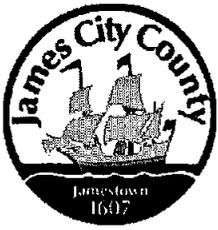


JR-039

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

- ① As-built plan
2. Completed construction certification
3. Construction Plan
- ④ Design Calculations
5. Watershed Map
- ⑥ Maintenance Agreement
7. Correspondence with owners
8. Inspection Records
9. Enforcement Actions



Stormwater Division

MEMORANDUM

DATE: March 11, 2010
TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services
FROM: Tina Cantwell, Stormwater
PO: 270712
RE: Files Approved for Scanning

General File ID or BMP ID: JR034

PIN: 4310400001B

Subdivision, Tract, Business or Owner

Name (if known):

Governor's Land Foundation

Property Description:

River Ridge Road

Site Address:

West end of River Ridge Road

(For internal use only)

Box 11

Drawer: 7

Agreements: (to file as of scan date)

Y

Book or Doc#:

980014758

Page:

501

498-501

Comments

980014758

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 22nd day of July, 1998, between Governor's Land Associates, and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: River Oaks North - Block B subdivision, being part of the Governor's Land Development, Recorded, Deed Book 501, Page No. 498-501, 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 runoff control facility, hereinafter referred to as the "FACILITY," located on and serving the above-described property to ensure that the FACILITY is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations.
2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the FACILITY to ensure that the FACILITY is properly maintained.
3. The COVENANTOR(S) shall provide and maintain perpetual access from public rights-of-way to the FACILITY 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 FACILITY for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the FACILITY.
5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY 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 owners of property served by the FACILITY 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 FACILITY.
7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the FACILITY. 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 FACILITY.
9. This COVENANT shall be recorded in the County Land Records.

AUG-7 8 0295

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 22nd day of July, 1998.

COVENANTOR(S)

Governor's Land Associates

W. Allen Ball

ATTEST:

COVENANTOR(S)

ATTEST:

COMMONWEALTH OF VIRGINIA
COUNTY OF James City

I hereby certify that on this 22nd day of July 1998, before the subscribed, a Notary Public of the State of Virginia, and for the County of James City aforesaid personally appeared W. Allen Ball and did acknowledge the foregoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 22nd day of July, 1998.

[Signature]
Notary Public

My Commission expires: 9/30/98

Approved as to form:

[Signature]

This Declaration of Covenants prepared by:

RAYMOND E. KEENEY

(Print Name)

Vice President, Development

(Title)

2700 Two Rivers Road

(Address)

Williamsburg VA 23188

(City)

(State)

(Zip)

0261U.wpf
Revised 9/96

Page 2 of 2

VIRGINIA, City of Williamsburg and County of James City, to wit:

Circuit Court of the City of James City the

3:02 o'clock

Deputy Clerk

AUG-7 0296

980017082

EXEMPT FROM RECORDATION TAX
UNDER VIRGINIA CODE SECTION 58.1-811(A)(6), AS AMENDED

DEED OF EASEMENT
FOR OPEN SPACE/MAJOR OPEN SPACE
RIVER OAKS NORTH - BLOCK "B"

THIS DEED OF EASEMENT, made as of July 15, 1998, by and among GOVERNOR'S LAND ASSOCIATES, a Virginia general partnership and its heirs, successors and assigns ("Grantor"); and COUNTY OF JAMES CITY, VIRGINIA ("Grantee").

WHEREAS, the Grantor is the owner of certain property known as River Oaks North - Block "B", The Governor's Land At Two Rivers (the "Property");

WHEREAS, Grantee has adopted The Chesapeake Bay Preservation Ordinance, Chapter 23 of the James City County Code, as required by Chapter 21 of Title 10.1 of the Code of Virginia, to protect the Chesapeake Bay and its tributaries from nonpoint source pollution from land uses or appurtenances within the Chesapeake Bay drainage area;

WHEREAS, Grantor wishes to preserve portions of the Property as natural open space as part of Grantor's efforts to improve the quality of stormwater runoff from the Property.

NOW, THEREFORE, in recognition of the foregoing and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor does hereby grant and convey to Grantee an easement in perpetuity in gross, with the right in perpetuity to restrict the use as described below, of the portion herein described of that certain tract, lot, piece or parcel of land with improvements thereon ("Easement Property"), containing 9.49 acres (Major Open Space Parcel #38) more or less, to wit:

Major Open Space Parcel Thirty-Eight (38), RIVER OAKS NORTH - BLOCK "B", THE GOVERNOR'S LAND AT TWO RIVERS, as the same appears duly dedicated, platted and subdivided on the Plat attached hereto and recorded simultaneously with this Easement in Plat Book 20 at Pages 53 through 55 in the Office of the Clerk of the Circuit Court for the City of Williamsburg and the County of James City, Virginia.

The restrictions hereby imposed on the use of the Easement Property, the acts which the Grantor covenants to do or not to do and the restrictions which the Grantee is hereby entitled to enforce, shall be as follows:

Prepared By:
Jenkins & Gilchrist,
a Professional Corporation
1919 Pennsylvania Avenue, NW
Suite 600
Washington, D.C. 20006-3404

REDAL:150998.3 17186-00001

SEP-8 98 0042

The restrictions hereby imposed on the use of the Easement Property, the acts which the Grantor covenants to do or not to do and the restrictions which the Grantee is hereby entitled to enforce, shall be as follows:

1. The Easement Property shall be kept free and clear of any junk, trash, rubbish and other unsightly or offensive material.
2. No building shall be permitted on or lots platted within the Easement Property, except that portions of the RPA Buffers and RPA Wetlands Buffers, as shown on the Plat (collectively, the "Buffers"), can be included as part of platted lots as shown on the Plat.
3. No roads or other structures (excluding utility lines, drainage facilities, paths and trails or signs approved in accordance with Paragraph 4 below) shall be built or maintained on the Easement Property other than such road or structure approved in writing by the County Engineer and the Planning Commission. Any roads shall be generally as shown on the approved Master Plan for The Governor's Land at Two Rivers.
4. No signs (including billboards or outdoor advertising), paths or trails, utility lines, irrigation systems or drainage facilities shall be placed on the Easement Property without the expressed written consent of the County Engineer and the Planning Commission or in accordance with a signage plan, path or trail plan, drainage plan, irrigation plan or utility plan approved in writing by the County Engineer and the Planning Commission.
5. The Easement Property shall remain in its natural condition with respect to natural leaf litter or other ground covering vegetation, understory vegetation or shrub layer, and tree canopy. The activities of Grantor within the Easement Property shall be limited to those activities which do not remove or damage any significant amount of healthy vegetation or materially disturb any soil except as approved by the County Engineer under this paragraph or in connection with approvals obtained in accordance with Paragraphs 3 and 4 above. Grantor may remove dead, diseased, poisonous or invasive vegetation or the Grantor may use hand tools (such as chain saws, wood chippers and stump grinders) for selective trimming and pruning and the clearing of understory which would not alter the natural character of the Easement Property only in a location and manner approved by the County Engineer.
6. Grantee and its representatives may enter upon the Easement Property from time to time for inspection, to enforce the terms of this Easement and, as to all of the Easement Property other than the Buffers, to post a sign or marker identifying Grantee's interest in the Easement Property (other than the Buffers) as natural open space and/or major open space. In the event of a violation of the terms of this Easement, the Grantee shall have the right to seek all appropriate legal and

SEP-8 0043

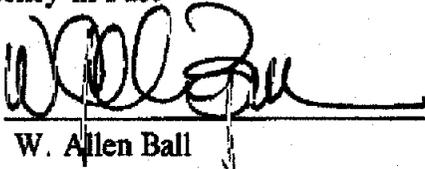
equitable relief, including, but not limited to, the right to restore the Easement Property to its natural condition and assert the cost of such restoration as a lien against the Easement Property, provided that Grantee shall notify Grantor at least thirty days in advance of any proposed action with respect to the Easement Property, describing the condition Grantee considers a violation. Grantor shall have a reasonable opportunity to cure prior to Grantee's exercise of its rights hereunder.

- 7. Grantee and Grantor may amend the provisions hereof or terminate this Easement by a written instrument signed by both parties.
- 8. Although this easement in gross will benefit the public in the ways recited above, nothing herein shall be construed to convey a right to the public of access to or use of the Easement Property and the Grantor shall retain exclusive right to such access and use, subject only to the provisions herein recited.

WITNESS the following signatures and seals as of the date first above written.

GOVERNOR'S LAND ASSOCIATES,
a Virginia general partnership

By: **DOMINION LAND MANAGEMENT
COMPANY - WILLIAMSBURG**
a Virginia corporation,
its Attorney-in-Fact

By: 
 Name: W. Allen Ball
 Title: President

SEP-8 2008 0044

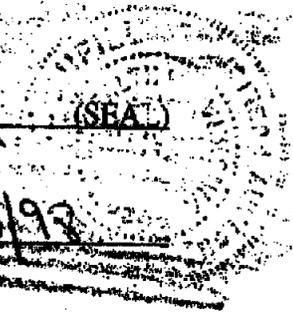
____ OF _____
County OF James City

§
§
§

I, the undersigned, a Notary Public in and for the jurisdiction aforesaid, do hereby certify that W. ALLEN BALL, President of DOMINION LAND MANAGEMENT COMPANY - WILLIAMSBURG, a Virginia corporation, Attorney-in-Fact for GOVERNOR'S LAND ASSOCIATES, a Virginia general partnership, whose name is signed to the foregoing Deed, has acknowledged the same before me in the aforesaid jurisdiction as an authorized officer of the corporation on behalf of the partnership.

GIVEN under my hand and seal on July 5th 1998.

Renée A. Hill
Notary Public



My Commission Expires: 9/30/98

SEP-83 0045

The form of this Deed of Easement is approved and, pursuant to Resolution of the Board of Supervisors of James City County, Virginia, duly executed on the 17th day of ~~July~~ ^{May}, 1998, this conveyance is hereby accepted on behalf of said County.

7/31/98
DATE

Leo P. Rogers
COUNTY ATTORNEY

Commonwealth OF VIRGINIA
County OF James City

§
§
§

I, the undersigned, a Notary Public in and for the jurisdiction aforesaid, do hereby certify that Leo P. Rogers, County Attorney for the COUNTY OF JAMES CITY, VIRGINIA, whose name is signed to the foregoing Deed of Easement, has acknowledged the same before me in the aforesaid jurisdiction on behalf of the County.

GIVEN under my hand and seal on July 31, 1998.



Mary Frances Rieger (SEAL)
Notary Public

My Commission Expires: October 31, 2001

SEP-8 2001 6

VIRGINIA: City of Williamsburg and County of James City, to WIC:

In the Clerk's Office at the Circuit Court for the City of

Williamsburg and County of James City the

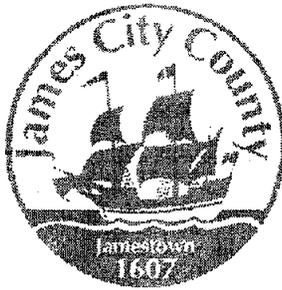
day of Sept, 19 98 the Deed of Easement

+ Plat was presented with the certificate annexed and admitted to record at 11:30 o'clock.

Teste: Helene S. Wolfe Clerk

By: Claudia J. Burkholz
Deputy Clerk

PLAT RECORDED IN
P.B. NO. 20 PAGE 53-55



James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

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

Section 1 - Site Information:

Project Name: GOVERNOR'S LAND AT TWO RIVERS - RIVER OAKS NORTH (BAY 3, P00 4)
Structure/BMP Name: BMP #3
Project Location: NORTH OF TWO RIVER ROAD
BMP Location: WEST END OF RIVER RIDGE (ROAD)
County Plan No.: 5 - 12 - 96

Project Type: Residential Business Commercial Office Institutional Industrial Public Roadway Other _____
Tax Map/Parcel No.: 431040001B
BMP ID Code (if known): JR034
Zoning District: POWHEATAN DISTRICT
Land Use: RESIDENTIAL
Site Area (sf or acres): _____

Brief Description of Stormwater Management/BMP Facility: MARSH ADJACENT DRAIN DETENTION POND (SIMILAR TO B-1 OR B-2 JCC BMP)

Nearest Visible Landmark to SWM/BMP Facility: CUL-DE-SAC OF RIVER RIDGE (DIRECTLY ADJACENT)

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: 348
Datum or Reference Elevation: 12.79
Control Description: JCC MAIN STATION
Control Location from Subject Facility: LOCATED APPROXIMATELY 500' DUE NORTH FROM THE FACILITY.

Section 2 - Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: Yes No Unknown
Approx. Construction Start Date for SWM/BMP Facility: ~~Feb~~ MARCH 1996
Facility Monitored by County Representative during Construction: Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: JACK L. MASSIE CONTRACTOR, INC
Name of Professional Firm Who Routinely Monitored Construction: AES CONSULTING ENGINEERS
Date of Completion for SWM/BMP Facility: _____
Date of Record Drawing/Construction Certification Submittal: MARCH 2002

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

Section 3 - Owner / Designer / Contractor Information:

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

Name: GOVERNOR'S LAND ASSOCIATES
Mailing Address: 9701 MILL POND RUN
TOANO, VIRGINIA
Business Phone: 757-234-5000 Fax: 757-234-5111
Contact Person: MR. JAMES H. BENNETT Title: VICE PRESIDENT - DEVELOPMENT

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

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
Business Phone: 757-253-0040
Fax: 757-220-8994
Responsible Plan Preparer: V. MARC BENNETT
Title: SENIOR PROJECT MANAGER
Plan Name: RIVER DASH NORTH (BAN 3, POOD 4)
Firm's Project No. 7173
Plan Date: FEBRUARY 1996
Sheet No.'s Applicable to SWM/BMP Facility: 6 / 10A / 1 / 1

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

Name: JACK L. MASSIE CONTRACTOR, INC.
Mailing Address: 3900 COKES LANE
WILLIAMSBURG VIRGINIA 23188
Business Phone: 1-757-566-8643
Fax: 1-757-8566-8566
Contact Person: MR. STACE MASSIE
Site Foreman/Supervisor: _____
Specialty Subcontractors & Purpose (for BMP Construction Only): _____

Section 4 - Professional Certifications:

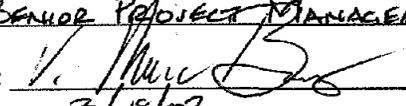
Certifying Professionals: (Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 5240 OLDE TOWNE RD, SUITE 1
WILLIAMSBURG, VIRGINIA 23108
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. MARC BENNETT
Title: SENIOR PROJECT MANAGER

Signature: 
Date: 3/18/02

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

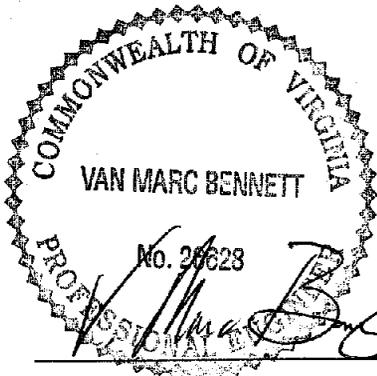
Construction Certification

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

Name: _____
Title: _____

Signature: _____
Date: _____

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



(Seal)

Virginia Registered Professional Engineer
or Certified Land Surveyor

_____ (Seal)

Virginia Registered
Professional Engineer

Section 5 - Record Drawing and Construction Certification Requirements and Instructions:

- PreConstruction Meeting - Provides an opportunity to review SWM / BMP facility construction, maintenance and operation plans and address any questions regarding construction and/or monitoring of the structure. The design engineer, certifying professionals (if different), Owner/Applicant, Contractor and County representative(s) are encouraged to attend the preconstruction meeting. Advanced notice to the Environmental Division is requested. Usually, this requirement can be met simultaneously with Erosion and Sediment Control preconstruction meetings held for the project.
- A fully completed **STORMWATER MANAGEMENT / BMP FACILITIES, RECORD DRAWING and CONSTRUCTION CERTIFICATION FORM** and **RECORD DRAWING CHECKLIST**. All applicable sections shall be completed in their entirety and certification statements signed and sealed by the registered professional responsible for individual record drawing and/or construction certification.
- The Record Drawing shall be prepared by a Registered Professional Engineer or Certified Land Surveyor for the drainage system of the project including any Best Management Practices.
- Construction Certification. Construction of Stormwater Management / BMP facilities which contain impoundments, embankments and related engineered appurtenances including subgrade preparation, compacted soils, structural fills, liners, geosynthetics, filters, seepage controls, cutoffs, toe drains, hydraulic flow control structures, etc. shall be visually observed and monitored by a Registered Professional Engineer or his/her authorized representative. The Engineer must certify that the structure, embankment and associated appurtenances were built in accordance with the approved design plan, specifications and stormwater management plan and standard accepted construction practice and shall submit a written certification and/or drawings to the Environmental Division as required. Soil and compaction test reports, concrete test reports, inspection reports, logs and other required construction material or installation documentation may be required by the Environmental Division to substantiate the certification, if specifically requested. The Engineer shall have the authority and responsibility to make minor changes to the approved plan, in coordination with the assigned County inspector, in order to compensate for unsafe or unusual conditions encountered during construction such as those related to bedrock, soils, groundwater, topography, etc. as long as changes do not adversely affect the integrity of the structure(s). Major changes to the approved design plan or structure must be reviewed and approved by the original design professional and the James City County Environmental Division.
- Record Drawing and Construction Certifications are required within **thirty (30) days** of the completion of Stormwater Management / BMP facility construction. Submittals must be reviewed and accepted by James City County Environmental Division prior to final inspection, acceptance and bond/surety release.

Dual Purpose Facilities - Completion of construction also includes an interim stage for Stormwater Management / BMP facilities which serve dual purpose as temporary sediment basins during construction and as permanent stormwater management / BMP facilities following construction, once development and stabilization are substantially complete. For these dual purpose facilities, construction certification is required once the temporary sediment basin phase of construction is complete. Final record drawing and construction certification of additional permanent components is required once permanent facility construction is complete.

