PREFACE

The standard detail drawings contained in this manual will apply to all new infrastructure construction plans submitted on or after August, 2020. They are intended to be used as a guide in the preparation and submittal of plans for private development and city contract projects within the City of Raleigh and the city’s extra-territorial jurisdiction.

The City of Raleigh will use these standards and specifications as well as sound engineering principles to review detailed engineering drawings submitted for the above type of projects. All engineers are encouraged to take these specifications into consideration in the preliminary layout of the project so changes can be held to a minimum when construction drawings are reviewed.

If a required detail is not included in this document, the NCDOT Roadway Standard Drawings shall apply. All construction shall conform to either City of Raleigh specifications or to the latest edition of the NCDOT Standard Specifications for Roads and Structures. If there are questions or conflicts between two drawings or specifications, the coordinating representative listed below shall be notified for resolution.

The Standard Details within this manual may be downloaded from the City’s website at www.raleighnc.gov.

If there are questions regarding details, you may contact the individual division coordinators listed below.

Bicycle Facilities: Transportation Planning Manager 919-996-2161
GSI: Assistant Director of Engineering Services 919-996-3940
Stormwater: Assistant Director of Engineering Services 919-996-3940
Transit: Assistant Director of Transportation - Transit 919-996-3030
Transportation: Assistant Director of Transportation 919-996-6446
Tree Protection and Planting: Capital Projects Superintendent 919-996-3285
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City of Raleigh

Standard Details

Bicycle Facilities
**PLACEMENT & SPACING**

Place bike lane markings at the beginning of each bike lane segment - i.e., after every intersection and major driveway and where bike lanes end.

Consider additional bike lane markings as needed to clearly delineate the bike lane on a case-by-case basis. Desired spacing is 250' in downtown Raleigh and 500' elsewhere.

**BIKE LANE WIDTH, W_1**

Where adjacent to the edge of pavement, the bike lane width (excluding the gutter pan) should be: 5' desired 4' minimum.

**BIKE LANE WIDTH, W_2**

Where adjacent to a parking lane, the bike lane width should be: 5' minimum, 6' desired 2' striped buffer desired.

**BIKE LANE WIDTH, W_3**

The parking lane width (including the gutter pan) should be: 8' desired 7.5' minimum.

**BIKE LANE SIGN**

Where the bike lane ends at mid-block locations, place “BIKE LANE ENDS” signage at the beginning of the bike lane mini-skips.

**BIKE LANE MINI-SKIPS**

Use 2' dashed with 6' gaps to end bike lanes and indicate conflict zones, e.g., at bus stops.

**CITY OF RALEIGH**

**STANDARD DETAIL**

**MEDIAN TRANSITIONS**

End bike lane and place shared lane markings in the center of the travel lane through a median area.

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**NOT TO SCALE**

**DATE: 8/2020**

**REVISIONS**

**BIKE LANE SIGNS AND MARKINGS**

**B-10.01**
BUFFER TRANSITION
TAPER THE START OF A BIKE LANE BUFFER BY NARROWING THE TRAVEL LANE.
A TAPER IS NOT REQUIRED AT THE END OF A BIKE LANE BUFFER UNLESS THE END OCCURS ON A HORIZONTAL CURVE.
TAPERS ARE NOT REQUIRED WHEN TRANSITION TO MINI-SKIPS AT CONFLICT ZONES I.E. BUS STOPS AND MAJOR DRIVEWAYS.

BUFFER WIDTH
WHERE PAVEMENT WIDTH ALLOWS FOR A BUFFER, THE BUFFER WIDTH SHOULD BE: 3' DESIRED 2' MINIMUM

USE DIAGONAL CROSS-HATCHING IN BUFFERS.

PLACEMENT OF BUFFER FOR BIKE LANES ADJACENT TO PARKING LANES
WHERE THE BIKE LANE IS ADJACENT TO A PARKING LANE WITH LOW TURN OVER, PLACE THE BUFFER BETWEEN THE BIKE LANE AND THE TRAVEL LANE.
WHERE THE BIKE LANE IS ADJACENT TO A PARKING LANE WITH HIGH TURN OVER, PLACE THE BUFFER BETWEEN THE BIKE LANE AND THE PARKING LANE.

BIKE LANE MINI-SKIPS
USE 2' DASHED WITH 6' GAPS TO END BIKE LANES AND INDICATE CONFLICT ZONES, E.G. AT BUS STOPS.
**COMBINED LANE**

WHERE PAVEMENT WIDTH DOES NOT ALLOW FOR BOTH A DEDICATED BIKE LANE AND DEDICATED RIGHT TURN LANE APPROACHING THE STOP BAR, USE OF A COMBINED BIKE LANE/RIGHT-TURN LANE IS PERMITTED.

PLACE SHARED LANE MARKINGS AT THE BEGINNING AND END ON THE LEFT SIDE OF THE COMBINED LANE.

**COMBINED BIKE LANE/RIGHT-TURN LANE WIDTH, W**

THE WIDTH OF THE COMBINED BIKE LANE/RIGHT-TURN LANE SHOULD BE:
- 9' MINIMUM
- 13' MAXIMUM

PLACE "EXCEPT BIKES" SUPPLEMENTAL PLACARD TO ANY* RIGHT TURN ONLY** SIGNAGE.

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**BIKE LANE MINI-SKIPS**

USE 2' DASHED WITH 6' GAPS TO END BIKE LANES AND INDICATE CONFLICT ZONES.

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**ADJACENT TO RIGHT-TURN LANE**

USE BIKE LANE MINI-SKIPS THROUGH THE RIGHT-TURN LANE TAPER. THE BIKE LANE SHOULD CONTINUE TO THE LEFT OF THE RIGHT TURN LANE APPROACHING THE INTERSECTION.

PLACE "BEGIN RIGHT TURN YIELD TO BIKES" SIGNAGE AT BEGINNING OF RIGHT-TURN TAPER.

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**BIKE LANE WIDTH, W**

WHERE ADJACENT TO A RIGHT TURN LANE, THE BIKE LANE WIDTH SHOULD BE: 6' DESIRED 4' MINIMUM

REFER TO NCDOT STANDARDS 1205.06, SHEET 1 of 5, FOR VEHICLES TURN ARROW AND TEXT SPACING

**THRU LANE TRANSITION TO RIGHT-TURN LANE**

USE MINI-SKIPS TO END THE BIKE LANE AT THE RIGHT-TURN LANE TRANSITION AND THEN CONTINUE BIKE LANE TO THE LEFT OF THE RIGHT-TURN LANE APPROACHING THE INTERSECTION.

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**ADJACENT TO THRU/RIGHT-TURN LANE**

APPROACHING A SIGNALIZED INTERSECTION OR AN UNSIGNALIZED INTERSECTION WITH A RIGHT-TURN PEAK HOUR VOLUME GREATER THAN 100 VEHICLES, USE BIKE LANE MINI-SKIPS. "TURNING VEHICLES YIELD TO BIKES" SIGNAGE MAY BE USED.

ELSEWHERE, STRIPE THE BIKE LANE TO THE STOP BAR.

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**CITY OF RALEIGH**

**STANDARD DETAIL**

**REVISIONS**

**DATE: 8/2020**

**BIKE LANE SIGNS AND MARKINGS APPROACHING INTERSECTIONS**

**B-10.03**
INTERSECTIONS

DISCONTINUE BIKE LANE MARKINGS THROUGH SIGNALIZED AND UNSIGNALIZED INTERSECTIONS.

WHERE CONDITIONS WARRANT (LONG CROSSING DISTANCES, TRAVEL LANE OFFSETS, HIGH RIGHT-TURN VOLUMES, ETC.), MINI-SKIPS AND BIKE LANE MARKINGS MAY BE USED THROUGH THE INTERSECTION.

AT T-INTERSECTIONS, A BIKE LANE AT THE "TOP" OF THE "T" SHOULD BE STRIPED SOLID THROUGH THE INTERSECTION.

MAJOR DRIVEWAYS

USE BIKE LANE MINI-SKIPS AT HIGH-VOLUME DRIVEWAYS, E.G. RETAIL CENTERS, APARTMENTS, ETC.

MINOR DRIVEWAYS

USE SOLID BIKE LANE STRIPING AT LOW-VOLUME DRIVEWAYS, E.G. SINGLE-FAMILY HOMES, FARMS, ETC.
PLACEMENT AND SPACING
PLACE SHARED LANE MARKINGS AFTER EVERY INTERSECTION AND MAJOR HIGHWAYS.

ADDITIONALLY, PLACE SHARED LANE MARKINGS EVERY 150' IN DOWNTOWN RALEIGH AND 250' ELSEWHERE.

WIDE LANES
WHERE THE TRAVEL LANE WIDTH IS 13', PLACE SHARED LANE MARKINGS 4' FROM THE EDGE OF PAVEMENT (MEASURED FROM THE APEX OF THE CHEVRON), EXCLUDING THE GUTTER PAN.
WHERE THE TRAVEL LANE WIDTH IS 14' OR WIDER, INSTALL BIKE LANE MARKINGS.

NARROW LANES OR ADJACENT TO PARKING LANES
WHERE THE TRAVEL LANE WIDTH IS LESS THAN 13' OR WHERE ADJACENT TO PARKING LANES, PLACE SHARED LANE MARKINGS IN THE CENTER OF THE TRAVEL LANE.

STREET CRITERIA
SHARED LANE MARKINGS DO NOT ESTABLISH A BICYCLE FACILITY AND SHOULD ONLY BE USED WHEN ONE OR MORE OF THE CONDITIONS APPLY:
- THE POSTED SPEED LIMIT OR PREVAILING SPEED IS 25 MPH OR LESS.
- THE AVERAGE DAILY TRAFFIC VOLUME IS 4,000 VEHICLES OR LESS.
- PLACEMENT THROUGH MEDIAN AREAS OR COMBINED BIKE LANE/RIGHT-TURN LANE.
- INSTALLATION PAIRED WITH TRAFFIC CALMING MEASURES, WAYFINDING SIGNAGE, AND INTERSECTION TREATMENTS TO ESTABLISH A NEIGHBORHOOD BIKEWAY.
CITY OF RALEIGH
STANDARD DETAIL
BICYCLE MARKING
B-10.06
BICYCLE SIGNS

R3-17
BIKE LANE
ENDS
R3-17bP

R4-4
BEGIN
RIGHT TURN LANE
YIELD TO BIKES

R10-15 MODIFIED
TURNING
VEHICLES
YIELD
TO
BIKE LANE

R7-9
NO PARKING
BIKE LANE

CITY OF RALEIGH
STANDARD DETAIL
DATE: 8/2020
NOT TO SCALE
BICYCLE SIGNS
B-10.07
1. Wheel stops to be equipped with retroreflective markings.

2. Angled racks may also be used.

CITY OF RALEIGH
STANDARD DETAIL

B-20.02
BIKE RACK INSTALLATION:
SURFACE MOUNT - WHEN INSTALLED ON CONCRETE SURFACE, USE 3/8" ANCHORS TO PLATE MOUNT. SHIM AS NECESSARY TO ENSURE VERTICAL PLACEMENT.

IN-GROUND MOUNT - WHEN INSTALLED ON PAVERS OR OTHER NON-STABLE SURFACES, EMBED INTO BASE. CORE HOLES NO LESS THAN 3" IN DIAMETER AND 10" DEEP.

