The standard detail drawings contained in this manual will apply to all new infrastructure construction plans submitted on or after August 1, 2018. 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](http://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 919-996-4115
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## Bicycle Facilities

- STD# GSI-01: Curb-Side and Bump-Out Bioretention
- STD# GSI-02.1: Median Bioretention (For 30 MPH and Below)
- STD# GSI-02.2: Median Bioretention (For Above 30 MPH)
- STD# GSI-03.1: Curb-Cut Inlet (Tapered Street Relief)
- STD# GSI-03.2: Curb-Cut Inlet (Cast Iron Grate)
- STD# GSI-04: Permeable Paver Parking Lane
- STD# GSI-05: Permeable Concrete Sidewalk
- STD# GSI-06.1: Green Infrastructure Example Configuration
- STD# GSI-06.2: Green Infrastructure General Notes

## Storm Water

- STD# SW-10.01: 5’ OM Catch Basin
- STD# SW-10.02: Double Width Catch Basin
- STD# SW-10.03: Standard Drop Inlet
- STD# SW-10.04: Standard Junction Box
- STD# SW-10.05: Standard Class “A” Manhole
- STD# SW-10.06.1: Catch Basin Castings
- STD# SW-10.06.2: Bolted Cover Assembly
- STD# SW-10.07: Catch Basin Steel Top
- STD# SW-10.08: Drop Inlet Casting
- STD# SW-10.09: Standard Drop Inlet Casting
- STD# SW-10.10: Standard Storm Manhole Cover
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### STANDARD DETAILS

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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, W₁
WHERE ADJACENT TO THE EDGE OF PAVEMENT, THE BIKE LANE WIDTH (EXCLUDING THE GUTTER PAN) SHOULD BE: 5' DESIRED 4' MINIMUM

BIKE LANE WIDTH, W₂
WHERE ADJACENT TO A PARKING LANE, THE BIKE LANE WIDTH SHOULD BE: 5' MINIMUM, 6' DESIRED 2' STRIPED BUFFER DESIRED

BIKE LANE WIDTH, W₃
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.
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.

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

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.

CITY OF RALEIGH
STANDARD DETAIL
B-10.02

B-10.02
BIKE LANE BUFFER MARKINGS
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, W₂
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.

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.

BIKE LANE WIDTH, W₁
WHERE ADJACENT TO A RIGHT TURN LANE, THE BIKE LANE WIDTH SHOULD BE: 6' DESIRED
4' MINIMUM

REFER TO NCDOT STANDARDS 1205.06, SHEET 1of 5, FOR FOR 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.

BIKE LANE MINI-SKIPS
USE 2' DASHED WITH 6' GAPS TO END BIKE LANES AND INDICATE CONFLICT ZONES.
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.
BICYCLE SIGNS

R3-17
BIKE LANE

R3-17bP
ENDS

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

BICYCLE SIGNS

B-10.07
BIKE RACK TO BE CENTERED WITH EXISTING INFRASTRUCTURE BUT NO LESS THAN 24" FROM BACK OF CURB

BIKE RACK PLACEMENT

CITY OF RALEIGH
STANDARD DETAIL

DATE: 8/1/18

REVISIONS

NOT TO SCALE

BIKE RACK PLACEMENT

B-20.01
SIDEWALK

Curb

Wheel Stop

Street

4" Solid White Thermoplastic Strip

PARKING TICK MARK

2', min

5'

3'

NOTES:
1. Wheel stops to be equipped with retroreflective markings.
2. Angled racks may also be used.

Bike Rack Corral

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS

DATE: 8/1/18

NOT TO SCALE

BIKE RACK CORRAL

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.
City of Raleigh
Standard Details

Green Stormwater Infrastructure
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.
5. IF REQUIRED, REFER TO DESIGN PLANS FOR UNDERDRAIN ELEVATIONS.
6. REFER TO PLANS FOR UNDERDRAIN CLEANOUT LOCATIONS AND INSTALLATION DETAILS.
7. BOTH PIPE PENETRATIONS AND ATTACHMENT OF 30 MIL HDPE 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. FOR BIORETENTION SYSTEMS THAT DO NOT REQUIRE AN IMPERMEABLE LINER, A MAXIMUM OFFSET OF 6 INCHES IS REQUIRED BETWEEN THE INVERT OF THE UNDERDRAIN AND BOTTOM OF DRAINAGE LAYER.
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 DEPENDING ON ROADWAY TYPE.
12. MINIMUM RADII FOR BUMP-OUT BIORETENTION SHALL MEET ENGINEERING SPECIFICATIONS IN STREET DESIGN MANUAL.
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. POOR 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.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS  DATE  8/1/18  NOT TO SCALE

CURB-SIDE AND BUMP-OUT BIORETENTION

GSI-01
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.
4. IF REQUIRED, REFER TO DESIGN PLANS FOR UNDERDRAIN ELEVATIONS.
5. THE SEASONAL HIGH WATER TABLE SHALL BE 2 FEET BELOW THE BOTTOM OF THE AGGREGATE STORAGE LAYER.
6. REFER TO PLANS FOR UNDERDRAIN CLEANOUT LOCATIONS AND INSTALLATION DETAILS.
7. BOTH PIPE PENETRATIONS, AND ATTACHMENT OF 30 MIL HDPE 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. FOR BIORETENTION SYSTEMS THAT DO NOT REQUIRE AN IMPERMEABLE LINER, A MAXIMUM OFFSET OF 6 INCHES IS REQUIRED BETWEEN THE INVERT OF THE UNDERDRAIN AND BOTTOM OF STORAGE LAYER. 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 BUMP-OUT 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 6" 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.
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.
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 AGGREGATE STORAGE LAYER.
6. REFER TO PLANS FOR UNDERDRAIN CLEANOUT LOCATIONS AND INSTALLATION DETAILS.
7. GEOTEXILE MAY BE UTILIZED IN-LIEU OF AGGREGATE CHOKEING LAYER IF APPROVED BY ENGINEER.
8. A MAXIMUM OFFSET OF 6 INCHES IS REQUIRED BETWEEN THE INVERT OF THE UNDERDRAIN AND BOTTOM OF STORAGE LAYER. 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 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.
NOTES:
1. ENERGY DISSIPATION PAD PROVIDED AS STABILIZED ENTRANCE TO BIOTETENTION 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 PRE-TREATMENT SOLUTIONS WILL BE CONSIDERED.
3. ROCK AND MORTAR INLET PROTECTION SHALL EXTEND ACROSS BOTTOM OF BIOTETENTION TO OPPOSITE TOE OF SLOPE, OR 2' MINIMUM. FINISH GRADE OF MORTARISED BOTTOM SHALL BE AT LEAST 3' BELOW ADJACENT BIOTETENTION BOTTOM ELEVATION TO PROVIDE SEDIMENT STORAGE.