Interim Construction Certification is required for those dual purpose embankment-type facilities that are generally ten (10) feet or greater in dam height (*) and may not be converted, modified or begin function as a permanent SWM / BMP structure for a period generally ranging from six (6) to eighteen (18) months or more from issuance of a Land Disturbance permit for construction.

Interim or final record drawing and construction certifications are not required for temporary sediment basins which are designed and constructed in accordance with current minimum standards and specifications for temporary sediment basins per the Virginia Erosion and Sediment Control Handbook (VESCH); have a temporary service life of less than eighteen (18) months; and will be removed completely once associated disturbed areas are stabilized, unless a distinct hazard to the public's health, safety and welfare is determined by the Environmental Division due to the size or presence of the structure or due to evidence of improper construction.

(*Note: Dam Height as referenced above is generally defined as the vertical distance from the natural bed of the stream or waterway at the downstream toe of the embankment to the top of the embankment structure in accordance with 4VAC50-20-30, Virginia Impoundment Structure Regulations and the Virginia Dam Safety Program.)

- Record Drawings shall provide, at a minimum, all information as shown within these requirements and the attached **RECORD DRAWING CHECKLIST** specific to the type of SWM/BMP facility being constructed. Other additional record data may be formally requested by the James City County Environmental Division. *(Note: Refer to the current edition of the James City County Guidelines for Design and Construction of Stormwater Management BMP's manual for a complete list of acceptable BMP's. Currently there are over 20 acceptable water quality type BMP's accepted by the County.)*
- Record Drawings shall consist of blue/black line prints and a reproducible (mylar, sepia, diazo, etc.) set of the approved stormwater management plan including applicable plan views, profiles, sections, details, maintenance plans, etc. as related to the subject SWM / BMP facility. The set shall indicate "**RECORD DRAWING**" in large text in the lower right hand corner of each sheet with record elevations, dimensions and data drawn in a clearly annotated format and/or boxed beside design values. Approved design plan values, dimensions and data shall not be removed or erased. Drawing sheet revision blocks shall be modified as required to indicate record drawing status. Elevations to the nearest 0.1' are sufficiently accurate except where higher accuracy is needed to show positive drainage. Certification statements as shown in Section 4 of the Record Drawing and Construction Certification Form, *or similar forms thereof*, and professional signatures and seals, with dates matching that of the record drawing status in the revision or title block, are also required on all associated record drawing plans, prints or reproducible.
- Submission Requirements. Initial and subsequent submissions for review shall consist of a minimum of one (1) blue/black line set for record drawings and one copy of the construction certification documents with appropriate transmittal. Under certain circumstances, it is understood that the record drawing and construction certification submissions may be performed by different professional firms. Therefore, record drawing submission may be in advance of construction certification or vice versa. Upon approval and prior to release of bond/surety, final submission shall include one (1) reproducible set of the record drawings, one (1) blue/black line set of the record drawings and one (1) copy of the construction certification. Also for current and/or future incorporation into the County BMP database and GIS system, it is requested that the record drawings also be submitted to the Environmental Division on a diskette or CD-ROM in an acceptable electronic file format such as *.dxf, *.dwg, etc. or in a standard scanned and readable format. The electronic file requirement can be discussed and coordinated with Environmental Division staff at the time of final submission.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

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

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

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

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

- X 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- INC 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- X 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacings (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.
- INC 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- INC 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- INC 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- INC 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.
- INC 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- INC 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- INC 18. Maintenance plan taken from approved design plan transposed onto record drawing set.
- N/A 19. Fencing location and type, if applicable to facility.
- X 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- X 21. No visual signs of erosion or channel degradation immediately downstream of facility.
- X 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

III. Group A - Wet Ponds (Includes A-1 Small Wet Ponds; A-2 Wet Ponds; A-3 Wet Ext Det Ponds.)

- XX A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.
- INC A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- N/A A3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.
- N/A A4. Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.
- N/A A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.
- N/A A6. Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.
- N/A A7. Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).
- XX A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.
- N/A A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.
- XX A10. Low flow orifice has a non-clogging mechanism.
- INC A11. A pond drain pipe with valve was provided.
- XX A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.
- N/A A13. End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

IV. Group B - Wetlands (Includes B-1 Shallow Marsh; B-2 Ext Det Shallow Wetlands; B-3 Pond Wetland System and B-4 Pocket Wetland)

- INC B1. Same requirements as Group A Wet Ponds.
- N/A B2. Minimum 2:1 length to width flow path provided across the facility.
- N/A B3. Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).
- XX B4. Wetland type landscaping provided ~~in accordance with approved plan. Includes correct pondscaping zones, plant species, planting arrangements, wetland beds, etc. Wetland plants include 5 to 7 emergent wetland species. Individual plants at 18 inches on center in clumps.~~
- N/A B5. Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).
- N/A B6. No more than one-half (1/2) of the wetland surface area is planted.
- XX B7. Topsoil or wetland mulch provided to support vigorous growth of wetland plants.
- N/A B8. Planting zones staked or flagged in field and locations subsequently established by appropriate field surveying methods for record drawing presentation.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

V. Group C - Infiltration Practices (Includes C-1 Infiltration Trench; C-2 Infiltration Trench;
C-3 Infiltration Basin; and C-4 Infiltration Basin)

- | | | |
|------------|------|--|
| <u>N/A</u> | C1. | All requirements of Section II, Minimum Standards, apply to Group C facilities as applicable. |
| | C2. | Facility is not located on fill slopes or on natural ground in excess of six (6) percent. |
| | C3. | Pretreatment devices provided prior to entry into the infiltration facility. Acceptable pretreatment devices include sediment forebays, sediment basins, sediment traps, sump pits or inlets, grass channels, plunge pools or other acceptable measures. |
| | C4. | Three (3) or more of the following pretreatment devices provided to protect long term integrity of structure: grass channel; grass filter strip; bottom sand layer; upper filter fabric layer; use of washed bank run gravel aggregate. |
| | C5. | Sides of infiltration practice lined with filter fabric. |
| | C6. | Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction. |
| | C7. | Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility. |
| | C8. | Minimum one hundred (100) foot separation horizontally from any known water supply well and minimum one hundred (100) foot separation upslope from any building. |
| | C9. | Minimum twenty-five (25) foot separation down gradient from any structure. |
| | C10. | Stormwater outfalls provided for overflow associated with larger design storms. |
| | C11. | No visual signs of erosion or channel degradation immediately downstream of facility. |
| | C12. | Facility does not currently cause any apparent surface or subsurface water problems to downgrade properties. |
| | C13. | Observation well provided. |
| <u>N/A</u> | C14. | Adequate, direct access provided to the facility for future maintenance, operation and inspection. |

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

VI. Group D - Filtering Systems (Includes D-1 Bioretention Cells; D-2 Surface Sand Filters; D-3 Underground Sand Filters; D-4 Perimeter Sand Filters; D-5 Organic Filters; and D-6 Pocket Sand Filters)

- | | | |
|------------|------|--|
| <u>N/A</u> | D1. | All requirements of Section II, Minimum Standards, apply to Group D facilities. |
| | D2. | Sediment pretreatment devices provided. |
| | D3. | For D-1 BMPs (Bioretention Cells), pretreatment consisting of a grass filter strip below level spreader (deflector); a gravel diaphragm; and mulch and planting soil layers were provided. |
| | D4. | For D-1 BMPs (Bioretention Cells), plantings consist of native plant species; vegetation provided was based on zones of hydric tolerances; trees and understory of shrubs and herbaceous materials were provided; woody vegetation is absent from inflow locations; and trees are located around facility perimeter. |
| | D5. | Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction. |
| | D6. | No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed . |
| | D7. | Filtering system is off-line from storm drainage conveyance system. |
| | D8. | Overflow outlet has adequate erosion protection. |
| | D9. | Deflector, diversion, flow splitter or regulator structure provided to divert the water quality volume to the filtering structure. |
| | D10. | Minimum four (4) inch perforated underdrain provided in a clean aggregate envelope layer beneath the facility. |
| | D11. | Minimum fifty (50) foot separation from any slope fifteen (15) percent or greater. Minimum one hundred (100) foot separation horizontally from any known water supply well. Minimum one hundred (100) foot separation upslope and twenty-five (25) foot separation downslope from any building. |
| | D12. | Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility. |
| | D13. | No visual signs of erosion or channel degradation immediately downstream of facility. |
| <u>N/A</u> | D14. | Adequate, direct access provided to the pretreatment area and/or filter bed for future maintenance. |

**STORMWATER MANAGEMENT / BMP FACILITIES
AS-BUILT PLAN CHECKLIST**

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

VII. Group E - Open Channel Systems *(Includes E-1 Wet Swales (Check Dams); E-2 Dry Swales; and E-3 Biofilters)*

- N/A E1. All requirements of Section II, Minimum Standards, apply to Group E facilities as applicable.
- E2. Open channel system has constructed longitudinal slope of less than four (4) percent.
- E3. No visual signs of erosion in the open channel system's soil and/or vegetative cover.
- E4. Open channel side slopes are no steeper than 2H:1V at any location. Preferred channel sideslope is 3H:1V or flatter.
- E5. No visual signs of ponding are present at any location in the open channel system, except at rock check dam locations for E-1 systems (Wet Swales).
- E6. For E-2 BMPs (Dry Swales), an underdrain system was provided.
- E7. Treated timber or rock check dams provided as pretreatment devices for the open channel system.
- E8. Gravel diaphragm provided in areas where lateral sheet flow from impervious surfaces are directly connected to the open channel system.
- E9. Grass cover/stabilization in the open channel system appears adaptable to the specific soils and hydric conditions for the site and along the channel system.
- E10. Open channel system areas with grass covers higher than four (4) to six (6) inches were properly mowed.
- E11. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
- E12. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.
- E13. For E-3 BMPs (Biofilters), the bottom width is six (6) feet maximum at any location.
- E14. For E-3 BMPs (Biofilters), sideslopes are 3H:1V maximum at any location.
- E15. For E-3 BMPs (Biofilters), the constructed channel slope is less than or equal to three (3) percent at any location.
- N/A E16. For E-3 BMPs (Biofilters), the constructed grass channel is approximately equivalent to the constructed roadway length.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

VIII. Group F - Extended Dry Detention (Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)

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

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

IX. Group G - Open Spaces (Includes All Open Space Types G-1; G-2; and G-3)

- | | | |
|------------|-----|---|
| <u>N/A</u> | G1. | All requirements of Section II, Minimum Standards, apply to Group G facilities as applicable. |
| | G2. | Constructed impervious areas appear to conform with locations indicated on the approved plan and appear less than sixty (60) percent impervious in accordance with the requirements of the James City County Chesapeake Bay Preservation Ordinance. |
| | G3. | Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection. |
| | G4. | Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked). |
| | G5. | Adequate protection measures were implemented during construction to protect the defined dedicated open space areas. |
| <u>N/A</u> | G6. | Dedicated open space areas were not disturbed during construction (ie. cleared, grubbed or graded). |

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

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

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

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

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

XII. Other Systems

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

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

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

XIII. References *(The James City County Record Drawing and Construction Certification Forms and Checklists for Stormwater Management / BMP facilities were developed using the following sources and references.)*

- Baltimore County, Maryland Soil Conservation District, As-Built Stormwater Management Pond Checklist.
- James City County, Virginia, Guidelines for Design and Construction of Stormwater Management BMP's (October 1999).
- James City County, Virginia, Stormwater Detention/Retention Basin Design Checklist and Erosion and Sediment Control and Stormwater Management Design Plan Checklists.
- James City County Stormwater Policy Framework, Final Report of the James City County BMP Policy Project, October 1998, The Center for Watershed Protection.
- Prince Georges County, Maryland, As-Built Requirements Retention or Detention Pond/Basin.
- Prince William County, Virginia, Stormwater Management Fact Sheet.
- Stafford County, Virginia, As-Built Plan Checklist.
- Stormwater Management Design Manual, NRCS Maryland Code No. 378, Pond Standards and Specifications.
- USEPA/Watershed Management Institute, Stormwater Management Inspection Forms.
- Virginia Impounding Structure Regulations (Dam Safety), Department of Conservation & Recreation, 1997.
- Virginia Erosion and Sediment Control Handbook, Third Edition 1992, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.
- Virginia Stormwater Management Handbook, 1999 edition, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

File: Shared\SWMPProg\BMP\CertifRDCC.wpd

Record Drawing/Construction Certification Submittal for a BMP Facility

Date: April 30 2002

Inspector: Pat Menichino
 Gerry Lewis
 Beth Davis
 Mike Woolson
 Joe Buchite
 Other: _____

Project: Governors LAND
BMP Facility: RIVER OAK North A (BMP# 3)
Plan No. 5-12-96
BMP ID Code: JR 034

I have received a transmittal for a Record Drawing and Construction Certification for the above referenced facility on MARCH 20 2002 Prior to full engineering review of these items and a field inspection, I am first forwarding the items to you to cursory review in case any major field changes were performed that I should be aware of and/or to ensure the record drawing accurately portrays what you saw in the field. Please review the drawing and return to me promptly so I can proceed with the review for certification purposes.

During my review, I will look at issues related to the BMP and its primary inflow and outflow conveyance systems, and will make comment in the following areas: Record Drawing (RD), Construction Certification (CC) and Construction-Related (CR) punch list items. If you have any other related non-BMP site issues such as erosion, stabilization, removal of erosion & sediment controls, etc. that are not related to the BMP, I can easily add these items to any comment letter that I may forward to the Owner/Engineer. Let me know if any outstanding site issues remain.

If I don't hear from you I will ask you if any other outstanding issues remain before I forward any letters to the Owner/Engineer.

Scott

**James City County, Virginia
Environmental Division**

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

*BAT 3
P004*

County Plan No.: 5-12-96
 Project Name: GOVERNORS LAND
 Stormwater Management Facility: RIVER OAK WORTH A (BMP #3)

Phase: I II III
 Information Received. Date: 3/20/02 AFS
 Administrative Check.
 Record Drawing Date: 3/18/02 Cert; 2/8/02 DWG.
 Construction Certification Date: None provided. Post Geotech.
 RD/CC Standard Forms (Required after Feb 1st 2001 Only)
 Insp/Maint Agreement Info: Global *Not in file*
 BMP Maintenance Plan Location: None
 Other:

Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
 Yes No Location: Note 18, drawing 12 sheet 12

Assign County BMP ID Code Code: IR 034

Log into Division's "As-Built" Tracking Log

Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, etc.)

Preliminary Log into BMP Database (BMP ID #, Site Plan #, GPIN, Project Name)

Active Project File Review (correspondence, H&H, etc.).

Initial As-Built File setup (label, copy hydraulics, BMP information, etc.).

Inspector Check of RD/CC.

Pre-Inspection Drawing Review - Approved Plan (Quick look prior to field inspection).

Final Inspection (FI) Performed Date: 1/15/03 RH

Record Drawing (RD) Review Date: 1/13/03. RH No signature or seal

Construction Certification (CC) Review Date: Post Geotech Report *1/24/03 SJT*

Actions:

No comments.

Comments. Letter Forwarded. Date: _____

Record Drawing (RD)

Construction Certification (CC)

Construction-Related (CR)

Site Issues (SI)

Other :

Second Submission: 5/16/03 AFS (RD)

Third Submission: _____

Acceptable for stormwater management facility purposes (RD/CC/CR/Other). Proceed with bond release.

Notify Darryl/Joan/Pat of acceptability using email (preferred), form or verbal.

Check/Clean active file of any remaining material and finish "As-Built" file.

Add to County BMP Inventory/Inspection schedule (Phase I, II or III).

Copy Final Inspection Report into County BMP Inspection Program file.

Digital Photographs obtained.

Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable

Plan Reviewer: *[Signature]*

Date: 6/26/03



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

January 24, 2003

Mr. James H. Bennett
Governors Land Associates
9701 Mill Pond Run
Toano, Va. 23168

*Respect
6-2-03*

Re: Governor's Land - River Oaks North
County Plan No. ~~S-14-93~~ S-12-96
Stormwater Management Facility
County BMP ID Code: JR 034

Dear Mr. Bennett:

The Environmental Division has reviewed a record drawing and a postconstruction geotechnical report (ECS #6221 dated December 31st 2000) as submitted to our office for the above referenced BMP. The record drawing provides as-built information for Wet Pond # 3 situated near the cul-de-sac at the west end of River Ridge Road.

Based on our review of the project and a concurrent field inspection as performed on January 15th 2003, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility at the site and to proceed with closing out the project:

Construction Certification:

- 1. In accordance with the Note # 18 on Sheet 12 of the approved plan, construction certification was required for the BMP. Although not provided, a postconstruction geotechnical analyses of the dam embankment was performed. The portion of the post-construction geotechnical report for Founders Hill Pond, which is actually River Oaks North BMP # 3, appears to satisfy any outstanding construction certification requirements for the facility and is satisfactory.

*✓
OK
6-26-03*

Record Drawing:

- 2. The professional certifications on both sheets of the record drawing set are blank and require signature and date.
- 3. Provide asbuilt spot elevations or contours for the bottom of the pond to show that the shallow marsh bottom and pond arrangement was constructed in accordance with the approved plan and that excessive sedimentation does not exist in the bottom of the facility. Record drawing Sheet 2 plan, section and profiles indicate a proposed bottom elevation at El. 17.0 with high marsh areas and forebays at the outfall of incoming storm drain pipes.

*✓
OK
6-26-03*

*✓
OK
6-26-03*

21' deep

✓ OK 6-26-03

- 4. Provide asbuilt information for incoming storm drain pipes which enter the BMP including approximate location, size and invert elevations for the outlet ends of the pipes.

Construction - Related Items:

OK TO LEAVE ORNAMENTALS

✓ OK 6-2-03
⑥
OK 6-2-03
OK 6-2-03

Remove small trees and woody vegetation from the dam embankment.

Clean and remove all debris, sediment and vegetation from the outfall end of the barrel through the dam. Flow out of the BMP shall not be obstructed.

Ensure the BMP is fully converted from temporary sediment basin to final permanent BMP mode in accordance with the approved plans and specifications. *DW pipe removed.*

Once this work is satisfactorily completed, contact our office appropriately for reinspection. We can then proceed with final release of the surety and/or closing out the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Joe Buchite at 757-253-6643 if you have any further comments or questions.