STANDARD BIKE RACK
City of Raleigh

Standard Details

Green Stormwater Infrastructure
TYPICAL BUMP-OUT BIORETENTION SECTION

NOTES:
1. EXPANSION JOINTS AND DUMMY JOINTS SHALL BE PER STANDARD DETAIL T-10.26.1, CURB AND GUTTER.
2. REFER TO DESIGN PLANS FOR HORIZONTAL CONTROL INFORMATION.
3. BIORETENTION SIZING IS THE RESPONSIBILITY OF THE DESIGN ENGINEER. SIZING CALCULATIONS SHALL BE SUBMITTED TO THE CITY FOR REVIEW.
4. THE INCLUSION OF AN UNDERDRAIN SYSTEM WITH IMPERMEABLE LINER (INCLUDING BOTTOM LAYER) IS DEPENDENT UPON THE RECOMMENDATION OF GEOTECHNICAL INVESTIGATION CONSISTENT WITH THE GUIDANCE PROVIDED IN THE NCDEQ STORMWATER DESIGN MANUAL AND CITY OF RALEIGH DESIGN MANUAL. IMPERMEABLE LINER SHALL BE HDPE, PVC, OR LDPE AND SHOULD BE INSTALLED SO THAT LINER EXPOSURE TO SUNLIGHT IS MINIMIZED.
5. IF REQUIRED, REFER TO DESIGN PLANS FOR UNDERDRAIN INVERT ELEVATIONS.
6. REFER TO PLANS FOR UNDERDRAIN CLEANOUT LOCATIONS AND INSTALLATION DETAILS.
7. BOTH PIPE PENETRATIONS AND ATTACHMENT OF 30 MIL IMPERMEABLE LINER TO CONCRETE CURBS (USING CONCRETE ANCHORS SPACED AT MAXIMUM 18" O.C. AND BATTEN STRIPS) SHALL BE DONE IN ACCORDANCE WITH ASTM 6497.
8. GEOTEXTILE MAY BE UTILIZED IN-LIEU OF AGGREGATE CHOKING LAYER IF APPROVED BY ENGINEER.
9. BOTTOM OF STORAGE LAYER SHALL BE SCARIFIED TO PROMOTE INFILTRATION PRIOR TO BACKFILL.
10. ALL UNDERDRAINS, IF REQUIRED, SHALL CONNECT TO STORM DRAIN OR OTHER DRAINAGE FEATURE.
11. ALL FEATURES INTEGRATED INTO BUMP-OUT BIORETENTION, INCLUDING VEGETATION, SHALL MEET SIGHT DISTANCE REQUIREMENTS PER STREET DESIGN MANUAL AND RECOMMENDED PLANT SPECIES IN THE NCDEQ STORMWATER DESIGN MANUAL.
12. MINIMUM RADIUS FOR BUMP-OUT BIORETENTION SHALL MEET ENGINEERING SPECIFICATIONS IN STREET DESIGN MANUAL DEPENDING ON ROADWAY TYPE.
13. BIORETENTION MEDIA SHALL BE PLACED IN 8" LIFTS THAT ARE WALKED ON OR WATERED TO CONSOLIDATE AND ALLOW SHAPING OF THE MEDIA'S SURFACE. THE MEDIA SHALL NOT BE MECHANICALLY COMPACTED. REFER TO NCDEQ STORMWATER DESIGN MANUAL FOR BIORETENTION SOIL MEDIA SPECIFICATIONS.
14. CONCRETE CURB EXTENSIONS ARE RECOMMENDED WHERE PARKING IS IMMEDIATELY ADJACENT AND/OR WHERE SPEED LIMITS EXCEED 35 MPH. POUR 1" WIDE CONCRETE EXTENDED CURB MONOLITHICALLY WITH THE PROPOSED CURB AND GUTTER. OTHERWISE, ANCHOR CONCRETE STRIP TO EXISTING CURB WITH OILED OR GREASED BAR (1/2"X9") AT 24" O.C. INSTALL BAR 3" INTO THE EXISTING CURB. USE CONCRETE ADHESIVE ON THE EXISTING CURB.
15. THE SEASONAL HIGH WATER TABLE SHALL BE 2 FEET BELOW THE BOTTOM OF THE DRAINAGE STONE LAYER.
16. STABILIZE CONTRIBUTING DRAINAGE AREA PRIOR TO PLACEMENT OF UNDERDRAIN AND VARIOUS FILL MATERIALS.
17. ALL MATERIALS SPECIFIED AS WASHED SHALL BE WASHED AND FREE OF FINES.
NOTES:
1. REFER TO DESIGN PLANS FOR HORIZONTAL CONTROL INFORMATION.
2. BIORETENTION SIZING IS THE RESPONSIBILITY OF THE DESIGN ENGINEER. SIZING CALCULATIONS SHALL BE SUBMITTED TO THE CITY FOR REVIEW.
3. THE INCLUSION OF AN UNDERDRAIN SYSTEM WITH IMPERMEABLE LINER (INCLUDING BOTTOM LAYER) IS DEPENDENT UPON THE RECOMMENDATION OF GEOTECHNICAL INVESTIGATION CONSISTENT WITH THE GUIDANCE PROVIDED IN THE NCDEQ STORMWATER DESIGN MANUAL AND CITY OF RALEIGH DESIGN MANUAL. IMPERMEABLE LINER SHALL BE HDPE, PVC, OR LDPE AND SHOULD BE INSTALLED SO THAT LINER EXPOSURE TO SUNLIGHT IS MINIMIZED.
4. IF REQUIRED, REFER TO PLANS FOR UNDERDRAIN INVERT ELEVATIONS.
5. THE SEASONAL HIGH WATER TABLE SHALL BE 2 FEET BELOW THE BOTTOM OF THE DRAINAGE STONE LAYER.
6. REFER TO PLANS FOR UNDERDRAIN CLEANOUT LOCATIONS AND INSTALLATION DETAILS.
7. BOTH PIPE PENETRATIONS, AND ATTACHMENT OF 30 MIL IMPERMEABLE LINER TO CONCRETE CURBS (USING CONCRETE ANCHORS SPACED AT MAXIMUM 18" O.C. AND BATTEN STRIPS), SHALL BE DONE IN ACCORDANCE WITH ASTM 6497.
8. GEOTEXTILE MAY BE UTILIZED IN-LIEU OF AGGREGATE CHOKING LAYER IF APPROVED BY ENGINEER.
9. BOTTOM OF STORAGE LAYER SHALL BE SCARIFIED TO PROMOTE INFILTRATION PRIOR TO BACKFILL.
10. ALL UNDERDRAINS, IF REQUIRED, SHALL CONNECT TO STORM DRAIN OR OTHER DRAINAGE FEATURE.
11. ALL FEATURES, INCLUDING VEGETATION, INTEGRATED INTO MEDIAN BIORETENTION SHALL MEET SIGHT DISTANCE REQUIREMENTS PER STREET DESIGN MANUAL AND RECOMMENDED PLANT SPECIES IN THE NCDEQ STORMWATER DESIGN MANUAL.
12. BIORETENTION MEDIA SHALL BE PLACED IN 8" LIFTS THAT ARE WALKED ON OR WATERED TO CONSOLIDATE AND ALLOW SHAPING OF THE MEDIA'S SURFACE. THE MEDIA SHALL NOT BE MECHANICALLY COMPACTED. REFER TO NCDEQ STORMWATER DESIGN MANUAL FOR BIORETENTION SOIL MEDIA SPECIFICATIONS.
13. STABILIZE CONTRIBUTING DRAINAGE AREA PRIOR TO PLACEMENT OF UNDERDRAIN AND VARIOUS FILL MATERIALS.
14. ALL MATERIALS SPECIFIED AS WASHED SHALL BE WASHED AND FREE OF FINES.
NOTES:
1. REFER TO DESIGN PLANS FOR HORIZONTAL CONTROL INFORMATION.
2. BIORETENTION SIZING IS THE RESPONSIBILITY OF THE DESIGN ENGINEER. SIZING CALCULATIONS SHALL BE SUBMITTED TO THE CITY FOR REVIEW.
3. THE INCLUSION OF AN UNDERDRAIN SYSTEM IS DEPENDENT UPON THE RECOMMENDATION OF GEOTECHNICAL INVESTIGATION CONSISTENT WITH THE GUIDANCE PROVIDED IN THE NCDOT STORMWATER DESIGN MANUAL AND CITY OF RALEIGH DESIGN MANUAL. IMPERMEABLE LINER SHALL BE HDPE, PVC, OR LDPE AND SHOULD BE INSTALLED SO THAT EXPOSURE TO SUNLIGHT IS MINIMIZED.
4. IF UNDERDRAIN IS REQUIRED, REFER TO DESIGN PLANS FOR UNDERDRAIN INVERT ELEVATIONS.
5. THE SEASONAL HIGH WATER TABLE SHALL BE 2 FEET BELOW THE BOTTOM OF THE DRAINAGE STONE LAYER.
6. REFER TO PLANS FOR UNDERDRAIN CLEANOUT LOCATIONS AND INSTALLATION DETAILS.
7. GEOTEXTILE MAY BE UTILIZED IN-LIEU OF AGGREGATE CHOKING LAYER IF APPROVED BY ENGINEER.
8. BOTTOM OF STORAGE LAYER SHALL BE SCARIFIED TO PROMOTE INFILTRATION PRIOR TO BACKFILL.
9. ALL UNDERDRAINS, IF REQUIRED, SHALL CONNECT TO STORM DRAIN OR OTHER DRAINAGE FEATURE.
10. VEGETATION MAY BE PLACED ON SIDE SLOPES TO ANCHOR MULCH IF DESIRED.
11. ALL FEATURES, INCLUDING VEGETATION, INTEGRATED INTO MEDIAN BIORETENTION SHALL MEET SIGHT DISTANCE REQUIREMENTS PER STREET DESIGN MANUAL AND RECOMMENDED PLANT SPECIES IN THE NCDOT STORMWATER DESIGN MANUAL.
12. BIORETENTION MEDIA SHALL BE PLACED IN 8" LIFTS THAT ARE WALKED ON OR WATERED TO CONSOLIDATE AND ALLOW SHAPING OF THE MEDIA'S SURFACE. THE MEDIA SHALL NOT BE MECHANICALLY COMPACTED. REFER TO NCDOT STORMWATER DESIGN MANUAL FOR BIORETENTION SOIL MEDIA SPECIFICATIONS.
13. STABILIZE CONTRIBUTING DRAINAGE AREA PRIOR TO PLACEMENT OF UNDERDRAIN AND VARIOUS FILL MATERIALS.
14. ALL MATERIALS SPECIFIED AS WASHED SHALL BE WASHED AND FREE OF FINES.
**NOTES:**

1. **ENERGY DISSIPATION PAD PROVIDED AS STABILIZED ENTRANCE TO BIORETENTION SYSTEM.** ROCK SHALL BE PLACED IN IRREGULAR PATTERN USING NON-UNIFORM SIZES TO PREVENT PREFERENTIAL FLOW PATHS, INCREASE ENERGY DISSIPATION, AND TO LIMIT THE SURFACE AREA OF EXPOSED MORTAR. ALTERNATIVE PRE-TREATMENT SOLUTIONS WILL BE CONSIDERED.

2. WHERE NECESSARY, EXTEND GUTTER TO 2.5' WIDTH TO ACCOMMODATE TRASH CONTAINER PLACEMENT.

3. **ROCK AND MORTAR INLET PROTECTION SHALL EXTEND ACROSS BOTTOM OF BIORETENTION TO OPPOSITE TOE OF SLOPE, OR 2' MINIMUM. FINISH GRADE OF MORTARED BOTTOM SHALL BE AT LEAST 3" BELOW ADJACENT BIORETENTION BOTTOM ELEVATION TO PROVIDE SEDIMENT STORAGE.**

4. **ATTACHMENT OF 30 MIL IMPERMEABLE LINER TO CONCRETE CURBS (USING CONCRETE ANCHORS SPACED AT MAXIMUM 18" O. C. AND BATTEN STRIPS) SHALL BE DONE IN ACCORDANCE WITH ASTM 6497.**

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**CITY OF RALEIGH**

**STANDARD DETAIL**

**CURB-CUT INLET**

**(TAPERED STREET RELIEF)**

**GSI-03.1**
1. CURB CUT SHALL BE 18" WIDE WITH VERTICAL SIDES.
2. GRATE FRAME SHALL BE CAST INTO TOP EDGES OF CURB CUT SO GRATE IS FLUSH WITH TOP OF CURB AND PEDESTRIAN LANDING STRIP.
3. CONCRETE CURB EXTENSIONS ARE RECOMMENDED WHERE PARKING IS IMMEDIATELY ADJACENT AND/OR WHERE SPEED LIMITS EXCEED 35 MPH.
POUR 1" WIDE CONCRETE EXTENDED CURB MONOLITHICALLY WITH THE PROPOSED CURB AND GUTTER. OTHERWISE, ANCHOR CONCRETE STRIP TO EXISTING CURB WITH OILED OR GREASED BAR (1/2"X 9") AT 24" O.C. INSTALL BAR 3" INTO THE EXISTING CURB. USE CONCRETE ADHESIVE ON THE EXISTING CURB.
4. GRATE SHALL BE COMPLIANT WITH AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS.
5. ATTACHMENT OF 30 MIL IMPERMEABLE LINER TO CONCRETE CURBS (USING CONCRETE ANCHORS SPACED AT MAXIMUM 18" O.C. AND BATTEN STRIPS) SHALL BE DONE IN ACCORDANCE WITH ASTM 6497.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE 02/20
CURB-CUT INLET (CAST IRON GRATE)
GSI-03.2
1. All PICP shall conform to ASTM C936 and ADA design guidelines.

2. Slope of soil subgrade shall be 0.5% or less. Maximum PICP surface slope shall be 6%.

3. The seasonal high water table shall have a minimum 2 ft separation from the bottom of the aggregate subbase.

4. In HSG B, C, or D soils, the surface of the subgrade under infiltrating PICP systems should be scarified, ripped, or trenched immediately prior to aggregate subbase placement to maintain pre-construction subgrade infiltration rate.

5. The inclusion of an underdrain system with permeable liner (including bottom layer) is dependent upon the results of the geotechnical investigation consistent with the guidance provided in the NCDOT Stormwater Design Manual and City of Raleigh Design Manual. Permeable liner shall be HDPE, PVC, or LDPE and should be installed so that liner exposure to sunlight is minimized.

6. Elevation gradient between the concrete gutter and adjacent PICP shall not exceed 1/4%; otherwise, provide 1:2 bevel on edge of gutter.

7. Open void fill media around PICP shall be larger of No. 8, No.9, or No. 89 stone, washed and free of fines, suitable for placement in joint size specified by manufacturer.

8. Both pipe penetrations and attachment of 30 mil permeable liner to concrete curbs (using concrete anchors spaced at maximum 18” O.C. and batten strips) shall be done in accordance with ASTM 6497.

9. All aggregate sized according to ASTM C136.

10. AASHTO layer coefficients for open-graded base and subbase shall range between 0.06 and 0.10.

11. AASHTO minimum layer coefficient of 0.3 for paver and bedding layers is recommended.

12. Locate underdrain as shown on the improvement plans. Horizontal location may vary within pavement section as long as minimum offset distances and bottom slopes are maintained.

13. Depth of perforated PVC pipe may be adjusted to tie into the adjacent drainage infrastructure as needed.

14. Alternate bottom profile omitting the inset trench may be used at direction of engineer so long as 1% min slope to underdrain is retained.

15. All materials specified as washed shall be washed and free of fines.
Notes:
1. Materials and construction of permeable concrete (PC) shall conform to the following specifications: mix design (ACI 522.1); fresh unit weights and voids (ASTM C1688); field infiltration (ASTM C1701); raveling potential (ASTM C1747); hardened unit weight and void content (ASTM C1754).
2. Recommended voids ratio for PC is 20% (15-25% acceptable).
3. Slope of soil subgrade shall be 0.5% or less. Maximum PC surface slope shall be 6%.
4. The seasonal high water table shall be 2 feet below the bottom of the aggregate base.
5. In HSG B, C, or D soils, the surface of the subgrade should be scarified, ripped, or trenched immediately prior to aggregate subbase placement to maintain pre-construction subgrade infiltration rate.
6. The inclusion of an underdrain system with impermeable liner (including bottom layer) is dependent upon the results of the geotechnical investigation consistent with the guidance provided in the NCDEQ Stormwater Design Manual and City of Raleigh Design Manual.
7. If permeable runoff drains to the PC sidewalk, a vegetated conveyance diversion shall be installed upgradient and sized for safe conveyance of the 10-yr, 24-hr storm. Conveyance diversion shall discharge to storm drainage system and not on or across PC sidewalk.
8. Impermeable runoff is allowed to drain to the PC sidewalk in accordance with design criteria provided in Chapter 18 of the NCDEQ Stormwater Design Manual.
9. All aggregate sized according to ASTM C136.
10. If required based on site conditions, including significant impervious run-on volumes, locate underdrain as shown on the improvement plans. Horizontal location may vary within pavement section as long as minimum offset distances and bottom slopes are maintained. Depth of perforated PVC pipe may be adjusted to tie into the adjacent drainage infrastructure as needed.
11. All material specified as washed shall be washed and free of fines.
NOTES:

1. SELECTION OF BUMP-OUT BIORETENTION TYPE AND LOCATION DEPENDS ON ROADWAY DESIGN CONDITIONS AND ARE ASSUMED TO BE INSTALLED IN CONJUNCTION WITH RETROFIT/STREET IMPROVEMENT PROJECTS.

2. IN ALL CASES, BUMP-OUTS MUST MAINTAIN REQUIRED GUTTER SPREAD TO SAFELY PASS OVERFLOW FROM THE 2-YR STORM (I.E., PONDED WATER LESS THAN 1/2 LANE WIDTH FROM EDGE OF CURB).

3. WHERE NECESSARY, RISER STRUCTURES SIZED FOR THE 2-YR STORM SHALL BE LOCATED WITHIN BUMP-OUT BIORETENTION. ALL BIORETENTION BUMP-OUTS SHALL BE DESIGNED TO BYPASS STORMS LARGER THAN THE 2-YR EVENT.

4. ALL BIORETENTION AND PERMEABLE PAVEMENT UNDERDRAINS, IF REQUIRED, SHALL CONNECT TO STORM DRAIN OR OTHER DRAINAGE FEATURE ACCEPTABLE TO THE CITY ENGINEER.

5. ALL FEATURES, INCLUDING VEGETATION, INTEGRATED INTO BUMP-OUT BIORETENTION SHALL MEET SIGHT DISTANCE REQUIREMENTS PER STREET DESIGN MANUAL AND RECOMMENDED PLANT SPECIES IN THE NC DEQ STORMWATER BMP MANUAL AND CITY OF RAELIGH STORMWATER DESIGN MANUAL.