CITY OF RALEIGH
STANDARD DETAIL
GSI-03.1
NOTES:
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.
NOTES:
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 SUBBASE AGGREGATE STORAGE LAYER.
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 IMPERMEABLE LINER (INCLUDING BOTTOM LAYER) IS DEPENDENT UPON THE RESULTS OF THE GEOTECHNICAL INVESTIGATION.
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 NO. 8, NO. 9, OR NO. 89 WASHED DRAINAGE STONE DEPENDING ON JOINT SIZE.
8. BOTH PIPE PENETRATIONS AND ATTACHMENT OF 30 MIL HDPE 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.
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 C1794).
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 SUBBASE AGGREGATE STORAGE LAYER.
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.
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.
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, AASHTO LAYER COEFFICIENTS FOR OPEN-GRADED BASE AND SUBBASE SHALL RANGE BETWEEN 0.06 AND 0.10.
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.
NOTES:

1. SELECTION OF BUMP-OUT BIORETENTION TYPE AND LOCATION DEPENDS ON EXISTING 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.

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.

6. ROADWAY FEATURES AND PAVEMENT MARKINGS ARE FOR REFERENCE ONLY. ACTUAL DIMENSIONS AND MARKINGS SHALL CONFORM TO THE CITY OF RALEIGH STREET DESIGN MANUAL.
City of Raleigh

Standard Details

Stormwater
NOTES:


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

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

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS
DATE 8/1/18
NOT TO SCALE

5' OM CATCH BASIN

SW-10.01
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.
GRATE PER CITY STANDARDS
USE STD. SW-10.08 OR SW-10.09

1/2" PLASTER

8" MINIMUM; OVER 8' DEEP,
12" MINIMUM UP TO 6'
FROM TOP OF GRATE.

3000 PSI CONCRETE

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.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS
DATE 6/18
NOT TO SCALE

STANDARD
DROP INLET

SW-10.03
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

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<th>PIPE SIZE</th>
<th>MH DIAMETER</th>
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<td>4'-0&quot;</td>
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<tr>
<td>30-42&quot;</td>
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<tr>
<td>48&quot;</td>
<td>6'-0&quot;</td>
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<tr>
<td>54&quot;</td>
<td>8'-0&quot;</td>
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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.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE 8/1/18

STANDARD CLASS "A" MANHOLE

SW-10.05
CITY OF RALEIGH
STANDARD DETAIL

BACK SIDE OF ASSEMBLY
NOTE: USE GRADE 8 BOLTS ONLY FOR BOLTING TOGETHER

BOLTED COVER
ASSEMBLY

CITY OF RALEIGH
NO DUMPING!
DRAINS TO NEUSE RIVER

NO TIRE BASURA!
DRENS AL RIO NEUSE

STANDARD DETAIL

USE EAST JORDAN IRON WORKS, INC.
V-4088-2 OR APPROVED EQUAL

NOTE:
USE GRADE 8 BOLTS ONLY FOR BOLTING TOGETHER

REVISIONS
DATE 05/18
NOT TO SCALE

BOLTED COVER
ASSEMBLY

SW-10.06.2
1/2" Ø STAINLESS STEEL DROP HANDLES

DETAIL OF pb1 PLATES

NOTES:
PAINT WITH RUST INHIBITING BLACK PAINT.

BILL OF MATERIAL

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<th>MATERIAL LIST FOR ONE UNIT - MAKE ( ) UNITS</th>
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CITY OF RALEIGH
STANDARD DETAIL

SW-10.07
STANDARD 24" X 24" DROP INLET CASTING
CITY OF RALEIGH
STANDARD DETAIL

STANDARD 24" X 36"
DROP INLET CASTING

SECTION A-A

SECTION B-B

REVISIONS
DATE 8/1/18
NOT TO SCALE

STANDARD DROP INLET CASTING

SW-10.09
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.
BUILDING

CURB DRAIN DETAIL

SW-10.12

CITY OF RALEIGH
STANDARD DETAIL

REVOLUTIONS
DATE: 8/1/18
NOT TO SCALE

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

USE U.S. FOUNDARY 4600 ANGEL TYPE FRAME AND 6110 GRATE OR APPROVED EQUAL.

Concrete Sidewalk 3000 PSI @ 28 Days

Concrete Slab 3000 PSI @ 28 Days

8" x 14 gauge WM centered Galvanized Structural Steel Tubing

Gutter ≤ 1/4" projection

Installing Channel Flush with Face of Curb

Compact ABC Gravel

Cutting Grade

INSTALL CHANNEL FLUSH WITH FACE OF CURB

CURB AND GUTTER

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

USE U.S. FOUNDARY 4600 ANGEL TYPE FRAME AND 6110 GRATE OR APPROVED EQUAL.

Concrete Sidewalk 3000 PSI @ 28 Days

Concrete Slab 3000 PSI @ 28 Days

8" x 14 gauge WM centered Galvanized Structural Steel Tubing

Gutter ≤ 1/4" projection

Installing Channel Flush with Face of Curb

Compact ABC Gravel

Cutting Grade
REPLACE DISTURBED AREA WITH FULL-DEPTH STONE & ASPHALT

NEW FRONT WALL

UNDISTURBED SUBGRADE

EX. ROADWAY

30\(^\circ\) VALLEY C & G

CONCRETE DRIVEWAY APPROACH WITH EXPANSION JOINT

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

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

1/2\' D

12\" MINIMUM

6\" MIN

8\"

SEE NOTE #2

#5 DOWELS @ 8\" CENTERS

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

REVISIONS DATE 8/18

CATCH BASIN CONVERSION DETAIL

SW-10.13
NOTE: SILT FENCE SHOULD NOT BE USED ALONE BELOW GRADED SLOPES GREATER THAN 10' IN HEIGHT.

