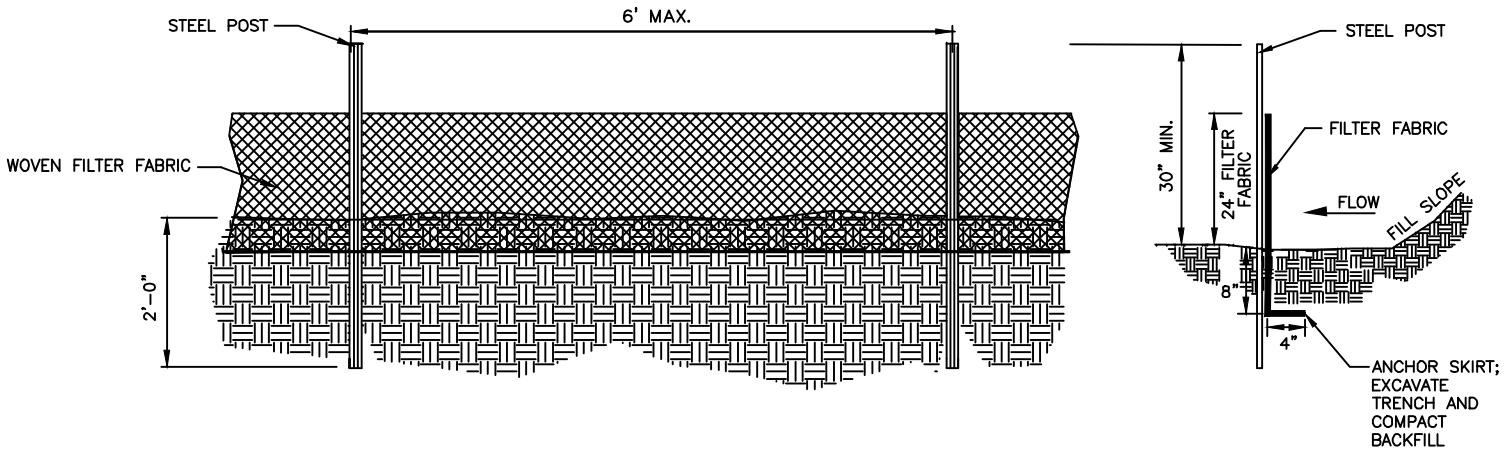
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY SILT DITCH

| STD. NO. | REV. |
|---|---|
| 30.05 | 22 |




GENERAL NOTES:

1. WOVEN FILTER FABRIC BE USED WHERE SILT FENCE IS TO REMAIN FOR A PERIOD OF MORE THAN 30 DAYS.
2. STEEL POSTS SHALL BE 5'–0" IN HEIGHT AND BE OF THE SELF–FASTENER ANGLE STEEL TYPE.
3. TURN SILT FENCE UP SLOPE AT ENDS.
4. ORANGE SAFETY FENCE IS REQUIRED AT BACK OF SILT FENCE WHEN GRADING IS ADJACENT TO SWIM BUFFERS, STREAMS OR WETLANDS (REFER TO SWIM BUFFER GUIDELINES). THE COLOR ORANGE IS RESERVED FOR VISUAL IDENTIFICATION OF ENVIRONMENTALLY SENSITIVE AREAS.
5. DRAINAGE AREA CAN NOT BE GREATER THAN 1/4 ACRE PER 100 FT OF FENCE.
6. SLOPE LENGTHS CAN NOT EXCEED CRITERIA SHOWN IN TABLE 6.62A NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
7. DO NOT INSTALL SEDIMENT FENCE ACROSS STREAMS, DITCHES, WATERWAYS OR OTHER AREAS OF CONCENTRATED FLOW.

MAINTENANCE NOTES:

1. FILTER BARRIERS SHALL BE INSPECTED BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS NEEDED SHALL BE MADE IMMEDIATELY.
2. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN DEPOSITS REACH APPROX. HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS REMOVED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

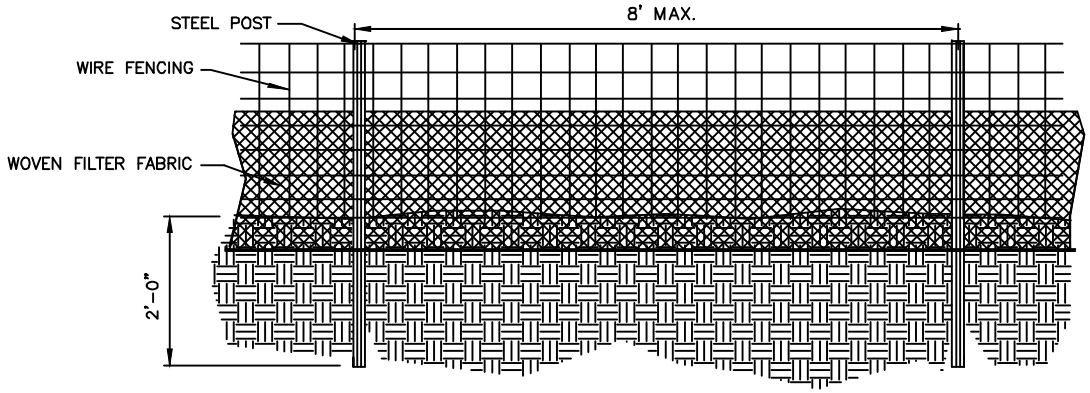
NOT TO SCALE

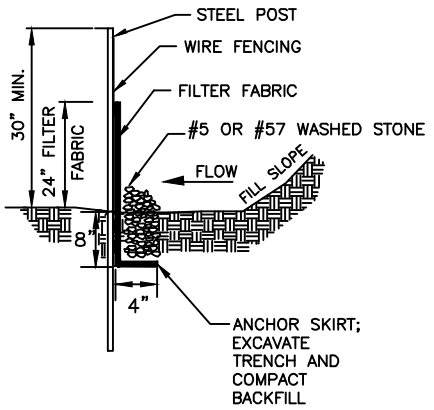
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY SILT FENCE

| STD. NO. | REV. |
|---|---|
| 30.06A | 15 |




GENERAL NOTES:

1. WIRE FENCING SHALL BE A MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
2. WOVEN FILTER FABRIC BE USED WHERE SILT FENCE IS TO REMAIN FOR A PERIOD OF MORE THAN 30 DAYS.
3. STEEL POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
4. WIRE FENCING SHALL BE AT LEAST #10 GAGE WITH A MINIMUM OF 6 LINE WIRES WITH 6" STAY SPACING.
5. TURN SILT FENCE UP SLOPE AT ENDS.
6. WIRE AND WASHED STONE IS REQUIRED TO BE SHOWN ON PLANS AT THE TOE OF SLOPES GREATER THAN 10 FEET VERTICAL (2:1 SLOPE)
7. ORANGE SAFETY FENCE IS REQUIRED AT BACK OF SILT FENCE WHEN GRADING IS ADJACENT TO SWIM BUFFERS, STREAMS OR WETLANDS (REFER TO SWIM BUFFER GUIDELINES). THE COLOR ORANGE IS RESERVED FOR VISUAL IDENTIFICATION OF ENVIRONMENTALLY SENSITIVE AREAS.
8. DRAINAGE AREA CAN NOT BE GREATER THAN 1/4 ACRE PER 100 FT OF FENCE.
9. SLOPE LENGTHS CAN NOT EXCEED CRITERIA SHOWN IN TABLE 6.62A NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
10. DO NOT INSTALL SEDIMENT FENCE ACROSS STREAMS, DITCHES, WATERWAYS OR OTHER AREAS OF CONCENTRATED FLOW.

MAINTENANCE NOTES:

1. FILTER BARRIERS SHALL BE INSPECTED BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS NEEDED SHALL BE MADE IMMEDIATELY.
2. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS REMOVED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

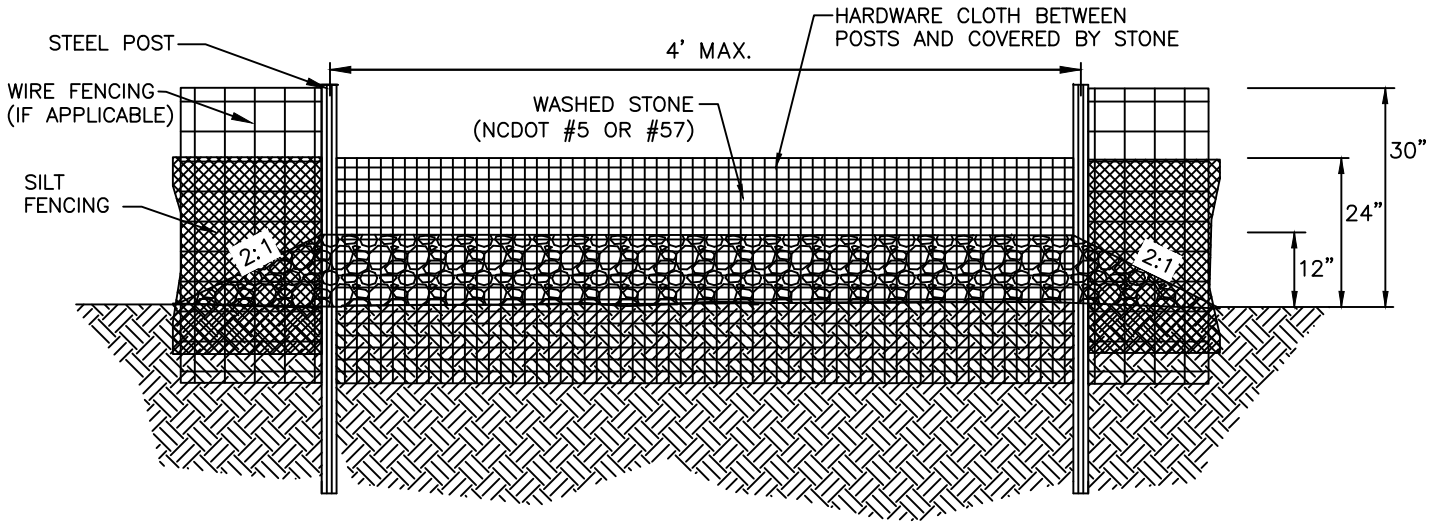
NOT TO SCALE

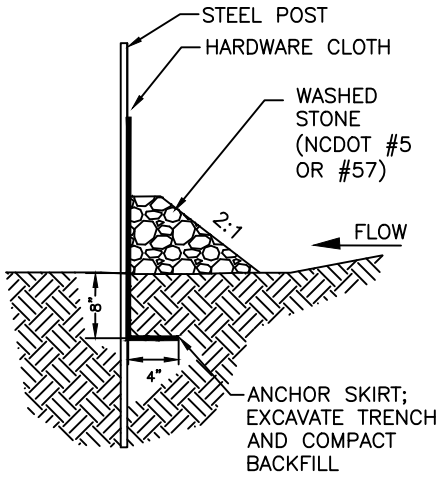
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# HIGH HAZARD TEMPORARY SILT FENCE

| STD. NO. | REV. |
|---|---|
| 30.06B | 15 |




## GENERAL NOTES:

1. SEDIMENT FILTER OUTLET HARDWARE CLOTH SHALL BE 24" HIGH AND STONE SHALL BE A MINIMUM OF 12" HIGH.
2. HARDWARE CLOTH SHALL BE ANCHORED TO THE STEEL POSTS SECURELY USING APPROPRIATE ANCHORS. HARDWARE CLOTH SHALL BE KEYED IN A MINIMUM OF 12 INCHES IN LENGTH AND BACKFILLED PROPERLY AS SHOWN IN ABOVE DETAIL. HARDWARE CLOTH TO BE SAME AS STD. #30.09 (19 GAUGE, 1/4" SPACING).
3. POSTS SHALL BE NO MORE THAN 4 FEET APART.
4. SITE OUTLETS AT LOW AREAS IN CONJUNCTION WITH AND ALONG LONG RUNS OF SILT FENCE AT INTERVALS NO CLOSER THAN 100 FEET. DRAINAGE AREA TO OUTLETS SHALL NOT EXCEED 1/4 ACRE.
5. EQUIVALENT ALTERNATIVES MAY BE USED WITH PRIOR CITY APPROVAL.

## MAINTENANCE NOTES:

1. FILTER OUTLETS SHALL BE INSPECTED BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS NEEDED SHALL BE MADE IMMEDIATELY.
2. THE STONE SHALL BE REPLACED PROMPTLY AFTER ANY EVENT THAT HAS CLOGGED OR REMOVED IT.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OUTLET IS REMOVED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

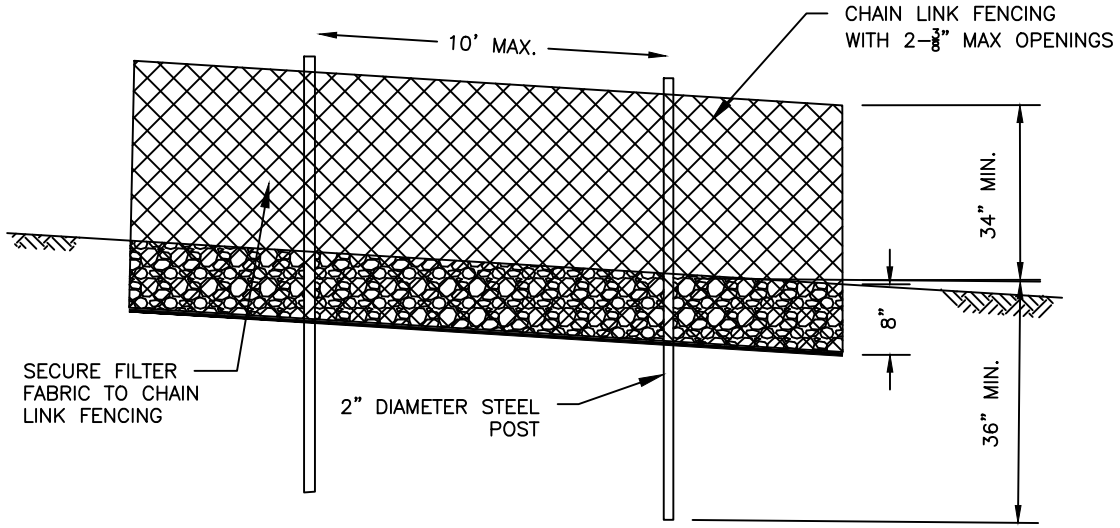
NOT TO SCALE

CHARLOTTE.

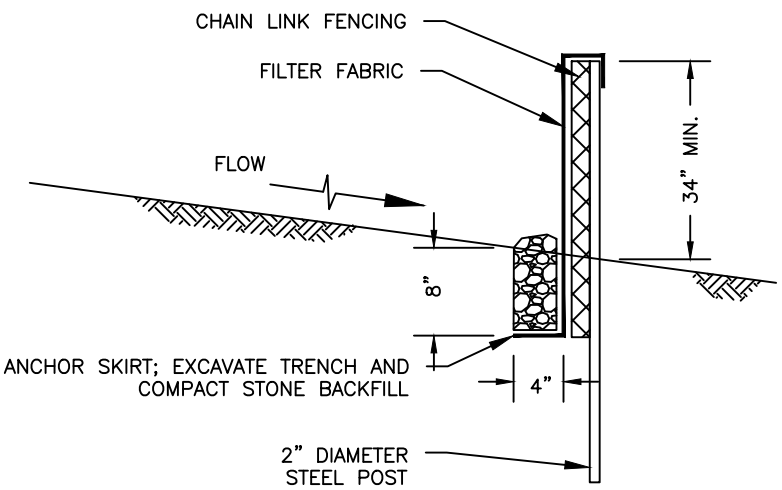
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SILT FENCE OUTLET

| STD. NO. | REV. |
|---|---|
| 30.06C | 20 |




ELEVATION




CROSS SECTION

## GENERAL NOTES:

1. SUPER SILT FENCE MAY BE USED IN CRITICAL AREAS IN LIEU OF DOUBLE ROW HIGH HAZARD SILT FENCE.
2. INSTALL MINIMUM 2 INCH DIAMETER GALVANIZED STEEL POSTS, SIX FOOT LENGTH, SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36" INTO THE GROUND.
3. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2 3/8 INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HOG RINGS.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BYPASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. WASHED STONE (#5 OR #57) STALL BE USED IN THE SILT FENCE TRENCH AND COMPACTED.
7. ORANGE SAFETY FENCE IS REQUIRED WHEN GRADING IS ADJACENT TO SWIM BUFFERS, STREAMS OR WETLANDS (REFER TO SWIM BUFFER GUIDELINES). THE COLOR ORANGE IS RESERVED FOR VISUAL IDENTIFICATION OF ENVIRONMENTALLY SENSITIVE AREAS.
8. DRAINAGE AREA CANNOT BE GREATER THAN ¼ ACRE PER 100 FT OF FENCE.
9. SLOPE LENGTHS CANNOT EXCEED CRITERIA SHOWN IN TABLE 6.62A NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
10. DO NOT INSTALL SUPER SILT FENCE ACROSS STREAMS, DITCHES, WATERWAYS OR OTHER AREAS OF CONCENTRATED FLOW.

## MAINTENANCE NOTES:

1. FILTER BARRIERS SHALL BE INSPECTED BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS NEEDED SHALL BE MADE IMMEDIATELY.
2. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS REMOVED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

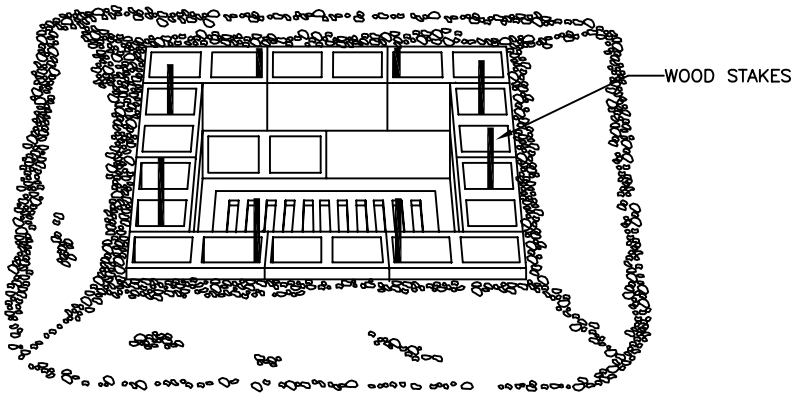
NOT TO SCALE

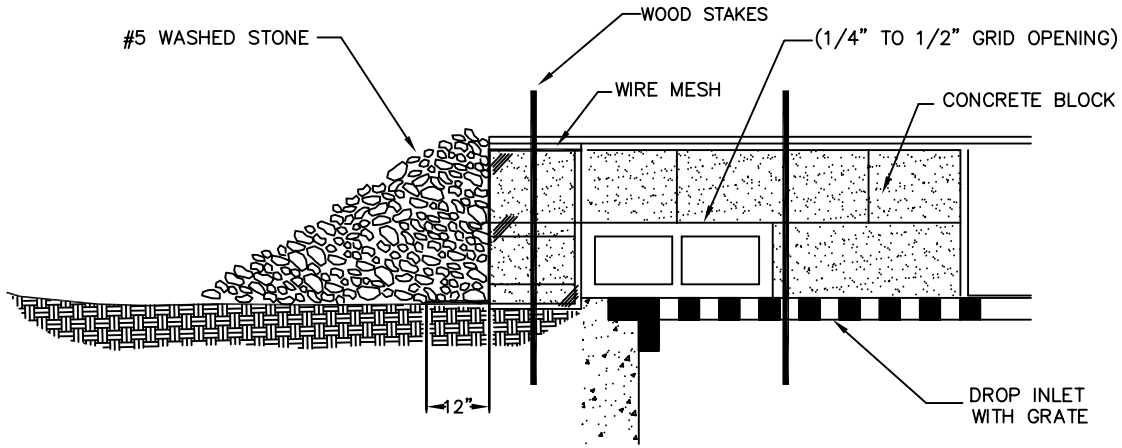
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SUPER SILT FENCE

| STD. NO. | REV. |
|---|---|
| 30.06D | 18 |




SPECIFIC APPLICATION:

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

NOT TO SCALE

CHARLOTTE.

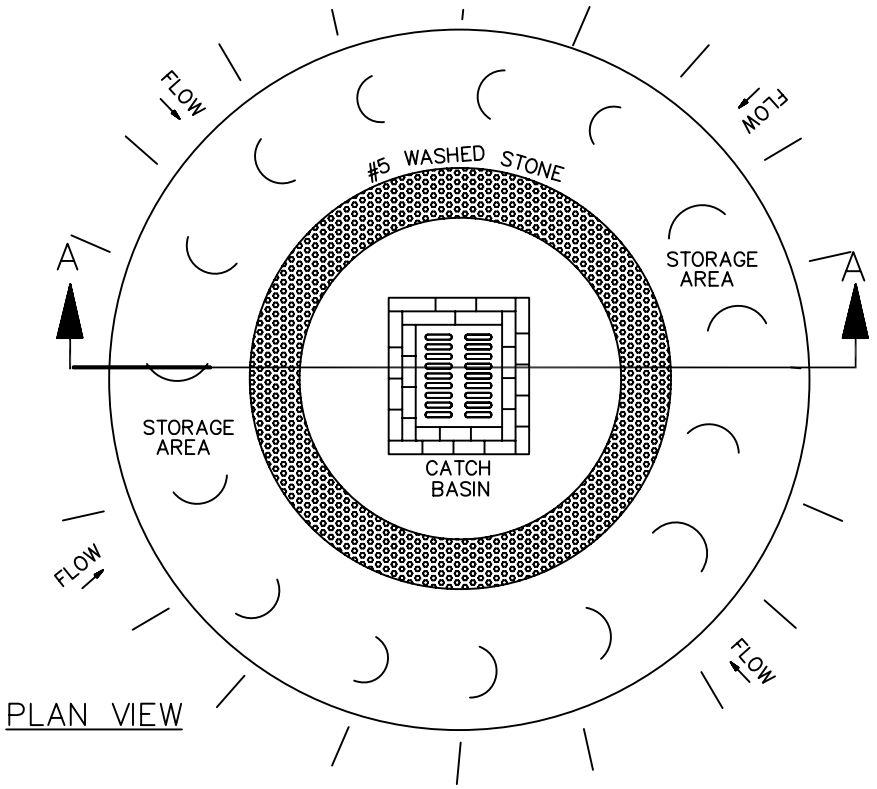
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BLOCK AND GRAVEL STONE INLET PROTECTION

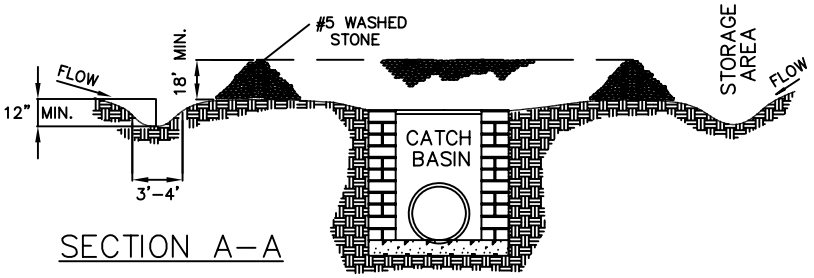
| STD. NO. | REV. |
|---|---|
| 30.07 | |

## GENERAL NOTES:

1. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP.
2. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
3. THE STRUCTURE SHALL BE INSPECTED BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT AFTER EACH STORM EVENT AND REPAIRS MADE AS NECESSARY.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE BASIN HAS BEEN PROPERLY STABILIZED.
6. ON LARGER DRAINAGE AREAS RIP RAP MAY BE REQUIRED UNDER THE WASHED STONE.




PLAN VIEW




SECTION A–A

NOT TO SCALE

CHARLOTTE.

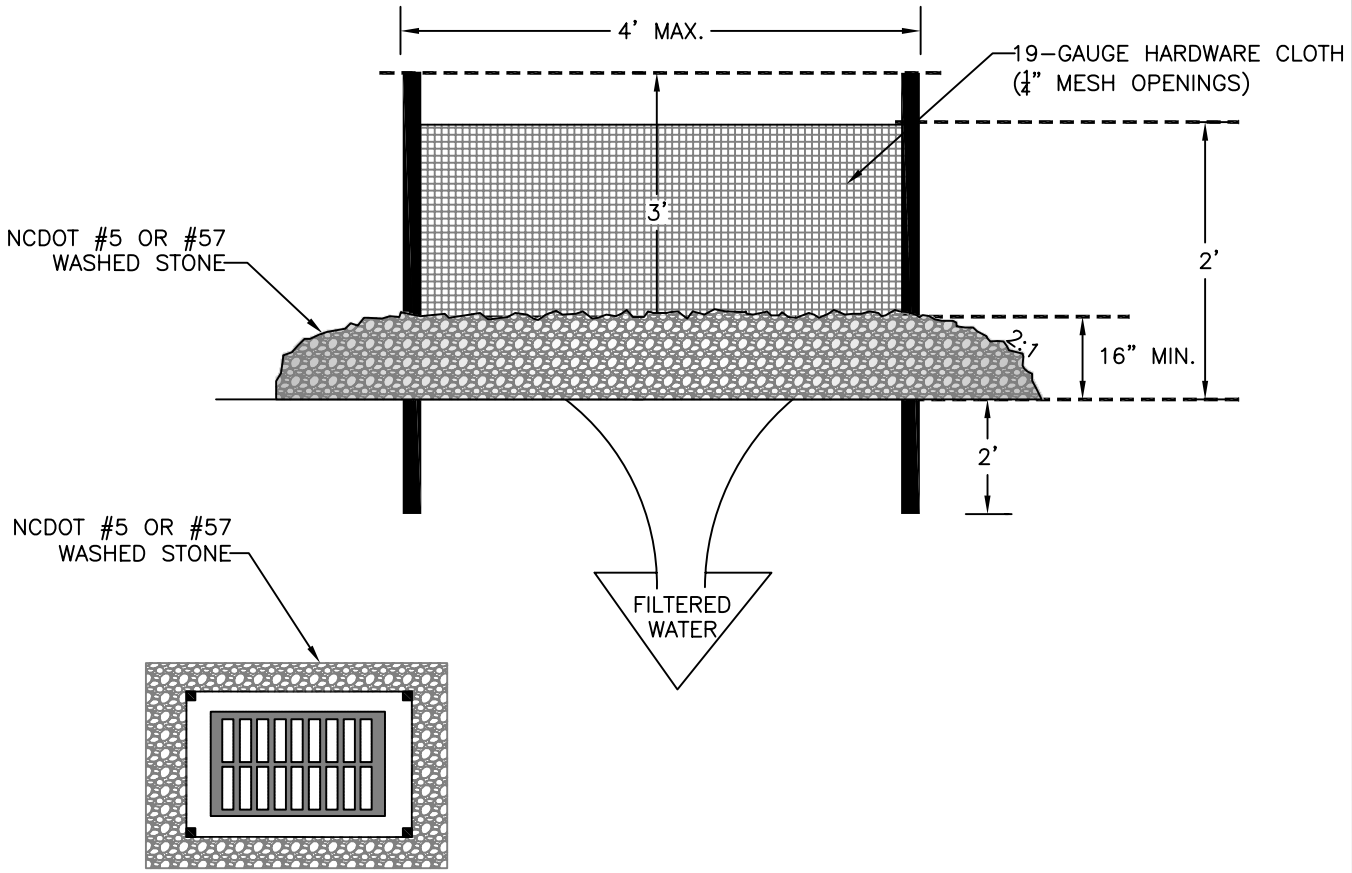
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# STONE INLET PROTECTION

| STD. NO. | REV. |
|---|---|
| 30.08 | |

GENERAL NOTES:

1. UNIFORMLY GRADE A SHALLOW DEPRESSION APPROACHING THE INLET.
2. DRIVE 5–FOOT STEEL POSTS 2 FEET INTO THE GROUND SURROUNDING THE INLET. SPACE POSTS EVENLY AROUND THE PERIMETER OF THE INLET, A MAXIMUM OF 4 FEET APART.
3. SURROUND THE POSTS WITH WIRE MESH HARDWARE CLOTH. SECURE THE WIRE MESH TO THE STEEL POSTS AT THE TOP, MIDDLE, AND BOTTOM. PLACING A 2–FOOT FLAP OF THE WIRE MESH UNDER THE GRAVEL FOR ANCHORING IS RECOMMENDED.
4. PLACE CLEAN GRAVEL (NC DOT #5 OR #57 STONE) ON A 2:1 SLOPE WITH A HEIGHT OF 16 INCHES AROUND THE WIRE, AND SMOOTH TO AN EVEN GRADE.
5. ONCE THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE ACCUMULATED SEDIMENT, AND ESTABLISH FINAL GRADING ELEVATIONS.
6. COMPACT THE AREA PROPERLY AND STABILIZED IT WITH GROUNDCOVER.




NOT TO SCALE

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CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

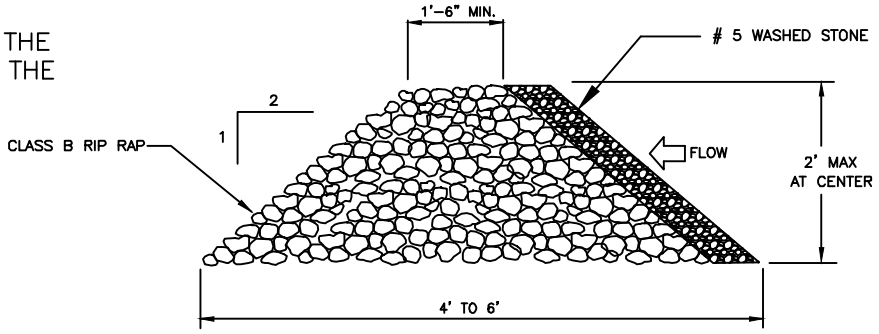
# HARDWARE CLOTH AND GRAVEL INLET PROTECTION

| STD. NO. | REV. |
|---|---|
| 30.09 | 1 |

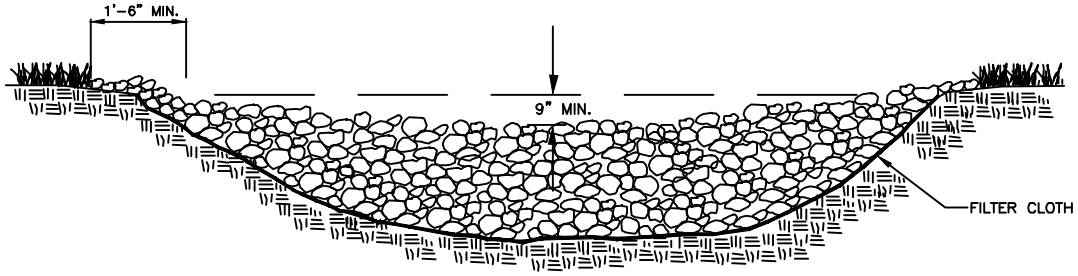
GENERAL NOTES:

1. RIPRAP SIZE TO BE DESIGNED BY ENGINEER.
2. CHECK DAMS MAY BE USED IN SLOPING DITCHES OR CHANNELS TO SLOW VELOCITY OR TO CREATE SEDIMENT TRAPS.
3. ENSURE THAT MAXIMUM SPACING BETWEEN DAMS PLACES THE TOE OF THE UPSTREAM DAM AT THE SAME ELEVATION AS THE DOWNSTREAM DAM (SEE DIAGRAM BELOW).


A AND B ARE AT EQUAL ELEVATIONS




CROSS SECTION




PLAN

NOT TO SCALE

CHARLOTTE.

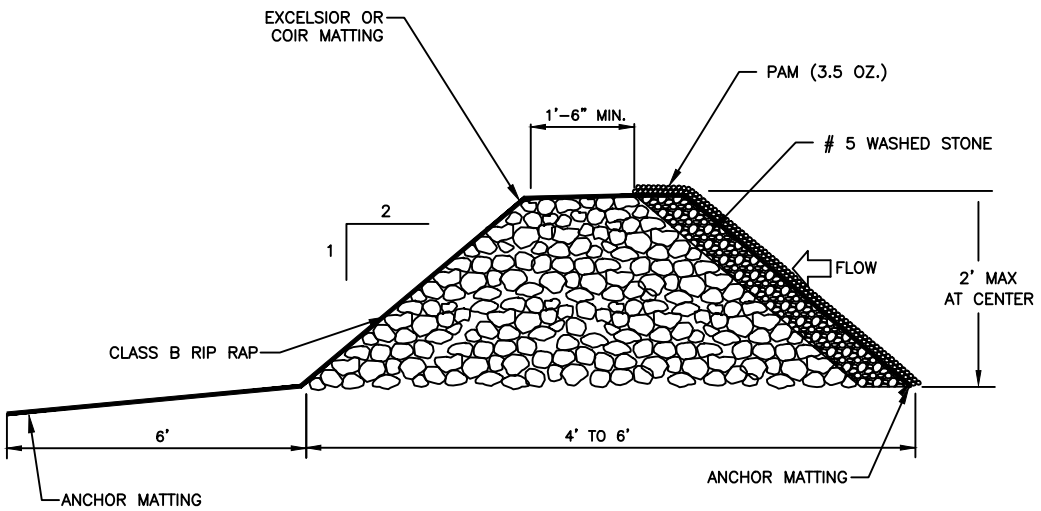
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY ROCK CHECK DAM

| STD. NO. | REV. |
|---|---|
| 30.10A | 15 |

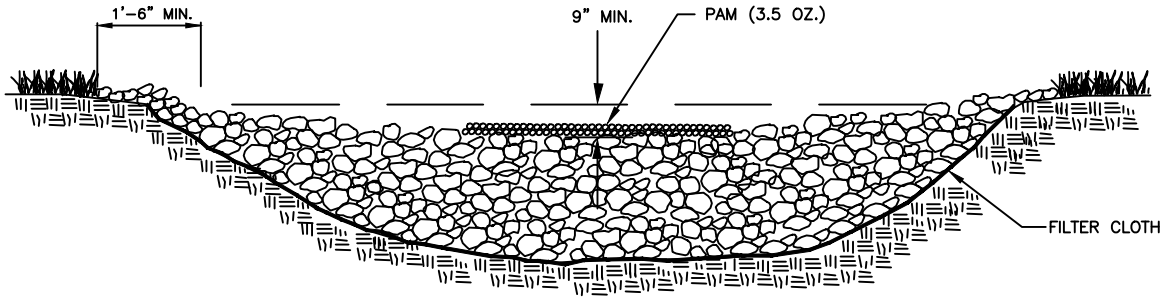
## GENERAL NOTES:

1. CHECK DAMS MAY BE USED IN SLOPING DITCHES OR CHANNELS TO SLOW VELOCITY OR TO CREATE SEDIMENT TRAPS.
2. ENSURE THAT MAXIMUM SPACING BETWEEN DAMS PLACES THE TOE OF THE UPSTREAM DAM AT THE SAME ELEVATION AS THE DOWNSTREAM DAM (SEE DIAGRAM BELOW).
3. COIR MATTING SHALL BE SUBSTITUTED FOR EXCELSIOR MATTING IN HIGH FLOW AREAS.
4. INITIALLY APPLY 3.50 OUNCES OF POLYACRYLAMIDE (PAM) TO THE FACE AND TOP OF THE CHECK DAM AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.
5. ONLY PAMs THAT PASS THE CHRONIC TOXICITY TESTING REQUIREMENTS, ESTABLISHED BY NCDWQ, MAY BE USED.
6. A SEDIMENT BASIN OR SIMILAR STRUCTURE BETWEEN THE APPLICATION POINT OF PAMs AND SURFACE WATERS IS REQUIRED.
7. SUPPLIER TO DETERMINE APPROPRIATE PAM BASED ON SOIL TYPE.




CROSS SECTION


A AND B ARE AT EQUAL ELEVATIONS




PLAN

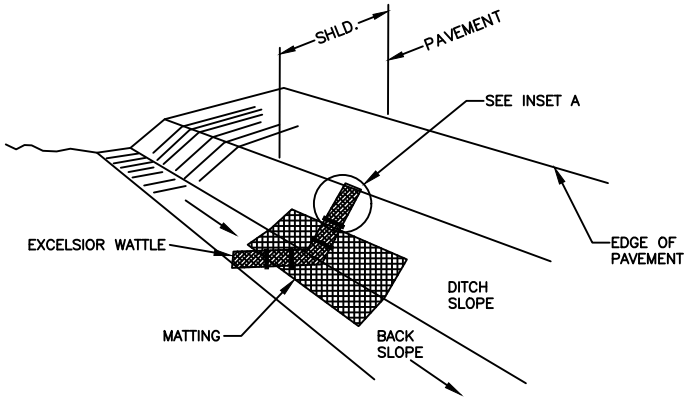
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY ROCK CHECK DAM WITH MATTING AND PAM

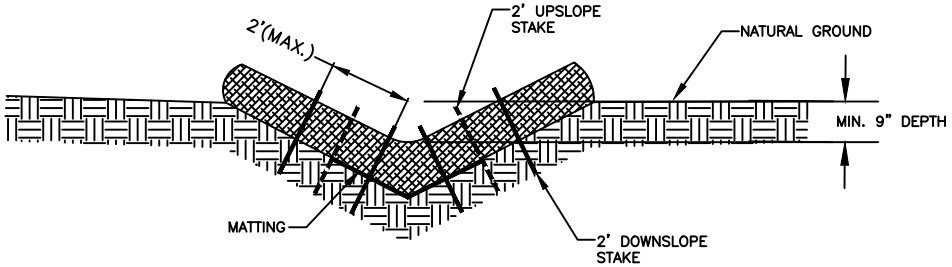
| STD. NO. | REV. |
|---|---|
| 30.10B | 22 |



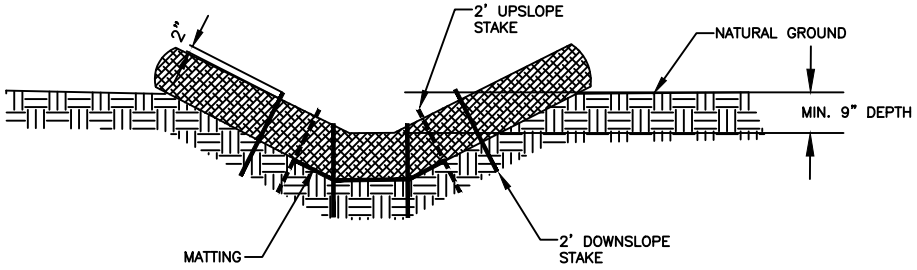

ISOMETRIC VIEW

## GENERAL NOTES:

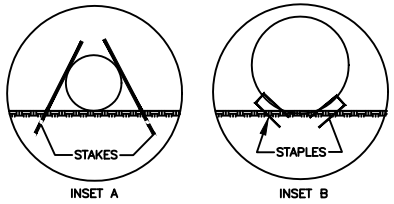
1. USE MINIMUM 12 INCH DIAMETER FIBER WATTLE.
2. USE 2 FT. WOODEN STAKES WITH A 2 IN. X 2 IN. NOMINAL CROSS SECTION
3. ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.
4. INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.
5. PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
6. INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
7. INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE NCDOT STANDARD SPECIFICATIONS.

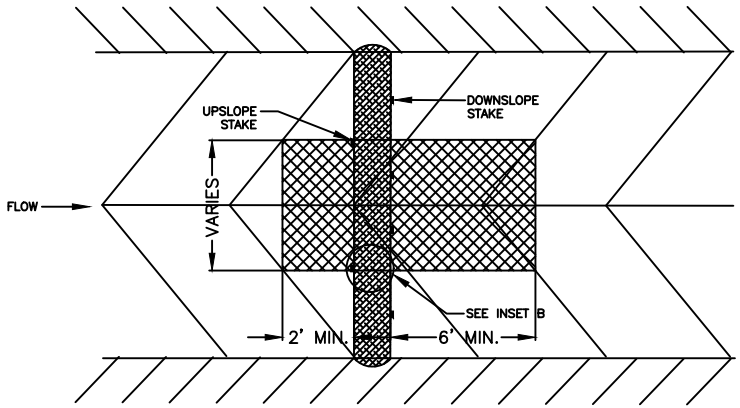



CROSS SECTION
VEE DITCH




CROSS SECTION
TRAPEZOIDAL DITCH



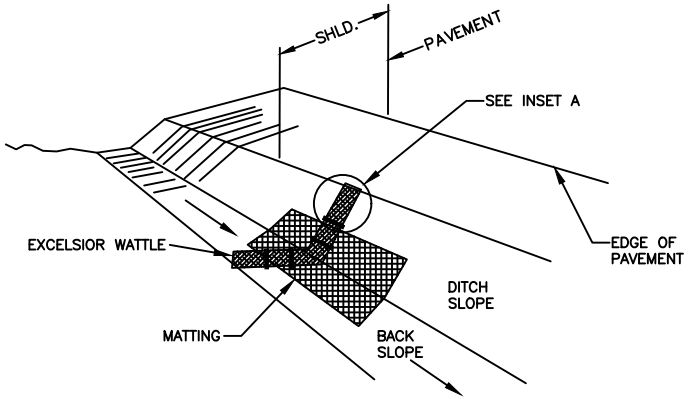

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY WATTLE CHECK DAM WITH MATTING

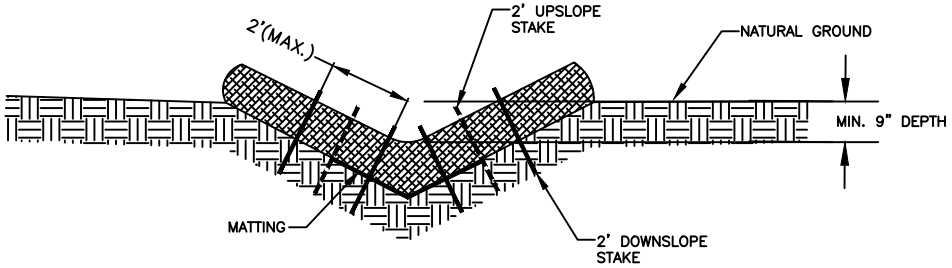
| STD. NO. | REV. |
|---|---|
| 30.10C | 24 |



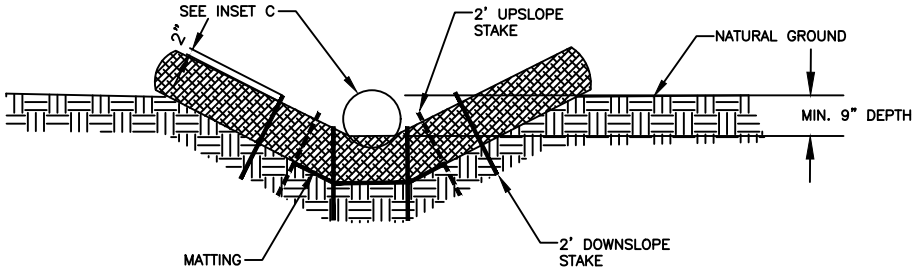

ISOMETRIC VIEW

## GENERAL NOTES:

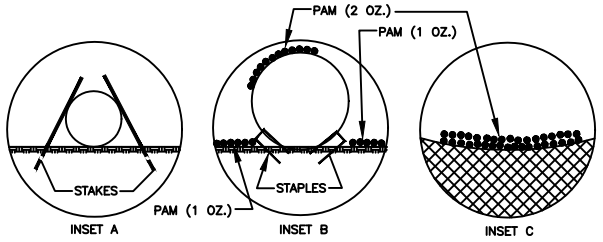
1. USE MINIMUM 12 INCH DIAMETER FIBER WATTLE.
2. USE 2 FT. WOODEN STAKES WITH A 2 IN. X 2 IN. NOMINAL CROSS SECTION
3. ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.
4. INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.
5. PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
6. INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
7. INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE NCDOT STANDARD SPECIFICATIONS.
8. PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.
9. INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

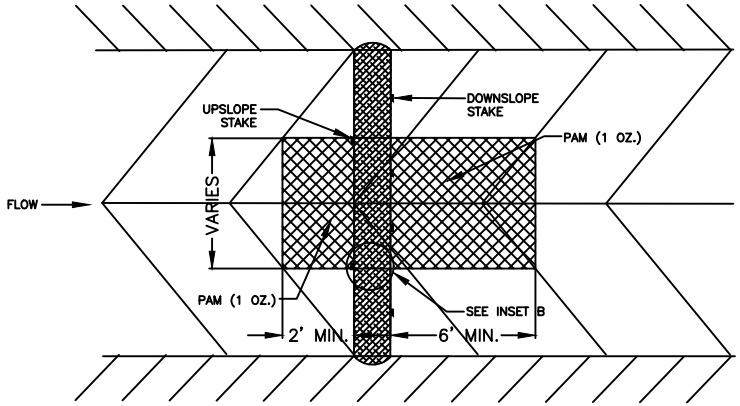



CROSS SECTION
VEE DITCH




CROSS SECTION
TRAPEZOIDAL DITCH




NOT TO SCALE

CHARLOTTE.

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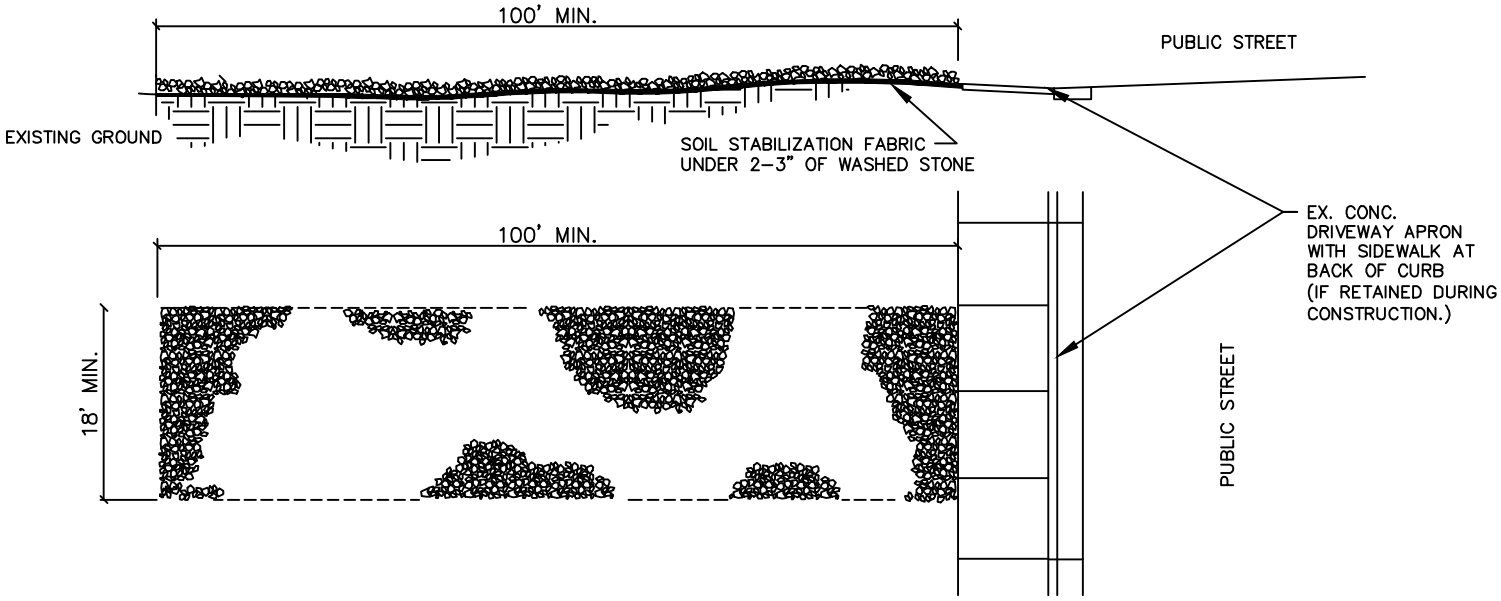
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY WATTLE CHECK DAM WITH MATTING AND PAM

| STD. NO. | REV. |
|---|---|
| 30.10D | 24 |

NOTES:

1. A STABILIZED ENTRANCE PAD OF 2–3" OF WASHED STONE AND/OR RAILROAD BALLAST SHALL BE LOCATED WHERE TRAFFIC WILL ENTER OR LEAVE THE CONSTRUCTION SITE ONTO A PUBLIC STREET.
2. FILTER FABRIC OR COMPACTED CRUSHER RUN STONE SHALL BE USED AS A BASE FOR THE CONSTRUCTION ENTRANCE.
3. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC STREETS OR EXISTING PAVEMENT. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS WARRANT AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
4. ANY SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC STREETS MUST BE REMOVED IMMEDIATELY. ANY AGGREGATE TRACKED INTO THE ROADWAY MUST BE SWEPT BACK ONSITE ON A NIGHTLY BASIS.
5. WHEN APPROPRIATE, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTERING A PUBLIC STREET. WHEN WASHING IS REQUIRED, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN SEE STD. NO. 30.11B.
6. CDOT MAY REQUIRE A STANDARD COMMERCIAL DRIVEWAY (STD. 10.24 & 10.25) TO ACCESS THE CONSTRUCTION SITE IF THE DRIVEWAY IS ON A THOROUGHFARE, OR ON ANY STREET WITH AN EXISTING SIDEWALK TO REMAIN OPEN DURING CONSTRUCTION.
7. FOLLOW WORK AREA TRAFFIC CONTROL HANDBOOK (WATCH) FOR SIDEWALK CLOSURE OR DETOUR/DIVERSION.




