Staff Report

To: The Hanahan Planning Commission
Cc: Larry Sturdivant, Building Official; Felipe Toledo, Thomas and Hutton
From: Jeff Hajek, Planner/Economic Development Director
Date: July 7, 2021
Re: Preliminary Land Development Plan Approval for "North Pointe Commerce Park—Lot A" Speculative Building

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Applicant/Owner: Thomas and Hutton (Felipe Toledo)/North Signal Capital
Location: Southern portion of North Pointe Industrial Boulevard and Henry E. Brown Jr. Boulevard.
Tax Map Number(s): 259-00-00-096
Approval Requested: Preliminary Land Development Plan Approval
Existing Zoning/Land Use: Industrial (ID)/No current use (undeveloped)

General Application Overview and Background

The proposed site is located on the southern corner of the intersection of Henry E. Brown, Jr. Boulevard and North Pointe Industrial Boulevard. Currently, the 10.13-acre site, which is located in the Industrial (ID) zoning district, is undeveloped and heavily wooded. There are no wetlands present on the parcel.

The applicant is proposing to construct a 127,150 SF speculative industrial building, that can potentially be divided into three (3) separate spaces for businesses that fit within the parameters of the allowed land uses in the ID district. 20% (25,430 SF) of the proposed building will consist of office

space, with the maximum amount of employees per shift reaching twenty-one (21).

Currently, there are two (2) means of ingress/egress for the site. The first curb cut, closest to Henry E. Brown, Jr. Boulevard, will be primarily for employees and visitors, while the second access point will be primarily for semi-truck loading and unloading.

General Conformance Analysis

The following report utilized the 2008 City of Hanahan Zoning Ordinance in order to analyze the submitted preliminary land development plan for the "North Pointe Commerce Park—Lot A" project. Per the Zoning Ordinance, staff finds the following general conformance standards for the proposed site:

1. **Lot size**—The proposed lot size conforms to the 2008 Zoning Ordinance required minimums for the Industrial (ID) zoning district, which is 6,000 SF. The proposed site is 441,262 SF (10.13 acres).
2. **Lot Width**—Lot conforms to the minimum lot width requirement of 100'. Each lot frontage is approximately 614.'
3. **Density**—Not applicable—there are no density requirements for the ID district.
4. **Setbacks**—All proposed building meet the required setbacks as dictated in the ID Standards By Zone:
    - Front: 25'
    - Side: 20'
    - Rear: 20'
5. **Impervious Surface Ratio**—The proposed site plan is well under the required 85% maximum impervious surface ratio, with a total of 53% (235,125 SF).

Preliminary Plat Requested Corrections (Section 3.2(B))

Given that the submitted preliminary land development plan meets general zoning conformance, there are other pertinent and required elements needed to have a complete submittal. These documentation requirements may be found in Section 3.2(B) of the Land Development Ordinance. The following will be needed for approval;

Existing Site Information

1. **Section 3.2(B)(3)(d):** Location, ownership, parcel identification numbers, zoning classifications, land uses of adjoining properties, including those across the right-of-way.
    a. Specifically, zoning classifications and land uses will need to be shown on the subject and adjacent parcels on the existing conditions plan.

2. **Section 3.2(B)(3)(g):** A tree protection plan will be required. Tree survey and protection standards shall be those found in Chapter 7 of the Zoning Ordinance. "*All trees required to be protected, including graphic indication as to whether landmark trees and protected trees are proposed to be preserved or removed.*
    a. The applicant has chosen to do a sampling survey. However, this does not negate the applicant from submitting the survey for the preliminary land development submittal. A survey, either its own sheet or part of the existing conditions plan, will need to be provided showing the following found in Section 7.6.3(B):

    "The sampling survey shall indicate the type of groundcover present on each acre of property required to be surveyed. Sampling shall therefore occur once per acre, evenly distributed throughout the property. Groundcover types to be documented on the appropriate development plan include, but are not limited to "cleared," "sandy area," "scrub/shrub," "bottomland hardwood forest," "upland hardwood forest," "bottomland mixed forest," "upland mixed forest," "bottomland pine forest," "upland pine forest," and "marshland."

    b. The applicant states that on the Planting Plan (L1.1) that there remains "Lot D excess mitigation" that will count toward mitigation for this project, Lot A. There is no such provision in the ordinance that allows the transfer of tree mitigation from one project to another. If there was excess mitigation from another project, and there was no available land to plant mitigation trees, then a fee-in-lieu of payment to the Hanahan Community Tree Fund should have been paid for said mitigation.
        i. Applicant will need to apply mitigation solely to the subject proposed project (Lot A).

Other

Landscape Buffers

Landscape Buffers for Off-Street Parking

According to Section 6.5 (Landscaping provisions for off-street parking, loading, and vehicular uses), "For off-street parking areas with more than forty (40) stalls, the buffer between the off-street parking, loading, and vehicular use areas and the adjacent road right-of-way shall be supplemented by one (1) of the following or a combination thereof:

1. A masonry garden wall at least thirty-two (32) inches tall
2. A landscaped berm at least two (2) feet tall with a maximum slope of one to two (1:2) with landscaping necessary to inhibit erosion.

Because the project proposes a total of 134 parking stalls, one of the two listed options will be required.

Landscape Buffer Between Subject Site and City-Owned, 53-Acre Park

Section 6.4.2(B) (Landscaping for provisions for certain land uses—Commercial and Industrial) states that, "an industrial land use abutting a conventional residential district" shall provide one buffer from a selection of four (4) (see Section 6.4.2(B) for detailed list of buffers).

While this ordinance does explicitly state that a buffer is required for a *residential* district, staff is requesting that the developer consider leaving a natural vegetative buffer (existing trees) on the shared property line between the "Lot A" development and the City Park (TMS# 259-00-00-189) because of the proximity of an industrial use, next to a less intense land use (active and passive park).

Fire/EMS and Public Safety

To accommodate for the ladder fire engine's clearance and ease of access to the building, the Fire Chief (Joseph Bowers) is requesting that the road width in the employee parking area closest to the building be changed from 24' to 25.' Additionally, the Fire Chief is requesting that an additional two (2) fire hydrants are installed. One to be located at the employee parking entrance and other to be installed in the southeast area of the site, where the proposed structure has a diagonal corner.

ADA parking stalls have been provided; however, crosswalks will need to be installed from applicable landscaped islands in the middle of the lot to the sidewalks that surround the side of the building.

Submittals to Respective Utilities

The applicant will need to ensure that the preliminary plan has been submitted to Charleston Water System (CWS), Berkeley County Water and Sanitation (BCWS) and Berkeley County for general review and review for stormwater management. Copies of the eventual construction plans will also need to be submitted to Berkeley County Engineering. Comments received by said agencies may affect changes to the preliminary plan.

Recommendations

This plan constitutes a preliminary land development plan. Approval of this plan does not imply approval of permits to begin construction. Approval of this application will enable the developer to seek permits for land disturbance and installation of necessary infrastructure to serve this phase of the project. Subsequent to approval to install infrastructure, the applicant must submit a final plat that depicts all easements provided for its maintenance, whether by a public agency or property owners association. Such plat must be approved and recorded prior to transfer of individual lots depicted on this plan.

Based upon staff's review, the City recommends that the Planning Commission ***approve*** the submitted preliminary land development plan for "North Pointe Commerce Park—Lot A," with strict conditions. Said conditions include:

1. Addressing all requested information in the "Preliminary Plat Requested Corrections (Section 3.2(B))" section of this staff report.
2. Addressing all requested information in the "Other" section of this staff report.
3. Receipt of recommendation letters from CWS, BCWS and Berkeley County Engineering.

NORTH SIGNAL CAPITAL

SITE DEVELOPMENT PLANS

OF

NORTH POINTE COMMERCE PARK - LOT A

CITY OF HANAHAN, SOUTH CAROLINA

PREPARED FOR:

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

6 LANDMARK SQUARE, 4TH FLOOR
STAMFORD, CT 06901

TM# 259-00-00-096

JUNE 4, 2021
LATEST REVISION: ----

J-23577.0013

PREPARED BY:

THOMAS & HUTTON

SITE ADDRESS:
1014 NORTH POINTE INDUSTRIAL BOULEVARD
HANAHAN, SC 29410

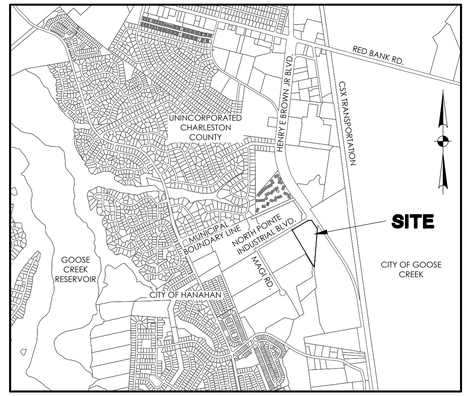
SOUTH CAROLINA PROFESSIONAL ENGINEER No. 26161 MICHAEL C. ROACH

THOMAS & HUTTON ENGINEERING CO. No. C00285 SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION

PERMITTING & CONSTRUCTION REVIEW - NOT FOR CONSTRUCTION

REVISION HISTORY

NO.	REVISIONS	BY	DATE



VICINITY MAP
SCALE: 1" = 2000'

J-23577.0013 NORTH POINTE COMMERCE PARK - LOT A
06/04/2021

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811 Know what's below. Call before you dig.

THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464
p.843.849.0200 f.843.849.0203
www.thomasandhutton.com

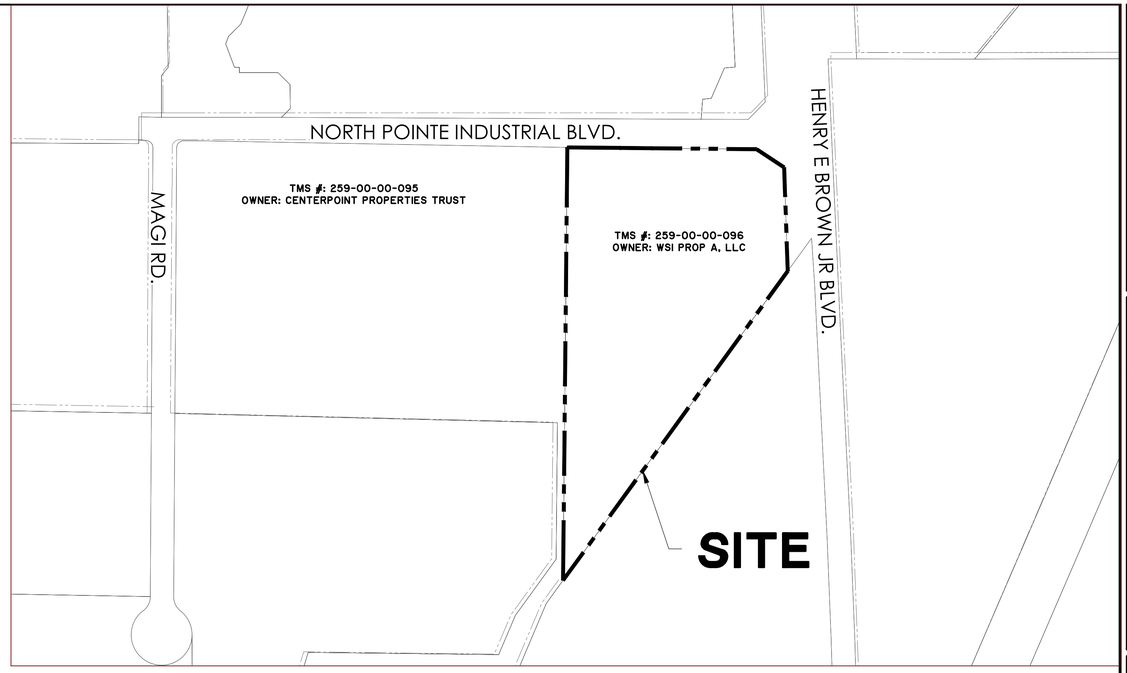
GENERAL NOTES

1. CONTRACTOR SHALL VERIFY THE SIZE, LOCATION, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION. CONTACT ENGINEER IMMEDIATELY WITH ANY DISCREPANCIES.
2. ALL ELEVATIONS REFER TO NGVD 29.
3. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY BRACING, SHEETING AND DEWATERING TO COMPLETE THE PROJECT, PROTECT THE CONSTRUCTION WORKERS AND ALL ADJACENT STRUCTURES, TREES, LANDSCAPING, AND IS RESPONSIBLE FOR ALL REPAIR AND COST TO RETURN AREA TO ORIGINAL CONDITION.
4. ALL UTILITY POLES ADJACENT TO PROPOSED CONSTRUCTION MUST BE SECURED PRIOR TO ANY ADJACENT DISTURBANCE AND THE CONSTRUCTION PROCEDURE MUST BE ACCEPTABLE TO THE UTILITY COMPANY.
5. CONTROL OF STORMWATER THROUGHOUT THE CONSTRUCTION PERIOD SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE EXISTING DRAINAGE CONVEYANCES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ALL PENALTIES, CLAIMS AND FEES IMPOSED ON THE OWNER AS A RESULT OF DAMAGE CAUSED BY ACTIONS OF THE CONTRACTOR, THEIR EMPLOYEES OR SUBCONTRACTORS SHALL BE BORNE IN FULL BY THE CONTRACTOR.
6. ALL DRAINAGE WILL BE MADE FUNCTIONAL DAILY AS WORK PROGRESSES.
7. THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES ENCOUNTERED DURING CONSTRUCTION OTHER THAN THOSE SHOWN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY AND TAKE STEPS TO PROTECT THE LINE(S) AND ENSURE CONTINUED SERVICE. DAMAGE CAUSED TO EXISTING UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR. ADDITIONALLY, THE CONTRACTOR SHALL CONFIRM THE CONNECTION POINTS OF NEW UTILITIES TO EXISTING UTILITIES PRIOR TO BEGINNING NEW CONSTRUCTION
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES AND FOR AVOIDING ALL CONFLICTS WITH SAME. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE EXPENSE OF THE CONTRACTOR.
9. CONTRACTOR IS TO VERIFY ACCURACY OF ANY TEMPORARY BENCHMARKS SHOWN PRIOR TO UTILIZING THEM FOR CONSTRUCTION.
10. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES BEFORE WORK COMMENCES, VERIFY UTILITIES WITHIN THE PROJECT LIMITS AND NOTIFY THE ENGINEER OF CONFLICTS OR VARIANCES TO THE PLANS PRIOR TO BEGINNING WORK OR PURCHASE OF MATERIALS.
11. CONTRACTOR SHALL COORDINATE REPAIRS TO EXISTING UTILITY LINES WITH THE LOCAL UTILITY.
12. IT IS THE OBLIGATION OF THE CONTRACTOR TO MAKE THEIR OWN INTERPRETATION OF ALL SURFACE AND SUBSURFACE DATA AVAILABLE AS TO THE NATURE AND EXTENT OF THE MATERIALS TO BE EXCAVATED, WASTED, GRADED, AND COMPACTED. THE INFORMATION SHOWN ON THESE PLANS IN NO WAY GUARANTEES THE AMOUNT OR NATURE OF THE MATERIAL TO BE ENCOUNTERED.
13. THE CONTRACTOR WILL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERED PRIOR TO BEGINNING ANY REMOVAL OPERATION.
14. ALL SUITABLE MATERIAL EXCAVATED FROM DITCHES AND SWALES SHALL BE USED ON SITE. ANY EXCESS MATERIAL SUITABLE OR UNSUITABLE SHALL BE DISPOSED OF OFF-SITE AT THE CONTRACTOR'S EXPENSE.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL DEVICES AND MEASURES AS NECESSARY TO MEET THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO OWNER FOR REVIEW AND ACCEPTANCE PRIOR TO STARTING CONSTRUCTION.
16. ALL TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS".
17. ALL WORK SHALL CONFORM TO APPLICABLE STATE, COUNTY AND MUNICIPAL REQUIREMENTS AND CODES.
18. THE CONTRACTOR SHALL NOT BEGIN CONSTRUCTION UNTIL THE PROPER PERMITS HAVE BEEN ISSUED
19. ALL CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN AN ACCEPTABLE WASTE DISPOSAL AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSAL OF ALL CONSTRUCTION DEBRIS.
20. ALL STORM DRAIN JOINTS ARE TO BE WRAPPED IN FILTER FABRIC.
21. ANY DEFECTIVE, DAMAGED, OR UNSOUND PIPE SHALL BE REJECTED. ALL FOREIGN MATTER OR DIRT SHALL BE REMOVED FROM INSIDE OF PIPE BEFORE IT IS LOWERED INTO ITS POSITION IN THE TRENCH AND SHALL BE KEPT CLEAN BY ACCEPTED MEANS DURING AND AFTER LAYING. CARE SHALL BE TAKEN TO PREVENT DIRT FROM ENTERING THE JOINT SPACE. AT TIMES WHEN PIPE LAYING IS NOT IN PROGRESS THE ENDS OF THE PIPE SHALL BE CLOSED BY ACCEPTABLE MEANS AND NO TRENCH WATER SHALL BE PERMITTED IN THE PIPE.
22. SHOULD PIPE, FITTINGS, AND OTHER MATERIALS BE NEEDED IN ADDITION TO THAT SHOWN ON THE DRAWINGS BECAUSE PIPELINE WAS NOT INSTALLED TO THE ALIGNMENT AND PROFILE SHOWN, THEN THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THOSE NECESSARY MATERIALS AND PROVIDING THE EQUIPMENT AND LABOR TO INSTALL THEM TO MEET THE DESIGN INTENT OF THE WATERMAIN AT NO ADDITIONAL COST TO THE OWNER.
23. THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER 48 HOURS IN ADVANCE OF ALL REQUIRED TESTS AND INSPECTIONS. THE CONTRACTOR SHALL GRASS ALL AREAS DISTURBED BY CONSTRUCTION IMMEDIATELY AFTER THE WORK IN THOSE AREAS HAS CEASED.
24. IF WORK IS SUSPENDED OR DELAYED FOR 14 DAYS, THE CONTRACTOR SHALL TEMPORARILY STABILIZE THE DISTURBED AREA AT NO ADDITIONAL COST TO THE OWNER.
25. CONTRACTOR WILL BE REQUIRED TO ADJUST ALL STRUCTURE FRAMES TO MATCH FINAL GRADE AT NO ADDITIONAL COST.
26. CONTRACTOR SHALL GRADE AREAS TO DRAIN FOR POSITIVE FLOW PRIOR TO FINAL APPROVAL.
27. EACH EXISTING ROAD WILL BE CLEANED UP AND RESTORED DAILY.
28. NEW PAVEMENT TO BE FLUSH WITH EDGE OF EXISTING PAVEMENT.
29. ALL STORM DRAIN PIPE INVERTS IN AND OUT ARE THE SAME AS THE BOX INVERT UNLESS OTHERWISE NOTED ON THE PLAN SHEETS AND/OR PROFILES.
30. THE DESIGN OF THE PAVEMENT AND EARTHWORK MATERIALS, PROCEDURES AND METHODS SPECIFIED ARE BASED ON THE CRITERIA AND RECOMMENDATIONS ESTABLISHED IN THE GEOTECHNICAL ENGINEERING REPORT PREPARED BY TERRACON CONSULTANTS, INC., DATED 6/26/2013 AND SUBSEQUENT ADDENDUMS. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT AND FOLLOW THE RECOMMENDATIONS OF THE REPORT. ANY CONFLICTS BETWEEN THE REPORT AND OTHER SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. THE ENGINEER WILL PROVIDE DIRECTION OR CLARIFICATION OF ANY CONFLICT.
31. THE CONTRACTOR SHALL INSTALL ALL EROSION CONTROL AND PREVENTION STRUCTURES SHOWN ON THE PLANS. BOTH MUST BE APPROVED BY BERKELEY COUNTY PRIOR TO BEGINNING ANY LAND DISTURBING ACTIVITIES.
32. ALL RCP STORM PIPE SHALL BE O-RING TYPE UNLESS SPECIFIED OTHERWISE
33. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERED PRIOR TO BEGINNING ANY REMOVAL OPERATION.

    THE FOLLOWING NOTES ARE AS SPECIFIED BY THE COUNTY ENGINEER AND ARE TO BE EXECUTED BY THE CONTRACTOR:

    a. ANY DAMAGE TO EXISTING PAVEMENT MUST BE REPAIRED AT CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE COUNTY ENGINEER.
    b. ALL RIGHT-OF-WAY AND DRAINAGE EASEMENT CONSTRUCTION SHALL MEET SCDOT STANDARD SPECIFICATIONS UNLESS SPECIFIED ELSEWHERE AND APPROVED IN WRITING BY THE COUNTY ENGINEER.
    c. THE SITE SHALL BE FILLED AND HAVE POSITIVE DRAINAGE TO THE APPROPRIATE EASEMENT OR RIGHT-OF-WAY AS APPROVED ON THE PLANS PRIOR TO THE ISSUANCE OF ANY BUILDING PERMITS OR FINAL ACCEPTANCE OF THE RIGHT-OF-WAYS BY THE COUNTY.
    d. WHERE FIELD INSPECTIONS ARE REQUIRED BY THE COUNTY, THE CONTRACTOR SHALL NOTIFY THE ENGINEERING DIVISION A MINIMUM OF 48 HOURS IN ADVANCE TO SCHEDULE SUCH INSPECTIONS.
    e. A COMPLETE SET OF APPROVED DRAWINGS AND SPECIFICATIONS MUST BE MAINTAINED ON SITE AT ALL TIMES THAT THE CONTRACTOR IS PERFORMING WORK. THESE DRAWINGS SHALL BE MADE AVAILABLE TO THE BERKELEY COUNTY PERSONNEL AT THEIR REQUEST.
    f. ANY REVISIONS DURING CONSTRUCTION WHICH ALTER THE ROAD LAYOUT, CONSTRUCTION METHODS, RIGHT-OF-WAY LOCATION OR DRAINAGE AS INDICATED AND APPROVED BY THE COUNTY MUST BE SUBMITTED AND APPROVED IN WRITING BY THE COUNTY ENGINEER.
    g. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL CONSTRUCTION PERMITS NECESSARY FROM OTHER RESPONSIBLE AGENCIES.

34. GEOTECHNICAL REPORT PROVIDED BY TERRACON DATED JUNE 6, 2018.



INDEX

SCALE: 1" = 200'

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
REINFORCED SILT FENCE	
CLEARING LIMITS	CL CL
SUBSURFACE DRAIN	SSD
TREE PROTECTION	
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
SODDING	SO
RIPRAP	
OUTLET PROTECTION - RIP RAP	
SEDIMENT TRAP	
ROCK CHECK DAM	OR
STABILIZED CONSTRUCTION ENTRANCE	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE E SURFACE COURSE CURB INLET FILTER	E

DRAINAGE LEGEND

DESCRIPTION	EXISTING	PROPOSED
PIPE		
DITCH		
CURB INLET		
GRATE INLET		
JUNCTION BOX		
OUTLET STRUCTURE		

ABBREVIATIONS

HDPE	HIGH DENSITY POLYETHELENE		LF	LINEAR FEET		SF	SQUARE FEET
BOT	BOTTOM		MAX	MAXIMUM		SS	SANITARY SEWER
CI	CURB INLET		MIN	MINIMUM		TC	TOP OF CURB
CPP	CORRUGATED PLASTIC PIPE		MH	MANHOLE		TG	TOP OF GUTTER
DIP	DUCTILE IRON PIPE		OC	ON CENTER		TP	TOP OF PAVEMENT
EL	ELEVATION		PC	POINT OF CURVE		TW	TOP OF WALK
FG	FINISH GRADE		PH	POST HYDRANT		TYP	TYPICAL
FH	FIRE HYDRANT		PT	POINT OF TANGENT		W	WATER
FM	FORCE MAIN (SANITARY SEWER)		PVC	POLYVINYL CHLORIDE		W/	WITH
FR	FRAME		RCP	REINFORCED CONCRETE PIPE		WV	WATER VALVE
GI	GRATE INLET		RJP	RESTRAINED JOINT PIPE		YI	YARD INLET
GV	GATE VALVE		R/W	RIGHT-OF-WAY			
INV	INVERT ELEVATION		SD	STORM DRAINAGE			
JB	JUNCTION BOX		SDMH	STORM DRAINAGE MANHOLE			

PROJECT INFORMATION

TOTAL SITE AREA:	10.13 AC
BUILDING SETBACK:	FRONT: 25'
BUFFERS:	AS SHOWN
OPEN SPACE REQUIRED:	20%
OPEN SPACE PROVIDED:	30%
IMPERVIOUS AREA PROPOSED:	
BUILDING 1:	127,150 SF
PAVEMENT/SIDEWALK:	56,900 SF
DETENTION PONDS	51,075 SF
TOTAL IMPERVIOUS AREA:	235,125 SF = 53% IMPERVIOUS

PARKING SPACES REQUIRED:
5 SPACES PER 1000 SF OFFICE SPACE
1 SPACE PER 5,000 WAREHOUSE SPACE

OFFICE SPACE = 20% BUILDING FOOTPRINT = 127,150*(0.2) = 25,430 SF
25,430 SF / 5,000 SF * 5 = 25 SPACES

WAREHOUSE EMPLOYEES DURING MAXIMUM SHIFT = 21

25 + 21 = 46 SPACES MINIMUM

A TOTAL OF 134 PARKING SPACES WILL BE PROVIDED THEREFORE PARKING REQUIREMENTS ARE MET.

SITE DATA

CITY:	CITY OF HANAHAN
COUNTY:	BERKELEY COUNTY
PROPERTY ZONING:	INDUSTRIAL (ID)
TAX MAP NUMBER:	259-00-00-096
FLOOD ZONE:	X
FEMA FLOOD MAP PANEL AND DATE:	45015C 0685D OCT 16, 2003
TOTAL SITE AREA:	10.13 AC
TOTAL DISTURBED AREA:	10.1 AC

OWNER: WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
6 Landmark Square, 4th Floor
Stamford, CT 06901
(203) 572-4511

ENGINEER: THOMAS & HUTTON
50 PARK OF COMMERCE WAY
SAVANNAH, GA 31405
(912) 234 - 5300

PRELIMINARY SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

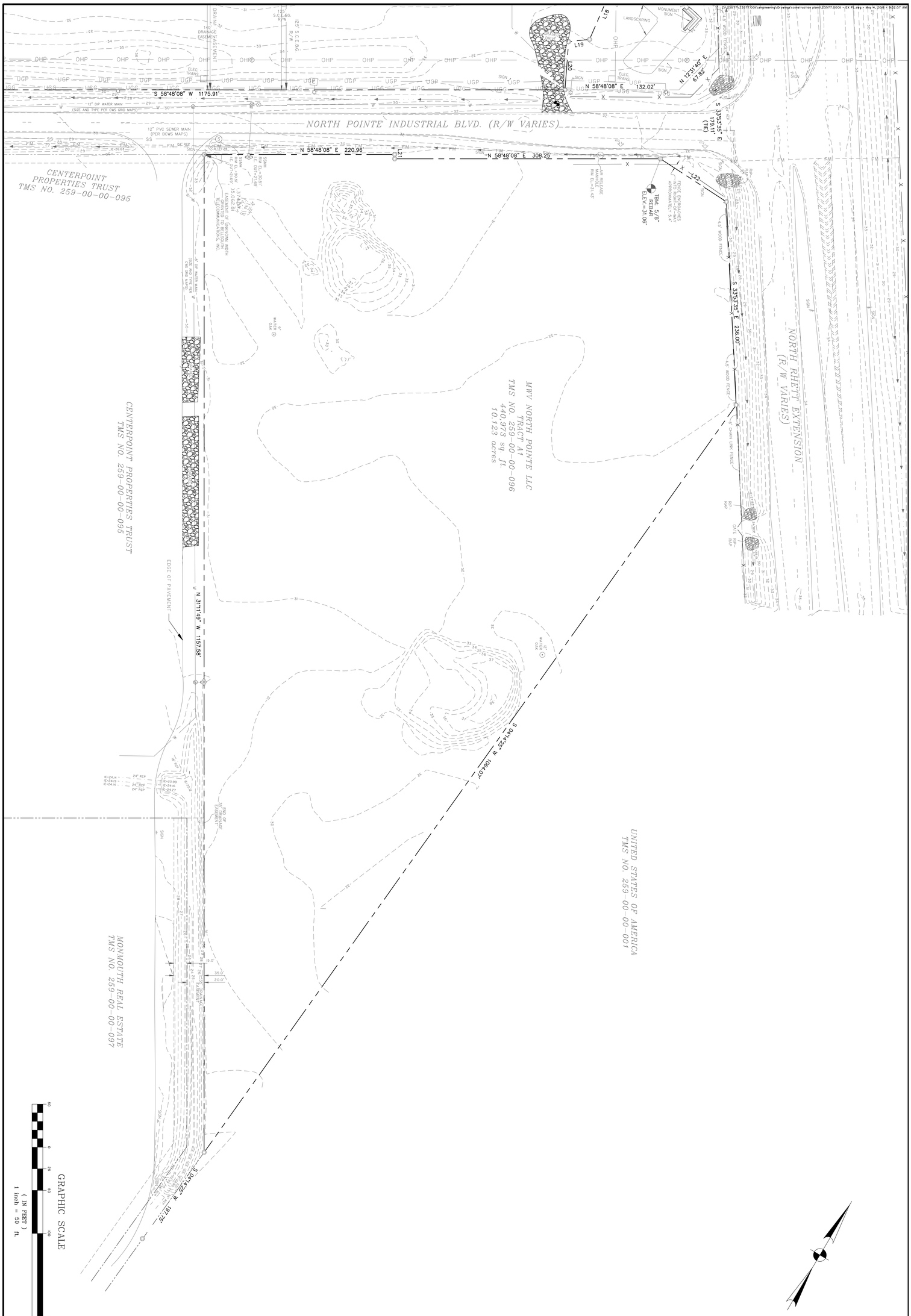
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

GENERAL NOTES AND INDEX

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	KHT
DESIGNED:	MBB
REVIEWED:	JVG
APPROVED:	MCR
SCALE:	AS SHOWN

G1.1



EX1.1

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

EXISTING CONDITIONS

JOB NO: 25577.03.03
DATE: 06/04/2020
DRAWN: EMD
DESIGNED: EMD
REVIEWED: MCR
APPROVED: MCR
SCALE: 1" = 50'

THOMAS & HUTTON

50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

NO.	REVISIONS	BY	DATE

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 26661 MICHAEL C. ROICH

SOUTH CAROLINA THOMAS & HUTTON ENGINEERING CO. No. COA2261 CERTIFICATE OF AUTHORITY

Z:\23577\23577.0008\Engineering\Drawings\Construction Plans\23577.0008 - EC GNDT.dwg - Oct 15, 2017 - 10:35:27 PM

I. SITE DESCRIPTION

A. PROJECT DESCRIPTION

A.1.	PROJECT AREA	10.13 ACRES
A.2.	AREA DISTURBED	10.1 ACRES
A.3.	PERCENT IMPERVIOUS AREA BEFORE CONSTRUCTION	10 %
A.4.	PERCENT IMPERVIOUS AREA AFTER CONSTRUCTION	53 %

B. DESCRIPTION OF CONSTRUCTION ACTIVITY

WORK CONSISTS OF GRADING; INSTALLATION OF WATER, WASTEWATER, DRAINAGE SYSTEMS, AND PAVED AREAS; LANDSCAPING ASSOCIATED WITH DEVELOPMENT

C. RUNOFF DATA

C.1.	SOIL CLASSIFICATIONS:	C & D
C.2.	LAND USE(S):	INDUSTRIAL WAREHOUSE

D. RECEIVING WATERS

D.1.	CLOSEST RECEIVING WATERS:	TRIBUTARY TO GOOSE CREEK RESERVOIR
D.2.	ULTIMATE RECEIVING WATERS:	GOOSE CREEK RESERVOIR

E. FLOOD

E.1.	FEMA FLOOD ZONE(S):	X
E.2.	FEMA FLOOD INSURANCE MAP(S):	45015C0685D

II. CONTROL MEASURES

1. EROSION AND SEDIMENT CONTROLS

PRIOR TO START OF CONSTRUCTION, ALL EXTERIOR SILT FENCE WILL BE INSTALLED AS SHOWN ON THE PLANS.

1.1. CLEARING

1.1.2. INSTALL CONSTRUCTION ENTRANCES / EXITS BEFORE BEGINNING CLEARING
1.1.3. AS CLEARING IS COMPLETED, ADDITIONAL SILT FENCE WILL BE INSTALLED WHERE SEDIMENT LADEN RUNOFF MAY LEAVE THE SITE AND CHECK DAMS WILL BE INSTALLED AS NECESSARY, SUCH AS POINTS WHERE FLOWS BECOME CHANNELIZED, AND OTHER POINTS WHERE EXCESSIVE RUNOFF VELOCITIES MAY OCCUR.
1.1.4. CONSTRUCTION DELAYS IN ANY ONE AREA GREATER THAN 14 DAYS PRIOR TO START OF ROUGH GRADING WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.1.5. MAINTAIN EXISTING VEGETATION WHENEVER POSSIBLE AND MINIMIZE THE AREA OF DISTURBANCE. RETAIN AND PROTECT TREES TO ENHANCE FUTURE LANDSCAPING EFFORTS AND REDUCE RAINDROP IMPACT.
1.1.6. INSTALL ALL SEDIMENT CONTROL PRACTICES PRIOR TO ANY UP-SLOPE SOIL DISTURBING ACTIVITIES.
1.1.7. PHASE CONSTRUCTION ACTIVITIES TO MINIMIZE THE AREAS DISTURBED AT ONE TIME. THIS WILL ALSO ALLOW COMPLETED AREAS TO BE STABILIZED AND RE-VEGETATED BEFORE DISTURBING ADJACENT SITES. THE NEED FOR TEMPORARY EROSION CONTROL MEASURES MAY BE AVOIDED BY COMPLETING A PHASE AND INSTALLING PERMANENT EROSION CONTROL MEASURES WHEN THE FINAL GRADE IS ATTAINED.
1.1.8. MAINTAIN AND PROTECT ALL NATURAL WATERWAYS. RETAIN AT LEAST A 35-FOOT UNDISTURBED BUFFER OF NATURAL VEGETATION ALONG ALL WATERWAYS TO FILTER OUT SEDIMENT AND OTHER POLLUTANTS. MAINTAIN A 45-FOOT UNDISTURBED BUFFER AROUND SENSITIVE WATERS.
1.1.9. INSTALL SILT FENCE (OR BIO ROLLS/ROCK SOCK PRODUCTS) ON THE DOWN-SLOPE PERIMETER OF ALL DISTURBED AREAS PRIOR TO ANY SOIL DISTURBING ACTIVITIES (INCLUDING CLEARING AND GRUBBING). SILT FENCE CAN TREAT A MAXIMUM OF 100 SQUARE FEET PER LINEAL FOOT OF FENCE. INSTALL SILT FENCE IN SHORTER REACHES ON THE CONTOUR WITH EACH END TURNED UP-SLOPE . SWALES AND SHORELAND AREAS SHOULD ALSO BE PROTECTED WITH SILT FENCE, BIO ROLLS, OR ROCK SOCKS.
1.1.10. IN AREAS OF CONCENTRATED FLOW INSTALL, ROCK CHECK DAMS, TRIANGULAR DIKES, BIO ROLL BLANKETS, OR ROCK SOCKS TO SLOW RUNOFF AND TRAP SEDIMENT.

1.1.11. USE TEMPORARY SLOPE DRAINS OR ROCK CHUTES TO MOVE WATER DOWN STEEP SLOPES.

1.1.12. CONSTRUCT SEDIMENT BASINS FOR DRAINAGE AREAS GREATER THAN 10 ACRES

1.2. ROUGH GRADING

1.2.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING ROUGH GRADING, DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.2.2. ALL AREAS NOT SUBJECT TO FURTHER CONSTRUCTION (DRAINAGE, SANITARY SEWER, ROADS, WATER DISTRIBUTION SYSTEMS, OR STORM WATER FACILITIES) SHALL BE GRASSED WITH A PERMANENT COVER.
1.2.3. COVER ANY STOCK PILED TOPSOIL WITH PLASTIC (OR OTHER IMPERVIOUS COVERING) OR USE A TEMPORARY SEED MIX. USE STOCKPILED TOPSOIL AS EARTHEN BERMS TO SERVE AS TEMPORARY SEDIMENT BASINS.

1.3. DRAINAGE

1.3.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING DRAINAGE INSTALLATION.
1.3.2. CONSTRUCTION DRAINAGE WILL BE ROUTED THROUGH LAKES, WHICH WILL ACT AS SEDIMENT BASINS OR OTHER ACCEPTABLE SEDIMENT BASINS/TRAPS.
1.3.3. STORM DRAIN INLET PROTECTION AS SHOWN ON DETAIL SHEET SHALL BE INSTALLED ON ALL CURB INLETS, STORM DRAIN MANHOLES, JUNCTION BOXES, AND GRATE INLETS.
1.3.4. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF THE NEXT CONSTRUCTION SEQUENCE WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.3.5. ALL STORM LINES NOT IN STREETS OR OTHER PAVED AREAS ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL.

1.4. GRASSING

1.4.1. ALL EXISTING CONTROLS WILL BE MAINTAINED UNTIL GRASSING IS ESTABLISHED
1.4.2. ANY AREAS THAT ERODE OR WHERE GRASS DOES NOT ESTABLISH ITSELF SHALL BE RE-GRADED AND RE-GRASSED.

2. STORM WATER MANAGEMENT

RUNOFF FROM THIS PROJECT WILL DISCHARGE INTO EXISTING OFFSITE DITCHES AND SWALES ALONG THE PERIMETER OF THE PROPERTY.

3. OTHER CONTROLS

3.1. WASTE DISPOSAL

3.1.1. NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED TO ANY RECEIVING WATERS.
3.1.2. OFFSITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST SHALL BE MINIMIZED.
3.1.3. THIS PLAN SHALL COMPLY WITH STATE AND/OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.
3.1.4. DUST CONTROL ON DISTURBED AREAS - CONTROLLING SURFACE AND AIR MOVEMENT OF DUST ON CONSTRUCTION SITE AND HAUL ROUTES. THE PURPOSE OF THE MEASURE IS TO REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES, WHICH MAY BE HARMFUL OR INJURIOUS TO HUMAN HEALTH, WELFARE OR SAFETY, OR TO ANIMALS OR PLANT LIFE.

III. MAINTENANCE

1. MAINTENANCE PROGRAM
1.1. THE SITE SUPERINTENDENT, OR HIS/HER REPRESENTATIVE, SHALL MAKE VISUAL INSPECTIONS OF ALL MECHANICAL CONTROLS AND NEWLY STABILIZED AREAS (I.E. SEEDED AND MULCHED AND/OR SODDED AREAS) ON A DAILY BASIS; ESPECIALLY AFTER HEAVY RAINFALL EVENT TO INSURE THAT ALL CONTROLS ARE MAINTAINED AND PROPERLY FUNCTIONING. ANY DAMAGED CONTROLS SHALL BE REPAIRED PRIOR TO THE END OF THE WORK DAY INCLUDING RE-SEEDING AND MULCHING OR RE-SODDING IF NECESSARY.

1.2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE. ALL DRAINAGE SWALES, POCKETS, DEPRESSION, LOW LINES, AND OUTLET DITCHES SHALL DRAIN EFFECTIVELY AT ALL TIMES. SETTLEMENT OR WASHING THAT MAY OCCUR SHALL BE REPAIRED BY THE CONTRACTOR. SEDIMENT WILL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN AN EFFECTIVE BARRIER. MAINTAIN THE CONSTRUCTION EXIT IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TACKED ONTO PUBLIC ROADWAYS. RESEED AND MULCH AREA WHERE SEEDING EMERGENCE IS POOR, OR WHERE EROSION OCCURS. PROTECT FROM TRAFFIC AS MUCH AS POSSIBLE. INSPECT ALL MULCHES PERIODICALLY, AND AFTER RAINSTORMS TO CHECK FOR EROSION, DISLOCATION OR FAILURE. IF WASHOUT OCCURS, REPAIR THE SLOPE GRADE, RESEED AND REINSTALL MULCH. FOLLOW THE CONSTRUCTION SEQUENCE THROUGHOUT THE PROJECT DEVELOPMENT. WHEN CHANGES IN CONSTRUCTION ACTIVITIES ARE NEEDED, AMEND THE SEQUENCE SCHEDULE IN ADVANCE TO MAINTAIN MANAGEMENT CONTROL. IF MAJOR CHANGES ARE NECESSARY, SEND A COPY OF THE MODIFIED SCHEDULE TO THE ENGINEER, SEDIMENT AND EROSION CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE DISTURBED AREAS ARE STABILIZED.

2. SILT FENCE
SILT FENCES WILL BE MONITORED DURING CONSTRUCTION. ANY SILT FENCE WHICH IS NOT FUNCTIONING PROPERLY WILL BE PROMPTLY REPAIRED. CLEAN OUT THE SILT FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE OR REPLACE WITH FUNCTIONAL SILT FENCE WITHIN 24 HOURS. USE OF HOSES AND WATER TO FLUSH THE SEDIMENT INTO THE STORM INLETS IS UNACCEPTABLE.

3. SEDIMENTATION BASINS
SEDIMENTATION BASINS WHICH ARE AT 50% USED CAPACITY OR APPROACHING SUCH CAPACITY SHALL BE RE-EXCAVATED TO ORIGINAL DIMENSIONS AND THE SILT PROPERLY DISPOSED OF.

4. SEDIMENT LOGS/ROLLS
SEDIMENT LOGS/ROLLS OR OTHER CONTROL MEASURES WHICH BEGIN TO DISINTEGRATE OR FUNCTION INEFFECTIVELY SHALL BE PROMPTLY REPLACED.

5. VEGETATION COVER
ANY VEGETATION COVER SERVING TO STABILIZE DISTURBED SOILS WHICH IS ITSELF DISTURBED SHALL IMMEDIATELY BE REPLACED.

6. CONSTRUCTION ENTRANCE
MAINTAIN ROCK CONSTRUCTION ENTRANCE AND CLEAN ADJACENT ROADS OF ANY MUD TRACKED ONTO THEM.

IV. INSPECTIONS

1. QUALIFIED PERSONNEL WILL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE, AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION THAT HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL CONTROL MEASURES, AND LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE AT LEAST ONCE EVERY SEVEN CALENDAR DAYS. WHERE SITES HAVE BEEN FINALLY STABILIZED SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH DURING THE WARRANTY PERIOD.

2. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM. EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATERS. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED FOR EVIDENCE OF OFFSITE SEDIMENT TRACKING.

3. A WRITTEN REPORT SUMMARIZING THE SCOPE OF THE INSPECTION, NAME(S) AND QUALIFICATIONS OF PERSONNEL MAKING THE INSPECTION, THE DATE(S) OF THE INSPECTION, WEATHER INFORMATION FOR THE PERIOD SINCE THE LAST INSPECTION (OR SINCE COMMENCEMENT OF CONSTRUCTION ACTIVITY) INCLUDING A BEST ESTIMATE OF THE BEGINNING OF EACH STORM EVENT, DURATION OF EACH STORM EVENT, APPROXIMATE AMOUNT OF RAINFALL FOR EACH STORM EVENT (IN INCHES) AND WHETHER ANY DISCHARGES OCCURRED, LOCATION(S) OF DISCHARGES OF SEDIMENT OR OTHER POLLUTANTS FROM THE SITE, LOCATION(S) OF BMP'S THAT NEED MAINTENANCE, LOCATION(S) OF BMP'S THAT FAILED TO OPERATE AS DESIGNED OR PROVED INADEQUATE FOR A PARTICULAR LOCATION, LOCATION(S) WHERE ADDITIONAL BMP'S ARE NEEDED THAT DID NOT EXIST AT THE TIME OF INSPECTION AND ANY CORRECTIVE ACTION REQUIRED INCLUDING ANY CHANGES TO SWPPP NECESSARY AND IMPLEMENTATION DATES.

4. THE REPORT SHALL BE MAINTAINED AT LEAST THREE YEARS FROM THE DATE THE SITE IS FINALLY STABILIZED. THE REPORT MUST BE SIGNED AND SHALL CONTAIN A CERTIFICATION THAT THE FACILITY IS IN COMPLIANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN AND THE NPDES PERMIT REFERENCED ABOVE. THE CONTRACTOR SHALL MAINTAIN THIS REPORT. THE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND OWNER.

V. NOT USED

VI. SC DHEC STANDARD NOTES

1. IF NECESSARY, SLOPES WHICH EXCEED EIGHT (8) VERTICAL FEET SHOULD BE STABILIZED WITH SYNTHETIC OR VEGETATIVE MATS, IN ADDITION TO GRASSING / HYDROSEEDING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE.

2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW:

2.1. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
2.2. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

3. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. IF PERIODIC INSPECTION OR OTHER INFORMATION INDICATES THAT A BMP HAS BEEN INAPPROPRIATELY OR INCORRECTLY INSTALLED, THE PERMITTEE MUST ADDRESS THE NECESSARY REPACEMENT OR MODIFICATION REQUIRED TO CORRECT THE BMP WITHIN 48 HOURS OF IDENTIFICATION.

4. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED INTO ANY WATERS OF THE STATE.

5. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.

6. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO THE PAVED ROADWAY FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT AS MAY BE REQUIRED.

7. RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS DURING CONSTRUCTION OR OBTAIN APPROVAL OF AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C. REG. 72-300 AND SCR100000.

8. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.

9. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50-FOOT BUFFER CAN NOT BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10-FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS

10. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.

11. A COPY OF THE SWPPP, INSPECTION RECORDS AND RAINFALL DATA MUST BE RETAINED AT THE CONSTRUCTION SITE OR A NEARBY LOCATION EASILY ACCESSIBLE DURING NORMAL BUSINESS HOURS, FROM THE DATE OF COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO THE DATE THAT FINAL STABILIZATION IS REACHED.

12. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.

13. MINIMIZE SOIL COMPACTION IN AREAS NOT UNDER PAVEMENTS AND /OR STRUCTURES AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.

14. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER AND OTHER WASH WATERS. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL THAT PROVIDES EQUAL OR BETTER TREATMENT PRIOR TO DISCHARGE.

15. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES AND EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMPS (SEDIMENT BASIN, FILTER BAG, ETC.).

16. THE FOLLOWING DISCHARGES ARE PROHIBITED:

16.1. WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL;
16.2. WASTEWATER FROM WASHOUT AND CLEANOUT OF OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS;
16.3. FUELS, OILS OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE; AND
16.4. SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.

17. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE CONSTRUCTION SITE.

18. IF EXISTING BMPS NEED TO BE MODIFIED OR IF ADDITIONAL BMPS ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF PERMIT SCR100000 AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE SWPPP AND ALTERNATIVE BMPS MUST BE IMPLEMENTED AS SOON AS REASONABLY POSSIBLE.

19. A PRE-CONSTRUCTION CONFERENCE MUST BE HELD FOR EACH CONSTRUCTION SITE WITH AN APPROVED ON-SITE SWPPP PRIOR TO THE IMPLEMENTATION OF CONSTRUCTION ACTIVITIES. FOR NON-LINEAR PROJECTS THAT DISTURB 10 ACRES OR MORE, THIS CONFERENCE MUST BE HELD ON-SITE UNLESS THE DEPARTMENT HAS APPROVED OTHERWISE.

VII. EROSION, SEDIMENTATION & POLLUTION CONTROL NOTES

1. THE IMPLEMENTATION OF THESE EROSION SEDIMENT CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.

2. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.

3. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.

4. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.

5. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 24 HOURS FOLLOWING A MAJOR STORM EVENT.

6. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING AND PRIOR TO FINAL INSPECTION. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.

7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

8. BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY, THE EXISTING STORM WATER INLET(S) THAT RECEIVING RUNOFF FROM THE PROPOSED WORK AREA SHALL BE PROTECTED. THE TEMPORARY INLET PROTECTION MUST REMAIN IN PLACE UNTIL THE CONSTRUCTION ACTIVITY IS COMPLETED, THE STREET HAS BEEN SWEPT AND ANY EXPOSED SOILS ARE STABILIZED. THE CONTRACTOR IS ALSO RESPONSIBLE FOR REMOVING ANY TEMPORARY INLET PROTECTION INSTALLED; AFTER ALL DISTURBED AREAS ARE STABILIZED. TEMPORARY PROTECTION OF THE INLETS MAY BE ACCOMPLISHED BY ONE OR MORE OF THE FOLLOWING:

8.1. USE OF GRAVEL BAGS OR OTHER APPROVED BMPs TO FILTER THE SEDIMENT FROM ANY RUNOFF. TO MAKE A GRAVEL BAG, USE A BAG MADE OF GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH EITHER 3/4 INCH ROCK OR 1/4 INCH PEA GRAVEL.
8.2. USE OF SEDIMENT LOGS TO FILTER THE SEDIMENT FROM ANY RUNOFF (AVAILABLE THROUGH LOCAL EROSION CONTROL SUPPLIERS).
8.3. USE OF ABOVE OR UNDER-GRATE FILTER BAGS OR DEVICES TO FILTER THE SEDIMENT FROM ANY RUNOFF (AVAILABLE THROUGH EROSION CONTROL SUPPLIERS).

9. WATER MAY NOT BE DISCHARGED IN A MANNER THAT CAUSES EROSION, SEDIMENTATION, OR FLOODING ON THE SITE, ON DOWNSTREAM PROPERTIES, IN THE RECEIVING CHANNELS, OR IN ANY STORM WATER INLET. WHEN SITE DEWATERING, WATER PUMPED FROM THE SITE, INCLUDING TRENCHES, SHALL BE TREATED BY ONE OF THE FOLLOWING:

9.1. TEMPORARY SEDIMENTATION BASINS
9.2. SEDIMENT FILTERING BAGS

10. THE CONTRACTOR SHALL VERIFY THE SIZE AND LOCATION OF ALL EXISTING UTILITIES. EXISTING UTILITIES ARE ALL UTILITIES THAT EXIST ON THE PROJECT IN AN ORIGINAL, RELOCATED OR NEWLY INSTALLED POSITION. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE COST OF REPAIRS TO DAMAGED UNDERGROUND OR OVERHEAD FACILITIES, EVEN IF THE UTILITY IS NOT SHOWN ON THE SITE DEVELOPMENT PLANS. THE CONTRACTOR SHALL CONTACT THE LOCAL UTILITIES PROTECTION CENTER TO COORDINATE THE MARKING OF EXISTING UTILITY LINES A MINIMUM OF 96 HOURS PRIOR TO COMMENCEMENT OF ANY WORK.

11. THE CONTRACTOR SHALL FLUSH ALL INLETS AND PIPE AT THE COMPLETION OF CONSTRUCTION TO REMOVE SILT AND DEBRIS. THE CLEANING AND FLUSHING OF INLETS AND PIPE (EXISTING AND PROPOSED) SHALL BE CONSIDERED PART OF THE COST FOR THE PROJECT.

12. EGRESS FROM THE SITE SHALL BE CONTROLLED SUCH THAT VEHICLES LEAVING THE SITE MUST TRAVERSE CONSTRUCTION EXITS TO REMOVE MUD FROM TIRES.

13. SCHEDULE CONSTRUCTION ACTIVITIES TO MINIMIZE THE EXPOSED AREA AND DURATION OF EXPOSURE. IN SCHEDULING, TAKE INTO ACCOUNT THE SEASON AND THE WEATHER FORECAST.

14. EROSION CONTROL MEASURES ARE THE MINIMUM REQUIRED. THE CONTRACTOR SHALL PROVIDE ADDITIONAL CONTROL MEASURES AS DICTATED BY ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION IN ORDER TO PREVENT EROSION AND CONTROL SEDIMENT. EROSION AND SEDIMENT CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE ENTIRE PROJECT IS TERMINATED OR SUSPENDED FOR AND INDEFINITE LENGTH OF TIME, ALL DISTURBED AREAS SHALL BE PLANTED WITH PERMANENT VEGETATION.

15. THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, IS BASED UPON FIELD INVESTIGATIONS AND IS BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME IS SHOWN AS INFORMATION ONLY, IS NOT GUARANTEED AND DOES NOT BIND THOMAS & HUTTON, OR THE OWNER IN ANY WAY.

16. CONTRACTOR SHALL MAINTAIN SITE ON A DAILY BASIS TO PROVIDE FOR POSITIVE DRAINAGE. CONTRACTOR, AT HIS COST, SHALL GRADE SITE AND PROVIDE NECESSARY TEMPORARY DRAINAGE SWALES TO INSURE STORM WATER DOES NOT POND ON SITE.

17. SITE DRAINAGE SHALL BE ESTABLISHED TO PREVENT ANY PONDED WATER CONDITIONS WITHIN THE CONSTRUCTION AREA AND TO FACILITATE STORM WATER DISCHARGE.

18. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.

19. LIME RATES AND ANALYSIS:
19.1. AGRICULTURAL LIME SHALL BE APPLIED AT THE RATE SHOWN IN THE SEEDING SECTION UNLESS SOIL TESTS INDICATE OTHERWISE. GRADED AREAS REQUIRE LIME APPLICATION. IF LIME IS APPLIED WITHIN SIX MONTHS OF PLANTING PERMANENT PERENNIAL VEGETATION, ADDITIONAL LIME IS NOT REQUIRED. AGRICULTURAL LIME APPLICATION SHALL BE WITHIN THE SPECIFICATIONS OF THE SOUTH CAROLINA DEPARTMENT OF AGRICULTURE.

20. MULCHING:

MULCHING IS REQUIRED FOR ALL PERMANENT VEGETATION APPLICATIONS. MULCH APPLIED TO SEEDED AREAS SHALL ACHIEVE 75% SOIL COVER. SELECT THE MULCHING MATERIAL FROM THE FOLLOWING AND APPLY AS INDICATED:

20.1. DRY STRAW OR DRY HAY OF GOOD QUALITY AND FREE OF WEED SEEDS CAN BE USED. DRY STRAW SHALL BE APPLIED AT THE RATE OF TWO TONS PER ACRE. DRY HAY SHALL BE APPLIED AT THE RATE OF 2 1/2 TONS PER ACRE.
20.2. WOOD CELLULOSE MULCH OR WOOD PULP FIBER SHALL BE USED WITH HYDRAULIC SEEDING. IT SHALL BE APPLIED AT A RATE OF 500 POUNDS PER ACRE. DRY STRAW OR DRY HAY SHALL BE APPLIED (AT THE RATE INDICATED ABOVE) AFTER HYDRAULIC SEEDING.
20.3. ONE THOUSAND POUNDS OF WOOD CELLULOSE OR WOOD PULP FIBER, WHICH INCLUDES A TACKIFIER, SHALL BE USED WITH HYDRAULIC SEEDING ON SLOPES 3/4:1 OR STEEPER.
20.4. SERICEA LESPEDEZA HAY CONTAINING MATURE SEED SHALL BE APPLIED AT A RATE OF 3 TONS PER ACRE.
20.5. PINE STRAW OR PINE BARK SHALL BE APPLIED AT A THICKNESS OF 3 INCHES FOR BEDDING PURPOSES. OTHER SUITABLE MATERIALS IN SUFFICIENT QUANTITY MAY BE USED WHERE ORNAMENTALS OR OTHER GROUND COVERS ARE PLANTED. THIS IS NOT APPROPRIATE FOR SEEDED AREAS.
20.6. WHEN USING TEMPORARY EROSION CONTROL BLANKETS OR BLACK SOD, MULCH IS NOT REQUIRED.
20.7. ON SLOPES GREATER THAN 10 FEET IN LENGTH AND 4:1 OR STEEPER, USE THE FOLLOWING EROSION CONTROL BLANKETS THAT HAVE BEEN PROPERLY ANCHORED TO THE SLOPE ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS:

- 2:1 SLOPES OR STEEPER: - STRAW/COCONUT BLANKET OR HIGH VELOCITY WOOD BLANKET
- 3:1 SLOPES OR STEEPER: - WOOD OR STRAW BLANKET WITH NET ON BOTH SIDES
- 4:1 SLOPES OR FLATTER: - WOOD OR STRAW MULCH BLANKET WITH NET ON ONE SIDE

VIII. HOUSEKEEPING

THESE PERFORMANCE STANDARDS APPLY TO ALL SITES.

1. PETROLEUM PRODUCTS: INCLUDING OIL, GASOLINE, LUBRICANTS AND ASPHALTIC SUBSTANCES.

1.1. HAVE EQUIPMENT TO CONTAIN AND CLEAN UP PETROLEUM SPILLS IN FUEL STORAGE AREAS OR ON MAINTENANCE AND FUELING VEHICLES
1.2. STORE IN COVERED AREAS PROTECTED WITH DIKES

2. SPILLS: PREVENTION AND RESPONSE.

2.1. STORE AND HANDLE MATERIALS TO PREVENT SPILLS
2.2. TIGHTLY SEALED CONTAINERS, NEAT AND SECURE STACKING, ETC.
2.3. REDUCE STORM WATER CONTACT IF SPILL OCCURS
  2.3.1. CLEANUP PROCEDURES SHOULD BE CLEARLY POSTED.
  2.3.2. CLEANUP MATERIALS SHOULD BE READILY AVAILABLE
  2.3.3. STOP THE SOURCE
  2.3.4. CONTAIN THE SPILL

3. NON-STORM WATER DISCHARGES

THE FOLLOWING NON-STORMWATER DISCHARGES MUST BE PROTECTED FROM CAUSING POLLUTION OR EROSION:

3.1. DISCHARGES FROM FIRE-FIGHTING ACTIVITIES
3.2. FIRE HYDRANT FLUSHINGS
3.3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED
3.4. WATER USED TO CONTROL DUST
3.5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHINGS
3.6. ROUTINE EXTERNAL BUILDING WASH DOWN THAT DOES NOT USE DETERGENTS
3.7. PAVEMENT WASH WATERS WHERE SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE NOT OCCURRED (UNLESS ALL SPILLED MATERIAL HAS BEEN REMOVED) AND WHERE DETERGENTS ARE NOT USED
3.8. UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE
3.9. UNCONTAMINATED GROUND WATER OR SPRING WATER
3.10. FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH PROCESS MATERIALS SUCH AS SOLVENTS
3.11. UNCONTAMINATED EXCAVATION DEWATERING
3.12. LANDSCAPE IRRIGATION
3.13. DECHLORINATED SWIMMING POOL DISCHARGES.

4. CONSTRUCTION WASTES: DEMOLITION RUBBLE, PACKAGING MATERIALS, SCRAP BUILDING SUPPLIES, ETC.

4.1. SELECT A DESIGNATED WASTE COLLECTION AREA
4.2. PROVIDE LIDS FOR WASTE CONTAINERS
4.3. WHEN POSSIBLE LOCATE CONTAINERS IN COVERED AREA
4.4. MAINTAIN CONSISTENT REMOVAL SCHEDULE FOR WASTE

5. PESTICIDES: REDUCE THE AMOUNT OF PESTICIDES AVAILABLE FOR CONTACT WITH STORM WATER.

5.1. STORE IN A DRY COVERED AREA
5.2. INSTALL CURBS OR DIKES AROUND STORAGE AREA TO PROTECT AGAINST SPILLS
5.3. STRICTLY FOLLOW RECOMMENDED APPLICATION RATES

6. FERTILIZERS AND DETERGENTS: REDUCE THE AMOUNT OF FERTILIZERS AND DETERGENTS AVAILABLE FOR CONTACT WITH STORM WATER.

6.1. LIMIT APPLICATION OF FERTILIZERS TO THE MINIMUM NEEDED
6.2. APPLY MORE FREQUENTLY BUT AT LOWER APPLICATION RATES
6.3. LIMIT USE OF DETERGENTS ON-SITE
6.4. DO NOT DISCHARGE WASH WATER INTO STORM WATER SYSTEM
6.5. MAINTAIN STRUCTURAL AND VEGETATIVE BMP'S
6.6. APPLY ACCORDING TO SOIL TEST RECOMMENDATIONS PRIOR TO SEEDING.

IX. GRASSING NOTES

1. SOD:

ALL SOD SHALL BE NURSERY GROWN AS CLASSIFIED IN THE ASPS GSS. MACHINE CUT SOD AT A UNIFORM THICKENS OF 3/4" WITHIN A TOLERANCE OF 1/4", EXCLUDING TOP GROWTH AND THATCH. EACH INDIVIDUAL SOD PIECE SHALL BE STRONG ENOUGH TO SUPPORT ITS OWN WEIGHT WHEN LIFTED BY THE ENDS. BROKEN PODS, IRREGULARLY SHAPED PIECES, AND TORN OR UNEVEN ENDS WILL BE REJECTED. WOOD PEGS AND / OR WIRE STAPLES SHALL REPLACE SOD WITH AN EQUAL SOD COMPOSITION AS THAT WHICH IS EXISTING. IF NO SOD TYPE EXIST. THEN THE FOLLOWING SOD COMPOSITION SHALL BE USED.

2. SODDING SCHEDULE:

LAY SOD FROM MAY 1 TO SEPTEMBER 15 FOR SPRING PLANTING AND FROM SEPTEMBER 15 TO NOVEMBER 1 FOR FALL PLANTING.

3. SEED:

ALL SEED SHALL CONFORM TO ALL STATE LAWS AND TO ALL REQUIREMENTS AND REGULATIONS OF THE SOUTH CAROLINA DEPARTMENT OF AGRICULTURE. THE SEVERAL VARIETIES OF SEED SHALL BE INDIVIDUALLY PACKAGED OR BAGGED, AND TAGGED TO SHOW NAME OF SEED, NET WEIGHT, ORIGIN, GERMINATION, LOT NUMBER, AND OTHER INFORMATION REQUIRED BY THE DEPARTMENT OF AGRICULTURE.

3.1. PENNISETUM GLAUCIUM (BROWNTOP MILLET): TESTING 98 PERCENT PURITY AND 85 PERCENT GERMINATION.
3.2. BERMUDA COMMON: TESTING 98 PERCENT PURITY AND 85 PERCENT GERMINATION.
3.3. DOMESTIC ITALIAN RYE: TESTING 98 PERCENT PURITY AND 90 PERCENT GERMINATION.

4. MISCELLANEOUS:

4.1. PERMANENT SEEDING SHALL COVER ALL DISTURBED AREA NOT TO BE COVERED BY LANDSCAPE PLANTING BEDS, STRUCTURE, OR PAVEMENT.
4.2. SEED ALL DISTURBED AREAS WITHIN SEVEN DAYS OF FINAL GRADING AND TEMPORARY SEED/MULCH ALL AREAS THAT WILL BE LEFT INACTIVE FOR MORE THAN FOURTEEN (14) DAYS.
4.3. ALL PERMANENT GRASS PLANTINGS SHALL BE MULCHED
4.4. CENTIPEDE SOD CAN BE USED AS PERMANENT COVER ANYTIME EXCEPT JUNE THRU OCTOBER
4.5. IF GRASSING OCCURS DURING A MONTH REQUIRING TEMPORARY COVER, THE CONTRACTOR SHALL APPLY PERMANENT COVER (IN ADDITION TO THE TEMPORARY COVER) AT THE APPROPRIATE TIME AT NO NO ADDITIONAL COST. THE CONTRACTOR MUST ACHIEVE A STRAND OF PERMANENT GRASS WITH AT LEAST 95% COVER. BARE SPOTS CAN NOT BE MORE THAN 1 INCH SQUARE IN ANY 10 SF.

X. PERMANENT STABILIZATION

NEWLY SEEDED OR SODDED AREAS MUST BE PROTECTED FROM VEHICLE TRAFFIC,EXCESSIVE PEDESTRIAN TRAFFIC, AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. IF NECESSARY, AREAS MUST BE RE-WORKED AND RE-STABILIZED IF GERMINATION IS SPARSE, PLANT COVERAGE IS SPOTTY ,OR TOPSOIL EROSION IS EVIDENT. ONE OR MORE OF THE FOLLOWING MAY APPLY TO THE SITE.

4.1. SEEDED AREAS

FOR SEEDED AREAS, PERMANENT STABILIZATION MEANS A 90% COVER OF THE DISTURBED AREA WITH MATURE, HEALTHY PLANTS WITH NO EVIDENCE OF WASHING OR RILLING OF THE TOPSOIL.

4.2. SODDED AREAS

FOR SODDED AREAS, PERMANENT STABILIZATION MEANS THE COMPLETE BINDING OF THE SOD ROOTS INTO THE APPROVED MULCH MATERIAL.

4.3. PERMANENT MULCH

FOR MULCHED AREAS, PERMANENT MULCHING MEANS TOTAL COVERAGE OF THE EXPOSED AREA WITH AN APPROVED MULCH MATERIAL.

4.4. RIPRAP

FOR AREAS STABILIZED WITH RIPRAP, PERMANENT STABILIZATION MEANS THAT SLOPES STABILIZED WITH RIPRAP HAVE AN APPROPRIATE BACKING OF AN APPROVED GEOTEXTILE TO PREVENT SOIL MOVEMENT FROM BEHIND THE RIPRAP.

4.5. DITCHES, CHANNELS, AND SWALES

FOR OPEN CHANNELS, PERMANENT STABILIZATION MEANS THE CHANNEL IS STABILIZED WITH MATURE VEGETATION AT LEAST THREE INCHES IN HEIGHT, WITH WELL-GRADED RIPRAP LINING, OR WITH ANOTHER NON-EROSIVE LINING CAPABLE OF WITHSTANDING THE ANTICIPATED FLOW VELOCITIES AND FLOW DEPTHS WITHOUT RELIANCE ON CHECK DAMS TO SLOW FLOW. THERE MUST BE NO EVIDENCE OF SLUMPING OF THE LINING, UNDERCUTTING OF THE BANKS, OR DOWN CUTTING OF THE CHANNEL.

XI. FERTILIZER REQUIREMENTS

1. TEMPORARY SEEDING FERTILIZER

APPLY A MINIMUM OF 500 LBS PER ACRE OF A COMPLETE 10-10-10 FERTILIZER (11.5 POUNDS PER 1000 SQUARE FEET) OR EQUIVALENT DURING TEMPORARY SEEDING OF GRASSES UNLESS A SOIL TEST INDICATES A DIFFERENT REQUIREMENT. INCORPORATE FERTILIZER AND LIME (IF USED) INTO THE TOP 4-6 INCHES OF THE SOIL BY DISKING OR OTHER MEANS WHERE CONDITIONS ALLOW. LIME IS NOT REQUIRED FOR TEMPORARY SEEDING UNLESS A SOIL TEST SHOWS THAT THE SOIL PH IS BELOW 5.0. IT IS DESIRABLE TO APPLY LIME DURING THE TEMPORARY SEEDING OPERATION TO BENEFIT THE LONG-TERM PERMANENT SEEDING. APPLY A MINIMUM OF 1.5 TONS OF LIME / ACRE (70LBS. / 1000 SQ. FT.).

2. PERMANENT SEEDING FERTILIZER

APPLY A MINIMUM OF 1000 LBS PER ACRE OF A COMPLETE 10-10-10 FERTILIZER (23 POUNDS PER 1000 SQUARE FEET) OR EQUIVALENT DURING PERMANENT SEEDING OF GRADES UNLESS A SOIL TEST INDICATES A DIFFERENT REQUIREMENT. INCORPORATE FERTILIZER AND LIME (IF USED) INTO THE TOP 4-6 INCHES OF THE SOIL BY DISKING OR OTHER MEANS WHERE CONDITIONS ALLOW. DO NOT MIX THE LIME AND THE FERTILIZER PRIOR TO THE FIELD APPLICATION. UNLESS A SPECIFIC SOIL TEST INDICATES OTHERWISE, APPLY 1 & 1/2 TONS OF GROUND COARSE TEXTURED AGRICULTURAL LIMESTONE PER ACRE (70 LBS. / 1000 SQ.FT.).

XII. SWPP PREPARER CERTIFICATION

I HAVE PLACED MY SIGNATURE AND SEAL ON THE DESIGN DOCUMENTS SUBMITTED SIGNIFYING THAT I ACCEPT RESPONSIBILITY FOR THE DESIGN OF THE SYSTEM. FURTHER, I CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE DESIGN IS CONSISTENT WITH THE REQUIREMENTS OF TITLE 48, CHAPTER 14 OF THE CODE OF LAWS OF SC, 1976 AS AMENDED, PURSUANT TO REGULATION 72-300 ET SEQ. (IF APPLICABLE), AND IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SCR100000.

