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: **PC104**

DATE VERIFIED: **June 8, 2016**

QUALITY ASSURANCE TECHNICIAN: **Natalie Prevette**

Natalie Prevette

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 4, 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: PC104

PIN: 4730100070

Subdivision, Tract, Business or Owner Name (if known): HCP Virginia

Property Description: Nursing Home/Retirement Home

Site Address: 1811 Jamestown Road

(For internal use only) **Box** 5 **Drawer:** 3

Agreements: (in file as of scan date) **Y** **Book or Doc#:** 99002667 **Page:**

641 425

Comments
Used to be the Indian Village Campsite

RJ SMITH COMPANIES

Site Developement

General Contracting

Demolition

Utilities

Richard Smith

President

7635 Hull Street Rd
Suite 101
Richmond, VA 23235

(804) 745-3450

Fax (804) 745-3353

richardsmith@rjsmithcos.com

Date Record Created:

Created By:

WS_BMPNO: PC104

PRINTED ON
Thursday, March 04, 2010
4:25:04 PM

WATERSHED	PC
BMP ID NO	104
PLAN NO	SP-87-98
TAX PARCEL	(47-3)(1-70)
PIN NO	4730100070
CONSTRUCTION DATE	1/1/1999
PROJECT NAME	Wmsburg Nursing & Rehab (Tandem)
FACILITY LOCATION	1811 Jamestown Road
CITY-STATE	Williamsburg, Va. 23185
CURRENT OWNER	Williamsburg Health Investors LLC
OWNER ADDRESS	4648 Brambleton Ave, SW
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Roanoke, Va. 24018
OWNER PHONE	(540) 776-7601
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu | Print Record

MAINTENANCE PLAN	No	CTRL STRUC DESC	PVC Siphon
SITE AREA acre	28.34	CTRL STRUC SIZE inches	12
LAND USE	Nursing & Rehab	OTLT BARRL DESC	PVC Siph
old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	12
JCC BMP CODE	A2 Wet Pond		
POINT VALUE	9	EMERG SPILLWAY	Yes
		DESIGN HW ELEV	18.84
		PERM POOL ELEV	14
SVC DRAIN AREA acres	19.56	2-YR OUTFLOW cfs	7.00
		10-YR OUTFLOW cfs	9.00
		REC DRAWING	Yes
SERVICE AREA DESCRI	Main Bldg, Park & Fut Office		
IMPERV AREA acres	4.00	CONSTR CERTIF	No
RECV STREAM	UT Pow Creek		
EXT DET-WQ-CTRL	No	LAST INSP DATE 3/14/2002	Inspected by:
WTR QUAL VOL acre-ft		INTERNAL RATING	3
CHAN PROT CTRL	No	MISC/COMMENTS	
CHAN PROT VOL acre-ft		Dam Repaired 12/03/04.	
SW/FLOOD CONTROL	Yes		
GEOTECH REPORT	Yes		

Additional Comments:

000004

Printed On 05/13/2008 By WOOLRIDGE

PC-104
1811 Jamestown Rd
4730100070

990002667

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 15 day of January, 1999, between Williamsburg Health Investors and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: 28.34 acres on Jamestown Rd., West of Sandy Bay Rd. Tax Map No./Parcel No. (47-3)(01-70), Deed Book 641, Page No. 425 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.

FEB-99 01117

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 15 day of JANUARY, 1999.

COVENANTOR(S)

H.H. Frazier
Managing Partner

ATTEST:

J. McNamee

COVENANTOR(S)

ATTEST:

COMMONWEALTH OF VIRGINIA
CITY/~~COUNTY~~ OF LYNCHBURG

I hereby certify that on this 15th day of JANUARY, 1999, before the subscribed, a Notary Public of the State of Virginia, and for the ~~County~~ CITY of LYNCHBURG, aforesaid personally appeared H.H. FRAZIER and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 15th day of JANUARY, 1999.

Notary Public

My Commission expires: 5.31.01

Approved as to form:

Deputy County Attorney

This Declaration of Covenants prepared by:

(Print Name)

MANAGING PARTNER
(Title)

P.O. BOX 11109
(Address)

LYNCHBURG, VA 24506
(City) (State) (Zip)

VIRGINIA: City of Williamsburg and County of James City, to Wit:
In the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City the 9 day of Feb, 1999. This Covenants was presented with certificate annexed and admitted to record at 10:48 o'clock
Teste: Helene S. Ward, Clerk
by Helene S. Ward
Deputy Clerk

FEB-9-99 0118

drainage.pre
Revised 2/97

Dewberry

4180 Innslake Drive
Glen Allen, Virginia 23060-3344

804 290 7957 • 804 290 7928 fax
www.dewberry.com

November 7, 2006

PC104
SP-12-06

Mr. Scott J. Thomas, PE
Chief Engineer - Stormwater
James City County Environmental Division
101 Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784

RE: New Dawn Assisted Living
Existing BMP Inspection Report
County BMP ID: PC 104

Dear Mr. Thomas:

In regards to comment number 25 of the Environmental Division review comments dated April 14, 2006, the following is a BMP inspection report based upon field visits to the existing basin on May 5, 2006 and November 1, 2006:

The existing basin, County BMP ID Code PC 104, is situated approximately 350' to the west of the New Dawn Assisted Living project site. Figure 1 shows an aerial view of the basin and project site.

The basin is a wet pond and appeared to be in good working order at the time of the visits. Substantial vegetation was around and within the limits of the basin (Figure 2) and vegetative cover is well established along the top and sides of the berm (Figure 3). The outlet structure was difficult to see from the banks of the pond due to the amount of vegetation, but it appeared that the structure was an inverted siphon with a 12" PVC pipe. A small, but constant flow of water was leaving the outfall pipe at the time of visit. The outfall was stabilized and no downstream erosion could be seen in the receiving channels (Figures 4-5). In addition, no signs of erosion or sediment deposition could be seen within the basin, nor around or along the berm or at the emergency spillway where stabilization matting is still in place (Figure 6).

In conclusion, although there had not been significant rainfall in the few days prior to the site visits, the water surface elevation was at normal operating levels. There was no visible evidence of erosion at key locations or debris blocking the intake. Given these conditions, the basin appears to be functioning adequately for the purpose for which it was designed and is not in need of any immediate maintenance.

If you have any questions or comments regarding this matter, of if I can be of further assistance, please feel free to contact me.

Sincerely,

Dewberry & Davis, Inc.

Bryan D. May

Bryan D. May, P.E.
Project Manager

COMMONWEALTH OF VIRGINIA
BRYAN D. MAY
No. 039552
11-7-06
PROFESSIONAL ENGINEER

Figure 1
Aerial View

Figure 2
View of Basin
From Top of Berm

Figure 3

Top of Berm

Looking East towards emergency spillway

(Photo taken 11/01/06)

Figure 4
Basin Outlet
Looking downstream

Figure 5
Basin outlet
Side view

Figure 6
Emergency Spillway

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 01/24/05

Name: Adam Garff, Director of Development
Firm or Company: Smith/Packett
Facsimile Number: 248-484-6584
Number of pages including this transmittal: 5
From: Scott J. Thomas

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments:
Williamsburg Nursing + Rehab (Tandem)
The following should "close the book" on this long-standing situation. Thanks.

If you do not receive all pages, call 757-253-6670 as soon as possible

PROTECTING RESOURCES
PRIDE
IN DELICATE ENVIRONMENTS

SCOTT J. THOMAS, P.E.
SENIOR ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

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

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codecomp@james-city.va.us

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environ@james-city.va.us

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

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

January 4, 2005

Mr. Frederick L. Dubin
Seaboard Surety Company
5 North Park Drive
Hunt Valley MD 21030

RE: Williamsburg Nursing and Rehabilitation Center

Dear Mr. Dubin:

The purpose of this letter is to authorize release of the $25,000 Erosion and Sedimentation Control Bond No. 379180 which was posted to guarantee installation of erosion control measures for the above referenced project. All measures have been installed in accordance with the Siltation Agreement and the approved plans.

Sincerely,

Darryl E. Cook

Darryl E. Cook
Environmental Director

cc: Williamsburg Health Investors LLC
The Haskell Company

Scott Thomas

From: Penn, Charles R [charles.penn@thehaskellco.com]
Sent: Wednesday, January 05, 2005 1:00 PM
To: Scott Thomas
Subject: FW: Williamsburg Nursing Facility

-----Original Message-----
From: Penn, Charles R
Sent: Wednesday, January 05, 2005 12:58 PM
To: 'scott@james-city.va.us'
Cc: Penn, Charles R
Subject: Williamsburg Nursing Facility

Sorry for the tardiness in my response. Randell Hudgins had advised me last month that you needed an additional corespondance with specific wording regarding the BMP.

Reference:
Project: Williamsburg Nursing & Rehab Center (Now Tandem Health Care at Williamsburg)
Location: 1811 Jamestown Rd
County Plan No.: SP-87-98
County BMP ID Code: PC 104

As you are aware all the remedial work has been completed. The contractor or my local superintendent will try and get back over to the faciltiy to assure stabilization, and that the dam/site work areas have germinated.

A geotech company was retained for the project. I know that compaction tests were taken throughout the site and dam area. They appearantly did not provide the construction certification as required. Due to this oversight I would like to request the construction requirements for the BMP by waived. Your continued understanding is appreciated. Let me know if I may be of any further assistance.

CERTIFICATION

Charles Penn
The Haskell Company
2617 Antilley Rd.
Abilene, Texas 79606
325.793.7797(office)
325.475.7797 (fax)

APPROVED
James City County
Environmental Division
By: [signature]
Date: 1-24-05

SEE ATTACHED.

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

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COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

January 24, 2005

Mr. Charles Penn
The Haskell Company
2617 Antilley Road
Abilene, Texas 79606

Re: Williamsburg Nursing & Rehab Center (Tandem Health Care)
County Plan No. SP-87-98
County BMP ID Code: PC 104

Dear Mr. Penn:

Based on your email request dated January 5th 2005, the Environmental Division has considered your request to waive construction certification requirements associated with the BMP for the above referenced project. The BMP for the subject plan of development is a wet pond in the southwest corner of the site. The farm pond was upgraded in accordance with Sheet C12 of the approved plan and the project geotechnical report. For this specific project, Note # 18 on Sheet C10 of the approved plan set indicated the following:

> ***"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 judgement, knowledge and belief the structure was constructed in accordance with the approved plans and specifications."***

As this note was present on the approved plans and specifications, it was the responsibility of the Owner or Contractor to ensure a professional engineer was present during the construction process to observe construction and to provide proper construction certification once the structure was completed.

Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed since review and approval of this plan.

In full consideration of your request, it appears that testing and inspection was performed by a geotechnical engineer during construction; however, there was an apparent failure to provide follow-up certification information as required. The basis of the variance request is that it was a complete oversight that the certification was not provided.

Based on field inspections of BMP, full coordination of this issue with Smith/Packett and the Haskell Company, a full review of the approved design plan and geotechnical investigation (pre-construction) and reviews of onsite and offsite adjacent land uses and the record (asbuilt) drawing as provided by Rickmond Engineering, Inc., it has been determined that for ***this specific review case only***, the construction certification requirement will be waived. Conditions that apply to the waiver are outlined below. The primary reasons for granting a waiver for this case are as follows:

- Based on re-inspection dated December 4, 2004, all field-related items as issued in a letter issued on October 10th 2000, an email issued April 15th 2004 and in a field meeting between the County Environmental Division and the R.J. Smith Company on December 2nd 2004 were properly addressed in a satisfactory manner.
- It appears geotechnical testing and inspection was performed when the BMP was modified; however, certification was never provided. Significant time has elapsed and proper diligence has been performed by subject parties to try and obtain this information to no avail.
- Postconstruction testing would be destructive to the dam embankment and surrounding area, including downstream Resource Protection Area (RPA).

Conditions which apply to granting of the waiver request are construction (field) related items which need to be performed as follows:

- Seed used to stabilize areas disturbed from December 2004 repairs (as outlined above) must germinate in an acceptable manner.

Our office will proceed with release of the erosion and sediment control surety in accordance with our usual administrative process under the assumption that these field items will be concurrently addressed in a satisfactory manner.

It should be realized that granting of variances of this nature are seldom performed by our Division. Lack of knowledge about the process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall history and general function of the facility as well as elapsed time were weighed into the decision.

If you have any additional questions or comments, you can contact me at 253-6673 or the assigned Environmental Division inspector, Ms. Molly Roggero at 757-253-6839. Thank you for your consideration on this matter.

Sincerely,

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

Attachments
SJT/sjt

cc: Molly Roggero, Environmental Division Inspector

Asbuilts\Variances\SP8798.pc104

Scott Thomas

From: Adam Garff [AGarff@smithpackett.com]
Sent: Monday, January 24, 2005 9:08 AM
To: Scott Thomas
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

The fax number below is correct 248-484-6584.

From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Monday, January 24, 2005 9:04 AM
To: Adam Garff
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

I will fax it to you, I deleted my email to Randell Hudgins dated December 6, 2004. If your fax is anything other than that below, let me know via email.

Scott J. Thomas, P.E.
James City County
Environmental Division

-----Original Message-----
From: Adam Garff [mailto:AGarff@smithpackett.com]
Sent: Friday, January 21, 2005 11:19 AM
To: Scott Thomas
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Scott,

I understand the work required has been completed. Could I receive something in writing confirming that?

Thanks,

Adam Garff
Director of Development

Smith/Packett
4415 Pheasant Ridge Rd
Suite 301
Roanoke, VA 24018

Phone 540-774-7762 Ext. 110
Direct Fax 248-484-6584
www.smithpackett.com

From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Thursday, April 15, 2004 2:37 PM
To: Adam Garff
Cc: Joe Buchite
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

AB FILE

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

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planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620

January 24, 2005

Mr. Charles Penn
The Haskell Company
2617 Antilley Road
Abilene, Texas 79606

Re: Williamsburg Nursing & Rehab Center (Tandem Health Care)
County Plan No. SP-87-98
County BMP ID Code: PC 104

Dear Mr. Penn:

Based on your email request dated January 5th 2005, the Environmental Division has considered your request to waive construction certification requirements associated with the BMP for the above referenced project. The BMP for the subject plan of development is a wet pond in the southwest corner of the site. The farm pond was upgraded in accordance with Sheet C12 of the approved plan and the project geotechnical report. For this specific project, Note # 18 on Sheet C10 of the approved plan set indicated the following:

> ***"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 judgement, knowledge and belief the structure was constructed in accordance with the approved plans and specifications."***

As this note was present on the approved plans and specifications, it was the responsibility of the Owner or Contractor to ensure a professional engineer was present during the construction process to observe construction and to provide proper construction certification once the structure was completed.

Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed since review and approval of this plan.

In full consideration of your request, it appears that testing and inspection was performed by a geotechnical engineer during construction; however, there was an apparent failure to provide follow-up certification information as required. The basis of the variance request is that it was a complete oversight that the certification was not provided.

Based on field inspections of BMP, full coordination of this issue with Smith/Packett and the Haskell Company, a full review of the approved design plan and geotechnical investigation (pre-construction) and reviews of onsite and offsite adjacent land uses and the record (asbuilt) drawing as provided by Rickmond Engineering, Inc., it has been determined that for ***this specific review case only***, the construction certification requirement will be waived. Conditions that apply to the waiver are outlined below. The primary reasons for granting a waiver for this case are as follows:

- Based on re-inspection dated December 4, 2004, all field-related items as issued in a letter issued on October 10th 2000, an email issued April 15th 2004 and in a field meeting between the County Environmental Division and the R.J. Smith Company on December 2nd 2004 were properly addressed in a satisfactory manner.
- It appears geotechnical testing and inspection was performed when the BMP was modified; however, certification was never provided. Significant time has elapsed and proper diligence has been performed by subject parties to try and obtain this information to no avail.
- Postconstruction testing would be destructive to the dam embankment and surrounding area, including downstream Resource Protection Area (RPA).

Conditions which apply to granting of the waiver request are construction (field) related items which need to be performed as follows:

- Seed used to stabilize areas disturbed from December 2004 repairs (as outlined above) must germinate in an acceptable manner.

Our office will proceed with release of the erosion and sediment control surety in accordance with our usual administrative process under the assumption that these field items will be concurrently addressed in a satisfactory manner.

It should be realized that granting of variances of this nature are seldom performed by our Division. Lack of knowledge about the process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall history and general function of the facility as well as elapsed time were weighed into the decision.

If you have any additional questions or comments, you can contact me at 253-6673 or the assigned Environmental Division inspector, Ms. Molly Roggero at 757-253-6839. Thank you for your consideration on this matter.

Sincerely,

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

Attachments
SJT/sjt

cc: Molly Roggero, Environmental Division Inspector

Asbuilts\Variances\SP8798.pc104

Scott Thomas

From: Scott Thomas
Sent: Monday, December 06, 2004 4:17 PM
To: 'Randall.Hudgins@thehaskellco.com'
Cc: Molly Roggero; 'richardsmith@rjsmithcos.com'
Subject: BMP at the Williamsburg Nursing & Rehab Center

Project: Williamsburg Nursing & Rehab Center (now Tandem Health Care at Williamsburg)
Location: 1811 Jamestown Road
County Plan No.: SP-87-98
County BMP ID Code: PC 104

At your request, I am forwarding the following information. On December 2nd 2004, the Environmental Division met with representatives of the RJ Smith Company to go over outstanding field-related items associated with the wet pond BMP for the above referenced project. RJ Smith was the assigned contractor to address outstanding field-related issues. This was as a result of items as issued in an email to Mr. Adam Garff on April 15, 2004 and an original letter issued by the Environmental Division to Richmond Engineering dated October 10, 2000 (attached, wordperfect file).

The work was performed immediately by the contractor. Work items generally included:

- Clearing small trees and brush present along top of dam and the downstream face of dam;
- Adding fill and regrading the downstream face of dam to a gentler slope;
- Adding approximately ½ foot of fill to top of dam;
- Topsoiling top of dam and the downstream face;
- Seeding and mulching top of dam,
- Placement of EC-2 matting on top of dam and the downstream face of dam;
- Clearing and removing vegetation from around the principal spillway (siphon) device;
- Reshaping and stabilizing the emergency spillway with seed & mulch and matting.

Based on our inspection, all field-related items associated with the BMP have been addressed in a satisfactory manner. Based on the previous referenced emails and letter, field-related items were not the only outstanding issue associated with the finishing the BMP and release of bond for the site. One of the major issues was the need for a construction certification in accordance with Note # 18 on Sheet 10 of the approved plan. The construction certification was never received by our office for the subject BMP.

Based on discussions on this project over the last year and in order to come to some sort of closure in a timely manner, it can be deducted that inspection/testing that should have been performed during BMP construction, in order to provide proper certification, was either not performed or is at a point in time now that it would be very difficult to obtain construction certification by a professional engineer. Our Division has decided that in lieu of trying to pursue the original construction certification or perform post-construction certification measures, which may be destructive to the dam embankment, structure and surrounding areas, that our primary focus would be to ensure field-related BMP items were fully addressed to our satisfaction. This has now been done. Our Division will proceed with processing the bond release paperwork through our normal administrative process. However, I need to following two items concurrently with this process.

1. A written request, either in letter or email format, requesting to waive construction certification requirements for the BMP. The request should give valid reasons to support granting the request. This is where you can try and explain why the original construction certification was never provided, the occurrence of Hurricane Isabel, etc.
2. It must be observed/confirmed that seed used for stabilization of the dam/site work areas has germinated.

As annual ryegrass was used in the mixture and with some fair weather, this can be expected to occur over the next 7 to 10 days.

In full consideration of the current situation of this project, there was an apparent failure by the Owner or Contractor to properly retain the services of a professional engineer to inspect and perform required testing of the BMP during it's construction and/or to provide subsequent construction certification. It should be realized that granting of variances of this nature are seldom performed by our Division. Lack of knowledge about the process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall history and general function and field-related corrections made to the facility were weighed into the decision.

Please forward the information to me as requested. In the meantime, we will proceed with paperwork for bond release. Any correspondence can be forwarded to me at the following address:

P. O. Box 8784
Williamsburg, Va. 23187

Scott J. Thomas, P.E.
Senior Engineer
James City CountyEnvironmental Division
757-253-6639
Email: scottt@james-city.va.us

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

Scott Thomas

From: Scott Thomas
Sent: Monday, December 06, 2004 4:17 PM
To: 'Randall.Hudgins@thehaskellco.com'
Cc: Molly Roggero; 'richardsmith@rjsmithcos.com'
Subject: BMP at the Williamsburg Nursing & Rehab Center

Project: Williamsburg Nursing & Rehab Center (now Tandem Health Care at Williamsburg)
Location: 1811 Jamestown Road
County Plan No.: SP-87-98
County BMP ID Code: PC 104

At your request, I am forwarding the following information. On December 2nd 2004, the Environmental Division met with representatives of the RJ Smith Company to go over outstanding field-related items associated with the wet pond BMP for the above referenced project. RJ Smith was the assigned contractor to address outstanding field-related issues. This was as a result of items as issued in an email to Mr. Adam Garff on April 15, 2004 and an original letter issued by the Environmental Division to Richmond Engineering dated October 10, 2000 (attached, wordperfect file).

The work was performed immediately by the contractor. Work items generally included:

- Clearing small trees and brush present along top of dam and the downstream face of dam;
- Adding fill and regrading the downstream face of dam to a gentler slope;
- Adding approximately ½ foot of fill to top of dam;
- Topsoiling top of dam and the downstream face;
- Seeding and mulching top of dam,
- Placement of EC-2 matting on top of dam and the downstream face of dam;
- Clearing and removing vegetation from around the principal spillway (siphon) device;
- Reshaping and stabilizing the emergency spillway with seed & mulch and matting.

Based on our inspection, all field-related items associated with the BMP have been addressed in a satisfactory manner. Based on the previous referenced emails and letter, field-related items were not the only outstanding issue associated with the finishing the BMP and release of bond for the site. One of the major issues was the need for a construction certification in accordance with Note # 18 on Sheet 10 of the approved plan. The construction certification was never received by our office for the subject BMP.

Based on discussions on this project over the last year and in order to come to some sort of closure in a timely manner, it can be deducted that inspection/testing that should have been performed during BMP construction, in order to provide proper certification, was either not performed or is at a point in time now that it would be very difficult to obtain construction certification by a professional engineer. Our Division has decided that in lieu of trying to pursue the original construction certification or perform post-construction certification measures, which may be destructive to the dam embankment, structure and surrounding areas, that our primary focus would be to ensure field-related BMP items were fully addressed to our satisfaction. This has now been done. Our Division will proceed with processing the bond release paperwork through our normal administrative process. However, I need to following two items concurrently with this process.

1. A written request, either in letter or email format, requesting to waive construction certification requirements for the BMP. The request should give valid reasons to support granting the request. This is where you can try and explain why the original construction certification was never provided, the occurrence of Hurricane Isabel, etc.
2. It must be observed/confirmed that seed used for stabilization of the dam/site work areas has germinated.

As annual ryegrass was used in the mixture and with some fair weather, this can be expected to occur over the next 7 to 10 days.

In full consideration of the current situation of this project, there was an apparent failure by the Owner or Contractor to properly retain the services of a professional engineer to inspect and perform required testing of the BMP during it's construction and/or to provide subsequent construction certification. It should be realized that granting of variances of this nature are seldom performed by our Division. Lack of knowledge about the process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall history and general function and field-related corrections made to the facility were weighed into the decision.

Please forward the information to me as requested. In the meantime, we will proceed with paperwork for bond release. Any correspondence can be forwarded to me at the following address:

P. O. Box 8784
Williamsburg, Va. 23187

Scott J. Thomas, P.E.
Senior Engineer
James City CountyEnvironmental Division
757-253-6639
Email: scottt@james-city.va.us

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

October 10, 2000

Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg, Va. 23185
Attn: Mr. Kenneth Jenkins, P.E.

Re: Williamsburg Nursing & Rehabilitation Center (Plan No. SP-87-98)
1811 Jamestown Road
Stormwater Management/BMP Facility (PC 104)

Dear Mr. Jenkins:

The Environmental Division has reviewed record drawing PAB1 as submitted to our office for the above referenced project. The record drawing provides as-built information for a single stormwater management/BMP wet pond facility located in the southwest of the site.

Based on our review of the drawing and concurrent field observations, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with Note # 18 on Sheet C10 of the approved plan, construction certification for all detention/BMP facilities is required. This would include work associated with dam repairs per Sheet C12 of the approved design plan. No certifications were provided.

Record Drawing:

2. Add Sheet C12 of the approved design plan set, annotated as necessary for as-built conditions, to the record drawing set. This sheet shows an enlarged plan view (1"=20' scale) and specific details relative to the facility and its repairs.

3. The top of dam elevation of El. 19.6 as indicated on record drawing PAB1 does not meet proposed top of dam elevation (El. 20) per the approved dam repair plan. A dam crest elevation of El. 19.6 would not provide 1 foot of freeboard between the design high water (El. 18.84) and top of dam.

4. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Provide additional spot elevations on the dam crest, downstream embankment and toe or verify the constructed downstream embankment slope.
5. Show the following additional information on the record drawing plan and detail views:

emergency spillway location, size and crest elevation; additional spot elevations along top of dam crest at sufficient intervals; location and invert out of the toe drain outfall (located near the old barrel outfall).

6. A professional engineer's seal and signature is required on all record drawings.

7. If possible, add the following County identifiers to all record drawing sheets: County Plan Number SP-87-98 and BMP ID No. PC 104.

Construction-Related Items:

8. Based on our field inspection dated September 20th 2000, an approximate 20' long by 10' wide slide (erosion) area was observed on the downstream embankment slope at about midpoint of the dam embankment. The slide area appears to coincide directly above the toe drain area delineated on the 1"=20' dam repair plan shown on Sheet C12 of the approved plan. Saturated soil conditions were also observed at the same location from toe of dam to about the vertical midpoint of the embankment, which correponded with the slide (erosion) area. This condition is unacceptable and potentially creates a failure hazard for the structure. Corrective action is required.

9. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Based on rough field measurement, the downstream slope appears to be as steep as 1H:1V.

10. Surveyed top of dam elevation of El. 19.6 per the record drawing does not meet the approved design plan requirements for proposed top of dam crest elevation at El. 20.0. Additional compacted fill per project specifications (and geotechnical report requirements) may be necessary.

11. The bottom portion of the emergency spillway and portions of the upstream embankment slope has bare soil areas. Stabilization with seed and mulch is required.

12. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream embankment.

Please contact me at 757-253-6639 if you have any further comments or questions pertaining to the record drawing, construction certification or construction-related punch list items for this facility.

Sincerely,

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

G:\SWMProg\AsBuilts\SP-87-98.cert

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

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(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(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) 253-2620

October 10, 2000

Repair performed 12/3/00. Reinspect.

Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg, Va. 23185
Attn: Mr. Kenneth Jenkins, P.E.

Re: Williamsburg Nursing & Rehabilitation Center (Plan No. SP-87-98)
1811 Jamestown Road
Stormwater Management/BMP Facility (PC 104)

Dear Mr. Jenkins:

The Environmental Division has reviewed record drawing PAB1 as submitted to our office for the above referenced project. The record drawing provides as-built information for a single stormwater management/BMP wet pond facility located in the southwest of the site.

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Construction Certification:

1. In accordance with Note # 18 on Sheet C10 of the approved plan, construction certification for all detention/BMP facilities is required. This would include work associated with dam repairs per Sheet C12 of the approved design plan. No certifications were provided.

Record Drawing:

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4. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Provide additional spot elevations on the dam crest, downstream embankment and toe or verify the constructed downstream embankment slope.

5. Show the following additional information on the record drawing plan and detail views: emergency spillway location, size and crest elevation; additional spot elevations along top of dam crest at sufficient intervals; location and invert out of the toe drain outfall (located near the old barrel outfall).

6. A professional engineer's seal and signature is required on all record drawings.

7. If possible, add the following County identifiers to all record drawing sheets: County Plan Number SP-87-98 and BMP ID No. PC 104.

Construction-Related Items:

8. Based on our field inspection dated September 20th 2000, an approximate 20' long by 10' wide slide (erosion) area was observed on the downstream embankment slope at about midpoint of the dam embankment. The slide area appears to coincide directly above the toe drain area delineated on the 1"=20' dam repair plan shown on Sheet C12 of the approved plan. Saturated soil conditions were also observed at the same location from toe of dam to about the vertical midpoint of the embankment, which correponded with the slide (erosion) area. This condition is unacceptable and potentially creates a failure hazard for the structure. Corrective action is required.

9. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Based on rough field measurement, the downstream slope appears to be as steep as 1H:1V.

10. Surveyed top of dam elevation of El. 19.6 per the record drawing does not meet the approved design plan requirements for proposed top of dam crest elevation at El. 20.0. Additional compacted fill per project specifications (and geotechnical report requirements) may be necessary.

11. The bottom portion of the emergency spillway and portions of the upstream embankment slope has bare soil areas. Stabilization with seed and mulch is required.

12. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream embankment.

Please contact me at 757-253-6639 if you have any further comments or questions pertaining to the record drawing, construction certification or construction-related punch list items for this facility.

Sincerely,

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

Scott Thomas

From: Scott Thomas
Sent: Thursday, December 02, 2004 11:38 AM
To: Molly Roggero
Cc: Darryl Cook
Subject: Williamsburg Nursing & Rehab (Tandem)

Molly

This is to give you an update and also inform you that a contractor will be mobilizing on the site (probably today) to perform BMP field-related items associated with bond release for the project. This is for Williamsburg Nursing & Rehab, SP-87-98, BMP ID Code: PC 104. The site is currently named Tandem Health Care and it is right before the Powhatan Creek Canoe Park on Jamestown Road. The contractor will be RJ Smith Companies (ie. Richard Smith 804-745-3450) on behalf of Haskell Company.

I met with the contractor who will be doing the work at the BMP in order to get bond release. This is a long outstanding issue in which I issued a letter in October of 2000 and most recently, the property was sold, and they are trying to close all loose ends. I have been on the phone many times over the last year on this one. At my meeting with the contractor, I gave them clear direction on what needed to be done at the BMP to address field-related items. Attached is my letter dated October 10, 2000; however, this is more of a simple punchlist FYI:

- Record drawings are ok.
- I don't think we are going to get a construction certification on this one. I am still working on this but in the meantime, I am really focusing in on getting the BMP in tip-top shape in the field.
- Field-Related Items:
  - Repair the slide area at center of the downstream face of dam. Topsoil, matting, seed & mulch.
  - Clear trees from the downstream face of dam and mow the dam. Repair any erosion or subsidence areas with matting, seed & mulch.
  - Add fill to top of dam to achieve elevation 20. Based on asbuilts dam is ½ foot to low in certain areas. Can add fill across entire top of dam or in select areas based on field-obtained elevations.
  - Clear all debris from emergency spillway and regrade to establish design section.
  - Remove trees and dense vegetation from the upstream end of the principal spillway (siphon structure)
  - I told them to notify us if upon mowing of the dam any substantial seepage, erosion or subsidence areas are found.
  - Notified them of the environmentally sensitive conditions downstream of the dam (ie. wetlands, RPA). If a substantial amount of the dam face will be disturbed, toe silt fence will be necessary. If they work in pieces, downstream controls should not be necessary.

Again, this is a bond release item and the project is still active in our files. Hopefully upon satisfactory completion of these field-related BMP items, we can go ahead and close this one out.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 07/19/04

Name: Jeff Minor
Firm or Company: Minor Excavating
Facsimile Number: 565-1145
Number of pages including this transmittal: 5
From: Scott J. Thomas

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments: Williamsburg Nursing & Rehab (Tandem Health Care)
See attached sheets 1 thru 4. Only those items circled apply to field-related BMP issues.

If you do not receive all pages, call 757-253-6670 as soon as possible

1811 Jamestown Road
Plan SP-87-98
BMP ID Code: PC104

(Any dam repairs, especially adding compacted soil will require appropriate certification by a professional engineer!!)

PROTECTING RESOURCES
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IN DELICATE ENVIRONMENTS

SCOTT J. THOMAS, P.E.
SENIOR ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

Scott Thomas

From: Scott Thomas
Sent: Thursday, April 15, 2004 2:37 PM
To: 'Adam Garff'
Cc: Joe Buchite
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Yes. I was out late this morning. In looking at the approved plan again (County Plan No. SP-87-98), it appears the existing pond is situated on the parent parcel and is not offsite. Although the pond was existing before this site was constructed, Sheet C12 of the approved plan required this existing farm pond to be upgraded to serve as the primary stormwater management/BMP for the nursing and rehabilitation center development. Work as outlined on the plan included: abandoning the existing pond riser/barrel, regrading the dam faces to 2.5H:1V sideslopes, installing a 12-inch PVC siphon spillway for the primary spillway, installing a toe drain, installing erosion control matting on the dam slopes, regrading an emergency spillway and installing a Class I riprap outlet apron. Therefore, existing pond modifications were part of the approved site plan for this project.