NOT TO SCALE

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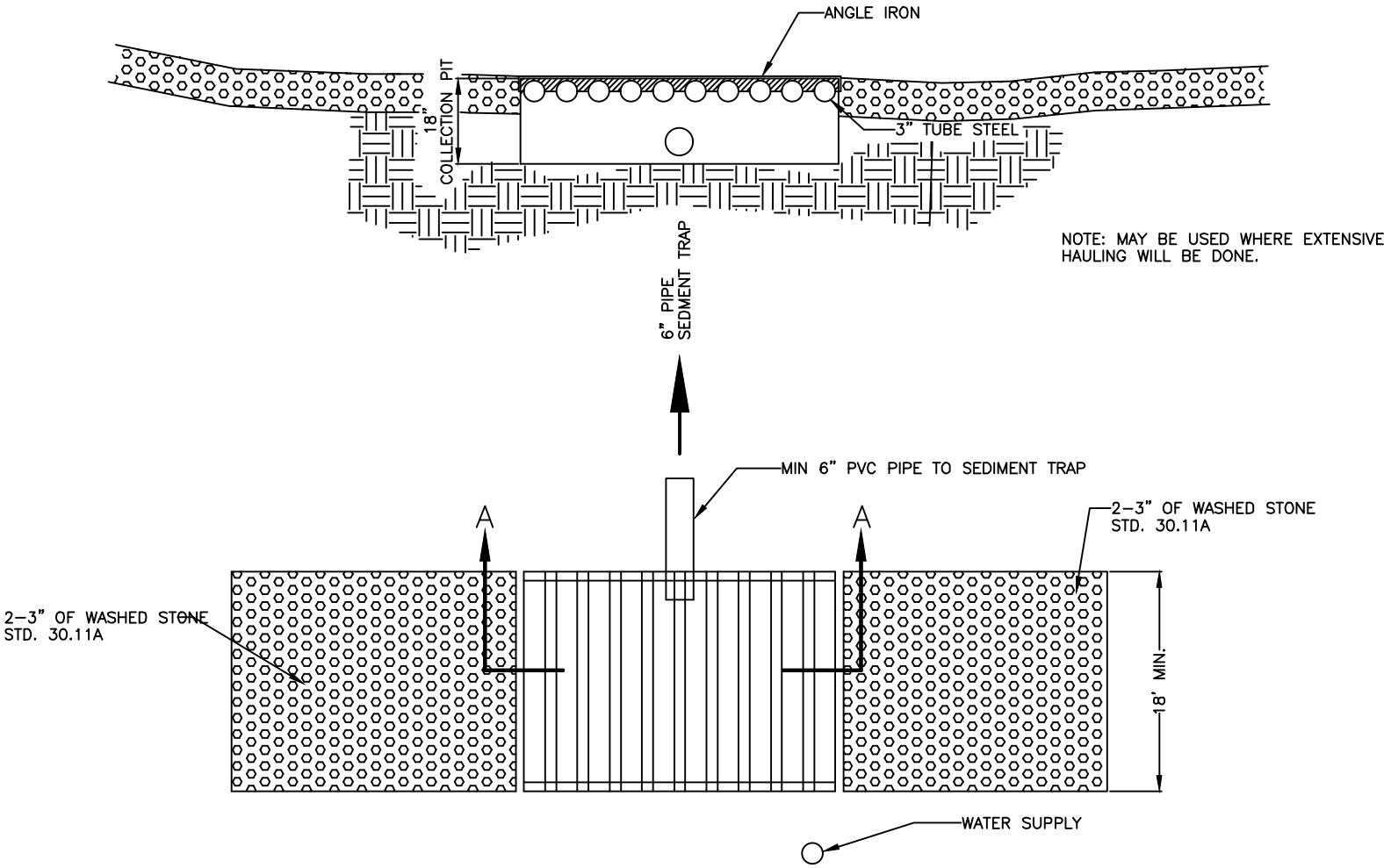
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# STABILIZED CONSTRUCTION ENTRANCE

| STD. NO. | REV. |
|---|---|
| 30.11A | 15 |



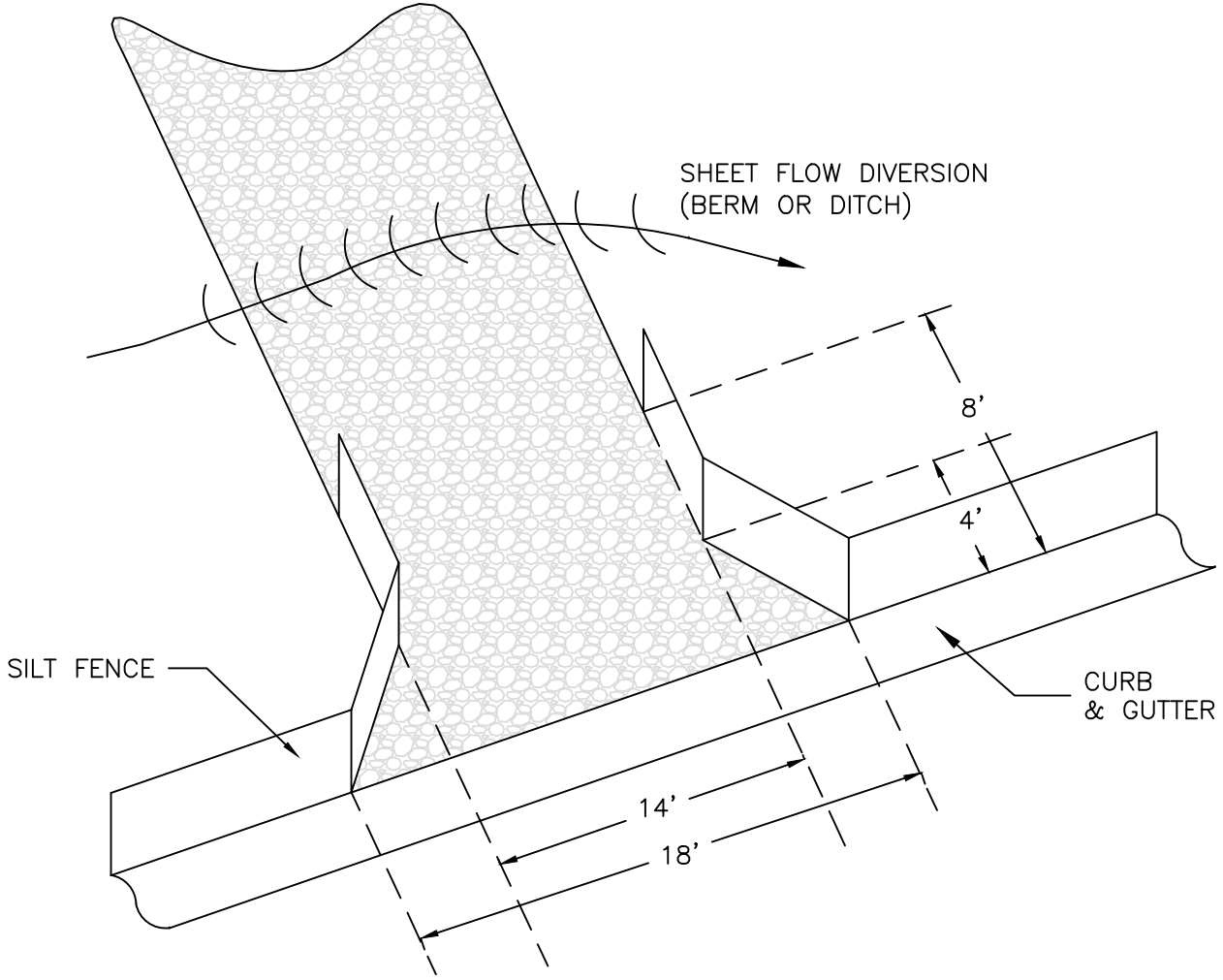

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# CONSTRUCTION ENTRANCE TIRE WASH

| STD. NO. | REV. |
|---|---|
| 30.11B | 15 |




NOTES:

1. PROVIDE 6" MINIMUM STONE DEPTH
2. USE #5 WASHED STONE AND RAILROAD BALLAST MIX
3. INSTALL SOIL STABILIZATION FABRIC OR 4" COMPACTED ABC STONE UNDER ENTRANCE
4. ANY AGGREGATE TRACKED INTO THE ROADWAY MUST BE SWEPT BACK ONSITE ON A NIGHTLY BASIS
5. MINIMUM LENGTH OF ENTRANCE = 25'

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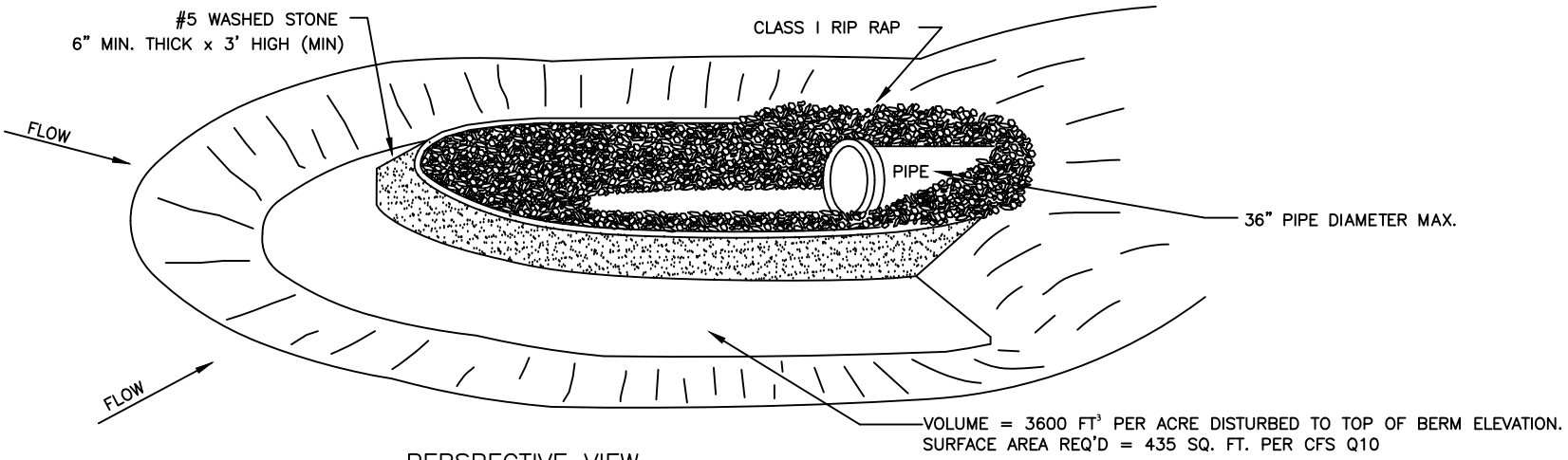
INCLUDES CHARLOTTE ETJ

# CONSTRUCTION ENTRANCE SINGLE FAMILY LOT

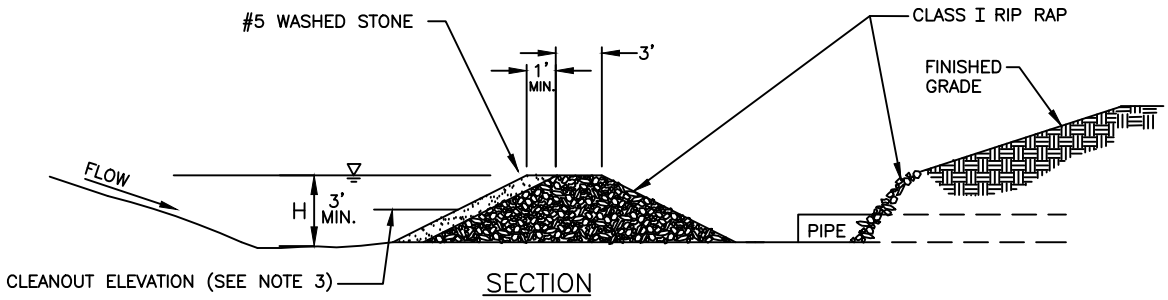
| STD. NO. | REV. |
|---|---|
| 30.11C | 12 |




PERSPECTIVE VIEW

GENERAL NOTES:

1. GRAVEL AND RIP RAP FILTER BERM BASIN SHOULD BE USED TO PROTECT EXISTING PIPE INVERTS.
2. DIMENSIONS SHOWN ARE THE MINIMUM ACCEPTED UNLESS OTHERWISE NOTED.
3. CLEANOUT PRIOR TO SEDIMENT REACHING HALF OF BERM HEIGHT.
4. MAY BE USED AT PIPES WITH MAX. DIAMETER OF 36".




SECTION

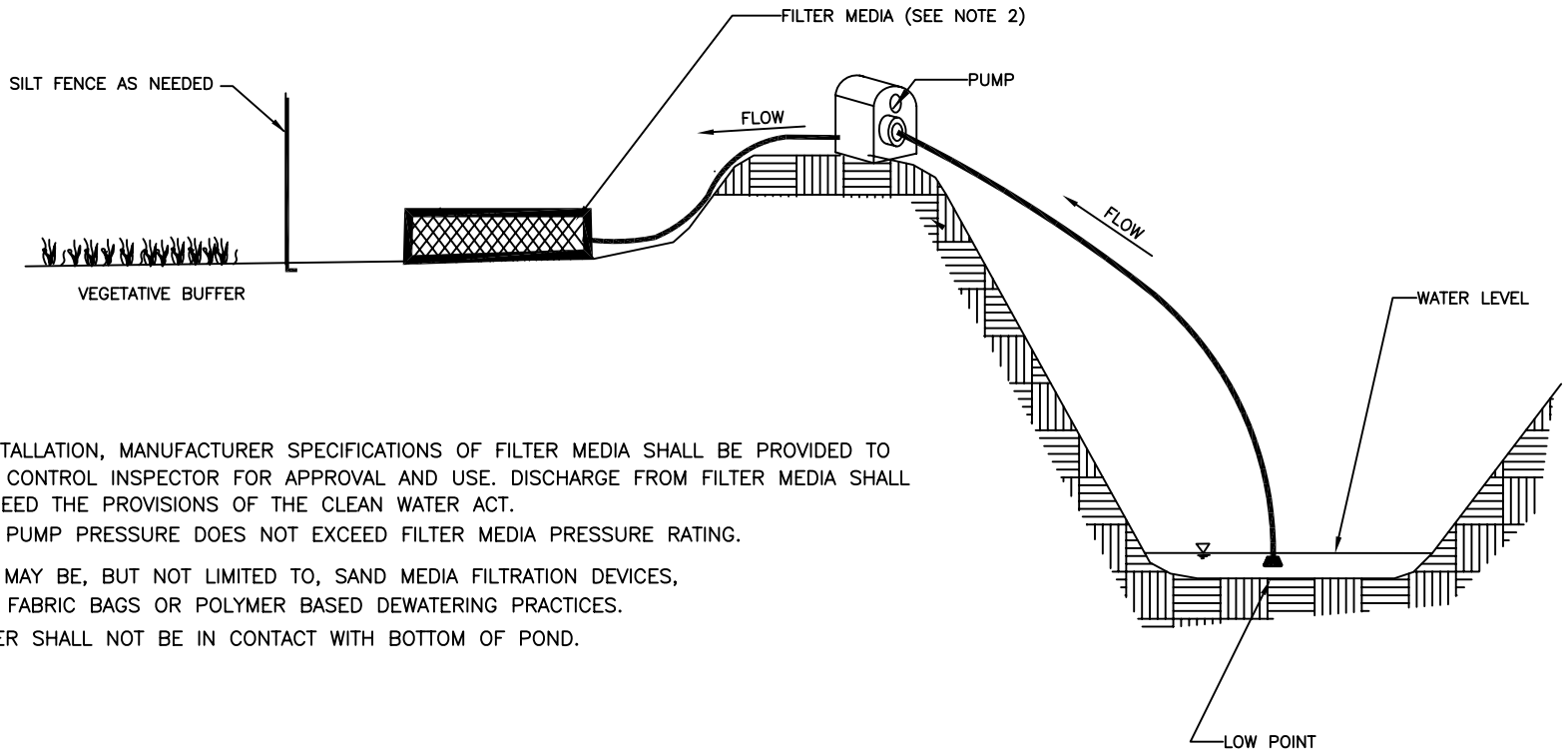
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# GRAVEL AND RIP RAP FILTER BERM BASIN

| STD. NO. | REV. |
|---|---|
| 30.12 | 19 |




NOTE:

1. PRIOR TO INSTALLATION, MANUFACTURER SPECIFICATIONS OF FILTER MEDIA SHALL BE PROVIDED TO THE EROSION CONTROL INSPECTOR FOR APPROVAL AND USE. DISCHARGE FROM FILTER MEDIA SHALL MEET OR EXCEED THE PROVISIONS OF THE CLEAN WATER ACT.
2. ENSURE THAT PUMP PRESSURE DOES NOT EXCEED FILTER MEDIA PRESSURE RATING.
3. FILTER MEDIA MAY BE, BUT NOT LIMITED TO, SAND MEDIA FILTRATION DEVICES, RATED FILTER FABRIC BAGS OR POLYMER BASED DEWATERING PRACTICES.
4. PUMP STRAINER SHALL NOT BE IN CONTACT WITH BOTTOM OF POND.

NOT TO SCALE

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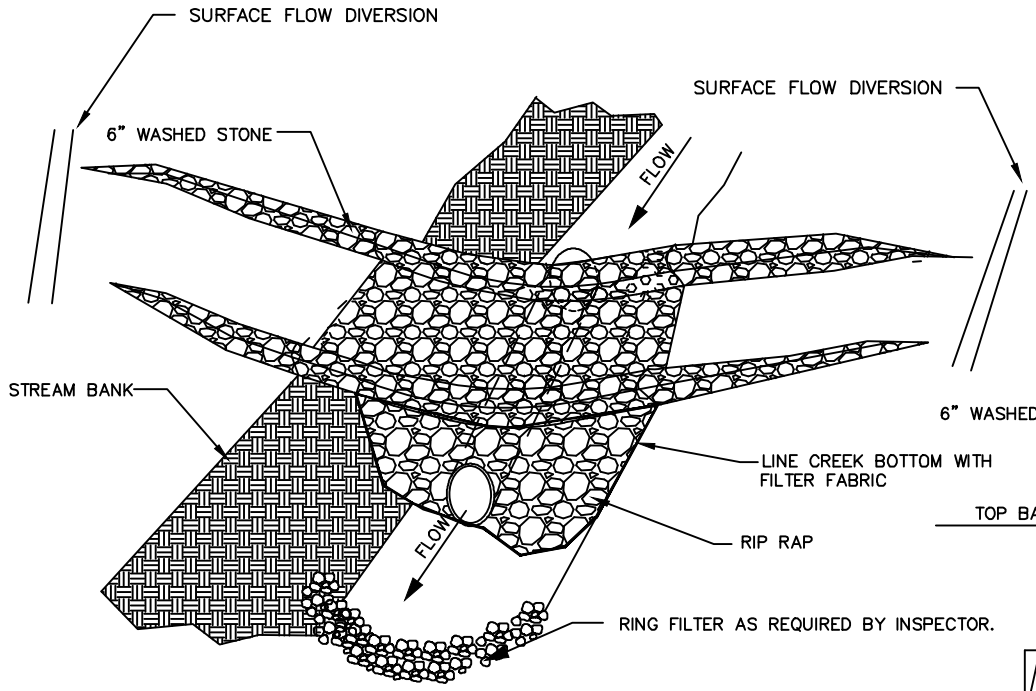
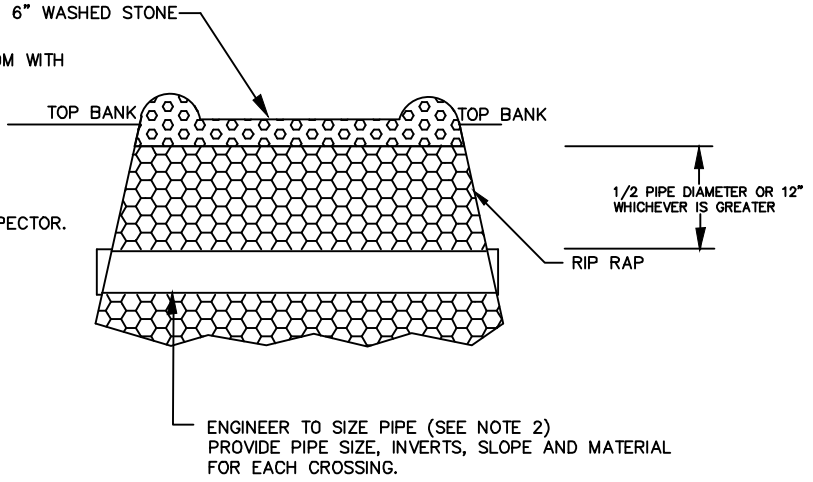
INCLUDES CHARLOTTE ETJ

# EROSION CONTROL DEWATERING

| STD. NO. | REV. |
|---|---|
| 30.13 | |




NOTES:

1. REMOVE THE STRUCTURE WHEN NO LONGER NEEDED. (NOT TO EXCEED 1 YEAR).
2. AS A MINIMUM, DESIGN THE STRUCTURE TO PASS 2 YEAR PEAK FLOW WITHOUT OVERTOPPING.
3. ENSURE THAT DESIGN FLOW VELOCITY AT THE OUTLET OF THE CROSSING STRUCTURE IS NON-EROSIVE FOR THE RECEIVING STREAM CHANNEL.
4. ADDITIONAL MEASURES MAY BE REQUIRED BY THE EROSION CONTROL COORDINATOR OR CITY ENGINEER BASED ON SITE SPECIFIC CONDITIONS.

NOT TO SCALE

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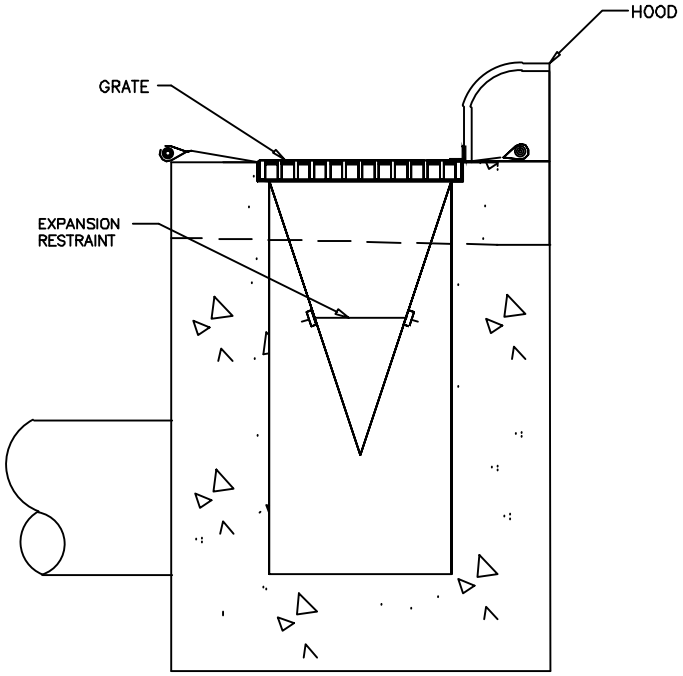
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY STREAM CROSSING

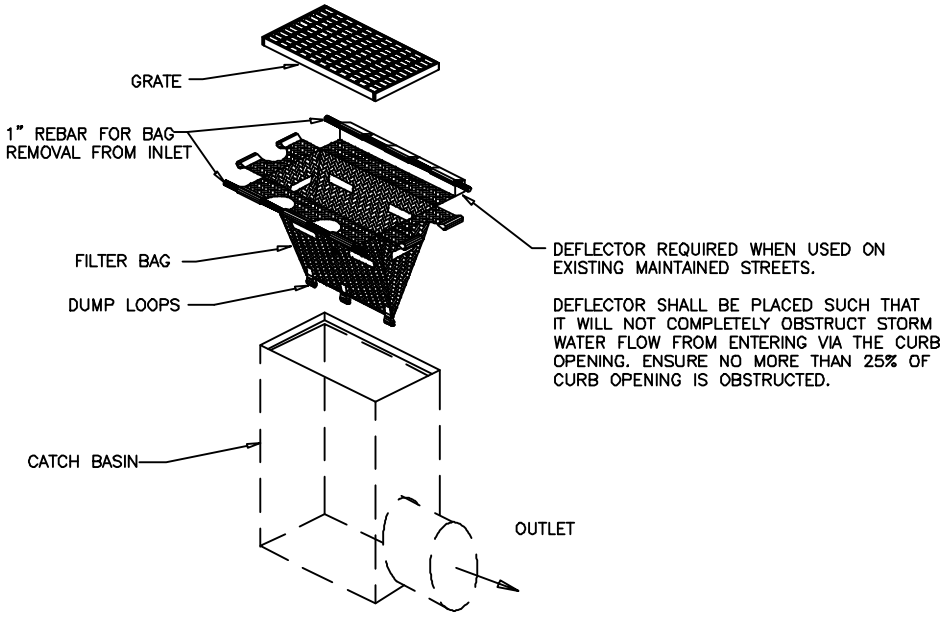
| STD. NO. | REV. |
|---|---|
| 30.14 | 15 |

NOTES:

1. INLET MAINTENANCE SHALL BE DOCUMENTED IN PROJECT LOG BOOK.
2. FILTER TYPES SHALL BE APPROVED BY THE CITY INSPECTOR PRIOR TO INSTALLATION.
3. FILTER BAGS MAY BE REMOVED WHEN SITE IS STABILIZED AT THE DIRECTION OF THE ENGINEER.
4. FILTER BAGS SHALL BE REMOVED PRIOR TO STREET ACCEPTANCE AND/OR CLOSE OUT OF GRADING PERMIT.
5. FILTER BAGS SHALL BE CLEANED OR REPLACED ON A REGULAR BASIS (NOT BE MORE THAN HALF FULL AT ANY TIME).
6. FILTER BAGS MAY BE INSTALLED IN EXISTING CITY OR NCDOT ROADS AS LONG AS STORM DRAINAGE IS NOT IMPEDED.




SECTION




INSTALLATION

NOT TO SCALE

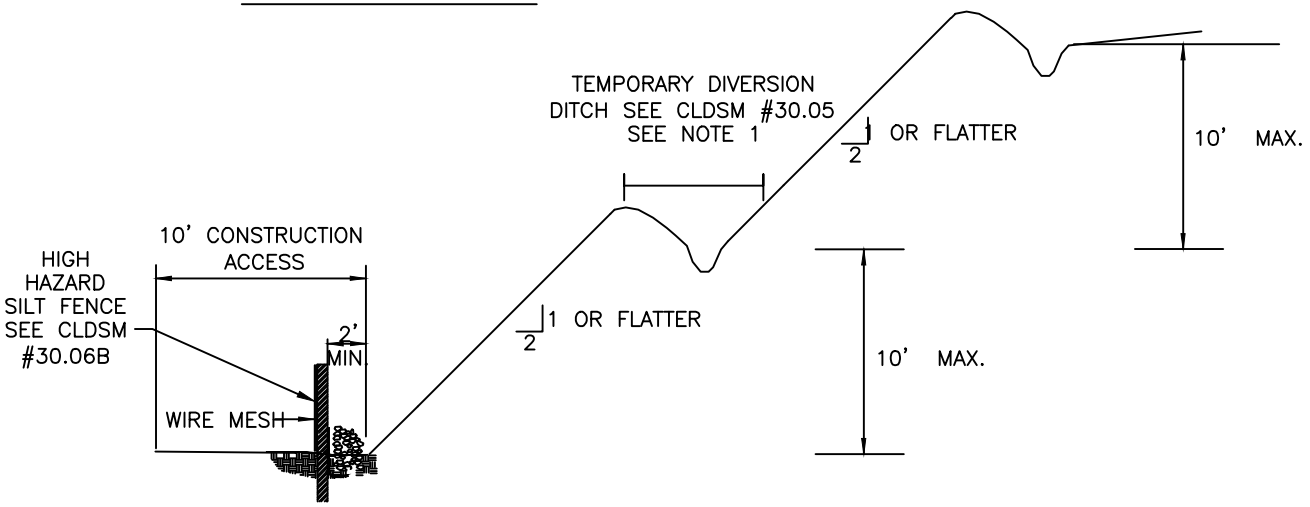
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

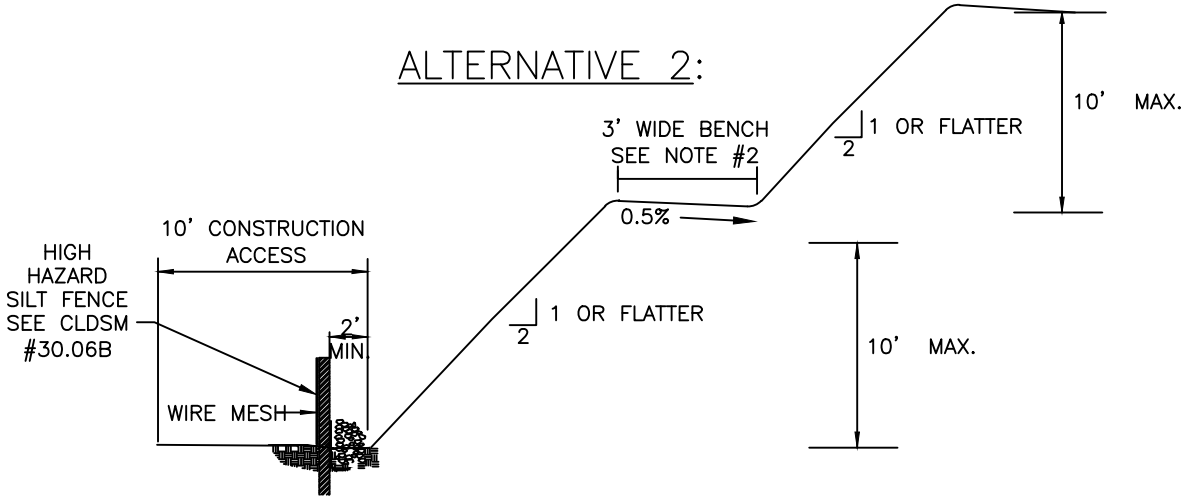
# CATCH BASIN INLET PROTECTION

| STD. NO. | REV. |
|---|---|
| 30.15 | 13 |

## ALTERNATIVE 1:




## ALTERNATIVE 2:




NOTES:

1. IF DIVERSION DITCH USED, IT SHOULD FLOW INTO SEDIMENT BASIN ROCK CHECK DAM, OR SLOPE DRAIN
2. BENCH SHOULD BE GRADED AT 0% LONGITUDINAL SLOPE (ON-CONTOUR)

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SLOPE STABILITY

| STD. NO. | REV. |
|---|---|
| 30.16 | 12 |

## FOR LATE WINTER AND EARLY SPRING:

SEEDING MIXTURE:
RYE (GRAIN) – 120 LB/ACRE
ANNUAL LESPEDEZA (KOBE) – 50 LB/ACRE
(OMIT ANNUAL LESPEDEZA WHEN DURATION OF TEMPORARY COVER IS NOT TO EXTEND BEYOND JUNE)

SEEDING DATES:
JAN. 1 – MAY 1

SOIL AMENDMENTS:
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10–10–10 FERTILIZER

MULCH:
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL

MAINTENANCE:
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, FERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE

## FOR SUMMER:

SEEDING MIXTURE:
GERMAN MILLET – 40 LB/ACRE
(A SMALL–STEMMED SUDANGRASS MAY BE SUBSTITUTED AT A RATE OF 50 LB/ACRE)

SEEDING DATES:
MAY 1 – AUG. 15

SOIL AMENDMENTS:
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10–10–10 FERTILIZER

MULCH:
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL

MAINTENANCE:
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, FERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE

## FOR FALL:

SEEDING MIXTURE:
RYE (GRAIN) – 120 LB/ACRE

SEEDING DATES:
AUG. 15 – DEC 30

SOIL AMENDMENTS:
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 1,000 LB/ACRE 10–10–10 FERTILIZER

MULCH:
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL

MAINTENANCE:
REPAIR AND REFERTILIZE DAMAGED AREAS IMMEDIATELY. TOPDRESS WITH 50 LB/ACRE OF NITROGEN IN MARCH. IF IT IS NECESSARY TO EXTEND TEMPORARY COVER BEYOND JUNE 15, OVERSEED WITH 50 LB/ACRE KOBE LESPEDEZA IN LATE FEBRUARY OR EARLY MARCH.

FOR ADDITIONAL INFORMATION, REFER TO NCDENR EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL (ESCPDM), SECTION 6.10.
FOR PERMANENT SEEDING SPECIFICATIONS, INCLUDING SEED BED PREP, SEASONAL LIMITATIONS FOR SEEDING OPERATIONS, THE KINDS OF GRADES OF FERTILIZERS, THE KINDS OF SEED, AND THE RATES OF APPLICATION OF LIMESTONE, FERTILIZER, AND SEED, REFER TO NCDENR ESCPDM SECTION 6.11 AND THE CHARLOTTE LANDSCAPE CONSTRUCTION STANDARDS SECTION 04200 SEEDING AND SODDING OF TURFGRASS.

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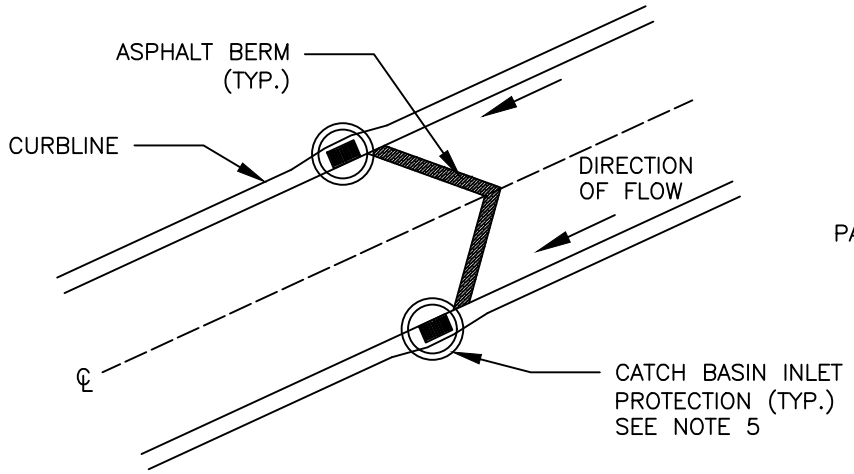
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

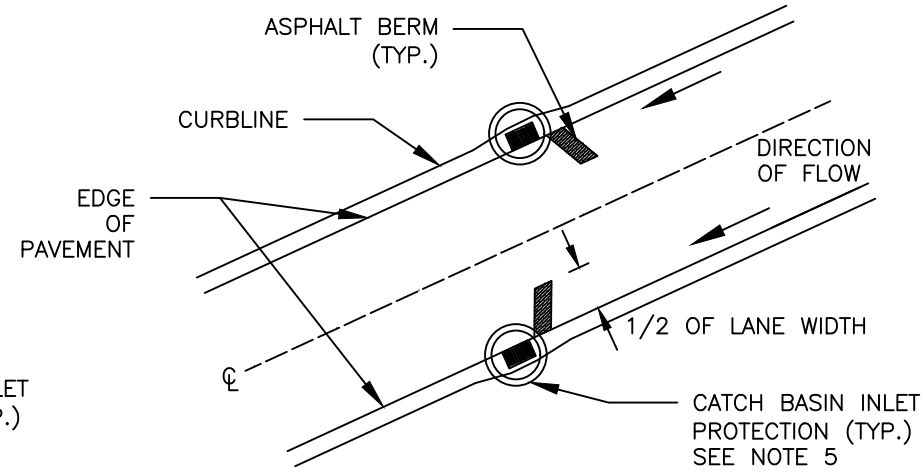
# TEMPORARY SEEDING SCHEDULE

| STD. NO. | REV. |
|---|---|
| 30.17 | 9 |




OPTION 1

CATCH BASINS ALIGNED
ACROSS STREET

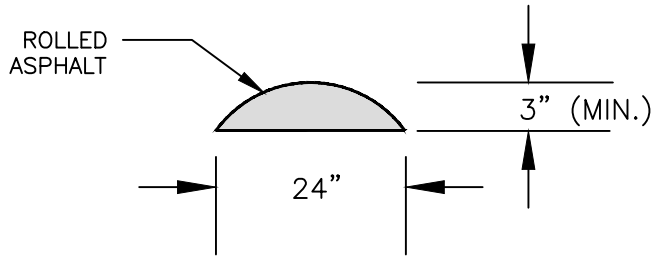



OPTION 2

CATCH BASINS OFFSET OR
INDIVIDUAL CATCH BASIN

NOTES:

1. TEMPORARY BERMS ARE INSTALLED TO ACHIEVE DESIGNED DRAINAGE AREAS PRIOR TO FINAL ASPHALT LIFT BEING INSTALLED ON ROAD SURFACE.
2. CONTRACTOR TO INSTALL TEMPORARY BERMS ON INTERMEDIATE COURSE, ON HIGH SIDE OF CURB INLETS FOR STRUCTURES ALONG THE STREET SLOPE.
3. REMOVE BERM PRIOR INSTALLING FINAL ASPHALT LIFT, FINISHING ROAD SURFACE.
4. REMOVE ACCUMULATED SEDIMENT FROM ABOVE BERM WEEKLY AND AFTER RAINFALL, AS NEEDED TO MAINTAIN FUNCTION.
5. CATCH BASIN INLET PROTECTION MAY BE OMITTED IF APPROVED BY EROSION CONTROL COORDINATOR




BERM CROSS SECTION

NOT TO SCALE

CHARLOTTE.

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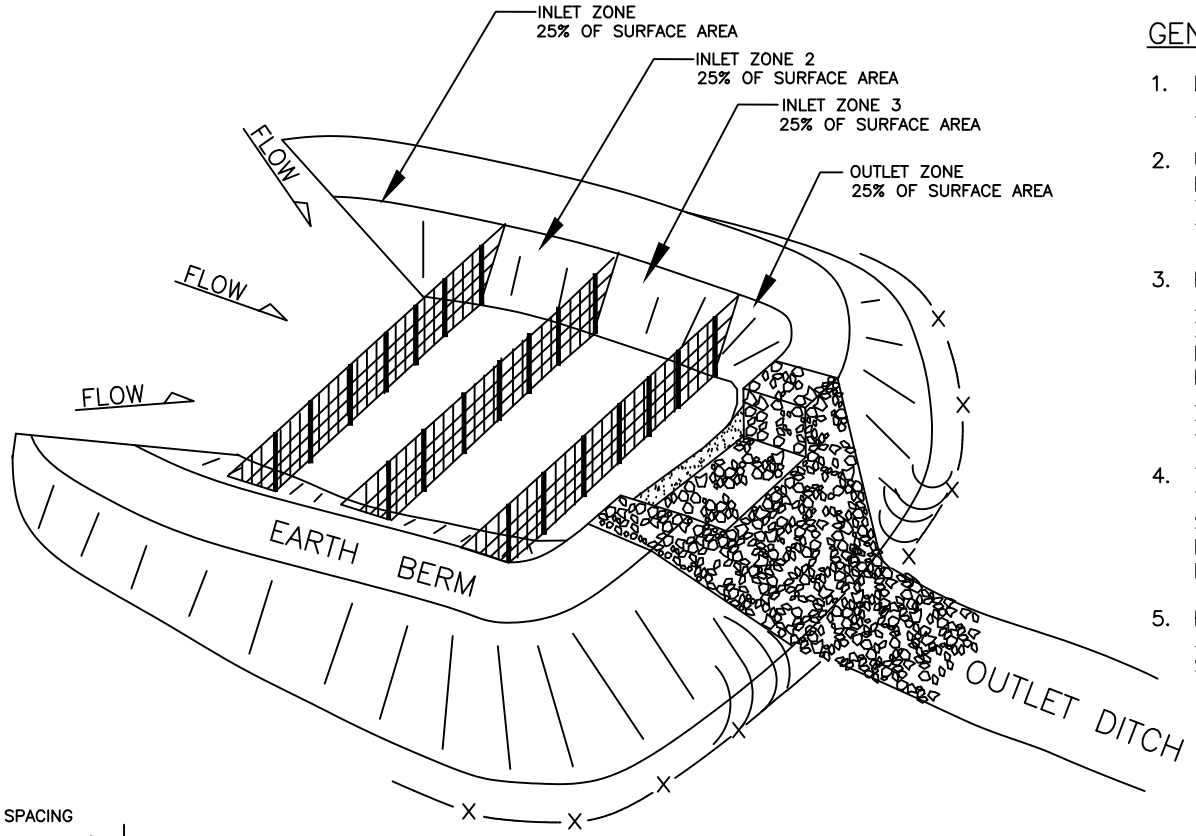
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

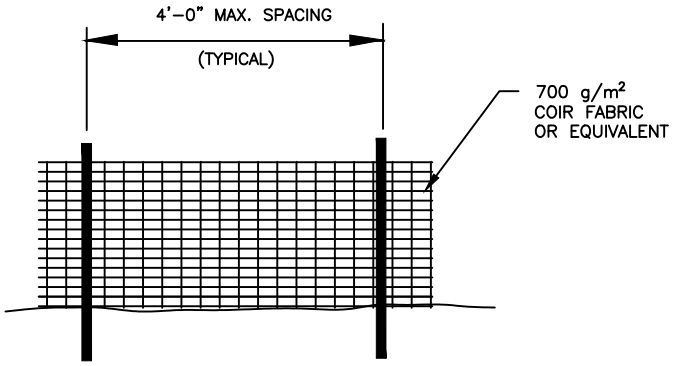
# TEMPORARY ASPHALT DIVERSION BERM

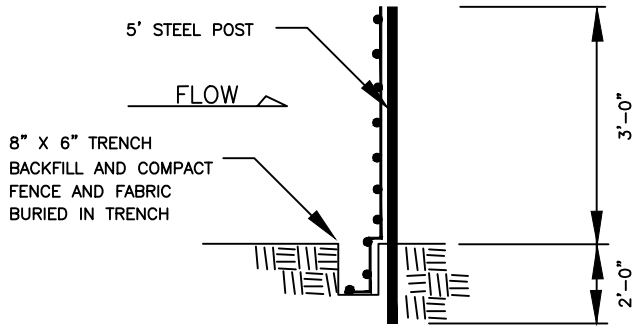
| STD. NO. | REV. |
|---|---|
| 30.18 | 21 |




## GENERAL NOTES:

1. DRIVE 5' STEEL POST AT LEAST 24" INTO SOLID GROUND.
2. USE STAPLES 1' APART HORIZONTALLY AND VERTICALLY TO ATTACH THE FILTER FABRIC TO THE WIRE FENCE.
3. PROVIDE 4 TREATMENT ZONES, 25% OF SURFACE AREA IN EACH ZONE (3 BAFFLES). FOR BASINS LESS THAN 40 FEET LONG, PROVIDE 3 TREATMENT ZONES, 33% OF SURFACE AREA EACH ZONE (2 BAFFLES)
4. THE FLOOR OF THE BASIN IN THE OUTLET ZONE AND BERMS SHOULD BE SEEDED IMMEDIATELY AFTER THE BASIN IS CONSTRUCTED.
5. REFER TO NCESCPDM SECTION #6.65 FOR ADDITIONAL SPECIFICATIONS.



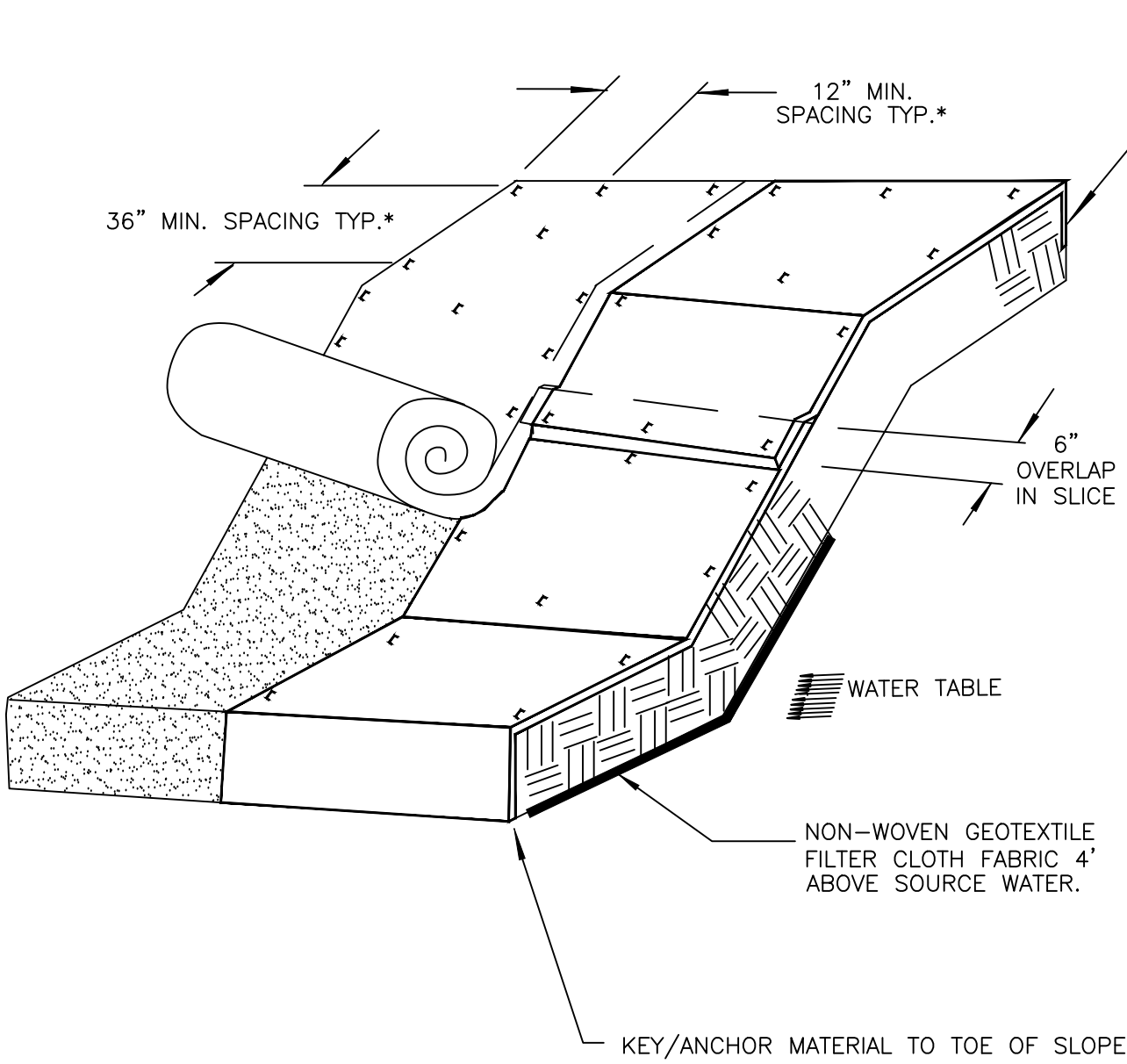

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BAFFLE INSTALLATION

| STD. NO. | REV. |
|---|---|
| 30.19 | 22 |




GENERAL NOTES:

1. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
2. * DIMENSIONS SHOWN ARE MINIMUM, MANUFACTURED PRODUCTS MAY HAVE ADDITIONAL REQUIREMENTS THAT MUST BE MET.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, SOIL CLODS, STICKS, GRASS. MAT/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
4. THE DETAIL SHOWN IS FOR SLOPE MATTING. FOR CHANNEL OR PIPE OUTFALL MATTING SPECIFICATIONS, PLEASE REFER TO NCESCPDM STANDARD #6.17 AND MANUFACTURER'S GUIDELINES.
5. ALL MATTING SHALL BE 100% BIODEGRADABLE WITH ORGANIC NETTING. PLASTIC OR NON-BIODEGRADABLE NETTING WILL NOT BE ALLOWED. PLEASE NOTE TURF REINFORCED MATTING (TRM) IS PERMITTED WHERE DESIGN CRITERIA WARRANTS ITS USE.

NOT TO SCALE

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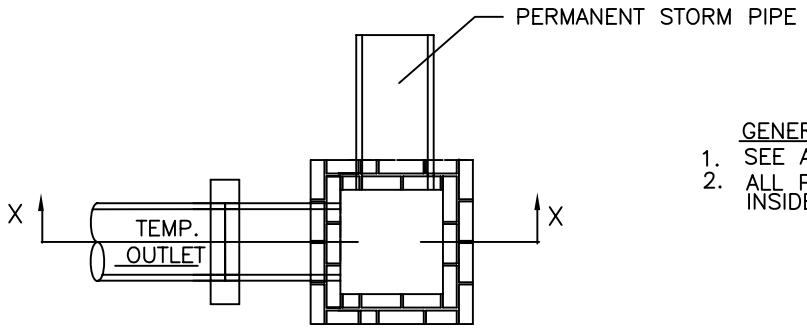
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# EMBANKMENT MATTING DETAIL

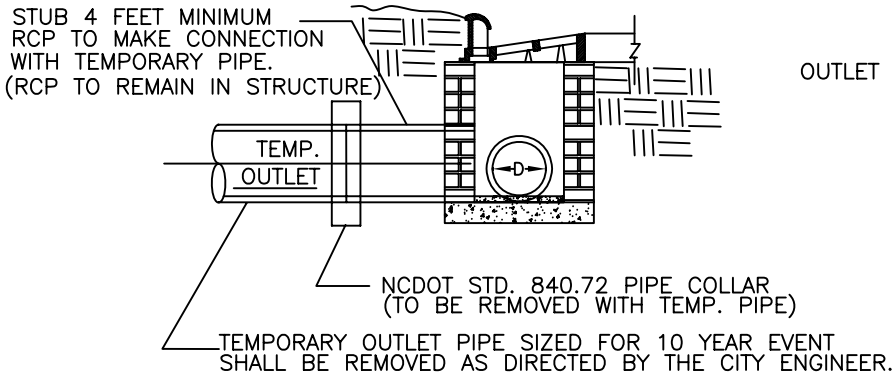
| STD. NO. | REV. |
|---|---|
| 30.20 | 22 |



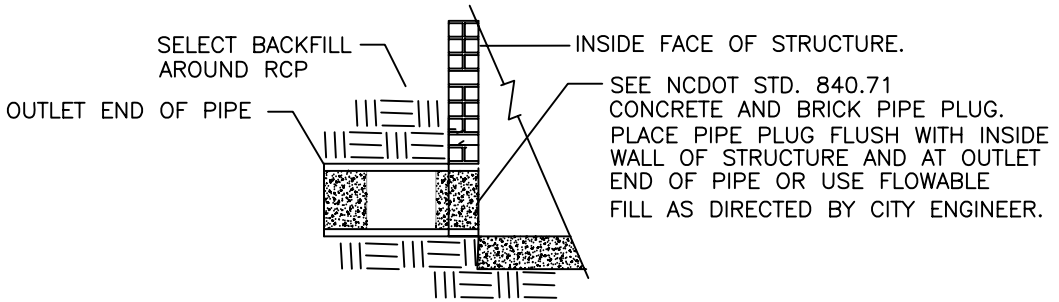

PLAN

GENERAL NOTES:

1. SEE APPROPRIATE STANDARD FOR CATCH BASIN, MANHOLE, JUNCTION BOX USED.
2. ALL PIPE IN STORM DRAIN STRUCTURES SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.




SECTION X–X
ACTIVE SYSTEM




PIPE PLUG DETAIL
AFTER REMOVAL OF TEMPORARY PIPE

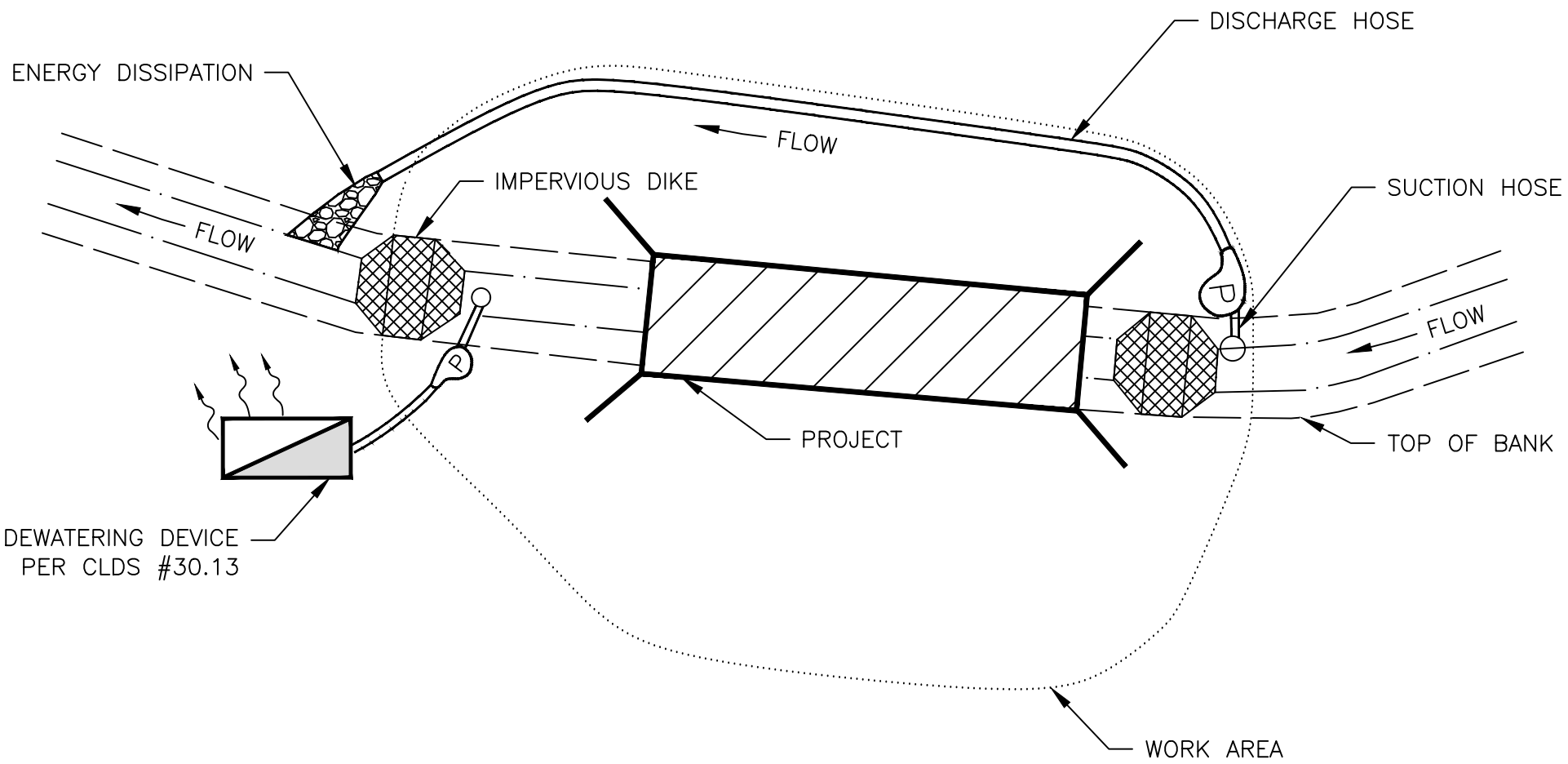
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BRICK STORM STRUCTURE WITH TEMPORARY PIPE

| STD. NO. | REV. |
|---|---|
| 30.21 | |




NOTE:
ANCHOR ALL PUMPS AND PIPES SECURELY

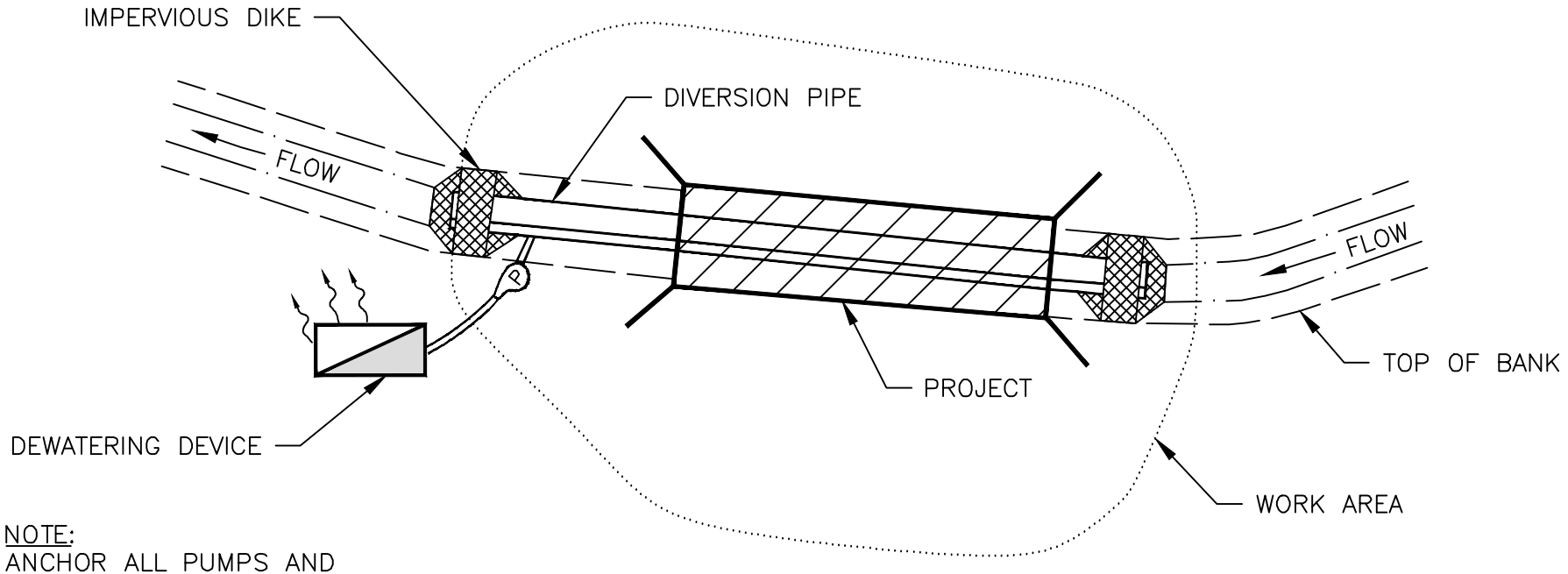
NOT TO SCALE

CHARLOTTE.