Sincerely,



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

cc: Marc Bennett, AES - via fax

G:\AsBuilts\S1296.jr034

Memorandum

DATE: May 15, 2003
TO: Scott Thomas
FROM: Victoria Bains
SUBJECT: River Oaks North, County BMP ID Code: JR034

In response to your letter dated January 24, 2003 AES Consulting Engineers has taken several actions.

Construction Certification:

Being provided by Earthworks Consulting Engineers, Inc.

*WAS NOT NEEDED BUT OK.
WHEN RECEIVED FILE.*

Record Drawings:

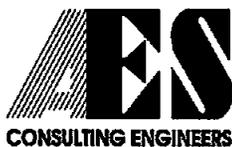
The professional certifications on both sheets are signed as required by the County.

Spot elevations for the bottom of the pond were added to plan view of the drawings. From this information, there is no significant sediment accumulation in this pond.

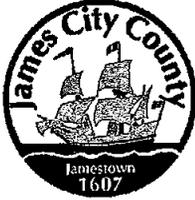
Added approximate location, size and invert elevations for incoming storm drain pipes.

Construction – Related Items:

Removed all small trees and woody vegetation from dam embankment. All debris, sediment and vegetation has been cleared and removed from the outfall end of 24" CMP barrel through dam. BMP is fully converted to permanent facility.



5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com



DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
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codecomp@james-city.va.us

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INTEGRATED PEST MANAGEMENT
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January 24, 2003

Mr. James H. Bennett
Governors Land Associates
9701 Mill Pond Run
Toano, Va. 23168

Re: Governor's Land - River Oaks North
County Plan No. S-14-93
Stormwater Management Facility
County BMP ID Code: JR 034

Dear Mr. Bennett:

The Environmental Division has reviewed a record drawing and a postconstruction geotechnical report (ECS #6221 dated December 31st 2000) as submitted to our office for the above referenced BMP. The record drawing provides as-built information for Wet Pond # 3 situated near the cul-de-sac at the west end of River Ridge Road.

Based on our review of the project and a concurrent field inspection as performed on January 15th 2003, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility at the site and to proceed with closing out the project:

Construction Certification:

1. In accordance with the Note # 18 on Sheet 12 of the approved plan, construction certification was required for the BMP. Although not provided, a postconstruction geotechnical analyses of the dam embankment was performed. The portion of the post-construction geotechnical report for Founders Hill Pond, which is actually River Oaks North BMP # 3, appears to satisfy any outstanding construction certification requirements for the facility and is satisfactory.

Record Drawing:

2. The professional certifications on both sheets of the record drawing set are blank and require signature and date.
3. Provide asbuilt spot elevations or contours for the bottom of the pond to show that the shallow marsh bottom and pond arrangement was constructed in accordance with the approved plan and that excessive sedimentation does not exist in the bottom of the facility. Record drawing Sheet 2 plan, section and profiles indicate a proposed bottom elevation at El. 17.0 with high marsh areas and forebays at the outfall of incoming storm drain pipes.

4. Provide asbuilt information for incoming storm drain pipes which enter the BMP including approximate location, size and invert elevations for the outlet ends of the pipes.

Construction - Related Items:

5. Remove small trees and woody vegetation from the dam embankment.
6. Clean and remove all debris, sediment and vegetation from the outfall end of the barrel through the dam. Flow out of the BMP shall not be obstructed.
7. Ensure the BMP is fully converted from temporary sediment basin to final permanent BMP mode in accordance with the approved plans and specifications.

Once this work is satisfactorily completed, contact our office appropriately for reinspection. We can then proceed with final release of the surety and/or closing out the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Joe Buchite at 757-253-6643 if you have any further comments or questions.

Sincerely,



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

cc: Marc Bennett, AES - via fax

G:\AsBuilts\SI296,jr034

James City County, Virginia
Environmental Division

Stormwater Management/BMP
Record Drawing Review Form

County Plan No. 5-12-96
Project Name: Gous Land - River Oak North A
Stormwater Management Facility: JR-034

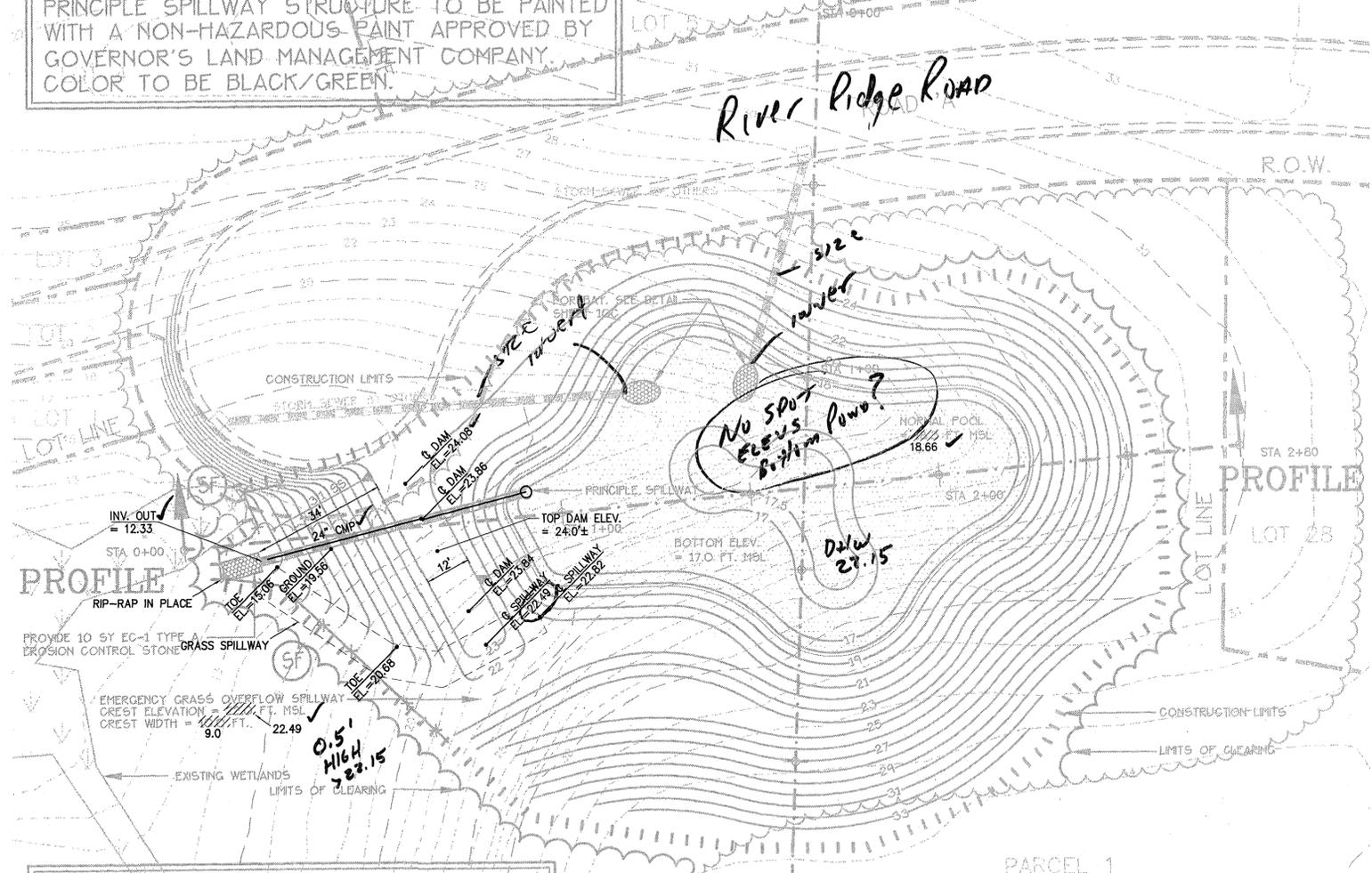
Component	Approved Plan	Record Drawing	OK
Top of dam (lowest point)	23.0	23.84	
Top of Dam (reported)		24.0	
Top width of dam	10'	12'	
Crest of riser			
Crest of Emerg. Spillway	22.0	22.85 22.49	
Low Water elevation			
Normal Water level	18.3	18.66	
Bottom of pond elevation	17.0	?	
Inflow Pipe size (1) ✓	24" RCP	N/A available	
Inflow Pipe size (2) ✓	15" RCP	N/A available	
Inflow Pipe size (3)		24" RCP	
Barrel Diameter (inches)		24" CMP	
100 yr Storm Elevation	?	?	
Trash rack/anti-vortex type		54" RCP	
Forbay, baffle wall, etc.	2 Forbays		
Pond drain elevation			

DHW
22.15
1.69' FB

Date: 4/13/03
Name: R. Hall

PRINCIPLE SPILLWAY STRUCTURE TO BE PAINTED WITH A NON-HAZARDOUS PAINT APPROVED BY GOVERNOR'S LAND MANAGEMENT COMPANY. COLOR TO BE BLACK/GREEN.

SECTION



NARRATIVE

THE PROPOSED BMP IS DESIGNED AS A 6-POINT MARSH ENHANCED EXTENDED DETENTION BASIN WHICH PROVIDES A 50% PHOSPHORUS REMOVAL EFFICIENCY. THE BMP WILL OFFSET ALL POTENTIAL IMPACTS CAUSED BY THE PROPOSED RPA ENCROACHMENTS FOR BAY 3 POD 4. FURTHERMORE, THE BMP PROVIDES ENOUGH TREATMENT CAPACITY TO OFFSET VACATING TWO EXISTING BMPs WHICH WERE PREVIOUSLY PROVIDING WATER QUALITY CREDIT IN THE GOVERNOR'S LAND MASTER STORMWATER MANAGEMENT PLAN. AN EXCEPTION REQUEST HAS BEEN SUBMITTED TO JAMES CITY COUNTY WHICH DETAILS THE QUANTIFICATION OF THESE WATER QUALITY BENEFITS.

THE BMP IS DESIGNED SUCH THAT IT IS NORMALLY INUNDATED WITH 1.3 FEET OF WATER BUT WILL OCCASIONALLY BECOME DRY DURING SEVERE DROUGHTS. VEGETATION HAS BEEN SPECIFIED WHICH WILL BE TOLERANT OF THESE SEASONAL HYDROLOGIC VARIATIONS.

BMP SIZING

I Compute Rv

Drainage Area =	8.1 acre
Impervious Area =	2.05 acre
Total Impervious	25.31 %

Rv = $0.05 + .009(\text{Impervious} \times 2)$
 Rv = 0.08

II Compute Storage Volume

Provide a wetlands enhanced extended detention basin to function as a 50% efficient BMP. Removal efficiencies are taken from Local Assistance Manual (CLAD1999). Design based on A Framework For Evaluating Compliance With The 10% Rule In The Chesapeake Bay Critical Area (MVCUG1997):

Req. Vol=(Runoff from a 1" storm)	
Req. Vol=(RvX1')X(Drainage Area)	
Req. Vol=	819 ac-ft
Req. Vol=	81675 cu-ft
Vol. Provided=	84866 cu-ft

CONSTRUCTION NOTES

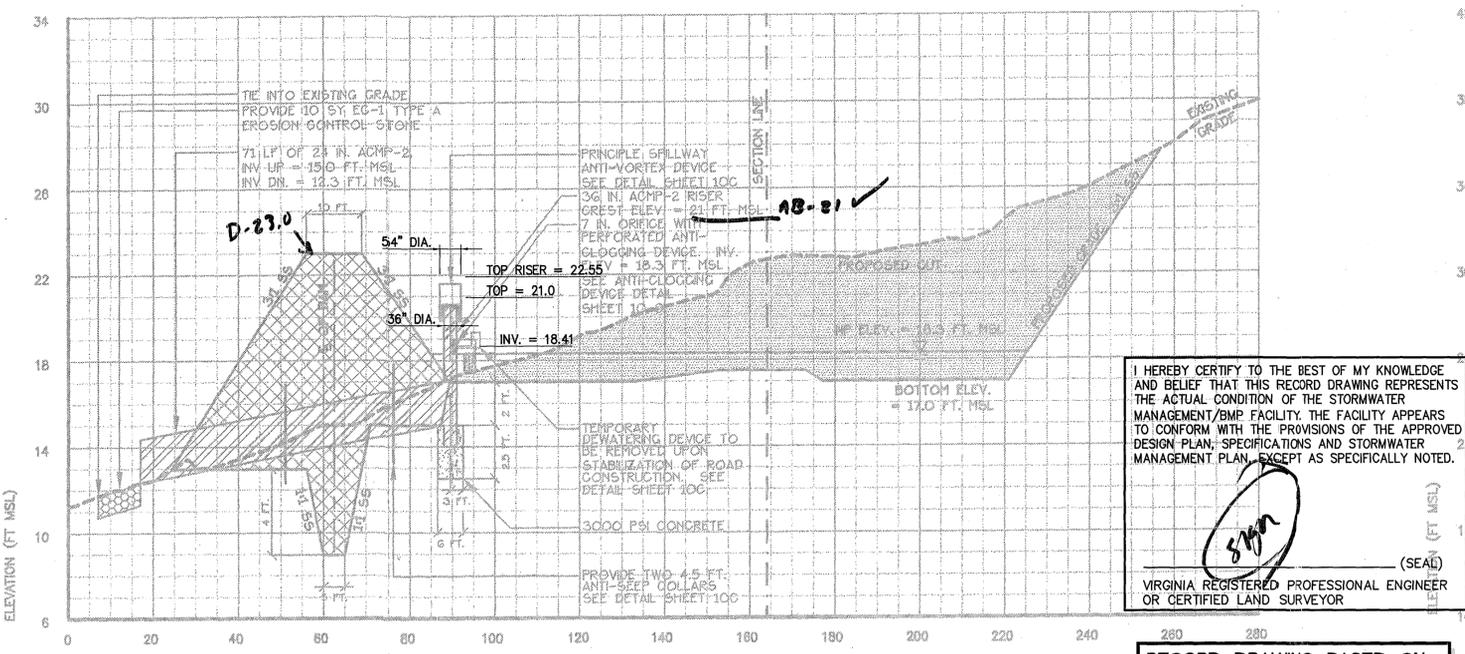
- 1) ALL TOPSOIL AND ORGANIC MATERIALS SHOULD BE REMOVED FROM BELOW THE DAM AND TO A DISTANCE OF AT LEAST 5 FEET BEYOND THE DESIGN TOE OF THE EMBANKMENT.
- 2) SOILS USED TO CONSTRUCT THE EMBANKMENT SHOULD CONSIST OF A SOIL MATERIAL FREE OF ORGANICS AND DEBRIS, CLASSIFIED AS SM, SC, CL OR ML WHICH CONTAINS NO LESS THAN 30% PASSING THE NO. 200 SIEVE.
- 3) THE FILL SHOULD BE COMPACTED IN MAXIMUM 10 INCH LIFTS TO A DRY DENSITY OF AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). IN ORDER TO ATTAIN THIS COMPACTION, IT WILL BE NECESSARY TO EMPLOY HEAVY COMPACTING EQUIPMENT IN THE BASE OF THE CUT.
- 4) THE CONTRACTOR SHOULD BE PREPARED TO PROVIDE THE METHODS NECESSARY TO ATTAIN ADEQUATE DEWATERING AND EXCAVATION STABILITY.
- 5) A KEY SHALL BE CONSTRUCTED THE FULL WIDTH OF THE DAM, TOP OF SHOULDER TO TOP OF SHOULDER. THE KEY SHOULD EXTEND TO A DEPTH OF APPROXIMATELY 4 FEET.
- 6) THE KEY SHOULD BE CONSTRUCTED WITH A WIDTH OF AT LEAST 5 FEET AND ITS SIDES SHOULD SLOPE UP AT A GRADE OF 1 VERTICAL TO 1 HORIZONTAL TO THE BOTTOM OF THE EMBANKMENT ABOVE WHICH THE KEY WILL BE CONSTRUCTED CONTIGUOUS WITH THE EMBANKMENT.
- 7) SLOPE PROTECTION SHALL BE ATTAINED BY STABILIZATION WITH GRASS MIX.
- 8) TEMPORARY SYNTHETIC STABILIZATION MATTING SHALL BE USED TO COVER THE EMBANKMENT IF CONSTRUCTION OCCURS DURING A PERIOD NOT CONDUCTIVE TO RAPID GROWTH OF VEGETATION.
- 9) TREES SHALL NOT BE PLANTED ON DAM EMBANKMENT.
- 10) HAND OPERATED EQUIPMENT SHOULD BE EMPLOYED AROUND AND IMMEDIATELY ABOVE PIPES AND FOUNDATIONS.
- 11) SOILS SHOULD BE COMPACTED AT MOISTURE CONTENTS WITHIN 3% +/- OPTIMUM MOISTURE CONTENT FOR THE MATERIAL USED.
- 12) THE SURFACE OF EACH COMPACTED LIFT SHOULD BE SCARIFIED BY BACKDRAGGING TO A DEPTH OF 2 INCHES PRIOR TO PLACEMENT OF THE NEXT LIFT.

BASIN HYDROLOGY

Basin Characteristics	DA	OH	T ₀
	acres		hours
Pre-development	3.88	30	.5
Post-development	8.1	65	.5
Top of Dam Elevation	23.0 ft (msl)		
Top of Emergency Spillway	22.0 ft (msl)		
Hydrologic Summary	2-yr	10-yr	100-yr
	cfs	cfs	cfs
Pre-development	5	10	17
Proposed Condition Unretted	14	27	42
Proposed Condition Retted	5	23	36
Routed Elevations			
2-yr Elevation	21.22 ft (msl)		
10-yr Elevation	21.74 ft (msl)		
100-yr Elevation	22.15 ft (msl)		

NOTE: BMP TO SERVE AS TEMPORARY SEDIMENT BASIN DURING ROAD CONSTRUCTION. SEE NOTES AND DETAILS, SHEET 10C.