From a **field** perspective, it does not appear that any of the items from our October 10, 2000 letter have been addressed and all items are outstanding. Due to Hurricane tree and debris removal activities, the top of dam and the emergency spillway are also now in a severely disturbed condition and require stabilization. Referencing the numbered items in our October 10, 2000 letter, I will reiterate our expectations for the dam/pond work. Some changes have been made due to changed conditions.

1. A construction certification for dam improvements has not been received and is still outstanding. Refer to Item # 1 on the October 10th letter.

2. Due to the amount of time that has elapsed since our original letter and the current situation of selling the property, I can back off some of the comments about the record (asbuilt) drawing from the original letter. Therefore, Item # 2, # 3, # 4, # 5 and # 7 do not need to be addressed. However, Item # 6 from the original letter cannot be dropped. The asbuilt drawing needs to sealed by an appropriate professional.

Note # 18 on Sheet C10 of the approved plan states: ***"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 judgement, knowledge and belief the structure was constructed in accordance with the approved plans and specifications.***

3. Item # 8 on the original letter is still outstanding. The slide area is still present and must be repaired in an appropriate manner.

4. Item # 9 on the original letter stated that it appeared the downstream slope of the dam was constructed much steeper than the 2.5H:1V as required per the approved plan. Based on our field observations, the steeper slope can be left in place if it is certified by a professional engineer (under # 1 above) and is in a stable condition. Due to the slide/seepage conditions that are present, additional fill on the dam may make the situation worse, construction would be difficult and more disturbance would occur. The area downstream of the dam is a Resource Protection Area (RPA). Therefore, based on my assessment, our Division would allow the steeper 1H:1V downstream slope to remain if it can be certified by an engineer, the slope failure area is filled and repaired and the entire dam embankment is stabilized with erosion control matting or seed and mulch. It is recommended that repair areas on the downstream face be matted and stabilized with EC-3 turf-reinforcement matting. If a construction certification for a steeper dam slope cannot be provided, then the downstream dam face would need to be constructed per the approved plan (2.5H:1V).

5. Fill must be added to the top of dam to achieve minimum El. 20.0 per the approved design plan. Refer to Item # 10 in the original letter.

6. Relative to Item # 11 in the original letter, it appears the bottom portions of the emergency spillway and

the upstream embankment slope have stabilized themselves over time. This issue would be resolved. However, conditions have changed such that operations to clear and remove Hurricane damaged trees and debris have severely disturbed the top of dam and the emergency spillway crest (flat section). The emergency spillway crest channel area must be regraded as there are ruts and soil mounds present and the entire top of dam and emergency spillway must be stabilized with seed and mulch.

7. Item # 12 in the original letter is still outstanding. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream dam embankment.

This is the best I can do in order to proceed with bond release on this project. If you have any questions, call me at 757-253-6639 or the assigned Environmental Division field inspector for this project, Mr. Joe Buchite at 757-253-6643.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

-----Original Message-----
From: Adam Garff [mailto:agarff@smithpackett.com]
Sent: Thursday, April 15, 2004 1:21 PM
To: Scott Thomas
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Scott did you make it out?

Adam

-----Original Message-----
From: Adam Garff
Sent: Wednesday, April 14, 2004 4:53 PM
To: 'Scott Thomas'
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Thanks.

-----Original Message-----
From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Wednesday, April 14, 2004 4:52 PM
To: Adam Garff
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Sorry, no not today. I will go out tomorrow late morning and have an answer to you tomorrow in early afternoon.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

2/4

GPIN 4730100070

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
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ENVIRONMENTAL DIVISION (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) 253-2620

October 10, 2000

Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg, Va. 23185
Attn: Mr. Kenneth Jenkins, P.E.

Reinspect 4/15/04

Re: Williamsburg Nursing & Rehabilitation Center (Plan No. SP-87-98)
1811 Jamestown Road
Stormwater Management/BMP Facility (PC 104)

Dear Mr. Jenkins:

The Environmental Division has reviewed record drawing PAB1 as submitted to our office for the above referenced project. The record drawing provides as-built information for a single stormwater management/BMP wet pond facility located in the southwest of the site.

Based on our review of the drawing and concurrent field observations, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with Note # 18 on Sheet C10 of the approved plan, construction certification for all detention/BMP facilities is required. This would include work associated with dam repairs per Sheet C12 of the approved design plan. No certifications were provided.

Record Drawing:

2. Add Sheet C12 of the approved design plan set, annotated as necessary for as-built conditions, to the record drawing set. This sheet shows an enlarged plan view (1"=20' scale) and specific details relative to the facility and its repairs.

3. The top of dam elevation of El. 19.6 as indicated on record drawing PAB1 does not meet proposed top of dam elevation (El. 20) per the approved dam repair plan. A dam crest elevation of El. 19.6 would not provide 1 foot of freeboard between the design high water (El. 18.84) and top of dam.

4. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Provide additional spot elevations on the dam crest, downstream embankment and toe or verify the constructed downstream embankment slope.

3/4

5. Show the following additional information on the record drawing plan and detail views: emergency spillway location, size and crest elevation; additional spot elevations along top of dam crest at sufficient intervals; location and invert out of the toe drain outfall (located near the old barrel outfall).

6. A professional engineer's seal and signature is required on all record drawings.

7. If possible, add the following County identifiers to all record drawing sheets: County Plan Number SP-87-98 and BMP ID No. PC 104.

Construction-Related Items:

STILL PRESENT 4/15/04

8. Based on our field inspection dated September 20th 2000, an approximate 20' long by 10' wide slide (erosion) area was observed on the downstream embankment slope at about midpoint of the dam embankment. The slide area appears to coincide directly above the toe drain area delineated on the 1"=20' dam repair plan shown on Sheet C12 of the approved plan. Saturated soil conditions were also observed at the same location from toe of dam to about the vertical midpoint of the embankment, which correponded with the slide (erosion) area. This condition is unacceptable and potentially creates a failure hazard for the structure. Corrective action is required.

STILL PRESENT 4/15/04

9. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Based on rough field measurement, the downstream slope appears to be as steep as 1H:1V. REFILL + GRADING MAY BE DIFFULT + EXAGGERATE SEEP, SLOUGH FAILURE. REPAIR FAILED SLOPE ONLY.

STILL PRESENT 4/15/04

10. Surveyed top of dam elevation of El. 19.6 per the record drawing does not meet the approved design plan requirements for proposed top of dam crest elevation at El. 20.0. Additional compacted fill per project specifications (and geotechnical report requirements) may be necessary.

OK, SEED TOP OF DAM + E.S.; CLEAN E.S. OF VEG, DEBRIS + REGRADE.

11. The bottom portion of the emergency spillway and portions of the upstream embankment slope has bare soil areas. Stabilization with seed and mulch is required.

STILL PRESENT 4/15/04

12. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream embankment. CLEAN RISER AREA

Please contact me at 757-253-6639 if you have any further comments or questions pertaining to the record drawing, construction certification or construction-related punch list items for this facility.

Top of Dam + E.S. Disturb due to Huge Tree, Debris removal operations.

1H:1V DAM SLOPE WOULD BE OK WITH STABLE FILL + MATTING.

Sincerely,

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

4/4

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 06/17/04

Name: Matt Stauch
Firm or Company: Jack L. Massie
Facsimile Number: 566-8566
Number of pages including this transmittal: 5
From: Scott J. Thomas

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments:
Williamsburg Nursing + Rehab (Tandem Health Care)
1811 Jamestown Road; PLAN SP-87-98; County BMP ID Code PC104

Scope of Dam Repair Items. See circled items on:

If you do not receive all pages, call 757-253-6670 as soon as possible

1. Email dated April 15 2004.
2. Letter dated October 10, 2000.

(Any dam repairs will require certification by a professional engineer!)

PROTECTING RESOURCES
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SCOTT J. THOMAS, P.E.
SENIOR ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

Scott Thomas

From: Scott Thomas
Sent: Thursday, April 15, 2004 2:37 PM
To: 'Adam Garff'
Cc: Joe Buchite
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Yes. I was out late this morning. In looking at the approved plan again (County Plan No. SP-87-98), it appears the existing pond is situated on the parent parcel and is not offsite. Although the pond was existing before this site was constructed, Sheet C12 of the approved plan required this existing farm pond to be upgraded to serve as the primary stormwater management/BMP for the nursing and rehabilitation center development. Work as outlined on the plan included: abandoning the existing pond riser/barrel, regrading the dam faces to 2.5H:1V sideslopes, installing a 12-inch PVC siphon spillway for the primary spillway, installing a toe drain, installing erosion control matting on the dam slopes, regrading an emergency spillway and installing a Class I riprap outlet apron. Therefore, existing pond modifications were part of the approved site plan for this project.

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Note # 18 on Sheet C10 of the approved plan states: ***"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 judgement, knowledge and belief the structure was constructed in accordance with the approved plans and specifications.***

3. Item # 8 on the original letter is still outstanding. The slide area is still present and must be repaired in an appropriate manner.

4. Item # 9 on the original letter stated that it appeared the downstream slope of the dam was constructed much steeper than the 2.5H:1V as required per the approved plan. Based on our field observations, the steeper slope can be left in place if it is certified by a professional engineer (under # 1 above) and is in a stable condition. Due to the slide/seepage conditions that are present, additional fill on the dam may make the situation worse, construction would be difficult and more disturbance would occur. The area downstream of the dam is a Resource Protection Area (RPA). Therefore, based on my assessment, our Division would allow the steeper 1H:1V downstream slope to remain if it can be certified by an engineer, the slope failure area is filled and repaired and the entire dam embankment is stabilized with erosion control matting or seed and mulch. It is recommended that repair areas on the downstream face be matted and stabilized with EC-3 turf-reinforcement matting. If a construction certification for a steeper dam slope cannot be provided, then the downstream dam face would need to be constructed per the approved plan (2.5H:1V).

5. Fill must be added to the top of dam to achieve minimum El. 20.0 per the approved design plan. Refer to Item # 10 in the original letter.

6. Relative to Item # 11 in the original letter, it appears the bottom portions of the emergency spillway and

the upstream embankment slope have stabilized themselves over time. This issue would be resolved. However, conditions have changed such that operations to clear and remove Hurricane damaged trees and debris have severely disturbed the top of dam and the emergency spillway crest (flat section). The emergency spillway crest channel area must be regraded as there are ruts and soil mounds present and the entire top of dam and emergency spillway must be stabilized with seed and mulch.

7. Item # 12 in the original letter is still outstanding. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream dam embankment.

This is the best I can do in order to proceed with bond release on this project. If you have any questions, call me at 757-253-6639 or the assigned Environmental Division field inspector for this project, Mr. Joe Buchite at 757-253-6643.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

-----Original Message-----
From: Adam Garff [mailto:agarff@smithpackett.com]
Sent: Thursday, April 15, 2004 1:21 PM
To: Scott Thomas
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Scott did you make it out?

Adam

-----Original Message-----
From: Adam Garff
Sent: Wednesday, April 14, 2004 4:53 PM
To: 'Scott Thomas'
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Thanks.

-----Original Message-----
From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Wednesday, April 14, 2004 4:52 PM
To: Adam Garff
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Sorry, no not today. I will go out tomorrow late morning and have an answer to you tomorrow in early afternoon.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

2/4

GPIN 4730100070

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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(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) 253-2620

October 10, 2000

Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg, Va. 23185
Attn: Mr. Kenneth Jenkins, P.E.

Reinspect 4/15/04

Re: Williamsburg Nursing & Rehabilitation Center (Plan No. SP-87-98)
1811 Jamestown Road
Stormwater Management/BMP Facility (PC 104)

Dear Mr. Jenkins:

The Environmental Division has reviewed record drawing PAB1 as submitted to our office for the above referenced project. The record drawing provides as-built information for a single stormwater management/BMP wet pond facility located in the southwest of the site.

Based on our review of the drawing and concurrent field observations, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with Note # 18 on Sheet C10 of the approved plan, construction certification for all detention/BMP facilities is required. This would include work associated with dam repairs per Sheet C12 of the approved design plan. No certifications were provided.

Record Drawing:

2. Add Sheet C12 of the approved design plan set, annotated as necessary for as-built conditions, to the record drawing set. This sheet shows an enlarged plan view (1"=20' scale) and specific details relative to the facility and its repairs.

3. The top of dam elevation of El. 19.6 as indicated on record drawing PAB1 does not meet proposed top of dam elevation (El. 20) per the approved dam repair plan. A dam crest elevation of El. 19.6 would not provide 1 foot of freeboard between the design high water (El. 18.84) and top of dam.

4. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Provide additional spot elevations on the dam crest, downstream embankment and toe or verify the constructed downstream embankment slope.

3/4

5. Show the following additional information on the record drawing plan and detail views: emergency spillway location, size and crest elevation; additional spot elevations along top of dam crest at sufficient intervals; location and invert out of the toe drain outfall (located near the old barrel outfall).

6. A professional engineer's seal and signature is required on all record drawings.

7. If possible, add the following County identifiers to all record drawing sheets: County Plan Number SP-87-98 and BMP ID No. PC 104.

Construction-Related Items:

STILL PRESENT 4/15/04

8. Based on our field inspection dated September 20th 2000, an approximate 20' long by 10' wide slide (erosion) area was observed on the downstream embankment slope at about midpoint of the dam embankment. The slide area appears to coincide directly above the toe drain area delineated on the 1"=20' dam repair plan shown on Sheet C12 of the approved plan. Saturated soil conditions were also observed at the same location from toe of dam to about the vertical midpoint of the embankment, which correponded with the slide (erosion) area. This condition is unacceptable and potentially creates a failure hazard for the structure. Corrective action is required.

STILL PRESENT 4/15/04

9. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Based on rough field measurement, the downstream slope appears to be as steep as 1H:1V. REFILL + GRADING MAY BE DIFFULT + EXAGGERATE SEEP, SLOUGH FAILURE. REPAIR FAILED SLOPE ONLY.

STILL PRESENT 4/15/04

10. Surveyed top of dam elevation of El. 19.6 per the record drawing does not meet the approved design plan requirements for proposed top of dam crest elevation at El. 20.0. Additional compacted fill per project specifications (and geotechnical report requirements) may be necessary.

OK, SEED TOP OF DAM + E.S.; CLEAN E.S. OF VEG, DEBRIS + REGRADE.

11. The bottom portion of the emergency spillway and portions of the upstream embankment slope has bare soil areas. Stabilization with seed and mulch is required.

STILL PRESENT 4/15/04

12. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream embankment. CLEAN RISER APE

Please contact me at 757-253-6639 if you have any further comments or questions pertaining to the record drawing, construction certification or construction-related punch list items for this facility.

TOP OF DAM + E.S. Disturb due to Huge Tree, Debris removal operations.

1H:1V DAM SLOPE WOULD BE OK WITH STABLE FILL + MATTING.

Sincerely,

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

4/4

Scott Thomas

From: Scott Thomas
Sent: Tuesday, June 15, 2004 5:46 PM
To: Leo Rogers
Cc: Darryl Cook
Subject: Inspection/Maintenance Agreement Question

Leo

I have a question. Item # 7 in our "Declaration of Covenants – Inspection/Maintenance of Drainage System" says:

"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."

In talking with Darryl, traditionally our Division has not routinely received notifications as such. However, of course, I just got one. It is for transfer of property from Williamsburg Health Investors LLC to HCP Virginia, Inc. Originally Williamsburg Health Investors LLC was listed as the Covenantor on the original Inspection-Maintenance Agreement for the project back in 1999.

Do you need to review this or should I just file it in our asbuilt files for the project? If you want to review, I can drop it in the pony.

The project is not closed out yet. They have some construction certification and field-related issues to address on the BMP for the project before we release bond.

(Note: This is the Tandem Health Care site along Jamestown Road just near the County's Powhatan Creek Canoe Access park. The address is 1811 Jamestown Road, the case file was County Plan No. SP-87-98)

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

Scott Thomas

From: Scott Thomas

Sent: Thursday, April 15, 2004 2:37 PM

To: 'Adam Garff'

Cc: Joe Buchite

Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Yes. I was out late this morning. In looking at the approved plan again (County Plan No. SP-87-98), it appears the existing pond is situated on the parent parcel and is not offsite. Although the pond was existing before this site was constructed, Sheet C12 of the approved plan required this existing farm pond to be upgraded to serve as the primary stormwater management/BMP for the nursing and rehabilitation center development. Work as outlined on the plan included: abandoning the existing pond riser/barrel, regrading the dam faces to 2.5H:1V sideslopes, installing a 12-inch PVC siphon spillway for the primary spillway, installing a toe drain, installing erosion control matting on the dam slopes, regrading an emergency spillway and installing a Class I riprap outlet apron. Therefore, existing pond modifications were part of the approved site plan for this project.

From a **field** perspective, it does not appear that any of the items from our October 10, 2000 letter have been addressed and all items are outstanding. Due to Hurricane tree and debris removal activities, the top of dam and the emergency spillway are also now in a severely disturbed condition and require stabilization. Referencing the numbered items in our October 10, 2000 letter, I will reiterate our expectations for the dam/pond work. Some changes have been made due to changed conditions.

1. A construction certification for dam improvements has not been received and is still outstanding. Refer to Item # 1 on the October 10th letter.

2. Due to the amount of time that has elapsed since our original letter and the current situation of selling the property, I can back off some of the comments about the record (asbuilt) drawing from the original letter. Therefore, Item # 2, # 3, # 4, # 5 and # 7 do not need to be addressed. However, Item # 6 from the original letter cannot be dropped. The asbuilt drawing needs to sealed by an appropriate professional.

Note # 18 on Sheet C10 of the approved plan states: ***"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 judgement, knowledge and belief the structure was constructed in accordance with the approved plans and specifications.***

3. Item # 8 on the original letter is still outstanding. The slide area is still present and must be repaired in an appropriate manner.

4. Item # 9 on the original letter stated that it appeared the downstream slope of the dam was constructed much steeper than the 2.5H:1V as required per the approved plan. Based on our field observations, the steeper slope can be left in place if it is certified by a professional engineer (under # 1 above) and is in a stable condition. Due to the slide/seepage conditions that are present, additional fill on the dam may make the situation worse, construction would be difficult and more disturbance would occur. The area downstream of the dam is a Resource Protection Area (RPA). Therefore, based on my assessment, our Division would allow the steeper 1H:1V downstream slope to remain if it can be certified by an engineer, the slope failure area is filled and repaired and the entire dam embankment is stabilized with erosion control matting or seed and mulch. It is recommended that repair areas on the downstream face be matted and stabilized with EC-3 turf-reinforcement matting. If a construction certification for a steeper dam slope cannot be provided, then the downstream dam face would need to be constructed per the approved plan (2.5H:1V).

5. Fill must be added to the top of dam to achieve minimum El. 20.0 per the approved design plan. Refer to Item # 10 in the original letter.

6. Relative to Item # 11 in the original letter, it appears the bottom portions of the emergency spillway and

the upstream embankment slope have stabilized themselves over time. This issue would be resolved. However, conditions have changed such that operations to clear and remove Hurricane damaged trees and debris have severely disturbed the top of dam and the emergency spillway crest (flat section). The emergency spillway crest channel area must be regraded as there are ruts and soil mounds present and the entire top of dam and emergency spillway must be stabilized with seed and mulch.

7. Item # 12 in the original letter is still outstanding. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream dam embankment.

This is the best I can do in order to proceed with bond release on this project. If you have any questions, call me at 757-253-6639 or the assigned Environmental Division field inspector for this project, Mr. Joe Buchite at 757-253-6643.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

-----Original Message-----
From: Adam Garff [mailto:agarff@smithpackett.com]
Sent: Thursday, April 15, 2004 1:21 PM
To: Scott Thomas
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Scott did you make it out?

Adam

-----Original Message-----
From: Adam Garff
Sent: Wednesday, April 14, 2004 4:53 PM
To: 'Scott Thomas'
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Thanks.

-----Original Message-----
From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Wednesday, April 14, 2004 4:52 PM
To: Adam Garff
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Sorry, no not today. I will go out tomorrow late morning and have an answer to you tomorrow in early afternoon.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

-----Original Message-----
From: Adam Garff [mailto:agarff@smithpackett.com]
Sent: Wednesday, April 14, 2004 11:38 AM
To: Scott Thomas
Subject: RE: Williamsburg Nursing and Rehabilitation - Nursing Home

Scott,

Where you able to go out and to the Nursing Home yesterday?

Adam Garff
Director of Development

Smith/Packett
4415 Pheasant Ridge Rd
Suite 301
Roanoke, VA 24014

Phone 540-774-7762
Direct Fax 248-484-6584
www.smithpackett.com

-----Original Message-----
From: Adam Garff
Sent: Monday, April 12, 2004 3:58 PM
To: 'scottt@james-city.va.us'
Subject: Williamsburg Nursing and Rehabilitation - Nursing Home

Scott,

I look forward to hearing back from you on Wednesday.

Adam Garff
Director of Development

Smith/Packett
4415 Pheasant Ridge Rd
Suite 301
Roanoke, VA 24014

Phone 540-774-7762
Direct Fax 248-484-6584
www.smithpackett.com

GPIN 4730100070

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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(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) 253-2620

October 10, 2000

Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg, Va. 23185
Attn: Mr. Kenneth Jenkins, P.E.

Reinspect 4/15/04

Re: Williamsburg Nursing & Rehabilitation Center (Plan No. SP-87-98)
1811 Jamestown Road
Stormwater Management/BMP Facility (PC 104)

Dear Mr. Jenkins:

The Environmental Division has reviewed record drawing PAB1 as submitted to our office for the above referenced project. The record drawing provides as-built information for a single stormwater management/BMP wet pond facility located in the southwest of the site.

Based on our review of the drawing and concurrent field observations, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with Note # 18 on Sheet C10 of the approved plan, construction certification for all detention/BMP facilities is required. This would include work associated with dam repairs per Sheet C12 of the approved design plan. No certifications were provided.

Record Drawing:

2. Add Sheet C12 of the approved design plan set, annotated as necessary for as-built conditions, to the record drawing set. This sheet shows an enlarged plan view (1"=20' scale) and specific details relative to the facility and its repairs.

3. The top of dam elevation of El. 19.6 as indicated on record drawing PAB1 does not meet proposed top of dam elevation (El. 20) per the approved dam repair plan. A dam crest elevation of El. 19.6 would not provide 1 foot of freeboard between the design high water (El. 18.84) and top of dam.

4. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Provide additional spot elevations on the dam crest, downstream embankment and toe or verify the constructed downstream embankment slope.

5. Show the following additional information on the record drawing plan and detail views: emergency spillway location, size and crest elevation; additional spot elevations along top of dam crest at sufficient intervals; location and invert out of the toe drain outfall (located near the old barrel outfall).

6. A professional engineer's seal and signature is required on all record drawings.

7. If possible, add the following County identifiers to all record drawing sheets: County Plan Number SP-87-98 and BMP ID No. PC 104.

Construction-Related Items:

8. Based on our field inspection dated September 20th 2000, an approximate 20' long by 10' wide slide (erosion) area was observed on the downstream embankment slope at about midpoint of the dam embankment. The slide area appears to coincide directly above the toe drain area delineated on the 1"=20' dam repair plan shown on Sheet C12 of the approved plan. Saturated soil conditions were also observed at the same location from toe of dam to about the vertical midpoint of the embankment, which correponded with the slide (erosion) area. This condition is unacceptable and potentially creates a failure hazard for the structure. Corrective action is required.

STILL PRESENT 4/15/04

9. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Based on rough field measurement, the downstream slope appears to be as steep as 1H:1V. REFILL + GRADING MAY BE DIFFULT + EXAGGERATE SLEEP, SLOUGH FAILURE. REPAIR FAILED SLOPE ONLY.

STILL PRESENT 4/15/04

10. Surveyed top of dam elevation of El. 19.6 per the record drawing does not meet the approved design plan requirements for proposed top of dam crest elevation at El. 20.0. Additional compacted fill per project specifications (and geotechnical report requirements) may be necessary.

OK, SEED TOP OF DAM + E.S.; CLEAN E.S. OF VEG, DEBRIS + REGRADE.

11. The bottom portion of the emergency spillway and portions of the upstream embankment slope has bare soil areas. Stabilization with seed and mulch is required.

STILL PRESENT 4/15/04

12. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream embankment. CLEAN RISER PIPE

Please contact me at 757-253-6639 if you have any further comments or questions pertaining to the record drawing, construction certification or construction-related punch list items for this facility.

TOP OF DAM + E.S. DISTURB due to HUGE TREE, Debris removal operations.

1H:1V DAM SLOPE WOULD BE OK WITH STABLE FILL + MATTING.

Sincerely,

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

Joan, FYI.
JTPH

FACSIMILE

McCandlish Holton
A PROFESSIONAL CORPORATION

Richmond, Virginia
Arlington, Virginia
Guangzhou, China

To	James City County Development Management
Company	
Facsimile Number	757-253-6850
Telephone Number	
From	Laura Lee Garrett
Telephone Number	804-775-3897
Facsimile Number	804-775-3800
Client/Matter Number	003487.00575
Date: 5/17/2004	**Total Pages:** 7

If you have trouble receiving this fax, please contact: Donna Bissey 804-775-7210

Note

400337v1

IMPORTANT: This transmission is intended to be viewed and read only by the individual or entity named above. If you are not the intended recipient so named, you are prohibited from reading this transmission. You are also notified that any dissemination, distribution or copying of this transmission is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone and return the original transmission to us by the U.S. Postal Service. Thank you.

1111 East Main Street, Suite 1500 Post Office Box 796 Richmond, Virginia 23218-0796
Telephone 804.775.3100 Facsimile 804.775.3800 Web site www.mccandlishholton.com

Laura Lee Garrett
Direct Dial: 804.775.3897
Facsimile: 804.775.3800
E-Mail: lgarrett@lawmh.com

McCandlish Holton
A Professional Corporation

Richmond, Virginia
Arlington, Virginia
Guangzhou, China

May 17, 2004

VIA FACSIMILE (757) 253-6850
and U.S. Mail

James City County
Development Management
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: Notice of transfer of responsibilities for drainage system
Declaration dated January 15, 1999 between James City County and Williamsburg Health Investors, LLC the ("Declaration")

Ladies and Gentlemen:

This letter is notice to you that Williamsburg Health Investors, LLC has transferred a portion of that certain real property formerly known as "28.34 acres on Jamestown Rd., West of Sandy Bay Rd., Tax Map No./Parcel No. (47-3)(01-70), Deed Book 641, Page No. 425," which property is subject to the Declaration. All of the responsibilities of COVENANTOR for the SYSTEM have been legally transferred to HCP Virginia, Inc. pursuant to the Deed from COVENANTOR to HCP Virginia, Inc., a copy of which is attached hereto and a part hereof.

A copy of the Declaration is attached hereto for your reference. Defined terms used herein shall have the same meanings as in the Declaration.

Very truly yours,

Laura Lee Garrett

Laura Lee Garrett

LLG/db
cc. Andrew L. Dawson, Esq.
Enclosures

400312v1

This Instrument Prepared By
Laura Lee Garrett, Esq
McCandlish Holton, PC
1111 East Main Street, 15th Floor
Richmond, VA 23219

Tax Parcel Identification No: (47-3) (01-0-0070)

SPECIAL WARRANTY DEED

THIS SPECIAL WARRANTY DEED is made as of April 22, 2004, by and between **WILLIAMSBURG HEALTH INVESTORS, LLC,** a Virginia limited liability company, (the "Grantor"), and **HCP VIRGINIA, INC.**, a Delaware corporation (the "Grantee"), with an address of: Attention Legal Department, 3760 Kilroy Airport Way, Suite 300, Long Beach, CA 90806.

WITNESSETH:

THAT for and in consideration of the sum of Ten Dollars ($10.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Grantor does hereby grant, bargain, sell and convey with Special Warranty unto the said Grantee, in fee simple, all that certain lot or parcel of land situate and being in Town of Williamsburg, James City County, Virginia, and being more particularly described as follows:

See Exhibit "A" attached hereto and by reference hereby made a part hereof.

This conveyance is made subject to all easements, conditions and restrictions of record or apparent by inspection of the property.

WITNESS the following signature as of the day and year first written above.

[THE REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]
[SIGNATURES ON FOLLOWING PAGES]

GRANTOR:

WILLIAMSBURG HEALTH INVESTORS, LLC, a Virginia limited liability company,

By: _____
James R. Smith, Manager

COMMONWEALTH OF VIRGINIA:
CITY/COUNTY OF Roanoke : to-wit

The foregoing instrument was executed before me, a Notary Public in the [illegible] aforesaid, this 22 day of April, 2004, by James R. Smith, Manager of Williamsburg Health Investors, LLC, a Virginia limited liability company, on behalf of such company.

[Affix Seal]

Bettina G Stine
Notary Public

My Commission expires: My Commission Expires February 28, 2005

3990-14v1

EXHIBIT A

LEGAL DESCRIPTION

All that certain tract, piece or parcel of land, together with all improvements thereon and all appurtenances thereunto appertaining, situate, lying and being in Berkeley Magisterial District, James City County, Virginia, containing, according to survey, 28.306 acres, and being more particularly shown and described on that certain plat of survey entitled, "Boundary Plat Showing 28.306 Acres Property of Williamsburg Health Investors, L.L.C., Berkeley District, James City County, Virginia", dated November 23, 1998, made by Pat L. Carpenito, Land Surveyor.

LESS AND EXCEPT that portion of the property conveyed to Southern Assisted Living, Inc., a North Carolina Corporation, by deed from Williamsburg Health Investors, LLC, a Virginia Limited Liability Company, dated June 9, 1999, recorded June 24, 1999, as Instrument No. 990013581.

Being the same land conveyed to Williamsburg Health Investors, LLC, by deed from Martha Gajeski, widow, dated December 21, 1998, and recorded December 30, 1998, in the Clerk's Office of the Circuit Court of James City County, Virginia, as Instrument No. 980025255.

THIS DECLARATION, made this 16 day of January, 19 99, between Williamsburg Health Investors and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: 28.34 acres on Jamestown Rd., west of Sandy Bay Rd. Tax Map No./Parcel No. (47-3)(01-70), Deed Book 641, Page No. 425 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.

H.H. Frazier
Managing Partner

ATTEST:

J. McNamee

COVENANTOR(S)

ATTEST:

COMMONWEALTH OF VIRGINIA
CITY/~~COUNTY~~ OF LYNCHBURG

I hereby certify that on this 15th day of JANUARY, 1999, before the subscribed, a Notary Public of the State of Virginia, and for the ~~County~~ CITY of LYNCHBURG, aforesaid personally appeared H.H. FRAZIER and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 15th day of JANUARY, 1999.

Notary Public

My Commission expires: 5.31.01

Approved as to form:

Deputy County Attorney

This Declaration of Covenants prepared by:

(Print Name)

MANAGING PARTNER
(Title)

P.O. BOX 1109
(Address)

LYNCHBURG VA 24506
(City) (State) (Zip)

VIRGINIA: City of Williamsburg and County of James City, to Wit:
In the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City the 4 day of Feb, 19 99. This Covenants was presented with certificate annexed and admitted to record at 10:42 o'clock
Teste: Helene S. Ward, Clerk
By Deputy Clerk

drainage pre
Revised 2/97

PC104

PC104

COUNTY OF JAMES CITY, VIRGINIA

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this _____ day of _____, 20_____, between _____, and all successors in interest, ("COVENANTOR(S),") owner(s) of the following property:

_____,

project name,_____,
Document No._____, Deed Book _____, Page No. _____; Instrument No. _____, and the County of James City, Virginia ("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.

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF _____

I hereby certify that on this _____ day of _____, 20____, before the subscribed, a Notary Public of the State of Virginia, and for the City/County of _____, aforesaid personally appeared _____ and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this _____ day of _____, 20_____.

_____
Notary Public

My Commission expires: _____

Approved as to form:

_____
County Attorney

This Declaration of Covenants prepared by:

_____
(Print Name)

_____
(Title)

_____
(Address)

_____
(City) (State) (Zip)

drainage.pre

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.

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of the date first above written.