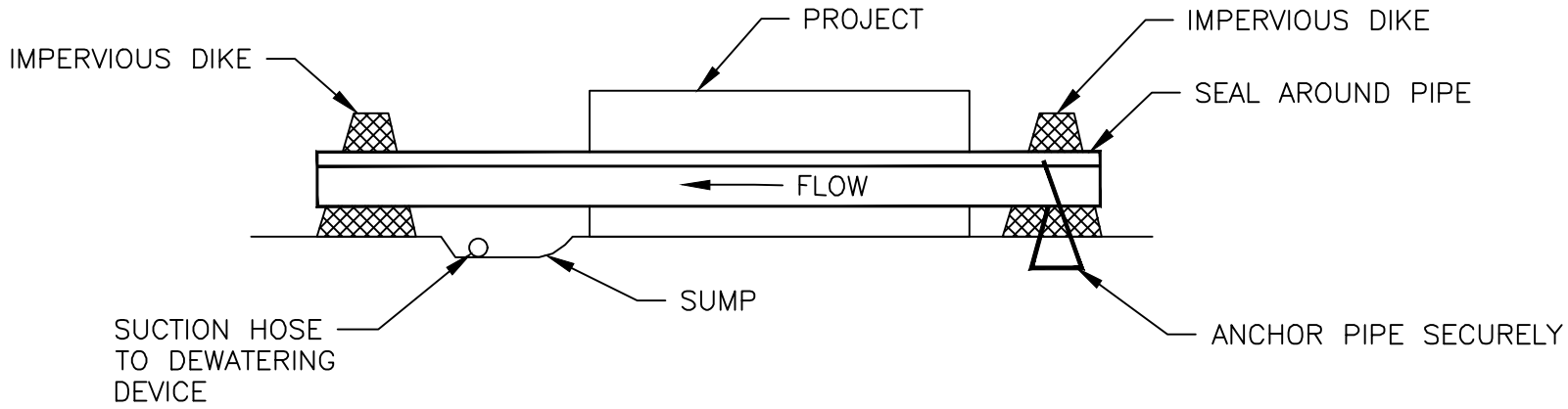
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BYPASS PUMPING

| STD. NO. | REV. |
|---|---|
| 30.22A | 24 |




NOTE:
ANCHOR ALL PUMPS AND PIPES SECURELY



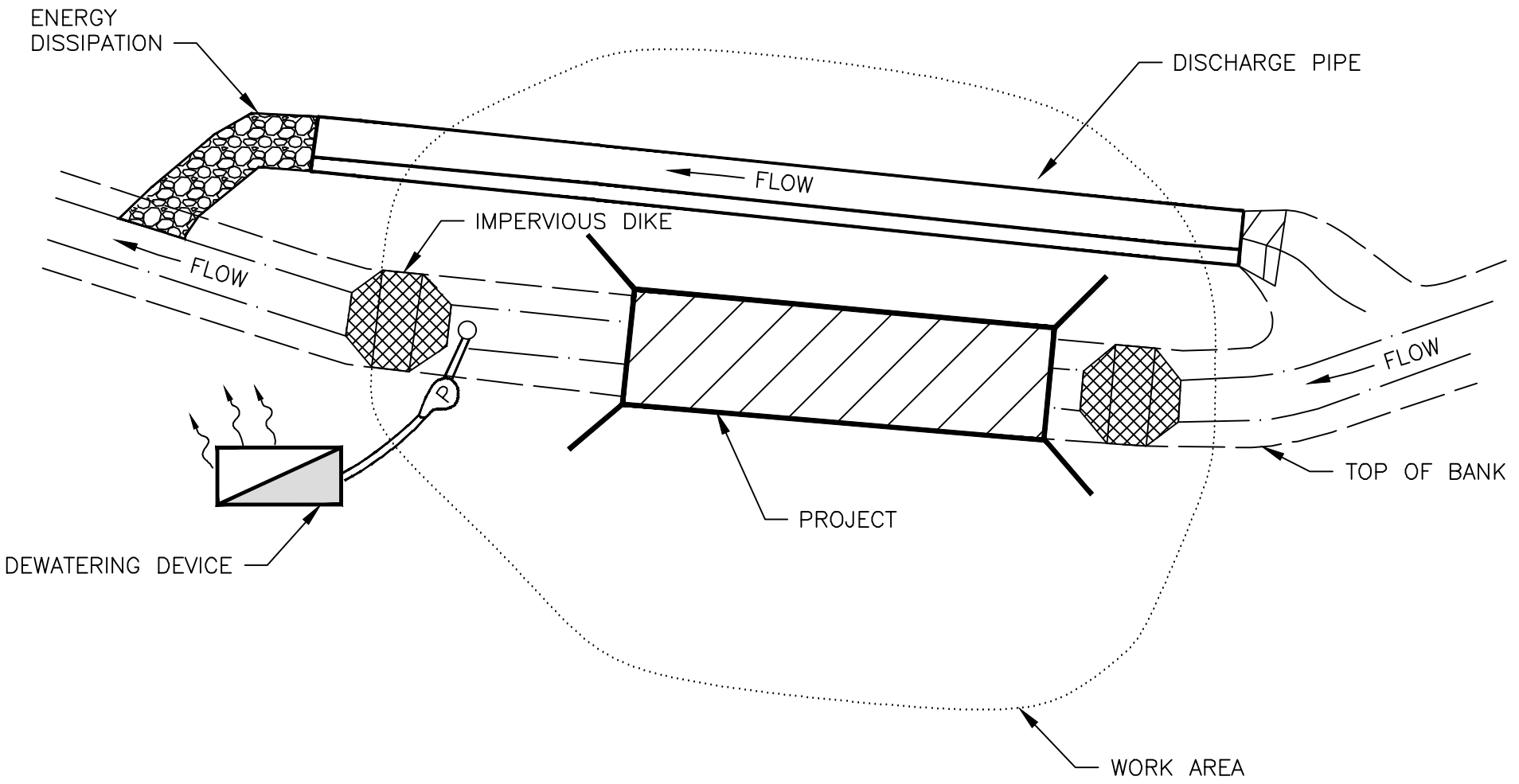

NOT TO SCALE

CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SUSPENDED BYPASS PIPE

| STD. NO. | REV. |
|---|---|
| 30.22B | 15 |




NOTE:
ANCHOR ALL PUMPS AND PIPES SECURELY

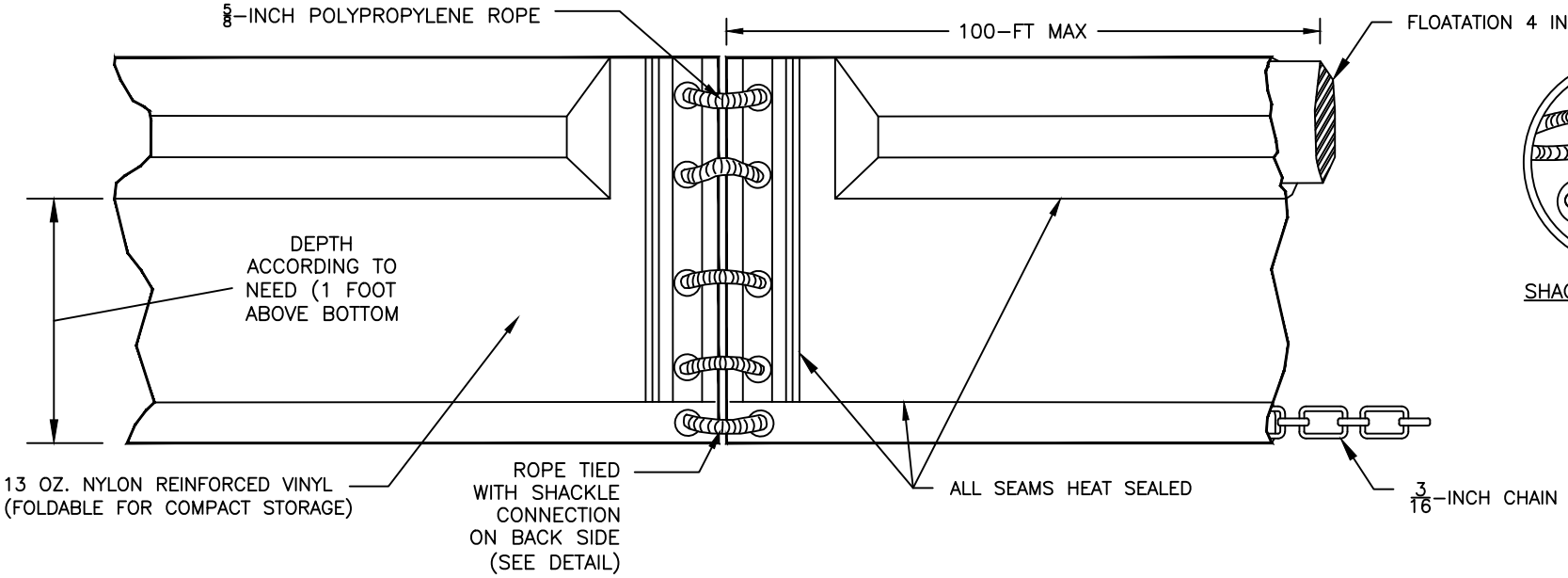
NOT TO SCALE

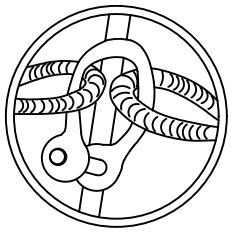
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PIPED DIVERSION

| STD. NO. | REV. |
|---|---|
| 30.22C | 15 |



SHACKLE CONNECTION DETAIL

## TURBIDITY CURTAIN (IN BASIN):

1. TURBIDITY CURTAINS MAY BE USED IN LIEU OF BAFFLES IN SEDIMENT OR SKIMMER BASINS WHERE THE TEMPORARY OR PERMANENT POOL ELEVATION WILL CONSISTENTLY BE ABOVE 3 FT (I.E. ABOVE TYPICAL INSTALLED BAFFLE HEIGHT).
2. A MINIMUM OF ONE TURBIDITY CURTAIN SHALL BE USED IN SKIMMER BASINS (30.02A) AND A MINIMUM OF ONE ROCK BAFFLE AND ONE TURBIDITY CURTAIN SHALL BE USED IN SEDIMENT BASINS (30.03A).
3. TYPE 1 TURBIDITY CURTAINS (FOR CALM WATERS) AT A MINIMUM SHALL BE USED, CONSTRUCTED OF MINIMUM SPECIFICATIONS OF 13 OZ. PVC FABRIC, 4 IN. FLOAT, AND A 3/16 IN. BOTTOM BALLAST CHAIN. THE MAXIMUM SPAN BETWEEN JOINTS IS 100 FT.
4. THE CURTAIN SHOULD EXTEND ACROSS THE ENTIRE WIDTH OF THE BASIN, BETWEEN THE SKIMMER/OUTLET ZONE AND INLETS AND BE ANCHORED TO THE BASIN EMBANKMENT A MINIMUM OF 6 INCHES ABOVE THE PRIMARY SPILLWAY ELEVATION. THE TURBIDITY CURTAIN SHALL EXTEND TO 1 FOOT ABOVE THE BOTTOM OF THE BASIN.
5. ACCUMULATED SEDIMENT SHALL BE REMOVED BEHIND THE TURBIDITY CURTAIN(S) TO RESTORE BASIN CAPACITY ONCE 50% CAPACITY IS REACHED.
6. WHEN THE CURTAIN IS NO LONGER REQUIRED, THE CURTAIN AND COMPONENTS SHALL BE REMOVED IN SUCH A MANNER AS TO MINIMIZE TURBIDITY. REMAINING SEDIMENT SHALL BE SUFFICIENTLY SETTLED BEFORE REMOVING THE CURTAIN. SEDIMENT MAY NEED TO BE REMOVED TO ACHIEVE THE PERMANENT PLANNED ELEVATION AND SPOILS PROPERLY DISPOSED OR STABILIZED.

## TURBIDITY CURTAIN (IN POND/COVE):

1. TURBIDITY CURTAINS MAY BE USED IN PONDS OR COVES (WITH REQUISITE APPROVAL) WHERE UPSLOPE DISTURBANCES/CONSTRUCTION WILL OCCUR TO REDUCE SEDIMENT TRANSPORT TO A LIMITED AREA IN THE RECEIVING WATERCOURSE.
2. TYPE 1 TURBIDITY CURTAINS SHALL BE USED IN PROTECTED AREAS WHERE THERE IS NO CURRENT AND THE AREA IS SHELTERED FROM WIND AND WAVES, CONSTRUCTED OF MINIMUM SPECIFICATIONS OF 13 OZ. PVC FABRIC, 4 IN. FLOAT, AND A 3/16 IN. BOTTOM BALLAST CHAIN. THE MAXIMUM SPAN BETWEEN JOINTS IS 100 FT. SHOULD TYPE 2 OR TYPE 3 TURBIDITY CURTAINS BE NEEDED (WHERE THERE MAY BE SMALL TO CONSIDERATE CURRENT AND/OR WIND AND WAVE ACTION), ENGINEERED SPECIFICATIONS SHALL BE PROVIDED WITH THE PLAN SUBMISSION. TURBIDITY CURTAINS SHOULD NOT BE PLACED ACROSS THE MAIN FLOW OF A SIGNIFICANT BODY OF MOVING WATER.
3. THE TURBIDITY CURTAIN SHOULD BE ANCHORED TO THE SHORELINE ABOVE THE NORMAL HIGH WATER MARK, TOWED TO THE DESIRED LOCATION, AND ANCHORED (IF NEEDED) TO MAINTAIN THE DESIRED LOCATION WITHIN THE WATERCOURSE. THE TURBIDITY CURTAIN SHOULD EXTEND TO 1 FT ABOVE THE BOTTOM OF THE WATERCOURSE.
4. WHEN THE CURTAIN IS NO LONGER REQUIRED, THE CURTAIN, ANCHORS, AND COMPONENTS SHALL BE REMOVED AND IN SUCH A MANNER AS TO MINIMIZE TURBIDITY. REMAINING SEDIMENT SHALL BE SUFFICIENTLY SETTLED BEFORE REMOVING THE CURTAIN. SEDIMENT MAY NEED TO BE REMOVED TO ACHIEVE THE ORIGINAL DEPTH OF THE WATERCOURSE AND SPOILS PROPERLY DISPOSED OR STABILIZED.

NOT TO SCALE

CHARLOTTE.

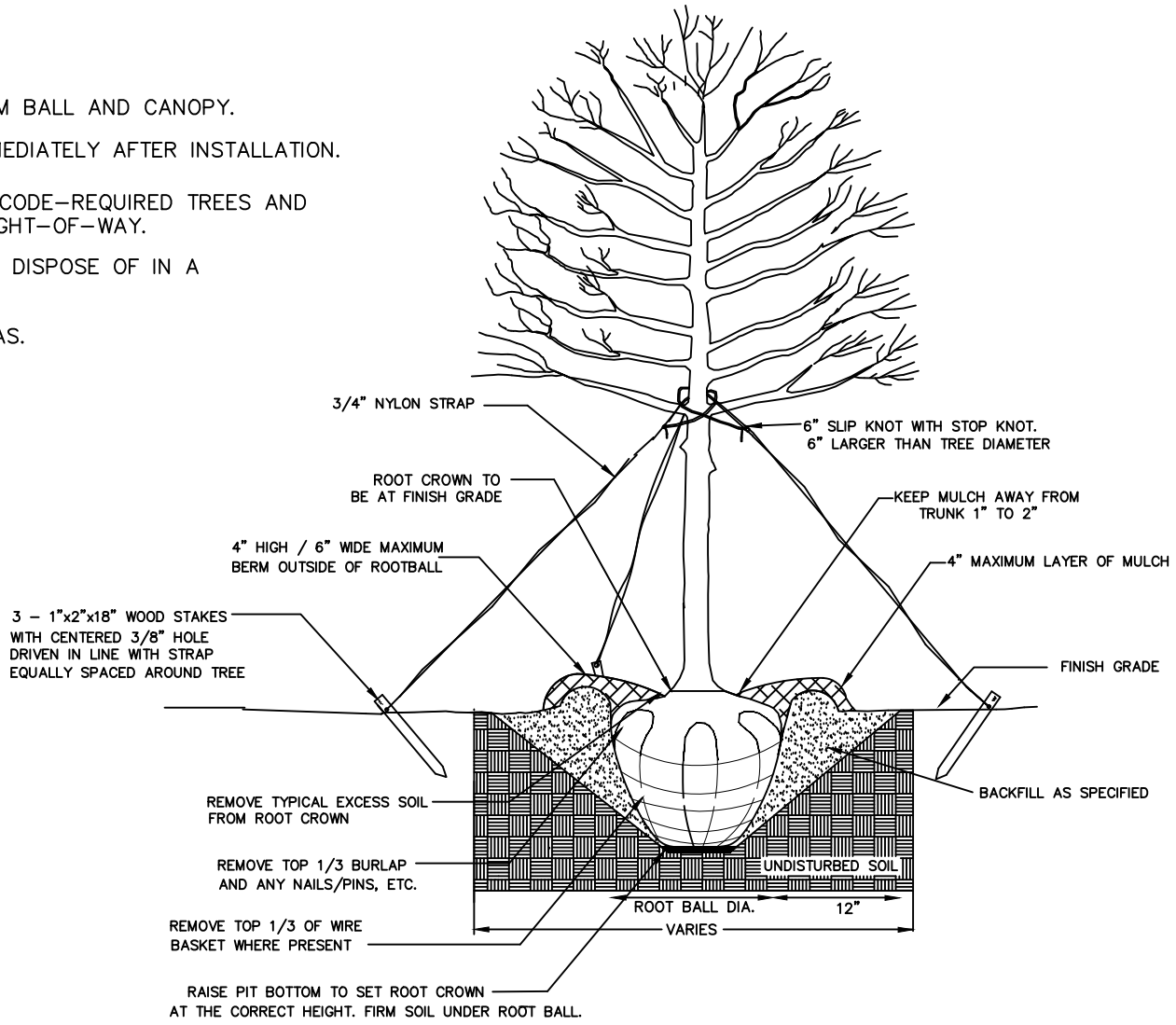
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TURBIDITY CURTAIN

| STD. NO. | REV. |
|---|---|
| 30.23 | 18 |

NOTES:

1. REMOVE WIRE AND NYLON TWINE FROM BALL AND CANOPY.
2. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION.
3. STAKING MAY BE REQUIRED FOR ALL CODE–REQUIRED TREES AND TREES PLANTED IN PUBLIC STREET RIGHT–OF–WAY.
4. REMOVE EXCESS SOIL FROM SITE AND DISPOSE OF IN A LEGAL MANNER.
5. RESEED UNMULCHED, DISTURBED AREAS.




ALL TREES SHALL MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1–2014 OR CURRENT EDITION)

| FOR EXAMPLE: | CALIPER | HEIGHT (RANGE) | MAX. HEIGHT | MIN. ROOT BALL DIA. | MIN. ROOT BALL DEPTH |
|---|---|---|---|---|---|
| | 2" | 12–14' | 16' | 24" | 16" |
| | 3" | 14–16' | 18' | 32" | 21" |

NOT TO SCALE

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LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TREE PLANTING

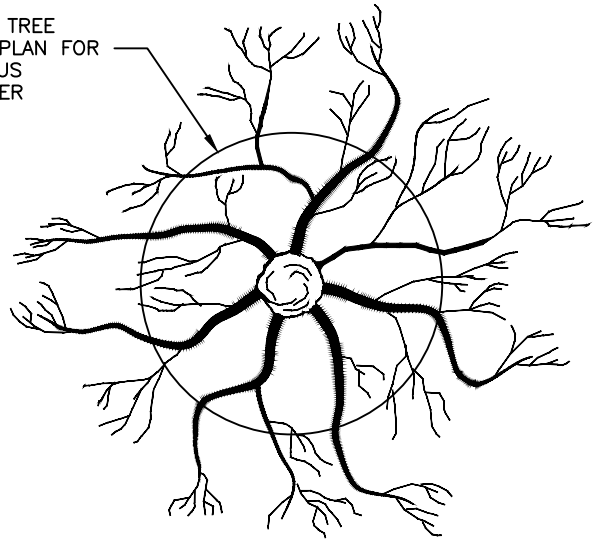
## (FOR SINGLE AND MULTI–STEM TREES)

| STD. NO. | REV. |
|---|---|
| 40.01 | 23 |

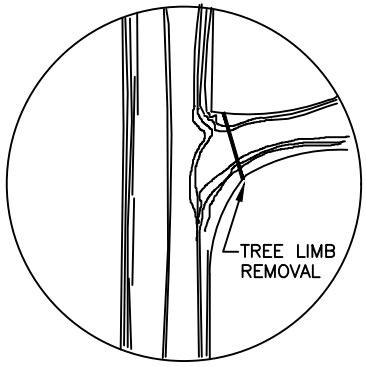
NOTES:

1. REMOVE ALL BARRIERS UPON COMPLETION OF PROJECT.
2. LANDSCAPING PLANS SHALL SHOW THE LOCATIONS OF ALL PROTECTION FENCES.
3. REFER TO CITY OF CHARLOTTE LANDSCAPE CONSTRUCTION STANDARDS SECTION 01000 FOR GENERAL SPECIFICATION REGARDING TREE PROTECTION.
4. INSTALL TREE PROTECTION SIGNAGE ON ALL FENCE BOUNDARIES PER CHARLOTTE TREE MANUAL (CTM) AND LANDSCAPE CONSTRUCTION STANDARDS. SIGN TEMPLATE PROVIDED IN CTM.
5. REFER TO CTM FOR CRITICAL ROOT ZONE PROTECTION STANDARDS.

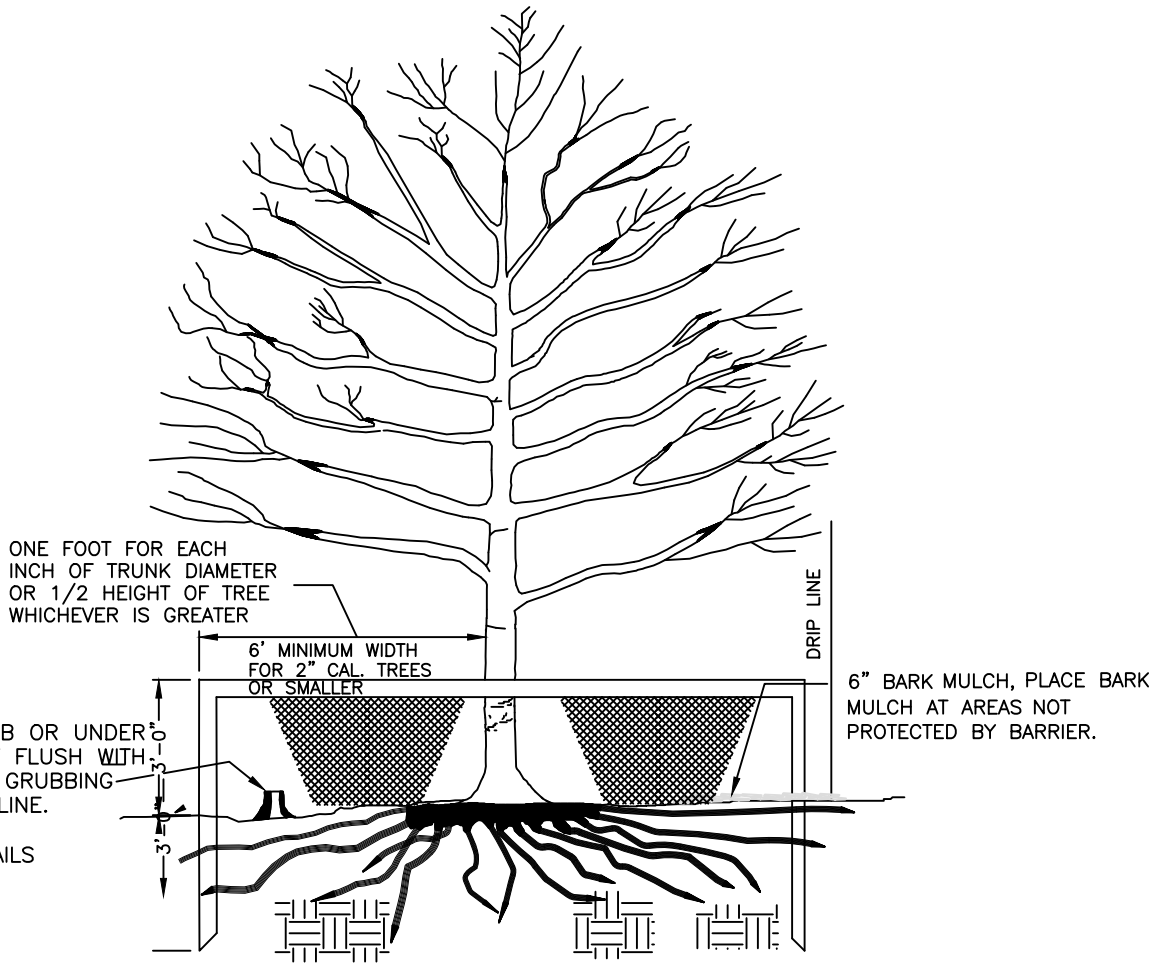
SEE APPROVED TREE PRESERVATION PLAN FOR REQUIRED RADIUS OF TREE BARRIER



PLAN VIEW OF ROOT ZONE




FOR PRUNING SEE INTERNATIONAL SOCIETY OF ARBORICULTURE SPECS.

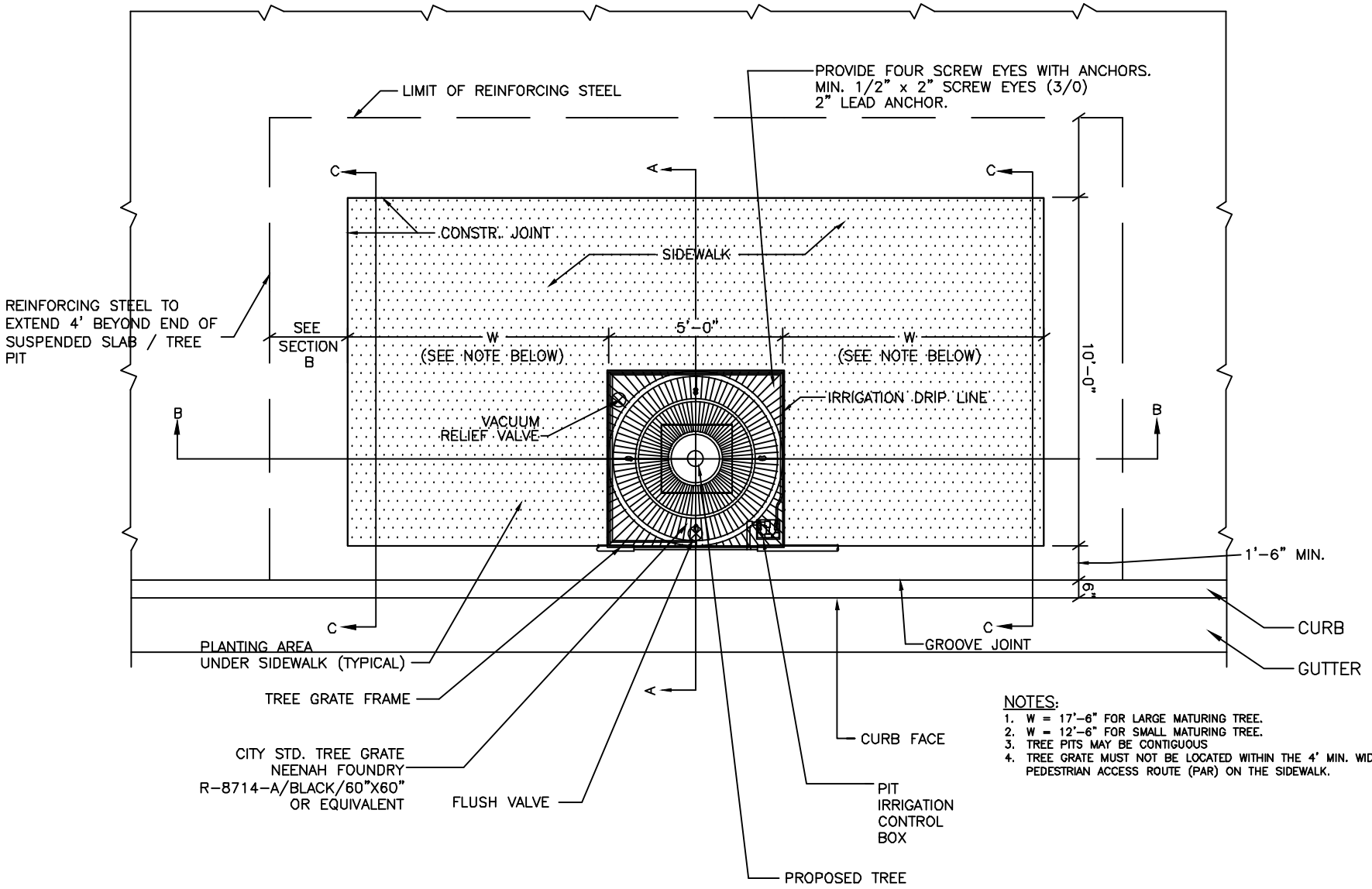



CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TREE PROTECTION DETAIL

| STD. NO. | REV. |
|---|---|
| 40.02 | 23 |



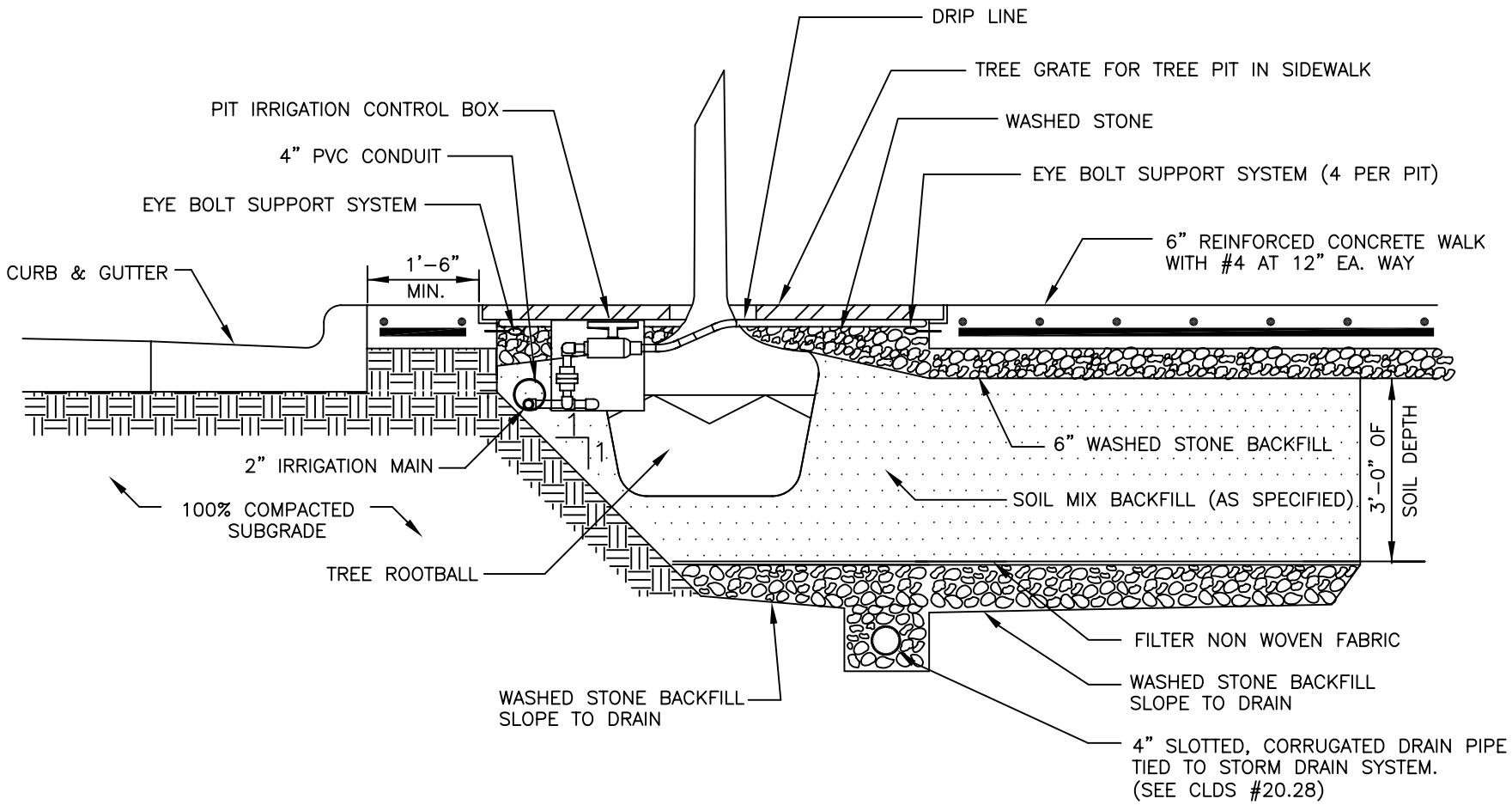

NOTES:
1. W = 17'-6" FOR LARGE MATURING TREE.
2. W = 12'-6" FOR SMALL MATURING TREE.
3. TREE PITS MAY BE CONTIGUOUS
4. TREE GRATE MUST NOT BE LOCATED WITHIN THE 4' MIN. WIDTH PEDESTRIAN ACCESS ROUTE (PAR) ON THE SIDEWALK.

CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LARGE AND SMALL MATURING TREE PIT WITH GRATE IN SIDEWALK (PLAN)

| STD. NO. | REV. |
|---|---|
| 40.03 | 13 |



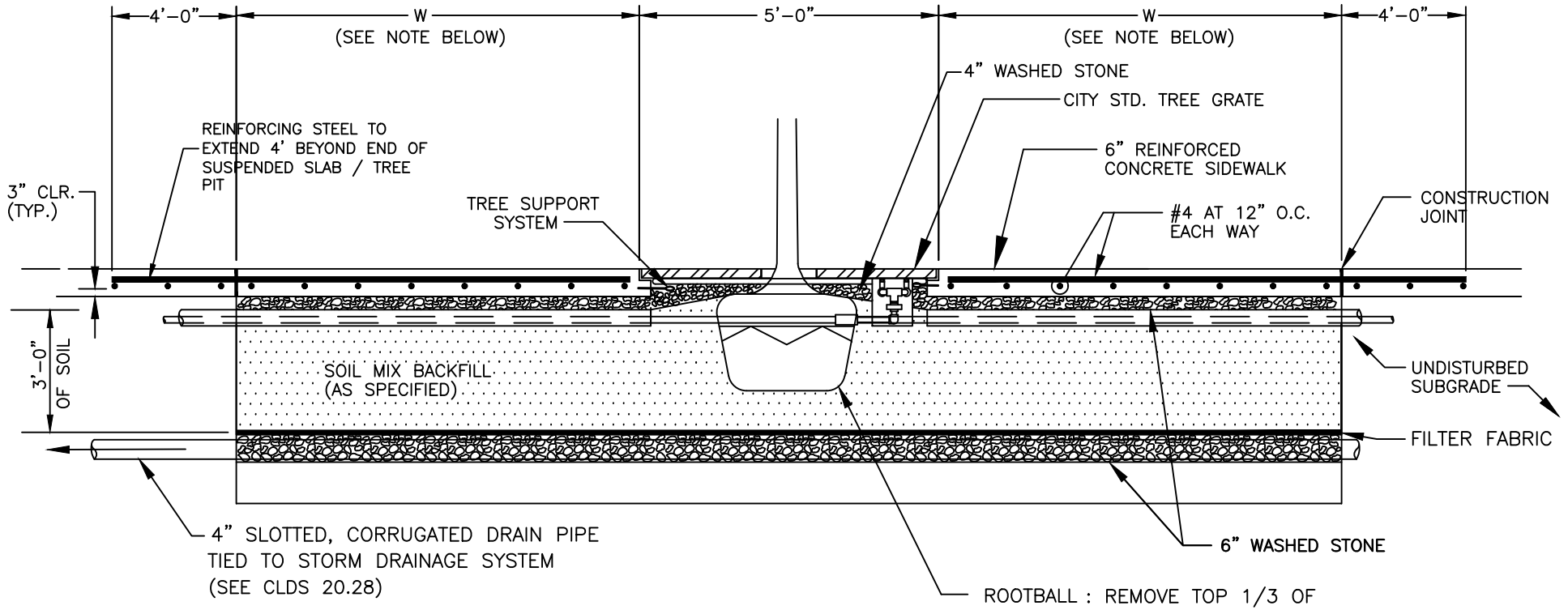

SECTION A

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LARGE AND SMALL MATURING TREE PIT WITH GRATE IN SIDEWALK (SECTION)

| STD. NO. | REV. |
|---|---|
| 40.03A | 3 |




NOTE:
W = 17'-6" FOR LARGE MATURING TREE.
W = 12'-6" FOR SMALL MATURING TREE.
TREE PITS MAY BE CONTIGUOUS

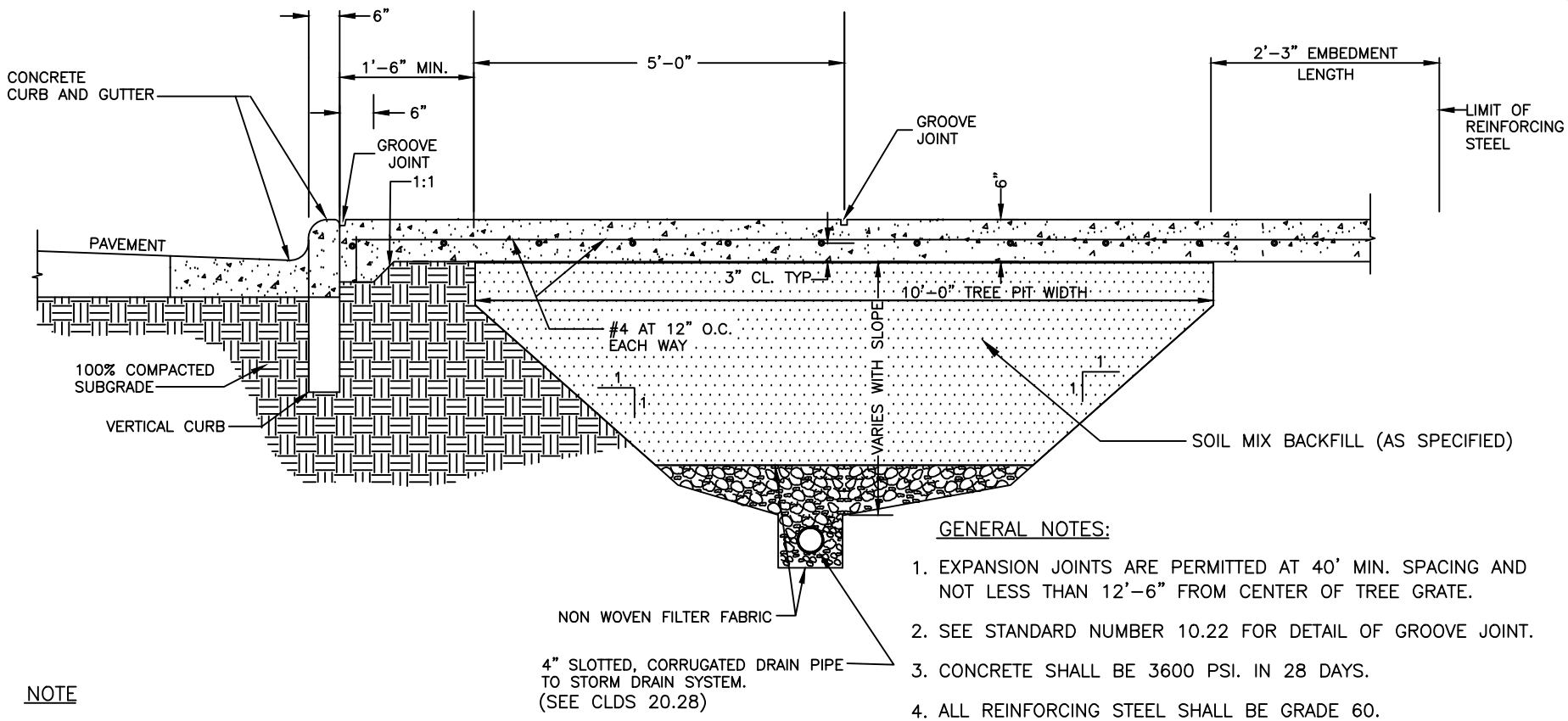
SECTION B

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LARGE AND SMALL MATURING TREE PIT WITH GRATE IN SIDEWALK (SECTION)

| STD. NO. | REV. |
|---|---|
| 40.03B | 23 |




SECTION C

NOTE

A DRAINAGE SYSTEM IS REQUIRED AS SHOWN FOR ALL IRRIGATED PLANTING AREAS LOCATED ADJACENT TO STREET.

GENERAL NOTES:

1. EXPANSION JOINTS ARE PERMITTED AT 40' MIN. SPACING AND NOT LESS THAN 12'–6" FROM CENTER OF TREE GRATE.
2. SEE STANDARD NUMBER 10.22 FOR DETAIL OF GROOVE JOINT.
3. CONCRETE SHALL BE 3600 PSI. IN 28 DAYS.
4. ALL REINFORCING STEEL SHALL BE GRADE 60.
5. USE REINFORCED STEEL BAR SUPPORTS IN COMPLIANCE WITH N.C.D.O.T. STANDARD SPECIFICATION 970–4.

CHARLOTTE

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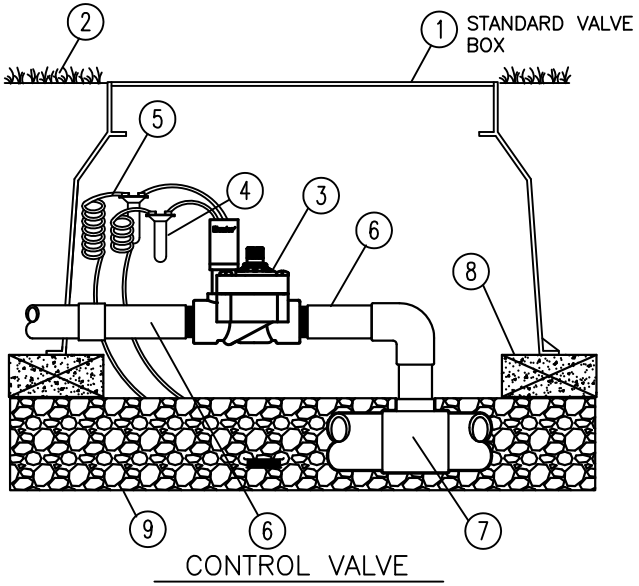
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

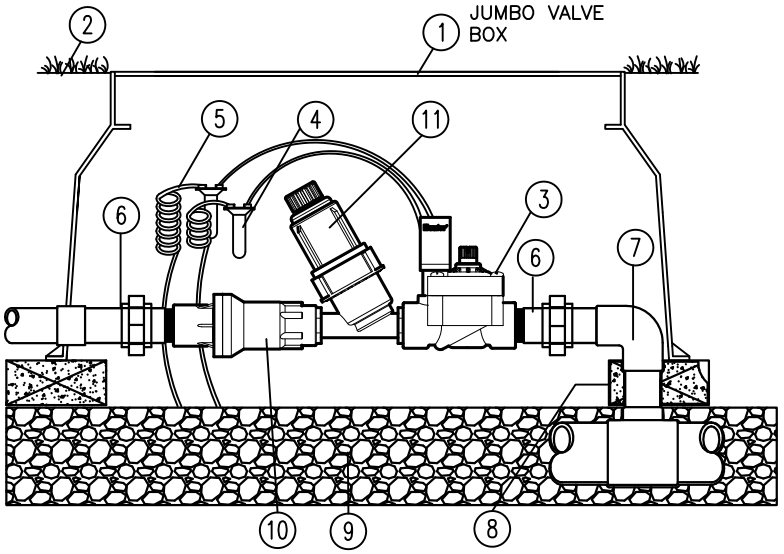
# LARGE AND SMALL TREE PIT WITH GRATE IN SIDEWALK (SECTION)

| STD. NO. | REV. |
|---|---|
| 40.03C | 12 |




CONTROL VALVE

2 FINISH GRADE
3 CONTROL VALVE WITH FLOW CONTROL
4 WATERPROOF CONNECTORS (2)
5 18–24" COILED WIRE
6 SCH 80 T.O.E. NIPPLE
7 MAIN LINE PIPE & FITTINGS
8 BRICK SUPPORTS (4)
9 3/4" MINUS WASHED GRAVEL, MIN. 3" DEPTH
10 PRESSURE REGULATOR
11 FILTER




DRIP IRRIGATION W/ PRESSURE REGULATOR AND FILTER

CHARLOTTE.

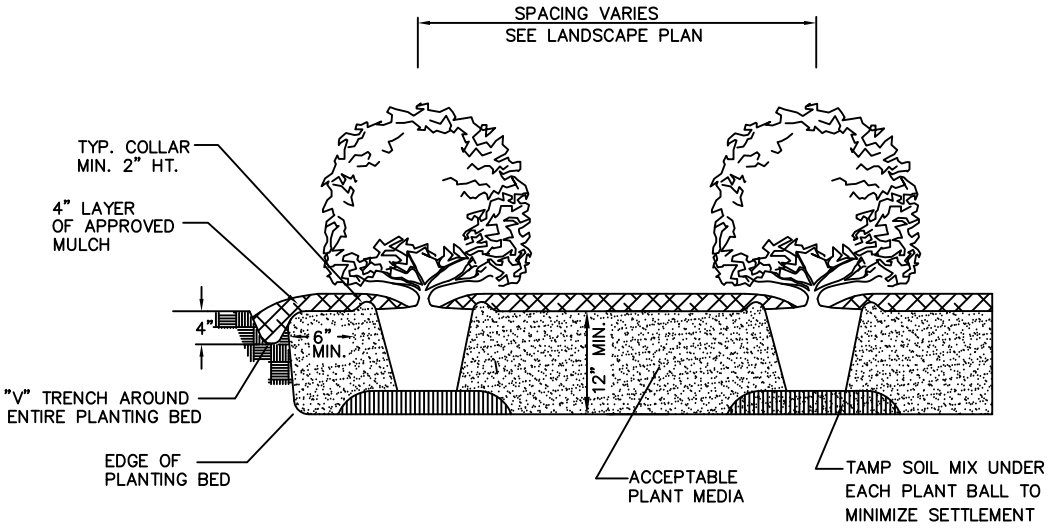
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TYPICAL VALVE AND VALVE BOX INSTALLATION

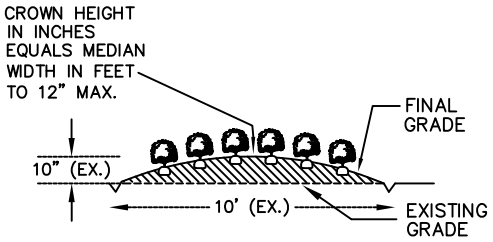
| STD. NO. | REV. |
|---|---|
| 40.04 | 9 |

NOTES:

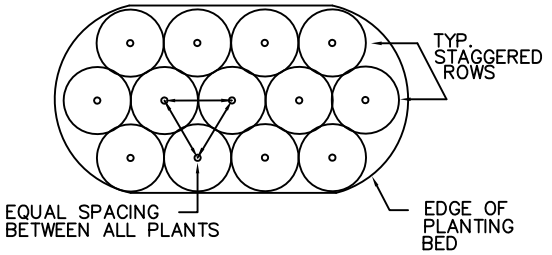
1. SCARIFY ROOT MASS OF CONTAINERIZED PLANT MATERIAL.
2. INSTALL CONTAINERIZED PLANTS AT FINSHED GRADE
3. TAMP PLANTING MIX FIRMLY AS PIT IS FILLED AROUND EACH PLANT BALL.
4. OMIT COLLAR AROUND EACH SHRUB WHEN IRRIGATION SYSTEM IS PRESENT.
5. SOAK EACH PLANT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.




TYPICAL PLANTING BED DETAIL




TYPICAL BED CROWNING




TYPICAL PLANTING BED PLAN

CHARLOTTE.

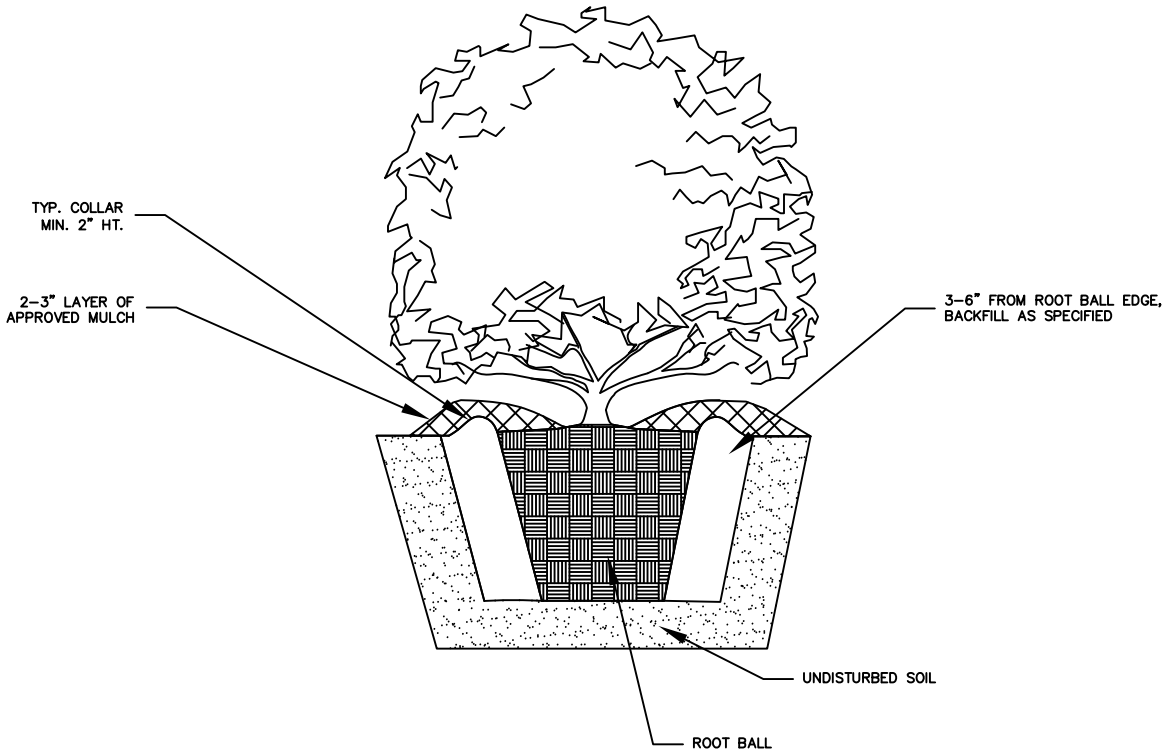
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SHRUB PLANTING BED

| STD. NO. | REV. |
|---|---|
| 40.05A | 9 |

NOTES:

1. SCARIFY ROOT MASS OF CONTAINERIZED PLANT MATERIAL.
2. INSTALL CONTAINERIZED PLANTS AT FINSHED GRADE
3. TAMP PLANTING MIX FIRMLY AS PIT IS FILLED AROUND EACH PLANT BALL.
4. OMIT COLLAR AROUND EACH SHRUB WHEN IRRIGATION SYSTEM IS PRESENT.
5. SOAK EACH PLANT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.




CHARLOTTE.