6. ROADWAY FEATURES AND PAVEMENT MARKINGS ARE FOR REFERENCE ONLY. ACTUAL DIMENSIONS AND MARKINGS SHALL CONFORM TO THE CITY OF RAELIGH STREET DESIGN MANUAL.
NOTES:
1. PLACEMENT OF THE UNDERDRAIN SHALL BE IN ACCORDANCE WITH THE APPROVED IMPROVEMENT PLANS, OR AS INDICATED BY THE CITY ENGINEER. HORIZONTAL LOCATION MAY VARY AS LONG AS MINIMUM OFFSET DISTANCES AND BOTTOM SLOPES ARE MAINTAINED.
2. PERFORATED PLASTIC PIPE SHALL BE SMOOTH-WALL PVC PLASTIC PIPE HAVING A CELL CLASSIFICATION OF 12454 OR 13364, AS DEFINED IN ASTM D1784.
3. PIPE, FITTING, AND JOINT DIMENSIONS SHALL BE COMPATIBLE AND MEASURED IN ACCORDANCE WITH ASTM D 2122. FITTING AND JOINT MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL. GLUE OR PRESS FIT ALL JOINTS PER MANUFACTURER’S SPECIFICATIONS.
4. PIPE PENETRATIONS THROUGH IMPERMEABLE BARRIER SHALL BE SEALED ACCORDING TO PLANS.
5. DEPTH OF UNDERDRAIN MAY BE ADJUSTED TO TIE INTO THE ADJACENT CONNECTION POINT OF THE DOWNSTREAM DRAINAGE INFRASTRUCTURE, AS NEEDED, PER CITY ENGINEER’S APPROVAL.
6. DIMENSIONS OF PERFORATED PVC PIPE, SOLID PVC PIPE, AND ALL FITTINGS SPECIFIED IN PLANS.

CITY OF RALEIGH
STANDARD DETAIL

UNDERDRAIN DETAIL

GSI-07.1
**EXISTING DRAINAGE STRUCTURE**

**EXISTING GRADE**

**FLOW**

**EXISTING DRAINAGE PIPE**

**NOTES**

1. INSTALL INSERTA TEE PER MANUFACTURER'S SPECIFICATIONS.
30 MIL IMPERMEABLE LINER PER GSI-01

1. Trim liner to top edge of batten. Place 1/8" bead of caulk, silicone or similar to seal top edge of batten.

2. Ensure batten anchors are max distance of 6" from batten butt joints.

3. Extend liner edge to min 3" above max ponding level.

4. Where site conditions prohibit temporary soil saturation within the anchor trench, the liner shall be punctured along the bottom of the trench by drilling/punching 1 inch diameter seepage holes at 2 foot spacing.

Non-Vertical Liner Attachment

Vertical Wall Liner Attachment

Notes:
1. The surface of the existing/proposed sidewalk or extended curb to which the geomembrane liner is to be attached should be constructed or formed to limit damage to the geomembrane by removing irregularities on the concrete surface to prevent stress points in the geomembrane.
2. If irregularities (i.e., sharp protrusions exceeding 1/2 inch from surface face) cannot be removed from an existing saw-cut or formed structure, a protective geotextile layer should be placed between the surface and the geomembrane.
3. Ensure batten anchors are max distance of 6" from batten butt joints.
4. Where site conditions prohibit temporary soil saturation within the anchor trench, the liner shall be punctured along the bottom of the trench by drilling/punching 1 inch diameter seepage holes at 2 foot spacing.
ADDITIONAL PVC LINER MATERIAL. WRAP AROUND PIPE. OVERLAP MATERIAL BY HALF THE DIAMETER OF PENETRATING PIPE.

PLASTIC HOSE CLAMPS. SIZE PER SLEEVE PIPE. 2 TOTAL.

PROVIDE MANUFACTURER RECOMMENDED ADHESIVE TO JOIN LINER TO PIPE ALONG CIRCUMFERENCE OF PIPE (TYP.)

FIELD-WELD PER LINER MANUFACTURER'S RECOMMENDATIONS ALONG ENTIRE PERIMETER AS WELL AS WHERE THE ADDITIONAL LINER IS WRAPPED AROUND PENETRATING PIPE.

NOTE:
1. CONTACT UTILITY OWNER FOR SLEEVE, COVERAGE, AND OTHER CROSSING REQUIREMENTS.
2. INCLUDE SLEEVE WITHIN PERVIOUS PAVEMENT SIMILAR TO THIS DETAIL.
3. CROSSING MAY PASS THROUGH SOIL MEDIA FILTER COURSE OR UNDERDRAIN GRAVEL LAYERS AND ARE NOT RESTRICTED TO THE SOIL AS SHOWN HEREIN.
1. GRADED AGGREGATE FOR CHOKER LAYER SHALL BE WASHED AND CONFORM TO ASTM D-448.
2. SAND FOR THE CHOKER LAYER SHALL BE WASHED AND CONFORM TO ASTM C-33 CONCRETE SAND.
3. ALL MATERIALS SPECIFIED AS WASHED SHALL BE WASHED AND FREE OF FINES.
4. SAND AND NO. 8 STONE LAYERS SHALL BE SPREAD USING HAND TOOLS TO ENSURE A CONSISTENT THICKNESS AND PREVENT VOIDS.
5. AGGREGATE MATERIAL SHALL BE NO. 8 STONE OR 78M (NCDOT SPECIFICATIONS).
NOTES

1. MAXIMUM GRATE OPENING SHALL BE 4 INCHES. SIZE OF ATRIUM GRATE SHALL MATCH SIZE OF RISER SPECIFIED IN PLANS, SHALL BE REMOVABLE TO PROVIDE MAINTENANCE ACCESS, AND SHALL BE BOLTED IN PLACE OR OUTFITTED WITH APPROVED TAMPER-RESISTANT LOCKING MECHANISM.

2. MINIMUM STREAMBED COBBLE DIAMETER SHALL BE LARGER THAN MAXIMUM GRATE OPENING.

3. OVERFLOW UNDERDRAIN PIPES MUST BE EQUIPPED WITH CLEANOUTS PER GSI 7.1.

4. OVERFLOW RISER TO BE INSTALLED AS REQUIRED BY HYDRAULIC ANALYSIS.
NOTES:
1. REFER TO PLANS FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION.
NOTES
1. CHECK DAMS TO BE USED UNDER PERMEABLE INTERLOCKING CONCRETE PAVERS WHERE INFILTRATION IS ALLOWED. IF THE SYSTEM IS FULLY LINED WITH NO INFILTRATION, CHECK DAMS ARE NOT NEEDED.
2. CONCRETE CHECK DAM EMBEDMENT PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
3. IF INCIDENTAL INFILTRATION IS ALLOWED ON POOR SOILS, OPTIONALLY INSTALL PERFORATED UNDERDRAIN PER GSI-07.1 AT ENGINEER'S DISCRETION.
4. CONCRETE SHALL BE 650-C-3250.

TYPICAL ELEVATION

SECTION A-A

EXISTING OR PROPOSED CURB PER PLANS

PROVIDE WATER TIGHT SEAL BETWEEN CONCRETE AND IMPERMEABLE LINER

WIDTH PER PLANS
NOTES:
1. ENERGY DISSIPATION PAD PROVIDED AS STABILIZED ENTRANCE TO BIORETENTION SYSTEM. ROCK SHALL BE PLACED IN IRREGULAR PATTERN USING NON-UNIFORM SIZES TO PREVENT PREFERENTIAL FLOW PATHS, INCREASE ENERGY DISSIPATION, AND TO LIMIT THE SURFACE AREA OF EXPOSED MORTAR. ALTERNATIVE PRE-TREATMENT SOLUTIONS WILL BE CONSIDERED.
2. ROCK AND MORTAR INLET PROTECTION SHALL EXTEND ACROSS BOTTOM OF BIORETENTION TO OPPOSITE TOE OF SLOPE, OR 2' MINIMUM. FINISH GRADE OF MORTARED BOTTOM SHALL BE AT LEAST 3" BELOW ADJACENT BIORETENTION BOTTOM ELEVATION TO PROVIDE SEDIMENT STORAGE.
City of Raleigh

Standard Details

Stormwater
NOTES:
1. The slope of the gutter to the catch basin on the uphill side shall begin 10' from the catch basin. The slope of the gutter to the catch basin on the downhill side shall begin 10' from the catch basin.
2. Steps shall be installed in all catch basins over 3' in depth. Depth shall be measured from the top of curb to the invert of the catch basin.
3. Solid concrete bricks may be used in 4x4x8 or 4x8x16 sizes.
4. NCDOT approved precast concrete boxes acceptable using standard 5' castings.
5. Domestic casting required within street right of way.
6. 1" maximum extension of pipe into the storm box.

STANDARD C.B. STEP

3-#3 rebars 8' long
2-2' pipes 22" long on a 3' slope -16" below top of C.B.
8' minimum, over 12' deep 12' minimum up to 8' from top of curb.
If structure is greater than 12' deep, footing is to extend 8' beyond the structure.

3000 psi concrete

GROUN'T IN PLACE

FLOW LINE

2-2' G.I. pipe or PVC pipe
8" min, over 12' deep 12" min. up to 6' from top of curb.

TOP OF CURB

FOR SLOPE REQ'S SEE NOTE 1.

DATE: 8/2020

CITY OF RALEIGH
STANDARD DETAIL

SW-10.01

5' OM CATCH BASIN

NOT TO SCALE

REVISIONS:
NOTES:
1. THE SLOPE OF THE GUTTER TO THE CATCH BASIN ON THE UPHILL SIDE SHALL BEGIN 10' FROM THE CATCH BASIN. THE SLOPE OF THE GUTTER TO THE CATCH BASIN ON THE DOWNHILL SIDE, SHALL BEGIN 10' FROM THE CATCH BASIN.

2. STEPS SHALL BE INSTALLED IN ALL CATCH BASINS OVER 3' IN DEPTH. DEPTH SHALL BE MEASURED FROM THE TOP OF CURB TO THE INVERT OF THE CATCH BASIN.

3. SOLID CONCRETE BRICKS MAY BE USED IN 4" X 4" X 16" OR 4" X 8" X 16" SIZES.

4. NCDOT APPROVED PRECAST CONCRETE BOXES ACCEPTABLE, USING STANDARD 5' CASTINGS.

5. DOMESTIC CASTING REQUIRED WITHIN STREET RIGHT OF WAY.
NOTES:
1. FOR 24" RCP & LARGER USE PIPE DIAMETER PLUS 12" FOR MINIMUM INSIDE DIMENSION.
2. 24" X 24" CASTING WITH 12", 15" & 18" PIPE, 24" X 36" CASTING USED WITH 24" PIPE OR LARGER. IF PLACED WITHIN PUBLIC R/W CASTING MUST BE TRAFFIC BEARING TYPE PER NCDOT STANDARDS.
3. USE 4" X 4" X 8" OR 4" X 8" X 16" SOLID CONCRETE BLOCK. CAST IN PLACE OR PRECAST CONCRETE TO MEET N.C.D.O.T. STANDARDS ACCEPTABLE.
4. STEPS SHALL BE INSTALLED IN ALL DROP INLETS OVER 3' IN DEPTH. DEPTH SHALL BE MEASURED FROM THE TOP OF GRATE TO THE INVERT OF THE DROP INLET.
NOTES:
1. FOR 24" PIPE & LARGER USE PIPE DIAMETER PLUS 12" FOR MINIMUM INSIDE DIMENSION.
2. USE 4" X 4" X 8" OR 4" X 8" X 16" SOLID CONCRETE BLOCK. CAST IN PLACE OR PRECAST CONCRETE TO MEET NCDOT STANDARDS ACCEPTABLE.
3. FOR STEP REQUIREMENTS, SEE NOTE 4 ON STANDARD DETAIL SW-10.03.
### TYPICAL MH FOR STORM SEWER

**PIPE SIZE** | **MH DIAMETER**
---|---
12-24" | 4'-0"
30-42" | 5'-0"
48" | 6'-0"
54" | 8'-0"

**NOTES:**

1. DEPTH MEASURED FROM TOP OF CASTING TO INVERT OF MANHOLE.

2. PRECAST MANHOLE COMPONENTS SHALL MEET ASTM-C-478 REQUIREMENTS.

3. SEE STANDARD. SW-10.10 FOR MANHOLE COVER DETAIL.

4. DOMESTIC CASTINGS REQUIRED WITHIN STREET RIGHT-OF-WAY.
No dumping! No tire dumping! NoAus. Al. tire dumping! No dumping!
1/2" Ø STAINLESS STEEL DROP HANDLES

NOTES:
PAINT WITH RUST INHIBITING BLACK PAINT.

DETAIL OF
pb1 PLATES

BILL OF MATERIAL

<table>
<thead>
<tr>
<th>MATERIAL LIST FOR ONE UNIT - MAKE ( ) UNITS</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
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<tr>
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<td>8</td>
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<td>4</td>
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CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 8/2020
CATCH BASIN
STEEL TOP
SW-10.07
STANDARD 24" X 24" DROP INLET CASTING
STANDARD 24" X 36"
DROP INLET CASTING
NOTES:
1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2. FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS. WITHIN PUBLIC ROW AND 160 LBS. WITHIN EASEMENTS.
3. COVER SHALL WEIGH A MINIMUM OF 120 LBS.
4. ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACE SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.
NOTES:
ALL PIPE UNDERDRAINS ARE TO EXIT INTO DRAINAGE STRUCTURES SUCH AS CATCH BASINS OR JUNCTION BOXES. IF STRUCTURE IS NOT AVAILABLE, SPECIAL EXIT REQUIREMENTS WILL APPLY IN ACCORDANCE WITH THE DIRECTION OF ENGINEERING SERVICES DIRECTOR OR HIS/HER DESIGNEE.

CITY OF RALEIGH
STANDARD DETAIL

SW-10.11
CUT EXISTING DOWNSPOUT OR DOWNSPOUT SHOE TO DRAIN INTO SLICE BOX AS SHOWN

USE U.S. FOUNDRY 4000 ANGLE TYPE FRAME AND 6110 GRATE OR APPROVED EQUAL

4" Poured Concrete Basin Slab 3000 PSI @ 28 Days

Concrete Sidewalk 3000 PSI @ 28 Days

6" x 6" 14 Gauge WMF Centered Galvanized Steel Tubing

Galvanized Steel Junction Box with Asphalt Mastic

COMPACTED ABC GRAVEL

FINISH GRADE INSTALL CHANNEL FLUSH WITH CURB AND GUTTER

CUT EXISTING DOWNSPOUT OR DOWNSPOUT SHOE TO DRAIN INTO SLICE BOX AS SHOWN

CITY OF RALEIGH

STANDARD DETAIL

CURB DRAIN DETAIL

SW-10.12
2'-6" MIN.
15" TYP.

