

JR-018

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

COMMENTS
H. H. Dellinger

James City County, Virginia Environmental Division

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

County Plan No.: SP-63-02
Project Name: GOVERNORS LAND - FOWLERS LAKE DAM MODIFICATIONS
Stormwater Management Facility: WET POND - LAKE

Phase: I II III

- Information Received. Date/By: June 8 '04
- Administrative Check.
- Record Drawing Date/By: 6/6/04 Watters LAND SURV.
- Construction Certification Date/By: N.R.
- RD/CC Standard Forms (Required for all BMPs after Feb 1st 2001 Only)
- Insp/Maint Agreement #/Date: PREV REVIEW
- BMP Maintenance Plan Location: PREV REVIEW
- Other: _____

Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
 Yes No Location: Note 20 sheet 2 RD+AB

Assign County BMP ID Code: Code: JR 018

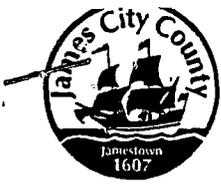
- Preliminary Input into Division's "As-Built Tracking Log"
- Add Location to GIS Database Map. Obtain site information (GPIN, Owner, Site Area, Address, etc.)
- Preliminary Log into Access BMP Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
- Active Project File Review (correspondence, H&H, etc.).
- Initial As-Built File setup (Label, copy hydraulics, BMP plan and detail information, etc.).
- Inspector Check of RD/CC (forward to inspector using transmittal for cursory review).
- Pre-Inspection Drawing Review - Approved Plan (Quick look prior to Field Inspection).
- Final Inspection (FI) Performed Date: 6/7/03 SJT, WNB
- Record Drawing (RD) Review (***) Date: 6/15/03 SJT
- Construction Certification (CC) Review Date: NR

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

- Second Submission: _____
- Reinspection (if necessary): _____
- Acceptable for stormwater management facility purposes (RD/CC/CR/Other). Proceed with bond release.
- Notify Inspector and Inspector Supervisor using "Surety Request Form".
- 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). EXIST JR 018
- Copy Final Inspection Report into County BMP Inspection Program file. updated prev report
- Obtain Digital Photographs of BMP and log into computer.
- Complete "As-built Tracking Log"
- Last check of BMP Access Database. Add to PRIDE database.
- Add to JCC Hydrology & Hydraulic database (optional).
- Add to PRIDE BMP ratings database.

Plan Reviewer: [Signature] Date: 6/18/04

*** See separate checklist.



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

County BMP ID Code (if known): JR 018
 Name of Facility: GOVERNOR'S LAND BMP No.: _____ of _____ Date: 3/25/03
 Location: FOWLER'S LAKE
 Name of Owner: _____
 Name of Inspector: Rick Hall
 Type of Facility: Wet Pond
 Weather Conditions: Sunny Mild Type: Final Inspection County BMP Inspection Program Owner Inspection

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			<i>Pines removed recently many small stumps 2"-6" dia.</i>
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage				
Fencing or Benches				
Interior Landscaping/Planted Areas: <input checked="" type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	✓			<i>deep pond w/ fountain aerator</i>
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input checked="" type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion	✓			Excavated pond
Algae	✓			
Trash & Debris	✓			15' pad type plants
Sediment	✓			Along NE corner
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations): Submerged pipes not directly				
Condition of Structure	✓			observed -
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): RCP RISER AND CAP -				
Condition of Structure	✓			NO VALVE CONTROL
Corrosion	✓			assembly approx
Trash and Debris	✓			15' from shore
Sediment	✓			did not access
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓			Outlet recently
Settlement	✓			cleaned and relined
Trash & Debris	✓			w/ RIP CAP -
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

Item	O.K.	Routine	Urgent	Comments
Source Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
Surrounding Perimeter Conditions:				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths		✓		No direct access
Other				

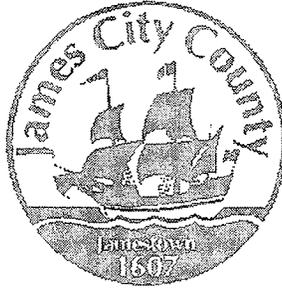
Remarks:

Embankment has recently received maintenance: removal of trees and repair of channel at barrel outlet.
No evidence of piping or seepage.

Overall Environmental Division Internal Rating: 4

Signature: 
 Title: ENR. Spec.

Date: 3/25/03



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 - GOLF COURSE
Structure/BMP Name: FOWLER'S LAKE
Project Location: PROJECT WIDE
BMP Location: NORTH OF 3RD FOREWAY
County Plan No.: S - 145 - 89

Project Type: Residential Business Tax Map/Parcel No.: 4320100004
 Commercial Office BMP ID Code (if known): JR 018
 Institutional Industrial Zoning District: POWHTAN DISTRICT
 Public Roadway Land Use: RESIDENTIAL
 Other RECREATIONAL Site Area (sf or acres): _____

Brief Description of Stormwater Management/BMP Facility: WET POND WITH LOW FLOW ORIFICE (LOW FLOW ORIFICE DISCHARGE VOLUME OF 1/2-INCH RUNOFF FROM WATERSHED IN 24 HOURS)

Nearest Visible Landmark to SWM/BMP Facility: CUL-DE-SAC OF FOWLER'S LAKE ROAD

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: NW OF FACILITY, APPROXIMATELY 6500 FEET

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: SPRING 1990
Facility Monitored by County Representative during Construction: Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: WADSWORTH GOLF CONSTRUCTION COMPANY
Name of Professional Firm Who Routinely Monitored Construction: _____
Date of Completion for SWM/BMP Facility: 1990
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: G. ARTHUR MARSTON III
Title: VICE PRESIDENT
Plan Name: GOVERNOR'S LAND - TWO RIVERS GOLF COURSE
Firm's Project No. 7173
Plan Date: 12/22/01
Sheet No.'s Applicable to SWM/BMP Facility: 5 | 10 | 1 | 1

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

Name: WADSWORTH GOLF CONSTRUCTION COMPANY
Mailing Address: 1901 VAN DYKE ROAD
PLAINFIELD, ILLINOIS 60544
Business Phone: 815-436-8400
Fax: 815-436-8400
Contact Person: BRIAN R. CONFEL
Site Foreman/Supervisor: JACK DOUGHERTY
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 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. MARC BENNETT
Title: SENIOR PROJECT MANAGER

Signature: 
Date: 3/7/02

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.

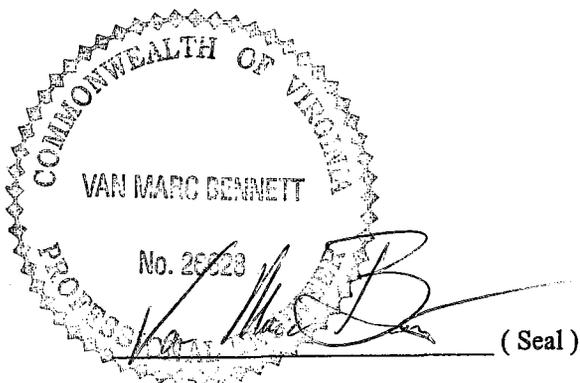
Construction Certification

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.



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.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plan sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

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

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- INC 4. Top widths, berm widths and embankment side slopes.
- INC 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.
- INC 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- XX 8. Elevation of the principal spillway crest or outlet crest of the structure.

- XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar 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.
- XX 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.
- N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- N/A 18. Maintenance plan taken from approved design plan transposed onto record drawing set.
- N/A 19. Fencing location and type, if applicable to facility.
- XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- XX 21. No visual signs of erosion or channel degradation immediately downstream of facility.
- XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

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

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

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

- INC A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.
- XX 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.
- XX 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.
- XX A11. A pond drain pipe with valve was provided.
- INC 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)

- | | | |
|------------|-----|--|
| <u>N/A</u> | B1. | Same requirements as Group A Wet Ponds. |
| <u> </u> | B2. | Minimum 2:1 length to width flow path provided across the facility. |
| <u> </u> | B3. | Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep). |
| <u> </u> | 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. |
| <u> </u> | B5. | Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures). |
| <u> </u> | B6. | No more than one-half (½) of the wetland surface area is planted. |
| <u> </u> | B7. | Topsoil or wetland mulch provided to support vigorous growth of wetland plants. |
| <u>N/A</u> | 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)

- N/A 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.
- N/A 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 .)

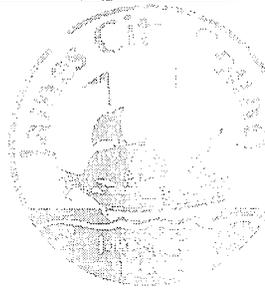
- N/A O1. All requirements of Section II, Minimum Standards, apply to this section.
- N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

**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.

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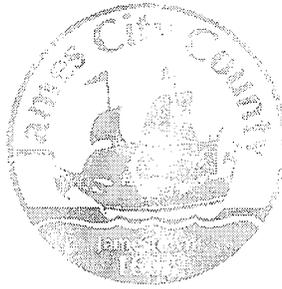
**James City County, Virginia
Environmental Division**

**Stormwater Management / BMP Facilities
Record Drawing and Construction Certification**

Standard Forms & Instructions

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*Issue Date
February 1, 2001*



**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: _____
Structure/BMP Name: _____
Project Location: _____
BMP Location: _____
County Plan No.: _____ - _____ - _____

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

Brief Description of Stormwater Management/BMP Facility: _____

Nearest Visible Landmark to SWM/BMP Facility: _____

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: _____
Datum or Reference Elevation: _____
Control Description: _____
Control Location from Subject 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: _____
Facility Monitored by County Representative during Construction: Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: _____
Name of Professional Firm Who Routinely Monitored Construction: _____
Date of Completion for SWM/BMP Facility: _____
Date of Record Drawing/Construction Certification Submittal: _____

(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: _____
Mailing Address: _____

Business Phone: _____ Fax: _____
Contact Person: _____ Title: _____

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: _____
Mailing Address: _____

Business Phone: _____
Fax: _____
Responsible Plan Preparer: _____
Title: _____
Plan Name: _____
Firm's Project No. _____
Plan Date: _____
Sheet No.'s Applicable to SWM/BMP Facility: ____ / ____ / ____ / ____ / ____

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

Name: _____
Mailing Address: _____

Business Phone: _____
Fax: _____
Contact Person: _____
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: _____
Mailing Address: _____

Business Phone: _____
Fax: _____

Name: _____
Title: _____

Signature: _____
Date: _____

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.*)

- _____ 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.
- _____ 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- _____ 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).
- _____ 4. All plan sheet revision blocks modified to indicate date and record drawing status.
- _____ 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.*)

- _____ 1. All requirements of Section I (Methods and Presentation) apply to this section.
- _____ 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- _____ 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.
- _____ 4. Top widths, berm widths and embankment side slopes.
- _____ 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.
- _____ 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.
- _____ 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- _____ 8. Elevation of the principal spillway crest or outlet crest of the structure.

- _____ 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.
- _____ 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- _____ 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.
- _____ 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.**
- _____ 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- _____ 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- _____ 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.
- _____ 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- _____ 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- _____ 18. Maintenance plan taken from approved design plan transposed onto record drawing set.
- _____ 19. Fencing location and type, if applicable to facility.
- _____ 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- _____ 21. No visual signs of erosion or channel degradation immediately downstream of facility.
- _____ 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.)

- _____ A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.
- _____ A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- _____ A3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.
- _____ 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.
- _____ A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.
- _____ 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.
- _____ 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).
- _____ A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.
- _____ A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.
- _____ A10. Low flow orifice has a non-clogging mechanism.
- _____ A11. A pond drain pipe with valve was provided.
- _____ A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.
- _____ 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*)

- _____ B1. Same requirements as Group A Wet Ponds.
- _____ B2. Minimum 2:1 length to width flow path provided across the facility.
- _____ B3. Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).
- _____ 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.
- _____ B5. Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).
- _____ B6. No more than one-half (1/2) of the wetland surface area is planted.
- _____ B7. Topsoil or wetland mulch provided to support vigorous growth of wetland plants.
- _____ 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)

- _____ 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.
- _____ 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)

- _____ 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.
- _____ 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*)

- 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.
- 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)*

- _____ 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.
- _____ 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)*

- _____ 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.
- _____ 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.)

- _____ 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.
- _____ 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 .)

- _____ O1. All requirements of Section II, Minimum Standards, apply to this section.
- _____ 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.

Record Drawing / Construction Certification Submittal for a BMP

Date:

06/15/04

Inspector:

- Pat Menichino
- Joe Buchite
- Beth Davis
- Gerry Lewis
- Jim Rudnicki
- Other: _____

Project:

GOVERNORS LAND FOWLERS LAKE DAM MODIFICATIONS

BMP Facility:

WET POND - LAKE

Plan No.:

SP-63-02

RE: TRILUCK INSTALL
EMERG. SPILLWAY

Assigned County BMP ID Code:

JR 018

I have received a transmittal for a Record Drawing and Construction Certification for the above referenced facility on June 9, 2004. Prior to performing a field inspection of the BMP and performing a full review of these certification items, 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 observed in the field. Please review the drawing and return to me promptly so I can proceed with the review of certification material.

During my review, I will look at issues related to the BMP and its primary inflow and outflow conveyance systems, and may make comment on the following areas: Inspection/Maintenance agreement, Record Drawings (RD), Construction Certification (CC) and Construction-Related (CR) field items as it pertains to the BMP. If you have any other related non-BMP site issues such as site erosion, stabilization, removal of erosion & sediment controls, etc. that are not related to the BMP, you must proceed with closing out these items on your own accord; or alternatively, if needed, I can easily add these items to any comment letter that I may generate to the owner.

Let me know if I need to add any site-related items to my punch list.

Scott

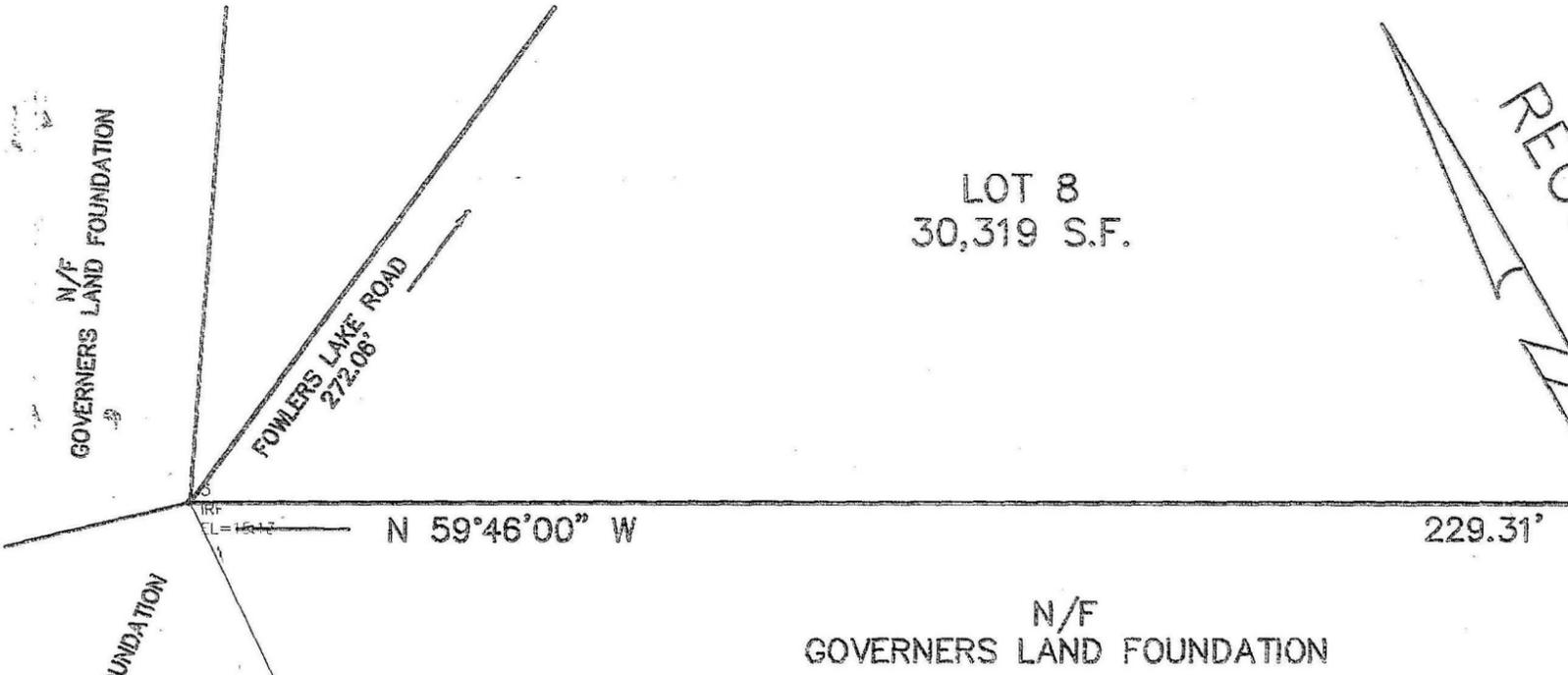
AsBUILTS\Admin\z-inspector

MY FINAL INSPECTION
OF DAM MODIFICATIONS
IS COMPLETE + ACCEPTABLE.

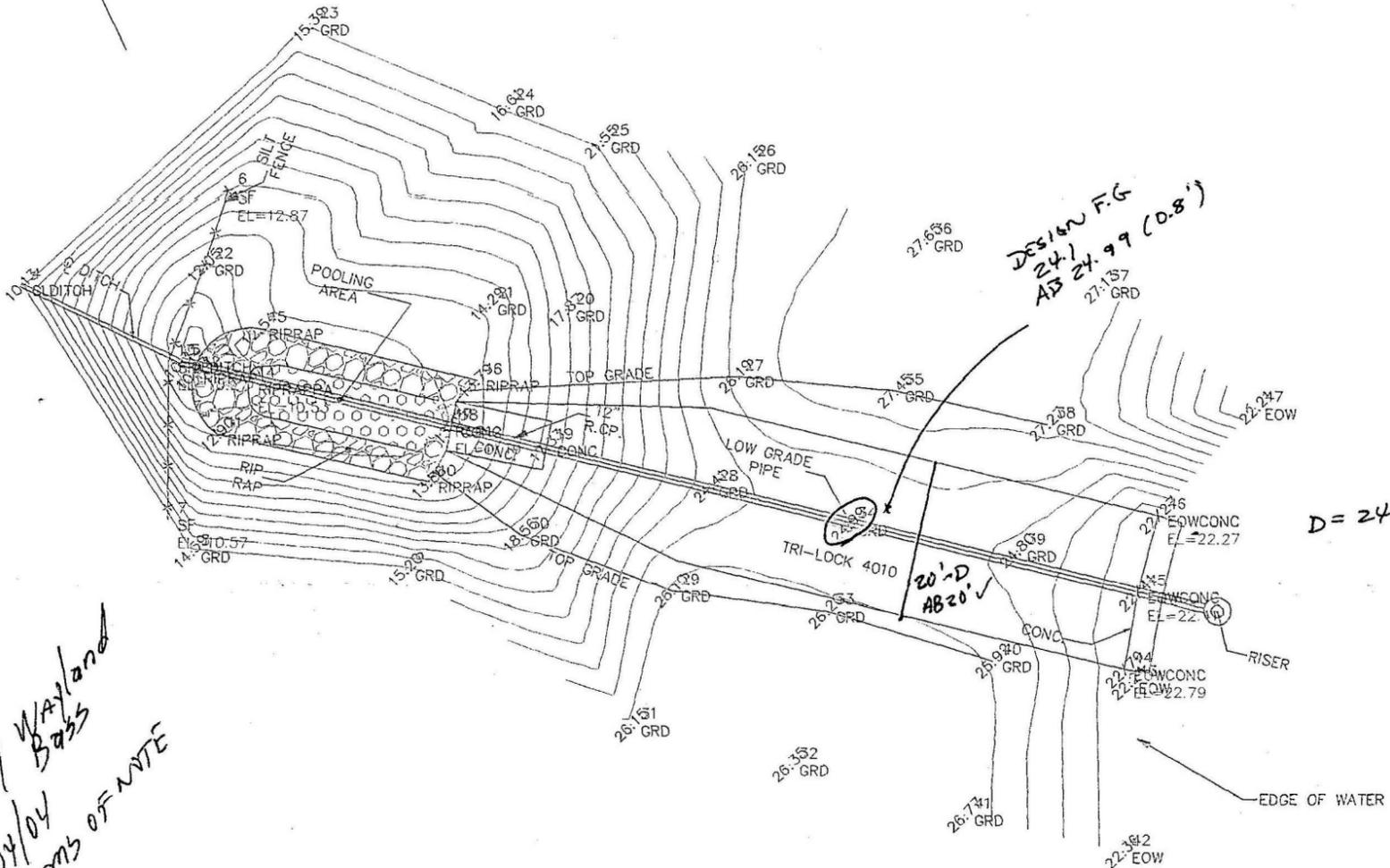
No deviations from plan
mmr 6/16/04

LOT 8
30,319 S.F.

RECORD NORTH



N/F
GOVERNERS LAND FOUNDATION



F.I w/ Wayland Bass
6/04/04
• NO ITEMS OF NOTE

N/F
GOVERNOR'S LAND FOUNDATION

OLD D.H.W = 24.73
NEW D.H.W = 24.04
Δ 2' HORIZ TOWARD LAKE

SP-63-02
JR 018

SIT REVIEW SET

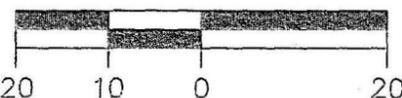
FOWLERS LAKE DAM MODIFICATION

FLOOD ZONE: X
COMMUNITY NO.: 210201
PANEL NO.: 30
SUFFIX: B
DATE OF FIRM INDEX: 2/6/91

This is to certify that on JUNE 4, 2004 I surveyed the property shown on this plat and found the property lines to be correct as shown hereon. There are no visible encroachments either way across the lines except as shown. This survey is subject to easements, servitudes and covenants of record and was prepared without benefit of a back title letter. This survey is not to be used for construction purposes.

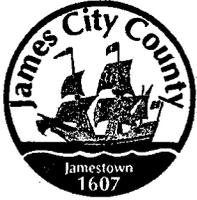


SCALE 1"=20'



JOHNNY S. WALTERS, III LAND SURVEYOR

PLAT OF THE PROPERTY OF
POWHATAN DISTRICT
JAMES CITY COUNTY, VIRGINIA
WALTERS LAND SURVEYING, LTD. 710 DENBIGH BOULEVARD, SUITE 4C NEWPORT NEWS, VIRGINIA 23608 (P.O. BOX 1594 YORKTOWN, VIRGINIA 23692) PHONE: (757)898-1057 FAX: (757) 898-2862



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

May 19, 2003

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

Re: Governor's Land - Fowler's Lake
County Plan No. SP-145- 89
Stormwater Management Facility
County BMP ID Code: JR 018

Dear Mr. Bennett:

The Environmental Divisions has reviewed a record drawing (asbuilt) and postconstruction geotechnical report (ECS # 6221 dated December 31st 2000) as submitted to our office for the above referenced BMP. The record drawing provides asbuilt information for a large lake BMP situated north of golf course fairway # 3 and southeast of the Fowler's Lake section of Governor's Land.