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LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# INDIVIDUAL SMALL SHRUB/TREE PLANTING

| STD. NO. | REV. |
|---|---|
| 40.05B | 9 |

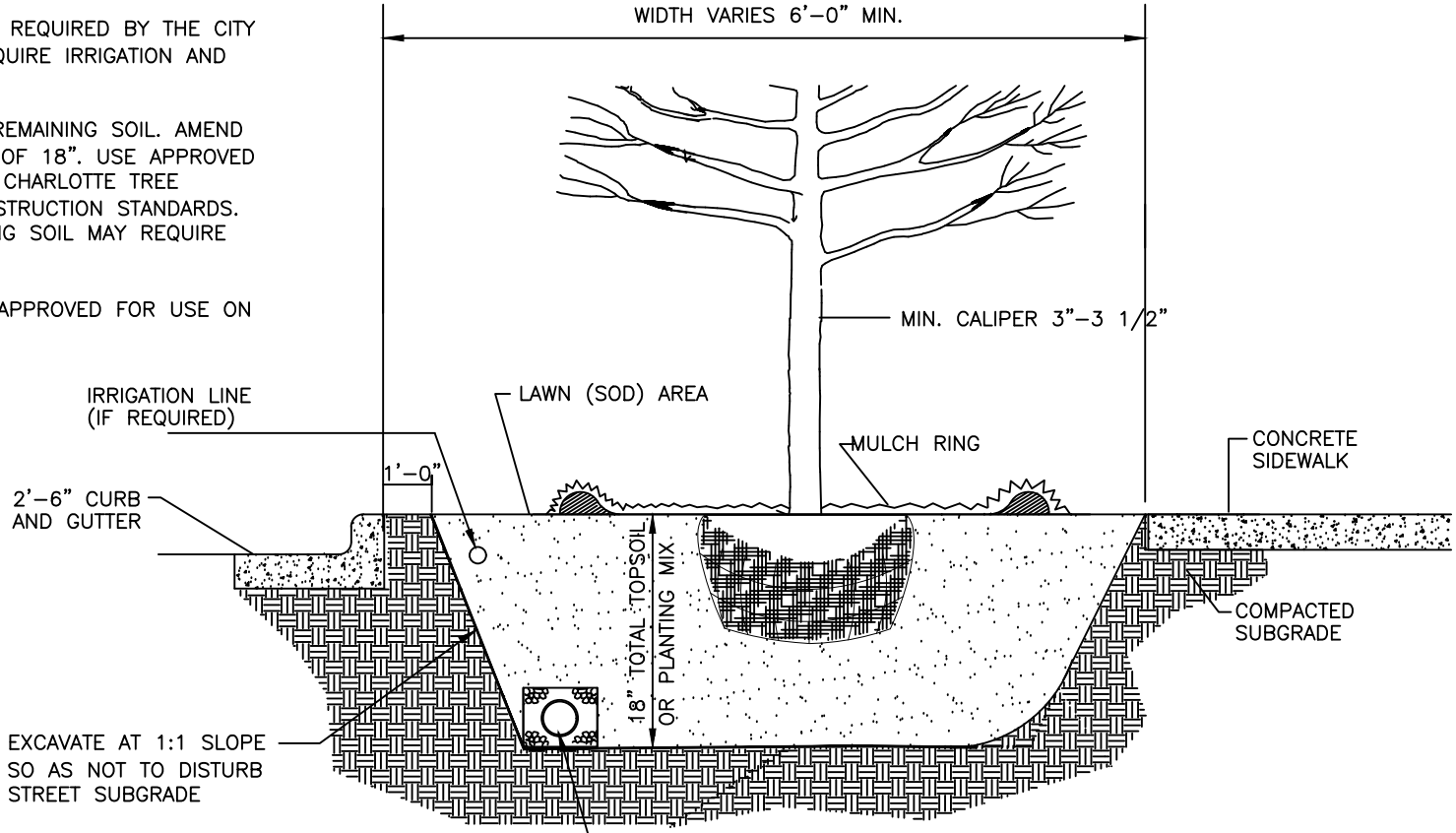
NOTES:

1. FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL, SUB–BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES

2. PLANTING STRIPS APPROVED AND/OR REQUIRED BY THE CITY WITH WIDTHS LESS THAN 8' MAY REQUIRE IRRIGATION AND DRAINAGE.

3. REMOVE OR DE–COMPACT EXISTING REMAINING SOIL. AMEND OR PROVIDE NEW SOIL TO A DEPTH OF 18". USE APPROVED PLANTING MIX WHEN AMENDING. SEE CHARLOTTE TREE MANUAL (CTM) AND LANDSCAPE CONSTRUCTION STANDARDS. SITES WITH EXTREMELY POOR EXISTING SOIL MAY REQUIRE AMENDING BEYOND 18" DEPTH.

4. IRRIGATION AND SUBDRAIN ARE NOT APPROVED FOR USE ON NCDOT–MAINTAINED STREETS.




SUBDRAIN:

DRAIN BEHIND CURB, BOTTOM OF DRAIN TO BE EVEN WITH BOTTOM OF UNCOMPACTED SOIL CONNECT TO STORM DRAINAGE SYSTEM WITH PERFORATED 4" SLOTTED, CORRUGATED DRAIN PIPE. (SEE CLDS 20.28)

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# PLANTING STRIPS LESS THAN 8' IN WIDTH

## ( WITH IRRIGATION AND DRAINAGE)

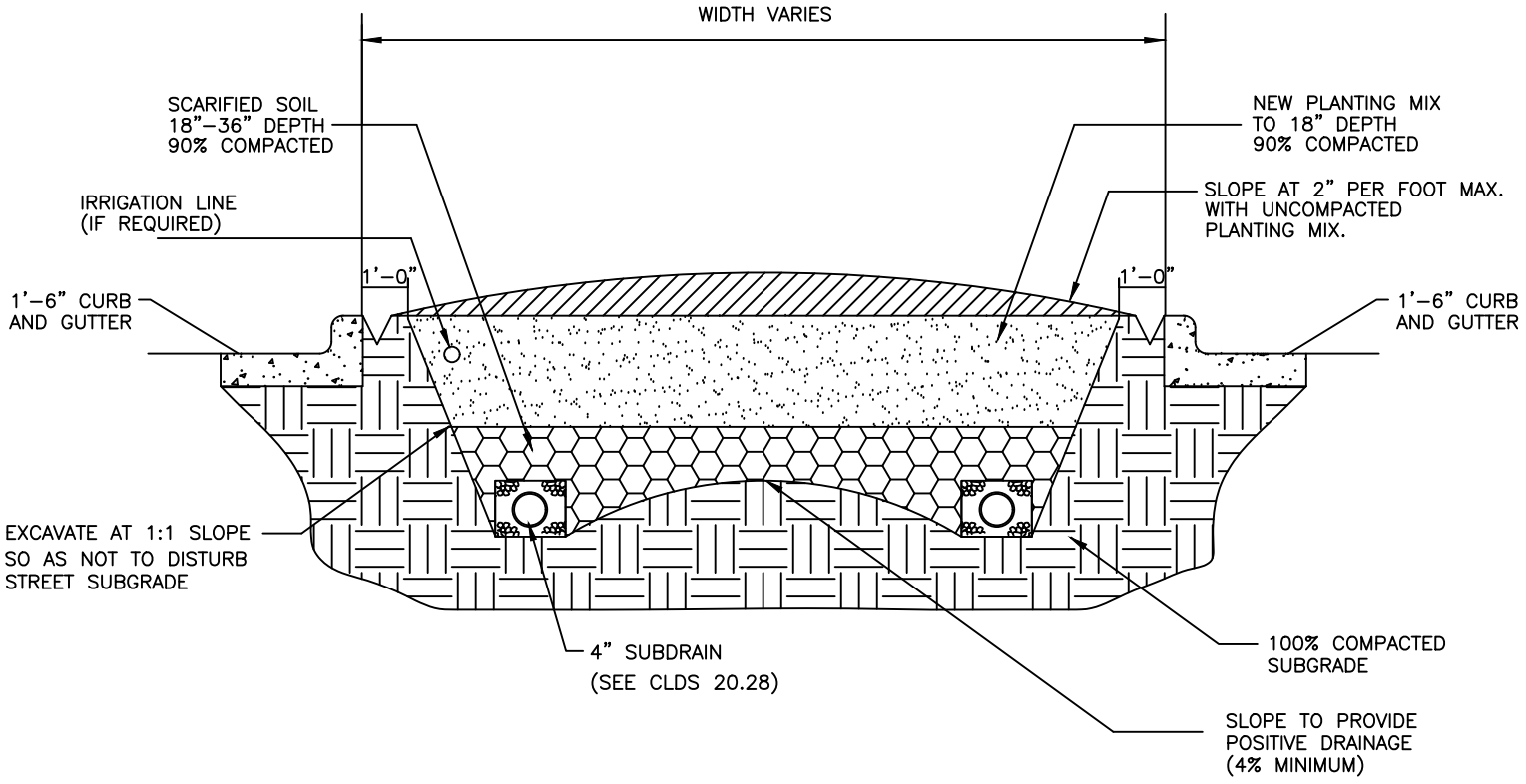
| STD. NO. | REV. |
|---|---|
| 40.06 | 23 |

NOTES:

1. FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL, SUB-BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.

2. REMOVE AND/OR AMEND EXISTING SOIL TO A DEPTH OF 18". SCARIFY, TILL, OR OTHERWISE LOOSEN REMAINING SOIL TO A DEPTH OF 18". ADD NEW PLANTING MIX AS NEEDED AND SPECIFIED BY THE CHARLOTTE TREE MANUAL (CTM) AND LANDSCAPE CONSTRUCTION STANDARDS.

3. SUBSURFACE DRAINAGE SHALL BE INSTALLED IN ALL MEDIANS AND TIED INTO EXISTING STORM DRAIN SYSTEM. A 4 INCH PERFORATED CORRUGATED PVC DRAIN OR HDPE PER AASHTO M252, TYPE CP (SINGLE-WALL, CORRUGATED) SHALL BE INSTALLED IN EACH MEDIAN AT THE BOTTOM OF THE EXCAVATED AREA. DRAIN SHALL BE COVERED WITH A MINIMUM 6 INCHES OF #57 WASHED STONE, THEN WRAPPED WITH A SPECIFIED NON-WOVEN GEOTEXTILE FABRIC. SPECIAL CARE SHALL BE EXERCISED WHEN FILLING MEDIANS WITH SOIL SO NOT TO CRUSH OR DAMAGE THE DRAINAGE SYSTEM.




CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# MEDIAN GREATER THAN 120 INCHES
# EXCAVATION, DRAINAGE AND BACKFILL

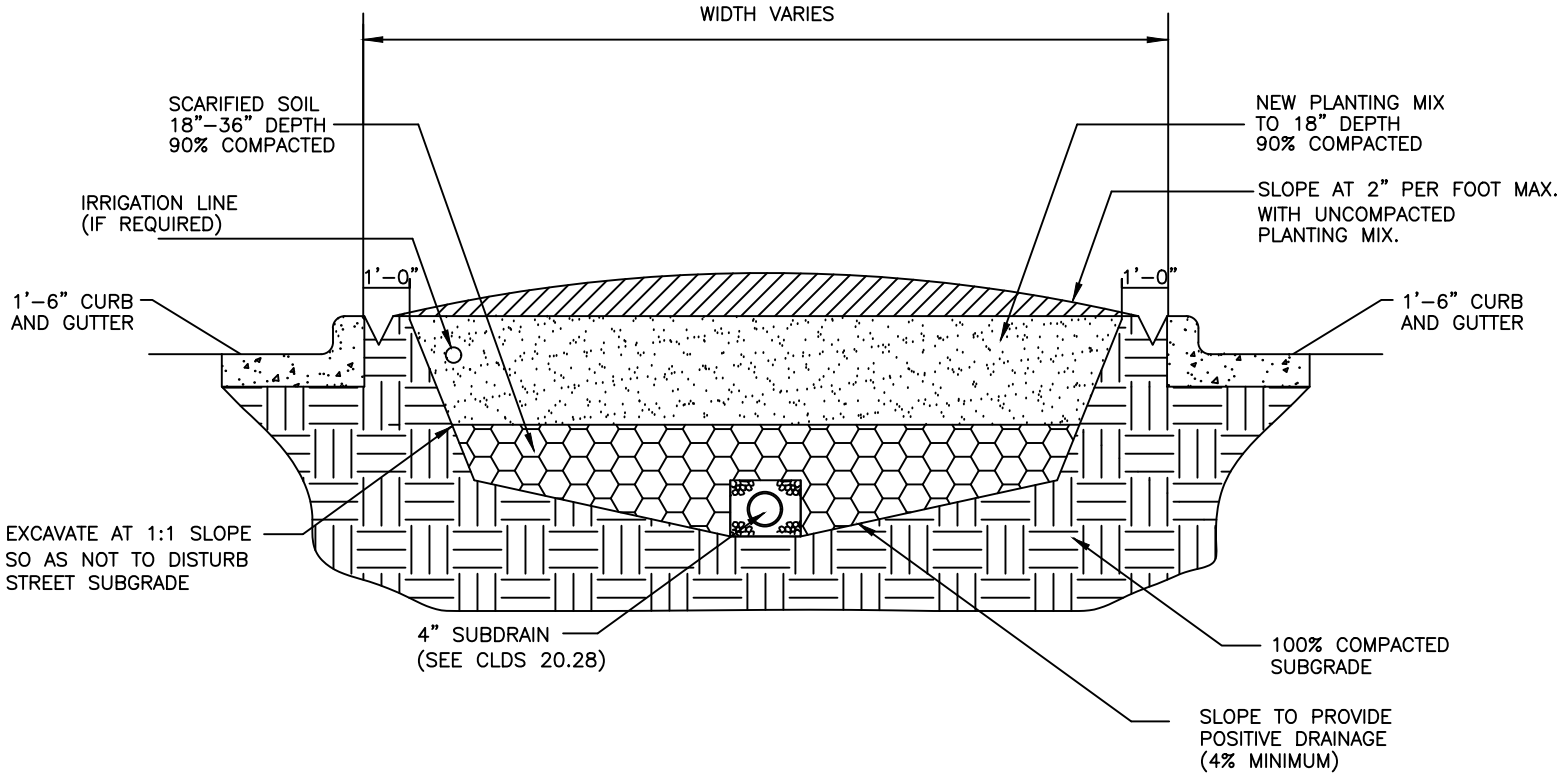
| STD. NO. | REV. |
|---|---|
| 40.08A | 23 |

NOTES:

1. FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL, SUB-BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.

2. REMOVE AND/OR AMEND EXISTING SOIL TO A DEPTH OF 18". SCARIFY, TILL, OR OTHERWISE LOOSEN REMAINING SOIL TO A DEPTH OF 18". ADD NEW PLANTING MIX AS NEEDED AND SPECIFIED BY THE CHARLOTTE TREE MANUAL (CTM) AND LANDSCAPE CONSTRUCTION STANDARDS.

3. SUBSURFACE DRAINAGE SHALL BE INSTALLED IN ALL MEDIANS AND TIED INTO EXISTING STORM DRAIN SYSTEM. A 4 INCH PERFORATED CORRUGATED PVC DRAIN OR HDPE PER AASHTO M252, TYPE CP (SINGLE-WALL, CORRUGATED) SHALL BE INSTALLED IN EACH MEDIAN AT THE BOTTOM OF THE EXCAVATED AREA. DRAIN SHALL BE COVERED WITH A MINIMUM 6 INCHES OF #57 WASHED STONE, THEN WRAPPED WITH A SPECIFIED NON-WOVEN GEOTEXTILE FABRIC. SPECIAL CARE SHALL BE EXERCISED WHEN FILLING MEDIANS WITH SOIL SO NOT TO CRUSH OR DAMAGE THE DRAINAGE SYSTEM.




CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# 73 TO 120 INCH MEDIAN EXCAVATION, DRAINAGE AND BACKFILL

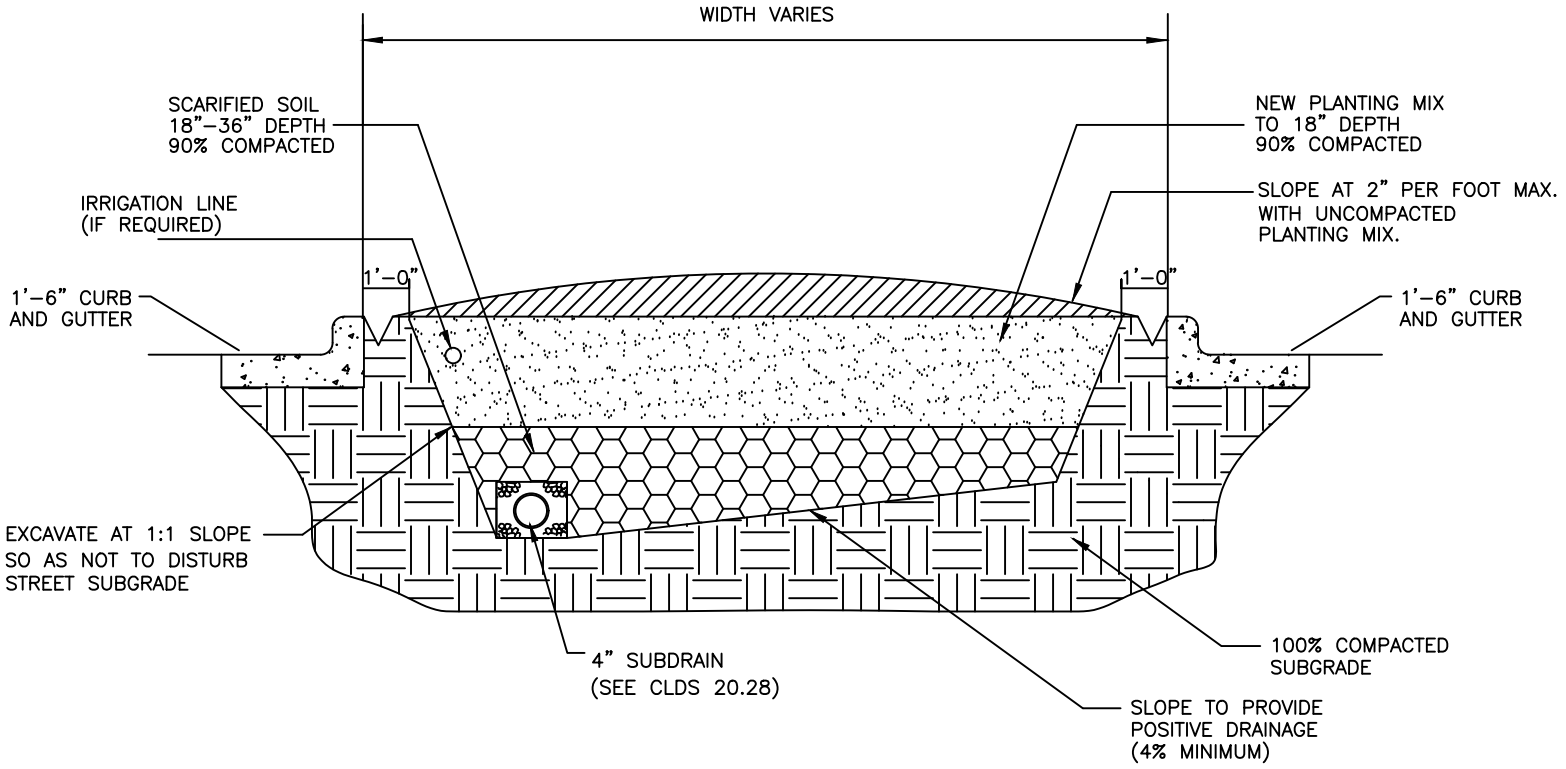
| STD. NO. | REV. |
|---|---|
| 40.08B | 23 |

NOTES:

1. FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL, SUB-BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.

2. REMOVE AND/OR AMEND EXISTING SOIL TO A DEPTH OF 18". SCARIFY, TILL, OR OTHERWISE LOOSEN REMAINING SOIL TO A DEPTH OF 18". ADD NEW PLANTING MIX AS NEEDED AND SPECIFIED BY THE CHARLOTTE TREE MANUAL (CTM) AND LANDSCAPE CONSTRUCTION STANDARDS..

3. SUBSURFACE DRAINAGE SHALL BE INSTALLED IN ALL MEDIANS AND TIED INTO EXISTING STORM DRAIN SYSTEM. A 4 INCH PERFORATED CORRUGATED PVC DRAIN OR HDPE PER AASHTO M252, TYPE CP (SINGLE-WALL, CORRUGATED) SHALL BE INSTALLED IN EACH MEDIAN AT THE BOTTOM OF THE EXCAVATED AREA. DRAIN SHALL BE COVERED WITH A MINIMUM 6 INCHES OF #57 WASHED STONE, THEN WRAPPED WITH A SPECIFIED NON-WOVEN GEOTEXTILE FABRIC. SPECIAL CARE SHALL BE EXERCISED WHEN FILLING MEDIANS WITH SOIL SO NOT TO CRUSH OR DAMAGE THE DRAINAGE SYSTEM.

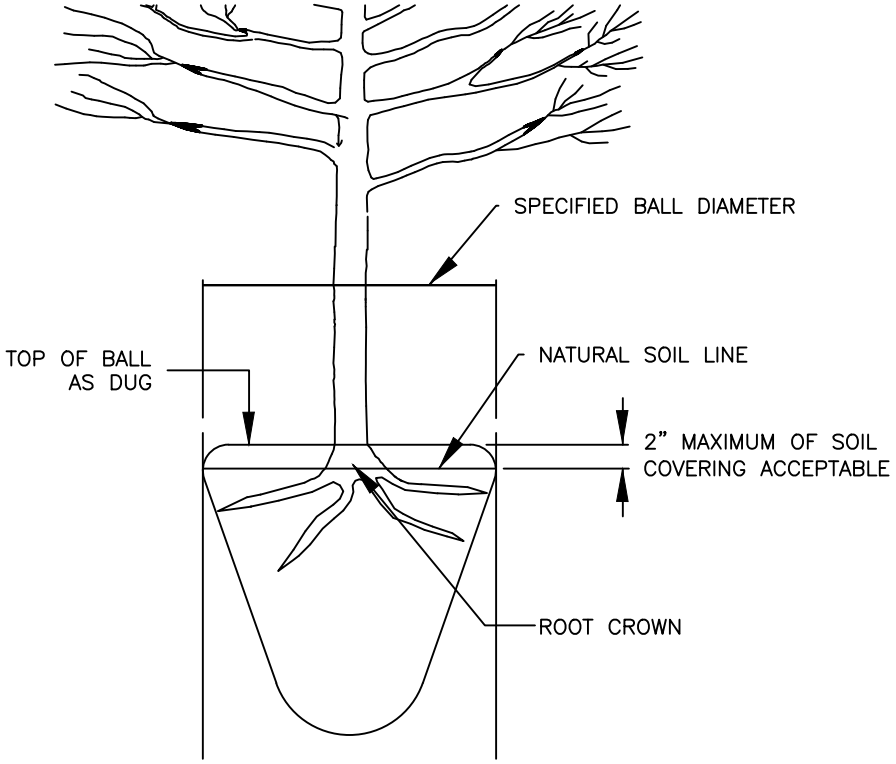



CHARLOTTE.

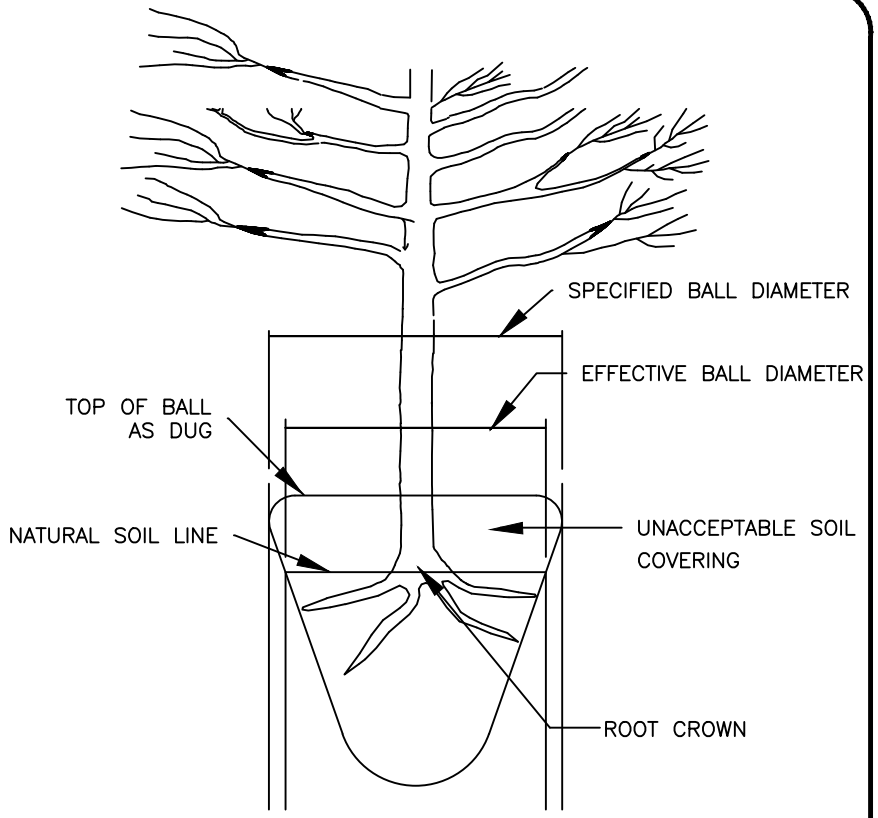
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# 48 TO 72 INCH MEDIAN EXCAVATION, DRAINAGE AND BACKFILL

| STD. NO. | REV. |
|---|---|
| 40.08C | 23 |




ACCEPTABLE CONDITION
(AS DELIVERED)




UNACCEPTABLE CONDITION
(AS DELIVERED)

NOTE:
A ROOT FLARE EXCAVATION FOR ALL TREES SPECIFIED WILL BE DONE BY THE CITY TO ENSURE THAT TREES WERE NOT PLANTED/GROWN TOO DEEPLY AT SOURCE (NURSERY). LANDSCAPE CONTRACTOR SHALL HAVE SUPPLIER MARK GROUND LEVEL LINE ABOVE ROOT BALL. IF THE CITY DETERMINES THAT THERE IS EXCESSIVE SOIL OVER THE ROOT CROWN, THESE TREES WILL BE REJECTED.

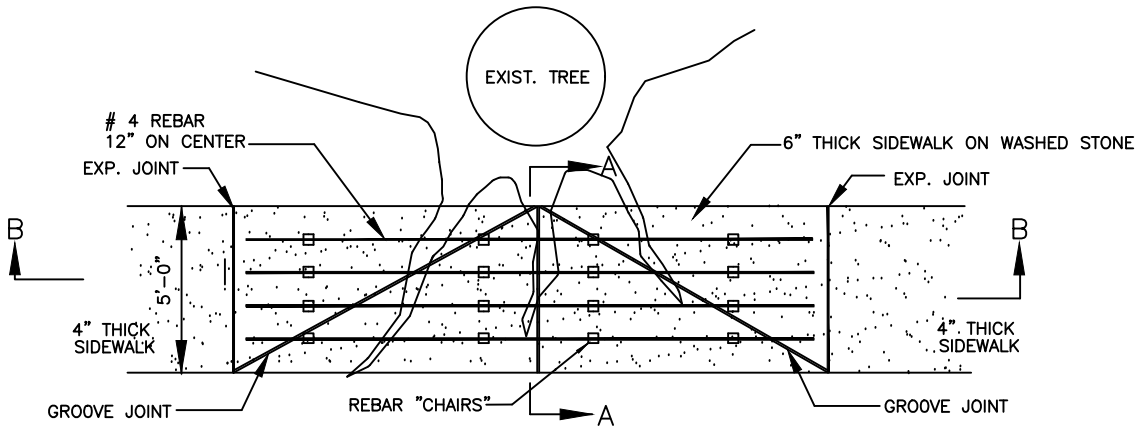
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# ROOT FLARE DEPTHS

(TREE ROOT BALL CONDITION ON TREES FROM SUPPLIERS)

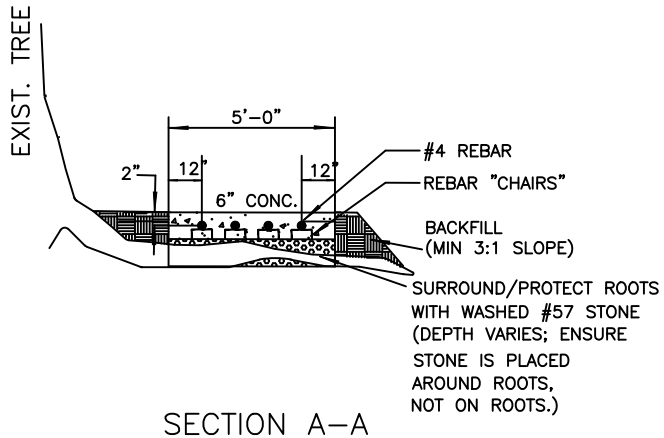
| STD. NO. | REV. |
|---|---|
| 40.09 | 23 |



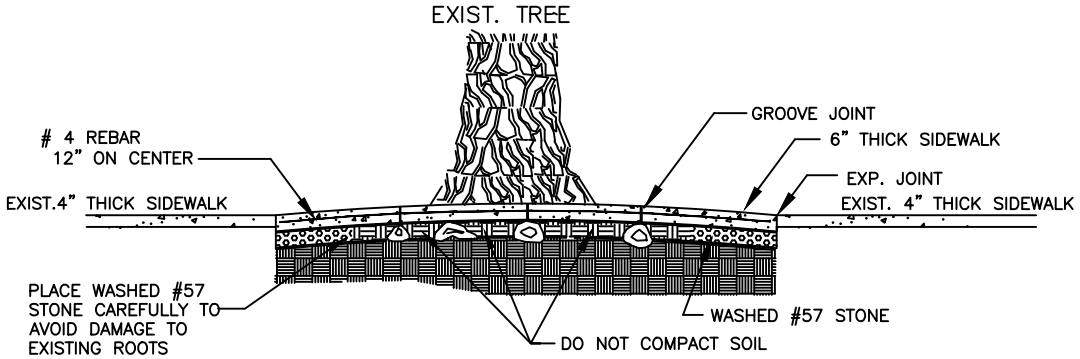

PLAN VIEW

NOTES:

1. BRIDGING LENGTH IS A MINIMUM OF 1 LINEAR FOOT OF BRIDGING PER INCH OF DIAMETER AT BREAST HEIGHT (DBH). BASED ON FIELD CONDITIONS, MAY BE LONGER AS NEEDED.
2. NOT TO BE USED WHEN LESS THAN 4' WIDE PLANTING STRIP BETWEEN SIDEWALK AND BACK OF CURB.




SECTION A–A




SECTION B–B

CHARLOTTE.

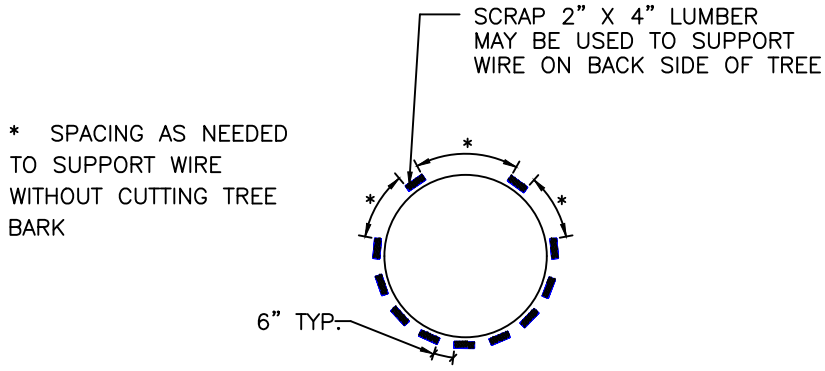
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# REINFORCED CONCRETE SIDEWALK (BRIDGING TREE ROOTS)

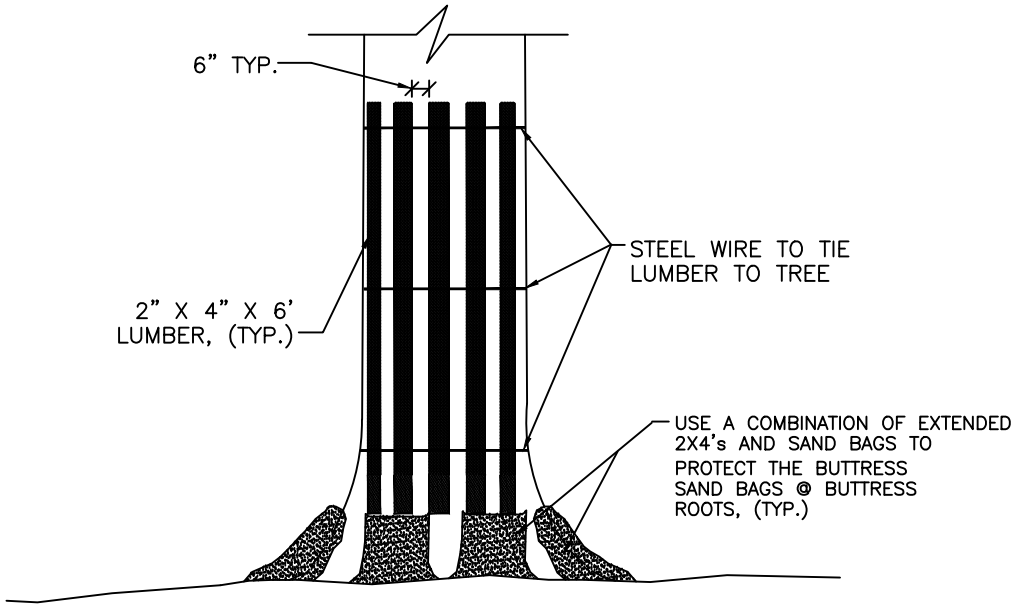
| STD. NO. | REV. |
|---|---|
| 40.11 | 23 |

NOTES:

1. THIS TREE BUMPER DETAIL SHALL BE USED WHEN WORKING WITHIN 10' OF AN EXISTING TREE TO BE PROTECTED.
2. ALL TREES SHALL BE SAVED UNLESS NOTED OTHERWISE ON THE PLANS OR DIRECTED BY THE CITY.
3. LUMBER, WIRE, AND SANDBAGS MAY BE REUSED AT OTHER TREES.
4. THE INTENT OF THIS DETAIL IS TO PROTECT EXISTING TREES FROM DAMAGE DURING CONSTRUCTION AN ALTERNATE APPROACH MAY BE USED IF APPROVED IN WRITING BY THE CITY.




PLAN VIEW




ELEVATION VIEW

CHARLOTTE.

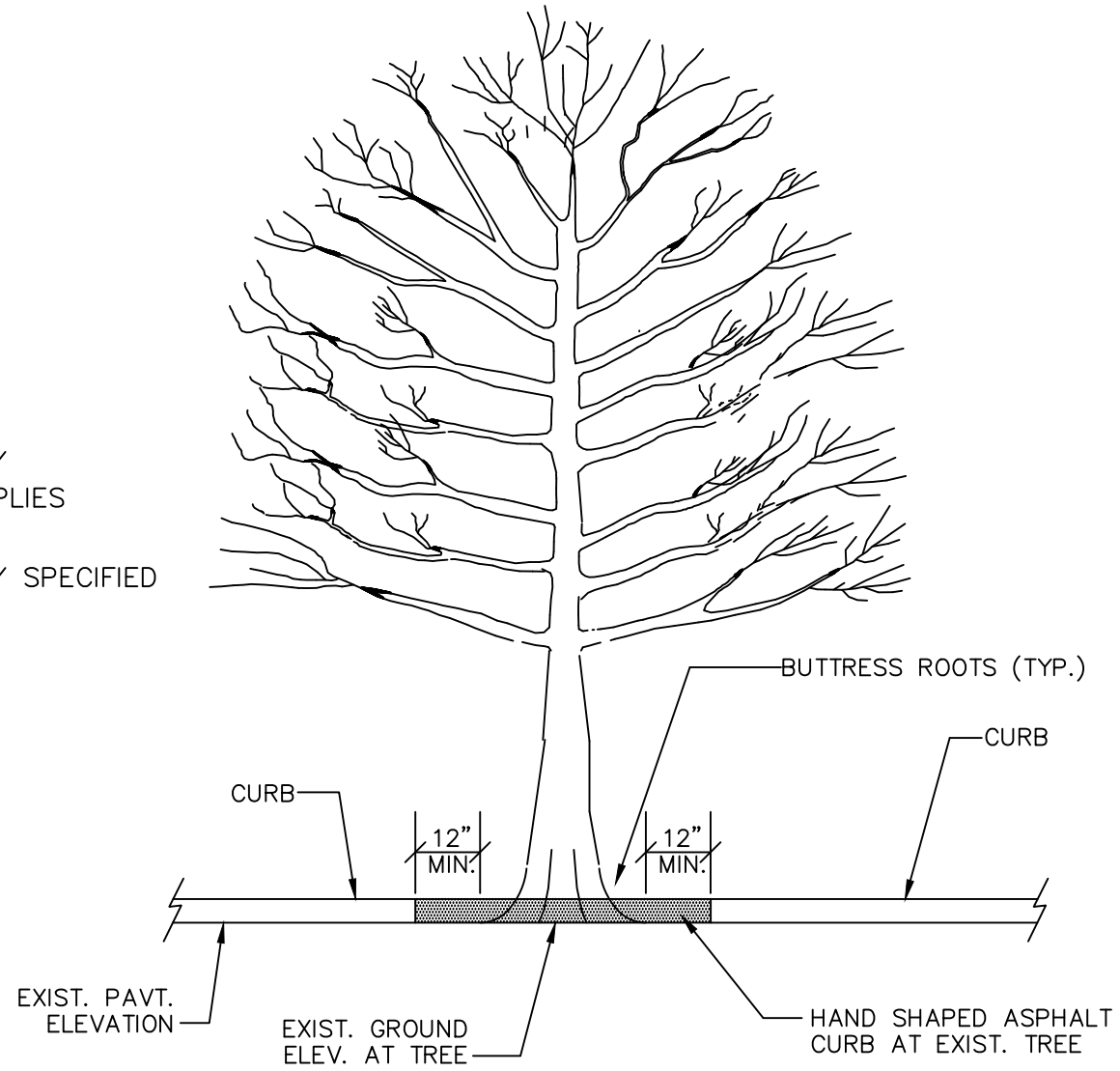
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TEMPORARY TREE TRUNK PROTECTION DETAIL

| STD. NO. | REV. |
|---|---|
| 40.12 | 23 |

NOTES:

1. CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR EXISTING TREES.
2. WHERE EXISTING TREES ARE WITHIN 4' OF THE PROPOSED BACK OF CURB, THE PROPOSED CURB SHALL END A MINIMUM OF 12" FROM THE TREE'S BUTTRESS ROOTS.
3. CONTRACTOR SHALL COORDINATE WITH THE CITY TO IDENTIFY TREES FOR WHICH THIS DETAIL APPLIES PRIOR TO CONSTRUCTION NEAR THE TREE(S).
4. NO TREES SHALL BE REMOVED UNLESS CLEARLY SPECIFIED ON THE PLANS OR IDENTIFIED BY THE CITY.
5. AVOID FILL PLACEMENT NEAR TREE.

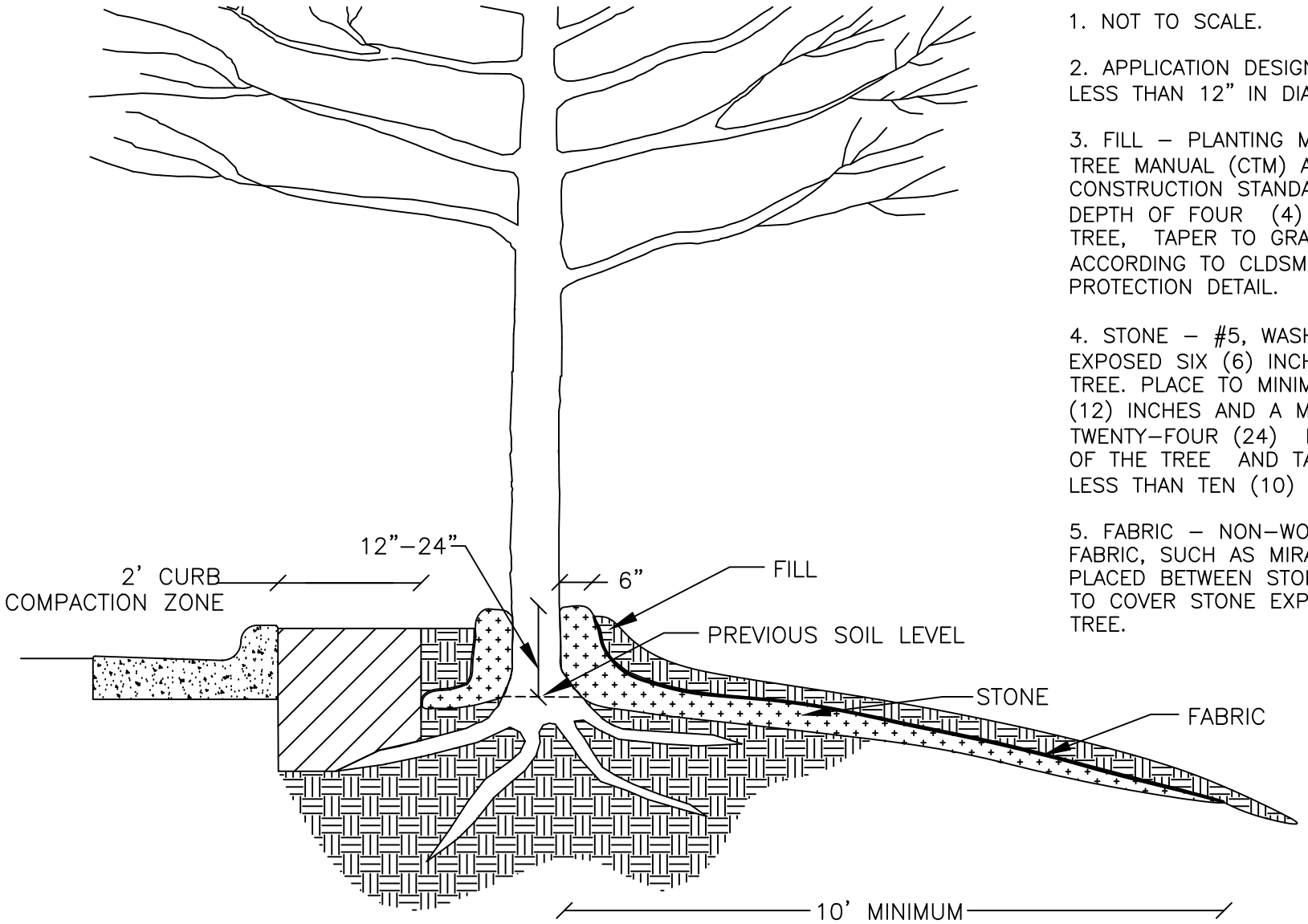



CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# ASPHALT CURB PLACEMENT AT EXISTING TREES

| STD. NO. | REV. |
|---|---|
| 40.13 | 23 |




NOTES:

1. NOT TO SCALE.

2. APPLICATION DESIGNED FOR TREES NO LESS THAN 12" IN DIAMETER.

3. FILL – PLANTING MIX PER CHARLOTTE TREE MANUAL (CTM) AND LANDSCAPE CONSTRUCTION STANDARDS. APPLY TO A DEPTH OF FOUR (4) INCHES AT BASE OF TREE, TAPER TO GRADE. SEED AND MULCH ACCORDING TO CLDSM DETAIL #40.02, TREE PROTECTION DETAIL.

4. STONE – #5, WASHED. MAINTAIN EXPOSED SIX (6) INCH WIDTH AT TRUNK OF TREE. PLACE TO MINIMUM DEPTH OF TWELVE (12) INCHES AND A MAXIMUM OF TWENTY–FOUR (24) INCHES AT THE BASE OF THE TREE AND TAPER OUTWARD TO NO LESS THAN TEN (10) FEET.

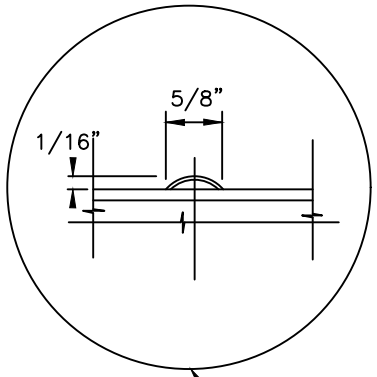
5. FABRIC – NON–WOVEN GEOTEXTILE FABRIC, SUCH AS MIRAFI OR EQUIVALENT, PLACED BETWEEN STONE AND FILL. IT IS NOT TO COVER STONE EXPOSED AT TRUNK OF TREE.

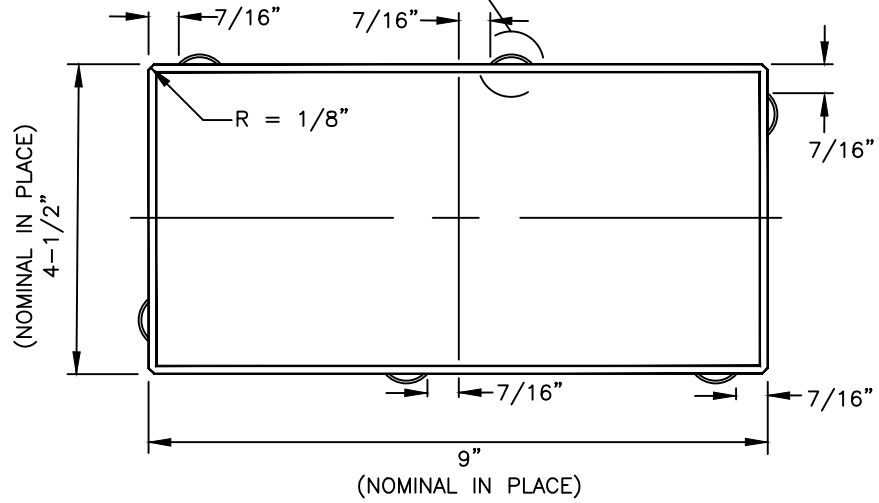
CHARLOTTE.

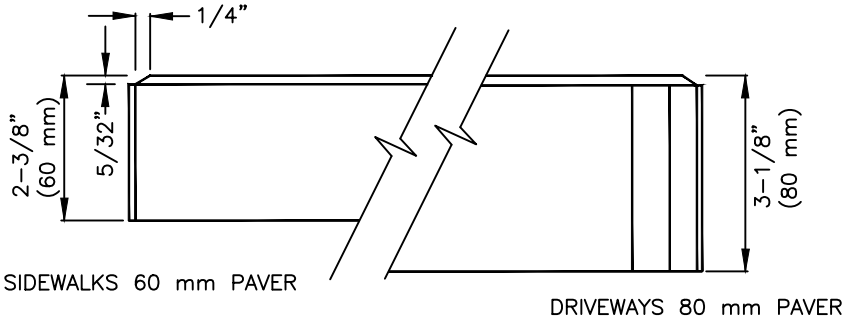
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# ROCK CHIMNEY

| STD. NO. | REV. |
|---|---|
| 40.14 | 23 |




NOTES:

1. CONCRETE PAVERS PERMITTED UNDER AN ENCROACHMENT AGREEMENT WITH ALL APPLICABLE AGENCIES (CDOT OR NCDOT)
2. 4 1/2" x 9" x 60mm FOR SIDEWALKS
3. 4 1/2" x 9" x 80mm FOR DRIVEWAYS
4. BATCH DESIGN SHALL CONSIST OF 450 lbs. CEMENT / 2,085 lbs. AGGREGATES / MINIMUM 12 lbs. OF INORGANIC COLOR PIGMENT
5. COLOR SHALL BE A THREE-COLOR BLEND OF 15% BRICK RED, 35% MIDNIGHT BLACK, AND 50% BAJA RED TO CREATE A DARK ROSE, MOTTLED PAVEMENT SURFACE
6. PAVERS SHALL HAVE A UNIFORM SURFACE TEXTURE THAT IS NOT UNUSUALLY COARSE OR PITTED
7. SHALL BE INSTALLED ON A CONCRETE SUBSLAB BASE (50.01B)
8. PAVER JOINTS SHALL BE TIGHT AND FILLED WITH MANUFACTURED SAND FINES
9. VERTICAL SURFACE DISCONTINUITIES SHOULD BE MINIMIZED AND SHALL NOT EXCEED 1/4"

NOT TO SCALE

CHARLOTTE.

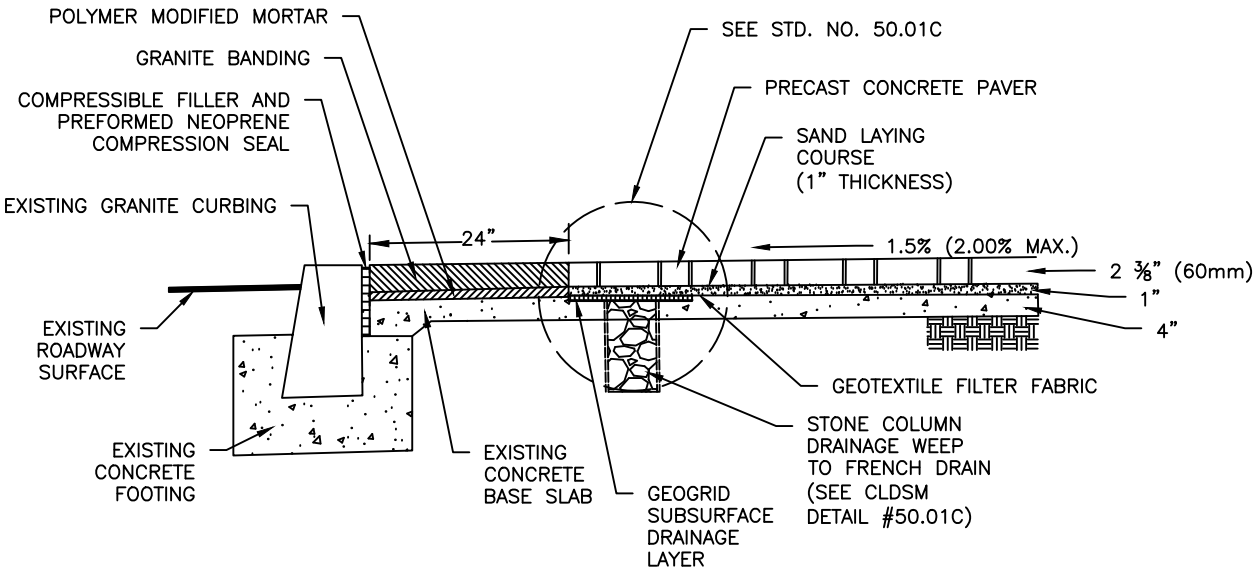
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PRECAST CONCRETE PAVERS FOR UPTOWN STREETSCAPE

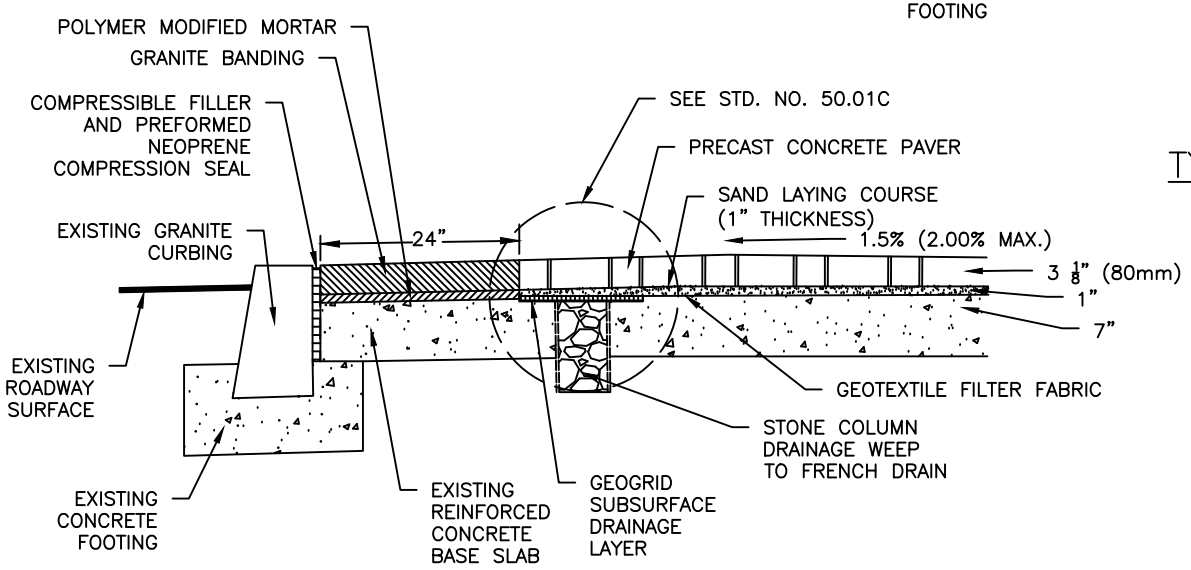
| STD. NO. | REV. |
|---|---|
| 50.01A | 23 |

## NOTES:

1. 4 ½" X 9" X 60mm PAVERS FOR SIDEWALKS
2. 4 ½" X 9" X 80mm PAVERS FOR DRIVEWAYS
3. THE BASE SLAB ELEVATION MAY HAVE TO BE ADJUSTED BY GRINDING AND/OR WITH MORTAR FILL TO PROVIDE A UNIFORM SAND LAYING COURSE THICKNESS OF ONE INCH
4. SIDEWALKS SHALL HAVE A DESIRED CROSS SLOPE OF 1.5% (2.00% MAXIMUM)
5. VERTICAL SURFACE DISCONTINUITIES SHOULD BE MINIMIZED AND SHALL NOT EXCEED ¼"




TYPICAL PAVER SIDEWALK SECTION WITH CONCRETE SUBSLAB BASE




TYPICAL PAVER DRIVEWAY SECTION WITH CONCRETE SUBSLAB BASE

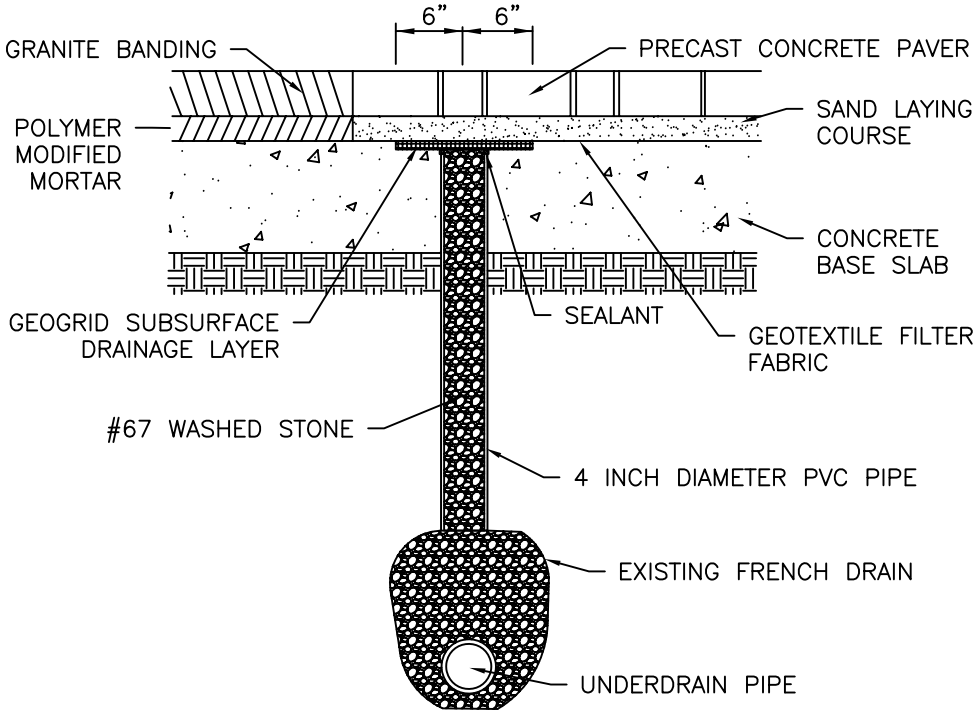
NOT TO SCALE

CHARLOTTE.