30° VALLEY C & G

CONC DRIVEWAY APPROACH W/ EXPANSION JOINT

EX. ROADWAY

REPLACE DISTURBED AREA W/ FULL-DEPTH STONE & ASPHALT

UNDISTURBED SUBGRADE

NEW FRONT WALL

SEE NOTE #2

#5 DOWELS @ 8" CENTERS

8" MINIMUM OVER 12' DEEP
12" MINIMUM UP TO 6' FROM TOP OF CURB

IF STRUCTURE IS GREATER THAN 12' DEEP, FOOTING IS TO EXTEND 6" BEYOND THE STRUCTURE

3000 PSI CONCRETE

12" CONC SLAB (MIN 3000 PSI W/#5 REBAR @11" O/C)

3' MIN

1'

1/2' D

30" VALLEY C & G

CONC DRIVEWAY APPROACH W/ EXPANSION JOINT

NOTES:

1. IF STRUCTURE IS LESS THAN 5' IN DEPTH, BOX MUST BE REBUILT BEGINNING AT ORIGINAL FOOTING ELEVATION.

2. IF STRUCTURE IS GREATER THAN 5' IN DEPTH, THE ELEVATED FOOTING DESIGN AS INDICATED ABOVE MAY BE USED.

3. DOMESTIC CASTING REQUIRED WITHIN STREET RIGHT-OF-WAY.

4. FOR STEP REQUIREMENTS, SEE NOTE 4 ON STANDARD DETAIL SW-10.03.

CITY OF RALEIGH
STANDARD DETAIL

SW-10.13
### Cover for Pipes Within the R.O.W. Minimum

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<th>Pipe Size (in)</th>
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<td>24</td>
<td>3.3</td>
</tr>
<tr>
<td>30</td>
<td>3.6</td>
</tr>
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<td>36</td>
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<tr>
<td>66</td>
<td>7.0</td>
</tr>
<tr>
<td>72</td>
<td>7.6</td>
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</table>

**Pipe Spring Line**

6" MIN / 12" MAX WHEN NO TRENCH BOX REQUIRED (TYPICAL).

**Undisturbed Soil**

**Class I, II or III Material**

Densely Compacted, Backfill Tamped in 6" Lifts

**#57 Stone Material**

**Notes:**

- Varies according with table above
- 6" MIN
- Undisturbed soil
- Class I, II or III material
- Densely compacted, backfill tamped in 6" lifts
- #57 stone material
- 6" MIN / 12" MAX when no trench box required (typical)

**City of Raleigh Standard Detail**

**Revisions:**

Date: 8/2020

**Bedding for Stormwater RCP Pipes**

**SW-10.14**
MAINTENANCE: CLEAN OUT AT 50% CAPACITY
LIFE OF FENCING: 6-9 MONTHS

NOTES:
1. FLOW SHALL NOT RUN PARALLEL WITH THE FENCE.
2. END OF SILT FENCE NEEDS TO BE TURNED UPHILL.
3. SEE NC DEQ SEDIMENT DESIGN MANUAL FOR CONSTRUCTION SPECIFICATIONS, WHERE PRACTICE APPLIES AND PLANNING CONSIDERATIONS.
4. SILT FENCE SHOULD NOT BE USED ALONE BELOW GRADED SLOPES GREATER THAN 10' IN HEIGHT.
NOTES:
1. USE NO. 5 OR NO. 97 STONE FOR SEDIMENT CONTROL STONE.
2. PROVIDE STABILIZED OUTLET TO STREAM BAG.
3. WOOD PALLETS MAY BE USED IN LIEU OF STONE AND GEOFABRIC AS DIRECTED A SUFFICIENT NUMBER OF PALLETS MUST BE PROVIDED TO ELEVATE THE ENTIRE SPECIAL STILLING BASKET ABOVE NATURAL GROUND.
4. THE SIZE AND NUMBER OF SLUDGE BAGS SHOULD BE BASED ON THE DRAINING PUMP AND MANUFACTURER RECOMMENDATIONS.
5. TIGHTLY SECURE THE PUMP DISCHARGE TO THE Silt BAG SLEEVE WITH A STRAP OR SIMILAR DEVICES TO PREVENT WATER/SEDIMENT FROM LEAKING WITHOUT TREATMENT.
6. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE Silt BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS AS THE BAG FILLS WITHIN SEDIMENT. REDUCE THE PUMP RATE.
7. REPLACE THE Silt BAG WHEN ONE-HALF (1/2) FULL OF SEDIMENT.
8. Silt BAG DEVICE MUST BE 20 FT FROM THE TOP OF THE STREAM BANK AND WATER MUST BE DISCHARGED IN A DIFFUSE MANNER.

CITY OF RALEIGH
STANDARD DETAIL

NOT TO SCALE
**TEMPORARY SEDIMENT TRAP**

**CITY OF RALEIGH**

**STANDARD DETAIL**

**INLET FLOW**

**EARTHEN EMBANKMENT**

**5' CREST WIDTH**

**INLET ZONE**

**FIRST CHAMBER 25% OF SURFACE AREA**

**SECOND CHAMBER 25% OF SURFACE AREA**

**OUTLET ZONE 25% OF SURFACE AREA**

**EXTEND BAFFLES UP SIDES AS TO NOT ALLOW FLOW AROUND THE ENDS.**

**MAINTENANCE:**
- Repair/replace baffles when they collapse, tear or decompose.
- Remove sediment when cell is 1/2 full.

**PERSPECTIVE VIEW**

**TOP VIEW**

**MIN. LENGTH:WIDTH RATIO - 2:1**

**NOTES:**
1. 3 BAFFLES (MIN) BETWEEN INLET & OUTLET.
2. SEE N.C. DEQ EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL FOR CONDITIONS WHERE PRACTICE APPLIES; PLANNING CONSIDERATION & DESIGN CRITERIA.
3. LOCATE SEDIMENT INFLOW TO THE BASIN AWAY FROM THE DAM TO PREVENT SHORT CIRCUITS FROM INLETS TO OUTLETS.
4. AT A MINIMUM, SEED, STRAW & TACK APPLICATION REQUIRED FOR SITE INSPECTION APPROVAL.
5. TRAPS MUST BE STABILIZED IMMEDIATELY UPON CONSTRUCTION AND PRIOR TO SITE INSPECTION APPROVAL.
**DESIGN CRITERIA**

**SUMMARY:**
- **PRIMARY SPILLWAY:** STONE SPILLWAY
- **MAXIMUM DRAINAGE AREA:** <1 ACRES
- **MINIMUM VOLUME:** 3600 CU FT PER ACRE OF DISTURBED AREA
- **MINIMUM SURFACE AREA:** 435 SQ FT PER CFS OF Q25 PEAK FLOW
- **MINIMUM LAW RATIO:** 2:1
- **MAXIMUM HEIGHT:** 3.5 FEET, 1.5 FEET EXCAVATED BELOW GRADE
- **MINIMUM DEPTH:** WEIR ELEVATION 3.5 FEET ABOVE GRADE
- **STONE SPILLWAY**
- **MIN DEWATERING TIME:** N/A
- **BAFFLES REQUIRED:** 3 MINIMUM (COR OR JUTE) MESH

**Note:** Traps less than 20' in length may use baffles.

**NOTES:**
- See N.C. DEQ erosion and sediment control planning and design manual for conditions where practice applies; planning consideration & design criteria. Basins less than 20' in length may use baffles.

**CITY OF RALEIGH**

**OUTLET DETAIL**

**TEMPORARY SEDIMENT TRAP**

**STANDARD DETAIL**

**REVISED**

**DATE**

**SCALE**

**SW.20.05.2**

**MAINTENANCE:**
- Remove sediment and restore trap to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in a designated disposal area and replace the contaminated part of the gravel facing.
- Check the structure for damage from erosion or piping. Periodically check the depth of the spillway to ensure it is a minimum of 1.5 ft below the low point of the embankment. Immediately fill any settlement of the embankment to slightly above design grade.

Any rip rap displaced from the spillway must be replaced immediately.
M A I N T E N A N C E:
S T O R A G E  A R E A  T O  IT S  O R I G I N A L  D I M E N S I O N
W H E N  S E D I M E N T  H A S  A C C U M U L A T E D  T O  1/2
D E S I G N  D E P T H  O F  T H E  T R A P.

N O T E S:
I F  E X C A V A T E D  S T O R A G E  A R E A  I S  U S E D  A S

A N Y  R I P - R A P  D I S P L A C E D  F R O M
T H E  S T O N E  H O R S E H O E  M U S T
B E  R E P L A C E D  I M M E D I A T E L Y.

R I P  R A P  H E A D W A L L  (1' M I N  H E I G H T
F R O M  R O A D  S H O U L D E R).

C L A S S  1  R I P - R A P  / H E A D W A L L
2:1
2:1
R E V I S I O N S
N O T T O  S C A L E
C I T Y  O F  R A L E I G H
S T A N D A R D  D E T A I L
D A T E:  8/2020
R O C K  P I P E  I N L E T
P R O T E C T I O N
S W - 2 0 . 0 6
NOTES:
1. AT END OF PROJECT, CATCH BASIN CAN BE RAISED AS NEEDED PLUGGING OPEN COURSE OF BLOCK WITH MORTAR.
2. RISER CAN BE BUILT AS A STANDARD CATCH BASIN/JUNCTION BOX (WITH WEEP HOLES) IN RECEIVING WALL AND BE UTILIZED AS SUCH WHEN PROJECT IS STABLE.
3. IF DRAINAGE AREA IS <1 ACRE THEN THIS STRUCTURE NEEDS TO BE TREATED AS A RISER STRUCTURE AND ALL RELATED INFORMATION NEEDS TO BE SUPPLIED, (TRASH RACK, ELEVATIONS, AND ANTI-FLOATABLE)
4. IF THIS DEVICE IS TREATED AS A SEDIMENT TRAP THEN IT SHALL MEET THE SPECIFICATION AS OUTLINED IN SW-20.05.1 AND SW-20.05.2.

PERSPECTIVE VIEW

SECTION VIEW

CITY OF RALEIGH
STANDARD DETAIL

CATCH BASIN RISER

SW-20.07

REVISIONS
DATE: 8/2020

NOTE: NOT TO SCALE
NOTES:
1. ENSURE THAT CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONES.
2. THE DRAINAGE AREA IS LIMITED TO ONE HALF ACRE.
3. KEY THE STONE INTO THE DITCH BANKS AND EXTEND IT BEYOND THE ABUTMENTS A MINIMUM OF 1.5 FEET TO AVOID WASHOUT FROM OVERFLOW AROUND THE DAM.

MAINTENANCE:
CLEAN OUT SEDIMENT AND DEBRIS AND REPAIR WASH OUTS.

PURPOSE: TO REDUCE EROSION IN A CHANNEL BY REDUCING THE VELOCITY OF FLOW.
DO NOT USE CHECK DAM IN INTERMITTENT OR PERENNIAL STREAMS.

SEE N.C. DEQ EROSION and SEDIMENT CONTROL PLANNING and DESIGN MANUAL FOR CONDITIONS WHERE PRACTICE APPLIES; PLANNING CONSIDERATION & DESIGN CRITERIA.
NOTES:
1. Silt fence should be installed to ensure construction entrance is used.
2. If mud is not removed from the vehicle traveling over the stone, then the tires of the vehicle must be washed before entering the public road or the length of the construction entrance extended.

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NOTES:
1. THIS DETAIL APPLIES ONLY TO ENTRANCES OF INDIVIDUAL SINGLE FAMILY RESIDENTIAL UNITS
2. SILT FENCE SHOULD BE INSTALLED TO ENSURE CONSTRUCTION ENTRANCE IS USED.

EXISTING ROADWAY

NEW CONSTRUCTION

RAILROAD BALLAST

SILT FENCE (SEE NOTE 2)

2" - 3" STONE TO BE USED (SURGE STONE OR RAILROAD BALLAST)

20' MIN.

AND SUFFICIENT TO KEEP SEDIMENT ON SITE

12'

EXISTING ROADWAY

PLAN

CITY OF RALEIGH
STANDARD DETAIL

NOT TO SCALE

REVISIONS

DATE: 8/2020

RESIDENTIAL CONSTRUCTION ENTRANCE

SW-20.10
NOTES:
1. STABILIZE IMMEDIATELY UPON CONSTRUCTION AND PRIOR TO SITE INSPECTION APPROVAL.
2. STABILIZE DIVERSION DITCH BASED ON DESIGN VELOCITY. IF DESIGN VELOCITIES (Q) IN BARE EARTH CONDITIONS EXCEEDS 2 FT/S, A TEMPORARY LINER IS REQUIRED.
3. MAXIMUM 5 ACRE DRAINAGE AREA TO TEMPORARY DIVERSION.
1. To be used where excessive stormwater velocities prohibit vegetative linings.

2. Dimensions for \( d \times w \) and size of stone must be determined by appropriate design criteria.

<table>
<thead>
<tr>
<th>( d \text{ MAX} )</th>
<th>STONE CLASSIFICATION</th>
<th>RIP RAP DEPTH</th>
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<tr>
<td>8&quot;</td>
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<td>27&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>CLASS 2</td>
<td>36&quot;</td>
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</table>
1/2 Diameter of pipe or 12" whichever is greater.

Filter Fabric

NCDOT #5 or #57 washed stone 9" deep.

Capacity of pipe culverts together = bankfull flow.

NCDOT #5 or #57 washed stone.

Capacity of stream channel = bankfull flow.

City of Raleigh
Standard Detail

Temporary Stream Crossing

SW-20.13
CONSTRUCTION SPECIFICATIONS

1. Lay one block on each side of the structure on its side in the bottom row to allow pool drainage. Place the bottom row of blocks against the edge of the storm drain for lateral support and to avoid washouts when overflow occurs.

2. Carefully fit hardware cloth or comparable wire mesh with 1/2-inch openings over all block openings to hold gravel in place.

3. Use clean gravel, placed 2 inches below the top of the block on a 2:1 slope or flatter and smoothed to an even grade. Dot #57 washed stone is recommended.

4. Not to be used for sediment storage or on roadways open to public traffic.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DUE: 8/2020
NOT TO SCALE

BLOCK AND GRAVEL
DROP INLET PROTECTION

SW-20.14
DRAINAGE AREA = <1 ACRE (MAXIMUM).
DATA: 8/2020

TEMPORARY SILT DITCH

SW-20.16

FILL SLOPE

SEED & MULCH AFTER CONSTRUCTION OF DITCH

2:1 M

VAR. 2' - 10'

FILL SLOPE

D M IN.

COMPACT EXCAVATED MATERIAL, SEED & MULCH AFTER CONSTRUCTION OF DITCH

L I N E R

M A I N T E N A N C E:
1. REMOVE SILT WHEN DITCH IS 1/2 FULL.
2. STABILIZE IMMEDIATELY UPON CONSTRUCTION AND PRIOR TO SITE INSPECTION APPROVAL.

NOTES:
DIMENSIONS d & w AND LINER TO BE DETERMINED BY ENGINEER.
1. Stripes on barricade rails slope at an angle of 45 degrees in the direction traffic is to pass.
2. Barricade rail stripe shall be 6 inches.
3. The sides of the barricade facing traffic shall have retroreflective rail faces.

