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: **PC135**

DATE VERIFIED: **October 24, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 13, 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: PC135

PIN: 3330100005C

Subdivision, Tract, Business or Owner Name (if known): Olde Towne Road

Property Description: Strip Shopping Center

Site Address: 5540 Olde Towne Road

(For internal use only)	Box	4		Drawer:	2	
Agreements: (in file as of scan date)	Y		Book or Doc#:	990001521	Page:	
				413		181

Comments
Deed of easement in file without (w/o) deed book/page or doc number to show recordation?

COPY

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 6th day of January, 1999, between Norfolk Paint Co. Inc, and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: 5540 Olde Towne Road, Williamsburg, Virginia 23188, Deed Book 913, Page No. 181 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.

Instrument # 990001521
Page 0237
Recorded on 1-22-99

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 6th day of JANUARY, 1999.

COVENANTOR(S)

NORFOLK PAINT CO. INC.
By: William K. Wright
WILLIAM K. WRIGHT, VICE PRES.

ATTEST:

Virginia Saunders

COVENANTOR(S)

_____

ATTEST:

_____

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF NORFOLK

I hereby certify that on this 6th day of JANUARY, 1999, before the subscribed, a Notary Public of the State of Virginia, and for the County of NORFOLK, aforesaid personally appeared William K. Wright and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 6th day of January, 1999.

Margaret L. Wright
Notary Public

My Commission expires: 6-30-99

Approved as to form:

Leo P Rogers
Deputy County Attorney

This Declaration of Covenants prepared by:

William K. Wright
(Print Name)

Vice President
(Title)

1373 Ingleside Road
(Address)

Norfolk, VA 23502
(City) (State) (Zip)

drainage.pre
Revised 2/97

DEED OF EASEMENT

This Deed of Easement is made this 25th day of November, 1998, by and between **OLD TOWN FARMS, INC.**, a Virginia Corporation ("Grantor") and **WBB PARTNERS**, a Virginia General Partnership ("Grantee"), whose address is c/o CCA Industries, Inc., One James Center, 901 East Cary Street, Richmond, VA 23219

WITNESSETH: For and in consideration of the sum of One and No/100 Dollar ($1.00) and other good and valuable consideration, cash in hand paid by the Grantee to the Grantor, receipt of which is hereby acknowledged, Grantor does hereby grant and convey with **GENERAL WARRANTY** unto the Grantee the exclusive privilege and easement in perpetuity to construct, lay, maintain, repair, improve, replace, alter and remove a drainage pipe and riprap outfall for collection of surface water runoff within the area designated as "10' PERMANENT MAINTENANCE EASEMENT" ("Easement Area") on a certain plat entitled "**PLAT SHOWING 10' PERMANENT MAINTENANCE EASEMENT AND 5' TEMPORARY CONSTRUCTION EASEMENT LOCATED ON THE PROPERTY OF OLD TOWN FARMS, INC., BERKELEY DISTRICT, JAMES CITY COUNTY, VIRGINIA**" dated November 19, 1998 and made by Rickmond Engineering, Inc. of Williamsburg, Virginia, a copy of which plat is attached hereto and made a part hereof.

The further terms and conditions of this easement are as follows:

A. Grantee shall have the additional right to use those areas identified as "5' Temporary Construction Easement" at any time that the Grantee or its agent is constructing, repairing or replacing any improvements within the Easement Area.

This document prepared by:
Anderson, Franck & Davis, P. C.
1200 Old Colony Lane
Williamsburg, Virginia 23185
(757) 229 7322

B. The Grantee will exercise reasonable care to protect the Grantor's property outside of the Easement Area from damage or injury occasioned in the enjoyment of this easement and the rights herein granted.

C. Grantee shall be solely responsible for the cost of maintaining the drainage facilities located within the Easement Area.

D. The easements, rights and privileges created and granted by this Deed of Easement shall be for the benefit of and restricted solely to the Grantee and the owner from time to time of the parcel shown and designated as "Lot 1" on the plat attached hereto. This easement does not create any rights in or for the benefit of the general public or any person or entity other than those expressly provided herein, whether a third party beneficiary or otherwise.

E. This easement is appurtenant to the parcel shown and designated as Lot 1 on the plat attached hereto.

WITNESS the following signature and seal:

OLD TOWN FARMS, INC.

By Michele Z. Ball
President

This document prepared by:
Anderson, Franck & Davis, P. C.
1200 Old Colony Lane
Williamsburg, Virginia 23185
(757) 229 7322

STATE OF VIRGINIA

CITY/COUNTY OF JAMES CITY, to-wit:

The foregoing instrument was acknowledged before me by MICHELE Z. BALL, President of Old Town Farms, Inc., a Virginia Corporation, this 8TH day of DECEMBER, 1998.

Mary B Sharp
NOTARY PUBLIC

My commission expires: MARCH 31, 2002

This document prepared by:
Anderson, Franck & Davis, P. C.
1200 Old Colony Lane
Williamsburg, Virginia 23185
(757) 229 7322

James City County, Virginia
Environmental Division

Stormwater Management/BMP Facilities
Record Drawing/Construction Certification
Review Tracking Form

Bond $13,010

County Plan No.: SP-90-98
Project Name: NORFOLK PAINT
Stormwater Management Facility: 5540 OLDE TOWNE ROAD.
Phase: ☐ I ☒ II ☐ III

☑ Information Received. Date: Oct 1 1999
☒ Administrative Check.
- ☒ Record Drawing Date: ~~Oct 1 1999~~ (9/23/99 MERIDIAN ASSOC)
- ☒ Construction Certification Date: Oct 13 99 (RICHMOND
- ☐ RD/CC Standard Forms (Required after Feb 1st 2001Only)
- ☒ Insp/Maint Agreement Info: Inst # 990001521 Pg 0237 1-22-99
- ☐ Other:

☒ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
☒ Yes ☐ No Note/Sheet: Note #18, Sheet C4
☒ Assign County BMP ID Code Code: PC135
☒ Log into Division's "As-Built" Tracking Log
☒ Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, etc.)
☒ Preliminary Log into BMP Database (BMP ID #, Site Plan #, GPIN, Project Name)
☒ Active Project File Review (correspondence, H&H, etc.).
☒ Initial As-Built File setup (label, copies of hydraulics, etc.).
☒ Inspector Check of RD/CC.
☒ Pre-Inspection Drawing Review (Quick look prior to field inspection).
☒ Final Inspection (FI) Date: 09/18/01
☒ Record Drawing (RD) Review Date: 09/18/01
☒ Construction Certification (CC) Review Date: 09/18/01
☒ Actions:
- ☐ No comments.
- ☒ Comments. Letter Forwarded. Date: Sept 19 2001
  - ☐ Record Drawing (RD)
  - ☐ Construction Certification (CC)
  - ☒ Construction-Related (CR) REINSPECT 11/02/01 OK SJT.
  - ☐ Site Issues (SI)
  - ☐ Other :

☐ Second Submission:
☐ Third Submission:
☑ Acceptable for stormwater managment facility purposes (RD/CC/CR/Other). Proceed with bond release.
☑ Notify Darryl & Joan of acceptability using email (preferred) or verbal.
☑ Clean active file of all stormwater management related material and finish/establish "As-Built" file.
☑ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
☑ Copy Final Inspection Report into County BMP Inspection Program file.
☑ Digital Photographs obtained.
☑ Add to JCC Hydrology & Hydraulic database (optional). NO

BMP Certification Information Acceptable

Plan Reviewer: Scott J. Thomas Date: 11/02/01.

McCALLUM
TESTING LABORATORIES, INC.

Geotechnical Engineering, Materials Testing & Environmental Services

October 13, 1999

Norfolk Paint Company, Inc.
1373 Ingleside Road
Norfolk, VA 23502

Attention: William K. Wright

Subject: Dam Acceptance
Norfolk Paint Store
James City County, Virginia
MTL Project 986690

Dear Mr. Wright:

On September 24, 1999, our engineer, Scott Deese, visited the site to verify that the existing dam at the west end of the storm water detention basin had been constructed in accordance with the construction drawings. During that inspection, it was noted that the slopes were steeper than designed and the specified excelsior matting was not present.

We understand that the contractor has subsequently corrected the previously noted discrepancies. The designer of the dam, Rickmond Engineering, Inc., was present during and after the repairs and has verified that the dam meets the general requirements of the construction drawings (see attached report). As such, no further inspection is required by this office.

Should you have any questions concerning this matter, please contact this office at your earliest convenience.

Very truly yours,

McCALLUM TESTING LABORATORIES, INC.

COMMONWEALTH OF VIRGINIA
DOUGLAS S. KINLOCH
No. 020
REGISTERED PROFESSIONAL ENGINEER

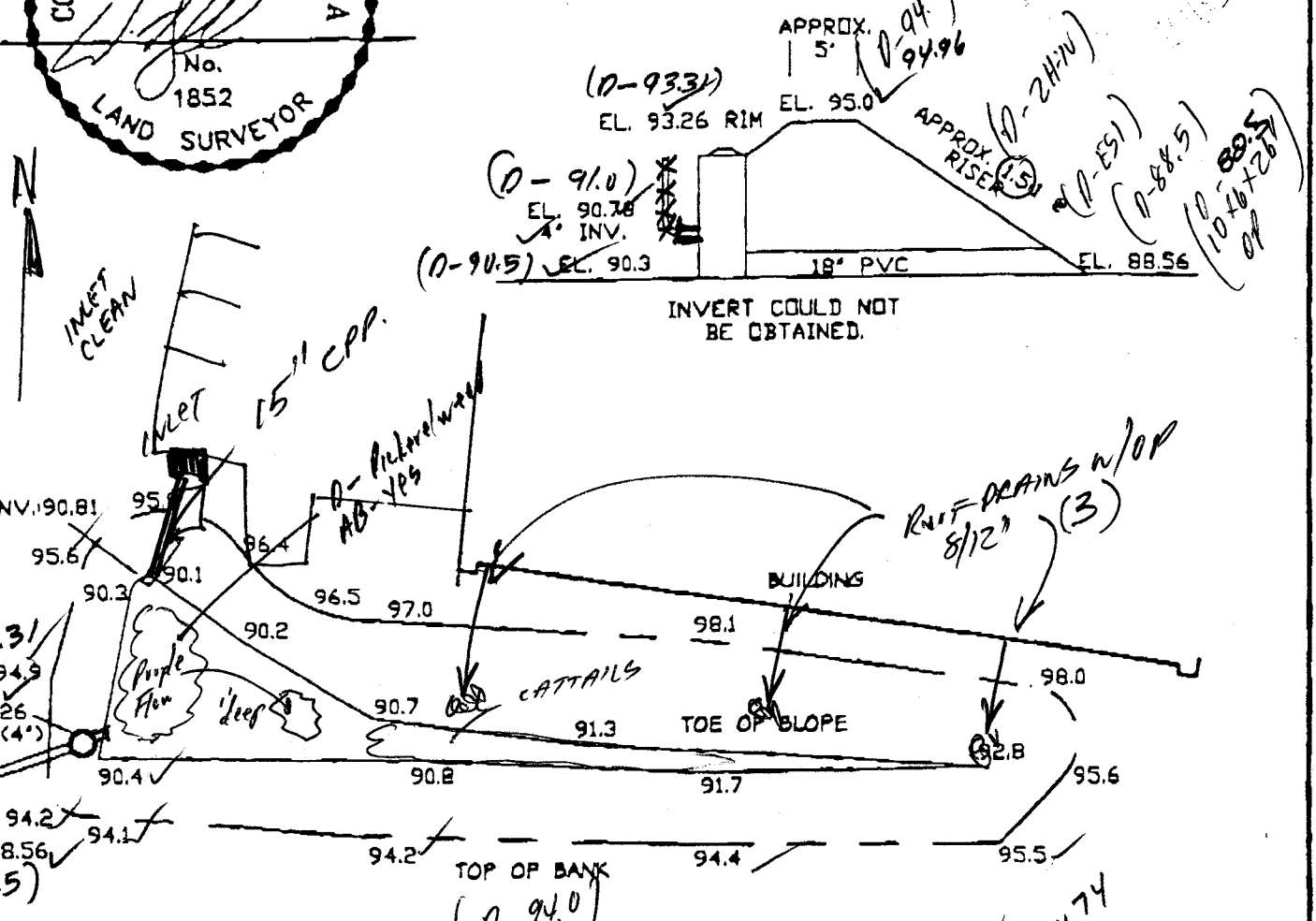
Douglas S. Kinloch, P.E.
Chief Engineer

cc: Robert Arnette

• 1/s emb Design 2H:1V OK
AB 1.5H:1V

COMMONWEALTH OF VIRGINIA
9/23/99
W. MARK SHUMAKER
No. 1852
LAND SURVEYOR

SIGNED:



PraDev
1.11 AC CN 74

PostDev
1.11 AC CN 84

Design
Bottom 90.5
WSEL NP 91.00
1-YR 93.33
10-YR 94.96
TOD

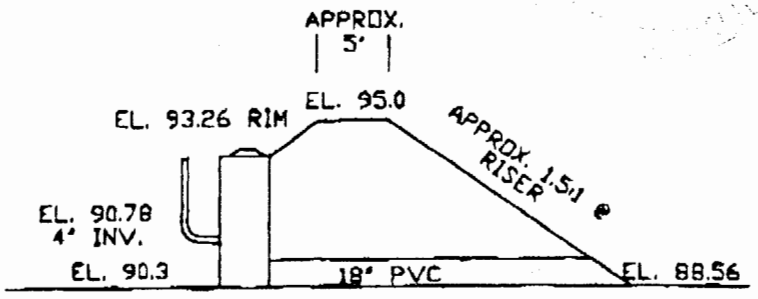
BMP AS-BUILT
FOR
NORFOLK PAINT STORE
ON OLE TOWNE ROAD
JAMES CITY COUNTY, VIRGINIA
SCALE: 1"=30'
JULY 20, 1999

SIT-FIELD SET

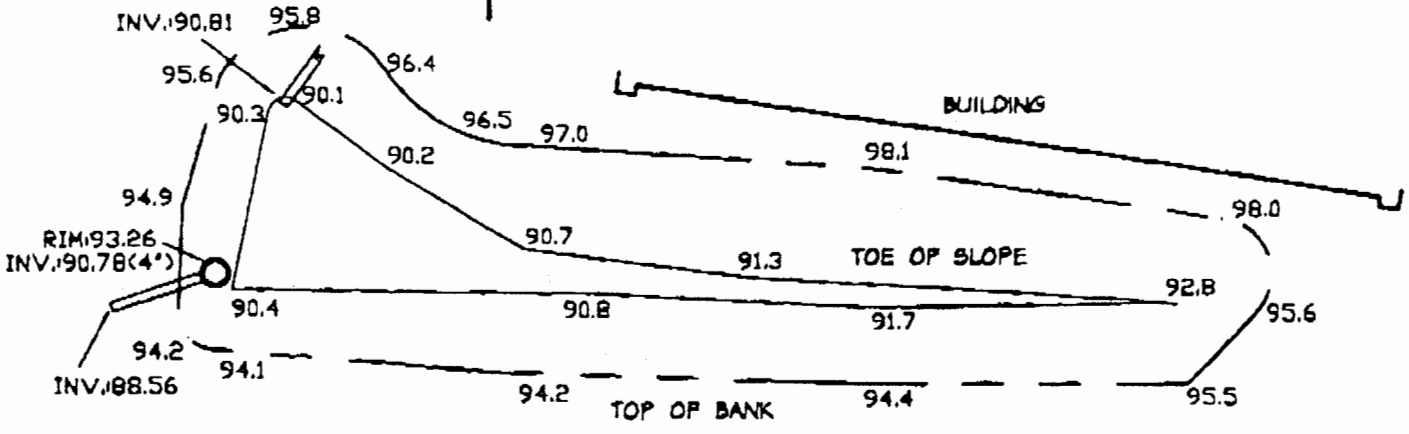
Meridian Associates, Inc.
P.O. Box 2573 . Virginia Beach, VA 23450
471-6826 · Fax 471-6819

COMMONWEALTH OF VIRGINIA
9/23/99
W. MARK SHUMAKER
No. 1852
LAND SURVEYOR

SIGNED: _____



INVERT COULD NOT BE OBTAINED.



BMP AS-BUILT
FOR
NORFOLK PAINT STORE
ON OLE TOWNE ROAD
JAMES CITY COUNTY, VIRGINIA
SCALE: 1"=30'
JULY 20, 1999

Meridian Associates, Inc.
P.O. Box 2573 . Virginia Beach, VA 23450
471-6026 · Fax 471-6819

CREECH
CONSTRUCTION CORP.

New As builts

FAX COVER SHEET

Date: Oct. 1 1999

To: Pat Menichino
Eng. Inspector Environmental

From: Creech Development
Tom Davis 438-3253

Fax #: 253-6850

Re: Norfolk Paint
5540 Olde Towne Rd

Number of Pages Including This Cover 2

Comments:

As Built

AS BUILTS O.K.
PTM 10-7-99

File:

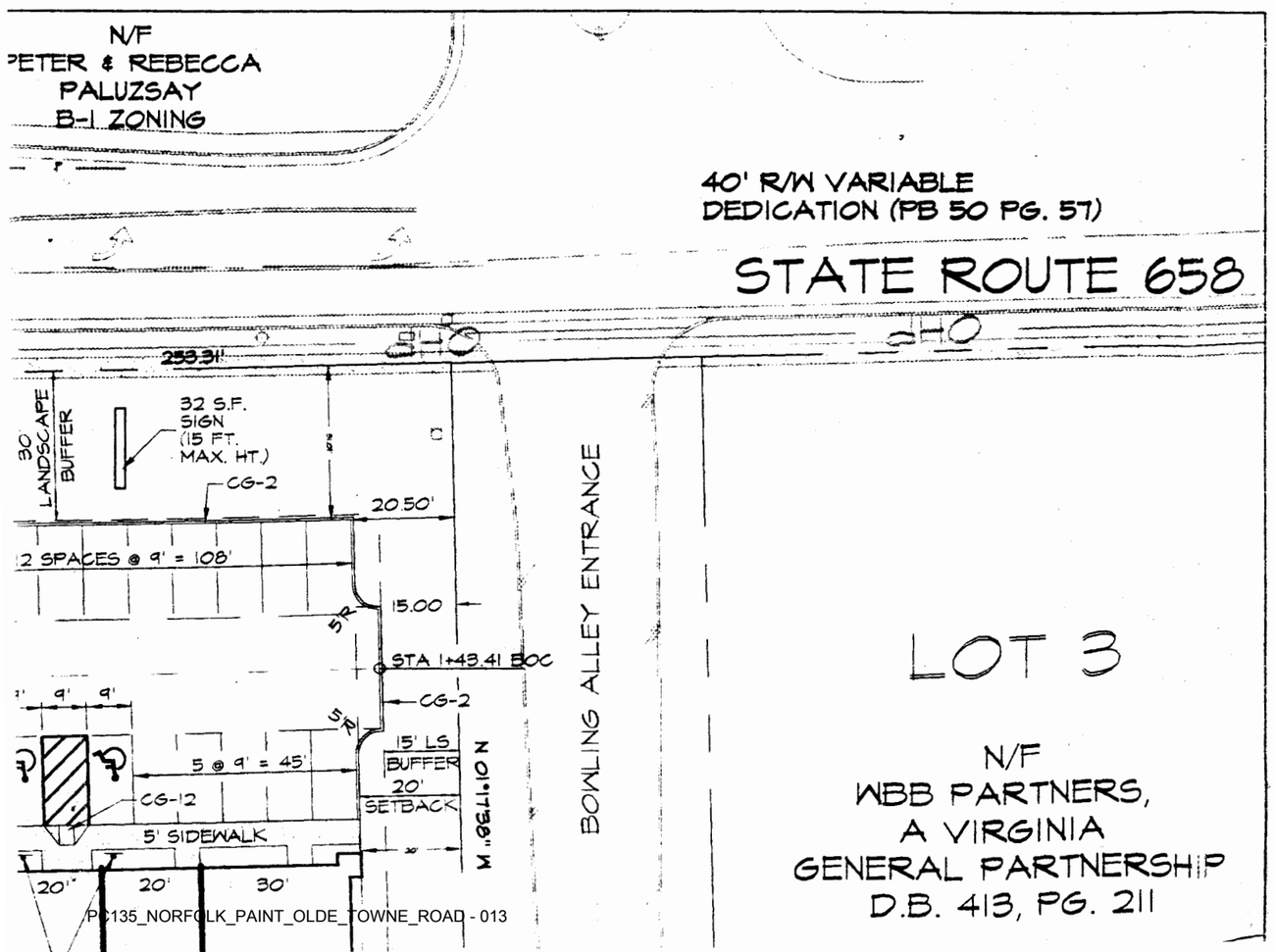
Norfolk
Paint

General Contractors
State Registration VA 016580 • NC 27857 • CA 745363
2604 Barrett Street, Suite 200 • Virginia Beach, Virginia 23452 • (757) 340-1771 • FAX (757) 498-1173

PAINT

AN

VIRGINIA



SP-90-98

PC135

COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS	DATE
Fire Dept JD/PDH	8/13/98
Health Dept UJ/PDH	8/4/98
VDOT RCB/PDH	9/21/98
Planning	12/1/98
Environ. DEC/PDH	12/10/98
Zoning Adm.	12/1/98
JCSA DWP/PDH	11/3/98
County Engr. WWB/PDH	8/17/98
BRA	
Other	

TABLE OF CONTENTS

NOTE :
PARKING LOT DIMENSIONS ARE
TO FACE OF CURB UNLESS STATED
OTHERWISE.