COVENANTOR(S)

_____

Print Name/Title _____

ATTEST:

_____

COVENANTOR(S)

_____

Print Name/Title _____

ATTEST:

_____

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

Database Inventory No. (if known): PC 104 (SP-87-98)

Name of Facility: Williamsburg Nursing + Rehab Center BMP No.: 1 of 1 Date: 9/20/00

Location: Jamestown Road (184 Jamestown Road)

Name of Owner: TANDEM Health Care at Williamsburg (Heath Investors LLC) ~~Williamsburg Nursing + Rehab Ctr~~

Inspector: SJ Thomas

Type of Facility: Wet (Retention) Pond

Weather Conditions: Sunny, Clear, Low 80's

Tributary to Powhatan Creek Directly to West.

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.
Routine - The item checked requires attention, but does not present an immediate threat to the function of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and 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:				Embankment South side of Pond; 18' wide at top; steep sideslop
Grass Height	X			Good Grass Cover.
Vegetated Condition	X			No D/S Trees.
Weed Growth	X			
Erosion			X	20'x10' D/S EMB. SLIDE AREA. Need Repair. Structural Concern.
Trash & Debris	X			
Seepage			X	D/S Toe of Emb. saturated soils. Especially South Emb & at PVC Outfall
Fencing or Benches	X			Note: D/S EMB SLOPE APPEARS STEEPER THAN PLAN. 1H:1V IN FIELD
Constructed Wetlands (Interior Landscaped & Planted) Areas:				(None)
Vegetated Conditions				
Trash & Debris				
Floatables				Note: Small dia. PVC SOLID WALL DRAIN OBSERVED at old barrel outfall location. Part of repair plan for dam.
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other	X			Perm. Wet Pool. No signs of interior veg.

TAX MAP (47-3)(01-70) GPIN 4730100070
SITE AREA 28.34AC. ZONE LBR-8
IMP AREA 3.85AC

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools	☒ Permanent Pool (Retention Basin)	☐ Shallow Marsh (Detention Basin)		
Shoreline Erosion	X			Minimal. Wide VARIETY Plant & Trees.
Algae	X			None. Turbid color to Pool.
Trash & Debris	X			
Sediment	X			Difficult to determine.
Aesthetics	X			
Other	X			Perm Pool 2' deep at siphon (U/S)
Inflow Stuctures (Describe Locations): 2 inflow pipes NE AND DUE North of Emb.				
Condition of Structure	X			RCP w/ RIPRAP OP.
Erosion	X			
Trash and Debris	X			
Sediment	X			
Aesthetics	X			HARD Access to outfall
Other	X			
Principal Flow Control Structure - Intake, Riser, etc. (Describe Location): Siphon PVC CLASS 150 DR 18				
Condition of Structure	X			Mainly Buried. Functional
Corrosion	X			None. Discoloration inside bottom.
Trash and Debris	X			
Sediment	X			
Aesthetics	X			~~Flow depth in PVC Pipe < 1 inch.~~
Other		X		DI Retainer Gland & Cast Iron
Principal Outlet Structure - Barrel, Conduit, etc. : Siphon PVC Large DIA. Blow-off. ; Small dia. PVC toe drain				
Condition of Structure	X			OK DS Side
Settlement	X			
Trash & Debris	X			
Sediment	X			
Erosion		X		Minor erosion D/S outfall
Other	X			Flow depth in PVC Pipe D/S < 1 inch.
Emergency Spillway (Overflow): 8' wide bottom, TRAPEZ SHAPE; 2' deep ±; EAST SIDE OF EMB.				
Vegetation		X		Sparse in bottom. Reseed.
Lining		X		Sparse.
Erosion		X		Slightly into fill emb. Reseed.
Trash & Debris	X			
Other	X			Appeared functional but not recent.

Note: Repairs Performed per approved plan SP-87-98 and geotech report 9/25/98.

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	X			None observed. Few mosquitoes in area.
Animal Burrows	X			None.
Graffiti	X			None.
Other	X			None.
Surrounding Perimeter Conditions:				
Land Uses	X			Dense Woods + Upland Forest.
Vegetation	X			OK.
Trash & Debris	X			None.
Aesthetics	X			Natural Look.
Access /Maintenance Roads or Paths	X			Coarse Agg. surf through woods No Access Problems to EMB.
Other		X		Single Large tree at toe, of D/S EMB. Very Tall. Monitor for damage to D/S toe.

Remarks: Dam repaired for approved plan SP-87-98. See drawing sheet C12 and Dam Embankment Evaluation by Snabel Engineering dated Sept 25 '98.

- 20 x 10' severe slide area mid portion of D/S emb. Also N/S EMB slope is 1H:1V, steeper than design plan.
- Saturated D/S Emb Toe Soils. Possible failure condition due to slope stability. Slope failure present (see above). Saturated soils to 1/2 D/S Emb. Height.
- Reseed bottom E.S. + sparse areas on U/S EMB. Eroding into EAST side of fill emb.

other: Site north. Bad slope erosion behind building. Inlet protections still present. Site mainly stabilized.

Overall Environmental Division Internal Rating: 1 Non-Routine Maintenance Required.

Signature: Scott J. Thorne, P.E. **Date:** 09/20/00

Title: CIVIL ENGINEER, JCC ENV. DIV.

SWMProg\BMP\CoInspProg\DetRet.wpd

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 04/07/04

Name: Laura Garrett
Firm or Company:
Facsimile Number: 804-775-3800
Number of pages including this transmittal: 4
From: Scott J. Thomas

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments:
1) Project Info.- County still holds $25,000 in Siltation Bond
2) Letter Issued 10/10/2000- Items that need resolved for bond release. As far as I'm aware, none of the 12 listed items have been addressed.

If you do not receive all pages, call 757-253-6670 as soon as possible

PROTECTING RESOURCES
PRIDE
IN DELICATE ENVIRONMENTS

SCOTT J. THOMAS, P.E.
SENIOR ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

Project: WILLIAMSBURG NURSING AND REHABILITATION CENTER

Site Plan No: SP-87-98 **Geo No:**

Fee Paid? ☑ **Fee Due:** $2,125

Date Paid: 7/21/1998

Released? ☐ **Release Date:**

Comments: **Notations**

LD Permit No: 99-48 **Fiscal Year:** 1999

Acres Disturbed: 14 **Declaration Covenant**

LD Issue Date: 2/4/1999 **Required:** X

LD Expire Date: **Received:** ☐

LD Comment: RELEASED 2/8/00

Cert Const? YES **CC Iss Date:** 2/4/1999

CC Expiration Date:

CC Comment:

Subdivisions

Issue Date: **Agreement?**

Surety:

Surety Type: **Amount:** $0

Notation: **Surety Released?** ☐

Expiration Date:

Comment:

Surety Number:

Surety Company:

Siltation

Agreement? YES **Surety:** BOND - 25,000

Surety Type: BOND **Amount:** $25,000

Notation: **Surety Released:** ☐

Expiration Date:

Comments:

Surety Number: 379180 SEABOARD SURETY

Surety Company: SEABOARD SURETY

Delete Record | Undo Record | Last Permit No | Add Record | Find Record | Save Record | Menu Screen

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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(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) 253-2620

October 10, 2000

Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg, Va. 23185
Attn: Mr. Kenneth Jenkins, P.E.

Re: Williamsburg Nursing & Rehabilitation Center (Plan No. SP-87-98)
1811 Jamestown Road
Stormwater Management/BMP Facility (PC 104)

Dear Mr. Jenkins:

The Environmental Division has reviewed record drawing PAB1 as submitted to our office for the above referenced project. The record drawing provides as-built information for a single stormwater management/BMP wet pond facility located in the southwest of the site.

Based on our review of the drawing and concurrent field observations, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with Note # 18 on Sheet C10 of the approved plan, construction certification for all detention/BMP facilities is required. This would include work associated with dam repairs per Sheet C12 of the approved design plan. No certifications were provided.

Record Drawing:

2. Add Sheet C12 of the approved design plan set, annotated as necessary for as-built conditions, to the record drawing set. This sheet shows an enlarged plan view (1"=20' scale) and specific details relative to the facility and its repairs.

3. The top of dam elevation of El. 19.6 as indicated on record drawing PAB1 does not meet proposed top of dam elevation (El. 20) per the approved dam repair plan. A dam crest elevation of El. 19.6 would not provide 1 foot of freeboard between the design high water (El. 18.84) and top of dam.

4. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Provide additional spot elevations on the dam crest, downstream embankment and toe or verify the constructed downstream embankment slope.

5. Show the following additional information on the record drawing plan and detail views: emergency spillway location, size and crest elevation; additional spot elevations along top of dam crest at sufficient intervals; location and invert out of the toe drain outfall (located near the old barrel outfall).

6. A professional engineer's seal and signature is required on all record drawings.

7. If possible, add the following County identifiers to all record drawing sheets: County Plan Number SP-87-98 and BMP ID No. PC 104.

Construction-Related Items:

8. Based on our field inspection dated September 20th 2000, an approximate 20' long by 10' wide slide (erosion) area was observed on the downstream embankment slope at about midpoint of the dam embankment. The slide area appears to coincide directly above the toe drain area delineated on the 1"=20' dam repair plan shown on Sheet C12 of the approved plan. Saturated soil conditions were also observed at the same location from toe of dam to about the vertical midpoint of the embankment, which correponded with the slide (erosion) area. This condition is unacceptable and potentially creates a failure hazard for the structure. Corrective action is required.

9. The downstream embankment slope appears steeper than the 2.5H:1V slope specified on the dam repair plan. Based on rough field measurement, the downstream slope appears to be as steep as 1H:1V.

10. Surveyed top of dam elevation of El. 19.6 per the record drawing does not meet the approved design plan requirements for proposed top of dam crest elevation at El. 20.0. Additional compacted fill per project specifications (and geotechnical report requirements) may be necessary.

11. The bottom portion of the emergency spillway and portions of the upstream embankment slope has bare soil areas. Stabilization with seed and mulch is required.

12. Remove trees and dense vegetation within 15 feet of the PVC siphon pipe and vent structure on the upstream embankment.

Please contact me at 757-253-6639 if you have any further comments or questions pertaining to the record drawing, construction certification or construction-related punch list items for this facility.

Sincerely,

Scott J. Thomas

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

NOTES:
1) SEWER SYSTEM TO BE CONSTRUCTED IN ACCORDANCE WITH JCSA SANITARY SEWER SYSTEMS STANDARDS & SPECIFICATIONS.
2) WATER SYSTEM TO BE CONSTRUCTED IN ACCORDANCE WITH JCSA WATER SYSTEMS STANDARDS & SPECIFICATIONS.
3) PVC STORM SEWER PIPE TO CONFORM TO AASHTO M 304M-88 SPECIFICATIONS WITH A MINIMUM PIPE STIFFNESS OF 46 PSI.
4) PVC STORM SEWER PIPE MAY BE REPLACED BY CORRUGATED STEEL PIPE CONFORMING TO ASTM A760 (AASHTO M36). COATING SHALL BE ALUMINIZED TYPE 2 CONFORMING TO ASTM A879 (AASHTO M274).
5) PVC STORM SEWER PIPE MAY BE REPLACED BY REINFORCED CONCRETE PIPE (RCP).
6) SIDEWALKS TO BE TROWELED OR BROOMED FINISHED CONCRETE. CG -12 (WARPED RAMPS) WILL BE EXPOSED AGGREGATE WITH RIVER RUN GRAVEL.
7) FILTER FABRIC TO LINE ALL RIP RAP TO SOIL SURFACES.
8) PARKING LOT AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH JAMES CITY COUNTY PRIVATE STREET REQUIREMENTS.
9) IN AREAS WHERE WATERLINE IS INSTALLED IN FILL COMPACTION SHALL BE TO 95%.
10) ALL FHA INCLUDE TEE, VALVE, & VALVE BOX. SEE DETAIL SHEET C11.
11) A 20' UTILITY EASEMENT IS DEDICATED TO JCSA ALONG ALL WATER & SEWER MAINS.
12) ANY OLD WELLS THAT MAY BE ON SITE MUST BE PROPERLY ABANDONED ACCORDING TO STATE PRIVATE WELL REGULATIONS.
13) ALL UTILITIES SHALL BE PLACED UNDERGROUND.
14) A MINIMUM OF ONE FULL JOINT OF WATERLINE BETWEEN THE LAST GATE VALVE AND THE BLOW-OFF SHALL BE PROVIDED.
15) THE EXISTING DAMPGROUND SEPTO SYSTEM SHALL BE ABANDONED IN ACCORDANCE WITH HEALTH DEPARTMENT REGULATIONS.

CHANCO'S GRANT SECTION I

CHANCO'S GRANT SECTION II

SANDY BAY ROAD ROUTE 681 (VARIABLE R/W)

OPEN SPACE TO BE DEDICATED TO JAMES CITY COUNTY 8.84 ACRES

N/F
ROBERT E. HOGAN, III &
MARY T. HOGAN
DB 289 PG 419
DB 250 PG 310 (PLAT)

N/F
RYLAND F. CLARK, III
DB 254 PG 740
DB 260 PG 310 (PLAT)

N/F
LINDA F. RIDDLE
DB 256 PG 537

N/F
JOHN W. REVELS &
ROSE REVELS
DB 276 PG 206
DB 260 PG 304

N/F
FRANZ S. HANNING
DB 375 PG 315

N/F
THE
SOUTHLAND CORP.
DB 181 PG 68,72
DB 192 PG 71

N/F
ROBERT T. ARMISTEAD &
LETITIA HANSON
WB 6 PG 431, WB 6 PG 195
WB 7 PG 380, DB 19 PG 238

DAM TO BE RECONSTRUCTED

WETLANDS

100' RPA

EX. PUMP STATION

EX. WELL

ROUTE 31
JAMESTOWN ROAD (110' R/W)

FF 42.7

Scale 1" = 60'

POND ELEVATIONS

100 YEAR STORM	19.10
10 YEAR STORM	17.75
2 YEAR STORM	16.17
STANDING WATER	15.15

DUMPSTER PAD DETAIL

BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1-800-552-7001

Richmond Engineering, Inc.
Civil Engineering
Environmental Engineering
Land Surveying
1843-C Merrimac Trail
Williamsburg, VA 23185
(757)229-1776

Designed By: KMJ | Drawn By: KMJ | Scale: 1"=60' | Date: 7/2/98 | Job No.: 98150 | File Name: 98150UP

WILLIAMSBURG NURSING AND REHABILITATION CENTER
UTILITY PLAN
JAMES CITY COUNTY VIRGINIA

No.	By	Revision	Date
1	KMJ	REV PER COUNTY COMMENTS LTR DTD 8/18/98	8.31.98

Job Number 98150 | Sheet No. C4

SP-87-98

WILLIAMSBURG NURSING AND REHABILITATION CENTER

BMP AND DRAINAGE CALCULATIONS

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. 98150

COMMONWEALTH OF VIRGINIA
K.M. JENKINS II
No.022872
9/28/98
PROFESSIONAL ENGINEER

PC 104
SP-87-98

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PRE
DA = 19.56 (0.0306 sq mi)
CN = 78
T_c = 0.51 hr (30.6 MIN)
Q2 = 24.28 cfs
Q10 = 56.65 cfs
Q100 = 86.5 cfs
RUNOFF 5.39"

POND INFLOW
DA = 19.56 AC (0.0306 sq mi)
CN = 80
T_c = 0.34 hrs (20.4 min)
IMPERV = 3.94 AC
Q2 35.51 CFS
Q10 75.43 cfs
Q100 = 111.03 cfs
POND STORAGE EL. 20
236,178 CF (5.42 AC-FT)

POND OUTFLOW
STOR
Q2 = 7.09 CFS @ EL 15.53 (0.993 AC-FT)
Q10 = 9.03 CFS @ EL. 17.71 (2.85 AC-FT)
Q100 = 22.50 cfs @ EL. 18.84 (4.04 AC-FT)

20
18.84
1.16' FB

Preface

The following Chesapeake Bay Preservation Act (CBPA) and drainage calculations pertain to the proposed Williamsburg Nursing and Rehabilitation Center located at the intersection of Jamestown Road and Sandy Bay Road in James City County, Virginia.

Currently the site contains 28.3 acres of woods with various log cabins, swimming pool, and asphalt areas located throughout the site. After development the site will contain a 120 bed center, 76 space parking lot, entrance road, and a future office development not exceeding 20,000 sf.

Both the pollutant removal requirements of the CBPA and the state stormwater management requirements are met by the use of any existing on site retention pond. The CBPA requirements are met by use of the pond as a 9 point wet pond for 6.21 points and the dedication of 12.10 acres for 4.27 points, for a total of 10.48 BMP points.

The existing retention pond dam and outlet structure are repaired and replaced with a siphon spillway, respectively. The redesigned structure controls the two year post-development storm of 32.51cfs to 7.09cfs, which is less than the pre-development rate of 23.43cfs. The ten year post-development storm of 75.43cfs is released at 9.08cfs, which is less than the pre-development rate of 54.65cfs. The 100 year post-development storm is released at 22.51cfs with 1.16' of freeboard to the crest of the dam.

J:\REI\PROJECTS\1998\98150.KMJ

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 98150
SHEET NO. 1 OF
CALCULATED BY KMJ DATE 7/13/98
CHECKED BY DATE
SCALE

EXISTING POND PERMANENT STORAGE

ELEV (ft)	ΔELEV (ft)	S.A. (sf)	STORAGE (cf)	ACCUM. STORAGE (cf)
8.0		2558		0
	2.0		9,634	
10.0		7076		9,634
	2.0		23,164	
12.0		16,088		32,798
	2.0		40,150	
14.0		24,062		72,948
	1.15		30,752	
15.15		29,420		103,700

REDESIGNED DAM PERMANENT STORAGE

ELEV (ft)	ΔELEV (ft)	S.A. (sf)	STORAGE (cf)	ACCUM. STORAGE (cf)
8.0		2558		0
	2.0		9634	
10.0		7076		9634
	2.0		23,164	
12.0		16,088		32,798
	2.0		40,150	
14.0		24,062		72,948

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 98150
SHEET NO. 2 OF
CALCULATED BY KMJ DATE 7/13/98
CHECKED BY DATE
SCALE

DETERMINE JCC BMP POND TYPE
OF EXISTING POND

1) Volume generated from mean storm over watershed area:

Impervious Area = 3.94 ac Total Area = 19.56 ac

$$I = \frac{3.94\,ac}{19.56\,ac} = 20\%$$

$$R_v = 0.05 + 0.009(20) = .23$$

$$V = \frac{.45\,in \mid 19.56\,ac \mid 43{,}560\,sf \mid .23 \mid 1\,ft}{\mid \mid 1\,ac \mid \mid 12\,in} = 7{,}350\,cf$$

The pond is a point wet BMP pond as its volume (72,948 cf) is 4 times greater than the volume generated from mean storm over watershed area (29,400 cf)

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP POINTS		Fraction of Site Served by BMP		Weighted BMP Points
4x Volume Wet Pond	9	X	19.56 Ac .690	=	6.21
		X		=	
		X		=	
		X		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: _____

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
12.10 Ac .427	X	10	=	4.27

C. TOTAL WEIGHTED POINTS

Structural BMP Points	+	Natural Open Space Points	=	TOTAL
6.21	+	4.27	=	10.48

Worksheet 2: Runoff curve number and runoff

Project Williamsburg N+RC By KKJ Date 7/13/98

Location James City County, Va. Checked ____ Date ____

Circle one: (Present) Developed Pond Drainage Area

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 (Poor Cover)	77			19.00	1463.00
Slagle (C)	Roof / Road	98			.56	54.88
				Totals =	19.56	1517.88

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1517.88}{19.56} = 77.6$; Use CN = 78

SJT Comp.

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr	2	10	100
Rainfall, P (24-hour) ..... in	3.5	6.0	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	3.5	

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

Project Williamsburg NA RC By KMJ Date 7/13/98

Location James City County, Va Checked ____ Date ____

Circle one: (Present) Developed Pond Drainage Area

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)		Woods			
2. Manning's roughness coeff., n (table 3-1) ..		.40			
3. Flow length, L (total L ≤ 300 ft)	ft	300			
4. Two-yr 24-hr rainfall, P_2	in	3.5			
5. Land slope, s	ft/ft	.080			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$ Compute T_t	hr	.47	+		=

Shallow concentrated flow		Segment ID			
7. Surface description (paved or unpaved)		UNPAVED			
8. Flow length, L	ft	450			
9. Watercourse slope, s	ft/ft	.0711			
10. Average velocity, V (figure 3-1)	ft/s	4.30			
11. $T_t = \frac{L}{3600\,V}$ Compute T_t	hr	.03	+		=

Channel flow		Segment ID			
12. Cross sectional flow area, a	ft^2	1.77			
13. Wetted perimeter, p_w	ft				
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft	.38			
15. Channel slope, s	ft/ft	.033			
16. Manning's roughness coeff., n		.045			
17. $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$ Compute V	ft/s	3.67			
18. Flow length, L	ft	150			
19. $T_t = \frac{L}{3600\,V}$ Compute T_t	hr	.01	+		=

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) ..... hr .51

Worksheet 5a: Basic watershed data

Project Williamsburg N+RC Location James City County, Va By KMCJ Date 7/13/98

Circle one: (Present) Developed Pond Drainage Area 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
2		.0306	.51				3.5	78	1.5	.0459	.564	.16
10		.0306	.51				6.0	78	3.5	.1071	.564	.09

From worksheet 3 From worksheet 2 From table 5-1

000076

Worksheet 5b: Tabular hydrograph discharge summary

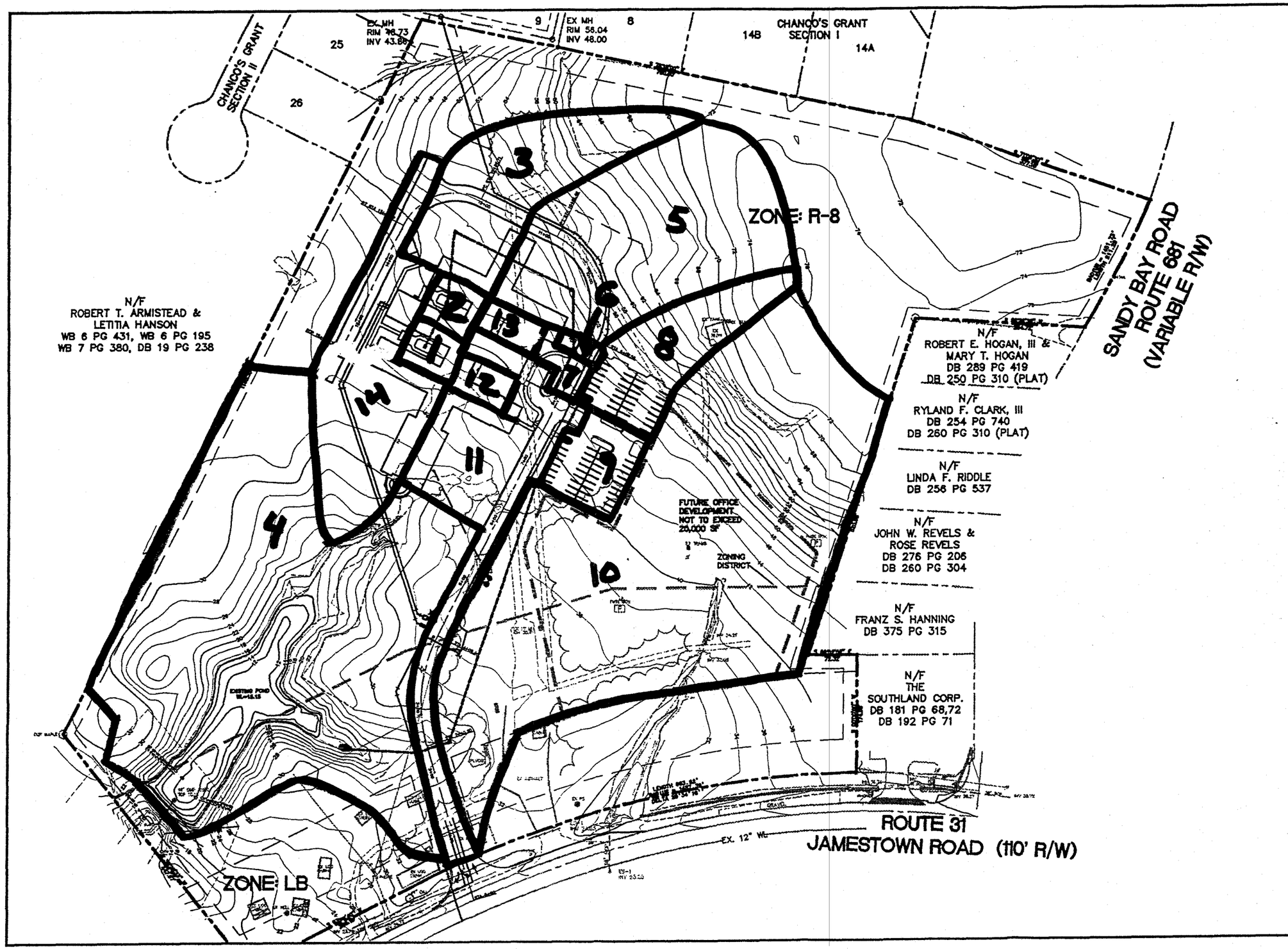
Project Williamsburg N+RC Location James City County, Va. By KMJ Date 7/13/98

Circle one: (Present) Developed Pond Drainage Area 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)					12.4							
						Discharges at selected hydrograph times 3/ -(cfs)-											
2		.51		.16	.0459					24.28							
10		.51		.09	.1071					56.65							
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.

000077



Rickmond Engineering, Inc.
1643-C Merrimac Trail
Williamsburg VA 23185
(804)229-1776 or 898-4146
Civil Engineering
Environmental Engineering
Land Surveying

Designed By:	Drawn By:	Scale:	Date:	Job No.:	File Name:
RMJ	RMJ	1"=60'	7/1/98	98150	98150

No.	By	Revision	Appr.	Date

WILLIAMSBURG NURSING AND REHABILITATION CENTER
PROFILE SHEET
JAMES CITY COUNTY VIRGINIA

Job Number: 98150
Sheet No.: C11

000072

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JOB 98150
SHEET NO. 9 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 1

	C	A	CA
Roof	.90	.12	.11
Grass	.20	.03	.01
		.15	.12

c= .80
A= .15 Ac.

OVERLAND FLOW

L= 40 ft.
S= 1.0 %
Tc= <5 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.80)(.15 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 0.86 cfs

Q_{DI} = CAI = (.80)(.15)(3.5) = 0.42 cfs

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JOB 98150
SHEET NO. 10 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 2

c= .80
A= .15 Ac.

	C	A	CA
Roof	.90	.12	.11
Grass	.20	.03	.01
		.15	.12

OVERLAND FLOW

L= 40 ft.
S= 1.0 %
Tc= <5 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.80)(.15 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 0.86 cfs

Q_{OI} = CAI = (.80)(.15)(3.5) = 0.42 cfs

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JOB 98150
SHEET NO. 11 OF
CALCULATED BY KMS DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 3

c= .29
A= 1.24 Ac.

	C	A	CA
Roof / Road	.90	.17	.15
Grass / Woods	.20	1.07	.21
		1.24	.36

OVERLAND FLOW

L= 300 ft.
S= 7.33 %
Tc= 16 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Overland Flow
L= 100' Slope= 12.0%
V= 5.5 fps Tc= .5 min

Tc= 16.5 min.

i_{10}= 5.0 in/hr

Q=CAi=(.29)(1.24 Ac.)(5.0 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 1.80 cfs

$Q_{DI} = CAI = (.29)(1.24)(5.0) = 1.80$ cfs

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JOB 98150
SHEET NO. 12 OF
CALCULATED BY KMS DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 4

c= .20
A= 5.66 Ac.

OVERLAND FLOW

L= 300 ft.
S= 6.0 %
Tc= 20.5 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= 20.5 min.

i_{10}= 4.4 in/hr

Q=CAi=(.20)(5.66 Ac.)(4.4 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 4.98 cfs

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JOB 98150
SHEET NO. 13 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 5

c= .27
A=2.20 Ac:

	C	A	CA
Road / Roof	.90	.22	.20
Woods / Grass	.20	1.98	.40
		2.20	.60

OVERLAND FLOW

L= 300 ft.
S= 8.67 %
Tc= 16 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Overland Flow
L= 50' Slope = 20%
V= 7.25 fps Tc= .1 min

Tc= 16 min.

i_{10}= 5.0 in/hr

Q=CAi=(.27)(2.20 Ac.)(5.0 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 2.97 cfs

Q_{OI} = CAI = (.27)(2.20)(3.5) = 2.08 cfs

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JOB 98150
SHEET NO. 14 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 6

c= .67
A= .06 Ac:

	C	A	CA
Roof /Road	.90	.04	.04
Grass	.20	.02	—
		.06	.04

OVERLAND FLOW

L= 40 ft.
S= 2.08 %
Tc= <5 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.67)(.06 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= .29 cfs

Q_{OI} = CAI = (.67)(.06)(3.5) = 0.14 cfs

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JOB 98150
SHEET NO. 15 OF
CALCULATED BY KMJ DATE 7/20/98
CHECKED BY DATE
SCALE

DA- 7

	C	A	CA
Roof / Road	.90	.07	.06
Grass	.20	.03	.01
		.10	.07

c= .70
A= .10 Ac:

OVERLAND FLOW

L= 40 ft.
S= 2.08 %
Tc= <5 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.70)(.10 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 0.50 cfs

Q_{PI} = CAI = (.70)(.10)(3.5) = 0.25 cfs

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SHEET NO. 16 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 8

c= .39
A= .83 Ac.

	C	A	CA
Road	.90	.22	.20
Woods	.20	.61	.12
		.83	.32

OVERLAND FLOW

L= 300 ft.
S= 10.7 %
Tc= 12 min.

CHANNEL FLOW

H= 2 ft.
L= 80 ft.
Tc= .2 min.

Tc= 12 min.

i_{10}= 5.7 in/hr

Q=CAi=(.39)(.83 Ac.)(5.7 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 1.85 cfs

Q_{DI} = CAI = (.39)(.83)(3.5) = 1.13 cfs

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JOB 98150
SHEET NO. 17 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 9

c= .81
A= .37 Ac.

	C	A	CA
Road	.90	.32	.29
Grass	.20	.05	.01
		.37	.30

OVERLAND FLOW

L= 120 ft.
S= 1.67 %
Tc= <5 min.

CHANNEL FLOW

H= 2 ft.
L= 80 ft.
Tc= .2 min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.81)(.37 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 2.16 cfs

Q_{DT} = CAI = (.81)(.37)(3.5) = 1.05 cfs

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JOB 98150
SHEET NO. 18 OF
CALCULATED BY KMJ DATE 7/10/98
CHECKED BY DATE
SCALE

DA- 10

c=.36
A=6.06 Ac:

	C	A	CA
Road / Roof	.90	1.38	1.24
Grass / Woods	.20	4.68	0.94
		6.06	2.18

OVERLAND FLOW

L= 300 ft.
S= 10.0 %
Tc= 13 min.

CHANNEL FLOW

H= 18 ft.
L= 550 ft.
Tc= 1 min.

Tc= 14 min.

i_{10}= 5.3 in/hr

Q=CAi=(.36)(6.06 Ac.)(5.3 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 11.56 cfs

Q_{DI} = CAI = (.36)(6.06)(3.5) = 7.64 cfs

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JOB 98150
SHEET NO. 19 OF
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CHECKED BY DATE
SCALE

DA- 11

c= .70
A= 1.23 Ac.

	C	A	CA
Road / Roof	.90	.88	.79
Grass	.20	.35	.07
		1.23	.86

OVERLAND FLOW

L= 100 ft.
S= 1.0 %
Tc= 7.5 min.

CHANNEL FLOW

H= 15 ft.
L= 550 ft.
Tc= 1 min.

Tc= 8.5 min.

i_{10}= 6.4 in/hr

Q=CAi=(.70)(1.23 Ac.)(6.4 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 5.51 cfs

Q_{10I} = CAI = (.70)(1.23)(3.5) = 3.01 cfs

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JOB 98150
SHEET NO. 19A OF
CALCULATED BY KMJ DATE 7/17/98
CHECKED BY DATE
SCALE

DA- 12

c= .64
A= .11 Ac.

	C	A	CA
Road / Roof	.90	.07	.06
Grass	.20	.04	.01
		.11	.07

OVERLAND FLOW

L= 35 ft.
S= 3.0 %
Tc= <5 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.64)(.11 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 0.51 cfs

Q_{DI} = CAI = (.64)(.11)(3.5) = 0.25 cfs

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JOB 98150
SHEET NO. 198 OF
CALCULATED BY KMJ DATE 7/17/98
CHECKED BY DATE
SCALE

DA- 13

c= .64
A= .11 Ac:

	C	A	CA
Road/Roof	.90	.07	.06
Grass	.20	.04	.01
		.11	.07

OVERLAND FLOW

L= 35 ft.
S= 3.0 %
Tc= 15 min.