Based on our review of the project and a concurrent field inspection as performed on March 25th 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 notes on Sheet 5 and on Section C-C of Sheet 10 of the approved plan, construction certification was required for the BMP. This note stated that "... after construction, the geotechnical consultant shall submit a report demonstrating that the dam was built in accordance with their report recommendations." None was provided. Although not provided, a post-construction geotechnical analyses of the dam embankment was performed. The portion of the post-construction geotechnical report for Travis Pond appears to satisfy any outstanding construction certification requirements for the facility.

Record Drawing:

2. Provide an asbuilt elevation for the bottom of the pond at the upstream toe of the dam embankment near the invert elevation of the pond drain to verify that design depth (elevation) was achieved and that excessive sedimentation does not exist in the bottom of the facility. The approved plan shows a design elevation at El. 14.00 or approximately 8 ft. below design normal pool.

3. Provide an asbuilt elevation for normal pool. Design normal pool is at El. 22.

Construction - Related Items:

4. Remove any silt fence present along the downstream toe of embankment.
5. Stabilize with seed and mulch or matting all bare soil areas present along the top and downstream face of the embankment.
6. Restore the rock outlet protection pad at the downstream end of the pipe barrel through the dam to approved plan dimensions and specifications.

(As a note, a modification plan was approved for Fowler's Lake under County Site Plan SP-63-02. Modifications included filling the existing emergency spillway at the east end of the dam and relocating a new emergency spillway to center of the dam and incorporating hard armor lining protection. The design high water for the facility would be reduced from previously approved design at El. 24.73 to El. 24.04 for the new design. As of the date of this letter, these modifications have not been performed.)

Once the work as outlined above 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

Memorandum

DATE: June 13, 2003
TO: Scott Thomas
FROM: Victoria Bains
SUBJECT: Fowler's Lake, County BMP ID Code: JR018

In response to your letter dated May 19, 2003 AES Consulting Engineers has taken several actions.

Construction Certification:

No further action required.

Record Drawings:

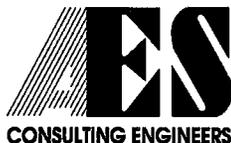
Spot elevations for the bottom of the pond were added to plan view of the drawings. From this information, there is no significant sediment accumulation in this pond.

As-built elevation for normal pool has been added to the plan.

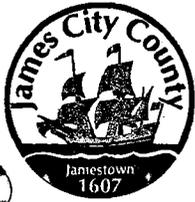
Construction – Related Items:

Grass has been mowed on top of dam and downstream face and sapling have been removed from dam embankment. All disturbed areas within the dam embankment area have been stabilized.

Rock outlet protection pad has been restored to approved plan dimensions and all silt fence in the area has been removed.



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(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com



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May 19, 2003

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

Reinspect
6-2-03
(ALREADY RELEASED)

Re: Governor's Land - Fowler's Lake
County Plan No. SP-145- 89
Stormwater Management Facility
County BMP ID Code: JR 018

Dear Mr. Bennett:

The Environmental Divisions has reviewed a record drawing (asbuilt) and postconstruction geotechnical report (ECS # 6221 dated December 31st 2000) as submitted to our office for the above referenced BMP. The record drawing provides asbuilt information for a large lake BMP situated north of golf course fairway # 3 and southeast of the Fowler's Lake section of Governor's Land.

Based on our review of the project and a concurrent field inspection as performed on March 25th 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 notes on Sheet 5 and on Section C-C of Sheet 10 of the approved plan, construction certification was required for the BMP. This note stated that "... after construction, the geotechnical consultant shall submit a report demonstrating that the dam was built in accordance with their report recommendations." None was provided. Although not provided, a post-construction geotechnical analyses of the dam embankment was performed. The portion of the post-construction geotechnical report for Travis Pond appears to satisfy any outstanding construction certification requirements for the facility.

OK
6-27-03

Record Drawing:

- 2. Provide an asbuilt elevation for the bottom of the pond at the upstream toe of the dam embankment near the invert elevation of the pond drain to verify that design depth (elevation) was achieved and that excessive sedimentation does not exist in the bottom of the facility. The approved plan shows a design elevation at El. 14.00 or approximately 8 ft. below design normal pool.

OK
6-27-03

3. Provide an asbuilt elevation for normal pool. Design normal pool is at El. 22.

Construction - Related Items:

- OK ✓ 4. Remove any silt fence present along the downstream toe of embankment.
- OK ✓ 5. Stabilize with seed and mulch or matting all bare soil areas present along the top and downstream face of the embankment.
- OK ✓ 6. Restore the rock outlet protection pad at the downstream end of the pipe barrel through the dam to approved plan dimensions and specifications.

(As a note, a modification plan was approved for Fowler's Lake under County Site Plan SP-63-02. Modifications included filling the existing emergency spillway at the east end of the dam and relocating a new emergency spillway to center of the dam and incorporating hard armor lining protection. The design high water for the facility would be reduced from previously approved design at El. 24.73 to El. 24.04 for the new design. As of the date of this letter, these modifications have not been performed.)

Once the work as outlined above 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

**James City County, Virginia
Environmental Division**

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

County Plan No.: S-110-98
 Project Name: Governors Land - FOWLER'S LAKE
 Stormwater Management Facility: Wet Pond - SR-018
 Phase: I II III

Information Received. Date: Feb 11 '2002 AES
 Administrative Check.
 Record Drawing. Date: 3/19/02
 Construction Certification. Date: _____
 RD/CC Standard Forms (Required after Feb 1st 2001 Only)
 Insp/Maint Agreement. Info: GLOBAL
 BMP Maintenance Plan. Location: NO
 Other: _____

NOT signed

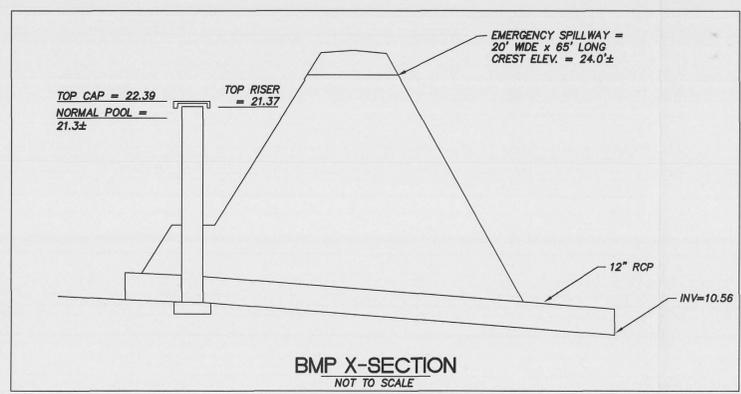
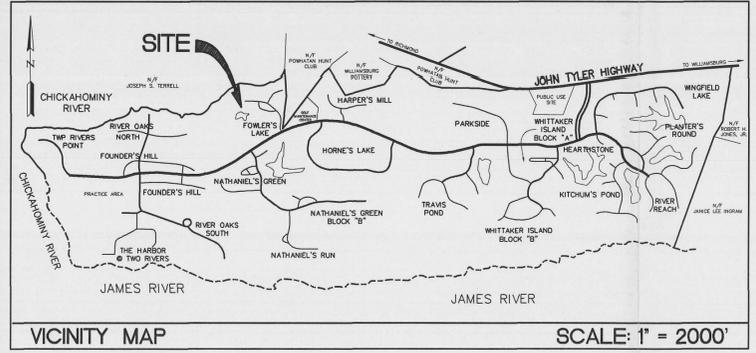
Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
 Yes No Location: Sheet 5 and 10.
 Assign County BMP ID Code Code: 22019
 Log into Division's "As-Built" Tracking Log
 Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, 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: 3/25/03 R.H.
 Record Drawing (RD) Review Date: 5/19/03 SJT
 Construction Certification (CC) Review Date: 5/19/03 SJT

Actions:
 No comments.
 Comments. Letter Forwarded. Date: 5/19/03 SJT
 Record Drawing (RD)
 Construction Certification (CC)
 Construction-Related (CR)
 Site Issues (SI)
 Other : _____

Second Submission: 6/17/03 AES (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. (2)
 Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable
 Plan Reviewer: Darryl Chamber P.E. Date: 6/27/03

SP-063-02



LIMITS OF WETLANDS APPROXIMATELY 400 FT DOWNSTREAM OF DAM EMBANKMENT (ACCORDING TO P.B.56, PG. 54)

CONTRACTOR TO PROVIDE SELECT BACKFILL WHERE REQUIRED (FREE OF STUMPS, ROOTS, ROCKS, TRASH, ETC.). BACKFILL MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 90% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698).

N/F GOVERNOR'S LAND FOUNDATION
TAX ID (43-2)(12-1A)
P.B. 70, PG. 55
MAJOR OPEN SPACE 38

OP PROVIDE 20' x 9' STILLING BASIN CLASS 1 RIP-RAP d50=6" EMBEDDED MIN. 18" OVER FILTER CLOTH (APPROX. 25 C.Y.) BOTTOM ELEV.=10.5

- DENOTES APPROX. LIMITS OF 25% SLOPES

LOT 21
N/F THOMAS ROCK
TAX ID (43-2)(12-9)
P.B. 70, PG. 55

EMERGENCY SPILLWAY
ELEV.=24.10
CONTROL SECTION 5' WIDE BOTTOM WITH 5:1 SIDE SLOPES. PROVIDE CHANNEL TO A DEPTH OF 1.5' IN CONTROL SECTION. CHANNEL TO BE REINFORCED WITH TRI-LOCK 4010 OR APPROVED EQUAL.

CONCRETE SWALE 25.62 10' LONG, 4" DEEP, 3000 PSI, FIBER REINFORCED TRANSITION FROM SOIL REINFORCEMENT INTO RIP-RAP STILLING BASIN

PROVIDE SOIL REINFORCED CHANNEL CONNECTING INTO 4" THICK CONCRETE SWALE

PROPOSED 100 YEAR STORM ELEVATION=24.04 EXISTING 100-YR ELEV=24.73 (BASED ON ORIGINAL DESIGN)

PROVIDE SOIL REINFORCED CHANNEL TO EXISTING NORMAL POOL ELEVATION

N/F GOVERNOR'S LAND FOUNDATION
TAX ID (43-2)(1-4)
P.B. 54, PG. 49-50

FOWLER'S LAKE
JCC BMP# JR 018

- SEQUENCE OF CONSTRUCTION**
1. INSTALL SILT FENCE AND TREE PROTECTION.
 2. INSTALL NEW SPILLWAY PROVIDING REINFORCED CHANNEL TO TOE OF SLOPE. CONCRETE SWALE TO BE CONSTRUCTED FIRST, FOLLOWED BY SOIL REINFORCEMENT ARC.
 3. REMOVE EXISTING STONE OUTLET PROTECTION FROM 12" RCP AND INSTALL STILLING BASIN. ENSURE FLOW FROM SPILLWAY CHANNEL IS DIRECTED TOWARDS STILLING BASIN.
 4. GRADE EXISTING SPILLWAY AREA ON LOT 8 BY USING EXCAVATIONS FROM NEW EMERGENCY SPILLWAY CONSTRUCTION (AND SELECT FILL AS REQUIRED).
 5. SEED AND STABILIZE ALL DISTURBED AREAS.
 6. REMOVE SILT FENCE.

OWNER INFORMATION:
GOVERNOR'S LAND FOUNDATION
1400 TWO RIVER'S ROAD
WILLIAMSBURG, VIRGINIA. 23185 AND ALFRED LITTLE, JR.
4017 CHURCH ROAD
VA BEACH, VIRGINIA. 23455
ATTENTION: DAVID KING
TELEPHONE: (757) 253-6976

RESPONSIBLE LAND DISTURBER:
MARC BENNETT, P.E.
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA. 23188
TELEPHONE: 757-253-0040

SITE DATA:

TAX MAP PARCEL No. (43-2) (4-8); (43-2) (1-4); (43-2)(12-1A)
ZONING: R-4, WITH PROFFERS
DISTURBED AREA: 0.53 ACRES / 23,050 SF
WETLAND DISTURBED AREA: NONE
FLOOD HAZARD MAP: FEMA PANEL NUMBER 510201 0030 B
NOTE: SITE IS LOCATED IN ZONE 'X' (AREAS DETERMINED TO BE OUTSIDE THE 500 YEAR FLOOD PLAIN)

GENERAL SITE NOTES:

1. NO TEMPORARY SOIL STOCKPILE OR EQUIPMENT STORAGE IS ANTICIPATED FOR THIS SITE.
2. TOPSOIL REMOVED FOR CONSTRUCTION IMPROVEMENTS TO BE UTILIZED ON SITE TO CORRECT ANY SOIL DEFICIENCIES CURRENTLY ON SITE.
3. NO OFF-SITE LAND DISTURBING REQUIRED.
4. NO RPA AREAS EXIST WITHIN SITE LIMITS.
5. A LAND DISTURBING PERMIT WITH SURETY AND SILTATION AGREEMENT IS REQUIRED.
6. THE CONTRACTOR SHALL SATISFY HIMSELF TO ALL SITE CONDITIONS PRIOR TO CONSTRUCTION.
7. CONTRACTOR TO CONTACT MISS UTILITY PRIOR TO A MINIMUM 48 HOURS PRIOR TO COMMENCING WORK.
8. ACCORDING TO SOIL SURVEY, NO HYDRIC SOILS EXIST WITHIN CONSTRUCTION AREA (EXISTING SOILS ARE 11C AND 15E, CRAVEN-UCHEE AND EMPORIA COMPLEX.)
9. NO NON-TIDAL WETLANDS EXIST WITHIN LIMITS OF CONSTRUCTION.
10. AS-BUILTS FOR FOWLER'S LAKE WERE SUBMITTED TO JCC ENVIRONMENTAL ON MARCH 11, 2002.
11. THIS PLAN IS FOR THE MODIFICATION OF FOWLER'S LAKE DAM (JCC PLAN NUMBER SP-145-89) FOR THE ALTERATION OF THE EXISTING EMERGENCY SPILLWAY LOCATION.

COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS	DATE
Fire Dept	
Health Dept	
VDOT	
Planning	6/10/02
Environ	6/10/02
Zoning Adm.	6/11/02
JCSA	
County Eng	6/10/02
REA	
Other	



No.	DATE	REVISION / COMMENT / NOTE
2	6/10/02	ADJUSTED TAX MAP #'S PER COMMENTS DATED 6/7/02
1	5/22/02	REVISED PER COMMENTS DATED 5/17/02



5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994



VIRGINIA
JAMES CITY COUNTY
POWhatan DISTRICT

SITE PLAN
FOWLER'S LAKE
DAM MODIFICATION

Designed VMB/JAG	Drawn AWT
Scale 1"=20'	Date 5/3/02
Project No. 9057-8	
Drawing No. 1 OF 2	

05.01.02-14.48 7172331BP.dwg AWT

**JAMES CITY COUNTY ENVIRONMENTAL DIVISION
EROSION AND SEDIMENT CONTROL NOTES
REVISED 7/6/01**

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, ALL APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJECT.

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, 3RD EDITION, 1992. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN THAT MAY BE PERTINENT TO THIS PROJECT, INCLUDING MINIMUM STANDARDS 1 THROUGH 19. IF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS FOUND TO BE INADEQUATE IN THE FIELD, THE MINIMUM STANDARDS WILL APPLY IN ADDITION TO THE PROVISIONS OF THE APPROVED PLAN.

2. AS A PREREQUISITE TO APPROVAL OF AN EROSION AND SEDIMENT CONTROL PLAN FOR LAND-DISTURBING ACTIVITIES, THE NAME OF A RESPONSIBLE LAND-DISTURBER SHALL BE PROVIDED. THE RESPONSIBLE LAND-DISTURBER SHALL BE AN INDIVIDUAL WHO HOLDS A VALID CERTIFICATE OF COMPETENCE ISSUED BY THE VIRGINIA DEPARTMENT OF CONSERVATION AND IS DEFINED AS THE PERSON IN CHARGE OF AND RESPONSIBLE FOR CARRYING OUT THE LAND-DISTURBING ACTIVITY. PERMITS OR PLANS WITHOUT THIS INFORMATION ARE DEEMED INCOMPLETE AND WILL NOT BE APPROVED UNTIL PROPER NOTIFICATION IS RECEIVED. ALSO, IF THE PERSON DESIGNATED AS RESPONSIBLE LAND-DISTURBER CHANGES BETWEEN THE TIME OF PLAN APPROVAL AND THE SCHEDULED PRECONSTRUCTION MEETING, THE ENVIRONMENTAL DIVISION SHALL BE INFORMED OF THE CHANGE, IN WRITING, 24-HOURS IN ADVANCE OF THE PRECONSTRUCTION MEETING.

3. A PRECONSTRUCTION MEETING SHALL BE HELD ON SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, THE RESPONSIBLE LAND-DISTURBER AND THE CONTRACTOR PRIOR TO ISSUANCE OF THE LAND DISTURBER PERMIT. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY FOR APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING. THE DESIGNATED RESPONSIBLE LAND-DISTURBER IS REQUIRED TO ATTEND THE PRECONSTRUCTION MEETING FOR THE PROJECT.

4. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE THOROUGHLY CLEANED AT THE END OF EACH DAY (STD & SPEC 3.02).

5. SEDIMENT BASINS AND TRAPS (STD & SPEC 3.13 AND 3.14), PERIMETER DIKES (STD & SPEC 3.09 AND 3.12), SEDIMENT FILTER BARRIERS (STD & SPEC 3.05) AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND MUST BE MADE FUNCTIONAL PRIOR TO ANY UPSLOPE LAND DISTURBANCE TAKING PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES BY THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE MADE TO ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.

6. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) AND SLOPE DRAIN (STD. & SPEC. 3.15) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.

7. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLAN.

8. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THE PLAN. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

9. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF THE SAME (STD & SPEC 3.18). THIS INCLUDES INSTALLATION OF EROSION CONTROL, STONE OR PAVED DITCHES WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY INSTALLATION BEGINS.

10. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

11. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM DRAIN, WATER OR UNDERGROUND UTILITY LINES ARE TO BE OPEN AT ONE TIME FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E., THE SAME DAY).

12. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING (STD & SPEC 3.35). SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

13. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME AND FERTILIZER (STD & SPEC 3.32). IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.

14. ALL SLOPES STEEPER THAN 3H:1V SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS AND MATTINGS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH STD. & SPEC. 3.35, MULCHING, STD. & SPEC. 3.36, SOIL STABILIZATION BLANKETS AND MATTING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2H:1V.

15. INLET PROTECTION (STD & SPEC 3.07 AND 3.08) SHALL BE PROVIDED FOR ALL STORM DRAIN AND CULVERT INLETS FOLLOWING CONSTRUCTION OF THE SAME.

16. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.

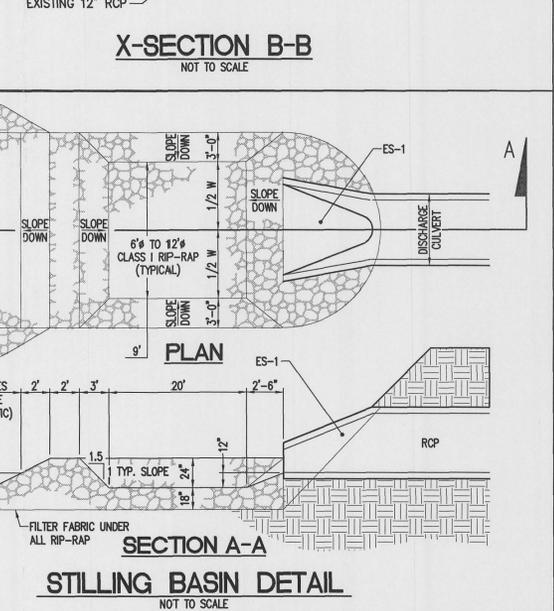
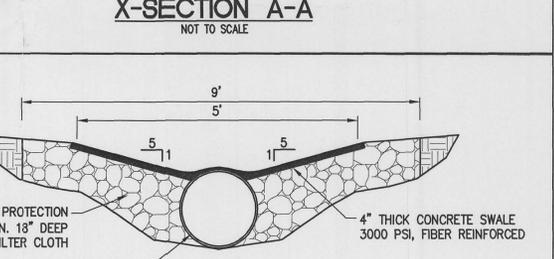
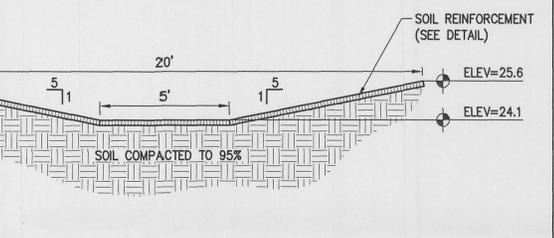
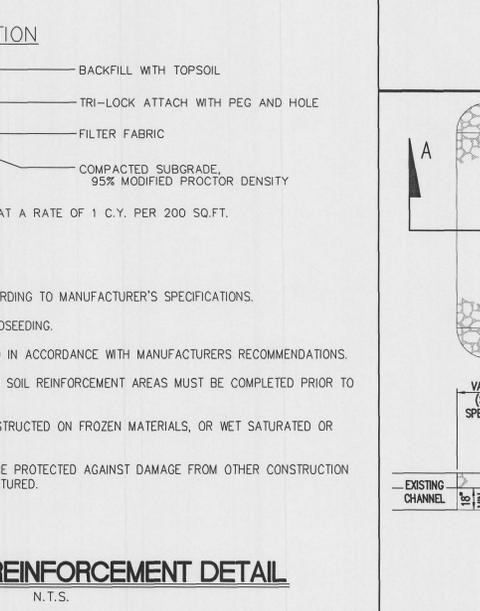
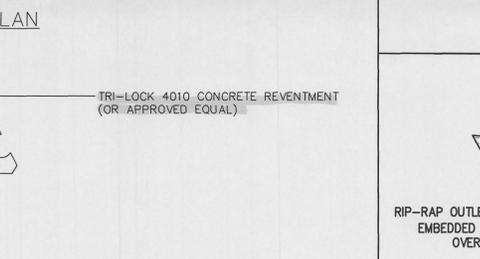
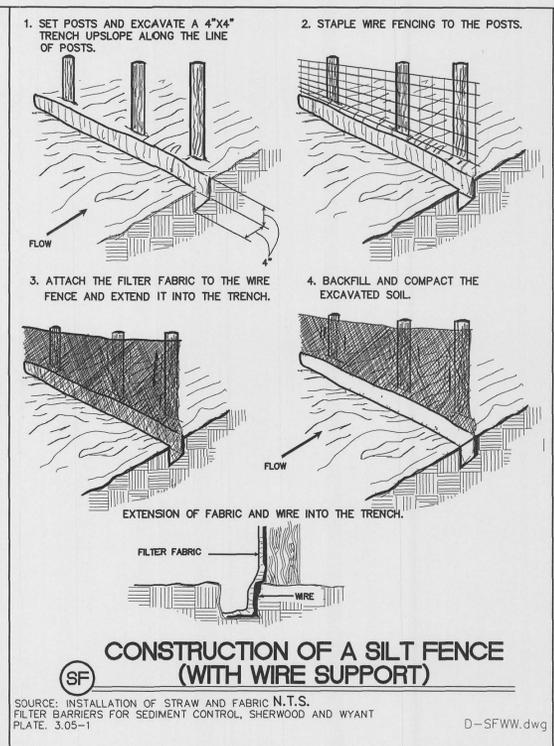
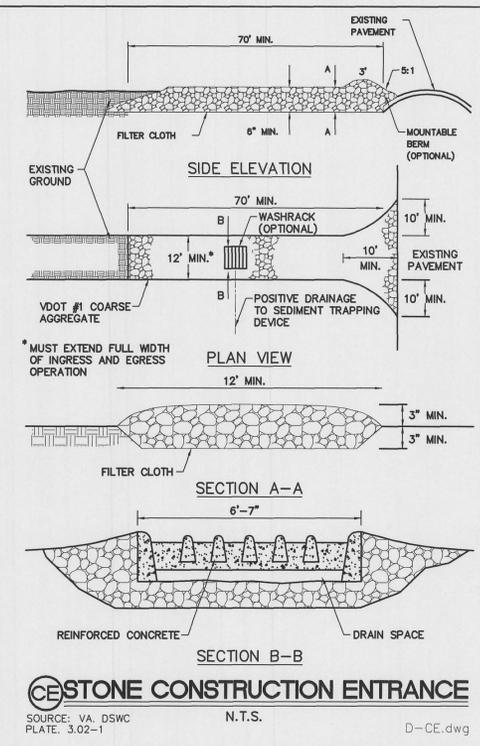
17. PAVED DITCHES SHALL BE REQUIRED WHEREVER ACCELERATED EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.

18. TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. TRAPPED SEDIMENT SHALL BE SPREAD, SEEDED AND MULCHED. AFTER THE PROJECT AND STABILIZATION IS COMPLETE, ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS.

19. NO SEDIMENT TRAP OR SEDIMENT BASIN SHALL BE REMOVED UNTIL A) AT LEAST 75 PERCENT OF THE LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN SOLD TO A THIRD PARTY (UNRELATED TO THE DEVELOPER) FOR THE CONSTRUCTION OF HOMES AND/OR B) 60 PERCENT OF THE SINGLE FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN COMPLETED AND THE SOIL STABILIZED. A BULK SALE OF THE LOTS TO ANOTHER BUILDER DOES NOT SATISFY THIS PROVISION. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL NOT BE REMOVED WITHOUT THE EXPRESS AUTHORIZATION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION.

20. RECORD DRAWINGS (AS-BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE BOTH REQUIRED FOR NEWLY CONSTRUCTED OR MODIFIED STORMWATER MANAGEMENT/BMP FACILITIES. CERTIFICATION ACTIVITIES SHALL BE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION, STORMWATER MANAGEMENT/BMP FACILITIES, RECORD DRAWING AND CONSTRUCTION CERTIFICATION, STANDARD FORMS & INSTRUCTIONS.

21. DESIGN AND CONSTRUCTION OF PRIVATE-TYPE SITE DRAINAGE SYSTEMS OUTSIDE VDOT RIGHTS-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION, STORMWATER DRAINAGE CONVEYANCE SYSTEMS (NON-BMP RELATED), GENERAL DESIGN AND CONSTRUCTION GUIDELINES.



NO.	DATE	REVISION / COMMENT	BY
2	5/10/02	NO CHANGES MADE TO DETAIL SHEET	VMB
1	5/22/02	REVISED PER COMMENTS DATED 5/17/02	VMB



5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994



NOTES AND DETAILS
**FOWLER'S LAKE
DAM MODIFICATION**
JAMES CITY COUNTY
POWATAN DISTRICT

Designed VMB/JAG	Drawn AWT
Scale NOTED	Date 5/3/02
Project No. 9057-8	
Drawing No. 2 OF 2	

05:01:02-13:10 717331BPZ.dwg AWT

N/F
JOSEPH S. TERRELL

SEE SHEET 10
FOR TYPICAL
DAM SECTION.

A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO ENSURE THE SUITABILITY OF THE SITE. THE INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. ADDITIONALLY, A GEOTECHNICAL CONSULTANT WILL ENSURE PROPER MATERIAL AND COMPACTION ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A REPORT DEMONSTRATING THAT THE DAM WAS BUILT IN ACCORDANCE WITH THEIR REPORT RECOMMENDATIONS. PRIOR TO CONSTRUCTION THE CONSULTANT SHALL SUBMIT TO JAMES CITY COUNTY CODE COMPLIANCE HIS RECOMMENDATIONS FOR DAM DESIGN, KEY TRENCH WIDTH AND DEPTH, ETC. THE GEOTECHNICAL REPORT IS REQUIRED PRIOR TO ISSUANCE OF A LAND DISTURBING PERMIT.
NOTE: AS-BUILT DRAWINGS SHALL BE PROVIDED FOR ALL DETENTION BASINS UPON COMPLETION.

(FOWLER'S LAKE)

SCALE IN FEET
0 100 200

EMERGENCY SPILLWAY TO BE AT 100% CONTROL SECTION 21'-24" WIDE AT 10% SLOPE TO 10' OF DAM. TO BE LINED WITH MIRRASANT CONCRETE. TO BE LINED WITH MIRRASANT.

NOTE: A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO ENSURE THE SUITABILITY OF THE SITE. THE INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. ADDITIONALLY, A GEOTECHNICAL CONSULTANT WILL ENSURE PROPER MATERIAL AND COMPACTION ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A REPORT DEMONSTRATING THAT THE DAM WAS BUILT IN ACCORDANCE WITH THEIR REPORT RECOMMENDATIONS. PRIOR TO CONSTRUCTION THE CONSULTANT SHALL SUBMIT TO JAMES CITY COUNTY CODE COMPLIANCE HIS RECOMMENDATIONS FOR DAM DESIGN, KEY TRENCH WIDTH AND DEPTH, ETC. THE GEOTECHNICAL REPORT IS REQUIRED PRIOR TO ISSUANCE OF A LAND DISTURBING PERMIT.
NOTE: AS-BUILT DRAWINGS SHALL BE PROVIDED FOR ALL DETENTION BASINS UPON COMPLETION.

- NOTES REGARDING GOLF CART PATH LOCATION
- CART PATH LOCATION MAY BE CHANGED TO AVOID EXISTING TREES OR TREE GROUPS DESIRED TO BE RETAINED BY THE GOLF COURSE DESIGNER OR OWNER'S REPRESENTATIVE.
 - PROPOSED CART PATH LOCATION SUBJECT TO FINAL ON-SITE APPROVAL.
 - LOCATION OF ALL CART PATHS, BRIDGES AND TRAILS SHALL BE APPROVED BY THE PLANNING COMMISSION IF THEY ARE TO BE ALLOWED IN THE 50' BUFFER STRIP ADJOINING WETLANDS OR THE CONSERVATION EASEMENT.

NOTE REGARDING GOLF CART PATHS:
GOLF CART PATHS ARE TO RECEIVE EQUAL APPLICABLE TREATMENT TO ALL OTHER APPLICABLE USES.

100' LONG x 8' WIDE TREATED WOOD TRAPES BEHIND WETLANDS LENGTH MAYBE ADJUSTED FOR FINAL LAKE CONTOUR

NOTE: A.C.O.E. LANDOWNER PERMIT HAS BEEN OBTAINED FOR LAND DISTURBING ACTIVITIES IN THIS AREA.

SEE SHEET 10
FOR TYPICAL
DAM SECTION.

EMERGENCY SPILLWAY AREA OF CONTROL SECTION TO BE 10' WIDE AT LONG 10' OF DAM. TO BE LINED WITH MIRRASANT CONCRETE. TO BE LINED WITH MIRRASANT.

16' LONG BOX CULVERT (SIZED TO MATCH EXISTING CHANNEL SHAPE) SHALL BE PROVIDED AT WETLANDS CROSSING IN THE 50' BUFFER EITHER SIDE OF WETLAND. PROVIDE OPEN GRID FRAME BACKFILLED WITH SAND 1/2" PER" SPACES TO PROVIDE A PERVIOUS YET STABLE CART PATH.

RECORD DRAWING CERTIFICATION:
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 NOTED.

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

APPROVED
James City County
Professional Engineer
Date: 6-27-02

NO.	DATE	REVISION / COMMENT / NOTE	BY
5	3/03	REVISIONS AS PER JAMES CITY COUNTY REVIEW	VMB
4	4/02	RECORD DRAWING	VMB
3	11/00	GENERAL REVISIONS	VMB
2	7/00	REVISED NOTES 1, 2, 3, 10, 11, 12	VMB
1	3/00	REVISED PER JCC COMMENTS	VMB

Central Grading Plan
GOVERNOR'S LAND

POWHTAN DISTRICT JAMES CITY COUNTY VIRGINIA

RECORD DRAWING-4/02



SEE SHEET 10 FOR TYPICAL DAM SECTION.

(POWER'S LAKE)

APPROXIMATE LOCATION OF THE DAM SITE TO BE DETERMINED BY THE ENGINEER. THE DAM SITE SHALL BE DETERMINED BY THE ENGINEER. THE DAM SITE SHALL BE DETERMINED BY THE ENGINEER. THE DAM SITE SHALL BE DETERMINED BY THE ENGINEER.

SEE SHEET 10 FOR TYPICAL DAM SECTION.

NOTE: A 4' C&G EMBANKMENT IS REQUIRED FOR THE DAM SITE. THE EMBANKMENT SHALL BE 4' HIGH AND 4' WIDE. THE EMBANKMENT SHALL BE 4' HIGH AND 4' WIDE.

EMPHASIS: SECTION 10 OF THE CONSTITUTION OF THE STATE OF TEXAS, ARTICLE VII, SECTION 10, WHICH PROVIDES THAT THE STATE SHALL HAVE THE RIGHT TO CONTROL THE COURSE OF THE RIVERS OF THIS STATE.

NOTE: A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO DETERMINE THE STABILITY OF THE SITE. THE GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO DETERMINE THE STABILITY OF THE SITE. THE GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO DETERMINE THE STABILITY OF THE SITE.

NOTE: THE DAM SITE SHALL BE 4' HIGH AND 4' WIDE. THE DAM SITE SHALL BE 4' HIGH AND 4' WIDE. THE DAM SITE SHALL BE 4' HIGH AND 4' WIDE.

1. DAM SITE LOCATION MAY BE CHANGED TO AVOID EXISTING TREES OR RESOURCES ON OWNERS' REPRESENTATIVE.
2. PROPOSED DAM SITE LOCATION SUBJECT TO FINAL ON-SITE APPROVAL.
3. LOCATION OF ALL DAMS, BRIDGES, AND TRAILS SHALL BE ALIGNED IN THE 50' BUFFER STRIP AROUND WETLANDS ON THE CONSERVATION EASEMENT.

NOTE: REGARDING GOLF CART PATHS: GOLF CART PATHS ARE TO BE LOCATED WITHIN THE 50' BUFFER STRIP AROUND WETLANDS. GOLF CART PATHS ARE TO BE LOCATED WITHIN THE 50' BUFFER STRIP AROUND WETLANDS.

RECORD DRAWING CERTIFICATION
I, HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE INFORMATION CONTAINED IN THIS RECORD DRAWING IS TRUE AND CORRECT AND THAT I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS. I HAVE REVIEWED THE RECORD DRAWING AND I AM SURE THAT IT ACCURATELY REPRESENTS THE INFORMATION CONTAINED IN THE RECORD DRAWING. I HAVE REVIEWED THE RECORD DRAWING AND I AM SURE THAT IT ACCURATELY REPRESENTS THE INFORMATION CONTAINED IN THE RECORD DRAWING.

RECORD DRAWING BASED ON INFORMATION AS SUPPLIED BY AEC CONSULTING ENGINEERS

NO.	DATE	REVISION / COMMENTS / BY
1	10/01	RECORD DRAWING
2	11/10	REVISION FOR SET
3	11/10	REVISION FOR SET
4	11/10	REVISION FOR SET

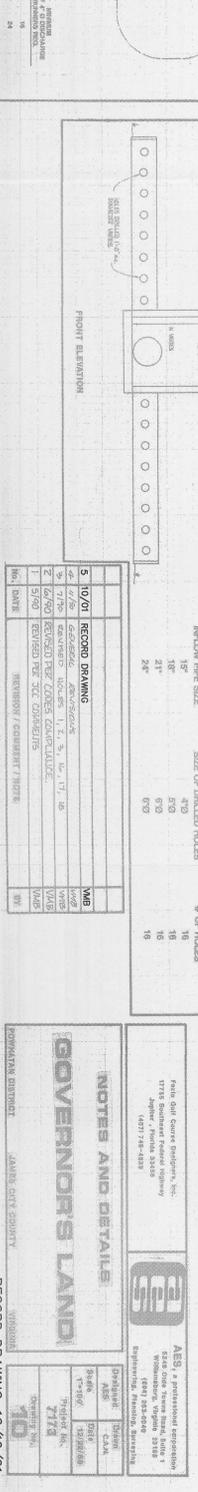
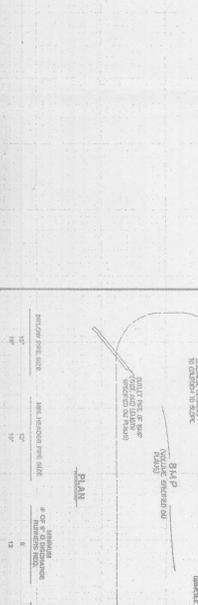
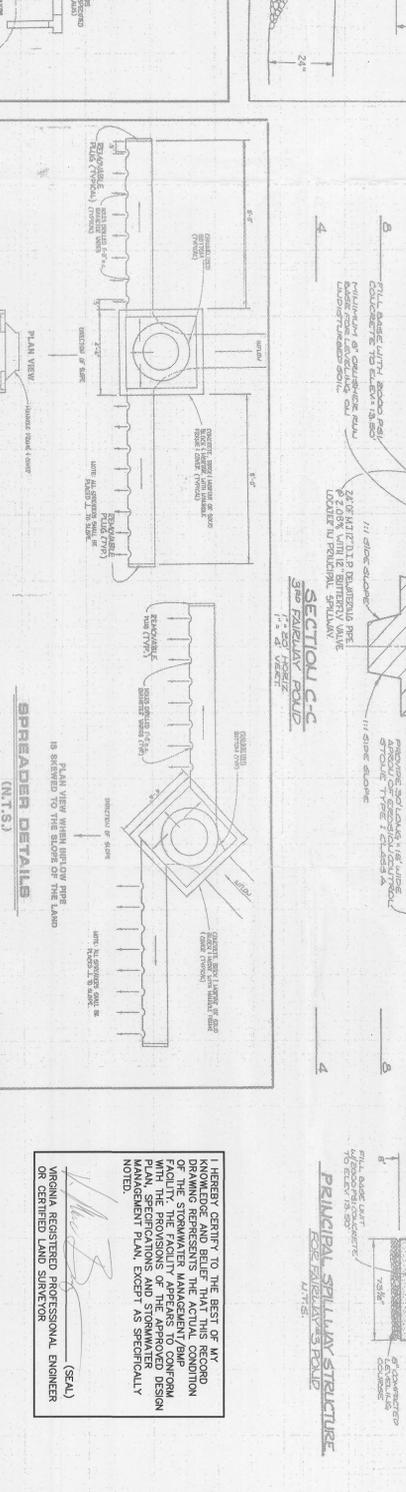
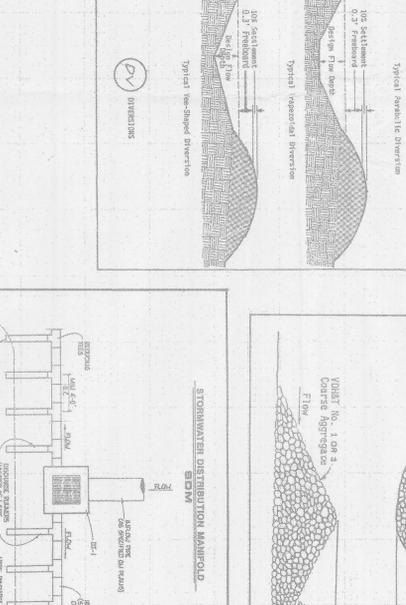
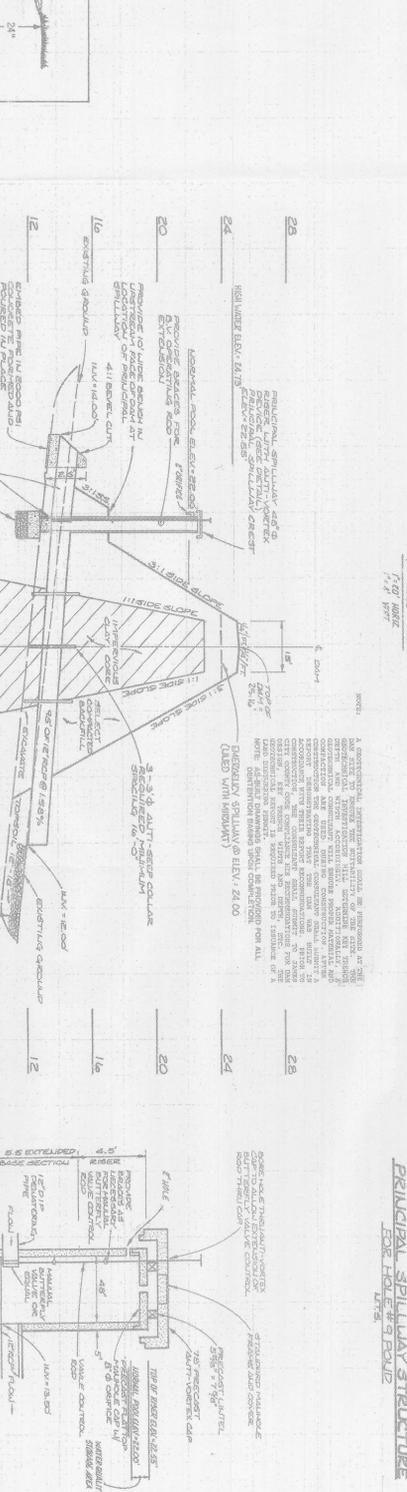
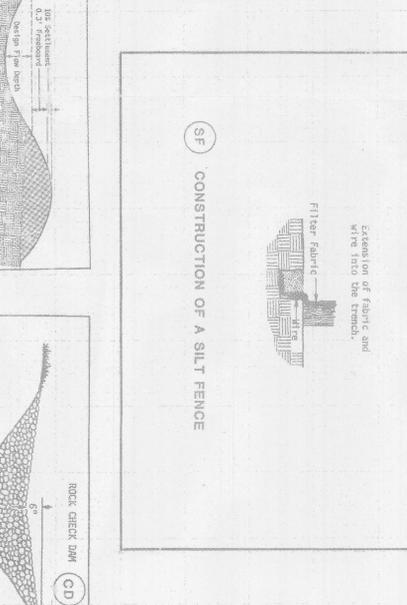
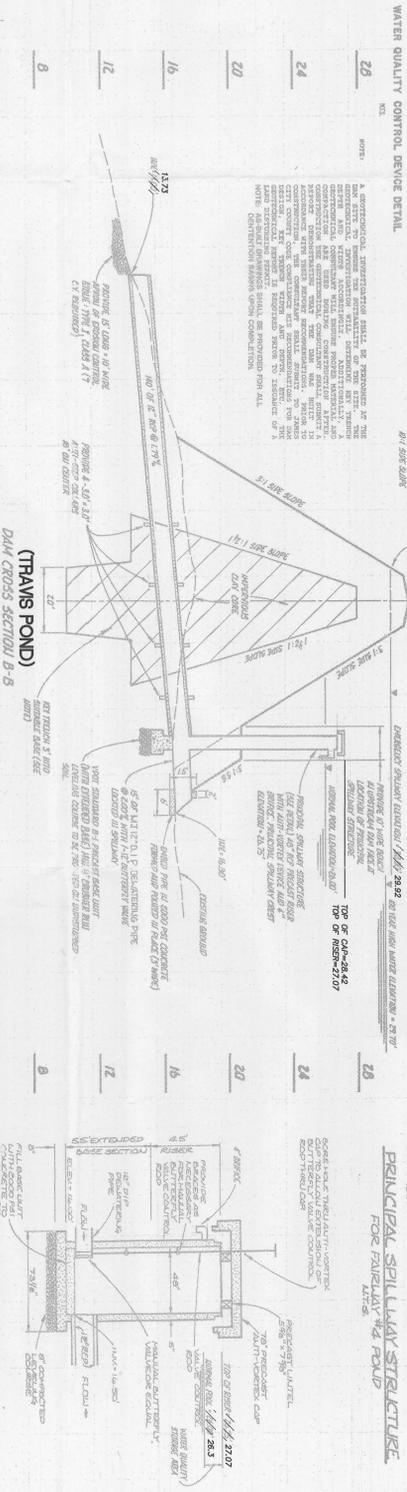
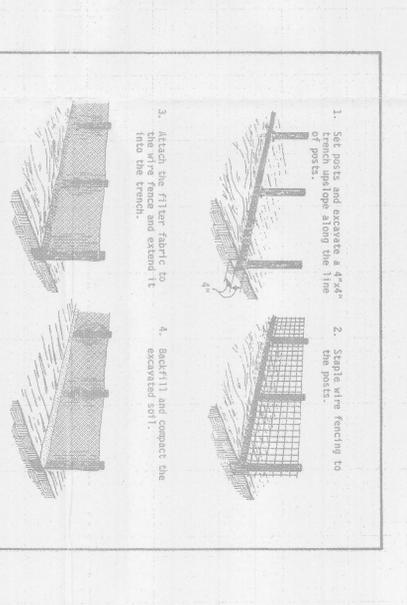
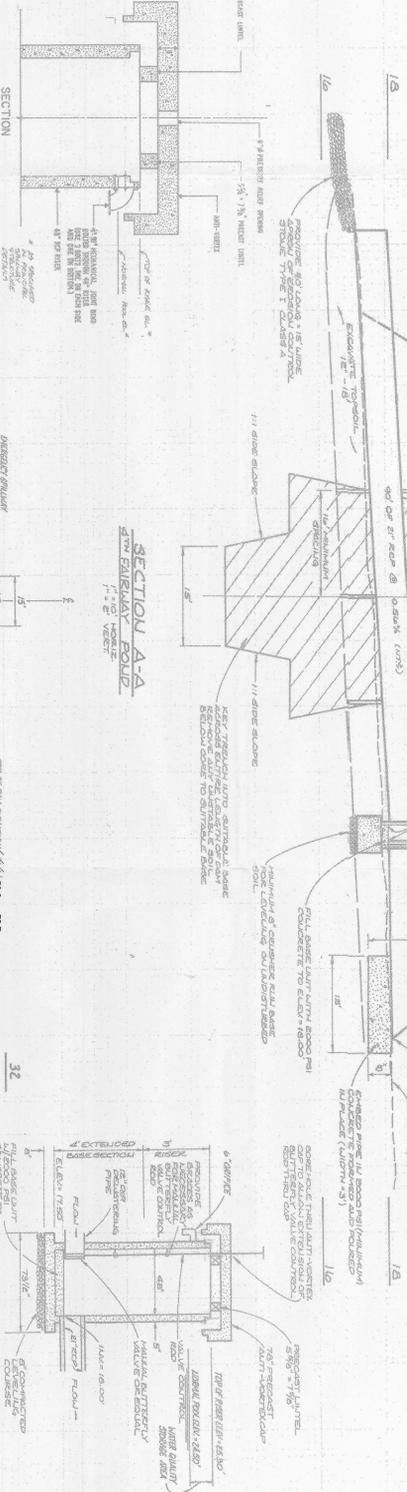
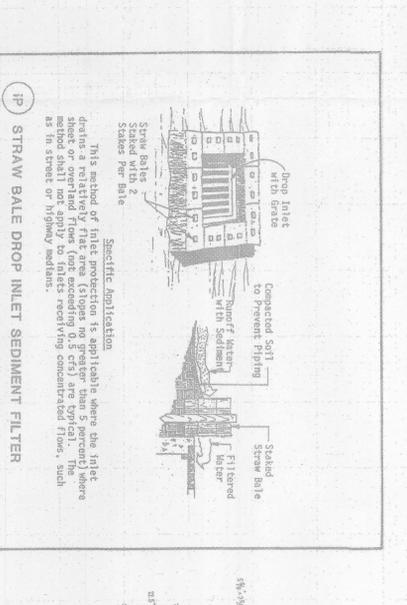
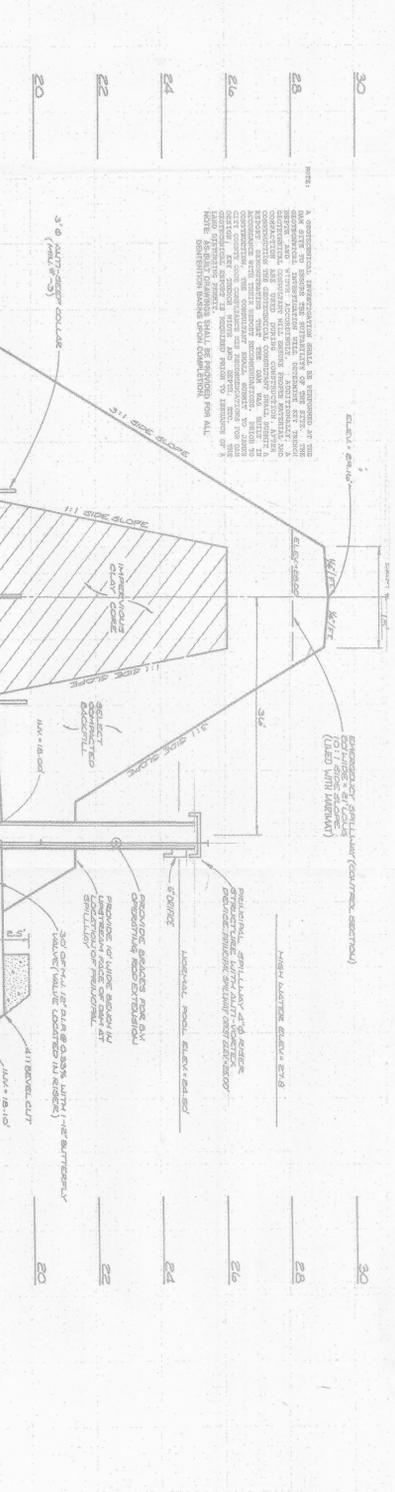
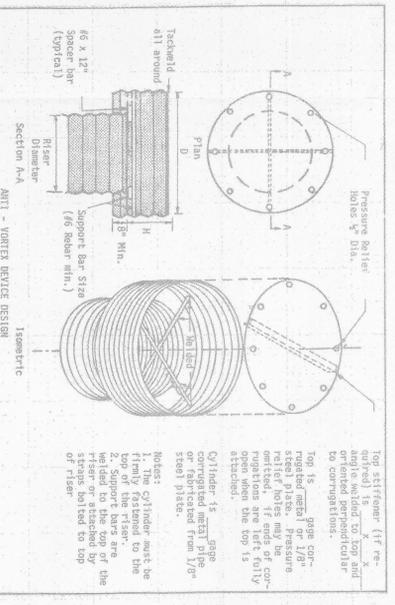
CENTRAL GRADING PLAN
GOVERNORS LAND