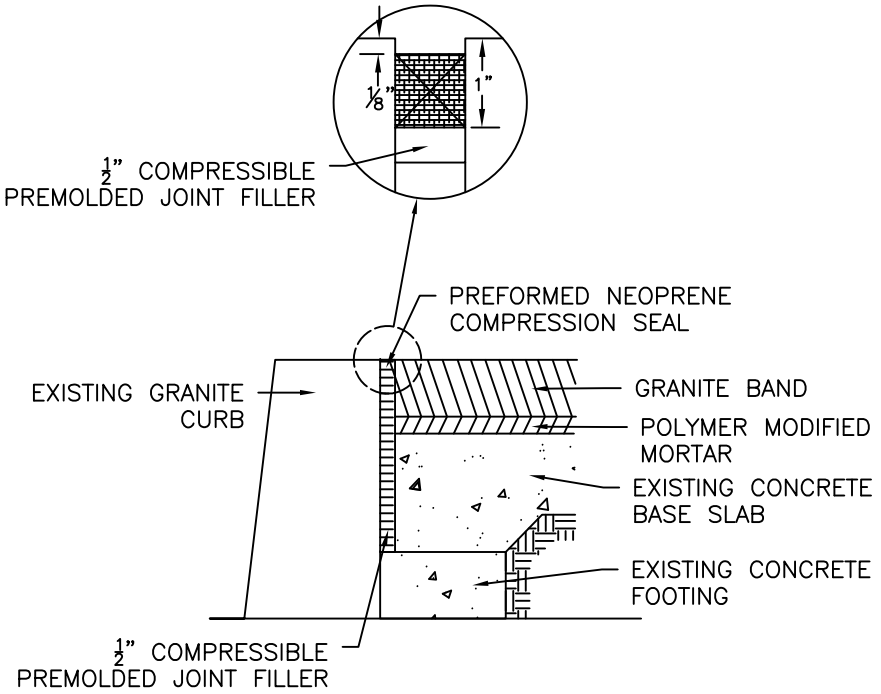
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PRECAST CONCRETE PAVERS FOR UPTOWN STREETSCAPE

| STD. NO. | REV. |
|---|---|
| 50.01B | 23 |




TYPICAL STONE COLUMN DRAINAGE WEEP




TYPICAL EXPANSION JOINT ON CONCRETE BASE SLAB AND CURB

NOTES:

1. SURFACE OF CONCRETE BASE SLAB TO BE LOWERED BY GRINDING OR OTHER MEANS TO OBTAIN 12 INCH STRIP OF GEOGRID SURFACE DRAINAGE LAYER

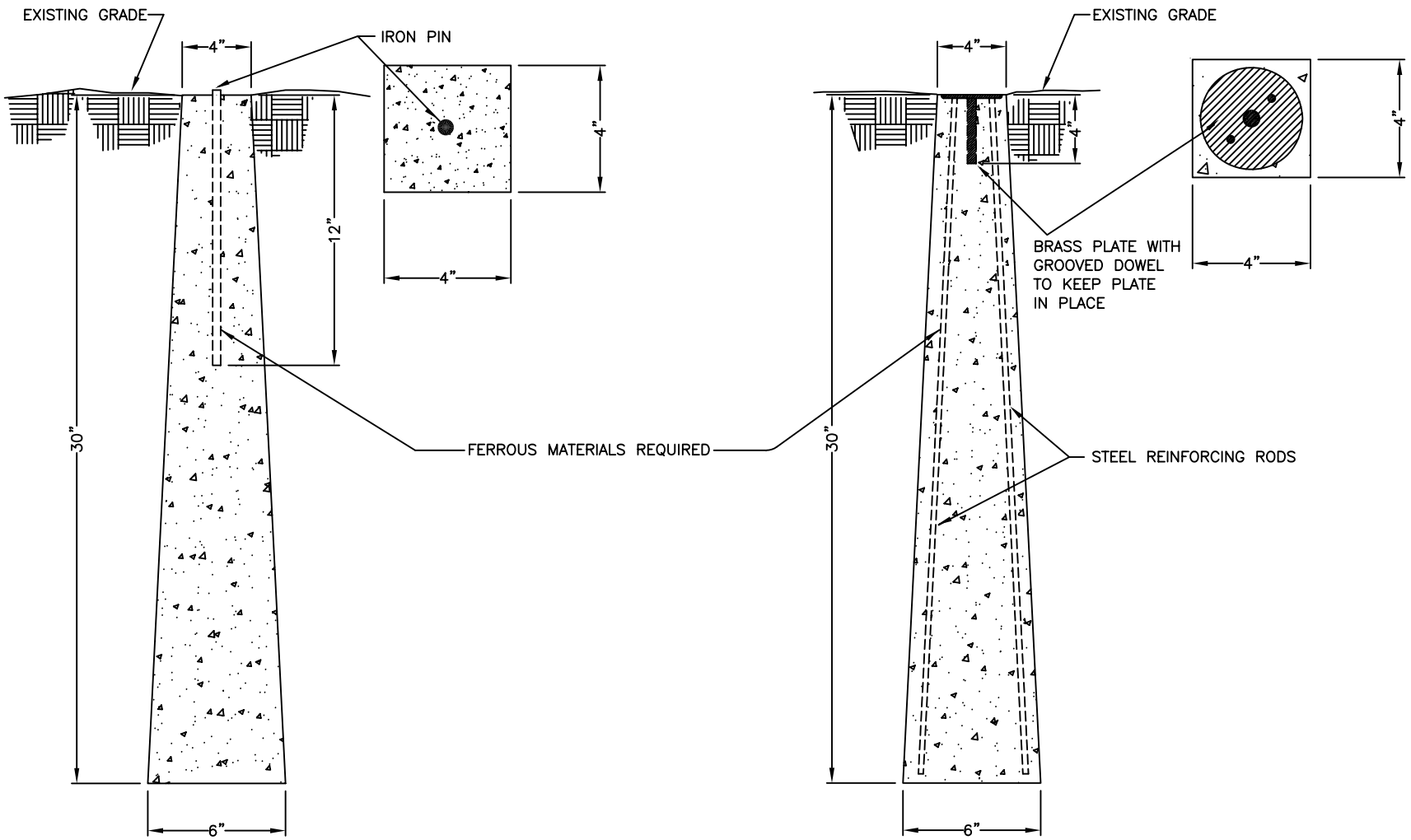
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PRECAST CONCRETE PAVERS FOR UPTOWN STREETSCAPE

| STD. NO. | REV. |
|---|---|
| 50.01C | 23 |



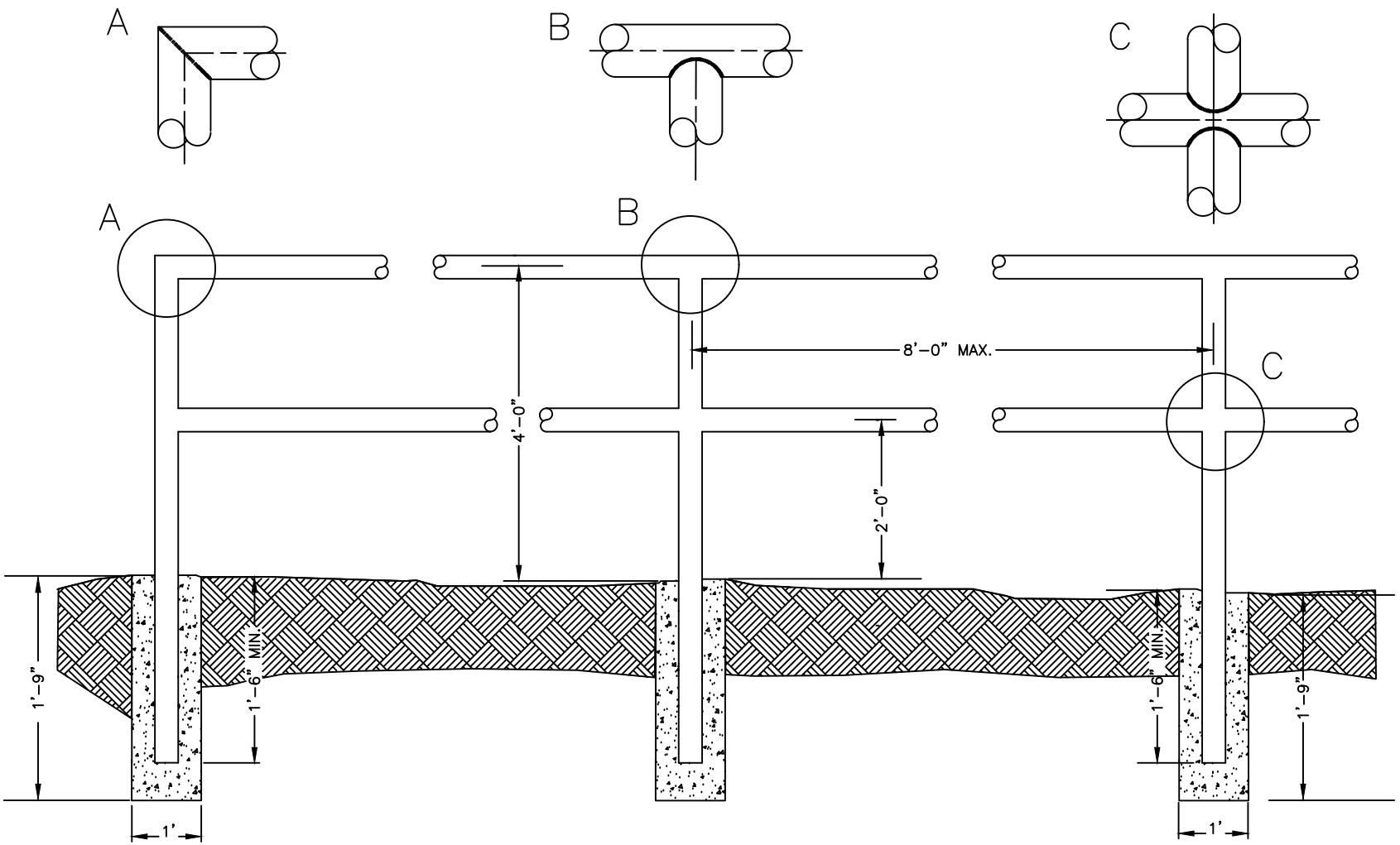

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# TYPICAL CONCRETE CONTROL MONUMENT

| STD. NO. | REV. |
|---|---|
| 50.03 | |




NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
2. TYPE OF PIPE TO BE USED IS 1-5/8" MAX. O.D. BLACK IRON, LOW CARBON PIPE OR GALVANIZED.
3. ALL JOINTS TO HAVE A 1/2" FILLET WELD AT ALL JOINTS.
4. AFTER INSTALLATION PAINT ASSMBLY WITH BLACK ALL WEATHER ENAMEL.
5. SEE DETAIL 50.04-B FOR WARRANTS
6. ALTERNATIVE DESIGNS SHALL BE SENT TO CDOT FOR APPROVAL. ANY ALTERNATE DESIGN WILL BE PRIVATELY MAINTAINED.

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SAFETY RAIL

| STD. NO. | REV. |
|---|---|
| 50.04A | 16 |

## WARRANTS

STANDARD SAFETY RAIL (STD. #50.04A) SHALL BE INSTALLED UNDER ANY OF THE FOLLOWING CIRCUMSTANCES IN BOTH NEW CONSTRUCTION AND IN RETROFITTING OR RECONSTRUCTION OF EXISTING ROADWAYS OR SITES:

1. WHEN THE CULVERT CROSSING DETAIL (STD. #10.36A–B) APPLIES.
2. IF THERE IS A TWO FOOT OR GREATER DROPOFF WITHIN 2 FEET OF THE EDGE OF THE SIDEWALK (SEE DIAGRAM A).
3. IF THERE IS A 1–FOOT OR LARGER DROPOFF DIRECTLY ADJACENT TO THE SIDEWALK EDGE (SEE DIAGRAM B).
4. AT THE DIRECTION OF CDOT, PLANNING, OR ENGINEERING STAFF BASED ON FIELD CONDITIONS.

## DEFINITIONS

- DROPOFF –– A SLOPE OF 2:1 OR STEEPER. EXAMPLES INCLUDE HEADWALLS, RETAINING WALLS, AND CULVERTS.
- SIDEWALK –– FOR PURPOSES OF THIS STANDARD, THE TERM "SIDEWALK" IS USED GENERICALLY AND SHALL MEAN ANY PATH OR SURFACE TO BE USED FOR BICYCLE AND/OR PEDESTRIAN TRANSPORTATION. EXAMPLES INCLUDE, BUT ARE NOT LIMITED TO, SIDEWALKS, BIKE PATHS, SHARED–USE PATHS, PEDESTRIAN PATHS, AND GREENWAYS.

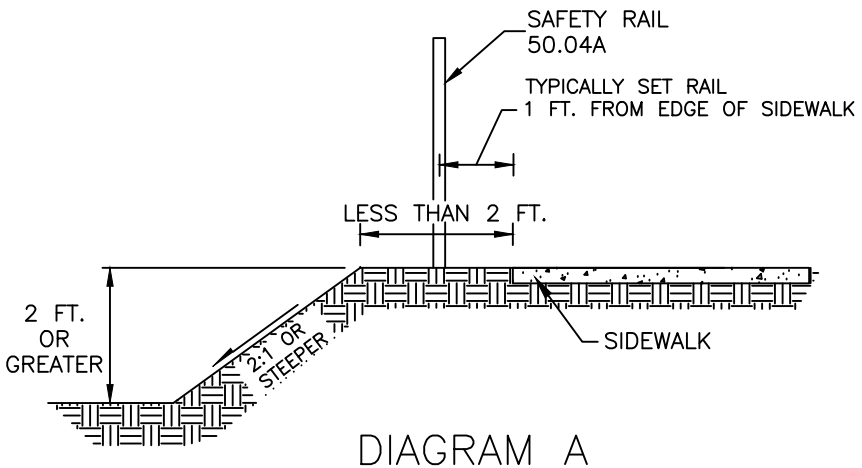



DIAGRAM A

SLOPED DROPOFF AT BACK OF SIDEWALK

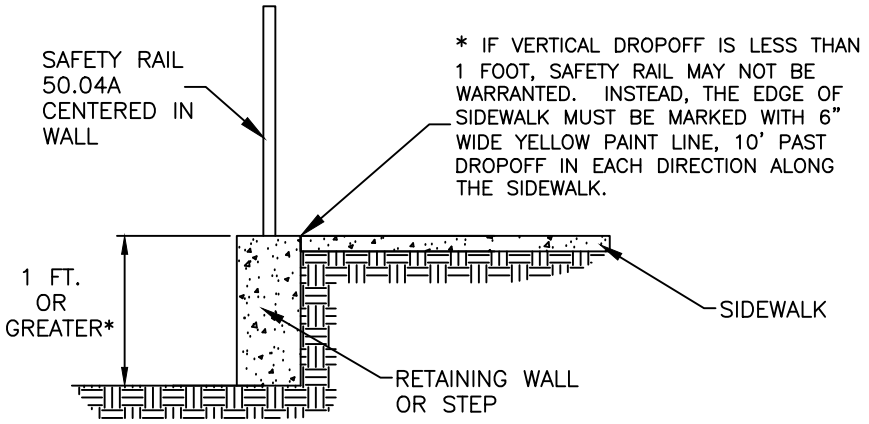



DIAGRAM B

VERTICAL DROPOFF AT BACK OF SIDEWALK

NOT TO SCALE

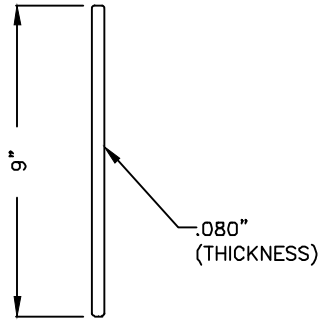
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

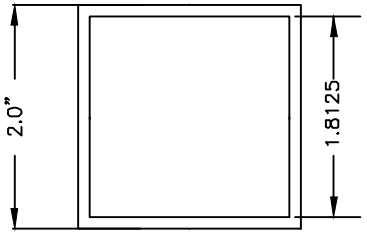
# SAFETY RAIL WARRANTS

| STD. NO. | REV. |
|---|---|
| 50.04B | 19 |

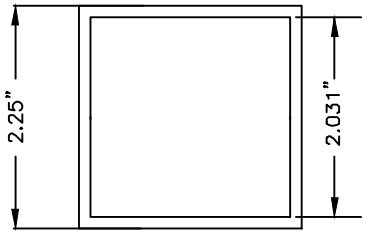
SIGN



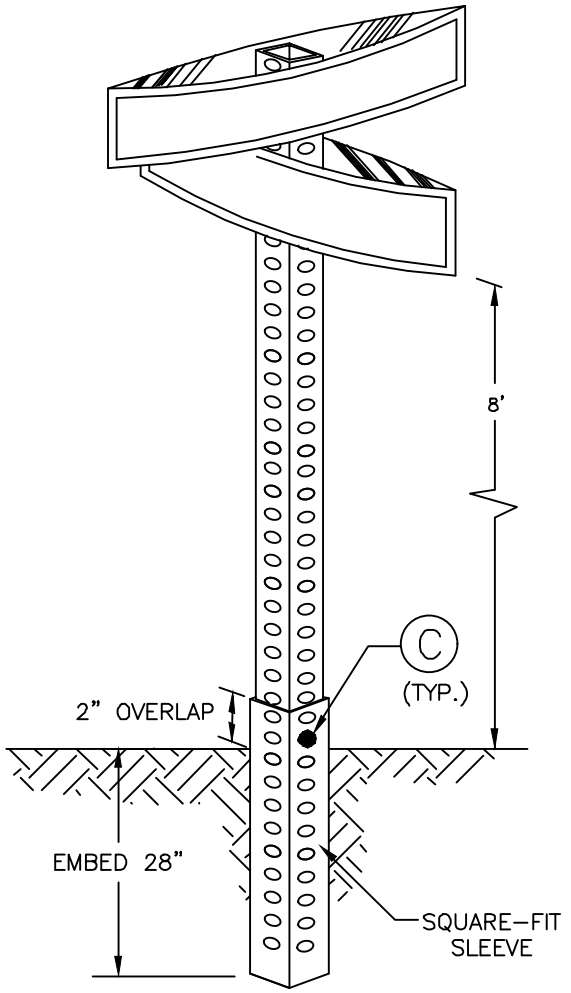

POST
(14 GAUGE)




SQUARE–FIT SLEEVE
(12 GAUGE)




STREET NAME SIGN
POST INSTALLATION




KEY TO FASTENERS:

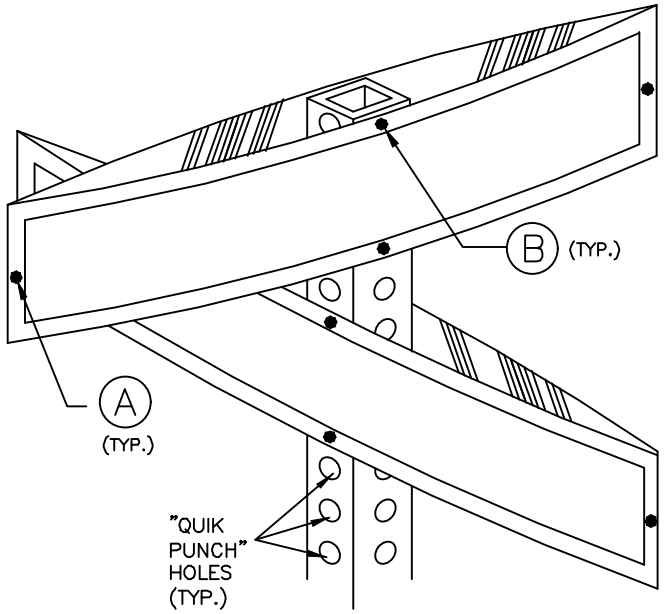
(A) #10–24 x $\frac{3}{4}$" HEX HEAD MACHINE, ZINC– DEAD END
#10–24 FLANGE NUT, ZINC– DEAD END

(B) $\frac{5}{16}$" #16 X 3" CARRIAGE BOLT, ZINC
$\frac{5}{16}$" #16 HEX NUT, STEEL

(C) $\frac{5}{16}$" #16 X 2–$\frac{3}{4}$" CORNER BOLT (BREAKAWAY), ZINC
$\frac{5}{16}$" #16 HEX NUT, STEEL

NOTES:

1. POST SHALL BE 14–GAUGE GALVANIZED STEEL, QUIK–PUNCH, $\frac{7}{16}$" HOLES, 1" ON CENTER, ALIGNED ON ALL SIDES, AND 2" SQUARE, 10 FEET IN LENGTH.
2. THE SLEEVE SHALL BE 12–GAUGE GALVANIZED STEEL, $\frac{7}{16}$" HOLES, 1" ON CENTER, ALIGNED ON ALL SIDES, AND 2.25" SQUARE, 30" IN LENGTH.



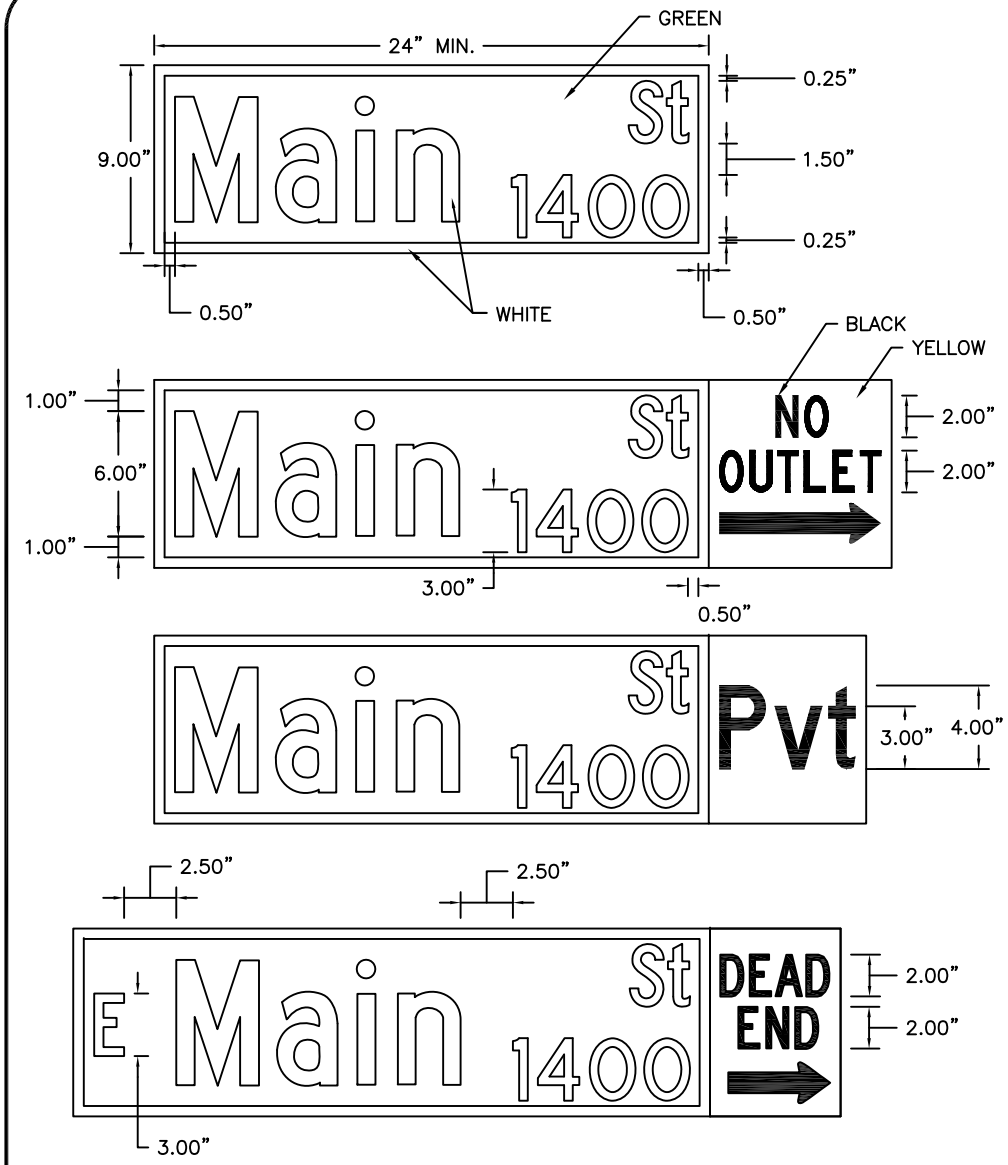

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# STREET NAME SIGN

| STD. NO. | REV. |
|---|---|
| 50.05A | 23 |




NOT TO SCALE

NOTES:

1. STREET NAME MARKERS (SNM) SHALL BE ALUMINUM, FLAT, AND HAVE DIMENSIONS AS SHOWN ON THIS DETAIL. MIMIMUM LENGTH OF 24"; MAXIMUM LENGTH OF 60". THE SNM'S SHALL BE COVERED WITH WHITE HIGH INTENSITY PRISMATIC (HIP) RETRO-REFLECTIVE SHEETING (3M SERIES 3930 OR EQUIVALENT) WITH PRESSURE SENSITIVE ADHESIVE (OR EQUIVALENT TYPE IV OR HIGHER).

2. THE LETTERS SHALL BE REVERSE CUT FROM TRANSPARENT GREEN OVERLAY FILM (3M #1177 EC FILM OR EQUIVALENT MEETING FEDERAL SPECIFICATION FP-96, SECTION 178.01(A) AND ASTM D4956). THE TRANSPARENT GREEN OVERLAY FILM MUST BE PLACED ON THE SNM TO PROVIDE AN EXPOSED 0.5" BORDER OF THE UNDERLAY WHITE HIP RETRO-REFLECTIVE SHEETING.

3. THE STREET NAME SHALL BE COMPOSED OF INITIAL UPPER CASE LETTERS 6" IN HEIGHT AND CORRESPONDING LOWER CASE LETTERS 4.5" IN HEIGHT, IN FHWA "HIGHWAY B" FONT. THE STREET NAME SHALL BE LEFT-JUSTIFIED AND PLACED 0.5" FROM THE SIGN BORDER. ANY STREET NAME WITH 3 OR FEWER LETTERS SHALL BE CENTERED IN THE SIGN TEXT AREA.

   - PREFIX/SUFFIX NAMES SHALL BE COMPOSED OF INITIAL UPPER CASE LETTERS 3" IN HEIGHT AND CORRESPONDING LOWER CASE LETTERS 2.25" IN HEIGHT, IN FHWA "HIGHWAY C" FONT.
   - BLOCK NUMBERS SHALL BE 3" IN HEIGHT, IN FHWA "HIGHWAY C" FONT.
   - SUFFIX NAMES AND BLOCK NUMBERS SHALL BE RIGHT-JUSTIFIED AND PLACED 0.5" FROM THE RIGHT-SIDE SIGN BORDER AND 0.25" FROM THE TOP AND BOTTOM SIGN BORDERS. PREFIX LETTERS (N, S, E, AND W) SHALL BE CENTERED AND PLACED 0.5" FROM THE LEFT-SIDE SIGN BORDER WITH 2.5" SPACING TO BEGINNING OF STREET NAME.

4. SUPPLEMENTAL SNM WORDING ON YELLOW HIP RETRO-REFLECTIVE SHEETING WITH BLACK VINYL LETTERS SHALL BE PLACED ADJACENT TO THE GREEN OVERLAY FILM/BORDER TO INDICATE STREETS THAT DEAD END, HAVE NO OUTLET, ETC. OR ARE PRIVATE STREETS (PVT). THE YELLOW HIP RETRO-REFLECTIVE SHEETING MUST BE PLACED ON THE SNM TO MAINTAIN AN EXPOSED 0.5" BORDER OF THE UNDERLAY WHITE HIP RETRO-REFLECTIVE SHEETING.

   - NO OUTLET WITH ARROW (RIGHT OR LEFT) – PLACED ON SNM AT ENTRANCE TO A STREET OR STREET NETWORK FROM WHICH THERE IS NO OTHER EXIT. USE UPPER CASE LETTERS 2" IN HEIGHT, IN FHWA "HIGHWAY C" FONT.
   - PVT – PLACED ON SNM AT ENTRANCE TO PRIVATE STREET, USE UPPER CASE LETTER 4" IN HEIGHT AND CORRESPONDING LOWER CASE LETTERS 3" IN HEIGHT, IN FHWA "HIGHWAY C" FONT.
   - DEAD END WITH ARROW (RIGHT OR LEFT) – PLACED ON SNM AT ENTRANCE TO A SINGLE STREET THAT TERMINATES IN A DEAD END OR CUL-DE-SAC. USE UPPER CASE LETTERS 2" IN HEIGHT, IN FHWA "HIGHWAY C" FONT. IF STUB STREET IS LESS THAN OR EQUAL TO 200 FEET, THEN DEAD END IS NOT NECESSARY.

5. ALL SNMs ARE SUBJECT TO THE APPROVAL OF THE DIRECTOR OF THE CHARLOTTE DEPARTMENT OF TRANSPORTATION AND THE CITY ENGINEER.

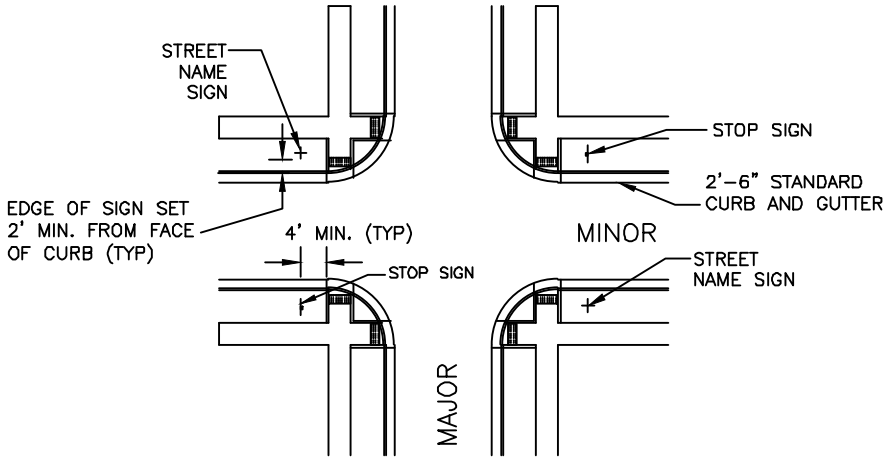
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

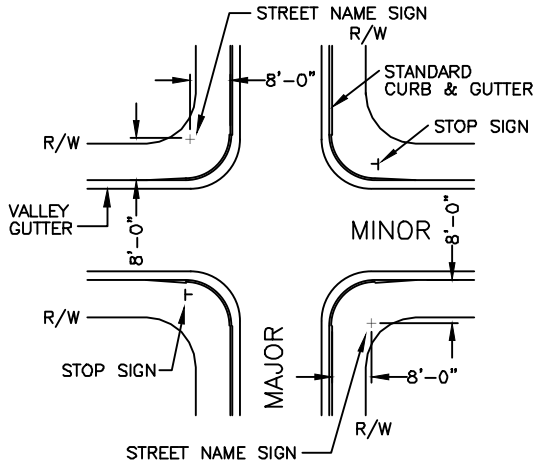
# STREET NAME SIGN

| STD. NO. | REV. |
|---|---|
| 50.05B | 9 |

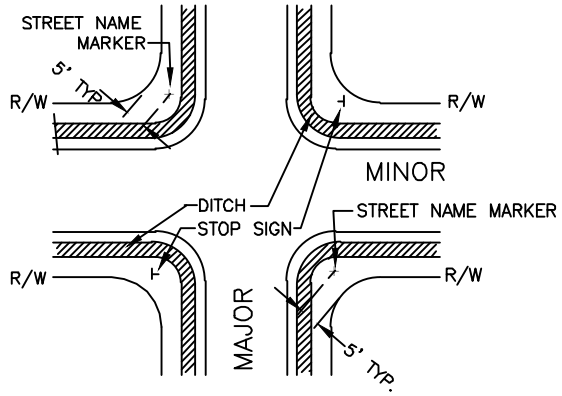
INTERSECTION with
SIDEWALK, CURB, and GUTTER




INTERSECTION with CURB and GUTTER




INTERSECTION with
DITCHES, and NO CURB and GUTTER




## NOTES

1. TWO STREET NAME MARKERS ARE REQUIRED IF THE MAJOR STREET HAS 3 OR MORE LANES.
2. ANY VARIANCE FROM THIS STANDARD MUST BE APPROVED BY THE CHARLOTTE DEPARTMENT OF TRANSPORTATION.
3. ENSURE STOP SIGN SIZE AND INSTALLATION PER MUTCD STANDARDS.

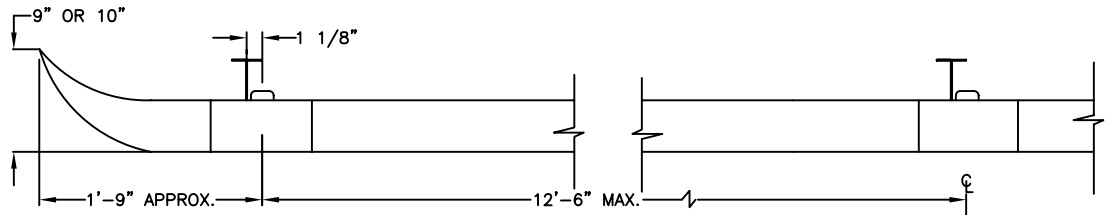
NOT TO SCALE

CHARLOTTE.

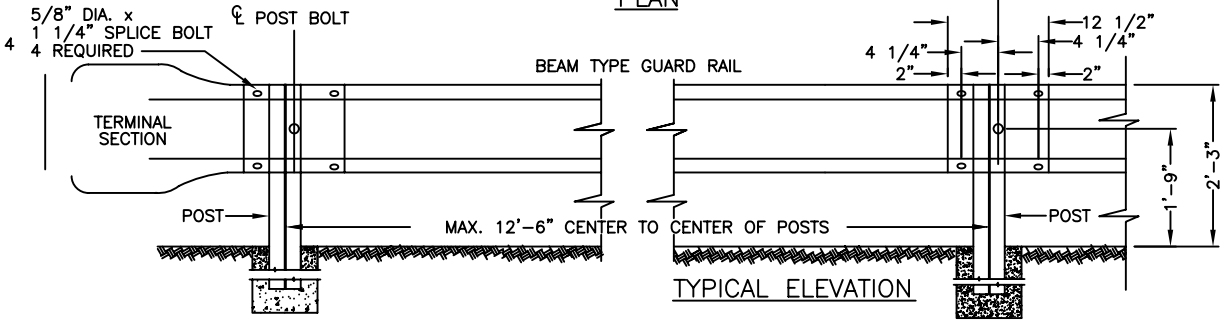
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# STREET SIGN INSTALLATION LOCATIONS

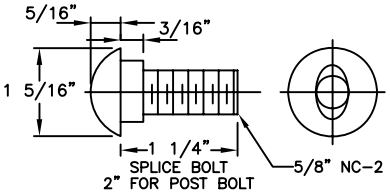
| STD. NO. | REV. |
|---|---|
| 50.06 | 13 |



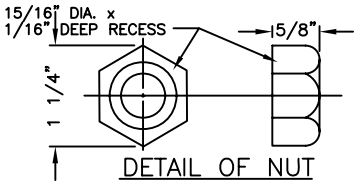

PLAN



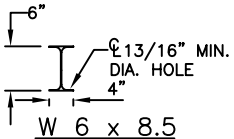

TYPICAL ELEVATION



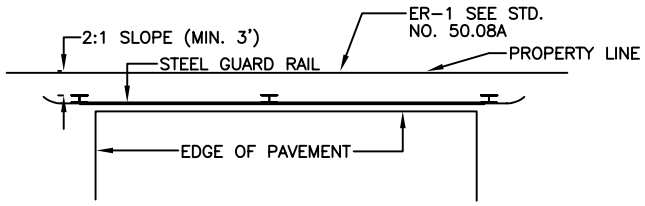

DETAIL OF BOLT




DETAIL OF NUT



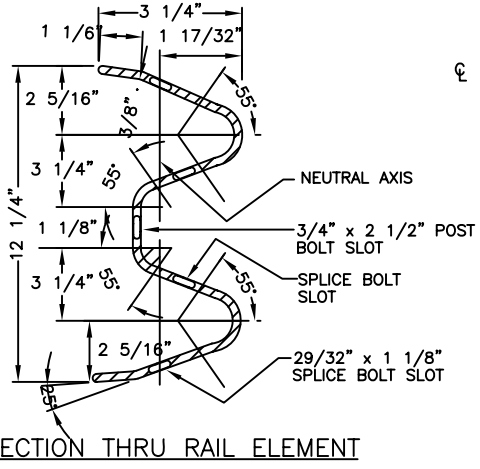

W 6 x 8.5



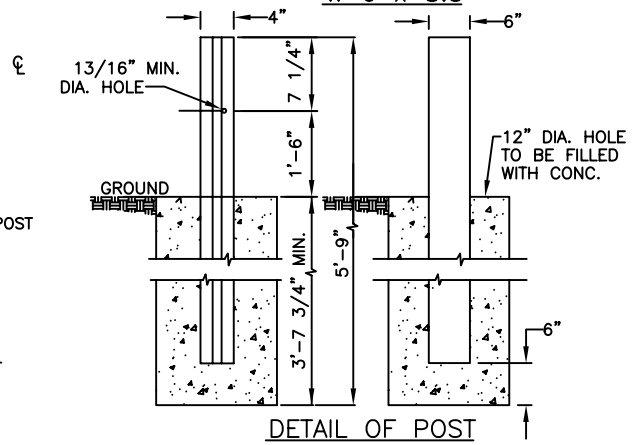

DEAD-END STREET BARRICADE

NOTE

THIS DETAIL IS NOT A GUARDRAIL DETAIL. FOR ROADSIDE GUARDRAIL, SEE NCDOT STANDARD DRAWINGS 862.01-862.03




SECTION THRU RAIL ELEMENT




DETAIL OF POST

APPROVED DATE

NOT TO SCALE

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CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# DEAD END STREET BARRICADE

| STD. NO. | REV. |
|---|---|
| 50.07A | |

## GENERAL NOTES:

1. STEEL BEAM TYPE GUARD RAILS SHALL BE INSTALLED AT THE END OF ALL DEAD–END STREETS, EXCEPT CUL–DE–SAC STREETS WHICH HAVE BEEN IMPROVED WITH A PERMANENT TURN–AROUND.
2. FOR STREETS 26' IN WIDTH THE GUARD RAIL SHALL CONSIST OF TWO(2) 12'–6" SECTIONS OR ONE(1) 25' SECTION, THREE (3) STEEL POSTS, AND TWO (2) TERMINAL SECTIONS. FOR STREETS GREATER THAN 25' IN WIDTH THE GUARD RAIL SHALL SPAN THE ENTIRE WIDTH OF THE STREET.
3. GUARD RAIL SHALL CONSIST OF RAIL ELEMENTS FABRICATED TO DEVELOP CONTINUOUS BEAM STRENGTH AND INSTALLED AS SHOWN.
4. MINIMUM THICKNESS OF GUARD RAIL SHALL BE 12 GAGE U.S. STANDARD.
   THE RAIL ELEMENT INCLUDING SPLICES, SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 80,000 LBS.
   GUARD RAIL PARTS FURNISHED SHALL BE INTERCHANGEABLE WITH SIMILAR PARTS REGARDLESS OF THE SOURCE OF MANUFACTURER.
   THE HOLES FOR CONNECTING BOLTS SHALL BE PUNCHED OF DRILLED, BURNING WILL NOT BE PERMITTED.
5. THE GUARD, BOLTS, NUTS, STEEL POSTS. AND ALL OTHER METAL PARTS SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS FOR THE COATING CLASS, (2.50 OUNCES PER SQUARE FOOT) OF THE CURRENT SPECIFICATIONS FOR ZINC–COATED (GALVANIZED) IRON, AND STEEL SHEETS, COILS, AND CUT LENGTHS, IN ACCORDANCE WITH ASTM 123A.
6. IF THE AVERAGE SPELTER COATING AS DETERMINED FROM THE REQUIRED SAMPLES IS LESS THAN TWO (2) OUNCES OF SPELTER PER SQUARE FOOT, OR IF ANY ONE SPECIMEN HAS LESS THAN 1.8 ONCES OF SPELTER PER SQUARE FOOT OF DOUBLE EXPOSED SURFACE, THE LOT SAMPLED SHALL BE REJECTED, THE FINISHED SHEETS SHALL BE OF FIRST CLASS COMMERCIAL QUALITY, FREE FROM INJURIOUS DEFECTS, SUCH AS BLISTERS, FLUX, AND UNCOATED SPOTS.
7. THE GUARD RAIL SHALL BE INSPECTED TO DETERMINE THAT THE MATERIAL, DIMENSIONS, AND WORKMANSHIP ARE IN ACCORDANCE WITH THIS PLAN.
8. WHERE A DEAD–END STREET REQUIRES GUARD RAIL, END OF ROADWAY MARKER SIGNS SHALL ALSO BE REQUIRED. (SEE STD. 50.08A & 50.08B) (ER–1).

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# DEAD END STREET BARRICADE
## GENERAL NOTES

| STD. NO. | REV. |
|---|---|
| 50.07B | |

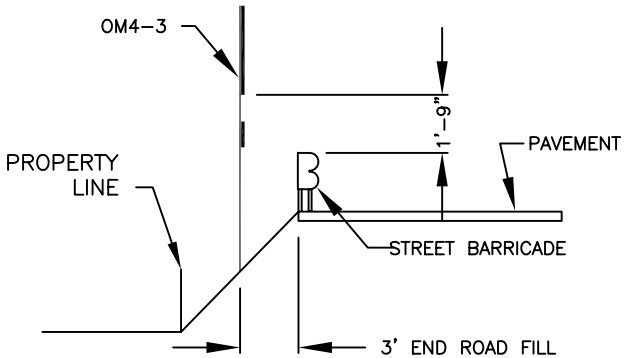
NOTES:

1. WHEN A DEAD–END OR STUBBED STREET REQUIRES A GUARDRAIL SECTION, END–OF–ROADWAY MARKER SIGNS (OM4–3, 24"x24", SOLID RED) SHALL BE PROVIDED.

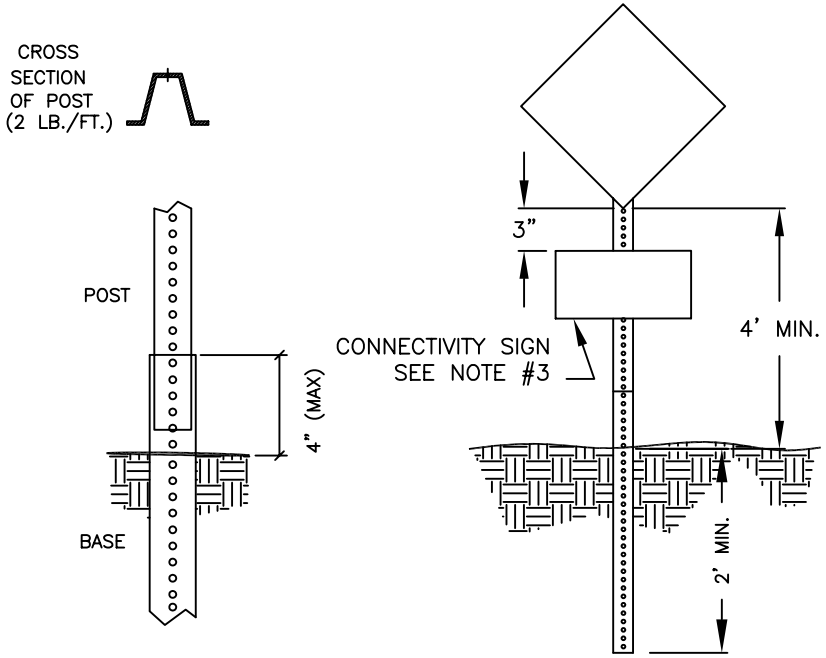
2. SIGNS ARE TO BE PLACED BEHIND THE BARRICADE (SEE DETAILS 50.07A–B), EVENLY SPACED WITH ONE SIGN PLACED AT THE CENTERLINE LOCATION AND ADDITIONAL SIGNS AT 6' O.C. (MINIMUM OF 3 SIGNS, MAXIMUM OF 5 SIGNS).

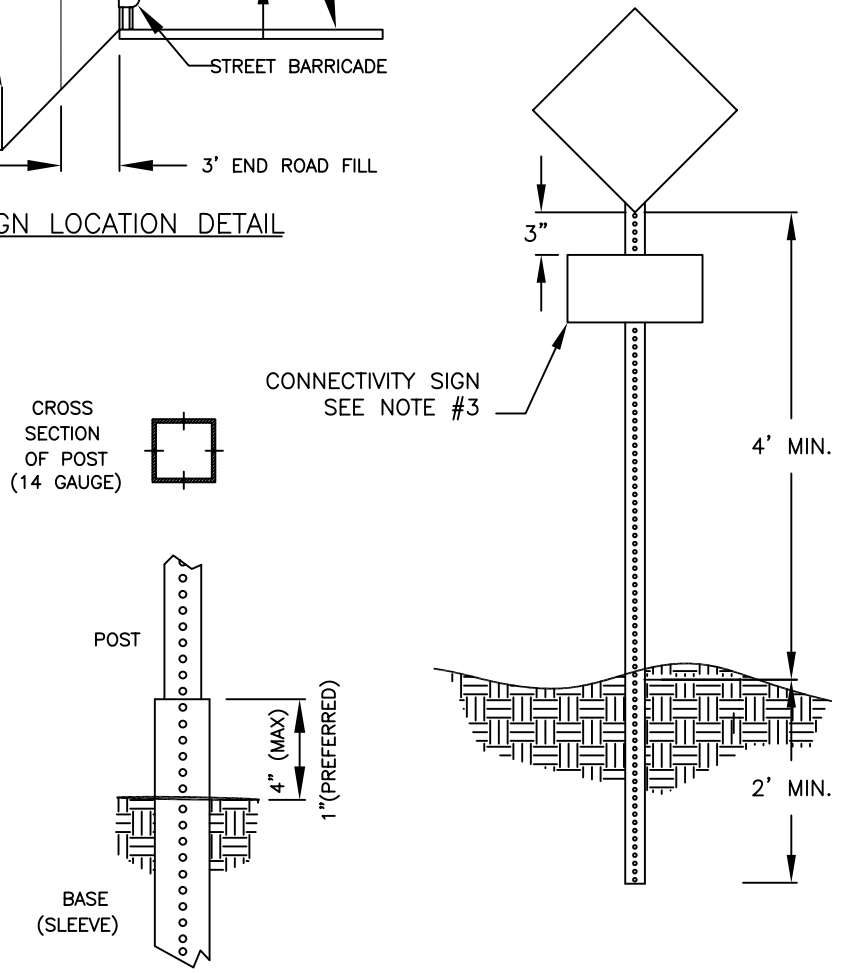
3. WHEN BARRICADE IS USED ON A STREET STUB, THE SIGN AT THE CENTERLINE SHALL BE SUPPLEMENTED WITH A STREET CONNECTIVITY SIGN. SEE DETAIL 50.08C.

4. ALL SIGNS/MARKERS SHALL MEET OR EXCEED MUTCD STANDARDS FOR RETROREFLECTIVITY.




SIGN LOCATION DETAIL



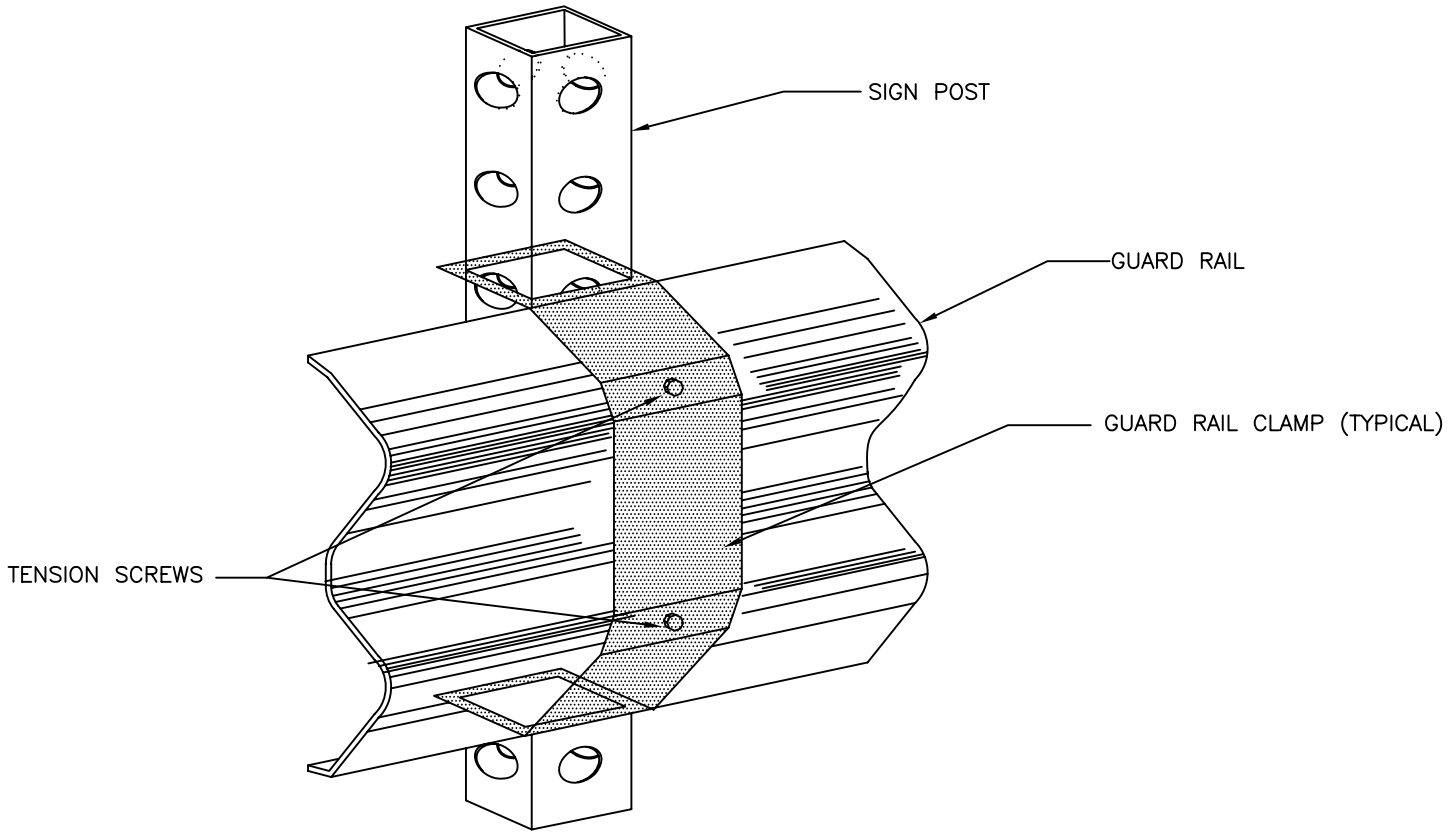

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# END OF ROADWAY MARKER

| STD. NO. | REV. |
|---|---|
| 50.08A | 4 |



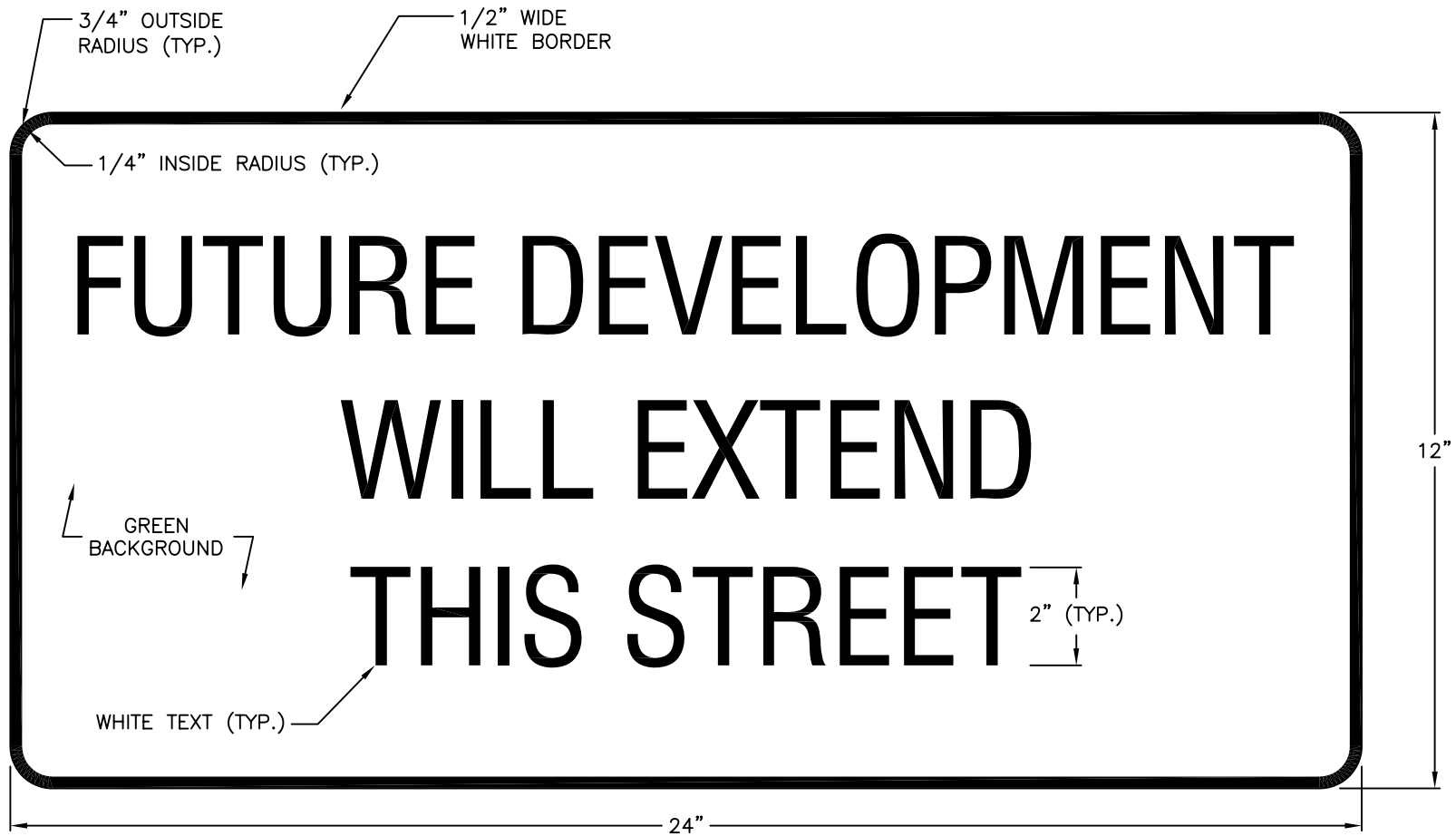

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# END OF ROADWAY MARKER
# GUARD RAIL CLAMP INSTALLATION

| STD. NO. | REV. |
|---|---|
| 50.08B | 4 |




NOTES:

1. SIGN SHALL MEET OR EXCEED MUTCD STANDARDS FOR RETROREFLECTIVITY
2. SIGN MATERIAL SHALL BE 0.080" THICK ALUMINUM
3. ALL LETTERS SHALL BE SERIES B-2000 FROM THE 2004 STANDARD HIGHWAY SIGNS MANUAL (AND ANY REVISION THERETO) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION.

NOT TO SCALE

CHARLOTTE.

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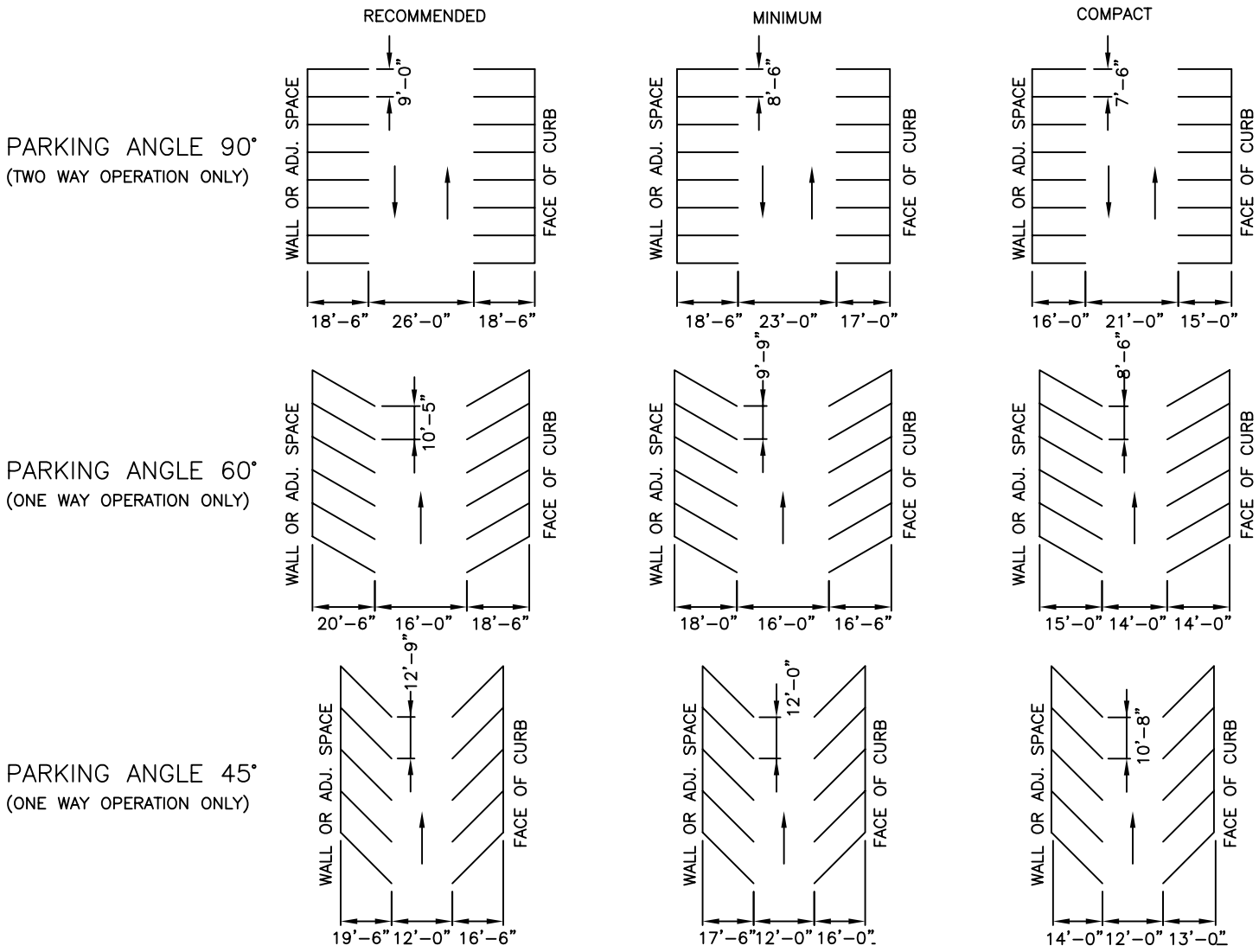
INCLUDES CHARLOTTE ETJ

# STREET CONNECTIVITY SIGN FOR END-OF-ROAD BARRICADE

| STD. NO. | REV. |
|---|---|
| 50.08C | 4 |




NOTES:

1. FOR ACCESSIBLE PARKING STANDARDS/SIGNAGE SEE STDS. 50.10A, B, AND C.
2. PAVEMENT MARKINGS SHALL BE 4" WHITE PAINT.
3. ALTERNATIVE PARKING ANGLES, AISLE WIDTHS, AND OPERATION (TWO-WAY ANGLED PARKING OR REVERSE-ANGLE PARKING) WILL BE CONSIDERED BY CDOT ON A CASE-BY-CASE BASIS.

NOT TO SCALE

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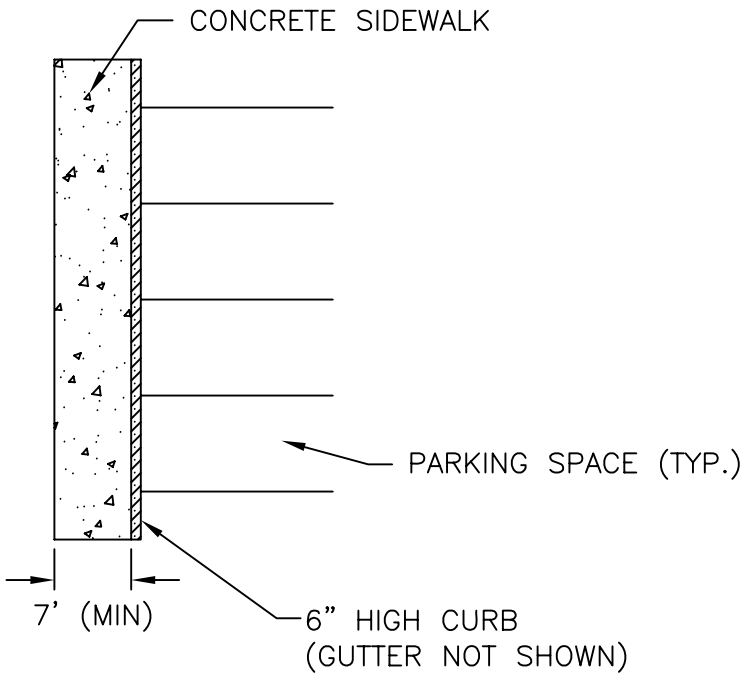
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PARKING STANDARDS

| STD. NO. | REV. |
|---|---|
| 50.09A | |

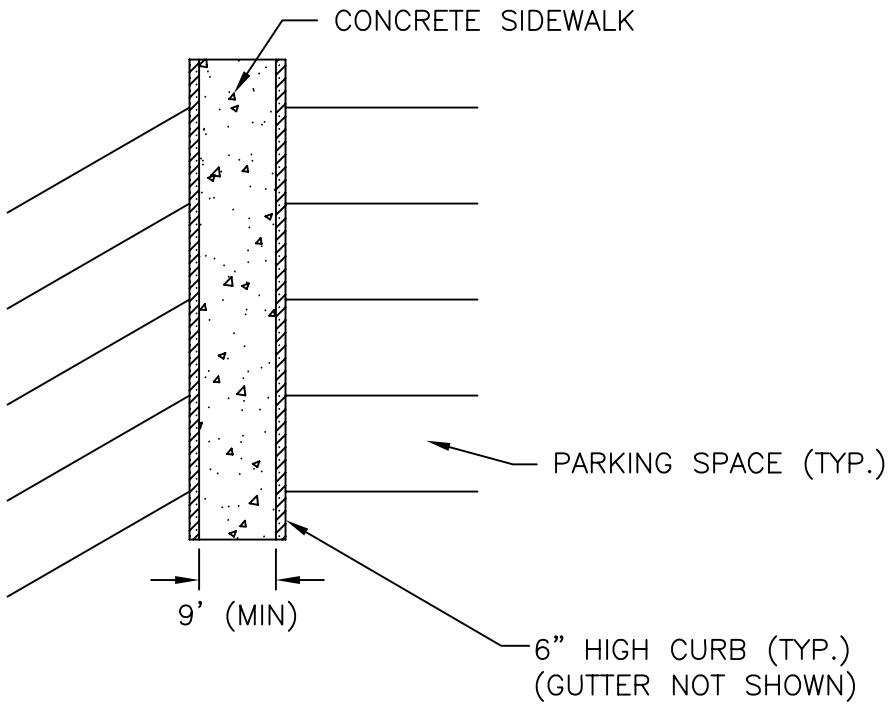
SIDEWALK ADJACENT TO HEAD–IN OR BACK–IN PARKING SHALL BE AT LEAST 7 FEET WIDE.

PARKING ON ONE SIDE OF A SIDEWALK




SIDEWALK BETWEEN TWO ROWS OF HEAD–IN OR BACK–IN PARKING SHALL BE AT LEAST 9 FEET WIDE.

PARKING ON BOTH SIDES OF A SIDEWALK




NOTES:

1. A 2–FOOT–WIDE PLANTING STRIP LOCATED AT THE BACK OF CURB CAN BE USED IN LIEU OF 2 FEET OF SIDEWALK WIDTH.
2. PARKING AT ANY ANGLE OTHER THAN PARALLEL SHALL BE SUBJECT TO THIS STANDARD.
3. IF MONOLITHIC CURB & SIDEWALK IS USED, ADD 6" TO ALL DIMENSIONS (1' IF PARKING ON BOTH SIDES).
4. WHEELSTOPS SHALL ONLY BE USED IN LIEU OF 2 FEET OF SIDEWALK WITH THE APPROVAL OF THE CITY AND WHEN EXISTING CONDITIONS PREVENT CONSTRUCTION OF A 7–FOOT/9–FOOT SIDEWALK. WHEELSTOPS SHALL BE 6" HIGH, MADE OUT OF 3600–PSI REINFORCED CONCRETE, AND ANCHORED WITH #5 OR GREATER REBAR (2' MINIMUM LENGTH). REBAR HOLES SHALL BE GROUTED UPON INSTALLATION. WHEELSTOPS SHALL BE PLACED AT 2 FEET FROM THE EDGE OF SIDEWALK OR OBSTRUCTION.

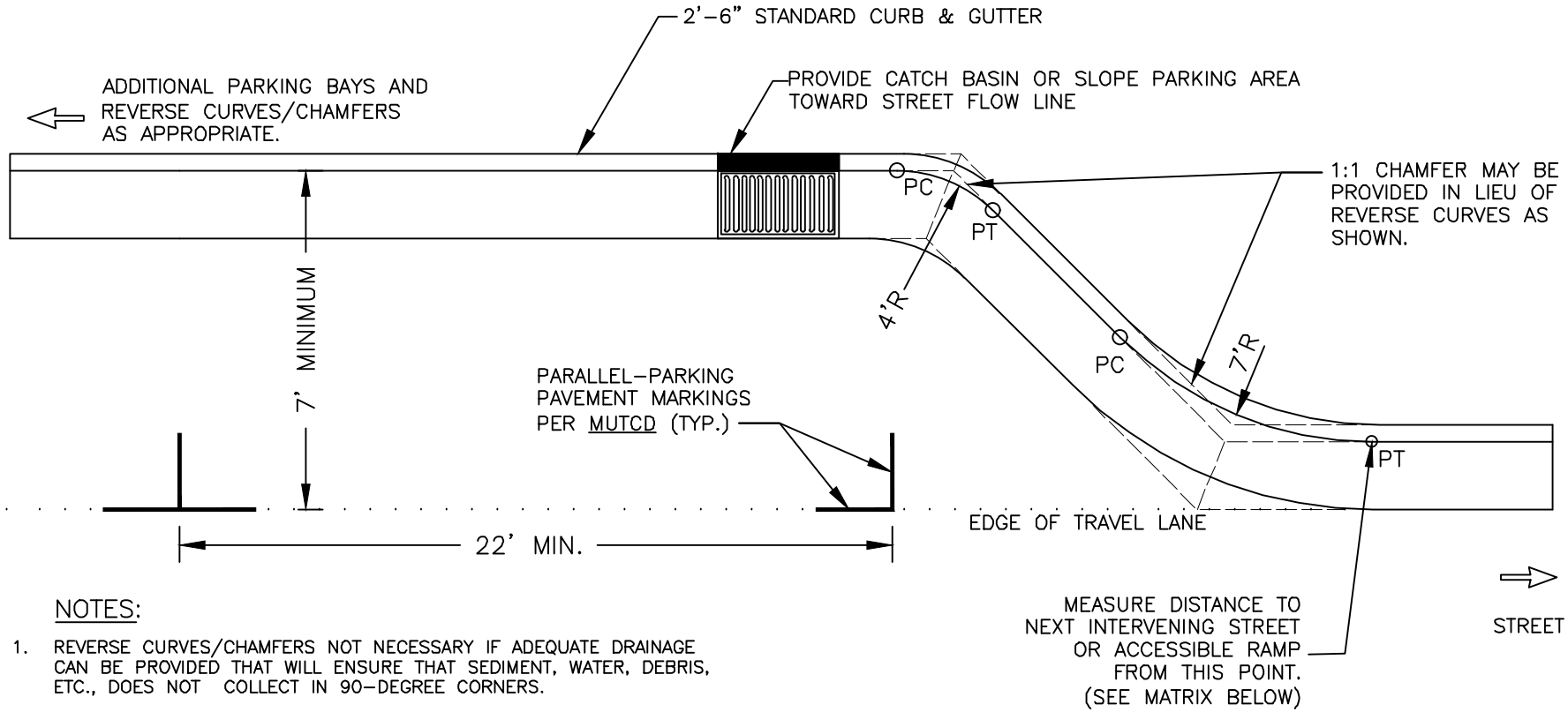
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PARKING STANDARDS (CONTINUED)

| STD. NO. | REV. |
|---|---|
| 50.09B | 1 |




NOTES:

1. REVERSE CURVES/CHAMFERS NOT NECESSARY IF ADEQUATE DRAINAGE CAN BE PROVIDED THAT WILL ENSURE THAT SEDIMENT, WATER, DEBRIS, ETC., DOES NOT COLLECT IN 90-DEGREE CORNERS.
2. PARALLEL ACCESSIBLE SPACES AND LOADING ZONES TO BE REVIEWED BY CDOT ON A CASE-BY-CASE BASIS.
3. FOR PARKING BAYS THAT ARE 8 FEET IN WIDTH OR GREATER, THE PAVEMENT MARKINGS SHALL BE SET AT ONE (1) FOOT LESS THAN THE STALL WIDTH.
4. GREATER SEPARATION FROM INTERVENING STREETS THAN THE DISTANCES PROVIDED IN THE MATRIX MAY BE REQUIRED AT CDOT'S DISCRETION.
5. POSITIVE DRAINAGE SHALL BE PROVIDED EITHER BY INSTALLATION OF APPROPRIATE DRAINAGE STRUCTURES OR SLOPE PARKING AREA TO STREET FLOW LINE. SLOPING PARKING AREA TO STREET FLOW LINE ONLY PERMITTED IF ROAD GRADE IS GREATER THAN 2%.
6. IF A BIKE LANE IS REQUIRED ADJACENT TO PARALLEL PARKING, A 3' BUFFER IS REQUIRED BETWEEN PARKING AND THE BIKE LANE.

MINIMUM DISTANCE TO NEXT INTERVENING STREET

| PARALLEL PARKING BAY LOCATED ON | DRIVEWAY | LOCAL/ COLLECTOR | ARTERIAL/ UPTOWN STREET |
|---|---|---|---|
| LOCAL/COLLECTOR | 20' | 20' | 20' |
| ARTERIAL/UPTOWN STREET | 20' | 20' | 50' |

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PARALLEL PARKING STANDARDS

| STD. NO. | REV. |
|---|---|
| 50.09C | 23 |

NOTES:

1. AN ACCESS AISLE SHALL BE PROVIDED AT STREET LEVEL FOR ON-STREET PARALLEL PARKING WITH 5' MIN. WIDTH AND SHALL EXTEND THE FULL LENGTH OF THE PARKING SPACE.
2. ACCESSIBLE SPACE AND ACCESS AISLE SHALL BE OBSTRUCTION-FREE.
3. ALL CONCRETE TO BE 3600 P.S.I.
4. SEE STD NO 10.18 FOR DETAIL OF 18" VERTICAL CURB.
5. SEE STD. NO 10.17B FOR DETAIL OF EXPANSION JOINT AND GROOVE JOINT.
6. GUTTER FLOW LINE SHALL BE MAINTAINED THROUGH THE ACCESS AISLE.
7. ACCESSIBLE PAVEMENT MARKING DETAIL:
   - INSTALL INTERNATIONAL SYMBOL OF ACCESSIBILITY PARKING SPACE MARKINGS, INCLUDING WHITE SYMBOL WITH BLUE BACKGROUND AND WHITE BORDER. SYMBOL SHALL HAVE MIN. HEIGHT OF 28 INCHES AND MIN. WIDTH OF 24 INCHES (EXCLUSIVE OF BLUE BACKGROUND AND WHITE BORDER). STROKE WIDTH SHALL BE MIN. 3 INCHES.
   - WHITE PAVEMENT MARKINGS PLACED ON CONCRETE SHALL BE SHADOWED WITH BLACK BORDER.
   - TYPICAL SYMBOL LOCATION AND ORIENTATION PER "DIAGRAM A" BELOW
8. PROPOSED TREES MUST BE PLANTED 6-8' AWAY FROM THE BACK OF ACCESS AISLE CURB.
9. SPECIFY STD. NO. 40.11, "BRIDGING TREE ROOTS" IF ENCROACHING ON GROWING SPACE OF TREE.
10. LOCATE IN MOST LEVEL AREA OF BLOCK (RECOMMENDED PRACTICE) TO MAXIMIZE USABILITY.
11. CURB LINE SHIFTS TOWARD RIGHT-OF-WAY TO ACCOMMODATE ACCESS AISLE.
12. SPACE AND ACCESS AISLE SHOULD HAVE SMOOTH SURFACE FOR LIFT DEPLOYMENT. MINIMIZE CROSS SLOPE FOR LIFT OPERATION.
13. PARKING METER FOR ACCESSIBLE SPACE – PROVIDE A CLEAR APPROACH AREA WHERE PARKING METERS ARE REQUIRED. COORDINATE WITH CDOT FOR METER LOCATIONS.
14. FOR MORE INFORMATION SEE SECTION R309 OF "PROPOSED GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
15. USE SIGN "C" AS SHOWN ON STD. 50.10A FOR ON-STREET PARKING.
16. ON-STREET ACCESSIBLE PARKING DOES NOT COUNT TOWARDS ON-SITE ACCESSIBLE PARKING REQUIREMENTS.

| ON-STREET PARKING SPACES REQUIRED | |
|---|---|
| TOTAL NUMBER OF MARKED OR METERED PARKING SPACES ON THE BLOCK PERIMETER | MINIMUM REQUIRED NUMBER OF ACCESSIBLE PARKING SPACES |
| 1 TO 25 | 1 |
| 26 TO 50 | 2 |
| 51 TO 75 | 3 |
| 76 TO 100 | 4 |
| 101 TO 150 | 5 |
| 151 TO 200 | 6 |
| 201 AND OVER | 4% OF TOTAL |

(BASED ON TABLE R214 OF PROWAG)

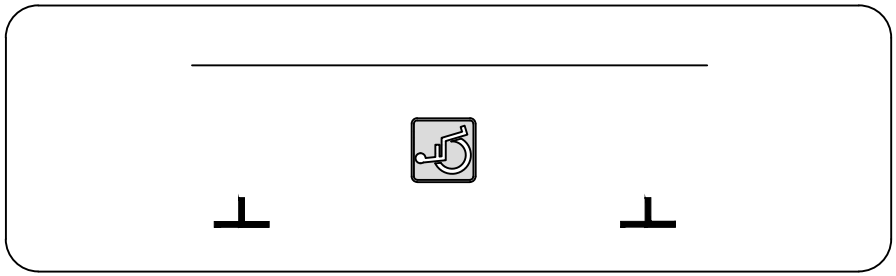


DIAGRAM A

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# ACCESSIBLE ON-STREET PARALLEL PARKING

| STD. NO. | REV. |
|---|---|
| 50.09D | 23 |

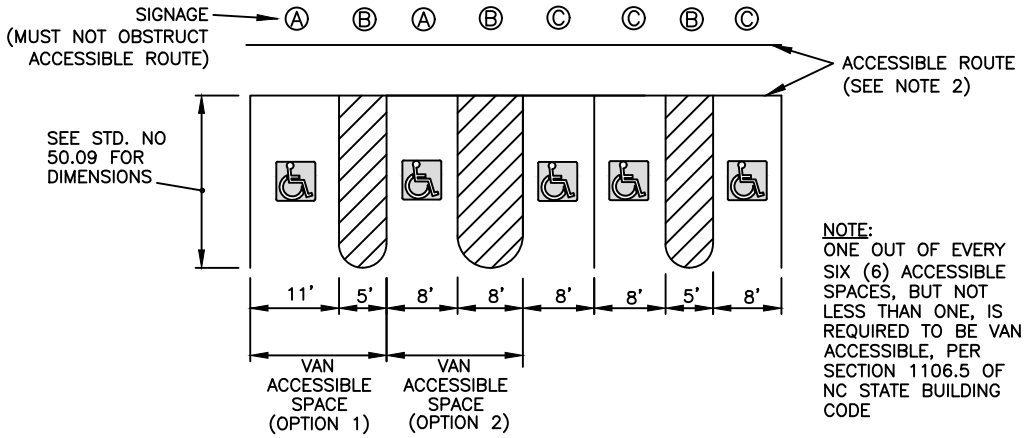
## ACCESSIBLE PARKING REQUIREMENTS

| TOTAL PARKING SPACES PROVIDED | MINIMUM NUMBER OF ACCESSIBLE SPACES SPACES REQUIRED | MINIMUM NUMBER OF ACCESSIBLE SPACES REQUIRED TO BE VAN ACCESSIBLE |
|---|---|---|
| 1 TO 25 | 1 | 1 |
| 26 TO 50 | 2 | 1 |
| 51 TO 75 | 3 | 1 |
| 76 TO 100 | 4 | 1 |
| 101 TO 150 | 5 | 1 |
| 151 TO 200 | 6 | 1 |
| 201 TO 300 | 7 | 2 |
| 301 TO 400 | 8 | 2 |
| 401 TO 500 | 9 | 2 |
| 501 TO 1000 | 2% OF TOTAL | 1 IN EVERY 6 ACCESSIBLE SPACES |
| 1001 AND OVER | 20 PLUS 1 FOR EACH 100 OVER 1000 | 1 IN EVERY 6 ACCESSIBLE SPACES |
| REFERENCE: SECTION 1106 OF NC BUILDING CODE | | |

NOTES:

1. ALL ACCESSIBLE SIGNS (R7-8P, R7-8, R7-1, AND 50.10C) SHALL BE MOUNTED AT 7 FEET FROM GRADE TO BOTTOM EDGE OF SIGN FACE (PER MUTCD). MOUNTING HEIGHT CAN BE REDUCED TO 5 FEET IF PLACED IN AN AREA BETWEEN SIDEWALK AND BUILDING FACE IN WHICH PEDESTRIANS ARE NOT EXPECTED TO USE.
2. IF ACCESSIBLE ROUTE IS A RAISED SIDEWALK AREA, THEN RAMPS ARE REQUIRED AT LOADING ZONE AREA. MAINTAIN MIN. 4' WIDE CONTINUOUS PASSAGE.
3. VERTICAL CLEARANCE FOR VANS MUST BE GREATER THAN 98-INCHES.
4. THIS DETAIL IS TO PROVIDE GENERAL GUIDANCE FOR PARKING LAYOUT AND DESIGN; REFER TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) U.S. DEPARTMENT OF TRANSPORTATION AND NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SUPPLEMENT AND NC BUILDING CODE FOR ADDITIONAL INFORMATION.
5. ON-STREET ACCESSIBLE PARKING DOES NOT COUNT TOWARD ON-SITE ACCESSIBLE PARKING REQUIREMENTS.

## PARKING SPACE PAVEMENT MARKINGS




NOTE:
ONE OUT OF EVERY SIX (6) ACCESSIBLE SPACES, BUT NOT LESS THAN ONE, IS REQUIRED TO BE VAN ACCESSIBLE, PER SECTION 1106.5 OF NC STATE BUILDING CODE

Ⓐ


MUTCD R7-8P 12"x6"

MUTCD R7-8 12"x18"

CLDSM 50.10C 12"x9"

Ⓑ


MUTCD R7-1 12"x18"

OPTIONAL ACCESIBLE LOADING ZONE SIGN

Ⓒ


MUTCD R7-8 12"x18"

CLDSM 50.10C 12"x9"

SEE STANDARD NO. 50.10C FOR SUPPLEMETAL SIGN DETAIL

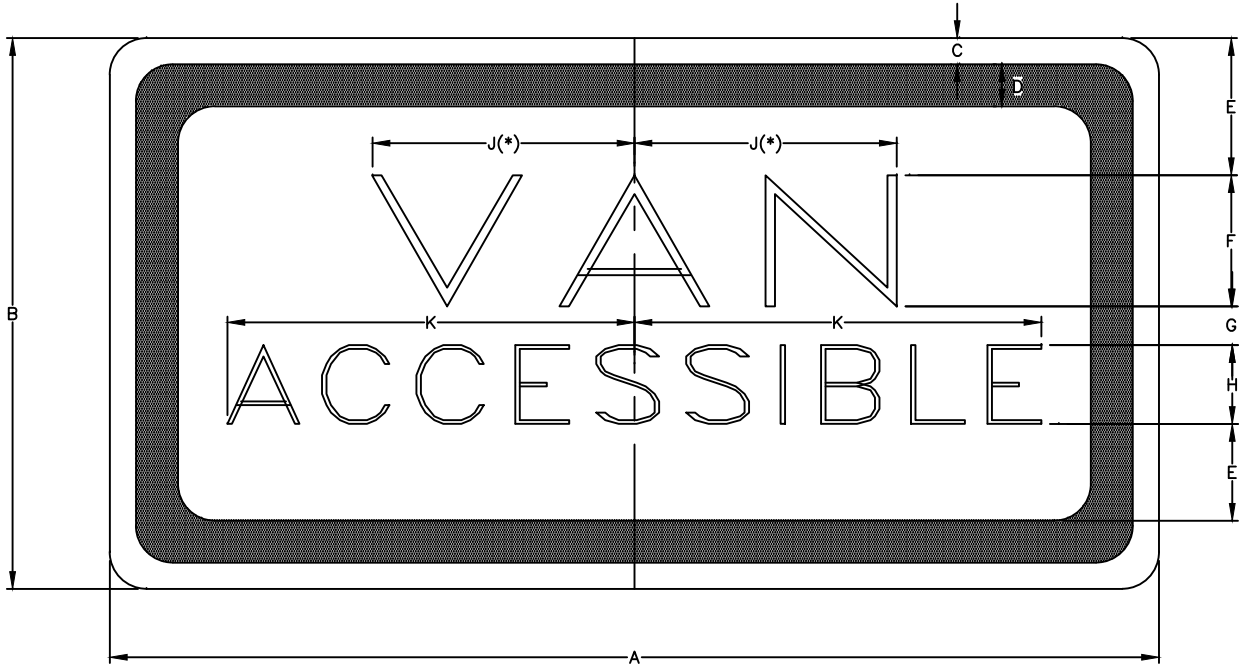
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# ACCESSIBLE PARKING AND SIGNAGE STANDARDS

| STD. NO. | REV. |
|---|---|
| 50.10A | 23 |

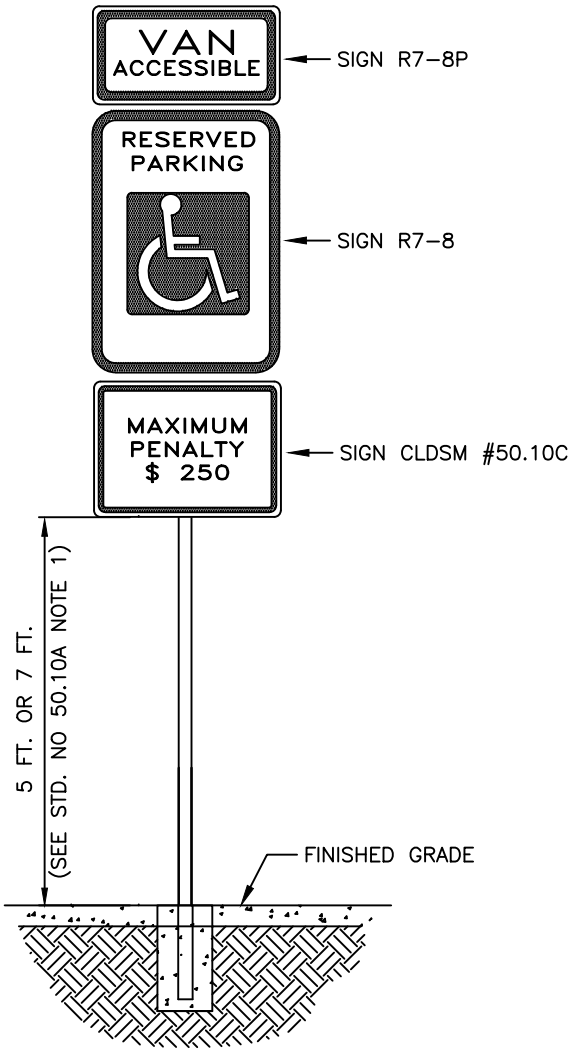



R7–8P

| DIMENSIONS (INCHES) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | J | K | L |
| 12 | 6 | 3/8 | 3/8 | 1–1/2 | 1–1/2D | 1/2 | 1D | 2–1/2 | 4 | 1–1/2 |

* INCREASE SPACING 50%
D–FHWA (FEDERAL HIGHWAY ADMINISTRATION/USDOT)
SERIES D LETTERS

LEGEND AND BORDER – GREEN
BACKGROUND – WHITE




NOT TO SCALE

CHARLOTTE.

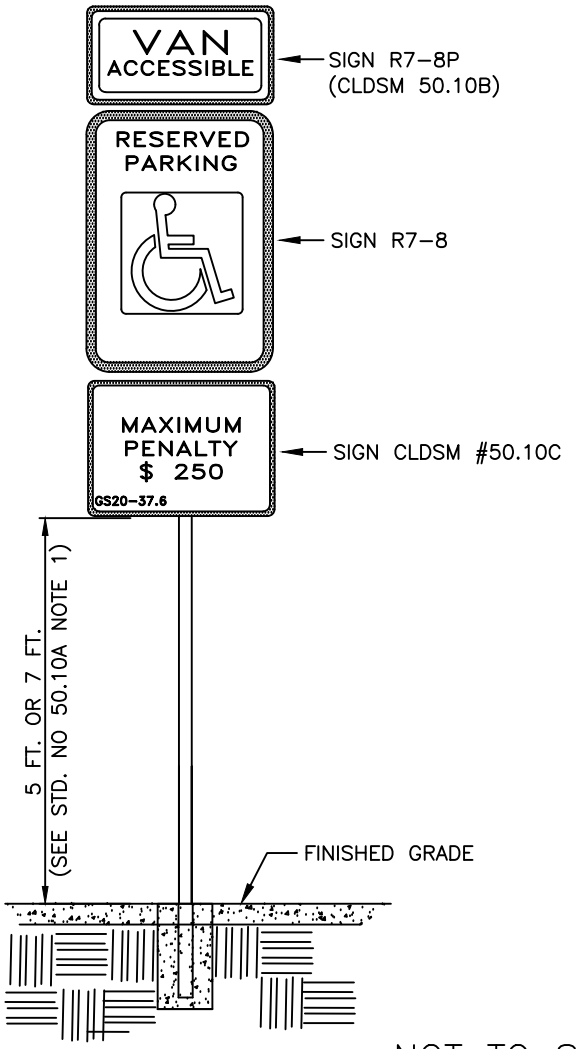
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SUPPLEMENTAL VAN ACCESSIBLE SIGN (R7–8P)

| STD. NO. | REV. |
|---|---|
| 50.10B | 18 |


NOTE:

SUPPLEMENTAL VAN ACCESSIBLE SIGN (R7-8P) USED IF THERE IS ONLY ONE REQUIRED ACCESSIBLE PARKING SPACE (MUST BE VAN ACCESSIBLE) AND AT EACH ADDITIONAL REQUIRED VAN ACCESSIBLE SPACE. (SEE STD. NO. 50.10B)




LEGEND AND BORDER – GREEN
BACKGROUND – WHITE

SIGN APPROVED FOR USE UNDER GENERAL STATUTE 20-37.6

THIS PENALTY SIGN IS REQUIRED TO ACCOMPANY ALL R7-8 PARKING SIGNS ERECTED AFTER DECEMBER 31,1990

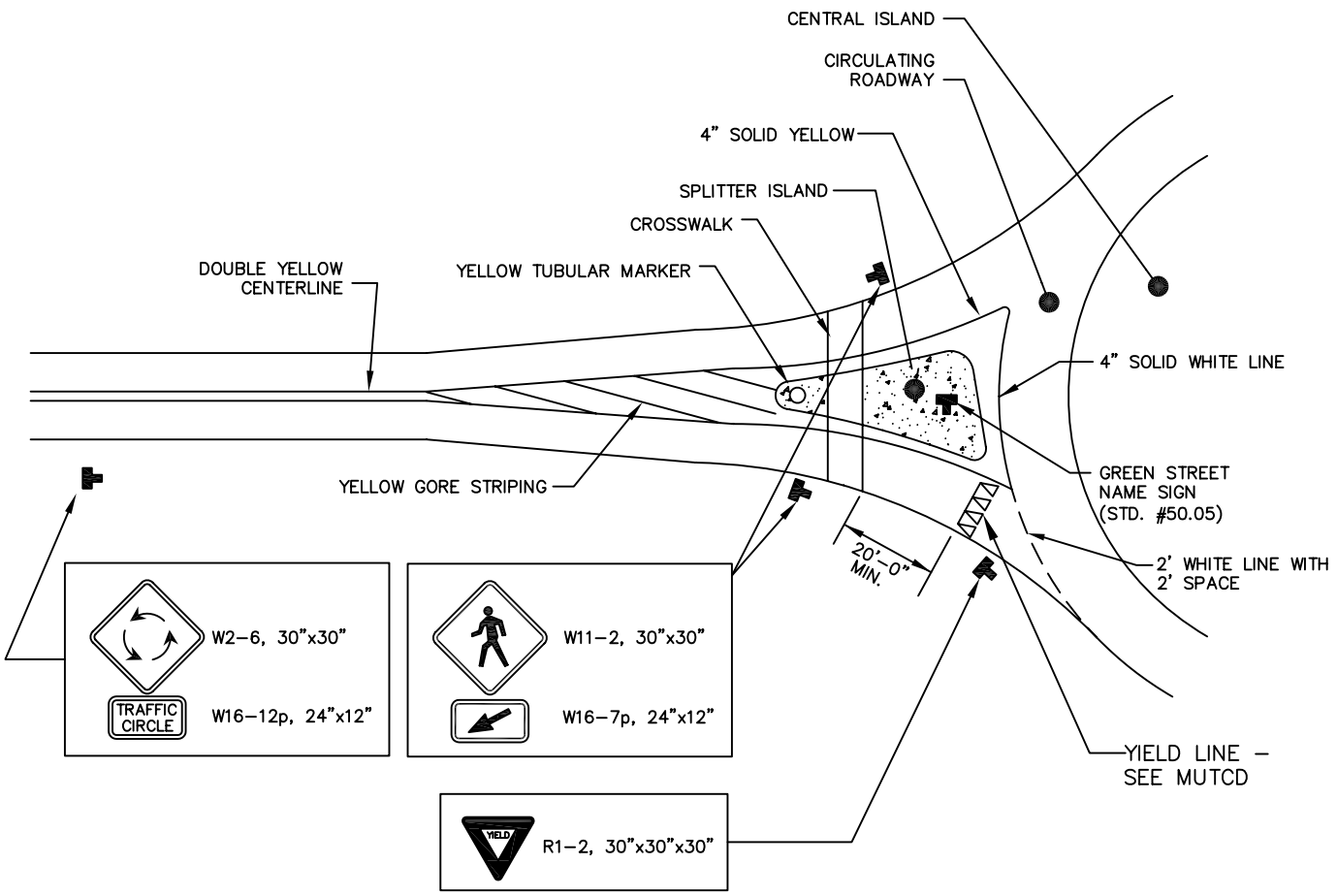
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SUPPLEMENTAL ACCESSIBLE SIGN

| STD. NO. | REV. |
|---|---|
| 50.10C | 18 |




## NOTES:

1. PAVEMENT MARKINGS TO BE PER LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. SIGNS TO BE LOCATED/SPACED PER MUTCD REQUIREMENTS.
3. "CIRCULAR INTERSECTION" AND "TRAFFIC CIRCLE" SUBPLATE SIGNS, AND YELLOW TUBULAR MARKERS, ARE REQUIRED ON THOROUGHFARES. CDOT WILL DETERMINE IF ONE OR MORE OF THESE ARE NECESSARY ON LOCAL OR COLLECTOR STREETS.
4. "PEDESTRIAN CROSSING" AND ARROW SUBPLATE SIGNS ARE REQUIRED WHEREVER THERE IS A MARKED CROSSWALK OR ON A THOROUGHFARE.
5. "YIELD" SIGNS ARE ALWAYS REQUIRED.
6. PAVEMENT MARKINGS, SPLITTER ISLAND DESIGNS, CROSSWALK, ETC., ARE SHOWN FOR CONTEXT ONLY. REFER TO THE MUTCD AND/OR THE FEDERAL HIGHWAY ADMINSITRATION'S MANUAL ROUNDABOUTS: AN INFORMATIONAL GUIDE FOR MORE DETAIL OR DESIGN INFORMATION.
7. ADDITIONAL SIGNS MAY BE NEEDED ON A CASE-BY-CASE BASIS, TO BE EVALUATED BY CDOT.
8. ALL PAVEMENT MARKING SHALL BE THERMOPLASTIC.

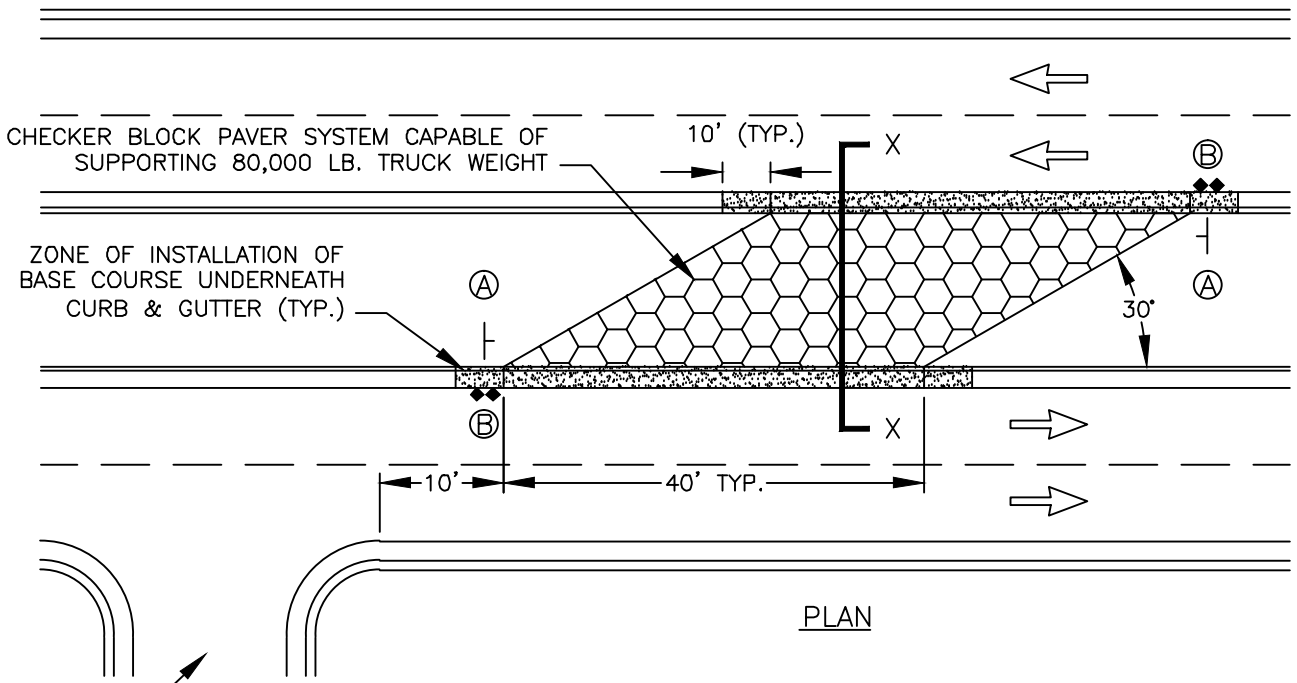
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# SIGNAGE AND PAVEMENT MARKINGS AT ROUNDABOUTS

| STD. NO. | REV. |
|---|---|
| 50.11 | 1 |



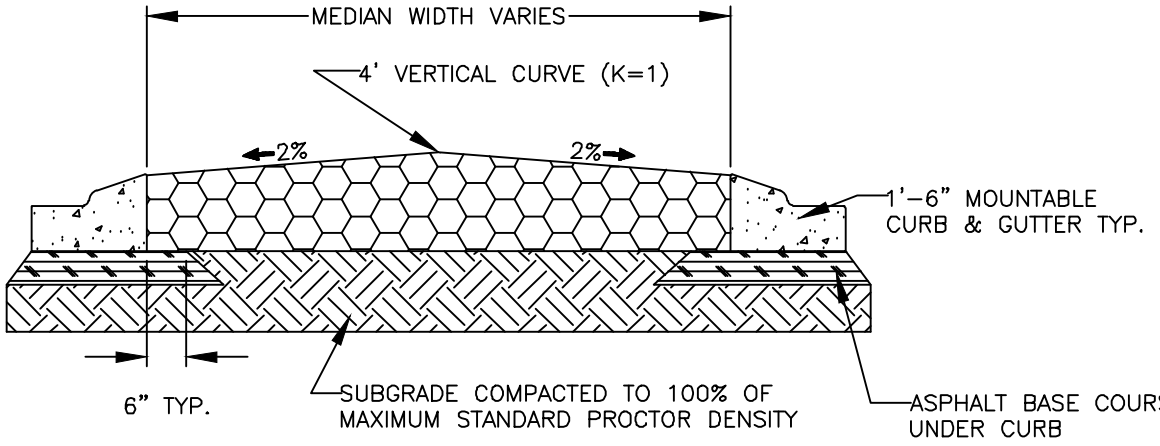

PLAN

Ⓐ "NO LEFT TURN" (R3-2, 24"x24")

Ⓑ YELLOW/YELLOW RAISED PVMT. MARKER 1' O.C. SEE NCDOT STD. #1250.01.

NOTES:

1. CROSSOVER TO BE OFFSET 10' FROM ANY INTERSECTING STREET OR DRIVEWAY OTHER THAN A FIRE DEPARTMENT DRIVEWAY.
2. ASPHALT BASE COURSE UNDERNEATH MOUNTABLE CURB AND GUTTER SHALL EXTEND AT LEAST 10 FEET BEYOND CROSSOVER.
3. ONLY FOR USE AT RIGHT-IN/RIGHT-OUT (RI/RO) ENTRANCES TO RESIDENTIAL SUBDIVISIONS AND COMMERCIAL DEVELOPMENTS WITH PRIOR APPROVAL FROM CHARLOTTE DEPARTMENT OF TRANSPORTATION (CDOT).
4. INCLUDE SUBDRAIN AS NECESSARY PER CLDSM 20.28.




CROSS-SECTION X-X

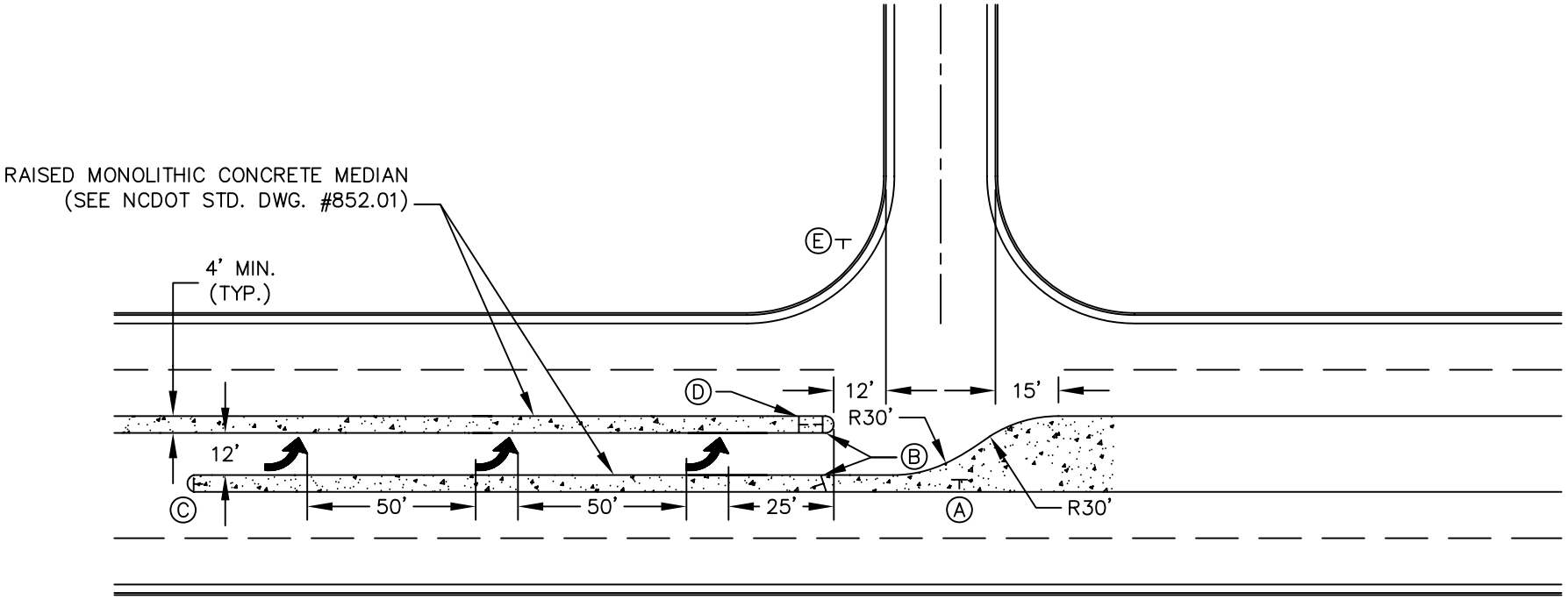
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# EMERGENCY VEHICLE MEDIAN CROSSOVER

| STD. NO. | REV. |
|---|---|
| 50.12 | 13 |




SIGN LEGEND

Ⓐ ONE WAY (R6-2R, 18"x24")

Ⓑ DO NOT ENTER (R5-1, 30"x30")

Ⓒ DOUBLE-DOWN ARROW (W12-1, 30"x30")

Ⓓ NO U-TURN (R3-4, 24"x24")*

Ⓔ STOP (R1-1, 30"x30")

* IF NECESSARY

NOTES:

1. ADDITIONAL PAVEMENT MARKINGS (EDGE LINES, GORES, ETC.) ARE NOT SHOWN BUT ARE REQUIRED. SEE CDOT PAVEMENT MARKING STANDARDS.
2. FOR DIVIDED SIDE STREETS, MEASURE THE 12 FOOT DIMENSION FROM THE FACE OF MEDIAN INSTEAD OF FACE OF CURB ON APPROACHING LANE.
3. ALL SIGNS SHALL BE MUTCD STANDARD SIGNS.

