11/14/2024

Public
Water Distribution / Extension System
The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utilities Department Permit # W-3961

Authorization to Construct

Date

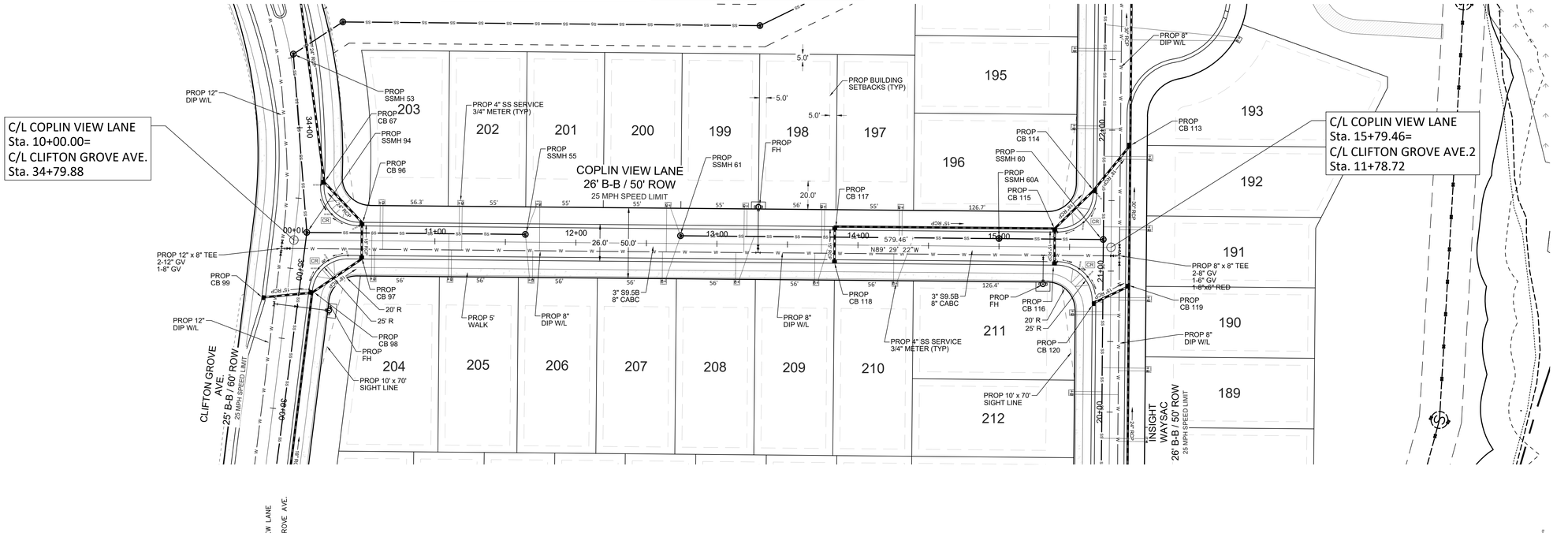
Public
Sewer Collection / Extension System
The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utilities Department Permit # S-5098

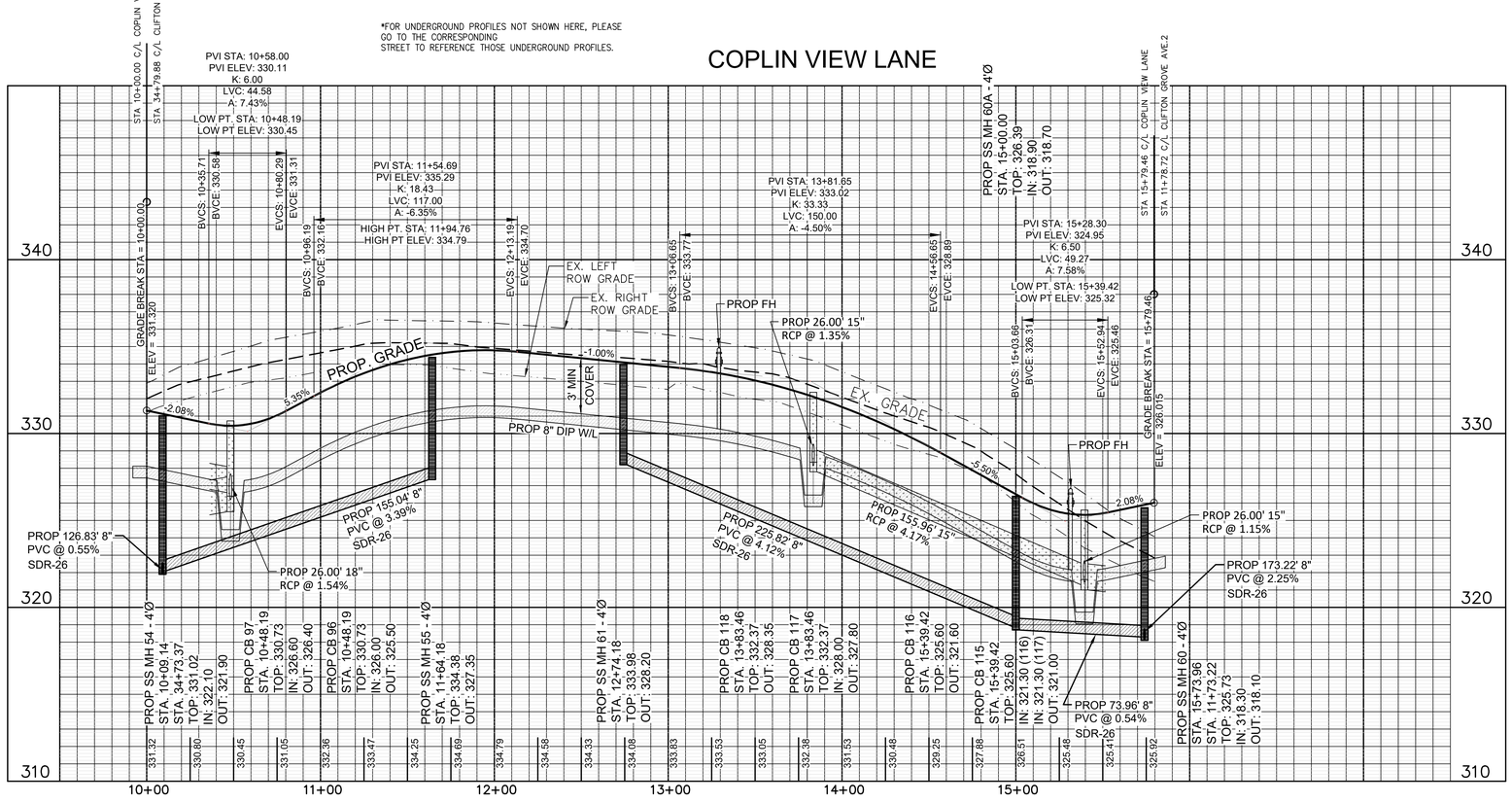
Authorization to Construct

Date

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL TOWN OF ZEBULON STANDARDS AND SPECIFICATIONS AND NCDOT IF APPLICABLE.

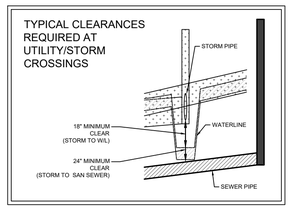


*FOR UNDERGROUND PROFILES NOT SHOWN HERE, PLEASE GO TO THE CORRESPONDING STREET TO REFERENCE THOSE UNDERGROUND PROFILES.



GRAPHIC SCALE
0' 40' 80' 120'
(IN FEET)
1 INCH = 40 FT

TYPICAL CLEARANCES REQUIRED AT UTILITY/STORM CROSSINGS



Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

COPLIN VIEW LANE

Date
February 15, 2022

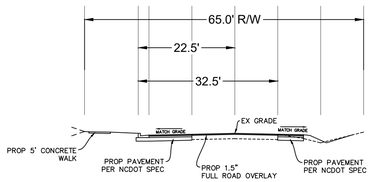
Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-26

11/14/2024

PEARCES ROAD TYPICAL WIDENING
STA. 10+70 – 20+65

FOR LANE WIDTHS/STRIPING, PLEASE SEE CS-31



Public
Water Distribution / Extension System

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City of Raleigh Public Utilities Department Permit # W-3961

Authorization to Construct

Date

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City of Raleigh Public Utilities Department Permit # S-5098

Authorization to Construct

Date

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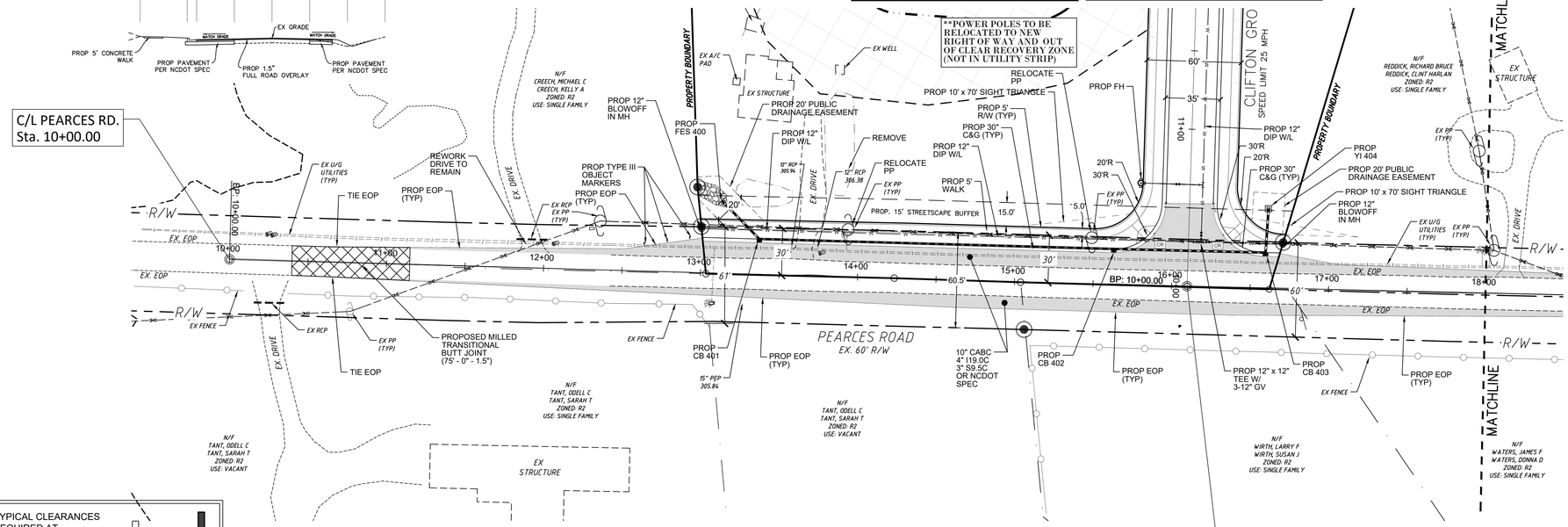

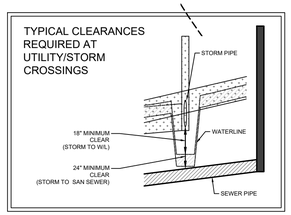

NCDOT ROADWAY PAVEMENT SECTIONS

FOR AREAS GREATER 6' IN WIDTH SHALL USE:
10 INCHES OF CABC
4 INCHES OF I19.0C
3 INCHES OF S9.5C
(2 LAYERS AT 1.5 INCHES, INCLUDES OVERLAY)

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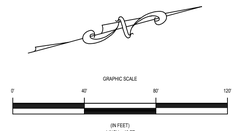
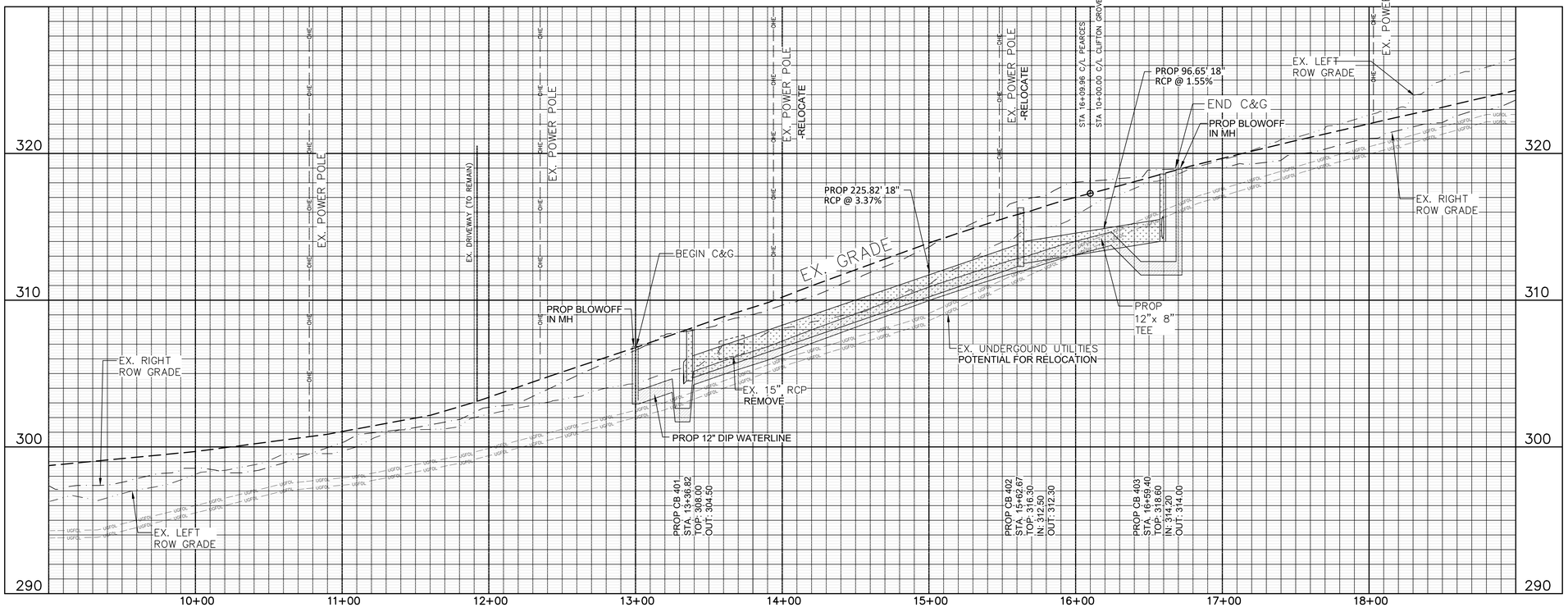


PEARCES ROAD



Wm G. Daniel & Assoc.
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Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
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Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

Pearces Road

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-27

11/14/2024

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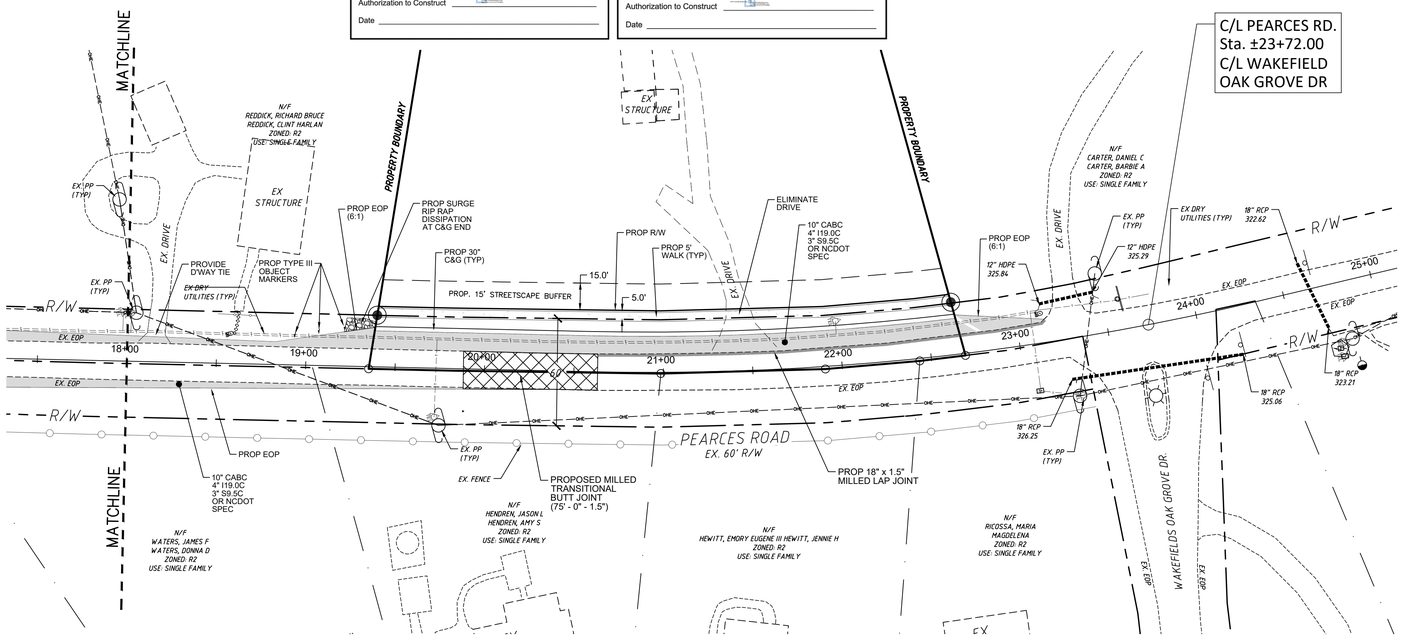
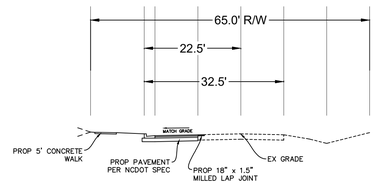
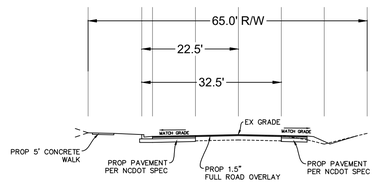


PEARCES ROAD TYPICAL WIDENING
STA. 20+65 – 23+20



PEARCES ROAD TYPICAL WIDENING
STA. 10+70 – 20+65



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GRAPHIC SCALE
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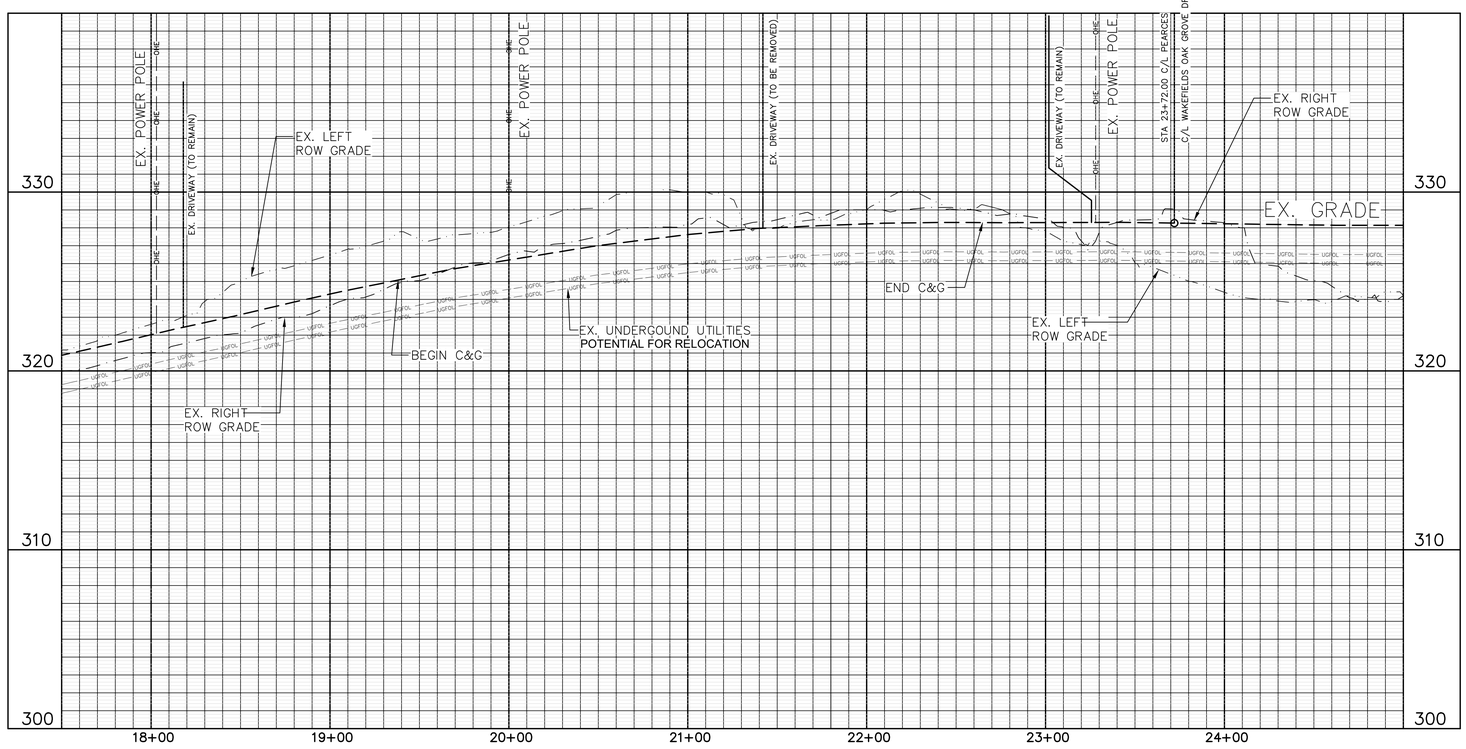
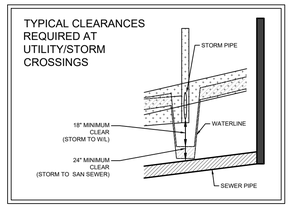
(IN FEET)
1 INCH = 40 FT

PEARCES ROAD



TYPICAL CLEARANCES REQUIRED AT UTILITY/STORM CROSSINGS



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C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
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Owner:
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7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

Pearces Road

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-28

11/14/2024

Public
Water Distribution / Extension System
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City of Raleigh Public Utilities Department Permit # W-3961

Authorization to Construct

Date

Public
Sewer Collection / Extension System
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City of Raleigh Public Utilities Department Permit # S-5098

Authorization to Construct

Date

C/L PIPPIN RD.
Sta. ±11+55.00
C/L LACEWING DR.

C/L PIPPIN RD.
Sta. 15+16.81=
C/L CLIFTON GROVE AVE.
Sta. 50+72.58

NCDOT ROADWAY PAVEMENT SECTIONS

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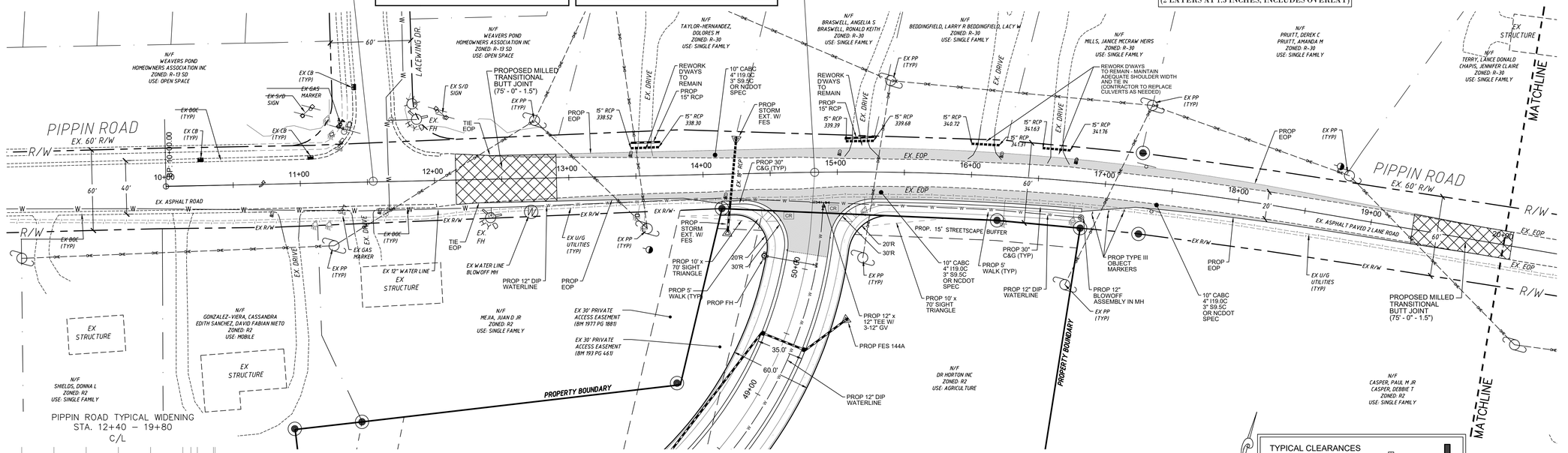
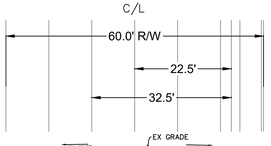
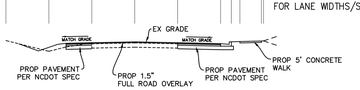


PIPPIN ROAD TYPICAL WIDENING
STA. 12+40 – 19+80
C/L



FOR LANE WIDTHS/STRIPING, PLEASE SEE CS-31



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GRAPHIC SCALE
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(IN FEET)
1 INCH = 40 FT

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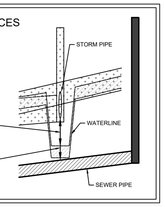
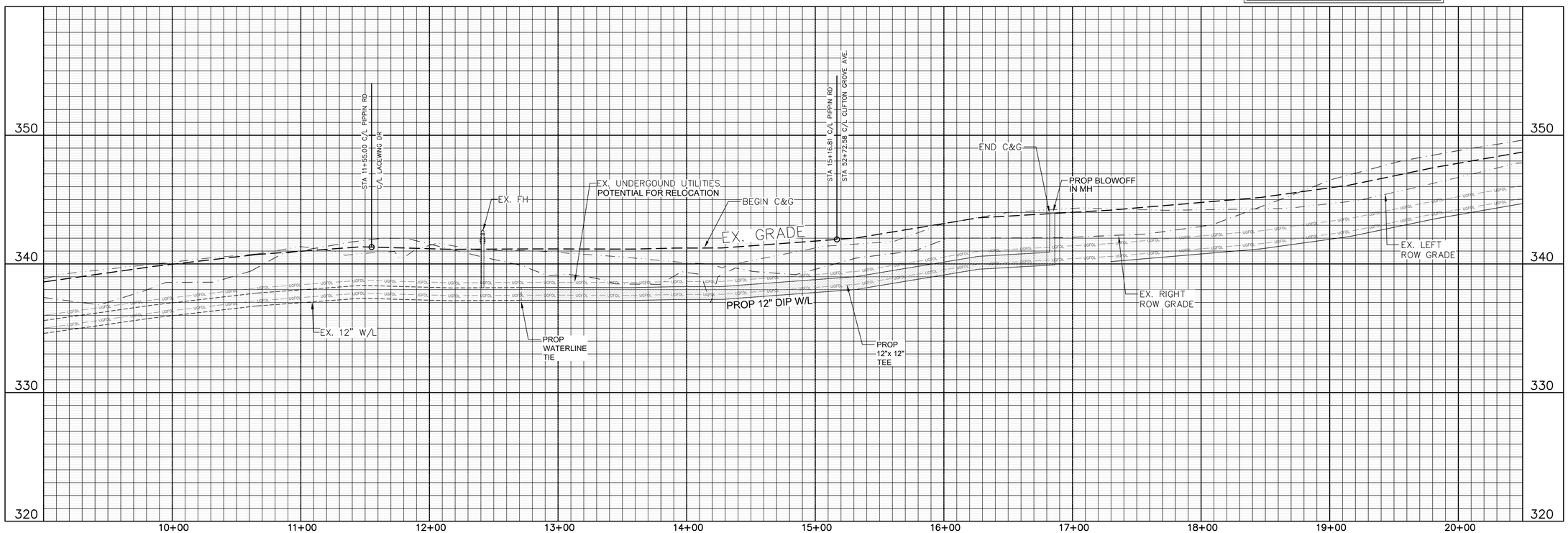


PIPPIN ROAD



Wm. G. Daniel & Assoc.
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SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

Pippin Road

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-29

11/14/2024

Public
Water Distribution / Extension System
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City of Raleigh
Public Utilities Department Permit # W-3961

Authorization to Construct _____

Date _____

Public
Sewer Collection / Extension System
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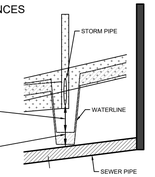
City of Raleigh
Public Utilities Department Permit # S-5098

Authorization to Construct _____

Date _____

TYPICAL CLEARANCES REQUIRED AT UTILITY/STORM CROSSINGS



NCDOT ROADWAY PAVEMENT SECTIONS

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C/L PIPPIN RD.
Sta. ±29+52.00
C/L GREENRIDGE VIEW LANE

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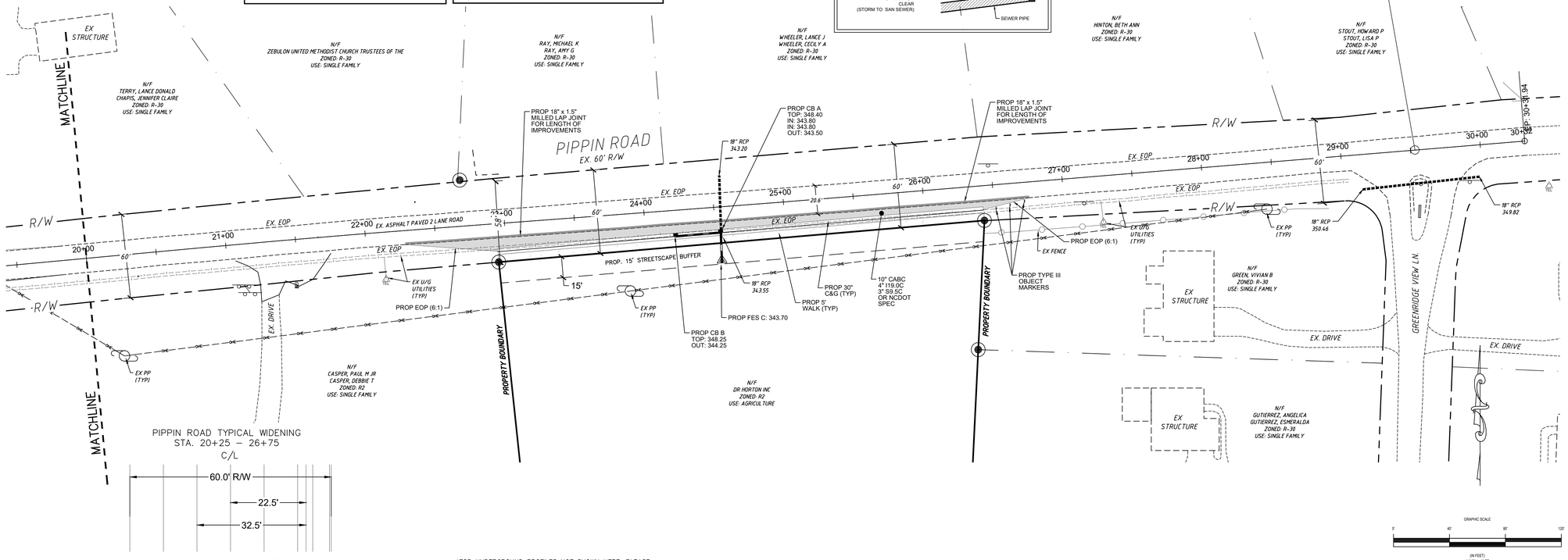