THOMAS & HUTTON ENGINEERING CO.
No. C00285

MICHAEL C. ROACH
No. 26161

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK - LOT A
SWPP NOTES

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
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APPROVED:	MCR
SCALE:	N/A

EC0.1

STORMWATER POLLUTION PREVENTION PLAN

TEMPORARY SEEDING - COASTAL

SPECIES	LBS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET	40			━	━	━	━	━	━				
RYE, GRAIN	56	━	━	━						━	━	━	━
RYEGRASS	50	━	━	━	━					━	━	━	━
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET JAPANESE MILLET	40 40			━	━	━	━	━	━				
RYE, GRAIN OATS	56 75	━	━	━						━	━	━	━
RYEGRASS	50	━	━	━	━					━	━	━	━

PERMANENT SEEDING - COASTAL

SPECIES	LBS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET BAHIAGRASS	10 40			━	━	━	━	━	━				
BROWNTOP MILLET BAHIAGRASS SERICEA LESPEDEZA	10 30 40			━	━	━	━	━	━				
BROWNTOP MILLET ATLANTIC COASTAL PANICGRASS	10 15 PLS			━	━	━	━						
BROWNTOP MILLET SWITCHGRASS (ALAMO) LITTLE BLUESTEM SERICEA LESPEDEZA	10 8 PLS 4 20			━	━	━	━						
BROWNTOP MILLET WEEPING LOVEGRASS	10 8			━	━	━	━						
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET BAHIAGRASS	10 40			━	━	━	━	━	━				
RYE, GRAIN BAHIAGRASS CLOVER, CRIMSON (ANNUAL)	10 40 5									━	━	━	
BROWNTOP MILLET BAHIAGRASS SERICEA LESPEDEZA	10 30 40			━	━	━	━	━	━				
BROWNTOP MILLET BERMUDA, COMMON SERICEA LESPEDEZA	10 10 40			━	━	━	━	━	━				
BROWNTOP MILLET BERMUDA, COMMON KOBE LESPEDEZA (ANNUAL)	10 12 10			━	━	━	━	━	━				
BROWNTOP MILLET BAHIAGRASS BERMUDA, COMMON SERICEA LESPEDEZA	10 20 6 40			━	━	━	━	━	━				
BROWNTOP MILLET SWITCHGRASS LITTLE BLUESTEM INDIANGRASS	10 8 PLS 3			━	━	━	━	━	━				

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
CLEARING LIMITS	CL CL
DIVERSION DIKE	DD
DIVERSION BERM	DB
TEMPORARY DIVERSION	TD
PERMANENT DIVERSION	PD
SUBSURFACE DRAIN	SSD
VEGETATED CHANNEL	
RIP RAP LINED CHANNEL	
ECB OR TRM LINED CHANNEL	
PAVED CHANNEL	PC
TREE PROTECTION	
SURFACE ROUGHENING	OR LG
TOP SOILING	
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
MULCHING	M

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT	
FLEXIBLE GROWTH MATRIX	FGM
BONDED FIBER MATRIX	BFM
SODDING	SO
SLOPED SODDING	
STAKED SOD	
STAKED SOD AROUND INLET	OR
RIPRAP	
OUTLET PROTECTION - RIP RAP	
OUTLET PROTECTION - ECB OR TRM	
DUST CONTROL	DC
POLYACRYLAMIDE (PAM)	PAM
SEDIMENT BASIN	
SEDIMENT BASIN WITH SKIMMER	
SEDIMENT TRAP	
ROCK SEDIMENT DIKE	
SEDIMENT TUBE	

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
ROCK CHECK DAM	OR
POROUS BAFFLES	
STABILIZED CONSTRUCTION ENTRANCE	
CONCRETE WASHOUT	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE A SEDIMENT TUBE	A
STORM DRAIN INLET PROTECTION - TYPE B HARDWARE FABRIC AND STONE	B
STORM DRAIN INLET PROTECTION - TYPE C BLOCK AND GRAVEL	C
STORM DRAIN INLET PROTECTION - TYPE D RIGID INLET FILTER	D
STORM DRAIN INLET PROTECTION - TYPE E SURFACE COURSE CURB INLET FILTER	E
STORM DRAIN INLET PROTECTION - TYPE F INLET TUBE	F
STORM DRAIN INLET PROTECTION - TYPE G IMPERVIOUS AREA	G
STORM DRAIN INLET PROTECTION - CATCH BASIN INSERT	I
PIPE SLOPE DRAINS	
TEMPORARY STREAM CROSSING	
LEVEL SPREADER	

LIST OF ACRONYMS FOR SEDIMENT AND EROSION CONTROL

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AMD	ACRYLAMIDE POLYMER
BFM	BONDED FIBER MATRIX
BMP(S)	BEST MANAGEMENT PRACTICE(S)
CFS	CUBIC FEET PER SECOND
CMP	CORRUGATED METAL PIPE
DHEC	DEPARTMENT OF HEATH AND ENVIRONMENTAL CONTROL
ECB	EROSION CONTROL BLANKET
EPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPSC	EROSION PREVENTION AND SEDIMENTATION CONTROL
FDA	UNITED STATES FOOD AND DRUG ADMINISTRATION
FGM	FLEXIBLE GROWTH MATRIX
HDPE	HIGH DENSITY POLYETHYLENE
MS4	MUNICIPAL SEPARATE STORM SEWER SYSTEM
MSDS	MATERIAL SAFETY DATA SHEETS
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PAM	POLYACRYLAMIDE OR POLYMER
RCP	REINFORCED CONCRETE PIPE
SCS	SOIL CONSERVATION SERVICE
SWPPP	STORMWATER POLLUTION PREVENTION PROGRAM
TRM	TURF REINFORCEMENT MAT
VFS	VEGETATED FILTER STRIP

CONSTRUCTION SEQUENCE

CONSTRUCTION ACTIVITY	SCHEDULE CONSIDERATION
1 OBTAIN COPIES OF ALL PLAN APPROVALS AND OTHER APPLICABLE PERMITS.	CONTRACTOR TO HAVE ONSITE AT ALL TIMES DURING CONSTRUCTION.
2 FLAG THE WORK LIMITS AND BARRICADE TREES AND MARK BUFFER AREAS FOR PROTECTION.	HAVE LOCAL REGULATORY AGENCY INSPECT TREE BARRICADES.
3 HOLD PRE CONSTRUCTION CONFERENCE AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION.	REVIEW TREE PROTECTION (BARRICADE) WITH OWNER AND LOCAL REGULATORY AGENCY. TAKE PICTURES OF ALL PROTECTED TREES AND LOCATIONS WHERE SITE WORK TIES INTO EXISTING TO DOCUMENT PREDEVELOPMENT PROCEDURES.
4 INSTALL CONSTRUCTION ACCESS AND LAY DOWN AREAS	STABILIZE BARE AREAS IMMEDIATELY AND INSTALL CONSTRUCTION EXITS / ENTRANCES.
5 CONSTRUCT SEDIMENT TRAPS AND BARRIERS - BASIN TRAPS, SEDIMENT FENCES, AND OUTLET PROTECTION.	INSTALL PRINCIPAL BASINS AFTER CONSTRUCTION SITE IS ACCESSED. INSTALL ADDITIONAL TRAPS AND BARRIERS AS NEEDED DURING GRADING.
6 ESTABLISH RUNOFF CONTROL - DIVERSIONS, PERIMETER DIKES, WATER BARS, AND OUTLET PROTECTION.	INSTALL KEY PRACTICES AFTER PRINCIPAL SEDIMENT TRAPS AND BEFORE LAND GRADING. INSTALL ADDITIONAL RUNOFF-CONTROL MEASURES DURING GRADING.
7 LAND CLEARING AND GRADING-SITE PREPARATION CUTTING, FILLING AND GRADING, SEDIMENTATION TRAPS, BARRIERS, DIVERSIONS, DRAINS, SURFACE ROUGHENING.	BEGIN MAJOR CLEARING AND GRADING AFTER PRINCIPAL SEDIMENT AND KEY RUNOFF-CONTROL MEASURES ARE INSTALLED. CLEAR BORROW AND DISPOSAL AREAS ONLY AS NEEDED. INSTALL ADDITIONAL CONTROL MEASURES AS GRADING PROGRESSES. MARK TREES AND BUFFER AREAS FOR PRESERVATION.
8 RUNOFF CONVEYANCE SYSTEM- INSTALL STORM DRAINS, STABILIZE BANKS, CHANNELS, INSTALL INLET AND OUTLET PROTECTION, SLOPE DRAINS.	WHERE NECESSARY, STABILIZE BANKS AS EARLY AS POSSIBLE. INSTALL PRINCIPAL RUNOFF CONVEYANCE SYSTEM WITH RUNOFF- CONTROL MEASURES. INSTALL REMAINDER OF SYSTEM AFTER GRADING.
9 INSTALL WASTEWATER COLLECTION, WATER DISTRIBUTION, AND STORM DRAINAGE SYSTEMS	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETE.
10 SURFACE STABILIZATION-TEMPORARY AND PERMANENT SEEDING, MULCHING, SODDING, RIP RAP.	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETE.
11 BUILDING CONSTRUCTION- BUILDINGS UTILITIES, ROADS, ETC.	INSTALL NECESSARY EROSION AND SEDIMENTATION CONTROL PRACTICES AS WORK TAKES PLACE.
12 LANDSCAPING AND FINAL STABILIZATION - TOPSOILING, TREES AND SHRUBS, PERMANENT SEEDING, MULCHING, SODDING, RIP RAP.	LAST CONSTRUCTION PHASE--STABILIZE ALL OPEN AREAS, INCLUDING BORROW AND SPOIL AREAS. REMOVE AND STABILIZE ALL TEMPORARY CONTROL MEASURES.

SOUTH CAROLINA THOMAS & HUTTON ENGINEERING CO. No. C00285 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 26161 MICHAEL C. ROACH

PERMIT SET - FOR REVIEW PURPOSES ONLY

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
Engineering | Surveying | Planning | GIS | Consulting
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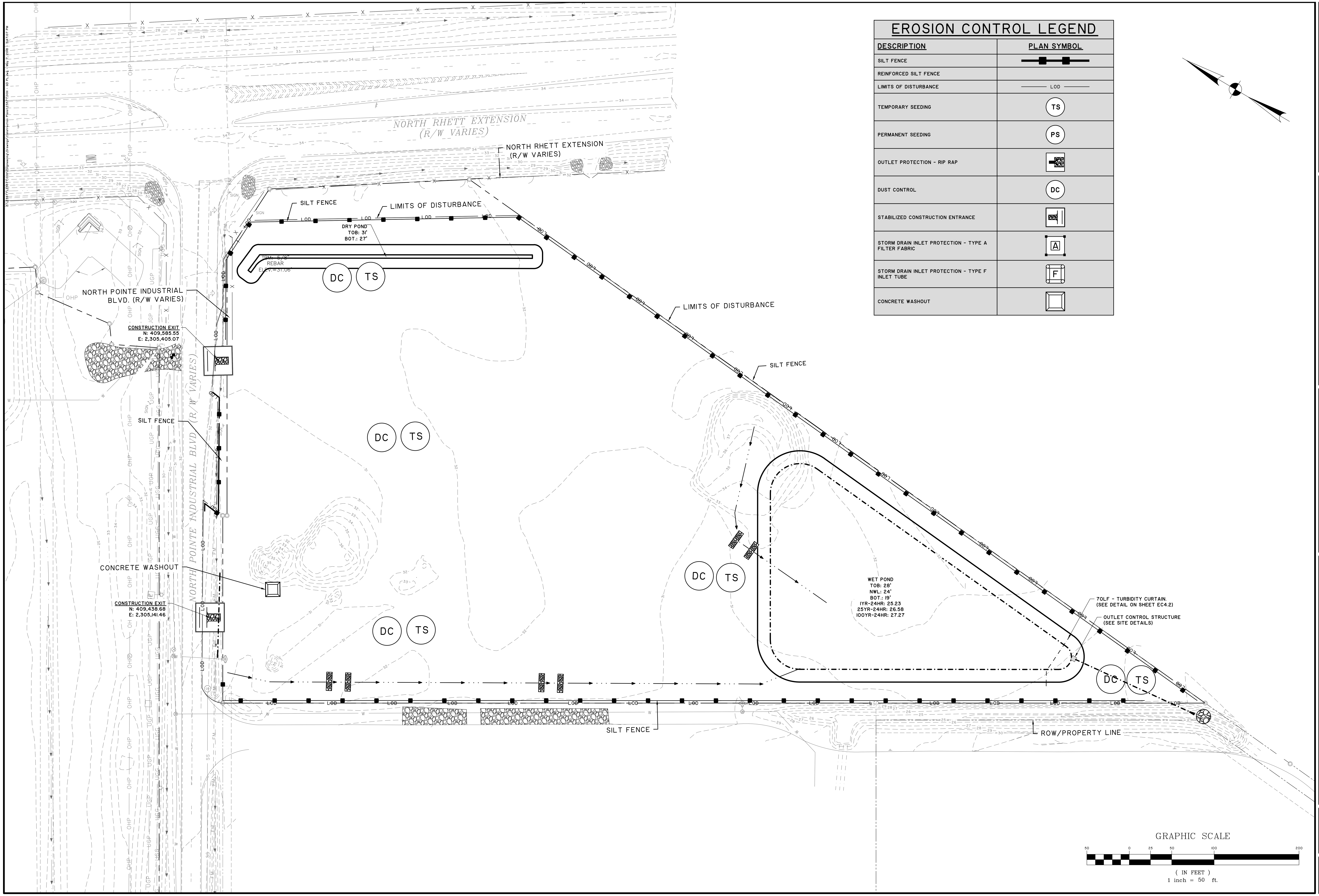
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK - LOT A
SWPP CHARTS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	N/A

EC0.2



EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
REINFORCED SILT FENCE	
LIMITS OF DISTURBANCE	LOD
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
OUTLET PROTECTION - RIP RAP	
DUST CONTROL	DC
STABILIZED CONSTRUCTION ENTRANCE	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE F INLET TUBE	F
CONCRETE WASHOUT	

PRELIMINARY SET - FOR REVIEW PURPOSES ONLY

NO	REVISIONS	BY	DATE

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
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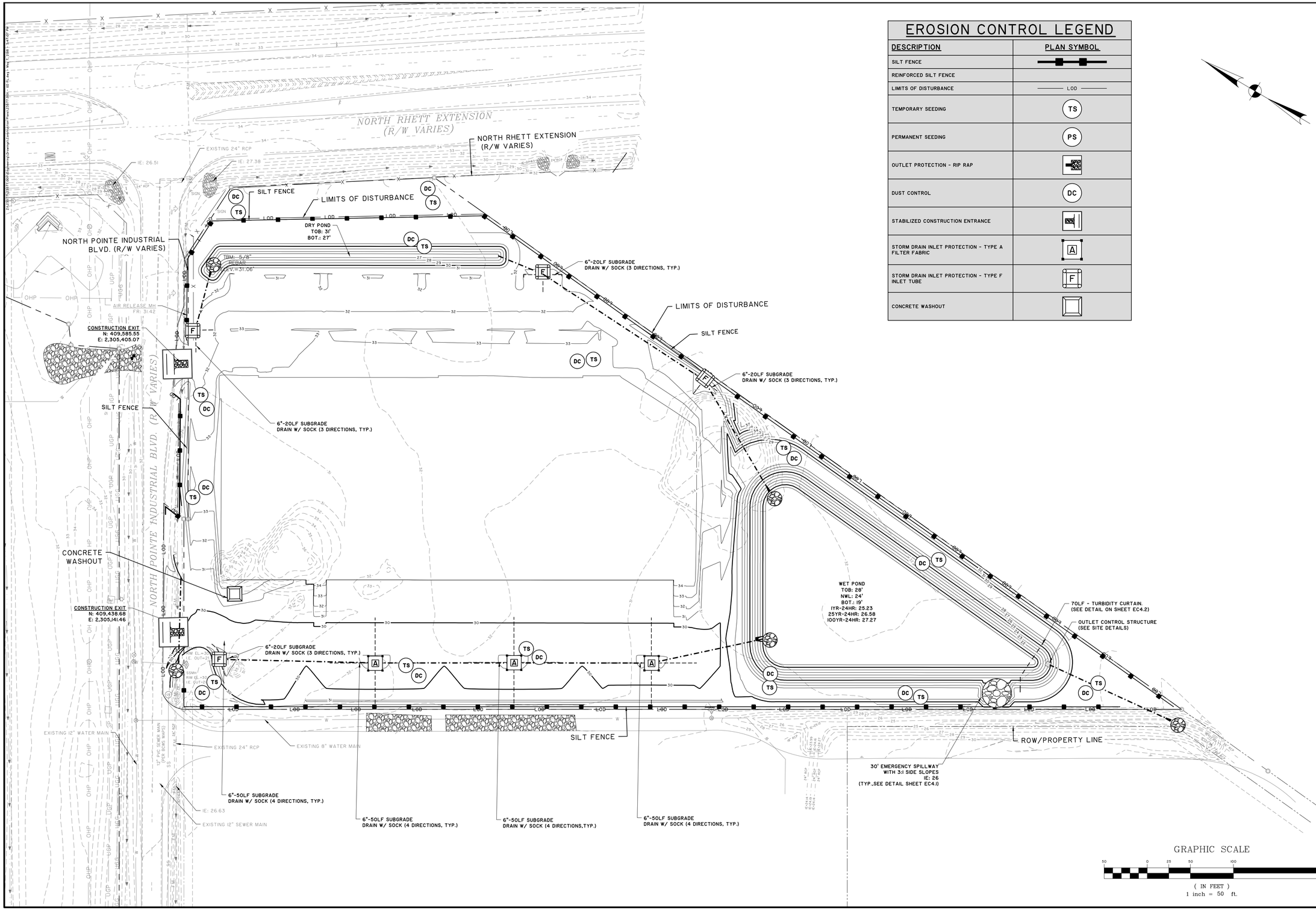
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

SWPP INITIAL PHASE

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

EC1.1



EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
REINFORCED SILT FENCE	
LIMITS OF DISTURBANCE	LOD
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
OUTLET PROTECTION - RIP RAP	
DUST CONTROL	DC
STABILIZED CONSTRUCTION ENTRANCE	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE F INLET TUBE	F
CONCRETE WASHOUT	

PRELIMINARY SET - NOT FOR CONSTRUCTION

SOUTH CAROLINA — THOMAS B. HUTTON ENGINEERING — CERTIFICATE OF AUTHORIZATION NO. C00285

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 26661 — MICHAEL C. RAY

NO.	REVISIONS	BY	DATE

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50 Park of Commerce Way
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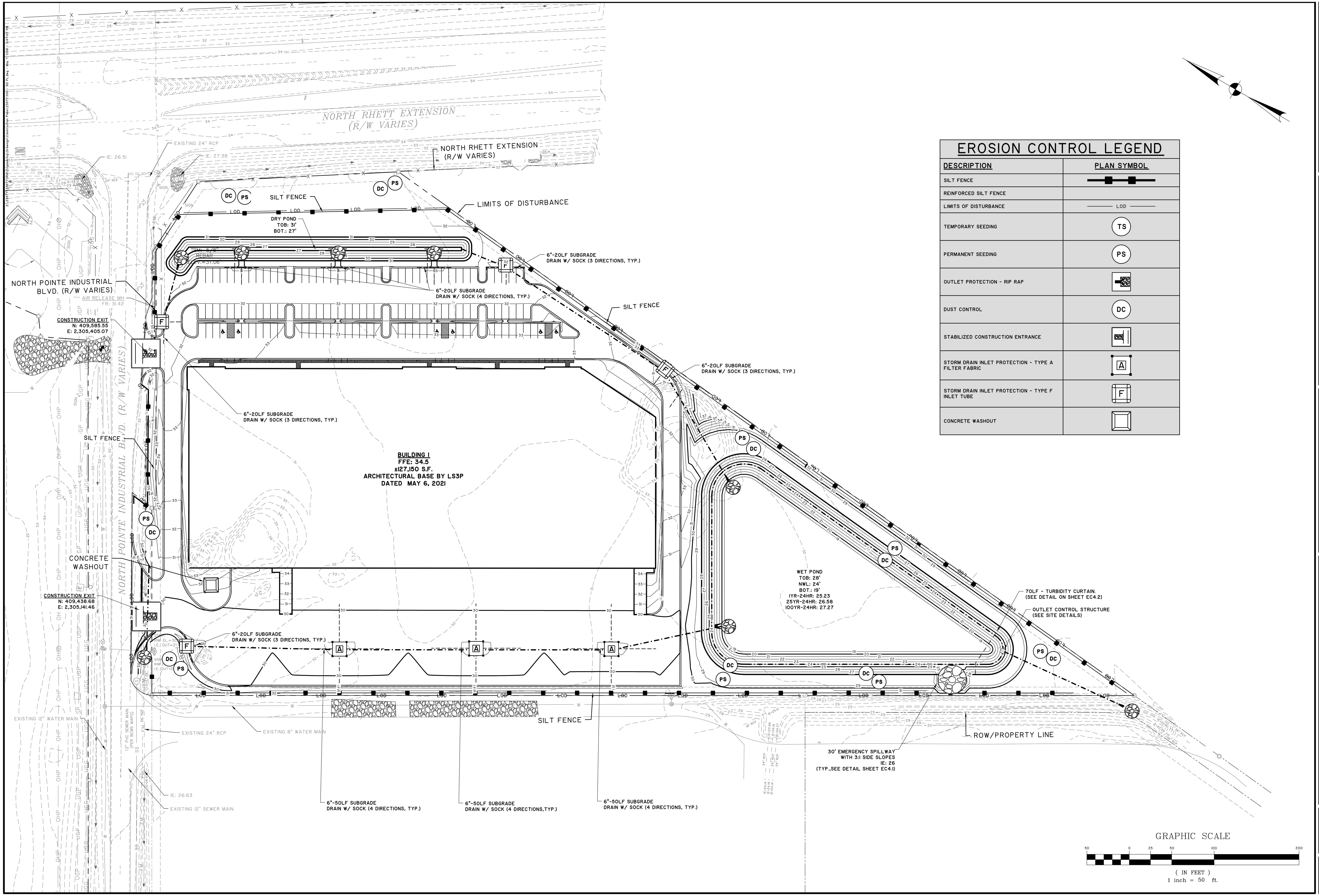
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK - LOT A
SWPP CONSTRUCTION PHASE

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

EC2.1



EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
REINFORCED SILT FENCE	
LIMITS OF DISTURBANCE	LOD
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
OUTLET PROTECTION - RIP RAP	
DUST CONTROL	DC
STABILIZED CONSTRUCTION ENTRANCE	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE F INLET TUBE	F
CONCRETE WASHOUT	

NO.	REVISIONS	BY	DATE

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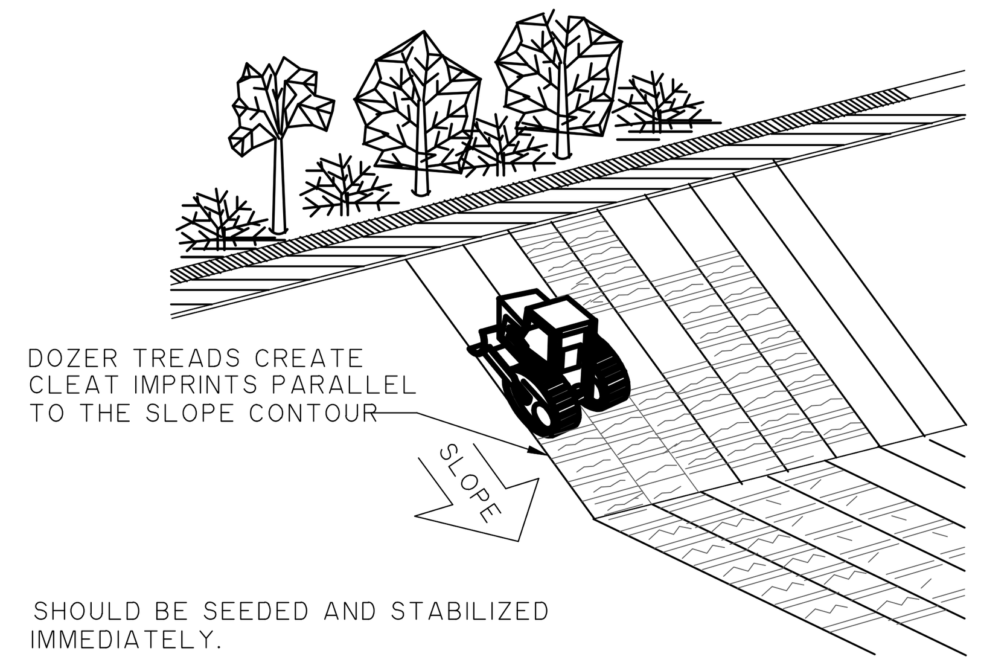
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

SWPP STABILIZATION PHASE

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

EC3.1



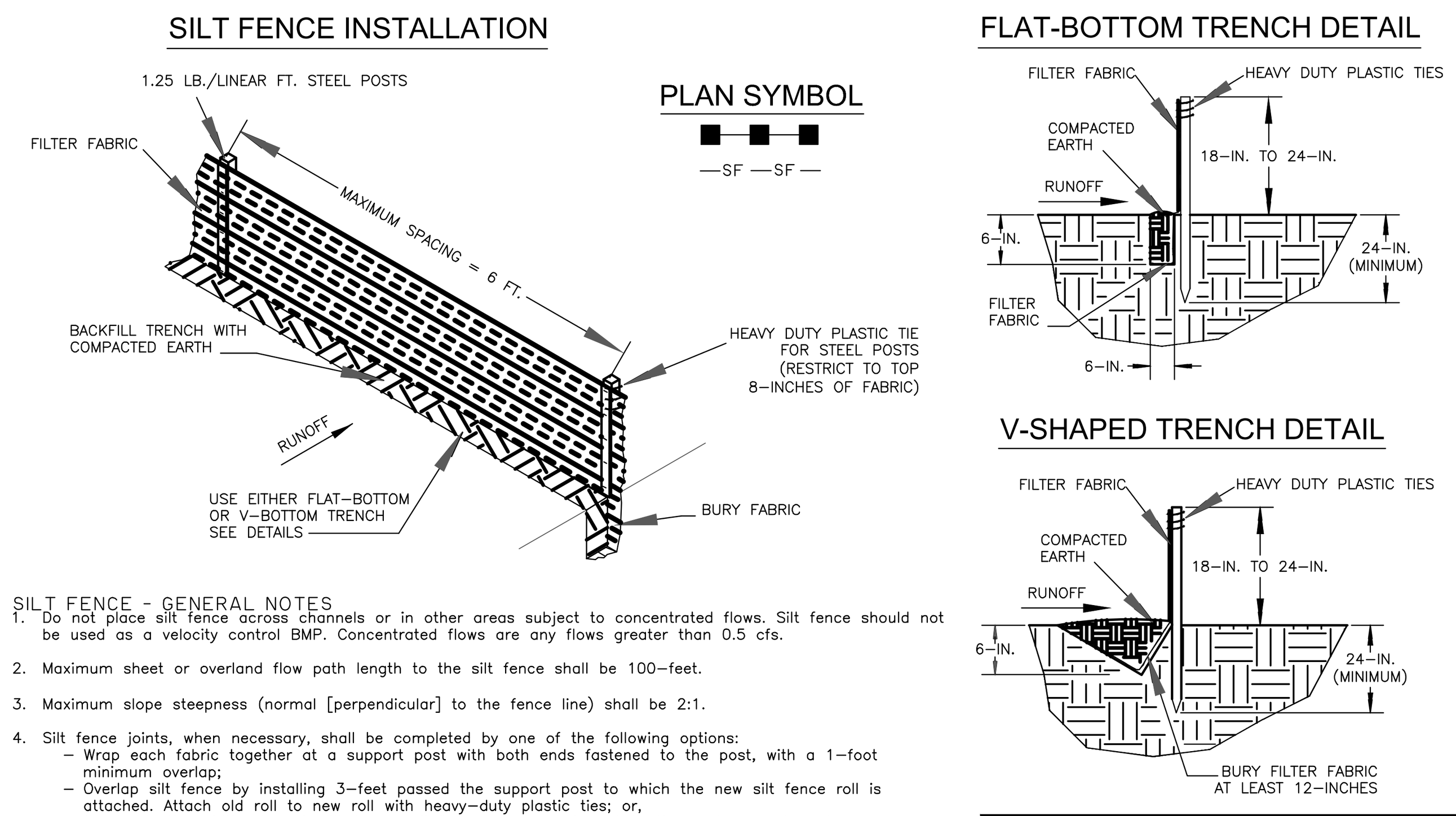
TRACKING

South Carolina Department of
Health and Environmental Control

TRACKING

STANDARD DRAWING NO. EC-01 Page 1

AUGUST, 2005 DATE



SILT FENCE - GENERAL NOTES

1. Do not place silt fence across channels or in other areas subject to concentrated flows. Silt fence should not be used as a velocity control BMP. Concentrated flows are any flows greater than 0.5 cfs.
2. Maximum sheet or overland flow path length to the silt fence shall be 100-feet.
3. Maximum slope steepness (normal [perpendicular] to the fence line) shall be 2:1.
4. Silt fence joints, when necessary, shall be completed by one of the following options:
   - Wrap each fabric together at a support post with both ends fastened to the post, with a 1-foot minimum overlap;
   - Overlap silt fence by installing 3-feet passed the support post to which the new silt fence roll is attached. Attach old roll to new roll with heavy-duty plastic ties; or,
   - Overlap entire width of each silt fence roll from one support post to the next support post.
5. Attach filter fabric to the steel posts using heavy-duty plastic ties that are evenly spaced within the top 8-inches of the fabric.
6. Install the silt fence perpendicular to the direction of the stormwater flow and place the silt fence the proper distance from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.
7. Install Silt Fence Checks (Tie-Backs) every 50-100 feet, dependent on slope, along silt fence that is installed with slope and where concentrated flows are expected or are documented along the proposed/installed silt fence.

South Carolina Department of
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SILT FENCE

STANDARD DRAWING NO. SC-03 Page 1 of 2

NOT TO SCALE — FEBRUARY 2014 DATE

SILT FENCE - POST REQUIREMENTS

1. Silt Fence posts must be 48-inch long steel posts that meet, at a minimum, the following physical characteristics.
   - Composed of a high strength steel with a minimum yield strength of 50,000 psi.
   - Include a standard "T" section with a nominal face width of 1.38-inches and a nominal "T" length of 1.48-inches.
   - Weigh 1.25 pounds per foot (± 8%)
2. Posts shall be equipped with projections to aid in fastening of filter fabric.
3. Steel posts may need to have a metal soil stabilization plate welded near the bottom when installed along steep slopes or installed in loose soils. The plate should have a minimum cross section of 17-square inches and be composed of 15 gauge steel, at a minimum. The metal soil stabilization plate should be completely buried.
4. Install posts to a minimum of 24-inches. A minimum height of 1- to 2-inches above the fabric shall be maintained, and a maximum height of 3 feet shall be maintained above the ground.
5. Post spacing shall be at a maximum of 6-feet on center.

SILT FENCE - FABRIC REQUIREMENTS

1. Silt fence must be composed of woven geotextile filter fabric that consists of the following requirements:
   - Composed of fibers consisting of long chain synthetic polymers of at least 85% by weight of polyolefins, polyesters, or polyamides that are formed into a network such that the filaments or yarns retain dimensional stability relative to each other;
   - Free of any treatment or coating which might adversely alter its physical properties after installation;
   - Free of any defects or flaws that significantly affect its physical and/or filtering properties; and,
   - Have a minimum width of 36-inches.
2. Use only fabric appearing on SC DOT's Qualified Products Listing (QPL), Approval Sheet #34, meeting the requirements of the most current edition of the SC DOT Standard Specifications for Highway Construction.
3. 12-inches of the fabric should be placed within excavated trench and toed in when the trench is backfilled.
4. Filter Fabric shall be purchased in continuous rolls and cut to the length of the barrier to avoid joints.
5. Filter Fabric shall be installed at a minimum of 24-inches above the ground.

SILT FENCE - INSPECTION & MAINTENANCE

1. The key to functional silt fence is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of silt fence shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall even that produces 1/2-inch or more of precipitation.
3. Attention to sediment accumulations along the silt fence is extremely important. Accumulated sediment should be continually monitored and removed when necessary.
4. Remove accumulated sediment when it reaches 1/3 the height of the silt fence.
5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.
6. Check for areas where stormwater runoff has eroded a channel beneath the silt fence, or where the fence has sagged or collapsed due to runoff overtopping the silt fence. Install checks/tie-backs and/or reinstall silt fence, as necessary.
7. Check for tears within the silt fence, areas where silt fence has begun to decompose, and for any other circumstance that may render the silt fence ineffective. Removed damaged silt fence and reinstall new silt fence immediately.
8. Silt fence should be removed within 30 days after final stabilization is achieved and once it is removed, the resulting disturbed area shall be permanently stabilized.

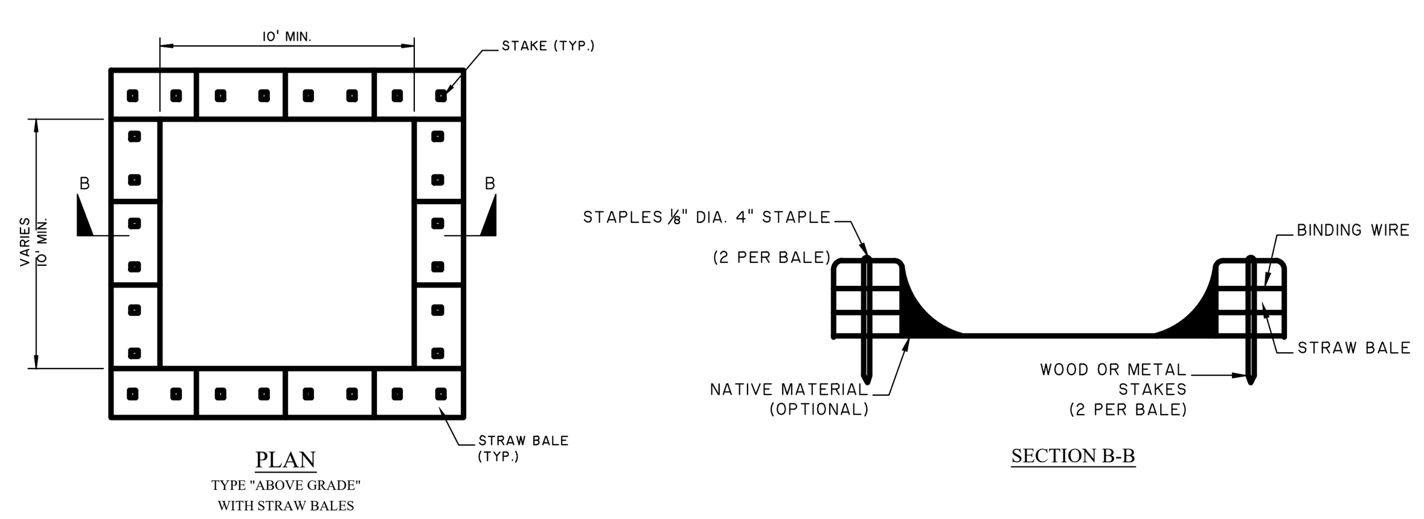
South Carolina Department of
Health and Environmental Control

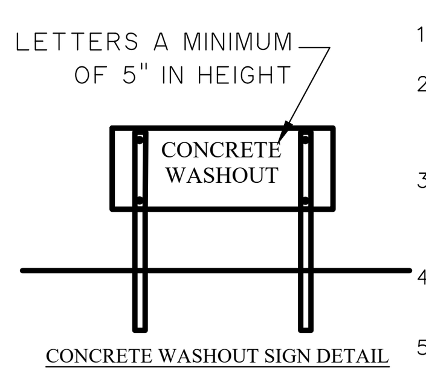
SILT FENCE

STANDARD DRAWING NO. SC-03 PAGE 2 of 2

GENERAL NOTES — FEBRUARY 2014 DATE

STRAW BALE BARRIER CONCRETE WASHOUT





NOTES:

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. INSTALL CONCRETE WASHOUT SIGN (24"X24", MINIMUM) WITHIN 30' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
3. TEMPORARY WASHOUT AREA MUST BE AT LEAST 50' FROM A STORM DRAIN, CREEK BANK OR PERIMETER CONTROL.
4. CLEAN OUT CONCRETE WASHOUT AREA WHEN 50% FULL.
5. THE KEY TO FUNCTIONAL CONCRETE WASHOUTS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR CLEAN OUT.
6. SILT FENCE SHALL BE INSTALLED AROUND PERIMETER OF CONCRETE WASHOUT AREA EXCEPT FOR THE SIDE UTILIZED FOR ACCESSING THE WASHOUT.
7. A ROCK CONSTRUCTION ENTRANCE MAY BE NECESSARY ALONG ONE SIDE OF THE WASHOUT TO PROVIDE VEHICLE ACCESS.

South Carolina Department of
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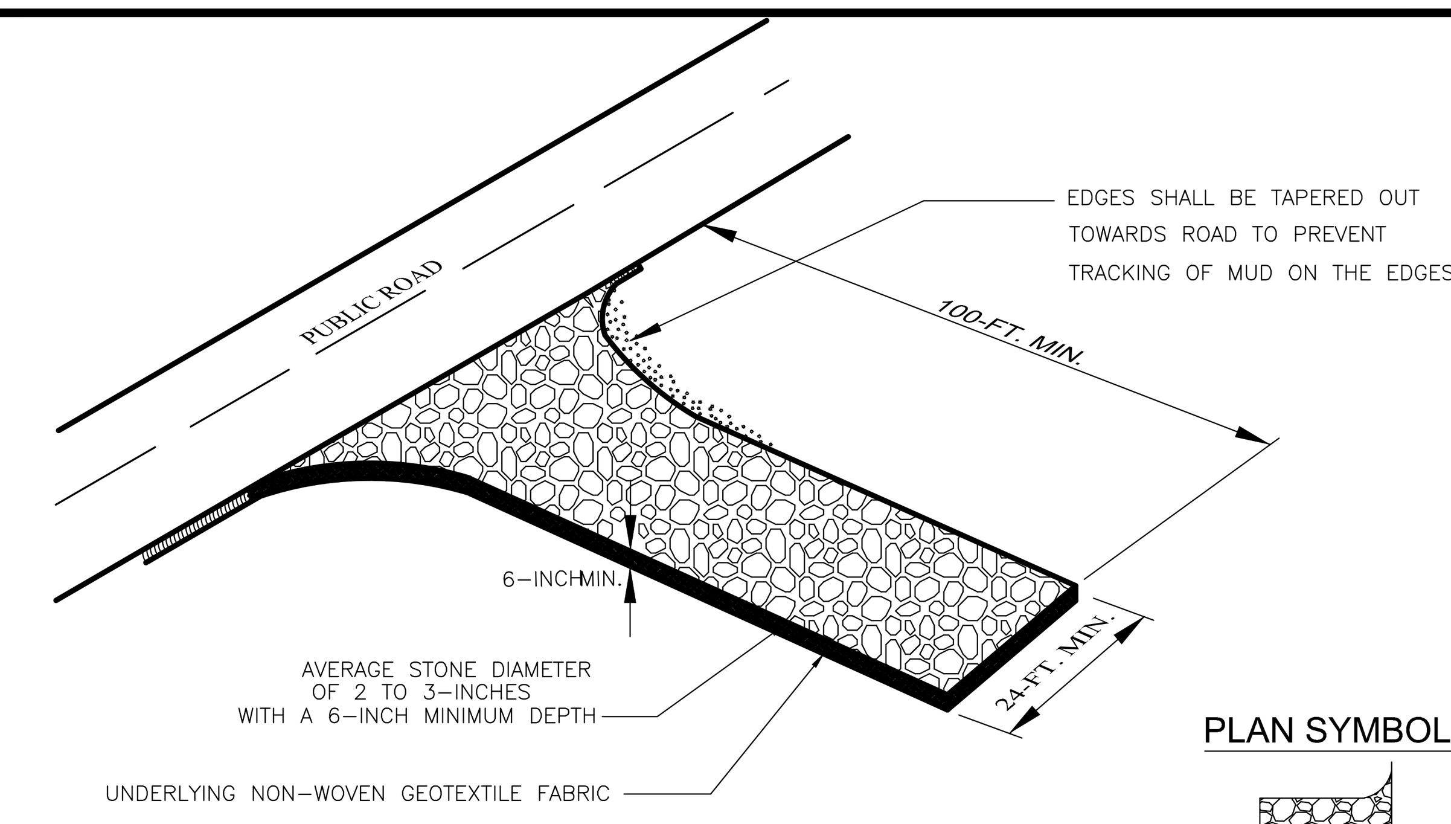
CONCRETE WASHOUT
STRAW BALES OR ABOVE GROUND

STANDARD DRAWING NO. RC-07 PAGE 1 of 1

NOT TO SCALE — FEBRUARY 2014 DATE



SPECIFICATION	SIZE
ROCK PAD THICKNESS	6 INCHES
ROCK PAD WIDTH	24 FEET
ROCK PAD LENGTH	100 FEET
ROCK PAD STONE SIZE	D = 2-3 INCHES

PLAN SYMBOL

South Carolina Department of
Health and Environmental Control

CONSTRUCTION ENTRANCE

STANDARD DRAWING NO. SC-06 PAGE 1 of 2

NOT TO SCALE — FEBRUARY 2014 DATE

CONSTRUCTION ENTRANCE - GENERAL NOTES

1. Stabilized construction entrances should be used at all points where traffic will egress/ingress a construction site onto a public road or any impervious surfaces, such as parking lots.
2. Install a non-woven geotextile fabric prior to placing any stone.
3. Install a culvert pipe across the entrance when needed to provide positive drainage.
4. The entrance shall consist of 2-inch to 3-inch D50 stone placed at a minimum depth of 6-inches.
5. Minimum dimensions of the entrance shall be 24-feet wide by 100-feet long, and may be modified as necessary to accommodate site constraints.
6. The edges of the entrance shall be tapered out towards the road to prevent tracking at the edge of the entrance.
7. Divert all surface runoff and drainage from the stone pad to a sediment trap or basin or other sediment trapping structure.
8. Limestone may not be used for the stone pad.

CONSTR. ENTRANCE - INSPECTION & MAINTENANCE

1. The key to functional construction entrances is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of construction entrances shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall even that produces 1/2-inch or more of precipitation.
3. During regular inspections, check for mud and sediment buildup and pad integrity. Inspection frequencies may need to be more frequent during long periods of wet weather.
4. Reshape the stone pad as necessary for drainage and runoff control.
5. Wash or replace stones as needed and as directed by site inspector. The stone in the entrance should be washed or replaced whenever the entrance fails to reduce the amount of mud being carried off-site by vehicles. Frequent washing will extend the useful life of stone pad.
6. Immediately remove mud and sediment tracked or washed onto adjacent impervious surfaces by brushing or sweeping. Flushing should only be used when the water can be discharged to a sediment trap or basin.
7. During maintenance activities, any broken pavement should be repaired immediately.
8. Construction entrances should be removed after the site has reached final stabilization. Permanent vegetation should replace areas from which construction entrances have been removed, unless area will be converted to an impervious surface to serve post-construction.

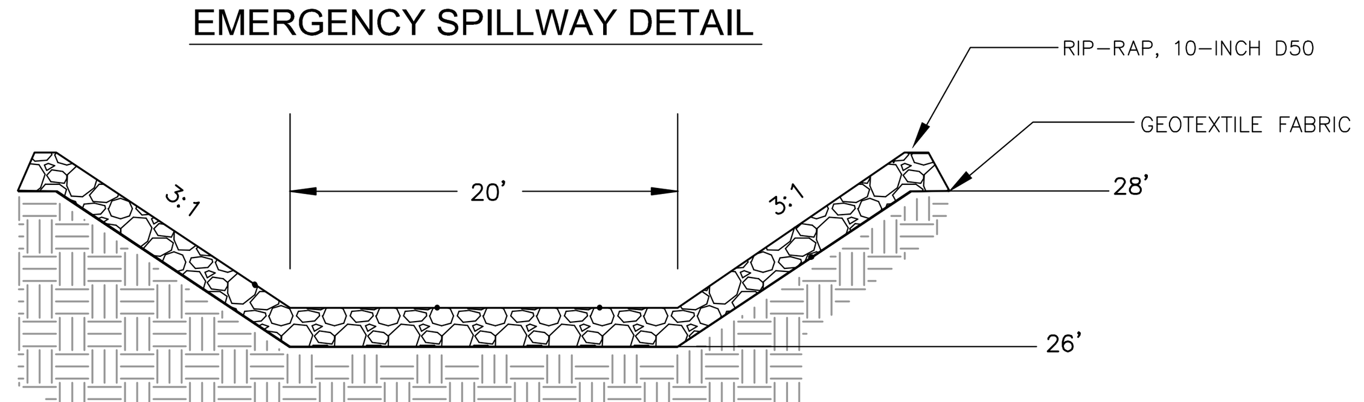
South Carolina Department of
Health and Environmental Control

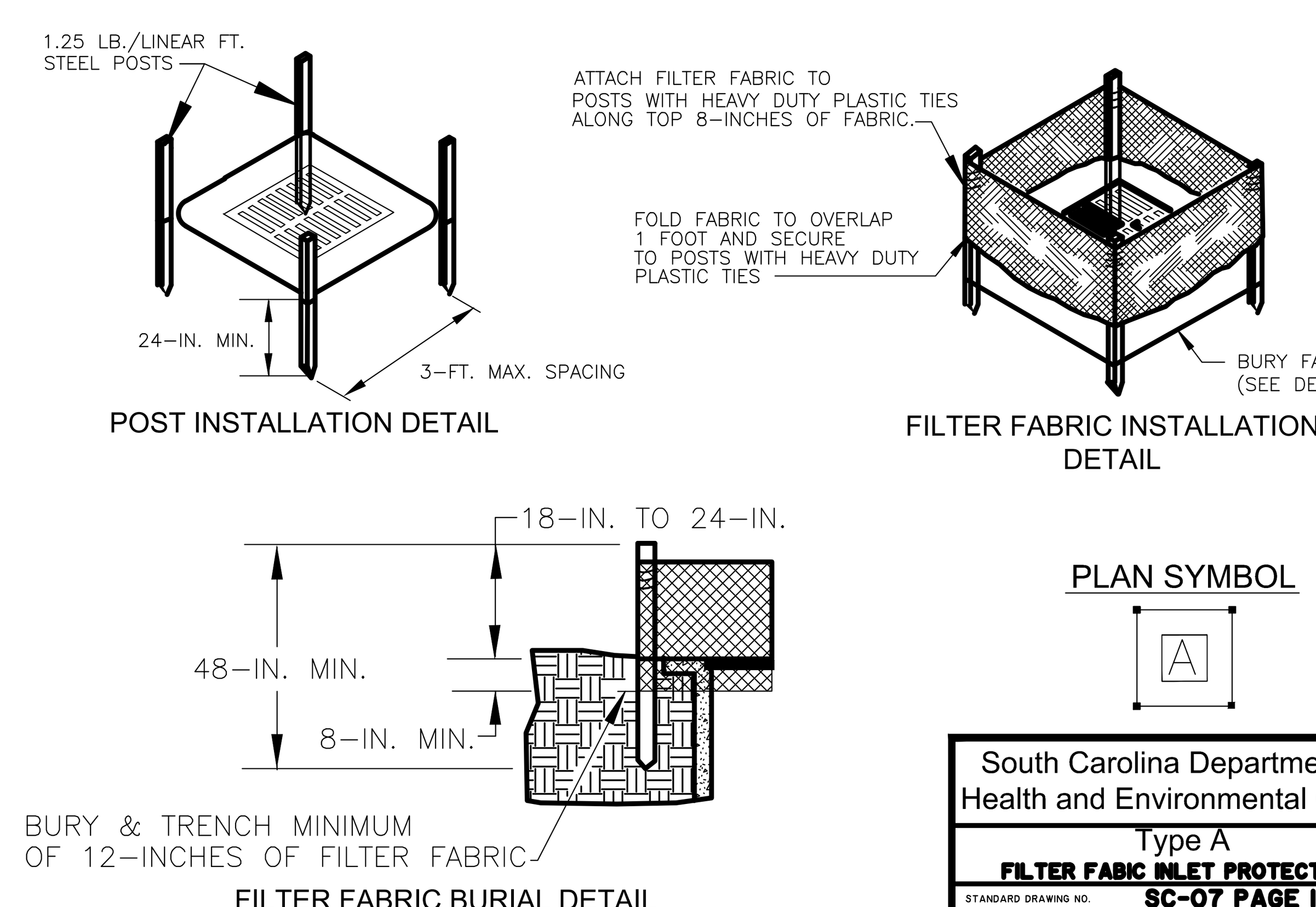
CONSTRUCTION ENTRANCE

STANDARD DRAWING NO. SC-06 PAGE 2 of 2

GENERAL NOTES — FEBRUARY 2014 DATE

EMERGENCY SPILLWAY DETAIL





South Carolina Department of
Health and Environmental Control

Type A
FILTER FABIC INLET PROTECTION

STANDARD DRAWING NO. SC-07 PAGE 1 of 2

NOT TO SCALE — FEBRUARY 2014 DATE

TYPE A - FILTER FABRIC REQUIREMENTS

1. Silt fence must be composed of woven geotextile filter fabric that consists of the following requirements:
   - Composed of fibers consisting of long chain synthetic polymers of at least 85% by weight of polyolefins, polyesters, or polyamides that are formed into a network such that the filaments or yarns retain dimensional stability relative to each other;
   - Free of any treatment or coating which might adversely alter its physical properties after installation;
   - Free of any defects or flaws that significantly affect its physical and/or filtering properties; and,
   - Have a minimum width of 36-inches.
2. Use only fabric appearing on SC DOT's Qualified Products Listing (QPL), Approval Sheet #34, meeting the requirements of the most current edition of the SC DOT Standard Specifications for Highway Construction.
3. 12-inches of the fabric should be placed within excavated trench and toed in when the trench is backfilled.
4. Filter Fabric shall be purchased in continuous rolls and cut to the length of the barrier to avoid joints.
5. Filter Fabric shall be installed at a minimum of 24-inches above the ground.

TYPE A - POST REQUIREMENTS

1. Silt Fence posts must be 48-inch long steel posts that meet, at a minimum, the following physical characteristics.
   - Composed of a high strength steel with a minimum yield strength of 50,000 psi.
   - Include a standard "T" section with a nominal face width of 1.38-inches and a nominal "T" length of 1.48-inches.
   - Weigh 1.25 pounds per foot (± 8%)
2. Posts shall be equipped with projections to aid in fastening of filter fabric.
3. Install posts to a minimum of 24-inches. A minimum height of 1- to 2- inches above the fabric shall be maintained, and a maximum height of 3 feet shall be maintained above the ground.
4. Post spacing shall be at a maximum of 3-feet on center.

TYPE A - INSPECTION & MAINTENANCE

1. The key to functional inlet protection is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of inlet protection shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall even that produces 1/2-inch or more of precipitation.
3. Attention to sediment accumulations along the filter fabric is extremely important. Accumulated sediment should be continually monitored and removed when necessary.
4. Remove accumulated sediment when it reaches 1/3 the height of the filter fabric. When a sump is installed in front of the fabric, sediment should be removed when it fills approximately 1/3 the depth of the sump.
5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.
6. Check for areas where stormwater runoff has eroded a channel beneath the filter fabric, or where the fabric has sagged or collapsed due to runoff overtopping the inlet protection.
7. Check for tears within the filter fabric, areas where fabric has begun to decompose, and for any other circumstance that may render the inlet protection ineffective. Removed damaged fabric and reinstall new filter fabric immediately.
8. Inlet protection structures should be removed after all the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.

South Carolina Department of
Health and Environmental Control

Type A
FILTER FABIC INLET PROTECTION

STANDARD DRAWING NO. SC-07 PAGE 2 of 2

GENERAL NOTES — FEBRUARY 2014 DATE

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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK - LOT A
SWPP DETAILS

NO.	REVISIONS	BY	DATE

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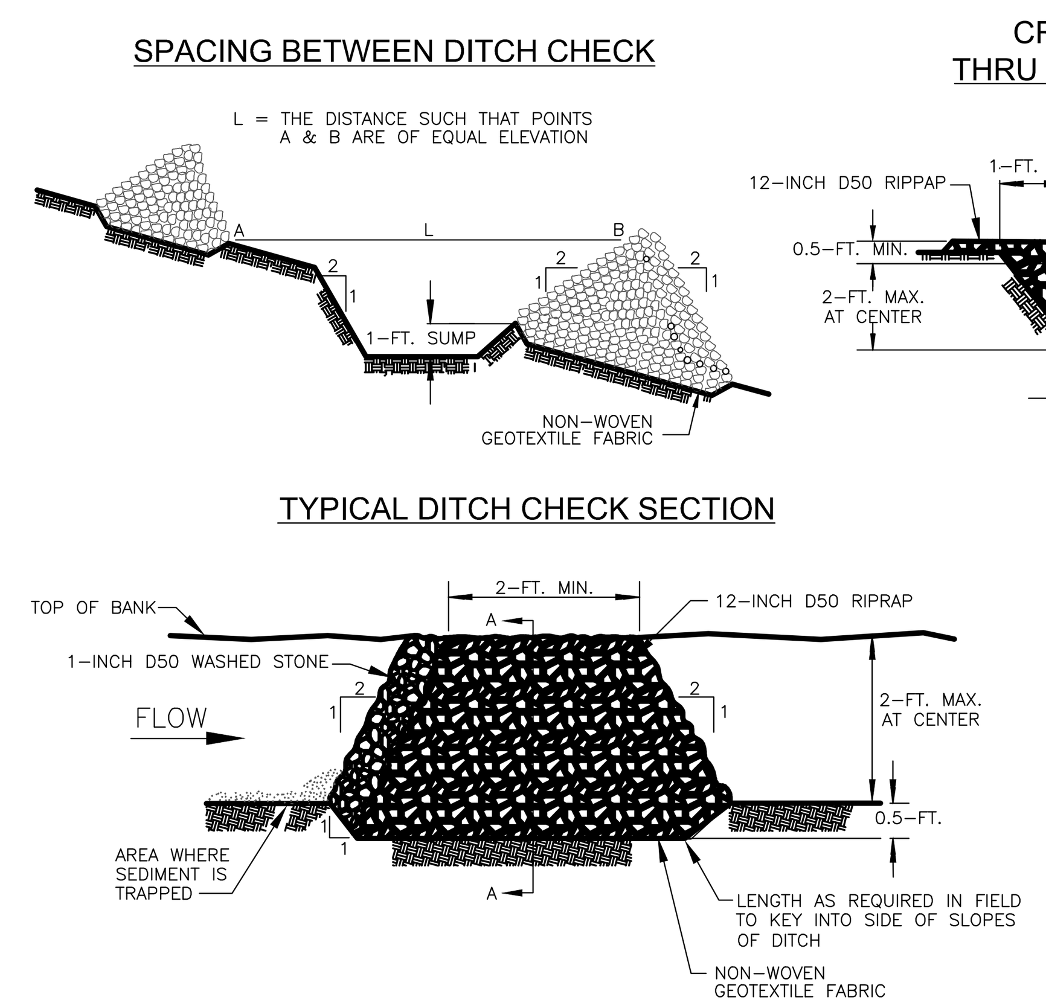
SCALE:	1" = 1'

EC4.1

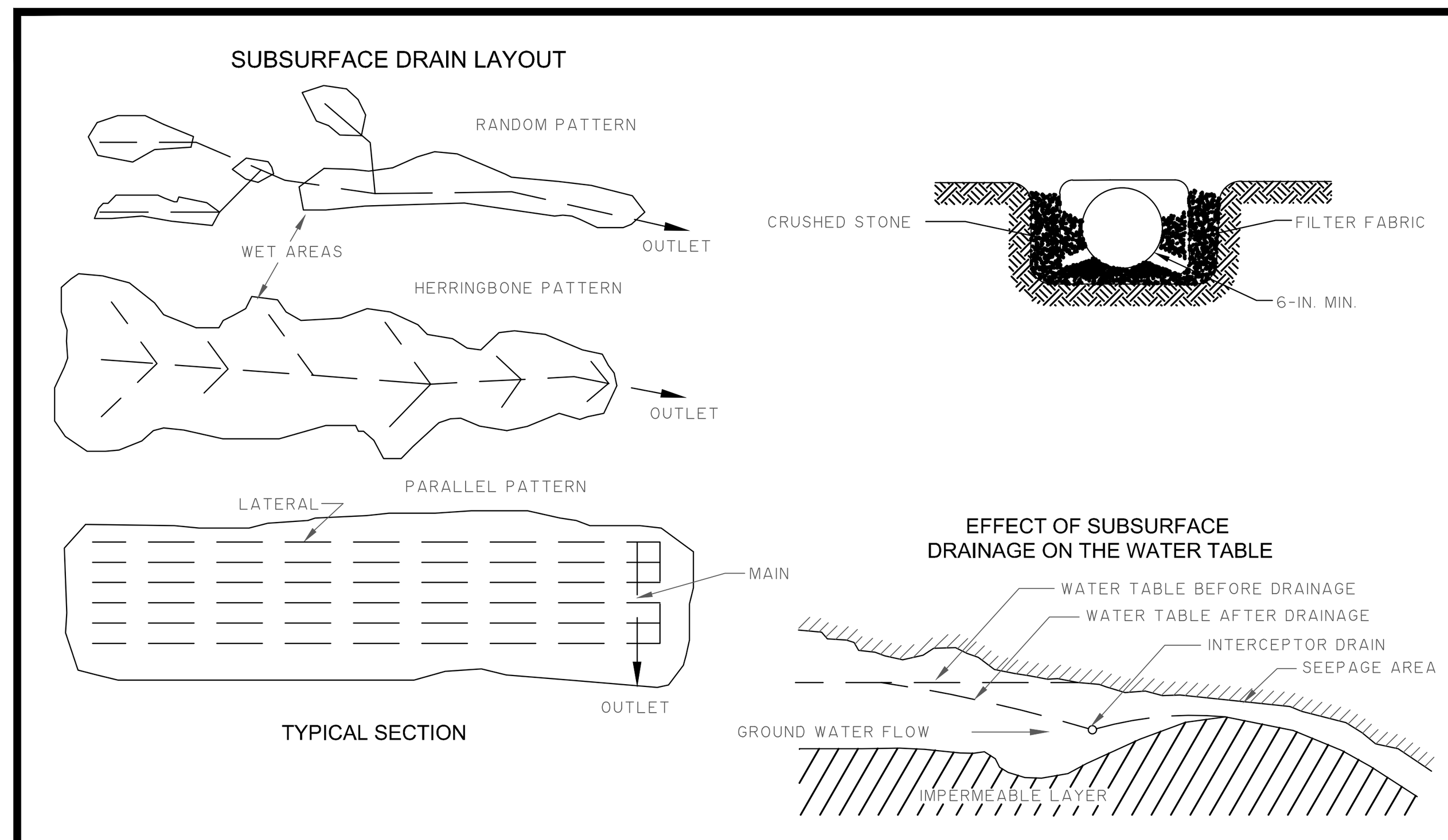


South Carolina Department of Health and Environmental Control

ROCK DITCH CHECK

STANDARD DRAWING NO. SC-04 PAGE 1 of 2

NOT TO SCALE — FEBRUARY 2014 DATE

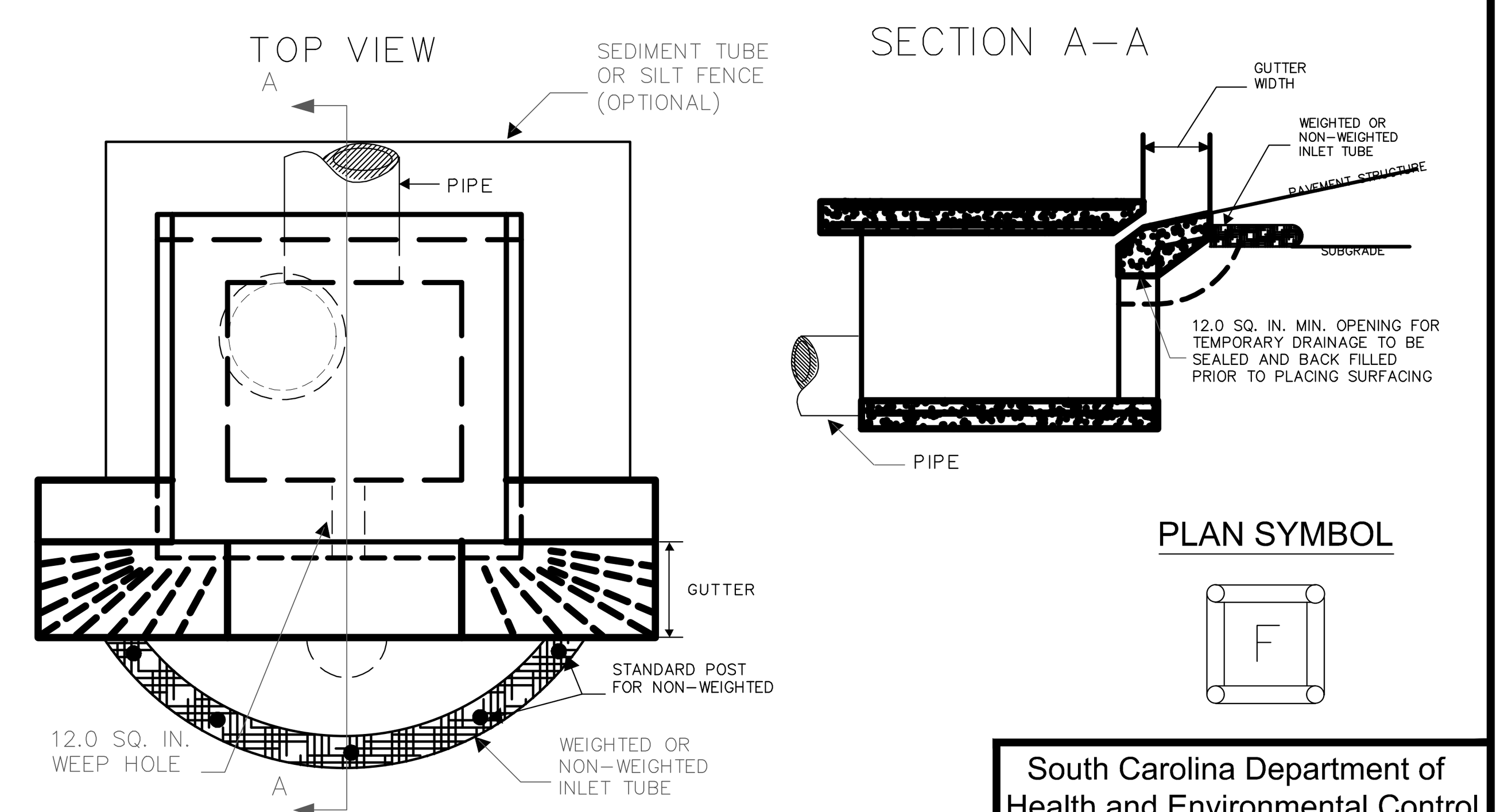


South Carolina Department of Health and Environmental Control

SUBSURFACE DRAIN LAYOUT

STANDARD DRAWING NO. RC-06 PAGE 1 of 1

NOT TO SCALE — JULY 31, 2008 DATE



South Carolina Department of Health and Environmental Control

Type F
INLET TUBES

STANDARD DRAWING NO. SC-11 PAGE 1 of 2

NOT TO SCALE — FEBRUARY 2014 DATE

TYPE F – INLET TUBES INLET PROTECTION

GENERAL NOTES

1. Inlets tubes should be composed of compacted geotextiles, curled excelsior wood, natural coconut fibers, a hardwood mulch, or a mix of these materials enclosed by a flexible netting material.

2. Inlets tubes should utilize an outer netting that consists of seamless, high–density polyethylene photodegradable materials treated with ultraviolet stabilizers or a seamless, high–density polyethylene non–degradable material. Curled wood excelsior fiber, or natural coconut fiber rolled erosion control products rolled up to create an inlet tube device are not allowed.

3. Do not use straw, straw fiber, straw bales, pine needles, or leaf mulch as fill material within inlet tubes.

4. Weighted inlet tubes must be capable of staying in place without external stabilization measures and may have a weighted inner core or other weighted mechanism to keep them in place.

5. Install weighted tubes lying flat on the ground, with no gaps between the underlying surface and the inlet tube. Do not stack inlet tubes. Do not completely block inlet with tube.

6. Non–weighted inlet tubes require staking or other stabilization methods to keep them safely in place.

7. Overflow or overtopping of inlet tubes must be allowed to flow into inlet unobstructed.

8. To avoid possible flooding, two or three concrete cinder blocks may be placed between the tube and the inlet.

INSPECTION AND MAINTENANCE

1. The key to functional inlet protection is weekly inspection, routine maintenance, and regular sediment removal.

2. Regular inspections of all inlet protection shall be conducted once every calendar week and, as recommended, within 24–hours after each rainfall event that produces 1/2–inch or more of precipitation.

3. Attention to sediment accumulations in front of the inlet protection is extremely important. Accumulated sediment should be continually monitored and removed when necessary.

4. Remove accumulated sediment when it reaches 1/3 the height of the blocks. If a sump is used, sediment should be removed when it fills approximately 1/3 the depth of the hole.

5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.

6. Large debris, trash, and leaves should be removed from in front of tubes when found.

7. Replace inlet tube when damaged or as recommended by manufacturer's specifications.

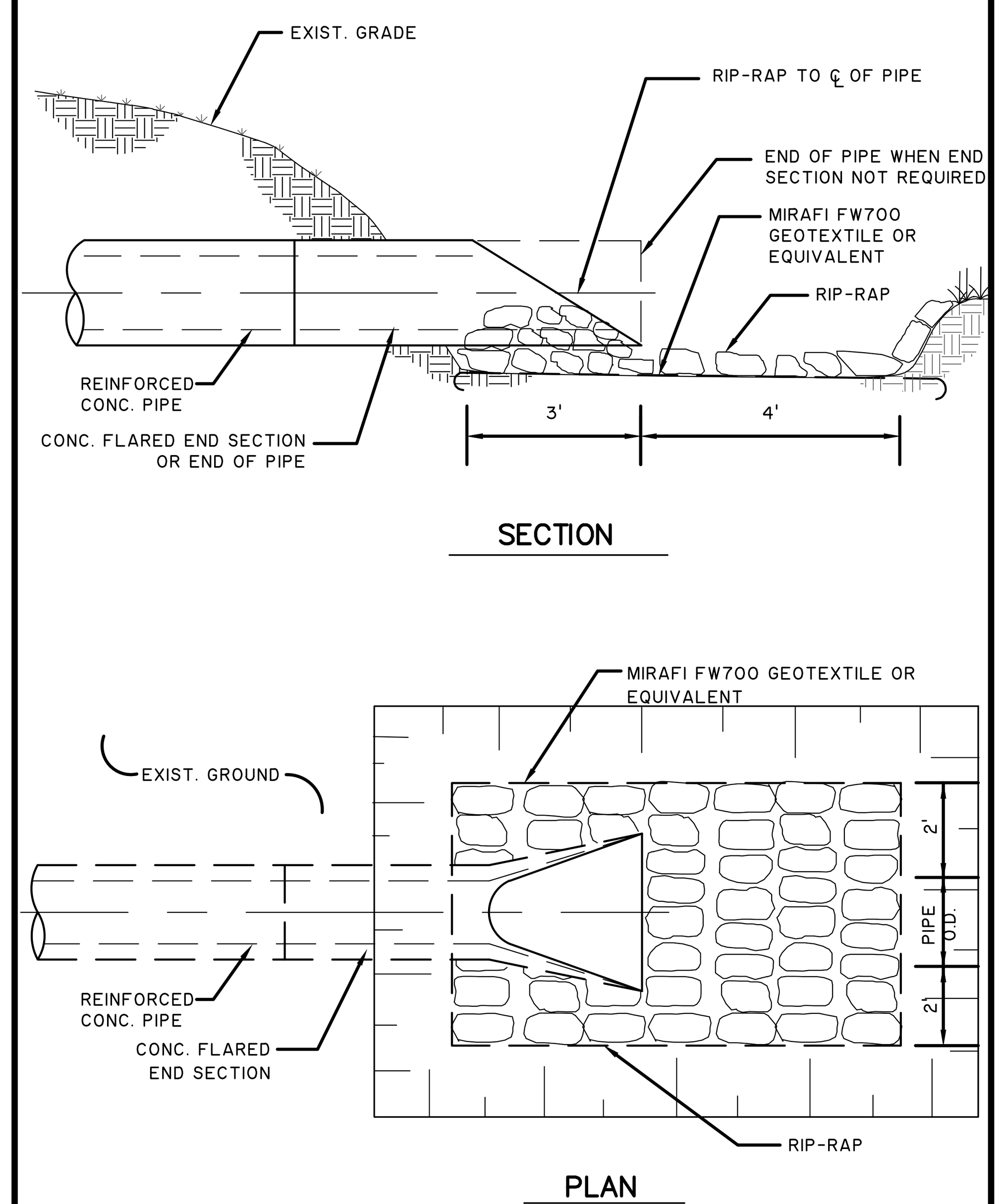
8. Inlet protection structures should be removed after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.