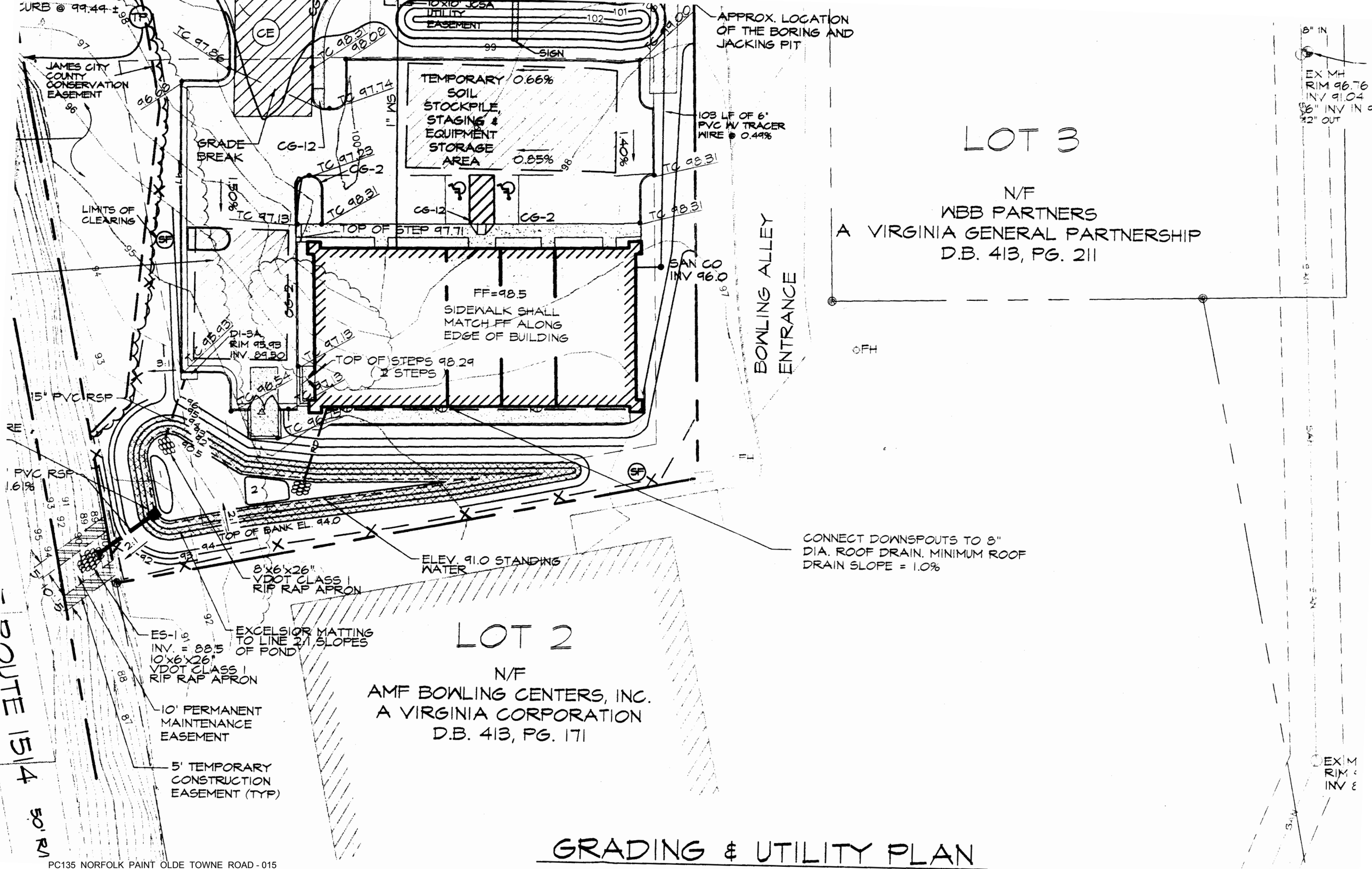
VICINITY MAP
SCALE: 1"=2000'

STATISTICAL INFORMATION

ZONED	B1
SITE AREA	1.11 ACRES
TAX MAP NO., PARCEL NO.	33-3, 1-5C
WATER	PUBLIC WATER
SEWER	PUBLIC SEWER
PAVED AREA	0.30 AC. (27%)
BUILDING AREA	7200 S.F./ 0.17 AC. (15%)
BUILDING HEIGHT	20 FEET
BUILDING STORIES	ONE (1)
IMPERVIOUS AREA	0.47 AC. (42%)
OPEN AREA	0.64 AC. (58%)
PARKING:	
REQUIRED (1/250S.F.)	29 SPACES
PROVIDED	35 SPACES
HANDICAPPED:	
REQUIRED	2 SPACE
PROVIDED	2 SPACE

OWNER/DEVELOPER

NORFOLK PAINT COMPANY, INC.
1373 INGLESIDE ROAD



GRADING & UTILITY PLAN

PC135_NORFOLK_PAINT_OLDE_TOWNE_ROAD - 015

TEMPORARY SOIL STOCKPILE, STAGING & EQUIPMENT STORAGE AREA

ED AREAS.

N/F
CHISEL RUN
R-2 ZONE

CHISEL RUN

LIMITS OF CLEARING

BREAK

TOP OF STEEP SLOPE

DI-3A
RIM 95.93
INV. 89.90

15" PVC RSP

OUTLET STRUCTURE
(SEE DETAIL)

18" PVC RSP
@ 1.6%

TOP OF BANK EL. 94.0

8'X6'X26"
VDOT CLASS I
RIP RAP APRON

ELEV. 91.0 STANDING WATER

EXCELSIOR MATTING
TO LINE 2:1 SLOPES
OF POND

ES-1
INV. = 88.5
10'X6'X26"
VDOT CLASS I
RIP RAP APRON

10' PERMANENT
MAINTENANCE
EASEMENT

5' TEMPORARY
CONSTRUCTION
EASEMENT (TYP)

NUMBER	
ELWEED)	50
	50

NEED DETAIL

STATE ROUTE 154

50' R/W (PB 39 PG. 9)

FF=98.5
SIDEWALK SHALL
MATCH FF ALONG
EDGE OF BUILDING

TOP OF STEPS 98.29
(2 STEPS)

SAN CO
INV 96.0

BOWLING ALLEY
ENTRANCE

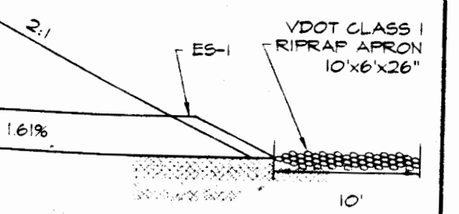
CONNECT DOWNSPOUTS TO 8"
DIA. ROOF DRAIN. MINIMUM ROOF
DRAIN SLOPE = 1.0%

N/F
WBB PARTN
A VIRGINIA GENERAL
D.B. 413, PG

LOT 2

N/F
AMF BOWLING CENTERS, INC.
A VIRGINIA CORPORATION
D.B. 413, PG. 171

DURING CONSTRUCTION THE 3"Φ ORIFICE WILL BE PLUGGED SO THE POND CAN FUNCTION AS A SEDIMENT TRAP. SEDIMENT IN POND BOTTOM TO BE REMOVED BEFORE WETLAND PLANTS ARE PLANTED.



GRADING & UTILITY PLAN

Scale 1" = 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, of 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 terms 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 Specifications 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 slope shall be created steeper than 2:1.

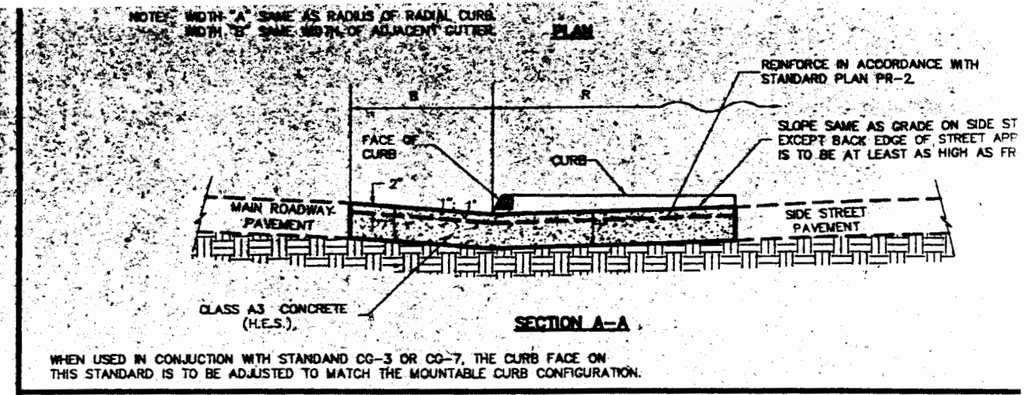
14. Inlet protection in accordance with Specification 3.07 shall be provided for all storm drain inlets as soon as practical following construction of same.

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.

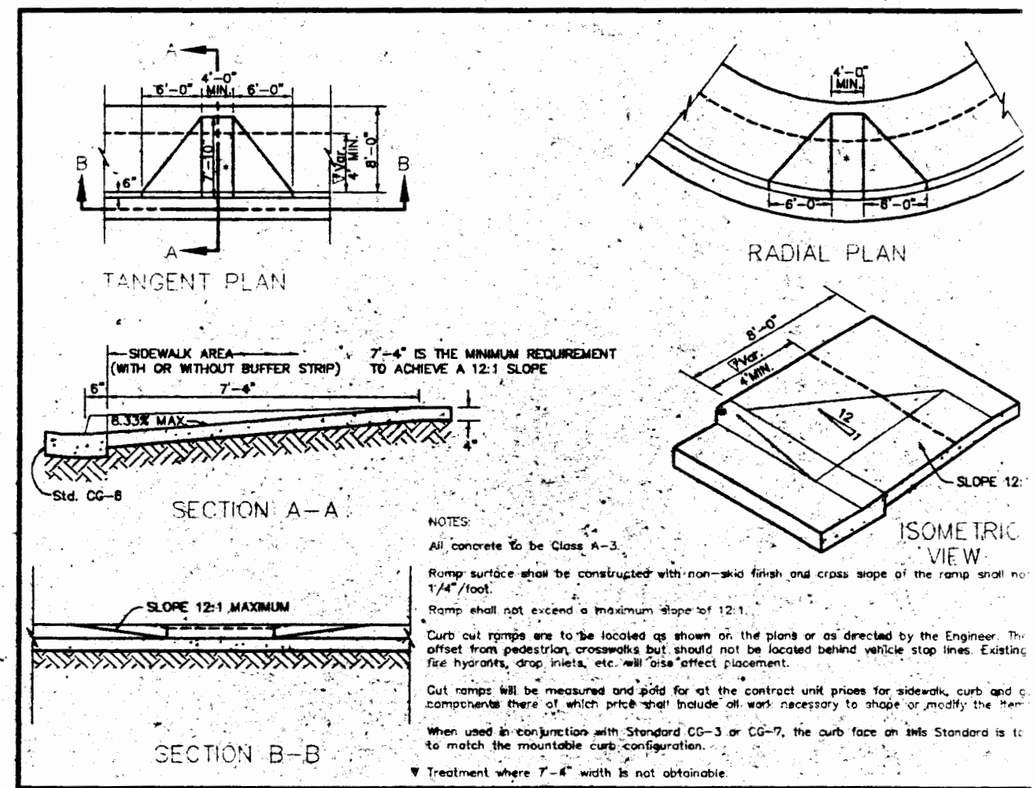
17. Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.

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 approved plans and specifications.



STANDARD CONNECTION FOR STREET INTERSECT

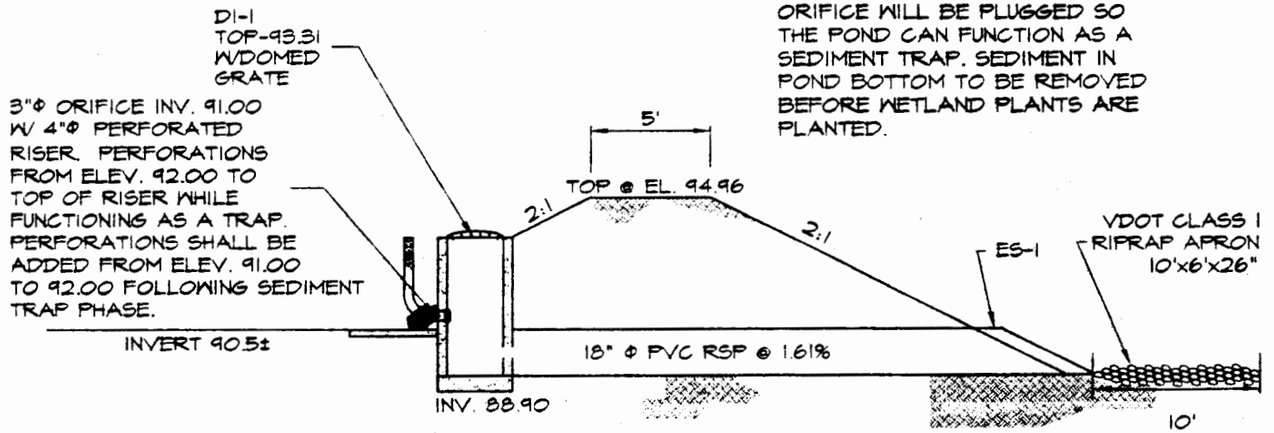
(TO BE USED ONLY WHEN MAIN ROADWAY PAVEMENT IS REINFORCED CONCR



CURB CUT RAMP

AREA	PLANT	NUMBER
1	PONTEDERIA CORDATA (PICKERELWEED)	50
2	SOFT-STEM BULRUSH	50

POND BOTTOM TO BE MAINTAINED AS
6" DEEP SHALLOW MARSH



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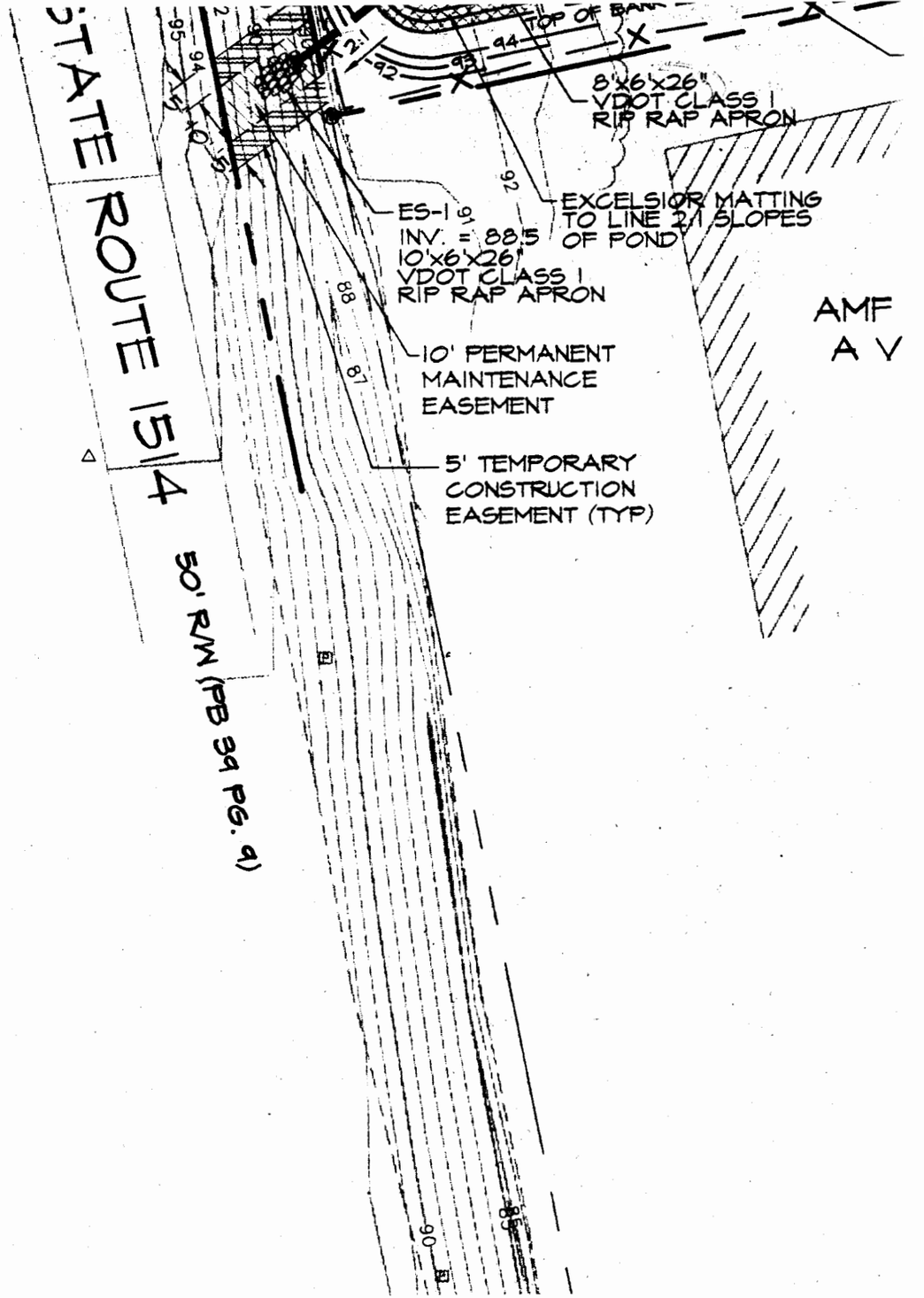
MATERIAL TO BE PLACED IN 6" TO 8" LOOSE LIFTS AND COMPACTED TO 95% MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT. FILL MATERIAL SHALL BE FREE FROM ORGANICS, STUMPS, ROOTS & OTHER DELETERIOUS MATERIAL.