PIPPIN ROAD TYPICAL WIDENING
STA. 20+25 – 26+75

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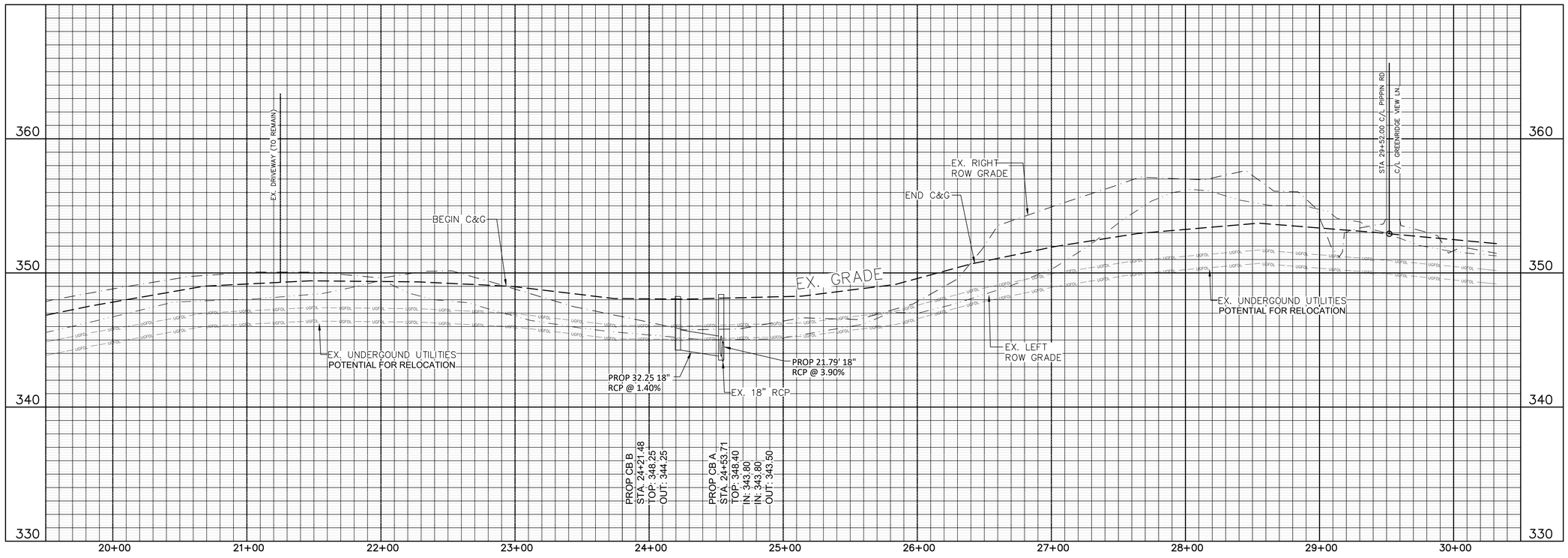
PIPPIN ROAD



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NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions
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Owner:
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7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

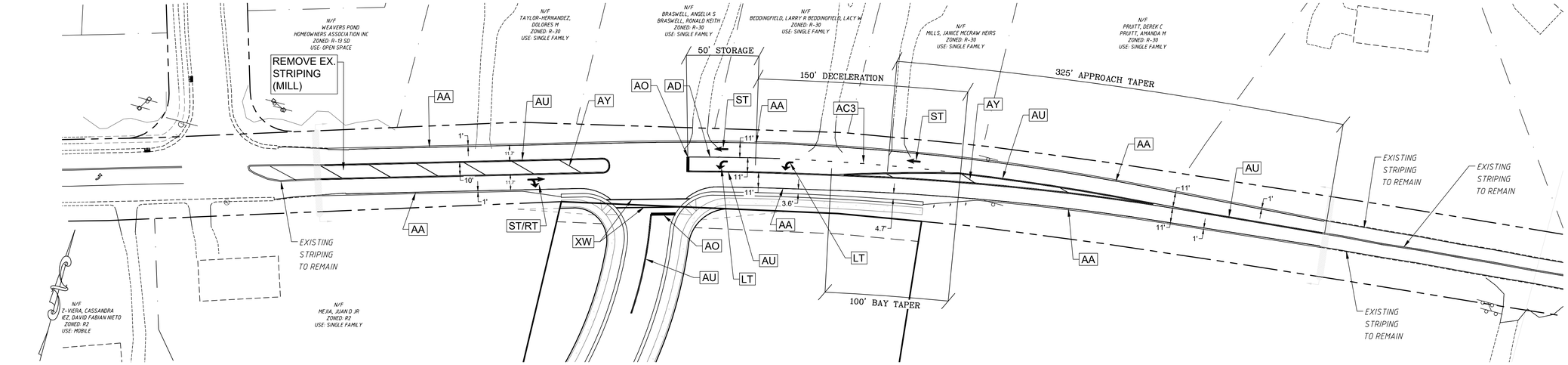
Pippin Road

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

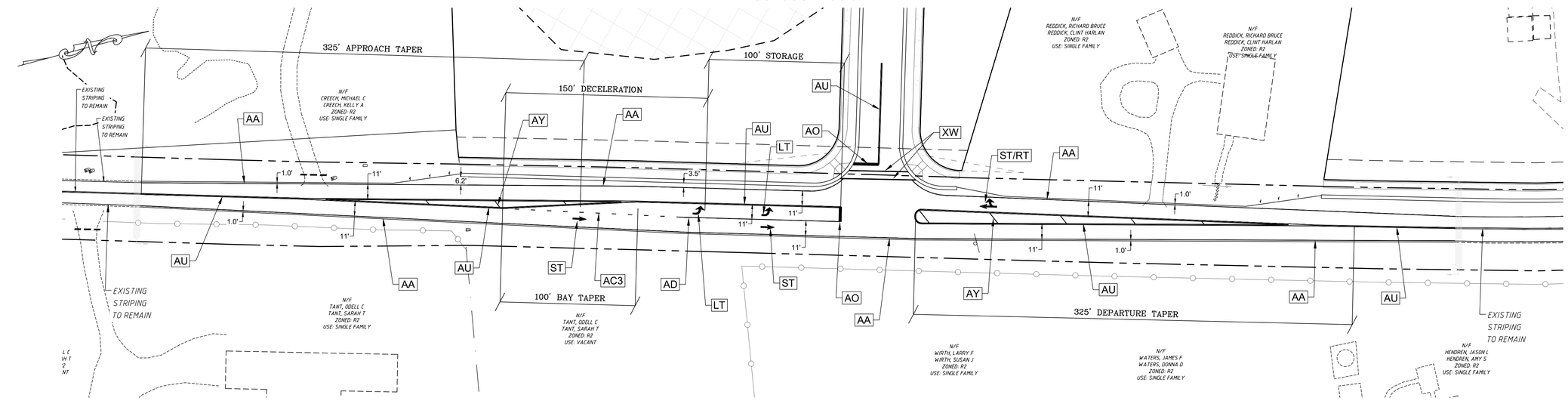
Sheet
CS-30

Pippin Road



GRAPHIC SCALE
0 40 80 120
(IN FEET)
1 INCH = 40 FT

Pearces Road



PAVEMENT MARKING SCHEDULE

ITEM	DESCRIPTION
AA	THERMOPLASTIC (4" WHITE, 90 MILS) EDGELINE
AC3	THERMOPLASTIC (4" WHITE, 120 MILS) 4"x3' W/ 9' SPACING MINI-SKIP (LANE LINES AND LINE EXTENSIONS THROUGH TAPERS)
AD	THERMOPLASTIC (4" WHITE, 120 MILS) SOLID LANE LINE
AO	THERMOPLASTIC (24" WHITE, 120 MILS) STOP BAR
AU	THERMOPLASTIC (4" YELLOW, 120 MILS) DOUBLE CENTER LINE
AY	THERMOPLASTIC (12" YELLOW, 90 MILS) DIAGONAL (8" = < 45 MPH) (12" = ≥ 45 MPH)
LT	THERMOPLASTIC (WHITE, 120 MILS) DIRECTIONAL ARROW - LEFT
XW	THERMOPLASTIC (WHITE, 120 MILS) 8" CROSSWALK LINES

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919.497.2163

Project
Clifton Grove

Striping Plan
-Pearces Rd &
Pippin Rd

Date
February 15, 2022

Scale
1" = 40'

Sheet
CS-31

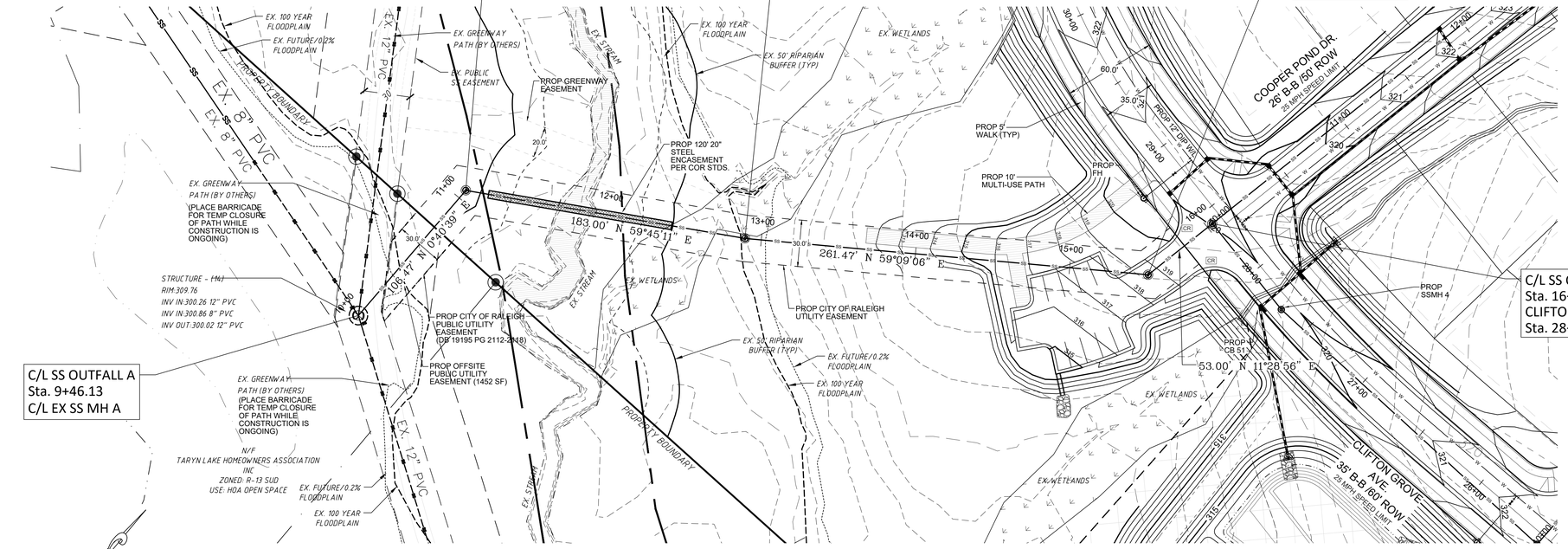
11/14/2024

C/L SS OUTFALL A
PROP MH 0
Sta. 11+06.47

C/L SS OUTFALL A
PROP MH 1
Sta. 12+89.47

C/L SS OUTFALL A
PROP MH 2
Sta. 15+50.93

ALL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH CURRENT CITY OF RALEIGH AND/OR NCDOT STANDARDS AND SPECIFICATIONS.



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Authorization to Construct _____
Date _____

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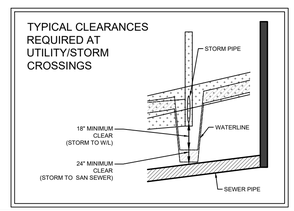
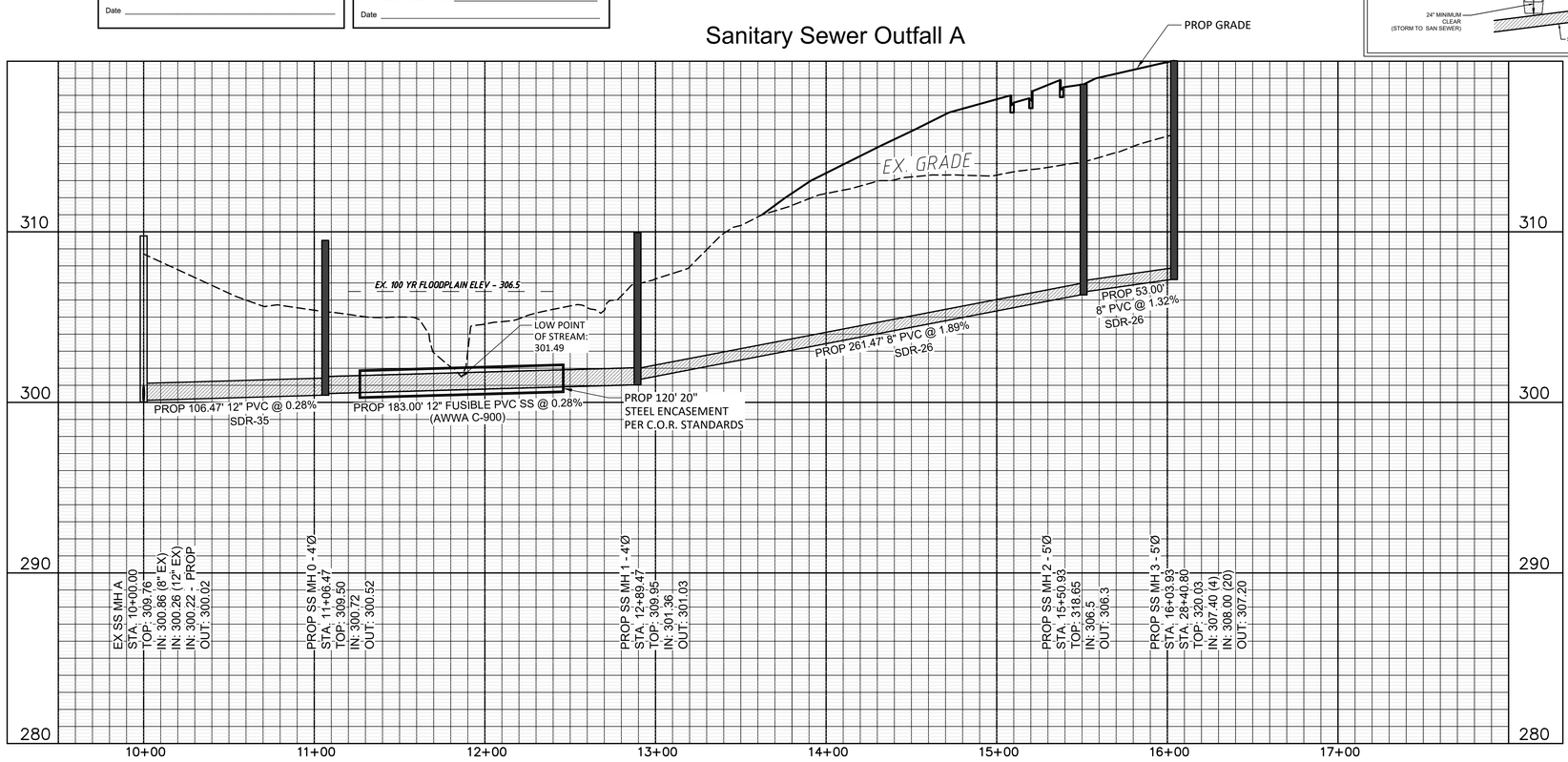


Sanitary Sewer Outfall A



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C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

Sanitary Sewer Outfall A

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-32

11/14/2024

Public
Water Distribution / Extension System
The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh Public Utilities Department Permit # W-3961

Authorization to Construct _____

Date _____

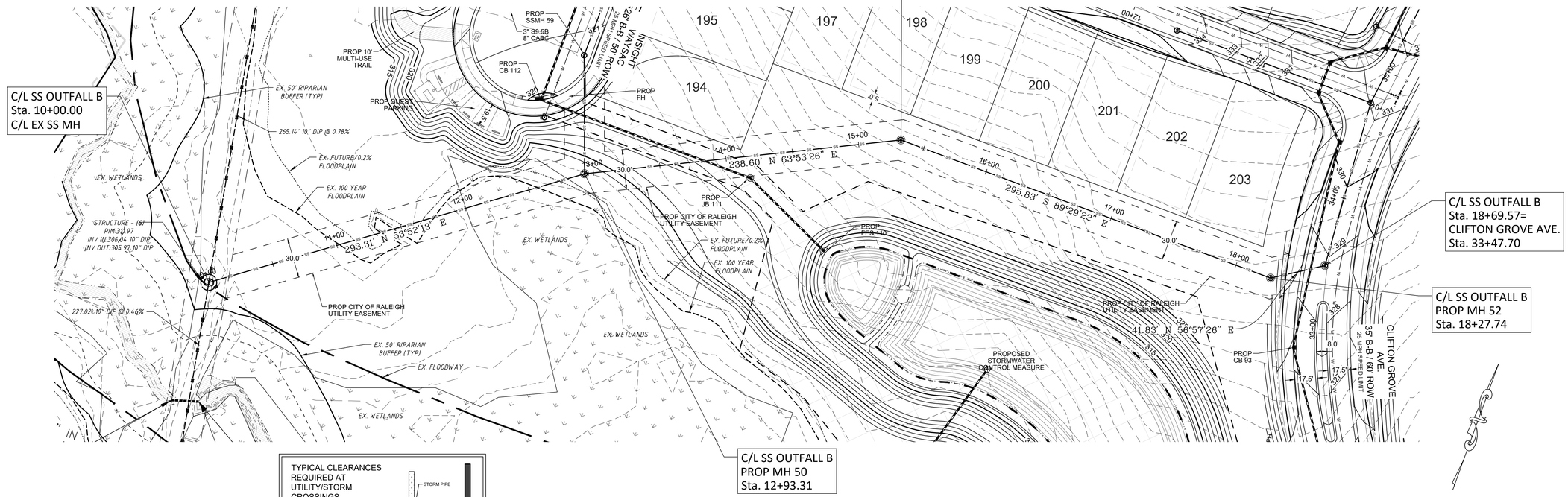
Public
Sewer Collection / Extension System
The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

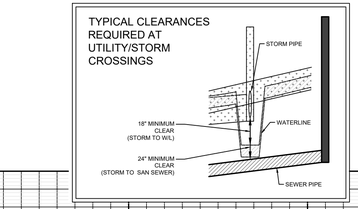
City of Raleigh Public Utilities Department Permit # S-5098

Authorization to Construct _____

Date _____

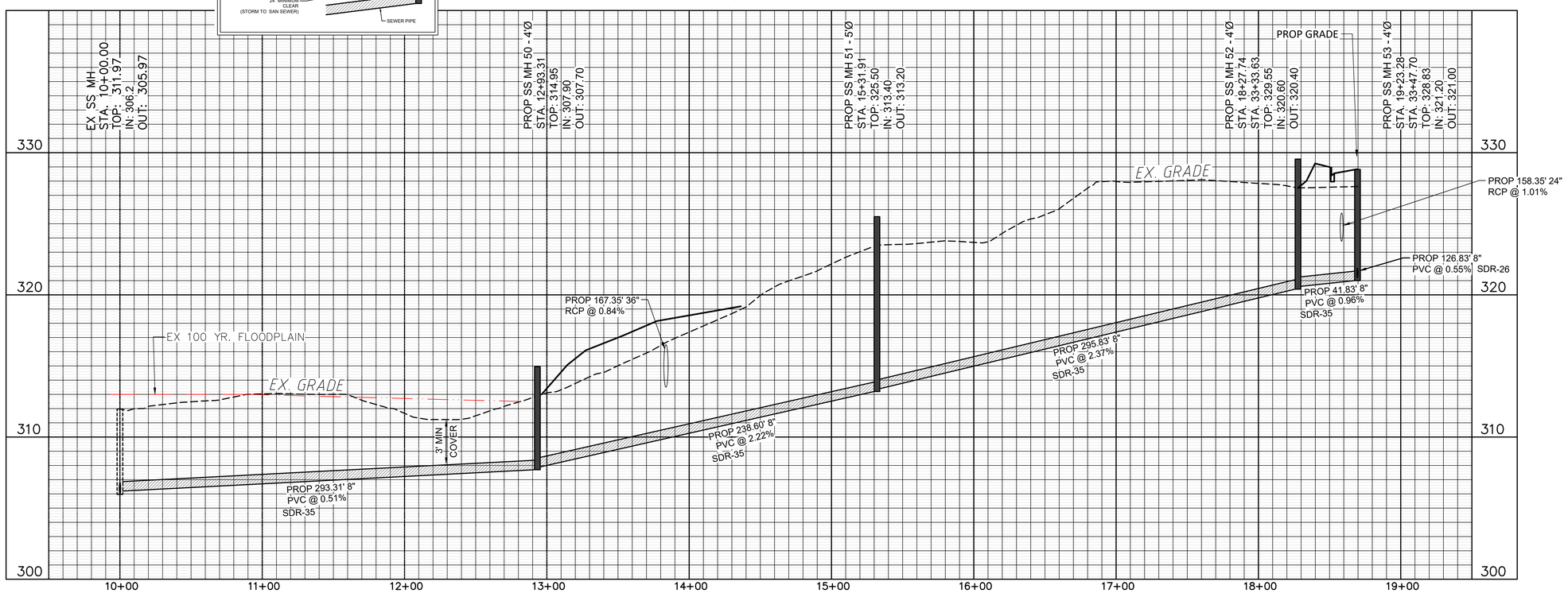
ALL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH CURRENT CITY OF RALEIGH AND/OR NCDOT STANDARDS AND SPECIFICATIONS.





GRAPHIC SCALE
0' 40' 80' 120'
(IN FEET)
1 INCH = 40 FT

Sanitary Sewer Outfall B



Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
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10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

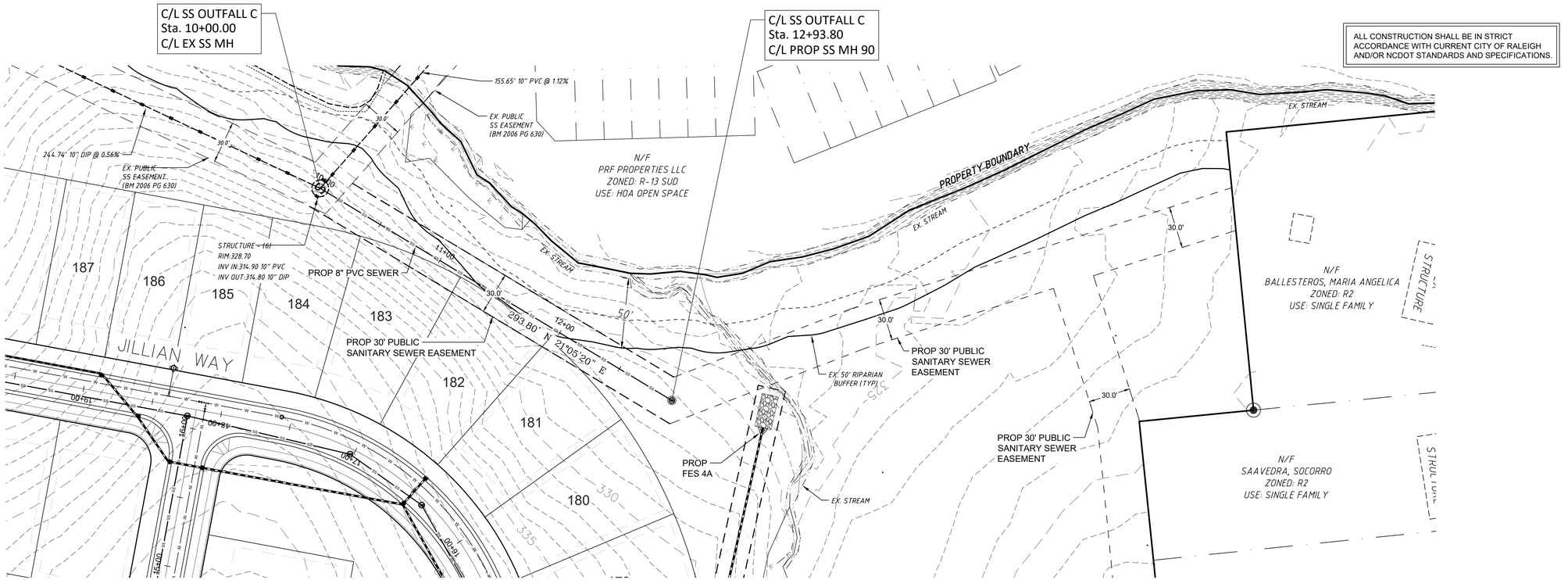
Sanitary Sewer Outfall B

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-33

11/14/2024



Public
Water Distribution / Extension System

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City of Raleigh
Public Utilities Department Permit # W-3961

Authorization to Construct _____

Date _____

Public
Sewer Collection / Extension System

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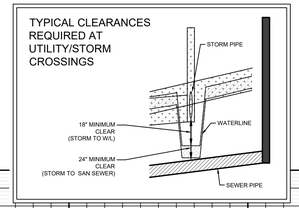
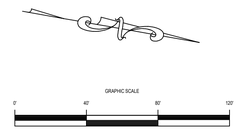
City of Raleigh
Public Utilities Department Permit # S-5098

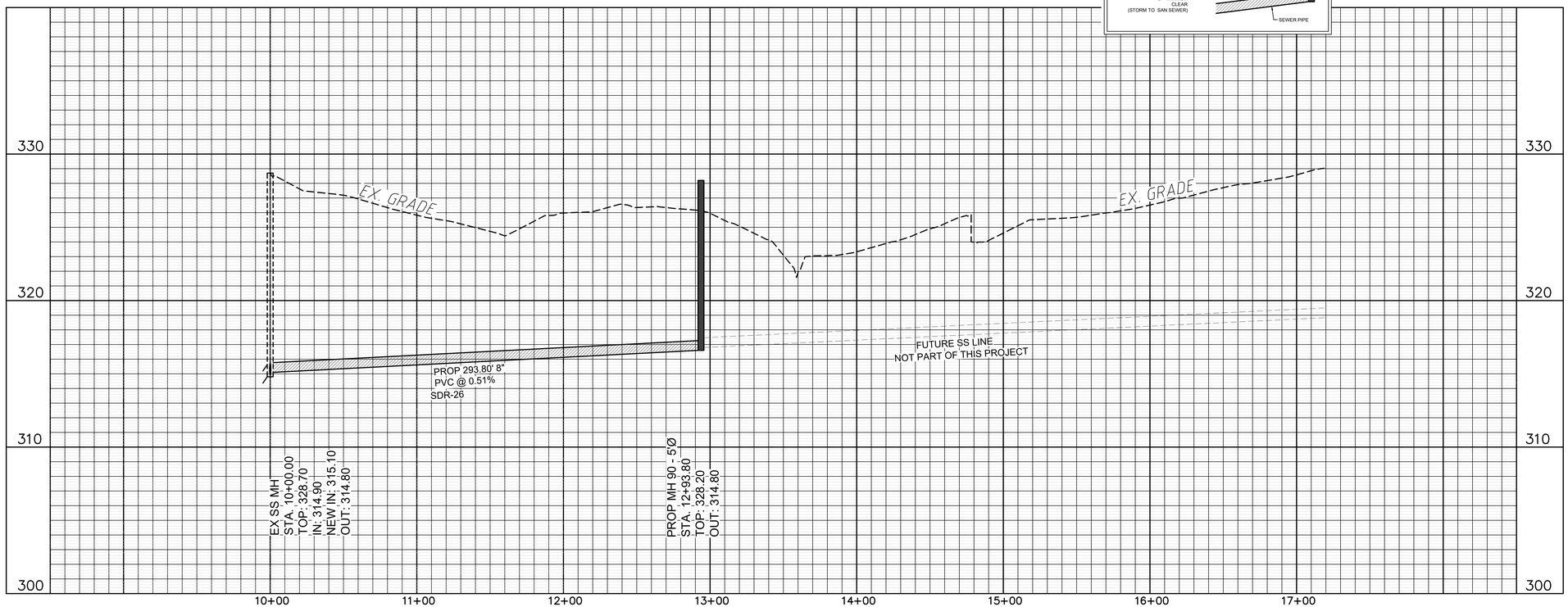
Authorization to Construct _____

Date _____





Sanitary Sewer Outfall C



Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions

07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

Sanitary Sewer Outfall C

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

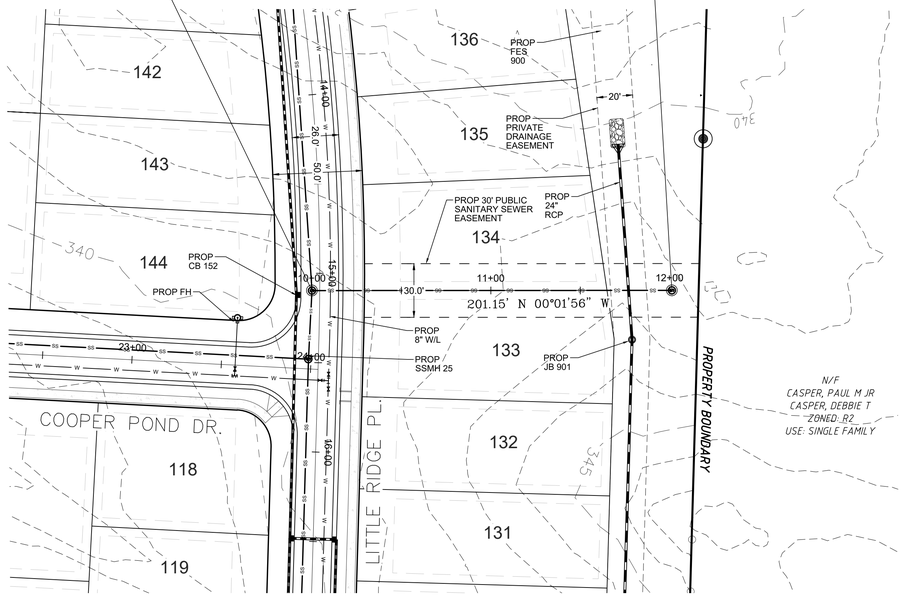
Sheet
CS-34

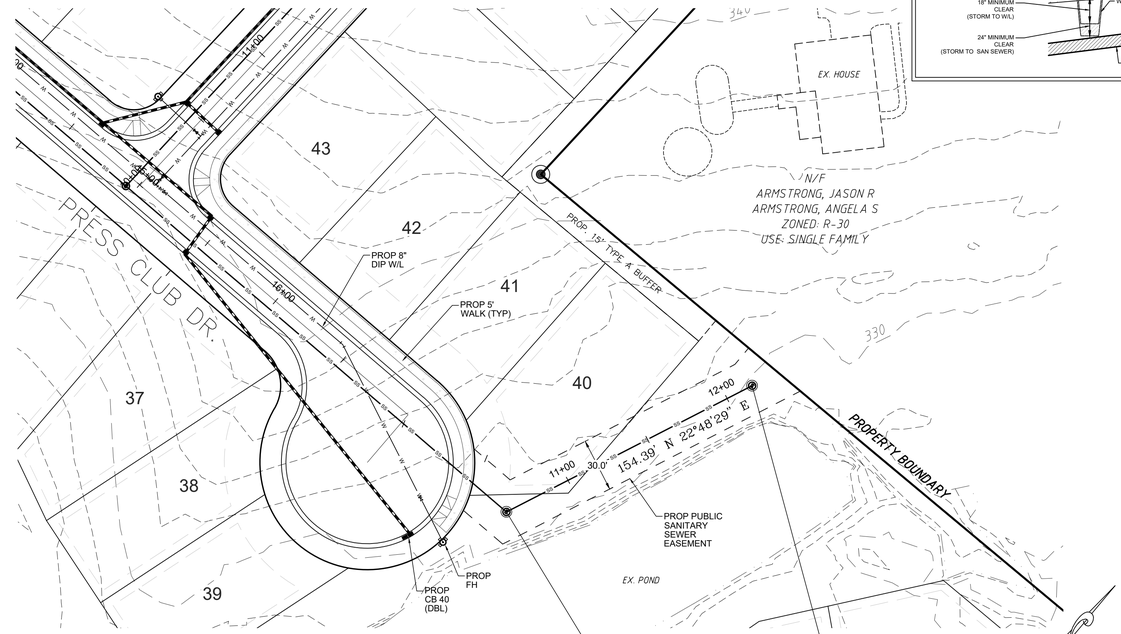
11/14/2024

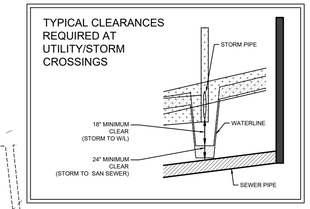
C/L SS OUTFALL D
Sta. 10+00.00

C/L SS OUTFALL D
PROP MH 28A
Sta. 12+01.15

ALL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH CURRENT CITY OF RALEIGH AND/OR NCDOT STANDARDS AND SPECIFICATIONS.