SECTION

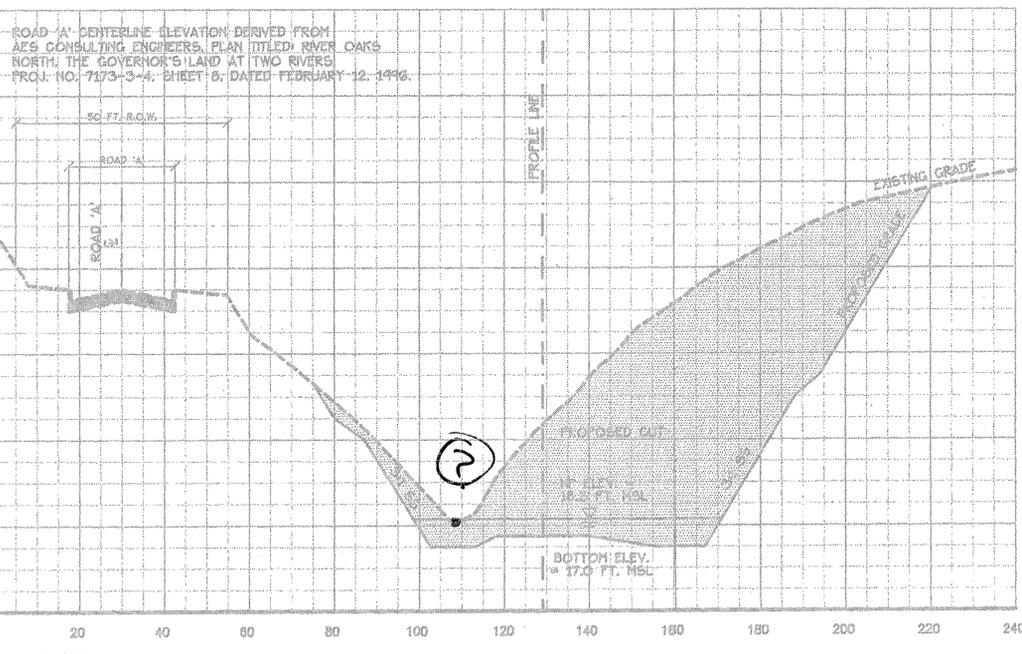


HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT/BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

(SEAL)

VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

RECORD DRAWING BASED ON INFORMATION AS SUPPLIED BY AES CONSULTING ENGINEERS.



SECTION

SCALE: HORIZONTAL 1 IN. = 20 FT., VERTICAL 1 IN. = 4 FT.

RECORD DRAWING
 RECORD DRAWING INFORMATION
 SHOWN PREPARED BY
 AES CONSULTING ENGINEERS
 AND BASED ON
 ORIGINAL DESIGN AS PREPARED BY
 WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

BMP #3 CONSTRUCTION PLAN
 GOVERNOR'S LAND: RIVER OAKS NORTH, BAYS, POD4
 JAMES CITY COUNTY, VIRGINIA

REVISIONS:

NO.	DATE	BY	DESCRIPTION

DRAWN BY: MDW/ACAD
 DESIGNED BY: MDW
 DATE: 5/14/96
 CHECKED BY: RB/EA/201

SHEET: 10A
 OF 9

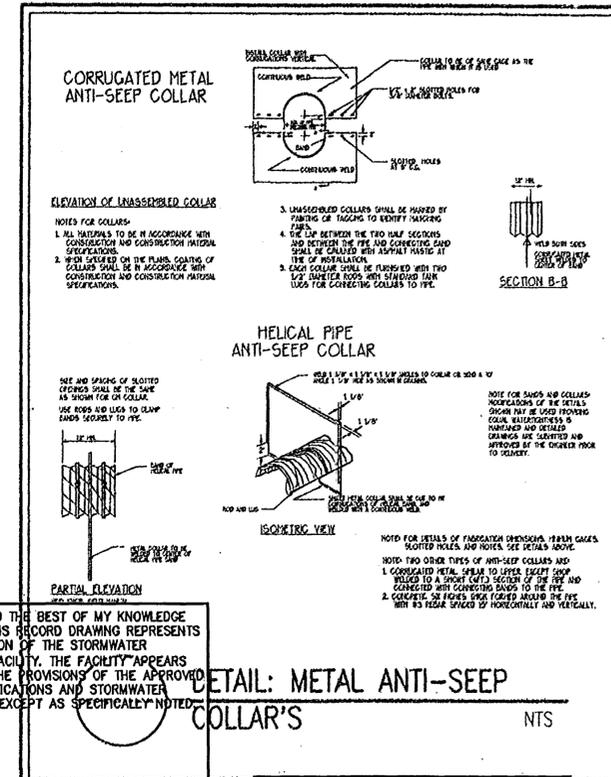
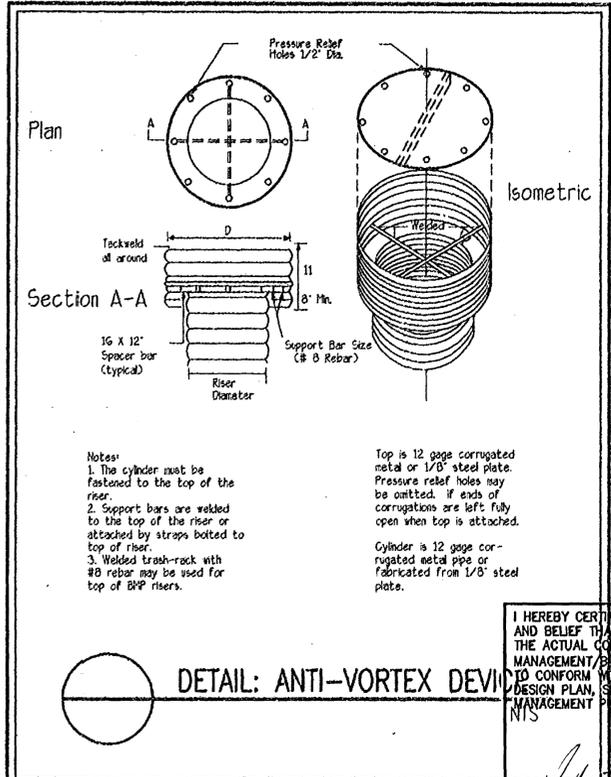
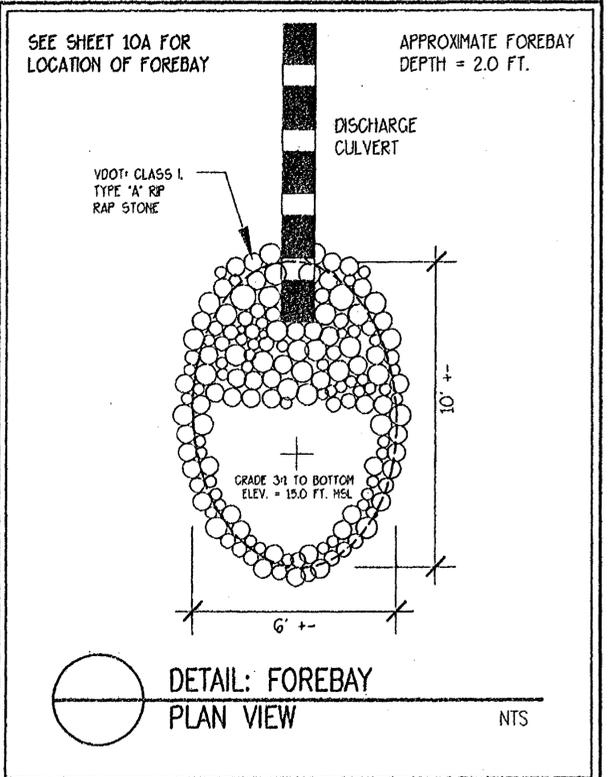
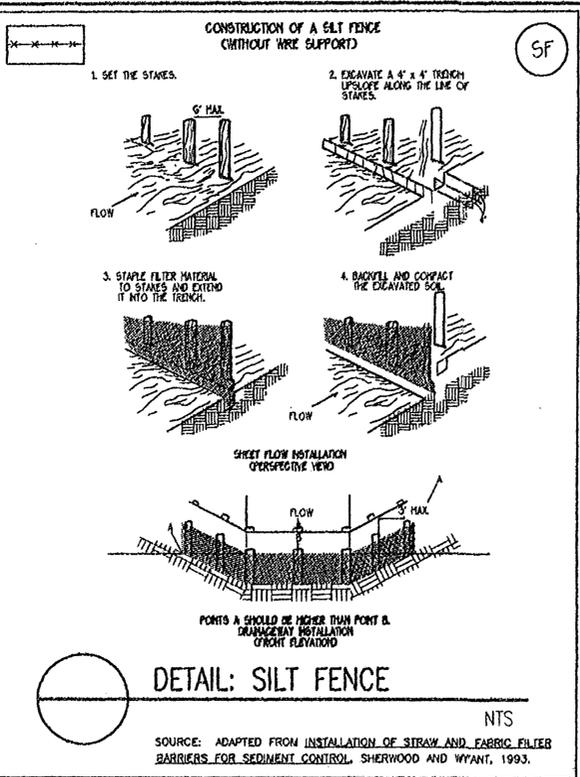
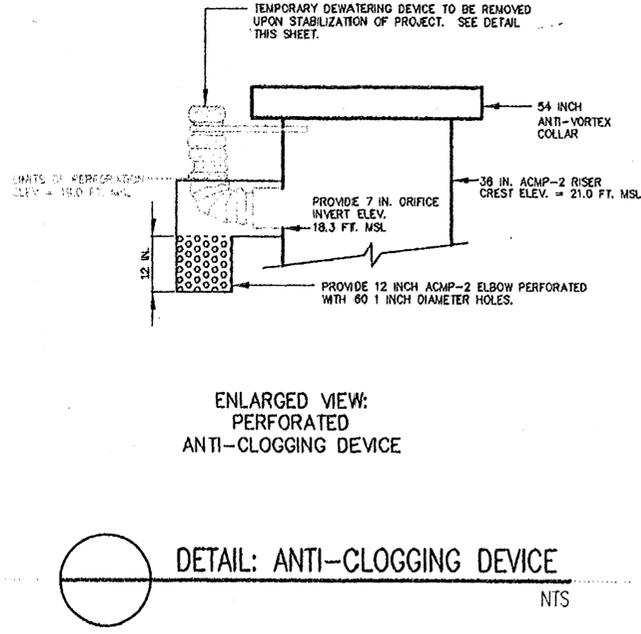
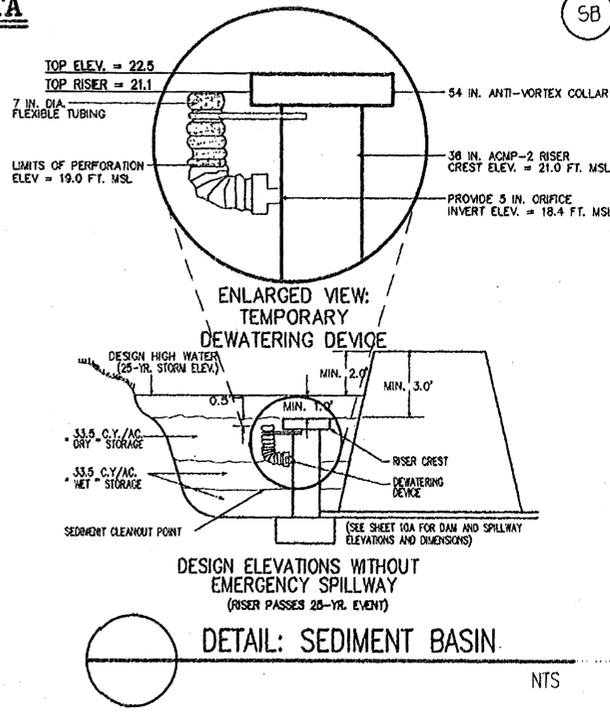
SEDIMENT BASIN ANALYSIS

THE PROPOSED PERMANENT BMP WILL SERVE AS A TEMPORARY SEDIMENT BASIN TO FACILITATE CONSTRUCTION OF THE PROPOSED ROADWAY. A DEWATERING DEVICE WITH A 5 INCH ORIFICE WITH 7 INCH PERFORATED VERTICAL TUBING SHALL BE TEMPORARILY INSERTED WITHIN THE PERMANENT 7 INCH ORIFICE. THE DEWATERING DEVICE SHALL BE REMOVED UPON STABILIZATION OF THE UPSTREAM ROADWAY AND RIGHT OF WAY AND REPLACED WITH THE PERFORATED ANTI-CLOGGING DEVICE.

THE PERMANENT BMP IS DESIGNED TO TREAT AN 8.1 ACRE WATERSHED. PRIOR TO PLACEMENT OF THE PROPOSED STORMSEWER, THE DRAINAGE AREA TO THE BMP/SEDIMENT BASIN WILL BE SIGNIFICANTLY LESS THAN 8.1 ACRES. AS DRAINAGE IS FORCED TO THE BASIN, TREATMENT WILL APPROACH 8.1 ACRES. BASED ON THE FORCED DRAINAGE AREA OF 8.1 ACRES, THE STRUCTURE WILL PROVIDE ALL OF THE TREATMENT VOLUME REQUIRED BY THE VIRGINIA EROSION AND SEDIMENT CONTROL MANUAL, 3RD EDITION. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES, SUCH AS STORMSEWER INLET PROTECTION, WILL BE IMPLEMENTED UPSTREAM TO PROVIDE SUPPLEMENTAL SERIAL SEDIMENT REMOVAL. THE FOLLOWING IS A SUMMARY OF SEDIMENT BASIN DESIGN PARAMETERS.

TEMPORARY SEDIMENT BASIN DESIGN DATA

	UNITS	
TOTAL AREA DRAINING TO BASIN	acres	8.1
BASIN VOLUME DESIGN		
Wet Storage Volume	cu yds	542
Available volume before cleanout required	cu yds	271
Distance from top of riser to cleanout level	feet	2.5
Dry Storage Volume	cu yds	542
Total available basin volume	cu yds	1084
DESIGN ELEVATIONS		
Top of dam - elevation	ft msl	23.0
Designed high water	ft msl	21.4
Principal spillway crest	ft msl	20.5
Dewatering Orifice Invert	ft msl	18.3
Limits of Perforations	ft msl	19.0
Cleanout elevation	ft msl	18.0
Elevation of upstream toe of dam	ft msl	17.0
BASIN SHAPE		
Length of flow	feet	130
Effective width	feet	50
if <2, baffles required		2.8
PRINCIPAL SPILLWAY DESIGN		
25-yr Inflow	ofs	29
Routed 25-yr flow	ofs	25
25-yr elevation	ft msl	21.37
Riser diameter	inches	36
Barrel length	feet	71
Barrel diameter	inches	24
Trash rack and Anti-vortex device		
Diameter	inches	54
Height	inches	17
DEWATERING		
Max. diameter of dewatering orifice	inches	5
Min. diameter of flexible tubing	inches	7
ANTI-SEEP COLLAR		
Depth of water at principal spillway crest	feet	5.4
Slope of upstream face of embankment	S:S	3
Slope of principle spillway barrel	%	5.0
Length of barrel in saturated zone	feet	50
Number of collars	No.	2
Collar dimensions	feet	4.5



I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

[Signature]
 VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

RECORD DRAWING BASED ON INFORMATION AS SUPPLIED BY AES CONSULTING ENGINEERS.

