FIND THE LINE
STUDIOS
LANDSCAPE ARCHITECTURE AND PLANNING

SIGNAL HILL TOWNHOMES

ZONING COMPLIANCE PLANS

HENDERSONVILLE, NORTH CAROLINA

~~MARCH 20, 2025~~
~~MAY 15, 2025~~ – per COH comments
JUNE 2, 2025 – Added sidewalk extension

PROPERTY OWNER / DEVELOPER:
FIRST VICTORY INC
542 S. CALDWELL STREET
BREVARD, NC 28712
828.884.7934

PIN NUMBERS: 9579076259; 9579067975; 9579065791;
9579068507; 9579068308; 9579068117

PROPERTY ADDRESS:
99999 SIGNAL HILL ROAD
HENDERSONVILLE, NC

TOTAL SIZE OF PROPERTY:
13.73 ACRES (598,078.8 SF)

ZONING:
R-15 MINOR PRD
ALLOWABLE DENSITY = 3.75 UNITS PER ACRE (51)
PROPOSED DENSITY = 50 SINGLE FAMILY ATTACHED UNITS

SETBACKS:
40' FROM ADJOINING R.O.W.
30' FROM EXTERIOR PROPERTY LINE
10' STRUCTURE FROM EDGE OF PAVEMENT
35' STRUCTURE FROM CENTERLINE OF ROAD
6' OFFSET FROM STRUCTURE TO LOT LINE

OPEN SPACE:
60% OF TOTAL LOT REQUIRED = 358,848 SF
TOTAL OPEN SPACE PROPOSED = 397,938 SF (66.5%)

TOTAL FOOTPRINT ALLOWED: 20% (119,616 SF)
TOTAL FOOTPRINT PROPOSED = 12% (71,500 SF)

COMMON OPEN SPACE:
10% OF TOTAL LOT REQUIRED = 59,808 SF
TOTAL COMMON OPEN SPACE PROPOSED = 67,580 SF (11.3%)

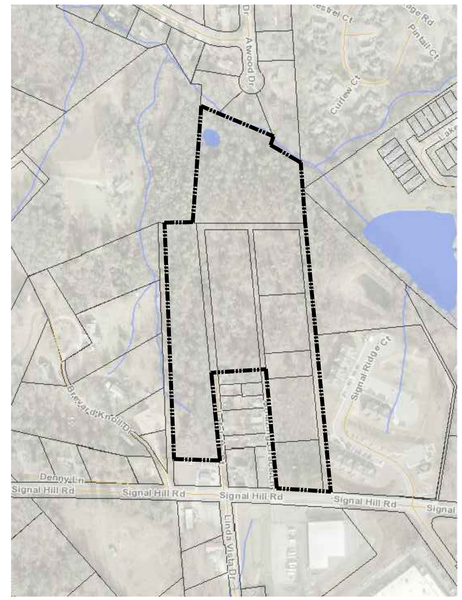
PARKLAND DEDICATION:
500 SF PER UNIT REQUIRED = 25,000 SF
PARKLAND DEDICATION PROPOSED AS PART OF GREENWAY
EASEMENT = 27,210 SF

GREENWAY DEDICATION:
50' WIDE EASEMENT WITH 10' PATH REQUIRED (OR FEE IN LIEU)
FEE IN LIEU PROPOSED

PARKING REQUIREMENTS:
1 PARKING SPACE PER 1 OR 2 BEDROOM UNIT REQUIRED = 50 SPACES MIN.
TOTAL PROPOSED PARKING: 100 SPACES (1 IN GARAGE, 1 IN DRIVEWAY)

CONTACT:
ROB DULL, PLA
362 DEPOT STREET, SUITE 107
ASHEVILLE, NC
828.674.5592
ROB@FINDTHELINESTUDIOS.COM

VICINITY MAP



DRAWING INDEX

SHEET #	SHEET TITLE
L-100	SITE ZONING COMPLIANCE PLAN
L-200	LANDSCAPE COMPLIANCE PLAN
L-201	LANDSCAPE NOTES AND DETAILS
L-400	TREE CANOPY PROTECTION PLAN

MINIMUM 50' WIDE GREENWAY EASEMENT (27,210 SF)
*ALSO COUNTS FOR PARKLAND DEDICATION
PROPOSED FEE-IN-LIEU

COMMON OPEN SPACE (67,580 SF)
WITH TRAILS

OPEN SPACE (330,358 SF)

35' SETBACK FROM CENTERLINE OF ROAD (TYP.)

PERIMETER SETBACKS (TYP.)
*30 FROM EXTERNAL PROPERY LINE
*40' FROM ADJACENT R.O.W.

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

COMMUNAL MAILBOX WITH PARKING AND LOADING SPACES

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

HIGHLAND INVESTORS LIMITED PARTNERSHIP
DB 1962 PG 521
PIN 9579-16-5868

CAROLINA VILLAGE, INC
DB 1341 PG 552
PB 2017 SL 1014
PIN 9579-18-3584

HOME DEPOT USA, INC
DB 992 PG 711
AS 1999 PI 3035
PIN 9526-16-0668

SIGNAL RIDGE LLC
DB 1760 PG 504
PB 2017 SL 10971
PIN 9579-16-1378

HENRY W. BRADLEY
DB 1177 PG 572
LOTS 81-84
PIN 9579-06-6401

NANCY L. CONLEY
DB 3672 PG 5366
LOTS 79-80
PIN 9579-06-6187

ASHLEY M. LOUISE BETTY R. MEAD
DB 3768 PG 310
LOTS 73-76
PIN 9579-06-6315

SEAN GIVENS
DB 3085 PG 278
LOTS 86-88
PC B SL 180A
(AKA PB 2 PG 156)
PIN 9579-06-4126

KRISTINA SOFRONIE
DB 3869 PG 369
PB 2021 PG 13157, TR 2
PIN 9579-06-3404

D & G ESTATE, LLC
DB 3876 PG 178
PB 2021 PG 13157, TR 1
PIN 9579-06-3217

SWAIN S. HAYNES
DB 901 PG 347
PC A SL 214A, LOT 6
PIN 9579-06-1764

JEANETTE Q. MATHIS
DB 910 PG 95
PC A SL 214A, LOT 7
PIN 9579-06-1562

HOMER F. HOWARD
DB 624 PG 73
PC A SL 214A, LOT 5
PIN 9579-06-1936

ANGELA M. LAMB
ESTATE FILE 21E973
REF: DB 481 PG 483
PIN 9579-07-1337

STEVEN M. PRESSLEY
PC C SL 285A
PIN 9579-07-6740

HARRY GRONIG
PC C SL 285A
PIN 9579-07-8653

YURIY SYSA
PC C SL 285A
PIN 9579-07-7529

TRACT 1
PIN 9579-06-5791

TRACT 2
PIN 9579-06-3117

TRACT 3
PIN 9579-06-5791

ZONED R-20

STREAMBANK MAINTENANCE EASEMENT
PER PB 2018 SL 1488, AREA F
DB 3284 PG 367 & DB 3273 PG 78

PERMANENT STORMWATER CONTROL MEASURE EASEMENT
PER PB 2018 SL 1488, AREA G
DB 3284 PG 367 & DB 3273 PG 78

OVERLAPPING EASEMENTS

LINES PER PC C SL 285A & PB 2018 SL 1148

LINES PER PB 1998 SL 3086

LINES PER PB 2021 PG 13157

LINES PER PC A SL 214A

ADJOINING LINES PER PB 2021 PG 18709

CSD CONTROL POINT #5 REBAR
NC GRID COORDINATES
N: 966,147.54 NAD 83/11
E: 970,567.47 NAD 83/11
LOCALIZED POINT

NC GRID COORDINATES
N: 966,178.67 NAD 83/11
E: 970,375.75 NAD 83/11

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50		

0 30 60 120 180 240'

THIS DOCUMENT IS THE PROPERTY OF FIND THE LINE STUDIOS, PLLC. IT IS TO BE USED FOR THIS SPECIFIC PROJECT ONLY AND IS NOT TO BE USED OTHERWISE WITHOUT OBTAINING WRITTEN CONSENT FROM FIND THE LINE STUDIOS, PLLC.

FIND THE LINE
STUDIOS
LANDSCAPE ARCHITECTURE AND PLANNING

CONSULTANTS

NORTH CAROLINA
REGISTERED LANDSCAPE ARCHITECT
No. 1585
ROBERT J DULL

TOWNHOMES

SIGNAL HILL ROAD
HENDERSONVILLE, NC

PREPARED FOR:
FIRST VICTORY INC

ZONING COMPLIANCE PLAN

PLAN SET

#	DATE	DESCRIPTION
1	3.20.25	ZONING COMPLIANCE
2	5.15.25	ZONING COMPLIANCE
3	6.2.25	ZONING COMPLIANCE

SHEET NO.
L-100

VEHICLE USE AREA (VUA): NOT APPLICABLE

PLANTING STRIPS (PS): NOT APPLICABLE

STREET TREES (ST):
1 TREE PER 35 LF OF PROPERTY ABUTTING A STREET
TOTAL LF: 3,268 LF (INTERNAL ROAD) & 166 LF (SIGNAL HILL ROAD)
TREES REQUIRED: 98 (69 LARGE MATURING TREES / 29 MEDIUM MATURING)
TREES PROVIDED: 75 LARGE-MATURING TREES / 42 MEDIUM MATURING TREE

COMMON SPACE TREE PLANTINGS (CS):
1 TREE AND 5 SHRUBS PER 1,200 SF
TOTAL COMMON SPACE PROVIDED: 59,808 SF
TOTAL TREE PLANTINGS REQUIRED: 50 (70% LARGE MATURING SPECIES)
TOTAL TREE PLANTINGS PROPOSED: 37 LARGE / 15 MEDIUM
TOTAL SHRUB PLANTINGS REQUIRED: 250
TOTAL SHRUB PLANTINGS PROVIDED: 250

OPEN SPACE LANDSCAPING (OS):
1 TREE AND 5 SHRUBS PER 4,000 SF
TOTAL OPEN SPACE PROVIDED: 358,848 SF
TOTAL TREE PLANTINGS REQUIRED: 90
TOTAL TREE PLANTINGS PROPOSED: 91
TOTAL SHRUB PLANTINGS REQUIRED: 450
TOTAL SHRUB PLANTINGS PROVIDED: 485

LANDSCAPE BUFFER (LB):
TYPE A 8' REQUIRED
TOTAL TREES REQUIRED: 6
TOTAL TREES PROVIDED: 6
TOTAL EVG SHRUBS REQUIRED: 45
TOTAL EVG SHRUBS PROVIDED: 46
TOTAL FLW SHRUBS REQUIRED: 59
TOTAL FLW SHRUBS PROVIDED: 59

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

(57) Round-Lobed Sweet Gum (OS)
(OS/CS)(61) Swamp White Oak
(CS) (10) Fastigiate Maidenhair Tree
(CS) (15) Tupelo
(70) Village Green Japanese Zelkova (ST)
(42) Fort McNair Red Horsechestnut (ST)
(5) Swamp White Oak (ST)
(6) Legacy Sugar Maple (LB)
(46) Catawba Rhododendron (LB)
(59) Little Henry® Sweetspire (LB)
(CS)(125) Dwarf Fothergilla
(CS)(125) Arrowwood Viburnum
(OS)(150) Bottlebrush Buckeye
(OS)(185) Spicebush
(OS)(150) Common Witch Hazel

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

PLANTING LEGEND
ST = STREET TREE REQUIREMENT
CS = COMMON SPACE REQUIREMENT
OS = OPEN SPACE REQUIREMENT
LB = LANDSCAPE BUFFER REQUIREMENT

OF PLANTS
3 — Plant Description
Large Deciduous Tree (ST)
ZONING USE ABBREVIATION
(SEE LEGEND)

0 30 60 120 180 240'

FIND THE LINE STUDIOS
LANDSCAPE ARCHITECTURE AND PLANNING

CONSULTANTS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT
No. 1585
ROBERT J DULL

SIGNAL HILL TOWNHOMES

SIGNAL HILL ROAD
HENDERSONVILLE, NC

PREPARED FOR:
FIRST VICTORY INC

LANDSCAPE COMPLIANCE PLAN

PLAN SET

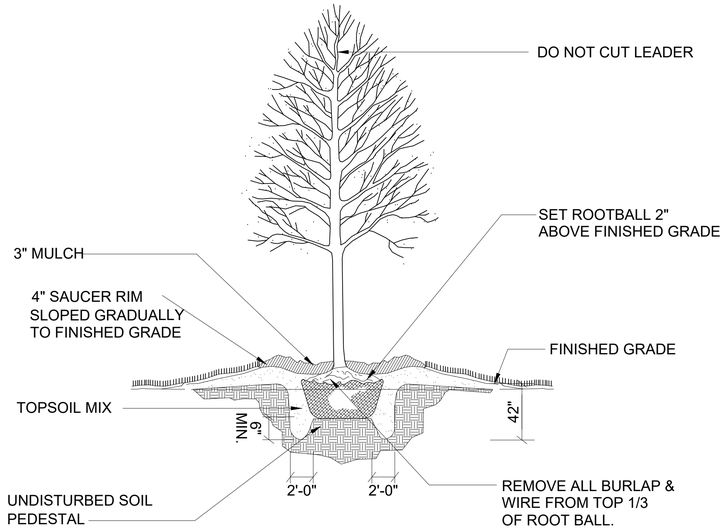
#	DATE	DESCRIPTION
1	3.20.25	LS COMPLIANCE
2	5.15.25	LS COMPLIANCE
3	6.2.25	LS COMPLIANCE

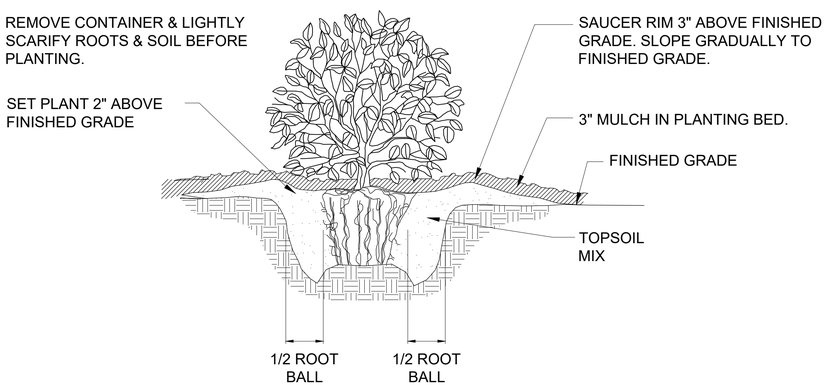
SHEET NO.
L-200

THIS DOCUMENT IS THE PROPERTY OF FIND THE LINE STUDIOS, PLLC. IT IS TO BE USED FOR THIS SPECIFIC PROJECT ONLY AND IS NOT TO BE USED OTHERWISE WITHOUT OBTAINING WRITTEN CONSENT FROM FIND THE LINE STUDIOS, PLLC.

PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	CONTAINER	QTY	DETAIL	REMARKS
TREES							
	ACE LEG	Acer saccharum 'Legacy' / Legacy Sugar Maple	3" Cal.	B&B	6		
	AES FOR	Aesculus x carnea 'Fort McNair' / Fort McNair Red Horsechestnut	3" Cal.	B&B	42		
	GIN FAS	Ginkgo biloba 'Fastigiata' / Fastigiate Maidenhair Tree	3" Cal.	B&B	10		
	LIQ RO3	Liquidambar styraciflua 'Rotundiloba' / Round-Lobed Sweet Gum	2" Cal.	B&B	57		
	NYS SYL	Nyssa sylvatica / Tupelo	2" Cal.	B&B	15		
	QUE NU2	Quercus bicolor / Swamp White Oak	3" Cal.	B&B	66		
	ZEL VIL	Zelkova serrata 'Village Green' / Village Green Japanese Zelkova	2" Cal.	B&B	70		
SHRUBS							
	AES PVF	Aesculus parviflora / Bottlebrush Buckeye	3 gal, 18-24" ht.	Pot	150		
	FOT GAR	Fothergilla gardenii / Dwarf Fothergilla	3 gal.		125		
	HAM VIR	Hamamelis virginiana / Common Witch Hazel	3 gal, 18-24" ht.	Pot	150		
	ITE SPR	Itea virginica 'Sprich' / Little Henry® Sweetspire	3 gal, 18-24" ht.	Container	59		
	LIN BEN	Lindera benzoin / Spicebush	3 gal, 18-24" ht.	Pot	185		
	RHO AN2	Rhododendron catawbiense 'Anah Kruschke' / Catawba Rhododendron	3 gal, 18-24" ht.	Container	46		
	VIB DEN	Viburnum dentatum 'Arrowwood' / Arrowwood Viburnum	3 gal.		125		





LANDSCAPE NOTES:

1. PROCEED WITH AND COMPLETE LANDSCAPE WORK AS RAPIDLY AS PORTIONS OF SITE BECOME AVAILABLE, WORKING WITHIN SEASONAL LIMITATIONS FOR EACH KIND OF LANDSCAPE WORK REQUIRED.

2. CONTRACTOR SHALL GUARANTEE ALL PLANTINGS FOR ONE YEAR FROM COMPLETION OF THE WORK. REPLACEMENT PLANTS AND LABOR SHALL BE PROVIDED AT THE CONTRACTOR'S EXPENSE.

3. DETERMINE LOCATION OF UNDERGROUND UTILITIES AND IRRIGATION OR DRAINAGE PIPING AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE. HAND EXCAVATE, AS REQUIRED. ANY DAMAGE TO UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S COST.

4. PROVIDE TREES, SHRUBS AND PLANTS OF QUANTITY, SIZE, GENUS, SPECIES AND VARIETY SHOWN AND SCHEDULE FOR LANDSCAPE WORK AND COMPLYING WITH RECOMMENDATIONS AND REQUIREMENTS OF ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK". PROVIDE HEALTHY, VIGOROUS STOCK, GROWN IN RECOGNIZED NURSERY IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICE . LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REJECT ANY PLANT MATERIAL, INCLUDING POOR BRANCHING STRUCTURE OR DAMAGED TRUNKS.

5. REPORT ANY POORLY DRAINED SOILS OR ANY DRAINAGE PROBLEMS TO LANDSCAPE ARCHITECT IMMEDIATELY. FAILURE TO REPORT SUCH CONDITIONS WILL RESULT IN THE CONTRACTOR BEING RESPONSIBLE FOR CORRECTING THE PROBLEM AND REPLACING DAMAGED OR LOST PLANTS.

6. BED PREPARATION:
REMOVE ALL DEBRIS, BRUSH, STUMPS, ROCKS, AND CONSTRUCTION TRASH.
SPRAY WEEDS WITH GLYPHOSATE TWO WEEKS BEFORE PLANTING. WHEN SOIL IS DRY, TILL EXISTING CLAY TO A DEPTH OF 8" AND RAKE OUT ALL CLODS AND DEBRIS. SPREAD TRIPLE SUPER PHOSPHATE AT RATE OF 5 LBS/1000 SF OR 1LB/100SF. SPREAD 3" OF SOIL MIX (SEE #7 BELOW). TILL MIX THOROUGHLY INTO NATIVE SOIL AND RAKE SMOOTH. WHERE SLOPES ARE TOO STEEP TO TILL, PLANT HOLE BY HOLE, DIGGING SOIL AMENDMENTS THOROUGHLY INTO NATIVE SOIL, AND DIGGING HOLES A MINIMUM OF 2 X THE SIZE OF ROOTBALL.

SOIL MIX IS A 60/40 BLEND OF WHICH 60% IS COMPOST AND 40% IS BLACK SCREENED TOPSOIL. ASHEVILLE MULCH YARD'S AEB MIX IS AN ACCEPTABLE SUBSTITUTE FOR COMPOST. LA TO APPROVE ANY SUBS. MUST BE CERTIFIED WEED FREE AND BLACK, WELL-ROTTED WITH NO CLUMPS OF PARTIALLY DECOMPOSED LEAVES.

7. PLANT AND WATER THOROUGHLY. CONFIRM THAT PERENNIAL AND GROUNDCOVER ROOT BALLS WILL BE COVERED WHEN SOIL HAS SETTLED AFTER WATERING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO RETURN TO THE SITE AND COVER WITH COMPOST ANY ROOT BALLS THAT ARE EXPOSED 1" OR MORE ABOVE GRADE DUE TO SETTLING OR FREEZE/THAW.

8. B&B TREES CAN BE PLANTED IN NATIVE SOIL, UNLESS THAT SOIL IS COMPACTED CONSTRUCTION CLAY(IF SO, USE40% NATIVE SOIL AND 60% SOIL MIX AS BACKFILL). DO NOT USE MUDDY SOIL FOR BACKFILLING.

9. INSTALLATION OF PLANT MATERIAL BELOW EXISTING TREES SHALL BE DONE WITHOUT TILLING TO PROTECT THE EXISTING ROOT STRUCTURES. HOLES FOR PLANT MATERIAL IN THESE AREAS SHALL BE DUG BY HAND. HAND DUG HOLES FOR SHRUBS AND CONTAINER TREES SHALL RECEIVE 60% SOIL MIX AS BACKFILL.

10. INSTALLATION OF PERENNIALS AND GROUND COVERS UNDER EXISTING TREES - BUILD UP SOIL (MAX HEIGHT 3") USING SOIL MIX AND SPREAD PLANT ROOTS OUT FOR SHALLOWER PLANTING.

11. MULCH: FOR TREES AND SHRUBS, MULCH SHALL BE 2" DOUBLE GROUND PINE, FREE FROM DELETERIOUS MATERIALS. PERENNIALS, GRASSES AND GROUND COVERS SHALL BE MULCHED WITH 2" ASHEVILLE MULCH YARDS AEB OR SIMILAR COMPOST.

FIND THE LINE STUDIOS
LANDSCAPE ARCHITECTURE AND PLANNING

CONSULTANTS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT No. 1585 ROBERT J DULL

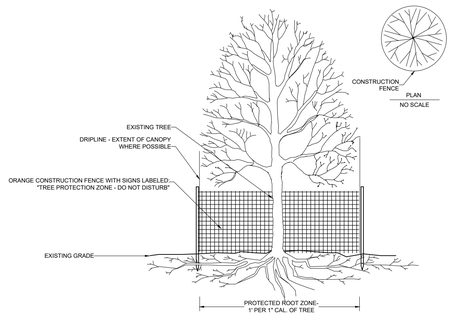
SIGNAL HILL TOWNHOMES
SIGNAL HILL ROAD
HENDERSONVILLE, NC
PREPARED FOR:
FIRST VICTORY INC
LANDSCAPE COMPLIANCE NOTES

PLAN SET

#	DATE	DESCRIPTION
1	3.20.25	LS NOTES
2	5.15.25	LS NOTES

SHEET NO.
L-201

THIS DOCUMENT IS THE PROPERTY OF FIND THE LINE STUDIOS, PLLC. IT IS TO BE USED FOR THIS SPECIFIC PROJECT ONLY AND IS NOT TO BE USED OTHERWISE WITHOUT OBTAINING WRITTEN CONSENT FROM FIND THE LINE STUDIOS, PLLC.



1 TREE PROTECTION
NTS

TREE CANOPY PROTECTION DATA			
TOTAL LAND AREA: 553,647.6 SF (12.71 AC)			
EXISTING TREE CANOPY (FROM GIS TREE CANOPY MAP) 96.1 % (531,923 SF)			
TIER ONE CANOPY REQUIRED 20 % (106,385 sf)	TIER ONE CANOPY PROVIDED 20 % (106,385 SF)		
TIER TWO CANOPY REQUIRED	TIER TWO PRESERVED	TIER TWO PLANTED	TIER TWO PAYMENT-IN-LIEU
53,192 sf (10 %)	59,052 sf (11.1%)	0 sf (0 %)	0 sf (0 %)
TIER ONE + TIER TWO TOTAL CANOPY PRESERVED 31.1 % (165,437 SF)			
NOTE: AREAS DESIGNATED AS TREE CANOPY PROTECTION AREAS SHALL REMAIN AS SUCH IN PERPETUITY. TREE REMOVAL SHALL BE PROHIBITED IN THESE AREAS UNLESS OTHERWISE PERMITTED.			

FIND THE LINE STUDIOS
LANDSCAPE ARCHITECTURE AND PLANNING

CONSULTANTS

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT
No. 1565
ROBERT J DULL

TOWNHOMES

SIGNAL HILL ROAD
HENDERSONVILLE, NC

PREPARED FOR:
FIRST VICTORY INC

TREE CANOPY PROTECTION PLAN

PLAN SET

#	DATE	DESCRIPTION
1	3.20.25	TREE CANOPY PLAN
2	5.15.25	TREE CANOPY PLAN
3	6.2.25	TREE CANOPY PLAN

SHEET NO.
L-400

0 30 60 120 180 240'

THIS DOCUMENT IS THE PROPERTY OF FIND THE LINE STUDIOS, PLLC. IT IS TO BE USED FOR THIS SPECIFIC PROJECT ONLY AND IS NOT TO BE USED OTHERWISE WITHOUT OBTAINING WRITTEN CONSENT FROM FIND THE LINE STUDIOS, PLLC.

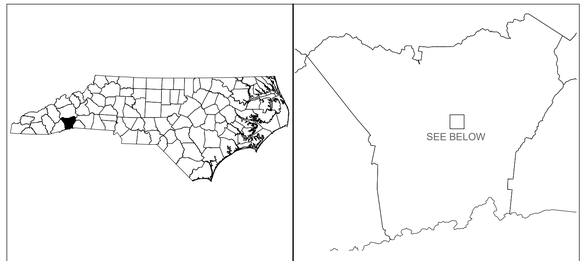
CONSTRUCTION PLANS

FOR

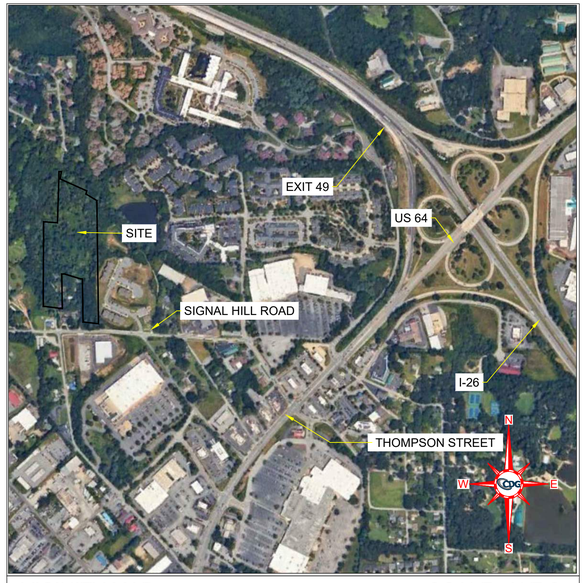
SIGNAL HILL

HENDERSONVILLE, NORTH CAROLINA

Sheet List Table	
Sheet Number	Sheet Title
COVER	COVER SHEET
C-100	EXISTING CONDITIONS PLAN
C-101	SITE PLAN
C-102	PRELIMINARY PLAT
C-103	PARCEL TABLES
C-104	ROAD PLAN & PROFILE 0+00 - 11+00
C-105	ROAD PLAN & PROFILE 11+00 - 21+93
COVER	COVER SHEET - ENCROACHMENT
CE-100	NC ENCROACHMENT PLAN & PROFILE
CE-101	ROADWAY PLAN
CE-102	STRIPING PLAN
CE-103	STRIPING DETAILS
CE-104	CROSS SECTIONS
CE-105	SIGHT DISTANCE PLAN - LAFOLETTE STREET
CE-106	SIGHT DISTANCE PLAN - AMAZING GRACE LANE
C-300	EROSION CONTROL PH 1 PLAN
C-310	EROSION CONTROL PH 2 PLAN
C-350	ESC DETAILS-1
C-351	ESC DETAILS-2
C-352	ESC DETAILS-3
C-353	NCG01-1
C-400	GRADING & STORMWATER PLAN
C-410	SCM DETAIL 1
C-411	SCM DETAIL 2
C-412	SCM DETAIL 3
C-413	ADS DETAILS
C-500	STORM PLAN & PROFILE - 1
C-501	STORM PLAN & PROFILE - 2
C-502	STORM PLAN & PROFILE - 3
C-550	STORM DETAILS-1
C-551	STORM DETAILS-2
C-600	UTILITY PLAN
C-610	SANITARY SEWER PLAN & PROFILE - 1
C-611	SANITARY SEWER PLAN & PROFILE - 2
C-613	SANITARY SEWER DETAILS
C-614	SANITARY SEWER DETAILS
C-650	WATERMAIN PLAN & PROFILE 0+00 - 11+00
C-651	WATERMAIN PLAN & PROFILE 11+00 - 22+00
C-652	WATERMAIN DETAILS - 1
C-653	WATERMAIN DETAILS - 2
C-654	MISCELLANEOUS DETAILS
C-700	PRE DEVELOPMENT DRAINAGE AREA MAP
C-701	POST DEVELOPMENT DRAINAGE AREA MAP



VICINITY MAP SCALE: N.T.S.



VICINITY MAP SCALE: N.T.S.

DEVELOPMENT DATA		
SUBDIVISION CONFIGURATION		
ZONING:	R-15 / R-20	
PARCEL ID NUMBER:	9579065791 9579068507 9579068308 9579068117 9579067975 9579076259	
TYPE OF DEVELOPMENT:	RESIDENTIAL	
DISTURBED AREA:	DA	
TOTAL SITE AREA (Ac.)	13.01	
NO. OF LOTS:	50	
GROSS DENSITY (UNITS/Ac.):		
BUILDING SETBACKS:	FRONT:	30'
	SIDE:	10'
	REAR:	15'
MIMIMUM LOT SIZE:	15,000 / 20,000	
MIMIMUM LOT WIDTH:	85 / 100	
RIGHT-OF-WAY WIDTH	45' MIN.	
UTILITY PROVIDERS		
WATER PROVIDER:		
HENDERSONVILLE WATER & SEWER		
10 6th AVENUE EAST		
HENDERSONVILLE, NC 28792		
828.697.3052		
SEWER PROVIDER:		
HENDERSONVILLE WATER & SEWER		
160 6TH AVENUE EAST		
HENDERSONVILLE, NC 28792		
828.697.3052		
TELEPHONE AND CABLE PROVIDER:		
SPECTRUM		
352 AIRPORT ROAD SUITE 70		
ARDEN, NC 28704		
866.874.2389		
POWER PROVIDER:		
DUKE ENERGY		
957 SPARTANBURG HWY		
HENDERSONVILLE, NC 28792		
828-698-2034		

CONTACT INFORMATION
OWNER/DEVELOPER
FIRST VICTORY
542 S .CALDWELL ST.
BREVARD, NC 28712
828.884.7934
SURVEYOR
COLE SURVEYING AND DESIGN
549 ELK PARK DRIVE; SUITE 707
ASHEVILLE, NC 28804
828.251.7025
ENGINEER
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
(704) 394-6913
CLIENT CONTACT
TRAVIS FOWLER
828.884.7934

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS

THREE NOTCH GROUP, INC. NORTH CAROLINA CORP # C-4973

FIRST VICTORY
542 S .CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
3	02/18/2025	ADDRESS CITY & COUNTY COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

ENGINEER'S SEAL:

09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP

4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: COVER SHEET

DRAWING NO: COVER

Y:\Stand2_ENGR\656605823\5_DESIGN\DWGS\SHEETS\COVER.dwg, 9/9/2025 12:33 PM, Toby Harris

LEGEND:

- PROPOSED CONTOUR
- EXISTING CONTOUR
- PROPOSED BOUNDARY
- EXISTING PARCEL LINE (TBR)
- EXISTING ADJACENT PARCEL LINE
- PROPOSED RIGHT-OF-WAY
- EXISTING CREEK
- EXISTING BUFFER
- EXISTING WATERMAIN

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

HIGHLAND INVESTORS LIMITED PARTNERSHIP
DB 1262 PG 521
PIN 9579-16-5868

CAROLINA VILLAGE, INC
DB 1341 PG 582
PB 2017 SL 11014
PIN 9579-18-3554
ZONING: PRD-CZD

HOME DEPOT USA, INC
DB 992 PG 711
PB 1999 SL 3086
PIN 9579-16-0862
ZONING: R-20

SIGNAL RIDGE LP
DB 1680 PG 504
PB 2017 SL 10971
PIN 9579-16-1378
ZONING: PRD-CZD

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

AMAZING GRACE LN.
20' PRIVATE R/W

LAFOLETTE ST.
30' PRIVATE R/W

PROPOSED PROPERTY LINE

EX. PARCEL LINES TO BE ABANDONED

EX. GRAVEL DRIVE TO BE REMOVED

EX. GRAVEL DRIVE TO BE REMOVED

PERMANENT DRAINAGE EASEMENT
PER PB 1999 SL 3086 & DB 993 PG 360

STREAMBANK MAINTENANCE EASEMENT
PER PB 2018 SL 11488, AREA G
DB 3284 PG 387 & DB 3273 PG 78

30' SEWER EASEMENT
PER DB 838 PG 434

STREAMBANK MAINTENANCE EASEMENT
PER PB 2018 SL 11488, AREAD

STREAMBANK MAINTENANCE EASEMENT
PER PB 2018 SL 11488, AREA F
DB 3284 PG 387 & DB 3273 PG 78

HENRY GRONKI
PC C SL 285A
PIN 9579-07-8653
ZONING: R-20

YURY SYSS
PC C SL 285A
PIN 9579-07-8529

STEVEN M. PRESSLEY
PC C SL 285A
PIN 9579-07-6740
ZONING: R-20

ANGELA M. LAMB ESTATE FILE 21E/973
(REF: DB 481 PG 483)
PIN 9579-07-1337
ZONING: R-20

ANGELA M. LAMB ESTATE FILE 21E/973
(REF: DB 481 PG 483)
PIN 9579-07-1337
ZONING: R-20

HOMER F. HOWARD
DB 674 PG 3
PC A SL 214A, LOT 5
PIN 9579-06-1936
ZONING: R-20

SWAIN S. HAYNES
DB 901 PG 347
PC A SL 214A, LOT 6
PIN 9579-06-1764
ZONING: R-20

JEANETTE Q. MATHIS
DB 910 PG 68
PC A SL 214A, LOT 7
PIN 9579-06-1562
ZONING: R-20

KRISTINA SOFRONIE
DB 3866 PG 389
PB 2021 PG 13157, TR 2
PIN 9579-06-3404
ZONING: R-20

D & G ESTATE, LLC
DB 3876 PG 178
PB 2021 PG 13157, TR 1
PIN 9579-06-3217
ZONING: CHMU

SEAN GIVENS
DB 3083 PG 278
LOTS 86-88
PC B SL 189A
(AKA PB 2 PG 156)
PIN 9579-06-4126
ZONING: C-2

NANCY L. CONLEY
DB 3672 PG 5366
LOTS 79-80
PIN 9579-06-6187
ZONING: R-20

HENRY W. BRADLEY
DB 1177 PG 572
LOTS 81-84
PIN 9579-06-6107
ZONING: R-20

ASHLEY M. CLOUSE
BETTY B. MEAD
DB 3768 PG 310
LOTS 73-76
PIN 9579-06-6315
ZONING: R-20

ASHLEY M. CLOUSE
DB 3768 PG 314
LOTS 77-78
PIN 9579-06-6583
ZONING: R-20

ADJOINING LINES PER PB 2021 PG 13709

LINES PER PC C SL 285A & PB 2018 SL 11488

LINES PER PC A SL 214A

LINES PER PB 2021 PG 13157

CSD CONTROL POINT #5 REBAR
NC GRID COORDINATES
N: 596,147.54 NAD 83/11
E: 970,567.47 NAD 83/11
(LOCALIZED POINT)

NC GRID COORDINATES
N: 596,176.67 NAD 83/11
E: 970,675.72 NAD 83/11

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1"=60'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
05/15/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: EXISTING CONDITIONS PLAN

DRAWING NO: C-100

Y:\Shared\2_ENGINEERING\05_DESIGN\GIS\SHEETS\EXISTING CONDITIONS.dwg, 9/9/2025 12:33 PM, Toby Harris

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

COMMON OPEN SPACE (67,580 SF) WITH TRAILS

OPEN SPACE (330,358 SF)

REFER TO PARCEL TABLES ON SHEET C-103 FOR DIMENSIONS

MINIMUM 50' WIDE GREENWAY EASEMENT (27,210 SF)
*ALSO COUNTS FOR PARKLAND DEDICATION
PROPOSED FEE-IN-LIEU

OVERLAPPING EASEMENTS

CONNECT TO EX. SIDEWALK

PROPOSED SCM ACCESS EASEMENT

RAISED CONCRETE ISLAND PER NCDOT DETAIL 846.01 - SHEET 31

PROP. 12' GRAVEL UTILITY ACCESS EASEMENT

PROP. 40' SS EASEMENT

PROPOSED SCM ACCESS EASEMENT

PROP. 40' SS EASEMENT

PROP. 30' SS EASEMENT

PROPOSED SCM ACCESS EASEMENT

2 – 9.5' X 22' PARALLEL PARKING SPACES

MAIL KIOSK

5' SIDEWALK

12' x 40' LOADING SPACE

LAFOLETTE ST.
45' PUBLIC R/W

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

30' SEWER EASEMENT PER DB 838 PG 434

PERMANENT DRAINAGE EASEMENT PER PB 1999 SL 3086 & DB 993 PG 360

STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA G DB 3284 PG 387 & DB 3273 PG 78

STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA F DB 3284 PG 387 & DB 3273 PG 78

STREAMBANK MAINTENANCE EASEMENT 2018 SL 11488, AREA D

#5 EIR ID-KEE

#5 EIR ID-KEE (POL)

CSD CONTROL POINT #5
NC GRID COORD
N: 596,147.54' NAD
E: 970,567.47' NAD
LOCALIZED

LOT 18 3219 SF. 0.07 AC.

LOT 17 3270 SF. 0.08 AC.

HIGHLAND INVESTORS LIMITED PARTNERSHIP
DB 1262 PG 621
PIN 9579-16-5868

CAROLINA VILLAGE, INC
DB 1341 PG 582
PB 2017 SL 11014
PIN 9579-18-3554
ZONING: PRD-CZD

HOME DEPOT USA, INC
DB 992 PG 711
PB 1999 SL 3086
PIN 9579-16-0862
ZONING: R-20

SIGNAL RIDGE, LP
DB 1680 PG 504
PB 2017 SL 10971
PIN 9579-16-1378
ZONING: PRD-CZD

HENRY GRONKI
PC C SL 285A
PIN 9579-07-8653
ZONING: R-20

YURIY SYSA
PC C SL 285A
PIN 9579-07-7529

ANGELA M. LAMB ESTATE FILE 21E973
(REF: DB 481 PG 483)
PIN 9579-07-1337
ZONING: R-20

HOMER F. HOWARD
DB 674 PG 3
PC A SL 214A, LOT 5
PIN 9579-06-1936
ZONING: R-20

SWAIN S. HAYNES
DB 901 PG 347
PC A SL 214A, LOT 6
PIN 9579-06-1764
ZONING: R-20

JEANETTE Q. MATHIS
DB 910 PG 68
PC A SL 214A, LOT 7
PIN 9579-06-1562
ZONING: R-20

KRISTINA SOFRONIE
DB 3866 PG 389
PB 2021 PG 13157, TR 2
PIN 9579-06-3404
ZONING: R-20

D & G ESTATE, LLC
DB 3876 PG 178
PB 2021 PG 13157, TR 1
PIN 9579-06-3217
ZONING: CHMU

SEAN GIVENS
DB 3083 PG 278
LOTS 86-88
PC B SL 180A
(AKA PB 2 PG 156)
PIN 9579-06-4126
ZONING: C-2

NANCY L. CONLEY
DB 3672 PG 5366
LOTS 79-80
PIN 9579-06-6187
ZONING: R-20

HENRY W. BRADLEY
DB 1177 PG 572
LOTS 81-84
PIN 9579-06-6107
ZONING: R-20

ASHLEY M. CLOUSE
BETTY B. MEAD
DB 3768 PG 310
LOTS 73-76
PIN 9579-06-6315
ZONING: R-20

KRISTIE GILLIAM
DB 1421 PG 633
LOTS 67-68
PIN 9579-06-4622

BONNIE BALDWIN
DB 1572 PG 20
PIN 9579-06-4547
ZONING: R-20

TILLIE MAE B. CARLISLE ET AL
DB 1564 PG 248
REF DB 799 PG 677
LOTS 71-72
PIN 9579-06-5412
ZONING: R-20

ASHLEY M. CLOUSE
BETTY B. MEAD
DB 3768 PG 314
LOTS 73-76
PIN 9579-06-6383
ZONING: R-20

SHED (ENCR.#1)

DWELLING (P.A.I.)

SHED

DWELLING

SHED

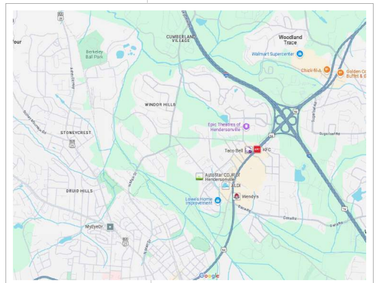
SHED

DWELLING

COMMERCIAL BUILDING (P.A.I.)

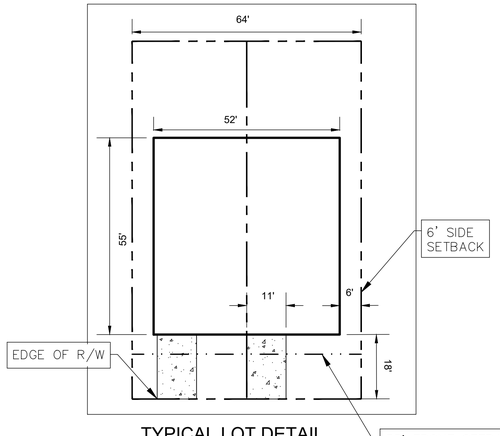
CHANG

VICINITY MAP



GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

TYPICAL LOT DETAIL
SCALE 1" = 20'



REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

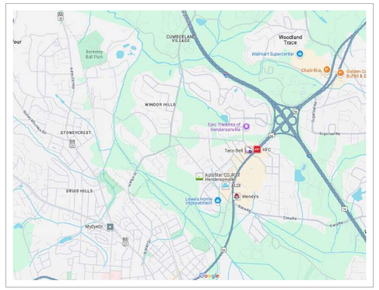
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SITE PLAN

DRAWING NO: C-101

Y:\Shared\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\SITE.dwg 9/9/2025 12:33 PM Toby Harris

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)



VICINITY MAP

REFER TO PARCEL TABLES ON SHEET C-103 FOR DIMENSIONS

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT, SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)

RIGHT IN - RIGHT OUT ENTRANCE WITH CONCRETE ISLAND

RAISED CONCRETE ISLAND PER NCDOT DETAIL 846.01 - SHEET 31

60' R/W

45.0' R/W

20' R

#5 EIR ID-KEE

344885 SF. 7.92 AC.

PROP. 40' SS EASEMENT

PROPOSED SCM LOCATION

3846 SF. 0.09 AC.

LOT 23 3199 SF. 0.07 AC.
LOT 24 3199 SF. 0.07 AC.
LOT 25 3200 SF. 0.07 AC.
LOT 26 3200 SF. 0.07 AC.
LOT 27 3200 SF. 0.07 AC.
LOT 28 3200 SF. 0.07 AC.
LOT 29 3200 SF. 0.07 AC.
LOT 30 3200 SF. 0.07 AC.
LOT 31 3200 SF. 0.07 AC.
LOT 32 3200 SF. 0.07 AC.
LOT 33 3336 SF. 0.08 AC.
LOT 34 3205 SF. 0.07 AC.
LOT 35 3200 SF. 0.07 AC.
LOT 36 3200 SF. 0.07 AC.
LOT 37 3200 SF. 0.07 AC.
LOT 38 3200 SF. 0.07 AC.
LOT 22 3229 SF. 0.07 AC.
LOT 21 3263 SF. 0.07 AC.
LOT 20 3258 SF. 0.07 AC.
LOT 19 3244 SF. 0.07 AC.
LOT 18 3219 SF. 0.07 AC.
LOT 17 3270 SF. 0.08 AC.
LOT 16 3075 SF. 0.07 AC.
LOT 15 3074 SF. 0.07 AC.
LOT 50 3181 SF. 0.07 AC.
LOT 49 3198 SF. 0.07 AC.
LOT 48 3202 SF. 0.07 AC.
LOT 47 3198 SF. 0.07 AC.
LOT 46 3200 SF. 0.07 AC.
LOT 45 3200 SF. 0.07 AC.
LOT 44 3186 SF. 0.07 AC.
LOT 43 3220 SF. 0.07 AC.
LOT 42 3200 SF. 0.07 AC.
LOT 41 3200 SF. 0.07 AC.

46912 SF. 1.08 AC.

LAFOLETTE ST.
45' PUBLIC R/W

94330 SF. 2.17 AC.

30' R/W

20' R

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

CSD CONTROL POINT #5 REBAR
NC GRID COORDINATES
N: 596,147.54' NAD 83/11
E: 970,567.47' NAD 83/11
-LOCALIZED POINT-

VER EASEMENT
DB 838 PG 434

PROPOSED SCM ACCESS EASEMENT (TYP.)

PROP. 30' SS EASEMENT

LOT 14 3200 SF. 0.07 AC.
LOT 13 3200 SF. 0.07 AC.
LOT 12 3200 SF. 0.07 AC.
LOT 11 3200 SF. 0.07 AC.
LOT 10 3171 SF. 0.07 AC.
LOT 9 3228 SF. 0.07 AC.
LOT 8 3255 SF. 0.07 AC.
LOT 7 3145 SF. 0.07 AC.
LOT 6 3168 SF. 0.07 AC.
LOT 5 3225 SF. 0.07 AC.
LOT 4 3216 SF. 0.07 AC.
LOT 3 3225 SF. 0.07 AC.
LOT 2 3200 SF. 0.07 AC.
LOT 1 3200 SF. 0.07 AC.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

REVISIONS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBIN M. HARRIS
07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

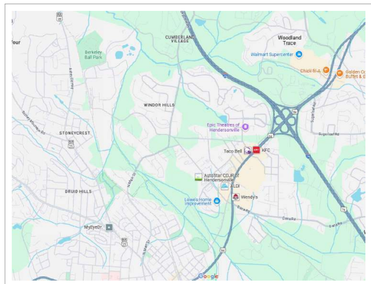
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: PRELIMINARY PLAT

DRAWING NO: C-102

Y:\Shared\2_ENG\R656605823\5_DESIGN\DWG\SHEETS\SITE.dwg 9/9/2025 12:34 PM, Toby Harris



VICINITY MAP

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L1	101.39	S11° 15' 36.21"E	
L3	106.71	N11° 15' 07.91"W	
L4	32.00	N78° 44' 22.75"E	
L5	32.00	N78° 44' 22.75"E	
C1	32.44	14.03	132.50
C2	32.44	14.03	132.50
L6	103.48	N22° 49' 06.54"E	
L8	32.00	S67° 11' 00.32"E	
L9	32.00	S67° 11' 00.32"E	
L10	104.95	S22° 48' 54.92"W	
C3	32.33	13.98	132.50
C4	32.33	13.98	132.50
C5	32.37	14.00	132.50
C6	32.37	14.00	132.50
L11	102.28	S66° 26' 37.49"W	
L13	105.86	N66° 26' 39.79"E	
L14	32.00	S23° 33' 25.67"E	
L15	32.00	S23° 33' 25.67"E	
L29	31.98	N0° 45' 26.71"W	
L30	31.98	N0° 45' 26.71"W	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L25	99.39	S89° 14' 33.29"W	
L27	32.00	S0° 45' 26.71"E	
L28	32.00	S0° 45' 26.71"E	
L33	32.00	N0° 45' 26.71"W	
L34	32.00	N0° 45' 26.71"W	
L36	100.00	S89° 14' 33.29"W	
L37	31.95	S0° 45' 26.71"E	
L38	31.95	S0° 45' 26.71"E	
L39	100.00	N89° 14' 33.29"E	
L40	100.00	N89° 14' 33.29"E	
L41	32.00	S0° 45' 26.71"E	
L43	32.00	N0° 45' 26.71"W	
L44	32.00	N0° 45' 26.71"W	
L45	100.00	S89° 14' 33.29"W	
L157	32.00	S0° 45' 26.71"E	
L46	100.00	N89° 14' 33.29"E	
L48	100.20	S89° 14' 33.29"W	
L49	32.31	S0° 55' 58.23"E	
L50	31.69	S0° 55' 58.23"E	
L51	32.00	N0° 45' 26.71"W	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L52	32.00	N0° 45' 26.71"W	
L53	100.00	N89° 14' 33.29"E	
L55	100.00	S89° 14' 33.29"W	
L56	32.00	N0° 45' 26.71"W	
L57	32.00	N0° 45' 26.71"W	
L58	32.00	S0° 45' 26.71"E	
L59	32.00	S0° 45' 26.71"E	
L2	100.11	S11° 04' 06.89"E	
L7	100.29	S22° 45' 56.21"W	
L12	100.14	S66° 34' 11.53"W	
L16	98.05	S0° 04' 14.61"W	
L26	99.39	N89° 26' 27.55"E	
L35	100.00	N89° 12' 54.12"E	
L42	100.00	N89° 14' 33.29"E	
L47	100.10	N89° 04' 01.77"E	
L54	100.00	N89° 14' 33.29"E	
L140	100.00	N89° 14' 33.29"E	
L83	100.00	N89° 14' 33.29"E	
L75	100.00	N89° 14' 33.29"E	
L63	100.00	N89° 14' 33.29"E	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L148	100.00	N89° 14' 33.33"E	
L153	100.00	N89° 14' 33.33"E	
L163	100.00	N89° 14' 33.29"E	
L166	100.00	N89° 13' 46.03"E	
L98	100.00	S89° 14' 17.61"W	
L90	100.68	N89° 14' 17.61"E	
L106	100.00	N77° 55' 22.44"E	
L111	100.01	N89° 48' 15.12"W	
L120	99.99	N89° 14' 42.27"E	
L127	100.00	N89° 34' 13.01"E	
L132	100.00	N89° 34' 13.01"E	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L150	32.00	S0° 45' 26.71"E	
L151	32.00	S0° 45' 26.71"E	
L60	32.00	N0° 45' 26.71"W	
L61	32.00	N0° 45' 26.71"W	
L62	100.00	N89° 14' 33.29"E	
L64	100.00	S89° 14' 33.29"W	
L65	32.00	S0° 45' 26.71"E	
L66	32.00	S0° 45' 26.71"E	
L74	100.00	N89° 14' 33.40"E	
L76	100.00	S89° 14' 33.38"W	
L77	32.00	S0° 45' 26.71"E	
L78	32.00	S0° 45' 26.71"E	
L79	32.00	N0° 45' 25.50"W	
L80	32.00	N0° 45' 25.50"W	
L81	32.00	N0° 45' 25.50"W	
L82	100.00	N89° 14' 33.31"E	
L84	100.00	S89° 14' 33.29"W	
L85	32.00	N0° 45' 25.50"W	
L86	32.00	S0° 45' 26.71"E	
L87	32.00	S0° 45' 26.71"E	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L138	100.00	N89° 14' 33.29"E	
L139	32.00	N0° 45' 26.71"W	
L141	32.00	S0° 45' 26.71"E	
L142	32.00	S0° 45' 26.71"E	
L143	100.00	S89° 14' 33.29"W	
L144	32.00	N0° 45' 26.71"W	
L95	100.00	N89° 14' 17.61"E	
L96	32.00	N0° 45' 42.39"W	
L97	32.00	N0° 45' 42.39"W	
L99	100.00	S89° 14' 17.61"W	
L100	32.00	S0° 45' 42.39"E	
L101	32.00	S0° 45' 42.39"E	
L88	50.05	N89° 15' 58.02"E	
C9	12.34	5.66	125.00
L89	19.62	S0° 45' 42.39"E	
L91	50.00	N89° 16' 18.02"E	
L92	32.00	N0° 43' 41.98"W	
L93	32.00	N0° 43' 41.98"W	
L94	100.69	S89° 16' 17.19"W	
L102	32.06	S0° 45' 42.39"E	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L103	32.50	S12° 04' 37.56"E	
L104	21.01	S12° 04' 37.56"E	
L105	100.09	N78° 17' 12.04"E	
L107	100.00	S78° 12' 34.17"W	
L108	32.00	N12° 04' 51.41"W	
L109	32.00	N12° 04' 51.41"W	
L110	100.00	N89° 34' 13.01"E	
L112	100.00	S89° 34' 13.01"W	
L113	32.00	S0° 45' 17.73"E	
L114	32.00	S0° 45' 17.73"E	
L115	30.91	N0° 45' 17.73"W	
L116	19.07	N0° 45' 17.73"W	
L117	32.57	S0° 45' 17.73"E	
L118	26.76	S0° 45' 17.73"E	
L119	100.00	N89° 34' 13.01"E	
L121	100.00	S89° 34' 13.01"W	
L122	32.00	N0° 43' 52.97"W	
L123	32.00	N0° 43' 52.97"W	
L124	32.00	S0° 25' 46.99"E	
L125	32.00	S0° 25' 46.99"E	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L126	100.00	S89° 34' 13.01"W	
L128	100.00	N89° 34' 13.01"E	
L129	32.00	N0° 25' 46.99"W	
L130	32.00	N0° 25' 46.99"W	
L131	100.00	N89° 34' 13.01"E	
L133	100.00	S89° 34' 13.01"W	
L134	32.00	S0° 25' 46.99"E	
L135	32.00	S0° 25' 46.99"E	
L136	32.00	N0° 25' 46.99"W	
L137	32.00	N0° 25' 46.99"W	
C7	32.77	21.46	87.50
C8	32.77	21.46	87.50
L17	92.00	S0° 04' 51.37"W	
L18	91.97	N0° 04' 08.19"E	
L21	20.30	N89° 55' 20.01"W	
L19	32.34	N0° 45' 19.40"W	
L20	32.00	S89° 55' 45.39"E	
L22	11.70	S89° 55' 45.39"E	
L23	55.69	N89° 18' 03.37"E	
L24	32.34	N0° 45' 19.40"W	

Parcel Line and Curve Table			
Line #/Curve #	Length	Bearing/Delta	Radius
L165	100.00	S89° 14' 33.29"W	
L167	100.00	N89° 12' 58.77"E	
L168	32.00	S0° 45' 26.71"E	
L169	32.00	S0° 45' 26.71"E	
L31	32.00	N0° 45' 26.71"W	
L32	32.00	N0° 45' 26.71"W	
L160	32.00	S0° 45' 26.71"E	
L161	32.00	S0° 45' 26.71"E	
L162	100.00	N89° 14' 33.29"E	
L164	100.00	S89° 14' 33.29"W	
L152	100.00	S89° 14' 33.29"W	
L154	100.00	N89° 14' 33.37"E	
L155	32.00	N0° 45' 25.88"W	
L156	32.00	N0° 45' 25.88"W	
L158	32.00	S0° 45' 26.71"E	
L159	32.00	S0° 45' 26.71"E	
L145	32.00	N0° 45' 26.36"W	
L146	32.00	N0° 45' 26.36"W	
L147	100.00	N89° 14' 33.36"E	
L149	100.00	S89° 14' 33.29"W	

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1"=50'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030855 ROBIN M. HARRIS

07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: PARCEL TABLES

DRAWING NO: C-103

Y:\Shared\2_ENG\R656605823\5_DESIGN\DWG\SHEETS\SITE.dwg 9/9/2025 12:34 PM, Toby Harris

Y:\Shared\2_ENG\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE ROAD.dwg, 9/9/2025 12:34 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

NORTH CAROLINA PROFESSIONAL SEAL 030805 ENGINEER TOBIN M HARRIS

ENGINEER'S SEAL:
09/16/2024

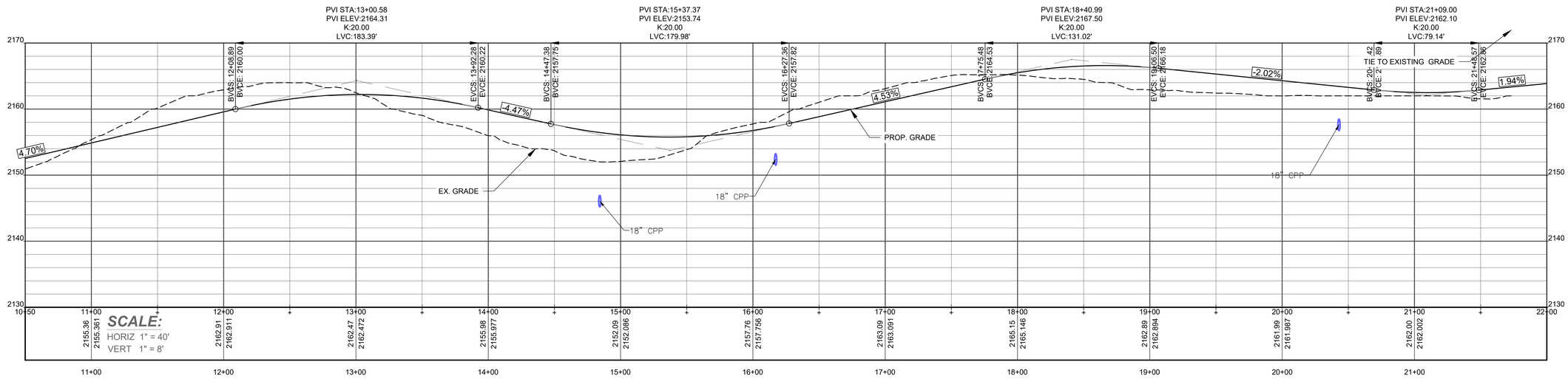
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

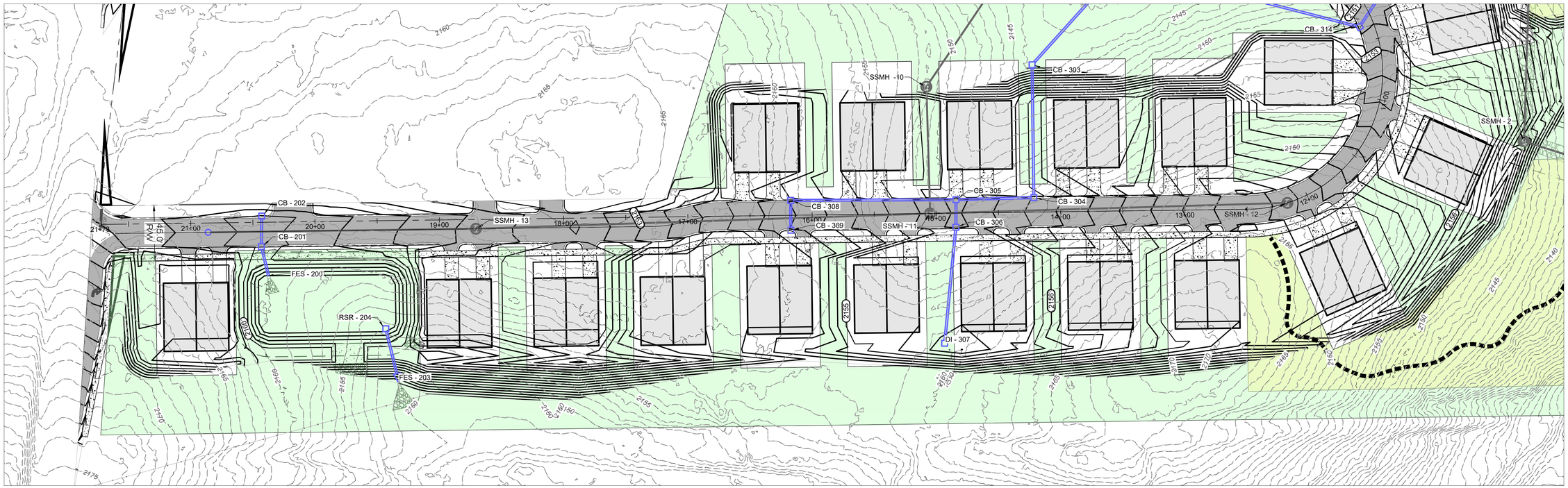
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-8913
www.3notch.com
License No. C-4973

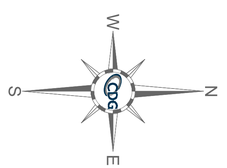
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
ROAD PLAN & PROFILE
0+00 - 11+00

DRAWING NO:
C-104







GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1"=40'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER ROBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
ROAD PLAN & PROFILE
11+00 - 21+93

DRAWING NO:
C-105

Y:\Shared2_ENGR\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE ROAD.dwg, 9/9/2025 12:34 PM, Toby Harris

SIGNAL HILL

CREEKSTONE COMPANIES

NCDOT ENCROACHMENT PLANS

(Issue For Bid)

09/16/2024

VICINITY MAP

1" = 500'

INDEX TO SHEETS	
Sheet Number	Sheet Title
COVER	COVER SHEET – ENCROACHMENT
CE–100	NC ENCROACHMENT PLAN & PROFILE
CE–101	ROADWAY PLAN
CE–102	STRIPING PLAN
CE–103	STRIPING DETAILS
CE–104	STRIPING DETAILS
CE–105	STRIPTING DETAILS
CE–106	CROSS SECTIONS
CE–107	SIGHT DISTANCE – LAFOLETTE STREET
CE–108	SIGHT DISTANCE – AMAZAING GRACE LANE

PROJECT DESIGN TEAM

THREE NOTCH GROUP

THREE NOTCH GROUP PROJECT NUMBER: R305524001
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
(704) 394-6913

PROJECT ENGINEER: TOBY M. HARRIS, PE
STREET ADDRESS: 4301 TAGGART CREEK ROAD
CITY, STATE, ZIP: CHARLOTTE, NC 28208
PHONE: (704) 394-6913
E-MAIL: TOBY.HARRIS@CDGE.COM

NORTH CAROLINA CORPORATION OF ENGINEERS & ASSOCIATES INC. CERTIFICATE OF AUTHORIZATION C-4973

06/06/2025

CLIENT

CREEKSTONE HOLDINGS HENDERSONSVILLE, LLC
4545 POST OAK PLACE, SUITE 150
HOUSTON, TEXAS 77027
CONTACT: STEPHEN D. KELLER
EMAIL: SDKELLER@CREEKSTONECOMPANIES.COM
(O) 713-621-5300
(M) 832-256-1871

LOCATION

HENDERSONVILLE, NC
HENDERSON COUNTY
LATITUDE: 35°20'27"N
LONGITUDE: 82°27'08"W

811 Know what's **below.** **Call** before you dig.
CALL 1-800-632-4949 OR 811
WWW.NC811.ORG
NC ONE-CALL CENTER
IT'S THE LAW!

This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

Y:\Shared2_ENG\R656058235_DESIGN\DWG\SHEETS\ENCROACHMENT EXHIBIT.dwg, 9/9/2025 12:34 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBY M. HARRIS

07/18/2025

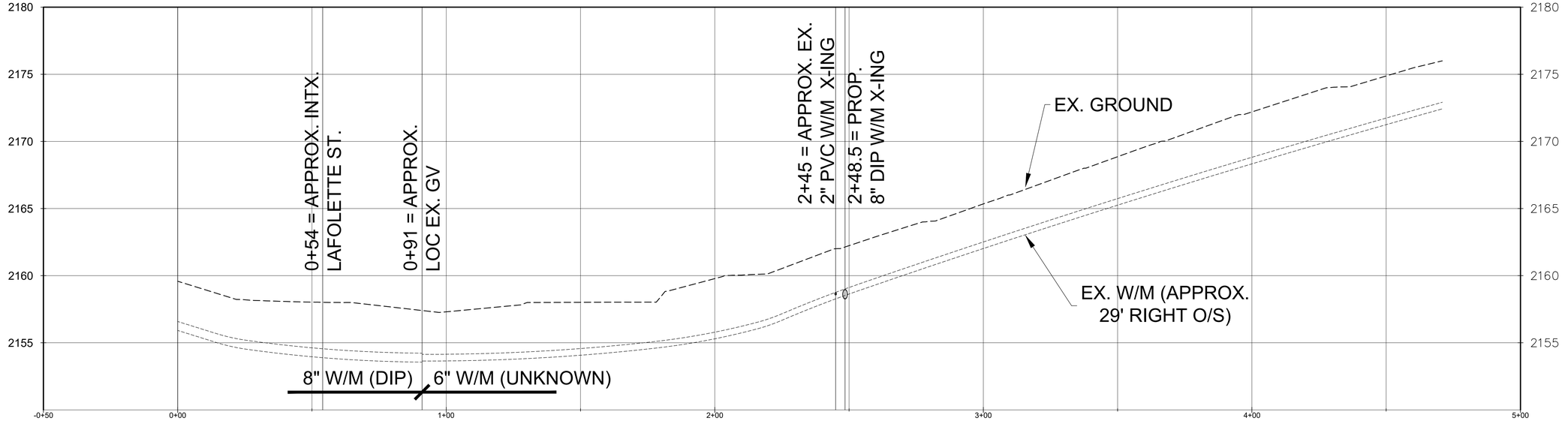
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

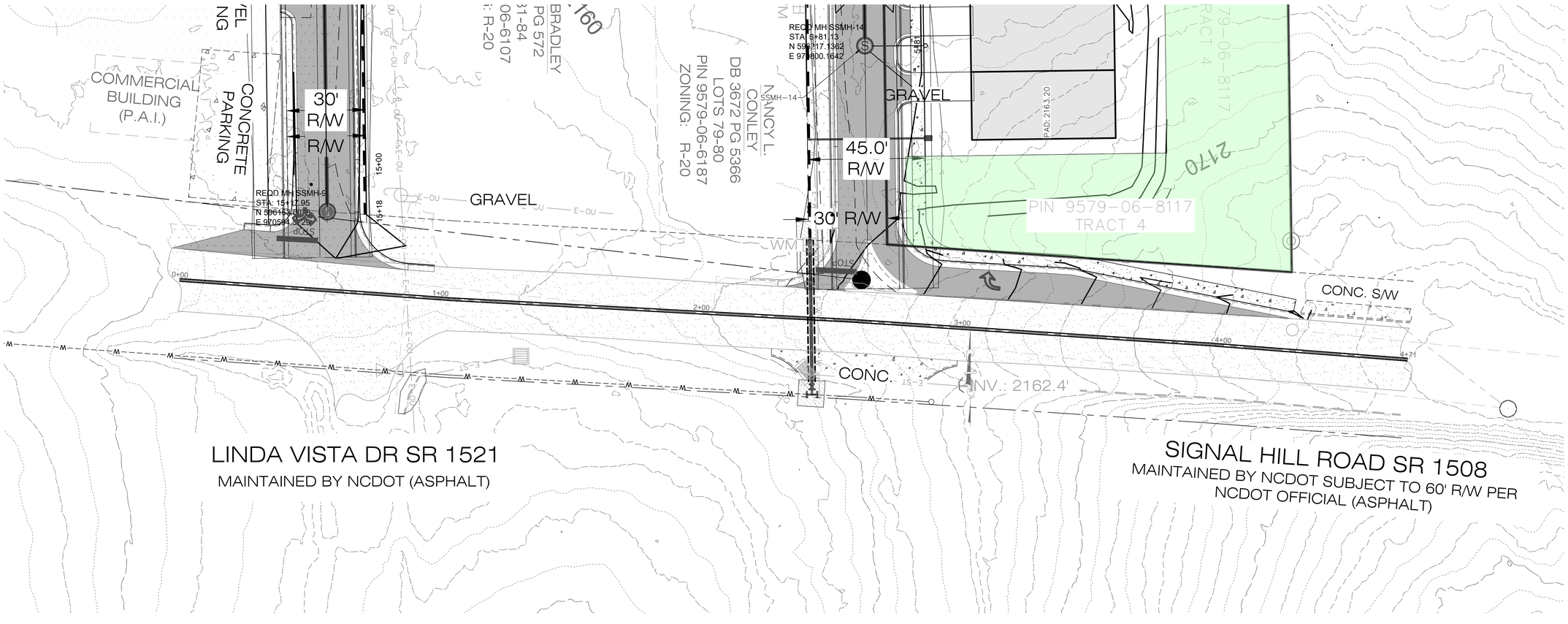
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3ncdch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SITE PLAN

DRAWING NO: C-101





LINDA VISTA DR SR 1521
MAINTAINED BY NCDOT (ASPHALT)

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER
NCDOT OFFICIAL (ASPHALT)

This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

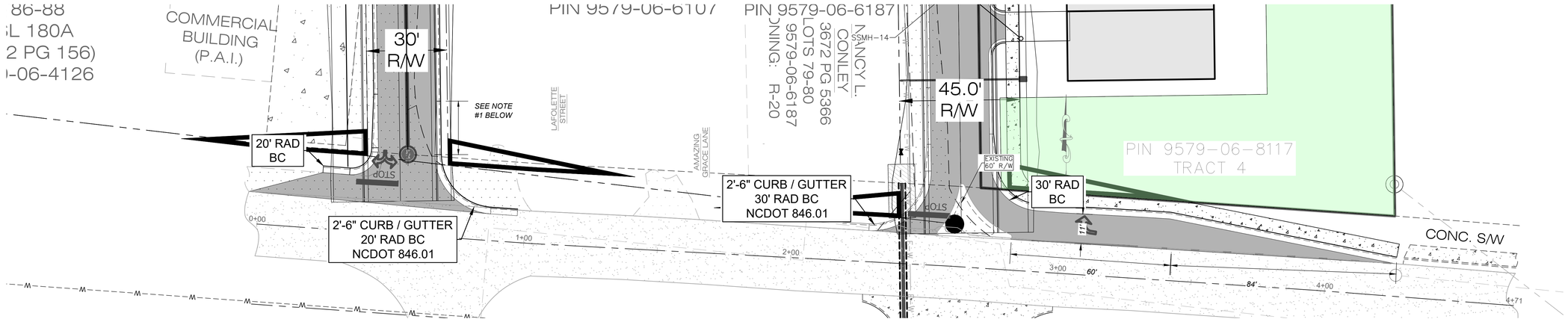
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: NC ENCROACHMENT PLAN & PROFILE

DRAWING NO: CE-100

Y:\Shared_ENGR\AD_LIB\RASE_TEMPLATE\X_Border11x17.dwg

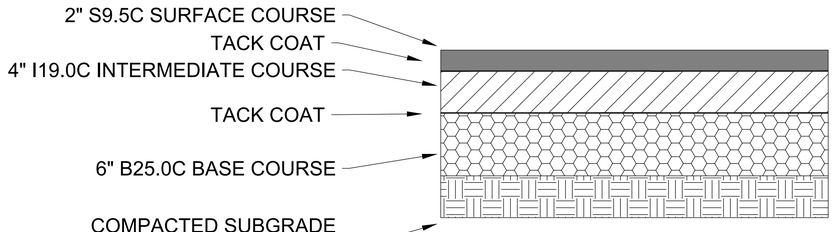


LEGEND

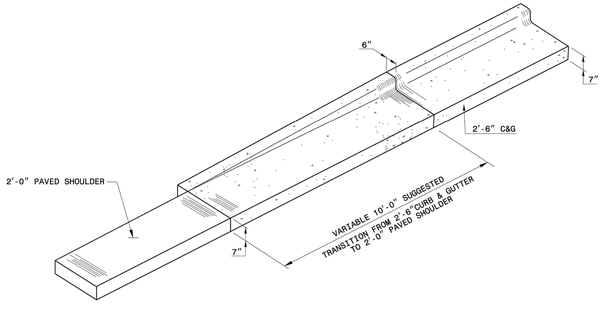
- WIDENING SECTION (PROPOSED FULL DEPTH PAVEMENT)
- EXISTING ROADWAY
- PROP. "PORK CHOP" TURN ISLAND (WITH MOUNTABLE MONOLITHIC CURB)

NOTES:

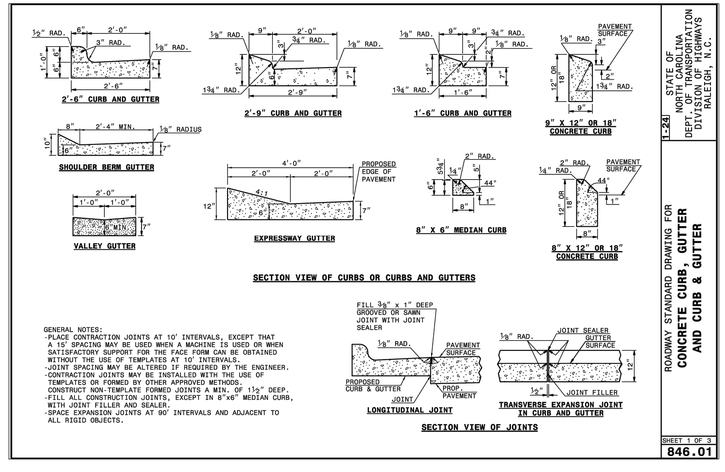
1. TYPICAL TRANSITION DISTANCES FROM 2' GUTTER AT CURB RETURN TO 1' CUTTER: 20'.



TURN LANE PAVING DETAIL



C/G TRANSITION DETAIL



NCDOT 846.01

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 JOHN M. HARRIS
07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

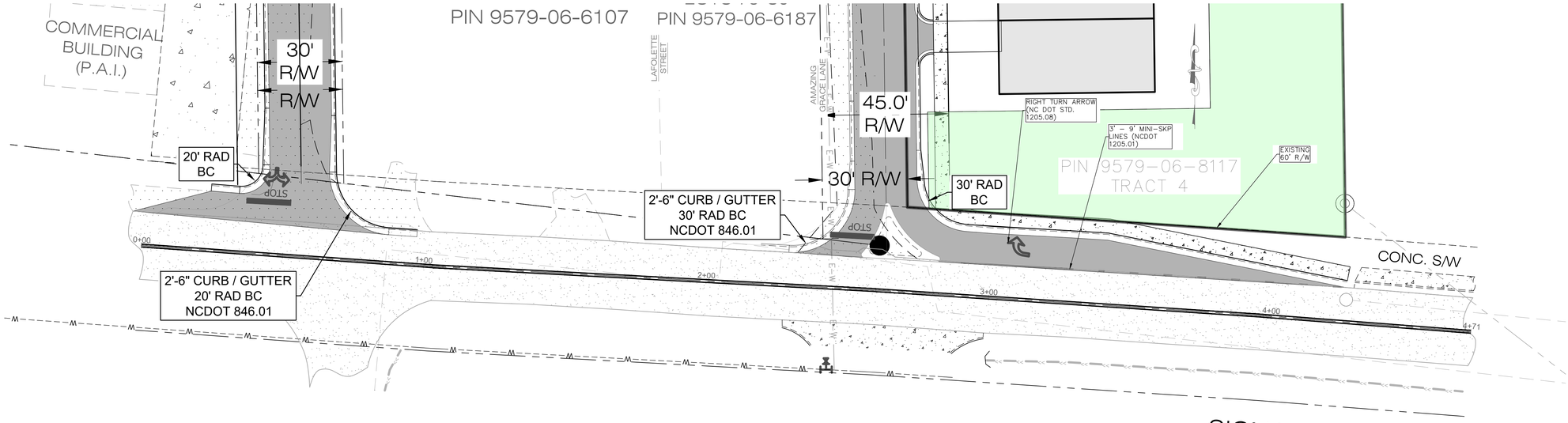
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: ROADWAY PLAN

DRAWING NO: CE-101

This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

Y:\Shared2_ENGICAD_LIBRASE_TEMPLATES_Border11x17.dwg



LINDA VISTA DR SR 1521
MAINTAINED BY NCDOT (ASPHALT)

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W P
NCDOT OFFICIAL (ASPHALT)

LEGEND

WIDENING SECTION
(PROPOSED FULL DEPTH PAVEMENT)

EXISTING ROADWAY

PROP. "PORK CHOP" TURN ISLAND
(WITH MOUNTABLE MONOLITHIC CURB)

NOTES:

1. TYPICAL TRANSITION DISTANCES FROM 2' GUTTER AT CURB RETURN TO 1' CUTTER: 20'.

This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28269
Phone: 704-394-6913
www.3notch.com
License No. C-4973

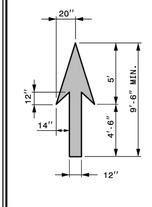
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: STRIPING PLAN

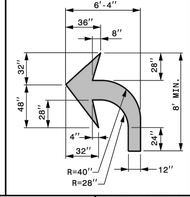
DRAWING NO: CE-102

V:\Base\2_ENGR\2D_LB\BASE_TEMPLATES_Base11x17.dwg

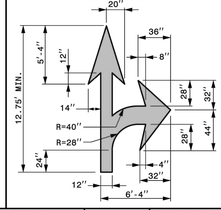
STRAIGHT ARROW



RIGHT OR LEFT TURN ARROW



COMBINATION STRAIGHT AND LEFT OR RIGHT TURN ARROW



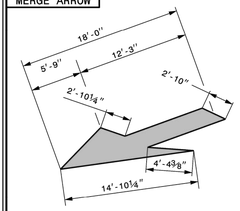
COMBINATION LEFT AND RIGHT TURN ARROW

SAME DIMENSIONS APPLY AS FOR THE LEFT/RIGHT TURN ARROW

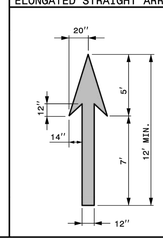
COMBINATION LEFT AND STRAIGHT AND RIGHT TURN ARROW

SAME DIMENSIONS APPLY AS FOR THE COMBINATION STRAIGHT AND LEFT/RIGHT TURN ARROW

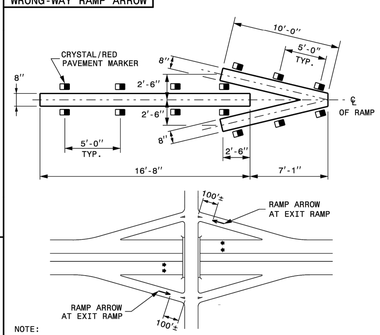
MERGE ARROW



ELONGATED STRAIGHT ARROW



WRONG-WAY RAMP ARROW



NOTE:

1- WHEN INSTALLING COLD APPLIED PLASTIC ON CONCRETE, IT IS RECOMMENDED TO USE COLD APPLIED PLASTIC WITH A BLACK CONTRASTING BOLDER.

GENERAL NOTES:

1- USE THE COLOR WHITE FOR ALL PAVEMENT MARKING SYMBOLS.

2- DO NOT LOCATE PAVEMENT MARKING SYMBOLS AS TO ENCROACH INTO INTERSECTION AREAS.

3- DO NOT PLACE SYMBOLS ACROSS TRANSVERSE EXPANSION JOINTS ON PORTLAND CEMENT CONCRETE PAVEMENTS, UNLESS APPROVED BY THE ENGINEER.

4- CONFORM ALL SYMBOLS TO THE FHWA "STANDARD HIGHWAY SIGNS" MANUAL WHICH INCLUDES PAVEMENT MARKINGS AND STANDARD ALPHABETS (REFER TO SHEETS 6 THRU 9). DIMENSIONS CAN VARY AMONG MANUFACTURERS, THEREFORE SLIGHT VARIANCES ARE ACCEPTABLE. HOWEVER, ALL SYMBOLS ARE REQUIRED TO BE APPROVED BY THE DEPARTMENT.

1-24

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
PAVEMENT MARKINGS
SYMBOLS AND WORD MESSAGES

SHEET 1 OF 9

1205.08

CONTINUOUS LINES

EDGE LINE — YELLOW OR WHITE — 4"/6"

LANE LINE — WHITE — 4"/6"

CENTER LINE — YELLOW — 4"/6"

GORE LINE — WHITE — 8"/12"

DIAGONAL LINE — YELLOW OR WHITE — 12" 45 MPH OR HIGHER; 8" LESS THAN 45 MPH

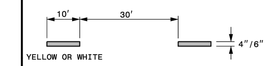
CROSSWALK LINE — WHITE — 8" TRANSVERSE; 24" LONGITUDINAL

RxR LINE — WHITE — 16"

STOP OR TRANSVERSE BAR — WHITE — 24"

10'-30'/SP SKIP LINE

UNLESS OTHERWISED SHOWN, USE 10'-30'/SP SKIPS FOR SKIP LANE LINES AND SKIP CENTER LINES.

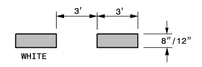


2'-6'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 2'-6'/SP MINI-SKIPS FOR LANE LINE EXTENSIONS THROUGH INTERSECTIONS, EDGE LINE EXTENSIONS THROUGH INTERSECTIONS AND BICYCLE LANE EXTENSIONS.

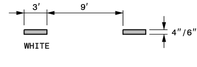
3'-3'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-3'/SP MINI-SKIPS FOR THE WHITE EDGE LINE EXTENSIONS AT ROUNDABOUTS.



3'-9'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-9'/SP MINI-SKIPS FOR WINI-SKIP LANE LINES, LINE EXTENSIONS THROUGH TAPERS, AND MINI-SKIPS USED FOR BICYCLE LANE LINES.



GENERAL NOTES:

1- USE 6" LANE, EDGE, AND CENTER LINES ON ALL FULL CONTROL OF ACCESS FACILITIES AND OTHER ROUTES AS DIRECTED BY THE ENGINEER.

2- LANE LINES INDICATED AS "WIDE" ON THE ROADWAY STANDARD DRAWINGS SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

1-24

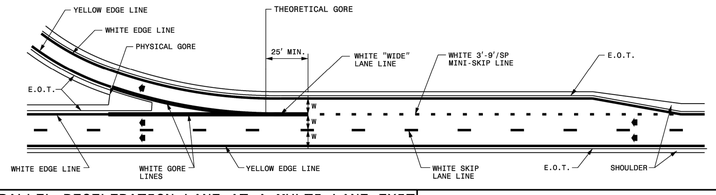
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
PAVEMENT MARKINGS
LINE TYPES AND OFFSETS

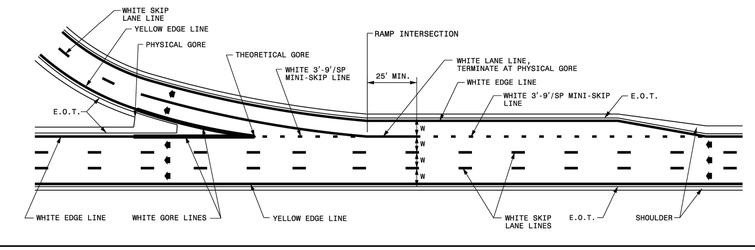
SHEET 1 OF 2

1205.01

PARALLEL DECELERATION LANE



PARALLEL DECELERATION LANE AT A MULTI-LANE EXIT



GENERAL NOTES:

1- LINE WIDTH ON ENTRANCE AND EXIT RAMPS SHALL MATCH THE LINE WIDTH ON THE MAINLINE.

2- GORE LINE MARKINGS TERMINATE AT THE PHYSICAL GORE.

3- LANE LINES INDICATED AS "WIDE" SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

4- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

5- REFER TO ROADWAY STANDARD DRAWING 1205.01 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND
W = WIDTH OF TRAVEL LANE
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW

1-24

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
PAVEMENT MARKINGS
EXIT AND ENTRANCE RAMPS

SHEET 2 OF 3

1205.03

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:

07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

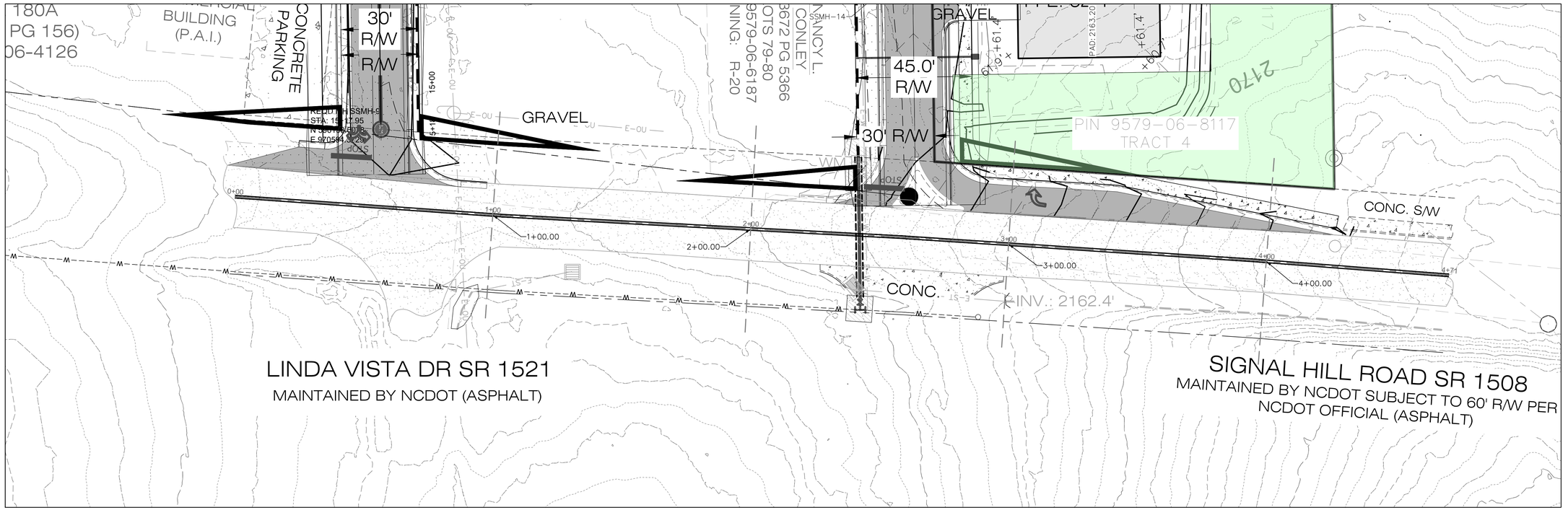
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

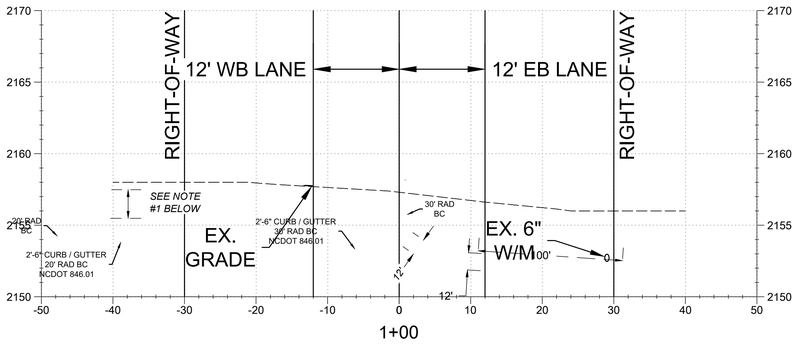
SHEET TITLE: STRIPING DETAILS

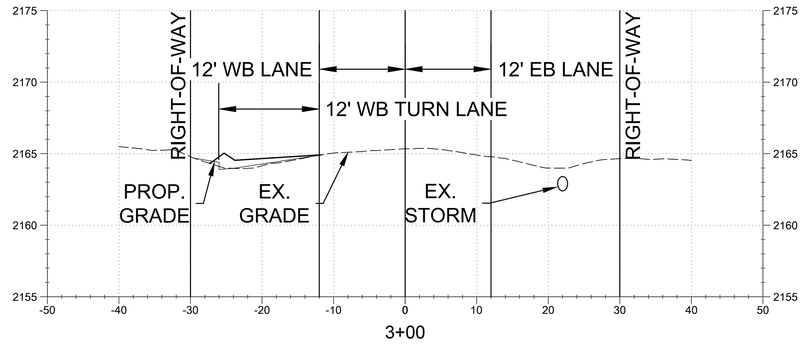
DRAWING NO: CE-103

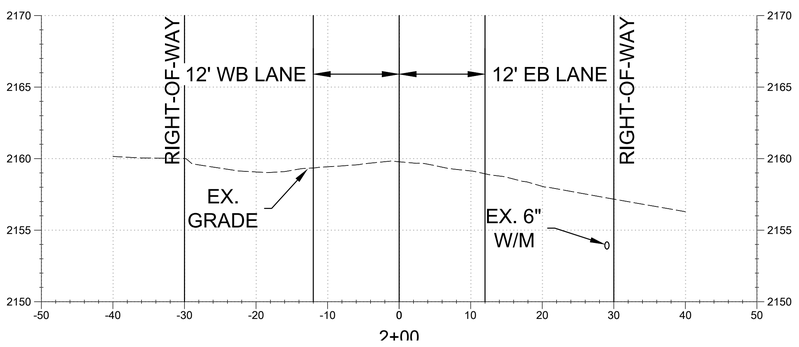
X:\Shared\3_ENGICAD_LIBRARIES_TEMPLATES_Standard 11x17.dwg

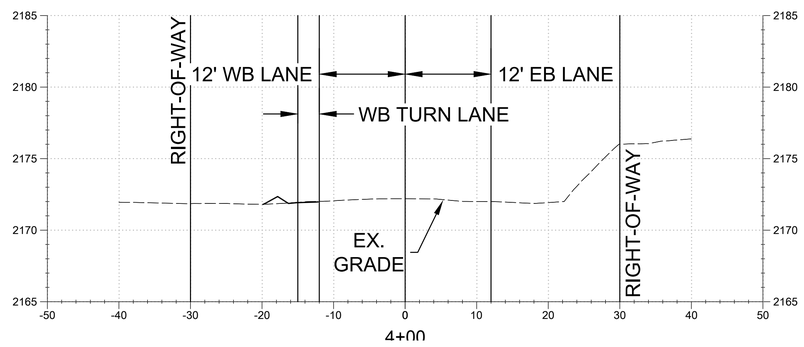
This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.











This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER KRISTIN M. HARRIS
07/18/2025

PROJECT #:	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

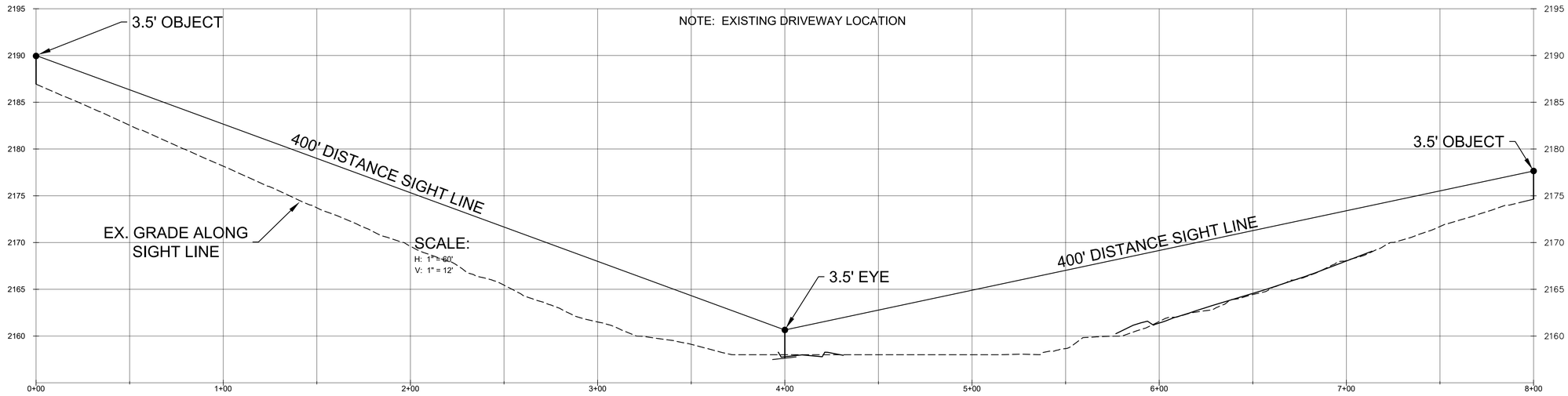
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
PHONE: 704.344.1213
www.3ntch.com
License No. C-4973

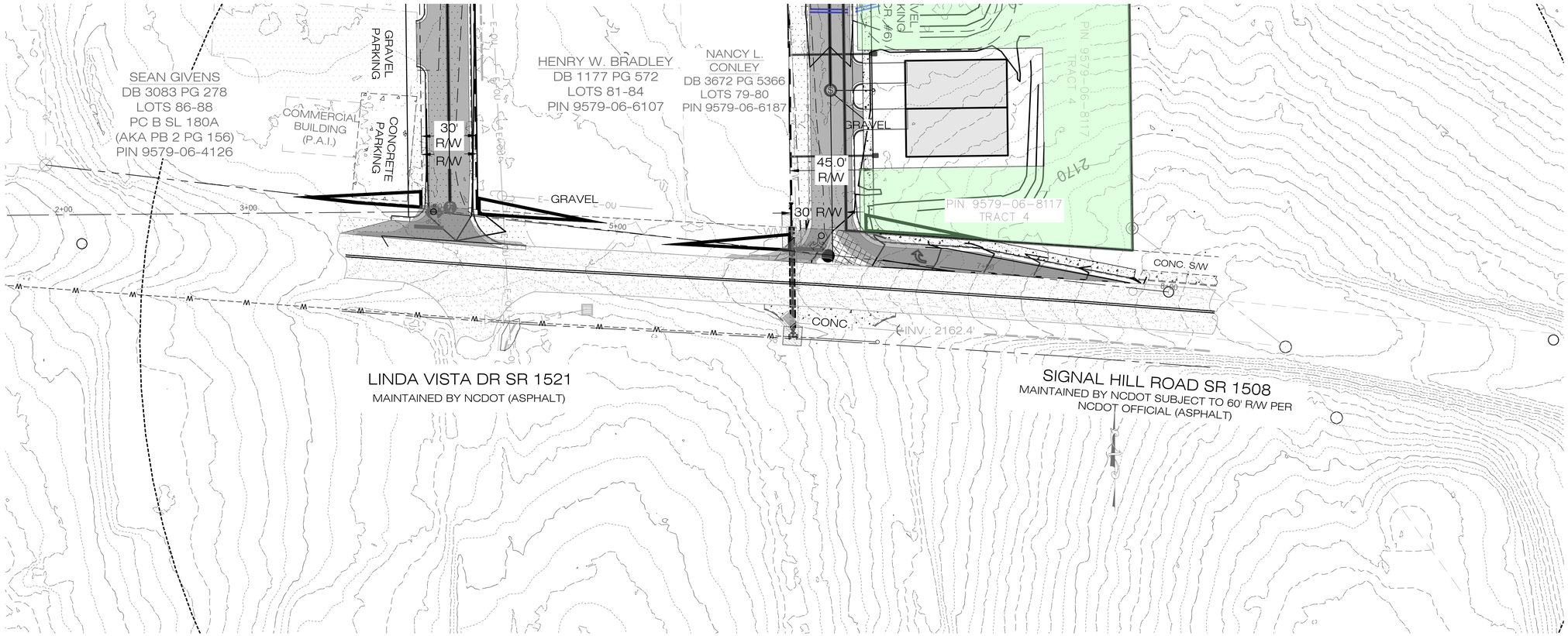
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: CROSS SECTIONS

DRAWING NO: CE-104

Y:\Drawn\2_ENGR\2D_LIB\BASE_TEMPLATES_Border11x17.dwg





SCALE: 1" = 30'

This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

Y:\Shared\2_ENGINEERING\656605823_DESIGN\DWG\SHEETS\ENCROACHMENT EXHIBIT SD.dwg, 9/9/2025 12:35 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	08/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBIN M. HARRIS
07/18/2025

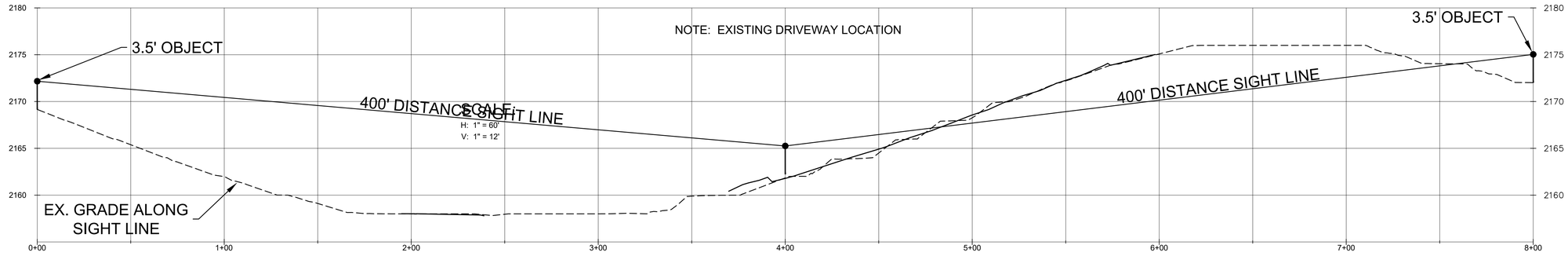
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

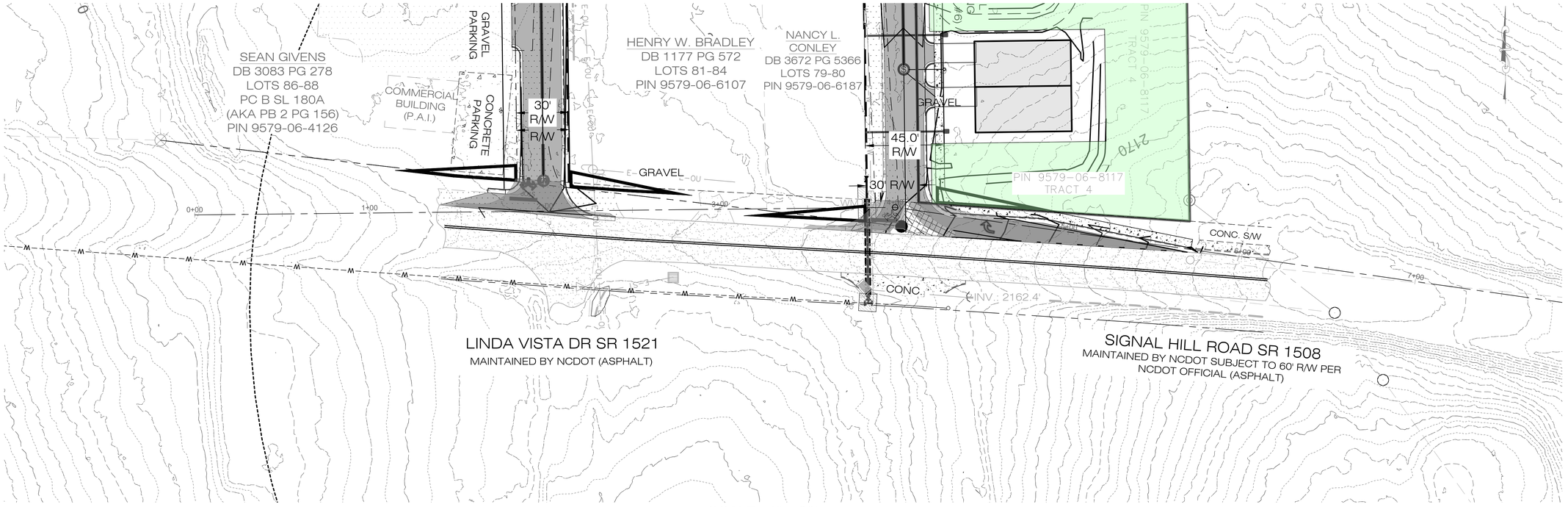
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-8913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SIGHT DISTANCE PLAN - LAFOLETTE STREET

DRAWING NO: CE-105





SCALE: 1" = 30'

This document and its contents are property of Three Notch Group, Inc. and may not be distributed, reused, or modified without permission.

Y:\Shared\2_ENGR\656605\6235_DESIGN\DWG\SHEETS\ENCROACHMENT EXHIBIT SD.dwg, 9/9/2025 12:35 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	08/20/2024	ADDRESS CLIENT COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBY M. HARRIS
07/18/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-0913
www.threenotchgroup.com
License No: C-4073

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SIGHT DISTANCE PLAN - AMAZING GRACE LANE

DRAWING NO: CE-106

TOTAL DENUDED AREA = 11.47 AC.

SEE SHEET 6 FOR EROSION CONTROL NOTES AND CONSTRUCTION SEQUENCE

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

SKIMMER BASIN #2
(STD 03.08.02)
DRAINAGE AREA = 1.24 AC.
DISTURBED AREA = 1.00 AC.
Q_{10} = 2.83 CFS
BASIN TOP ELEV = 2158.00
PRIMARY SPWY ELEV = 2156.50
BASIN BOTTOM ELEV = 2154.00
MIN. VOLUME REQUIRED = 1,800 CF
MIN. VOLUME DESIGNED = 2,487 CF
SURFACE AREA REQUIRED = 920 SF
SURFACE AREA DESIGNED = 1,740 SF

SKIMMER BASIN #1
(STD 03.08.02)
DRAINAGE AREA = 1.22 AC.
DISTURBED AREA = 1.22 AC.
Q_{10} = 2.79 CFS
BASIN TOP ELEV = 2143.00
PRIMARY SPWY ELEV = 2142.00
BASIN BOTTOM ELEV = 2140.00
MIN. VOLUME REQUIRED = 2,196 CF
MIN. VOLUME DESIGNED = 3,000 CF
SURFACE AREA REQUIRED = 907 SF
SURFACE AREA DESIGNED = 1,800 SF

SKIMMER BASIN #3
(STD 03.08.02)
DRAINAGE AREA = 7.12 AC.
DISTURBED AREA = 6.17 AC.
Q_{10} = 16.27 CFS
BASIN TOP ELEV = 2138.00
PRIMARY SPWY ELEV = 2137.00
BASIN BOTTOM ELEV = 2134.00
MIN. VOLUME REQUIRED = 11,106 CF
MIN. VOLUME DESIGNED = 23,165 CF
SURFACE AREA REQUIRED = 5,288 SF
SURFACE AREA DESIGNED = 9,285 SF

HIGHLAND INVESTORS LIMITED PARTNERSHIP
DB 1262 PG 521
PIN 9579-16-5868

CAROLINA VILLAGE, INC
DB 1341 PG 582
PB 2017 SL 11014
PIN 9579-18-3554
ZONING: PRO-CZD

HOME DEPOT USA, INC
DB 992 PG 711
PB 1999 SL 3086
PIN 9579-16-0862
ZONING: R-20

OVERLAPPING EASEMENTS

PERMANENT DRAINAGE EASEMENT PER PB 1999 SL 3086, & DB 993 PG 360

STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA G DB 3284 PG 387 & DB 3273 PG 78

#5 EIR ID-KEE

30' SEWER EASEMENT PER DB 838 PG 434

ANGELA M. LAMB
ESTATE FILE 21E973
(REF: DB 481 PG 483)
PIN 9579-07-1337
ZONING: R-20

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)

AMAZING GRACE LN.
20' PRIVATE R/W

LAFOLETTE ST.
30' PRIVATE R/W

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

CSD CONTROL POINT #5 REBAR
NC GRID COORDINATES
N: 596,147.54' NAD 83/11
E: 970,567.47' NAD 83/11
-LOCALIZED POINT-

LIMITS OF DISTURBANCE (TYP)
SILT FENCE OUTLET (DETAIL DWG. 7)
SILT FENCE (NCDEQ STD. 6.62)
ROCK CHECK DAM (NCDEQ STD. 6.63)
TEMP DIVERSION DITCH (NCDEQ STD. 6.20)
HDPE SLOPE DRAIN 2/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32)
INV IN = 2144.00
INV OUT = 2140.00
HDPE SLOPE DRAIN 2/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32)
INV IN = 2141.50
INV OUT = 2140.00
4" SKIMMER W/ 3/4" DIA. ORIFICE 6" PVC OUTLET W/ 6' x 6' CLASS B RIPRAP APRON SKIMMER
INV. = 2140.00
6" INV OUT = 2135.00
8" SKIMMER W/ 1.5" DIA. ORIFICE 6" PVC OUTLET W/ 6' x 6' CLASS B RIPRAP APRON SKIMMER
INV. = 2134.00
6" INV OUT = 2127.00
20' SPILLWAY ELEVATION = 2137.00. LINE WITH RIP RAP TO TOE OF SLOPE
2.5" SKIMMER W/ 3/4" DIA. ORIFICE 6" PVC OUTLET W/ 6' x 6' CLASS B RIPRAP APRON SKIMMER
INV. = 2152.00
6" INV OUT = 2151.00
HDPE SLOPE DRAIN 2/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32)
INV IN = 2158.00
INV OUT = 2153.00
HDPE SLOPE DRAIN W/ 6' x 6' CLASS B RIPRAP (NCDEQ STD. 6.32)
INV IN = 2135.00
INV OUT = 2134.00
CONSTRUCTION ENTRANCE (DETAIL DWG. 6)
EX. GRAVEL DRIVE TO BE REMOVED
POSSIBLE TEMPORARY STOCKPILE
CONCRETE WASHOUT (NCDEQ STD. 6.63)

ASHLEY M. CLOUSE
BETTY B. MEAD
DB 3768 PG 310
LOTS 73-76
PIN 9579-06-6315
ZONING: R-20

HENRY W. BRADLEY
DB 1177 PG 572
LOTS 81-84
PIN 9579-06-6107
ZONING: R-20

NANCY L. CONLEY
DB 3672 PG 5366
LOTS 79-80
PIN 9579-06-6187
ZONING: R-20

SEAN GIVENS
DB 3083 PG 278
LOTS 86-88
PC B SL 180A
(AKA PB 2 PG 156)
PIN 9579-06-4126
ZONING: O-2

KRISTINA SOFRONIE
DB 3866 PG 389
PB 2021 PG 13157, TR 2
PIN 9579-06-3404
ZONING: R-20

D & G ESTATE, LLC
DB 3876 PG 178
PB 2021 PG 13157, TR 1
PIN 9579-06-3217
ZONING: CHMU

JEANETTE Q. MATHIS
DB 910 PG 68
PC A SL 214A, LOT 7
PIN 9579-06-1562
ZONING: R-20

SWAIN S. HAYNES
DB 901 PG 347
PC A SL 214A, LOT 6
PIN 9579-06-1764
ZONING: R-20

HOMER F. HOWARD
DB 674 PG 3
PC A SL 214A, LOT 5
PIN 9579-06-1936
ZONING: R-20

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBY M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-384-6913
www.3ngtch.com
License No. C-0473

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: EROSION CONTROL PH 1 PLAN

DRAWING NO: C-300

Y:\Shared\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\EROSION CONTROL PH 1.dwg, 9/9/2025 12:35 PM, Toby Harris

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

TOTAL DENUDED AREA = 11.47 AC.
SEE SHEET 6 FOR EROSION CONTROL NOTES AND CONSTRUCTION SEQUENCE

SKIMMER BASIN #2
(STD 03.08.02)
DRAINAGE AREA = 1.24 AC.
DISTURBED AREA = 1.00 AC.
Q_{10} = 2.83 CFS
BASIN TOP ELEV = 2158.00
PRIMARY SPWY ELEV = 2156.50
BASIN BOTTOM ELEV = 2154.00
MIN. VOLUME REQUIRED = 1,800 CF
MIN. VOLUME DESIGNED = 2,487 CF
SURFACE AREA REQUIRED = 920 SF
SURFACE AREA DESIGNED = 1,740 SF

SKIMMER BASIN #1
(STD 03.08.02)
DRAINAGE AREA = 1.22 AC.
DISTURBED AREA = 1.22 AC.
Q_{10} = 2.79 CFS
BASIN TOP ELEV = 2143.00
PRIMARY SPWY ELEV = 2142.00
BASIN BOTTOM ELEV = 2140.00
MIN. VOLUME REQUIRED = 2,196 CF
MIN. VOLUME DESIGNED = 3,000 CF
SURFACE AREA REQUIRED = 907 SF
SURFACE AREA DESIGNED = 1,800 SF

SKIMMER BASIN #3
(STD 03.08.02)
DRAINAGE AREA = 7.12 AC.
DISTURBED AREA = 6.17 AC.
Q_{10} = 16.27 CFS
BASIN TOP ELEV = 2138.00
PRIMARY SPWY ELEV = 2137.00
BASIN BOTTOM ELEV = 2134.00
MIN. VOLUME REQUIRED = 11,106 CF
MIN. VOLUME DESIGNED = 23,165 CF
SURFACE AREA REQUIRED = 5,288 SF
SURFACE AREA DESIGNED = 9,285 SF

HIGHLAND INVESTORS LIMITED PARTNERSHIP
DB 1262 PG 521
PIN 9579-16-5868

CAROLINA VILLAGE, INC
DB 1341 PG 582
PB 2017 SL 11014
PIN 9579-18-3554
ZONING: PRD-CZD

HOME DEPOT USA, INC
DB 992 PG 711
PB 1999 SL 3086
PIN 9579-16-0862
ZONING: R-20

SIGNAL RIDGE, LP
DB 1680 PG 504
PB 2017 SL 10971
PIN 9579-16-1378
ZONING: PRD-CZD

OVERLAPPING EASEMENTS

PERMANENT DRAINAGE EASEMENT
PER PB 1999 SL 3086, & DB 993 PG 360

STREAMBANK MAINTENANCE EASEMENT
#5 EIR ID-KEE
PER PB 2018 SL 11488, AREA G
DB 3284 PG 387 & DB 3273 PG 78

ALLEN ST.
NOT CURRENTLY IN USE
VARIABLE WIDTH PRIVATE R/W
PER PB 2 PG 156

AMAZING GRACE LN. N.
NOT CURRENTLY IN USE
20' PRIVATE R/W PER PB 2 PG 156

AMAZING GRACE LN. S.
20' PRIVATE R/W

LAFOLETTE ST.
30' PRIVATE R/W

SIGNAL HILL ROAD SR 1508
MAINTAINED BY NCDOT SUBJECT TO 60' R/W PER NCDOT OFFICIAL (ASPHALT)

LINDA VISTA DR
SR 1521
MAINTAINED BY NCDOT (ASPHALT)

INLET PROTECTION (SEE DETAIL DWG. 7)

CONSTRUCTION ENTRANCE (DETAIL DWG. 6)

SILT FENCE OUTLET (DETAIL DWG. 7)

CSD CONTROL POINT #5 REBAR
NC GRID COORDINATES
N: 596,147.54' NAD 83/11
E: 970,567.47' NAD 83/11
-LOCALIZED POINT-

NANCY L. CONLEY
DB 9672 PG 5366
LOTS 79-80
PIN 9579-06-6187
ZONING: R-20

HENRY W. BRADLEY
DB 1177 PG 572
LOTS 81-84
PIN 9579-06-6107
ZONING: R-20

ASHLEY M. CLOUSE
BETTY B. MEAD
DB 3768 PG 310
LOTS 73-76
PIN 9579-06-6315
ZONING: R-20

SEAN GIVENS
DB 3083 PG 278
LOTS 86-88
PC B SL 180A
(AKA PB 2 PG 156)
PIN 9579-06-4126
ZONING: O-2

KRISTINA SOFRONIE
DB 3866 PG 389
PB 2021 PG 13157, TR 2
PIN 9579-06-3404
ZONING: R-20

D & G ESTATE, LLC
DB 3876 PG 178
PB 2021 PG 13157, TR 1
PIN 9579-06-3217
ZONING: CHMU

JEANETTE Q. MATHIS
DB 910 PG 68
PC A SL 214A, LOT 7
PIN 9579-06-1562
ZONING: R-20

SWAIN S. HAYNES
DB 901 PG 347
PC A SL 214A, LOT 6
PIN 9579-06-1764
ZONING: R-20

HOMER F. HOWARD
DB 674 PG 3
PC A SL 214A, LOT 5
PIN 9579-06-1936
ZONING: R-20

ANGELA M. LAMB
ESTATE FILE 21E973
(REF: DB 481 PG 483)
PIN 9579-07-1337
ZONING: R-20

30' SEWER EASEMENT PER DB 838 PG 434

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBIN M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-384-6913
www.3notch.com
License No. C-0473

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: EROSION CONTROL PH 2 PLAN

DRAWING NO: C-310

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

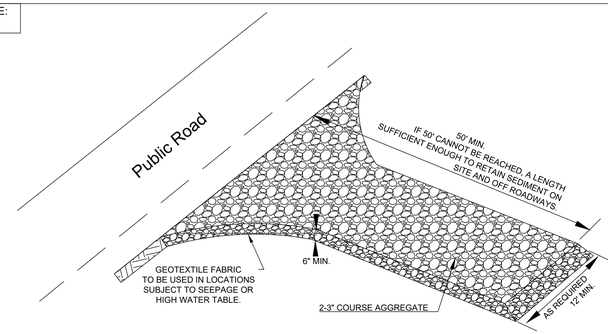
Y:\Shared\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\EROSION CONTROL PH 2.dwg, 9/9/2025 12:36 PM, Toby Harris

CONSTRUCTION SEQUENCE:

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT EROSION IS MINIMIZED AND THAT COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, REGULATIONS, AND ORDINANCES IS MAINTAINED THROUGHOUT EXECUTION OF THIS PROJECT.

1. OBTAIN A LAND DISTURBING PERMIT. SCHEDULE A PRE-CONSTRUCTION MEETING.
2. CLEAR FOR AND INSTALL GRAVEL CONSTRUCTION ENTRANCES. CLEAR FOR AND INSTALL ONSITE PERIMETER SILT FENCE AS SHOWN ON THE APPROVED PLANS. ONCE IN PLACE, CONTRACTOR MAY THEN CLEAR FOR AND INSTALL SEDIMENT BASINS, FOLLOWED BY ANY TEMPORARY DIVERSIONS AS SHOWN ON THE APPROVED PLANS. PERMANENT BASIN / POND OUTFALL STRUCTURES AND PIPING WILL REQUIRE INSTALLATION DURING PHASE 1 EROSION CONTROL. ALL SEDIMENT BASINS AND TRAPS MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL UPGRADIENT AREAS ARE STABILIZED.
3. ONCE EROSION CONTROL MEASURES HAVE BEEN APPROVED BY INSPECTOR, COMPLETE DEMOLITION OF ALL FEATURES ON SITE NOT ALREADY NECESSARY TO BE REMOVED FOR BASIN INSTALLATION.
4. EXCAVATION MAY BEGIN AT THIS TIME. ANY FILL OPERATIONS MUST BEGIN AT THE REAR / UPSTREAM SIDE OF THE SITE AND WORK THEIR WAY FORWARD / DOWNSTREAM. THIS WILL ENSURE POSITIVE DRAINAGE OF THE SITE TOWARDS THE SEDIMENT BASINS THROUGHOUT THE MASS GRADING PORTION OF CONSTRUCTION. CONTRACTOR TO ENSURE NO SUMPS ARE CREATED IN GRADED AREAS UNTIL STORM INLETS CAN BE PROVIDED FOR THOSE SUMPS.
5. BEGIN INSTALLATION OF STORM DRAIN, SEWER AND WATER UTILITIES. STORM DRAIN INSTALLATION MUST START AT MOST DOWN STREAM STRUCTURE AND MOVE UPSTREAM. AS INLETS ARE INSTALLED, PROVIDE INLET PROTECTION IMMEDIATELY. AFTER INLETS ARE INSTALLED, CURBING MAY BE INSTALLED WHERE NECESSARY AND WHEN EVER A TEMPORARY DITCH IS TO BE FILLED IN / RELOCATED, CONTRACTOR MUST CONTACT AN EROSION CONTROL INSPECTOR BEFORE AND AFTER THE RELOCATION HAS TAKEN PLACE WITH 48 HOURS NOTICE BEING GIVEN PRIOR TO RELOCATION. AS AREAS ARE BROUGHT UP TO GRADE, TEMPORARILY OR PERMANENTLY STABILIZE PER TIME FRAMES LISTED ON THIS SHEET.
   NOTE: ALL SEDIMENT BASINS AND TRAPS MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL UPGRADIENT AREAS HAVE BEEN STABILIZED AND THE STORM DRAIN SYSTEM IS IN PLACE, DIVERTING DRAINAGE FROM THESE TEMPORARY TRAPS / BASINS TO THE PERMANENT BASINS. A NC DEMLR REPRESENTATIVE MUST APPROVE THE REMOVAL OF ANY SEDIMENT BASIN OR TRAP PRIOR TO IT TAKING PLACE.
6. PROVIDE PAVEMENT IN ROADWAY AND PARKING AREAS IN ORDER TO PERMANENTLY STABILIZE THESE AREAS. IF ALL BUILDING PERMITS HAVE BEEN ACQUIRED, CONSTRUCTION MAY ALSO BEGIN ON BUILDINGS AND RETAINING WALLS AT THIS TIME.
   NOTE: THE CONTRACTOR SHALL ENSURE THAT THE EROSION CONTROL DEVICES REMAIN UNDISTURBED DURING CONSTRUCTION OF THE BUILDING PADS AND ASSOCIATED PARKING/DRIVE AREAS ADJACENT TO THESE DEVICES UNTIL THE CONTRIBUTING UPSTREAM AREAS HAVE BEEN STABILIZED AND APPROVED.
7. ONCE SITE IS APPROVED BY INSPECTOR, SILT FENCING AND CONSTRUCTION ENTRANCE MAY BE REMOVED. SEDIMENT BASINS MAY BE CONVERTED TO THEIR FINAL WET POND CONDITIONS. PERMANENTLY STABILIZE ANY REMAINING AREAS WITH SOD, SEED AND MULCH, OR PAVING AS NECESSARY.

DATE: PAGE:



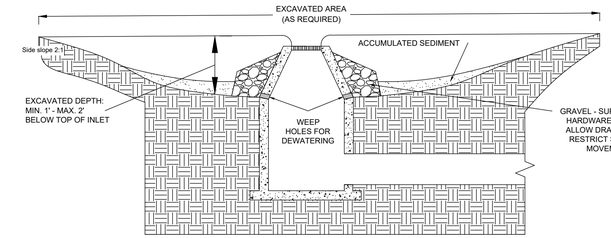
Construction:
1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.
2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
3. Provide drainage to carry water to a sediment trap or other suitable outlet.
4. Use geotextile fabrics in order to improve stability of the foundation in locations subject to seepage or high water table.

Maintenance:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any required repairs immediately.
2. 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.
3. Sediment on roadways is to be removed immediately by broom and shovel, either by manual or mechanical means, and not to be washed off where it has the potential to enter a stream, drainage way or storm drain system.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:



Notes:
1. Clear the area of all debris that might hinder excavation and disposal of spoil.
2. Grade the approach to the inlet uniformly.
3. Protect weep holes by gravel.
4. When the contributing drainage area has been permanently stabilized, seal weep holes, fill the basin with stable soil to final grading elevations, compact it properly and stabilize.

Maintenance:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater.
2. Clean, and properly maintain the excavated basin after every storm until the contributing drainage area has been permanently stabilized.
3. remove sediment when the volume of the basin has been reduced by one-half.
4. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize appropriately.

EXCAVATED DROP INLET PROTECTION (TEMPORARY)

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:

TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding Dates
Mountains—Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER

Seeding Mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding Dates
Mountains — May 15 - Aug. 15
Piedmont — May 1 - Aug. 15
Coastal Plain — Apr. 15 - Aug. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding Dates
Mountains — Aug. 15 - Dec. 15
Coastal Plain and Piedmont — Aug. 15 - Dec. 31

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1-1½ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700 - 1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

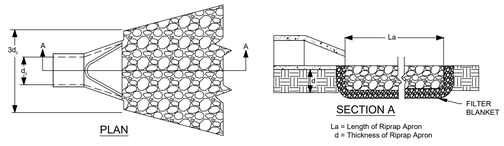
SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

TEMPORARY SEEDING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

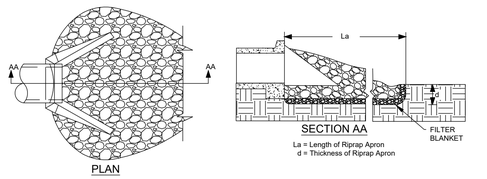
DATE: PAGE:

PIPE OUTLET TO FLAT AREA NO WELL-DEFINED CHANNEL



La = Length of Riprap Apron
d = Thickness of Riprap Apron

PIPE OUTLET TO WELL-DEFINED CHANNEL



La = Length of Riprap Apron
d = Thickness of Riprap Apron

NOTES:
1. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.
2. The riprap and gravel filter must conform to the specified grading limits shown on the plans.
3. Filter cloth, when used, must meet design requirements, and be properly protected from punching or tearing during installation. Repair any damage by removing the riprap and placing another piece over the damaged area. If the damage is extensive, replace the entire filter cloth.
4. All connecting joints should overlap so the top layer is above the downstream layer a minimum of 1 foot.
5. The minimum thickness of the riprap should be 1.5 times the maximum stone diameter but not less than 6".
6. Riprap may be field stone or rough quarry stone. It should be hard, angular highly weather-resistant and well graded.
7. Construct the apron on zero grade with no overfill at the end. Make the top of the riprap at the downstream end level with the receiving area or slightly below it.
8. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed, place in the upper section of the apron.

MAINTENANCE:
1. Inspect outlet structures at least weekly and after each rainfall of 1.0 inch or greater.
2. Check outlets for erosion around or below riprap and for if stones have been dislodged. Make repairs immediately to prevent further damage.

OUTLET STABILIZATION STRUCTURE

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

SEEDING MIXTURE

Species	Rate
Centipede	5 lbs/acre
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Coastal or Eastern Piedmont for Centipede- Sept. 1 - May 1
Coastal and Piedmont for Indian Woodoats and Virginia Wild Rye- Feb 15 - April 1
Mountains for Indian Woodoats and Virginia Wild Rye- March 1 - May 15

Maintenance:
Significant maintenance may be required to obtain desired cover.

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR SUMMER

SEEDING MIXTURE

Species	Rate
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Mountains - July 15- Aug 15
Piedmont - Aug 15 - Oct 15

Maintenance:
Indian Woodoats and Virginia Wild Rye are both sun and shade tolerant.

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR FALL

SEEDING MIXTURE

Species	Rate
Hard Fescue	15 lbs/acre
Switchgrass	2.5-3.5 lbs/acre*
Indian Grass	5-7 lbs/acre*
Big Bluestem	5-7 lbs/acre*
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Mountains - Hard Fescue- Aug 1 - June 1
Mountains- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 15
Piedmont and Coastal- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 1
Coastal- Indian Woodoats and Virginia Wild Rye- Sept 1 - Nov 1

Maintenance:
Hard Fescue is not recommended for slopes > 5%. Prefers shade.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1 to 1½ tons/acre on coarse0textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. the finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. all ridges and depressions shall be removed and filled to provide the approved surface drainage . Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

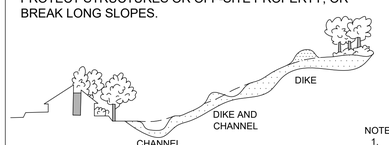
NOTES:
1. Permanent seeding, sodding or other means of stabilization are required when all construction work is completed according to the NPDES timeframes table.
2. A North Carolina Department of Agriculture soils test (or equal) is highly recommended to be obtained for all areas to be seeded, sprigged, sodded or planted.
3. Use a seeding mix that will produce fast0growing nurse crops and includes non-invasive species that will eventually provide a permanent groundcover. Soil blankets may be used in lieu of nurse crops. Mat, tack or crimp mulch, as needed to stabilize seeded areas until root establishment. Mulch must cover at leaser 80% of the soil surface.
4. Ground cover shall be maintained until permanent vegetation is established and stable against accelerated erosion.

PERMANENT SEEDING

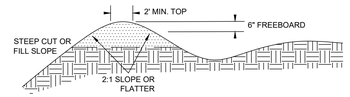
Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:

USE OF DIVERSIONS TO PROTECT CUT OR FILL SLOPES, PROTECT STRUCTURES OR OFF-SITE PROPERTY, OR BREAK LONG SLOPES.



CROSS-SECTION FOR PERMANENT DIVERSION LOCATED ABOVE A SLOPE.



Minimum Design Storm for Degrees of Hazard

Level of Protection	Area to Be Protected	Minimum Design Storm
Low	All erosion control facilities. Open areas, parking lots, minor recreation areas.	10 year
Medium	Recreation development, low-capacity roads and minor structures.	25 year, 24 hour 50 year, 24 hour
High	Major structures, homes, main school buildings, high-capacity roads.	100 year, 24 hour

NOTES:
1. Permanent Diversions can be installed as temporary diversions until the site is stabilized and then completed as a permanent measure, or they can be installed in final form during the initial construction operation, so long as they function properly and meet all temporary measure standards.
2. Remove and properly dispose of all trees, brush, stumps, or other objectionable material. Fill and compact all ditches, swales, or gullies that will be crossed to natural ground level or above.
3. Just before placement of fill, the base of the ridge should be disked by machinery.
4. Excavate, shape, and stabilize the diversion to line, grade, and cross section, as required in the design plan.
5. Compact the ridge to prevent unequal settlement, and to provide stability against seepage.
6. Stabilized the diversion with Permanent vegetation after installation.

MAINTENANCE:
1. Inspect permanent diversions at least weekly and after each rainfall of 1.0 inch or greater.
2. Immediately remove any obstructions from the flow area, and repair the diversion ridge.
3. Check outlets, and make timely repairs as needed.
4. Maintain the vegetation in a vigorous, healthy condition at all times.

PERMANENT DIVERSIONS

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:

Mulching Materials and Application Rates

Material Organic Mulches	Rate Per Acre	Quality	Notes
Straw	1-2 tons	Dry, unchopped, unweathered; avoid weeds.	Should come from wheat or oats; spread by hand or machine; must be tacked down.
Wood Chips	5-6 tons	Air dry	Treat with 12 lbs nitrogen/ton. Apply with mulch blower, chip handle, or by hand. Not for use in fine turf.
Wood Fiber	0.5-1 tons		Also referred to as wood cellulose. May be hydroseeded. Do not use in hot, dry weather.
Bark	35 cubic yards	Air dry, shredded or hammer-milled, or chips.	Apply with mulch blower, chip handler, or by hand. Do not use asphalt tack.
Corn Stalks	4-6 tons	Cut or shredded in 4-6 inch lengths.	Apply with mulch blower or by hand. Not for use in fine turf.
Sericea Lespedeza seed-bearing stems	1-3 tons	Green or dry; should contain mature seed.	
Nets and Mats*			
Jute net	Cover area	Heavy, uniform; woven of single jute yarn.	Withstands waterflow. Best when used with organic mulch
Fiberglass net	Cover area		Withstands waterflow. Best when used with organic mulch
Excelsior (wood fiber net)	Cover area		Withstands waterflow.
Fiberglass roving	0.5-1 tons	Continuous fibers of drawn glass bound together with a non-toxic agent.	Apply with a compressed air ejector. Tack with emulsified asphalt at a rate of 25-35 gal/1,000 sq. ft.
Chemical Stabilizers**			
Aquatain Aerospray Curasol AK Pertroset SB Terra Tack Crust 500 Genaqua 743 M-145	Follow Manufacturer's specifications		Not beneficial to plant growth

*Refer to Practice No. 6.30, Grass Lined Channels in the NC DEQ E&SC Planning and Design Manual
**Use of trade names does not imply endorsement of product.

NOTES:
1. Select material based on site and practice requirements, availability of material, labor and equipment.
2. Before mulching, complete grading, install sediment control practices, and prepare the seedbed. Apply seed before mulching **except** when seed is applied as part of a hydroseeder slurry containing wood fiber mulch or a hydroseeder slurry is applied over straw.

APPLICATION OF ORGANIC MULCH
1. Spread mulch uniformly by hand, or with a mulch blower.
2. When spreading straw mulch by hand, divide the area to be mulched into sections of approximately 1,000 ft^2, and place 70-90 lb. of straw(1 1/2 to 2 bales) in each section to facilitate uniform distribution.
3. After Spreading, no more than 25% of the ground surface should be visible.
4. In hydroseeding operations a green dye, added to the slurry, assures a uniform application.

ANCHORING ORGANIC MULCH
1. Straw mulch must be anchored immediately after spreading.
2. A tractor-drawn implement designed to punch mulch into the soil or a mulch anchoring tool provides maximum erosion control with straw. A regular farm disk, weighted and set nearly straight, may substitute, but will not do a job comparable to the mulch anchoring tool. The disk should not be sharp enough to cut the straw. These methods are limited to slopes no steeper than 3:1, where equipment can operate safely.
3. Application of liquid mulch binders and tackifiers should be heaviest at the edges of areas and at crests of ridges and banks, to resist winds. Binder should be applied uniformly to the rest of the area. Binders may be applied after mulch is spread, or may be sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method.
4. Emulsified asphalt should be applied at 0.10 gallons per square yard (10 gal/1,000 ft^2). Heavier applications cause straw to "perch" over rills. Use Rapid setting (RS or CRS) designated asphalt in traffic areas to prevent uncured asphalt from being picked up on shoes and causing damage to rugs, clothes, etc.
5. Synthetic binders may be used as recommended by the manufacturer.
6. Lightweight plastic, cotton, jute, wire or paper nets may be stapled over the mulch according to the manufacturer's recommendations.
7. For small areas where other methods cannot be used, peg and twine anchoring can be used. Drive 8-10 inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes can be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine two or more times around each peg.
8. Rye Grain may be used to anchor mulch in fall plantings, and German Millet in spring. Broadcast at 15 lb/acre before applying mulch.

CHEMICAL MULCHES
1. May be effective for soil stabilization if used between May 1 and June 15, or Sept. 15 and Oct. 15, provided that they are used on slopes **no steeper** than 4:1, and that proper seedbed preparation has been accomplished, including surface roughening where required.
2. Chemical mulches cannot be used to bind other mulches, or with wood fiber in a hydroseeded slurry at any time. Follow the manufacturer's recommendations for application.

FIBERGLASS ROVING
1. Spread roving uniformly over the area at a rate of 0.25 to 0.35 lb/yd^2. Anchor with asphalt immediately after application, at a rate of 0.25-0.35 gal/yd^2
2. As a channel lining, and at other sites of concentrated flow, the roving mat must be further anchored to prevent undermining.
3. It may be secured with stakes placed at intervals no greater than 10 feet along the drainageway, and randomly throughout its width, but not more than 10 feet apart.
4. As an option to staking, the roving can be buried to a depth of 5 inches at the upgrade end and at intervals of 50 feet along the length of the channel.

NETS AND MATS
1. Nests alone generally provide little moisture conservation benefits and only limited erosion protection. Therefore, typically use in conjunction with an organic mulch such as straw.
2. Except when wood fiber slurry is used, netting should always be installed **over** the mulch. Wood fiber may be sprayed on top of an installed net.
3. Mats, including "excelsior" (wood fiber) blankets, are considered protective mulches and may be used alone.
4. Place the matting in firm contact with the soil, and staple securely.

MULCHING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

REVISIONS			
REV.	DATE	COMMENTS	
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS	

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER ROBIN M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-0473

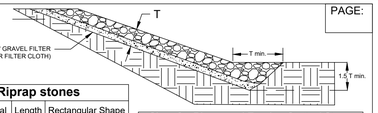
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: ESC DETAILS-1

DRAWING NO: C-350

Y:\Shared\2_ENGR\656605823\5_DESIGN\DWG\SHEET\ESC DETAILS.dwg, 9/9/2025 12:36 PM, Toby Harris

DATE: PAGE:



Subgrade Preparation:
1. Prepare the subgrade for riprap and filter to the required lines and grades shown on the plans.
2. Compact any fill required in the subgrade to a density approximating that of the surrounding undisturbed material or overfill depressions with riprap.
3. Remove brush, trees, stumps, and other objectionable material.

Sand and Gravel Filter Blanket:
1. Place the filter blanket immediately after the ground foundation is prepared.
2. When using gravel, spread filter stone in a uniform layer to the specified depth.
3. When more than one layer of filter material is used, spread the layers with minimal mixing.

Synthetic Filter Fabric:
1. Place the cloth filter directly on the prepared foundation.
2. Overlap the edges by at least 12 inches, and space anchor pins every 3 feet along the overlap.
3. Bury the upstream end of the cloth a minimum of 12 inches below ground and bury the lower end of the cloth or over lap with the next section as required.
4. If damage occurs while placing riprap, remove the riprap, and repair the sheet by adding another layer of filter material with a minimum overlap of 12 inches around the damaged area. If damage is extensive, remove and replace the entire sheet.
5. If placing large stones or machine placing is difficult, a 4 inch layer of fine gravel or sand may be needed to protect the filter cloth.

Maintenance:
In general, once a riprap installation has been properly designed and installed it requires very little maintenance. Riprap should be inspected periodically for scour or dislodged stones. Control of weed and brush growth may be needed in some locations.

Size of Riprap stones

Weight (lb)	Mean Spherical Diameter (ft)	Length (ft)	Rectangular Shape Width/Height (ft)
50	0.8	1.4	0.5
100	1.1	1.8	0.6
150	1.3	2.0	0.7
300	1.6	2.6	0.9
500	1.9	3.0	1.0
1000	2.2	3.7	1.3
1500	2.6	4.7	1.5
2000	2.8	5.4	1.8
4000	3.6	6.0	2.0
6000	4.0	6.9	2.3
8000	4.5	7.6	2.5
20,000	6.1	10.0	3.3

Sizes for Riprap and Erosion Control Stone Specified by NCDOT

Riprap		Erosion Control	
Class 1	Class 2	Class A	Class B
5-200 lb	25-250 lb	2"-6"	5"-15"
30% shall weigh a minimum of 60 lbs each	60% shall weigh a minimum of 100 lbs each		
No more than 10% shall weigh less than 15 lbs each	No more than 5% shall weigh less than 50 lbs each	10% tolerance top and bottom sizes	
		Equally distributed, no gradation specified	Equally distributed, no gradation specified

Riprap should be a well-graded mixture with 50% by weight larger than the specified design size.
Diameter of the largest stone size in the mix should be 1.5 times the d_{50} size with smaller sizes grading down to 1 inch.

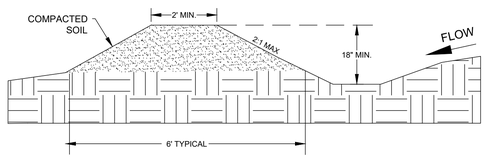
Stone Placement:
1. Placement of riprap should follow immediately after placement of the filter.
2. Place so that riprap forms a dense, well-graded mass of stone with a minimum of voids.
3. Place to its full thickness in one operation.
4. Do not place by dumping through chutes or other methods that cause segregation of stone sizes.
5. Take care not to dislodge underlying base or filter when placing stone.
6. The toe of the riprap slope should be keyed to a stable foundation at its base.
7. The toe should be excavated to a depth about 1.5 times the design thickness of the riprap and extend horizontally from the slope, as shown above.
8. Hand placing may be necessary to achieve the proper distribution of stone sizes to produce a relatively smooth, uniform surface.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

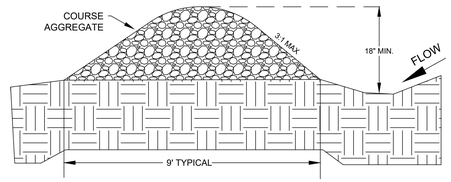
RIP RAP

DATE: PAGE:

TEMPORARY EARTHEN DIVERSION DIKE



TEMPORARY GRAVEL DIVERSION DIKE FOR VEHICLE CROSSING



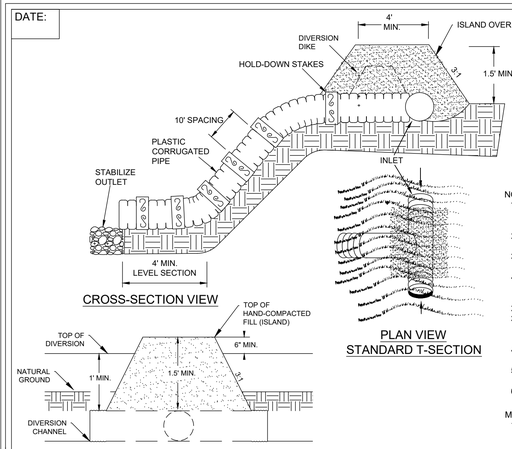
NOTES:
1. Remove and properly dispose of all tree, brush, stumps, and other objectionable material.
2. Temporary diversions are to only be used for drainage areas of 5 acres or less.
3. Ridges will have a 2 feet minimum top width, 2:1 or flatter side slopes and a minimum of 0.3 feet freeboard.
4. Channels will have a parabolic, trapezoidal, or V shape with side slopes of 2:1 or flatter.
5. Any point where vehicles will be crossing should have 3:1 or flatter side slopes.
6. Ensure the top of the dike is not lower at any point than the design elevation plus the specified settlement.
7. Provide sufficient room around diversions to permit machine re-grading and cleanout.
8. Vegetate the ridge immediately after construction unless it will remain in place less than 30 working days.

MAINTENANCE:
1. Inspect all measures at least weekly and after every rainfall of 1.0 inch or greater.
2. Make all repairs immediately.
3. Immediately remove any sediment from the flow area and repair the diversion ridge.
4. Check outlets and make timely repairs as needed.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

TEMPORARY DIVERSIONS

DATE: PAGE:



Size of Slope Drain

Max. Drainage Area per Pipe (Acres)	Pipe Diameter (Inches)
0.50	12
0.75	15
1.00	18
>1.00*	as designed

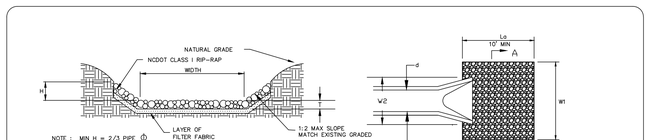
* Inlet design becomes more complex beyond this size.

NOTES:
1. Place slope drains on undisturbed soil or well compacted fill at locations and elevations shown on the plan.
2. Slightly slope the section of pipe under the dike toward its outlet.
3. Hand tamp the soil under and around the entrance section in lifts not to exceed 6 inches.
4. Fill over the drain at the top of the slope to a minimum of 1.5 feet depth, 4 feet top width and 3:1 side slopes.
2. Ensure all slope drain connections are watertight.
3. Compact fill material and securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart.
4. Extend the drain beyond the toe of the slope, and adequately protect the outlet from erosion.
5. Make the compacted, settled dike ridge no less than 1 foot above the top of the pipe at every point.
6. Immediately stabilize all disturbed areas following construction.

MAINTENANCE:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater; repair immediately.

Effective Date: 9/1/2023

TEMPORARY SLOPE DRAINS



CONSTRUCTION SPECIFICATIONS :

A. BOTTOM GRADE SHALL BE 0.0 %.
B. SIDE SLOPES 2:1 OR FLATTER.
C. SIDEWALLS SHALL EXTEND UP AS SHOWN ON THE PLANS BUT NOT LESS THAN TWO-THIRDS THE PIPE DIAMETER.
D. THERE SHALL BE NO OVERFALL FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIP-RAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF TO TOE WALL AT THE DOWNSTREAM END.
E. APRON DIMENSIONS AND RIP-RAP SIZE OR CONCRETE THICKNESS MUST BE AS SHOWN ON THE PLANS.
F. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL AT THE OUTLET PIPE, WHICHEVER IS GREATER, OR 3 TIMES THE DIAMETER.
G. THE PLACING OF FILL, EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.
H. NO BENDS OR CURVES IN THE HORIZONAL ALIGNMENT OF THE APRON WILL BE PERMITTED.
I. FILTER FABRIC TO BE MIRAFI 500 OR APPROVED EQUAL
J. THICKNESS OF RIP-RAP TO BE 1' OR AS NOTED BY THE ENGINEER.

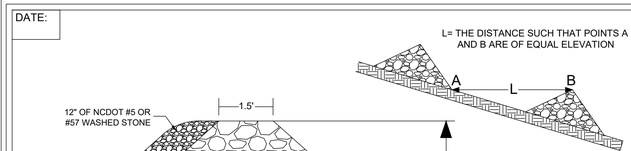
USE USDA NOMOGRAPH FROM NC SEDIMENT AND EROSION CONTROL MANUAL FOR DESIGN DATA.

OUTLET	Q(CFS)	V(FPS)	La	W1	W2	*T	H
FES-200	10.5	5.9	16'	17.5'	4.5'	14"	20"
FES-204	23.7	13.4	16'	17.5'	4.5'	14"	20"**
FES-300	41.1	8.4	8'	10.5'	7.5'	14"	20"
FES-316	7.8	4.4	14'	15.5'	4.5'	14"	20"
FES-320	40.1	12.8	12'	14'	6'	14"	20"
FES-322	14.4	8.2	12'	13.5'	6'	14"	20"

* d50 (see fig. 8.06 a&b "NC SEDIMENT AND EROSION CONTROL MANUAL"
dmax = 1.5 x d50
T = 1.5 X dmax
** H = DEPTH OF RIP RAP APRON, 4xd
W1 = END OF APRON, 3xd
W2 = END OF FLARED SECTION

RIP-RAP APRON
FOR FLARED END SECTION

DATE: PAGE:



NOTES:
1. Place stone on a filter fabric foundation.
2. The center stone section must be at least 9 inches below natural ground level where the dam abuts the channel banks.
3. Extend stone at least 1.5 feet beyond the ditch bank to keep water from cutting around the ends of the check dam.
4. Set spacing between dams to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.
5. Protect the channel after the lowest check dam from heavy flow that could cause erosion.
6. Make sure the channel reach above the most upstream dam is stable.
7. Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.
8. Riprap and filter fabric should be keyed in to prevent under cutting.
9. Ends of check dams may need to be turned uphill to prevent bypass and better conform to site conditions.
10. Do not place check dams in intermittent or perennial streams.

MAINTENANCE:
1. Inspect check dams and channels at least weekly and after each rainfall of 1.0 inch or greater. Clean out sediment, straw, limbs or other debris that could clog the channel when needed.
2. 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.
3. 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 the dams as needed to maintain design height and cross section.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

CHECK DAM

DATE: PAGE:

Temporary Seeding Recommendations

Common Name	Scientific Name	Rate per Acre	Optimal Planting Date
Rye Grain	Secale Cereale	30 lbs	Aug. 15 - May 15
Wheat	Triticum Aestivum	30 lbs	Aug. 15 - May 15
German Millet	Setaria Italica	10 lbs	May 15 - Aug. 15
Browntop Millet	Urochloa Ramosa	10 lbs	May 15 - Aug. 15

Temporary Seeding Recommendations:
- Temporary annual seed selection should be based on season of project installation.
- A single species selection for temporary cover is acceptable.
- In some cases where seasons overlap, a mixture of two or more temporary species may be necessary; however, application rates should not exceed the total recommended rate per acre.
- Temporary seed should be mixed and applied simultaneously with the permanent seed mix if optimal planting dates allow.

Permanent Seeding Recommendations: Optimal Planting: Mar. 1 - May 15, July 15 - Aug. 15

Common Name	Scientific Name	Type*	% of Mix	Soil Drainage Adaptation	Shade Tolerance	Height
Indian Woodoats	Chasmanthium latifolium	Cold Season	1-10%	Well-drained to Droughty	Moderate	4
Virginia Wildrye	Elymus virginicus	Cold Season	5-25%	Well-drained to Droughty	Moderate	3
Eastern Bottle-brush Grass	Elymus hystrix	Cold Season	5-10%	Well-drained to Droughty	Moderate	3
Winter Bentgrass	Argostis hyemalis	Cold Season	10-20%	Well-drained	Moderate	3
Rough Bentgrass	Agrostis scabra	Cold Season	10-20%	Poorly-drained	Poor	2.5

Permanent Seeding Recommendations: Optimal Planting: Dec. 15 - May 15, Aug. 15 - May 15

Common Name	Scientific Name	Type*	% of Mix	Soil Drainage Adaptation	Shade Tolerance	Height
Soft Rush	Juncus effusus	Wetland	1-10%	Poorly-drained	Poor	4
Shallow Sedge	Carex lurida	Wetland	1-10%	Poorly-drained	Poor	3
Fox Sedge	Carex vulpinoidea	Wetland	1-10%	Poorly-drained	Poor	3
Leathery Rush	Juncus coriaceus	Wetland	2-5%	Poorly-drained	Poor	2

Permanent Seeding Recommendations: Optimal Planting Dec. 1 - Apr. 15

Common Name	Scientific Name	Cultivars	Type*	% of Mix	Soil Drainage Adaptation	Shade Tolerance	Height
Switchgrass	Panicum virgatum	Cave-in-rock -- well drained Blackwell -- well drained Shelter -- well drained Kanlow -- poorly drained Carthage -- well drained	Warm Season	10-15%	Cultivar Dependent	Poor	6
Indiangrass	Sorghastrum nutans	Rumsey, Osage, Cheyenne	Warm Season	10-30%	Well-drained to Droughty	Poor	6
Deertongue	Dichanthelium clandestinum	Tioga	Warm Season	5-25%	Poorly-drained to Droughty	Moderate	6
Big Bluestem	Andropogon gerardii	Roundtree, Kaw, Earl	Warm Season	10-30%	Well-drained to Droughty	Poor	6
Little Bluestem	Schizachyrium scoparium	Aldous, Cimarron	Warm Season	10-30%	Well-drained to Droughty	Poor	4
Sweet Woodreed	Cinna arundinacea		Warm Season	1-10%	Poorly-drained to Well-drained	Moderate	5
Rice Cutgrass	Leersia oryzoides		Warm Season	5-25%	Poorly-drained	Poor	5
Redtop Panic Grass	Panicum rigidulum		Warm Season	10-20%	Well-drained	Poor	3.5
Eastern Gammagrass	Tripsacum dactyloides		Warm Season	10-20%	Well-drained to Poorly-drained	Poor	4.5
Purple Top	Tridens flavus		Warm Season	5-10%	Well-drained to Droughty	Poor	2.5

- No specific seeding rate is given in order to allow for custom seed mixes based on site characteristics and season. However, permanent seed inclusion in the mix should total 15 pounds of pure live seed (PLS) per acre drilled or 15-20 pounds PLS per acre broadcast applied.
- At least 4 species should be selected for the mixture, including one species from each type(warm and cold season and wetland); selection of more than four species is recommended for increasing chances of successful vegetation establishment.
- If other species such as wildflowers are added to the mix, they should not be counted in the minimum seeding rate for grasses.

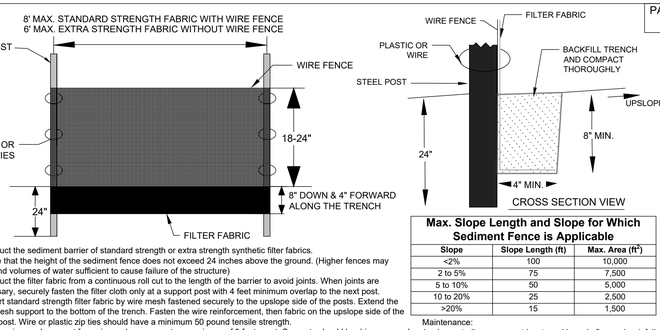
Permanent Seeding:
- Soil analysis should be performed to determine nutrient and lime needs of each site.
- Riparian buffers regulated for nutrient management may be limited to a single application of fertilizer.
- Apply seed uniformly with a cyclone seeder, drop-type spreader, drill or hydroseeder on a firm, friable seedbed.
- When using a drill, equipment should be calibrated in the field for the desired seeding rate.
- Mulch all plantings immediately after seeding (see 6.14, Mulching).If planting on stream banks steeper than 10% or areas subject to flooding, a biodegradable RECP (6.17, Rolled Erosion Control Products) is recommended to hold seed and soil in place.

Maintenance:
- Many of the recommended permanent grass species may require two years of establishment, depending on site conditions.
- Inspect seeded areas for failure and make necessary repairs, soil amendments, and reseedings.
- If weedy exotic species have overtaken the area after the first growing season, the invading species must be eradicated to allow native species to grow.
- Monitor the site until long term stability has been established.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

RIPARIAN AREA SEEDING (MOUNTAIN REGION)

DATE: PAGE:



Notes:
1. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.
2. Ensure that the height of the sediment fence does not exceed 24 inches above the ground. (Higher fences may impound volumes of water sufficient to cause failure of the structure)
3. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.
4. Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have a minimum 50 pound tensile strength.
5. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Supports should be driven securely into the ground a minimum of 24 inches. Wire mesh should be a minimum 14-gauge with 6 inch mesh spacing.
6. Extra strength filter fabric with 6 foot post spacing does not require a wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have a minimum of 50 pound tensile strength.
7. Excavate the trench approximately 4 inches wide and 8 inches deep along the proposed line of the posts and upslope from the barrier.
8. Place 12 inches of fabric along the bottom and side of the trench.
9. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.
10. Do not attach filter fabric to existing trees.
11. Do not place across ditches, streams, or any other areas of concentrated flow.

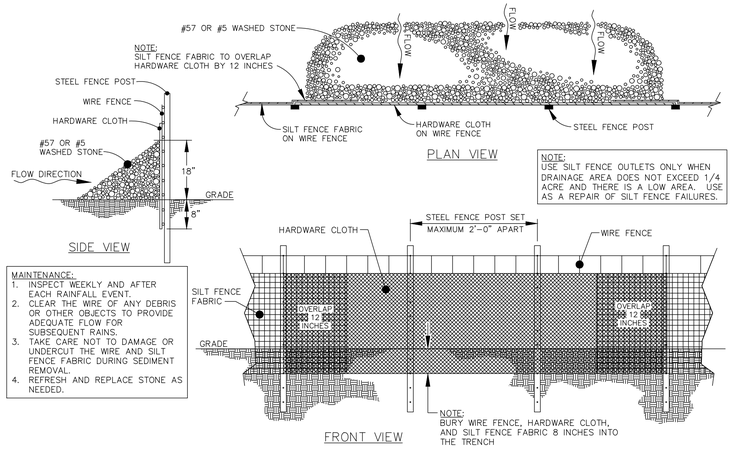
Max. Slope Length and Slope for Which Sediment Fence is Applicable

Slope	Slope Length (ft)	Max. Area (ft²)
<2%	100	10,000
2 to 5%	75	7,500
5 to 10%	50	5,000
10 to 20%	25	2,500
>20%	15	1,500

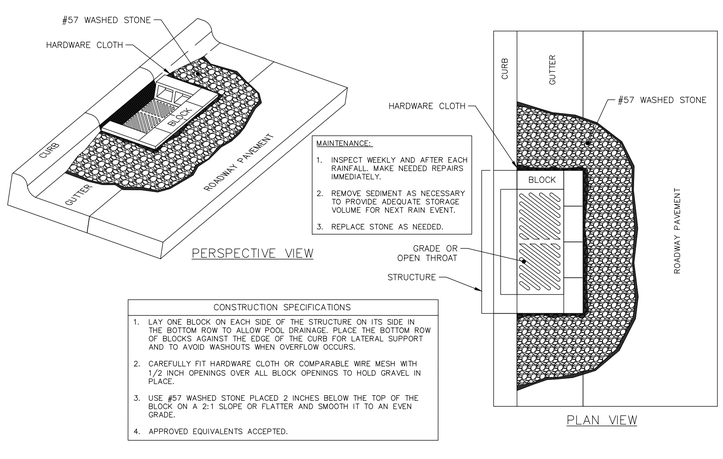
Maintenance:
1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any required repairs immediately.
2. Should the fabric of a sediment fence collapse, tear, decompose, or become ineffective, replace it promptly.
3. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and reduce pressure on the fence. Take care to avoid undermining the fence during cleanouts.
4. 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.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

SEDIMENT FENCE



STANDARD SILT FENCE OUTLET



STANDARD BLOCK & GRAVEL PROTECTION

REVISIONS

REV.	DATE	COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ENGINEER ROBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-0473

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: ESC DETAILS-2

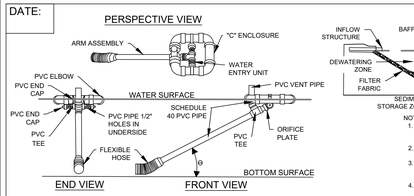
DRAWING NO: C-351

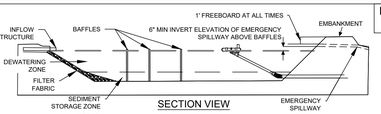
Y:\Shared\2_ENGR\656605823\24_DESIGN\DWG\SHEETS\ESC DETAILS.dwg, 9/9/2025 12:36 PM, Toby Harris

DATE:

PAGE:

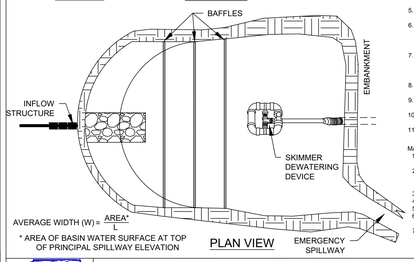
SKIMMER SEDIMENT BASIN





NOTES:

1. Clear, grub and strip the area under the embankment of all vegetation and root mat. Remove all surface soil containing high amounts of organic matter and stockpile or dispose of it properly. Haul all objectionable material to the designated disposal area. Place temporary sediment control measures below basin as needed.
2. Place the fill in lifts not to exceed 9 inches, and machine compact it. Over fill the embankment 6 inches to allow for settlement.
3. Place the barrel on a firm, smooth foundation of impervious soil. Do not use pervious material such as sand, gravel, or crushed stone as backfill around the pipe. Place the fill around the pipe spillway in 4-inch layers and compact it under and around the pipe to at least the same density as the adjacent embankment.
4. Place a minimum depth of 2 feet compacted backfill over the pipe spillway before crossing with construction equipment.
5. Ensure that the flow length to basin width ratio is at least 2:1 to improve trapping efficiency. Length is measured at the elevation of the principal spillway.
6. Assemble the skimmer following manufacturers instructions or as designed and lay on the bottom of the basin with the flexible joint at the inlet of the barrel pipe. Attach the flexible joint to the barrel pipe and position the skimmer over the excavated pit or support. Be sure to attach a rope and anchor it to the side of the basin.This will be used to pull the skimmer to the side for maintenance.
7. Install the spillway in undisturbed soil to the greatest extent possible. The spillway should be lined with laminated plastic or impermeable geotextile fabric. The fabric must be wide and long enough to cover the bottom and sides and extend onto the top of the dam for anchoring in a trench. The edges may be secured with 8-inch staples or pins.
8. Filter fabric must be long enough to extend down the slope and exit onto stable ground. The width of the fabric must be one piece, not joined or spliced; otherwise water can get under the fabric.
9. The upper section(s) should overlap the lower section(s) so that water cannot flow under the fabric. Secure the upper edge and sides of the fabric in a trench with staples or pins.
10. Discharge water into the basin in a manner to prevent erosion. Use temporary slope drains or diversions with outlet protection to divert sediment-laden water to the upper end of the pool area to improve basin trap efficiency.
11. Stabilize the emergency spillway embankment and all other disturbed areas above the crest of the principal spillway immediately after construction.



MAINTENANCE:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make necessary repairs immediately.
2. 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 can be excavated. Excavate the sediment from the entire basin, not just around the skimmer or within the first cell.
3. Make sure any vegetation growing in the bottom of the basin does not hold down the skimmer.
4. Repair baffles if they are damaged. Re-anchor the baffles if water is flowing underneath or around them.
5. Ensure the skimmer is not clogged with trash or debris.
6. If the skimmer arm or barrel pipe is clogged, remove orifice and clear debris with a plumber's snake or by flushing with clean water. Be sure to replace the orifice before repositioning the skimmer.
7. Check fabric lined spillway for damage and make any required repairs with fabric that spans the full width of the spillway. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE:

PAGE:

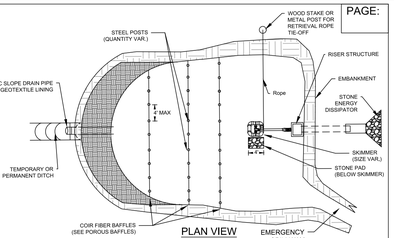
SEDIMENT BASIN

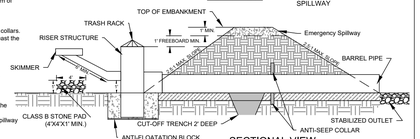
NOTES:

1. Install temporary sediment basins to the approved design. If the basin will eventually be converted to a permanent SCM device, the basin must function as a temporary sediment basin and meet the following parameters until completion of the project:
   - Maximum Drainage Area: 100 acres
   - Minimum Sediment Storage Volume: 1800 cubic feet per acre of disturbed area
   - Minimum Surface Area: 435 square feet per cfs of Q_{10} peak inflow
   - Minimum dewatering time: 48 hours
2. Clear, grub, and strip topsoil from areas under the embankment to remove trees, vegetation, roots, and other objectionable material. Delay clearing the pool area until the dam is complete. Stockpile all topsoil or soil containing organic matter for use on the outer shell of the embankment to facilitate vegetative establishment.
3. Place temporary sediment control measures below the basin and stockpile as needed.
4. Excavate a cut-off trench along the center line of the earth fill embankment. Cut trench to stable soil material, but in no case make it less than 2 feet deep with maximum side slopes no steeper than 1:1. Compaction requirements are the same as those for the embankment.
5. Extend the cut-off trench into both abutments to at least the elevation of the riser crest.
6. Keep the trench dry during backfilling and compaction operations.
7. Fill material should be clean mineral soil, free of roots, woody vegetation, rocks, and other objectionable material. Areas of approved fill should be shown on the plans.
8. Scarify areas on which fill is to be placed prior to placing. Ensure that fill material contains sufficient moisture so it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction.
9. Place fill material in 6 to 8 inch continuous layers over the entire length of fill area and compact.
10. Construct the embankment to an elevation 10% higher than the design height to allow for settling.
11. Securely attach the riser to the barrel or barrel stub to make a watertight structural connection. All connections should be made using approved watertight assemblies.
12. If no riser structure is to be used, couple the skimmer arm directly into the embankment 1 foot from the bottom of the basin.
13. The arm pipe connecting the skimmer to the riser shall have a minimum length of 6 feet.
14. Place barrel and riser on a firm, smooth foundation of impervious soil.
15. Do not use pervious material such as sand, gravel, or crushed stone as backfill around the pipe or anti-seep collars.
16. Place fill material around the pipe spillway in 4-inch layers, and compact it under and around the pipe to at least the same density as the adjacent embankment.
17. Place a minimum depth of 2 feet of compacted backfill over the pipe spillway before crossing it with any construction equipment.
18. Anchor riser in place by concrete or other satisfactory means to prevent floatation.
19. In no case should the pipe conduit be installed by cutting a trench through the dam after the embankment is complete.
20. Install the emergency spillway in undisturbed soil.
21. Discharge water into the basin in a manner to prevent erosion.
22. Construct basin so that the disturbed area is minimized, divert surface water from bare areas and complete the embankment before the area is cleared.
23. Stabilize the emergency spillway embankment and all other disturbed area above the crest of the principal spillway immediately after construction.
24. Seed and place matting for erosion control on interior and exterior side slopes.
25. Install Porous Baffles as specified on following sheets.

MAINTENANCE:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater. Make any repairs immediately.
2. Remove sediment and restore basin to its original dimensions when it accumulates to one-half the design depth.
3. Place removed sediment in an area with sediment control measures to ensure no loss of sediment off-site.
4. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement.
5. Remove all trash and other debris from the riser and pool area.





Acceptable Dimensions for Basin Embankment

Fill Height	Minimum Top Width
Less than 10.0 ft	8.0 ft
10.0 ft to 15.0 ft	10.0 ft

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE:

PAGE:

LAND GRADING

SPACING GUIDE FOR SLOPE BREAKS		
	SLOPE	SPACING (FT)
Steep Slopes	2:1	20
	3:1	35
	4:1	45
Long Slopes	15-25%	50
	10-15%	80
	6-10%	125
	3-6%	200
	<3%	300

Use slope breaks, such as diversions, wattles, or benches, as appropriate, to reduce the length of cut-and-fill slope to limit sheet and rill erosion and prevent gullying.

MAINTENANCE:

1. Periodically check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls.
2. Promptly remove all sediment from diversions and other water-disposal practices.
3. If washouts or breaks occur, repair immediately.
4. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

NOTES:

1. Construct and maintain all erosion and sediment control practices and measures in accordance with the approved sedimentation control plan and construction schedule.
2. Remove good topsoil from areas to be graded and filled, and preserve it for use in finishing the grading of all critical areas.
3. Scarify areas to be topsoiled to a minimum depth of 2 inches before placing topsoil.
4. Clear and grub areas to be filled by removing trees, vegetation, roots, or other objectionable material that would affect the planned stability of the fill.
5. Ensure that fill material is free of brush, rubbish, rocks, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.
6. Place all fill in layers not to exceed 9 inches in thickness, and compact the layers as required to reduce erosion, slippage, settlement, or other related problems.
7. Do not incorporate frozen, soft, mucky, or highly compressible materials into fill slopes.
8. Do not place fill on a frozen foundation, due to possible subsidence and slippage.
9. Keep diversions and other water conveyance measures free of sediment during all phases of development.
10. Handle seeps or springs encountered during construction in accordance with approved methods (subsurface drain).
11. Permanently stabilize all graded areas immediately after final grading is completed on each area in the grading plan. Apply temporary stabilization measures on all graded areas when work is to be interrupted or delayed for 30 days or longer.
12. Show topsoil, stockpiles, borrow areas, and spoil areas on the plans, and make sure they are adequately protected from erosion. Include final stabilization of these areas in the plan.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE:

PAGE:

POROUS BAFFLES

NOTES:

1. Use matting made of 100% coconut fiber(coir) twine woven into high strength matrix.
2. Staples should be made of 0.125 inch diameter, new steel wire formed into a 'U' shape not less than 12 inches in length with a throat of 1 inch in width. The staples anchor the porous baffles into the sides and bottom of the basin.
3. Grade the basin so that the bottom is level front to back and side to side.
4. Install the coir fiber baffles immediately upon excavation of the basins.
5. Install posts across the width of the sediment trap.
6. Steel posts should be driven to a depth of 24 inches and spaced in a maximum of 4 feet apart. The top of the fabric should be a minimum of 6 inches higher than the invert of the spillway. Tops of the baffles should be a minimum of 2 inches lower than the top of the earthen embankment.
7. Install 3 coir fiber baffles in basins at drainage outlets with a spacing of 1/4 the basin length. 2 coir fiber baffles can be installed in the basins less than 20 feet in length with a spacing of 1/3 the basin length.
8. Attach a 9-gauge high tension wire strand to the steel posts at a height of 6 inches above the spillway elevation with plastic ties or wire fasteners to prevent sagging. If the temporary sediment basin will be converted to a permanent stormwater basin of a greater depth, the baffle height should be based on the pool depth during use as a temporary sediment basin.

MAINTENANCE:

1. Inspect all measures at least weekly and after each rainfall of 1.0 inch or greater and repair immediately.
2. Maintain access to baffles. If the fabric collapses, tears, decomposes, or becomes ineffective, replace immediately.
3. Remove sediment deposits when it reaches half full. Replace if baffle fabric is damaged during clean-out operations. Sediment depth should never exceed half the designed storage depth.

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

REV.	DATE	COMMENTS

REVISIONS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: ESC DETAILS-3

DRAWING NO: C-352

Y:\Sheets\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\ESC-DETAILS.dwg, 8/9/2025 12:38 PM, Toby Harris

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 feet 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.

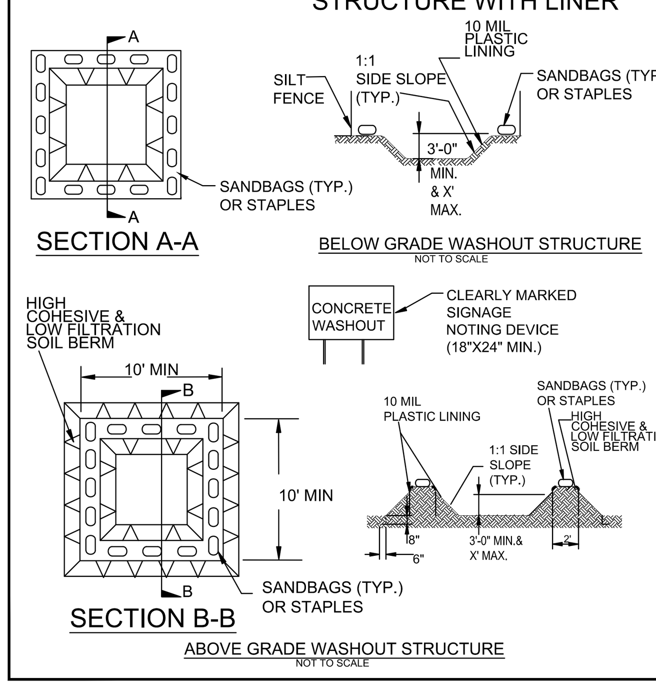
EARTHEN STOCKPILE MANAGEMENT

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.

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.

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY.
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

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.

NORTH CAROLINA Department of Environmental Quality — DEQ

EFFECTIVE DATE: 11/12/2020

NCG-01 GROUND COVER & MATERIALS HANDLING

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.

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 on holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (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 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 record of the following shall be made: 1) Actions taken to clean up or stabilize sediment that has left the site limits 2) Description, Evidence and date of corrective actions taken 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 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 2)Records of 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 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	Document 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 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 Timeframe (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 caused, 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.

NORTH CAROLINA Department of Environmental Quality — DEQ

EFFECTIVE DATE: 11/12/2020

NCG01- SELF INSPECTION

SIGNAL HILL SIGNAL HILL ROAD HENDERSONVILLE, NORTH CAROLINA	
DRAWING NO: C-353	SHEET TITLE: NCG01-1

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

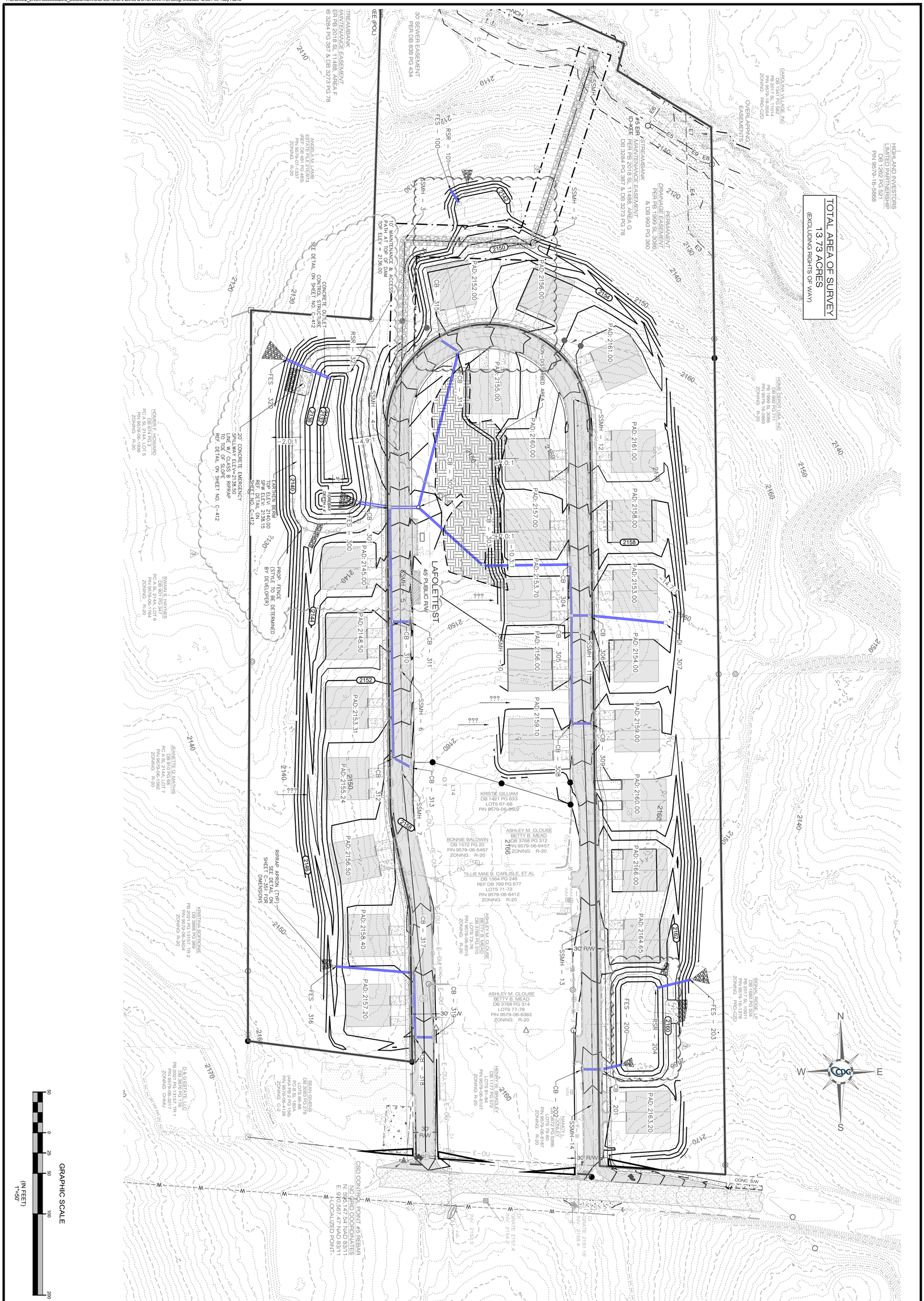
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 TOBIN M. HARRIS 05/15/2025

REVISIONS

REV.	DATE	COMMENTS
4	05/15/2025	ADDRESS ZONING COMMENTS

FIRST VICTORY
542 S.CALDWELL ST.
BREVARD
828.884.7934



SIGNAL HILL

SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: C-400

SHEET TITLE: GRADING & STORMWATER PLAN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

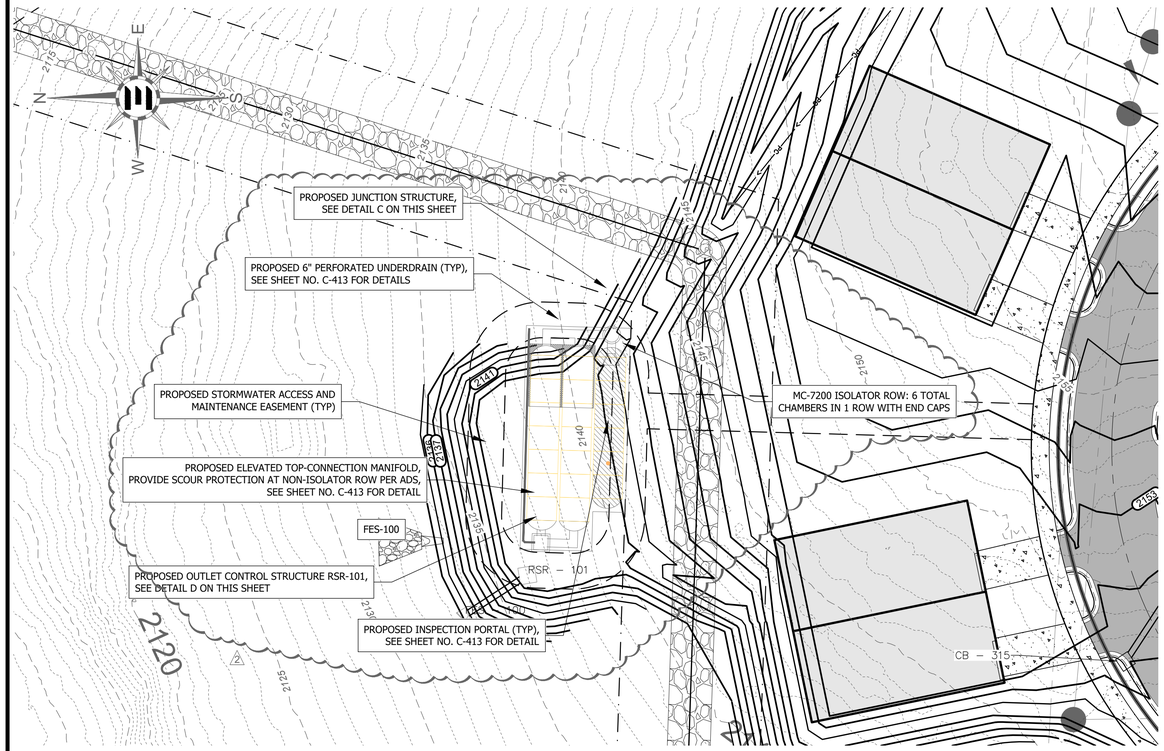
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049787 TOBY M. HARRIS 02/18/2025

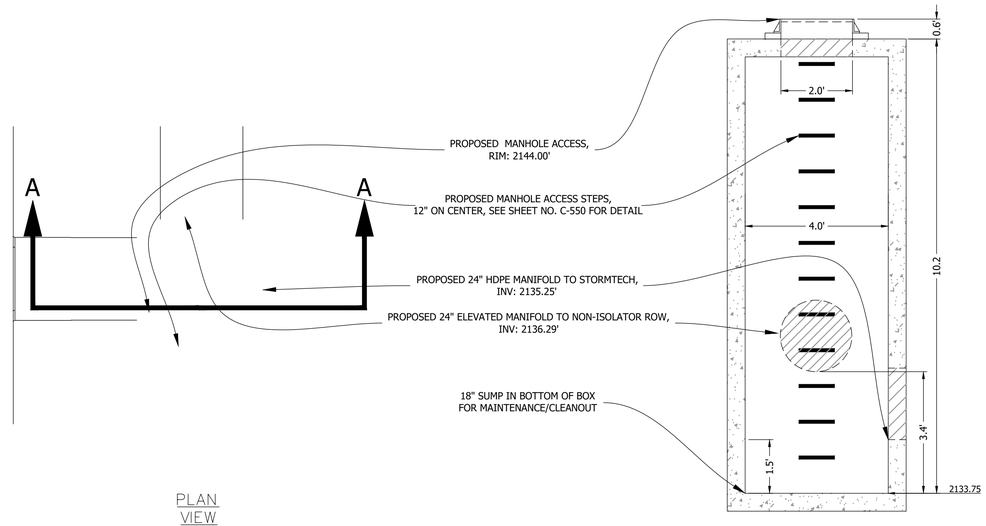
REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS
3	02/18/2025	ADDRESS CITY & COUNTY COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934



A STORMWATER SCM SYSTEM B4 - PLAN VIEW
SCALE= 1" = 20'



C ST-81: JUNCTION MANHOLE TO ISOLATOR ROW
SCALE= 1" = 2'

SCM-1	
WATER QUALITY VOL. (CF)	362
SCM TYPE)	STORMTECH MC-7200
TOTAL STORAGE (CF)	2135.00
BOTTOM OF STORAGE (')	2135.25
BOTTOM OF STORMTECH (')	2136.00
TOP OF STORMTECH (')	2141.00
TOP OF STORAGE (')	2142.00
MIN. FINISHED GRADE	2143.00
MAX FINISHED GRADE	2148.00
WQ ORIFICE SIZE (")	0.5
ELEVATED MANHOLE ELEV. (')	2144.00
FIRST OVERFLOW INV. (')	2135.00
SECOND OVERFLOW INV. (')	2135.00
THIRD OVERFLOW INV. (')	2135.00
WQV STAGE (UNROUTED)(')	2135.00
WQV STAGE (ROUTED)(')	2135.00
2-YR STAGE (')	2137.26
10-YR STAGE (')	2138.28
25-YR STAGE (')	2139.16
50-YR STAGE (')	2139.98

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

7 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 51.61' Row Length +12.0" End Stone x 2 = 53.61' Base Length

3 Rows x 100.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 28.50' Base Width

12.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 7.00' Field Height

21 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 3 Rows = 3,930.4 cf Chamber Storage

10,694.9 cf Field - 3,930.4 cf Chambers = 6,764.5 cf Stone x 40.0% Voids = 2,705.8 cf Stone Storage

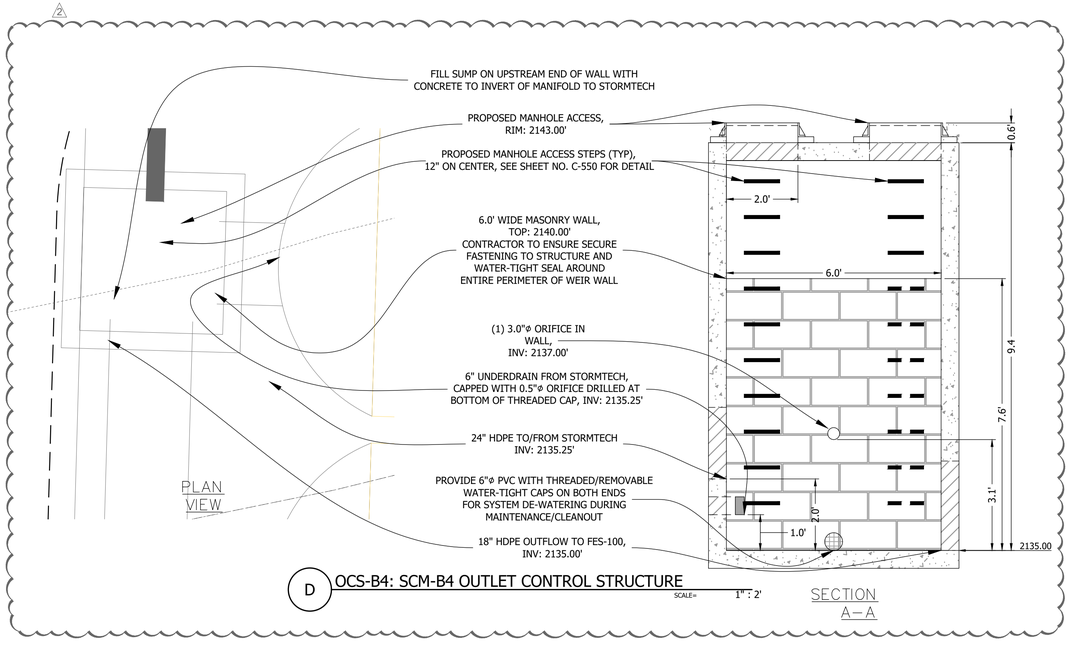
Chamber Storage + Stone Storage = 6,636.2 cf = 0.152 af
Overall Storage Efficiency = 62.1%
Overall System Size = 53.61' x 28.50' x 7.00'

21 Chambers
396.1 cy Field
250.5 cy Stone

B SCM-B2: STORMTECH MC-7200 SYSTEM SUMMARY
SCALE= NTS

STORMWATER WETLAND PLANT RECOMMENDATIONS (FROM NC DEQ MANUAL)

BOTANICAL NAME	COMMON NAME
ASCLEPIAS INCARNATA	SWAMP MILKWEED
CAREX TENERA	QUILL SEDGE
CHELONE GLABRA	WHITE TURTLEHEAD
EUPATORIADELPHUS DUBIUS	DWARF JOE PYE WEED
EUPATORIADELPHUS FISTULOSUS	JOE PYE WEED
EUPATORIADELPHUS MACULATUS	SPOTTED TRUMPETWEED
HIBISCUS COCCINEUS	SCARLET ROSE MALLOW
HIBISCUS LAEVIS	HALBERDLEAF ROSE MALLOW
KOSTELETZKYA VIRGINICA	SEASHORE MALLOW
LOBELIA CARDINALIS	CARDINAL FLOWER
LOBELIA ELONGATA	LONGLEAF LOBELIA
LOBELIA SIPHILITICA	GREAT BLUE LOBELIA
RHYNCHOSPORA COLORATA	STARRUSH WHITETOP
SACCHARUM BALDWINII	NARROW PLUMEGRASS



D OCS-B4: SCM-B4 OUTLET CONTROL STRUCTURE
SCALE= 1" = 2'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBIN M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	1" = 50'

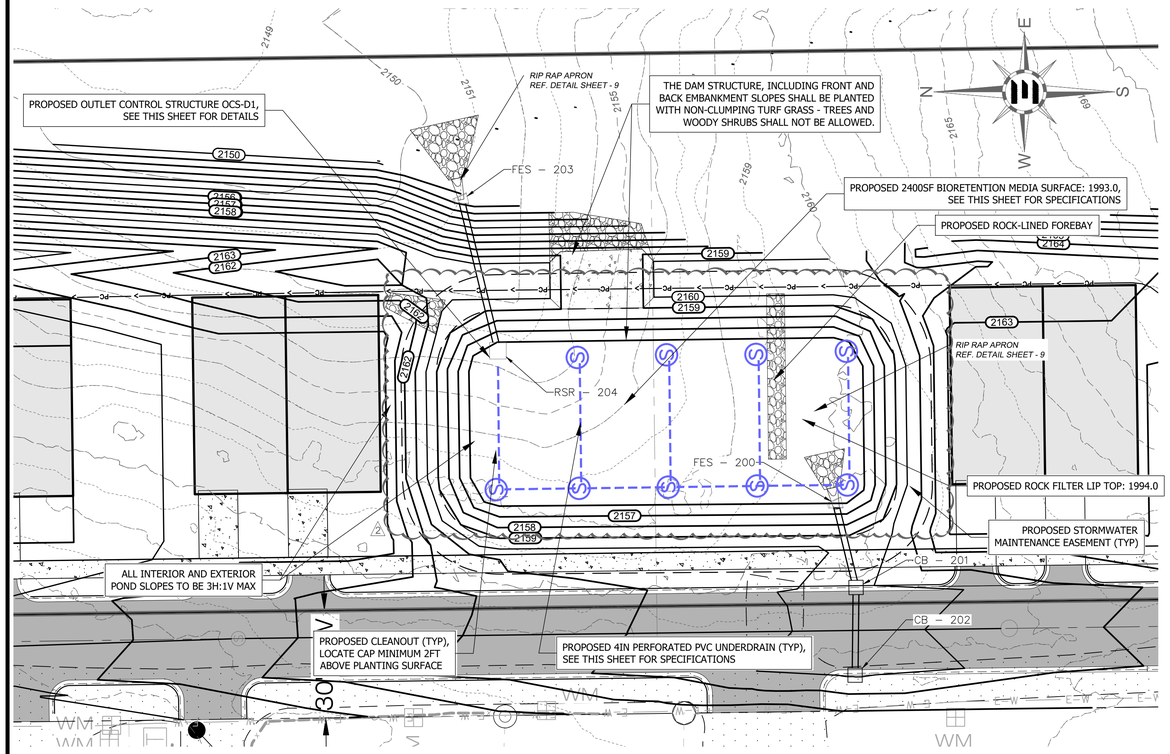
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No: C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SCM DETAIL 1

DRAWING NO: C-410

Y:\Shared\2_ENGINEERING\2023\3_DESIGN\DWG\SHEETS\SCM DETAILS.dwg, 9/9/2025 12:37 PM, Toby Harris



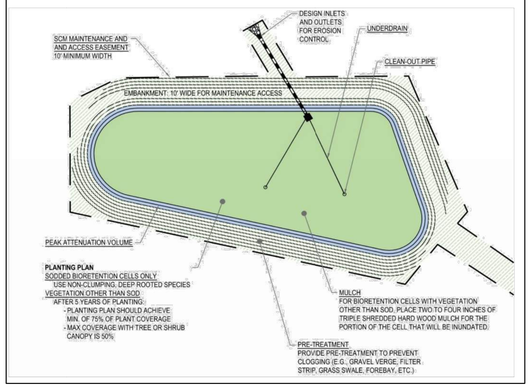
STORMWATER WETLAND PLANT RECOMMENDATIONS
(FROM NC DEQ MANUAL)

BOTANICAL NAME	COMMON NAME
ASCLEPIAS INCARNATA	SWAMP MILKWEED
CAREX TENERA	QUILL SEDGE
CHELONE GLABRA	WHITE TURTLEHEAD
EUPATORIADELPHUS DUBIUS	DWARF JOE PYE WEED
EUPATORIADELPHUS FISTULOSUS	JOE PYE WEED
EUPATORIADELPHUS MACULATUS	SPOTTED TRUMPETWEED
HIBISCUS COCCINEUS	SCARLET ROSE MALLOW
HIBISCUS LAEVIS	HALBERDLEAF ROSE MALLOW
KOSTELETZKYA VIRGINICA	SEASHORE MALLOW
LOBELIA CARDINALIS	CARDINAL FLOWER
LOBELIA ELONGATA	LONGLEAF LOBELIA
LOBELIA SIPHILITICA	GREAT BLUE LOBELIA
RHYNCHOSPORA COLORATA	STARRUSH WHITETOP
SACCHARUM BALDWINII	NARROW PLUMEGRASS

UNDERDRAIN NOTES:

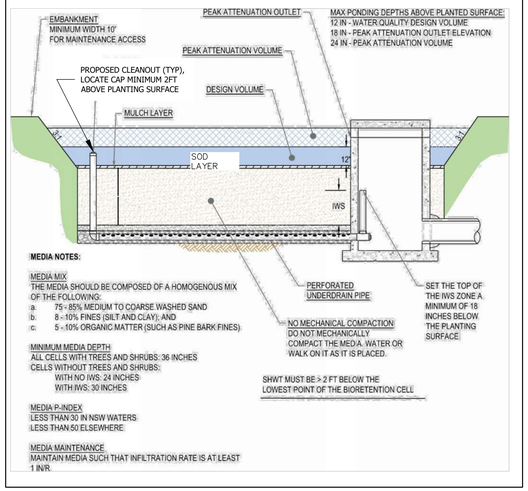
1) ALL PIPING IN THE UNDERDRAIN SYSTEM SHOULD HAVE A MINIMUM SLOPE OF 0.5% AND SHOULD BE CONSTRUCTED OF SCHEDULE 40 OR SDR-35 SMOOTH WALL PVC PIPE
2) A MINIMUM OF 4 ROWS OF PERFORATIONS SHOULD BE PROVIDED AROUND THE DIAMETER OF THE PIPE. THE PERFORATIONS SHOULD BE PLACED 6IN ON CENTER WITHIN EACH ROW FOR THE ENTIRE LENGTH OF THE DRAINAGE LATERAL. PERFORATIONS SHOULD BE 3/8IN DIAMETER.
3) UNDERDRAIN PIPES SHOULD HAVE A MINIMUM OF 3IN OF WASHED #57 STONE ABOVE AND ON EACH SIDE OF THE PIPE (NOT REQUIRED BELOW THE PIPE). ABOVE THE STONE, EITHER FILTER FABRIC OR 2IN OF CHOKING STONE SHOULD BE INSTALLED TO PROTECT THE UNDERDRAIN FROM BLOCKAGE (FILTER FABRIC SHOULD BE AVOIDED IF THERE IS ANY QUESTION ABOUT THE FUTURE STABILITY OF THE DRAINAGE AREA). ABOVE THE FILTERING DEVICE, A MINIMUM OF 2IN OF WASHED SAND SHOULD BE INSTALLED. CHOKING STONE (#8 OR #89) IN LIEU OF FILTER FABRIC IS RECOMMENDED IF THERE IS POTENTIAL FOR HIGHER SEDIMENT LOADS THAT WOULD LEAD TO CLOGGING. PIPE SOCKS ARE ALSO NOT RECOMMENDED

Figure 1: Bioretention Example: Plan View



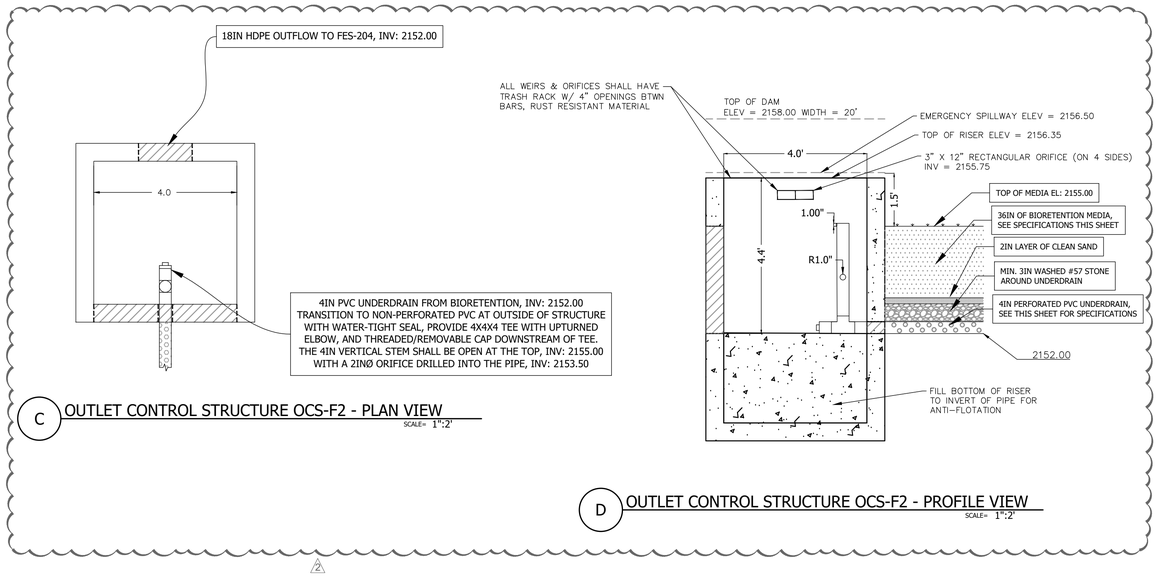
B BIORETENTION DETAILS
SCALE= NTS

Figure 2: Bioretention Example: Cross-Section



MEDIUM TO COARSE WASHED SAND SHALL BE ASTM C33, AASHTO M 6/M 80, ASTM C330, AASHTO M195, OR EQUIVALENT

THE ENTIRE SURFACE OF THE CELL WILL BE VEGETATED. SOD SHOULD BE INSTALLED WHEN GRASS IS USED FOR BIORETENTION CELLS AS SEEDING IS TYPICALLY NOT A VIABLE OPTION.



C OUTLET CONTROL STRUCTURE OCS-F2 - PLAN VIEW
SCALE= 1":2'

D OUTLET CONTROL STRUCTURE OCS-F2 - PROFILE VIEW
SCALE= 1":2'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TABITHA M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	1" = 50'

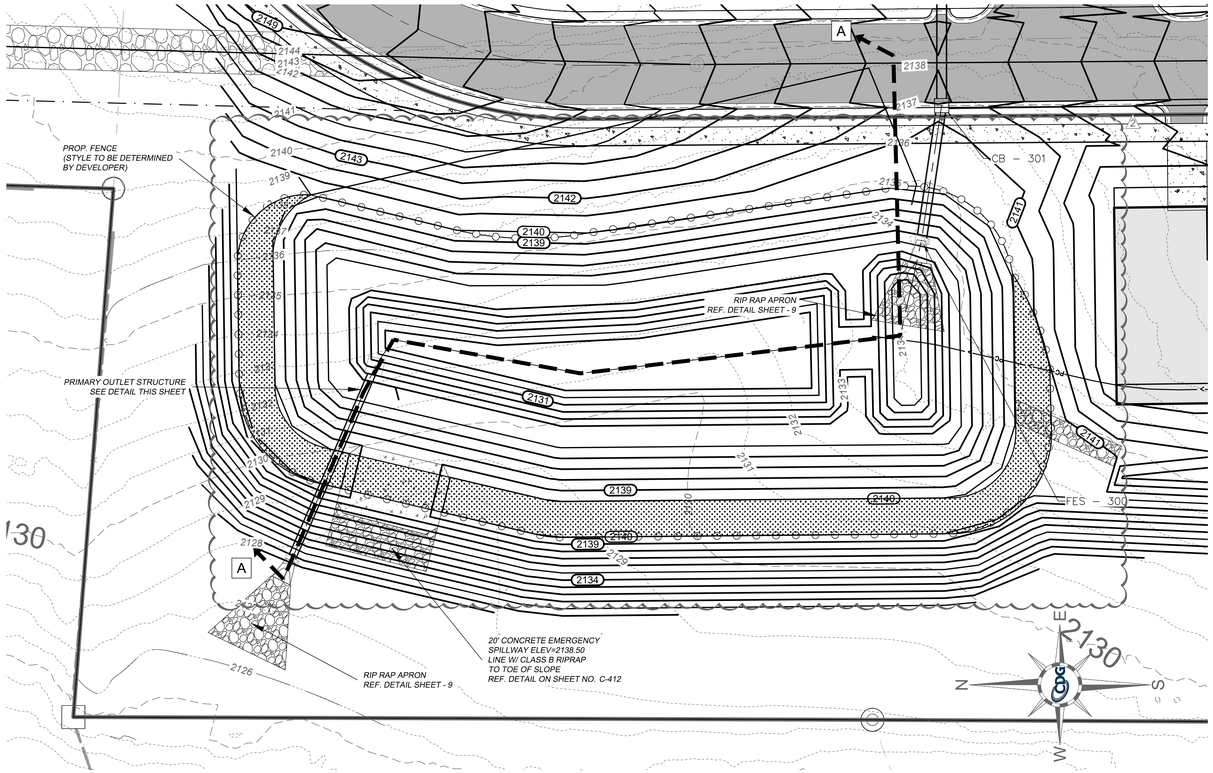
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
Licensed No. C-0973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SCM DETAIL 2

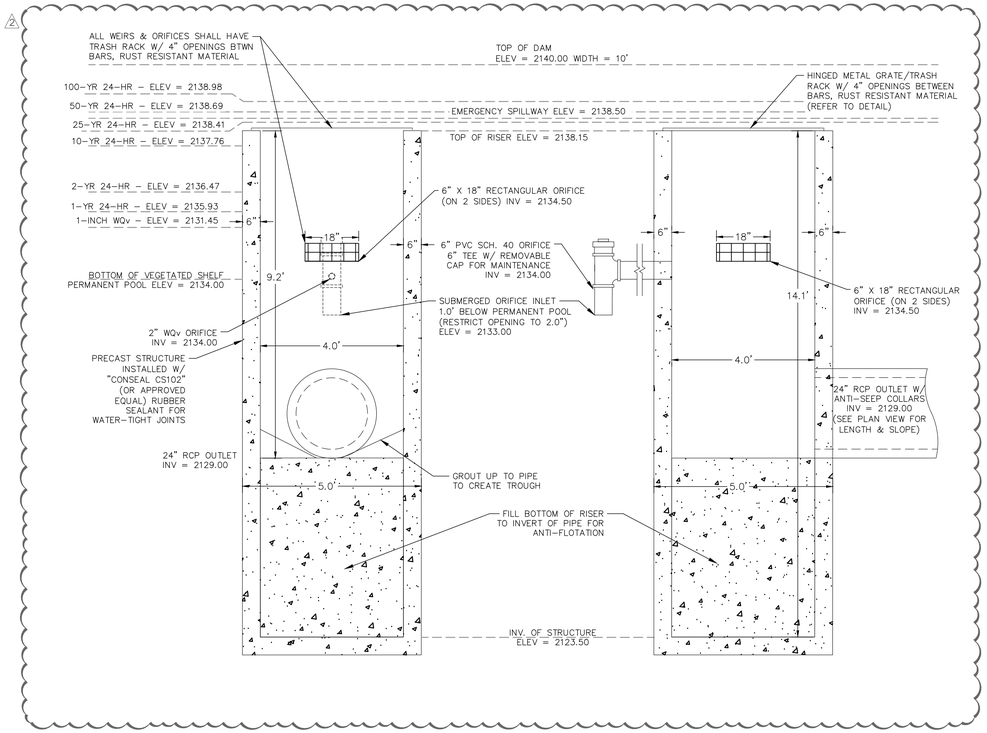
DRAWING NO: C-411

Y:\Sheets\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\SCM DETAILS.dwg, 8/9/2025 12:37 PM, Toby Harris



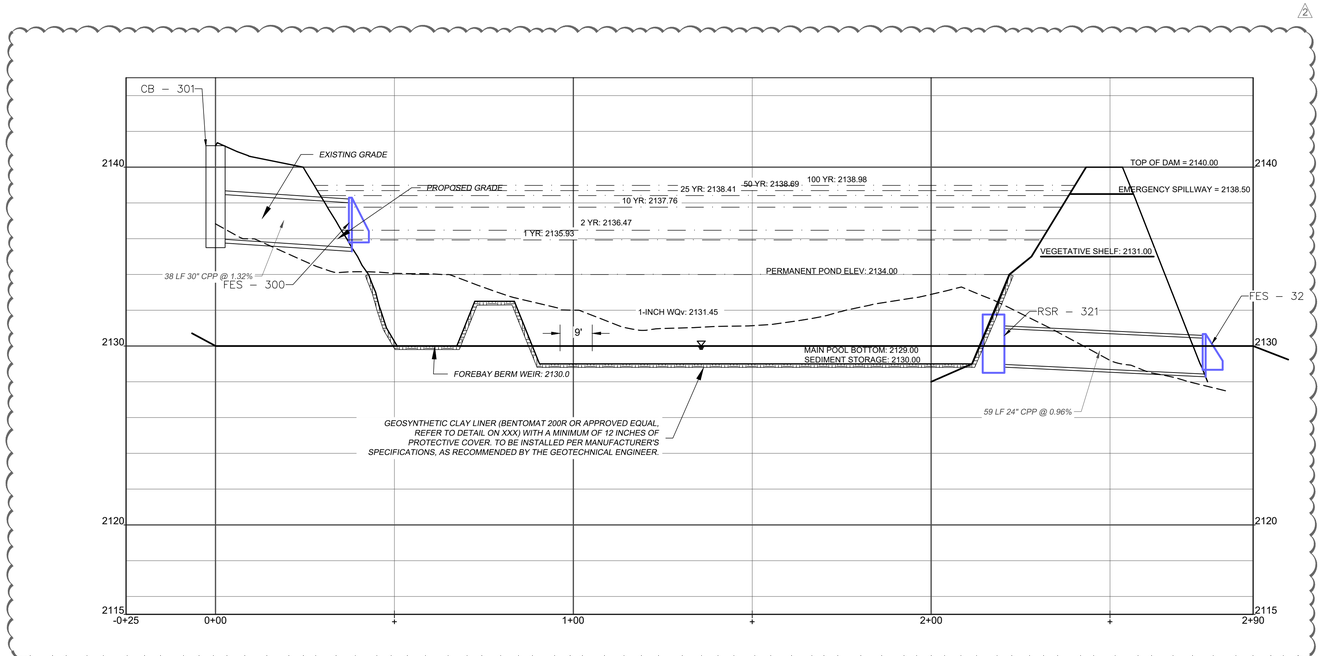
WET POND 3 PLAN VIEW

SCALE : 1" = 20'



WET POND 3
OUTLET STRUCTURE DETAIL

1" = 2'



WET POND 3 SECTION VIEW A-A

HORIZONTAL SCALE : 1" = 20'

VERTICAL SCALE: 1" = 2'

VEGETATED SHELF
0"-18" ABOVE NORMAL POOL
PLANT REQ. 50 PLANTS/200 S.F.

INTERIOR SLOPES ABOVE THE VEGETATED SHELF AND EXTERIOR EMBANKMENT SLOPES SHALL BE VEGETATED WITH NON-CLUMPING TURF GRASS. TREES & WOODY SHRUBS SHALL NOT BE ALLOWED.

MINIMUM PLANTING REQUIREMENTS (PER NCDEQ BMP MANUAL)
50 PLANTS PER 200 SF OF VEGETATED SHELF REQUIRED

AREA OF VEGETATED (LITTORAL) SHELF: *3,290 SF*

MINIMUM NUMBER OF PLANTS: *823 PLANTS*

USE THREE SPECIES EACH OF SHALLOW LAND HERBACEOUS PLANTS:
3-4 OF EA. SPECIES

PLANTS SHOULD BE SPACED APPROXIMATELY 24" - 36" ON CENTER AND SHOULD YIELD COVER IN APPROXIMATELY 1 - 2 YEARS.

STORMWATER WETLAND PLANT RECOMMENDATIONS
(FROM NC DEQ MANUAL)

BOTANICAL NAME	COMMON NAME
ASCLEPIAS INCARNATA	SWAMP MILKWEED
CAREX TENERA	QUILL SEDGE
CHELONE GLABRA	WHITE TURTLEHEAD
EUPATORIADELPHUS DUBIUS	DWARF JOE PYE WEED
EUPATORIADELPHUS FISTULOSUS	JOE PYE WEED
EUPATORIADELPHUS MACULATUS	SPOTTED TRUMPETWEED
HIBISCUS COCCINEUS	SCARLET ROSE MALLOW
HIBISCUS LAEVIS	HALBERDLEAF ROSE MALLOW
KOSTELETZKYA VIRGINICA	SEASHORE MALLOW
LOBELIA CARDINALIS	CARDINAL FLOWER
LOBELIA ELONGATA	LONGLEAF LOBELIA
LOBELIA SIPHILITICA	GREAT BLUE LOBELIA
RHYNCHOSPORA COLORATA	STARRUSH WHITETOP
SACCHARUM BALDWINII	NARROW PLUMEGRASS

NOTE: DURING EROSION CONTROL PHASES, THE 6" WATER QUALITY ORIFICE SHALL BE USED TO CONNECT THE SKIMMER TO THE OUTLET STRUCTURE. ALL OTHER WEIRS & ORIFICES, INCLUDING THE TOP GRATE, SHALL BE TEMPORARILY BLOCKED IN ORDER TO FORCE WATER FROM THE SEDIMENT BASIN THROUGH THE SKIMMER. THE EMERGENCY SPILLWAY IN THE DAM SHALL REMAIN ACTIVE THROUGH ALL STAGES OF EROSION CONTROL. ONCE EROSION CONTROL MEASURES ARE REMOVED, THE SEDIMENT BASIN SHALL BE CONVERTED TO A PERMANENT WET DETENTION POND. THE SKIMMER SHAL BE DISCONNECTED, THE WATER QUALITY DEVICE SHALL BE INSTALLED & IHEIRS SHALL BE UNCOVERED. REFER TO DETAIL SHEET FOR EROSION CONTROL DETAILS REGARDING THE SKIMMER.

WET DETENTION POND DESIGN CRITERIA
DRAINAGE AREA = 8.79 AC
IMPERVIOUS AREA = 2.18 AC (24.80%)
WATER QUALITY VOLUME = 11,245 CF

TOP OF DAM ELEV = 2140.00
TOP OF VEGETATED SHELF = 2135.00
PERMANENT POOL ELEVATION = 2134.00
BOTTOM OF FOREBAY = 2130.00
BOTTOM OF MAIN POOL = 2129.00

MAIN POOL VOLUME = 17,819 CF
FOREBAY VOLUME = 3,207 CF (18.0%)

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1"=50'

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	1" = 50'

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SCM DETAIL 3

DRAWING NO: C-412

Y:\Shared\2_ENGR\656605823\3_DESIGN\DWG\SHEETS\SCM DETAILS.dwg, 9/8/2025 12:37 PM, Toby Harris

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	
ADS SALES REP:	
PROJECT NO:	

ADS
Advanced Drainage Systems, Inc.

SiteAssist
FOR INSTALLATION INSTRUCTIONS VISIT OUR APP

SIGNAL HILL

HENDERSONVILLE, NC, USA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-7200.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (+1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75 YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418, AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR LONG-DURATION DEAD LOADS AND 1.75 FOR SHORT-DURATION LIVE LOADS, BASED ON ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE 46.33 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

©2023 ADS, INC

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONE AND ROW BY ROW backfill with excavator on the foundation stone or subgrade.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM -9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

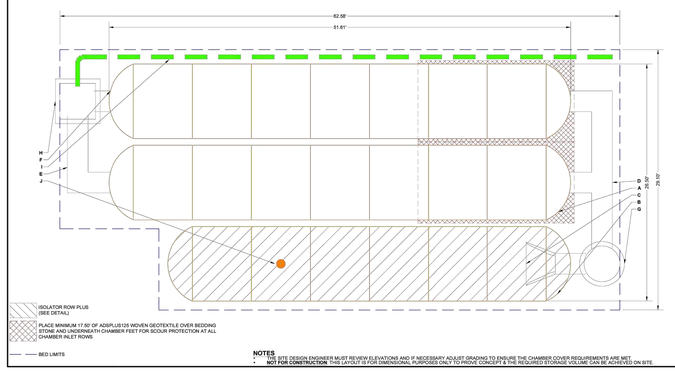
NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-7200 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT: BED 4		PROPOSED ELEVATIONS		*INVERT ABOVE BASE OF CHAMBER			
QC	STORMTECH MC-7200 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)	2148.00	PART TYPE	ITEM OR LAYER	DESCRIPTION	INVERT*
QI	STORMTECH MC-7200 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)	2143.50				MAX FLOW
X	12" (300 mm) STONE	MINIMUM ALLOWABLE GRADE (PAVED WITH ASPHALT)	2143.00	PREFABRICATED END CAP	A	24" TOP PARTIAL CUT END CAP, PART#: MC07200EPP24T / TYP OF ALL 24" TOP CONNECTIONS	23.09"
Y	6" (150 mm) BELOW SC	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT)	2143.00	PREFABRICATED END CAP	B	24" BOTTOM PARTIAL CUT END CAP, PART#: MC07200EPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	3.39"
RD	STONE DEPTH	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)	2142.00	FLAMP		24" (600 mm) FLAMP, PART#: MCFLAMP	
	INSTALLED SYSTEM VOLUME (CF)	TOP OF STONE	2142.00	MANIFOLD	D	24" CAP TOP MANIFOLD, ADS N-12	23.09"
6859	(PERIMETER STONE INCLUDED)	TOP OF MC-7200 CHAMBER	2137.09	MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"
	INSTALLED SYSTEM VOLUME	24" (600 mm) INVERT	2135.50	PIPE CONNECTION	F	24" BOTTOM CONNECTION	2.26"
1721	(PERIMETER STONE INCLUDED)	24" ISOLATOR ROW PLUS INVERT	2135.50	CONCRETE STRUCTURE	G	DESIGN BY ENGINEER / PROVIDED BY OTHERS)	6.5 CFS IN
1614	SYSTEM PERIMETER (ft)	12" (300 mm) ISOLATOR ROW PLUS INVERT	2135.50	CONCRETE STRUCTURE	H	DESIGN BY ENGINEER / PROVIDED BY OTHERS)	14.2 CFS OUT
		BOTTOM OF ADVANCED UNDERDRAIN	2135.00	NATURAL WALL PERFORATED HDPE UNDERDRAIN	I	6" (150 mm) NATURAL WALL PERFORATED HDPE UNDERDRAIN	
		HORIZONTAL INVERT	2135.00	INSPECTION PORT	J	312" SEE DETAIL	
		BOTTOM OF STONE	2135.00				



NOTES
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

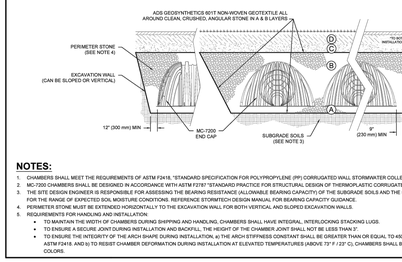
ADS TRUCKMAN BLVD ROCKY MOUNT, NC 27803 1.800.733.7473

SHEET 2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEERS PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE (9" LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[2] A-1, A-2-4, A-3 OR AASHTO M43[3] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% RELATIVE DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE (A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[1]	AASHTO M43[3] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[1]	AASHTO M43[3] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'H' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".

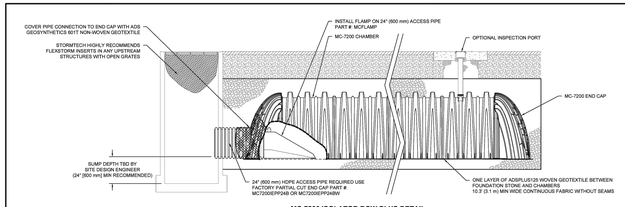


*THIS CROSS SECTION DETAIL REPRESENTS MINIMUM REQUIREMENTS FOR INSTALLATION. PLEASE SEE THE LAYOUT SHEET(S) FOR PROJECT SPECIFIC REQUIREMENTS.

NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418, AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

SHEET 4 OF 6



MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORT (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED.
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i. MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii. FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

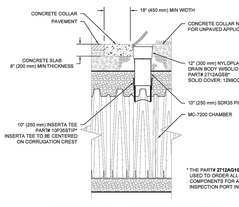
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY WATER FROM THE DOWNSTREAM MANHOLE, BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

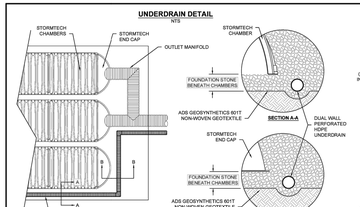
1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



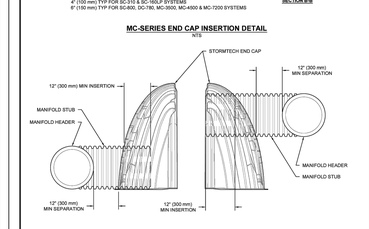
MC-7200 10" (250 mm) INSPECTION PORT DETAIL
NTS

SHEET 5 OF 6

UNDERDRAIN DETAIL
NTS

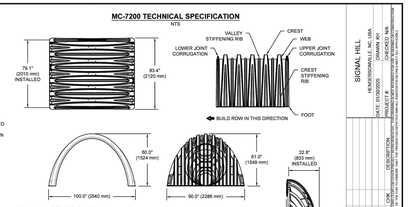


MC-SERIES END CAP INSERTION DETAIL
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-7200 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.3" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.5 CUBIC FEET	(4.96 m³)
MINIMUM INSTALLED STORAGE*	357.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	209 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.5 CUBIC FEET	(3.28 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "06"

PART #	STUB	B	C
MC7200EPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200EPP06B		---	0.86" (22 mm)
MC7200EPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200EPP08B		---	1.01" (26 mm)
MC7200EPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200EPP10B		---	1.33" (34 mm)
MC7200EPP12T	12" (300 mm)	35.89" (907 mm)	---
MC7200EPP12B		---	1.55" (39 mm)
MC7200EPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200EPP15B		---	1.70" (43 mm)
MC7200EPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200EPP18W		---	1.97" (50 mm)
MC7200EPP18B		---	
MC7200EPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200EPP24W		---	2.26" (57 mm)
MC7200EPP24B			
MC7200EPP30W	30" (750 mm)	---	2.90" (73 mm)
MC7200EPP36W	36" (900 mm)	---	3.29" (83 mm)
MC7200EPP42W	42" (1050 mm)	---	3.56" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12.04" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) SIZE ON SIZE. PLEASE NOTE THAT CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 12" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

SHEET 6 OF 6

REVISIONS			
REV.	DATE	DESCRIPTION	
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS	

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
01/31/2025

PROJECT #:	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

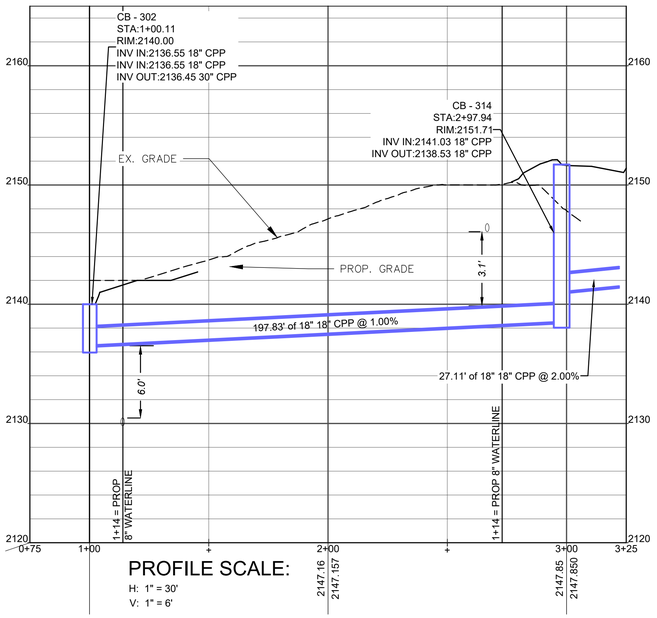
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
Licensed No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

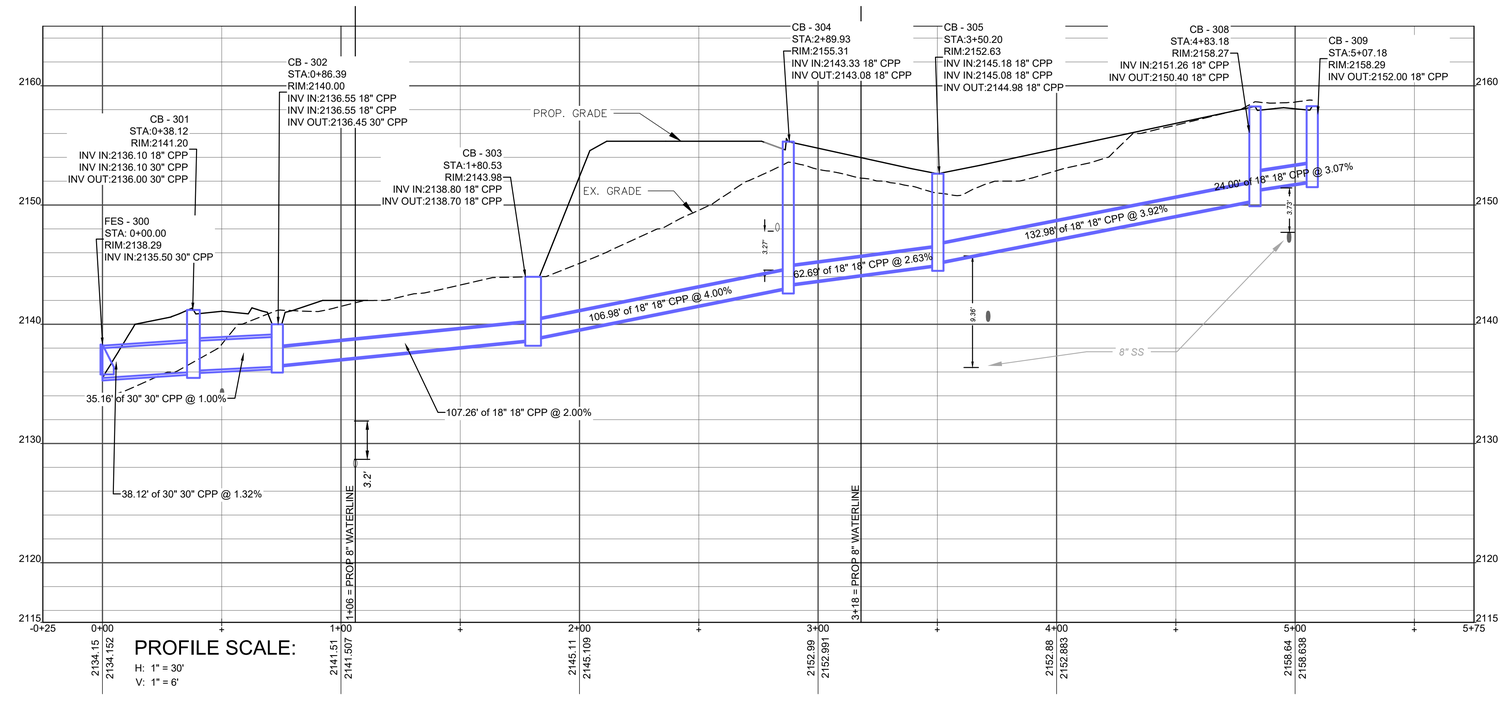
SHEET TITLE: ADS DETAILS

DRAWING NO: C-413

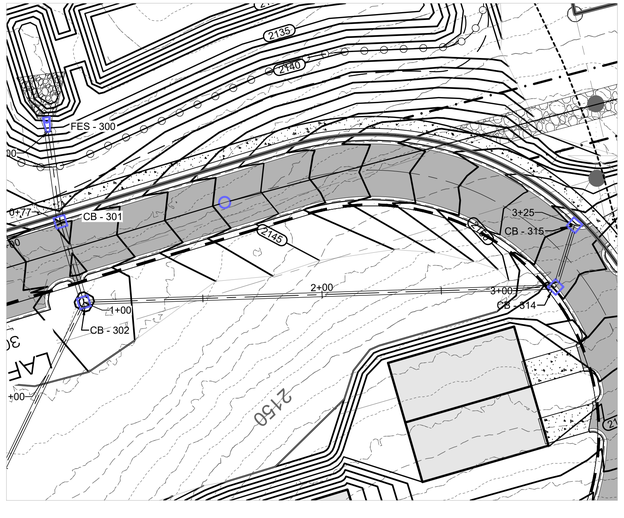
Y:\Sheet\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\SCH DETAILS.dwg 8/9/2025 12:37 PM, Toby Harris



PROFILE SCALE:
H: 1" = 30'
V: 1" = 6'



PROFILE SCALE:
H: 1" = 30'
V: 1" = 6'



GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1"=30'

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1"=30'

N
W E
S

N
W E

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/16/2024

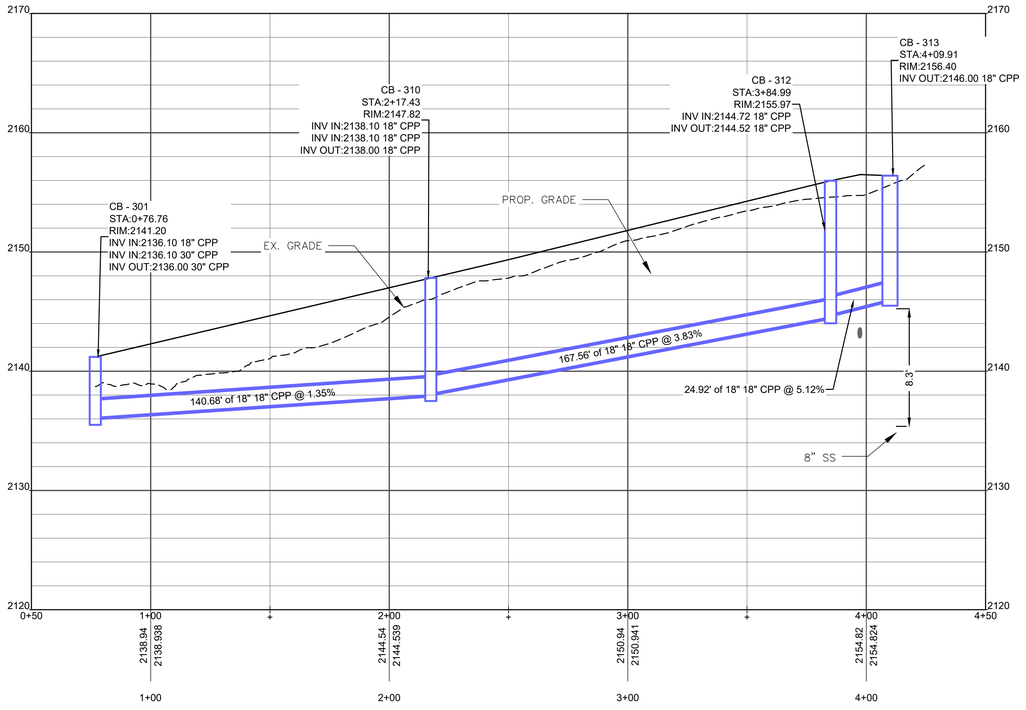
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

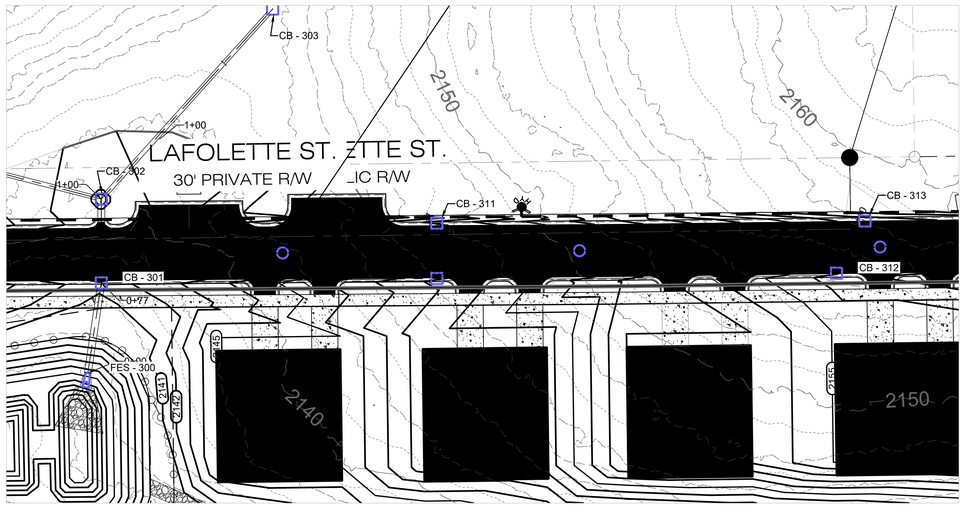
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: C-500
SHEET TITLE: STORM PLAN & PROFILE - 1

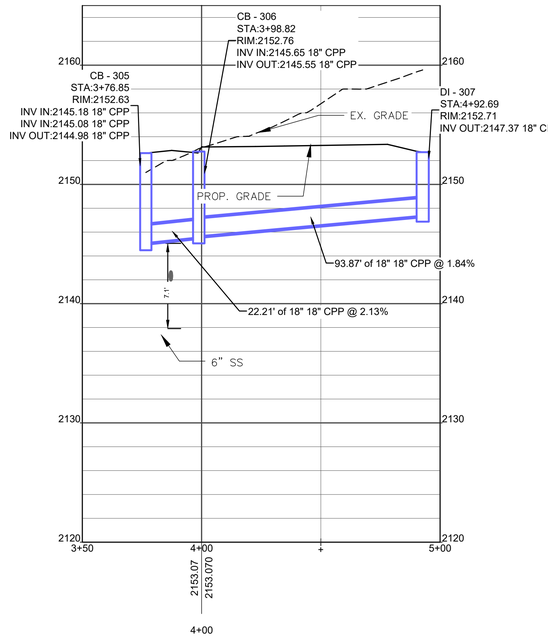
Y:\Shared\2_ENGINEERING\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE STM.dwg, 9/9/2025 12:37 PM, Toby Harris



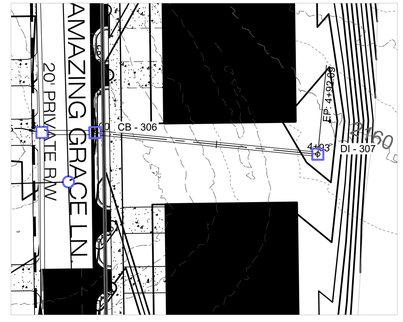
PROFILE SCALE:
H: 1" = 30'
V: 1" = 6'



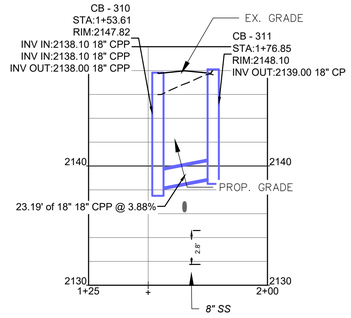
GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1"=30'



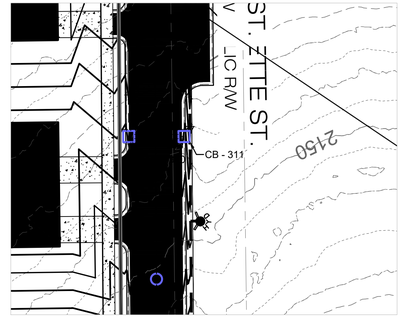
PROFILE SCALE:
H: 1" = 30'
V: 1" = 6'



GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1"=30'



PROFILE SCALE:
H: 1" = 30'
V: 1" = 6'



GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1"=30'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER ROBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

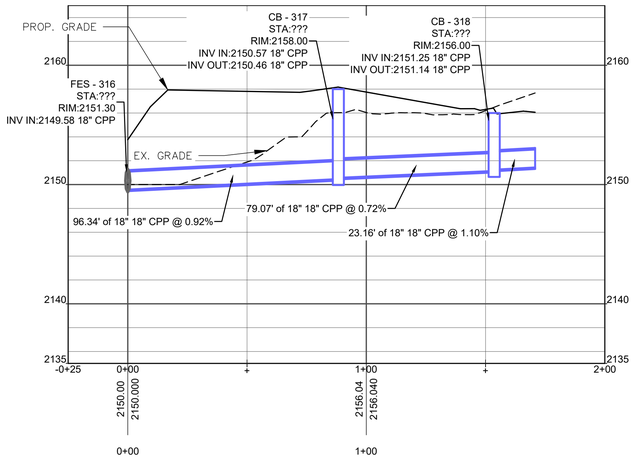
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: STORM PLAN & PROFILE - 2

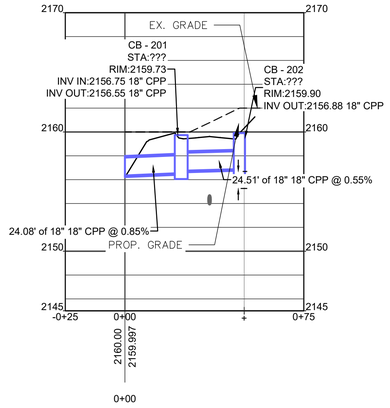
DRAWING NO: C-501

Y:\Shared\2_ENGR\656605823\5_DESIGN\CIVIL\SHEETS\PLAN PROFILE STM.dwg, 9/9/2025 12:38 PM, Toby Harris



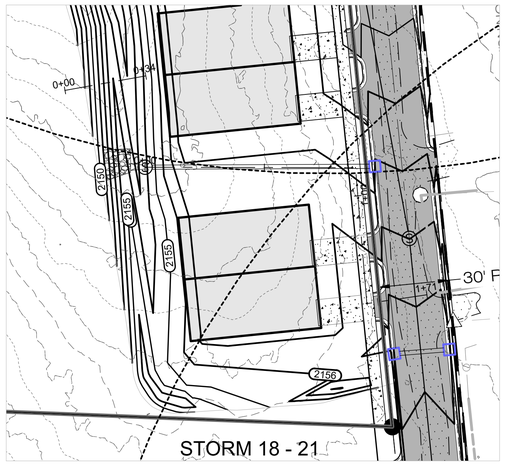
PROFILE SCALE:

H: 1" = 30'
V: 1" = 6'



PROFILE SCALE:

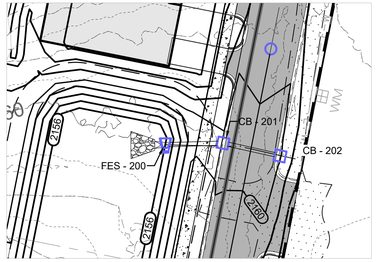
H: 1" = 30'
V: 1" = 6'



GRAPHIC SCALE

30 0 15 30 60 120

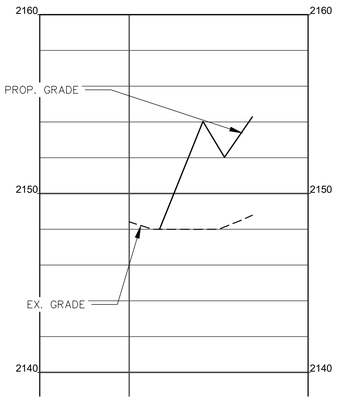
(IN FEET)
1"=30'

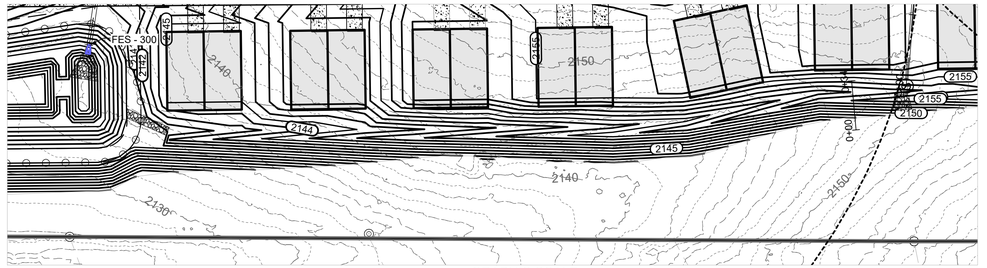


GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1"=30'





GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1"=50'

STORM CALCULATIONS

100 - NETWORK

Line No.	Line ID	Drng Area (ac)	Line Size (in)	Line Length (ft)	Line Slope (%)	Line Type	Invert Dn (ft)	Invert Up (ft)	Incr Q (cfs)	Vel Dn (ft/s)	Vel Up (ft/s)	HGL Dn (ft)	HGL Up (ft)
1	RSR-101 - FES-100	0.01	18	37.326	0.99	Cir	2134.63	2135.00	0.04	0.04	1.22	2135.41	2135.07

200 - NETWORK

Line No.	Line ID	Drng Area (ac)	Line Size (in)	Line Length (ft)	Line Slope (%)	Line Type	Invert Dn (ft)	Invert Up (ft)	Incr Q (cfs)	Vel Dn (ft/s)	Vel Up (ft/s)	HGL Dn (ft)	HGL Up (ft)
1	CB-201 - FES-200	0.34	18	37.085	0.54	Cir	2156.35	2156.55	1.23	4.13	3.81	2156.92	2157.15
2	CB-202 - CB-201	0.37	18	24.500	0.53	Cir	2156.75	2156.88	1.34	3.44	3.17	2157.16	2157.31
3	RSR-204 - FES-203	0.01	18	41.349	1.21	Cir	2151.50	2152.00	0.04	1.52	1.22	2151.56	2152.07

300 - NETWORK

Line No.	Line ID	Drng Area (ac)	Line Size (in)	Line Length (ft)	Line Slope (%)	Line Type	Invert Dn (ft)	Invert Up (ft)	Incr Q (cfs)	Vel Dn (ft/s)	Vel Up (ft/s)	HGL Dn (ft)	HGL Up (ft)
1	CB-301 - FES-300	0.21	30	62.678	1.00	Cir	2129.00	2129.63	1.06	3.83	3.83	2133.73	2133.84
2	CB-302 - CB-301	0.99	30	23.359	2.01	Cir	2129.73	2130.20	5.02	2.95	2.95	2134.19	2134.21
3	CB-303 - CB-302	0.59	18	94.448	4.83	Cir	2130.73	2135.29	2.99	4.91	6.02	2134.50	2136.43 j
4	CB-304 - CB-303	0.14	18	162.565	3.00	Cir	2137.00	2141.88	0.71	9.96	5.25	2137.59	2142.86
5	CB-305 - CB-304	0.06	18	55.000	3.00	Cir	2143.33	2144.98	0.30	9.72	5.07	2143.89	2145.91
6	CB-308 - CB-305	0.05	18	130.469	4.00	Cir	2145.18	2150.40	0.25	1.02	2.81	2145.91	2150.75 j
7	CB-309 - CB-308	0.13	18	24.532	3.02	Cir	2151.26	2152.00	0.66	5.16	2.61	2151.45	2152.30
8	CB-306 - CB-305	0.32	18	23.671	1.99	Cir	2145.08	2145.55	1.62	5.69	5.03	2145.91	2146.47
9	DI-307 - CB-306	0.84	18	86.197	2.00	Cir	2145.65	2147.37	4.26	4.28	4.51	2146.47	2148.16 j
10	CB-310 - CB-301	0.11	18	154.064	2.00	Cir	2131.26	2134.34	0.56	2.16	4.35	2134.19	2135.09 j
11	CB-312 - CB-310	0.16	18	168.026	6.00	Cir	2134.44	2144.52	0.81	1.55	3.02	2135.09	2144.92 j
12	CB-313 - CB-312	0.08	18	25.529	5.01	Cir	2144.72	2146.00	0.41	2.95	2.29	2144.92	2146.24
13	CB-314 - CB-302	0.20	18	178.583	5.71	Cir	2130.73	2140.93	1.01	1.32	3.72	2134.50	2141.51 j
14	CB-315 - CB-314	0.27	18	27.156	1.99	Cir	2141.03	2141.57	1.37	2.84	3.19	2141.51	2142.01 j
15	CB-311 - CB-310	0.58	18	23.342	2.01	Cir	2134.44	2134.91	2.94	4.03	3.99	2135.09	2135.56
16	CB-317 - FES-316	0.04	18	88.172	0.54	Cir	2148.10	2148.58	0.20	1.45	3.47	2149.10	2149.09 j
17	CB-318 - CB-317	0.21	18	57.179	0.54	Cir	2148.69	2149.00	1.06	3.71	3.39	2149.15	2149.49
18	CB-319 - CB-318	0.14	18	25.421	0.59	Cir	2149.10	2149.25	0.71	1.94	2.66	2149.49	2149.56 j
19	RSR-321 - FES-320	0.01	24	56.616	1.01	Cir	2125.43	2126.00	0.05	0.03	1.29	2126.47	2126.08

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
1	09/20/2024	ADDRESS CLIENT COMMENTS

ENGINEER'S SEAL:

09/20/2024

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-0973

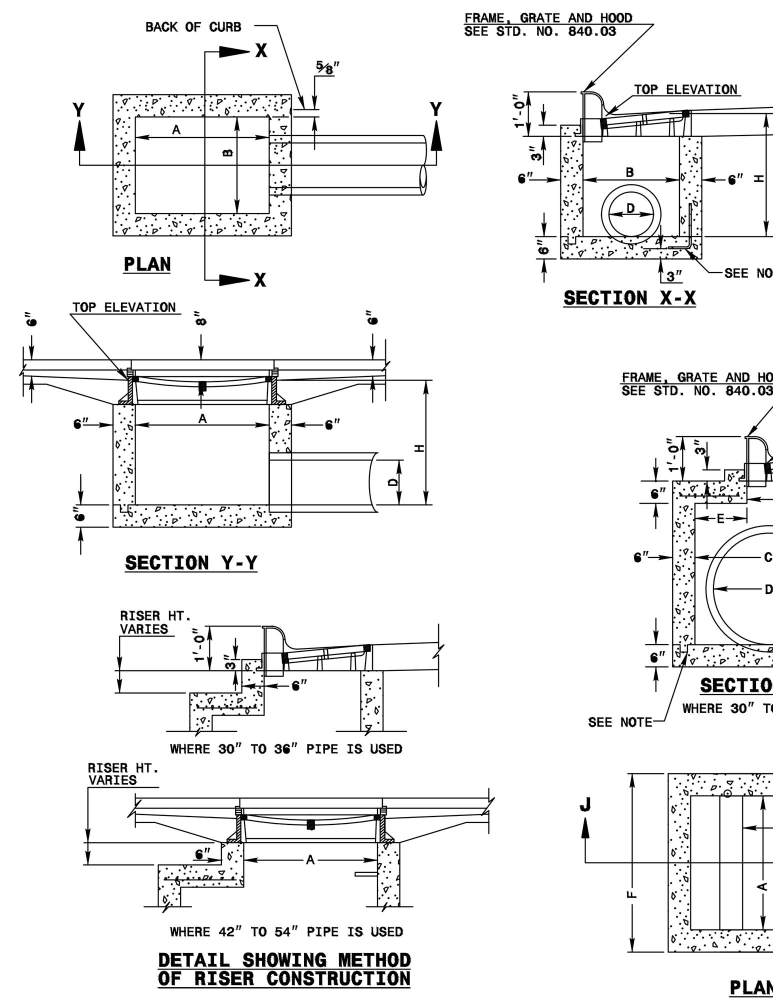
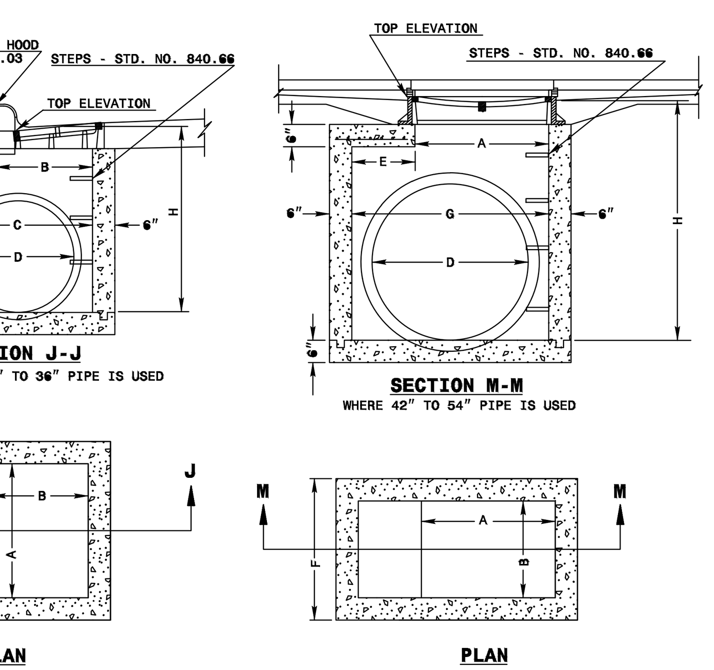
PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: STORM PLAN & PROFILE - 3

DRAWING NO: C-502

Y:\Sheets\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE STM.dwg, 9/9/2025 12:38 PM, Toby Harris

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

MAXIMUM DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 16'-0". STD. NO. 840.45 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

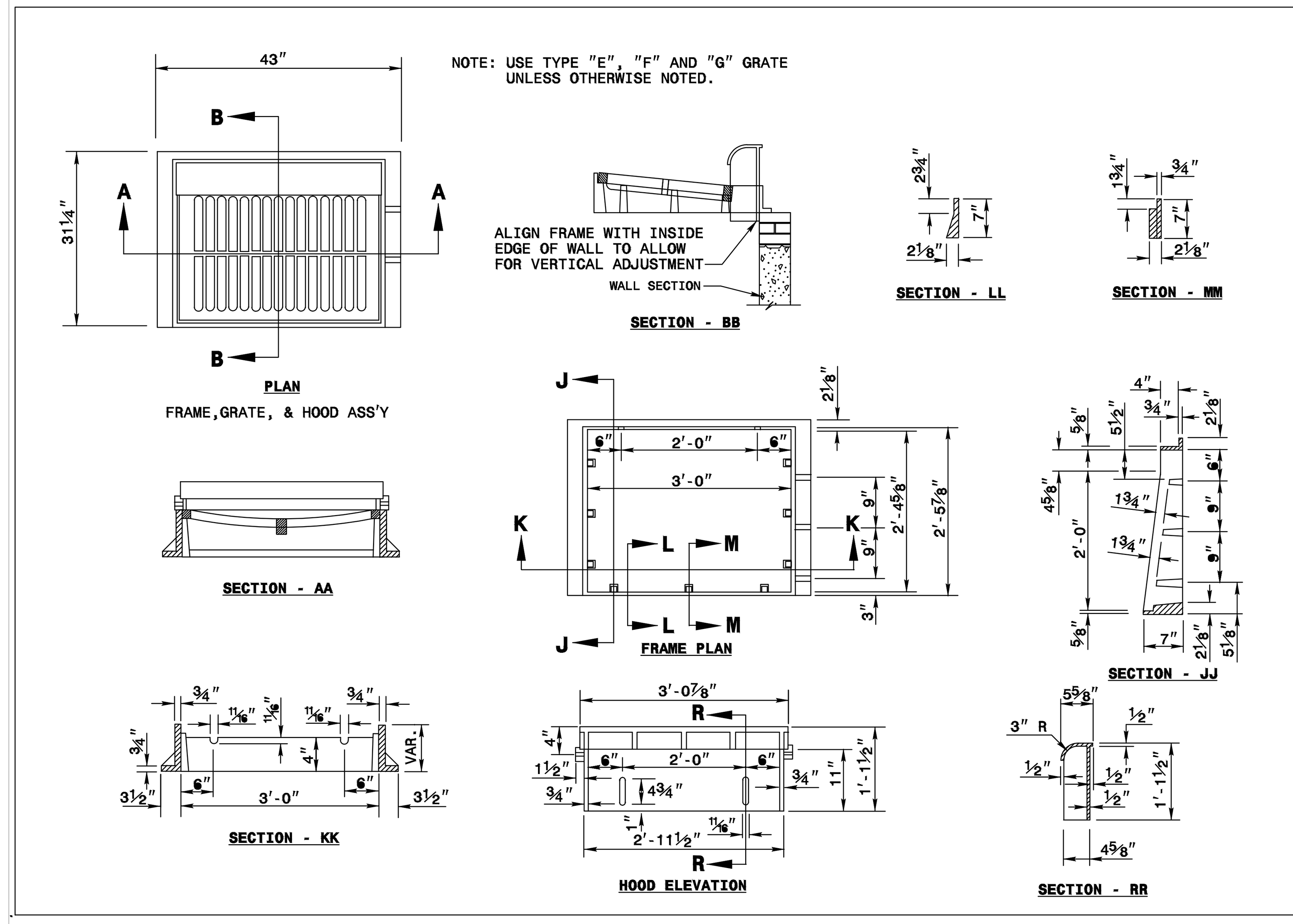
DRAWING NOT TO SCALE.

1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 1 OF 2
840.02

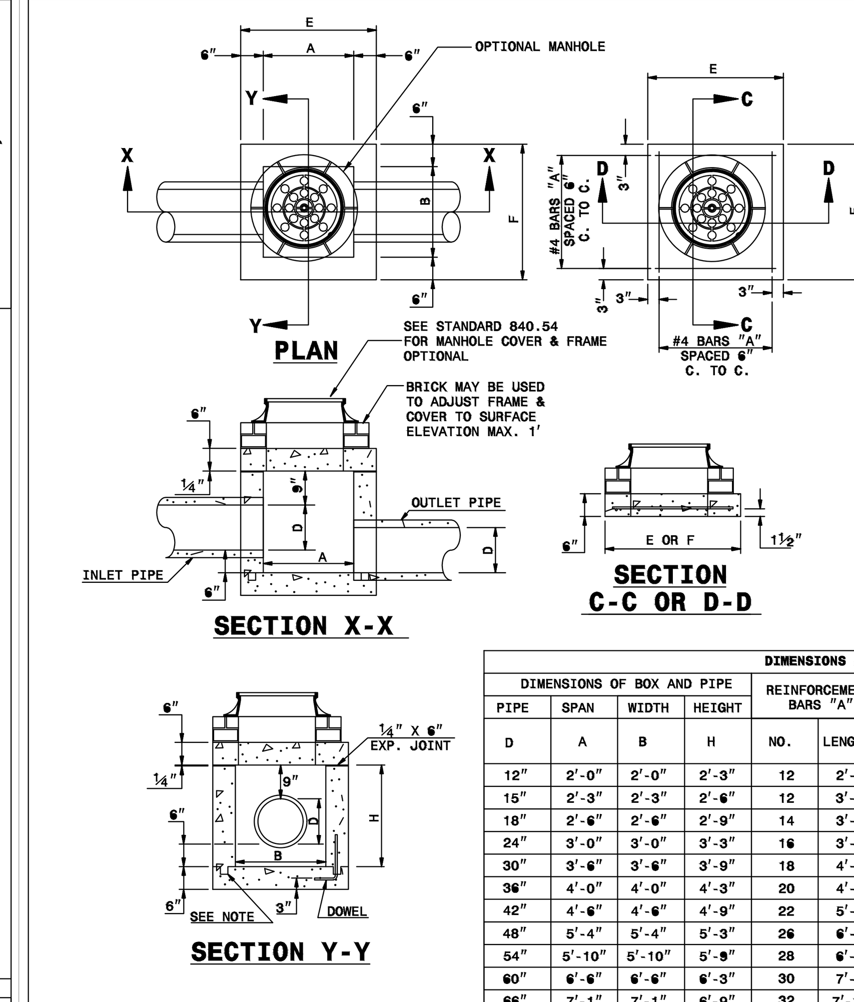
NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.



1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 1 OF 2
840.03



GENERAL NOTES:

CHAMFER ALL EXPOSED CORNERS 1".

USE CLASS "B" CONCRETE THROUGHOUT.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

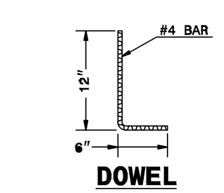
USE FORMS TO CONSTRUCT THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.

PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.

ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)

MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12'-0". STANDARD DRAWING 840.45 OR 840.46 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.



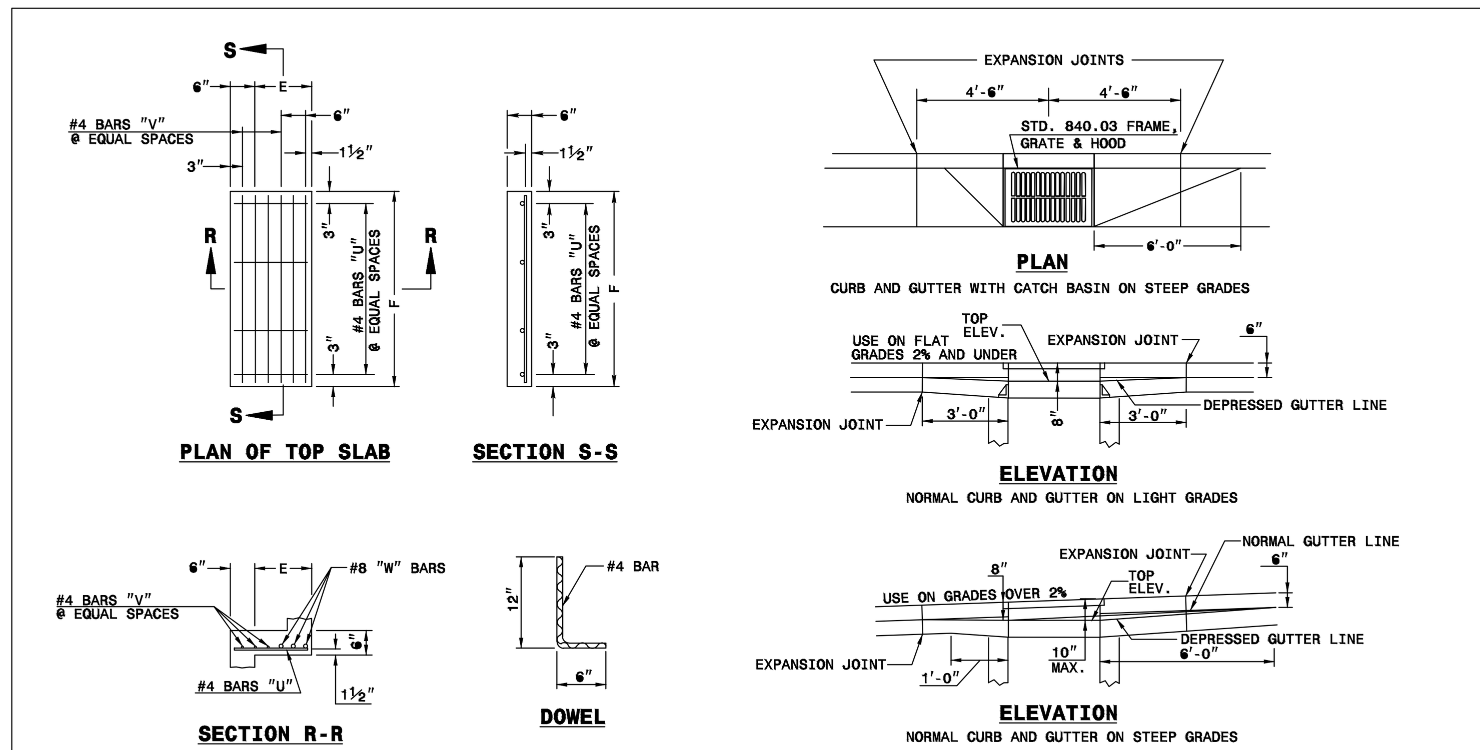
DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

PIPE D	SPAN A	WIDTH B	HEIGHT H	REINF. BARS "A" NO.	REINF. BARS "A" LENGTH	TOP SLAB E	TOP SLAB F	CU. YDS. IN BOX TOP SLAB	BOTTOM SLAB	WALL/FT. OF HT.	TOTAL LBS. REINF	TOTAL CU. YDS. MIN. "H"	DEDUCTIONS C.S.	DEDUCTIONS R.C.
12"	2'-0"	2'-0"	2'-3"	12	2'-9"	3'-0"	3'-0"	0.167	0.167	0.185	22	0.750	0.015	0.024
15"	2'-3"	2'-3"	2'-6"	12	3'-0"	3'-3"	3'-3"	0.196	0.196	0.204	24	0.902	0.023	0.036
18"	2'-6"	2'-6"	2'-9"	14	3'-3"	3'-6"	3'-6"	0.227	0.227	0.222	30	1.065	0.033	0.049
24"	3'-0"	3'-0"	3'-3"	16	3'-9"	4'-0"	4'-0"	0.296	0.296	0.259	40	1.434	0.059	0.085
30"	3'-6"	3'-6"	3'-9"	18	4'-3"	4'-6"	4'-6"	0.375	0.375	0.296	51	1.860	0.092	0.127
36"	4'-0"	4'-0"	4'-3"	20	4'-9"	5'-0"	5'-0"	0.463	0.463	0.333	64	2.341	0.132	0.178
42"	4'-6"	4'-6"	4'-9"	22	5'-3"	5'-6"	5'-6"	0.560	0.560	0.370	77	2.878	0.180	0.243
48"	5'-4"	5'-4"	5'-3"	26	6'-3"	6'-4"	6'-4"	0.743	0.743	0.407	111	3.623	0.235	0.317
54"	5'-10"	5'-10"	5'-9"	28	6'-7"	6'-10"	6'-10"	0.865	0.865	0.444	126	4.283	0.297	0.401
60"	6'-6"	6'-6"	6'-3"	30	7'-3"	7'-6"	7'-6"	1.042	1.042	0.481	145	5.090	0.367	0.495
66"	7'-1"	7'-1"	6'-9"	32	7'-10"	8'-1"	8'-1"	1.210	1.210	0.518	169	5.917	0.444	0.589

1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
CONCRETE JUNCTION BOX
12" THRU 66" PIPE

SHEET 1 OF 1
840.31



MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

PIPE D	SPAN A	WIDTH B	WIDTH C	SPAN G	MIN. HEIGHT H	COVER E	COVER F	BARS-U NO.	BARS-U LENGTH	BARS-V NO.	BARS-V LENGTH	BARS-W NO.	BARS-W LENGTH	TOTAL LBS.	TOP SLAB	BOTTOM SLAB	TOT. CONC. FOR MINIMUM HEIGHT, H	C.M.	R.C.
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	--	0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			3'-0"											0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			3'-3"											0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"											0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.123	0.321	1.433	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.738	0.180	0.243
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-2"	4	2'-10"	5	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401

(Column groups: DIMENSIONS OF BOX AND PIPE; COVER DIMENSION; BARS-U, BARS-V, BARS-W; CU.YDS. CONC. IN BOX; DEDUCTIONS ONE PIPE)

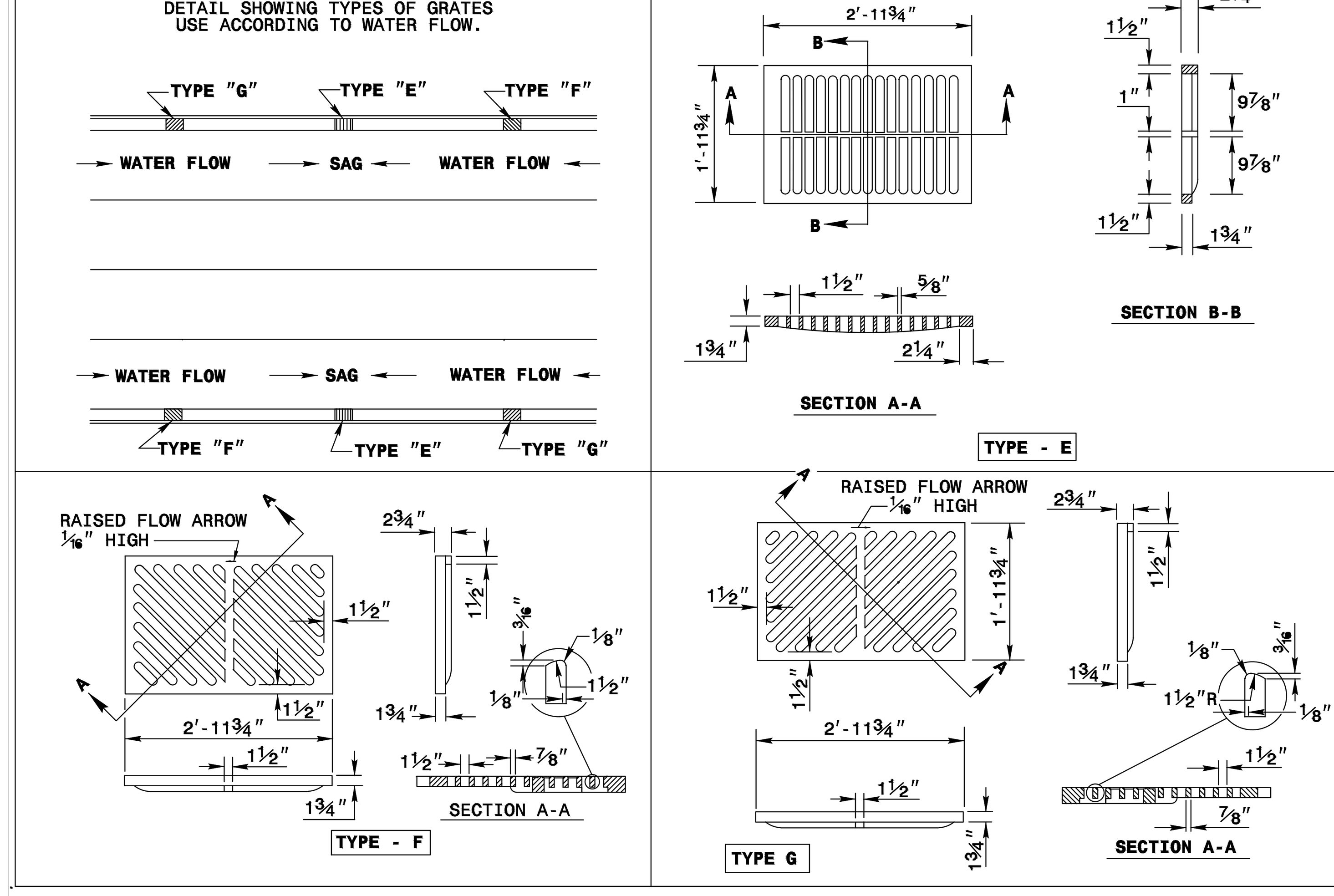
* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 2 OF 2
840.02

DETAIL SHOWING TYPES OF GRATES USE ACCORDING TO WATER FLOW.



1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 2 OF 2
840.03

GENERAL NOTES

USE 4000 PSI MINIMUM COMPRESSIVE STRENGTH CONCRETE.

USE ASTM A615 GRADE 60 REINFORCING STEEL. USE ASTM A1064 WELDED WIRE FABRIC (WWF).

FABRICATE, ASSEMBLE AND DESIGN PRECAST MANHOLE COMPONENTS ACCORDANCE WITH AASHTO M199.

ASSEMBLE RISER AND GRADE RINGS WITH THE STEPS SPACED 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.

THE HEIGHT OF GRADE ADJUSTMENT RINGS PLUS FRAME AND COVER SHALL NOT EXCEED 24".

WHERE THE MANHOLE IS EXPOSED TO ROAD TRAFFIC, CONSTRUCT THE TOP OF THE MANHOLE FLUSH WITH THE GROUND AND A MINIMUM OF 9" ABOVE THE GROUND AT OTHER LOCATIONS.

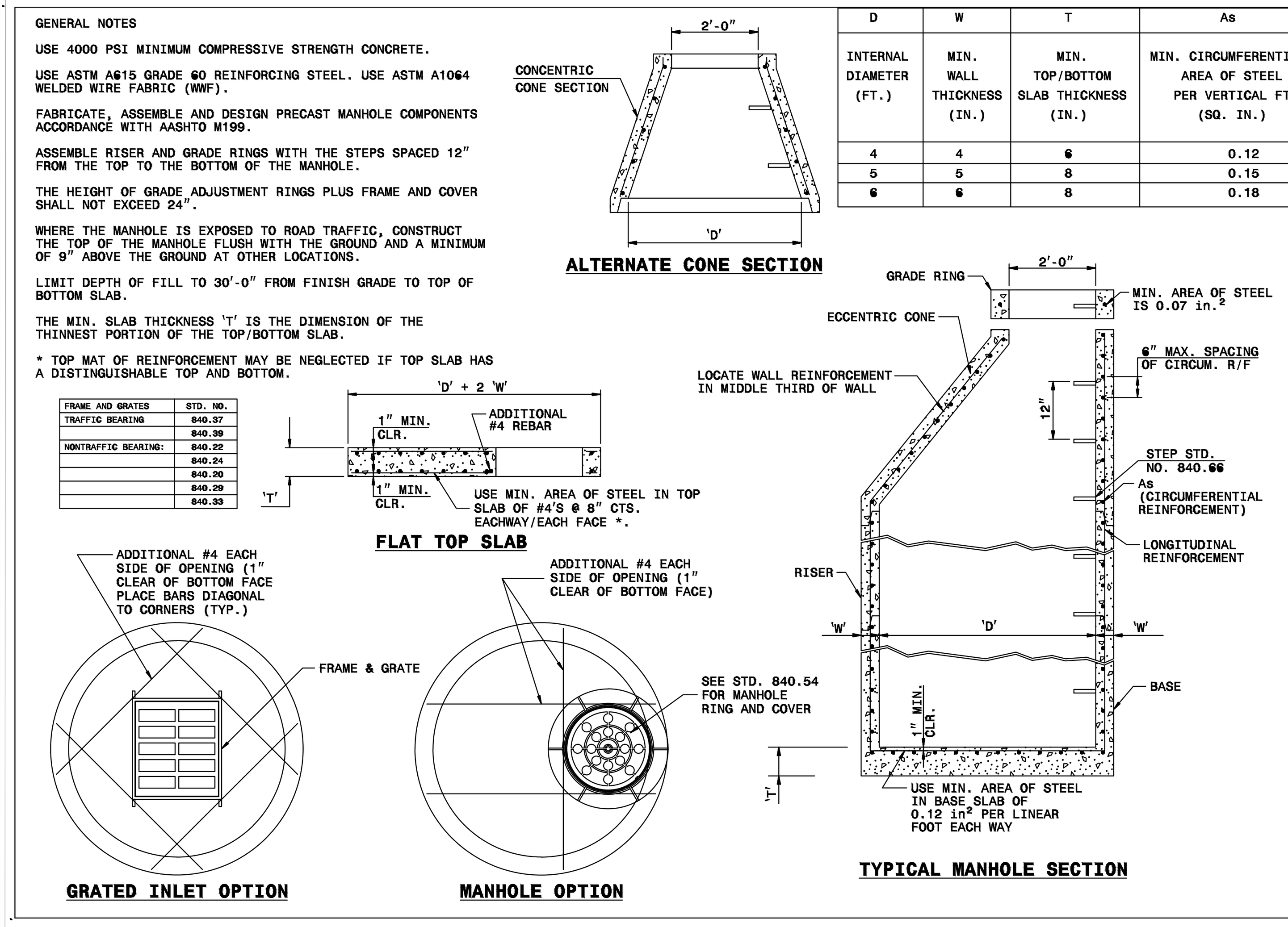
LIMIT DEPTH OF FILL TO 30'-0" FROM FINISH GRADE TO TOP OF BOTTOM SLAB.

THE MIN. SLAB THICKNESS 'T' IS THE DIMENSION OF THE THINNEST PORTION OF THE TOP/BOTTOM SLAB.

* TOP MAT OF REINFORCEMENT MAY BE NEGLECTED IF TOP SLAB HAS A DISTINGUISHABLE TOP AND BOTTOM.

FRAME AND GRATES	STD. NO.
TRAFFIC BEARING	840.37
	840.39
NONTRAFFIC BEARING:	840.22
	840.24
	840.20
	840.29
	840.33

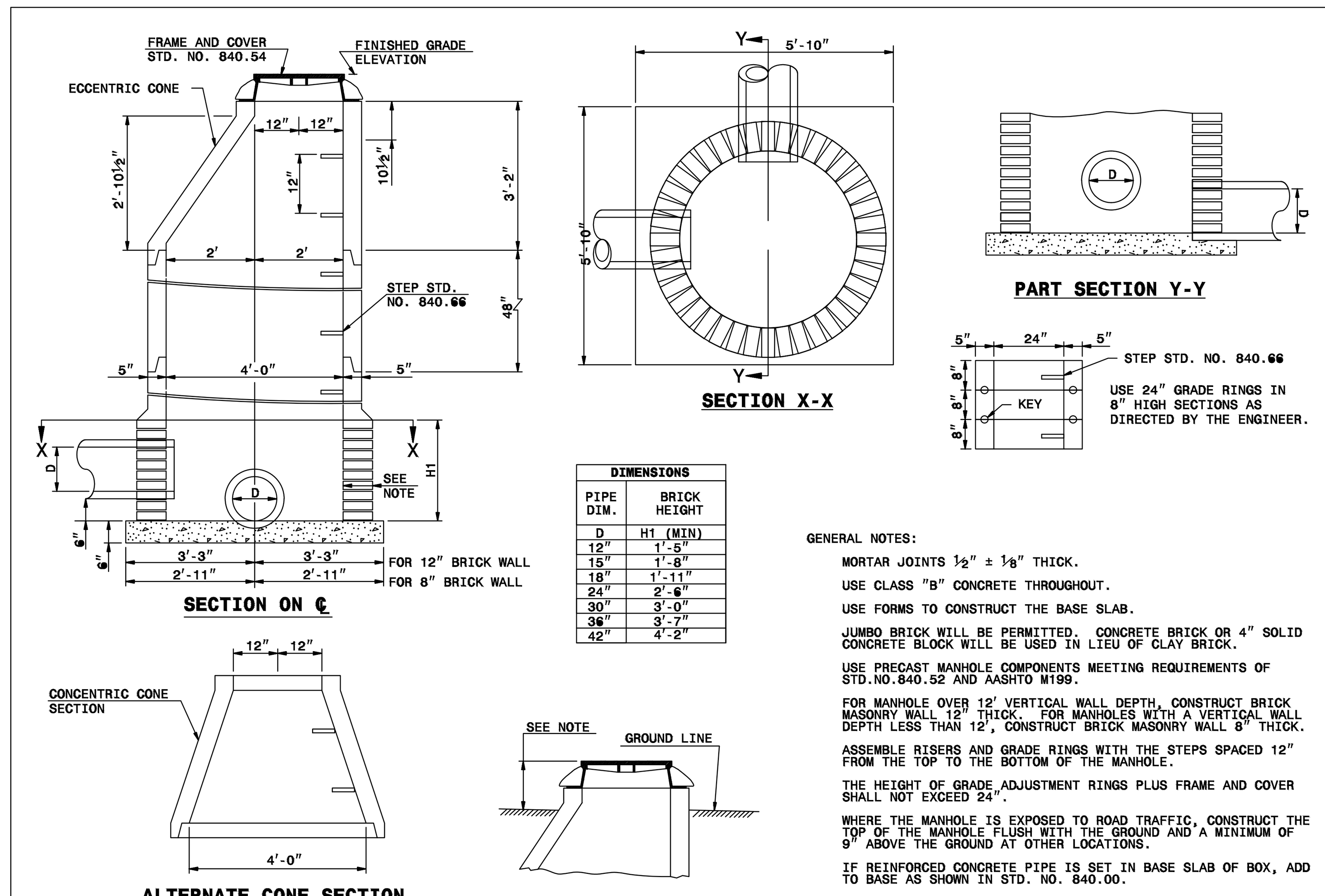
D	W	T	As
INTERNAL DIAMETER (FT.)	MIN. WALL THICKNESS (IN.)	MIN. TOP/BOTTOM SLAB THICKNESS (IN.)	MIN. CIRCUMFERENTIAL AREA OF STEEL PER VERTICAL FT. (SQ. IN.)
4	4	6	0.12
5	5	8	0.15
6	6	8	0.18



1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
PRECAST MANHOLE 4', 5', AND 6' DIAMETER
12" THRU 48" PIPE

SHEET 1 OF 1
840.52



DIMENSIONS	
PIPE DIM.	BRICK HEIGHT
D	H1 (MIN)
12"	1'-5"
15"	1'-8"
18"	1'-11"
24"	2'-6"
30"	3'-0"
36"	3'-7"
42"	4'-2"

USE 24" GRADE RINGS IN 8" HIGH SECTIONS AS DIRECTED BY THE ENGINEER.

GENERAL NOTES:

MORTAR JOINTS $\frac{1}{2}" \pm \frac{1}{8}"$ THICK.

USE CLASS "B" CONCRETE THROUGHOUT.

USE FORMS TO CONSTRUCT THE BASE SLAB.

JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4" SOLID CONCRETE BLOCK WILL BE USED IN LIEU OF CLAY BRICK.

USE PRECAST MANHOLE COMPONENTS MEETING REQUIREMENTS OF STD.NO.840.52 AND AASHTO M199.

FOR MANHOLE OVER 12' VERTICAL WALL DEPTH, CONSTRUCT BRICK MASONRY WALL 12" THICK. FOR MANHOLES WITH A VERTICAL WALL DEPTH LESS THAN 12', CONSTRUCT BRICK MASONRY WALL 8" THICK.

ASSEMBLE RISERS AND GRADE RINGS WITH THE STEPS SPACED 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.

THE HEIGHT OF GRADE ADJUSTMENT RINGS PLUS FRAME AND COVER SHALL NOT EXCEED 24".

WHERE THE MANHOLE IS EXPOSED TO ROAD TRAFFIC, CONSTRUCT THE TOP OF THE MANHOLE FLUSH WITH THE GROUND AND A MINIMUM OF 9" ABOVE THE GROUND AT OTHER LOCATIONS.

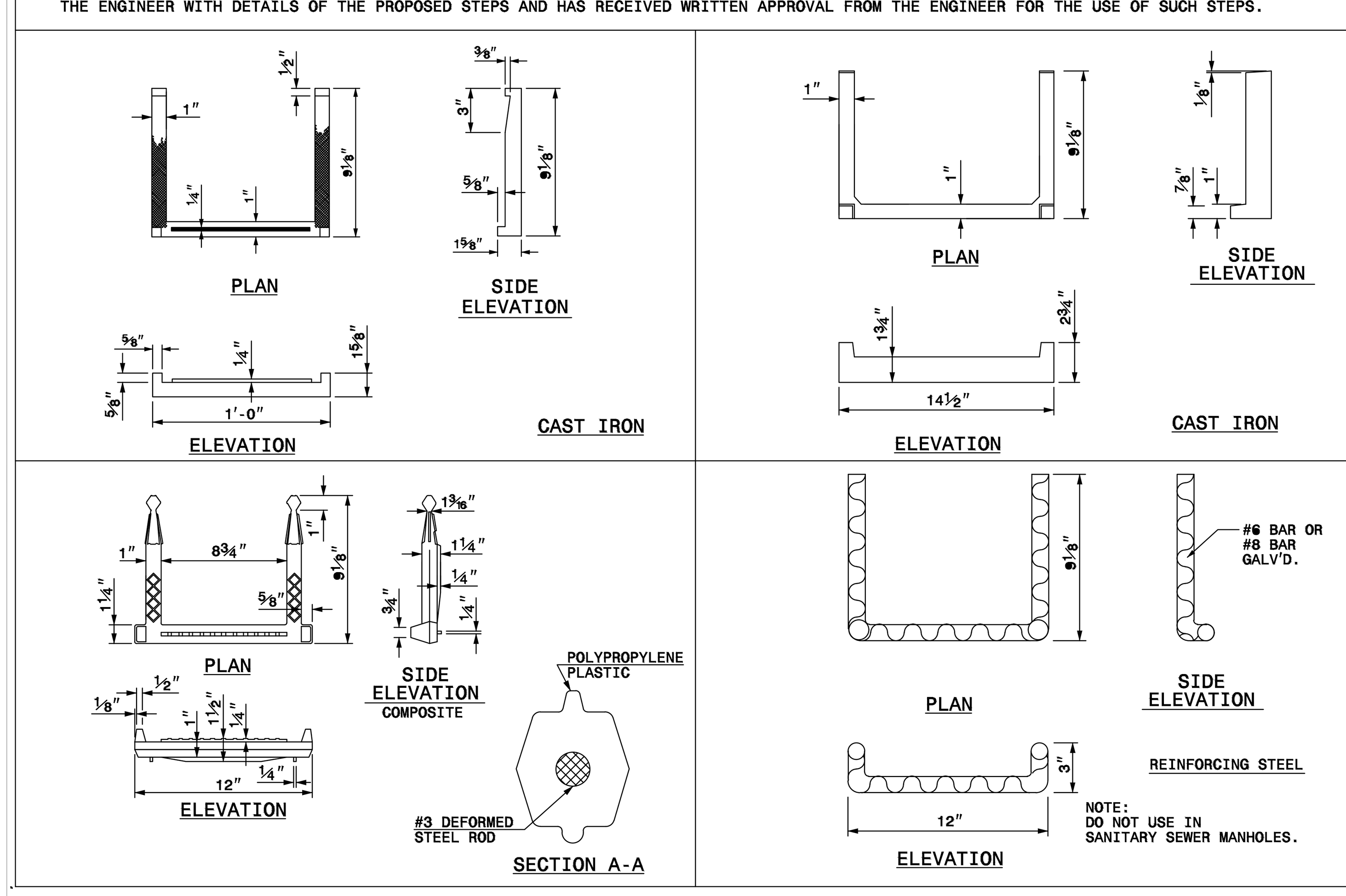
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN IN STD. NO. 840.00.

1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
PRECAST MANHOLE WITH MASONRY BASE
12" THRU 42" PIPE

SHEET 1 OF 1
840.53

NOTES:
INSTALL ALL STEPS PROTRUDING 4" FROM INSIDE FACE OF STRUCTURE WALL.
STEPS DIFFERING IN DIMENSIONS, CONFIGURATION, OR MATERIALS FROM THOSE SHOWN MAY ALSO BE USED PROVIDED THE CONTRACTOR HAS FURNISHED THE ENGINEER WITH DETAILS OF THE PROPOSED STEPS AND HAS RECEIVED WRITTEN APPROVAL FROM THE ENGINEER FOR THE USE OF SUCH STEPS.



1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
DRAINAGE STRUCTURE STEPS

SHEET 1 OF 1
840.66

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/16/2024

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

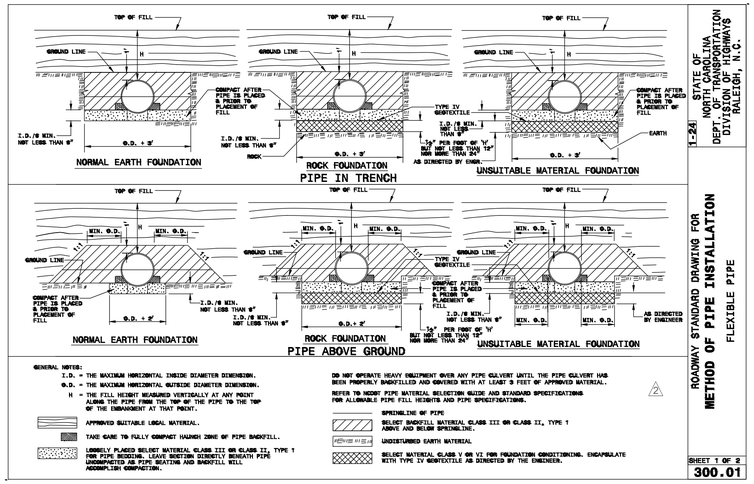
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: STORM DETAILS-1 (SHEET 1 OF 2)

DRAWING NO: C-550

Y:\Shared\2_ENG\656605823\5_DESIGN\DWG\SHEETS\STORM DETAILS.dwg 9/9/2025 12:38 PM, Toby Harris



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE BEDDING DIRECTLY BENEATH PIPE UNDISTURBED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINKLING OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINKLING.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

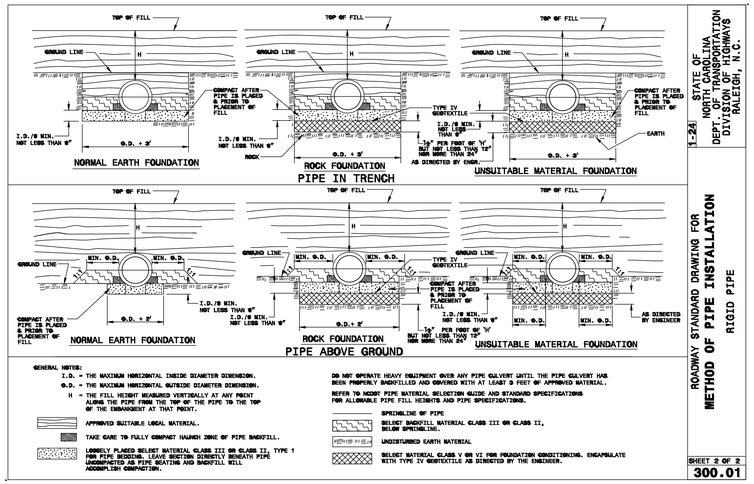
2

STATE OF NORTH CAROLINA DEPT. TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 2
300.01



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE BEDDING DIRECTLY BENEATH PIPE UNDISTURBED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINKLING OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINKLING.

UNDISTURBED EARTH MATERIAL

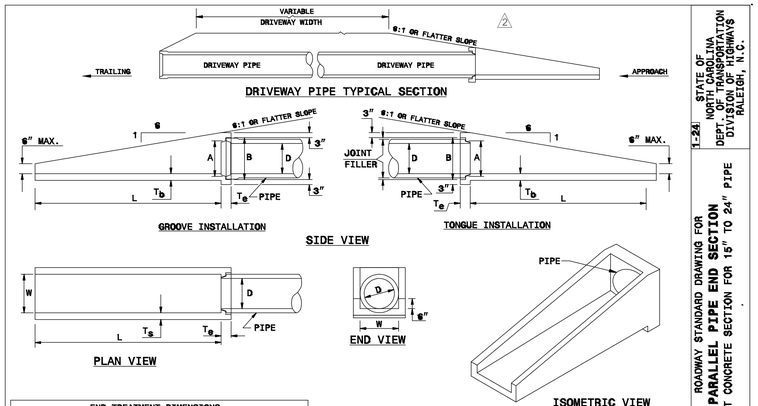
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA DEPT. TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 2
300.01



END TREATMENT DIMENSIONS							
D	L	W	T_S	T_b	T_e	A	B
15"	7'-6"	19"	4"	4"	6"	17¾"	20⅞"
18"	9'-0"	23"	4"	4"	6"	21¼"	25"
24"	12'-6"	30"	4"	4"	6"	27⅞"	32"

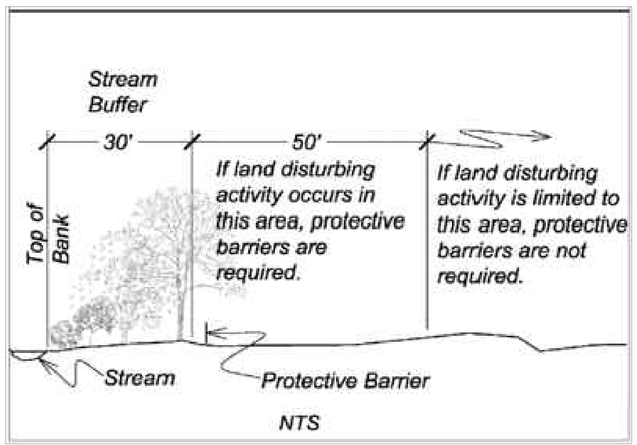
NOTES:
1. CONSTRUCT PIPE END SECTION USING #4 REBAR SPACED 9" EACH WAY AND MEET ALL REQUIREMENTS OF STD. SPEC. 310.
2. CHAMFER ALL EXPOSED CORNERS ¾".

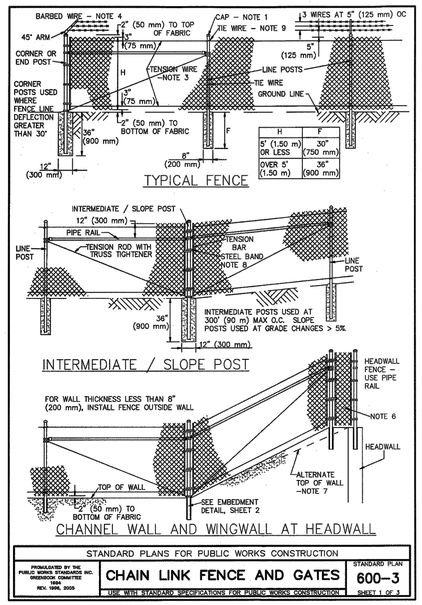
STATE OF NORTH CAROLINA DEPT. TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-24

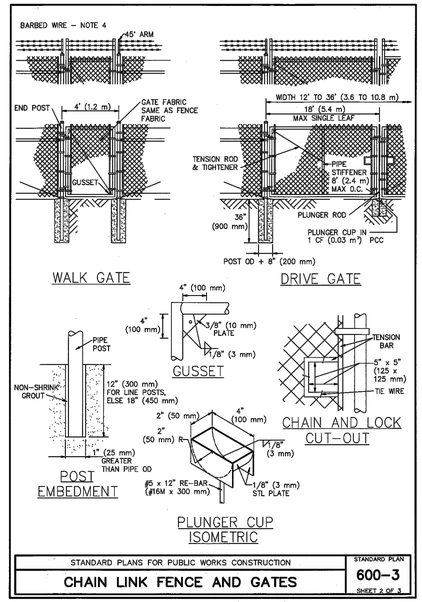
ROADWAY STANDARD DRAWING FOR
PARALLEL PIPE END SECTION
PRECAST CONCRETE SECTION FOR 15" TO 24" PIPE

SHEET 1 OF 1
310.02





STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. SPECIFICATION COMMITTEE 1998 REV. 10/98, 2009	CHAIN LINK FENCE AND GATES	STANDARD PLAN 600–3
USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION		SHEET 1 OF 3



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
CHAIN LINK FENCE AND GATES		STANDARD PLAN 600–3
		SHEET 2 OF 3

NOTES:

1. SECURE DRIVE–FIT GALVANIZED CAP TO POST WITH 1/4" (6 mm) ROUND–HEAD RIVET.
2. H DENOTES FABRIC WIDTH AND NOMINAL FENCE HEIGHT. H = 5' (1.5 m) UNLESS OTHERWISE NOTED.
3. IF FENCE WITH TOP RAIL IS SPECIFIED, DELETE STEEL TENSION WIRE AT TOP, AND PIPE RAILS AT INTERMEDIATE, SLOPE, END AND CORNER POSTS. EXTEND TENSION ROD TO TOP RAIL.
4. BARBED WIRE SHALL BE USED ONLY WHEN SPECIFIED.
5. POST SPACING IS MAXIMUM 10' (3.0 m).
6. FILL CLEAR OPENINGS GREATER THAN 3" (75 mm) WITH FABRIC. FOR OPENINGS LESS THAN 18" (450 mm), TIE FABRIC TO POSTS.
7. USE ONE POST FOR COMBINED SLOPE AND CORNER POST IF TOP OF CHANNEL WALL IS CONSTRUCTED AS SHOWN FOR "ALTERNATE".
8. STEEL BANDS AT TENSION BARS SHALL BE 1/8" x 1" (3 x 25 mm), MINIMUM, SPACED AT MAXIMUM 18" (400 mm).
9. SECURE TENSION WIRES TO EACH LINE POST WITH TIE WIRES.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		
CHAIN LINK FENCE AND GATES		STANDARD PLAN 600–3
		SHEET 3 OF 3

2

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER JUSTIN M HARRIS

ENGINEER'S SEAL: 01/31/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: C-551

SHEET TITLE: STORM DETAILS-2 (SHEET 2 OF 2)

Y:\Shared\2_ENGR\656605823_DESIGN\DWG\SHEETS\STORM DETAILS.dwg, 9/9/2025 12:38 PM, Toby Harris

ENGINEER'S NOTES:

1. A CITY OF HENDERSONVILLE PLANNING AND ZONING APPROVAL IS REQUIRED BEFORE A CITY OF HENDERSONVILLE UTILITY PLAN APPROVAL CAN BE ISSUED.
2. THE SPECIFICATIONS AND REQUIREMENTS OF THE CITY OF HENDERSONVILLE (COH) WATER AND SEWER DEPARTMENT SUPERSEDE ALL OTHERS IN THE INSTALLATION OF THE PROPOSED WATER EXTENSION.
3. FOR PROPOSED PUBLIC UTILITIES ON PROPERTY NOT OWNED BY THE DEVELOPER, EASEMENT FROM THE PRIVATE PROPERTY OWNER MUST BE PROVIDED PRIOR TO PLAN APPROVAL.
4. THE COH WATER AND SEWER DEPARTMENT MAINTENANCE OF WATER SYSTEMS ENDS AT THE METERS FOR THE SERVICES (ALL FIRE HYDRANTS SHALL BE MAINTAINED/ OWNED BY THE COH WATER AND SEWER DEPARTMENT). ALL WATER METERS SHALL BE LOCATED INSIDE THE ROAD RIGHT-OF-WAY.
5. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION, SIZE, AND MATERIAL OF ALL EXISTING UTILITIES.
6. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE TAPS, CONNECTIONS, SHUTDOWNS AND METER REQUEST WITH THE COH WATER AND SEWER DEPARTMENT.
7. THE CONSTRUCTION SITE MUST BE PROPERLY SIGNED AND SECURED TO LIMIT ACCESS FOR NON-CONSTRUCTION PERSONNEL.
8. DURING NON-WORKING HOURS, THE SITE SHOULD BE SECURED SO THAT NO OPEN TRENCHES OR OTHERS HAZARDS ARE ACCESSIBLE.
9. ANYWHERE "RESTRAINED JOINT" PIPING IS SHOWN OR REQUIRED BY THE COH WATER AND SEWER DEPARTMENT, THE CONTRACTOR HAS THE OPTION TO USE MEGA-LUGS, FIELD LOCK GASKETS OR ACTUAL RESTRAINED JOINT PIPE.
10. THE COH WATER AND SEWER DEPARTMENT SHALL HAVE THE RIGHT TO ACCESS ALL PUBLICLY OWNED WATER METERS.
11. ALL BACKFLOW PREVENTION DEVICES MAKE AND MODEL SHALL BE USC APPROVED, LEAD FREE, AND ARE TO BE REVIEWED AND APPROVED BY THE CITY ENVIRONMENTAL COMPLIANCE COORDINATOR (EERWIN@HVLNC.GOV).
12. 10 FT OF EASEMENT ON BOTH SIDES OF THE PROPOSED MAIN IS REQUIRED. IT IS THE RESPONSIBILITY OF THE DEVELOPER TO ACQUIRE AND DEDICATE ALL REQUIRED UTILITY EASEMENTS.
13. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING COH INSPECTIONS WHEN WORK IS BEING PERFORMED AND THE SCHEDULING OF ALL INSPECTIONS.
14. ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE PUBLISHED STANDARDS OF THE RESPONSIBLE JURISDICTION.
15. UNLESS OTHERWISE NOTED ON THESE PLANS OR APPROVED BY THE COH WATER & SEWER DEPARTMENT, ALL PROPOSED PUBLIC WATER MAINS SHALL BE INSTALLED WITH A MINIMUM OF 3FT OF COVER.
16. ALL WATER TESTING SHOULD BE SCHEDULED USING THE CITY OF HENDERSONVILLE ONLINE FORM.
17. ALL NEW PUBLIC WATER MAINS FOR THIS PROJECT SHALL BE EQUIPPED WITH WITH RESTRAINED JOINTS UNLESS OTHERWISE APPROVED BY THE CITY OF HENDERSONVILLE WATER INSPECTOR.
18. THE CITY OF HENDERSONVILLE'S OWNERSHIP OF THE WATER SYSTEM ENDS IMMEDIATELY BEHIND EACH SERVICE METER.
19. THE CITY OF HENDERSONVILLE'S OWNERSHIP OF THE SEWER SYSTEM ENDS IMMEDIATELY AT THE SERVICE LATERAL CLEAN OUT.
20. THE JUMPER CANNOT BE INSTALLED UNTIL THE WATER LINE IS READY FOR TESTING.
21. NO MORE THAN A TOTAL OF THREE (3) INCOMING LINES AND ONE OUTGOING LINE WILL BE ALLOWED IN ANY MANHOLE INCLUDING SERVICE LINES.
22. ALL EXISTING SUB-SURFACE UTILITIES IDENTIFIED ON THE CONSTRUCTION DOCUMENTS ARE SHOWN IN THEIR APPROXIMATE LOCATION BASED ON SURVEY INFORMATION GATHERED FROM FIELD INSPECTION AND/OR ANY OTHER APPLICABLE RECORD DRAWINGS WHICH MAY BE AVAILABLE. DEPTHS OF EXISTING UTILITIES SHOWN IN PROFILE VIEWS ARE BASED ON STANDARD ASSUMPTIONS. THE CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATION, DEPTH, SIZE AND MATERIAL OF ANY AND ALL SUB-SURFACE CONDITIONS REFERENCED IN THESE PLANS PRIOR TO ANY EXCAVATION OR CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES OR CONFLICTS.
23. THE CONTRACTOR SHALL NOT PROCEED WITH ANY WORK INSIDE THE PUBLIC RIGHT OF WAY PRIOR TO RECEIPT AND COMPLIANCE WITH ALL APPLICABLE NCDOT PERMITS. ADDITIONALLY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY FLAGGERS AND TRAFFIC CONTROL DURING ALL WORK INSIDE THE PUBLIC RIGHTS OF WAY.
24. ELEVATIONS OF UTILITIES ARE GIVEN TO THE EXTENT OF INFORMATION AVAILABLE. WHERE ELEVATIONS ARE NOT GIVEN AT POINTS OF EXISTING UTILITY CROSSINGS, SUCH ELEVATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND REPORTED TO THE ENGINEER, WHEN UNKNOWN LINES ARE EXPOSED, THEIR LOCATIONS AND ELEVATIONS SHALL ALSO BE REPORTED TO THE ENGINEER.
25. CONTRACTOR IS RESPONSIBLE FOR RELOCATING ANY APPLICABLE CONFLICTING UTILITIES NECESSARY TO COMPLETE SERVICE INSTALLATIONS.
26. AS-BUILT DOCUMENTATION REQUIREMENTS: PRIOR TO APPROVAL FROM LOCAL JURISDICTION OR ENGINEER THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS (IN BOTH PAPER AND ELECTRONIC FORMAT (CAD / PDF) PREPARED AND SEALED BY A PROFESSIONAL LAND SURVEYOR SHOWING ALL UTILITY INSTALLATION. HORIZONTAL AND VERTICAL INFORMATION SHALL BE PROVIDED FOR WATER, SEWER, STORM INCLUDING ALL STRUCTURES, VALVES, HYDRANTS, AND OTHER APPURTENANCES.

MATERIAL SUMMARY	
8" WATER (DIP)	2,003 LF
PROP. FIRE HYDRANTS	1
8" SEWER (SDR-35 PVC)	2,150 LF
8" SEWER (DIP)	389 LF
PUBLIC SEWER MANHOLES	13

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

400' RADIUS AT FIRE HYDRANTS, TYP.

PROP. FIRE HYDRANT
SEE DETAIL SHEET C-653

PROP. 40' SS EASEMENT

PROP. 30' SS EASEMENT

12' GRAVEL SS ACCESS DRIVE

30' SEWER EASEMENT PER DB 838 PG 434

PERMANENT DRAINAGE EASEMENT PER PB 1999 SL 3086 & DB 993 PG 360

STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA G DB 3284 PG 387 & DB 3273 PG 78

STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA F DB 3284 PG 387 & DB 3273 PG 78

STREAMBANK MAINTENANCE EASEMENT PER PB 2018 SL 11488, AREA D

SIGNAL HILL ROAD
(60' PUBLIC R/W)

LAFOLETTE STREET
(45' PUBLIC R/W)

MATCH LINE SEE BELOW

MATCH LINE SEE ABOVE

PROP. 10' x 20' x 8'D BORING PIT

PROP. 6" RJDIP WATER LINE INSIDE 45 LF OF 18" Ø 0.25"t STEEL CASING (CITY MAINTAINED)

PROP. 10' x 10' x 7'D RECEIVING PIT

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1"=20'

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1"=60'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
3	02/18/2025	ADDRESS CITY & COUNTY COMMENTS
5	07/18/2025	ADDRESS ZONING COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER ROBIN M. HARRIS
09/09/2025

PROJECT #:	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: UTILITY PLAN

DRAWING NO: C-600

Y:\Shared2_ENGR\656605823\2_DESIGN\DWG\SHEETS\UTILITY - OVERALL.dwg, 9/9/2025 12:39 PM, Toby Harris

NOTE: EXISTING SANITARY SEWER MANHOLE TO BE INCLUDED IN VACUUM TESTING.

EX. SSMH - 1

SSMH - 1

SSMH - 2

SSMH - 3

SSMH - 4

SSMH - 5

SSMH - 6

SSMH - 7

SSMH-8

SSMH-9

DROP MANHOLE. SEE DETAIL SHEET C-613

12' GRAVEL SS ACCESS DRIVE

30' SEWER EASEMENT PER DB 838 PG 434

PROP. 8" DIP WATER LINE

PROP. 8" PVC SS LINE

LAFOLETTE STREET (45' PUBLIC R/W)

SIGNAL HILL ROAD (60' PUBLIC R/W)

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1"=50'

SS 1-9

EX. SSMH - 1
STA:0+00.00
RIM:2103.12
INV IN:2099.40 8"

SSMH - 1
STA:0+50.00
RIM:2107.38
INV IN:2106.40 8"
INV OUT:2101.40 8"

SSMH - 2
STA:2+30.88
RIM:2148.28
INV IN:2130.23 8"
INV OUT:2130.00 8"

SSMH - 3
STA:3+89.13
RIM:2136.69
INV IN:2131.38 8"
INV OUT:2131.18 8"

SSMH - 4
STA:6+50.03
RIM:2144.25
INV IN:2133.16 8"
INV OUT:2132.95 8"

SSMH - 5
STA:7+94.43
RIM:2144.82
INV IN:2135.60 8"
INV IN:2135.42 8"
INV OUT:2134.60 8"

SSMH - 6
STA:9+18.90
RIM:2150.92
INV IN:2137.20 8"
INV OUT:2136.84 8"

SSMH - 7
STA:10+44.90
RIM:2156.74
INV IN:2145.06 8"
INV OUT:2143.50 8"

SSMH-8
STA:13+24.20
RIM:2157.01
INV IN:2148.06 8"
INV OUT:2147.85 8"

SSMH-9
STA:15+17.95
RIM:2157.94
INV OUT:2150.00 8"

180.88' of 8" @ 13.05%

50.00' of 8" @ 4.00%

158.25' of 8" @ 0.60%

260.90' of 8" @ 0.60%

144.40' of 8" @ 1.00%

124.47' of 8" @ 1.00%

18" RCP

126.00' of 8" @ 5.00%

279.30' of 8" @ 1.00%

18" CPP

193.75' of 8" @ 1.00%

DROP MANHOLE. SEE DETAIL SHEET C-613

PROFILE SCALE:
H: 1" = 50'
V: 1" = 10'

0+25	0+00	1+00	2+00	3+00	4+00	5+00	6+00	7+00	8+00	9+00	10+00	11+00	12+00	13+00	14+00	15+00	15+30
2103.12	2103.119	2127.90	2127.900	2141.54	2141.538	2144.00	2144.000	2137.46	2137.459	2143.55	2143.551	2142.56	2142.562	2138.19	2138.194	2141.99	2141.988	2149.27	2149.272	2155.52	2155.524	2158.04	2158.044	2158.14	2158.138	2157.68	2157.676	2157.63	2157.628	2158.00	2158.000		

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TOBIN M. HARRIS
09/09/2025

PROJECT #:	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

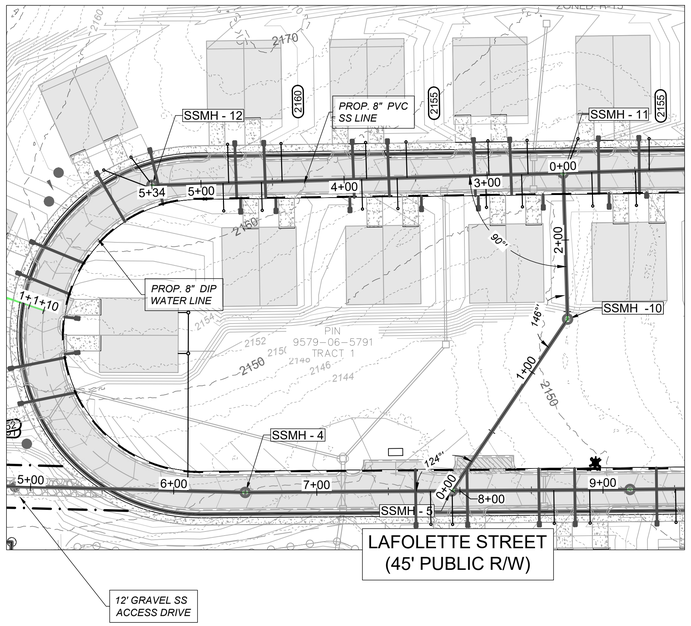
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-0473

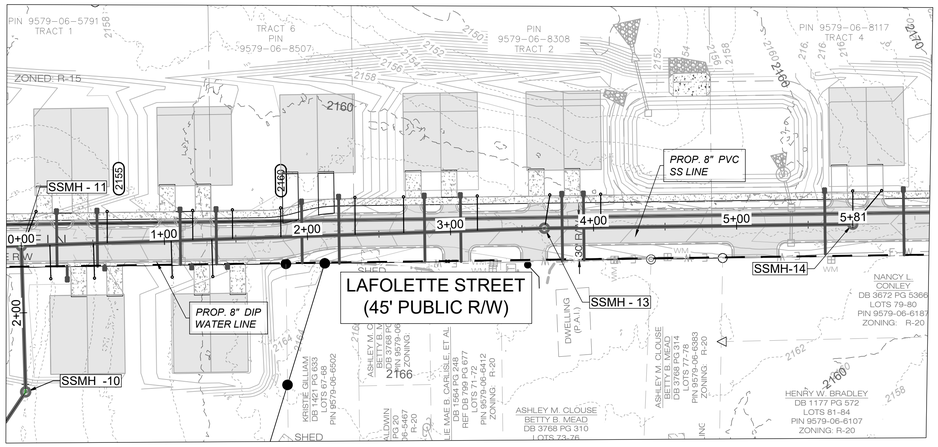
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

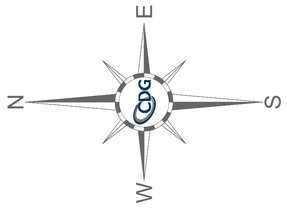
SHEET TITLE: SANITARY SEWER PLAN & PROFILE - 1

DRAWING NO: C-610

Y:\Shared2_ENGR\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE SAN.dwg, 9/9/2025 12:39 PM, Toby Harris



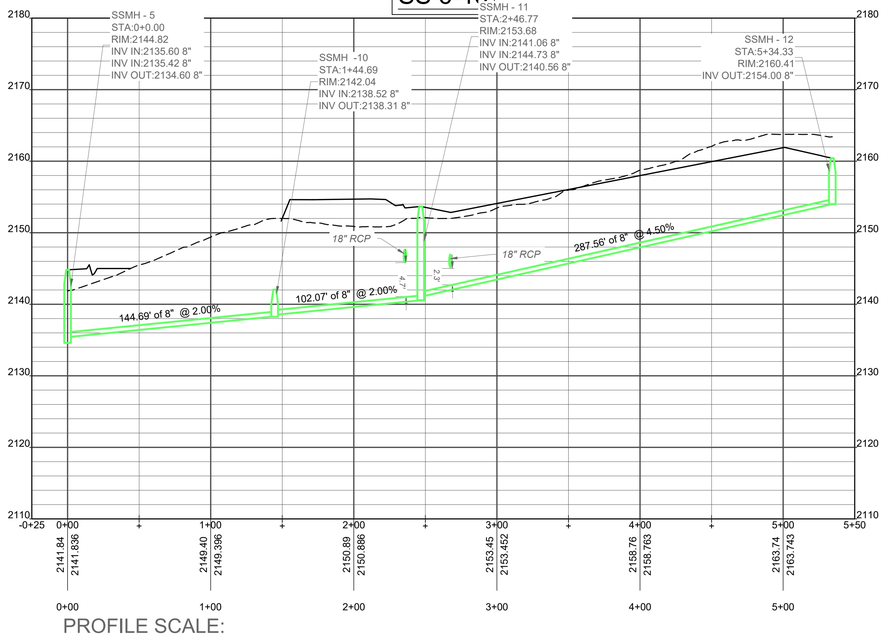




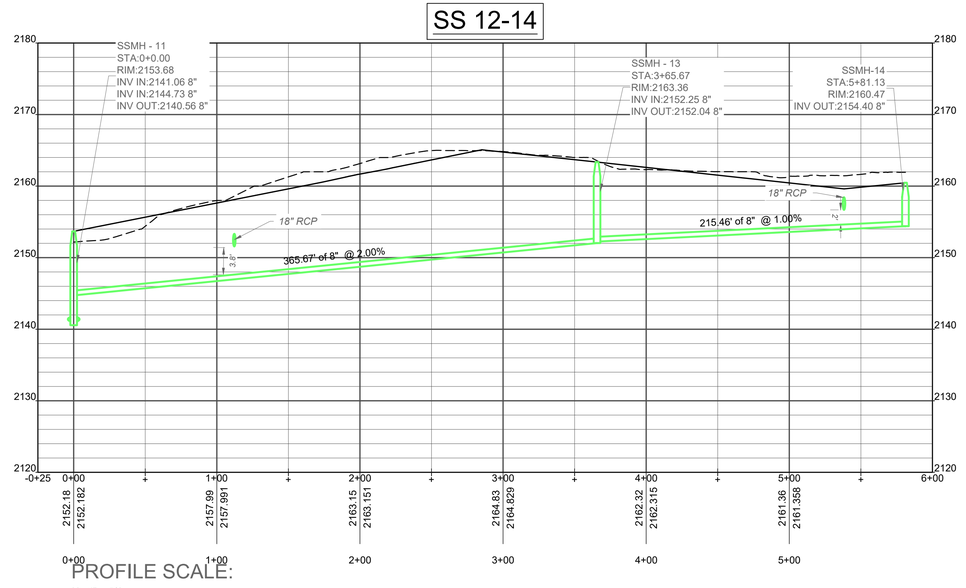
GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1"=50'



PROFILE SCALE:
H: 1" = 50'
V: 1" = 10'



PROFILE SCALE:
H: 1" = 50'
V: 1" = 10'

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

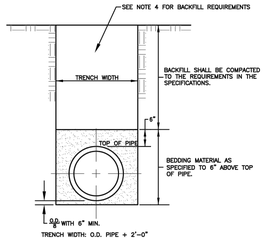
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE:
SANITARY SEWER PLAN & PROFILE - 2

DRAWING NO:
C-611

Y:\Shared\2_ENG\R656605\6205_DESIGN\DWG\SHEET\SP-PLAN PROFILE SAN2.dwg, 9/9/2025 12:39 PM, Toby Harris



NOTES:

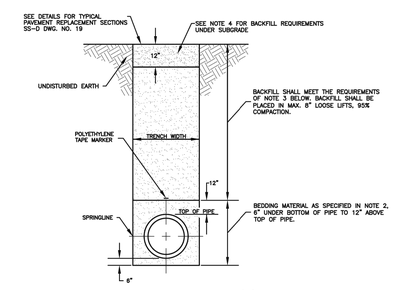
1. BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS 'B' BEDDING FOR RIGID PIPING.
2. IN ROCK OR WET SOIL, PIPE MUST BE BEDDED IN AT LEAST 6" OF #57 WASHED STONE.
3. FORCE MAIN BEDDING SHALL BE SELECT NATURAL SAND WELL COMPACTED IN 6" LIFTS.
4. TRENCHES EXCAVATED OUTSIDE EXISTING ROAD AND RAILWAY RIGHTS-OF-WAY SHALL BE BE BACKFILLED WITH COMMON BACKFILL MATERIAL CONSISTING OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS AND TAMPED THOROUGHLY. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS. ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF AT LEAST 85% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR) OR AS APPROVED BY THE ENGINEER. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.
5. WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DEWATERING, DRYING, PROTECTION, AND STORAGE OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS ML, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR.
6. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

DATE: 10/19/2023	SS-D DWG. NO. 1
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

GRAVITY SEWER
TRENCH CONSTRUCTION
OUTSIDE PAVEMENT

H:\DETAILS\-Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, TRENCH-DETAIL OSP -1



NOTES:

1. THIS TRENCH BACKFILL DETAIL APPLIES TO AREAS UNDER PAVEMENT. CURB AND GUTTER, AND SIDEWALK.
2. BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS B BEDDING FOR RIGID PIPING.
3. COMMON BACKFILL MATERIAL SHALL CONSIST OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING EIGHT (8) INCHES IN DEPTH FOR THE FULL WIDTH. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS AND CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.

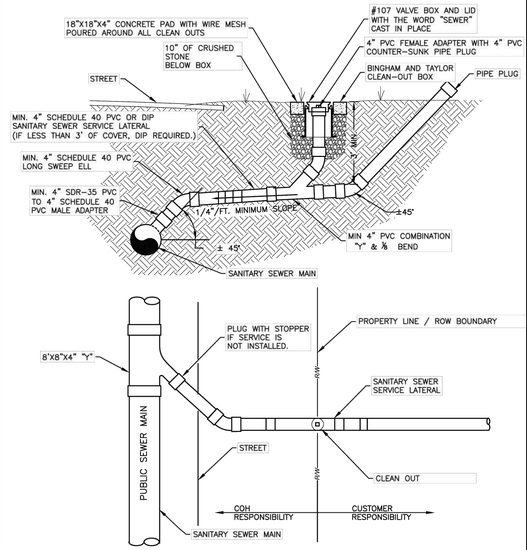
   WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DEWATERING, DRYING, PROTECTION, AND STORAGE OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS ML, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR.
4. THE TOP 12 INCHES OF FINAL BACKFILL FOR ROAD OR STREET SUBGRADE SHALL BE COMPACTED TO 98% STANDARD PROCTOR.
5. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

DATE: 10/19/2023	SS-D DWG. NO. 2
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

GRAVITY SEWER
TRENCH CONSTRUCTION
UNDER PAVEMENT

H:\DETAILS\-Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, TRENCH-DETAIL UNP-2

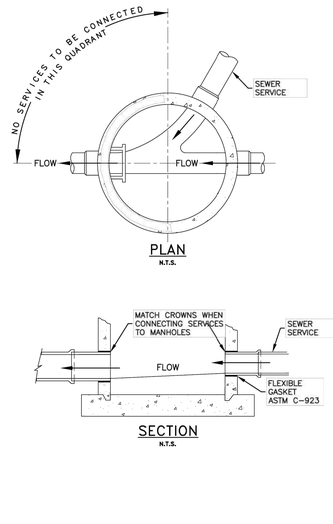


DATE: 10/19/2023	SS-D DWG. NO. 04
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

STANDARD SERVICE CONNECTION
LATERAL AND CLEANOUT

H:\DETAILS\-Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, STANDARD SERVICE CON-4

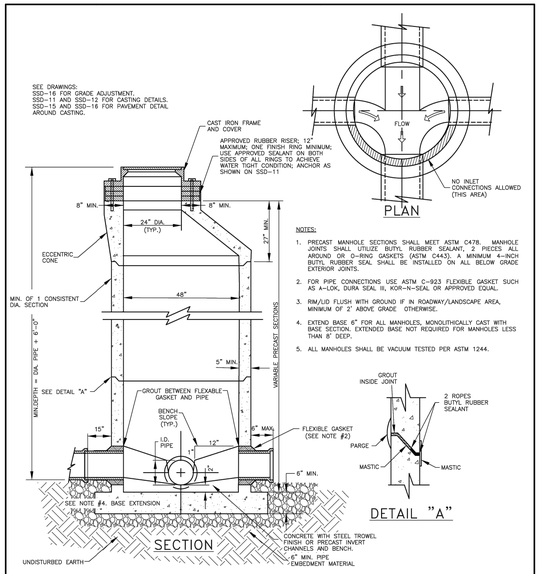


DATE: 10/19/2023	SS-D DWG. NO. 5
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

SERVICE CONNECTIONS
AT MANHOLES

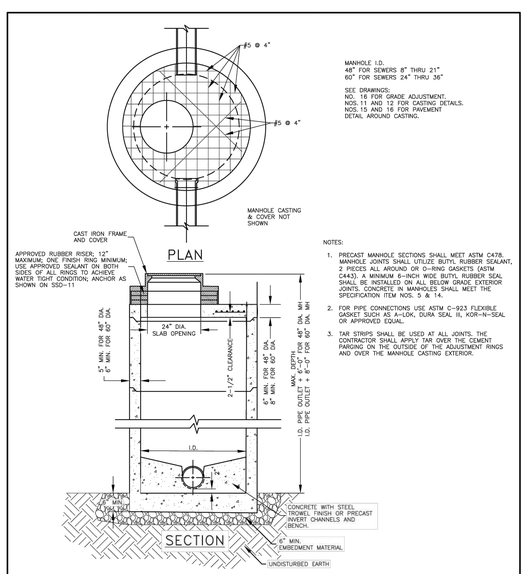
H:\DETAILS\-Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, SERVICE CON AT MH-5



DATE: 04/11/2025	SS-D DWG. NO. 6
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

PRECAST MANHOLE



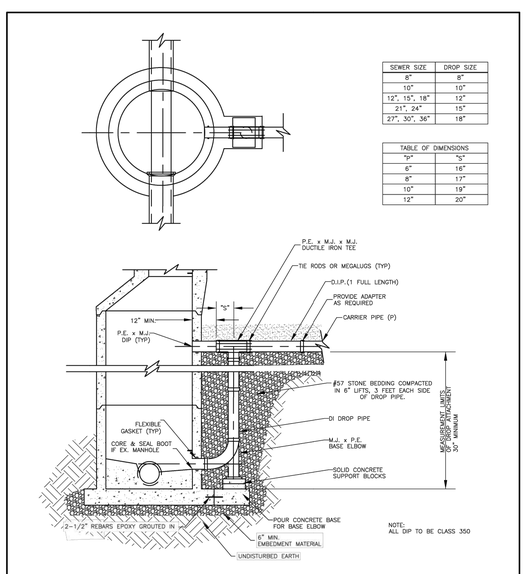
NOTES:

1. PRECAST MANHOLE SECTIONS SHALL MEET ASTM C478. MANHOLE JOINTS SHALL UTILIZE BUTYL RUBBER SEALANT, 2 PIECES ALL AROUND OR O-RING GASKETS (ASTM C443). A MINIMUM 6-INCH WIDE BUTYL RUBBER SEAL SHALL BE INSTALLED ON ALL BELOW GRADE EXTERIOR JOINTS. CONCRETE IN MANHOLES SHALL MEET THE SPECIFICATION ITEM NOS. 5 & 14.
2. FOR PIPE CONNECTIONS USE ASTM C-923 FLEXIBLE GASKET SUCH AS A-LOK, DURA SEAL III, KOR-N-SEAL OR APPROVED EQUAL.
3. TAR STRIPS SHALL BE USED AT ALL JOINTS. THE CONTRACTOR SHALL APPLY TAR OVER THE CEMENT PARGING ON THE OUTSIDE OF THE ADJUSTMENT RINGS AND OVER THE MANHOLE CASTING EXTERIOR.

DATE: 09/23/2024	SS-D DWG. NO. 8
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

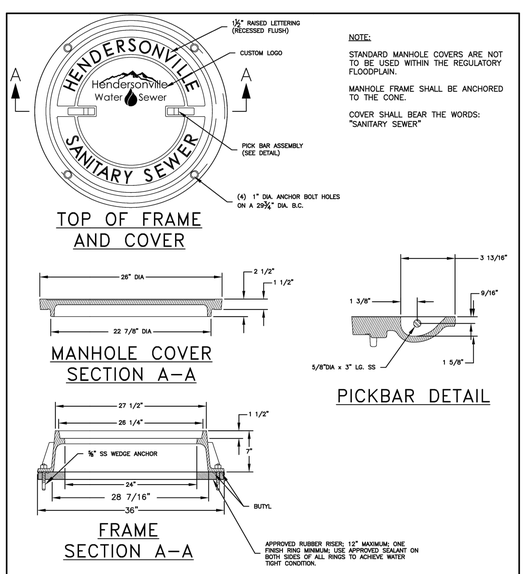
SHALLOW PRECAST MANHOLE



DATE: 09/23/2024	SS-D DWG. NO. 9
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

DROP MANHOLE



DATE: 01/26/2024	SS-D DWG. NO. 11
SCALE: NOT TO SCALE	

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

STANDARD MANHOLE
FRAME AND COVER

H:\DETAILS\-Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, 1/26/2024 11:52:52 AM

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER ROBIN M. HARRIS
09/09/2025

PROJECT #:	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: SANITARY SEWER DETAILS

DRAWING NO: C-613

Y:\Shared2_ENGR\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE SAN.dwg, 9/9/2025 12:40 PM, Toby Harris

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

ENGINEER'S SEAL:

09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

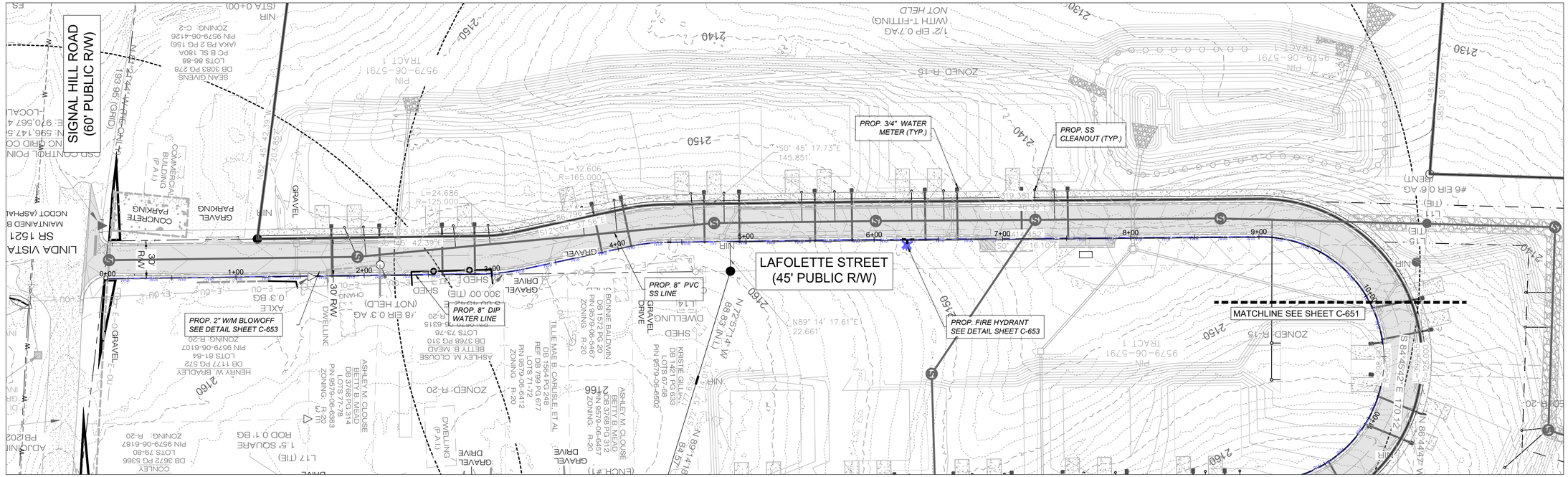
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

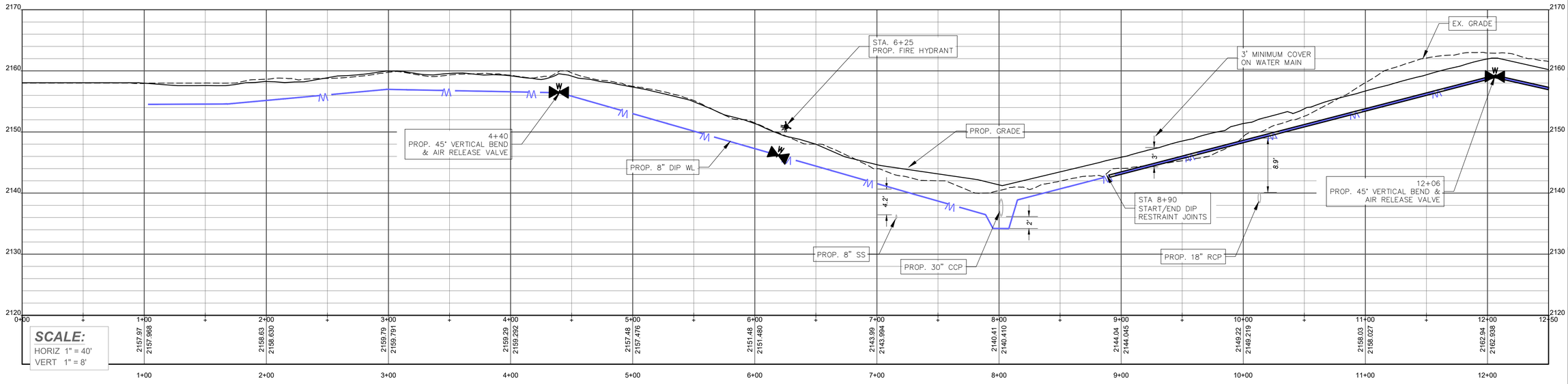
SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO.: C-614

SHEET TITLE: SANITARY SEWER DETAILS

Y:\Sheet\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\PLAN PROFILE SAN.dwg, 9/9/2025 12:40 PM, Toby Harris





WATERMAIN2

SCALE: 1"=50' (h); 1"=10' (v)

REV.	DATE	COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

REVISIONS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

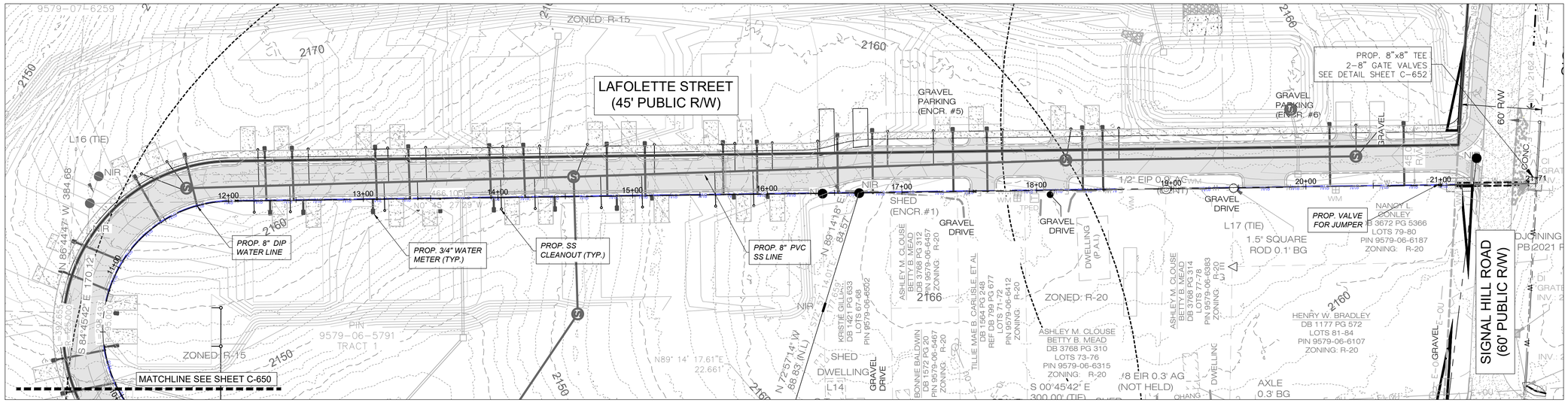
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: WATERMAIN PLAN & PROFILE 0+00 - 11+00

DRAWING NO: C-650

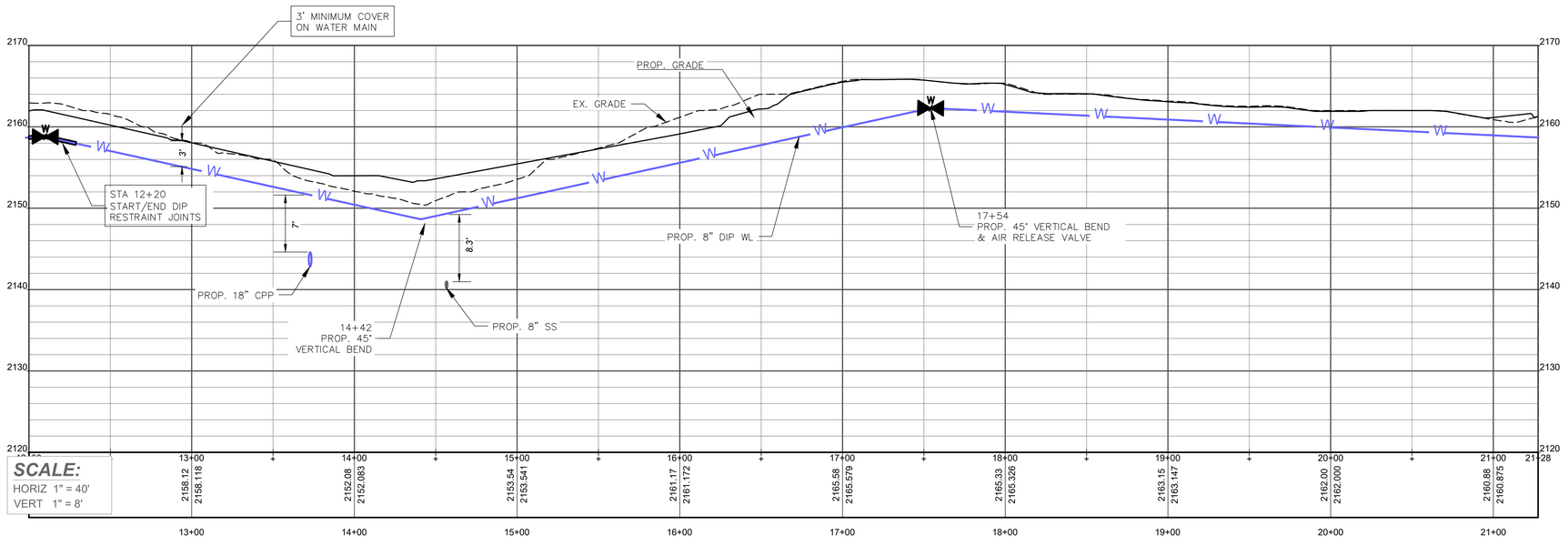
Y:\Shared2_ENGR\656605823\5_DESIGN\03SHEETS\WATER PLAN PROFILE.dwg, 9/9/2025 12:43 PM, Toby Harris



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1"=40'



SCALE:
HORIZ 1" = 40'
VERT 1" = 8'

WATERMAIN2
SCALE: 1"=50' (h); 1"=10' (v)

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
6	08/08/2025	ADDRESS UTILITY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TIMOTHY M. HARRIS
09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-8913
www.3notchgroup.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: WATERMAIN PLAN & PROFILE 11+00 - 22+00

DRAWING NO: C-651

Y:\Shared\2_ENGINEERING\656605823_DESIGN\DWG\SHEETS\WATER PLAN PROFILE.dwg, 9/9/2025 12:40 PM, Toby Harris

GENERAL NOTES:

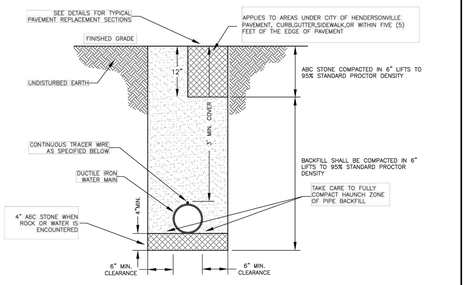
1. WATER CONSTRUCTION IS AUTHORIZED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ) AND THE CITY OF HENDERSONVILLE . THE WORK IS SUBJECT TO INSPECTIONS AT ALL TIMES BY REPRESENTATIVES OF NCDEQ, THE CITY OF HENDERSONVILLE, THE OWNER, OR THE ENGINEER. THE PERMITS REQUIRE CERTIFICATION OF COMPLETION OF THE WATER SYSTEMS BY THE ENGINEER AND THE APPLICANT BEFORE FINAL OPERATING APPROVAL IS ISSUED.
2. MATERIALS AND INSTALLATION FOR WATER CONSTRUCTION SHALL CONFORM TO THE LATEST VERSIONS OF CITY OF HENDERSONVILLE SPECIFICATIONS AND DETAILS, APPROVED MATERIALS LIST, AND AWWA STANDARDS AND REQUIREMENTS.
3. THE CONTRACTOR SHALL NOTIFY NC811 & APPROPRIATE UTILITIES AGENCIES PRIOR TO PERFORMING ANY WORK.
4. REGULAR WORKING HOURS SHALL BE FROM 7:00 AM TO 5:00 PM, MONDAY THROUGH FRIDAY, EXCEPT IN CASES OF EMERGENCY OR OTHERWISE APPROVED IN WRITING BY THE CITY OR AUTHORIZED REPRESENTATIVES. THE CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE SAFE FOR ANY PERSONS WHO MAY BE ON SITE DURING NON-WORKING HOURS. AT TIMES, THE ENGINEER MAY DETERMINE THAT THESE HOURS SHALL BE MODIFIED TO ACCOMMODATE SPECIAL NEEDS OF IMPACTED CUSTOMERS.
5. ALL PERSONS SHALL BE COURTEOUS AND RESPECTFUL TO THE PUBLIC. CURSING OUR FOUL LANGUAGE IS NOT PERMITTED AND WILL NOT BE TOLERATED.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TRAFFIC CONTROL ON ALL ROADWAYS DURING THE PROJECT. THE CONTRACTOR SHALL NOTIFY LOCAL EMERGENCY, SCHOOL AND OTHER NECESSARY AUTHORITIES PRIOR TO ANY STREET CLOSING OR TRAFFIC CHANGE.
7. THE CONTRACTOR, AT THEIR OWN EXPENSE, SHALL KEEP THE CONSTRUCTION SITE AND ADJACENT PUBLIC AND PRIVATE ROADWAYS CLEAN DURING THE PROJECT. THE CONTRACTOR IS ALSO RESPONSIBLE FOR CONTROLLING, SUPPRESSING, AND MITIGATING DUST WITHIN THE PROJECT AREA.
8. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION IN ACCORDANCE WITH THE LINES, GRADES, AND ELEVATIONS SHOWN ON THE PLANS OR AS GIVEN BY THE ENGINEER IN THE FIELD.
9. THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS AND ELEVATIONS FOR ALL UTILITIES, DRAINAGE, AND OTHER UNDERGROUND FACILITIES BOTH EXISTING AND PROPOSED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR CONFLICTS PRIOR TO CONSTRUCTION.
10. THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES DURING CONSTRUCTION. REPAIRS TO CONTRACTOR DAMAGED UTILITIES SHALL BE MADE IN ACCORDANCE WITH APPLICABLE STANDARDS OF APPROPRIATE AGENCIES AT THE CONTRACTOR'S EXPENSE.
11. THE CONTRACTOR SHALL MAINTAIN THE OPERATION OF EXISTING UTILITIES WITH THE LEAST AMOUNT OF SERVICE INTERRUPTION POSSIBLE. WATER AND SEWER INTERRUPTIONS SHALL BE MADE IN COORDINATION WITH THE CITY OF HENDERSONVILLE. CONTINUOUS SERVICE, PUBLIC HEALTH, AND SAFETY CONSIDERATIONS SHALL EXCEED ALL OTHERS. THE CONTRACTOR'S SCHEDULE, CONSTRUCTION METHODS, AND SEQUENCE ARE SUBJECT TO ALTERATION AND REVISION IF NECESSARY FOR THESE CONSIDERATIONS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TEMPORARY OR PERMANENT RELOCATION OF STRUCTURES AND UTILITIES, INCLUDING BUT NOT LIMITED TO POLES, SIGNS, FENCES, HYDRANTS, VALVES, PIPING, CONDUITS AND DRAINS THAT INTERFERE WITH THE POSITIONING OF THE WORK AS SHOWN ON THE DRAWINGS.
13. THE CONTRACTOR SHALL BE REQUIRED TO CONFORM AND COMPLY WITH ALL RESTRICTIONS AND EASEMENT CONDITIONS AND IS RESPONSIBLE FOR ALL RELATED INCIDENTAL COSTS INVOLVED.
14. EXISTING WATER SERVICES SHALL BE REPLACED TO THE EXISTING METER UNLESS OTHERWISE APPROVED OR DIRECTED IN WRITING BY THE CITY. SPLICING THE WATER SERVICE ON THE DOWNSTREAM SIDE OF THE METER IS NOT PERMITTED.
15. ALL DISTURBED AREAS, INCLUDING BUT NOT LIMITED TO ASPHALT, CONCRETE, DRIVEWAYS, ROADS, AND LANDSCAPING, SHALL BE REPAIRED TO A CONDITION EQUAL OR BETTER THAN THE ORIGINAL SITE. GRASS AND LANDSCAPED AREAS FILL MATERIAL MUST BE REPLACED IN TRENCH TO GRADE AS SOON AS WATERLINE CONSTRUCTION ALLOWS. ADEQUATE SEEDING AND STRAW OR MULCH SHALL THEN BE APPLIED TO THE DISTURBED TRENCH AREA. ADDITIONAL FILL AND SITE RESTORATION MAY BE REQUIRED WITHIN THE WARRANTY PERIOD AT THE CITY'S DISCRETION.
16. CONTRACTOR SHALL PROVIDE EROSION CONTROL DEVICES TO CONTROL RUNOFF AS REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY FINES THAT MAY BE INCURRED DUE TO EROSION AND/OR SEDIMENTATION.
17. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW ALL APPLICABLE FEDERAL, STATE, AND LOCAL HEALTH AND SAFETY REGULATIONS PERTAINING TO CONSTRUCTION OPERATIONS.
18. ALL WATER MAINS SHALL HAVE 3 FEET MINIMUM COVER.
19. INSTALL FERROUS PIPING FOR BOTH WATER AND SEWER WITHIN 10 FT. OF A CROSSING IF:
    - 19.1. SEWER LINE CROSSES OVER WATER, OR
    - 19.2. VERTICAL CLEARANCE BETWEEN WATER AND SEWER IS LESS THAN 18 INCHES.
    - 19.3. MAINTAIN 10 FEET HORIZONTAL SEPARATION BETWEEN SEWER AND WATER MAINS UNLESS LAID IN SEPARATE TRENCHES WITH THE BOTTOM OF THE WATER LINE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE OR USE FERROUS MATERIAL FOR BOTH WATER AND SEWER.
20. WHERE CONFLICT OF WATER AND SEWER MAIN OCCURS, MAINTAIN 10 FEET HORIZONTAL SEPARATION BETWEEN SEWER AND WATER MAINS UNLESS LAID IN SEPARATE TRENCHES WITH THE BOTTOM OF THE WATER LINE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE, OR ALTERNATIVELY, THE INSTALLATION MUST COMPLY WITH RULE .0904(C) AND .0906(7)"
21. MAINTAIN 18 INCHES VERTICAL SEPARATION BETWEEN STORM DRAIN AND WATER, OR INSTALL FERROUS MATERIAL WATER LINE WITHIN 10 FEET EACH SIDE OF CROSSING
22. TAPS GREATER THAN ONE-INCH IN DIAMETER ON EXISTING, ACTIVE WATER MAINS SHALL BE PERFORMED BY THE CITY UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY. TAPS IN NEW CONSTRUCTION ARE TO BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH CITY REQUIREMENTS.
23. ALL WATER METERS WILL BE SET BY CITY STAFF UNLESS THE CONTRACTOR IS GRANTED WRITTEN PERMISSION BY THE CITY.
    - 23.1. THE CONTRACTOR WILL PROVIDE THE CITY NOTICE OF 10 WORKING DAYS MINIMUM PRIOR TO THE DATE OF METER INSTALLATION.
    - 23.2. THE CONTRACTOR WILL PROVIDE A LICENSED PLUMBER DURING THE METER INSTALLATION TO VERIFY LINE SERVICES IN ALL MULTI-METER BOXES.
24. ALL PUBLIC WATER MAIN CONSTRUCTION SHALL BE PERFORMED BY A NORTH CAROLINA LICENSED UTILITY CONTRACTOR.
25. ALL WATER APPURTENANCES ARE TO BE MADE USING LEAD-FREE MATERIALS. PIPE, FITTINGS, VALVES, HYDRANTS, PIPE CLAMPS, RESTRAINTS, FLANGES, CASTINGS, REBAR, MATCHES, INLETS, METER BOXES, AND ALL OTHER CAST IRON COMPONENTS SHALL BE MANUFACTURED IN THE USA.
26. RESTRAINED JOINTS BY AN APPROVED PIPE MANUFACTURER ARE TO BE USED FOR ALL PUBLIC WATER LINES WHERE THRUST RESTRAINING IS REQUIRED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S SPECIFICATIONS. WHERE RESTRAINING GASKETS ARE UTILIZED, THE GASKET AND PIPE SHALL BE MADE BY THE SAME MANUFACTURER. CONCRETE THRUST BLOCKS ARE PERMITTED ONLY WHERE CONNECTIONS ARE MADE TO EXISTING WATER LINES OR WHERE THE USE OF MECHANICAL RESTRAINT IS NOT FEASIBLE.
27. ALL FIRE HYDRANTS, VAULTS, BACKFLOW PREVENTERS, HOT BOXES, AND WATER METERS ARE TO BE INSTALLED ON FLAT AREAS OUTSIDE OF PAVEMENT.
28. TAMPERING WITH OR ILLEGAL USE OF THE PUBLIC WATER SUPPLY WILL RESULT IN SUSPENSION OF WATER SERVICE, INCLUDING DOMESTIC AND COMMERCIAL UNTIL FINAL APPROVAL BY THE CITY IS ISSUED. A PERSON FOUND TO BE USING WATER ILLEGALLY SHALL BE SUBJECT TO PENALTIES OR FINES, AS PRESCRIBED AND APPROVED BY CITY COUNCIL.

TESTING & INSPECTION:

1. NOTIFY THE CITY OF HENDERSONVILLE AND ENGINEER AT LEAST 5 WORKING DAYS BEFORE STARTING CONSTRUCTION OF WATER FACILITIES AND AFTER ALL MATERIAL IS ON SITE TO SCHEDULE A FIELD PRE-CONSTRUCTION CONFERENCE. THE ENGINEER SHALL PERIODICALLY INSPECT THE PROGRESS OF INSTALLATION AT A MINIMUM AND SHALL COMPLETE A FINAL WATER CERTIFICATION.
2. THE BACKFLOW PREVENTION ASSEMBLY (JUMPER) SHALL BE INSPECTED BY A CITY INSPECTOR PRIOR TO INSTALLATION. THE JUMPER INSTALLATION SHALL BE APPROVED IN WRITING BY THE CITY INSPECTOR. THE JUMPER SHALL BE INSTALLED AND UTILIZED FOR TESTING AND VERIFICATION PURPOSES ONLY. ANY DELAY IN THE PLANNED VERIFICATION SCHEDULE MAY RESULT IN THE JUMPER BEING DISCONNECTED. ANY UNAUTHORIZED USE OF WATER WHILE THE JUMPER IS INSTALLED SHALL RESULT IN THE REMOVAL OF THE JUMPER UNTIL SUCH TIME AS THE CITY ENGINEER IS SATISFIED THAT THE CONTRACTOR SUITABLY UNDERSTANDS AND CAN CONTROL THE USE OF THE WATER. ALL CHANGES TO THE APPROVED CONSTRUCTION PLANS AND SUBMITTALS MUST BE APPROVED IN WRITING BY THE CITY PRIOR TO IMPLEMENTATION IN THE FIELD.
3. THE CONTRACTOR SHALL FURNISH SECURE AND PROVIDE ALL NECESSARY TESTING EQUIPMENT AND LABOR AS REQUIRED BY THE ENGINEER TO PROVIDE ALL REQUIRED TESTING VERIFICATIONS. THE CONTRACTOR SHALL DEMONSTRATE HYDROSTATIC TESTING, FLUSHING, DISINFECTION, AND BACTERIOLOGICAL SAMPLING WITH CITY INSPECTOR.
4. CITY CONSTRUCTION INSPECTORS SHALL BE NOTIFIED AT LEAST 72 HOURS PRIOR TO ANY TESTING OPERATIONS. CITY INSPECTORS SHALL VERIFY TAPPING PITS, FLUSHING, HYDROSTATIC TESTING, DISINFECTION, AND SAMPLING. REQUESTS SHOULD BE MADE USING THE CITY'S ONLINE INSPECTION REQUEST FORMS.
5. HYDROSTATIC PRESSURE TEST WATER MAINS TO 200 PSI MINIMUM FOR A MINIMUM OF TWO HOURS IN ACCORDANCE WITH AWWA C600 AND MODIFIED TO CITY REQUIREMENTS.
6. FLUSH WATER LINES IN ACCORDANCE WITH AWWA C600 (AT A MINIMUM FLUSHING VELOCITY OF 3.0 FEET PER SECOND) PRIOR TO DISINFECTION. THE FLOW RATE NEEDED TO ACHIEVE THE REQUIRED VELOCITY SHALL BE DETERMINED BY THE DESIGN ENGINEER AND VERIFIED BY THE CITY ENGINEER.
    - 6.1 DISINFECT WATER LINES AND PROVIDE ACCEPTABLE BACTERIOLOGICAL TEST FROM A CERTIFIED TESTING LABORATORY IN ACCORDANCE WITH CITY REQUIREMENTS AND AWWA C651. THE CONTRACTOR MAY ELECT TO USE THE CITY'S CERTIFIED TESTING LABORATORY.
7. PRIVATELY OWNED FIRE SYSTEMS SHALL BE APPROVED BY THE APPROPRIATE LOCAL PERMITTING AUTHORITY. THE CITY ENGINEERING OR WATER AND SEWER DEPARTMENTS ARE NOT RESPONSIBLE FOR ENSURING COMPLIANCE WITH APPROPRIATE FIRE PROTECTION REGULATIONS. THE CITY DOES NOT PROVIDE ANY GUARANTEE OF ITS WATER SYSTEM'S CAPABILITY TO DELIVER WATER FLOW AND RESIDUAL PRESSURE THE FIRE PERMITTING AUTHORITY MAY REQUIRE.
8. ALL PERMANENT BACKFLOW PREVENTION ASSEMBLIES SHALL BE USC APPROVED AND REVIEWED BY THE CITY'S ENVIRONMENTAL COMPLIANCE COORDINATOR. PROTECTION OF THE PUBLIC WATER DISTRIBUTION SYSTEM SHALL BE ASSURED BY INSPECTIONS AND TESTING OF BACKFLOW PREVENTION ASSEMBLIES AND FLOW METERS IN ACCORDANCE WITH APPROPRIATE LOCAL, STATE, AND FEDERAL REGULATIONS.
9. CONSTRUCTION WATER SOURCING MUST BE APPROVED IN WRITING BY THE CITY. CONSTRUCTION WATER CONNECTIONS SHALL BE PAIRED WITH AN APPROPRIATE METER AND APPROVED BACKFLOW PREVENTION ASSEMBLY. THIS ASSEMBLY INSTALLATION MUST BE TESTED BY A LICENSED PLUMBER AND TEST RESULTS SUBMITTED TO THE CITY BEFORE USE OF CONSTRUCTION WATER.
10. SECURE FINAL WRITTEN ACCEPTANCE FROM THE CITY OF HENDERSONVILLE PRIOR TO ACTIVATION OF THE SYSTEM. WATER SERVICE WILL NOT BE PROVIDED UNTIL WRITTEN ACCEPTANCE OF THE SYSTEM IS ISSUED BY THE CITY.
11. THE ENGINEER SHALL SUPPLY THE CITY WITH FINAL AS-BUILT DRAWINGS AND COMPLETE ALL PROJECT CLOSE OUT REQUIREMENTS.

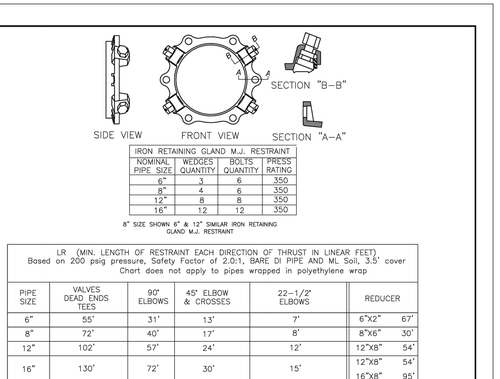
DISCLAIMER:

STANDARD WATER DETAILS ARE FOR THE SOLE USE OF PROJECTS THAT ARE OWNED BY, OR WILL BE TRANSFERRED TO, THE CITY OF HENDERSONVILLE. STANDARD WATER DETAILS ARE INTENDED TO SHOW THE CITY OF HENDERSONVILLE'S EXPECTATIONS FOR THE GENERAL LAYOUT AND ARRANGEMENT FOR WATER DISTRIBUTION SYSTEM ITEMS AND THEIR RELATED APPURTENANCES. IT REMAINS THE SOLE RESPONSIBILITY OF THE ENGINEER IN RESPONSIBLE CHARGE (ERC) OF EACH APPLICATION TO DETERMINE, DESIGN TO, AND CERTIFY TO, THE DESIGN PARAMETERS FOR EACH INSTALLATION. THE ERC MUST ALSO ENSURE THE DESIGN COMPLIES WITH THE MINIMUM DESIGN CRITERIA OF NC DIVISION OF ENVIRONMENTAL QUALITY AND ALL LOCAL AND STATE LAWS AND REGULATIONS.



NOTES:

1. COMPACTION OF BACKFILL SHALL BE ACHIEVED THROUGH THE USE OF AN APPROVED VIBRATORY PLATE TAMPER OR ROLLER.THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.
2. COORDINATE TESTING OF THE BACKFILL SHALL BE COORDINATED BY THE OWNER, WITH TESTING INTERVALS AT THE OWNER'S, DISCRETION AND SUBJECT TO CHANGE. IF A TEST FAILS, THE CONTRACTOR MUST REMOVE THE DEFECTIVE BACKFILL, REDO THE WORK AND RETEST THE AREA. THE CONTRACTOR IS RESPONSIBLE FOR MEETING THE REQUIRED LEVEL OF COMPACTION AND ENSURING THE PROPER WATER CONTENT IN THE BACKFILL MATERIAL IF THE WATER CONTENT IS DEEMED INSUFFICIENT FOR PROPER COMPACTION, THE CONTRACTOR SHALL REMOVE THE DEFECTIVE MATERIAL AND PERFORM CORRECTIVE WORK AS DIRECTED BY THE OWNER OR ENGINEER.
3. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE WATER BLOCKING TRACER WIRE OR EQUIVALENT AS SHOWN IN THE APPROVED PARTS LIST AND APPROVED BY THE ENGINEER. EQUIVALENT TRACER WIRE WILL BE A 19 GAUGE TIN COATED COPPER CONDUCTOR WITH POLYETHYLENE INSULATION, A HIGH-TENACITY WOVEN POLYESTER STRENGTH ELEMENT INCLUDING WATER BLOCKING YARN, AND AN ABRASION RESISTANT 30 MIL BLUE HDPE OUTER JACKET.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING A SAFE WORK ENVIRONMENT WHEN WORKING IN TRENCHES INCLUDING THE USE OF TRENCH BOXES, SHORING, OR BENCHING AS REQUIRED TO PREVENT COLLAPSE AND MAINTAIN STABILITY OF EXCAVATION. ALL TRENCHING OPERATIONS MUST COMPLY WITH THE LATEST OSHA STANDARDS FOR EXCAVATION SAFETY, INCLUDING BUT NOT LIMITED TO THE USE OF PROTECTIVE SYSTEMS IN ACCORDANCE WITH 29 CFR 1926 SUBPART P.

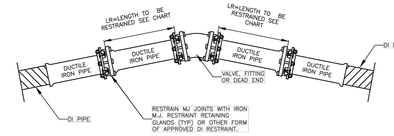


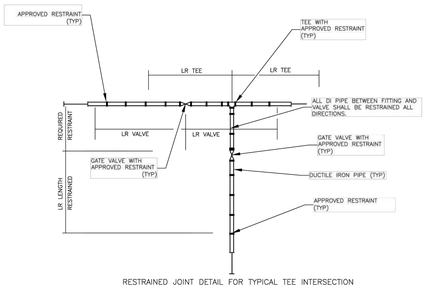
IRON RETAINING GLAND M.J. RESTRAINT				
NOMINAL PIPE SIZE	WEDGES QUANTITY	BOLTS QUANTITY	PRESS RATING	
6"	3	6	350	
8"	4	6	350	
12"	8	8	350	
16"	12	12	350	

8" SIZE SHOWN 6" & 12" SIMILAR IRON RETAINING GLAND M.J. RESTRAINT

LR (MIN. LENGTH OF RESTRAINT EACH DIRECTION OF THRUST IN LINEAR FEET)
Based on 200 psig pressure, Safety Factor of 2.0:1, BARE DI PIPE AND ML Soil, 3.5' cover
Chart does not apply to pipes wrapped in polyethylene wrap

PIPE SIZE	VALVES DEAD ENDS TEES	90° ELBOWS	45° ELBOW & CROSSES	22-1/2° ELBOWS	REDUCER	
6"	55'	31'	13'	7'	6"x2"	67'
8"	72'	40'	17'	8'	8"x6"	30'
12"	102'	57'	24'	12'	12"x8"	54'
16"	130'	72'	30'	15'	12"x8"	54'
					16"x8"	95'

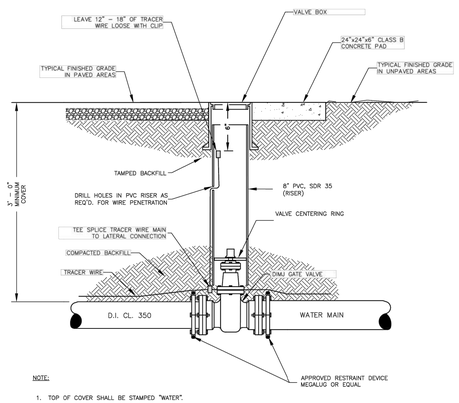




RESTRAINED JOINT DETAIL FOR TYPICAL TEE INTERSECTION
4 WAY INTERSECTION SIMILARLY RESTRAINED

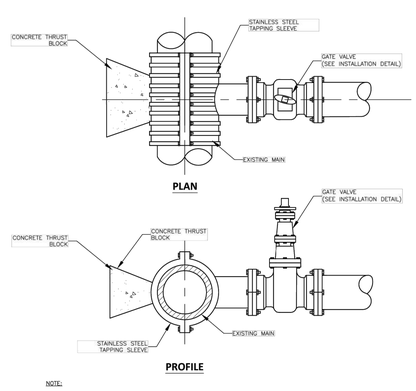
NOTES:

1. THE MINIMUM LENGTH OF RESTRAIN INDICATED SHALL REQUIRE ALL JOINTS WITHIN THE LR DISTANCE TO BE RESTRAINED.
2. THRUST RESTRAINT SHALL BE INSTALLED ON DUCTILE IRON WATER DISTRIBUTION LINES 6" THRU 14" DIAMETER IN THE MANNER SHOWN.
3. PIPE GREATER THAN 14" DIAMETER SHALL REQUIRE RESTRAINED JOINT PIPE FOR THE PROPER LENGTH.
4. COMPACT FITTINGS ARE ACCEPTABLE FOR USE WITH IRON RETAINING GLAND M.J. RESTRAINT AND OTHER FORMS OF DI RESTRAINT.
5. RESTRAINT SYSTEM SHALL BE INSPECTED AND APPROVED PRIOR TO BACKFILLING.
6. RESTRAINT SYSTEMS MAY VARY BASED UPON THE ENGINEER'S DESIGN AS SHOWN ON THE PLAN AND PROFILE SHEETS.
7. GRIPPER RING AND FIELD LOK GASKETS ARE AN ACCEPTABLE METHOD OF RESTRAINT ON DUCTILE IRON PIPE ONLY. GASKET MANUFACTURER MUST MATCH PIPE MANUFACTURER.



NOTE:

1. TOP OF COVER SHALL BE STAMPED "WATER".
2. VALVE PAD REQUIREMENTS SHALL NOT BE APPLICABLE FOR PAVED SURFACES.
3. PAVEMENT REPAIR SHALL MATCH THE EXISTING ROAD PAVING SECTION. SEE NCDOT ASPHALT REPAIR DETAIL #654.01.
4. A MINIMUM OF 24" OF WATER MAIN SHALL BE CONSTRUCTED BETWEEN VALVES AND OTHER FITTINGS OR APPURTENANCES.
5. WHEN OPERATING NUT DEPTH EXCEEDS 6'-0" BELOW FINISHED GRADE, PROVIDE A SURFACE EXTENSION KIT STEM FROM THE VALVE MANUFACTURER.
6. TRACER WIRE AND CONNECTORS SHALL BE TRACE-SAFE WATER-BLOCKING TRACER WIRE, OR AN EQUIVALENT, AS SHOWN IN THE APPROVED PARTS LIST AND APPROVED BY THE ENGINEER. EQUIVALENT TRACER WIRE SHALL BE A 19-GAUGE TIN-COATED COPPER CONDUCTOR WITH POLYETHYLENE INSULATION, A HIGH-TENACITY WOVEN POLYESTER STRENGTH ELEMENT INCLUDING WATER-BLOCKING YARNS, AND AN ABRASION-RESISTANT 30 MIL BLUE HDPE OUTER JACKET.



PLAN

PROFILE

NOTE:

1. CONCRETE SHALL BE 3000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS BY THE INSTALLATION OF POLYETHYLENE FILM PLACED BETWEEN THE FITTINGS AND POURED CONCRETE.
3. ENGINEER TO SIZE THE CONCRETE THRUST BLOCK BASED ON THE WATER MAIN SIZE AND SITE SPECIFIC SOIL-BEARING CAPACITY.
4. TAPPING SLEEVES SHALL BE INSTALLED PER MANUFACTURERS SPECIFICATIONS.
5. SAME DIAMETER TAPS ARE NOT PERMITTED. IF THE MAINS ARE THE SAME DIAMETER THE CONTRACTOR SHALL INSTALL A TEE WITH RESTRAINED JOINTS.
6. CONTRACTOR SHALL SET THE TAPPING SLEEVE. CITY OF HENDERSONVILLE WATER AND SEWER DEPARTMENT SHALL PERFORM THE TAP.

DATE: 07/14/2025 WD DWG. NO. 1-1	WATER DETAILS GENERAL NOTES	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

DATE: 07/14/2025 WD DWG. NO. 1-2	WATER DETAILS GENERAL NOTES	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

DATE: 07/14/2025 WD DWG. NO.02	TRENCH CONSTRUCTION	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

DATE: 07/14/2025 WD DWG. NO. 03-1	DUCTILE IRON PIPE RESTRAINT SHEET 1 OF 2	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

DATE: 07/14/2025 WD DWG. NO. 03-2	DUCTILE IRON PIPE RESTRAINT SHEET 2 OF 2	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

DATE: 07/14/2025 WD DWG. NO. 04	VALVE INSTALLATION	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

DATE: 07/14/2025 WD DWG. NO. 05	TAPPING SLEEVE AND VALVE ASSEMBLY	
SCALE: NOT TO SCALE		
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org		

REVISIONS

REV.	DATE	COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

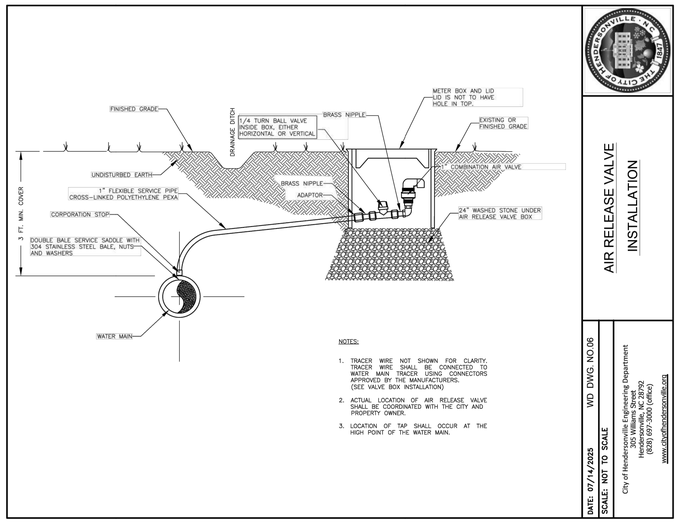
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: WATERMAIN DETAILS - 1 (SHEET 1 OF 2)

DRAWING NO: C-652

Y:\Shared\2_ENGR\656605823\5_DESIGN\DWG\SHEETS\WATER PLAN PROFILE.dwg, 9/9/2025 12:40 PM, Toby Harris

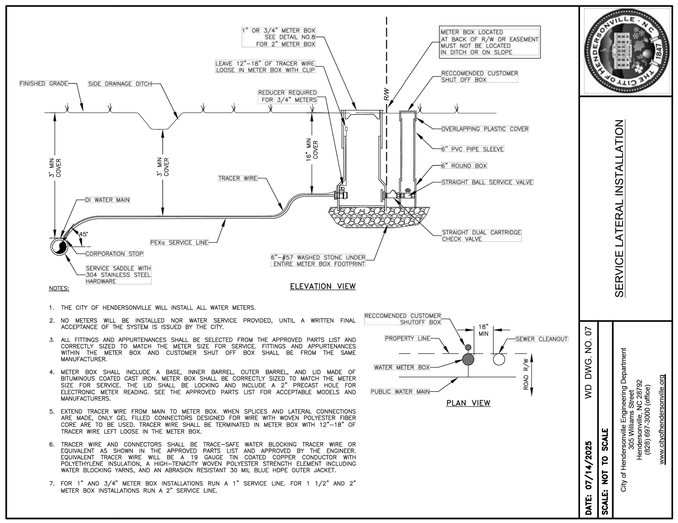


AIR RELEASE VALVE INSTALLATION

DATE: 07/14/2025 WD DWG. NO.06

SCALE: NOT TO SCALE

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

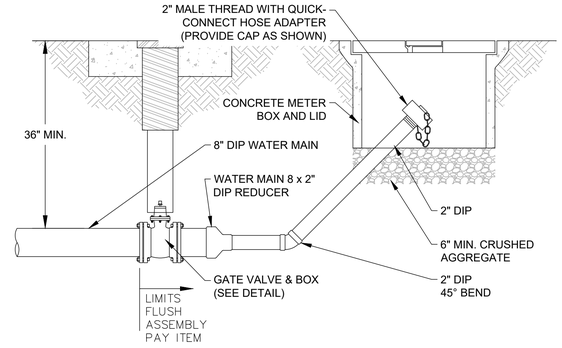


SERVICE LATERAL INSTALLATION

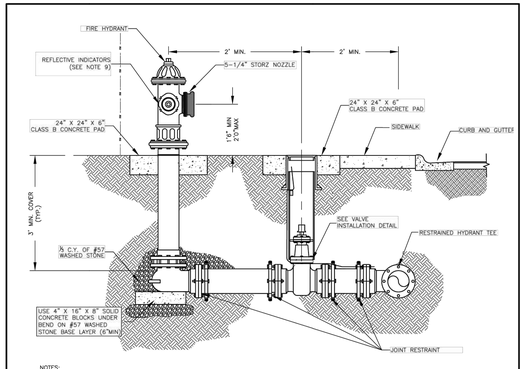
DATE: 07/14/2025 WD DWG. NO. 07

SCALE: NOT TO SCALE

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org



TWO-INCH BLOWOFF ASSEMBLY DETAIL



NOTES:

1. FIRE HYDRANTS SHALL BE RATED TO A MINIMUM 250 PSI WORKING PRESSURE IN ACCORDANCE WITH AWWA C-502 UNLESS SPECIFIED AS 350 PSI BY THE CITY. HYDRANTS SHALL HAVE A 5¼-INCH BARREL AND STORZ CONNECTION.
2. ALL VALVES AND HYDRANTS SHALL HAVE MECHANICAL JOINTS CONNECTIONS WITH IRON RETAINING GLAND MECHANICAL JOINTS RESTRAINT.
3. FIRE HYDRANT SHALL BE FACTORY PAINTED YELLOW, WITH FIELD PAINTED TOUCH-UP, BEFORE PROJECT IS ACCEPTED.
4. HYDRANT VALVE SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE MAIN, BUT DO NOT PLACE VALVE IN PROPOSED OR EXISTING CURB AND GUTTER. IF THE STREET IS SOIL AND NO PAVING IS TO BE DONE AT THIS TIME, THE LOCATION OF THE VALVE IS TO BE DETERMINED BY THE ENGINEER.
5. FIRE HYDRANTS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
6. HYDRANT LEG SHALL NOT BE BACK FILLED UNTIL INSPECTED AND APPROVED BY THE CITY OF HENDERSONVILLE ENGINEERING DEPARTMENT.
7. GATE VALVE AND BOX SHALL CONSTRUCTED BE IN ACCORDANCE WITH STANDARD DETAIL.
8. FIRE HYDRANTS WHICH HAVE BEEN INSTALLED, MUST BE TAGGED "OUT OF SERVICE" AND BAGGED, UTILIZING A RED CANVAS BAG WITH WHITE LETTERING, UNTIL SUCH TIME AS THE WATER MAIN TO WHICH CONNECTED IS DISINFECTED AND CONNECTED TO THE ACTIVE WATER SYSTEM.
9. FIRE HYDRANT SHALL HAVE REFLECTIVE INDICATORS INSTALLED BEHIND TWO-INCH CONNECTION CAPS. COLOR CODING SHALL MEET NFPA-291 STANDARDS AND AVAILABLE FIRE FLOW SHALL BE CONFIRMED BY ENGINEER.

FIRE HYDRANT STANDARD INSTALLATION

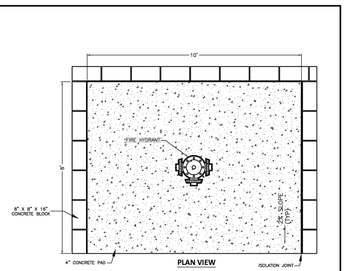
DATE: 07/14/2025 WD DWG. NO. 11

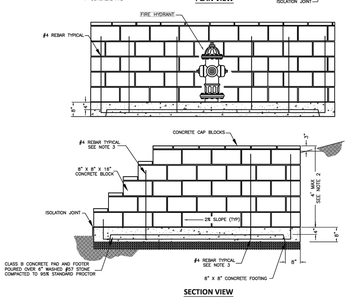
SCALE: NOT TO SCALE

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

NOTES:

1. RETAINING WALLS FOR USE IN CONJUNCTION WITH THE INSTALLATION OF FIRE HYDRANTS SHALL BE INSTALLED WHERE SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. FIGURES SHOWN REPRESENT MINIMUMS ONLY. ALL RETAINING WALLS ABOVE 4' SHALL BE DESIGNED BY AN ENGINEER AND PERMITTED BY HENDERSON COUNTY.
3. STEEL REBAR TO BE INSTALLED AT 16" ON CENTER. INSTALL MINIMUM 1-BAR IN THE CENTER OF THE FOOTING FOR WALL.
4. GRAVITY WALL MAY BE INSTALLED ONLY WITH PRIOR APPROVAL OF SUBMITTAL FOR INSTALLATION.
5. AN EASEMENT MAY BE REQUIRED DEPENDING ON THE LOCATION OF THE WALL.
6. RETAINING WALL SHALL NOT BE BUILT ABOVE WATER INFRASTRUCTURE.
7. HYDRANT VALVE TO BE LOCATED OUTSIDE OF CONCRETE PAD FOOTPRINT WHEN FEASIBLE.



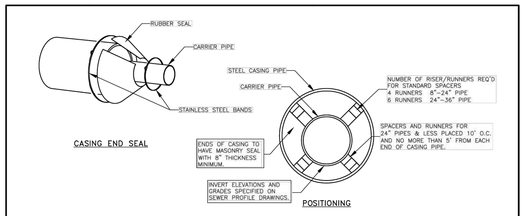


FIRE HYDRANT SLOPE INSTALLATION

DATE: 07/14/2025 WD DWG. NO. 13

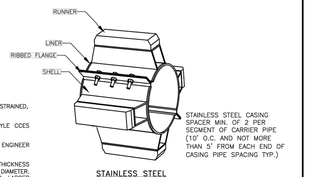
SCALE: NOT TO SCALE

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org



CASING END SEAL

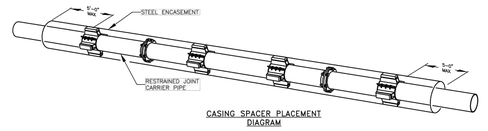
POSITIONING



NOTES:

1. CARRIER PIPE JOINTS SHALL BE MECHANICALLY RESTRAINED, DUCTILE IRON.
2. STAINLESS STEEL CASING SPACERS SHALL BE STYLE CCES OR ENGINEER APPROVED EQUIVALENT.
3. CASING END SEAL SHALL BE STYLE CCES OR ENGINEER APPROVED EQUIVALENT.
4. STEEL ENCASEMENT PIPE SHALL HAVE A WALL THICKNESS OF 1/4" FOR CARRIER PIPES UP TO 12" IN DIAMETER. ENGINEER TO DETERMINE WALL THICKNESS FOR LARGER CARRIER PIPES.

STAINLESS STEEL CASING SPACER



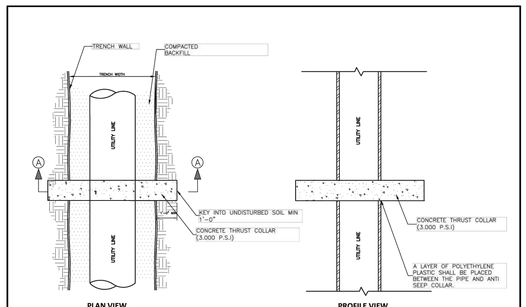
CASING SPACER PLACEMENT DIAGRAM

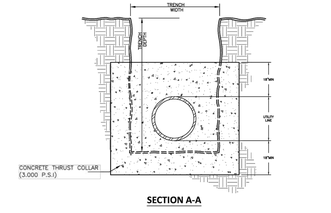
CARRIER PIPE IN STEEL ENCASEMENT

DATE: 07/14/2025 WD DWG. NO. 14

SCALE: NOT TO SCALE

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org





SECTION A-A

ANTI - SEEP COLLAR

DATE: 07/14/2025 WD DWG. NO. 16

SCALE: NOT TO SCALE

City of Hendersonville Engineering Department
305 Williams Street
Hendersonville, NC 28792
(828) 697-3000 (office)
www.cityofhendersonville.org

REVISIONS

REV.	DATE	COMMENTS
6	09/09/2025	ADDRESS UTILITY COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

ENGINEER'S SEAL: NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER JOHN M. HARRIS

09/09/2025

PROJECT #	656605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

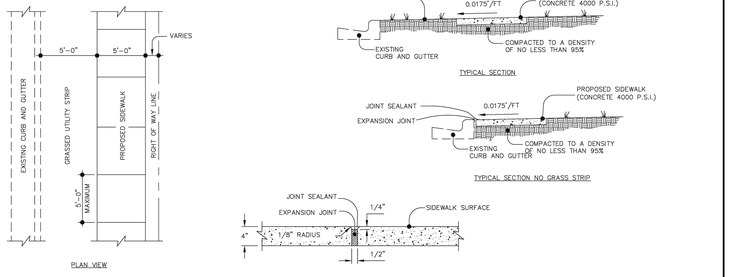
THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

DRAWING NO: C-653

SHEET TITLE: WATERMAIN DETAILS - 2 (SHEET 2 OF 2)

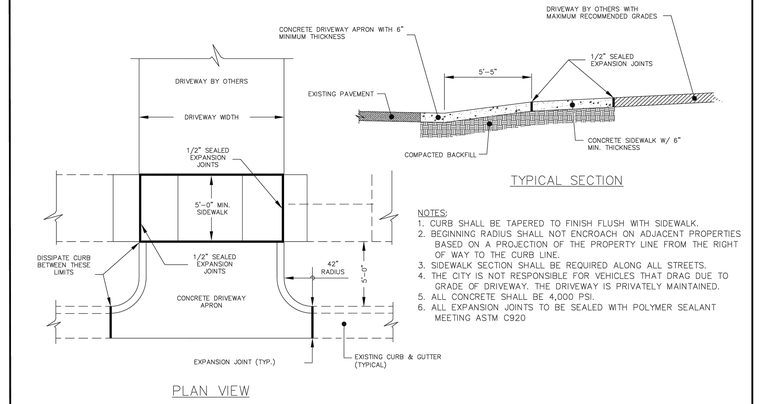
Y:\Shared\2_ENGINEERING\656605823\5_DESIGN\DWG\SHEETS\WATER PLAN PROFILE.dwg, 9/9/2025 12:40 PM, Toby Harris



NOTES:

1. TRANSVERSE EXPANSION JOINTS TO BE A MAXIMUM OF 50 FEET.
2. ALL CONCRETE TO BE FINISHED WITH CURING COMPOUND.
3. A 6 INCH DEPTH IS REQUIRED AT LOCATIONS OF DRIVEWAY CROSSINGS, AT STREET INTERSECTIONS (ALONG THE LENGTH OF RADIUS CURB RETURNS), AND IN THE HANDICAP RAMPS.
4. ALL SIDEWALK MUST BE INSPECTED BY CITY INSPECTOR PRIOR TO CONCRETE PLACEMENT.
5. SIDEWALK CROSS SLOPE WILL BE A MAXIMUM OF 0.02"/1" PER ADA REQUIREMENTS.
6. ALL SIDEWALK WILL BE LEFT IN A BROOM FINISH CONDITION.
7. CONTRACTOR MUST REPAIR ALL DAMAGE TO SIDEWALK PRIOR TO TRANSFER OF OWNERSHIP.
8. EXPANSION JOINT MATERIAL TO BE INSTALLED AT ALL LOCATIONS WHERE SIDEWALK ABUTS A RIGID STRUCTURE.
9. ALL EXPANSION JOINTS TO BE SEALED WITH POLYMER SEALANT MEETING ASTM C920

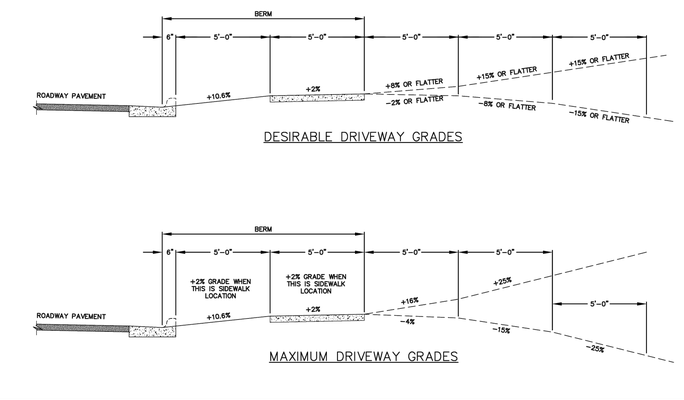
DATE: 05/19/2023	
SCALE: NOT TO SCALE	WD DWG. NO. 22
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org	STANDARD CONCRETE SIDEWALK



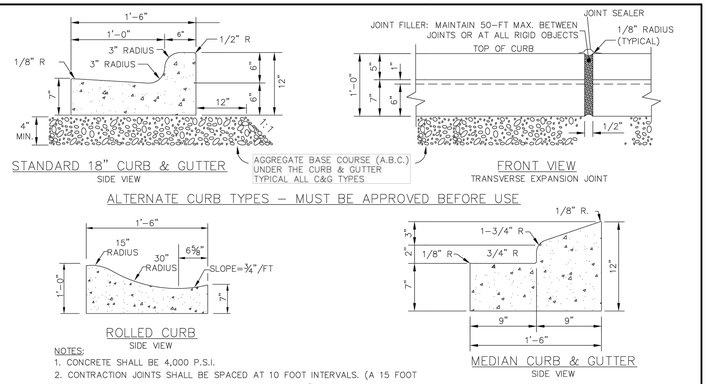
NOTES:

1. CURB SHALL BE TAPERED TO FINISH FLUSH WITH SIDEWALK.
2. BEGINNING RADIUS SHALL NOT ENCROACH ON ADJACENT PROPERTIES BASED ON A PROJECTION OF THE PROPERTY LINE FROM THE RIGHT OF WAY TO THE CURB LINE.
3. SIDEWALK SECTION SHALL BE REQUIRED ALONG ALL STREETS.
4. THE CITY IS NOT RESPONSIBLE FOR VEHICLES THAT DRAG DUE TO GRADE OF DRIVEWAY. THE DRIVEWAY IS PRIVATELY MAINTAINED.
5. ALL CONCRETE SHALL BE 4,000 PSI.
6. ALL EXPANSION JOINTS TO BE SEALED WITH POLYMER SEALANT MEETING ASTM C920

DATE: 05/19/2023	
SCALE: NOT TO SCALE	WD DWG. NO. 02
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org	DRIVEWAY APRON TYPE I & II



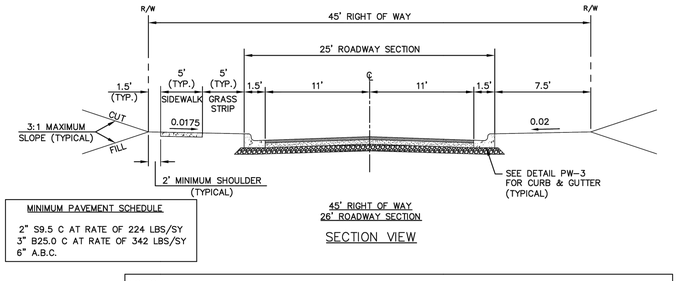
DATE: 05/19/2023	
SCALE: NOT TO SCALE	WD DWG. NO. 02G
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org	DRIVEWAY APRON TYPE I & II GRADES



NOTES:

1. CONCRETE SHALL BE 4,000 P.S.I.
2. CONTRACTION JOINTS SHALL BE SPACED AT 10 FOOT INTERVALS. (A 15 FOOT SPACING WILL BE ALLOWED WHEN A MACHINE IS USED)
3. FINISH ALL CONCRETE WITH CURING COMPOUND.
4. REFER TO **NCDOT** DET. 846.01 FOR CURB & GUTTER SUPERELEVATION RATES.
5. ALL EXPANSION JOINTS WILL BE SEALED WITH JOINT SEALER.

DATE: 05/19/2023	
SCALE: NOT TO SCALE	WD DWG. NO. 03
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org	CONCRETE CURB AND GUTTER TYPES



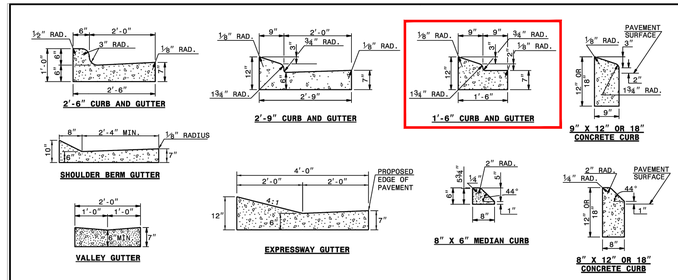
MINIMUM PAVEMENT SCHEDULE

2" S9.5 C AT RATE OF 224 LBS/SY
3" B25.0 C AT RATE OF 342 LBS/SY
6" A.B.C.

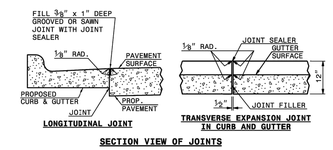
NOTES:

1. NORMAL CROWN OF 0.02' PER FOOT UNLESS OTHERWISE REQUIRED TO HAVE SUPERELEVATION.
2. PAVEMENT DESIGN SHALL BE REQUIRED AND APPROVED BY **NCDOT** (FOR NCDOT ROADS) AND/OR CITY OF HENDERSONVILLE PRIOR TO PLACEMENT OF ANY BASE MATERIAL.
3. PAVEMENT DESIGN SHALL BE AS SHOWN OR AS DESIGNED BY GEOTECHNICAL ENGINEER, WHICHEVER IS GREATER.
4. TACK COAT SHALL BE APPLIED BENEATH EACH LAYER OF ASPHALT MIX TO BE PLACED AT A RATE OF 0.04 GAL/SY
5. GRASS UTILITY STRIP REQUIRED UNLESS APPROVED BY PUBLIC WORKS DIRECTOR.
6. FINAL SURFACE COURSE TO BE APPLIED UPON CITY OF HENDERSONVILLE APPROVAL.

DATE: 05/19/2023	
SCALE: NOT TO SCALE	WD DWG. NO. 04
City of Hendersonville Engineering Department 305 Williams Street Hendersonville, NC 28792 (828) 697-3000 (office) www.cityofhendersonville.org	STANDARD LOCAL STREET



GENERAL NOTES:
-PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
-JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
-CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
-FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
-SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



RAISED CONCRETE ISLAND DETAIL @ SIGNAL HILL ROAD ENTRANCE

ROADWAY STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER

SHEET 1 OF 3
846.01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-26J

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030895 ROBIN M. HARRIS
09/16/2024

PROJECT #	656605823	
DATE:	09/16/2024	DW
DESIGN BY:		DW
DRAWN BY:		TMH
APPROVED:		AS SHOWN
SCALE:		

DRAWING NO: C-654

SHEET TITLE: MISCELLANEOUS DETAILS

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

REVISIONS

REV.	DATE	COMMENTS

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

Y:\Shared\2_ENGR\656605823\0_DESIGN\DWG\SHEETS\MISC DETAILS.dwg, 9/9/2025 12:41 PM, Toby Harris

TOTAL AREA OF SURVEY
13.73 ACRES
(EXCLUDING RIGHTS OF WAY)

B1 – C1
320 LF SHALLOW CONCENTRATED FLOW
(UNPAVED) @ 19.85%

A1 – B1
100 LF SHEET FLOW
(GRASS) @ 8.0%

B2 – C2
282 LF SHALLOW CONCENTRATED FLOW
(UNPAVED) @ 6.4%

A2 – B2
100 LF SHEET FLOW
(GRASS) @ 4.8%

A3 – B3
100 LF SHEET FLOW
(GRASS) @ 5%

B3 – C3
554 LF SHALLOW CONCENTRATED FLOW
(UNPAVED) @ 5%

PRE-DEVELOPED DRAINAGE AREA #1
2.22 AC
CN = 70
Tc = 14.10 MINUTES

PRE-DEVELOPED DRAINAGE AREA #2
2.99
AC
CN = 74
Tc = 14.70 MINUTES

PRE-DEVELOPED DRAINAGE AREA #3
11.36 AC
CN = 73
Tc = 18.70 MINUTES

C1 B1 A1 A3 B3 C3
C2 B2 A2

AMAZING GRACE LN.
20' PRIVATE R/W

30' SEWER EASEMENT
PER DB 838 PG 434

ZONED: R-20

HYDRAULIC SOIL GROUP
C (HyC, DeB)
W

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1"=50'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER ROBIN M. HARRIS
09/16/2024

PROJECT #	DATE:	DESIGN BY:	DRAWN BY:	APPROVED:	SCALE:
656605823	09/16/2024	DW	DW	TMH	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704-394-6913
www.3notch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: PRE DEVELOPMENT DRAINAGE AREA MAP

DRAWING NO: C-700

HyC

TOTAL AREA OF SURVEY
13.73 ACRES

POST-DEVELOPED DRAINAGE AREA #1
0.67 AC
CN = 77
Tc = 5.0 MINUTES

POST-DEVELOPED DRAINAGE AREA #1-BYPASS
1.33 AC
CN = 70
Tc = 12.0 MINUTES

POST-DEVELOPED DRAINAGE AREA #2
1.57 AC
CN = 82
Tc = 5.0 MINUTES

HyC

POST-DEVELOPED DRAINAGE AREA #2 - BYPASS
2.06 AC
CN = 70
Tc = 12.0 MINUTES

POST-DEVELOPED DRAINAGE AREA #3
8.11 AC
CN = 82
Tc = 5.0 MINUTES

POST-DEVELOPED DRAINAGE AREA #3-BYPASS
3.07 AC
CN = 70
Tc = 12.0 MINUTES

OVERLAPPING EASEMENTS

PERMANENT DRAINAGE EASEMENT
PER PB 1999 SL 3086
& DB 993 PG 360

STREAMBANK MAINTENANCE EASEMENT
PER PB 2018 SL 11488, AREA G
DB 3284 PG 387 & DB 3273 PG 78

ALLEN ST.
NOT CURRENTLY IN USE
VARIABLE WIDTH PRIVATE R/W
PER PB 2 PG 156

AMAZING GRACE LN.
NOT CURRENTLY IN USE
20' PRIVATE R/W PER PB 2 PG 156

AMAZING GRACE LN.
20' PRIVATE R/W

LAFOLETTE ST. ETTE ST.
30' PRIVATE R/W JIC R/W

30' SEWER EASEMENT
PER DB 838 PG 434

STREAMBANK MAINTENANCE EASEMENT
PER PB 2018 SL 11488, AREA F
DB 3284 PG 387 & DB 3273 PG 78

ZONED: R-12

HYDRAULIC SOIL GROUP

C (HyC, DeB)

W

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1"=50'

FIRST VICTORY
542 S. CALDWELL ST.
BREVARD, NC 28712
828.884.7934

REVISIONS

REV.	DATE	COMMENTS
2	01/31/2025	ADDRESS CITY & COUNTY COMMENTS

ENGINEER'S SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 030895 ENGINEER TIMOTHY M. HARRIS

PROJECT #	456605823
DATE:	09/16/2024
DESIGN BY:	DW
DRAWN BY:	DW
APPROVED:	TMH
SCALE:	AS SHOWN

THREE NOTCH GROUP
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
Phone: 704.464.4503
www.3ntch.com
License No. C-4973

SIGNAL HILL
SIGNAL HILL ROAD
HENDERSONVILLE, NORTH CAROLINA

SHEET TITLE: C-701 - POST DEVELOPMENT DRAINAGE AREA MAP

DRAWING NO: C-701

V:\Signal\2. ENGINEERING\2.2 DESIGN\MONSERT\SHSE (AND POST DEV) DA MAP.dwg, 9/30/2025 12:41 PM, Tyler Hines