CHANNEL FLOW

H= — ft.
L= — ft.
Tc= — min.

Tc= 15 min.

i_{10}= 7.2 in/hr

Q=CAi=(.64)(.11 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 0.51 cfs

Q_{OL} = CAI = (.64)(.11)(3.5) = 0.25cfs

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JOB 98150
SHEET NO. 19C OF
CALCULATED BY KMJ DATE 7/20/98
CHECKED BY DATE
SCALE

DA- 14

c= .34
A= 1.29 Ac:

	C	A	CA
Road/Roof	.90	.26	.23
Grass	.20	1.03	.21
		1.29	.44

OVERLAND FLOW

L= 24 ft.
S= 2.08 %
Tc= — min.

CHANNEL FLOW

H= 18 ft.
L= 525 ft.
Tc= <5 min.

Tc= <5 min.

i_{10}= 7.2 in/hr

Q=CAi=(.34)(1.29 Ac.)(7.2 in/hr)(C_f 1.0)

C_f for storms 25 yr+
(VDOT Manual Pg. 1-11)

Q= 3.16 cfs

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E-mail: rickmond@tni.net
www.rickmond.com

JOB 98150
SHEET NO. 20 OF
CALCULATED BY KMJ DATE 7/13/98
CHECKED BY DATE
SCALE

DESIGN DI #1

Q = 0.42 cfs
S_x = .010 ft/ft
DI-1
W = 2.5'
L = 2.5'

P = 2(W+L) = 10'

From Chart 14: d = .11'

$T = \frac{d}{S_x} = \frac{.11}{.01} = 11'$ OK

USE VDOT DI-1

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JOB 98150
SHEET NO. 21 OF
CALCULATED BY KMJ DATE 7/13/98
CHECKED BY DATE
SCALE

DESIGN DI #2

$Q = 0.42$ cfs
$S_x = .010$ ft/ft
DI-1
$w = 2.5'$
$L = 2.5'$

$P = 2(w+L) = 10'$

From Chart 14: $d = .11'$

$T = \frac{d}{S_x} = \frac{.11}{.01} = 11'$ OK

USE VDOT DI-1

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JOB 98150
SHEET NO. 22 OF
CALCULATED BY KMJ DATE 7/13/98
CHECKED BY DATE
SCALE

DESIGN DI #3

Q = 1.80 cfs
S_x = .010 ft/ft
DI-1
W = 2.5'
L = 2.5'

P = 2(W+L) = 10'

From Chart 14: d = .17'

$T = \frac{d}{S_x} = \frac{.17}{.01} = 17'$ OK

USE VDOT DI-1

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JOB 98150
SHEET NO. 23 OF
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CHECKED BY DATE
SCALE

DESIGN DI #5

$Q = 2.08$ cfs
$S_x = .010$ ft/ft
DI-1
$W = 2.5'$
$L = 2.5'$

$P = 2(W+L) = 10'$

From Chart 14: $d = .18'$

$T = \frac{d}{S_x} = \frac{.18}{.01} = 18'$ OK

USE VDOT DI-1

OI #6

User Name: ??

Project: i:\98150\98150tp.STM

Time: 12:03:09

Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	1.61
Total Flow to inlet	=	0.14	DEPTH AT CURB (ft)	=	0.13
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	0.14	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.005
Gutter Width (ft)	=	2.000	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.016	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	2.00
Curb Throat Type	= Horizontal				
Curb Length (ft)	=	1.88			

DI #7

User Name: ??
Project: i:\98150\98150up.STM

Date: 07-17-98
Time: 14:30:52
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)

Total Flow to inlet	= 0.25	PONDING WIDTH (ft)	= 2.02
		DEPTH AT CURB (ft)	= 0.17
		EFFICIENCY (%)	
		Curb = 100.00	
Intercepted by current inlet	= 0.25	Grate = *	Total = 100.00
Bypassed by current inlet	= 0.00	Slot = *	

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.005
Gutter Width (ft)	= 2.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.016	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 2.00
Curb Throat Type	= Horizontal		
Curb Length (ft)	= 2.40		

DI #8

User Name: ??
Project: i:\98150\98150tp.STM

Date: 07-13-98
Time: 12:09:30
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	3.26
Total Flow to inlet	=	1.13	DEPTH AT CURB (ft)	=	0.22
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	1.13	Grate = *	Total = 100.00	
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.024
Gutter Width (ft)	=	2.000	Pavement Cross Slope (ft/ft)	=	0.041
Inlet n-value	=	0.016	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	2.00
Curb Throat Type	= Horizontal				
Curb Length (ft)	=	7.32			

DI #9

User Name: ??
Project: i:\98150\98150tp.STM

Date: 07-13-98
Time: 12:12:00
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)		PONDING WIDTH (ft)	= 5.32
Total Flow to inlet	= 1.05	DEPTH AT CURB (ft)	= 0.21
		EFFICIENCY (%)	
		Curb = 100.00	
Intercepted by current inlet	= 1.05	Grate = *	Total = 100.00
Bypassed by current inlet	= 0.00	Slot = *	

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.024
Gutter Width (ft)	= 2.000	Pavement Cross Slope (ft/ft)	= 0.013
Inlet n-value	= 0.016	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 2.00
Curb Throat Type	= Horizontal		
Curb Length (ft)	= 7.31		

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www.rickmond.com

JOB 98150
SHEET NO. 28 OF
CALCULATED BY KMJ DATE 7/13/98
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SCALE

DESIGN DI # 10

$Q = 7.64$ cfs
$S_x = .050$ ft/ft
DI-7
$w = 3.0'$
$L = 3.5'$

$P = 2(3.0 + 3.5) = 13'$

From Chart 14: $d = .34'$

$T = \frac{d}{S_x} = \frac{.34}{.05} = 6.8'$ OK

USE VDOT DI-7

DI #11

User Name: ??
Project: i:\98150\98150tp.STM

Date: 07-13-98
Time: 12:21:07
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	6.00
Total Flow to inlet	=	0.38	DEPTH AT CURB (ft)	=	0.25
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	0.38	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.001
Gutter Width (ft)	=	2.000	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.016	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	2.00
Curb Throat Type	= Horizontal				
Curb Length (ft)	=	1.96			

DI # 11A

User Name: ??
Project: i:\98150\98150up.STM

Date: 07-17-98
Time: 14:33:11
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 1.32
Intercepted by current inlet = 1.32
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 5.05
DEPTH AT CURB (ft) = 0.23
EFFICIENCY (%)
Curb = 100.00
Grate = * Total = 100.00
Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.021
Gutter Width (ft)	= 2.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.016	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 2.00
Curb Throat Type	= Horizontal		
Curb Length (ft)	= 7.91		

DI #11B

User Name: ??
Project: i:\98150\98150up.STM

Date: 07-17-98
Time: 14:33:12
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)

Total Flow to inlet = 1.32

Intercepted by current inlet = 1.32

Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 5.05

DEPTH AT CURB (ft) = 0.23

EFFICIENCY (%)

Curb = 100.00

Grate = * Total = 100.00

Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.021
Gutter Width (ft)	= 2.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.016	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 2.00
Curb Throat Type	= Horizontal		
Curb Length (ft)	= 7.91		

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DESIGN DI #12

$Q = 0.25$ cfs
$S_x = .030$ ft/ft
DI-1
$W = 2.5'$
$L = 2.5'$

$P = 2(W+L) = 10'$

From chart 14: $d = .10'$

$T = \frac{d}{S_x} = \frac{.10}{.03} = 3'$ OK

USE VDOT DI-1

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SCALE

DESIGN DI #13

$Q = 0.25$ cfs
$S_x = .030$ ft/ft
DI-1
$W = 2.5'$
$L = 2.5'$

$P = 2(W+L) = 10'$

From Chart 14: $d = .10'$

$T = \frac{d}{S_x} = \frac{.10}{.03} = 3'$ OK

USE VDOT DI-1

RICKMOND ENGINEERING, INC.
1643 Merrimac Trail
WILLIAMSBURG, VIRGINIA 23185
(804) 229-1776

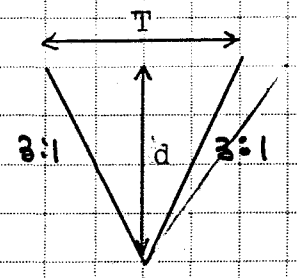
JOB 98150
SHEET NO. 31C OF
CALCULATED BY KMJ DATE 7/20/98
CHECKED BY DATE
SCALE

V-DITCH DESIGN

DA-14

Q= 3.16 cfs
S= 6.00 %
L= ____ ft.

T= 6.0 ft.
d= 1.0 ft.



$$R=\frac{zd}{2(z^2+1)^{1/2}}=\frac{(3)(1\text{ ft.})}{2(10)^{1/2}}=.47\text{ ft.}$$

n=.025

$$A=zd^2=(3)(1\text{ ft.})^2=3\text{ ft.}^2$$

d=0.45 V=5.20 fps

USE GRASS V-DITCH
LINED w/ EC-2 MATING

PRODUCT 204-1 NEBS Inc., Groton, Mass. 01471.

Nowsing & Rehabilitation Center

STORM SEWER DESIGN

MH From	MH To	Area Ac	C	A×C	Total Section A.R.	Total Trunk A.R.	Inten. D/Hr	Q CFS	Length of Pipe	Size Pipe in	Slope ft/ft	Fall in Feet	M.H. Drop	Invert Up Stream	Invert Down Stream	Actual Cap. CFS	Vel FPS	Time Sect Min	Time Accum Min	Entry Time Min
2	1	.15	.80	.12			7.2	0.86	70	15	.005	.35		38.58	38.23	5.81	3.22	.34	5.36	5.0
1	ES	.15	.80	.12	.24	.24	7.2	1.72	110	15	.0375	4.13	.10	38.13	34.00	13.46	7.15	.26	5.62	
3	ES	1.24	.29	.36			5.0	1.80	85	15	.0098	.83		38.33	37.50	6.88	4.42	.32	16.82	16.5
5	6	2.20	.27	.59			5.0	2.95	90	15	.0055	.50		36.43	35.93	6.09	4.60	.32	16.32	16
13	6	.11	.64	.07			7.2	0.51	75	15	.0287	2.15		38.08	35.93	13.91	5.12	.24	5.24	5.0
6	8	.06	.67	.04	.11	.70	5.0	3.50	40	15	.0178	.71	.10	35.83	35.12	10.96	7.53	.09	16.41	16.32
8	9	.83	.39	.32	.43	1.02	5.0	5.10	125	15	.0035	0.44	.10	33.27	32.83	5.34	4.61	.45	16.86	
12	7	.11	.64	.07			7.2	0.51	80	15	.0323	2.58		38.08	35.50	14.76	5.33	.25	5.25	5.0
7	9	.10	.70	.07	.14	.14	7.2	1.02	75	15	.0209	1.57	1.10	34.40	32.83	11.87	5.62	.22	5.47	
9	ES	.37	.81	.30	.44	1.46	4.9	7.15	365	15	.0431	15.73	1.10	31.73	16.00	17.05	12.58	.48	17.14	16.66
10	11	6.06	.36	2.18			5.3	11.56	50	15	.0210	1.05		23.90	22.85	11.90	10.23	.08	14.08	14.0
11B	11A	.59	.70	.41			6.4	2.62	60	15	.0232	1.39		26.11	24.72	12.51	7.65	.13	8.63	8.50
11A	11	.59	.70	.41	.82	.82	6.4	5.25	70	15	.0253	1.77	.10	24.62	22.85	13.06	9.54	.12	8.75	
11	ES	.16	.70	.11	.93	3.11	5.3	16.48	100	24	.010	1.0	5.85	17.00	16.00	28.76	8.95	.19	14.27	14.08

LD-347

HYDRAULIC GRADE LINE

PROJECT Williamsburg Nursing + Rehabilitation Center

INLET STATION	Outlet Water Surface Elev.	D_o	Q_o	L_o	S_{f_o} %	H_f	JUNCTION LOSS												Final H	Inlet Water Surface Elev.	Rim Elev.
							V_o	H_o	Q_i	V_i	Q_iV_i	$\frac{V_i^2}{2g}$	H_i	Angle	H_Δ	H_t	$1.3\ H_t$	$0.5\ H_t$			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
11	17.71	24	16.48	100	.010	1.0	8.95	.31	11.56	10.23	118.26	1.63	.57	20	.26	1.14	1.48	.57	2.14	19.85	27.45
10	19.85	15	11.56	50	.021	1.05	10.23	.41	0	0	0	0	0	0	0	.41	.53	.21	1.46	21.31	27.00
11A	19.85	15	5.25	70	.0253	1.77	9.54	.35	2.62	7.65	20.04	.91	.32	20	.15	.82	1.07	.41	2.59	22.44	28.14
11B	22.44	15	2.62	60	.0232	1.39	7.65	.23	0	0	0	0	0	0	0	.23	.30	.12	1.62	24.06	29.53
9	17.71	15	7.15	365	.0431	15.73	12.58	.61	5.10	8.25	42.08	1.06	.37	35	.35	1.33	1.73	.67	17.06	34.77	38.50
7	34.77	15	1.02	75	.0209	1.57	5.62	.12	0.51	5.33	2.72	.44	.15	80	.29	.56	.73	.28	2.13	36.90	39.34
12	36.90	15	0.51	80	.0323	2.58	5.33	.11	0	0	0	0	0	0	0	.11	.14	.06	2.69	39.59	40.50
8	34.77	15	5.10	125	.0033	.44	4.61	.08	3.50	7.53	26.36	.88	.31	90	.62	1.01	1.31	.51	1.45	36.22	41.60
6	36.22	15	3.50	40	.0178	.71	7.53	.22	2.95	4.66	13.75	.34	.12	60	.19	.53	.69	.27	1.24	37.46	39.66
13	37.46	15	0.51	75	.0287	2.15	5.12	.10	0	0	0	0	0	0	0	.10	.13	.05	2.25	39.71	40.50
5	36.22	15	2.95	90	.0055	.50	4.66	.08	0	0	0	0	0	0	0	.08	.10	.04	.58	36.80	39.00
3	37.90	15	1.80	85	.0098	.83	4.42	.08	0	0	0	0	0	0	0	.08	.10	.04	.91	38.81	40.58
1	34.27	15	1.72	110	.0375	4.13	7.15	.20	0.86	3.22	2.77	.16	.06	90	.11	.37	.48	.19	4.50	38.77	41.00
2	38.77	15	0.86	70	.005	.35	3.22	.04	0	0	0	0	0	0	0	.04	.05	.02	.39	39.16	40.58

$H_i = 0.35 \frac{V_i^2}{2g}$ $H_o = 0.25 \frac{V_o^2}{2g}$ $H_\Delta = K \frac{V_i^2}{2g}$

FINAL $H = H_f + H_t$

$H_t = H_o + H_i + H_\Delta$

SEE LD-72(D)67

90° K = 0.70	50° K = 0.47	20° K = 0.16
80° K = 0.66	40° K = 0.38	15° K = 0.10
70° K = 0.61	30° K = 0.28	
60° K = 0.55	25° K = 0.22	

610100

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JOB 98150
SHEET NO. 34 OF
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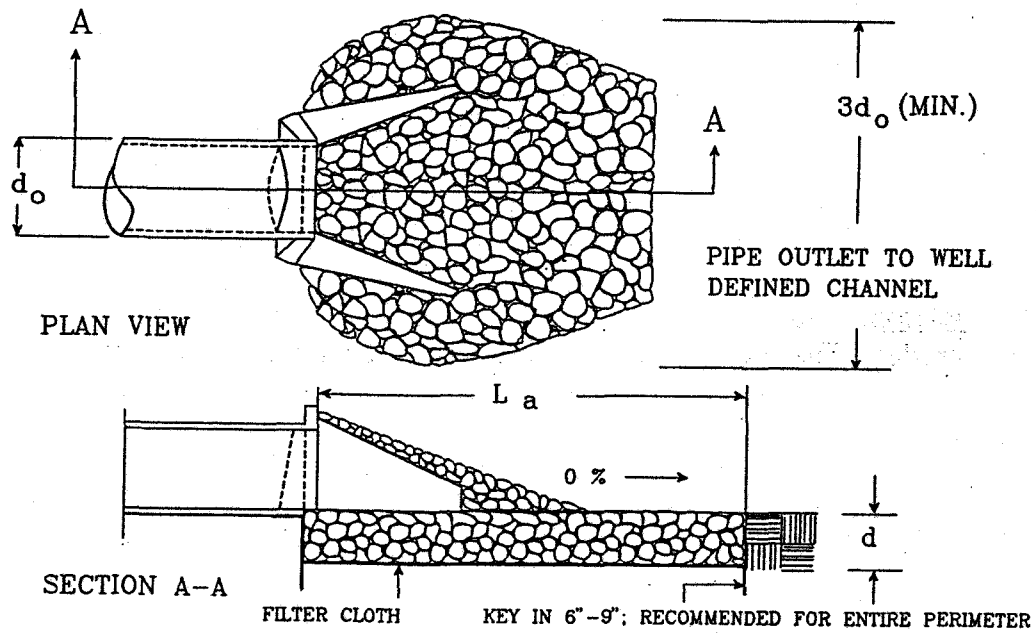
DESIGN OUTLET PROTECTION
FROM DI #11



NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18-3 AND 3.18-4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

Plate 3.18-4
Q = 16.48
d = 2'
3d = 6'
La = 8'
W = 6'
d_{50} = .1'

USE 8' x 6' x 26"
VDOT CLASS I
RIP RAP APRON

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JOB 98150
SHEET NO. 34A OF
CALCULATED BY KMJ DATE 7/20/98
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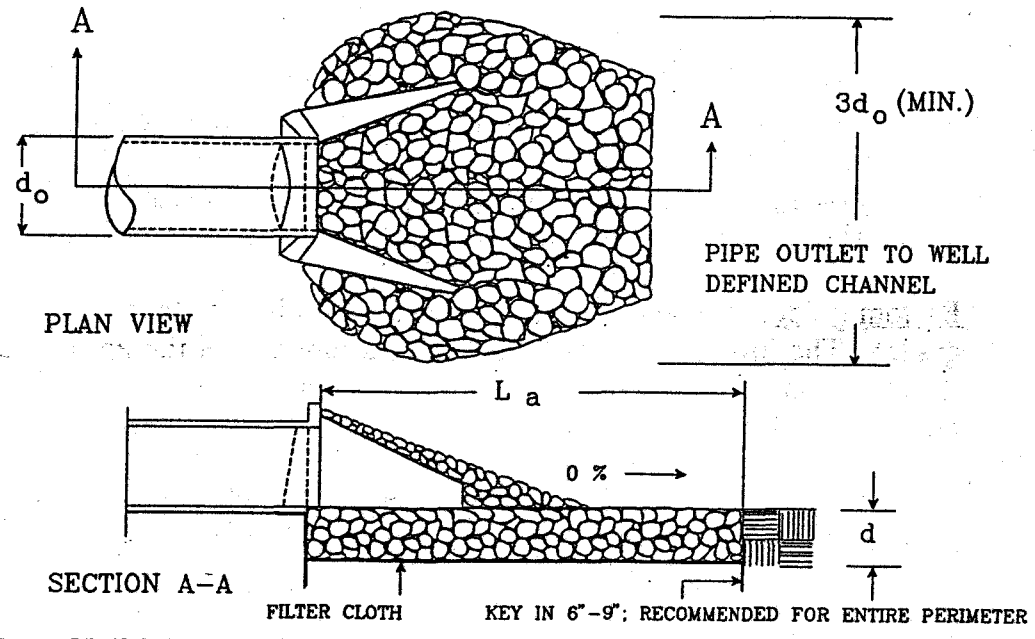
DESIGN OUTLET PROTECTION
FROM DI # 9



NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18-3 AND 3.18-4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

Plate 3.18-3
Q=7.01 cfs
d=1.25'
3d=4'
La=9'
w= 11'
d_{50}=.2'

USE 9' x 11' x 26"
VDOT CLASS I
RIP RAP APRON

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JOB 98150
SHEET NO. 34B OF
CALCULATED BY KMJ DATE 7/20/98
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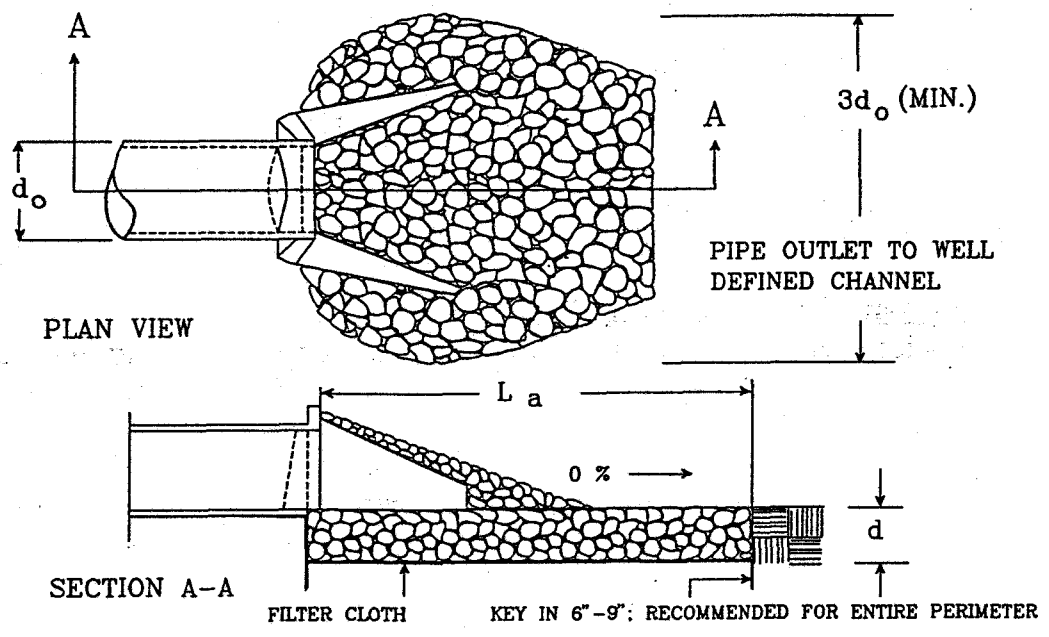
DESIGN OUTLET PROTECTION
FROM DI #1 & #3



NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18-3 AND 3.18-4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

Plate 3.18-4
Q = 0.51 cfs
d = 1.25'
3do = 4'
La = 4'
W = 3'
dso = .1'

USE 4' x 4' x 26"
VDOT CLASS I
RIP RAP APRON

2 YEAR HYDROGRAPH

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

 PROJECT: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:11:05
   Input: WNH2.IN
  Output: WNH2.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: WNH
```

User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:11:05
Input: WNH2.IN
Output: WNH2.OUT

========== SUBAREA DATA
==========

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
	19.58 AC				
1	.0306	.340	80.00	.0	

Composite Watershed Curve Number = 80.00
Minimum Subarea Time of Concentration = .340 hours.

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

PROJECT: WNH
User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:11:05
Input: WNH2.IN
Output: WNH2.OUT

RETURN PERIOD (yrs): 2

========== RAINFALL HYETOGRAPH INFORMATION
==========

RAINFALL HYETOGRAPH: SCS TYPE II
RAINFALL DURATION: 24.00 Hours
RAINFALL DEPTH: 3.50 Inches

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

.000,	.00	2.000,	.08	4.000,	.17	6.000,	.28
7.000,	.34	8.000,	.42	8.500,	.47	9.000,	.51
9.500,	.57	9.750,	.60	10.000,	.63	10.500,	.71
11.000,	.82	11.500,	.99	11.750,	1.25	12.000,	2.32

```
     12.500,  2.57     13.000,  2.70     13.500,  2.80     14.000,  2.87
     16.000,  3.08     20.000,  3.33     24.000,  3.50
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: WNH
   Input: WNH2.IN
  Output: WNH2.OUT
                                                          RETURN PERIOD
(yrs):      2


    SUBAREA     1       SUBAREA     1       SUBAREA     1       SUBAREA
1


     AREA (square miles)          :        .0306
     TIME OF CONCENTRATION (hrs):          .34
     RUNOFF CURVE NUMBER          :      80.00
     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	.02	.03	.05	.07	.09	.11	.14	.16
10.00	.18	.21	.25	.30	.34	.38	.43	.52	.61	.69
11.00	.76	.86	1.07	1.30	1.49	1.64	2.18	3.61	6.57	13.81

```
 12.00 |   25.39  32.51  27.55  18.84  12.98  10.09   8.28   6.59   5.26
4.47
 13.00 |    4.06   3.73   3.37   3.06   2.88   2.79   2.69   2.51   2.33
2.23
 14.00 |    2.18   2.16   2.16   2.15   2.10   2.03   1.95   1.87   1.80
1.72
 15.00 |    1.65   1.58   1.52   1.46   1.40   1.35   1.31   1.27   1.24
1.21
 16.00 |    1.18   1.16   1.14   1.13   1.12   1.11   1.10   1.09   1.08
1.08
 17.00 |    1.07   1.06   1.05   1.04   1.03   1.02   1.01   1.00   1.00
.99
 18.00 |     .98    .97    .96    .95    .94    .93    .92    .92    .91
.90
 19.00 |     .89    .88    .87    .86    .85    .84    .83    .82    .82
.81
 20.00 |     .80    .79    .78    .77    .76    .75    .74    .74    .73
.72
 21.00 |     .71    .70    .70    .69    .68    .68    .67    .66    .66
.65
 22.00 |     .65    .64    .64    .63    .63    .62    .62    .62    .61
.61
 23.00 |     .61    .60    .60    .60    .60    .60    .59    .59    .59
.59
 24.00 |     .59    .54    .38    .21    .11    .06    .03    .02    .01
.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):      32.51
                   TIME TO PEAK (hrs):      12.10
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
*******************

 PROJECT: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:11:05
   Input: WNH2.IN
  Output: WNH2.OUT
                                                        RETURN PERIOD
(yrs):      2


 ==========================   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	.02	.03	.05	.07	.09	.11	.14	.16
10.00	.18	.21	.25	.30	.34	.38	.43	.52	.61	.69
11.00	.76	.86	1.07	1.30	1.49	1.64	2.18	3.61	6.57	13.81
12.00	25.39	32.51	27.55	18.84	12.98	10.09	8.28	6.59	5.26	4.47
13.00	4.06	3.73	3.37	3.06	2.88	2.79	2.69	2.51	2.33	2.23
14.00	2.18	2.16	2.16	2.15	2.10	2.03	1.95	1.87	1.80	1.72
15.00	1.65	1.58	1.52	1.46	1.40	1.35	1.31	1.27	1.24	1.21
16.00	1.18	1.16	1.14	1.13	1.12	1.11	1.10	1.09	1.08	1.08
17.00	1.07	1.06	1.05	1.04	1.03	1.02	1.01	1.00	1.00	.99
18.00	.98	.97	.96	.95	.94	.93	.92	.92	.91	.90
19.00	.89	.88	.87	.86	.85	.84	.83	.82	.82	.81
20.00	.80	.79	.78	.77	.76	.75	.74	.74	.73	.72
21.00	.71	.70	.70	.69	.68	.68	.67	.66	.66	.65
22.00	.65	.64	.64	.63	.63	.62	.62	.62	.61	.61
23.00	.61	.60	.60	.60	.60	.60	.59	.59	.59	.59
24.00	.59	.54	.38	.21	.11	.06	.03	.02	.01	

```
.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):      32.51
                      TIME TO PEAK (hrs):      12.10
 Hydrograph Saved In: WNH2.DAT

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

 PROJECT: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:11:05
   Input: WNH2.IN
  Output: WNH2.OUT
                                                          RETURN PERIOD
(yrs):      2

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


 SCS TYPE II  Hyetograph.
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.
 APPLIED RAINFALL DEPTH (inches):  3.50


                VOLUME OF                                |
                 RAINFALL     VOLUME OF    RAINFALL      |     PEAK
PEAK
                 APPLIED       RUNOFF       LOSSES       |   DISCHARGE
DISCHARGE
                 (ac-ft)       (ac-ft)     (percent)     |    (cfs)
(cfs/ac)
                ___________   ___________  __________    |  ___________
___________
                                                        |
                                                        |
 SUBAREA     1  5.7120        2.6569        53.49        |      32.512
1.660
                                                        |
                                                        |
                                                        |
```

TOTAL WATERSHED	5.7120	2.6569	53.49	32.512	1.660

TOTAL WATERSHED AREA (square miles): .0306
TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): 2.6569
COMPOSITE WATERSHED CURVE NUMBER: 80.00
MINIMUM SUBAREA TIME OF CONCENTRATION: .340 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

10 YEAR HYDROGRAPH

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

 PROJECT: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:11:56
   Input: WNH10.IN
  Output: WNH10.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: WNH
```

User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:11:56
Input: WNH10.IN
Output: WNH10.OUT

========== SUBAREA DATA
==========

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0306	.340	80.00	.0	

Composite Watershed Curve Number = 80.00
Minimum Subarea Time of Concentration = .340 hours.