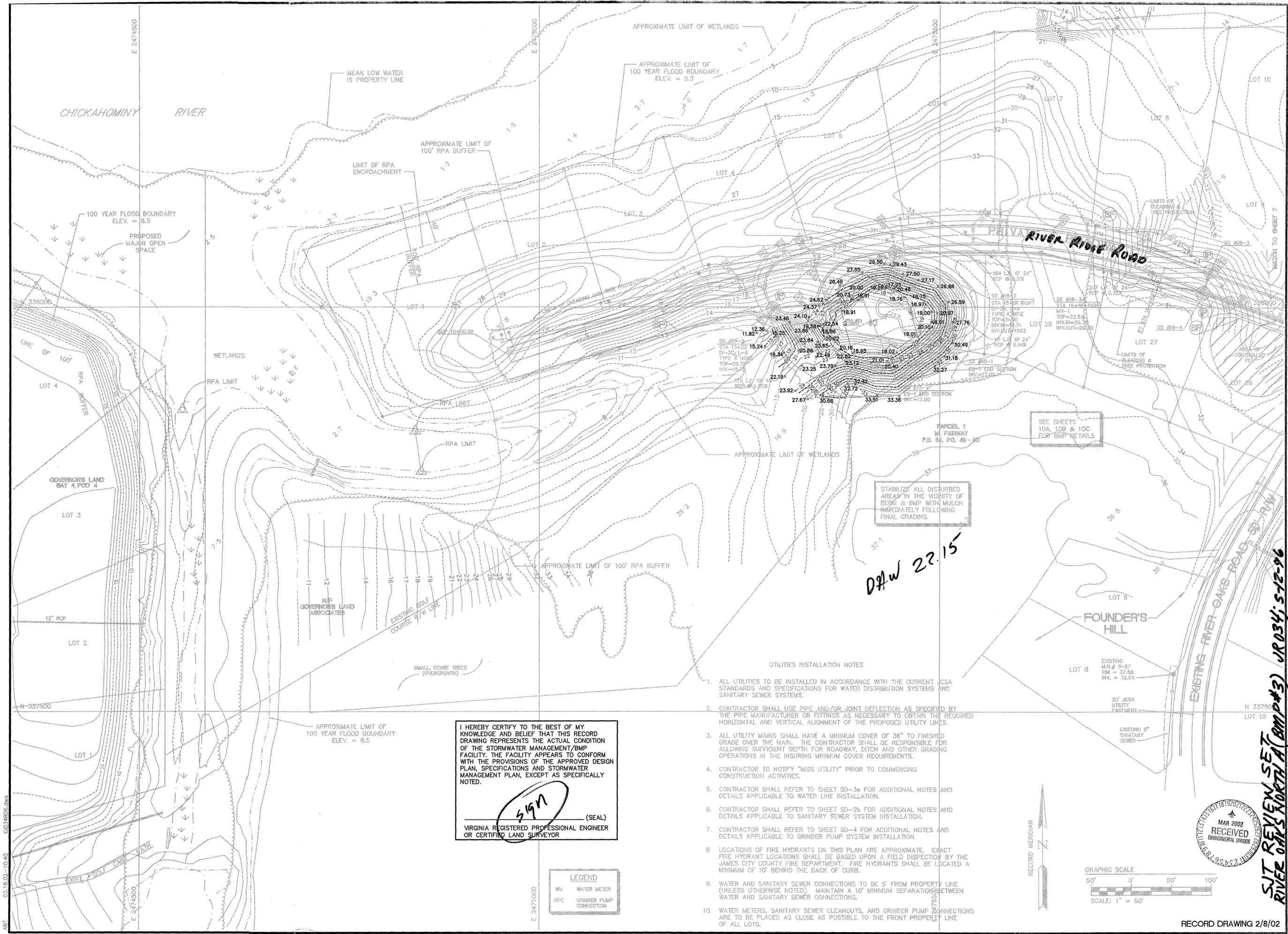
RECORD DRAWING INFORMATION SHOWN PREPARED BY AES CONSULTING ENGINEERS AND BASED ON ORIGINAL DESIGN AS PREPARED BY WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

BMP #3 GENERAL DETAILS
 GOVERNOR'S LAND: RIVER OAKS NORTH, BAYS, POD4
 JAMES CITY COUNTY, VIRGINIA

APPROVED
 James City County
 Environmental Division
 By: *[Signature]*
 Date: 6-26-03

REVISIONS:	DATE:	BY:	REASON:

DRAWN BY: 10W/ACAD
 DESIGNED BY: 10W
 DATE: 5/14/06
 CHECKED BY: SB/ZA/BL
 SHEET: 10C
 10B of 91



AMT 03.18.02-10-10 G03.4R06.dwg

E 2474500

E 2475000

E 2475500

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I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT/BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

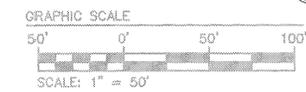
 (SEAL)
 VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

LEGEND	
WM	WATER METER
GPC	GRINDER PUMP CONNECTION

- UTILITIES INSTALLATION NOTES
- ALL UTILITIES TO BE INSTALLED IN ACCORDANCE WITH THE CURRENT ICSA STANDARDS AND SPECIFICATIONS FOR WATER DISTRIBUTION SYSTEMS AND SANITARY SEWER SYSTEMS.
 - CONTRACTOR SHALL USE PIPE AND/OR JOINT DEFLECTION AS SPECIFIED BY THE PIPE MANUFACTURER OR FITTINGS AS NECESSARY TO OBTAIN THE REQUIRED HORIZONTAL AND VERTICAL ALIGNMENT OF THE PROPOSED UTILITY LINES.
 - ALL UTILITY MAINS SHALL HAVE A MINIMUM COVER OF 36" TO FINISHED GRADE OVER THE MAIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALLOWING SUFFICIENT DEPTH FOR ROADWAY, DITCH AND OTHER GRADING OPERATIONS IN THE INSURING MINIMUM COVER REQUIREMENTS.
 - CONTRACTOR TO NOTIFY "MISS UTILITY" PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
 - CONTRACTOR SHALL REFER TO SHEET SD-3e FOR ADDITIONAL NOTES AND DETAILS APPLICABLE TO WATER LINE INSTALLATION.
 - CONTRACTOR SHALL REFER TO SHEET SD-2b FOR ADDITIONAL NOTES AND DETAILS APPLICABLE TO SANITARY SEWER SYSTEM INSTALLATION.
 - CONTRACTOR SHALL REFER TO SHEET SD-4 FOR ADDITIONAL NOTES AND DETAILS APPLICABLE TO GRINDER PUMP SYSTEM INSTALLATION.
 - LOCATIONS OF FIRE HYDRANTS ON THIS PLAN ARE APPROXIMATE. EXACT FIRE HYDRANT LOCATIONS SHALL BE BASED UPON A FIELD INSPECTION BY THE JAMES CITY COUNTY FIRE DEPARTMENT. FIRE HYDRANTS SHALL BE LOCATED A MINIMUM OF 10' BEHIND THE BACK OF CURB.
 - WATER AND SANITARY SEWER CONNECTIONS TO BE 5' FROM PROPERTY LINE (UNLESS OTHERWISE NOTED). MAINTAIN A 10' MINIMUM SEPARATION BETWEEN WATER AND SANITARY SEWER CONNECTIONS.
 - WATER METERS, SANITARY SEWER CLEANOUTS, AND GRINDER PUMP CONNECTIONS ARE TO BE PLACED AS CLOSE AS POSSIBLE TO THE FRONT PROPERTY LINE OF ALL LOTS.

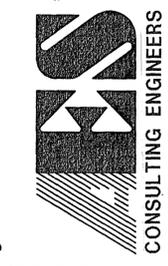
STABILIZE ALL DISTURBED AREAS IN THE VICINITY OF BERM & BMP WITH MULCH IMMEDIATELY FOLLOWING FINAL GRADING.

SEE SHEETS 10A, 10B & 10C FOR BMP DETAILS



No.	DATE	REVISION / COMMENT / NOTE	BY
5	2/2/02	RECORD DRAWING	VM
4	11/96	REVISED WATERLINE FOR ROAD REINFORCEMENT	VM
3	8/96	REVISED PER HEALTH DEPARTMENT (NONE THIS SHEET)	VM
2	7/96	CONSTRUCTION ADDENDUM #1	VM
1	5/96	REVISED FOR LOT ADDITIONS & SEWER CHANGES	VM

5248 Clide Towne Road, Suite 1
 Williamsburg, Virginia 23188
 (804) 253-0040
 Fax (804) 220-8994



GRADING, DRAINAGE, AND EROSION CONTROL

RIVER OAKS NORTH
 BAY 3, POD 4
 THE
 GOVERNOR'S LAND
at Trece Rivers
 JAMES CITY COUNTY

DESIGNED: VMB
 DRAWN: CLJ
 SCALE: 1"=50'
 DATE: FEB., 1996
 PROJECT NO.: 7173-3-4
 DRAWING NO.: 6

VIRGINIA POWHATAN DISTRICT
 RECORD DRAWING 2/8/02

SUIT REVIEW SET
 RIVER OAKS NORTH A (BMP#3) JRO34; S-12-96

DAW 22.15

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

DATE <i>MARCH 19, 2002</i>	JOB NO. <i>7173-00</i>
ATTENTION <i>Mr. Mike Woodson</i>	
RE: <i>Governor's CMO</i>	

TO *James City County Environmental Division*



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

- Shop drawings
- Prints
- Plans
- Samples
- Specifications
- Copy of letter
- Change order
- Record Drawings*

COPIES	DATE	NO.	DESCRIPTION
<i>2</i>			<i>Record Drawings for BMP @ Barrett's Point (JR042)</i>
<i>2</i>			<i>" " " " @ River One North (JR034)</i>
<i>1</i>			<i>UPDATE OVERALL BMP MAP</i>

THESE ARE TRANSMITTED as checked below:

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

REMARKS

COPY TO _____

SIGNED: *V. Mike B...*

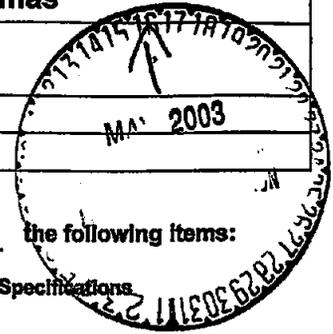
AES CONSULTING ENGINEERS

Engineering, Surveying and Planning
 5248 Olde Towne Road, Suite 1
 Williamsburg, Virginia 23188
 Phone: (757) 253-0040
 Fax: (757) 220-8994

LETTER OF TRANSMITTAL

DATE: 16-May-03	JOB NO. 7173-09
ATTENTION: Scott Thomas	
RE: Governor's Land	

**TO : James City County
 Environmental Division
 101 Mounts Bay Road
 Williamsburg, VA 23187**



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

Shop drawings Prints Plans Samples Specifications

Copy of letter Change order Other Construction Certification

COPIES	DATE	NO.	DESCRIPTION
1	5-15-03		As-Built drawing (Mylar) – Founder's Hill Timber Wall JR030
1	5-15-03		As-Built drawing (Black line) – Founder's Hill Timber Wall JR030
1	5-15-03		Memo responding to letter from County – Founder's Hill Timber Wall JR030
1	5-15-03		As-Built drawing (Mylar) – Fowler's Lake Block "B" Timber Wall JR054
1	5-15-03		As-Built drawing (Black line) – Fowler's Lake Block "B" Timber Wall JR054
1	5-15-03		Memo responding to letter from County – Fowler's Lake Block "B" Timber Wall JR054
1	5-15-03		As-Built drawing (Mylar) – The Harbor @ Two Rivers JR033
1	5-15-03		As-Built drawing (Black line) – The Harbor @ Two Rivers JR033
1	5-15-03		Memo responding to letter from County – The Harbor @ Two Rivers JR033
1	5-15-03		As-Built drawing (Mylar) – River Oaks North BMP JR034
1	5-15-03		As-Built drawing (Black line) – River Oaks North BMP JR034
1	5-15-03		Memo responding to letter from County – River Oaks North BMP JR034
1	5-16-03		As-Built drawing (Mylar) – Bennett's Pond JR021
1	5-16-03		As-Built drawing (Black line) – Bennett's Pond JR021
1	5-16-03		Memo responding to letter from County – Bennett's Pond JR021

THESE ARE TRANSMITTED as checked below:

For Approval Approved as submitted Resubmit _____ copies for approval

For your use Approved as noted Submit _____ copies for distribution

As requested Returned for corrections Return _____ Corrected prints

For review and comment For Signature _____

FOR BIDS DUE _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

If you have any questions please contact me. Thank you.

COPIES TO: file

SIGNED: Victoria Bains
 Victoria Bains

*Post Const
Report
JR 034*

REPORT OF
SUBSURFACE EXPLORATION
AND GEOTECHNICAL ENGINEERING ANALYSIS
GOVERNOR'S LAND DAMS - EMBANKMENT EVALUATION
JAMES CITY COUNTY, VIRGINIA

ECS PROJECT NO. 6221

FOR

Mr. Jim Bennett, P.E.
Dominion Land Management Co.
P.O. Box 26532
Richmond, Virginia 23261

December 31, 2000

December 31, 2000

Mr. Jim Bennett, P.E.
Dominion Land Management Co.
P.O. Box 26532
Richmond, Virginia 23261

ECS Project No. 6221

RE: Governor's Land Dams - Embankment Evaluation
James City County, Virginia

Dear Mr. Bennett:

As requested, ECS, Ltd. conducted a subsurface soils exploration and engineering evaluation of eight (8) existing "earthen type" dams located within the Governor's Land Development in James City County, Virginia. The following dams were included in this evaluation:

- Fowler's Lake
- Home's Lake
- #12 Tee Box Dry Detention Pond
- Travis Pond
- Whittaker's Lake
- Bennett's Pond
- Founder's Hill Pond
- Wingfield Lake

Included in Appendix I of this report are a boring location diagram (from site drawings provided by AES and/or WEG), the boring logs with a subsurface profile (by ECS), and the dam cross-section/schematic (from initial construction drawings provided by AES and/or WEG), for each dam referenced above.

The purpose of this subsurface exploration and engineering evaluation was to determine the composition of the existing dam and ascertain the nature of the subsurface soils underlying the dam. The data collected from the soil test borings was utilized to evaluate the general stability and condition of the existing dam. The findings and conclusions discussed herein are based on the results of our site reconnaissance, soil test borings, laboratory test results, and our understanding of the required dam construction.

~~• Founder's Hill Pond (RIVER OAK North, BMP # 3, JRO34)~~

- **Travis Pond Dam**

It is our estimation that the existing dam at Travis Pond is approximately 200 feet long. The front (pond) side of the dam was vegetated with manicured grass. The topography of the crest of the dam is relatively flat. The back (downstream) side of the dam was vegetated with manicured grass.

- **Whittaker's Lake Dam**

It is our estimation that the existing dam at Whittaker Lake is approximately 400 feet long. The front side of the dam was vegetated with grass. The topography of the crest of the dam is relatively flat. The backside of the dam was heavily vegetated with underbrush and small trees.

- **Bennett's Pond Dam**

It is our estimation that the existing dam at Bennett's Pond is approximately 330 feet long. The front side of the dam was lightly vegetated with tall grass. The topography of the crest of the dam is relatively flat. The backside of the dam is vegetated with manicured grass.

- **Founder's Hill Pond Dam**

It is our estimation that the existing dam at Founder's Hill detention pond is approximately 85 feet long. The front side of the dam was lightly vegetated with tall grass. The topography of the crest of the dam is relatively flat. The backside of the dam is vegetated with manicured grass. Organic debris was observed partially blocking the spillway pipe on the backside of the dam, with 2 to 3 inches of water in the pipe.

- **Wingfield Lake Dam**

Plan and topography information was not available for Wingfield Lake Dam; however, from the site reconnaissance it is estimated that the dam is approximately 300 feet long. The front side of the dam was vegetated with grass. The topography of the crest of the dam is relatively flat. The backside of the dam is heavily wooded with underbrush and small to medium trees.

approximate depths of 28 feet and 33 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of erratic deposits of medium dense Poorly Graded SAND (SP), soft to medium stiff Sandy Elastic SILT (MH), and medium stiff Sandy Lean CLAY (CL).

Significant moisture was not observed within the dam fill material.

• Bennett's Pond Dam

The results of our soil test borings and laboratory testing indicates that the existing dam, at the areas and depths sampled, is generally comprised of fill material to depths of about 13.5 to 15 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as Fat CLAY (CH), sandy SILT (ML), and sandy Lean CLAY (CL). The clay and silt soils are soft to stiff in consistency. The transitions from the fill material into the natural original soils were not determined along the shoulders of the dam (borings B-1 and B-3). With regard to the center boring (B-2), it appears that proper steps were taken to remove heavy topsoil and/or thick vegetation prior to fill placement. The transition between the fill material (clay core) and the original ground surface in boring B-2, which was performed near the center of the dam, was marked by the presence of a layer of orangish brown, Silty SAND (SM). This stratum was observed between the approximate depths of 13.5 feet and 18 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of erratic deposits of very loose Clayey SANDS (SC), loose Silty SAND (SM), very soft to soft Fat CLAY (CH), and soft, organic, Elastic SILT (OH).

Significant moisture was not observed within the dam fill material. Groundwater was encountered in boring B-2 at a depth of about 16 feet below top of the dam surface. The presence of water at this does not present a problem with the stability of the dam.

• Founder's Hill Dam

The results of our soil test borings and laboratory testing indicates that the existing dam, at the areas and depths sampled, is generally comprised of fill material to depths of about 4.0 to 8.0 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as Fat CLAY (CH) and clayey SAND (SC). The clay soils are medium stiff to very stiff in consistency, and the sand soils are loose to medium dense. The transitions from the fill material into the natural original soils were relatively clean. In this regard, it appears that proper steps were taken to remove heavy topsoil

and/or thick vegetation prior to fill placement. The transition between the fill material (clay core) and the original ground surface in boring B-2, which was performed near the center of the dam, was marked by the presence of a layer of orangish brown and gray Fat CLAY with fine sand (CH). This stratum was observed between the approximate depths of 8.0 feet and 12.0 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of deposits of loose to medium dense Silty SAND (SM), very soft to medium stiff Fat CLAY (CH), and soft to stiff sandy CLAY (CL).

Significant moisture was not observed within the dam fill material. Groundwater was encountered in borings B-2 and B-3 at depths of about 17 feet and 5 feet below top of the dam surface, respectively. The presence of water at this depth indicates that there is seepage below the dam. The normal pool elevation for this dam is relatively shallow; therefore, the water encountered at these depths does not present a problem with the stability of the dam.

- **Wingfield Lake Dam**

The results of our soil test borings and laboratory testing indicates that the existing dam, at the areas and depths sampled, is generally comprised of fill material to depths of about 15 to 30 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as Fat CLAY (CH). The clay soils are soft to medium stiff in consistency. The transitions from the fill material into the natural original soils were not determined along the shoulders of the dam (borings B-1 and B-3). With regard to the center boring (B-2), it appears that proper steps were taken to remove heavy topsoil and/or thick vegetation prior to fill placement. The transition between the fill material (clay core) and the original ground surface in boring B-2, which was performed near the center of the dam, was marked by the presence of a layer of bluish gray Fat CLAY with fine sand (CH). This stratum was observed between the approximate depths of 30.0 feet and 34.0 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of deposits of Fat CLAY (CH), clayey SAND (SC), fine to coarse SAND trace silt (SP), and sandy Lean CLAY (CL).

Significant moisture was not observed within the dam fill material.

ENGINEERING EVALUATION AND CONCLUSIONS:

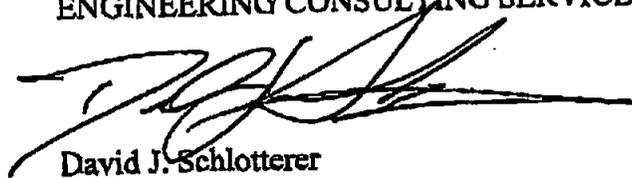
Based on the results of our soil test borings and laboratory testing, it is our opinion that the existing dams ~~satisfy the current state dam design criteria, and/or other commonly accepted dam design criteria,~~ with regard to embankment composition (material type and density) and overall stability. In general, the dams are classified as Zoned Earthen Dam structures, comprised predominantly of an impervious clay core with clayey and sandy soils comprising the shell.

General maintenance, however, should be provided for each dam on a routine basis. This should include annual inspections for surface erosion or vertical and horizontal cracking in the embankment. In addition, the toe drain and stilling basin should be inspected for erosion and loss of rip-rap, seepage beyond the toe drain, or increased flow or movement of fines through the drains. All large bushes and trees should be removed from the embankment face (both front and back sides), and animal burrows or other holes/cavities along the embankment should be thoroughly inspected and filled as appropriate.