BASIN ELEVATION

BOTTOM	90.50
STANDING WATER	91.00
1 YEAR	93.33
100 YEAR	93.96
TOP OF DAM	94.96



DETENTION POND PLANTING SCHEDULE

AREA	PLANT	NUMBER
1	PONTEDERIA CORDATA (PICKERELWEED)	50
2	SOFT-STEM BULRUSH	50

POND BOTTOM TO BE MAINTAINED AS
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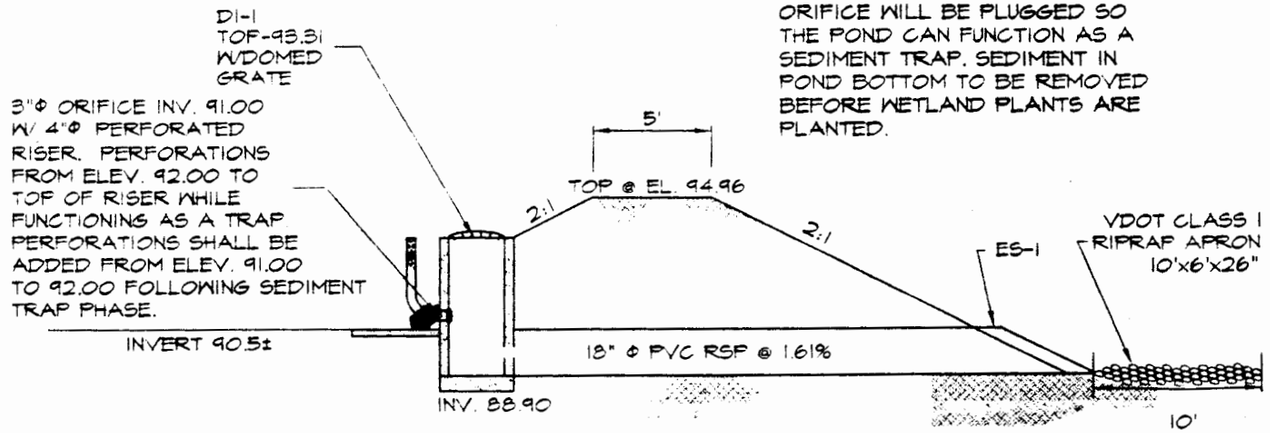

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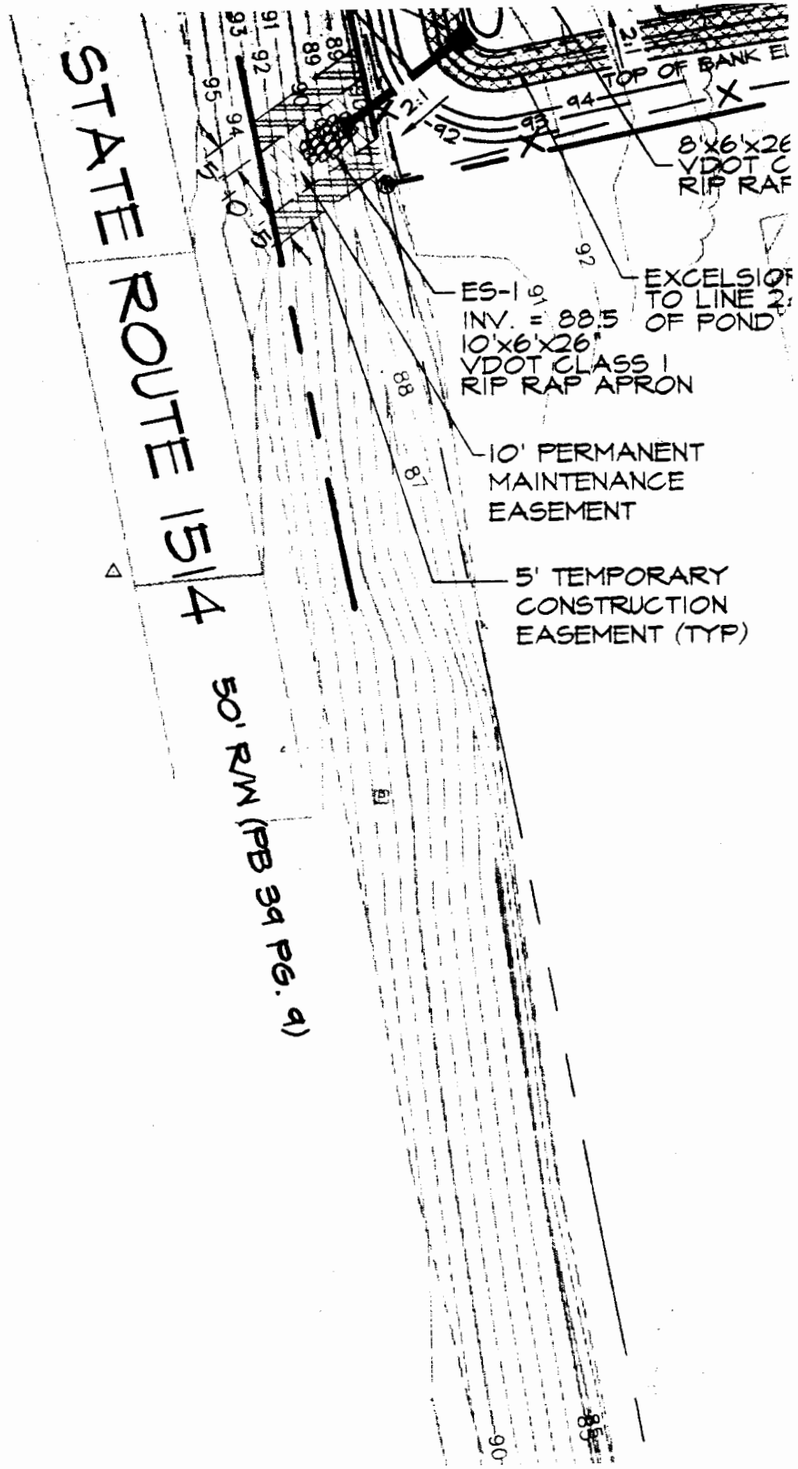
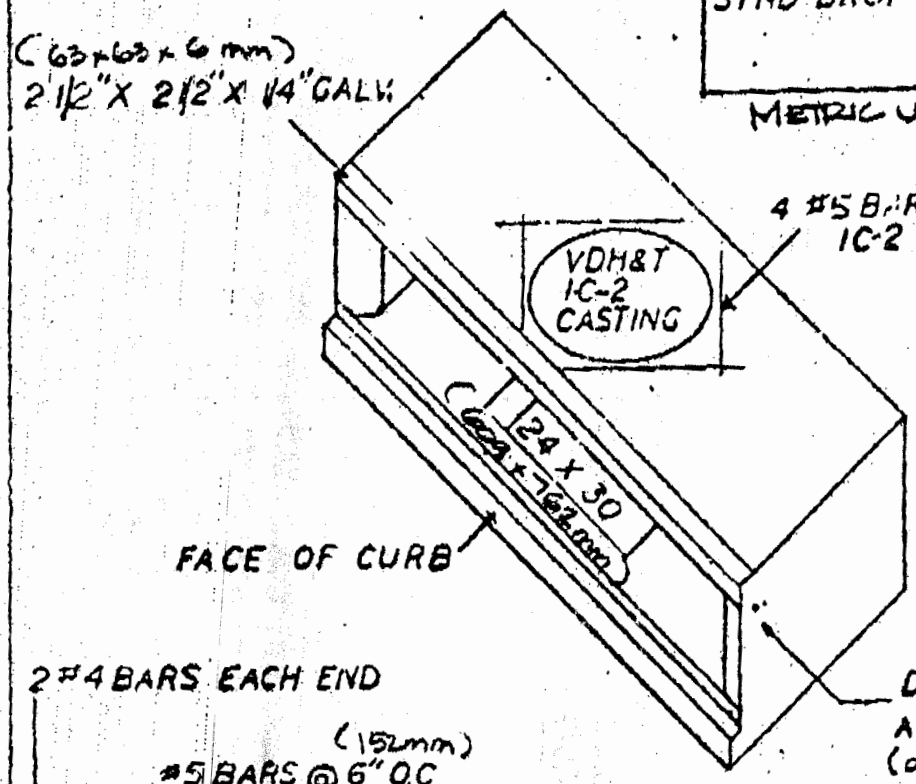
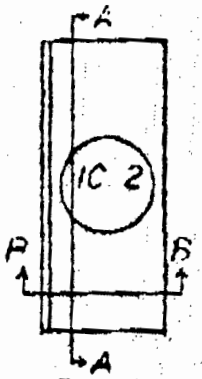


#2 - L = 2'6

NANSEMOND PRE CAST
STND DROP INLET THROAT

METRIC UPDATE



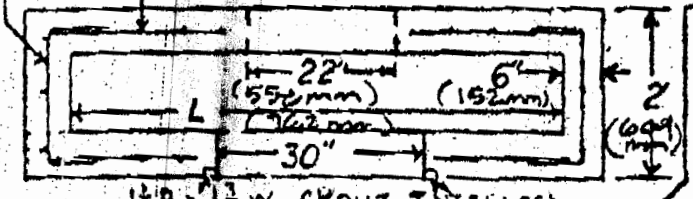


PLAN
NO SCALE

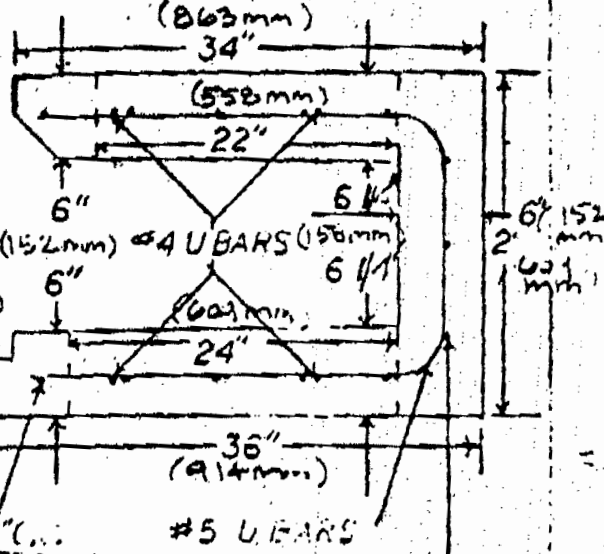
2 #4 BARS EACH END

#5 BARS @ 6" O.C. (152mm)

ADJ. CONCRETE 12" O.C. (304mm)
(OR PROVIDE BLOCKOUT)

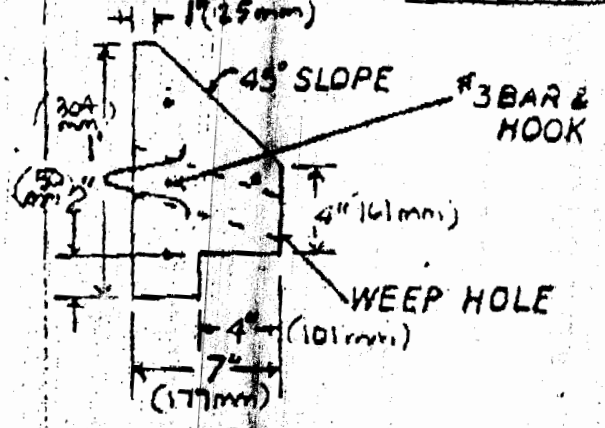


SECTION A-A



SECTION B-B

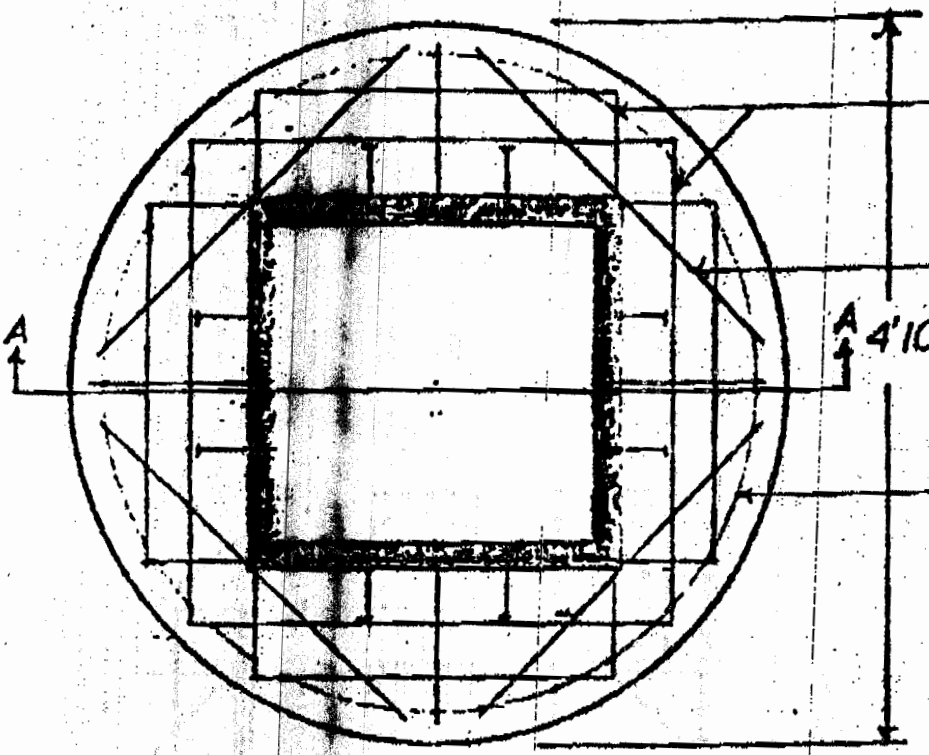
FACE PLATE



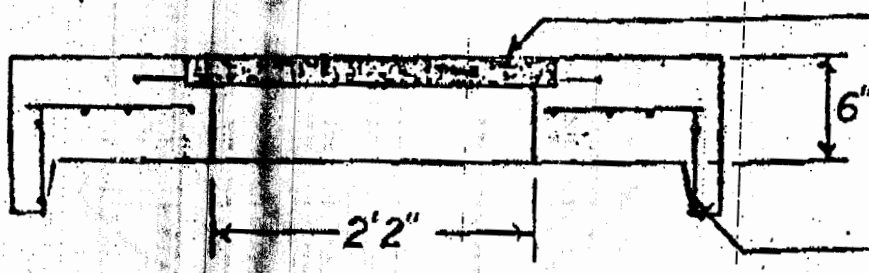
NOTES
1) CONCRETE 4000 PSI AE
2) IF THROAT RECEIVES NOTCH USE ADDITIONAL #4 BARS
3) L = INSIDE LENGTH OF THROAT INCREMENTS OF 2" THRU 20" CA L = 2'6" (762mm)
4) DOWEL HOLES PROVIDED FOR ADJACENT CONCRETE AT BACK OF THROAT OF FACE PLATE

#1

NANSEMOND PRE-CAST
STND DI-1 DROP INLET



PLAN



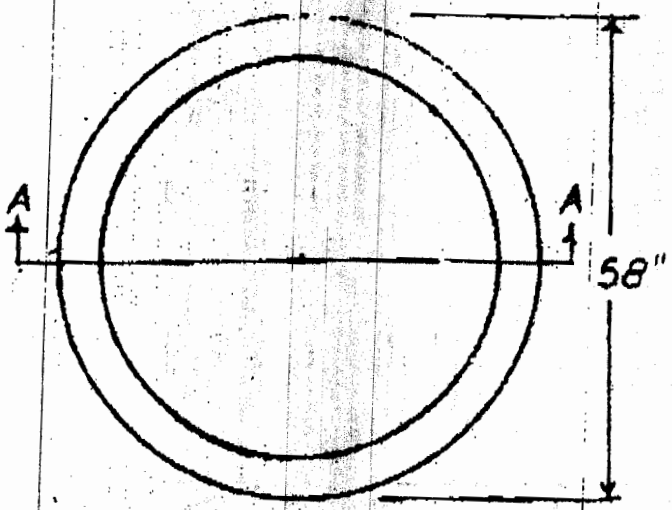
SECTION A-A

Contractor to install grate upside down to create a slight dome effect

JND PRE-CAST TEL: 804-538-8342 Jan 21,99 9:55 No.004 P.05

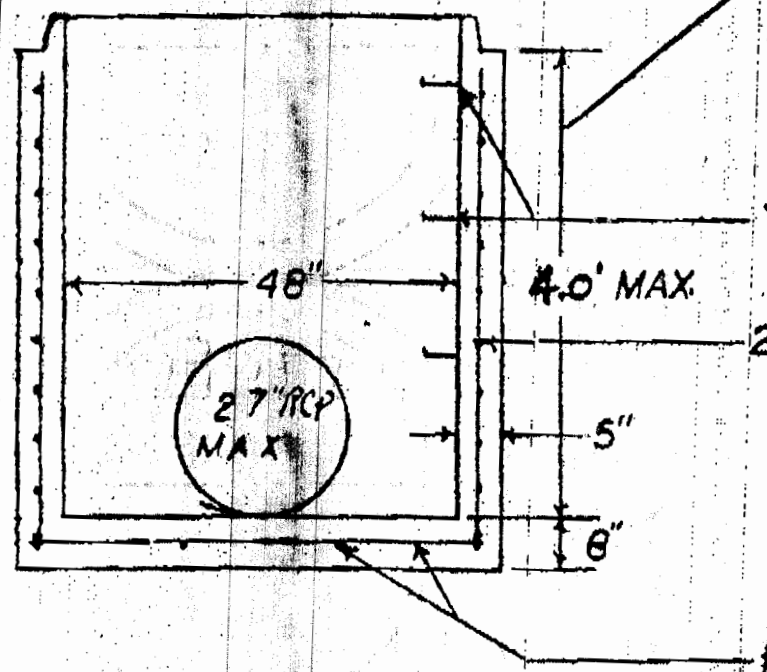
RICHMOND PRE CAST

STND 48 MONOLITHIC BOTTOM
NON-EXTENDED



PLAN

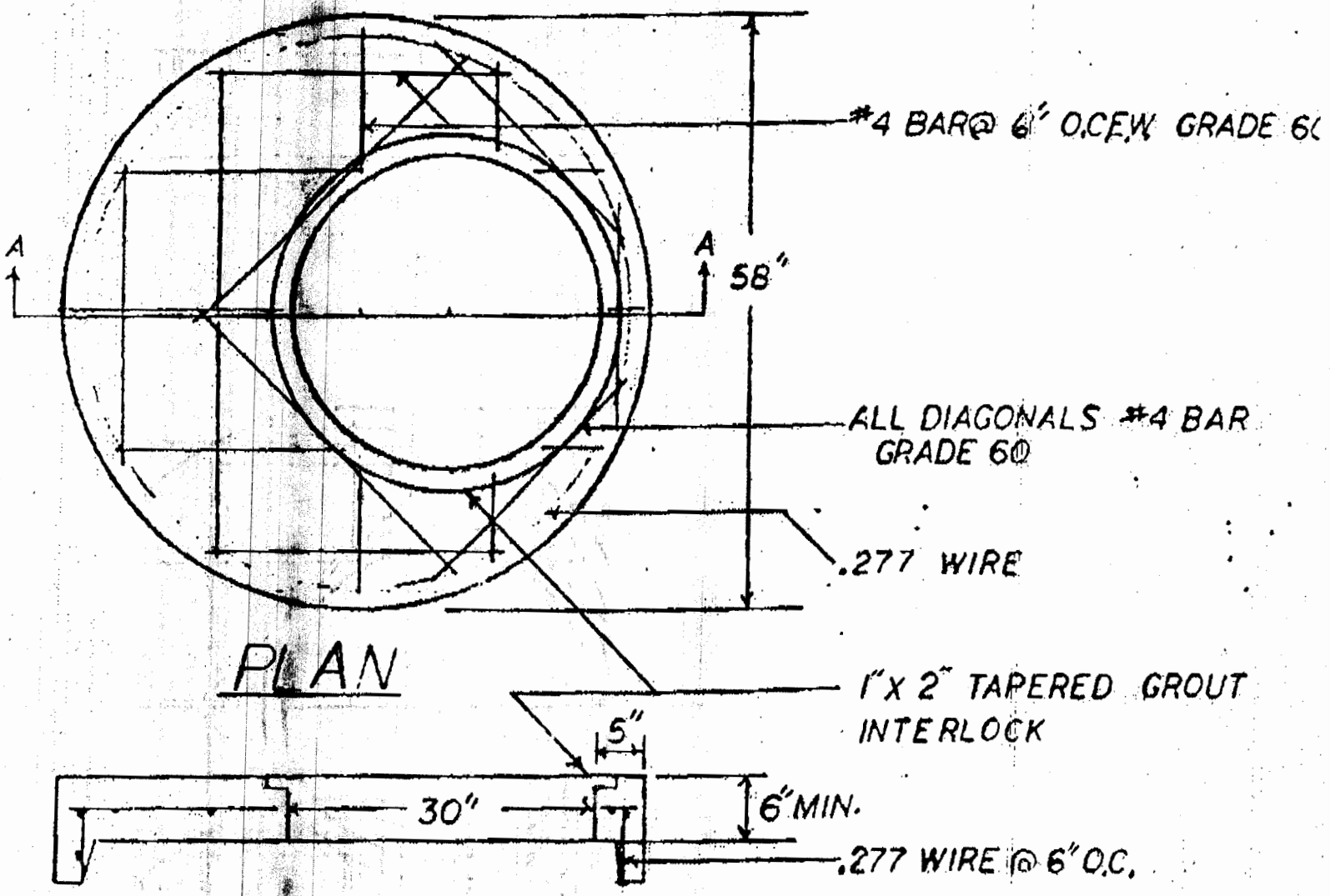
#1 - 4.00'
#2 - 3.67'



SECTION A-A

NANSEMOND PRE CAST
STND. 48"X 30" FLAT TOP

#2



PLAN

SECTION A-A

OWNERS CONSENT

GRANTING OF THE EASEMENT AS SHOWN HEREON IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRES OF THE UNDERSIGNED OWNER.