South Carolina Department of Health and Environmental Control

Type F
INLET TUBES

STANDARD DRAWING NO. SC-11 PAGE 2 of 2

GENERAL NOTES — FEBRUARY 2014 DATE



E5
OCT. 2008
THOMAS & HUTTON ENGINEERING CO.

DRAINAGE OUTFALL DETAIL

NOT TO SCALE

DUST CONTROL

DEFINITION: CONTROLLING SURFACE AND AIR MOVEMENT OF DUST ON LAND-DISTURBING ACTIVITIES.

PURPOSE: PREVENT THE MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES AND PREVENT THE MOVEMENT OF AIRBORNE SUBSTANCES THAT MAY BE HARMFUL TO HEALTH.

TEMPORARY METHODS	PERMANENT METHODS
- MULCHES - TEMPORARY VEGETATIVE COVER - SPRAY ON ADHESIVES - TILLAGE - IRRIGATION - BARRIERS - CALCIUM CHLORIDE	- PERMANENT VEGETATION - TOPSOILING - STONE COVER

INSTALLATION:
APPLY ACCORDING TO APPROVED PLAN, IF SHOWN. MULCH DISTURBED AREAS AND TACKIFY WITH REDSINS SUCH AS ASPHALT, CURASOL OR TERRATACK ACCORDING TO MANUFACTURES RECOMMENDATIONS. STABILIZE DISTURBED AREAS WITH TEMPORARY OR PERMANENT VEGETATION. COVER SURFACES WITH CRUSHED STONE OR GRAVEL. APPLY CALCIUM CHLORIDE AT A RATE TO KEEP SURFACES MOIST. APPLY SPRAY-ON ADHESIVES TO MINERAL SOILS (NOT MUCK SOILS AS DESCRIBED IN TABLE I.

TABLE I. SPRAY-ON ADHESIVE APPLICATION REQUIREMENTS

ADHESIVE	WATER DILUTION	NOZZLE TYPE	APPLICATION (GAL / ACRE)
ANIONIC ASPHALT EMULSION	7:1 *	COARSE SPRAY	1,200
LATEX EMULSION	12.5:1 *	FINE SPRAY	235
RESIN-IN-WATER EMULSION	4:1 *	FINE SPRAY	300

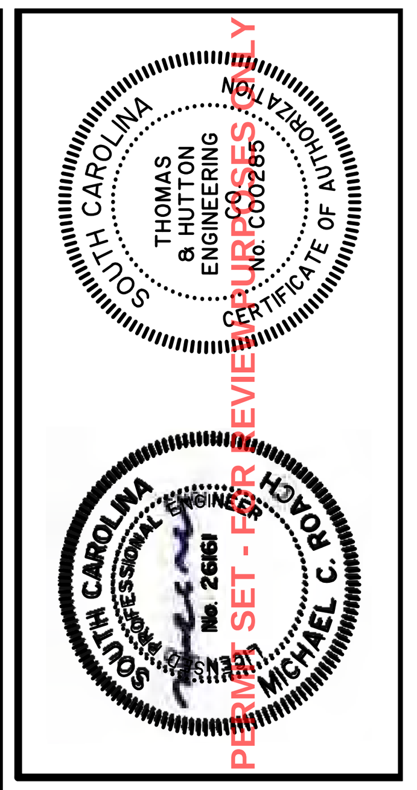
MAINTENANCE:
PROHIBIT TRAFFIC ON SURFACE AFTER SPRAYING.
SUPPLEMENT SURFACE COVERING AS NEEDED.

Du

E2
OCT. 2008
THOMAS & HUTTON ENGINEERING CO.

DUST CONTROL

NOT TO SCALE



NO	REVISIONS	BY	DATE

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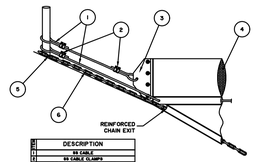
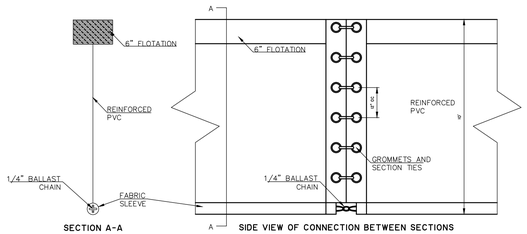
EC4.2



#	DESCRIPTION
1	#6 CABLE
2	#6 CABLE CLAMPS
3	4'-0" x 4'-0" x 4'-0" #6 BRACKET
4	UNICELLULAR FLOAT
5	#6 QUICK LINK
6	#6 CHAIN

CURTAIN ANCHOR DETAIL
NOT TO SCALE



SECTION A-A

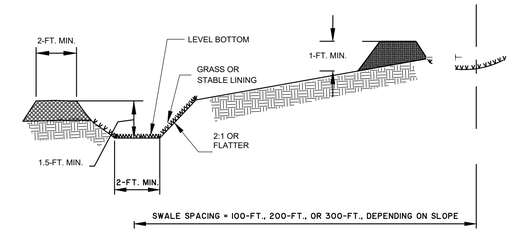
SIDE VIEW OF CONNECTION BETWEEN SECTIONS

NOTE:
MAINTAIN MINIMUM 1.5' SEPARATION BETWEEN BOTTOM OF CURTAIN AND BOTTOM OF POND

NOTE:
WILL BE GRANITE: TYPE 1 ECONOMY SILT BARRIER OR EQUIVALENT

TYPICAL BARRIER SPECIFICATIONS:							
FLOTATION	FABRIC	SECTION CONNECTION	CONNECTOR	BOTTOM CHAIN	STANDARD SECTION	HEIGHT	FLOTATION
6" Marine Grade Foam (depending on skirt depth)	PVC Impermeable Fabric	Bolt Rope Reinforced Grommet Section Ties	Poly Rope and Web Handle	Heavy Ballast Chain	50' or 100'	Sizes 3' to 100' Available	6" Marine Grade Foam (depending on skirt depth)

TURBIDITY CURTAIN
NOT TO SCALE



SECTION

INSTALLATION:
THE BOTTOM WIDTH SHOULD BE A MINIMUM OF 2-FEET, AND THE BOTTOM SHOULD BE LEVEL.

THE DEPTH SHOULD BE A MINIMUM OF 1.5-FEET AND THE SIDE SLOPES SHOULD BE 2H:1V OR FLATTER.

THE MAXIMUM GRADE SHALL BE 5%, WITH POSITIVE DRAINAGE TO A SUITABLE OUTLET.

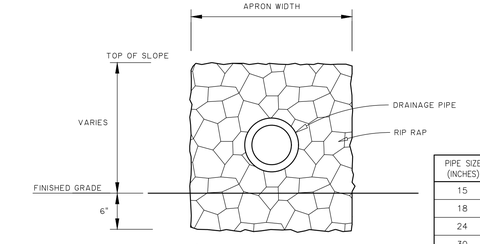
SLOPES SHALL BE STABILIZED IMMEDIATELY USING VEGETATION, SOD, AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS TO PREVENT EROSION.

THE UPSLOPE SIDE OF THE SWALE SHOULD PROVIDE POSITIVE DRAINAGE SO NO EROSION OCCURS AT THE OUTLET. PROVIDE ENERGY DISSIPATION MEASURES AS NECESSARY.

SEDIMENT-LADEN RUNOFF SHALL BE DIRECTED TO A SEDIMENT TRAPPING FACILITY.

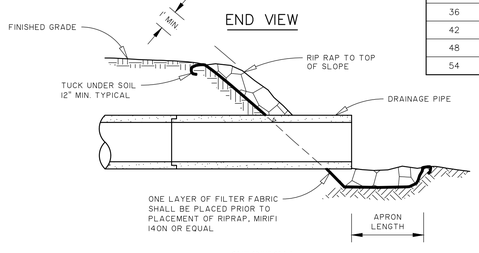
INSPECTION AND MAINTENANCE:
DAMAGE CAUSED BY CONSTRUCTION TRAFFIC OR OTHER ACTIVITY MUST BE REPAIRED BEFORE THE END OF EACH WORKING DAY.

TD **TEMPORARY DIVERSION DITCH OR SWALE**
NOT TO SCALE



END VIEW

PIPE SIZE (INCHES)	APRON WIDTH (FEET)	APRON LENGTH (FEET)	QUANTITY (S.Y.)
15	6	18	12
18	6	18	12
24	8	22	20
30	10	28	31
36	12	32	43
42	14	36	68
48	16	44	78
54	18	52	104



SECTION

RIP RAP DETAIL
NOT TO SCALE

PRELIMINARY SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
Engineering | Surveying | Planning | GIS | Consulting
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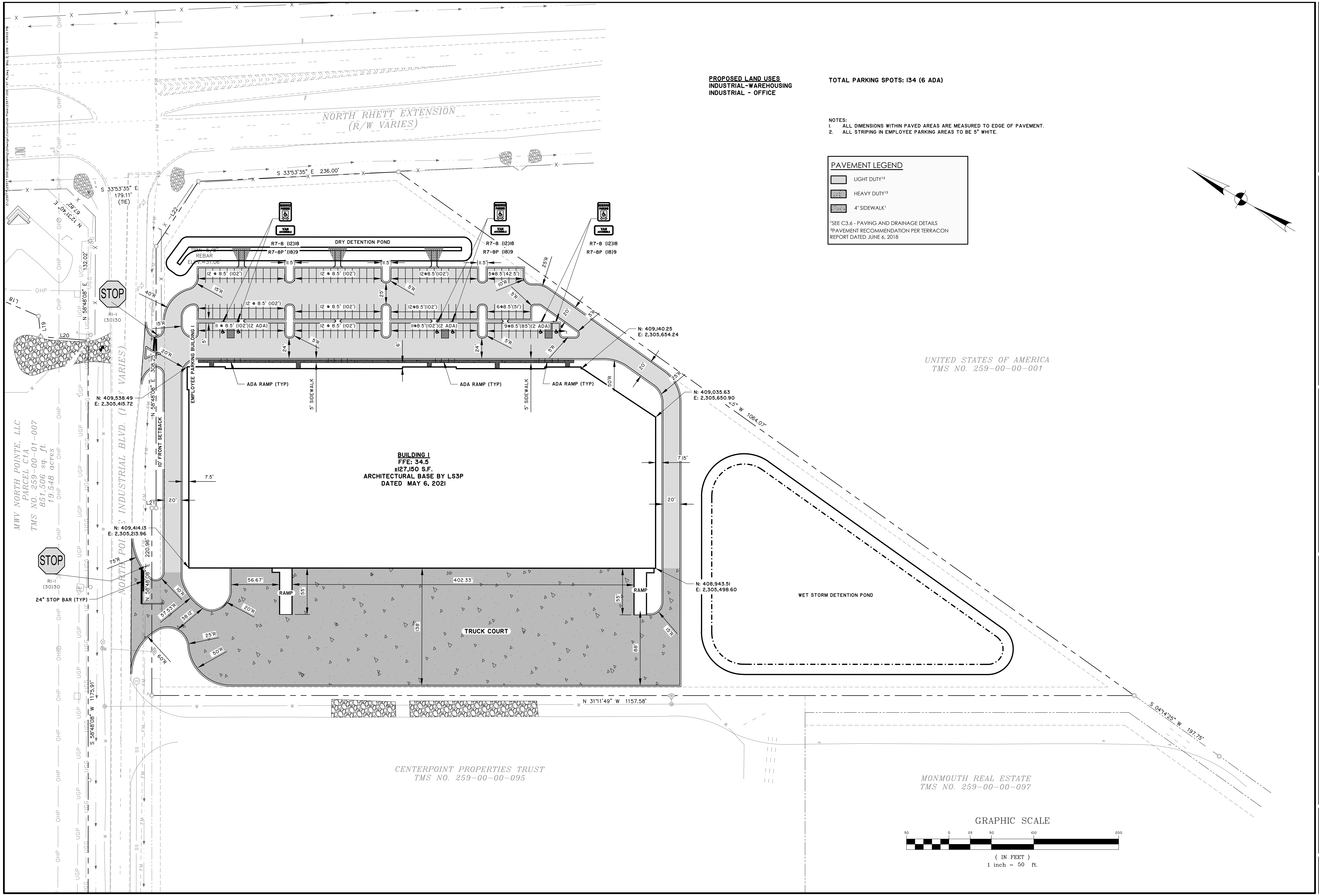
SCALE:	1" = 1'

EC4.3


PROPOSED LAND USES
INDUSTRIAL-WAREHOUSING
INDUSTRIAL - OFFICE
TOTAL PARKING SPOTS: 134 (6 ADA)
NOTES:
1. ALL DIMENSIONS WITHIN PAVED AREAS ARE MEASURED TO EDGE OF PAVEMENT.
2. ALL STRIPING IN EMPLOYEE PARKING AREAS TO BE 5" WHITE.
PAVEMENT LEGEND
LIGHT DUTY[1,2]
HEAVY DUTY[1,2]
4" SIDEWALK[1]
[1]SEE C3.6 - PAVING AND DRAINAGE DETAILS
[2]PAVEMENT RECOMMENDATION PER TERRACON REPORT DATED JUNE 6, 2018
NORTH RHETT EXTENSION
(R/W VARIES)
S 33°53'35" E 236.00'
S 33°53'35" E
179.11'
(TIE)
DRY DETENTION POND
R7-8 (12)18
R7-8P (18)9
STOP
R1-1
(30)30
EMPLOYEE PARKING BUILDING I
ADA RAMP (TYP)
5' SIDEWALK
N: 409,140.25
E: 2,305,654.24
N: 409,035.63
E: 2,305,650.90
N: 409,538.49
E: 2,305,415.72
N: 409,414.13
E: 2,305,213.96
N: 408,943.51
E: 2,305,498.60
10' FRONT SETBACK
BUILDING I
FFE: 34.5
±127,150 S.F.
ARCHITECTURAL BASE BY LS3P
DATED MAY 6, 2021
UNITED STATES OF AMERICA
TMS NO. 259-00-00-001
MWV NORTH POINTE, LLC
PARCEL C1A
TMS NO. 259-00-01-007
851,506 sq. ft.
19.548 acres
NORTH POINTE INDUSTRIAL BLVD. (R/W VARIES)
24" STOP BAR (TYP)
TRUCK COURT
RAMP
402.33'
56.67'
WET STORM DETENTION POND
N 31°11'49" W 1157.58'
S 04°14'25" W 197.75'
S 58°48'08" W 1175.91'
CENTERPOINT PROPERTIES TRUST
TMS NO. 259-00-00-095
MONMOUTH REAL ESTATE
TMS NO. 259-00-00-097
GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

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REVISIONS

NO.		BY	DATE

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

SITE LAYOUT, STRIPING & SIGNAGE PLAN

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

C1.1

NOTES:

1. ACCESSIBLE ROUTE - EXTERIOR:
MINIMUM CLEAR WIDTH IS 3'. IF ACCESSIBLE ROUTE HAS LESS THAN 5' CLEAR WIDTH, THEN PASSING SPACES AT LEAST 5'X5' SHALL BE LOCATED EVERY 200' OR LESS (INTERSECTING SIDEWALKS MEET THIS REQUIREMENT). LONGITUDINAL (RUNNING) SLOPE MAY NOT EXCEED 5% UNLESS RAMP IS INSTALLED (RAMPS MAY NOT EXCEED 8.33%). CROSS SLOPE MAY NOT EXCEED 2%. GAPS IN ROUTE MAY NOT EXCEED 1/2" IN WIDTH.

2. FINISHED SURFACE HEIGHT DIFFERENCE REQUIREMENTS:
   A. 0 TO 1/4" : NO REQUIREMENTS
   B. 1/4" TO 1/2" : BEVEL WITH 1:2 SLOPE
   C. LARGER THAN 1/2" : CONFORM TO REQUIREMENTS FOR RAMP

3. RAMPS:
- MAX RAMP SLOPE 8.33% (1:12).
- RAMPS STEEPER THAN 8.33% ARE NOT ACCEPTABLE.
- MAX RISE FOR ANY RAMP RUN IS 30" (AT 8.33% SLOPE, MAXIMUM RUN OF RAMP IS 30').
- MAX CROSS SLOPE OF RAMP 2% (1:50)

A.LANDINGS:
- RAMPS SHALL HAVE LEVEL LANDINGS AT BOTTOM AND TOP OF EACH RAMP.
- LANDING SHALL BE AT LEAST AS WIDE AS RAMP LEADING TO IT.
- LANDING LENGTH SHALL BE MINIMUM 5' CLEAR.
- IF RAMPS CHANGE DIRECTION AT LANDING, MINIMUM LANDING SIZE SHALL BE 5'X5'.
- ALL LANDINGS ARE TO BE NO MORE THAN 2% SLOPE IN ANY DIRECTION.

B.HANDRAILS:
- HANDRAILS REQUIRED ON BOTH SIDES (MIN. 36" CLEAR BETWEEN HANDRAILS) WHEN RAMP RISE IS GREATER THAN 6".
- PROVIDE MINIMUM 12" LONG HANDRAIL EXTENSIONS AT TOP AND BOTTOM LANDINGS.
- PROVIDE MINIMUM 2" HIGH EDGE PROTECTION OR RAIL WITH LESS THAN 4" CLEAR TO RAMP IF RAMP HAS DROP-OFFS.
- ROUTES BETWEEN BUILDINGS WITH ONLY DWELLING UNITS DO NOT HAVE TO HAVE HANDRAILS.
- STAIRS NOT ALLOWED AS PART OF ACCESSIBLE ROUTE BUT IF ADJACENT TO ROUTE OR PART OF TENANT SPACE MUST MEET REQUIREMENTS FOR STAIR RAILS.

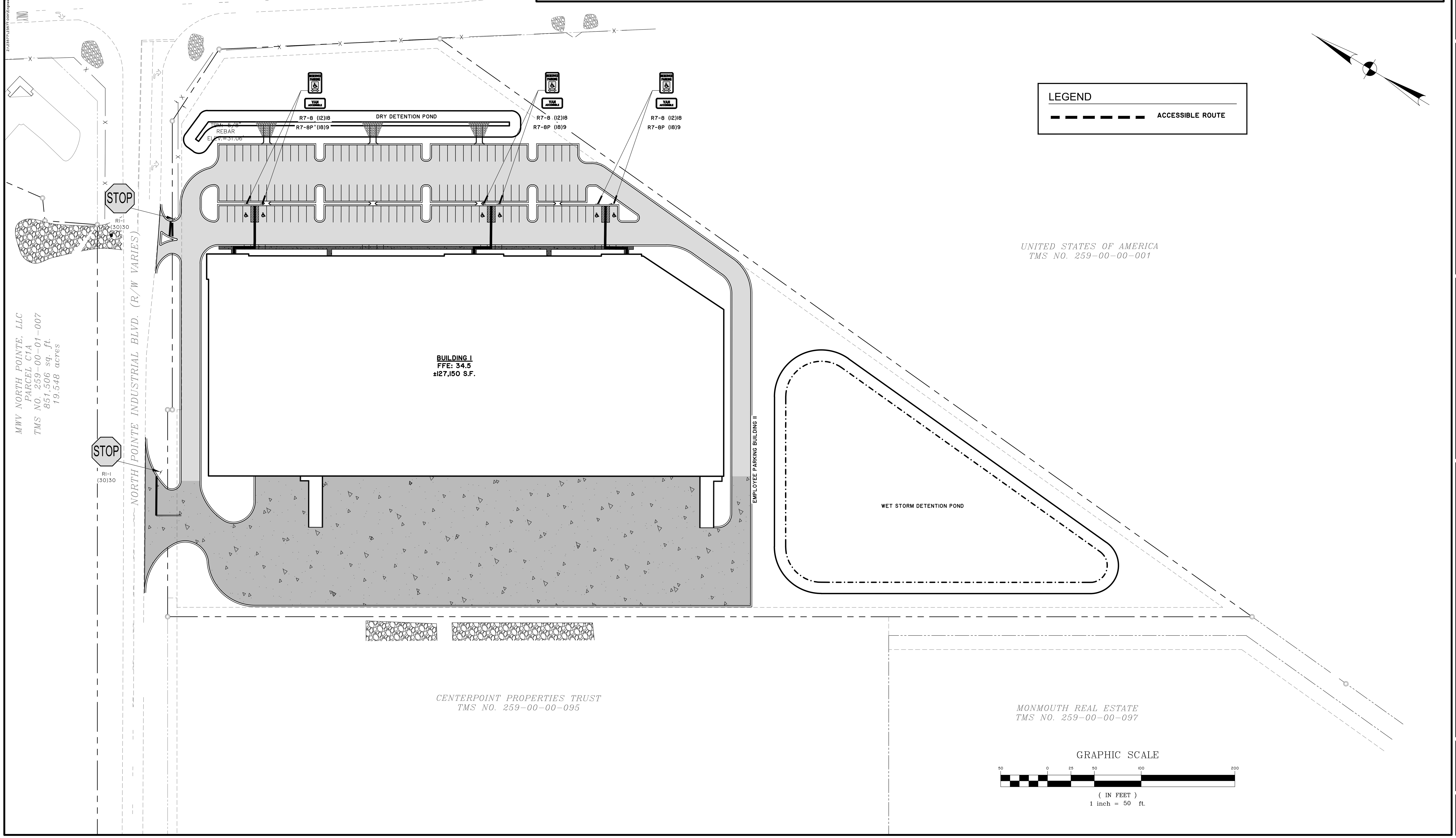
4. CURB RAMPS:
- MAX SLOPE OF CURB RAMP 8.33%.
- MAX SLOPE OF SIDE FLARES 10%.
- MAX SLOPE OF ADJOINING GUTTERS, ROAD SURFACE, OR ACCESSIBLE ROUTE 5%.
- MIN WIDTH 36" (NOT INCLUDING SIDE FLARES).
- DETECTABLE WARNING IS REQUIRED ON CURB RAMPS IN PUBLIC RIGHTS OF WAY, AND SHALL BE 24" MINIMUM IN THE DIRECTION OF TRAVEL AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR FLUSH SURFACE. DETECTABLE WARNINGS SHALL BE LOCATED SO THE EDGE NEAREST THE CURB LINE IS 6" TO 8" FROM THE CURB LINE.

5. PAVEMENT MARKINGS:
AS REQUIRED BY LOCAL JURISDICTIONAL AUTHORITY (RECOMMENDED CROSSWALK MARKING TO DESIGNATE ACCESSIBLE PEDESTRIAN ROUTE)

6. PARKING SPACES
- MINIMUM 8.5' WIDE ACCESSIBLE PARKING SPACE
- MINIMUM 5' WIDE ACCESS AISLE AT STANDARD SPACES
- MINIMUM 8.5' WIDE ACCESS AISLE AT VAN ACCESSIBLE SPACES
- MAXIMUM 2% (1:50) SLOPE IN ANY DIRECTION

7. SIGNAGE
ACCESSIBLE PARKING SPACES SHALL BE DESIGNATED AS RESERVED BY A SIGN SHOWING THE SYMBOL OF ACCESSIBILITY. VAN ACCESSIBLE SPACES SHALL HAVE AN ADDITIONAL SIGN "VAN-ACCESSIBLE" MOUNTED BELOW THE SYMBOL. SUCH SIGNS SHALL BE LOCATED SO THEY CANNOT BE OBSCURED BY A VEHICLE PARKED IN THE SPACE (60" ABOVE GRADE UNLESS OTHER HEIGHT REQUIRED BY LOCAL JURISDICTION).

8. ACCESSIBLE ROUTES
MUST COMPLY WITH ADA, THE FAIR HOUSING ACT AND ICC/ANSI A117.1-2017.



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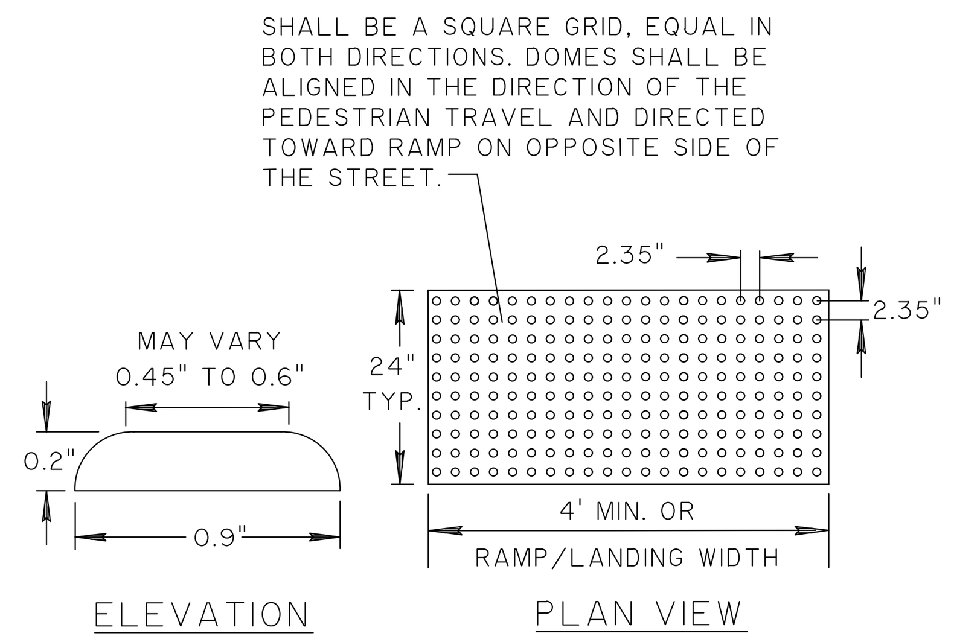
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK - LOT A
ACCESSIBILITY PLAN

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

C1.2



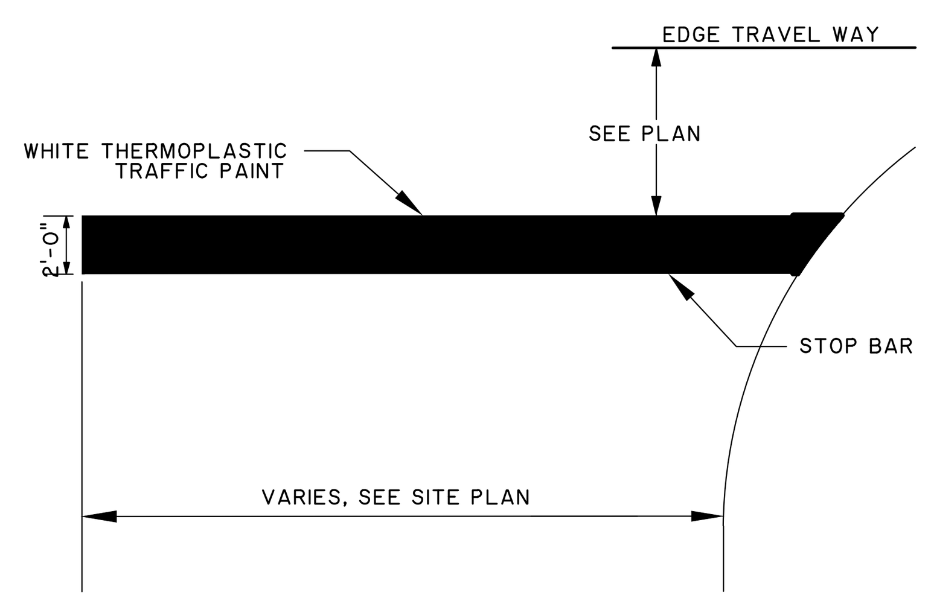
NOTE:

1. DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 INCHES, A HEIGHT OF NOMINAL 0.2 INCHES AND A CENTER TO CENTER SPACING OF NOMINAL 2.35 INCHES AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES. IF THE SIDEWALK AND RAMP ARE CONSTRUCTED OF CONCRETE, THE WARNING AREA SHALL BE RED BRICK IN COLOR. IF THE SIDEWALK AND RAMP ARE CONSTRUCTED OF RED BRICK, THE WARNING AREA SHALL BE GRAY IN COLOR. THE COLOR USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.

2. BRICK PAVERS SHALL BE SET IN A WET MORTAR BED ON A 4" MIN. THICK CONCRETE FOUNDATION.

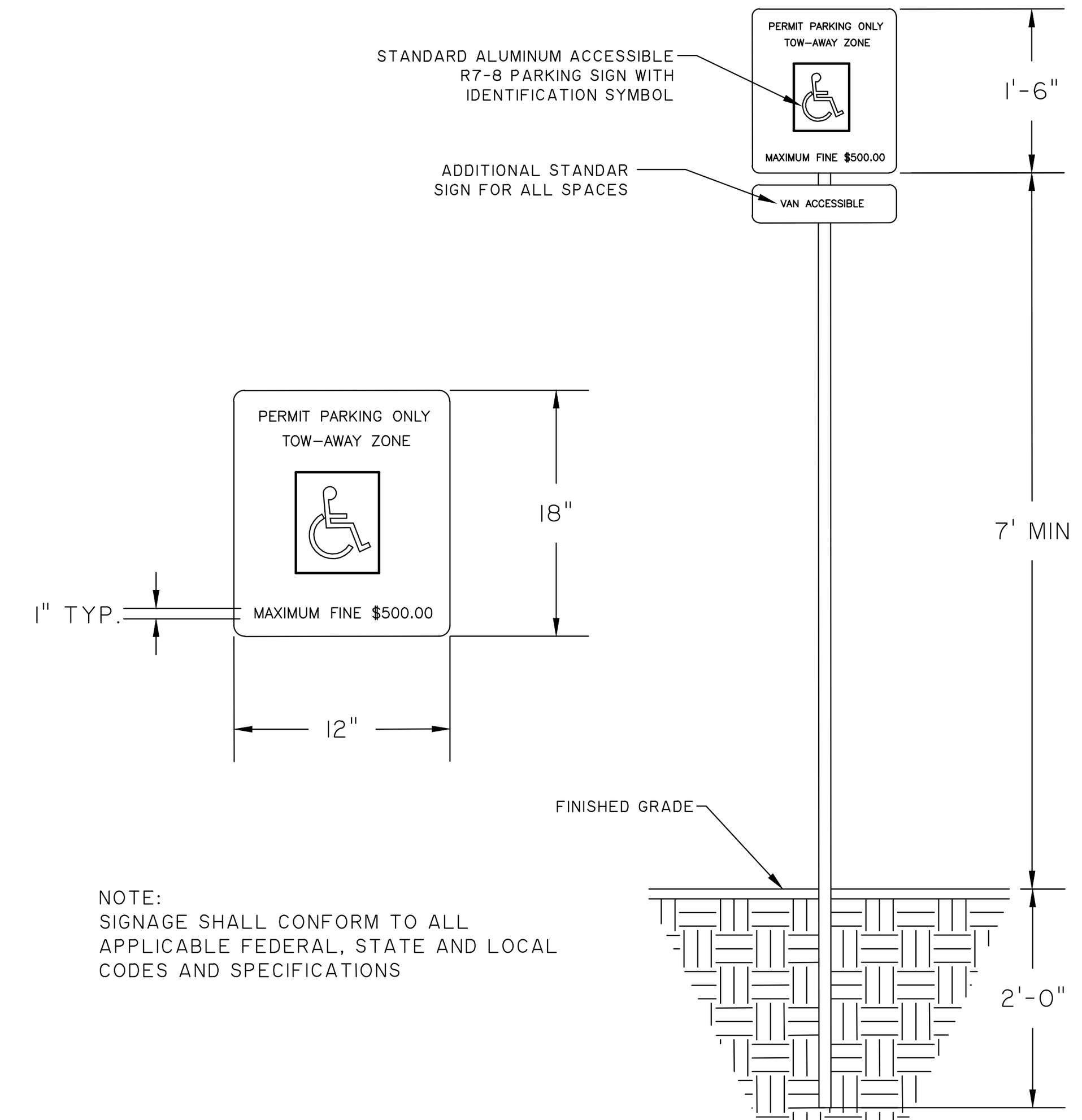
DETECTABLE WARNING DETAIL

NOT TO SCALE



TYPICAL STOP BAR PAVEMENT MARKING DETAIL

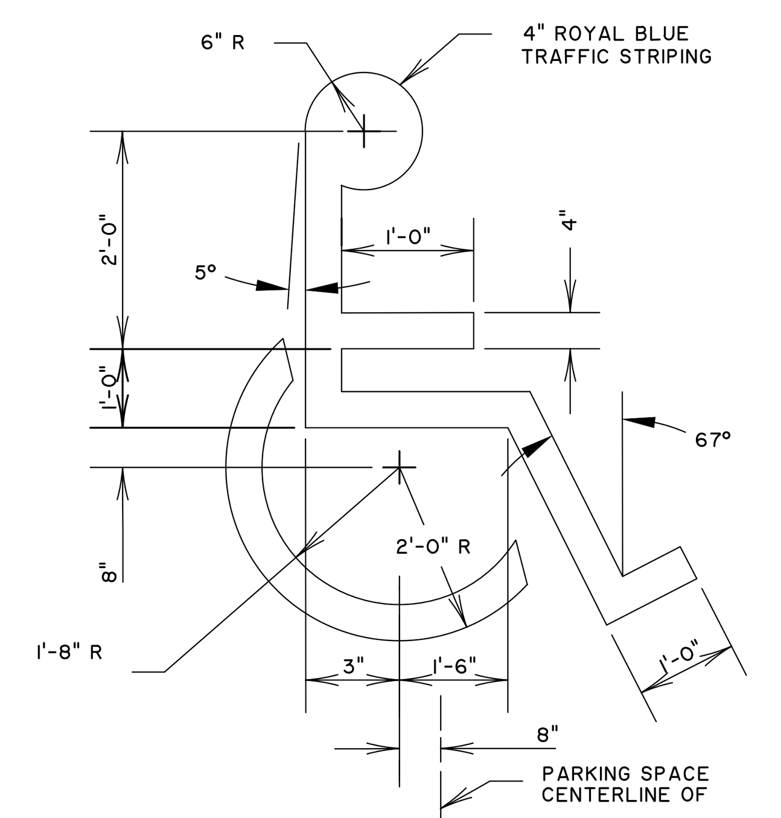
NOT TO SCALE



NOTE:
SIGNAGE SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND SPECIFICATIONS

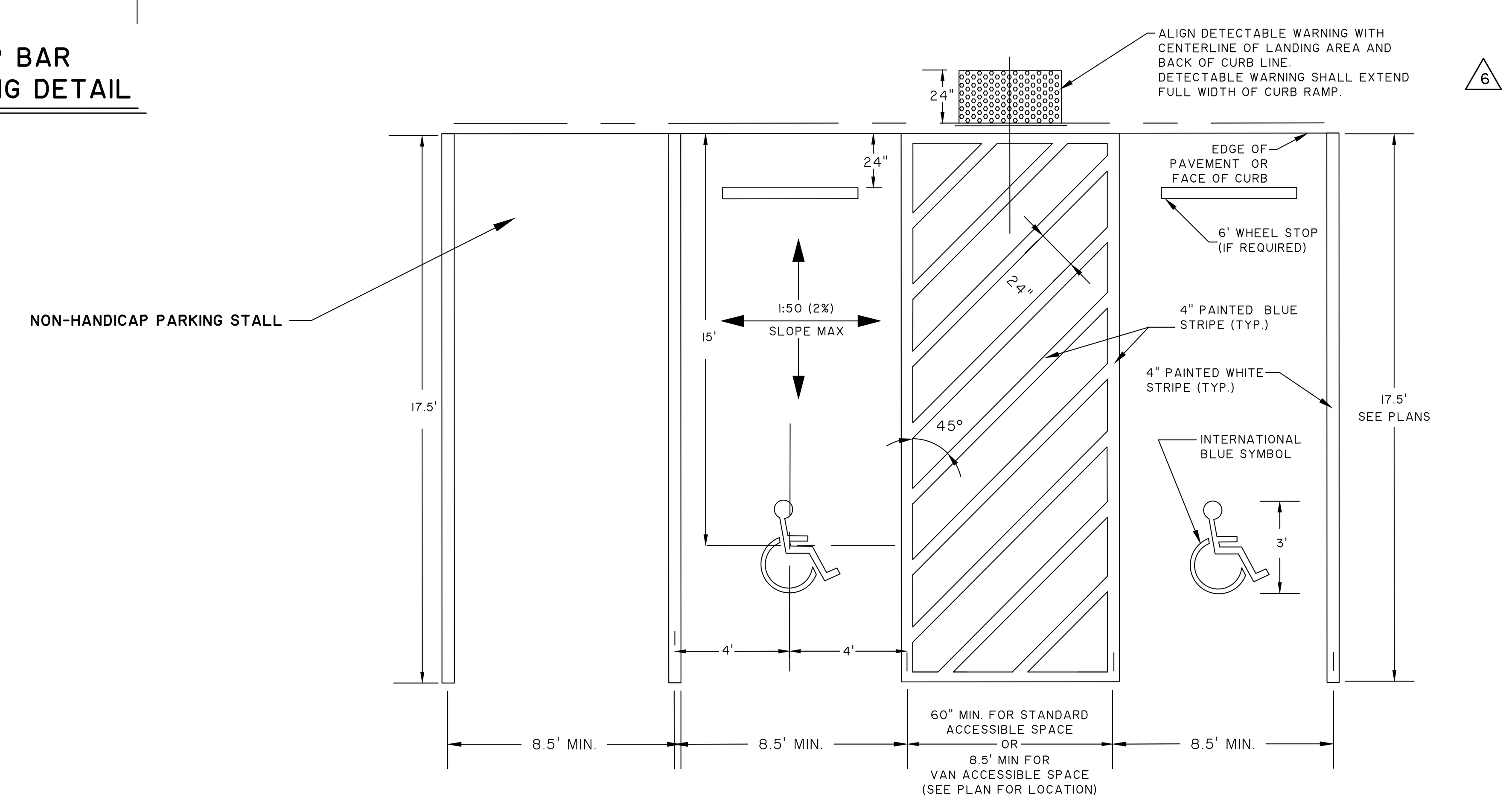
ACCESSIBLE PARKING SIGN DETAIL

NOT TO SCALE



PAVEMENT "RESERVED PARKING" SYMBOL

NOT TO SCALE

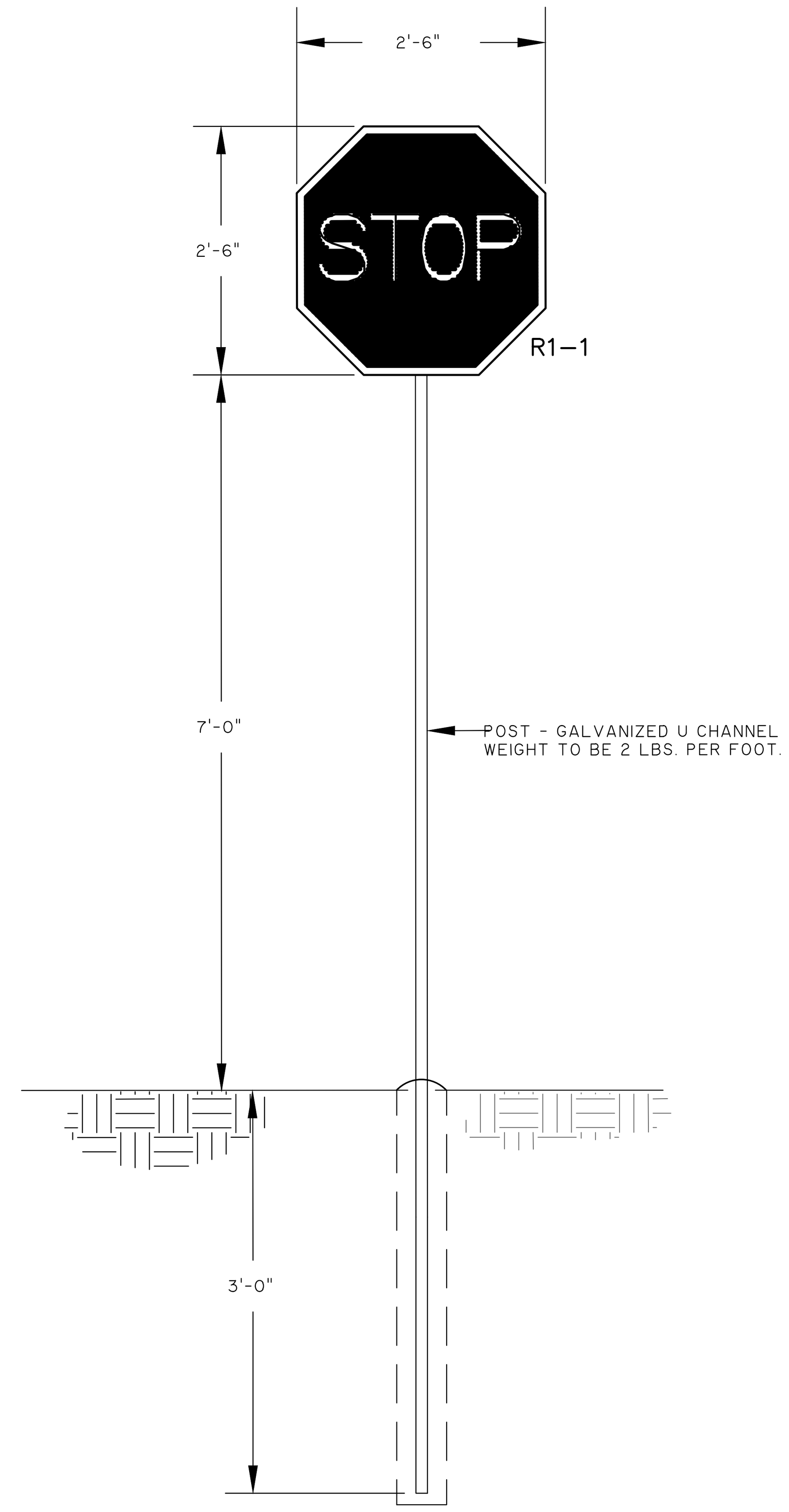


NOTES:

1. STRIPING AND CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND SPECIFICATIONS.
2. 2% MAXIMUM SLOPE IN ALL DIRECTIONS WITHIN ACCESSIBLE PARKING SPACE AND ACCESS AISLE.
3. ONE IN EVERY 8 ACCESSIBLE SPACES SHALL BE SERVED BY AN 8' WIDE ACCESS AISLE AND SHALL BE DESIGNATED "VAN ACCESSIBLE".

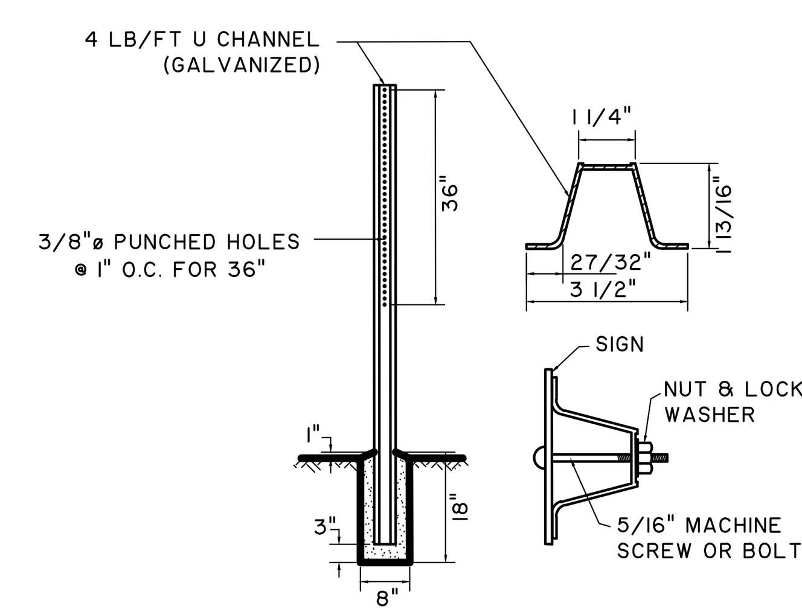
ACCESSIBLE PARKING SPACE STRIPING DETAIL

NOT TO SCALE



STOP SIGN DETAIL

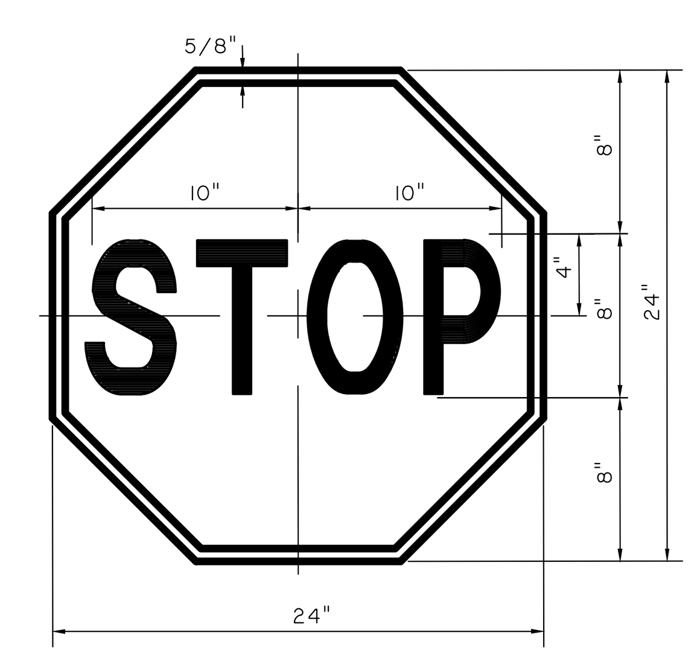
NOT TO SCALE



NOTE:
POST SHALL BE CAREFULLY CLEANED AND PHOSPHATED. IMMEDIATELY AFTER PHOSPHATING POST SHALL BE COATED WITH A MODIFIED POLYESTER PAINT BY ELECTRODEPOSITION AND THEN THOROUGHLY BAKED. COLOR IS PERMA-GREEN PER FED. STANDARD 595-A COLOR #14109 (DARK LIMIT V-)

SIGN POST DETAIL

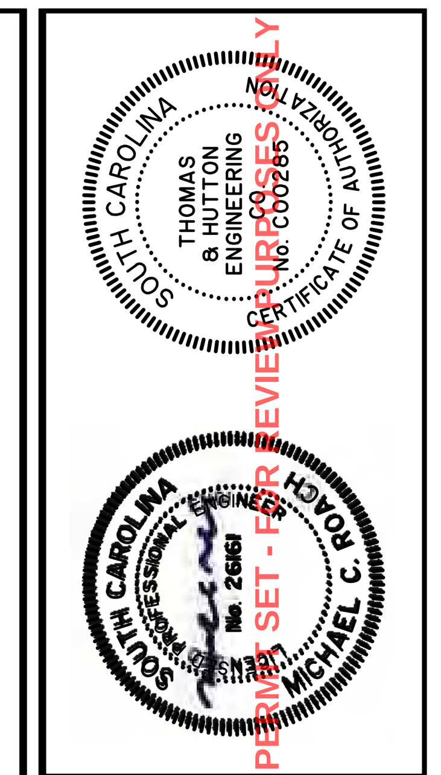
NOT TO SCALE



COLORS
LEGEND - WHITE REFLECTORIZED PAINT
BACKROUND - RED REFLECTORIZED PAINT

STOP SIGN

NOT TO SCALE



NO.	REVISIONS	BY	DATE

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Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

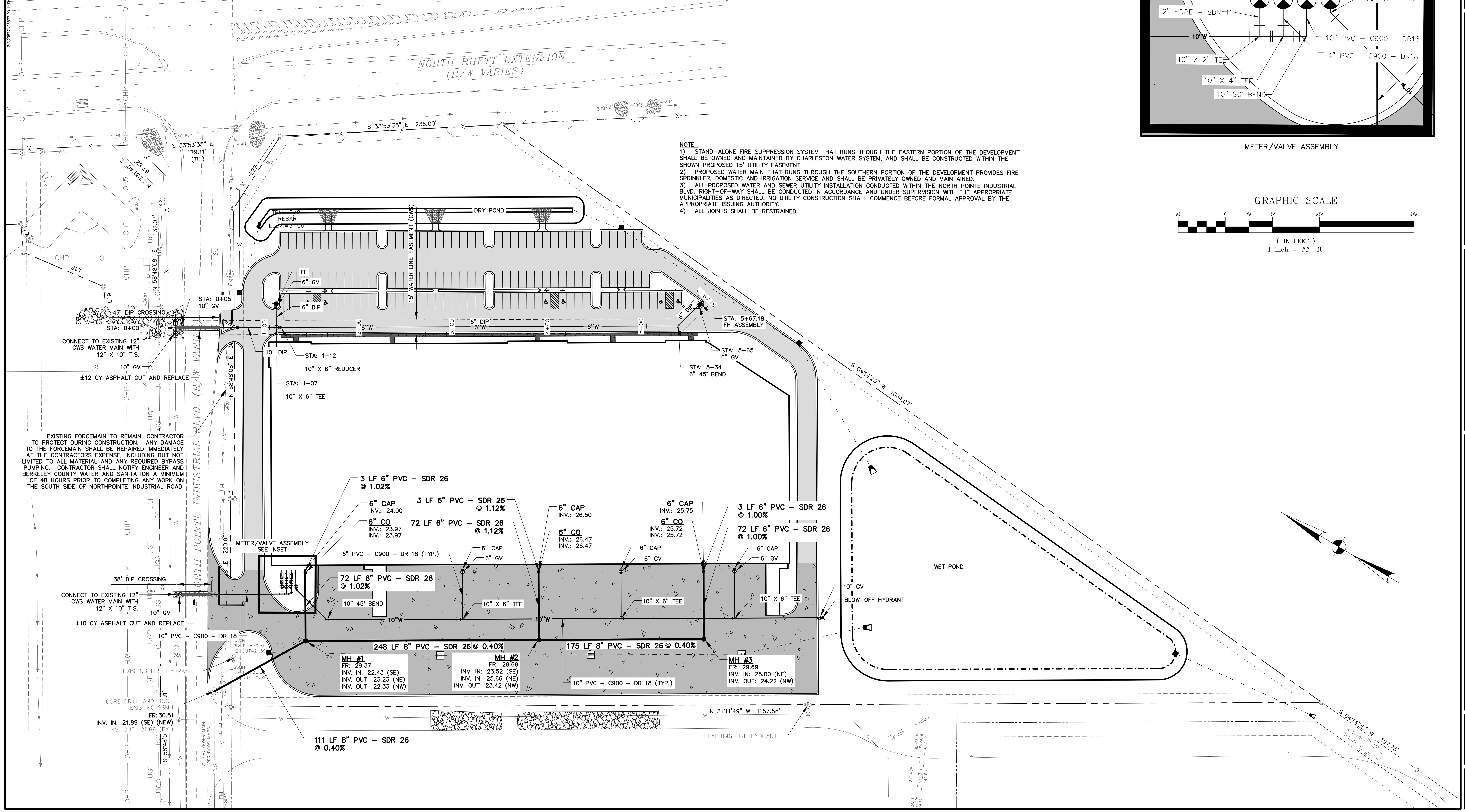
NORTH POINTE COMMERCE PARK - LOT A

SIGNAGE & STRIPING DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	N/A

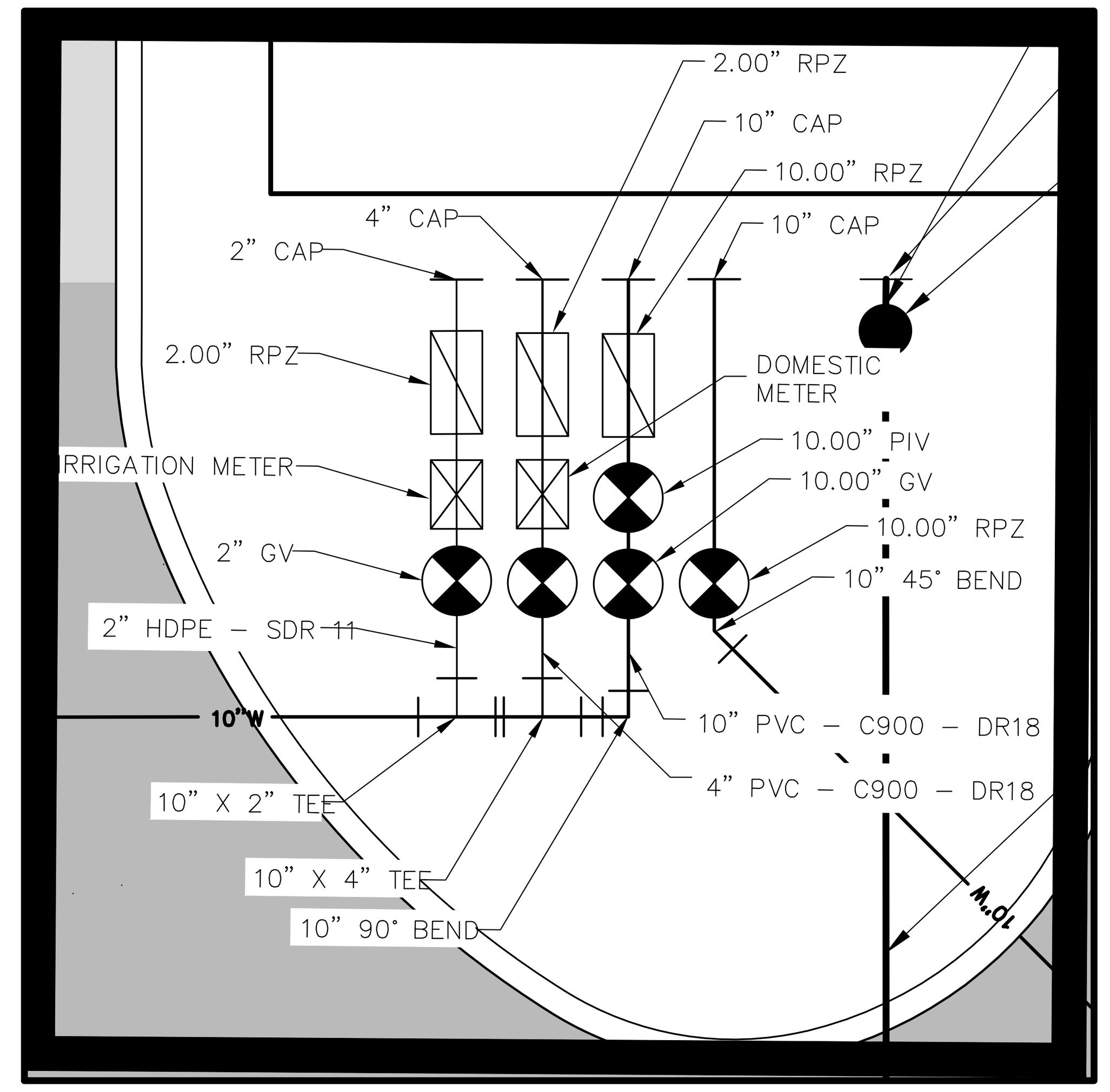
C1.3

TRAFFIC CONTROL NOTE:
CONTRACTOR TO COORDINATE INSTALLATION OF WATER LINE UNDER NORTHPOINTE INDUSTRIAL ROAD WITH CITY OF HANAHAN AND CHARLESTON WATER SYSTEM.
CONTRACTOR TO MAINTAIN ONE LANE OPEN AT ALL TIMES AND SHALL PROVIDE THE APPROPRIATE ADVANCED WARNING AND FLAGGERS IN ACCORDANCE WITH MUTCD AND SCDOT GUIDELINES ON TRAFFIC CONTROL IN A CONSTRUCTION SITE.



NORTH RHETT EXTENSION
(R/W VARIES)
S 33°53'35" E 236.00'
DRY POND
15' WATER LINE EASEMENT (CWS)
STA: 0+05
10" GV
STA: 0+00
47' DIP CROSSING
CONNECT TO EXISTING 12" CWS WATER MAIN WITH 12" X 10" T.S.
10" GV
±12 CY ASPHALT CUT AND REPLACE
FH
6" GV
6" DIP
10" DIP
STA: 1+12
10" X 6" REDUCER
STA: 1+07
10" X 6" TEE
STA: 5+67.18
FH ASSEMBLY
STA: 5+65
6" GV
STA: 5+34
6" 45° BEND
S 04°14'25" W 1064.07'
EXISTING FORCEMAIN TO REMAIN. CONTRACTOR TO PROTECT DURING CONSTRUCTION. ANY DAMAGE TO THE FORCEMAIN SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTORS EXPENSE, INCLUDING BUT NOT LIMITED TO ALL MATERIAL AND ANY REQUIRED BYPASS PUMPING. CONTRACTOR SHALL NOTIFY ENGINEER AND BERKELEY COUNTY WATER AND SANITATION A MINIMUM OF 48 HOURS PRIOR TO COMPLETING ANY WORK ON THE SOUTH SIDE OF NORTHPOINTE INDUSTRIAL ROAD.
NORTH POINTE INDUSTRIAL BLVD. (R/W VARIES)
3 LF 6" PVC – SDR 26 @ 1.02%
6" CAP INV.: 24.00
6" CO INV.: 23.97 INV.: 23.97
3 LF 6" PVC – SDR 26 @ 1.12%
72 LF 6" PVC – SDR 26 @ 1.12%
6" CAP INV.: 26.50
6" CO INV.: 26.47 INV.: 26.47
6" CAP INV.: 25.75
6" CO INV.: 25.72 INV.: 25.72
3 LF 6" PVC – SDR 26 @ 1.00%
72 LF 6" PVC – SDR 26 @ 1.00%
METER/VALVE ASSEMBLY SEE INSET
6" PVC – C900 – DR 18 (TYP.)
6" CAP
6" GV
72 LF 6" PVC – SDR 26 @ 1.02%
10" 45° BEND
10" X 6" TEE
10" GV
BLOW-OFF HYDRANT
WET POND
38' DIP CROSSING
CONNECT TO EXISTING 12" CWS WATER MAIN WITH 12" X 10" T.S.
±10 CY ASPHALT CUT AND REPLACE
10" PVC – C900 – DR 18
248 LF 8" PVC – SDR 26 @ 0.40%
175 LF 8" PVC – SDR 26 @ 0.40%
MH #1 FR: 29.37 INV. IN: 22.43 (SE) INV. OUT: 23.23 (NE) INV. OUT: 22.33 (NW)
MH #2 FR: 29.69 INV. IN: 23.52 (SE) INV. IN: 25.66 (NE) INV. OUT: 23.42 (NW)
MH #3 FR: 29.69 INV. IN: 25.00 (NE) INV. OUT: 24.22 (NW)
10" PVC – C900 – DR 18 (TYP.)
EXISTING FIRE HYDRANT
CORE DRILL AND BOOT EXISTING SSMH
FR: 30.51
INV. IN: 21.89 (SE) (NEW)
INV. OUT: 21.69 (EX.)
N 31°11'49" W 1157.58'
111 LF 8" PVC – SDR 26 @ 0.40%
S 04°14'25" W 197.75'

NOTE:
1) STAND-ALONE FIRE SUPPRESSION SYSTEM THAT RUNS THOUGH THE EASTERN PORTION OF THE DEVELOPMENT SHALL BE OWNED AND MAINTAINED BY CHARLESTON WATER SYSTEM, AND SHALL BE CONSTRUCTED WITHIN THE SHOWN PROPOSED 15' UTILITY EASEMENT.
2) PROPOSED WATER MAIN THAT RUNS THROUGH THE SOUTHERN PORTION OF THE DEVELOPMENT PROVIDES FIRE SPRINKLER, DOMESTIC AND IRRIGATION SERVICE AND SHALL BE PRIVATELY OWNED AND MAINTAINED.
3) ALL PROPOSED WATER AND SEWER UTILITY INSTALLATION CONDUCTED WITHIN THE NORTH POINTE INDUSTRIAL BLVD. RIGHT-OF-WAY SHALL BE CONDUCTED IN ACCORDANCE AND UNDER SUPERVISION WITH THE APPROPRIATE MUNICIPALITIES AS DIRECTED. NO UTILITY CONSTRUCTION SHALL COMMENCE BEFORE FORMAL APPROVAL BY THE APPROPRIATE ISSUING AUTHORITY.
4) ALL JOINTS SHALL BE RESTRAINED.



METER/VALVE ASSEMBLY

GRAPHIC SCALE
(IN FEET)
1 inch = ## ft.

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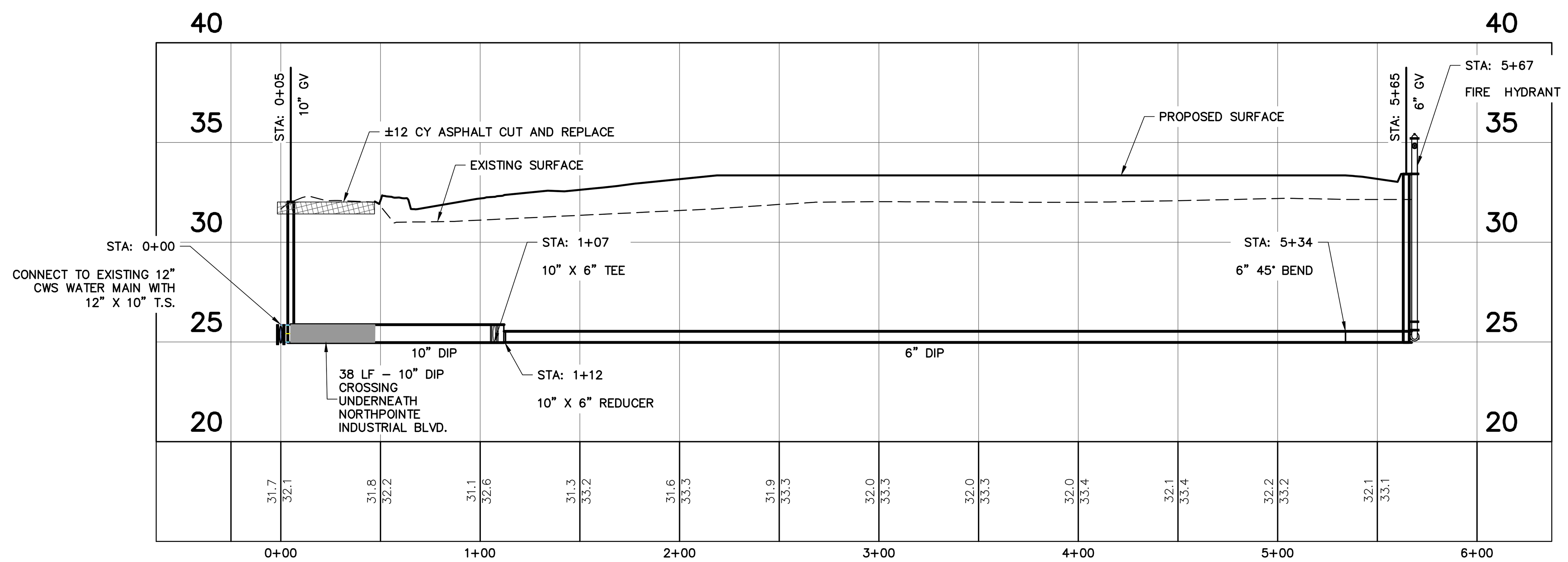
NO.	REVISIONS	BY	DATE

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINT COMMERCE PARK – LOT A
WATER AND SEWER PLAN

JOB NO:	J-23577.0011
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

C2.1



CWS PUBLIC WATER MAIN LINE

STATIONS: −0+25 – 6+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

NO.	REVISIONS	BY	DATE

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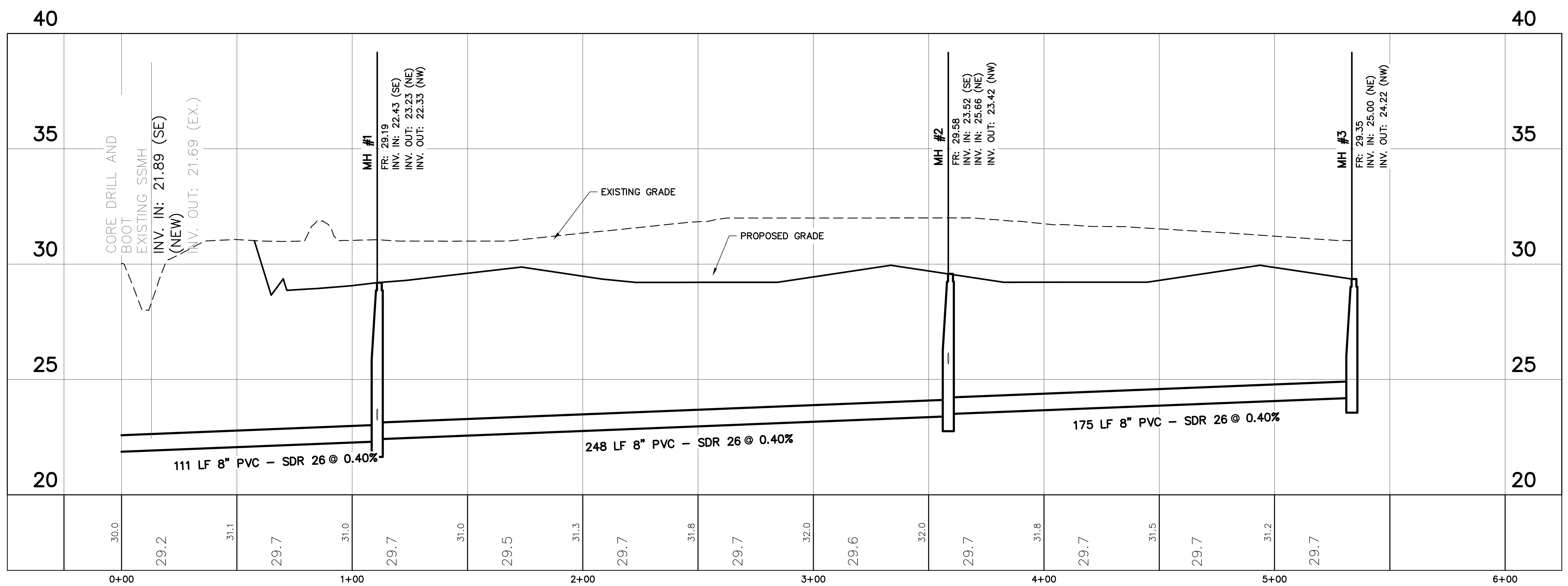
WEST–SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
WATER PROFILES

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

C2.2



23577.0013 – SEWER – RUN 1

STATIONS: -0+25 – 6+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

REVISIONS	NO.	BY	DATE

THOMAS & HUTTON

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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK – LOT A

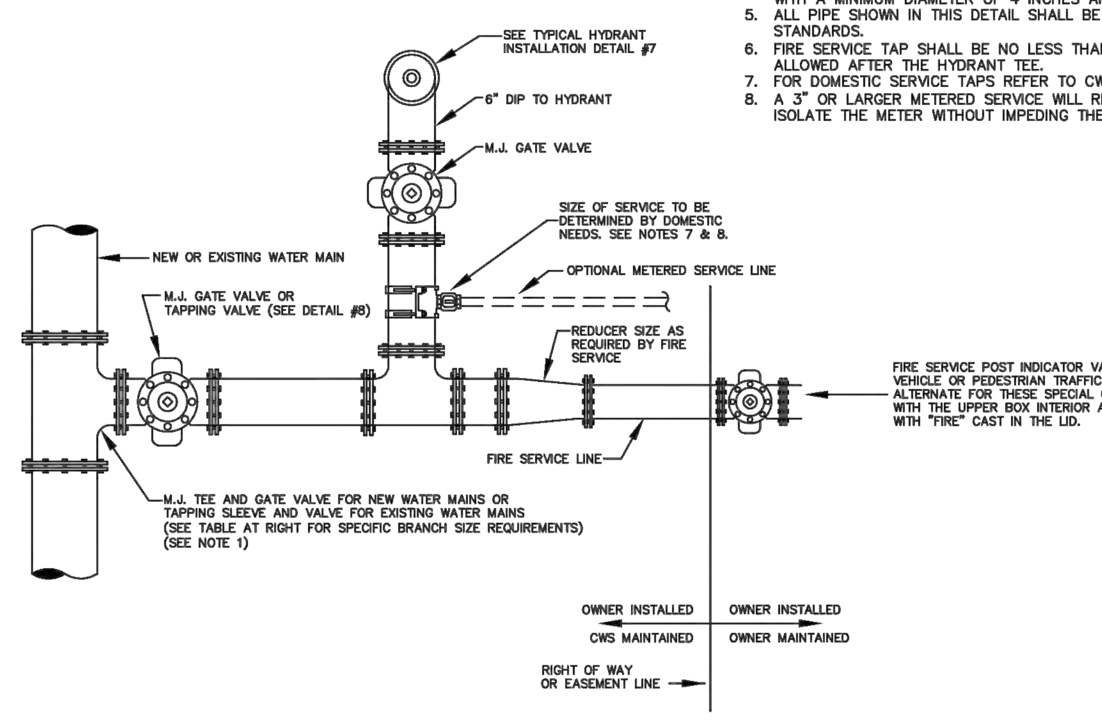
SEWER PROFILES

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 32.7744'

C2.3

NOTES:

1. SEE TYPICAL TAPPING SLEEVE DETAIL #8 FOR CONNECTING TO EXISTING MAINS.
2. OWNER SHALL BE RESPONSIBLE FOR ENCROACHMENT APPLICATIONS, CERTIFICATIONS, PERMITS, OR EASEMENTS WITH REGULATION AUTHORITIES.
3. THE CWS APPROVED CONTRACTOR SHALL NOTIFY CWS AT LEAST 72 WORKING HOURS IN ADVANCE OF COMMENCING WORK FOR INSPECTION BY CWS PERSONNEL.
4. THE LINE UP TO THE OWNER'S POST INDICATOR VALVE SHALL BE DUCTILE IRON WITH A MINIMUM DIAMETER OF 4 INCHES AFTER THE REDUCER.
5. ALL PIPE SHOWN IN THIS DETAIL SHALL BE RESTRAINED PER CWS MINIMUM STANDARDS.
6. FIRE SERVICE TAP SHALL BE NO LESS THAN 8" IN DIAMETER. REDUCER MAY BE ALLOWED AFTER THE HYDRANT TEE.
7. FOR DOMESTIC SERVICE TAPS REFER TO CWS MINIMUM STANDARDS AND DETAILS.
8. A 3" OR LARGER METERED SERVICE WILL REQUIRE AN ADDITIONAL VALVE TO ISOLATE THE METER WITHOUT IMPEDING THE FIRE PROTECTION.