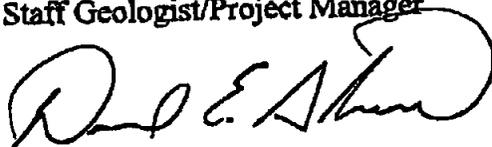
ECS, Ltd. has appreciated the opportunity to be of service to you on this project. Please contact this office should you have any questions or need further assistance.

Respectfully,

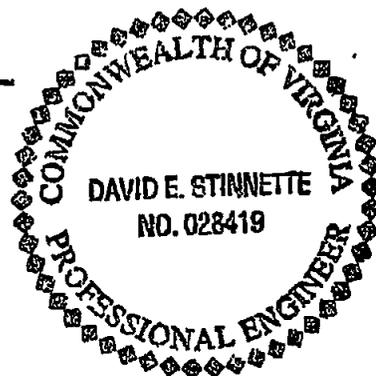
ENGINEERING CONSULTING SERVICES, LTD.



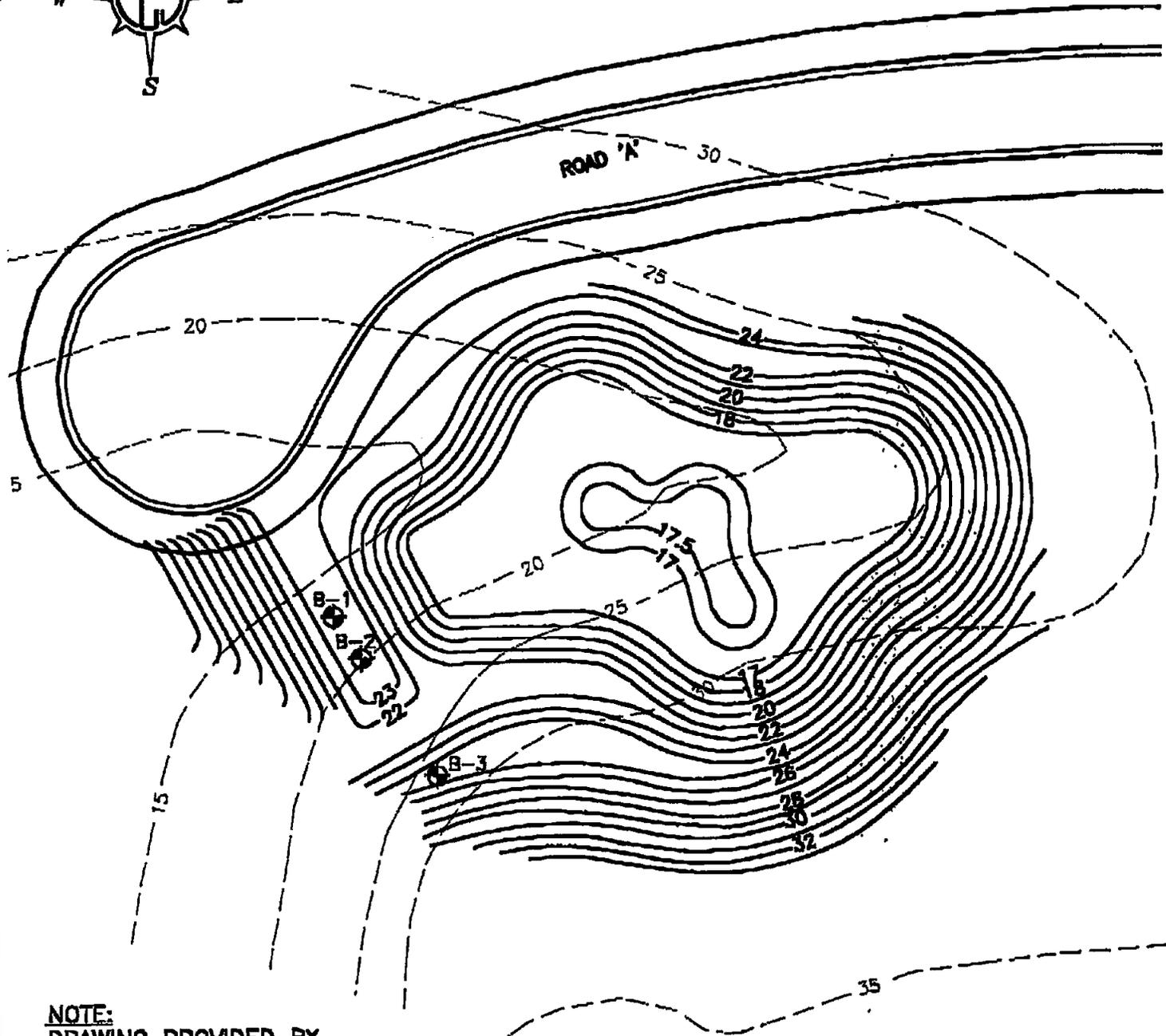
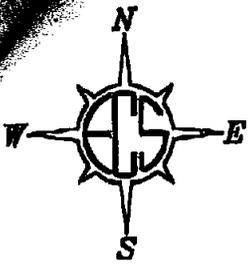
David J. Schlotterer
Staff Geologist/Project Manager



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



Copies: (3) Jim Bennett (Dominion Land Management Co.)



NOTE:
DRAWING PROVIDED BY
WILLIAMSBURG ENVIRONMENTAL
GROUP, DATE: 5/14/96

⊕ -- Approximate Boring Location

Scale: 1"=40'

PREPARED FOR:

DOMINION LAND MANAGEMENT



BORING LOCATION DIAGRAM

FOUNDER'S HILL

GOVERNOR'S LAND

JAMES CITY CO., VIRGINIA

ECS, LTD. PROJECT NO. 6221

CLIENT

DOMINION LAND MANAGEMENT CO.

JOB #

6221

BORING #

B-1

SHEET

1 OF 1



PROJECT NAME

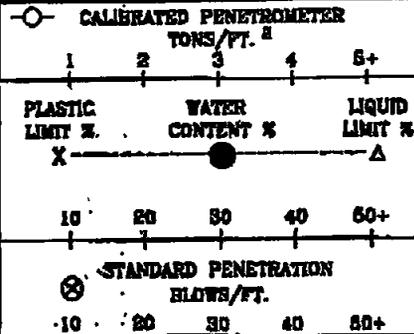
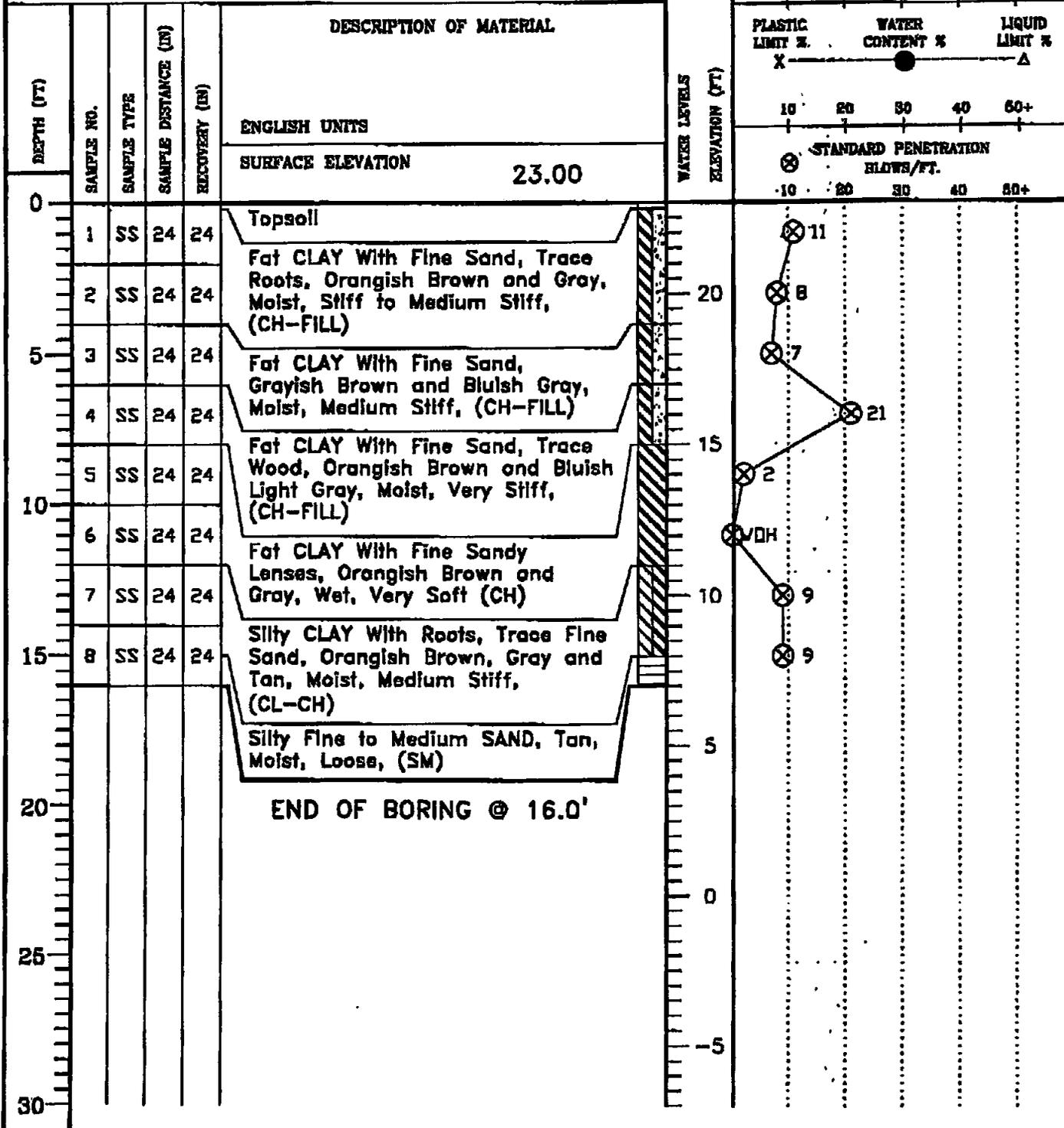
GOVERNOR'S LAND DAMS EVAL.

ARCHITECT-ENGINEER

AES, INC.

SITE LOCATION

FOUNDERS HILL, JAMES CITY COUNTY, VA

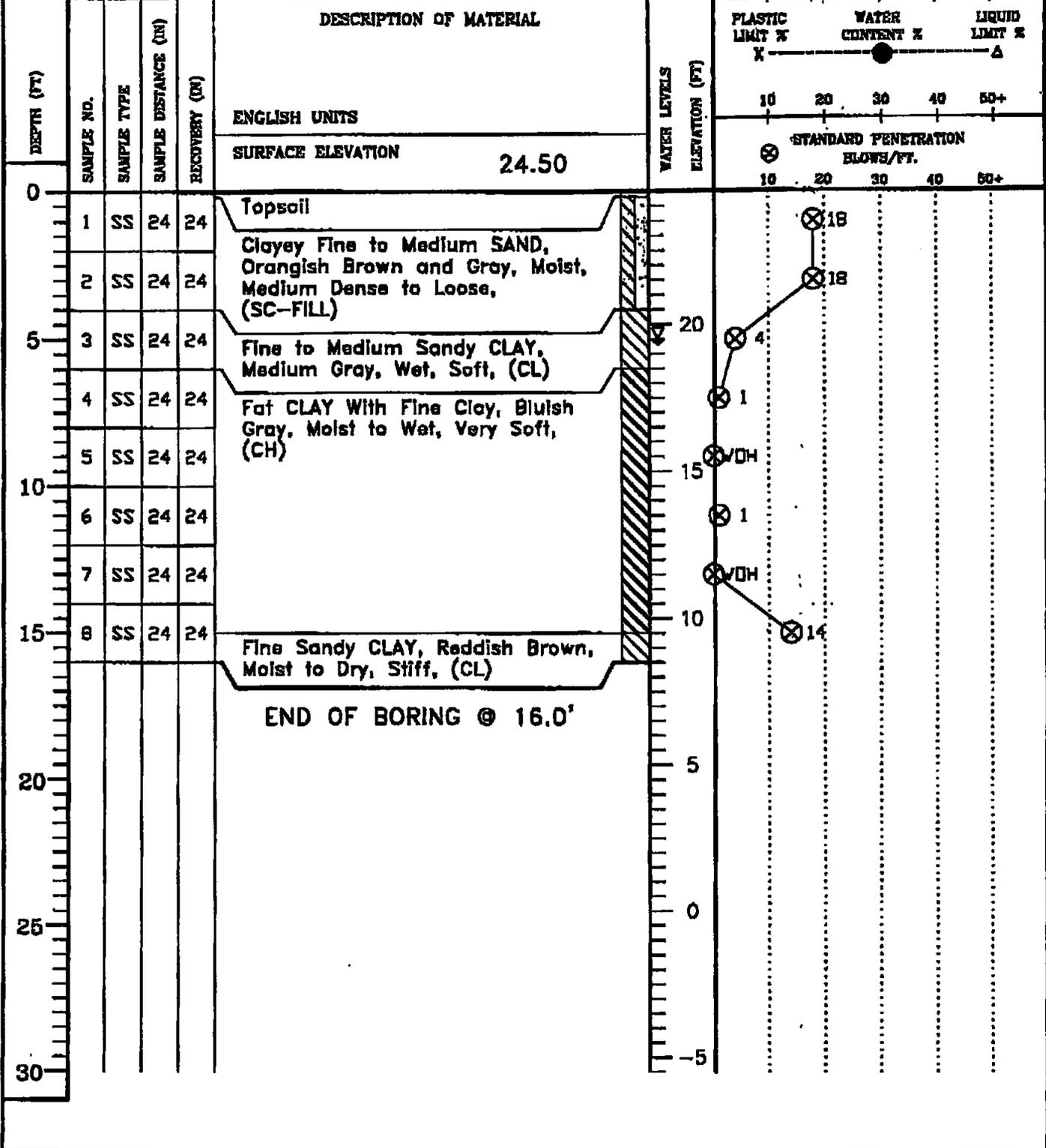


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

∇WL DRY	WS OR (D)	BORING STARTED	12-5-00	TOPSOIL DEPTH 2"
∇WL(AB)	∇WL(AC)	BORING COMPLETED	12-5-00	CAVE IN DEPTH @ 13.2'
∇WL		RIG FISHBURNE FOREMAN	SONNY	DRILLING METHOD HOLLOW STEM AUGER

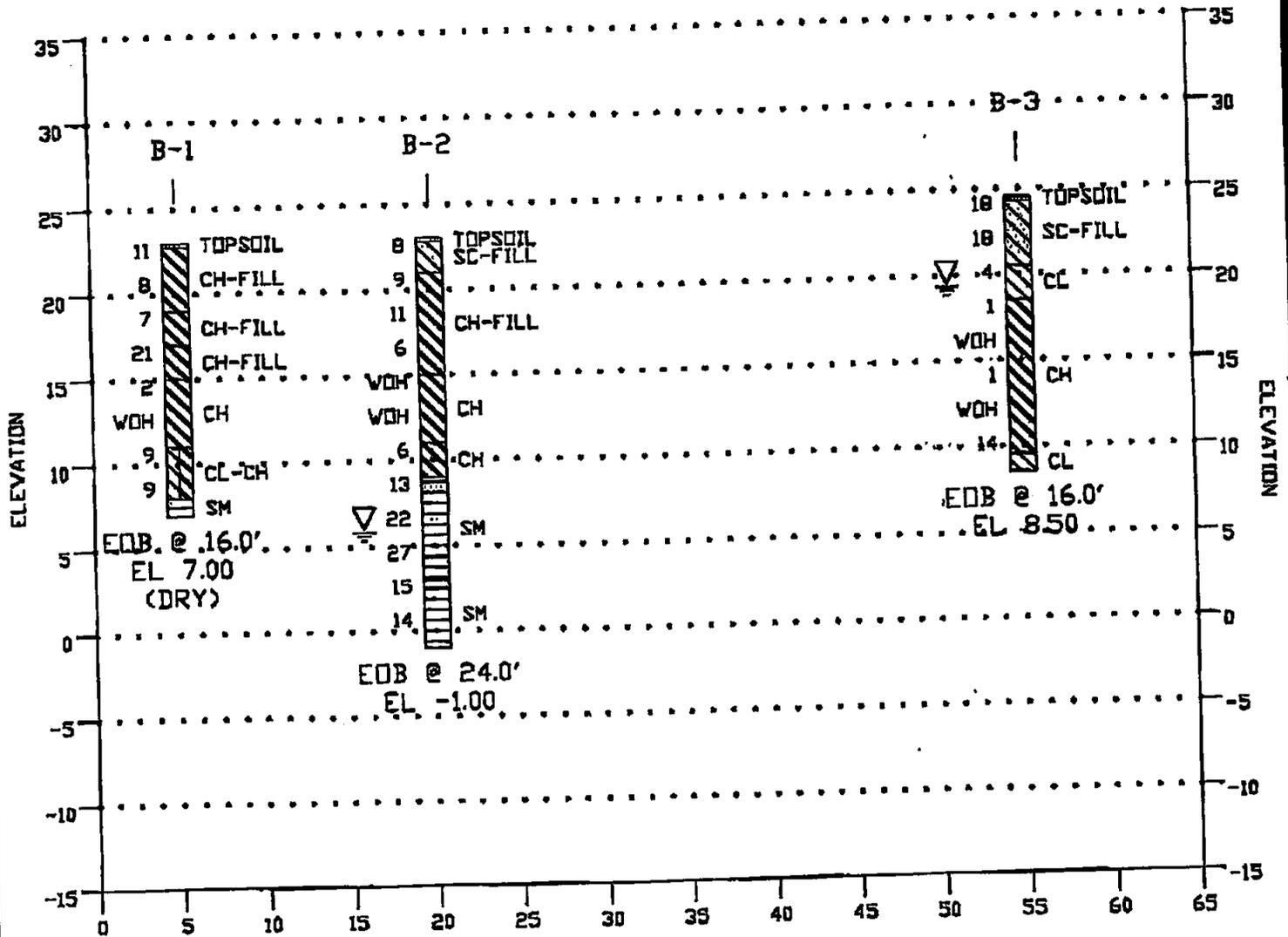
CLIENT DOMINION LAND MANAGEMENT CO.	JOB # 6221	BORING # B-3	SHEET 1 OF 1	ECS LTD
PROJECT NAME GOVERNOR'S LAND DAMS EVAL.	ARCHITECT-ENGINEER AES, INC.			