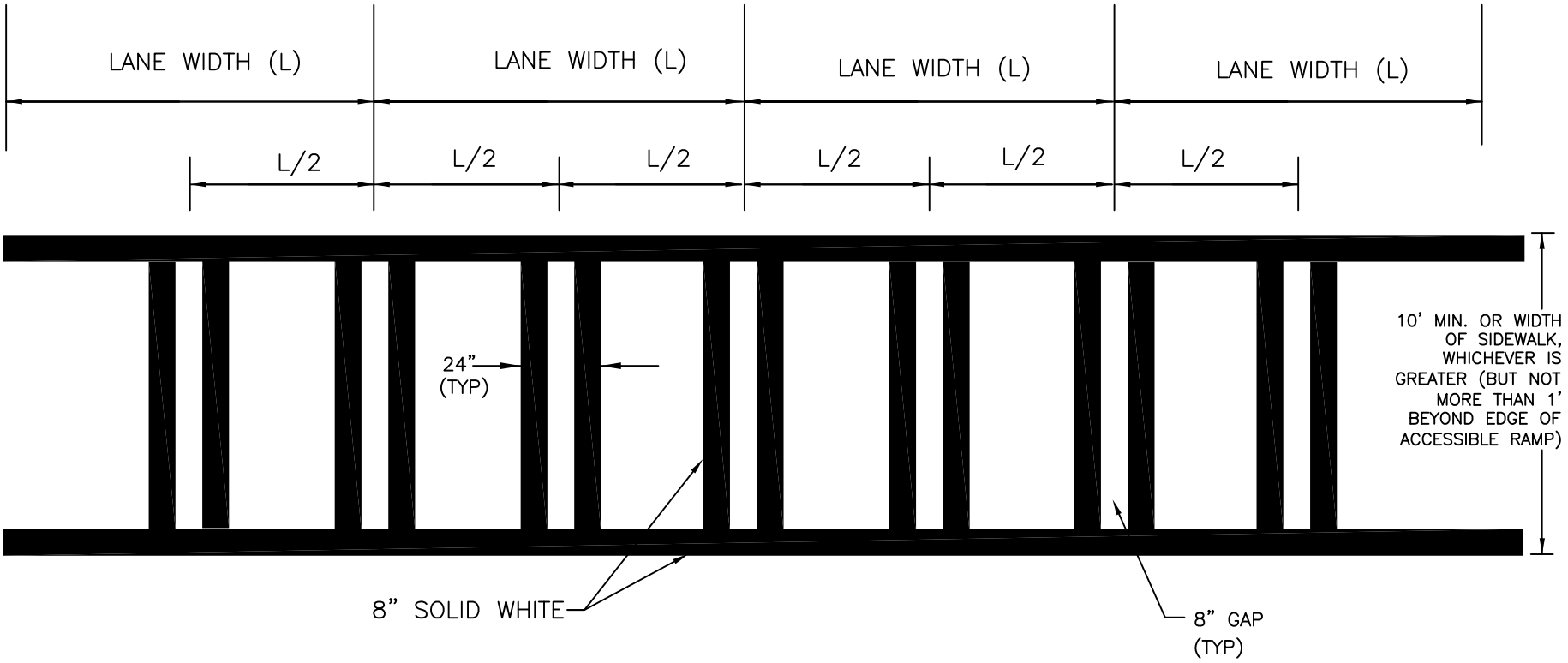
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# DIRECTIONAL CROSSOVER WITH RAISED MEDIANS

| STD. NO. | REV. |
|---|---|
| 50.13 | |




NOTES:

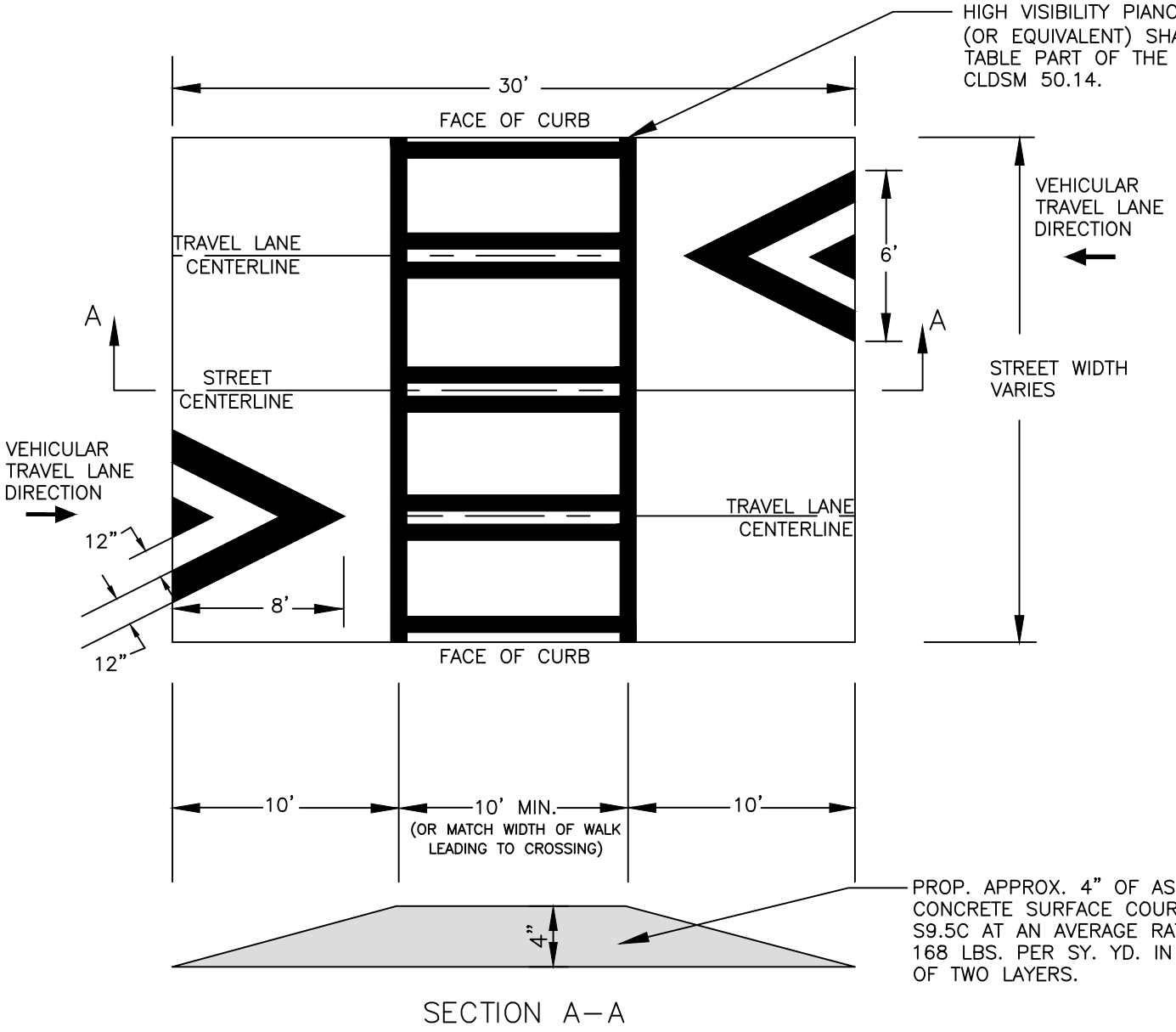
1. PER MUTCD STANDARDS, WHEN CROSSWALK LINES ARE USED THEY SHALL CONSIST OF SOLID WHITE LINES THAT MARK THE CROSSWALK. THEY SHALL BE NOT LESS THAN 150 MM (6 IN) NOR GREATER THAN 600 MM (24 IN) IN WIDTH.
2. IF TRANSVERSE LINES ARE USED TO MARK A CROSSWALK, THE GAP BETWEEN THE LINES SHOULD NOT BE LESS THAN 1.8 M (6 FT). IF DIAGONAL OR LONGITUDINAL LINES ARE USED WITHOUT TRANSVERSE LINES TO MARK A CROSSWALK, THE CROSSWALK SHOULD NOT BE LESS THAN 1.8 M (6 FT) WIDE.
3. IF USED, THE DIAGONAL OR LONGITUDINAL LINES SHOULD BE 300 TO 600 MM (12 TO 24 IN) WIDE AND SPACED 300 TO 1500 MM (12 TO 60 IN) APART. THE MARKING DESIGN SHOULD AVOID THE WHEEL PATHS, AND THE SPACING SHOULD NOT EXCEED 2.5 TIMES THE LINE WIDTH.

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# PIANO–STYLE CROSSWALK

| STD. NO. | REV. |
|---|---|
| 50.14 | 9 |




SECTION A–A

## NOTES:

1. THIS DETAIL IS TO BE USED ONLY WITH PRIOR APPROVAL BY CDOT AND CHARLOTTE FIRE DEPARTMENT.
2. ADJACENT CURB RAMPS SHALL BE INSTALLED PER CLDSM 10.31, MODIFIED TO A 1 ¼" DEPRESSION AT BACK OF CURB.
3. PROVIDE APPROPRIATE STORM DRAINAGE MEASURES TO ENSURE WATER DOES NOT POND AT ANY POINT ALONG THE SURFACE CROSSWALK OR AT THE BASE OF THE RAISED CROSSWALK.
4. THE CROSSWALK SURFACE RUNNING SLOPE AND CROSS SLOPE SHALL NOT EXCEED THAT OF THE EXISTING ROADWAY.
5. STORM GRATES SHALL NOT BE INSTALLED INTO THE TAPERS OR TABLE PORTION OF THE RAISED CROSSWALK.
6. THIS DETAIL IS NOT PERMITTED FOR USE ON NCDOT–MAINTAINED ROADWAYS.

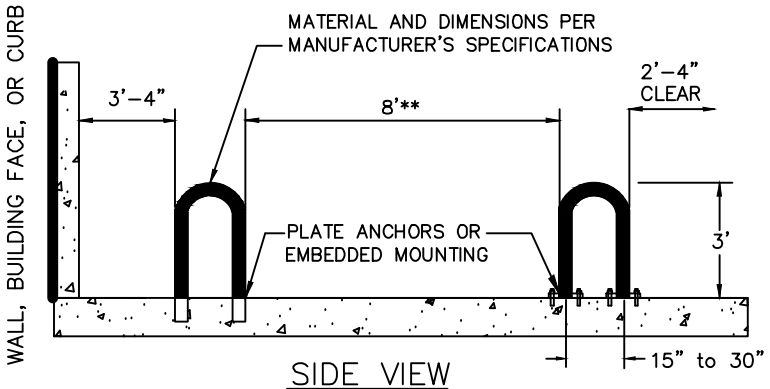
NOT TO SCALE

CHARLOTTE.

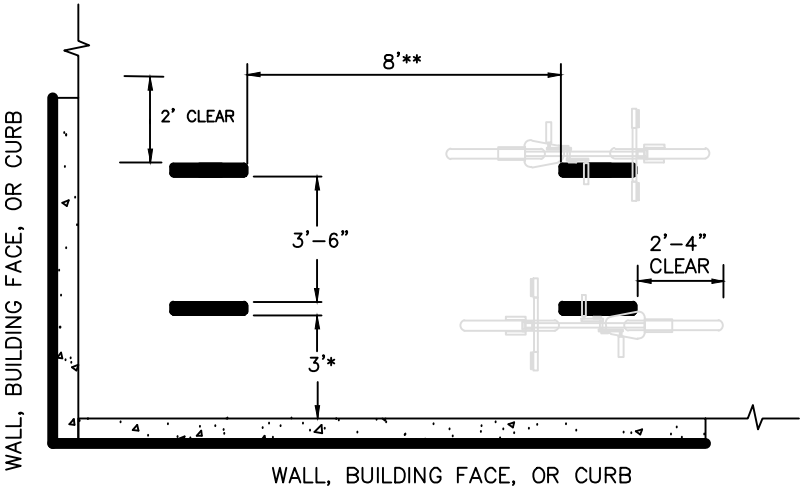
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# RAISED CROSSWALK

| STD. NO. | REV. |
|---|---|
| 50.15 | 23 |




SIDE VIEW




PLAN VIEW

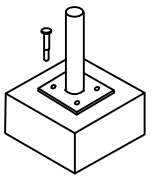
* 5' MINIMUM SEPARATION FROM CURB FACE WHEN INSTALLED ADJACENT TO A CURB WITH "HEAD–IN" AUTOMOBILE PARKING

** MEASURED FROM NEAREST VERTICAL COMPONENT OF NEIGHBORING RACK

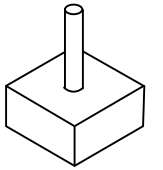
## NOTES:

1. BIKE RACK GENERAL REQUIREMENTS:
   - SHOULD SUPPORT THE BICYCLE UPRIGHT WITHOUT PUTTING STRESS ON THE WHEELS
   - SHOULD ACCOMODATE A VARIETY OF BICYCLES AND ATTACHMENTS
   - SHOULD ALLOW LOCKING OF FRAME AND AT LEAST ONE WHEEL WITH U–LOCK
   - SHOULD PROVIDE SECURITY AND LONGEVITY FEATURES APPROPRIATE FOR THE INTENDED LOCATION
   - SHOULD BE INTUITIVE
2. BIKE RACKS SHOULD BE INSTALLED PER MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.
3. ALTERNATIVE BIKE RACKS OR LOCKERS MAY BE USED BUT ARE SUBJECT TO APPROVAL OF THE CHARLOTTE DEPT. OF TRANSPORTATION.
4. ALL DIMENSIONS SHOWN ARE MINIMUM.
5. RACK MUST BE CANE DETECTABLE. RACK AND CLEARANCES SHOWN ARE TO BE OUTSIDE THE PEDESTRIAN ACCESSIBLE ROUTE.

## TYPICAL MOUNT OPTIONS:



SURFACE
PLATE BASE WITH ANCHORS
(NOT PERMITTED IN
PAVER BRICK SURFACE)



IN–GROUND
EMBED INTO
CONCRETE BASE

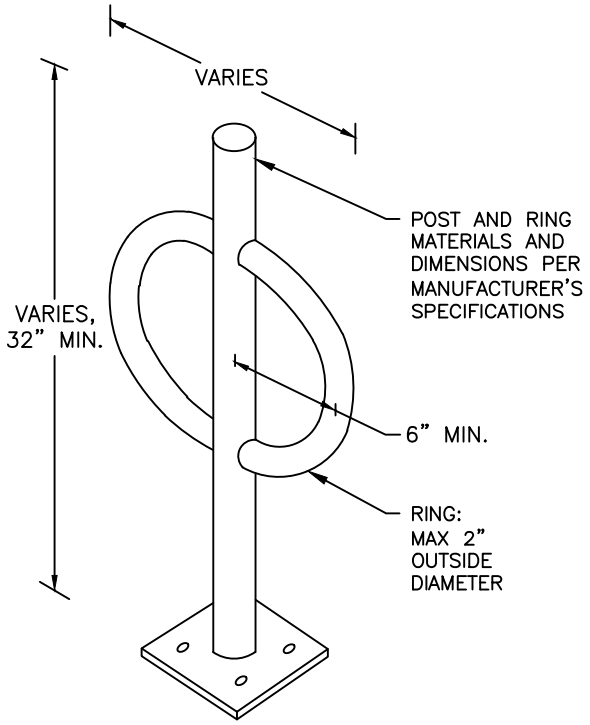
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# INVERTED "U" RACK FOR BICYCLE PARKING

| STD. NO. | REV. |
|---|---|
| 50.20 | 15 |




## TYPICAL MOUNT OPTIONS:

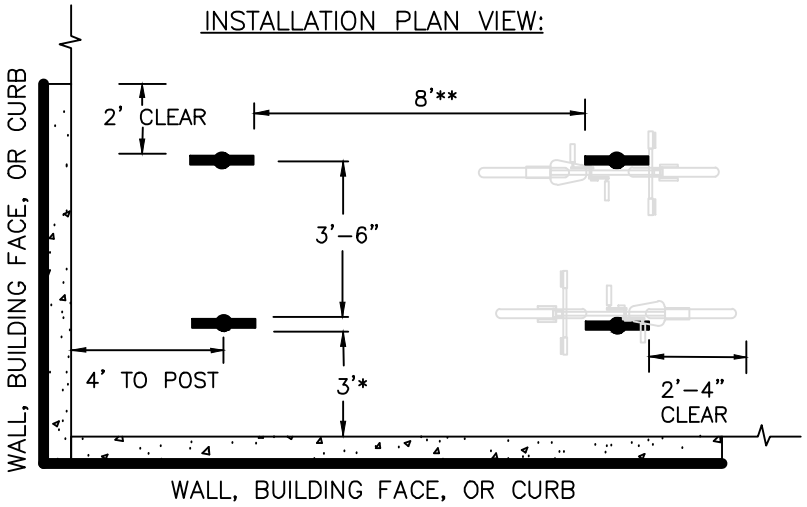
SURFACE
PLATE BASE WITH ANCHORS (NOT PERMITTED IN PAVER BRICK SURFACE)

IN-GROUND
EMBED INTO CONCRETE BASE

## NOTES:

1. BIKE RACK GENERAL REQUIREMENTS:
   - SHOULD SUPPORT THE BICYCLE UPRIGHT WITHOUT PUTTING STRESS ON THE WHEELS
   - SHOULD ACCOMODATE A VARIETY OF BICYCLES AND ATTACHMENTS
   - SHOULD ALLOW LOCKING OF FRAME AND AT LEAST ONE WHEEL WITH U-LOCK
   - SHOULD PROVIDE SECURITY AND LONGEVITY FEATURES APPROPRIATE FOR THE INTENDED LOCATION
   - SHOULD BE INTUITIVE
2. BIKE RACKS SHOULD BE INSTALLED PER MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.
3. ALTERNATIVE BIKE RACKS OR LOCKERS MAY BE USED BUT ARE SUBJECT TO APPROVAL OF THE CHARLOTTE DEPT. OF TRANSPORTATION.
4. ALL DIMENSIONS SHOWN ARE MINIMUM.
5. RACK MUST BE CANE DETECTABLE. RACK AND CLEARANCES SHOWN ARE TO BE OUTSIDE THE PEDESTRIAN ACCESSIBLE ROUTE.

## INSTALLATION PLAN VIEW:




* 5' MINIMUM SEPARATION FROM CURB FACE WHEN INSTALLED ADJACENT TO A CURB WITH "HEAD-IN" AUTOMOBILE PARKING

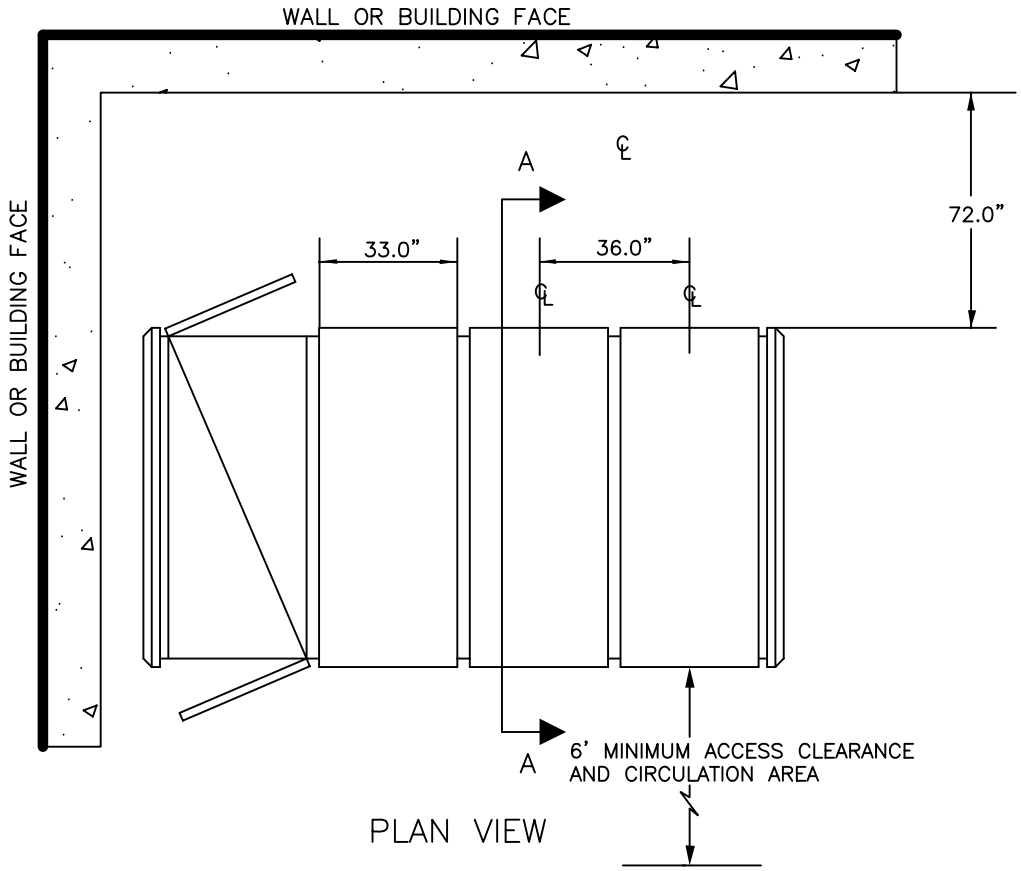
** MEASURED FRON NEAREST VERTICAL COMPONENT OF NEIGHBORING RACK

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# POST AND RING BIKE RACK

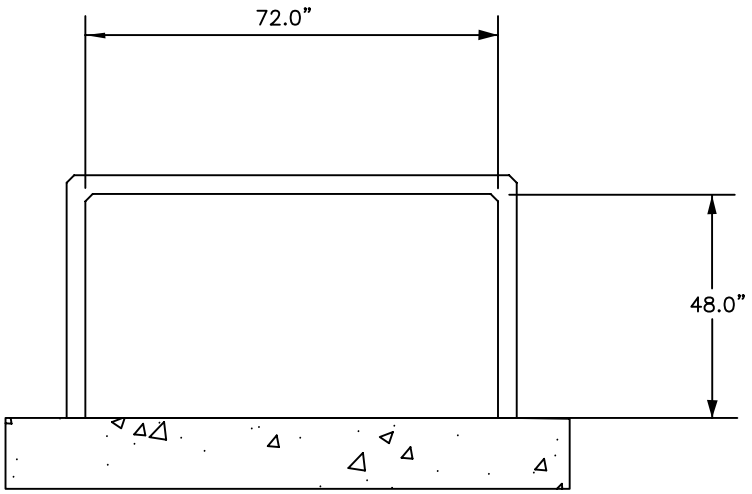
| STD. NO. | REV. |
|---|---|
| 50.21 | 15 |




PLAN VIEW

NOTES:

1. BIKE LOCKERS SHOULD BE INSTALLED AS PER MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.
2. ALTERNATIVE BIKE RACKS OR LOCKERS MAY BE USED BUT ARE SUBJECT TO APPROVAL BY THE CHARLOTTE DEPARTMENT OF TRANSPORTATION.
3. ALL DIMENSIONS SHOWN ARE MINIMUM.
4. ALLOW FOR POSITIVE DRAINAGE AWAY FROM LOCKERS.




SECTION A–A

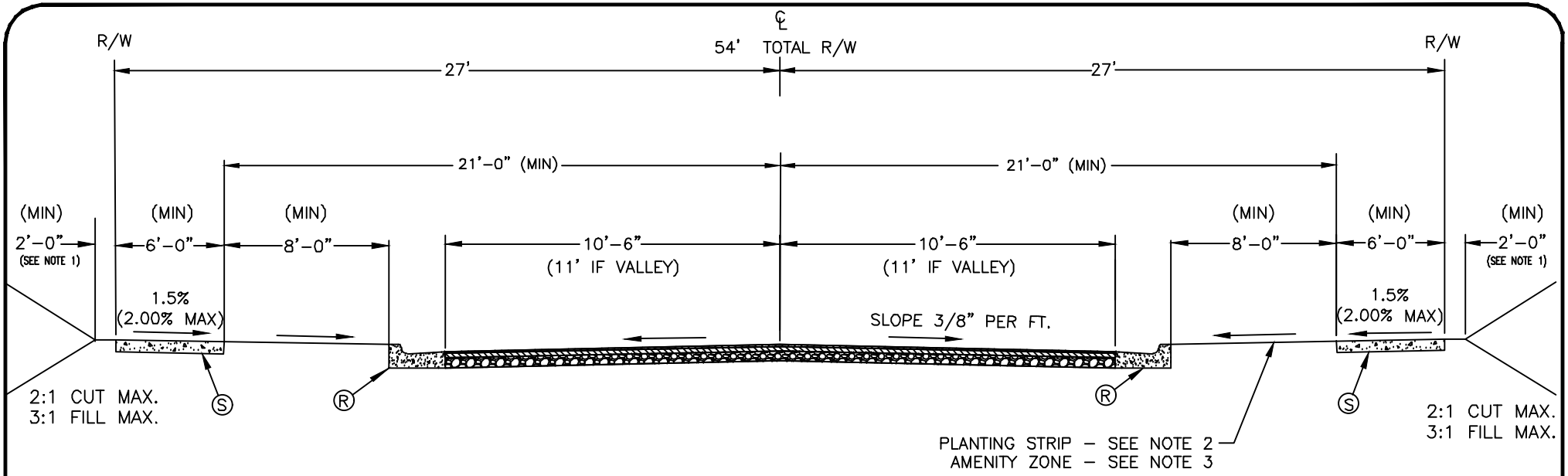
NOT TO SCALE

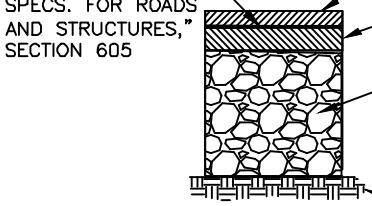
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# BICYCLE LOCKERS

| STD. NO. | REV. |
|---|---|
| 50.22 | |




SURFACE COURSE
1" S9.5B
FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE
1 1/2" S9.5C OR S9.5B

BASE COURSE
8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE
COMPACTED SUBGRADE (SEE SECTION 1.A.18)

## TYPICAL PAVEMENT SECTION

NOTES:

1. 2' BUFFER CAN BE ADDITIONAL R/W OR SIDEWALK UTILITY EASEMENT.
2. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
3. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
4. MIN. 11' LANES REQUIRED IF USED IN ETJ

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER OR 2'-0" VALLEY GUTTER

Ⓢ 4" CONCRETE SIDEWALK

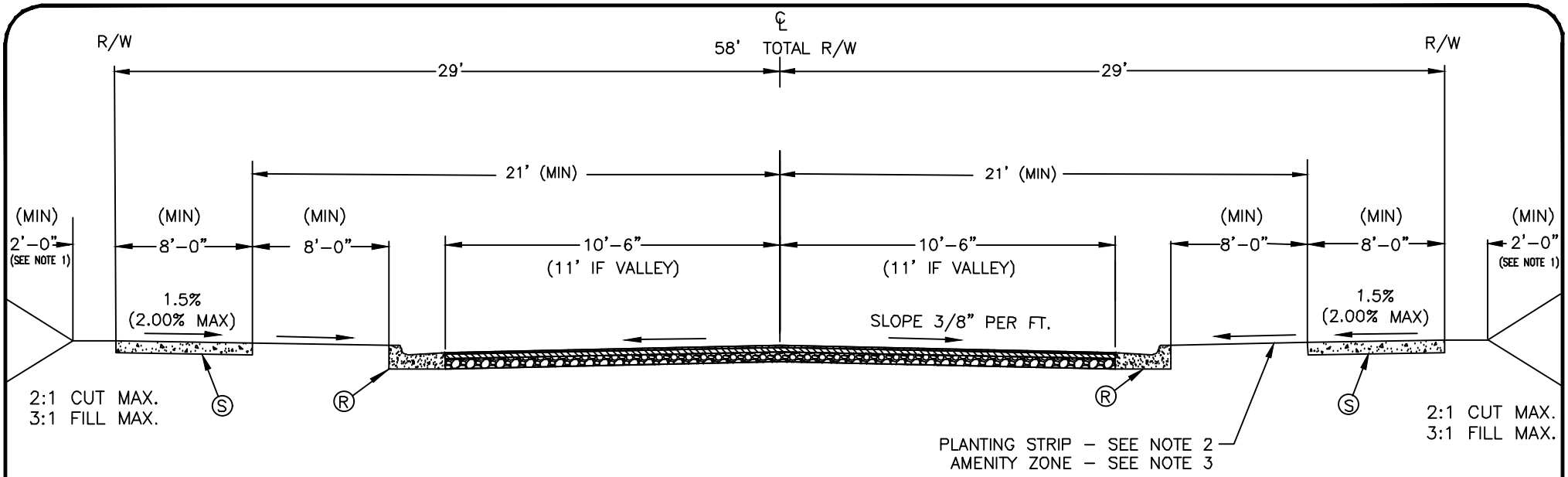
NOT TO SCALE

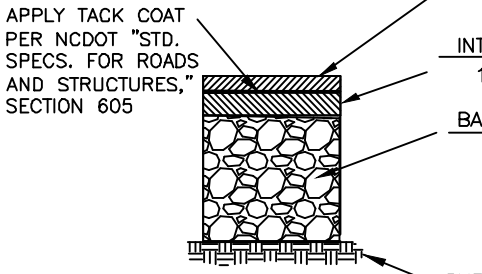
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL RESIDENTIAL MEDIUM STREET
# TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-02A | 23 |




SURFACE COURSE
1" S9.5B
FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE
1 1/2" S9.5C OR S9.5B

BASE COURSE
8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE
COMPACTED SUBGRADE (SEE SECTION 1.A.18)

TYPICAL PAVEMENT SECTION

NOTES:

1. 2' BUFFER CAN BE ADDITIONAL R/W OR SIDEWALK UTILITY EASEMENT.
2. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
3. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
4. MIN. 11' LANES REQUIRED IF USED IN ETJ

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER OR 2'-0" VALLEY GUTTER

Ⓢ 4" CONCRETE SIDEWALK

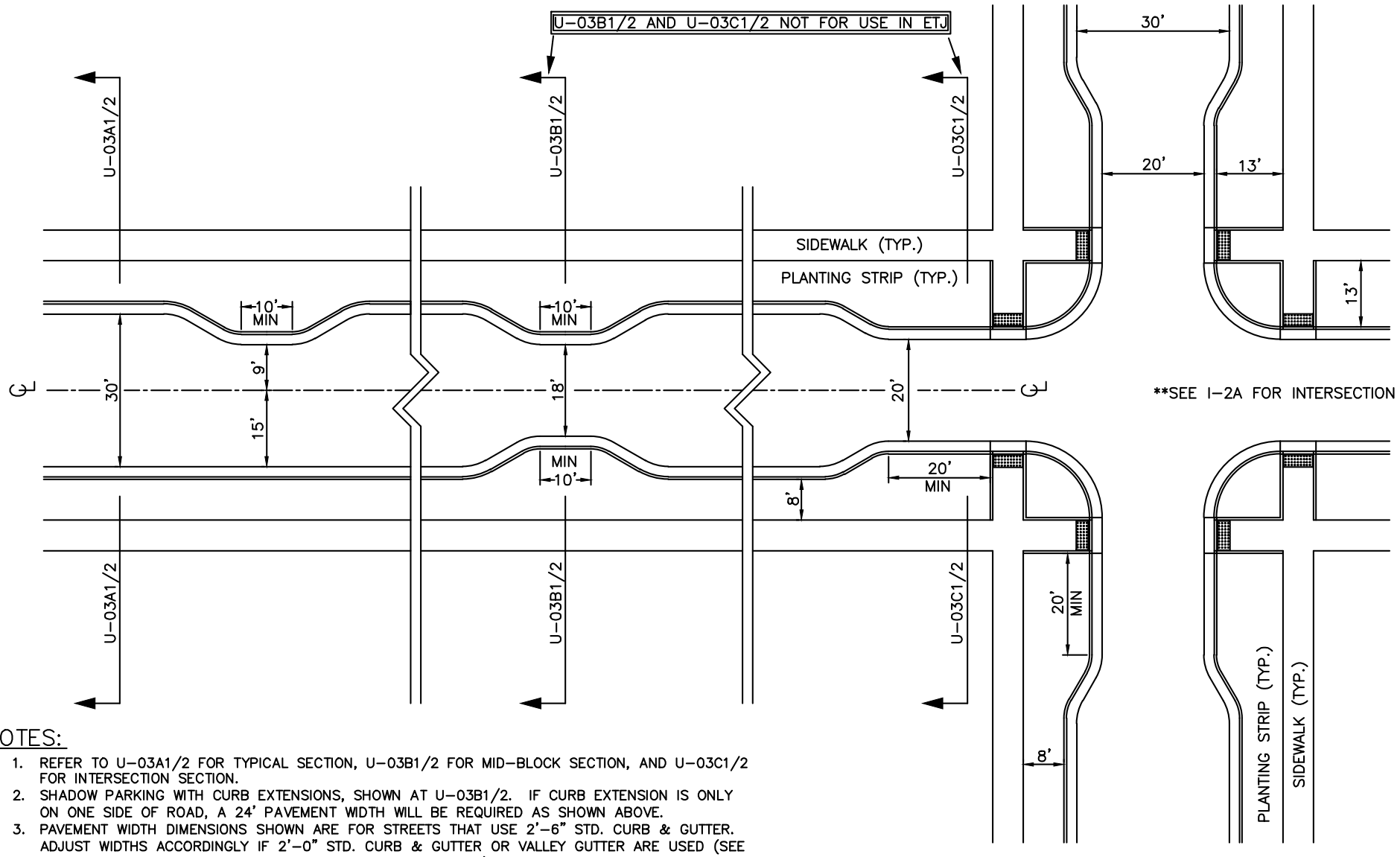
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL RESIDENTIAL MEDIUM STREET TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-02B | 23 |




NOTES:

1. REFER TO U-03A1/2 FOR TYPICAL SECTION, U-03B1/2 FOR MID-BLOCK SECTION, AND U-03C1/2 FOR INTERSECTION SECTION.
2. SHADOW PARKING WITH CURB EXTENSIONS, SHOWN AT U-03B1/2. IF CURB EXTENSION IS ONLY ON ONE SIDE OF ROAD, A 24' PAVEMENT WIDTH WILL BE REQUIRED AS SHOWN ABOVE.
3. PAVEMENT WIDTH DIMENSIONS SHOWN ARE FOR STREETS THAT USE 2'-6" STD. CURB & GUTTER. ADJUST WIDTHS ACCORDINGLY IF 2'-0" STD. CURB & GUTTER OR VALLEY GUTTER ARE USED (SEE DETAILS U-03 A1, A2, B1, B2, C1, AND C2 FOR MORE INFO.)

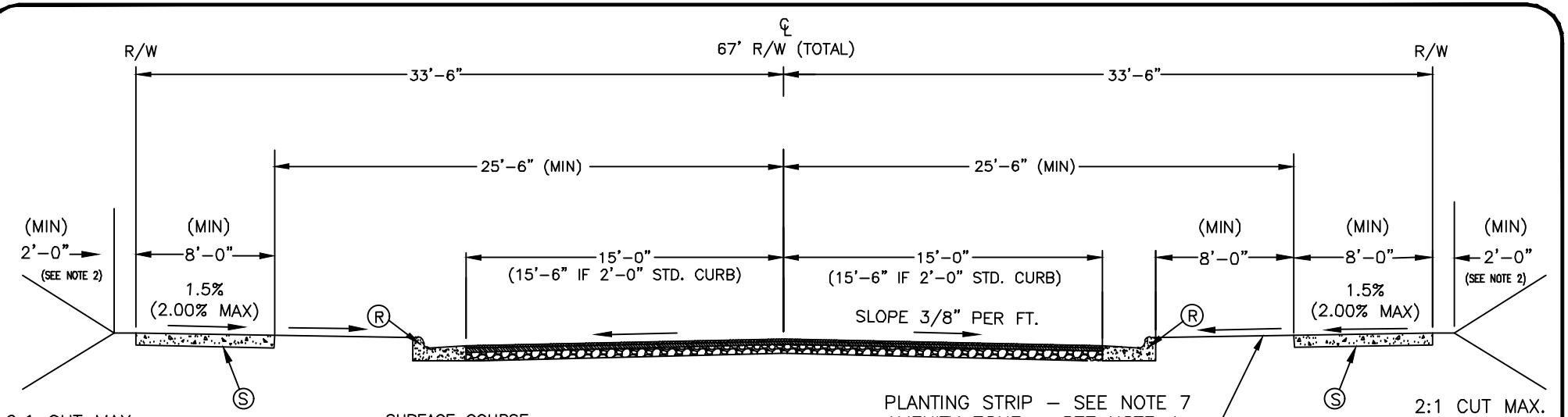
NOT TO SCALE

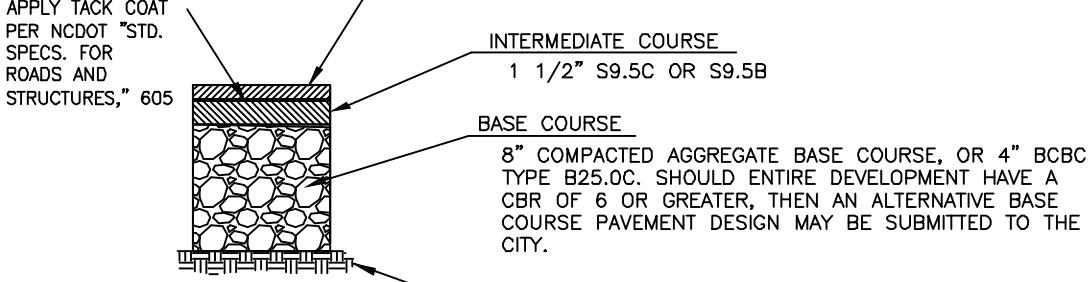
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL RESIDENTIAL WIDE STREET
## PLAN VIEW

| STD. NO. | REV. |
|---|---|
| U-03 | 23 |




TYPICAL PAVEMENT SECTION

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOTES:

1. VALLEY GUTTER IS ALLOWED ONLY WITH PRIOR APPROVAL FROM CITY.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. SEE PARKING STANDARD DETAILS #50.09A, B, & C FOR INFORMATION REGARDING ON-STREET "HEAD-IN" PARKING.
6. ON STREETS WITH FREQUENT DRIVEWAYS THAT PRECLUDE ON-STREET PARKING, USE DETAIL #U-03C1.
7. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

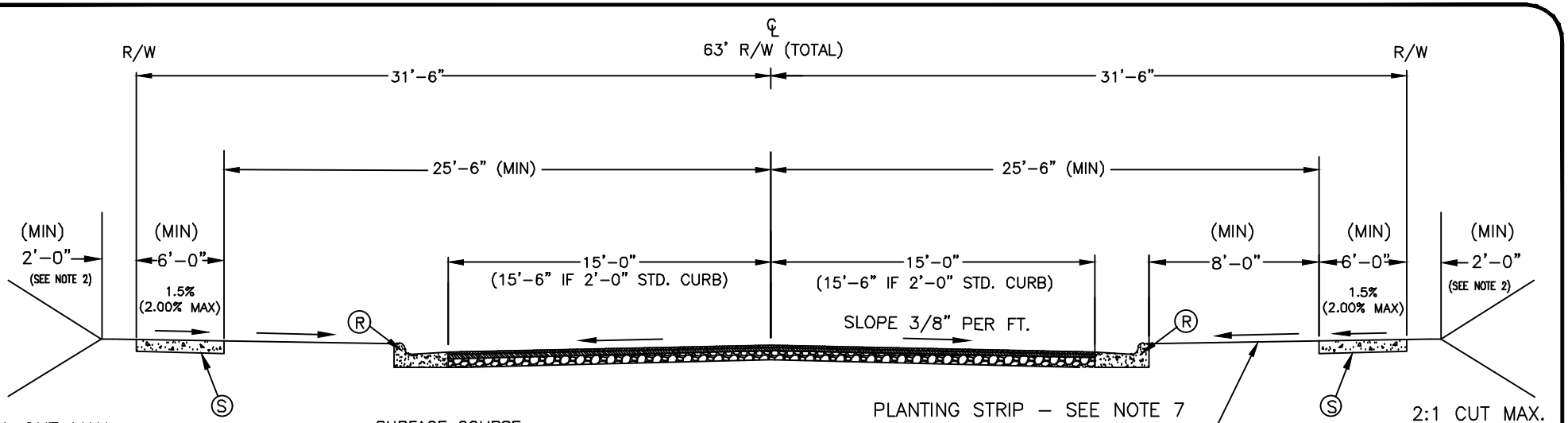
NOT TO SCALE

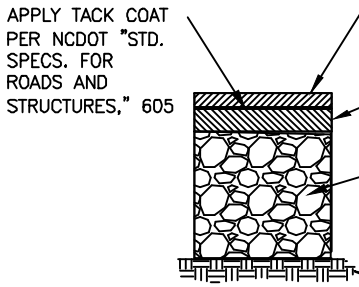
CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL RESIDENTIAL WIDE STREET TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-03A1 | 23 |




SURFACE COURSE

1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE

1 1/2" S9.5C OR S9.5B

BASE COURSE

8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY.

SUBGRADE

COMPACTED SUBGRADE (SEE SECTION I.A.18)

TYPICAL PAVEMENT SECTION

NOTES:

1. VALLEY GUTTER IS ALLOWED ONLY WITH PRIOR APPROVAL FROM CITY.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. SEE PARKING STANDARD DETAILS #50.09A, B, & C FOR INFORMATION REGARDING ON-STREET "HEAD-IN" PARKING.
6. ON STREETS WITH FREQUENT DRIVEWAYS THAT PRECLUDE ON-STREET PARKING, USE DETAIL #U-03C2.
7. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, THE CITY ENGINEER MAY AUTHORIZE A SUITABLE GRADE.

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

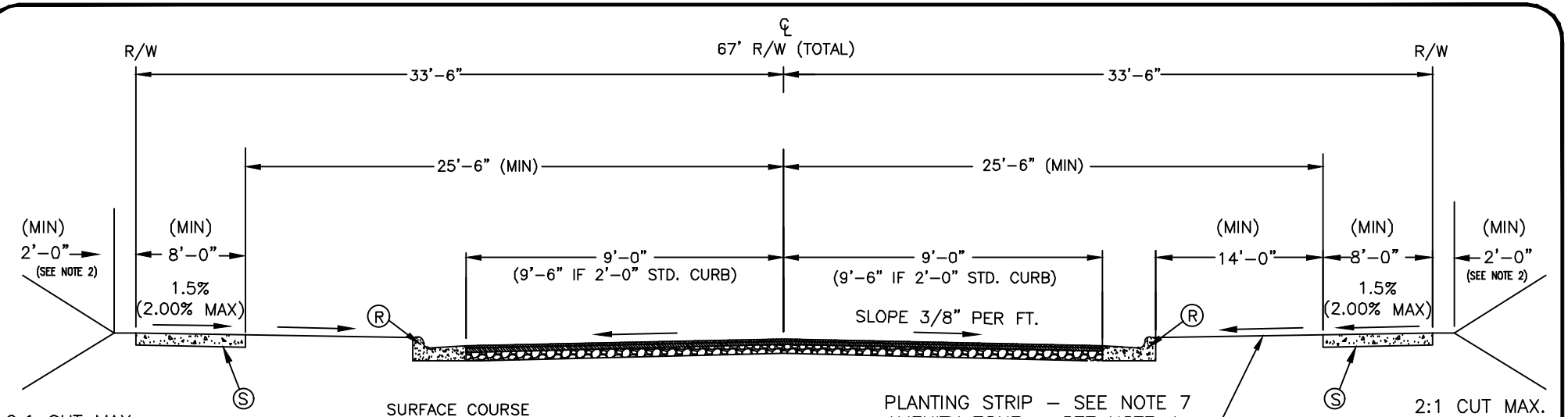
NOT TO SCALE

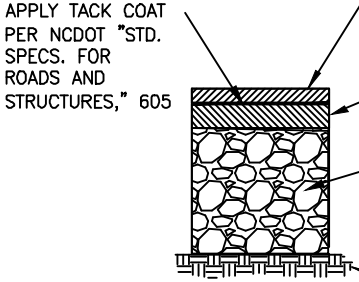
CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL RESIDENTIAL WIDE STREET TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-03A2 | 23 |




SURFACE COURSE

1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE

1 1/2" S9.5C OR S9.5B

BASE COURSE

8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY.

SUBGRADE

COMPACTED SUBGRADE (SEE SECTION I.A.18)

## TYPICAL PAVEMENT SECTION

NOTES:

1. VALLEY GUTTER IS ALLOWED ONLY WITH PRIOR APPROVAL FROM CITY.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. SEE PARKING STANDARD DETAILS #50.09A, B, & C FOR INFORMATION REGARDING ON-STREET "HEAD-IN" PARKING.
6. ON STREETS WITH FREQUENT DRIVEWAYS THAT PRECLUDE ON-STREET PARKING, USE DETAIL #U-03C1.
7. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

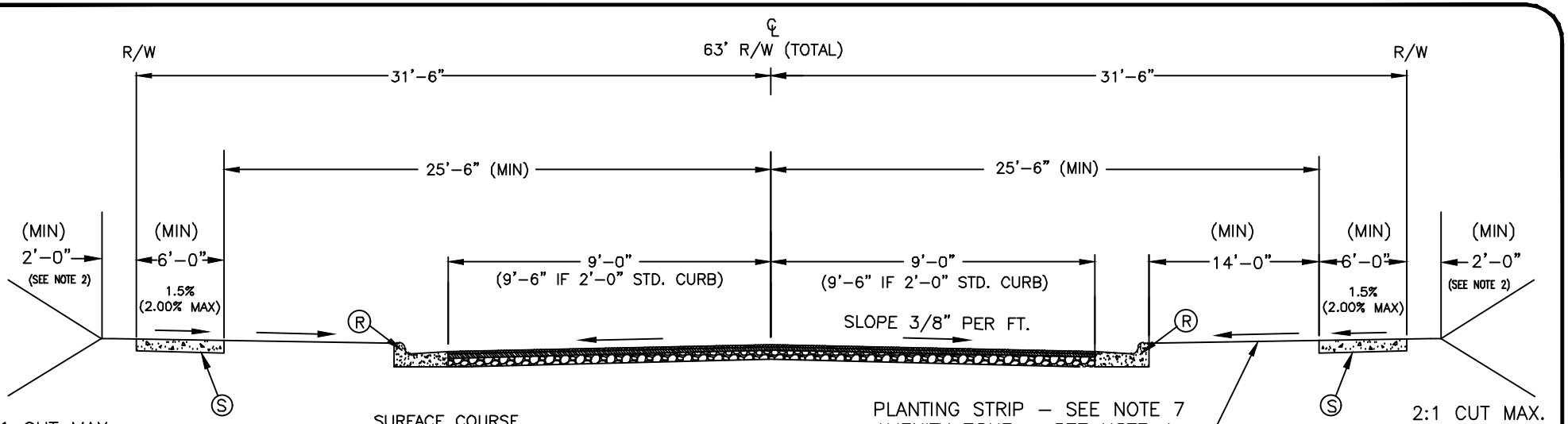
NOT TO SCALE

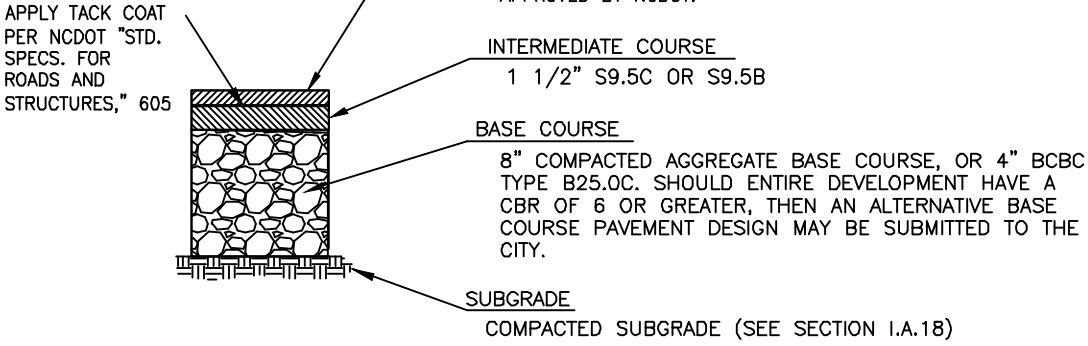
CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL RESIDENTIAL WIDE STREET AT MIDBLOCK WITH CURB EXTENSION TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-03B1 | 23 |




TYPICAL PAVEMENT SECTION

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER, 2'-0" STANDARD CURB AND GUTTER, OR 2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOTES:

1. VALLEY GUTTER IS ALLOWED ONLY WITH PRIOR APPROVAL FROM CITY.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. SEE PARKING STANDARD DETAILS #50.09A, B, & C FOR INFORMATION REGARDING ON-STREET "HEAD-IN" PARKING.
6. ON STREETS WITH FREQUENT DRIVEWAYS THAT PRECLUDE ON-STREET PARKING, USE DETAIL #U-03C2.
7. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

NOT FOR USE IN ETJ

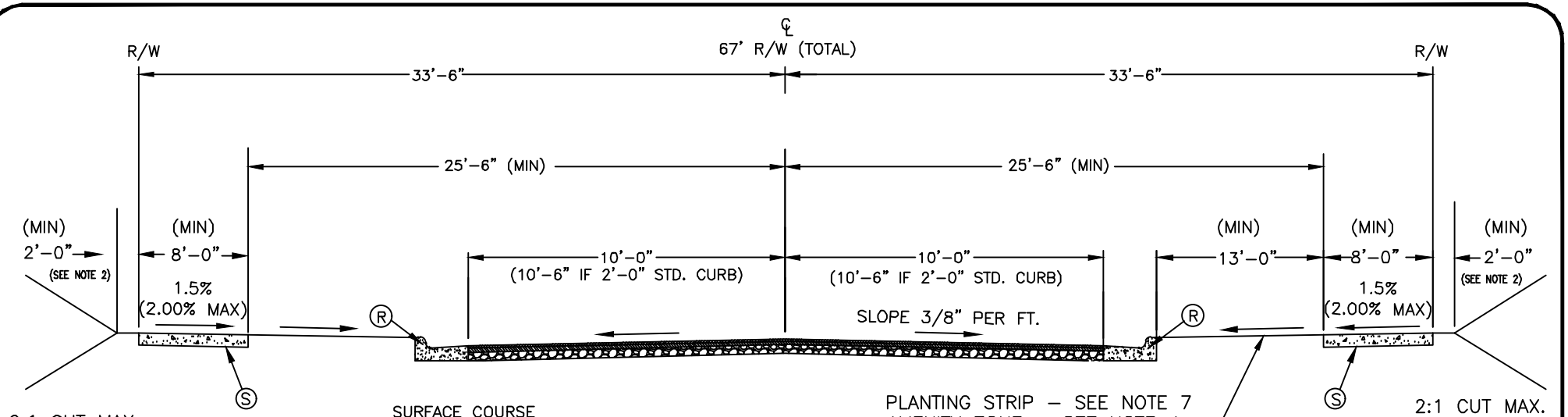
NOT TO SCALE

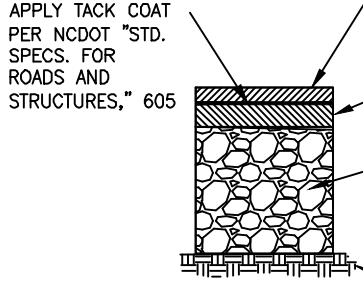
CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL RESIDENTIAL WIDE STREET AT MIDBLOCK WITH CURB EXTENSION TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-03B2 | 23 |




SURFACE COURSE

1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE

1 1/2" S9.5C OR S9.5B

BASE COURSE

8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY.

SUBGRADE

COMPACTED SUBGRADE (SEE SECTION I.A.18)

## TYPICAL PAVEMENT SECTION

NOTES:

1. VALLEY GUTTER IS ALLOWED ONLY WITH PRIOR APPROVAL FROM CITY.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. SEE PARKING STANDARD DETAILS #50.09A, B, & C FOR INFORMATION REGARDING ON-STREET "HEAD-IN" PARKING.
6. THIS DETAIL IS FOR USE ON STREETS WITH FREQUENT DRIVEWAYS THAT PRECLUDE ON-STREET PARKING.
7. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

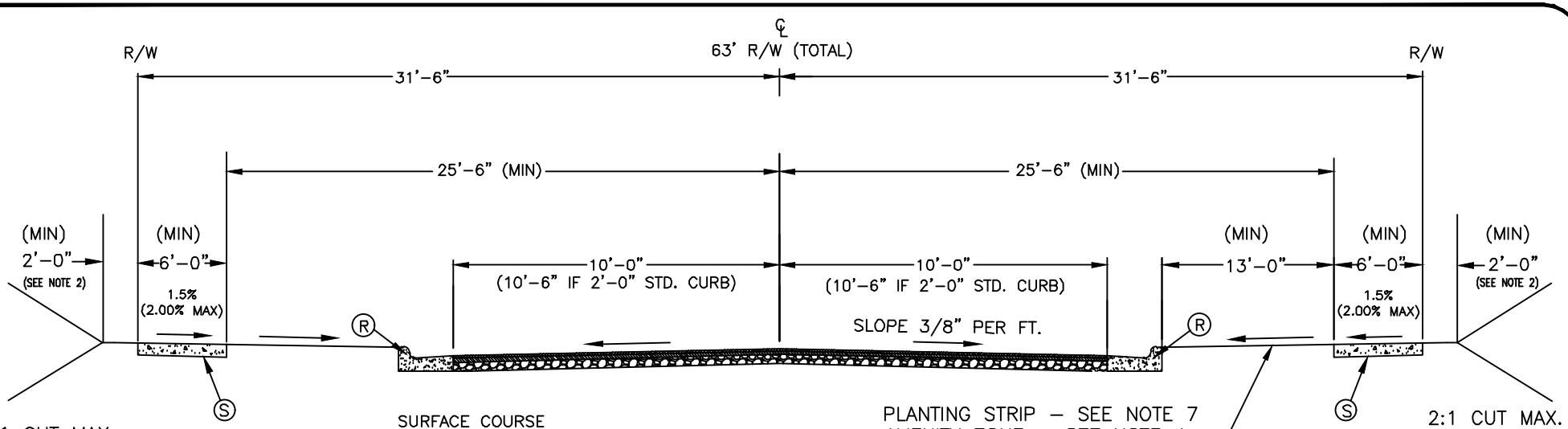
NOT TO SCALE

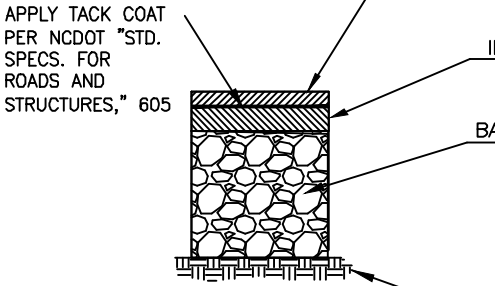
CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL RESIDENTIAL WIDE STREET AT INTERSECTION WITH CURB EXTENSION TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-03C1 | 23 |




SURFACE COURSE

1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE

1 1/2" S9.5C OR S9.5B

BASE COURSE

8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY.