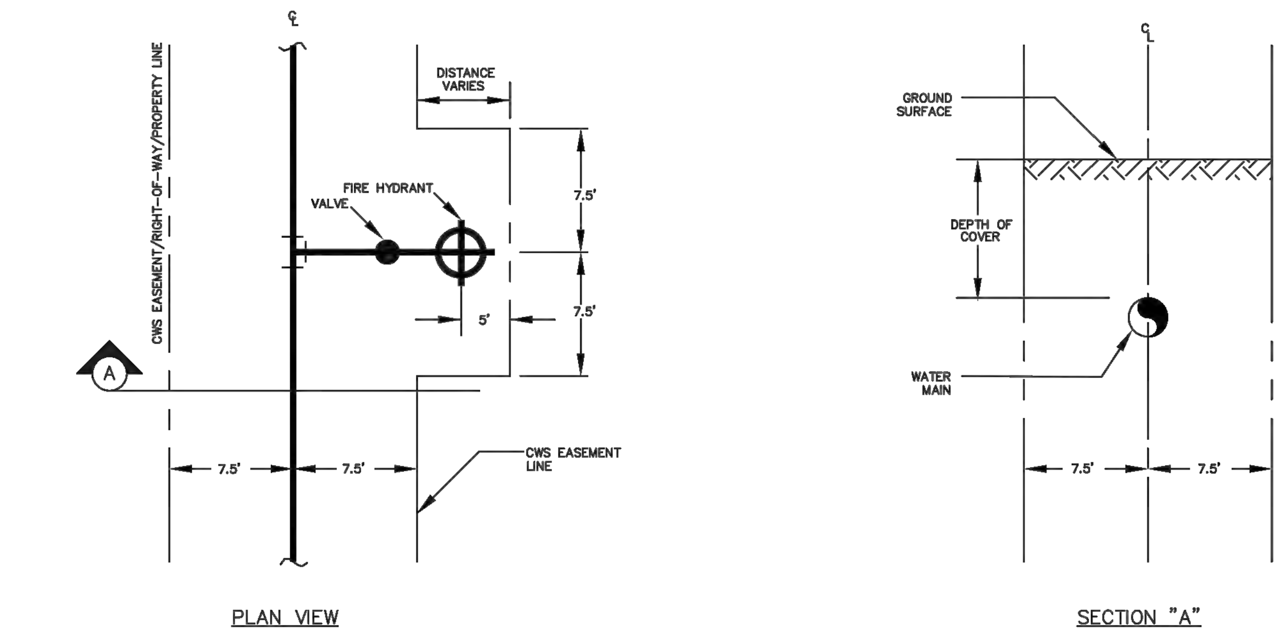
BRANCH SIZE REQUIREMENTS

SIZE OF FIRE SERVICE	SIZE OF BRANCH
6" OR LESS	8"
8"	10"
10"	12"

TYPICAL UNMETERED FIRE SERVICE LINE WITH HYDRANT AND METER SERVICE LINE
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 9A
REVISION DATE: NOV 1, 2015



TYPICAL 15' CWS WATER EASEMENT
NOT TO SCALE

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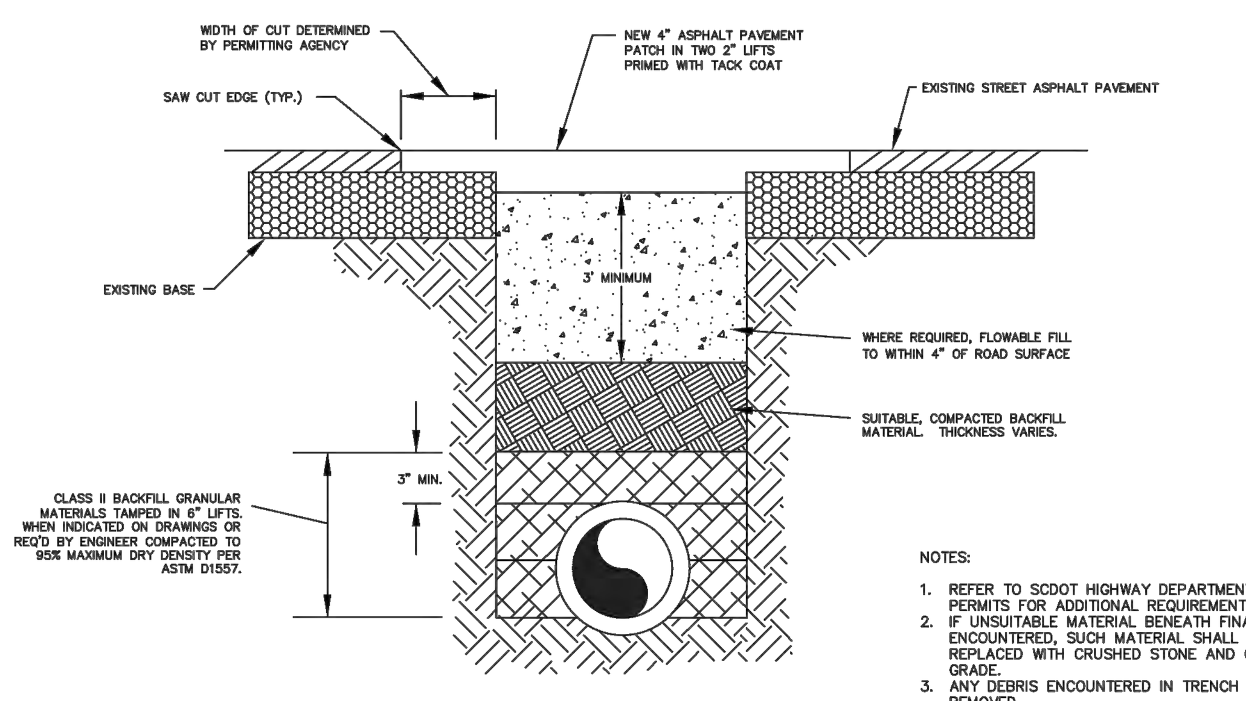
Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 27
REVISION DATE: NOV 1, 2015



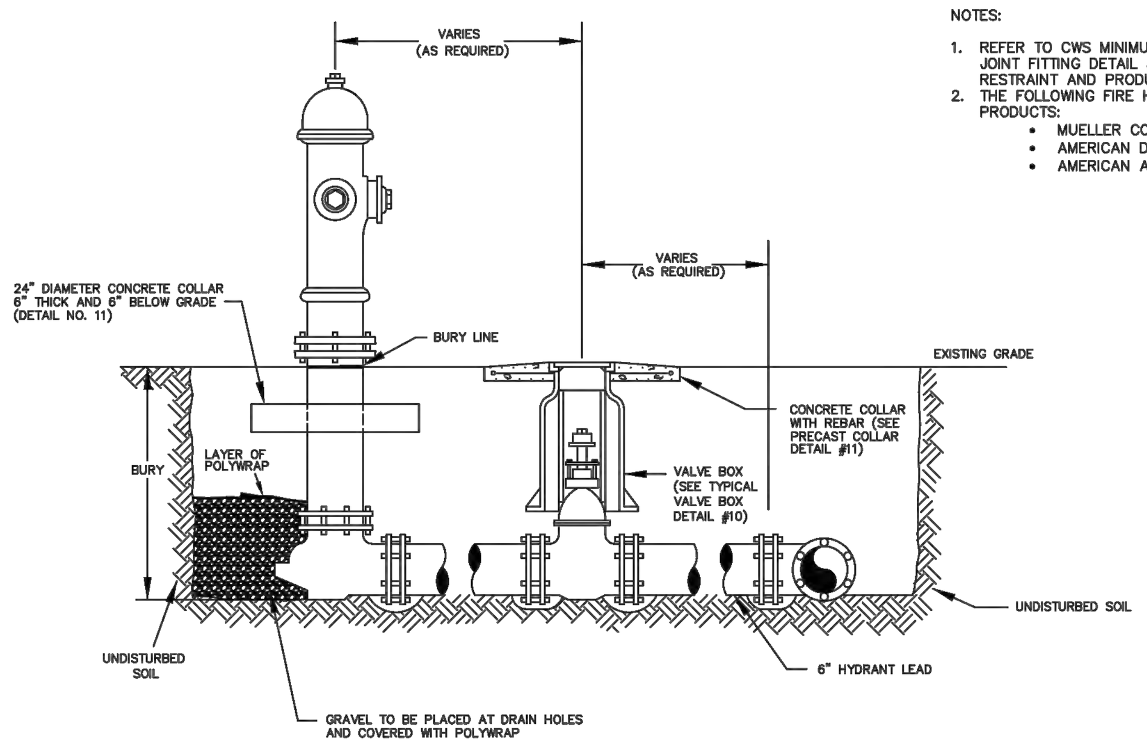
NOTES:

1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

TYPICAL ROAD CUT
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 2
REVISION DATE: NOV 1, 2015



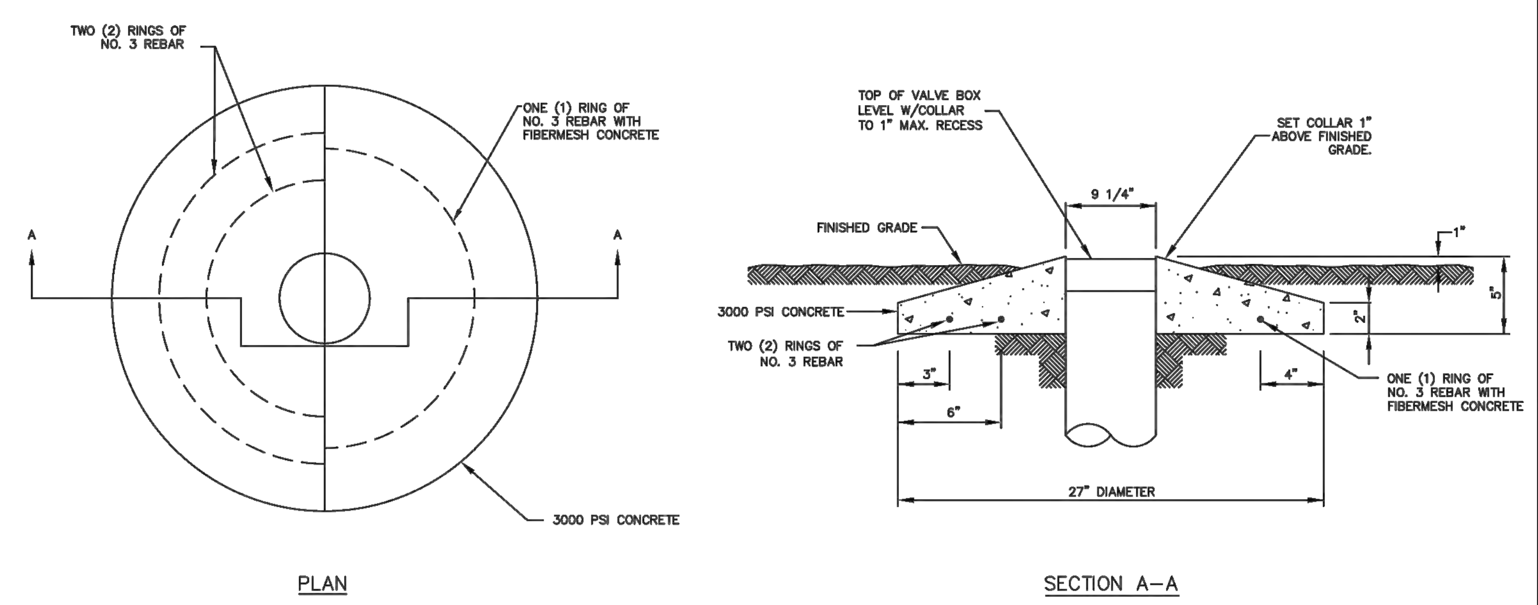
NOTES:

1. REFER TO CWS MINIMUM STANDARDS AND RESTRAINED JOINT FITTING DETAIL #4 FOR APPROVED METHODS OF RESTRAINT AND PRODUCTS.
2. THE FOLLOWING FIRE HYDRANTS ARE APPROVED PRODUCTS:
   - MUELLER COMPANY (SUPER CENTURION A423)
   - AMERICAN DARLING (B-84-B)
   - AMERICAN AVK (SERIES 2780)

TYPICAL HYDRANT INSTALLATION
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 7
REVISION DATE: NOV 1, 2015



NOTE:

NO PRECAST CONCRETE COLLAR IS NEEDED IF VALVE BOX IS LOCATED IN PAVED OR CONCRETE AREA.

PRECAST CONCRETE COLLAR
NOT TO SCALE

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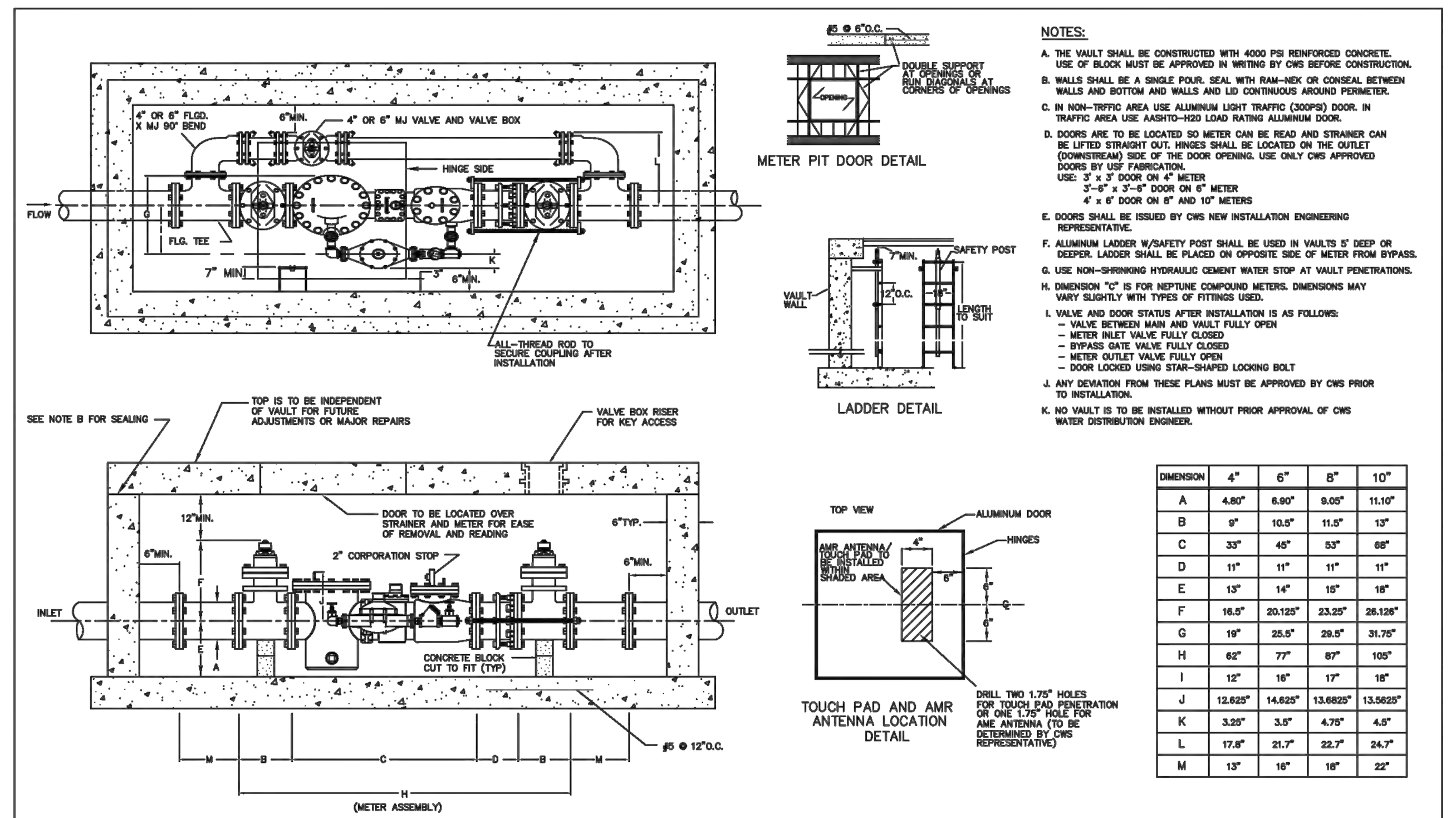
Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 11
REVISION DATE: NOV 1, 2015



4" - 10" METER WITH BYPASS
NOT TO SCALE

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Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 25
REVISION DATE: NOV 1, 2015

NOTES:

1. THE FOLLOWING CONDITIONS WERE USED TO CALCULATE THE RESTRAINED LENGTHS SHOWN IN THE TABLE:
   - LAYING CONDITION IS TYPE 3
   - SOIL DESIGNATED AS SAND-SILT
   - DEPTH IS 3 FT.
   - DESIGN PRESSURE (TEST) IS 150 P.S.I.
   - SAFETY FACTOR IS 1.5
   - PIPE IS POLYETHYLENE ENCASED

   FOR THE TEE BRANCH AND REDUCER, LENGTHS ARE BASED ON BRANCHING AND REDUCING FROM THE NEXT LARGER SIZE IN THE TABLE. TEE BRANCH LENGTH BASED ON RUN LENGTH TO FIRST JOINT OF 10 FT. DEVIATIONS FROM THESE CONDITIONS MUST BE BASED ON THE ABOVE PARAMETERS.
2. REFER TO CWS MINIMUM STANDARDS FOR APPROVED RESTRAINING METHODS.
3. THE FOLLOWING RESTRAINING GLANDS AND GASKETS ARE APPROVED PRODUCTS:

   FOR DUCTILE IRON PIPE
   - AMERICAN CAST IRON PIPE – FAST GRIP, FLEX-RING, FIELD FLEX-RING, OR LOCK-RING
   - US PIPE – TR FLEX OR FIELD LOK 350 GASKETS
   - GRIFFIN PIPE – SNAP-LOK RESTRAINED JOINT, OR TALON RJ GASKET
   - EBAA – MEGALUG RESTRAINT GLAND
   - FORD – SERIES 1400 RESTRAINT GLAND
   - SIGMA – ONE-LOK SERIES SLD RESTRAINT GLAND
   - MCWANE – SURE STOP 350 RESTRAINT GASKET

   FOR PVC PIPE
   - EBAA MEGALUG SERIES 2000PV
   - FORD SERIES 1500 WILL BE USED ON EXISTING PVC PIPE

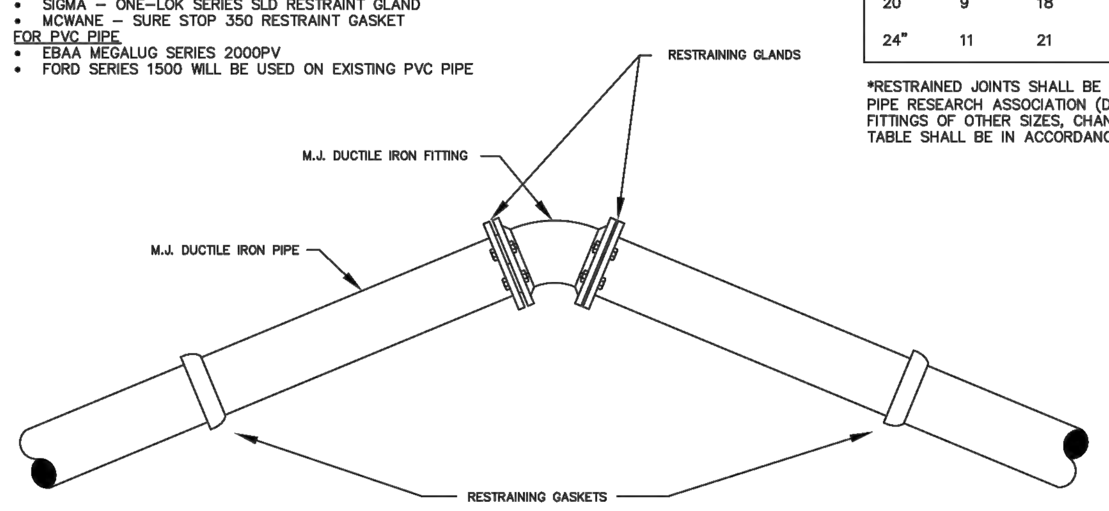
RESTRAINT JOINT TABLE

RESTRAIN ALL JOINTS WITHIN THESE LENGTHS

(IN L.F. EACH SIDE OF THE FITTING)

SIZE	11 1/4°	22 1/2°	45°	90°	TEE BRANCH	DEAD END	REDUCER
4"	2	5	10	24	38	61	44
6"	4	7	14	33	64	85	47
8"	5	9	18	44	91	111	45
10"	6	11	22	52	113	132	46
12"	6	12	25	60	133	155	84
16"	8	16	32	76	177	198	84
20"	9	18	38	91	218	238	83
24"	11	21	43	104	255	277	116

*RESTRAINED JOINTS SHALL BE IN ACCORDANCE WITH THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) STANDARDS FOR ALL FITTINGS. FITTINGS OF OTHER SIZES, CHANGES IN CONDITIONS, ETC. NOT IN THIS TABLE SHALL BE IN ACCORDANCE WITH DIPRA STANDARDS.



RESTRAINED JOINT FITTING
(HORIZONTAL PIPE ONLY)
NOT TO SCALE

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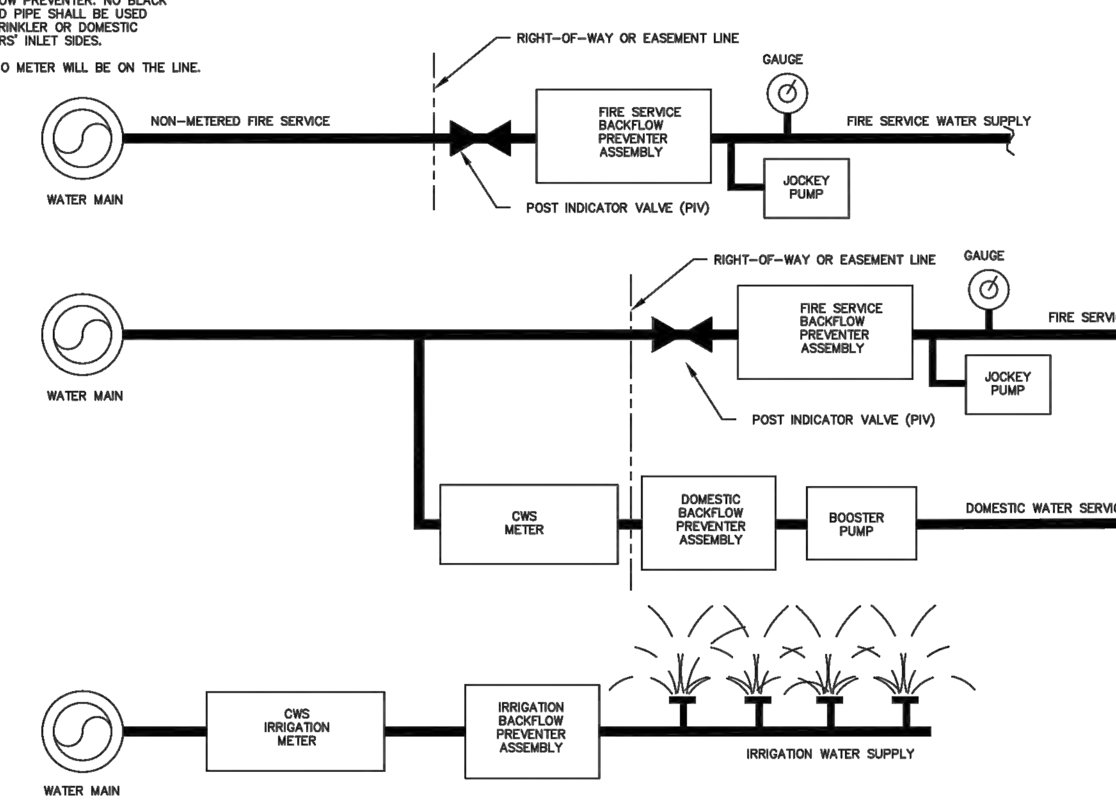
Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 4
REVISION DATE: JAN 1, 2016

NOTES:

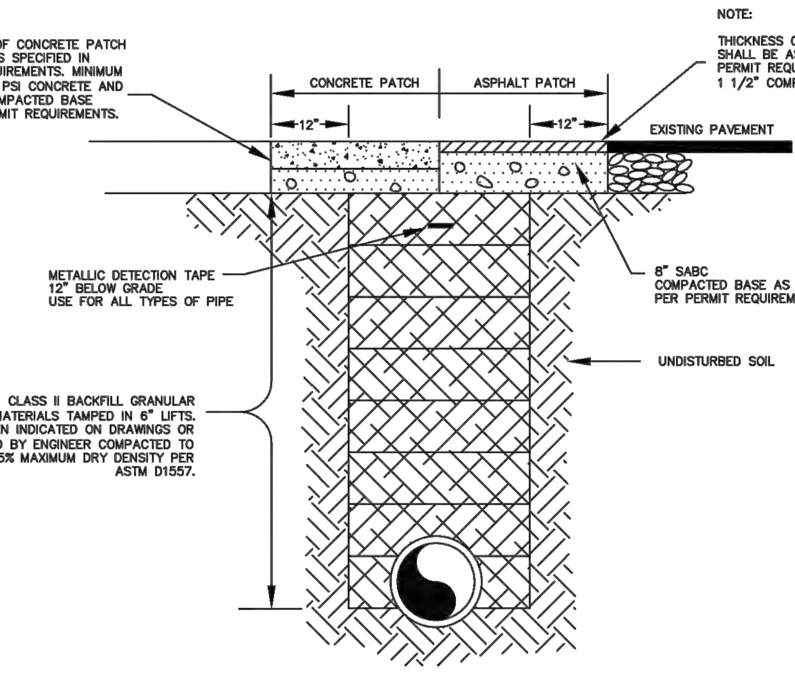
1. APPROVED WATER CARRYING PIPE SHALL BE USED BETWEEN CWS'S METER AND THE INLET SIDE OF THE BACKFLOW PREVENTER. NO BLACK STEEL OR GALVANIZED PIPE SHALL BE USED BEFORE THE FIRE SPRINKLER OR DOMESTIC BACKFLOW PREVENTERS' INLET SIDES.
2. FOR FIRE SERVICE, NO METER WILL BE ON THE LINE.



METER AND BACKFLOW SCHEMATIC FOR FIRE, DOMESTIC, AND IRRIGATION SERVICES
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 36
REVISION DATE: NOV 1, 2015



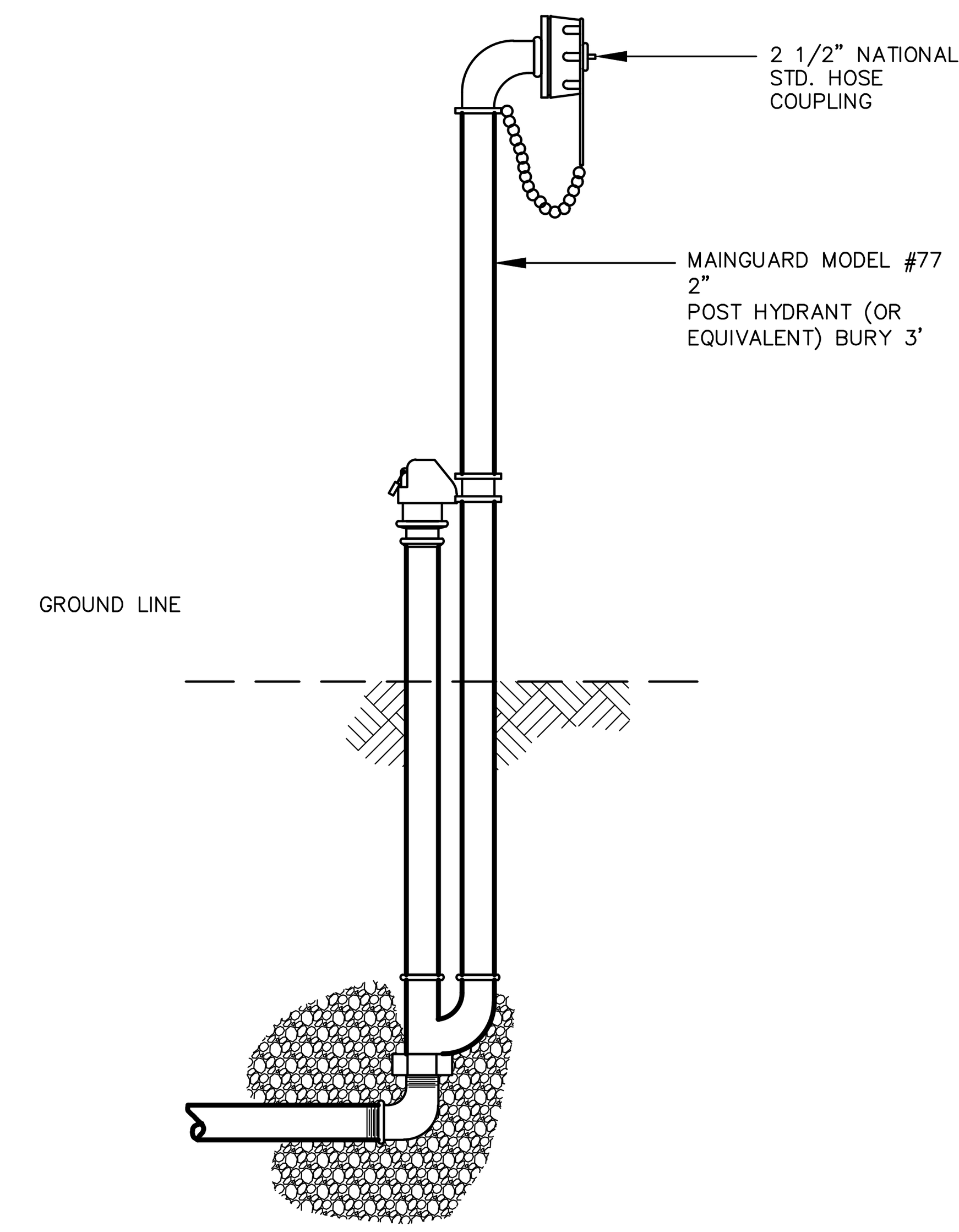
NOTES:

1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

MAIN UNDER PAVED DRIVEWAY
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W | DETAIL NO. 3
REVISION DATE: NOV 1, 2015



BLOW-OFF HYDRANT
NOT TO SCALE

REVISIONS

NO.		BY	DATE

THOMAS & HUTTON
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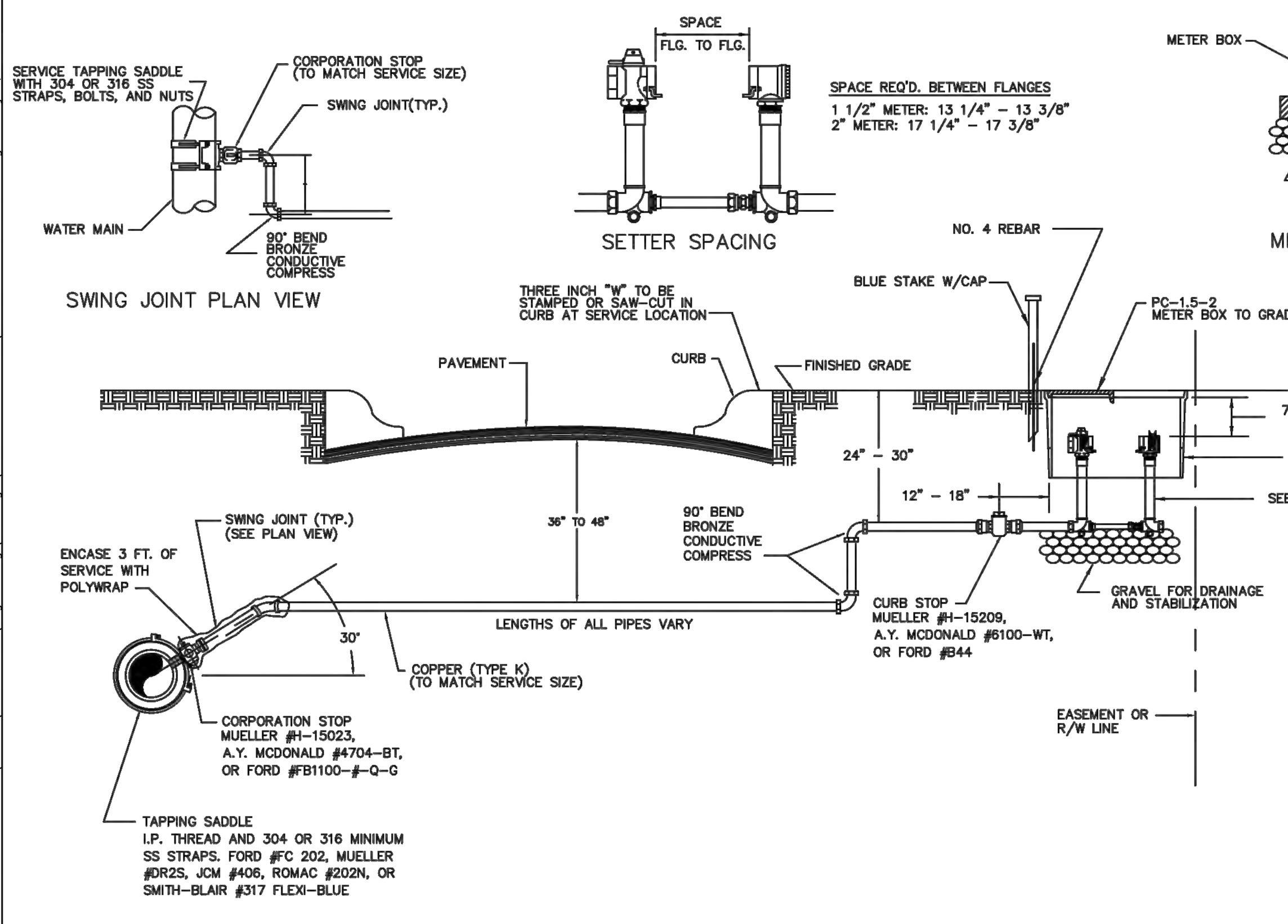
www.thomasandhutton.com

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
WATER DETAILS

JOB NO:	J-23577.0013
DATE:	10/16/17
DRAWN:	KHT
DESIGNED:	MBB
REVIEWED:	JVG
APPROVED:	MCR
SCALE:	N/A

C2.4



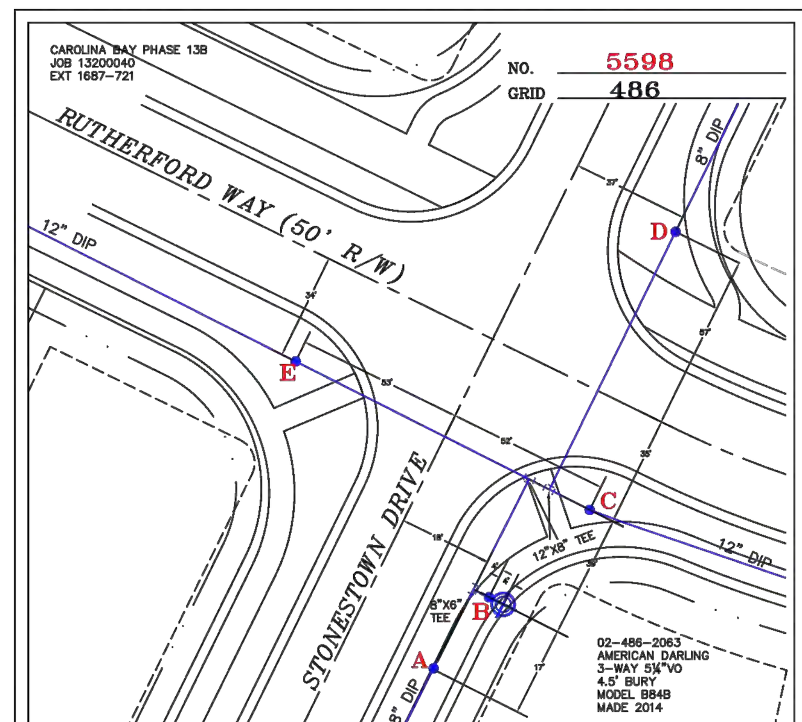
NOTES:

1. CONTRACTOR WILL PROVIDE ALL MATERIAL SHOWN OR INDICATED, AND INSTALL SERVICES UNDER CWS SUPERVISION.
2. ALL TAPS WILL BE MADE IN ACCORDANCE WITH CPW SPECIFICATIONS AND AWWA GUIDELINES FOR TAPPING THROUGH POLYETHELENE ENCASEMENT.
3. ALL METER BOXES SHALL BE INSTALLED PERPENDICULARLY TO THE RIGHT-OF-WAY LINE OR PROPERTY LINE, AS SHOWN HEREIN.
4. ALL METER BOXES TO BE INSTALLED WITHIN ROAD RIGHTS-OF-WAY UNLESS SPECIFIED OTHERWISE.
5. SETTER FOR 1 1/2" METER TO BE FORD #VBH76-15-44-66-G AND FOR 2" METER SETTER FORD #VBH77-15-44-77-G OR MUELLER #B-2422-2 FOR 1 1/2" OR 2" METERS WITH 15" RISER AND 110 COMPRESSION CONNECTION OR A.Y. MCDONALD 21-615WDGG 660 FOR 1 1/2" METER AND 21-715WDGG 770 FOR 2" METER.

1 ½" AND 2" WATER SERVICE

NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: NOV 1, 2015 — DETAIL NO. 21



LOCATION	SIZE	MAKE	DATE SET	NO. TURNS
A	8"	AM DARLING	11/1/2014	27
B	6"	AM DARLING	11/1/2014	20.5
C	12"	AM DARLING	11/1/2014	38.5
D	8"	AM DARLING	11/1/2014	27
E	12"	AM DARLING	11/1/2014	38.5

REVISED BY: — DRAWN BY: MJC/CMA — DATE: 6/16/15 — CHECKED BY:

NOTES:

1. THE NUMBER OF TURNS FOR VALVES SHALL BE FIELD DETERMINED AND NOT TAKEN FROM MANUFACTURER'S MANUAL.
2. ALL HYDRANTS, VALVES & METER VAULTS SHALL HAVE TWO DIMENSIONS FOR TIE-DOWN PERPENDICULAR TO EACH OTHER. NO RADIAL DIMENSIONS SHALL BE INCLUDED.

TYPICAL VALVE CARD

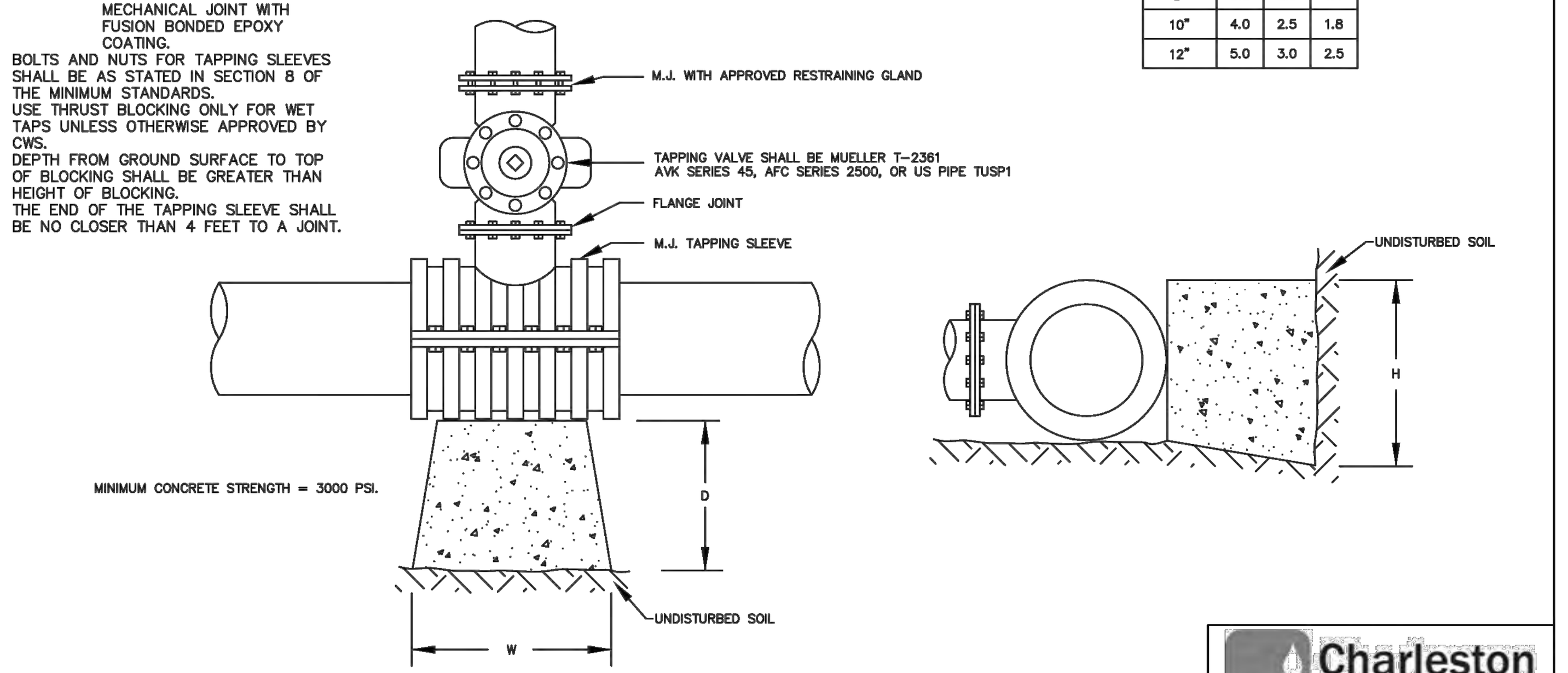
NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: JAN 1, 2016 — DETAIL NO. 28

NOTES:

1. TAPPING SADDLES ARE NOT ALLOWED FOR MAIN-ON-MAIN TAPS.
2. REFER TO THE CWS MINIMUM STANDARDS FOR APPROVED INSTALLATION REQUIREMENTS.
3. THE FOLLOWING TAPPING SLEEVES ARE APPROVED PRODUCTS:
   - 4" THROUGH 24" – MUELLER H-615 OR AMERICAN FLOW CONTROL SERIES 2800.
   - 30" THROUGH 36" – AMERICAN FLOW CONTROL SERIES 2800 OR JCM 414 FABRICATED MECHANICAL JOINT WITH FUSION BONDED EPOXY COATING.
4. BOLTS AND NUTS FOR TAPPING SLEEVES SHALL BE AS STATED IN SECTION 8 OF THE MINIMUM STANDARDS.
5. USE THRUST BLOCKING ONLY FOR WET TAPS UNLESS OTHERWISE APPROVED BY CWS.
6. DEPTH FROM GROUND SURFACE TO TOP OF BLOCKING SHALL BE GREATER THAN HEIGHT OF BLOCKING.
7. THE END OF THE TAPPING SLEEVE SHALL BE NO CLOSER THAN 4 FEET TO A JOINT.

TAP SIZE	DIMENSIONS IN FEET W	H	D
4" & 6"	2.0	1.4	1.0
8"	3.5	2.0	1.4
10"	4.0	2.5	1.8
12"	5.0	3.0	2.5



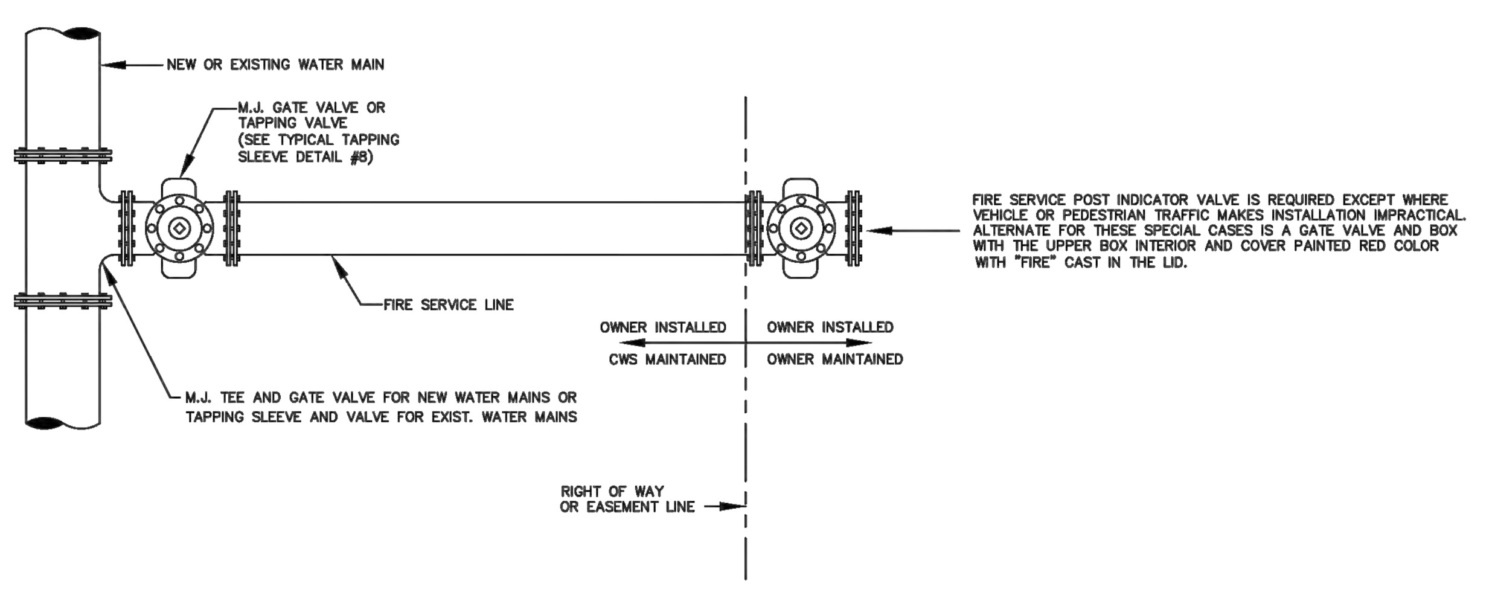
TYPICAL TAPPING SLEEVE

NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: JAN 1, 2016 — DETAIL NO. 8

NOTES:

1. SEE TYPICAL TAPPING SLEEVE DETAIL #8 FOR CONNECTING TO EXISTING MAINS.
2. OWNER SHALL BE RESPONSIBLE FOR ENCROACHMENT APPLICATIONS, CERTIFICATIONS, PERMITS, OR EASEMENTS WITH REGULATION AUTHORITIES.
3. THE CWS APPROVED CONTRACTOR SHALL NOTIFY CWS AT LEAST 72 WORKING HOURS IN ADVANCE OF COMMENCING WORK FOR INSPECTION BY CWS PERSONNEL.
4. THE LINE UP TO THE OWNER'S POST INDICATOR VALVE SHALL BE DUCTILE IRON WITH A MINIMUM DIAMETER OF 4 INCHES.
5. ALL PIPE SHOWN IN THIS DETAIL SHALL BE RESTRAINED PER CWS MINIMUM STANDARDS.



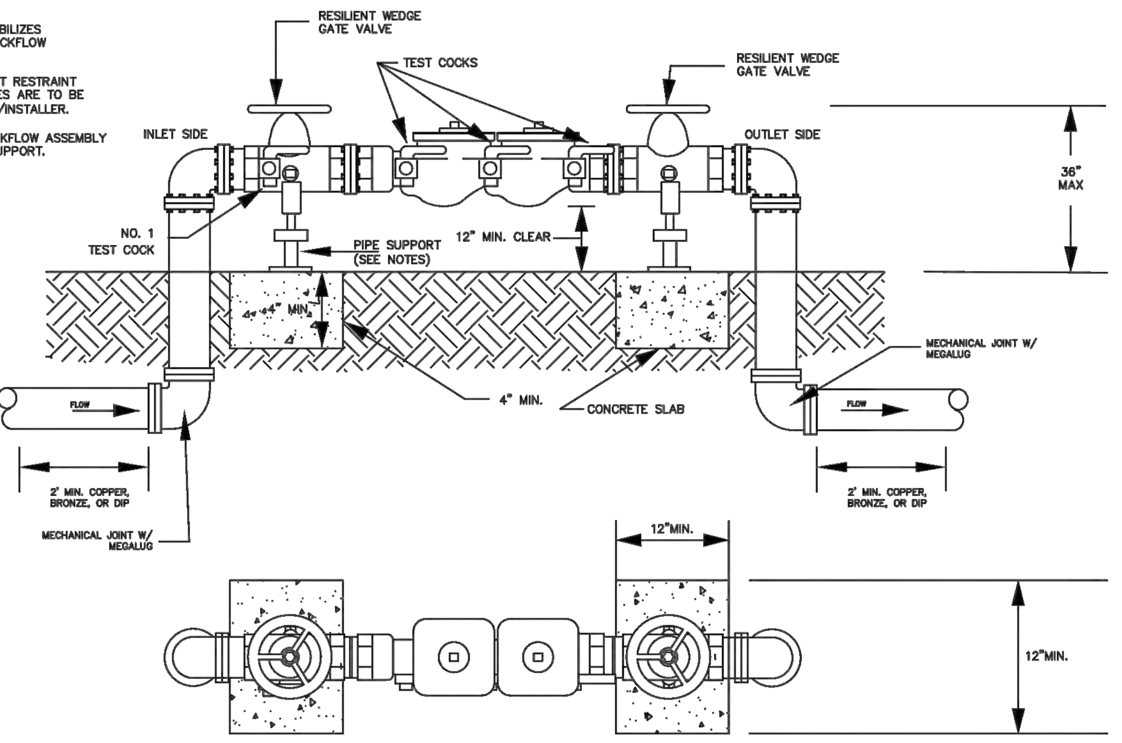
TYPICAL UNMETERED FIRE SERVICE LINE

NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: NOV 1, 2015 — DETAIL NO. 9

NOTES:

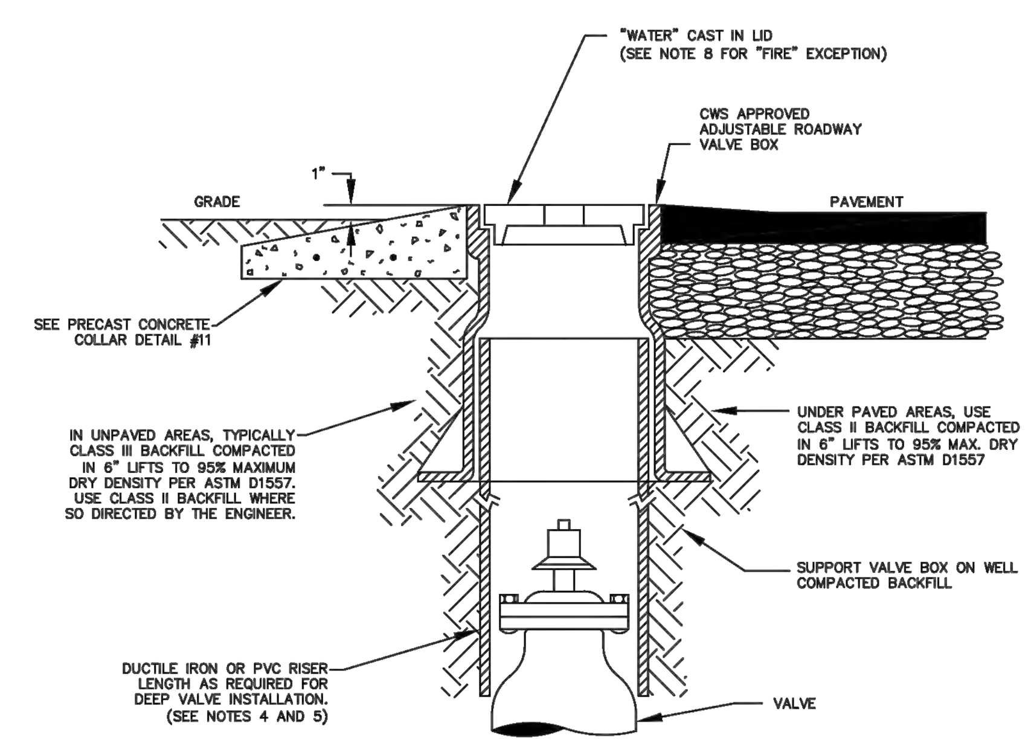
1. CONCRETE SLAB STABILIZES SUPPORTS BETWEEN BACKFLOW AND GROUND.
2. APPROPRIATE THRUST RESTRAINT AND SUPPORT MEASURES ARE TO BE DETERMINED BY OWNER/INSTALLER.
3. 4" OR GREATER BACKFLOW ASSEMBLY SHALL REQUIRE PIPE SUPPORT.



TYPICAL LARGER THAN 2" DOUBLE CHECK VALVE ASSEMBLY ONLY BACKFLOW PREVENTION ASSEMBLY ABOVE GROUND INSTALLATION

NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: NOV 1, 2015 — DETAIL NO. 32



NOTES:

1. CENTER VALVE BOX OVER OPERATING NUT TO ENSURE FREE VALVE OPERATION.
2. USE 6" RISER PIPE ON 4" AND 6" VALVES.
3. USE 8" RISER PIPE ON 8" VALVES AND LARGER.
4. DO NOT ALLOW VALVE BOX OR RISER TO REST ON ANY PORTION OF VALVE.
5. RISER LENGTH AS REQUIRED WITH VALVE BOX ADJUSTED FULLY DOWN. VALVE BOX SHALL BE ADJUSTED UP TO MATCH FINISH PAVEMENT ELEVATION OR 1" ABOVE FINISH GRADE.
6. REFER TO CWS MINIMUM STANDARDS FOR APPROVED INSTALLATION REQUIREMENTS.
7. THE FOLLOWING VALVE BOXES ARE APPROVED PRODUCTS:
   - TYLER UNION #6850 SERIES
   - BINGHAM & TAYLOR #4905 SERIES (U.S. ONLY)
   - AFC BOX WITH EXTERNAL STEM AND LOCKING LID
   - EAST JORDAN IRONWORKS #8550 SERIES
8. IF VALVE BOX IS USED WITH GATE VALVE AS AN ALTERNATIVE TO A FIRE SERVICE POST INDICATOR VALVE, THE UPPER BOX INTERIOR AND LID SHALL BE PAINTED RED AND "FIRE" SHALL BE CAST IN THE LID.

TYPICAL VALVE BOX

NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: JAN 1, 2016 — DETAIL NO. 10

NOTES:

1. THE FOLLOWING CONDITIONS WERE USED TO CALCULATE THE RESTRAINED LENGTHS SHOWN IN THE TABLE:
   - LAYING CONDITION IS TYPE 3
   - SOIL DESIGNATED AS SAND-SILT
   - DEPTH IS 3 FT.
   - DESIGN PRESSURE (TEST) IS 150 P.S.I.
   - SAFETY FACTOR IS 1.5
   - PIPE IS POLYETHYLENE ENCASED

   FOR THE TEE BRANCH AND REDUCER, LENGTHS ARE BASED ON BRANCHING AND REDUCING FROM THE NEXT LARGER SIZE IN THE TABLE. TEE BRANCH LENGTH BASED ON RUN LENGTH TO FIRST JOINT OF 10 FT. DEVIATIONS FROM THESE CONDITIONS MUST BE BASED ON THE ABOVE PARAMETERS.
2. REFER TO CWS MINIMUM STANDARDS FOR APPROVED RESTRAINING METHODS.
3. THE FOLLOWING RESTRAINING GLANDS AND GASKETS ARE APPROVED PRODUCTS:

   FOR DUCTILE IRON PIPE
   - AMERICAN CAST IRON PIPE – FAST GRIP, FLEX-RING, FIELD FLEX-RING, OR LOCK-RING
   - US PIPE – TR FLEX OR FIELD LOK 350 GASKETS
   - GRIFFIN PIPE – SNAP-LOK RESTRAINED JOINT, OR TALON RJ GASKET
   - EBAA – MEGALUG RESTRAINT GLAND
   - FORD – SERIES 1400 RESTRAINT GLAND
   - SIGMA – ONE-LOK SERIES SLD RESTRAINT GLAND
   - MCWANE – SURE STOP 350 RESTRAINT GASKET

   FOR PVC PIPE
   - EBAA MEGALUG SERIES 2000PV
   - FORD SERIES 1500 WILL BE USED ON EXISTING PVC PIPE

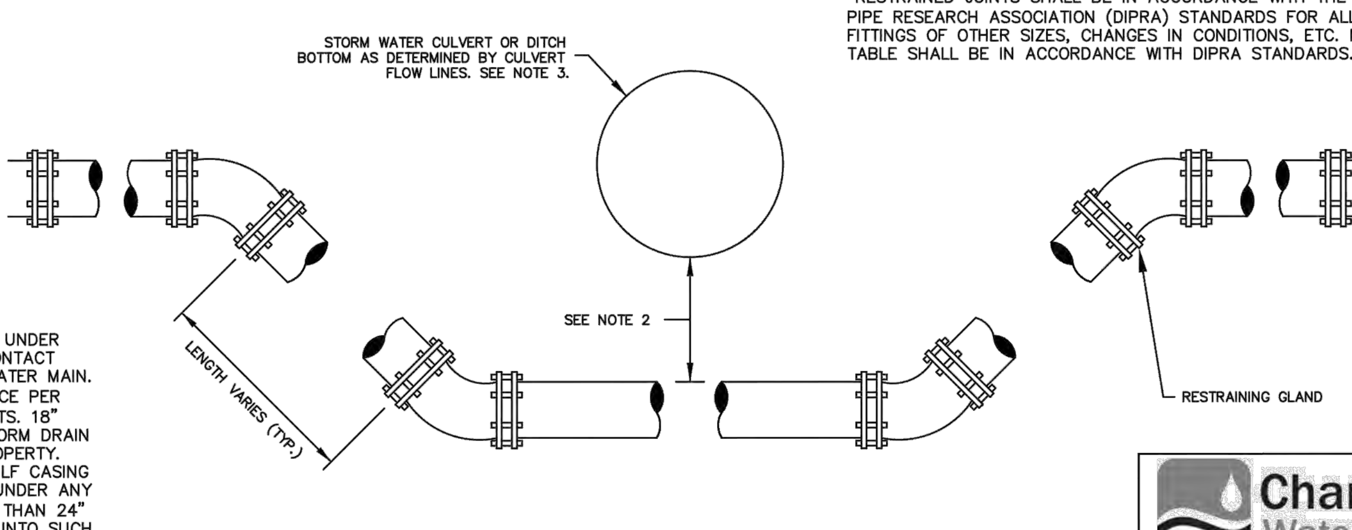
RESTRAINT JOINT TABLE

RESTRAIN ALL JOINTS WITHIN THESE LENGTHS

(IN L.F. EACH SIDE OF THE FITTING)

SIZE	11 1/4°	22 1/2°	45°	90°	TEE BRANCH	DEAD END	REDUCER
4"	2	5	10	24	38	61	44
6"	4	7	14	33	64	85	47
8"	5	9	18	44	91	111	45
10"	6	11	22	52	113	132	46
12"	6	12	25	60	133	155	84
16"	8	16	32	76	177	198	84
20"	9	18	38	91	218	238	83
24"	11	21	43	104	255	277	116

*RESTRAINED JOINTS SHALL BE IN ACCORDANCE WITH THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) STANDARDS FOR ALL FITTINGS. FITTINGS OF OTHER SIZES, CHANGES IN CONDITIONS, ETC. NOT IN THIS TABLE SHALL BE IN ACCORDANCE WITH DIPRA STANDARDS.



NOTES:

1. DO NOT PLACE STONE UNDER CULVERT IN DIRECT CONTACT WITH POLYWRAP ON WATER MAIN.
2. 36" MINIMUM CLEARANCE PER PUBLIC AGENCY PERMITS. 18" CLEARANCE UNDER STORM DRAIN LINES ON PRIVATE PROPERTY.
3. MAIN SHALL BE IN 10 LF CASING WITH SPACERS WHEN UNDER ANY DRAIN LINES GREATER THAN 24" OR A DITCH DRAINING INTO SUCH A STORM DRAIN LINE. NO JOINTS ARE ALLOWED IN CASING.

VERTICAL OFFSET

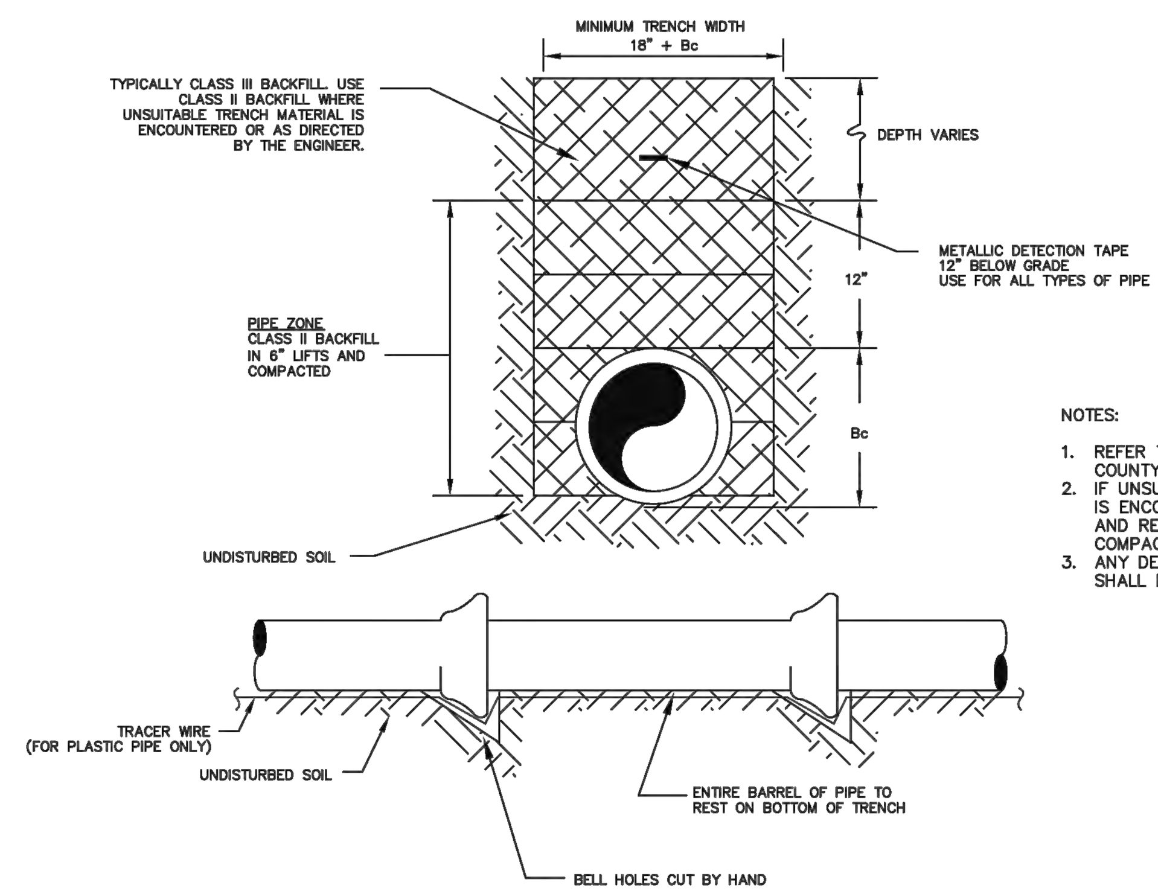
NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: JAN 1, 2016 — DETAIL NO. 6

NOTES FOR WATER SYSTEM:

1. WATER INSTALLATION SHALL BE IN ACCORDANCE WITH "TEN STATES STANDARDS", S.C.D.H.E.C. REGULATIONS, AND CHARLESTON WATER SYSTEM'S "MINIMUM STANDARDS FOR THE DESIGN & CONSTRUCTION OF WATER AND SANITARY SEWER SYSTEMS" AS FOUND AT www.charlestonwater.com. BACKFLOW PREVENTION REQUIREMENTS CAN ALSO BE FOUND AT www.charlestonwater.com.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL TAPS. TAPS REQUIRING A SLEEVE SHALL BE NO CLOSER TO A JOINT THAN 4 FEET.
3. THRUST BLOCKING SHALL BE USED ONLY ON WET TAPS. CONTRACTOR SHALL NOTIFY CWS INSPECTOR A MINIMUM OF 72 HOURS (THREE FULL WORKING DAYS) PRIOR TO MAKING ANY WET TAP.
4. ROUGH GRADING SHALL BE DONE PRIOR TO INSTALLATION OF WATER MAINS.
5. CONTRACTOR SHALL MAINTAIN BETWEEN 36" – 48" COVER OVER TOP OF PIPE.
6. ALL COMPONENTS OF THE PIPING SYSTEM SHALL BE NEW DUCTILE IRON AND ENCLOSED WITH LINEAR LOW-DENSITY 8 MILS BLUE POLYETHYLENE ENCASEMENT.
7. ALL VALVES AND HYDRANTS SHALL OPEN CLOCKWISE, EXCEPT ON THE FORMER NAVAL BASE, WHERE THE VALVES SHALL OPEN COUNTERCLOCKWISE..
8. MEGALUG, FORD SERIES 1400, OR SIGMA ONE-LOK RETAINER GLANDS SHALL BE USED FOR ALL FITTINGS, VALVES. AND HYDRANTS.
9. RESTRAINED LENGTHS SHALL BE IN MULTIPLES OF A FULL LENGTH OF PIPE.
10. USE 45° OR FLATTER BENDS WHEN GOING UNDER RCP AND DO NOT INSTALL VALVES, HYDRANTS, OR SERVICES ON DEEP PIPE SECTIONS.
11. WHERE POSSIBLE, HORIZONTAL WATERLINES SHALL BE DEFLECTED IN LIEU OF USING BENDS. DEFLECTIONS SHALL NOT EXCEED 75% OF MANUFACTURER'S SPECIFICATIONS.
12. WHERE WATER AND SANITARY SEWER LINES CROSS WITHIN 18", THE LINE LAID LAST SHALL HAVE A FULL LENGTH OF PIPE INSTALLED WITH ITS MIDPOINT VERTICALLY IN LINE WITH THE OTHER LINE. THE CROSSING SHALL BE AT NOT LESS THAN A 45° ANGLE.
13. ALL MATERIAL SHALL CONFORM TO CWS SPECIFICATIONS AS TO MANUFACTURER, TYPE, AND DESIGN.
14. DEVELOPER'S ENGINEER SHALL INSPECT PROJECT WEEKLY TO PROVIDE WRITTEN WEEKLY UPDATES TO CWS INSPECTOR AND TO CERTIFY THE CORRECTNESS OF THE WATER PORTION OF CONTRACTOR'S RECORD DRAWINGS.
15. CONTRACTOR INSTALLING THE WATER SYSTEM SHALL BE ON CWS'S "APPROVED CONTRACTORS LIST".
16. COORDINATE INSPECTION OF THE BACKFLOW DEVICES WITH CWS CROSS CONNECTION DEPARTMENT BY CALLING (843) 727-6981. WATER SERVICE SHALL NOT BE TURNED ON UNTIL ALL BACKFLOW DEVICES HAVE PASSED INSPECTION.
17. DEVELOPER SHALL TAKE NECESSARY MEASURES TO PROTECT CWS WATER SYSTEM DURING THE TIME BETWEEN THE COMMISSIONING INSPECTION AND THE 2-YEAR MAINTENANCE BOND INSPECTION.
18. CHARLESTON WATER SYSTEM RESERVES THE RIGHT NOT TO INSTALL WATER METERS IF METER BOXES ARE NOT LOCATED AND ON GRADE IN COMPLIANCE WITH ITS MINIMUM STANDARDS.
19. ALL METER VAULTS AND ASSOCIATED PIPING 3" AND LARGER SHALL BE INSTALLED BY CWS UNLESS APPROVED IN WRITING BY THE CWS WATER DISTRIBUTION ENGINEER.