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

PROJECT: WNH
User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:11:56
Input: WNH10.IN
Output: WNH10.OUT

RETURN PERIOD (yrs): 10

========== RAINFALL HYETOGRAPH INFORMATION
==========

RAINFALL HYETOGRAPH: SCS TYPE II
RAINFALL DURATION: 24.00 Hours
RAINFALL DEPTH: 6.00 Inches

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

.000,	.00	2.000,	.13	4.000,	.29	6.000,	.48
7.000,	.59	8.000,	.72	8.500,	.80	9.000,	.88
9.500,	.98	9.750,	1.03	10.000,	1.09	10.500,	1.22
11.000,	1.41	11.500,	1.70	11.750,	2.14	12.000,	3.98

```
     12.500,  4.41     13.000,  4.63     13.500,  4.79     14.000,  4.92
     16.000,  5.28     20.000,  5.71     24.000,  6.00
1*******************************     SCSHYDRO
*******************************
 *******************************   Version 3.21
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: WNH
   Input: WNH10.IN
  Output: WNH10.OUT
                                                        RETURN PERIOD
(yrs):     10


    SUBAREA     1       SUBAREA     1       SUBAREA     1       SUBAREA
1


     AREA (square miles)          :        .0306
     TIME OF CONCENTRATION (hrs):        .34
     RUNOFF CURVE NUMBER          :      80.00
     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	.01	.02	.03	.04	.06	.08
7.00	.09	.11	.14	.17	.20	.22	.25	.27	.30	.32
8.00	.34	.37	.41	.46	.50	.53	.57	.61	.66	.69
9.00	.73	.77	.84	.90	.96	1.00	1.06	1.14	1.21	1.28
10.00	1.33	1.42	1.58	1.74	1.87	1.96	2.11	2.39	2.68	2.90
11.00	3.06	3.35	3.99	4.66	5.15	5.48	6.96	10.92	18.57	35.89

12.00 |	61.53	75.43	62.54	42.16	28.61	21.88	17.69	13.93	11.04	9.32
13.00 |	8.41	7.69	6.92	6.28	5.89	5.70	5.49	5.11	4.75	4.53
14.00 |	4.42	4.38	4.38	4.34	4.24	4.10	3.94	3.78	3.62	3.46
15.00 |	3.31	3.18	3.05	2.93	2.81	2.71	2.62	2.54	2.47	2.41
16.00 |	2.36	2.32	2.28	2.26	2.24	2.22	2.20	2.18	2.16	2.14
17.00 |	2.12	2.10	2.08	2.07	2.05	2.03	2.01	1.99	1.97	1.96
18.00 |	1.94	1.92	1.90	1.88	1.86	1.85	1.83	1.81	1.79	1.77
19.00 |	1.75	1.73	1.72	1.70	1.68	1.66	1.64	1.62	1.61	1.59
20.00 |	1.57	1.55	1.53	1.51	1.50	1.48	1.46	1.44	1.43	1.41
21.00 |	1.40	1.38	1.37	1.35	1.34	1.33	1.31	1.30	1.29	1.28
22.00 |	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.21	1.20	1.19
23.00 |	1.19	1.18	1.18	1.17	1.17	1.16	1.16	1.16	1.16	1.15
24.00 |	1.15	1.05	.74	.42	.21	.11	.06	.03	.02	.01
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): 75.43
TIME TO PEAK (hrs): 12.10

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

PROJECT: WNH
User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:11:56
Input: WNH10.IN
Output: WNH10.OUT

RETURN PERIOD (yrs): 10

```
 ============================   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	.01	.02	.03	.04	.06	.08
7.00	.09	.11	.14	.17	.20	.22	.25	.27	.30	.32
8.00	.34	.37	.41	.46	.50	.53	.57	.61	.66	.69
9.00	.73	.77	.84	.90	.96	1.00	1.06	1.14	1.21	1.28
10.00	1.33	1.42	1.58	1.74	1.87	1.96	2.11	2.39	2.68	2.90
11.00	3.06	3.35	3.99	4.66	5.15	5.48	6.96	10.92	18.57	35.89
12.00	61.53	75.43	62.54	42.16	28.61	21.88	17.69	13.93	11.04	9.32
13.00	8.41	7.69	6.92	6.28	5.89	5.70	5.49	5.11	4.75	4.53
14.00	4.42	4.38	4.38	4.34	4.24	4.10	3.94	3.78	3.62	3.46
15.00	3.31	3.18	3.05	2.93	2.81	2.71	2.62	2.54	2.47	2.41
16.00	2.36	2.32	2.28	2.26	2.24	2.22	2.20	2.18	2.16	2.14
17.00	2.12	2.10	2.08	2.07	2.05	2.03	2.01	1.99	1.97	1.96
18.00	1.94	1.92	1.90	1.88	1.86	1.85	1.83	1.81	1.79	1.77
19.00	1.75	1.73	1.72	1.70	1.68	1.66	1.64	1.62	1.61	1.59
20.00	1.57	1.55	1.53	1.51	1.50	1.48	1.46	1.44	1.43	1.41
21.00	1.40	1.38	1.37	1.35	1.34	1.33	1.31	1.30	1.29	1.28
22.00	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.21	1.20	1.19
23.00	1.19	1.18	1.18	1.17	1.17	1.16	1.16	1.16	1.16	1.15
24.00	1.15	1.05	.74	.42	.21	.11	.06	.03	.02	

```
.01
 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):       75.43
                      TIME TO PEAK (hrs):       12.10
 Hydrograph Saved In: WNH10.DAT

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

 PROJECT: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:11:56
   Input: WNH10.IN
  Output: WNH10.OUT
                                                          RETURN PERIOD
(yrs):     10


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


 SCS TYPE II  Hyetograph.
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.
 APPLIED RAINFALL DEPTH (inches):  6.00


                VOLUME OF                                |
                 RAINFALL      VOLUME OF     RAINFALL    |      PEAK
PEAK
                 APPLIED        RUNOFF        LOSSES     |    DISCHARGE
DISCHARGE
                 (ac-ft)        (ac-ft)      (percent)   |      (cfs)
(cfs/ac)
                ___________    ___________   __________  |  ___________
___________
                                                         |
                                                         |
 SUBAREA     1  9.7920         6.1395         37.30     |       75.434
3.852
                                                         |
                                                         |
                                                         |
```

TOTAL WATERSHED	9.7920	6.1395	37.30	75.434	3.852

TOTAL WATERSHED AREA (square miles): .0306
TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): 6.1395
COMPOSITE WATERSHED CURVE NUMBER: 80.00
MINIMUM SUBAREA TIME OF CONCENTRATION: .340 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: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:12:33
   Input: WNH100.IN
  Output: WNH100.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: WNH
```

User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:12:33
Input: WNH100.IN
Output: WNH100.OUT

========== SUBAREA DATA
==========

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0306	.340	80.00	.0	

Composite Watershed Curve Number = 80.00
Minimum Subarea Time of Concentration = .340 hours.

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

PROJECT: WNH
User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:12:33
Input: WNH100.IN
Output: WNH100.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: WNH
   Input: WNH100.IN
  Output: WNH100.OUT
                                                          RETURN PERIOD
(yrs):    100

    SUBAREA     1       SUBAREA     1       SUBAREA     1       SUBAREA
1

     AREA (square miles)          :        .0306
     TIME OF CONCENTRATION (hrs):        .34
     RUNOFF CURVE NUMBER          :      80.00
     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	.01	.02	.04	.06	.08	.10	.13	.15	.17
6.00	.20	.22	.25	.29	.32	.35	.38	.40	.43	.45
7.00	.48	.52	.58	.64	.69	.73	.77	.81	.84	.87
8.00	.91	.95	1.04	1.12	1.19	1.24	1.30	1.37	1.44	1.50
9.00	1.55	1.62	1.73	1.84	1.93	2.00	2.08	2.21	2.34	2.44
10.00	2.51	2.65	2.91	3.19	3.39	3.53	3.76	4.22	4.69	5.03
11.00	5.26	5.72	6.74	7.80	8.55	9.03	11.31	17.49	29.15	54.88

12.00 |	91.92	111.03	91.35	61.26	41.36	31.45	25.30	19.85	15.69	13.21
13.00 |	11.90	10.85	9.76	8.85	8.30	8.02	7.72	7.18	6.67	6.36
14.00 |	6.20	6.14	6.14	6.09	5.95	5.75	5.52	5.29	5.06	4.85
15.00 |	4.64	4.44	4.26	4.09	3.94	3.79	3.67	3.55	3.45	3.37
16.00 |	3.29	3.24	3.19	3.15	3.12	3.09	3.06	3.04	3.01	2.98
17.00 |	2.96	2.93	2.91	2.88	2.85	2.83	2.80	2.78	2.75	2.72
18.00 |	2.70	2.67	2.65	2.62	2.59	2.57	2.54	2.52	2.49	2.46
19.00 |	2.44	2.41	2.39	2.36	2.33	2.31	2.28	2.26	2.23	2.21
20.00 |	2.18	2.15	2.13	2.10	2.08	2.05	2.03	2.01	1.98	1.96
21.00 |	1.94	1.92	1.90	1.88	1.86	1.84	1.82	1.81	1.79	1.77
22.00 |	1.76	1.75	1.73	1.72	1.71	1.69	1.68	1.67	1.66	1.65
23.00 |	1.65	1.64	1.63	1.62	1.62	1.61	1.61	1.60	1.60	1.60
24.00 |	1.60	1.45	1.02	.58	.30	.16	.08	.04	.02	.01
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): 111.03
TIME TO PEAK (hrs): 12.10

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

PROJECT: WNH
User: Rickmond Engineering
Date: 07/20/1998 Monday
Time: 10:12:33
Input: WNH100.IN
Output: WNH100.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	.00	.00	.00	.00	.00	.00
5.00	.00	.01	.02	.04	.06	.08	.10	.13	.15	.17
6.00	.20	.22	.25	.29	.32	.35	.38	.40	.43	.45
7.00	.48	.52	.58	.64	.69	.73	.77	.81	.84	.87
8.00	.91	.95	1.04	1.12	1.19	1.24	1.30	1.37	1.44	1.50
9.00	1.55	1.62	1.73	1.84	1.93	2.00	2.08	2.21	2.34	2.44
10.00	2.51	2.65	2.91	3.19	3.39	3.53	3.76	4.22	4.69	5.03
11.00	5.26	5.72	6.74	7.80	8.55	9.03	11.31	17.49	29.15	54.88
12.00	91.92	111.03	91.35	61.26	41.36	31.45	25.30	19.85	15.69	13.21
13.00	11.90	10.85	9.76	8.85	8.30	8.02	7.72	7.18	6.67	6.36
14.00	6.20	6.14	6.14	6.09	5.95	5.75	5.52	5.29	5.06	4.85
15.00	4.64	4.44	4.26	4.09	3.94	3.79	3.67	3.55	3.45	3.37
16.00	3.29	3.24	3.19	3.15	3.12	3.09	3.06	3.04	3.01	2.98
17.00	2.96	2.93	2.91	2.88	2.85	2.83	2.80	2.78	2.75	2.72
18.00	2.70	2.67	2.65	2.62	2.59	2.57	2.54	2.52	2.49	2.46
19.00	2.44	2.41	2.39	2.36	2.33	2.31	2.28	2.26	2.23	2.21
20.00	2.18	2.15	2.13	2.10	2.08	2.05	2.03	2.01	1.98	1.96
21.00	1.94	1.92	1.90	1.88	1.86	1.84	1.82	1.81	1.79	1.77
22.00	1.76	1.75	1.73	1.72	1.71	1.69	1.68	1.67	1.66	1.65
23.00	1.65	1.64	1.63	1.62	1.62	1.61	1.61	1.60	1.60	1.60
24.00	1.60	1.45	1.02	.58	.30	.16	.08	.04	.02	

```
.01
 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):     111.03
                      TIME TO PEAK (hrs):      12.10
 Hydrograph Saved In: WNH100.DAT

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

 PROJECT: WNH
    User: Rickmond Engineering
    Date: 07/20/1998    Monday
    Time: 10:12:33
   Input: WNH100.IN
  Output: WNH100.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)     |     (cfs)
(cfs/ac)
                ___________   ___________  __________    |  ___________
___________
                                                        |
                                                        |
 SUBAREA    1  13.056        9.1332         30.05       |      111.030
5.669
                                                        |
                                                        |
                                                        |
```

TOTAL WATERSHED	13.056	9.1332	30.05	111.030	5.669

TOTAL WATERSHED AREA (square miles): .0306
TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): 9.1332
COMPOSITE WATERSHED CURVE NUMBER: 80.00
MINIMUM SUBAREA TIME OF CONCENTRATION: .340 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

Larger Storage
than orig
cales.

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 98150
SHEET NO. 56 OF
CALCULATED BY KMS DATE 9/22/98
CHECKED BY DATE
SCALE

POND STAGE - STORAGE

ELEV (ft)	ΔELEV (ft)	SA (sf)	STORAGE (cf)	ACCUM STORAGE (cf)
14.0		24,062		0
	2.0		58,124	
16.0		34,062		58,124
	2.0		78,336	
18.0		44,274		136,460
	2.0		99,718	
20.0		55,444		236,178

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JOB 98150
SHEET NO. 57 OF
CALCULATED BY KMJ DATE 9/22/98
CHECKED BY DATE
SCALE

SIZE OUTLET ORIFICE

12" PVC SIPHON SPILLWAY

$Q = CA\sqrt{2gh}$

$C = .6$
$A = 0.785\ ft^2$
INTAKE ELEV = 12.0

ELEV	h	Q
14.0	0.0	0.00
15.0	3.0	6.55
16.0	4.0	7.56 ← 9.26 cfs (see below)
17.0	5.0	8.45
18.0	6.0	9.26
19.0	7.0	10.00
20.0	8.0	10.69

$$q = a\sqrt{\frac{2gH}{1 + k_e + k_b + k_p L}}$$

elev 16

$$= .785\sqrt{\frac{2 \times 32.2 \times 6}{1 + \underbrace{.5}_{k_e} + \underbrace{.15 + .1 + .1}_{k_b} + (.0185)(50)}} = \sqrt{\frac{2 \times 32.2 \times 6}{2.78}} = (11.8)(.785) = 9.26$$

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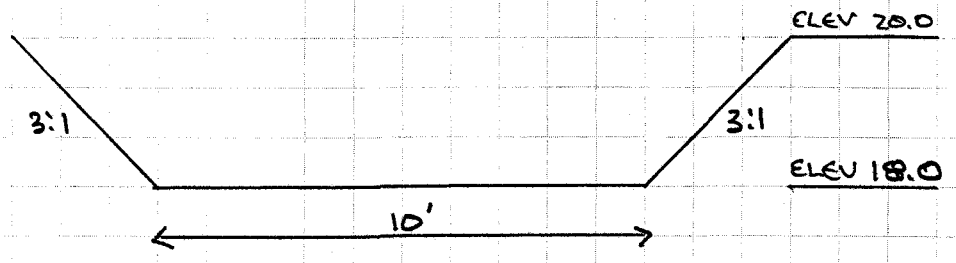
www.rickmond.com

JOB 98150
SHEET NO. 58 OF
CALCULATED BY KWJ DATE 9/22/98
CHECKED BY DATE
SCALE

DESIGN EMERGENCY SPILLWAY



n=.035

$$Q = \frac{1.49}{n} R^{2/3} S^{1/2} A$$

needs to be on ex. ground

ELEV	Q
18.0	0
19.0	15.00
20.0	54.10

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JOB 98150
SHEET NO. 59 OF
CALCULATED BY KMJ DATE 9/22/98
CHECKED BY DATE
SCALE

STAGE - STORAGE - DISCHARGE

STAGE (ft)	STORAGE (ac-ft)	DISCHARGE (cfs)
14.0	0.552	0.00
15.0	0.667	6.55
16.0	0.782	7.56
17.0	0.899	8.45
18.0	1.016	9.26
19.0	1.145	25.00
20.0	1.273	64.79

2-YR STORM ROUTING

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

PROJECT: WNRC
User: Rickmond Engineering
Date: 09/22/1998 Tuesday
Time: 16:09:06
Output: WNHP2.OUT

SOLUTION FOR 1 STORMS.

TIME INCREMENT: .100 Hours

STORM NUMBER	HYDROGRAPH IN FILE:
1	WNH2.DAT

TAILWATER STAGE (ft)	STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)
11.000	1	32.512 ✓	N/A	1794.00	.1157E+06

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

PROJECT: WNRC
User: Rickmond Engineering
Date: 09/22/1998 Tuesday
Time: 16:09:06
Output: WNHP2.OUT

Stage-Area-Discharge
Filename: WNHPOND.DAT

```
          TAILWATER STAGE:   11.000 feet.
            INITIAL STAGE:   14.000 feet.

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

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

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
14.000	.0000	.0000
15.000	.6086	6.550
16.000	1.332	7.560
17.000	2.172	8.450
18.000	3.129	9.260
19.000	4.209	25.00
20.000	5.417	64.79

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:09:06
  Output: WNHP2.OUT


          TAILWATER STAGE:   11.000 feet.
            INITIAL STAGE:   14.000 feet.

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

     MAXIMUM ELEVATION:    15.53     feet.
        MAXIMUM INFLOW:    32.51     cfs.
       MAXIMUM OUTFLOW:    7.087     cfs.
       MAXIMUM STORAGE:    .9931     acre-feet.

      CONTINUITY ERROR:     .793E-05 percent.
```

POND

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

14.000	6	.000	.000	I
14.000	12	.000	.000	I
14.000	18	.000	.000	I
14.000	24	.000	.000	I
14.000	30	.000	.000	I
14.000	36	.000	.000	I
14.000	42	.000	.000	I
14.000	48	.000	.000	I
14.000	54	.000	.000	I
14.000	60	.000	.000	I
14.000	66	.000	.000	I
14.000	72	.000	.000	I
14.000	78	.000	.000	I
14.000	84	.000	.000	I
14.000	90	.000	.000	I
14.000	96	.000	.000	I
14.000	102	.000	.000	I
14.000	108	.000	.000	I
14.000	114	.000	.000	I
14.000	120	.000	.000	I
14.000	126	.000	.000	I
14.000	132	.000	.000	I
14.000	138	.000	.000	I
14.000	144	.000	.000	I
14.000	150	.000	.000	I
14.000	156	.000	.000	I
14.000	162	.000	.000	I
14.000	168	.000	.000	I
14.000	174	.000	.000	I
14.000	180	.000	.000	I

14.000	186	.000	.000	I
14.000	192	.000	.000	I
14.000	198	.000	.000	I
14.000	204	.000	.000	I
14.000	210	.000	.000	I
14.000	216	.000	.000	I
14.000	222	.000	.000	I
14.000	228	.000	.000	I
14.000	234	.000	.000	I
14.000	240	.000	.000	I
14.000	246	.000	.000	I
14.000	252	.000	.000	I
14.000	258	.000	.000	I
14.000	264	.000	.000	I
14.000	270	.000	.000	I
14.000	276	.000	.000	I
14.000	282	.000	.000	I
14.000	288	.000	.000	I
14.000	294	.000	.000	I
14.000	300	.000	.000	I
14.000	306	.000	.000	I
14.000	312	.000	.000	I
14.000	318	.000	.000	I
14.000	324	.000	.000	I
14.000	330	.000	.000	I
14.000	336	.000	.000	I
14.000	342	.000	.000	I
14.000	348	.000	.000	I
14.000	354	.000	.000	I
14.000	360	.000	.000	I

14.000				
	366	.000	.000	I
14.000				
	372	.000	.000	I
14.000				
	378	.000	.000	I
14.000				
	384	.000	.000	I
14.000				
	390	.000	.000	I
14.000				
	396	.000	.000	I
14.000				
	402	.000	.000	I
14.000				
	408	.000	.000	I
14.000				
	414	.000	.000	I
14.000				
	420	.000	.000	I
14.000				
	426	.000	.000	I
14.000				
	432	.000	.000	I
14.000				
	438	.000	.000	I
14.000				
	444	.000	.000	I
14.000				
	450	.000	.000	I
14.000				
	456	.000	.000	I
14.000				
	462	.000	.000	I
14.000				
	468	.000	.000	I
14.000				
	474	.000	.000	I
14.000				
	480	.000	.000	I
14.000				
	486	.000	.000	I
14.000				
	492	.000	.000	I
14.000				
	498	.000	.000	I
14.000				
	504	.000	.000	I
14.000				
	510	.000	.000	I
14.000				
	516	.000	.000	I
14.000				
	522	.000	.000	I
14.000				
	528	.000	.000	I
14.000				
	534	.000	.000	I
14.000				
	540	.002	.000	I

14.000	546	.008	.000	I
14.000	552	.019	.002	I
14.000	558	.034	.004	I
14.001	564	.051	.007	I
14.001	570	.068	.011	I
14.002	576	.088	.017	I
14.003	582	.111	.024	I
14.004	588	.136	.033	I
14.005	594	.160	.042	I
14.006	600	.183	.053	I
14.008	606	.212	.066	I
14.010	612	.255	.080	I
14.012	618	.302	.097	I
14.015	624	.345	.116	I
14.018	630	.382	.137	I
14.021	636	.434	.160	I
14.024	642	.518	.187	I
14.029	648	.610	.219	I
14.033	654	.689	.256	I
14.039	660	.756	.296	I
14.045	666	.864	.339	I
14.052	672	1.073	.393	I
14.060	678	1.301	.461	I
14.070	684	1.489	.540	I
14.082	690	1.639	.627	I
14.096	696	2.181	.737	I
14.112	702	3.608	.920	I
14.141	708	6.568	1.275	I
14.195	714	13.808	2.034	I
14.311	720	25.393	3.530	I

14.539				
	726	32.512	5.695	I
14.869				
	732	27.547	6.714	I
15.162				
	738	18.841	6.903	I
15.349				
	744	12.977	7.006	I
15.452				
	750	10.094	7.058	I
15.503				
	756	8.280	7.083	I
15.527				
	762	6.587	7.087	I
15.531				
	768	5.260	7.073	I
15.518				
	774	4.473	7.048	I
15.493				
	780	4.063	7.016	I
15.461				
	786	3.729	6.980	I
15.426				
	792	3.366	6.941	I
15.387				
	798	3.062	6.898	I
15.345				
	804	2.877	6.853	I
15.300				
	810	2.788	6.807	I
15.254				
	816	2.688	6.760	I
15.208				
	822	2.506	6.713	I
15.161				
	828	2.333	6.663	I
15.112				
	834	2.227	6.613	I
15.062				
	840	2.175	6.563	I
15.012				
	846	2.158	6.269	I
14.957				
	852	2.162	5.919	I
14.904				
	858	2.147	5.598	I
14.855				
	864	2.099	5.302	I
14.809				
	870	2.030	5.026	I
14.767				
	876	1.953	4.768	I
14.728				
	882	1.874	4.525	I
14.691				
	888	1.796	4.296	I
14.656				
	894	1.720	4.080	I
14.623				
	900	1.648	3.876	I

14.592				
	906	1.581	3.683	
14.562				
	912	1.517	3.501	
14.535				
	918	1.458	3.330	
14.508				
	924	1.404	3.168	
14.484				
	930	1.355	3.016	
14.460				
	936	1.310	2.872	
14.439				
	942	1.270	2.738	
14.418				
	948	1.235	2.611	
14.399				
	954	1.205	2.493	
14.381				
	960	1.180	2.382	
14.364				
	966	1.160	2.279	
14.348				
	972	1.144	2.183	
14.333				
	978	1.132	2.094	
14.320				
	984	1.121	2.012	
14.307				
	990	1.111	1.935	
14.295				
	996	1.102	1.865	
14.285				
	1002	1.093	1.799	
14.275				
	1008	1.084	1.739	
14.265				
	1014	1.075	1.683	
14.257				
	1020	1.067	1.631	
14.249				
	1026	1.058	1.582	
14.242				
	1032	1.049	1.537	
14.235				
	1038	1.040	1.495	
14.228				
	1044	1.031	1.456	
14.222				
	1050	1.023	1.420	
14.217				
	1056	1.014	1.385	
14.212				
	1062	1.005	1.353	
14.207				
	1068	.996	1.323	
14.202				
	1074	.987	1.295	
14.198				
	1080	.978	1.268	

14.194	1086	.969	1.243	I
14.190	1092	.960	1.220	I
14.186	1098	.951	1.197	I
14.183	1104	.942	1.176	I
14.180	1110	.933	1.155	I
14.176	1116	.924	1.136	I
14.173	1122	.915	1.118	I
14.171	1128	.906	1.100	I
14.168	1134	.897	1.083	I
14.165	1140	.888	1.067	I
14.163	1146	.879	1.051	I
14.161	1152	.870	1.036	I
14.158	1158	.861	1.022	I
14.156	1164	.852	1.008	I
14.154	1170	.843	.994	I
14.152	1176	.834	.981	I
14.150	1182	.824	.968	I
14.148	1188	.815	.955	I
14.146	1194	.806	.943	I
14.144	1200	.797	.931	I
14.142	1206	.788	.919	I
14.140	1212	.779	.907	I
14.139	1218	.770	.896	I
14.137	1224	.761	.885	I
14.135	1230	.752	.874	I
14.133	1236	.743	.863	I
14.132	1242	.735	.853	I
14.130	1248	.727	.842	I
14.129	1254	.719	.832	I
14.127	1260	.712	.822	I

14.126				
	1266	.704	.813	I
14.124				
	1272	.697	.803	I
14.123				
	1278	.690	.794	I
14.121				
	1284	.683	.785	I
14.120				
	1290	.677	.776	I
14.118				
	1296	.670	.767	I
14.117				
	1302	.664	.758	I
14.116				
	1308	.659	.750	I
14.115				
	1314	.653	.742	I
14.113				
	1320	.648	.734	I
14.112				
	1326	.643	.727	I
14.111				
	1332	.638	.719	I
14.110				
	1338	.633	.712	I
14.109				
	1344	.629	.705	I
14.108				
	1350	.624	.699	I
14.107				
	1356	.621	.692	I
14.106				
	1362	.617	.686	I
14.105				
	1368	.613	.680	I
14.104				
	1374	.610	.674	I
14.103				
	1380	.607	.668	I
14.102				
	1386	.604	.663	I
14.101				
	1392	.602	.658	I
14.100				
	1398	.600	.653	I
14.100				
	1404	.598	.649	I
14.099				
	1410	.596	.644	I
14.098				
	1416	.594	.640	I
14.098				
	1422	.593	.636	I
14.097				
	1428	.592	.632	I
14.097				
	1434	.591	.629	I
14.096				
	1440	.590	.626	I

14.096				
	1446	.537	.620	I
14.095				
	1452	.377	.606	I
14.093				
	1458	.213	.580	I
14.089				
	1464	.110	.544	I
14.083				
	1470	.058	.505	I
14.077				
	1476	.030	.466	I
14.071				
	1482	.016	.428	I
14.065				
	1488	.008	.393	I
14.060				
	1494	.004	.360	I
14.055				
	1500	.002	.329	I
14.050				
	1506	.000	.301	I
14.046				
	1512	.000	.276	I
14.042				
	1518	.000	.252	I
14.039				
	1524	.000	.231	I
14.035				
	1530	.000	.211	I
14.032				
	1536	.000	.193	I
14.029				
	1542	.000	.177	I
14.027				
	1548	.000	.162	I
14.025				
	1554	.000	.148	I
14.023				
	1560	.000	.135	I
14.021				
	1566	.000	.124	I
14.019				
	1572	.000	.113	I
14.017				
	1578	.000	.104	I
14.016				
	1584	.000	.095	I
14.014				
	1590	.000	.087	I
14.013				
	1596	.000	.079	I
14.012				
	1602	.000	.073	I
14.011				
	1608	.000	.066	I
14.010				
	1614	.000	.061	I
14.009				
	1620	.000	.056	I

14.008				
	1626	.000	.051	I
14.008				
	1632	.000	.046	I
14.007				
	1638	.000	.043	I
14.006				
	1644	.000	.039	I
14.006				
	1650	.000	.036	I
14.005				
	1656	.000	.033	I
14.005				
	1662	.000	.030	I
14.005				
	1668	.000	.027	I
14.004				
	1674	.000	.025	I
14.004				
	1680	.000	.023	I
14.003				
	1686	.000	.021	I
14.003				
	1692	.000	.019	I
14.003				
	1698	.000	.017	I
14.003				
	1704	.000	.016	I
14.002				
	1710	.000	.015	I
14.002				
	1716	.000	.013	I
14.002				
	1722	.000	.012	I
14.002				
	1728	.000	.011	I
14.002				
	1734	.000	.010	I
14.002				
	1740	.000	.009	I
14.001				
	1746	.000	.009	I
14.001				
	1752	.000	.008	I
14.001				
	1758	.000	.007	I
14.001				
	1764	.000	.007	I
14.001				
	1770	.000	.006	I
14.001				
	1776	.000	.005	I
14.001				
	1782	.000	.005	I
14.001				
	1788	.000	.005	I
14.001				
	1794	.000	.004	I
14.001				
	1800	.000	.004	I

```
14.001
        1806                .000                .004                |
14.001
        1812                .000                .003                |
14.000
        1818                .000                .003                |
14.000
        1824                .000                .003                |
14.000
        1830                .000                .002                |
14.000
        1836                .000                .002                |
14.000
        1842                .000                .002                |
14.000
        1848                .000                .002                |
14.000
        1854                .000                .002                |
14.000
        1860                .000                .002                |
14.000
        1866                .000                .001                |
14.000
        1872                .000                .001                |
14.000
        1878                .000                .001                |
14.000
        1884                .000                .001                |
14.000
        1890                .000                .001                |
14.000
        1896                .000                .001                |
14.000
        1902                .000                .001                |
14.000
        1908                .000                .001                |
14.000
        1914                .000                .001                |
14.000
        1920                .000                .001                |
14.000
        1926                .000                .001                |
14.000
        1932                .000                .001                |
14.000
        1938                .000                .000                |
14.000
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 *******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
*******************

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:09:06
  Output: WNHP2.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	15.531	.993	32.512	7.087

10 -YR STORM ROUTING

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:08:18
  Output: WNHP10.OUT


 SOLUTION FOR  1  STORMS.


 TIME INCREMENT:   .100  Hours


 STORM
 NUMBER   HYDROGRAPH IN FILE:
 ______   ___________________________________________________________

   1      WNH10.DAT


                                   ALLOWABLE
                        PEAK         PEAK                    RUNOFF
TAILWATER
            STORM      INFLOW     DISCHARGE   DURATION      VOLUME
STAGE
            NUMBER      (cfs)       (cfs)       (min)        (ft3)
(ft)
            ______   __________   __________   ________   ___________
_________

              1         75.434       N/A       1794.00    .2674E+06
11.000

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:08:18
  Output: WNHP10.OUT


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

```
          TAILWATER STAGE:   11.000 feet.
            INITIAL STAGE:   14.000 feet.

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

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

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
14.000	.0000	.0000
15.000	.6086	6.550
16.000	1.332	7.560
17.000	2.172	8.450
18.000	3.129	9.260
19.000	4.209	25.00
20.000	5.417	64.79

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:08:18
  Output: WNHP10.OUT


          TAILWATER STAGE:   11.000 feet.
            INITIAL STAGE:   14.000 feet.

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

     MAXIMUM ELEVATION:    17.71     feet.
        MAXIMUM INFLOW:    75.43     cfs.
       MAXIMUM OUTFLOW:    9.025     cfs.
       MAXIMUM STORAGE:    2.851     acre-feet.

      CONTINUITY ERROR:     .143E-04 percent.
```

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

14.000				
	6	.000	.000	I
14.000				
	12	.000	.000	I
14.000				
	18	.000	.000	I
14.000				
	24	.000	.000	I
14.000				
	30	.000	.000	I
14.000				
	36	.000	.000	I
14.000				
	42	.000	.000	I
14.000				
	48	.000	.000	I
14.000				
	54	.000	.000	I
14.000				
	60	.000	.000	I
14.000				
	66	.000	.000	I
14.000				
	72	.000	.000	I
14.000				
	78	.000	.000	I
14.000				
	84	.000	.000	I
14.000				
	90	.000	.000	I
14.000				
	96	.000	.000	I
14.000				
	102	.000	.000	I
14.000				
	108	.000	.000	I
14.000				
	114	.000	.000	I
14.000				
	120	.000	.000	I
14.000				
	126	.000	.000	I
14.000				
	132	.000	.000	I
14.000				
	138	.000	.000	I
14.000				
	144	.000	.000	I
14.000				
	150	.000	.000	I
14.000				
	156	.000	.000	I
14.000				
	162	.000	.000	I
14.000				
	168	.000	.000	I
14.000				
	174	.000	.000	I
14.000				
	180	.000	.000	I

14.000				
	186	.000	.000	I
14.000				
	192	.000	.000	I
14.000				
	198	.000	.000	I
14.000				
	204	.000	.000	I
14.000				
	210	.000	.000	I
14.000				
	216	.000	.000	I
14.000				
	222	.000	.000	I
14.000				
	228	.000	.000	I
14.000				
	234	.000	.000	I
14.000				
	240	.000	.000	I
14.000				
	246	.000	.000	I
14.000				
	252	.000	.000	I
14.000				
	258	.000	.000	I
14.000				
	264	.000	.000	I
14.000				
	270	.000	.000	I
14.000				
	276	.000	.000	I
14.000				
	282	.000	.000	I
14.000				
	288	.000	.000	I
14.000				
	294	.000	.000	I
14.000				
	300	.000	.000	I
14.000				
	306	.000	.000	I
14.000				
	312	.000	.000	I
14.000				
	318	.000	.000	I
14.000				
	324	.000	.000	I
14.000				
	330	.000	.000	I
14.000				
	336	.000	.000	I
14.000				
	342	.000	.000	I
14.000				
	348	.000	.000	I
14.000				
	354	.000	.000	I
14.000				
	360	.000	.000	I

14.000				
	366	.000	.000	I
14.000				
	372	.000	.000	I
14.000				
	378	.001	.000	I
14.000				
	384	.006	.000	I
14.000				
	390	.016	.001	I
14.000				
	396	.029	.003	I
14.000				
	402	.045	.006	I
14.001				
	408	.061	.010	I
14.002				
	414	.078	.015	I
14.002				
	420	.095	.021	I
14.003				
	426	.115	.028	I
14.004				
	432	.142	.037	I
14.006				
	438	.171	.047	I
14.007				
	444	.199	.059	I
14.009				
	450	.225	.072	I
14.011				
	456	.249	.086	I
14.013				
	462	.273	.101	I
14.015				
	468	.296	.116	I
14.018				
	474	.319	.133	I
14.020				
	480	.341	.149	I
14.023				
	486	.370	.167	I
14.025				
	492	.414	.186	I
14.028				
	498	.460	.207	I
14.032				
	504	.499	.231	I
14.035				
	510	.533	.255	I
14.039				
	516	.569	.280	I
14.043				
	522	.612	.307	I
14.047				
	528	.656	.335	I
14.051				
	534	.695	.364	I
14.055				
	540	.729	.393	I

14.060				
	546	.772	.424	|
14.065				
	552	.836	.456	|
14.070				
	558	.903	.491	|
14.075				
	564	.958	.529	|
14.081				
	570	1.004	.567	|
14.087				
	576	1.058	.607	|
14.093				
	582	1.135	.648	|
14.099				
	588	1.214	.693	|
14.106				
	594	1.279	.740	|
14.113				
	600	1.332	.788	|
14.120				
	606	1.417	.838	|
14.128				
	612	1.576	.894	|
14.137				
	618	1.741	.959	|
14.146				
	624	1.868	1.031	|
14.157				
	630	1.961	1.107	|
14.169				
	636	2.108	1.186	|
14.181				
	642	2.388	1.276	|
14.195				
	648	2.680	1.383	|
14.211				
	654	2.900	1.503	|
14.229				
	660	3.057	1.629	|
14.249				
	666	3.354	1.763	|
14.269				
	672	3.989	1.926	|
14.294				
	678	4.656	2.130	|
14.325				
	684	5.147	2.366	|
14.361				
	690	5.484	2.617	|
14.400				
	696	6.955	2.924	|
14.446				
	702	10.920	3.436	|
14.525				
	708	18.569	4.399	|
14.672				
	714	35.890	6.343	|
14.968				
	720	61.526	7.008	|