1718 Anderson Road, Suite 100
Austin, Texas 78748
717.717.7173

ASBESTOS & ENVIRONMENTAL INVESTIGATION
1718 Anderson Road, Suite 100
Austin, Texas 78748
717.717.7173

RECORD DRAWING-10/16/01

1. The program of the erosion control measures shown on these plans shall be to provide the control of all weathered sediments resulting from construction activities from the site to the receiving water body. The erosion control measures shall be designed to prevent the erosion of the site and to prevent the erosion of the receiving water body.
2. All erosion and sediment control measures shall be installed and maintained in accordance with the Virginia Department of Transportation (VDOT) Erosion Control Manual. The contractor shall be responsible for the maintenance of all erosion control measures.
3. All points of construction bypass and access shall be protected by a temporary structure. The structure shall be designed to prevent the erosion of the site and to prevent the erosion of the receiving water body.
4. The contractor shall ensure that all erosion control measures are installed in accordance with the Virginia Department of Transportation (VDOT) Erosion Control Manual. The contractor shall be responsible for the maintenance of all erosion control measures.
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NOTES AND DETAILS

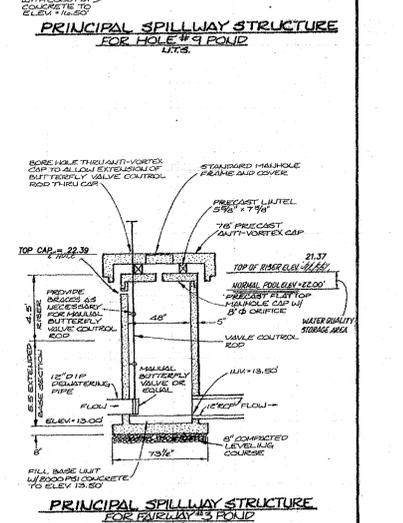
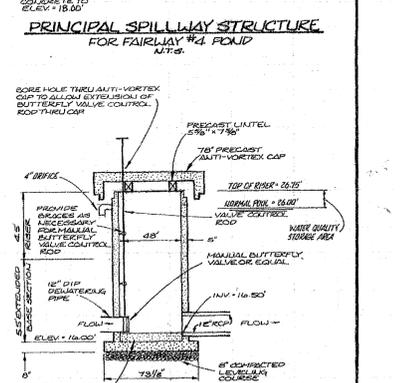
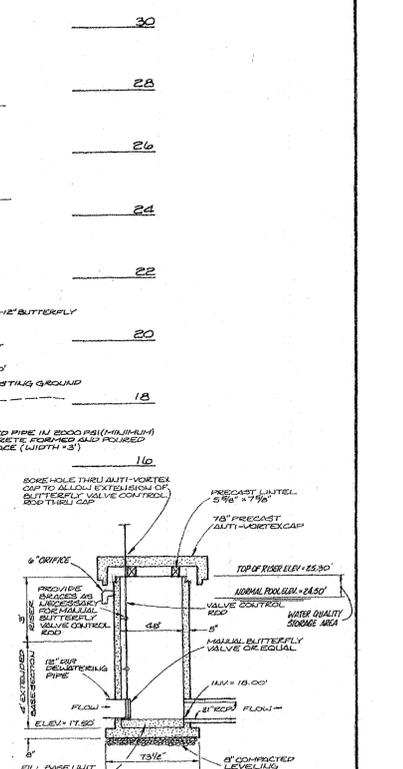
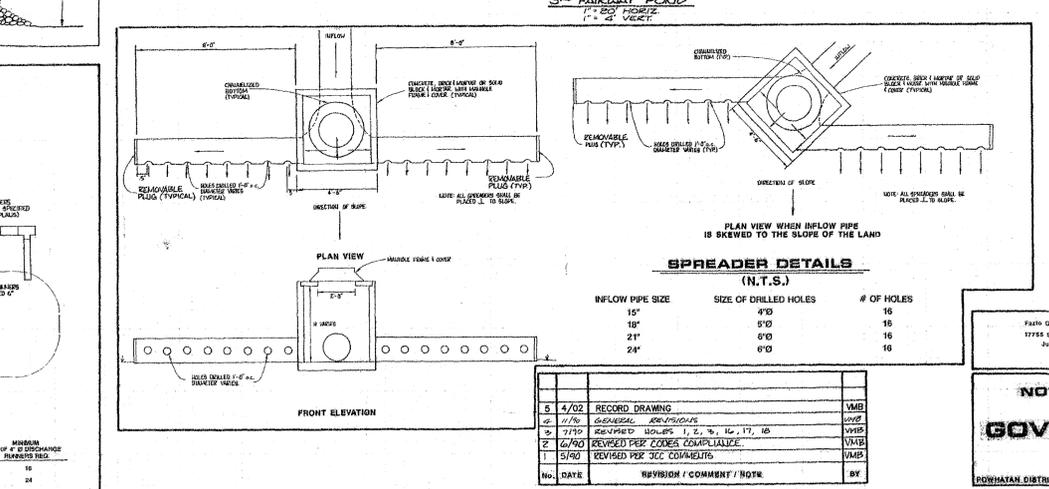
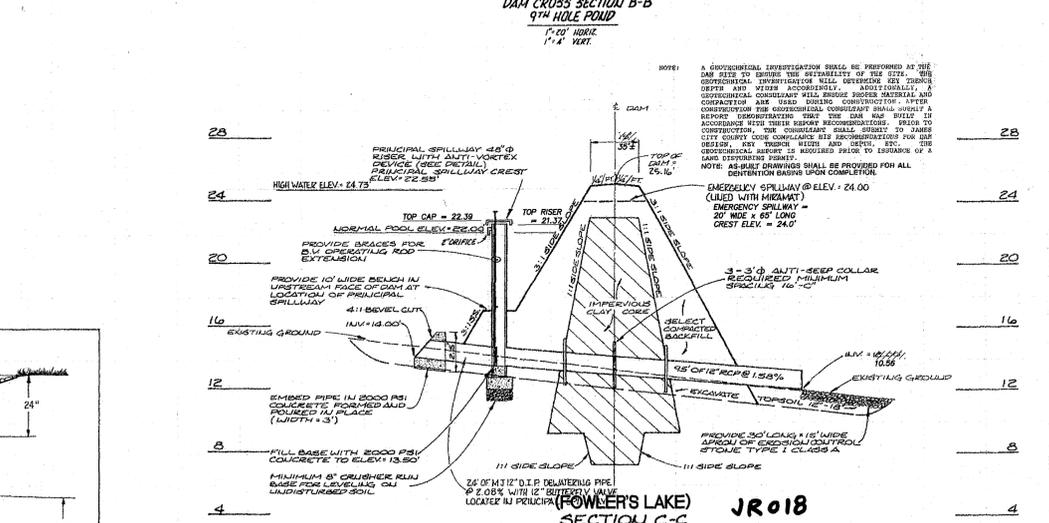
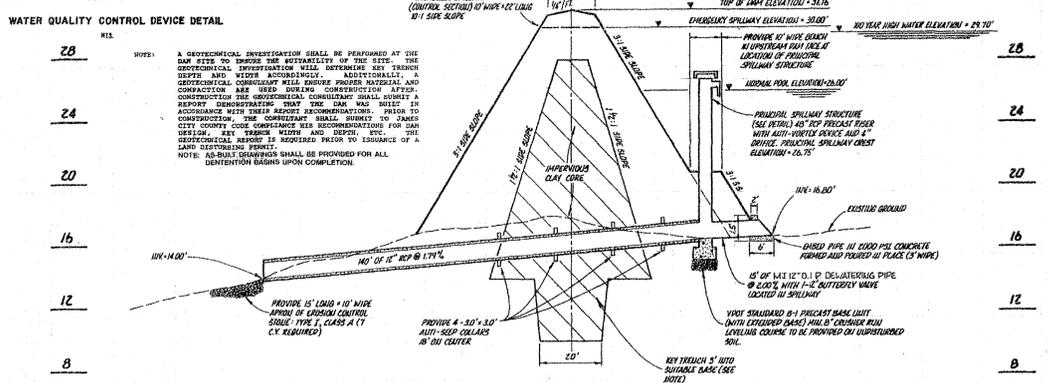
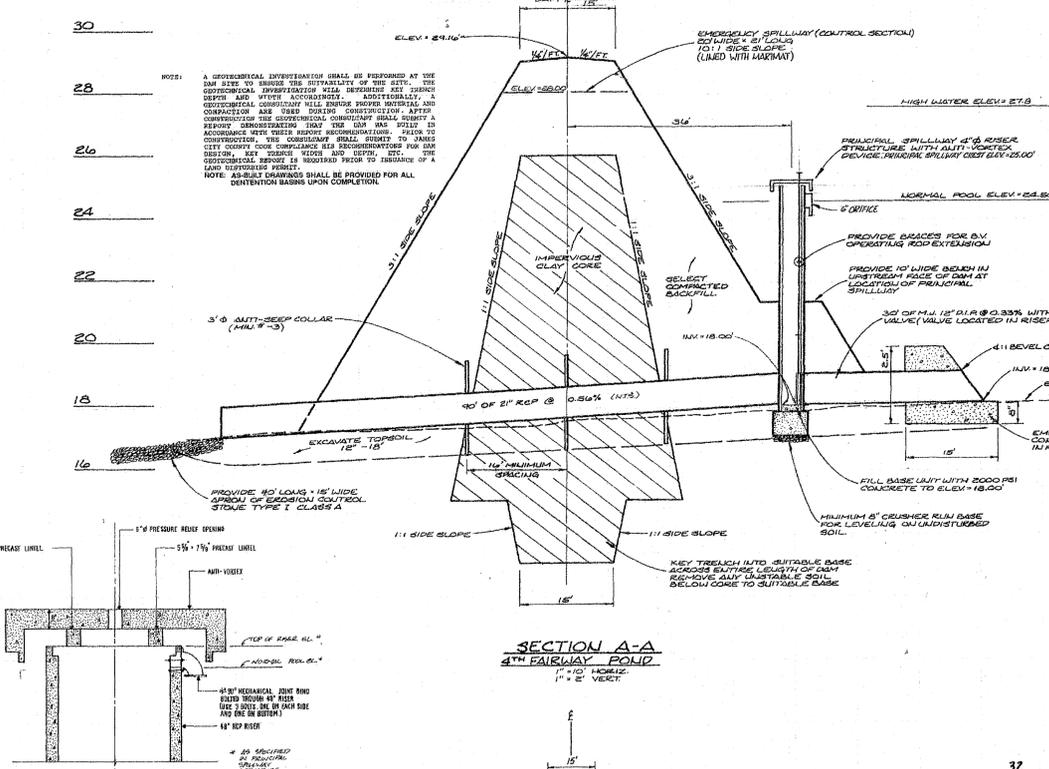
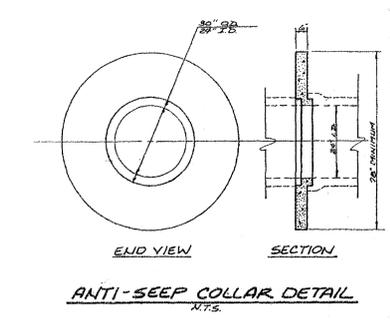
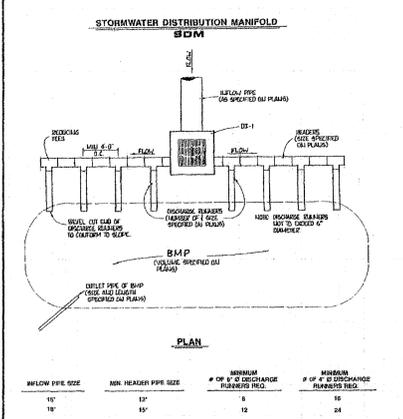
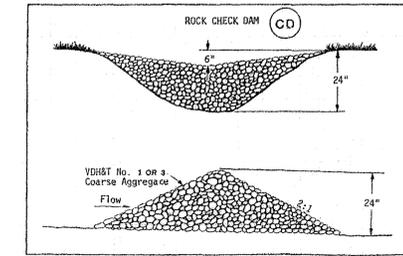
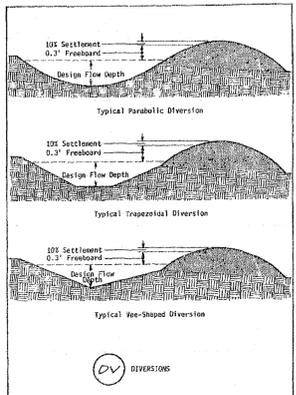
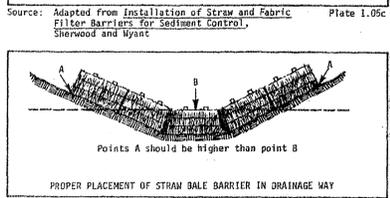
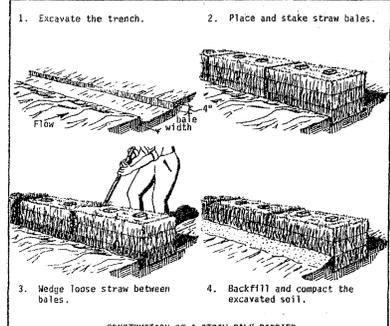
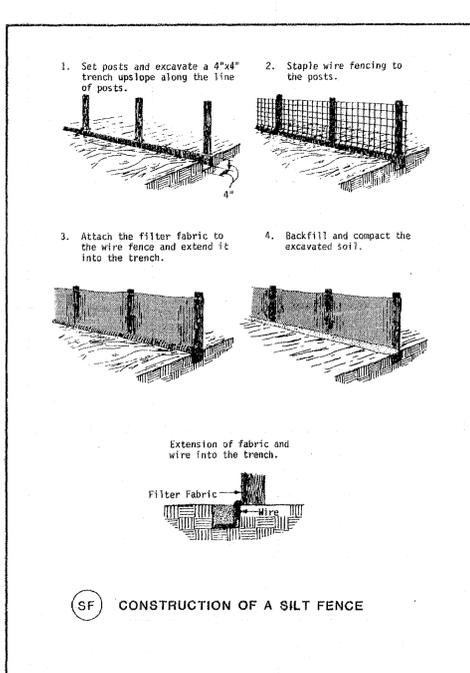
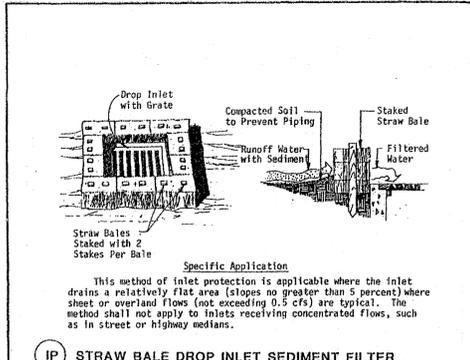
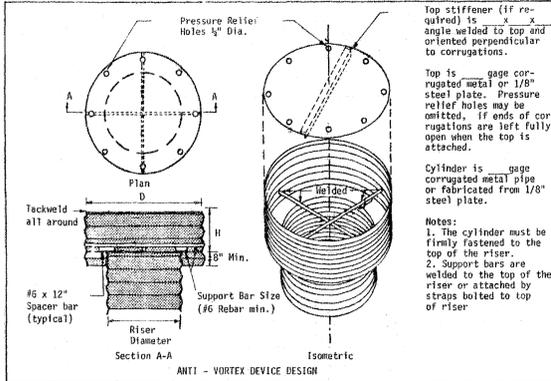
GOVERNORS LAND

RECORD DRAWING - 10/16/01

EROSION AND SEDIMENT CONTROL NOTES

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

- All erosion and sediment control measures shall be installed and maintained in accordance with the "Virginia Erosion and Sediment Control Handbook". The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.
- All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within state right-of-way.
- Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before uplope land disturbance takes place. Earthen structures such as dikes, ditches, and diversions must be seeded and mulched with 15 days of installation. An on-site pre-construction meeting will be held between the Department of Public Works and the contractor to identify those measures to be initially installed.
- Maintenance of all erosion and sediment control measures shall be accomplished in accordance with the "Virginia Erosion and Sediment Control Handbook". Maintenance will include the repair of measures damaged by any subcontractor including those of the public utility companies. At the pre-construction meeting, the contractor will supply Public Works with the name of the individual who will be responsible for ensuring maintenance of installed measures on a daily basis.
- Surface flows over cut and fill slopes shall be controlled by either redirecting flow from transversing the slopes or by installing mechanical devices to safely lower water discharge without causing erosion. A temporary fill diversion (Std. & Spec. 1.16) shall be installed prior to the end of each working day.
- Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Department of Public Works approval will be required for other deviations from the approved plans.
- The contractor shall strip and pile topsoil at the locations shown on this plan or as directed by the engineer. Strip fence shall be placed at the toe of the stockpile after stripping of topsoil is complete.
- The contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall have precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of same. This includes installation of erosion control stone where required. Any drainage outfalls required for a street must be completed before street grading begins.
- Permanent or temporary soil stabilization must be applied to all denuded areas within 15 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded areas which may not be at final grade but will remain denuded (unmulched) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
- No more than 300' of sanitary sewer, storm sewer, or waterlines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).
- If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 1.75. Seeding will then take place as soon as the season permits.
- The berm Seeding, Final Vegetative Cover or Stabilization, on this site plan shall mean the successful germination and establishment of a stable grass cover. This is properly defined as the specified amounts of seed, lime, and fertilizer in accordance with Specification 1.66, Permanent Seeding. Irrigation shall be required as necessary to ensure establishment of grass cover.
- All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 1.75, Mulching and Manufacturer's instructions.
- Inlet protection in accordance with Specification 1.08 shall be provided for all storm drain inlets as soon as practical following construction of same.
- Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.
- Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to those areas where grades exceed 3%.
- Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.
- Off-site waste or borrow areas shall be approved by James City County prior to the import of any borrow or export of any waste to or from the project site.
- All paved and/or piped outfalls will be constructed before road grading and utility installation begins.
- AS-BUILT DRAWINGS SHALL BE PROVIDED FOR ALL DETENTION BASINS UPON COMPLETION.