CITY OF RALEIGH
STANDARD DETAIL

NOT TO SCALE
ISOLATED VIEW

1.5 X PIPE AREA

RISER

MIN 15" CMP OR
12" SMOOTH WALL

DESIGN NOTES:
1. MAXIMUM DRAINAGE AREA WHEN UTILIZING RISER IS 100 ACRES.
2. DAM HEIGHT BEHIND RISER IS 15 FEET OR LESS FROM TOP OF DAM TO LOW POINT OF DOWNSTREAM TOE.
3. MAY OR MAY NOT BE "FLASHBOARD" RISER

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<th>FILL HEIGHT</th>
<th>MINIMUM TOP WIDTH</th>
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FLASHBOARD RISER

TRASH GUARD

WATER LEVEL

REMOVABLE BOARDS OR STOP LOGS

COMPACTED EARTHEN DAM

ANTI-SEEP COLLAR

CROSS SECTIONAL VIEW

SEE N.C. DEQ EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL FOR CONDITIONS WHERE PRACTICE APPLIES; PLANNING CONSIDERATION & DESIGN CRITERIA.
DESIGN CRITERIA

SUMMARY:

- PRIMARY SLIPWAY: 435 SQUARE FEET PER CF OF Q25 PEAK INFLOW
- MINIMUM SURFACE AREA: 1000 SQUARE FEET PER ACRE OF DISTURBED AREA
- MINIMUM SPILLWAY VOLUME: 435 CUBIC FEET PER CF OF Q25 PEAK INFLOW

DESIGN CRITERIA:

- STABLE TRANSITION REQUIRED TO THE BASE OF THE SLOPE
- EXTEND BAFFLE UP SIDES AS TO ALLOW LOW FLOW AROUND THE ENDS
- SUPPORT ROPE TO PREVENT SAGGING
- SUPPORT POST 24" INTO BOTTOM OF SIDES
- SUPPORT POST 4" TO WIRE TO PREVENT SAGGING
- SUPPORT POST 2" INTO BOTTOM OF SIDES

EXTERIOR VIEW:

- RISER / BARREL PIPE
- 100 ACRE MAX.
- 1800 CUBIC FEET PER ACRE OF DISTURBED AREA
- 2:1
- 6:1
- 2 FEET
- 24 HOURS
- 3 YEARS MAX
- 5 FEET OR LESS FROM TOP OF DAM TO LOW POINT OF DOWNSTREAM TCE

DESIGN CRITERIA:

- PRIMARY SPILLWAY: MAXIMUM DRAINAGE AREA
- MINIMUM SURFACE AREA: MAXIMUM DRAINAGE AREA
- MINIMUM WIDTH: MAXIMUM DRAINAGE AREA
- MINIMUM DEWATERING TIME: MAXIMUM DRAINAGE AREA
- MINIMUM DEWATERING TIME: MAXIMUM DRAINAGE AREA
- DESIGN LIFE: MAXIMUM DRAINAGE AREA

NOTES:

1. LOCATE SEDIMENT INFLOW TO THE BASIN AWAY FROM DAMS TO PREVENT SHORT CIRCUITS.
2. BASINS MUST BE STABILIZED IMMEDIATELY FROM INFLOWS TO OUTLETS.
3. SEDIMENT BASIN:
- MIN. SIZE 15" X 12" SMOOTH WALL
- MIN. SIZE 15" X 12" SMOOTH WALL
- BASE OF THE SLOPE REQUIRED TO THE BASE OF THE SLOPE
- STABLE TRANSITION REQUIRED TO THE BASE OF THE SLOPE
- EXTEND BABBLES UP SIDES AS TO ALLOW LOW FLOW AROUND THE ENDS
- SUPPORT ROPE TO PREVENT SAGGING
- SUPPORT POST 24" INTO BOTTOM OF SIDES
- SUPPORT POST 4" TO WIRE TO PREVENT SAGGING
- SUPPORT POST 2" INTO BOTTOM OF SIDES

DESIGN LIFE OF FABRIC IS 6-12 MONTHS

INSTRUCTIONS:

- INSPECTION APPROVAL UPON CONSTRUCTION AND PRIOR TO SITE
**Design Criteria**

**Summary:**
- Primary Spillway Drainage Area: 2:1
- Maximum Surface Area: 3.5 feet, 1.5 feet excavation below grade
- Minimum Sediment Storage Volume: 6 feet above grade
- Minimum Weir Elevation: 1.5 feet thick Rock Apron
- Maximum weir height: 8 feet
- Minimum Dewatering Time: 3 years or less limited to 8 feet
- Minimum Foundation Thickness: 1.5 feet
- Minimum Level Apron: 2 min
- Rock Apron: 3:1
- Silt Filter Fabric: 2:1
- Gravel Facing: 2 min
- Spillway Crest: 2 min
- Natural Ground: 6 min
- Snowmelt: 300 cubic feet per acre of disturbed area
- Rainfall: 435 square feet per acre of disturbed area
- Peak Inflow: 2:1

**Design Basin with Rock Dam**

**Spillway Details**

**Cross-Section View**

**City of Raleigh Standard Detail**

**REVISIONS DATE: 8/2020**

**Sediment Basin with Rock Dam**

**SW-20.21**
NOTES:
1. WARNING SIGNS TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL.
2. LETTERS TO BE 3" HIGH MINIMUM, CLEARLY LEGIBLE AND SPACED AS DETAILED.
3. SIGNS SHALL BE PLACED AT 50' MAXIMUM INTERVALS.
4. FOR WATERCOURSE BUFFER PROTECTION AREAS LESS THAN 200' IN PERIMETER, PROVIDE NO LESS THAN ONE SIGN PER PROTECTION AREA.
5. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC.
6. MAINTAIN WATERCOURSE BUFFER PROTECTION FENCE THROUGHOUT DURATION OF PROJECT.
7. ADDITIONAL SIGNS MAY BE REQUIRED BY CITY OF RALEIGH BASED ON ACTUAL FIELD CONDITIONS.
8. PLACE A SIGN AT EACH END OF LINEAR WATERCOURSE BUFFER PROTECTION AND 50' ON CENTER THEREAFTER.
9. END OF SILT FENCE SHALL BE TURNED UPHILL.
10. SEE N.C. STATE DENR PRACTICE & SPECIFICATION SEDIMENTS FENCE SECTION FOR CONDITIONS WHERE PRACTICE APPLIES AND PLANNING CONSIDERATIONS.
NOTES:
1. WATTTLES SHALL BE FILLED WITH STRAW OR OTHER APPROVED MATERIAL.
2. SPAEING FOR WATTTLES SHALL BE DETERMINED BY THE SITE ENGINEER.
3. WATTTLES MAY BE USED FOR PROTECTION OF CATCH BASINS AND DROP INLETS WITH APPROVAL BY THE STORMWATER PROGRAM MANAGER OR DESIGNEE.
4. FOR USE OF WATTTLE IN A DITCH, GRADE OF DITCH MUST BE < 2.5%.

CITY OF RALEIGH
STANDARD DETAIL

WATTTLE / INLET
PROTECTION DETAIL

SW-20.23
SW-20.24

1. Remove sediment when half of stone outlet is covered.
2. Replace stone as needed to ensure waterproofing.

NOTES:

1. Top of silt fence must be at least 1" above the top of the washed stone.
2. Steel post set max 2' apart min 2' into solid ground.
3. STEEL POST
4. WOVEN WIRE FABRIC
5. HARDWARE CLOTH
6. FILTER OF #57 WASHED STONE
7. FILTER FABRIC APRON ON GROUND
8. BURY WIRE FENCE AND HARDWARE CLOTH
9. BURY TOP EDGE OF FILTER FABRIC APRON IN TRENCH
10. BURY WIRE FENCE AND HARDWARE CLOTH
11. STEEL POST
12. WOVEN WIRE FABRIC
13. HARDWARE CLOTH
14. FILTER OF #57 WASHED STONE
15. FILTER FABRIC APRON ON GROUND
16. BURY WIRE FENCE AND HARDWARE CLOTH

CITY OF RALEIGH
STANDARD DETAIL
DATE: 8/2020
NOT TO SCALE

STANDARD SILT FENCE OUTLET

SW-20.24
NOTES:
1. ACTUAL LAYOUT TO BE DETERMINED IN THE FIELD.
2. A CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
3. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF OR RECYCLED.
4. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCE CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE BACKFILLED, REPAIRED, AND STABILIZED TO PREVENT EROSION.
5. MUST BE LOCATED >50 FT AWAY FROM INLETS/WATERWAYS UNLESS THERE IS NO OTHER PRACTICAL ALTERNATIVE.
NOTES:

1. TWO CONCRETE BLOCKS SHALL BE PLACED ON THEIR SIDES ABUTTING THE CURB AT EITHER SIDE OF THE INLET OPENING, A 2" X 4" STUD SHALL BE CUT AND PLACED THROUGH THE OUTER HOLES OF THE SPACER BLOCKS TO BRACE THE FRONT BLOCKS. FRONT BLOCKS ARE PLACED ON THEIR SIDES ACROSS THE INLET AND ABUTTING THE SPACER BLOCKS.

2. WIRE MESH OR HARDWARE CLOTH WITH 1/4" - 1/2" OPENINGS SHALL BE PLACED OVER THE OUTSIDE VERTICAL FACE (WEBBING) OF THE BLOCKS, TO PREVENT STONE FROM BEING WASHED THROUGH THE HOLES IN THE BLOCKS.

3. STONE SHALL BE PILED AGAINST THE WIRE TO THE TOP OF THE BLOCK. (NO. 57 WASHED STONE)

4. CHECK DEVICE AFTER EACH RAIN AND REPLACE WASHED STONE IF IT CLOGS WITH SEDIMENT.
NOTES:

- All partially completed storm drains shall be protected at the end of each day in accordance with these details.
**DESIGN CRITERIA**

**SUMMARY:**
- **SKIMMER SEDIMENT BASIN:** TRAPEZOIDAL SPILLWAY WITH IMPERMEABLE MEMBRANE
- **PRIMARY SPILLWAY:** TRAPEZOIDAL SPILLWAY WITH IMPERMEABLE MEMBRANE
- **MAXIMUM DRAINAGE AREA:** 10 ACRES
- **MINIMUM VOLUME:** 1800 CUBIC FEET PER ACRE OF DISTURBED AREA
- **MINIMUM SURFACE AREA:** 325 SQUARE FEET PER CFS OF Q25 PEAK INFLOW
- **MINIMUM L/W RATIO:** 2:1
- **MAXIMUM L/W RATIO:** 6:1
- **MINIMUM DEPTH:** 2 FEET
- **DEWATERING MECHANISM:** SKIMMER
- **MINIMUM DEWATERING TIME:** 2 DAYS
- **DESIGN BASIN LIFE:** 3 YEARS OR LESS
- **DAM HEIGHT:** 5 FEET MAXIMUM
- **BAFFLES REQUIRED:** ★ 3 BAFFLES

**SEE NC EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.**

**NOTE:** BASINS LESS THAN 20' IN LENGTH MAY USE 2 BAFFLES.

**DESIGN CRITERIA PERSPECTIVE VIEW**

- **INLET FLOW:** (PIPE OR DITCH)
- **STABLE TRANSITION REQUIRED TO THE BASE OF THE SLOPE**
- **INLET ZONE 25% OF SURFACE AREA**
- **FIRST CHAMBER 25% OF SURFACE AREA**
- **SECOND CHAMBER 25% OF SURFACE AREA**
- **OUTLET ZONE 25% OF SURFACE AREA**
- **EXTEND BAFFLES UP SIDES AS TO NOT ALLOW FLOW AROUND THE ENDS.**

**BAFFLE DETAIL**

- **SUPPORT ROPE TO WIRE TO PREVENT SAGGING**
- **SUPPORT POST 24" INTO BOTTOM OR SIDES**
- **STAKE TO SUPPORT WIRE**
- **DESIGN LIFE OF FABRIC IS 6-12 MONTHS**
- **COIR MESH OR JUTE, TRENCHED INTO BOTTOM AND SIDE**

**NOTES:**
1. LOCATE SEDIMENT INFLOW TO THE BASIN AWAY FROM THE DAM TO PREVENT SHORT CIRCUITS FROM INLETS TO OUTLETS.
2. BASIN MUST BE STABILIZED IMMEDIATELY UPON CONSTRUCTION AND PRIOR TO SITE INSPECTION APPROVAL.
NOTES:
1. MAINTENANCE SHALL OCCUR WHEN NEEDED. SILT FENCE SHALL BE REPLACED EVERY 6 MONTHS AND POSTS SHALL BE INSPECTED WEEKLY. MAINTENANCE ISSUES SHALL BE CORRECTED AT THAT TIME.
2. SILT FENCE SHOULD BE A MINIMUM OF 5 FEET FROM THE TOE OF SLOPE.

DATE: 8/2020

SILT FENCE SHOULDN'T BE A MINIMUM OF 5 FEET FROM THE TOE OF SLOPE.
City of Raleigh
Standard Details

Transit
BUS SHELTER

40' STRAIGHT
60' FOR TURN

FAR SIDE BUS STOPS

MID BLOCK BUS STOPS

NEAR SIDE BUS STOPS

CITY OF RALEIGH
STANDARD DETAIL

TT-01
GENERAL CONCRETE PAD NOTES:

1. TYPICAL SECTION AND DIMENSIONS OF PAD ARE SUBJECT TO CHANGE DUE TO RIDERSHIP, AMENITIES TO BE INSTALLED, AND TO ENSURE PROPOSED FIXED OBJECTS ARE OUTSIDE THE CLEAR ZONE. COORDINATE WITH THE CITY OF RALEIGH & GORALEIGH, BY CALLING 919-996-4043 OR COMMUNICATING WITH TRANSIT DIVISION (TRANSPORTATION DEPARTMENT) STAFF.

2. CONCRETE PAD WILL CONSIST OF 3,000 PSI CONCRETE IN ACCORDANCE WITH NCDOT STANDARDS.

3. REINFORCE AS SHOWN IN TYPICAL SECTION. WOVEN WIRE FABRIC SHALL HAVE MINIMUM 6" OVERLAPS AND MINIMUM COVER OF 3" ON ALL SIDES.

4. WHERE PROPOSED SHELTER PAD ELEVATION IS ABOVE EXISTING GRADE, PROVIDE A 1' WIDE CONCRETE "BEAM" TO EXTEND A MINIMUM OF 6" BELOW THE EXISTING SURROUNDING GRADE WITH A 45° SECTION TO BRING BACK TO THE STANDARD 6" THICKNESS.