_____

OWNER: OLD TOWN FARMS, INC.

BY : _____, President
NAME, POSITION

STATE OF VIRGINIA,
COUNTY, TO WIT :

I, Gloria M. Judah A NOTARY PUBLIC IN AND FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE PERSON WHOSE NAME IS SIGNED TO THE FOREGOING WRITING HAS ACKNOWLEDGED THE SAME BEFORE ME.

GIVEN UNDER MY HAND AND SEAL THIS 4th DAY OF December, 1998

NOTARY PUBLIC : Gloria M. Judah

MY COMMISSION EXPIRES : August 31, 2000

STATE OF VIRGINIA,
COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY, THE MAP SHOWN HEREON WAS PRESENTED AND ADMITTED TO RECORD AS THE LAW DIRECTS.

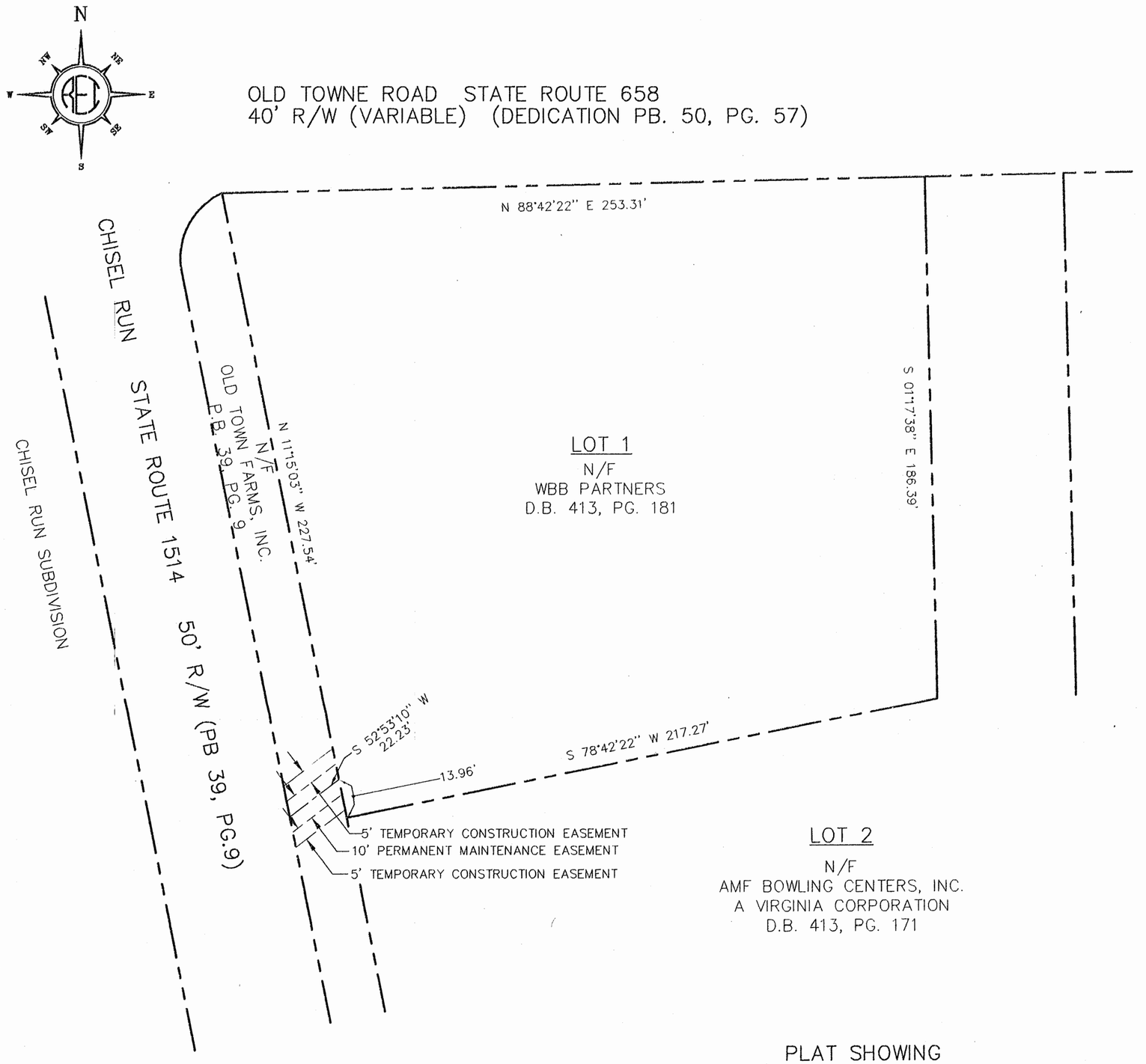
_____
TESTE DATE

PLAT BOOK ___, PAGE _____.

CERTIFICATE OF APPROVAL

THIS EASEMENT PLAT AS SHOWN HEREON IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE ADMITTED TO RECORD.

_____ _____
AGENT OF GOVERNING BODY DATE



PLAT SHOWING
10' PERMANENT MAINTENANCE EASEMENT AND 5' TEMPORARY CONSTRUCTION EASEMENT

LOCATED ON THE PROPERTY OF
OLD TOWN FARMS, INC.
BERKELEY DISTRICT
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
PAT L. CARPENITO
No. 001830
LAND SURVEYOR

Rickmond Engineering, Inc.

1643 Merrimac Trail
Williamsburg VA 23185
Voice: (757)229-1776
Fax No. (757) 229-4683

Engineering
Surveying
Land Planning
www.rickmond.com

Field Work:	Drawn By:	Scale:	Date:	Job No.:
	R.E.D.	1" = 30'	11/19/98	98164

PC135_NORFOLK_PAINT_OLDE_TOWNE_ROAD - 024

Drainage and Best Management Practice Calculations

for

Norfolk Paint Company
Olde Towne Road Site
James City County, Virginia

September 1998

Rickmond

Rickmond Engineering, Inc.
1643 Merrimac Trail
Williamsburg, VA 23185
Phone: 757-229-1776
Fax: 757-229-4683
e-mail: rickmond@tni.net
www.rickmond.com

Project No. 98164

Drainage and Best Management Practice Calculations

for

Norfolk Paint Company
Olde Towne Road Site
James City County, Virginia

September 1998

Project No. 98164

Table of Contents

Preface

The following drainage and Best Management Practice (BMP) calculations pertain to the proposed Norfolk Paint Store at the intersection of Olde Road and Chisel Run.

An extended detention pond with marsh bottom (9 point) is used on site in conjunction with a (1.1 point) conservation easement to obtain 10.1 points to meet the requirements of the James City County code. The downstream receiving channel is not stable so the 1 year 24 hour storm is released over 24 hours to reduce any erosion potentional in the channel.

Narrative

Project Description

The project consists of building with parking lots, sidewalks, waterlines, and sanitary sewer lines. The total site area is 1.11 acres.

Existing Conditions

Currently the site is mostly cleared and draining to a ditch on the west side of the property. The site falls from approximately elevation 100 near the entrance on Old Towne Road to elevation 91 at the southwest corner of the site near the ditch.

Adjacent Areas

The site is bounded on the north by Old Towne Road, on the east and south by a bowling alley, and on the west by Chisel Run.

Off-site Areas

The only off-site area to be disturbed is at the discretion of the Contractor. Construction will require some off-site fill material which the Contractor is responsible for obtaining in a lawful manner.

Soils

The on-site soils consist of Slagle fine sandy loam (29).

Slagle soils are deep, nearly level and moderately well drained. Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 50 inches. It is mostly mottled yellowish brown clay loam to a depth of 25 inches and mottled clay loam and sandy clay loam below. The substratum to a depth of at least 60 inches is mottled sandy clay loam. The erosion hazard is slight.

The previous soils information was taken from "Soil Survey of James City and York Counties and the City of Williamsburg Virginia", by the United States Department of Agriculture Soil Conservation Service, issued April 1985.

Critical Erosion Areas

The critical erosion area on this site is the 2:1 side slopes of the basin and the outfall pipe. This outfall pipe discharges to a manmade ditch. To prevent sediment from leaving the site, it is imperative that the contractor install all erosion and sediment control measures shown on these plans before any land disturbing activities commence. The contractor should take additional care

in constructing the basin by installing the silt fence first. Regular inspection and maintenance is also required for all erosion and sediment control measures to keep them functioning as designed.

Erosion and Sediment Control Measures

The following E&S measures are used on-site:

1. A construction entrance is installed at all entrances to reduce the amount of mud transported onto paved public roads by motor vehicles and runoff.

2. Silt fence is placed around the limits of clearing to intercept and detain small amounts of sediment from disturbed areas during construction operations.

Permanent Stabilization

All areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be done with Kentucky 31 Tall Fescue according to Std. and Spec. 3.32, PERMANENT SEEDING, of the handbook. Mulch (straw or fiber) will be used to protect the site from erosion and to allow seed to germinate properly. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching.

Stormwater Management

This project will construct a dry detention basin to meet the requirements of stormwater management and the Chesapeake Bay Preservation Act requirements for the proposed construction. The design of this basin is described in detail later in this report.

Maintenance

In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. The following items will be checked in particular:

1. The gravel outlets will be checked regularly for sediment buildup which will prevent drainage. If the gravel is clogged by sediment, it shall be removed and cleaned or replaced.

2. The silt fence barrier will be checked regularly for undermining or deterioration of the fabric. Sediment shall be removed when the level for sediment deposition reaches half way to the barrier.

3. The seeded areas will be checked regularly to ensure that a good stand is maintained. Areas should be fertilized and reseeded as needed.

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP POINTS		Fraction of Site Served by BMP		Weighted BMP Points
Design 4	9	X	1.0	=	9.0
		X		=	
		X		=	
		X		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 9.0

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
.11	X	10	=	1.1

C. TOTAL WEIGHTED POINTS

Structural BMP Points	+	Natural Open Space Points	=	TOTAL
9.0		1.1		10.1

each 500 sf = .1 pt

RICKMOND ENGINEERING, INC.
1643 A Merrimac Trail
Williamsburg, Virginia 23185-5624
(757) 229-1776 or (757) 898-4149
Fax Number (757) 229-4683

JOB 98164 - Basin Design
SHEET NO. 4 OF
CALCULATED BY JBL DATE 6-25-98
CHECKED BY DATE
SCALE

Quantity Control

Predevelopment Qpeak 2-yr = 1.02 cfs ~~taken off this calc~~ OK!

Quality Control

Use Design 4: Runoff from site

$$V = 1.12\,AC \times 1'' \times \frac{FT}{12''} \times \frac{43560\,SF}{AC} = 4065.6\,CF \quad (elev.\ 93.47)$$

(release over 24 hours)

Use minimum dia orifice with gravel jacket to reduce flow with marsh bottom pond

Worksheet 2: Runoff curve number and runoff

Project Norfolk Paint By KWS Date 9/9/98

Location James City County, Va Checked ____ Date ____

Circle one: (Present) Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
Slagle (C)	Woods	70			0.12	8.40
Slagle (C)	Grass	74			0.99	73.26
1/ Use only one CN source per line.		Totals =			1.11	81.66

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{81.66}{1.11} = 73.6$; Use CN = 74

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr	1		
Rainfall, P (24-hour) ..... in	3.0		
Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)	0.9		

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Norfolk Paint By KMS Date 9/9/98

Location James City County, Va Checked ____ Date ____

Circle one: (Present) Developed

Circle one: (T_c) T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)	Segment ID				
1. Surface description (table 3-1)		GRASS			
2. Manning's roughness coeff., n (table 3-1) ..		0.24			
3. Flow length, L (total L ≤ 300 ft)	ft	170			
4. Two-yr 24-hr rainfall, P_2	in	3.5			
5. Land slope, s	ft/ft	.0676			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.21	+		=
Shallow concentrated flow	Segment ID				
7. Surface description (paved or unpaved)					
8. Flow length, L	ft				
9. Watercourse slope, s	ft/ft				
10. Average velocity, V (figure 3-1)	ft/s				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	—	+		=
Channel flow	Segment ID				
12. Cross sectional flow area, a	ft^2				
13. Wetted perimeter, p_w	ft				
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s				
18. Flow length, L	ft				
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	—	+		=
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr				.21

Worksheet 5a: Basic watershed data

Project Norfolk Paint. Location James City County, Va. By KMJ Date 9/9/98

Circle one: (Present) Developed _____ Frequency (yr) _____ Checked _____ Date _____

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2-in)	Initial abstraction I_a (in)	I_a/P
1	.0017	.21				3.0	74	0.9	.0015	.703	.23

From worksheet 3 | From worksheet 2 | From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 5b: Tabular hydrograph discharge summary

Project Norfolk Paint Location James City County, Va By KMJ Date 9/9/98

Circle one: (Present) Developed _____ Frequency (yr) _____ Checked _____ Date _____

Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5 II 2/										
	Sub-area T_c (hr)	ΣT_t to outlet (hr)	I_a/P	$A_m Q$ (mi^2-in)				12.2							
					Discharges at selected hydrograph times 3/ (cfs)										
1	.21		.23	.0015				1.05							
Composite hydrograph at outlet															

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is $A_m Q$ multiplied by tabular discharge from appropriate exhibit 5.

Worksheet 2: Runoff curve number and runoff

Project Norfolk Paint By KMJ Date 9/9/98

Location James City County, Va Checked ____ Date ____

Circle one: Present (Developed)

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
slagle (C)	Road / Roof	98			0.47	46.06
slagle (C)	Grass	74			0.52	38.48
slagle (C)	Woods	70			0.12	8.40
1/ Use only one CN source per line.		Totals =			1.11	92.94

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{92.94}{1.11} = 83.7$; Use CN = 84

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr	1	100	
Rainfall, P (24-hour) ..... in	3.0	8.0	
Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)	1.5	6.1	

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Norfolk Paint By KMS Date 9/10/98

Location James City County, Va Checked ____ Date ____

Circle one: Present (Developed)

Circle one: (T_c) T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)			ASPHALT			
2. Manning's roughness coeff., n (table 3-1) ..			.011			
3. Flow length, L (total L ≤ 300 ft)	ft		50			
4. Two-yr 24-hr rainfall, P_2	in		3.5			
5. Land slope, s	ft/ft		.020			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr		.01	+		=
Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)			PAVED			
8. Flow length, L	ft		185			
9. Watercourse slope, s	ft/ft		.0108			
10. Average velocity, V (figure 3-1)	ft/s		1.40			
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr		.04	+		=
Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2		1.23			
13. Wetted perimeter, p_w	ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft		.31			
15. Channel slope, s	ft/ft		.01			
16. Manning's roughness coeff., n			.011			
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s		6.18			
18. Flow length, L	ft		30			
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr		—	+		=
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					.05

Worksheet 5a: Basic watershed data

Project Norfolk Paint Location James City County, Va By KWJ Date 9/10/98

Circle one: Present (Developed) _____ Frequency (yr) _____ Checked _____ Date _____

	Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2-in)	Initial abstraction I_a (in)	I_a/P
1		.0017	.05			2 yr →	3.0	84	1.5	.0026	.381	.13
100		.0017	.05				8.0	84	6.1	.0104	.381	.05

From worksheet 3 | From worksheet 2 | From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 5b: Tabular hydrograph discharge summary

Project Norfolk Paint Location James City County, Va By KMJ Date 9/10/98

Circle one: Present (Developed) _____ Frequency (yr) _____ Checked _____ Date _____

Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5-II 2/											
	Sub-area T_c (hr)	ΣT_t to outlet (hr)	I_a/P	A_mQ (mi^2-in)			12.1									
	Discharges at selected hydrograph times 3/ (cfs)															
1	.05		.13	.0026			2.63									
100	.05		.05	.0104			10.50									
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is A_mQ multiplied by tabular discharge from appropriate exhibit 5.

1 YEAR HYDROGRAPH

```
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 09:22:59
   Input: NP1.IN
  Output: NP1.OUT




 ============================   PROGRAM EXECUTION
============================



                          NUMBER OF STORMS TO BE MODELED    :     1
                          NUMBER OF CHANNELS                :     0
                          NUMBER OF SUBAREAS                :     1
                          UPSTREAM HYDROGRAPHS ENTER AT     :     0
LOCATIONS
                          NUMBER OF TIME STEPS              :   300
                          COMPUTATIONAL TIME INCREMENT      :  .100 Hours


 NOTE:   The DURATION of the final computed hydrograph(s) for this
watershed
         system will be 30.000 hours.



 ========================   UNIT HYDROGRAPH METHODOLOGY
========================


 The SCS DIMENSIONLESS UNIT HYDROGRAPH is used in all runoff
computations.
 The peak rate factor (PRF) for all unit hydrographs is 484 (U.S.
Customary
 units) or 2.08356 (Metric units).
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
```

User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 09:22:59
Input: NP1.IN
Output: NP1.OUT

SUBAREA DATA

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0017	.050	84.00	.0	

Composite Watershed Curve Number = 84.00
Minimum Subarea Time of Concentration = .050 hours.

