



See also WC055, WC056, and WC058

CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

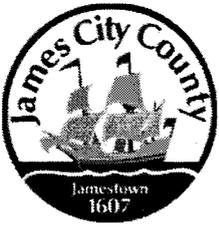
BMP NUMBER: WC057

DATE VERIFIED: July 18, 2012

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

DATE: March 12, 2010
TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services
FROM: Jo Anna Ripley, Stormwater
PO: 270712
RE: Files Approved for Scanning

General File ID or BMP ID: WC057

PIN: 1210100045

Subdivision, Tract, Business or Owner

Name (if known):

Stonehouse Commerce Park

Property Description:

Parcel A Section C Stonehouse Commerce Park

Site Address:

3000 John Deere Road

(For internal use only)

Box 15

Drawer: 8

Agreements: (in file as of scan date)

Book or Doc#:

990011799

Page:

420

712

Comments

WC055, WC056, WC057, WC058 are combined in one folder

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 24 day of May, 1999.

COVENANTOR(S)

John Deere Vehicle Group Inc.

ATTEST:

By: Michael A. Haring
Assistant Secretary

COVENANTOR(S)

ATTEST:

~~COMMONWEALTH OF VIRGINIA~~
State of Illinois
CITY/COUNTY OF Rock Island

I hereby certify that on this 24 day of May, 1999, before the subscribed, a Notary Public of the State of Virginia, and for the County of Rock Island, aforesaid personally appeared Michael A. Haring and did acknowledge the foregoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 24th day of May, 1999.

NOTARY PUBLIC
SUSAN K. STROUP
11111111111111111111

Susan K. Stroup
Notary Public

JUN - 3 - 99

My Commission expires: 4/16/00



Approved as to form:

Leo P. Rogers
Deputy County Attorney

This Declaration of Covenants prepared by:

Tom Park

(Print Name)

Construction Agent

(Title)

One John Deere Place

(Address)

Moline,

IL

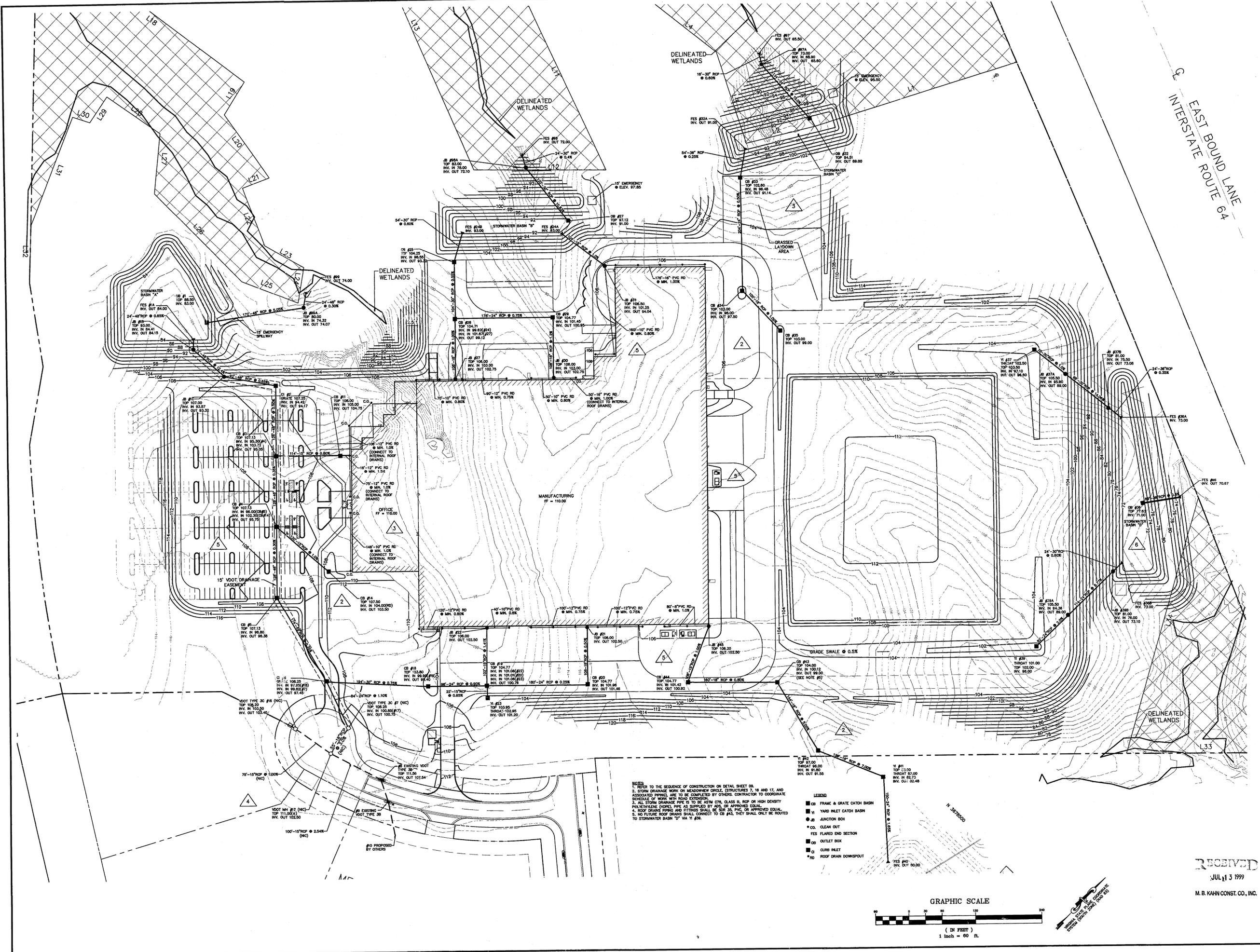
61265

(City)

(State)

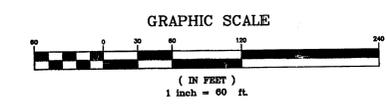
(Zip)

VIRGINIA: City of Williamsburg and County of James City to Wit:
In the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City the 3 day of June, 1999. This Covenants was presented with certificate annexed and admitted to record at 9:25 o'clock
Teste: Holone S. Ward, Clerk
by Debra, Deputy Clerk



NOTES:
 1. REFER TO THE SEQUENCE OF CONSTRUCTION ON DETAIL SHEET 01-C500.
 2. STORM DRAINAGE WORK ON MEADOWS/CREEK, STRUCTURES 7, 18 AND 17, AND ASSOCIATED PIPING, ARE TO BE COMPLETED BY OTHERS. CONTRACTOR TO COORDINATE SEQUENCE OF WORK WITH ROAD EXTENSION BY AEC OR APPROVED EQUAL.
 3. ALL STORM DRAINAGE PIPE IS TO BE ASTM C78, CLASS II, RCP OR HIGH DENSITY POLYETHYLENE (HDPE) PIPE AS SUPPLIED BY AEC OR APPROVED EQUAL.
 4. ROOF DRAIN PIPING AND FITTINGS SHALL BE SDR 35 PVC OR APPROVED EQUAL.
 5. NO FUTURE ROOF DRAINS SHALL CONNECT TO CB #A3, THEY SHALL ONLY BE ROUTED TO STORMWATER BASIN "D" VIA YI #30.

- LEGEND
- CB FRAME & GRATE CATCH BASIN
 - YI YARD INLET CATCH BASIN
 - JB JUNCTION BOX
 - CO CLEAN OUT
 - FES FLARED END SECTION
 - OB OUTLET BOX
 - CI CURB INLET
 - RD ROOF DRAIN DOWNSPOUT



RECEIVED
 JUL 13 1999
 M. B. KAHN CONST. CO., INC.

REV. NO.	DATE	BY	APP. LOCATION	REVISIONS
1	4/29/99	CDK		DATE DRAWING ISSUE
2	5/10/99	CDK		REV. PER JAMES CO.
3	5/27/99	CDK		NOTED REV./PARKING/LAND/DRAINAGE AREA
4	6/8/99	CDK		NOTED REV./STORM DRAINAGE
5	6/8/99	CDK		NOTED REV./PERMIT ISSUE
6	7/13/99	CDK		FIELD RUN TO TOP/REV./BASIN D'

FILE NAME: 01-C500
 DATE: 4/19/99
 APPROVALS
 PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: RESCH
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: [blank]
 DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

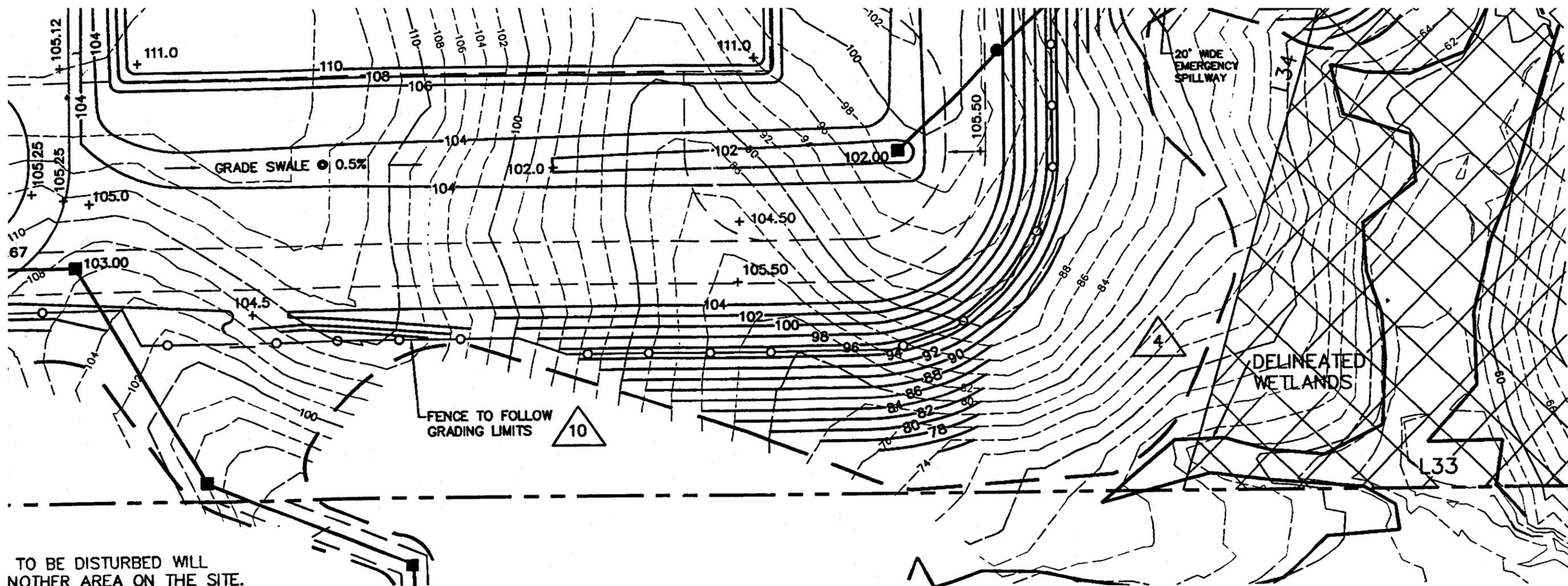
THIS DRAWING AND THE DESIGN SHOWN THEREON ARE THE PROPERTY OF CARLISLE ASSOCIATES INC. THE REPRODUCTION, COPYING OR USE OF THIS DRAWING WITHOUT THEIR WRITTEN CONSENT IS PROHIBITED AND ANY INFRINGEMENT WILL BE SUBJECT TO LEGAL ACTION. © 1999 C.A.I.

KAHN
 CARLISLE ASSOCIATES
 ARCHITECTS ENGINEERS
 1015 GERVAIS STREET
 COLUMBIA, SOUTH CAROLINA 29201
 803-252-2222

JOHN DEERE
 VEHICLE GROUP
 FACILITY
 TOAND, VIRGINIA

PROJECT TITLE: STORM DRAINAGE PLAN
 SHEET TITLE: [blank]

SHEET NUMBER: 01-C500
 R6
 6 OF 12 SHEETS



FENCE TO FOLLOW GRADING LIMITS 

TO BE DISTURBED WILL
 NOTHER AREA ON THE SITE.
 ANCE WITH THE GEOTECHNICAL
 DETAIL SHEET 09.
 OMPLETED IN ACCORDANCE WITH
 AN PREPARED BY LANGLEY AND
 BY LANGLEY & MCDONALD, AND
 UNDS. ANY AREA OF SUSPECTED
 LUATION CAN BE COMPLETED.
 MS WILL BE CERTIFIED BY A
 RUCTURES DURING CONSTRUCTION.
 VERTICAL INCREMENTS AS THEY

15' STORM DRAINAGE
 EASEMENT

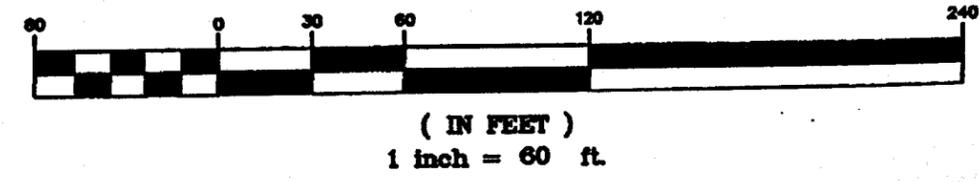


RECEIVED

APR 20 2000

M. B. KAHN CONST. CO., INC.

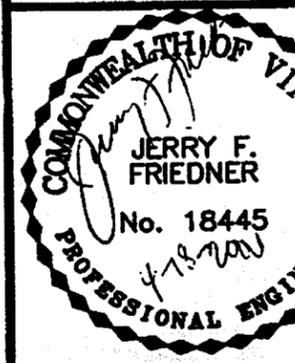
GRAPHIC SCALE



JOHN DI
 VEHICLE C
 FACILI

PROJECT TITL
 SHEET TITLE

OVERALL
 GRADING
 PLAN

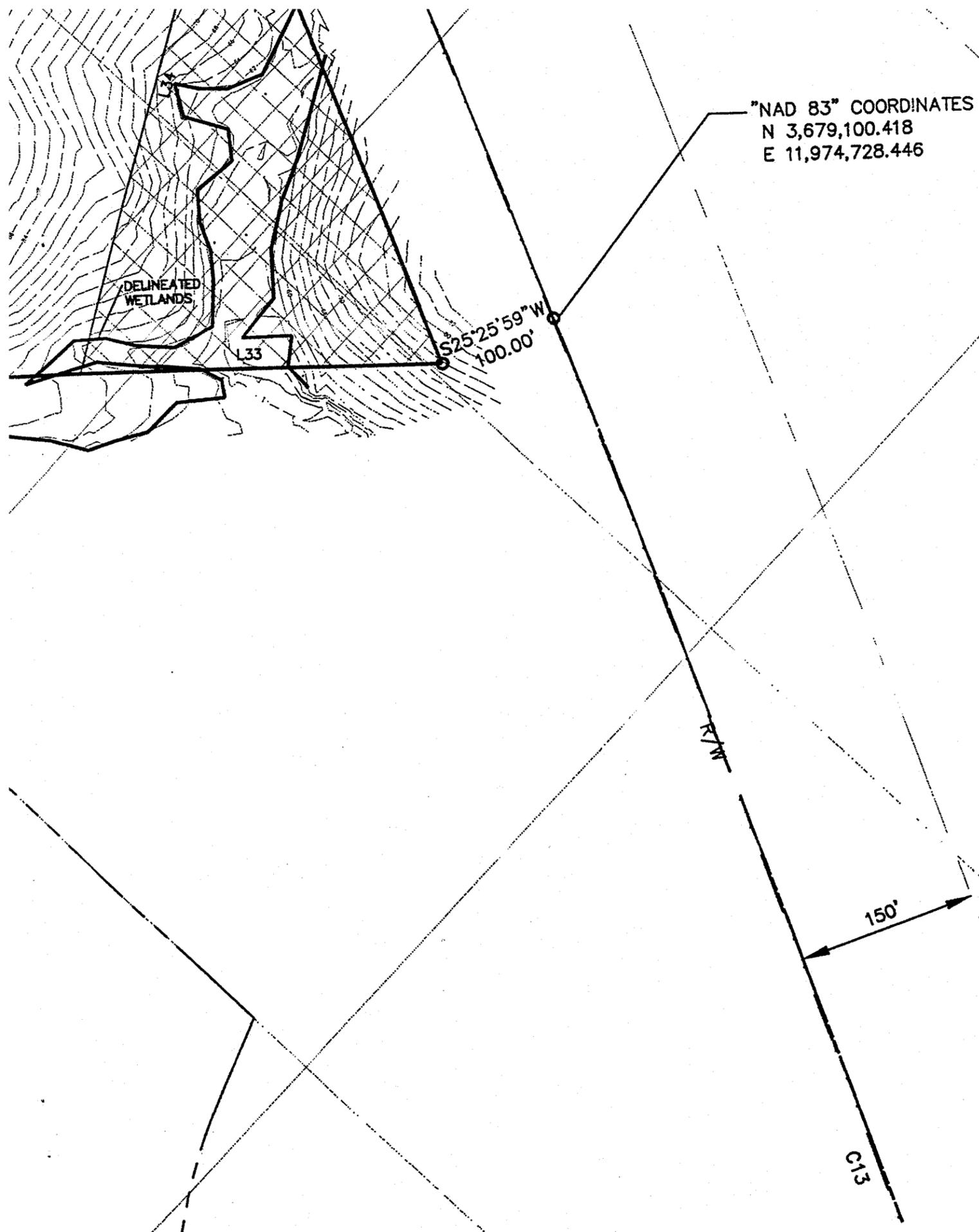


SHEET NUMBER

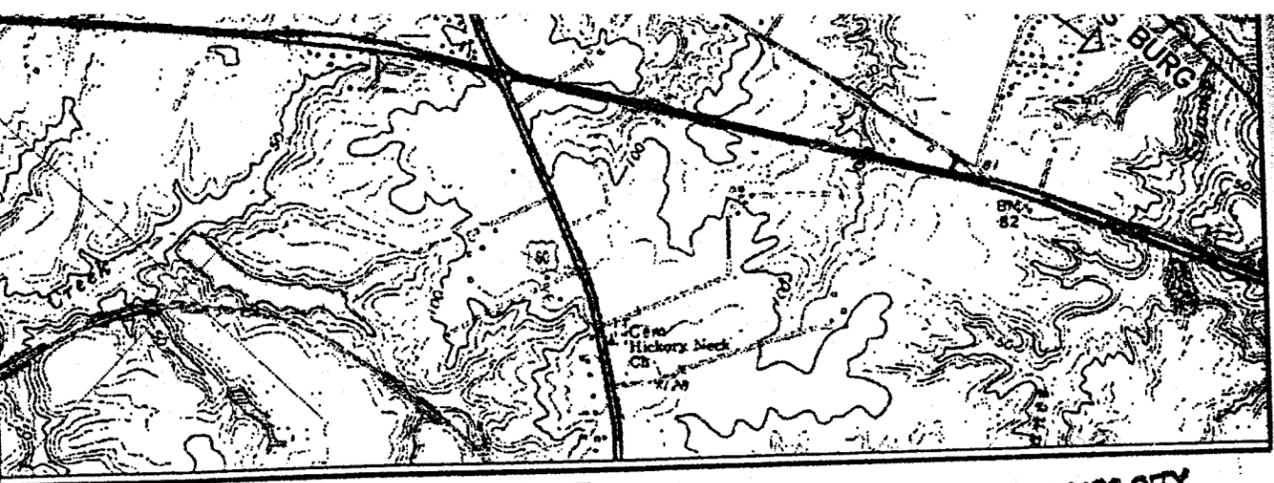
01-C30

R12

3 OF 13 S

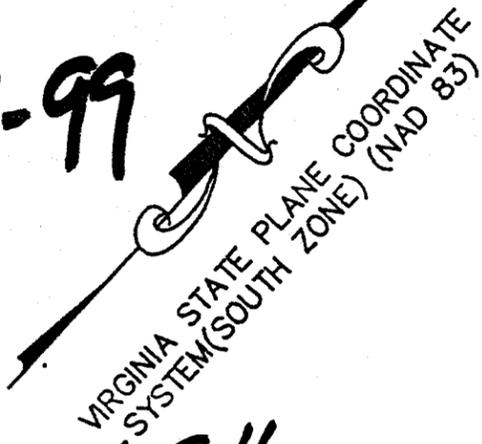


"NAD 83" COORDINATES
 N 3,679,100.418
 E 11,974,728.446



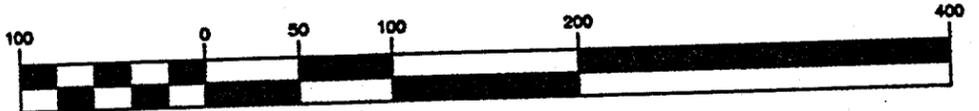
VICINITY MAP
 SCALE: 1" = 2000'

SP-47-99



"BASIN C"

GRAPHIC SCALE



(IN FEET)
 1 inch = 100 ft.

CIVIL SHEET INDEX

- 01-C100 EXISTING CONDITION/DEMOLITION PLAN
- 01-C200 SITE LAYOUT AND STAKING PLAN
- 01-C300 OVERALL GRADING PLAN
- 01-C301 ENLARGED GRADING PLAN
- 01-C400 UTILITY PLAN
- 01-C500 STORM DRAINAGE PLAN
- 01-C501 DRAINAGE DIVIDE PLAN
- 01-C600 EROSION AND SEDIMENT CONTROL PLAN
- 01-C700 SITE DETAIL SHEET
- 01-C701 SITE DETAIL SHEET
- 01-C702 SITE DETAIL SHEET
- 01-C703 SITE DETAIL SHEET
- 01-C704 SITE DETAIL SHEET



COUNTY OF JAMES CITY
 FINAL SITE PLAN

APPROVALS	DATE
Fire Dept. PP/PDH	4/2/00
Health Dept. _____	_____
VDOT PCB/PDH	8/4/99
Planning _____	5/3/00
Environ. DEC/PDH	10/2/99
Zoning Adm. _____	5/3/00
JCSA PWP/PDH	2/5/99
County Eng. WJB/PDH	4/22/00
REA _____	_____
Other _____	_____

JOHN DEER
 PROFESSIONAL ENGINEER

PRO
 SH

EXISTING CONDITIONS
 AND DEMOLITION



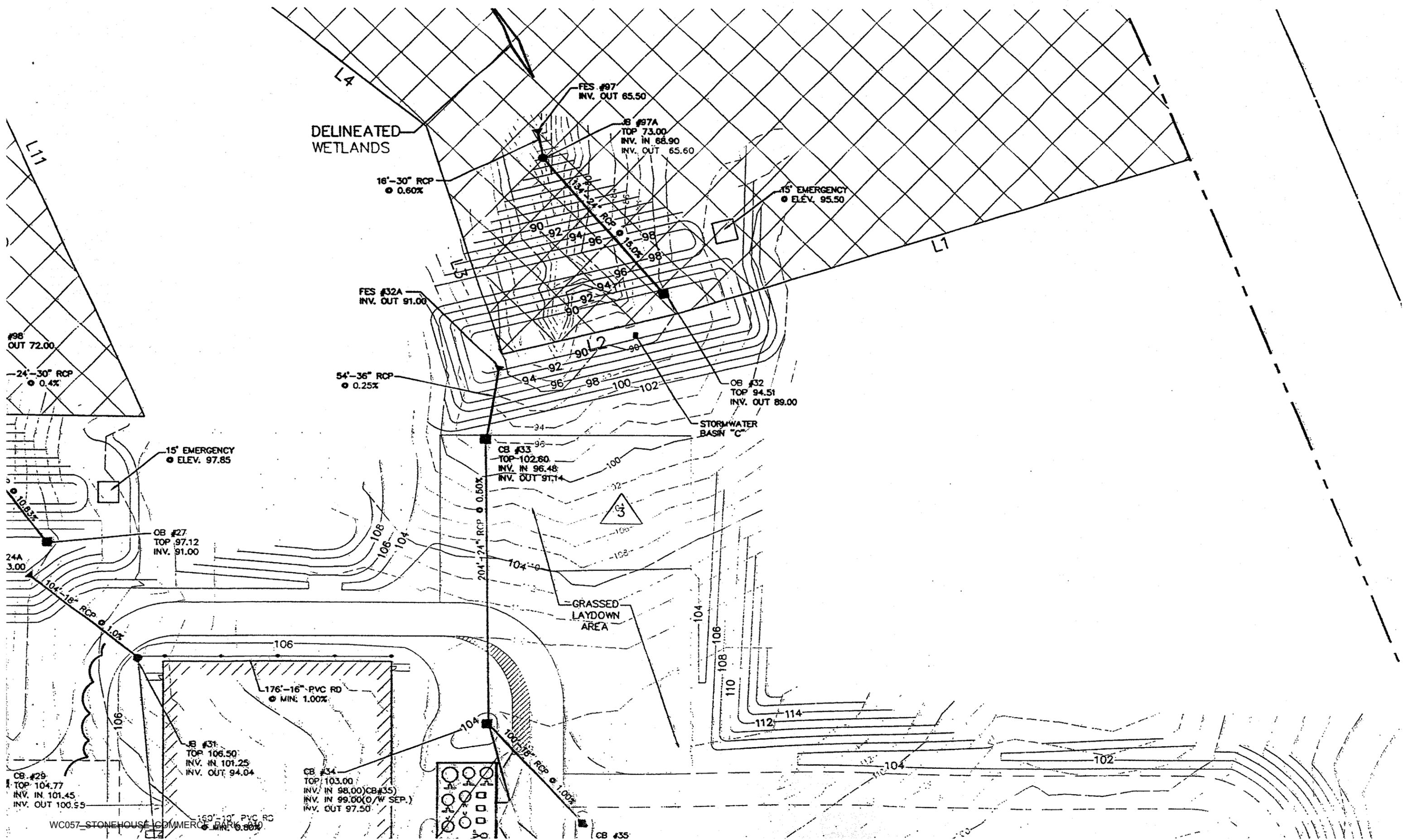
SHEET

01-C

F

1 OF





DRAIN
E DETAIL THIS SHEET)

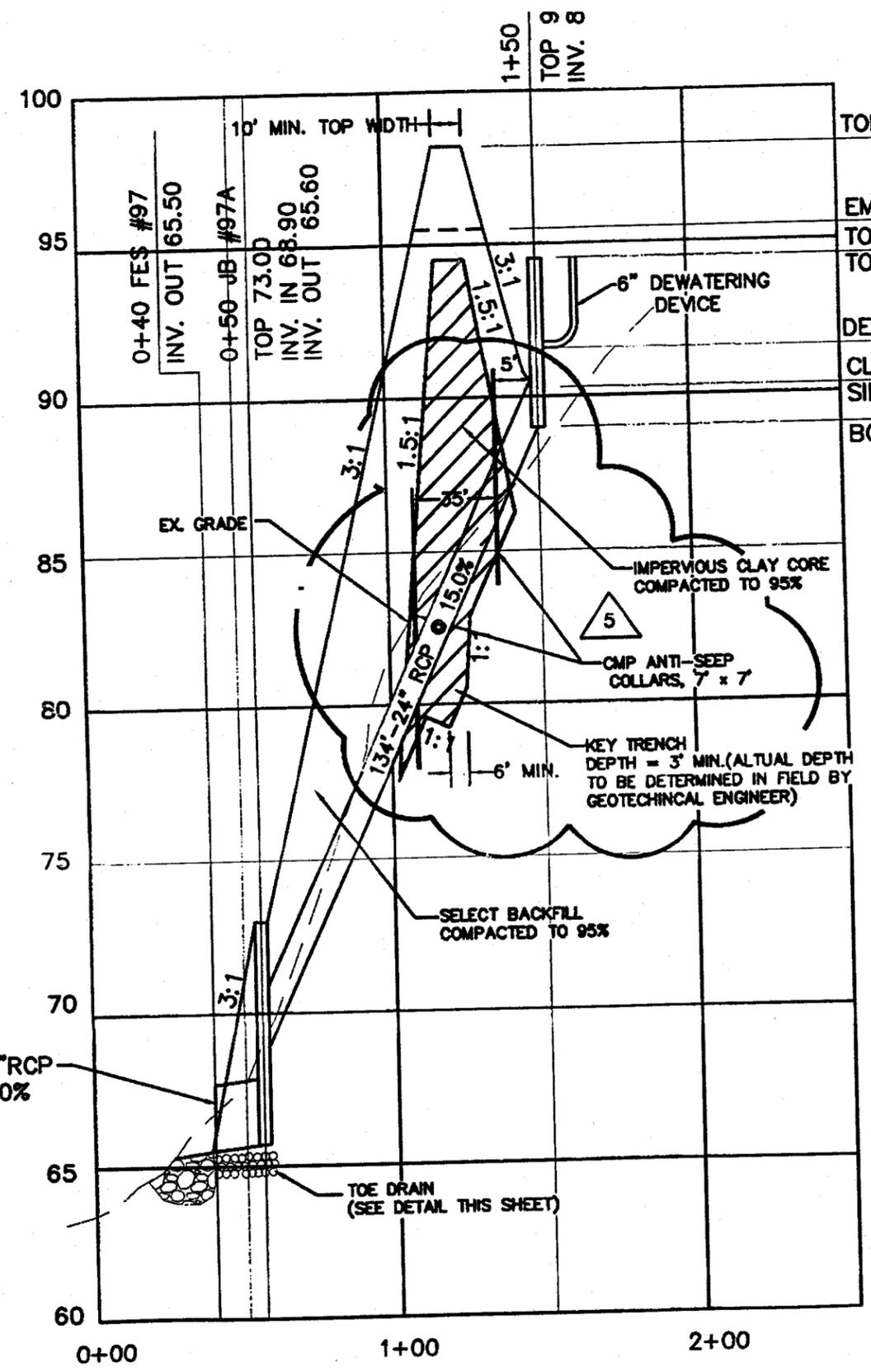
1+00 2+00

POND "A"

SCALE: HOR. 1" = 50'
VER. 1" = 5'

TOP OF DAM = 100.20
EMER. SPILLWAY 97.85
TOP RISER 97.12 = HIGH WATER (25 yr. STORM)
TOTAL STORAGE = 1290 cy.
DEWATERING ELEV. = 93.50
LEANOUT ELEV. = 92.42
SILT STORAGE = 195 cy.
BOTTOM ELEV. = 91.00

SUMMARY POND "B"		
DRAINAGE AREA = 5.9 AC.		
STORAGE TYPE	REQ'D(cy.)	PROVIDED(cy.)
CLEANOUT	195	195
WET STORAGE	395	451
TOTAL STORAGE	790	1,290



SUMMARY POND "C"		
DRAINAGE AREA = 5.1 AC.		
STORAGE TYPE	REQ'D(cy.)	PROVIDED(cy.)
CLEANOUT	168	168
WET STORAGE	342	418
TOTAL STORAGE	684	1,541

POND "C"
SCALE: HOR. 1" = 50'
VER. 1" = 5'

OCT 25 1999

JOHN DE
VEHICLE C

PRO
SH

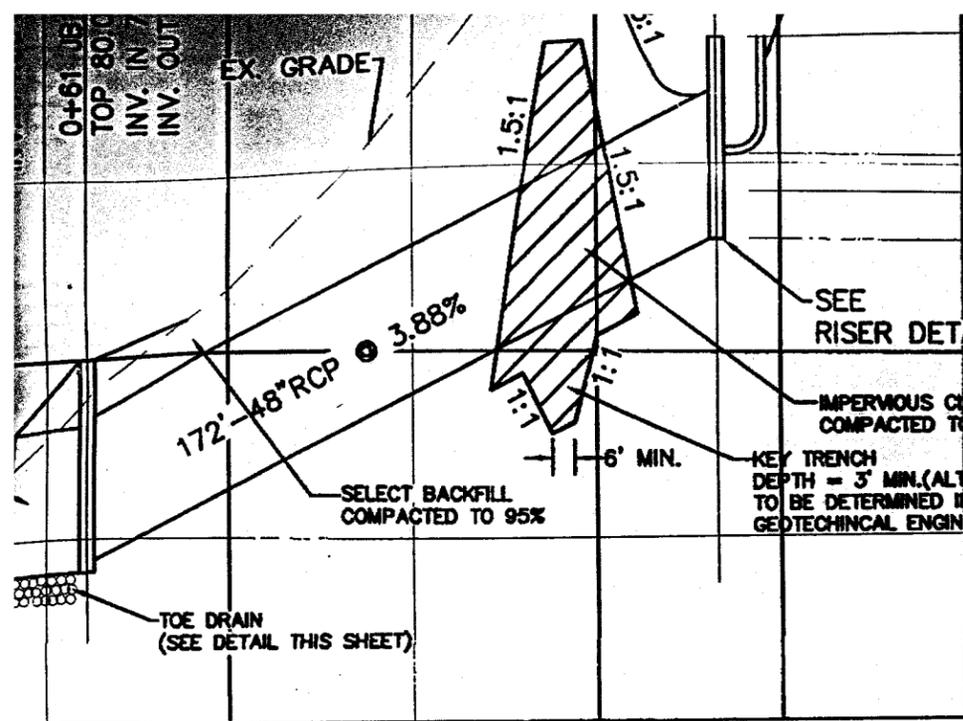
CITE DETAIL



St

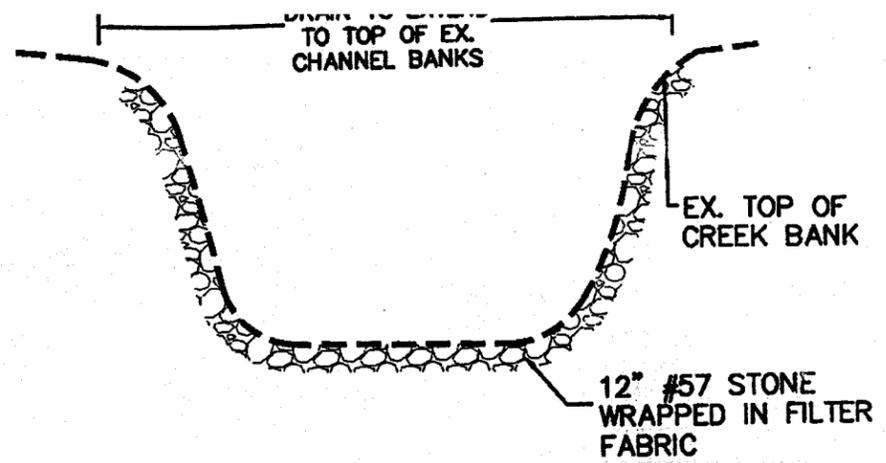
0

10



TOP RISER = 88.50
 TOTAL STORAGE = 5,369 cy.
 WET STORAGE = 1,234 cy.
 DEWATERING ELEV. = 83.25
 CLEANOUT LEVEL = 82.27
 SILT STORAGE = 528 cy.
 BOTTOM ELEV. = 81.00

SUMMARY POND "A"		
DRAINAGE AREA = 16.0 AC.		
STORAGE TYPE	REQ'D(cy.)	PROVIDED(cy.)
CLEANOUT	528	528
WET STORAGE	1,072	1,234
TOTAL STORAGE	2,144	5,369

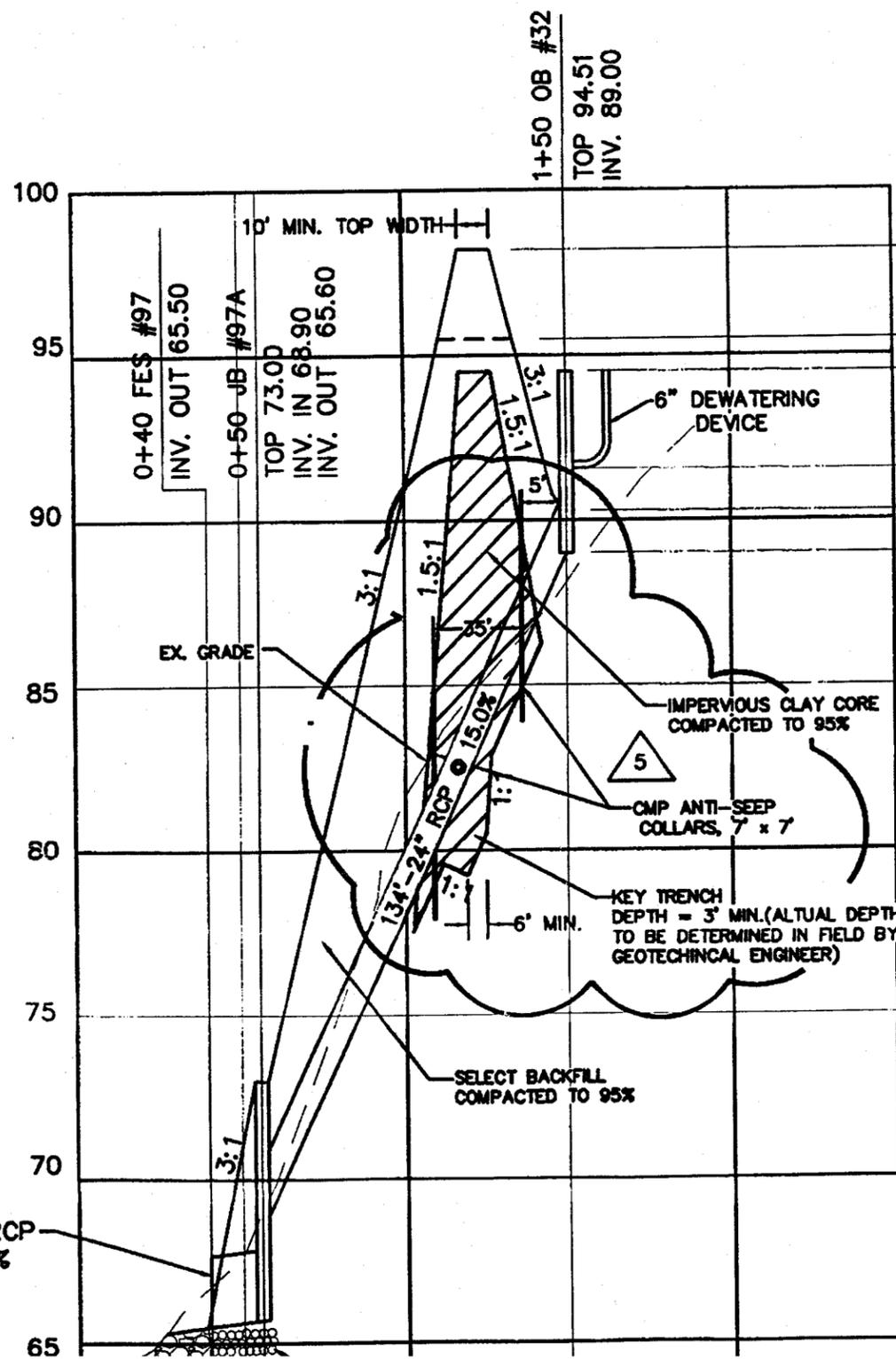


TOE DRAIN DETAIL
 N.T.S.

POND "A"
 SCALE: HOR. 1" = 50'
 VER. 1" = 5'

TOP OF DAM = 100.20
 EMER. SPILLWAY 97.85
 TOP RISER 97.12 = HIGH WATER (25 yr. STORM)
 TOTAL STORAGE = 1290 cy.
 DEWATERING ELEV. = 93.50
 CLEANOUT ELEV. = 92.42
 SILT STORAGE = 195 cy.
 BOTTOM ELEV. = 91.00

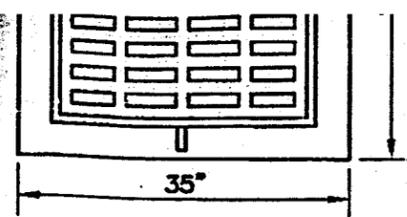
SUMMARY POND "B"		
DRAINAGE AREA = 5.9 AC.		
STORAGE TYPE	REQ'D(cy.)	PROVIDED(cy.)
CLEANOUT	195	195
WET STORAGE	395	451
TOTAL STORAGE	790	1,290



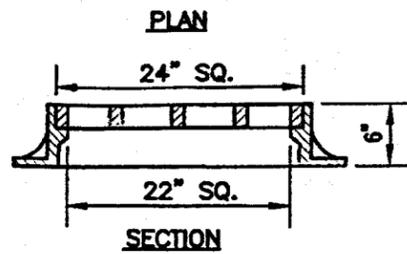
TOP OF DAM = 98.20
 EMER. SPILLWAY = 95.50 = HIGH WATER (25 yr. STORM)
 TOP RISER = 94.51
 TOTAL STORAGE = 1541 cy.
 DEWATERING ELEV. = 91.28 WET STORAGE = 418 cy.
 CLEANOUT ELEV. = 90.28
 SILT STORAGE = 168 cy.
 BOTTOM ELEV. = 89.00

SUMMARY POND "C"		
DRAINAGE AREA = 5.1 AC.		
STORAGE TYPE	REQ'D(cy.)	PROVIDED(cy.)
CLEANOUT	168	168
WET STORAGE	342	418
TOTAL STORAGE	684	1,541

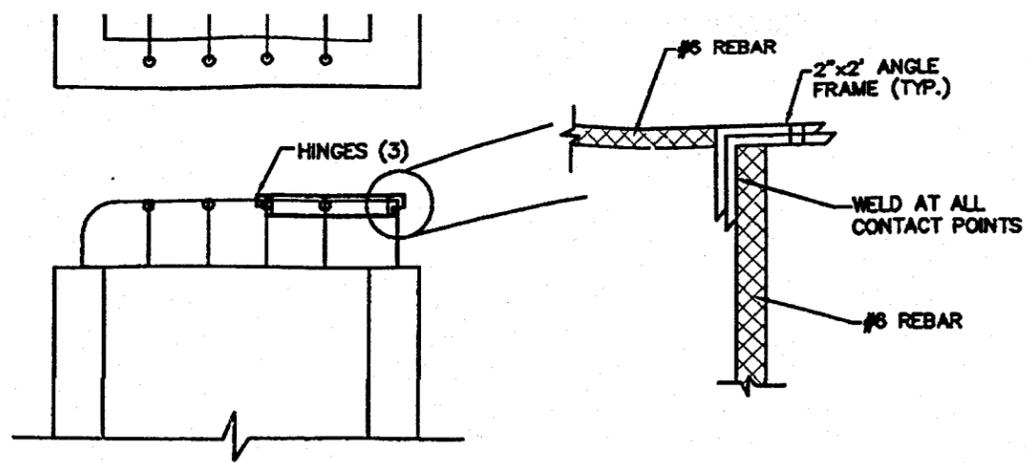
IMP. CLAY CORE
 COMPACTED TO 95%
 KEY TRENCH
 DEPTH = 3' MIN. (ACTUAL DEPTH
 TO BE DETERMINED IN FIELD BY
 GEOTECHNICAL ENGINEER)



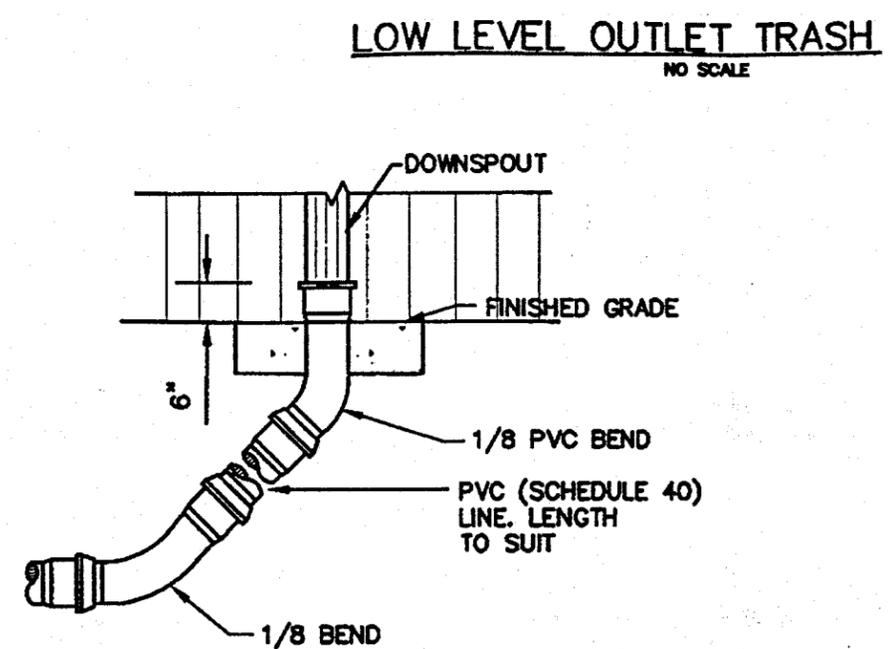
APPROX. WTS.
NEENAH
TOTAL 400



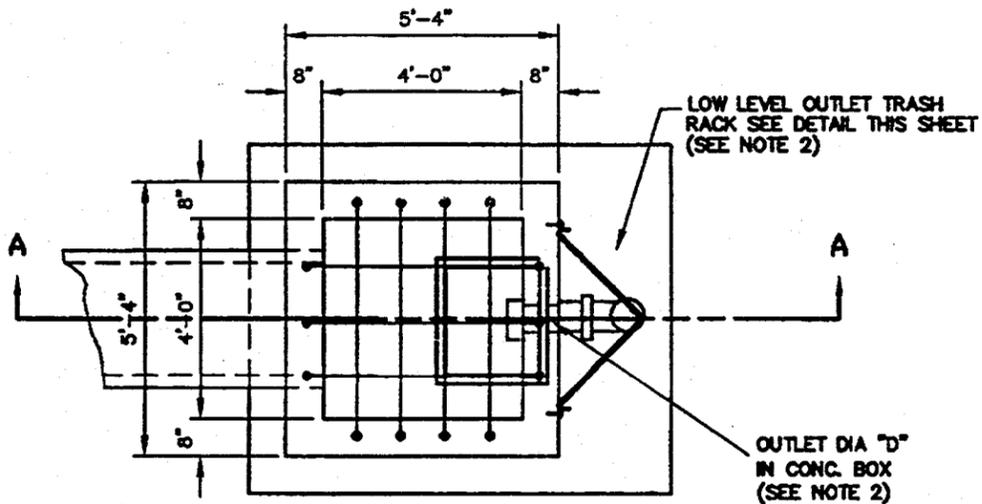
FRAME & GRATE DETAIL
NO SCALE



REBAR CAGE DETAIL
NO SCALE



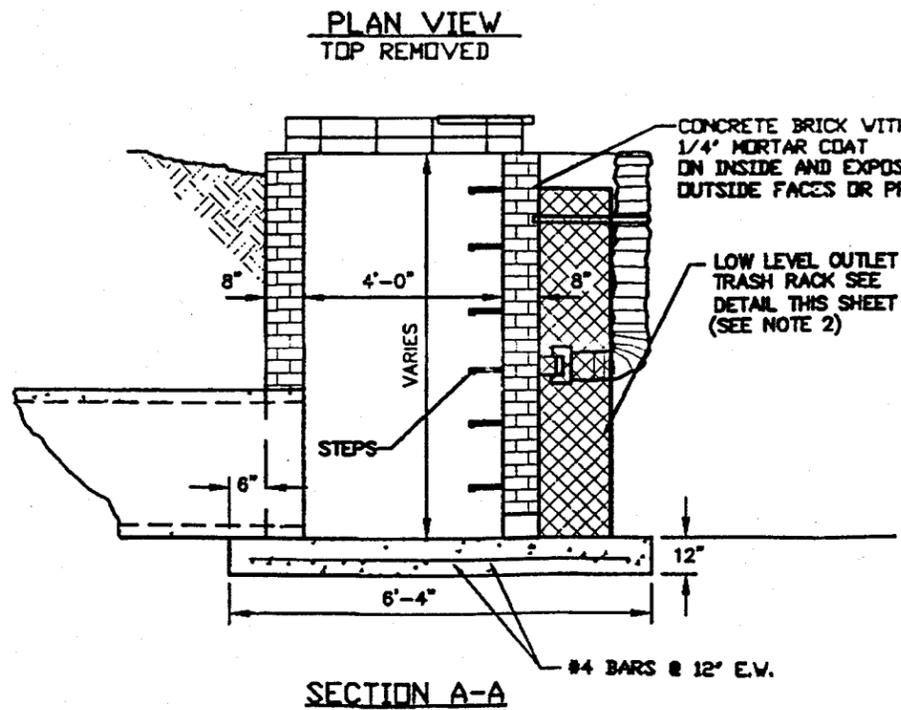
TYPICAL ROOF DRAIN & DOWNSPOUT DETAIL
NO SCALE



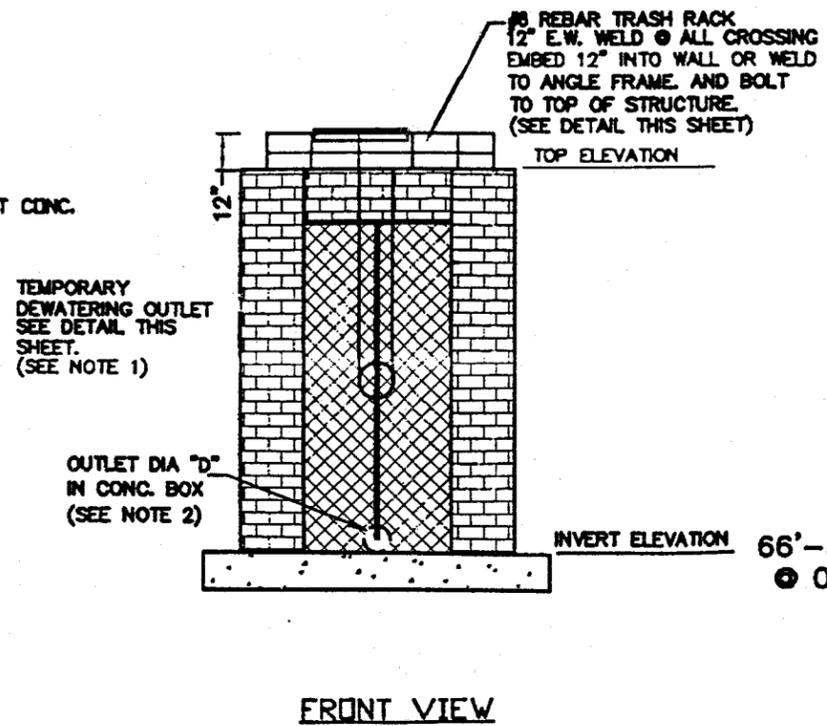
OUTLET BOX DIMENSIONS						
BASIN NO.	STRUC. NO.	OUTLET DIA. "D"	ELEVATIONS			
			INVERT	TOP		
A	OB #1	5 IN.		81.00	88.50	
B	OB #27	3 IN.		91.00	97.12	
C	OB #32	3 IN.		89.00	94.80	
D	OB #36	4 IN.		71.00	77.83	

NOTES: 1. TEMPORARY DEWATERING OUTLET IS TO BE INSTALLED WHILE SITE IS UNDER CONSTRUCTION, AND REMOVED WHEN SITE IS STABILIZED.
2. LOW LEVEL OUTLET IS TO REMAIN CLOSED DURING CONSTRUCTION. AFTER SITE IS STABILIZED, THE TEMPORARY DEWATERING DEVICE SHALL BE REMOVED THE LOW LEVEL OUTLET OPENED, AND TRASH RACK INSTALLED.

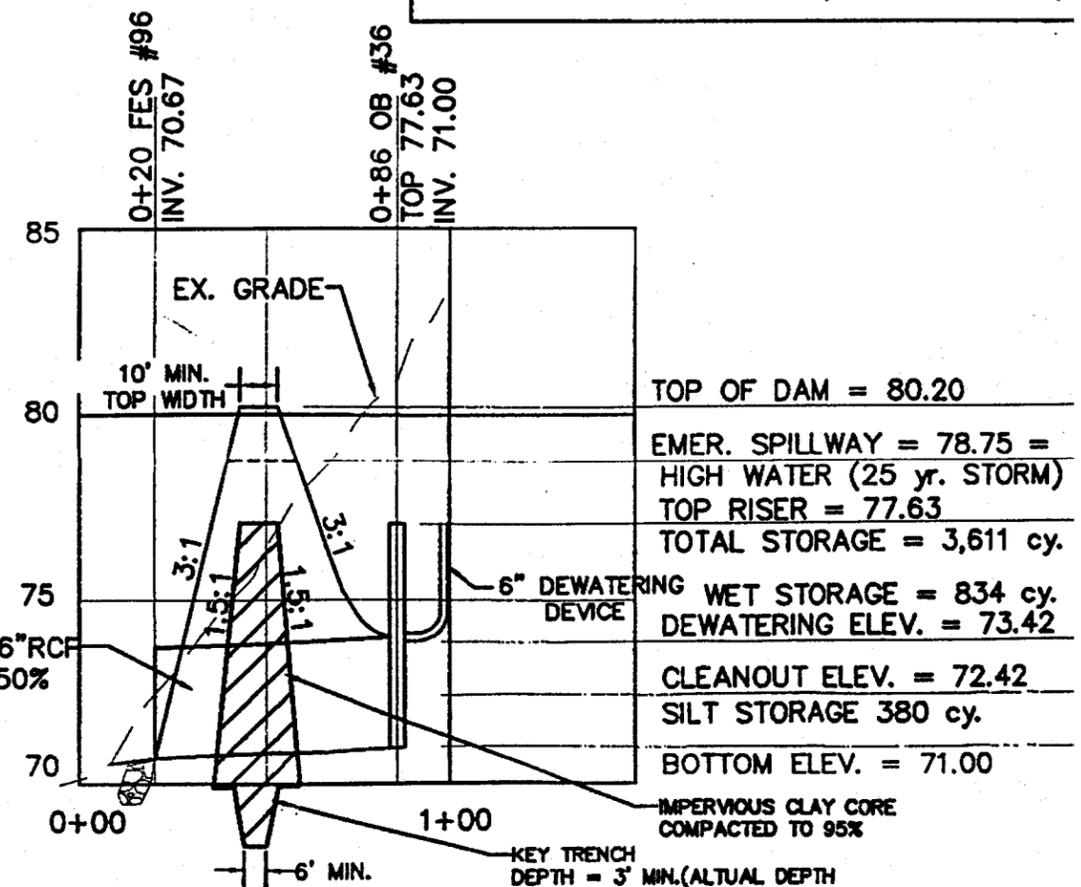
SUMMARY POND "D"		
DRAINAGE AREA = 11.5 AC.		
STORAGE TYPE	REQ'D (cy.)	PROVIDED
CLEANOUT	380	38
WET STORAGE	770	83
TOTAL STORAGE	1,540	3,6



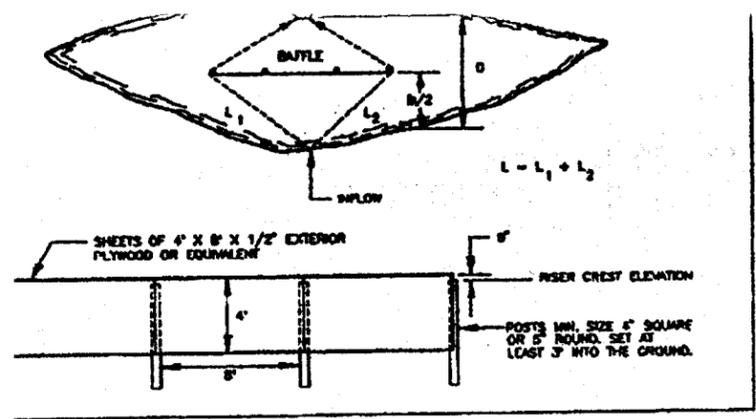
SECTION A-A



FRONT VIEW



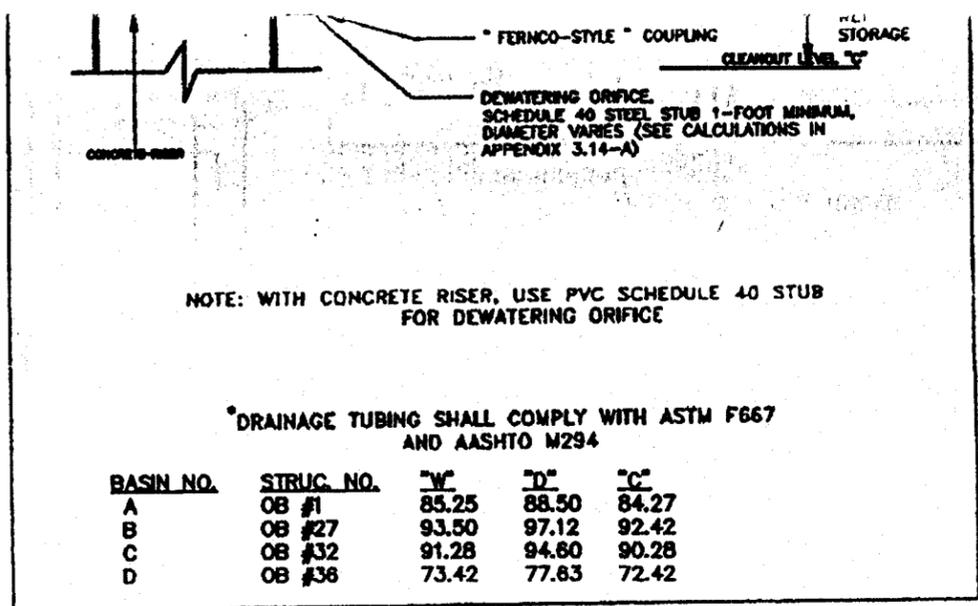
TOP OF DAM = 80.20
EMER. SPILLWAY = 78.75 = HIGH WATER (25 yr. STORM)
TOP RISER = 77.63
TOTAL STORAGE = 3,611 cy.
WET STORAGE = 834 cy.
DEWATERING ELEV. = 73.42
CLEANOUT ELEV. = 72.42
SILT STORAGE 380 cy.
BOTTOM ELEV. = 71.00
IMPERVIOUS CLAY CORE COMPACTED TO 95%
KEY TRENCH DEPTH = 3' MIN. (ACTUAL DEPTH)



USDA-SCS

Plate 3.14-6

III - 94

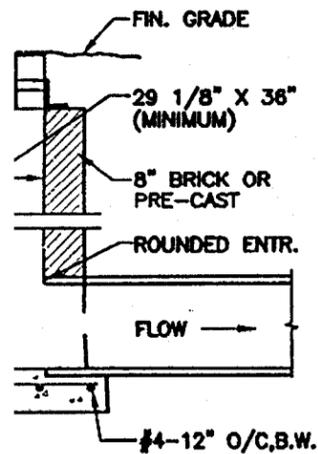
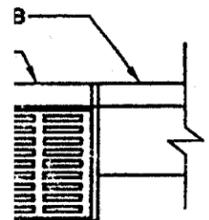


Source: Va. DSWC

Plate 3.14-15

TEMPORARY BASIN OUTLET BOX DETAIL

NO SCALE



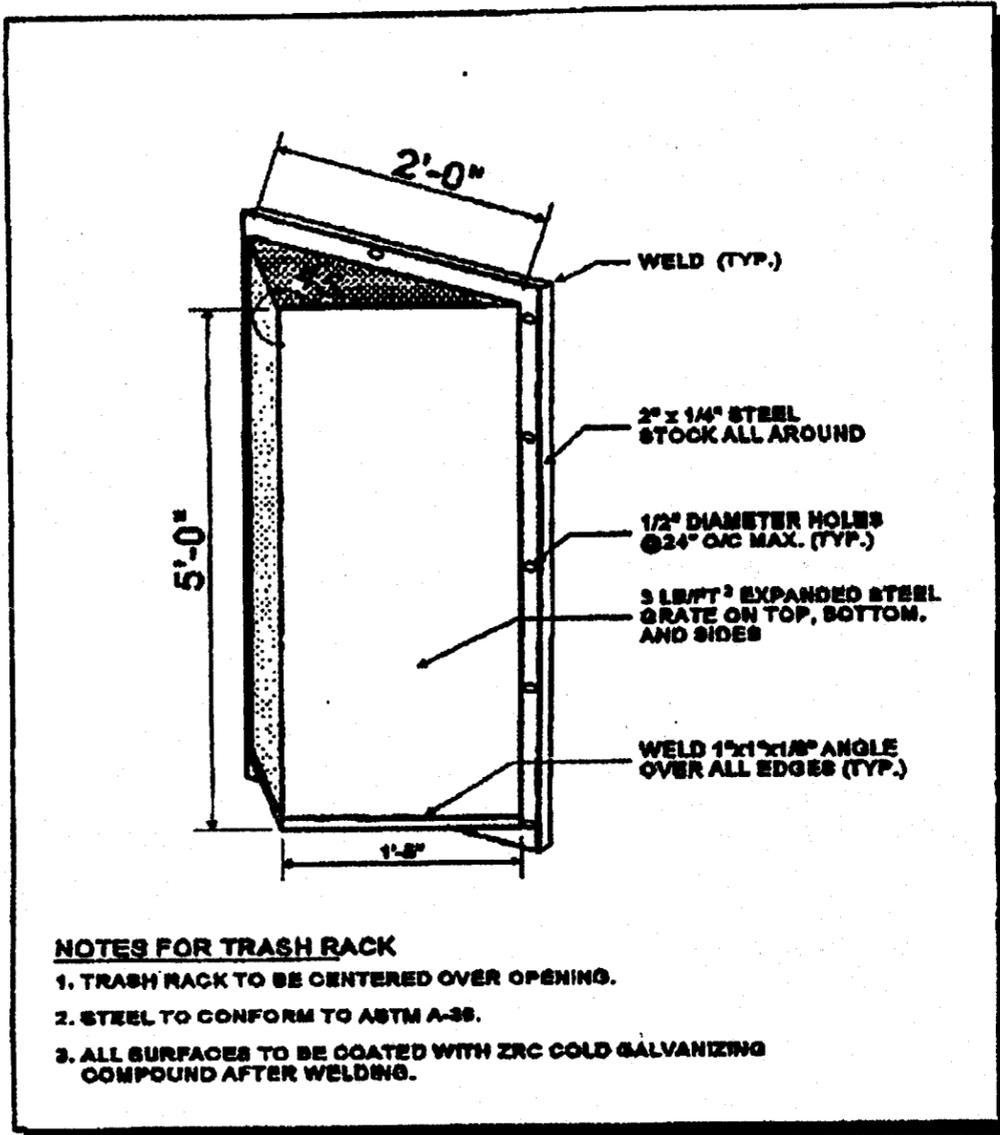
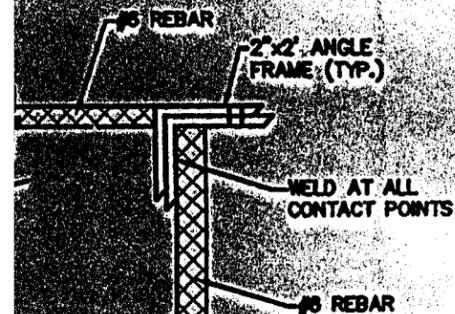
NDRY CO.
CATALOG NO.
R 3246-A

FOUNDRY CO.
APPROVED EQUAL

URB INLET

2"x2" OPENING
W/ 2"x2" ANGLES
TO REBAR.

DRILLED
PADLOCK



NOTES FOR TRASH RACK

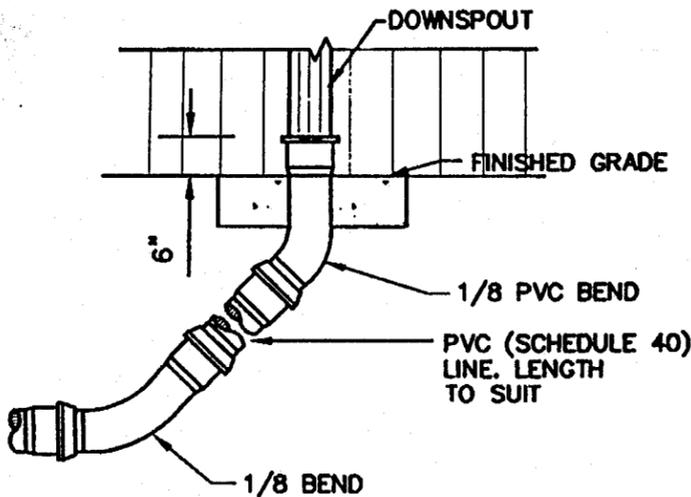
1. TRASH RACK TO BE CENTERED OVER OPENING.
2. STEEL TO CONFORM TO ASTM A-36.
3. ALL SURFACES TO BE COATED WITH ZRC COLD GALVANIZING COMPOUND AFTER WELDING.

Center for Watershed Protection

C-1

LOW LEVEL OUTLET TRASH RACK DETAIL

NO SCALE



TYPICAL ROOF DRAIN & DOWNSPOUT DETAIL

NO SCALE

DIMENSIONS	
ELEVATIONS	
INVERT	TOP
81.00	88.50

57 STONE HOUSE COMMERCE PARK - 014

100

10' MIN. TOP WIDTH

98	98A	100	2.10
----	-----	-----	------

24'

Revised 4/7/97 James City County

Erosion and Sediment Control Notes

The purpose of the erosion control measures shown on these plans shall be to preclude the transport of all waterborne sediments resulting from construction activities from entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, appropriate modifications will be made to correct any plan deficiencies. In addition to these notes, all provisions of the Virginia Erosion and Sediment Control Regulations shall apply to this project.

1. All erosion and sediment control measures shall be installed and maintained in accordance with the "Virginia Erosion and Sediment Control Handbook." The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.
2. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within State right-of-ways. Where sediment is transported onto a public road surface, the road shall be thoroughly cleaned at the end of each day.
3. A preconstruction meeting shall be held on site between the County, the Developer, the Project Engineer, and the Contractor prior to issuance of the Land Disturbing Permit. The Contractor shall submit a Sequence of Construction to the County for approval prior to the preconstruction meeting. The Contractor will supply the Environmental Division with the name of the individual who will be responsible for ensuring maintenance of installed measures on a daily basis.
4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before upslope land disturbance takes place. Earthen structures such as dams, dikes, and diversions must be seeded and mulched immediately after installation. Periodic inspections of the erosion control measures shall be made to assess their condition. Any necessary maintenance of the measures shall be accomplished immediately upon notification by the County and shall include the repair of measures damaged by any subcontractor including those of the public utility companies.
5. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) shall be installed prior to the end of each working day.
6. Sediment control measures may require minor field adjustments at a time of construction to insure their intended purpose is accomplished. Environmental Division approval will be required for other deviations from the approved plans.
7. The contractor shall place soil stockpiles at the locations shown on this plan or as directed by the engineer. Soil stockpiles shall be stabilized or protected with sediment trapping measures. Off-site waste or borrow areas shall be approved by the Environmental Division prior to the import of any borrow or export of any waste to or from the project site.
8. The contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of same. This includes installation of erosion control stone or paved ditches where required. Any drainage outfalls required for a street must be completed before street grading or utility installation begins.
9. Permanent or temporary soil stabilization must be applied to all denuded areas within 7 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded areas which may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
10. No more than 300 feet of sanitary sewer, storm sewer, waterlines, or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).
11. If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 3.35. Seeding will then take place as soon as the season permits.
12. The term Seeding, Final Vegetative Cover or Stabilization, on this plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime, and fertilizer in accordance with Specification 3.32, Permanent Seeding. Irrigation shall be required as necessary to ensure establishment of grass cover.
13. All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 3.35, Mulching and Manufacturer's Instructions. No slopes shall be created steeper than 2:1.
14. Inlet protection in accordance with Specification 3.07 shall be provided for all storm drain inlets as soon as practical following construction of same.
15. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.
16. Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to those areas where grades exceed 3 percent.
17. Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.
18. As-built drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgment, knowledge, and belief, the structure was constructed in accordance with the approval plans and specifications.

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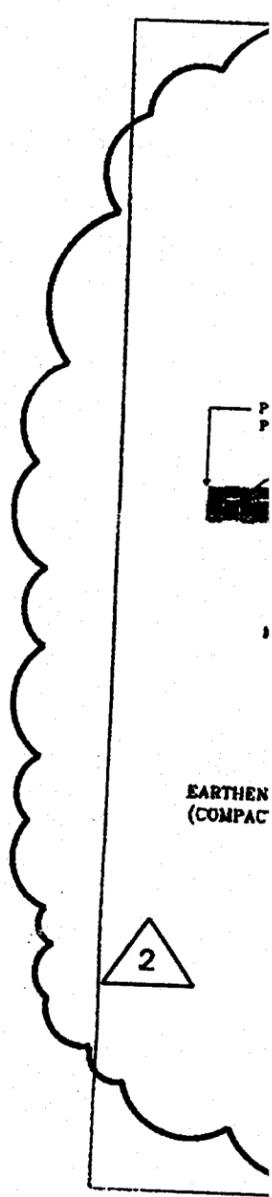
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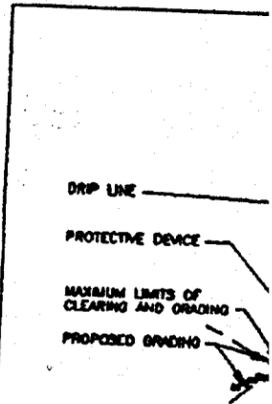


TABLE 3.35-A

ORGANIC MULCH MATERIALS AND APPLICATION RATES

MATERIALS	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
Hay	1 1/2 - 2 tons (Minimum 2 tons for water cover)	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower

AES CONSULTING ENGINEERS

Engineering, Surveying and Planning

5248 Olde Towne Road, Suite 1

WILLIAMSBURG, VIRGINIA 23188

LETTER OF TRANSMITTAL

(757) 253-0040
FAX (757) 220-8994

TO JCC ENVIRONMENTAL DIVISION

DATE <u>2/28/00</u>	JOB NO. <u>8886</u>
ATTENTION <u>DARRYL Cook</u>	
RE: <u>JOHN DEERE SITE PLAN & CALCS</u>	

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:

- Shop drawings Prints Plans Samples Specifications
 Copy of letter Change order CALCULATIONS

COPIES	DATE	NO.	DESCRIPTION
1			JOHN DEERE CONSTRUCTION PLANS
1			DRAINAGE CALCULATIONS



THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
 For your use Approved as noted Submit _____ copies for distribution
 As requested Returned for corrections Return _____ corrected prints
 For review and comment _____
 FOR BIDS DUE _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS

DARRYL,
THANK YOU FOR THE USE OF THESE ITEMS,
I APPRECIATE IT. THANKS

COPY TO _____

SIGNED: CHARLES RECORDS

Engineer's Report

Stormwater Management and Erosion & Sediment Control Plan

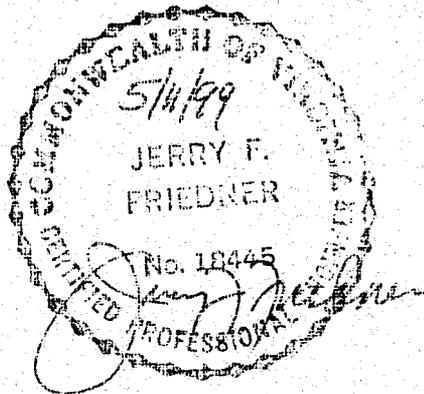
For

Project Columbia James City County, Virginia

Project No. D48

April 19, 1999

(Revised May 10, 1999)



Carlisle Associates Inc.
P. O. Box 11528
1015 Gervais Street (29201)
Columbia, SC 29211
803-252-3242

Engineer's Report

Stormwater Management and Erosion & Sediment Control Plan

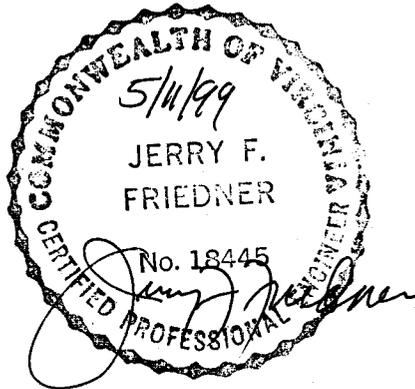
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A. INTRODUCTION

Project Columbia consists of a new manufacturing facility in Stonehouse Commerce Park, a planned industrial park in James City County, Virginia. The site is located on Virginia State Route 30, approximately one mile south of the interchange with Interstate 64. The site is shown on a vicinity map and is highlighted on the USGS topographic map in Appendix A. The total area of the site is 74.4 acres, of which, approximately 44 acres will be disturbed during the construction. The facility will include approximately 228,000 sf of manufacturing space, 32,000 sf of office space, and a 32,000 sf paint building with associated loading, parking and drives.

B. SITE CONDITIONS

Topography and Watershed Data

The site topography varies greatly through the site, with grades ranging from 2 percent to as much as 67 percent in some of the ravines in the northern portion of the site. The majority of the construction will be occurring in the area where slopes are 10 percent or less. However, in some areas, the slopes for the detention basin embankments are on slopes as great as 33 percent. The site is almost entire wooded, except for areas near the roadway where a temporary sediment basin was constructed, and a borrow area in the northwest area of the property. The majority of the site drains to the north, through three well defined ravines. These ravines drain into Bird Swamp, which in turn drains to Richardson Millpond, a regional Best Management Practices, (BMP) pond. From Richardson Millpond, it drains into Ware Creek, then on to the York River.

Approximately 15 acres of the site drains to the south to France Swamp. France Swamp also drains to Ware Creek. Approximately 4.2 acres of this watershed passes through a BMP pond, which was constructed as part of the overall Stonehouse Commerce Park BMP Plan. The pond has been designed to accommodate this area of the property.

The onsite pre-development drainage divides, and the offsite divides to the Stonehouse BMP pond included in Appendix C for reference.

Soils.

The predominant soil types on the site are Kempsville-Emporia, (19B), Slagle, (29A, & 29B), Craven-Uchee, (11C), Emporia, (14B, 15E, & 15F), Johnston, (17), Undorthents, (35). Of these, only the Kempsville is a hydrologic group B soil, with all of the remaining being group C or D. A copy of the soils map is included in Appendix B, along with general descriptions of the soils and Table 15 from the Soils Survey of James City and York Counties and the City of Williamsburg, Virginia.

Wetlands.

The site is known to contain wetland areas. Due to the nature of the project, all of the wetland areas on the site have not been delineated. Rather, only the upper reaches of the wetland areas have been delineated by Langley & McDonald, Inc., and are shown on the drawings. The intent of the plan is not to disturb any wetland areas, and any grading proposed does not impact any known wetland areas.

C. STORMWATER MANAGEMENT

1. General. For the purposes of the stormwater management design, the site has been broken down into five watersheds, 'A' through 'E'. Watersheds 'A' through 'D' drain through attenuation basins designed in accordance with James City County requirements, and are sized to retain the 1 year, 24 hour storm, and release that volume over a 24 hour period. Watershed 'E' drains through an existing attenuation basin/BMP pond designed by Langley & McDonald, Inc. It is understood from that firm, that all BMP requirements of the Chesapeake Bay Ordinance are met for the Stonehouse Commerce Park. Therefore, none of the new attenuation basins are designed as BMP ponds, and no BMP calculations are included in this report.

2. Attenuation Basin Design. To determine the volume for each of the four attenuation basins, drainage calculations were completed for the 1 year, 24 hour storm. The computer program, 'Drain:Edge', which uses an SCS synthetic hydrograph, based upon the TR-55 method. The output from the analysis is included in Appendix D and the results are summarized in Table 1 below.

Table 1. Summary of 1 Year, 24 Hour Storm

<u>Basin</u>	<u>Area (ac)</u>	<u>Runoff (in)</u>	<u>Volume Req'd (cf)</u>
A	16.0	1.85	107,448
B	5.9	2.30	49,259
C	5.1	2.25	41,654
D	11.5	2.34	97,683

Using this data, and the area of the two foot interval contours for the proposed attenuation basins, the water surface elevation for the 1 year, 24 hour storm was established, and the outlet structure was designed with a low level orifice, to release this water over a 24 hour period. Detailed calculations for the pond volumes and discharges are included in Appendix D, with the results summarized in Table 2 on page 2.

The outlet structures are designed as concrete risers, with temporary dewatering devices. These will be used during the construction period, and removed when the site has stabilized. The low

level orifice will be blocked during construction to allow for wet storage in the basin. Once construction is complete, they will be opened, with a screen trash rack installed on the side of the riser to reduce the opportunity for clogging. Details of the trash rack are shown on sheet 010 of the construction drawings.

Table 2. Summary of Attenuation Basin Design

<u>Basin</u>	<u>Volume (cf)</u>	<u>Top of Riser Elevation</u>	<u>Average Discharge Rate (cfs)</u>	<u>Size of Orifices</u>
A	107,448	88.50	1.24	5" Dia
B	49,259	97.12	0.57	3" Dia.
C	41,654	94.51	0.48	3" Dia.
D	97,683	77.63	1.13	4" Dia.

3. Stormwater Collection System. The collection system for the site drainage is designed for the 25 Year, 24 Hour Storm. The attenuation basins have been designed to route this design storm through the outlet riser and outfall pipe. The outfall pipe for each pond is also sized to handle the 25 year flow from the outlet structure. Larger storms will pass through the riser structure and the emergency spillway.

The computer program 'Drain:Edge' was once again used to design the storm drainage system, and route the runoff through the detention basins. Curve numbers were selected based upon the type soil and the land use proposed. For areas where future expansion is planned, or possible, a curve number of 98 is used to ensure that the drainage system is adequate to handle the future flow. Post-development drainage divides are shown on the drawings, and a drainage link-node schematic is included in Appendix C.

The complete output from the 25 year storm routing is included in Appendix E. A summary is shown in Table 3 below:

Table 3. Summary of 25 Year Storm Routing Calculations

<u>Basin</u>	<u>Top of Riser Elevation</u>	<u>25 Year Flow Out (cfs)</u>	<u>25 Year Water Surface Elev.</u>	<u>Emergency Spillway Elevation</u>
A	88.50	75.7	89.86	89.90
B	97.12	32.1	97.88	97.90
C	94.51	30.8	95.28	95.50
D	77.63	54.8	78.72	78.75

4. 100 Year Storm Routing. The ensure that the embankments are not overtopped, the 100 year storm was routed through the attenuation basins. Emergency spillways have been graded in cut areas to prevent water from flowing over the embankment. The computer program 'Drain:Edge' automatically upsizes the pipes in the drainage model to carry the flow. This is a conservative approach, as there will be some storage provided onsite in the parking lot and open areas when the storm system surcharges.

The complete output from the 100 year storm routing is included in Appendix F. A summary is shown in Table 4 below:

Table 4. Summary of 100 Year Storm Routing Calculations

<u>Basin</u>	<u>Emergency Spillway Elevation</u>	<u>100 Year Flow Out (cfs)</u>	<u>100 Year Water Surface Elev.</u>	<u>Top of Bank Elevation</u>	<u>Freeboard</u>
A	89.90	111.1	90.13	92.20	2.07
B	97.90	50.1	98.06	100.20	2.14
C	95.50	40.7	95.49	98.20	2.71
D	78.75	89.10	79.03	80.20	1.17

Outlet Ditch Velocity

Stormwater flow velocities were checked for the 25 year storm at the detention basin outlets. All outfall ditches are protected by rip rap aprons, and the velocities are shown to be non-erosive. These calculations are included in Appendix G.

D. Sediment Control

The four attenuation basins are to function as temporary sediment basins during the construction period. The outlets have been sized to allow 67 cy/ acre of watershed wet storage. The dry storage varies based on the final riser elevation, but total storage for all of the basins exceed 134 cy/ acre of watershed.

The Temporary Sediment Basin Design Data Sheets are contained in Appendix H for reference.

Erosion and Sediment Control Narrative

NOTE: All erosion and sediment control devices should be installed as the first item of construction and remain in place and maintained until the areas above them are completely stabilized.

Sediment will be controlled throughout the life of the project through a number of different methods depending upon the stage of construction. The principal means of controlling sediment will be the attenuation basins. In addition, the various stages and methods of control are outlined below:

Stage

Rough Grading

Perimeter controls, silt fencing or straw bales shall be installed as the first item of construction. The sediment basins shall then be constructed and a gravel outlet weir placed at the outlet to control sediment. These controls will remain in place until the site is paved and stabilized.

Basin 'A' and the storm drainage system draining to it will be constructed prior to disturbance of the total watershed draining to the wetlands in that area. This will reduce the watershed area draining to the temporary sediment traps to less than 3 acres and reduce the possibility of damaging the wetland area which is not protected by a sediment basin.

Seeding

All areas will receive permanent seeding after the area is brought to grade. The seeding schedule is shown on the plan sheet. Temporary seeding will be provided on disturbed areas which will not be worked on for more than 14 days as prescribed in the seeding schedule shown on the plan sheet.

Maintenance

Erosion and sediment control devices shall be inspected during construction on a weekly basis and after any rainfall greater than 0.5". Any devices which are not functioning properly shall be repaired and/or replaced as soon as possible to prevent sediment from leaving the site. If sediment has accumulated off site, it shall be removed and any eroded areas repaired.

Sediment accumulated in the sediment basin shall be removed and spread on site when it reaches a depth of 6 inches.

Sediment accumulated behind silt fencing shall be removed and spread on site when it reaches a depth of 6" behind the fence. Any tears or breaks in silt fencing will be repaired immediately after it is discovered.

Construction Sequence

- ✓ Install perimeter controls and construction entrance/exit pad(s).
- ✓ Construction of stormwater attenuation basins and temporary sediment traps.
- ✓ Construct drainage system to attenuation basin 'A' before disturbing watershed area directly above wetland areas.
- ✓ Install remainder of storm drainage system, and underground utilities. Roof drains should be installed

as soon as possible to reduce high runoff from roof areas over disturbed soil. Controls at storm drainage structures shall be installed as the system is built.

Bring paved areas to final grade. Install stone base as soon as possible after grading.

Topsoil, seed and mulch slopes as soon as possible after grading.

Maintain all erosion and sediment control measures and seeded areas.

Appendix A

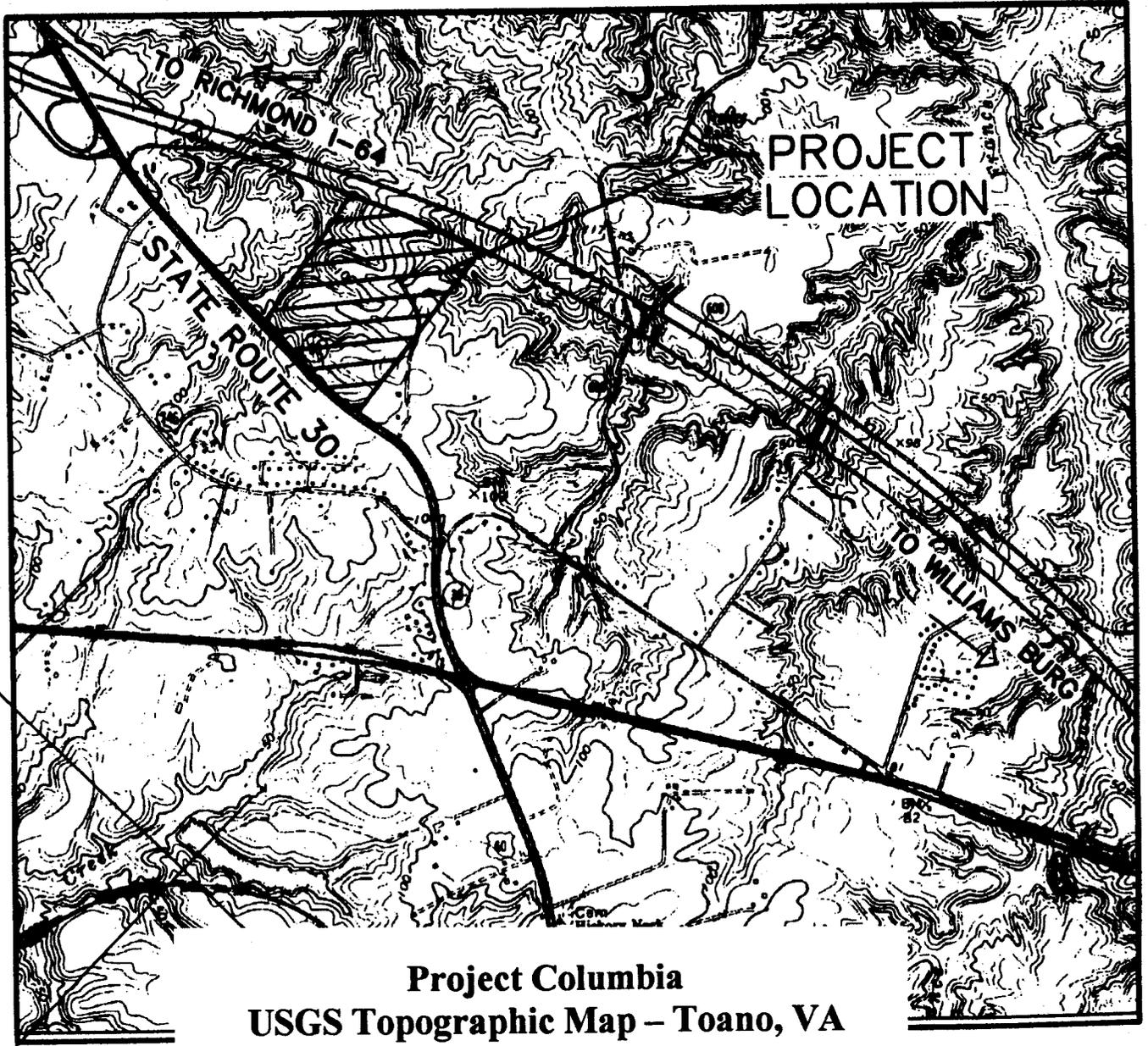
**Location Map
USGS Topography Map**

**PROJECT COLUMBIA, JAMES CITY COUNTY, VIRGINIA
STORMWATER, EROSION & SEDIMENT CONTROL PLAN**



**Project Columbia
Location Map**

A-1



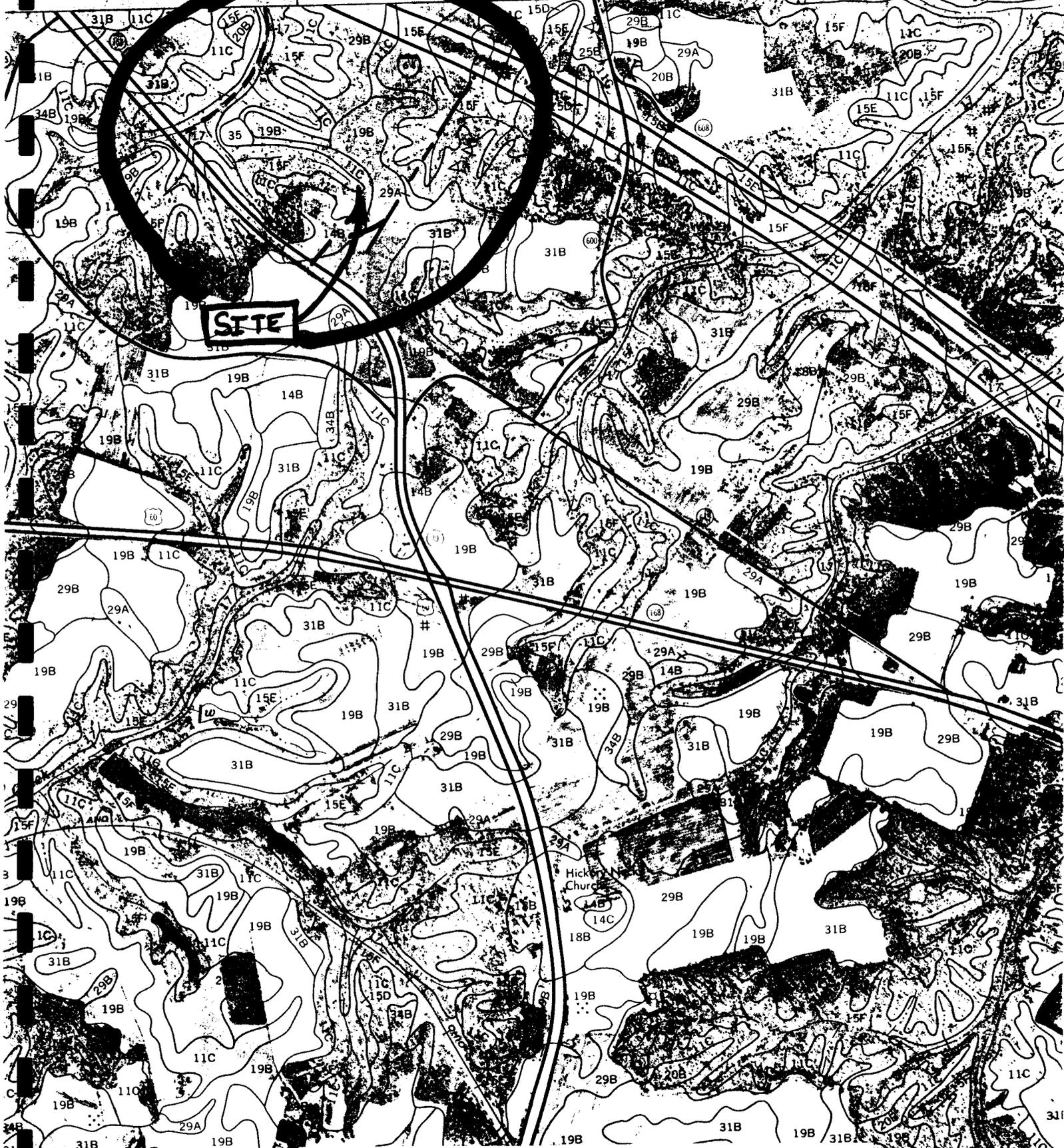
Project Columbia
USGS Topographic Map – Toano, VA
1"=2000'

ILLUSTRATION OF A SURVEYING INSTRUMENT (ALTA) WITH THE FOLLOWING TEXT:
VIRGINIA STATE PLANE COORDINATE SYSTEM (SOUTH ZONE) (NAD 83)

Appendix B

Soils Map and Data

**PROJECT COLUMBIA, JAMES CITY COUNTY, VIRGINIA
STORMWATER, EROSION & SEDIMENT CONTROL PLAN**



Project Columbia
Soils Map
1:15,840

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth* Ft	Kind	Months	Depth In	Hard-ness	Uncoated steel	Concr
1----- Altavista	C	None-----	---	---	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	Moder
2----- Augusta	C	None-----	---	---	1.0-2.0	Apparent	Jan-May	>60	---	High-----	Moder
3----- Axis	D	Frequent----	Very brief	Jan-Dec	+1-1.0	Apparent	Jan-Dec	>60	---	High-----	High
4**, Beaches											
5----- Bethera	D	None-----	---	---	+1-1.5	Apparent	Dec-Apr	>60	---	High-----	High
6----- Bohicket	D	Frequent----	Very brief	Jan-Dec	+2-0	Apparent	Jan-Dec	>60	---	High-----	High
7----- Bojac	B	None-----	---	---	>4.0	Apparent	Nov-Apr	>60	---	Low-----	High
8B----- Caroline	C	None-----	---	---	>6.0	---	---	>60	---	High-----	High
9----- Chickahominy	D	None-----	---	---	0-0.5	Apparent	Nov-Apr	>60	---	High-----	High
10B, 10C----- Craven	C	None-----	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	High-----	High
11B**, 11C**: Craven-----	C	None-----	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	High-----	High
Uchee-----	A	None-----	---	---	3.5-5.0	Perched	Jan-Apr	>60	---	Low-----	High
12----- Dogue	C	None-----	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	High-----	High
13----- Dragston	C	None-----	---	---	1.0-2.5	Apparent	Nov-Apr	>60	---	Low-----	High
14B, 14C, 15D**, 15E**, 15F**----- Emporia	C	None-----	---	---	3.0-4.5	Perched	Nov-Apr	>60	---	Moderate	High
16----- Izagora	C	None-----	---	---	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	High
17**----- Johnston	D	Frequent----	Brief to long.	Nov-Jul	+1-1.5	Apparent	Nov-Jun	>60	---	High-----	High
18B----- Kempsville	B	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moder
19B**: Kempsville----- Emporia-----	B	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moder
20B----- Kenansville	A	None-----	---	---	3.0-4.5	Perched	Nov-Apr	>60	---	Moderate	High
21----- Levy	D	Frequent----	Very long	Jan-Dec	+2-+1	Apparent	Jan-Dec	>60	---	High-----	High

See footnotes at end of table.

B-2

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosio	
		Frequency	Duration	Months	Depth*	Kind	Months	Depth	Hard-ness	Uncoated steel	Concret
					Ft			In			
22----- Munden	B	None-----	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	Low-----	High.
23----- Newflat	D	None-----	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	High.
24----- Nimmo	D	None-----	---	---	0-0.5	Apparent	Dec-Apr	>60	---	Low-----	High.
25B----- Norfolk	B	None-----	---	---	4.0-6.0	Perched	Jan-Mar	>60	---	Moderate	High.
26B**----- Pamunkey	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderat
27----- Peawick	D	None-----	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High.
28----- Seabrook	C	None-----	---	---	2.0-4.0	Apparent	Dec-Mar	>60	---	Low-----	Moderat
29A, 29B----- Slagle	C	None-----	---	---	1.5-3.0	Perched	Nov-Apr	>60	---	Moderate	High.
30----- State	B	None-----	---	---	4.0-6.0	Apparent	Dec-Jun	>60	---	Moderate	High.
31B----- Suffolk	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High.
32----- Tetotum	C	None-----	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	High-----	High.
33----- Tomotley	B/D	None-----	---	---	0-1.0	Apparent	Dec-Mar	>60	---	High-----	High.
34B, 34C----- Uchee	A	None-----	---	---	3.5-5.0	Perched	Jan-Apr	>60	---	Low-----	High.
35**----- Udorthents											
36**----- Udorthents. Dumps..											
37**----- Urban land											
38----- Yemassee	C	None-----	---	---	1.0-1.5	Apparent	Dec-Mar	>60	---	High-----	High.

* A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

** See description of the map unit for composition and behavior characteristics of the map unit.

Caroline soils in this survey area are taxadjuncts to the Caroline series because they have a thinner solum and less mottling in the subsoil than is shown in the range for the series. These differences, however, do not affect the use and management of the

Chickahominy Series

Soils of the Chickahominy series are deep and poorly drained. They formed in clayey fluvial sediments. Chickahominy soils are on low-lying flats and depressions along major rivers on the Coastal Plain. Slopes range from 0 to 2 percent.

Chickahominy soils commonly are near Altavista, Emporia, Dogue, Newflat, Peawick, and Tetotum soils. Chickahominy soils are more poorly drained than all of the other soils and have more clay in the subsoil than the Emporia, Augusta, or Tetotum soils.

Typical pedon of Chickahominy silt loam, located approximately 300 feet west of intersection of VA-5 and 13, 100 feet south of VA-5, James City County:

0 to 2 inches; dark grayish brown (2.5Y 4/2) silt loam; moderate medium and fine granular structure; friable, sticky, plastic; many fine medium and coarse roots; few very fine tubular pores; extremely acid; abrupt smooth boundary.

2 to 7 inches; grayish brown (2.5Y 5/2) silt loam; common fine faint light olive brown (2.5Y 5/4) mottles and common fine distinct very dark grayish brown (10YR 3/2) mottles; moderate medium granular and weak fine subangular blocky structure; friable, sticky, plastic; many fine medium and coarse roots; common very fine tubular pores; few fine flakes of mica; extremely acid; clear smooth boundary.

7 to 13 inches; gray (N 6/0) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; strong medium and fine subangular blocky structure; very firm, sticky, plastic; common fine medium and coarse roots; few very fine tubular pores; few thin continuous clay films on faces of peds; few fine flakes of mica; extremely acid; gradual smooth boundary.

13 to 33 inches; gray (N 6/0) silty clay; common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to strong fine and medium angular blocky; very firm, sticky, plastic; common fine and medium roots along primary structural faces; few very fine tubular pores; common thick continuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

33 to 47 inches; gray (5Y 6/1) silty clay; common medium prominent yellowish brown (10YR

5/8) mottles; moderate coarse prismatic structure parting to strong medium and fine angular blocky; very firm, sticky, plastic; common fine and few medium roots along primary structural faces; common thick continuous clay films on faces of peds; few fine flakes of mica; extremely acid; gradual smooth boundary.

B24tg—47 to 61 inches; gray (5Y 5/1) silty clay; common medium prominent yellowish brown (10YR 5/8) mottles; strong medium and fine subangular and angular blocky structure; firm, sticky, plastic; few fine and medium roots; few thick continuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

B25tg—61 to 85 inches; gray (5Y 6/1) clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; strong medium and fine subangular and angular blocky structure; firm, sticky, plastic; few fine roots; few very fine tubular pores; few thick continuous clay films on faces of peds; few fine flakes of mica; very strongly acid.

The solum thickness is more than 60 inches. The soil is extremely acid or very strongly acid unless limed.

Quartz pebbles make up 0 to 2 percent of the solum.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 1 or 2. It is loam or silt loam.

Some pedons have a B1 horizon that has no hue or hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 2. Mottles with high chroma are in some pedons. Texture is loam, silt loam, clay loam, or silty clay loam.

The B2t horizon has no hue or hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 through 2. Texture is clay loam, silty clay loam, silty clay, or clay.

Craven Series

Soils of the Craven series are deep and moderately well drained. They formed in clayey fluvial and marine sediments. Craven soils are on upland ridges and side slopes on the Coastal Plain. Slopes range from 2 to 10 percent.

Craven soils commonly are near Caroline, Emporia, Slagle, and Uchee soils. Craven soils are not as well drained as Caroline, Emporia, and Uchee soils. They have more clay in the subsoil than Emporia, Slagle, and Uchee soils and do not have the thick sandy surface layer characteristic of Uchee soils.

Typical pedon of Craven fine sandy loam in an area of Craven-Uchee complex, 6 to 10 percent slopes, approximately 2,700 feet east of Skimino Creek bridge on VA-602, 750 feet east of pond on Skimino Girl Scout Camp, York County:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable,

brown (10YR 5/6) mottles; massive; friable, nonsticky, nonplastic; few fine roots; few fine and medium pores; few pebbles up to 3/4 inch in diameter; few fine flakes of mica; slightly acid; gradual wavy boundary.

IIC2—47 to 54 inches; yellowish brown (10YR 5/6) fine sandy loam; common medium prominent olive gray (5Y 5/2) mottles; massive; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium pores; few pebbles up to 3/4 inch in diameter; iron stains on 15 percent of sand grains; few fine flakes of mica; very strongly acid; gradual wavy boundary.

IIC3g—54 to 72 inches; gray (5Y 6/1) loamy fine sand; common medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) mottles; massive; very friable, nonsticky, nonplastic; few fine flakes of mica; very strongly acid.

The solum thickness ranges from 25 to 50 inches. The soil is very strongly acid or strongly acid in the A horizon and upper part of the B horizon unless limed. It ranges from very strongly acid through slightly acid in the lower part of the B horizon and in the C horizon. Quartz pebbles make up 0 to 2 percent of the solum and 0 to 10 percent of the C horizon.

The A1 or Ap horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 2 through 4. The A2 horizon has hue of 10YR through 5Y, value of 4 through 7, and chroma of 2 through 4. The A horizon is loamy fine sand or fine sandy loam.

The B1 horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 3 through 8. It has few or common mottles. The B2t horizon has no hue or hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 8. The B2t horizon has high or low chroma mottles. The B1 and B2t horizons are sandy loam or fine sandy loam.

Some pedons have a B3 horizon that has colors and mottles similar to those of the B2t horizon. This horizon is loamy fine sand, sandy loam, or fine sandy loam.

The C horizon has no hue or has hue of 10YR through 5Y. It has value of 4 through 7 and chroma of 0 through 8. This horizon has high or low chroma mottles. It is sand, fine sand, loamy sand, loamy fine sand, fine sandy loam, or sandy loam.

Emporia Series

Soils of the Emporia series are deep and well drained. They formed in stratified loamy and clayey fluvial and marine sediments. Emporia soils are on uplands on the Coastal Plain. Slopes range from 2 to 50 percent.

Emporia soils commonly are near Caroline, Izagora, Kempsville, Kenansville, Slagle, Suffolk, and Uchee soils.

Emporia soils have less clay in the subsoil than Caroline soils and are better drained than Izagora or Slagle soils. They have a perched water table, unlike Kempsville or Suffolk soils, and do not have the thick sandy surface layer characteristic of Kenansville or Uchee soils.

Typical pedon of Emporia fine sandy loam, 2 to 6 percent slopes, approximately 5,500 feet southwest of mouth of Carters Creek at the York River, 1,300 feet south of Carters Creek on Camp Peary, York County:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; many fine medium and coarse roots; common fine and medium tubular pores; very strongly acid; clear smooth boundary.

A2—4 to 13 inches; pale brown (10YR 6/3) loam; weak fine and medium granular structure; friable, slightly sticky, nonplastic; common fine medium and coarse roots; many fine and medium tubular pores; very strongly acid; gradual smooth boundary.

B1t—13 to 19 inches; yellowish brown (10YR 5/6) loam common medium faint light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, sticky, plastic; common medium and fine roots; many fine and medium tubular pores few thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

B21t—19 to 30 inches; yellowish brown (10YR 5/6) loam; common medium distinct strong brown (7.5YR 5/6) mottles and few medium faint pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common thin continuous clay films on faces of peds; very strongly acid; clear smooth boundary.

B22t—30 to 37 inches; yellowish brown (10YR 5/8) loam; common medium distinct strong brown (7.5YR 5/8) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium tubular pores; common thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

B23t—37 to 51 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak medium and coarse subangular blocky structure; firm, sticky, plastic; few fine roots; common fine and medium tubular pores; few thin discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

B3t—51 to 58 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/8) sandy clay loam; weak coarse subangular blocky structure; firm, sticky, plastic; common fine tubular pores; few thin patchy clay

of 4 through 8. Texture is loam or clay loam.

The lower part of the B2t horizon and the B3 horizon have no hue or hue of 10YR through 5Y, value of 5 or 6, and chroma of 0 through 8. They have few to many high and low chroma mottles, or some pedons are mottled without dominant matrix color. Texture is clay loam or clay.

Johnston Series

Soils of the Johnston series are deep and very poorly drained. They formed in loamy fluvial sediments.

Johnston soils are on flood plains on the Coastal Plain. Slopes range from 0 to 2 percent.

Johnston soils commonly are near Axis, Bohicket, Chickahominy, Levy, Nimmo, and Tomotley soils.

Johnston soils are commonly flooded from runoff, whereas Axis, Bohicket, and Levy soils are inundated twice daily by tidal waters. Johnston soils are more poorly drained than Chickahominy, Nimmo, or Tomotley soils.

Typical pedon of Johnston silt loam in an area of Johnston complex, on Long Hill Swamp flood plain, about 4,500 feet south of bridge on VA-612, James City County:

A—0 to 8 inches; black (5Y 2/1) silt loam; weak medium granular structure; friable, sticky, plastic; many fine and medium roots; 9 percent organic matter; very strongly acid; clear smooth boundary.

Bg—8 to 34 inches; black (10YR 2/1) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; 13 percent organic matter; strongly acid; clear smooth boundary.

C1g—34 to 49 inches; black (5Y 2/1) sandy clay loam; few fine prominent light olive brown (2.5Y 5/4) mottles; massive; friable, sticky, plastic; 3 percent organic matter; strongly acid; gradual wavy boundary.

C2g—49 to 60 inches; gray (5Y 5/1) fine sandy loam; massive; friable, slightly sticky, slightly plastic; 1 percent organic matter; medium acid.

The soil is very strongly acid or strongly acid above a depth of 40 inches and ranges from very strongly acid to medium acid below this depth. Organic matter content decreases irregularly with depth and ranges from 8 to 15 percent in the upper part of the profile. Some pedons have a few inches of recent alluvial sediments deposited on the dark A horizon.

The A horizon has no hue or hue of 10YR through 5Y, value of 2 or 3, and chroma of 0 through 2. It is sandy loam, fine sandy loam, loam, silt loam, or silty clay loam.

The Bg horizon has no hue or hue of 10YR through 5Y, value of 2 or 3, and chroma of 0 through 2. Texture

is fine sandy loam, loam, silt loam, clay loam, sandy clay loam, or silty clay loam.

The Cg horizon has no hue or hue of 10YR through 5Y, value of 2 through 6, and chroma of 0 through 2. It is stratified and ranges from sand to sandy clay loam. Some pedons contain shell fragments, and some pedons have few to many pebbles.

The Johnston soils in this survey area are taxadjuncts to the Johnston series because they have more clay in the subsoil and a higher reaction in the substratum than is defined in the range for the series. These differences, however, do not affect the use and management of the soils.

Kempsville Series

Soils of the Kempsville series are deep and well drained. They formed in loamy fluvial and marine sediments. Kempsville soils are on uplands in the Coastal Plain. Slopes range from 2 to 6 percent.

Kempsville soils commonly are near Emporia, Kenansville, Slagle, and Suffolk soils. Kempsville soils do not have the perched water table characteristic of Emporia soils. They do not have the thick sandy surface layer characteristic of Kenansville soils, are better drained than Slagle soils, and have a thicker subsoil than Suffolk soils.

Typical pedon of Kempsville fine sandy loam, 2 to 6 percent slopes, approximately 3 miles northwest of Williamsburg, 0.5 mile east of junction of US-60 and VA-645, 100 feet south of VA-645, York County:

A1—0 to 4 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine granular structure; very friable; many medium and common coarse roots; common fine and medium tubular pores; very strongly acid; clear smooth boundary.

A2—4 to 14 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine and medium granular structure; very friable; common coarse medium and fine roots; common fine and medium tubular pores; very strongly acid; gradual smooth boundary.

B1t—14 to 20 inches; yellowish brown (10YR 5/6) fine sandy loam; few medium faint light yellowish brown (10YR 6/4) mottles; weak fine and medium subangular blocky and weak fine angular blocky structure; friable; few coarse medium and fine roots; common fine and medium pores; few thin clay films on faces of peds and common clay bridging between grains of sand; very strongly acid; clear smooth boundary.

B21t—20 to 32 inches; strong brown (7.5YR 5/6) sandy clay loam; few medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few coarse fine and medium roots with the coarse roots mainly in the upper part

Slagle Series

Soils of the Slagle series are deep and moderately well drained. They formed in stratified loamy and clayey fluvial and marine sediments. Slagle soils are on upland flats, in slight depressions, and on side slopes of small drainageways on the Coastal Plain. Slopes range from 0 to 6 percent.

Slagle soils commonly are near Bethera, Caroline, Craven, Emporia, Izagora, Kempsville, and Uchee soils. Slagle soils have less clay in the upper part of the subsoil than Bethera, Caroline, or Craven soils. They are not as well drained as Emporia, Kempsville, or Uchee soils. They do not have as thick a subsoil as Izagora soils. They do not have a thick sandy surface layer characteristic of Uchee soils.

Typical pedon of Slagle fine sandy loam, 2 to 6 percent slopes, approximately 1.2 miles north of the Virginia Division of Highways office at Croaker, James City County:

- A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; many fine medium and coarse roots; common very fine and fine tubular pores; very strongly acid; abrupt wavy boundary.
- A2—4 to 9 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine and medium roots; many fine and common medium tubular pores; very strongly acid; clear smooth boundary.
- B21t—9 to 25 inches; yellowish brown (10YR 5/8) clay loam; common medium faint light yellowish brown (10YR 6/4) mottles and common fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots; common fine tubular pores; thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.
- B22t—25 to 31 inches; mottled yellowish brown (10YR 5/8), light gray (5Y 7/1), and strong brown (7.5YR 5/8) clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine and medium pores; thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.
- B23tg—31 to 45 inches; light gray (5Y 7/1) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; firm, sticky, plastic; few fine roots; common fine and medium tubular pores; thick discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.
- B3t—45 to 50 inches; mottled yellowish brown (10YR 5/8), light gray (5Y 7/1), and strong brown (7.5YR

5/8) clay loam; weak coarse subangular blocky structure; firm, sticky, plastic; few fine roots; common fine and medium tubular pores; thick patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

C—50 to 60 inches; mottled yellowish brown (10YR 5/8), light gray (5Y 7/1), and strong brown (7.5YR 5/8) sandy clay loam; massive; firm, sticky, plastic; few fine roots; few fine tubular pores; few thin vertical clay flows; few fine flakes of mica; very strongly acid.

The solum thickness ranges from 40 to 60 inches or more. The soil is extremely acid through strongly acid unless limed. Coarse fragments make up 0 to 5 percent of the soil.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. The A horizon is sandy loam, fine sandy loam, or loam.

Some pedons have a B1 horizon that has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 3 through 6. It is sandy loam, fine sandy loam, or loam.

The upper part of the B2t horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. The lower part of the B2t and the B3 horizons have hue of 7.5YR through 5Y, value of 4 through 7, and chroma of 1 through 8; or they are mottled or variegated with high and low chroma colors. The B2t horizon is sandy clay loam, loam, or clay loam. The lower part of the B2t horizon and the B3 horizon are sandy clay or clay in some pedons.

The C horizon is variable in color. It is gray and has high chroma mottles, or it is mottled or variegated in shades of red, yellow, brown, olive, and gray. Texture is variable and ranges from loamy sand to clay. In some pedons it is stratified.

State Series

Soils of the State series are deep and well drained. They formed in loamy fluvial sediments. State soils are on low-lying stream terraces on the Coastal Plain. Slopes range from 0 to 3 percent.

State soils commonly are near Altavista, Augusta, Dogue, Dragston, Pamunkey, and Tetotum soils. State soils are better drained than Altavista, Augusta, Dogue, Dragston, or Tetotum soils. Also, they have less clay in the subsoil than Dogue soils and more clay than Dragston soils. They have a higher seasonal water table than Pamunkey soils.

Typical pedon of State fine sandy loam, approximately 1.8 miles east of Jamestown Island parking lot on Loop Road and 500 feet north of Loop Road, James City County:

of 2 through 4, and chroma of 1 or 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. The A horizon is fine sandy loam or loam.

The B1g horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. It is fine sandy loam or loam.

The B2tg horizon has no hue or hue of 10YR through 5Y, value of 4 through 7, and chroma of 0 through 2. It is loam, sandy clay loam, or clay loam.

The B3g horizon has no hue or hue of 10YR through 5Y, value of 5 through 7, and chroma of 0 through 2. It is fine sandy loam, loam, or sandy clay loam.

The Cg horizon has no hue or hue of 10YR through 5Y, value of 6 or 7, and chroma of 0 through 2. It is loamy sand, loamy fine sand, or fine sandy loam.

Uchee Series

Soils of the Uchee series are deep and well drained. They formed in loamy fluvial and marine sediments. Uchee soils are on upland ridges and side slopes on the Coastal Plain. Slopes range from 2 to 10 percent.

Uchee soils commonly are near Emporia, Kempsville, Kenansville, Slagle, and Suffolk soils. Uchee soils have a thicker sandier surface layer than Emporia, Kempsville, Slagle, or Suffolk soils. They have more clay in the subsoil than Kenansville soils.

Typical pedon of Uchee loamy fine sand, 2 to 6 percent slopes, approximately 1.3 miles north of Croaker on VA-607, 1,500 feet southeast of VA-607 on logging road, 1,000 feet south of York River State Park and 1,000 feet west of Taskinas Creek, James City County:

A1—0 to 5 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; nonsticky, nonplastic; many fine medium and coarse roots; many fine pores; very strongly acid; clear smooth boundary.

A21—5 to 11 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine granular structure; very friable, nonsticky, nonplastic; many fine medium and coarse roots; many fine and common medium pores; very strongly acid; clear smooth boundary.

A22—11 to 24 inches; very pale brown (10YR 7/4) loamy fine sand; weak fine granular structure; very friable, nonsticky, nonplastic; few fine roots; many fine pores; strongly acid; abrupt smooth boundary.

B1t—24 to 29 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium faint light yellowish brown (10YR 6/4) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and common medium roots; common fine and medium pores; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B21t—29 to 36 inches; strong brown (7.5YR 5/6) sandy clay loam; few fine prominent yellowish red (5YR 5/6) mottles and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; many fine pores; thick patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—36 to 50 inches; strong brown (7.5YR 5/6) sandy clay loam; many fine prominent yellowish red (5YR 5/6) mottles, common fine distinct brownish yellow (10YR 6/6) mottles, and few fine distinct light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; many fine and medium pores; thick patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—50 to 56 inches; strong brown (7.5YR 5/6) sandy clay; common fine distinct light yellowish brown (10YR 6/4) and light gray (10YR 7/1) mottles, and few fine prominent yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; few fine roots; common fine pores; thick patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—56 to 65 inches; variegated yellowish red (5YR 5/6), yellowish brown (10YR 5/6), very pale brown (10YR 7/4), light gray (10YR 7/1), and strong brown (7.5YR 5/6) strata of sandy loam and sandy clay loam; massive; friable, sticky, plastic; few fine roots; common fine pores; very strongly acid.

The solum thickness ranges from 40 to 60 inches. The soil is very strongly acid or strongly acid unless limed. Pebbles and ferricrete coarse fragments make up 0 to 15 percent of the soil.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Some pedons have an Ap horizon with hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 3 through 6. The A horizon is sand, loamy sand, or loamy fine sand.

The B1 horizon and upper part of the B2t horizon have hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 4 through 8. Most pedons have few or common high chroma mottles. Texture is sandy loam or sandy clay loam. The lower part of the B2t horizon has colors similar to those in the upper part of the B2t horizon and has few to many high and low chroma mottles; or it is mottled and does not have a dominant matrix color. It is sandy clay loam, sandy clay, or clay.

The C horizon is mottled or variegated in shades of yellow, brown, red, or gray. It is sandy loam or sandy clay loam. Some pedons have pockets or strata of sand or clay.

Udorthents

Udorthents in this survey area consist of deep,

excessively drained to moderately well drained soils. The soils formed mostly in loamy fluvial and marine sediments. Udorthents are mainly on ridgetops and side slopes along drainageways and make up mostly areas that have been quarried for sand, gravel, or roadfill. Slopes range from 0 to 70 percent or more.

Udorthents commonly are near Emporia, Kempsville, Slagle, and Suffolk soils. Udorthents have been excavated to depths of as much as 30 feet or more. Some areas have been filled by earthy and nonearthy materials. All associated soils have a well-defined subsoil due to natural soil-forming processes.

Because of the variability of these soils, a typical pedon is not given. The soils range from extremely acid through strongly acid. Quartz pebbles make up 0 to 50 percent of some pedons. Thin discontinuous ironstone fragments make up 0 to 50 percent of some pedons. Common fine flakes of mica are in some pedons.

The surface layer has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. It is loamy sand, sandy loam, clay loam, or gravelly sandy loam. The surface layer ranges from about 2 to 10 inches in thickness, but it commonly is about 2 to 5 inches thick.

The lower layers to a depth of more than 60 inches have hue of 2.5YR through 10YR, value of 3 through 7, and chroma of 4 through 8. They range from fine sandy loam to clay loam. Mottles that have hue of 5YR through 2.5Y, value of 3 through 8, and chroma of 1 through 8 are in some pedons.

Yemassee Series

Soils of the Yemassee series are deep and somewhat poorly drained. They formed in loamy fluvial and marine sediments. Yemassee soils are on low-lying uplands in the Coastal Plain. Slopes range from 0 to 2 percent.

Yemassee soils commonly are near Bethera, Izagora, and Slagle soils. Yemassee soils are better drained than Bethera soils and have less clay in the subsoil. They are not as well drained as Izagora and Slagle soils.

Typical pedon of Yemassee fine sandy loam, approximately 1,600 feet northwest of junction of VA-636 with the Chessie and Ohio Railroad along powerline and 250 feet north of powerline, York County:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine and medium granular structure; very friable, slightly sticky, slightly plastic; many fine medium and coarse roots; common fine tubular pores; extremely acid; clear smooth boundary.

A2—4 to 11 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; common fine medium and coarse roots; common fine and very fine tubular pores; few krotovinas up to 1/4 inch in diameter; extremely acid; clear smooth boundary.

B21t—11 to 15 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium and fine subangular blocky structure; friable, sticky, plastic; common fine medium and coarse roots; common fine and very fine tubular pores; few thin discontinuous clay films on faces of peds; few krotovinas up to 1/4 inch in diameter; extremely acid; clear smooth boundary.

B22t—15 to 20 inches; light olive brown (2.5Y 5/4) sandy clay loam; common fine prominent dark brown (7.5YR 4/4) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium roots; few fine tubular pores; common thin continuous clay films on faces of peds; few krotovinas up to 1/4 inch in diameter; very strongly acid; gradual smooth boundary.

B23t—20 to 30 inches; mottled light gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; few very fine tubular pores; thin discontinuous clay films on faces of peds; mottling pattern is vertically oriented but not continuous or streaked; the yellowish brown and strong brown portion is firmer in place than the gray portion; very strongly acid; gradual smooth boundary.

B24tg—30 to 51 inches; gray (5Y 6/1) sandy clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles and common fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; few fine and medium roots; few very fine tubular pores; thin discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Cg—51 to 63 inches; gray (5Y 6/1) fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; friable, sticky, plastic; few fine flakes of mica; very strongly acid.

The solum thickness is more than 40 inches. The soil ranges from extremely acid through strongly acid unless limed. Few to many very fine flakes of mica and fine black minerals are in the lower part of the B horizon and in the C horizon of many pedons.

The A1 or Ap horizon has hue of 10YR or 2.5Y, value of 2 through 5, and chroma of 1 or 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 3 or 4. The A horizon is sandy loam or fine sandy loam.

The upper part of the B horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 3 through

Appendix C

**Pre-Development Drainage Divides
Post-Development Drainage Schematic**

CONSERVATION EASEMENT
"UNDISTURBED/NATURAL OPEN SPACE"
PRIVATE OPEN SPACE

STONEHOUSE
COMMERCE PARK
SECTION C
PARCEL A
3,239,610 S.F.
74.3712 AC

POND A

POND B

POND C
3.4Ac

6.0Ac

16.5Ac

POND D

4.2Ac

To Existing
BMP

Project Columbia
Pre-Development Drainage Divides
1"=200'

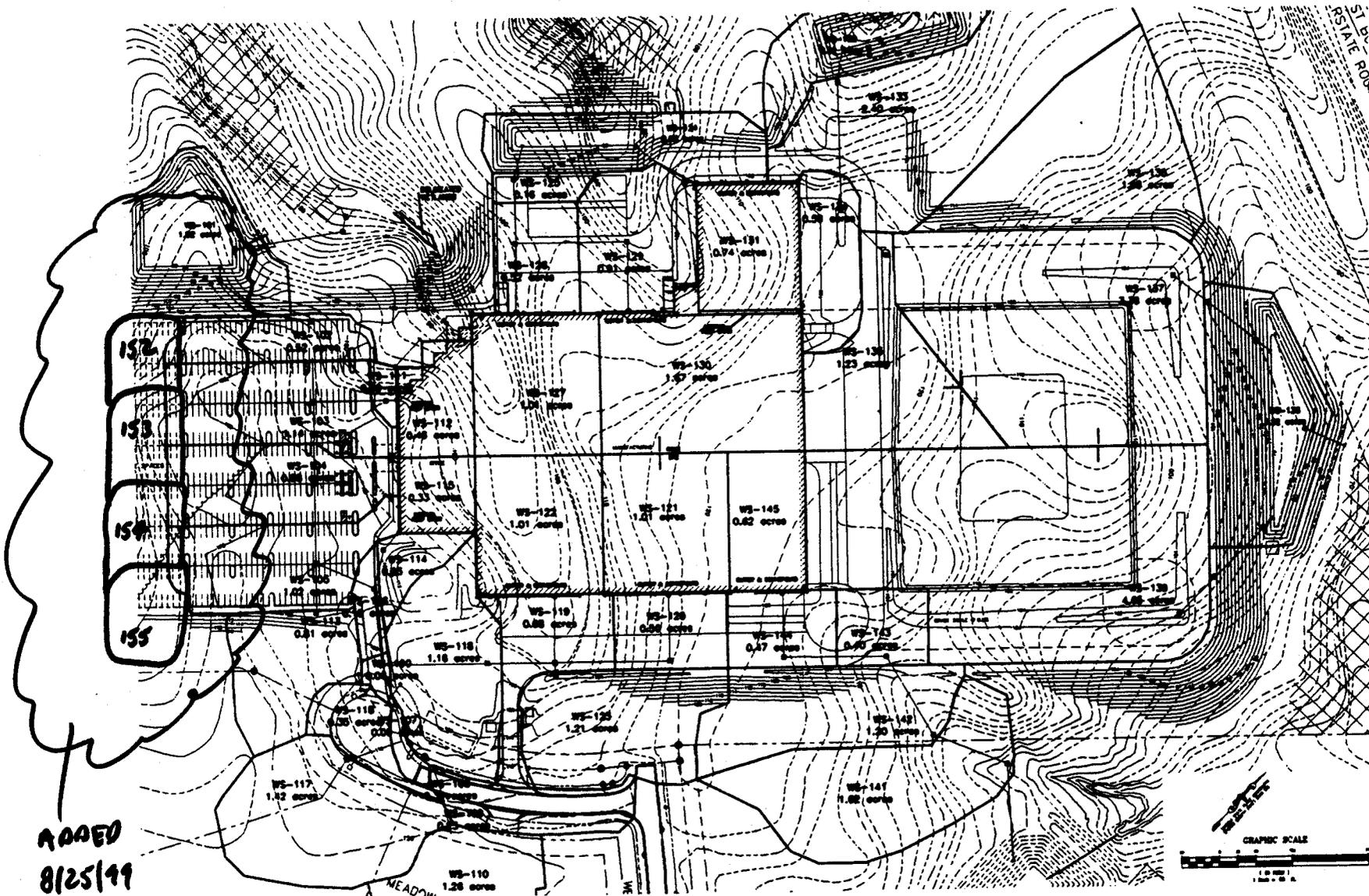
PROJECT COLUMBIA
ORIGINAL DRAINAGE
TO EXISTING
BMP FACILITY
FROM LANGLOT MEDOWN
PLAN

DA-8
9.27 AC.

DA-7
9.45 AC.

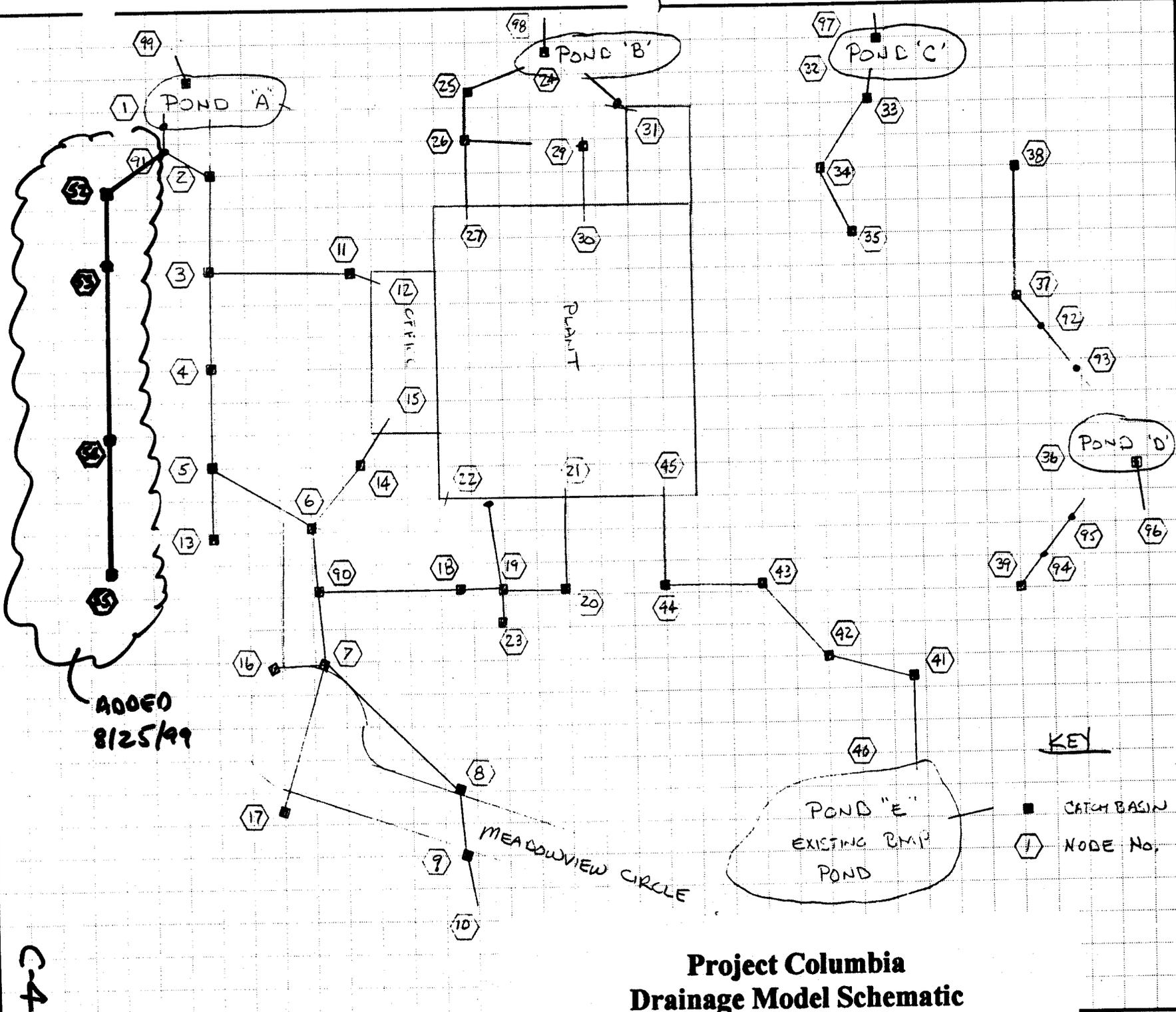
DA-2
25.10 AC.

C-2



ADDED
8/25/99

Project Columbia
Post-Development Drainage Divides
1"=240'



**Project Columbia
 Drainage Model Schematic**

C-4

Appendix D

1 Year, 24 Hour Storm Runoff

CARLISLE ASSOCIATES INC.

1015 Gervais Street
 P.O. Box 11528
 COLUMBIA, SC 29211
 Tel: (803) 252-3232
 FAX: (803) 799-9054

JOB 048 DEERE VA
 SHEET NO. 1 OF 1
 CALCULATED BY EJR DATE 10/18/99
 CHECKED BY _____ DATE _____
 SCALE _____

DRAINAGE SUMMARY

★ ADDED WATERSHEDS 155, 154, 153, 152 DRAINING INTO POND A' FOR A TOTAL OF 2.4 AC ADDITIONAL AREA. (SEE C-3 & C-4)

★ LOWERED BOTTOM OF POND 2', BUT KEPT TOP OF RISER AT THE SAME ELEVATION. (SEE C-1 & C-2)

★ STORAGE REQD FOR 1 YEAR STORM - 1.92" OF RUNOFF FOR TOTAL ACREAGE OF 18.0 AC. (SEE PAGE A-3)

$$18.0 \text{ ac} \times \frac{43,560 \text{ sf}}{\text{ac}} \cdot \frac{1.92 \text{ in}}{12 \text{ in/ft}} = 125,453 \text{ cf}$$

STORAGE PROVIDED AT 88.50 = 138,426 (SEE C-1)
 OK ✓ STORAGE PROV > STORAGE REQD.

★ CHECK 25 YR ROUTING OF POND TO ENSURE SPILLWAY IS ADEQUATE.

MAX. WATER SURFACE FOR 25 YR STORM = 89.9 (SEE B-2)

OK ✓ SPILLWAY OVERTFLOW AT 89.91

★ PEAK OUTFLOW = 76 cfs (SEE B-2)

OUTFALL PIPES - 48" RCP @ 3.88% - CAPACITY ≈ 200 cfs OK
 48" RCP @ 0.30% - " = 80 cfs OK ✓

✓ + 100 YR WATER SURFACE = 90.2 (PAGE D-2)

TOP OF BANK = 92.5 OK ✓

∴ POND DESIGN IS ADEQUATE.

Pond 'C' - Volume

Pond Volume Calcs - Pond 'C'

04/19/1999

D48 Project Columbia

EJR

Elevation	Area (sf)	Avg Area (sf)	Depth Chg (ft)	Volume (cf)	Total Volume (cf)
89.00	0				
90.00	5388	2694	1.00	2694	2694
92.00	8048	6718	2.00	13436	16130
94.00	11006	9527	2.00	19054	35184
96.00	14232	12619	2.00	25238	60422
98.00	17729	15981	2.00	31961	92383
100.00	21499	19614	2.00	39228	131611

Pond 'C' - Discharge

Outlet Box Calculations

D48 Project Columbia Pond 'C'

	Orifice	Wier 1	Wier 2	Wier 3	Emergency Spillway	
Inv.Elev:	89	94.6	76	76	95.5	
Dia/Length	0	16	0.00	0	15	
C factor	0.67	3	0	3	3	
Exponent		1.5	1.5	1.5	1.5	
Elevation	Orifice	Wier 1	Wier 2	Wier 3	Emergency Spillway	Total Flow (cfs)
89.00	0.00					0.00
90.00	0.00					0.00
92.00	0.00					0.00
94.00	0.00					0.00
94.60	0.00	0.00				0.00
95.00	0.00	12.14	0.00			12.14
95.50	0.00	40.98	0.00		0.00	40.98
96.00	0.00	79.51	0.00	0.00	15.91	95.42
98.00	0.00	300.93	0.00	0.00	177.88	478.80
99.00	0.00	443.02	0.00	0.00	294.66	737.67

D48 PROJECT COLUMBIA, TOANO, VIRGINIA
 POST-DEVELOPMENT POND ROUTING
 1 YEAR, 24 HOUR STORM

POND 'C'
 1 YEAR STORM

INPUT FILE: D48C1.INP

SUMMARY OUTPUT

***** RUNOFF HYDROGRAPH DATA *****

WS NO	WATERSHED DATA				UH PEAK ORD		HYDROGRAPH DATA		
	AREA (AC)	LENGTH (FT)	SLOPE (%)	CURVE NO	PRF (CSM)	TC (MIN)	VOLUME (IN)	PEAK (CFS)	PEAK TIME (HRS)
135	1.2	310.	1.00	98.0	484.	5.9	2.57	3.7	12.00
134	.6	250.	1.00	98.0	484.	5.0	2.57	1.8	12.00
133	2.4	380.	1.00	98.0	484.	7.0	2.57	7.4	12.00
132	.9	200.	25.00	74.0	484.	2.1	.78	1.1	12.00

***** ROUTING DATA *****

CONDUIT CODE = 1 - PIPE
 = 2 - DITCH
 = 3 - STREAM

CONNECTING NODE NOS	CODE NO	LENGTH (FT)	SLOPE (%)	DIA-WIDTH (IN-FT)	MANNING N-VALUE	PEAK FLOW DATA			
						INFLOW (CFS) (HR)		OUTFLOW (CFS) (HR)	
35 34	1	130.	.50	15.	.013	4. 12.00	4. 11.92	4. 11.92	4. 11.92
34 33	1	195.	.50	18.	.013	5. 11.92	5. 11.92	5. 11.92	5. 11.92
33 32	1	100.	.50	24.	.013	13. 11.92	13. 11.92	13. 11.92	13. 11.92

***** POND DATA *****

POND CODE = 1 - EXISTING POND
 = 2 - USER DESIGNED POND
 = 3 - ROAD CROSSING

CONNECTING NODE NOS	CODE NO	PEAK FLOW DATA				HYDROGRAPH VOLUME (IN)	MAXIMUM WSE (FT)
		INFLOW (CFS) (HR)		OUTFLOW (CFS) (HR)			
32 97	2	14. 11.92	0. .00	2.25	3.4		

TOTAL RUNOFF

HYDROGRAPH VOLUME (IN) 2.25

MAXIMUM WSE (FT) 3.4

***** ADDED HYDROGRAPHS DATA *****

SUMMATION HYDROGRAPH

NODE NO	HYD NO	ADDED HYD NOS		PEAK (CFS)	PEAK TIME (HRS)	HYD VOLUME (INCHES)	BASEFLOW (CFS)	DRAINAGE AREA (ACRES)
		1st	2nd					
34	204	134	305	5.	11.92	2.57	.0	1.8

33	205	306	133	13.	11.92	2.57	.0
32	206	307	132	14.	11.92	2.25	.0

4.2
5.1



TOTAL
ACREAGE

CARLISLE ASSOCIATES INC.

1015 Gervais Street
 P.O. Box 11528
 COLUMBIA, SC 29211
 Tel: (803) 252-3232
 FAX: (803) 799-9054

JOB D48 PROJECT COLUMBIA
 SHEET NO. _____ OF _____
 CALCULATED BY EJR DATE 5/6/99
 CHECKED BY _____ DATE _____
 SCALE _____

+ 1 YEAR DRAWDOWN CALCS

Basin 'C'

- VOLUME REQ'D = 41,654 cf

- TOP OF RISER = 94.60
 - INVERT 89.00
 5.6'

- AVERAGE HEAD = $5.60 / 2 = 2.8'$

AVG.
 - RELEASE RATE = 0.48 cfs

$$41,654 / 24 \cdot 3600 = 0.48 \text{ cfs}$$

- SIZE OPENING

$$Q = 0.67 A \sqrt{2gh}$$

$$Q = 0.48 = 0.67 (A) \sqrt{2 (32.2) (2.8)}$$

$$A = 0.0534 \text{ sf}$$

- USE ROUND OPENING

$$\text{DIA} = \sqrt{\frac{0.0534}{\pi}} \times \frac{12''}{\text{ft}} \times 2 = 3.12'' \Rightarrow \text{USE } \underline{\underline{3'' \text{ OPENING}}}$$

Appendix E

25 Year, 24 Hour Storm Routing

D48 PROJECT COLUMBIA, TOANO, VIRGINIA
POST-DEVELOPMENT POND ROUTING, POND 'C'
25 YEAR, 24 HOUR STORM

Pond 'C'
25 YEAR STORM

INPUT FILE: D48C25.INP

***** DESIGN RAINFALL DATA *****

RETURN PERIOD. 25 YEARS
EVENT DURATION 24.00 HOURS
SCS RAINFALL PATTERN TYPE. 2
ACCUMULATED DEPTH. 6.50 INCHES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 135
LOCATION NODE NUMBER 35

WATERSHED CHARACTERISTICS:

DRAINAGE AREA. 1.2 ACRES
AVERAGE OVERLAND SLOPE 1.00 PERCENT
HYDRAULIC LENGTH 310. FEET
SCS CURVE NUMBER 98.0
TIME OF CONCENTRATION.10 HOURS
RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 10.50 HOURS
TIME RUNOFF ENDS 13.33 HOURS
PEAK FLOWRATE. 8.6 CFS
TIME OF PEAK 12.00 HOURS
RUNOFF VOLUME. 6.26 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 18.INCHES <<<<<

UPSTREAM NODE NUMBER 35
DOWNSTREAM NODE NUMBER 34

PIPE DATA:

DIAMETER 18. INCHES
LENGTH 100. FEET
SLOPE. 1.00 PERCENT
MANNING N-VALUE.013
MANNING PIPE FULL FLOW 10.5 CFS

HYDROGRAPH CHARACTERISTICS:

PEAK INFLOW RATE 8.6 CFS

E-39

PEAK OUTFLOW RATE 8.6 CFS
 PEAK TRAVEL TIME16 MINUTES
 MANNING TRAVEL TIME.27 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 134
 LOCATION NODE NUMBER 34

WATERSHED CHARACTERISTICS:

DRAINAGE AREA.6 ACRES
 AVERAGE OVERLAND SLOPE 1.00 PERCENT
 HYDRAULIC LENGTH 250. FEET
 SCS CURVE NUMBER 98.0
 TIME OF CONCENTRATION.08 HOURS
 RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 10.50 HOURS
 TIME RUNOFF ENDS 13.33 HOURS
 PEAK FLOWRATE. 4.3 CFS
 TIME OF PEAK 12.00 HOURS
 RUNOFF VOLUME. 6.26 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH 134
 SECOND HYDROGRAPH. 301
 SUMMATION HYDROGRAPH 201
 LOCATION NODE NUMBER 34
 TIME RUNOFF STARTS 10.50 HOURS
 TIME RUNOFF ENDS 13.17 HOURS
 PEAK FLOWRATE. 12.9 CFS
 TIME OF PEAK 12.00 HOURS
 RUNOFF VOLUME. 6.26 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 24.INCHES <<<<<

UPSTREAM NODE NUMBER 34
 DOWNSTREAM NODE NUMBER 33

PIPE DATA:

DIAMETER 24. INCHES
 LENGTH 204. FEET
 SLOPE.50 PERCENT
 MANNING N-VALUE.013
 MANNING PIPE FULL FLOW 16.0 CFS

HYDROGRAPH CHARACTERISTICS:

E-40

PEAK INFLOW RATE 12.9 CFS
 PEAK OUTFLOW RATE 12.7 CFS
 PEAK TRAVEL TIME39 MINUTES
 MANNING TRAVEL TIME.66 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 133
 LOCATION NODE NUMBER 33

WATERSHED CHARACTERISTICS:

DRAINAGE AREA. 2.4 ACRES
 AVERAGE OVERLAND SLOPE 1.00 PERCENT
 HYDRAULIC LENGTH 380. FEET
 SCS CURVE NUMBER 98.0
 TIME OF CONCENTRATION.12 HOURS
 RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 10.50 HOURS
 TIME RUNOFF ENDS 13.33 HOURS
 PEAK FLOWRATE. 17.3 CFS
 TIME OF PEAK 12.00 HOURS
 RUNOFF VOLUME. 6.26 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH 302
 SECOND HYDROGRAPH. 133
 SUMMATION HYDROGRAPH 202
 LOCATION NODE NUMBER 33
 TIME RUNOFF STARTS 10.50 HOURS
 TIME RUNOFF ENDS 13.42 HOURS
 PEAK FLOWRATE. 30.1 CFS
 TIME OF PEAK 11.92 HOURS
 RUNOFF VOLUME. 6.26 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 36.INCHES <<<<<

UPSTREAM NODE NUMBER 33
 DOWNSTREAM NODE NUMBER 32

PIPE DATA:

DIAMETER 36. INCHES
 LENGTH 54. FEET
 SLOPE.25 PERCENT
 MANNING N-VALUE.013
 MANNING PIPE FULL FLOW 33.3 CFS

EAI

HYDROGRAPH CHARACTERISTICS:

PEAK INFLOW RATE 30.1 CFS
 PEAK OUTFLOW RATE 29.8 CFS
 PEAK TRAVEL TIME11 MINUTES
 MANNING TRAVEL TIME.18 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 132
 LOCATION NODE NUMBER 32

WATERSHED CHARACTERISTICS:

DRAINAGE AREA.9 ACRES
 AVERAGE OVERLAND SLOPE 25.00 PERCENT
 HYDRAULIC LENGTH 200. FEET
 SCS CURVE NUMBER 74.0
 TIME OF CONCENTRATION.03 HOURS
 RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 11.33 HOURS
 TIME RUNOFF ENDS 13.58 HOURS
 PEAK FLOWRATE. 4.7 CFS
 TIME OF PEAK 12.00 HOURS
 RUNOFF VOLUME. 3.61 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH 303
 SECOND HYDROGRAPH. 132
 SUMMATION HYDROGRAPH 203
 LOCATION NODE NUMBER 32
 TIME RUNOFF STARTS 10.75 HOURS
 TIME RUNOFF ENDS 13.42 HOURS
 PEAK FLOWRATE. 34.5 CFS
 TIME OF PEAK 12.00 HOURS
 RUNOFF VOLUME. 5.79 INCHES

***** DETENTION POND ANALYSIS *****

UPSTREAM NODE NUMBER 32
 DOWNSTREAM NODE NUMBER 97

STAGE-STORAGE AND STAGE-OUTFLOW RATING CURVES GIVEN AS FOLLOW:

STAGE FT	POND RATING CURVES		STORAGE CU FT
	OUTFLOW CFS		
89.00	.0		0.
90.00	.0		2694.
92.00	.0		16130.
94.00	.0		35184.

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94.60	.0	42755.
95.00	12.1	47803.
95.34	30.6	52093.
95.50	41.0	54112.
96.00	177.9	60422.
98.00	294.7	92383.

POND ROUTING RESULTS

TIME HRS	INFLOW CFS	OUTFLOW CFS	DEPTH FT
11.58	9.29	.00	4.10
11.67	12.57	.00	4.44
11.75	12.45	.00	4.83
11.83	27.11	.00	5.34
11.92	34.49	10.61	5.95
12.00	34.52	28.66	6.30
12.08	15.80	25.91	6.25
12.17	5.42	13.89	6.03
12.25	6.50	9.11	5.90
12.33	3.73	7.00	5.83
12.42	3.96	5.33	5.78
12.50	3.41	4.46	5.75
12.58	3.28	3.87	5.73
12.67	2.91	3.46	5.71
12.75	2.98	3.19	5.71
12.83	2.54	2.96	5.70
12.92	2.29	2.67	5.69
13.00	2.38	2.49	5.68
13.08	2.00	2.33	5.68
13.17	2.00	2.15	5.67
13.25	1.88	2.04	5.67
13.33	1.82	1.94	5.66
13.42	1.62	1.82	5.66
13.50	1.74	1.75	5.66
13.58	1.45	1.66	5.65
13.67	1.47	1.56	5.65
13.75	1.38	1.49	5.65
13.83	1.37	1.43	5.65
13.92	1.25	1.37	5.65
14.00	1.33	1.33	5.64
14.08	1.17	1.28	5.64
14.17	1.19	1.23	5.64
14.25	1.14	1.20	5.64
14.33	1.10	1.15	5.64
14.42	1.01	1.10	5.64
14.50	1.06	1.07	5.64
14.58	.93	1.02	5.63
14.67	.93	.97	5.63
14.75	.89	.94	5.63
14.83	.92	.92	5.63
14.92	.89	.91	5.63
15.00	.92	.91	5.63
15.08	.89	.91	5.63
15.17	.92	.91	5.63
15.25	.90	.91	5.63
15.33	.83	.88	5.63
15.42	.77	.84	5.63
15.50	.79	.81	5.63
15.58	.77	.79	5.63

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15.67	.79	.78	5.63
15.75	.77	.78	5.63
15.83	.78	.78	5.63
15.92	.77	.78	5.63
16.00	.78	.78	5.63
16.08	.77	.78	5.63
16.17	.78	.78	5.63
16.25	.77	.78	5.63
16.33	.78	.78	5.63
16.42	.77	.78	5.63
16.50	.78	.78	5.63
16.58	.69	.75	5.62
16.67	.65	.71	5.62
16.75	.65	.68	5.62
16.83	.65	.66	5.62
16.92	.65	.66	5.62
17.00	.65	.65	5.62
17.08	.65	.65	5.62
17.17	.65	.65	5.62
17.25	.65	.65	5.62
17.33	.65	.65	5.62
17.42	.65	.65	5.62
17.50	.65	.65	5.62
17.58	.65	.65	5.62
17.67	.65	.65	5.62
17.75	.65	.65	5.62
17.83	.56	.63	5.62
17.92	.52	.58	5.62
18.00	.52	.55	5.62
18.08	.52	.53	5.62
18.17	.52	.53	5.62
18.25	.52	.52	5.62
18.33	.52	.52	5.62
18.42	.52	.52	5.62
18.50	.52	.52	5.62
18.58	.52	.52	5.62
18.67	.52	.52	5.62
18.75	.52	.52	5.62
18.83	.52	.52	5.62
18.92	.52	.52	5.62
19.00	.52	.52	5.62
19.08	.52	.52	5.62
19.17	.52	.52	5.62
19.25	.52	.52	5.62
19.33	.52	.52	5.62
19.42	.52	.52	5.62
19.50	.52	.52	5.62
19.58	.52	.52	5.62
19.67	.52	.52	5.62
19.75	.52	.52	5.62
19.83	.43	.50	5.62
19.92	.39	.45	5.61
20.00	.39	.42	5.61
20.08	.39	.40	5.61
20.17	.39	.40	5.61
20.25	.39	.39	5.61
20.33	.39	.39	5.61
20.42	.39	.39	5.61
20.50	.39	.39	5.61
20.58	.39	.39	5.61

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20.67	.39	.39	5.61
20.75	.39	.39	5.61
20.83	.39	.39	5.61
20.92	.39	.39	5.61
21.00	.39	.39	5.61
21.08	.39	.39	5.61
21.17	.39	.39	5.61
21.25	.39	.39	5.61
21.33	.39	.39	5.61
21.42	.39	.39	5.61
21.50	.39	.39	5.61
21.58	.39	.39	5.61
21.67	.39	.39	5.61
21.75	.39	.39	5.61
21.83	.39	.39	5.61
21.92	.39	.39	5.61
22.00	.39	.39	5.61
22.08	.39	.39	5.61
22.17	.39	.39	5.61
22.25	.39	.39	5.61
22.33	.39	.39	5.61
22.42	.39	.39	5.61
22.50	.39	.39	5.61
22.58	.39	.39	5.61
22.67	.39	.39	5.61
22.75	.39	.39	5.61
22.83	.39	.39	5.61
22.92	.39	.39	5.61
23.00	.39	.39	5.61
23.08	.39	.39	5.61
23.17	.39	.39	5.61
23.25	.39	.39	5.61
23.33	.39	.39	5.61
23.42	.39	.39	5.61
23.50	.39	.39	5.61
23.58	.39	.39	5.61
23.67	.39	.39	5.61
23.75	.39	.39	5.61
23.83	.30	.37	5.61
23.92	.26	.32	5.61
24.00	.26	.29	5.61
24.08	.09	.23	5.61
24.17	.00	.13	5.60
24.25	.00	.06	5.60
24.33	.00	.03	5.60
24.42	.00	.01	5.60
24.50	.00	.01	5.60
24.58	.00	.00	5.60
24.67	.00	.00	5.60
24.75	.00	.00	5.60
24.83	.00	.00	5.60
24.92	.00	.00	5.60

PEAK OUTFLOW RATE. 28.7 CFS
MAX FLOODING ELEVATION 95.30 FT-MSL
MAX PONDING DEPTH. 6.30 FT

Q_W Peak
EMOR
SPILLWAY
@ 95.50

E-95

D48 PROJECT COLUMBIA, TOANO, VIRGINIA
POST-DEVELOPMENT POND ROUTING, EXISTING BMP POND
25 YEAR, 24 HOUR STORM

INPUT FILE: D48E25.INP

***** DESIGN RAINFALL DATA *****

RETURN PERIOD. 25 YEARS
EVENT DURATION 24.00 HOURS
SCS RAINFALL PATTERN TYPE. 2
ACCUMULATED DEPTH. 6.50 INCHES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 145
LOCATION NODE NUMBER 45

WATERSHED CHARACTERISTICS:

DRAINAGE AREA.6 ACRES
AVERAGE OVERLAND SLOPE 2.00 PERCENT
HYDRAULIC LENGTH 240. FEET
SCS CURVE NUMBER 98.0
TIME OF CONCENTRATION.06 HOURS
RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 10.50 HOURS
TIME RUNOFF ENDS 13.33 HOURS
PEAK FLOWRATE. 4.3 CFS
TIME OF PEAK 12.00 HOURS
RUNOFF VOLUME. 6.26 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 15.INCHES <<<<<

UPSTREAM NODE NUMBER 45
DOWNSTREAM NODE NUMBER 44

PIPE DATA:

DIAMETER 15. INCHES
LENGTH 108. FEET
SLOPE. 1.00 PERCENT
MANNING N-VALUE.013
MANNING PIPE FULL FLOW 6.5 CFS

HYDROGRAPH CHARACTERISTICS:

PEAK INFLOW RATE 4.3 CFS

E-55

PEAK OUTFLOW RATE 4.3 CFS
PEAK TRAVEL TIME21 MINUTES
MANNING TRAVEL TIME.35 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 144
LOCATION NODE NUMBER 44

WATERSHED CHARACTERISTICS:

DRAINAGE AREA.5 ACRES
AVERAGE OVERLAND SLOPE 1.00 PERCENT
HYDRAULIC LENGTH 140. FEET
SCS CURVE NUMBER 98.0
TIME OF CONCENTRATION.05 HOURS
RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 10.50 HOURS
TIME RUNOFF ENDS 13.33 HOURS
PEAK FLOWRATE. 3.6 CFS
TIME OF PEAK 12.00 HOURS
RUNOFF VOLUME. 6.26 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH 144
SECOND HYDROGRAPH. 301
SUMMATION HYDROGRAPH 201
LOCATION NODE NUMBER 44
TIME RUNOFF STARTS 10.50 HOURS
TIME RUNOFF ENDS 13.17 HOURS
PEAK FLOWRATE. 7.9 CFS
TIME OF PEAK 12.00 HOURS
RUNOFF VOLUME. 6.26 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER INCREASED TO 24. INCHES <<<<

UPSTREAM NODE NUMBER 44
DOWNSTREAM NODE NUMBER 43

PIPE DATA:

DIAMETER 24. INCHES
LENGTH 160. FEET
SLOPE.50 PERCENT
MANNING N-VALUE.013
MANNING PIPE FULL FLOW 16.0 CFS

HYDROGRAPH CHARACTERISTICS:

CS6

PEAK INFLOW RATE	7.9 CFS
PEAK OUTFLOW RATE	7.8 CFS
PEAK TRAVEL TIME35 MINUTES
MANNING TRAVEL TIME.58 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER	143
LOCATION NODE NUMBER	43

WATERSHED CHARACTERISTICS:

DRAINAGE AREA.4 ACRES
AVERAGE OVERLAND SLOPE	1.50 PERCENT
HYDRAULIC LENGTH	340. FEET
SCS CURVE NUMBER	92.0
TIME OF CONCENTRATION.12 HOURS
RAINFALL BURST DURATION.	5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS	10.75 HOURS
TIME RUNOFF ENDS	13.33 HOURS
PEAK FLOWRATE.	2.8 CFS
TIME OF PEAK	12.00 HOURS
RUNOFF VOLUME.	5.56 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH	302
SECOND HYDROGRAPH.	143
SUMMATION HYDROGRAPH	202
LOCATION NODE NUMBER	43
TIME RUNOFF STARTS	10.58 HOURS
TIME RUNOFF ENDS	13.42 HOURS
PEAK FLOWRATE.	10.7 CFS
TIME OF PEAK	11.92 HOURS
RUNOFF VOLUME.	6.07 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 15.INCHES <<<<<

UPSTREAM NODE NUMBER	43
DOWNSTREAM NODE NUMBER	42

PIPE DATA:

DIAMETER	15. INCHES
LENGTH	144. FEET
SLOPE.	5.00 PERCENT
MANNING N-VALUE.013
MANNING PIPE FULL FLOW	14.4 CFS

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HYDROGRAPH CHARACTERISTICS:

PEAK INFLOW RATE	10.7 CFS
PEAK OUTFLOW RATE	10.6 CFS
PEAK TRAVEL TIME12 MINUTES
MANNING TRAVEL TIME.20 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER	142
LOCATION NODE NUMBER	42

WATERSHED CHARACTERISTICS:

DRAINAGE AREA.	1.2 ACRES
AVERAGE OVERLAND SLOPE	6.00 PERCENT
HYDRAULIC LENGTH	380. FEET
SCS CURVE NUMBER	61.0
TIME OF CONCENTRATION.17 HOURS
RAINFALL BURST DURATION.	5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS	11.50 HOURS
TIME RUNOFF ENDS	14.58 HOURS
PEAK FLOWRATE.	3.2 CFS
TIME OF PEAK	12.08 HOURS
RUNOFF VOLUME.	2.35 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH	303
SECOND HYDROGRAPH.	142
SUMMATION HYDROGRAPH	203
LOCATION NODE NUMBER	42
TIME RUNOFF STARTS	10.83 HOURS
TIME RUNOFF ENDS	13.58 HOURS
PEAK FLOWRATE.	13.6 CFS
TIME OF PEAK	12.00 HOURS
RUNOFF VOLUME.	4.42 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 15.INCHES <<<<

UPSTREAM NODE NUMBER	42
DOWNSTREAM NODE NUMBER	41

PIPE DATA:

DIAMETER	15. INCHES
LENGTH	126. FEET
SLOPE.	7.00 PERCENT
MANNING N-VALUE.013
MANNING PIPE FULL FLOW	17.1 CFS

E-58

HYDROGRAPH CHARACTERISTICS:

PEAK INFLOW RATE 13.6 CFS
PEAK OUTFLOW RATE 13.6 CFS
PEAK TRAVEL TIME09 MINUTES
MANNING TRAVEL TIME.15 MINUTES

***** SIMULATED STORMWATER HYDROGRAPH *****

WATERSHED NUMBER 141
LOCATION NODE NUMBER 41

WATERSHED CHARACTERISTICS:

DRAINAGE AREA. 1.6 ACRES
AVERAGE OVERLAND SLOPE 6.00 PERCENT
HYDRAULIC LENGTH 500. FEET
SCS CURVE NUMBER 61.0
TIME OF CONCENTRATION.21 HOURS
RAINFALL BURST DURATION. 5.0 MINUTES

HYDROGRAPH CHARACTERISTICS:

TIME RUNOFF STARTS 11.50 HOURS
TIME RUNOFF ENDS 14.58 HOURS
PEAK FLOWRATE. 4.3 CFS
TIME OF PEAK 12.08 HOURS
RUNOFF VOLUME. 2.35 INCHES

***** ADDED STORMWATER HYDROGRAPHS *****

FIRST HYDROGRAPH 304
SECOND HYDROGRAPH. 141
SUMMATION HYDROGRAPH 204
LOCATION NODE NUMBER 41
TIME RUNOFF STARTS 11.08 HOURS
TIME RUNOFF ENDS 13.92 HOURS
PEAK FLOWRATE. 17.8 CFS
TIME OF PEAK 12.00 HOURS
RUNOFF VOLUME. 3.65 INCHES

***** PIPE ROUTING SUMMARY *****

>>>> PIPE DIAMETER DECREASED TO 24.INCHES <<<<

UPSTREAM NODE NUMBER 41
DOWNSTREAM NODE NUMBER 40

PIPE DATA:

DIAMETER 24. INCHES
LENGTH 150. FEET
SLOPE. 1.65 PERCENT
MANNING N-VALUE.013

E-59

MANNING PIPE FULL FLOW 29.1 CFS

HYDROGRAPH CHARACTERISTICS:

PEAK INFLOW RATE 17.8 CFS

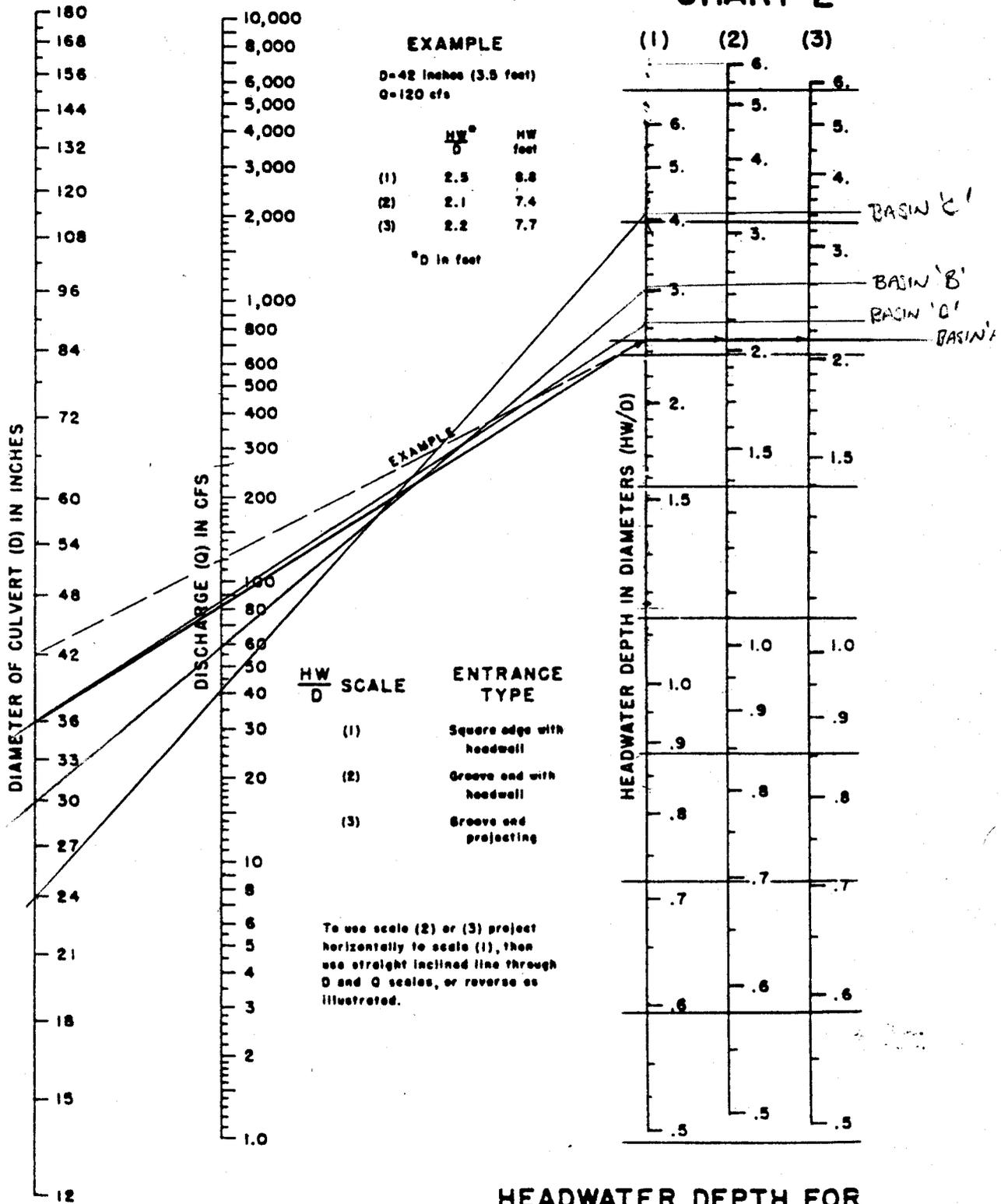
PEAK OUTFLOW RATE 17.7 CFS

PEAK TRAVEL TIME17 MINUTES

MANNING TRAVEL TIME.28 MINUTES

HEADWATER ON POND OUTFALL PIPES

CHART 2



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HEADWATER SCALES 283
 REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

Appendix F

100 Year, 24 Hour Storm Routing

D48 PROJECT COLUMBIA, TOANO, VIRGINIA
 POST-DEVELOPMENT POND ROUTING, POND 'C'
 100 YEAR, 24 HOUR STORM

POND 'C'
 100 YEAR
 STORM

INPUT FILE: D48C100.INP

SUMMARY OUTPUT

***** RUNOFF HYDROGRAPH DATA *****

WS NO	WATERSHED DATA				UH PEAK ORD		HYDROGRAPH DATA		
	AREA (AC)	LENGTH (FT)	SLOPE (%)	CURVE NO	PRF (CSM)	TC (MIN)	VOLUME (IN)	PEAK (CFS)	PEAK TIME (HRS)
135	1.2	310.	1.00	98.0	484.	5.9	7.66	10.5	12.00
134	.6	250.	1.00	98.0	484.	5.0	7.66	5.3	12.00
133	2.4	380.	1.00	98.0	484.	7.0	7.66	21.0	12.00
132	.9	200.	25.00	74.0	484.	2.1	4.84	6.1	12.00

***** ROUTING DATA *****

CONDUIT CODE = 1 - PIPE
 = 2 - DITCH
 = 3 - STREAM

CONDUIT DATA							PEAK FLOW DATA			
CONNECTING NODE NOS	CODE NO	LENGTH (FT)	SLOPE (%)	DIA-WIDTH (IN-FT)	MANNING N-VALUE	INFLOW (CFS)	INFLOW (HR)	OUTFLOW (CFS)	OUTFLOW (HR)	
35 34	1	100.	1.00	24.	.013	11.	12.00	10.	11.92	
34 33	1	204.	.50	24.	.013	16.	12.00	16.	11.92	
33 32	1	54.	.25	42.	.013	37.	11.92	36.	11.92	

***** POND DATA *****

POND CODE = 1 - EXISTING POND
 = 2 - USER DESIGNED POND
 = 3 - ROAD CROSSING

TOP OF BANK 98.20

PEAK FLOW DATA						HYDROGRAPH VOLUME	MAXIMUM WSE
CONNECTING NODE NOS	CODE NO	INFLOW (CFS)	INFLOW (HR)	OUTFLOW (CFS)	OUTFLOW (HR)	(IN)	(FT)
32 97	1	42.	11.92	41.	12.00	4.85	95.5

***** ADDED HYDROGRAPHS DATA *****

SUMMATION HYDROGRAPH									
NODE NO	HYD NO	ADDED HYD NOS 1st 2nd	PEAK (CFS)	PEAK TIME (HRS)	HYD VOLUME (INCHES)	BASEFLOW (CFS)	DRAINAGE AREA (ACRES)		
34	201	134 301	16.	12.00	7.66	.0	1.8		

33	202	302	133	37.	11.92	7.66	.0	4.2
32	203	303	132	42.	11.92	7.16	.0	5.1

Appendix G

Outlet Ditch Velocity Calculations

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: Pond 'C' Outfall

Comment: Pond 'C' Outfall Ditch

Solve For Depth

Given Input Data:

Bottom Width.....	8.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0025 ft/ft
Discharge.....	30.80 cfs

Computed Results:

Depth.....	1.28 ft
Velocity.....	2.04 fps
Flow Area.....	15.12 sf
Flow Top Width...	15.67 ft
Wetted Perimeter.	16.08 ft
Critical Depth...	0.70 ft
Critical Slope...	0.0219 ft/ft
Froude Number....	0.37 (flow is Subcritical)

Open Channel Flow Module, Version 3.43 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Appendix H

**Temporary Sediment Basin
Design Data Sheets**

**PROJECT COLUMBIA, JAMES CITY COUNTY, VIRGINIA
STORMWATER, EROSION & SEDIMENT CONTROL PLAN**

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project D48 PROJECT COLUMBIA

Basin # BASIN 'C' Location NORTH EAST OF PLANT

Total area draining to basin: 5.1 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

$$67 \text{ cu. yds.} \times \underline{5.1} \text{ acres} = \underline{342} \text{ cu. yds. (9,225 cf)}$$

2. Available basin volume = 418 cu. yds. at elevation 91.28. (From storage - elevation curve) (11,293 cf)

3. Excavate 0 cu. yds. to obtain required volume*.

(ADJUSTED TO MAKE 1' HIGHER THAN CLEANOUT)

* Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

$$33 \text{ cu. yds.} \times \underline{5.1} \text{ acres} = \underline{168} \text{ cu. yds. (4544)}$$

5. Elevation corresponding to cleanout level = 90.28.

(From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1.22 ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

$$67 \text{ cu. yds.} \times \underline{5.1} \text{ acres} = \underline{342} \text{ cu. yds.}$$

1992

42755 cf 3.14

8. Total available basin volume at crest of riser* = 1,584 cu. yds. at elevation 94.60. (From Storage - Elevation Curve)

310 cy/Ac

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 6" in. USE 6" PVC

10. Diameter of flexible tubing = 8" in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 94.60

Top of Dam = 98.20

Design High Water = 95.28

Upstream Toe of Dam = 89.00

Basin Shape

12. $\frac{\text{Length of Flow}}{\text{Effective Width}} = \frac{L}{We} = \frac{100'}{45'}$

If > 2, baffles are not required X

If < 2, baffles are required _____

Runoff

13. $Q_2 = \frac{N/A}{cfs}$ (From Chapter 5)

14. $Q_{25} = \frac{34.5}{cfs}$ (From Chapter 5) (INFLOW)
 $Q_{25} = \frac{28.7}{cfs}$ (OUTFLOW FROM POND)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2 = \frac{N/A}{cfs}$. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25} = \frac{28.7}{cfs}$. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = N/A ft. (Using Q₂)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway: 95.30 - 94.60

Assumed available head (h) = 0.70 ft. (Using Q₂₅)

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = — in. Actual head (h) = 0.70 ft.

(From Plate 3.14-8.) 4' SQUARE RISER
 $Q = 3Lh^{1.5} = 3(16)(0.70)^{1.5} = 28.17$

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 150' ft.

Head (H) on barrel through embankment = 6.30 ft.

(From Plate 3.14-7).

19. Barrel diameter = 24'/30' in. CAP OF 30' @ 0.60% = 32 cfs
SEE HW CHART FOR 24" RCP = 40 cfs

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device #6 REBAR

Diameter = — inches.

Height = 12' inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity Q_e = Q₂₅ - Q_p = N/A cfs. N/A Q₂₅ GOES THROUGH PRINCIPAL

22. Bottom width (b) = — ft.; the slope of the exit channel (s) = — ft./foot; and the minimum length of the exit channel (x) = — ft.

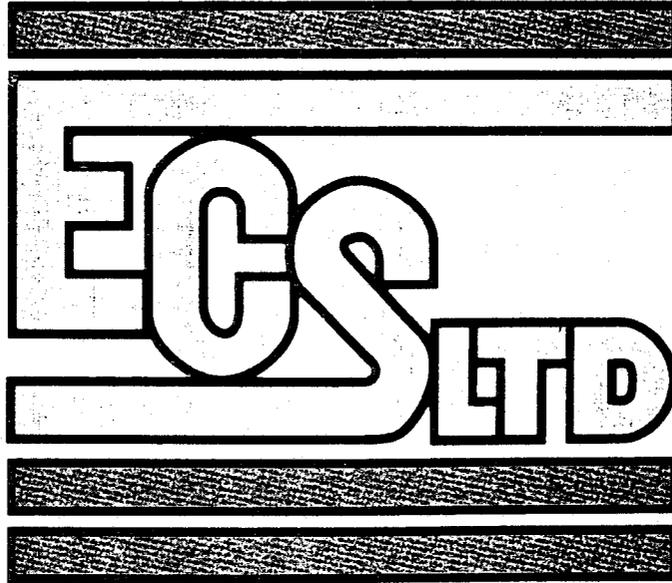
(From Table 3.14-C).

Anti-Seep Collar Design N/A EMBANKMENT < 10' HEIGHT

23. Depth of water at principal spillway crest (Y) = 6.25 ft.
 Slope of upstream face of embankment (Z) = 3 :1.
 Slope of principal spillway barrel (S_b) = _____ %
 Length of barrel in saturated zone (L_s) = _____ ft.
24. Number of collars required = 0 dimensions = _____
 (from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 98.20
 Design High Water = 95.30
 Emergency Spillway Crest = 95.50
 Principal Spillway Crest = 94.60
 Dewatering Orifice Invert = 91.28
 Cleanout Elevation = 90.28
 Elevation of Upstream Toe of Dam
 or Excavated Bottom of "Wet Storage
 Area" (if excavation was performed) = 89.00



**PRELIMINARY SUBSURFACE EXPLORATION
AND GEOTECHNICAL ENGINEERING ANALYSIS**

Conducted on

**STONEHOUSE INDUSTRIAL SITE
JAMES CITY COUNTY, VIRGINIA**

ECS Project No. 5020

for

**Mr. Steve Campitell
Stonehouse, Inc.
530 East Park Court, Suite A
Sandston, VA 23150**

February 16, 1999

*All soil borings
taken in Bldg pad
area. Most soils
sandy.*

*Dam construction
or BMPs not mentioned
at all.*



ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical • Construction Materials • Environmental

February 16, 1999

Mr. Steve Campitell
Stonehouse, Inc.
530 East Park Court, Suite A
Sandston, VA 23150

ECS Project No. 5020

Reference: Preliminary Subsurface Exploration and
Geotechnical Engineering Analysis
Stonehouse Industrial Site
James City County, Virginia

Dear Mr. Campitell:

Engineering Consulting Services, Ltd. (ECS, Ltd.) is pleased to provide Stonehouse, Inc. with the results of our preliminary subsurface exploration performed at the Stonehouse Commerce Park in northwestern James City County, Virginia. This report was prepared in accordance with ECS, Ltd. Proposal No. R4703-PR dated February 2, 1999.

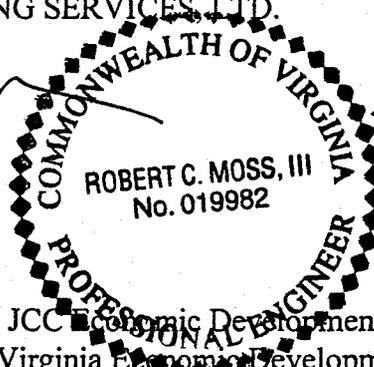
This report presents the results of the field exploration, laboratory testing, and engineering analysis, with our preliminary planning recommendations for foundations, floor slabs, and earthwork operations associated with industrial type construction.

We appreciate this opportunity to be of service to Stonehouse, Inc. and look forward to working with you as the project proceeds. If there are any questions regarding the contents of this report, or if there is need for further information, please contact us.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

Robert C. Moss, III, P.E.
Vice President
Richmond Branch Manager



David E. Stinnette, P.E.
Engineering Services Manager

Copies: (2) Client

- (1) Mr. Keith Taylor - JCC Economic Development
- (3) Mr. Phil Tuning - Virginia Economic Development Partnership

GEOTECH/REPORTS/3.5020

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REPORT

PROJECT

Preliminary Subsurface Exploration
and Geotechnical Engineering Analysis
Stonehouse Industrial Site
James City County, Virginia

CLIENT

Mr. Steve Campitell
Stonehouse, Inc.
530 East Park Court, Suite A
Sandston, Virginia 23150

SUBMITTED BY

Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, Virginia 23230

ECS PROJECT NO. 3.5020

DATE February 16, 1999

**PRELIMINARY SUBSURFACE EXPLORATION
AND GEOTECHNICAL ENGINEERING ANALYSIS
STONEHOUSE INDUSTRIAL SITE
JAMES CITY COUNTY, VIRGINIA
ECS PROJECT NO. 5020**

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PROJECT OVERVIEW

Executive Summary

This report presents the results of our preliminary subsurface exploration and geotechnical engineering analysis for the proposed Stonehouse Industrial Park site. The site is located in the Stonehouse Commerce Park one half mile east of the intersection of U.S. Route 30 and Interstate 64 in northwestern James City County, Virginia. The proposed project site is planned for industrial manufacturing/distribution usage. The total area available for development includes about 50 acres. The development will include a one story, high bay structure containing up to 350,000 square feet in plan area. Given the topographic relief of the site, cuts on the order of 15 feet and fills on the order of 30 feet may be required to grade the site.

Site stratigraphy includes primarily granular soils (Sands) which generally extend to boring termination (25 ft). Based on this, the site is well suited for shallow foundations supporting column loads up to about 250 kips with settlements less than one inch. As foundation bearing will largely be controlled by settlement, the compatibility of higher foundation loads with spread footing support will depend on settlement tolerances. For foundation loads in excess of about 250 kips but less than about 300 kips, settlements on the order of one and one half inches are estimated. For loads in excess of about 300 kips, a deep foundation system may be most desirable. As the site is underlain by loose to medium dense Sands, driven timber piles or precast concrete piles would be well suited to this site. Auger cast in place piles and caissons can also be employed in this subsurface environment. These deep foundation types are readily available in this region.

The predominant soils which will be used in cuts and fills as were encountered in the top 15 to 20 feet in the higher site elevations consist of Silty and Clayey Sands and Sandy Clays. These soils should serve adequately in preparation of structural building pads and pavement subgrades. Depending on final design elevations, the grading may require relatively deep fills.

Groundwater was located at depths 20 or more feet below the existing surface in the higher site elevations. With existing surface elevations ranging from 70 to 120 feet in the primary grading areas and considering cuts will probably be limited to 15 feet, the static groundwater table will not adversely affect site grading activities. Perched water occurs in ravine bottoms and may require dewatering prior to fill placement. Where filling is required in ravine bottoms, installation of French drains to canalize spring flows below the fills may be necessary. Some undercutting of soft, wet soils from ravine bottoms should also be anticipated.

Information regarding building loads, grading plans, and specific development characteristics was not available at the time of this reporting. The recommendations contained herein, therefore, should be considered preliminary in nature. It is anticipated that additional soil borings will be performed upon completion of a site development plan.

Further information regarding the subsurface exploration procedures used, soil conditions encountered, and preliminary commentary for foundation, ground slab, and pavement design, earthwork operations and construction considerations is included in the text of this report.

Scope of Work

The conclusions and commentary contained in this report are based upon a total of eight (8) soil test borings drilled to planned depths of 25 feet below the existing grades, a site reconnaissance performed by the Geotechnical Engineer, and laboratory test results of boring samples. The boring locations were prescribed by the client and were located in the field by a surveyor under contract to the client.

The recommendations contained herein are preliminary in nature and were developed based on estimated building characteristics and the data obtained in the soil test borings which indicate subsurface conditions at these specific locations at the time of the exploration. It is anticipated that additional soil borings will be performed upon completion of a more specific site development plan.

Purposes of Exploration

The purposes of this exploration were to explore the soil and groundwater conditions at the site and to develop preliminary geotechnical engineering commentary to guide planning and evaluate feasibility for development of the site. We accomplished these purposes by drilling preliminary borings to explore the subsurface soil and groundwater conditions, performing a site reconnaissance, performing laboratory tests on selected samples, and analyzing the field and laboratory data to develop appropriate engineering commentary regarding preliminary foundation, slab, and pavement design, and earthwork and general construction considerations.

Project Characteristics

It is anticipated that the Stonehouse Commerce Park site will be developed for industrial manufacturing/distribution usage. High bay, steel frame structures with masonry, metal, or tilt up walls will be employed. For this type of structure, we estimate general foundation loads will range between 50 and 150 kips for columns and 2 to 6 kips/ft for walls.

Ground slabs will support distributed loading of 150 to 500 psf with machine or storage pads potentially supporting loads of 1000 to 1500 psf. Loading docks with concrete aprons are anticipated to be part of the construction. Pavements will support both light automobile traffic as well as heavy tractor trailer traffic.

Information regarding grading plans and specific development characteristics was not available at the time of this reporting. Topographic information contained herein was obtained from an undated conceptual site plan provided by the client and the U.S.G.S. mapping of the Toano, VA Quadrangle. Based on the general topography of the site, it is anticipated that cuts of up to 15 feet might occur in the southern and central portions of the site with fills on the order of 20 to 30 feet in the northeast and southwest corners of the site in order to establish site grades prior to future development. This is based on an estimated finished floor elevation of about 105 feet.

Stormwater management for the site will likely include excavation of Stormwater Management Facilities (dry detention ponds). We anticipate that material removed from the pond areas will be used as Engineered Fill in the grading operations.

EXPLORATION PROCEDURES

Subsurface Exploration Procedures

On February 16 and 17, 1999, a total of eight (8) soil borings were performed with an ATV mounted CME 45 drill rig. The drilling rig utilized continuous-flight, hollow-stem augers to advance the boreholes. Drilling fluid was not used in this process. The borings were advanced to the prescribed depth of 25 feet below the existing site grades. The borings were performed at approximate locations prescribed by the client. Actual boring locations are approximately indicated on the Boring Location Diagram included in Appendix III.

Representative samples were obtained by means of the split-barrel sampling procedure in accordance with ASTM Specification D-1586. In this procedure, a 2 inch O.D., split barrel sampler is driven into a soil a distance of 24 or 18 inches by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12-inch interval is termed the Standard Penetration Test (SPT) Value and is indicated for each sample on the boring logs. This value can be used as a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, it also indicates the consistency of cohesive soils. This indication is qualitative, since many factors can significantly affect the Standard Penetration resistance value and thus prevent a direct correlation between drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies. Samples were taken continuously to a depth of 10 feet and at 5

foot intervals thereafter. Groundwater levels were observed in the bore holes immediately after completion of the borings.

After recovery, representative portions of each sample were removed from the sampler and sealed in glass jars. The samples were taken to our laboratory for visual classification and laboratory testing.

Laboratory Testing Program

Representative soil samples were selected and tested in our laboratory to substantiate visual classifications and to determine pertinent engineering properties. The laboratory testing program included visual classification, natural moisture content tests, grain size analyses, and Atterberg Limits tests. The results of laboratory testing are included in Appendix V of this report.

An experienced Geotechnical Engineer classified each soil sample on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS). The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. A brief explanation of the USCS is included with this report in Appendix IV. The Geotechnical Engineer grouped the various soil types into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 90 days, after which they will be discarded unless other instructions are received as to their disposition.

EXPLORATION RESULTS

Site Conditions

The project site is located in the Stonehouse Commerce Park in northwestern James City County approximately one half mile east of the intersection of U.S. Route 30 and Interstate 64. The site contains about 50 acres of land potentially available for development, although specific site boundaries had not yet been defined. As requested by the client, the geotechnical exploration for this property was performed in a building area containing roughly 350,000 square feet and indicated by the client's conceptual site plan

Our reconnaissance of the site indicates it has primarily been used as forested timber land. Most of the site's original second growth hardwoods had been cut and first growth vegetation was returning.

Topography of the site is rolling. The U.S.G.S. topographical map for the Toano Quadrangle indicates surface elevations of a high of 120 feet in the central portion along a north-south trending ridgeline. Surface grades fall along the shoulders of this ridge towards creeks either side of the site. Surface elevations in the swales and ravines within the immediate development area are about 30 or 40 feet lower than the intervening high ground. Intermittent creeks extend up into the site through ravines on the shoulder of the ridge. These exist on the northern and southern ends of the approximate building. At the time of our study (February 1999) shallow perched water was encountered within these ravines.

Site Geology

The project site is located in the Toano 7.5 minute quadrangle and within the Coastal Plain Physiographic Province midway between the Fall line and the Atlantic Ocean. The Coastal Plain is characterized by bands of alluvial and marine sediments generally paralleling the coast which were deposited by advancing and retreating ocean shorelines through the Mesozoic and Cenozoic Eras. Rises and falls in sea level have brought the Atlantic coast across this area many times. During Pliocene times, (late Cenozoic Era - 24 million years ago), when beaches and bays transgressed through the Upper and Middle Peninsula, the characteristically granular soils (sands) of the Bacons Castle Formation were deposited over the marine Yorktown Formation of earlier Pliocene Times. This created the relatively flat terrace, known as the Norge Uplands, which locally extends along the Route 60 corridor from Charles City County to Williamsburg. The terrace was deeply eroded with the formation of Illionian and Wisconsinan stage glaciers as sea level fell from 170 feet above to some 330 feet below present levels. Erosion features extended outward from the ancestral York and James Rivers towards the high, flat Norge Uplands, causing the development of sharp relief, characterized by deep ravines and valleys in which the tributaries of these rivers were formed and which now touch the edge of the Norge Uplands. Melting of the Wisconsinan glaciers (10,000 years ago) resulted in the flooding of the Chesapeake Bay and its tributaries, as sea level reached its modern elevations. With this inundation the James, York, and Chickahominy rivers changed from a fluvial to an estuarine, tidal mode. The lower reaches of the erosion features were filled with sediments resulting in the existing tidal marshes and mud flats, such as Bird and France swamps located north of the site.

The soil borings performed on this site passed through but did not penetrate the sandy Bacons Castle formation of the Norge Uplands. Marine sediment of the Yorktown Formation underlies the site beyond boring termination depth (25 feet).

Additional details concerning the materials encountered can be obtained from the test boring logs and laboratory data summary included in the Appendix of this report.

Soil Conditions

The natural, near surface deposits, which were studied by our field exploration program, are consistent with the regional geology described in the preceding section. Topsoil depths of about 6 inches were observed on the site. Deeper organics occurs in ravine bottoms. A seasonally wet zone 2 feet thick occurs in the ravine bottoms.

Underlying the topsoil are the Silty and Clayey Sands and Sandy Clays of the Bacons Castle Formation. These soils are of loose to medium stiff consistency and extend to boring termination depths 25 feet below the surface. Sedimentation in ravine bottoms is 1 to 2 feet deep.

A review of the Soil Survey for James City County by the USDA-SCS indicates the site is surficially dominated by the Silty, Clayey Sands and Sandy Clays of the Kempsville, Craven, and Slagle series. These soils comprise the near surface soils which will largely be used as fill and exposed as subgrade. These soils are of moderate to low plasticity and moderately erodible. Their shrink-swell potential is low.

Groundwater Observations

Observations for groundwater were made during sampling and upon completion of the drilling operations at each boring location. In auger drilling operations, water is not introduced into the boreholes, and the groundwater position can often be determined by observing water flowing into or out of the boreholes. Furthermore, visual observation of the soil samples retrieved during the auger drilling exploration can often be used in evaluating the groundwater conditions.

Groundwater on this site occurs at depths of 20 or more feet below the surface in the higher site elevations. The groundwater surface generally reflects the contour of the ground surface with springs developing in ravines a short distance downstream of the site. Perched water seasonally occurs in these ravine bottoms. Groundwater trends east and west away from the central high ground to flow to tributaries of Bird and France Swamps, which themselves flow northward to Ware Creek and the York River.

PRELIMINARY GEOTECHNICAL FINDINGS

Foundation Design

Based on the subsurface conditions encountered in the soil borings, it appears that moderately loaded structures with column loads up to about 250 kips can be supported by shallow spread footings with settlements of 1 inch or less. The suitability of spread footing support of heavy loads will depend on the structure's tolerance for settlement. Footings supporting column loads on the order of 250 to 300 kips could experience settlements of up to 1.5 inches. Where settlement controls and for heavier foundation loads, a deep foundation (driven piles) can be employed. Deep foundation types suitable for this site include driven timber or precast, prestressed concrete piles, auger cast in place piles, and caissons.

For planning purposes, the following shallow spread footing bearing capacity design table is presented. These preliminary design capacities are based on a maximum settlement of about one inch .

Foundation Load (kips)	Approx. Min. Fdn. Width (Ft)	Approx. Min. Fdn. Embedment (Ft)	Bearing Capacity (ksf)
<50	2.0	2.0	2.5
50-100	4.0	2.0	3.0
100-250	6.0	2.0	3.5

For foundations loaded in excess of about 250 to 300 kips, or where settlement or overturning resistance are critical, it may be most desirable to employ a deep foundation system. Deep foundations (piles) are considered appropriate for foundation loads in excess of about 250 kips where settlement of less than about one inch controls. For the planning of a deep foundation system, the following capacities are presented.

Pile Type	Pile Length (ft)	Allowable Compressive Load (tons)	Allowable Uplift Resistance (tons)
10 inch Concrete	40	50	25
14 inch concrete	40	70	25
Treated Timber	40	30	10
14 inch Auger Cast	40	40	15

These capacities are based on anticipated conditions below boring termination depths and are based on our experience in the project area. Other pile sizes and lengths could be employed and substantially higher capacities achieved if necessary.

Ground Slab Design

We expect that conventional slab-on-grade construction can be employed on this project. For heavy industrial space, a granular base (porous fill) consisting of at least 6 inches of Aggregate Base Material, VDOT Type I, Size 21-A, could be employed as the porous fill layer. For more lightly loaded office space, a porous fill consisting of 4 inches of VDOT No. 57 Stone can be employed. Alternatively, a clean, medium Sand classified as SP or better and containing less than 10% passing the No. 200 Sieve could be employed. This granular layer will facilitate the fine grading of the subgrade, provide more uniform bearing conditions, and help prevent the rise of water to the bottom to the slab (capillary action). Where employed, the Aggregate Base Material will help protect the subgrade from moisture penetration during construction as well as provide for a working surface for construction traffic. Its use on slab areas should prove advantageous. We estimate that a slab subgrade modulus, based on a standard plate load test using a 1 ft. square plate, of 175 to 200 pci is available for this site. This modulus can be increased by increasing the thickness of the granular base.

For heavily loaded machine pads subject to vibration, the granular subgrade soils should not present unusual design issues associated with consolidation, although thorough subgrade compaction should be achieved. For structural mat foundations, an effective subgrade modulus on the order of 175 pci could be employed.

Pavement Design

Pavement bearing quality of the subgrade soils on this site is considered good relative to regional conditions. We estimate that the CBR quality of on site soils primarily available from cut areas will be on the order of 8 to 10. It is anticipated that cuts will primarily produce granular soils from the higher site elevations. These soils will serve adequately for support of pavement sections. Depending on the final grading, it may be necessary to import fill material. Locally available fill is generally granular in nature and should provide relatively good pavement support. Sands readily available to the site from local borrow pits can possess a CBR value of at least 10.

For the preliminary planning of pavement structures, we anticipate that the following sections will approximate final design sections:

**Standard Duty
(Automobile Traffic Only)**

Subgrade: Stable and compacted.

Aggregate Base: Minimum 6.0 inches Aggregate Base Material Type I, Size 21-A.

Asphalt Base: None

Asphalt Surface: Minimum 2.0 to 2.5 inches Asphalt Surface Material.

**Heavy Duty
(Tractor Trailer Traffic)**

Subgrade: Stable and compacted.

Aggregate Base: Minimum 8 to 10 inches Aggregate Base Material Type I, Size 21-A.

Asphalt Base: Minimum 3.5 inches Asphalt Base Material.

Asphalt Surface: Minimum 2.0 inches Asphalt Surface Material.

Subgrade Preparation and Earthwork Operations

Stripping of "topsoil" materials will vary on site. In upland areas, a 6 to 8 inch strip would be required to remove topsoil and organic debris. In ravines and swales, a strip on the order of 10 to 12 inches should be adequate to remove organic sediment. However, underlying materials will be loose and seasonally wet. Therefore, depending on seasonal conditions, additional stripping of 1 to 1.5 feet could be required in low lying areas.

Soils on the site are primarily granular in nature and should not present unusual problems with working during adverse seasonal conditions. In the James City County area, earthwork from May through October generally encounters favorable weather for such operations. During winter earthwork operations, aeration and drying of cut to fill soils may be necessary. It will be critical during adverse seasonal conditions that ditches and swales be employed to enhance surface drainage on the relatively flat site. As a design element, ditches and swales around the perimeter of driveways, parking lots, and other pavements will contribute substantially towards enhancing the life of these structures.

All subgrades and subsequent lifts of engineered fill should be moisture conditioned to within $\pm 3\%$ of the optimum moisture content and compacted to at least 95% of the maximum dry density in accordance with ASTM Specification D-698, Standard Proctor Method. In deeper fills or under heavily loaded structures, a Modified Proctor specification may be warranted.

The following fill types should be available for use on this project:

On-site Borrow Engineered Fill: Soil Material classification as CL, ML, SM, SC or better with a maximum Liquid Limit of 45. Most soils available from on site cuts should satisfy this criteria.

Imported Engineered Fill: Soil Material classified as SM, SC, SP, or better which contains less than 30% by weight Silt or Clay and is free of organics and debris and possesses a minimum CBR quality of 10.0. Maximum aggregate size should be limited to 4 inches. Soils satisfying this criteria are available from local pits.

Porous Fill/Drainage Fill: Clean crushed gravel (No. 57 Stone) or coarse graded granular material with a maximum aggregate size of 1.5 inches and no more than 2% passing the #200 Sieve. As an alternative for Porous Fill below slabs, Aggregate Base Material could be employed in a minimum 6 inch layer.

Aggregate Base: Aggregate Base Material Type I, Size 21-A.

The soil test borings do not indicate that excessively hard soil or rock will be encountered during site grading and utility construction. Soils on this site are considered Type C relative to OSHA excavation safety requirements, and sloughing or seeping from the surficial layers into the excavations should be expected.

Dewatering and Drainage

Most utility excavations on this site should not require extensive dewatering as groundwater is located well below the anticipated design building and pavement grades. Therefore, dewatering using sump pumping operations should prove effective.

At least two ravines which enter the site development area are seasonally wet. These may require construction two foot diameter French drains which extend through the bottom of the ravines to a day lighted discharge point.

In order to maintain positive site drainage and optimize earthwork conditions, particularly during adverse seasonal conditions, the use of ditches and swales around the perimeter of pavement areas is highly recommended as part of the site civil design.

Closing

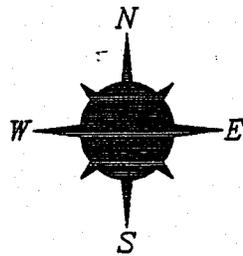
Once site planning has progressed to the point that structures are being located on site, we recommend that a more thorough geotechnical exploration be performed. This exploration should include the following investigative procedures to determine specific geotechnical parameters for the site:

1. Additional soil borings to more thoroughly ascertain subsurface conditions. Soil borings to depths of 40 feet or more will be required if a pile foundation is indicated.
2. CBR testing of shallower surface soils to determine slab and pavement bearing design parameters.
3. Additional laboratory testing as required to evaluate and characterize soil properties.

This information, used in conjunction with a more extensive drilling program, should provide the design information necessary to more closely define bearing and settlement parameters for soils on this site.

APPENDIX I
Site Vicinity Map

11



SOURCE:
USGS 7.5 MINUTE SERIES
TOPOGRAPHIC QUADRANGLE.

TOANO, VA
1965

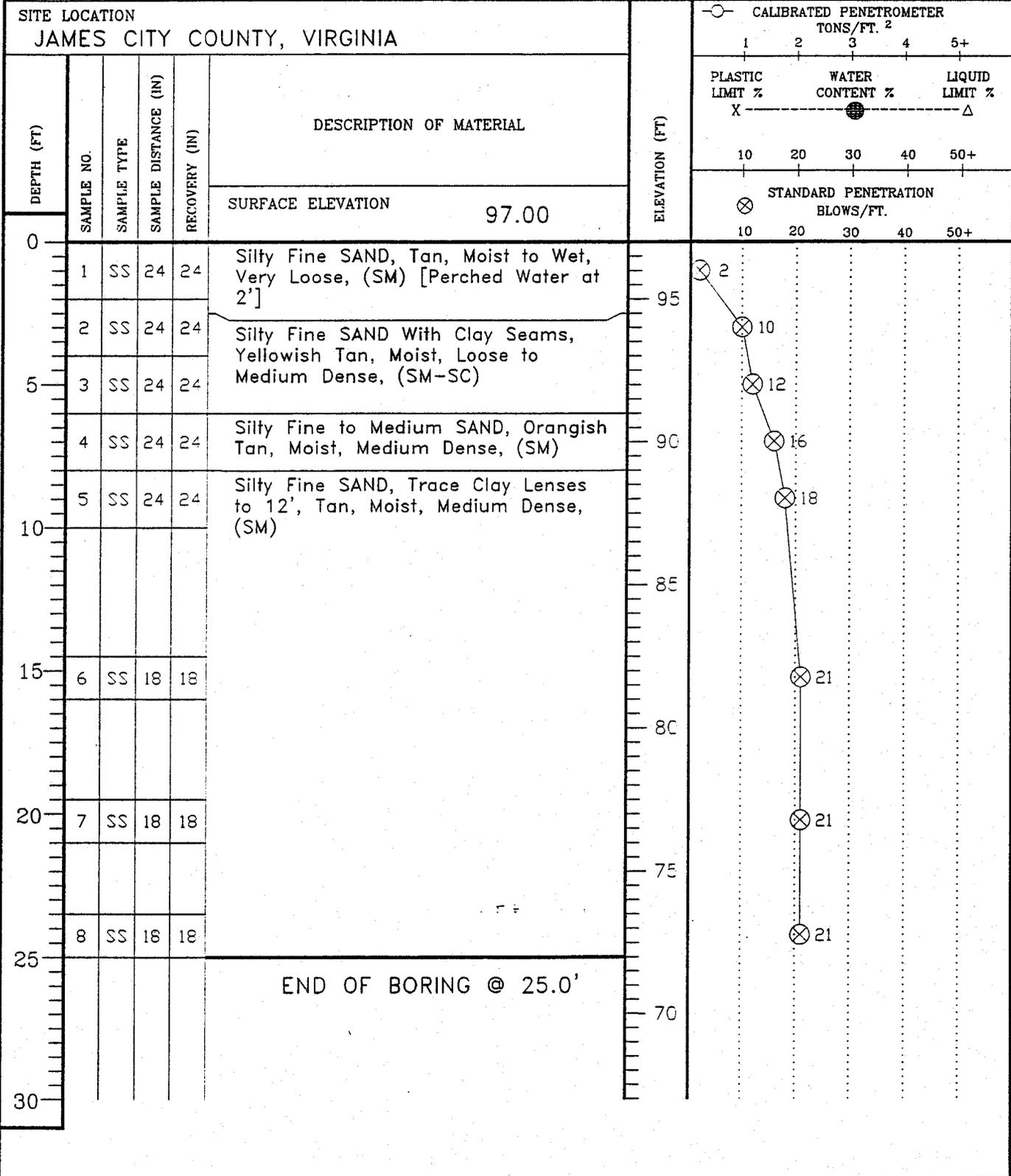


SITE VICINITY MAP
STONEHOUSE INDUSTRIAL SITE
JAMES CITY CO., VIRGINIA
ECS, LTD. PROJECT NO. 3.5020

APPENDIX II
Soil Boring Logs

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-1	SHEET 1 OF 1	
PROJECT NAME STONEHOUSE INDUSTRIAL SITE		ARCHITECT-ENGINEER		



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL				
WL	WS OR <input checked="" type="radio"/>	BORING STARTED	2-17-99	TOPSOIL DEPTH: 6"
WL	BCR	ACR	BORING COMPLETED	2-17-99
WL	DRY	RIG DVORAK FOREMAN ROBBIE		DRILLING METHOD HOLLOW STEM AUGER

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-2	SHEET 1 OF 1	ECS LTD
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			

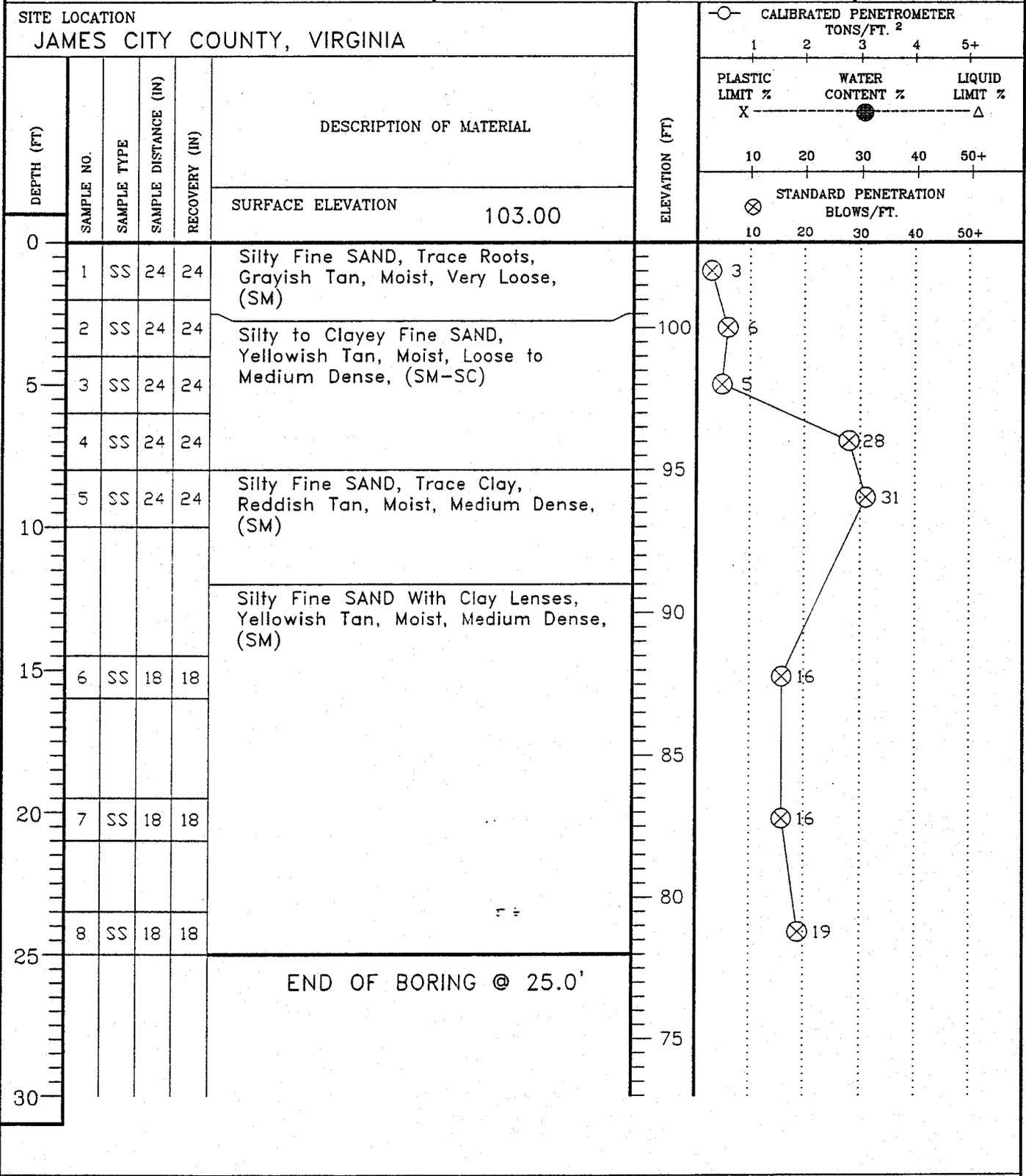
SITE LOCATION
JAMES CITY COUNTY, VIRGINIA

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ELEVATION (FT)	CALIBRATED PENETROMETER TONS/FT. ²			
							1	2	3	4
						PLASTIC LIMIT % X WATER CONTENT % ● LIQUID LIMIT % Δ 10 20 30 40 50+				
						STANDARD PENETRATION BLOWS/FT. ⊗ 10 20 30 40 50+				
0	1	SS	24	24	Silty Fine SAND, Light Tan, Moist,, Very Loose to Medium Dense, (SM)	95.00	⊗ 2			
	2	SS	24	24				⊗ 11		
5	3	SS	24	24	Silty Fine SAND, Trace Clay, Orangish Tan, Moist, Medium Dense, (SM)	90		⊗ 20		
	4	SS	24	24				⊗ 21		
10	5	SS	24	24	Silty Fine SAND, Trace Clay Lenses, Yellowish Tan, Moist, Medium Dense, (SP-SM)	85		⊗ 17		
15	6	SS	18	18		80		⊗ 20		
20	7	SS	18	18		75		⊗ 20		
25	8	SS	18	18		70		⊗ 15		
30	END OF BORING @ 25.0'									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

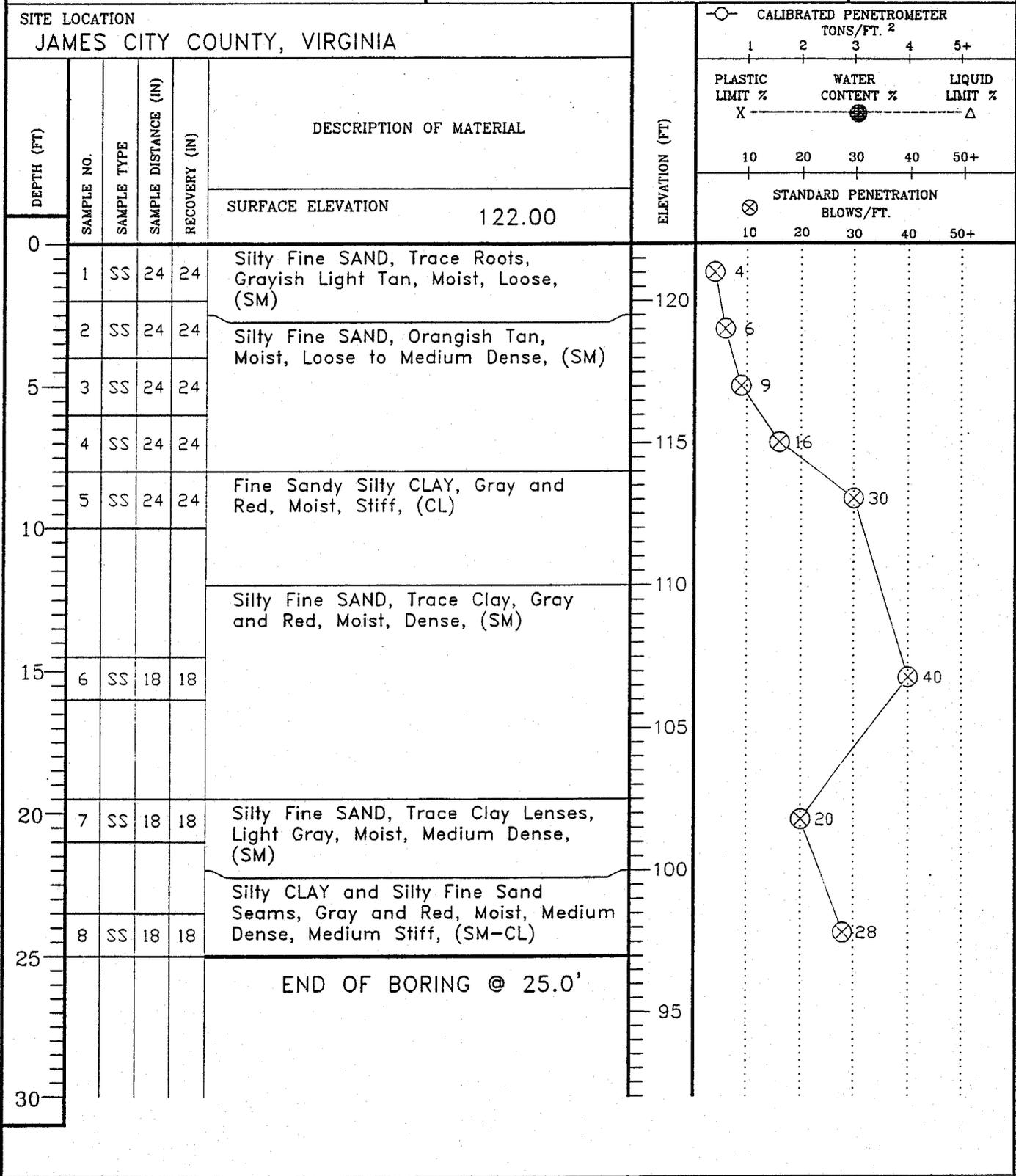
WL	WS OR WD	BORING STARTED	2-17-99	TOPSOIL DEPTH: 5"
WL	BCR	ACR	BORING COMPLETED 2-17-99	CAVE IN DEPTH @ 16.5'
WL DRY		RIG DVORAK	FOREMAN ROBBIE	DRILLING METHOD HOLLOW STEM AUGER

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-3	SHEET 1 OF 1	ECS LTD
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			



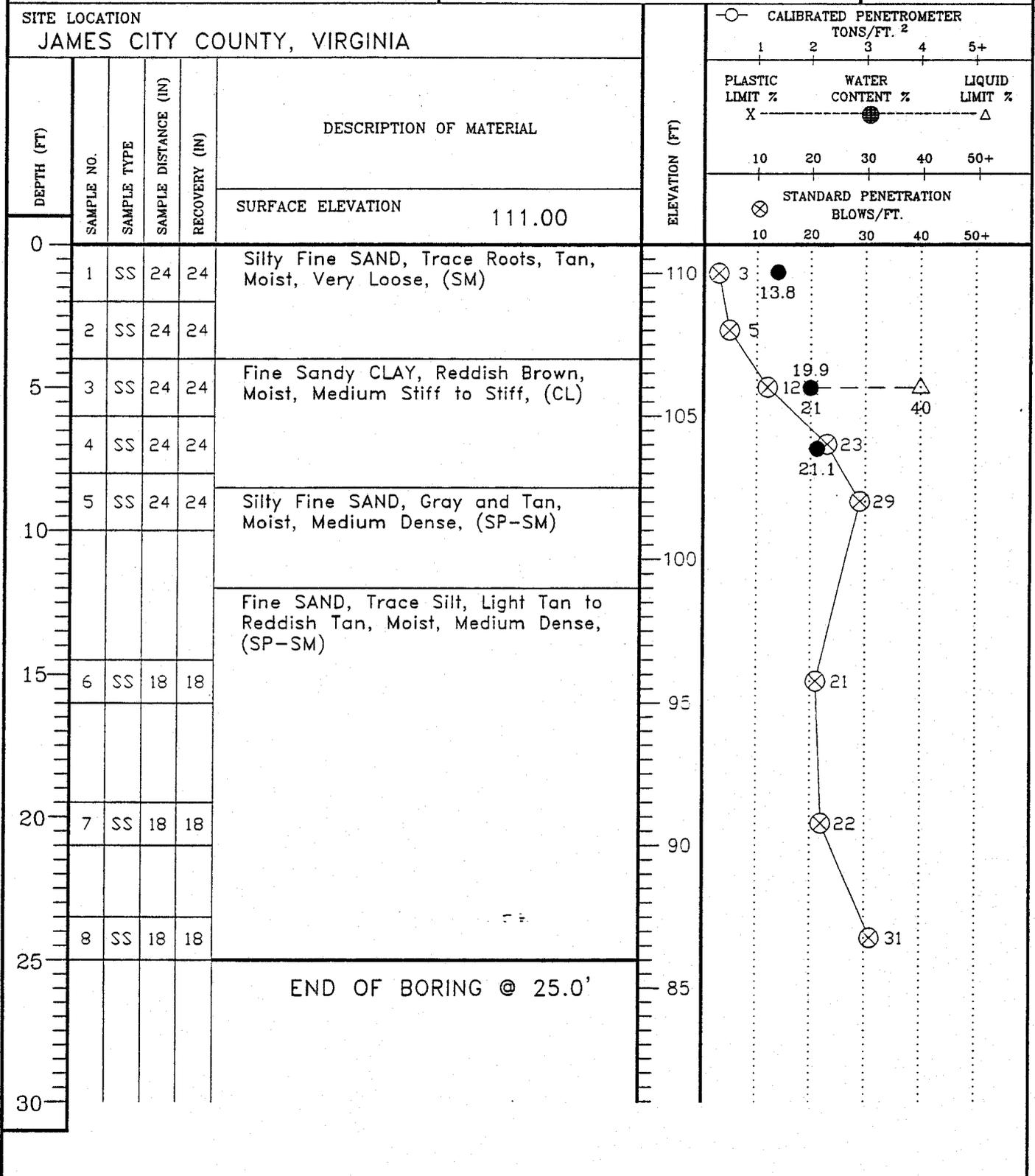
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL				
WL	WS OR (WD)	BORING STARTED	2-17-99	TOPSOIL DEPTH: 7"
WL	BCR	ACR	BORING COMPLETED 2-17-99	CAVE IN DEPTH @ 18.3'
WL	DRY	RIG DVORAK	FOREMAN ROBBIE	DRILLING METHOD HOLLOW STEM AUGER

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-4	SHEET 1 OF 1	ECS LTD
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			



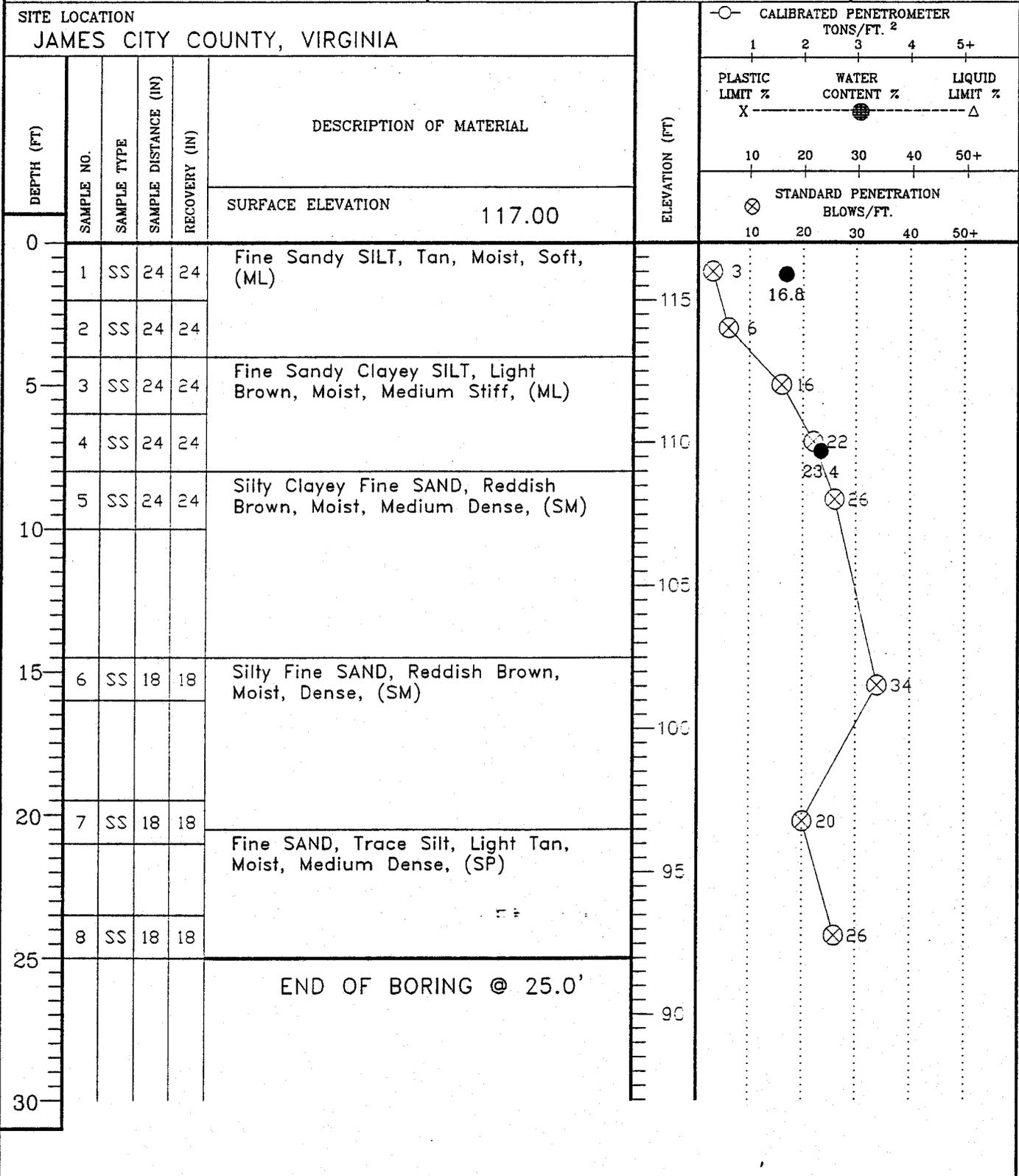
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL					
WL	WS OR	WD	BORING STARTED	2-17-99	TOPSOIL DEPTH: 6"
WL	BCR	ACR	BORING COMPLETED	2-17-99	CAVE IN DEPTH @ 17.3'
WL	DRY		RIG DVORAK FOREMAN	ROBBIE	DRILLING METHOD HOLLOW STEM AUGER

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-5	SHEET 1 OF 1	ECS LTD
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL					
WL	Contact @ 23.6'	WS OR <input checked="" type="radio"/>	BORING STARTED	2-16-99	TOPSOIL DEPTH: NONE
WL	BCR	ACR	BORING COMPLETED	2-16-99	CAVE IN DEPTH @ 17.2'
WL	DRY		RIG DVORAK	FOREMAN ROBBIE	DRILLING METHOD HOLLOW STEM AUGER

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-6	SHEET 1 OF 1	ECS LTD
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL					
WL	WS OR ϕ D	BORING STARTED	2-16-99	TOPSOIL DEPTH: 7"	
WL	BCR	ACR	BORING COMPLETED	2-16-99	CAVE IN DEPTH @ 16.0'
WL	DRY	RIG DVORAK	FOREMAN ROBBIE	DRILLING METHOD HOLLOW STEM AUGER	

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-7	SHEET 1 OF 1	
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			

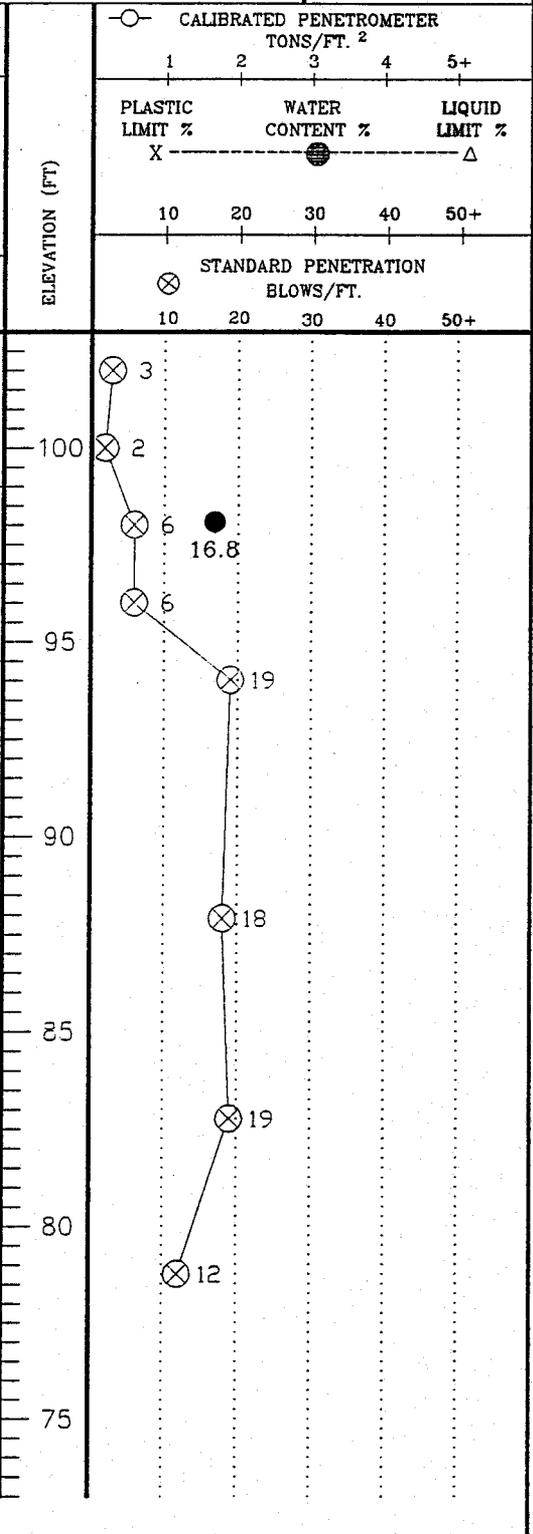
SITE LOCATION JAMES CITY COUNTY, VIRGINIA					ELEVATION (FT)					
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)		DESCRIPTION OF MATERIAL	1	2	3	4
SURFACE ELEVATION 96.00										
0	1	SS	24	24	Silty Fine SAND, Tan, Moist, Very Loose, (SM) [Saturated 2.0'-4.0']	95				
	2	SS	24	24			95			
5	3	SS	24	24	Silty Fine SAND, Trace Clay, Light Brown, Moist to Wet, Very Loose, (SM) [Trace Clay Lenses from 6.0']	90				
	4	SS	24	24			90			
10	5	SS	24	24	Silty Fine SAND With Clay Seams, Reddish Brown, Moist, Medium Dense, (SM) [Wet from 15.7']	85				
	6	SS	18	18			85			
15						80				
20	7	SS	18	18		75				
25	8	SS	18	18		70				
30	END OF BORING @ 25.0'					70				

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL					
WL	Perched @ 2.3' - 4" WS OR	BORING STARTED	2-16-99	TOPSOIL DEPTH: 4"	
WL	BCR ACR	BORING COMPLETED	2-16-99	CAVE IN DEPTH @ 18.2'	
WL	15.7'	RIG DVORAK	FOREMAN ROBBIE	DRILLING METHOD	HOLLOW STEM AUGER

OWNER STONEHOUSE, INC.	JOB # 5020	BORING # B-8	SHEET 1 OF 1	ECS LTD
PROJECT NAME STONEHOUSE INDUSTRIAL SITE	ARCHITECT-ENGINEER			

SITE LOCATION
JAMES CITY COUNTY, VIRGINIA

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL
0	1	SS	24	24	Fine Sandy SILT, Gray, Moist to Wet, Very Loose, (SM-ML) [Perched Water]
	2	SS	24	24	
5	3	SS	24	24	Silty to Clayey Fine SAND With Roots, Gray, Wet, Loose, (SM-SC) [Perched Water]
	4	SS	24	24	Fine Sandy CLAY, Light Gray, Moist to Wet, Soft to Medium Stiff, (CL) [Perched Water]
	5	SS	24	24	
10					Fine SAND, Trace Silt and Clay Lenses, Light Tan, Moist, Medium Dense, (SP-SM)
15	6	SS	18	18	
20	7	SS	18	18	
					Silty Fine SAND, Yellowish Tan, Wet, Medium Dense, (SM)
25	8	SS	18	18	
					END OF BORING @ 25.0'
30					

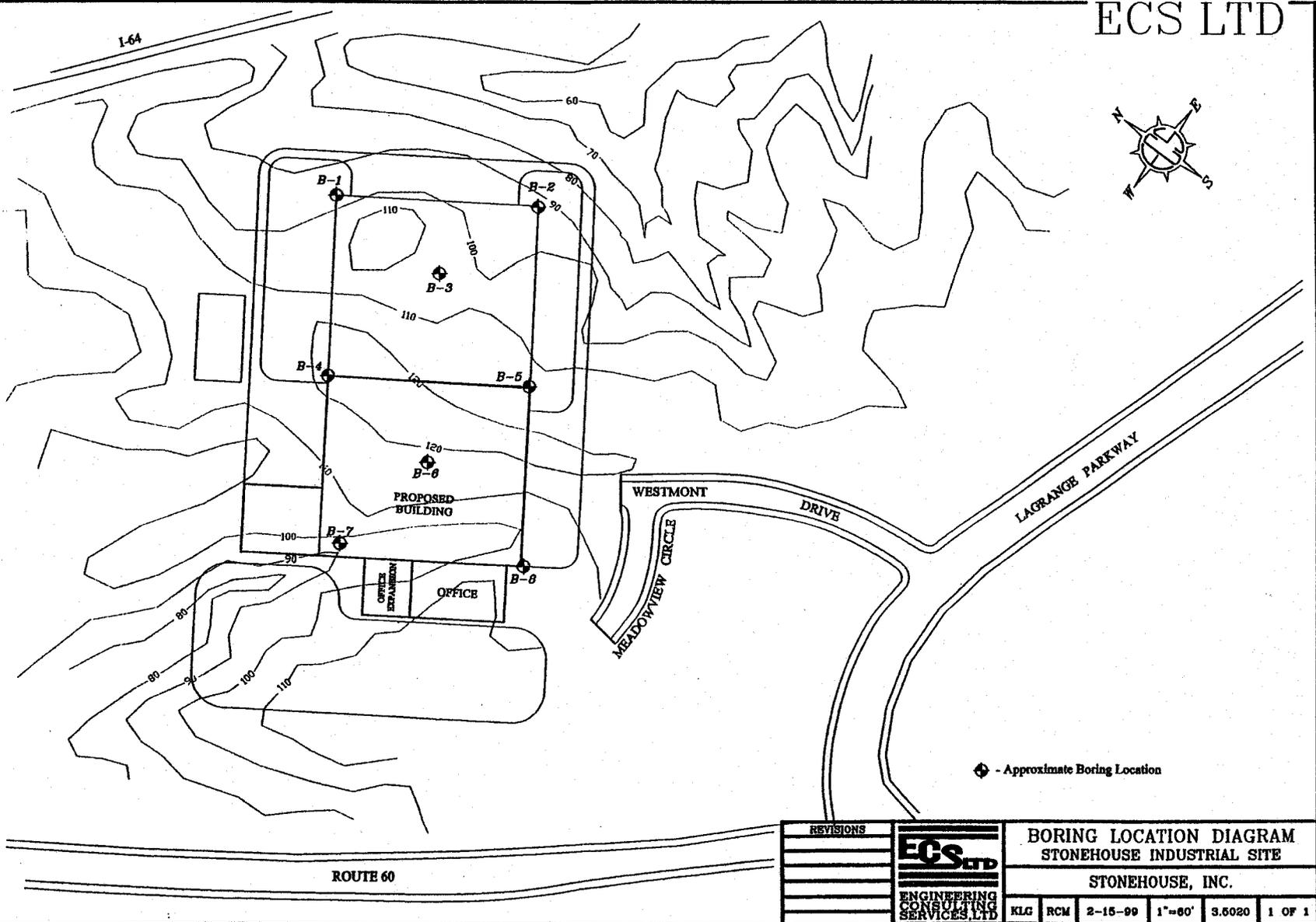


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL		
WL Perched @ 2-8.5' WS OR (WD)	BORING STARTED 2-16-99	TOPSOIL DEPTH: 6"
WL BCR ACR	BORING COMPLETED 2-16-99	CAVE IN DEPTH @ 22.0'
WL 22.0'	RIG DVORAK FOREMAN ROBBIE	DRILLING METHOD HOLLOW STEM AUGER

APPENDIX III
Boring Location Diagram

G:\DATA\DWG\REC20BLD.DWG Tue Feb 15 09:02:41 1999 Keith L. Green

ECS LTD



REVISIONS



BORING LOCATION DIAGRAM						
STONEHOUSE INDUSTRIAL SITE						
STONEHOUSE, INC.						
KLK	RCM	2-15-99	1"=60'	3.5020	1 OF 1	

APPENDIX IV

**Unified Soil Classification System
Reference Notes for Boring Logs**

Unified Soil Classification System (ASTM D-2487)

Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria					
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 per cent More than 12 per cent 5 to 12 per cent	GW, GP, SW, SP GM, GC, SM, SC Borderline cases requiring dual symbols ^b	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines				Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM ^a	d u			Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures			Atterberg limits below "A" line with P.I. greater than 7		
		Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW			Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	Not meeting all gradation requirements for SW
	SP			Poorly graded sands, gravelly sands, little or no fines					
	Sands with fines (Appreciable amount of fines)		SM ^a	d u	Silty sands, sand-silt mixtures	Atterberg limits above "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols		
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7				
	Fine-grained soils (More than half material is smaller than No. 200 sieve)		Silts and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	Plasticity Chart 			
		CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					
OL		Organic silts and organic silty clays of low plasticity							
Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts						
		CH	Inorganic clays of high plasticity, fat clays						
		OH	Organic clays of medium to high plasticity, organic silts						
Pt		Peat and other highly organic soils							

^a Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.
^b Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

From Winterkorn and Fang, 1975

REFERENCE NOTES FOR BORING LOGS

I. Drilling and Sampling Symbols:

SS - Split Spoon Sampler	DC - Dutch Cone Penetrometer	PM - Pressuremeter	BS - Bulk Sample of Cuttings
ST - Shelby Tube Sampler	PA - Power Auger (no sample)	WS - Wash Sample	RB - Rock Bit Drilling
RC - Rock Core; NX, BX, AX	HSA - Hollow Stem Auger		

Standard Penetration Test (SPT) refers to the blows per foot of a 140 lb hammer free falling 30 inches on a 2 in. O.D. split-spoon sampler, as specified in ASTM D-1586. The SPT blow count is commonly referred to as the N-value. Typically the split-spoon sampler is driven to depths of 18 to 24 inches. The SPT result, N-value, is commonly determined by summing the second and third 6-inch increments.

II. Correlation of Penetration Resistances to Soil Properties:

COHESIVE SOILS

(CLAY, SILT and COMBINATIONS)

CONSISTENCY	SPT, N (Blows/Foot)	UNDRAINED SHEAR STRENGTH C, (PSF)
VERY SOFT	< 2	<250
SOFT	3 - 5	250 - 500
MEDIUM STIFF	6 - 10	500 - 1000
STIFF	11 - 15	1000 - 2000
VERY STIFF	16- 30	2000 - 4000
HARD	> 31	> 4000

NON-COHESIVE SOILS

(SAND, GRAVEL, SILT and COMBINATIONS)

DENSITY	SPT, N (Blows/Foot)	RELATIVE DENSITY (%)
VERY LOOSE	< 5	0 - 15
LOOSE	6 - 10	16 - 35
MEDIUM DENSE	11 - 30	36 - 65
DENSE	31 - 50	66 - 85
VERY DENSE	51 - 80	86 - 98
EXTREMELY DENSE	> 81	99 - 100

[Particle Size Identification]:

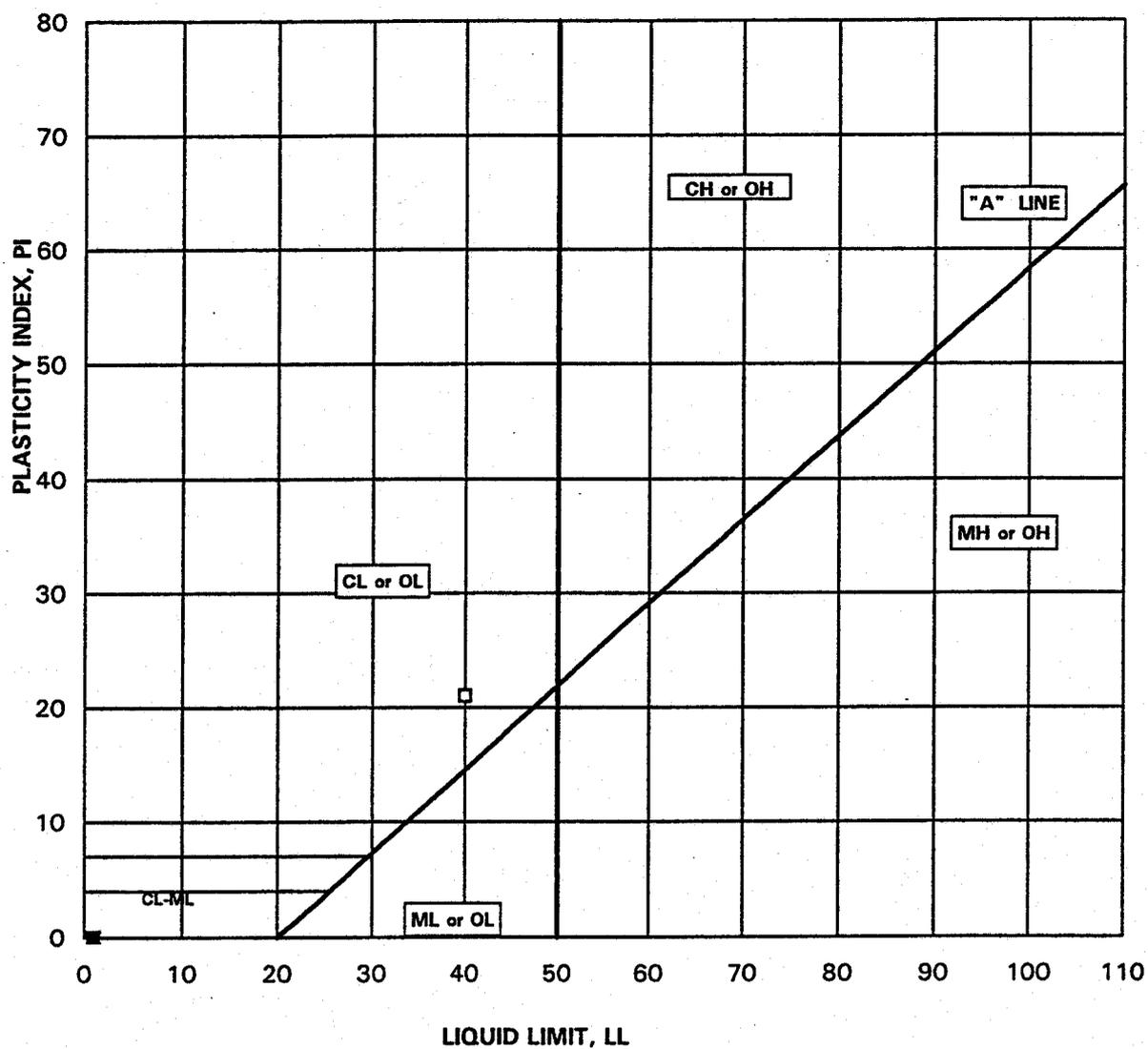
- Boulders: 8 inch diameter or more
- Cobbles: 3 to 8 inch diameter
- Gravel:
 - Coarse 1 to 3 inch
 - Medium 1/2 to 1 inch
 - Fine 1/4 to 1/2 inch
- Sand:
 - Coarse 2.00 mm to 1/4 inch (diameter of pencil lead)
 - Medium .42 mm to 2.00 mm (diameter of broom straw)
 - Fine .074 mm to .42 mm (diameter of human hair)

III. Water Level Measurement Symbols:

WL - Water Level	WS - While Sampling	WD - While Drilling	ACR - After Casing Removal
WCI - Wet Cave In	DCI - Dry Cave In	BCR - Before Casing Removal	

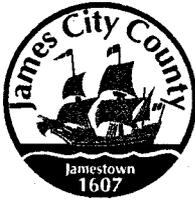
The water levels are those water levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids in a granular soil. In clays and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases additional methods of measurement are generally applied.

APPENDIX V
Summary of Laboratory Test Data



BORING/ SAMPLE No.	DEPTH (feet)	TEST SYMBOL	DESCRIPTION	WATER CONTENT			
				(%)	LL	PL	PI
B-5 / S-3	4.0 - 6.0	□	Reddish Brown fine Sandy CLAY (CL)	19.9	40	19	21
/		■		-	-	-	-
/		△		-	-	-	-
/		▲		-	-	-	-
/		X		-	-	-	-
/		○		-	-	-	-
/		●		-	-	-	-
/		◇		-	-	-	-
/		◆		-	-	-	-
/		+		-	-	-	-
/		X		-	-	-	-

Project: Stonehouse Industrial Site	Engineering Consulting Services Ltd.
Project No: 03:5020	Richmond, Virginia
Date: 2/18/99	Plasticity Chart



DEVELOPMENT MANAGEMENT

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ENVIRONMENTAL DIVISION
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environ@james-city.va.us

PLANNING

(757) 253-6685

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COUNTY ENGINEER

(757) 253-6678

INTEGRATED PEST MANAGEMENT

(757) 253-2620

July 22, 2002

Ms. Monica Francesconi
Environmental Coordinator
John Deere Vehicle Group
P.O. Box 3540
Williamsburg, Va. 23187-3540

Re: John Deere Complex
Project Closeout

Dear Ms. Francesconi:

In response to your recent request relative to closing out permits for the above referenced project, the Environmental Division has reviewed active and record file information and considers the following projects as "active" at the John Deere complex:

<u>County Plan No.</u>	<u>Project Description</u>
SP-47-99	John Deere Vehicle Group Facility
SP-108-00	Gator Demonstration Track
SP-107-01	Outparcel Building Addition

The main site plan, which is the John Deere Vehicle Group Facility (SP-47-99), had four (4) onsite wet pond stormwater management/best management practices (BMP) facilities constructed as part of the stormwater management plan for the overall plan of development. For clarity purposes, I have listed BMP information for your use:

<u>Basin</u>	<u>Location</u>	<u>Assigned County BMP ID Code</u>
Stormwater Basin A	Northwest Corner of Site	WC 055
Stormwater Basin B	North of Main Building	WC 056
Stormwater Basin C	North of Outparcel Building	WC 057
Stormwater Basin D	East of Gator Track	WC 058

Based on our review of the project, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility at the site. In general, it consists of receiving proper certification information and addressing any construction-related items associated with the BMPs as well as addressing any remaining "site-related" issues, such as any drainage or erosion problem areas found with any of the three sites listed above.

Record Drawing and Construction Certifications:

Note # 18 on Sheet 12 of the approved plan required as-built drawings and construction certification for the detention/BMP facilities. Note # 7 on Sheet 3 of the approved plan required construction certification of the detention/BMP facilities upon completion. Therefore, as-builts and construction certification are required for each of the facilities. None were received. To aid in understanding current submittal requirements for record (as-built) drawings and construction certifications, I previously forwarded a copy of the information packet entitled *James City County, Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms and Instructions*.

Once information as such is received for all the facilities, we can proceed with the final field inspection of all four stormwater management facilities. A final field inspection will determine if any construction-related items are necessary for completion. Construction-related items for wet pond facilities may consist of, but are not limited to, the following: the removal of obstructions such as debris, litter, trash, sediment, vegetation, etc. from any incoming pipes or channels and/or principal or emergency spillways for the ponds; removal of trees, shrubs or woody vegetation from constructed earthen embankments; repair of erosion or bare soil areas on fill embankments or interior graded side slopes of the ponds, stabilization of any denuded areas associated with BMP construction or correction of items not constructed or built in accordance with the approval plans or specifications. When performing the final inspection, we will consider normal wear and tear associated with the age of the facility in determination of construction-related items that need performed. Action would only normally be required for any detrimental conditions that affect stormwater function or structural integrity of the BMPs. *(Note: It is our normal process to not proceed with final inspection of stormwater management facilities until such time as the record drawings and construction certifications are received, reviewed and compared for consistency to approved design plan requirements; however, based on the plant's current situation, our division will consider advance inspections to help expedite the process, if desired.)*

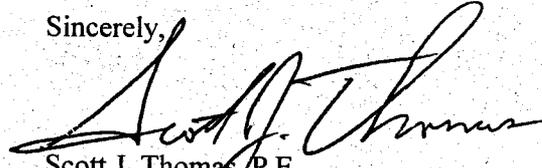
Once the final inspection is completed, you will be informed if any construction (field) related items are present or need addressed for the four BMPs. If the record drawings and construction certification are found to be satisfactory and no construction-related items are present, or if construction-related items present are properly addressed, we can proceed with final release of the surety on the project.

Site Issues:

Any remaining site erosion or drainage problem areas would also need to be resolved prior to full release of surety being held for erosion and sediment control purposes. This includes those items already conveyed to Kevin Kolda, Facilities Engineer, via inspection reports by our assigned inspector, Jim Rudnicki, or those that may be present upon final inspection of the site or upon final inspection of the BMPs. Recent inspection reports from our division included directives to repair riprap at the outfall from Basin A, remove inlet protections around the Outparcel Building and stabilize various slopes associated with the Gator Demonstration Track project. As of the date of this letter, these items have not been started nor completed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Jim Rudnicky, at 757-259-4026 if you have any further comments or questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott J. Thomas". The signature is fluid and cursive, with a large initial "S" and "T".

Scott J. Thomas, P.E.
Senior Engineer
Environmental Division

G:\SWMProg\AsBuilts\SP4799.wc055

Scott Thomas

From: Darryl Cook
Sent: Thursday, July 18, 2002 7:33 AM
To: Scott Thomas; Pat Menichino; Jim Rudnicky; Gerry Lewis
Cc: Joan Etchberger
Subject: RE: John Deere Permits

We should proceed as we normally do - I'm not sure there is anything else we can do even tho the plant is closing. Send a letter telling them what we need regarding the BMP AB and CC (I feel like I'm working for the Army again - all these acronyms). I would include in the letter what we need to close out the projects and release the surety. The AB and CC are just part of what they need to do to finish. I think that Jim has done some of that notification work on the E&S deficiencies so we should mention in the letter which items we have already notified them of. If there are any additions to the site work because of work related to the BMP closeouts, we can give them a heads-up in the letter that any land disturbing that occurs incidental to the BMP closeout work will need to be corrected and stabilized before bond release.

-----Original Message-----

From: Scott Thomas
Sent: Wednesday, July 17, 2002 5:21 PM
To: Darryl Cook; Pat Menichino; Jim Rudnicky; Gerry Lewis
Cc: Joan Etchberger
Subject: John Deere Permits

Yesterday I got a call from Monica Francesconi, Environmental Coordinator with John Deere Vehicle Group (564-2643).

She stated that in lieu of the plant closing, they are trying diligently to close out all permits associated with the facility. We discussed the site briefly and I told her that I would need to sort through the project information and get back to her.

Following our conversation, I looked at the files and discussed it with Joan, Jim and Gerry. It appears the following three projects are still considered "active" as we still hold E&SC surety:

SP-47-99	John Deere Vehicle Group (Main Site & BMPs)	\$275,000
SP-108-00	Gator Demonstration Track	\$ 50,000
SP-107-01	Outparcel Building Addition	\$ 0 Rider to Main Site

In researching the main site, there are 4 BMPs that were constructed as part of the original main site track under SP-47-99. These BMPs are Stormwater Basins A, B, C & D. The onsite BMPs were not inventoried into the databases therefore, I initially presumed that as-builts and construction certifications were never received. In talking with Gerry and researching the files, this appears to be the case.

As-builts (AB) and construction certifications (CC) were definitely required for each of the onsite BMPs and projects. The following are ways that I have confirmed the need for AB and CC based on file information:

Original Plan (SP-47-99)

1. Env Div comment # 3 dated April 27th 1999 required AB and CC.
2. Engineers response to Env Div comment # 3 stated AB will be provided and notes were added to the plan to require CC.
2. Note 7 on Sheet 3 of the plan required CC of BMPs upon completion.
3. Note 18 on Sheet 12 required AB and CC.

Gator Demo Track (SP-108-00)

Drains to Basins C & D. Note 19 on Sheet 3 required AB & CC.

Outparcel Addition (SP-107-01)

Drains to Basin C. Note 20 on Sheet C3 required AB & CC.

As you can see the need for AB and CC is well documented. I have also cleaned out the files of stormwater/drainage information and assigned BMP ID Code numbers, created as-built files and input each of the BMPs into the GIS and Access databases.

WC 055	Stormwater Basin A	NW corner of site
WC 056	Stormwater Basin B	North of Main Building
WC 057	Stormwater Basin C	North of Outparcel Building
WC 058	Stormwater Basin D	East of Gator Track

I need to respond back to Monica ASAP on what remains to close the projects. I would need to know if we should proceed as usual, or if due to the plant closing, there would be any special requirements imposed on these projects. With the uncertainty of who may occupy the property in the future, I feel it is warranted to ensure that we proceed in the usual fashion to obtain and review as-builts and construction certifications, perform a final field inspection of the BMPs and have them perform any field (construction) related items as necessary (ie. trees, sediment removal, conversion, etc.).

Also, I think it would be best to send a letter to Monica, outlining specifically what remains to close the projects or release the bonds. This would include requesting as-builts and construction certifications for the facilities. I am not sure how to handle any "site" issues that Jim may have, whether it is best to outline those in the letter or wait till we perform final inspections on the BMPs as there may construction-related issues for the ponds. It appears that some recent inspection reports were issued for the project.

Any suggestions on how to proceed within the relatively short time frame available, both from the BMP and site perspective?

Scott

Scott Thomas

From: Jim Rudnicky
Sent: Thursday, July 18, 2002 8:21 AM
To: Scott Thomas; Darryl Cook; Pat Menichino; Gerry Lewis
Cc: Joan Etchberger
Subject: RE: John Deere Permits

As a followup to this note - I issued inspection reports to fix a riprap outfall from Basin A, remove inlet protections and stabilize slopes on the gator track. As of Tuesday this work has not been started.

Jim

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Scott

JOHN DEERE VEHICLE GROUP

P.O. Box 3540 • WILLIAMSBURG, VA 23187-3540 • TEL 757-564-2500 • FAX 757-564-2599



05-29-02

TO: Mr. Scott Thomas,
RE: VPDES General Permit Notice of Termination [VAR4]
Permit #VAR450031

Scott,

If you have any questions regarding this Notice of Termination, please contact me at 757-564-2643.

Thank you,

Monica Francesconi
Environmental Coordinator

CARLISLE ASSOCIATES INC.
ARCHITECTS/ENGINEERS
 POST OFFICE BOX 11528
 1015 GERVAIS STREET
 COLUMBIA, SOUTH CAROLINA 29211
 (803) 252-3232
 (803) 799-9054 FAX

FACSIMILE TRANSMITTAL SHEET

To: Darryl Cook, PE	From: Gene Resch
Company: JCC Environmental Division	Date: June 15, 1999
Fax Number: 757-253-6850	Total No. Of Pages Including Cover: 1
Phone Number: 757-253-6673	Project Name: Project Columbia
Re: Revised Drawings	Project Number: D48

URGENT FOR REVIEW PER YOUR REQUEST PLEASE REPLY HARD COPY TO FOLLOW IN MAIL

NOTES/COMMENTS:

Darryl:

I wanted to make sure that you received the latest revised sheet 010 which showed the anti-seep collars on the pond outlet pipes for Ponds "B" & "C". Once you have reviewed the drawings, we would like to know when the contractor can begin work on the pond embankments.

Also, after discussions with the grading contractor I want to make sure that everyone has the same understanding of the drawings, and the expectations of James City County. Therefore, we would like answers to the following questions:

- On sheet 03, there is a note which permits substitution of HDPE pipe for RCP. Will JCC accept HDPE pipe for the pond outfall pipes? - *what about riser?*
- If RCP is required on the outfall pipes, must the joints be O-Ring type? - *Yes*
- We have indicated on Sheet 010, CMP anti-seep collars to be installed on the outfall pipes of Pond "B" & "C". Will JCC accept CMP anti-seep collars around HDPE, (if HDPE is acceptable), or RCP pipe? - *prefer same meth as pipe*

Gene Resch

cc: Chris Brinkley, MB Kahn

Date Record Created: [REDACTED]

WS_BMPNO:

WC057

Print Form

Created By: [REDACTED]

WATERSHED WC
 BMP ID NO 057
 PLAN NO SP-47-99
 TAX PARCEL (12-1)(1-45)
 PIN NO 1210100045
 CONSTRUCTION DATE 1/1/2000
 PROJECT NAME John Deere Vehicle Group
 FACILITY LOCATION 3000 John Deere Road
 CITY-STATE
 CURRENT OWNER
 OWNER ADDRESS
 OWNER ADDRESS 2
 CITY-STATE-ZIP CODE
 OWNER PHONE
 MAINT AGREEMENT No
 EMERG ACTION PLAN No

**PRINTED ON:
 Friday, March 12, 2010
 3:28:40 PM**

MAINTENANCE PLAN No
 SITE AREA acre
 LAND USE
 old BMP TYP Wet Pond
 JCC BMP CODE A2 Wet Pond
 POINT VALUE

CTRL STRUC DESC
 CTRL STRUC SIZE inches
 OTLT BARRL DESC
 OTLT BARRL SIZE inch

SVC DRAIN AREA acres 10

EMERG SPILLWAY No
 DESIGN HW ELEV
 PERM POOL ELEV
 2-YR OUTFLOW cfs 0.00
 10-YR OUTFLOW cfs 0.00
 REC DRAWING No

SERVICE AREA DESCRI

IMPERV AREA acres 0.00

CONSTR CERTIF No

RECV STREAM

EXT DET-WQ-CTRL No

LAST INSP DATE Inspected by: [REDACTED]

WTR QUAL VOL acre-ft

INTERNAL RATING

CHAN PROT CTRL No

MISC/COMMENTS

CHAN PROT VOL acre-ft

Basin C north of outparcel bldg.

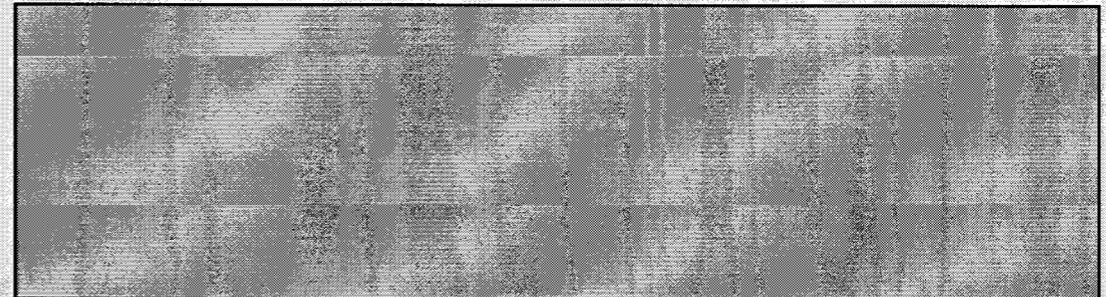
SW/FLOOD CONTROL No

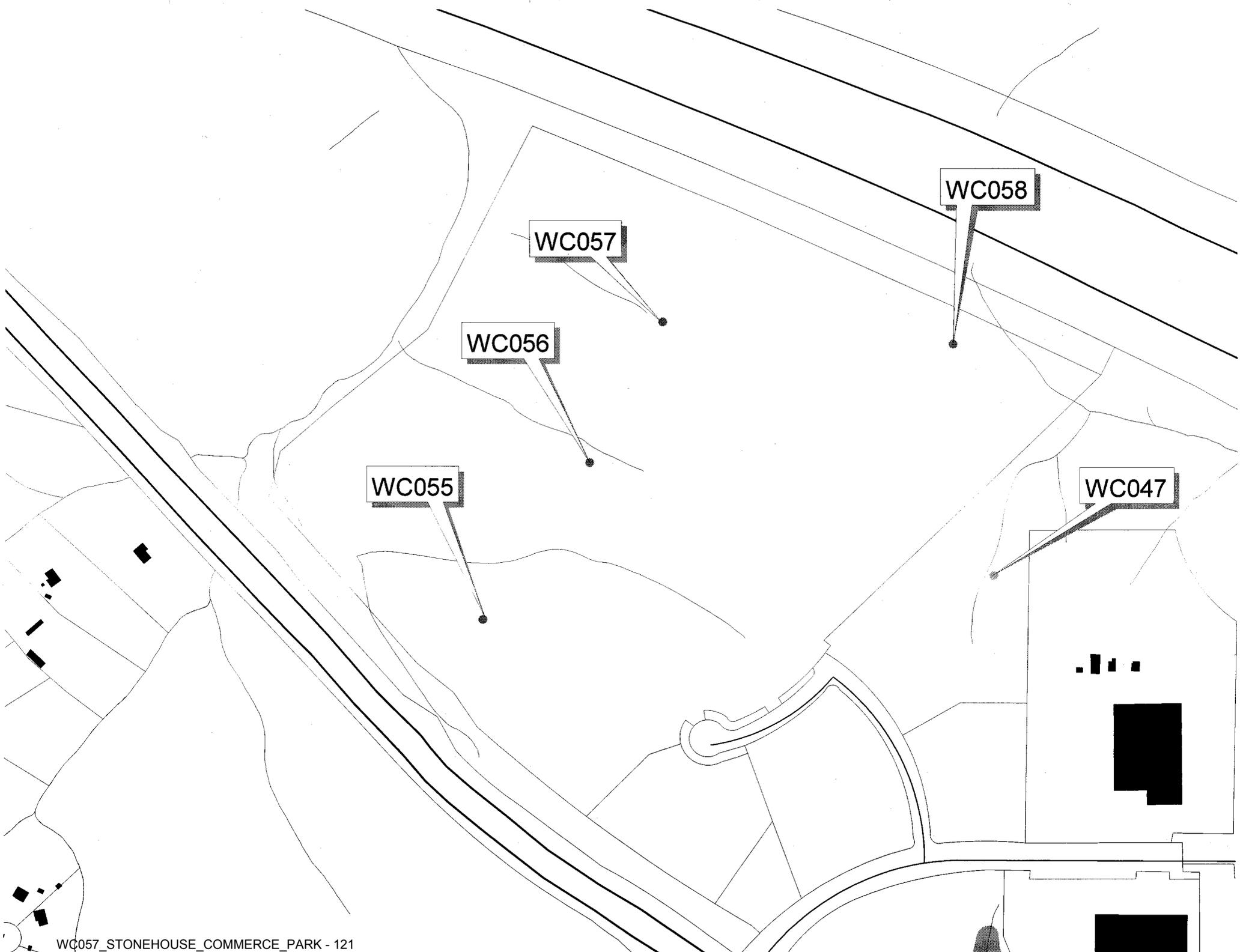
GEOTECH REPORT No

Get Last BMP No

Return to Menu

Additional Comments:





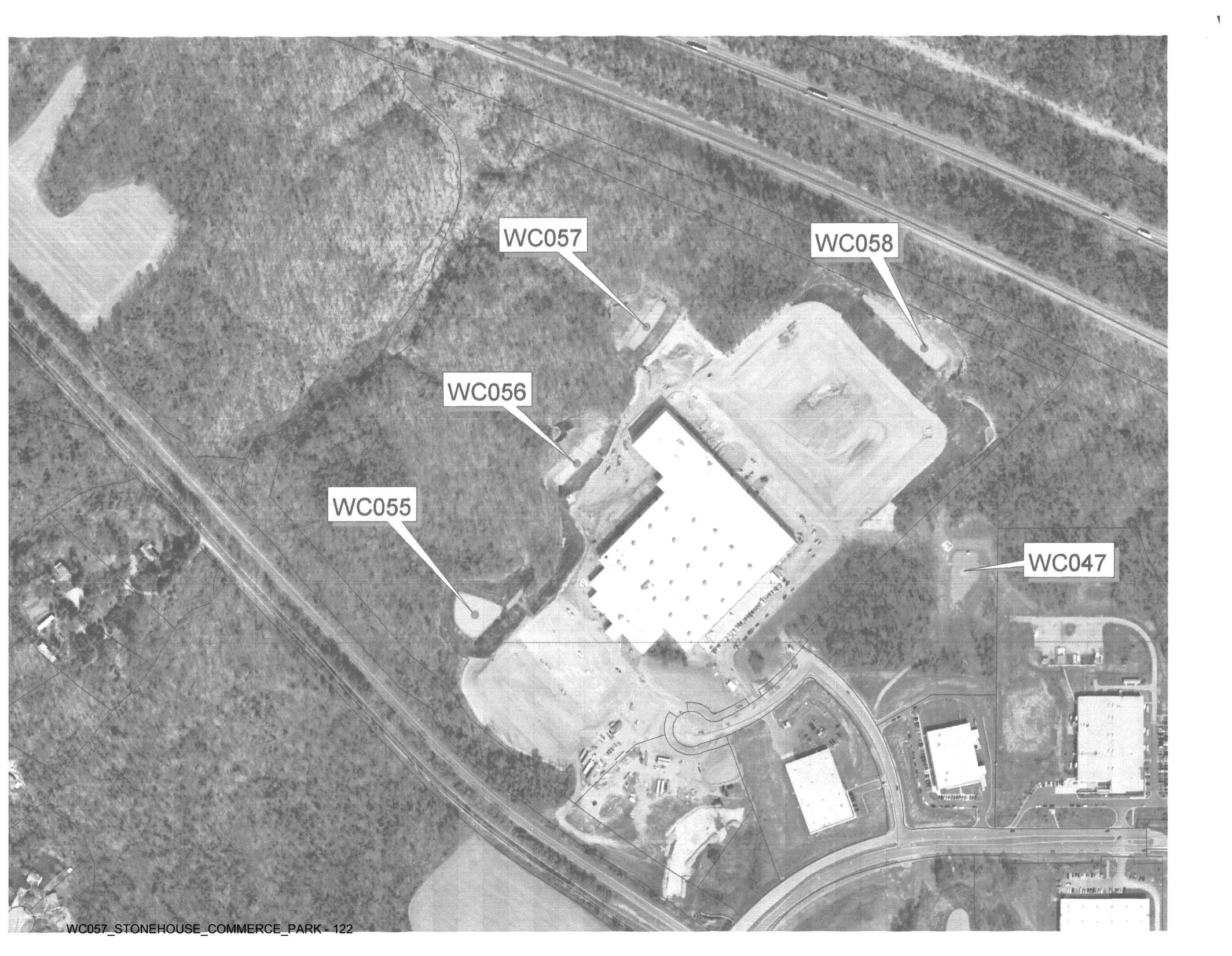
WC058

WC057

WC056

WC055

WC047



WC057

WC058

WC056

WC055

WC047

Gene Roach - John Deere -

4/12/00

8th bay would add 0.55 ac imp. to WS-105 + 155

- see A-1

13 structure is gone

calcs show that there is 13,000 ft² extra available even with the extra parking bays.

See information dated 10/18/99

JOHN DEERE DRAINAGE PLAN

2/4/00
DEC

STORMWATER BASIN "A"

TOTAL Watershed = 18.0 ac

WS-106, 116 & 117 cover a portion of the Design MASTERS' SITE

Basins were designed as 1-year storm attenuation basins -
No Water Quality included as drainage is to Richardsons
MILL Pond

- Design Assumptions

WS-106	RCN = 82	A = 0.4 ac
WS-116	RCN = 83	A = 0.5 ac
WS-117	RCN = 88	A = 1.4 ac

Al Hutchens - President

▲ Old access to graveyard.

D Ensure Access to back pond.

Monica Francesconi
757-564-2643
ENV COORDINATOR
John Deere Vehicle Group

P.O. Box 3540
WMBG VA.
23187-3540

Const Permit

① Monica
John Deere, Toano
sw/bmp rope packet
Const Permit
757-564-2643

① Building
② Const Activities
Test Track

② Bambi 11:00 AM

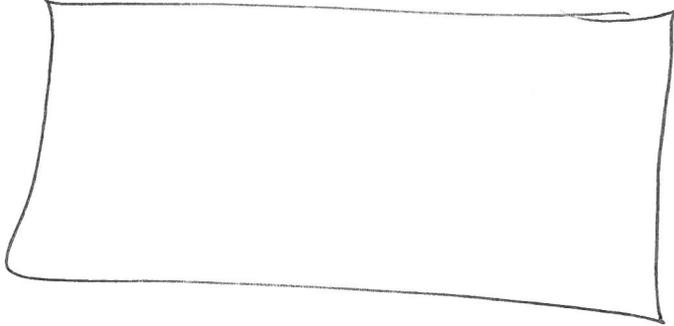
Bvk Lane
• end of March
• send in forms

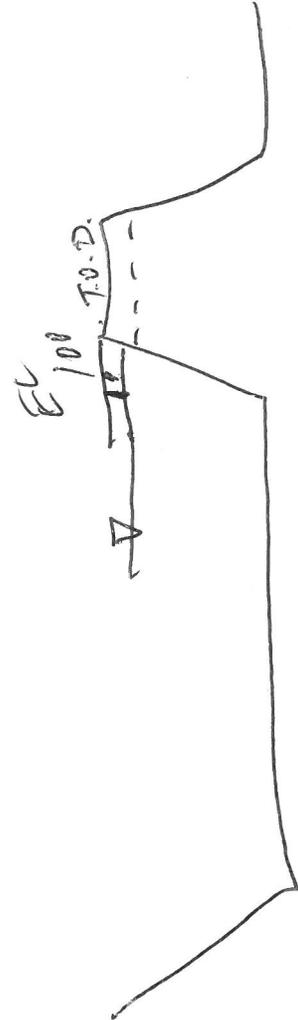
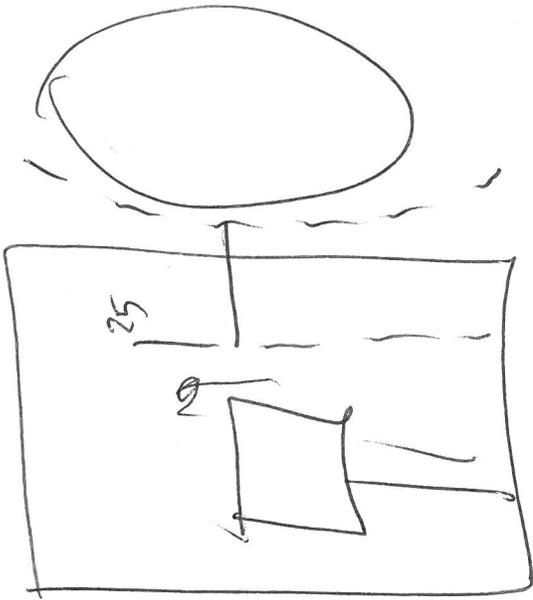
Construction

- closing plant
- Const Permit

- Test Track
- Storage Building

4 BMPs
A, B, C & D





MAIN SITE ^{Phase III} Approved 10/29/99
SP-47-99 John Deere Vehicle Group Facility

3000 Meadowview Circle Toano VA. 23168

Required ⁴abtcc Comment 3 April 27 1999 SP-47-99

Comment 2 need i/m Agreement

Ponds B+C

A, B, C + D

Basin A

John Deere Vehicle Group

DA=18.0AC.

GPIN 1210/00045

1-YEAR STORM ATT
w/ WC

3000 John Deere Road
TOANO, VA.

i/m June 3 1999

WACHOVIA CAPITAL INVESTMENTS INC.
74.37 AC.

Note 7 sheet 3 of 13
(01-C300) upon completion.

PC DVD Commercial

Parcel A sit Comm PARIC

Note #18 sheet 12 of 13 (01-C703 R4)

AD Pumps must be provided for all det/bmp FAC.

Also upon completion, the users for all det/bmp
facilities shall be certified by a PE...

056 WC SW Basin A NW Corner WC 055

057 WC SW Basin B North Manor Blvd WC 056

057 WC SW Basin C NORTH of Outpost Bldg. WC 057

058 WC SW Basin D East Corner WC 058

Gary Vico.

487-3441

SP-107-01 outparcel Addition (TO BASIN C)

Note 20 Sheet C 3 required AB+CC

SP-108-01 GATOR Demo Tract (AT BASIN C & D)

Note 19 Sheet 3 AB+CC are required.

Surety by Site Name

SURETY	SUBDIVISION		SURETY	SILTATION		NAME
	RELEASED?	EXPIRATION		RELEASED?	EXPIRATION	
\$0	<input type="checkbox"/>		BOND	\$275,000	<input type="checkbox"/>	JOHN DEERE
\$0	<input type="checkbox"/>		Bond	\$50,000	<input type="checkbox"/>	JOHN DEERE - GATOR DEMONSTRATION TRACK
\$0	<input type="checkbox"/>		\$0		<input type="checkbox"/>	JOHN DEERE - OUTBUILDING ADDITION

Number Listed: 3

MAIN SITE SP-47-99 \$275,000
 OUTBUILDING ADDITION SP-107-01 \$0
 GATOR DEMO TRACK SP-108-00 \$50,000 RISK TO SP-47-99

Project: JOHN DEERE - OUTBUILDING ADDITION	
Site Plan No: SP-107-01	Geo No: <input type="text"/>
LD Permit No: <input type="text"/>	Fiscal Year: <input type="text"/>
Fee Paid? <input type="checkbox"/> Fee Due: \$0	Acres Disturbed: 0 Declaration Covenant
Date Paid: <input type="text"/>	LD Issue Date: <input type="text"/> Required: No
Released? <input type="checkbox"/> Release Date: <input type="text"/>	LD Expire Date: <input type="text"/> Received: <input type="checkbox"/>
Comments: <input type="text"/> Notations	LD Comment: <input type="text"/>
FEES NOT PAID AS OF 10/30/01-DISTURBED AREA NOT LISTED ON PLAN.	Cert Const? No CC Iss Date: <input type="text"/>
	CC Expiration Date: <input type="text"/>
	CC Comment: <input type="text"/>
Subdivisions	
Issue Date: <input type="text"/> Agreement? No	
Surety: <input type="text"/>	
Surety Type: <input type="text"/> Amount: \$0	
Notation: <input type="text"/> Surety Released? <input type="checkbox"/>	
Expiration Date: <input type="text"/>	
Comment: <input type="text"/>	
Surety Number: <input type="text"/>	
Surety Company: <input type="text"/>	
Siltation	
Agreement? Yes Surety: <input type="text"/>	
Surety Type: <input type="text"/> Amount: \$0	
Notation: <input type="text"/> Surety Released: <input type="checkbox"/>	
Expiration Date: <input type="text"/>	
Comments: <input type="text"/>	
Surety Number: <input type="text"/>	
Surety Company: <input type="text"/>	
Delete Record	Undo Record
Last Permit No	Add Record
Find Record	Save Record
Menu Screen	

Project: JOHN DEERE - GATOR DEMONSTRATION TRACK			
Site Plan No: SP-108-00	Geo No: <input type="text"/>	LD Permit No: 99-76	Fiscal Year: 1999
Fee Paid? <input checked="" type="checkbox"/>	Fee Due: \$1,800	Acres Disturbed: 0	Declaration Covenant
Date Paid: 8/29/2000		LD Issue Date: 10/15/2000	Required: No
Released? <input type="checkbox"/>	Release Date: <input type="text"/>	LD Expire Date: 8/1/2002	Received: <input type="checkbox"/>
Comments:	Notations	LD Comment: INCLUDED IN JOHN DEERE PLANT PMT	
FILED IN JOHN DEERE PLANT		Cert Const? No	CC Iss Date: <input type="text"/>
		CC Expiration Date: <input type="text"/>	
		CC Comment: <input type="text"/>	
Subdivisions			
Issue Date: <input type="text"/>	Agreement? No	Siltation	
Surety: <input type="text"/>		Agreement? Yes	Surety: <input type="text"/>
Surety Type: <input type="text"/>	Amount: \$0	Surety Type: Bond	Amount: \$50,000
Notation: <input type="text"/>	Surety Released? <input type="checkbox"/>	Notation: <input type="text"/>	Surety Released: <input type="checkbox"/>
Expiration Date: <input type="text"/>		Expiration Date: <input type="text"/>	
Comment: <input type="text"/>		Comments: RIDER BOND TO JOHN DEERE PLANT	
Surety Number: <input type="text"/>		Surety Number: BR 71673	
Surety Company: <input type="text"/>		Surety Company: JOHN DEERE INSURANCE CO	
Delete Record	Undo Record	Last Permit No	Add Record
			Find Record
			Save Record
			Menu Screen

Project: JOHN DEERE			
Site Plan No: SP-47-99	Geo No:	LD Permit No: 99-76	Fiscal Year: 1999
Fee Paid? <input checked="" type="checkbox"/>	Fee Due: \$11,700	Acres Disturbed: 39	Declaration Covenant
Date Paid: 5/25/1999		LD Issue Date: 5/27/1999	Required: YES
Released? <input type="checkbox"/>	Release Date:	LD Expire Date: 8/1/2002	Received: <input type="checkbox"/>
Comments:	Notations	LD Comment: INCLUDES GATOR DEM.TRACK 10/00	
Subdivisions			
Issue Date:	Agreement?	Siltation	
Surety:		Agreement? YES	Surety: BOND - 275,000
Surety Type:	Amount: \$0	Surety Type: BOND	Amount: \$275,000
Notation:	Surety Released? <input type="checkbox"/>	Notation:	Surety Released: <input type="checkbox"/>
Expiration Date:		Expiration Date:	
Comment:		Comments:	
Surety Number:		Surety Number: BR 71673 JOHN DEERE INS. CO.	
Surety Company:		Surety Company: JOHN DEERE INS. CO.	
Delete Record	Undo Record	Last Permit No	Add Record
			Find Record
			Save Record
			Menu Screen

**VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES)
GENERAL PERMIT NOTICE OF TERMINATION
FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES [VAR4]**

(Please Type or Print All Information)

1. Construction Activity Operator

Name: John Deere Vehicle Group Inc.
Mailing Address: 3000 John Deere Road
City: Toano State: VA Zip: 23168 Phone: 757-564-2500

2. Location of Construction Activity

Name: John Deere Vehicle Group Facility
Address: 3000 John Deere Road
City: Toano State: VA Zip: 23168
If street address unavailable: Latitude _____ Longitude _____

3. VPDES Storm Water General Permit Number: VAR450031

4. Check the appropriate box indicating the reason for terminating coverage under the general permit.

I am no longer the operator of the site.

The construction site has undergone final stabilization and the storm water discharges from the construction activity have been terminated.

5. Certification:

"I certify under penalty of law that all storm water discharges from the identified construction activity that are authorized by a VPDES general permit have been eliminated, or that I am no longer the operator of the construction activity. I understand that by submitting this notice of termination, that I am no longer authorized to discharge storm water in accordance with the general permit, and that discharging pollutants to surface waters is unlawful where the discharge is not authorized by a VPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit."

Print Name: Curt Hoppestad Title: Factory Manager

Signature: *Curtis Hoppestad* Date: 5/28/02

For Department of Environmental Quality Use Only

DEQ-WATER FORM SWGP99-004-NOT (6/99)

Accepted/Not Accepted by: _____ Date: _____

copy

ENVIRONMENTAL DIVISION REVIEW COMMENTS

JOHN DEERE
PLAN NO. SP-47-99 MCE/DEC
April 27, 1999

✓ 1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.

✓ 2. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facility for this project.

✓ 3. As-built drawings must be provided for the detention basins on completion. Also, a note shall be provided on the plan stating that upon completion, the construction of the dams will be certified by a professional engineer who has inspected the structures during construction.

✓ 4. Provide and label the limits of clearing on the plan.

✓ 5. Identify any off-site land disturbing areas required with proper erosion control measures.

✓ 6. Provide wire reinforced silt fence (super silt fence) below large fill slopes, including all sediment basins.

✓ 7. Provide a note on the plan that fill slopes will be stabilized in 10-foot vertical increments as they are constructed.

DEC (8) *will add addl trap*
Provide additional information on the sediment traps, including dimensions for both wet and dry storage (length, width, depth) and size of stone outlets. *one trap has drainage area of 4.1 acres*
NEEDS TO BE ON PLAN.

✓ 9. Provide a sediment basin design worksheet for each of the proposed basins. A worksheet is contained in the 1992 edition of VESCH as are details and specifications. *Please review*

DEC ✓ 10. Replace the CMP portion of the riser pipes with aluminized steel or asphalt coated steel pipe. *Details, sheet 10 -*

✓ 11. Provide baffles in all three sediment basins to increase the flow length between inflow and outflow to a minimum of 2:1 in accordance with VESCH, 1992 edition.

DEC (12) *Needs to be able to open for maint*
Change the design of the outlet structures on all the detention/sediment basins. Flat tops are not acceptable as they tend to clog easily, causing continuing maintenance problems. Either provide a sloping top on the riser of at least 3:1 or a cage type grate as shown in enclosed figure from the Virginia Stormwater Management Handbook.
- hinged top

13. Revise the sediment basins to provide both wet and dry storage, and a method of dewatering should maintenance be required. - Is dewatering pipes to be used
how is it to be installed/removed

14. Page E-57 of the drainage calculations mislabels the hydrograph watershed number 145 when it should be 142. Please examine to see if this causes a change in the answer for the "Added Stormwater hydrographs" section and revise as necessary.

15. Provide more information on how the discharge rates, and size and number of orifices was determined for the 1-year storm release.

16. The drainage map, sheet C-1 shows 4.2 acres of drainage to the existing BMP, while the calculations on sheets E-54 through E-58 indicate that 5.3 acres are delivered to the BMP. Please clarify the discrepancy to ensure that the capacity of the BMP is not exceeded.

17. Provide a large check dam of #1 stone and rip rap between the two temporary slope drains and the delineated wetland between storm water basins A and B.

18. Identify all areas of 25% slopes to be disturbed. Submit a request to the Director of the Environmental Division for an exception to disturb slopes in excess of 25%. State what special measures, sodding etc., will be undertaken to restabilize these slopes.

Do you want to go to S150
Planting.

11. The documents listed have been submitted to the owner for review and signature, and will be submitted under separate cover, by the owner.
12. There are no current plans for a sign along the I-64 right of way at this time. If this should change, the owner will submit any necessary permitting information.

Fire Department:

1. The fire department connection will be at the hydrant near the pump house. This has been indicated on Sheet 05.
2. Hydrant spacing has been adjusted to be a maximum of 400'.
3. The fence has been moved so that all hydrants will be within the fenced area.
4. The location of the hydrant in the trailer parking area has been revised.
5. The tank farm is still in the preliminary design stage. When final construction drawings are developed for this area, detailed plans will be submitted for approval. If additional fire hydrants are required, the plan will be revised accordingly.

Environmental Division:

- ✓ 1. A Land Disturbing Permit and Siltation Agreement has been submitted to the owner for signature, and will be submitted, along with the required surety, under separate cover.
- ✓ 2. An Inspection/Maintenance Agreement has been submitted to the owner for signature, and will be submitted by the owner, under separate cover.
- ✓ 3. An as-built survey will be completed for the entire site, upon completion of construction. A note concerning certification of the dam construction has been added to Sheet 03.
- ✓ 4. The limit of clearing and grading is shown on Sheets 03 and 08.
- ✓ 5. No offsite land disturbance is anticipated for this project.
- ✓ 6. Super silt fence has been added to the legend on Sheet 08, and is shown to be installed at the bottom of all large fill slopes.
- ✓ 7. The note concerning stabilization of fill slopes in 10 foot vertical increments has been added on Sheet 03.
8. A table outlining the design criteria for the sediment traps has been added to Sheet 08. *H.I.N.S*
- ✓ 9. Sediment basin design worksheets for the four proposed basins have been included in the Stormwater Management Report, Appendix H.
- ✓ 10. Because of the re-design of the outlet structure to include a temporary, sediment control outlet, the CMP portion of the riser has been deleted.
11. Baffles have been added in two of the sediment basins, basin 'A' and 'B'. The inlet pipe to basin 'C' has been moved to provide a L/W ratio greater than 2.
12. A rebar trash rack has been added to the top of the basin outlet boxes. *Will look flat on top*



TRANSMITTAL SHEET
ENGINEERING & RESOURCE PROTECTION → STORMWATER

Project: **John Deere**

County Plan No.: SP-47-99 & SP-039-13

Assigned BMP No.: **WC055, WC056, WC057, WC058**

BMP Type: Dry Ponds

Information Enclosed:

X Record Drawings (Asbuilts)

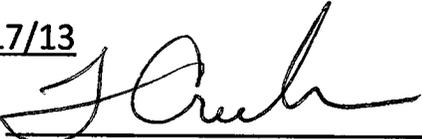
Construction Certification

Computations

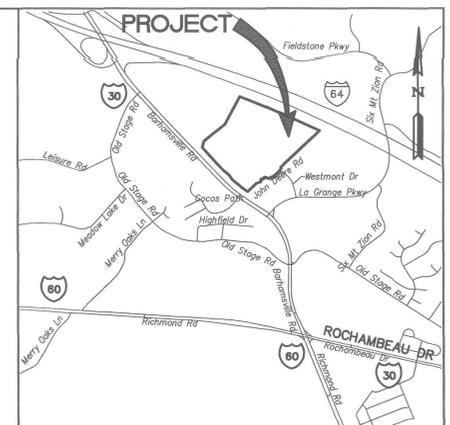
X Other : Approved Plan with 2013 amendment, IM Agreement, and insp reports

Name: **Tina Creech**

Date: 10/17/13

Signature: 

Created in SWMF
10/18/13 JMR



VICINITY MAP
SCALE: 1"=2000'

INDEX OF SHEETS:

SHEET NO.	SHEET DESCRIPTION
C-01	OVERALL SITE
C-02	BMP JCC WC055 AND JCC WC056 MAINTENANCE AND REPAIR
C-03	BMP JCC WC057 AND JCC WC058 MAINTENANCE AND REPAIR
C-04	EROSION & SEDIMENT CONTROL NOTES AND DETAILS

DATE: 5/6/13
AES PROJECT NO.: 9476-04
JCC PLAN NUMBER: SP-0039-2013

APPROVALS		DATE
Fire Dept.		
Health Dept.		
VDOT		
Planning	CP	5/28/13
Environ.	SLG	5/22/13
Training	JP	5/28/13
County Eng.		
Director		

GENERAL NOTES

- OWNER: ANC, LLC
- SITE ADDRESS: 3000 JOHN DEERE ROAD, WILLIAMSBURG, VA 23189341
- SITE IS CURRENTLY ZONED PLANNED UNIT DEVELOPMENT COMMERCIAL (PUD-C) PROPERTY CLASSIFICATION 404 COMMERCIAL & INDUSTRIAL
- TAX MAP PARCEL NO. 1210100045
- CONTACT: V. MARC BENNETT, PE
PHONE: (757) 253-0040
FAX: (757) 220-8994
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING MISS UTILITY (1-800-552-7001) FOR EXISTING UTILITY LOCATIONS PRIOR TO COMMENCING CONSTRUCTION
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FOR THIS PROJECT, INCLUDING VSMP AND JAMES CITY COUNTY LAND DISTURBING PERMIT.
- PRIOR TO OBTAINING A LAND DISTURBING PERMIT, THE CONTRACTOR SHALL OBTAIN A VSMP CONSTRUCTION ACTIVITY GENERAL PERMIT (VIRGINIA STORMWATER MANAGEMENT PROGRAM) FROM DCR (DEPARTMENT OF CONSERVATION AND RECREATION). AS PART OF THIS PERMIT THE CONTRACTOR SHALL PROVIDE AND MAINTAIN THE SWPPP.
- ALL CONSTRUCTION TO BE IN ACCORDANCE WITH HRPDC (FIFTH EDITION) AND VDOT SPECIFICATIONS AND STANDARDS.
- THIS PROPERTY LIES IN THE WARE CREEK WATER SHED.
- THE CONTRACT SHALL HAVE CLEARING LIMITS MARK WITH WHITE RIBBON PRIOR TO SCHEDULING A PRE-CONSTRUCTION MEETING WITH THE JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION AND ENGINEER PRIOR TO BEGINNING ANY WORK AT THE SITE
- INSTALLATION AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE COORDINATED WITH THE ASSIGNED JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION INSPECTOR. WITHIN THIRTY DAYS OF FINAL SITE STABILIZATION, OBTAIN APPROVAL FROM THE ASSIGNED JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION INSPECTOR FOR REMOVAL.
- THIS PLAN AMENDS SP-0047-1999, STONEHOUSE COMMERCE PARK AND PROJECT IS SUBJECT TO PROFFERS ASSOCIATED WITH Z-001-1999.

Environmental Division
OCT 02 2013
RECEIVED

PURPOSE OF DOCUMENTS

- THE PURPOSE OF THESE DOCUMENTS IS TO IDENTIFY, REPAIR AND MAINTENANCE TASK TO BE COMPLETED BY THE GENERAL CONTRACTOR, TO INCLUDE, BUT NOT LIMITED TO:
- CONSTRUCTION OF ACCESS WAY TO THE EMBANKMENTS OF THE STORMWATER FACILITIES.
 - REMOVAL OF WOODY VEGETATION FROM STORMWATER FACILITY EMBANKMENTS.
 - COMPLETE REPAIRS AND MAINTENANCE ITEMS TO STORMWATER MANAGEMENT RISER STRUCTURES.
 - REMOVAL OF ACCUMULATED SEDIMENT AND WOODY GROWTH FROM THE IMPOUNDMENT AREAS OF THE STORMWATER MANAGEMENT FACILITIES.
 - FINE GRADE THE BOTTOM OF THE STORMWATER MANAGEMENT FACILITY TO PROVIDE SURFACE FLOW DIRECTED TO RISER STRUCTURE.
 - REMOVAL OF WOODY VEGETATION ABOUT THE PERIMETER OF THE IMPOUNDMENT AREA (FROM BOTTOM TO 25' HORIZONTALLY FROM HIGH WATER ELEVATION)
 - ARRANGE RIPRAP AT RECEIVING CHANNELS.
 - ESTABLISH GROUND COVER ON ALL DISTURBED AREA, INCLUDING PROVIDING A MINIMUM OF 6" OF TOPSOIL AND PERMANENT SEEDING.
 - PROVIDING AND MAINTAINING EROSION AND SEDIMENT CONTROL MEASURES.
 - REALIGNMENT OR REPAIR OF STORM SEWER CONVEYANCE PIPING.
 - FILING FOR, PREPARING, AND RECORD KEEPING OF THE VSMP AND SWPPP.
 - PERFORMING A VIDEO INSPECTION OF THE PRINCIPAL SPILLWAY PIPE AT STORMWATER BASIN JCC BMP WC056. REPORT FINDINGS TO ENGINEER.

Rev.	Date	Description

PLANNING DIVISION
MAY 24 2013
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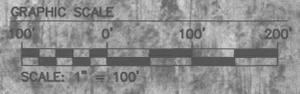


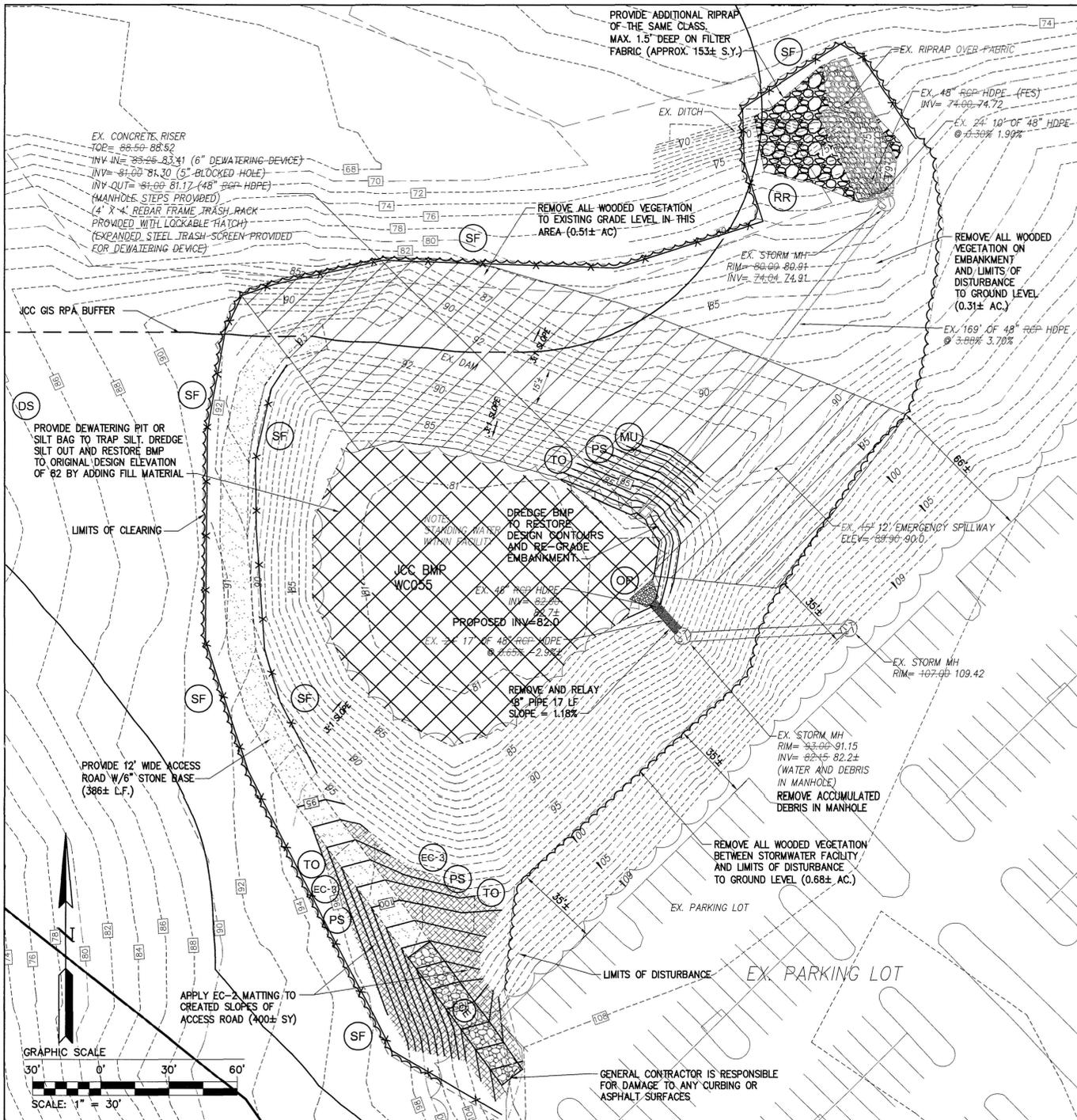
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Phone: (757) 253-0040
Fax: (757) 220-8994
www.aesva.com

AES
CONSULTING ENGINEERS
Hampden Roads | Central Virginia | Middle Peninsula

SITE PLAN AMENDMENT
FORMER JOHN DEERE FACILITY
BMP MAINTENANCE AND REPAIR
STONEHOUSE DISTRICT | JAMES CITY COUNTY | VIRGINIA

Project Contacts:	LBA
Project Number:	W09476-04
Scale:	1"=100'
Date:	5/6/13
Sheet Title:	OVERALL SITE
Sheet Number:	C-01





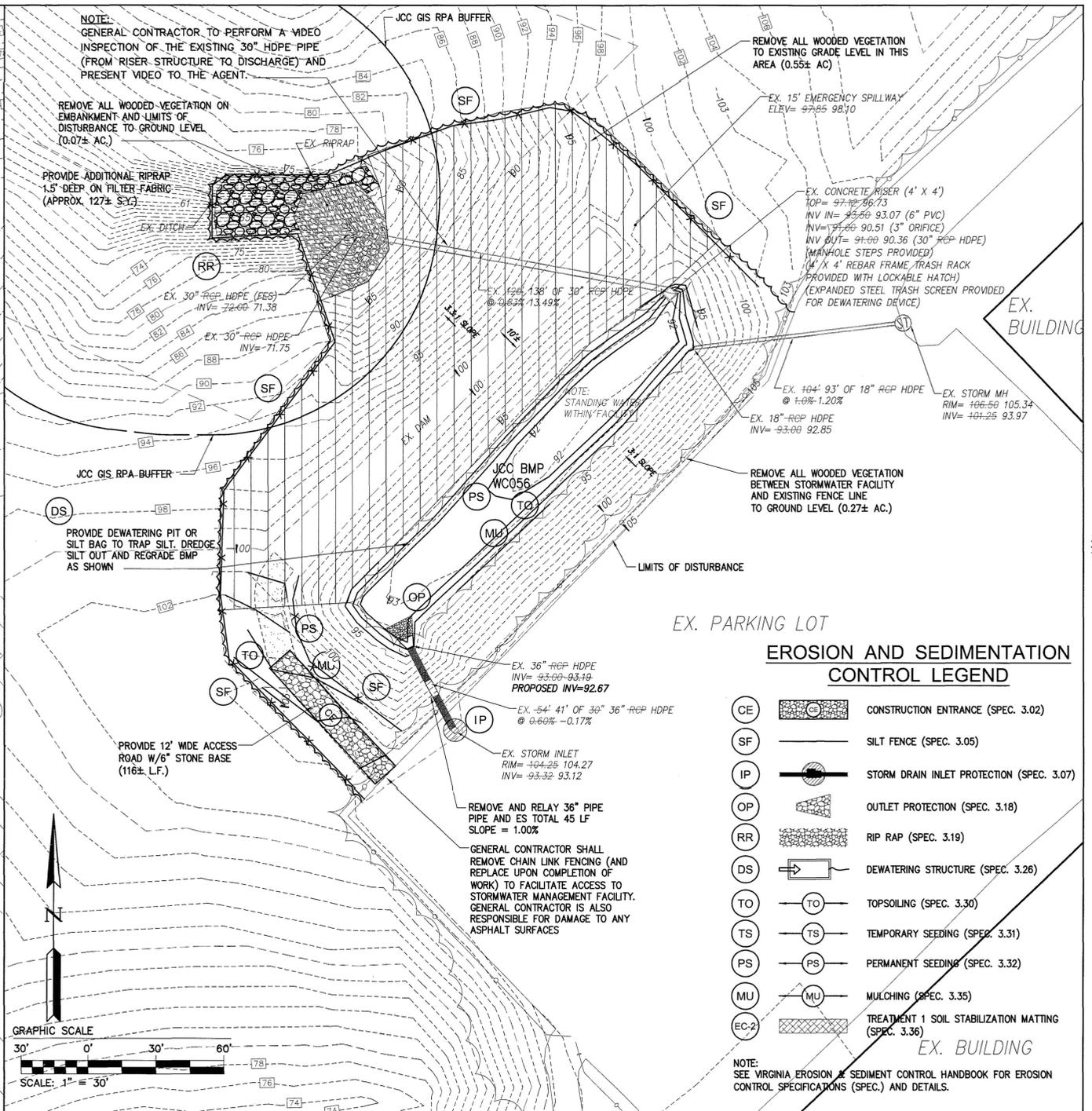
- MAINTENANCE ITEMS**
1. REMOVE DEBRIS IN MANHOLE OF STORMSEWER SYSTEM DISCHARGING INTO THE FACILITY.
 2. AUGMENT OUTLET PROTECTION AT STORMSEWER DISCHARGE.
 3. CLEAN DEWATER FACILITY, TRASH RACK / SCREEN AND DEWATER ORIFICES OF MATERIAL.
 4. REMOVE WOODY VEGETATION FROM SITE LIMITS OF DISTURBANCE.
 5. DREDGE BMP TO RESTORE DESIGN CONTOURS AND DISPOSE EXCESS MATERIAL OFF SITE.
 6. AUGMENT RIP-RAP AT RECEIVING CHANNEL OF PRINCIPAL SPILLWAY.
 7. ESTABLISH GROUND COVER (PROVIDE A MINIMUM OF 6" TOPSOIL, PERMANENT SEED, AND PERIODIC WATERING) TO ESTABLISH GROUND COVER. (ALL DISTURBED AREAS EXCLUDING ACCESS GRAVEL AREA)
 8. MOW GROUND COVER TO MAXIMUM 6-INCH HEIGHT.

- REPAIR ITEMS**
1. CONSTRUCT AN ACCESS TO THE FACILITY BY CLEARING, GRADING, PLACING 6" STONE BASE USING VDOT 21A AGGREGATE (175 ± TONS) AND STABILIZING WITH SEED AND EC-3 MATTING IN FILL AREA AS SHOWN ON PLAN, SEED AND MULCH OTHER SHOULDER AREAS.
 2. REMOVE AND REINSTALL 17" OF 48" HDPE PIPE TO 1.18% GRADE IN ACCORDANCE WITH ASTM D-2321 AND ALL APPLICABLE VDOT STANDARDS AND ADD OUTLET PROTECTION.

NOTE:

1. ALL EXCESS EARTH MATERIALS, WOODY VEGETATION INCLUDING TREES IN EXCESS OF 4" (UNLESS CHIPPED OR MULCHED AND USED AT THE SITE), DEBRIS, MATERIAL GENERATED BY CLEARING THE WORK SHALL BE REMOVED FROM THE SITE.
2. VEGETATION SUCH AS BRUSH, LIMBS, AND SAPLINGS MAY BE CHIPPED BY A CHIPPER AND USED AS MULCH IN AREAS DESIGNATED AT EACH SITE. EXCESS CHIPPING SHALL BE REMOVED FROM SITE.
3. CHIPPING OPERATIONS SHALL ONLY BE PERFORMED WITHIN THE AREA OF ACTIVITIES.

JCC BMP WC055



- MAINTENANCE ITEMS**
1. AUGMENT OUTLET PROTECTION AT STORMSEWER DISCHARGE.
 2. CLEAN DEWATERING FACILITY TRASH RACK / SCREEN AND DEWATER ORIFICES OF MATERIAL.
 3. REMOVE WOODY VEGETATION FROM THE SITE LIMITS OF DISTURBANCE.
 4. DREDGE BMP TO RESTORE DESIGN CONTOURS AND DISPOSE EXCESS MATERIAL OFF SITE.
 5. INVESTIGATE POSSIBLE FAILURE OF PRINCIPAL SPILLWAY PIPE.
 6. AUGMENT RIP-RAP AT RECEIVING CHANNEL OF PRINCIPAL SPILLWAY.
 7. ESTABLISH GROUND COVER (PROVIDE A MINIMUM OF 6" TOPSOIL, PERMANENT SEED, AND PERIODIC WATERING) TO ESTABLISH GROUND COVER. (ALL DISTURBED AREAS EXCLUDING ACCESS GRAVEL AREA)
 8. MOW GROUND COVER TO MAXIMUM 6-INCH HEIGHT.

- REPAIR ITEMS**
1. CONSTRUCT AN ACCESS TO THE FACILITY BY CLEARING, GRADING, PLACING 6" STONE BASE (52± TONS) AND STABILIZING SHOULDERS WITH SEED AND MULCH.
 2. REMOVE AND RE-INSTALL 41" OF 36" HDPE PIPE TO 1.00% GRADE IN ACCORDANCE WITH ASTM D-2321 AND ALL APPLICABLE VDOT STANDARDS AND ADD OUTLET PROTECTION.
 3. REMOVE AND REPLACE EXISTING CHAINLINK FENCE.

NOTE:

1. ALL EXCESS EARTH MATERIALS, WOODY VEGETATION INCLUDING TREES IN EXCESS OF 4" (UNLESS CHIPPED OR MULCHED AND USED AT THE SITE), DEBRIS, MATERIAL GENERATED BY CLEARING THE WORK SHALL BE REMOVED FROM THE SITE.
2. VEGETATION SUCH AS BRUSH, LIMBS, AND SAPLINGS MAY BE CHIPPED BY A CHIPPER AND USED AS MULCH IN AREAS DESIGNATED AT EACH SITE. EXCESS CHIPPING SHALL BE REMOVED FROM SITE.
3. CHIPPING OPERATIONS SHALL ONLY BE PERFORMED WITHIN THE AREA OF ACTIVITIES.

JCC BMP WC056

EROSION AND SEDIMENTATION CONTROL LEGEND

CE		CONSTRUCTION ENTRANCE (SPEC. 3.02)
SF		SILT FENCE (SPEC. 3.05)
IP		STORM DRAIN INLET PROTECTION (SPEC. 3.07)
OP		OUTLET PROTECTION (SPEC. 3.18)
RR		RIP RAP (SPEC. 3.19)
DS		DEWATERING STRUCTURE (SPEC. 3.26)
TO		TOPSOILING (SPEC. 3.30)
TS		TEMPORARY SEEDING (SPEC. 3.31)
PS		PERMANENT SEEDING (SPEC. 3.32)
MU		MULCHING (SPEC. 3.35)
EC-2		TREATMENT 1 SOIL STABILIZATION MATTING (SPEC. 3.36)

NOTE: SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

Revised By	Date	Description



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SITE PLAN AMENDMENT
SUP -0047-1999
FORMER JOHN DEERE FACILITY
BMP MAINTENANCE AND REPAIR

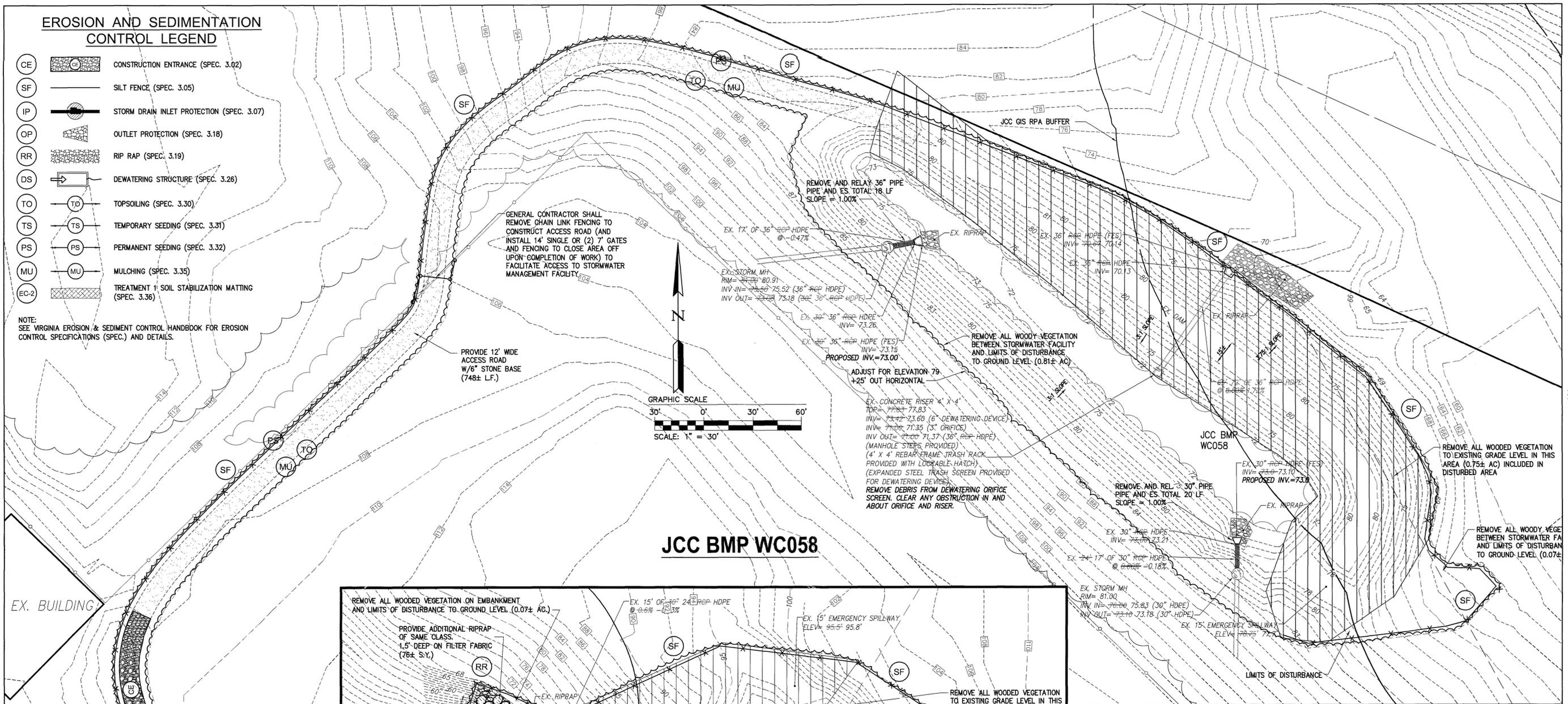
STONEHOUSE DISTRICT | JAMES CITY COUNTY | VIRGINIA

Project Contacts: LBA
Project Number: W09476-04
Scale: 1"=30' Date: 5/6/13
Sheet Title: BMP JCC WC055 AND JCC WC056 MAINTENANCE AND REPAIR
Sheet Number: C-02

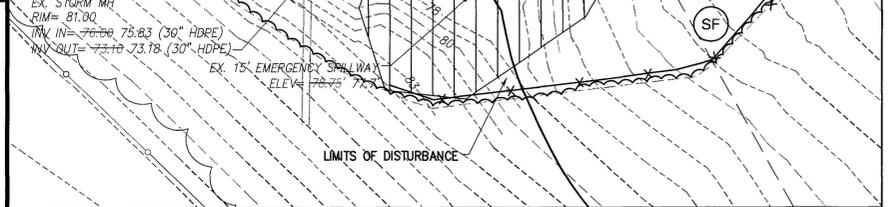
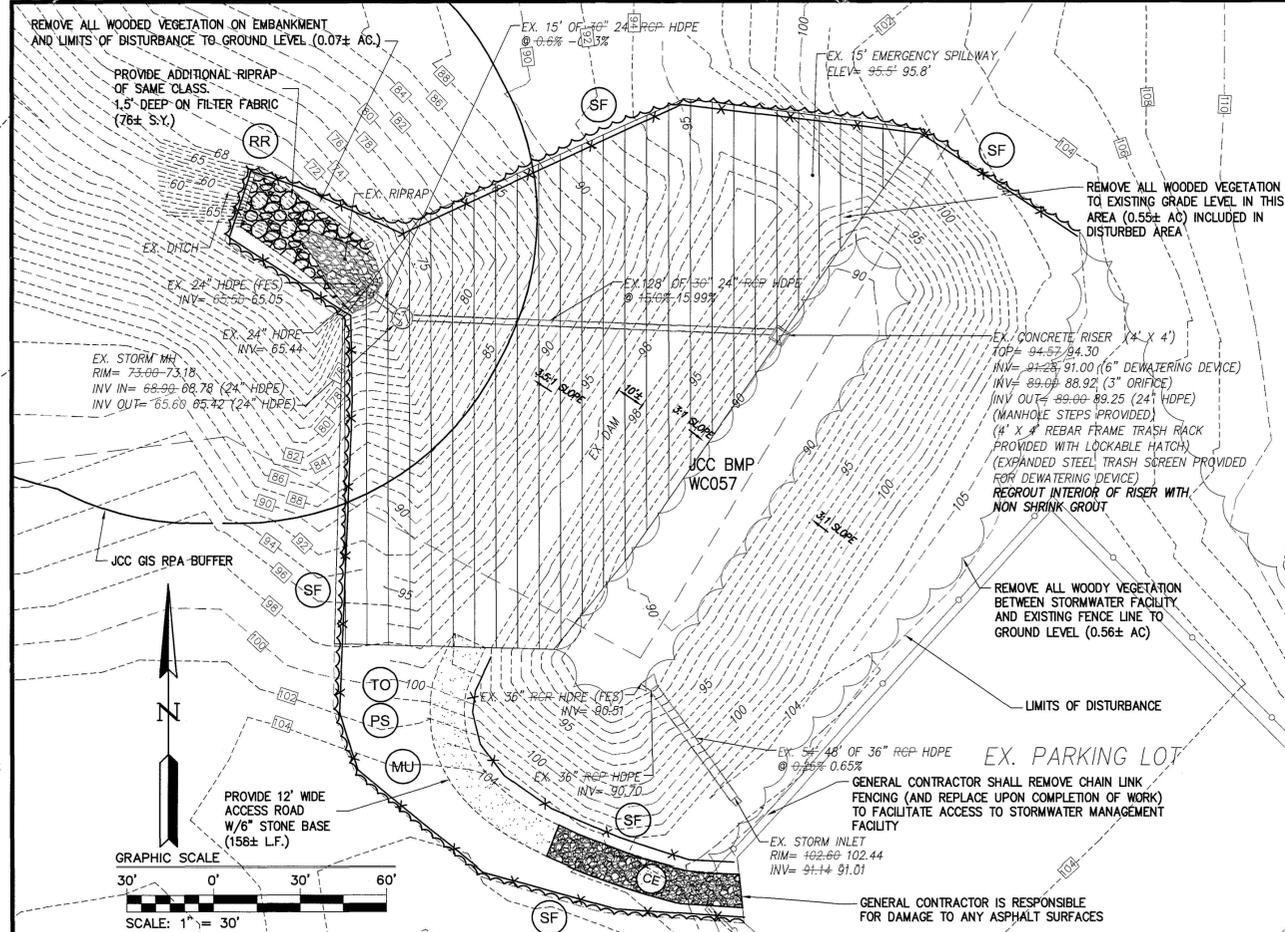
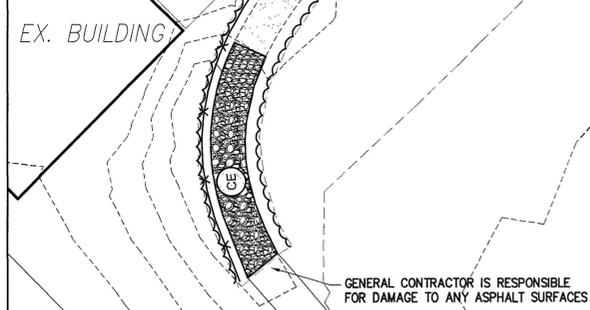
EROSION AND SEDIMENTATION CONTROL LEGEND

-  CONSTRUCTION ENTRANCE (SPEC. 3.02)
-  SILT FENCE (SPEC. 3.05)
-  STORM DRAIN INLET PROTECTION (SPEC. 3.07)
-  OUTLET PROTECTION (SPEC. 3.18)
-  RIP RAP (SPEC. 3.19)
-  DEWATERING STRUCTURE (SPEC. 3.26)
-  TOPSOILING (SPEC. 3.30)
-  TEMPORARY SEEDING (SPEC. 3.31)
-  PERMANENT SEEDING (SPEC. 3.32)
-  MULCHING (SPEC. 3.35)
-  TREATMENT 1 SOIL STABILIZATION MATTING (SPEC. 3.36)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.



JCC BMP WC058



MAINTENANCE ITEMS

1. CLEAN TRASH RACK / SCREEN AND DEWATER ORIFICES OF MATERIAL.
2. REMOVE WOODY VEGETATION FROM SITE, LIMITS OF DISTURBANCE.
3. ESTABLISH GROUND LAYER (PROVIDE A MINIMUM OF 6" TOPSOIL, PERMANENT SEED, AND PERIODIC WATERING TO ESTABLISH GROUND COVER. (ALL DISTURBED AREAS EXCLUDING ACCESS GRAVEL AREA)
4. MOW GROUND COVER TO MAXIMUM 6-INCH HEIGHT.

REPAIR ITEMS

1. CONSTRUCT AN ACCESS TO THE FACILITY BY CLEARING, GRADING, PLACING 6" STONE BASE (330 ± TONS) AND STABILIZING SHOULDERS WITH SEED AND MULCH.
2. REMOVE AND RE-INSTALL 18" OF 36" HDPE PIPE TO 1.00% GRADE IN ACCORDANCE WITH ASTM D-2321 AND ALL APPLICABLE VDOT STANDARDS..
3. REMOVE AND RE-INSTALL 20" OF 30" HDPE PIPE TO 1.00% GRADE IN ACCORDANCE WITH ASTM D-2321 AND ALL APPLICABLE VDOT STANDARDS.

- NOTE:
1. ALL EXCESS EARTH MATERIALS, WOODY VEGETATION INCLUDING TREES IN EXCESS OF 4" (UNLESS CHIPPED OR MULCHED AND USED AT THE SITE), DEBRIS, MATERIAL GENERATED BY CLEARING THE WORK SHALL BE REMOVED FROM THE SITE.
 2. VEGETATION SUCH AS BRUSH, LIMBS, AND SAPLINGS MAY BE CHIPPED BY A CHIPPER AND USED AS MULCH IN AREAS DESIGNATED AT EACH SITE. EXCESS CHIPPING SHALL BE REMOVED FROM SITE.
 3. CHIPPING OPERATIONS SHALL ONLY BE PERFORMED WITHIN THE AREA OF ACTIVITIES.

MAINTENANCE ITEMS

1. CLEAN TRASH RACK / SCREEN AND DEWATER ORIFICES OF MATERIAL.
2. REMOVE WOODY VEGETATION FROM SITE, LIMITS OF DISTURBANCE.
3. AUGMENT RIP-RAP AT RECEIVING CHANNEL OF PRINCIPAL SPILLWAY.
4. ESTABLISH GROUND LAYER (PROVIDE A MINIMUM OF 6" TOPSOIL, PERMANENT SEED, AND PERIODIC WATERING TO ESTABLISH GROUND COVER. (ALL DISTURBED AREAS EXCLUDING ACCESS GRAVEL AREA)
5. MOW GROUND COVER TO MAXIMUM 6-INCH HEIGHT.

REPAIR ITEMS

1. CONSTRUCT AN ACCESS TO THE FACILITY BY CLEARING, GRADING, PLACING 6" STONE BASE (70 ± TONS) AND STABILIZING SHOULDERS WITH SEED AND MULCH.
2. SEAL PIPE TO RISER STRUCTURE.
3. REMOVE EXISTING CHAINLINK FENCING TO CONSTRUCT ACCESS ROAD, REPLACE FENCING AND PROVIDE GATES FOR ACCESS TO NEWLY CONSTRUCTED ACCESS ROAD.

- NOTE:
1. ALL EXCESS EARTH MATERIALS, WOODY VEGETATION INCLUDING TREES IN EXCESS OF 4" (UNLESS CHIPPED OR MULCHED AND USED AT THE SITE), DEBRIS, MATERIAL GENERATED BY CLEARING THE WORK SHALL BE REMOVED FROM THE SITE.
 2. VEGETATION SUCH AS BRUSH, LIMBS, AND SAPLINGS MAY BE CHIPPED BY A CHIPPER AND USED AS MULCH IN AREAS DESIGNATED AT EACH SITE. EXCESS CHIPPING SHALL BE REMOVED FROM SITE.
 3. CHIPPING OPERATIONS SHALL ONLY BE PERFORMED WITHIN THE AREA OF ACTIVITIES.

JCC BMP WC057

Rev.	Date	Description



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Hampton Roads | Central Virginia | Middle Peninsula

SITE PLAN AMENDMENT
SUP -0047-1999
FORMER JOHN DEERE FACILITY
BMP MAINTENANCE AND REPAIR

STONEHOUSE DISTRICT | JAMES CITY COUNTY | VIRGINIA

Project Contacts: LBA
Project Number: W09476-04
Scale: 1"=30' Date: 5/6/13

Sheet Title:
BMP JCC WC057
AND JCC WC058
MAINTENANCE
AND REPAIR

Sheet Number
C-03

THE FOLLOWING STANDARD EROSION AND SEDIMENT CONTROL (E&SC) NOTES SHALL BECOME PART OF APPROVED EROSION AND SEDIMENT CONTROL PLANS FOR ALL PLAN OF DEVELOPMENT PROJECTS IN JAMES CITY COUNTY, VIRGINIA.

- ALL THE PROVISIONS OF VIRGINIA EROSION AND SEDIMENT CONTROL LAW AND REGULATIONS, MINIMUM STANDARDS, HANDBOOKS, AND TECHNICAL BULLETINS AS PUBLISHED BY THE VIRGINIA SOIL & WATER CONSERVATION BOARD AND/OR THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION, DIVISION OF SOIL & WATER CONSERVATION SHALL APPLY TO THE PROJECT.
- MINIMUM STANDARDS # 1 THROUGH # 19 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS (4VAC50-30-40) SHALL APPLY TO THE PROJECT.
- THE OWNER OR APPLICANT SHALL BE RESPONSIBLE TO REGISTER FOR COVERAGE UNDER THE GENERAL PERMIT FOR DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES, IN ACCORDANCE WITH CURRENT REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMF) AND THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION.
- THE OWNER OR APPLICANT SHALL PROVIDE THE NAME OF AN INDIVIDUAL HOLDING A VALID RESPONSIBLE LAND DISTURBER (RLD) CERTIFICATE OF COMPETENCE WHO WILL BE RESPONSIBLE FOR THE LAND-DISTURBER ACTIVITY PRIOR TO ENGAGING IN THE LAND-DISTURBER ACTIVITY. THIS WILL BE NECESSARY PRIOR TO ISSUANCE OF A LAND-DISTURBER PERMIT FOR THE PROJECT. THE RLD IS REQUIRED TO ATTEND THE PRECONSTRUCTION CONFERENCE FOR THE PROJECT.
- THE CONTRACTOR IS RESPONSIBLE TO CONTACT MISS UTILITY (DIAL 811 IN VA OR 1-800-552-7001) PRIOR TO ANY UTILITY OR SITE WORK EXCAVATIONS.
- ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PLANNED, DESIGNED, IMPLEMENTED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PROVISIONS OF THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). THE CONTRACTOR SHALL MAINTAIN, INSPECT AND REPAIR ALL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED THROUGHOUT THE LIFE OF THE PROJECT TO ENSURE CONTINUED ACCEPTABLE PERFORMANCE.
- A PRECONSTRUCTION CONFERENCE (MEETING) SHALL BE HELD ON SITE BETWEEN THE COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION, THE OWNER-APPLICANT, THE RESPONSIBLE LAND-DISTURBER (RLD), THE CONTRACTOR AND OTHER RESPONSIBLE AGENCIES, AS APPLICABLE, PRIOR TO ISSUANCE OF A LAND-DISTURBER PERMIT. THE OWNER OR APPLICANT IS REQUIRED TO COORDINATE SCHEDULING OF THE PRECONSTRUCTION CONFERENCE BETWEEN ALL APPLICABLE PARTIES. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION FOR REVIEW AND APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING.
- ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBER ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.
- ADDITIONAL SAFETY FENCE OR DUST CONTROL MEASURES, IN ACCORDANCE WITH THE PROVISIONS OF MINIMUM STANDARDS & SPECS. 3.01 AND 3.39 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), MAY BE REQUIRED TO BE IMPLEMENTED IN ADDITION TO THAT SHOWN ON THE APPROVED PLAN IN ORDER TO ENSURE ADEQUATE PROTECTION OF THE HEALTH, SAFETY AND WELFARE OF THE PUBLIC OR IF SITE CONDITIONS CHANGE, BECOME APPARENT OR ALTER SIGNIFICANTLY FOLLOWING THE DATE OF PLAN APPROVAL.
- EROSION AND SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT OR FOLLOWING TIME OF CONSTRUCTION TO ENSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED, TO ENSURE ADEQUATE PROTECTION OF THE HEALTH, SAFETY AND WELFARE OF THE PUBLIC, OR IF SITE CONDITIONS CHANGE, BECOME APPARENT OR ALTER SIGNIFICANTLY FOLLOWING THE DATE OF PLAN APPROVAL. COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION APPROVAL SHALL BE REQUIRED FOR ANY DEVIATION OF EROSION AND SEDIMENT CONTROL MEASURES FROM THE APPROVED PLAN.
- OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
- CULVERT AND STORM DRAIN INLET PROTECTIONS, IN ACCORDANCE WITH THE PROVISIONS OF MINIMUM STANDARDS & SPECS. 3.07 & 3.08 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), MAY BE REMOVED AT THE DISCRETION OF THE ASSIGNED COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION INSPECTOR SHOULD PLACEMENT OF THE MEASURE RESULT IN EXCESSIVE ROAD FLOODING OR TRAFFIC HAZARD OR RESULT IN THE REDIRECTION OF DRAINAGE ONTO OR TOWARD EXISTING LOTS, DRIVEWAYS OR STRUCTURES. DECISIONS SHALL BE MADE ON A CASE-BY-CASE BASIS BASED ON FIELD SITUATIONS ENCOUNTERED.
- DRAINAGE FACILITIES SHALL BE INSTALLED AND FUNCTIONAL WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT.
- NO MORE THAN 300 FEET OF TRENCH MAY BE OPEN AT ONE TIME FOR UNDERGROUND UTILITY LINES, INCLUDING STORM WATER CONVEYANCES. ALL OTHER PROVISIONS OF MINIMUM STANDARD # 16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS APPLY.
- IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH MINIMUM STANDARD & SPEC. 3.35 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.
- THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION ON THE APPROVED PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED, IN ACCORDANCE WITH MINIMUM STANDARDS & SPECS. 3.29 THROUGH 3.37 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), AS APPLICABLE. IRRIGATION, IF NECESSARY, SHALL COMPLY WITH ALL APPLICABLE OUTDOOR WATER USE RESTRICTIONS OF THE JAMES CITY SERVICE AUTHORITY.

- TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. REMOVAL SHALL NOT OCCUR WITHOUT AUTHORIZATION BY THE COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION. DISTURBANCES ASSOCIATED WITH THE REMOVAL OF TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROPERLY STABILIZED.
- NO SEDIMENT TRAP OR SEDIMENT BASIN SHALL BE REMOVED UNTIL A) AT LEAST 75 PERCENT OF THE SINGLE-FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN SOLD TO A THIRD PARTY FOR THE CONSTRUCTION OF HOMES (UNRELATED TO THE DEVELOPER); AND/OR, B) 60 PERCENT OF THE SINGLE-FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN ARE COMPLETED AND STABILIZED. A BULK SALE OF THE LOTS TO ANOTHER BUILDER DOES NOT SATISFY THIS PROVISION. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL NOT BE REMOVED WITHOUT AUTHORIZATION OF THE COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION.
- APPLICABLE PROVISIONS OF THE COUNTY BMP MANUAL (JAMES CITY COUNTY GUIDELINES FOR DESIGN AND CONSTRUCTION OF STORMWATER MANAGEMENT BMPs) AND THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK (VSMH) APPLY TO THE PROJECT.
- DESIGN AND CONSTRUCTION OF PRIVATE-TYPE STORM DRAINAGE SYSTEMS, OUTSIDE VDOT RIGHT-OF-WAY, SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION, STORMWATER DRAINAGE CONVEYANCE SYSTEMS (NON-BMP RELATED), GENERAL DESIGN AND CONSTRUCTION GUIDELINES.
- RECORD DRAWINGS (AS-BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE REQUIRED FOR ALL STORMWATER FACILITIES INCLUDING STORMWATER MANAGEMENT/BMP FACILITIES AND STORM DRAINAGE CONVEYANCE SYSTEMS. RECORD DRAWINGS AND CONSTRUCTION CERTIFICATIONS MUST MEET ESTABLISHED PROGRAM REQUIREMENTS OF BOTH THE COUNTY ENGINEERING AND RESOURCE PROTECTION AND STORMWATER DIVISIONS.
- ALL STORMWATER FACILITIES INCLUDING BMPs, STORM DRAINAGE PIPES, STORMWATER CONVEYANCES, INLETS, MANHOLES, OUTFALLS AND ROADSIDE AND OTHER OPEN CHANNELS SHALL BE INSPECTED BY THE JAMES CITY COUNTY STORMWATER DIVISION AND GEOTECHNICAL ENGINEER IN ACCORDANCE WITH ESTABLISHED THE JAMES CITY COUNTY STORMWATER DIVISION PROGRAM REQUIREMENTS.

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

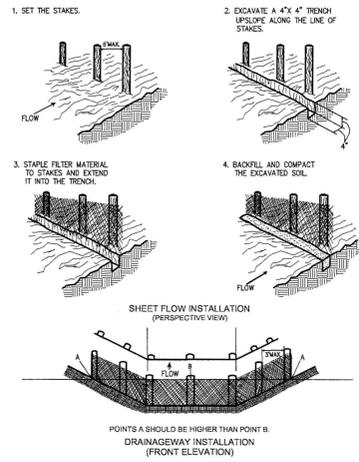


Plate 3.05-2

STONE CONSTRUCTION ENTRANCE

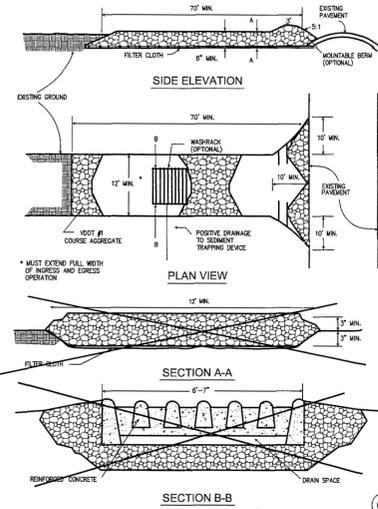


Plate 3.02-1

SILT FENCE DROP INLET PROTECTION

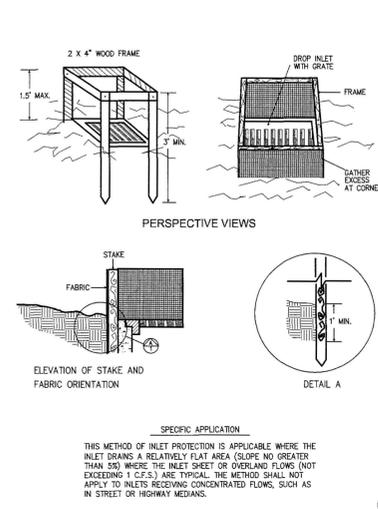


Plate 3.07-1

SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

MIXTURE	TOTAL LBS. PER ACRE
MINIMUM CARE LAWN COMMERCIAL OR RESIDENTIAL -KENTUCKY 31 OR TURF-TYPE TALL FESCUE OR -COMMON BERMAUDA GRASS **	175-200 LBS. 75 LBS.
HIGH-MAINTENANCE LAWN -KENTUCKY 31 OR TURF-TYPE TALL FESCUE OR -HYBRID BERMAUDA GRASS (SEED)**	200-250 LBS. 40 LBS. (UNHULLED) 30 LBS. (HULLED)
GENERAL SLOPE (3:1 OR LESS) -KENTUCKY 31 FESCUE -RED TOP GRASS -SEASONAL NURSE CROP *	128 LBS. 2 LBS. 20 LBS. 150 LBS.
LOW MAINTENANCE SLOPE (STEEPER THAN 3:1) -KENTUCKY 31 TALL FESCUE -COMMON BERMAUDA GRASS ** -RED TOP GRASS -SEASONAL NURSE CROP * -SERICEA LESPEDeza **	95-108 LBS. 0-15 LBS. 2 LBS. 20 LBS. 20 LBS. 150 LBS.

Table 3.32-1

ORGANIC MULCH MATERIALS AND APPLICATION RATES

MULCHES:	RATES:		NOTES:
	PER ACRE	PER 1000 FT. SQ.	
STRAW OR HAY	1 1/2 - 2 Tons (Minimum 2 Tons for winter cover)	70-90 Lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
FIBER MULCH	Minimum 1500 Lbs.	35 Lbs.	Do not use as mulch for winter cover or during hot, dry periods. Apply as slurry.
CORN STALKS	4-6 Tons.	185-275 Lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
WOOD CHIPS	4-6 Tons	185-275 Lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs. nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
BARK CHIPS OR SHREDED BARK	50-70 Cu. Yds. Yes	1-2 Cu. Yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

Table 3.35-A

STRAW BALE/SILT FENCE PIT

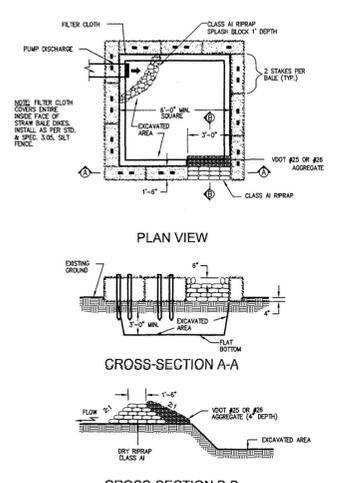


Plate 3.26-3

TYPICAL TREATMENT - 2 SOIL STABILIZATION MATTING SLOPE INSTALLATION

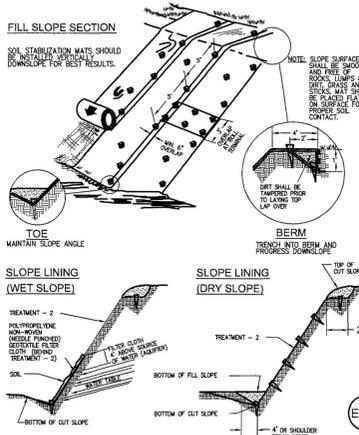


Plate 3.36-5

PIPE OUTLET CONDITIONS

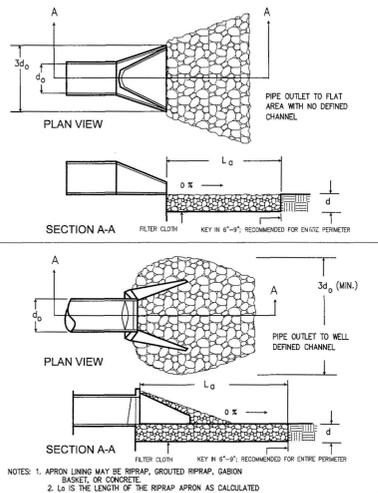


Plate 3.18-1

TOE REQUIREMENTS FOR BANK STABILIZATION

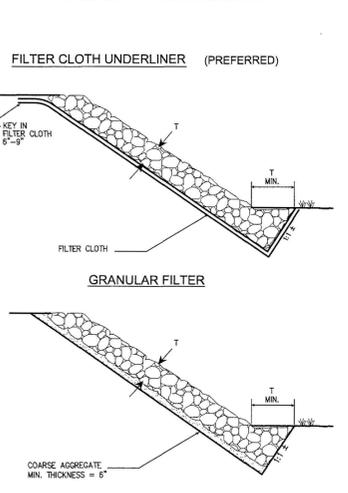
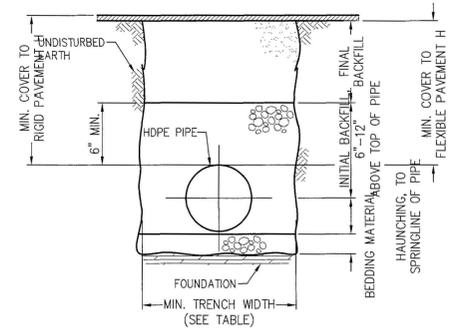


Plate 3.19-1



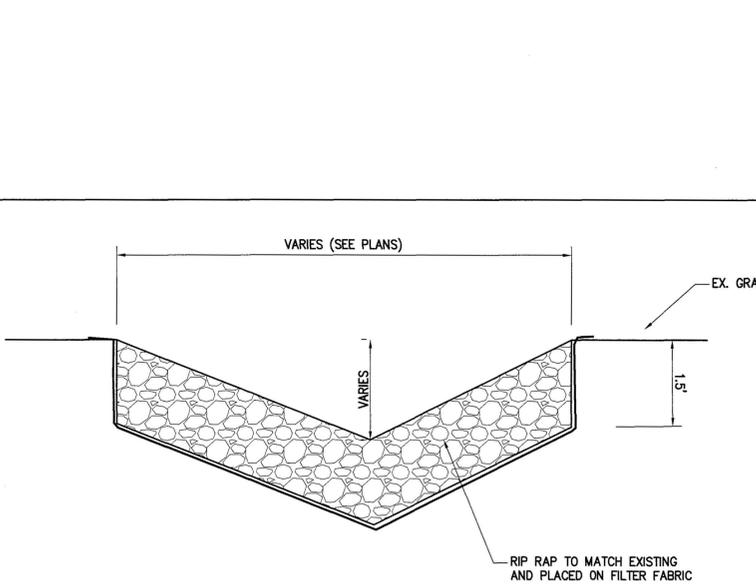
Notes:

- MATERIALS: UNLESS OTHERWISE SPECIFIED ON THE PLANS OR HEREIN, CORRUGATED POLYETHYLENE PIPE SHALL CONFORM TO AASHTO M-294, LATEST EDITION, STANDARD SPECIFICATION FOR CORRUGATED POLYETHYLENE PIPE.
RESINS: CORRUGATED POLYETHYLENE PIPE SHALL BE MANUFACTURED FROM HIGH DENSITY POLYETHYLENE VIRGIN COMPOUNDS, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM D-3350 FOR THE CELL CLASSIFICATION 335400C.
COUPLING BANDS: EXCEPT AS OTHERWISE REQUIRED HEREIN, COUPLING BANDS AND OTHER HARDWARE FOR CORRUGATED POLYETHYLENE PIPE SHALL DEMONSTRATE THAT THEY MEET THE SOIL TIGHTNESS REQUIREMENTS OF AASHTO SECTION 26 "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES."
COUPLING BANDS SHALL LAP EQUALLY ON EACH OF THE PIPES BEING CONNECTED TO FORM A TIGHTLY CLOSED JOINT AFTER INSTALLATION.
THE CORRUGATIONS IN THE BAND SHALL INDEX THE CORRUGATIONS IN THE PIPE ENDS TO ENGAGE AT LEAST TWO FULL CORRUGATIONS FROM THE END OF EACH PIPE.
WHEN INFILTRATION OR EXFILTRATION IS A CONCERN, THE COUPLING BANDS MAY BE REQUIRED TO HAVE GASKETS. THE GASKET MATERIAL SHALL BE CLOSED-CELL EXPANDED RUBBER OR NEOPRENE.
OTHER COUPLINGS MAY BE BELL & SPIGOT AND CONFORM TO THE REQUIREMENTS OF AASHTO M294.
- DESIGNATION OF TYPE: THE PIPE SHALL BE THE FOLLOWING TYPE:
TYPE S: THIS PIPE WILL HAVE A FULL CIRCULAR CROSS-SECTION, WITH AN OUTER CORRUGATED PIPE WALL AND A SMOOTH INNER LINER.
- FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL IN ACCORDANCE WITH ASTM D2321, LATEST EDITION. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING GEOTEXTILE MATERIAL.
- BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN ACCORDANCE WITH ASTM D2321, LATEST EDITION. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" FOR 4"-24"; 6" FOR 30"-60".
- MINIMUM TRENCH WIDTHS SHALL BE AS FOLLOWS:

DIAMETER	MIN. TRENCH WIDTH	DIAMETER	MIN. TRENCH WIDTH	DIAMETER	MIN. TRENCH WIDTH
4"	21"	15"	34"	42"	72"
6"	23"	18"	39"	48"	80"
8"	26"	24"	46"	54"	88"
10"	28"	30"	56"	60"	96"
12"	30"	36"	64"		

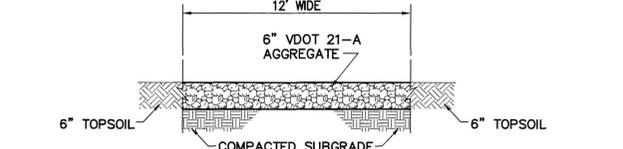
- MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS MEASURED FROM THE TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.
- CONNECTION TO CONCRETE STRUCTURES: CONNECTIONS SHALL MEET SPECIFICATIONS ASTM C823.
- PERFORATED HDPE PIPE SHALL HAVE FIVE HOLES, ONE INCH IN DIAMETER EVENLY SPACED AND PLACED WITHIN AN ARC OF 130 DEGREES. THE CENTER HOLE BEING DIRECTLY OPPOSITE THE TOP MARKING. SPACING OF EACH SET OF FIVE HOLES SHALL BE AT 6 INCH INTERVALS ALONG THE TUBE. THE HOLES WILL BE DRILLED AND BE FREE OF ANY DEFECTS. THE PERFORATED PIPE SHALL BE INSTALLED SO THAT THE CENTER HOLE IS IN THE HORIZONTAL PLANE AND INTERFACES WITH THE GRADED GRAVEL.
- THIS DETAIL IS NOT APPROPRIATE FOR HDPE PIPE PLACED WITHIN IMPOUNDMENT EMBANKMENTS.

HDPE PIPE INSTALLATION DETAIL



CHANNEL RIPRAP TYPICAL

N.T.S.



TYPICAL GRAVEL ACCESS ROAD SECTION

N.T.S.

Rev.	Date	Description



Soil Old Towne Road, Suite 1
PO Box 203105
Richmond, VA 23220-0310
Phone: (757) 263-0040
Fax: (757) 260-8894
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ABS
CONSULTING ENGINEERS
Hampton Roads | Central Virginia | Middle Peninsula

SITE PLAN AMENDMENT
SUP -0047-1999
FORMER JOHN DEERE FACILITY
BMP MAINTENANCE AND REPAIR
STONEHOUSE DISTRICT - JAMES CITY COUNTY - VIRGINIA

Project Contacts: LBA
Project Number: W09476-04
Scale: 1"=30'
Date: 5/6/13
Sheet Title:
EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
Sheet Number:
C-04



**James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities**

County BMP ID Code (if known): WC055

Name of Facility: John Deere BMP No.: 1 of 4 Date: 10/9/13

Location: 3000 John Deere Road

Name of Owner: ANC, LLC

Name of Inspector: T. Creech / W. Cain / S. Thomas

Type of Facility: Dry Pond

Weather Conditions: Cloudy Type: Final Inspection County BMP Inspection Program Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

- O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
- Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
- Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			Removed all veg / trees
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	✓			Dredged BMP Bottom to approved plan centers
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): 48" HDPE				
Condition of Structure	✓			Removed beaverdam material
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 4'x4' TR-48" - converted to final conf.				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : 48" HDPE				
Condition of Structure	✓			→ relocated outlet due to embankment conditions.
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	/			
Animal Burrows	/			
Graffiti	/			
Other				
Surrounding Perimeter Conditions: Parking lot / wooded				
Land Uses	/			
Vegetation	/			
Trash & Debris	/			
Aesthetics	/			
Access /Maintenance Roads or Paths	/			established access road per plan.
Other				
Remarks:				
Overall Environmental Division Internal Rating: <u>4</u>				
Signature: <u>Uipa Creech</u>			Date: <u>10/9/13</u>	
Title: <u>Env Insp</u>				



**James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities**

County BMP ID Code (if known): WC056
 Name of Facility: John Deere BMP No.: 2 of 4 Date: 10/11/13
 Location: 3000 John Deere Road
 Name of Owner: ANC, LLC
 Name of Inspector: J. Creech / W. Cain / S. Thomas
 Type of Facility: Dry Pond
 Weather Conditions: Cloudy Type: Final Inspection County BMP Inspection Program Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

- O.K.** - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
- Routine** - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
- Urgent** - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

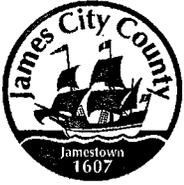
Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			Removed all wooded veg from facility
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	✓			
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): 36" HDPE & 18" HDPE				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 4x4' Riser				
Condition of Structure	✓			
Corrosion	✓			Converted to final conf.
Trash and Debris	✓			per approved plan
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : 30" HDPE				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			→ additional rip rap see amu plan.
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
Surrounding Perimeter Conditions: <i>parking lot/wooded</i>				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			
Other				
Remarks:				
Overall Environmental Division Internal Rating: <u>4</u>				
Signature: <u><i>Dina Creed</i></u>		Date: <u>10/2/13</u>		
Title: <u>ENV INSP</u>				

SWMPProg\BMP\CoInspProg\InspForms\DetRet.wpd



**James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities**

County BMP ID Code (if known): WCC057
 Name of Facility: John Deere BMP No.: 3 of 4 Date: 10/1/13
 Location: 3000 John Deere Road
 Name of Owner: ANC, LLC
 Name of Inspector: J Creech / W Cain / S Thomas
 Type of Facility: Day Pond
 Weather Conditions: Cloudy Type: Final Inspection County BMP Inspection Program Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

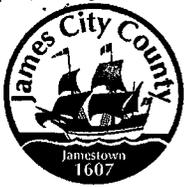
- O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
- Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
- Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			removed all weeds/veg
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches	✓			
Interior Landscaping/Planted Areas: <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	✓			
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): 36" HDPE				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 4x4' Riser				
Condition of Structure	✓			regrouted structure
Corrosion	✓			ok.
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : 30" HDPE				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
Surrounding Perimeter Conditions: parking lot / wooded				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			* relocated to east side of dry pond.
Other				
Remarks:				
Overall Environmental Division Internal Rating: <u> f </u>				
Signature: <u>Via Ornel</u>		Date: <u>10/9/13</u>		
Title: <u>Env Insp</u>				



**James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities**

County BMP ID Code (if known): W058
 Name of Facility: John Deere BMP No.: 4 of 4 Date: 10/9/13
 Location: 3000 John Deere Road
 Name of Owner: ANC, LLC
 Name of Inspector: J Creech / W Cain / S Thomas
 Type of Facility: Dry Pond
 Weather Conditions: Cloudy Type: Final Inspection County BMP Inspection Program Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

- O.K.** - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
- Routine** - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
- Urgent** - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

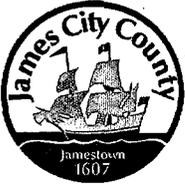
Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			Removed all wooded veg
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	✓			
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): 30" HDPE & 36" HDPE				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 454' Riser				
Condition of Structure	✓			Converted to final BMP
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : 36" HDPE				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
Surrounding Perimeter Conditions: <u>Wooded</u>				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			<u>Per Plan</u>
Other				
Remarks:				
Overall Environmental Division Internal Rating: <u>4</u>				
Signature: <u>Vina Creed</u>			Date: <u>10/9/13</u>	
Title: <u>ENV INSP</u>				

SWMPProg\BMP\ColnspProg\InspForms\DetRet.wpd



**James City County Engineering and Resource
Protection Division
Stormwater Management/BMP Record Drawing and
Construction Certification Review Tracking Form**

*JMR 10/18/13
Transmitted
Mgt has
WC055, WC056,
WC057, WC058*

Project Name: John Dere
 County Plan No. (List any amendments): SP-27-99
 Stormwater Management Facility Type: Dry Ponds (A)
 BMP Phase #: I II III

- Information Package Submittal Date: 5/7/12
- Completeness Check:
 - Record Drawing Date/By: 5/7/12 AES-Marc Bennett
 - Construction Certification Date/By: N/A
 - RD/CC Standard Forms (Ensure that all forms for the BMP type are included)
 - Insp/Maint Agreement # / Date: 5/24/99
 - BMP Maintenance Plan Location: SP-029-13 - Sheet C02 & C03
 - Special Considerations:

- Standard E&SC Notes on Approved Plan Requiring RD/CC or County comment in plan review
 Location (sheet #): C-04
- County BMP ID Code #: WC058, WC059, WC060 & WC056
- Log into Division's "As-Built Tracking Log"
- Obtain basic site information (GPIN, Owner, Address, etc.)
- Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.) *→ not in file*
- Copy from Active Project File (correspondence, H&H, design computations, etc.)
- Create As-Built File using Project File information (File label, folder, copy plan/details/design information, etc.)

- Inspector Review of RD/CC (consult with Chief Engineer prior to completion of comments).
- Record Drawing Review against Approved Plan prior to Field Inspection.
- Final Site Inspection (FI) Performed Date: 10/19/13
- Record Drawing (RD) Review Date: 10/15/13
- Construction Certification (CC) Review Date: N/A - Scott Waiver

- Actions:
 - No comments.
 - Comments. Letter Forwarded. Date: _____
 - Record Drawing (RD)
 - Construction Certification (CC)
 - Construction-Related (CR)
 - Site Issues (SI)
 - Other : _____

- Resubmittal (# and date): _____
- Re-inspection (if necessary): _____
- Drainage System Information Acceptable (RD/CC/System Info). Ok for bond release.
- Complete "Surety Request Form".
- Final Inspection of active file copying any relevant information to "As-Built" file.
- On County BMP Inventory (Phase I, II or III).
- Copy Final Inspection Report into County BMP Inspection Program file.
- Provide Digital Photographs of BMP and save into County BMP Inventory. *→ Scott*
- Request mylar/reproducible from As-Built plan preparer.
- Complete "As-built Tracking Log".
- Last check of BMP Access Database (County BMP Inventory).
- Add BMP to JCC Hydrology & Hydraulic database (optional).
- Add BMP to Municipal BMP list (if a County-owned facility)
- Add BMP to PRIDE BMP ratings database.

Final Sign-Off

Inspector: *Vina Ored* Date: _____
 Chief Engineer: *[Signature]* Date: 10/16/13

*** See separate checklist, if needed.

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 24 day of May, 1999, between John Deere Vehicle Group, Inc. and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: 3000 Meadowview Circle, Toano, VA 23168, Deed Book 420, Page No. 712 or Instrument No. _____, and James City County, Virginia, hereinafter referred to as the "COUNTY."

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

- 1. The COVENANTOR(S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.
2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the SYSTEM to ensure that the SYSTEM is properly maintained.
3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the SYSTEM for the COUNTY, its agent and its contractor.
4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the SYSTEM for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM.
5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the SYSTEM in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the SYSTEM for the cost of the work and any applicable penalties.
6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance, repair, operation or use of the SYSTEM.
7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the SYSTEM. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.
8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the SYSTEM.
9. This COVENANT shall be recorded in the County Land Records.

JUN-30 00 17

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 24 day of May, 1999.

COVENANTOR(S)

John Deere Vehicle Group Inc.

ATTEST:

By: Michael A. Haring
Assistant Secretary

COVENANTOR(S)

ATTEST:

State of Illinois
~~COMMONWEALTH OF VIRGINIA~~
CITY/COUNTY OF Rock Island

I hereby certify that on this 24 day of May, 1999, before the subscribed, a Notary Public of the State of Virginia, and for the County of Rock Island, aforesaid personally appeared Michael A. Haring and did acknowledge the foregoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 24th day of May, 1999.

THU JUN 10 1999
NOTARY PUBLIC
ILLINOIS

Susan K. Stroup
Notary Public

JUN 10 1999

My Commission expires: 4/16/00



Approved as to form:

Leo P. Rogers
Deputy County Attorney

This Declaration of Covenants prepared by:

Tom Park
(Print Name)

Construction Agent
(Title)

One John Deere Place
(Address)

Moline, IL 61265
(City) (State) (Zip)

VIRGINIA: City of Williamsburg and County of James City to Wit:
In the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City the 3 day of June, 1999. This Covenants was presented with certificate annexed and admitted to record at 9:25 o'clock
Teste: Helen S. Ward Clerk
by Leo P. Rogers Deputy Clerk



Environmental Division

OCT 15 2013

RECEIVED

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 – Site Information:

Project Name: Lumber Liquidators (formerly John Deere)
Structure/BMP Name: WCO58 Revisions 10/9/13 (Formerly Stormwater Basin "D")
Project Location: Stonehouse Commerce Park, at end of John Deere Road
BMP Location: northwest of parking lot
County Plan No.: SP - 47, 0039 - 99, 2013

Project Type: Residential Business Commercial Office Institutional Industrial Roadway Other
Tax Map/Parcel No.: (12-1) (1-45)
BMP ID Code (if known):
Zoning District: PUD-C
Land Use: Industrial, Warehouse, Retail Outlet
Site Area (sf or acres): 74.4 acres

Brief Description of Stormwater Management/BMP Facility: Earthen, Extended Detention Dry Pond, with Riser Structure and grassed emergency spillway

Nearest Visible Landmark to SWM/BMP Facility: Lumber Liquidator Retail Outlet and Warehouse (to the southwest)

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: 340
Datum or Reference Elevation: 123.20
Control Description: James City County Vertical Datum
Control Location from Subject Facility: Northeast of site, at the Interstate 64 / Bahramsville Road Interchange

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: For Revisions Yes No Unknown
Approx. Construction Start Date for SWM/BMP Facility: 2000 (revisions made 10/9/13)
Facility Monitored by County Representative during Construction: For Revisions Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: Jack L. Massie Contractor, Inc.(Longhill Excavating Inc. rev. 10/9/13)
Name of Professional Firm Who Routinely Monitored Construction: unknown
Date of Completion for SWM/BMP Facility: unknown (AES Consulting Engineers for revisions only)
Date of Record Drawing/Construction Certification Submittal: May 2012 (revisions made 10/9/13)

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 – Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: ANO, LLC
Mailing Address: 3000 John Deere Road
Toano, Virginia 23168-9332
Business Phone: _____ Fax: _____
Contact Person: Stacey Maddox Title: Facilities Manager

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: Carlisle Associates (AES Consulting Engineers revisions only)
Mailing Address: 1015 Gervais Street 5248 Olde Towne Road
Columbia, South Carolina 29201 Williamsburg, Va. 23188
Business Phone: 803-252-3232 757-220-0040
Fax: _____ 757-220-8994
Responsible Plan Preparer: Jerry F. Friedner V. Marc Bennett, P.E.
Title: Project Manager Senior Project Manager
Plan Name: John Deere Vehicle Group Facility Site Plan Amendment Former John Deere Facility
Firm's Project No. 9476-04
Plan Date: 10/22/1999, 5/6/13
Sheet No.'s Applicable to SWM/BMP Facility: 01- C300 / 01- C500 / 01- C501 / 01- C701 / 1 OF 2
2 OF 2

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: Jack L. Massie Contractor, Inc. (No longer in business) Longhill Excavating, Inc. (for revisions)
Mailing Address: _____ 5099 Longhill Road
Williamsburg, Va. 23188
Business Phone: _____ 757-220-0760
Fax: _____
Contact Person: _____ Jimmy Minor
Site Foreman/Supervisor: _____ Buck Minor
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

Certifying Professionals: *(Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)*

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. Marc Bennett
Title: Senior Project Manager

Signature: 
Date: 10/13/2013

I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

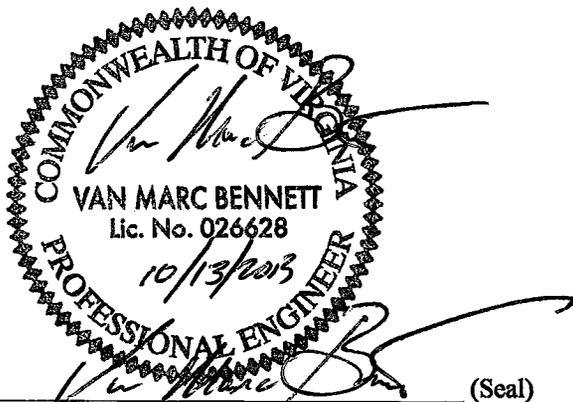
Construction Certification

Firm Name: _____
Mailing Address: _____
Business Phone: _____
Fax: _____

Name: _____
Title: _____

Signature: _____
Date: _____

I hereby certify to the best of my knowledge and belief that this Stormwater Management / BMP facility was monitored and constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.



Virginia Registered Professional Engineer
Or Certified Land Surveyor

(Seal)

Virginia Registered
Professional Engineer

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: (Required for all Stormwater Management / BMP facilities.)

- XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plans sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: (Required for all Stormwater Management / BMP facilities, as applicable.)

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- Inc 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.
- XX 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- XX 8. Elevation of the principal spillway crest or outlet crest of the structure.
- XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacing's (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

- Inc 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- Inc 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or end wall.
- XX 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- Inc 18. Maintenance plan taken from approved design plan transposed onto record drawing set.
NOTE : NO MAINTENANCE PLAN ON PLAN SHEET.
- N/A 19. Fencing location and type, if applicable to facility.
- XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- Inc 21. No visual signs of erosion or channel degradation immediately downstream of facility.
NOTE: SOME EROSION NOTED BEYOND OUTLET PROTECTION.
- XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

- VIII. Group F – Extended Dry Detention (Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)**
- XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.
- Inc F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.
- N/A F3. Timber wall BMP used in intermittent stream only. (i.e. Prohibited in perennial streams.)
- N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.
- N/A F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging
- Inc F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.
- XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.
- N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.
- N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.
- N/A F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.
- XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.
- Inc F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable. **NOTE: NO ACCESS COORIDOR PROVIDED.**
- Inc F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.
- Inc F15. No visual signs of erosion or channel degradation immediately downstream of facility. **NOTE: SOME EROSION NOTED DOWNSTREAM.**
- XX F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse effects to the functions of the facility are anticipated.

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

- XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.
- XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.
- XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).
- XX SD4. Material type, size or diameters, class, invert elevations, lengths and slopes for all pipe segments.
- XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception.)

- N/A O1. All requirements of Section II, Minimum Standards, apply to this section.
- N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.



Environmental Division

OCT 15 2013

RECEIVED

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 – Site Information:

Project Name: Lumber Liquidators (formerly John Deere)
Structure/BMP Name: WCO57 Revisions 10/9/13 (Formerly Stormwater Basin "C")
Project Location: Stonehouse Commerce Park, at end of John Deere Road
BMP Location: northwest of parking lot
County Plan No.: SP - 47 - 99

Project Type: Residential Business Office Institutional Industrial Roadway Public Other
Tax Map/Parcel No.: (12-1) (1-45)
BMP ID Code (if known):
Zoning District: PUD-C
Land Use: Industrial, Warehouse, Retail Outlet
Site Area (sf or acres): 74.4 acres

Brief Description of Stormwater Management/BMP Facility: Earthen, Extended Detention Dry Pond, with Riser Structure and grassed emergency spillway

Nearest Visible Landmark to SWM/BMP Facility: Lumber Liquidator Retail Outlet and Warehouse (to the south-)

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: 340
Datum or Reference Elevation: 123.20
Control Description: James City County Vertical Datum
Control Location from Subject Facility: Northeast of site, at the Interstate 64 / Bahramsville Road Interchange

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: For Revisions Yes No Unknown
Approx. Construction Start Date for SWM/BMP Facility: 2000 (revisions made 10/9/13)
Facility Monitored by County Representative during Construction: For Revisions Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: Jack L. Massie Contractor, Inc. (Longhill Excavating Inc. rev. 10/9/13)
Name of Professional Firm Who Routinely Monitored Construction: unknown (AES Consulting Engineers for revisions only)
Date of Completion for SWM/BMP Facility: unknown (revisions made 10/9/13)
Date of Record Drawing/Construction Certification Submittal: May 2012 (revisions made 10/9/13)

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 – Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: ANO, LLC
Mailing Address: 3000 John Deere Road
Toano, Virginia 23168-9332
Business Phone: _____ Fax: _____
Contact Person: Stacey Maddox Title: Facilities Manager

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: Carlisle Associates (AES Consulting Engineers revisions only)
Mailing Address: 1015 Gervais Street 5248 Olde Towne Road
Columbia, South Carolina 29201 Williamsburg, Va. 23188
Business Phone: 803-252-3232 757-220-0040
Fax: _____ 757-220-8994
Responsible Plan Preparer: Jerry F. Friedner V. Marc Bennett, P.E.
Title: Project Manager Senior Project Manager
Plan Name: John Deere Vehicle Group Facility Site Plan Amendment Former John Deere Facility
Firm's Project No. 9476-04
Plan Date: 10/22/1999, 5/6/13
Sheet No.'s Applicable to SWM/BMP Facility: 01- 01- 01- 01- 1 of 2
C300 / C500 / C501 / C701 / 2 of 2

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: Jack L. Massie Contractor, Inc. (No longer in business) Longhill Excavating, Inc. (for revisions)
Mailing Address: _____ 5099 Longhill Road
Williamsburg, Va. 23188
Business Phone: _____ 757-220-0760
Fax: _____
Contact Person: _____ Jimmy Minor
Site Foreman/Supervisor: _____ Buck Minor
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

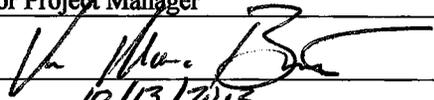
Certifying Professionals: *(Note: A Registered Professional Engineer of Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)*

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. Marc Bennett
Title: Senior Project Manager

Signature: 
Date: 10/13/2013

I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

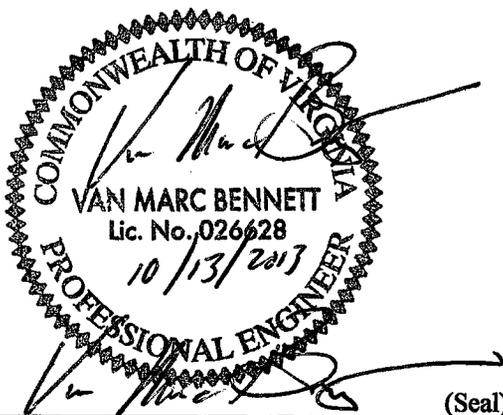
Construction Certification

Firm Name: _____
Mailing Address: _____
Business Phone: _____
Fax: _____

Name: _____
Title: _____

Signature: _____
Date: _____

I hereby certify to the best of my knowledge and belief that this Stormwater Management / BMP facility was monitored and constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.



Virginia Registered Professional Engineer
Or Certified Land Surveyor

(Seal)

Virginia Registered
Professional Engineer

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: (Required for all Stormwater Management / BMP facilities.)

- XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plans sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: (Required for all Stormwater Management / BMP facilities, as applicable.)

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- Inc 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.
- XX 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- XX 8. Elevation of the principal spillway crest or outlet crest of the structure.
- XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacing's (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

- Inc 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- Inc 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or end wall.
- XX 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- Inc 18. Maintenance plan taken from approved design plan transposed onto record drawing set. **NOTE : NO MAINTENANCE PLAN ON PLAN SHEET.**
- N/A 19. Fencing location and type, if applicable to facility.
- XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- Inc 21. No visual signs of erosion or channel degradation immediately downstream of facility. **NOTE: SOME EROSION NOTED BEYOND OUTLET PROTECTION.**
- XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

- VIII. Group F – Extended Dry Detention** *(Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)*
- XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.
- Inc F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.
- N/A F3. Timber wall BMP used in intermittent stream only. (i.e. Prohibited in perennial streams.)
- N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.
- N/A F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging
- Inc F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.
- XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.
- N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.
- N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.
- N/A F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.
- XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.
- XX F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable.
- Inc F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.
- Inc F15. No visual signs of erosion or channel degradation immediately downstream of facility. **NOTE: SOME EROSION NOTED DOWNSTREAM.**
- XX F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse effects to the functions of the facility are anticipated.

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

- XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.
- XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.
- XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).
- XX SD4. Material type, size or diameters, class, invert elevations, lengths and slopes for all pipe segments.
- XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception.)

- N/A O1. All requirements of Section II, Minimum Standards, apply to this section.
- N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

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Environmental Division

OCT 15 2013

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James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 – Site Information:

Project Name: Lumber Liquidators (formerly John Deere)
Structure/BMP Name: WCO56 Revisions 10/09/13 (Formerly Stormwater Basin "B")
Project Location: Stonehouse Commerce Park, at end of John Deere Road
BMP Location: northwest of parking lot
County Plan No.: SP - 47, 0039 - 99, 2013

Project Type: Residential Business Commercial Office Institutional Industrial Public Roadway Other
Tax Map/Parcel No.: (12-1) (1-45)
BMP ID Code (if known):
Zoning District: PUD-C
Land Use: Industrial, Warehouse, Retail Outlet
Site Area (sf or acres): 74.4 acres

Brief Description of Stormwater Management/BMP Facility: Earthen, Extended Detention Dry Pond, with Riser Structure and grassed emergency spillway

Nearest Visible Landmark to SWM/BMP Facility: Lumber Liquidator Retail Outlet and Warehouse (to the southeast)

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: 340
Datum or Reference Elevation: 123.20
Control Description: James City County Vertical Datum
Control Location from Subject Facility: Northeast of site, at the Interstate 64 / Bahramsville Road Interchange

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: For Revisions Yes No Unknown
Approx. Construction Start Date for SWM/BMP Facility: 2000 (revisions made 10/9/13)
Facility Monitored by County Representative during Construction: For Revisions Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: Jack L. Massie Contractor, Inc.(Longhill Excavating Inc. rev. 10/9/13)
Name of Professional Firm Who Routinely Monitored Construction: unknown (AES Consulting Engineers for revisions only)
Date of Completion for SWM/BMP Facility: unknown (revisions made 10/9/13)
Date of Record Drawing/Construction Certification Submittal: May 2012 (revisions made 10/9/13)

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 – Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: ANO, LLC
Mailing Address: 3000 John Deere Road
Toano, Virginia 23168-9332
Business Phone: _____ Fax: _____
Contact Person: Stacey Maddox Title:Facilities Manager

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: Carlisle Associates (AES Consulting Engineers revisions only)
Mailing Address: 1015 Gervais Street 5248 Olde Towne Road
Columbia, South Carolina 29201 Williamsburg, Va. 23188
Business Phone: 803-252-3232 757-220-0040
Fax: _____ 757-220-8994
Responsible Plan Preparer: Jerry F. Friedner V. Marc Bennett, P.E.
Title: Project Manager Senior Project Manager
Plan Name: John Deere Vehicle Group Facility Site Plan Amendment Former John Deere Facility
Firm's Project No. 9476-04
Plan Date: 10/22/1999 5/6/13
Sheet No.'s Applicable to SWM/BMP Facility: 01- 01- 01- 01- 1 of 2
C300 / C500 / C501 / C701 / 2 of 2

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: Jack L. Massie Contractor, Inc. (No longer in business) Longhill Excavating, Inc. (for revisions)
Mailing Address: _____ 5099 Longhill Road
Williamsburg, Va. 23188
Business Phone: _____ 757-220-0760
Fax: _____
Contact Person: _____ Jimmy Minor
Site Foreman/Supervisor: _____ Buck Minor
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

Certifying Professionals: *(Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)*

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. Marc Bennett
Title: Senior Project Manager
Signature: 
Date: 10/13/2013

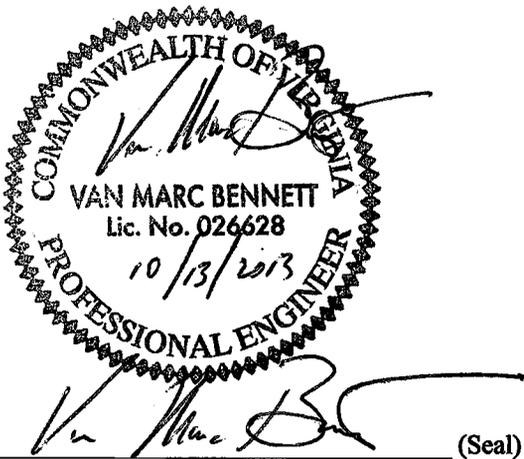
I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

Construction Certification

Firm Name: _____
Mailing Address: _____
Business Phone: _____
Fax: _____

Name: _____
Title: _____
Signature: _____
Date: _____

I hereby certify to the best of my knowledge and belief that this Stormwater Management / BMP facility was monitored and constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.



Virginia Registered Professional Engineer
Or Certified Land Surveyor

(Seal)
Virginia Registered
Professional Engineer

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: (Required for all Stormwater Management / BMP facilities.)

- XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plans sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: (Required for all Stormwater Management / BMP facilities, as applicable.)

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- Inc 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.
- XX 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- XX 8. Elevation of the principal spillway crest or outlet crest of the structure.
- XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacing's (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

- Inc 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- Inc 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or end wall.
- XX 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- Inc 18. Maintenance plan taken from approved design plan transposed onto record drawing set. **NOTE: NO MAINTENACE PLAN ON PLAN SHEET.**
- N/A 19. Fencing location and type, if applicable to facility.
- XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- Inc 21. No visual signs of erosion or channel degradation immediately downstream of facility. **NOTE: SOME EROSION NOTED BEYOND OUTLET PROTECTION.**
- XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

- VIII. Group F – Extended Dry Detention (Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)**
- XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.
- Inc F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.
- N/A F3. Timber wall BMP used in intermittent stream only. (i.e. Prohibited in perennial streams.)
- N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.
- N/A F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging
- Inc F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.
- XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.
- N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.
- N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.
- N/A F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.
- XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.
- XX F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable.
- Inc F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.
- Inc F15. No visual signs of erosion or channel degradation immediately downstream of facility. **NOTE: SOME EROSION NOTED DOWNSTREAM.**
- Inc F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse effects to the functions of the facility are anticipated. **Note: Accumulated sediment noted.**

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

- XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.
- XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.
- XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).
- XX SD4. Material type, size or diameters, class, invert elevations, lengths and slopes for all pipe segments.
- XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception.)

- N/A O1. All requirements of Section II, Minimum Standards, apply to this section.
- N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.



Environmental Division

OCT 15 2013

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James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 – Site Information:

Project Name: Lumber Liquidators (formerly John Deere)
Structure/BMP Name: WCO55 Revisions 10/09/13 (Formerly Stormwater Basin "A")
Project Location: Stonehouse Commerce Park, at end of John Deere Road
BMP Location: northwest of parking lot
County Plan No.: SP - 47, 0039 - 99, 2013

Project Type: Residential Business Tax Map/Parcel No.: (12-1) (1-45)
 Commercial Office BMP ID Code (if known): _____
 Institutional Industrial Zoning District: PUD-C
 Public Roadway Land Use: Industrial, Warehouse, Retail Outlet
 Other _____ Site Area (sf or acres): 74.4 acres

Brief Description of Stormwater Management/BMP Facility: Earthen, Extended Detention Dry Pond, with Riser Structure and grassed emergency spillway

Nearest Visible Landmark to SWM/BMP Facility: Lumber Liquidator Retail Outlet and Warehouse (to the southeast)

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: 340
Datum or Reference Elevation: 123.20
Control Description: James City County Vertical Datum
Control Location from Subject Facility: Northeast of site, at the Interstate 64 / Bahramsville Road Interchange

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: For revisions Yes No Unknown
Approx. Construction Start Date for SWM/BMP Facility: 2000 (revisions made 10/9/13)
Facility Monitored by County Representative during Construction: For revisions Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: Jack L. Massie Contractor, Inc. (Longhill Excavating Inc. rev. 10/9/13)
Name of Professional Firm Who Routinely Monitored Construction: unknown (AES Consulting Engineers for revisions only)
Date of Completion for SWM/BMP Facility: unknown (revisions made 10/9/13)
Date of Record Drawing/Construction Certification Submittal: May 2012 (revisions made 10/9/13)

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 – Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: ANO, LLC
Mailing Address: 3000 John Deere Road
Toano, Virginia 23168-9332
Business Phone: _____ Fax: _____
Contact Person: Stacey Maddox Title: Facilities Manager

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: Carlisle Associates (AES Consulting Engineers revisions only)
Mailing Address: 1015 Gervais Street 5248 Olde Towne Road
Columbia, South Carolina 29201 Williamsburg, Va. 23188
Business Phone: 803-252-3232 757-220-0040
Fax: _____ 757-220-8994
Responsible Plan Preparer: Jerry F. Friedner V. Marc Bennett, P.E.
Title: Project Manager Senior Project Manager
Plan Name: John Deere Vehicle Group Facility Site Plan Amendment Former John Deere Facility
Firm's Project No. 9476-04
Plan Date: 10/22/1999, 5/6/13
Sheet No.'s Applicable to SWM/BMP Facility: 01- 01- 01- 01- 1 OF 2
C300 / C500 / C501 / C701 / 2 OF 2

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: Jack L. Massie Contractor, Inc. (No longer in business) Longhill Excavating, Inc. (for revisions)
Mailing Address: _____ 5099 Longhill Road
Williamsburg, Va. 23188
Business Phone: _____ 757-220-0760
Fax: _____
Contact Person: _____ Jimmy Minor
Site Foreman/Supervisor: _____ Buck Minor
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

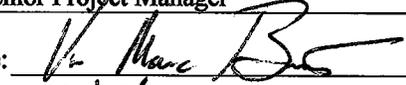
Certifying Professionals: *(Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)*

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. Marc Bennett
Title: Senior Project Manager

Signature: 
Date: 10/13/2013

I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

Construction Certification

Firm Name: _____
Mailing Address: _____
Business Phone: _____
Fax: _____

Name: _____
Title: _____

Signature: _____
Date: _____

I hereby certify to the best of my knowledge and belief that this Stormwater Management / BMP facility was monitored and constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.



 (Seal)

Virginia Registered Professional Engineer
Or Certified Land Surveyor

(Seal)

Virginia Registered
Professional Engineer

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: (Required for all Stormwater Management / BMP facilities.)

- XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plans sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: (Required for all Stormwater Management / BMP facilities, as applicable.)

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- Inc 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.
- XX 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- XX 8. Elevation of the principal spillway crest or outlet crest of the structure.
- XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacing's (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

- Inc 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- Inc 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or end wall.
- XX 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- Inc 18. Maintenance plan taken from approved design plan transposed onto record drawing set. **NOTE: NO MAINTENANCE PLAN ON PLAN SHEETS.**
- N/A 19. Fencing location and type, if applicable to facility.
- XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- XX 21. No visual signs of erosion or channel degradation immediately downstream of facility.
- XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

- VIII. Group F – Extended Dry Detention** *(Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)*
- XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.
- Inc F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.
- N/A F3. Timber wall BMP used in intermittent stream only. (i.e. Prohibited in perennial streams.)
- N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.
- N/A F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging
- Inc F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.
- XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.
- N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.
- N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.
- N/A F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.
- XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.
- Inc F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable. **Note: No Access available to embankment.**
- Inc F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.
- XX F15. No visual signs of erosion or channel degradation immediately downstream of facility.
- Inc F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse effects to the functions of the facility are anticipated. **Note: Accumulated sediment noted.**

STORMWATER MANAGEMENT / BMP FACILITIES

RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

- XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.
- XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.
- XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).
- XX SD4. Material type, size or diameters, class, invert elevations, lengths and slopes for all pipe segments.
- XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception.)

- N/A O1. All requirements of Section II, Minimum Standards, apply to this section.
- N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.



Environmental Division

OCT 15 2013

Hampton Roads | Central Virginia | Middle Peninsula
5248 Olde Towne Road, Suite 1, Williamsburg, Virginia 23188
Phone (757) 253-0040 / Fax (757) 220-8994

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aesva.com

Letter of Transmittal

ATTN: **Mr. Scott Thomas**

CO.: **James City County Engineering
and Resource Protection**

Address: **101-E Mounts Bay Road
Williamsburg, Virginia 23187**

cc: **Jeffery R. Kutz, John Deere**

DATE October 15, 2013	JOB NO. W09476-04
FROM: Bruce Abbott	
RE Bmp Record Drawings (rev.) John Deere Facility	

WE ARE SENDING YOU THE FOLLOWING ITEMS:

Attached
 Under separate cover via

- Original(s) Print(s) Plan(s) Specification(s) Change Order
- Copy of letter(s) Other:

COPIES	DATE	No. of Pages	DESCRIPTION
2		2	Record Drawings of 4 SWM Facilities at former John Deere Site
1		7	Certification for SWM WC055
1		7	Certification for SWM WC056
1		7	Certification for SWM WC057
1		7	Certification for SWM WC058

THESE ARE TRANSMITTED as checked below:

- For your approval For your signature For review and comment
- For your use As you requested As requested by:
- Other:

REMARKS:

VIA: Hand Deliver UPS Ground UPS Next Day Air USPS Mail Other:

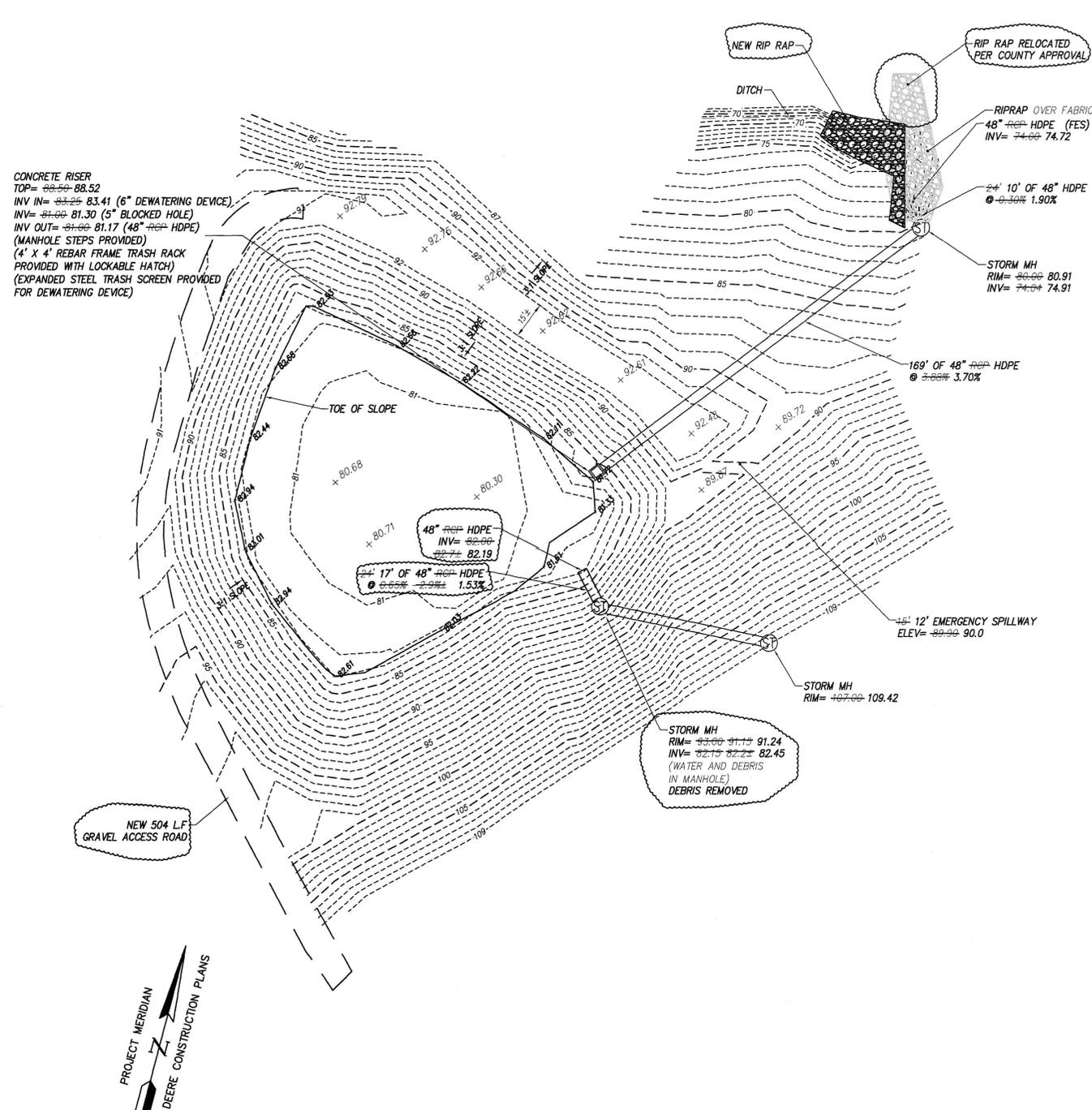
If enclosures are not as noted, kindly notify us at once.

Environmental Division

OCT 15 2013

RECEIVED

BASIN WC055



CONCRETE RISER
 TOP= ~~88.52~~ 88.52
 INV IN= ~~83.41~~ 83.41 (6" DEWATERING DEVICE)
 INV= ~~81.30~~ 81.30 (5" BLOCKED HOLE)
 INV OUT= ~~81.17~~ 81.17 (48" HDPE)
 (MANHOLE STEPS PROVIDED)
 (4' X 4' REBAR FRAME TRASH RACK
 PROVIDED WITH LOCKABLE HATCH)
 (EXPANDED STEEL TRASH SCREEN PROVIDED
 FOR DEWATERING DEVICE)

NEW RIP RAP

RIP RAP RELOCATED
 PER COUNTY APPROVAL

RIPRAP OVER FABRIC
 48" HDPE (FES)
 INV= ~~74.66~~ 74.72

10' OF 48" HDPE
 @ ~~1.90%~~ 1.90%

STORM MH
 RIM= ~~80.91~~ 80.91
 INV= ~~74.91~~ 74.91

169' OF 48" HDPE
 @ ~~3.70%~~ 3.70%

TOE OF SLOPE

48" HDPE
 INV= ~~82.00~~ 82.19

17' OF 48" HDPE
 @ ~~1.53%~~ 1.53%

12' EMERGENCY SPILLWAY
 ELEV= ~~90.0~~ 90.0

STORM MH
 RIM= ~~109.42~~ 109.42

STORM MH
 RIM= ~~91.24~~ 91.24
 INV= ~~82.45~~ 82.45
 (WATER AND DEBRIS
 IN MANHOLE)
 DEBRIS REMOVED

NEW 504 L.F.
 GRAVEL ACCESS ROAD

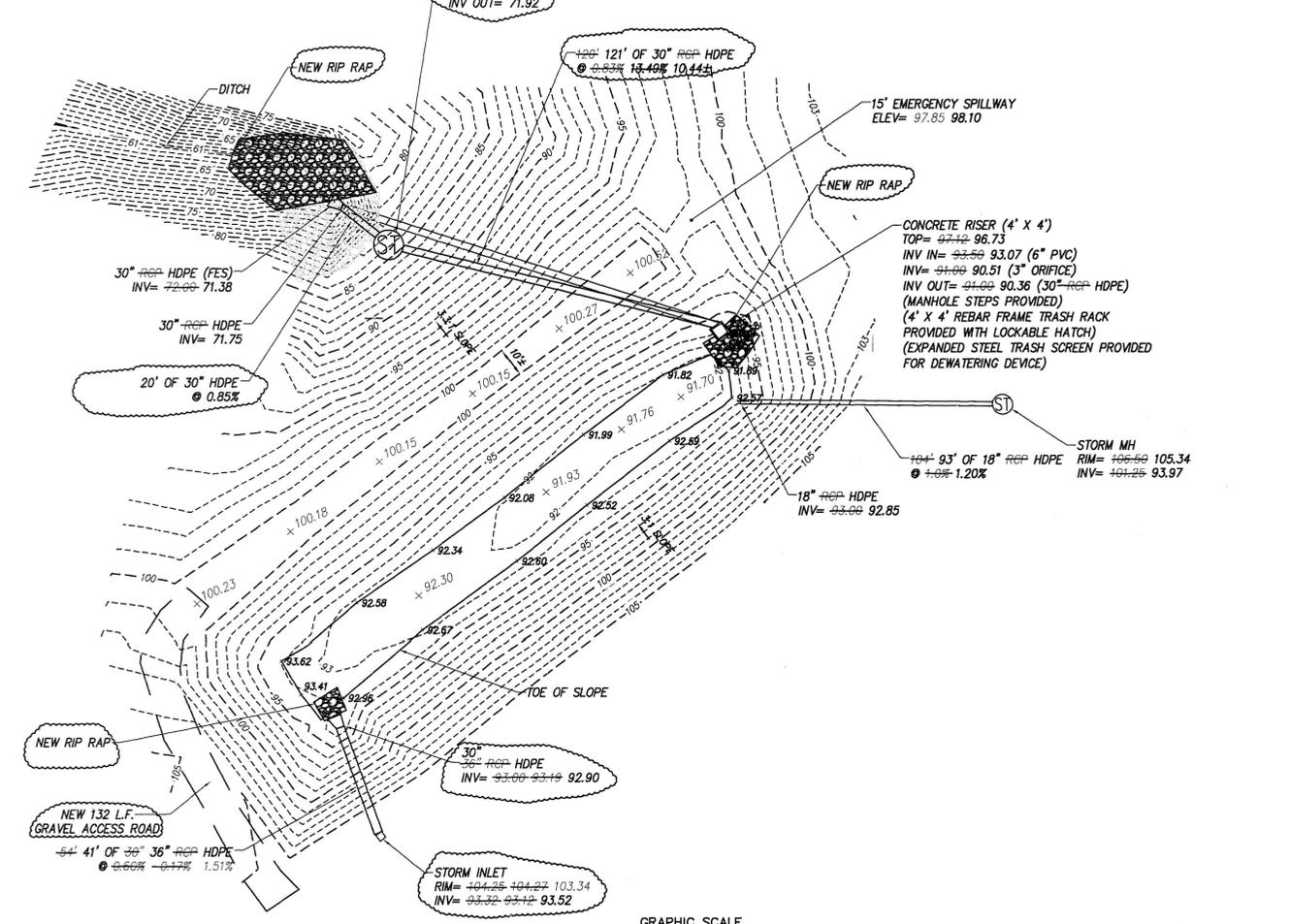
GRAPHIC SCALE
 30' 0' 30' 60'
 SCALE: 1" = 30'

PROJECT MERIDIAN
 JOHN DEERE CONSTRUCTION PLANS

REVISOR: REVISED 9/13/13

NOTE:
 VALUES SHOWN AS "STRIKE-THRU'S" (****)
 REPRESENT ORIGINAL DESIGN INFORMATION

BASIN WC056



STORM MH
 RIM= ~~82.95~~ 82.95
 INV IN= ~~71.92~~ 71.92
 INV OUT= ~~71.92~~ 71.92

NEW RIP RAP

DITCH

121' OF 30" HDPE
 @ ~~10.44%~~ 10.44%

15' EMERGENCY SPILLWAY
 ELEV= 97.85 98.10

NEW RIP RAP

CONCRETE RISER (4' X 4')
 TOP= ~~96.73~~ 96.73
 INV IN= ~~93.07~~ 93.07 (6" PVC)
 INV OUT= ~~90.36~~ 90.36 (30" HDPE)
 (MANHOLE STEPS PROVIDED)
 (4' X 4' REBAR FRAME TRASH RACK
 PROVIDED WITH LOCKABLE HATCH)
 (EXPANDED STEEL TRASH SCREEN PROVIDED
 FOR DEWATERING DEVICE)

STORM MH
 RIM= ~~105.34~~ 105.34
 INV= ~~93.97~~ 93.97

93' OF 18" HDPE
 @ ~~1.20%~~ 1.20%

18" HDPE
 INV= ~~92.85~~ 92.85

30" HDPE (FES)
 INV= ~~71.38~~ 71.38

30" HDPE
 INV= 71.75

20' OF 30" HDPE
 @ 0.85%

TOE OF SLOPE

NEW RIP RAP

NEW 132 L.F.
 (GRAVEL ACCESS ROAD)

41' OF 36" HDPE
 @ ~~1.51%~~ 1.51%

STORM INLET
 RIM= ~~103.34~~ 103.34
 INV= ~~93.52~~ 93.52

30" HDPE
 INV= ~~92.90~~ 92.90

GRAPHIC SCALE
 30' 0' 30' 60'
 SCALE: 1" = 30'

PROJECT MERIDIAN
 JOHN DEERE CONSTRUCTION PLANS

REVISOR: REVISED 9/13/13

NOTE:
 VALUES SHOWN AS "STRIKE-THRU'S" (****)
 REPRESENT ORIGINAL DESIGN INFORMATION

"THE STORM DRAINAGE AS-BUILT LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT."

THOMAS C. SUBLETT
 Lic. No. 1886
 4/08/12
 LAND SURVEYOR

THOMAS C. SUBLETT
 DATE 9/13/13

THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF, THOMAS C. SUBLETT, L.S. FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION; THE ORIGINAL DATA WAS OBTAINED ON APRIL 8, 2012. THIS TOPOGRAPHIC SURVEY MAP MEETS MINIMUM ACCURACY STANDARDS AND IS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NAVD 1929).

Rev.	Date	Description
2	9/13	REVISED RECORD DRAWINGS FOR SWM BASINS
1	4/12	RECORD DRAWINGS FOR SWM BASINS A & B

6248 Old Towne Road, Suite 1
 Williamsburg, Virginia 23188
 Phone: (757) 253-0040
 Fax: (757) 226-8584
 www.aesva.com

AES
 CONSULTING ENGINEERS

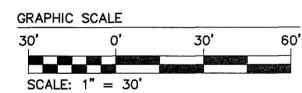
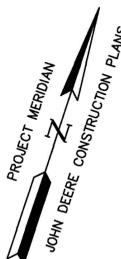
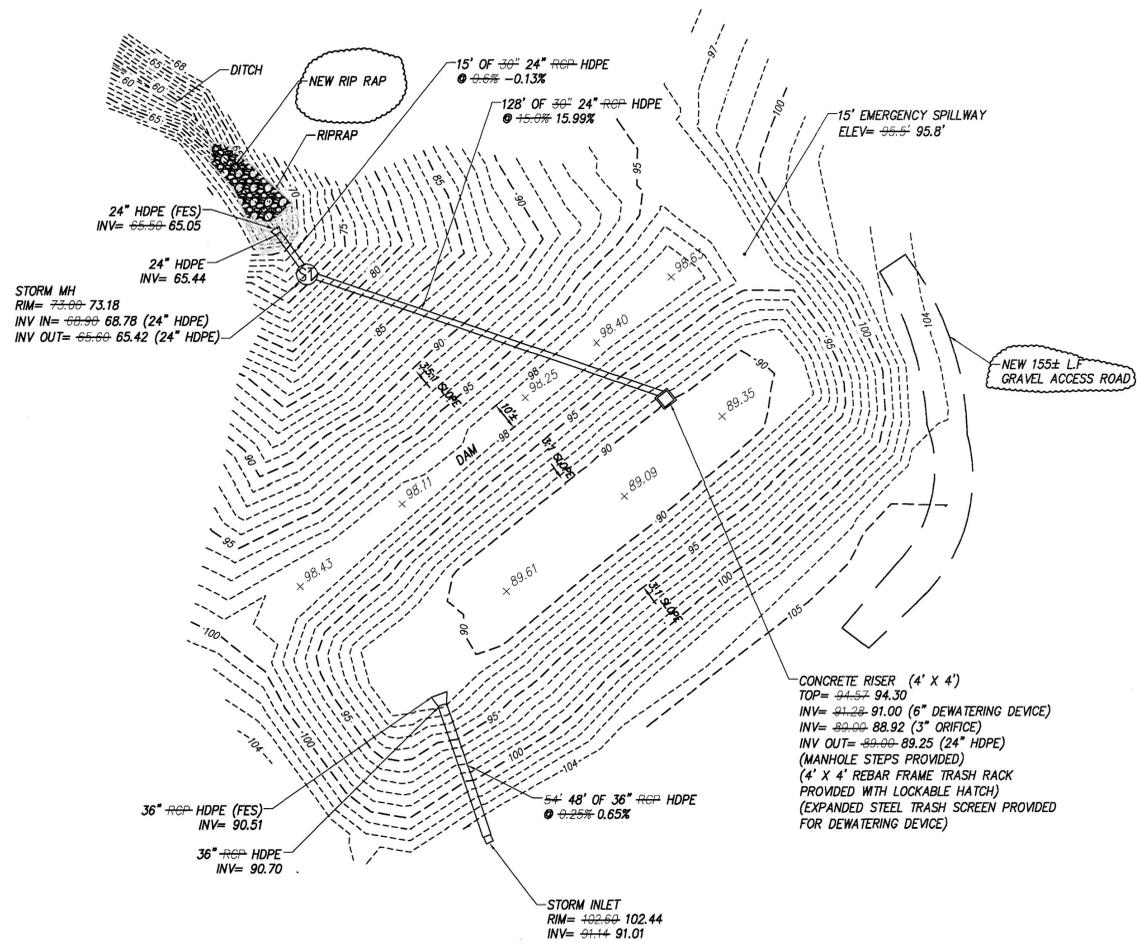
Hampton Roads | Central Virginia | Middle Peninsula

RECORD DRAWINGS FOR
 STORMWATER BASINS A, B, C AND D
 JOHN DEERE VEHICLE GROUP FACILITY

STONEHOUSE DISTRICT | JAMES CITY COUNTY | VIRGINIA

Project Contacts: VMB/TCS
 Project Number: 9476-04
 Scale: 1"=30' Date: 4-08-2012
 Sheet Title:
 STORMWATER
 BASIN
 ASBUILTS
 Sheet Number
1 OF 2

BASIN WC057

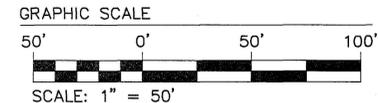
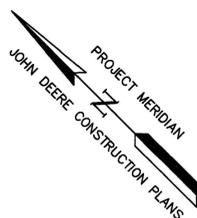
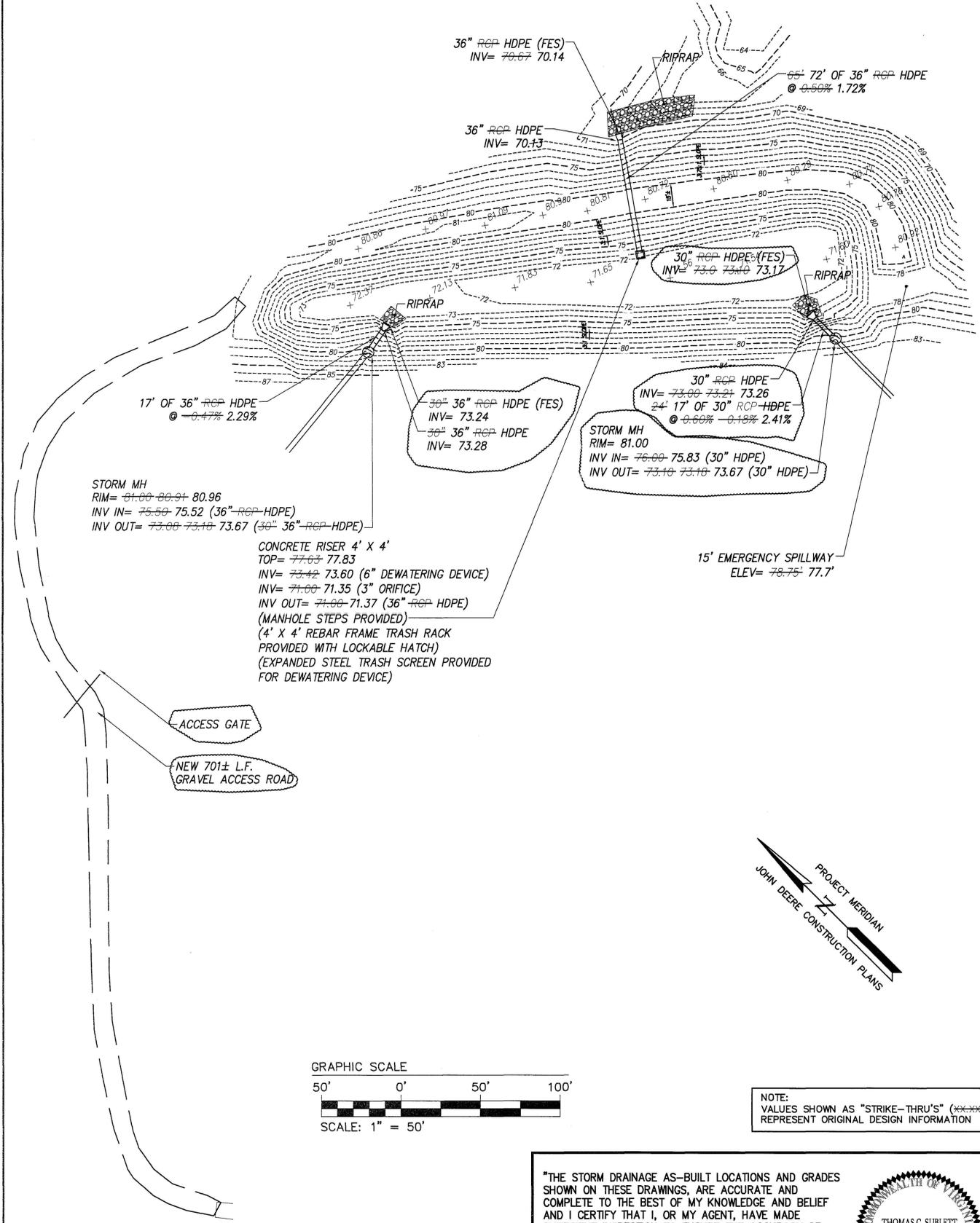


REVISED 9/13/13

NOTE:
VALUES SHOWN AS "STRIKE-THRU'S" (---) REPRESENT ORIGINAL DESIGN INFORMATION

BASIN WC058

THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF, THOMAS C. SUBLETT, L.S. FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION; THE ORIGINAL DATA WAS OBTAINED ON APRIL 8, 2012. THIS TOPOGRAPHIC SURVEY MAP MEETS MINIMUM ACCURACY STANDARDS AND IS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NAVD 1929).



REVISED 9/13/13

"THE STORM DRAINAGE AS-BUILT LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT."

THOMAS C. SUBLETT
L.S. No. 1886
4/08/12
LAND SURVEYOR

9/13/13
DATE

Rev.	Date	Description
2	9/13	REVISED RECORD DRAWINGS FOR SWM BASINS
1	4/12	RECORD DRAWINGS FOR SWM BASINS C & D

5248 Old Town Road, Suite 1
Williamsburg, Virginia 23188
Phone: (757) 265-0040
Fax: (757) 265-0041
www.ajsw.com

AJSW
CONSULTING ENGINEERS

Hampton Roads | Central Virginia | Middle Peninsula

RECORD DRAWINGS FOR
STORMWATER BASINS A, B, C AND D
JOHN DEERE VEHICLE GROUP FACILITY

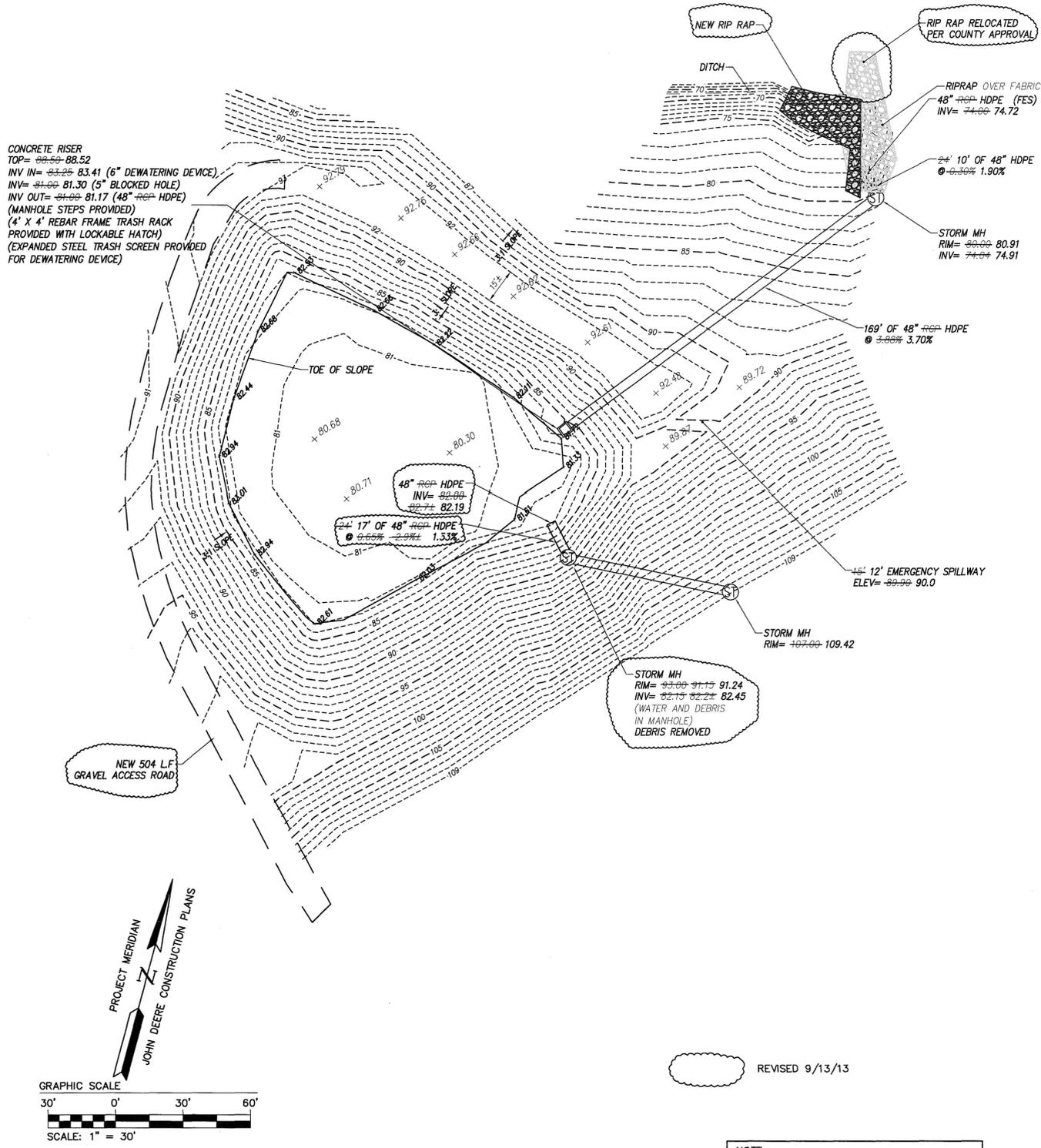
STONEHOUSE DISTRICT | JAMES CITY COUNTY | VIRGINIA

Project Contacts: VMB/TCS
Project Number: 9476-04
Scale: 1"=30'
Date: 4-08-2012

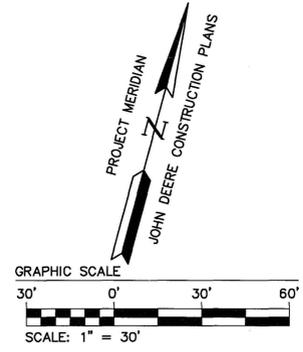
Sheet Title:
STORMWATER
BASIN
ASBUILTS

Sheet Number
2 OF 2

BASIN WC055



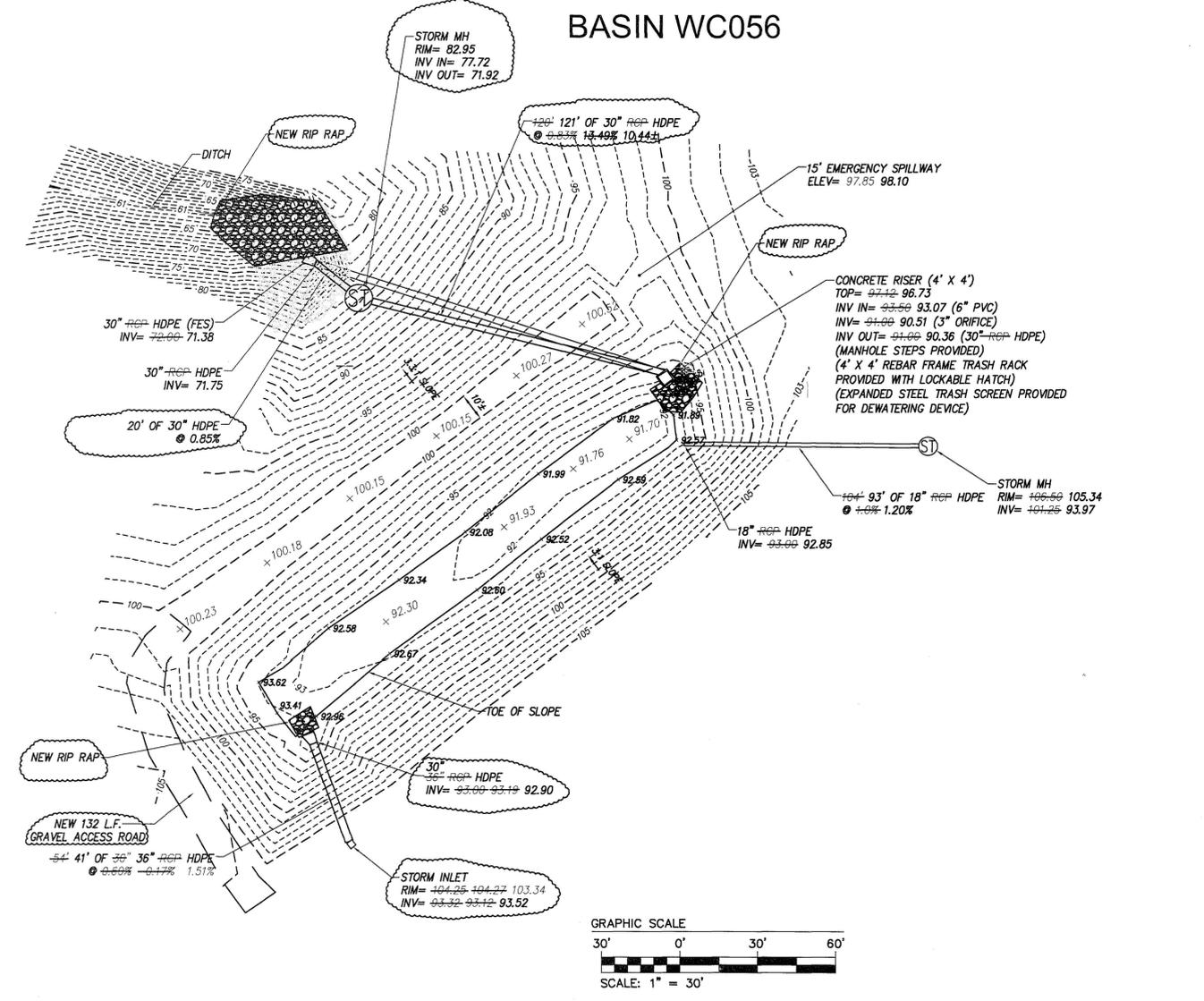
CONCRETE RISER
 TOP= ~~88.52~~ 88.52
 INV IN= ~~83.25~~ 83.41 (6" DEWATERING DEVICE)
 INV= ~~81.00~~ 81.30 (5" BLOCKED HOLE)
 INV OUT= ~~81.00~~ 81.17 (48" HDPE)
 (MANHOLE STEPS PROVIDED)
 (4' X 4' REBAR FRAME TRASH RACK
 PROVIDED WITH LOCKABLE HATCH)
 (EXPANDED STEEL TRASH SCREEN PROVIDED
 FOR DEWATERING DEVICE)



NOTE:
 VALUES SHOWN AS "STRIKE-THRU'S" (---) REPRESENT ORIGINAL DESIGN INFORMATION

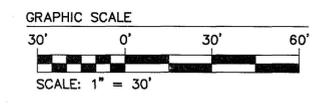
REVISED 9/13/13

BASIN WC056



THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF, THOMAS C. SUBLETT, L.S. FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION; THE ORIGINAL DATA WAS OBTAINED ON APRIL 8, 2012. THIS TOPOGRAPHIC SURVEY MAP MEETS MINIMUM ACCURACY STANDARDS AND IS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NAVD 1929).

CONCRETE RISER (4' X 4')
 TOP= ~~97.12~~ 96.73
 INV IN= ~~93.50~~ 93.07 (6" PVC)
 INV= ~~91.00~~ 90.51 (3" ORIFICE)
 INV OUT= ~~91.00~~ 90.36 (30" HDPE)
 (MANHOLE STEPS PROVIDED)
 (4' X 4' REBAR FRAME TRASH RACK
 PROVIDED WITH LOCKABLE HATCH)
 (EXPANDED STEEL TRASH SCREEN PROVIDED
 FOR DEWATERING DEVICE)



NOTE:
 VALUES SHOWN AS "STRIKE-THRU'S" (---) REPRESENT ORIGINAL DESIGN INFORMATION

REVISED 9/13/13

"THE STORM DRAINAGE AS-BUILT LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT."

THOMAS C. SUBLETT
 Lic. No. 1886
 4/08/12
 LAND SURVEYOR

THOMAS C. SUBLETT
 DATE 9/13/13

Rev.	Date	Description
1	4/12	RECORD DRAWINGS FOR SWM BASINS A,B
2	8/13	REVISED RECORD DRAWINGS FOR SWM BASINS

6240 Old Town Road, Suite 1
 Williamsburg, Virginia 23188
 Phone: (757) 263-0400
 Fax: (757) 220-8894
 www.ams.com

AMS
 CONSULTING ENGINEERS

Hampton Roads | Central Virginia | Middle Peninsula
 VIRGINIA
 JAMES CITY COUNTY
 STONEHOUSE DISTRICT

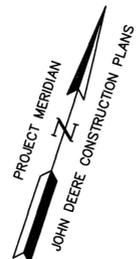
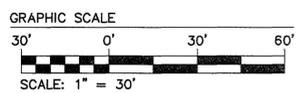
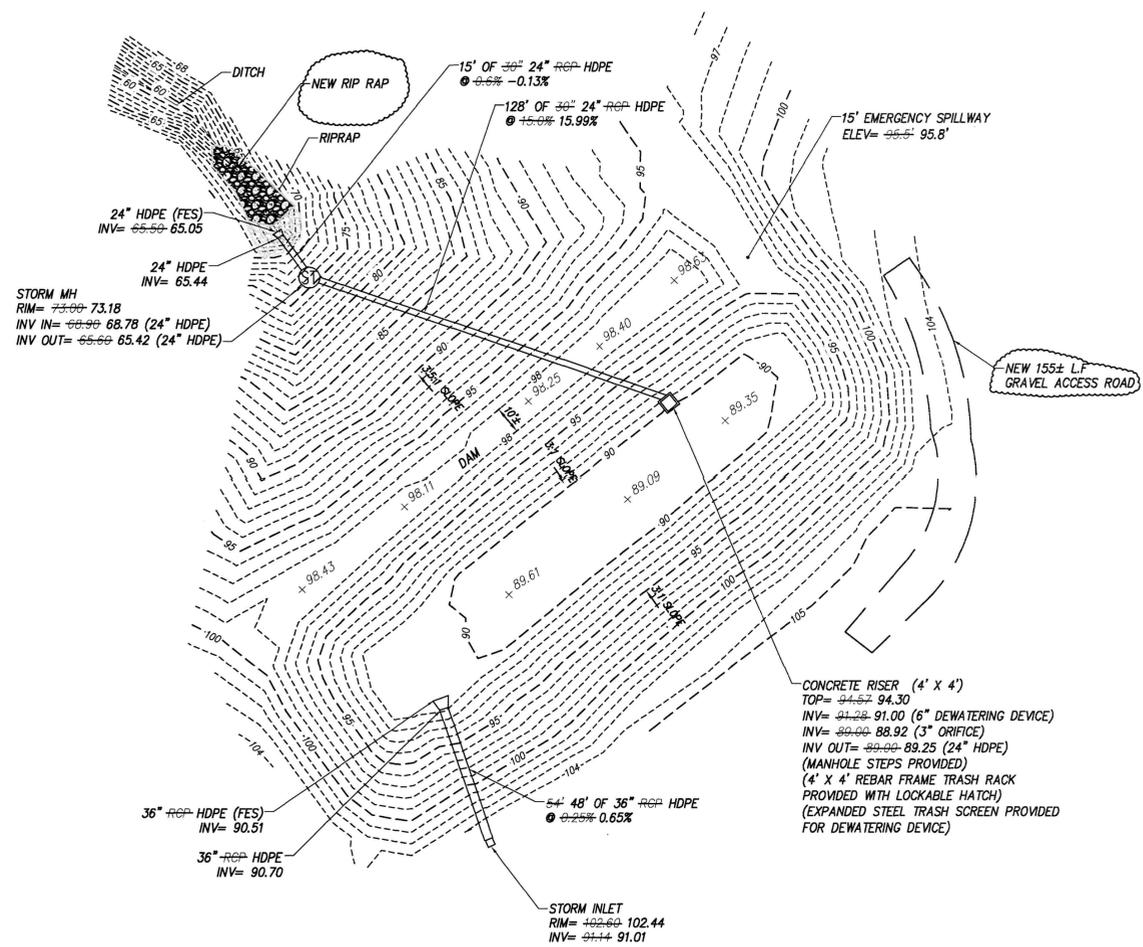
RECORD DRAWINGS FOR
 STORMWATER BASINS A, B, C AND D
 JOHN DEERE VEHICLE GROUP FACILITY

Project Contacts: VMB/TCS
 Project Number: 9476-04
 Scale: 1"=30'
 Date: 4-08-2012

Sheet Title:
 STORMWATER
 BASIN
 ASBUILTS

Sheet Number
1 OF 2

BASIN WC057

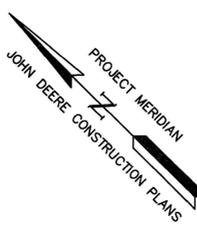
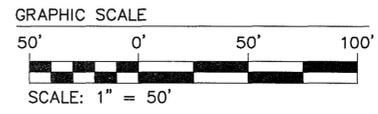
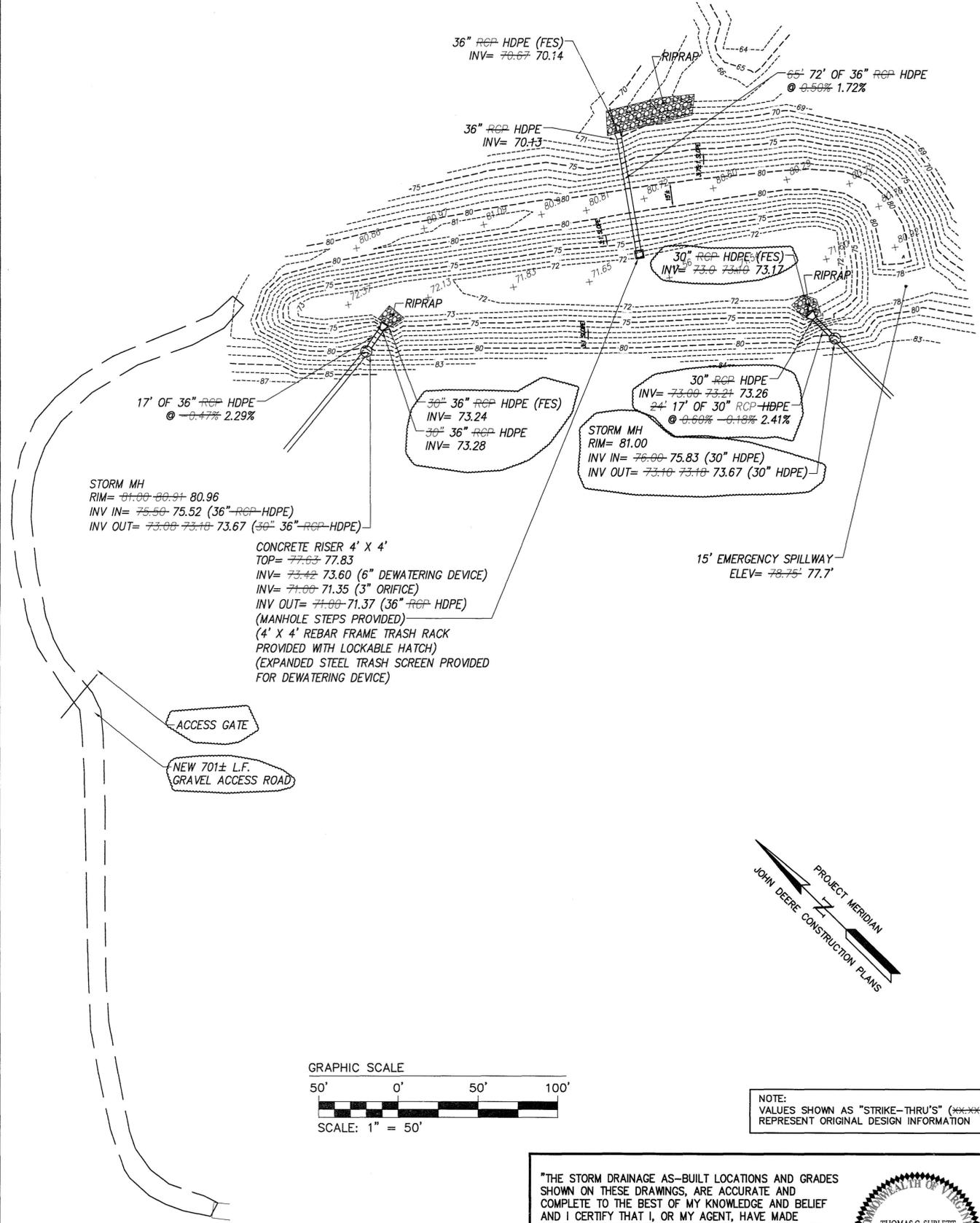


REVISED 9/13/13

NOTE:
VALUES SHOWN AS "STRIKE-THRU'S" (****)
REPRESENT ORIGINAL DESIGN INFORMATION

BASIN WC058

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REVISED 9/13/13

"THE STORM DRAINAGE AS-BUILT LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT."

THOMAS C. SUBLETT
Lic. No. 1886
4/08/12
LAND SURVEYOR

THOMAS C. SUBLETT
DATE 9/13/13

Rev.	Date	Description
2	9/13	REVISED RECORD DRAWINGS FOR SWM BASINS
1	4/12	RECORD DRAWINGS FOR SWM BASINS C & D

5248 Old Town Road, Suite 1
Williamsburg, Virginia 23188
Phone: (757) 255-0940
Fax: (757) 255-0897
www.ajns.com

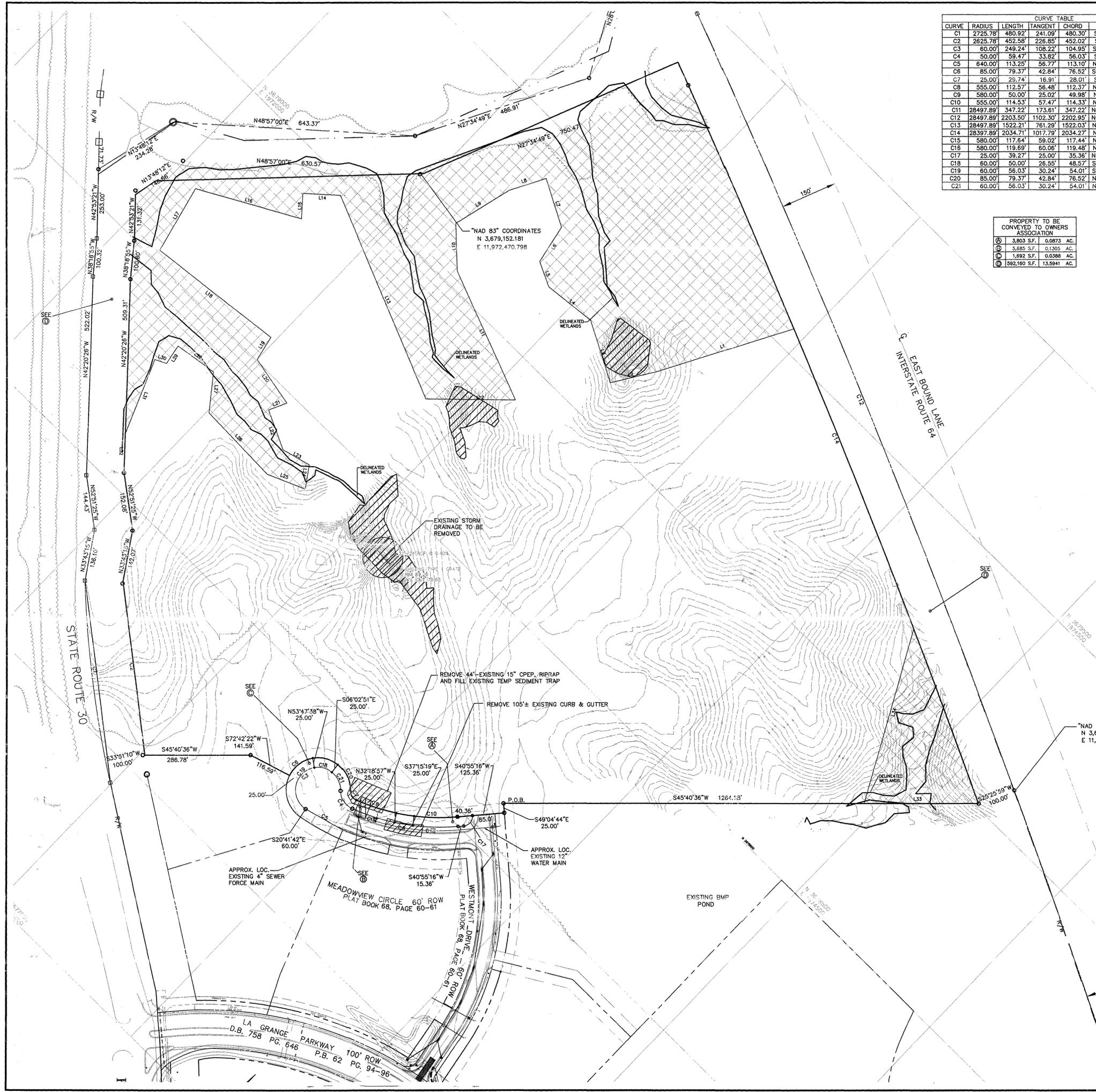
AJNS
CONSULTING ENGINEERS

Hampton Roads | Central Virginia | Middle Peninsula

RECORD DRAWINGS FOR
STORMWATER BASINS A, B, C AND D
JOHN DEERE VEHICLE GROUP FACILITY

STONEHOUSE DISTRICT | JAMES CITY COUNTY | VIRGINIA

Project Contacts:	VMB/TCS
Project Number:	9476-04
Scale:	1"=30'
Date:	4-08-2012
Sheet Title:	STORMWATER BASIN ASBUILTS
Sheet Number:	2 OF 2



CURVE	RADIUS	LENGTH	TANGENT	CHORD	BEARING	DELTA
C1	2725.78'	480.92'	241.09'	480.30'	S51°05'34"E	10°08'32"
C2	2625.78'	452.58'	228.85'	452.02'	S51°12'34"E	09°52'32"
C3	60.00'	249.24'	108.22'	104.95'	S18°28'53"W	238°00'34"
C4	50.00'	59.47'	33.82'	56.03'	S76°37'16"E	88°08'52"
C5	640.00'	113.25'	56.77'	113.10'	N74°22'27"E	10°08'19"
C6	85.00'	79.37'	42.84'	76.52'	S08°27'22"W	53°30'00"
C7	25.00'	29.74'	16.91'	28.01'	S76°37'16"E	68°08'52"
C8	555.00'	112.57'	56.48'	112.37'	N63°29'40"E	11°37'15"
C9	580.00'	50.00'	25.00'	49.98'	N55°12'52"E	04°56'21"
C10	555.00'	114.53'	57.47'	114.33'	N46°49'58"E	11°49'26"
C11	28497.89'	347.22'	173.61'	347.22'	N69°20'43"W	00°41'53"
C12	28497.89'	2203.50'	1102.30'	2202.95'	N66°46'56"W	04°55'09"
C13	28497.89'	1522.21'	761.29'	1522.03'	N63°02'13"W	03°03'38"
C14	28397.89'	2034.71'	1017.79'	2034.27'	N66°37'11"W	04°06'19"
C15	580.00'	117.64'	59.02'	117.44'	N63°29'40"E	11°37'15"
C16	580.00'	119.69'	60.06'	119.48'	N46°49'58"E	11°49'26"
C17	25.00'	39.27'	25.00'	35.36'	N04°04'44"W	90°00'00"
C18	60.00'	50.00'	26.55'	48.57'	S60°04'48"W	47°44'47"
C19	60.00'	56.03'	30.24'	54.01'	S59°27'22"W	53°30'00"
C20	85.00'	79.37'	42.84'	76.52'	N69°17'50"W	53°30'01"
C21	60.00'	56.03'	30.24'	54.01'	N69°17'50"W	53°30'01"

PROPERTY TO BE CONVEYED TO OWNERS ASSOCIATION	SQ. FT.	ACRES
①	3,803	0.0873
②	3,985	0.0915
③	1,892	0.0388
④	592,160	13.5941

LINE	LENGTH	BEARING
L1	381.24'	S28°32'41"W
L2	126.80'	S32°20'03"W
L3	172.08'	N61°55'29"W
L4	141.32'	S84°05'52"W
L5	70.86'	N84°27'45"W
L6	106.07'	N11°11'47"W
L7	134.52'	N61°55'29"W
L8	103.49'	S28°04'31"W
L9	166.20'	S14°25'39"W
L10	124.74'	S48°04'03"E
L11	372.10'	S88°53'36"E
L12	238.29'	S46°20'29"W
L13	580.00'	N67°19'11"W
L14	98.73'	S48°57'00"W
L15	67.02'	S41°03'00"E
L16	292.60'	S61°25'27"W
L17	187.37'	S13°37'27"E
L18	373.53'	N83°21'22"E
L19	68.97'	S12°02'43"E
L20	139.01'	S79°04'51"E
L21	51.90'	S23°50'52"W
L22	111.65'	S84°29'08"E
L23	80.30'	N75°06'59"E
L24	64.47'	S34°23'51"E
L25	108.07'	S86°47'42"W
L26	223.60'	N88°11'35"W
L27	108.36'	N38°03'38"W
L28	116.27'	S81°11'47"W
L29	55.38'	S10°00'45"E
L30	32.43'	S64°17'42"W
L31	210.41'	S22°27'09"E
L32	102.88'	S42°20'26"E
L33	306.60'	S43°40'36"W
L34	477.18'	N28°07'35"W

- NOTES:
 1. BOUNDARY TAKEN FROM SURVEY FOR STONEHOUSE, INC. BY LANGLEY & McDONALD, DATED 3/22/99.
 2. TOPOGRAPHY PROVIDED BY STONEHOUSE, INC.
 3. A PARTIAL WETLANDS DELINEATION HAS BEEN COMPLETED BY LANGLEY & McDONALD AND ONLY THE UPPER REACHES HAVE BEEN SHOWN.
 4. SEE SHEET 12 FOR CONSTRUCTION SEQUENCE.

- LEGEND
 □ V.D.O.T. CONCRETE RIGHT-OF-WAY MONUMENT (FOUND)
 ○ IRON PIN (SET)
 • IRON PIN (SET)

AREA TABULATIONS
 STONEHOUSE COMMERCE PARK SECTION C

TOTAL AREA 88,5703 ACRES
 3,858,122 S.F.

PARCEL A 74,3712 ACRES
 3,239,610 S.F.

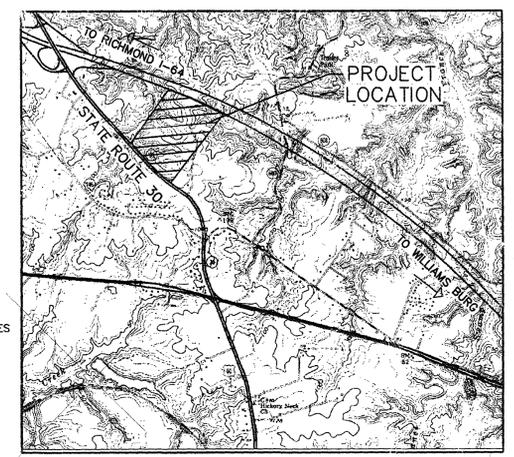
RIGHT-OF-WAY 0.3484 ACRES
 15,175 S.F.

PROPERTY TO BE CONVEYED TO OWNERS ASSOCIATION 13,8507 ACRES
 603,337 S.F.

25% DISTURBED SLOPE AREA = 1.26 AC.

- 25% DISTURBED SLOPE AREA (diagonal hatching)
 CONSERVATION EASEMENT "UNDISTURBED NATURAL OPEN SPACE" PRIVATE OPEN SPACE (cross-hatching)

SITE ADDRESS: 3000 MEADOWVIEW CIRCLE
 TOANO, VA. 23168
 TAX MAP: (12-1)(1-45)
 SITE ZONING: (PUD-C)



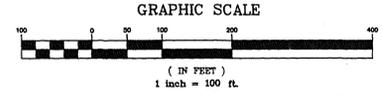
VICINITY MAP SCALE: 1" = 2000'

SP-47-99

COUNTY OF JAMES CITY FINAL SITE PLAN

APPROVALS:

APPROVALS	DATE
Fire Dept. [Signature]	4/12/00
Health Dept. [Signature]	4/11/00
VDOT [Signature]	4/11/00
Planning [Signature]	4/11/00
Environ. [Signature]	4/11/00
Zoning Adm. [Signature]	4/11/00
JCCA [Signature]	4/11/00
County Eng. [Signature]	4/11/00
PEA [Signature]	4/11/00
Other	



- CIVIL SHEET INDEX
- 01-C100 EXISTING CONDITION/DEMOLITION PLAN
 - 01-C200 SITE LAYOUT AND STAKING PLAN
 - 01-C300 OVERALL GRADING PLAN
 - 01-C301 ENLARGED GRADING PLAN
 - 01-C400 UTILITY PLAN
 - 01-C500 STORM DRAINAGE PLAN
 - 01-C501 DRAINAGE DIVIDE PLAN
 - 01-C600 EROSION AND SEDIMENT CONTROL PLAN
 - 01-C700 SITE DETAIL SHEET
 - 01-C701 SITE DETAIL SHEET
 - 01-C702 SITE DETAIL SHEET
 - 01-C703 SITE DETAIL SHEET
 - 01-C704 SITE DETAIL SHEET

REV. NO.	DATE	BY	APP.	LOCATION	REVISIONS
0	4/19/99	0	0	0	0
1	4/19/99	0	0	0	0
2	4/19/99	0	0	0	0
3	4/19/99	0	0	0	0
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50	4/19/99	0	0	0	0

FILE NAME: 01-C100
 DATE: 4/19/99

APPROVALS

PROJECT MANAGER
 FRIEDNER

ARCHITECT OF RECORD
 2 ANDERS

SITE ENGINEERING
 RESCH

STRUCTURAL ENGINEERING
 CARSON

MECHANICAL ENGINEERING
 BRYANT

ELECTRICAL ENGINEERING

DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

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K
KAHN

CARLISLE ASSOCIATES
 ARCHITECT'S ENGINEERS

1015 GERVAS STREET
 COLUMBIA SOUTH CAROLINA 29201
 803-252-3232

JOHN DEERE
 VEHICLE GROUP
 FACILITY

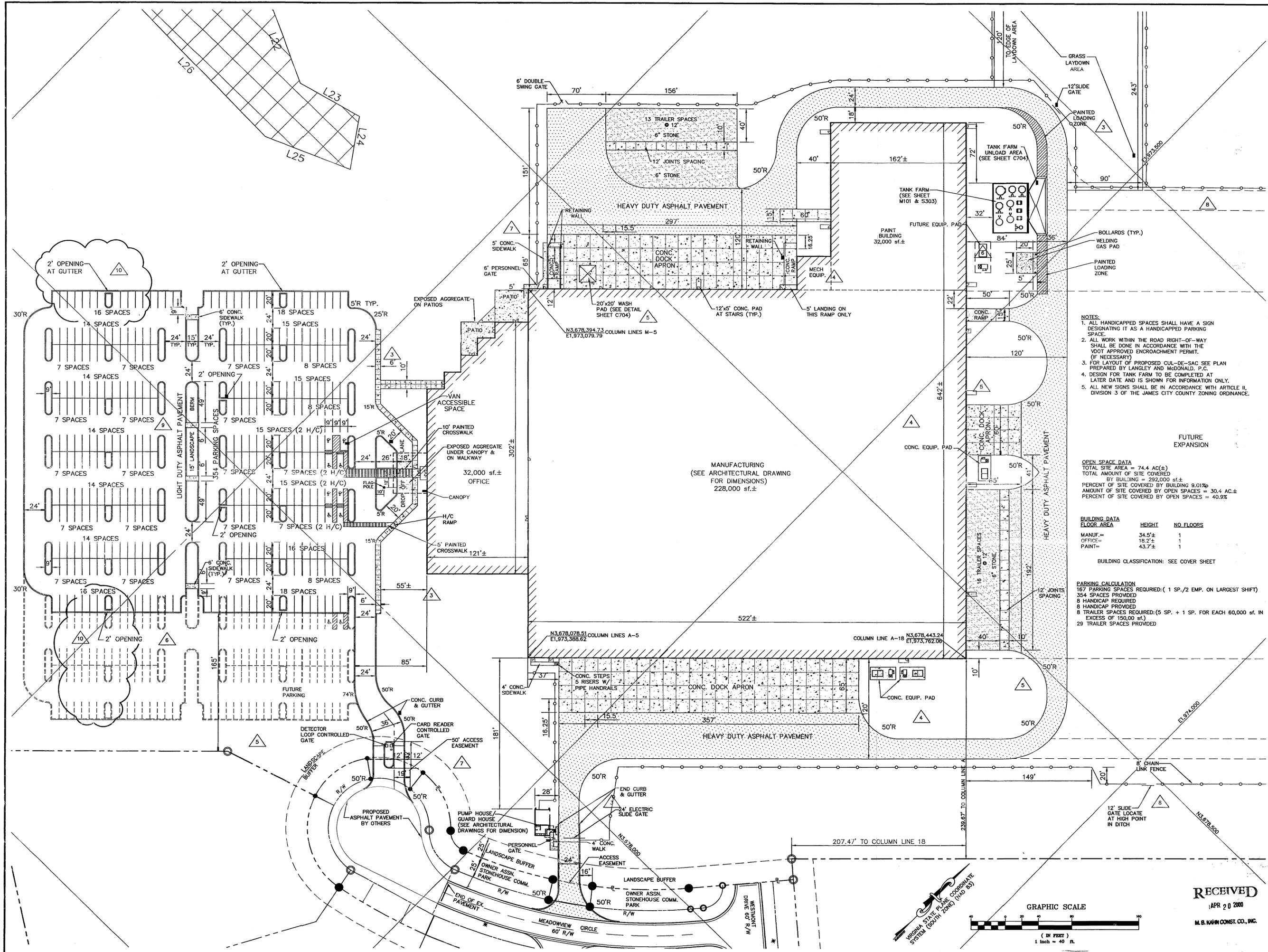
TOANO, VIRGINIA

PROJECT TITLE
 SHEET TITLE

EXISTING CONDITIONS AND DEMOLITION PLAN

SHEET NUMBER
01-C100
 R4

1 OF 13 SHEETS



- NOTES:**
- ALL HANDICAPPED SPACES SHALL HAVE A SIGN DESIGNATING IT AS A HANDICAPPED PARKING SPACE.
 - ALL WORK WITHIN THE ROAD RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH THE VDOT APPROVED ENCROACHMENT PERMIT, (IF NECESSARY).
 - FOR LAYOUT OF PROPOSED CUL-DE-SAC SEE PLAN LATER DATE AND IS SHOWN FOR INFORMATION ONLY.
 - DESIGN FOR TANK FARM TO BE COMPLETED AT A LATER DATE AND IS SHOWN FOR INFORMATION ONLY.
 - ALL NEW SIGNS SHALL BE IN ACCORDANCE WITH ARTICLE II, DIVISION 3 OF THE JAMES CITY COUNTY ZONING ORDINANCE.

OPEN SPACE DATA
 TOTAL SITE AREA = 74.4 AC(±)
 TOTAL AMOUNT OF SITE COVERED BY BUILDING = 292,000 sf ±
 PERCENT OF SITE COVERED BY BUILDING = 9.01%
 AMOUNT OF SITE COVERED BY OPEN SPACES = 30.4 AC ±
 PERCENT OF SITE COVERED BY OPEN SPACES = 40.9%

BUILDING DATA

FLOOR AREA	HEIGHT	NO. FLOORS
MANUF. =	34.5' ±	1
OFFICE =	18.2' ±	1
PAINT =	43.7' ±	1

BUILDING CLASSIFICATION: SEE COVER SHEET

PARKING CALCULATION
 167 PARKING SPACES REQUIRED: (1 SP./2 EMP. ON LARGEST SHIFT)
 354 SPACES PROVIDED
 8 HANDICAP REQUIRED
 8 HANDICAP PROVIDED
 8 TRAILER SPACES REQUIRED: (5 SP. + 1 SP. FOR EACH 60,000 sf. IN EXCESS OF 150,000 sf.)
 29 TRAILER SPACES PROVIDED

REVISIONS

REV. NO.	DATE	BY	LOCATION	REMARKS
1	03/12/00	CDK	ER	NOTED REVISED FENCE LAYOUT
2	04/13/00	CDK	ER	NOTED REVISED PARKING LOT
3	04/18/00	CDK	ER	NOTED ADD PARKING LOT ISLANDS
4	06/09/00	CDK	ER	NOTED PERMIT ISSUUE
5	10/21/00	CDK	ER	NOTED REV. PARKING/TANK FARM, ETC.
6	11/24/99	CDK	ER	NOTED REV. PARKING/TANK FARM, ETC.
7	01/31/00	CDK	ER	NOTED REVISED DRIVEWAY, SIDEWALK

APPROVALS

PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: FRIEDNER
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: [blank]
 DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

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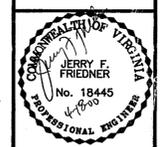
CARLISLE ASSOCIATES
 ARCHITECTS ENGINEERS

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 COLUMBIA, SOUTH CAROLINA 29201
 803-252-3252

JOHN DEERE VEHICLE GROUP FACILITY
 TOWN, VIRGINIA

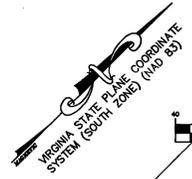
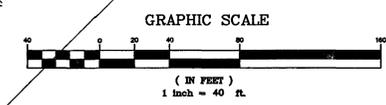
PROJECT TITLE
 SHEET TITLE

SITE LAYOUT AND STAKING PLAN

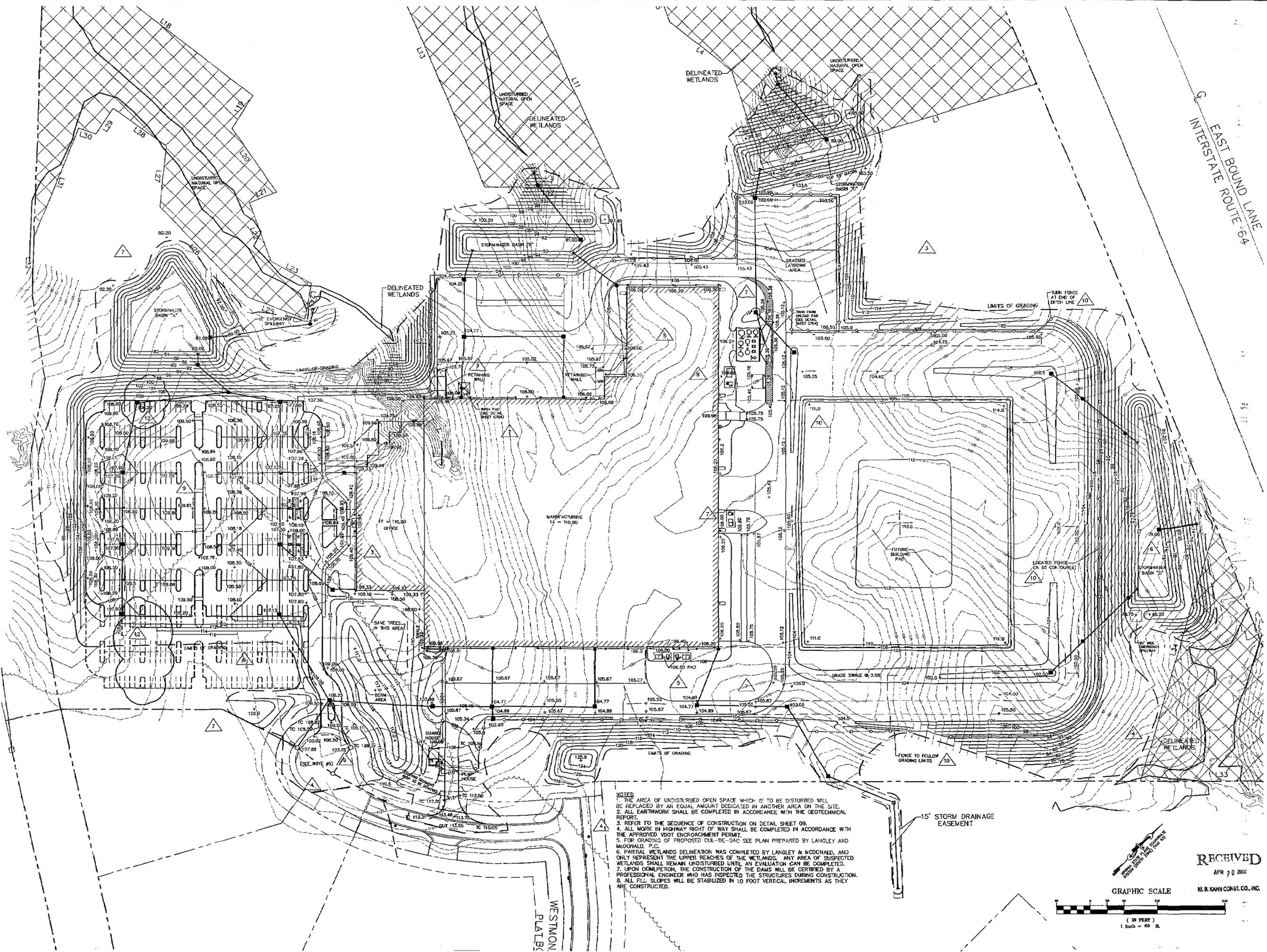


SHEET NUMBER
01-C200
 R10
 2 OF 13 SHEETS

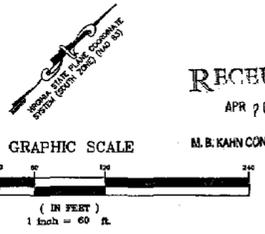
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 APR 20 2000
 M.B. KAHN CONST. CO., INC.



H:\CV\1104901-C200.dwg Tue Apr 18 12:16:20 2000 Reclch



- NOTES:
1. THE AREA OF UNDISTURBED OPEN SPACE WHICH IS TO BE DISTURBED WILL BE REPLACED BY AN EQUAL AMOUNT DEDICATED IN ANOTHER AREA ON THE SITE.
 2. ALL EARTHWORK SHALL BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.
 3. REFER TO THE SEQUENCE OF CONSTRUCTION ON DETAIL SHEET 09.
 4. ALL WORK IN HIGHWAY RIGHT OF WAY SHALL BE COMPLETED IN ACCORDANCE WITH THE APPROVED VDOT ENCROACHMENT PERMIT.
 5. FOR GRADING OF PROPOSED CUL-DE-SAC SEE PLAN PREPARED BY LANGLEY AND McDONALD, P.C.
 6. PARTIAL WETLANDS DELINEATION WAS COMPLETED BY LANGLEY & McDONALD, AND ONLY REPRESENT THE UPPER REACHES OF THE WETLANDS. ANY AREA OF SUSPECTED WETLANDS SHALL REMAIN UNDISTURBED UNTIL AN EVALUATION CAN BE COMPLETED.
 7. UPON COMPLETION, THE CONSTRUCTION OF THE DAMS WILL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO HAS INSPECTED THE STRUCTURES DURING CONSTRUCTION.
 8. ALL FILL SLOPES WILL BE STABILIZED IN 10 FOOT VERTICAL INCREMENTS AS THEY ARE CONSTRUCTED.



REV. NO.	DATE	BY	APP. LOCATION	REVISIONS
1	11/24/99	CDK	CDK	REVISED DRIVEWAY, SIDEWALK
2	01/23/00	CDK	CDK	NOTED REVISED FENCE LAYOUT
3	03/18/00	CDK	CDK	NOTED REVISED PARKING LAYOUT
4	04/18/00	CDK	CDK	NOTED ADD PARKING LOT ISLANDS
5	04/18/00	CDK	CDK	NOTED ADD PARKING LOT ISLANDS
6	07/13/99	CDK	CDK	GEN. FIELD RUN TOP/PC/REV. BASIN 'E'
7	10/27/99	CDK	CDK	NOTED REV. PARK, GRADISTANK FARM ETC

FILE NAME: 01-C300
DATE: 4/19/99

APPROVALS

PROJECT MANAGER	FRIEDNER
ARCHITECT OF RECORD	ZANDERS
SITE ENGINEERING	FRIEDNER
STRUCTURAL ENGINEERING	CARSON
MECHANICAL ENGINEERING	BRYANT
ELECTRICAL ENGINEERING	

DRAWN: CDK
DESIGNED: EIR
CHECKED: JFF

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CARLISLE ASSOCIATES
ARCHITECTS ENGINEERS

1015 GERVAYS STREET
COLUMBIA, SOUTH CAROLINA 29210
803-252-3232

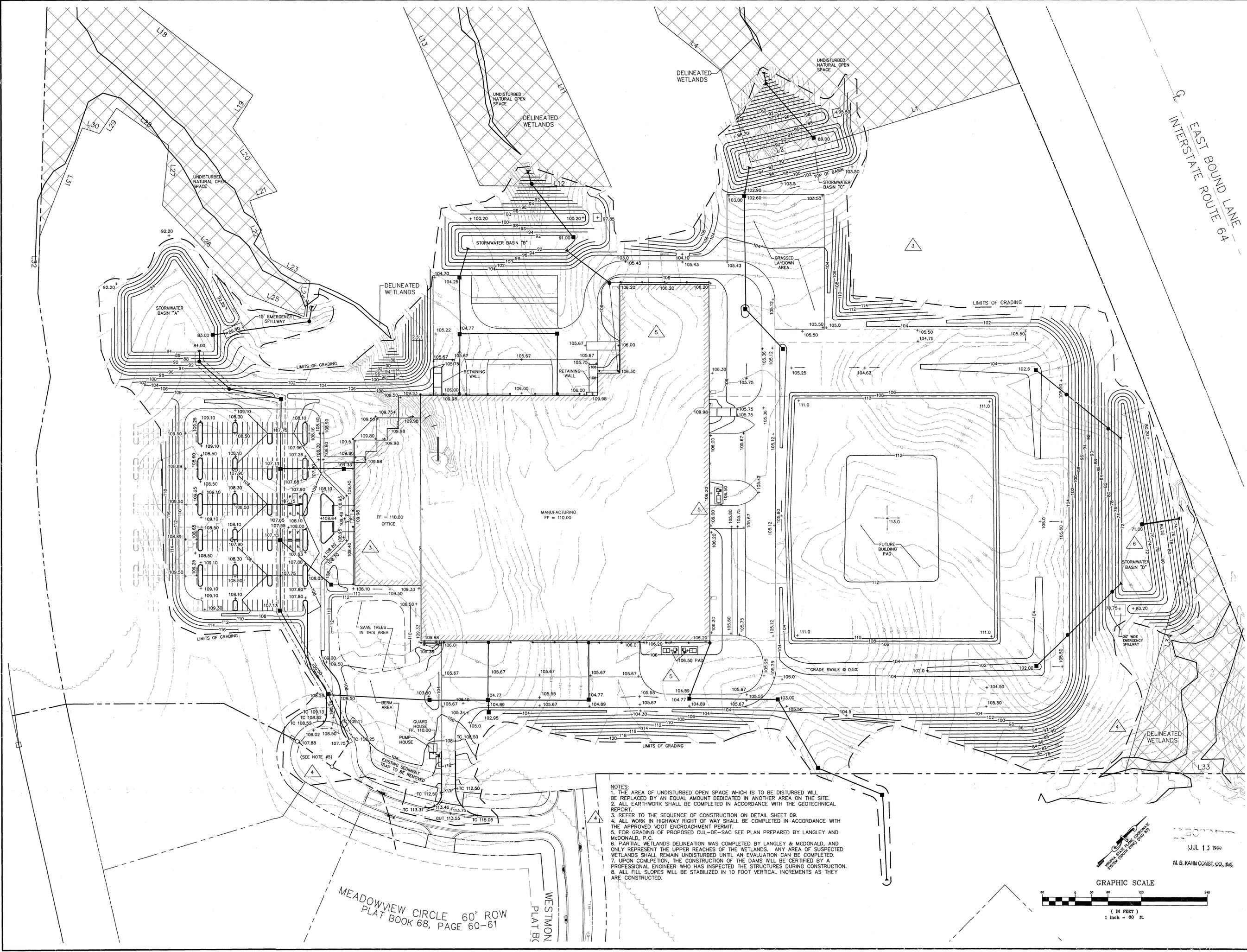
JOHN DEERE VEHICLE GROUP FACILITY
TOWN, VIRGINIA

PROJECT TITLE
SHEET TITLE

OVERALL GRADING PLAN

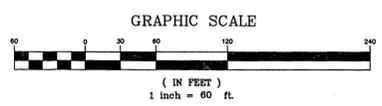
RECEIVED
APR 20 2000
M.B. KAHN CONST. CO., INC.

SHEET NUMBER
01-C300
R12
3 OF 13 SHEETS



NOTES:
 1. THE AREA OF UNDISTURBED OPEN SPACE WHICH IS TO BE DISTURBED WILL BE REPLACED BY AN EQUAL AMOUNT DEDICATED IN ANOTHER AREA ON THE SITE.
 2. ALL EARTHWORK SHALL BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.
 3. REFER TO THE SEQUENCE OF CONSTRUCTION ON DETAIL SHEET 09.
 4. ALL WORK IN HIGHWAY RIGHT OF WAY SHALL BE COMPLETED IN ACCORDANCE WITH THE APPROVED VDOT ENCROACHMENT PERMIT.
 5. FOR GRADING OF PROPOSED CUL-DE-SAC SEE PLAN PREPARED BY LANGLEY AND McDONALD, P. C.
 6. PARTIAL WETLANDS DELINEATION WAS COMPLETED BY LANGLEY & McDONALD, AND ONLY REPRESENT THE UPPER REACHES OF THE WETLANDS. ANY AREA OF SUSPECTED WETLANDS SHALL REMAIN UNDISTURBED UNTIL AN EVALUATION CAN BE COMPLETED.
 7. UPON COMPLETION, THE CONSTRUCTION OF THE DAMS WILL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO HAS INSPECTED THE STRUCTURES DURING CONSTRUCTION.
 8. ALL FILL SLOPES WILL BE STABILIZED IN 10 FOOT VERTICAL INCREMENTS AS THEY ARE CONSTRUCTED.

MEADOWVIEW CIRCLE 60' ROW
 PLAT BOOK 68, PAGE 60-61
 WESTMON PLAT BC



EAST BOUND LANE
 INTERSTATE ROUTE 64

REV. NO.	DATE	BY	APP.	LOCATION	REMARKS
0	4/28/99	CDK	0		GEN. DRAWING ISSUE
1	5/10/99	CDK	0		REV. PER JAMES CO. RE. PARKING, LAYDOWN AREA
2	5/27/99	CDK	0		NOTED REV. WETLANDS GRADING LIMITS
3	6/8/99	CDK	0		NOTED REV. WETLANDS GRADING LIMITS
4	6/20/99	CDK	0		NOTED REV. WETLANDS GRADING LIMITS
5	7/13/99	CDK	0		NOTED REV. WETLANDS GRADING LIMITS

REVISIONS
 FILE NAME: 01-C300
 DATE: 4/17/99

APPROVALS
 PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: RESCH
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: [blank]

DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

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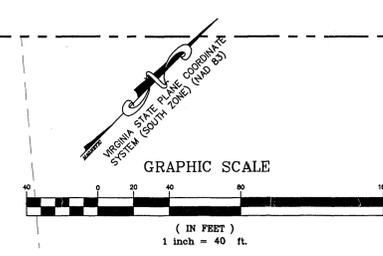
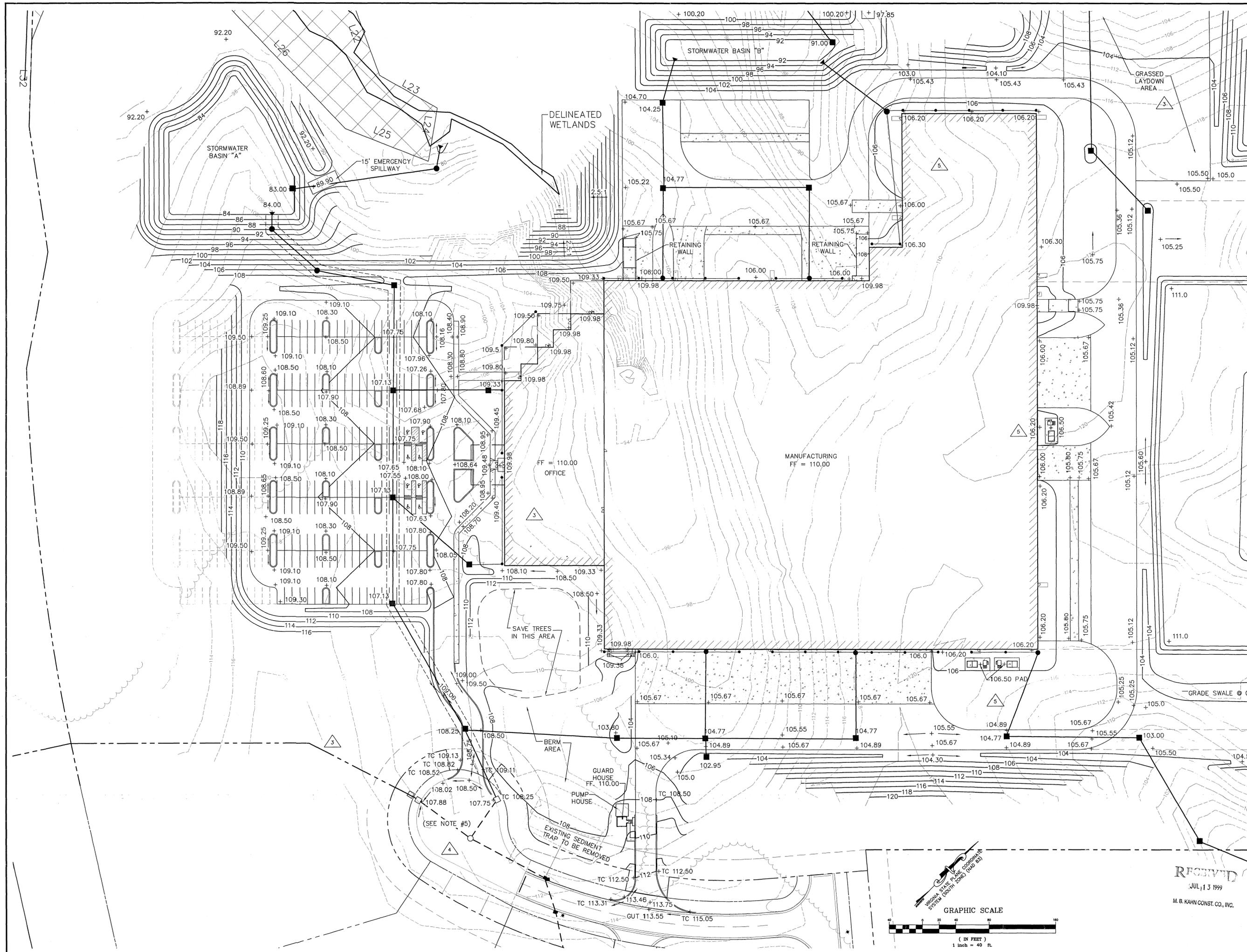
JOHN DEERE
 VEHICLE GROUP
 FACILITY

PROJECT TITLE
 SHEET TITLE

JUL 13 1999
 M.B. KAHN CONST. CO., INC.
 PROFESSIONAL ENGINEER

SHEET NUMBER
 01-C300
 R6
 3 OF 12 SHEETS

H:\civildwg\01-c301.dwg Tue Jul 13 10:13:54 1999 KESTNER
CARLISLE ASSOC. CDK D48C300.dwg 04/14/1999 08:30:03 AM EDT



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JUL 13 1999
M. B. KAHN CONST. CO., INC.

NO.	DATE	BY	APP.	LOCATION	REVISIONS
0	0	0	0	0	0
1	6/20/99	CDK	CDK	NOTED	SEE DRAWING ISSUE
2	6/27/99	CDK	CDK	NOTED	REV. PARKING LAYDOWN AREA
3	6/27/99	CDK	CDK	NOTED	REV. CUL-DE-SAC GRADING LIMITS
4	6/27/99	CDK	CDK	NOTED	REV. GENERAL REVISIONS
5	6/27/99	CDK	CDK	NOTED	PERMIT ISSUE
6	7/13/99	CDK	CDK	NOTED	FIELD RUN TOPO

APPROVALS

PROJECT MANAGER	FRIEDNER
ARCHITECT OF RECORD	ZANDERS
SITE ENGINEERING	RESCH
STRUCTURAL ENGINEERING	CARSON
MECHANICAL ENGINEERING	BRYANT
ELECTRICAL ENGINEERING	

DRAWN: CDK
DESIGNED: EJR
CHECKED: JFF

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ARCHITECTS ENGINEERS

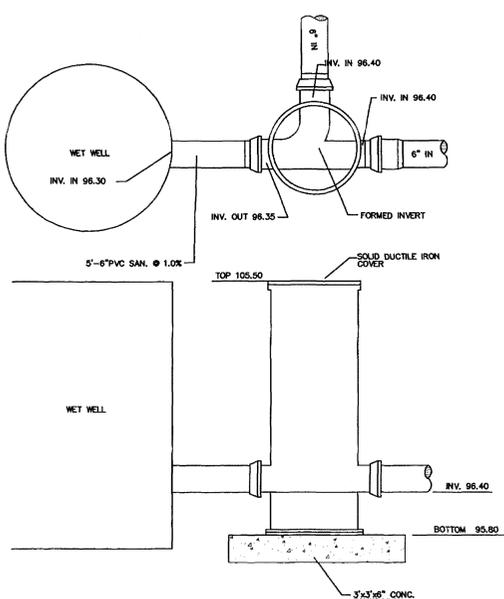
1015 GERVAIS STREET
COLUMBIA, SOUTH CAROLINA 29201
803-252-3232

JOHN DEERE
VEHICLE GROUP
FACILITY

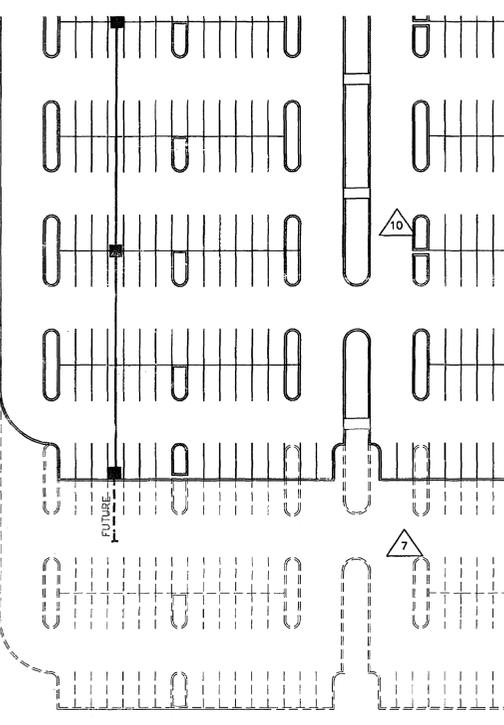
PROJECT TITLE
SHEET TITLE

ENLARGED
GRADING PLAN

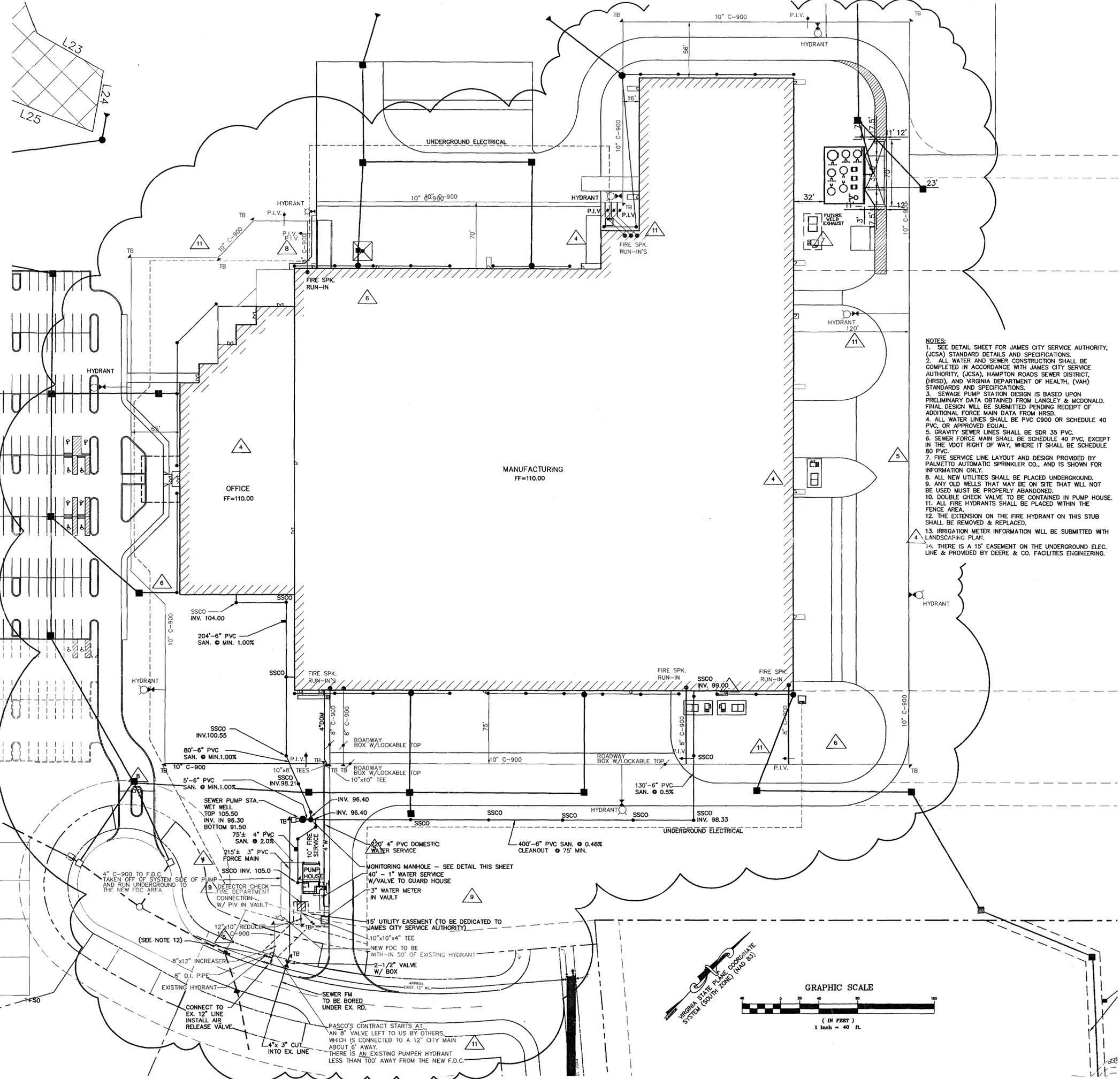
SHEET NUMBER
01-C301
R7
4 OF 12 SHEETS



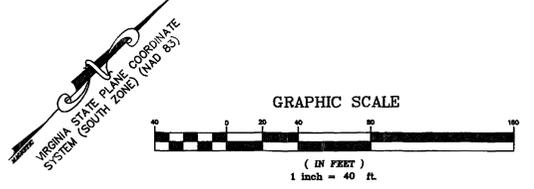
NOTES: 1. MANHOLE SHALL BE 18" DIA. PRE-FAB PVC AS SUPPLIED BY NYLOPLAST AMERICA, OR APPROVED EQUAL.
MONITORING MANHOLE DETAIL
 NO SCALE



WATER LINE PROFILE
 SCALE: 1" = 20' HOR.
 1" = 10' VER.



- NOTES:
- SEE DETAIL SHEET FOR JAMES CITY SERVICE AUTHORITY, (JCSA) STANDARD DETAILS AND SPECIFICATIONS.
 - ALL WATER AND SEWER CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH JAMES CITY SERVICE AUTHORITY, (JCSA), HAMPTON ROADS SEWER DISTRICT, (HRSD), AND VIRGINIA DEPARTMENT OF HEALTH, (VAH) STANDARDS AND SPECIFICATIONS.
 - SEWER PUMP STATION DESIGN IS BASED UPON PRELIMINARY DATA OBTAINED FROM LANGLEY & McDONALD. FINAL DESIGN WILL BE SUBMITTED PENDING RECEIPT OF ADDITIONAL FORCE MAIN DATA FROM HRSD.
 - ALL WATER LINES SHALL BE PVC C900 OR SCHEDULE 40 PVC, OR APPROVED EQUAL.
 - GRAVITY SEWER LINES SHALL BE SDR 35 PVC.
 - SEWER FORCE MAIN SHALL BE SCHEDULE 40 PVC, EXCEPT IN THE VDOT RIGHT OF WAY, WHERE IT SHALL BE SCHEDULE 80 PVC.
 - FIRE SERVICE LINE LAYOUT AND DESIGN PROVIDED BY PALMETTO AUTOMATIC SPRINKLER CO., AND IS SHOWN FOR INFORMATION ONLY.
 - ALL NEW UTILITIES SHALL BE PLACED UNDERGROUND.
 - ANY OLD WELLS THAT MAY BE ON SITE THAT WILL NOT BE USED MUST BE PROPERLY ABANDONED.
 - DOUBLE CHECK VALVE TO BE CONTAINED IN PUMP HOUSE.
 - ALL FIRE HYDRANTS SHALL BE PLACED WITHIN THE FENCE AREA.
 - THE EXTENSION ON THE FIRE HYDRANT ON THIS STUB SHALL BE REMOVED & REPLACED.
 - IRRIGATION METER INFORMATION WILL BE SUBMITTED WITH LANDSCAPING PLAN.
 - THERE IS A 15' EASEMENT ON THE UNDERGROUND ELEC. LINE & PROVIDED BY DEERE & CO. FACILITIES ENGINEERING.



REV. NO.	DATE	BY	APP.	LOCATION	REMARKS
1	01/21/00	CDK	EJR	NOTED	REVISED DRIVEWAY, SIDEWALK
2	01/21/00	CDK	EJR	NOTED	ADD SERVICES TO GUARD HOUSE
3	01/21/00	CDK	EJR	NOTED	REVISED PARKING LOT
4	01/21/00	CDK	EJR	NOTED	REVISED UTILITY INFORMATION
5	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
6	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
7	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
8	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
9	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
10	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
11	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
12	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
13	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
14	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
15	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
16	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
17	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
18	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
19	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.
20	01/21/00	CDK	EJR	NOTED	REV. F.A. MAT'L. SSSCO INV.

REVISIONS

FILENAME: 01-C400
 DATE: 4/19/99

APPROVALS

PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: FRIEDNER
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: FRIEDNER

DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

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1015 GERVAS STREET
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 803-252-3222

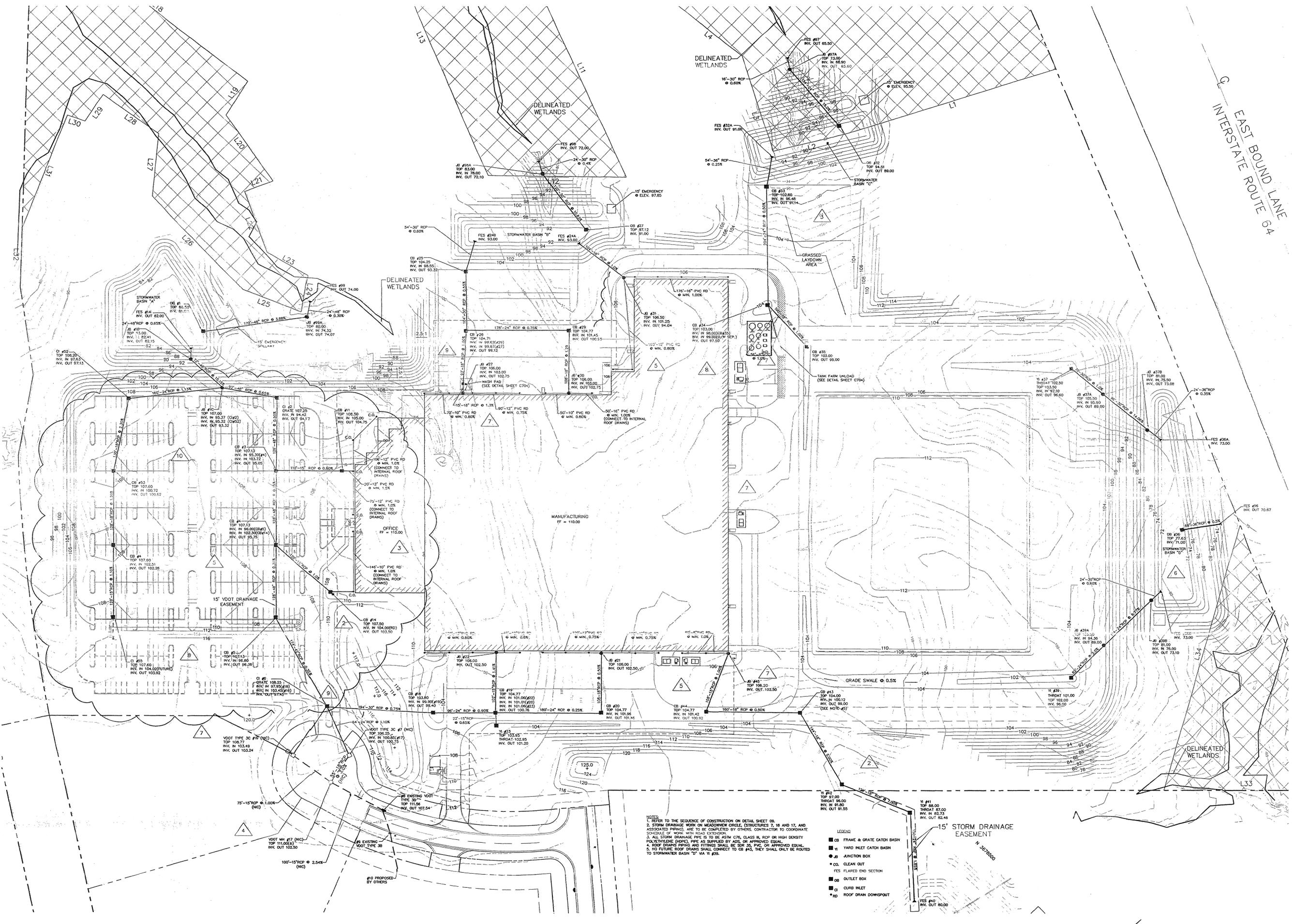
JOHN DEERE VEHICLE GROUP FACILITY
 TOANO, VIRGINIA

PROJECT TITLE: UTILITY PLAN
 SHEET TITLE: RECEIVED
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 M.B. KAHN CONST. CO., INC.

UTILITY PLAN

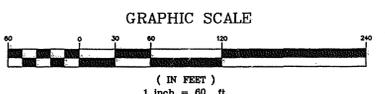
COMMONWEALTH OF VIRGINIA
 JERRY F. FRIEDNER
 No. 18445
 PROFESSIONAL ENGINEER

SHEET NUMBER: 01-C400
 R11
 5 OF 13 SHEETS



NOTES:
 1. REFER TO THE SEQUENCE OF CONSTRUCTION ON DETAIL SHEET 08.
 2. STORM DRAINAGE WORK ON MEADOWVIEW CIRCLE, (STRUCTURES 7, 16 AND 17, AND ASSOCIATED PAVED) ARE TO BE COMPLETED BY OTHERS. CONTRACTOR TO COORDINATE SCHEDULE OF WORK WITH ROAD CONTRACTOR.
 3. ALL STORM DRAINAGE PIPE IS TO BE ASTM C76, CLASS III, RCP OR HIGH DENSITY POLYETHYLENE (HDPE), PIPE AS SUPPLIED BY A.S. OR APPROVED EQUAL.
 4. ROOF DRAIN PIPING AND FITTINGS SHALL BE SDR 35 PVC OR APPROVED EQUAL.
 5. NO FUTURE ROOF DRAINS SHALL CONNECT TO CB #43. THEY SHALL ONLY BE ROUTED TO STORMWATER BASIN "D" VIA VI #39.

- LEGEND
- CB FRAME & GRATE CATCH BASIN
 - YARD INLET CATCH BASIN
 - JUNCTION BOX
 - CLEAN OUT
 - FES FLARED END SECTION
 - OUTLET BOX
 - CURB INLET
 - ROOF DRAIN DOWNSPOUT



EAST BOUND LANE
 INTERSTATE ROUTE 64

REV. NO.	DATE	BY	APP.	LOCATION	REMARKS
1	11/24/99	CDK	ER	NOTED	REV. PARK, GRADE/TANK FARM
2	01/01/00	CDK	ER	NOTED	REVISED DRIVEWAY, SIDEWALK
3	04/13/00	CDK	ER	NOTED	REVISED PARKING LOT
4	04/09/99	CDK	ER	NOTED	REV. STORM DRAINAGE
5	04/09/99	CDK	ER	NOTED	PERMIT ISSUE
6	07/13/99	CDK	ER	CSA	FIELD RUN TOPO/REVBASIN "D"
7	10/21/99	CDK	ER	NOTED	REV. PARK, GRADES, ST. DRAIN

REVISIONS
 FILE NAME: 01-C500
 DATE: 4/19/99

APPROVALS
 PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: FRIEDNER
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: [blank]

DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

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 803-552-3232

JOHN DEERE
 VEHICLE GROUP
 FACILITY
 TOANO, VIRGINIA

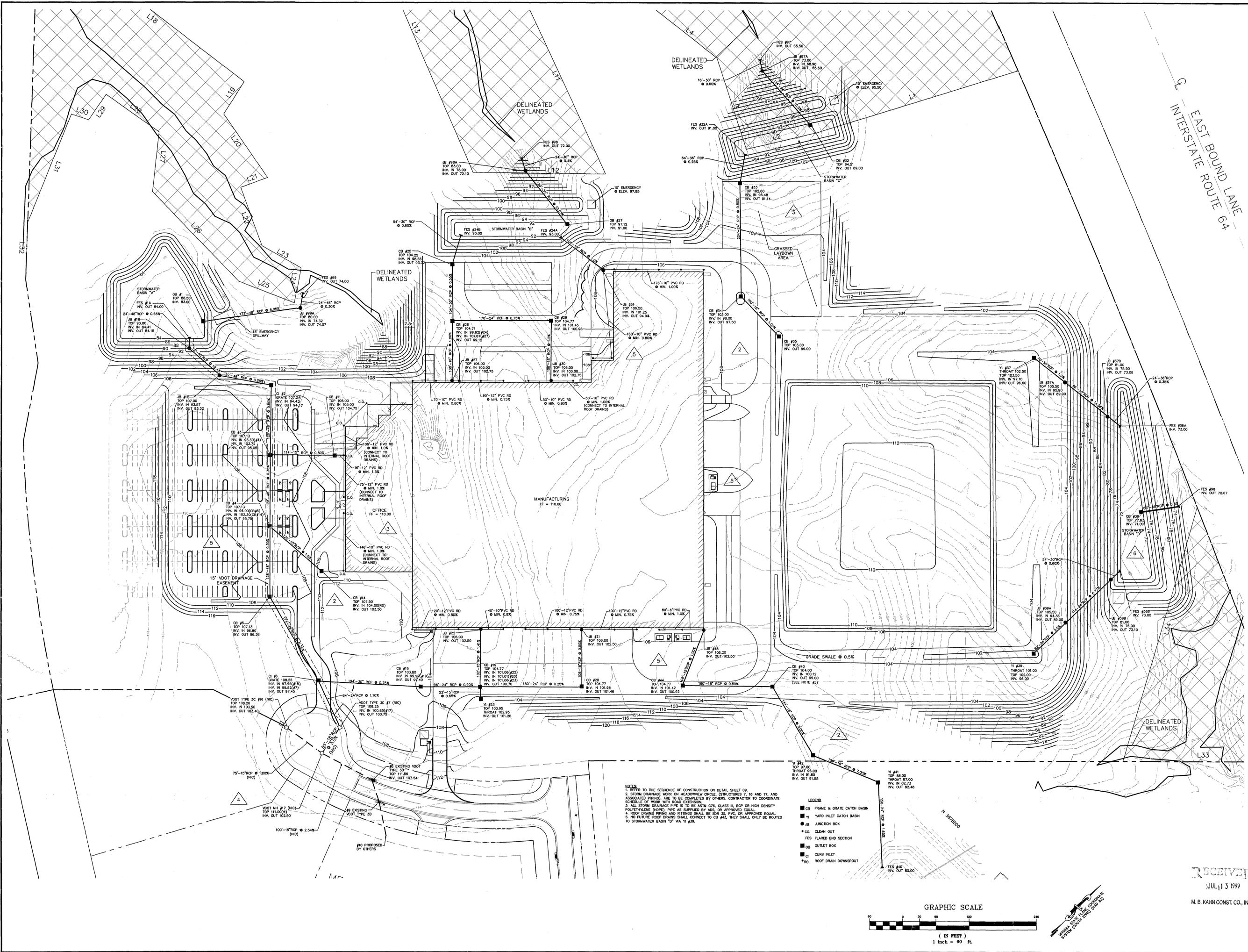
PROJECT TITLE
 SHEET TITLE

STORM DRAINAGE PLAN

COMMONWEALTH OF VIRGINIA
 JERRY F. FRIEDNER
 No. 18445
 4/13/99
 PROFESSIONAL ENGINEER

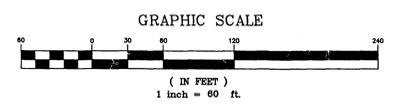
SHEET NUMBER
 01-C500
 R10
 6 OF 13 SHEETS

RECEIVED
 APR 13 2000
 M. B. KAHN CONST. CO., INC.



NOTES:
 1. REFER TO THE SEQUENCE OF CONSTRUCTION ON DETAIL SHEET 09.
 2. STORM DRAINAGE WORK ON MEADOWVIEW CIRCLE, STRUCTURES 7, 16 AND 17, AND ASSOCIATED PAVING, ARE TO BE COMPLETED BY OTHERS. CONTRACTOR TO COORDINATE SCHEDULE OF WORK WITH ROAD EXTENSION.
 3. ALL STORM DRAINAGE PIPE IS TO BE ASTM C76, CLASS II, RCP OR HIGH DENSITY POLYETHYLENE (HDPE) PIPE AS SUPPLIED BY ADS, OR APPROVED EQUAL.
 4. ROOF DRAINING PIPING AND FITTINGS SHALL BE SIZE 3/4" PVC OR APPROVED EQUAL.
 5. NO FUTURE ROOF DRAINS SHALL CONNECT TO CB #43. THEY SHALL ONLY BE ROUTED TO STORMWATER BASIN #1 VIA YI #28.

- LEGEND
- CB FRAME & GRATE CATCH BASIN
 - YI YARD INLET CATCH BASIN
 - JB JUNCTION BOX
 - CO CLEAN OUT
 - FES FLEATED END SECTION
 - OB OUTLET BOX
 - CI CURB INLET
 - RD ROOF DRAIN DOWNSPOUT



EAST BOUND LANE 64
 INTERSTATE ROUTE 64

REV. NO.	DATE	BY	APP.	LOCATION	REVISIONS
0	4/20/99	CDK			CSE DRAWING ISSUE
1	5/10/99	CDK			REV. PER JAMES CO.
2	5/27/99	CDK			REV. PARKING/LANDSCAPE
3	6/20/99	CDK			REV. STORM DRAINAGE
4	6/20/99	CDK			PERMIT ISSUE
5	7/13/99	CDK			FIELD RUN TOPO/REV. BASIN #1

FILE NAME: 01-C500
 DATE: 4/19/99

APPROVALS

PROJECT MANAGER	FRIEDNER
ARCHITECT OF RECORD	ZANDERS
SITE ENGINEERING	RESCH
STRUCTURAL ENGINEERING	CARSON
MECHANICAL ENGINEERING	BRYANT
ELECTRICAL ENGINEERING	

DRAWN: CDK
 DESIGNED: EJR
 CHECKED: JFF

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 ARCHITECTS ENGINEERS

1015 GERVAIS STREET
 COLUMBIA, SOUTH CAROLINA 29201
 803-252-2232

JOHN DEERE
 VEHICLE GROUP
 FACILITY
 TOANO, VIRGINIA

PROJECT TITLE
 SHEET TITLE

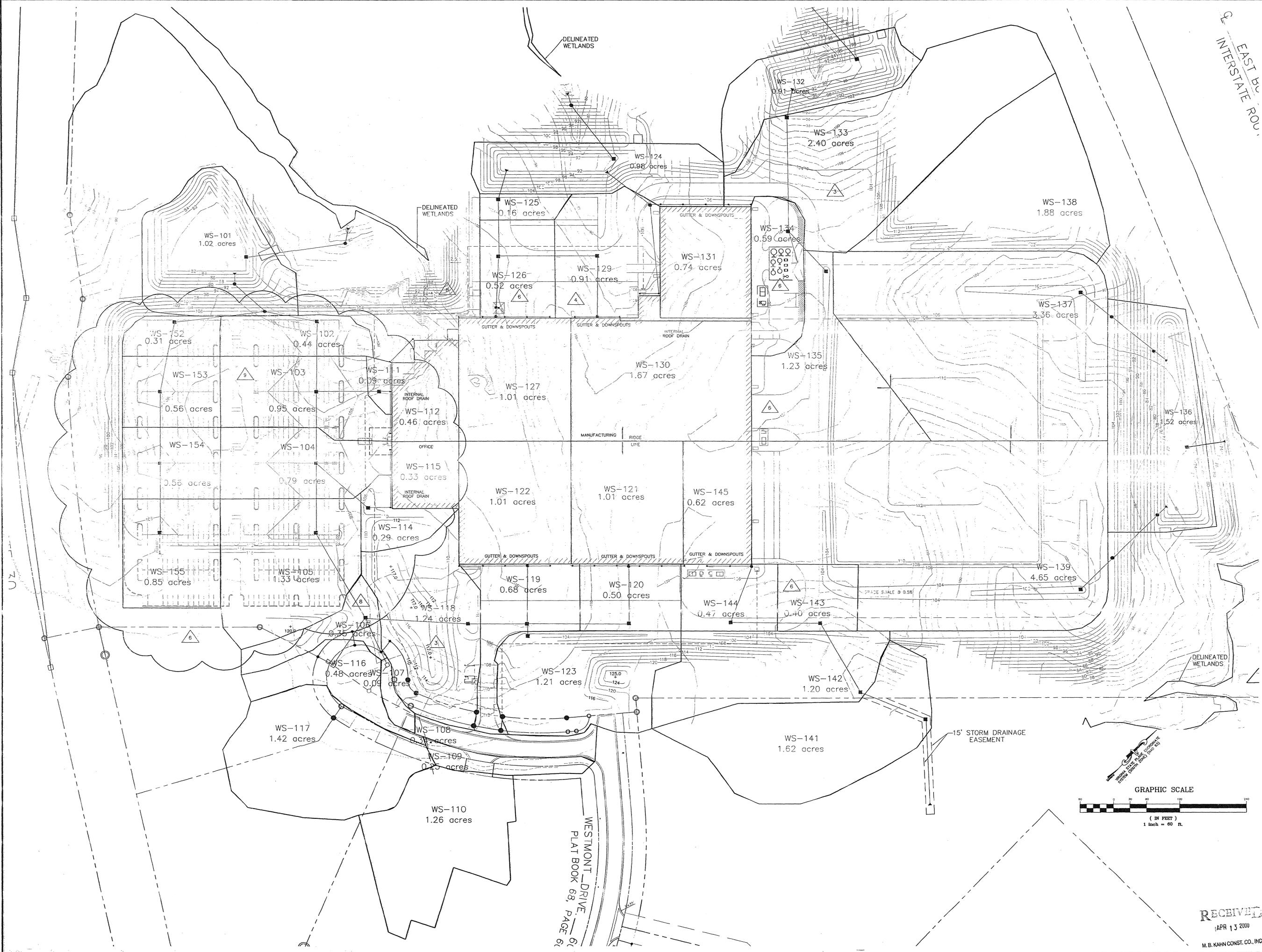
STORM DRAINAGE PLAN

RECEIVED
 JUL 13 1999
 M.B. KAHN CONST. CO., INC.

18445
 7-13-99
 PROFESSIONAL ENGINEER

SHEET NUMBER
 01-C500
 R6
 6 OF 12 SHEETS

EAST B.C.
INTERSTATE ROUTE



REV. NO.	DATE	BY	APP. LOCATION	REMARKS
1	01/01/00	CDK	EJR	NOTED REVISED DRIVEWAY, SIDEWALK
2	04/13/00	CDK	CDK	NOTED REVISED PARKING LOT
3	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
4	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
5	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
6	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
7	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
8	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
9	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
10	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
11	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
12	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
13	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
14	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
15	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
16	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
17	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
18	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
19	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA
20	07/27/99	CDK	EJR	NOTED REVISED PARKING LOT AREA

REVISIONS

DATE	APPROVALS
4/19/99	PROJECT MANAGER FRIEDNER
	ARCHITECT OF RECORD ZANDERS
	SITE ENGINEERING FRIEDNER
	STRUCTURAL ENGINEERING CARSON
	MECHANICAL ENGINEERING BRYANT
	ELECTRICAL ENGINEERING

DRAWN: CDK
DESIGNED: EJR
CHECKED: JFF

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CARLISLE ASSOCIATES

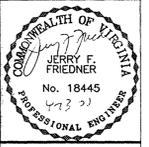
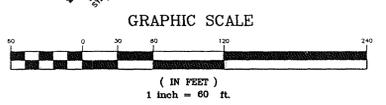
ARCHITECTS ENGINEERS

1015 GERVAIS STREET
COLUMBIA, SOUTH CAROLINA 29201
803-252-3232

JOHN DEERE
VEHICLE GROUP
FACILITY

PROJECT TITLE
SHEET TITLE

DRAINAGE
DIVIDE
PLAN



SHEET NUMBER

01-C501

R9

7 OF 13 SHEETS

RECEIVED
APR 13 2000
M. B. KAHN CONST. CO., INC.

WESTMONT DRIVE
PLAT BOOK 68, PAGE 6

LEGEND:

- CE TEMPORARY STONE CONSTRUCTION ENTRANCE
- SSF SILT FENCE (W/ WIRE SUPPORTS)
- SF SILT FENCE (W/O WIRE SUPPORTS)
- IP STORM DRAIN INLET PROTECTION
- DD TEMPORARY DIVERSION DIKE
- FD TEMPORARY FILL DIVERSION
- ST#1 TEMPORARY SEDIMENT TRAP
- SB TEMPORARY SEDIMENT BASIN
- TSD TEMPORARY SLOPE DRAIN
- OP OUTLET PROTECTION
- RR RIP RAP
- CD ROCK CHECK DAMS
- 11C SOIL TYPE & BOUNDARY

TRAP NUMBER	DRAINAGE AREA (A ₁)	NET STORAGE (REAR)	BOTTOM ELEVATION	ELEVATION @ TOP OF NET STORAGE	BASIN DIMENSIONS @ TOP OF NET STORAGE	SURFACE AREA @ TOP OF NET STORAGE	VOLUME OF NET STORAGE PROVIDED (V ₁)	DRY STORAGE REQUIRED (V ₂)	ELEV. @ TOP OF GRAVEL WEIR	BASIN DIMENSIONS @ TOP OF GRAVEL WEIR	AREA OF TOP OF GRAVEL WEIR	VOLUME OF NET STORAGE PROVIDED (V ₂)	ELEVATION TOP OF EMBANKMENT	WIDTH OF QUARTER MILE	REMARKS
1	2.4	4342	96	102	70' x 50'	1750	1443	4342	101	70' x 33'	2374	4342	102	14	Note 1
2	1.7	3075	102	105	50' x 20'	1250	2295	3075	107	38' x 33'	1914	3164	108	10	Note 1
3	1.2	4703	93	99	50' x 50'	2500	4250	4703	96	28' x 28'	2400	4984	100	7	Note 1
4	2.6	4703	93	99	50' x 50'	2500	4250	4703	96	28' x 28'	2400	4984	100	16	Note 1
5	5.6	4703	93	99	50' x 50'	2500	4250	4703	96	28' x 28'	2400	4984	100	16	Note 1
6	1.9	2352	Note 1	93	35' x 35'	1664	2258	2352	116	33' x 33'	2574	4324	97.25	9	Note 2
7	1.1	1990	64	66	45' x 35'	1344	2883	1990	68	30' x 40'	2000	3344	69	7	Note 2
8	7A	5427	64	66	80' x 40'	3200	5440	5427	68	30' x 40'	2000	3344	69	8	Note 2
9	2.3	4151	Note 1	93	70' x 35'	1750	4463	4151	78	33' x 33'	2574	4324	97.5	14	Note 2
10	1.3	2352	Note 1	93	45' x 25'	1125	2391	2352	53	33' x 33'	1749	2443	98.5	8	Note 2
11	1.9	3618	82.7	90	162' x 12'	1944	3801	3618	91.5	70' x 20'	3400	4098	98.5	12	Note 2

Notes:
 1. These sediment traps are to be installed during the construction of Pond "A", and remain in place until the storm drainage line to pond "A" is constructed and operational.
 2. These sediment traps shall be installed at the top of the fill slope. The dimensions shown will be maintained as the slope is brought up, with the outlet draining to the slope drains. (see temporary slope drain detail on sheet 12 for slope drain size and configuration.)

SOIL TYPE LEGEND

- 11C GRAVEN-UCHEE COMPLEX
- 14B EMPORIA PINESANDY LOAM
- 15F EMPORIA COMPLEX
- 19B KEMPVILLE-EMPORIA FINE SANDY LOAM

REVISIONS

REV. NO.	DATE	BY	APP.	LOCATION	REMARKS
1	11/24/99	CDK	EAR	NOTED	REV. PARK GRADES, TANK FARM
2	01/01/00	CDK	CDK	NOTED	REV. DRIVEWAY, SIDEWALK
3	04/13/00	CDK	EAR	NOTED	REVISED PARKING LOT
4	06/09/00	CDK	EAR	NOTED	REV. ST. #7A, GRADING LIMITS
5	08/09/00	CDK	EAR	NOTED	PERMIT ISSUE
6	07/15/99	CDK	EAR	NOTED	FIELD RUN TO TOP OF REV. BASIN "D"
7	10/21/99	CDK	EAR	NOTED	REV. PARK GRADES, TANK FARM, ETC.

APPROVALS

PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: FRIEDNER
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: CHECKED OFF

DRAWN: CDK
 DESIGNED: EAR
 CHECKED OFF: EAR

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KAHN

CARLISLE ASSOCIATES

ARCHITECTS ENGINEERS

1015 GERVAIS STREET
 COLUMBIA, SOUTH CAROLINA, 29201
 803-252-3232

JOHN DEERE
 VEHICLE GROUP
 FACILITY

TOANO, VIRGINIA

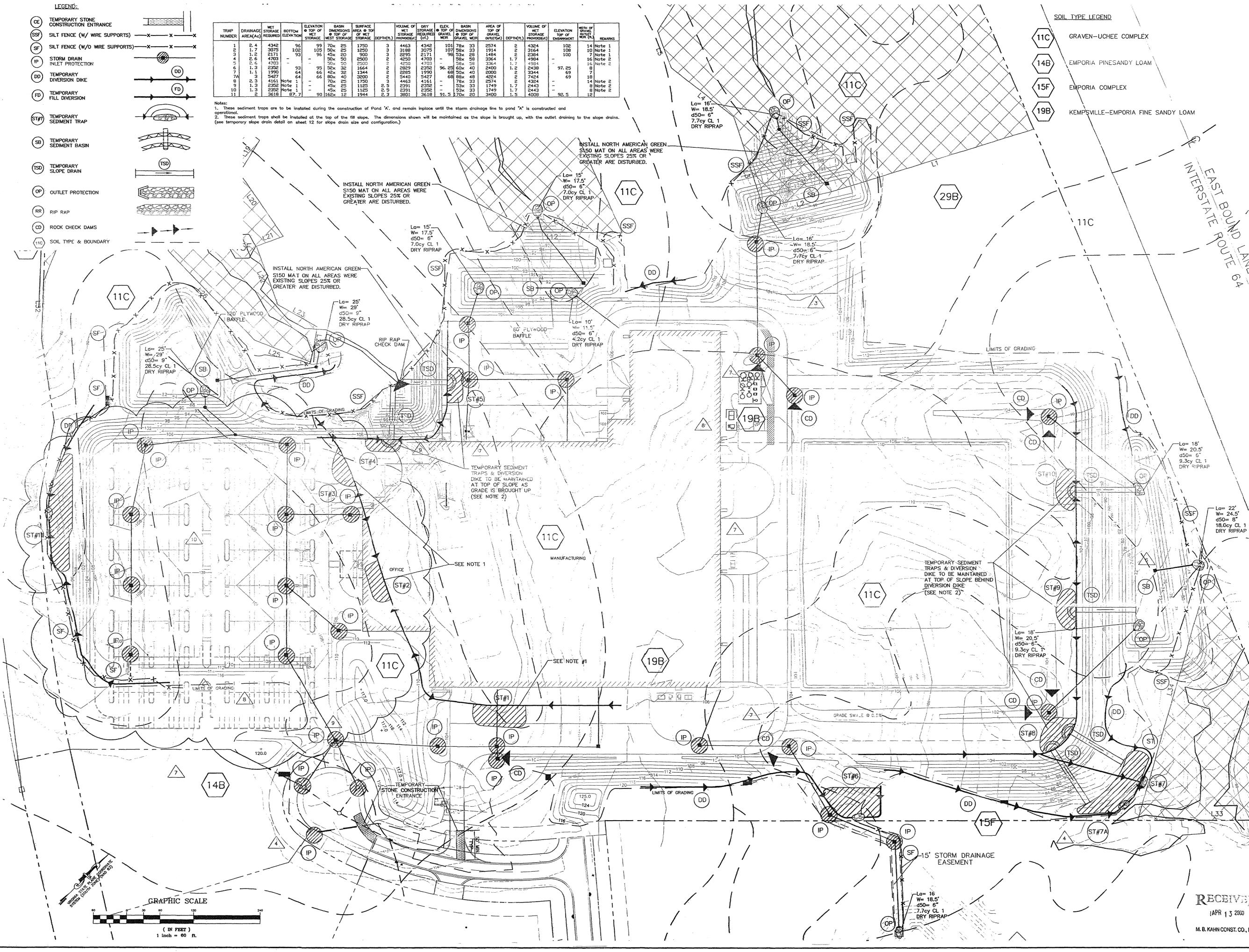
PROJECT TITLE
 SHEET TITLE

EROSION AND SEDIMENT CONTROL PLAN

COMMONWEALTH OF VIRGINIA
 JERRY F. FRIEDNER
 No. 18445
 APR 5 '99
 PROFESSIONAL ENGINEER

SHEET NUMBER
01-C600
R10

8 OF 13 SHEETS



I:\Projects\1048\01-C600.dwg Thu Apr 13 11:32:15 2000 kesner

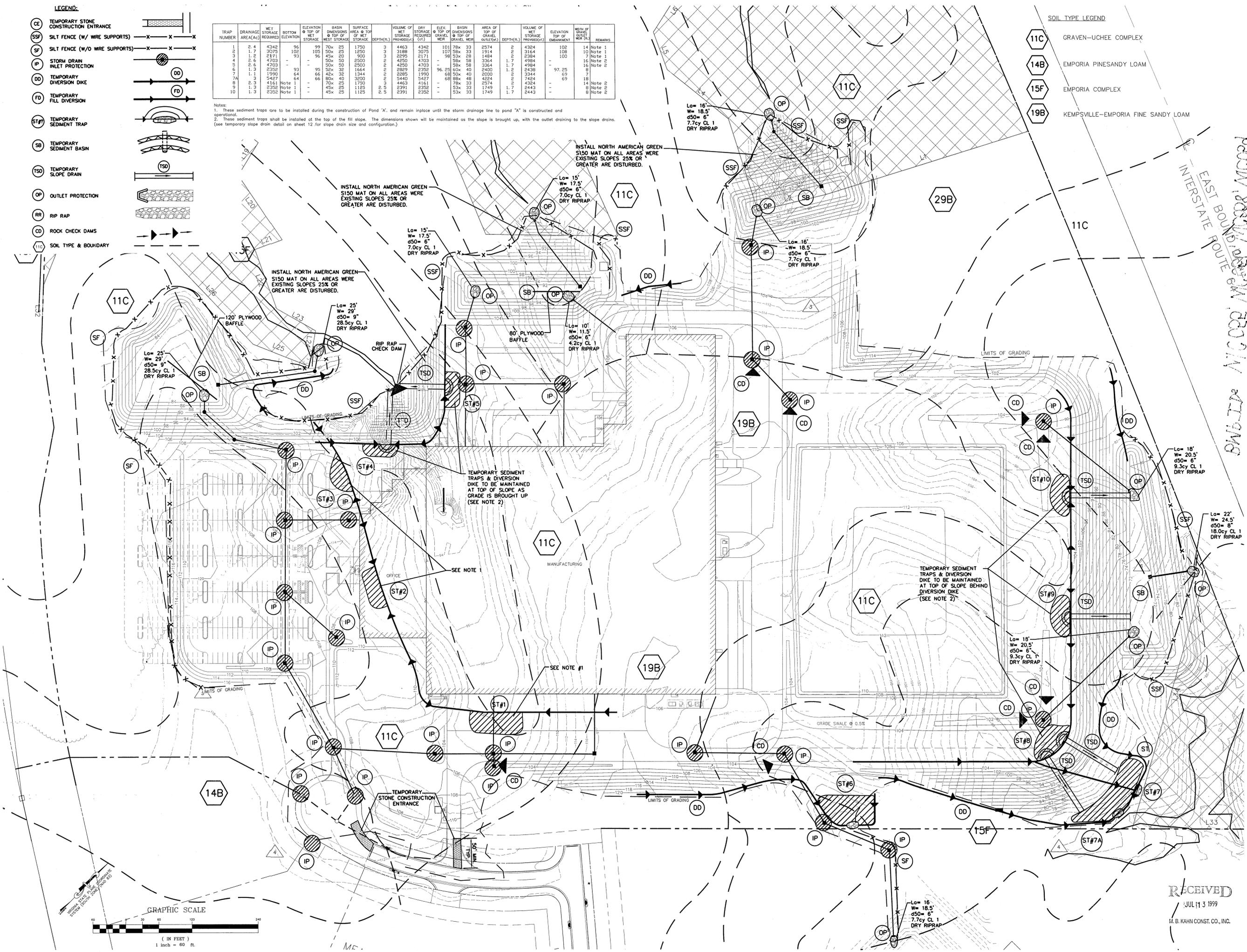
- LEGEND:**
- CE TEMPORARY STONE CONSTRUCTION ENTRANCE
 - SSF SILT FENCE (W/ WIRE SUPPORTS)
 - SF SILT FENCE (W/O WIRE SUPPORTS)
 - IP STORM DRAIN INLET PROTECTION
 - DD TEMPORARY DIVERSION DIKE
 - FD TEMPORARY FILL DIVERSION
 - ST# TEMPORARY SEDIMENT TRAP
 - SB TEMPORARY SEDIMENT BASIN
 - TSD TEMPORARY SLOPE DRAIN
 - OP OUTLET PROTECTION
 - RR RIP RAP
 - CD ROCK CHECK DAMS
 - 11C SOIL TYPE & BOUNDARY

TRAP NUMBER	DRAINAGE AREA (AC)	WET STORAGE VOLUME (CY)	BOTTOM ELEVATION	ELEVATION @ TOP OF WEST STORAGE	BASIN DIMENSIONS TOP OF WEST STORAGE	SURFACE AREA @ TOP OF STORAGE	VOLUME OF STORAGE PROVIDED (CY)	DRY STORAGE VOLUME (CY)	ELEV. @ TOP OF GRAVEL WEIR	BASIN DIMENSIONS @ TOP OF GRAVEL WEIR	AREA OF TOP OF GRAVEL (SQ. FT.)	VOLUME OF STORAGE PROVIDED (CY)	ELEVATION TOP OF EMBANKMENT	WIDTH OF DRAIN NEAR (FT.)	REMARKS
1	2.4	4342	96	99	70x 25	1750	3	4463	4342	101	76x 33	2574	102	14	Note 1
2	1.7	3075	102	105	50x 20	1000	3	3188	3075	107	58x 28	1614	108	10	Note 1
3	1.2	2171	93	96	45x 20	900	2	2295	2171	98	53x 28	1484	100	16	Note 2
4	2.6	4703	-	-	50x 20	2500	4	4290	4703	98	58x 28	3364	100	16	Note 2
5	2.6	4703	-	-	50x 20	2500	4	4250	4703	98	58x 28	3364	100	16	Note 2
6	1.3	2352	93	95	32x 32	1664	2	2829	2352	96	25x 40	2400	97.25	8	Note 2
7	1.1	1990	64	66	42x 32	1344	1	2085	1990	68	30x 40	3000	69	7	Note 2
8	2.3	3427	64	66	80x 40	3200	5	5440	3427	68	88x 48	4224	69	18	Note 2
9	1.3	2352	Note 1	-	70x 25	1750	3	4463	2352	-	70x 25	2574	-	14	Note 2
10	1.3	2352	Note 1	-	45x 25	1125	2	2391	2352	-	53x 33	1749	-	8	Note 2

Notes:
 1. These sediment traps are to be installed during the construction of Pond "A", and remain in place until the storm drainage line to pond "A" is constructed and operational.
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REVISIONS:

REV. NO.	DATE	BY	APP.	LOCATION	REMARKS
0	4/19/99	CDK	CDK	CDK	ISSUE FOR PERMITS
1	5/19/99	CDK	CDK	CDK	REVISED PERMITS
2	5/27/99	CDK	CDK	CDK	REVISED PERMITS
3	6/8/99	CDK	CDK	CDK	REVISED PERMITS
4	6/20/99	CDK	CDK	CDK	REVISED PERMITS
5	7/13/99	CDK	CDK	CDK	REVISED PERMITS

APPROVALS

PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: RESCH
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: BRYANT

DRAWN: CDK
 CHECKED: JFF

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 COLUMBIA, SOUTH CAROLINA 29201
 803-252-3232

JOHN DEERE VEHICLE GROUP FACILITY

EROSION AND SEDIMENT CONTROL PLAN

PROJECT TITLE: SHEET TITLE

RECEIVED JUL 13 1999
 M.B. KAHN CONST. CO., INC.

SHEET NUMBER: 01-C600
 R6
 8 OF 12

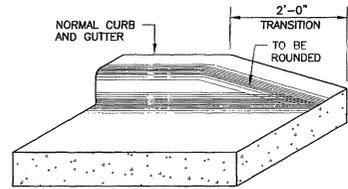
TOWN DEERE 7/15/99
REVISED POND D

Environmental Division
MAY 8 2012
RECEIVED

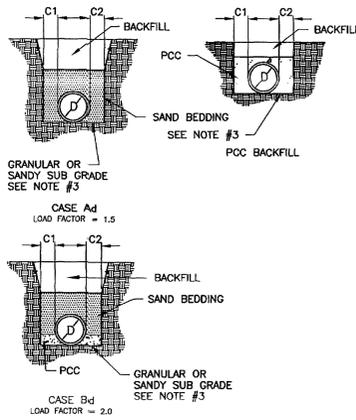
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58

58



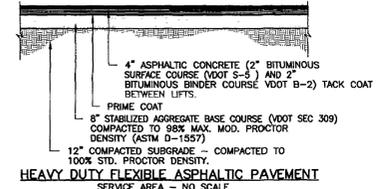
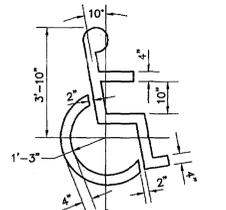
FEATHERING OF CURB AND GUTTER DETAIL
NO SCALE



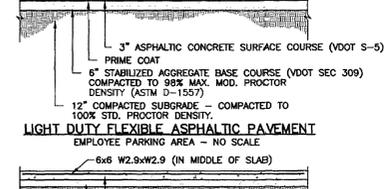
PIPE TRENCH BEDDING
NO SCALE

- NOTES:
- BACKFILL IN STREET SHALL BE SAND OR WELL GRANULATED GRANULAR MATERIAL APPROVED BY THE ENGINEER. BACKFILL OUTSIDE OF STREET LIMITS MAY BE NONORGANIC MATERIAL FROM TRENCH EXCAVATION.
 - ALL REINFORCED CONCRETE PIPE SHALL BE PLACED IN ACCORDANCE WITH "CASE Ad" BEDDING UNLESS OTHERWISE SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
 - IF OTHER GRANULAR OR SANDY MATERIAL IS ENCOUNTERED AT SUBGRADE THE TRENCH BOTTOM SHALL BE OVER EXCAVATED TO A DEPTH OF AT LEAST 3 INCHES AND BACKFILLED WITH SAND, NO. 3 OR NO. 4 CRUSHED ROCK EXCEPT THAT NO. 3 ROCK SHALL NOT BE USED UNDER PIPE 24 INCHES OR LESS IN DIAMETER. ALL COST FOR OVER EXCAVATING AND BACKFILLING WITH GRANULAR MATERIAL SHALL BE BORNE BY THE CONTRACTOR.
 - C1 AND C2 SHALL NOT BE LESS THEN 6 INCHES.
 - C1 PLUS C2 SHALL NOT BE GREATER THEN 24 INCHES, IF THE TRENCH WIDTH IS EXCAVATED TO A GREATER WIDTH THE CONTRACTOR SHALL FURNISH AND PLACE "CASE Bb" BEDDING AT HIS OWN EXPENSE.
 - PIPES 21 INCHES IN DIAMETER AND SMALLER WITH 2 FEET OF COVER OR LESS, AND PIPES 24 INCHES IN DIAMETER OR GREATER WITH 1 FOOT OF COVER OR LESS SHALL BE PLACED IN ACCORDANCE WITH "P.C.C. BACKFILL" BEDDING.
 - P.C.C. SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF AT LEAST 2,000 P.S.I.
 - THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE STATE DIVISION OF INDUSTRIAL SAFETY PRIOR TO EXCAVATING ANY TRENCH 5 FEET OR MORE IN DEPTH.
 - EXCESS MATERIAL FROM TRENCH EXCAVATION SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTORS EXPENSE.

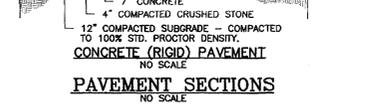
PAINTED HANDICAP SYMBOL DETAIL
NO SCALE



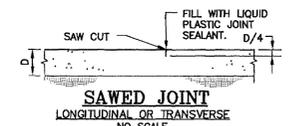
HEAVY DUTY FLEXIBLE ASPHALTIC PAVEMENT
SERVICE AREA - NO SCALE



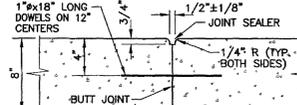
LIGHT DUTY FLEXIBLE ASPHALTIC PAVEMENT
EMPLOYEE PARKING AREA - NO SCALE



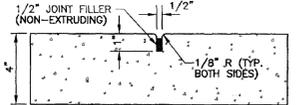
CONCRETE (RIGID) PAVEMENT
NO SCALE



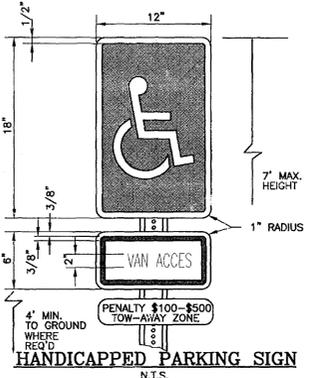
SAWED JOINT
LONGITUDINAL OR TRANSVERSE
NO SCALE



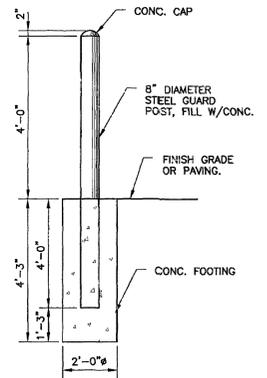
CONSTRUCTION JOINT W/DOWEL
NO SCALE



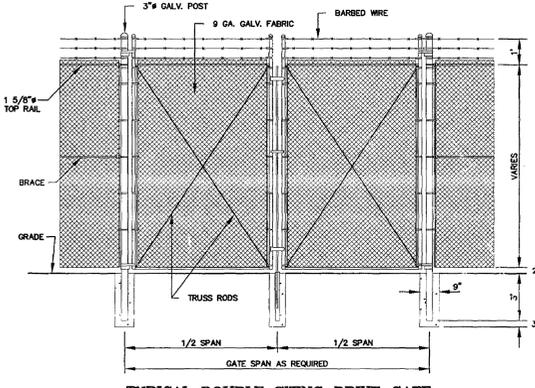
CONTRACTION JOINT
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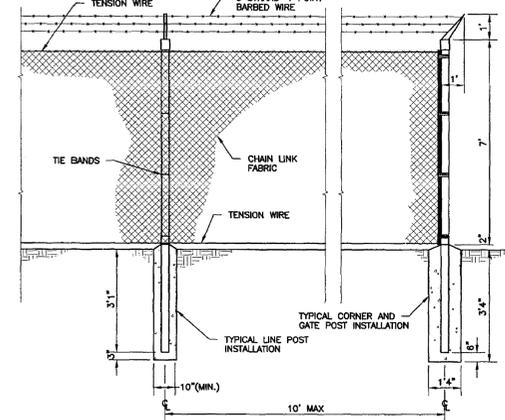
HANDICAPPED PARKING SIGN
N.T.S.



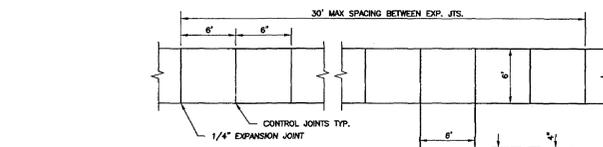
BOLLARD DETAIL
NO SCALE



TYPICAL DOUBLE SWING DRIVE GATE
N.T.S.

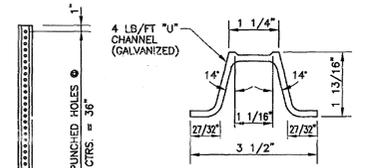


TYPICAL CHAIN LINK FENCE DETAIL
NO SCALE

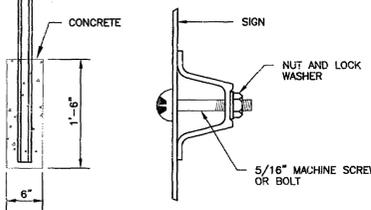


STANDARD JOINT LAYOUT FOR CONCRETE SIDEWALKS
NO SCALE

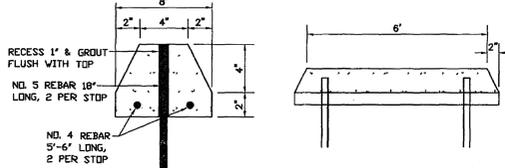
- NOTES:
- ALL SIDEWALKS SHALL BE 4" THICK
 - CONTROL JOINTS SHALL BE SPACED AT 6' INTERVALS FOR 6' SIDEWALKS.
 - CONTROL JOINTS SHALL BE 1" DEEP AND EDGED WITH 1/8" RADIUS.
 - WHEN SIDEWALKS ABUT ROADWAY, WHERE THERE IS NO CURB, THICKEN WALK TO 6" IN 3'-0".
 - 1/2" EXP. MATERIAL REQUIRED WHERE CONC. SIDEWALK ABUT CONC. STRUCTURE.



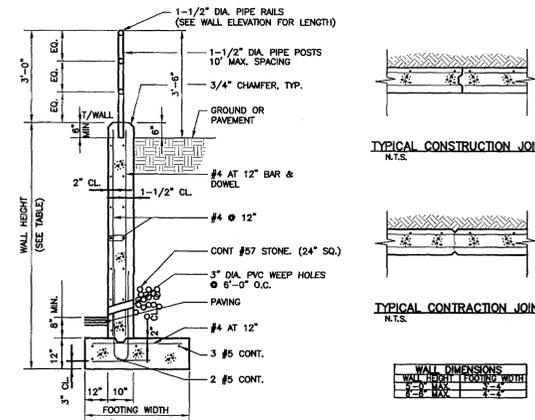
POST SECTION



MOUNTING DETAIL

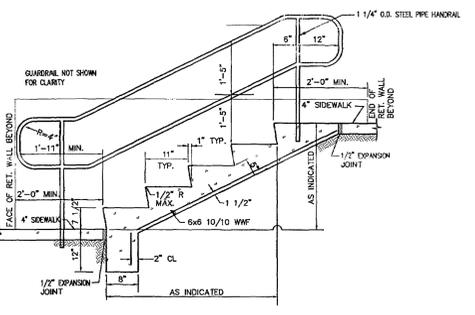


CONCRETE WHEEL STOP DETAIL
NOT TO SCALE

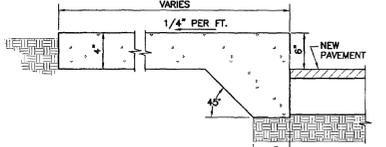


DOCK RETAINING WALL DETAILS
N.T.S.

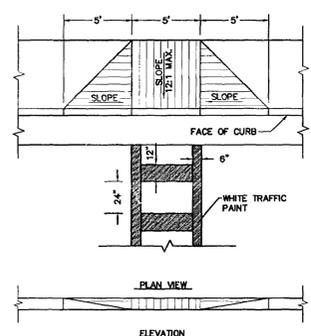
- NOTES:
- PROVIDE CLASS B SPLICE FOR FOOTING DOWELS CONCRETE STRENGTH @ 28 DAYS $f_c = 3,000$ PSI
 - PROVIDE CONSTRUCTION OF CONTRACTION JOINTS SPACED AT 30' O.C. MAXIMUM.



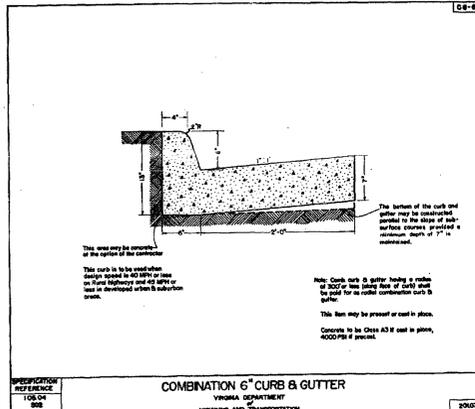
CONC. STEP & HANDRAIL DETAIL
NOT TO SCALE



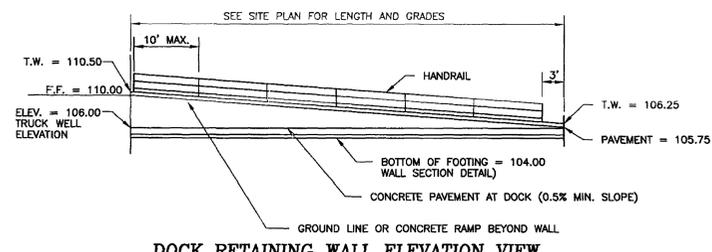
INTEGRAL CURB & WALK DETAIL
NO SCALE



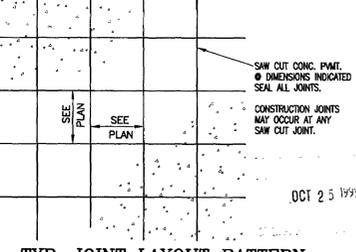
HANDICAP CURB CUT & CROSSWALK DETAIL
NO SCALE



COMBINATION 6" CURB & GUTTER
INDUSTRIAL TRANSPORTATION



DOCK RETAINING WALL ELEVATION VIEW
NO SCALE



TYP. JOINT LAYOUT PATTERN
NO SCALE

REV. NO.	DATE	BY	DESCRIPTION
0	4/19/99	CDK	ISSUE FOR PERMIT
1	5/10/99	CDK	REVISED PER PERMIT
2	6/20/99	CDK	REVISED PER PERMIT
3	10/21/99	CDK	REVISED PER PERMIT

REVISIONS
DATE: 4/19/99
FILE NAME: 01-C703
APPROVALS
PROJECT MANAGER: FRIEDNER
ARCHITECT OF RECORD: ZANDERS
SITE ENGINEERING: RESCH
STRUCTURAL ENGINEERING: CARSON
MECHANICAL ENGINEERING: BRYANT
ELECTRICAL ENGINEERING:
DRAWN: CDK
DESIGNED: EIR
CHECKED: JFF

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ARCHITECTS ENGINEERS
1015 GERVAS STREET
COLUMBIA SOUTH CAROLINA 29201
803-252-3232

JOHN DEERE
VEHICLE GROUP
FACILITY
TOANO, VIRGINIA

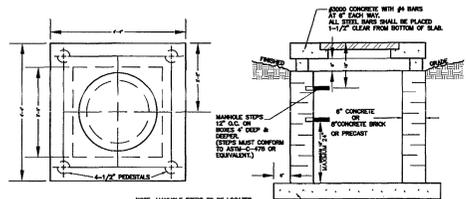
PROJECT TITLE
VEHICLE GROUP FACILITY
SHEET TITLE
SITE DETAIL SHEET

SHEET NUMBER
01-C700
R4

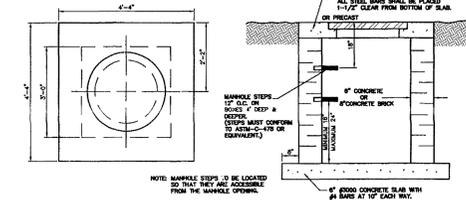
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01-C700
R4

SHEET NUMBER
01-C700
R4

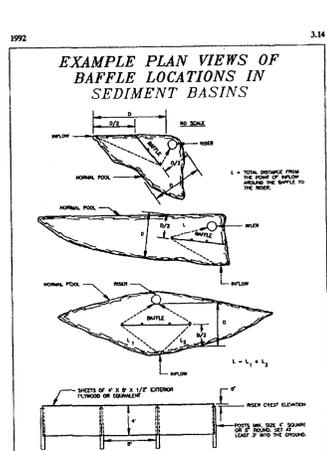
SHEET NUMBER
01-C700
R4



PLAN & SIDE VIEW
YARD INLET DETAIL
NO SCALE

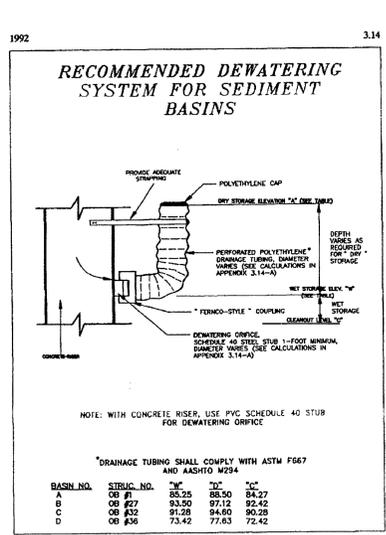


PLAN & SIDE VIEW
JUNCTION BOX DETAIL
NO SCALE



EXAMPLE PLAN VIEWS OF
BAFFLE LOCATIONS IN
SEDIMENT BASINS

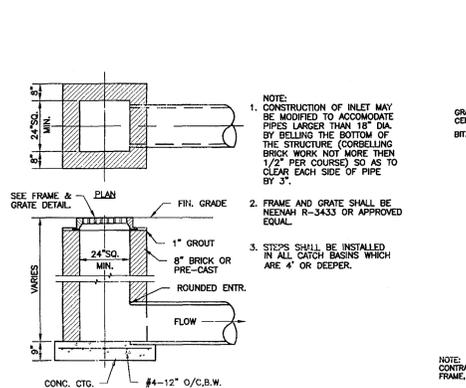
Source: USDA-SCS Plate 3.14-6



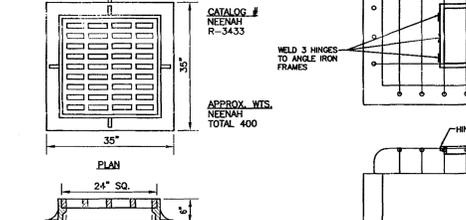
RECOMMENDED DEWATERING
SYSTEM FOR SEDIMENT
BASINS

Source: VA DSWC Plate 3.14-15

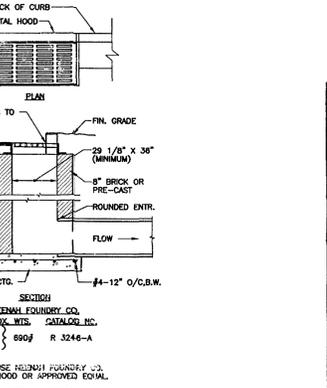
TEMPORARY BASIN OUTLET BOX DETAIL
NO SCALE



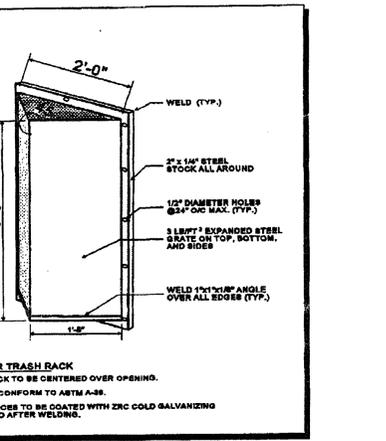
STANDARD CATCH BASIN
NO SCALE



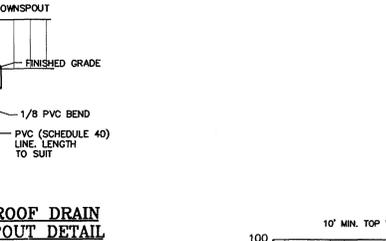
FRAME & GRATE DETAIL
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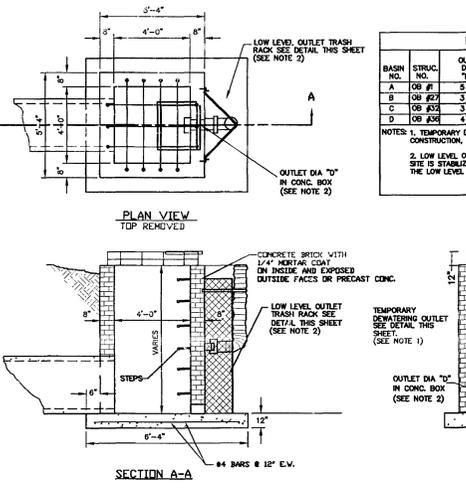
STANDARD CURB INLET
NO SCALE



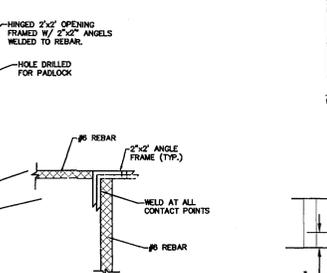
LOW LEVEL OUTLET TRASH RACK DETAIL
NO SCALE



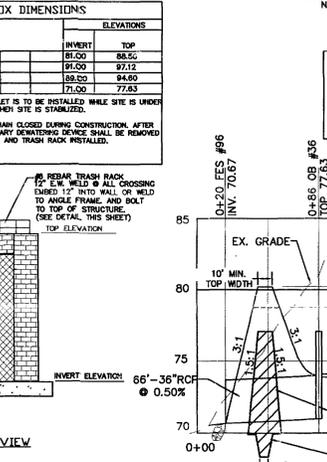
TYPICAL ROOF DRAIN &
DOWNSPOUT DETAIL
NO SCALE



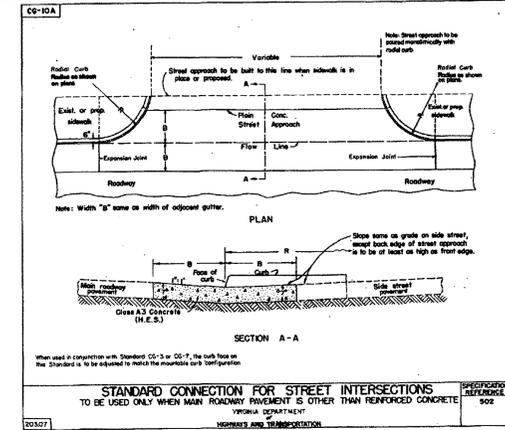
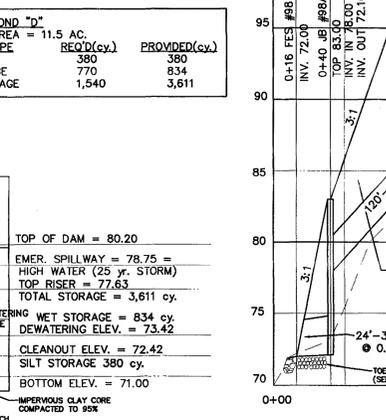
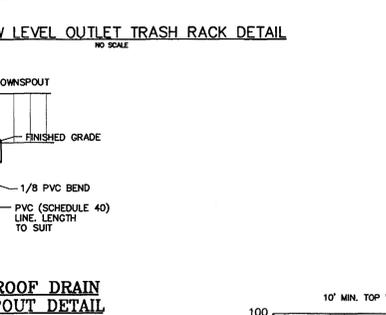
FINAL BASIN OUTLET BOX DETAIL
NO SCALE



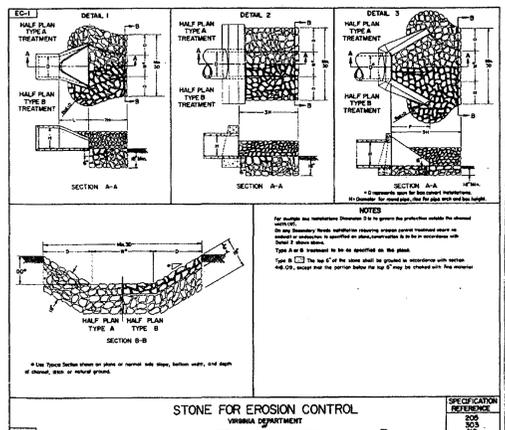
REBAR CAGE DETAIL
NO SCALE



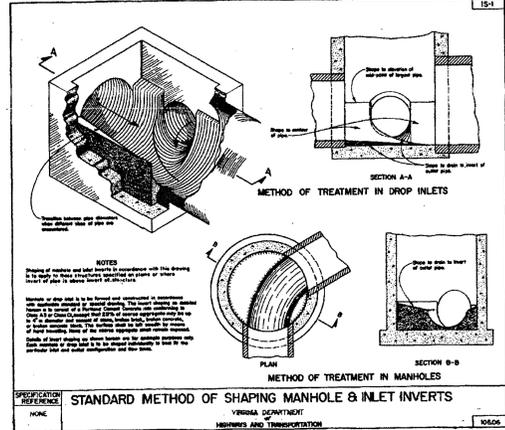
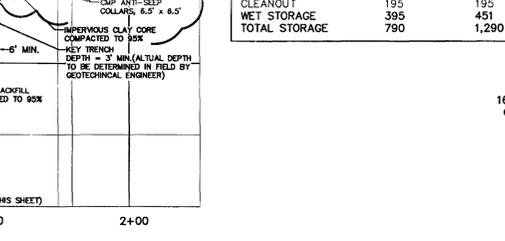
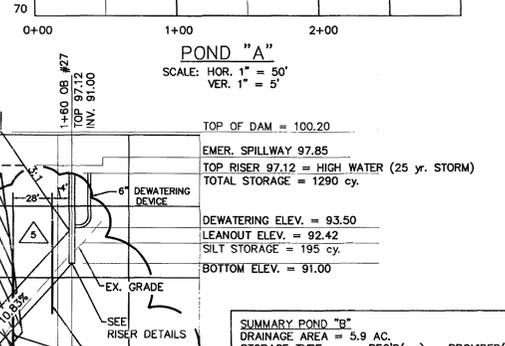
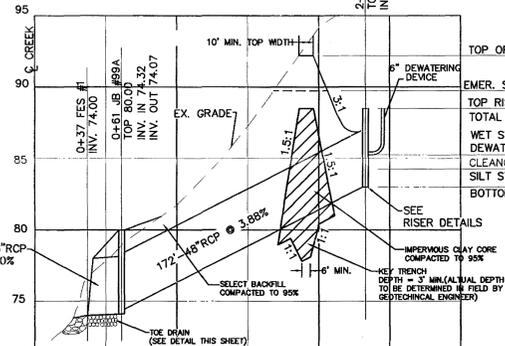
FRONT VIEW
NO SCALE



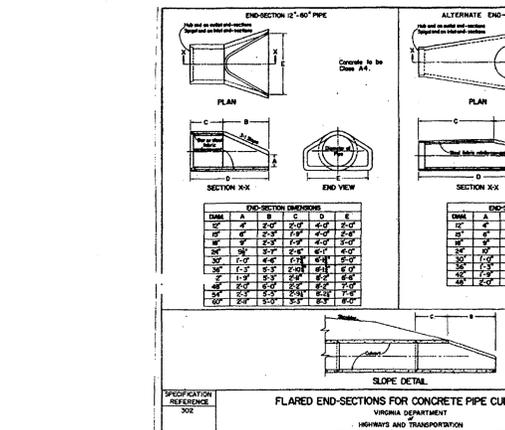
STANDARD CONNECTION FOR STREET INTERSECTIONS
TO BE USED ONLY WHEN MAIN ROADWAY PAVEMENT IS OTHER THAN REINFORCED CONCRETE



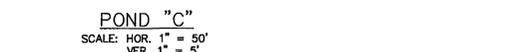
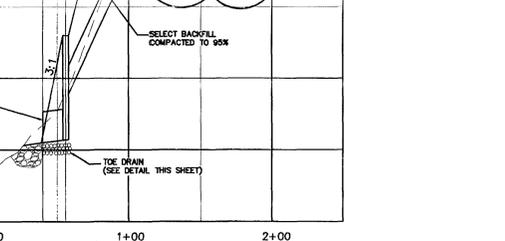
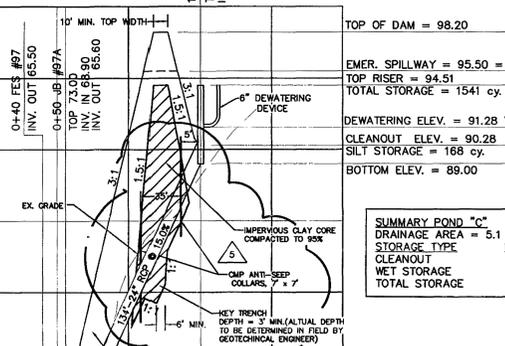
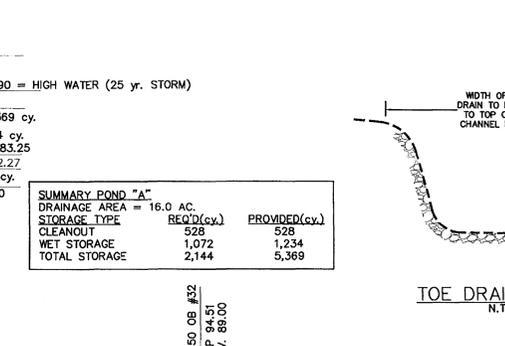
STONE FOR EROSION CONTROL



STANDARD METHOD OF SHAPING MANHOLE & INLET INVERTS



FLARED END-SECTIONS FOR CONCRETE PIPE CULVERTS



REV. NO.	DATE	BY	APP. LOCATION	REVISIONS
1	10/21/99	CDK	ER	RENUMBER SHEETS
2	5/10/99	CDK	CDK	REV. PER JAMES CO.
3	5/17/99	CDK	ER	REV. PER JAMES CO.
4	6/8/99	CDK	ER	ADDED DAM SECTIONS
5	6/11/99	CDK	ER	ADDED DAM SECTIONS
6	6/20/99	CDK	ER	PERMITS ISSUE
7	8/25/99	CDK	ER	REV. POND "A" OUTLET

FILE NAME: 01-C701
DATE: 4/19/99

APPROVALS
PROJECT MANAGER: FRIEDNER
ARCHITECT OF RECORD: ZANDERS
SITE ENGINEERING: RESCH
STRUCTURAL ENGINEERING: CARSON
MECHANICAL ENGINEERING: BRYANT
ELECTRICAL ENGINEERING: [Blank]

DRAWN: CDK
DESIGNED: EJR
CHECKED: JFF

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1015 GERVAIS STREET
COLUMBIA, SOUTH CAROLINA 29201
803-252-3232

JOHN DEERE VEHICLE GROUP FACILITY
TOANO, VIRGINIA

SITE DETAIL SHEET

01-C701
R8
10 OF 13 SHEETS

- NOTES:**
1. ALL METER VAULT DESIGNS, DIMENSIONS AND LAYOUTS SHALL BE SUBMITTED TO THE AUTHORITY FOR APPROVAL.
 2. ALL METER VAULT DESIGNS SHALL BE PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF VIRGINIA. THE DESIGN SHALL BE BASED ON SOIL CONDITIONS, WATER TABLE, EARTH LOADS, LOADING, SIZE OF VAULT, FLOATATION, ETC.
 3. METER VAULTS MAY BE CAST IN PLACE, OR PRE-CAST.
 4. METER VAULTS SHALL BE DESIGNED TO DRAIN TO ATMOSPHERE WHEN POSSIBLE. WHEN DRAINAGE TO ATMOSPHERE IS NOT POSSIBLE, A 12 INCH X 12 INCH X 6 INCH SLUMP SHALL BE PROVIDED.
 5. VAULTS SHALL BE DESIGNED TO ALLOW MINIMUM DIMENSIONS AS INDICATED ON THE STANDARDS DETAILS. WALL SLEEVES SHALL BE CAST IN DURING FABRICATION.
 6. VAULTS SHALL BE DESIGNED TO BE WATER TIGHT.
 7. INTERIOR CONCRETE WALLS SHALL BE PAINTED WHITE WITH AN APPROVED CONCRETE PAINT SYSTEM. EXTERIOR CONCRETE WALLS SHALL BE PAINTED WITH AN APPROVED WATER PROOFING COATING SYSTEM.
 8. ALL VAULTS SHALL BE DESIGNED USING A 36"x36" ALUMINUM ACCESS HATCH CENTERED OVER THE METER OR DETECTOR CHECK. ACCESS HATCH SHALL INCLUDE A COMPRESSION SPRING OPERATOR FOR EASY DOOR OPERATIONS. STAINLESS STEEL PINS AND HARDWARE, DOOR LEAF SHALL BE A POSITIVE HOLD OPEN ARM AND EASY RELEASE FOR THE HOLD OPEN DEVICE. ACCESS HATCHES SHALL BE AS MANUFACTURED BY SILCO OR APPROVED EQUAL.
 9. GROUND SHALL BE SLOPED AWAY FROM THE VAULT AND POSITIVE DRAINAGE PROVIDED TO PREVENT SURFACE RUNOFF FROM ENTERING THE VAULT.
 10. INTERIOR PIPING, VALVES AND METERS SHALL BE FIELD PAINTED WITH A PAINT SYSTEM APPROVED BY THE AUTHORITY.

Addendum No. 5
James City Service Authority
General Notes - Sanitary Sewer Force Main

1. All materials and construction of the sewage force main system shall be installed in accordance with the latest edition of the James City Service Authority Standards and Specifications for water distribution systems. Testing shall be in accordance with Section 1.6.3 of the James City Service Authority Standards and Specifications for the Sanitary sewer system.
2. The developer's representative shall submit a list of materials for approval to the James City Service Authority prior to commencement of construction.
3. Force mains shall be installed after grading to 6-inch of final grade and prior to placement of base material.
4. All approved erosion and sediment control requirements shall be observed during water main construction.
5. After testing is complete and all components of the force main system are acceptable to the James City Service Authority, as-built drawings shall be submitted to the service authority. Any discrepancies noted during the as-built inspection shall be corrected by the developer's representatives within 30 days.

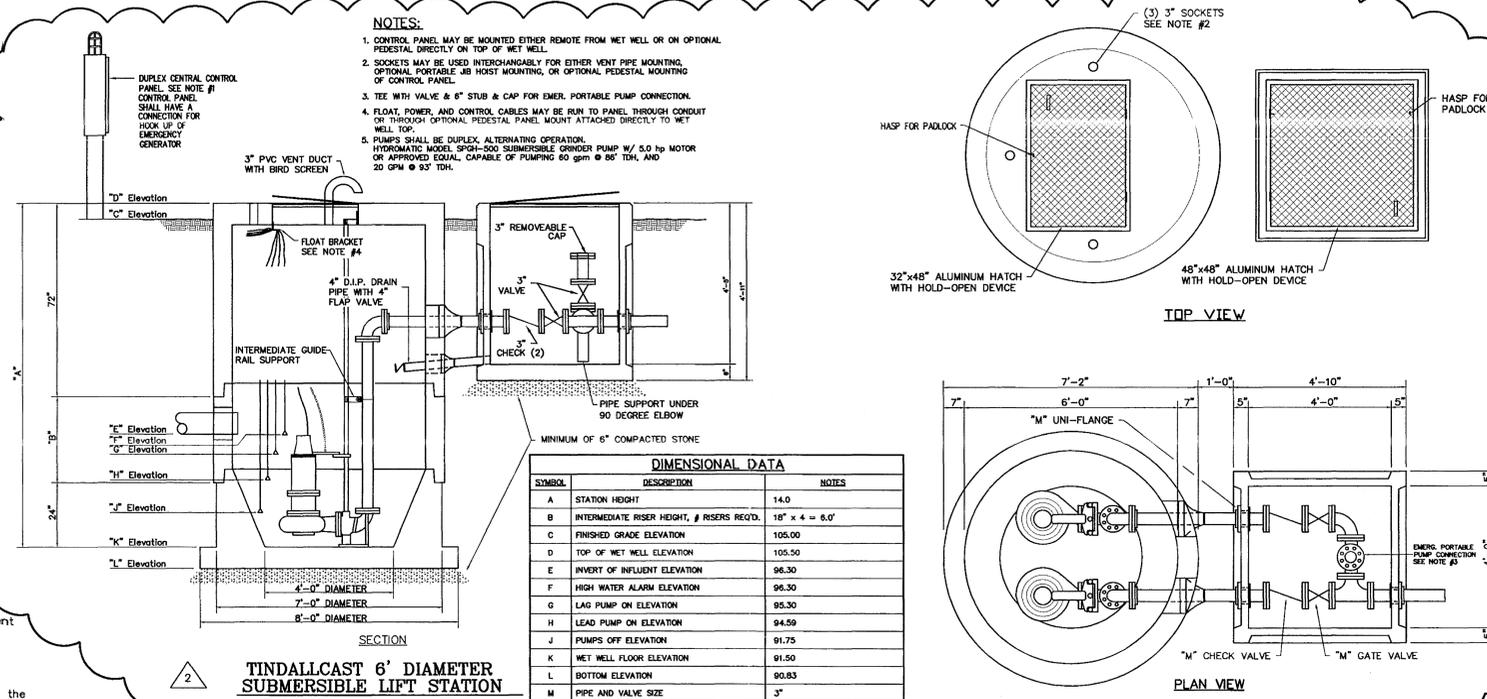
6. Routine periodic inspections during construction will be provided by the James City Service Authority. These inspections do not relieve the developer from his obligation and responsibility for constructing a water distribution system in strict accordance with the standards and specifications of the James City Service Authority.
7. Any changes to the final plans shall be approved by the James City Service Authority and shall be accurately indicated on the as-built drawings.
8. All lots shall be provided with sanitary sewer service connections. The connections shall be extended from the main to the property line or easement line, and shall terminate with a connection in a meter box set at final grade.
9. The developer is required to submit sewer data sheets and shall acquire a Certificate of Construct prior to commencement of construction.
10. Any required easements, permits, and approvals shall be acquired by the developer prior to the commencement of water main construction.
11. The sewer main contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguard for safety and protection. He shall also notify "Miss Utility" prior to performing any underground excavation.
12. Minimum size force mains shall be not less than four inches in diameter except for grinder systems.
13. At pumping capacity, a minimum self-sustaining velocity of two feet per second shall be maintained unless flushing facilities are provided. A velocity of eight feet per second should not be exceeded.
14. Force mains shall be sufficiently anchored within the pump station and throughout the line length. The number of bends shall be as few as possible. Thrust blocks, restrained joints and/or tie rods shall be provided where restraint is needed.
15. Air release valves shall be placed at high points in the force main to relieve air locking.

JCSA - Sanitary Sewer Force Main Page 2
General Notes

James City Service Authority
General Notes - Water Distribution Mains

1. All components of the water distribution system shall be installed and tested in accordance with the latest edition of the James City Service Authority Standards and Specifications for water distribution systems and the Virginia Waterworks Regulations.
2. The developer's representative shall submit a list of materials for approval to the James City Service Authority prior to commencement of construction.
3. Water mains shall be installed after grading to 6-inch of final grade and prior to placement of base material.
4. All approved erosion and sediment control requirements shall be observed during water main construction.
5. All water mains shall be disinfected and pressure tested and satisfactory bacteriological samples obtained, in accordance with James City Service Authority standards.
6. After testing is complete and all components of the water system are acceptable to the James City Service Authority, as-built drawings shall be submitted to the Service Authority. No water meters will be installed until as-built drawings are received and checked for accuracy by the James City Service Authority. Any discrepancies noted during the as-built inspection shall be corrected by the developer's representatives within 30 days.
7. Routine periodic inspections during construction will be provided by the James City Service Authority. These inspections do not relieve the developer from his obligation and responsibility for constructing a water distribution system in strict accordance with the standards and specifications of the James City Service Authority.
8. Any changes to the final plans shall be approved by the James City Service Authority and shall be accurately indicated on the as-built drawings.
9. All lots shall be provided with water service connections. The connections shall be extended from the main to the property line or easement line, and shall terminate with a yoke in a meter box set at final finished grade. Meters for all lots (units) shall be paid for by the developer or builder and installed by the JCSA.
10. The developer is required to submit water data sheets and shall acquire a Certificate of Construct prior to commencement of construction.
11. Any required easements, permits and approvals shall be acquired by the developer prior to commencement of water main construction.
12. The water main contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. He shall also notify "Miss Utility" prior to performing any underground excavation.

JCSA - Water Distribution Mains Page 2
General Notes



EROSION & SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION: THIS PROJECT CONSISTS OF SITE PREPARATION FOR A 228,000 SF MANUFACTURING PLANT, WITH A 32,000 SF OFFICE, AND ASSOCIATED PARKING, DRIVES, LOADING AND STORAGE AREAS AND UTILITY EXTENSIONS. THE PROJECT WILL INCLUDE CONSTRUCTION OF FOUR STORMWATER MANAGEMENT BASINS.

EXISTING SITE CONDITIONS: THE MAJORITY OF THE 74 ACRE TRACT IS WOODED, WITH STEEP SLOPES. DEVELOPING MAINLY ON THE HIGH AREA OF THE SITE, WITH STORMWATER MANAGEMENT BASINS ARE BEING CONSTRUCTED IN THE MAJOR DRAINAGE WAYS. THERE ARE WETLAND AREAS IDENTIFIED IN THREE OF THE RAVINES. DEVELOPMENT HAS BEEN SITUATED TO AVOID THESE AREAS.

SOILS: PREDOMINANT SOIL TYPES ON THE SITE INCLUDE KEMPVILLE FINE SANDY LOAM, SLAGLE FINE SANDY LOAM, CRAVEN-UCHEE COMPLEX, EMPORIA FINE SANDY LOAM, AND IN THE LOW AREAS JOHNSTON SOILS ARE PRESENT. THERE IS ALSO AN AREA IN THE NORTHWEST PORTION OF THE SITE THAT WAS A PREVIOUS BORROW AREA. GENERAL DESCRIPTIONS OF THE SOILS ARE:

KEMPVILLE IS A FINE SANDY LOAM, WHICH IS DEEP AND WELL DRAINED. SLOPES GENERALLY RANGE 2 TO 6 PERCENT. KEMPVILLE HAS AN ERODIBILITY INDEX OF 0.24.

SLAGLE IS A FINE SANDY LOAM AND ARE DEEP AND MODERATELY WELL DRAINED. SLOPES RANGE FROM 1 TO 6 PERCENT. THE ERODIBILITY INDEX FOR SLAGLE IS 0.24.

CRAVEN-UCHEE COMPLEX ARE SANDY CLAY LOAM, AND STRONGLY ACIDIC. SLOPES FROM 6 TO 10 PERCENT. THEY HAVE AN ERODIBILITY INDEX OF 0.29.

EMPORIA IS CLOSELY RELATED TO KEMPVILLE, AND IS A FINE SANDY LOAM WHICH IS DEEP AND WELL DRAINED. SLOPES RANGE FROM 2 TO 50 PERCENT. THE ERODIBILITY INDEX IS 0.28.

CRITICAL EROSION CONTROL AREAS: CRITICAL AREAS ON THE SITE INCLUDE ALL OF THE CRAVEN-UCHEE SOILS DUE TO THEIR HIGH ERODIBILITY. THERE ALSO EXISTS ON THE SITE AN AREA WHERE PREVIOUSLY ERODED CHANNEL HAS BEEN REPAIRED WITH A STORM DRAIN PIPE AND DROP INLET. CARE WILL HAVE TO BE TAKEN ON ALL OF THE STEEP SLOPES TO PROTECT THEM FROM CONCENTRATED RUNOFF. WETLAND AREAS WILL HAVE TO BE PROTECTED.

EROSION AND SEDIMENT CONTROL MEASURES: ALL VEGETATIVE STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION, AND THE JAMES CITY COUNTY EROSION AND SEDIMENT CONTROL NOTES, LATEST REVISION.

STRUCTURAL PRACTICES:

- TEMPORARY CONSTRUCTION ENTRANCE, 3.02. TEMPORARY CONSTRUCTION ENTRANCES SHALL BE CONSTRUCTED AT THE END OF THE EXISTING PAVEMENT OF MEADOWVIEW CIRCLE, AND AT THE DRIVEWAY ENTRANCE OFF OF MEADOWVIEW CIRCLE.
- SILT FENCE BARRIERS, 3.05. SILT FENCING SHALL BE INSTALLED AT THE TOE OF ALL SLOPES AND AREAS WHICH SHEET FLOW TO OFF SITE PROPERLY.
- INLET PROTECTION, 3.07. ALL STORM DRAIN STRUCTURES SHALL BE PROTECTED WITH INLET PROTECTION. THESE MEASURES CAN INCLUDE SILT FENCING, GRAVEL AND WIRE MESH, GRAVEL CURB INLET PROTECTION OR GRAVEL AND BLOCK. ALL INLETS WILL BE PROTECTED UNTIL THE AREA WHICH DRAINS TO THEM IS STABILIZED.
- TEMPORARY SEDIMENT TRAPS, 3.13. TEMPORARY SEDIMENT TRAPS SHALL BE INSTALLED IN ALL AREAS WHERE CONCENTRATED FLOW WILL BE LEAVING THE PROPERTY. THEY SHALL BE USED WITH FILL DIVERSIONS AND DIVERSION DIKES TO DIRECT WATER INTO THE TRAPS. THE OUTLET OF THE TRAPS WILL CONSIST OF GRAVEL AND RIPRAP. THESE TRAPS MAY BE REGRADED.
- OUTLET PROTECTION, 3.18. CLASS I, DRY RIP RAP SHALL BE INSTALLED AT ALL STORM DRAIN OUTFALLS.
- TEMPORARY SEEDING, 3.31. ANY DISTURBED AREA WHICH WILL NOT BE RE-GRADED FOR A PERIOD OF MORE THAN 30 DAYS SHALL RECEIVE TEMPORARY SEEDING TO PREVENT EROSION.
- PERMANENT SEEDING, 3.32. ALL DISTURBED AREAS WILL RECEIVE PERMANENT SEEDING ONCE FINAL GRADING HAS BEEN COMPLETED.

CONSTRUCTION SEQUENCE:

- FLAG LIMITS OF CLEARING. INSTALL SILT FENCE AT LIMITS OF DISTURBED AREAS WHERE FLOW IS DIRECTED OFFSITE. INSTALL TREE PROTECTION AS NECESSARY.
- INSTALL GRAVEL CONSTRUCTION ENTRANCE AT MEADOWVIEW CIRCLE.
- CONSTRUCT TEMPORARY SEDIMENT TRAPS AND DIVERSIONS AT THE LIMITS OF CONSTRUCTION AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN.
- CLEAR AND STRIP ONLY PORTIONS OF THE SITE NECESSARY TO INSTALL THE EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLAN.
- CONSTRUCTION OF THE STORMWATER MANAGEMENT BASINS SHALL BE THE FIRST ITEM OF CONSTRUCTION. THE EMBANKMENT WILL BE CONSTRUCTED AND TEMPORARY SLOPE DRAINS AND DIVERSION DIKES INSTALLED TO PREVENT RUNOFF FROM FLOWING DOWN THE EMBANKMENT. AS THE GRADE IS BROUGHT UP, THESE SEDIMENT TRAPS WILL BE MAINTAINED AT THE TOP OF THE SLOPE.
- ONCE THE EMBANKMENTS FOR THE SEDIMENT BASINS ARE CONSTRUCTED AND IN PLACE, THE REMAINDER OF THE SITE CAN BE CLEARED AND GRADED. AS THE SITE IS BROUGHT UP, THE SEDIMENT BASIN EMBANKMENTS SHALL BE RAISED AND MAINTAINED.
- TEMPORARY SILT TRAPS AND SEDIMENT BASINS SHALL BE MAINTAINED AND CLEANED OUT AS NECESSARY. SILT FENCING SHALL BE INSPECTED ON A WEEKLY BASIS, AND AFTER ANY STORM EVENT GREATER THAN 1/2 INCH OF RAIN. SEDIMENT TRAPS AND BASINS SHALL BE CLEANED OUT WHEN SEDIMENT ACCUMULATES TO 1/2 OF THEIR CAPACITY. SILT FENCING SHALL BE REPLACED AS NECESSARY, AND SEDIMENT ACCUMULATED SHALL BE REMOVED WHEN IT EXCEEDS A DEPTH OF 6 INCHES.
- STORM DRAINAGE SHALL BE INSTALLED AND INLET PROTECTION PLACED AS SOON AS THE GRADE IS BROUGHT UP TO ELEVATIONS WHERE SUFFICIENT COVER CAN BE PLACED OVER THE PIPE.
- UTILITIES SHALL BE INSTALLED WHEN THE SITE IS BROUGHT TO FINAL GRADE. TRENCHING OPERATIONS WILL BE PROTECTED WITH SILT FENCING AND DIVERSIONS AS NECESSARY. AFTER BACKFILLING, DISTURBED AREAS SHALL BE SEEDING WITH TEMPORARY OR PERMANENT SEEDING AS APPROPRIATE.
- COMPLETE SITE GRADING OPERATIONS. INSTALL PAYMENT BASE AS SOON AS POSSIBLE TO STABILIZE DRIVES AND TO REDUCE EROSION FROM THE PARKING LOT AREAS.
- COMPLETE BUILDING CONSTRUCTION. INSTALL ROOF DRAIN COLLECTION SYSTEM AS SOON AS POSSIBLE TO MINIMIZE THE RUNOFF FROM THE ROOF AREA ONTO DISTURBED EARTH.
- PAVING, PERMANENT SEEDING AND LANDSCAPING. REMOVE ACCUMULATED SEDIMENT FROM TEMPORARY SILT TRAPS AND SEDIMENT BASINS. REGRADE TO REQUIRED CONFIGURATION AND COMPLETE PERMANENT SEEDING.
- SILT FENCING AND INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE A GOOD STAND OF GRASS IS OBTAINED AND ALL AREAS ARE STABILIZED. ANY ERODED AREAS SHALL BE REGRADED AS NECESSARY AND RESEDED.

Revised 4/7/97

James City County

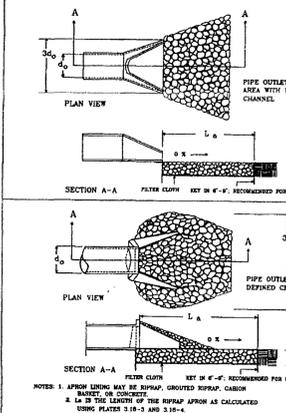
Erosion and Sediment Control Notes

The purpose of the erosion control measures shown on these plans shall be to preclude the transport of all waterborne sediments resulting from construction activities from entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, appropriate modifications will be made to correct any plan deficiencies. In addition to these notes, all provisions of the Virginia Erosion and Sediment Control Regulations shall apply to this project.

- All erosion and sediment control measures shall be installed and maintained in accordance with the "Virginia Erosion and Sediment Control Handbook." The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.
- All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within State right-of-ways. When sediment is transported onto a public road surface, the road shall be thoroughly cleaned at the end of each day.
- A preconstruction meeting shall be held on site between the County, the Developer, the Project Engineer, and the Contractor prior to issuance of the Letter Disbarring and Grading. The Contractor shall submit a Sequence of Construction to the County for approval prior to the preconstruction meeting. The Contractor will supply the Environmental Division with the name of the individual who will be responsible for ensuring maintenance of installed measures on a daily basis.
- Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before upstage land disturbance takes place. Earth structures such as dikes, ditches, and diversions must be seeded and mulched immediately after installation. Periodic inspections of the erosion control measures shall be made to assess their condition. Any necessary maintenance of the measures shall be accomplished immediately upon notification by the County and shall include the repair of measures damaged by any subcontractor including those of the public utility companies.
- Surface flows over cut and fill slopes shall be controlled by either redirecting flows from downstage to upstage or by installing mechanical devices to safely lower water downstage without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) shall be installed prior to the end of each working day.
- Sediment control measures may require minor field adjustments at a time of construction to insure their intended purpose is accomplished. Environmental Division approval will be required for other deviations from the approved plans.
- The contractor shall place soil stockpiles at the locations shown on this plan or as directed by the engineer. Soil stockpiles shall be stabilized or protected with sediment trapping measures. Off-site waste or borrow areas shall be approved by the Environmental Division prior to the import of any borrow or export of any waste to or from the project site.
- The contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of same. This includes installation of erosion control stone or paved ditches where required. Any drainage outfalls required for a street must be completed before street grading or utility installation begins.
- Permanent or temporary soil stabilization must be applied to all denuded areas within 7 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded areas which may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on crees to be paved.
- No more than 300 feet of sanitary sewer, storm sewer, waterlines, or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).
- If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 3.35. Seeding will then take place as soon as the season permits.
- The term Seeding, Final Vegetative Cover or Stabilization, on this plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime, and fertilizer in accordance with Specification 3.32. Permanent Seeding. Irrigation shall be required as necessary to ensure establishment of grass cover.
- All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 3.35. Mulching and Manufacturer's Instructions. No slopes shall be created steeper than 2:1.
- Inlet protection in accordance with Specification 3.07 shall be provided for all storm drain inlets as soon as practical following construction of same.
- Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.
- Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to those areas where grades exceed 3 percent.
- Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be stored and seeded.
- As-built drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgment, knowledge, and belief, the structure was constructed in accordance with the approved plans and specifications.

Source: Va. DSWC

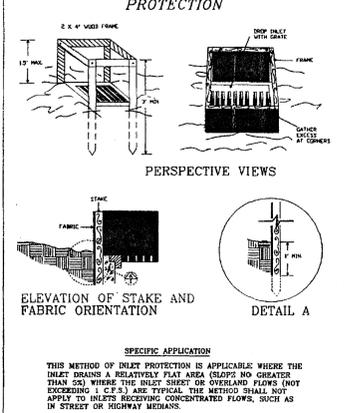
PIPE OUTLET CONDITIONS



Source: Va. DSWC

Plate 3.18-1

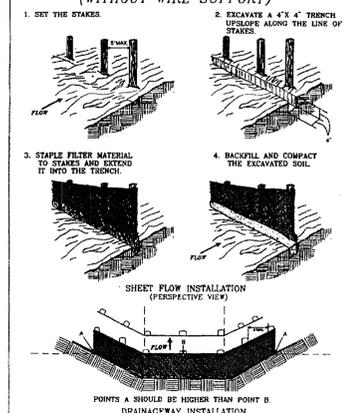
SILT FENCE DROP INLET PROTECTION



Source: N.C. Erosion and Sediment Control Planning and Design Manual, 1995

Plate 3.07-1

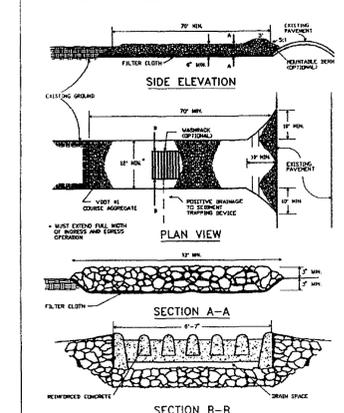
CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyatt

Plate 3.05-2

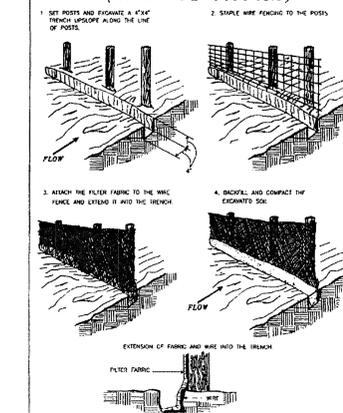
STONE CONSTRUCTION ENTRANCE



Source: Adapted from 1983 Maryland Standards for Soil Erosion and Sediment Control, and Va. DSWC

Plate 3.02-1

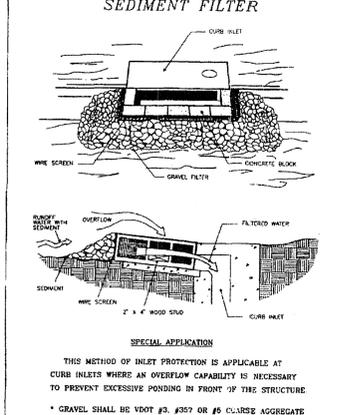
CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)



Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyatt

Plate 3.05-1

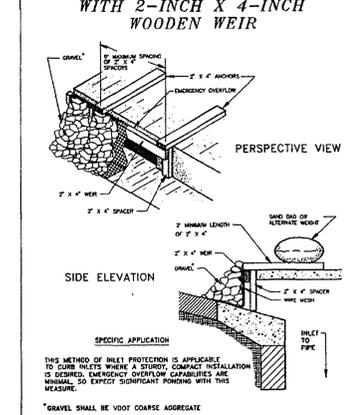
BLOCK & GRAVEL CURB INLET SEDIMENT FILTER



Source: Va. DSWC

Plate 3.07-8

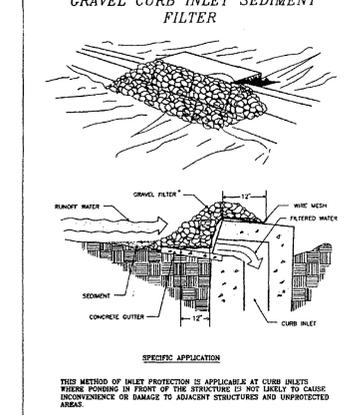
CURB INLET PROTECTION WITH 2-INCH X 4-INCH WOODEN WEIR



Source: 1983 Maryland Standards and Specifications for Soil Erosion and Sediment Control, and USDA-SCS

Plate 3.07-7

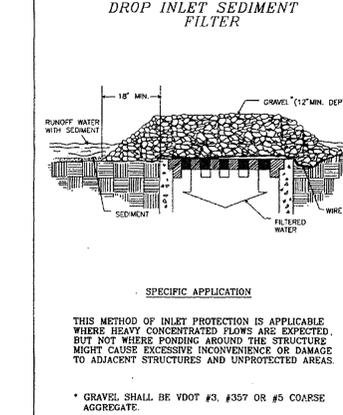
GRAVEL CURB INLET SEDIMENT FILTER



Source: Va. DSWC

Plate 3.07-6

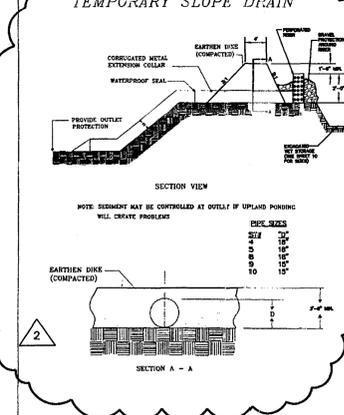
GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER



Source: Va. DSWC

Plate 3.07-2

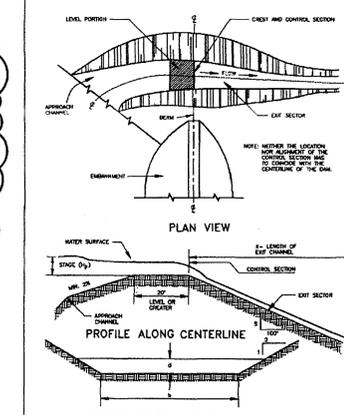
TEMPORARY SLOPE DRAIN



Source: Va. DSWC

Plate 3.15-1

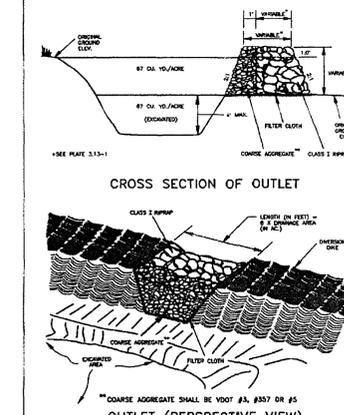
EXCAVATED EARTH SPILLWAY



Source: USDA-SCS

Plate 3.14-9

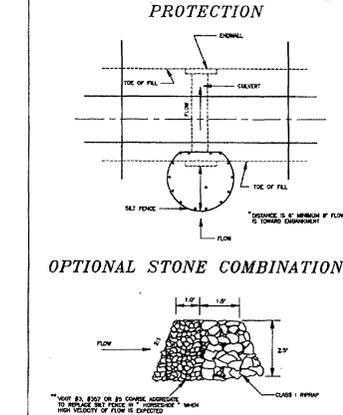
TEMPORARY SEDIMENT TRAP



Source: Va. DSWC

Plate 3.13-2

SILT FENCE CULVERT INLET PROTECTION



Source: Adapted from VDOT Standard Sheets and Va. DSWC

Plate 3.08-1

TABLE 3.33-D

SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

Minimum Care Level	Total Lbs. Per Acre
Commercial or Residential	175-200 lbs.
- Kentucky 31 or Turf-Type Tall Fescue	20 lbs.
- Common Bermudagrass **	75 lbs.
High-Maintenance Lawn	200-250 lbs.
- Kentucky 31 or Turf-Type Tall Fescue	40 lbs. (unhulled) or 30 lbs. (hulled)
- Hybrid Bermudagrass (seed) **	40 lbs. (unhulled) or 30 lbs. (hulled)
- Hybrid Bermudagrass (by other vegetative establishment method, see Std. & Spec. 3.34)	
Seasonal Slope (3:1 or less)	178 lbs.
- Kentucky 31 Fescue	2 lbs.
- Red Top Grass	20 lbs.
- Seasonal Nurse Crop *	150 lbs.
Low Maintenance Slope (Steeper than 3:1)	93-108 lbs.
- Kentucky 31 Tall Fescue	0-15 lbs.
- Common Bermudagrass **	2 lbs.
- Red Top Grass	20 lbs.
- Seasonal Nurse Crop *	20 lbs.
- Sericea Lespedeza **	150 lbs.

* Use seasonal nurse crop in accordance with seeding dates as stated below:
 February, March through April Annual Rye
 May 1st through August Fescue/Millet
 September, October through November 15th Annual Rye
 November 16th through January Winter Rye

** May through October, use hulled seed. All other seeding periods, use unhulled seed. Weeping Lovegrass may be added to any slope or low-maintenance mix during warmer seeding periods; add 10-20 lbs./acre in mixes.

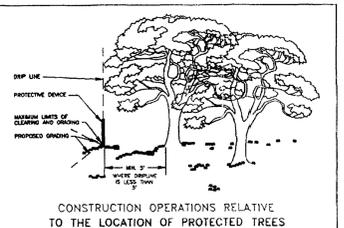
TABLE 3.35-A

ORGANIC MULCH MATERIALS A/D APPLICATION RATES

MULCHES	RATES	NOTES	
Per Acre	Per 1000 sq. ft.		
Straw or Hay	1 1/2 tons (Minimum 2 tons for winter cover)	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower by hand.	
Fiber Mulch	Minimum 1500 lbs.	Do not use as mulch for winter cover or during hot periods. Apply as slurry.	
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 - 275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 - 70 cu. yds.	1-2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

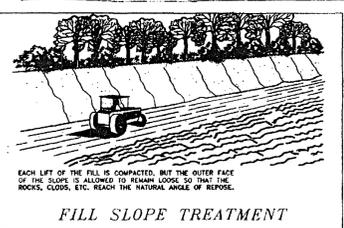
* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./1000 sq. ft.

Source: Va. DSWC



Source: Public Facilities Manual, Vol. III, Fairfax Co., Va., 1976

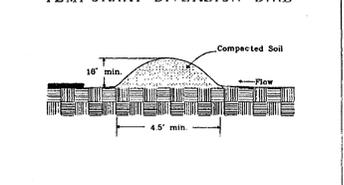
Plate 3.38-1



Source: Va. DSWC

Plate 3.29-3

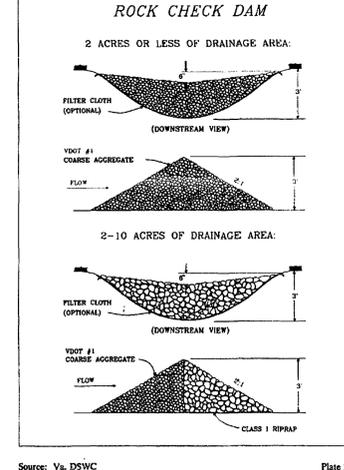
TEMPORARY DIVERSION DIKE



Source: Michigan Soil Erosion and Sedimentation Guide

Plate 3.29-4

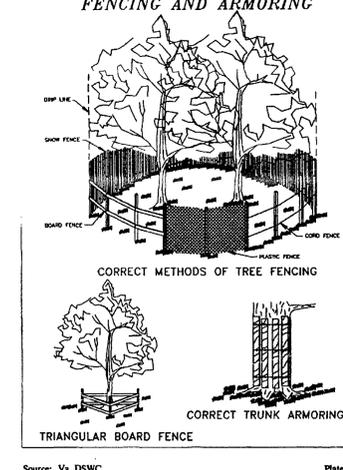
ROCK CHECK DAM



Source: Va. DSWC

Plate 3.20-1

FENCING AND ARMORING



Source: Va. DSWC

Plate 3.38-2

DATE: 4/23/97
 DRAWN: CDK
 CHECKED: JFR
 PROJECT TITLE: SHEET TITLE

REVISIONS

APPROVALS

PROJECT MANAGER: FRIEDNER
 ARCHITECT OF RECORD: ZANDERS
 SITE ENGINEERING: RESCH
 STRUCTURAL ENGINEERING: CARSON
 MECHANICAL ENGINEERING: BRYANT
 ELECTRICAL ENGINEERING: BRYANT

DRAWN: CDK
 DESIGNED: JFR
 CHECKED: JFR

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PROJECT TITLE: SHEET TITLE

SITE DETAIL SHEET

OCT 25 1999

PROFESSIONAL ENGINEER

JERRY F. FRIEDNER
 No. 18445
 10/24/99

SHEET NUMBER: 01-C703

R4

12 OF 13 SHEETS