C/L SS OUTFALL E
PROP MH 15
Sta. 10+61.32

C/L SS OUTFALL E
PROP MH 15b
Sta. 12+15.71

GRAPHIC SCALE
0' 40' 80' 120'
(IN FEET)
1 INCH = 40 FT

Public
Water Distribution / Extension System

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City of Raleigh
Public Utilities Department Permit # W-3961

Authorization to Construct _____

Date _____

Public
Sewer Collection / Extension System

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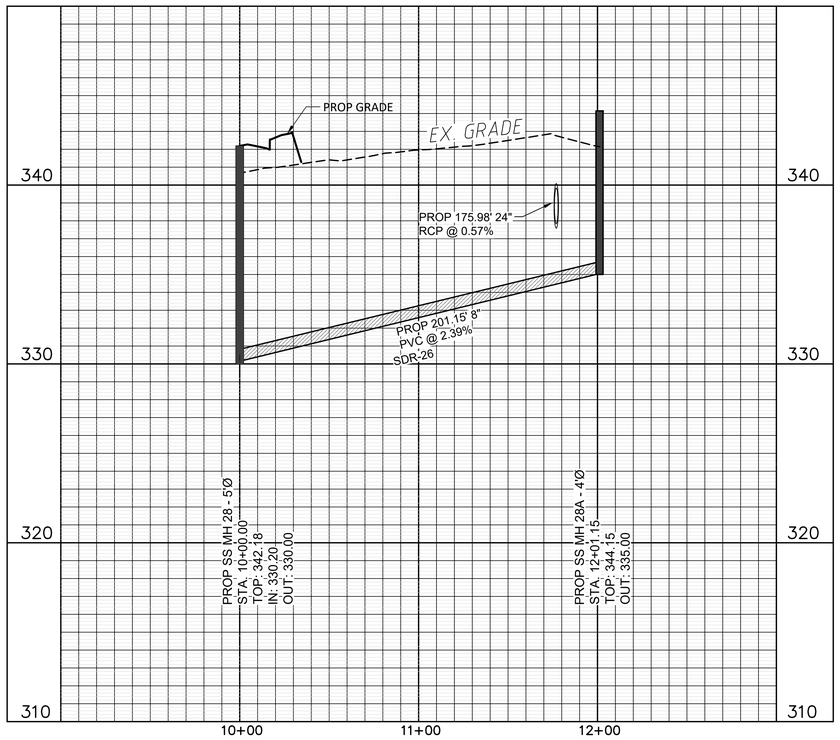
City of Raleigh
Public Utilities Department Permit # S-5098

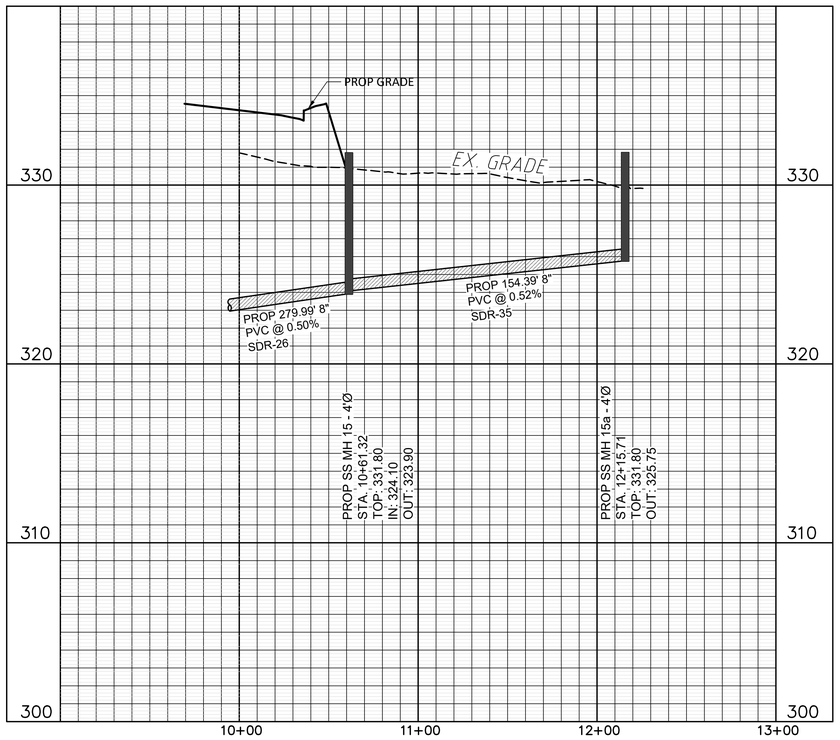
Authorization to Construct _____

Date _____

Sanitary Sewer Outfall D



Sanitary Sewer Outfall E



Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions

07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
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09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

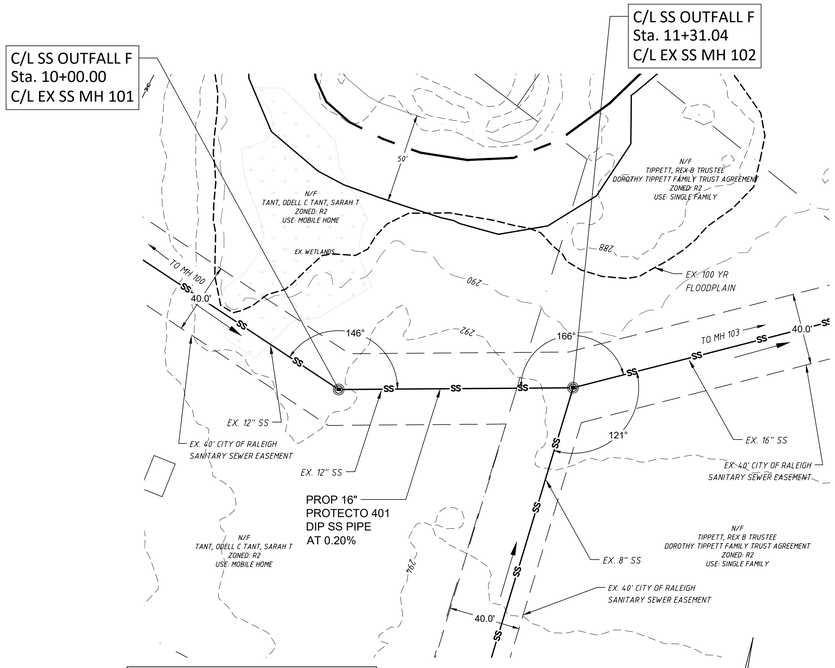
Project
Clifton Grove

Sanitary Sewer Outfall D & Outfall E

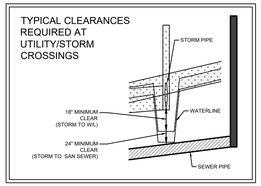
Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

Sheet
CS-35



TYPICAL CLEARANCES REQUIRED AT UTILITY/STORM CROSSINGS



ALL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH CURRENT CITY OF RALEIGH AND/OR NCDOT STANDARDS AND SPECIFICATIONS.

GRAPHIC SCALE
0' 40' 80' 120'
(IN FEET)
1 INCH = 40 FT

Note:
A bypass plan sealed by a NC Professional Engineer must be submitted to Public Utilities prior to pumping operations to coordinate with administration engineering staff. Pumps should be sized to handle the peak daily flow (2.5Xaverage daily flow) for the line or area of work. The contractor shall secure pumps from a pump supplier according to the provided flow information. Pumping operations must be monitored 24 hours per day for each day of the pumping operation by qualified personnel in order to respond to problems or failures. 100% redundancy is required for pumping operations. In addition, back pumps are to be connected to the bypass force main to facilitate immediate use upon failure of the primary pumps.

Additional Notes:

1. **The locations of the suction and discharge manholes for each of the pipe segments that are to be replaced are identified on these plans. The replacements of the identified outfall segments shall be performed sequentially--with the initial replacement segment being physically accomplished such that the new segment is in place and operational prior to disruption in service of the subsequent segment to be replaced. The work shall be coordinated with and in conformity to the notification and inspection procedures of the City of Raleigh Public Utilities Department, and shall be conducted so as to conform to the following general sequence:**
   - **Install all temporary silt and tree protection fencing**
   - **Clear only the minimum area required for access and performance of the work.**
   - **Install pump and temporary force main from the first manhole upstream from the segment to be replaces to the first manhole downstream of the segment to be replaced---includes plugging of outlet pipe at upstream manhole followed by plugging of inlet pipe at downstream manhole.**
   - **Once pump-around operation is underway and functioning, excavate and remove existing pipe to be replaced and install the replacement pipe on the same invert grade and alignment as the existing pipe.**
   - **Seal openings at upstream and downstream manholes.**
   - **Stabilized all disturbed areas by seeding and mulching.**
   - **Upon establishment of vegetative cover, remove all temporary erosion control measures and tree protection fencing.**

   All work is to be conducted in conformity to the standards, and inspection and testing procedures of the City of Raleigh.

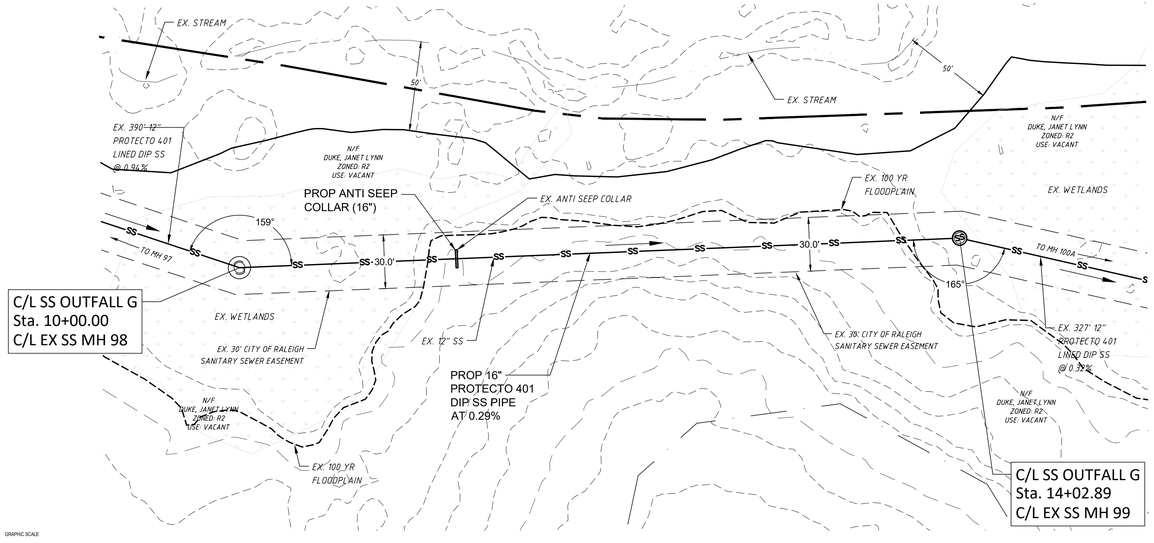
2. **For each of the proposed pipe replacement segments, The following specific information is provided for the proposed pump-around operation for each of the pipe segments to be replaced:**

   Segment A (MH 99 to MH 98)
   - **Suction Manhole MH 97**
   - **Discharge Manhole MH 100A**
   - **Suction Static Lift 11.0**
   - **Discharge static lift -17.2**
   - **Approximate length of force main 1117 l.f.**
   - **Peak flow 190 GPM**

   Segment B (MH 102 to MH 101)
   - **Suction Manhole MH 100**
   - **Discharge Manhole MH 103**
   - **Suction Static Lift 14.0**
   - **Discharge static lift -17.0**
   - **Approximate length of force main 570 l.f.**
   - **Peak flow 190 GPM**

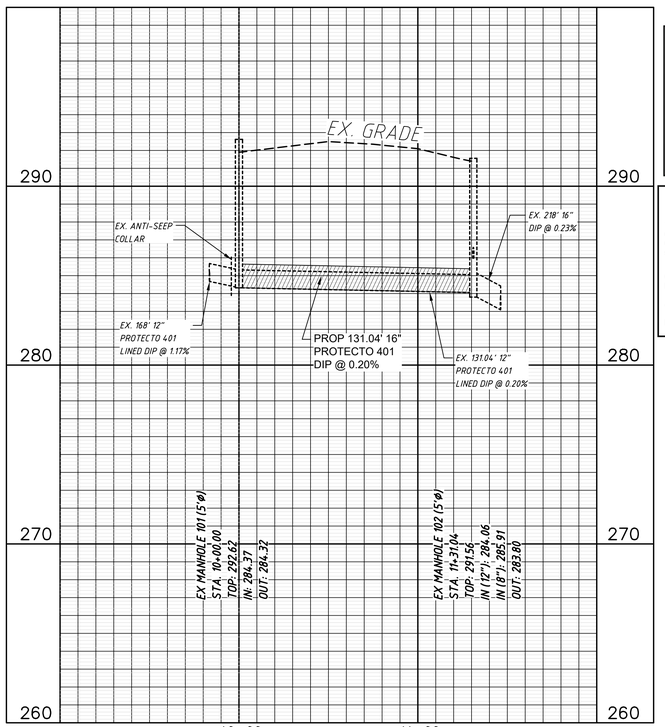
   Pump rate is based on 2.5 x avg. daily flow (estimated to be 76 GPM based on COR metering data); => Pump Rate =190 GPM

3. **Prior to initiating work, contractor shall submit to the City of Raleigh Public Utilities Department hydraulic pump design satisfying the above criteria, sealed by a NC Professional Engineer, and receive concurrence of acceptability from the Department.**



GRAPHIC SCALE
0' 40' 80' 120'
(IN FEET)
1 INCH = 40 FT

Sanitary Sewer Outfall F



Public
Water Distribution / Extension System
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City of Raleigh
Public Utilities Department Permit # W-3961

Authorization to Construct _____

Date _____

Public
Sewer Collection / Extension System
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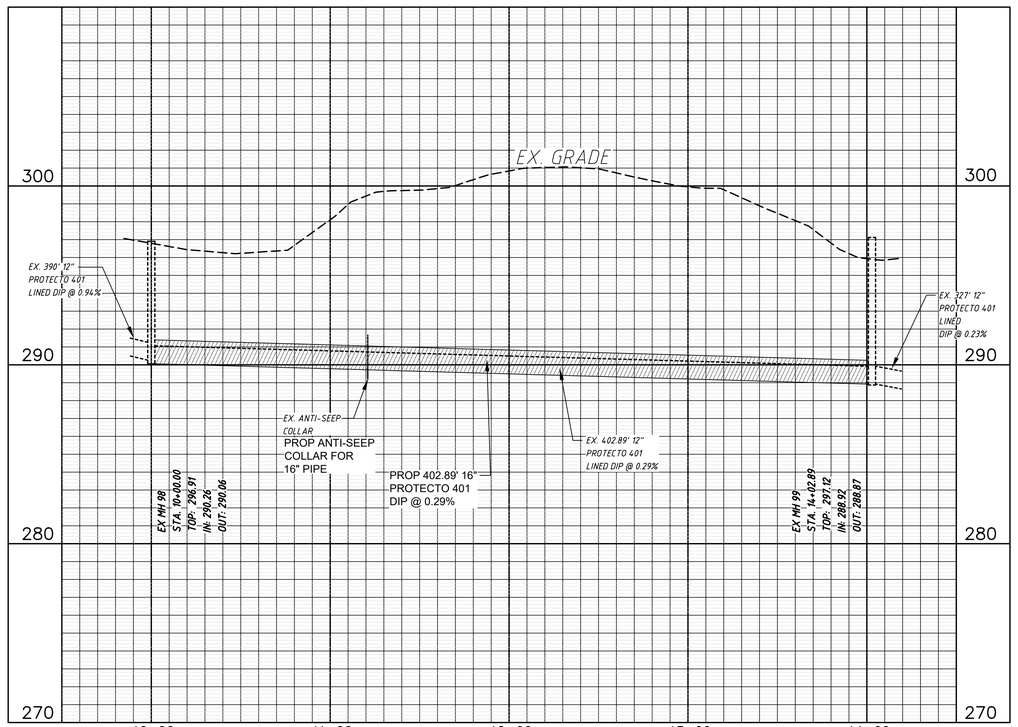
City of Raleigh
Public Utilities Department Permit # S-5098

Authorization to Construct _____

Date _____

Sanitary Sewer Outfall G



Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/11/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

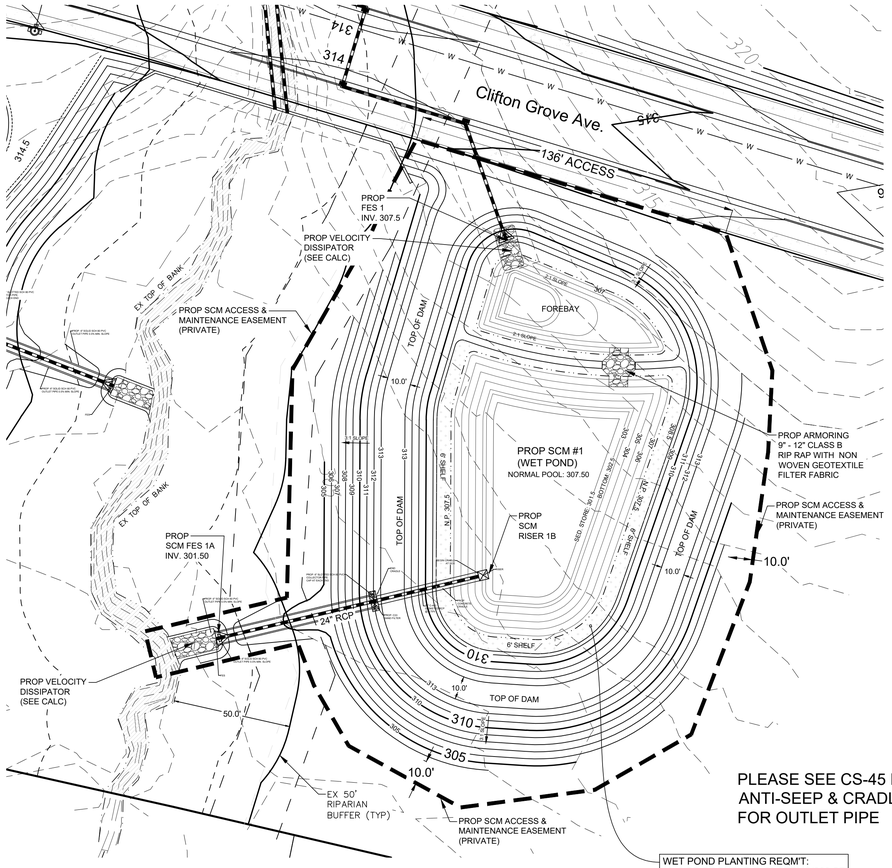
Project
Clifton Grove

Sanitary Sewer Outfall F & Outfall G

Date
February 15, 2022

Scale
Horiz: 1" = 40'
Vert: 1" = 4'

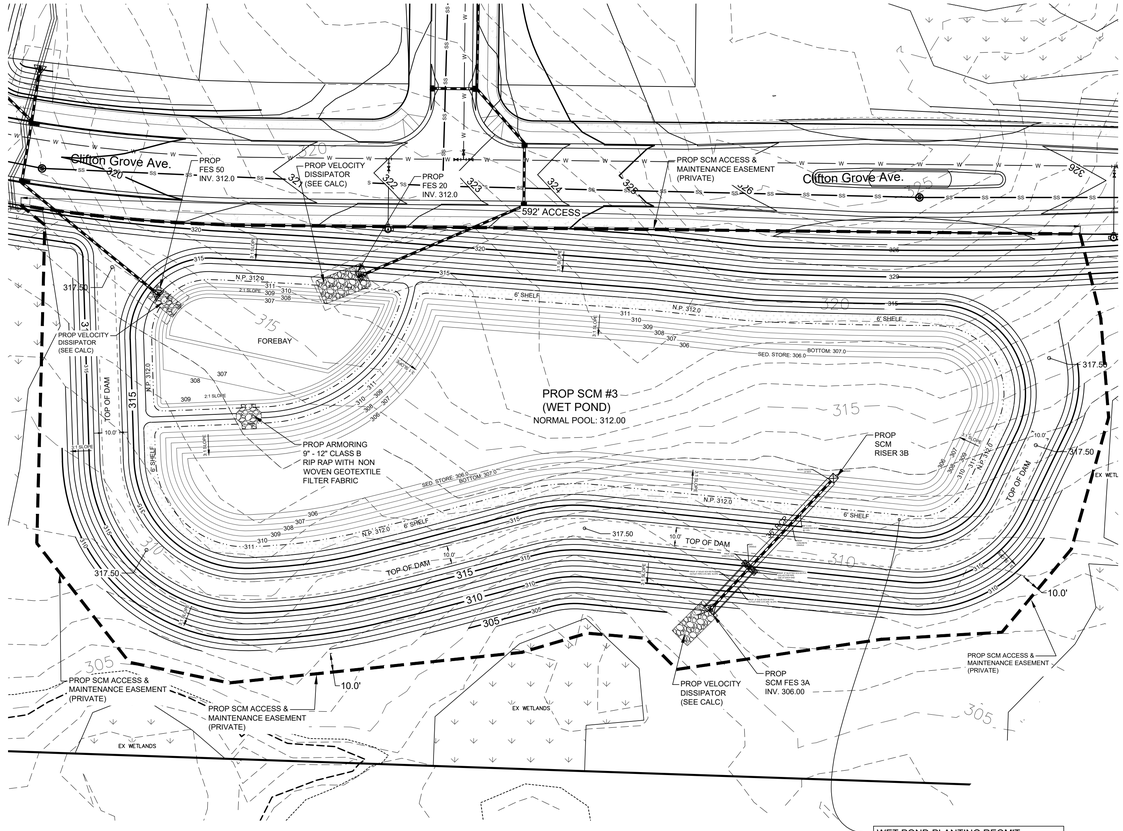
Sheet
CS-35a



PLEASE SEE CS-45 FOR ANTI-SEEP & CRADLE DETAILS FOR OUTLET PIPE

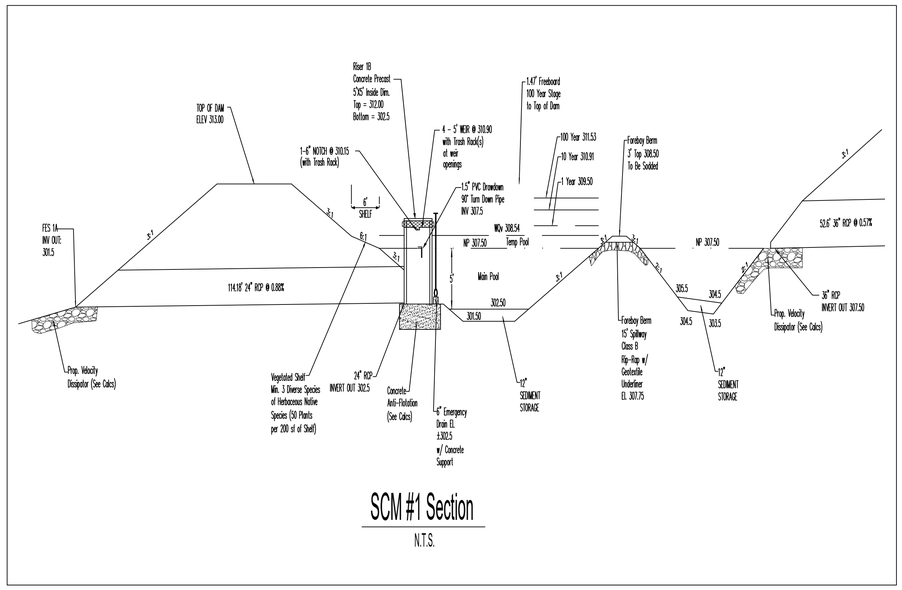
WET POND PLANTING REQM'T:
1810 SF OF SHELF @ 50 STEMS/200 SF
(1810/200)*50 = 453 STEMS REQUIRED

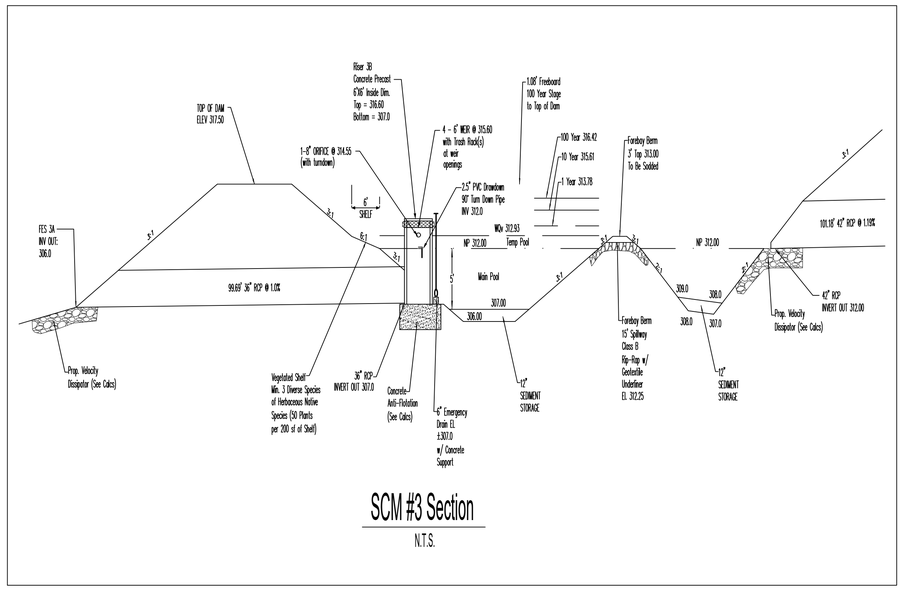
6' SHELF - SHALLOW LAND
151-Eupatoriadelphus fistulosus - 'Joe Pye Weed'
151-Carex tenera - 'Quill Sedge'
151-Rhyncholspora colorata - 'Starrush Whitetop'



WET POND PLANTING REQM'T:
5604 SF OF SHELF @ 50 STEMS/200 SF
(5604/200)*50 = 1401 STEMS REQUIRED

6' SHELF - SHALLOW LAND
467-Eupatoriadelphus fistulosus - 'Joe Pye Weed'
467-Carex tenera - 'Quill Sedge'
467-Rhyncholspora colorata - 'Starrush Whitetop'





Wm. G. Daniel & Assoc.
Engineering Planning
Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
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10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

SCM 1 & 3 Details

Date
February 15, 2022

Scale
As Shown

Sheet
CS-36

11/14/2024

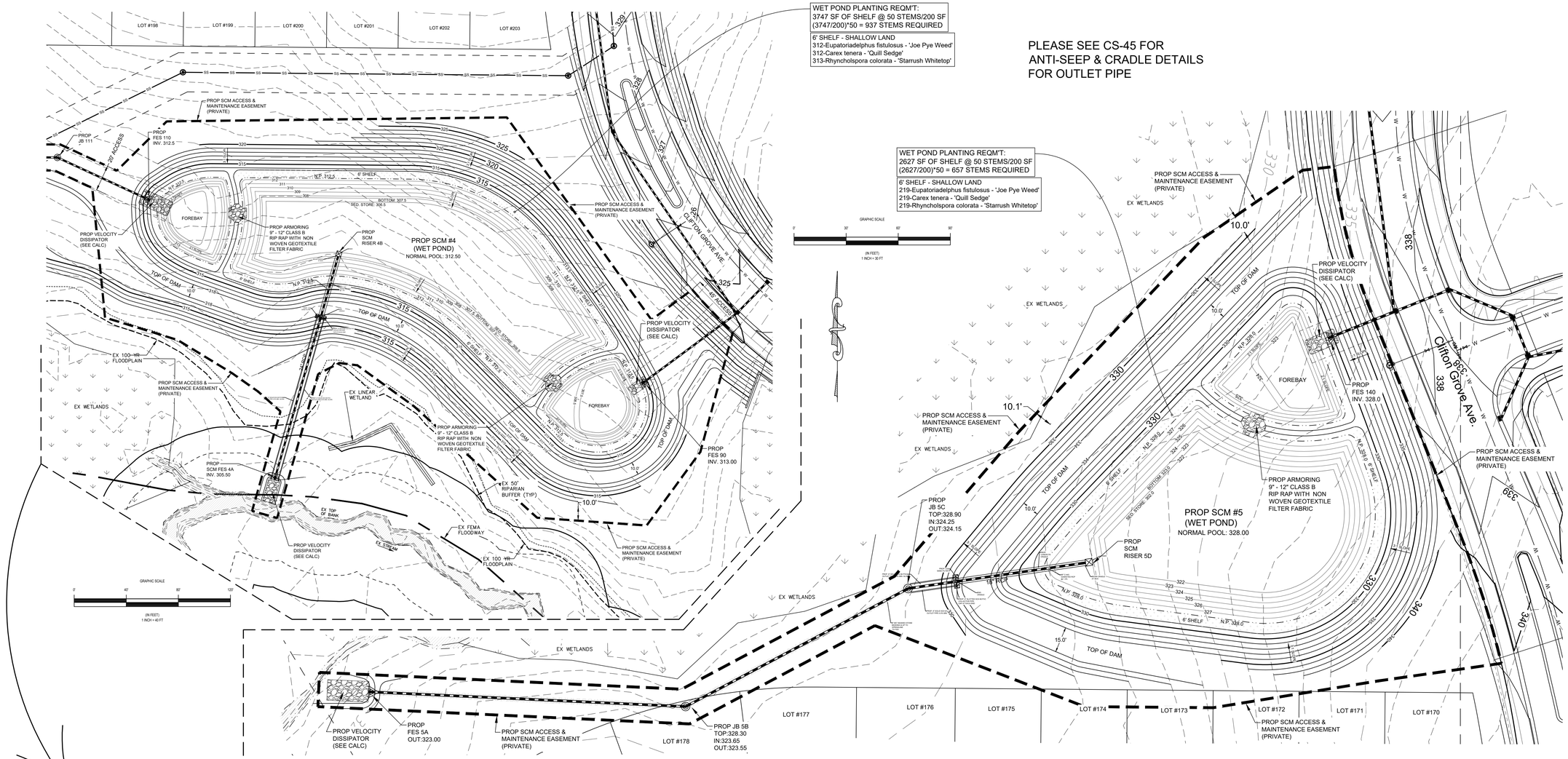
WET POND PLANTING REQM'T:
3747 SF OF SHELF @ 50 STEMS/200 SF
(3747/200)*50 = 937 STEMS REQUIRED

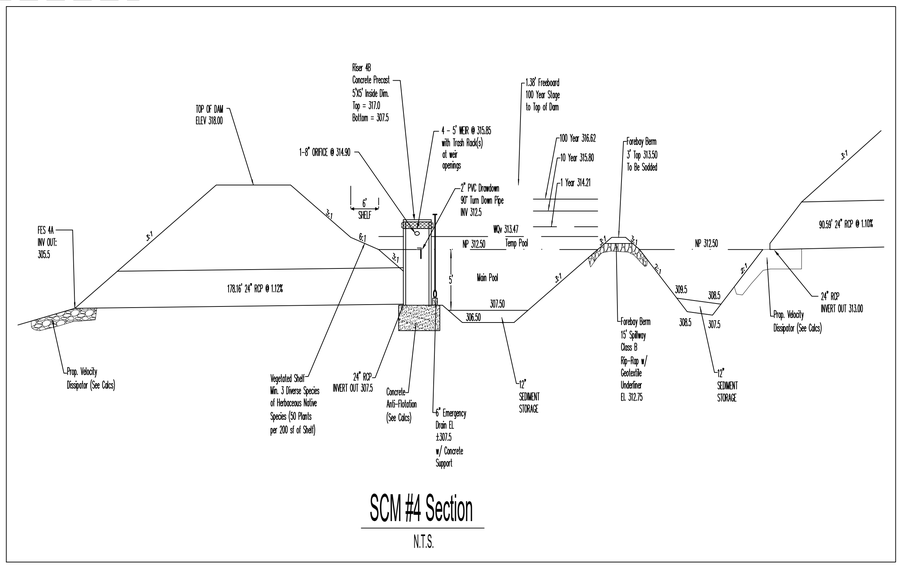
6' SHELF - SHALLOW LAND
312-Eupatoriadelphus fistulosus - 'Joe Pye Weed'
312-Carex tenera - 'Quill Sedge'
313-Rhyncholspora colorata - 'Starrush Whitetop'

PLEASE SEE CS-45 FOR
ANTI-SEEP & CRADLE DETAILS
FOR OUTLET PIPE

WET POND PLANTING REQM'T:
2627 SF OF SHELF @ 50 STEMS/200 SF
(2627/200)*50 = 657 STEMS REQUIRED

6' SHELF - SHALLOW LAND
219-Eupatoriadelphus fistulosus - 'Joe Pye Weed'
219-Carex tenera - 'Quill Sedge'
219-Rhyncholspora colorata - 'Starrush Whitetop'





SCM #4 Section
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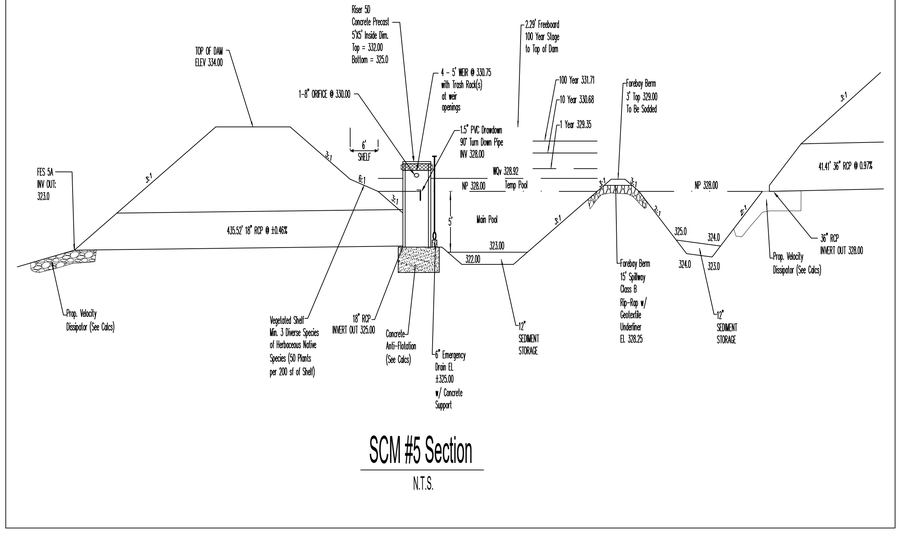

SCM #5 Section
N.T.S.

Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
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Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

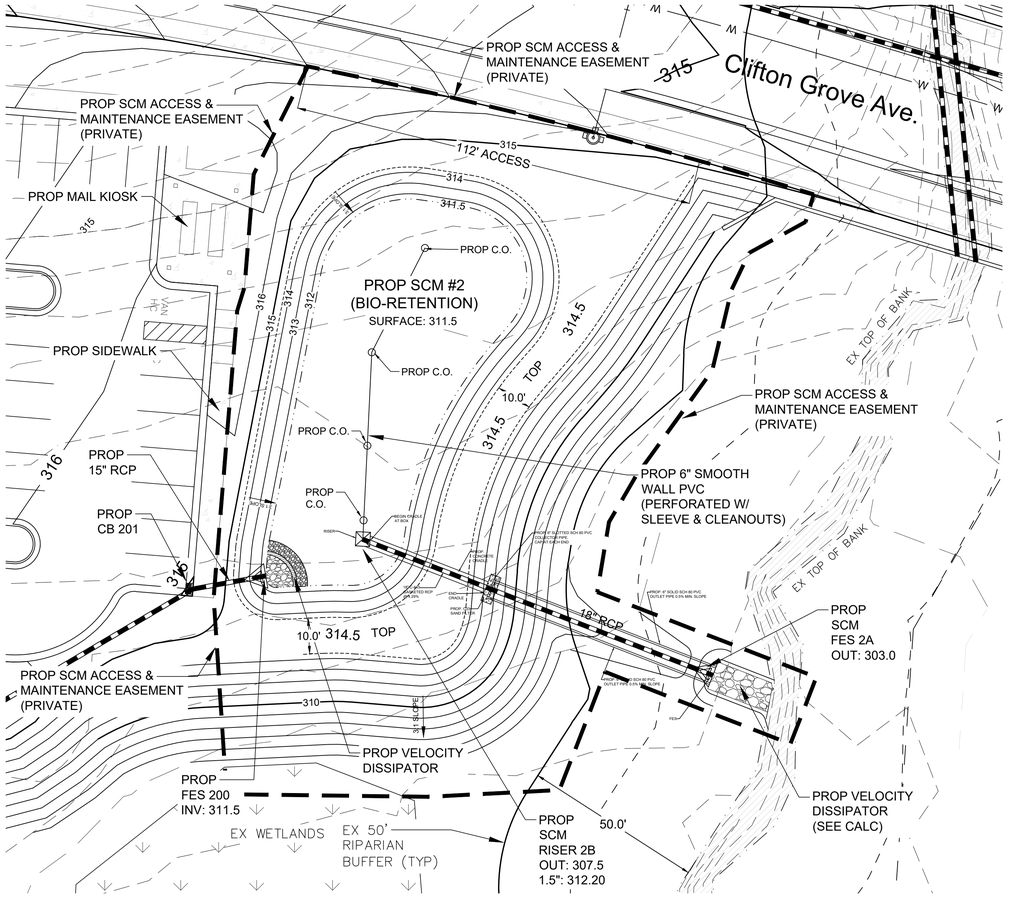
SCM 4 & 5 Details

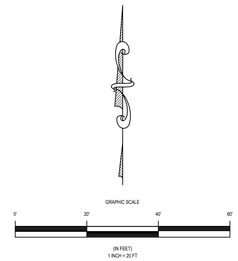
Date
February 15, 2022

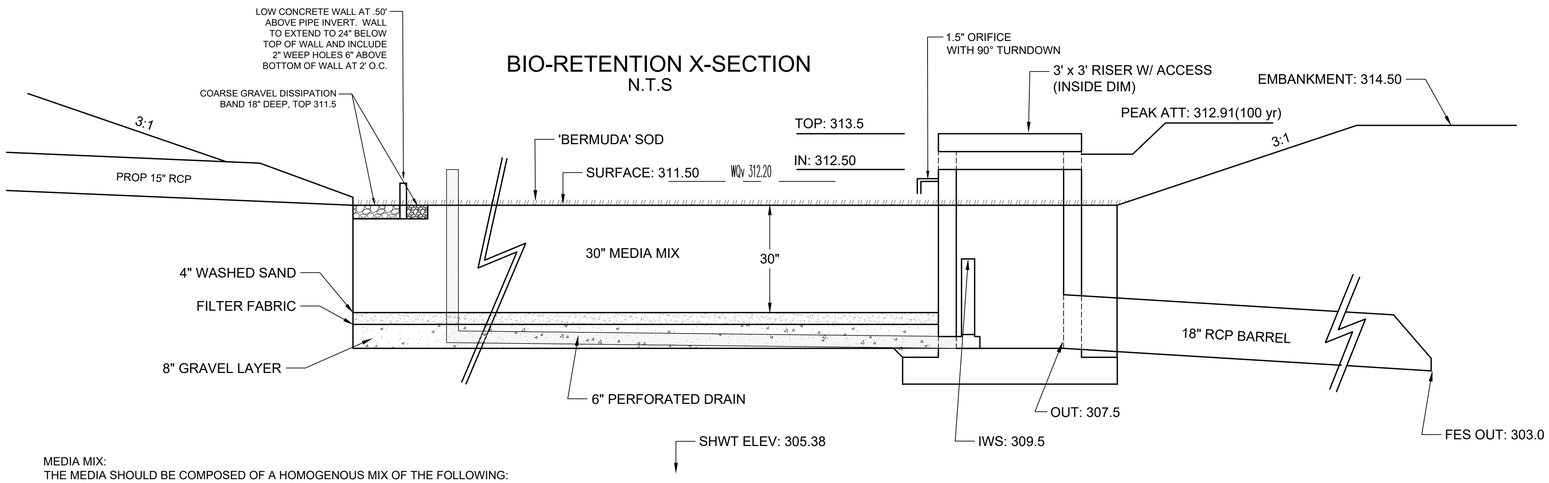
Scale
As Shown

Sheet
CS-37

PLEASE SEE CS-45 FOR
ANTI-SEEP & CRADLE DETAILS
FOR OUTLET PIPE







MEDIA MIX:
THE MEDIA SHOULD BE COMPOSED OF A HOMOGENOUS MIX OF THE FOLLOWING:
A. 75-85% MEDIUM TO COARSE WASHED SAND
B. 8-10% FINES (SILT AND CLAY); AND
C. 5-10% ORGANIC MATTER (SUCH AS PINE PARK FINES)

Wm. G. Daniel & Assoc.
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NORTH CAROLINA PROFESSIONAL SEAL 7498 ENGINEER WILLIAM G. DANIEL
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919.497.2163

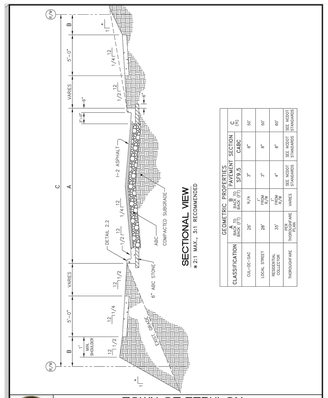
Project
Clifton Grove

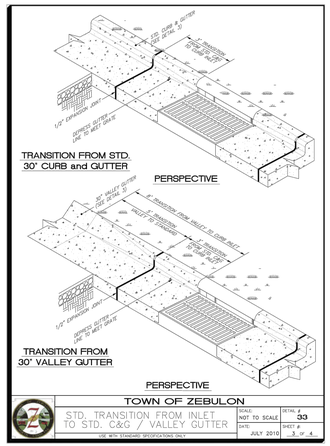
SCM 2 Details

Date
February 15, 2022

Scale
1" = 20'

Sheet
CS-38


SECTIONAL VIEW
* 2:1 MAX., 3:1 RECOMMENDED
GEOMETRIC PROPERTIES
SECTION
CLASSIFICATION
CURB HEIGHT
GUTTER WIDTH
GUTTER SLOPE
CURB SLOPE
CURB RADIUS
CURB TYPE
GUTTER TYPE
CONCRETE
ASPHALT
COMPACTED SUBGRADE
6" ABC STONE
CURB & GUTTER
CONCRETE APRON
DRIVEWAY
SIDEWALK
CONCRETE CURB
ASPHALT CURB
CONCRETE SWALE
ASPHALT SWALE
GRASS SWALE
CONCRETE SWALE
ASPHALT SWALE
GRASS SWALE
SEE ABOVE (STANDARD)
SEE ABOVE (STANDARD)
SEE ABOVE (STANDARD)

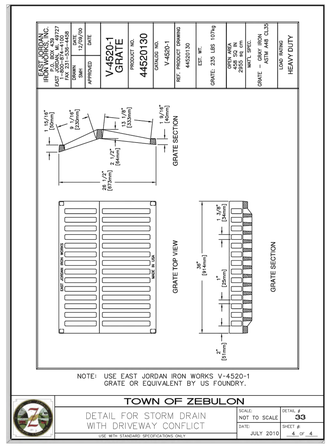


TOWN OF ZEBULON

STD. TRANSITION FROM INLET TO STD. C&G / VALLEY GUTTER

SCALE: NOT TO SCALE | DETAIL #: 33 | DATE: JULY 2010 | SHEET #: 3_of_4_

USE WITH STANDARD SPECIFICATIONS ONLY



NOTE: USE EAST JORDAN IRON WORKS V-4520-1 GRATE OR EQUIVALENT BY US FOUNDRY.

TOWN OF ZEBULON

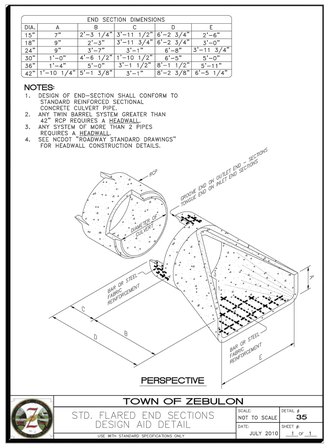
DETAIL FOR STORM DRAIN WITH DRIVEWAY CONFLICT

SCALE: NOT TO SCALE | DETAIL #: 33 | DATE: JULY 2010 | SHEET #: 4_of_4_

USE WITH STANDARD SPECIFICATIONS ONLY

END SECTION DIMENSIONS					
DIA.	A	B	C	D	E
15"	7"	2'-3 1/4"	3'-11 1/2"	8'-2 3/4"	2'-6"
18"	9"	2'-3"	3'-11 3/4"	8'-2 3/4"	3'-0"
24"	9"	3'-2"	3'-1"	8'-8"	3'-11 3/4"
30"	1'-0"	4'-6 1/2"	3'-10 1/2"	8'-5"	5'-0"
36"	1'-4"	5'-0"	3'-1 1/2"	8'-1 1/2"	5'-11"
42"	1'-10 1/4"	5'-1 3/8"	3'-1"	8'-2 3/8"	6'-5 1/4"

NOTES:
1. DESIGN OF END-SECTION SHALL CONFORM TO STANDARD REINFORCED SECTIONAL CONCRETE CULVERT PIPE.
2. ANY TWIN BARREL SYSTEM GREATER THAN 42" RCP REQUIRES A HEADWALL.
3. ANY SYSTEM OF MORE THAN 2 PIPES REQUIRES A HEADWALL.
4. SEE NCDOT "ROADWAY STANDARD DRAWINGS" FOR HEADWALL CONSTRUCTION DETAILS.



TOWN OF ZEBULON

STD. FLARED END SECTIONS DESIGN AID DETAIL

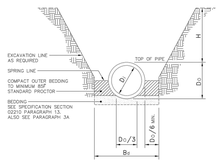
SCALE: NOT TO SCALE | DETAIL #: 35 | DATE: JULY 2010 | SHEET #: 1_of_1_

USE WITH STANDARD SPECIFICATIONS ONLY

PIPE D_i	MAX. B_d	MAX. BURY H CLASS III (CLASS A&B)	MAX. BURY H CLASS IV (CLASS A&B)
15"	4'	8.5'	14.5'
18"	4'	8.5'	15.0'
24"	4'	13.0'	23.5'
30"	5.5'	10.0'	17.0'
36"	6'	10.5'	18.0'
42"	6.5'	13.0'	19.0'
48"	7'	13.0'	18.5'
54"	8'	13.0'	18.5'
60"	9'	11.0'	18.0'
72"	10'	13.0'	19.0'

D_i = INSIDE DIAMETER OF PIPE
D_o = OUTSIDE DIAMETER OF PIPE
B_d = TRENCH WIDTH
H = BACKFILL COVER ABOVE TOP OF PIPE

THIS TABLE ASSUMES TYPE 4 INSTALLATION & NO STONE BEDDING



NOTES:
1. FOR OTHER BURY DEPTHS THAN SHOWN (H), NORTH CAROLINA PE TO PROVIDE CALCS ON PIPE BURY THAT EXCEED THOSE GIVEN IN THIS CHART FOR THE CONDITIONS IN WHICH IT IS PROPOSED TO BE USED.
2. THIS TABLE OF BURY DEPTHS (H) APPLIES EQUALLY TO A CLASS C STONE BEDDING, TYPE 4, LAYING CONDITIONS.
3. MINIMUM COVER NOT SHOWN BUT NO LESS THAN 12" W/O ENGINEERS APPROVAL UP TO 48" PIPE.

TOWN OF ZEBULON

STD. TRENCH INSTALLATION FOR CONCRETE PIPE (FOR CONTRACTOR'S USE)

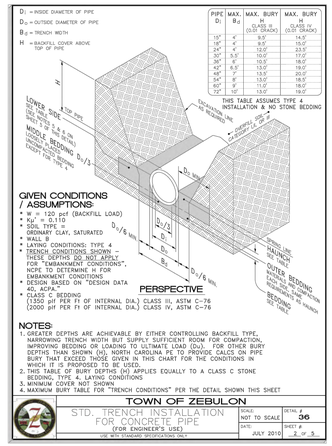
SCALE: NOT TO SCALE | DETAIL #: 36 | DATE: JULY 2010 | SHEET #: 1_of_3_

USE WITH STANDARD SPECIFICATIONS ONLY

PIPE D_i	MAX. B_d	MAX. BURY H CLASS III (CLASS A&B)	MAX. BURY H CLASS IV (CLASS A&B)
15"	4'	8.5'	14.5'
18"	4'	8.5'	15.0'
24"	4'	13.0'	23.5'
30"	5.5'	10.0'	17.0'
36"	6'	10.5'	18.0'
42"	6.5'	13.0'	19.0'
48"	7'	13.0'	18.5'
54"	8'	13.0'	18.5'
60"	9'	11.0'	18.0'
72"	10'	13.0'	19.0'

THIS TABLE ASSUMES TYPE 4 INSTALLATION & NO STONE BEDDING

D_i = INSIDE DIAMETER OF PIPE
D_o = OUTSIDE DIAMETER OF PIPE
B_d = TRENCH WIDTH
H = BACKFILL COVER ABOVE TOP OF PIPE



GIVEN CONDITIONS / ASSUMPTIONS:
- W = 120 pcf (BACKFILL LOAD)
- $K\mu'$ = 0.110
- SOIL TYPE = ORDINARY CLAY, SATURATED
- WALL B
- LAYING CONDITIONS: TYPE 4
- TRENCH CONDITIONS SHOWN – THESE DEPTHS DO NOT APPLY FOR "EMBANKMENT CONDITIONS", SEE TABLE FOR TRENCH EMBANKMENT CONDITIONS
- DESIGN BASED ON "DESIGN DATA 4S, ACPA"
- CLASS C BEDDING (1350 pif PER FT OF INTERNAL DIA.) CLASS III, ASTM C-76 (2000 pif PER FT OF INTERNAL DIA.) CLASS IV, ASTM C-76

NOTES:
1. GREATER DEPTHS ARE ACHIEVABLE BY EITHER CONTROLLING BACKFILL TYPE, NARROWING TRENCH WIDTH BUT SUPPLY SUFFICIENT ROOM FOR COMPACTION, IMPROVING BEDDING OR LOADING TO ULTIMATE LOAD (D_u). FOR OTHER BURY DEPTHS THAN SHOWN (H), NORTH CAROLINA PE TO PROVIDE CALCS ON PIPE BURY THAT EXCEED THOSE GIVEN IN THIS CHART FOR THE CONDITIONS IN WHICH IT IS PROPOSED TO BE USED.
2. THIS TABLE OF BURY DEPTHS (H) APPLIES EQUALLY TO A CLASS C STONE BEDDING, TYPE 4, LAYING CONDITIONS
3. MINIMUM COVER NOT SHOWN
4. MAXIMUM BURY TABLE FOR "TRENCH CONDITIONS" PER THE DETAIL SHOWN THIS SHEET

TOWN OF ZEBULON

STD. TRENCH INSTALLATION FOR CONCRETE PIPE (FOR ENGINEER'S USE)

SCALE: NOT TO SCALE | DETAIL #: 36 | DATE: JULY 2010 | SHEET #: 2_of_3_

USE WITH STANDARD SPECIFICATIONS ONLY

Table 1 Equivalent USCS and AASHTO Soil Classification for SIDD Soil Designations				
	Representative Soil Types		Percent Compaction	
SIDD Soil	USCS,	AASHTO	Standard Proctor	Modified Proctor
Gravelly Sand (Category I)	SW, SP, GW, GP	A1,A3	100 95 90 80 70	95 90 85 75 65
Sandy Soil (Category II)	SM, SM, SC with less than 20% passing #200 sieve	A2,A4	100 95 90 80 70	95 90 85 80 65
Silty Clay (Category III)	CL, MH GC, SC CH	A5,A6 A7	100 95 90 80 65 100 95 90 80 65	90 85 80 70 60 90 85 80 70 60

TOWN OF ZEBULON

STD. TRENCH INSTALLATION (TRENCH CONDITION SHOWN)

SCALE: NOT TO SCALE | DETAIL #: 36 | DATE: JULY 2010 | SHEET #: 3_of_5_

USE WITH STANDARD SPECIFICATIONS ONLY

Table 2 Standard EMBANKMENT Installation Soils and Minimum Compaction Requirements			
Installation Type *	Bedding Thickness	Haunch and Outer Bedding	Lower Side
Type 1	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	98% Category I	90% Category I, 95% Category II, or 100% Category III
Type 2	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	90% Category I or 95% Category II	85% Category I, 90% Category II, or 95% Category III
Type 3	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	85% Category I, 90% Category II, or 95% Category III	85% Category I, 90% Category II, or 95% Category III
Type 4	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	No compaction required, except if Category III, use 85% Category III	No compaction required, except if Category III, use 85% Category III

Notes:
1. Compaction and soils symbols – i.e. "98% Category I" refers to Category 1 soil material with a minimum standard Proctor compaction of 98%. See Table 1 for equivalent modified Proctor values.
2. Soil in the outer bedding, haunch, and lower side zones, except within D0/3 from the pipe springline, shall be compacted to at least the same compaction as the majority of the soil in the overfill zone.
3. Subtrenches
   3.1 A subtrench is defined as a trench with its top below finished grade by more than 0.1 H or, for roadways, its top is at an elevation lower than 0.3 m (1') below the bottom of the pavement base material.
   3.2 The minimum width of a subtrench shall be 1.33 D_o or wider if required for adequate space to attain the specified compaction in the haunch and bedding zones.
   3.3 For subtrenches with wall of natural soil, any portion of the lower side zone in the subtrench wall shall be at least as firm as an equivalent soil placed to the compaction requirements specified for the lower side zone and as firm as the majority of soil in the overfill zone, or shall be removed and replaced with soil compacted to the specified level.
4. Type 1 installation = relatively high quality material & high compaction effort. Type 4 installation = little or no control over material and compaction.

TOWN OF ZEBULON

STD. TRENCH INSTALLATION (TRENCH CONDITION SHOWN)

SCALE: NOT TO SCALE | DETAIL #: 36 | DATE: JULY 2010 | SHEET #: 4_of_5_

USE WITH STANDARD SPECIFICATIONS ONLY

Table 3 Standard TRENCH Installations Soils and Minimum Compaction Requirements			
Installation Type	Bedding Thickness	Haunch and Outer Bedding	Lower Side
Type 1	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	98% Category I	90% Category I, 95% Category II, or 100% Category III
Type 2	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	90% Category I or 95% Category II	85% Category I, 90% Category II, or 95% Category III
Type 3	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	85% Category I, 90% Category II, or 95% Category III	85% Category I, 90% Category II, or 95% Category III
Type 4	$D_o/24$ minimum, not less than 75 mm (3"). If rock foundation, use $D_o/12$ minimum, not less than 150 mm (6").	No compaction required, except if Category III, use 85% Category III	No compaction required, except if Category III, use 85% Category III

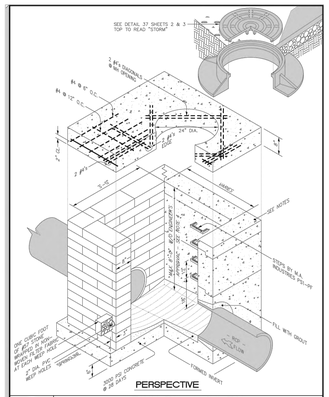
Notes:
1. Compaction and soils symbols – i.e. "98% Category I" refers to Category I soil materials with minimum standard Proctor compaction of 98%. See Table 1 for equivalent modified Proctor values.
2. The trench top elevation shall be no lower than 0.1 H below finished grade or, for roadways, its top shall be no lower than an elevation of 0.3 m (1') below the bottom of the pavement base material.
3. Soil in bedding and haunch zones shall be compacted to at least the same compaction as specified for the majority of soil in the backfill zone.
4. The trench width shall be wider than shown if required for adequate space to attain the specified compaction in the haunch and bedding zone.
5. For trench walls that are within 10 degrees of vertical, the compaction or firmness of the soil in the trench walls and lower side zone need not be considered.
6. For trench walls with greater than 10 degrees slopes that consist of embankment, the lower side shall be compacted to at least the same compaction as specified for the soil in the backfill zone.
7. Type 1 installation = relatively high quality material & high compaction effort. Type 4 installation = little or no control over material and compaction.

TOWN OF ZEBULON

STD. TRENCH INSTALLATION (TRENCH CONDITION SHOWN)

SCALE: NOT TO SCALE | DETAIL #: 36 | DATE: JULY 2010 | SHEET #: 5_of_5_

USE WITH STANDARD SPECIFICATIONS ONLY

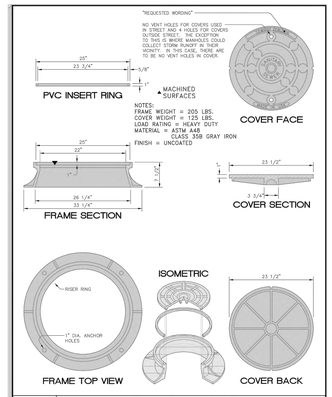


TOWN OF ZEBULON

STD. M.H. J.B. VARIABLE LENGTH

SCALE: NOT TO SCALE | DETAIL #: 37 | DATE: JULY 2010 | SHEET #: 1_of_3_

USE WITH STANDARD SPECIFICATIONS ONLY

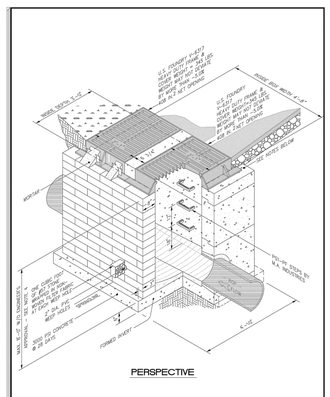


TOWN OF ZEBULON

STANDARD MANHOLE & RING US FOUNDRY 700 KL

SCALE: NOT TO SCALE | DETAIL #: 37 | DATE: JULY 2010 | SHEET #: 3_of_3_

USE WITH STANDARD SPECIFICATIONS ONLY

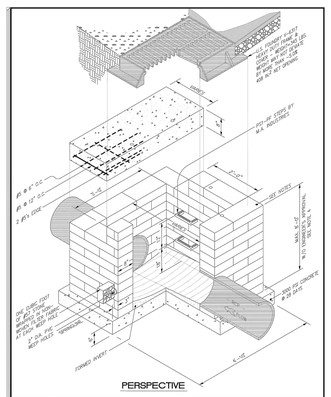


TOWN OF ZEBULON

STD. MULTIPLE 2' x 3' CATCH BASIN DETAIL

SCALE: NOT TO SCALE | DETAIL #: 38 | DATE: JULY 2010 | SHEET #: 1_of_1_

USE WITH STANDARD SPECIFICATIONS ONLY

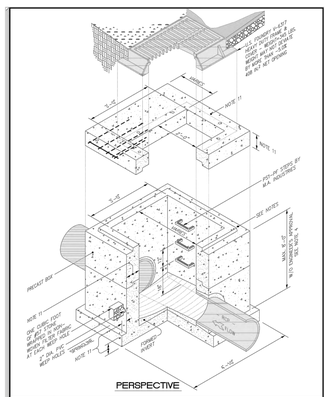


TOWN OF ZEBULON

STD. 3' x VARIABLE LENGTH BOX WITH 2' x 3' C.B.

SCALE: NOT TO SCALE | DETAIL #: 39 | DATE: JULY 2010 | SHEET #: 1_of_2_

USE WITH STANDARD SPECIFICATIONS ONLY

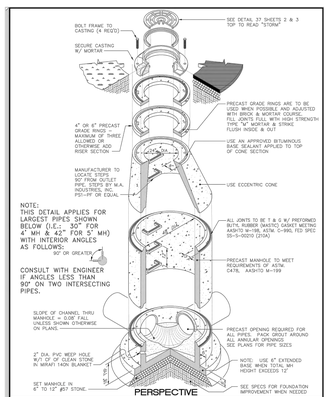


TOWN OF ZEBULON

STD. 3' x VARIABLE LENGTH PRECAST BOX WITH 2' x 3' C.B.

SCALE: NOT TO SCALE | DETAIL #: 39 | DATE: JULY 2010 | SHEET #: 2_of_2_

USE WITH STANDARD SPECIFICATIONS ONLY

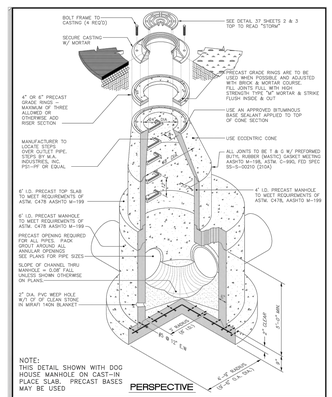


TOWN OF ZEBULON

PRECAST CONCRETE 4' DIA. MH JB

SCALE: NOT TO SCALE | DETAIL #: 40 | DATE: JULY 2010 | SHEET #: 1_of_1_

USE WITH STANDARD SPECIFICATIONS ONLY



TOWN OF ZEBULON

PRECAST CONCRETE 6' TO 4' DIA. MH JB

SCALE: NOT TO SCALE | DETAIL #: 41 | DATE: JULY 2010 | SHEET #: 1_of_1_

USE WITH STANDARD SPECIFICATIONS ONLY

Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/1/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
Watson Family II LLC
6220 Forestville Road
Raleigh NC 27604
919.819.5509

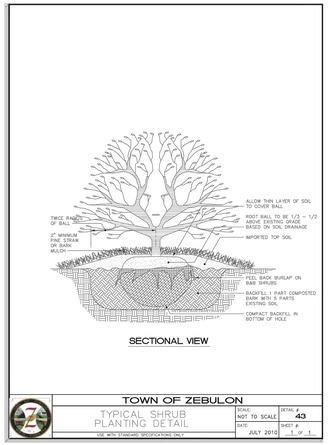
Project
Clifton Grove

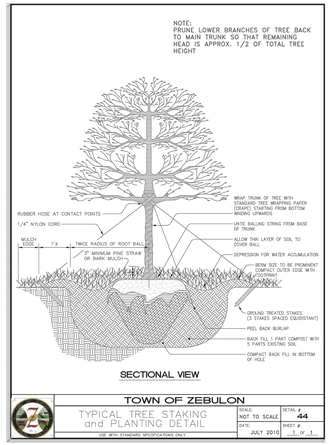
Details

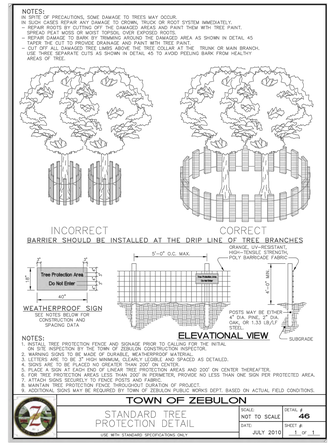
Date
February 15, 2022

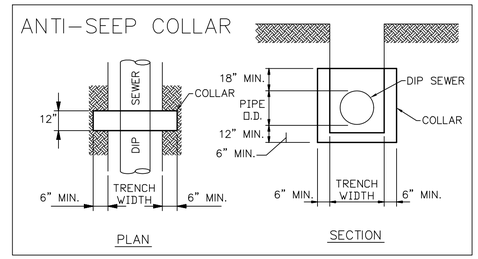
Scale
None

Sheet
CS-40



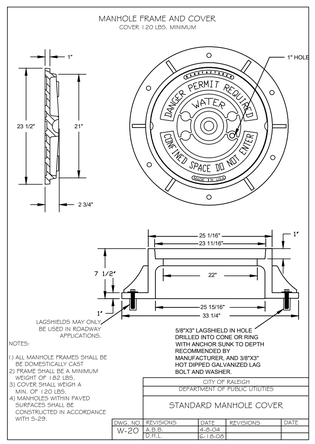


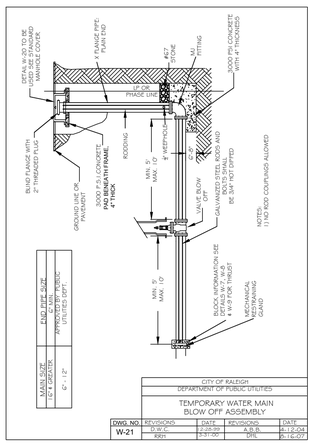


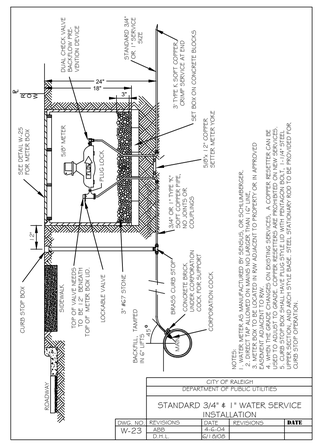


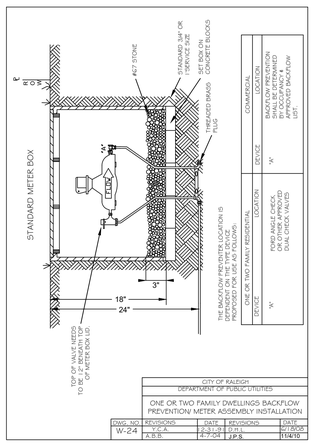
A. Anti-seep Collars: Provide anti-seep collars to prevent groundwater flow along pipe in wetlands as indicated on the Drawings. Use select clay material for collars. Collars shall extend past trench walls and bear against undisturbed soils. Dimension of collars shall be as indicated on the Drawings. Do not place stone in area of anti-seep collars.

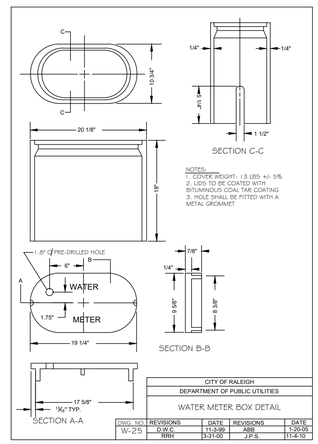
B. Clay Collar: Provide clay of medium to high plasticity with a soil classification of CL or CH and a permeability of 10-5 cm / second. Place clay in 6-inch lifts and compact by use of a mechanical hydraulic tamper to 95 percent.











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NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions

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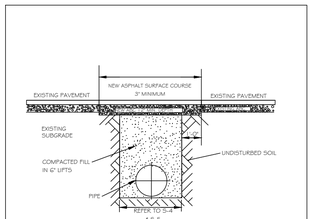
Project
Clifton Grove

Details

Date
February 15, 2022

Scale
None

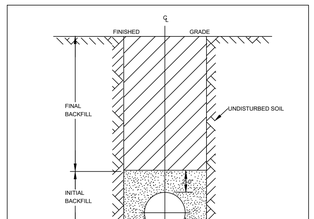
Sheet
CS-41



NOTES:
1. IN NCDOT MAINTAINED ROADWAYS ENCROACHMENT PAVEMENT PATCH REQUIREMENTS SHALL TAKE PRECEDENCE.
2. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAWCUT MACHINE.
3. 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.
4. THE FINAL 1' OF FILL SHALL CONSIST OF SELECT MATERIAL COMPACTED TO A DENSITY EQUAL TO 100% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-180 AS MODIFIED BY NCDOT.
5. THE ENTIRE THICKNESS AND VERTICAL FACE OF CUT SHALL BE TACKED.
6. THE FULL DEPTH OF PAVEMENT MATERIAL, WHICH EXISTS SHALL BE REINSTALLED, BUT IN NO CASE SHALL THE THICKNESS BE LESS THAN 6".
7. THE ASPHALT PAVEMENT MATERIAL SHALL BE INSTALLED AND COMPACTED THOROUGHLY WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH LEVEL PATCH.
8. REFER TO CITY OF RALEIGH STANDARDS FOR TRENCHED AND PIPE BEDDING (S-4 & S-5) FOR ADDITIONAL DETAILS
9. NO HAND PATCHING ALLOWED.
10. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD ASPHALT PAVEMENT PATCH DETAIL

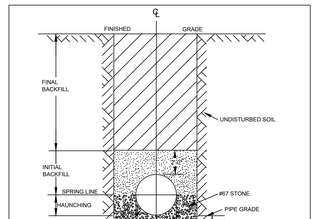
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-3	D.W.C.	1-1-1-2/93	A.B.B.	04-13-04
	RRH	3-30-00	J.P.S.	01-5-10



NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.
5. ACHIEVE 80% COMPACTION IN NON-TRAFFIC AREAS, AND 95% COMPACTION IN TRAFFIC AREAS.
6. IF IN EASEMENT 4" TOPSOIL, AND 12" CLEAN SELECT FILL MAY BE REQUIRED.
7. NO BOULDERS 8" IN DIAMETER OR GREATER ALLOWED IN FINAL BACKFILL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-4	B.W.C.	9-3-99		
	RRH	3-30-00		

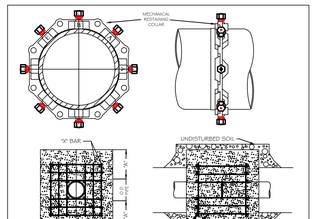


TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE

NOTES:
1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN

DWG. NO.	REVISIONS TO NOTES	DATE	REVISIONS	DATE
S-5	B.W.C.	5-1-97	D.W.C.	9-3-99
		7-2-02	RRH	3-30-00



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6" - 36"	#5	2'-0"+O.D. PIPE	1.043 LBS/FT	1'-0"	1.043 LBS/FT	A,2A, Y-12
42" & greater	#6	2'-0"+ O.D. PIPE	1.502 LBS/FT	1'-0"	1.913 BS EACH	A,2A, Y-12

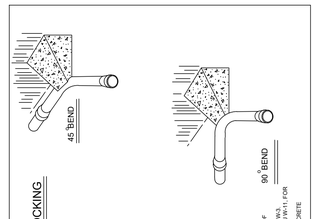
THRUST COLLAR AND THRUST BLOCK SCHEDULE

I.D. PIPE	"A"	"B"	"C"	"D"
4" - 12"	1'-4"	1'-0"	2"	5/8"
20" - 24"	1'-4"	1'-3"	3"	1/2"
30" - 36"	1'-4"	1'-6"	4"	5/8"
48" & greater	1'-6"	1'-9"	6"	7/8"

NOTES:
1. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK, INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL S-4, S-5.
4. BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL S-4, S-5.
5. MECHANICAL RESTRAINING COLLAR SHALL BE AS MANUFACTURED BY MEGA-LUG OR EQUAL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
RESTRAINING COLLAR DESIGN DATA FOR PVC FORCE MAINS

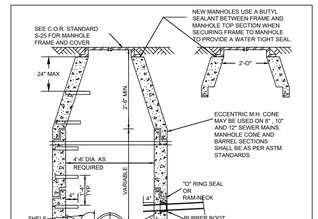
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-5a	RRH	3-21-02	J.P.S.	01-5-10
	D.H.L.	C.1.05-08		



NOTES:
1. CONCRETE SHALL BE 3000 PSI
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TO S.T.B. OR ENDS OF MECHANICAL JOINT FITTINGS.
3. THRUST BLOCKING SHALL CONFORM TO STANDARD DETAIL W-3, ADDITIONAL DETAILS & TABLES, W-10 THRU W-11, FOR
4. SEE STANDARD THRUST BLOCK
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING

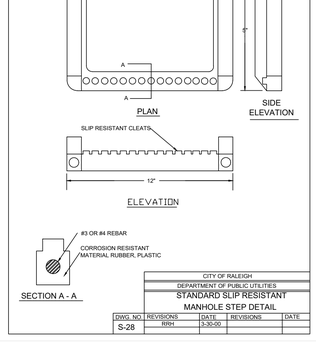
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD THRUST BLOCKING VIEWS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-7	D.W.C.	9-7-99	D.H.L.	6-18-08



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD PRECAST SANITARY SEWER MANHOLE

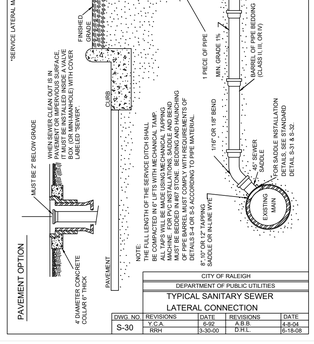
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20	Y.C.A.	12-97-94	ABB	4-15-04
	RRH	3-30-00	D.H.L.	6-18-08



NOTES:
1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL INSTALLATION DEEPER THAN 8 FT, THE TRACING WIRE SHALL BE INSTALLED AT A DEPTH OF 7-8 FT. THE WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OF CUTS IN THE TRACER WIRE SHALL BE PERMITTED.
2. WHERE LATERAL TAPS ARE MADE BY SERVICE SADDLES, THE TRACER WIRE SHALL NOT BE ALLOWED TO TO BE PLACED BETWEEN THE SADDLE AND MAIN.
3. MANHOLE MARKERS SHALL BE PLACED ADJACENT TO MANHOLES AT THE DISCRETION OF OWNER OR OWNER'S REPRESENTATIVE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
GRAVITY SEWER MAIN TRACER WIRE AND MANHOLE MARKER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20A	WKD	09-14		



BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T2	#5	5'-0"	19	103
CL. "A" CONCRETE TOTAL CU. YDS.				0.69

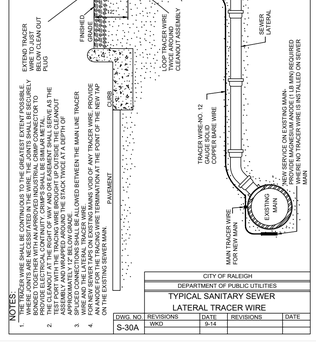
BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T1	#5	5'-0"	20	136
CL. "A" CONCRETE TOTAL CU. YDS.				0.81

BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T2	#5	7'-0"	24	165
CL. "A" CONCRETE TOTAL CU. YDS.				1.776

* ALL BASES ARE MINIMUM 9" THICK

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
EXTENDED BASE OR CAST-IN-PLACE REINFORCED CONCRETE BASE

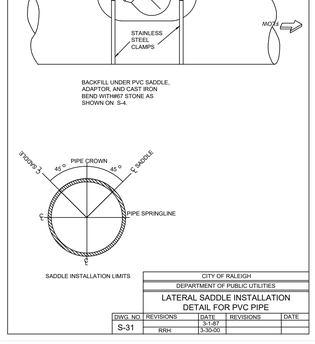
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-21		3-1-87	ABB	2-9-05
	RRH	3-30-00		



NOTES:
1. VENT MUST BE FACTORY WELDED FABRICATED AND "HOT DIPPED" GALVANIZED
2.HYFE- Hundred Year Flood elevation

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD SEAL TIGHT MANHOLE WITH VENTED STACK

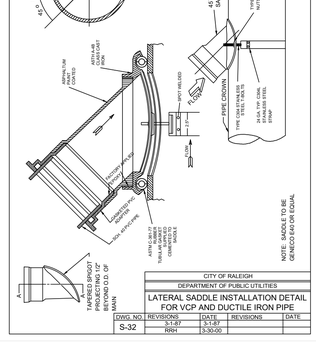
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-24	D.W.C.	6-7-99	A.B.B.	4-15-04
	RRH	3-30-00	D.H.L.	6/16/08



NOTES:
1) ALL MANHOLE FRAMES SHALL BE VERTICALLY CAST.
2) FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS. WITHIN PUBLIC ROW AND 160 LBS. WITHIN EASEMENTS.
3) COVER SHALL WEIGH A MIN. OF 120 LBS.
4) ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.
5/8"X3" LAGSHIELD IN HOLE DRILLED INTO CONE OR RING WITH ANCHOR SUNK TO DESIGN DEPTH, AND 3/8"X3" HOT DIPPED GALVANIZED LAG BOLT AND WASHER.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MANHOLE COVER

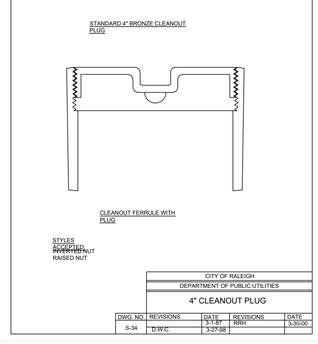
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08



Note: solid cover required when water tight manhole specified.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
FLAT TOP MANHOLE COVER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25a	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
MANHOLE FRAME AND WATERTIGHT COVER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-26	3-1-87	3-1-87	ABB	8-29-05
	RRH	3-30-00	D.H.L.	6/16/08

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD SLIP RESISTANT MANHOLE STEP DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-28	RRH	3-30-00		

NOTE:
THE FULL LENGTH OF THE SERVICE DITCH SHALL BE BACKFILLED WITH SELECT MATERIAL COMPACTED TO 95% STANDARD PROCTOR DENSITY. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING SADDLES. ALL SERVICE LATERALS INSTALLED SHALL BE STUBBED UP OR BEDDED IN #67 STONE. BEDDING AND HAUNCHING OF PIPE SHALL BE #67 STONE. ALL LATERALS SHALL BE AS PER DETAILS S-4 OR S-5 ACCORDING TO PIPE MATERIAL.

6" OR 8" OR 12" TAPPING SADDLE, FOR PVC MAIN WITH

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TYPICAL SANITARY SEWER LATERAL CONNECTION

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30	Y.C.A.	6-92	A.B.B.	4-8-04
	RRH	3-30-00	D.H.L.	6-18-08

NOTES:
1. TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL INSTALLATION DEEPER THAN 8 FT, THE TRACING WIRE SHALL BE INSTALLED AT A DEPTH OF 7-8 FT. THE WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OF CUTS IN THE TRACER WIRE SHALL BE PERMITTED.
2. WHERE LATERAL TAPS ARE MADE BY SERVICE SADDLES, THE TRACER WIRE SHALL NOT BE ALLOWED TO TO BE PLACED BETWEEN THE SADDLE AND MAIN.
3. MANHOLE MARKERS SHALL BE PLACED ADJACENT TO MANHOLES AT THE DISCRETION OF OWNER OR OWNER'S REPRESENTATIVE.
4. AN ANODE FOR THE TRACING WIRE TERMINATION AT THE POINT OF THE NEW TAP ON THE EXISTING SEWER MAIN.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TYPICAL SANITARY SEWER LATERAL TRACER WIRE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30A	WKD	9-14		

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
LATERAL SADDLE INSTALLATION DETAIL FOR PVC PIPE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-31		3-1-87		
	RRH	3-30-00		

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
LATERAL SADDLE INSTALLATION DETAIL FOR VCP AND DUCTILE IRON PIPE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-32	3-1-87	3-1-87		
	RRH	3-30-00		

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
4" CLEANOUT PLUG

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-34	D.W.C.	3-1-87	RRH	3-30-00
		3-27-98		

Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
Watson Family II LLC
6220 Forestville Road
Raleigh NC 27604
919.819.5509

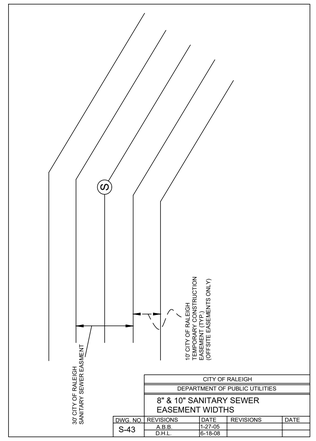
Project
Clifton Grove

Details

Date
February 15, 2022

Scale
None

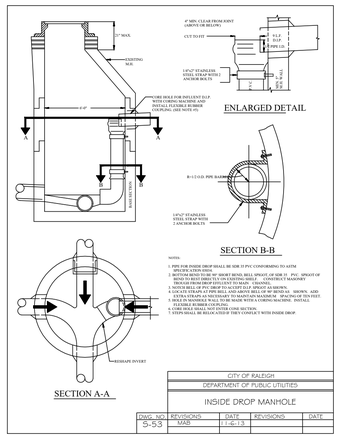
Sheet
CS-42



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

8" & 10" SANITARY SEWER EASEMENT WIDTHS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-43	A.B.B.	1-27-05		
	D.H.L.	6-18-08		

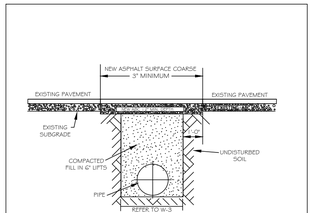


1. PIPE FOR INSIDE DROP SHALL BE SDR 35 PVC CONFORMING TO ASTM SPECIFICATION D3034.
2. BOTTOM BEND TO BE 90° SHORT RADIUS, BELL SPIGOT, OF SDR 35 PVC. SPIGOT OF BEND TO BE CUT OFF AS REQUIRED TO ACCOMMODATE INSIDE DROP MASONRY THICKNESS FROM DROP EFFLUENT TO MAIN. CHANNEL.
3. ALL JOINTS SHALL BE SOLVENT WELDED WITH PVC CEMENT.
4. LOCATE STRAPS AT PIPE BELL AND ABOVE BELL OF 90° BEND AS SHOWN. ADD ADDITIONAL STRAPS AS REQUIRED TO SUPPORT PIPE AT INTERVALS NOT TO EXCEED 5 FEET.
5. CORE HOLE IN MANHOLE WALL TO BE MADE WITH A CORING MACHINE. INSTALL FLEXIBLE RUBBER COUPLING.
6. CONTRACTOR TO VERIFY EXISTING MANHOLE CONE SECTION.
7. STEPS SHALL BE RELOCATED AS THEY CONFLICT WITH INSIDE DROP

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

INSIDE DROP MANHOLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-55	MAS	1-16-13		

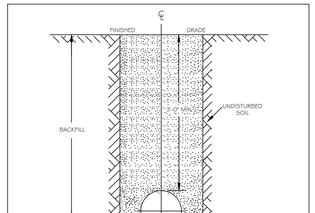


NOTES:
1. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAW CUT MACHINE.
2. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO A DENSITY OF AT LEAST 95% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH 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-180 AS MODIFIED BY NCDOT.
4. THE ENTIRE THICKNESS/ VERTICAL EDGE OF 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 WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH LEVEL PATCH.
7. REFER TO CITY OF RALEIGH STANDARDS FOR TRENCHES AND PIPE BEDDING, W-3. FOR ADDITIONAL DETAILS.
8. NO HAND PATCHING ALLOWED.
9. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD ASPHALT PAVEMENT PATCH DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-2	RRH	5-31-00	A.B.B.	4-15-04
	D.W.C.	11-1-99	J.P.S.	10-29-10

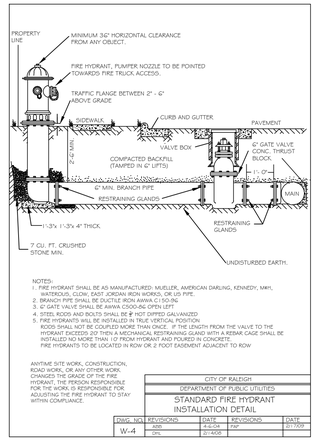


NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-3	W.W.C.	9-3-99	ABB	2-15-05
	RRH	3-31-00	J.P.S.	10-29-10



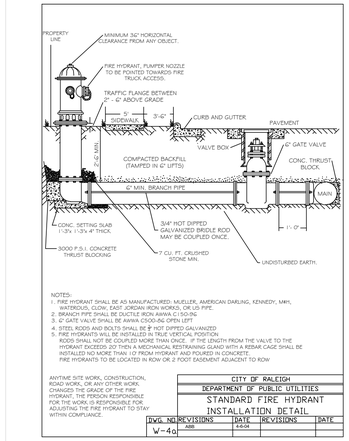
NOTES:
1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY, MAH, WATEROUS, CLOW, EAST JORDAN IRON WORKS, OR US PIPE.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C-150-96
3. 6" GATE VALVE SHALL BE AWWA C500-96 OPEN LEFT
4. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION. RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE. FIRE HYDRANTS TO BE LOCATED IN ROW OR 2' FOOT EASEMENT ADJACENT TO ROW

ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD FIRE HYDRANT INSTALLATION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-4	ABB	4-15-04	KWP	2-17-09
	DHL	2-1-05		



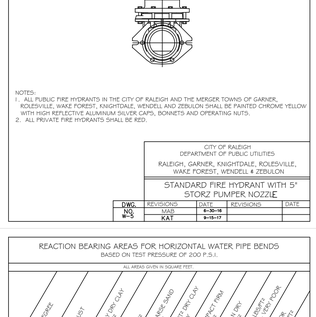
NOTES:
1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY, MAH, WATEROUS, CLOW, EAST JORDAN IRON WORKS, OR US PIPE.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C-150-96
3. 6" GATE VALVE SHALL BE AWWA C500-96 OPEN LEFT
4. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION. RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE. FIRE HYDRANTS TO BE LOCATED IN ROW OR 2' FOOT EASEMENT ADJACENT TO ROW

ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD FIRE HYDRANT INSTALLATION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-4a	ABB	4-15-04		



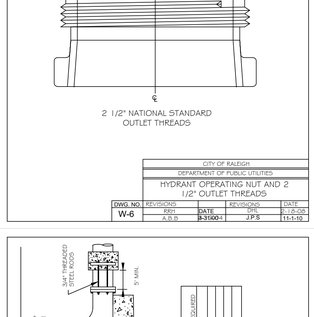
NOTES:
1. ALL PUBLIC FIRE HYDRANTS IN THE CITY OF RALEIGH AND THE MERGER TOWNS OF GARNER, ROLESVILLE, WAKE FOREST, KNIGHTDALE, WENDELL AND ZEBULON SHALL BE PAINTED CHROME YELLOW WITH HIGH REFLECTIVE ALUMINUM SILVER CAPS, BONNETS AND OPERATING NUTS.
2. ALL PRIVATE FIRE HYDRANTS SHALL BE RED.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

RALEIGH, GARNER, KNIGHTDALE, ROLESVILLE, WAKE FOREST, WENDELL & ZEBULON

STANDARD FIRE HYDRANT WITH 5" STORZ PUMPER NOZZLE

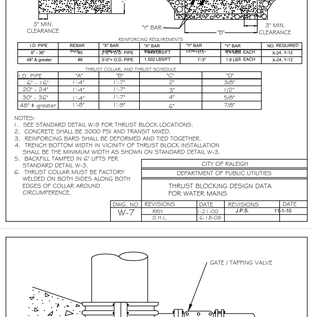
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-5	MAS	9-16-14		
	KAT	9-15-17		



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

HYDRANT OPERATING NUT AND 2 1/2" OUTLET THREADS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-6	RRH	DATE	DRL	2-18-08
	A.B.B.	9-31/00-1	J.P.S.	11-1-10



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR	"X" BAR	"Y" BAR	"Y" BAR	"C" BAR	NO. REQUIRED
6" - 36"	#5	2'6"@12" PIPE	1'6"@18"PIPE	1'0"	1'0"	s.24, V-12
48" & greater	#6	3'0" O.D. PIPE	1'@12"PIPE	1'0"	1'0"	s.24, V-12

THRUST COLLAR AND THRUST SCHEDULE

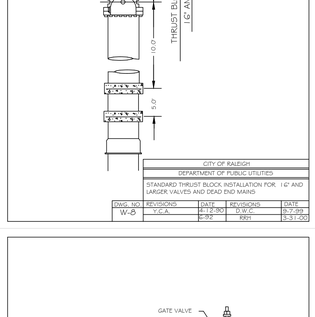
I.D. PIPE	"A"	"B"	"C"	"D"
6" - 12"	1'-4"	1'-7"	2"	5/8"
20" - 24"	1'-4"	1'-7"	3"	1'0"
30" - 36"	1'-4"	1'-7"	4"	5/8"
48" & greater	1'-8"	1'-9"	6"	7/8"

NOTES:
1. SEE STANDARD DETAIL W-9 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL W-3.
5. BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL W-3.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

THRUST BLOCKING DESIGN DATA FOR WATER MAINS

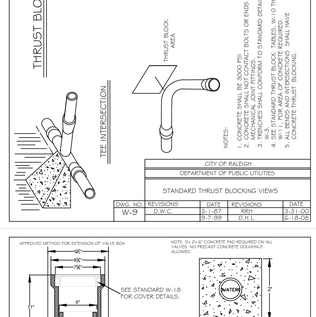
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-7	RRH	1-21-00	J.P.S.	11-1-10
	D.H.L.	6-18-08		



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD THRUST BLOCK INSTALLATION FOR 16" AND LARGER VALVES AND DEAD END MAINS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-8	Y.C.A.	12-19-01	D.T.L.	5-6-08
		4-9-02	RRH	3-31-00



NOTES:
1. CONCRETE SHALL BE 3000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO STANDARD DETAIL W-3.
4. SEE STANDARD THRUST BLOCK TABLES, W-10 THRU W-11 FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD THRUST BLOCKING VIEWS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-9	D.W.C.	1-15-97	RRH	3-31-00
	D.H.L.	9-7-99		

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS

BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET

SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MECHANICAL JOINT CLAY OR SAND	SOFT CLAY OR SILTY CLAY	SILTY SAND	ORDINARY SAND	ROCK, FIRM SAND OR GRAVEL	SAND, GRAVEL OR CLAY MIXTURES	SAND, CLEAN DRY GRAVEL OR SAND	ROCK, FIRM TRENCH SIDES AND BOTTOM	ROCK, FIRM UNDISTURBED
6"										
11 1/4°	1,108	1	1	1	1	1	1	2	1	
22 1/2°	2,207	1	2	2	1	1	1	3	1	
45°	4,328	2	3	3	1	1	2	5	1	
90°	7,996	2	4	5	1	1	2	8	1	
PLUG	5,655	2	3	4	1	1	2	6	1	
8"										
11 1/4°	1,970	1	1	2	1	1	1	2	1	
22 1/2°	3,922	1	2	3	1	1	1	4	1	
45°	7,694	2	4	5	1	1	2	8	1	
90°	14,215	4	8	9	2	2	4	15	2	
PLUG	10,053	3	5	6	2	2	3	10	1	
12"										
11 1/4°	4,433	2	3	3	1	1	2	5	1	
22 1/2°	8,826	3	5	6	2	2	3	9	1	
45°	17,312	5	9	11	3	3	5	18	2	
90°	31,983	8	16	19	4	4	8	32	4	
PLUG	22,619	6	12	14	3	3	6	23	3	
16"										
11 1/4°	7,881	2	4	5	1	1	2	8	1	
22 1/2°	15,691	4	8	10	2	2	4	16	2	
45°	30,779	8	16	19	4	4	8	31	4	
90°	56,861	15	29	35	8	8	15	57	6	
PLUG	40,213	10	21	25	5	5	10	41	5	

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6" - 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-10	D.W.C.	2-23-99		

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS

BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET

SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MECHANICAL JOINT CLAY OR SAND	SOFT CLAY OR SILTY CLAY	SILTY SAND	ORDINARY SAND	ROCK, FIRM SAND OR GRAVEL	SAND, GRAVEL OR CLAY MIXTURES	SAND, CLEAN DRY GRAVEL OR SAND	ROCK, FIRM TRENCH SIDES AND BOTTOM	ROCK, FIRM UNDISTURBED
24"										
11 1/4°	17,734	5	9	11	3	3	5	18	2	
22 1/2°	35,305	9	18	22	5	5	9	36	4	
45°	69,252	18	35	42	9	9	18	70	7	
90°	127,936	32	64	77	16	16	32	128	13	
PLUG	90,478	23	46	55	12	12	23	91	10	
30"										
11 1/4°	27,709	7	14	17	4	4	7	2	3	
22 1/2°	55,163	14	28	34	7	7	14	56	6	
45°	108,206	28	55	65	14	14	28	109	11	
90°	199,900	50	100	120	25	25	50	200	20	
PLUG	141,372	36	71	85	18	18	36	142	15	
36"										
11 1/4°	39,901	10	20	24	5	5	10	40	4	
22 1/2°	79,439	20	40	48	10	10	20	30	8	
45°	155,816	39	78	94	20	20	39	156	16	
90°	287,855	72	144	172	36	36	72	288	29	
PLUG	203,575	51	102	122	26	26	51	204	21	
48"										
11 1/4°	70,935	18	36	43	9	9	18	71	8	
22 1/2°	141,218	36	71	85	18	18	36	142	15	
45°	277,007	70	139	166	35	35	70	277	28	
90°	511,742	128	256	320	64	64	128	512	52	
PLUG	361,911	91	181	217	46	46	91	362	37	

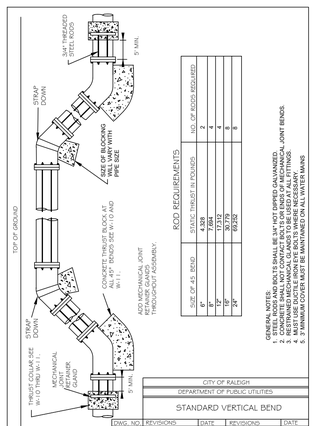
REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6" - 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-11	D.W.C.	2-23-99		

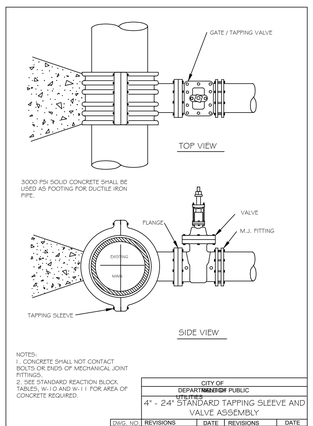


GENERAL NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. SEE STANDARD THRUST BLOCK, TABLES W-10 AND W-11 FOR CONCRETE REQUIRED.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.
5. 3' MINIMUM COVER MUST BE MAINTAINED ON ALL WATER MAINS

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD VERTICAL BEND

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-12	ABB	4-16-04	RRH	3-31-00
	D.H.L.	6-18-08	J.P.S.	11-1-10

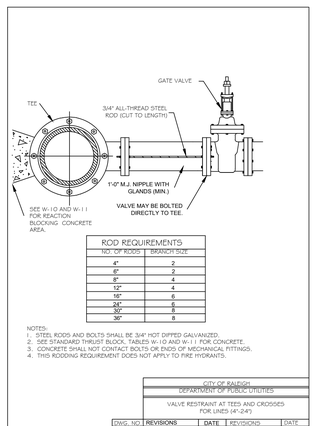


NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE STANDARD REACTION BLOCK TABLES, W-10 AND W-11 FOR AREA OF CONCRETE REQUIRED.

CITY OF DEPARTMENT OF PUBLIC UTILITIES

4" - 24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-14	D.W.C.	6-7-99	J.P.S.	11-1-10



ROD REQUIREMENTS

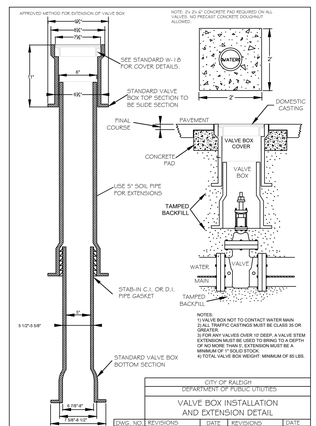
NO. OF RODS	BRANCH SIZE
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. SEE STANDARD THRUST BLOCK, TABLES W-10 AND W-11 FOR CONCRETE.
3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")

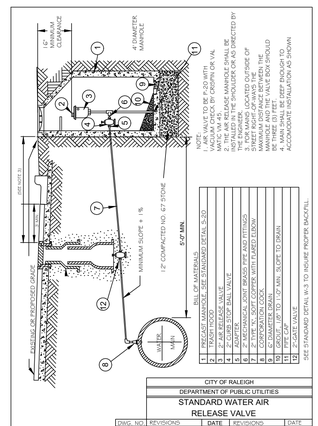
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-15	RRH	3-31-00	D.T.L.	5-6-08
	A.B.B.	4-15-04	J.P.S.	11-1-10



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

VALVE BOX INSTALLATION AND EXTENSION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-17	D.W.C.	10-7-99	A.B.B.	4-15-04
	RRH	3-31-00	DHL	2-1-05


12" MINIMUM CLEARANCE
45 DIAMETER BENDS
NOTE: SEE STANDARD DETAIL S-30
1" AIR VALVE TO BE P-301 WITH 1" AIR RELEASE VALVE, 1" GATE VALVE, 1" BRASS NIPPLE, 1" BRASS ELBOW, 1" BRASS NIPPLE, 1" BRASS ELBOW, 1" BRASS NIPPLE, 1" BRASS ELBOW

Clifton Grove

Zebulon, North Carolina

Date: 10/12/2021

Revised: 7/23/2024

Storm Chart (10 Year Event)

DOWNSTREAM STRUCTURE	UPSTREAM STRUCTURE	TOP ELEV. UPSTREAM STRUCTURE	PIPE SEGMENT DATA DIA. (in)	LTH (ft)	PIPE TYPE	S%	AREA (ac) TOTAL	UPSTREAM AREA (ac) IND	C	I (IN/HR)	Q(TOT) (CFS)	Q(IND) (CFS)	INVERT DOWNSTRM STRUCTURE	INVERT UPSTRM STRUCTURE
FES 1	CB 2	314.61	36	52.58	RCP	0.57	6.56	0.18	0.50	7.22	23.68	0.65	307.50	307.80
CB 2	CB 3	314.39	36	54.38	RCP	0.92	6.38	0.35	0.50	7.22	23.03	1.26	308.00	308.50
CB 3	CB 4	314.39	30	35.00	RCP	0.86	6.03	0.81	0.50	7.22	21.77	2.92	309.00	309.30
CB 4	CB 5	316.68	24	180.27	RCP	1.00	5.22	0.12	0.50	7.22	18.84	0.43	309.80	311.60
CB 5	CB 6	320.57	24	177.78	RCP	1.41	5.10	0.02	0.50	7.22	18.41	0.07	311.80	314.30
CB 6	CB 7	320.36	24	41.87	RCP	1.55	5.08	0.43	0.50	7.22	18.34	1.55	314.50	315.15
CB 7	CB 8	320.36	18	26.00	RCP	0.96	1.34	0.64	0.50	7.22	4.84	2.31	316.10	316.35
CB 8	CB 9	321.55	15	41.87	RCP	1.07	0.70	0.13	0.50	7.22	2.53	0.47	316.65	317.10
CB 9	CB 10	321.59	15	35.19	RCP	0.99	0.13	0.13	0.50	7.22	0.47	0.47	317.30	317.65
CB 9	CB 9A	323.69	15	187.06	RCP	0.96	0.44	0.22	0.50	7.22	1.59	0.79	317.30	319.10
CB 9A	CB 9B	323.69	15	35.00	RCP	1.11	0.22	0.22	0.50	7.22	0.79	0.79	319.30	319.69
CB 7	CB 11	324.75	24	115.67	RCP	4.06	3.31	0.48	0.50	7.22	11.95	1.73	315.40	320.10
CB 11	CB 12	325.75	15	43.85	RCP	1.03	0.46	0.46	0.50	7.22	1.66	1.66	321.30	321.75
CB 11	CB 13	327.47	18	164.85	RCP	1.27	2.37	0.46	0.50	7.22	8.56	1.66	320.80	322.90
CB 13	CB 14	327.77	15	35.62	RCP	0.98	0.41	0.41	0.50	7.22	1.48	1.48	323.40	323.75
CB 13	CB 15	329.27	18	150.00	RCP	0.90	1.50	0.79	0.50	7.22	5.42	2.85	323.30	324.65
CB 15	CB 16	329.27	15	26.00	RCP	1.15	0.71	0.71	0.50	7.22	2.56	2.56	324.95	325.25
FES 20	CB 21	324.02	42	101.18	RCP	1.19	13.49	0.14	0.50	7.22	48.41	0.51	312.00	313.20
CB 21	CB 22	324.02	36	35.00	RCP	1.14	13.35	0.14	0.50	7.22	47.90	0.51	314.20	314.60
CB 22	CB 23	322.45	36	40.43	RCP	0.99	13.21	0.58	0.50	7.22	47.40	2.09	314.90	315.30
CB 23	CB 24	322.45	15	26.00	RCP	1.35	0.63	0.63	0.50	7.22	2.27	2.27	318.10	318.45
CB 23	CB 25	325.79	36	178.59	RCP	1.79	12.00	0.50	0.50	7.22	43.03	1.81	315.50	318.70
CB 25	CB 26	325.92	15	26.81	RCP	1.31	0.55	0.55	0.50	7.22	1.99	1.99	321.55	321.90
CB 25	CB 27	329.52	36	187.23	RCP	0.80	10.95	0.15	0.50	7.22	39.24	0.54	319.20	320.70
CB 27	CB 28	329.52	15	26.00	RCP	1.54	0.32	0.32	0.50	7.22	1.16	1.16	325.10	325.50
CB 27	CB 27A	330.6	30	55.00	RCP	0.91	10.48	0.26	0.50	7.22	37.54	0.94	321.10	321.60
CB 27A	CB 29	332.38	30	93.50	RCP	0.86	9.83	0.04	0.50	7.22	35.20	0.14	321.80	322.60
CB 29	CB 30	333.77	30	42.08	RCP	1.90	10.22	0.43	0.50	7.22	36.61	1.55	323.00	323.80
CB 30	CB 31	333.77	30	26.00	RCP	1.15	9.79	0.50	0.50	7.22	35.05	1.81	324.00	324.30
CB 31	CB 32	332.47	24	38.68	RCP	2.57	3.89	0.62	0.50	7.22	14.04	2.24	326.40	327.40
CB 32	CB 33	332.47	15	26.00	RCP	1.35	0.70	0.70	0.50	7.22	2.53	2.53	328.10	328.45
CB 32	CB 34	338.01	18	221.99	RCP	2.12	2.57	0.68	0.50	7.22	9.28	2.45	328.10	332.80
CB 34	CB 35	338.01	15	26.00	RCP	1.15	0.69	0.69	0.50	7.22	2.49	2.49	333.60	333.90
CB 34	CB 36*	340.43	15	240.00	RCP	1.00	1.20	0.65	0.50	7.22	4.33	2.35	333.40	335.80
CB 36	CB 37*	340.43	15	26.00	RCP	1.35	0.55	0.55	0.50	7.22	1.99	1.99	336.00	336.35
CB 31	CB 38	335.99	30	170.15	RCP	0.76	5.40	0.02	0.50	7.22	19.21	0.07	324.80	326.10
CB 38	CB 39	336.04	18	80.07	RCP	0.62	1.62	0.02	0.50	7.22	5.56	0.07	327.00	327.50
CB 39	CB 39a	336.04	18	26.09	RCP	0.77	1.60	0.08	0.50	7.22	0.29	0.29	327.60	327.80
CB 39a	CB 40*	333.35	18	202.33	RCP	0.74	1.52	1.52	0.50	7.22	5.49	5.49	327.90	329.40
CB 38	CB 41	335.26	24	47.83	RCP	3.35	3.76	0.67	0.50	7.22	13.57	2.42	328.50	330.10
CB 41	CB42	335.26	18	26.00	RCP	1.35	0.65	0.65	0.50	7.22	2.35	2.35	330.90	331.25
CB 41	CB 43	344.05	18	256.91	RCP	3.23	2.44	0.70	0.50	7.22	8.81	2.53	330.90	339.20
CB 43	CB 44	344.05	15	26.00	RCP	1.35	0.75	0.75	0.50	7.22	2.71	2.71	339.70	340.05
CB 43	CB 45	349.84	15	244.70	RCP	2.37	0.99	0.37	0.50	7.22	3.57	1.34	339.70	345.50
CB 45	CB 46	350.09	15	28.07	RCP	1.25	0.62	0.62	0.50	7.22	2.24	2.24	345.70	346.05
FES 50	CB 51*	320.16	36	99.89	RCP	0.70	10.83	0.45	0.50	7.22	39.09	1.62	312.00	312.70
CB 51	CB 52*	320.16	36	35.00	RCP	0.86	10.38	0.44	0.50	7.22	37.46	1.59	313.00	313.30
CB 52	CB 53	319.75	30	49.77	RCP	1.00	9.94	0.44	0.50	7.22	35.87	1.59	313.70	314.20
CB 53	CB 54	319.75	15	26.00	RCP	0.96	0.88	0.52	0.50	7.22	3.18	1.88	315.30	315.55
CB 54	CB 55	320.64	15	38.36	RCP	0.91	0.36	0.17	0.50	7.22	1.30	0.61	315.75	316.10
CB 55	CB 55a	320.62	15	35.07	RCP	0.86	0.19	0.19	0.50	7.22	0.69	0.69	316.30	316.60
CB 52	FES 52A	-	15	31.33	RCP	6.38	0.00	0.00	0.50	7.22	0.00	0.00	314.50	316.50
CB 53	CB 56	322.50	30	138.97	RCP	1.69	8.62	0.56	0.50	7.22	31.11	2.02	314.70	317.05
CB 56	CB 57	322.55	15	26.11	RCP	0.96	0.60	0.60	0.50	7.22	2.17	2.17	318.30	318.55
CB 56	CB 58	326.96	30	202.58	RCP	1.41	7.46	0.48	0.50	7.22	26.92	1.73	317.25	320.10
CB 58	CB 59	330.51	24	167.54	RCP	1.01	6.98	0.02	0.50	7.22	25.19	0.07	320.60	322.30
CB 59	CB 60	330.48	15	42.27	RCP	0.95	0.49	0.14	0.50	7.22	1.76	0.51	325.60	326.00
CB 60	CB 61	330.48	15	26.00	RCP	1.15	0.35	0.35	0.50	7.22	1.25	1.25	326.20	326.50
CB 59	CB 62	330.51	24	26.00	RCP	1.15	6.47	0.04	0.50	7.22	23.36	0.14	322.50	322.80
CB 62	CB 63	331.71	24	75.74	RCP	1.06	6.43	0.09	0.50	7.22	23.21	0.32	323.00	323.80
CB 63	CB 64	331.71	15	26.00	RCP	1.15	0.51	0.51	0.50	7.22	1.84	1.84	327.40	327.70
CB 63	CB 65	333.32	24	156.35	RCP	0.96	5.83	0.32	0.50	7.22	21.05	1.16	324.00	325.50
CB 65	CB 66	333.48	15	30.39	RCP	1.65	0.67	0.67	0.50	7.22	2.42	2.42	329.00	329.50
CB 65	CB 67	334.99	24	165.00	RCP	1.09	4.84	0.02	0.50	7.22	17.47	0.07	326.00	327.80
CB 67	CB 68	334.80	24	41.85	RCP	1.19	4.82	0.50	0.50	7.22	17.40	1.81	328.00	328.50
CB 68	CB 69	334.80	24	26.00	RCP	1.15	4.32	0.33	0.50	7.22	15.60	1.19	328.70	329.00
CB 69	CB 70	336.00	18	41.85	RCP	1.19	1.58	0.34	0.50	7.22	5.70	1.23	329.50	330.00
CB 70	CB 71*	336.15	15	28.13	RCP	2.31	0.36	0.36	0.50	7.22	1.30	1.30	331.50	332.15
CB 70	CB 72	337.54	15	100.00	RCP	0.60	0.88	0.49	0.50	7.22	3.18	1.77	330.30	330.90
CB 72	CB 73	338.02	15	40.26	RCP	0.75	0.39	0.39	0.50	7.22	1.41	1.41	331.10	331.40
CB 73	YI 73A	335.75	15	26.00	RCP	0.58	0.00	0.00	0.50	7.22	0.00	0.00	331.60	331.75
CB 69	CB 74	337.62	24	185.02	RCP	1.41	2.41	0.02	0.50	7.22	8.70	0.07	329.50	332.10
CB 74	CB 75	337.76	15	27.48	RCP	1.82	0.40	0.40	0.50	7.22	1.44	1.44	333.25	333.75
CB 74	CB 76	337.59	24	38.51	RCP	1.04	1.99	0.55	0.50	7.22	7.18	1.99	332.30	332.70
CB 76	CB 77	337.59	18	26.00	RCP	0.96	0.85	0.85	0.50	7.22	3.07	3.07	333.30	333.55
CB 76	CB 78	339.39	15	154.54	RCP	1.04	0.59	0.29	0.50	7.22	2.13	1.05	333.30	334.90
CB 78	CB 79	339.39	15	26.00	RCP	1.15	0.30	0.30	0.50	7.22	1.08	1.08	335.10	335.40
FES 90	CB 91	327.93	24	90.59	RCP	1.10	3.87	0.12	0.50	7.22	13.97	0.43	313.00	314.00
CB 91	CB 92	324.93	15	35.00	RCP	1.14	0.28	0.28	0.50	7.22	1.01	1.01	320.50	320.90
CB 91	CB 93	327.93	24	169.02	RCP	1.66	3.47	0.12	0.50	7.22	12.53	0.43	320.00	322.80
CB 93	CB 94	330.73	24	158.35	RCP	1.01	3.35	0.02	0.50	7.22	12.09	0.07	323.00	324.60
CB 94	CB 96	330.73	24	38.94	RCP	1.80	3.33	0.42	0.50	7.22	12.02	1.52	324.80	325.50
CB 96	CB 97	330.73	18	26.00	RCP	1.54	2.91	0.38	0.50	7.22	10.51	1.37	326.00	326.40
CB 97	CB 98	332.16	18	42.38	RCP	1.89	2.53	0.25	0.50	7.22	9.13	0.90	326.60	327.40
CB 98	CB 99	332.30	15	35.86	RCP	0.98	0.20	0.20	0.50	7.22	0.72	0.72	328.00	328.35
CB 98	CB 100	336.33	18	220.24	RCP	1.14	2.08	0.02	0.50	7.22	7.51	0.07	328.10	330.60
CB 100	CB 101	336.43	18	40.79	RCP	0.98	2.06	0.49	0.50	7.22	7.44	1.77	330.80	331.20
CB 101	CB 102	336.43	15	26.00	RCP	2.31	0.95	0.54	0.50	7.22	3.43	1.95	331.60	332.20
CB 102	CB 103	338.03	15	44.38	RCP	2.25	0.41	0.26	0.50	7.22	1.48	0.94	332.40	333.40
CB 103	CB 104	337.84	15	42.00	RCP	0.95	0.15	0.15	0.50	7.22	0.54	0.54	333.60	334.00
CB 101	CB 105	343.45	15	120.28	RCP	5.82	0.62	0.33	0.50	7.22	2.24	1.19	331.80	338.80
CB 105	CB 106	343.45	15	26.00	RCP	1.73	0.29	0.29	0.50	7.22	1.05	1.05	339.00	339.45
FES 110	JB 111	318.20	36	78.39	RCP	0.64	10.43	0.00	0.50	7.22	37.65	0.00	312.50	313.00
JB 111	CB 112*	320.35	36	167.35	RCP	0.84	10.43	1.09	0.50	7.22	37.65	3.93	313.20	314.60
CB 112	CB 113	324.04	30	148.78	RCP	2.29	9.34	0.29	0.50	7.22	33.72	1.05	315.10	318.50
CB 113	CB 114	325.05	18	41.67	RCP	1.44	1.87	0.02	0.50	7.22	6.75	0.07	319.80	320.40
CB 114	CB 115	325.60	18	38.21	RCP	1.05	1.85	0.35	0.50	7.22	6.68	1.26	320.60	321.00
CB 115	CB 116	325.60	15	26.00	RCP	1.15	0.50	0.50	0.50	7.22	1.81	1.81	321.30	321.60
CB 115	CB 117	332.37	15	155.96	RCP	4.17	1.00	0.45	0.50	7.22	3.61	1.62	321.30	327.80
CB 117	CB 118	332.37	15	26.00	RCP	1.35	0.55	0.55	0.50	7.22	1.99	1.99	328.00	328.35
CB 113	CB 119	327.15	30	100.00	RCP	2.90	7.18	0.60	0.50	7.22	25.92	2.17	318.90	321.80
CB 119	CB 120	327.54	15	28.87	RCP	1.73	0.64	0.64	0.50	7.22	2.31	2.31	323.00	323.50
CB 119	CB 121	337.02	24	200.00	RCP	1.55	5.94	0.32	0.50	7.22	21.44	1.16	322.20	325.30
CB 121	CB 122	338.36	24	40.72	RCP	0.98	5.62	0.02	0.50	7.22	20.29	0.07	325.50	325.90
CB 122	CB 123	338.65	24	38.23	RCP	1.05	5.60	0.72	0.50	7.22	20.22	2.60	326.10	326.50
CB 123	CB 124	338.65	24	26.00	RCP	1.15	4.88	0.76	0.50	7.22	17.62	2.74	326.70	327.00
CB 124	CB 125	337.85	24	144.41	RCP	0.90	4.12	0.15	0.50	7.22	14.87	0.54	327.30	328.60
CB 125	CB 126	337.85	15	26.00	RCP	2.50	0.33	0.33	0.50	7.22	1.19	1.19	333.20	333.85
CB 125	CB 127*	334.83	24	123.57	RCP	0.81	3.64	0.55	0.50	7.22	13.14	1.99	329.00	330.00
CB 127*	CB 128	334.83	18	26.00	RCP	1.15	0.97	0.97	0.50	7.22	3.50	3.50	330.50	330.80
CB 127*	CB 129	335.54	18	72.50	RCP	0.83	2.12	0.55	0.50	7.22	7.65	1.99	330.50	331.10
CB 129	CB 130	335.75	15	30.74	RCP	0.98	0.53	0.53	0.50	7.22	1.91	1.91	331.45	331.75
CB 129	CB 131	337.79	18	180.00	RCP	1.03	1.04	0.47	0.50	7.22	3.75	1.70	331.40	333.25
CB 131	CB 132	337.79	15	26.00	RCP	1.15	0.57	0.57	0.50	7.22	2.06	2.06	333.45	333.75

Clifton Grove
Pond #1 (Riser/Barrel)

Riser/Barrel Anti-Floatation Calculations

DIMENSIONS	Required volume	See Calc's	cu ft
	Required surface area	See Calc's	sq ft
	Dimensions:	5 x 5	inside dim conc box
	Riser Diameter (equiv)	68.0	inches
	Barrel Diameter	24.0	inches
	Type	Concrete	
	Riser Height	9.5	feet
	Dam Height	10.5	feet
	Q, Riser/Barrel	0.05	
BOUYANCY	Bouyant Force *	16911	lbs
	Concrete Base	10.0	length/width
	Concrete Base	1.50	thick (ft)
	Weight Provided	13140	lbs
	Concrete Riser	5.5	length/width
	Concrete Riser	9.5	length/height
	Concrete Riser	0.5	thick (ft)
	Weight Provided	9154	lbs
	Total Weight	22294	lbs
	Factor of Saftey	1.3	

Clifton Grove
Pond #2 (Riser/Barrel)

Riser/Barrel Anti-Floatation Calculations

DIMENSIONS	Required volume	See Calc's	cu ft
	Required surface area	See Calc's	sq ft
	Dimensions:	3 x 3	inside dim conc box
	Riser Diameter (equiv)	41.0	inches
	Barrel Diameter	18.0	inches
	Type	Concrete	
	Riser Height	6.0	feet
	Dam Height	7.0	feet
	Q, Riser/Barrel	0.05	
BOUYANCY	Bouyant Force *	4535	lbs
	Concrete Base	6.0	length/width
	Concrete Base	1.00	thick (ft)
	Weight Provided	3154	lbs
	Concrete Riser	3.5	length/width
	Concrete Riser	6.0	length/height
	Concrete Riser	0.5	thick (ft)
	Weight Provided	3879	lbs
	Total Weight	6833	lbs
	Factor of Saftey	1.5	

Clifton Grove
Pond #3 (Riser/Barrel)

Riser/Barrel Anti-Floatation Calculations

DIMENSIONS	Required volume	See Calc's	cu ft
	Required surface area	See Calc's	sq ft
	Dimensions:	6 x 6	inside dim conc box
	Riser Diameter (equiv)	81.0	inches
	Barrel Diameter	36.0	inches
	Type	Concrete	
	Riser Height	9.2	feet
	Dam Height	10.2	feet
	Q, Riser/Barrel	0.05	
BOUYANCY	Bouyant Force *	24954	lbs
	Concrete Base	12.0	length/width
	Concrete Base	2.00	thick (ft)
	Weight Provided	25229	lbs
	Concrete Riser	6.5	length/width
	Concrete Riser	9.2	length/height
	Concrete Riser	0.5	thick (ft)
	Weight Provided	10477	lbs
	Total Weight	35706	lbs
	Factor of Saftey	1.4	

Clifton Grove
Pond #4 (Riser/Barrel)

Riser/Barrel Anti-Floatation Calculations

DIMENSIONS	Required volume	See Calc's	cu ft
	Required surface area	See Calc's	sq ft
	Dimensions:	5 x 5	inside dim conc box
	Riser Diameter (equiv)	68.0	inches
	Barrel Diameter	24.0	inches
	Type	Concrete	
	Riser Height	9.5	feet
	Dam Height	10.5	feet
	Q, Riser/Barrel	0.05	
BOUYANCY	Bouyant Force *	16911	lbs
	Concrete Base	10.0	length/width
	Concrete Base	1.50	thick (ft)
	Weight Provided	17520	lbs
	Concrete Riser	5.5	length/width
	Concrete Riser	9.5	length/height
	Concrete Riser	0.5	thick (ft)
	Weight Provided	9154	lbs
	Total Weight	26674	lbs
	Factor of Saftey	1.6	

Clifton Grove
Pond #5 (Riser/Barrel)

Riser/Barrel Anti-Floatation Calculations

DIMENSIONS	Required volume	See Calc's	cu ft
	Required surface area	See Calc's	sq ft
	Dimensions:	5 x 5	inside dim conc box
	Riser Diameter (equiv)	68.0	inches
	Barrel Diameter	18.0	inches
	Type	Concrete	
	Riser Height	7.0	feet
	Dam Height	9.0	feet
	Q, Riser/Barrel	0.05	
BOUYANCY	Bouyant Force *	12119	lbs
	Concrete Base	10.0	length/width
	Concrete Base	1.50	thick (ft)
	Weight Provided	13140	lbs
	Concrete Riser	5.5	length/width
	Concrete Riser	7.0	length/height
	Concrete Riser	0.5	thick (ft)
	Weight Provided	6745	lbs
	Total Weight	19885	lbs
	Factor of Saftey	1.6	

Riser Basin 1 — Okay

7.15	Disturbed Area (Acres)
29.28	Peak Flow from 25-year Storm (cfs)
12870	Required Volume ft³
12754	Required Surface Area ft²
79.9	Suggested Width ft
159.7	Suggested Length ft
158	Trial Top Width at Spillway Invert ft
82	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
4	Trial Depth ft
134	Bottom Width ft
58	Bottom Length ft
7772	Bottom Area ft²
41072	Actual Volume ft³ — Okay
12956	Actual Surface Area ft² — Okay
10	Trial Weir Length ft
1.5	Trial Depth of Flow ft
55.1	Spillway Capacity cfs — Okay
2.5	Skimmer Size (inches)
0.208	Head on Skimmer (feet)
2	Orifice Size (1/4 inch increments)
3.06	Dewatering Time (days)
	Suggest about 3 days

Riser Basin 2 — Okay

3.63	Disturbed Area (Acres)
14.86	Peak Flow from 25-year Storm (cfs)
6534	Required Volume ft³
6473	Required Surface Area ft²
56.9	Suggested Width ft
113.8	Suggested Length ft
110	Trial Top Width at Spillway Invert ft
60	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
3	Trial Depth ft
92	Bottom Width ft
42	Bottom Length ft
3864	Bottom Area ft²
15534	Actual Volume ft³ — Okay
6600	Actual Surface Area ft² — Okay
10	Trial Weir Length ft
1.5	Trial Depth of Flow ft
55.1	Spillway Capacity cfs — Okay
1.5	Skimmer Size (inches)
0.125	Head on Skimmer (feet)
1.5	Orifice Size (1/4 inch increments)
3.56	Dewatering Time (days)
	Suggest about 3 days

Riser Basin 3 — Okay

26.22	Disturbed Area (Acres)
107.37	Peak Flow from 25-year Storm (cfs)
47196	Required Volume ft³
46770	Required Surface Area ft²
152.9	Suggested Width ft
305.8	Suggested Length ft
465	Trial Top Width at Spillway Invert ft
105	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
4	Trial Depth ft
441	Bottom Width ft
81	Bottom Length ft
35721	Bottom Area ft²
168708	Actual Volume ft³ — Okay
48825	Actual Surface Area ft² — Okay
20	Trial Weir Length ft
1.5	Trial Depth of Flow ft
110.2	Spillway Capacity cfs — Okay
4	Skimmer Size (inches)
0.333	Head on Skimmer (feet)
3.25	Orifice Size (1/4 inch increments)
3.35	Dewatering Time (days)
	Suggest about 3 days

Riser Basin 4 — Okay

16.73	Disturbed Area (Acres)
68.51	Peak Flow from 25-year Storm (cfs)
30114	Required Volume ft³
29843	Required Surface Area ft²
122.2	Suggested Width ft
244.3	Suggested Length ft
380	Trial Top Width at Spillway Invert ft
85	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
4	Trial Depth ft
356	Bottom Width ft
61	Bottom Length ft
21716	Bottom Area ft²
107648	Actual Volume ft³ — Okay
32300	Actual Surface Area ft² — Okay
15	Trial Weir Length ft
1.5	Trial Depth of Flow ft
82.7	Spillway Capacity cfs — Okay
3	Skimmer Size (inches)
0.25	Head on Skimmer (feet)
2.75	Orifice Size (1/4 inch increments)
3.45	Dewatering Time (days)
	Suggest about 3 days

Riser Basin 5 — Okay

10.48	Disturbed Area (Acres)
42.92	Peak Flow from 25-year Storm (cfs)
18664	Required Volume ft³
18696	Required Surface Area ft²
96.7	Suggested Width ft
193.4	Suggested Length ft
175	Trial Top Width at Spillway Invert ft
110	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
4	Trial Depth ft
151	Bottom Width ft
86	Bottom Length ft
12986	Bottom Area ft²
64088	Actual Volume ft³ — Okay
19250	Actual Surface Area ft² — Okay
10	Trial Weir Length ft
1.5	Trial Depth of Flow ft
55.1	Spillway Capacity cfs — Okay
2.5	Skimmer Size (inches)
0.208	Head on Skimmer (feet)
2.25	Orifice Size (1/4 inch increments)
3.54	Dewatering Time (days)
	Suggest about 3 days

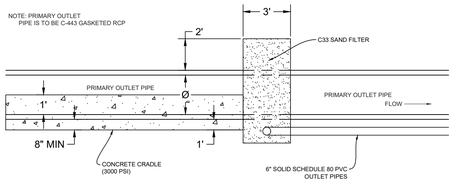
Skimmer Basin 6 — Okay

10.02	Disturbed Area (Acres)
41.03	Peak Flow from 25-year Storm (cfs)
18036	Required Volume ft³
17873	Required Surface Area ft²
94.5	Suggested Width ft
189.1	Suggested Length ft
192	Trial Top Width at Spillway Invert ft
98	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
3	Trial Depth ft
174	Bottom Width ft
80	Bottom Length ft
13920	Bottom Area ft²
48942	Actual Volume ft³ — Okay
18816	Actual Surface Area ft² — Okay
10	Trial Weir Length ft
1.5	Trial Depth of Flow ft
55.1	Spillway Capacity cfs — Okay
2.5	Skimmer Size (inches)
0.208	Head on Skimmer (feet)
2.25	Orifice Size (1/4 inch increments)
3.38	Dewatering Time (days)
	Suggest about 3 days

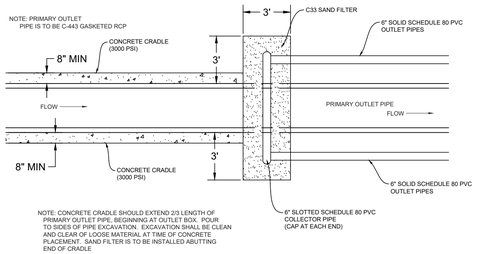
Skimmer Basin 7 — Okay

6.58	Disturbed Area (Acres)
26.95	Peak Flow from 25-year Storm (cfs)
11844	Required Volume ft³
11738	Required Surface Area ft²
58.3	Suggested Width ft
153.2	Suggested Length ft
242	Trial Top Width at Spillway Invert ft
65	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
3	Trial Depth ft
224	Bottom Width ft
47	Bottom Length ft
10528	Bottom Area ft²
39225	Actual Volume ft³ — Okay
15730	Actual Surface Area ft² — Okay
10	Trial Weir Length ft
1.5	Trial Depth of Flow ft
55.1	Spillway Capacity cfs — Okay
2	Skimmer Size (inches)
0.167	Head

PROFILE

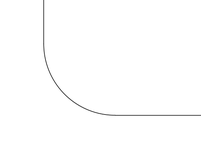


PLAN



NOTE: CONCRETE CRADLE SHOULD EXTEND 2/3 LENGTH OF PRIMARY OUTLET PIPE, BEGINNING AT OUTLET BOX. POUR TO SIDES OF PIPE EXCAVATION. EXCAVATION SHALL BE CLEAN AND CLEAR OF LOOSE MATERIAL AT TIME OF CONCRETE PLACEMENT. SAND FILTER IS TO BE INSTALLED ABUTTING END OF CRADLE

SECTION - CRADLE

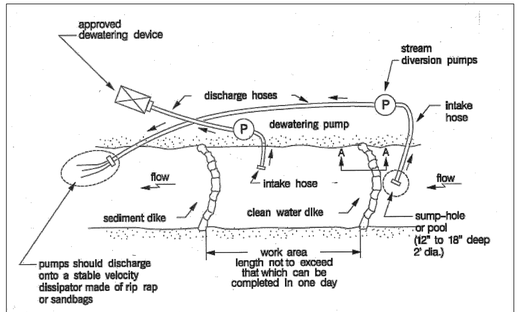


NOTE: PRIMARY OUTLET PIPE IS TO BE C-443 GASKETED RCP

SECTION - SEEPAGE FILTER

SECTION - STONE BEDDING FOR SCM 5

NOTE: PRIMARY OUTLET (JB SC - RISER SD) PIPE IS TO BE C-443 GASKETED RCP



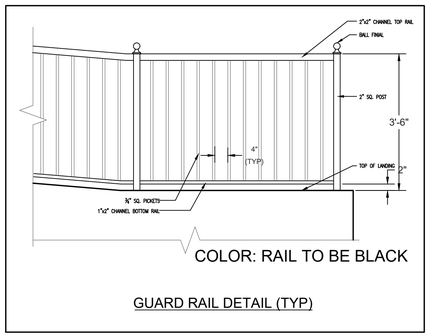
Stream Pump Around Practices/Guidance

Clifton Grove
Culvert Installation Sequence & Notes (Clifton Grove Ave - all stream crossings)

The installation of the culverts shown on this plan shall be conducted in conformity to the following steps and measures:

1. **No disturbance of the area in which the culvert will be installed shall occur until the materials for the culvert and end treatment are confirmed as available for immediate delivery.**
2. **Timing of the culvert installation and associated land disturbance shall be scheduled so as to coincide with a period of favorable weather forecasts for low probability of rainfall.**
3. **Following installation of tree protection fencing and silt fencing in accordance with the overall sedimentation and erosion control plan (and approval of such installation by the erosion control inspector of Wake County), conduct clearing only to the extent necessary to provide for access to & implementation of the following items:**
   - **a. Excavate for and install the temporary velocity dissipator as shown on plans.**
   - **b. Construct a temporary diversion berm and sump hole at the upstream end of the proposed culvert location. The diversion berm shall be a minimum of 2' wide at the top with 1.5H:1V side slopes, and a top elevation a minimum of 4' above the proposed invert elevation of the culvert. The diversion berm shall be constructed of Class B RipRap.**
   - **c. Install bypass pump and piping.**
   - **d. Upon completion of installation of bypass pump and piping, install portions of foundations for endwalls at both upstream and downstream ends of the proposed culvert foundation to 10' either side of the proposed culvert centerline.**
   - **e. Install the culvert(s).**
   - **f. Reconfigure the RipRap comprising the diversion berm so as to direct the channel flow into and through the culvert.**
   - **g. Abandon and remove temporary bypass pump, piping, diversion berm, sump hole, and dissipator.**
   - **h. Construct remainder of endwall foundations and complete the endwalls.**
   - **i. Proceed with earthwork necessary to complete the roadway fill.**
   - **j. Stabilize all disturbed areas contributory to the culvert.**
   - **k. Remove riprap armoring at the upper end of the culvert and restore the area to natural conditions as much as practicable.**

End of Culvert Installation Sequence & Notes



GUARD RAIL DETAIL (TYP)

PROPOSED MEDIAN ON CLIFTON GROVE DETAIL (TYPICAL)

Clifton Grove
Sanitary Sewer Chart

Date: 12/2/2021
Revised: 4/13/2023

STRUCTURE			INLET PIPE DATA								
MH#	Invert Out	Top	Segment			Type	ø-(in)	Lf	Slope	Invert Down	Invert Up
MH A	301.15	309.76	Ex MH	to	0	PVC	12	106.47	0.28	300.12	300.42
0	300.42	309.50	0	to	1	F PVC	12	183.00	0.28	300.52	301.03
1	300.42	309.95	1	to	2	PVC	8	261.47	1.89	301.36	306.30
2^	306.30	318.65	2	to	3	PVC	8	53.00	1.32	306.50	307.20
3^	307.20	320.03	3	to	4	PVC	8	71.17	0.56	307.40	307.80
4^	307.80	319.82	4	to	5	PVC	8	224.11	0.54	308.00	309.20
5^	309.20	322.69	5	to	6	PVC	8	266.61	0.53	309.40	310.80
6^	310.80	326.62	6	to	7	PVC	8	333.43	0.51	311.00	312.70
7	312.70	323.22	7	to	8	PVC	8	209.11	0.53	312.90	314.00
8	314.00	320.81	8	to	9	DIP	8	172.86	0.93	314.20	315.80
9	315.80	324.38	9	to	10	PVC	8	392.93	0.51	316.00	318.00
10	318.00	329.88	10	to	10a	PVC	8	280.24	0.57	318.20	319.80
10a	319.80	331.00	10a	to	10b	PVC	8	41.13	1.09	320.00	320.45
10b	320.45	332.00	-	-	-	-	-		-	-	-
5^	309.20	322.69	5	to	11	PVC	8	257.50	2.29	309.40	315.30
11	315.30	325.84	11	to	12	PVC	8	255.79	1.52	315.50	319.40
12	319.40	330.86	12	to	13	PVC	8	92.47	0.87	319.60	320.40
13^	320.40	332.72	13	to	14	PVC	8	250.22	0.68	320.60	322.30
14^	322.30	335.76	14	to	15	PVC	8	279.99	0.50	322.50	323.90
15	323.90	332.40	15	to	15a	PVC	8	154.39	0.52	324.10	324.90
15a	324.90	331.80	-	-	-	-	-		-	-	-
14^	322.30	335.76	14	to	16	PVC	8	349.64	4.15	322.50	337.00
16	337.00	344.49	16	to	17	PVC	8	375.86	2.61	337.20	347.00
17	347.00	353.39	-	-	-	-	-		-	-	-
13^	320.40	332.72	13	to	18	PVC	8	316.99	2.97	320.60	330.00
18	330.00	338.01	18	to	19	PVC	8	312.37	1.70	330.20	335.50
19	335.50	341.30	-	-	-	-	-		-	-	-
3^	307.20	320.03	3	to	20	PVC	8	314.45	1.91	308.00	314.00
20	314.00	324.80	20	to	21	PVC	8	261.20	2.14	314.20	319.80
21	319.80	330.41	21	to	22	PVC	8	227.03	1.59	320.00	323.60
22	323.60	333.03	22	to	23	PVC	8	189.36	0.53	323.80	324.80
23	324.80	335.01	23	to	24	PVC	8	228.91	1.22	325.00	327.80
24	327.80	338.46	24	to	25	PVC	8	183.38	0.76	328.00	329.40
25^	329.40	341.64	25	to	26	PVC	8	217.21	1.24	331.50	334.20
26	334.20	342.35	26	to	27	PVC	8	376.67	4.49	334.40	351.30
27	351.30	357.28	-	-	-	-	-		-	-	-
25^	329.40	341.64	25	to	28	PVC	8	37.96	0.53	329.60	329.80
28^	329.80	342.18	28	to	28A	PVC	8	201.15	2.39	330.20	335.00
28a	335.00	344.15	28	to	29	PVC	8	233.26	0.51	330.00	331.20
29	331.20	340.97	29	to	29a	PVC	8	118.89	0.55	331.40	332.05
29a	332.05	339.05	29a	to	30	PVC	8	46.68	0.54	332.25	332.50
30	332.05	338.25	-	-	-	-	-		-	-	-
23	324.80	335.01	23	to	31	PVC	8	270.00	1.67	325.00	329.50
31	329.50	337.96	31	to	32	PVC	8	208.50	1.34	329.70	332.50
32	332.50	338.78	-	-	-	-	-		-	-	-
31	329.50	337.96	31	to	33	PVC	8	73.38	4.91	329.70	333.30
33	333.30	339.14	-	-	-	-	-		-	-	-
Ex. MH	305.97	311.97	Ex MH	to	50	PVC	8	293.31	0.51	306.20	307.70
50	307.70	314.95	50	to	51	PVC	8	238.60	2.22	307.90	313.20
51	313.20	325.50	51	to	52	PVC	8	295.83	2.37	313.40	320.40
52	320.40	329.55	52	to	53	PVC	8	41.83	0.96	320.60	321.00
53	321.00	328.83	53	to	54	PVC	8	126.83	0.55	321.20	321.90
54	321.90	331.02	54	to	55	PVC	8	155.04	3.39	322.10	327.35
55	327.35	334.38	-	-	-	-	-		-	-	-
54	321.90	331.02	54	to	56	PVC	8	236.25	1.74	322.10	326.20
56	326.20	335.47	56	to	57	PVC	8	64.23	0.54	326.40	326.75
57	326.75	336.63	57	to	58	PVC	8	205.52	5.96	326.95	339.20
58	339.20	345.59	-	-	-	-	-		-	-	-
50	307.70	314.95	50	to	59	PVC	8	88.94	5.96	308.70	314.00
59	314.00	320.34	59	to	60	PVC	8	173.22	2.25	314.20	318.10
60	318.10	325.73	60	to	60A	PVC	8	73.96	0.54	318.30	318.70
60A	318.70	326.39	60A	to	61	PVC	8	225.82	4.12	318.90	328.20
61	328.20	333.98	-	-	-	-	-	-	-	-	-
60	318.10	325.73	60	to	62	PVC	8	298.78	1.10	318.30	321.60
62^	321.60	338.85	62	to	63	PVC	8	287.65	6.54	321.80	340.60
63	340.60	346.75	-	-	-	-	-		-	-	-
62^	321.60	338.85	62	to	70	PVC	8	119.58	3.18	321.80	325.60
70^	325.60	339.17	70	to	71	PVC	8	62.88	0.80	325.80	326.30
71	326.30	337.07	71	to	72	PVC	8	109.32	0.73	326.50	327.30
72	327.30	334.49	72	to	73	PVC	8	60.27	0.83	327.50	328.00
73	328.00	334.84	73	to	74	PVC	8	344.93	1.16	328.20	332.20
74	332.20	339.13	-	-	-	-	-		-	-	-
existing	0.00		ex	to	90	PVC	8	293.80	0.51	315.10	316.60
90	316.60	328.20	-	-	-	-	-		-	-	-
replacement pipes											
ex mh 99	ex mh 98		99	to	98	DIP**	16	402.89	0.28	288.92	290.06
ex mh 102	ex mh 101		102	to	101	DIP**	16	131.04	0.20	284.06	284.32

^ -5' diameter
** drop manhole*
F PVC = fusible pvc
*DIP**= protecto 401 lined dip*
All distances are center to center of manhole
All construction to be in accordance with current City of Raleigh Standards & Specifications

Pipe Material	Depth	
DIP (Class I Bedding)	Min. 3' to 5'	Traffic area
PVC - SDR 26	> 5'	Traffic area
PVC - SDR35	Min. 3' to 12'	Non-traffic area
PVC - SDR 26	12' to 20'	Non-traffic area
DIP	> 20'	Director Approval Required

Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7468 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
Watson Family II LLC
6220 Forestville Road
Raleigh NC 27604
919.819.5509

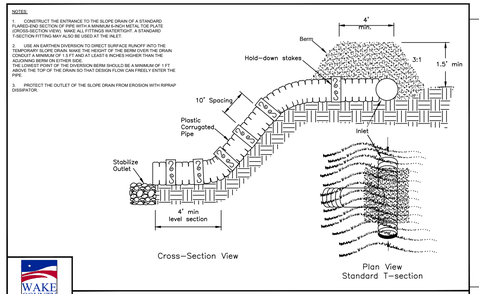
Project
Clifton Grove

Details

Date
February 15, 2022

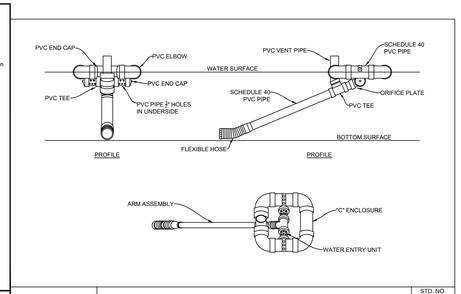
Scale
None

Sheet
CS-45



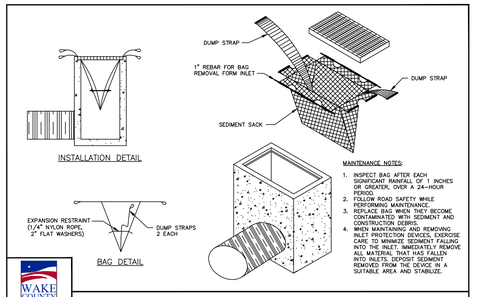
STANDARD TEMPORARY SLOPE DRAIN

EFFECTIVE: 01/31/08



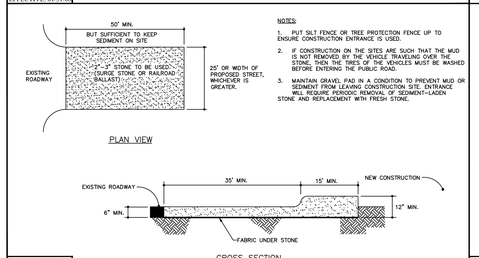
SKIMMER DETAIL

STD. NO.



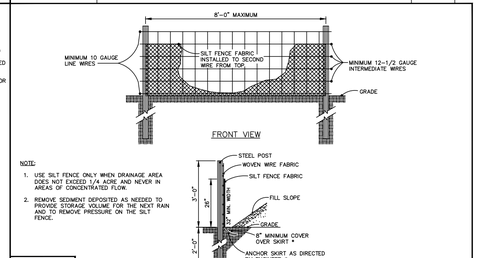
STANDARD SILT BAG - INLET SEDIMENT CONTROL DEVICE

EFFECTIVE: 01/31/08



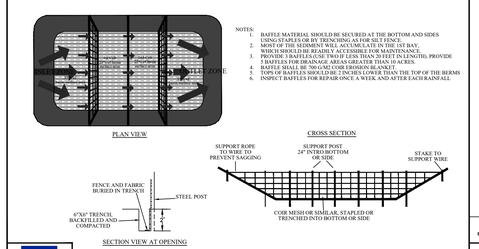
STANDARD CONSTRUCTION ENTRANCE

EFFECTIVE: 01/31/08



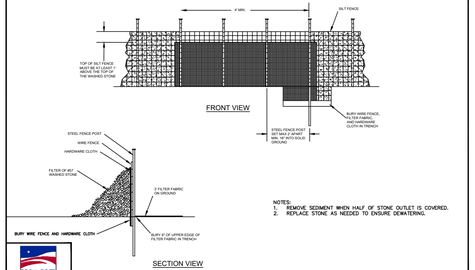
STANDARD TEMPORARY SILT FENCE

EFFECTIVE: 01/31/08



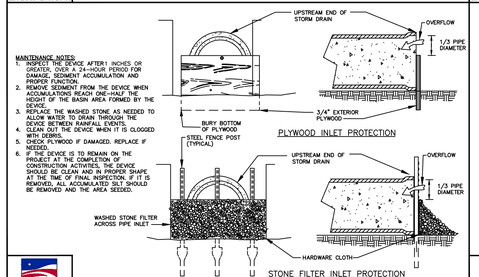
STANDARD BAFFLES DETAIL

EFFECTIVE: 01/31/08



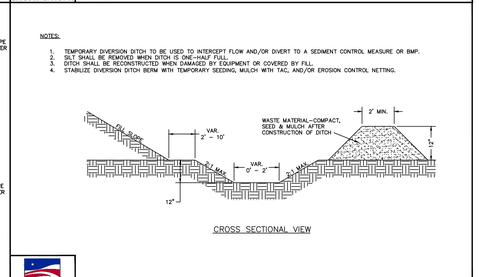
STANDARD SILT FENCE OUTLET

EFFECTIVE: 01/31/08



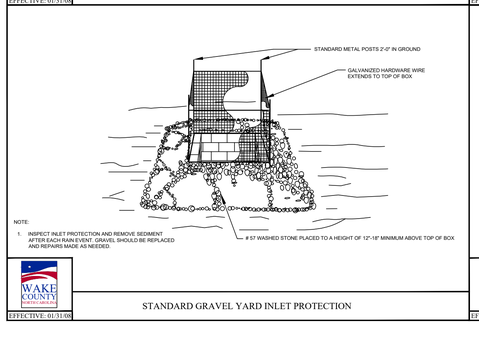
STANDARD PIPE INLET PROTECTION (PLYWOOD & STONE)

EFFECTIVE: 01/31/08



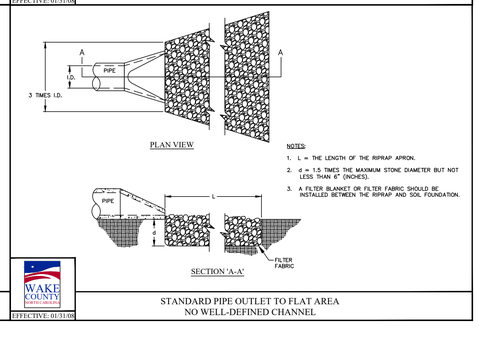
STANDARD TEMPORARY DIVERSION DITCH

EFFECTIVE: 01/31/08



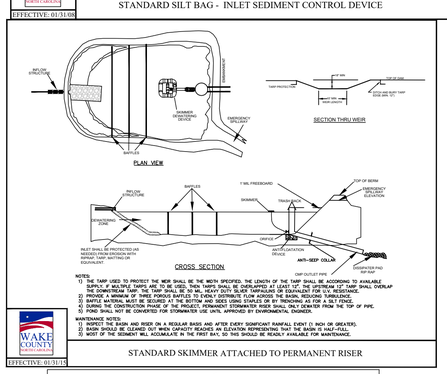
STANDARD GRAVEL YARD INLET PROTECTION

EFFECTIVE: 01/31/08



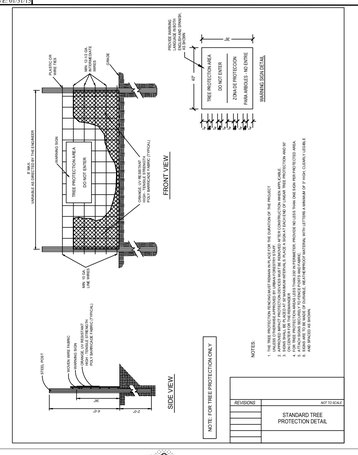
STANDARD PIPE OUTLET TO FLAT AREA NO WELL-DEFINED CHANNEL

EFFECTIVE: 01/31/08



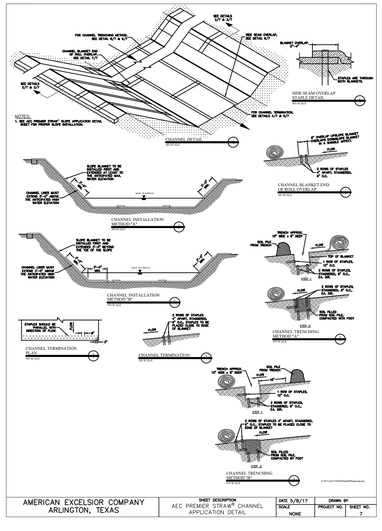
STANDARD SKIMMER ATTACHED TO PERMANENT RISER

EFFECTIVE: 01/31/15



STANDARD TREE PROTECTION DETAIL

REVISIONS	NOT TO SCALE


SEE DETAIL
SEE SHEET
SEE BOOK
SEE DETAIL
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SEE DETAIL
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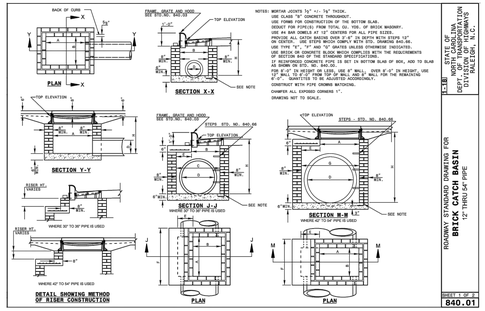
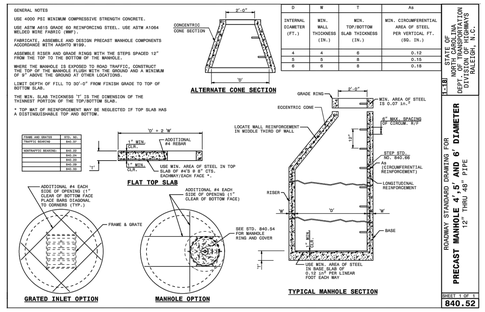
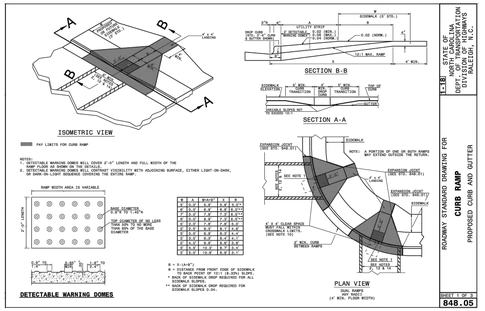
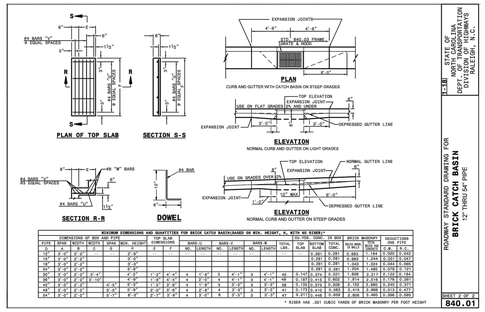
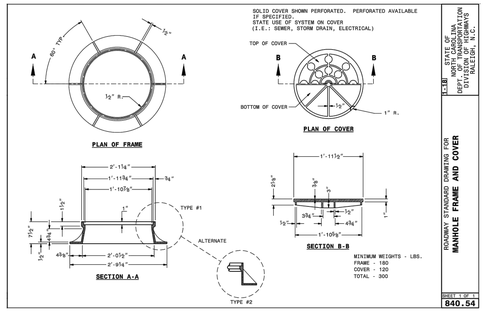
SEE BOOK

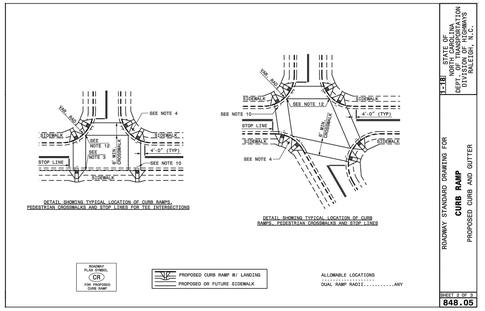


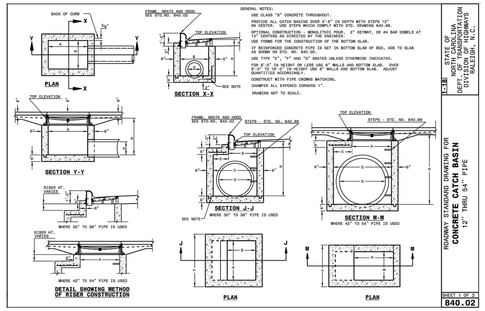


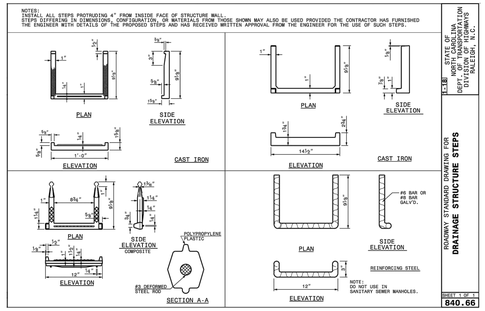


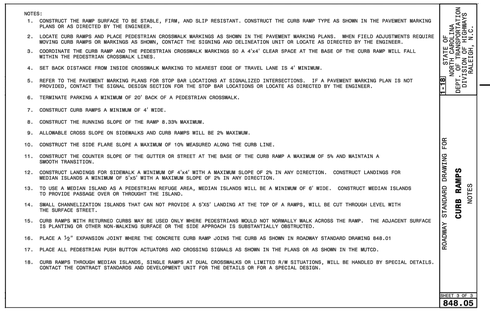


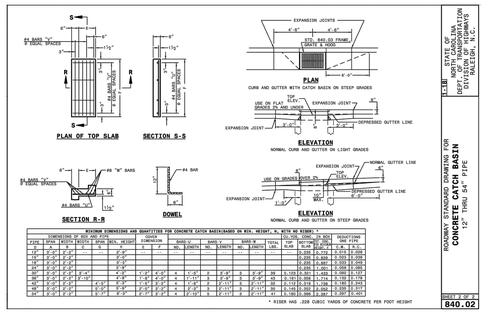


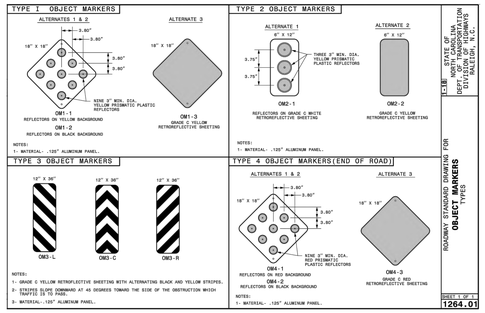


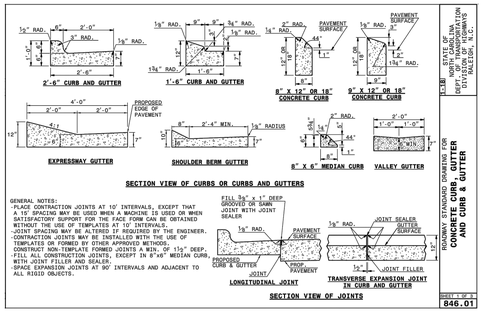


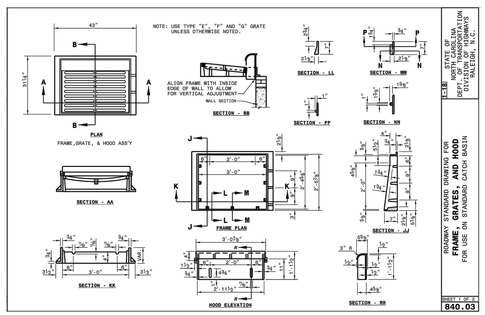


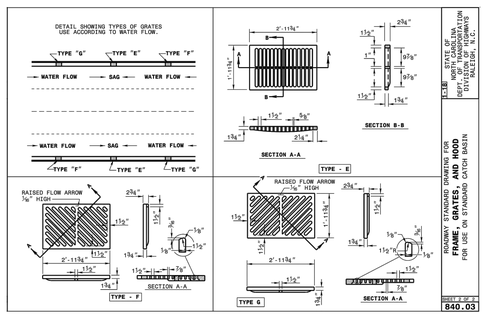


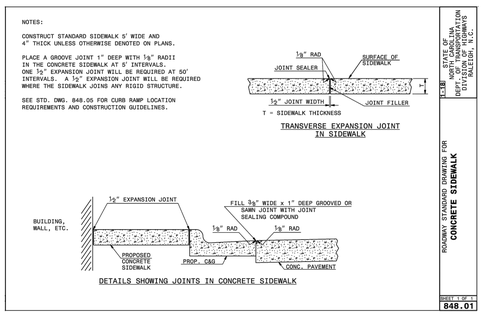












Permanent
Seeding Schedule

Grassed Area, Shoulders, Side Ditches, Slopes (Max.3:1)

Date	Type	Planting Rate
Aug.15-Nov.1	Tall Fescue	300 lbs./acre
Nov.1-Mar.1	Tall Fescue & Abruzzi Rye	300 lbs./acre 25 lbs./acre
Mar.1-Apr.15	Tall Fescue	300 lbs./acre
Apr.15-Jun.30	Hulled Common Bermudagrass	25 lbs./acre
Jul.1-Aug.15	Tall Fescue and Browntop Millet	120 lbs./acre 35 lbs./acre

Slopes (3:1 to 2:1)

Date	Type	Planting Rate
Mar.1-Jun.1	Sericea Lespedeza (Scarified) &	50 lbs./acre
(Mar.1-Apr.15) (Mar.1-June.30) Jun.1-Sep.1	Add Tall Fescue Or Add Hulled Common Bermudagrass Tall Fescue and Browntop Millet	120 lbs./acre 25 lbs./acre 120 lbs./acre 35 lbs./acre
Sep.1-Mar.1 (Nov.1-Mar.1)	Sericea Lespedeza (unhulled-unscarified) and Tall Fescue Add Abruzzi Rye	70 lbs./acre 120 lbs./acre 25 lbs./acre

Consult Conservation Engineer or Soil Conservation Service for additional information concerning other alternatives for vegetation of denuded areas. The above vegetation rates are those which do well under local conditions; other seeding rate combinations are possible.

Seeding Preparation

1.) Chisel compacted areas and spread topsoil 3 inches deep over adverse soil conditions, if available.

2.) Rip the entire area to 6 inches depth.

3.) Remove all loose rock, roots, and other obstructions leaving surface reasonably smooth and uniform.

4.) Apply agricultural lime, fertilizer, and superphosphate uniformly and mix with soil (see below).

5.) Continue tillage until a well-pulverized, firm, reasonably uniform seedbed is prepared 4 to 6 inches deep.

6.) Seed on a freshly prepared seedbed and cover seed lightly with seeding equipment or cultipack after feeding.

7.) Mulch immediately after seeding and anchor mulch.

8.) Inspect all seeded areas and make necessary repairs or reseedings within the planing season, if possible. If stand should be over 60% damaged, reestablish following original lime, fertilizer and seeding rates.

9.) Consult Conservation Inspector on maintenance treatment and fertilization after permanent cover is established.

* Apply: Agricultural Limestone – 2 tons/acre (3 tons/acre in clay soils)
Fertilizer – 1,000 lbs./acre – 10–10–10
Superphosphate – 500 lbs./acre – 20% analysis
Mulch – 2 tons/acre – small grain straw
Anchor – Asphalt Emulsion @ 300 gals./acre

MAINTENANCE SPECIFICATIONS FOR EROSION CONTROL DEVICES

Skimmer Sediment Basin with Baffles

Inspect skimmer sediment basins at least weekly and after each significant (one-half inch or greater) rainfall event and repair immediately. Remove sediment and restore the basin to its original dimensions when sediment accumulates to one-half the height of the first baffle. Pull the skimmer to one side so that the sediment underneath it can be excavated. Excavate the sediment from the entire basin, not just around the skimmer or the first cell. Make sure vegetation growing in the bottom of the basin does not hold down the skimmer.

Repair the baffles if they are damaged. Re-anchor the baffles if water is flowing underneath or around them.

If the skimmer is clogged with trash and there is water in the basin, usually jerking on the rope will make the skimmer bob up and down and dislodge the debris and restore flow. If this does not work, pull the skimmer over to the side of the basin and remove the debris. Also check the orifice inside the skimmer to see if it is clogged; if so remove the debris.

If the skimmer arm or barrel pipe is clogged, the orifice can be removed and the obstruction cleared with a plumber's snake or by flushing with water. Be sure and replace the orifice before repositioning the skimmer.

Check the fabric lined spillway for damage and make any required repairs with fabric that spans the full width of the spillway. Check the embankment, spillways, outlet for erosion damage, and inspect the embankment for piping and settlement. Make all necessary repairs immediately. Remove all trash and other debris from the skimmer and pool areas.

Freezing weather can result in ice forming in the basin. Some special precautions should be taken in the winter to prevent the skimmer from plugging with ice.

Gravel Inlet Protection

Inspect the barrier at least weekly and after each significant (1/2 inch or greater) rainfall and make repairs as needed.

Remove sediment as necessary to provide adequate storage volume for subsequent rains.

When the contributing drainage area has been adequately stabilized, remove all materials and any unstable soil, and either salvage or dispose of it properly. Bring the disturbed area to proper grade, then smooth and compact it. Appropriately stabilize all bare areas around the inlet.

Silt Fence

Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment fence collapse, tear, decompose or become ineffective, replace it promptly.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

Construction Entrance

Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

Velocity Dissipator (Outlet Stabilization)

Inspect riprap outlet structures weekly and after significant (1/2 inch or greater) rainfall events to see if any erosion around or below the riprap has taken place, or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

Temporary Diversions Maintenance

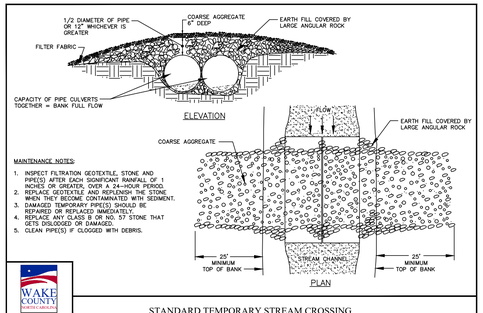
Inspect temporary diversions once a week and after every rainfall. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlet and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it.

Check Dam Maintenance

Inspect check dams and channels at least weekly and after each significant (.5 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel.

Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation , allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed to maintain design height and cross section.



Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

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919.819.5509

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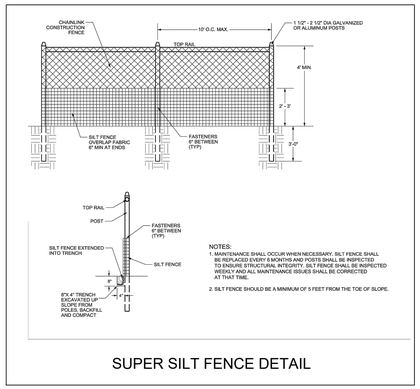


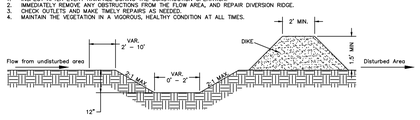
SUPER SILT FENCE DETAIL

NOTES:

1. DIVERSION TO BE USED UPSLOPE OF A CONSTRUCTION SITE TO PREVENT STORM RUNOFF FROM ENTERING THE DISTURBED AREA.
2. IMMEDIATELY LINE AND STABILIZE BEFORE ANY DOWNSLOPE GRADING BEGINS (STABILIZATION MUST OCCUR BEFORE ISSUANCE OF A CERTIFICATE OF COMPLIANCE). STABILIZATION METHOD IS BASED ON VELOCITY OF OFFSITE DRAINAGE.
3. DIVERSIONS SHOULD ONLY BE USED FOR DRAINAGES 5 ACRES OR LESS.
4. ANY SEDIMENT LADEN WATER PRIOR TO STABILIZATION OF THE DIVERSION MUST BE DIVERTED INTO AN APPROVED EROSION AND SEDIMENT CONTROL BMP. CLEAN WATER SHOULD EMPTY INTO AN APPROVED OUTLET DEVICE.

MAINTINANCE NOTES:

1. INSPECT AFTER EVERY RAINFALL DURING THE CONSTRUCTION OPERATION.
2. IMMEDIATELY REMOVE ANY OBSTRUCTIONS FROM THE FLOW AREA, AND REPAIR DIVERSION RIDGE.
3. CHECK OUTLETS AND MAKE TIMELY REPAIRS AS NEEDED.
4. MAINTAIN THE VEGETATION IN A VIGOROUS, HEALTHY CONDITION AT ALL TIMES.



CROSS SECTIONAL VIEW

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD CLEAN WATER DIVERSION

NOTES

1. PROVIDE STABILIZED OUTLET TO STREAM BANK.
2. 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 FILTER BAG FOR DEWATERING ABOVE NATURAL GROUND.

MAINTENANCE NOTES

1. REPLACE AND DISPOSE OF FILTER BAG(S) WHEN IT IS ⅔ FULL OF SEDIMENT OR WHEN IT IS IMPRCTICAL FOR BAG TO FILTER SEDIMENT.
2. PROVIDE A SUFFICEINT QUANTITY OF FILTER BAGS TO CONTAIN SILT FROM PUMPED EFFLUENT.

NOT TO SCALE

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD FILTER BAG FOR DEWATERING ACTIVITIES

Clifton Grove

Impervious Limits for Residential Lots 1-237 (& amenity area)

Lot #	Maximum Impervious Allowed (sf)	Lot Area (sf)	Finished Floor Elevation	Minimum FFE*
1	3696	6720	321.9	
2	3554	6461	324.5	
3	4002	7276	326.9	
4	3301	6002	327.6	
5	3300	6000	328.3	
6	3300	6000	328.9	
7	3300	6000	329.4	
8	3300	6000	330.1	
9	3691	6711	330.7	
10	4504	8189	331.3	
11	6388	11614	331.5	
12	6807	12376	331.8	
13	4721	8584	331.9	
14	5634	10243	331.6	329.10*
15	5231	9510	331.4	329.10*
16	4177	7595	330.5	
17	3432	6240	329.7	
18	3432	6240	329.2	
19	3432	6240	328.5	
20	3432	6240	327.9	
21	3480	6326	327.3	
22	3693	6715	326.2	
23	3886	7065	324.4	
24	3898	7086	322.1	
25	3933	7150	324.0	
26	3328	6050	325.3	
27	3322	6039	326.3	
28	3572	6494	327.6	
29	3328	6050	329.1	
30	3328	6050	330.1	
31	3328	6050	331.1	
32	3641	6620	332.1	
33	4178	7596	333.1	
34	3346	6083	336.4	
35	3328	6050	337.1	
36	3697	6721	337.2	
37	4815	8755	336.7	
38	3944	7172	335.8	
39	3608	6724	335.3	329.10*
40	4922	8949	334.6	329.10*
41	3805	6918	335.4	329.10*
42	3937	7158	336.1	
43	4289	7797	336.8	
44	3946	7174	341.1	
45	3349	6090	343.1	
46	3409	6199	344.4	
47	3404	6188	345.6	
48	3398	6178	346.5	
49	3392	6168	348.1	
50	3387	6157	349.4	
51	3381	6147	350.5	
52	3375	6137	351.7	
53	3369	6126	352.9	
54	3364	6116	354.2	
55	4047	7359	355.5	
56	3300	6000	353.0	
57	3300	6000	351.7	
58	3300	6000	350.2	
59	3300	6000	348.8	
60	3300	6000	347.4	
61	3300	6000	346.0	
62	3300	6000	344.6	
63	3300	6000	343.1	
64	3300	6000	340.9	
65	4218	7669	336.9	
66	3742	6803	336.1	
67	4418	8032	335.2	
68	3300	6000	338.0	
69	3300	6000	338.7	
70	3300	6000	339.2	
71	3300	6000	339.9	
72	3300	6000	340.5	
73	3300	6000	341.1	
74	3300	6000	341.7	
75	3300	6000	342.4	
76	3300	6000	343.0	
77	3942	7168	347.4	
78	3468	6305	350.4	
79	4054	7372	353.1	
80	3300	6000	343.0	
81	3300	6000	342.4	
82	3300	6000	341.8	
83	3300	6000	341.2	
84	3300	6000	340.5	
85	3300	6000	339.9	
86	3300	6000	339.3	
87	3300	6000	338.7	
88	3300	6000	338.0	
89	3300	6000	336.3	
90	3332	6059	334.0	
91	4426	8047	332.6	
92	3575	6500	331.1	317.05*
93	3575	6500	329.8	317.05*
94	3575	6500	328.6	317.05*
95	3355	6100	327.4	317.05*
96	3515	6391	326.5	317.05*
97	3841	6984	325.4	317.05*
98	4072	7403	324.0	317.05*
99	4099	7452	321.4	317.05*
100	3906	7101	322.9	317.05*
101	3712	6749	324.3	317.05*
102	3602	6550	325.7	317.05*
103	3565	6481	327.7	317.05*
104	3410	6200	328.6	317.05*
105	3412	6204	330.2	
106	4090	7436	331.2	
107	3553	6460	333.1	
108	3300	6000	333.6	
109	3300	6000	334.3	
110	3300	6000	334.8	
111	3300	6000	335.4	
112	3300	6000	336.1	
113	3300	6000	336.8	
114	3300	6000	337.6	
115	3300	6000	338.5	
116	3300	6000	339.5	
117	3300	6000	340.4	
118	3677	6686	342.2	
119	3396	6175	342.2	
120	3788	6888	343.1	
121	4324	7862	358.4	
122	3966	7210	358.6	
123	3966	7210	357.0	
124	3966	7210	354.5	
125	3966	7210	352.1	
126	3966	7210	349.6	
127	3966	7210	347.2	341.04*
128	3966	7210	345.0	341.04*
129	4505	8190	343.4	341.04*
130	3966	7210	342.1	341.04*
131	3966	7210	342.1	341.04*
132	3966	7210	342.4	341.04*
133	4696	8538	343.2	341.04*
134	4458	8106	344.0	341.04*
135	3545	6446	344.4	341.04*
136	3506	6375	344.1	341.04*
137	5028	9142	340.3	
138	4983	9060	339.3	
139	4960	9017	339.5	
140	5007	9105	341.2	
141	3802	6913	343.4	
142	3438	6250	344.3	
143	3607	6559	344.4	
144	4417	8032	343.8	
145	3328	6050	340.0	
146	3328	6050	339.1	
147	3328	6050	338.2	
148	3583	6514	337.3	
149	3354	6099	335.9	
150	3428	6233	335.3	
151	3394	6171	327.1	
152	3317	6031	326.1	
153	3300	6000	325.0	
154	3300	6000	323.9	
155	3300	6000	322.8	315.05*
156	4577	8322	321.5	315.05*
157	3328	6050	337.5	
158	3328	6050	338.4	
159	3328	6050	339.3	
160	3328	6050	340.1	
161	3426	6230	341.0	
162	3583	6514	338.8	
163	3328	6050	339.3	
164	3328	6050	339.9	
165	3328	6050	340.4	
166	4377	7957	340.4	
167	3848	6996	339.9	
168	3483	6333	339.3	
169	3401	6184	338.8	
170	3932	7149	341.0	
171	3300	6000	340.3	
172	3300	6000	339.7	332.7*
173	3300	6000	339.1	332.7*
174	3300	6000	338.4	332.7*
175	3300	6000	337.8	332.7*
176	3792	6895	336.9	332.7*
177	3978	7232	338.5	332.7*
178	4223	7678	338.0	332.7*
179	4223	7678	336.0	332.7*
180	4223	7678	336.6	
181	4223	7678	338.0	
182	4223	7678	339.7	
183	4223	7678	340.8	
184	3873	7042	341.2	
185	3300	6000	340.5	
186	3300	6000	338.9	
187	3300	6000	336.5	
188	3300	6000	333.4	
189	3300	6000	331.0	
190	3300	6000	329.0	
191	3308	6014	327.4	
192	3748	6814	325.9	
193	5586	10157	323.6	
194	3512	6386	321.9	
195	3487	6340	323.5	
196	4328	7868	325.4	
197	3328	6050	332.5	
198	3328	6050	334.2	
199	3328	6050	335.1	
200	3328	6050	335.7	
201	3328	6050	336.1	
202	3328	6050	335.2	
203	3443	6260	332.8	
204	4320	7855	342.4	
205	3831	6966	335.0	
206	3831	6966	336.1	
207	3831	6966	335.8	
208	3831	6966	335.2	
209	3831	6966	334.3	
210	3831	6966	332.3	
211	4342	7894	329.4	
212	3479	6325	331.8	
213	3479	6325	334.8	
214	4342	7894	337.9	
215	3636	6611	346.4	
216	3421	6219	347.4	
217	3421	6219	347.9	
218	3421	6219	348.4	
219	3421	6219	347.8	
220	3421	6219	345.9	
221	3421	6219	342.9	
222	4125	7500	338.9	
223	3835	6973	338.5	
224	3483	6333	342.5	
225	3483	6333	346.2	
226	3483	6333	348.1	
227	3483	6333	348.2	
228	3483	6333	347.6	
229	3483	6333	346.6	
230	3483	6333	343.9	
231	3401	6183	336.2	
232	3483	6333	337.0	
233	3483	6333	337.7	
234	3483	6333	338.4	
235	3483	6333	339.2	
236	3483	6333	340.0	
237	4539	8252	340.9	

Amenity Site	40511		320.5
Streets	442774		-
Sidewalks	110991		-

Maximum Impervious Area Square Footage on each individual lot will be stringently enforced with no exceptions into perpetuity
Plans approved with a maximum impervious surface of (3300 - 6807) SF per residential lot.

* Minimum FFE's shall be 1' above 100 year elevation - as noted on this chart
Note: No existing structures will be retained.

Wm. G. Daniel & Assoc.
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SUITE 260
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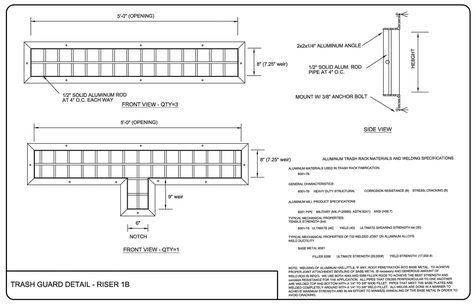
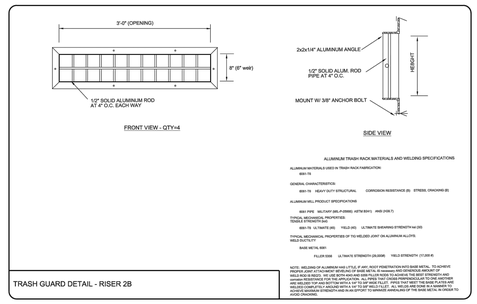
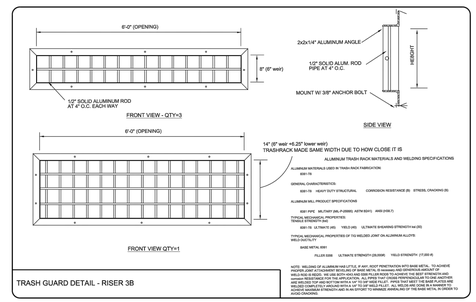
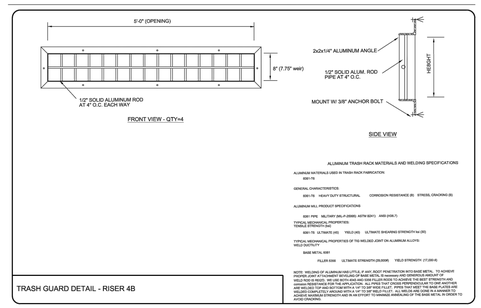
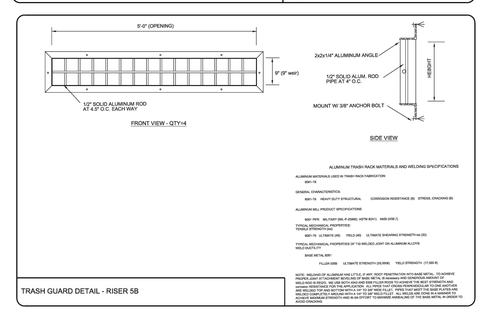










FOR APPROVAL ONLY

CP&P

Structure: REV POND 1B
Job Number: 156073
Job Name: CLIFTON GROVE
Job Location: ZEBULON, NC

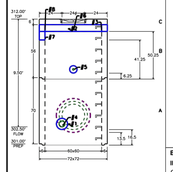
Based On: Specification: 60x60
Take Off By: 10/6/2023 acampos Contractor: **Wynn Site Development**

Design Build Height			Stack Build Height			Pour Date:	
Top of Casting	+	312.00'	Concentric Slab	+	0.50'	QC Date:	
Outlet Invert	-	302.50'	Risers	+	4.67'	Ring&Cover:	CAST-IN RING & COVER SUPPLIED BY CP&P
Sump	+	1.00'	Last Riser Gain	+	5.33'		
Design Height	=	**10.50'**	**Design Height**	=	**10.50'**	Invert:	No Channel
			To Floor	+	0.50'	Notes:	**CAST-IN RING & COVER SUPPLIED BY CONTRACTOR (20) CAST-IN DOWEL BAR SPLICERS (20) SHIP LOOSE DOWEL BARS ENG TO VERIFY ALL ELEVATIONS & WEIR SIZES?**
			Inside Height	=	**11.00'**		
			Floor Thickness	+	0.00'		
			Outside Height	=	**11.00'**		

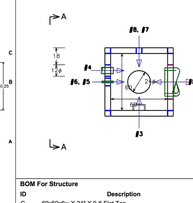
Opening Schedule

ID	Invert	Grade	To / From	Pipe Size	Connector	Hole Size	Bottom	Angle
#1	302.50'			24" RCP B	Mortar	36" Ø	13.50"	0°
#2	310.90'		7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	60"Wx7.25"H Box	50.25"	0°
#3	310.90'		7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	60"Wx7.25"H Box	50.25"	90°
#4	302.50'		6" DRAIN	6" PVC Schd 40	Mortar	12" Ø	16.50"	180°
#5	307.50'		1.5 PVC DRAW DOWN	1.5 PVC Schd 40	Mortar	6" Ø	6.25"	180°
#6	310.90'		7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	60"Wx7.25"H Box	50.25"	180°
#7	310.15'		9"TALLX6"WIDE	9"TALLX6"WIDE WEIR	9"TALLX6"WIDE WEIR	6"Wx9"H Box	41.25"	270°
#8	310.90'		7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	7.25"TALLX60"WIDE WE	60"Wx7.25"H Box	50.25"	270°

Elevation (View A-A)



Plan View



BOM For Structure

ID	Description	Qty.	Weight
C	60x60x8w X 24" X 0-6 Flat Top	1	2,540
B	60x60x8w 4-8Ht Riser	1	7,072
A	60x60x8w 5-10Ht Riser (Keyed top)	1	9,337
	Totals (pieces, lbs)	3	18,950

Submittal 7.3.38 Page 1 of 5 10/6/2023

FOR APPROVAL ONLY

CP&P

Structure: REV POND 2B
Job Number: 156073
Job Name: CLIFTON GROVE
Job Location: ZEBULON, NC

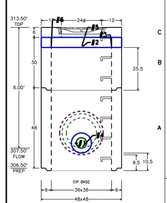
Based On: Specification: 36x36
Take Off By: 10/6/2023 acampos Contractor: **Wynn Site Development**

Design Build Height			Stack Build Height			Pour Date:	
Top of Casting	+	313.50'	Concentric Slab	+	0.50'	QC Date:	
Outlet Invert	-	307.50'	Risers	+	2.50'	Frame/Ring:	CAST-IN RING & COVER SUPPLIED BY CONTRACTOR
Design Height	=	**6.00'**	Last Riser Gain	+	3.00'		
Above Base	=	**6.00'**	**Above Base**	=	**6.00'**	Invert:	Base Poured In Field By Contractor
			Contractor Base	+	0.00'	Notes:	**CAST-IN RING & COVER SUPPLIED BY CONTRACTOR (12) CAST-IN DOWEL BAR SPLICERS (12) SHIP LOOSE DOWEL BARS ENG TO VERIFY ALL ELEVATIONS & WEIR SIZES?**
			Design Height	=	**6.00'**		

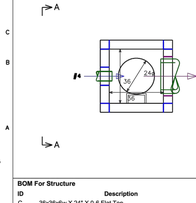
Opening Schedule

ID	Invert	Grade	To / From	Pipe Size	Connector	Hole Size	Bottom	Angle
#1	307.50'			18" RCP B	Mortar	26" Ø	8.50"	0°
#2	312.50'		6"TX36"W WEIR	6" Throat Box	Throat	36"Wx6"H Box	25.50"	0°
#3	312.50'		6"TX36"W WEIR	6" Throat Box	Throat	36"Wx6"H Box	25.50"	90°
#4	307.50'		6" DRAIN	6" PVC Schd 40	12-06 PSX:DD	12" Ø	10.50"	180°
#5	312.50'		6"TX36"W WEIR	6" Throat Box	Throat	36"Wx6"H Box	25.50"	180°
#6	312.50'		6"TX36"W WEIR	6" Throat Box	Throat	36"Wx6"H Box	25.50"	270°

Elevation (View A-A)



Plan View



BOM For Structure

ID	Description	Qty.	Weight
C	36x36x8w X 24" X 0-6 Flat Top	1	997
B	36x36x8w 2-6Ht Riser	1	2,310
A	36x36x8w 4-0Ht Riser (Keyed top)	1	3,993
	Totals (pieces, lbs)	3	7,300

Submittal 7.3.38 Page 2 of 5 10/6/2023

FOR APPROVAL ONLY

CP&P

Structure: REV POND 3B
Job Number: 156073
Job Name: CLIFTON GROVE
Job Location: ZEBULON, NC

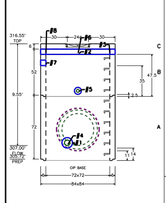
Based On: Specification: 72x72
Take Off By: 10/6/2023 acampos Contractor: **Wynn Site Development**

Design Build Height			Stack Build Height			Pour Date:	
Top of Casting	+	316.55'	Concentric Slab	+	0.50'	QC Date:	
Outlet Invert	-	307.00'	Risers	+	4.33'	Ring&Cover:	CAST-IN RING & COVER SUPPLIED BY CONTRACTOR
Design Height	=	**9.55'**	Last Riser Gain	+	4.72'		
Above Base	=	**9.55'**	**Above Base**	=	**9.55'**	Invert:	Base Poured In Field By Contractor
			Contractor Base	+	0.00'	Notes:	**CAST-IN RING & COVER SUPPLIED BY CONTRACTOR (24) CAST-IN DOWEL BAR SPLICERS (24) SHIP LOOSE DOWEL BARS ENG TO VERIFY ALL ELEVATIONS & WEIR SIZES?**
			Design Height	=	**9.55'**		

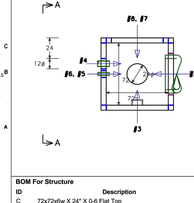
Opening Schedule

ID	Invert	Grade	To / From	Pipe Size	Connector	Hole Size	Bottom	Angle
#1	307.00'			36" RCP B	Mortar	48" Ø	11"	0°
#2	315.55'		6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	72"Wx6"H Box	47.50"	0°
#3	315.55'		6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	72"Wx6"H Box	47.50"	90°
#4	307.00'		6" DRAIN	6" PVC Schd 40	Mortar	12" Ø	14"	180°
#5	312.00'		3" PVC DRAW DOWN	3" PVC Schd 40	Mortar	8" Ø	2.50"	180°
#6	315.55'		6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	72"Wx6"H Box	47.50"	180°
#7	314.50'		6.25"TALLX60"WIDE	6.25"TALLX60"WIDE	60"Wx6.25"H Box	60"Wx6.25"H Box	.35"	270°
#8	315.55'		6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	6"TALLX72"WIDE WEIR	72"Wx6"H Box	47.50"	270°

Elevation (View A-A)



Plan View



BOM For Structure

ID	Description	Qty.	Weight
C	72x72x8w X 24" X 0-6 Flat Top	1	3,554
B	72x72x8w 4-4Ht Riser	1	7,694
A	72x72x8w 6-0Ht Riser (Keyed top)	1	11,055
	Totals (pieces, lbs)	3	22,303

Submittal 7.3.38 Page 3 of 5 10/6/2023

FOR APPROVAL ONLY

CP&P

Structure: REV POND 4B
Job Number: 156073
Job Name: CLIFTON GROVE
Job Location: ZEBULON, NC

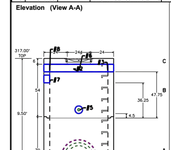
Based On: Specification: 60x60
Take Off By: 10/6/2023 acampos Contractor: **Wynn Site Development**

Design Build Height			Stack Build Height			Pour Date:	
Top of Casting	+	317.00'	Concentric Slab	+	0.50'	QC Date:	
Outlet Invert	-	307.50'	Risers	+	4.50'	Ring&Cover:	CAST-IN RING & COVER SUPPLIED BY CONTRACTOR
Sump	+	1.00'	Last Riser Gain	+	5.50'		
Design Height	=	**10.50'**	**Above Base**	=	**10.50'**	Invert:	Base Poured In Field By Contractor
Above Base	=	**9.50'**	Contractor Base	+	0.00'	Notes:	**CAST-IN RING & COVER SUPPLIED BY CONTRACTOR (20) CAST-IN DOWEL BAR SPLICERS (20) SHIP LOOSE DOWEL BARS ENG TO VERIFY ALL ELEVATIONS & WEIR SIZES?**
			Design Height	=	**10.50'**		

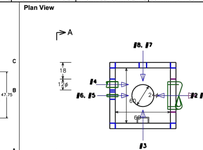
Opening Schedule

ID	Invert	Grade	To / From	Pipe Size	Connector	Hole Size	Bottom	Angle
#1	307.50'			24" RCP B	Mortar	36" Ø	11.50"	0°
#2	315.80'		7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	60"Wx7.75"H Box	47.75"	0°
#3	315.80'		7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	60"Wx7.75"H Box	47.75"	90°
#4	307.50'		6" DRAIN	6" PVC Schd 40	Mortar	12" Ø	14.50"	180°
#5	312.50'		2" PVC DRAW DOWN	2" PVC Schd 40	BORS STEP "S" PSX:DDE	8" Ø	4.50"	180°
#6	315.80'		7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	60"Wx7.75"H Box	47.75"	180°
#7	314.90'		8" ORIFICE	Access		8" Ø	36.25"	270°
#8	315.80'		7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	7.75"TALLX60"WIDE WE	60"Wx7.75"H Box	47.75"	270°

Elevation (View A-A)



Plan View



BOM For Structure

ID	Description	Qty.	Weight
C	60x60x8w X 24" X 0-6 Flat Top	1	2,547
B	60x60x8w 4-6Ht Riser	1	6,719
A	60x60x8w 5-10Ht Riser (Keyed top)	1	9,337
	Totals (pieces, lbs)	3	18,603

Submittal 7.3.38 Page 4 of 5 10/6/2023

FOR APPROVAL ONLY

CP&P

Structure: REV POND 5B
Job Number: 156073
Job Name: CLIFTON GROVE
Job Location: ZEBULON, NC

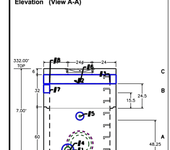
Based On: Specification: 60x60
Take Off By: 10/6/2023 acampos Contractor: **Wynn Site Development**

Design Build Height			Stack Build Height			Pour Date:	
Top of Casting	+	332.00'	Concentric Slab	+	0.50'	QC Date:	
Outlet Invert	-	325.00'	Risers	+	2.67'	Ring&Cover:	USF 1117-BL
Sump	+	1.00'	Last Riser Gain	+	4.83'	Invert:	Base Poured In Field By Contractor
Design Height	=	**8.00'**	**Above Base**	=	**7.00'**	Notes:	**CAST-IN RING & COVER SUPPLIED BY CONTRACTOR (20) CAST-IN DOWEL BAR SPLICERS (20) SHIP LOOSE DOWEL BARS ENG TO VERIFY ALL ELEVATIONS & WEIR SIZES?**
Above Base	=	**7.00'**	Contractor Base	+	0.00'		
			Design Height	=	**8.00'**		

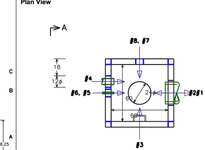
Opening Schedule

ID	Invert	Grade	To / From	Pipe Size	Connector	Hole Size	Bottom	Angle
#1	325.00'			18" RCP B	Mortar	26" Ø	11.50"	0°
#2	330.75'		9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	60"Wx9"H Box	24.50"	0°
#3	330.75'		9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	60"Wx9"H Box	24.50"	90°
#4	325.00'		6" DRAIN	6" PVC Schd 40	Mortar	12" Ø	12.50"	180°
#5	328.00'		1.5" PVC DRAW DOWN	1.5 PVC Schd 40	Mortar	8" Ø	48.25"	180°
#6	330.75'		9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	60"Wx9"H Box	24.50"	180°
#7	330.00'		6" ORIFICE	Access		8" Ø	15.50"	270°
#8	330.75'		9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	9"TALLX60"WIDE WEIR	60"Wx9"H Box	24.50"	270°

Elevation (View A-A)



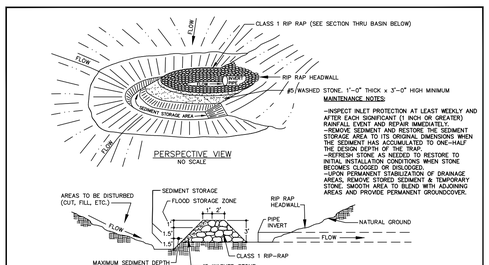
Plan View

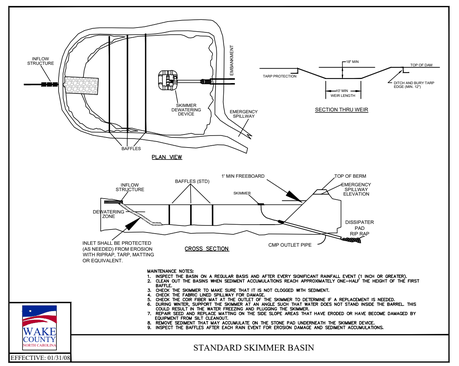


BOM For Structure

ID	Description	Qty.	Weight
C	60x60x8w X 24" X 0-6 Flat Top	1	2,547
B	60x60x8w 2-8Ht Riser	1	3,459
A	60x60x8w 5-0Ht Riser (Keyed top)	1	8,151
	Totals (pieces, lbs)	3	14,157

Submittal 7.3.38 Page 5 of 5 10/6/2023





Wm. G. Daniel & Assoc.
Engineering Planning
Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions

07.13.22--06.12.23 Per City/Town 1st--5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

WAKE COUNTY GOVERNMENT

Environmental Services

tel: 919 856 7400
fax: 919 743 4772

Sedimentation & Erosion Control
336 Fayetteville St. • P.O. Box 550 • Raleigh, NC 27602

Effective September 1, 2008
Soil stockpiles shall be located on the approved plan and shall adhere to the following requirements:

Design Criteria

a. A 25-foot temporary maintenance and access easement shall be shown around all proposed stockpiles (erosion control measures surrounding the stockpile shall be shown at the outer limit of this easement).
b. Stockpile footprints shall be setback a minimum of 25' from adjacent property lines.
c. A note shall be provided on the approved plan that stockpile height shall not exceed 35 feet.
d. Stockpile slopes shall be 2:1 or flatter.
e. Approved BMPs shall be shown on a plan to control any potential sediment loss from a stockpile.
f. Stockpiling materials adjacent to a ditch, drainageway, watercourse, wetland, stream buffer, or other body of water shall be avoided unless an alternative location is demonstrated to be unavailable.
g. Any concentrated flow likely to affect the stockpile shall be diverted to an approved BMP.
h. Off-site spoil or borrow areas must be in compliance with Wake County UDO and State Regulations. All spoil areas over an acre are required to have an approved sediment control plan. Developer/Contractor shall notify Wake County of any offsite disposal of soil, prior to disposal. Fill of FEMA Floodways and Non-encroachment Areas are prohibited except as otherwise provided by subsection 14-19-2 of the Wake County Unified Development Ordinance (certifications and permits required).

Maintenance Requirements to be Noted on the Plan

i. Seeding or covering st

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(d) Anticipated bypasses and unanticipated bypasses.

(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible***. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,
(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,
(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,
(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
(f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	**Stabilize within this many calendar days after ceasing land disturbance**	**Timeframe variations**
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

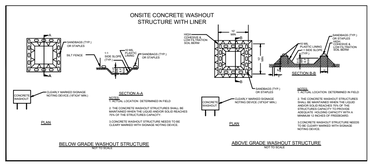
PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

NORTH CAROLINA Environmental Quality



CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

Wm. G. Daniel & Assoc.
Engineering Planning Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7488 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions
07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
Watson Family II LLC
6220 Forestville Road
Raleigh NC 27604
919.819.5509

Project
Clifton Grove

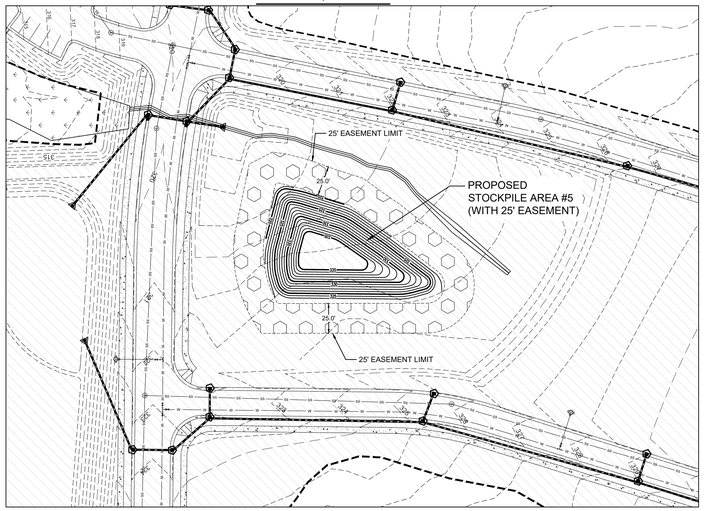
Details

Date
February 15, 2022

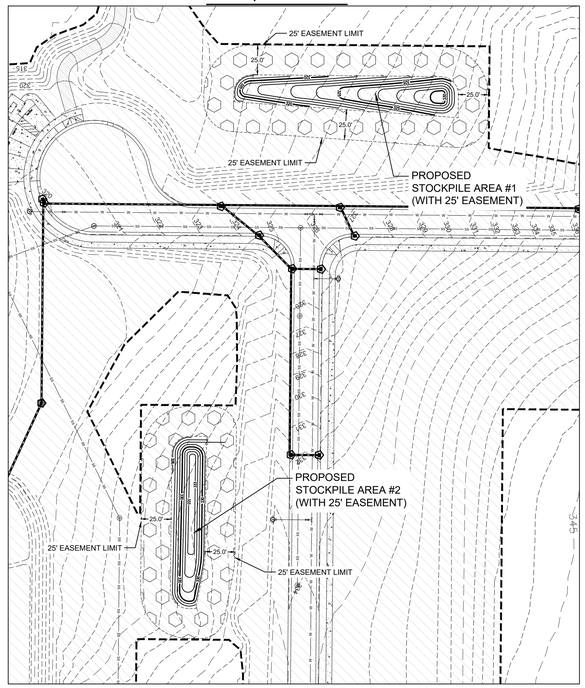
Scale
None

Sheet
CS-50

Stockpile #5

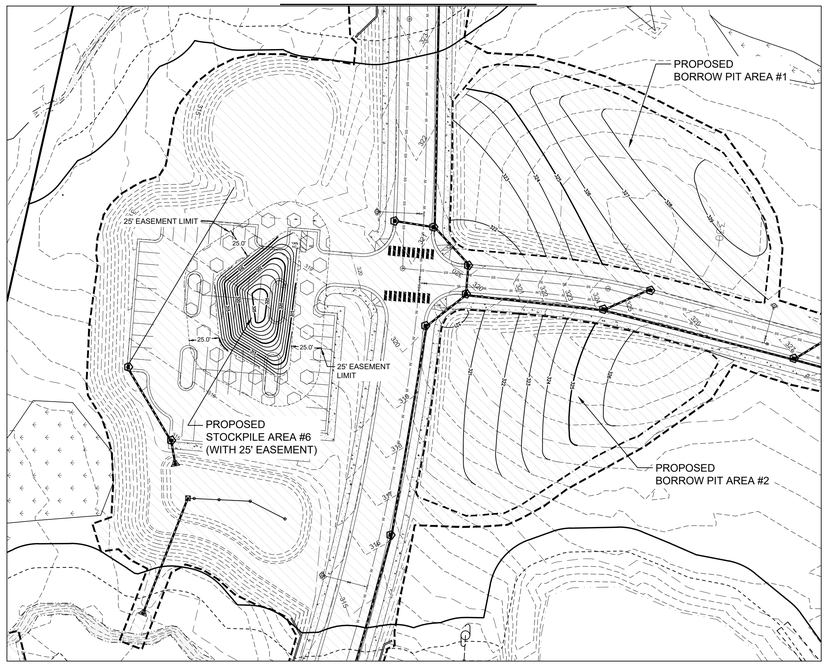


Stockpile #1 & #2

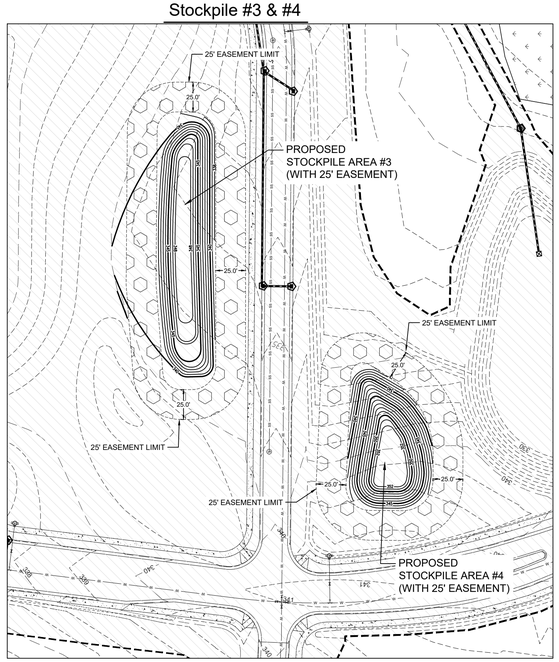


GRAPHIC SCALE
0' 60' 120' 180'
(IN FEET)
1 INCH = 60 FT

Borrow Pits #1 & 2 / Stockpile #6



Stockpile #3 & #4



- PROP TREE PROTECTION FENCE
- PROP. COMBINATION SILT/TREE FENCE
- PROP. SUPER SILT FENCE
- PROP STORM DRAINAGE
- PROP JUNCTION BOX
- PROP CATCH BASIN
- PROP FLARED END SECTION
- PROP INLET PROTECTION
- PROP DIVERSION DITCH
- PROP TEMPORARY CONSTRUCTION ENTRANCE
- PROP RISER/SKIMMER BASIN
- PROP CHECK DAM
- PROP SLOPE DRAIN
- DENUDED AREA (TYP)
- SILT OUTLET (TYP)
- STOCKPILE AREAS
- CLEAN WATER SWALE

Wm. G. Daniel & Assoc.
Engineering Planning
Site Design
1150 SE MAYNARD ROAD
SUITE 260
CARY, NC 27511
Ph:919-467-9708 Fx:919-460-7585
C-0329

NORTH CAROLINA PROFESSIONAL SEAL 7428 ENGINEER WILLIAM G. DANIEL
10/7/2024

Revisions

07.13.22–06.12.23 Per City/Town 1st–5th review
10.19.23 Per Wake Co review
01.31.24 Per Wake Co review
08.01.24 Per Wake Co review
09.05.24 Per Wake Co review
10.07.24 Per Wake Co review

Owner:
D.R. Horton, Inc.
7208 Falls of Neuse Road
Raleigh NC 27615
919.497.2163

Project
Clifton Grove

Erosion Control Plan
Stockpile & Borrow Areas

Date
February 15, 2022

Scale
1" = 60'

Sheet
CS-51