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: NOV 1, 2015 — DETAIL NO. 37



NOTES:

1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

WATER MAIN BEDDING

NOT TO SCALE

Charleston Water System — DOCUMENT NO.: EC-4.3.2-CD-W — REVISION DATE: NOV 1, 2015 — DETAIL NO. 1

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

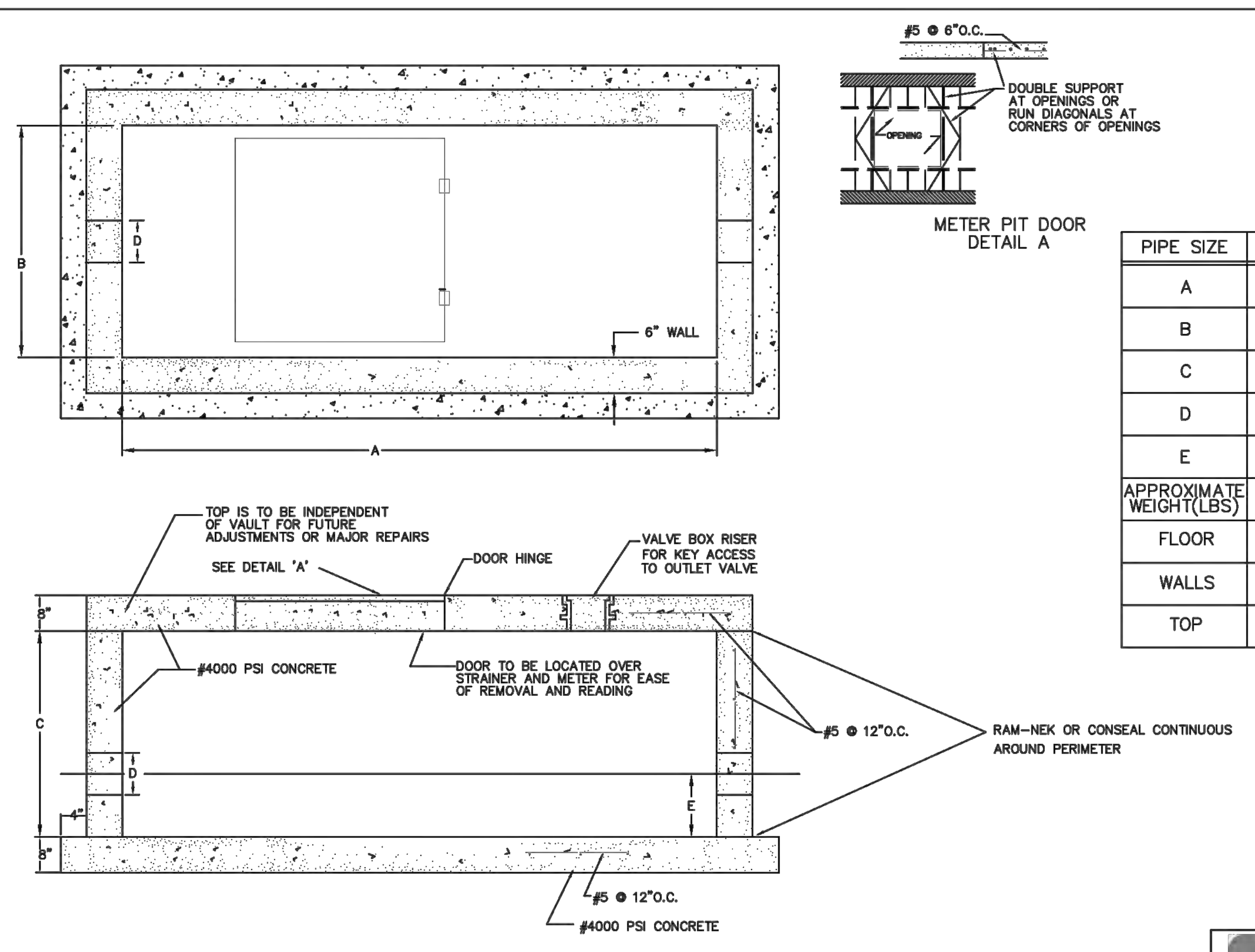
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK – LOT A

WATER DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	N/A

C2.5



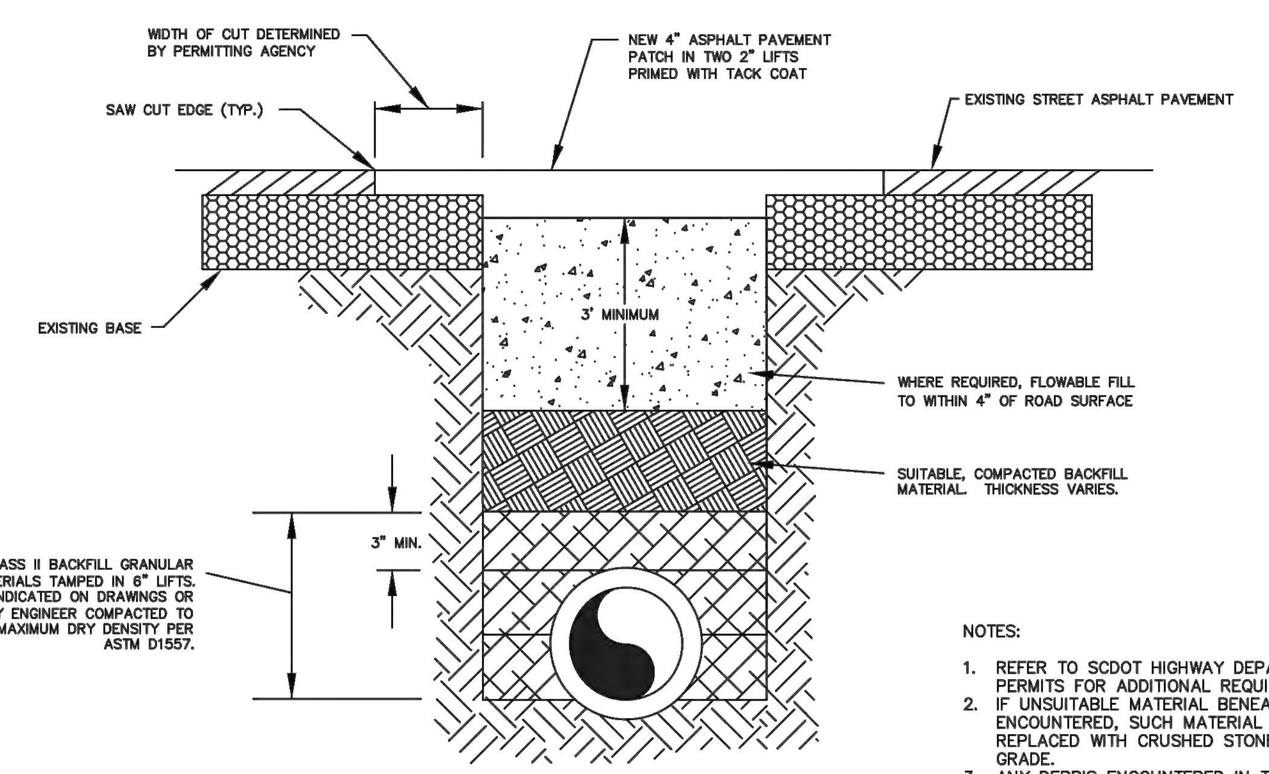
PIPE SIZE	3" – 4"	6" – 8"	10"
A	8'–6"	11'–6"	13'–6"
B	4'	5'	5'–6"
C	4'	4'–6"	5'
D	8"	13"	16"
E	14"	19"	20"
APPROXIMATE WEIGHT(LBS)			
FLOOR	5800	8800	10900
WALLS	8100	11850	15000
TOP	3900	6300	7050

PRECAST VAULTS
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System

DOCUMENT NO.:	DETAIL NO.
EC-4.3.2-CD-W	26
REVISION DATE: NOV 1, 2015	



NOTES:

1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

TYPICAL ROAD CUT
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System

DOCUMENT NO.:	DETAIL NO.
EC-4.3.2-CD-W	2
REVISION DATE: NOV 1, 2015	

NO.	REVISIONS	BY	DATE

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50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
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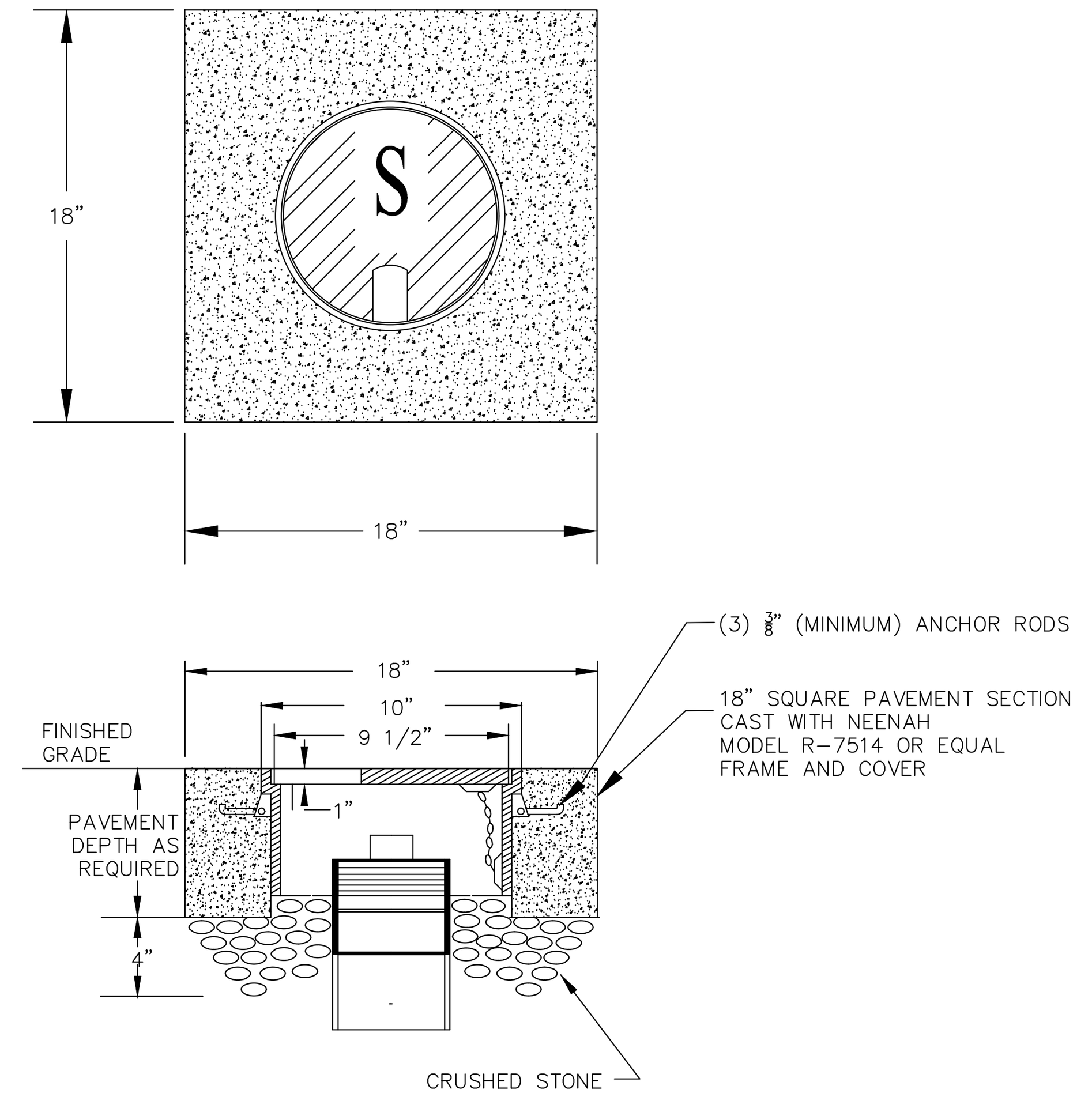
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
WATER DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 1'

C2.6

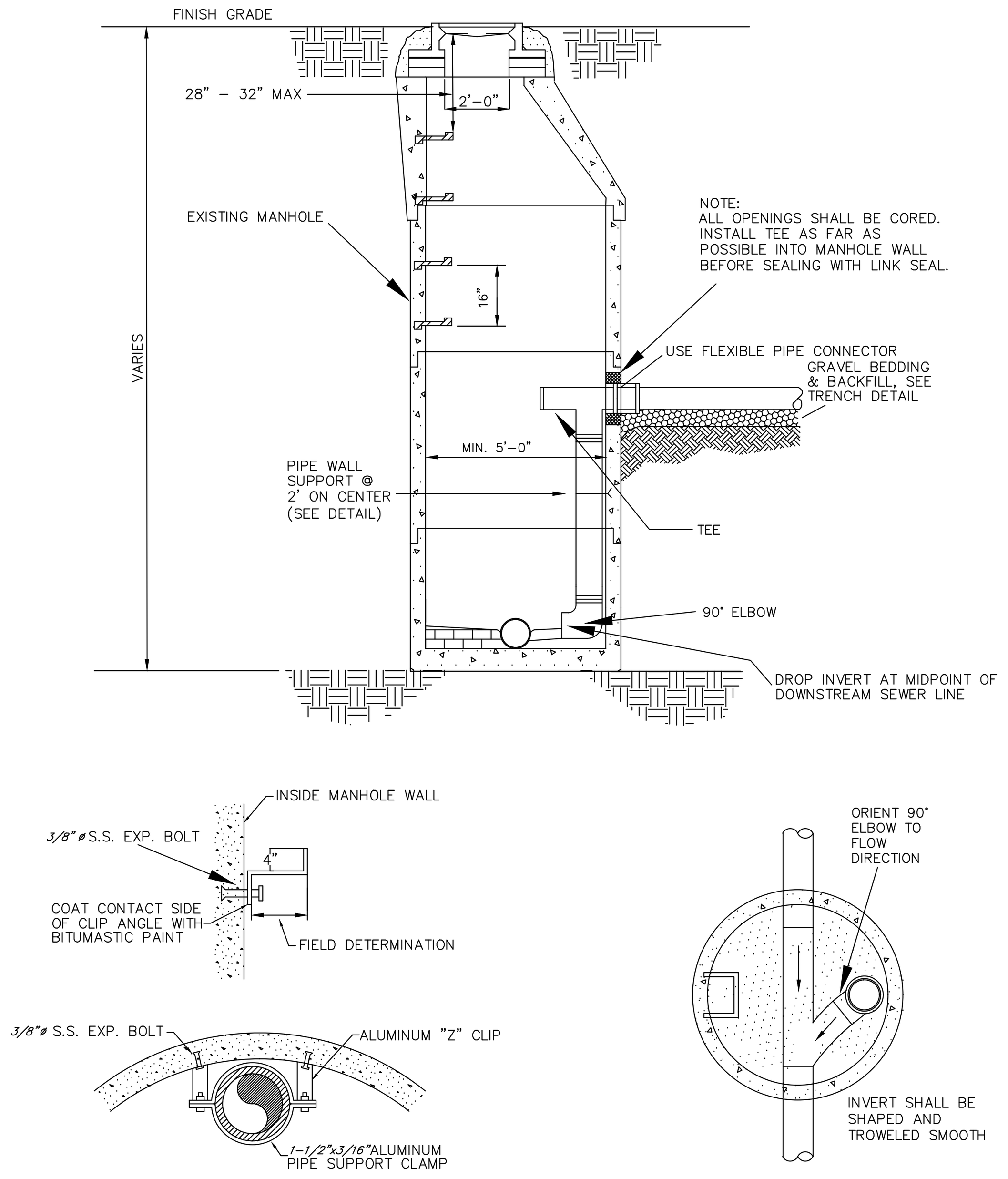


NOTES:
1. ASSEMBLY TO BE USED IN ALL PAVED OR CONCRETE AREAS.
2. CASTING SHALL BE NEENAH MODEL R-7514 OR EQUAL.
3. EXPANSION JOINT MATERIAL TO BE PLACED AT JOINTS WHEN LOCATED IN CONCRETE SURFACES.

PAVEMENT CLEANOUT DETAIL
NOT TO SCALE

SEWER PANEL 1C

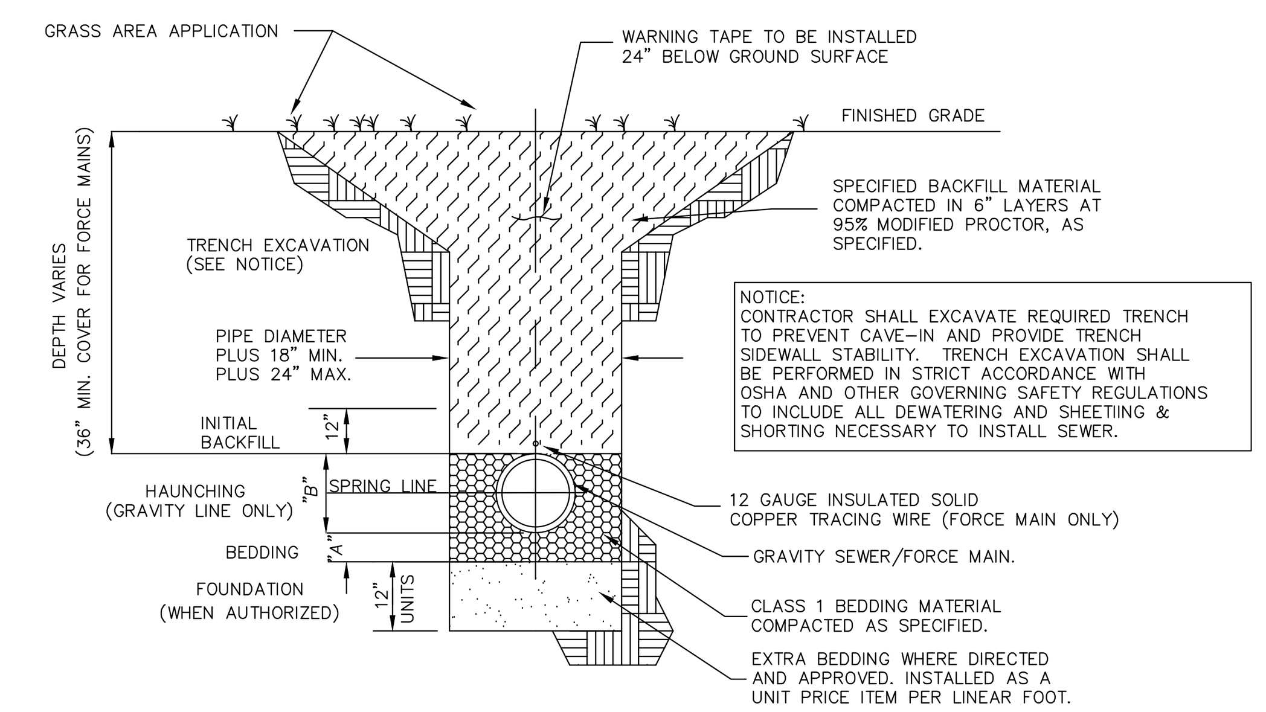
BERKELEY COUNTY WATER AND SANITATION
REVISED 05/03/10



INSIDE DROP MANHOLE
(TO BE USED FOR DROPS OVER 18")
NOT TO SCALE

SEWER PANEL 2F

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 01/26/12



DEPTH SCHEDULE FOR HAUNCHING (GRAVITY LINE ONLY) AND BEDDING				
PIPE ø	4"-10"	12"-18"	24"	36"
"A"	6"	8"	10"	12"
"B"	TO TOP OF PIPE		20"	27"

EMBEDMENT COMPACTION SHALL BE THE MINIMUM DENSITIES INDICATED IN TABLE 2 OF ASTM D2321-LR.

FORCE MAIN/GRAVITY LINE TRENCH DETAIL
NOT TO SCALE

SEWER PANEL 4

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 08/01/08

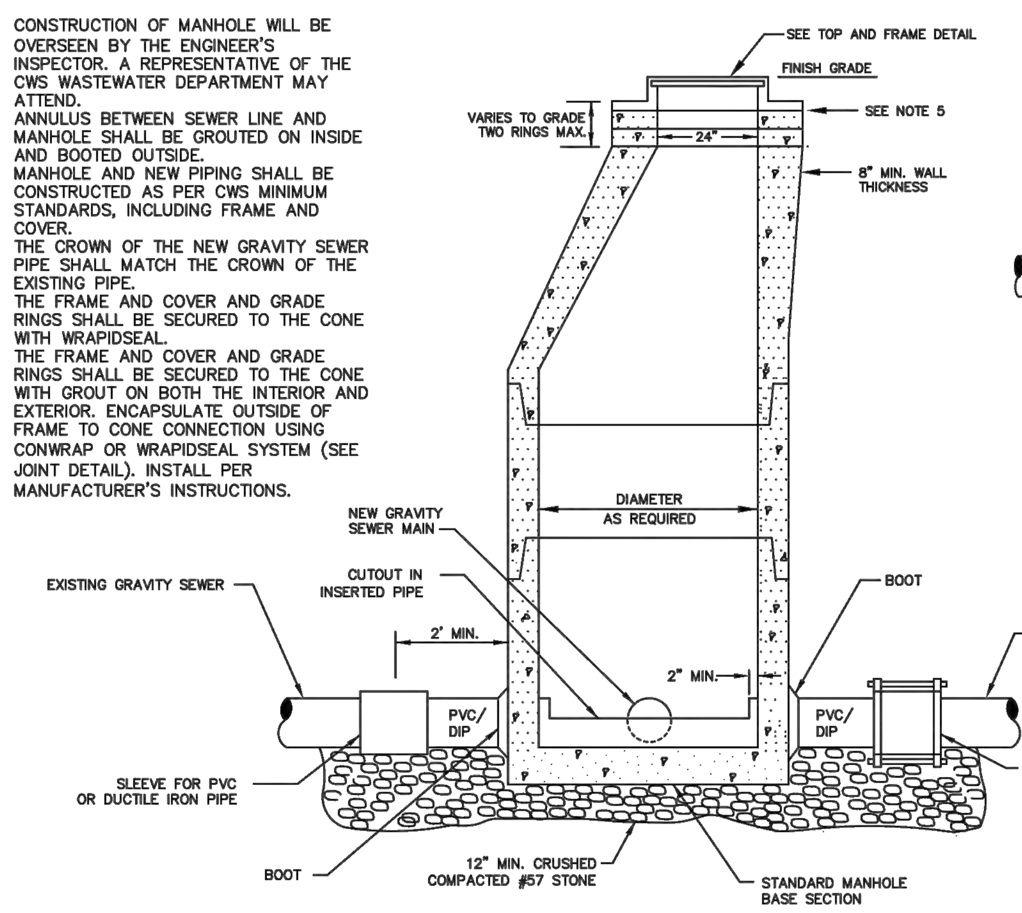
SEWER NOTES:

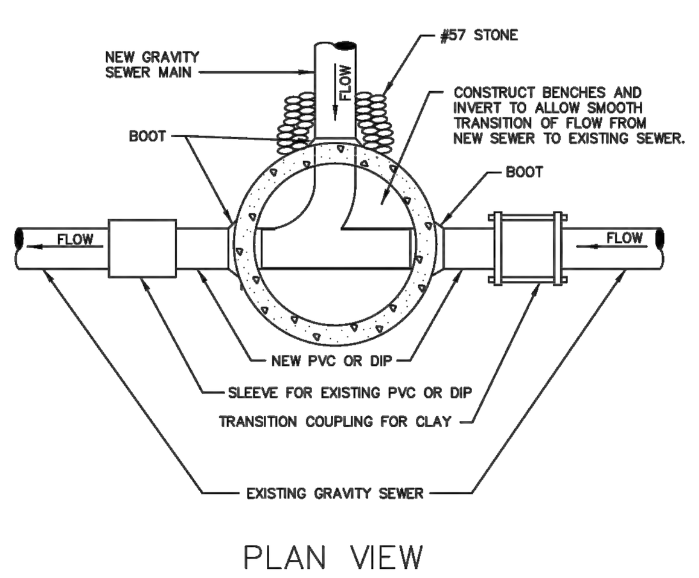
1. SEWER INSTALLATION SHALL BE IN ACCORDANCE WITH "TEN STATES STANDARDS," SC DHEC AND BCWS REGULATIONS.
2. ALL SANITARY SEWER SERVICES SHALL BE LAID ON A MINIMUM SLOPE OF 0.5% AND SHALL BE 6" PVC UNLESS INCIDENCES NOTED IN NOTE NO. 10 OCCUR, OR OTHERWISE SPECIFIED.
3. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH BCWS AT LEAST 72 HOURS PRIOR TO BEGINNING WORK.
4. CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND IN THE FIELD OR ON THE DRAWINGS PRIOR TO BEGINNING OR CONTINUING WORK. ANY DEVIATIONS FROM THE CONSTRUCTION PLANS SHALL NEED TO BE APPROVED IN WRITING BY BCWS.
5. CONNECTION TO EXISTING SEWER SYSTEM SHALL BE MADE IN THE PRESENCE OF BCWS INSPECTOR WITH AT LEAST 72 HOURS ADVANCED NOTICE.
6. CONTRACTOR SHALL PLACE 6" SERVICES AND STUB UP TO EXISTING GRADE. CONCRETE COLLARS SHALL BE PLACED AROUND 6" PLUGGED CLEAN OUT.
7. WATERTIGHT RINGS AND COVERS SHALL BE INSTALLED ON MANHOLES IN SIDEWALK, AREAS AFFECTED BY STREET RUNOFF OR BELOW THE 50 YEAR FLOOD ELEVATION. MANHOLE COVER SHALL BE INSTALLED COMPLETELY WITHIN OR COMPLETELY OUT OF PAVED AREAS (INCLUDING SIDEWALKS).
8. MANHOLES RECEIVING FORCE MAIN DISCHARGE SHALL BE COATED WITH RAVEN 405 LINER.
9. ALL DUCTILE IRON PIPES, JOINTS AND FITTINGS SHALL BE LINED WITH PROTECTO 401 CERAMIC EPOXY COATING.
10. THICKNESS CLASS 52 DIP OR SDR-26 PVC IN STEEL OR HDPE CASING SHALL BE USED WHEN:
    - CROSSING BENEATH STORM DRAINAGE PIPE WITH LESS THAN 2' OF CLEARANCE;
    - CROSSING WATER MAIN WITHIN 18".
11. SELECTION OF PIPE MATERIALS SHALL COMPLY WITH THE FOLLOWING:
    - LESS THAN THREE (<3') OF COVER: CLASS 52 DIP;
    - GREATER THAN 3 FEET BUT LESS THAN 15 FEET (>3' BUT <15') IN DEPTH: SDR-26 PVC AND IN ACCORDANCE WITH CROSSING REQUIREMENTS LISTED ABOVE;
    - GREATER THAN 15 FEET BUT LESS THAN 24 FEET (>15' BUT <24') IN DEPTH: CLASS 52 DIP OR DR-18 C900 PVC;
    - GREATER THAN 24 FEET (>24') IN DEPTH: CLASS 52 DIP.
12. SEWER SERVICE CONNECTIONS LOCATED AT DEPTHS GREATER THAN 15' SHALL BE MADE WITH DUCTILE IRON FITTINGS LINED WITH PROTECTO 401 COATING OR SOLID MOLDED C900 FITTINGS.
13. CLEAN OUTS SHALL BE INSTALLED WITHIN THE RIGHT-OF-WAY OR GENERAL UTILITY EASEMENT (GUE) AND HAVE A MINIMUM OF 1 FOOT SEPARATION FROM SIDEWALKS. INSTALL CLEAN OUTS NO MORE THAN 18" OFF OF THE COMMON PROPERTY CORNER UNLESS OTHERWISE NOTED ON THE CONSTRUCTION PLANS.
14. CONTRACTOR SHALL KEEP A RED-LINED SET OF THE CONSTRUCTION DRAWINGS ON SITE AT ALL TIMES.
15. UPON COMPLETION OF CONSTRUCTION OF THE SEWER SYSTEM, THE FOLLOWING APPROVAL PROCEDURES MUST BE FOLLOWED:
    A. THE CONTRACTOR SHALL SCHEDULE ALL REQUIRED TESTS AND INSPECTIONS WITH BCWS AT LEAST 72 HOURS IN ADVANCE.
    B. THE CONTRACTOR SHALL CONDUCT A PRELIMINARY INSPECTION TO LOCATE ANY DEFECTS AND DETERMINE WHEN THE SEWER SYSTEM IS READY FOR TESTS AND FINAL INSPECTION. PRIOR TO INSPECTION, THE SEWER SYSTEM SHALL BE FLUSHED AND CLEANED OF DEBRIS.
    C. THE ENGINEER SHALL SCHEDULE LOW PRESSURE AIR TEST AND DEFLECTION TEST WITH BCWS. DEFLECTION TEST SHALL BE CONDUCTED PRIOR TO LOW PRESSURE AIR TEST.
    D. THE CONTRACTOR SHALL SUPPLY TO THE OWNER'S ENGINEER AN AS-BUILT SURVEY, INCLUDING THE SERVICE LATERAL INFORMATION, THE LOCATIONS OF WHICH SHALL HAVE BEEN STAKED IN THE FIELD.
    E. A SET OF PRELIMINARY RECORD DRAWINGS SHALL BE PROVIDED TO BCWS INSPECTOR FOR CCTV INSPECTION VIDEO REVIEW.
    F. CCTV INSPECTION VIDEOS SHALL BE SUBMITTED FOR BCWS REVIEW. ANY NECESSARY REPAIRS ARE TO BE COMPLETED PRIOR TO SCHEDULING A FINAL INSPECTION.
    G. THE ENGINEER SHALL SUBMIT THE TEST RESULTS, RECORD DRAWINGS, CONTINUITY TEST CERTIFICATION LETTER AND ALL OTHER REQUIRED DOCUMENTS TO BCWS FOR REVIEW AND APPROVAL.
    H. THE ENGINEER SHALL SCHEDULE A FINAL INSPECTION WITH BCWS AT LEAST 72 HOURS IN ADVANCE.
16. LIMESTONE IS NOT AN APPROVED EMBEDMENT MATERIAL. USE #57 GRANITE, AIR COOLED BLAST FURNACE SLAG OR APPROVED MATERIALS LISTED IN BCWS SPECIFICATIONS.
17. MJ SLEEVES OR APPROVED ADAPTERS SHALL BE USED TO TRANSITION BETWEEN PVC AND DIP. FERNCO OR SIMILAR COUPLINGS ARE NOT ALLOWED.

SEWER PANEL 8

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
6/15/15

NOTES:
1. CONSTRUCTION OF MANHOLE WILL BE OVERSEEN BY THE ENGINEER'S INSPECTOR. A REPRESENTATIVE OF THE CWS WASTEWATER DEPARTMENT MAY ATTEND.
2. ANNULUS BETWEEN SEWER LINE AND MANHOLE SHALL BE GROUTED ON INSIDE AND BOOTED OUTSIDE.
3. MANHOLE AND NEW PIPING SHALL BE CONSTRUCTED AS PER CWS MINIMUM STANDARDS, INCLUDING FRAME AND COVER.
4. THE CROWN OF THE NEW GRAVITY SEWER PIPE SHALL MATCH THE CROWN OF THE EXISTING PIPE.
5. THE FRAME AND COVER AND GRADE RINGS SHALL BE SECURED TO THE CONE WITH WRAPIDSEAL.
6. THE FRAME AND COVER AND GRADE RINGS SHALL BE SECURED TO THE CONE WITH GROUT ON BOTH THE INTERIOR AND EXTERIOR. ENCAPSULATE OUTSIDE OF FRAME TO CONE CONNECTION USING CONWRAP OR WRAPIDSEAL SYSTEM (SEE JOINT DETAIL). INSTALL PER MANUFACTURER'S INSTRUCTIONS.

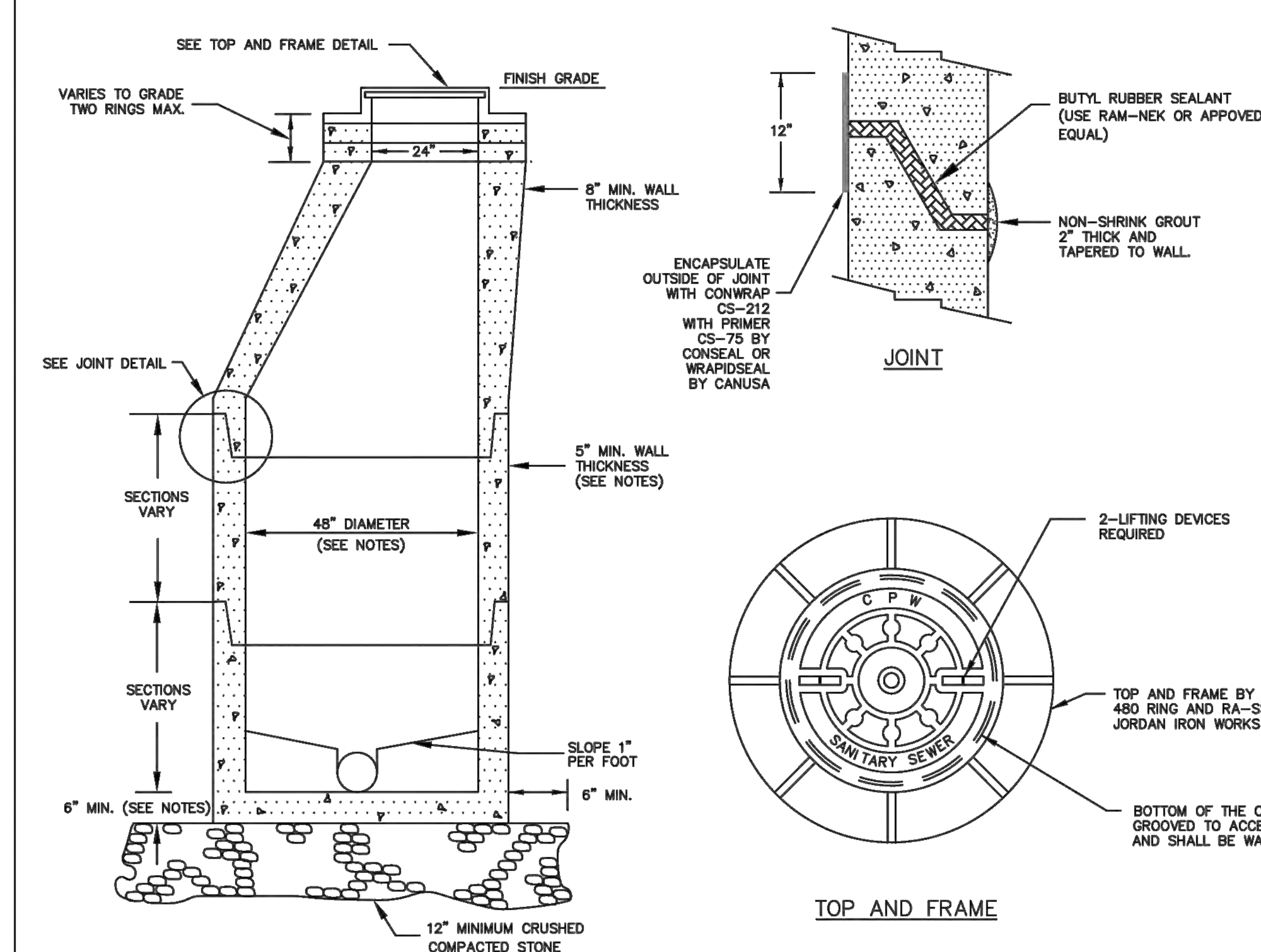




CUT-IN MANHOLE
NOT TO SCALE

Charleston Water System

DOCUMENT NO.:	DETAIL NO.
EC-4.3.2-CD-WW	50
REVISION DATE: NOV 1, 2015	

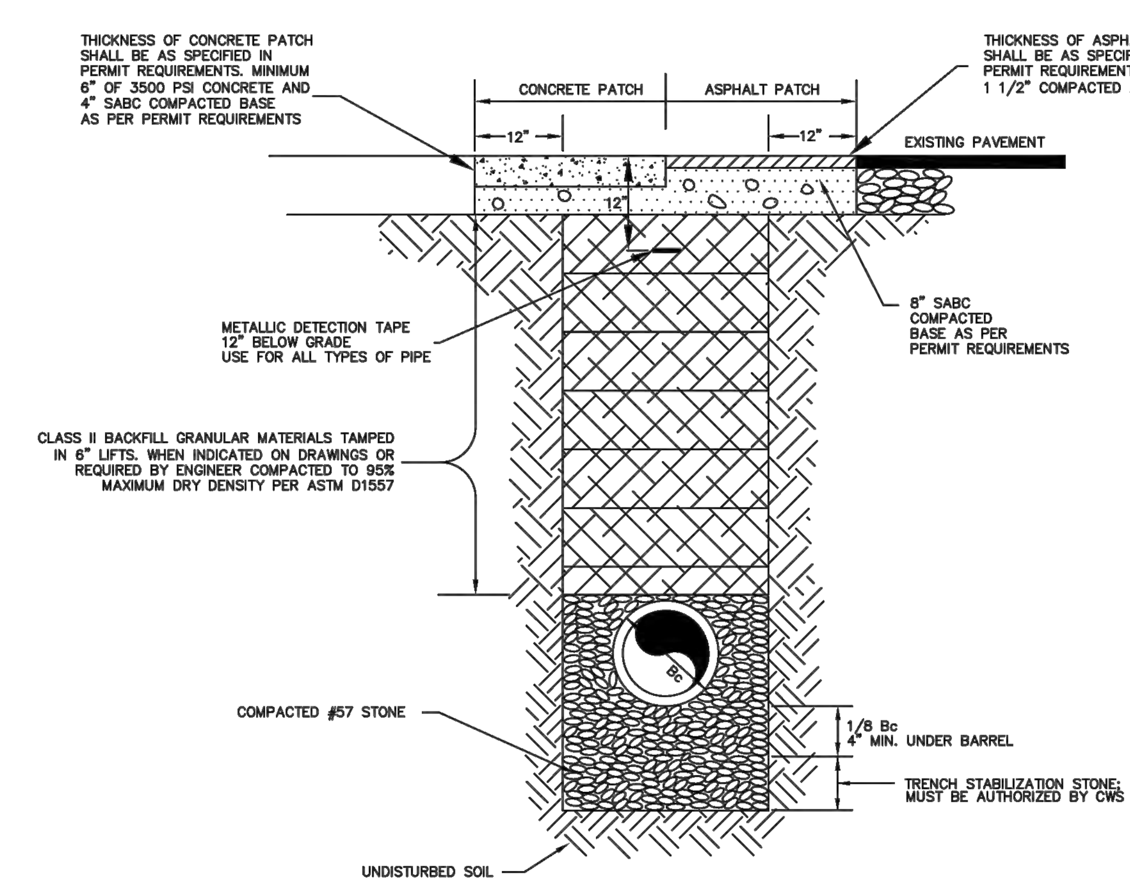


NOTES:
1. BENCH CAN BE PRECAST OR BRICK AND MORTAR TROWELED SMOOTH.
2. MANHOLE SHALL BE UNLINED UNLESS IT IS THE RECEIVING MANHOLE FOR A FORCE MAIN OR THE NEXT MANHOLE DOWNSTREAM.
3. MANHOLES OVER 8 FT. DEEP SHALL HAVE A 60" MINIMUM INSIDE DIAMETER WITH 6" WALL THICKNESS.
4. THE FRAME AND COVER AND GRADE RINGS SHALL BE SECURED TO THE CONE WITH GROUT ON BOTH THE INTERIOR AND EXTERIOR. ENCAPSULATE OUTSIDE OF FRAME TO CONE CONNECTION (SEE JOINT DETAIL). INSTALL PER MANUFACTURER'S INSTRUCTIONS.
5. MANHOLE STEPS ARE NOT ALLOWED.
6. FOR 5' DIAMETER MANHOLES:
    - 5" MINIMUM WALL THICKNESS
    - 8" MINIMUM BASE SLAB THICKNESS
7. FOR 6' DIAMETER MANHOLES:
    - 6" MINIMUM WALL THICKNESS
    - 8" MINIMUM BASE SLAB THICKNESS
8. WHEN INCOMING INVERT WILL BE LESS THAN 24 INCHES ABOVE OUTGOING INVERT, THE LINE SHALL BE BENCHED, TROUGHED, AND MORTAR TROWELED SMOOTH TO COME IN AT THE MANHOLE INVERT.

ECCENTRIC CONE PRECAST MANHOLE
NOT TO SCALE

Charleston Water System

DOCUMENT NO.:	DETAIL NO.
EC-4.3.2-CD-WW	47
REVISION DATE: NOV 1, 2015	



NOTES:
1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

SEWER MAIN UNDER PAVED ROADWAY
NOT TO SCALE

Charleston Water System

DOCUMENT NO.:	DETAIL NO.
EC-4.3.2-CD-WW	43
REVISION DATE: NOV 1, 2015	

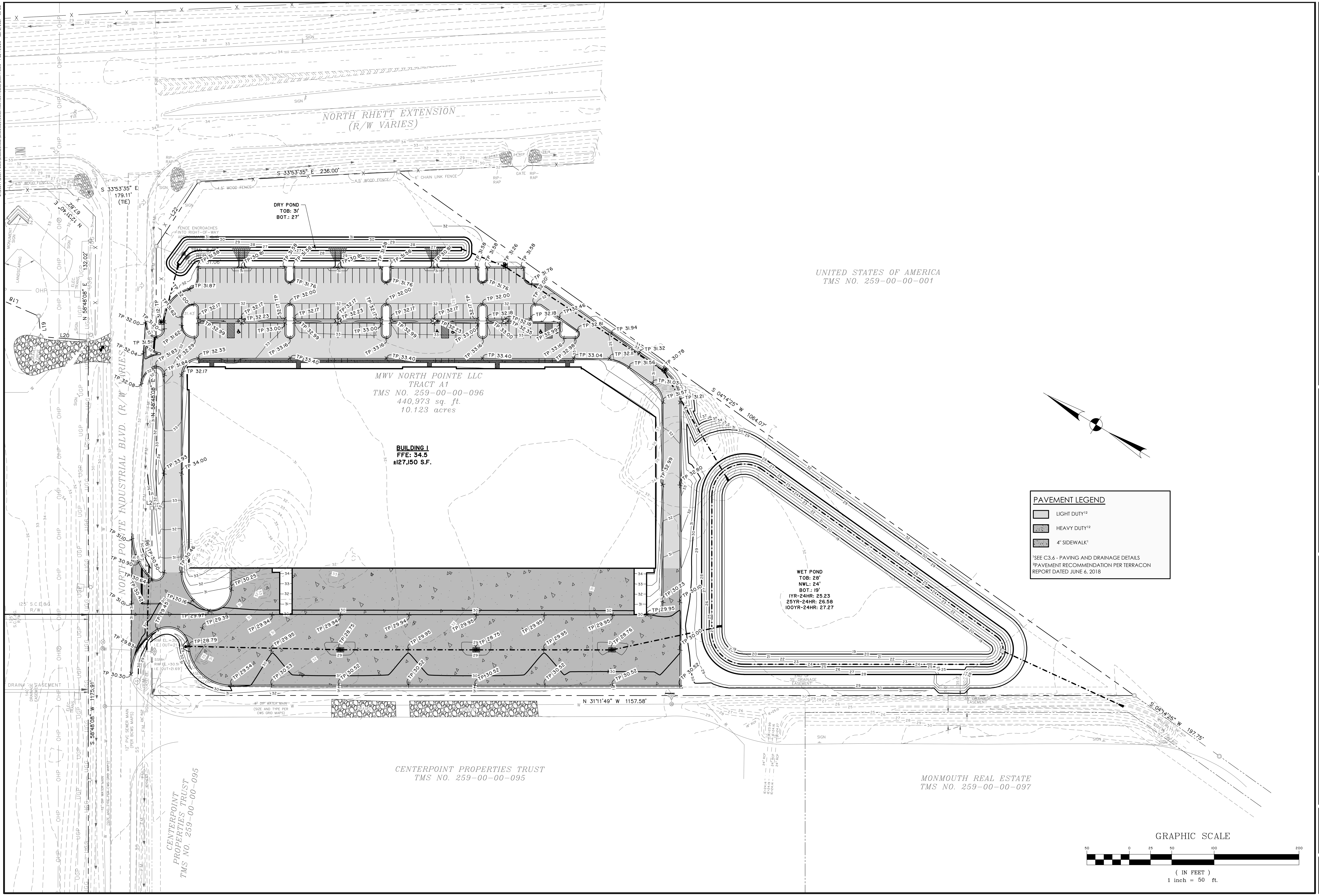
NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK - LOT A
SEWER DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 1'

C2.7


NORTH RHETT EXTENSION
(R/W VARIES)
NORTH POINTE INDUSTRIAL BLVD. (R/W VARIES)
UNITED STATES OF AMERICA
TMS NO. 259-00-00-001
MWV NORTH POINTE LLC
TRACT A1
TMS NO. 259-00-00-096
440,973 sq. ft.
10.123 acres
BUILDING 1
FFE: 34.5
±127,150 S.F.
DRY POND
TOB: 31'
BOT.: 27'
WET POND
TOB: 28'
NWL: 24'
BOT.: 19'
1YR-24HR: 25.23
25YR-24HR: 26.58
100YR-24HR: 27.27
S 04°14'25" W 1064.07'
N 31°11'49" W 1157.58'
S 04°14'25" W 197.75'
S 33°53'35" E 236.00'
CENTERPOINT PROPERTIES TRUST
TMS NO. 259-00-00-095
MONMOUTH REAL ESTATE
TMS NO. 259-00-00-097
PAVEMENT LEGEND
LIGHT DUTY[1,2]
HEAVY DUTY[1,2]
4" SIDEWALK[1]
[1]SEE C3.6 - PAVING AND DRAINAGE DETAILS
[2]PAVEMENT RECOMMENDATION PER TERRACON REPORT DATED JUNE 6, 2018
GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

NO. | REVISIONS | BY | DATE

THOMAS & HUTTON
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Savannah, GA 31405 • 912.234.5300
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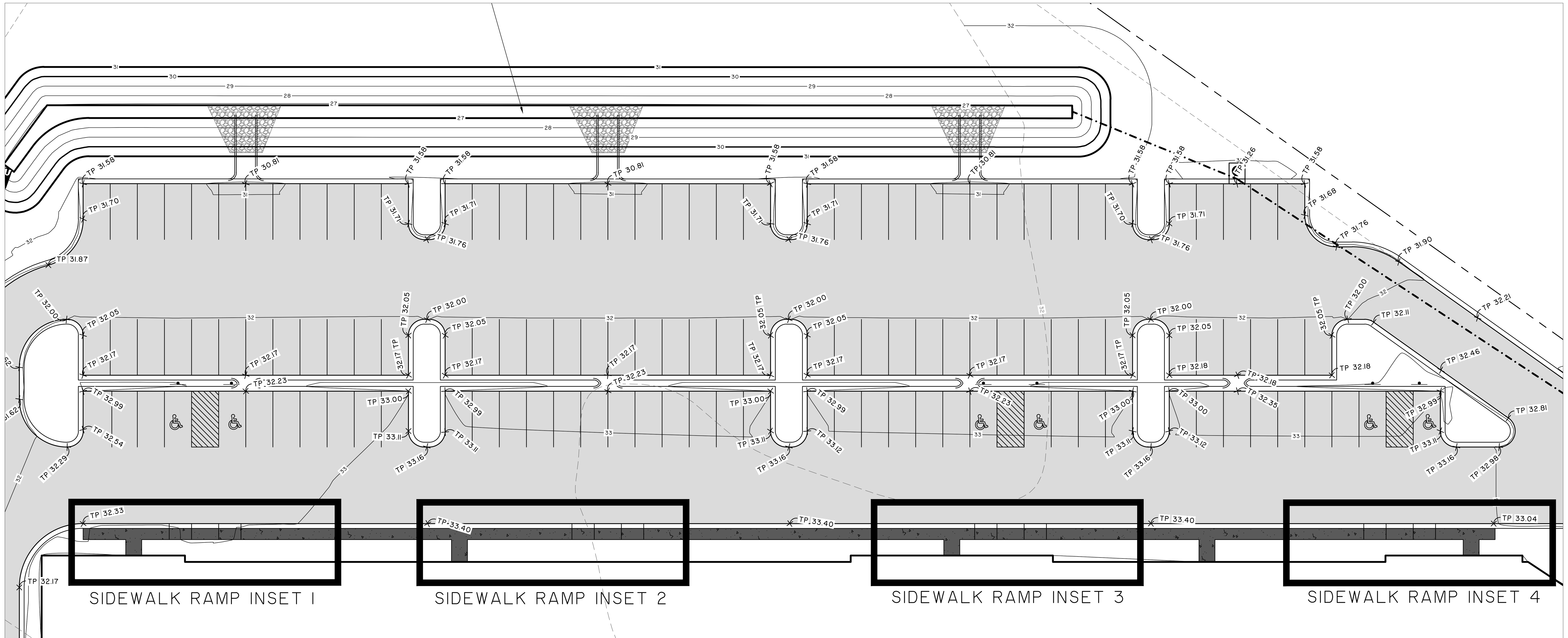
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

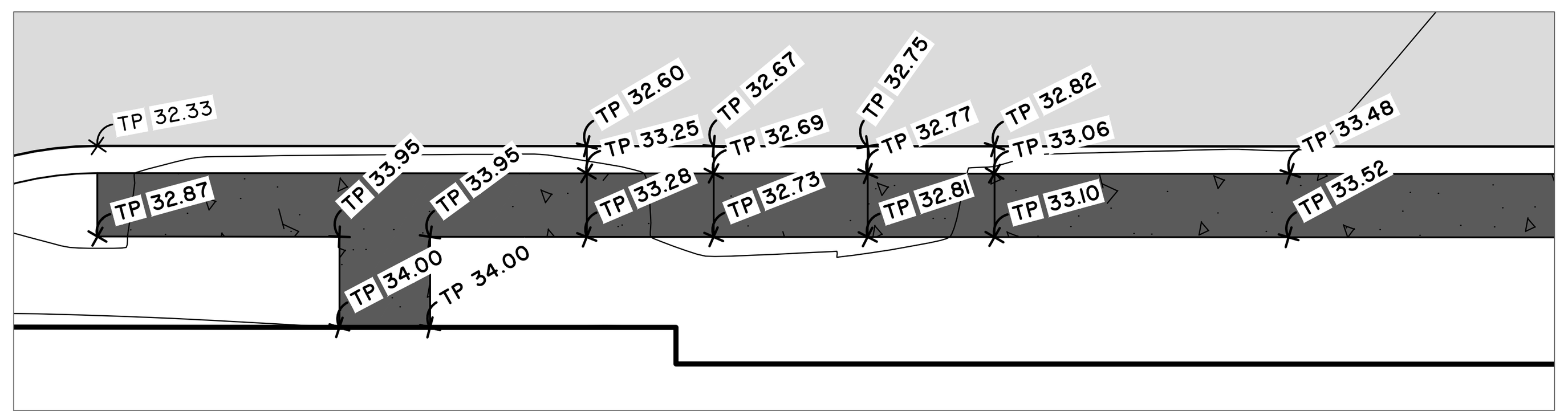
PAVING & GRADING PLAN

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

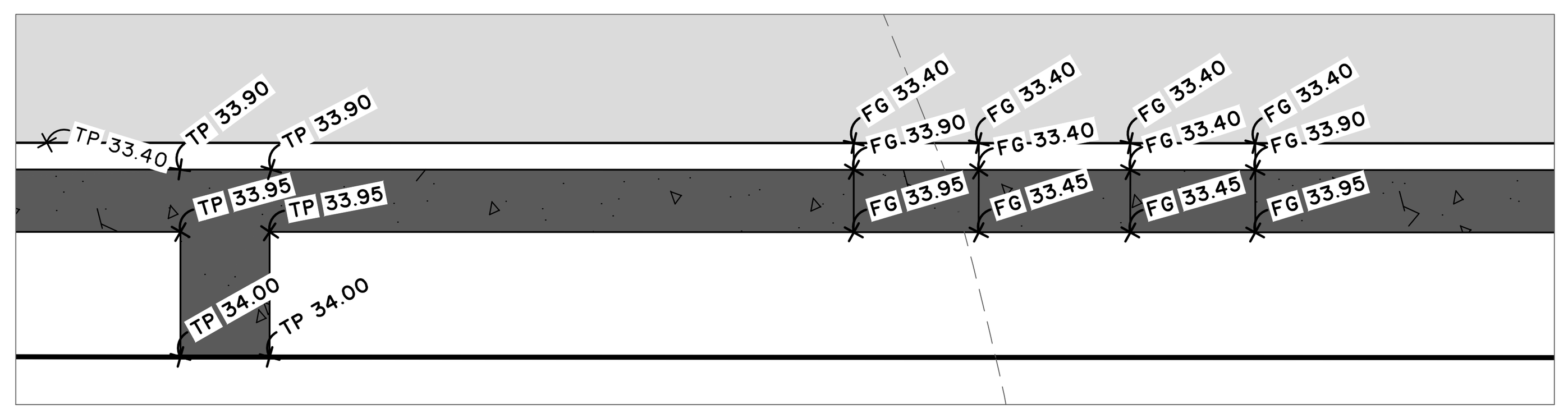
C3.1



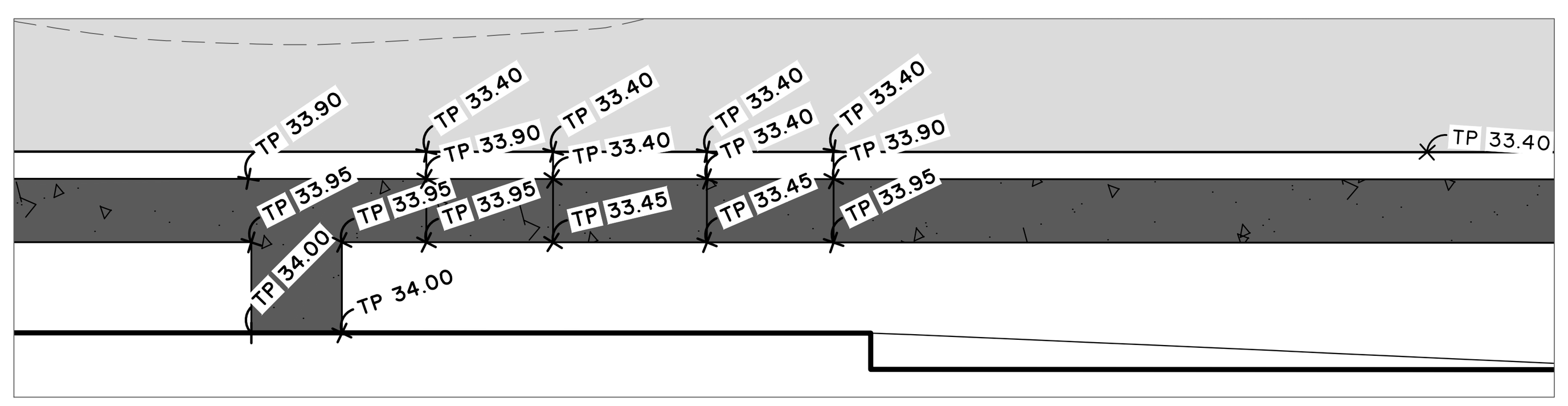
EMPLOYEE PARKING - SCALE: 1" = 20'



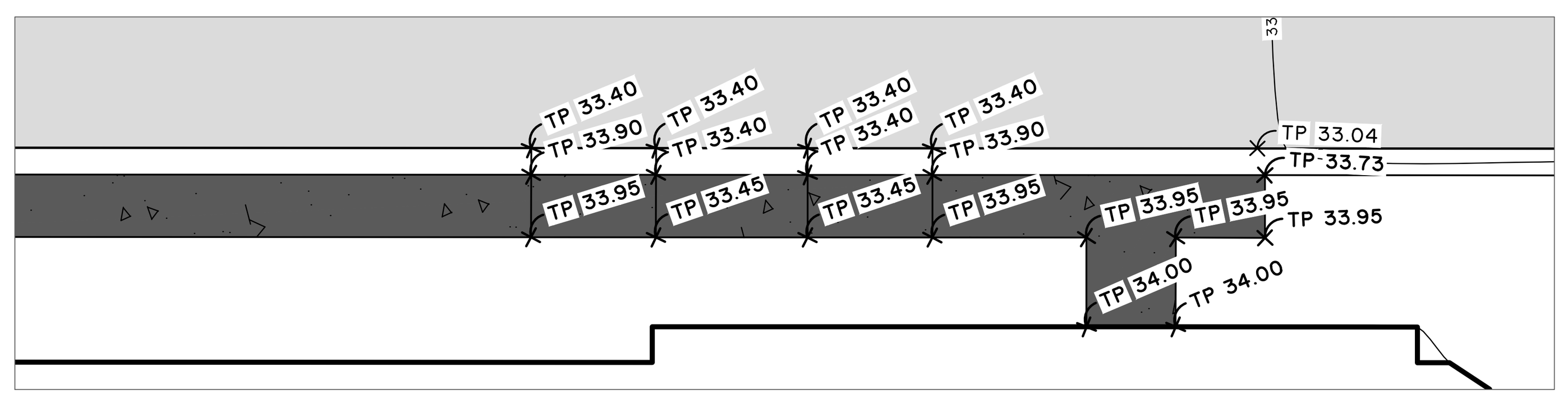
SIDEWALK RAMP INSET 1 - SCALE: 1" = 10'



SIDEWALK RAMP INSET 2 - SCALE: 1" = 10'



SIDEWALK RAMP INSET 3 - SCALE: 1" = 10'



SIDEWALK RAMP INSET 4 - SCALE: 1" = 10'

NO.	REVISIONS	BY	DATE

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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

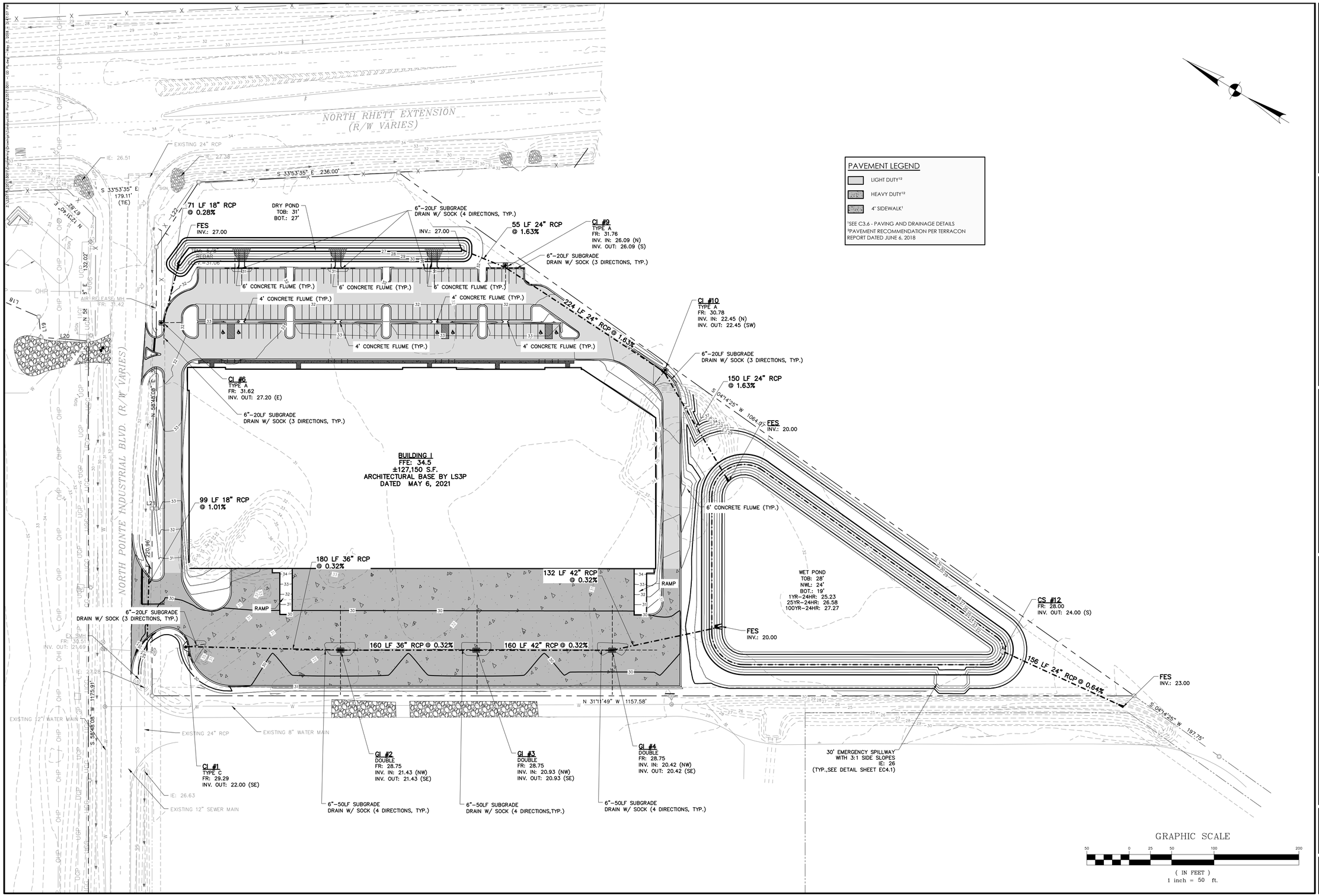
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

GRADING INSETS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	

C3.2



PAVEMENT LEGEND

▭	LIGHT DUTY[1][2]
▨	HEAVY DUTY[1][2]
▨	4" SIDEWALK[1]

[1]SEE C3.6 - PAVING AND DRAINAGE DETAILS

[2]PAVEMENT RECOMMENDATION PER TERRACON REPORT DATED JUNE 6, 2018

THOMAS & HUTTON ENGINEERING CO.
No. C00265

MICHAEL C. ROACH

PERMIT SET - FOR REVIEW PURPOSES ONLY

NO.	REVISIONS	BY	DATE

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Savannah, GA 31405 • 912.234.5300
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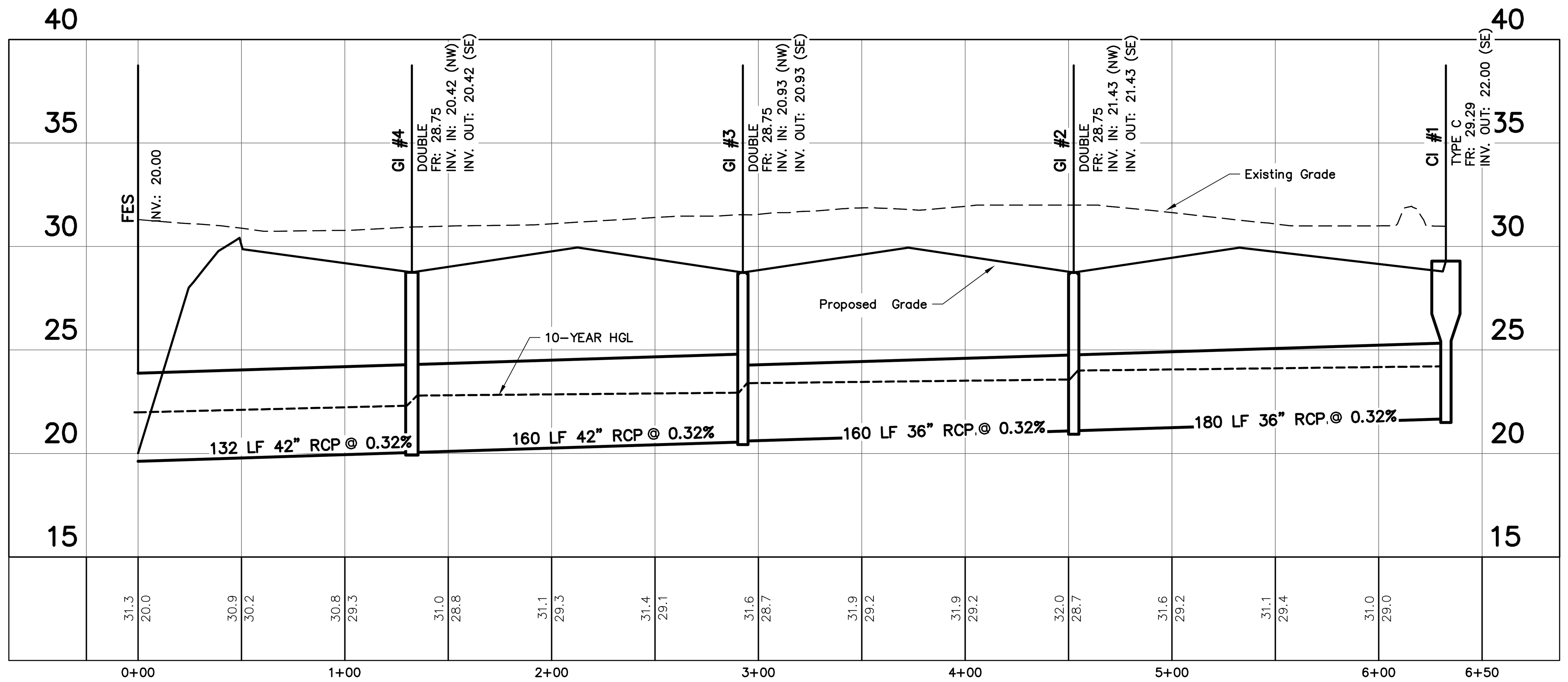
WEST–SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK – LOT A