WARNING: The minimum subarea time of concentration (TCmin) should be greater than 1.2 times the time increment (DT) in order for the unit hydrograph computations to be valid. In this case,

DT = .100 hours, and
TCmin = .050 hours.

To correct this situation, break the model into larger subareas having longer times of concentration, or use a smaller DT.

1****** SCSHYDRO
****** Version 3.21
****** COMPUTER-AIDED HYDROLOGY & HYDRAULICS

PROJECT: NORFOLK PAINT
User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 09:22:59
Input: NP1.IN
Output: NP1.OUT

RETURN PERIOD (yrs): 1

RAINFALL HYETOGRAPH INFORMATION

RAINFALL HYETOGRAPH: SCS TYPE II

RAINFALL DURATION: 24.00 Hours
RAINFALL DEPTH: 3.00 Inches

could be 2.8"

RAINFALL HYETOGRAPH,
SCS TYPE II
Time (Hours), Total Depth (Inches):

.000,	.00	2.000,	.07	4.000,	.14	6.000,	.24
7.000,	.29	8.000,	.36	8.500,	.40	9.000,	.44
9.500,	.49	9.750,	.52	10.000,	.54	10.500,	.61
11.000,	.70	11.500,	.85	11.750,	1.07	12.000,	1.99
12.500,	2.20	13.000,	2.32	13.500,	2.40	14.000,	2.46
16.000,	2.64	20.000,	2.86	24.000,	3.00		

1********** SCSHYDRO
********** Version 3.21
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
Input: NP1.IN
Output: NP1.OUT

RETURN PERIOD (yrs): 1

SUBAREA 1 SUBAREA 1 SUBAREA 1 SUBAREA 1

AREA (square miles)	:	.0017
TIME OF CONCENTRATION (hrs)	:	.05
RUNOFF CURVE NUMBER	:	84.00
BASEFLOW (cfs)	:	.00
DOWNSTREAM CHANNELS	:	

SUBAREA RUNOFF (cfs)

TIME: (hrs)	+.00 hrs	+.10 hrs	+.20 hrs	+.30 hrs	+.40 hrs	+.50 hrs	+.60 hrs	+.70 hrs	+.80 hrs	+.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
7.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
9.00	.00	.01	.01	.01	.01	.01	.01	.01	.01
.02									
10.00	.02	.02	.02	.03	.03	.03	.04	.04	.05
.05									
11.00	.05	.08	.09	.10	.10	.11	.32	.39	1.08
2.12									
12.00	2.56	.64	.37	.33	.34	.34	.20	.18	.18
.18									
13.00	.18	.14	.13	.13	.13	.13	.11	.10	.10
.10									
14.00	.10	.11	.10	.10	.09	.09	.09	.08	.08
.08									
15.00	.07	.07	.07	.07	.06	.06	.06	.06	.06
.06									
16.00	.06	.05	.05	.05	.05	.05	.05	.05	.05
.05									
17.00	.05	.05	.05	.05	.05	.05	.05	.05	.05
.05									
18.00	.05	.05	.05	.05	.04	.04	.04	.04	.04
.04									
19.00	.04	.04	.04	.04	.04	.04	.04	.04	.04
.04									
20.00	.04	.04	.04	.04	.04	.04	.04	.03	.03
.03									
21.00	.03	.03	.03	.03	.03	.03	.03	.03	.03
.03									
22.00	.03	.03	.03	.03	.03	.03	.03	.03	.03
.03									
23.00	.03	.03	.03	.03	.03	.03	.03	.03	.03
.03									
24.00	.03	.00	.00	.00	.00	.00	.00	.00	.00
.00									
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00									

PEAK RUNOFF (cfs): 2.56
TIME TO PEAK (hrs): 12.00

1********** SCSHYDRO
****
********** Version 3.21
****
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
User: Rickmond Engineering

Date: 09/10/1998 Thursday
Time: 09:22:59
Input: NP1.IN
Output: NP1.OUT

RETURN PERIOD (yrs): 1

DOWNSTREAM HYDROGRAPH

DISCHARGE (cfs)

TIME: (hrs)	+.00 hrs	+.10 hrs	+.20 hrs	+.30 hrs	+.40 hrs	+.50 hrs	+.60 hrs	+.70 hrs	+.80 hrs	+.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9.00	.00	.01	.01	.01	.01	.01	.01	.01	.01	.02
10.00	.02	.02	.02	.03	.03	.03	.04	.04	.05	.05
11.00	.05	.08	.09	.10	.10	.11	.32	.39	1.08	2.12
12.00	2.56	.64	.37	.33	.34	.34	.20	.18	.18	.18
13.00	.18	.14	.13	.13	.13	.13	.11	.10	.10	.10
14.00	.10	.11	.10	.10	.09	.09	.09	.08	.08	.08
15.00	.07	.07	.07	.07	.06	.06	.06	.06	.06	.06
16.00	.06	.05	.05	.05	.05	.05	.05	.05	.05	.05
17.00	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
18.00	.05	.05	.05	.05	.04	.04	.04	.04	.04	

```
.04
 19.00 |      .04     .04     .04     .04     .04     .04     .04     .04     .04
.04
 20.00 |      .04     .04     .04     .04     .04     .04     .04     .03     .03
.03
 21.00 |      .03     .03     .03     .03     .03     .03     .03     .03     .03
.03
 22.00 |      .03     .03     .03     .03     .03     .03     .03     .03     .03
.03
 23.00 |      .03     .03     .03     .03     .03     .03     .03     .03     .03
.03
 24.00 |      .03     .00     .00     .00     .00     .00     .00     .00     .00
.00
 25.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 26.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 27.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 28.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 29.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00

                    PEAK DISCHARGE (cfs):       2.56
                      TIME TO PEAK (hrs):      12.00
 Hydrograph Saved In: NP1.DAT

1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 09:22:59
   Input: NP1.IN
  Output: NP1.OUT
                                                          RETURN PERIOD
(yrs):      1


 ============================   HYDROLOGIC SUMMARY
============================
 ======================   Volumes, Losses, and Discharges
======================


 SCS TYPE II  Hyetograph.
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.
 APPLIED RAINFALL DEPTH (inches):  3.00

                VOLUME OF                                  |
                 RAINFALL      VOLUME OF     RAINFALL     |      PEAK
PEAK
                 APPLIED        RUNOFF        LOSSES      |    DISCHARGE
```

		DISCHARGE (ac-ft)	(ac-ft)	(percent)	DISCHARGE (cfs)	(cfs/ac)
SUBAREA	1	.27200	.13352	50.91	2.563	2.356
TOTAL WATERSHED		.27200	.13352	50.91	2.563	2.356

TOTAL WATERSHED AREA (square miles):	.0017
TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft):	.1335
COMPOSITE WATERSHED CURVE NUMBER:	84.00
MINIMUM SUBAREA TIME OF CONCENTRATION:	.050 hours.

NOTE: "VOLUME OF RUNOFF" includes surface runoff only; baseflows are not included in this summation. The "TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED" includes all baseflows.

1

100 YEAR HYDROGRAPH

```
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 09:24:47
   Input: NP100.IN
  Output: NP100.OUT




 ============================   PROGRAM EXECUTION
============================


                          NUMBER OF STORMS TO BE MODELED    :     1
                          NUMBER OF CHANNELS                :     0
                          NUMBER OF SUBAREAS                :     1
                          UPSTREAM HYDROGRAPHS ENTER AT     :     0
LOCATIONS
                          NUMBER OF TIME STEPS              :   300
                          COMPUTATIONAL TIME INCREMENT      :  .100 Hours


 NOTE:   The DURATION of the final computed hydrograph(s) for this
watershed
         system will be 30.000 hours.



 ========================   UNIT HYDROGRAPH METHODOLOGY
========================


 The SCS DIMENSIONLESS UNIT HYDROGRAPH is used in all runoff
computations.
 The peak rate factor (PRF) for all unit hydrographs is 484 (U.S.
Customary
 units) or 2.08356 (Metric units).
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
```

User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 09:24:47
Input: NP100.IN
Output: NP100.OUT

SUBAREA DATA

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0017	.050	84.00	.0	

Composite Watershed Curve Number = 84.00
Minimum Subarea Time of Concentration = .050 hours.

WARNING: The minimum subarea time of concentration (TCmin) should be greater than 1.2 times the time increment (DT) in order for the unit hydrograph computations to be valid. In this case,

DT = .100 hours, and
TCmin = .050 hours.

To correct this situation, break the model into larger subareas having longer times of concentration, or use a smaller DT.

1****** SCSHYDRO
****** Version 3.21
****** COMPUTER-AIDED HYDROLOGY & HYDRAULICS

PROJECT: NORFOLK PAINT
User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 09:24:47
Input: NP100.IN
Output: NP100.OUT

RETURN PERIOD (yrs): 100

RAINFALL HYETOGRAPH INFORMATION

RAINFALL HYETOGRAPH: SCS TYPE II

RAINFALL DURATION: 24.00 Hours
RAINFALL DEPTH: 8.00 Inches

RAINFALL HYETOGRAPH,
SCS TYPE II
Time (Hours), Total Depth (Inches):

.000,	.00	2.000,	.18	4.000,	.38	6.000,	.64
7.000,	.78	8.000,	.96	8.500,	1.06	9.000,	1.18
9.500,	1.30	9.750,	1.38	10.000,	1.45	10.500,	1.63
11.000,	1.88	11.500,	2.26	11.750,	2.86	12.000,	5.30
12.500,	5.88	13.000,	6.18	13.500,	6.39	14.000,	6.56
16.000,	7.04	20.000,	7.62	24.000,	8.00		

1********** SCSHYDRO
****
********** Version 3.21
****
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
Input: NP100.IN
Output: NP100.OUT

RETURN PERIOD (yrs): 100

SUBAREA 1 SUBAREA 1 SUBAREA 1 SUBAREA 1

AREA (square miles) : .0017
TIME OF CONCENTRATION (hrs): .05
RUNOFF CURVE NUMBER : 84.00
BASEFLOW (cfs) : .00
DOWNSTREAM CHANNELS :

SUBAREA RUNOFF (cfs)

TIME: (hrs)	+.00 hrs	+.10 hrs	+.20 hrs	+.30 hrs	+.40 hrs	+.50 hrs	+.60 hrs	+.70 hrs	+.80 hrs	+.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
5.00	.02	.02	.02	.02	.02	.02	.02	.03	.03	.03

```
  6.00 |      .03     .03     .04     .04     .04     .04     .04     .04     .05
.05
  7.00 |      .05     .06     .06     .06     .07     .07     .07     .07     .07
.07
  8.00 |      .08     .09     .09     .10     .10     .10     .11     .11     .11
.12
  9.00 |      .12     .14     .14     .14     .15     .15     .17     .17     .17
.18
 10.00 |      .18     .23     .24     .24     .24     .25     .33     .34     .35
.35
 11.00 |      .36     .54     .57     .59     .60     .61    1.74    1.96    4.88
8.53
 12.00 |     9.37    2.28    1.27    1.14    1.14    1.14     .67     .60     .59
.59
 13.00 |      .59     .45     .44     .43     .43     .43     .35     .34     .34
.34
 14.00 |      .34     .35     .34     .32     .31     .29     .28     .27     .26
.25
 15.00 |      .24     .23     .22     .21     .20     .20     .19     .19     .18
.18
 16.00 |      .18     .18     .17     .17     .17     .17     .17     .17     .16
.16
 17.00 |      .16     .16     .16     .16     .16     .15     .15     .15     .15
.15
 18.00 |      .15     .15     .14     .14     .14     .14     .14     .14     .14
.13
 19.00 |      .13     .13     .13     .13     .13     .13     .12     .12     .12
.12
 20.00 |      .12     .12     .12     .11     .11     .11     .11     .11     .11
.11
 21.00 |      .11     .10     .10     .10     .10     .10     .10     .10     .10
.10
 22.00 |      .10     .10     .09     .09     .09     .09     .09     .09     .09
.09
 23.00 |      .09     .09     .09     .09     .09     .09     .09     .09     .09
.09
 24.00 |      .09     .01     .00     .00     .00     .00     .00     .00     .00
.00
 25.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 26.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 27.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 28.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00
 29.00 |      .00     .00     .00     .00     .00     .00     .00     .00     .00
.00

                    PEAK RUNOFF (cfs):       9.37
                   TIME TO PEAK (hrs):      12.00
1*********************************     SCSHYDRO
*********************************
 *********************************   Version 3.21
*********************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
```

Date: 09/10/1998 Thursday
Time: 09:24:47
Input: NP100.IN
Output: NP100.OUT

RETURN PERIOD (yrs): 100

DOWNSTREAM HYDROGRAPH

DISCHARGE (cfs)

TIME: (hrs)	+.00 hrs	+.10 hrs	+.20 hrs	+.30 hrs	+.40 hrs	+.50 hrs	+.60 hrs	+.70 hrs	+.80 hrs	+.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
5.00	.02	.02	.02	.02	.02	.02	.02	.03	.03	.03
6.00	.03	.03	.04	.04	.04	.04	.04	.04	.05	.05
7.00	.05	.06	.06	.06	.07	.07	.07	.07	.07	.07
8.00	.08	.09	.09	.10	.10	.10	.11	.11	.11	.12
9.00	.12	.14	.14	.14	.15	.15	.17	.17	.17	.18
10.00	.18	.23	.24	.24	.24	.25	.33	.34	.35	.35
11.00	.36	.54	.57	.59	.60	.61	1.74	1.96	4.88	8.53
12.00	9.37	2.28	1.27	1.14	1.14	1.14	.67	.60	.59	.59
13.00	.59	.45	.44	.43	.43	.43	.35	.34	.34	.34
14.00	.34	.35	.34	.32	.31	.29	.28	.27	.26	.25
15.00	.24	.23	.22	.21	.20	.20	.19	.19	.18	.18
16.00	.18	.18	.17	.17	.17	.17	.17	.17	.16	.16
17.00	.16	.16	.16	.16	.16	.15	.15	.15	.15	.15
18.00	.15	.15	.14	.14	.14	.14	.14	.14	.14	

```
.13
 19.00 |     .13    .13    .13    .13    .13    .13    .12    .12    .12
.12
 20.00 |     .12    .12    .12    .11    .11    .11    .11    .11    .11
.11
 21.00 |     .11    .10    .10    .10    .10    .10    .10    .10    .10
.10
 22.00 |     .10    .10    .09    .09    .09    .09    .09    .09    .09
.09
 23.00 |     .09    .09    .09    .09    .09    .09    .09    .09    .09
.09
 24.00 |     .09    .01    .00    .00    .00    .00    .00    .00    .00
.00
 25.00 |     .00    .00    .00    .00    .00    .00    .00    .00    .00
.00
 26.00 |     .00    .00    .00    .00    .00    .00    .00    .00    .00
.00
 27.00 |     .00    .00    .00    .00    .00    .00    .00    .00    .00
.00
 28.00 |     .00    .00    .00    .00    .00    .00    .00    .00    .00
.00
 29.00 |     .00    .00    .00    .00    .00    .00    .00    .00    .00
.00

                    PEAK DISCHARGE (cfs):       9.37
                      TIME TO PEAK (hrs):      12.00
 Hydrograph Saved In: NP100.DAT

1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 09:24:47
   Input: NP100.IN
  Output: NP100.OUT
                                                        RETURN PERIOD
(yrs):    100


 ============================   HYDROLOGIC SUMMARY
============================
 =====================   Volumes, Losses, and Discharges
=====================


 SCS TYPE II  Hyetograph.
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.
 APPLIED RAINFALL DEPTH (inches):  8.00

                VOLUME OF                                |
                 RAINFALL      VOLUME OF    RAINFALL    |      PEAK
PEAK
                 APPLIED        RUNOFF       LOSSES     |   DISCHARGE
```

		DISCHARGE (ac-ft)	(ac-ft)	(percent)	DISCHARGE (cfs)	(cfs/ac)
SUBAREA	1	.72533	.53675	26.00	9.372	8.614
TOTAL WATERSHED		.72533	.53675	26.00	9.372	8.614

TOTAL WATERSHED AREA (square miles):	.0017
TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft):	.5367
COMPOSITE WATERSHED CURVE NUMBER:	84.00
MINIMUM SUBAREA TIME OF CONCENTRATION:	.050 hours.

NOTE: "VOLUME OF RUNOFF" includes surface runoff only; baseflows are not included in this summation. The "TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED" includes all baseflows.

1

RICKMOND ENGINEERING, INC.
1643 Merrimac Trail
Williamsburg, Virginia 23185-5624
(757) 229-1776 or (757) 898-7007
Fax Number (757) 229-4683
E-mail: rickmond@tni.net
www.rickmond.com

JOB 98164
SHEET NO. 27 OF
CALCULATED BY KMS DATE 9/10/98
CHECKED BY DATE
SCALE

DETERMINE VOLUME OF ONE-YEAR POST-DEVELOPMENT STORM

Area = 1.11 ac Imp. Area = 0.47 ac

$I = \frac{.47}{1.11} = .42$

$R_v = 0.05 + (.009)(42) = .43$

$V = \frac{3.0\text{ in} \mid .43 \mid 1.11\text{ ac} \mid 43{,}560\text{ sf} \mid 1\text{ ft}}{\mid \mid \mid 1\text{ ac} \mid 12\text{ in}} = 5200\text{ cf}$

DETERMINE RATE TO RELEASE ONE-YEAR STORM OVER 24-HRS

$Q = \frac{5200\text{ cf} \mid 1\text{ hr} \mid 1\text{ min}}{24\text{ hr} \mid 60\text{ min} \mid 60\text{ s}} = .060\text{ cfs}$

SIZE ORIFICE

$Q = CA\sqrt{2gh}$ $h = 93.31 - 91.00 = 2.31'$

$.06 = .6A\sqrt{2(32.2)(2.31)}$

$A = \pi r^2 = .0082$

$r = .05' = .61''$ use 1.2" diameter orifice

since 1.2" ø orifice is too small, use 3" ø orifice with gravel jacket

RICKMOND ENGINEERING, INC.
1643 Merrimac Trail
Williamsburg, Virginia 23185-5624
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Fax Number (757) 229-4683
E-mail: rickmond@tni.net
www.rickmond.com

JOB 98164
SHEET NO. 28 OF
CALCULATED BY KMT DATE 9/9/98
CHECKED BY DATE
SCALE

POND STAGE - STORAGE

ELEV (ft)	Δ ELEV (ft)	S.A. (sf)	STORAGE (cf)	ACCUM. STORAGE (cf)
91		1575		0
	1.0		1818	
92		2060		1818
	1.0		2410	
93		2760		4228
	1.0		3130	
94		3500		7358

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JOB 98164
SHEET NO. 29 OF
CALCULATED BY KMS DATE 9/10/98
CHECKED BY DATE
SCALE

DESIGN DI-1 OUTLET RISER

$Q = CLH^{3/2}$ $C = 3.1$

ELEV	H	Q
93.31	0	0
94.00	0.69	17.77

use sloping or domed grate

RICKMOND ENGINEERING, INC.
1643 Merrimac Trail
Williamsburg, Virginia 23185-5624
(757) 229-1776 or (757) 898-7007
Fax Number (757) 229-4683
E-mail: rickmond@tni.net
www.rickmond.com

JOB 98164
SHEET NO. 30 OF
CALCULATED BY KMJ DATE 9/10/98
CHECKED BY DATE
SCALE

18" OUTLET BARREL

25' @ 1.61% n=.011

Q	d_n	d_c	V_n	R	H	h_o	LSo	HW	HW ELEV
0	—	—	—	—	—	—	—	—	91.00
5	0.58	0.86	7.91	.32	1.85	1.18	.40	2.63	93.63
10	0.87	1.22	9.44	.41	2.47	1.36	.40	3.43	94.43

RICKMOND ENGINEERING, INC.
1643 Merrimac Trail
Williamsburg, Virginia 23185-5624
(757) 229-1776 or (757) 898-7007
Fax Number (757) 229-4683
E-mail: rickmond@tni.net
www.rickmond.com

JOB 98164
SHEET NO. 31 OF
CALCULATED BY KMS DATE 9/10/98
CHECKED BY DATE
SCALE

DETERMINE THE FEASIBILITY OF USING WETLANDS TO AUGMENT EXTENDED DETENTION POLLUTANT REMOVAL

Area = 1.11 ac Imp. Area = 0.47 ac

$I = \frac{.47 ac}{1.11 ac} = .42 = 42\%$

$Rv = 0.05 + (.009)(42) = .43$

1) Volume of lower stage:
$[(Rm)(Rv)/12]A$
$[(.45)(.43)/12]1.11 = .018$ ac-feet = 785 sf

2) Annual nutrient load to lower stage:
$[(P)(P_j)(Rv)/12]CA(2.72)$

$N = [(45)(.9)(.43)/12](2.00)(1.11)(2.72) = 8.76$ lbs/yr
$P = [(45)(.9)(.43)/12](0.26)(1.11)(2.72) = 1.14$ lbs/yr

3) Assume lower stage 6" deep:
bottom area required $= (.018)/(.5) = .036$ ac-ft $= 1570$ sf ✓

Average annual loading per wetland acre:

$(8.76)/(.036) = 243$ lbs/acre/yr for nitrogen ≤ 225 ✓
$(1.14)/(.036) = 32$ lbs/acre/yr for phosphorus < 45

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JOB 98164
SHEET NO. 32 OF
CALCULATED BY KMJ DATE 9/10/98
CHECKED BY DATE
SCALE

STAGE-STORAGE-DISCHARGE

STAGE (ft)	STORAGE (ac-ft)	DISCHARGE (cfs)
91.0	.0362	0
92.0	.0473	.24
93.0	.0634	.33
93.31	.0686	.36
94.0	.0803	7.72

1 -YR STORM ROUTING

```
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 10:34:49
  Output: NPP1.OUT


 SOLUTION FOR  1  STORMS.

 TIME INCREMENT:    .100  Hours

 STORM
 NUMBER   HYDROGRAPH IN FILE:
 ______   ____________________________________________________________

   1      NP1.DAT
```

STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)	TAILWATER STAGE (ft)
1	2.563	N/A	1794.00	5816.	89.000

```
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 10:34:49
  Output: NPP1.OUT


 Stage-Area-Discharge
 Filename: NPPOND.DAT
```

TAILWATER STAGE: 89.000 feet.
INITIAL STAGE: 91.000 feet.