15.453				
	726	75.434	7.676	|
16.131				
	732	62.537	8.211	|
16.731				
	738	42.156	8.566	|
17.144				
	744	28.607	8.753	|
17.375				
	750	21.881	8.868	|
17.517				
	756	17.693	8.945	|
17.611				
	762	13.934	8.992	|
17.670				
	768	11.043	9.017	|
17.700				
	774	9.324	9.025	|
17.710				
	780	8.414	9.024	|
17.708				
	786	7.688	9.017	|
17.700				
	792	6.921	9.005	|
17.685				
	798	6.282	8.988	|
17.665				
	804	5.892	8.968	|
17.640				
	810	5.699	8.946	|
17.612				
	816	5.486	8.923	|
17.583				
	822	5.108	8.897	|
17.552				
	828	4.748	8.870	|
17.518				
	834	4.527	8.840	|
17.482				
	840	4.417	8.810	|
17.444				
	846	4.376	8.779	|
17.406				
	852	4.379	8.748	|
17.368				
	858	4.344	8.718	|
17.330				
	864	4.243	8.687	|
17.292				
	870	4.100	8.655	|
17.254				
	876	3.940	8.623	|
17.214				
	882	3.777	8.590	|
17.173				
	888	3.617	8.556	|
17.131				
	894	3.462	8.521	|
17.087				
	900	3.315	8.485	|

17.043				
	906	3.176	8.448	|
16.998				
	912	3.046	8.402	|
16.946				
	918	2.925	8.354	|
16.892				
	924	2.815	8.306	|
16.839				
	930	2.714	8.258	|
16.784				
	936	2.623	8.209	|
16.730				
	942	2.542	8.160	|
16.675				
	948	2.471	8.111	|
16.619				
	954	2.410	8.062	|
16.564				
	960	2.358	8.012	|
16.508				
	966	2.317	7.963	|
16.452				
	972	2.284	7.913	|
16.397				
	978	2.258	7.864	|
16.342				
	984	2.236	7.815	|
16.287				
	990	2.215	7.766	|
16.232				
	996	2.196	7.718	|
16.177				
	1002	2.177	7.670	|
16.123				
	1008	2.158	7.622	|
16.069				
	1014	2.140	7.574	|
16.016				
	1020	2.121	7.516	|
15.956				
	1026	2.103	7.454	|
15.895				
	1032	2.085	7.392	|
15.834				
	1038	2.066	7.331	|
15.774				
	1044	2.048	7.271	|
15.714				
	1050	2.030	7.211	|
15.654				
	1056	2.011	7.151	|
15.595				
	1062	1.993	7.092	|
15.537				
	1068	1.974	7.034	|
15.479				
	1074	1.956	6.976	|
15.421				
	1080	1.937	6.918	|

15.364				
	1086	1.919	6.861	|
15.308				
	1092	1.901	6.804	|
15.251				
	1098	1.882	6.748	|
15.196				
	1104	1.864	6.692	|
15.140				
	1110	1.845	6.636	|
15.085				
	1116	1.827	6.581	|
15.031				
	1122	1.808	6.376	|
14.973				
	1128	1.790	5.986	|
14.914				
	1134	1.771	5.628	|
14.859				
	1140	1.753	5.299	|
14.809				
	1146	1.735	4.996	|
14.763				
	1152	1.716	4.718	|
14.720				
	1158	1.698	4.461	|
14.681				
	1164	1.679	4.225	|
14.645				
	1170	1.661	4.008	|
14.612				
	1176	1.642	3.807	|
14.581				
	1182	1.624	3.622	|
14.553				
	1188	1.605	3.451	|
14.527				
	1194	1.587	3.293	|
14.503				
	1200	1.569	3.147	|
14.480				
	1206	1.550	3.012	|
14.460				
	1212	1.532	2.886	|
14.441				
	1218	1.513	2.770	|
14.423				
	1224	1.495	2.662	|
14.406				
	1230	1.478	2.562	|
14.391				
	1236	1.461	2.469	|
14.377				
	1242	1.444	2.383	|
14.364				
	1248	1.428	2.302	|
14.351				
	1254	1.412	2.227	|
14.340				
	1260	1.397	2.157	|

14.329				
	1266	1.382	2.092	
14.319				
	1272	1.367	2.030	
14.310				
	1278	1.353	1.973	
14.301				
	1284	1.340	1.920	
14.293				
	1290	1.327	1.870	
14.286				
	1296	1.314	1.823	
14.278				
	1302	1.302	1.779	
14.272				
	1308	1.290	1.738	
14.265				
	1314	1.279	1.700	
14.259				
	1320	1.268	1.663	
14.254				
	1326	1.258	1.629	
14.249				
	1332	1.248	1.597	
14.244				
	1338	1.239	1.567	
14.239				
	1344	1.230	1.539	
14.235				
	1350	1.222	1.512	
14.231				
	1356	1.214	1.487	
14.227				
	1362	1.206	1.464	
14.223				
	1368	1.199	1.441	
14.220				
	1374	1.193	1.420	
14.217				
	1380	1.187	1.401	
14.214				
	1386	1.181	1.382	
14.211				
	1392	1.176	1.365	
14.208				
	1398	1.171	1.349	
14.206				
	1404	1.167	1.333	
14.204				
	1410	1.163	1.319	
14.201				
	1416	1.160	1.306	
14.199				
	1422	1.157	1.293	
14.197				
	1428	1.155	1.281	
14.196				
	1434	1.153	1.271	
14.194				
	1440	1.152	1.261	

14.192				
	1446	1.047	1.247	|
14.190				
	1452	.735	1.217	|
14.186				
	1458	.415	1.162	|
14.177				
	1464	.215	1.090	|
14.166				
	1470	.113	1.011	|
14.154				
	1476	.059	.932	|
14.142				
	1482	.031	.857	|
14.131				
	1488	.016	.786	|
14.120				
	1494	.008	.720	|
14.110				
	1500	.003	.659	|
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	1506	.001	.603	|
14.092				
	1512	.000	.552	|
14.084				
	1518	.000	.505	|
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	1524	.000	.462	|
14.070				
	1530	.000	.422	|
14.064				
	1536	.000	.386	|
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	1542	.000	.354	|
14.054				
	1548	.000	.323	|
14.049				
	1554	.000	.296	|
14.045				
	1560	.000	.271	|
14.041				
	1566	.000	.248	|
14.038				
	1572	.000	.227	|
14.035				
	1578	.000	.207	|
14.032				
	1584	.000	.190	|
14.029				
	1590	.000	.173	|
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	1596	.000	.159	|
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	1602	.000	.145	|
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	1608	.000	.133	|
14.020				
	1614	.000	.121	|
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	1620	.000	.111	|

14.017			
	1626	.000	.102
14.016			
	1632	.000	.093
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	1638	.000	.085
14.013			
	1644	.000	.078
14.012			
	1650	.000	.071
14.011			
	1656	.000	.065
14.010			
	1662	.000	.060
14.009			
	1668	.000	.055
14.008			
	1674	.000	.050
14.008			
	1680	.000	.046
14.007			
	1686	.000	.042
14.006			
	1692	.000	.038
14.006			
	1698	.000	.035
14.005			
	1704	.000	.032
14.005			
	1710	.000	.029
14.004			
	1716	.000	.027
14.004			
	1722	.000	.024
14.004			
	1728	.000	.022
14.003			
	1734	.000	.020
14.003			
	1740	.000	.019
14.003			
	1746	.000	.017
14.003			
	1752	.000	.016
14.002			
	1758	.000	.014
14.002			
	1764	.000	.013
14.002			
	1770	.000	.012
14.002			
	1776	.000	.011
14.002			
	1782	.000	.010
14.002			
	1788	.000	.009
14.001			
	1794	.000	.008
14.001			
	1800	.000	.008

14.001				
	1806	.000	.007	|
14.001				
	1812	.000	.006	|
14.001				
	1818	.000	.006	|
14.001				
	1824	.000	.005	|
14.001				
	1830	.000	.005	|
14.001				
	1836	.000	.005	|
14.001				
	1842	.000	.004	|
14.001				
	1848	.000	.004	|
14.001				
	1854	.000	.003	|
14.001				
	1860	.000	.003	|
14.000				
	1866	.000	.003	|
14.000				
	1872	.000	.003	|
14.000				
	1878	.000	.002	|
14.000				
	1884	.000	.002	|
14.000				
	1890	.000	.002	|
14.000				
	1896	.000	.002	|
14.000				
	1902	.000	.002	|
14.000				
	1908	.000	.002	|
14.000				
	1914	.000	.001	|
14.000				
	1920	.000	.001	|
14.000				
	1926	.000	.001	|
14.000				
	1932	.000	.001	|
14.000				
	1938	.000	.001	|
14.000				
	1944	.000	.001	|
14.000				
	1950	.000	.001	|
14.000				
	1956	.000	.001	|
14.000				
	1962	.000	.001	|
14.000				
	1968	.000	.001	|
14.000				
	1974	.000	.001	|
14.000				
	1980	.000	.001	|

```
14.000
         1986                .000                .000
14.000
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
******************

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:08:18
  Output: WNHP10.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	17.710	2.85	75.434	9.025

100-YR STORM ROUTING

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:07:10
  Output: WNHP100.OUT


 SOLUTION FOR  1  STORMS.


 TIME INCREMENT:   .100  Hours
```

STORM NUMBER	HYDROGRAPH IN FILE:
1	WNH100.DAT

STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)	TAILWATER STAGE (ft)
1	111.030	N/A	1794.00	.3978E+06	11.000

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:07:10
  Output: WNHP100.OUT


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

```
          TAILWATER STAGE:   11.000 feet.
            INITIAL STAGE:   14.000 feet.

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

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

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
14.000	.0000	.0000
15.000	.6086	6.550
16.000	1.332	7.560
17.000	2.172	8.450
18.000	3.129	9.260
19.000	4.209	25.00
20.000	5.417	64.79

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

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:07:10
  Output: WNHP100.OUT


          TAILWATER STAGE:   11.000 feet.
            INITIAL STAGE:   14.000 feet.

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

     MAXIMUM ELEVATION:    18.84     feet.
        MAXIMUM INFLOW:    111.0     cfs.
       MAXIMUM OUTFLOW:    22.51     cfs.
       MAXIMUM STORAGE:    4.038     acre-feet.

      CONTINUITY ERROR:     .693E-05 percent.
```

POND

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

14.000				
	6	.000	.000	I
14.000				
	12	.000	.000	I
14.000				
	18	.000	.000	I
14.000				
	24	.000	.000	I
14.000				
	30	.000	.000	I
14.000				
	36	.000	.000	I
14.000				
	42	.000	.000	I
14.000				
	48	.000	.000	I
14.000				
	54	.000	.000	I
14.000				
	60	.000	.000	I
14.000				
	66	.000	.000	I
14.000				
	72	.000	.000	I
14.000				
	78	.000	.000	I
14.000				
	84	.000	.000	I
14.000				
	90	.000	.000	I
14.000				
	96	.000	.000	I
14.000				
	102	.000	.000	I
14.000				
	108	.000	.000	I
14.000				
	114	.000	.000	I
14.000				
	120	.000	.000	I
14.000				
	126	.000	.000	I
14.000				
	132	.000	.000	I
14.000				
	138	.000	.000	I
14.000				
	144	.000	.000	I
14.000				
	150	.000	.000	I
14.000				
	156	.000	.000	I
14.000				
	162	.000	.000	I
14.000				
	168	.000	.000	I
14.000				
	174	.000	.000	I
14.000				
	180	.000	.000	I

14.000			
	186	.000	.000
14.000			
	192	.000	.000
14.000			
	198	.000	.000
14.000			
	204	.000	.000
14.000			
	210	.000	.000
14.000			
	216	.000	.000
14.000			
	222	.000	.000
14.000			
	228	.000	.000
14.000			
	234	.000	.000
14.000			
	240	.000	.000
14.000			
	246	.000	.000
14.000			
	252	.000	.000
14.000			
	258	.000	.000
14.000			
	264	.000	.000
14.000			
	270	.000	.000
14.000			
	276	.000	.000
14.000			
	282	.000	.000
14.000			
	288	.000	.000
14.000			
	294	.000	.000
14.000			
	300	.001	.000
14.000			
	306	.006	.000
14.000			
	312	.019	.001
14.000			
	318	.037	.004
14.001			
	324	.058	.007
14.001			
	330	.080	.013
14.002			
	336	.104	.019
14.003			
	342	.127	.028
14.004			
	348	.151	.037
14.006			
	354	.174	.048
14.007			
	360	.197	.059

14.009				
	366	.222	.072	I
14.011				
	372	.255	.086	I
14.013				
	378	.289	.102	I
14.016				
	384	.320	.119	I
14.018				
	390	.349	.138	I
14.021				
	396	.377	.157	I
14.024				
	402	.403	.177	I
14.027				
	408	.429	.197	I
14.030				
	414	.455	.218	I
14.033				
	420	.480	.239	I
14.037				
	426	.516	.261	I
14.040				
	432	.575	.285	I
14.044				
	438	.639	.313	I
14.048				
	444	.691	.343	I
14.052				
	450	.734	.374	I
14.057				
	456	.773	.407	I
14.062				
	462	.808	.439	I
14.067				
	468	.842	.472	I
14.072				
	474	.874	.505	I
14.077				
	480	.906	.538	I
14.082				
	486	.953	.571	I
14.087				
	492	1.035	.607	I
14.093				
	498	1.120	.647	I
14.099				
	504	1.189	.690	I
14.105				
	510	1.242	.735	I
14.112				
	516	1.299	.781	I
14.119				
	522	1.370	.828	I
14.126				
	528	1.442	.877	I
14.134				
	534	1.502	.928	I
14.142				
	540	1.552	.979	I

14.149				
	546	1.619	1.030	
14.157				
	552	1.729	1.085	
14.166				
	558	1.841	1.145	
14.175				
	564	1.929	1.208	
14.184				
	570	1.997	1.272	
14.194				
	576	2.080	1.338	
14.204				
	582	2.207	1.406	
14.215				
	588	2.335	1.480	
14.226				
	594	2.435	1.557	
14.238				
	600	2.512	1.635	
14.250				
	606	2.646	1.715	
14.262				
	612	2.912	1.806	
14.276				
	618	3.188	1.912	
14.292				
	624	3.390	2.029	
14.310				
	630	3.529	2.151	
14.328				
	636	3.759	2.278	
14.348				
	642	4.219	2.424	
14.370				
	648	4.693	2.597	
14.396				
	654	5.035	2.790	
14.426				
	660	5.264	2.991	
14.457				
	666	5.724	3.204	
14.489				
	672	6.742	3.462	
14.529				
	678	7.799	3.786	
14.578				
	684	8.548	4.160	
14.635				
	690	9.031	4.554	
14.695				
	696	11.307	5.032	
14.768				
	702	17.495	5.830	
14.890				
	708	29.154	6.654	
15.103				
	714	54.885	7.059	
15.504				
	720	91.922	7.758	

16.222	726	111.030	8.550	
17.123	732	91.347	9.196	
17.921	738	61.265	15.837	
18.418	744	41.360	19.868	
18.674	750	31.448	21.747	
18.793	756	25.300	22.499	
18.841	762	19.853	22.508	
18.842	768	15.690	21.970	
18.807	774	13.214	21.116	
18.753	780	11.896	20.143	
18.691	786	10.851	19.147	
18.628	792	9.760	18.142	
18.564	798	8.853	17.138	
18.501	804	8.298	16.165	
18.439	810	8.020	15.256	
18.381	816	7.717	14.416	
18.328	822	7.182	13.625	
18.277	828	6.673	12.864	
18.229	834	6.359	12.143	
18.183	840	6.203	11.477	
18.141	846	6.142	10.874	
18.103	852	6.145	10.337	
18.068	858	6.093	9.857	
18.038	864	5.949	9.421	
18.010	870	5.746	9.245	
17.981	876	5.520	9.220	
17.950	882	5.291	9.193	
17.918	888	5.065	9.165	
17.883	894	4.847	9.136	
17.847	900	4.639	9.105	

17.809				
	906	4.444	9.073	
17.770				
	912	4.261	9.041	
17.729				
	918	4.091	9.007	
17.687				
	924	3.936	8.972	
17.644				
	930	3.794	8.936	
17.600				
	936	3.666	8.900	
17.555				
	942	3.552	8.863	
17.510				
	948	3.452	8.826	
17.464				
	954	3.366	8.788	
17.417				
	960	3.294	8.750	
17.370				
	966	3.235	8.712	
17.323				
	972	3.189	8.673	
17.276				
	978	3.152	8.635	
17.228				
	984	3.120	8.597	
17.181				
	990	3.091	8.558	
17.134				
	996	3.064	8.520	
17.087				
	1002	3.037	8.482	
17.039				
	1008	3.010	8.442	
16.991				
	1014	2.984	8.395	
16.938				
	1020	2.958	8.348	
16.885				
	1026	2.932	8.300	
16.832				
	1032	2.906	8.254	
16.779				
	1038	2.880	8.207	
16.727				
	1044	2.854	8.160	
16.674				
	1050	2.828	8.114	
16.622				
	1056	2.802	8.068	
16.570				
	1062	2.776	8.022	
16.519				
	1068	2.750	7.976	
16.467				
	1074	2.724	7.930	
16.416				
	1080	2.698	7.885	

16.365	1086	2.672	7.839	I
16.314	1092	2.646	7.794	I
16.263	1098	2.620	7.749	I
16.212	1104	2.594	7.704	I
16.162	1110	2.568	7.660	I
16.112	1116	2.542	7.615	I
16.062	1122	2.516	7.571	I
16.012	1128	2.490	7.516	I
15.956	1134	2.464	7.458	I
15.899	1140	2.438	7.401	I
15.842	1146	2.412	7.344	I
15.786	1152	2.386	7.287	I
15.730	1158	2.361	7.231	I
15.674	1164	2.335	7.175	I
15.618	1170	2.309	7.119	I
15.563	1176	2.283	7.064	I
15.509	1182	2.257	7.009	I
15.454	1188	2.231	6.954	I
15.400	1194	2.205	6.900	I
15.346	1200	2.180	6.846	I
15.293	1206	2.154	6.792	I
15.240	1212	2.128	6.739	I
15.187	1218	2.102	6.686	I
15.134	1224	2.077	6.633	I
15.082	1230	2.053	6.581	I
15.030	1236	2.029	6.392	I
14.976	1242	2.006	6.019	I
14.919	1248	1.983	5.676	I
14.867	1254	1.961	5.361	I
14.818	1260	1.939	5.070	I

14.774				
	1266	1.918	4.803	
14.733				
	1272	1.898	4.556	
14.696				
	1278	1.878	4.329	
14.661				
	1284	1.860	4.120	
14.629				
	1290	1.841	3.926	
14.599				
	1296	1.824	3.748	
14.572				
	1302	1.807	3.583	
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	1308	1.790	3.431	
14.524				
	1314	1.775	3.291	
14.502				
	1320	1.760	3.161	
14.483				
	1326	1.745	3.041	
14.464				
	1332	1.732	2.930	
14.447				
	1338	1.719	2.828	
14.432				
	1344	1.706	2.733	
14.417				
	1350	1.694	2.645	
14.404				
	1356	1.683	2.563	
14.391				
	1362	1.673	2.488	
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	1368	1.663	2.418	
14.369				
	1374	1.654	2.353	
14.359				
	1380	1.645	2.293	
14.350				
	1386	1.637	2.238	
14.342				
	1392	1.630	2.186	
14.334				
	1398	1.623	2.139	
14.327				
	1404	1.618	2.095	
14.320				
	1410	1.612	2.054	
14.314				
	1416	1.608	2.016	
14.308				
	1422	1.604	1.981	
14.302				
	1428	1.600	1.949	
14.298				
	1434	1.598	1.919	
14.293				
	1440	1.596	1.892	

14.289				
	1446	1.451	1.860	
14.284				
	1452	1.018	1.807	
14.276				
	1458	.575	1.721	
14.263				
	1464	.297	1.612	
14.246				
	1470	.157	1.494	
14.228				
	1476	.082	1.377	
14.210				
	1482	.042	1.265	
14.193				
	1488	.022	1.160	
14.177				
	1494	.011	1.062	
14.162				
	1500	.005	.973	
14.148				
	1506	.001	.890	
14.136				
	1512	.000	.814	
14.124				
	1518	.000	.745	
14.114				
	1524	.000	.681	
14.104				
	1530	.000	.623	
14.095				
	1536	.000	.570	
14.087				
	1542	.000	.522	
14.080				
	1548	.000	.477	
14.073				
	1554	.000	.437	
14.067				
	1560	.000	.399	
14.061				
	1566	.000	.365	
14.056				
	1572	.000	.334	
14.051				
	1578	.000	.306	
14.047				
	1584	.000	.280	
14.043				
	1590	.000	.256	
14.039				
	1596	.000	.234	
14.036				
	1602	.000	.214	
14.033				
	1608	.000	.196	
14.030				
	1614	.000	.179	
14.027				
	1620	.000	.164	

14.025	1626	.000	.150	I
14.023	1632	.000	.137	I
14.021	1638	.000	.126	I
14.019	1644	.000	.115	I
14.018	1650	.000	.105	I
14.016	1656	.000	.096	I
14.015	1662	.000	.088	I
14.013	1668	.000	.080	I
14.012	1674	.000	.074	I
14.011	1680	.000	.067	I
14.010	1686	.000	.062	I
14.009	1692	.000	.056	I
14.009	1698	.000	.052	I
14.008	1704	.000	.047	I
14.007	1710	.000	.043	I
14.007	1716	.000	.039	I
14.006	1722	.000	.036	I
14.006	1728	.000	.033	I
14.005	1734	.000	.030	I
14.005	1740	.000	.028	I
14.004	1746	.000	.025	I
14.004	1752	.000	.023	I
14.004	1758	.000	.021	I
14.003	1764	.000	.019	I
14.003	1770	.000	.018	I
14.003	1776	.000	.016	I
14.002	1782	.000	.015	I
14.002	1788	.000	.014	I
14.002	1794	.000	.012	I
14.002	1800	.000	.011	I

14.002	1806	.000	.010	|
14.002	1812	.000	.010	|
14.001	1818	.000	.009	|
14.001	1824	.000	.008	|
14.001	1830	.000	.007	|
14.001	1836	.000	.007	|
14.001	1842	.000	.006	|
14.001	1848	.000	.006	|
14.001	1854	.000	.005	|
14.001	1860	.000	.005	|
14.001	1866	.000	.004	|
14.001	1872	.000	.004	|
14.001	1878	.000	.004	|
14.001	1884	.000	.003	|
14.000	1890	.000	.003	|
14.000	1896	.000	.003	|
14.000	1902	.000	.003	|
14.000	1908	.000	.002	|
14.000	1914	.000	.002	|
14.000	1920	.000	.002	|
14.000	1926	.000	.002	|
14.000	1932	.000	.002	|
14.000	1938	.000	.001	|
14.000	1944	.000	.001	|
14.000	1950	.000	.001	|
14.000	1956	.000	.001	|
14.000	1962	.000	.001	|
14.000	1968	.000	.001	|
14.000	1974	.000	.001	|
14.000	1980	.000	.001	|

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14.000
        1986                .000                .001                |
14.000
        1992                .000                .001                |
14.000
        1998                .000                .001                |
14.000
        2004                .000                .001                |
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        2010                .000                .001                |
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        2016                .000                .000                |
14.000
1*******************************     PONDOPT
*******************************
 *******************************   Version 1.83
*******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS
*******************

 PROJECT: WNRC
    User: Rickmond Engineering
    Date: 09/22/1998   Tuesday
    Time: 16:07:10
  Output: WNHP100.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	18.842	4.04	111.030	22.508

RICKMOND ENGINEERING, INC.
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JOB 98150
SHEET NO. 98 OF
CALCULATED BY KMJ DATE 7/14/98
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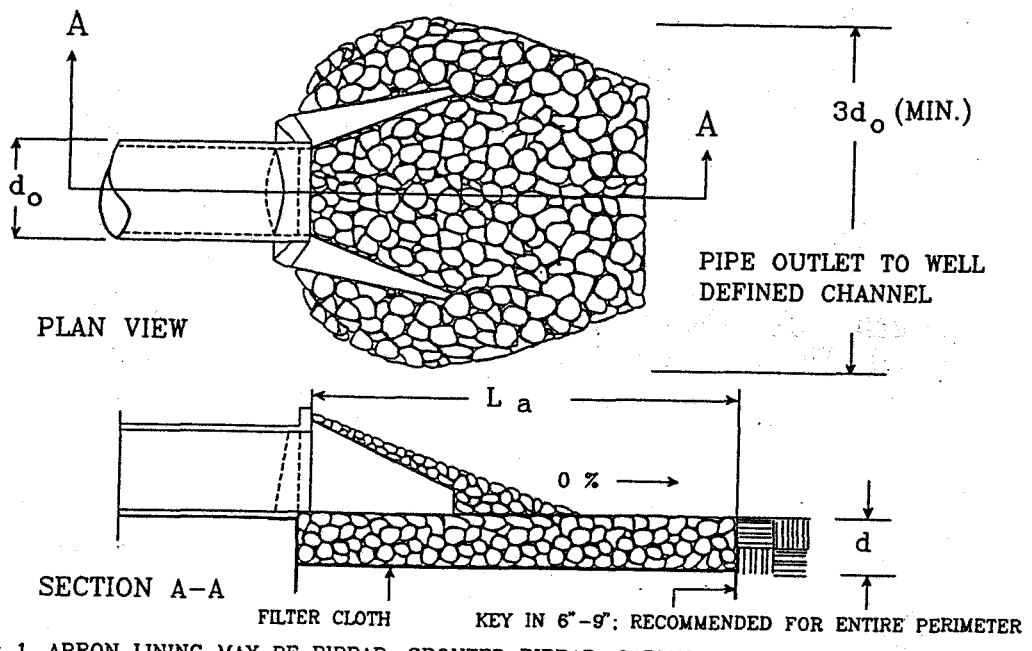
DESIGN OUTLET PROTECTION
EXISTING POND



NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18–3 AND 3.18–4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

Plate 3.18-4
Q = 9.75 cfs
d = 1.0'
3d = 3.0'
La = 15'
W = 27'
d_{50} = 0.1'

USE 15' x 27' x 26"
VDOT CLASS I
RIP RAP APRON

RICKMOND ENGINEERING, INC.
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WILLIAMSBURG, VIRGINIA 23185
(804) 229-1776

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CULVERT DESIGN
Entrance

c= .20
A= .69 Ac.

OVERLAND FLOW

L= 300 ft.
S= 2.0 %
Tc= 24 min.

CHANNEL FLOW

H= 1.0 ft.
L= 50 ft.
Tc= <1 min.

Tc= 24 min

i_{10}= 4.0 in/hr

Q=CAi=(.20)(.69 Ac.)(4.0 in/hr)

Q= 0.55 cfs
L= 110 ft.
S= 0.5 %
HW= 2.5 ft.

Inv_i = 26.55
Inv_o = 26.00

INLET CONTROL

D= 15 in. or 1.25 ft.

HW/D= .5

HW=(1.25 ft.)(.5)= .63 ft. < 2.5 ft.

RICKMOND ENGINEERING, INC.
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(804) 875-1785

JOB 98150
SHEET NO. 100 OF
CALCULATED BY KMJ DATE 7/14/98
CHECKED BY DATE
SCALE

OUTLET CONTROL

$d_c = 0.29$

$h_o = \frac{d_o + D}{2} = \frac{1.25 + 0.29}{2} = .77$

$S_o L = (.005)(110) = 0.55$

$d_n = .29$

$\frac{d}{D} = .23$ $\frac{r}{D} = .1364$ P.E. Manual Pg 3-43

$R = .17$

$v = 2.51$ fps

$H = (1 + k_e + \frac{29 n^2 L}{R^{4/3}}) \frac{v^2}{2g} = .70$

$HW = H + h_o - S_o L = 0.92' < 2.5'$

Outlet Control Governs

WILLIAMSBURG NURSING AND REHABILITATION CENTER

EROSION AND SEDIMENT CONTROL

NARRATIVE

Richmond

ENGINEERING, INC.

1643 Merrimac Trail
Williamsburg, VA 23185
(757) 229-1776

July 15, 1998

Project 98150

Project Description

The project consists of a one-story, 120 bed, 43,527sf Skilled Care facility with a parking lot, sidewalks, entrance and service road, waterlines, sanitary sewer pump station and forcemain, and storm sewer lines. The total disturbed area is 7.10 acres.

Existing Conditions

Currently the majority of the site is wooded with numerous dilapidated buildings and a swimming pool along the Jamestown Road frontage. The site falls from elevation 76 in the northeast corner to an existing pond with water elevation of 15 at the southwest corner.

Adjacent Areas

The site is bounded on the north by Chanco's Grant Subdivision, on the east by five single family homes, 7-11 Store, and Sandy Bay Road, on the south by Jamestown Road, and on the west by a wooded undeveloped parcel.

Off-Site Areas

The only off-site areas disturbed in the Jamestown Road right-of-way for the new entrance and right turn lane.

Soils

The on-site soils are Slagle (29A) and Kempsville-Emporia (19B).

Slagle fine sandy loam is 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. Below this depth, it is mostly mottled clay loam and sandy clay loam. The substratum is mottled sandy clay loam to a depth of at least 60 inches.

Slagle soil permeability is moderate in the upper part of the subsoil and moderately slow or slow in the lower part and the erosion hazard is slight.

Kempsville-Emporia fine sandy loam is deep, gently sloping, and well drained.

Typically, the surface layer of this Kempsville soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam 10 inches thick. The subsoil extends to a depth of 55 inches. It is yellowish brown and strong brown fine sandy loam and sandy clay loam to a depth of 32 inches. Below this, the subsoil is mottled fine sandy loam that is somewhat firm and compact over yellowish brown sandy clay loam. The substratum is yellowish brown fine sandy loam to a depth of at least 68 inches.

Typically, the surface layer of this Emporia soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale brown loam 9 inches thick. The subsoil extends to a depth of 58 inches. It is yellowish brown loam with mostly strong brown mottles in the upper part, yellowish brown, firm sandy clay loam with strong brown and gray mottles in the middle part, and mottled gray and brown firm sandy clay loam in the lower part. The substratum is variegated gray, brown, and red firm sandy clay loam to a depth of at least 75 inches.

The permeability of the Kempsville soil is moderate. In the Emporia soil, permeability is moderate in the upper part of the subsoil and moderately slow to slow in the lower part. The erosion hazard is moderate.

Critical Erosion Areas

The critical erosion areas on the site are the hill in the northeast corner and the ravine upstream from the pond. These areas discharge to wetlands which would experience serious degradation if sediment was to leave the site and enter these areas. To prevent sediment from entering these areas it is imperative that the contractor install all erosion and sediment control measures shown on these plans before any and disturbing activities commence. Regular inspection and maintenance are also required for all erosion and sediment control measures to keep them functioning as designed.

Erosion and Sediment Central 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 fences is placed around the limits of clearing to intercept and detain a small amount of sediment from disturbed areas during construction operations and to direct sediment laden runoff to sediment traps.

3. Inlet protection is installed at all drainage inlets to prevent sediment from entering the storm drainage systems prior to permanent stabilization for the disturbed areas.

4. Sediment traps are installed to detain sediment laden runoff from upstream disturbed areas long enough to allow the majority of the sediment to settle out.

5. Soil stabilization matting will be used on all slopes steeper than 3:1 to aid in controlling erosion by providing a microclimate which protects young vegetation and promotes its establishment.

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. Erosion control blankets will be installed over fill slopes which have been brought to final grade and have been seeded to protect the slopes from rill and gully erosion and to allow seed to germinate properly. Mulch (straw or fiber) will be used on relatively flat areas. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching.

Stormwater Management

The sites Chesapeake Bay Preservation Act (CBPA) and stormwater management requirements area met by the use of the on-site existing retention pond in conjunction with the dedication of approximately a third of the site to James City County as natural open space

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 sediment traps will be checked regularly for sediment cleanout.

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

3. 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.