5. CONCRETE PAD WILL HAVE A BROOM FINISH.

6. MAXIMUM CROSS SLOPE SHALL BE 2%.

7. EXTEND ABC 1' BEYOND EDGE OF PAD IN ALL DIRECTIONS EXCEPT WHERE BORDERED BY EXISTING PAVEMENT OR SIDEWALK.

8. WHERE HANDRAIL IS INSTALLED INCREASE PAD THICKNESS AS SHOWN ON THE HANDRAIL DETAIL STD. T-8.

9. EXPANSION JOINTS WILL BE INSTALLED AT ALL RIGID OBJECTS AND ADJACENT TO EXISTING PAVEMENT AND HAVE 1/8" RADIUS TOOLED EDGE AND FILL WITH SEALER. JOINT SEALER TO BE GREY IN COLOR.


11. SIDEWALK AND CONCRETE IN UTILITY STRIP AT BACK OF CURB WILL BE 4" THICK IN ACCORDANCE WITH THE STANDARD SIDEWALK SECTION.
NOTES:
1. SHELTER SHOWN IS A FULL SIZE BRASCO MODEL TL 510 ILS, OR APPROVED EQUAL. COORDINATE WITH CITY OF RALEIGH FOR SHELTER TYPE.

2. INSTALL COLUMN BASE 6" FROM EDGE OF CONCRETE PAD WITH APPROVED CONCRETE ANCHOR UNITS RECOMMENDED BY THE MANUFACTURER, TYPICAL UNLESS OTHERWISE SHOWN.

3. INSTALL BENCH ON OPPOSITE SIDE OF LEAN BAR.

4. ALL CERTIFICATIONS OF STRUCTURES TO BE PROVIDED BY MANUFACTURER.

5. IF INSTALLED WITHIN NCDOT RIGHT-OF-WAY, SHELTER MUST BE ON THE NCDOT APPROVED PRODUCTS LIST.
NOTES:

1. IF NO SIDEWALK CURRENTLY EXISTS, PROVIDE SIDEWALK TO NEAREST ADA ACCESSIBLE INTERSECTION OR DRIVEWAY WITH APPROPRIATE RAMPS. SIDEWALK AND PLANTING AREA WIDTH TO BE IN COMPLIANCE WITH THE CITY’S UDO. PROVIDE CURB RAMP IN ACCORDANCE WITH CITY STANDARDS.

2. BUS SHELTER SHALL BE MINIMUM 6" FROM EDGE OF CONCRETE PAD.

3. FIXED OBJECTS SHALL BE PLACED OUTSIDE OF THE CLEAR ZONE.
NOTES:
1. BENCH STYLE SUBJECT TO CHANGE, COORDINATE WITH CITY.
2. BENCH SHOULD BE A MINIMUM OF 3' FROM THE SIDE OF THE CONCRETE PAD AND 2' FROM THE BACK EDGE OF THE CONCRETE PAD. COORDINATE LOCATION WITH THE CITY.
3. IF NO SIDEWALK CURRENTLY EXISTS, PROVIDE SIDEWALK TO NEAREST ADA ACCESSIBLE INTERSECTION OR DRIVEWAY WITH APPROPRIATE RAMPS.
4. FIXED OBJECTS SHALL BE PLACED OUTSIDE OF THE CLEAR ZONE.
REVISIONS
NOT TO SCALE
DATE: 8/2020
SIGN POST LAYOUT
TT-06

CITY OF RALEIGH
COORD. WITH
BUS STOP SIGN
CITY OF RALEIGH

NOTES:
1. INSTALL SIGN AHEAD OF STOP 2' FROM CONCRETE
   SECTION IN UTILITY STRIP
2. CALL 811 FOR UNDERGROUND UTILITY LOCATION PRIOR TO INSTALLATION.

2"x2" GALV. STEEL
POST, 12 GAUGE.

2' MIN.

GROUND
STREET
SIDEWALK

CITY OF RALEIGH
STANDARD DETAIL

SIGN POST LAYOUT

TT-06
NOTES:
1. CONTRACTOR TO PROVIDE FULL SHOP DRAWINGS FOR HANDRAIL PRIOR TO INSTALLING.
**CITY OF RALEIGH**

**STANDARD DETAIL**

**BOLLARD INSTALLATION**

**TT-08**

**DATE:** 8/2020

**NOT TO SCALE**

**PAVING**

3'

**COMPACTED SUBGRADE**

4" (TYP)

**3000 PSI CONCRETE FOOTING**

6" (TYP)

**4" DIAMETER STEEL POST (SCH 40)**

**CAP OFF WITH 3/16" STEEL PLATE, ARC. WELD AND GRIND SMOOTH**

**FINISHES: ALL SURFACES TO BE HOT DIPPED GALVANIZED, AND SHOP PRIMED AND PAINTED WITH TWO COATS IND. ENAMEL "SAFETY YELLOW"**

**TAR COATING ON EXT. SURFACES OF POST IN CONTACT WITH CEMENT**
SEGMENTAL GRAVITY RETAINING WALL NOTES:
1. STANDARD UNIT WILL MEET NCDOT APPROVED VENDORS LIST. DIMENSIONS OF CONCRETE BLOCKS ARE TYPICALLY 18" WIDE BY 18" DEEP BY 8" TALL. BACK FILL VOIDS IN BLOCKS WITH #57 STONE TO TOP.
2. DO NOT MIX UNITS FROM DIFFERENT VENDORS ON SAME WALL.
3. TOP CAP UNIT WILL BE GLUED TO BLOCKS WITH ADHESIVE MEETING MANUFACTURERS RECOMMENDATIONS.
4. DO NOT USE SEGMENTAL GRAVITY WALLS WHEN SURCHARGE LOADS WILL BE WITHIN 5'-6" OF THE BACK OF THE CAP UNIT.
5. DO NOT ATTACH FENCE OR HANDRAIL TO WALL.
6. WALL SIMILAR TO NCDOT STANDARD DRAWING 453.02.

REINFORCED CONCRETE GRAVITY RETAINING WALL NOTES:
1. USE CLASS A CONCRETE AND PROVIDE CLASS I SURFACE FINISH ON ALL EXPOSED SURFACES.
2. PROVIDE GROVED CONTRACTION JOINTS EVERY 10'-0".
3. PROVIDE 4" PERFORATED PVC DRAIN PIPE THE LENGTH OF THE WALL. WRAP PIPE WITH FILTER FABRIC AND PROVIDE 1' WIDE BY 1' DEEP WASHED STONE AROUND PIPE. TIE TO STORM DRAIN OR DAYLIGHT AT ENDS AND PROVIDE SOCK AROUND END OF PIPE.
4. DO NOT BACKFILL WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. COMPACT BACKFILL AND COMPACT WITH HAND OPERATED EQUIPMENT.
5. TAPER ENDS OF WALL TO 6" ABOVE GRADE IN 3' MINIMUM. END OF WALL SHALL HAVE 6" HORIZONTAL CLEARANCE FROM THE EDGE OF SIDEWALK.
6. WALL SIMILAR TO NCDOT STANDARD DRAWING 453.01.

GENERAL NOTES:
1. COORDINATE WITH CITY OF RALEIGH ON WHICH WALL TYPE TO USE.
2. ALL RETAINING WALLS SHALL BE DESIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER.
NOTES:
1. BIKE RACK TO BE 2" SCHEDULE 40 STEEL POWDER COATED BLACK.
2. COORDINATE LOCATION WITH THE CITY PRIOR TO INSTALLATION.
USE 6.5" WHEN DRIVEWAY IS USED IN LIEU OF A WHEELCHAIR RAMP TO ACCOMMODATE 12:1 MAXIMUM SLOPE (ADA COMPLIANT), SUCH AS IN A CUL-DE-SAC.

SLOPE 1/4"/FT (MAX)

6" EXPANSION JOINT

EXPANSION JOINT

MONOLITHIC POUR OF 3000 PSI CONCRETE

3.5' RADIUS TYP.

1/2" EXPANSION JOINT
NOTES:
1. WHEN A DRIVEWAY IS TO BE CONSTRUCTED WHERE FINAL LAYER OF ASPHALT HAS BEEN PLACED, THE CURB CAN BE SAW CUT IN A STRAIGHT LINE AND REMOVED. IF THE FINAL LAYER HAS NOT BEEN PLACED, THE ENTIRE CURB AND GUTTER SHALL BE REMOVED AND THE DRIVEWAY SHALL BE A MONOLITHIC POUR USING 3000 PSI, MAX. 4" SLUMP CONCRETE.
2. EXPANSION MATERIAL SHALL EXTEND THE FULL DEPTH OF THE CONCRETE. 1/2" EXPANSION JOINTS ALONG SIDEWALK SHALL BE LOCATED AT NOT MORE THAN 40' INTERVALS & DUMMY CONSTRUCTION JOINTS AT 6' INTERVALS. DUMMY JOINTS SHALL BE AT LEAST 1/3 THE SLAB THICKNESS IN DEPTH.
3. SLOPE ON UNPAVED AREAS BETWEEN BACK OF CURB & SIDEWALK SHALL BE 1/4" PER FT.
4. NO EXPOSED AGGREGATE OR OTHER SPECIAL SURFACE TREATMENTS IN ROW.
5. W-DIMENSION AS SHOWN ON PLAN VIEW SHALL BE AS FOLLOWS:
   10' MINIMUM, 18' MAXIMUM FOR RESIDENTIAL DRIVEWAYS
   36' MAXIMUM FOR COMMERCIAL DRIVEWAYS
6. THE DISTANCE FROM THE END OF A STREET CURB RADIUS TO THE BEGINNING OF THE DRIVEWAY RADIUS SHOULD BE MINIMUM OF 20 FT.
7. CURB RADIUS TO BE DISSIPATED BETWEEN LIMITS NOTED ABOVE.
8. 7' MIN. BETWEEN DRIVEWAYS ON ADJACENT LOTS.
   45' MIN. BETWEEN DRIVEWAYS ON SAME LOT.
9. NO RADIUS ENCROACHMENT SHALL BE ALLOWED ACROSS AN ADJOINING PROP. FRONTAGE. THIS IS DETERMINED BY EXTENDING A LINE FROM THE PROPERTY CORNER PERPENDICULAR TO THE RW TO THE CURB AND GUTTER LOCATION.
10. ALL CONCRETE MUST BE Poured ON SAME DAY AS INSPECTION OR RE-INSPECTION IS REQUIRED.
11. DRIVEWAY RADIUS SHALL BE A MINIMUM OF 5' FROM ANY CATCH BASIN.
NOTES:
1. SEE STANDARD DETAIL T-10.26.1 FOR CURB AND GUTTER DETAILS.
2. EXPANSION MATERIAL SHALL EXTEND THE FULL DEPTH OF THE CONCRETE.
3. ALL CONCRETE SHALL BE 3000 PSI (MIN.).
NOTES:
1. PIPE TO BE RCP OR HDPE AND SIZED TO CARRY THE DESIGN FLOW OF THE DITCH FOR A 10-YEAR, 24-HOUR STORM EVENT; THE MINIMUM ACCEPTABLE PIPE SIZE IS 15" IF THE DESIGN FLOW WOULD REQUIRE A SMALLER PIPE. PIPE TO BE EXTENDED TO ALLOW ACCEPTABLE COVER AND SLOPES.
2. 12" MINIMUM COVER OVER PIPE MEASURED FROM TOP OF PAVEMENT.
3. STEEPER SLOPES CAN BE ALLOWED WHERE SPECIAL STABILIZATION IS PROVIDED IN ACCORDANCE WITH EROSION AND SEDIMENTATION CONTROL ORDINANCE.
4. USE 5' VERTICAL CURVE FOR TRANSITION.
5. SEE CITY OF RALEIGH STREET DESIGN MANUAL FOR COMMERCIAL DRIVEWAYS.
6. NO EXPOSED AGGREGATE OR OTHER SPECIAL SURFACE TREATMENTS IN RIGHT OF WAY.
7. W-DIMENSION AS SHOWN ON PLANS SHALL BE AS FOLLOWS; 15' MINIMUM, 16' MAXIMUM FOR RESIDENTIAL DRIVEWAYS.

CITY OF RALEIGH
STANDARD DETAIL

RESIDENTIAL DRIVEWAY INSTALLATION ON NON CURB & GUTTERED STREETS

T-10.03
DRIVEWAY GRADES

A. CURB & GUTTER, SIDEWALK SECTION

B. SHOULDER SECTION

NOTES:
IF THE SLOPE BETWEEN THE TOP OF CURB AND GUTTER AND A POINT 30 FEET FROM THE CURB AND GUTTER EXCEEDS 20%, THIS SLOPE SHALL BE ADJUSTED TO A MAXIMUM OF 8.33% (1"/FT) UP OR 4.17% (1/2"/FT) DOWN.

CITY OF RALEIGH
STANDARD DETAIL

DRIVEWAY GRADES

T-10.04
NOTES:

1. THE PAVEMENT EDGE SHALL BE DEFINED BY A STRAIGHT EDGE FORMED BY A MACHINED SAW CUT.

2. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO A DENSITY OF AT LEAST 95% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY NCDOT.

3. THE FINAL 1' OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO A DENSITY EQUAL TO 100% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-80 AS MODIFIED BY NCDOT. BITUMINOUS BASE OR BINDER MAY BE SUBSTITUTED IF APPROVED BY TRANSPORTATION DIRECTOR OR DESIGNEE.

4. THE ENTIRE THICKNESS/VERTICAL EDGE OF THE CUT SHALL BE TACKED.

5. THE SAME DEPTH OF PAVEMENT MATERIAL WHICH EXISTS SHALL BE REINSTALLED, BUT IN NO CASE SHALL THE ASPHALT BE LESS THAN 3" THICK.

6. THE ASPHALT PAVEMENT MATERIAL SHALL BE INSTALLED AND COMPACTED THOROUGHLY AND ROLLED WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH, LEVEL PATCH.
NOTES:
1. IF DRIVEWAY IS WITHIN CLOSE PROXIMITY OF ACCESS RAMP, TIE SIDEWALK INTO DRIVEWAY.
2. REFER TO STANDARD DETAIL T-10.01.2, DRIVE WAY AND SIDEWALK DETAIL, SHEET 1 OF 2.
GENERAL

<table>
<thead>
<tr>
<th>WALKWAY TYPE</th>
<th>SIDEWALK BOTH SIDES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANTING TYPE</td>
<td>TREE/LAWN</td>
</tr>
<tr>
<td>TREE SPACING</td>
<td>40' O.C. AVG</td>
</tr>
<tr>
<td>PARKING TYPE</td>
<td>PARALLEL ON 2 SIDES</td>
</tr>
</tbody>
</table>

PAVEMENT DESIGN

- 3" SF9.5A
- 8" ABC
**GENERAL**

- **WALKWAY TYPE**: SIDEWALK
- **PLANTING TYPE**: TREE/LAWN
- **TREE SPACING**: 40' O.C.AVG.
- **PARKING TYPE**: PARALLEL, HEAD-IN, ANGLE

**PAVEMENT DESIGN**

- 3" SF9.5A
- 8" ABC

---

* PARKING DIMENSION VARIES: PARALLEL 8', HEAD-IN 18', 60° ANGLE 20'

**CITY OF RALEIGH**

**STANDARD DETAIL**

**DATE: 8/2020**

**STANDARD DETAIL**
When using a center turn lane, the RW distance will be 90' and the back to back curb distance will be 62'.

NOT TO SCALE
Residential

20' Easement

16' Travel Lane

2'

Grade Point

2'

Mixed Use

24' Easement

20' Travel Lane

2'

Grade Point

2'

Building

Building

City of Raleigh
Standard Detail

Revisions

Date: 8/2020

Not to Scale

ALLEY

T-10.22
1. CURB AND GUTTER SECTION SHALL BE REMOVED IN ACCORDANCE WITH DRIVEWAY WIDTH APPROVED BY THE CITY.

2. IF PERPENDICULAR CUT IS LESS THAN 5' FROM NEXT JOINT, THEN THE PARALLEL CUT SHALL BE MADE TO THAT JOINT.

3. THIS METHOD IS NOT ALLOWED IN NEW ROADWAY CONSTRUCTION.

NOTES:

IF THE FINAL LIFT OF ASPHALT HAS BEEN INSTALLED AND IS DAMAGED DURING CURB REMOVAL, A ONE FOOT WIDE SECTION OF ASPHALT SHOULD BE SAWCUT AND REMOVED FOR FORMS TO BE USED TO KEEP A STRAIGHT EDGE ON THE DRIVEWAY APRON. REINSTALL HOT MIX SURFACE ASPHALT PATCH S9.5B.

IF THE FINAL LIFT OF ASPHALT HAS NOT BEEN INSTALLED, THE ASPHALT IN FRONT OF THE APRON CAN REMAIN IN PLACE.
SCORE FULL WIDTH OF CURB AND GUTTER

BACK OF CURB

EDGE OF PAVEMENT

PLAN

2'-0"

6"

1'-6"

1/2"

FRONT

2'-6"

2'-0"

6"

EDGE OF PAVEMENT

BACK OF CURB

END

CITY OF RALEIGH
STANDARD DETAIL

DATE: 8/2020

REVISIONS

STANDARD METHOD OF ENDING CURB AND GUTTER

T-10.25
1. 30° CURB & GUTTER

2. 30° VALLEY TYPE GUTTER

MEDIAN CURB AND GUTTER
SIDE ELEVATION

MEDIAN CURB AND GUTTER
(NON-MOUNTABLE)

NOTES:
1. 10' MAXIMUM BETWEEN DUMMY JOINTS.
   15' MAXIMUM BETWEEN DUMMY JOINTS ON
   MACHINE POURS.
2. 1/2" EXPANSION JOINT EVERY 50'.
3. 3000 PSI CONCRETE MINIMUM, 4" SLUMP MAXIMUM.
4. LIQUID MEMBRANE CURING COMPOUND SHALL MEET
   THE REQUIREMENTS OF SECTION 1026-2 OF NCDOT
   STANDARDS & SPECIFICATIONS FOR ROADS AND
   STRUCTURES.
5. ALL CONSTRUCTION JOINTS SHALL BE FILLED
   WITH JOINT FILLER AND SEALER IN ACCORDANCE
   WITH NCDOT ROADWAY STANDARD DETAIL 846.01
   THE JOINT MATERIAL SHALL CONFORM TO SECTION
   1026-2 OF NCDOT STANDARD & SPECIFICATIONS FOR
   ROADS AND STRUCTURES.
6. REFER TO NCDOT DETAIL 846.01 FOR CURB AND
   GUTTER SUPERELEVATION RATES.
CITY OF RALESIGH
STANDARD DETAIL

NOTES:
TRANSITION NOT TO BE LOCATED WITHIN THE CURB RADIUS.
REVISIONS
[404x85]NOT TO SCALE
[0x0]T-10.27
[492x24]2 W
[459x560]2 W
[471x553](MIN.)
[378x475]R /W

NOTES:
1. TAPER ON BOTH ENDS OF ROADWAY WIDENING SHALL BE A MINIMUM OF 1/3 OF THE DISTANCE X, SHOWN BELOW, FOR NEW ASPHALT WIDTHS > 15 FEET.
2. A SOLID WHITE EDGE MARKING SHALL BE EXTENDED ALONG WIDENING AT EXISTING PAVEMENT.
3. DELINERATORS SHALL ONLY BE REQUIRED AT TAPER FROM CURB TO EXISTING PAVEMENT IN DIRECTION OF TRAVEL.
4. DELINERATORS SHALL BE ORIENTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.
5. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.
6. BOTTOM EDGE OF DELINERATORS SHALL BE 4 FEET ABOVE ROADWAY.
7. THE DELINERATORS SHALL BE MOUNTED ON BREAKAWAY POSTS.
8. DELINERATORS SHALL BE REFLECTORIZED.
9. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.
10. THE TRANSPORTATION DIRECTOR OR DESIGNER AND/OR NC DOT RESERVES THE RIGHT TO REQUIRE A LONGER TAPER IF DEEMED NECESSARY FOR THE SAFETY OF THE PUBLIC.

A. BOTTOM EDGE OF DELINERATOR SHALL BE 4 FEET ABOVE ROADWAY.
B. THE DELINERATOR STRIPES SHALL SLOPE UPWARD AND OUTWARD FROM TRAFFIC.
C. DELINERATOR WIDTHS ≤ 15 FEET OR AT 1/4 OF X FOR NEW ASPHALT WIDTHS > 15 FEET.
D. DELINERATOR WIDTHS SHALL BE MOUNTED ON BREAKAWAY POSTS.
E. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.
1. Barricade(s) to be erected across entire roadway including curb & gutter.

2. Advance warning sign W14-1 (Dead End) shall be placed just after last intersecting street.

3. Markings for barricade rails shall be reflective and alternate red & white strips.

4. "Road Closed" sign shall meet specifications of M.U.T.C.D. R11-2 and be required atop each barricade used.

5. Call 811 for underground utility locate prior to installation.

NOTES:

1. Barricade(s) to be erected across entire roadway including curb & gutter.

2. Advance warning sign W14-1 (Dead End) shall be placed just after last intersecting street.

3. Markings for barricade rails shall be reflective and alternate red & white strips.

4. "Road Closed" sign shall meet specifications of M.U.T.C.D. R11-2 and be required atop each barricade used.

5. Call 811 for underground utility locate prior to installation.
NOTES:
1. WATER AND/OR SANITARY SEWER LINES SHALL BE A MINIMUM OF TWO FEET FROM THE EDGE OF THE CURB AND GUTTER
2. ENCROACHMENT ONTO CITY MAINTAINED RIGHT OF WAY SHALL FOLLOW CONDITIONS OF THE APPLICABLE ENCROACHMENT AGREEMENT OR FRANCHISE AGREEMENT.
3. FOR HYDRANT LOCATION SEE PUBLIC UTILITIES STANDARD DETAIL W-4.
4. PUE TO BE EXPANDED ON A CASE BY CASE BASIS AS NEEDED TO ACCOMMODATE PRIVATE UTILITIES APPURTEAN FACILITIES AND EQUIPMENT.
NOTE: SEE STANDARD DETAIL T-20.05 FOR PAVEMENT MARKING PLACEMENT

DETAIL SHOWING TYPICAL LOCATION OF SIDEWALK ACCESS RAMPS, PEDESTRIAN CROSSWALKS AND STOP BARS.

DETAIL SHOWING TYPICAL LOCATION OF SIDEWALK ACCESS RAMPS PEDESTRIAN CROSSWALKS AND STOP BARS FOR TEE INTERSECTION.

FOR RAMPS AT ASPHALT TO ASPHALT STREET TYPE DRIVEWAYS OR PRIVATE STREET TIE IN.
CITY OF RALEIGH

STANDARD DETAIL

CURB RAMPS
(NEW DEVELOPMENT)

T-20.01.2
NOTE: * USE SMALL FLARE ONLY WHEN A CURB WOULD DIRECTLY CONFLICT WITH APPROACHING VEHICLE TURNING MOVEMENTS.

**TYPE N-3**

1. 8.33% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.00%
3. CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.
4. RAMPS AND DOMES SHALL BE INSTALLED THE SAME WIDTH AS THE SIDEWALK.

**TYPE N-3A**

(COMMERCIAL/RETAIL USE)
CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.

Ramps and domes shall be installed the same width as the sidewalk.

If length exceeds 6’, truncated domes shall be installed along the back of the curb covering the full width of the ramp.

**TYPE N-4**

1. SLOPE TO MEET GRADE, 15' MAXIMUM.
2. CROSS SLOPE: 2.00%
3. CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.
4. RAMPS AND DOMES SHALL BE INSTALLED THE SAME WIDTH AS THE SIDEWALK.
CURB RAMPS
(RETROFIT)

T-20.01.5

1. 8.33% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.00%
3. CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.
4. RAMPS AND DOMES SHALL BE INSTALLED THE SAME WIDTH AS THE SIDEWALK.
5. IF LENGTH EXCEEDS 5', TRUNCATED DOMES SHALL BE INSTALLED ALONG THE BACK OF THE CURB COVERING THE FULL WIDTH OF THE RAMP.
CURB RAMPS (RETROFIT)

T-20.01.6

**TYPE R-3**

1. 8.33% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.00%
3. CURB RAMPS REQUIRE A 4'-0" MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00%, WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.
4. RAMPS AND DOMES SHALL BE INSTALLED THE SAME WIDTH AS THE SIDEWALK.

**TYPE R-4**

**CONCRETE DEPTH**

<table>
<thead>
<tr>
<th>SIDE RAMPS</th>
<th>4&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANDING &amp; CURB RAMPS</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS

DATE: 8/2020

NOT TO SCALE

CURB RAMPS

(RETROFIT)

T-20.01.6
CURB RAMP/FLARE (RETROFIT)

6"

4"

SIDE RAMPS

LANDING & CURB RAMPS

CROSS SLOPE: 2.00%

8.33% (12:1) MAX RAMP SLOPE

CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.

RAMP SLOPE

DEPRESSED 2'-6" CURB & GUTTER

1/2" EXPANSION JOINT (TYP)

DETECTABLE WARNING SURFACE (TYP)

1/2" EXPANSION JOINT (TYP)

24" TYP

12" MIN

CONCRETE DEPTH

SIDE RAMPS 4"

LANDING & CURB RAMPS 6"

LARGER RADIUS

15' OR GREATER

ONLY TO BE USED WITH CITY OF RALEIGH APPROVAL.

SHARED CURB RAMP/FLARE (RETROFIT)

T-20.01.7

CITY OF RALEIGH

STANDARD DETAIL

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DATE: 8/2020

NOT TO SCALE

PAY LIMITS FOR CURB RAMP

1/2" EXPANSION JOINT (TYP)

6"W X 12"D CONCRETE CURB

SIDEWALK

DEPRESSED 2'-6" CURB & GUTTER

DETECTABLE WARNING SURFACE (TYP)

1/2" EXPANSION JOINT (TYP)

24" TYP

12" MIN

LARGER RADIUS

15' OR GREATER

ONLY TO BE USED WITH
CITY OF RALEIGH APPROVAL.
1. CITY OF RALEDGH STANDARD CURB RAMPS HAVE BEEN DEVELOPED IN ACCORDANCE WITH THE
   AMERICANS WITH DISABILITIES ACT (ADA) AND PUBLIC RIGHT OF WAY ACCESS GUIDELINES (PROWAG).

2. CURB RAMPS SHALL BE PROVIDED AT LOCATIONS AS SHOWN ON THE PLANS
   OR AS DIRECTED BY THE ENGINEER. SIDEWALK ACCESS RAMPS SHALL BE LOCATED AS
   INDICATED IN THE DETAIL, HOWEVER, THE LOCATION MAY BE ADJUSTED IN COORDINATION WITH
   THE CITY OF RALEIGH WHERE EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. AFFECT
   PLACEMENT.

3. DOUBLE WHEELCHAIR RAMPS ARE TO BE INSTALLED AT ALL PUBLIC STREET INTERSECTIONS
   WHERE SIDEWALK IS REQUIRED.

4. THE WALKING SURFACE SHALL BE SLIP RESISTANT. THE COLOR FOR THE DETECTABLE WARNING
   AREA SHALL BE YELLOW FOR CONTRAST.

5. NO SLOPE ON THE SIDEWALK ACCESS RAMP SHALL EXCEED 1”/FT (12:1) IN RELATIONSHIP TO
   THE GRADE OF THE STREET.

6. IN NO CASE SHALL THE WIDTH OF THE SIDEWALK ACCESS RAMP BE LESS THAN 48”
   ALL RAMPS SHALL BE INSTALLED THE SAME WIDTH AS THE SIDEWALK.

7. USE CLASS A (3000 PSI) CONCRETE WITH A SIDEWALK FINISH IN ORDER TO OBTAIN A ROUGH
   NONSKID SURFACE.

8. A 1/2” EXPANSION JOINT INSTALLED FULL DEPTH WILL BE REQUIRED WHERE THE CONCRETE
   SIDEWALK ACCESS RAMP JOINS THE CURB AND ALSO WHERE NEW CONCRETE ABUTS
   EXISTING CONCRETE.

9. CURB RAMPS SHOULD BE PLACED PARALLEL TO THE DIRECTION OF TRAVEL.
TRIANGULAR ISLANDS MAY BE CONSTRUCTED WITH ONLY 2 POINTS OF ENTRY AND EXIT AS SHOWN IN THE ROADWAY PLANS.

MEDIAN ISLAND CURB RAMPS
(MEDIANS WIDER THAN 20')

MEDIAN ISLAND
WITH CUT THROUGH

CONCRETE PEDESTRIAN REFUGE

DETECTABLE WARNING DOMES (YELLOW)

PAVEMENT

5" MONOLITHIC CONCRETE ISLAND

MEDIAN ISLAND
WITH CUT THROUGH
(MEDIANS ≤ 20')

CITY OF RALEIGH
STANDARD DETAIL

T-20.02
ISOMETRIC VIEW

4' MIN.
5" CONCRETE MONOLITHIC ISLAND

VARIABLE (SEE PLANS)

2' MIN. GAP

2' MIN.

(SEE PLANS)

CROSS SECTION VIEW

VARIATIONS (6' MIN.)

CONCRETE PEDESTRIAN REFUGE

2' MIN.

5:1 SLOPE

5:1 SLOPE

5" CONCRETE MONOLITHIC ISLAND

5"

2" EXPANSION JOINT (TYP)

1/2" EXPANSION JOINT (TYP)

6" (TYP)

4' MIN.

VARIABLE (SEE PLANS)

6' (TYP)

4' MIN.

PROFILE VIEW

CONCRETE PEDESTRIAN REFUGE

1/2" EXPANSION JOINT (TYP)

5:1

5:1

6' (TYP)

4' MIN.

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS

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NOT TO SCALE

PEDESTRIAN REFUGE

T-20.03
CITY OF RALEIGH
STANDARD DETAIL

DETECTABLE WARNING SURFACE PLACEMENT

T-20.04.1
NOTES:
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON DETAIL. SIZE OF PAVER SHALL BE 1' X 1'.

2. THE COLOR FOR THE DETECTABLE WARNING AREA SHALL BE YELLOW FOR CONTRAST.
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON DETAIL.