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. 7 stone for sediment control stone.

2. Provide stabilized outlet to stream bank.

3. Wood pallets may be used in lieu of stone and geotextile as directed. A sufficient number of pallets must be provided to elevate the entire special stilling basin above natural ground.

4. The size and number of silt bags should be based on the filtering pump and manufacturer recommendations.

5. Tighten the pump discharge to the silt bag sleeve with a strap or similar device 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 with sediment, reduce the pump rate.

7. Replace the silt bag when one half (1/2) full of sediment.

8. Silt bag device must be 2 ft. from the top of the stream bank and water must be discharged in a diffuse manner.

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**CITY OF RALEIGH**  
**STANDARD DETAIL**

**REVISIONS**  
**DATE 8/18**  
**NOT TO SCALE**

**SILT BAG**

**SW-20.04**
\section*{Temporary Sediment Trap}

\subsection*{Standard Detail}

- **Baffle (Typ.)**: INLET FLOW
- **Inlet Flow**: 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

\paragraph{Extension Baffles}
- Extend baffles up sides as to not allow flow around the ends.

\paragraph{Maintenance}
- Repair/replace baffles when they collapse, tear or decompose.
- Remove sediment when cell is 1/2 full.

\paragraph{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.

\section*{Design Life of Fabric}
- Design life of fabric is 6-12 months.

\section*{Support Post}
- Support post 24" into bottom or sides.

\section*{Support Rope}
- Support rope to wire to prevent sagging.

\section*{Stake to Support Wire}
- Stake to support wire.

\section*{Coir Mesh or Jute}
- Trenched into bottom and sides.

\section*{CITY OF RALEIGH}

\subsection*{Temporary Sediment Trap}

\section*{SW-20.05.1}
12" MIN. N.C.D.O.T. #5 OR #57 WASHED STONE
MIN. 1.5' FREE BOARD

SEE 20.05.1 FOR BODY OF SEDIMENT TRAP

DESIGN CRITERIA

SUMMARY:
PRIMAR Y 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 LOW RATIO: 2:1
MINIMUM DEPTH: 3.5 FEET, 1.5 FEET EXCAVATED BELOW GRADE
MAXIMUM HEIGHT: WEIR ELEVATION 3.5 FEET ABOVE GRADE
DEWATERING MECHANISM: STONE SPILLWAY
MINIMUM DEWATERING TIME: N/A
BAFFLES REQUIRED: 3 MINIMUM (COR OR JUTE) MESH
MIN WEIR (COR): 10'

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,
BEGIN ION LESS THAN 20' IN LENGTH MAY
USE BAFFLES.

STRUCTURE LIFE LIMITED
TO 2 YEARS

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.
MAINTENANCE:
REMOVE SEDIMENT & RESTORE THE SEDIMENT STORAGE AREA TO ITS ORIGINAL DIMENSION WHEN SEDIMENT HAS ACCUMULATED TO 1/2 DESIGN DEPTH OF THE TRAP.

ANY RIP-RAP DISPLACED FROM THE STONE HORSESHOE MUST BE REPLACED IMMEDIATELY.

NOTES:
IF EXCAVATED STORAGE AREA IS USED AS TEMPORARY SEDIMENT TRAP, THE DESIGN CRITERIA FOR TEMPORARY SEDIMENT TRAP MUST BE SATISFIED.
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.
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.

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

REVISIONS  DATE  8/1/18  NOT TO SCALE

CITY OF RALEIGH
STANDARD DETAIL

CHECK DAM

SW-20.08
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.

Notes:
- 25' or full width of proposed street or entrance, whichever is greater.
- 3'-4' stone to be used (surge stone or railroad ballast).
- 6' min.
- 12' min.
- Fabric under stone

Maintenance:
Add additional stone and "fluff" top dressing with 2" stone.

See N.C. DEQ erosion and sediment control planning and design manual for conditions where practice applies; planning consideration & design criteria.
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.

NOTES:
1. 2" - 3" STONE TO BE USED (SURGE STONE OR RAILROAD BALAST)
2. SILT FENCE SHOULD BE INSTALLED TO ENSURE CONSTRUCTION ENTRANCE IS USED.

PLAN

EXISTING ROADWAY

SILT FENCE (SEE NOTE 2)

12'

20' MIN.

AND SUFFICIENT TO KEEP SEDIMENT ON SITE

CROSS SECTION

EXISTING ROADWAY

NEW CONSTRUCTION

RAILROAD BALLAST

6" MIN.

CITY OF RALEIGH

STANDARD DETAIL

NOT TO SCALE
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.
NOTES:
1. TO BE USED WHERE EXCESSIVE STORMWATER VELOCITIES PROHIBIT VEGETATIVE LININGS.
2. DIMENSIONS FOR D & W AND SIZE OF STONE MUST BE DETERMINED BY APPROPRIATE DESIGN CRITERIA.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS
DATE 8/1/18

NOT TO SCALE

RIP RAP
LINED CHANNELS

SW-20.12
1/2 DIAMETER OF PIPE OR 12" WHICHEVER IS GREATER.

FILTER FABRIC

CAPACITY OF PIPE CULVERTS TOGETHER = BANKFULL FLOW

FLOW

NCDOT #5 OR #57 WASHED STONE

CLASS "B" CULVERTS

6" DEEP

STREAM CHANNEL

TOP OF BANK

TOP OF BANK

MINIMUM

MINIMUM

30°

30°

STANDARD DETAIL

CITY OF RALEIGH

TEMPORARY STREAM CROSSING

SW-20.13
1. Lay one block on each side of the structure on its side in the bottom row to allow pool drainage to 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. Use clean gravel, placed 2 inches below the top of the block on a 2:1 slope or flatter and smooth it to an even grade. Dot #57 washed stone is recommended.

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. Do not to be used for sediment storage or on roadways open to public traffic.

CONSTRUCTION SPECIFICATIONS

D R A I N A G E

3.