========== STAGE-STORAGE-DISCHARGE RELATIONSHIP ==========

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< STORM 1
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
91.000	.0000	.0000
92.000	.4138E-01	.2400
93.000	.9618E-01	.3300
93.310	.1166	.3600
94.000	.1680	7.720

1********** PONDOPT
****
********** Version 1.83
****
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 10:34:49
Output: NPP1.OUT

TAILWATER STAGE: 89.000 feet.
INITIAL STAGE: 91.000 feet.

<<<<<<<<<<<<<<<<<<<< ROUTING RESULTS FOR STORM 1
>>>>>>>>>>>>>>>>>>>>

MAXIMUM ELEVATION: 92.34 feet.
MAXIMUM INFLOW: 2.563 cfs.
MAXIMUM OUTFLOW: .2703 cfs.
MAXIMUM STORAGE: .5980E-01 acre-feet.

CONTINUITY ERROR: .227E-05 percent.

POND

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)	SURFACE ELEVATION (ft)
0	.000	.000	91.000
6	.000	.000	

91.000				
	12	.000	.000	I
91.000				
	18	.000	.000	I
91.000				
	24	.000	.000	I
91.000				
	30	.000	.000	I
91.000				
	36	.000	.000	I
91.000				
	42	.000	.000	I
91.000				
	48	.000	.000	I
91.000				
	54	.000	.000	I
91.000				
	60	.000	.000	I
91.000				
	66	.000	.000	I
91.000				
	72	.000	.000	I
91.000				
	78	.000	.000	I
91.000				
	84	.000	.000	I
91.000				
	90	.000	.000	I
91.000				
	96	.000	.000	I
91.000				
	102	.000	.000	I
91.000				
	108	.000	.000	I
91.000				
	114	.000	.000	I
91.000				
	120	.000	.000	I
91.000				
	126	.000	.000	I
91.000				
	132	.000	.000	I
91.000				
	138	.000	.000	I
91.000				
	144	.000	.000	I
91.000				
	150	.000	.000	I
91.000				
	156	.000	.000	I
91.000				
	162	.000	.000	I
91.000				
	168	.000	.000	I
91.000				
	174	.000	.000	I
91.000				
	180	.000	.000	I
91.000				
	186	.000	.000	I

91.000				
	192	.000	.000	
91.000				
	198	.000	.000	
91.000				
	204	.000	.000	
91.000				
	210	.000	.000	
91.000				
	216	.000	.000	
91.000				
	222	.000	.000	
91.000				
	228	.000	.000	
91.000				
	234	.000	.000	
91.000				
	240	.000	.000	
91.000				
	246	.000	.000	
91.000				
	252	.000	.000	
91.000				
	258	.000	.000	
91.000				
	264	.000	.000	
91.000				
	270	.000	.000	
91.000				
	276	.000	.000	
91.000				
	282	.000	.000	
91.000				
	288	.000	.000	
91.000				
	294	.000	.000	
91.000				
	300	.000	.000	
91.000				
	306	.000	.000	
91.000				
	312	.000	.000	
91.000				
	318	.000	.000	
91.000				
	324	.000	.000	
91.000				
	330	.000	.000	
91.000				
	336	.000	.000	
91.000				
	342	.000	.000	
91.000				
	348	.000	.000	
91.000				
	354	.000	.000	
91.000				
	360	.000	.000	
91.000				
	366	.000	.000	

91.000				
	372	.000	.000	|
91.000				
	378	.000	.000	|
91.000				
	384	.000	.000	|
91.000				
	390	.000	.000	|
91.000				
	396	.000	.000	|
91.000				
	402	.000	.000	|
91.000				
	408	.000	.000	|
91.000				
	414	.000	.000	|
91.000				
	420	.000	.000	|
91.000				
	426	.000	.000	|
91.000				
	432	.000	.000	|
91.000				
	438	.000	.000	|
91.000				
	444	.000	.000	|
91.000				
	450	.000	.000	|
91.000				
	456	.000	.000	|
91.000				
	462	.000	.000	|
91.000				
	468	.000	.000	|
91.000				
	474	.000	.000	|
91.000				
	480	.000	.000	|
91.000				
	486	.000	.000	|
91.000				
	492	.000	.000	|
91.000				
	498	.000	.000	|
91.000				
	504	.001	.000	|
91.000				
	510	.001	.000	|
91.000				
	516	.002	.000	|
91.000				
	522	.003	.000	|
91.001				
	528	.003	.000	|
91.001				
	534	.004	.001	|
91.002				
	540	.005	.001	|
91.003				
	546	.006	.001	|

91.004			
	552	.007	.001
91.005			
	558	.008	.002
91.006			
	564	.009	.002
91.008			
	570	.010	.002
91.009			
	576	.012	.003
91.011			
	582	.014	.003
91.013			
	588	.015	.004
91.015			
	594	.016	.004
91.017			
	600	.017	.005
91.020			
	606	.022	.005
91.023			
	612	.024	.006
91.026			
	618	.026	.007
91.030			
	624	.027	.008
91.034			
	630	.029	.009
91.038			
	636	.040	.010
91.043			
	642	.044	.012
91.049			
	648	.047	.013
91.055			
	654	.049	.015
91.062			
	660	.052	.017
91.069			
	666	.081	.019
91.079			
	672	.090	.022
91.092			
	678	.096	.025
91.106			
	684	.101	.029
91.120			
	690	.106	.032
91.134			
	696	.324	.041
91.170			
	702	.390	.056
91.232			
	708	1.076	.087
91.364			
	714	2.123	.158
91.659			
	720	2.563	.246
92.065			
	726	.640	.264

92.268				
	732	.366	.267	
92.304				
	738	.332	.268	
92.316				
	744	.335	.269	
92.326				
	750	.338	.270	
92.336				
	756	.198	.270	
92.336				
	762	.178	.269	
92.324				
	768	.176	.268	
92.310				
	774	.177	.267	
92.296				
	780	.178	.265	
92.283				
	786	.137	.264	
92.267				
	792	.131	.262	
92.247				
	798	.131	.260	
92.228				
	804	.131	.259	
92.208				
	810	.132	.257	
92.189				
	816	.107	.255	
92.168				
	822	.103	.253	
92.146				
	828	.103	.251	
92.124				
	834	.103	.249	
92.101				
	840	.103	.247	
92.080				
	846	.107	.245	
92.058				
	852	.104	.243	
92.037				
	858	.099	.241	
92.016				
	864	.095	.238	
91.993				
	870	.091	.231	
91.964				
	876	.087	.225	
91.937				
	882	.083	.218	
91.909				
	888	.079	.212	
91.883				
	894	.076	.206	
91.856				
	900	.073	.199	
91.831				
	906	.070	.193	

91.806			
	912	.068	.188
91.782			
	918	.065	.182
91.758			
	924	.063	.176
91.735			
	930	.061	.171
91.713			
	936	.059	.166
91.691			
	942	.058	.161
91.670			
	948	.057	.156
91.650			
	954	.056	.151
91.631			
	960	.055	.147
91.612			
	966	.055	.143
91.594			
	972	.054	.138
91.577			
	978	.054	.134
91.560			
	984	.053	.131
91.544			
	990	.053	.127
91.529			
	996	.052	.124
91.515			
	1002	.052	.120
91.501			
	1008	.052	.117
91.488			
	1014	.051	.114
91.475			
	1020	.051	.111
91.463			
	1026	.050	.108
91.451			
	1032	.050	.105
91.439			
	1038	.049	.103
91.429			
	1044	.049	.100
91.418			
	1050	.049	.098
91.408			
	1056	.048	.096
91.398			
	1062	.048	.093
91.389			
	1068	.047	.091
91.380			
	1074	.047	.089
91.372			
	1080	.046	.087
91.363			
	1086	.046	.085

91.355				
	1092	.045	.083	
91.348				
	1098	.045	.082	
91.340				
	1104	.045	.080	
91.333				
	1110	.044	.078	
91.326				
	1116	.044	.077	
91.319				
	1122	.043	.075	
91.313				
	1128	.043	.074	
91.307				
	1134	.042	.072	
91.301				
	1140	.042	.071	
91.295				
	1146	.042	.069	
91.289				
	1152	.041	.068	
91.284				
	1158	.041	.067	
91.278				
	1164	.040	.066	
91.273				
	1170	.040	.064	
91.268				
	1176	.039	.063	
91.263				
	1182	.039	.062	
91.259				
	1188	.038	.061	
91.254				
	1194	.038	.060	
91.250				
	1200	.038	.059	
91.245				
	1206	.037	.058	
91.241				
	1212	.037	.057	
91.237				
	1218	.036	.056	
91.233				
	1224	.036	.055	
91.229				
	1230	.035	.054	
91.225				
	1236	.035	.053	
91.222				
	1242	.035	.052	
91.218				
	1248	.034	.052	
91.215				
	1254	.034	.051	
91.211				
	1260	.034	.050	
91.208				
	1266	.033	.049	

91.205			
	1272	.033	.048
91.202			
	1278	.033	.048
91.199			
	1284	.032	.047
91.196			
	1290	.032	.046
91.193			
	1296	.032	.046
91.190			
	1302	.032	.045
91.187			
	1308	.031	.044
91.185			
	1314	.031	.044
91.182			
	1320	.031	.043
91.179			
	1326	.031	.042
91.177			
	1332	.030	.042
91.175			
	1338	.030	.041
91.172			
	1344	.030	.041
91.170			
	1350	.030	.040
91.168			
	1356	.030	.040
91.166			
	1362	.029	.039
91.164			
	1368	.029	.039
91.162			
	1374	.029	.038
91.160			
	1380	.029	.038
91.158			
	1386	.029	.038
91.156			
	1392	.029	.037
91.155			
	1398	.029	.037
91.153			
	1404	.029	.036
91.152			
	1410	.029	.036
91.150			
	1416	.029	.036
91.149			
	1422	.029	.035
91.147			
	1428	.028	.035
91.146			
	1434	.028	.035
91.145			
	1440	.028	.034
91.143			
	1446	.004	.034

91.140			
	1452	.001	.032
91.134			
	1458	.000	.031
91.127			
	1464	.000	.029
91.121			
	1470	.000	.028
91.116			
	1476	.000	.026
91.110			
	1482	.000	.025
91.105			
	1488	.000	.024
91.100			
	1494	.000	.023
91.096			
	1500	.000	.022
91.091			
	1506	.000	.021
91.087			
	1512	.000	.020
91.083			
	1518	.000	.019
91.079			
	1524	.000	.018
91.075			
	1530	.000	.017
91.072			
	1536	.000	.016
91.068			
	1542	.000	.016
91.065			
	1548	.000	.015
91.062			
	1554	.000	.014
91.059			
	1560	.000	.014
91.056			
	1566	.000	.013
91.054			
	1572	.000	.012
91.051			
	1578	.000	.012
91.049			
	1584	.000	.011
91.047			
	1590	.000	.011
91.044			
	1596	.000	.010
91.042			
	1602	.000	.010
91.040			
	1608	.000	.009
91.038			
	1614	.000	.009
91.037			
	1620	.000	.008
91.035			
	1626	.000	.008

91.033	1632	.000	.008
91.032	1638	.000	.007
91.030	1644	.000	.007
91.029	1650	.000	.007
91.027	1656	.000	.006
91.026	1662	.000	.006
91.025	1668	.000	.006
91.024	1674	.000	.005
91.023	1680	.000	.005
91.022	1686	.000	.005
91.021	1692	.000	.005
91.020	1698	.000	.004
91.019	1704	.000	.004
91.018	1710	.000	.004
91.017	1716	.000	.004
91.016	1722	.000	.004
91.015	1728	.000	.004
91.015	1734	.000	.003
91.014	1740	.000	.003
91.013	1746	.000	.003
91.013	1752	.000	.003
91.012	1758	.000	.003
91.012	1764	.000	.003
91.011	1770	.000	.003
91.011	1776	.000	.002
91.010	1782	.000	.002
91.010	1788	.000	.002
91.009	1794	.000	.002
91.009	1800	.000	.002
91.008	1806	.000	.002

91.008			
	1812	.000	.002
91.008			
	1818	.000	.002
91.007			
	1824	.000	.002
91.007			
	1830	.000	.002
91.007			
	1836	.000	.001
91.006			
	1842	.000	.001
91.006			
	1848	.000	.001
91.006			
	1854	.000	.001
91.005			
	1860	.000	.001
91.005			
	1866	.000	.001
91.005			
	1872	.000	.001
91.005			
	1878	.000	.001
91.004			
	1884	.000	.001
91.004			
	1890	.000	.001
91.004			
	1896	.000	.001
91.004			
	1902	.000	.001
91.004			
	1908	.000	.001
91.003			
	1914	.000	.001
91.003			
	1920	.000	.001
91.003			
	1926	.000	.001
91.003			
	1932	.000	.001
91.003			
	1938	.000	.001
91.003			
	1944	.000	.001
91.003			
	1950	.000	.001
91.003			
	1956	.000	.001
91.002			
	1962	.000	.001
91.002			
	1968	.000	.001
91.002			
	1974	.000	.000
91.002			

1********** PONDOPT
****
********** Version 1.83

****
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 10:34:49
Output: NPP1.OUT

ROUTING SUMMARY ----------
SIMULATION MODE ----------
FOR THE ABOVE CASE ----------

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	92.336	.598E-01	2.563	.270

1-YEAR ROUTED

100-YR STORM ROUTING

```
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 10:36:50
  Output: NPP100.OUT


 SOLUTION FOR  1  STORMS.


 TIME INCREMENT:   .100  Hours


 STORM
 NUMBER   HYDROGRAPH IN FILE:
 ______   ____________________________________________________________

   1      NP100.DAT
```

STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)	TAILWATER STAGE (ft)
1	9.372	N/A	1794.00	.2338E+05	89.000

```
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: NORFOLK PAINT
    User: Rickmond Engineering
    Date: 09/10/1998  Thursday
    Time: 10:36:50
  Output: NPP100.OUT


 Stage-Area-Discharge
 Filename: NPPOND.DAT
```

TAILWATER STAGE: 89.000 feet.
INITIAL STAGE: 91.000 feet.

========== STAGE-STORAGE-DISCHARGE RELATIONSHIP ==========

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< STORM 1
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
91.000	.0000	.0000
92.000	.4138E-01	.2400
93.000	.9618E-01	.3300
93.310	.1166	.3600
94.000	.1680	7.720

1********** PONDOPT
****
********** Version 1.83
****
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
User: Rickmond Engineering
Date: 09/10/1998 Thursday
Time: 10:36:50
Output: NPP100.OUT

TAILWATER STAGE: 89.000 feet.
INITIAL STAGE: 91.000 feet.

<<<<<<<<<<<<<<<<<<<< ROUTING RESULTS FOR STORM 1
>>>>>>>>>>>>>>>>>>>>

MAXIMUM ELEVATION: 93.97 feet.
MAXIMUM INFLOW: 9.372 cfs.
MAXIMUM OUTFLOW: 7.361 cfs.
MAXIMUM STORAGE: .1655 acre-feet.

CONTINUITY ERROR: .426E-05 percent.