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

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JOB 98150
SHEET NO. ____ OF ____
CALCULATED BY KMJ DATE 7/15/98
CHECKED BY ____ DATE ____
SCALE ____

DESIGN SEDIMENT TRAP #1

Area = 3.00 ac (Disturbed)

Initial Storage = 3.00 ac × 134 cyd/ac = 402 cyd

Dry Storage = 201 cyd

Wet Storage = 201 cyd

Calculate Wet Storage:

V_1 = 201 cyd = 5,427 cf
D_1 = 4'

$V_1 = .85 \times A_1 \times D_1$

$5427 = .85 \times A_1 \times 4$

A_1 = 1,596 sf = 40' × 40'

Sediment Trap #1 is used in lieu of a sediment basin because the downstream wet pond will act as a sediment basin. By using a sediment trap significantly less woods will be destroyed for a temporary structure

Calculate Dry Storage:

V_2 = 201 cyd = 5427 cf
D_2 = 4'
A_1 = 1596 sf

$$V_2 = \frac{A_1 + A_2}{2} \times D_2 \Rightarrow 5427 = \frac{1596 + A_2}{2} \times 4$$

A_2 = 1,118 sf

L = 6' × 3 = 18'

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JOB 98150
SHEET NO. ____ OF ____
CALCULATED BY KMJ DATE 7/21/98
CHECKED BY ____ DATE ____
SCALE ____

DESIGN SEDIMENT TRAP #2

Area = 3.00 ac (Disturbed)

Initial Storage = 3.00 ac × 134 $\frac{cyd}{ac}$ = 402 cyd

Dry Storage = 201 cyd

Wet Storage = 201 cyd

Calculate Wet Storage:

V_1 = 201 cyd = 5427 cf
D_1 = 4'

$V_1 = .85 \times A_1 \times D_1$

$5427 = .85 \times A_1 \times 4$

A_1 = 1596 sf = 40' × 40'

Calculate Dry Storage:

V_2 = 201 cyd = 5427 cf
D_2 = 4'
A_1 = 1596 sf

$V_2 = \frac{A_1 + A_2}{2} \times D_2 \Rightarrow 5427 = \frac{1596 + A_2}{2} \times 4$

A_2 = 1118 sf

L = 6' × 3 = 18'

Sediment Trap #2 is used in lieu of a sediment basin because the downstream wet pond will act as sediment basin. By using a sediment trap significantly less woods will be destroyed for a temporary structure.

Hampton Gib Seese - 827-7207

Schnabel Engineering

Schnabel Engineering Associates, Inc.
One West Cary Street
Richmond, VA 23220-5809
804-649-7035 • Fax 804-783-8023

RECEIVED
SEP 1998
PLANNING DEPARTMENT

September 25, 1998

Mr. T. A. Groover, P.E.
The Haskell Company/Frazier Division
P. O. Box 11109
Lynchburg, Virginia 24506

Subject: Project 983745, Report Adendum No. 1, Geotechnical Engineering Services, Dam Embankment Evaluation, James Point II Nursing Home, James City County, Virginia

Dear Tim:

We are pleased to submit three copies of our geotechnical engineering report addendum for the project referenced above. These services have been provided in accordance with our contract addendum dated September 8, 1998, and accepted on September 9, 1998.

1. SITE DESCRIPTION AND PROPOSED CONSTRUCTION

The existing earth dam and pond are located at the site of the proposed James Point II Nursing Home north of Jamestown Road and east of Sandy Bay Road in James City County, Virginia. The site was previously a campground consisting of test and RV sites, cabins and picnic areas. The pond and dam are located in the southwest corner of the site.

The earth embankment has a crest length of about 100 ft and a crest width between about 8 and 12 ft. The embankment height is about 10 ft measured from the downstream toe. Up and downstream slopes vary from about 1H:1V to 2.5H:1V. An existing 18-inch diameter CMP riser and conduit through the embankment serves as the principal

spillway. The top of the riser is at El 15.15 and the invert of the outlet pipe is El 9.48. There is no emergency spillway.

At the time of our site visit on September 8, 1998, no water was flowing through the principal spillway and no seepage was observed from around the pipe. Minor seepage was observed in an area adjacent to the left side of the spillway outlet at the downstream toe. Negligible flow was observed in this wet area. Concrete rubble had been placed in a steep area of the downstream slope between the left abutment and the spillway pipe. The area was overgrown and it was not possible to observe whether a slope failure had previously occurred in this area. Two rail ties and several pieces of reinforcing steel were observed on the embankment crest.

Site information was obtained from the Williamsburg Nursing and Rehabilitation Center Utility Plan dated July 2, 1998, by Rickmond Engineering, Inc., and through our site visits. A Geotechnical Engineering Study, dated July 17, 1998, for the Nursing and Rehabilitiation Center has been provided by Schnabel Engineering Associates, Inc.

The existing pond and embankment are to be used as the BMP facility for this site. Therefore, this facility was inspected by James City County personnel. We have reviewed the comments from James City County's Environmental Division Review dated August 24, 1998 as they apply to the geotechnical aspects of the facility. These comments recommend that the facility be inspected by a professional engineer. The report of the inspection is to include comments on the structural integrity of the dam. The comments also indicated that the existing spillway needed to be replaced due to its physical condition and hydraulic considerations and an emergency spillway constructed. In addition, the comments indicated that the crest width, slope grades and general condition of the embankment were not suitable for use as a permanent BMP facility.

Rickmond Engineering, Inc is providing plans for remedial construction of the existing dam. This report has been prepared to aid in the evaluation of the embankment and to assist the Rickmond Engineering, Inc. in the design of the remedial construction. It is intended for use with regard to the specific project described above.

2. SUBSURFACE EXPLORATION

Three test borings were drilled on the embankment crest under our observation by Ayers and Ayers, Inc. of Powhatan, Virginia. A water observation well was also installed in the

test boring drilled at the highest section of the embankment. Specific observations, remarks, and logs for the borings, classification criteria and sampling protocols are included in Appendix A. Approximate test boring locations are shown in Figure A1 in Appendix A. Soil samples will be retained up to 45 days beyond the issuance of this report, unless other disposition is requested.

Topsoil, rootmat and forest litter were encountered to a depth of about 0.2 ft below the ground surface. Very soft to medium consistency sandy lean clay EMBANKMENT FILL and loose density clayey sand EMBANKMENT FILL were encountered underlying the topsoil to depths of about 7 to 12 ft. The embankment fill, designated as Stratum A contained organic matter, asphalt, wood fragments gravel and shell fragments. A layer of soft consistency ORGANIC SILT designated as Stratum B1, was encountered below the embankment fill in Boring B-102 to a depth of 14 ft. Generally loose density fine to medium silty sand containing organic matter and gravel, designated as Stratum B2 was encountered below the embankment fill and organic silt to the maximum depths of penetration in the borings.

We observed ground water during drilling in the three borings performed along the crest of the embankment at depths of 7 to 9 ft, about El 10 to 12. Following removal of the augers, Test Borings B-101 and B-103 caved dry at depths of 3.4 and 2.2 ft, respectively. A water observation well was installed in Boring B-102. We recorded a ground water level in the well at a depth of 6.9 ft, El 12.1, seven days after completion of the drilling. The ground water levels on the logs show our estimate of the phreatic water level at the time the borings were drilled. Fluctuations in the phreatic water level through the embankment may occur, depending on variations in precipitation, surface runoff, pond levels, evaporation, and similar factors.

Laboratory testing was performed on two sample of embankment fill obtained from Boring B-102. The laboratory tests included natural moisture content and percent finer than the No. 200 sieve.

The natural moisture content values of the soil samples tested are shown on the test boring log in Appendix A. The results of the remaining laboratory testing are presented in Appendix B.

3. GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS

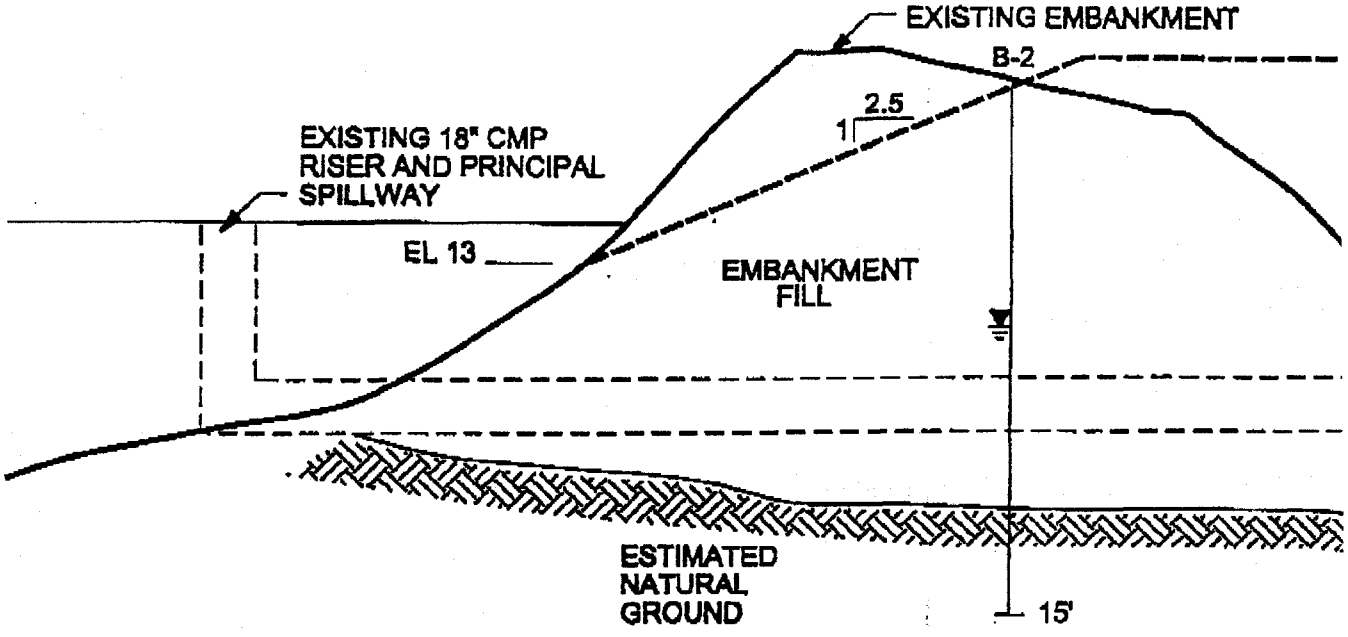
Based on our visual inspection of the existing earth embankment dam, and the test boring and soil laboratory test data, the following comments and recommendations are provided.

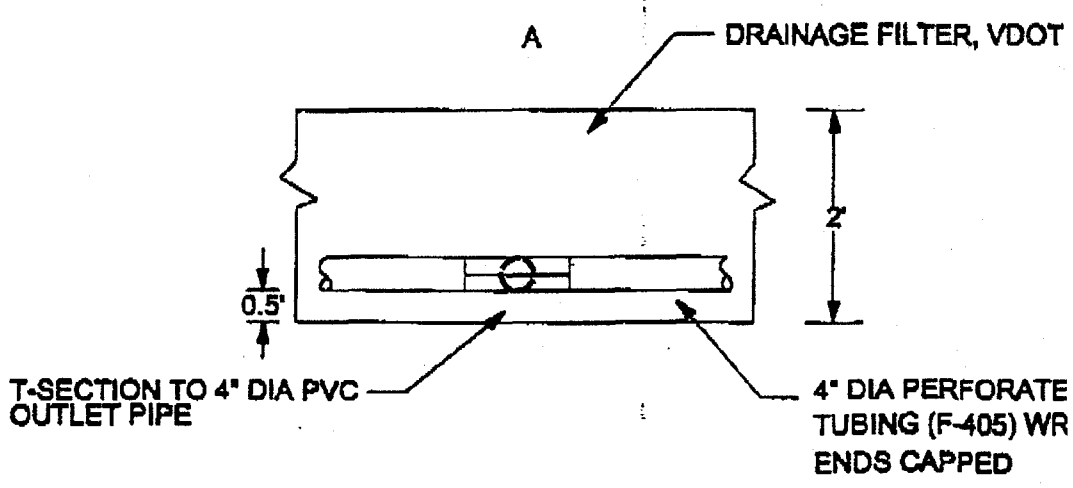
The embankment should be cleared of all trees, bushes, rubble and other debris on the crest and slopes. Stumps and roots should be removed to at least 2 ft below the ground surface. Excavations should be backfilled with compacted structural fill as described in Section 3.2.2 of our Geotechnical Engineering Study referenced above for this project.

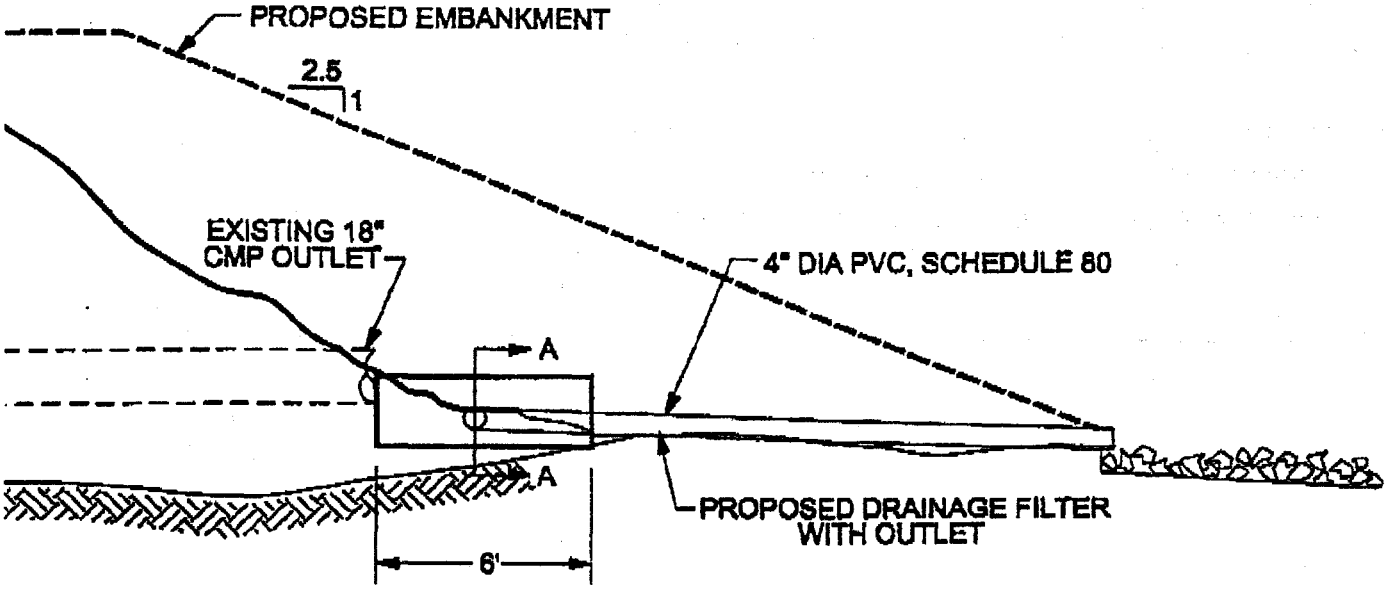
The embankment is constructed of generally soft to medium consistency lean clay and loose density clayey sand. Based on the consistency/density of the embankment fill, and the soil types encountered, the existing slopes are steeper than those recommend by the U. S. Bureau of Reclamation for small homogenous earth dams. We recommend the upstream and downstream slopes be regraded to 2.5H:1V for stability. These slope grades are recommended by the U. S. Bureau of Reclamation for small dams when constructed with the materials described above. A recommended embankment section is shown on Figure 1.

Based on the available topographic data, it will be necessary to lower the pond level to below El 13 to regrade the upstream slopes. Prior to placement of new embankment fill, on the upstream or downstream slopes, subgrades should be observed by the Geotechnical Engineer. Any loose or soft material should be undercut and replaced by new embankment fill. Embankment fill should meet the requirements for compacted structural fill as described in our report referenced above. Placement and compaction requirements are also the same as recommended in this report.

A drainage filter should be installed at the downstream toe. This filter should consist of a 2 ft thick layer of VDOT Grade A Fine Aggregate placed in an area in front of the existing principal spillway outlet and the area of seepage. We estimate this area to be about 6 ft wide by 20 ft long at the downstream toe. A 4 inch diameter corrugated slotted polyethylene tubing (ASTM F-405) should be placed in the sand drainage filter. The ends of the tubing should be capped. An outlet pipe from the drainage filter should extend to the downstream toe with the invert in a small riprap lined basin. The outlet pipe should consist of, Schedule 80 PVC pipe. Drainage filter details are shown on Figure 1.


EXISTING EMBANKMENT
B-2
2.5
1
EXISTING 18" CMP
RISER AND PRINCIPAL
SPILLWAY
EL 13
EMBANKMENT
FILL
ESTIMATED
NATURAL
GROUND
15'


A
DRAINAGE FILTER, VDOT
2'
0.5'
T-SECTION TO 4" DIA PVC
OUTLET PIPE
4" DIA PERFORATE
TUBING (F-405) WR
ENDS CAPPED



R, VDOT GRADE A FINE AGGREGATE

FORATED CORRUGATED POLYETHYLENE
-405) WRAPPED IN DRAINAGE GEOTEXTILE
PED

Schnabel Engineering

JAMES POINT II DAM, JAMESTOWN ROAD
JAMES CITY COUNTY, VIRGINIA

EMBANKMENT SECTION AT BORING B-2	SCALE 1"=5'	DATE SEPT. 1998	
	DRAWN BY VAM	CHECKED BY GS	REVISED DATE
	CONTRACT NO. 983745	FIGURE 1	REVISED DATE

We understand that the existing CMP principal spillway is to be grouted closed in-place and a new principal spillway designed. The riser structure should be cut off at least 2 ft below the permanent pool level. We recommend that the contractor submit his plan for grouting the principal spillway.

We understand a siphon type spillway is planned to replace the existing spillway. Construction of this type of principal spillway will not require breaching of the existing embankment and can be installed during remedial construction of the embankment slopes. Also, the siphon spillway can also be used to lower the pond level.

We have performed our services and prepared this report in accordance with generally accepted geotechnical engineering practice and make no warranties, either express or implied, as to the professional advice provided under the terms of our agreement and included in this report.

We are pleased to be of continued service to you on this project. Please contact either of the undersigned for further clarification.

Very truly yours,
SCHNABEL ENGINEERING ASSOCIATES, INC.

Gilbert T. Seese, P.E.
Senior Associate

J. J. Seli

James J. Seli, P.E.
Principal

COMMONWEALTH OF VIRGINIA
GILBERT T. SEESE, JR.
NO. 012625
PROFESSIONAL ENGINEER

GTS:JJS:lfb

Attachments:
(1) Subsurface Exploration
(2) Summary of Soil Laboratory Tests

Appendix A

SUBSURFACE EXPLORATION DATA

SUBSURFACE EXPLORATION DATA

Subsurface Exploration Procedures
General Notes for Subsurface Exploration Logs
Identification of Soil
Boring Logs, B-101 through B103
Location Plan, Figure A1

SUBSURFACE EXPLORATION PROCEDURES

Test Boring Procedure

The borings were advanced by turning a hollow-stem auger. A plug device was used to block off the center opening in the hollow-stem auger to prevent cuttings from entering the augers during drilling. At the designated depth, drillers removed the plug and performed the Standard Penetration Test, as defined below. Water or drilling fluid was not introduced into the boring using this procedure, unless indicated on individual logs. Water level data are indicated on the logs.

Standard Penetration Test Results

The numbers in the Sampling Data column of the boring logs represent Standard Penetration Test (SPT) results. Each number represents the blows needed to drive a 2-inch O.D., 1-3/8 inch I.D. split-spoon sampler 6 inches, using a 140-pound hammer falling 30 inches. The sampler is typically driven a total of 18 inches. The first 6 inches are considered a seating interval. The total of the number of blows for the second and third 6-inch intervals is the SPT N value. The Standard Penetration Test is conducted per ASTM D-1586.

Soil Classification Criteria

The group symbols on the boring logs represent the Unified Soil Classification System Group Symbols (ASTM D-2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variation may be expected between samples visually classified and samples classified in the laboratory.

Pocket Penetrometer Results

The values following "PP=" in the remarks column of the boring logs represent pocket penetrometer readings. Pocket penetrometer readings provide an estimate of the unconfined compressive strength and undrained shear strength of fine-grained soils.

Water Observation Well

A temporary water observation well was installed in Boring B-102 by inserting a hand-slotted, 1¼-inch PVC pipe in the boring. The pipe was capped and area surrounding the pipe was backfilled with cuttings from the test boring.

Test Boring Location and Elevation Survey

Our personnel located the test borings by taping from the principal spillway pipe center line through the embankment. The approximate test boring locations are shown in Figure 2. The ground surface elevation at the test boring locations were referenced to the Utility Plan dated July 2, 1998 prepared by Rickmond Engineering, Inc. The locations and elevations should be considered no more accurate than the methods and plans used to obtain them.

SCHNABEL ENGINEERING ASSOCIATES, INC.

GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. Numbers in sampling data column next to Standard Penetration Test (SPT) symbols indicate blows required to drive a 2 inch O.D., 1-3/8 inch I.D. sampling spoon 6 inches using a 140 pound hammer falling 30 inches. The Standard Penetration Test (SPT) N value is the number of blows required to drive the sampler 12 inches, after a 6 inch seating interval. The Standard Penetration Test is performed in accordance with ASTM-1586.

2. Visual classification of soil is in accordance with terminology set forth in "Identification of Soil." The ASTM D-2487 group symbols (e.g. CL) shown in the classification column are based on visual observations.

3. Estimated ground water levels indicated by ▼; these levels are only estimates from available data and may vary with precipitation, porosity of the soil, site topography, etc.

4. Refusal at the surface of rock, boulder, or obstruction is defined as an SPT resistance of 100 blows for 2 inches or less of penetration.

5. The logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled or excavated. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at the test boring, test pit and/or hand auger locations.

6. The stratification lines represent the approximate boundary between soil and rock types as obtained from the subsurface exploration. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistances presented on these logs have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.

7. Key to symbols and abbreviations:

▮ 5+10+15	Standard Penetration Test
▮ 3T 24/18	2" or 3" Undisturbed Tube Sample Length Pushed/Recovery (in inches)
W	Water Content
PM	Presssuremeter Test (in Remarks Column)
Do	Ditto
WOW	Water Observation Well
PP	Pocket Penetrometer Reading (TSF)
FID (OVA)	Flame Ionization Detector Reading (PPM)
PID	Photoionization Detector Reading (PPM)
GP	Geostick Penetration Reading (inches)

SCHNABEL ENGINEERING ASSOCIATES, INC.
Consulting Geotechnical Engineers

IDENTIFICATION OF SOILS

I. DEFINITION OF SOIL GROUP NAMES (ASTM D-2487-83)

			SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	Well graded gravel
			GP	Poorly graded gravel
		Gravels with fines More than 12% fines	GM	Silty gravel
			GC	Clayey gravel
	Sands – 50% or more of coarse Fraction passes No. 4 sieve Coarse, No. 40 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	Well-graded sand
			SP	Poorly graded sand
		Sands with fines More than 12% fines	SM	Silty sand
			SC	Clayey sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	Lean clay
			ML	Silt
		Organic	OL	Organic clay
				Organic silt
	Silts and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	Fat clay
			MH	Elastic silt
		Organic	OH	Organic clay
				Organic silt
Highly Organic Soils	Primarily organic matter, dark in color and organic odor		PT	Peat

II. DEFINITION OF MINOR SOIL COMPONENT PROPORTIONS

Adjective Form			Examples
	Gravelly Sandy	30% or more coarse grained	Gravelly lean clay
"With"	With gravel With sand	15% or more coarse grained	Fat clay with gravel
	With silt With clay	5% to 12% fine grained	Poorly graded sand with silt
"Trace"	Trace gravel Trace sand	1% to 15% coarse grained	Silty sand, trace gravel
	Trace clay Trace silt	1% to 5% fine grained	Poorly graded sand, trace clay

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS ..... Unified Soil Classification Symbols are shown above as group symbols. Dual symbols are used for borderline classifications.

BOULDERS & COBBLES..... Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inch size.

DISINTEGRATED ROCK ..... Residual rock materials with a standard penetration resistance (SPT) between 60 blows per foot and refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

ROCK FRAGMENTS..... Angular pieces of rock, distinguished from transported gravel, which have separated from original vein strata and are present in a soil matrix.

QUARTZ..... A hard silica mineral often found in residual soils.

IRONITE..... Iron oxide deposited within a soil layer forming cemented deposits.

CEMENTED SAND ..... Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate or other materials.

MICA..... A soft plate of silica mineral found in many rocks, and in residual or transported soil derived therefrom

ORGANIC MATERIALS..... (Excluding Peat)
- Topsoil..... Surface soils that support plant life and which contain considerable amounts of organic matter;
- Organic Matter..... Soil containing organic colloids throughout its structure;
- Lignite..... Hard, brittle decomposed organic matter with low fixed carbon content (a low gr. of coal).

FILL..... Man-made deposit containing soil, rock and often foreign matter.

PROBABLE FILL..... Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

LENSES..... 0 to ½ inch seam of minor soil component.

LAYERS..... ½ to 12 inch seam of minor soil component.

POCKET..... Discontinuous body of minor soil component.

COLOR SHADES ..... Light to dark to indicate substantial difference in color.

MOISTURE CONDITIONS ..... Wet, moist or dry to indicate visual appearance of specimen.

Soilfieldidentification

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: James Point II Dam Jamestown Road James City County, Virginia	Contract Number: 983745 Boring Number: B-101 Sheet: 1 of 1

Boring Contractor: Ayers and Ayers, Inc.
Powhatan, Virginia

Boring Foreman: C. Jamerson

Drilling Method: 2¼" Hollow Stem Auger

Drilling Equipment: CME-45B

SEA Representative: N. Hawks

Dates Started: 9/11/98 Finished: 9/11/98

Location: See Location Plan, Figure A1

Ground Surface Elevation: 19.0±

Ground Water Observations

	Date	Time	Depth	Casing	Caved
Encountered	9/11	9:40	9.0	--	--
Completion	9/11	9:45	DRY	--	--
Casing Pulled	9/11	9:50	DRY	--	3.4

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
.2	Forest litter, rootmat and topsoil	FILL	18.8			4+4+5		FILL
	Fine to coarse clayey sand FILL, contains root fragments and asphalt, moist - brown					5+6+8		PP>4.5 TSF
	Fine to coarse sandy lean clay FILL, trace gravel, contains organic matter, moist - brown			A	5	3+3+3		Organic odor detected PP=2.25 TSF
						3+3+4		PP=1.75 TSF
9.0			10.0			2+1+1		ALLUVIUM
10.0	Fine to medium silty sand, contains organic matter, wet - gray	SM	9.0	B1	10			
	Boring terminated at 10.0 ft							

Comments:
Boring backfilled upon completion.

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: James Point II Dam Jamestown Road James City County, Virginia	Contract Number: 983745 Boring Number: B-102 Sheet: 1 of 1

Boring Contractor: Ayers and Ayers, Inc.
Powhatan, Virginia
Boring Foreman: C. Jamerson
Drilling Method: 2¼" Hollow Stem Auger
Drilling Equipment: CME-45B
SEA Representative: N. Hawks
Dates Started: 9/11/98 **Finished:** 9/11/98
Location: See Location Plan, Figure A1
Ground Surface Elevation: 19.0±

Ground Water Observations

	Date	Time	Depth	Casing	Caved
Encountered	9/11	10:05	8.0	--	--
Completion	9/11	10:10	11.9	--	--
Casing Pulled	9/11	10:15	--	--	--
W.O.W.	9/11	10:15	9.6	--	--
W.O.W.	9/18	12:30	6.9	--	--

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
.2	Forest litter, rootmat and topsoil	FILL	18.8			6+8+6+5		PP>4.5 TSF FILL
	Fine to coarse clayey sand FILL, contains root fragments and crushed stone, moist - dark brown					5+3+3+3		PP=4.0 TSF
	do, contains asphalt - brown and black					4+3+2+2		PP=3.0 TSF
	do, contains wood fragments				5			
	do, wet			A		2+1+1+2	15.0	PP=2.25 TSF Wet at bottom of spoon
	Fine to medium sandy lean clay FILL with gravel, wet - gray					1+1+1+2	20.0	PP<0.5 TSF
	do, contains organic matter				10	1+1+2+2		PP<0.5 TSF Organic odor detected
12.0	Organic silt with sand, contains mica, root fragments and organic matter, moist - black	OL	7.0	B2		1+1+2		ALLUVIUM
14.0	Fine to medium silty sand, contains root fragments, organic matter and mica moist - brown	SM	5.0	B1		2+2+4		
15.0	Boring terminated at 15.0 ft		4.0		15			

Comments:
1¼" PVC Water Observation Well (W.O.W.) installed to 15.0 ft upon completion.

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: James Point II Dam Jamestown Road James City County, Virginia	Contract Number: 983745 Boring Number: B-103 Sheet: 1 of 1

Boring Contractor: Ayers and Ayers, Inc.
Powhatan, Virginia

Boring Foreman: C. Jamerson

Drilling Method: 24" Hollow Stem Auger

Drilling Equipment: CME-45B

SEA Representative: N. Hawks

Dates Started: 9/11/98 Finished: 9/11/98

Location: See Location Plan, Figure A1

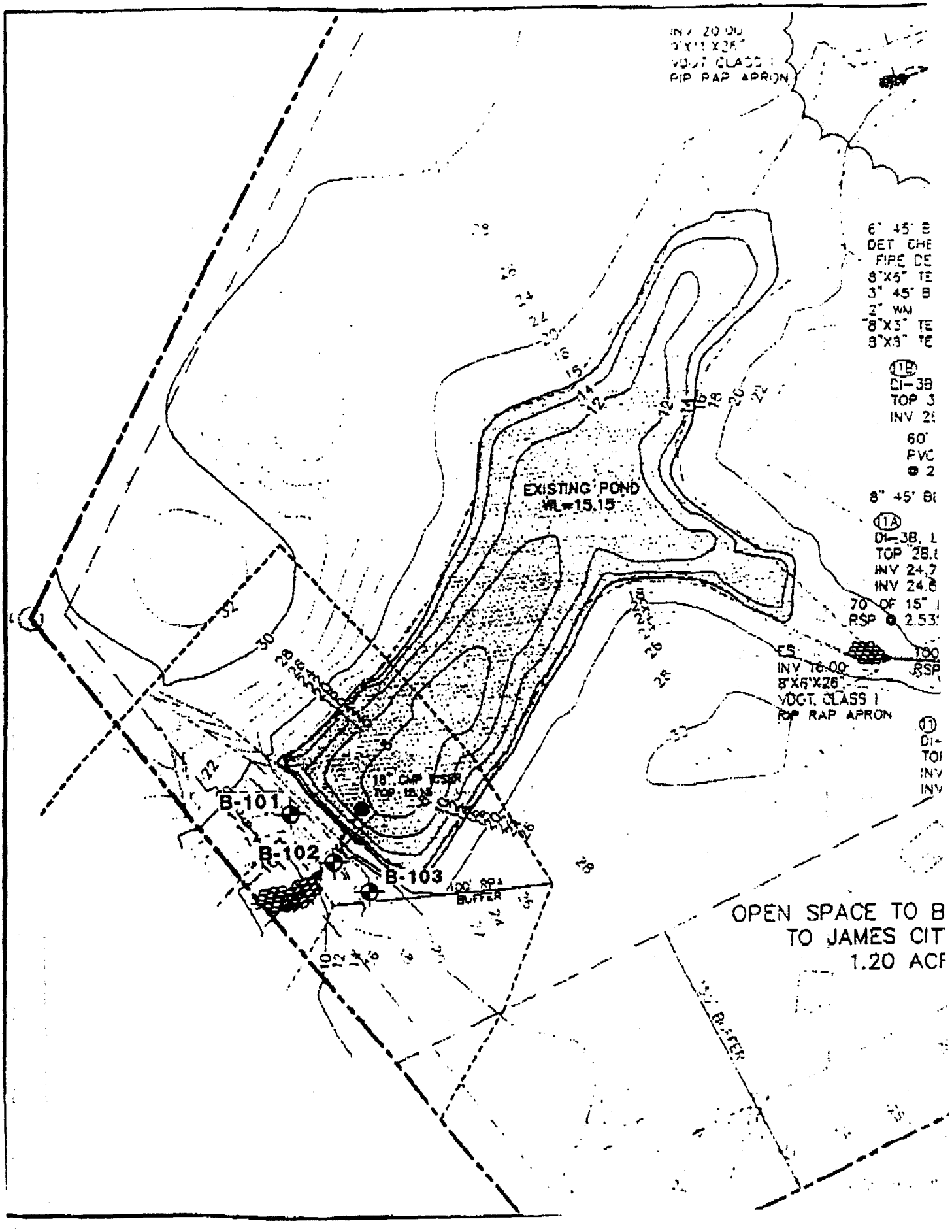
Ground Surface Elevation: 19.0±

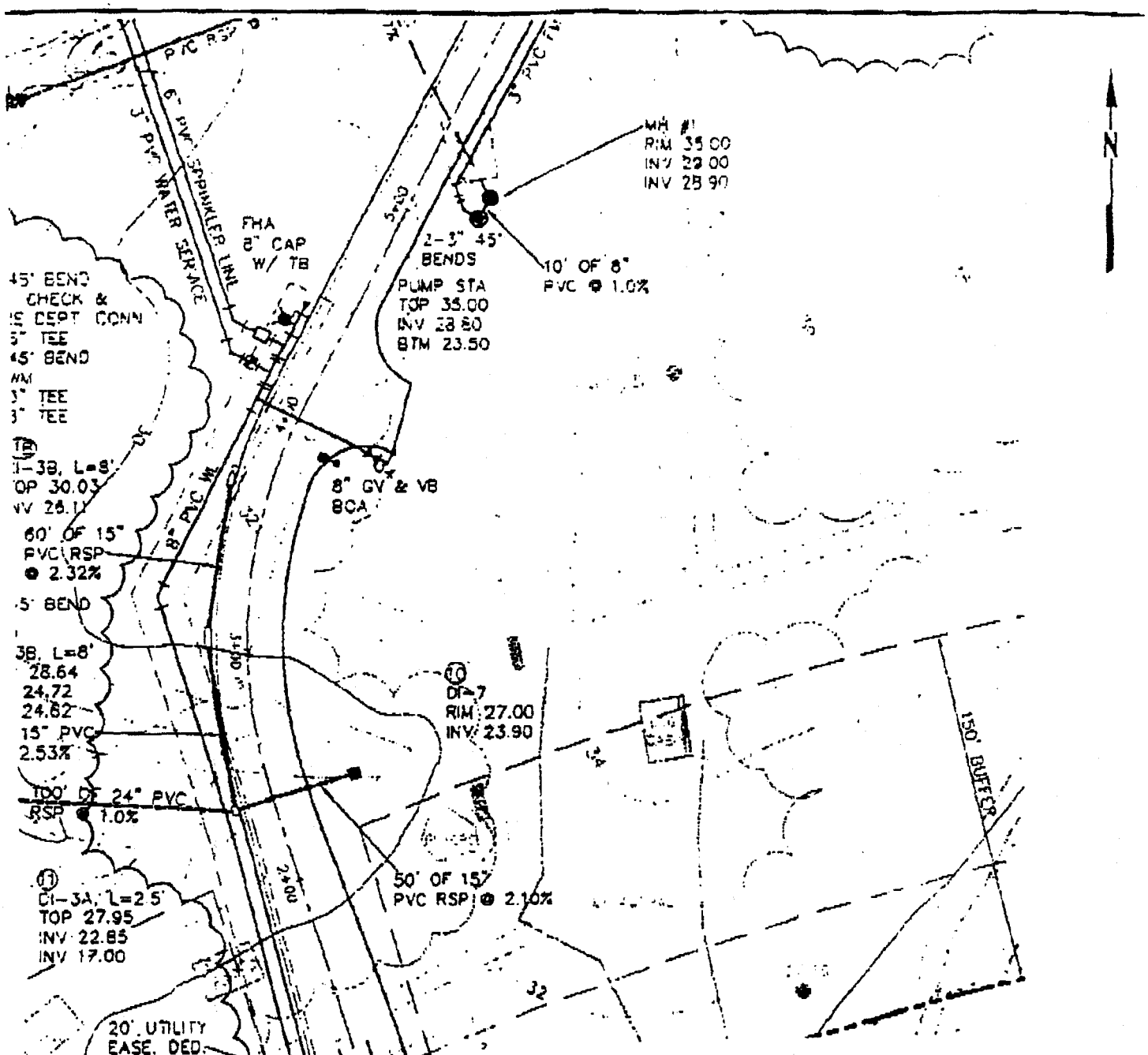
Ground Water Observations

	Date	Time	Depth	Casing	Caved
Encountered	9/11	10:40	7.0	--	--
Completion	9/11	10:45	Dry	--	--
Casing Pulled	9/11	10:50	Dry	--	2.2

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
.2	Forest litter, rootmat and topsoil	FILL	18.8					
	Fine to coarse sandy lean clay FILL, contains asphalt and crushed stone, moist - brown					6+5+4		PP>4.5 TSF FILL
	do, contains shell fragments					5+4+3		PP=2.5 TSF
	do, trace gravel, contains fat clay pockets			A	5	2+2+2		PP=1.76 TSF
7.0	Fine to medium silty sand, contains organic matter, wet - gray	SM	12.0			1+1+1		ALLUVIUM
	do, with gravel, no organic matter, gray and tan			B1	10	2+2+4		
10.0	Boring terminated at 10.0 ft		9.0					

Comments:
Boring backfilled upon completion.


EXISTING POND
WL=15.15
B-101
B-102
B-103
18" CMP RSP
TOP 15.15
100' RPA BUFFER
OPEN SPACE TO B
TO JAMES CIT
1.20 ACF
RIP RAP APRON
VDOT CLASS I
INV 16.00
8'X6'X26'
RSP



Schnabel Engineering

JAMES POINT II DAM, JAMESTOWN ROAD
JAMES CITY COUNTY, VIRGINIA

TEST BORING LOCATION PLAN	SCALE 1"=60'	DATE SEPT. 1998
	DRAWN BY VAM	CHECKED BY GS
	DRAWING NO. 983745	FIGURE A1

Appendix B

SUMMARY OF SOIL LABORATORY TESTS

Appendix B
Contract 983745

SUMMARY OF SOIL LABORATORY TESTS

BORING	B-102	B-102		
DEPTH	4-6'	8'-10'		
SAMPLE TYPE	JAR	JAR		
STRATUM	A	A		
SAMPLE DESCRIPTION	FINE TO COARSE CLAYEY SAND (SC), BROWN (VISUAL)	FIINE TO MEDIUM SANDY LEAN CLAY (CL), BROWN (VISUAL)		
NATURAL MOISTURE CONTENT (%)	15.0	20.0		
NATURAL WET DENSITY (pcf)	–	–		
LIQUID LIMIT PLASTIC LIMIT PLASTICITY INDEX				
GRADATION DATA				
(% FINER THAN SIEVE) #4 NO. 40 NO. 60 NO. 200	– – – 42.6	– – – 58.7		
REMARKS				

NOTES: 1. Soil tests in accordance with applicable ASTM, AASHTO and VTM Standards

CHANCO'S GRANT SECTION II

25

26

DB 181 @ PG 72

N/F
ROBERT T. ARMISTEAD &
LETITIA HANSON
WB 6 PG 431, WB 6 PG 195
WB 7 PG 380, DB 19 PG 238

EX MH
RIM 48.73

9

EX MH
RIM 56.04

8

CHANCO'S GRANT
SECTION I

14B

14A

FF 38.17
FG 37.5

OPEN SPACE TO BE DEDICATED
TO JAMES CITY COUNTY
8.84 ACRES

SANDY BAY ROAD
ROUTE 681
(VARIABLE R/W)

N/F
ROBERT E. HOGAN, III &
MARY T. HOGAN
DB 289 PG 419
DB 250 PG 310 (PLAT)

N/F
RYLAND E. CLARK, III
DB 254 PG 740
DB 260 PG 310 (PLAT)

N/F
LINDA F. RIDDLE
DB 256 PG 537

N/F
JOHN W. REVELS &
ROSE REVELS
DB 276 PG 206
DB 260 PG 304

N/F
FRANZ S. HANNING
DB 375 PG 315

N/F
THE
SOUTHLAND CORP.
DB 181 PG 68,72
DB 192 PG 71

ENG SEAL

1. Add sheet C12 to approved plan to ABC at Amstofe as required. this sheet shows special info about priv. dam repairs & current status.

PC104

EXISTING POND
NEW WL=12.72±

OPEN SPACE TO BE DEDICATED
TO JAMES CITY COUNTY
2.06 ACRES

OPEN SPACE TO BE DEDICATED
TO JAMES CITY COUNTY
1.20 ACRES

12" PVC
INV 12.32

TOP OF DAM
15' WIDE
ELEV 19.6±

12" PVC INV 9.96
RIP RAP APRON

TOE OF DAM
ELEV 7.7±

ROUTE 31
JAMESTOWN ROAD (110' R/W)

EX. 12" WL

Drawing 16, pt. seems to be o.k. GERRY

As-built Inspection (SJT) 9/20/00

20

AB PLAN No. BMP #

60 0 60 120 180
Scale 1" = 60'

Rickmond Engineering Inc.
1643-C Merrimac Trail
Williamsburg, VA 23185
(757) 229-1776
Civil Engineering
Environmental Engineering
Land Surveying

Designed By:	Drawn By:	Scale:	Date:	Job No.	File Name:
RMJ	RMJ	1"=60'	11/24/99	98150	98150PAB

No.	By	Revision	Date	App.
		AB STAMP		

WILLIAMSBURG NURSING AND REHABILITATION CENTER
POND "RECORD DRAWINGS"
JAMES CITY COUNTY, VIRGINIA

Job Number 98150 | Sheet No. PAB1

S1-87-198 PC104
SJT FIELD SET

I:\98150\98150PAB Wed Nov 24 13:46:39 1999

000216

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

Database Inventory No. (if known): PC 104 (SP-87-98)

Name of Facility: Williamsburg Nursing + Rehab Center BMP No.: 1 of 1 Date: 9/20/00

Location: Jamestown Road (1811 Jamestown Road)

Name of Owner: Tandem Health Care at Williamsburg (~~Williamsburg Nursing + Rehab Ctr.~~ Health Investors LLC)

Inspector: SJ Thomas

Type of Facility: Wet (Retention) Pond

Weather Conditions: Sunny, Clear, Low 80's

Tributary to Powhatan Creek Directly to West.

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.
Routine - The item checked requires attention, but does not present an immediate threat to the function of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and 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:				Embankment South side of Pond; 18' wide at top; steep sideslopes.
Grass Height	X			Good Grass Cover.
Vegetated Condition	X			No D/S Trees.
Weed Growth	X			
Erosion			X	20'x10' D/S EMB. SLIDE AREA. Need Repair. Structural Concern.
Trash & Debris	X			
Seepage			X	D/S Toe of Emb. saturated soils. Especially South Emb & at PVC Outfall
Fencing or Benches	X			Note: D/S EMB SLOPE APPEARS STEEPER THAN PLAN. 1H:1V IN FIELD
Constructed Wetlands (Interior Landscaped & Planted) Areas:	(None)			
Vegetated Conditions				
Trash & Debris				
Floatables				Note: Small dia. PVC SOLID WALL DRAIN OBSERVED at old barrel outfall location. Part of repair plan for dam.
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other	X			Perm. Wet Pool. No signs of interior veg.

TAX MAP (47-3)(01-70) GPIN 4730100070
SITE AREA 28.34AC. ZONE LBR-8
IMP AREA 3.85AC

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin)				
Shoreline Erosion	X			Minimal. Wide VARIETY Plant & Trees.
Algae	X			None. Turbid color to Pool.
Trash & Debris	X			
Sediment	X			Difficult to determine.
Aesthetics	X			
Other	X			Perm Pool 2' deep at siphon (U/S)
Inflow Stuctures (Describe Locations): 2 inflow pipes NE AND DUE North of Emb.				
Condition of Structure	X			RCP w/ RIPRAP OP.
Erosion	X			
Trash and Debris	X			
Sediment	X			
Aesthetics	X			HARD Access to outfall
Other	X			
Principal Flow Control Structure - Intake, Riser, etc. (Describe Location): Siphon PVC CLASS 150 DR 18				
Condition of Structure	X			Mainly Buried. Functional
Corrosion	X			None. Discoloration inside bottom.
Trash and Debris	X			
Sediment	X			
Aesthetics	X			Flow depth in PVC Pipe < 1 inch.
Other		X		DI Retainer Gland & Cast Iron
Principal Outlet Structure - Barrel, Conduit, etc. : Siphon PVC Large DIA. Blow-off; small dia. PVC toe drain				
Condition of Structure	X			OK DS Side
Settlement	X			
Trash & Debris	X			
Sediment	X			
Erosion		X		Minor erosion D/S outfall
Other	X			Flow depth in PVC Pipe D/S < 1 inch.
Emergency Spillway (Overflow): 8' wide bottom, TRAPEZ SHAPE; 2' deep±; EAST SIDE OF EMB.				
Vegetation		X		Sparse in bottom. Reseed.
Lining		X		Sparse.
Erosion		X		slightly into fill emb. Reseed.
Trash & Debris	X			
Other	X			Appeared functional but not recent.
Note: Repairs Performed per approved plan SP-87-98 and geotech report 9/25/98.				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	X			None observed. Few mosquitoes in area.
Animal Burrows	X			None.
Graffiti	X			None.
Other	X			None.
Surrounding Perimeter Conditions:				
Land Uses	X			Dense Woods + Upland Forest.
Vegetation	X			OK.
Trash & Debris	X			None.
Aesthetics	X			Natural Look.
Access /Maintenance Roads or Paths	X			Coarse Agg. surf through woods No Access Problems to EMB.
Other		X		Single Large tree at toe of D/S EMB. Very TALL. Monitor for damage to D/S toe.

Remarks: Dam repaired for approved plan SP-87-98. See drawing sheet C12 and Dam Embankment Evaluation by Snabel Engineering dated Sept 25 '98.

- 20 x 10' severe slide area mid portion of D/S emb. Also U/S EMB slope is 1H:1V, steeper than design plan.
- Saturated D/S Emb Toe Soils. Possible failure condition due to slope stability. Slope failure present (see above). Saturated soils to 1/2 D/S Emb. Height.
- Reseed bottom E.S. + sparse areas on U/S EMB. Eroding into EAST side of Fill emb.

other: Site north. Bad slope erosion behind building. Inlet protections still present. Site mainly stabilized.

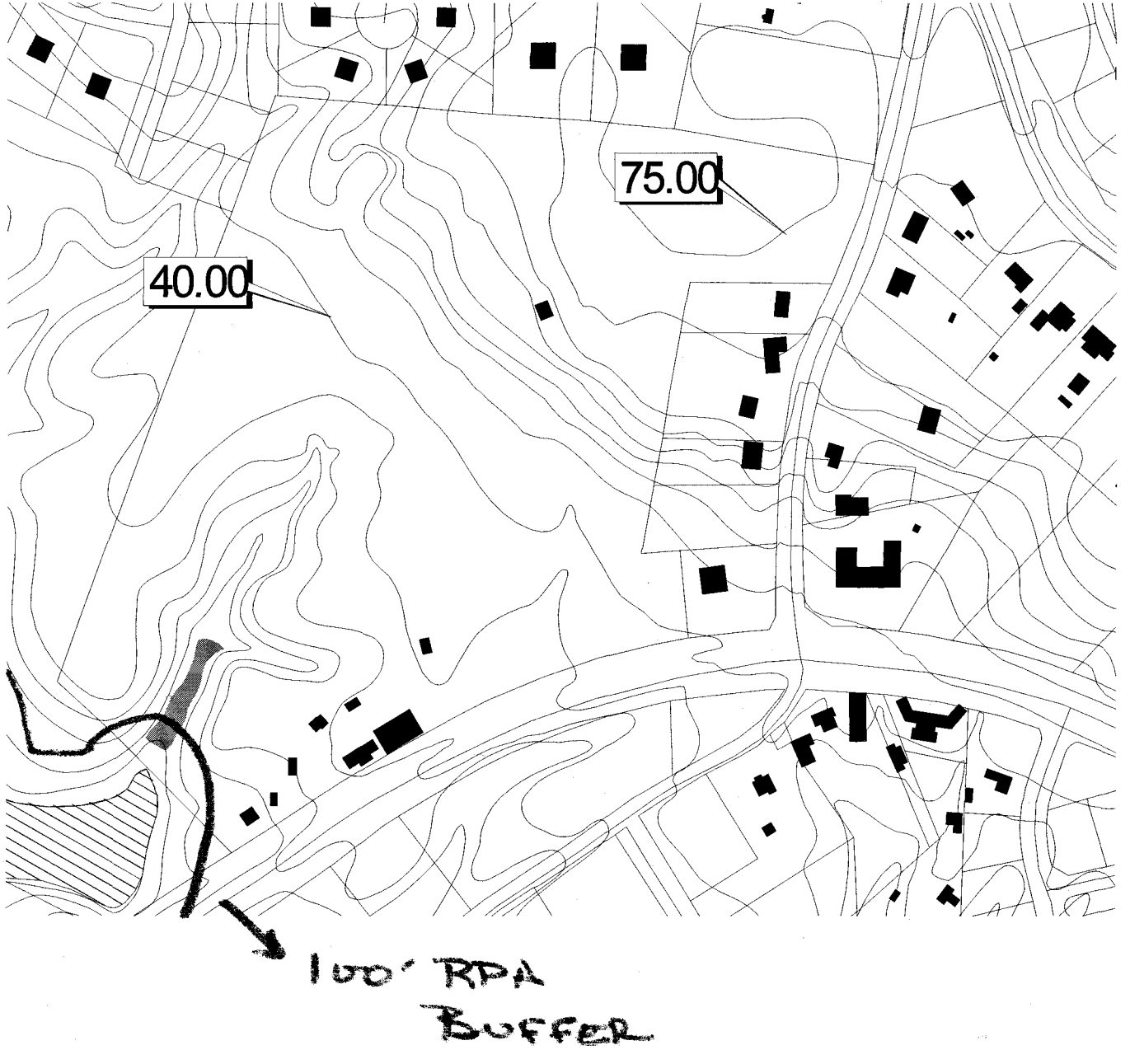
Overall Environmental Division Internal Rating: 1 Non-Routine Maintenance Required.

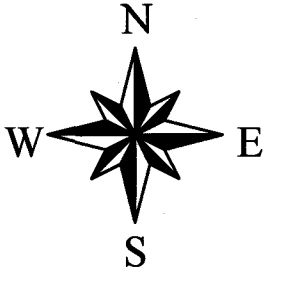
Signature: Scott J. Thrume, P.E. **Date:** 09/20/00

Title: CIVIL ENGINEER, JCL ENV. DIV.

SWMProg\BMP\CoInspProg\DetRet.wpd

WILLIAMSBURG NURSING AND REHABILITATION CENTER





000220

WORK COMMENCE DATE 2-16-99

Erosion and Sediment Control Preconstruction Meeting Checklist

Project: WMSBURG NURSING AND REHAB CENTER Date: FEB 16, 1999 Time: 9:00 AM/PM

Permittee: WMSBURG HEALTH INVESTORS LLC. Address: 4646 BRAMBLETON AVE, S.W ROANOKE VA 24018

Contractor: PERDUE MARSHALL JOHNSON 757 508-1634 MOBILE 249-1274 RECORDER

1. Phasing of Erosion and Sediment Control Practices

   A. Narrative Plan

   (B) Contractor-Developed Sequence of Construction

2. Installation Procedure for Erosion and Sediment Control Practices

✓	Construction Entrance		Outlet Protection
✓	Silt Fence		Sediment Traps
	Straw Bale Barrier	✓	Sediment Basins MODIFICATION OF EXISTING
	Rock Check Dams	✓	Diversions
	Inlet Protection		Soil Retention Matting
	Paved Channels		Mulching
	Temporary Seeding	✓	Permanent Seeding
	Other		Storm Drainage System

3. Inspection and Enforcement Procedures

   A. Permittee/Contractor Inspections _____

   B. County Inspections _____

   C. Enforcement Actions _____

      1. Informal Contact ✓

      2. Inspection Report _____

Erosion and Sediment Control
Preconstruction Meeting Checklist

3. Notice to Comply _____

4. Legal Proceedings _____

4. Limits of Clearing, Tree and Other Critical Areas Protection Measures Inspection

A. Clearing limits properly flagged? ☑ Yes ☐ No

B. Color of flagging BLUE/WHITE ORANGE

C. Tree Preservation/Critical Areas protected adequately? ☑ Yes ☐ No (50' COUNTOUR FENCING)

D. Color of Flagging BLUE/WHITE

E. Tree Preservation/Critical Areas Protection Measures, Type _____

5. Attendees - Identify Contact Person for Erosion Control

Signature: [signature] T. [signature]

Printed Name: GARY WHITMAN PERDUE CONTR'S. 869-8440 (pager 820-6557) PACOFK

Company Affiliation: _____

Address: _____

Phone No.: _____

6. Comments: _____

County Agent: GERALD LEWIS 253-6672 Date: 4/16/99

Title: ENG. INSPECTOR

espolicy.frm

[signature]

U.S. Army Corps of Engineers
Norfolk District, Western Virginia Regulatory Section
803 Front Street
Norfolk, Virginia 23510

November 3, 1998

RECEIVED
NOV - 9 1998
Wmsbg Environmental Grp

Project Number: 98-5423

Waterway: Powhatan Creek

1. Participant:
Smith/Packett Med-Com, Inc.
Attn: James Pietrzak
4648 Brambleton Avenue, SW
Roanoke, VA 24018

2. Authorized Agent:
Williamsburg Environmental Group, Inc.
Attn: David Ramsey
516-B South Henry Street
Williamsburg, VA 23185

3. Address of Job Site:
North of Jamestown Road and west of Ironbound Road in James City County.

4. Project Description:
Fill .306 acres of forested wetlands and waters of the United States as shown on the site plan entitled "Wetland impacts map, Williamsburg Nursing and Rehabilitation Center" and dated October 6, 1998.

5. Findings

This is regarding your request to perform work in the waters of the United States, as described in part 4 above. This activity has been reviewed and found to satisfy the criteria contained in the Corps Nationwide Permit (26), attached. (The Corps Nationwide Permits were published in the Federal Register (61 FR 65874) on December 13, 1996 and the regulations governing their use can be found in 33 CFR 330 published in Volume 56, Number 226 of the Federal Register dated November 22, 1991.)

Provided the enclosed conditions are met, an individual Department of the Army Permit will not be required. In addition, the Virginia Department of Environmental Quality has waived 401 certification for Nationwide Permit Number 26 for less than 1 acre of wetland impacts. However, a permit may be required from the Virginia Marine Resources Commission, and/or your local wetlands board, and this verification is not valid until you obtain their approval, if necessary. You may contact the Virginia Marine Resources Commission at (757) 247-2200 for further information concerning their permit requirements.

Enclosed is a "compliance certification" form, which must be signed and returned within 30 days of completion of the project, including any required mitigation (see nationwide permit condition number 14). Your signature on this form certifies that you have completed the work in accordance with the nationwide permit terms and conditions.

This verification is valid until Nationwide Permit (NWP) 26 expires on September 15, 1999, unless the Norfolk District Engineer uses discretionary authority to modify, suspend or revoke this verification. If NWP 26 is modified or revoked so that the activity listed above would no longer be authorized and you have commenced or are under contract to commence the work, you will have twelve months from the date of that permit change to complete the activity. Activities completed under the authorization of a nationwide permit which was in effect at the time the activity was completed continue to be authorized by that nationwide permit.

It is your responsibility to remain informed of changes to the nationwide permits. We will issue a special public notice announcing any changes to the nationwide permits when they occur.

6. Corps Contact: Robert Berg at (757) 441-7793.

Robert L

for J. Robert Hume, III
Chief, Western Virginia Regulatory Section

NAO FL 13 REVISED DEC 90

TEL: NOV 11'98 10:37 No.008 P.02

BOND COMPUTATIONS

NAME OF SUBDIVISION: WILLIAMSBURG NURSING AND REHAB CENTER

SECTION: _____

OWNER/DEVELOPER: SMITH-PACE MED-COM, INC.

ENGINEER: RICKMOND ENGINEERING

SUBDIVISION BOND AMOUNT: $_____

ESTIMATES (September 1987)

1. Street Construction and Sidewalks $ _____

2. Drainage _____

3. Utilities:

   a. Electrical Service _____
   b. Water _____
   c. Sewer _____

4. Streetlights _____

5. Street Signs _____

Total Subdivision Bond $ _____

EROSION AND SEDIMENT CONTROL BOND AMOUNT $ ~~24,500~~ 25,000

Bond computation by [illegible] 12-14-88

PERDUE
CONTRACTORS, INC.

TELEPHONE (804) 868-8440
FACSIMILE (804) 865-8162

JAN 1999
RECEIVED
ENVIRONMENTAL DIVISION

ENVIRONMENTAL DIVISION
JAMES CITY COUNTY
101-E MOUNTS BAY ROAD
WILLIAMSBURG, VA 23187-8784

ATTN.: GERALD E. LEWIS
RE: WILLIAMSBURG NURSING AND REHABILITATION CENTER

BELOW IS A SLIGHT REVISION IN THE SEQUENCE OF CONSTRUCTION FOR THE ABOVE REFERENCED PROJECT.

1.) INSTALL SILT FENCE WHERE POSSIBLE WITHOUT ANY CLEARING
2.) CLEAR AREA ENOUGH TO INSTALL DIVERSION DIKES, SEDIMENT TRAPS, AND REMAINING SILT FENCE
3.) INSTALL CONSTRUCTION ENTRANCE
4.) CLEAR REMAINING AREA
5.) BEGIN MOVING DIRT TO GRADE BUILDING PAD AND PARKING AREA.
6.) REPAIR EXISTING DAM
7.) PLACE FILL FOR BUILDING AND BEGIN BUILDING CONSTRUCTION
8.) INSTALL UTILITIES (STORM, WATER, SANITARY)
9.) ROUGH GRADE ROAD AND PARKING AREA
10.) FINE GRADE, INSTALL CURB, INSTALL STONE ALONG ROAD AND PARKING AREA, INSTALL ALL WALK
11.) INSTALL BM-2 TO ALL ASPHALT AREA
12.) GRADE GREEN AREA AND APPLY FINAL STABILIZATION MEASURES
13.) INSTALL TOP COURSE ASPHALT UPON COMPLETION OF ALL WORK
14.) REMOVE ALL TEMPORARY EROSION MEASURES

PLEASE REVIEW THIS SEQUENCE AND ADVISE ON ANY PROBLEMS.

GARY T. WILLIAMS JR.
OPERATION MANAGER

THE HASKELL COMPANY
FRAZIER DIVISION P.O. BOX 11109◆ LYNCHBURG VA 24506◆ 804/846-2366

January 20, 1999

James City County
Environmental Division
P.O. Box 8784
Williamsburg, VA. 23187

Attn: Gerry Lewis

RE: Williamsburg Nursing & Rehabilitation
1811 Jamestown Rd.

The Haskell Co.
Chip Penn
P.O. Box 11109
Lynchburg, VA. 24506

Dear: Mr. Lewis

This letter is to satisfy your request to submit a Sequence of Construction sheet.

It is our intention to construct the above mentioned project per plans and specifications as submitted to James City County. Inclusive of those plans, you will find the sequence of Construction on sheet C3. I am sure the information on sheet C3 will satisfy your request. Upon review of this sheet, if you have do have any further questions, please don't hesitate to call.

Sincerely
The Haskell Co.

Chip Penn
Project Manager

Letter of Transmittal	Date/Time: 11/29/99
Rickmond Engineering, Inc. 1643 Merrimac Trail Williamsburg, Virginia 23185 (757) 229-1776 • Fax (757) 229-4683 e-mail: rickmond @tmi.net www.rickmond.com	Project #: 98150 PC 104 SP-87-98 Project Title: Williamsburg Nursing Home Pond "Record Drawings"

To: James City County Environmental Division

Address: P.O. Box 8784

City/State/Zip: Williamsburg, Va. 23187

Attn: Darryl Cook

We are sending you (X) Attached ( ) Under Separate cover _____

The following items:
( ) Shop Drawings (X) Prints ( ) Samples ( ) Specifications ( ) Copy of Letter ( ) Change Order
( ) Other

Copies	Date	# of Pages	Description
2	11/24/99	1	Pond "Record Drawings"

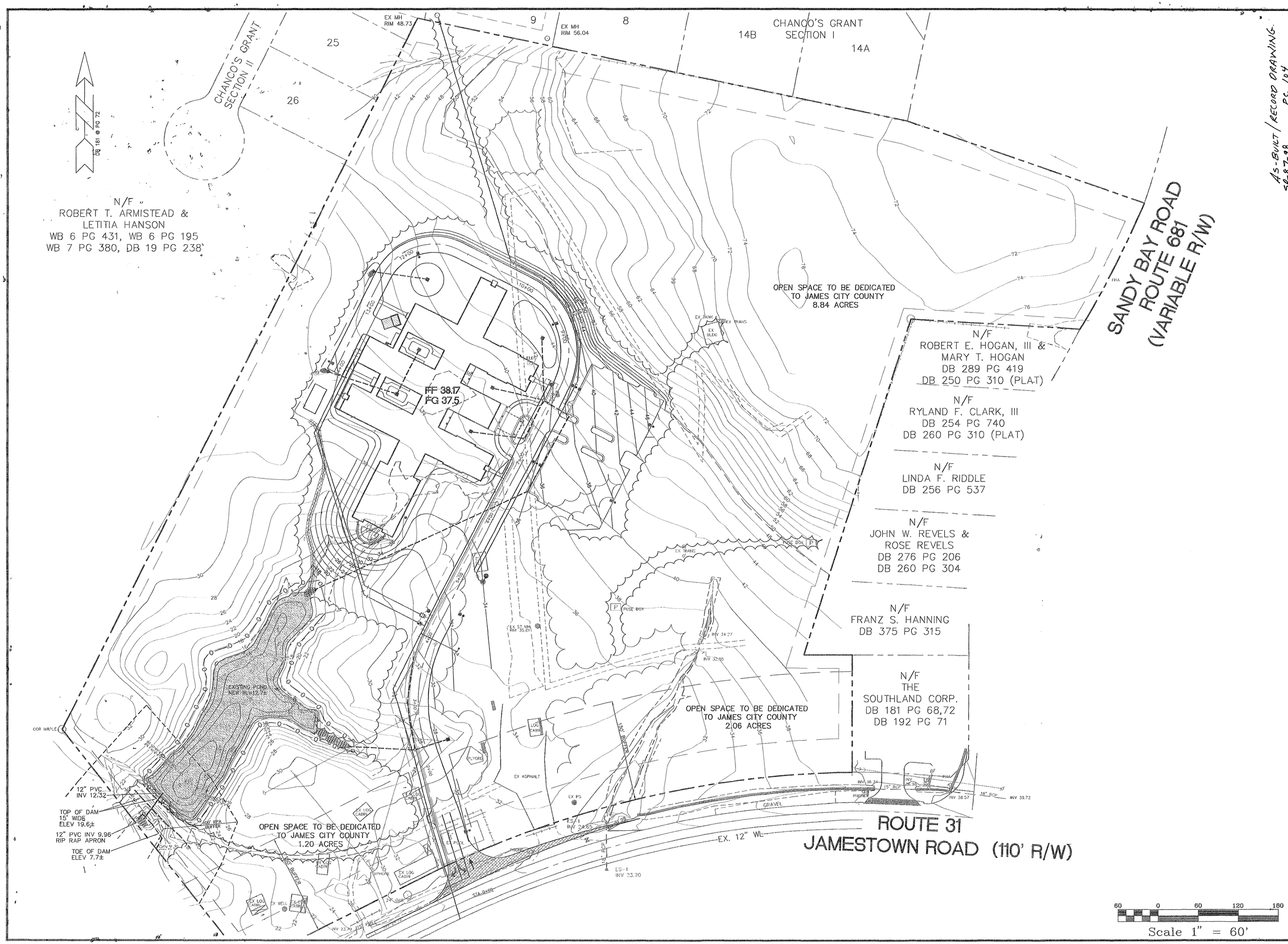
These are transmitted as checked below:

(X) For Approval ( ) For Your Use ( ) As Requested ( ) For Review and Comment
( ) Other

Remarks:

Copy to: _____ Signed: Kenneth Jenkins

J:\REI FORMS\OFFICE TRANSMIT.FRM



Rickmond Engineering, Inc.

1643-C Merrimac Trail
Williamsburg, VA 23185
(757)229-1776

Civil Engineering
Environmental Engineering
Land Surveying

Designed By:	Drawn By:	Scale:	Date:	Job No.:	File Name:
KMJ	KMJ	1"=60'	11/24/99	98150	98150PAB

No.	By	Revision	App.	Date

WILLIAMSBURG NURSING AND REHABILITATION CENTER

POND "RECORD DRAWINGS"

JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
98150	PAB1

I:\98150\98150PAB Wed Nov 24 13:56:38 1999

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