SITE LOCATION
FOUNDERS HILL, JAMES CITY COUNTY, VA



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

▽WL 5.0'	WS OR (D)	BORING STARTED	11-20-00	TOPSOIL DEPTH 2"
▽WL(AB)	▽WL(AC)	BORING COMPLETED	11-20-00	CAVE IN DEPTH 0
▽WL		RIG FISHBURNE FOREMAN	MIKE	DILLING METHOD HOLLOW STEM AUGER



SCALE
 VERTICAL SCALE 1"=10'
 HORIZONTAL SCALE 1"=10'

PREPARED FOR:

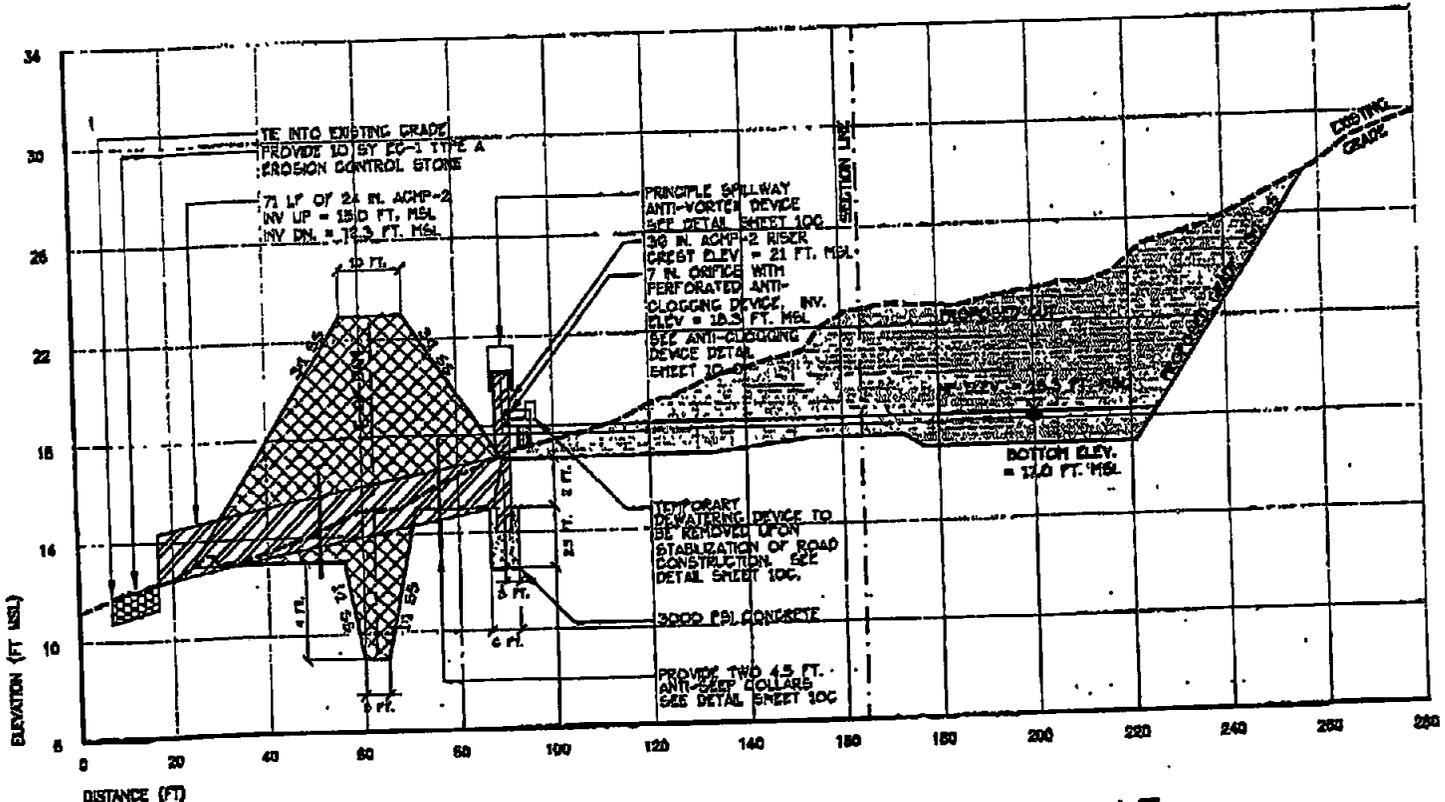
DOMINION LAND MGMNT. CO.



GENERALIZED CROSS SECTION

FOUNDER'S HILL
 GOVERNOR'S LAND DAMS
 JAMES CITY COUNTY, VIRGINIA

ECS, LTD. PROJECT NO. 6221



PROFILE

SCALE: HORIZONTAL 1 IN. = 20 FT., VERTICAL 1 IN. = 4 FT.

NOTE:
DRAWING PROVIDED BY
WILLIAMSBURG ENVIRONMENTAL
GROUP, DATE: 5/14/96

PREPARED FOR:

DOMINION LAND MANAGEMENT



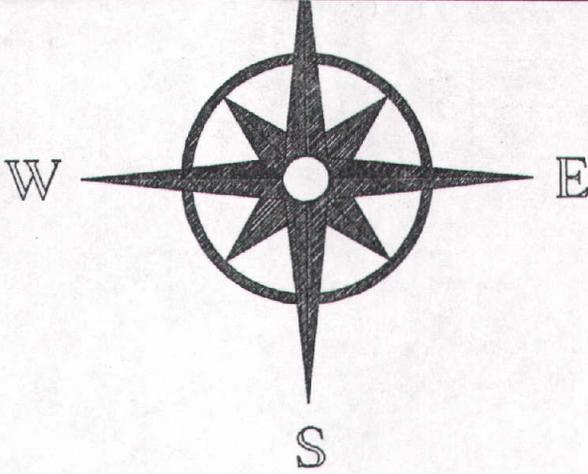
DAM SCHEMATIC

FOUNDER'S HILL

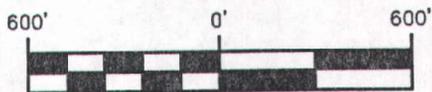
GOVERNOR'S LAND

JAMES CITY CO., VIRGINIA

ECS, LTD. PROJECT NO. 6221



GRAPHIC SCALE



SCALE: 1" = 600'

BMP #12 (JR018)
FOWLER'S LAKE
 RECORD DRAWING
 PREPARED: 3/02

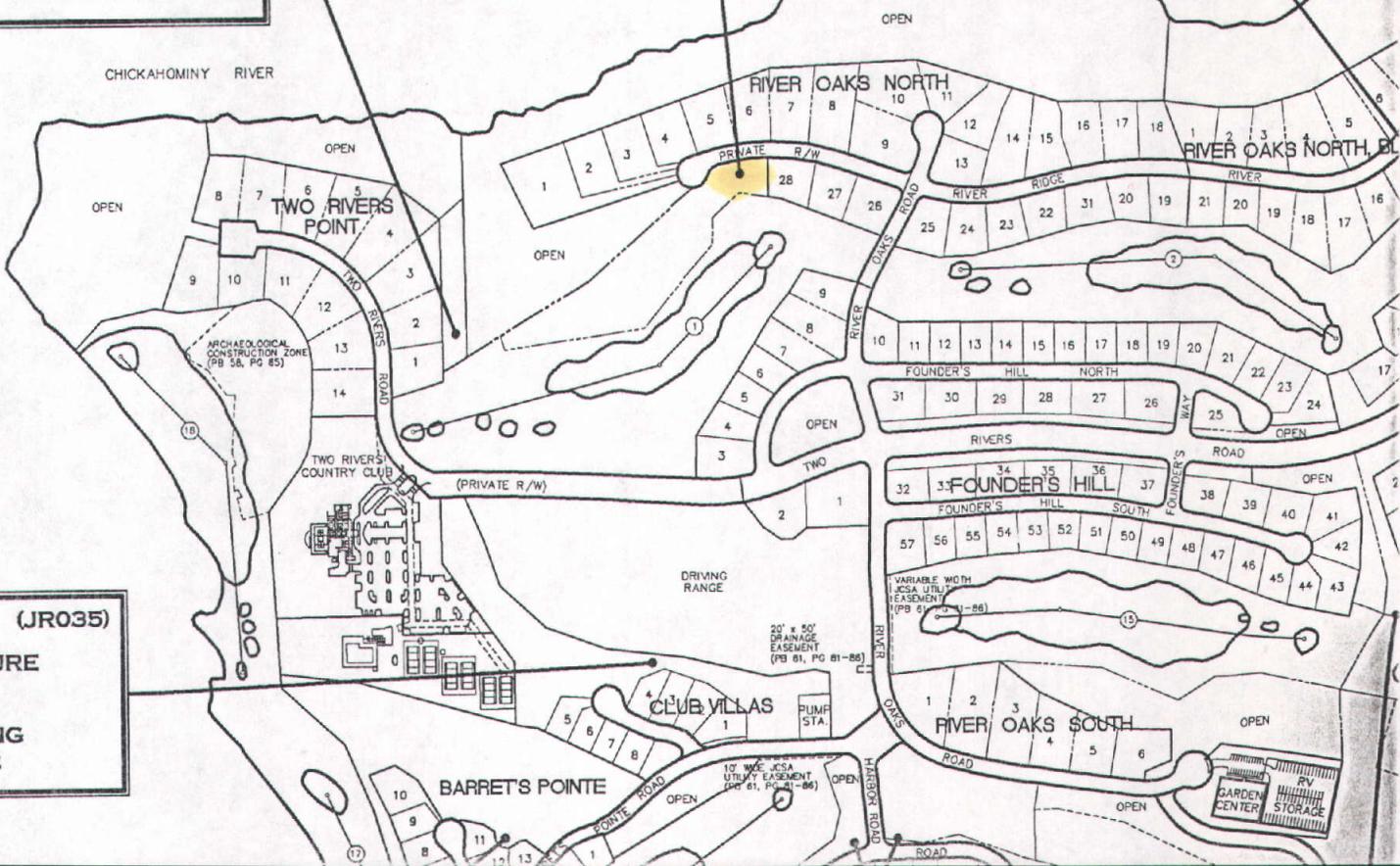
BMP #7 (JR034)
RIVER OAKS NORTH BMP
 RECORD DRAWING
 PREPARED: 3/02

BMP #4 (JR040)
WYTHE HAMLET DRY POND
 RECORD DRAWING
 PREPARED:

BMP #11 (JR036)
TIMBER STRUCTURE
 RECORD DRAWING
 PREPARED: 11/01

N/F
 JOSEPH S. TERRELL

BMP #15 (JR035)
**TIMBER STRUCTURE
 (OLF CLUB)**
 RECORD DRAWING
 PREPARED: 3/02



Governors Land
Bay 3, Pod 4
BMP#3
Hydrologic/Hydraulic Computations

S-12-96
JR034

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM
RIVER OAKS NORTH
GOVERNOR'S LANDS

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points	Fraction of Site Served by BMP	Weighted BMP Points
BASIN #1 RETENTION POND DESIGN TYPE 3	6	$\frac{6.95}{1426.92}$	0.03
BASIN #2 RETENTION POND DESIGN TYPE 3	6	$\frac{5.33}{1426.92}$	0.02
OTHER EXISTING & PROPOSED			5.12
TOTAL WEIGHTED STRUCTURAL BMP POINTS:			5.17

B. NATURAL OPEN SPACE CREDIT

Fraction of Site	Natural Open Space Credit	Points for Natural Open Space
$\frac{610.07}{1426.92}$	$\frac{0.1}{(0.1 \text{ per } 1\%)}$	4.28

C. TOTAL WEIGHTED POINTS

5.17	+	4.28	=	9.45
Structural BMP Points		Natural Open Space Points		TOTAL

A REVISED BMP PLAN FOR THE PROJECT WILL ARRIVE WITHIN THE NEXT 3 DAYS. THIS AREA WAS RAINED TO HAVE ONE TIMBER STRUCTURE (DESIGN TYPE 2) SERVING 10.7 AC. IN LIEU OF THE SINGLE STRUCTURAL BMP, THE TWO BMP'S LISTED ABOVE ARE PROVIDED.

Pre-development Hydrology

TR-55 TABULAR HYDROGRAPH METHOD
 Type II. Distribution
 (24 hr. Duration Storm)

Executed: 05-01-1996 09:20:52
 Watershed file: --> C:\PONDPACK\GLBMP3 .MOP
 Hydrograph file: --> C:\PONDPACK\GLB2P.HYD

Governors Land Pre-development

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1	3.58	80.0	0.50	0.00	3.60	1.72	I.14 .14

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 3.58 acres or 0.00559 sq.mi
 Peak discharge = 5 cfs

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hr)	* Tt (hr)	Tc (hr)	* Tt (hr)	(Yes/No)	
1	0.50	0.00	**	**	Yes	--

* Travel time from subarea outfall to composite watershed outfall point.
 ** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-01-1996 09:20:52
Watershed file: --> C:\PONDPACK\GLBMP3 .MOP
Hydrograph file: --> C:\PONDPACK\GLB2P.HYD

Governors Land Pre-development

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
1	5	12.4
Composite Watershed	5	12.4

TR-55 TABULAR HYDROGRAPH METHOD
 Type II. Distribution
 (24 hr. Duration Storm)

Executed: 05-01-1996 09:20:52
 Watershed file: --> C:\PONDPACK\GLBMP3 .MOP
 Hydrograph file: --> C:\PONDPACK\GLB10P.HYD

Governors Land Pre-development

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1	3.58	80.0	0.50	0.00	5.70	3.51	I.09 .10

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 3.58 acres or 0.00559 sq.mi
 Peak discharge = 10 cfs

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hr)	* Tt (hr)	Tc (hr)	* Tt (hr)	(Yes/No)	
1	0.50	0.00	**	**	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
 ** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)Executed: 05-01-1996 09:20:52
Watershed file: --> C:\PONDPACK\GLBMP3 .MOP
Hydrograph file: --> C:\PONDPACK\GLB10P.HYD

Governors Land Pre-development

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
1	10	12.4
Composite Watershed	10	12.4

TR-55 TABULAR HYDROGRAPH METHOD
 Type II. Distribution
 (24 hr. Duration Storm)

Executed: 05-01-1996 09:20:52
 Watershed file: --> C:\PONDPACK\GLBMP3 .MOP
 Hydrograph file: --> C:\PONDPACK\GLB100P.HYD

Governors Land Pre-development

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1	3.58	80.0	0.50	0.00	8.10	5.72	I.06 .10

* Travel time from subarea outfall to composite watershed outfall point.

I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 3.58 acres or 0.00559 sq.mi
 Peak discharge = 17 cfs

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hr)	* Tt (hr)	Tc (hr)	* Tt (hr)	(Yes/No)	
1	0.50	0.00	**	**	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-01-1996 09:20:52
Watershed file: --> C:\PONDPACK\GLBMP3 .MOP
Hydrograph file: --> C:\PONDPACK\GLB100P.HYD

Governors Land Pre-development

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
1	17	12.4
Composite Watershed	17	12.4

Post-development Hydrology

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-13-1996 11:08:14
Watershed file: --> C:\PONDPACK\GLBMP3F.MOP
Hydrograph file: --> C:\PONDPACK\GLB2F.HYD

Governors Land Pre-development

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1		85.0	0.50	0.00	3.60	2.10	I.1 .10

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 8.10 acres or 0.01266 sq.mi
Peak discharge = 14 cfs

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hr)	* Tt (hr)	Tc (hr)	* Tt (hr)	(Yes/No)	
1	0.50	0.00	**	**	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-13-1996 11:08:14
Watershed file: --> C:\PONDPACK\GLBMP3F.MOP
Hydrograph file: --> C:\PONDPACK\GLB2F.HYD

Governors Land Pre-development

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
1	14	12.4
Composite Watershed	14	12.4

TR-55 TABULAR HYDROGRAPH METHOD
 Type II. Distribution
 (24 hr. Duration Storm)

Executed: 05-13-1996 11:08:14
 Watershed file: --> C:\PONDPACK\GLBMP3F .MOP
 Hydrograph file: --> C:\PONDPACK\GLB10F.HYD

^{rest}
 Governors Land ~~Pre~~-development

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1	8.10	85.0	0.50	0.00	5.70	4.02	I.06 .10

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 8.10 acres or 0.01266 sq.mi
 Peak discharge = 27 cfs

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hr)	* Tt (hr)	Tc (hr)	* Tt (hr)	(Yes/No)	
	0.50	0.00	**	**	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
 ** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)Executed: 05-13-1996 11:08:14
Watershed file: --> C:\PONDPACK\GLBMP3F .MOP
Hydrograph file: --> C:\PONDPACK\GLB10F.HYD

Governors Land Pre-development

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
1	27	12.4
Composite Watershed	27	12.4

TR-55 TABULAR HYDROGRAPH METHOD
 Type II. Distribution
 (24 hr. Duration Storm)

Executed: 05-13-1996 11:08:14
 Watershed file: --> C:\PONDPACK\GLBMP3F.MOP
 Hydrograph file: --> C:\PONDPACK\GLB100F.HYD

Governors Land ^{Post}Pre-development

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
1	8.10	85.0	0.50	0.00	8.10	6.31	I.04 .10

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 8.10 acres or 0.01266 sq.mi
 Peak discharge = 42 cfs

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hr)	* Tt (hr)	Tc (hr)	* Tt (hr)	(Yes/No)	
	0.50	0.00	**	**	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.
 ** Tc & Tt are available in the hydrograph tables.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-13-1996 11:08:14
Watershed file: --> C:\PONDPACK\GLBMP3F .MOP
Hydrograph file: --> C:\PONDPACK\GLB100F.HYD