U S E C L E A N G R A V E L ,
1.
L A Y O N E B L O C K O N E A C H S I D E O F T H E S T R U C T U R E
O N I T S S I D E I N T H E B O T T O M R O W T O A L L O W P O O L

C O N S T R U C T IO N S P E C I F I C A T IO N S

N O T T O B E U S E D F O R S E D I M E N T S T O R A G E
P L A C E D 2 I N C H E S B E L O W T H E T O P

O F T H E B L O C K O N A 2 :1 S L O P E O R F L A T T E R A N D
S M O O T H I T T O A N E V E N G R A D E . D O T # 5 7 W A S H E D
S T O N E I S R E C O M M E N D E D .

W I R E S C R E E N

W I R E S C R E E N

D R O P I N L E T W / G R A T E

D R O P I N L E T W / G R A T E

1 8"
GALVANIZED HARDWARE WIRE EXTENDS TO THE TOP OF BOX. (19 GAUGE, 1/4" MESH OPENINGS.)

#57 WASHED STONE PLACED AGAINST HARDWARE WIRE TO A HEIGHT OF 16" MIN. ABOVE TOP OF BOX.

#57 WASHED STONE PLACED AGAINST HARDWARE WIRE (19 GAUGE, 1/4" MESH OPENINGS.)

CONCRETE BLOCKS

6'-8" BURT IN SOLID GROUND

SECTION VIEW

STANDARD METAL POSTS (MINIMUM LENGTH 5') 2'-0" IN GROUND

HARDWARE WIRE

2'-0" IN GROUND

4'-MAX

DRAINAGE AREA = < 1 ACRE (MAXIMUM)

NOT TO SCALE
DATE: 8/1/18

TEMPORARY SILT DITCH

SW-20.16

FILL S
LO
PE
SEEDE & MULCH AFTER CONSTRUCTION OF DITCH

2:1 MAX.

COMPACT EXCAVATED MATERIAL, SEED & MULCH AFTER CONSTRUCTION OF DITCH

LinEx

REVISIONS NOT TO SCALE

CROSS SECTIONAL VIEW

MANTENANCE:
1. REMOVE SILT WHEN DITCH IS 1/2 FULL.
2. STABILIZE IMMEDIATELY UPON CONSTRUCTION AND PRIOR TO SITE INSPECTION APPROVAL.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 8/1/18
NOT TO SCALE

TEMPORARY SILT DITCH

SW-20.16

NOTES:
DIMENSIONS d & w AND LINER TO BE DETERMINED BY ENGINEER.
STANDARD DETAIL

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.

Notes:

MAXIMUM

4' MINIMUM

8" - 12" TYP.

20" TYP.

45°

60°

MIN. 2" x 4" (TREATED)

ALTERNATE ORANGE & WHITE STRIPES

CITY OF RALEIGH

STANDARD TEMPORARY BARRICADE

SW-20.17
**CITY OF RALEIGH**  
**STANDARD DETAIL**  

**FLASHBOARD RISER**  

**REVISIONS**  
**DATE 01/18**  
**NOT TO SCALE**  

**SW-20.18**

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**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**

**flashboard riser**

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**ISOLATED VIEW**

**MINIMUM TOP WIDTH**

- Less than 10 ft: 8.0 ft
- 10 ft to 15 ft: 10.0 ft

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**CITY OF RALEIGH**  
**STANDARD DETAIL**  

**FLASHBOARD RISER**  

**REVISIONS**  
**DATE 01/18**  
**NOT TO SCALE**  

**SW-20.18**
NOTE: SKIMMER TO BE TETHERED

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

DATE: 8/1/18

CITY OF RALEIGH
STANDARD DETAIL

SW-20.19
**DESIGN CRITERIA**

**SUMMARY:**
- **TEMPORARY SEDIMENT BASIN**
  - **RISER / BARREL PIPE**
  - **100 ACRES MAX.**
  - **1800 CUBIC FEET PER ACRE OF DISTURBED AREA**
  - **435 SQUARE FEET PER CFS OF Q25 PEAK INFLOW**
  - **2:1**
  - **6:1**
  - **2 FEET**
  - **SKIMMER ATTACHED TO BOTTOM OF RISER**
  - **24 HOURS**
  - **3 MINIMUM**
  - **3 YEARS MAX**
  - **15 FEET OR LESS FROM TOP OF DAM TO LOW POINT OF DOWNSTREAM TOE.**

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

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

1. LOCATE SEDIMENT INFLOW TO THE BASIN AWAY FROM THE DAM TO PREVENT SHORT CIRCUITS FROM INLETS TO OUTLETS

2. BASINS MUST BE STABILIZED IMMEDIATELY UPON CONSTRUCTION AND PRIOR TO SITE INSPECTION APPROVAL

**DESIGN LIFE OF FABRIC IS 6-12 MONTHS**

**STABLE TRANSITION REQUIRED TO THE BASE OF THE SLOPE**

**OUTLET ZONE 25% OF SURFACE AREA**

**SECOND CHAMBER 25% OF SURFACE AREA**

**FIRST CHAMBER 25% OF SURFACE AREA**

**INLET ZONE 25% OF SURFACE AREA**

**INLET FLOW (PIPE OR DITCH)**

**EMERGENCY SPILLWAY**

**MIN. SIZE 15" CMP 12" SMOOTH WALL**

**STONE ENERGY DISSIPATOR**

**COMPACTED EARTHEEN DAM**

**TETHER**

**SKIMMER ATTACHED TO**

**BASE OF THE SLOPE**

**RISER**

**NOTES:**
- **5' CREST WIDTH**
- **25% OF SURFACE AREA**
- **EXTRACTION ZONE**
- **COIR MESH OR JUTE, TRENCHED INTO BOTTOM AND SIDE**
- **4" MAX**
- **STAKE TO SUPPORT WIRE**
- **3" MIN**

**INLET FLOW (PIPE OR DITCH) TO WIRE TO PREVENT SAGGING**

**SUPPORT POST 24" INTO BOTTOM OR SIDES**
DESIGN CRITERIA

SUMMARY:
PRIMARY SPILLWAY:
MAXIMUM DRAINAGE AREA:
MINIMUM SEDIMENT STORAGE VOLUME:
MINIMUM SURFACE AREA:
MINIMUM L/W RATIO:
MINIMUM DEPTH:
MAXIMUM HEIGHT:
DEWATERING MECHANISM:
MINIMUM DEWATERING TIME:
BAFFLES REQUIRED:
DESIGN BASIN LIFE:
DAM HEIGHT:

TEMPORARY SEDIMENT BASIN
STONE SPILLWAY
<1 ACRE.
3600 CUBIC FEET PER ACRE OF DISTURBED AREA.
435 SQUARE FEET PER CFS OF Q10 PEAK INFLOW
2:1
3.5 FEET, 1.5 FEET EXCAVATION BELOW GRADE
WEIR ELEVATION 6 FEET ABOVE GRADE
STONE SPILLWAY
N/A
3 MINIMUM
3 YEARS OR LESS
LIMITED TO 8 FEET.

CITY OF RALEIGH
STANDARD DETAIL
SW-20.21
MATERIALS
1' MIN NCDOT #5
OR #57 WASHED STONE
CLASS I AND II
RIP-RAP

FILTER FABRIC
CUT-OFF TRENCH
FABRIC FILTER
TOP OF ROCK ABUTMENT
SPILLWAY
SLOPE FOUNDATION

NOTE: DEVICE SHOULD NOT BE LOCATED IN ANY INTERMITTENT OR PERENNIAL STREAM.

SEE N.C. DEQ SEDIMENT DESIGN MANUAL FOR CONSTRUCTION SPECIFICATIONS, WHERE PRACTICE APPLIES AND PLANNING CONSIDERATIONS.
NOTES:
1. WARNING SIGNS TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL.
2. LETTERS TO BE 3" HIGH MINIMUM, CLEARLY LEGIBLE AND SPACED AS DETAIL.
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. PLACE A SIGN AT EACH END OF LINEAR WATERCOURSE BUFFER PROTECTION AND 50' ON CENTER THEREAFTER.
6. ADDITIONAL SIGNS MAY BE REQUIRED BY CITY OF RALEIGH BASED ON ACTUAL FIELD CONDITIONS.
7. END OF SILT FENCE SHALL BE TURNED UPHILL.
8. SEE N.C. STATE DENR PRACTICE & SPECIFICATION SECTIONS, FENCE SECTION FOR CONDITIONS WHERE PRACTICE APPLIES AND PLANNING CONSIDERATIONS.

CITY OF RALEIGH
STANDARD DETAIL

WATERCOURSE BUFFER PROTECTION FENCE

SW-20.22

DATE: 8/1/18

REVISIONS

NOT TO SCALE
NOTES:
1. WATTLES SHALL BE FILLED WITH STRAW OR OTHER APPROVED MATERIAL.
2. SPACING FOR WATTLES SHALL BE DETERMINED BY THE SITE ENGINEER.
3. WATTLES MAY BE USED FOR PROTECTION OF CATCH BASINS AND DROP INLETS WITH APPROVAL BY THE STORMWATER PROGRAM MANAGER OR DESIGNEE.
4. FOR USE OF WATTLE IN A DITCH, GRADE OF DITCH MUST BE <2.5%.
1. The top of the silt fence must be at least 1' above the top of the washed stone.

2. Steel posts are set max 2' apart min 2' into solid ground.

3. Steel post set min 2' apart min 2' into solid ground.


5. Bury 1' of upper edge of filter fabric apron on ground.

6. Bury wire fence and hardware cloth.


9. 3' filter fabric apron on ground.


12. City of Raleigh.


14. Date: 8/1/18.

15. Notes:

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

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.

CITY OF RALEIGH
STANDARD DETAIL

CONCRETE WASHOUT

SW-20.25
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.

DATE: 8/1/18

CITY OF RALEIGH
STANDARD DETAIL
REVISIONS

BLOCK AND GRAVEL INLET
PROTECTION FOR CURB INLET

SW-20.26
DESIGN CRITERIA

SUMMARY:
- PRIMARY SPILLWAY: TRAPEZOIDAL SPILLWAY WITH IMPERMEABLE MEMBRANE
- MAXIMUM DRAINAGE AREA: 10 ACRES
- MINIMUM VOLUME: 1600 CUBIC FEET PER ACRE OF DISTURBED AREA
- MINIMUM SURFACE AREA: 325 SQUARE FEET PER CFS OF Q25 PEAK INFLOW
- MINIMUM L/W RATIO: 6:1
- MAXIMUM DEPTH: 2 FEET
- DESIGN BASIN MECHANISM: SKimmer
- MINIMUM DewaterING TIME: 2 DAYS
- 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

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:

FIRST CHAMBER 25% OF SURFACE AREA
SECOND CHAMBER 25% OF SURFACE AREA
OUTLET ZONE 25% OF SURFACE AREA

INLET ZONE 25% OF SURFACE AREA

STABLE TRANSITION REQUIRED TO THE BASE OF THE SLOPE
NOTES:
1. Maintenance shall occur when necessary. Silt fence shall be replaced every 6 months and posts shall be inspected weekly and all maintenance issues shall be corrected at that time.
2. Silt fence should be a minimum of 5 feet from the toe of slope.

DATE: 8/1/18
City of Raleigh
Standard Details

Transit
**BUS SHELTER**

40' STRAIGHT

60' FOR TURN

**DATE: 8/1/18**

**FAR SIDE BUS STOPS**

**MID BLOCK BUS STOPS**

**NEAR SIDE BUS STOPS**

**CITY OF RALEIGH**

**STANDARD DETAIL**
GENERAL CONCRETE PAD NOTES:

1. DIMENSIONS OF PAD ARE SUBJECT TO CHANGE DUE TO RIDERSHIP AND AMENITIES, COORDINATE WITH THE CITY OF RALEIGH.

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

3. INSTALL AS SHOWN IN TYPICAL SECTION. WOVEN WIRE FABRIC SHALL HAVE MINIMUM 6" OVERLAPS AND MINIMUM COVER OF 2" 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.
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.
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.

CITY OF RALEIGH
STANDARD DETAIL
REVISIONS DATE 8/1/18 NOT TO SCALE
SITE LAYOUT FOR BENCH
TT-05
NOTES:
1. INSTALL SIGN AHEAD OF STOP 2' FROM CONCRETE SECTION IN UTILITY STRIP
2. CALL 811 FOR UNDERGROUND UTILITY LOCATION PRIOR TO INSTALLATION.
SHELTER PAD INSTALLATION

GRADE INSTALLATION

NOTES:
CONTRACTOR TO PROVIDE FULL SHOP DRAWINGS FOR HANDRAIL PRIOR TO INSTALLING.

CITY OF RALEIGH
STANDARD DETAIL

HANDRAIL INSTALLATION

TT-07
4" DIAMETER STEEL POST (SCH 40)

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

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

COMPACTED SUBGRADE

TAR COATING ON EXT. SURFACES OF POST IN CONTACT WITH CEMENT

3000 PSI CONCRETE FOOTING

6" (TYP)
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.

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, WITH PIN OR SIMILAR LOCKING MECHANISMS. 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.
NOTES:
1. BIKE RACK TO BE 2" SCHEDULE 40 STEEL POWDER COATED BRONZE.
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

* 7.5"

7.5" EXPANSION JOINT

6" SIDEWALK

3.5' RADIUS MAXIMUM

6" EXPANSION JOINT

1/2" EXPANSION JOINT

MONOLITHIC POUR OF 3000 PSI CONCRETE

DUMMY JOINT

MONOLITHIC POUR OF 3000 PSI CONCRETE

DUMMY JOINT

1/2" EXPANSION JOINT

VARIABLE WIDTH DEPENDENT ON GRASS STRIP WIDTH

EXPANSION JOINT

SEE T-10.01.2 FOR ADDITIONAL NOTES

CITY OF RALEIGH
STANDARD DETAIL

T-10.01.1
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 poured around the curb and gutter. 

2. Expansion Joints, Dummies and Dummy Joints shall be located at not more than 10’ 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 of driveways. 

5. W Dimension as shown on plan view shall be followed. 

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. The driveway apron shall be monolithic pour using 3000 psi, max. 4” slump concrete. 

9. No radius encroachment shall be allowed across an adjacent property. The radius shall be determined by extending a line from the property corner perpendicular to the R/W 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.
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.

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.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 8/1/18 NOT TO SCALE

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.
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.

7. FOR RCP 36" OR LARGER, #57 OR #67 WASHED STONE SHALL BE INSTALLED TO THE SPRING LINE BEFORE BACKFILL.
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.
CITY OF RALEIGH

STANDARD DETAIL

T-10.08

SENSITIVE AREA AVENUE

GENERAL

<table>
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<tr>
<th>WALKWAY TYPE</th>
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<tr>
<td>PLANTING TYPE</td>
<td>TREE/LAWN</td>
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<tr>
<td>TREE SPACING</td>
<td>50' O.C. AVG</td>
</tr>
<tr>
<td>PARKING TYPE</td>
<td>NONE</td>
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</table>

PAVEMENT DESIGN

| 3" S9.5B       |
| 3" I19.0B      |
| 8" ABC         |

P.S. - PAVED SHOULDERS
G.S. - GRASS SHOULDERS

80' PUBLIC R/W
30' EP-EP

5' UTILITY PLACEMENT EASEMENT

5' UTILITY PLACEMENT EASEMENT
GENERAL

WALKWAY TYPE
SIDEWALK BOTH SIDES

PLANTING TYPE
TREE/LAWN

TREE SPACING
40' O.C. AVG

PARKING TYPE
PARALLEL ON 2 SIDES

PAVEMENT DESIGN

3" SF9.5A
8" ABC
1. Point Grade

With Center Turn Lane (Retrofit Only)

When using a center turn lane, the RW distance will be 90° and the back to back curb distance will be 62°.

66' B-B
94' Public RW

11'
8.5'
14'
6'

T-10.16 City of Raleigh
Standard Detail

Revisions
Date: 8/1/18

Avenue, 3 Lane,
Parallel Parking
CITY OF RALEIGH
STANDARD DETAIL

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<tr>
<td>WALKWAY TYPE</td>
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<tr>
<td>PLANTING TYPE</td>
<td>TREE GRATE / LAWN</td>
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<tr>
<td>TREE SPACING</td>
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<td>PARKING TYPE</td>
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<tr>
<td>3&quot; S9.5B</td>
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</tr>
<tr>
<td>3&quot; 119.0B</td>
<td></td>
</tr>
<tr>
<td>8&quot; ABC</td>
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</tr>
</tbody>
</table>
### General

- **Walkway Type**: Sidewalk both sides
- **Planting Type**: Tree grate / lawn
- **Tree Spacing**: 40 O.C. AVG
- **Parking Type**: Parallel in a access lane

### Parallel Parking

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<tr>
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### Angled Parking

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**CITY OF RALEIGH STANDARD DETAIL**

**MULTI-WAY BOULEVARD**

**DATE: 8/1/18**

**T-10.20**

**NOT TO SCALE**

**REVISED**

---

**Pavement Design**

- **Access / Parking**:
  - 3" S9.5B
  - 3" I19.0B
  - 8" ABC
<table>
<thead>
<tr>
<th>General</th>
<th>Pavement Design</th>
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<td>40&quot; O.C. AVG</td>
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<tr>
<td>Parking Type</td>
<td>Parallel on 2 Sides</td>
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CITY OF RALEIGH
STANDARD DETAIL

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<tbody>
<tr>
<td>PARKING TYPE</td>
<td>PARALLEL ON 2 SIDES</td>
</tr>
</tbody>
</table>

PAVEMENT DESIGN

| 3" SF9.5A | 8" ABC |
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

EDGE OF PAVEMENT

BACK OF CURB

2'-0"

2'-6"

6"

END

CITY OF RALEIGH

STANDARD DETAIL

STANDARD METHOD OF ENDING CURB AND GUTTER

T-10.25

DATE: 8/1/18

CITY OF RALEIGH

STANDARD DETAIL

T-10.25

REVISIONS

DATE: 8/1/18

STANDARD METHOD OF ENDING CURB AND GUTTER

T-10.25
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 1028-2 OF NCDOT STANDARD & SPECIFICATIONS FOR ROADS AND STRUCTURES.
6. REFER TO NCDOT DETAIL 846.01 FOR CURB AND GUTTER SUPERELEVATION RATES.
NOTES:
TRANSITION NOT TO BE LOCATED WITHIN THE CURB RADIUS.
NOTES:

A. BOTTOM EDGE OF DELINEATOR SHALL BE 4 FEET ABOVE ROADWAY.

B. THE DELINEATORS SHALL SLOPE UPWARD AND OUTWARD FROM TRAFFIC.

C. DELINEATORS TO BE SPACED ON CENTERS AT 1/3 OF THE DISTANCE X, SHOWN BELOW, FOR NEW ASPHALT WIDTHS > 15 FT.

D. DELINEATORS SHALL BE MOUNTED ON BREAKAWAY POSTS.

E. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

F. NOT TO SCALE

1. TAPER ON BOTH ENDS OF ROADWAY WIDENING SHALL BE A MINIMUM RESERVES THE RIGHT TO REQUIRE A LONGER TAPER IF DEEMED NECESSARY FOR THE SAFETY OF THE PUBLIC.

2. TWO SOLID WHITE EDGE MARKING SHALL BE EXTENDED ALONG WIDENING AT EXISTING PAVEMENT.

3. DELINERATORS SHALL BE MOUNTED ON BREAKAWAY POSTS.

4. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

5. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

6. TAPER FROM CURB TO EXISTING PAVEMENT.

7. DELINERATORS SHALL ONLY BE REQUIRED AT TAPER FROM CURB TO EXISTING PAVEMENT.

8. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

9. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

10. TAPER FROM CURB TO EXISTING PAVEMENT.

11. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

12. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

13. TAPER FROM CURB TO EXISTING PAVEMENT.

14. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

15. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

16. TAPER FROM CURB TO EXISTING PAVEMENT.

17. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

18. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

19. TAPER FROM CURB TO EXISTING PAVEMENT.

20. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

21. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

22. TAPER FROM CURB TO EXISTING PAVEMENT.

23. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

24. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

25. TAPER FROM CURB TO EXISTING PAVEMENT.

26. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

27. CALL 811 FOR UNDERGROUND UTILITY LOCATE PRIOR TO INSTALLATION.

28. TAPER FROM CURB TO EXISTING PAVEMENT.

29. DELINERATORS SHALL BE MOUNTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO TRAVEL LANE.

30. 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:

For use at four lane street and ≥ 40 MPH, otherwise three red object markers.

Local & Mixed Use

7' U-channel posts (1.12 lb/ft)
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. Due to be expanded on a case by case basis as needed to accommodate private utilities appurtenant 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

T-20.01.1
CURB RAMPS

NEW DEVELOPMENT

T-20.01.2

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP OR TRANSITION TO STREET.

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP OR TRANSITION TO STREET.

NOTE: USE SMALL FLARES ONLY WHEN A CURB TYPE DIRECTLY CONFLICTS WITH APPROACHING VEHICULAR TURNING MOVEMENTS.

TYPE N-1 (CURB TYPE)

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.

TYPE N-1A (FLARE TYPE)

NOTE: USE SMALL FLARES ONLY WHEN A CURB TYPE DIRECTLY CONFLICTS WITH APPROACHING VEHICULAR TURNING MOVEMENTS.

TYPE N-2 (RADIUS)

TYPE N-2 (TEE INTERSECTION)

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS

DRAFT 01/18

NOT TO SCALE

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.

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.
5. 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

- CONCRETE CURB
- WARNING SURFACE (TYP)
- 1/2" EXPANSION JOINT (TYP)
- 6" W X 12" D CONCRETE CURB
- 5' MAX.
- 5' MAX.
- 1/2" EXPANSION JOINT (TYP)
- 6" D. (TYP)
- 12" D. (TYP)
- SIDEWALK
- GRASS STRIP

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP OR TRANSITION TO STREET.

TYPE N-4A

- CONCRETE CURB
- WARNING SURFACE (TYP)
- 1/2" EXPANSION JOINT (TYP)
- 6" W X 12" D CONCRETE CURB
- 5' MAX.
- 5' MAX.
- 1/2" EXPANSION JOINT (TYP)
- 6" D. (TYP)
- 12" D. (TYP)
- SIDEWALK
- GRASS STRIP

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP OR TRANSITION TO STREET.
CURB RAMPS
(RETROFIT)

T-20.01.5

CITY OF RALEIGH
STANDARD DETAIL

PAY LIMITS FOR CURB RAMP

REVISIONS
NOTE TO SCALE

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS
NOTE TO SCALE

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS
NOTE TO SCALE

CITY OF RALEIGH

STANDARD DETAIL

REVISIONS
NOTE TO SCALE
CURB RAMPS
(RETROFIT)

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
SIDE RAMPS  4"
LANDING & OPENINGS  6"

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS
DATE 8/1/18
NOT TO SCALE

T-20.01.6
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 SHALL BE INSTALLED THE SAME WIDTH AS THE SIDEWALK.**

**CONCRETE DEPTH**

| SIDE RAMPS | 4" |
| LANDING & CURB RAMPS | 6" |

**LARGER RADIUS** **15' OR GREATER**

**SMALL RADIUS** **LESS THAN 15’**

**DETECTABLE WARNING SURFACE (TYP)**

**1/2" EXPANSION JOINT (TYP)**

**6"W X 12"D CONCRETE CURB**

**24" TYP 12" MIN**

**DEPRESSED 2'-6" CURB & GUTTER**

**NON-WALK SURFACE**

**SIDEWALK**

**ONLY TO BE USED WITH CITY OF RALEIGH APPROVAL.**

**CITY OF RALEIGH STANDARD DETAIL**

**REVISIONS DATE 8/1/18**

**T-20.01.7**
1. CITY OF RALEIGH 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
(MEDIANS ≤ 20')
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP OR TRANSITION TO STREET.

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP OR TRANSITION TO STREET.

PARALLEL CURB RAMP

2' STRIP IF CUT THROUGH IS GREATER THAN 4' IN LENGTH. OTHERWISE PLACE DETECTABLE WARNING ON THE ENTIRE SURFACE OF CUT THROUGH.

ALIGN CURB PARALLEL WITH CROSSWALK

CITY OF RALEIGH
STANDARD DETAIL

DETECTABLE WARNING SURFACE SHALL EXTEND FULL WIDTH OF SIDEWALK OR RAMP

TYPE N-1, N-1A & R-1

TYPE N-2 & N-3

TYPE N-3A

TYPE R-1A

TYPE R-2

TYPE R-3

TYPE R-4

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.
RAMP SECTION
WITH DETECTABLE WARNING SURFACE
CAST-IN-PLACE SYSTEM

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.
PAVEMENT MARKINGS

HI-VISIBILITY

PEDESTRIAN CROSSWALK

24" W H I T E  C R O S S W A L K  L I N E

S I D E W A L K

S I D E W A L K

S I D E W A L K

S I D E W A L K

P E D - X IN G

P E D - X IN G

P E D - X IN G

S I D E W A L K

S I D E W A L K

S I D E W A L K

S I D E W A L K

NOTE S :

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 RA L EIGH TRANSPORTATION OPERATIONS DIVISION OR AS DIRECTED BY THE ENGINEER.

5. CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE TO THE LATEST CITY OF RA L EIGH 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 6-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

T-30.01
6'' ABC

2'' SF 9.5A

COMPACTED SUB GRADE
NOTES:
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 Details

Tree Protection and Planting
STANDARD TREE PROTECTION DETAIL

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 3" HIGH, CLEARLY LEGIBLE AND SPACED AS SHOWN.

WARNING SIGN DETAIL

CONTACT INFORMATION:
CITY OF RALEIGH PARKS, RECREATION AND CULTURAL RESOURCES DEPARTMENT
URBAN FORESTER:
TREES@RALEIGHNC.GOV
WWW.RALEIGHNC.GOV
NOTES:
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.
1. CONTRACTOR IS RESPONSIBLE FOR ADEQUATE DRAINAGE OF ALL PLANTING PITS. (POSITIVE DRAINAGE AWAY FROM PIT)
2. ADHERE TO STANDARDS IN THE CITY TREE MANUAL.
3. STREET TREES MUST BE 3" CALIPER AT INSTALLATION WITH A 5' MINIMUM FIRST BRANCH HEIGHT.
4. PLANTING SEASON OCTOBER - APRIL.
5. A TREE IMPACT PERMIT IS REQUIRED.
6. ELECTRICAL OUTLETS AND OTHER UTILITIES ARE PROHIBITED IN THE PLANTING AREA IMMEDIATELY SURROUNDING THE TREE.

NOTES:

THE ROOT FLARE SHALL BE PLANTED AT GRADE, NO HIGHER THAN 2" ABOVE GRADE, AND NEVER BELOW GRADE. REMOVE EXCESS SOIL TO EXPOSE THE ROOT FLARE AT GRADE. TREE SHALL BE SET PLUMB.

MULCH DEPTH 3". KEEP MULCH 3" FROM ROOT FLARE AND DO NOT CONTACT STEM.

HIGH QUALITY SOIL MIX AS SPECIFIED.

WATER SAUCER, IF SPECIFIED, SHALL RISE NO MORE THAN 3" ABOVE GRADE.

COMPLETELY REMOVE TOP HALF OF BURLAP, LACING STRAPS, NAILS AND WIRE BASKET AND DISCARD FROM HOLE. ALL SYNTHETIC BURLAP MUST BE REMOVED FROM SIDES OF ROOT BALL.

ROOT BALL SHALL BE PLACED DIRECTLY ON COMPACTED SUBGRADE. HANDLE TREE BY THE ROOT BALL ONLY.

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

Trenching is permitted outside of the CRZ.
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:

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

SECONDARIES
1. OVERHEAD 6 FEET
2. SIDE 4 FEET
3. BELOW 4 FEET
4. NEUTRAL 2 FEET

COMMUNICATION LINES
1. OVERHEAD 2 FEET
2. SIDE 2 FEET
3. BELOW 2 FEET
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

Notes:
- All dimensions shown are in English
- Material: Cast Gray Iron ASTM A-48, Class 35B
- Finish: No Paint
- Weight: 608/#/set

Gray Iron, rectangular 4"x6", 1.5" min. thick, with 1/4" opening or less

All slots are 1/4" wide max.

Bolt tree grate halves together with (2) 1/2"-13 x 3" STNL. STL. HEX BOLTS, GALV. FLAT WASHERS AND STNL. STL. HEX NUT

Frames are assembled using a 6" x 1 1/4" x 1/4" thick steel plate bolted to frame with (2) 3/8-16UNC X 1 STNL STL. FLAT HD. CAP SCREWS

Assembled Detail

City of Raleigh Standard Detail

Revisions Date: 8/1/18

Tree grate in sidewalk within row

TPP-06

NOT TO SCALE

Revision Details

Date 8/1/18
NOTES:
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.
WARNING SIGN DETAIL

1. PROVIDE WARNING SIGN IN ENGLISH AND SPANISH.
2. WARNING SIGN MUST BE PLACED AT THE END OF THE TREE PROTECTION AREA.
3. MESSAGE TO BE CLEARLY READABLE FROM DISTANCE.
4. SIGN MOUNTED TO POST.
5. MINIMUM SIGN SIZE 8" x 8".
6. POINTS TO BE MET AT START AND END OF TREE PROTECTION AREA.
7. SIGN FOR TREE PROTECTION AREA LESS THAN 200' IN PERIMETER TO BE PLACED ALONG EACH END OF TREE PROTECTION AND 50' ON CENTER.
8. PLACE ONE SIGN PER PROTECTED AREA.
9. ATTACH AND SECURE TO TREE FENCE POSTS AND FABRIC.
10. IGNORE THIS PRACTICE STANDARDS SPECIFICATIONS FOR CONDITIONS WHERE FLOW WILL RUN PARALLEL WITH THE TOE OF THE FENCE.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS
DATE: 8/1/18

STANDARD TEMPORARY
(SEDIMENT/SILT) / TREE PROTECTION FENCE

TPP-08
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 STRAPPING AROUND THE 2X4 WOOD SLATS

12" FROM LOWEST BRANCH

EXIST TREE BRANCH

EXIST TREE TRUNK

2" X 4" WOOD SLATS, MAXIMUM 3 INCH SPACING BETWEEN WOOD SLATS WITH A MINIMUM OF 3 SLATS PER TREE

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

EXIST GROUND

SECTION A - A

EXIST TREE TRUNK

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

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

CITY OF RALEIGH
STANDARD DETAIL

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

TPP-09