SUBGRADE

COMPACTED SUBGRADE (SEE SECTION I.A.18)

## TYPICAL PAVEMENT SECTION

NOTES:

1. VALLEY GUTTER IS ALLOWED ONLY WITH PRIOR APPROVAL FROM CITY.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. SEE PARKING STANDARD DETAILS #50.09A, B, & C FOR INFORMATION REGARDING ON-STREET "HEAD-IN" PARKING.
6. THIS DETAIL IS FOR USE ON STREETS WITH FREQUENT DRIVEWAYS THAT PRECLUDE ON-STREET PARKING.
7. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

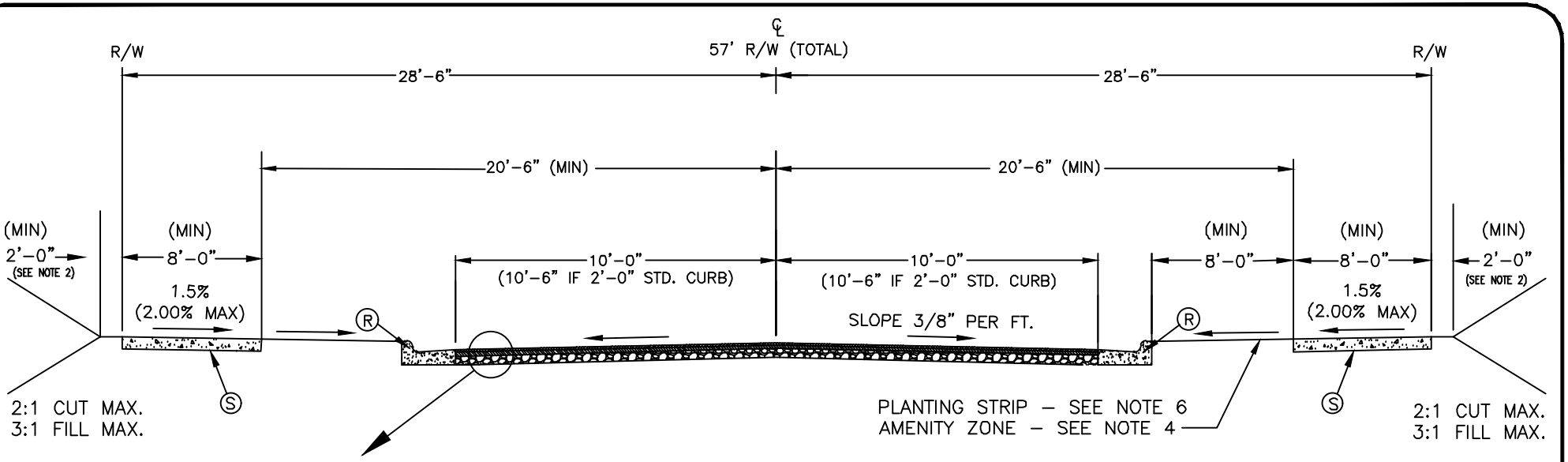
NOT TO SCALE

CHARLOTTE

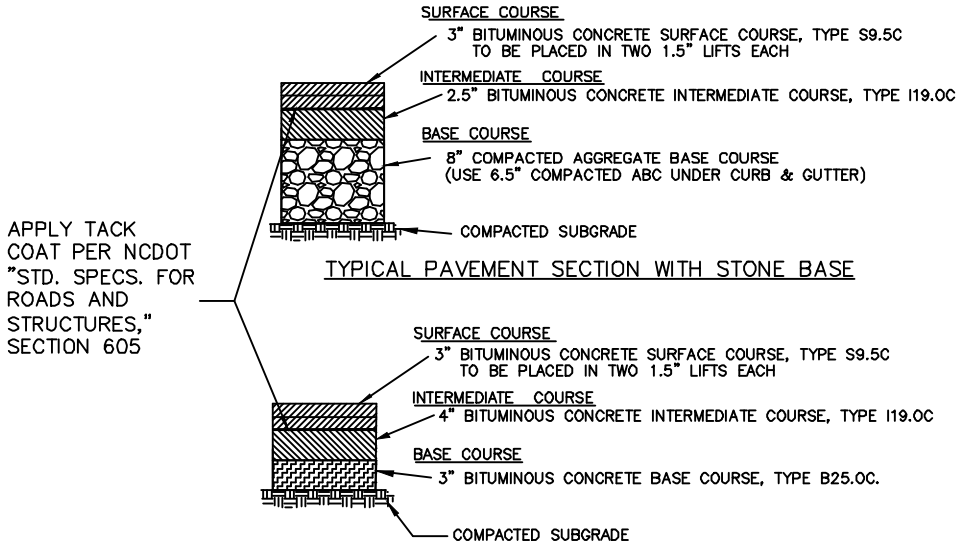
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL RESIDENTIAL WIDE STREET AT INTERSECTION WITH CURB EXTENSION TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-03C2 | 23 |




EITHER OF THESE PAVEMENT SECTIONS MAY BE USED:




TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER PROHIBITED.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT SECTION DESIGN TO CITY.
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

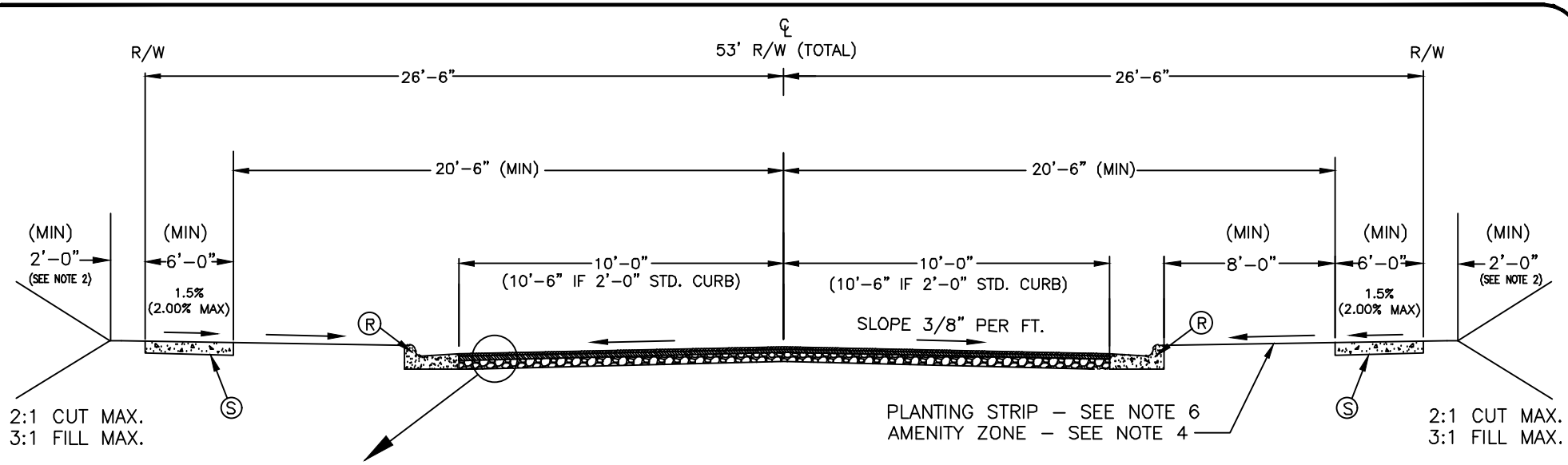
NOT TO SCALE

CHARLOTTE

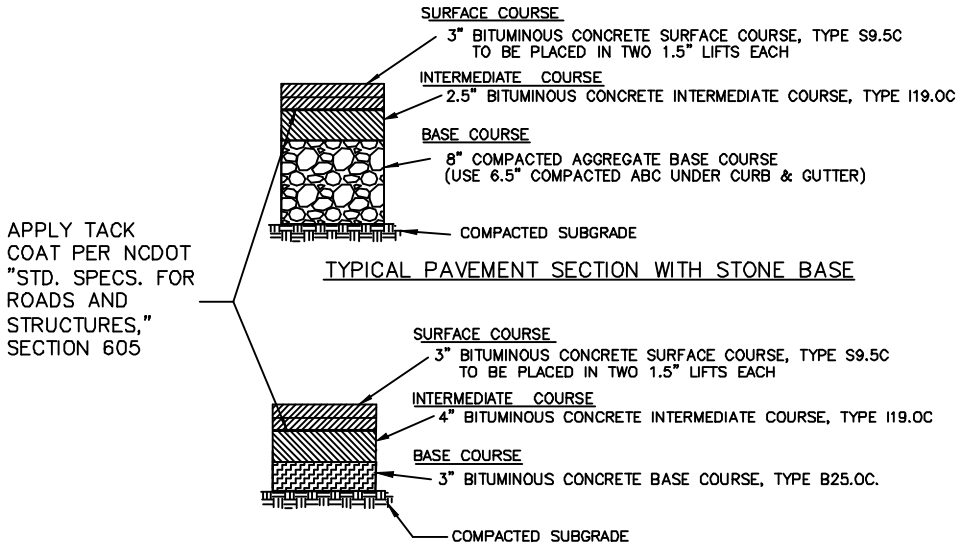
CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL NARROW STREET TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-04A | 23 |




EITHER OF THESE PAVEMENT SECTIONS MAY BE USED:




TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER PROHIBITED.
2. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT SECTION DESIGN TO CITY.
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER,
2'-0" STANDARD CURB AND GUTTER, OR
2'-0" VALLEY GUTTER (SEE NOTE 1)

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

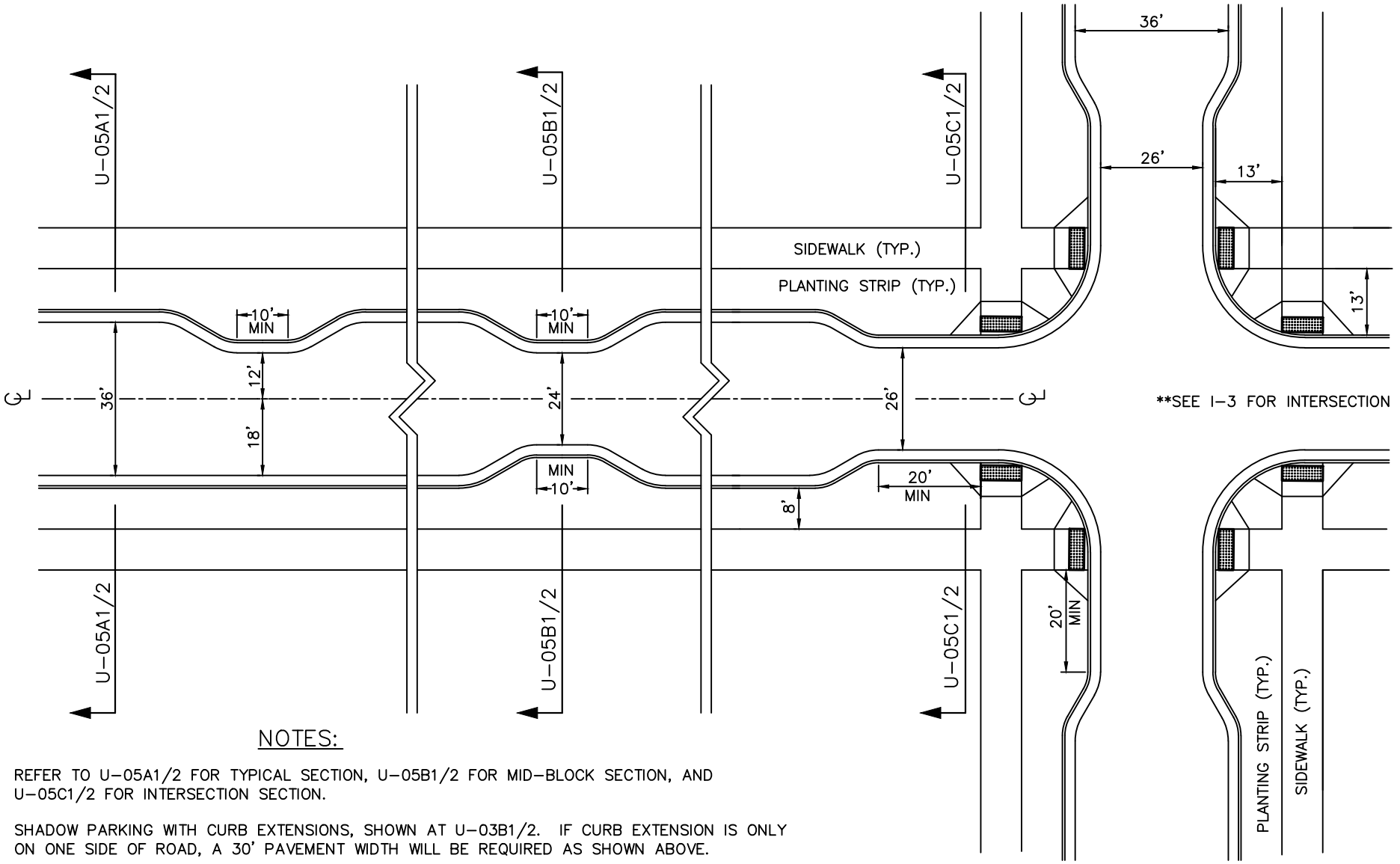
NOT TO SCALE

CHARLOTTE

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL NARROW STREET TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-04B | 23 |




NOTES:

1. REFER TO U-05A1/2 FOR TYPICAL SECTION, U-05B1/2 FOR MID-BLOCK SECTION, AND U-05C1/2 FOR INTERSECTION SECTION.
2. SHADOW PARKING WITH CURB EXTENSIONS, SHOWN AT U-03B1/2. IF CURB EXTENSION IS ONLY ON ONE SIDE OF ROAD, A 30' PAVEMENT WIDTH WILL BE REQUIRED AS SHOWN ABOVE.

NOT FOR USE IN ETJ

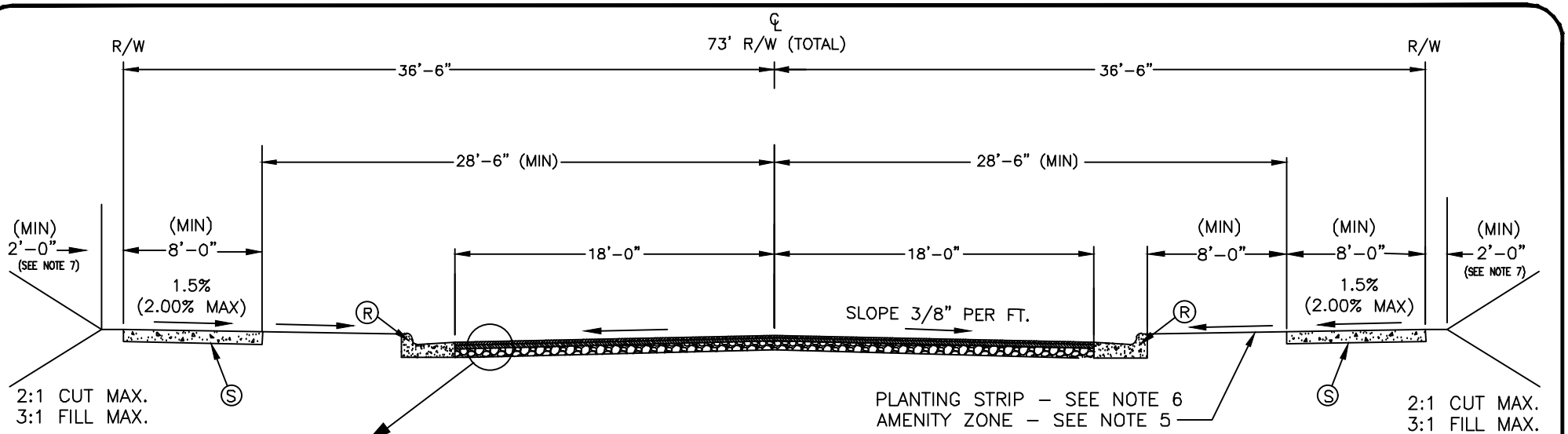
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET
## PLAN VIEW

| STD. NO. | REV. |
|---|---|
| U-05 | 23 |

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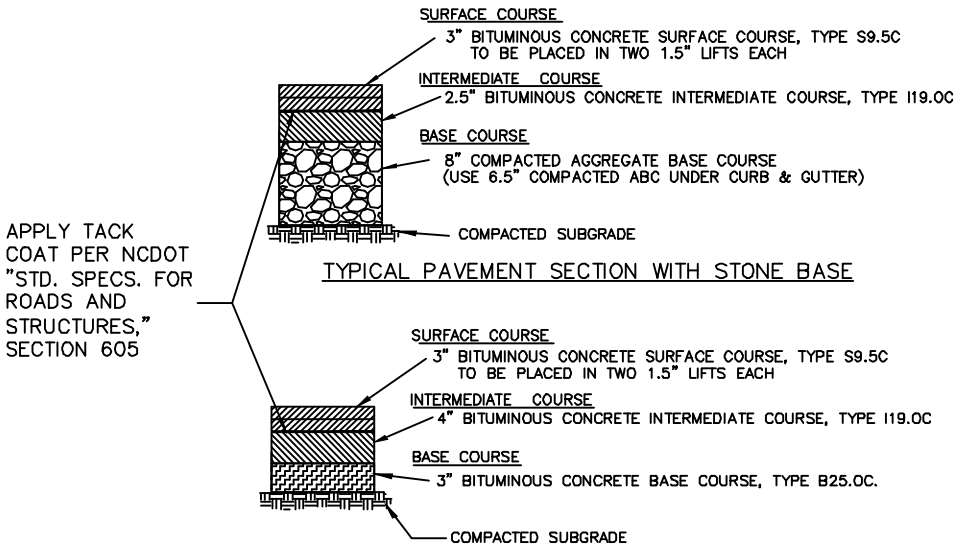



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. WIDER SIDEWALKS MAY BE REQUIRED UNDER CIRCUMSTANCES AS IDENTIFIED IN THE USDG.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
5. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2.% MAX).
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
7. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

KEY

(R) 2'-6" STANDARD CURB AND GUTTER ONLY

(S) 4" CONCRETE SIDEWALK 3600 PSI AT 28 DAYS

NOT FOR USE IN ETJ

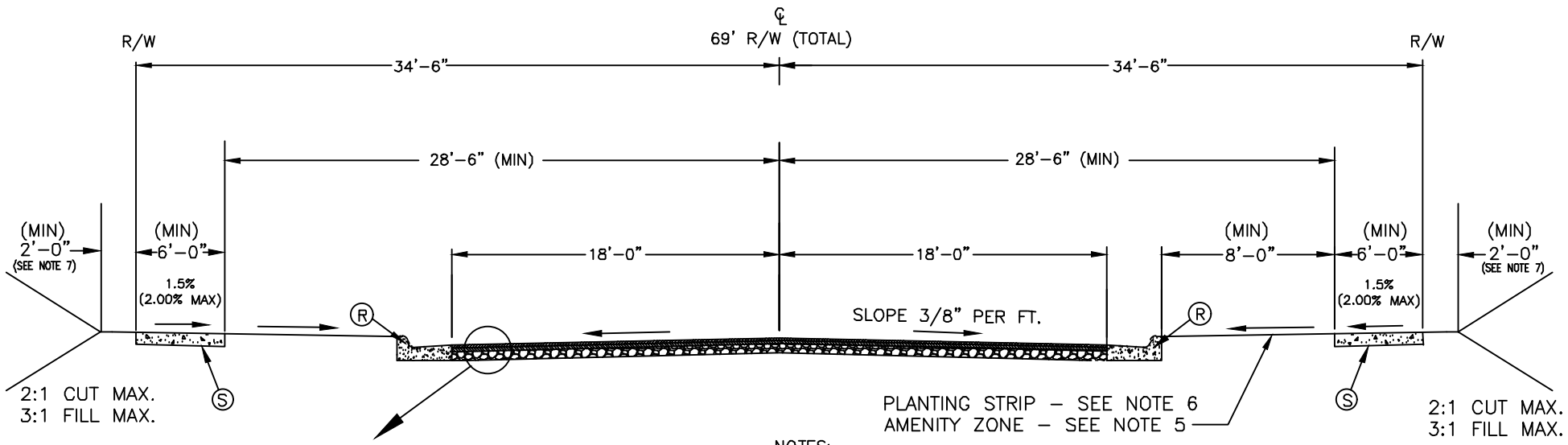
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-05A1 | 23 |

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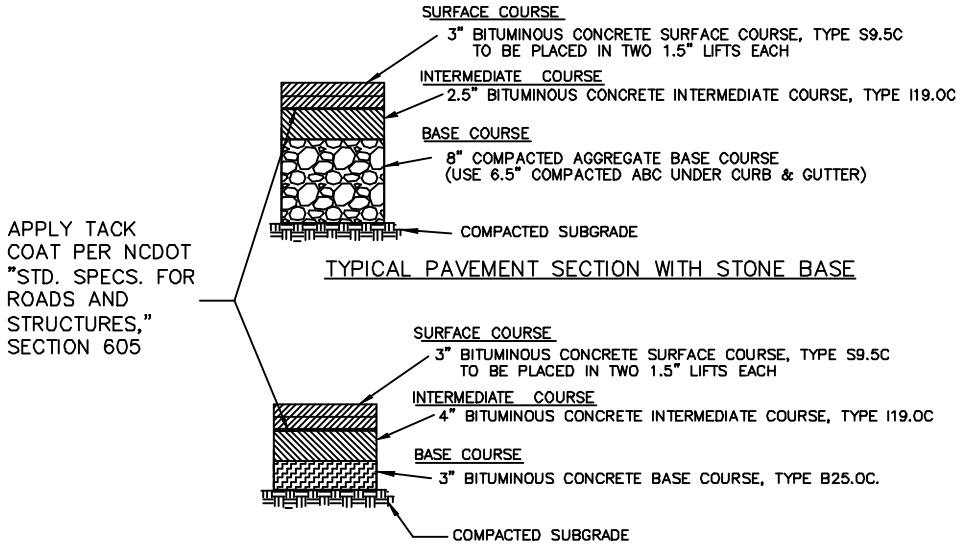



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. WIDER SIDEWALKS MAY BE REQUIRED UNDER CIRCUMSTANCES AS IDENTIFIED IN THE USDG.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
5. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2.% MAX).
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
7. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

KEY

(R) 2'-6" STANDARD CURB AND GUTTER ONLY

(S) 4" CONCRETE SIDEWALK 3600 PSI AT 28 DAYS

NOT FOR USE IN ETJ

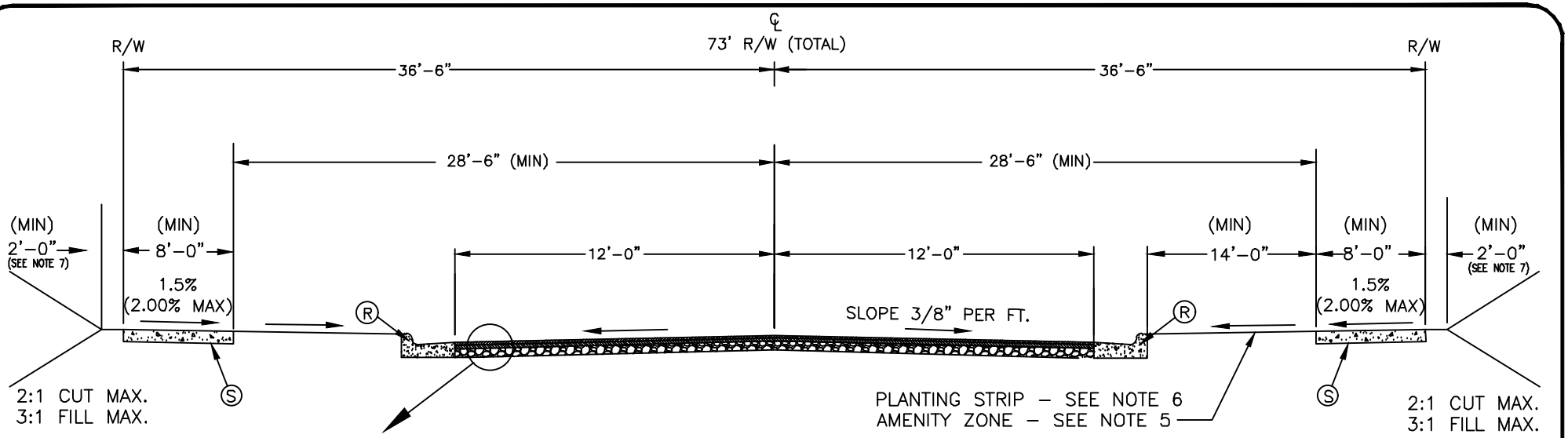
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-05A2 | 23 |

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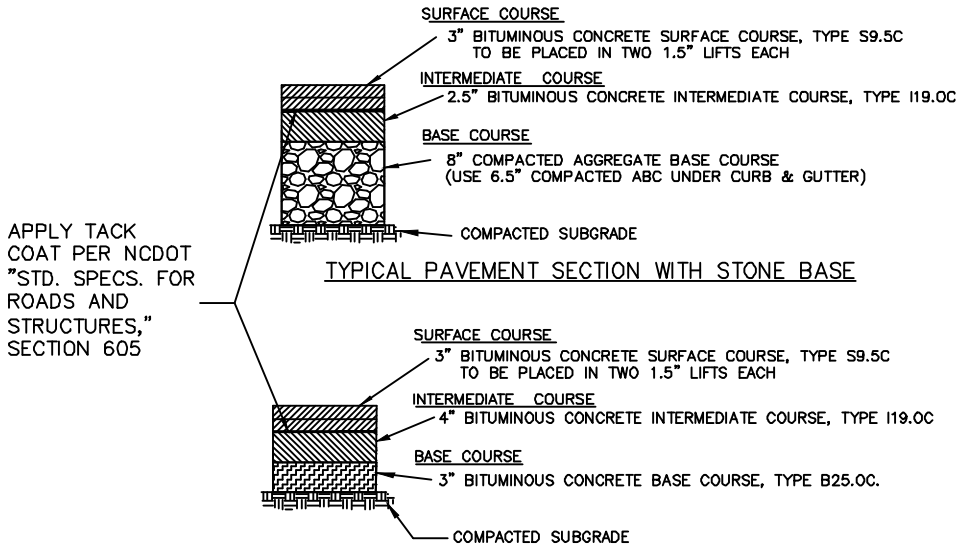



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. WIDER SIDEWALKS MAY BE REQUIRED UNDER CIRCUMSTANCES AS IDENTIFIED IN THE USDG.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
5. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2.% MAX).
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
7. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER ONLY

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

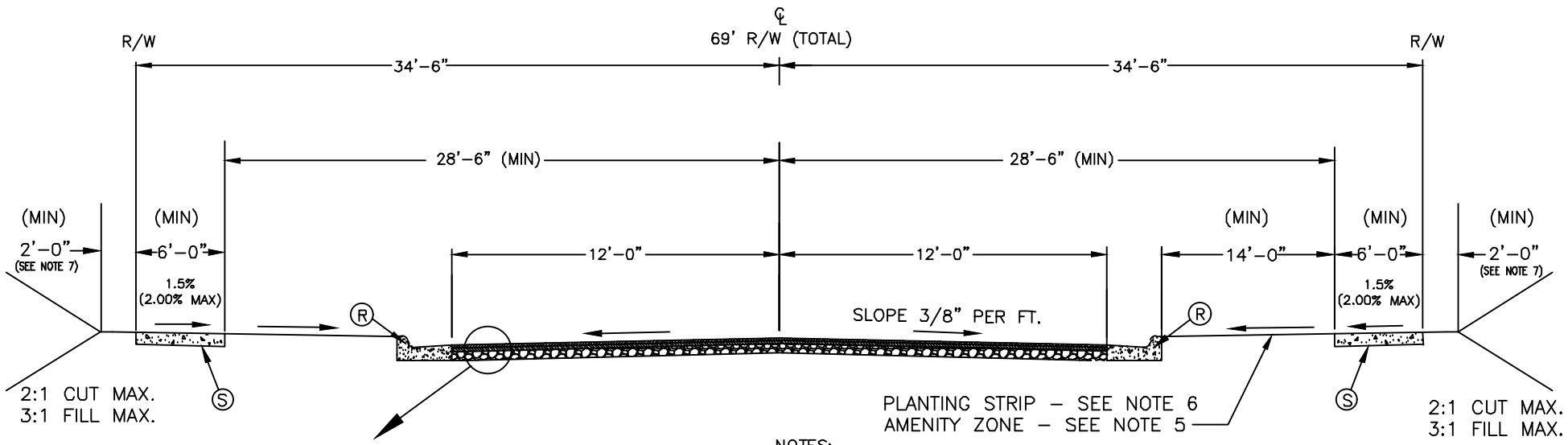
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET AT MIDBLOCK WITH CURB EXTENSION TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-05B1 | 23 |

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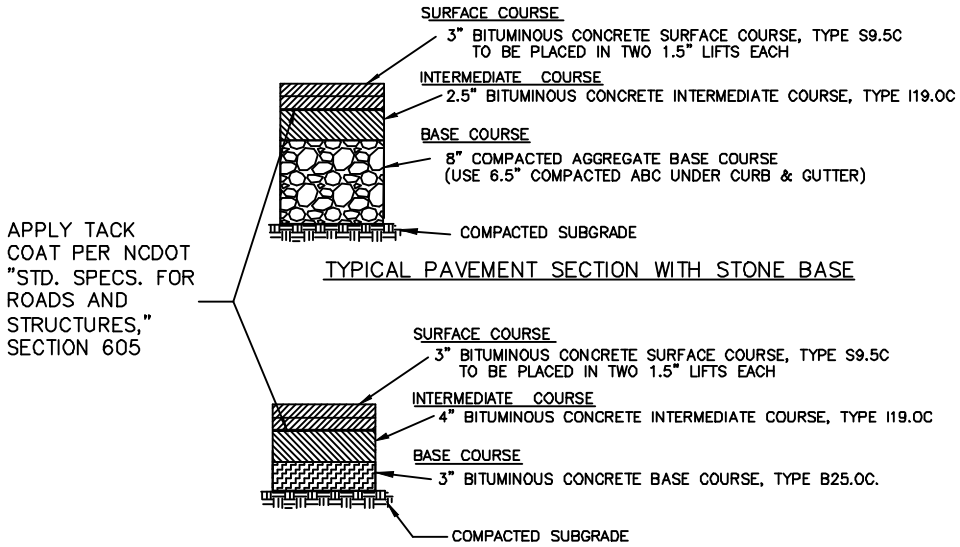



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. WIDER SIDEWALKS MAY BE REQUIRED UNDER CIRCUMSTANCES AS IDENTIFIED IN THE USDG.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
5. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2.% MAX).
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
7. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

KEY

(R) 2'-6" STANDARD CURB AND GUTTER ONLY

(S) 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

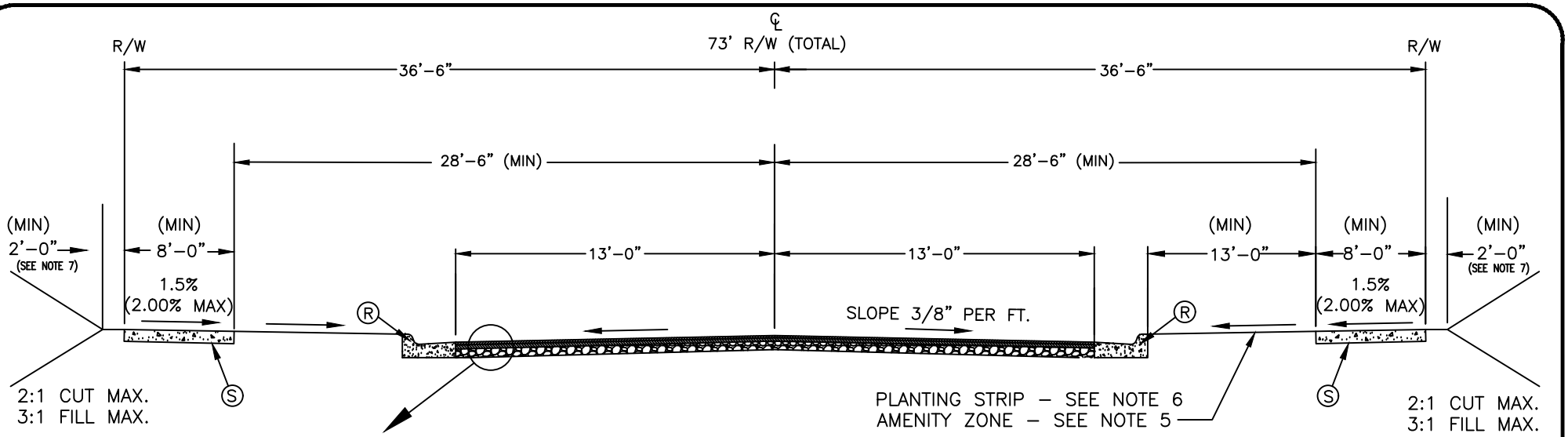
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET AT MIDBLOCK WITH CURB EXTENSION TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-05B2 | 23 |

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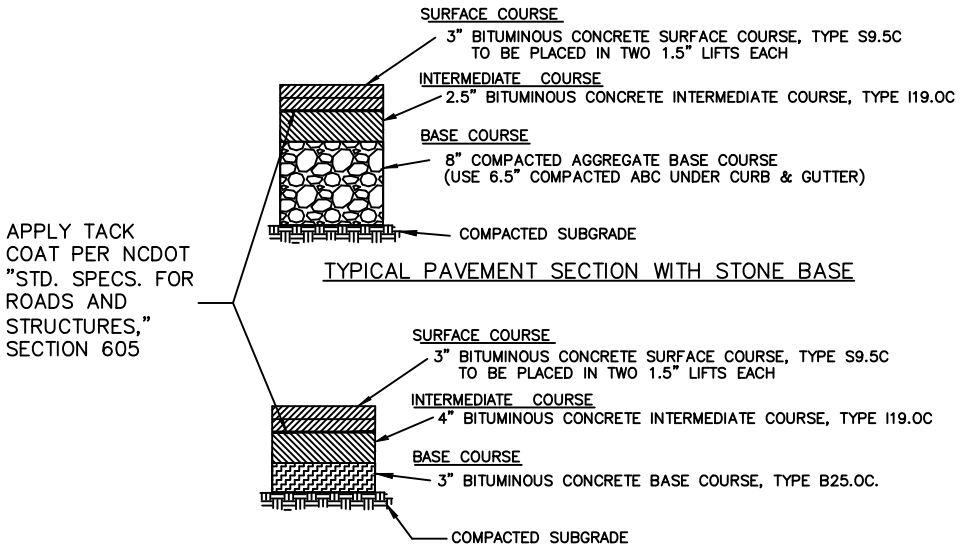



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. WIDER SIDEWALKS MAY BE REQUIRED UNDER CIRCUMSTANCES AS IDENTIFIED IN THE USDG.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
5. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2.% MAX).
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
7. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER ONLY

Ⓢ 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

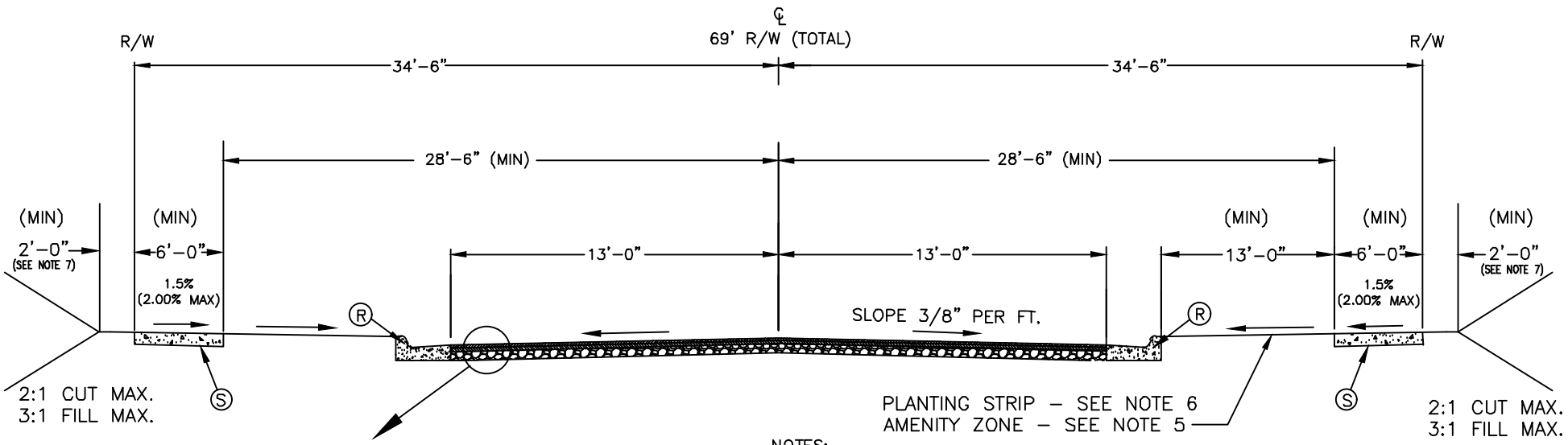
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET AT INTERSECTION WITH CURB EXTENSION TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-05C1 | 23 |

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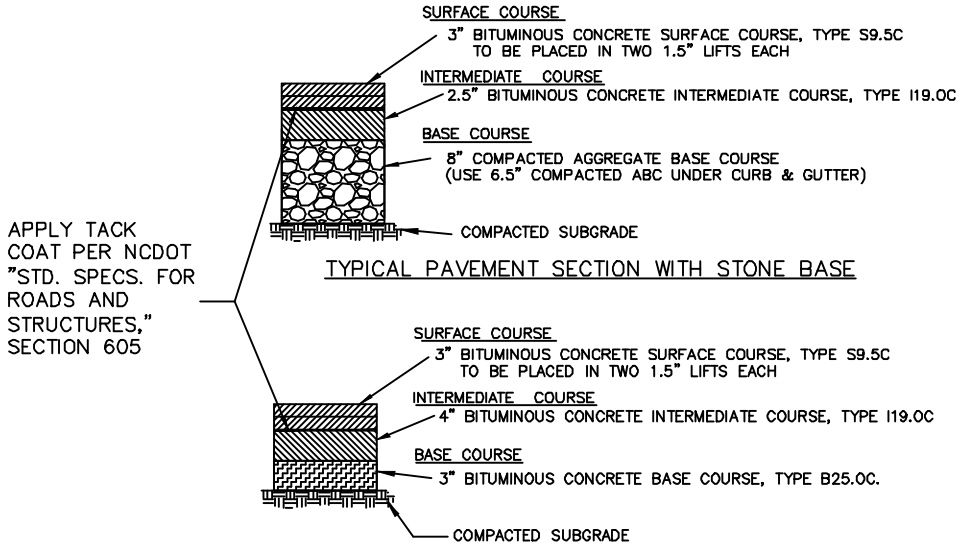



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL-DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. WIDER SIDEWALKS MAY BE REQUIRED UNDER CIRCUMSTANCES AS IDENTIFIED IN THE USDG.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
4. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
5. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2.% MAX).
6. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
7. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W

KEY

(R) 2'-6" STANDARD CURB AND GUTTER ONLY

(S) 4" CONCRETE SIDEWALK

NOT FOR USE IN ETJ

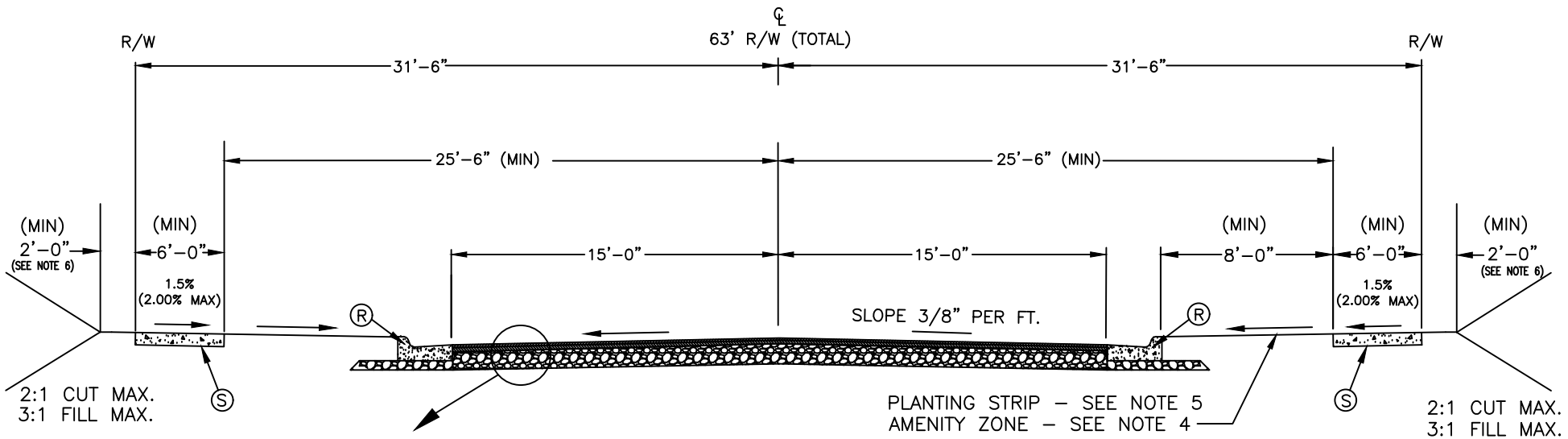
NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS

# LOCAL OFFICE/COMMERCIAL WIDE STREET AT MIDBLOCK WITH CURB EXTENSION TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-05C2 | 23 |

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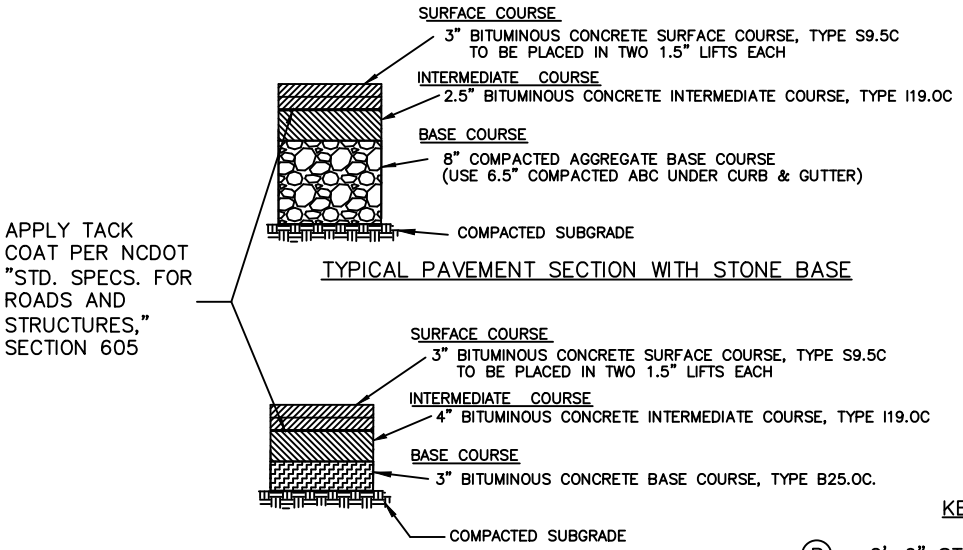



TYPICAL PAVEMENT SECTION WITH STONE BASE

TYPICAL FULL–DEPTH ASPHALT PAVEMENT SECTION

NOTES:

1. USE OF VALLEY GUTTER IS PROHIBITED.
2. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT DESIGN TO CITY.
3. AN ALTERNATIVE PAVEMENT DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).
5. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
6. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W
7. IF USED IN ETJ, FULL–DEPTH ASPHALT PAVEMENT SECTION REQUIRED.

KEY

Ⓡ 2'–6" STANDARD CURB AND GUTTER

Ⓢ 4" CONCRETE SIDEWALK

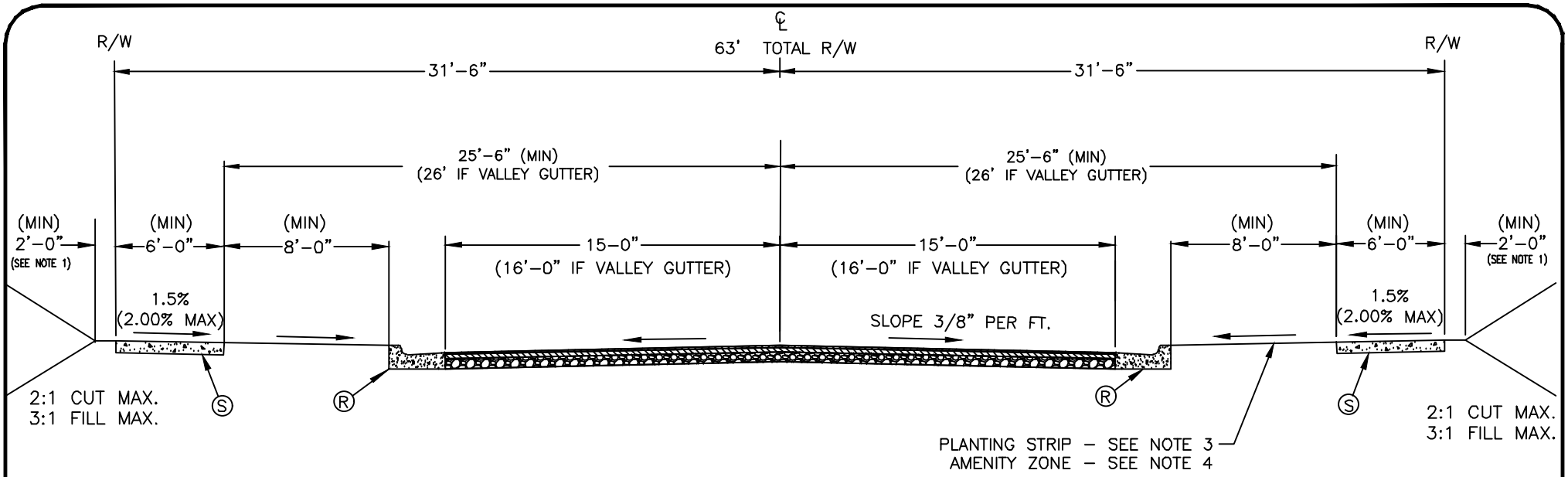
NOT TO SCALE

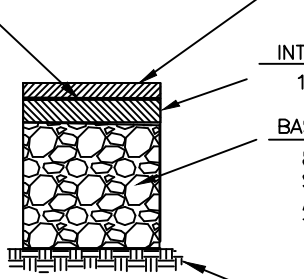
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL INDUSTRIAL STREET TYPICAL SECTION

| STD. NO. | REV. |
|---|---|
| U–06 | 23 |




SURFACE COURSE

1" S9.5B

FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE

1 1/2" S9.5C OR S9.5B

BASE COURSE

8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE

COMPACTED SUBGRADE (SEE SECTION 1.A.18)

TYPICAL PAVEMENT SECTION

NOTES:

1. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
2. AN ALTERNATIVE PAVEMENT SECTION DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS
3. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).

KEY

Ⓡ 2'–6" STANDARD CURB AND GUTTER OR 2'–0" VALLEY GUTTER

Ⓢ 4" CONCRETE SIDEWALK

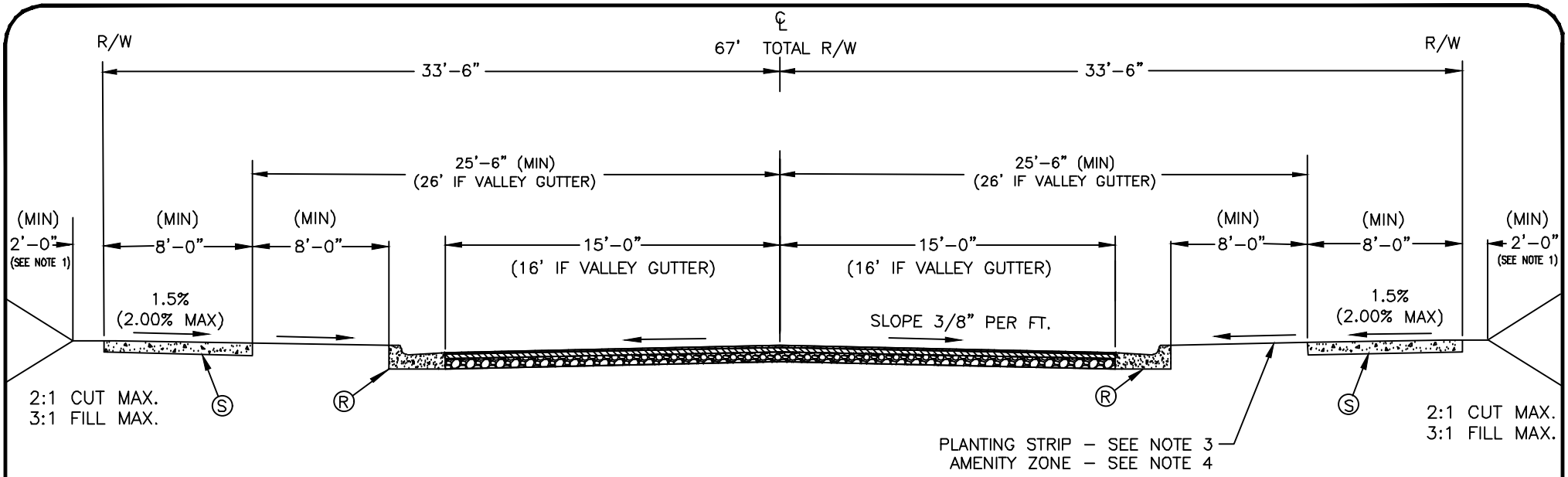
NOT TO SCALE

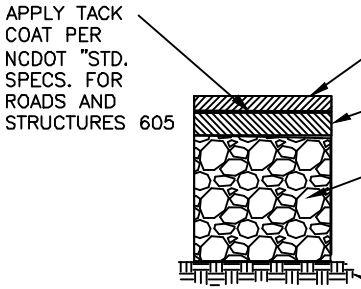
CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL COLLECTOR STREET
# TYPICAL SECTION (6' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U–07A | 23 |




SURFACE COURSE
1" S9.5B
FINAL LIFT TO BE APPLIED UPON MEETING ONE OF THE FOLLOWING CONDITIONS:
1) 75% DEVELOPMENT OCCUPANCY,
2) 1 YEAR FROM INTERMEDIATE COURSE PLACEMENT,
3) FOR ETJ STREETS, FINAL 1" MAY BE PLACED WHEN APPROVED BY NCDOT.

INTERMEDIATE COURSE
1 1/2" S9.5C OR S9.5B

BASE COURSE
8" COMPACTED AGGREGATE BASE COURSE, OR 4" BCBC TYPE B25.0C. SHOULD ENTIRE DEVELOPMENT HAVE A CBR OF 6 OR GREATER, THEN AN ALTERNATIVE BASE COURSE PAVEMENT DESIGN MAY BE SUBMITTED TO THE CITY FOR APPROVAL.

SUBGRADE
COMPACTED SUBGRADE (SEE SECTION 1.A.18)

TYPICAL PAVEMENT SECTION

NOTES:

1. 2' BUFFER CAN BE SUE OR ADDITIONAL R/W.
2. AN ALTERNATIVE PAVEMENT SECTION DESIGN MAY BE REQUIRED BY CDOT/NCDOT BASED ON SPECIFIC TRAFFIC PARAMETERS
3. PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO ¼" PER FOOT (MIN.) UP TO 1¼" PER FOOT (MAX.), EXCEPT WHERE EXCESSIVE NATURAL GRADES MAKE THIS REQUIREMENT IMPRACTICAL. IN SUCH CASES, CDOT MAY AUTHORIZE A SUITABLE GRADE.
4. IF AMENITY ZONE IS AUTHORIZED IN PLACE OF PLANTING STRIP, CONCRETE SHALL BE 4" THICK AND CROSS SLOPE SHALL BE 1.5% (2% MAX).

KEY

Ⓡ 2'-6" STANDARD CURB AND GUTTER OR 2'-0" VALLEY GUTTER

Ⓢ 4" CONCRETE SIDEWALK

NOT TO SCALE

CHARLOTTE.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE ETJ

# LOCAL COLLECTOR STREET
# TYPICAL SECTION (8' SIDEWALK)

| STD. NO. | REV. |
|---|---|
| U-07B | 23 |