POND

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)	SURFACE ELEVATION (ft)
0	.000	.000	91.000
6	.000	.000	

91.000				
	12	.000	.000	
91.000				
	18	.000	.000	
91.000				
	24	.000	.000	
91.000				
	30	.000	.000	
91.000				
	36	.000	.000	
91.000				
	42	.000	.000	
91.000				
	48	.000	.000	
91.000				
	54	.000	.000	
91.000				
	60	.000	.000	
91.000				
	66	.000	.000	
91.000				
	72	.000	.000	
91.000				
	78	.000	.000	
91.000				
	84	.000	.000	
91.000				
	90	.000	.000	
91.000				
	96	.000	.000	
91.000				
	102	.000	.000	
91.000				
	108	.000	.000	
91.000				
	114	.000	.000	
91.000				
	120	.000	.000	
91.000				
	126	.000	.000	
91.000				
	132	.000	.000	
91.000				
	138	.000	.000	
91.000				
	144	.000	.000	
91.000				
	150	.000	.000	
91.000				
	156	.000	.000	
91.000				
	162	.000	.000	
91.000				
	168	.000	.000	
91.000				
	174	.000	.000	
91.000				
	180	.000	.000	
91.000				
	186	.000	.000	

91.000			
	192	.000	.000
91.000			
	198	.000	.000
91.000			
	204	.000	.000
91.000			
	210	.000	.000
91.000			
	216	.000	.000
91.000			
	222	.000	.000
91.000			
	228	.000	.000
91.000			
	234	.000	.000
91.000			
	240	.000	.000
91.000			
	246	.001	.000
91.000			
	252	.003	.000
91.001			
	258	.005	.000
91.001			
	264	.006	.001
91.002			
	270	.008	.001
91.004			
	276	.010	.001
91.005			
	282	.011	.002
91.007			
	288	.013	.002
91.009			
	294	.014	.003
91.011			
	300	.016	.003
91.014			
	306	.018	.004
91.016			
	312	.019	.005
91.019			
	318	.020	.005
91.022			
	324	.022	.006
91.025			
	330	.023	.007
91.028			
	336	.025	.008
91.032			
	342	.026	.008
91.035			
	348	.027	.009
91.039			
	354	.029	.010
91.042			
	360	.030	.011
91.046			
	366	.035	.012

91.050				
	372	.037	.013	
91.055				
	378	.038	.014	
91.060				
	384	.040	.015	
91.064				
	390	.041	.017	
91.069				
	396	.043	.018	
91.074				
	402	.044	.019	
91.079				
	408	.045	.020	
91.084				
	414	.047	.021	
91.089				
	420	.048	.023	
91.094				
	426	.059	.024	
91.100				
	432	.062	.026	
91.107				
	438	.064	.028	
91.115				
	444	.066	.029	
91.122				
	450	.068	.031	
91.129				
	456	.070	.033	
91.137				
	462	.071	.035	
91.144				
	468	.073	.036	
91.151				
	474	.075	.038	
91.159				
	480	.076	.040	
91.166				
	486	.090	.042	
91.174				
	492	.094	.044	
91.184				
	498	.096	.047	
91.194				
	504	.098	.049	
91.204				
	510	.100	.051	
91.214				
	516	.109	.054	
91.224				
	522	.112	.056	
91.235				
	528	.115	.059	
91.246				
	534	.116	.062	
91.257				
	540	.119	.064	
91.268				
	546	.136	.067	

91.281				
	552	.140	.071	
91.294				
	558	.143	.074	
91.308				
	564	.145	.077	
91.322				
	570	.147	.080	
91.335				
	576	.166	.084	
91.350				
	582	.171	.088	
91.367				
	588	.174	.092	
91.383				
	594	.177	.096	
91.399				
	600	.179	.100	
91.415				
	606	.226	.105	
91.435				
	612	.235	.110	
91.460				
	618	.240	.116	
91.485				
	624	.244	.122	
91.509				
	630	.247	.128	
91.533				
	636	.326	.135	
91.564				
	642	.343	.145	
91.603				
	648	.349	.154	
91.642				
	654	.355	.163	
91.681				
	660	.360	.173	
91.719				
	666	.539	.185	
91.773				
	672	.574	.203	
91.845				
	678	.587	.220	
91.919				
	684	.597	.238	
91.991				
	690	.606	.244	
92.048				
	696	1.740	.257	
92.187				
	702	1.959	.278	
92.425				
	708	4.880	.321	
92.896				
	714	8.531	2.740	
93.533				
	720	9.372	7.361	
93.966				
	726	2.284	6.221	

93.859				
	732	1.269	2.915	
93.550				
	738	1.139	1.642	
93.430				
	744	1.142	1.269	
93.395				
	750	1.145	1.175	
93.386				
	756	.666	.975	
93.368				
	762	.599	.720	
93.344				
	768	.591	.627	
93.335				
	774	.591	.600	
93.333				
	780	.592	.594	
93.332				
	786	.454	.541	
93.327				
	792	.435	.469	
93.320				
	798	.433	.443	
93.318				
	804	.433	.436	
93.317				
	810	.433	.434	
93.317				
	816	.351	.403	
93.314				
	822	.339	.360	
93.310				
	828	.338	.360	
93.307				
	834	.338	.359	
93.305				
	840	.338	.359	
93.302				
	846	.350	.359	
93.300				
	852	.338	.359	
93.298				
	858	.323	.359	
93.295				
	864	.308	.358	
93.289				
	870	.294	.357	
93.282				
	876	.281	.356	
93.274				
	882	.269	.355	
93.263				
	888	.257	.354	
93.252				
	894	.246	.353	
93.239				
	900	.236	.352	
93.225				
	906	.226	.350	

93.210				
	912	.218	.349	
93.194				
	918	.210	.347	
93.177				
	924	.203	.345	
93.160				
	930	.197	.344	
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	936	.191	.342	
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	942	.186	.340	
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	948	.182	.338	
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	954	.179	.336	
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	960	.177	.334	
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	996	.168	.322	
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	1008	.165	.318	
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	1014	.163	.316	
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	1020	.162	.314	
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	1026	.160	.312	
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	1044	.156	.306	
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	1050	.154	.304	
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	1056	.153	.302	
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	1062	.152	.300	
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	1068	.150	.298	
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	1074	.149	.296	
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	1080	.147	.294	
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	1086	.146	.292	

92.574				
	1092	.144	.290	
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	1098	.143	.288	
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	1104	.141	.286	
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	1116	.139	.282	
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	1122	.137	.280	
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	1128	.136	.278	
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	1140	.133	.274	
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	1146	.131	.272	
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	1164	.127	.266	
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	1170	.125	.265	
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	1176	.124	.263	
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	1182	.123	.261	
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	1200	.118	.255	
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	1212	.115	.251	
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	1224	.113	.248	
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	1230	.111	.246	
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	1278	.102	.213	
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	1284	.101	.207	
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	1290	.100	.202	
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	1296	.099	.198	
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	1308	.098	.189	
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	1332	.095	.172	
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	1488	.000	.087	I
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	1554	.000	.051	I
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	1638	.000	.026
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	1644	.000	.025
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	1650	.000	.024
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	1656	.000	.023
91.095			
	1662	.000	.022
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	1674	.000	.020
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	1680	.000	.019
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	1686	.000	.018
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	1776	.000	.009
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	1782	.000	.008
91.035			
	1788	.000	.008
91.033			
	1794	.000	.008
91.031			
	1800	.000	.007
91.030			
	1806	.000	.007

91.029			
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91.027			
	1818	.000	.006
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	1824	.000	.006
91.025			
	1830	.000	.006
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	1842	.000	.005
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	1848	.000	.005
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	1854	.000	.005
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	1860	.000	.004
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	1866	.000	.004
91.018			
	1872	.000	.004
91.017			
	1878	.000	.004
91.016			
	1884	.000	.004
91.015			
	1890	.000	.004
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	1896	.000	.003
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	1908	.000	.003
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	1914	.000	.003
91.012			
	1920	.000	.003
91.011			
	1926	.000	.003
91.011			
	1932	.000	.003
91.010			
	1938	.000	.002
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	1944	.000	.002
91.009			
	1950	.000	.002
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	1956	.000	.002
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	1962	.000	.002
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	1974	.000	.002
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	1986	.000	.002

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	1992	.000	.002
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	1998	.000	.001
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	2004	.000	.001
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	2010	.000	.001
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	2016	.000	.001
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	2022	.000	.001
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91.005			
	2034	.000	.001
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	2040	.000	.001
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	2046	.000	.001
91.004			
	2052	.000	.001
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91.004			
	2070	.000	.001
91.003			
	2076	.000	.001
91.003			
	2082	.000	.001
91.003			
	2088	.000	.001
91.003			
	2094	.000	.001
91.003			
	2100	.000	.001
91.003			
	2106	.000	.001
91.003			
	2112	.000	.001
91.002			
	2118	.000	.001
91.002			
	2124	.000	.001
91.002			
	2130	.000	.001
91.002			
	2136	.000	.000

1********** PONDOPT
********** Version 1.83
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS
****

PROJECT: NORFOLK PAINT
User: Rickmond Engineering

Date: 09/10/1998 Thursday
Time: 10:36:50
Output: NPP100.OUT

ROUTING SUMMARY ----------
SIMULATION MODE ----------
FOR THE ABOVE CASE ----------

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	93.966	.165	9.372	7.361

OHW

100-YR ROUTED

RICKMOND ENGINEERING, INC.
1643 Merrimac Trail
Williamsburg, Virginia 23185-5624
(757) 229-1776 or (757) 898-7007
Fax Number (757) 229-4683
E-mail: rickmond@tni.net
www.rickmond.com

JOB 98164
SHEET NO. 62 OF
CALCULATED BY KMJ DATE 9/10/98
CHECKED BY DATE
SCALE

EXAMINE POND AS SEDIMENT TRAP

Area = 0.99 ac

Initial Storage = 0.99 ac × 134 $\frac{\text{cyd}}{\text{ac}}$ = 134 cyd

Dry Storage = 67 cyd

Wet Storage = 67 cyd

Calculate Wet Storage:

V_1 = 67 cyd = 1,809 cf
D_1 = 2.31'

Wet storage volume of 1,809 cf is obtained by plugging 3" ø orifice during construction

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE	ENVIRONMENTAL DIVISION	PLANNING	COUNTY ENGINEER
(757) 253-6626	(757) 253-6670	(757) 253-6685	(757) 253-6678
codecomp@james-city.va.us	environ@james-city.va.us	planning@james-city.va.us	INTEGRATED PEST MANAGEMENT
			(757) 259-4116

September 19, 2001

Reinspection 11-02-01 OK for Bond Release. SAT 11-2-01 1:10 pm

Norfolk Paint Company, Inc.
1373 Ingleside Road
Norfolk, Va. 23502
Attn: Mr. William K. Wright

Re: Norfolk Paint
5540 Olde Towne Road
Stormwater Management Facility
County BMP ID Code: PC 135

Dear Mr. Wright:

The Environmental Division has reviewed a record drawing and construction certification as submitted for the stormwater management facility at the above referenced project. The record drawing and construction certification provides as-built information for a dry pond - shallow marsh basin constructed in the southwest corner of the site.

Based on our review of the certification information as submitted and a concurrent field observation as performed on August 18th 2001, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. The construction certification dated October 13th 1999 is **satisfactory** for the facility.

Record Drawing:

2. The record drawing dated September 23rd 1999 is **satisfactory** for the facility.

Construction-Related Items:

3. ✓ Remove trees and woody vegetation along the entire downslope embankment. Trees and woody vegetation were especially present along the west (natural stream side) of the embankment. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For this facility, this is especially crucial due to the steepness of the downstream embankment and the presence of the existing natural stream along the toe of the downstream embankment. High stream flow could overtop unstable trees or root mat systems and threaten the earthen embankment. *(Note: For this particular facility, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be starting to establish. Efforts should then be made to reduce restablishment and replace the tree growth with an established low-maintenance grass covering).*

TREES CLEARED.

4. ✓ Clean and remove all trash and wood debris present around the concrete riser structure, on and around the cast iron grate on top of the riser structure and in the bottom of the basin at the south corner. A significant amount of trash and debris were present at these locations. Efforts should be made to keep the flow control structures clean of trash and debris to reduce the chance of embankment overtopping. Riser & Corner POND CLEAN.

5. ✓ Clean and remove sediment and vegetation present in the end section at the outfall of the 18-inch pond barrel through the embankment. Flow out of the pond must not be obstructed by sediment and vegetation.

6. ✓ Clean yard trash present in the grassed area between the south side of the building and the BMP.

7. ✓ Remove entrenched silt fence located on the downstream side of the pond embankment. Removed.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. Please contact me at 757-253-6639 or the Environmental Division supervisor inspector, Pat Menichino at 757-253-6675 if you have any further comments or questions.

Sincerely,

Scott J. Thomas

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

G:\SWMProg\AsBuilts\SP9098.pc135

Note #5
Although end section was cleaned, riprap still present within limits of end section. Determined this is okay not to be removed. Due to adjacent natural drainage channel along R/S tie, it may be better to keep rock in as ballast for plastic. Flows in channel could detach end section & float it.

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
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(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 259-4116

September 19, 2001

Norfolk Paint Company, Inc.
1373 Ingleside Road
Norfolk, Va. 23502
Attn: Mr. William K. Wright

Re: Norfolk Paint
5540 Olde Towne Road
Stormwater Management Facility
County BMP ID Code: PC 135

Dear Mr. Wright:

The Environmental Division has reviewed a record drawing and construction certification as submitted for the stormwater management facility at the above referenced project. The record drawing and construction certification provides as-built information for a dry pond - shallow marsh basin constructed in the southwest corner of the site.

Based on our review of the certification information as submitted and a concurrent field observation as performed on August 18th 2001, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. The construction certification dated October 13th 1999 is **satisfactory** for the facility.

Record Drawing:

2. The record drawing dated September 23rd 1999 is **satisfactory** for the facility.

Construction-Related Items:

3. Remove trees and woody vegetation along the entire downslope embankment. Trees and woody vegetation were especially present along the west (natural stream side) of the embankment. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For this facility, this is especially crucial due to the steepness of the downstream embankment and the presence of the existing natural stream along the toe of the downstream embankment. High stream flow could overtop unstable trees or root mat systems and threaten the earthen embankment. *(Note: For this particular facility, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be starting to establish. Efforts should then be made to reduce restablishment and replace the tree growth with an established low-maintenance grass covering).*

4. Clean and remove all trash and wood debris present around the concrete riser structure, on and around the cast iron grate on top of the riser structure and in the bottom of the basin at the south corner. A significant amount of trash and debris were present at these locations. Efforts should be made to keep the flow control structures clean of trash and debris to reduce the chance of embankment overtopping.

5. Clean and remove sediment and vegetation present in the end section at the outfall of the 18-inch pond barrel through the embankment. Flow out of the pond must not be obstructed by sediment and vegetation.

6. Clean yard trash present in the grassed area between the south side of the building and the BMP.

7. Remove entrenched silt fence located on the downstream side of the pond embankment.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. Please contact me at 757-253-6639 or the Environmental Division supervisor inspector, Pat Menichino at 757-253-6675 if you have any further comments or questions.

Sincerely,

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

G:\SWMProg\AsBuilts\SP9098.pc135

FROM : ACM

Oct. 13 1999 03:17PM P3

FILE:
NORFOLK
PAINT

FROM : ACM

Oct-13-99 10:41 Rickmon

Oct. 13 1999 11:04AM P1
229 3594 P.01

Rickmond Engineering, Inc.

1643 Merrimac Trail
Williamsburg, Virginia USA 23185-3024

Engineering • Surveying • Land Planning

Phone: 757-229-1776 • Fax: 757-229-4683
email: rei@rickmond.com • www.rickmond.com

October 13, 1999

Postit® Fax Note 7671	Date 10/12	# of pages ▶ 1
To Scott Pierce	From Rob Durrette	
Co./Dept. McCallum	Co. REI	
Phone #	Phone #	
Fax #	Fax #	

Mr. Robert Arnette
4104 Holland Blvd., Suite 102
Chesapeake, Va 23322

RE: Norfolk Paint
Project No. 98164

Dear Mr. Arnette:

Per McCallum Testings request, the interior sideslopes of the above referenced detention pond were inspected yesterday and today and appear to meet the general requirements of the construction drawings.

If you have any questions, please feel free to contact me.

Sincerely,

RICKMOND ENGINEERING, INC.

Kenneth M. Jenkins
P.E.

KMJ/cab

J:\REI\Projects\98164\Arnette\98164.doc

ACM AREA COMMERCIAL MANAGEMENT
AREA COMMERCIAL REALTY T/A

4104 HOLLAND BLVD.
SUITE 102
CHESAPEAKE, VA. 23323

FAX COVER SHEET

TO: James City County FAX # 757-253-6850

ATTENTION: PAT MENICHINO

REF: Norfolk Paint

FROM: Bob Arnette

DATE: 2/4/99 TIME: 3:45

NUMBER OF PAGES INCLUDING COVER SHEET: 5

IF YOU DO NOT RECEIVE THE CORRECT NUMBER OF PAGES, PLEASE CALL 757-485-5088 OR FAX 757-485-5303

MESSAGE: Please review Shop Drawings For the Following:

(1) DI-3A

(2) OUTLET STRUCTURE -

NOTE: We plan to Flip the GRATE in order to have Doomed Shape -

IF You Have Any Questions, please call — Thanks

Bob Arnette

Phone: 757-485-5088 Fax: 757-485-5303

FILE - Norfolk Paint

ROBERT BROWN & ASSOC INC

December 9, 1998

Mr. Darryl Cook
Environamental Director
James City County
101-E Mounts Bay Road
Williamsburg, VA 23187

RE: Norfolk Paint @ Olde Towne Road
Willimsburg, VA

Dear Darryl,

Please find enclosed a copy of the Deed Of Easement between Old Town Farms and WBB Partners for the subject development which has been executed by Ms. Michele Ball of Old Town Farms. I have also attached a copy of the plat showing the 10' permanent maintenance easement and the 5' temporary construction easement which has also been executed by Ms. Ball.

Should you have any questions regarding the enclosed easement please do not hesitate to contact me.

Yours truly,

Robert J. Singley, Jr.

cc: Paul Holt w/enclosures

Commercial Real Estate • Brokerage • Development
3 Koger Executive Center, Suite 100 • P.O. Box 13228 • Norfolk, Virginia 23506-0228
(757) 461-0000 • Fax (757) 461-1630

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

SP-90-98
GPIN 3330100005C

County BMP ID Code (if known): PC 135

Name of Facility: NORFOLK PAINT - PLAZA BMP No.: 1 of 1 Date: 09/18/07

Location: 5540 OLDE TOWNE ROAD (near Chisel Run ROAD)

Name of Owner: NORFOLK PAINT CO. INC.

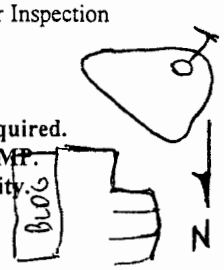
Name of Inspector: EJ THOMAS

Type of Facility: Dry Pond with Shallow Marsh

Weather Conditions: _____ 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:	EARTH EMBANK (SMALL); 4'-5' HIGH; 1.5H:1V O/S SLOPE			
Grass Height	✓			2-4" HEIGHT.
Vegetation Condition	✓			GRASS, GROUND COVER.
Tree Growth		✓		1" TREES EAST SOUTH O/S TOE; CENTER & LEFT (~~WEST~~)
Erosion	✓			Some O/S emb toe erosion due to SOUTH natural stream widening. See Note. Remove SF O/S EMB.
Trash & Debris	✓			
Seepage	✓			None Observed.
Fencing or Benches	✓			None.
Interior Landscaping/Planted Areas:	☐ None	☑ Constructed Wetland/Shallow Marsh	☐ Naturally Established Vegetation	
Vegetated Conditions	✓			Shallow Marsh Area.
Trash & Debris		✓		Full of Pointed, Purple colored
Floating Material		✓		flowers with large leafs (60%)
Erosion	✓			(identified as Pickerelweed)
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			Wetland veg; Cattails in back of bldg.
Other				Nearly 100% in forebay area
Services Building & Parking Areas; Plaza Paint Shop, Pizza Shop,				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☐ Permanent Pool (Retention Basin) ☒ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			3' deep shallow marsh; water 6"–1' deep in certain areas
Algae	✓			
Trash & Debris		✓	✓	Pool Area – especially SE corner at riser/pond corner. Considerable amount of trash + debris
Sediment	✓	MINIMAL		
Aesthetics	✓	✓		Wetland veg ok; trash unsightly.
Other				
Inflows (Describe Types/Locations): 15" CPP @ ~~NW~~ Corner (ie. parking area); SMALL DIA ROOF DR.				
Condition of Structure	✓			
Erosion	✓			Some Minor Scour creating forebay
Trash and Debris	✓			
Sediment	✓			
Aesthetics	✓			Clean + Unobstructed.
Other				6+5 rock OP.
Principal Flow Control Structure - Riser, Intake, etc. (Describe Location): 4' High RCP Riser w/ Neenah grate.				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris		✓		Considerable amount of trash, debris around grate.
Sediment	✓			
Aesthetics		✓		Trash, debris around riser.
Other	✓			4" Perf. Pipe Broken to riser but OK.
Principal Outlet Structure - Barrel, Conduit, etc. : 18" Black Corrug. PE Pipe w/ Plastic End Sect.				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris		✓		Clear + Remove Sed, rock + veg from outfall plastic end sect + within 5' of outfall. Obstructing barrel flow.
Erosion/Sediment		✓		
Outlet Protection	✓			
Other				OP Adequate.
Emergency Spillway (Overflow): None Observed. Riser control's high flow.				
Vegetation				
Lining				
Erosion				
Trash & Debris				
Other				

Good stand of wetland veg and animal habitat.

3 – 8 or 12" root drains w/ OP's tie into back of BMP. Acceptable ✓ Unobstructed.

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			None Found.
Animal Burrows	✓			
Graffiti	✓			Basin trash from Parking Area.
Other				
Surrounding Perimeter Conditions: NW Building/Parking Site; East Woods/Adj Bldg; South Nat Stream				
Land Uses	✓			Clean Businesses
Vegetation	✓			Area LANDSCAPED/STABILIZED
Trash & Debris		✓		Excessive Amount in BASIN. Trash ~~IN TALU AREA BETWEEN BLDG AND BMP~~
Aesthetics	✓			OK except for trash.
Access /Maintenance Roads or Paths	✓			Good Access Olde Towne ROAD TO PARKING LOT/EMB.
Other	✓			Frogs, turtle, abundant life.

Remarks:

△ Remove SF O/S EMB.

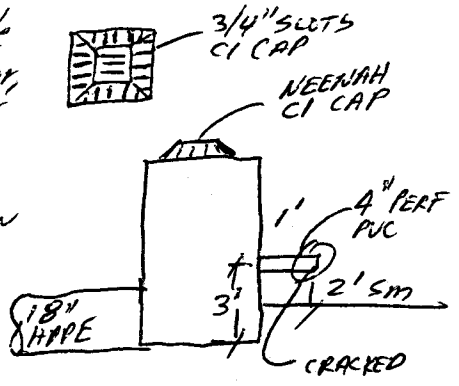
△ Clear + Remove Trees + Saplings on and at O/S toe. Mainly southwest and south toe at embankment turn (angle). 8-12' tall sapling 1-2" ϕ. About 2 dozen trees.

△ Monitor toe erosion starting on ~~South~~ EAST O/S embank toe. Natural channel erosion is starting along toe of embank. May need Lining in future if condition worsens, persists. No current harm to structure

□ Clean + Remove all trash + debris from basin. Considerable amount of plastic material including bottles, bags, paper, wood debris, leaves. Clogging 4" CPOnt and top riser grate. Especially at riser + SE corner of basin.

△ Clean + Remove trash, debris on/around top grate (Note: Trash + debris removed at time of insp from Low Flow ORIF AND Top Grate. Pushed to side.)

△ clear veg from within plastic end section. Remove rocks + debris from end sect. Clear veg 5' of outfall.



Overall Environmental Division Internal Rating: 3

Note: SD system. Inlet @ corner of parking area is clean, No trash, debris or obstructions.

Signature: Scott J Thomas PE. **Date:** 09/19/01

Title: Civil Engineer ENV DIV

SWMProg\BMP\CoInspProg\DetRet.wpd

James City County Stormwater Division Stormwater Management Facility (SWMF)Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

BMP ID # PC135 PIN 3330100005C Responsible Party: LANDMARK INDUSTRIES

Site Address: 5540 OLDE TOWNE ROAD District: 3

Location (other):

Date: 3/1/2010 Inspector: TC

(3 or 4 requires attention):

Structure Type: **Detention** **Total Score** **3**

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
1. Forebay Score:	0	
2. Inlet(s):	1	**Remove trees and woody vegtation from wihtin 10' of the inlets.**
*3. Outlet:	3	**Remove trees and woody vegtation from wihtin 10' of the outlet.** **Remove the rip rap from within the outlets flared end section.**
*4. Principal Spillway:	3	**Low flow orifice or weir is clogged.** **Remove trees and woody vegetation from within 10' of the structure.**
5. Emergency Spillway:	0	
6. Basin Bottom and Side Slopes:	1	
7. Safety Devices:	0	
*8. Embankments:	3	**Remove trees and woody vegetation from within 10 feet of the embankment.**
*9. Structural Components:	1	
*10. Media:	0	

James City County Stormwater Division Stormwater Management Facility (SWMF)Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
11. Routine Maintenance:	2	**Embankment access right of ways needs mowing to a minimum grass height of 6-8 inches**
12. Condition of Aquatic Environment:	2	**Invasive plant dominance**
13. Vegetation:	3	**Overall vegetation poor, unwanted and invasive weeds**
*14. Storage Volume:	1	
15. Debris/Sediment Accumulation:	2	**Excessive deris/ floatable material must be removed from the facility.**
16. Standing Water:	1	
17. Safety and Aquatic Bench:	0	
18. Side Slope Vegetation:	1	
19. Other:	0	

Checked below identify corrective work required on your stormwater management facility.

- [x] Remove all trees and other woody vegetation from the embankment (earthen dam) and also within 10' of the toe of the embankment slope.
- [x] Remove all trees and other woody vegetation from within 10' of the principal spillway, any principal inlet devices, and the principal outfall.
- [x] Remove all trees and other woody vegetation from within 10' of any inlet structures, such as: pipes, end sections, concrete channels, flumes, rip rap channels, etc.
- [ ] Remove all trees and other woody vegetation from within the emergency spillway and also from within 10' of the spillway.
- [ ] Investigate the cause of any settlement, sink holes, subsidence, or erosion, noted on the report and develop and implement an appropriate plan to correct the deficiencies noted permanently.
- [x] Remove all accumulated sediment, leaves and debris from within any pipes, end sections, concrete channels, emergency spillways, flumes, rip rap channels, etc. and dispose of the material in an appropriate method and location.
- [ ] Stabilize any disturbed, unstable, denuded or bare soil areas, by installing top soil and planting a permanent grass seed to establish an effective grass ground cover over these areas.
- [x] All grassed areas of the BMP such as: access roads, emergency spillways, embankments (earthen dam), or other non-treed areas, shall be maintained at a minimum grass height of 8", and should not be subjected to low mowing.
- [x] Trees and woody vegetation should be cut flush with the ground, and smaller trees and limbs (less than 4" dia) may be processed with a wood chipper and dispersed in natural areas.

Date Record Created: [redacted]

Created By: [redacted]

WS_BMPNO: PC135

WATERSHED	PC
BMP ID NO	135
PLAN NO	SP-90-98
TAX PARCEL	(33-3)(1-5C)
PIN NO	3330100005C
CONSTRUCTION DATE	10/1/1999
PROJECT NAME	Norfolk Paint
FACILITY LOCATION	5540 Old Towne Road (at Chisel Run Rd)
CITY-STATE	Williamsburg, Va. 23185
CURRENT OWNER	Norfolk Paint Company, Inc.
OWNER ADDRESS	1373 Ingleside Drive
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Norfolk, Va. 23502
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu | Print Record

MAINTENANCE PLAN	No
SITE AREA acre	1.11
LAND USE	Gen Business
old BMP TYP	Dry Pond - SM
JCC BMP CODE	B1 Shallow Marsh
POINT VALUE	9
SVC DRAIN AREA acres	1.11
SERVICE AREA DESCRI	Building & Parking Area
IMPERV AREA acres	0.47
RECV STREAM	UT of Powhatan Creek
EXT DET-WQ-CTRL	Yes
WTR QUAL VOL acre-ft	0.0933
CHAN PROT CTRL	Yes
CHAN PROT VOL acre-ft	0.1194
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

CTRL STRUC DESC	DI-1 Inlet
CTRL STRUC SIZE inches	26 x 26
OTLT BARRL DESC	PVC Barrel
OTLT BARRL SIZE inch	18
EMERG SPILLWAY	No
DESIGN HW ELEV	93.97
PERM POOL ELEV	90.78
2-YR OUTFLOW cfs	0.00
10-YR OUTFLOW cfs	0.00
REC DRAWING	Yes
CONSTR CERTIF	Yes
LAST INSP DATE	1/22/2002
Inspected by:	[redacted]
INTERNAL RATING	3

MISC/COMMENTS

Inst # 990001521 p. 0237 1-22-99. 1-yr 0.27cfs@92.34; 100-yr 7.36 cfs @ 93.97.

Additional Comments:

[redacted]

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	DI-1 Inlet
BMP ID NO	135	SITE AREA acre	1.11	CTRL STRUC SIZE inches	26 x 26
PLAN NO	SP-90-98	LAND USE	Gen Business	OTLT BARRL DESC	PVC Barrel
TAX PARCEL	(33-03)(01-5C)	old BMP TYP	Dry-Shallow Mar	OTLT BARRL SIZE inch	18
PIN NO	3330100005C	JCC BMP CODE			
CONSTRUCTION DATE	10/1/1999	POINT VALUE	9	EMERG SPILLWAY	No
PROJECT NAME	Norfolk Paint			DESIGN HW ELEV	93.97
FACILITY LOCATION	5540 Old Towne Road (at Chisel Run Rd)			PERM POOL ELEV	90.78
CITY-STATE	Williamsburg, Va. 23185	SVC DRAIN AREA acres	1.11	2-YR OUTFLOW cfs	0.00
CURRENT OWNER	Norfolk Paint Company, Inc.			10-YR OUTFLOW cfs	0.00
OWNER ADDRESS	1373 Ingleside Drive			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI	Building & Parking Area		
CITY-STATE-ZIP CODE	Norfolk, Va. 23502	IMPERV AREA acres	0.47	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0.0933	INTERNAL RATING	
		CHAN PROT CTRL	Yes	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0.1194	Inst # 990001521 p. 0237 1-22-99. 1-yr 0.27cfs@92.34; 100-yr 7.36 cfs @ 93.97.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu


PC135

ENVIRONMENTAL DIVISION REVIEW COMMENTS
NORFOLK PAINT
PLAN NO. SP-90-98 MCE/DEC
OCTOBER 7, 1998

1. The following comments refer to the design of the detention basin:
   - A. The 50 cattails that are proposed for the BMP should be replaced with a less invasive species. We recommend an equal number of Pontederia cordata (Pickerelweed). The soft-stem bullrushes are an acceptable species. THIS REVISION HAS BEEN MADE.
   - B. Replace the jute mesh on the pond slopes of 2:1 with a blanket material such as Excelsior matting. THIS REVISION HAS BEEN MADE.
   - C. The top of the dam needs to be raised to elevation 95 to provide one foot of freeboard above the 100-year storm. THE TOP OF THE DAM HAS BEEN REVISED TO PROVIDE ONE (1) FOOT OF FREEBOARD ABOVE THE 100-YR STORM
   - D. A small perforated riser needs to be provided over the 3-inch orifice to establish a permanent pool at elevation 92 while the basin functions as a sediment trap. The riser needs to be solid to elevation 92 and perforated above that point with the top of the riser extending up to about the top of the DI. THIS REVISION HAS BEEN MADE.
   - E. The gravel blanket covering the 3-inch orifice does not provide adequate trash protection. A better solution would be to retain permanently the riser/dewatering pipe described in item D. The riser could be perforated from elevation 91 to 92 to provide the drawdown necessary to achieve the stream channel and water quality protection for the project. THIS REVISION HAS BEEN MADE.
   - F. The top of the DI-1 needs to be modified to provide a sloping surface to reduce the chance of clogging with debris. A sloping grate allows collected debris to rise with rising water elevations and is therefore less prone to clogging. An alternative would be to provide a domed grate over the DI-1. THIS REVISION HAS BEEN MADE.
2. The outfall from the detention basin is proposed to be placed offsite in what is labelled a drainage easement. Is this a private drainage easement and is it necessary to obtain written permission to place the pipe and outfall in this easement? AN AGREEMENT HAS BEEN REACHED WITH THE OWNER OF THIS EASEMENT.
3. Provide a method of capturing roof runoff and conveying it into the basin without having it run down the 2:1 slopes of the basin. A ROOF DRAIN SYSTEM HAS BEEN ADDED.

ENVIRONMENTAL DIVISION REVIEW COMMENTS
NORFOLK PAINT
PLAN NO. SP-90-98 MCE/DEC
OCTOBER 7, 1998

1. The following comments refer to the design of the detention basin:
   A. The 50 cattails that are proposed for the BMP should be replaced with a less invasive species. We recommend an equal number of Pontederia cordata (Pickerelweed). The soft-stem bullrushes are an acceptable species.
   B. Replace the jute mesh on the pond slopes of 2:1 with a blanket material such as Excelsior matting.
   C. The top of the dam needs to be raised to elevation 95 to provide one foot of freeboard above the 100-year storm.
   D. A small perforated riser needs to be provided over the 3-inch orifice to establish a permanent pool at elevation 92 while the basin functions as a sediment trap. The riser needs to be solid to elevation 92 and perforated above that point with the top of the riser extending up to about the top of the DI.
   E. The gravel blanket covering the 3-inch orifice does not provide adequate trash protection. A better solution would be to retain permanently the riser/dewatering pipe described in item D. The riser could be perforated from elevation 91 to 92 to provide the drawdown necessary to achieve the stream channel and water quality protection for the project.
   F. The top of the DI-1 needs to be modified to provide a sloping surface to reduce the chance of clogging with debris. A sloping grate allows collected debris to rise with rising water elevations and is therefore less prone to clogging. An alternative would be to provide a domed grate over the DI-1.

2. The outfall from the detention basin is proposed to be placed offsite in what is labelled a drainage easement. Is this a private drainage easement and is it necessary to obtain written permission to place the pipe and outfall in this easement?

3. Provide a method of capturing roof runoff and conveying it into the basin without having it run down the 2:1 slopes of the basin.

AUG 1998
RECEIVED

ENVIRONMENTAL DIVISION REVIEW COMMENTS

NORFOLK PAINT
PLAN NO. SP-90-98 MCE/DEC
August 26, 1998

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project. THE DEVELOPER WILL PROVIDE.

2. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facility for this project. THE DEVELOPER WILL PROVIDE.

3. As-built drawings must be provided for the detention basin on completion. Also, a note shall be provided on the plan stating that upon completion, the construction of the dam will be certified by a professional engineer who has inspected the structure during construction. THESE NOTES HAVE BEEN ADDED TO SHEET NO. C2 OF THE PLANS. REFER TO NOTES NO. 5&6.

4. Show any temporary soil stockpile areas, staging and equipment storage areas. THESE AREAS HAVE BEEN ADDED ON SHEET NO. C2 OF THE PLANS.

5. Provide additional silt fence along the south side of the proposed sanitary sewer. Wrap the silt fence around the sanitary manhole to which the new line will join. SILT FENCE HAS BEEN ADDED ON SHEET NO. C2 OF THE PLANS.

6. Identify any off-site land disturbing areas required with proper erosion control measures. NO OFF-SITE LAND DISTURBING ACTIVITIES ASSOCIATED WITH THIS PROJECT ARE ANTICIPATED.

7. Field inspection reveals that the channel is not stable upstream or downstream of the proposed outlet pipe. Therefore, use the channel protection criteria of detaining and releasing over 24 hours the 1-year, 24 hour storm to control the quantity of stormwater runoff. THE POND HAS BEEN REDESIGNED IN ACCORDANCE WITH THIS CRITERIA. THE APPROPRIATE REVISIONS HAVE BEEN MADE TO THE PLANS.

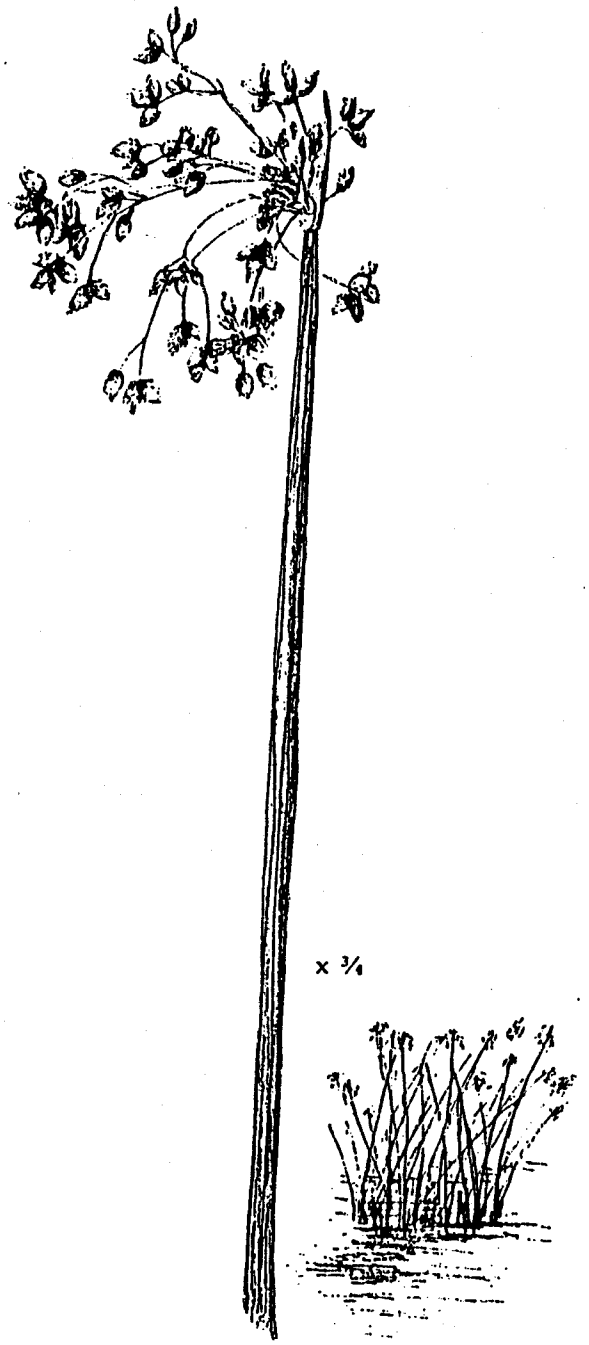
8. The BMP calculation worksheet shows that this project only achieves 7.1 BMP points. Ten points are required to satisfy the County's water quality criteria. An alternate BMP type needs to be utilized to increase the points achieved by this project. See the attached proposed 10-point system revisions for additional choices. THE POND HAS BEEN REDESIGNED TO OBTAIN A 10.1 POINT BMP AND THE APPROPRIATE REVISIONS HAVE BEEN MADE TO THE PLANS.

9. Provide conservation easements for all Natural Open Space areas claimed in the BMP worksheet. A CONSERVATION EASEMENT HAS BEEN ADDED TO SHEET NO. C2 OF THE PLANS.

10. The BMP must be examined for performance as a sediment basin/trap during the construction of the project and be designed according to the new handbook criteria. THE POND REDESIGN INCLUDES SEDIMENT TRAP PERFORMANCE, SEE DRAINAGE CALCULATIONS.

11. Provide a sequence of construction on the plan.
A SEQUENCE OF CONSTRUCTION HAS BEEN ADDED TO SHEET NO. C2 OF THE PLANS.

Norfolk Paint



Giant Bulrush
Soft-stem Bulrush
Scirpus validus Vahl.

OBL

A majestic rush-like sedge, Giant Bulrush forms colonies in freshwater marshes and may grow to heights of 10 feet. The long round tapering stems are soft to the touch, hence the name Soft-stem Bulrush. The leaves are reduced to inconspicuous sheaths at the base of the stem. The terminal, brownish panicle is evident in mid-summer. Colonies are found in the lower parts of the marsh, often associated with Arrow Arum and Pickerelweed. The stems and underground rhizomes are a favorite food of muskrats. The seeds are eaten by birds. This plant reproduces by both seed and rhizome.

Giant Bulrush can be found in wetland areas throughout most of the continental United States. It is common along the Mid-Atlantic Coast.