2. THE COLOR FOR THE DETECTABLE WARNING AREA SHALL BE YELLOW FOR CONTRAST.

NOTE:
THIS APPLICATION ONLY TO BE USED WHEN RETRO FITTING EXISTING BARRIER FREE RAMPS

SECTION "B"
TYPICAL SECTION

SECTION "A-A"
WITH DETECTABLE WARNING PAVERS

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS
DATE: 8/2020

DETECTABLE WARNING SURFACE, SURFACE APPLIED (RETROFIT ONLY)

T-20.04.3
NOTES:

1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON DETAIL.

2. THE COLOR FOR THE DETECTABLE WARNING AREA SHALL BE YELLOW FOR CONTRAST.
NOTES:
1. HI-VISIBILITY CROSSWALKS SHOULD ONLY BE USED AT CROSSINGS WHERE THE INTERSECTION IS SIGNALIZED OR UN-CONTROLLED BY ANY TRAFFIC CONTROL DEVICE (e.g. STOP SIGN).

2. THE CROSSWALK LINE SHOULD BE PLACED AT THE ANGLE OF THE TRAVEL LANES AND TRAVERSE THE PEDESTRIAN CROSSING.

3. A CROSSWALK LINE SHOULD BE PLACED TO AVOID WHEEL PATHS. THIS IS IDEALLY DONE BY CENTERING THE LINES AT THE EDGE OF EACH TRAVEL LANE AND IN THE CENTER OF EACH TRAVEL LANE. DUE TO VARYING LANE WIDTHS THIS IS SOMETIMES NOT POSSIBLE.

4. PLACE STOP BARS A MINIMUM OF 4 FEET FROM NEAREST CROSSWALK LINE. STOP BARS AT SIGNALIZED INTERSECTIONS SHOULD BE COORDINATED WITH THE CITY OF RALEIGH TRANSPORTATION OPERATIONS DIVISION OR AS DIRECTED BY THE ENGINEER.

5. CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE TO THE LATEST CITY OF RALEIGH STANDARD DRAWINGS.
NOTES:
1. TRANSVERSE EXPANSION JOINTS TO BE A MAXIMUM OF 50 FEET.
2. ALL CONCRETE TO BE 3000 PSI AND FINISHED WITH CURING COMPOUND.
3. A 1" INCH DEPTH IS REQUIRED AT LOCATIONS OF DRIVEWAY CROSSINGS, AT STREET INTERSECTIONS (ALONG THE LENGTH OF RADIUS CURB RETURNS), AND IN THE HANDICAP RAMPS.

CITY OF RALEIGH

STANDARD DETAIL

CONCRETE SIDEWALK

T-30.01
1. Transverse expansion joints to be a maximum of 50 feet apart.
2. All concrete to be finished with curing compound.
3. A 6 inch depth is required.
4. Saw cut joints every 10 feet or same as width, whichever is less.
5. No utility surface covers/plates/manholes (i.e. waterline valve covers, etc.) shall be located within path and shall be minimum 1 foot from the edge of path.
6. All paths shall be located minimum 6 feet from the back of curb.
7. Multi-use path width to be determined by City of Raleigh based on roadway type, location and pedestrian volumes.
CONCRETE PAVER
2 3/8" (60 MM) MIN. THICKNESS
1" TO 1 1/2" (25 - 40 MM)
COMPACTED BEDDING SAND
COMPACTED AGGREGATE BASE
4" (100 MM) MIN. THICKNESS
COMPACTED SOIL SUBGRADE

SECTION 1

CONCRETE CURB
SET 1/4" (7 MM) BELOW TOP OF PAVERS
AND CONTROL JOINTS @ 15' (4.58 M) OC

SECTION 2

NOTES:
1. BRICK OR CONCRETE PAVERS ALLOWED ONLY UNDER SPECIAL CONDITIONS.
2. THICKNESS OF BASE MAY VARY WITH SUBGRADE/TRAFFIC CONDITIONS.
3. SCATTER SAND OR SCREENINGS OVER COMPLETE WORK AND SWEEP INTO CRACKS.
4. CONCRETE PAVERS SHOULD CONFORM TO REQUIREMENTS OF ASTM C-1319.
   BRICK PAVERS SHOULD CONFORM TO REQUIREMENTS OF ASTM C902-95
5. SEE CITY OF RALEIGH CODE SECTION 10-7001 (D) FOR CONDITIONS UNDER WHICH CONCRETE / BRICK PAVERS ARE ALLOWED.

CITY OF RALEIGH
STANDARD DETAIL

T-30.03
City of Raleigh
Standard Details

Tree Protection and Planting
WARNING SIGNS DETAIL

REVISIONS

NOTE: FOR TREE PROTECTION ONLY

NOTES:
1. TREE PROTECTION FENCING MUST BE INSTALLED AT A MINIMUM RADIUS OF THE CRITICAL ROOT ZONE (SEE DETAIL TPP-02 FOR EXAMPLES)
2. THE TREE PROTECTION FENCING MUST REMAIN IN PLACE FOR THE DURATION OF THE PROJECT UNLESS OTHERWISE APPROVED BY URBAN FORESTRY STAFF.
3. APPROVED IMPACT PROTECTION DEVICES MUST BE REMOVED AFTER CONSTRUCTION WHEN APPLICABLE.
4. SIGNS SHALL BE PLACED AT 50' MAXIMUM INTERVALS; PLACE A SIGN AT EACH END OF LINEAR TREE PROTECTION AND 50' ON CENTER FOR THE REMAINDER.
5. FOR TREE PROTECTION AREAS LESS THAN 200' IN PERIMETER, PROVIDE NO LESS THAN ONE SIGN PER PROTECTED AREA.
6. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC.
7. ADDITIONAL SIGNS MAY BE REQUIRED BY CITY OF RALEIGH BASED ON ACTUAL FIELD CONDITIONS.
8. SIGNS ARE TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL WITH LETTERS A MINIMUM OF 2 1/2" HIGH, CLEARLY LEGIBLE AND SPACED AS SHOWN.
1. CONTRACTOR MUST PROVIDE AND INSTALL TREE PROTECTION SIGNAGE.
2. A TREE IMPACT PERMIT IS REQUIRED PRIOR TO INITIATION OF CONSTRUCTION IF ANY TREES ON CITY PROPERTY ARE TO BE IMPACTED BY PRUNING, TRENCHING, BORING, REMOVAL, PAVING, PLANTING, ETC.
NOTES:
1. TREES MUST MEET THE TREE QUALITY STANDARDS IN CH. 2 OF THE CITY TREE MANUAL.
2. CONTRACTOR IS RESPONSIBLE FOR ADEQUATE DRAINAGE OF ALL PLANTING PITS. (POSITIVE DRAINAGE AWAY FROM PIT)
3. TREES SHALL BE PLANTED BETWEEN OCTOBER 1ST AND APRIL 30TH.
4. A TREE IMPACT PERMIT IS REQUIRED.
5. ELECTRICAL OUTLETS AND OTHER UTILITIES ARE PROHIBITED IN THE PLANTING AREA IMMEDIATELY SURROUNDING THE TREE.
6. IF STAKING IN ACCORDANCE WITH THE CITY TREE MANUAL, THE STAKING MUST BE REMOVED WITHIN ONE YEAR
7. TREES WILL HAVE A MINIMUM 1 YEAR WARRANTY AFTER THE INITIAL PLANTING IS APPROVED BY THE CITY.
NOTES:

1. THE CRITICAL ROOT ZONE (CRZ) IS DEFINED AS A RADIUS EXTENDING FROM THE TRUNK OF A TREE 1.25 FEET PER INCH OF DBH.

2. TRENCHING SHALL OCCUR OUTSIDE THE CRZ
   2.1. TUNNELING AND BORING IS PERMITTED WITHIN THE CRZ AS LONG AS IT IS 30 INCHES DEEP OR GREATER. EXCAVATIONS AND HAND HOLES SHALL BE OUTSIDE THE CRZ.
   2.2. ENCROACHMENT INTO THE CRZ REQUIRES APPROVAL FROM THE URBAN FORESTER

3. ROOTS MUST BE PRUNED TO A CLEAN CUT. CUTTING OR PRUNING OF ROOTS 2" OR LARGER IS PROHIBITED.

4. IF EXCAVATION CAUSES PRUNED ROOTS OVER 1.5" IN DIAMETER TO REMAIN EXPOSED FOR MORE THAN 24 HOURS, ROOTS ON TREE SIDE MUST BE KEPT MOIST.

5. A TREE IMPACT PERMIT IS REQUIRED PRIOR TO INITIATION OF CONSTRUCTION IF ANY TREES ON CITY PROPERTY ARE TO BE IMPACTED BY PRUNING, TRENCHING, BORING, REMOVAL, PAVING, PLANTING, ETC.

CONTACT INFORMATION:
CITY OF RALEIGH PARKS, RECREATION AND CULTURAL RESOURCES DEPARTMENT URBAN FORESTER: TREES@RALEIGHNC.GOV
WWW.RALEIGHNC.GOV

MIN. (FT) = DBH (IN) x 1.25
EX. TREE DBH

EXISTING TREE

30" MINIMUM

TRENCHING IS PERMITTED OUTSIDE OF THE CRZ

TPP-04
A TREE IMPACT PERMIT IS REQUIRED.
ADHERE TO STANDARDS IN THE CITY TREE MANUAL.

CONTACT INFORMATION:
CITY OF RALEIGH PARKS, RECREATION AND CULTURAL
RESOURCES DEPARTMENT URBAN FORESTER:
TREES@RALEIGHNC.GOV
WWW.RALEIGHNC.GOV

NOTES:

PRIMARY LINES
1. OVERHEAD 8 FEET
2. SIDE 7.5 FEET
3. BELOW 6 FEET
4. NEUTRAL 2 FEET

SECONDARY LINES
1. OVERHEAD 6 FEET
2. SIDE 4 FEET
3. BELOW 4 FEET
4. NEUTRAL 2 FEET

COMMUNICATION LINES
(SERVICE/PHONE/CABLE/FIBER
OPTIC LINES, ETC.)
1. OVERHEAD 2 FEET
2. SIDE 2 FEET
3. BELOW 2 FEET
GRAY IRON, RECTANGULAR 4'X6', 1.5" MIN. THICK, WITH 1/4" OPENING OR LESS

NOTES:
1. GRATE DESIGN MUST BE ADA COMPLIANT.
2. GENERAL PATTERN DESIGN MUST BE AS SHOWN.
3. EXCEPTIONS OR PERSONALIZATION MUST BE REVIEWED AND APPROVED BY THE CITY OF RALEIGH.
4. A TREE IMPACT PERMIT IS REQUIRED.
5. ADHERE TO STANDARDS IN THE CITY TREE MANUAL.
6. ELECTRIC OUTLETS AND OTHER UTILITIES ARE PROHIBITED IN THE GRATE AREA.

CONTACT INFORMATION:
CITY OF RALEIGH PARKS, RECREATION AND CULTURAL RESOURCES DEPARTMENT URBAN FORESTER: TREES@RALEIGHNC.GOV
WWW.RALEIGHNC.GOV

NOTE: ALL DIMENSIONS SHOWN ARE IN ENGLISH
MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
FINISH: NO PAINT
WEIGHT: 608#/SET

REVISIONS
DATE: 8/2020
NOT TO SCALE

TREE GRATE IN SIDEWALK WITHIN ROW

TPP-06
1. A site specific plan must be developed to ensure that:
   1.1. Each tree is provided a min. root-accessible soil volume of 600 cubic feet.
   1.2. The tree root area beneath the sidewalk is expanded to maximize root accessible soil space under the pavement.
   1.3. Connect soil space for root expansion where possible to allow root systems of trees to overlap and colonize a shared soil space.
   1.4. Any combination of structural soils, soil containment system (e.g., Silva Cell), or root channeling (e.g., soil strip drain/aeration system) that performs as specified is acceptable.
3. 40' X 6' width minimum applies to both structural soils and subsurface soil containment systems.
4. Subsurface application shall be reviewed and approved by City of Raleigh Parks, Recreation and Cultural Resources Urban Forestry Division prior to installation.
**NOTES:**
1. TREE PROTECTION FENCING MUST BE INSTALLED AT A MINIMUM RADIUS OF THE CRITICAL ROOT ZONE (SEE DETAIL TPP-02 FOR EXAMPLES)
2. THE TREE PROTECTION FENCING MUST REMAIN IN PLACE FOR THE DURATION OF THE PROJECT UNLESS OTHERWISE APPROVED BY URBAN FORESTRY STAFF.
3. APPROVED IMPACT PROTECTION DEVICES MUST BE REMOVED AFTER CONSTRUCTION WHEN APPLICABLE.
4. SIGNS SHALL BE PLACED AT 50' MAXIMUM INTERVALS. PLACE A SIGN AT EACH END OF LINEAR TREE PROTECTION AND 50' ON CENTER FOR THE REMAINDER.
5. FOR TREE PROTECTION AREAS LESS THAN 200' IN PERIMETER, PROVIDE NO LESS THAN ONE SIGN PER PROTECTED AREA.
6. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC.
7. ADDITIONAL SIGNS MAY BE REQUIRED BY CITY OF RALEIGH BASED ON ACTUAL FIELD CONDITIONS.
8. SIGNS ARE TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL WITH LETTERS A MINIMUM OF 2 1/2" HIGH, CLEARLY LEGIBLE AND SPACED AS SHOWN.
9. FLOW SHALL NOT RUN PARALLEL WITH THE FENCE. END OF SILT FENCE NEEDS TO BE TURNED UPHILL.
10. SEE NC STATE DEQ PRACTICE STANDARDS & SPECIFICATIONS SEDIMENT FENCE SET FOR CONDITIONS WHERE APPLIES; PLANNING CONSIDERATIONS & DESIGN CRITERIA. (HOWEVER, FLOW SHALL NOT RUN PARALLEL WITH THE TOE OF THE FENCE.)
2" X 4" WOOD SLATS, BETWEEN WOOD SLATS WITH A MINIMUM OF 3 SLATS PER TREE

EXIST TREE TRUNK

EXIST TREE BRANCH

ROPE OR STEEL STRAPING AROUND THE 2X4 WOOD SLATS

12" FROM LOWEST BRANCH

EXIST TREE TRUNK

ORANGE PLASTIC CONSTRUCTION FENCE WRAPPED TO A MINIMUM OF 3 LAYERS OUTSIDE SLATS

EXIST GROUND

NOTE: NO SLATS, ROPE, STEEL STRAPPING OR PLASTIC CONSTRUCTION FENCE SHALL BE ATTACHED TO, ANCHORED TO OR TIED TO THE TREE.

CONTACT INFORMATION:
CITY OF RALEIGH PARKS, RECREATION AND CULTURAL RESOURCES DEPARTMENT
URBAN FORESTER: TREES@RALEIGHNC.GOV
WWW.RALEIGHNC.GOV

SECTION A - A

CITY OF RALEIGH
STANDARD DETAIL

DATE: 8/2020

REVISIONS

TTP-09

TREE ARMOUR

NOT TO SCALE