Governors Land Pre-development

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
1	42	12.4
Composite Watershed	42	12.4

Outlet Structure

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15
Date Executed:

S/N: 1295100016
Time Executed:

***** COMPOSITE OUTFLOW SUMMARY *****

<u>Elevation (ft)</u>	<u>Q (cfs)</u>	<u>Contributing Structures</u>
17.00	0.0	
17.30	0.0	
17.60	0.0	
17.90	0.0	
18.20	0.0	
18.50	0.1	1
18.80	0.5	1
19.10	0.9	1
19.40	1.1	1
19.70	1.3	1
20.00	1.5	1
20.30	1.7	1
20.60	1.8	1
20.90	2.0	1
21.20	4.9	1 +2
21.50	13.3	1 +2
21.80	24.8	1 +2
22.10	38.1	1 +2
22.40	41.5	1 +3
22.70	45.5	1 +3 +5
23.00	55.3	1 +3 +5

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15

S/N: 1295100016

Date Executed:

Time Executed:

Outlet Structure File: c:\pondpack\GLBMP3 .STR
Planimeter Input File: c:\pondpack\GLBMP3 .VOL
Rating Table Output File: c:\pondpack\GLBMP3 .PND

Min. Elev.(ft) = 17 Max. Elev.(ft) = 23 Incr.(ft) = .3

Additional elevations (ft) to be included in table:

* * * * *

SYSTEM CONNECTIVITY

Structure	No.	Q Table	Q Table
CULVERT-CR	1		-> 1
STAND PIPE	2		-> 2
CULVERT-CR	3	? 2	-> 4
WEIR-VR	5		-> 5

Outflow rating table summary was stored in file:
c:\pondpack\GLBMP3 .PND

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15

S/N: 1295100016

Date Executed:

Time Executed:

>>>>> Structure No. 1 <<<<<<
(Input Data)

CULVERT-CR

Circular Culvert (With Inlet Control)

E1 elev.(ft)?	18.3
E2 elev.(ft)?	23.001
Diam. (ft)?	.58
Inv. el.(ft)?	18.3
Slope (ft/ft)?	.01
T1 ratio?	
T2 ratio?	
K Coeff.?	.0098
M Coeff.?	2
c Coeff.?	.0398
Y Coeff.?	.67
Form 1 or 2?	1
Slope factor?	-.5

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15

S/N: 1295100016

Date Executed:

Time Executed:

>>>>> Structure No. 2 <<<<<<
(Input Data)

STAND PIPE

Stand Pipe with weir or orifice flow

E1 elev.(ft)?	21
E2 elev.(ft)?	23.001
Crest elev.(ft)?	21
Diameter (ft)?	3
Weir coefficient?	3.33
Orifice coefficient?	.6
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15

S/N: 1295100016

Date Executed:

Time Executed:

>>>>> Structure No. 3 <<<<<<
(Input Data)

CULVERT-CR

Circular Culvert (With Inlet Control)

E1 elev.(ft)?	21
E2 elev.(ft)?	23.001
Diam. (ft)?	2
Inv. el.(ft)?	15
Slope (ft/ft)?	.05
T1 ratio?	
T2 ratio?	
K Coeff.?	.0098
M Coeff.?	2
c Coeff.?	.0398
Y Coeff.?	.67
Form 1 or 2?	1
Slope factor?	-.5

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15
Date Executed:

S/N: 1295100016
Time Executed:

>>>>> Structure No. 5 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	22.5
E2 elev.(ft)?	23.001
Weir coefficient?	3.33
Weir elev.(ft)?	22.5
Length (ft)?	10
Contracted/Suppressed (C/S)?	S

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15
Date Executed:

S/N: 1295100016
Time Executed:

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation	Messages
17.00	0.0	E < Inv.El.=	18.3
17.30	0.0	E < Inv.El.=	18.3
17.60	0.0	E < Inv.El.=	18.3
17.90	0.0	E < Inv.El.=	18.3
18.20	0.0	E < Inv.El.=	18.3
18.50	0.1	Equ.1: HW =.2	dc=.142 Ac=.05
18.80	0.5	Equ.1: HW =.5	dc=.339 Ac=.16
19.10	0.9	Submerged: HW =.8	
19.40	1.1	Submerged: HW =1.1	
19.70	1.3	Submerged: HW =1.4	
20.00	1.5	Submerged: HW =1.7	
20.30	1.7	Submerged: HW =2.0	
20.60	1.8	Submerged: HW =2.3	
20.90	2.0	Submerged: HW =2.6	
21.20	2.1	Submerged: HW =2.9	
21.50	2.2	Submerged: HW =3.2	
21.80	2.3	Submerged: HW =3.5	
22.10	2.4	Submerged: HW =3.8	
22.40	2.6	Submerged: HW =4.1	
22.70	2.7	Submerged: HW =4.4	
23.00	2.8	Submerged: HW =4.7	

Used Unsubmerged Equ. Form (1) for elev. less than 18.97 ft
Used Submerged Equation for elevations greater than 19.06 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=18.97 ft; Q1=.7 cfs; Dc=.41 ft; E2=19.06 ft; Q2=.8 cfs

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15
Date Executed:

S/N: 1295100016
Time Executed:

Outflow Rating Table for Structure #2
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation	Messages
17.00	0.0	E < Inv.El.=	21
17.30	0.0	E < E1=	21
17.60	0.0	E < E1=	21
17.90	0.0	E < E1=	21
18.20	0.0	E < E1=	21
18.50	0.0	E < E1=	21
18.80	0.0	E < E1=	21
19.10	0.0	E < E1=	21
19.40	0.0	E < E1=	21
19.70	0.0	E < E1=	21
20.00	0.0	E < E1=	21
20.30	0.0	E < E1=	21
20.60	0.0	E < E1=	21
20.90	0.0	E < E1=	21
21.20	2.8	Weir:	H =.2
21.50	11.1	Weir:	H =.5
21.80	22.5	Weir:	H =.8
22.10	35.7	Orifice:	H =1.1
22.40	40.3	Orifice:	H =1.4
22.70	44.4	Orifice:	H =1.7
23.00	48.1	Orifice:	H =2.0

Weir $C_w = 3.33$ Weir length = 9.424779 ft
Orifice $C_o = .6$ Orifice area = 7.068584 sq.ft.
 Q (cfs) = $(C_w * L * H^{1.5})$ or $(C_o * A * \text{sqr}(2*g*H))$
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 22.08445 ft

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15
Date Executed:

S/N: 1295100016
Time Executed:

Outflow Rating Table for Structure #3
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation	Messages
17.00	0.0	E < E1=21	
17.30	0.0	E < E1=21	
17.60	0.0	E < E1=21	
17.90	0.0	E < E1=21	
18.20	0.0	E < E1=21	
18.50	0.0	E < E1=21	
18.80	0.0	E < E1=21	
19.10	0.0	E < E1=21	
19.40	0.0	E < E1=21	
19.70	0.0	E < E1=21	
20.00	0.0	E < E1=21	
20.30	0.0	E < E1=21	
20.60	0.0	E < E1=21	
20.90	0.0	E < E1=21	
21.20	34.9	Submerged:	HW =6.2
21.50	36.0	Submerged:	HW =6.5
21.80	37.0	Submerged:	HW =6.8
22.10	38.0	Submerged:	HW =7.1
22.40	38.9	Submerged:	HW =7.400
22.70	39.9	Submerged:	HW =7.7
23.00	40.8	Submerged:	HW =8.0

Used Unsubmerged Equ. Form (1) for elev. less than 17.27 ft
Used Submerged Equation for elevations greater than 17.56 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=17.27 ft; Q1=15.55 cfs; Dc=1.42 ft; E2=17.56 ft; Q2=17.77 cfs

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15

S/N: 1295100016

Date Executed:

Time Executed:

Outflow Rating Table for Structure #5
WEIR-VR Weir - Vertical Rectangular

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
17.00	0.0	E < Inv.El.= 22.5
17.30	0.0	E < Inv.El.= 22.5
17.60	0.0	E < Inv.El.= 22.5
17.90	0.0	E < Inv.El.= 22.5
18.20	0.0	E < Inv.El.= 22.5
18.50	0.0	E < Inv.El.= 22.5
18.80	0.0	E < Inv.El.= 22.5
19.10	0.0	E < Inv.El.= 22.5
19.40	0.0	E < Inv.El.= 22.5
19.70	0.0	E < Inv.El.= 22.5
20.00	0.0	E < Inv.El.= 22.5
20.30	0.0	E < Inv.El.= 22.5
20.60	0.0	E < Inv.El.= 22.5
20.90	0.0	E < Inv.El.= 22.5
21.20	0.0	E < Inv.El.= 22.5
21.50	0.0	E < Inv.El.= 22.5
21.80	0.0	E < Inv.El.= 22.5
22.10	0.0	E < Inv.El.= 22.5
22.40	0.0	E < Inv.El.= 22.5
22.70	3.0	H =.2
23.00	11.8	H =.5

C = 3.33 L (ft) = 10

H (ft) = Table elev. - Invert elev. (22.5 ft)

Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: GLBMP3 .STR

POND-2 Version: 5.15

S/N: 1295100016

Date Executed:

Time Executed:

Outflow Rating Table 4
Table 4 = 2 ? 3

<u>Elevation (ft)</u>	<u>Q (cfs)</u>	<u>Contributing Structures</u>
17.00	0.0	-
17.30	0.0	-
17.60	0.0	-
17.90	0.0	-
18.20	0.0	-
18.50	0.0	-
18.80	0.0	-
19.10	0.0	-
19.40	0.0	-
19.70	0.0	-
20.00	0.0	-
20.30	0.0	-
20.60	0.0	-
20.90	0.0	-
21.20	2.8	2
21.50	11.1	2
21.80	22.5	2
22.10	35.7	2
22.40	38.9	3
22.70	39.9	3
23.00	40.8	3

Routed Hydrographs

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 * Governors Land *
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Inflow Hydrograph: c:\pondpack\GLB2F .HYD
 Rating Table file: c:\pondpack\GLBMP3 .PND

----INITIAL CONDITIONS----
 Elevation = 18.30 ft
 Outflow = 0.03 cfs
 Storage = 0.19 ac-ft

GIVEN POND DATA

INTERMEDIATE ROUTING
 COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
17.00	0.0	0.000	0.0	0.0
17.30	0.0	0.040	9.7	9.7
17.60	0.0	0.082	19.9	19.9
17.90	0.0	0.126	30.6	30.6
18.20	0.0	0.173	41.8	41.8
18.50	0.1	0.221	53.5	53.6
18.80	0.5	0.271	65.7	66.2
19.10	0.9	0.324	78.5	79.4
19.40	1.1	0.379	91.8	92.9
19.70	1.3	0.437	105.7	107.0
20.00	1.5	0.496	120.1	121.6
20.30	1.7	0.558	135.1	136.8
20.60	1.8	0.623	150.8	152.6
20.90	2.0	0.690	167.0	169.0
21.20	4.9	0.760	183.8	188.7
21.50	13.3	0.832	201.3	214.6
21.80	24.8	0.907	219.5	244.3
22.10	38.1	0.984	238.2	276.3
22.40	41.5	1.065	257.7	299.2
22.70	45.5	1.148	277.8	323.3
23.00	55.3	1.234	298.6	353.9

Time increment (t) = 0.100 hrs.

***** SUMMARY OF ROUTING COMPUTATIONS *****

Pond File: c:\pondpack\GLBMP3 .PND
Inflow Hydrograph: c:\pondpack\GLB2F .HYD
Outflow Hydrograph: c:\pondpack\GL20 .HYD

Starting Pond W.S. Elevation = 18.30 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 14.00 cfs
Peak Outflow = 5.39 cfs
Peak Elevation = 21.22 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 0.19 ac-ft
Peak Storage From Storm = 0.58 ac-ft

Total Storage in Pond = 0.76 ac-ft

>>>> Warning, initial pond outflow > 1st inflow ordinate. <<<<

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 * Governors Land *
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Inflow Hydrograph: c:\pondpack\GLB10F .HYD
 Rating Table file: c:\pondpack\GLBMP3 .PND

----INITIAL CONDITIONS----
 Elevation = 18.30 ft
 Outflow = 0.03 cfs
 Storage = 0.19 ac-ft

GIVEN POND DATA

INTERMEDIATE ROUTING
 COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
17.00	0.0	0.000	0.0	0.0
17.30	0.0	0.040	9.7	9.7
17.60	0.0	0.082	19.9	19.9
17.90	0.0	0.126	30.6	30.6
18.20	0.0	0.173	41.8	41.8
18.50	0.1	0.221	53.5	53.6
18.80	0.5	0.271	65.7	66.2
19.10	0.9	0.324	78.5	79.4
19.40	1.1	0.379	91.8	92.9
19.70	1.3	0.437	105.7	107.0
20.00	1.5	0.496	120.1	121.6
20.30	1.7	0.558	135.1	136.8
20.60	1.8	0.623	150.8	152.6
20.90	2.0	0.690	167.0	169.0
21.20	4.9	0.760	183.8	188.7
21.50	13.3	0.832	201.3	214.6
21.80	24.8	0.907	219.5	244.3
22.10	38.1	0.984	238.2	276.3
22.40	41.5	1.065	257.7	299.2
22.70	45.5	1.148	277.8	323.3
23.00	55.3	1.234	298.6	353.9

Time increment (t) = 0.100 hrs.

***** SUMMARY OF ROUTING COMPUTATIONS *****

Pond File: c:\pondpack\GLBMP3 .PND
Inflow Hydrograph: c:\pondpack\GLB10F .HYD
Outflow Hydrograph: c:\pondpack\GL100 .HYD

Starting Pond W.S. Elevation = 18.30 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 27.00 cfs
Peak Outflow = 22.63 cfs
Peak Elevation = 21.74 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 0.19 ac-ft
Peak Storage From Storm = 0.70 ac-ft
Total Storage in Pond = 0.89 ac-ft

Warning: Inflow hydrograph truncated on left side.

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 * Governors Land *
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Inflow Hydrograph: c:\pondpack\GLB100F .HYD
 Rating Table file: c:\pondpack\GLBMP3 .PND

----INITIAL CONDITIONS----

Elevation = 18.30 ft
 Outflow = 0.03 cfs
 Storage = 0.19 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
17.00	0.0	0.000
17.30	0.0	0.040
17.60	0.0	0.082
17.90	0.0	0.126
18.20	0.0	0.173
18.50	0.1	0.221
18.80	0.5	0.271
19.10	0.9	0.324
19.40	1.1	0.379
19.70	1.3	0.437
20.00	1.5	0.496
20.30	1.7	0.558
20.60	1.8	0.623
20.90	2.0	0.690
21.20	4.9	0.760
21.50	13.3	0.832
21.80	24.8	0.907
22.10	38.1	0.984
22.40	41.5	1.065
22.70	45.5	1.148
23.00	55.3	1.234

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
9.7	9.7
19.9	19.9
30.6	30.6
41.8	41.8
53.5	53.6
65.7	66.2
78.5	79.4
91.8	92.9
105.7	107.0
120.1	121.6
135.1	136.8
150.8	152.6
167.0	169.0
183.8	188.7
201.3	214.6
219.5	244.3
238.2	276.3
257.7	299.2
277.8	323.3
298.6	353.9

Time increment (t) = 0.100 hrs.

***** SUMMARY OF ROUTING COMPUTATIONS *****

Pond File: c:\pondpack\GLBMP3 .PND
Inflow Hydrograph: c:\pondpack\GLB100F .HYD
Outflow Hydrograph: c:\pondpack\GL1000 .HYD

Starting Pond W.S. Elevation = 18.30 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 42.00 cfs
Peak Outflow = 38.71 cfs
Peak Elevation = 22.15 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 0.19 ac-ft
Peak Storage From Storm = 0.81 ac-ft

Total Storage in Pond = 1.00 ac-ft

Warning: Inflow hydrograph truncated on left side.

Date Record Created:

WS BMPNO:

Print Record

Created By:

JR034

**PRINTED ON
Thursday, March 11, 2010
12:46:05 PM**

WATERSHED JR
BMP ID NO 034
PLAN NO S-12-96
TAX PARCEL (44-2)(1-16)
PIN NO 44201000016
CONSTRUCTION DATE 6/1/1996
PROJECT NAME Governors Land - River Oaks North A
FACILITY LOCATION Near (west) of 1588 River Ridge
CITY-STATE Williamsburg, VA
CURRENT OWNER Governors Land Foundation
OWNER ADDRESS 2700 Two Rivers Road
OWNER ADDRESS 2
CITY-STATE-ZIP CODE Williamsburg, VA 23185
OWNER PHONE
MAINT AGREEMENT Yes
EMERG ACTION PLAN No

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MAINTENANCE PLAN

SITE AREA acre

LAND USE

old BMP TYP

JCC BMP CODE

POINT VALUE

SVC DRAIN AREA acres

SERVICE AREA DESCR

IMPERV AREA acres

RECV STREAM

EXT DET-WQ-CTRL

WTR QUAL VOL acre-ft

CHAN PROT CTRL

CHAN PROT VOL acre-ft

SW/FLOOD CONTROL

GEOTECH REPORT

No

1444

SF Residential

Dry Pond - SM

B1 Shallow Marsh

6

8.1

SF Lots & Roadways

UT of James River

Yes

0.25

No

0

Yes

Yes

CTRL STRUC DESC

CTRL STRUC SIZE inches

OTLT BARRL DESC

OTLT BARRL SIZE inch

EMERG SPILLWAY

DESIGN HW ELEV

PERM POOL ELEV

2-YR OUTFLOW cfs

10-YR OUTFLOW cfs

REC DRAWING

CONSTR CERTIF

LAST INSP DATE 1/15/2003

INTERNAL RATING

MISC/COMMENTS

BMP 3. Near cul-de-sac west end River Ridge Road.

ACMP Riser

36

ACMP Barrel

24

Yes

22.15

18.66

5.39

22.63

Yes

Yes

Inspected by:

3

Additional Comments:

