TRACT AREA--31.27 AC
--1,362,275 SF
ZONING--MF-M
PROPOSED UNITS--93
UNITS PER ACRE--3.0
MINIMUM LOT SIZE--5,928 SF
TAX PIN--R07006-001-005-000
--R07006-002-021-000
DEED BOOK/PAGE--58222/946
CAMA LUC--URBAN & CONSERVATION
PROPOSED BUA--521,549 SF
--11.97 AC
% BUA--38.3%
RECIEVING STREAM--BARNARDS CREEK
CLASSIFICATION--C;SW
SETBACKS--
FRONT--15
REAR--15
SIDE--5
CORNER--10
MAX HEIGHT--35

SITE DATA

BOUNDARY
WETLANDS
FLOOD LINE
EASEMENT
EX CONTOURS
EX SEWER
PROP SEWER
EX WATER
PROP WATER
STORM DRAIN

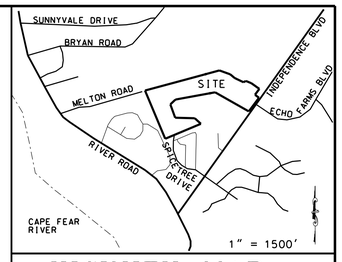
SILT FENCE
TREE FENCE
& L.O.D.

LIMITS OF
DISTURBANCE

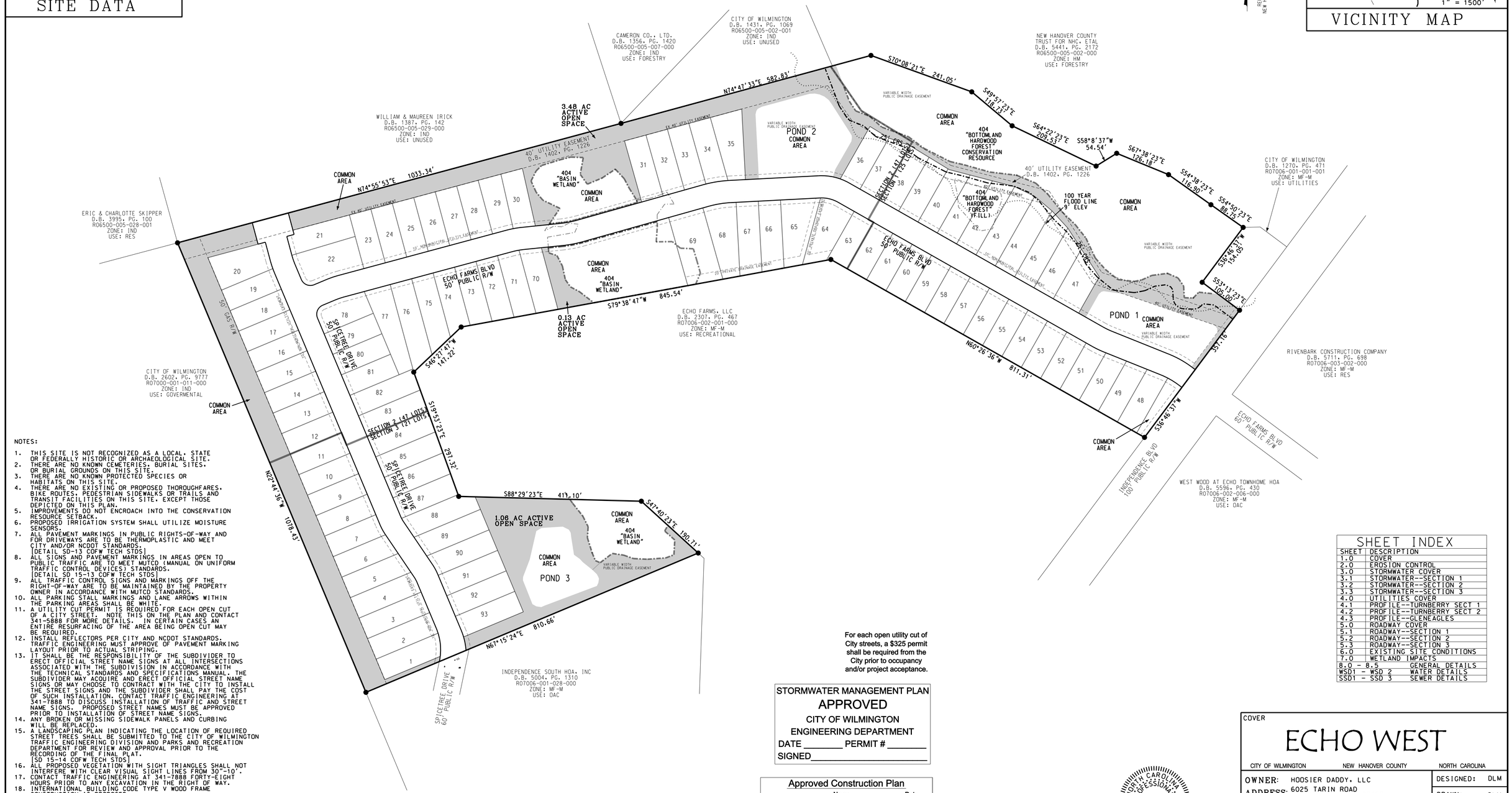
LEGEND

TOTAL TRACT AREA-- 31.27 AC
AREA IN R/W-- 3.72 AC
AREA IN LOTS-- 15.20 AC
TOTAL COMMON AREA-- 12.35 AC
REQUIRED RECREATION SPACE (0.03 ACRES X 93 LOTS)-- 2.79 AC
COMMON AREA RESERVED FOR ACTIVE RECREATION (1.40 AC MIN)-- 5.18 AC
COMMON AREA RESERVED FOR PASSIVE RECREATION (1.40 AC MIN)-- 7.17 AC

THE SQUARE FOOTAGE OF THE PROPOSED LOTS
RANGES FROM 5,928 SF TO 13,048 SF



VICINITY MAP



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STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED_____

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENNING

DAVID L. MENNING, P.E.
DATE 10/1/2015

SHEET INDEX

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COVER

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED: DLM
DRAWN: DLM
APPROVED: JHF
DATE: 1/13/2015
SCALE: 1"= 100'
SHEET: 1.0

TRACT AREA--31.27 AC
--1,362,275 SF
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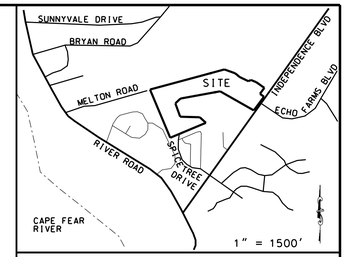

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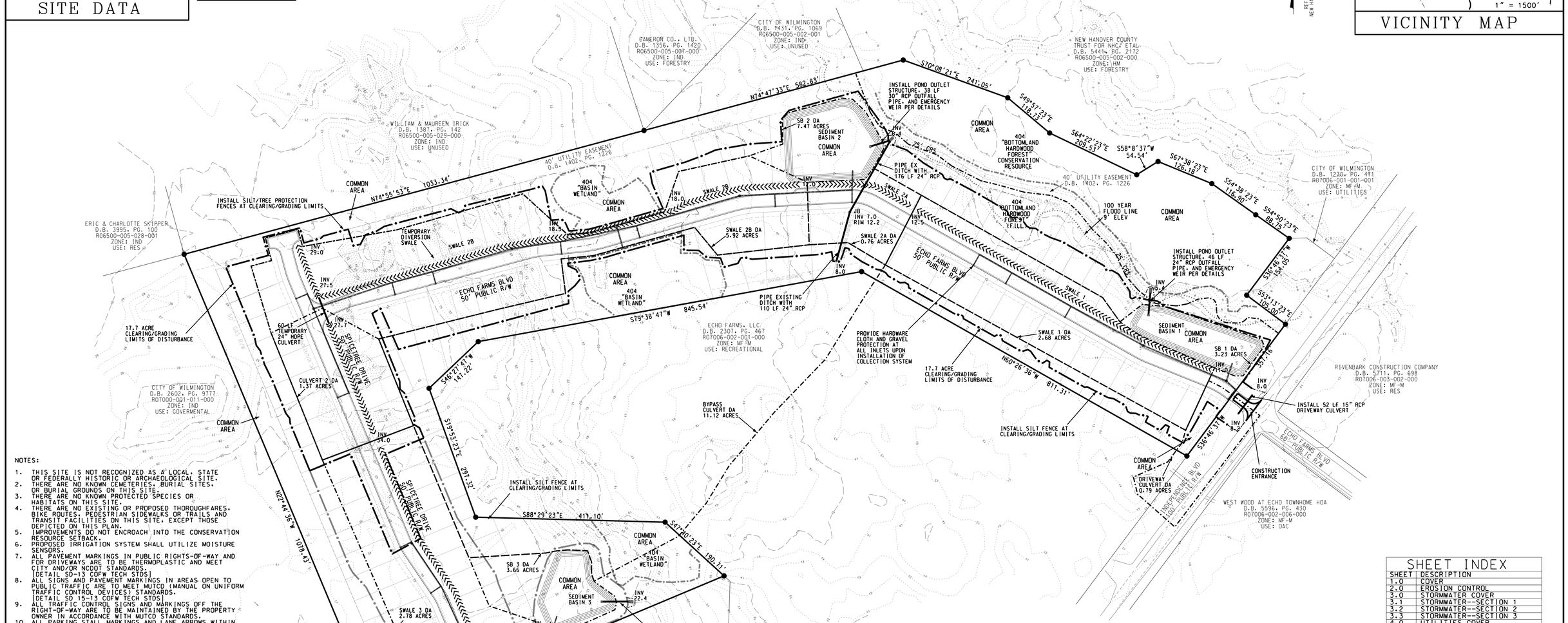

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DATE _____ PERMIT # _____
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NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MEWBS

DAVID L. MEWBS, P.E.
DATE 10/1/2015

EROSION CONTROL

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	1"= 100'
SHEET:	2.0

TRACT AREA--31.27 AC
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SILT FENCE
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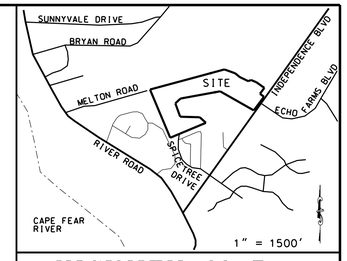
LIMITS OF DISTURBANCE

LEGEND

PROPOSED BUA TABLE			
POND #	1	2	3
DRAINAGE AREA	4.43 AC	9.11 AC	4.11 AC
=	193,090 SF	396,841 SF	178,933 SF
STREETS	24,602 SF	54,299 SF	15,258 SF
SIDEWALK	8,053 SF	15,436 SF	5,352 SF
RESERVE	3,000 SF	5,000 SF	3,000 SF
LOT (PRIMARY)	3,200 SF	3,200 SF	3,200 SF
LOT (SECONDARY	100 SF	100 SF	100 SF
# OF LOTS	25	47	21
TOTAL LOT BUA	82,500 SF	155,100 SF	69,300 SF
TOTAL BUA	118,155 SF	229,835 SF	92,910 SF
% BUA	61.2 %	57.9 %	51.9 %



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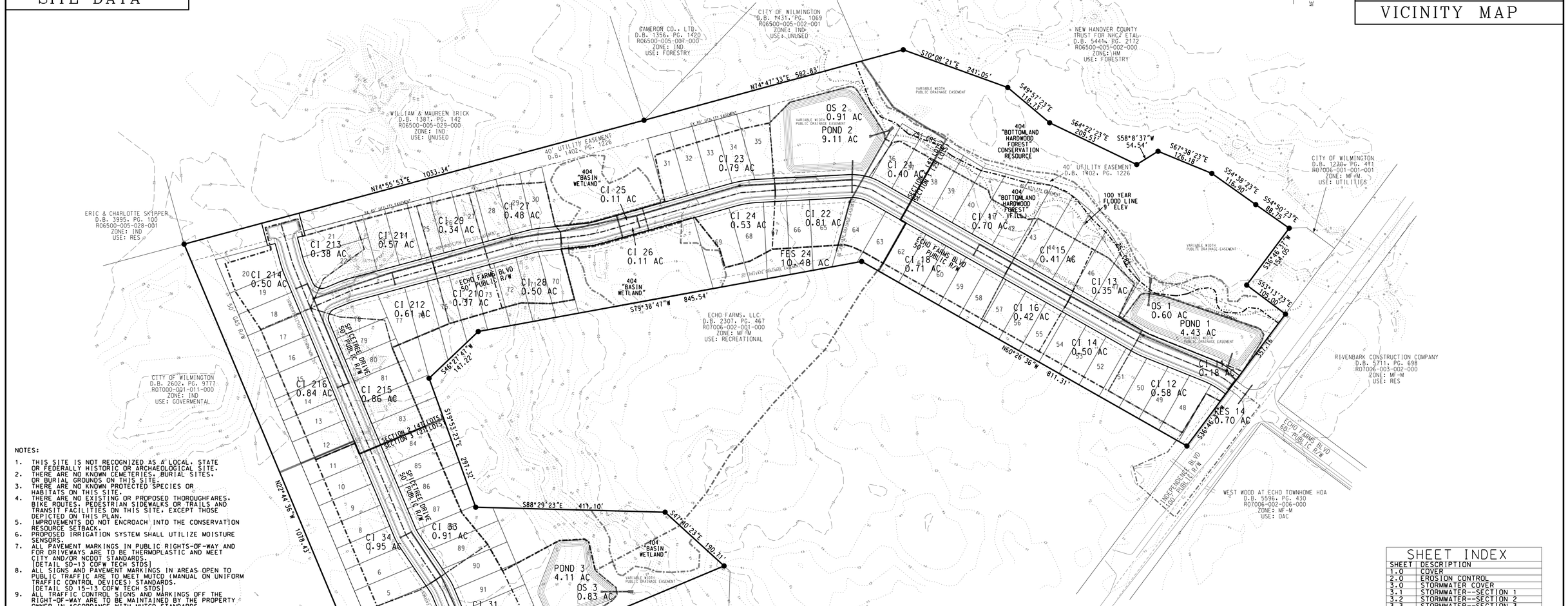

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GRAPHIC SCALE: 1" = 100'

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DATE _____ PERMIT # _____
SIGNED_____

Approved Construction Plan

	Name	Date
Planning		
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NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENNING

DAVID L. MENNING, P.E.
DATE 10/1/2015

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STORMWATER COVER

ECHO WEST

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DESIGNED:	DLM
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SHEET:	3.0

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NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MENNIS

DAVID L. MENNIS, PE
DATE 10/1/2015

SECTION 1 STORMWATER

ECHO WEST

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SHEET:	3.1

REF: M.B. 35, PAGE 370
NEW HANOVER COUNTY REGISTRY

404 "BASIN WETLAND"

ECHO FARMS BLVD
50' PUBLIC R/W

SPICETREE DRIVE
50' PUBLIC R/W

50' GAS R/W

40' UTILITY EASEMENT
D.B. 1402, PG. 1226

EX 40' UTILITY EASEMENT

10' NON-MUNICIPAL UTILITY EASEMENT

20' PRIVATE DRAINAGE EASEMENT

VARIABLE WIDTH
PUBLIC DRAINAGE EASEMENT

POND 2

40 LF VINYL SHEET PILE

40 LF DEPRESSED WEIR SECTION

PROVIDE POND LANSCAPING ON 100' INTERVALS USE LIVE OAK W/ AZALEA CLUSTERS

SECTION 1 (25 LOTS)
SECTION 2 (47 LOTS)
SECTION 3 (21 LOTS)

VARIABLE PUBLIC D

EX JB
RIM 30.1
INV 18.8

EX JB

EX 48" FES
INV 18.3

EX DITCH
TOP 16.7
INV 11.9

EX DITCH
TOP 11.7
INV 7.5

EX DITCH
TOP 7.6
INV 5.4

CI 213
TC/BC 28.56
CROWN 26.90

CI 214
TC/BC 28.56
CROWN 27.00

JB 24
RIM 28.80
CROWN 26.30

CI 211
TC/BC 26.20
CROWN 24.50

CI 212
TC/BC 26.20
CROWN 24.60

CI 210
TC/BC 26.58
CROWN 24.50

CI 29
TC/BC 26.58
CROWN 24.40

JB 23
RIM 22.27
CROWN 20.00

CI 27
TC/BC 19.53
CROWN 17.80

CI 28
TC/BC 19.53
CROWN 17.80

12" DIP
INV 16.00

CI 25
TC/BC 18.09
CROWN 15.30

CI 26
TC/BC 18.09
CROWN 15.40

JB 22
RIM 14.50
CROWN 12.90

CI 23
TC/BC 13.41
CROWN 11.80

CI 21
TC/BC 11.69
CROWN 9.50

CI 24
TC/BC 13.41
CROWN 11.90

CI 22
TC/BC 11.69
CROWN 9.60

JB 21
RIM 12.20
CROWN 9.00

FES 24
INV 8.00

FES 22
INV 6.00

FES 23
INV 6.50

OS 2
INV 6.50

EM WEIR FES 21
INV 6.40

CI 215
TC/BC 28.14
CROWN 26.50

CI 216
TC/BC 28.14
CROWN 26.50

GRAPHIC SCALE: 1" = 50'

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STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
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	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MEMLER

DAVID L. MEMLER, P.E.
DATE 10/1/2015

SECTION 2 STORMWATER

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	1"= 50'
SHEET:	3.2

REF. M.B. 35, PAGE 370
NEW HANOVER COUNTY REGISTRY

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50' 25' 0 50' 100'
GRAPHIC SCALE: 1" = 50'

NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MEANS

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DATE 10/1/2015

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TRACT AREA--31.27 AC
--1,362,275 SF
ZONING--MF-M
PROPOSED UNITS--93
UNITS PER ACRE--3.0
MINIMUM LOT SIZE--5,928 SF
TAX PIN--R07006-001-005-000
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DEED BOOK/PAGE--58222946
CAMA LUC--URBAN & CONSERVATION
PROPOSED BUA--521,549 SF
--11.97 AC
% BUA--38.3%
RECIEVING STREAM--BARNARDS CREEK
CLASSIFICATION--C;SW
SETBACKS--
FRONT--15
REAR--15
SIDE--5
CORNER--10
MAX HEIGHT--35

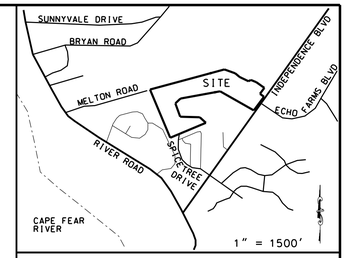
SITE DATA

BOUNDARY
WETLANDS
FLOOD LINE
EASEMENT
EX CONTOURS
EX SEWER
PROP SEWER
EX WATER
PROP WATER
STORM DRAIN

SILT FENCE
TREE FENCE
& L.O.D.

LIMITS OF
DISTURBANCE

LEGEND



VICINITY MAP

REF. M.B. 35, PAGE 370
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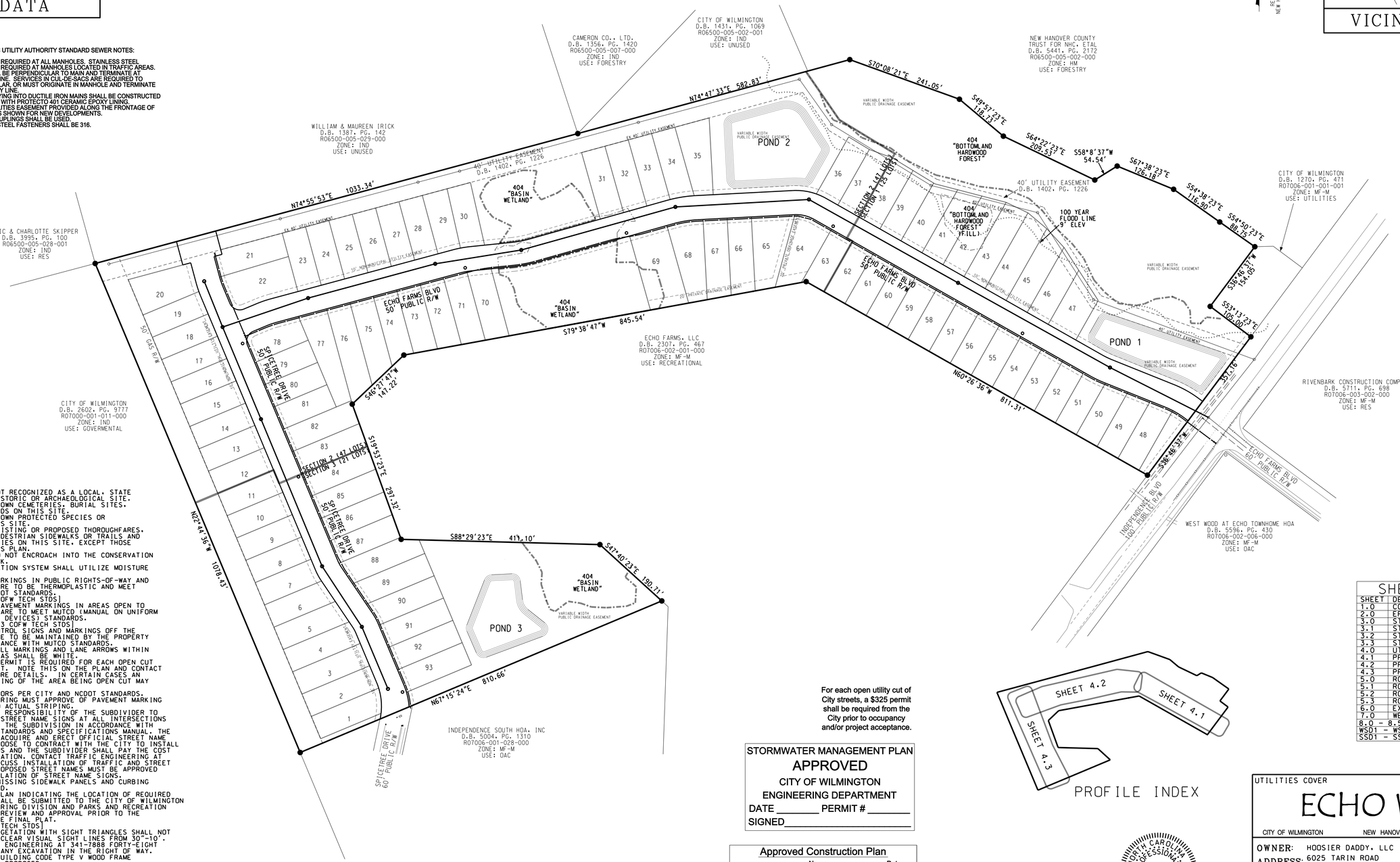

NOTES:

1. THIS SITE IS NOT RECOGNIZED AS A LOCAL, STATE OR FEDERALLY HISTORIC OR ARCHAEOLOGICAL SITE.
2. THERE ARE NO KNOWN CEMETERIES, BURIAL SITES, OR BURIAL GROUNDS ON THIS SITE.
3. THERE ARE NO KNOWN PROTECTED SPECIES OR HABITATS ON THIS SITE.
4. THERE ARE NO EXISTING OR PROPOSED THOROUGHFARES, BIKE ROUTES, PEDESTRIAN SIDEWALKS OR TRAILS AND TRANSIT FACILITIES ON THIS SITE, EXCEPT THOSE DEPICTED ON THIS PLAN.
5. IMPROVEMENTS DO NOT ENCROACH INTO THE CONSERVATION RESOURCE SETBACK.
6. PROPOSED IRRIGATION SYSTEM SHALL UTILIZE MOISTURE SENSORS.
7. ALL PAVEMENT MARKINGS IN PUBLIC RIGHTS-OF-WAY AND FOR DRIVEWAYS ARE TO BE THERMOPLASTIC AND MEET CITY AND/OR NCDOT STANDARDS.
[DETAIL SD-13 COFW TECH STDS]
8. ALL SIGNS AND PAVEMENT MARKINGS IN AREAS OPEN TO PUBLIC TRAFFIC ARE TO MEET MUTCD (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES) STANDARDS.
[DETAIL SD 15-13 COFW TECH STDS]
9. ALL TRAFFIC CONTROL SIGNS AND MARKINGS OFF THE RIGHT-OF-WAY ARE TO BE MAINTAINED BY THE PROPERTY OWNER IN ACCORDANCE WITH MUTCD STANDARDS.
10. ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
11. A UTILITY CUT PERMIT IS REQUIRED FOR EACH OPEN CUT OF A CITY STREET. NOTE THIS ON THE PLAN AND CONTACT 341-5888 FOR MORE DETAILS. IN CERTAIN CASES AN ENTIRE RESURFACING OF THE AREA BEING OPEN CUT MAY BE REQUIRED.
12. INSTALL REFLECTORS PER CITY AND NCDOT STANDARDS. TRAFFIC ENGINEERING MUST APPROVE OF PAVEMENT MARKING LAYOUT PRIOR TO ACTUAL STRIPING.
13. IT SHALL BE THE RESPONSIBILITY OF THE SUBDIVIDER TO ERECT OFFICIAL STREET NAME SIGNS AT ALL INTERSECTIONS ASSOCIATED WITH THE SUBDIVISION IN ACCORDANCE WITH THE TECHNICAL STANDARDS AND SPECIFICATIONS MANUAL. THE SUBDIVIDER MAY ACQUIRE AND ERECT OFFICIAL STREET NAME SIGNS OR MAY CHOOSE TO CONTRACT WITH THE CITY TO INSTALL THE STREET SIGNS AND THE SUBDIVIDER SHALL PAY THE COST OF SUCH INSTALLATION. CONTACT TRAFFIC ENGINEERING AT 341-7888 TO DISCUSS INSTALLATION OF TRAFFIC AND STREET NAME SIGNS. PROPOSED STREET NAMES MUST BE APPROVED PRIOR TO INSTALLATION OF STREET NAME SIGNS.
14. ANY BROKEN OR MISSING SIDEWALK PANELS AND CURBING WILL BE REPLACED.
15. A LANDSCAPING PLAN INDICATING THE LOCATION OF REQUIRED STREET TREES SHALL BE SUBMITTED TO THE CITY OF WILMINGTON TRAFFIC ENGINEERING DIVISION AND PARKS AND RECREATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO THE RECORDING OF THE FINAL PLAT.
[SD 15-14 COFW TECH STDS]
16. ALL PROPOSED VEGETATION WITH SIGHT TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHT LINES FROM 30"-10'.
17. CONTACT TRAFFIC ENGINEERING AT 341-7888 FORTY-EIGHT HOURS PRIOR TO ANY EXCAVATION IN THE RIGHT OF WAY.
18. INTERNATIONAL BUILDING CODE TYPE V WOOD FRAME CONSTRUCTION IS PROPOSED.
19. NEW HYDRANTS MUST BE AVAILABLE FOR USE PRIOR TO CONSTRUCTION OF THE BUILDING(S).
20. CONTRACTOR SHALL MAINTAIN AN ALL-WEATHER ACCESS FOR EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION.
21. UNDERGROUND FIRE LINE AND PRIVATE WATER MAINS MUST BE PERMITTED AND INSPECTED BY THE WILMINGTON FIRE DEPARTMENT FROM THE PUBLIC RIGHT-OF-WAY TO THE BUILDING. CONTACT THE WILMINGTON FIRE DEPARTMENT DIVISION OF FIRE AND LIFE SAFETY AT 910-343-0696 FOR ADDITIONAL INFORMATION.
22. FIRE HYDRANTS SHALL BE IN SUFFICIENT NUMBER TO ACCOMMODATE FIRE FLOW REQUIREMENTS.

100' 50' 0 100' 200'
GRAPHIC SCALE: 1" = 100'

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PROFILE INDEX

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENNING

DAVID L. MENNING, P.E.
DATE 10/1/2015

SHEET INDEX

SHEET	DESCRIPTION
1.0	COVER
2.0	EROSION CONTROL
3.0	STORMWATER COVER
3.1	STORMWATER--SECTION 1
3.2	STORMWATER--SECTION 2
3.3	STORMWATER--SECTION 3
4.0	UTILITIES COVER
4.1	PROFILE--TURNBERRY SECT 1
4.2	PROFILE--TURNBERRY SECT 2
4.3	PROFILE--GLENEAGLES
5.0	ROADWAY COVER
5.1	ROADWAY--SECTION 1
5.2	ROADWAY--SECTION 2
5.3	ROADWAY--SECTION 3
6.0	EXISTING SITE CONDITIONS
7.0	WETLAND IMPACTS
8.0 - 8.5	GENERAL DETAILS
WSD1 - WSD 2	WATER DETAILS
SSD1 - SSD 3	SEWER DETAILS

UTILITIES COVER

ECHO WEST

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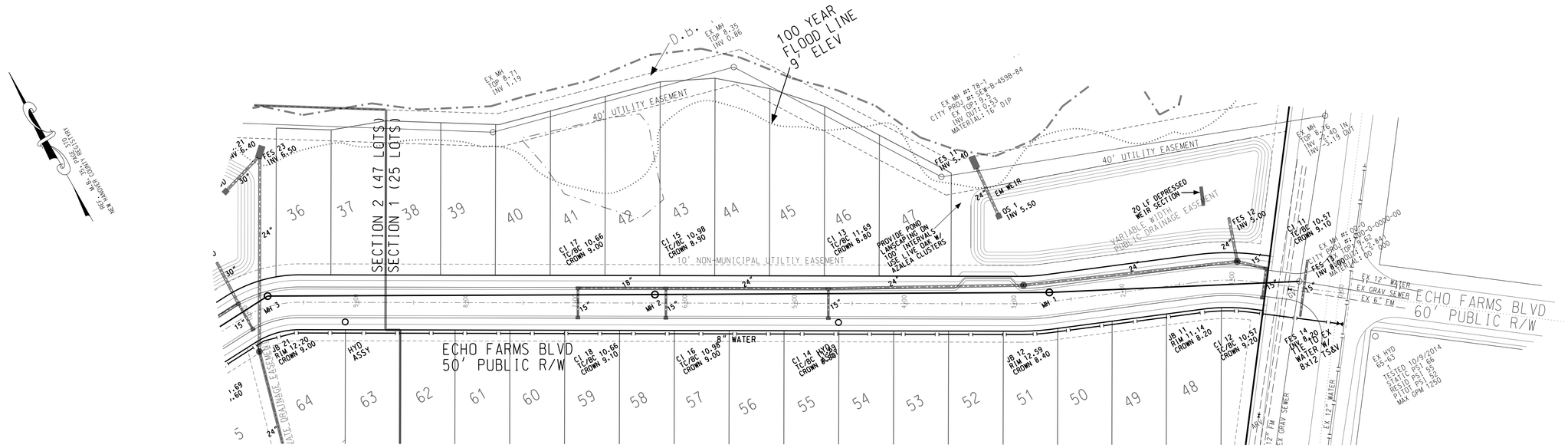

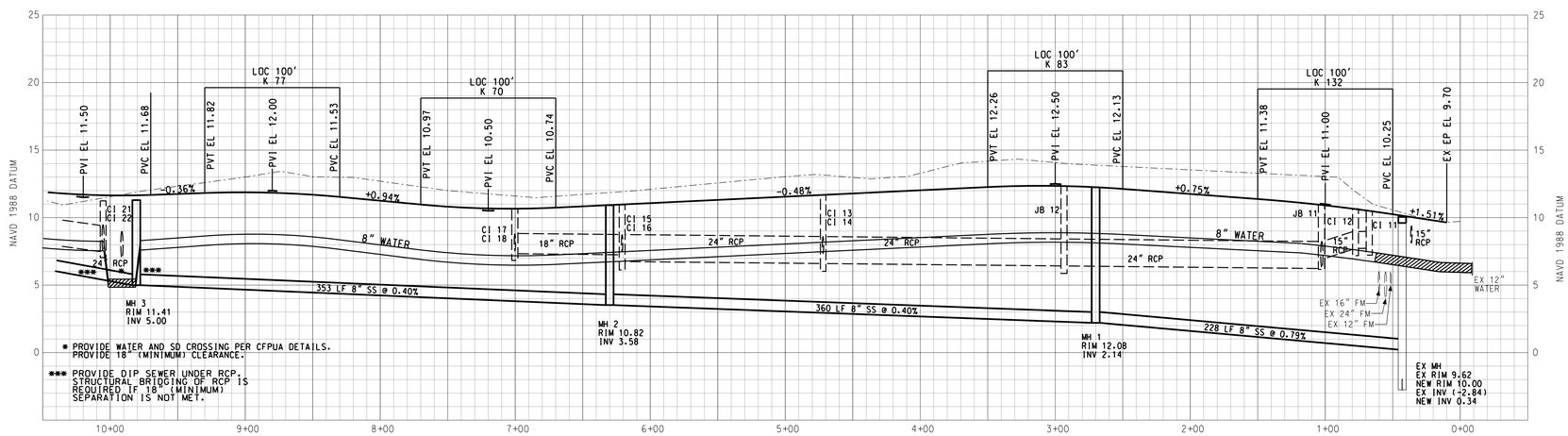

ECHO FARMS BLVD

WATER MAIN EXTENSION NOTES:

1. EXISTING UTILITY LOCATIONS IN INDEPENDENCE BLVD BASED ON MCKIM AND CREED DRAWINGS TITLED "PUMP STATION #25 WASTEWATER SYSTEM IMPROVEMENTS" DATED AND SEALED ON 3/3/2003.
2. CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES PRIOR TO EXCAVATION.
3. PROVIDE DIP WATER FROM TIE TO THE R/W LINE OR 10 FEET BEYOND SEWER MAIN CROSSING, WHICHEVER IS GREATER.
4. MINIMUM COVER OVER WATER MAIN IS 30 INCHES FROM FINISHED GRADE. DESIRED COVER IS 36 INCHES.
5. WATER MAIN SHALL BE INSTALLED VIA OPEN CUT.

PIPE MATERIAL NOTES:

2" WATER MAINS SHALL BE ASTM D2241 SDR 21 CLASS 200 PVC. 6" AND 8" WATER MAINS SHALL BE AWWA C900 DR 18 CLASS 150 PVC. WHERE REQUIRED, DUCTILE IRON WATER SHALL CONFORM TO AWWA C104, C111, C150, C151, AND C153.

GRAVITY SEWER MAINS SHALL BE AWWA C900 DR 18 CLASS 150 PVC. WHERE REQUIRED, DUCTILE IRON SEWER SHALL CONFORM TO AWWA C151. ALL PROPOSED GRAVITY SEWER IS 8 INCHES IN DIAMETER.

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REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL MATERIAL DETAILS. WHERE A DISCREPANCY OCCURS, THE PROJECT SPECIFICATIONS CONTROL.

STORM DRAINS SHALL BE CLASS IV RCP.

PVC WATER MAINS SHALL BE BLUE. DIP WATER MAINS SHALL BE MARKED WITH A CONTINUOUS BLUE STRIPE.

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50' 25' 0 50' 100'

GRAPHIC SCALE: 1" = 50'

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Fire		

NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MEWING

DAVID L. MEWING, P.E.
DATE 10/1/2015

SECTION 1 PROFILE

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
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PHONE: (252) 412-9622

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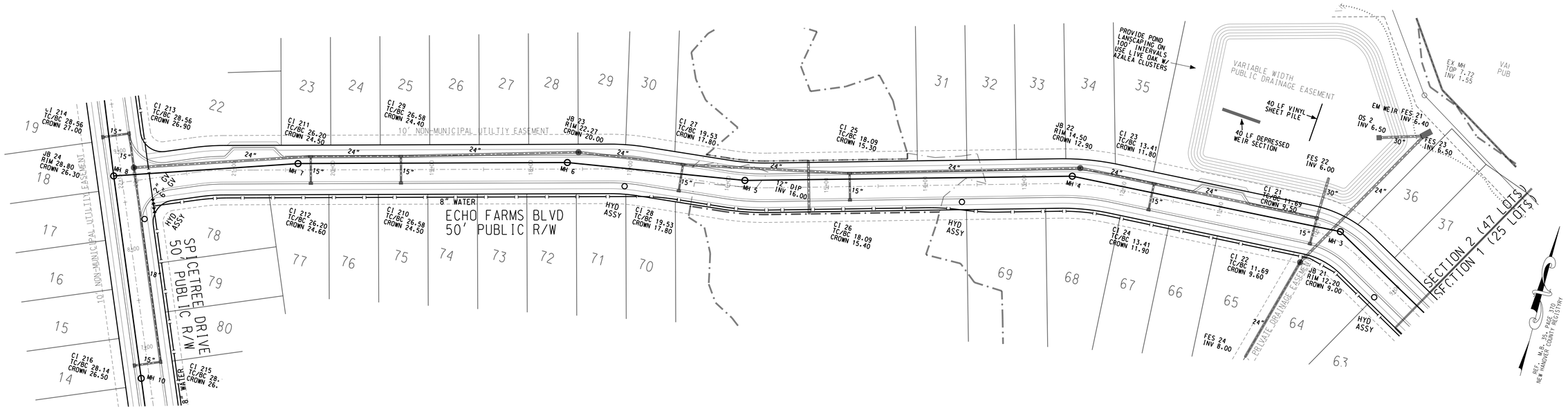

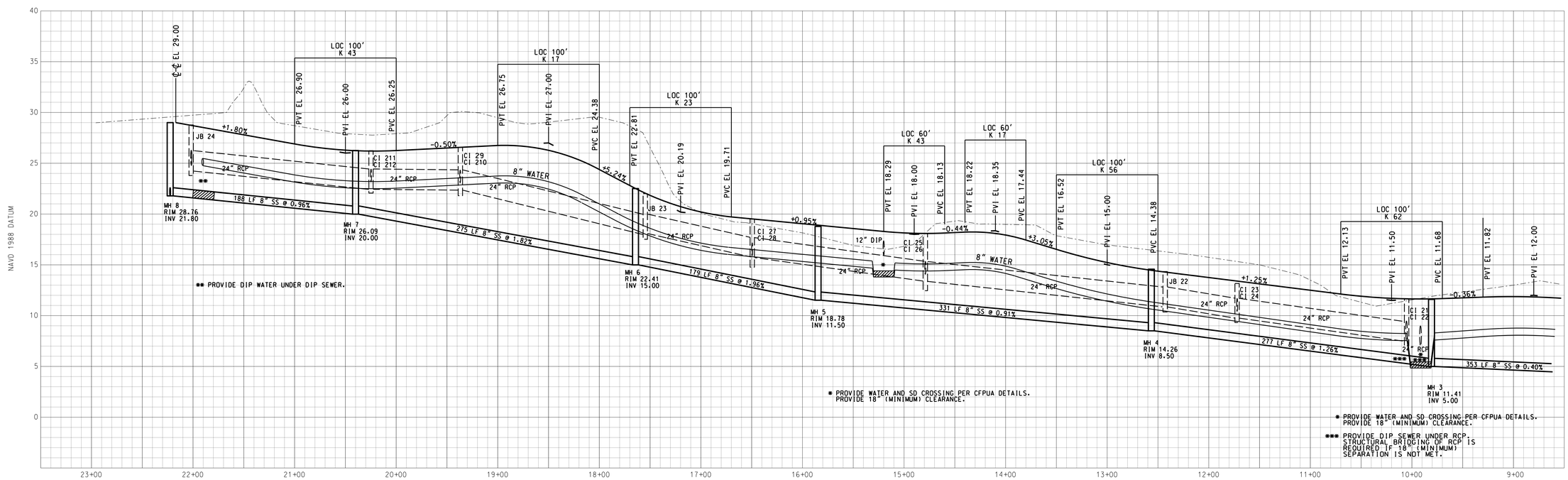

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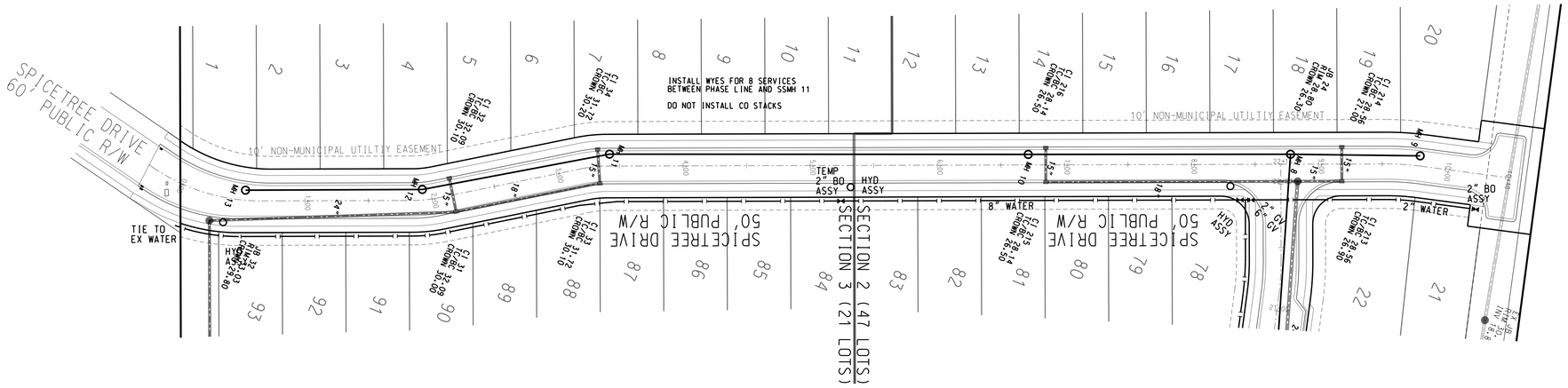

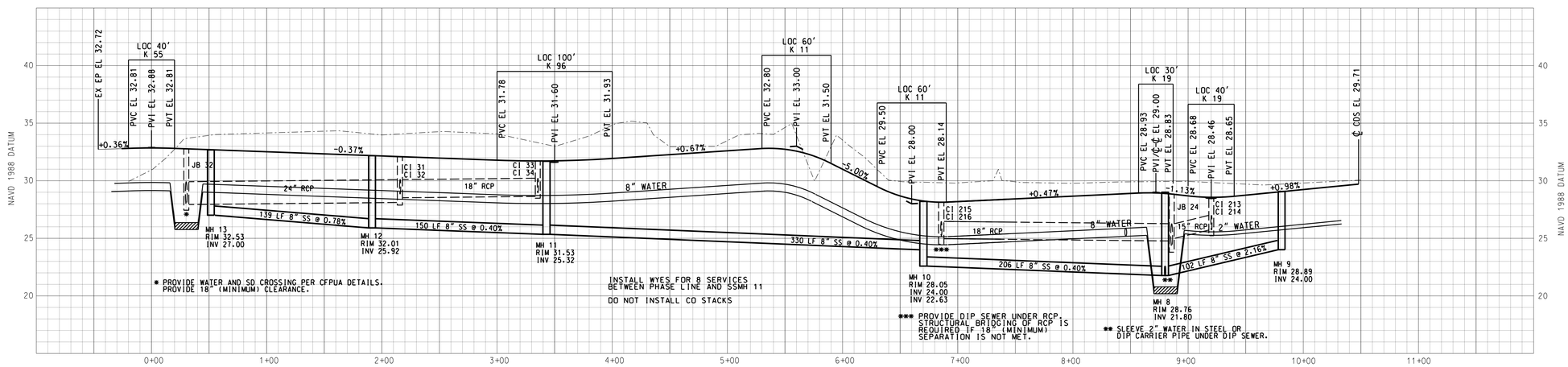

SPICETREE DRIVE

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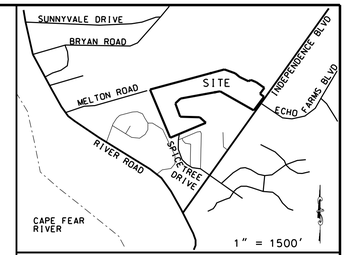
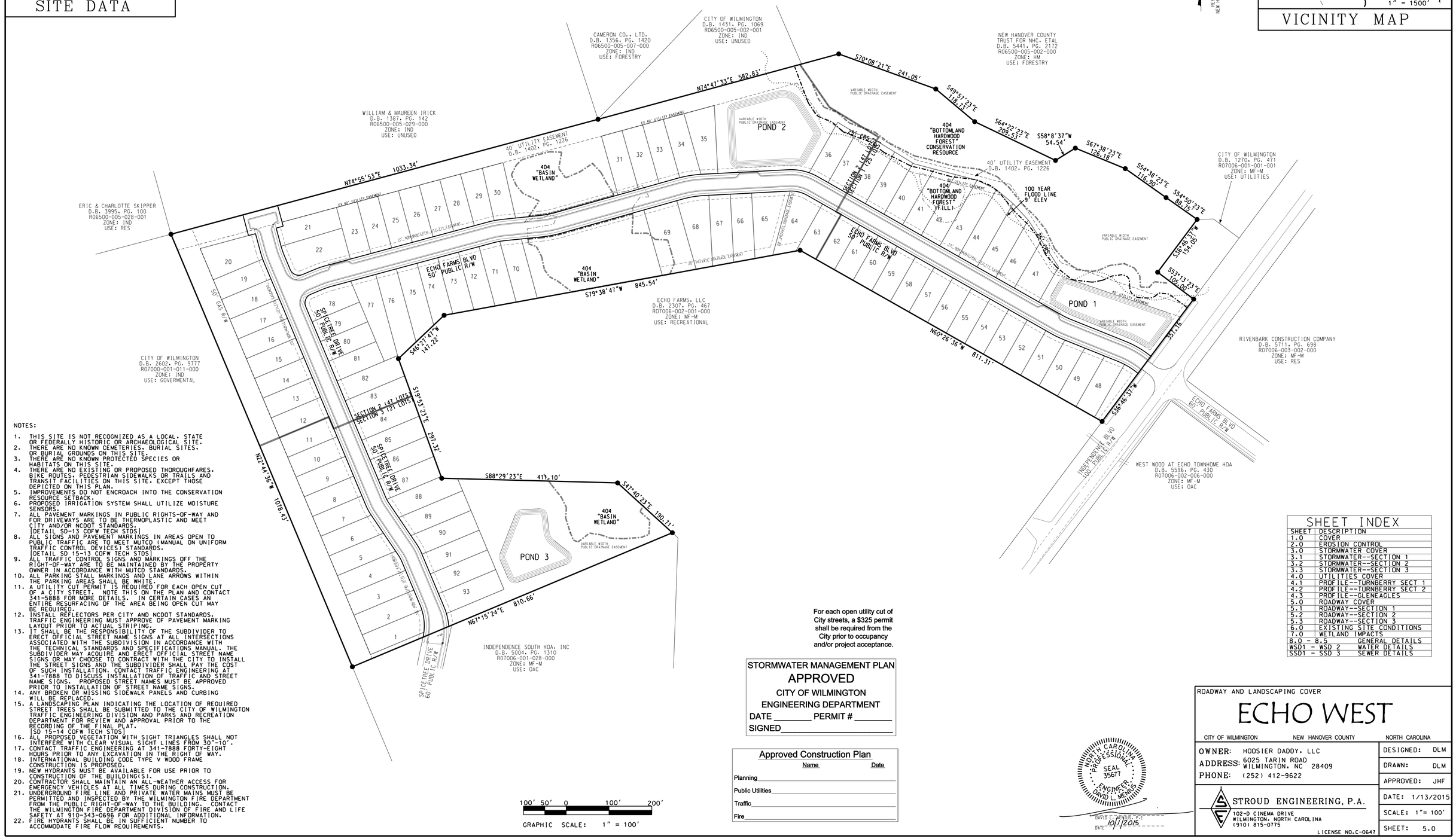
LIMITS OF
DISTURBANCE

LEGEND



VICINITY MAP



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21. UNDERGROUND FIRE LINE AND PRIVATE WATER MAINS MUST BE PERMITTED AND INSPECTED BY THE WILMINGTON FIRE DEPARTMENT FROM THE PUBLIC RIGHT-OF-WAY TO THE BUILDING. CONTACT THE WILMINGTON FIRE DEPARTMENT DIVISION OF FIRE AND LIFE SAFETY AT 910-343-0696 FOR ADDITIONAL INFORMATION.
22. FIRE HYDRANTS SHALL BE IN SUFFICIENT NUMBER TO ACCOMMODATE FIRE FLOW REQUIREMENTS.

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED_____

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

SHEET INDEX

SHEET	DESCRIPTION
1.0	COVER
2.0	EROSION CONTROL
3.0	STORMWATER COVER
3.1	STORMWATER--SECTION 1
3.2	STORMWATER--SECTION 2
3.3	STORMWATER--SECTION 3
4.0	UTILITIES COVER
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6.0	EXISTING SITE CONDITIONS
7.0	WETLAND IMPACTS
8.0 - 8.5	GENERAL DETAILS
WSD1 - WSD 2	WATER DETAILS
SSD1 - SSD 3	SEWER DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENDIS

DAVID L. MENDIS, P.E.
DATE 10/1/2015

ROADWAY AND LANDSCAPING COVER

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	1"= 100'
SHEET:	5.0

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

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	Name	Date
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Public Utilities		
Traffic		
Fire		

50' 25' 0 50' 100'
GRAPHIC SCALE: 1" = 50'

NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MEANS

DAVID L. MEANS, P.E.
DATE 10/1/2015

SECTION 1 ROADWAY AND LANDSCAPING

ECHO WEST

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REF.: M.B. 35, PAGE 370
NEW HANOVER COUNTY REGISTRY

VARIABLE WIDTH
PUBLIC DRAINAGE EASEMENT
POND 2

PROVIDE POND LANSCAPING ON 100' INTERVALS USE LIVE OAK W/ AZALEA CLUSTERS

40' UTILITY EASEMENT
D.B. 1402, PG. 1226

404
"BASIN
WETLAND"

EX 40' UTILITY EASEMENT

MAIL KIOSK (32)

TWO 8.5' X 20' PARKING STALLS W/ 15 MINUTE LIMIT SIGN

R=250'

R=100'

R=200'

20' PRIVATE DRAINAGE EASEMENT

SECTION 2 (47 LOTS)
SECTION 1 (25 LOTS)

25' CRS

VARIABLE
PUBLIC D

PROPOSED CURB RAMP W/ TACTILE WARNING MAT

64'

20'

R=20'

STREET NAME BLADES OVER STOP SIGN REFER TO SD 15-03

R=35'

MAIL KIOSK (29)

STREET TREES IN 6' PLAZA ARE TRIDENT MAPLES ON 35' SPACING

5' SIDEWALK

24' ASPHALT

2' VALLEY CURB

ECHO FARMS BLVD
50' PUBLIC R/W

TWO 8.5' X 20' PARKING STALLS W/ 15 MINUTE LIMIT SIGN

PROPOSED CURB RAMP W/ TACTILE WARNING MAT

STREET LIGHT (TYP)

50' GAS R/W

SPICETREE DRIVE
50' PUBLIC R/W

SECTION 2 (47 LOTS)
SECTION 3 (21 LOTS)

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Public Utilities		
Traffic		
Fire		

50' 25' 0 50' 100'
GRAPHIC SCALE: 1" = 50'

NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MEANS

DAVID L. MEANS, P.E.
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SECTION 2 ROADWAY AND LANDSCAPING

ECHO WEST

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DESIGNED:	DLM
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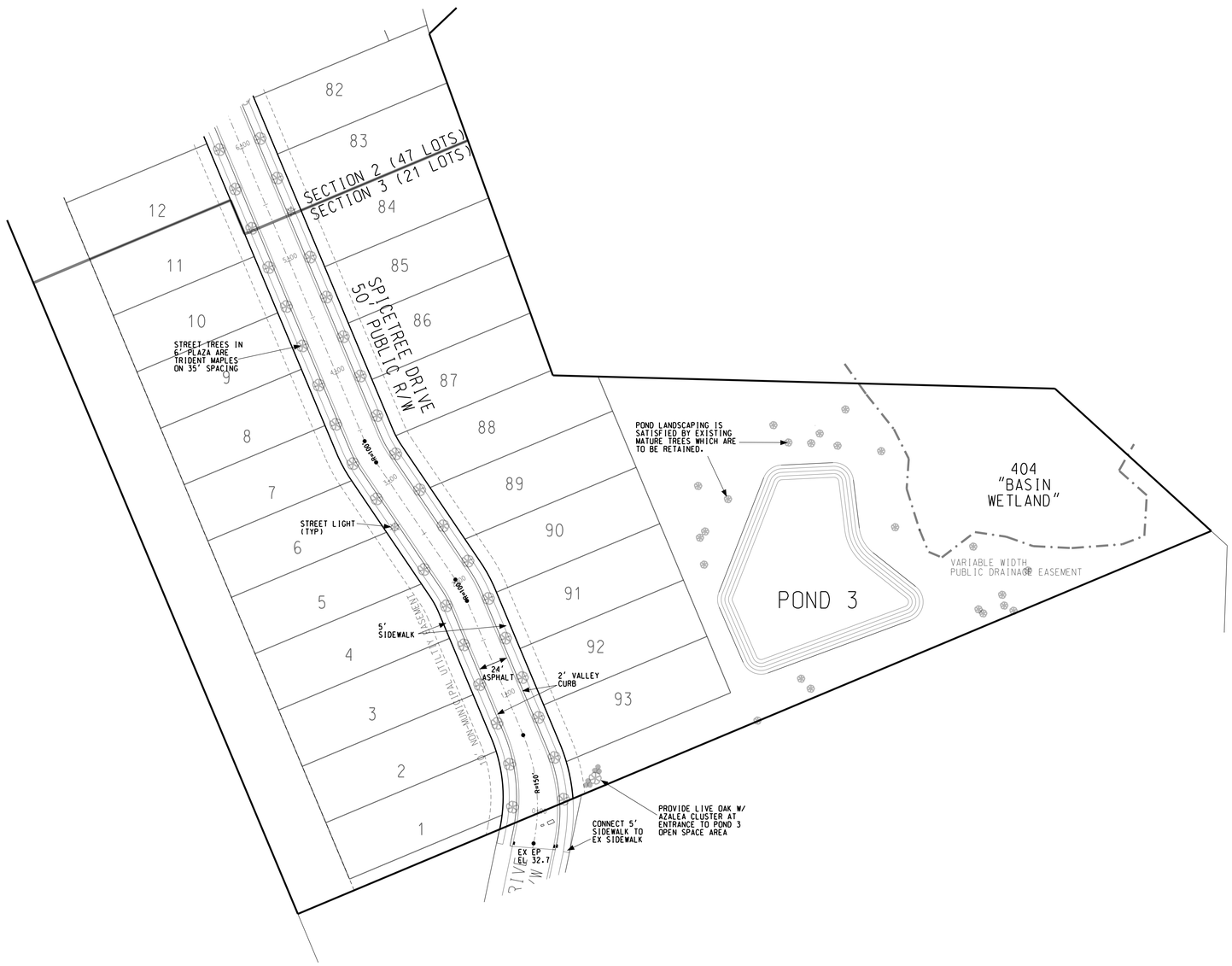
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	1"= 50'
SHEET:	5.2



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50' 25' 0 50' 100'

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NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENDIS

DAVID L. MENDIS, P.E.
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SECTION 3 ROADWAY AND LANDSCAPING

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DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	1"= 50'
SHEET:	5.3

TRACT AREA--31.27 AC
--1,362,275 SF
ZONING--MF-M
PROPOSED UNITS--93
UNITS PER ACRE--3.0
MINIMUM LOT SIZE--5,928 SF
TAX PIN--R07006-001-005-000
--R07006-002-021-000
DEED BOOK/PAGE--58222946
CAMA LUC--URBAN & CONSERVATION
PROPOSED BUA--521,549 SF
--11.97 AC
% BUA--38.3%
RECIEVING STREAM--BARNARDS CREEK
CLASSIFICATION--C;SW
SETBACKS--
FRONT--15
REAR--15
SIDE--5
CORNER--10
MAX HEIGHT--35

SITE DATA

BOUNDARY
WETLANDS
FLOOD LINE
EASEMENT
EX CONTOURS
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LIMITS OF
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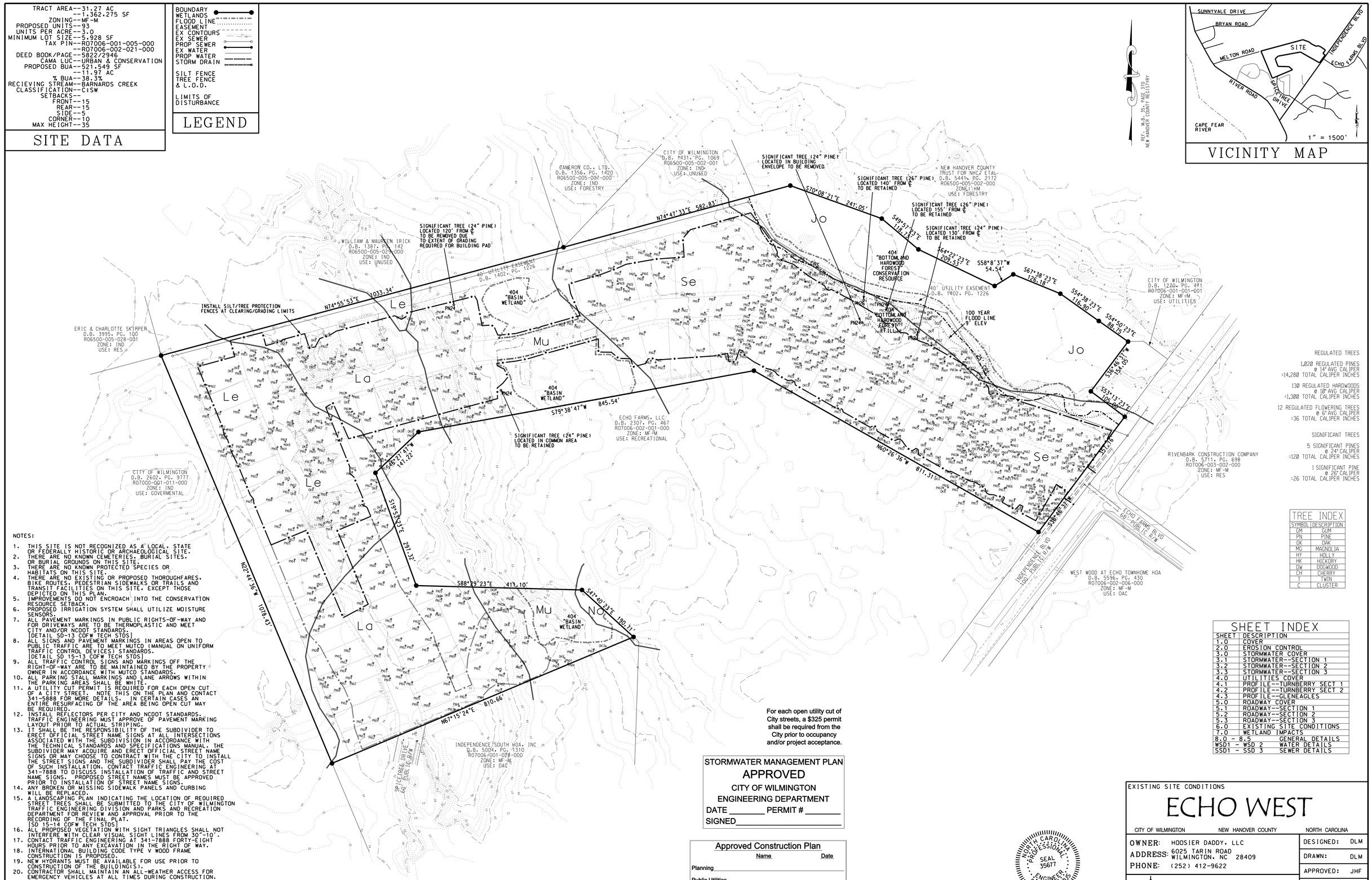

REGULATED TREES

1,020 REGULATED PINES
@ 14" AVG CALIPER
=14,280 TOTAL CALIPER INCHES

130 REGULATED HARDWOODS
@ 10" AVG CALIPER
=1,300 TOTAL CALIPER INCHES

12 REGULATED FLOWERING TREES
@ 6" AVG CALIPER
=36 TOTAL CALIPER INCHES

SIGNIFICANT TREES

5 SIGNIFICANT PINES
@ 24" CALIPER
=120 TOTAL CALIPER INCHES

1 SIGNIFICANT PINE
@ 26" CALIPER
=26 TOTAL CALIPER INCHES

TREE INDEX

SYMBOL	DESCRIPTION
GM	GUM
PN	PINE
OK	OAK
MG	MAGNOLIA
HY	HOLLY
HK	HICKORY
DW	DOGWOOD
CH	CHERRY
T	TWIN
C	CLUSTER

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100' 50' 0 100' 200'
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NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENNIS

DAVID L. MENNIS, P.E.
DATE 10/1/2015

EXISTING SITE CONDITIONS

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

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PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED: DLM
DRAWN: DLM
APPROVED: JHF
DATE: 1/13/2015
SCALE: 1"= 100'
SHEET: 6.0

TRACT AREA--31.27 AC
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PROPOSED UNITS--93
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LIMITS OF DISTURBANCE

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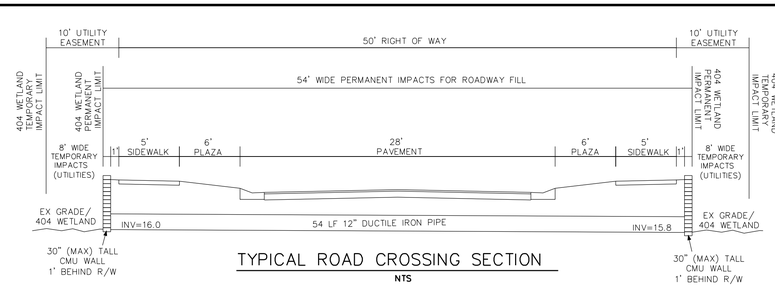
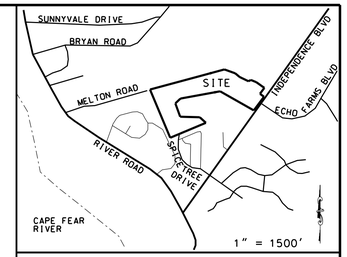


TYPICAL ROAD CROSSING SECTION

NTS

REF. M.B. 35, PAGE 370
NEW HANOVER COUNTY REGISTRY



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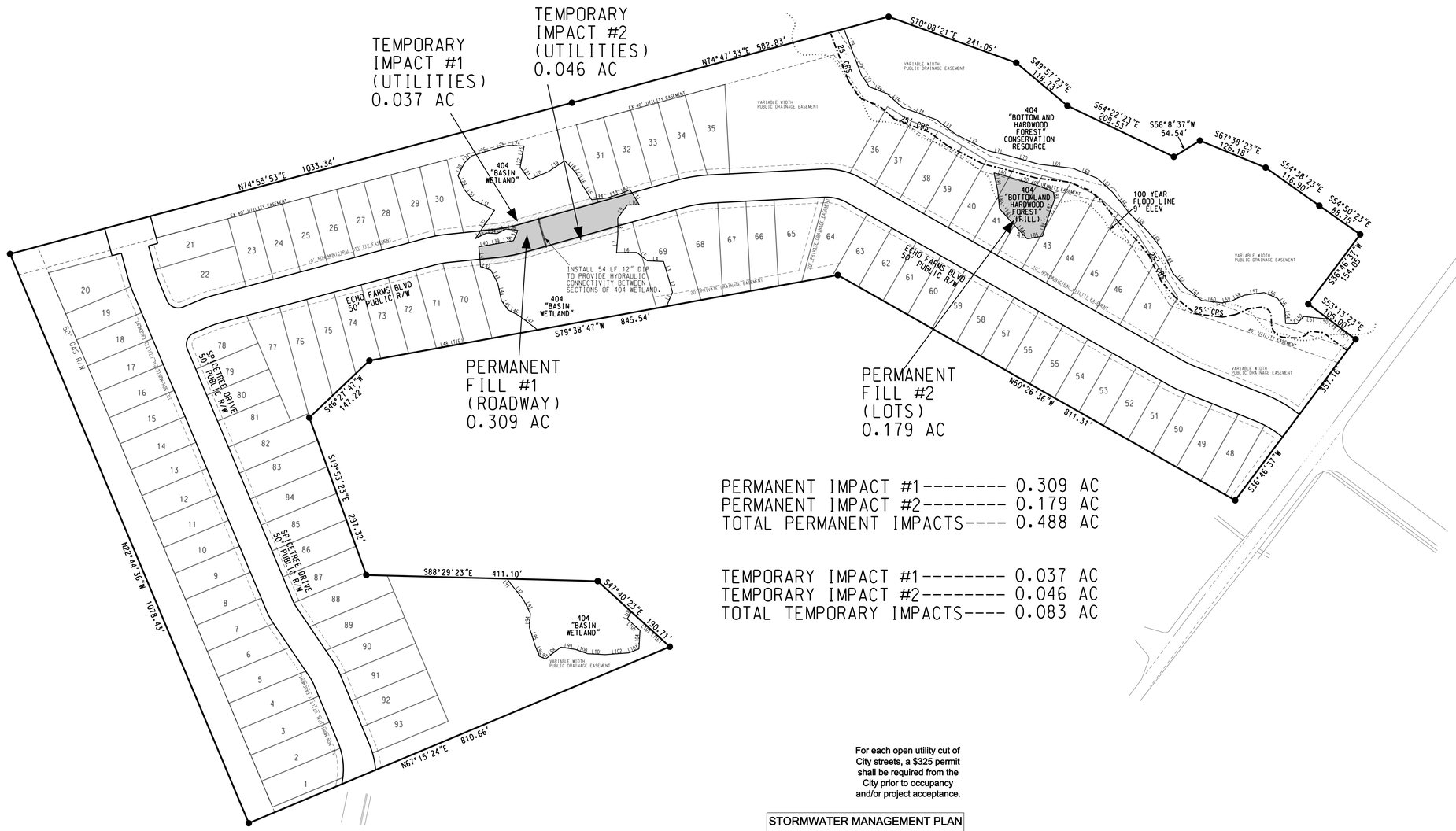


PERMANENT IMPACT #1-------- 0.309 AC
PERMANENT IMPACT #2-------- 0.179 AC
TOTAL PERMANENT IMPACTS---- 0.488 AC

TEMPORARY IMPACT #1-------- 0.037 AC
TEMPORARY IMPACT #2-------- 0.046 AC
TOTAL TEMPORARY IMPACTS---- 0.083 AC

Wetland Line Table

Name	Length	Direction
L1	23.30	N 23°04'07" E
L2	28.28	N 15°48'27" W
L3	28.69	N 16°30'08" W
L4	29.02	N 87°35'39" W
L5	23.68	N 51°06'11" W
L6	36.10	S 89°16'38" W
L7	32.86	N 4°05'05" E
L8	28.50	N 0°16'03" W
L9	28.82	N 35°38'47" E
L10	21.38	N 88°59'26" E
L11	31.59	N 31°25'03" W
L12	16.09	S 66°19'16" W
L13	26.60	S 71°55'17" W
L14	28.46	S 83°56'13" W
L15	31.60	N 32°00'58" W
L16	21.42	N 28°40'12" W
L17	2.07	N 15°36'48" W
L18	29.33	N 43°09'35" W
L19	35.77	S 56°19'14" W
L20	36.03	S 67°24'37" W
L21	27.32	N 35°47'22" W
L22	18.60	N 10°16'44" E
L23	19.76	N 10°16'44" E
L24	28.27	N 87°52'28" W
L25	25.44	S 75°42'21" W
L26	42.49	S 72°46'02" W
L27	17.36	S 45°28'05" W
L28	25.43	S 26°47'43" W
L29	27.69	S 24°28'40" E
L30	23.43	S 40°06'13" E
L31	42.57	S 64°26'27" E
L32	61.28	S 34°19'50" W
L33	22.55	N 63°16'35" E
L34	19.10	S 87°11'56" E
L35	17.05	N 62°23'21" E
L36	21.55	S 84°18'01" E
L37	19.87	S 22°43'32" W
L38	20.89	S 79°17'04" W
L39	20.78	S 80°24'30" W
L40	20.88	S 80°24'23" W
L41	35.59	S 4°58'54" E
L42	19.13	S 72°07'37" E
L43	26.69	S 27°34'29" E
L44	31.27	S 12°06'11" E
L45	20.02	S 35°06'56" E
L46	22.49	S 62°07'42" E
L47	39.12	S 52°27'01" E
L48	302.03	S 79°19'37" W
L49	59.90	N 53°13'23" W
L50	14.21	N 83°48'55" W
L51	29.90	N 83°48'55" W
L52	18.10	S 43°29'11" W
L53	20.05	N 88°02'01" W
L54	26.29	N 3°04'44" W
L55	22.27	N 34°53'17" W
L56	26.09	N 66°45'25" W
L57	35.33	S 82°26'24" W
L58	24.95	S 65°46'01" W
L59	17.34	S 78°59'52" W
L60	36.63	N 83°25'20" W
L61	36.54	N 51°03'01" W
L62	33.97	N 41°22'41" W
L63	49.60	N 25°16'37" W
L64	38.15	N 38°18'18" W
L65	42.50	N 45°54'31" W
L66	51.18	N 38°46'46" W
L67	36.14	N 47°48'42" W
L68	46.51	N 67°35'05" W
L69	60.17	N 83°13'22" W
L70	60.56	N 74°21'08" W
L71	32.76	N 76°50'04" W
L72	65.73	N 63°07'32" W
L73	43.23	N 53°09'10" W
L74	63.67	N 70°09'40" W
L75	37.33	N 48°31'06" W
L76	33.10	N 69°00'59" W
L77	26.13	N 33°23'34" W
L78	34.41	N 20°38'39" W
L79	52.50	N 20°38'39" W
L80	27.64	N 74°19'44" W
L81	32.59	S 11°44'06" E
L82	32.06	S 5°53'33" E
L83	33.43	S 41°43'10" E
L84	39.38	S 43°26'54" E
L85	27.47	N 80°13'31" E
L86	34.80	N 16°28'48" E
L87	34.28	N 19°44'24" E
L88	13.09	N 9°44'40" W
L89	26.72	N 67°11'56" W
L90	56.71	N 73°16'54" W
L91	11.00	S 35°22'32" E
L92	36.34	S 38°27'56" E
L93	27.12	S 26°40'10" E
L94	24.63	S 4°03'01" W
L95	35.04	S 17°27'08" E
L96	19.65	S 22°16'15" E
L97	11.76	S 67°04'53" E
L98	34.15	N 52°32'23" E
L99	25.84	S 81°33'56" E
L100	23.41	S 70°44'31" E
L101	31.60	S 87°07'38" E
L102	41.50	N 85°44'10" E
L103	19.36	N 69°00'35" E
L104	33.25	N 3°26'47" E
L105	30.43	N 48°24'55" W
L106	14.66	N 29°33'04" E
L107	92.33	S 47°40'23" E

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED_____

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

100' 50' 0 100' 200'
GRAPHIC SCALE: 1" = 100'

SHEET INDEX

SHEET	DESCRIPTION
1.0	COVER
2.0	EROSION CONTROL
3.0	STORMWATER COVER
3.1	STORMWATER--SECTION 1
3.2	STORMWATER--SECTION 2
3.3	STORMWATER--SECTION 3
4.0	UTILITIES COVER
4.1	PROFILE--TURNBERRY SECT 1
4.2	PROFILE--TURNBERRY SECT 2
4.3	PROFILE--GLENEAGLES
5.0	ROADWAY COVER
5.1	ROADWAY--SECTION 1
5.2	ROADWAY--SECTION 2
5.3	ROADWAY--SECTION 3
6.0	EXISTING SITE CONDITIONS
7.0	WETLAND IMPACTS
8.0 - 8.5	GENERAL DETAILS
WSD1 - WSD 2	WATER DETAILS
SSD1 - SSD 3	SEWER DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENNIS

DAVID L. MENNIS, P.E.
DATE 10/1/2015

WETLAND IMPACTS

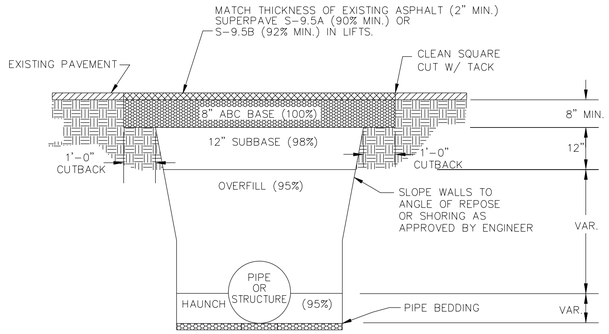
ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

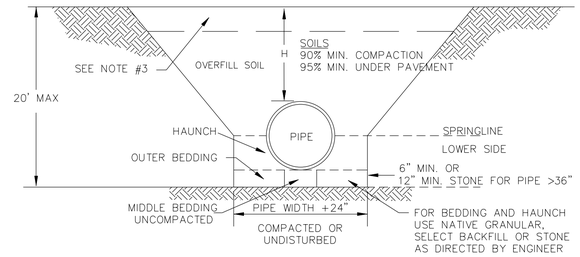
STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	1"= 100'
SHEET:	7.0



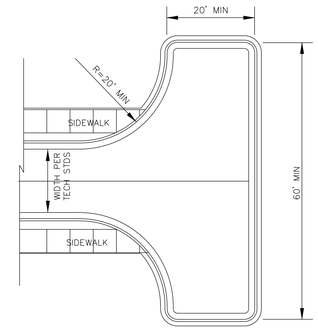
NOTES:

1. CONTRACTOR SHALL ENSURE BOTTOM OF TRENCH IS SUITABLE FOR INSTALLATION AND DOES NOT REQUIRE FOUNDATION CONDITIONING STONE.
2. FILL SHALL BE SUITABLE MATERIAL THAT IS FREE FROM HEAVY CLAY, GUMBOS, DEBRIS, ORGANICS AND LITTLE TO NO EXCESSIVE MOISTURE.
3. SELECT BACKFILL MAY BE SUBSTITUTED OR REQUIRED BY CITY TO ACHIEVE COMPACTION, (I.E. #57, ABC, CRUSHED LIMESTONE, CLEAN SAND, FLOWABLE FILL, ETC).
5. SOIL SHALL BE INSTALLED IN 6"-8" LIFTS AND COMPACTED BY A MECHANIZED TAMPER (I.E JUMPING JACK), HOWEVER, VIBRATORY ROLLERS > 18" WIDTH MAY BE USED FOR LARGER EXCAVATIONS. THE PLATE TAMP METHOD SHALL NOT BE USED.
6. ALL APPROVED CASTINGS SHALL BE SET FLUSH TO GRADE AND SUPPORTED IF APPLICABLE.
7. COMPACT MATERIALS TO MINIMUM % DENSITY SHOWN IN DIAGRAM AS DETERMINED BY THE STANDARD PROCTOR METHOD ASTM D-698-A FOR SOILS; AND ASTM D-698-C FOR ABC STONE; AND BY NUCLEAR GAUGE OR CORE SAMPLE FOR ASPHALT.
8. CUTBACKS OF ASPHALT SHALL BE PREPARED ON EDGE OF EXCAVATION OVER TOP OF UNDISTURBED SOIL.

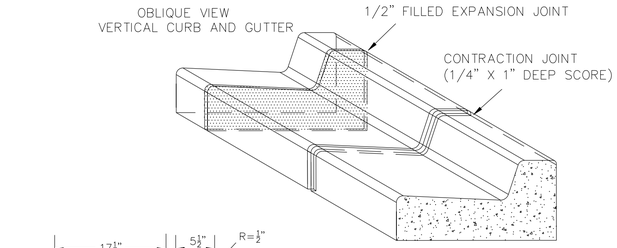


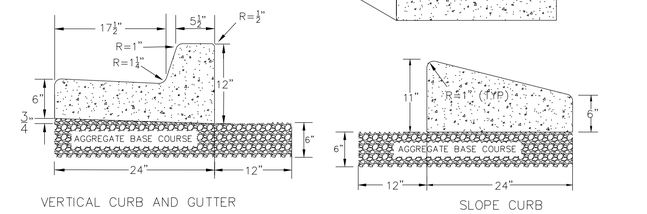
NOTES:

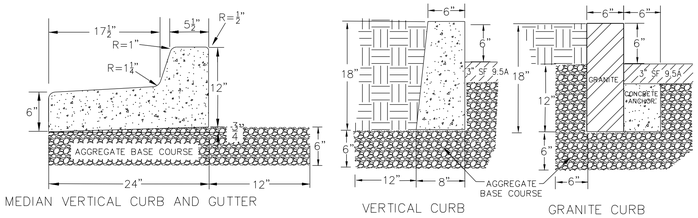
1. CONTRACTOR SHALL ENSURE BOTTOM OF TRENCH IS SUITABLE FOR PIPE INSTALLATION AND DOES NOT REQUIRE FOUNDATION CONDITIONING STONE.
2. CONTRACTOR TO INSTALL BEDDING AND PIPE BEFORE INSTALLING HAUNCH AND THEN OVERFILL. SOILS SHALL BE INSTALLED IN 6"-8" LIFTS AND COMPACTED TO MIN. % DENSITY AS DETERMINED BY THE STANDARD PROCTOR ASTM D-698-A METHOD.
3. WHERE IN PAVEMENT, CONTRACTOR SHALL ADHERE TO CITY STREET CUT POLICY AND SD 1-04 OR SD 1-05 FOR ROAD AND PAVEMENT REBUILD.
4. SOIL SHALL BE COMPACTED BY A MECHANIZED TAMP (I.E. JUMPING JACK). HOWEVER, VIBRATORY ROLLERS > 18" WIDTH MAY BE USED FOR LARGER EXCAVATIONS. THE PLATE TAMP METHOD SHALL NOT BE USED.
5. THIS DETAIL IS REPRESENTATIVE AND PIPE TRENCH DESIGN IS SUBJECT TO SPECIFIC SOIL CATEGORY (I, II, III), AND INSTALLATION TYPE (1, 2, 3, 4), AS DIRECTED BY THE ENGINEER AND SITE CONDITIONS.

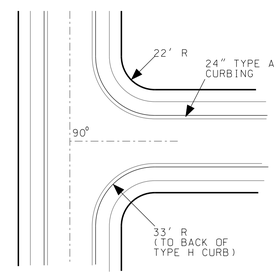


TURNAROUND DETAIL
SD 5-05
NOT TO SCALE



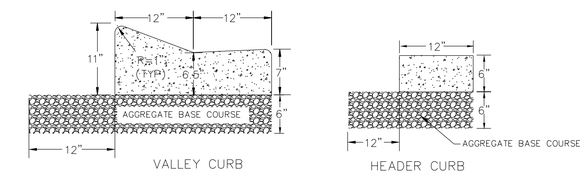




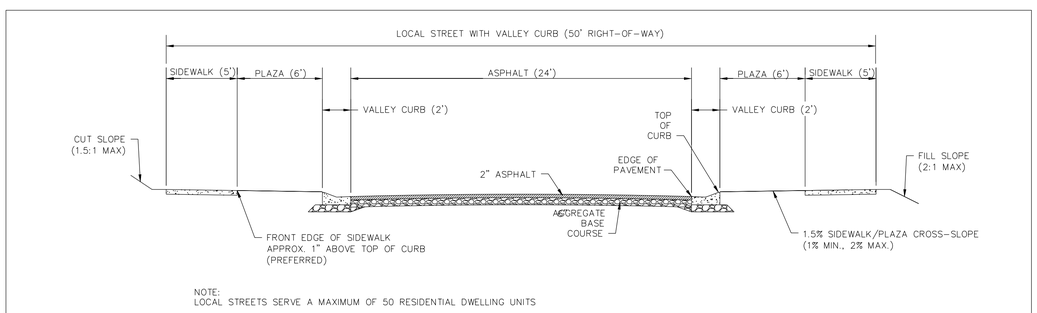


INTERSECTION DETAIL

NTS

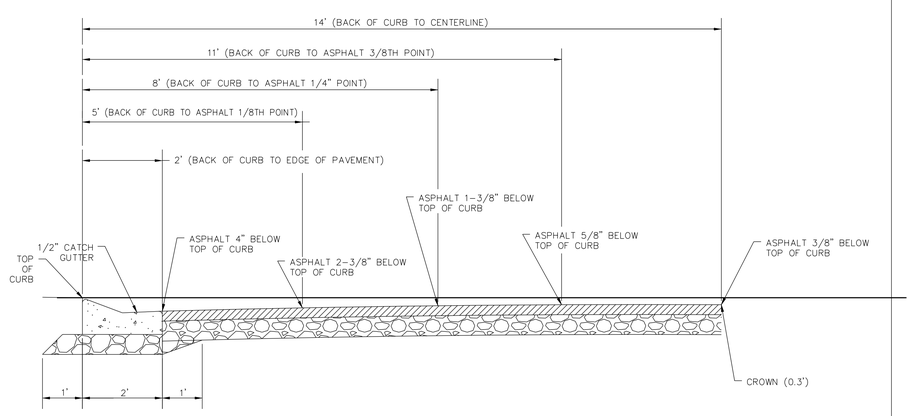


NOTES:
1. EXPANSION JOINT MATERIAL TO COMPLY WITH CURRENT NCDOT STANDARDS
2. 50' MAX EXPANSION JOINT SPACING, 10' MAX CONTRACTION JOINT SPACING
3. MINIMUM INSTALLATION LENGTH IS 5 FT.
4. CONCRETE TO BE 3000 PSI MIN
5. VERTICAL CURB AND GUTTER BASE CAN BE SLOPED 3/4" OR USE A FLAT BASE

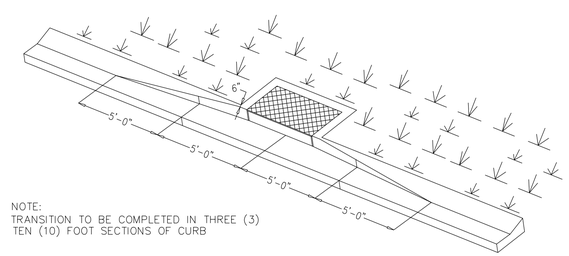


NOTE:
LOCAL STREETS SERVE A MAXIMUM OF 50 RESIDENTIAL DWELLING UNITS

LOCAL STREET WITH VALLEY CURB-SECTION



LOCAL STREET WITH VALLEY CURB-CROWN



NOTE:
TRANSITION TO BE COMPLETED IN THREE (3)
TEN (10) FOOT SECTIONS OF CURB

TYPE 'H' CURBING AROUND FACE BASIN TRANSITION SECTION
SDS 7-05
NOT TO SCALE

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan		
	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED_____

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENDIS

DAVID L. MENDIS, P.E.
DATE 10/1/2015

DETAILS

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
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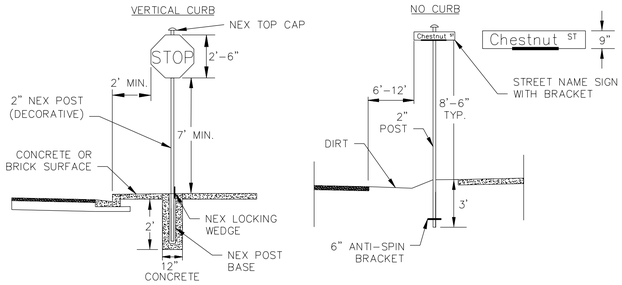
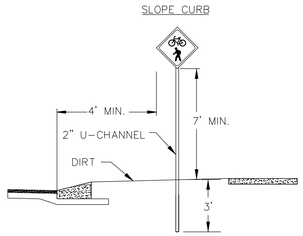
DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	AS NOTED
SHEET:	8.0





*DETAILS SHOW VARIOUS TYPES AND LOCATION, BUT NOT ALL COMBINATIONS.

SIGNS

1. All signs shall meet the requirements of MUTCD and City Traffic Engineering in effect at the time of construction.

2. All Traffic Control Signs including multi-use paths shall be fabricated with 0.080 inch aluminum blanks using high intensity prismatic reflective sheeting Type IV or better. STOP signs shall be a minimum of 30"x30".

3. SPECIAL DESIGNATION signs by location and type shall adhere to City of Wilmington signage plan (ie. downtown, historic, cross-city trail, parks, riverfront, scenic by-way, parking, etc.) and all associated policies.

4. POST MOUNTED STREET NAME SIGNS shall be fabricated with 9" extruded aluminum street name sign blanks using a standard cut-out. Minimum sign length is 18" long and increasing in 6" increments to 54" maximum as dictated by the number of letters in the name. The color scheme shall be white letters on a green background without a border. Generally, in the downtown and historic areas or as designated in the City of Wilmington signage plan the background shall be blue and contain a topper.

5. Decorative sign posts shall consist of the NEX sign support system, 2" octagonal tube, 14 gauge, powder coated glossy black and include cap, post, base and wedge.

6. All other sign posts shall be u-channel posts made of galvanized steel with 8' posts 2lbs/ft or 12' posts 3lbs/ft. Galvanized NEX post may be substituted with approval from the City Signs and Markings Engineer.

7. OVERHEAD STREET NAME SIGNS shall be fabricated with 0.080 inch aluminum flat sign blanks 18" in height using a standard cut-out. Sign length will be dictated by the number of letters in the name. For mast-arm type traffic signal supports and other overhead support systems refer to the design plans for maximum sign length.

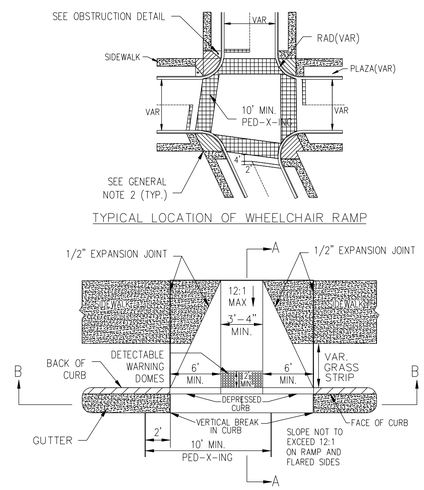
8. All sign lettering, colors and fonts shall adhere to the MUTCD in effect at the time of construction. Florescent Yellow-Green shall be used on signs, in place of Yellow, when listed as an optional color in the MUTCD. Generally, the font will be FHWA series fonts (Highway Gothic.) Other font types require prior City Signs and Markings Engineer approval .

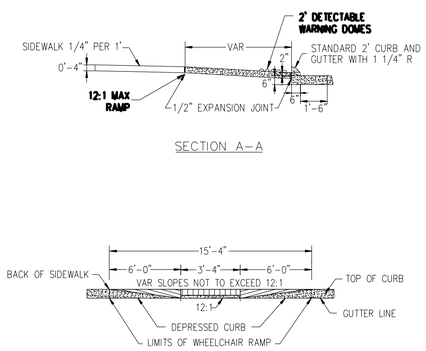
LOCATION

9. Sign locations depend on the edge of road condition. Generally, signs shall be a minimum 2' from face of a vertical curb, 4' from front of slope face curb, and 6' from edge of pavement without curb. Signs shall not be located more than 12' from any of these locations.

10. Sign posts installed in dirt shall be buried a minimum of 36". Octagonal posts shall utilize an anti-spin device, 6" in length minimum. Sign posts installed in concrete or brick shall utilize a base cast in concrete 24" x 12" diameter.

11. Street name signs shall be installed 8'-6" from the ground to the bottom of the sign. Street name signs co-located with STOP signs shall be installed above the STOP sign. A 6" space shall be maintained between the STOP sign and a Street name sign that is parallel to the STOP sign face. All other signs should be mounted per MUTCD guidelines for Urban Areas.





GUIDELINES FOR WHEELCHAIR RAMPS & DEPRESSED CURBS
SD 8-10

GENERAL NOTES

I. LOCATION OF WHEELCHAIR RAMPS:

1. IN ACCORDANCE WITH THE RATIFIED HOUSE BILL 1296, ALL STREET CURBS IN NORTH CAROLINA BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY HANDICAPPED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTERS AND SIDEWALKS ARE PROVIDED AND AT OTHER MAJOR POINTS OF PEDESTRIAN FLOW.
2. WHEELCHAIR RAMPS SHOULD BE LOCATED AS INDICATED IN DETAIL DRAWINGS, HOWEVER EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. MAY AFFECT PLACEMENT.

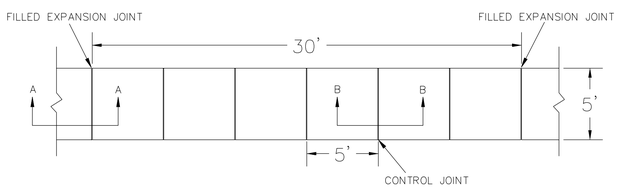
II. CONSTRUCTION NOTES:

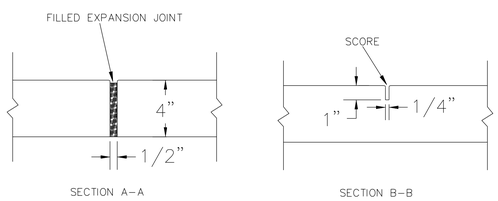
1. NO SLOPE SHALL EXCEED 1"=1" (12:1) ON THE RAMP OR SIDEWALK.
2. IN NO CASE SHALL THE WIDTH OF WHEELCHAIR RAMPS BE LESS THAN 40" (3'-4"). WIDTHS MAY EXCEED 40" IF NECESSARY.
3. USE CLASS "A" CONCRETE WITH THE SURFACE HAVING A ROUGH, NON-SKID TYPE FINISH.
4. 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE CONCRETE WHEELCHAIR RAMP JOINS ANY RIGID PAVEMENT OR STRUCTURE.
5. CONSTRUCTION METHODS SHALL CONFORM WITH THOSE OF THE GOVERNING BODY WHICH HAS JURISDICTION OF THE PARTICULAR STREET.

III. ADDITIONAL NOTES:

1. THE INSIDE PEDESTRIAN CROSSWALK LINES SHALL BE ESTABLISHED BY BISECTING THE INTERSECTION RADII WHERE MARKED (SEE NOTE 6).
2. THE WHEELCHAIR RAMP SHALL BE LOCATED SO THAT THE BEGINNING OF THE WHEEL CHAIR RAMP WILL BE TWO FEET FROM THE INSIDE PEDESTRIAN CROSSWALK LINE.
3. THE WIDTH OF THE PEDESTRIAN CROSSWALK SHALL BE 10 FEET UNLESS A GREATER WIDTH IS REQUIRED TO ACCOMMODATE THE PEDESTRIAN TRAFFIC.
4. STOP BARS SHALL BE USED WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL, STOP SIGN, OR OTHER LEGAL REQUIREMENTS.
5. PARKING SHALL BE ELIMINATED A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
6. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION. THIS IS AVAILABLE FROM THE SUPERINTENDENT OF DOCUMENTS, U.S GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20402.

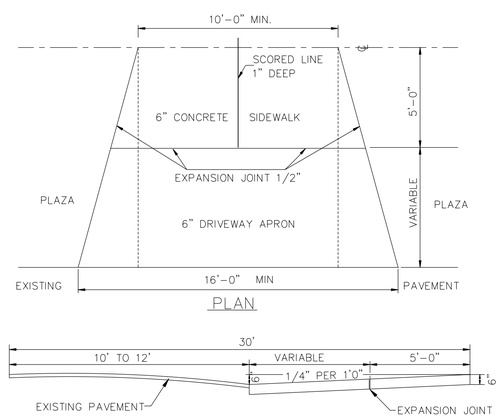
GUIDELINES FOR WHEELCHAIR RAMPS
SD 8-09

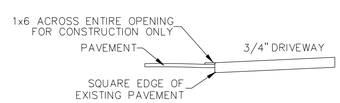




NOTES:

1. JOINT MATERIAL TO COMPLY WITH CURRENT NCDOT STANDARDS.
2. SANITARY SEWER CLEAN-OUTS, WATER METERS, MANHOLES, AND VALVE LIDS TO BE LOCATED OUTSIDE SIDEWALK WHERE FEASIBLE.
3. MINIMUM SIDEWALK WIDTH TO BE 6' MINIMUM IF PLACED AT BACK OF CURB.
4. CONCRETE FOR ALL SIDEWALKS (EXCEPT ANY PORTION CONTAIN WITHIN A DRIVEWAY APRON) SHALL BE CLASS "A" – 3,000 PSI.
5. MINIMUM REPLACEMENT FOR REPAIRS IS A 5' X 5' PANEL
6. 4" STONE BASE MAY BE REQUIRED FOR POOR SOIL CONDITIONS
7. MINIMUM DEPTH FOR TUNNELING BELOW SIDEWALK IS 12"
8. MAX ADJACENT GROUND SLOPE WITHOUT RAILING IS 2:1
9. MIN GRADE FOR PROPER DRAINAGE IS 1% IN AT LEAST 1 DIRECTION. MAX CROSS SLOPE IS 2%. MAX LONGITUDINAL SLOPE IS 8.3%, 10% IF LIMITED BY EXISTING CONDITIONS, OR NO GREATER THAN THE SLOPE OF THE EXISTING ADJACENT ROAD.





RESIDENTIAL DRIVEWAY--STREETS WITH NO CURB OR VALLEY CURB
SD 8-05
NOT TO SCALE

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED_____

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENDIS

DAVID L. MENDIS, P.E.
DATE 10/1/2015

DETAILS

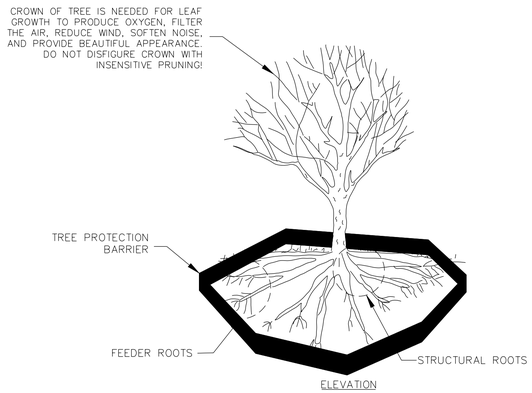
ECHO WEST

CITY OF WILMINGTON | NEW HANOVER COUNTY | NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	AS NOTED
SHEET:	8.1



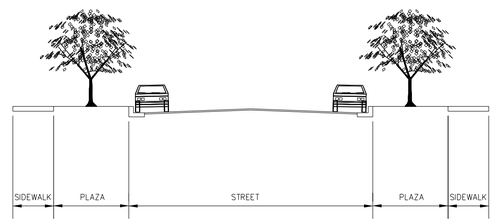
ELEVATION

TREE PROTECTION DURING CONSTRUCTION

1. CLEARLY MARK THE TREES TO BE SAVED PRIOR TO CONSTRUCTION AND ERECT A PROTECTIVE BARRIER AT THE CRZ. TREE PROTECTION BARRIER SHALL BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE.
2. CRITICAL ROOT ZONE (CRZ) DISTANCE SHALL BE DETERMINED BY DIAMETER OF THE TREE AT BREAST HEIGHT.
3. DO NOT COMPACT SOIL BENEATH TREES. NO VEHICLE SHALL BE ALLOWED TO PARK UNDER TREES. NO HEAVY MATERIALS SHALL BE STORED BENEATH TREES. DAMAGING THE BARK WITH LAWNMOWERS, CONSTRUCTION EQUIPMENT, OR ANYTHING ELSE IS PROHIBITED. CUTTING OF LARGE STRUCTURAL ROOTS LOCATED NEAR THE BASE OF THE TRUNK IS PROHIBITED.
4. CUT AND FILL WITHIN DIAMETER OF TREE CROWN.
5. WHERE SIDEWALKS AND PATHWAYS PASS WITHIN CRZ, EXTRA CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE ROOTS. ALTERNATE CONSTRUCTION METHODS, SUCH AS A REINFORCED SIDEWALK, SHALL BE IMPLEMENTED AS NECESSARY.

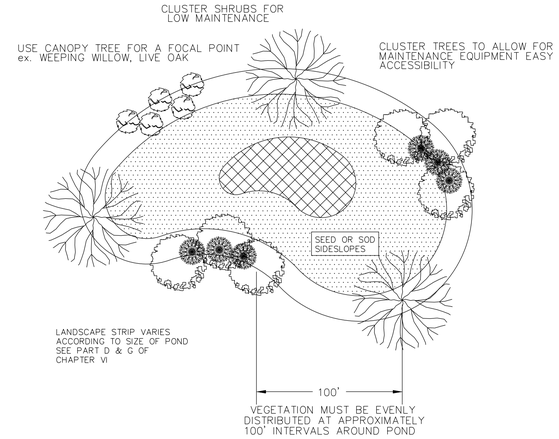
RESIDENTIAL STREET TREE STANDARDS

1. Street trees shall be installed along residential streets after all driveways have been installed.
2. The developer shall notify Landscape Designer prior to installation to ensure proper tree selection and spacing.
3. Each tree shall be a minimum of two (2) caliper inches.
4. Phasing of a project shall be permitted, however, Street Trees on the same block shall be planted at the same time to avoid size irregularities.
5. Trees within the same block shall be the same species.

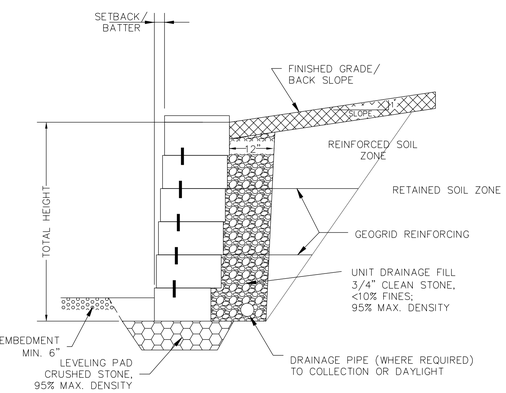


RECOMMENDED STREET TREE SPACING ACCORDING TO PLAZA WIDTHS

4'–6'	6'–8'	GREATER THAN 8'
ex. CREPE MYRTLE HOLLY	ex. JAPANESE MAPLE ZELKOVA	ex. DARLINGTON OAK RED MAPLE
25'–30' SPACING	35'–40' SPACING	50' SPACING



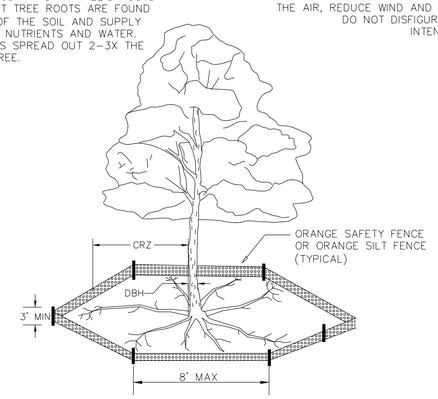
Notes:
1. If possible, locate pond where vegetation exists.
2. Suggest minimal clearing to conserve visual quality of site and minimize the additional of tree planting. An irregular shape provides a more natural appearance.
3. Landscape strip shall be a maximum slope of 7:1 in order to plant vegetation.
4. Provide a minimum of 3 inches of mulch around all vegetation.



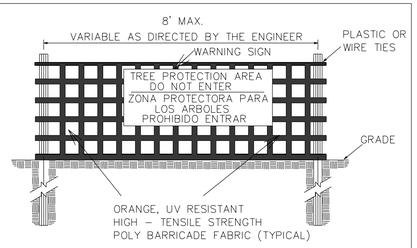
1. ALL RETAINING WALL DESIGNS (GRAVITY AND REINFORCED) ARE SUBJECT TO REVIEW AND APPROVAL BY CITY ENGINEER.
2. RETAINING WALLS GREATER THAN 4' SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.

NOTE:
THE CRITICAL ROOT ZONE (CRZ) OF A TREE IS WHERE THE MAJORITY OF A TREE'S ROOTS LAY. 85% OF MOST TREE ROOTS ARE FOUND IN THE TOP 24" OF THE SOIL AND SUPPLY THE MAJORITY OF NUTRIENTS AND WATER. GENERALLY, ROOTS SPREAD OUT 2–3X THE HEIGHT OF THE TREE.

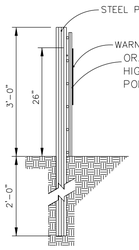
NOTE:
CROWN OF THE TREE IS NEEDED FOR LEAF GROWTH TO PRODUCE OXYGEN, FILTER THE AIR, REDUCE WIND AND SOFTEN NOISE. DO NOT DISFIGURE CROWN WITH INTENSIVE PRUNING.



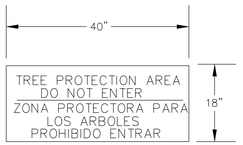
NOTES:
1. PROTECT CRITICAL ROOT ZONE (CRZ) OF TREES PRIOR TO CONSTRUCTION. CLEARLY MARK THE TREES AND ERECT A PROTECTIVE BARRIER AT THE CRZ. BARRIER SHALL BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE.
2. CRZ RADIUS IS 1 FT PER INCH OF TREE DIAMETER AT BREAST HEIGHT (DBH).
3. IF CONSTRUCTION OCCURS WITHIN THE CRZ, AT LEAST 12" OF MULCH AND/OR LOGGING MATTS SHALL BE PLACED WHERE MACHINERY MANEUVERS TO REDUCE SOIL COMPACTION IN THIS ZONE.
4. WHERE SIDEWALKS AND PATHWAYS PASS WITHIN CRZ, EXTRA CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE ROOTS. ALTERNATE CONSTRUCTION METHODS, SUCH AS A REINFORCED SIDEWALK, SHALL BE IMPLEMENTED AS NECESSARY.
5. FOR ALL TREES, CUTTING OF LARGE STRUCTURAL ROOTS LOCATED NEAR THE BASE OF THE TRUNK IS PROHIBITED. DO NOT COMPACT SOIL BENEATH TREES. NO VEHICLE SHALL BE ALLOWED TO PARK UNDER TREES. NO MATERIALS OR EQUIPMENT SHALL BE STORED BENEATH TREES. DAMAGING THE BARK WITH LAWNMOWERS, CONSTRUCTION EQUIPMENT, OR ANYTHING ELSE IS PROHIBITED. CONTRACTOR SHALL REPAIR DAMAGE TO TREES.
6. FAILING TO INSTALL OR MAINTAIN PROTECTION MEASURES SHALL RESULT IN A STOP WORK ORDER AND FINE OF $500/DAY. DISTURBANCE OTHER THAN THAT ALLOWED ON THE APPROVED PLAN WILL REQUIRE OWNER TO POST A LETTER OF CREDIT FOR 3 YRS FOR TREE MITIGATION.



FRONT VIEW



SIDE VIEW



WARNING SIGN DETAIL

NOTES:

1. THE TREE PROTECTION FENCING SHALL NOT BE VIOLATED FOR THE ENTIRE DURATION OF THE PROJECT WITHOUT APPROVAL FROM URBAN FORESTRY STAFF.
2. WARNING SIGNS TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL. LETTERS TO BE 3" HIGH, MINIMUM, CLEARLY LEGIBLE AND SPACED AS DETAILED.
3. SIGNS SHALL BE PLACED AT 50' MAXIMUM INTERVALS. PLACE A SIGN AT EACH END OF LINEAR TREE PROTECTION AND 50' ON CENTER THEREAFTER. FOR TREE PROTECTION AREAS LESS THAN 100' IN PERIMETER, PROVIDE NO LESS THAN TWO SIGNS PER PROTECTION AREA.
4. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC. MAINTAIN TREE PROTECTION FENCE AND SIGNS THROUGHOUT DURATION OF PROJECT.
5. TREE PROTECTION FENCING AND SIGNAGE SHALL BE REMOVED AFTER CONSTRUCTION.
6. ADDITIONAL SIGNS MAY BE REQUIRED BY CITY OF WILMINGTON, BASED ON ACTUAL FIELD CONDITIONS.

NOT TO SCALE

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED _____

NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MEANS

DAVID L. MEANS, PE
DATE 10/1/2015

DETAILS

ECHO WEST

CITY OF WILMINGTON — NEW HANOVER COUNTY — NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409
PHONE: (252) 412-9622

STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO. C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	AS NOTED
SHEET:	8.2

NPDES STABILIZATION TIMEFRAMES		
SITE AREA DESCRIPTION	STABILIZATION	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, AND DITCHES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND FLATTER THAN 2:1 THEN 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE

EROSION & SEDIMENT CONTROL MAINTENANCE PLAN

1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE CHECKED FOR STABILITY AND OPERATION FOLLOWING EVERY RUNOFF-PRODUCING RAINFALL BUT IN NO CASE LESS THAN ONCE EVERY WEEK AND WITHIN 24 HOURS OF EVERY HALF INCH RAINFALL.

2. ALL POINTS OF EGRESS WILL HAVE CONSTRUCTIONS ENTRANCES THAT WILL BE PERIODICALLY TOP-DRESSED WITH AN ADDITIONAL 2" OF #4 STONE TO MAINTAIN PROPER DEPTH. THEY WILL BE MAINTAINED IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. IMMEDIATELY REMOVE OBJECTIONABLE MATERIAL SPILLED, WASHED, OR TRACKED ONTO THE CONSTRUCTION ENTRANCE OR ROADWAYS.

3. SEDIMENT WILL BE REMOVED FROM HARDWARE CLOTH AND GRAVEL INLET PROTECTION, BLOCK AND GRAVEL INLET PROTECTION, ROCK DOUGHNUT INLET PROTECTION, ROCK PIPE INLET PROTECTION, AND GUTTERBUDDY INLET PROTECTOIN WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS AS DESIGNED. DEBRIS WILL BE REMOVED FROM THE ROCK AND HARWARE CLOTH TO ALLOW PROPER DRAINAGE. SILT SACKS WILL BE EMPTIED ONCE A WEEK AND AFTER EVERY RAIN EVENT. SEDIMENT WILL BE REMOVED FROM AROUND BEAVER DAMS, DANDY SACKS/SOCKS, AND GUTTERBUDDIES ONCE A WEEK AND AFTER EVERY RAIN EVENT. NOTE THAT THE GUTTERBUDDY IS REUSABLE SHOULD BE STORED OUT OF DIRECT SUNLIGHT BETWEEN JOBS.

4. DIVERSION DITCHES WILL BE CLEANED OUT IMMEDIATLEY TO REMOVE SEDIMENT OR OBSTRUCTIONS FROM THE FLOW AREA. THE DIVERSION RIDGES WILL ALSO BE REPAIRED. SWALES MUST BE RESTABLIZED WITHIN 21 CALENDAR DAYS OF CEASE OF ANY PHASE OF PHASE OF ACTIVITY ASSOCIATED WITH A SWALE.

5. SEDIMENT WILL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT BECOMES HALF FILLED. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A BARRIER. STAKES MUST BE STEEL. STAKE SPACING WILL BE 6 FEET (MAX) WITH THE USE OF EXTRA STRENGHT FABRIC WITHOUT WIRE BACKING. STAKE SPACING WILL BE 8 FEET (MAX) WHEN STANDARD STRENGTH FABRIC AND WIRE BACKING ARE USED. IF ROCK FILTERS ARE USED AT LOW POINTS IN THE SEDIMENT FENCE. THE ROCK WILL BE REPAIRED OR REPLACED IF IT BECOMES HALF FULL OF SEDIMENT, NO LONGER DRAINS AS DESIGNED, OR IS DAMGED.

6. SEDIMENT WILL BE REMOVED FROM SEDIMENT TRAPS WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. THE ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS OR WHEN THE ROCK IS DISLODGED. BAFFLES WILL BE REPAIRED OR REPLACED IF THEY COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE. THEY WILL BE REPLACED PROMPTLY. SEDIMENT WILL BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE FIRST BAFFLE. IF APPLICABLE, FLOATING SKIMMERS WILL BE INSPECTED WEEKLY AND WILL BE KEPT CLEAN.

7. SEDIMENT WILL BE REMOVED FROM THE SEDIMENT BASIN WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS OR WHEN THE ROCK IS DISLODGED. BAFFLES WILL BE REPAIRED OR REPLACED IF THEY COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE. THEY WILL BE REPLACED PROMPTLY. SEDIMENT WILL BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE FIRST BAFFLE. FLOATING SKIMMERS WILL BE INSPECTED WEEKLY AND WILL BE KEPT CLEAN.

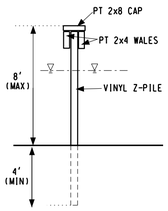
8. ALL SEEDED AREAS WILL BE FERTILIZED, RESEEDED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATIVE PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. ALL SLOPES WILL BE SLABILIZED WITHIN 21 CALENDAR DAYS. ALL OTHER AREAS WILL BE STABILIZED WITHIN 15 WORKING DAYS.

9. FLOCCULANTS WILL BE USED TO ADDRESS TURBIDITY ISSUES. THE PUMPS, TANKS, HOSES AND INJECTION SYSTEMS WILL BE CHECKED FOR PROBLEMS OR TURBID DISCHARGES DAILY.

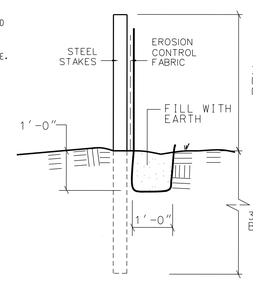
CONSTRUCTION SEQUENCE

1. INSTALL INLET PROTECTION, SILT FENCE, AND STONE CONSTRUCTION ENTRANCES.
2. CLEAR & GRADE
3. INSTALL UNDERGROUND UTILITIES
4. INSTALL PAVEMENT
5. PROVIDE 100% VEGETATIVE COVER OF ALL DISTURBED SOILS.
6. CLEAN SEDIMENT FROM PIPES AFTER STABILIZATION.

NOTE:
WETLANDS IN DISTURBED PORTIONS OF SITE SHALL BE PERMITTED BY USACE AND NCDENR AS REQUIRED.

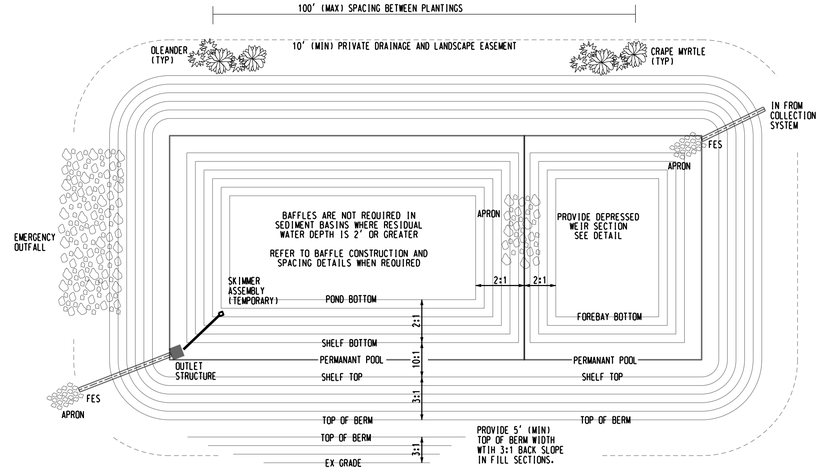


VINYL SHEET PILE DETAIL
NTS

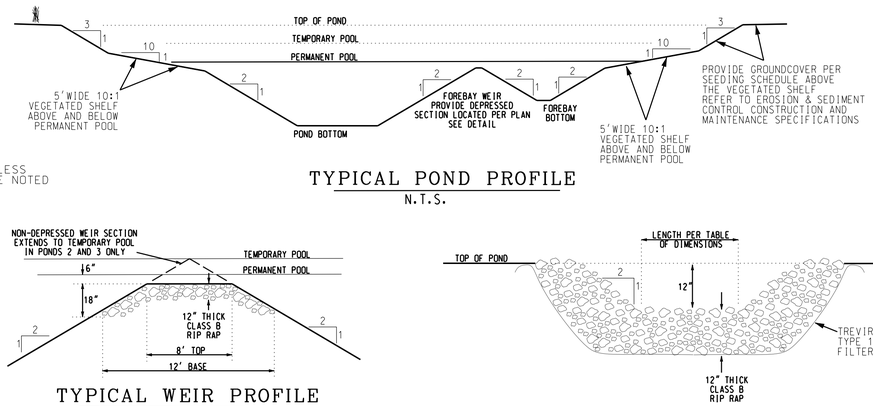


TYPICAL SILT FENCE
NTS

NOTE: POSTS TO BE SPACED 6 FT O.C. OR 8 FT O.C. W/ 14 GAUGE 6 X 6 WIRE MESH REINFORCEMENT. WOODEN POSTS ARE NOT ACCEPTABLE



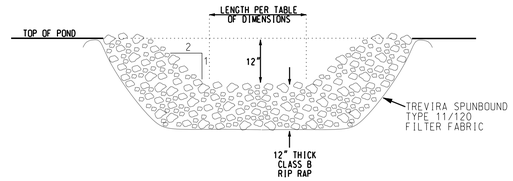
TYPICAL POND PLAN
NTS



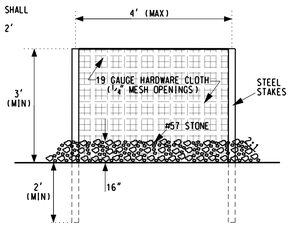
TYPICAL POND PROFILE
N.T.S.

TYPICAL WEIR PROFILE
N.T.S.

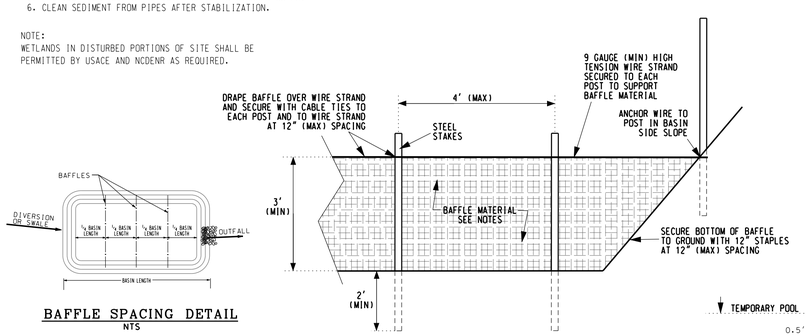
POND 1 NON-DEPRESSED WEIR SECTION SHALL EXTEND ONLY TO THE PERMANENT POOL BASE WIDTH IS 8' AND TOP WIDTH IS 2'



TYPICAL EMERGENCY OUTFALL SECTION
NTS



TYPICAL INLET PROTECTION
NTS



BAFFLE SPACING DETAIL
NTS

SEDIMENT TRAP SCHEDULE		
BASIN/TST #	LENGTH	BATTEN SPACING
1	200'	50'
2	140'	35'
3	100'	25'

NOTE:

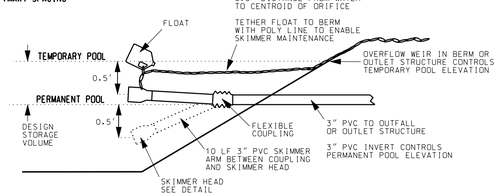
PROVIDE (3) BAFFLES ACROSS WIDTH OF TRAP SPACED PER THE SCHEDULE OF DIMENSIONS.

REFER TO BAFFLE DETAILS

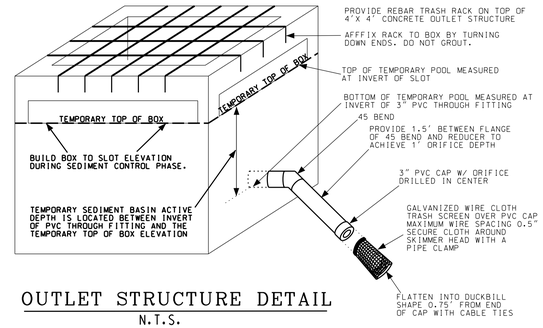
BAFFLE DETAIL
NTS

COIR BAFFLE MATERIAL PROPERTY REQUIREMENTS	
THKNESS	0.30 IN (MIN)
TENSILE STRENGTH (WET)	900 x 680 LB/FT (MIN)
ELONGATION (WET)	69% x 34% (MAX)
FLOW VELOCITY	10-12 FT/SEC
WEIGHT	20 OZ/SY (MIN)
MINIMUM WIDTH	6.5 FT
OPEN AREA	50% (MAX)

NOTE:
BAFFLES ARE NOTE REQUIRED IN SEDIMENT BASINS WHERE RESIDUAL WATER DEPTH IS 2' OR GREATER.



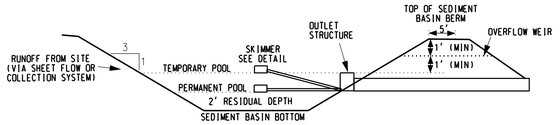
SKIMMER ASSEMBLY DETAIL
NTS



OUTLET STRUCTURE DETAIL
N.T.S.

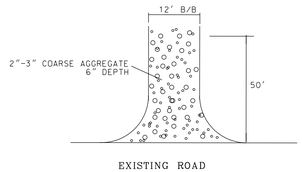
STORMWATER POND TABLE OF DIMENSIONS			
DESCRIPTION	POND 1	POND 2	POND 3
TOP OF BANK	10.70	12.20	31.10
EMERGENCY WEIR EL	9.70	11.20	30.10
EMERGENCY WEIR LENGTH	30.00	60.00	30.00
25 YR TEMP POOL	9.16	10.67	29.55
DENR TEMP POOL	6.52	7.79	27.48
TOP OF SHELF	6.00	7.00	27.00
PERMANENT POOL	5.50	6.50	26.50
FOREBAY WEIR EL	5.50	7.79	27.48
DEPRESSED SECTION	5.00	6.00	26.00
BOTTOM OF SHELF	5.00	6.00	26.00
BOTTOM FOREBAY	(-1.00)	1.00	23.00
BOTTOM POND	(-1.00)	(-1.00)	21.00
TOP OF BOX	9.20	10.70	29.60
# OF SLOTS	1	3	1
SLOT HEIGHT	0.33'	0.33'	0.33'
SLOT LENGTH	2.80'	1.58'	2.95'
SLOT INVERT	6.52	7.79	27.48
ORIFICE DIAMETER	2.00"	3.00"	2.00"
ORIFICE INVERT	5.50	6.50	26.50
OUTFALL PIPE	24"	30"	24"
INVERT OUT	5.50	6.50	26.50

SEDIMENT BASIN TABLE OF DIMENSIONS			
DESCRIPTION	TSB 1	TSB 2	TSB 3
SKIMMER INVERT (PERMANENT POOL)	5.50	6.50	26.50
TOP OF BOX (TEMPORARY POOL)	6.52	7.79	27.48
ACTIVE DEPTH	1.02'	1.29'	0.98'
EMERGENCY WEIR EL	9.70	11.20	30.10
EMERGENCY WEIR LENGTH	30.0'	60.0'	30.0'
FREEBOARD (BOX TO EM. WEIR)	3.18'	3.41'	2.62'
TOP OF BANK ELEV	10.70	12.20	31.10
FREEBOARD (WEIR TO TOP OF BANK)	1.00'	1.00'	1.00'
SKIMMER ORIFICE DIAMETER	1.00"	1.50"	1.00"
OUTFALL PIPE DIAMETER	24"	30"	24"
INVERT OUT ELEV	5.50	6.50	26.50

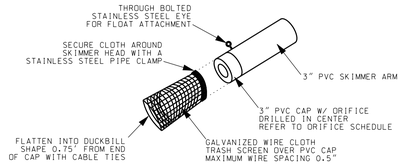


TYPICAL SEDIMENT BASIN DETAIL
NTS

NOTE:
RETROFIT POND PER STORMWATER DETAILS ONCE SITE IS STABILIZED.



CONSTRUCTION ENTRANCE DETAIL
NTS



SKIMMER HEAD DETAIL
NTS

COASTAL PLAIN SITE STABILIZATION SCHEDULE

1. Fertilize and lime per recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.
2. Incorporate lime/fertilizer 4-6 inches.
3. Roughen steep slopes by tracked machinary.
4. Select species based on season. Refer to tables.
5. Broadcast seeds evenly and cover by raking or dragging a chain. Firm soil by rolling.
6. Apply straw mulch at a rate 1-2 tons per acre. 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.
7. Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damge.

PERMANENT SEEDING TABLE 1

Seeding Dates	Recommended Planting	Rate (lb/ac)
Feb. 15 - Apr. 1 Sep. 1 - Nov. 1	Tall Fescue Mixture	see table 2
Apr. 1 - Aug. 1	Hybrid Bermudagrass	see table 2
Apr. 1 - Jul. 15	Common Bermudagrass	see table 2
Mar. 1 - Jul. 1	Centipedegrass	see table 2

PERMANENT SEEDING TABLE 2a-LOW MAINTENANCE MIXTURES

Site Description	Recommended Planting	Rate (lb/ac)
Well to poorly drained soils	Tall Fescue Mixture Pensacola Bahiagrass Kobe Lespedeza	80 50 40
Dry to well drained soils	Pensacola Bahiagrass Common Bermudagrass Kobe Lespedeza German Millet	50 30 10 10
Swales	Common Bermudagrass	40-80

PERMANENT SEEDING TABLE 2b-HIGH MAINTENANCE MIXTURES

Site Description	Recommended Planting	Rate (lb/ac)
Well to poorly drained soils	Tall Fescue Mixture Rye Grain	200 25
Dry to well drained soils	Hybrid Bermudagrass	50
Well drained sandy loam to sand, lawns.	Centipedegrass	10-20

Notes:
For seeding outside of recommended dates and/or for temporary stabilization, refer to temporary seeding table.

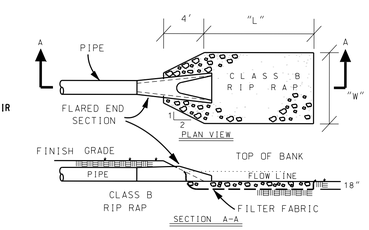
For highly erosive areas or as directed by an engineer, sod shall be provided.

TEMPORARY SEEDING TABLE

Seeding Dates	Recommended Planting	Rate (lb/ac)
Dec. 1 - Apr. 15	Kobe Lespedeza with Rye Grain	50 120
Apr. 15 - Aug. 15	German Millet	40
Aug. 15 - Dec. 1	Rye Grain	120

SOD INSTALLATION

1. Fertilize and lime per recommendations of soil tests or apply 100 lb/1,000 sf ground agricultural limestone and 25 lb/1,000 sf fertilizer. In the fall, use 10-10-10. In the spring, use 5-10-10.
2. Incorporate lime/fertilizer 4-6 inches.
3. Rake or harrow to achieve a smooth final grade.
4. Roll to achieve a smooth, firm surface on which to lay the sod.
5. Lightly rake and irrigate top layer of soil just prior to installation.
6. Lay sod in a staggered, brick-like pattern with the longest dimension perpendicular to the slope. Avoid gaps. Use a knife to fit irregular shapes.
7. Roll sod lightly after installation to ensure good sod to soil contact.
8. Irrigate initially to wet soil to a depth of 4". Keep soil moist for 2-3 weeks thereafter or until sod has taken root.



FILTER FABRIC TO BE TREVIRA SPUNBOUND TYPE 11/120

RIP RAP APRONS SHALL BE PROVIDED ON DOWNSTREAM ENDS OF CULVERT FLARED END SECTIONS

RIP RAP APRON DETAIL
NTS

RIP RAP APRON SCHEDULE		
PIPE	LENGTH	WIDTH
15"	7.5'	3.8'
18"	9.0'	4.5'
24"	12.0'	6.0'
30"	15.0'	7.5'
36"	18.0'	9.0'

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan		
	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED_____

NORTH CAROLINA PROFESSIONAL SEAL 35617 ENGINEER DAVID L. MENUS

DAVID L. MENUS, PE
DATE 10/1/2015

DETAILS

ECHO WEST

CITY OF WILMINGTON — NEW HANOVER COUNTY — NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409
PHONE: (252) 412-9622

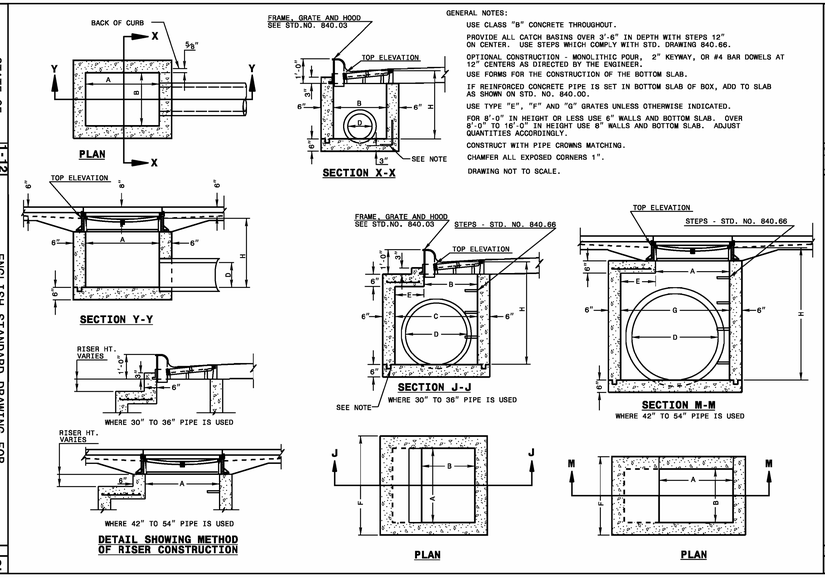
STROUD ENGINEERING, P.A.
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA
(910) 815-0775
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	AS NOTED
SHEET:	8.3

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

1-12

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



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.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

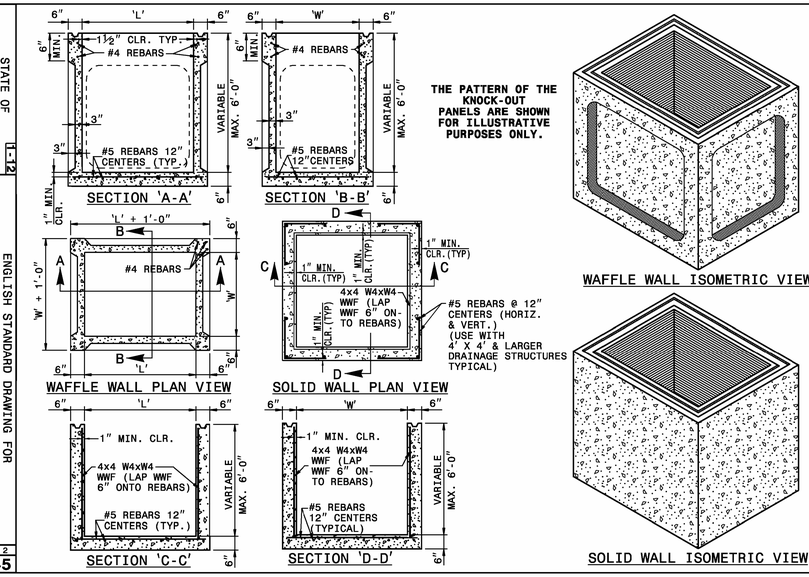
DRAWING NOT TO SCALE.

SHEET 1 OF 2
840.02

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

1-12

ENGLISH STANDARD DRAWING FOR
PRECAST DRAINAGE STRUCTURE
(SOLID AND WAFFLE WALL)

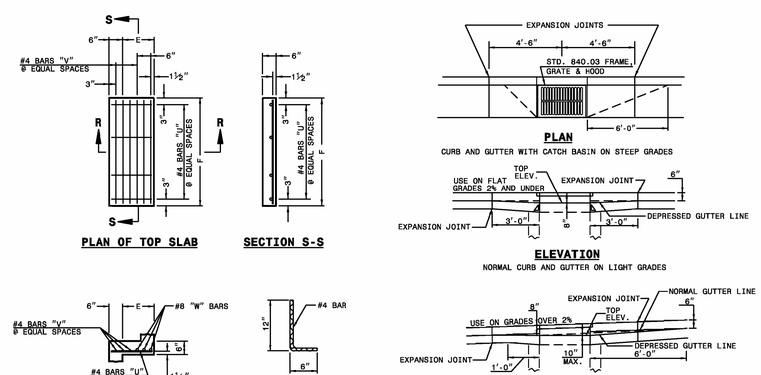


SHEET 1 OF 2
840.45

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

1-12

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



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

DIMENSIONS OF BOX AND PIPE						COVER DIMENSION		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT										TOP SLAB	BOTTOM SLAB	TOT. CONC. IN HORIZ. SECTION		C.M.	R.C.
D	A	B	C	G	H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH							
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

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

SHEET 2 OF 2
840.02

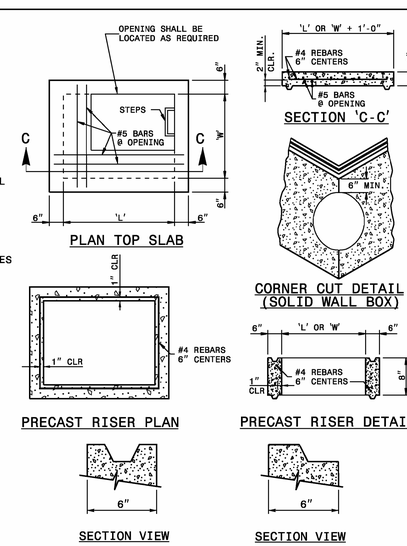
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
PRECAST DRAINAGE STRUCTURE
(GENERAL NOTES AND DETAILS)

GENERAL NOTES:

* THIS PRECAST BOX MAY BE USED FOR THE FOLLOWING STANDARDS: 840.01, 840.02, 840.04, 840.05, 840.11, 840.12, 840.14, 840.15, 840.17, 840.18, 840.19, 840.26, 840.27, 840.28, 840.31, 840.32 AND 840.41.
* INSTALL PRECAST DRAINAGE STRUCTURES AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 840.
* DO NOT PLACE PRECAST DRAINAGE STRUCTURES UNDER TRAFFIC OR WHERE TRAFFIC WILL BE DETOURED.
* USE 4000 PSI CONCRETE.
* PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185.
* LIMIT MAXIMUM DEPTH TO TOP OF BOTTOM SLAB FOR WAFFLE WALL STRUCTURE TO 10'-0"; LIMIT SOLID WALL STRUCTURE TO 15'-0".
* PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
* CUT OR FORM OPENINGS FOR PIPE TO PROVIDE REQUIRED SIZE AND LOCATION. ORIENT WAFFLE WALL STRUCTURES SO THAT PIPES ENTER THROUGH THE KNOCKOUT/WAFFLE PANELS ONLY. PIPES MAY ENTER THROUGH THE CORNERS OF SOLID WALL BOXES IF A MINIMUM OF 6" OF WALL IS PROVIDED ABOVE THE HOLE.
* ALL ELEMENTS PRECAST TO MEET ASTM C913.
* FRAME AND GRATE HEIGHT MAY BE ADJUSTED WITH CONCRETE OR BRICK IN ACCORDANCE WITH STANDARD 840.25.
* PROVIDE PRECAST STRUCTURES OVER 4'-0" IN DEPTH WITH STEPS AS DIRECTED BY THE ENGINEER.
* WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
* SEAL JOINTS WITH A FLEXIBLE BUTYL RUBBER BASE CONFORMING TO FEDERAL SPECIFICATION SS-S-21A, AASHTO M-198, TYPE B - BUTYL RUBBER.
* LIMIT MAXIMUM STRUCTURE SIZE TO INSIDE CLEAR DIMENSIONS OF 5'-0" X 5'-0".
* THE OUTSIDE PIPE DIAMETER PLUS 2" OR THE OPENING REQUIRED FOR FRAME AND GRATE IS THE MINIMUM STRUCTURE SIZE WHICHEVER IS GREATER.
* USE MANHOLE FRAME AND COVER AS INDICATED ON THE PLANS. REINFORCE OPENING AS SHOWN ON THIS SHEET.



OPTIONAL JOINT DETAILS

SHEET 2 OF 2
840.45

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED _____

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENDEZ

DAVID L. MENDEZ, P.E.
DATE 10/1/2015

DETAILS

ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC
ADDRESS: 6025 TARIN ROAD
WILMINGTON, NC 28409
PHONE: (252) 412-9622

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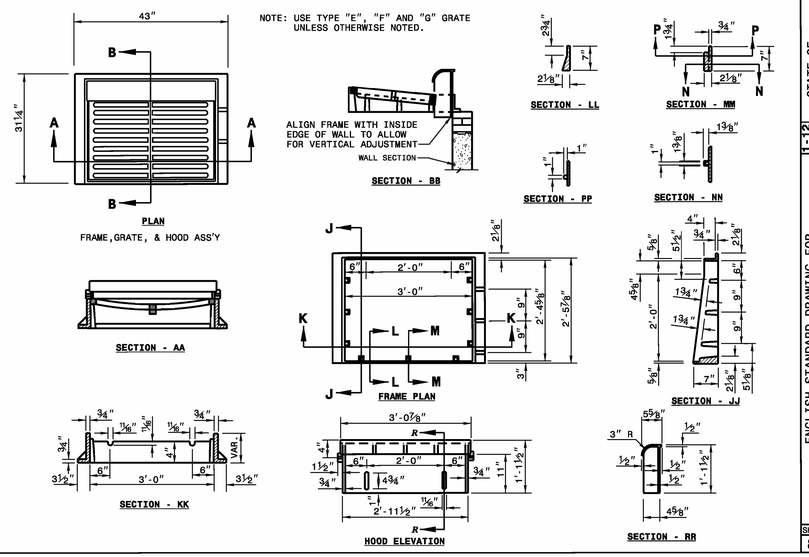
LICENSE NO.C-0647

DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	AS NOTED
SHEET:	8.4

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

1-12

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



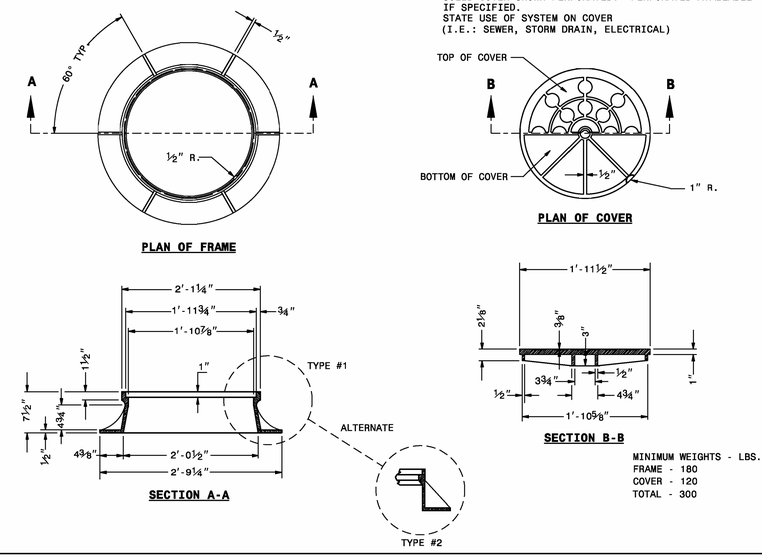
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

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

SHEET 1 OF 2
840.03

SOLID COVER SHOWN PERFORATED. PERFORATED AVAILABLE IF SPECIFIED.
STATE USE OF SYSTEM ON COVER
(I.E.: SEWER, STORM DRAIN, ELECTRICAL)



MINIMUM WEIGHTS - LBS.
FRAME - 180
COVER - 120
TOTAL - 300

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

1-12

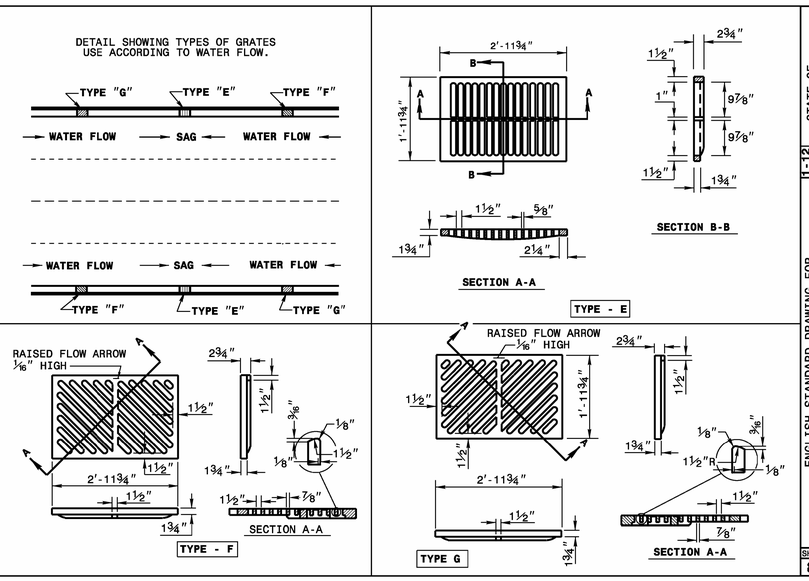
ENGLISH STANDARD DRAWING FOR
MANHOLE FRAME AND COVER

SHEET 1 OF 1
840.54

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

1-12

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



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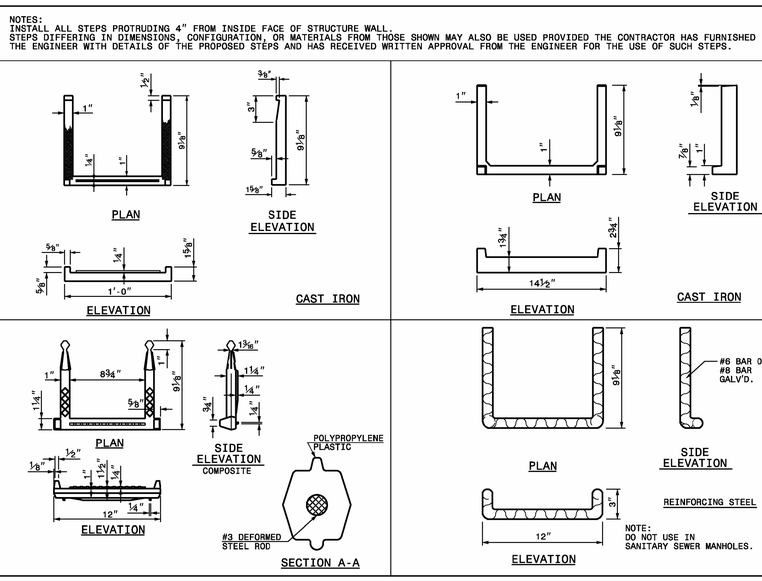
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

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

SHEET 2 OF 2
840.03

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.



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

1-12

ENGLISH STANDARD DRAWING FOR
DRAINAGE STRUCTURE STEPS

SHEET 1 OF 1
840.66

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Approved Construction Plan	
Name	Date
Planning	
Public Utilities	
Traffic	
Fire	

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED _____

NORTH CAROLINA PROFESSIONAL SEAL 35677 ENGINEER DAVID L. MENDIS

DAVID L. MENDIS, P.E.
DATE 10/1/2015

DETAILS

ECHO WEST

CITY OF WILMINGTON — NEW HANOVER COUNTY — NORTH CAROLINA

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DESIGNED:	DLM
DRAWN:	DLM
APPROVED:	JHF
DATE:	1/13/2015
SCALE:	AS NOTED
SHEET:	8.5