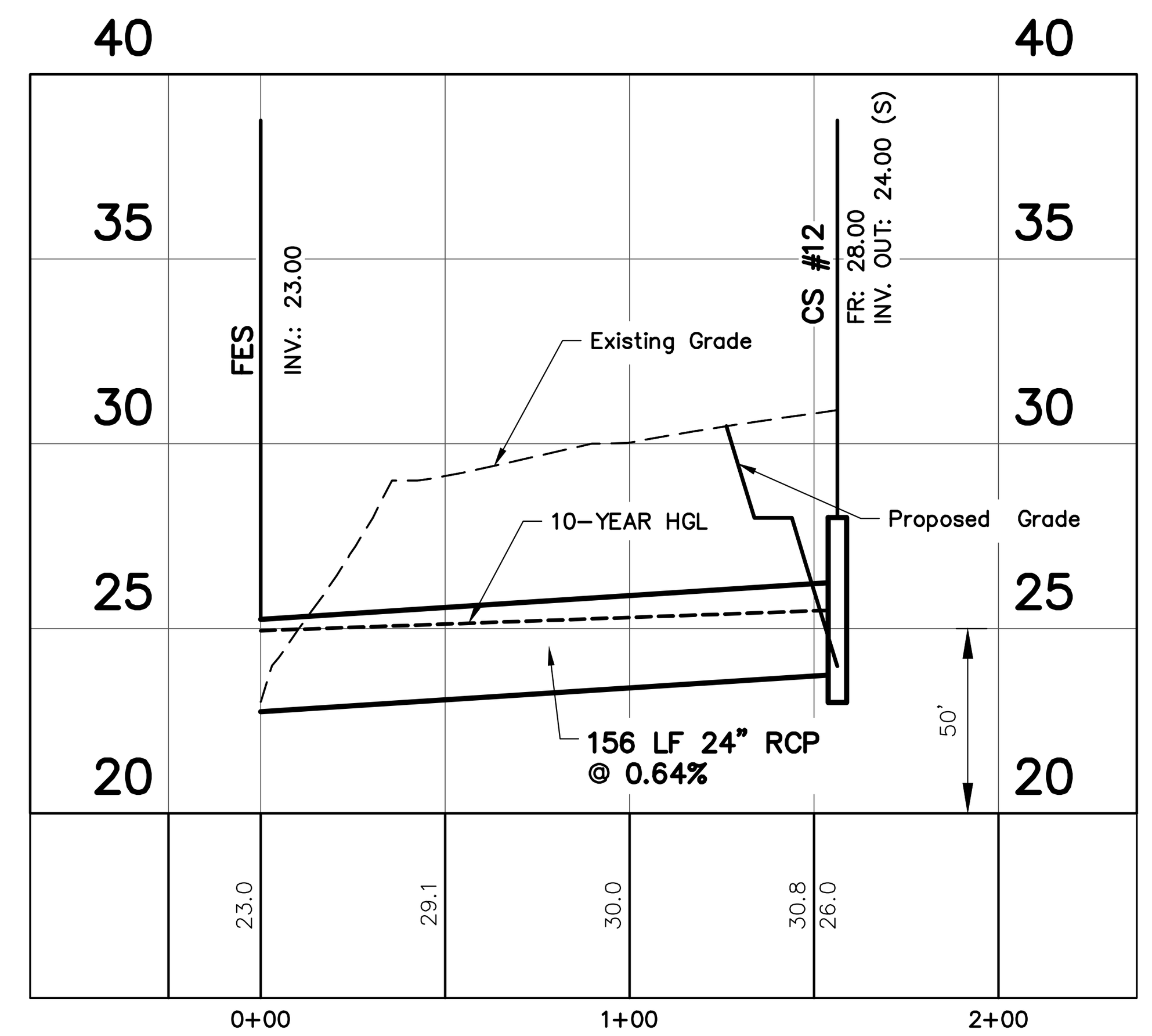
DRAINAGE PLAN

JOB NO:	J–23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

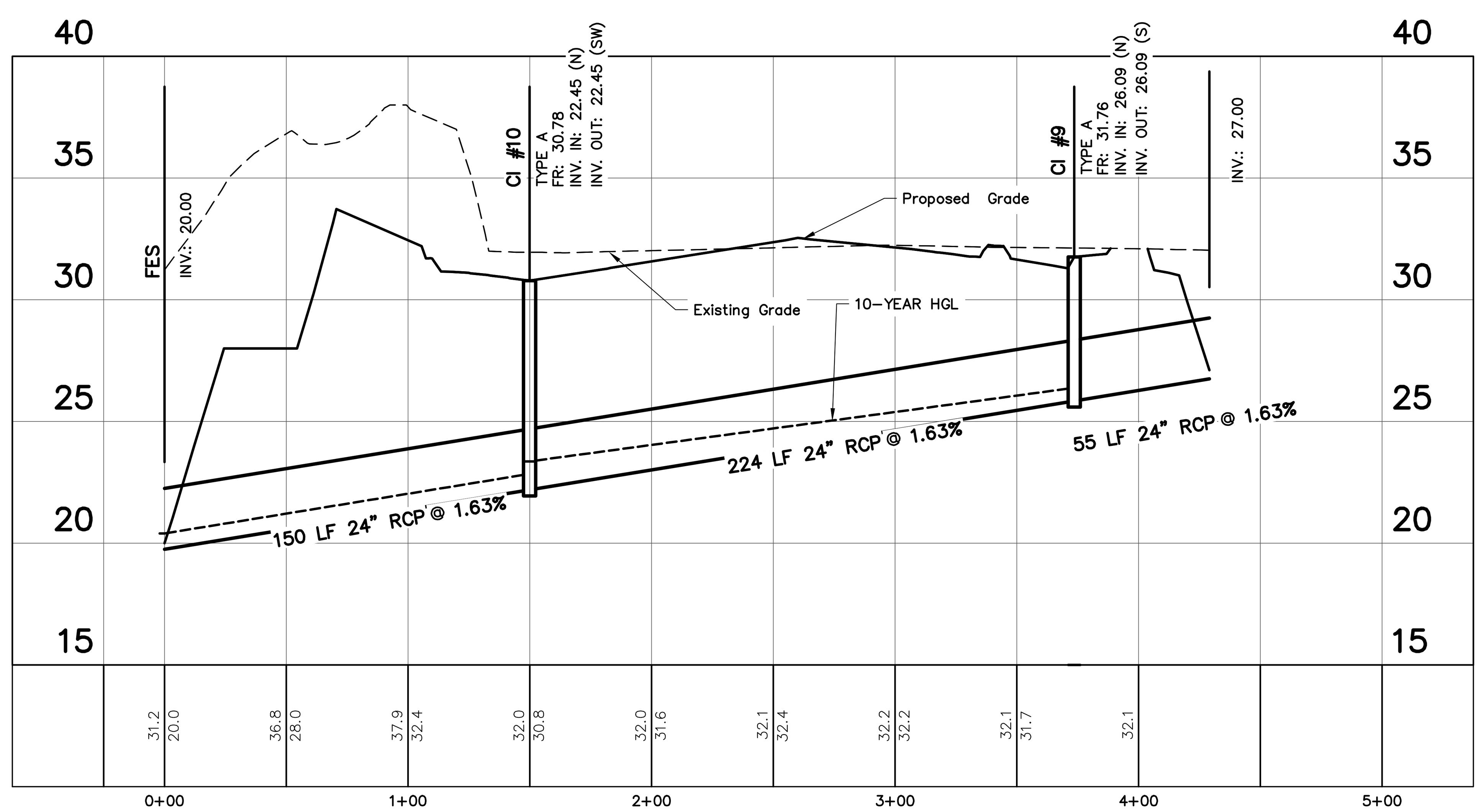
C3.3



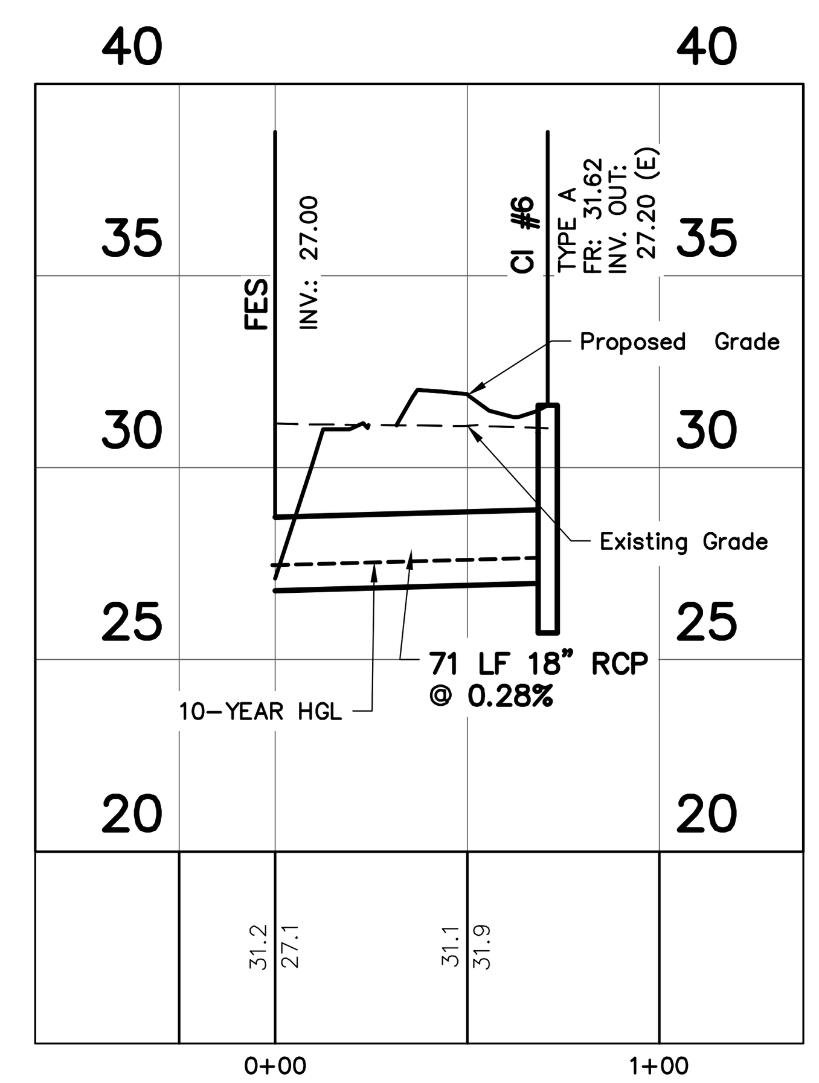
23577.0013 – DRAINAGE – RUN 1
STATIONS: -0+25 – 6+50
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'



23577.0013 – DRAINAGE – RUN 2
STATIONS: -0+25 – 2+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'



23577.0013 – DRAINAGE – RUN 3
STATIONS: -0+25 – 5+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'



23577.0013 – DRAINAGE – RUN 4
STATIONS: -0+25 – 1+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

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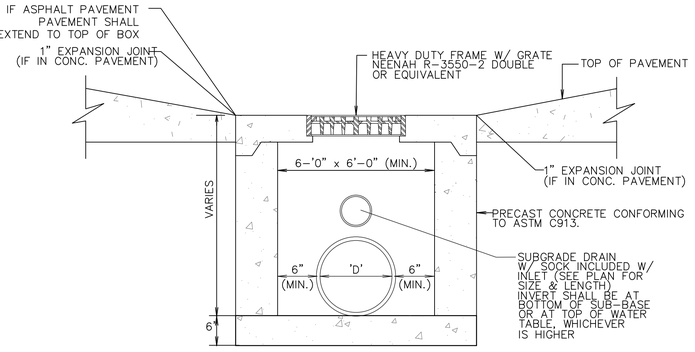
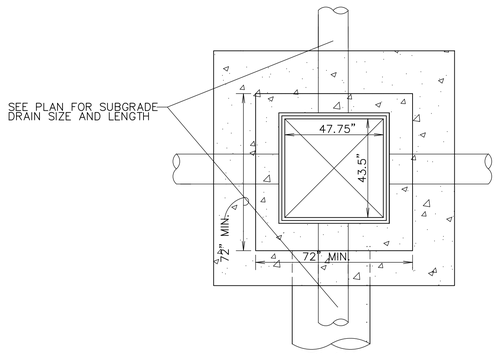
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
DRAINAGE PROFILES

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 50'

C3.4



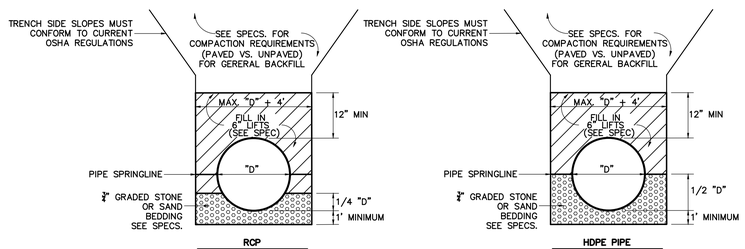
SECTION



PLAN

STANDARD INLET – DOUBLE GRATE TYPE

NOT TO SCALE

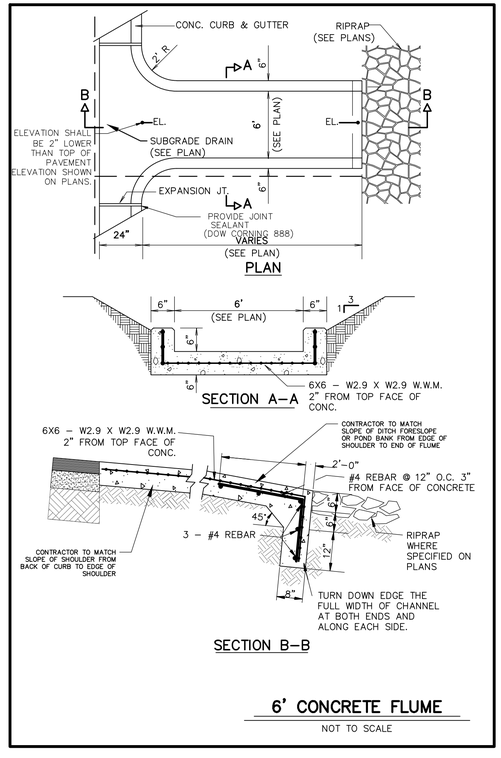


NOTES:

1. THIS DETAIL SHALL ONLY APPLY WHEN IN PLACE MATERIALS ARE UNSUITABLE FOR PIPE BEDDING. SEE THE SPECIFICATIONS FOR BEDDING REQUIREMENTS.
2. FOR PIPE UNDER 48"ø THE MINIMUM BEDDING DEPTH BELOW THE PIPE IS 1'. FOR 48"ø AND LARGER, 2' OF BEDDING SHALL BE USED UNDER PIPE. (ONLY APPLIES TO THIS DETAIL WHERE EXISTING MATERIALS ARE UNSUITABLE FOR BEDDING)
3. WHERE THE ENGINEER DETERMINES ADDITIONAL UNDERCUTTING AND STONE BEDDING IS REQUIRED BEYOND THAT SHOWN ON THE DETAILS TO PROVIDE A STABLE SUBGRADE, IT SHALL BE PAID FOR AT THE COST OF REMOVING THE ADDITIONAL UNSUITABLE MATERIAL BEYOND THAT SHOWN ON THE DETAILS, AND FURNISHING AND INSTALLING ADDITIONAL STONE BEDDING. NO PAYMENT FOR ADDITIONAL STONE OR SAND BEDDING BEYOND THE QUANTITY SHOWN ON THE DETAILS SHALL BE PAID WITHOUT PRIOR WRITTEN APPROVAL OF LOCATION, QUANTITY, AND OVERALL PRICE BY ENGINEER.
4. ALL STORMPIPE JOINTS SHOULD BE WRAPPED IN FILTER FABRIC.

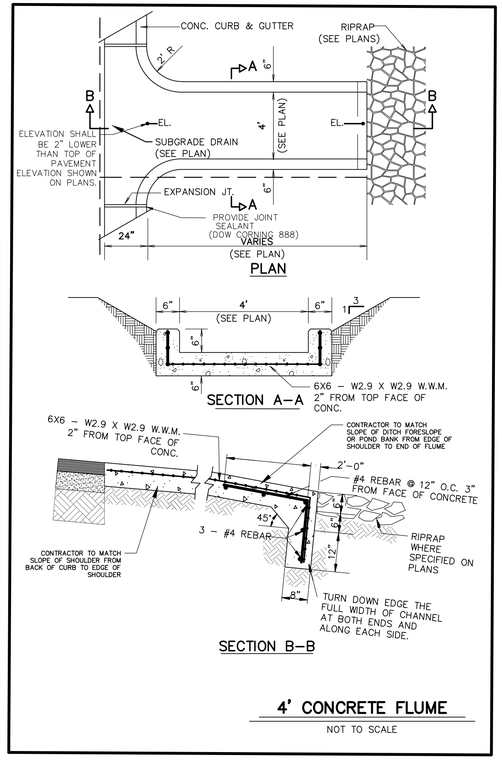
STORM PIPE BEDDING DETAILS

SCALE: NONE



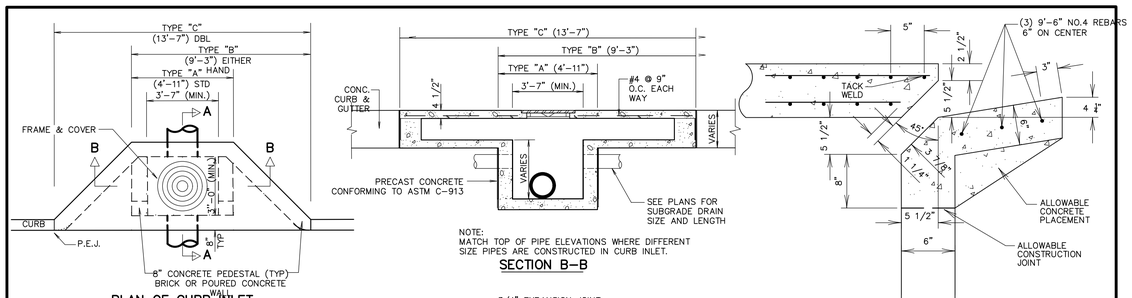
6' CONCRETE FLUME

NOT TO SCALE



4' CONCRETE FLUME

NOT TO SCALE



CURB INLET DETAIL

NOT TO SCALE

D14
OCT. 2008
THOMAS & HUTTON ENGINEERING CO.

PRELIMINARY SET - NOT FOR CONSTRUCTION

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 26662 MICHAEL C. FIT

SOUTH CAROLINA NATIONAL CERTIFICATE OF AUTHORIZATION THOMAS & HUTTON ENGINEERING CO. No. COA2365

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON

682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

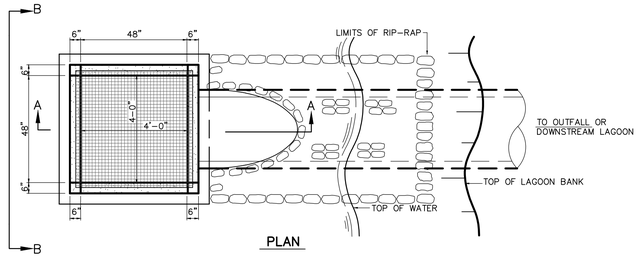
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK – LOT A

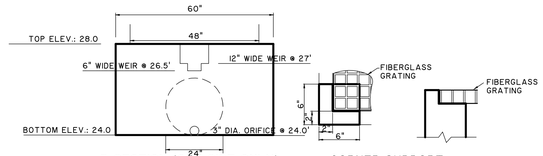
PAVING, GRADING & DRAINAGE DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 1'

C3.5

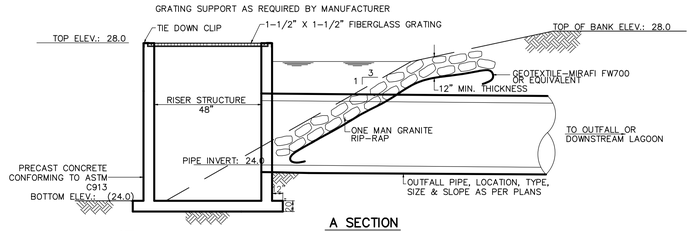


PLAN



B SECTION (ONE SIDE ONLY)

CORNER SUPPORT



A SECTION

NOTE:
THE PRECAST MANUFACTURER IS TO PREPARE AND SUBMIT TO THE ENGINEER DESIGN DETAILS AND CALCULATIONS FOR THE STRUCTURE SHOWN BASED ON THE DESIGN CRITERIA SPECIFIED. THE DESIGN SHALL BE PERFORMED UNDER THE DIRECT SUPERVISION AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA EXPERIENCED IN THE DESIGN OF PRECAST CONCRETE. THE DESIGN SHALL INCLUDE PROVISIONS FOR HANDLING STRESSES AND CONSTRUCTION LOADS. REPRODUCED COPIES OF ASTM C1433 "STANDARD SPECIFICATION FOR PRECAST REINFORCED CONCRETE MONOLITHIC BOX SECTIONS FOR CULVERTS, STORM DRAINS AND SEWERS" WILL NOT BE ACCEPTED AS A SUBSTITUTE FOR DESIGN.

CONTROL STRUCTURE (CS #1)

NOT TO SCALE

SOUTH CAROLINA — THOMAS B. HUTTON ENGINEERING CERTIFICATE OF AUTHORIZATION No. COA2265

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 26661 — MICHAEL C. ROY

PRELIMINARY SET - FOR REVIEW ONLY - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK – LOT A

PAVING, GRADING & DRAINAGE DETAILS

JOB NO:	J-23577.0013
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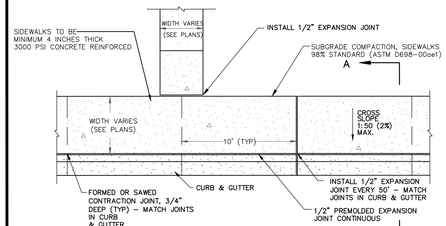
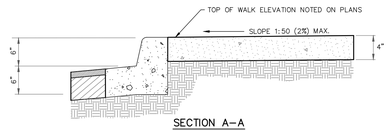
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 1'

C3.6

NOTE:
LONGITUDINAL SLOPE OF SIDEWALK SHALL BE NO GREATER THAN 1:20 (5%)



PLAN



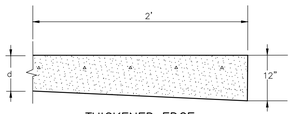
SECTION A-A

NOTES:
1. ALL CONSTRUCTION SHALL CONFORM TO THE TECHNICAL SPECIFICATIONS INCLUDING, BUT NOT LIMITED TO, SECTION 02200 - EARTHWORK AND SECTION 03300 - CAST-IN-PLACE CONCRETE.
2. CONTRACTION JOINTS SHOULD BE FORMED OR SAWED COINCIDENT WITH THE 10' JOINTS IN THE CURB.
3. CURB RAMPS SHALL BE INSTALLED AT EACH INTERSECTION OR DESIGNATED CROSSWALK LOCATION AND MUST MEET THE MOST CURRENT ADA STANDARDS AND SPECIFICATIONS AT THE TIME OF CONSTRUCTION.
4. ON ACCESSIBLE ROUTES WHERE SIDEWALK IS LESS THAN 5' WIDE, PASSING SPACES AT LEAST 5'X5' SHALL BE LOCATED AT REASONABLE INTERVALS NOT TO EXCEED 200'.

ACCESSIBLE SIDEWALK DETAIL

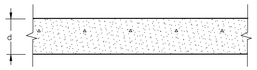
NOT TO SCALE

A5.1
FEB. 2009
THOMAS & HUTTON ENGINEERING CO.

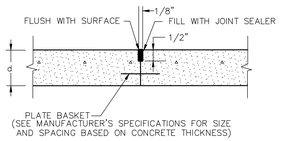


THICKENED EDGE

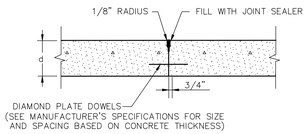
* CONTRACTOR TO PROVIDE THICKENED EDGE ALONG ALL EDGES OF CONCRETE PAVEMENT



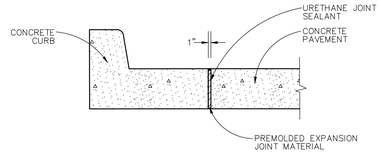
TYPICAL SECTION



TYPE A
SAWED

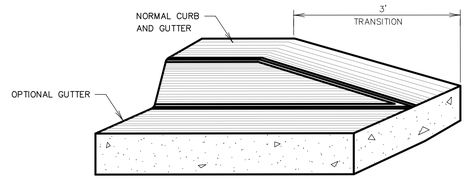


TYPE B
LONGITUDINAL CONSTRUCTION JOINT



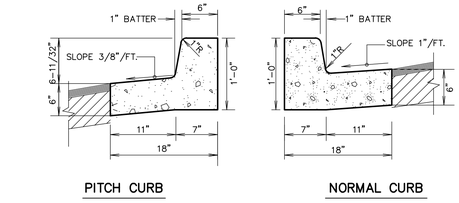
EXPANSION JOINT AT CURB

NOT TO SCALE



FEATHERING OF CURB AND GUTTER DETAIL

NOT TO SCALE

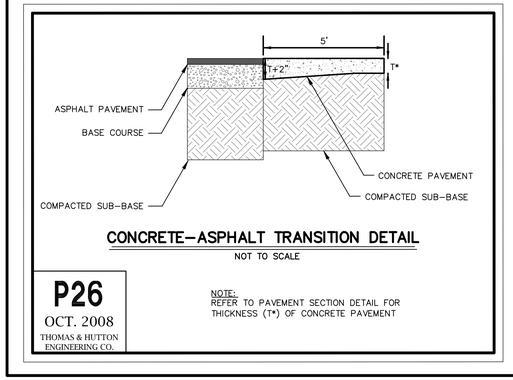


PITCH CURB NORMAL CURB

18" STANDARD CURB & GUTTER

NOT TO SCALE

NOTES:
1. ALL CONCRETE SHALL BE 3,000 PSI.
2. PROVIDE CONTROL JOINTS EVERY TEN FEET (10').
3. PROVIDE EXPANSION JOINTS EVERY FIFTY FEET (50').
4. PROVIDE EXPANSION JOINT WHERE CURB ABUTS SIDEWALKS, OR OTHER STRUCTURES.
5. PROVIDE LIGHT BROOM FINISH.

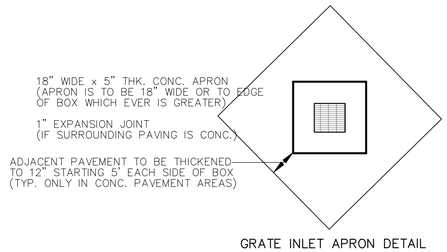


CONCRETE-ASPHALT TRANSITION DETAIL

NOT TO SCALE

P26
OCT. 2008
THOMAS & HUTTON ENGINEERING CO.

NOTE:
REFER TO PAVEMENT SECTION DETAIL FOR THICKNESS (T*) OF CONCRETE PAVEMENT



GRATE INLET APRON DETAIL

NOTE: CONTRACTOR SHALL PROVIDE SAW JOINT PLAN TO ENGINEER FOR APPROVAL

1. ALL CATCH BASINS SHALL BE SEPARATED FROM THE PAVEMENT AND CURB BY BOXING OUT AROUND BASIN AS SHOWN ABOVE. EXPANSION JOINT MATERIAL SHALL RUN COMPLETELY THROUGH CURB AND SLAB. MANHOLE CASTINGS WITHIN THE PAVEMENT SHALL BE BOXED IN LIKE MANNER EXCEPT WHEN TELESCOPING TYPE CASTINGS ARE USED.

2. WHEN A JOINT FALLS WITHIN 5' OF OR CONTACTS BASINS, MANHOLES, OR OTHER STRUCTURES, SHORTEN ONE OR MORE PANELS EITHER SIDE OF OPENING TO PERMIT JOINT TO FALL ON ROUND STRUCTURES AND AT OR BETWEEN CORNERS OF RECTANGULAR STRUCTURES.

3. ALL TRANSVERSE JOINTS MUST EXTEND THROUGH CURBS AND MUST BE CONTINUOUS ACROSS PAVEMENT, EXCEPT TIED TRANSVERSE CONSTRUCTION JOINTS. EXPANSION JOINTS WILL NOT BE REQUIRED EXCEPT AT STRUCTURES OR AS SHOWN ON THE PLANS.

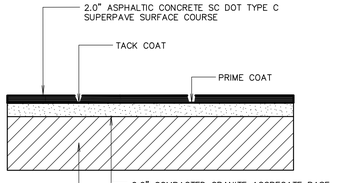
4. ALL SOFT AND YIELDING MATERIAL AND OTHER PORTIONS OF THE SUBGRADE WHICH WILL NOT COMPACT READILY WHEN ROLLED OR TAMPED SHALL BE REMOVED AS DIRECTED AND REPLACED WITH SUITABLE MATERIAL PLACED AND COMPACTED.
THE SUBGRADE SHALL BE THOROUGHLY COMPACTED WITH SUITABLE EQUIPMENT TO HAVE UNIFORM DENSITY AT MOISTURE CONTENTS OF NOT LESS THAN STANDARD OPTIMUM(AASHTO 98).
ALL SEWER TRENCHES AND STRUCTURE EXCAVATIONS SHALL BE BACKFILLED TO NATURAL OR FINISHED GRADE AS SOON AS CONDITIONS PERMIT. ALL BACKFILL SHALL BE COMPACTED WITH MECHANICAL TAMPERS IN LAYERS OF NOT OVER 6" LOOSE MATERIAL IN ORDER TO PREVENT DIFFERENTIAL HEAVE THE BACKFILL MATERIAL SHALL BE THE SAME MATERIAL AS THE SUBGRADE ADJACENT TO THE TRENCH.

5. THE MINIMUM CEMENT CONTENT SHALL NOT BE LESS THAN 6.0 SACKS (94 lb. PER SACK) PER cu. yd. OF CONCRETE. THE MAXIMUM SIZE AGGREGATE SHALL NOT EXCEED 1/4 OF THE SLAB THICKNESS. THE MAXIMUM SLUMP SHALL NOT EXCEED 3". ALL CONCRETE SHALL BE AIR ENTRAINED IN ACCORDANCE WITH THE FOLLOWING TABLE:

MAX. SIZE OF COARSE AGGREGATE, INCHES	AIR CONTENT, PER CENT BY VOLUME
1-1/2 , 2	5 ± 1
3/4 , 1	6 ± 1
3/8 ,1/2	7-1/2 ± 1

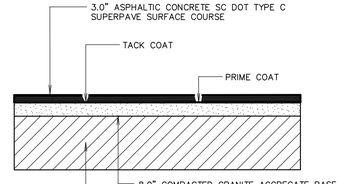
CONCRETE PAVEMENT DETAILS

NOT TO SCALE



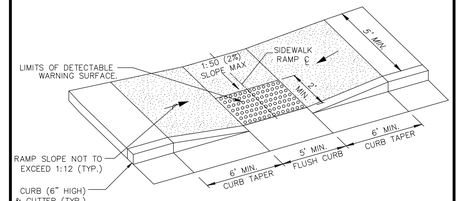
LIGHT PAVEMENT SECTION

NOT TO SCALE
PER TERRACON'S GEOTECHNICAL REPORT
JUNE 6, 2018



HEAVY PAVEMENT SECTION

NOT TO SCALE
PER TERRACON'S GEOTECHNICAL REPORT
JUNE 06, 2018



ISOMETRIC VIEW OF RAMP

NOTES:
1. CONSTRUCTION OF ACCESSIBLE CURB RAMP SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
2. TRANSITIONS FROM RAMPS TO WALKS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. MAXIMUM SLOPES OF ADJOINING GUTTERS, ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP, OR ACCESSIBLE ROUTE SHALL NOT EXCEED 1:20 (5%)
3. CURB RAMP SHALL HAVE A DETECTABLE WARNING THAT EXTENDS THE FULL WIDTH OF CURB RAMP. SEE DETECTABLE WARNING DETAIL.

CURB RAMP "TYPE B"

NOT TO SCALE

A1.2
FEB. 2009
THOMAS & HUTTON ENGINEERING CO.

SOUTH CAROLINA NATIONAL CERTIFICATE OF AUTHORIZATION THOMAS & HUTTON ENGINEERING No. C00265

PRELIMINARY SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

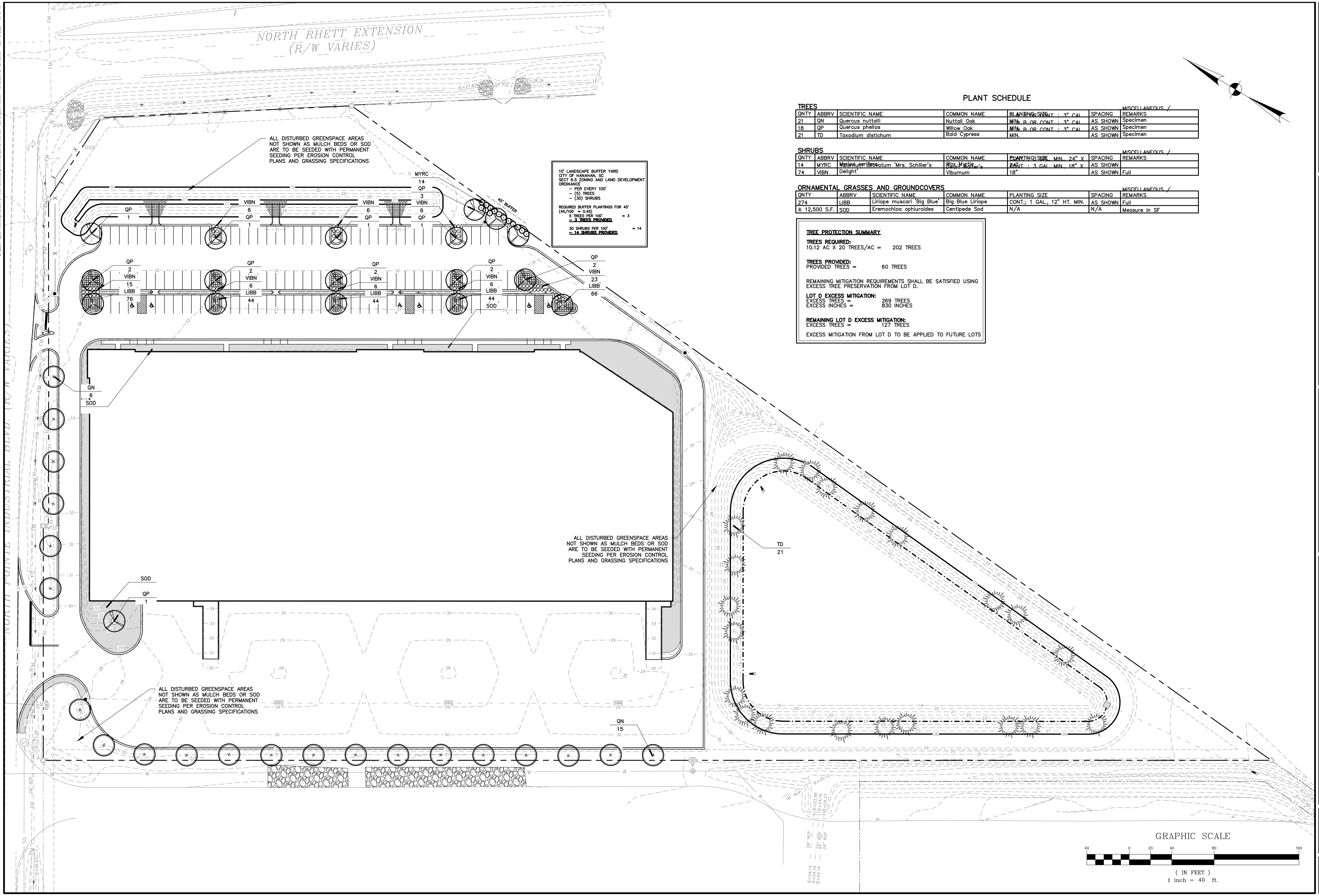
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK – LOT A

PAVING, GRADING & DRAINAGE DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	1" = 1'

C3.7



10' LANDSCAPE BUFFER YARD
CITY OF HANAHAN, SC
SECT 6.5 ZONING AND LAND DEVELOPMENT ORDINANCE
- PER EVERY 100'
- (5) TREES
- (30) SHRUBS

REQUIRED BUFFER PLANTINGS FOR 45'
(45/100 = 0.45)
5 TREES PER 100' = 3
= 3 TREES PROVIDED

30 SHRUBS PER 100' = 14
= 14 SHRUBS PROVIDED

PLANT SCHEDULE

TREES

QNTY	ABBRV	SCIENTIFIC NAME	COMMON NAME	PLANTING SIZE	SPACING	MISCELLANEOUS / REMARKS
21	QN	Quercus nuttalli	Nuttall Oak	B & B OR CONT.; 3" CAL MIN.	AS SHOWN	Specimen
18	QP	Quercus phellos	Willow Oak	B & B OR CONT.; 3" CAL MIN.	AS SHOWN	Specimen
21	TD	Taxodium distichum	Bald Cypress	B & B OR CONT.; 3" CAL MIN.	AS SHOWN	Specimen

SHRUBS

QNTY	ABBRV	SCIENTIFIC NAME	COMMON NAME	PLANTING SIZE	SPACING	MISCELLANEOUS / REMARKS
14	MYRC	Myrica cerifera	Wax Myrtle	CONT.; 3 GAL. MIN., 24" X 24"	AS SHOWN	
74	VIBN	Viburnum obovatum 'Mrs. Schiller's Delight'	Dwarf Walter's Viburnum	CONT.; 3 GAL. MIN., 18" X 18"	AS SHOWN	Full

ORNAMENTAL GRASSES AND GROUNDCOVERS

QNTY	ABBRV	SCIENTIFIC NAME	COMMON NAME	PLANTING SIZE	SPACING	MISCELLANEOUS / REMARKS
274	LIBB	Liriope muscari 'Big Blue'	Big Blue Liriope	CONT.; 1 GAL., 12" HT. MIN.	AS SHOWN	Full
± 12,500 S.F.	SOD	Eremochloa ophiuroides	Centipede Sod	N/A	N/A	Measure in SF

TREE PROTECTION SUMMARY

TREES REQUIRED:
10.12 AC X 20 TREES/AC = 202 TREES

TREES PROVIDED:
PROVIDED TREES = 60 TREES

REMAINING MITIGATION REQUIREMENTS SHALL BE SATISFIED USING EXCESS TREE PRESERVATION FROM LOT D.

LOT D EXCESS MITIGATION:
EXCESS TREES = 269 TREES
EXCESS INCHES = 830 INCHES

REMAINING LOT D EXCESS MITIGATION:
EXCESS TREES = 127 TREES

EXCESS MITIGATION FROM LOT D TO BE APPLIED TO FUTURE LOTS

PERMIT SET - FOR REVIEW PURPOSES ONLY

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

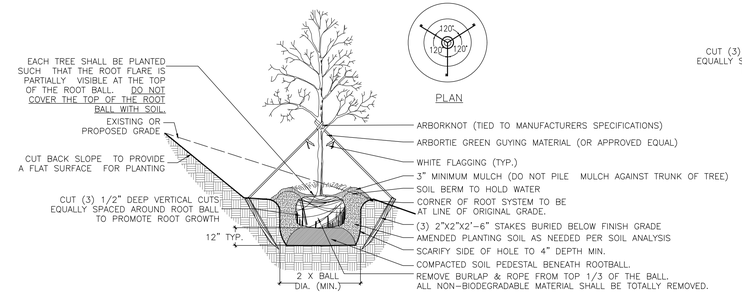
CITY OF HANAHAN, SOUTH CAROLINA

NORTH POINTE COMMERCE PARK - LOT A

PLANTING PLAN

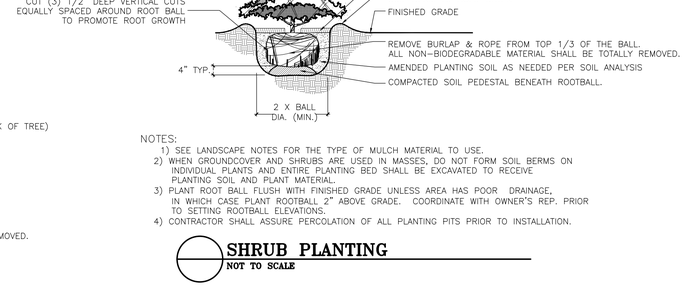
JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	CET
DESIGNED:	CET
REVIEWED:	JLG
APPROVED:	JLG
SCALE:	1" = 40'

L1.1



NOTES:
1) SEE LANDSCAPE NOTES FOR THE TYPE OF MULCH MATERIAL TO USE.
2) ONLY GUY TREES WHEN SITE CONDITIONS REQUIRE IT.
3) PLANT ROOT BALL FLUSH WITH FINISHED GRADE UNLESS AREA HAS POOR DRAINAGE, IN WHICH CASE PLANT ROOTBALL 2" ABOVE GRADE.
4) REMOVE ALL BRANCHES THAT ARE DAMAGED, RUBBING, OR CROSSING OTHER BRANCHES.
5) NEVER CUT A CENTRAL LEADER.
6) FINAL TREE STAKING AND PLACEMENT TO BE APPROVED BY OWNER'S REP.
7) CONTRACTOR SHALL ASSURE PERCOLATION OF ALL PLANTING PITS PRIOR TO INSTALLATION.

TREE PLANTING ON A SLOPE
NOT TO SCALE



NOTES:
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2) WHEN GROUNDCOVER AND SHRUBS ARE USED IN MASSES, DO NOT FORM SOIL BERMS ON INDIVIDUAL PLANTS AND ENTIRE PLANTING BED SHALL BE EXCAVATED TO RECEIVE PLANTING SOIL AND PLANT MATERIAL.
3) PLANT ROOT BALL FLUSH WITH FINISHED GRADE UNLESS AREA HAS POOR DRAINAGE, IN WHICH CASE PLANT ROOTBALL 2" ABOVE GRADE. COORDINATE WITH OWNER'S REP. PRIOR TO SETTING ROOTBALL ELEVATIONS.
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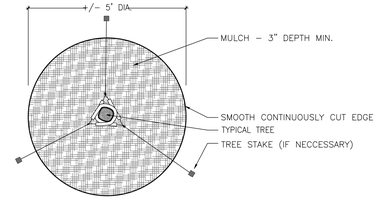
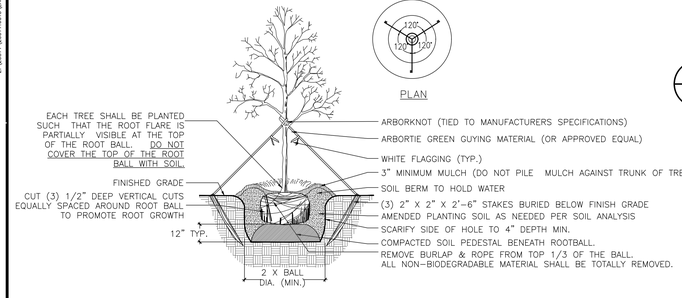
SHRUB PLANTING
NOT TO SCALE



NOTES:
1) SEE LANDSCAPE NOTES FOR THE TYPE OF MULCH MATERIAL TO USE.
2) APPLY MULCH IN A +/- 5' DIAMETER WHERE PROPOSED TREE PLANTINGS OCCUR IN SOD OR SEEDED AREA.

TREE RING
NOT TO SCALE



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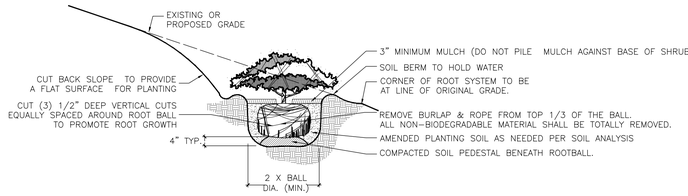
TREE PLANTING
NOT TO SCALE



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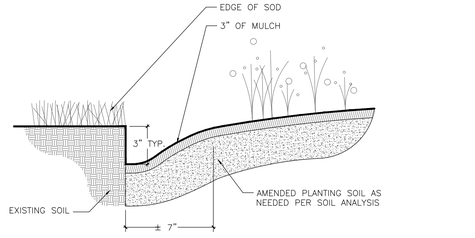
SHRUB PLANTING ON A SLOPE
NOT TO SCALE



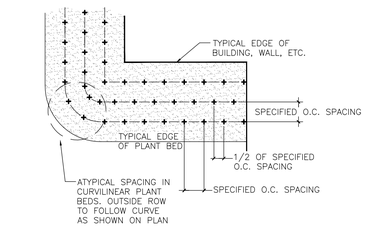
NOTES:
1) TRENCH EDGE TO BE LOCATED BETWEEN PLANTING BEDS AND ALL LAWN AREAS.

SOD TO PLANT BED EDGE
NOT TO SCALE

GENERAL PLANTING / IRRIGATION NOTES:

1. REQUIREMENTS FOR THE MEASUREMENTS, BRANCHING, GRADING, QUALITY, BALLING AND BURLAPPING OF PLANTS IN THE PLANT LIST SHOULD FOLLOW OR EXCEED THE STANDARDS CURRENTLY RECOMMENDED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. IN THE AMERICAN STANDARD FOR NURSERY STOCKS (ASNS). UNLESS OTHERWISE SPECIFIED, ANY SIZE SPECIFIED SHALL BE CONSIDERED MINIMUM. MINIMUMS FOR HEIGHT, SPREAD, CALIPER, ETC. SHALL TAKE PRECEDENT OVER A SPECIFIED CONTAINER SIZE. (I.E. – IF 7 GALLON IS REQUIRED, TO PROVIDE A SPECIFIED HEIGHT OR SPREAD THAT IS SPECIFIED AS A 3 GALLON, THEN THE 7 GALLON SHALL BE SHALL BE REQUIRED AND INCLUDED IN THE BASE BID AND SHALL NOT BE CONSIDERED A CHANGE ORDER.)
2. ALL PLANTS SHALL HAVE A WELL FORMED HEAD WITH MINIMUM CALIPER, HEIGHT AND SPREAD OF THE SIDE BRANCHES AS SHOWN ON THE PLANT LIST. TRUNKS SHALL BE UNDAMAGED AND SHAPE SHALL BE TYPICAL OF THE SPECIES.
3. MEASUREMENT OF CONIFER HEIGHT SHALL INCLUDE NOT MORE THAN FIFTY (50) PER CENT OF THIS YEARS' VERTICAL GROWTH (TOP CANDLE).
4. THE LANDSCAPE CONTRACTOR IS HEREBY NOTIFIED OF THE EXISTENCE OF UNDERGROUND UTILITIES WITHIN THE LIMITS OF THE PROJECT AREA. THE CONTRACTOR SHOULD VERIFY THE EXACT LOCATION OF ALL UTILITY LINES PRIOR TO COMMENCEMENT OF DIGGING OPERATIONS. CONTRACTOR RESPONSIBLE FOR LOCATING, PROTECTING, AND REPAIRING ALL DAMAGE TO BUILDINGS, UTILITIES, PAVEMENT, AND CURB & GUTTER. ANY REPAIRS SHALL BE DONE PROMPTLY AT CONTRACTOR'S EXPENSE.
5. THE CONTRACTOR WILL BE RESPONSIBLE FOR STAKING AND LAYOUT OF PLANTINGS ON THIS PROJECT. THE LANDSCAPE ARCHITECT OR OWNER SHALL BE ADVISED WHEN STAKES ARE READY FOR INSPECTION ON VARIOUS PLANTING AREAS. ALL LAYOUT WORK SHALL BE INSPECTED AND APPROVED BY THE LANDSCAPE ARCHITECT AND OWNER PRIOR TO OPENING ANY PLANTING PITS.
6. IT IS THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR TO VERIFY THAT EACH EXCAVATED TREE OR SHRUB PIT WILL PERCOLATE (DRAIN) PRIOR TO ADDING TOPSOIL AND INSTALLING TREES OR SHRUBS. THE CONTRACTOR SHALL FILL THE BOTTOM OF HOLES WITH SIX (6) INCHES OF WATER. THIS WATER SHOULD PERCOLATE WITHIN A TWENTY-FOUR (24) HOUR PERIOD. IF WATER DOESN'T PERC, CONTRACTOR SHALL NOTIFY THE OWNER'S REP PRIOR TO INSTALLING PLANTS.
7. SHOULD THE LANDSCAPE CONTRACTOR ENCOUNTER UNSATISFACTORY SURFACE OR SUBSURFACE DRAINAGE CONDITIONS, SOIL DEPTH, LATENT SOILS, HARD PANS, STEAM OR OTHER UTILITY LINES OR OTHER CONDITIONS THAT WILL JEOPARDIZE THE HEALTH AND VIGOR OF THE PLANTS, HE MUST ADVISE THE LANDSCAPE ARCHITECT IN WRITING OF THE CONDITIONS PRIOR TO INSTALLING THE PLANTS. OTHERWISE, THE LANDSCAPE CONTRACTOR WARRANTS THAT THE PLANTING AREAS ARE SUITABLE FOR PROPER GROWTH AND DEVELOPMENT OF THE PLANTS TO BE INSTALLED.
8. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING UP THE SITE AT THE COMPLETION OF THE PROJECT AND SHALL MAINTAIN THE SITE IN A REASONABLY NEAT AND CLEAN STATE THROUGHOUT THE INSTALLATION PROCESS. STREETS AND PAVED AREAS SHALL BE CLEANED REGULARLY TO REMOVE CONSTRUCTION MATERIALS AND OTHER DEBRIS RESULTING FROM WORK OF THE PROJECT.
9. REPLACEMENTS OF DEAD OR UNSATISFACTORY MATERIAL SHALL BE MADE AS SPECIFIED IN THE PLANT LIST. THE OWNER OR LANDSCAPE ARCHITECT SHALL INSPECT REPLACED PLANTS WHEN ALL REPLACEMENTS HAVE BEEN MADE. REPLACEMENTS ARE TO BE ALIVE AND IN A HEALTHY CONDITION WHEN THE REPLACEMENTS ARE COMPLETE. REPLACEMENTS ARE NOT SUBJECT TO AN ADDITIONAL GUARANTEE, BUT THE LANDSCAPE CONTRACTOR SHALL CONSULT WITH THE LANDSCAPE ARCHITECT ON REASON FOR PLANT DECLINE/DEATH AND HOW TO AVOID FUTURE INSTANCES.
10. SHOULD THE CONTRACTOR NOT MAKE REPLACEMENTS IN A SATISFACTORY AND TIMELY FASHION IN ACCORD WITH THE PLANTING NOTES, THE OWNER, AFTER PROPER NOTIFICATION TO THE CONTRACTOR MAY UTILIZE THE FUNDS OF THE RETAINAGE TO HAVE THE REPLACEMENTS MADE IN ACCORDANCE WITH THE SPECIFICATIONS BY ANOTHER CONTRACTOR.
11. NO EXCAVATION OR PLANTING PIT SHALL BE LEFT UNATTENDED OVERNIGHT.
12. PLANT MATERIAL QUANTITIES PROVIDED IN THE PLANT LIST ARE FOR REFERENCE ONLY AND THE CONTRACTOR IS RESPONSIBLE FOR THE ACTUAL PLANT MATERIAL COUNTS. DISCREPANCIES BETWEEN QUANTITIES SHOWN ON THE PLANTING PLAN AND THOSE IN THE PLANT LIST SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT FOR CLARIFICATION. IF CLARIFICATION OF DISCREPANCIES FROM THE LANDSCAPE ARCHITECT IS NOT POSSIBLE, THEN QUANTITIES SHOWN ON THE PLANTING PLAN SHALL TAKE PRECEDENCE.
13. REMOVE BURLAP/STRAPPING AND WIRE BASKET FROM TOP ⅓ OF ROOT BALL ON TREES.
14. REMOVE PAPER, PLASTIC OR METAL AROUND ROOT BALLS OF SHRUBS.
15. DO NOT WRAP TREES.
16. WATER ALL PLANT MATERIAL IMMEDIATELY AFTER PLANTING.
17. TREE GUYING MATERIAL SHALL BE 'ARBOR-TIE' OR EQUIVALENT.
18. ALL PLANT BEDS TO BE MULCHED WITH 3" DEPTH OF PINE STRAW MULCH.
19. ALL AREAS OF PLANTING, INCLUDING AREAS OF GRASS SEEDING AND SOD, SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE AND SHALL BE PROVIDED APPROPRIATE SOIL FOR THE PROPOSED PLANTINGS. THE LANDSCAPE CONTRACTOR SHALL ADJUST PH AND / OR SOIL FERTILITY BY UNIFORMLY INCORPORATING REQUIRED SOIL CONDITIONING MATERIALS AT THE RATE AND DEPTH DETERMINED BY THE ANALYSIS OF THE SOIL TEST (AS REQUIRED IN 3.02 AND 3.13 OF THE LANDSCAPING SPECIFICATIONS). EACH SOIL TEST SHALL BE SPECIFIC TO THE PROPOSED PLANT MATERIAL TO BE INSTALLED IN A GIVEN AREA.
20. ALL EXISTING VEGETATION WITHIN AREAS TO BE PLANTED / SODDED / SEEDED SHALL BE REMOVED PRIOR TO PLANTING / SODDING / SEEDING. ALL AREAS INDICATED TO BE GRASS SEED SHALL BE SEEDED PER GRASSING SPECIFICATIONS FOR PERMANENT STABILIZATION.
21. CONTRACTOR TO SUPPLY AUTOMATIC IRRIGATION SYSTEMS, COMPLETE AND INSTALLED. SYSTEM TO INCLUDE ALL VALVES, PIPES, HEADS, FITTINGS, RAIN SENSOR, AND CLOCK AND TO PROVIDE 100% COVERAGE OF ALL NEW SODDED AND IMPROVED EXISTING GRASS AREAS, TREES, SHRUBS AND PLANTING BEDS. COORDINATE IRRIGATION WITH OWNER'S REPRESENTATIVE. (CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF PROPOSED IRRIGATION SYSTEM FOR OWNER ACCEPTANCE)
22. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR AUTOMATIC IRRIGATION SYSTEMS. CONTRACTOR SHALL PROVIDE ELECTRIC METER AND SERVICE IN ACCORDANCE WITH STATE AND LOCAL CODES FOR IRRIGATION SYSTEM. LOCATION OF METERS AND CONTROL PANELS FOR IRRIGATION SHALL BE APPROVED BY OWNER'S REP. PRIOR TO INSTALLATION.
23. WHERE IRRIGATION SYSTEM WILL BE INSTALLED WITH ANY WATER SOURCE OTHER THAN DOMESTIC POTABLE WATER, LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR IRRIGATION WATER TESTING. IRRIGATION WATER SHALL BE TESTED FOR LEVELS OF pH, ALKALINITY AND SOLUBLE SALTS. SUBMIT TEST RESULTS TO OWNER'S REPRESENTATIVE FOR REVIEW PRIOR TO INSTALLATION OR ORDERING OF IRRIGATION EQUIPMENT, PUMPS OR WELL DIGGING.
24. ALL TREES SHALL BE INSTALLED PER THE REQUIREMENTS OF THE CITY OF HANAHAN, SOUTH CAROLINA APPLICABLE ORDINANCES.
25. ALL PLANT BEDS TO RECEIVE WEED INHIBITOR OF PREEN OR ACCEPTED ALTERNATE.
26. FOR SUMMERTIME PLANTINGS, CONTRACTOR TO USE EITHER CONTAINERIZED OR PRE-DUG B & B PLANT MATERIAL.
27. AS AN ADD ALTERNATE BID, THE CONTRACTOR SHALL PROVIDE "SOIL MOIST TRANSPLANT" (OR ACCEPTED EQUIVALENT) AT THE APPLICATION RATES SHOWN BELOW FOR ALL NEWLY INSTALLED PLANTINGS.

Container Size/Amount	Caliper Size/Amount
1 Gallon/.75 oz.	1"/3.0 oz.
2 Gallon/1.5 oz.	2"/6.0 oz.
3 Gallon/1.5 oz.	3"/9.0 oz.
5 Gallon/2.0 oz.	4"/12.0 oz.
7 Gallon/3.0 oz.	5"/15.0 oz
10 Gallon/3.0 oz.	6"/18.0 oz
15 Gallon/5.0 oz.	7"/21.0 oz
20 Gallon/7.0 oz.	8"/24.0 oz
Plant Height/Amount	**Box Size/Amount**
2'/1.5 oz.	16"/5.0 oz.
3'/2.0 oz.	20"/6.0 oz.
4'/3.0 oz.	24"/9.0 oz.
5'/4.0 oz.	30"/12.0 oz.
6'/5.0 oz.	36"/18.0 oz
7'/6.0 oz.	42"/27.0 oz



NOTES:
1) EXCAVATE ENTIRE BED SPECIFIED FOR GROUNDCOVER PLANTING TO A DEPTH OF 12".

PLANT SPACING DETAIL
NOT TO SCALE

NO.	REVISIONS	BY	DATE

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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
PLANTING DETAILS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	AS SHOWN

L2.1

GRASSING SPECIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Seeding, planting grass, and fertilizing graded areas around buildings, structures, soccer fields and sidewalk shoulders and other disturbed areas.

B. Seed protection.

C. Maintaining grassed areas until final acceptance.

1.2 RELATED WORK

A. Civil and Landscape plans and specifications.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, and location of packaging. Damaged packages are not acceptable. Store in cool, dry locations away from contaminants.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags are not acceptable. Store in cool, dry locations away from contaminants.

C. Deliver sod on pallets.

D. All material shall be acceptable to Engineer prior to use.

1.4 PLANTING DATES

A. This specification provides for establishment of a permanent grass cover between the dates of March 1 and September 30. If finished earth grades are not completed in time to permit planting and establishment of permanent grass during the favorable season between dates specified above unless otherwise accepted, Contractor will be required to plant a temporary cover to protect new graded areas from erosion and to keep windborne dust to a minimum. The temporary cover shall be planted between October 1 and February 28 unless otherwise permitted.

1.5 MEASUREMENT AND PAYMENT

A. When the season or stage of project is such results of grassing work cannot be determined, conditional acceptance will be made on work completed. When conditional acceptance is made for items of work covered, Contractor shall be entitled to 50% of bid price for the actual work placed and shall receive remaining 50% of bid price when final acceptance is made. Conditional acceptance shall not apply to the remaining items of work, and full bid price payment shall be made when work is acceptably placed and completed in accordance with specifications.

B. Payment for grassing will be made at contract unit price for the item "Grassing" and such payment shall constitute full compensation for furnishing and placing seed and fertilizer or sod where directed and protecting and maintaining seed and sod in all graded and disturbed areas.

PART 2 - PRODUCTS

Contractor shall submit source and species certification documents to Engineer and Owner's Representative for review prior to installation. Supply complete information on all analysis / test methodologies and results: laboratory certifications, manufacturer's specifications, and agency approvals to the Landscape Architect prior to placement of soil mixtures. In addition, provide the Landscape Architect with thoroughly mixed sample of soil mixes for approval prior to placement. Landscape Contractor shall make modifications and improvements to soil mixes deemed necessary by the soil analysis to meet requirements specified here in before, and to ensure proper growing medium for plant material.

2.1 SEED

A. All seed shall conform to all State Laws and to all requirements and regulations of the State Department of Agriculture.

B. The varieties of seed, as specified in Section 2.2, shall be individually packaged or bagged, and tagged to show name of seed, net weight, origin, germination, lot number, and other information required by the State Department of Agriculture.

C. The Engineer reserves the right to test, reject, or accept all seed before seeding.

2.2 SEEDING SCHEDULE

A. SEED	RATE	PLANTING DATES
'Princess 77' Bermuda	75 lbs/ acre	March 1 - September 30
Annual Rye (Temp only)	75 lbs/acre	October 1 - February 28

2.3 FERTILIZER

A. Commercial fertilizer of approved type, conforming to state fertilizer laws at the rate as recommended by soils test.

2.4 LIME

A. Agricultural grade, ground limestone at the rate as recommended by soils test.

2.5 SPRIG

A. Healthy living stems, stolons, or rhizomes and attached roots of locally adapted grass without adhering soil, including two to three nodes and from 4 to 6 inches long. Obtain from heavy, dense certified sod. Provide sprigs which have been grown under climatic conditions similar to those in the locality of the project. Coordinate harvesting and planting operations to prevent exposure of sprigs to the sun for more than 30 minutes before covering and moistening. Sprigs showing signs of wilt, mold, containing weeds or other detrimental material or that are heat damaged will be rejected.

B. The varieties of sprig, as specified in section 2.6, shall be individually packaged or bagged, and tagged to show name of sprig, net weight, origin and other information required by the State Department of Agriculture.

C. Sprigs shall be pure to variety specified and shall be free of other grass species, weeds or foreign matter.

D. Sprigs shall be harvested by digging (not collected above soil level) shredding sod, by rototilling sod and raking, by vericutting or by a sprig harvester. Sprigs shall consist of mostly rhizomes and crowns with only a few green leaves.

2.6 SPRIGGING SCHEDULE

A. SPRIG	RATE	PLANTING DATES
'Tifway 419' Bermuda (or approved equal)	1,000 bushels / ac. (Coverage in 3 months)	April 1 - August 31
Stabilize site with temporary grass seed (See section 2.2)		September 1 - March 31

B. In areas where existing grass is to be matched, Contractor shall sprig at the rate and dates recommended by sprig distributor.

2.7 SOD

A. Sod shall be premium grade, densely rooted, good quality grass of the species and certified variety as shown on the plans, free from noxious weeds with no surface soil being visible. The sod shall be obtained from areas where the soil is reasonably fertile. Sod of specified species with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed. The sod shall be machine cut to a uniform soil thickness that shall contain practically all of the dense root system and not be less than 1-inch thick.

B. Before cutting, sod shall be mowed to a height of not less that 1-1/2" or more than 2". Sod shall be cut in uniform widths min. 12" and in lengths min. 24 inches.

C. Sod shall be delivered to site in a fresh, moist condition with healthy green foliage. It shall be unloaded from delivery trucks on pallets or rolls and placed in final position within 24 hours of delivery. Sod shall be protected from wind and sun and shall not be allowed to dry out before planting.

D. Sod shall be strong enough to support its own weight and retain its size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.

2.8 ACCESSORIES

A. Straw Mulch: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.

B. Excelsior Mulch: Excelsior mulch shall consist of wood fibers cut from sound, green timber. The average length of fibers shall be 4 to 6 inches. Cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to natural grain of the wood to cause splintering of fibers when weathering in order to provide adherence to each other and to soil.

C. Wood cellulose fiber shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form a homogenous slurry. Mulch fibers shall intertwine physically to form a strong moisture holding mat on the ground surface and allow rainfall to percolate into underlying soil. The mulch shall be heat processed to contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color to facilitate metering of material.

2.9 PRODUCT REVIEW

A. Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer will review all products before they are ordered.

PART 3 - EXECUTION

3.1 PREPARATION

A. Areas to be seeded or sprigged shall be made smooth and uniform and shall conform to the finished grade indicated on plans.

B. Remove foreign materials, plants, roots, stones, and debris from surfaces to be seeded.

C. Grassing areas, if not loose, shall be loosened to a minimum depth of 3 inches before fertilizer, seed, sprig or sod is applied.

D. Amendments to soils shall be incorporated into loosened 3 inch top soil layer as recommended by soils test.

3.2 STAND OF GRASS

A. Before acceptance of seeding or sprigging is performed for the establishment of permanent vegetation, Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and winter weather and be capable of re-establishment in spring.

B. Before acceptance of seeding performed for the establishment of temporary vegetation, Contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or establishment of permanent vegetation is to commence.

3.3 SEEDING AND SPRIGGING DATES

A. Seeding and sprigging shall be performed during periods and at rates specified in their respective schedules. Seeding and sprigging work may, at discretion of Contractor, be performed throughout the year using schedule prescribed for given period. Seeding and sprigging work shall not be conducted when the ground is frozen or excessively wet. Contractor will be required to produce a satisfactory stand of grass regardless of the period of year work is performed.

3.4 APPLYING LIME AND FERTILIZER

A. Following advance preparation and placing selected material for shoulders and slopes, lime and fertilizer, if called for based on soil tests, shall be spread uniformly over the designated areas, and shall be thoroughly mixed with the soil to a depth of approximately 2 inches. Fertilizer and lime shall be applied at the rate at the rate recommended by required soils test. Unless otherwise provided, lime will not be applied for temporary seeding. In all cases where practicable, acceptable mechanical spreaders shall be used for spreading fertilizer. On steep slopes subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied with combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together when Wood Cellulose Fiber Mulch is used. Any stones larger than 2 ½ inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.5 SEEDING

A. Seed shall be sown within 24 hours following application of fertilizer and lime and preparation of the seedbed as specified in Section 3.4. Seed shall be uniformly sown at rate specified by the use of acceptable mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas inaccessible to seed drills.

B. Seeds shall be covered and lightly compacted by means of cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.

C. Apply water with fine spray immediately after each area has been sown.

D. Do not sow seed when ground is too dry, during windy periods or immediately following a rain.

E. If permitted by the special provisions, wood cellulose fiber mulch or excelsior fiber mulch may be used.

3.6 SEED PROTECTION (STRAW MULCH)

A. All seeded areas seeded with permanent grasses shall be uniformly mulched in a continuous blanket immediately following seeding and compacting operations, using at least 2 tons of straw per acre.

3.7 SEED PROTECTION (EXCELSIOR MULCH)

A. Seed shall be sown as specified in Section 3.5. Within 24 hours after covering of seed, excelsior mulch shall be uniformly applied at the rate of 2 tons per acre. The mulch may be applied hydraulically or by other acceptable methods. Should the mulch be placed in a dry condition, it shall be thoroughly wetted immediately after placing. Engineer may require light rolling of the mulch to form a tight mat.

3.8 SEED PROTECTION (WOOD CELLULOSE FIBER MULCH)

A. After the lime has been applied and ground prepared as specified in Section 3.4, wood cellulose fiber mulch shall be applied at a rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for application of fertilizer, seed, and slurry of the prepared wood pulp. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which will provide an even distribution of slurry on various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

Seed, fertilizer, wood pulp mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by hydraulic seeding method specified herein. Materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be regulated so amounts and rates of application shall result in a uniform application of all materials at rates not less than amount specified. Using the color of wood pulp as a guide, equipment operator shall spray prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream to fall like rain, allowing wood fibers to build upon each other until an even coat is achieved.

3.9 SPRIGGING

A. Sprigs shall be placed at the date and rates as shown in section 2.6. The sprigging method shall be by broadcast sprigging, hydroplanting or row planter. Sprigging procedure shall ensure even coverage.

B. Sprigs applied by broadcast over the site with a distributor or hydroseeder shall be planted at the rates listed in section 2.6. Cover broadcast sprigs with straw mulch immediately after broadcast and water in immediately (within 2 hours).

C. Sprigs installed by row planter creating a narrow furrow that covers 50 to 80% of the sprig with soil may use less sprig material. Rate shall be as recommended by sprig supplier to provide a solid stand of turf within the time required in Section 2.6. Water in immediately (within 1 hour).

3.10 SODDING

A. Sod shall be placed between March 1st and December 1st. However, if sod is to be placed during periods of temperatures over 90 degrees F., the contractor shall take extra care for quick placement of sod with adequate, consistent watering necessary to ensure sod thrives as planted.

B. Sod shall be placed within 24 hours of cutting.

C. Place top elevation of sod 1/2 inch below adjoining paving or curbs.

D. All areas to be sodded shall be brought to the proper line grade or cross section as was existing prior to construction. Sod shall be placed so that, upon completion, the edges of the sodded areas will be smooth and will conform to the proposed finished grade. Sod shall be laid smooth, edge to edge, with staggered joints. Sod shall be immediately pressed firmly into contact with the sod bed by tamping or rolling, to eliminate any air pockets. A true and even surface shall be provided, to insure knitting without displacement of the sod or deformation of the surfaces of the sodded areas. Do not stretch or overlap sod pieces. Following compaction, screened soil of good quality shall be used to fill all cracks, and excess soil shall be worked into the grass with rakes or other suitable equipment. On slopes steeper than 4 to1, the sod shall be fastened in place with suitable wood or metal pins to hold the sod in place. Any damage by erosion or other causes that may have occurred after completion of grading operations shall be repaired, before commencing with the sodding operations.

E. Immediately before sodding, moisten topsoil with a fine spray to a minimum 1" depth. Sod shall not be laid on soil that is dry and powdery.

F. Sod shall be moist when laid and placed on moist ground. The sod shall be carefully placed by hand, beginning at the toe of slopes and working upwards. The length of the strips shall be at right angles to the flow of surface water. All joints shall be tightly butted and end joints shall be staggered at least 12 inches. The sod shall be immediately pressed firmly into the ground by tamping or rolling. Fill all joints between strips with fine screened soil. Sod on slopes shall be pegged with sod pegs to prevent movement. The sod shall be watered, mowed, weeded, repaired, or otherwise maintained, to insure the establishment of a uniform healthy stand of grass until acceptance.

G. Within 2 hours after sod has been placed, thoroughly water to a minimum depth of 4". After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove depressions and irregularities. Roll sodded areas with a roller not exceeding 150 lbs. per foot of roller width. Top dress and roll again as necessary to create a smooth even surface.

PART 4 - MAINTENANCE, WARRANTY AND ACCEPTANCE

4.1 MAINTENANCE

A. Maintenance shall consist of providing protection against traffic, watering to ensure uniform seed germination and to keep surface of soil damp, and repairing any areas damaged as a result of construction operations or erosion. Maintenance shall also include, but is not limited to, watering, weeding, cultivating, removal of dead material, lawn mowing, fertilizing, and other necessary operations.

B. The Contractor shall maintain all proposed plantings until the date of final acceptance by the Owner.

4.2 WARRANTY

A. All grassed areas shall be guaranteed by the Contractor to be alive and healthy for a one year period from the date of substantial completion issued by the Owner. A final inspection with the Owner shall be conducted at the end of the warranty period to determine if any areas require replanting. At the end of the warranty period, the sod shall show evidence of rooting to the underlying soil and shall have no competitive weed growth from either the sod or from between the sod joints.

B. Any grassed area which is dead or not showing satisfactory growth shall be replaced at Contractor's expense at the end of warranty period. All replacements shall be of original quality and of a size equal to adjacent plants or trees of the same kind. Replacements required because of vandalism, excessive use or other causes beyond the control of the Contractor are not part of this contract.

4.3 ACCEPTANCE

A. Before acceptance of seeding performed for the establishment of permanent vegetation, Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and winter weather and be capable of reestablishment in spring.

B. A minimum coverage of 80% density over 100% of the disturbed area is required for seeded areas before project acceptance. Sprig and sod areas shall have 95 % coverage over 100% of the disturbed area prior project acceptance.

END OF SECTION

NO.	REVISIONS	BY	DATE

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Savannah, GA 31405 • 912.234.5300
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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
LANDSCAPING SPECIFICATIONS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	NOT TO SCALE

L2.2

LANDSCAPING SPECIFICATION

LANDSCAPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered in this section consists of soil preparation, fine grading, lawns, trees, shrubs and ground cover plantings, their protection and maintenance of planted areas until acceptance.

1.2 RELATED WORK

A. See Civil and Landscape plans and specifications.

1.3 QUALITY ASSURANCE

A. Qualifications of Workmen: Contractor shall provide at least one person present at all times during execution of work that is thoroughly familiar with the type of materials being installed and proper equipment and methods for their installation and who shall direct all work performed under this section.

B. Standards: All seed, sod, trees, shrubs, and ground covers shall meet or exceed the specifications of Federal, State, County and / or Municipality laws requiring inspection for disease and insect control.

1. Plants and planting methods shall conform to the latest edition of American Standard for Nursery Stock, American Nursery & Landscape Association, 1000 Vermont Avenue, NW, Suite 300, Washington, DC 20005
2. Plants shall be true and representative of their genus, species, cultivar, or variety. Nursery stock shipped in accordance with the required specifications shall be deemed to be acceptable within the terms of this section if it is typical in size and habit for the species in the region of the country in which it is grown unless the specifications include additional details.
3. Prior to ordering any plant material, representative photos of each species shall be provided for review and acceptance.
4. One of each bundle or lot shall be tagged with name and size of the plant in accordance with American Nursery & Landscape Association standards. In all cases, botanical names shall take precedence over common names. Landscape Architect should be consulted in the event questions arise about nomenclature of plants to be used and their availability.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

C. Deliver sod on pallets.

D. Handling of plants shall be by lifting the root mass or container and not by lifting plant by trunk or branches. Handling of plants in an improper fashion shall be cause for rejection of plant materials. Care must be taken during all phases of the location and planting procedures not to damage root system, trunk or branches. All plant materials shall be planted as soon after arrival at the site as possible. Contractor is responsible for keeping plants safe from injury by the construction activity and watered to prevent drying out before planting. Balled and burlapped plants shall be "Healed-in" and protected with burlap or other accepted material if they cannot be planted upon delivery. Plants with broken major branches, badly bruised or damaged bark are not acceptable and will be rejected.

1.5 PLANTING DATES

A. The planting season for trees, shrubs and groundcovers is between October 1st and June 1st of the following year. Do not plant if temperature is below freezing or above 90 degrees. Planting at any other time other than the planting season is the Contractor's option and full responsibility and without additional compensation. Planting may, at the option of the Contractor, be postponed into the following planting season but without additional compensation provided the Owner and local governing jurisdiction have approved.

C. Planting dates for sod, sprigging or seeding shall be per the grassing specification.

1.6 MEASUREMENT AND PAYMENT

A. Measurement - The items listed in the proposal shall be considered as sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not listed in bid form, but required to complete the work, shall be deemed to be a part of the item with which it is associated and shall be included in the cost of the unit shown on the bid form.

B. Payment - Payment for the unit shown on the bid form shall be considered to cover the cost of all labor, material, equipment, and performing all operations necessary to complete the work in place. No payment will be made for any material wasted, used for the convenience of the Contractor, unused or rejected.

1. Trees, Shrubs, and Groundcovers - Will be paid for at the contract unit price for planted/installed and accepted trees, shrubs, and groundcovers.
2. Payment for grassing will be made per the grassing specification.
3. Clearing - Will be paid for at the lump sum price for clearing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Contractor shall, at time of delivery, furnish Owner and / or Landscape Architect with invoices of all materials received; in order the quality and source of materials may be reviewed.

2.2 TOPSOIL

A. Topsoil shall be existing soil on site amended per Soil Test recommendations.

2.3 SEED

A. See grassing specification.

2.4 SPRIG

A. See grassing specification.

2.5 SOD

A. See grassing specification.

2.6 PLANT MATERIALS

A. Provide all plant materials as indicated on the plans. In the event of any discrepancies between quantities of plants indicated on the plant schedule and those indicated on the plan, plan quantities shall govern.

B. Plants shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs or larvae, and shall have healthy, well developed root systems. Plants shall be from a nursery within 300 miles north or south of the project location and shall have been grown under climate conditions similar to those in the locality of project. Trees for planting in rows shall be uniform in size and shape.

B. Plants shall possess a normal balance between height and width. Plants shall be measured when branches are in their normal position. Height and spread dimensions specified refer to the main body of plant and not from branch tip to tip. Plants larger in size than specified may be used with no change in contract price.

C. Plants shall be dug with firm natural balls of earth, of diameter not less than recommended by American Standard for Nursery Stock and of sufficient depth to include fibrous and feeding roots. Plants will not be accepted if ball is cracked or broken before or during planting operations.

D. Trees specified for Street Tree Grade shall conform to standards of the A.N.L.A.:

1. Suitable for planting as street trees.
2. Free of branches to approximately 50% of height from ground.
3. Crown of tree shall be in good balance with the trunk.

2.7 FERTILIZER

A. Commercial fertilizer shall be slow release 5-10-10 or 6-12-12 (or as recommended by soil test), uniform in composition, free flowing, and suitable for application with appropriate equipment. Deliver to site unopened in manufacturer's standard containers showing weight, analysis and name of manufacturer. If stored on site, protect from the elements.

2.8 PEAT MOSS

A. Peat moss shall be finely shredded, 90% organic moss peat, brown in color and suitable for horticultural purposes. Peat shall be measured in air dry condition, containing not more than 35% moisture by weight. Ash content shall not exceed 10%.

2.9 MULCH FOR TREES, SHRUBS, AND GROUND COVERS

A. Mulch for non bio-retention areas shall be as shown on plans.

B. Mulch for bio-retention areas shall be shredded hardwood.

2.10 STAKING EQUIPMENT

A. Trees and palms shall be staked as shown in landscape plans.

2.11 WATER

A. Contractor shall provide water to the project via the installation of a new irrigation system for the area shown on the plans. For bidding purposes, the contractor shall assume drilling a new well with associated pumps and controls as needed for irrigation.

PART 3 - EXECUTION

3.1 FINE GRADING

A. All areas within limits of construction shall be fine graded to the desired grades. All areas within limits of construction are to be fine graded, free of roots, debris and/or other objectionable material, before planting or grassing commence. Any additional fill material needed to fill low or uneven areas shall be provided by the Contractor. Positive drainage away from structures shall be provided in all plant beds so standing water does not occur. Planting beds shall be raised above adjacent lawn areas to provide good drainage conditions.

B. Planting and grassed areas, if not loose, shall be loosened to a minimum depth of 3-inches before fertilizer, seed or sod is applied.

3.2 FERTILIZER AND SOIL AMENDMENTS

A. Contractor shall provide Topsoil Analysis Tests that has been performed by a State Agricultural Experiment Station, Soil and Water Conservation District, State University, or other qualified private testing laboratory, as approved by Landscape Architect.

B. Apply fertilizer and soil amendments after fine grading and mix thoroughly into upper 2 inches of soil.

C. Fertilizer and other necessary soil amendments shall be applied at the rate recommended by Topsoil Analysis Test.

3.3 SODDING

A. See grassing specification.

3.4 SPRIGGING

A. See grassing specification.

3.5 SEEDING

A. See grassing specification.

3.6 SEED PROTECTION

A. See grassing specification.

3.7 LAYOUT OF TREES, SHRUBS, AND GROUND COVERS

A. All plants shall be placed in the proper location as shown on construction plans, allowing Landscape Architect to review all plant locations prior to actual planting. Landscape Architect may make minor adjustments which shall not be cause for changes to the contract price.

3.8 OBSTRUCTIONS BELOW GROUND

A. Prior to excavating planting holes, Contractor shall determine the exact location of electrical, phone, or television cables or conduits, water, drainage or sewer lines, and any other subsurface structures and take precautions to protect them. Any damage to underground utilities shall be repaired immediately at the Contractor's expense.

B. In the event rock, underground construction work, or other obstructions are encountered in any plant hole excavation under this contract, alternate locations may be selected. Where locations cannot be changed, the obstructions shall be removed to a depth of not less than three (3) feet below grade and not less than six (6) inches below bottom of ball or roots when plant is properly set at the required grade. The Contractor shall be responsible for the removal of such rock or other underground obstructions encountered.

3.9 PLANTING HOLES

A. For trees, shrubs and ground covers the planting hole shall be as shown on planting details in the plans. Do not leave planting holes open overnight. In the event that plant holes are dug and not planted in a timely manner, install four (4) foot high orange safety fencing around all excavated areas.

3.10 PLANTING TREES AND SHRUBS

A. Shall be same as grown in the nursery and/or container soil level. Adjust bottom soil mix to insure proper planting level with the proposed surrounding grades. Check plants to insure proper vertical alignment.

B. Fill holes to proper height to receive plant, and thoroughly tamp before setting the plant. Set plant in upright position in the center of the hole, and compact the backfill mixture around the ball or roots. Add soil amendments as required to improve fertility of existing soil and plant growing conditions.

1. When balled or burlapped plants are set, compact topsoil around base of ball to fill all voids. All bindings shall be removed and the top half of burlap removed from around root ball. If burlap is made of natural fibers it can be laid back from the root mass or can be cut away. Remove all burlap if it is made of non-degradable material/fabric. All weeds growing on the root mass shall be removed prior to planting.
2. Containerized plants shall have the container removed prior to planting. Care shall be taken to protect root mass from injury and the root mass intact. If root mass shows evidence of being bound or matted, three vertical 1/2" deep cuts shall be made on alternate sides of the root mass and roots pulled away slightly. This is to untangle roots which have begun to "circle" the root mass and to encourage new root growth. All weeds growing in the root mass shall be removed prior to planting.
3. Roots of bare root plants shall be spread out and topsoil carefully worked in among them. Remove with a clean cut, any broken or frayed roots.

3.11 PLANTING GROUND COVERS

A. Planting beds shall be thoroughly worked to a depth of twelve (12) inches incorporating fertilizer and other soil improvements at the recommended rate suggest by the soils test. Rake prepared planting bed until level, smooth and free from all soil, lumps, rocks, sticks and other deleterious materials. Bed area should be neatly outlined. Space the plants evenly as indicated on the drawings. Plant only in soil that is moist and friable, and not wet or soggy. In the case of planting in the open on hot days, shorten the time between planting and watering.

3.12 WATERING

A. Thoroughly water each plant when the hole is 1/3 full, again at 2/3 full and then complete backfilling. Once backfilling is complete, water again, then tamp the soil in place until the surface of the backfill is level with the surrounding area and the plant bears the same relation of finished grade as it bore to existing grade before being dug.

B. Earth saucers shall be constructed around the perimeter of planting holes of all trees and all single planted shrubs. Earth saucers shall be minimum 3" high and compacted to retain water. Earth saucers shall not be installed in areas where the subsoil is very poorly drained or around mass shrub / groundcover plantings.

C. All trees and shrubs to be hand watered on a regular basis as necessary during the warranty period.

3.13 SOIL MIX

A. Shall be per existing soils on site with recommended amendments from soils test.

3.14 STAKING OF TALL PLANTS

A. Shall be done only if site / environment conditions make if required. If required, trees and palms shall be staked as indicated on the plans.

3.15 MULCHING

A. All plants shall be mulched with an evenly thick layer of clean mulch immediately after planting. Mass plant beds shall be completely mulched to the limits of the bed as shown on the plans. Limit of mulching for individual trees and shrubs shall be slightly beyond the saucer berm. The areas mulched shall be tidy and clean in appearance.

3.16 PRUNING

A. Remove dead, broken or bruised branches after planting using clean, sharp tools.

3.17 WEEDING

A. All planted areas shall be kept free from weeds and undesirable grasses until final acceptance by the Owner. See General notes on plans for additional information.

3.18 INSECT AND DISEASE CONTROL

A. All plant materials shall be disease or insect free upon arrival to the site, however, should any plants show signs of insect or disease infestations, Contractor shall identify nature of infestation and submit to Landscape Architect a proposed method of control. Contractor shall treat all infested plants at its expense. Should the infestation be wide spread and uncontrollable, plants affected shall be removed from site, fresh plants brought in and all other plants treated to prevent infestation of remaining plants at Contractor's expense.

3.19 CLEAN UP

A. Contractor is responsible for removing all trash, debris, rubbish and all other materials associated with the construction from site on a daily basis. All tags, flags, and labels will be removed from plants and trees. The site shall be left broom clean and tidy. Clean up of the site is a prerequisite to final acceptance by the Owner.

PART 4 - MAINTENANCE AND WARRANTY

4.1 MAINTENANCE

A. Protect all plantings (grass, plants and trees) until accepted by Owner. All damage, regardless of cause, shall be immediately repaired and plants replaced if necessary. Erect temporary fences, barricades, signs and other protection as needed to prevent trampling. Contractor is not responsible for replacement of damaged or missing plants and plant materials due to vandalism or other acts beyond the control of the Contractor if proper barriers or other safeguards have been maintained.

B. Maintenance shall include but is not limited to watering, weeding, cultivating, removal of dead material, mulch reapplication, resetting plants to proper grades or upright position, lawn mowing, fertilizing, and other necessary operations.

C. The Contractor shall repair immediately any areas damaged as a result of construction operations or erosion.

E. The Contractor shall maintain all proposed plantings until final acceptance is issued by the Owner.

F. At the end of the maintenance period, all plants shall be in a healthy growing condition. During the maintenance period, should the appearance of any plant indicate weakness and probability of dying, immediately replace without additional cost to the Owner. Replacements required because of vandalism or other causes beyond the control of the Contractor are not part of this contract.

4.2 WARRANTY

A. All shrubs, ground cover, and trees shall be guaranteed by the Contractor to be alive and healthy for a one year period after substantial completion is issued by the Owner. A final inspection with the Owner shall be conducted at the end of the warranty period to determine if any plants will be required to be replaced.

B. Any lawn, plant, or tree which is dead or not showing satisfactory growth shall be replaced at Contractor's expense at the end of warranty period. All replacements shall be of original quality and of a size equal to adjacent plants or trees of the same kind.

END OF SECTION

STATE OF SOUTH CAROLINA
THOMAS & HUTTON ENGINEERING CO.
No. 202
COA

State of South Carolina
LICENSED LANDSCAPE ARCHITECT
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WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC
CITY OF HANAHAN, SOUTH CAROLINA
NORTH POINTE COMMERCE PARK – LOT A
GRASSING SPECIFICATIONS

JOB NO:	J-23577.0013
DATE:	06/04/2021
DRAWN:	EMD
DESIGNED:	EMD
REVIEWED:	FIT
APPROVED:	MCR
SCALE:	NOT TO SCALE

L2.3

STORMWATER MANAGEMENT REPORT FOR:

NORTH POINTE COMMERCE PARK
LOT A
HANAHAN, SOUTH CAROLINA

PREPARED FOR:
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

J-23577.0013

JUNE 4, 2021

Prepared by:

THOMAS & HUTTON

Savannah, GA | Charleston, SC | Myrtle Beach, SC | Brunswick, GA | Charlotte, NC

TABLE OF CONTENTS

APPENDICES

SECTION 1 – SUMMARY OF RESULTS

TABLE 1 Summary of Results – Peak Runoff (Site Only)				
	Peak Runoff (cfs)			
Location	*1-yr*	*10-yr*	*25-yr*	*100-yr*
Pre-Development				
Outfall				
East	0.37	1.13	1.55	2.33
North	1.68	4.90	6.70	9.99
South	26.75	52.70	65.55	88.03
Post-Development				
Outfall				
East	-	-	-	-
North	0.17	0.51	0.69	1.04
South	26.75	51.84	64.12	85.69

			Peak Pond Stage (ft)			
Pond	**NWL (ft)**	**TOB (ft)**	*1-yr*	*10-yr*	*25-yr*	*100-yr*
1	24.00	28.00	25.47	26.75	27.12	27.65

SECTION 2 – PROJECT NARRATIVE

North Pointe Commerce Park Lot A is a proposed industrial warehouse facility to be located on North Pointe Industrial Boulevard which is located off of North Rhett Avenue in the City of Hanahan, South Carolina. The site for the future building is currently wooded.
The proposed build-out condition of the site consists of an industrial warehouse facility with truck docks, associated parking, and a stormwater detention ponds. The pond will be equipped with an outfall structure that will discharge the ditch located to the southwest of the development while meeting detention and water quality requirements.

SECTION 3 – PURPOSE

- To define the limits of the drainage basin or basins that contain this project.

- To document that major drainage infrastructure such as drainage connectors, ponds, and outfalls are adequate for all existing and proposed development within the drainage basin.

- To document compliance with regulatory requirements of the State of South Carolina and the City of Hanahan summarized as follows:

    - Post Development peak runoff rates shall be detained for 2 and 10 year storms.
    - Paek Stages in ponds shall be below the minimum Finished Floor Elevations.
    - Water Quality shall be maintained by retaining specified amounts of runoff in a 24 hour period.
    - Sediment shall be prevented from leaving the site during construction.

SECTION 4 – PROPOSED DRAINAGE SYSTEM

The post-development drainage system will consist of two ponds serving serving the entire development. This pond will outfall into the ditch located to the southwest of the development that ultimately drains into the Goose Creek Reservoir. The outfalling ditch for the proposed development is subject to tailwater conditions from offsite developments downstream of the North Pointe Industrial Park. The hydrographs for these conditions can be found under Appendix F.

SECTION 5 – STORMWATER QUANTITY METHODOLOGY

The existing and proposed conditions will be analyzed using the Storm and Sanitary Analysis (SSA) computer program developed by Autodesk. The program is used to model rainfall and stormwater runoff and to perform hydraulic routing through the storm drainage system. The SSA program analyzes complex interconnected drainage systems dynamically over extended time periods.

The hydrologic input data consists of information for each drainage basin, or subwatershed, within the project. Input variables include runoff curve number, rainfall distribution pattern, hydrograph peaking factor, area of each drainage basin, and time of concentration (see below section "Hydrology" for specifics on the values of these variables that were used in this model). The SSA program generates runoff hydrographs for each subwatershed based on the user–specified variables. Hydrographs are generated by SSA using the SCS Unit Hydrograph Method.

The model hydraulic input data consists of a system of nodes and links. Nodes represent locations where flows enter or exit the system, pipe or channel characteristics change, or where stage/storage/time relationships are provided. Links represent traditional types of hydraulic conveyance such as pipes, channels, drop structures, weirs, etc. The sizes, inverts, lengths, and Manning n values for all pipes connecting the lagoons are input into the model. In addition to pipe information, all lagoon and detention area stage–storage information and the respective outfall structure information is input into the model. The node and link conditions are analyzed within the model for a given storm, and flow conditions are determined.

The basic equation used by SSA to route flows through the system is:

$$\Delta s = (Q_{in} - Q_{out})\ \Delta t$$

Where:

Δs	=	Change in storage for time step
Q_{in}	=	Flow into a node at time "t"
Q_{out}	=	Flow out of a node at time "t"
Δt	=	Length of time step; user defined range from 1.0 sec to 0.1 sec.

Hydrographs for each drainage area are merged within the SSA program, and the hydrologic results are then combined with the hydraulic information to model the hydraulic interactions of the entire drainage system. The results include lagoon and detention area discharge rates and stage/storage information during the design storm.

Please refer to Appendix A – Pre- and Post-Development CN & Tc for curve numbers and times of concentration used for each drainage basin in the SSA models.

For the design of the storm drainage system, a warning stage elevation is set for the basin and structure to assure no stormwater ponding. In addition, the ultimate discharge rate from the system cannot exceed the pre–developed runoff rate. Knowing these two factors, the drainage system is designed by trial and error.

SECTION 6 – HYDROLOGY

- SCS Unit Hydrograph Method is used.

- Amount of rainfall for each storm was obtained from the City of Hanahan Stormwater Design Standards & Procedures Manual. The following design storms are used in the model simulations:

TABLE 3
Rainfall Amounts

Storm Event	Duration	Rainfall (inches)
2-year	24-hour Design Storm	4.0
10-year	24-hour Design Storm	6.2
25-year	24-hour Design Storm	7.5
50-year	24-hour Design Storm	8.6
100-year	24-hour Design Storm	9.8

- SCS Type III Statistical Rainfall Distribution is used. This distribution pattern is determined by the Soil Conservation Service comparing regional rain-gage data.

- A 323 Hydrograph Peaking Factor is used instead of the Typical SCS 484 Peaking Factor. The 323 Factor is based on statistical analysis of actual rainfall and runoff data from the Southeastern United States, and is typical for coastal areas.

SECTION 7 – PRE-DEVELOPMENT RUNOFF CALCULATIONS

Pre–development peak flow rates for each design storm are calculated by the SSA program.

7.1 Curve Numbers

Curve numbers are generated according to procedures set forth in SCS TR–55. The composite curve numbers for each drainage basin are calculated using soils information from the SCS Soil Survey of Berkley County. Pre–Development Curve Numbers were weighted based on the type and amount of soil within the basin. TR-55 in SSA was used to caculate the weighted curve number. See Appendix A.

7.2 Time of Concentration

Times of concentration were calculated according to procedures set forth in SCS Hydrology Technical Note No. N4. The travel times (T_t) for overland flow, shallow concentrated flow, and channel flow are added together for the drainage basin to get the time of concentration T_c.

- Overland Flow
  The equation for overland flow travel time is as follows:

  $$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}S^{0.4}}$$

  Where: n = Manning's friction factor
  L = slope length (ft)
  S = Slope (ft/ft)
  P_2 = 24-hour precipitation (inches)

  The travel time as calculated in the above equation in hours. Multiply by 60 minutes per hour to convert to minutes.

- Shallow Concentrated Flow
  The equation for shallow concentrated flow travel time is as follows:

  $$T_t = \frac{L}{60v} \text{ (min)}$$

  Where: L = length (ft)
  v = velocity (ft/sec)

  The velocity is determined using the TR-55 method.

- Channel and Pipe Flow
  The equation for channel flow travel time is as follows:

  $$T_t = \frac{L}{60v} \text{ (min)}$$

  Where: L = length of channel (ft)
  v = velocity (ft/sec)

  The velocity is determined using Manning's equation:

  $$v = (1.49/n)r^{2/3}S^{1/2}$$

  Where: r = hydraulic radius (ft) = A/P

A_x = cross-sectional area (sf)
P = wetted perimeter (ft)
S = slope (ft/ft)

The equation for pipe flow travel time is as follows:

$T_t = \frac{L}{60v}$ (min) Where: L = length of pipe (ft)
v = velocity (ft/sec)

The velocity is assumed at 2 ft/sec.

Travel times for each sub-basin were then added together to determine the time of concentration for each pre-developed drainage area.

SECTION 8 – POST-DEVELOPMENT RUNOFF CALCULATIONS

The components of the proposed system are inlets, storm pipes, ponds, and outfalls. A piped drainage system conveys runoff from the buildings, truck docks, driveways and parking areas to the ponds.

8.1 Curve Numbers

Curve numbers are generated according to procedures set forth in SCS TR–55. The composite curve numbers for each drainage basin are calculated using soils information from the SCS Soil Survey of Berkley County. Post–Development Curve Numbers were weighted based on the type and amount of soil within the basin. TR-55 in SSA was used to calculate the weighted curve number. See Appendix B.

8.2 Time of Concentration

Times of concentration for post-development are determined according to the longest anticipated travel path within each basin. The travel times (T_t) for overland flow, shallow concentrated flow, and pipe flow are added together for each drainage basin to calculate the time of concentration T_c.

- Overland Flow

  The equation for overland flow travel time is as follows:

  $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}S^{0.4}}$ Where: n = Manning's friction factor
  L = slope length (ft)
  S = Slope (ft/ft)
  P_2 = 24-hour precipitation (inches)
  For 2-year storm event

  The travel time as calculated in the above equation is in hours. Multiply the result by 60 minutes per hour to convert to minutes.

- Shallow Concentrated Flow

  The equation for shallow concentrated flow travel time is as follows:

  $T_t = \frac{L}{60v}$ (min) Where: L = length (ft)
  v = velocity (ft/sec)

The velocity is determined using the TR-55 method.

- Channel and Pipe Flow

  The equation for channel flow travel time is as follows:

  $T_t = \frac{L}{60v}$ (min.) Where: L = length of channel (ft), v = velocity (ft/sec)

  The velocity is determined using Manning's equation:

  $v = (1.49/n)r^{2/3}S^{1/2}$ Where: r = hydraulic radius (ft) = A/P, A_x = cross-sectional area (sf), P = wetted perimeter (ft), S = slope (ft/ft)

  The equation for pipe flow travel time is as follows:

  $T_t = \frac{L}{60v}$ (min) Where: L = length of pipe (ft), v = velocity (ft/sec)

  The velocity is assumed at 2 ft/sec.

Travel times for each sub-basin were then added together to calculated time of concentration for each post-developed drainage area.

The minimum time of concentration used for any basin is six (6) minutes. Times of concentration are generated according to procedures set forth in SCS Technical Release 55. TR-55 in SSA was used to calculate the time of concentrations. See Appendix A.

The specific hydrology theory is described in the Soils Conservation Services National Handbook, Section 4, "Hydrology."

Post-development drainage basins are shown in an attached exhibit in Appendix D. Refer to Appendix B for design parameters and Post-Development SSA model input and results.

SECTION 9 – CONCLUSIONS

This report documents that the proposed stormwater management system for the proposed development will meet applicable State of South Carolina (SCDHEC/OCRM) and City of Hanahan regulations.

STORMWATER MANAGEMENT REPORT

NORTH POINTE COMMERCE PARK
LOT A

APPENDIX A

PRE- AND POST-DEVELOPMENT CN & TC

J-23577.0013

THOMAS & HUTTON

Subbasin Hydrology

Subbasin : EAST

Input Data

Area (ac)	1.03
Peak Rate Factor	323.00
Weighted Curve Number	70.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	1.03	-	70.00
Composite Area & Weighted CN	1.03		70.00

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.8	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	.5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.00	0.00	0.00
Velocity (ft/sec) :	0.03	0.00	0.00
Computed Flow Time (min) :	58.22	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	80	0.00	0.00
Slope (%) :	.5	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.14	0.00	0.00
Computed Flow Time (min) :	1.17	0.00	0.00

Total TOC (min) 59.39

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	6.05
Peak Runoff (cfs)	2.33
Weighted Curve Number	70.00
Time of Concentration (days hh:mm:ss)	0 00:59:23

Subbasin : NORTH

Input Data

Area (ac) 4.66
Peak Rate Factor 323.00
Weighted Curve Number 71.03
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	4.30	C	70.00
> 75% grass cover, Good	0.22	C	74.00
Paved parking & roofs	0.14	C	98.00
Composite Area & Weighted CN	4.66		71.03

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.8	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	.5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.00	0.00	0.00
Velocity (ft/sec) :	0.03	0.00	0.00
Computed Flow Time (min) :	58.22	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	560	0.00	0.00
Slope (%) :	.5	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.14	0.00	0.00
Computed Flow Time (min) :	8.19	0.00	0.00

Total TOC (min) 66.41

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 6.18
Peak Runoff (cfs) 10.02
Weighted Curve Number 71.03
Time of Concentration (days hh:mm:ss) 0 01:06:25

Subbasin : OFFSITE

Input Data

Area (ac) 15.00
Peak Rate Factor 323.00
Weighted Curve Number 90.60
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	12.00	B	98.00
> 75% grass cover, Good	3.00	B	61.00
Composite Area & Weighted CN	15.00		90.60

Time of Concentration

User-Defined TOC override (minutes): 20

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 8.66
Peak Runoff (cfs) 81.65
Weighted Curve Number 90.60
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : OUTDITCH

Input Data

Area (ac)	0.44
Peak Rate Factor	323.00
Weighted Curve Number	74.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.44	C	74.00
Composite Area & Weighted CN	0.44		74.00

Time of Concentration

User-Defined TOC override (minutes): 25

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	6.56
Peak Runoff (cfs)	1.76
Weighted Curve Number	74.00
Time of Concentration (days hh:mm:ss)	0 00:25:00

Subbasin : SOUTH

Input Data

Area (ac) 4.79
Peak Rate Factor 323.00
Weighted Curve Number 70.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	4.79	C	70.00
Composite Area & Weighted CN	4.79		70.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.8	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	.5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	4.00	0.00	0.00
Velocity (ft/sec) :	0.03	0.00	0.00
Computed Flow Time (min) :	58.22	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	441	0.00	0.00
Slope (%) :	.5	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.14	0.00	0.00
Computed Flow Time (min) :	6.45	0.00	0.00

Total TOC (min) 64.67

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 6.05
Peak Runoff (cfs) 10.25
Weighted Curve Number 70.00
Time of Concentration (days hh:mm:ss) 0 01:04:40

Subbasin Hydrology

Subbasin : EMPLPARK

Input Data

Area (ac)	2.43
Peak Rate Factor	323.00
Weighted Curve Number	81.60
Rain Gage ID	

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	1.09	C	74.00
Paved parking & roofs	0.85	C	98.00
Woods, Good	0.49	C	70.00
Composite Area & Weighted CN	2.43		81.60

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	7.53
Peak Runoff (cfs)	13.55
Weighted Curve Number	81.60
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : FRONTAGE

Input Data

Area (ac) 0.23
Peak Rate Factor 323.00
Weighted Curve Number 70.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	0.23	C	70.00
Composite Area & Weighted CN	0.23		70.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 6.04
Peak Runoff (cfs) 1.06
Weighted Curve Number 70.00
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : LOOPANDPONDAREA

Input Data

Area (ac) 1.91
Peak Rate Factor 323.00
Weighted Curve Number 88.40
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.76	C	74.00
Paved parking & roofs	1.15	C	98.00
Composite Area & Weighted CN	1.91		88.40

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 8.38
Peak Runoff (cfs) 11.49
Weighted Curve Number 88.40
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : OFFSITE

Input Data

Area (ac) 15.00
Peak Rate Factor 323.00
Weighted Curve Number 90.60
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	12.00	C	98.00
> 75% grass cover, Good	3.00	B	61.00
Composite Area & Weighted CN	15.00		90.60

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 8.66
Peak Runoff (cfs) 81.65
Weighted Curve Number 90.60
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : OUTDITCH

Input Data

Area (ac) 0.44
Peak Rate Factor 323.00
Weighted Curve Number 74.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.44	C	74.00
Composite Area & Weighted CN	0.44		74.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 6.56
Peak Runoff (cfs) 1.76
Weighted Curve Number 74.00
Time of Concentration (days hh:mm:ss) 0 00:25:00

Subbasin : SOUTHSWALES

Input Data

Area (ac) 0.88
Peak Rate Factor 323.00
Weighted Curve Number 74.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.88	C	74.00
Composite Area & Weighted CN	0.88		74.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 6.56
Peak Runoff (cfs) 3.89
Weighted Curve Number 74.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : WHSE1A

Input Data

Area (ac) 1.09
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.09	C	98.00
Composite Area & Weighted CN	1.09		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 7.89
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1B

Input Data

Area (ac) 1.39
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.39	C	98.00
Composite Area & Weighted CN	1.39		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 10.07
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1C

Input Data

Area (ac) 1.38
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.38	C	98.00
Composite Area & Weighted CN	1.38		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 10.03
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1D

Input Data

Area (ac) 1.17
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID .....

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.17	C	98.00
Composite Area & Weighted CN	1.17		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 8.50
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

STORMWATER MANAGEMENT REPORT

NORTH POINTE COMMERCE PARK
LOT A

APPENDIX B

SSA PRE-DEVELOPMENT
MODEL INPUT AND OUTPUT

J-23577.0013

THOMAS & HUTTON

Project Description

File Name	23577.0013 - Pre-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 26, 2021	00:00:00
End Analysis On	May 28, 2021	00:00:00
Start Reporting On	May 26, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	5
Nodes	6
Junctions	3
Outfalls	3
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	3
Channels	2
Pipes	1
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EAST	1.03	323.00	70.00	3.60	1.07	1.10	0.37	0 00:59:23
2	NORTH	4.66	323.00	71.03	3.60	1.13	5.26	1.68	0 01:06:24
3	OFFSITE	15.00	323.00	90.60	3.60	2.60	38.97	25.94	0 00:20:00
4	OUTDITCH	0.44	323.00	74.00	3.60	1.31	0.58	0.34	0 00:25:00
5	SOUTH	4.79	323.00	70.00	3.60	1.07	5.12	1.64	0 01:04:40

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	Junction	23.30	30.00	23.30	30.00	10.00	26.23	25.58	0.00	4.42	0 00:00	0.00	0.00
2	OUTDITCH2	Junction	23.30	30.00	23.30	30.00	10.00	26.86	24.50	0.00	5.50	0 00:00	0.00	0.00
3	OUTDITCH3	Junction	23.00	30.00	23.00	30.00	10.00	26.75	24.17	0.00	5.83	0 00:00	0.00	0.00
4	OUT-EAST	Outfall	28.00					0.37	28.00					
5	OUT-NORTH	Outfall	29.00					1.68	29.00					
6	OUT-SOUTH	Outfall	22.50					26.75	23.43					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-03	Pipe	OUTDITCH3	OUT-SOUTH	40.00	23.00	22.50	1.2500	3.000	0.0150	26.75	129.26	0.21	6.08	1.05	0.35	0.00	Calculated
2	Link-01	Channel	OUTDITCH1	OUTDITCH2	450.00	24.00	23.30	0.1600	5.000	0.0320	26.05	357.80	0.07	2.05	1.38	0.28	0.00	
3	Link-02	Channel	OUTDITCH2	OUTDITCH3	50.00	23.30	23.00	0.6000	5.000	0.0320	26.75	702.71	0.04	2.64	1.18	0.24	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	26.23	26.23	25.58	2.28	0.00	4.42	24.06	0.76	0 12:21	0 00:00	0.00	0.00
2	OUTDITCH2	26.86	1.64	24.50	1.20	0.00	5.50	23.40	0.10	0 12:23	0 00:00	0.00	0.00
3	OUTDITCH3	26.75	0.00	24.17	1.17	0.00	5.83	23.10	0.10	0 12:23	0 00:00	0.00	0.00

Project Description

File Name	23577.0013 - Pre-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 26, 2021	00:00:00
End Analysis On	May 28, 2021	00:00:00
Start Reporting On	May 26, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	5
Nodes	6
Junctions	3
Outfalls	3
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	3
Channels	2
Pipes	1
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EAST	1.03	323.00	70.00	6.20	2.96	3.06	1.13	0 00:59:23
2	NORTH	4.66	323.00	71.03	6.20	3.06	14.28	4.90	0 01:06:24
3	OFFSITE	15.00	323.00	90.60	6.20	5.11	76.62	49.52	0 00:20:00
4	OUTDITCH	0.44	323.00	74.00	6.20	3.35	1.48	0.90	0 00:25:00
5	SOUTH	4.79	323.00	70.00	6.20	2.97	14.20	4.95	0 01:04:40

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	Junction	23.30	30.00	23.30	30.00	10.00	50.35	26.12	0.00	3.88	0 00:00	0.00	0.00
2	OUTDITCH2	Junction	23.30	30.00	23.30	30.00	10.00	52.97	25.06	0.00	4.94	0 00:00	0.00	0.00
3	OUTDITCH3	Junction	23.00	30.00	23.00	30.00	10.00	52.70	24.76	0.00	5.24	0 00:00	0.00	0.00
4	OUT-EAST	Outfall	28.00					1.13	28.00					
5	OUT-NORTH	Outfall	29.00					4.90	29.00					
6	OUT-SOUTH	Outfall	22.50					52.70	23.83					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-03	Pipe	OUTDITCH3	OUT-SOUTH	40.00	23.00	22.50	1.2500	3.000	0.0150	52.70	129.26	0.41	7.16	1.54	0.52	0.00	Calculated
2	Link-01	Channel	OUTDITCH1	OUTDITCH2	450.00	24.00	23.30	0.1600	5.000	0.0320	50.02	357.80	0.14	2.40	1.93	0.39	0.00	
3	Link-02	Channel	OUTDITCH2	OUTDITCH3	50.00	23.30	23.00	0.6000	5.000	0.0320	52.70	702.71	0.07	2.91	1.76	0.35	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	50.35	50.35	26.12	2.82	0.00	3.88	24.15	0.85	0 12:20	0 00:00	0.00	0.00
2	OUTDITCH2	52.97	4.94	25.06	1.76	0.00	4.94	23.45	0.15	0 12:23	0 00:00	0.00	0.00
3	OUTDITCH3	52.70	0.00	24.76	1.76	0.00	5.24	23.16	0.16	0 12:23	0 00:00	0.00	0.00

Project Description

File Name	23577.0013 - Pre-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 26, 2021	00:00:00
End Analysis On	May 28, 2021	00:00:00
Start Reporting On	May 26, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	5
Nodes	6
Junctions	3
Outfalls	3
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	3
Channels	2
Pipes	1
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EAST	1.03	323.00	70.00	7.50	4.04	4.17	1.55	0 00:59:23
2	NORTH	4.66	323.00	71.03	7.50	4.15	19.35	6.70	0 01:06:24
3	OFFSITE	15.00	323.00	90.60	7.50	6.38	95.76	61.18	0 00:20:00
4	OUTDITCH	0.44	323.00	74.00	7.50	4.48	1.97	1.21	0 00:25:00
5	SOUTH	4.79	323.00	70.00	7.50	4.04	19.33	6.81	0 01:04:40

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	Junction	23.30	30.00	23.30	30.00	10.00	62.29	26.34	0.00	3.66	0 00:00	0.00	0.00
2	OUTDITCH2	Junction	23.30	30.00	23.30	30.00	10.00	65.90	25.63	0.00	4.37	0 00:00	0.00	0.00
3	OUTDITCH3	Junction	23.00	30.00	23.00	30.00	10.00	65.54	25.50	0.00	4.50	0 00:00	0.00	0.00
4	OUT-EAST	Outfall	28.00					1.55	28.00					
5	OUT-NORTH	Outfall	29.00					6.70	29.00					
6	OUT-SOUTH	Outfall	22.50					65.55	24.94					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-03	Pipe	OUTDITCH3	OUT-SOUTH	40.00	23.00	22.50	1.2500	3.000	0.0150	65.55	129.26	0.51	5.29	2.45	0.82	0.00	Calculated
2	Link-01	Channel	OUTDITCH1	OUTDITCH2	450.00	24.00	23.30	0.1600	5.000	0.0320	61.71	357.80	0.17	2.22	2.32	0.47	0.00	
3	Link-02	Channel	OUTDITCH2	OUTDITCH3	50.00	23.30	23.00	0.6000	5.000	0.0320	65.54	702.71	0.09	2.22	2.41	0.48	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	62.29	62.29	26.34	3.04	0.00	3.66	24.20	0.90	0 12:21	0 00:00	0.00	0.00
2	OUTDITCH2	65.90	6.80	25.63	2.33	0.00	4.37	23.86	0.56	0 12:23	0 00:00	0.00	0.00
3	OUTDITCH3	65.54	0.00	25.50	2.50	0.00	4.50	23.78	0.78	0 12:23	0 00:00	0.00	0.00

Project Description

File Name	23577.0013 - Pre-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 26, 2021	00:00:00
End Analysis On	May 28, 2021	00:00:00
Start Reporting On	May 26, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	5
Nodes	6
Junctions	3
Outfalls	3
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	3
Channels	2
Pipes	1
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EAST	1.03	323.00	70.00	9.80	6.05	6.24	2.33	0 00:59:23
2	NORTH	4.66	323.00	71.03	9.80	6.18	28.81	10.02	0 01:06:24
3	OFFSITE	15.00	323.00	90.60	9.80	8.66	129.84	81.65	0 00:20:00
4	OUTDITCH	0.44	323.00	74.00	9.80	6.56	2.89	1.76	0 00:25:00
5	SOUTH	4.79	323.00	70.00	9.80	6.05	28.94	10.25	0 01:04:40

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	Junction	23.30	30.00	23.30	30.00	10.00	83.28	26.75	0.00	3.25	0 00:00	0.00	0.00
2	OUTDITCH2	Junction	23.30	30.00	23.30	30.00	10.00	88.72	26.22	0.00	3.78	0 00:00	0.00	0.00
3	OUTDITCH3	Junction	23.00	30.00	23.00	30.00	10.00	88.02	26.12	0.00	3.88	0 00:00	0.00	0.00
4	OUT-EAST	Outfall	28.00					2.33	28.00					
5	OUT-NORTH	Outfall	29.00					9.99	29.00					
6	OUT-SOUTH	Outfall	22.50					88.03	25.28					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-03	Pipe	OUTDITCH3	OUT-SOUTH	40.00	23.00	22.50	1.2500	3.000	0.0150	88.03	129.26	0.68	6.32	2.88	0.96	0.00	Calculated
2	Link-01	Channel	OUTDITCH1	OUTDITCH2	450.00	24.00	23.30	0.1600	5.000	0.0320	82.19	357.80	0.23	2.20	2.83	0.57	0.00	
3	Link-02	Channel	OUTDITCH2	OUTDITCH3	50.00	23.30	23.00	0.6000	5.000	0.0320	88.02	702.71	0.13	2.07	3.02	0.60	0.00	

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	OUTDITCH1	83.28	83.28	26.75	3.45	0.00	3.25	24.32	1.02	0 12:21	0 00:00	0.00	0.00
2	OUTDITCH2	88.72	10.23	26.22	2.92	0.00	3.78	24.02	0.72	0 12:23	0 00:00	0.00	0.00
3	OUTDITCH3	88.02	0.00	26.12	3.12	0.00	3.88	23.95	0.95	0 12:23	0 00:00	0.00	0.00

STORMWATER MANAGEMENT REPORT

NORTH POINTE COMMERCE PARK
LOT A

APPENDIX C

SSA POST-DEVELOPMENT
MODEL INPUT AND OUTPUT

J-23577.0013

THOMAS & HUTTON

Project Description

File Name	23577.0013 - Post-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 25, 2021	00:00:00
End Analysis On	May 27, 2021	00:00:00
Start Reporting On	May 25, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	10
Nodes	16
Junctions	11
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	16
Channels	2
Pipes	10
Pumps	0
Orifices	1
Weirs	3
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EMPLPARK	2.43	323.00	81.60	3.60	1.84	4.46	3.38	0 00:15:00
2	FRONTAGE	0.23	323.00	70.00	3.60	1.07	0.25	0.17	0 00:15:00
3	LOOPANDPONDAREA	1.91	323.00	88.40	3.60	2.40	4.58	3.47	0 00:15:00
4	OFFSITE	15.00	323.00	90.60	3.60	2.60	38.97	25.94	0 00:20:00
5	OUTDITCH	0.44	323.00	74.00	3.60	1.31	0.58	0.34	0 00:25:00
6	SOUTHSWALES	0.88	323.00	74.00	3.60	1.31	1.15	0.75	0 00:20:00
7	WHSE1A	1.09	323.00	98.00	3.60	3.37	3.67	2.87	0 00:10:00
8	WHSE1B	1.39	323.00	98.00	3.60	3.37	4.68	3.66	0 00:10:00
9	WHSE1C	1.38	323.00	98.00	3.60	3.37	4.65	3.65	0 00:10:00
10	WHSE1D	1.17	323.00	98.00	3.60	3.37	3.94	3.09	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	Junction	22.00	27.50	22.00	27.50	10.00	15.70	25.47	0.00	2.03	0 00:00	0.00	0.00
2	Inlet-02	Junction	21.44	27.82	21.44	27.82	10.00	21.16	27.84	0.02	0.00	0 00:02	0.00	0.00
3	Inlet-03	Junction	20.90	27.82	20.90	27.82	10.00	35.99	27.83	0.01	0.00	0 00:03	0.00	0.00
4	Inlet-04	Junction	20.35	27.82	20.35	27.82	10.00	55.40	27.85	0.03	0.00	0 00:00	0.00	0.00
5	Jun-01	Junction	22.09	31.76	22.09	31.76	10.00	3.17	26.57	0.00	5.19	0 00:00	0.00	0.00
6	Jun-04	Junction	23.30	30.00	23.30	30.00	10.00	26.97	25.61	0.00	4.39	0 00:00	0.00	0.00
7	Jun-05	Junction	23.30	30.00	23.30	30.00	10.00	26.90	24.50	0.00	5.50	0 00:00	0.00	0.00
8	Jun-06	Junction	23.00	30.00	23.00	30.00	10.00	26.75	24.17	0.00	5.83	0 00:00	0.00	0.00
9	Jun-07	Junction	30.00	35.00	30.00	35.00	10.00	0.17	30.15	0.00	4.85	0 00:00	0.00	0.00
10	Jun-09	Junction	24.00	30.00	24.00	30.00	10.00	0.27	24.50	0.00	11.50	0 00:00	0.00	0.00
11	Jun-10	Junction	22.45	30.78	22.45	30.78	0.00	7.50	25.47	0.00	5.31	0 00:00	0.00	0.00
12	Out-03	Outfall	22.50					26.75	23.43					
13	Out-05	Outfall	29.00					0.17	29.15					
14	Stor-01	Storage Node	19.00	28.00	24.00		0.00	18.92	25.47				0.00	0.00
15	Stor-02	Storage Node	27.00	31.00	27.00		0.00	3.33	27.54				0.00	0.00
16	Stor-03	Storage Node	0.00	6.00	0.00		0.00	0.00	0.00				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	Inlet-01	Inlet-02	163.00	22.00	21.60	0.2500	3.000	0.0150	15.70	28.64	0.55	3.29	3.00	1.00	2118.00	SURCHARGED
2	Link-02	Pipe	Inlet-02	Inlet-03	160.00	21.60	21.21	0.2400	3.000	0.0150	21.16	28.54	0.74	3.58	3.00	1.00	2151.00	SURCHARGED
3	Link-03	Pipe	Inlet-03	Inlet-04	160.00	20.71	20.32	0.2400	3.500	0.0150	35.99	51.12	0.70	5.92	3.50	1.00	2159.00	SURCHARGED
4	Link-04	Pipe	Inlet-04	Stor-01	103.00	20.32	20.00	0.3100	3.500	0.0150	55.40	50.83	1.09	6.43	3.50	1.00	2878.00	SURCHARGED
5	Link-05	Pipe	Stor-02	Jun-01	55.00	27.00	26.09	1.6500	2.000	0.0150	3.17	25.22	0.13	5.01	0.51	0.26	0.00	Calculated
6	Link-06	Pipe	Jun-01	Jun-10	224.00	26.09	22.45	1.6300	2.000	0.0150	3.17	24.99	0.13	1.55	1.24	0.62	0.00	Calculated
7	Link-11	Pipe	Jun-06	Out-03	40.00	23.00	22.50	1.2500	3.000	0.0150	26.75	129.26	0.21	6.08	1.05	0.35	0.00	Calculated
8	Link-13	Pipe	Jun-07	Out-05	100.00	30.00	29.00	1.0000	1.500	0.0150	0.17	9.10	0.02	1.96	0.15	0.10	0.00	Calculated
9	Link-14	Pipe	Jun-09	Jun-05	151.00	24.00	23.30	0.4600	2.000	0.0150	0.27	13.35	0.02	2.49	0.85	0.43	0.00	Calculated
10	Link-15	Pipe	Jun-10	Stor-01	150.00	22.45	20.00	1.6300	2.000	0.0150	7.50	25.06	0.30	3.13	2.00	1.00	2154.00	SURCHARGED
11	Link-09	Channel	Jun-04	Jun-05	450.00	24.00	23.30	0.1600	5.000	0.0320	26.78	357.80	0.07	2.08	1.40	0.28	0.00	
12	Link-10	Channel	Jun-05	Jun-06	50.00	23.30	23.00	0.6000	5.000	0.0320	26.75	702.71	0.04	2.64	1.18	0.24	0.00	
13	Weir-09	Orifice	Stor-01	Jun-09		19.00	24.00		0.250		0.27							
14	Weir-10	Weir	Stor-01	Jun-09		19.00	24.00				0.00							
15	Weir-11	Weir	Stor-01	Jun-09		19.00	24.00				0.00							
16	Weir-12	Weir	Stor-01	Jun-09		19.00	24.00				0.00							

Subbasin Hydrology

Subbasin : EMPLPARK

Input Data

Area (ac)	2.43
Peak Rate Factor	323.00
Weighted Curve Number	81.60
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	1.09	C	74.00
Paved parking & roofs	0.85	C	98.00
Woods, Good	0.49	C	70.00
Composite Area & Weighted CN	2.43		81.60

Subbasin Runoff Results

Total Rainfall (in)	3.60
Total Runoff (in)	1.84
Peak Runoff (cfs)	3.38
Weighted Curve Number	81.60
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : FRONTAGE

Input Data

Area (ac) 0.23
Peak Rate Factor 323.00
Weighted Curve Number 70.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	0.23	C	70.00
Composite Area & Weighted CN	0.23		70.00

Subbasin Runoff Results

Total Rainfall (in) 3.60
Total Runoff (in) 1.07
Peak Runoff (cfs) 0.17
Weighted Curve Number 70.00
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : LOOPANDPONDAREA

Input Data

Area (ac)	1.91
Peak Rate Factor	323.00
Weighted Curve Number	88.40
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.76	C	74.00
Paved parking & roofs	1.15	C	98.00
Composite Area & Weighted CN	1.91		88.40

Subbasin Runoff Results

Total Rainfall (in)	3.60
Total Runoff (in)	2.40
Peak Runoff (cfs)	3.47
Weighted Curve Number	88.40
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : OFFSITE

Input Data

Area (ac)	15.00
Peak Rate Factor	323.00
Weighted Curve Number	90.60
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	12.00	C	98.00
> 75% grass cover, Good	3.00	B	61.00
Composite Area & Weighted CN	15.00		90.60

Subbasin Runoff Results

Total Rainfall (in)	3.60
Total Runoff (in)	2.60
Peak Runoff (cfs)	25.94
Weighted Curve Number	90.60
Time of Concentration (days hh:mm:ss)	0 00:20:00

Subbasin : OUTDITCH

Input Data

Area (ac) 0.44
Peak Rate Factor 323.00
Weighted Curve Number 74.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.44	C	74.00
Composite Area & Weighted CN	0.44		74.00

Subbasin Runoff Results

Total Rainfall (in) 3.60
Total Runoff (in) 1.31
Peak Runoff (cfs) 0.34
Weighted Curve Number 74.00
Time of Concentration (days hh:mm:ss) 0 00:25:00

Subbasin : SOUTHSWALES

Input Data

Area (ac)	0.88
Peak Rate Factor	323.00
Weighted Curve Number	74.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.88	C	74.00
Composite Area & Weighted CN	0.88		74.00

Subbasin Runoff Results

Total Rainfall (in)	3.60
Total Runoff (in)	1.31
Peak Runoff (cfs)	0.75
Weighted Curve Number	74.00
Time of Concentration (days hh:mm:ss)	0 00:20:00

Subbasin : WHSE1A

Input Data

Area (ac)	1.09
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.09	C	98.00
Composite Area & Weighted CN	1.09		98.00

Subbasin Runoff Results

Total Rainfall (in)	3.60
Total Runoff (in)	3.37
Peak Runoff (cfs)	2.87
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : WHSE1B

Input Data

Area (ac) 1.39
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.39	C	98.00
Composite Area & Weighted CN	1.39		98.00

Subbasin Runoff Results

Total Rainfall (in) 3.60
Total Runoff (in) 3.37
Peak Runoff (cfs) 3.66
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1C

Input Data

Area (ac) 1.38
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.38	C	98.00
Composite Area & Weighted CN	1.38		98.00

Subbasin Runoff Results

Total Rainfall (in) 3.60
Total Runoff (in) 3.37
Peak Runoff (cfs) 3.65
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1D

Input Data

Area (ac)	1.17
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.17	C	98.00
Composite Area & Weighted CN	1.17		98.00

Subbasin Runoff Results

Total Rainfall (in)	3.60
Total Runoff (in)	3.37
Peak Runoff (cfs)	3.09
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	15.70	2.80	25.47	3.47	0.00	2.03	24.96	2.96	1 00:04	0 00:00	0.00	0.00
2	Inlet-02	21.16	3.57	27.84	6.40	0.02	0.00	24.96	3.52	0 00:02	0 00:02	0.00	0.00
3	Inlet-03	35.99	3.55	27.83	6.93	0.01	0.00	24.96	4.06	0 00:03	0 00:03	0.00	0.00
4	Inlet-04	55.40	3.02	27.85	7.50	0.03	0.00	24.96	4.61	0 00:00	0 00:00	0.00	0.00
5	Jun-01	3.17	0.00	26.57	4.48	0.00	5.19	25.31	3.22	0 12:22	0 00:00	0.00	0.00
6	Jun-04	26.97	26.97	25.61	2.31	0.00	4.39	24.06	0.76	0 12:21	0 00:00	0.00	0.00
7	Jun-05	26.90	0.00	24.50	1.20	0.00	5.50	23.43	0.13	0 12:23	0 00:00	0.00	0.00
8	Jun-06	26.75	0.00	24.17	1.17	0.00	5.83	23.15	0.15	0 12:23	0 00:00	0.00	0.00
9	Jun-07	0.17	0.17	30.15	0.15	0.00	4.85	30.01	0.01	0 12:20	0 00:00	0.00	0.00
10	Jun-09	0.27	0.00	24.50	0.50	0.00	11.50	24.16	0.16	0 12:23	0 00:00	0.00	0.00
11	Jun-10	7.50	0.00	25.47	3.02	0.00	5.31	24.97	2.52	1 00:05	0 00:00	0.00	0.00

Project Description

File Name	23577.0013 - Post-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 25, 2021	00:00:00
End Analysis On	May 27, 2021	00:00:00
Start Reporting On	May 25, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	10
Nodes	16
Junctions	11
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	16
Channels	2
Pipes	10
Pumps	0
Orifices	1
Weirs	3
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EMPLPARK	2.43	323.00	81.60	6.20	4.13	10.03	7.59	0 00:15:00
2	FRONTAGE	0.23	323.00	70.00	6.20	2.96	0.68	0.52	0 00:15:00
3	LOOPANDPONDAREA	1.91	323.00	88.40	6.20	4.86	9.30	6.85	0 00:15:00
4	OFFSITE	15.00	323.00	90.60	6.20	5.11	76.62	49.52	0 00:20:00
5	OUTDITCH	0.44	323.00	74.00	6.20	3.35	1.49	0.90	0 00:25:00
6	SOUTHSWALES	0.88	323.00	74.00	6.20	3.35	2.95	2.00	0 00:20:00
7	WHSE1A	1.09	323.00	98.00	6.20	5.96	6.50	4.98	0 00:10:00
8	WHSE1B	1.39	323.00	98.00	6.20	5.96	8.28	6.36	0 00:10:00
9	WHSE1C	1.38	323.00	98.00	6.20	5.96	8.23	6.33	0 00:10:00
10	WHSE1D	1.17	323.00	98.00	6.20	5.96	6.98	5.36	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	Junction	22.00	27.50	22.00	27.50	10.00	15.70	26.75	0.00	0.75	0 00:00	0.00	0.00
2	Inlet-02	Junction	21.44	27.82	21.44	27.82	10.00	21.16	27.84	0.02	0.00	0 00:02	0.00	0.00
3	Inlet-03	Junction	20.90	27.82	20.90	27.82	10.00	35.99	27.83	0.01	0.00	0 00:03	0.00	0.00
4	Inlet-04	Junction	20.35	27.82	20.35	27.82	10.00	55.40	27.85	0.03	0.00	0 00:00	0.00	0.00
5	Jun-01	Junction	22.09	31.76	22.09	31.76	10.00	7.14	26.82	0.00	4.94	0 00:00	0.00	0.00
6	Jun-04	Junction	23.30	30.00	23.30	30.00	10.00	52.34	26.16	0.00	3.84	0 00:00	0.00	0.00
7	Jun-05	Junction	23.30	30.00	23.30	30.00	10.00	52.15	25.05	0.00	4.95	0 00:00	0.00	0.00
8	Jun-06	Junction	23.00	30.00	23.00	30.00	10.00	51.84	24.75	0.00	5.25	0 00:00	0.00	0.00
9	Jun-07	Junction	30.00	35.00	30.00	35.00	10.00	0.51	30.25	0.00	4.75	0 00:00	0.00	0.00
10	Jun-09	Junction	24.00	30.00	24.00	30.00	10.00	0.66	25.05	0.00	10.95	0 00:00	0.00	0.00
11	Jun-10	Junction	22.45	30.78	22.45	30.78	0.00	7.50	26.75	0.00	4.03	0 00:00	0.00	0.00
12	Out-03	Outfall	22.50					51.84	23.82					
13	Out-05	Outfall	29.00					0.51	29.24					
14	Stor-01	Storage Node	19.00	28.00	24.00		0.00	35.48	26.75				0.00	0.00
15	Stor-02	Storage Node	27.00	31.00	27.00		0.00	7.50	27.87				0.00	0.00
16	Stor-03	Storage Node	0.00	6.00	0.00		0.00	0.00	0.00				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	Inlet-01	Inlet-02	163.00	22.00	21.60	0.2500	3.000	0.0150	15.70	28.64	0.55	3.29	3.00	1.00	2158.00	SURCHARGED
2	Link-02	Pipe	Inlet-02	Inlet-03	160.00	21.60	21.21	0.2400	3.000	0.0150	21.16	28.54	0.74	3.58	3.00	1.00	2184.00	SURCHARGED
3	Link-03	Pipe	Inlet-03	Inlet-04	160.00	20.71	20.32	0.2400	3.500	0.0150	35.99	51.12	0.70	5.92	3.50	1.00	2232.00	SURCHARGED
4	Link-04	Pipe	Inlet-04	Stor-01	103.00	20.32	20.00	0.3100	3.500	0.0150	55.40	50.83	1.09	6.43	3.50	1.00	2878.00	SURCHARGED
5	Link-05	Pipe	Stor-02	Jun-01	55.00	27.00	26.09	1.6500	2.000	0.0150	7.14	25.22	0.28	6.07	0.80	0.40	0.00	Calculated
6	Link-06	Pipe	Jun-01	Jun-10	224.00	26.09	22.45	1.6300	2.000	0.0150	7.14	24.99	0.29	3.12	1.36	0.68	0.00	Calculated
7	Link-11	Pipe	Jun-06	Out-03	40.00	23.00	22.50	1.2500	3.000	0.0150	51.84	129.26	0.40	7.13	1.53	0.51	0.00	Calculated
8	Link-13	Pipe	Jun-07	Out-05	100.00	30.00	29.00	1.0000	1.500	0.0150	0.51	9.10	0.06	2.71	0.24	0.16	0.00	Calculated
9	Link-14	Pipe	Jun-09	Jun-05	151.00	24.00	23.30	0.4600	2.000	0.0150	0.66	13.35	0.05	3.03	1.39	0.70	0.00	Calculated
10	Link-15	Pipe	Jun-10	Stor-01	150.00	22.45	20.00	1.6300	2.000	0.0150	7.50	25.06	0.30	3.13	2.00	1.00	2216.00	SURCHARGED
11	Link-09	Channel	Jun-04	Jun-05	450.00	24.00	23.30	0.1600	5.000	0.0320	52.00	357.80	0.15	2.46	1.94	0.39	0.00	
12	Link-10	Channel	Jun-05	Jun-06	50.00	23.30	23.00	0.6000	5.000	0.0320	51.84	702.71	0.07	2.90	1.74	0.35	0.00	
13	Weir-09	Orifice	Stor-01	Jun-09		19.00	24.00		0.250		0.38							
14	Weir-10	Weir	Stor-01	Jun-09		19.00	24.00				0.28							
15	Weir-11	Weir	Stor-01	Jun-09		19.00	24.00				0.00							
16	Weir-12	Weir	Stor-01	Jun-09		19.00	24.00				0.00							

Subbasin Hydrology

Subbasin : EMPLPARK

Input Data

Area (ac)	2.43
Peak Rate Factor	323.00
Weighted Curve Number	81.60
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	1.09	C	74.00
Paved parking & roofs	0.85	C	98.00
Woods, Good	0.49	C	70.00
Composite Area & Weighted CN	2.43		81.60

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	4.13
Peak Runoff (cfs)	7.59
Weighted Curve Number	81.60
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : FRONTAGE

Input Data

Area (ac) 0.23
Peak Rate Factor 323.00
Weighted Curve Number 70.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	0.23	C	70.00
Composite Area & Weighted CN	0.23		70.00

Subbasin Runoff Results

Total Rainfall (in) 6.20
Total Runoff (in) 2.96
Peak Runoff (cfs) 0.52
Weighted Curve Number 70.00
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : LOOPANDPONDAREA

Input Data

Area (ac)	1.91
Peak Rate Factor	323.00
Weighted Curve Number	88.40
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.76	C	74.00
Paved parking & roofs	1.15	C	98.00
Composite Area & Weighted CN	1.91		88.40

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	4.86
Peak Runoff (cfs)	6.85
Weighted Curve Number	88.40
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : OFFSITE

Input Data

Area (ac) 15.00
Peak Rate Factor 323.00
Weighted Curve Number 90.60
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	12.00	C	98.00
> 75% grass cover, Good	3.00	B	61.00
Composite Area & Weighted CN	15.00		90.60

Subbasin Runoff Results

Total Rainfall (in) 6.20
Total Runoff (in) 5.11
Peak Runoff (cfs) 49.52
Weighted Curve Number 90.60
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : OUTDITCH

Input Data

Area (ac) 0.44
Peak Rate Factor 323.00
Weighted Curve Number 74.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.44	C	74.00
Composite Area & Weighted CN	0.44		74.00

Subbasin Runoff Results

Total Rainfall (in) 6.20
Total Runoff (in) 3.35
Peak Runoff (cfs) 0.90
Weighted Curve Number 74.00
Time of Concentration (days hh:mm:ss) 0 00:25:00

Subbasin : SOUTHSWALES

Input Data

Area (ac)	0.88
Peak Rate Factor	323.00
Weighted Curve Number	74.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.88	C	74.00
Composite Area & Weighted CN	0.88		74.00

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	3.35
Peak Runoff (cfs)	2.00
Weighted Curve Number	74.00
Time of Concentration (days hh:mm:ss)	0 00:20:00

Subbasin : WHSE1A

Input Data

Area (ac)	1.09
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.09	C	98.00
Composite Area & Weighted CN	1.09		98.00

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	5.96
Peak Runoff (cfs)	4.98
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : WHSE1B

Input Data

Area (ac)	1.39
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.39	C	98.00
Composite Area & Weighted CN	1.39		98.00

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	5.96
Peak Runoff (cfs)	6.36
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : WHSE1C

Input Data

Area (ac)	1.38
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.38	C	98.00
Composite Area & Weighted CN	1.38		98.00

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	5.96
Peak Runoff (cfs)	6.33
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : WHSE1D

Input Data

Area (ac)	1.17
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.17	C	98.00
Composite Area & Weighted CN	1.17		98.00

Subbasin Runoff Results

Total Rainfall (in)	6.20
Total Runoff (in)	5.96
Peak Runoff (cfs)	5.36
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	15.70	4.85	26.75	4.75	0.00	0.75	25.88	3.88	0 21:29	0 00:00	0.00	0.00
2	Inlet-02	21.16	6.19	27.84	6.40	0.02	0.00	25.88	4.44	0 00:02	0 00:02	0.00	0.00
3	Inlet-03	35.99	6.16	27.83	6.93	0.01	0.00	25.88	4.98	0 00:03	0 00:03	0.00	0.00
4	Inlet-04	55.40	5.22	27.85	7.50	0.03	0.00	25.88	5.53	0 00:00	0 00:00	0.00	0.00
5	Jun-01	7.14	0.00	26.82	4.73	0.00	4.94	25.78	3.69	0 12:21	0 00:00	0.00	0.00
6	Jun-04	52.34	52.34	26.16	2.86	0.00	3.84	24.16	0.86	0 12:20	0 00:00	0.00	0.00
7	Jun-05	52.15	0.00	25.05	1.75	0.00	4.95	23.50	0.20	0 12:22	0 00:00	0.00	0.00
8	Jun-06	51.84	0.00	24.75	1.75	0.00	5.25	23.21	0.21	0 12:22	0 00:00	0.00	0.00
9	Jun-07	0.51	0.51	30.25	0.25	0.00	4.75	30.02	0.02	0 12:20	0 00:00	0.00	0.00
10	Jun-09	0.66	0.00	25.05	1.05	0.00	10.95	24.22	0.22	0 12:22	0 00:00	0.00	0.00
11	Jun-10	7.50	0.00	26.75	4.30	0.00	4.03	25.88	3.43	0 21:33	0 00:00	0.00	0.00

Project Description

File Name	23577.0013 - Post-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 25, 2021	00:00:00
End Analysis On	May 27, 2021	00:00:00
Start Reporting On	May 25, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	10
Nodes	16
Junctions	11
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	16
Channels	2
Pipes	10
Pumps	0
Orifices	1
Weirs	3
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EMPLPARK	2.43	323.00	81.60	7.50	5.34	12.98	9.74	0 00:15:00
2	FRONTAGE	0.23	323.00	70.00	7.50	4.04	0.93	0.71	0 00:15:00
3	LOOPANDPONDAREA	1.91	323.00	88.40	7.50	6.13	11.71	8.54	0 00:15:00
4	OFFSITE	15.00	323.00	90.60	7.50	6.38	95.76	61.18	0 00:20:00
5	OUTDITCH	0.44	323.00	74.00	7.50	4.48	1.99	1.21	0 00:25:00
6	SOUTHSWALES	0.88	323.00	74.00	7.50	4.48	3.94	2.67	0 00:20:00
7	WHSE1A	1.09	323.00	98.00	7.50	7.26	7.91	6.03	0 00:10:00
8	WHSE1B	1.39	323.00	98.00	7.50	7.26	10.09	7.70	0 00:10:00
9	WHSE1C	1.38	323.00	98.00	7.50	7.26	10.02	7.66	0 00:10:00
10	WHSE1D	1.17	323.00	98.00	7.50	7.26	8.50	6.49	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	Junction	22.00	27.50	22.00	27.50	10.00	15.70	27.12	0.00	0.38	0 00:00	0.00	0.00
2	Inlet-02	Junction	21.44	27.82	21.44	27.82	10.00	21.16	27.84	0.02	0.00	0 00:02	0.00	0.00
3	Inlet-03	Junction	20.90	27.82	20.90	27.82	10.00	35.99	27.83	0.01	0.00	0 00:03	0.00	0.00
4	Inlet-04	Junction	20.35	27.82	20.35	27.82	10.00	55.40	27.85	0.03	0.00	0 00:00	0.00	0.00
5	Jun-01	Junction	22.09	31.76	22.09	31.76	10.00	9.08	27.12	0.00	4.64	0 00:00	0.00	0.00
6	Jun-04	Junction	23.30	30.00	23.30	30.00	10.00	64.96	26.38	0.00	3.62	0 00:00	0.00	0.00
7	Jun-05	Junction	23.30	30.00	23.30	30.00	10.00	64.53	25.60	0.00	4.40	0 00:00	0.00	0.00
8	Jun-06	Junction	23.00	30.00	23.00	30.00	10.00	64.11	25.47	0.00	4.53	0 00:00	0.00	0.00
9	Jun-07	Junction	30.00	35.00	30.00	35.00	10.00	0.69	30.29	0.00	4.71	0 00:00	0.00	0.00
10	Jun-09	Junction	24.00	30.00	24.00	30.00	10.00	1.79	25.60	0.00	10.40	0 00:00	0.00	0.00
11	Jun-10	Junction	22.45	30.78	22.45	30.78	0.00	8.98	27.12	0.00	3.66	0 00:00	0.00	0.00
12	Out-03	Outfall	22.50					64.12	24.94					
13	Out-05	Outfall	29.00					0.69	29.28					
14	Stor-01	Storage Node	19.00	28.00	24.00		0.00	43.69	27.12				0.00	0.00
15	Stor-02	Storage Node	27.00	31.00	27.00		0.00	9.65	28.02				0.00	0.00
16	Stor-03	Storage Node	0.00	6.00	0.00		0.00	0.00	0.00				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	Inlet-01	Inlet-02	163.00	22.00	21.60	0.2500	3.000	0.0150	15.70	28.64	0.55	3.29	3.00	1.00	2171.00	SURCHARGED
2	Link-02	Pipe	Inlet-02	Inlet-03	160.00	21.60	21.21	0.2400	3.000	0.0150	21.16	28.54	0.74	3.58	3.00	1.00	2226.00	SURCHARGED
3	Link-03	Pipe	Inlet-03	Inlet-04	160.00	20.71	20.32	0.2400	3.500	0.0150	35.99	51.12	0.70	5.92	3.50	1.00	2281.00	SURCHARGED
4	Link-04	Pipe	Inlet-04	Stor-01	103.00	20.32	20.00	0.3100	3.500	0.0150	55.40	50.83	1.09	6.43	3.50	1.00	2878.00	SURCHARGED
5	Link-05	Pipe	Stor-02	Jun-01	55.00	27.00	26.09	1.6500	2.000	0.0150	9.08	25.22	0.36	6.37	0.99	0.50	0.00	Calculated
6	Link-06	Pipe	Jun-01	Jun-10	224.00	26.09	22.45	1.6300	2.000	0.0150	8.98	24.99	0.36	3.69	1.51	0.76	0.00	Calculated
7	Link-11	Pipe	Jun-06	Out-03	40.00	23.00	22.50	1.2500	3.000	0.0150	64.12	129.26	0.50	5.20	2.44	0.81	0.00	Calculated
8	Link-13	Pipe	Jun-07	Out-05	100.00	30.00	29.00	1.0000	1.500	0.0150	0.69	9.10	0.08	2.96	0.29	0.19	0.00	Calculated
9	Link-14	Pipe	Jun-09	Jun-05	151.00	24.00	23.30	0.4600	2.000	0.0150	1.79	13.35	0.13	2.72	1.80	0.90	0.00	Calculated
10	Link-15	Pipe	Jun-10	Stor-01	150.00	22.45	20.00	1.6300	2.000	0.0150	8.98	25.06	0.36	3.13	2.00	1.00	2264.00	SURCHARGED
11	Link-09	Channel	Jun-04	Jun-05	450.00	24.00	23.30	0.1600	5.000	0.0320	64.40	357.80	0.18	2.30	2.32	0.47	0.00	
12	Link-10	Channel	Jun-05	Jun-06	50.00	23.30	23.00	0.6000	5.000	0.0320	64.11	702.71	0.09	2.21	2.38	0.48	0.00	
13	Weir-09	Orifice	Stor-01	Jun-09		19.00	24.00		0.250		0.39							
14	Weir-10	Weir	Stor-01	Jun-09		19.00	24.00				1.27							
15	Weir-11	Weir	Stor-01	Jun-09		19.00	24.00				0.14							
16	Weir-12	Weir	Stor-01	Jun-09		19.00	24.00				0.00							

Subbasin Hydrology

Subbasin : EMPLPARK

Input Data

Area (ac) 2.43
Peak Rate Factor 323.00
Weighted Curve Number 81.60
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	1.09	C	74.00
Paved parking & roofs	0.85	C	98.00
Woods, Good	0.49	C	70.00
Composite Area & Weighted CN	2.43		81.60

Subbasin Runoff Results

Total Rainfall (in) 7.50
Total Runoff (in) 5.34
Peak Runoff (cfs) 9.74
Weighted Curve Number 81.60
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : FRONTAGE

Input Data

Area (ac) 0.23
Peak Rate Factor 323.00
Weighted Curve Number 70.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	0.23	C	70.00
Composite Area & Weighted CN	0.23		70.00

Subbasin Runoff Results

Total Rainfall (in) 7.50
Total Runoff (in) 4.04
Peak Runoff (cfs) 0.71
Weighted Curve Number 70.00
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : LOOPANDPONDAREA

Input Data

Area (ac)	1.91
Peak Rate Factor	323.00
Weighted Curve Number	88.40
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.76	C	74.00
Paved parking & roofs	1.15	C	98.00
Composite Area & Weighted CN	1.91		88.40

Subbasin Runoff Results

Total Rainfall (in)	7.50
Total Runoff (in)	6.13
Peak Runoff (cfs)	8.54
Weighted Curve Number	88.40
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : OFFSITE

Input Data

Area (ac)	15.00
Peak Rate Factor	323.00
Weighted Curve Number	90.60
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	12.00	C	98.00
> 75% grass cover, Good	3.00	B	61.00
Composite Area & Weighted CN	15.00		90.60

Subbasin Runoff Results

Total Rainfall (in)	7.50
Total Runoff (in)	6.38
Peak Runoff (cfs)	61.18
Weighted Curve Number	90.60
Time of Concentration (days hh:mm:ss)	0 00:20:00

Subbasin : OUTDITCH

Input Data

Area (ac) 0.44
Peak Rate Factor 323.00
Weighted Curve Number 74.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.44	C	74.00
Composite Area & Weighted CN	0.44		74.00

Subbasin Runoff Results

Total Rainfall (in) 7.50
Total Runoff (in) 4.48
Peak Runoff (cfs) 1.21
Weighted Curve Number 74.00
Time of Concentration (days hh:mm:ss) 0 00:25:00

Subbasin : SOUTHSWALES

Input Data

Area (ac)	0.88
Peak Rate Factor	323.00
Weighted Curve Number	74.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.88	C	74.00
Composite Area & Weighted CN	0.88		74.00

Subbasin Runoff Results

Total Rainfall (in)	7.50
Total Runoff (in)	4.48
Peak Runoff (cfs)	2.67
Weighted Curve Number	74.00
Time of Concentration (days hh:mm:ss)	0 00:20:00

Subbasin : WHSE1A

Input Data

Area (ac) 1.09
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.09	C	98.00
Composite Area & Weighted CN	1.09		98.00

Subbasin Runoff Results

Total Rainfall (in) 7.50
Total Runoff (in) 7.26
Peak Runoff (cfs) 6.03
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1B

Input Data

Area (ac) 1.39
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.39	C	98.00
Composite Area & Weighted CN	1.39		98.00

Subbasin Runoff Results

Total Rainfall (in) 7.50
Total Runoff (in) 7.26
Peak Runoff (cfs) 7.70
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1C

Input Data

Area (ac) 1.38
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.38	C	98.00
Composite Area & Weighted CN	1.38		98.00

Subbasin Runoff Results

Total Rainfall (in) 7.50
Total Runoff (in) 7.26
Peak Runoff (cfs) 7.66
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1D

Input Data

Area (ac)	1.17
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.17	C	98.00
Composite Area & Weighted CN	1.17		98.00

Subbasin Runoff Results

Total Rainfall (in)	7.50
Total Runoff (in)	7.26
Peak Runoff (cfs)	6.49
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	15.70	5.87	27.12	5.12	0.00	0.38	26.03	4.03	0 16:22	0 00:00	0.00	0.00
2	Inlet-02	21.16	7.49	27.84	6.40	0.02	0.00	26.03	4.59	0 00:02	0 00:02	0.00	0.00
3	Inlet-03	35.99	7.46	27.83	6.93	0.01	0.00	26.03	5.13	0 00:03	0 00:03	0.00	0.00
4	Inlet-04	55.40	6.32	27.85	7.50	0.03	0.00	26.03	5.68	0 00:00	0 00:00	0.00	0.00
5	Jun-01	9.08	0.00	27.12	5.03	0.00	4.64	25.98	3.89	0 16:19	0 00:00	0.00	0.00
6	Jun-04	64.96	64.96	26.38	3.08	0.00	3.62	24.21	0.91	0 12:21	0 00:00	0.00	0.00
7	Jun-05	64.53	0.00	25.60	2.30	0.00	4.40	23.89	0.59	0 12:22	0 00:00	0.00	0.00
8	Jun-06	64.11	0.00	25.47	2.47	0.00	4.53	23.80	0.80	0 12:22	0 00:00	0.00	0.00
9	Jun-07	0.69	0.69	30.29	0.29	0.00	4.71	30.02	0.02	0 12:15	0 00:00	0.00	0.00
10	Jun-09	1.79	0.00	25.60	1.60	0.00	10.40	24.34	0.34	0 12:22	0 00:00	0.00	0.00
11	Jun-10	8.98	0.00	27.12	4.67	0.00	3.66	26.03	3.58	0 16:22	0 00:00	0.00	0.00

Project Description

File Name	23577.0013 - Post-Development.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 25, 2021	00:00:00
End Analysis On	May 27, 2021	00:00:00
Start Reporting On	May 25, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	10
Nodes	16
Junctions	11
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	16
Channels	2
Pipes	10
Pumps	0
Orifices	1
Weirs	3
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EMPLPARK	2.43	323.00	81.60	9.80	7.53	18.30	13.55	0 00:15:00
2	FRONTAGE	0.23	323.00	70.00	9.80	6.04	1.39	1.06	0 00:15:00
3	LOOPANDPONDAREA	1.91	323.00	88.40	9.80	8.38	16.03	11.49	0 00:15:00
4	OFFSITE	15.00	323.00	90.60	9.80	8.66	129.84	81.65	0 00:20:00
5	OUTDITCH	0.44	323.00	74.00	9.80	6.56	2.92	1.76	0 00:25:00
6	SOUTHSWALES	0.88	323.00	74.00	9.80	6.56	5.77	3.89	0 00:20:00
7	WHSE1A	1.09	323.00	98.00	9.80	9.56	10.42	7.89	0 00:10:00
8	WHSE1B	1.39	323.00	98.00	9.80	9.56	13.28	10.07	0 00:10:00
9	WHSE1C	1.38	323.00	98.00	9.80	9.56	13.19	10.03	0 00:10:00
10	WHSE1D	1.17	323.00	98.00	9.80	9.56	11.20	8.50	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	Junction	22.00	27.50	22.00	27.50	10.00	15.70	27.65	0.15	0.00	0 12:52	0.00	220.00
2	Inlet-02	Junction	21.44	27.82	21.44	27.82	10.00	21.16	27.84	0.02	0.00	0 00:02	0.00	0.00
3	Inlet-03	Junction	20.90	27.82	20.90	27.82	10.00	35.99	27.83	0.01	0.00	0 00:03	0.00	0.00
4	Inlet-04	Junction	20.35	27.82	20.35	27.82	10.00	55.40	27.85	0.03	0.00	0 00:00	0.00	0.00
5	Jun-01	Junction	22.09	31.76	22.09	31.76	10.00	11.25	28.26	0.00	3.50	0 00:00	0.00	0.00
6	Jun-04	Junction	23.30	30.00	23.30	30.00	10.00	87.17	26.78	0.00	3.22	0 00:00	0.00	0.00
7	Jun-05	Junction	23.30	30.00	23.30	30.00	10.00	86.46	26.18	0.00	3.82	0 00:00	0.00	0.00
8	Jun-06	Junction	23.00	30.00	23.00	30.00	10.00	85.69	26.08	0.00	3.92	0 00:00	0.00	0.00
9	Jun-07	Junction	30.00	35.00	30.00	35.00	10.00	1.04	30.36	0.00	4.64	0 00:00	0.00	0.00
10	Jun-09	Junction	24.00	30.00	24.00	30.00	10.00	4.97	26.18	0.00	9.82	0 00:00	0.00	0.00
11	Jun-10	Junction	22.45	30.78	22.45	30.78	0.00	11.01	27.67	0.00	3.11	0 00:00	0.00	0.00
12	Out-03	Outfall	22.50					85.69	25.28					
13	Out-05	Outfall	29.00					1.04	29.34					
14	Stor-01	Storage Node	19.00	28.00	24.00		0.00	57.18	27.65				0.00	0.00
15	Stor-02	Storage Node	27.00	31.00	27.00		0.00	13.45	28.49				0.00	0.00
16	Stor-03	Storage Node	0.00	6.00	0.00		0.00	0.00	0.00				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(ft)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	Link-01	Pipe	Inlet-01	Inlet-02	163.00	22.00	21.60	0.2500	3.000	0.0150	15.70	28.64	0.55	3.29	3.00	1.00	2210.00	SURCHARGED
2	Link-02	Pipe	Inlet-02	Inlet-03	160.00	21.60	21.21	0.2400	3.000	0.0150	21.16	28.54	0.74	3.58	3.00	1.00	2286.00	SURCHARGED
3	Link-03	Pipe	Inlet-03	Inlet-04	160.00	20.71	20.32	0.2400	3.500	0.0150	35.99	51.12	0.70	5.92	3.50	1.00	2343.00	SURCHARGED
4	Link-04	Pipe	Inlet-04	Stor-01	103.00	20.32	20.00	0.3100	3.500	0.0150	55.40	50.83	1.09	6.43	3.50	1.00	2878.00	SURCHARGED
5	Link-05	Pipe	Stor-02	Jun-01	55.00	27.00	26.09	1.6500	2.000	0.0150	11.25	25.22	0.45	6.28	1.74	0.87	0.00	Calculated
6	Link-06	Pipe	Jun-01	Jun-10	224.00	26.09	22.45	1.6300	2.000	0.0150	11.01	24.99	0.44	3.56	2.00	1.00	23.00	SURCHARGED
7	Link-11	Pipe	Jun-06	Out-03	40.00	23.00	22.50	1.2500	3.000	0.0150	85.69	129.26	0.66	6.15	2.88	0.96	0.00	Calculated
8	Link-13	Pipe	Jun-07	Out-05	100.00	30.00	29.00	1.0000	1.500	0.0150	1.04	9.10	0.11	3.31	0.35	0.23	0.00	Calculated
9	Link-14	Pipe	Jun-09	Jun-05	151.00	24.00	23.30	0.4600	2.000	0.0150	4.97	13.35	0.37	2.72	2.00	1.00	18.00	SURCHARGED
10	Link-15	Pipe	Jun-10	Stor-01	150.00	22.45	20.00	1.6300	2.000	0.0150	11.01	25.06	0.44	3.51	2.00	1.00	2326.00	SURCHARGED
11	Link-09	Channel	Jun-04	Jun-05	450.00	24.00	23.30	0.1600	5.000	0.0320	86.21	357.80	0.24	2.29	2.82	0.57	0.00	
12	Link-10	Channel	Jun-05	Jun-06	50.00	23.30	23.00	0.6000	5.000	0.0320	85.69	702.71	0.12	2.06	2.97	0.60	0.00	
13	Weir-09	Orifice	Stor-01	Jun-09		19.00	24.00		0.250		0.39							
14	Weir-10	Weir	Stor-01	Jun-09		19.00	24.00				1.99							
15	Weir-11	Weir	Stor-01	Jun-09		19.00	24.00				2.61							
16	Weir-12	Weir	Stor-01	Jun-09		19.00	24.00				0.00							

Subbasin Hydrology

Subbasin : EMPLPARK

Input Data

Area (ac)	2.43
Peak Rate Factor	323.00
Weighted Curve Number	81.60
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	1.09	C	74.00
Paved parking & roofs	0.85	C	98.00
Woods, Good	0.49	C	70.00
Composite Area & Weighted CN	2.43		81.60

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	7.53
Peak Runoff (cfs)	13.55
Weighted Curve Number	81.60
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : FRONTAGE

Input Data

Area (ac)	0.23
Peak Rate Factor	323.00
Weighted Curve Number	70.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	0.23	C	70.00
Composite Area & Weighted CN	0.23		70.00

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	6.04
Peak Runoff (cfs)	1.06
Weighted Curve Number	70.00
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : LOOPANDPONDAREA

Input Data

Area (ac)	1.91
Peak Rate Factor	323.00
Weighted Curve Number	88.40
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.76	C	74.00
Paved parking & roofs	1.15	C	98.00
Composite Area & Weighted CN	1.91		88.40

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	8.38
Peak Runoff (cfs)	11.49
Weighted Curve Number	88.40
Time of Concentration (days hh:mm:ss)	0 00:15:00

Subbasin : OFFSITE

Input Data

Area (ac)	15.00
Peak Rate Factor	323.00
Weighted Curve Number	90.60
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	12.00	C	98.00
> 75% grass cover, Good	3.00	B	61.00
Composite Area & Weighted CN	15.00		90.60

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	8.66
Peak Runoff (cfs)	81.65
Weighted Curve Number	90.60
Time of Concentration (days hh:mm:ss)	0 00:20:00

Subbasin : OUTDITCH

Input Data

Area (ac)	0.44
Peak Rate Factor	323.00
Weighted Curve Number	74.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.44	C	74.00
Composite Area & Weighted CN	0.44		74.00

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	6.56
Peak Runoff (cfs)	1.76
Weighted Curve Number	74.00
Time of Concentration (days hh:mm:ss)	0 00:25:00

Subbasin : SOUTHSWALES

Input Data

Area (ac) 0.88
Peak Rate Factor 323.00
Weighted Curve Number 74.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
> 75% grass cover, Good	0.88	C	74.00
Composite Area & Weighted CN	0.88		74.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 6.56
Peak Runoff (cfs) 3.89
Weighted Curve Number 74.00
Time of Concentration (days hh:mm:ss) 0 00:20:00

Subbasin : WHSE1A

Input Data

Area (ac)	1.09
Peak Rate Factor	323.00
Weighted Curve Number	98.00
Rain Gage ID	*

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.09	C	98.00
Composite Area & Weighted CN	1.09		98.00

Subbasin Runoff Results

Total Rainfall (in)	9.80
Total Runoff (in)	9.56
Peak Runoff (cfs)	7.89
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:10:00

Subbasin : WHSE1B

Input Data

Area (ac) 1.39
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.39	C	98.00
Composite Area & Weighted CN	1.39		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 10.07
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1C

Input Data

Area (ac) 1.38
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.38	C	98.00
Composite Area & Weighted CN	1.38		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 10.03
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : WHSE1D

Input Data

Area (ac) 1.17
Peak Rate Factor 323.00
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.17	C	98.00
Composite Area & Weighted CN	1.17		98.00

Subbasin Runoff Results

Total Rainfall (in) 9.80
Total Runoff (in) 9.56
Peak Runoff (cfs) 8.50
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:10:00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	15.70	7.67	27.65	5.65	0.15	0.00	26.18	4.18	0 14:00	0 12:52	0.00	220.00
2	Inlet-02	21.16	9.81	27.84	6.40	0.02	0.00	26.18	4.74	0 00:02	0 00:02	0.00	0.00
3	Inlet-03	35.99	9.76	27.83	6.93	0.01	0.00	26.18	5.28	0 00:03	0 00:03	0.00	0.00
4	Inlet-04	55.40	8.27	27.85	7.50	0.03	0.00	26.17	5.82	0 00:00	0 00:00	0.00	0.00
5	Jun-01	11.25	0.00	28.26	6.17	0.00	3.50	26.20	4.11	0 12:31	0 00:00	0.00	0.00
6	Jun-04	87.17	87.17	26.78	3.48	0.00	3.22	24.32	1.02	0 12:21	0 00:00	0.00	0.00
7	Jun-05	86.46	0.00	26.18	2.88	0.00	3.82	24.04	0.74	0 12:23	0 00:00	0.00	0.00
8	Jun-06	85.69	0.00	26.08	3.08	0.00	3.92	23.96	0.96	0 12:23	0 00:00	0.00	0.00
9	Jun-07	1.04	1.04	30.36	0.36	0.00	4.64	30.03	0.03	0 12:15	0 00:00	0.00	0.00
10	Jun-09	4.97	0.00	26.18	2.18	0.00	9.82	24.45	0.45	0 12:23	0 00:00	0.00	0.00
11	Jun-10	11.01	0.00	27.67	5.22	0.00	3.11	26.18	3.73	0 12:45	0 00:00	0.00	0.00

STORMWATER MANAGEMENT REPORT

NORTH POINTE COMMERCE PARK
LOT A

APPENDIX D

PIPE SIZING / INLET CAPACITY CALCULATIONS

J-23577.0013

THOMAS & HUTTON

HEC-22

Energy Grade Line Computations

Struct. ID	*Q* (cfs)	*EGLo* (ft)	*HGLo* (ft)	Total Pipe Loss (ft)	*EGLi* (ft)	*HGLi* (ft)	*Ea* (ft)	*EGLa* (ft)	Surface Elev. (ft)
5		20.00	20.00						23.88
4	30.7	22.45	21.99	0.32	22.77	22.31	2.6	22.89	27.82
3	23.9	22.95	22.80	0.39	23.35	22.94	2.8	23.46	27.82
2	15.6	23.51	23.39	0.39	23.90	23.57	2.4	24.02	27.82
1	7.0	24.03	24.01	0.40	24.43	24.21	2.5	24.51	27.50
13B		300.10	300.10						301.33
58	23.1	304.29	303.99		306.52	302.63	4.7	306.52	323.31
13A	23.2	316.80	313.15		319.45	315.80	4.5	319.45	335.95
13A	15.5	324.90	322.81		328.64	326.55	2.9	328.64	335.96
12A	7.8	328.68	328.58		332.07	330.61	2.1	332.07	335.96
35		300.10	300.10						301.88
61	43.6	305.24	304.43		307.10	302.77	5.4	307.10	314.41
37	43.9	312.13	307.77		322.75	318.39	5.5	322.75	330.12
36	41.4	322.98	322.40		324.07	322.54	3.5	324.31	332.11
32	38.4	324.50	324.04	0.38	324.88	324.42	3.5	325.51	335.52
32	28.5	325.72	325.20	0.76	326.48	325.95	3.9	327.92	338.33
33	18.4	328.14	327.60	1.14	329.27	328.74	3.5	329.60	335.95
46	8.1	329.65	329.54	0.14	329.78	329.68	2.5	329.84	335.24
45	4.1	329.87	329.79	0.14	330.02	329.93	1.3	330.11	337.22
14D		300.10	300.10						300.25
60	6.6	300.17	300.10		306.86	304.28	3.0	306.86	323.12
14C	6.6	312.38	309.25		318.04	314.90	3.5	318.04	337.02
14B	4.9	326.52	324.91		331.01	329.39	2.0	331.01	336.88
14A	0.7	331.01	331.00		337.77	337.18	0.8	337.77	341.52
23		300.10	300.10						297.04
55	112.2	300.87	300.10	0.36	301.23	300.46	5.5	301.55	320.67
7A	112.6	314.75	307.67		319.51	312.43	8.7	319.51	335.95
7A	108.5	321.45	319.34		324.45	322.34	5.3	325.03	336.10
6A	99.6	325.28	324.67	0.80	326.08	325.47	5.5	327.32	336.62
5A	78.3	327.56	326.96	0.53	328.09	327.49	4.5	328.26	336.75
4A	57.6	328.39	328.06	0.31	328.69	328.37	4.0	328.78	336.78
3A	47.3	328.93	328.56	0.40	329.33	328.96	3.6	329.74	336.74
2A	25.6	329.82	329.62	0.27	330.09	329.88	3.0	331.16	336.74
44	14.8	331.19	331.12		332.00	331.23	1.8	332.00	337.21
43	1.9	332.00	331.99	0.33	332.33	332.17	1.9	332.42	336.55
43	0.4	332.42	332.42		335.43	335.16	0.4	335.43	341.49
1B	11.6	333.94	333.27	1.23	335.17	334.50	2.5	335.50	337.30
2B	11.8	331.42	330.73	1.77	333.19	332.50	2.6	333.63	336.47
4B	11.8	331.70	331.01	1.49	333.19	332.50	2.6	333.62	336.30
5B	9.0	332.28	331.59		333.76	333.07	2.3	334.30	336.80
5A	5.8	330.01	329.44		330.92	330.34	1.6	331.18	337.92
6B	5.8	331.25	331.08		332.38	331.80	1.7	332.72	337.34
27		303.20	303.20						300.79
54	11.6	303.29	303.20	0.07	303.36	303.27	2.0	304.01	316.75
52	11.6	312.26	307.48		320.26	315.48	5.3	320.26	335.08
24	6.1	325.61	325.01		330.04	329.43	1.6	330.22	335.44
30	4.1	330.25	330.17		337.54	336.49	1.5	337.54	342.22
30	2.1	338.40	338.06		338.79	338.45	0.8	338.79	342.66
52	2.0	324.96	324.64		326.26	325.94	0.8	326.26	330.79
52	2.1	329.35	328.99		329.80	329.44	0.8	329.80	335.57

HEC-22
Energy Grade Line Computations

Struct. ID	*Q* (cfs)	*EGLo* (ft)	*HGLo* (ft)	Total Pipe Loss (ft)	*EGLi* (ft)	*HGLi* (ft)	*Ea* (ft)	*EGLa* (ft)	Surface Elev. (ft)
7		27.00	27.00						28.71
6	1.1	27.56	27.46	0.20	27.76	27.66	0.6	27.82	31.62
10A	23.2	316.76	313.11		319.41	315.76	4.5	319.41	335.95
10A	15.5	324.91	322.83		328.65	326.57	2.9	328.65	335.95
9A	7.8	328.69	328.59		332.09	330.62	2.1	332.09	335.95
13B		300.10	300.10						301.33
58	23.1	304.29	303.99		306.52	302.63	4.7	306.52	323.31
13A	23.2	316.80	313.15		319.45	315.80	4.5	319.45	335.95
13A	15.5	324.90	322.81		328.64	326.55	2.9	328.64	335.96
12A	7.8	328.68	328.58		332.07	330.61	2.1	332.07	335.96
35		300.10	300.10						301.88
61	43.6	305.24	304.43		307.10	302.77	5.4	307.10	314.41
37	43.9	312.13	307.77		322.75	318.39	5.5	322.75	330.12
36	41.4	322.98	322.40		324.07	322.54	3.5	324.31	332.11
32	38.4	324.50	324.04	0.38	324.88	324.42	3.5	325.51	335.52
32	28.5	325.72	325.20	0.76	326.48	325.95	3.9	327.92	338.33
33	18.4	328.14	327.60	1.14	329.27	328.74	3.5	329.60	335.95
46	8.1	329.65	329.54	0.14	329.78	329.68	2.5	329.84	335.24
45	4.1	329.87	329.79	0.14	330.02	329.93	1.3	330.11	337.22
14D		300.10	300.10						300.25
60	6.6	300.17	300.10		306.86	304.28	3.0	306.86	323.12
14C	6.6	312.38	309.25		318.04	314.90	3.5	318.04	337.02
14B	4.9	326.52	324.91		331.01	329.39	2.0	331.01	336.88
14A	0.7	331.01	331.00		337.77	337.18	0.8	337.77	341.52
23		300.10	300.10						297.04
55	112.2	300.87	300.10	0.36	301.23	300.46	5.5	301.55	320.67
7A	112.6	314.75	307.67		319.51	312.43	8.7	319.51	335.95
7A	108.5	321.45	319.34		324.45	322.34	5.3	325.03	336.10
6A	99.6	325.28	324.67	0.80	326.08	325.47	5.5	327.32	336.62
5A	78.3	327.56	326.96	0.53	328.09	327.49	4.5	328.26	336.75
4A	57.6	328.39	328.06	0.31	328.69	328.37	4.0	328.78	336.78
3A	47.3	328.93	328.56	0.40	329.33	328.96	3.6	329.74	336.74
2A	25.6	329.82	329.62	0.27	330.09	329.88	3.0	331.16	336.74
44	14.8	331.19	331.12		332.00	331.23	1.8	332.00	337.21
43	1.9	332.00	331.99	0.33	332.33	332.17	1.9	332.42	336.55
43	0.4	332.42	332.42		335.43	335.16	0.4	335.43	341.49
1B	11.6	333.94	333.27	1.23	335.17	334.50	2.5	335.50	337.30
2B	11.8	331.42	330.73	1.77	333.19	332.50	2.6	333.63	336.47
4B	11.8	331.70	331.01	1.49	333.19	332.50	2.6	333.62	336.30
5B	9.0	332.28	331.59		333.76	333.07	2.3	334.30	336.80
5A	5.8	330.01	329.44		330.92	330.34	1.6	331.18	337.92
6B	5.8	331.25	331.08		332.38	331.80	1.7	332.72	337.34
27		303.20	303.20						300.79
54	11.6	303.29	303.20	0.07	303.36	303.27	2.0	304.01	316.75
52	11.6	312.26	307.48		320.26	315.48	5.3	320.26	335.08
24	6.1	325.61	325.01		330.04	329.43	1.6	330.22	335.44
30	4.1	330.25	330.17		337.54	336.49	1.5	337.54	342.22
30	2.1	338.40	338.06		338.79	338.45	0.8	338.79	342.66
52	2.0	324.96	324.64		326.26	325.94	0.8	326.26	330.79
52	2.1	329.35	328.99		329.80	329.44	0.8	329.80	335.57

HEC-22
Energy Grade Line Computations

Struct. ID	*Q* (cfs)	*EGLo* (ft)	*HGLo* (ft)	Total Pipe Loss (ft)	*EGLi* (ft)	*HGLi* (ft)	*Ea* (ft)	*EGLa* (ft)	Surface Elev. (ft)
11		20.00	20.00						23.33
10	3.3	21.03	20.46		23.48	22.90	1.0	23.48	30.78
9	1.6	23.48	23.47		26.80	26.42	0.7	26.80	31.76
10A	15.5	324.91	322.83		328.65	326.57	2.9	328.65	335.95
9A	7.8	328.69	328.59		332.09	330.62	2.1	332.09	335.95
13B		300.10	300.10						301.33
58	23.1	304.29	303.99		306.52	302.63	4.7	306.52	323.31
13A	23.2	316.80	313.15		319.45	315.80	4.5	319.45	335.95
13A	15.5	324.90	322.81		328.64	326.55	2.9	328.64	335.96
12A	7.8	328.68	328.58		332.07	330.61	2.1	332.07	335.96
35		300.10	300.10						301.88
61	43.6	305.24	304.43		307.10	302.77	5.4	307.10	314.41
37	43.9	312.13	307.77		322.75	318.39	5.5	322.75	330.12
36	41.4	322.98	322.40		324.07	322.54	3.5	324.31	332.11
32	38.4	324.50	324.04	0.38	324.88	324.42	3.5	325.51	335.52
32	28.5	325.72	325.20	0.76	326.48	325.95	3.9	327.92	338.33
33	18.4	328.14	327.60	1.14	329.27	328.74	3.5	329.60	335.95
46	8.1	329.65	329.54	0.14	329.78	329.68	2.5	329.84	335.24
45	4.1	329.87	329.79	0.14	330.02	329.93	1.3	330.11	337.22
14D		300.10	300.10						300.25
60	6.6	300.17	300.10		306.86	304.28	3.0	306.86	323.12
14C	6.6	312.38	309.25		318.04	314.90	3.5	318.04	337.02
14B	4.9	326.52	324.91		331.01	329.39	2.0	331.01	336.88
14A	0.7	331.01	331.00		337.77	337.18	0.8	337.77	341.52
23		300.10	300.10						297.04
55	112.2	300.87	300.10	0.36	301.23	300.46	5.5	301.55	320.67
7A	112.6	314.75	307.67		319.51	312.43	8.7	319.51	335.95
7A	108.5	321.45	319.34		324.45	322.34	5.3	325.03	336.10
6A	99.6	325.28	324.67	0.80	326.08	325.47	5.5	327.32	336.62
5A	78.3	327.56	326.96	0.53	328.09	327.49	4.5	328.26	336.75
4A	57.6	328.39	328.06	0.31	328.69	328.37	4.0	328.78	336.78
3A	47.3	328.93	328.56	0.40	329.33	328.96	3.6	329.74	336.74
2A	25.6	329.82	329.62	0.27	330.09	329.88	3.0	331.16	336.74
44	14.8	331.19	331.12		332.00	331.23	1.8	332.00	337.21
43	1.9	332.00	331.99	0.33	332.33	332.17	1.9	332.42	336.55
43	0.4	332.42	332.42		335.43	335.16	0.4	335.43	341.49
1B	11.6	333.94	333.27	1.23	335.17	334.50	2.5	335.50	337.30
2B	11.8	331.42	330.73	1.77	333.19	332.50	2.6	333.63	336.47
4B	11.8	331.70	331.01	1.49	333.19	332.50	2.6	333.62	336.30
5B	9.0	332.28	331.59		333.76	333.07	2.3	334.30	336.80
5A	5.8	330.01	329.44		330.92	330.34	1.6	331.18	337.92
6B	5.8	331.25	331.08		332.38	331.80	1.7	332.72	337.34
27		303.20	303.20						300.79
54	11.6	303.29	303.20	0.07	303.36	303.27	2.0	304.01	316.75
52	11.6	312.26	307.48		320.26	315.48	5.3	320.26	335.08
24	6.1	325.61	325.01		330.04	329.43	1.6	330.22	335.44
30	4.1	330.25	330.17		337.54	336.49	1.5	337.54	342.22
30	2.1	338.40	338.06		338.79	338.45	0.8	338.79	342.66
52	2.0	324.96	324.64		326.26	325.94	0.8	326.26	330.79
52	2.1	329.35	328.99		329.80	329.44	0.8	329.80	335.57

STORMWATER MANAGEMENT REPORT

NORTH POINTE COMMERCE PARK
LOT A

APPENDIX E

WATER QUALITY DESIGN / SEDCAD

J-23577.0013

THOMAS & HUTTON

North Pointe Lot A

EMD

General Information

Storm Information:

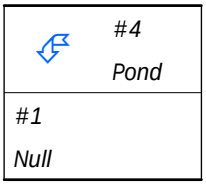
Storm Type:	NRCS Type III
Design Storm:	10 yr - 24 hr
Rainfall Depth:	6.200 inches

Particle Size Distribution:

Size (mm)	Lenoir (C/D)
1.4000	100.000%
1.0000	93.000%
0.0630	76.900%
0.0440	52.100%
0.0380	48.400%
0.0040	4.100%
0.0030	2.500%
0.0010	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Outfall
Pond	#4	==>	#1	0.000	0.000	Pond Area



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#4	In	11.100	11.100	16.03	3.40	28.0	10,336	5.24	3.07
	Out			2.38	3.09	1.2	423	0.00	0.00
#1		0.000	11.100	2.38	3.09	1.2	422	0.00	0.00

Particle Size Distribution(s) at Each Structure

Structure #4 (Pond Area):

Size (mm)	In	Out
1.4000	100.000%	100.000%
1.0000	100.000%	100.000%
0.0630	100.000%	100.000%
0.0440	88.063%	100.000%
0.0380	81.809%	100.000%
0.0040	6.930%	100.000%
0.0030	4.226%	95.000%
0.0010	0.000%	0.000%

Structure #1:

Size (mm)	In/Out
1.4000	100.000%
1.0000	100.000%
0.0630	100.000%
0.0440	100.000%
0.0380	100.000%
0.0040	100.000%
0.0030	95.000%
0.0010	0.000%

Structure Detail:

Structure #4 (Pond)

Pond Area

Pond Inputs:

Initial Pool Elev:	24.00 ft
Initial Pool:	4.88 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Side-contracting Weir

Weir Width (ft)	Spillway Elev (ft)
0.33	24.00

Side-contracting Weir

Weir Width (ft)	Spillway Elev (ft)
0.50	26.00

Side-contracting Weir

Weir Width (ft)	Spillway Elev (ft)
1.00	27.00

Pond Results:

Peak Elevation:	25.80 ft
H'graph Detention Time:	9.71 hrs
Pond Model:	CSTRS
Dewater Time:	1.77 days
Trap Efficiency:	95.55 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
19.00	0.820	0.000	0.000		Top of Sed. Storage
19.50	0.850	0.417	0.000		
20.00	0.880	0.850	0.000		
20.50	0.910	1.297	0.000		
21.00	0.942	1.760	0.000		
21.50	0.973	2.239	0.000		
22.00	1.006	2.734	0.000		
22.50	1.038	3.245	0.000		
23.00	1.072	3.772	0.000		
23.50	1.106	4.317	0.000		
24.00	1.140	4.878	0.000		Spillway #1
24.50	1.173	5.456	0.361	19.37*	
25.00	1.207	6.052	1.001	11.45	
25.50	1.241	6.664	1.816	7.10	
25.80	1.262	7.036	2.381	4.55	Peak Stage
26.00	1.276	7.293	2.772		Spillway #2
26.50	1.311	7.940	4.400		
27.00	1.347	8.605	6.559		Spillway #3
27.50	1.383	9.287	10.203		
28.00	1.420	9.988	15.013		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Side-contracted Weir (cfs)	Side-contracted Weir (cfs)	Side-contracted Weir (cfs)	Combined Total Discharge (cfs)
19.00	0.000	0.000	0.000	0.000
19.50	0.000	0.000	0.000	0.000
20.00	0.000	0.000	0.000	0.000
20.50	0.000	0.000	0.000	0.000
21.00	0.000	0.000	0.000	0.000
21.50	0.000	0.000	0.000	0.000
22.00	0.000	0.000	0.000	0.000
22.50	0.000	0.000	0.000	0.000
23.00	0.000	0.000	0.000	0.000
23.50	0.000	0.000	0.000	0.000
24.00	0.000	0.000	0.000	0.000
24.50	0.361	0.000	0.000	0.361
25.00	1.001	0.000	0.000	1.001

Elevation (ft)	Side-contracted Weir (cfs)	Side-contracted Weir (cfs)	Side-contracted Weir (cfs)	Combined Total Discharge (cfs)
25.50	1.816	0.000	0.000	1.816
26.00	2.772	0.000	0.000	2.772
26.50	3.848	0.552	0.000	4.400
27.00	5.031	1.529	0.000	6.559
27.50	6.310	2.774	1.119	10.203
28.00	7.678	4.235	3.100	15.013

Structure #1 (Null)

Outfall

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	11.100	0.333	0.019	0.227	94.000	S	16.03	3.404
	Σ	**11.100**						**16.03**	**3.404**
#1	Σ	**11.100**						**2.38**	**3.085**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#4	1	0.370	100.00	0.50	1.0000	1.0000	1	35.0	12,893	7.25	4.24
	Σ							**28.0**	**10,336**	**5.24**	**3.07**
#1	Σ							**1.2**	**422**	**0.00**	**0.00**

North Pointe Lot A | **DATE :** | **June 2, 2021**
Hanahan, SC | **BY :** | **EMD**
West-Signal Industrial Proprety A, LLC | **JOB :** | **23577.0013**
THOMAS & HUTTON ENGINEERING CO. | **REV:**

WATER QUALITY STORAGE CALCULATIONS - OUTFALL NODE

The post-development drainage basins being released at the Outfall contain ditches within them to attenuate storwater run-off. The drainage basins are shown on the Post-Development Stormwater Exhibit at the end of this report. Node CS#1 will release stormwater to the Outfall.

REQUIRED QUALITY STORAGE

Outfall - Node CS#1

Entire Site Area:

			Total Site Area=	**10.12**	**ac**
440,827	**sf X**	**0.5 inch**	**=**	**18,514.74**	**cf**

AVAILABLE QUALITY STORAGE AT OUTFALL

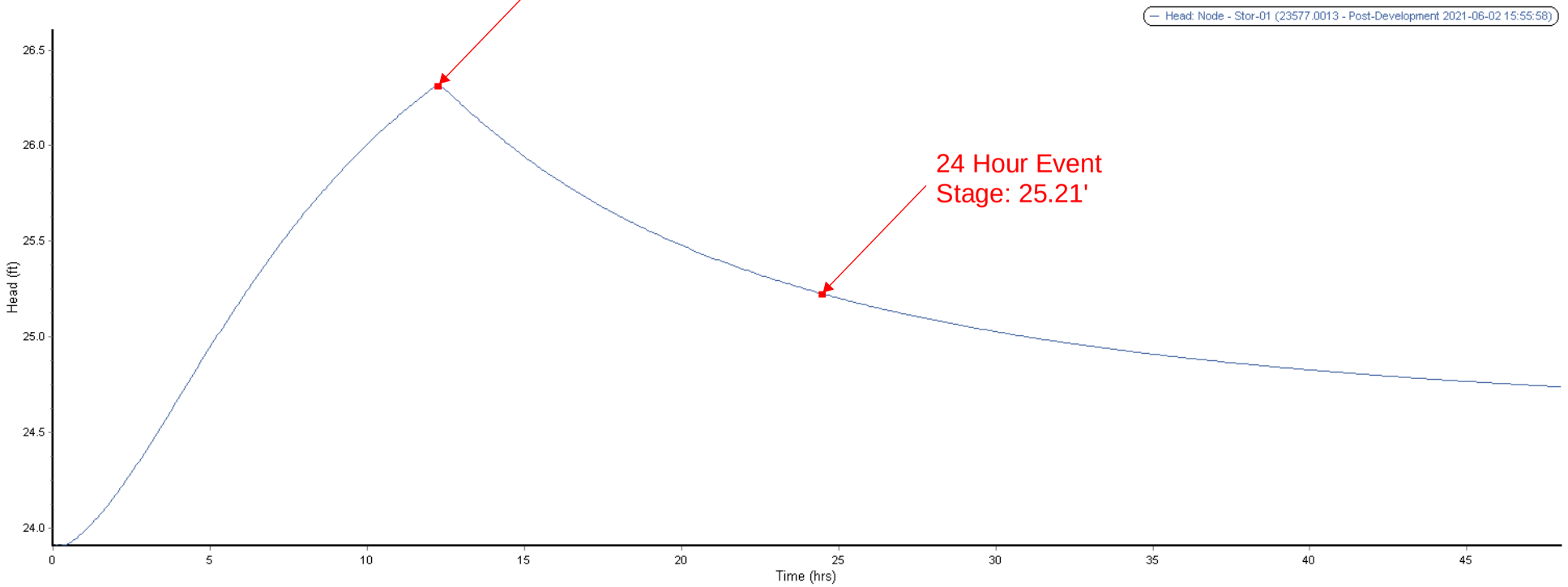
Lagoon acreage at Normal Water Elevation=	1.14	acres
Lagoon acreage at Normal Water Elevation=	**49,658**	**sf**

We must calculate the depth of water that must be stored and released in a 24hr period:

Required Quality Storage=	18,514.74	cf
Lagoon acreage at Normal Water Elevation=	49,658	sf
Depth of Water to be stored and released over 24hrs=	**0.37**	**ft**

Peak Inflow Stage:
26.31' @ 12 Hours

24 Hour Event
Stage: 25.21'



Head Summary Table

Time period
From: 05/25/2021, 12:00:00 AM
To: 05/27/2021, 12:00:00 AM

Thresholds
Exceedance: 0
Deficit: 0

Element ID	Stor-01
Maximum Head (ft)	26.31
Minimum Head (ft)	23.91
Event Mean Head (ft)	25.21
Duration of Exceedances (hrs)	N/A
Duration of Deficits (hrs)	N/A
Number of Exceedances	N/A
Number of Deficits	N/A

Depth of Water from WQ Event Released
= 26.31 - 25.21 = **1.11 FT**

1.11 FT > 0.37 FT Min.

MEETS 0.5 INCH WQ EVENT REQUIREMENT

STORMWATER MANAGEMENT REPORT

NORTH POINTE COMMERCE PARK
LOT A

APPENDIX F

EXHIBITS

J-23577.0013

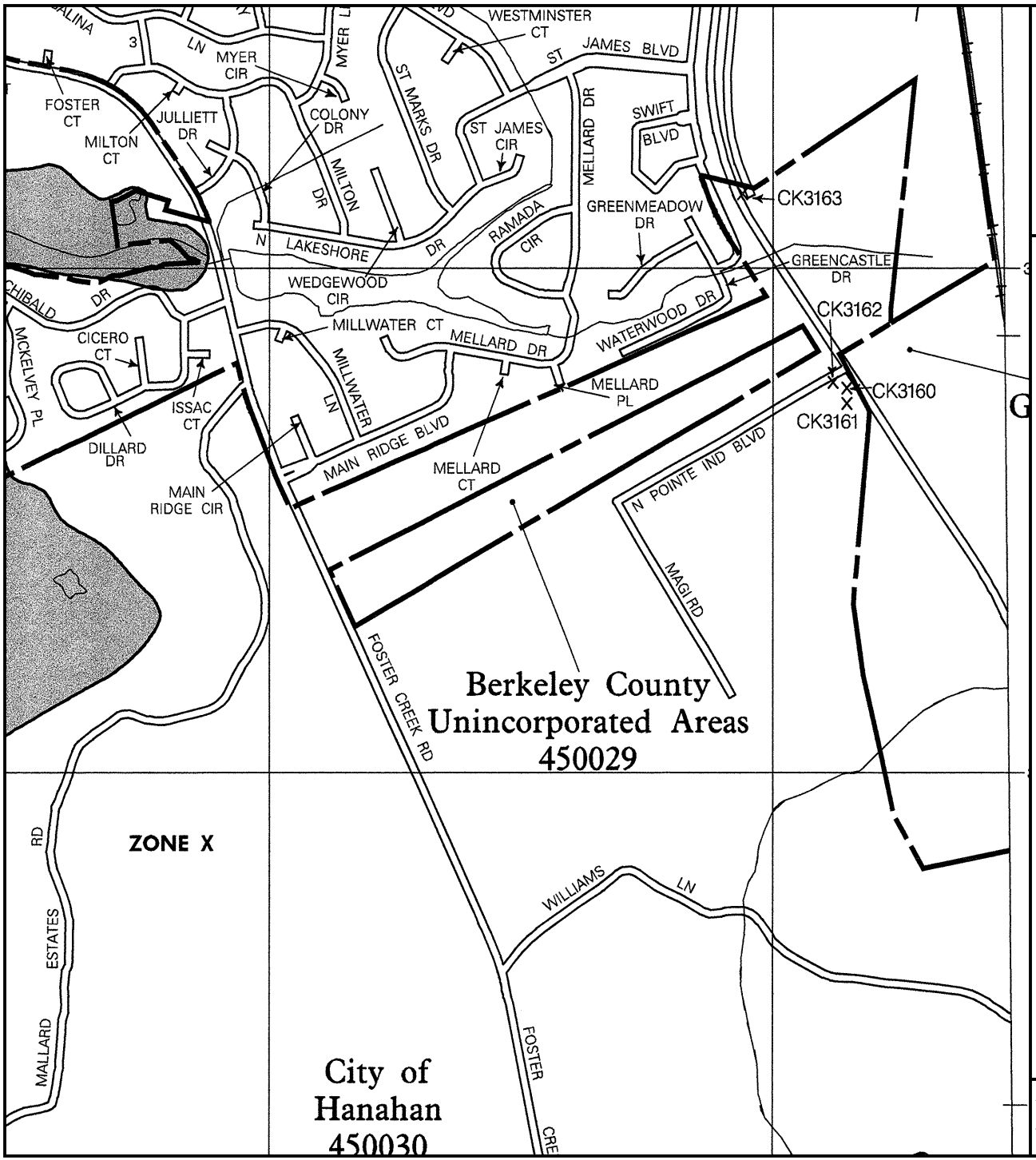
THOMAS & HUTTON

THOMAS & HUTTON

LOCATION MAP

NORTH POINTE LOT A

05/31/2018



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0685 D

FIRM

FLOOD INSURANCE RATE MAP

BERKELEY COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 685 OF 776

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BERKELEY COUNTY	450029	0685	D
GOOSE CREEK, CITY OF	450206	0685	D
HANAHAN, CITY OF	450030	0685	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
45015C0685D

EFFECTIVE DATE
OCTOBER 16, 2003

Federal Emergency Management Agency

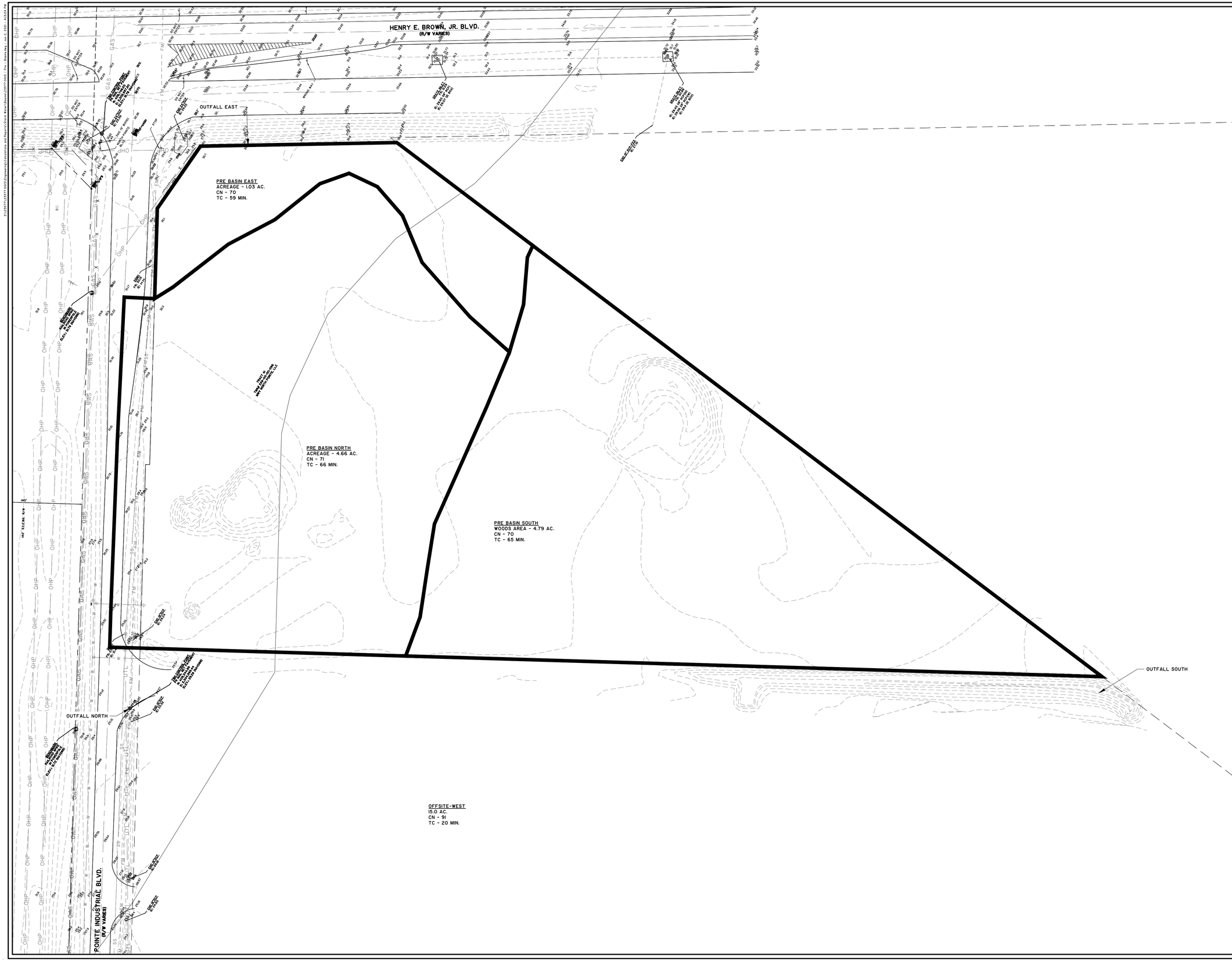
THOMAS & HUTTON

SOILS MAP

NORTH POINTE LOT A

05/31/2018

- A
- A/D
- B
- B/D
- C
- C/D
- D
- NONE
- URBAN LAND
- WATER



PRE DEVELOPMENT BASINS
NORTH POINTE COMMERCE PARK - LOT A
CITY OF HANAHAN, SOUTH CAROLINA

PREPARED FOR:

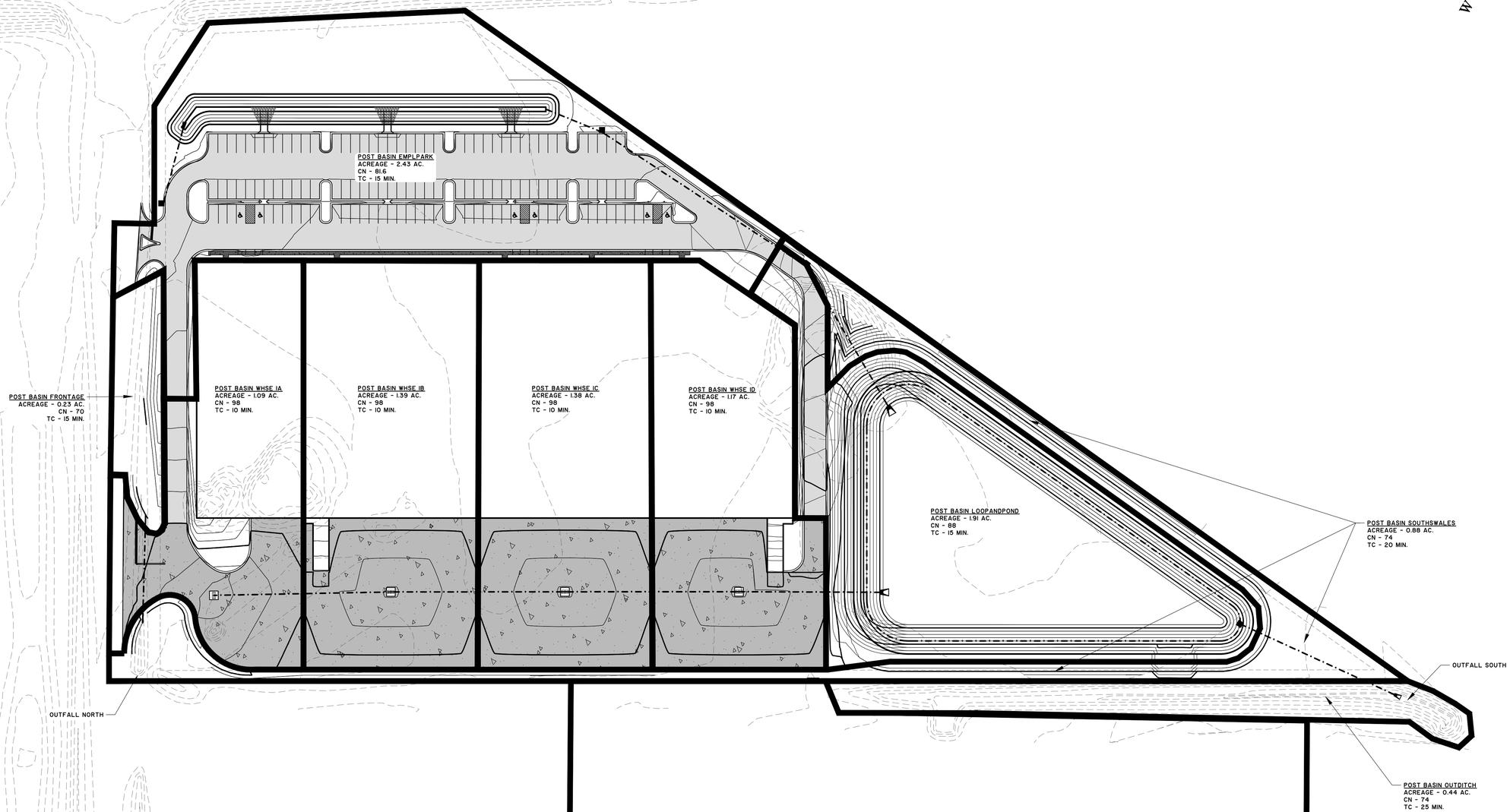
WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

PREPARED BY:

THOMAS & HUTTON

50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

JOB NO: J-23577.0013	DATE: 06/02/21
DRAWN: EMD	SCALE: 1" = 50'
REVIEWED: MCR	SHEET: 1 OF 1



POST DEVELOPMENT BASINS
NORTH POINTE COMMERCE PARK - LOT A

CITY OF HANAHAN, SOUTH CAROLINA

PREPARED FOR:

WEST-SIGNAL INDUSTRIAL PROPERTY A, LLC

PREPARED BY:

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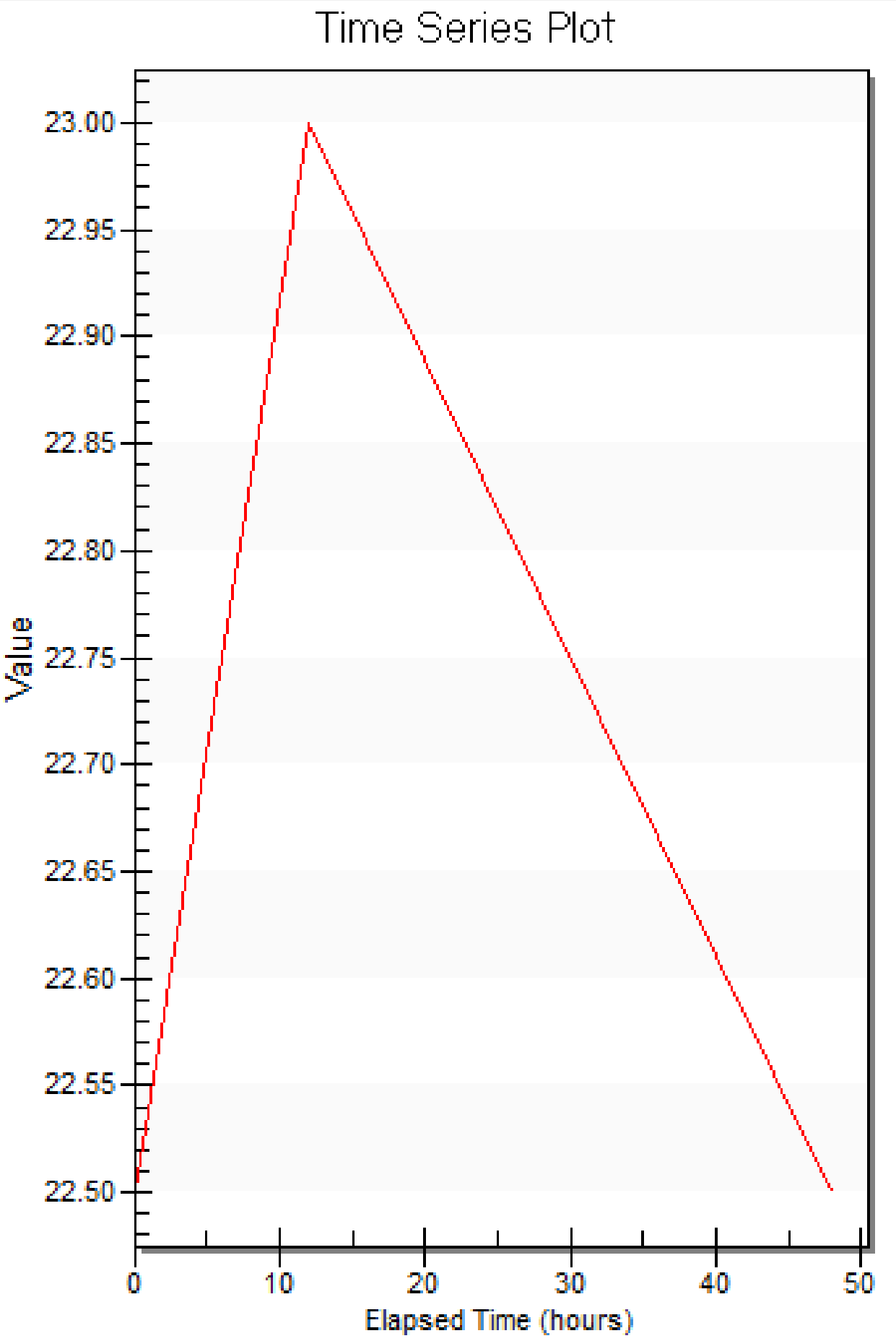
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300

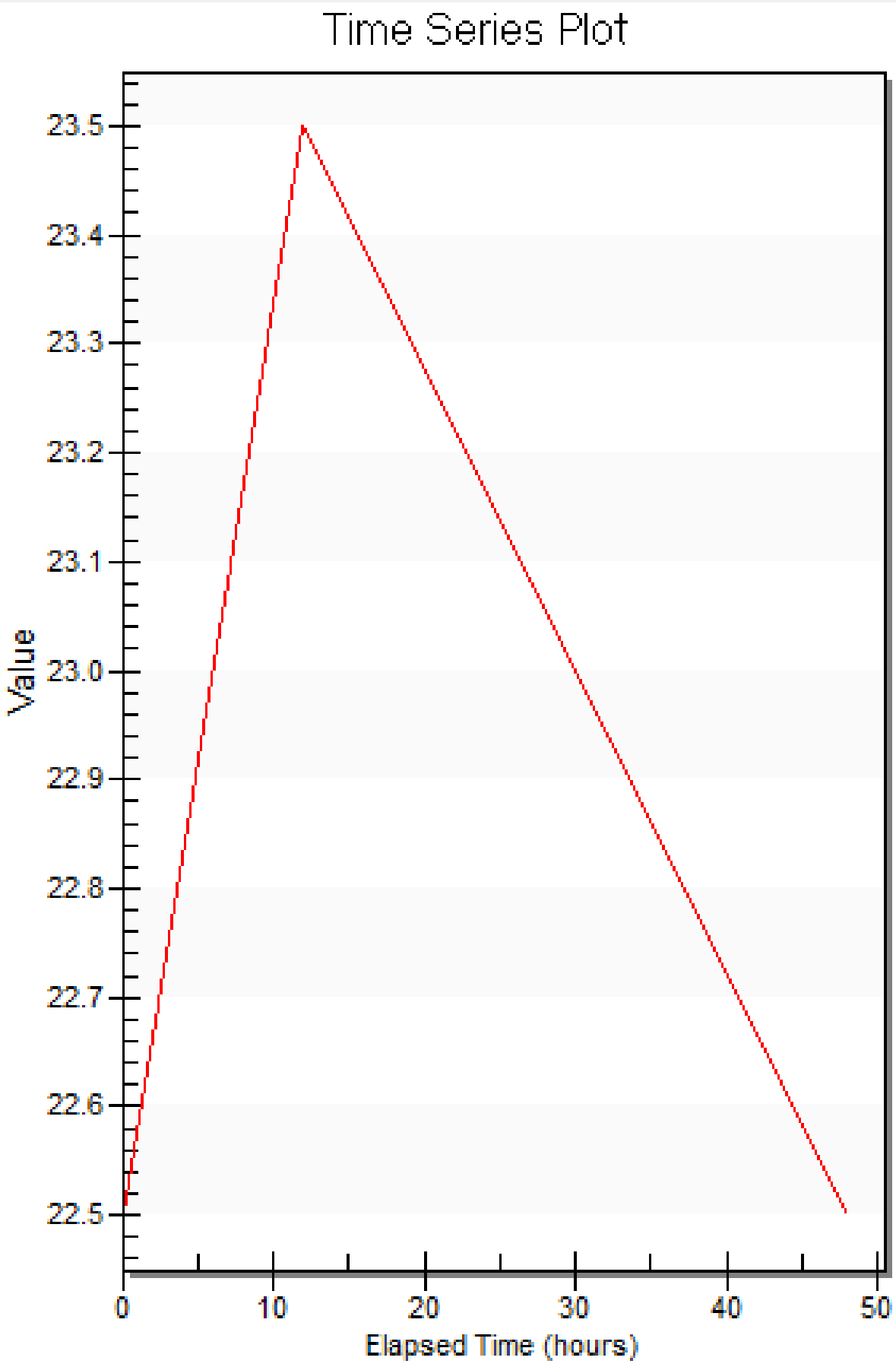
www.thomasandhutton.com

JOB NO:	J-23577.0011
DRAWN:	EMD
REVIEWED:	MCR
DATE:	06/02/21
SCALE:	1" = 50'
SHEET:	1 OF 1



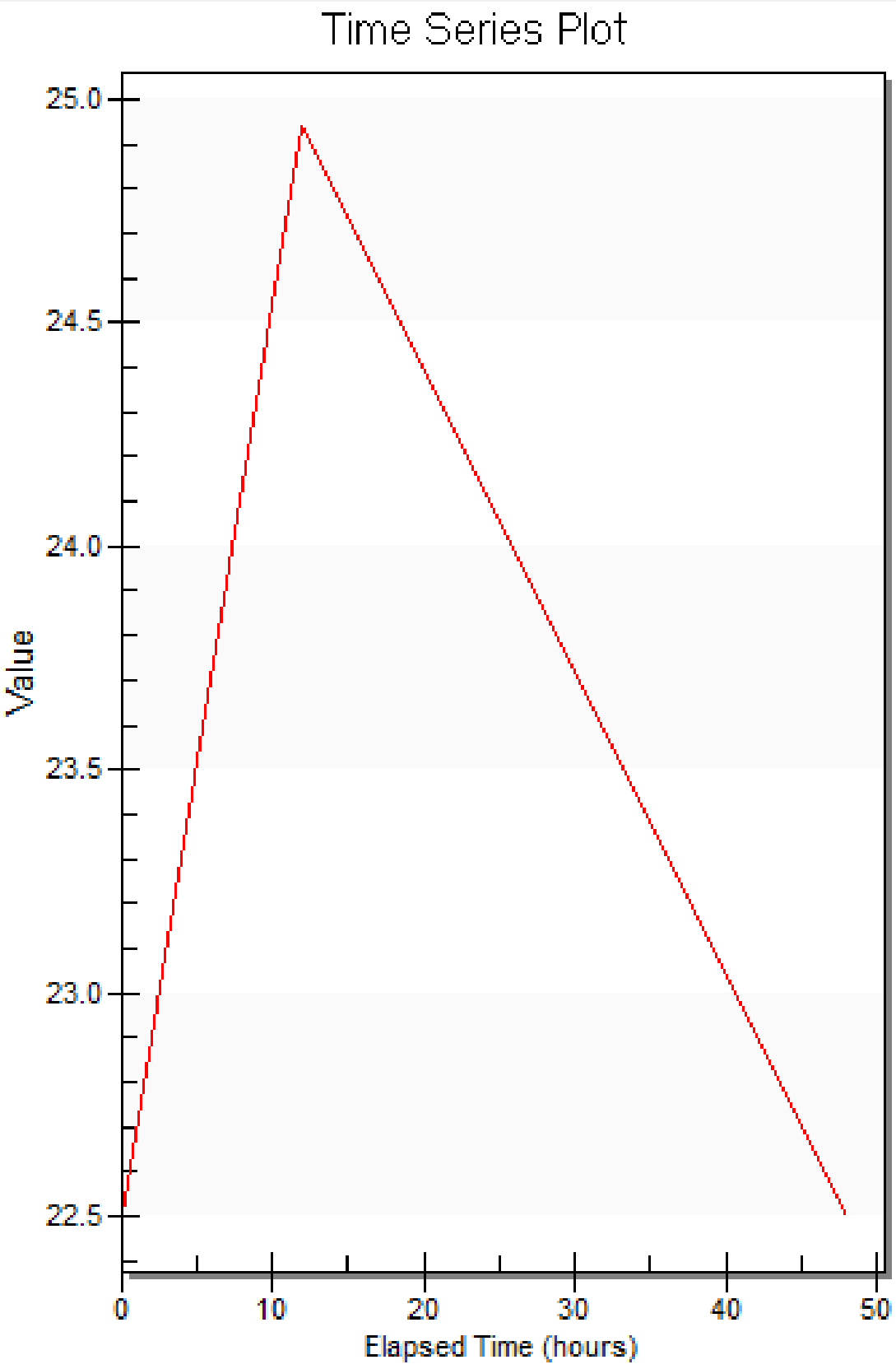
1-YR Storm Event Tailwater Condition Hydrograph

Peak Stage: 23.00' @ 12 Hours



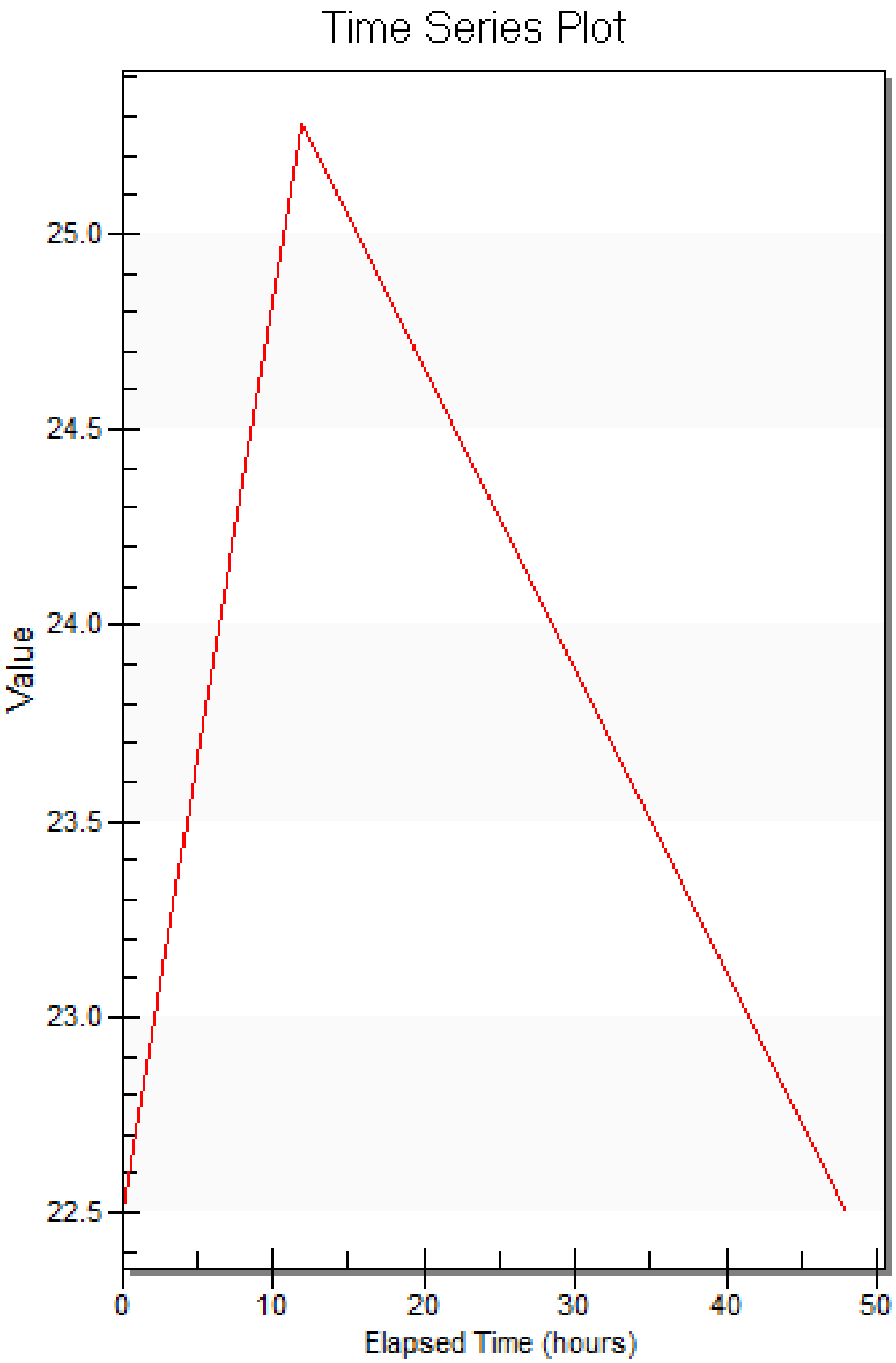
10-YR Storm Event Tailwater Condition
Hydrograph

Peak Stage: 23.50'



25-YR Storm Event Tailwater Condition
Hydrograph

Peak Stage: 24.94'



100-YR Storm Event Tailwater Condition
Hydrograph

Peak Stage: 25.28'