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.

Virginia B. [Signature] (SEAL)
 VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

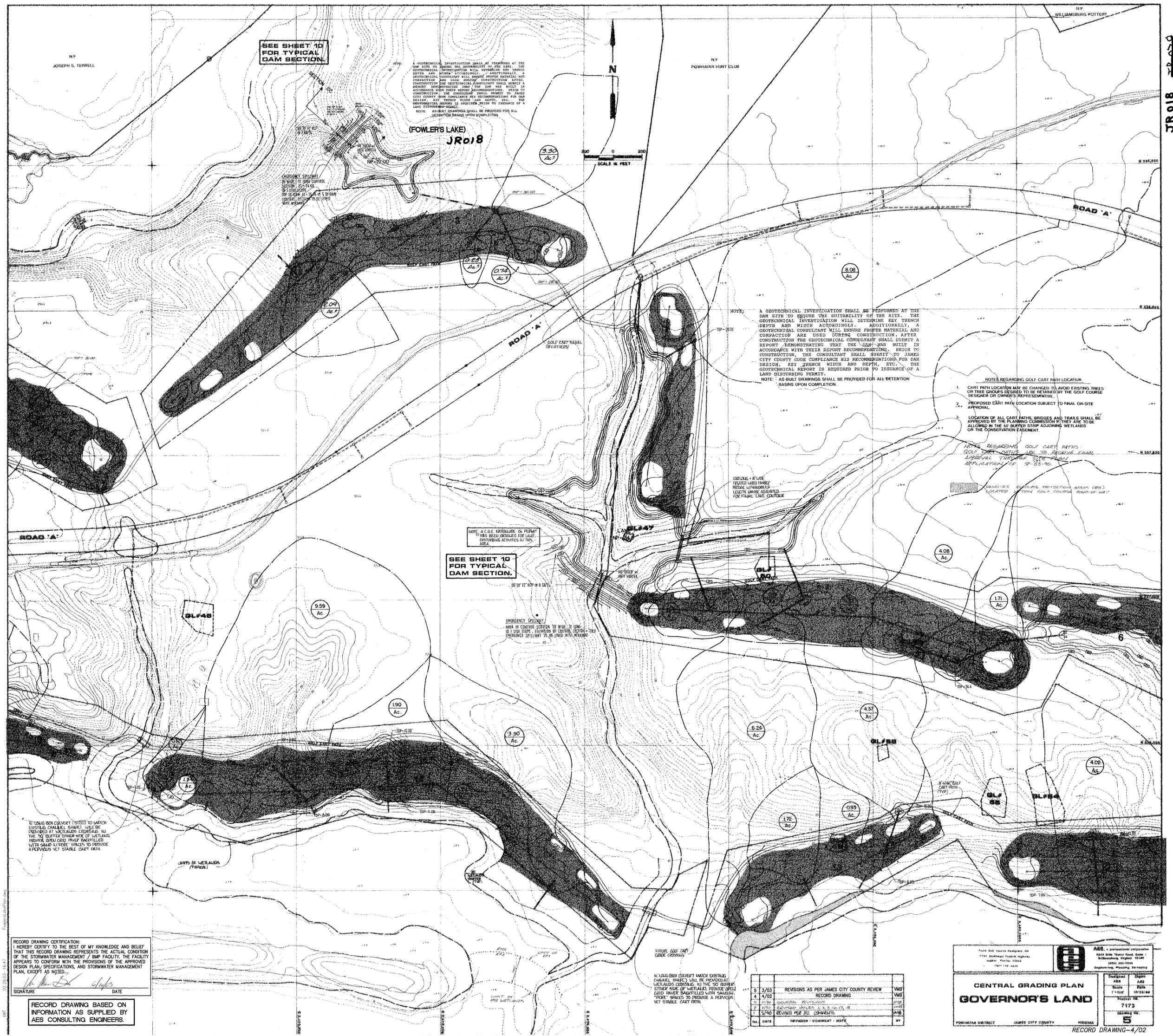
NOTES AND DETAILS

GOVERNOR'S LAND JR 018

DESIGNED: [Signature] DATE: 11/23/00
 DRAWN: [Signature] DATE: 12/22/00
 SCALE: 1"=40'

PROJECT NO: 7173
 DRAWING NO: 10

AWT 02-28-03-16-51 Foster@acbar.com



SEE SHEET 10 FOR TYPICAL DAM SECTION.

A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO DETERMINE THE SUITABILITY OF THE SITE. THE GEOTECHNICAL INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. ADDITIONALLY, A GEOTECHNICAL CONSULTANT WILL DETERMINE PROPER MATERIAL AND COMPACTION ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A REPORT DEMONSTRATING THAT THE DAM WAS BUILT IN ACCORDANCE WITH THEIR REPORT RECOMMENDATIONS. PRIOR TO CONSTRUCTION, THE CONSULTANT SHALL SUBMIT TO JAMES CITY COUNTY CODE COMPLIANCE HIS RECOMMENDATIONS FOR DAM DESIGN, KEY TRENCH WIDTH AND DEPTH, ETC. THE GEOTECHNICAL REPORT IS REQUIRED PRIOR TO ISSUANCE OF A LAND DISTURBING PERMIT.
NOTE: AS-BUILT DRAWINGS SHALL BE PROVIDED FOR ALL DETENTION BASINS UPON COMPLETION.

(FOWLER'S LAKE)
JR018

EMERGENCY SPILLWAY TO BE LOCATED TO CONTROL SECTION DD WHILE IT LIES TO THE RIGHT OF SECTION DD. ELEVATION OF CONTROL SECTION DD TO BE LOCATED WITH MOVEMENT.

SEE SHEET 10 FOR TYPICAL DAM SECTION.

EMERGENCY SPILLWAY TO BE LOCATED TO CONTROL SECTION DD WHILE IT LIES TO THE RIGHT OF SECTION DD. ELEVATION OF CONTROL SECTION DD TO BE LOCATED WITH MOVEMENT.

NOTE: A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO DETERMINE THE SUITABILITY OF THE SITE. THE GEOTECHNICAL INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. ADDITIONALLY, A GEOTECHNICAL CONSULTANT WILL DETERMINE PROPER MATERIAL AND COMPACTION ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A REPORT DEMONSTRATING THAT THE DAM WAS BUILT IN ACCORDANCE WITH THEIR REPORT RECOMMENDATIONS. PRIOR TO CONSTRUCTION, THE CONSULTANT SHALL SUBMIT TO JAMES CITY COUNTY CODE COMPLIANCE HIS RECOMMENDATIONS FOR DAM DESIGN, KEY TRENCH WIDTH AND DEPTH, ETC. THE GEOTECHNICAL REPORT IS REQUIRED PRIOR TO ISSUANCE OF A LAND DISTURBING PERMIT.
NOTE: AS-BUILT DRAWINGS SHALL BE PROVIDED FOR ALL DETENTION BASINS UPON COMPLETION.

- NOTES REGARDING GOLF CART PATH LOCATION
- GOLF CART PATH LOCATION MAY BE CHANGED TO AVOID EXISTING TREES OR TREE GROUPS DESIRED TO BE RETAINED BY THE GOLF COURSE DESIGNER OR OWNER'S REPRESENTATIVE.
 - PROPOSED GOLF CART PATH LOCATION SUBJECT TO FINAL ON-SITE APPROVAL.
 - LOCATION OF ALL CART PATHS, BRIDGES AND TRAILS SHALL BE APPROVED BY THE PLANNING COMMISSION IF THEY ARE TO BE ALLOWED IN THE 50' BUFFER STRIP ADJOINING WETLANDS OR THE CONSERVATION EASEMENT.

NOTE REGARDING GOLF CART PATHS: GOLF CART PATHS ARE TO RECEIVE EQUAL APPROVAL THROUGH SITE PLAN APPLICATIONS FOR '95-99.

REASONS FOR PROTECTING AREAS (RPA) LOCATED WITHIN GOLF COURSE BUFFER STRIP.

NOTE: A.C.D.E. INFORMATION TO PREVENT HAS BEEN OBTAINED FOR LAND DISTURBING ACTIVITIES IN THIS AREA.

100' LONG x 8' WIDE TREATED WOOD TIMBER FENCE WITH 18" HIGH WOOD PICKETS. LENGTH MAY BE ADJUSTED FOR FINAL TAKE OUTLINE.

16' CONCRETE BOX CHANNELS TO MATCH EXISTING CHANNEL. CHANNELS WILL BE PROVIDED AT WETLANDS BOUNDARIES IN THE 50' BUFFER STRIP. CHANNELS WILL BE PROVIDED WITH SAND FILLED SPACES TO PROVIDE A PERVIOUS YET STABLE CART PATH.

LIMIT OF WETLANDS (TYPICAL)

RECORD DRAWING CERTIFICATION:
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 NOTED.
SIGNATURE: *[Signature]* DATE: 4/14/02

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

16' CONCRETE BOX CHANNELS TO MATCH EXISTING CHANNEL. CHANNELS WILL BE PROVIDED AT WETLANDS BOUNDARIES IN THE 50' BUFFER STRIP. CHANNELS WILL BE PROVIDED WITH SAND FILLED SPACES TO PROVIDE A PERVIOUS YET STABLE CART PATH.

NO.	DATE	REVISION / COMMENT / NOTE	BY
5	3/03	REVISIONS AS PER JAMES CITY COUNTY REVIEW	WMB
4	4/02	RECORD DRAWING	WMB
3	11/00	DESIGN REVISIONS	WMB
2	1/00	DESIGN REVISIONS 1, 2, 3, 4, 5, 6, 7, 8	WMB
1	5/00	DESIGN PER 50% COMMENTS	WMB

Plan 001, County of Chesterfield, VA
1700 Southpark Parkway, Suite 100
Richmond, Virginia 23234
703.261.0000
FAX: 703.261.0001

AES - PROFESSIONAL CORPORATION
1700 Southpark Parkway, Suite 100
Richmond, Virginia 23234
703.261.0000
FAX: 703.261.0001

CENTRAL GRADING PLAN
GOVERNOR'S LAND

7173
5

RECORD DRAWING-4/02

TRANSMITTAL



DATE: May 28, 2002
TO: ENVIRONMENTAL
FROM: Paul Holt, Planner
SUBJECT: SP-63-02. Fowler's Lake Dam Modification

ITEMS ATTACHED: Revised site plan, response letter

INSTRUCTIONS: Please review and comment

RETURN BY: June 10, 2002

AGENCY COMMENTS:

Approved DEC 6/6/02

MAY 31 2002
DVE Jmell

Is this development served by Newport News Water Works? _____ (JCSA please check if yes)

If checked, PLANNER, please fax copy of preliminary approval letter with Fire Department comments, and the JCSA completed water data sheet to Newport News Water Works as soon as all three are available.

(757) 247-2334 ATTN: CHIEF ENGINEER

TRANSMITTAL



DATE: June 13, 2002

TO: Records Management
Environmental

FROM: Matthew Arcieri, Development Management Assistant

SUBJECT: SP-063-02, Fowler's Lake Dam Modification Exception

TAX MAP: (43-2)(1-4)

ACTION: For your files.

Reservoir Report

Reservoir No. 1 - Ex. Pond w/New Outfall

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	21.00	00	0	0
1.00	22.00	39,575	19,788	19,788
3.00	24.00	60,531	100,106	119,894
4.00	25.00	75,484	68,008	187,901
5.00	26.00	94,941	85,213	273,114

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0 ✓	0.0	0.0	0.0
Span in	= 12.0 ✓	0.0	0.0	0.0
No. Barrels	= 1 ✓	0	0	0
Invert El. ft	= 13.50 ✓	0.00	0.00	0.00
Length ft	= 95.0	0.0	0.0	0.0
Slope %	= 1.45	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.60 ✓	5.00 ✓	0.00	0.00
Crest El. ft	= 21.37 ✓	24.10	0.00	0.00
Weir Coeff.	= 3.33 ✓	2.60	0.00	0.00
Weir Type	= Riser	Broad	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

FREE OUTFALL
OK

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	21.00	0.00	—	—	—	0.00	0.00	—	—	—	0.00
1.00	19,788	22.00	8.88	—	—	—	8.88	0.00	—	—	—	8.88
3.00	119,894	24.00	9.86	—	—	—	9.47	0.00	—	—	—	9.47
4.00	187,901	25.00	10.30	—	—	—	9.43	11.10	—	—	—	20.53
5.00	273,114	26.00	10.73	—	—	—	10.35	34.05	—	—	—	44.40

Note: All outflows have been analyzed under inlet and outlet control.

TRUCK 4" - max V
14 FPS

MODIFICATIONS TO
EM. SPILLWAY UNDER
SP-63-02; JR 018
2ND SUBMISSION
June 2002.

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description	
1	SCS Runoff	34.59	2	768	300,506	—	—	—	Post-Development SCS Storm	
3	Reservoir	12.06	2	840	193,507	1	25.05	172,447	Routed w/o outfall	
5	Reservoir	9.63	2	846	300,505	1	24.04 <i>p.w.</i>	122,545	Mod. Pond Routed	
<i>100-YEAR NEW RUN</i>										
Proj. file: BMP modification.gpw					Return Period: 100 yr			Run date: 05-21-2002		

Memorandum

SP-63-02
FOWLERS LAKE
DAM MODIFICATIONS
(JR 018)

DATE: May 3, 2002
TO: All Plan Reviewers and Review Agencies
FROM: Jason Grimes – Project Engineer
SUBJECT: Fowler's Lake Dam Modification
AES Project No. 9057-8

Approximately 12 years ago, AES designed the wet pond located on the 3rd fairway of the Governor's Land Golf Course. The existing design has the emergency spillway encroaching on the existing Lot 8 of the Fowler's Lake subdivision. It is the wish of the property owner to have the existing spillway relocated. The Governor's Land Foundation has agreed to allow the spillway to be relocated and the existing structure modified accordingly.

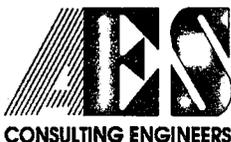
In an effort to move the spillway, we wanted to be sure that the new spillway would not adversely affect any surrounding property owners by increasing the 100-year high water elevation. To do this we created a new routing model using the data from the previous calculations and a new survey of the dam provided elevations of the associated structures. Using the new spillway design, the 100-year storm was routed to ensure that the high water elevation would not increase. Our calculations show the 100-year high water elevation actually decreases from the originally calculated 24.73 to 24.21. For additional insurance, we modeled what would happen in the event that the principle spillway was clogged. The model showed it would be able to successfully route the storm within the design section of the new spillway.

24.04 LATEST DESIGN

We believe we have adequately designed the new spillway to prevent overtopping of the dam and not to impact the surrounding property owners. If further clarification is necessary or if you have any questions, we would be more than happy to assist you.

cc: JCC Planning
JCC Environmental
JCC County Engineer

S:\jobs\9057\08 - Fowler's lake\Wordproc\Document\905708102.jag.doc

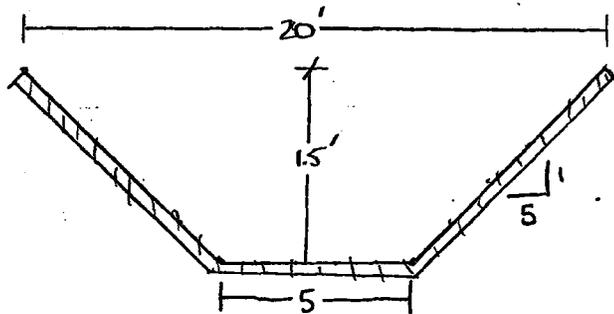


5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com

SPILLWAY DESIGN CALCULATIONS:

Emergency Spillway:

(reinforced with rigid lining) = assumed concrete for calculations



$$Q_0 = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$$= \frac{1.49}{0.013} (13.12)(0.93)^{2/3} (0.01)^{1/2}$$

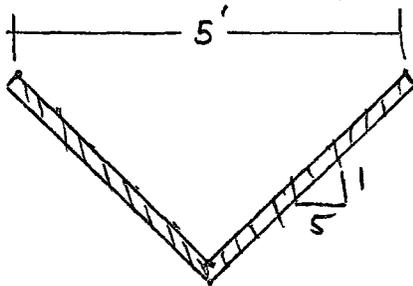
$$Q_0 = 142.63 \text{ cfs}$$

$$Q_{100} < Q_0$$

$$V = 9.4 \text{ fps.}$$

Discharge Channel:

(@ narrowest section)



$$Q_0 = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$$= \frac{1.49}{0.013} (1.25)(0.25)^{2/3} (0.5)^{1/2}$$

$$Q_0 = 40.20 \text{ cfs}$$

$$Q_{100} < Q_0$$

$$V = 20.8 \text{ fps.}$$

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

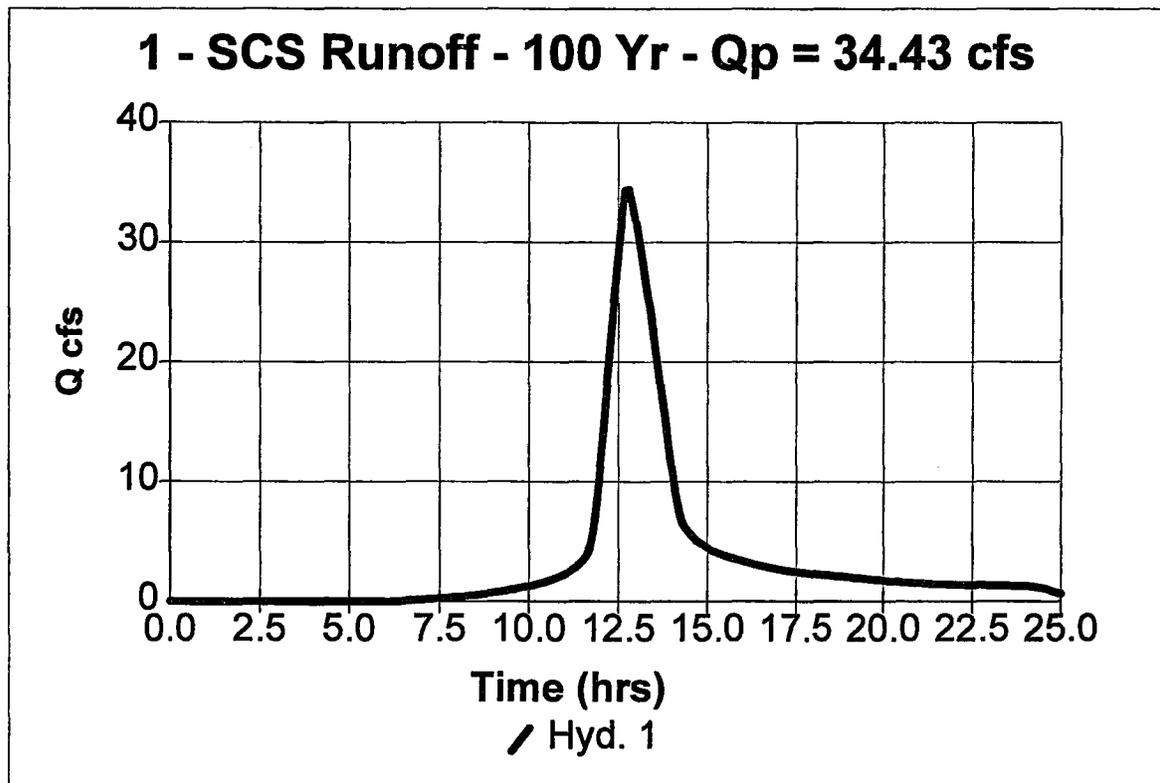
Hyd. No. 1

Post-Development SCS Storm

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 15.03 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.00 in
Storm duration = 24 hrs

Peak discharge = 34.43 cfs
Time interval = 6 min
Curve number = 79
Hydraulic length = 0 ft
Time of conc. (Tc) = 90 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 300,506 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description	
1	SCS Runoff	34.43	6	768	300,506	—	—	—	Post-Development SCS Storm	
3	Reservoir	12.05	6	840	193,596	1	25.05	172,386	Routed w/o outfall	
5	Reservoir	10.99	6	840	300,505	1	24.19 NEW D.H.W.	132,944	Mod. Pond Routed	
Proj. file: BMP modification.gpw							Return Period: 100 yr		Run date: 05-03-2002	

Reservoir Report

Reservoir No. 1 - Ex. Pond w/New Outfall

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	21.00	00	0	0
1.00	22.00	39,575	19,788	19,788
3.00	24.00	60,531	100,106	119,894
4.00	25.00	75,484	68,008	187,901
5.00	26.00	94,941	85,213	273,114

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0 ✓	0.0	0.0	0.0
Span in	= 12.0 ✓	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 13.50 ✓	0.00	0.00	0.00
Length ft	= 95.0	0.0	0.0	0.0
Slope %	= 1.45	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.60 ✓	5.00	0.00	0.00
Crest El. ft	= 21.87 ✓	24.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= Riser	Broad	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft **FREE OUTFALL**

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	21.00	0.00	—	—	—	0.00	0.00	—	—	—	0.00
1.00	19,788	22.00	8.39	—	—	—	1.97	0.00	—	—	—	1.97
3.00	119,894	24.00	9.86	—	—	—	9.68	0.00	—	—	—	9.68
4.00	187,901	25.00	10.30	—	—	—	10.27	13.00	—	—	—	23.27
5.00	273,114	26.00	10.73	—	—	—	10.67	36.77	—	—	—	47.44

AB PLAN
CREST RISER
21.37
RECORD DRAWING 10/16/02

Reservoir Report

Reservoir No. 2 - Pond w/o outfall

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known values

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	22.00	00	0	0
2.00	24.00	00	0	100,106
3.00	25.00	00	0	168,137
4.00	26.00	00	0	253,350

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	5.00	0.00	0.00
Crest El. ft	= 0.00	24.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= ---	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	22.00	---	---	---	---	---	0.00	---	---	---	0.00
2.00	100,106	24.00	---	---	---	---	---	0.00	---	---	---	0.00
3.00	168,137	25.00	---	---	---	---	---	13.00	---	---	---	13.00
4.00	253,350	26.00	---	---	---	---	---	36.77	---	---	---	36.77

" CLOGGED "
ROUTING
NO PRIMARY
FLOW CONTROL

LAND AT 4028 NO. 3

ORIGINAL
DESIGN
CALCS
(sheet 1 of 6)

S.C.S. - PEAK DISCHARGE

- 1) PKG - DEVELOPMENT P.A. = 10.9 ac = 0.017 mi²
- 2) CURVE NUMBER

SOIL NO.	SOIL NAME	SOIL GROUP	CN	AREA	(CN)(AREA)
11C	CLAYTON-UCHSB	C	70	7.50 ac	525
15B	EMPERIA COMPLEX	C	70	1.00 ac	70
27	PEAWICK	D	77	1.00 ac	77
23	NOBLET	D	77	1.00 ac	107.6
				10.9 ac	779.8

CN = $\frac{779.8}{10.9} = 71.5$

- 3) RAINFALL (2-YR 24-HR) P = 3.6 in.
- 4) INITIAL ABSTRACTION I_a = 0.778 in
- 5) I_a / P = (0.778 in / 3.6 in) = 0.216
- 6) UNIT PEAK DISCHARGE Q_u

SHOULDER FLOW - MANNINGS ROUGHNESS COEF n = 0.45
 FLOW LENGTH L = 300'
 2-YR 24-HR RAINFALL P₂ = 3.6 in.
 LAND SLOPE S = .0083 FT/FT

$$T_L = \frac{.007 (nL)^{0.8}}{P^{0.5} S^{0.4}} = \frac{(.007) I (.715) (300) I^{.8}}{(3.6)^{0.5} (.0083)^{.4}} = 1.27 \text{ HR}$$

SHALLOW CONCENTRATED FLOW - UNPAVED
 FLOW LENGTH L = 400'
 SLOPE S = .0388 FT/FT
 AVERAGE VELOCITY V = 3.15 FT/SEC

$$T_L = \frac{L}{3600 V} = \frac{400}{(3600)(3.15)} = 0.0353 \text{ HR}$$

CHANNEL FLOW CROSS SECTION AREA = 55 FT²
 WETTED PERIMETER P_w = 110 FT
 HYDRAULIC RADIUS r = $\frac{A}{P_w} = \frac{55}{110} = 0.50$
 CHANNEL SLOPE S = .0150 FT/FT
 MANNINGS ROUGHNESS COEF n = 0.11

$$V = \frac{1.49 r^{2/3} S^{1/2}}{n} = \frac{1.49 (0.50)^{2/3} (0.0150)^{1/2}}{0.11} = 1.04 \text{ FT/SEC}$$

FLOW LENGTH L = 200'

$$T_L = \frac{L}{(3600) V} = \frac{200}{(3600)(1.04)} = 0.0539 \text{ HR}$$

T = 1.27 + .0353 + .0539 = 1.36 HR

LAKO AT HOLE NO. 3 CONT.

6) $g_0 = 270 \text{ csm/in}$

7) $Q = \frac{(P - 0.25)^2}{(P + 0.85)}$ $S = \frac{1000 - 10}{CN} = \frac{1000 - 10}{72} = 3.89$

$Q = \frac{[(3.6) - (2)(3.89)]^2}{[3.6 + (2)(3.89)]} = 1.19 \text{ in.}$

8) POND AND SWAMP ADJUSTMENT FACTOR, $F_p = 1.00$

9) PEAK DISCHARGE, $Q_p = g_0 A_m Q F_p$

$Q_p = (270 \text{ csm/in})(0.017 \text{ mi}^2)(1.19 \text{ in})(1.00) = \underline{5.46 \text{ cfs (2 YR RES)}}$

1) POST-DEVELOPMENT D.A. = 15.03 AC = 0.0235 mi²

2) CURVE NUMBER

SOIL GROUP	CN	AREA	(CN)(AREA)
D, OPEN SPACE	80	6.08 AC	486.4
C, WOODD	70	3.07 AC	214.9
C, RES, 1/2 → 1 AC	79	3.12 AC	246.5
D, RES, 1/2 → 1 AC	84	1.84 AC	154.6
D, PAVEMENT	93	0.92 AC	85.6
		<u>15.03 AC</u>	<u>1188.0</u>
	$CN = \frac{1188.0}{15.03} = 79.04$		

3) RAINFALL (100-YR 24-HR) $P = 8.1 \text{ in.}$ (5.7 in, 10 yr)

4) INITIAL ABSTRACTION, $I_a = 0.532 \text{ in.}$ ($I_a = 0.532 \text{ in, } \frac{10}{9}$)

5) $I_a / P = (0.532 \text{ in} / 8.1 \text{ in}) = 0.07$ ($I_a / P = 0.09, 10 \text{ yr}$)

6) $T_c = \text{SHOULDER} + 2 \text{ MIN.} = 1.30 \text{ HR}$
 $g_u = 350 \text{ csm/in}$

($g_u = 340 \text{ csm/in, } 10 \text{ yr}$)

7) $S = \frac{1000 - 10}{79} = 2.66$ $Q = \frac{(P - 0.25)^2}{(P + 0.85)} = 5.60$

($S = 2.66$ $Q = \frac{(5.7 - 0.2(2.66))^2}{5.7 + 0.8(2.66)} = \frac{26.7}{7.83} = 3.41$)
 10 year.

8) POND AND SWAMP ADJUSTMENT FACTOR, $F_p = 0.72$

9) PEAK DISCHARGE, $Q_p = (350 \text{ csm/in})(0.0235 \text{ mi}^2)(5.60)(0.72) = \underline{33.14 \text{ cfs (100 YR RES)}}$

(11.61 cfs 10 yr)

LAKES AT HOLY NO. 3 CONT.

- 1) $Q_0 = 5.46 \text{ cfs (2 yr peak)}$
- 2) $Q_1 = 33.14 \text{ cfs (100 yr peak (19.31 cfs, 10 yr))}$
- 3) $\frac{Q_0}{Q_1} = \frac{5.46 \text{ cfs}}{33.14 \text{ cfs}} = 0.16$ $\frac{V_0}{V_1} = 0.49$ (0.39 10 yr)
- 4) $V_r = 53.33 \text{ cfs} = (53.33)(5.60)(0.0235) = 7.02 \text{ ac ft} = 305,714 \text{ cu. ft. (runoff volume)}$
(4.27 ac ft 186,158 cu ft, 10 year)
- 5) $V_s = V_r \left(\frac{V_s}{V_r} \right) = (7.02)(0.49) = 3.44 \text{ ac ft} = 149,838 \text{ cu. ft. (storage volume)}$
(2.09 ac ft 91,140 cu ft, 10 year)

NORMAL POOL OF LAKE TO BE SET AT 22.00'
 SURFACE AREA AT ELEVATION 22.00' = 0.91 AC. = 39,575 SQ. FT.

ELEVATION	SURFACE AREA (SQ. FT)	STORAGE (CU. FT)	TOTAL STORAGE (CU. FT)
22.00'	39,575	0	NORMAL POOL 0
24.00'	60,531	100,106	100,106
25.00'	75,487	68,031	168,137
26.00'	94,941	85,213	253,350

ELEVATION	FOR 100 YR PEAK IN 24 HR		
24.00	100,106	49,752	$y = 0.73$
X	149,838	68,031	1
25.00	168,137		

X = 24.73' HIGH WATER

THE PRINCIPAL SPILLWAY WILL CONSIST OF A 45" RISER STRUCTURE WITH ANTI-VORTEX COLLAR, OUTLET BARREL WILL BE 75' OF 12" RCP @ 1.58% INV. IN: 13.50' INV. OUT: 12.00'

EMERGENCY SPILLWAY WILL BE PROVIDED AT 24.73

LAKE AT HOLE NO 3 CONT.

REQUIRED SEDIMENT STORAGE

$$(67 \text{ cu. yd./acre})(15.03 \text{ ac.}) = 1007 \text{ cu. yd. REQUIRED} = 27,189 \text{ cu. ft.}$$

OCCURS AT ELEV. 17.50' WITH EXCAVATION

WATER QUALITY

$$\frac{(67 \text{ cu. yd.})(27 \text{ cu. ft./cu. yd.})}{43,560 \text{ sq. ft.}} = 0.04 \text{ FT} = \frac{1}{2}''$$

OBTAIN FIRST 1/2" OF RUNOFF AND RELEASE IN 48 HRS.

$$(15.03 \text{ ac.})(43,560 \text{ sq. ft./acre})\left(\frac{0.5 \text{ in}}{12 \text{ in./ft.}}\right) = 27,279.45 \text{ cu. ft. REQUIRED TO STORE } \frac{1}{2}'' \text{ OF RUNOFF.}$$

AT ELEV. 22.00', SURFACE AREA: 39,575 SQ. FT.

$$y \frac{22.00'}{24.00'} = \frac{27,279.45}{100,106} \quad y = 0.55'$$

RAISE ELEV. = 22.55'

TO RELEASE IN 48 HRS.

$$\frac{(27,279.45 \text{ cu. ft.})}{(48 \text{ hrs})(60 \text{ min./hr.})(60 \text{ sec./min.})} = 0.16 \text{ CFS}$$

SIZE ORIFICE

$$q = 0.6 a \sqrt{2gh}$$

$$0.16 = 0.6 a \sqrt{2(32.2)(0.55)}$$

$$a = 0.0448 \quad d = \sqrt{\frac{4}{\pi}(0.0448)} \quad d = 0.2389 = 2.37 \text{ INCHES.}$$

USE 2" HOLE

$$a = 0.0218$$

$$q = (0.6)(0.0218) \sqrt{2(32.2)(0.55)} = 0.0778 \text{ CFS}$$

$$\frac{27,279.45 \text{ cu. ft.}}{(0.0778 \text{ CFS})(60 \text{ sec./min.})(60 \text{ min./hr.})} = 97.4 \text{ HRS.}$$

FIRST 1/2" OF RUNOFF WILL DRAIN IN 97.4 HRS.

LAKE AT HOLD NO. 3 CONT.ANTI-SHEEP COLLARS

$$L_s = Y(Z+4) \left(1 + \frac{S}{0.25-S}\right)$$

$$Y = \text{DEPTH AT PRINCIPAL SPILLWAY CREST} = 22.55 - 13.50 = 9.05'$$

$$Z = \text{SLOPE OF UPSTREAM FACE OF EMBANKMENT (Z:1)} = 3$$

$$S = \text{SLOPE OF BANK IN FT/FT} = 0.0158$$

$$L_s = (9.05)(3+4) \left(1 + \frac{0.0158}{.25-0.0158}\right) = 67.62'$$

USE 3 COLLARS 3' IN DIAMETER

MINIMUM SPACING = 16'

BUOYANCY CALCULATIONS OF PRINCIPAL SPILLWAY

VOLUME AND WEIGHT OF STRUCTURE

$$\begin{aligned} V_{\text{RISER}} &= \pi R^2 H = \pi (R_{\text{OUTSIDE}}^2 - R_{\text{INSIDE}}^2) H \\ &= \pi (2.42^2 - 2.00^2) (9.05') \\ &= 52.78 \text{ CU. FT.} \end{aligned}$$

$$V_{\text{BASE}} = \pi (3.06)^2 (0.67) = 19.7 \text{ CU. FT.}$$

$$\text{VOLUME (EXCLUDING CONCRETE IN BASE AND ANTI-VORTER DEVICE)} = 72.48 \text{ CU. FT.}$$

$$\begin{aligned} \text{WEIGHT OF STRUCTURE} &= (72.48 \text{ CU. FT.}) (150 \#/\text{CU. FT. OF CONC.}) + 7422 (\text{ANTI-VORTER}) \\ &\quad + 150 (\pi) (2)^2 (0.5) (\text{CONC. IN BASE}) \\ &= 10,872 \text{ lbs} + 7422 \text{ lbs} + 942.48 \text{ lbs.} = 19,236.48 \text{ lbs.} \end{aligned}$$

WEIGHT OF WATER DISPLACED BY AIR

$$\begin{aligned} W_{H_2O} &= (62.4 \#/\text{CU. FT.}) (\pi) (2)^2 (9.05) \\ &= 7076.48 \text{ lbs.} \end{aligned}$$

WEIGHT OF STRUCTURE \gg WEIGHT OF WATER DISPLACED BY AIR

WEIGHT OF EARTH DISPLACED BY AIR

$$W_{SOIL} = (120 \#/\text{CU. FT.}) (\pi) (2)^2 (4.53) = 6831 \text{ lbs.}$$

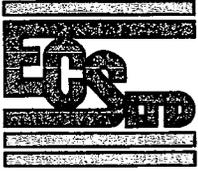
WEIGHT OF STRUCTURE \gg WEIGHT OF SOIL DISPLACED BY AIR

STRUCTURE WILL NOT FLOAT!

LAKE AT HOLD NO. 3 CONT.

THIS LAKE HAS BEEN DESIGNED FOR A 100 YR. POST-DEVELOPMENT STORM WITH LESS THAN THE 2 YR. PRE-DEVELOPMENT BEING COLLECTED. A 12" OUTLET PIPE HAS BEEN USED TO MINIMIZE THE DISTURBANCE IN THE DOWNSREAM CHANNEL DURING THE POST-DEVELOPMENT STORMS. WATER QUALITY HAS BEEN ~~BEING~~ REMOVED BY DETAINING THE FIRST 1/2" OF RUNOFF AND RELEASING IT THRU A 2" ORIFICE IN APPROXIMATELY 97 HRS. THE NORMAL POOL IS 22.00' WITH THE TOP OF THE LIP AT 22.55' TO OBTAIN WATER QUALITY. THE HIGH WATER ELEV. 24.73 AND NO EMERGENCY SPILLWAY IS NEEDED.

~~Fowls~~
FOWLERS
LAKE



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

EXCEPTS FROM REPORT
FOR FOWLER'S LAKE

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 (12018)
- Horne'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.

2119-D North Hamilton Street, Richmond Virginia 23230 • (804) 353-6333 • Fax (804) 353-9478

Offices: Richmond, VA • Washington, D.C. • Norfolk, VA • Williamsburg, VA • Roanoke, VA • Fredericksburg, VA • Danville, VA
Baltimore, MD • Frederick, MD • Research Triangle Park, NC • Wilmington, NC • Charlotte, NC • Greensboro, NC • Greenville, SC • Atlanta, GA

It is our understanding that AES will perform an as-built survey with regard to slope gradient(s), elevation(s), and spillway structures.

SCOPE OF STUDY:

[Subsurface Exploration]:

The subsurface exploration was conducted by performing three (3) soil test borings along the approximate longitudinal centerline of each existing dam. The borings were typically extended to depths of 15 feet at each approximate shoulder and to a depth of 30 feet near the center of the dam, except as noted herein. Whittaker's Lake Dam had a 40-foot deep center boring and #12 Tee Box Dry Detention Pond had a 20-foot deep center boring. The Founder's Hill Detention Pond had borings extended to depths of 24-feet at the center and 16-feet at each approximate shoulder, below existing surface elevations.

The borings were performed with a truck mounted drill rig, which utilized mud-rotary procedures to advance the boreholes. Drilling fluid was used in this process. Soil sampling was continuous throughout the depth of the borings. At completion of the drilling operations, the boreholes were backfilled with the drilling fluid ("Bentonite Slurry").

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

After recovery, representative portions of each sample were removed from the split-barrel sampler and sealed in glass jars. The samples were taken to our laboratory in Richmond, Virginia for visual classification and laboratory testing. Visual classifications were performed on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS). A brief description of the USCS and Reference Notes for Boring Logs are included in Appendix III.

[Laboratory Analysis]:

Representative soil samples collected from the soil test borings were subjected to laboratory testing for the purposes of substantiating the visual classifications and to determine the soil's pertinent engineering properties. Laboratory testing included natural moisture content determination, Atterberg Limits tests, and grain size analysis (percent passing the #200 sieve). The results of the laboratory testing are included in Appendix II of this report.

EXISTING DAM CHARACTERISTICS:

In general, each dam evaluated as part of this study is classified as a Zoned Earthen Dam. A zoned dam is defined by an inner core (typically a relatively impervious clay material) and an outer shell (typically a more granular or sandy material). It is our understanding that topography information will be provided by the project Civil Engineer (AES, Inc.), as part of their "as-built" survey.

The surface description of each dam is based on observations by ECS personnel during the drilling activities (October/November 2000).

- **Fowler's Lake Dam**

It is our estimation that the existing dam at Fowler's Lake is approximately 200 feet long. The front (pond) side of the dam is vegetated with grass. The topography of the crest of the dam is undulating, presumably for aesthetic reasons. The back (downstream) side of the dam was heavily vegetated with thick underbrush and small diameter trees.

- **Horne's Lake Dam**

It is our estimation that the existing dam at Horne's Lake is approximately 700 feet long. The front (pond) side of the dam is vegetated with grass. The topography of the crest of the dam is relatively flat. The back (downstream) side of the dam was heavily vegetated with thick brush and small diameter trees.

- **#12 Tee Box Dry Detention Pond**

It is our estimation that the existing dam at the dry detention pond at the #12 Tee Box is approximately 175 feet long. The front (pond) side of the dam is vegetated with grass and a few small trees. The topography of the crest of the dam is relatively flat with an asphalt golf cart path traversing along the centerline of the dam. The back (downstream) side of the dam was grass covered.

RESULTS OF THE BORINGS AND LABORATORY TESTING:

The following discussions provide a general overview of the composition of each dam and the underlying subsurface conditions.

It should be noted that mud-rotary drilling procedures involve the use of a "bentonite slurry" that temporarily seals the borehole, and therefore, groundwater readings are difficult to obtain during drilling. In this regard, the presence of water below the surface is determined from visual inspection of each soil sample obtained from the split-spoon sampler. Actual soil moisture and/or the water conditions within each soil strata can be obtained from the boring logs. Be advised that the water level referenced at completion of the drilling (lower left corner of the boring logs) may not accurately represent the static water table level. Groundwater commentary (provided below) for each dam is based on the visual inspection of each soil sample. It is common for most subsurface soils to possess moist to wet properties. Soils classified as very wet to saturated typically indicate the presence of the static water table.

It should also be noted that a majority of the fill samples evaluated contained some organic debris. Typically, the organic debris was in the form of small root and wood material (in trace amounts), which is considered typical in most cases when fill for dam embankments is obtained from on-site or nearby borrow sources where shallow excavating and/or scraping operations are performed. The presence of this organic material, in small quantities or trace amounts, is considered acceptable.

• Fowler's 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 8 to 19 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as Clayey SAND (SC), Silty SAND (SM), and Fat CLAY (CH). The sandy soils are loose in density and the clay soils are very soft to very stiff in consistency. 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 (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, Sandy Lean CLAY (CL). This stratum was observed between the approximate depths of 14 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 medium dense to dense Silty and Clayey SANDS (SM, SC and SP) and soft to very stiff Sandy Lean CLAY (CL).

Significant moisture was not observed within the dam fill material. Groundwater, however, was encountered in boring B-3 at a depth of about 24 feet below top of the dam surface. The presence of water at this depth does not present a problem with regard to the stability of the dam.

- **Horne's 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 12 to 16 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as Sandy Lean CLAY (CL), Sandy Fat CLAY with organics (OH) and Fat CLAY (CH). The clayey soils are soft to very stiff in consistency. The transitions from the fill material (clay core) 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 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, Clayey SAND (SC). This stratum was observed between the approximate depths of 16 feet and 20 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of erratic deposits of loose to medium dense Silty and Clayey SANDS (SM and SC) and stiff Fat CLAY (CH).

Significant moisture was not observed within the dam fill material.

- **#12 Tee Box Dry Detention Pond**

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 8 to 12 feet below top of dam surface. An asphalt golf cart path traversed the centerline of the dam consisting of 4 inches of asphalt and 2 inches of stone. The fill layers, which comprise the top shell and the inner core, are classified as Fat CLAY (CH). The clay soils are soft to stiff in consistency. The transitions from the fill material (clay core) into the natural original soils were relatively clean along the shoulders of the dam (borings B-1 and B-3), although some organic material was encountered in the natural soil in B-1. Overall, it appears that proper steps were taken to remove heavy topsoil and/or thick vegetation prior to fill placement. The transition between the fill 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, Sandy Lean CLAY (CL). This stratum was observed between the approximate depths of 10 feet and 14 feet, and appears to represent the original ground surface.

ENGINEERING EVALUATION AND CONCLUSIONS:

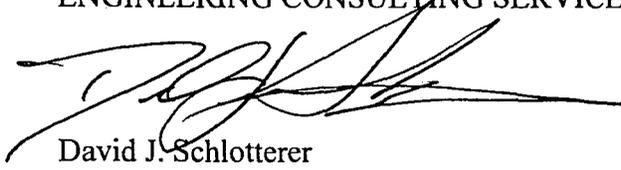
Based on the results of our soil test borings and laboratory testing, it is our opinion that the existing dams *satisfy* the current state dam design criteria, and/or other commonly accepted dam design criteria, with regard to embankment composition (material type and density) and overall stability. 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.

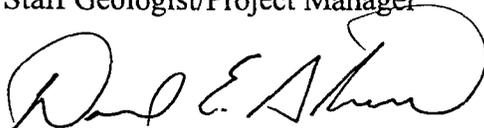
ECS, Ltd. has appreciated the opportunity to be of service to you on this project. Please contact this office should you have any questions or need further assistance.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.



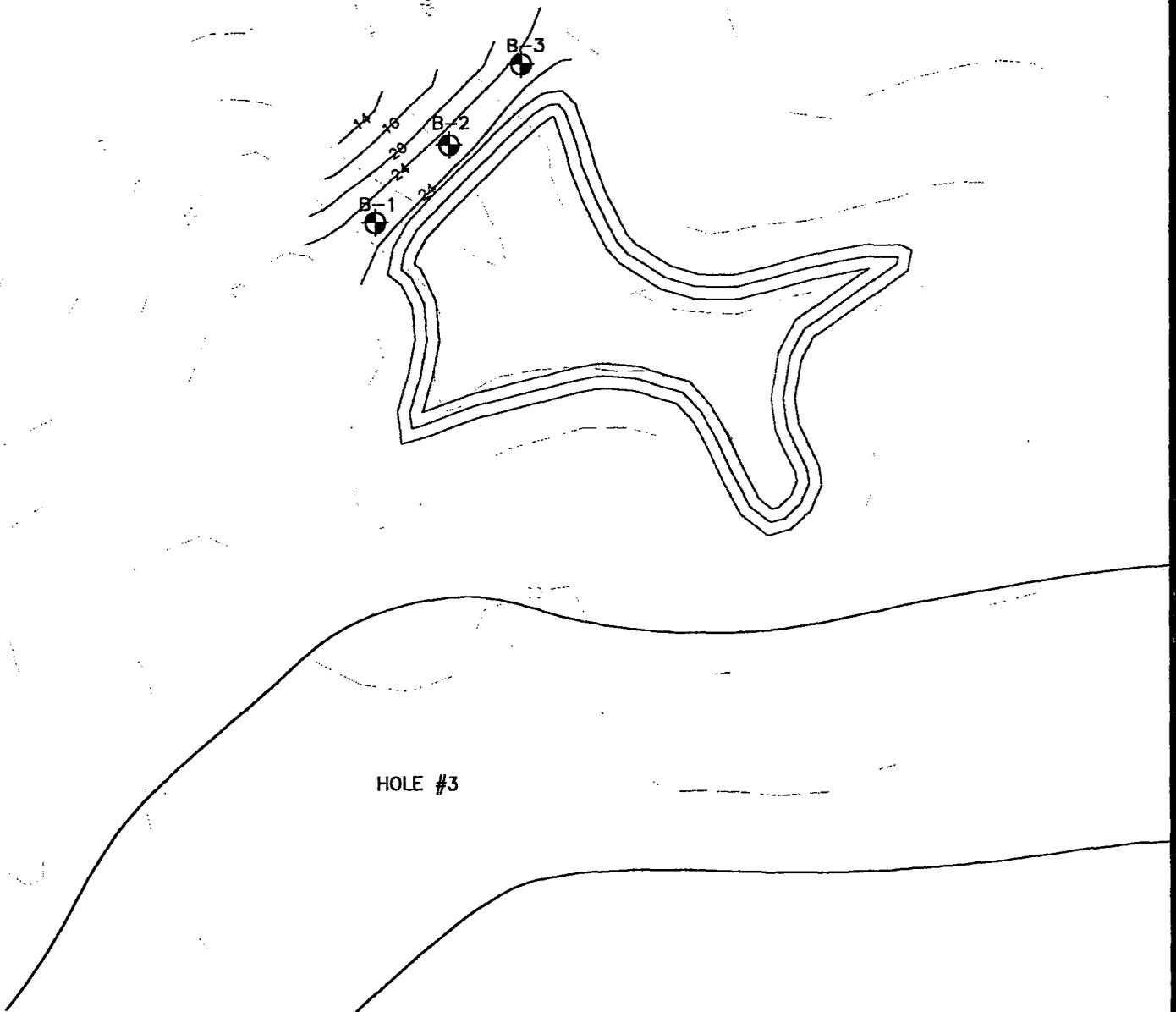
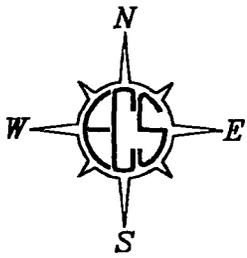
David J. Schlotterer
Staff Geologist/Project Manager



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



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



⊕ - Approximate Boring Location

Scale: 1"=200'

PREPARED FOR:

DOMINION LAND MANAGEMENT

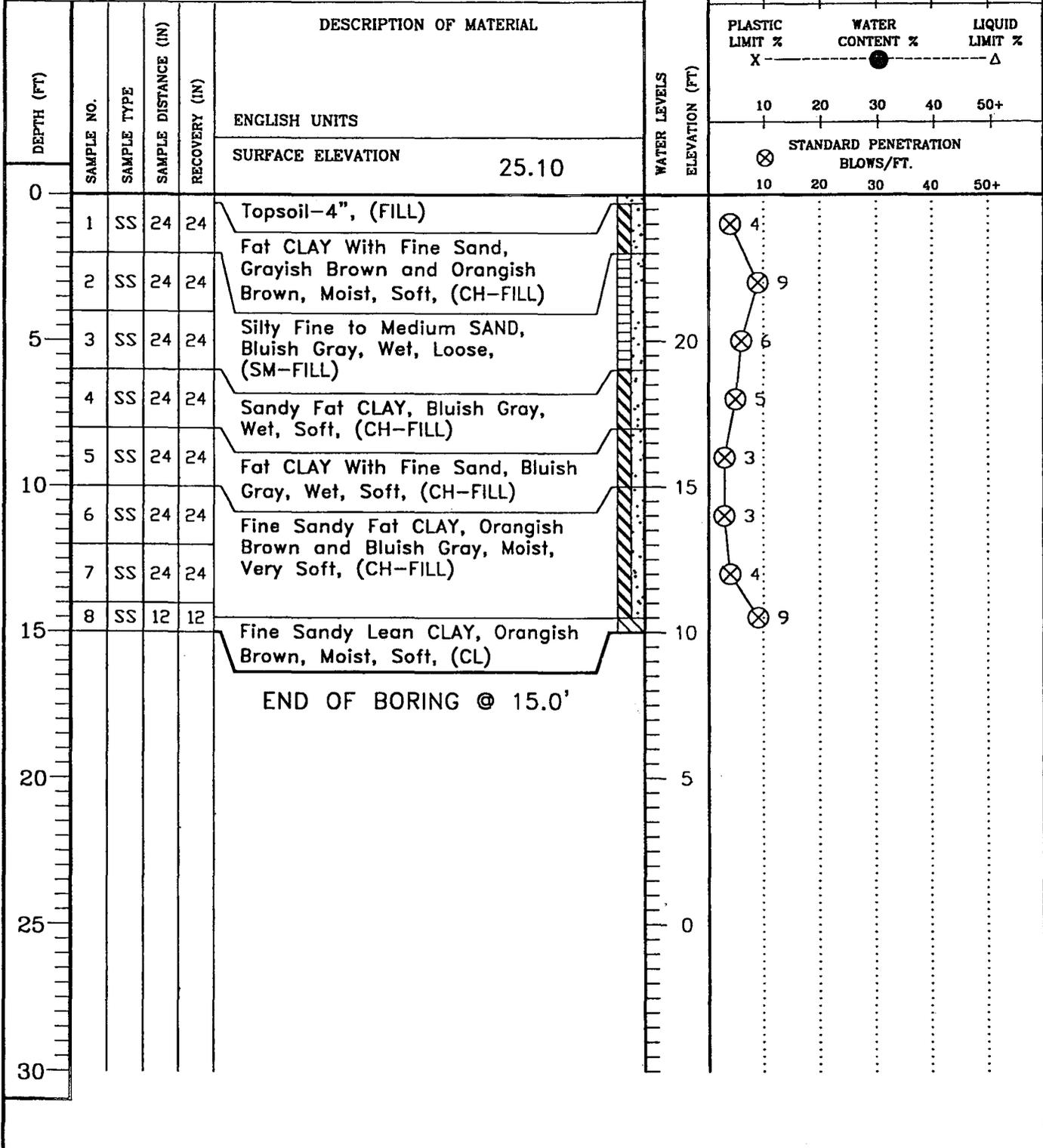


BORING LOCATION DIAGRAM

**GOVERNOR'S LAND
FOWLERS LAKE
JAMES CITY COUNTY, 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 (EMBANKMENT EVAL.)	ARCHITECT-ENGINEER AES, INC.			

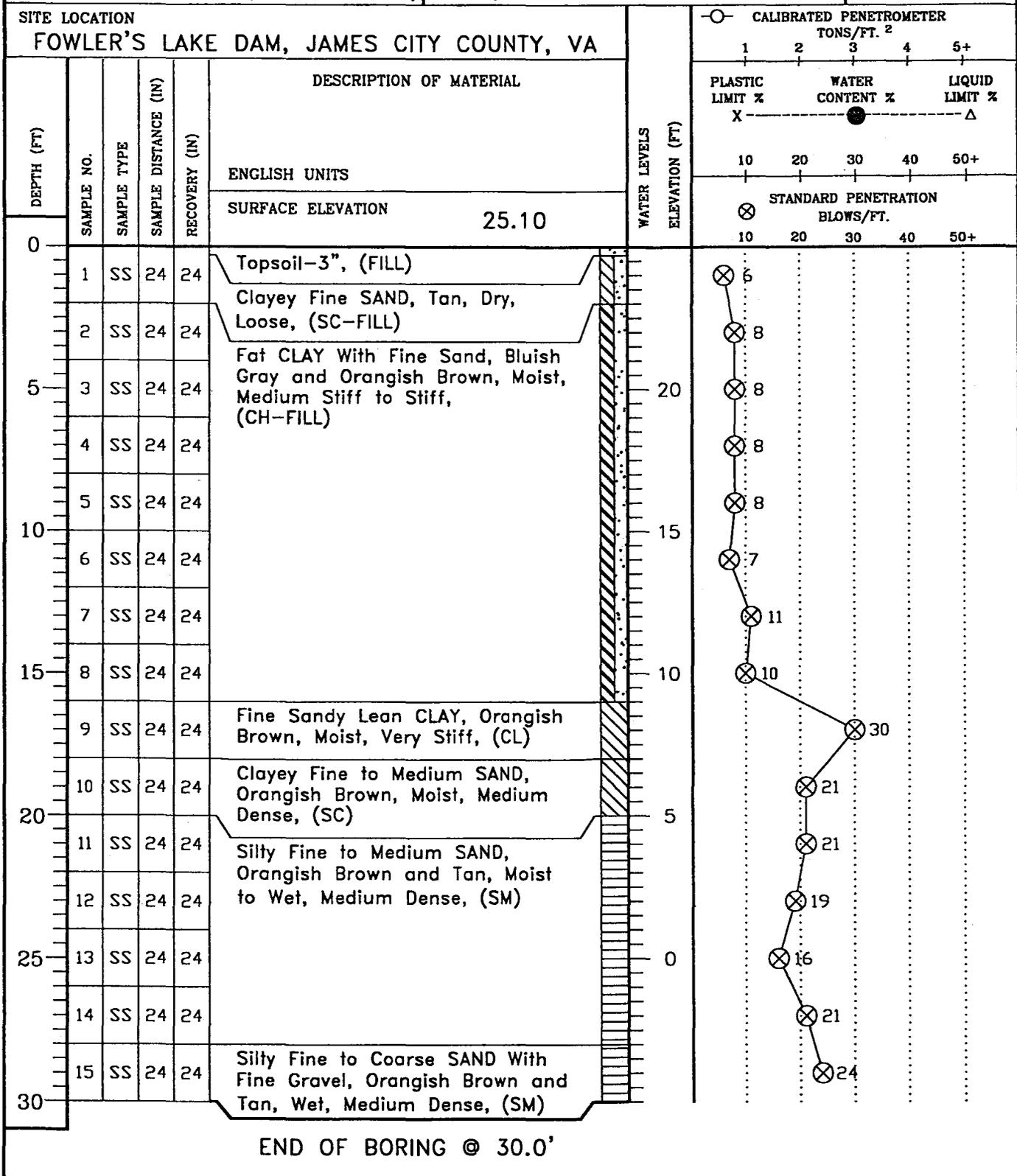
SITE LOCATION
FOWLER'S LAKE DAM, JAMES CITY COUNTY, VA



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	10-23-00	TOPSOIL DEPTH 4"
▽ WL (AB)	▽ WL (AC)	BORING COMPLETED	10-23-00	CAVE IN DEPTH @
▽ WL		RIG FISHBURNE FOREMAN ED		DRILLING METHOD HOLLOW STEM AUGER

CLIENT DOMINION LAND MANAGEMENT CO.	JOB # 6221	BORING # B-2	SHEET 1 OF 1	
PROJECT NAME GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)	ARCHITECT-ENGINEER AES, INC.			

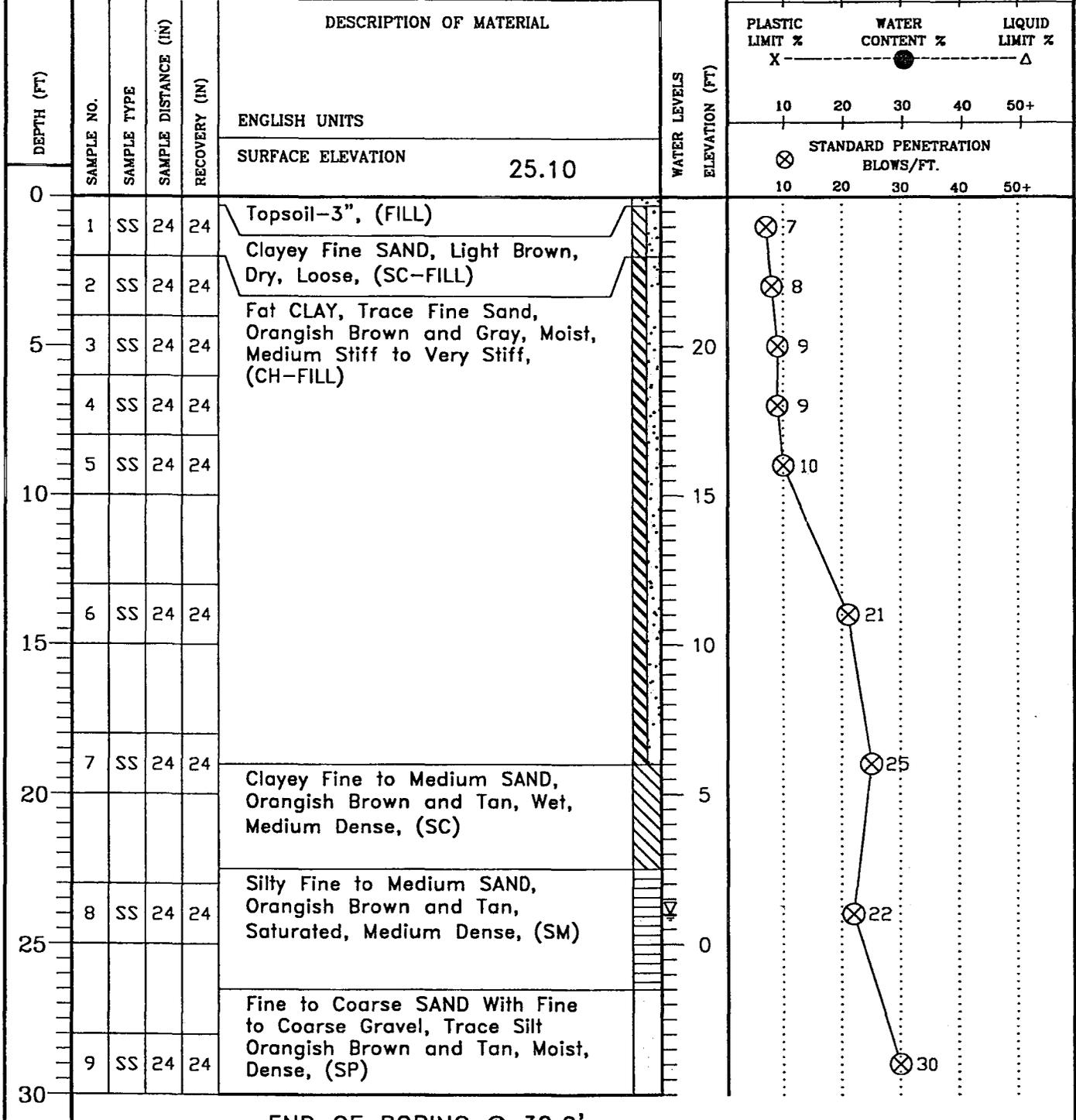


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

▽WL	WS OR (D)	BORING STARTED 10-23-00	TOPSOIL DEPTH 3"
▽WL(AB)	▽WL(AC)	BORING COMPLETED 10-23-00	CAVE IN DEPTH ●
▽WL		RIG FISHBURNE FOREMAN ED	DRILLING METHOD HOLLOW STEM AUGER

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

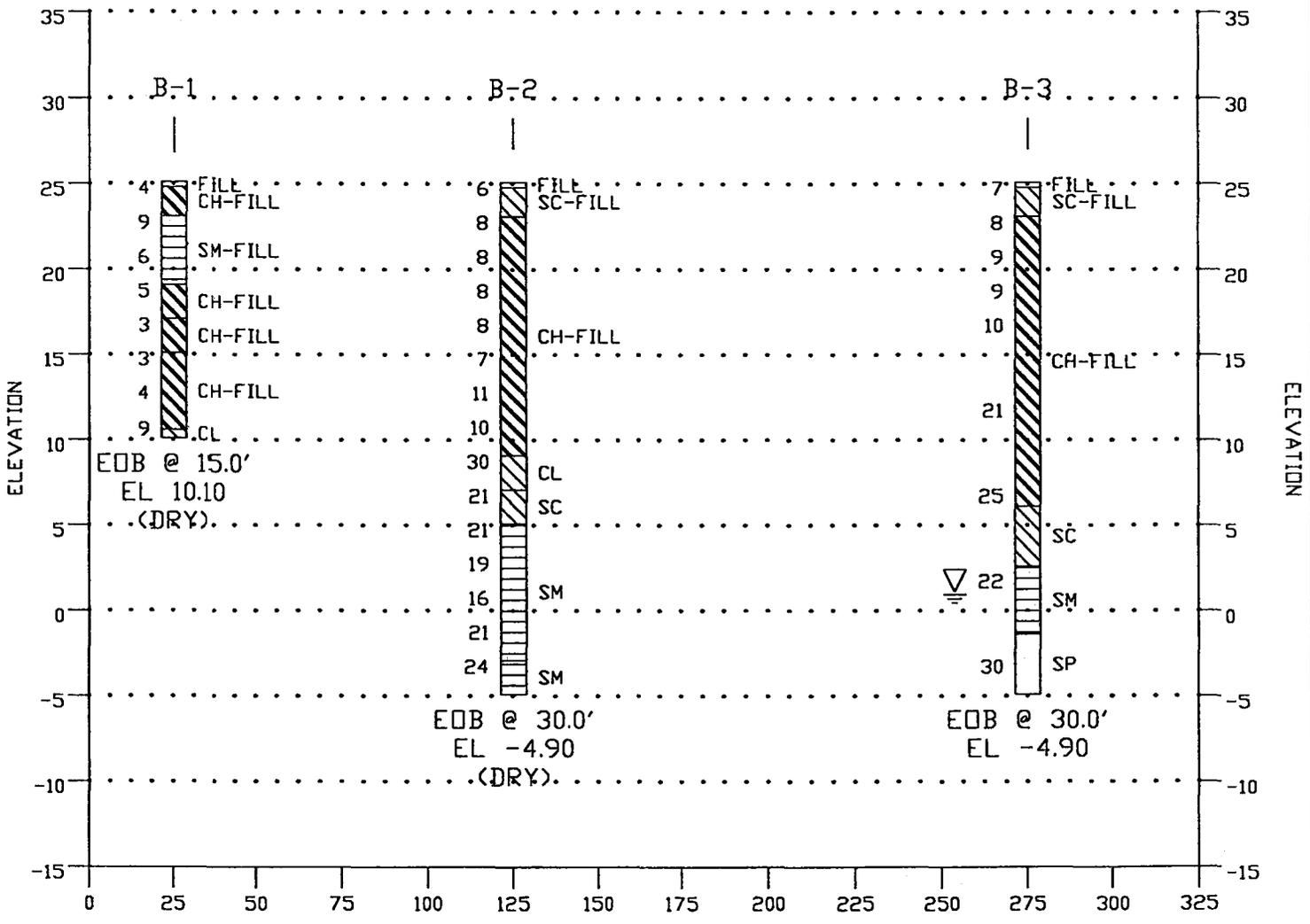
SITE LOCATION
FOWLER'S LAKE DAM, JAMES CITY COUNTY, VA



END OF BORING @ 30.0'

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

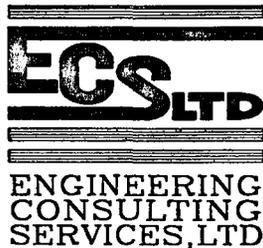
▽WL 24.0'	WS OR (D)	BORING STARTED 10-23-00	TOPSOIL DEPTH 3"
▽WL(AB)	▽WL(AC)	BORING COMPLETED 10-23-00	CAVE IN DEPTH ●
▽WL		RIG FISHBURNE FOREMAN ED	DRILLING METHOD HOLLOW STEM AUGER



SCALE
 VERTICAL SCALE 1"=10'
 HORIZONTAL SCALE 1"=50'

PREPARED FOR:

DOMINION LAND MGMNT. CO.



GENERALIZED CROSS SECTION

FOWLER'S LAKE
 GOVERNOR'S LAND DAMS
 JAMES CITY COUNTY, VIRGINIA

ECS, LTD. PROJECT NO. 6221

28

24

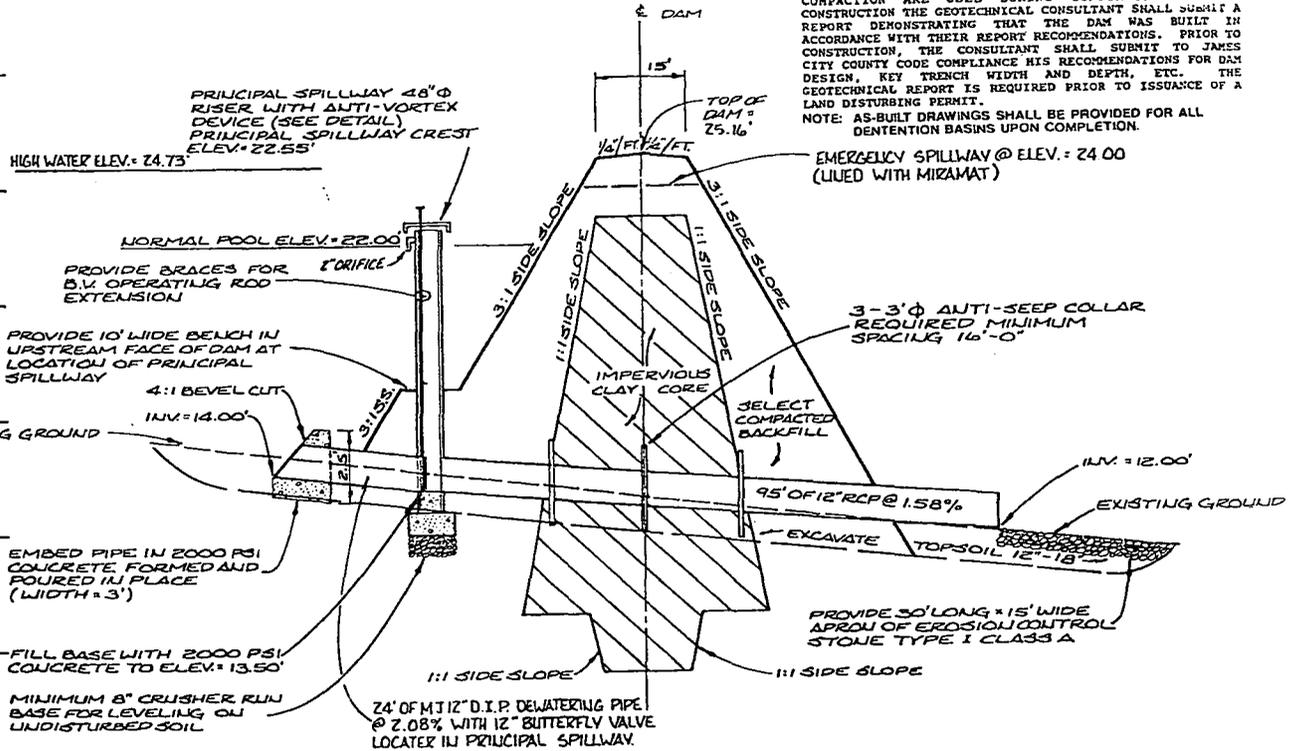
20

16

12

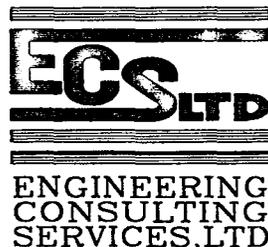
8

4



PREPARED FOR:

DOMINION LAND MANAGEMENT



DAM SCHEMATIC

GOVERNOR'S LAND

FOWLERS LAKE

JAMES CITY COUNTY, VIRGINIA

ECS, LTD. PROJECT NO. 6221

LOT 8
30,319 S.F.

RECORD NORTH

N/F
GOVERNORS LAND FOUNDATION

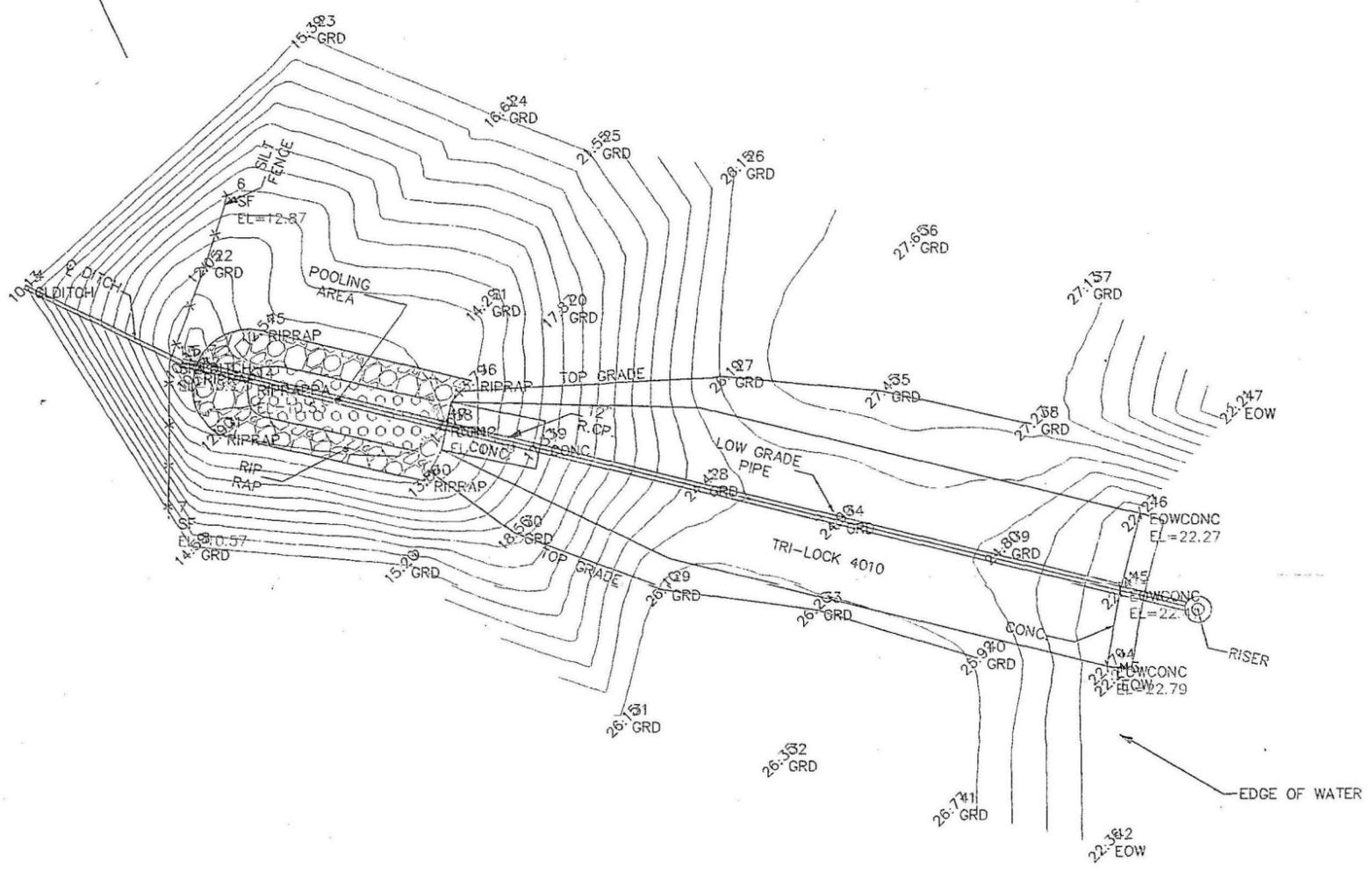
FOWLERS LAKE ROAD
272.08'

N 59°46'00" W

229.31'

N/F
GOVERNORS LAND FOUNDATION

N/F
GOVERNORS LAND FOUNDATION



N/F
GOVERNOR'S LAND FOUNDATION

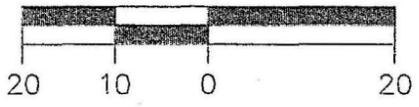
APPROVED
James City County
Environmental Division
By: *[Signature]*
Date: 6/18/04
SP-63-02
JR 018

FLOOD ZONE: X
COMMUNITY NO.: 210201
PANEL NO.: 30
SUFFIX: B
DATE OF FIRM INDEX: 2/6/91

This is to certify that on JUNE 4, 2004 I surveyed the property shown on this plat and found the property lines to be correct as shown hereon.
There are no visible encroachments either way across the lines except as shown.
This survey is subject to easements, servitudes and covenants of record and was prepared without benefit of a back title letter.
This survey is not to be used for construction purposes.



SCALE 1"=20'



FOWLERS LAKE DAM MODIFICATION

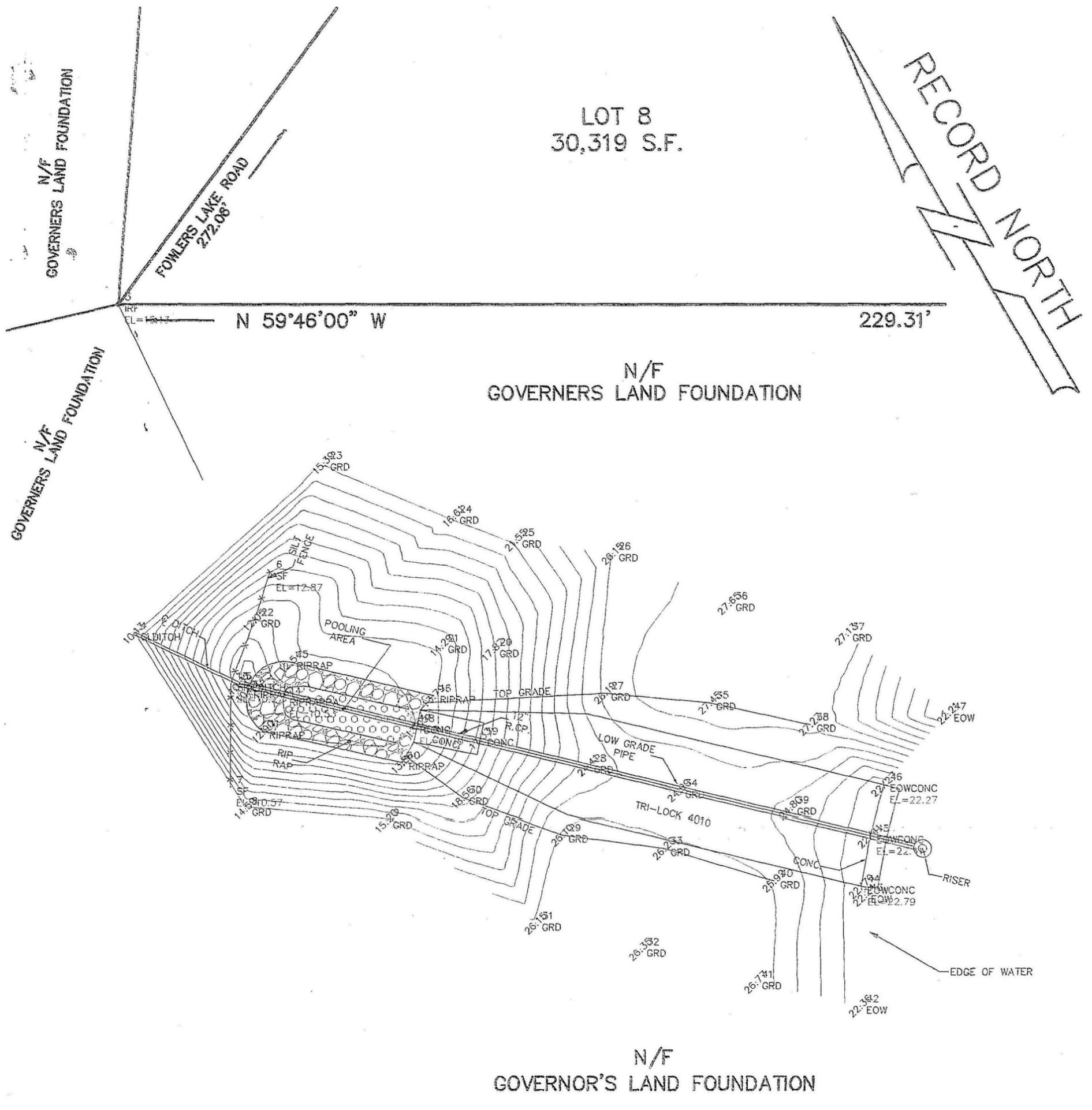
PLAT OF THE PROPERTY OF

POWHATAN DISTRICT

JAMES CITY COUNTY, VIRGINIA

WALTERS LAND SURVEYING, LTD.
710 DENBIGH BOULEVARD, SUITE 4C
NEWPORT NEWS, VIRGINIA 23608
(P.O. BOX 1594 YORKTOWN, VIRGINIA 23692)
PHONE: (757) 898-1057 FAX: (757) 898-2862

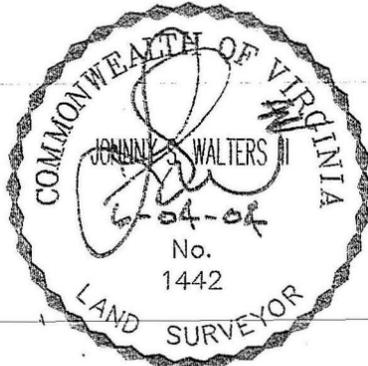
JOHNNY S. WALTERS, III LAND SURVEYOR



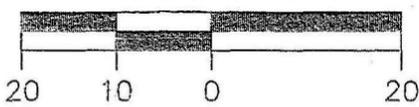
APPROVED
James City County
Environmental Division
By: *Scott Thomas*
Date: 6/18/04
SP-63-02
JR 018

FLOOD ZONE: X
COMMUNITY NO.: 210201
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SCALE 1"=20'



Johnny S. Walters, III
JOHNNY S. WALTERS, III LAND SURVEYOR

FOWLERS LAKE DAM MODIFICATION

PLAT OF THE PROPERTY OF
POWHATAN DISTRICT
JAMES CITY COUNTY, VIRGINIA
WALTERS LAND SURVEYING, LTD. 710 DENBIGH BOULEVARD, SUITE 4C NEWPORT NEWS, VIRGINIA 23608 (P.O. BOX 1594 YORKTOWN, VIRGINIA 23692) PHONE: (757)898-1057 FAX: (757) 898-2862

Reservoir Report

Reservoir No. 1 - Ex. Pond w/New Outfall

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	21.00	00	0	0
1.00	22.00	39,575	19,788	19,788
3.00	24.00	60,531	100,106	119,894
4.00	25.00	75,484	68,008	187,901
5.00	26.00	94,941	85,213	273,114

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0 ✓	0.0	0.0	0.0
Span in	= 12.0 ✓	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 13.50 ✓	0.00	0.00	0.00
Length ft	= 95.0	0.0	0.0	0.0
Slope %	= 1.45	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.60 ✓	5.00 ✓	0.00	0.00
Crest El. ft	= 21.37 ✓	24.10	0.00	0.00
Weir Coeff.	= 3.33 ✓	2.60	0.00	0.00
Weir Type	= Riser	Broad	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

FREE OUTFALL
OK

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	21.00	0.00	—	—	—	0.00	0.00	—	—	—	0.00
1.00	19,788	22.00	8.88	—	—	—	8.88	0.00	—	—	—	8.88
3.00	119,894	24.00	9.86	—	—	—	9.47	0.00	—	—	—	9.47
4.00	187,901	25.00	10.30	—	—	—	9.43	11.10	—	—	—	20.53
5.00	273,114	26.00	10.73	—	—	—	10.35	34.05	—	—	—	44.40

TRUCK 411 - MAX V
14 FPS

MODIFICATIONS TO
EM. SPILLWAY UNDER
SP-63-02; JR 018
2ND SUBMISSION
JUNE 2002.

Reservoir Report

Reservoir No. 2 - Pond w/o outfall

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known values

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	22.00	00	0	0
2.00	24.00	00	0	100,106
3.00	25.00	00	0	168,137
4.00	26.00	00	0	253,350

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	5.00	0.00	0.00
Crest El. ft	= 0.00	24.10	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= ---	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	22.00	---	---	---	---	---	0.00	---	---	---	0.00
2.00	100,106	24.00	---	---	---	---	---	0.00	---	---	---	0.00
3.00	168,137	25.00	---	---	---	---	---	11.10	---	---	---	11.10
4.00	253,350	26.00	---	---	---	---	---	34.05	---	---	---	34.05

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description	
1	SCS Runoff	6.16	2	770	56,983	—	—	—	Post-Development SCS Storm	
3	Reservoir	0.00	2	0	0	1	23.14	56,982	Routed w/o outfall	
5	Reservoir	5.78	2	784	56,982	1	21.63	12,560	Mod. Pond Routed	
Proj. file: BMP modification.gpw			Return Period: 1 yr				Run date: 05-21-2002			

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description	
1	SCS Runoff	9.56	2	768	85,438	—	—	—	Post-Development SCS Storm	
3	Reservoir	0.00	2	0	0	1	23.71	85,438	Routed w/o outfall	
5	Reservoir	8.47	2	790	85,438	1	21.77	15,160	Mod. Pond Routed	
						<i>2-yr.</i>				
Proj. file: BMP modification.gpw				Return Period: 2 yr			Run date: 05-21-2002			

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description	
1	SCS Runoff	22.01	2	768	191,042	—	—	—	Post-Development SCS Storm	
3	Reservoir	2.73	2	922	84,057	1	24.45	130,799	Routed w/o outfall	
5	Reservoir	9.27	2	834	191,042	1	22.81	60,580	Mod. Pond Routed	
							<i>10-YEAR</i>			
Proj. file: BMP modification.gpw				Return Period: 10 yr			Run date: 05-21-2002			

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	34.59	2	768	300,506	—	—	—	Post-Development SCS Storm
3	Reservoir	12.06	2	840	193,507	1	25.05	172,447	Routed w/o outfall
5	Reservoir	9.63	2	846	300,505	1	24.04 p.m.	122,545	Mod. Pond Routed
						<i>100-YEAR NEW RUN</i>			
Proj. file: BMP modification.gpw					Return Period: 100 yr		Run date: 05-21-2002		

Memorandum

SP-63-02
FOWLERS LAKE
DAM MODIFICATIONS
(JR 018)

DATE: May 3, 2002
TO: All Plan Reviewers and Review Agencies
FROM: Jason Grimes – Project Engineer
SUBJECT: Fowler's Lake Dam Modification
AES Project No. 9057-8

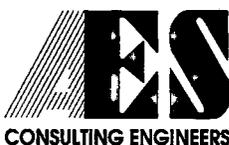
Approximately 12 years ago, AES designed the wet pond located on the 3rd fairway of the Governor's Land Golf Course. The existing design has the emergency spillway encroaching on the existing Lot 8 of the Fowler's Lake subdivision. It is the wish of the property owner to have the existing spillway relocated. The Governor's Land Foundation has agreed to allow the spillway to be relocated and the existing structure modified accordingly.

In an effort to move the spillway, we wanted to be sure that the new spillway would not adversely affect any surrounding property owners by increasing the 100-year high water elevation. To do this we created a new routing model using the data from the previous calculations and a new survey of the dam provided elevations of the associated structures. Using the new spillway design, the 100-year storm was routed to ensure that the high water elevation would not increase. Our calculations show the 100-year high water elevation actually decreases from the originally calculated 24.73 to 24.21. For additional insurance, we modeled what would happen in the event that the principle spillway was clogged. The model showed it would be able to successfully route the storm within the design section of the new spillway.

We believe we have adequately designed the new spillway to prevent overtopping of the dam and not to impact the surrounding property owners. If further clarification is necessary or if you have any questions, we would be more than happy to assist you.

cc: JCC Planning
JCC Environmental
JCC County Engineer

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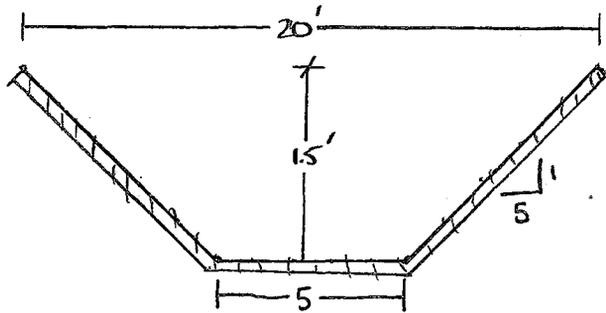


5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com

SPILLWAY DESIGN CALCULATIONS:

Emergency Spillway:

(reinforced with rigid lining) = assumed concrete for calculations



$$Q_0 = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$$= \frac{1.49}{0.013} (13.12) (0.93)^{2/3} (0.01)^{1/2}$$

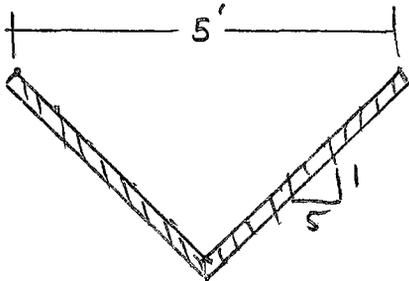
$$\underline{Q_0 = 142.63 \text{ cfs}}$$

$$Q_{100} < Q_0$$

$$V = 9.4 \text{ fps.}$$

Discharge Channel:

(@ narrowest section)



$$Q_0 = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$$= \frac{1.49}{0.013} (1.25) (0.25)^{2/3} (0.5)^{1/2}$$

$$\underline{Q_0 = 40.20 \text{ cfs}}$$

$$Q_{100} < Q_0$$

$$V = 20.8 \text{ fps.}$$

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

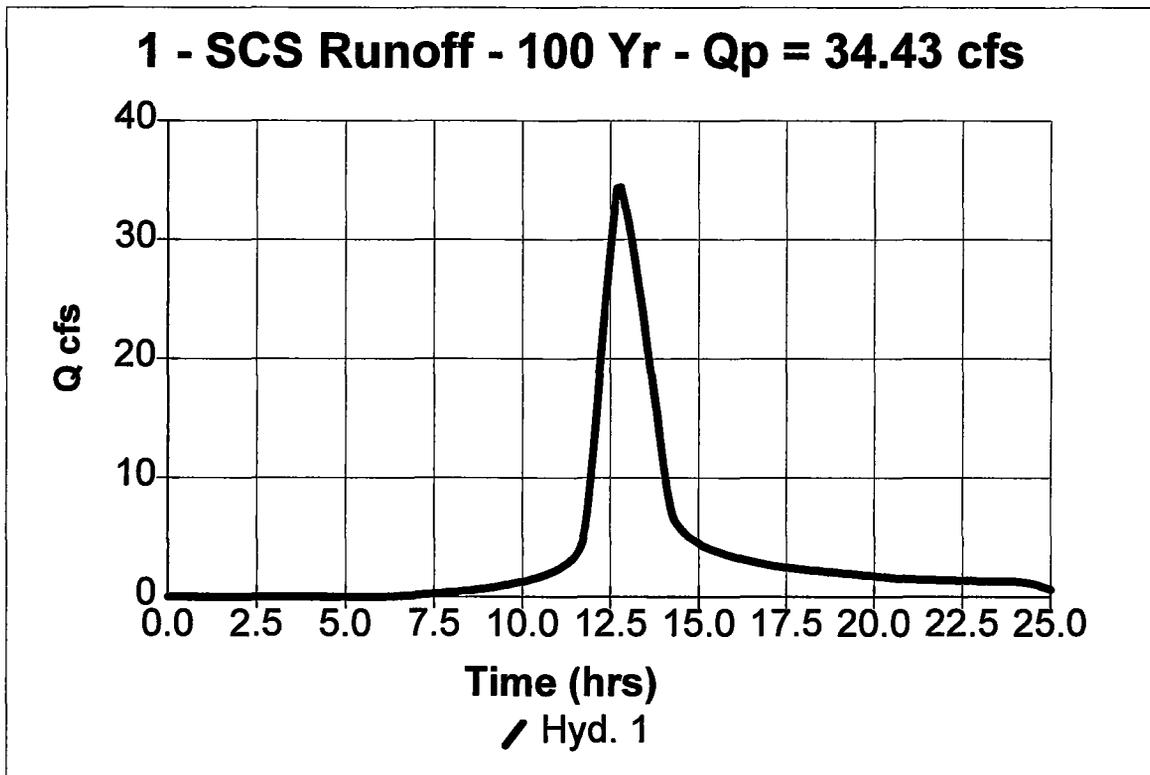
Hyd. No. 1

Post-Development SCS Storm

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 15.03 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.00 in
Storm duration = 24 hrs

Peak discharge = 34.43 cfs
Time interval = 6 min
Curve number = 79
Hydraulic length = 0 ft
Time of conc. (Tc) = 90 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 300,506 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	34.43	6	768	300,506	—	—	—	Post-Development SCS Storm
3	Reservoir	12.05	6	840	193,596	1	25.05	172,386	Routed w/o outfall
5	Reservoir	10.99	6	840	300,505	1	24.19	132,944	Mod. Pond Routed
							NEW D.H.W.		
Proj. file: BMP modification.gpw					Return Period: 100 yr		Run date: 05-03-2002		

Reservoir Report

Reservoir No. 1 - Ex. Pond w/New Outfall

Hydraflow Hydrographs by Intellisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	21.00	00	0	0
1.00	22.00	39,575	19,788	19,788
3.00	24.00	60,531	100,106	119,894
4.00	25.00	75,484	68,008	187,901
5.00	26.00	94,941	85,213	273,114

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0 ✓	0.0	0.0	0.0
Span in	= 12.0 ✓	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 13.50 ✓	0.00	0.00	0.00
Length ft	= 95.0	0.0	0.0	0.0
Slope %	= 1.45	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.60 ✓	5.00	0.00	0.00
Crest El. ft	= 21.87 ✓	24.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= Riser	Broad	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

FREE
OUTFALL

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	21.00	0.00	—	—	—	0.00	0.00	—	—	—	0.00
1.00	19,788	22.00	8.39	—	—	—	1.97	0.00	—	—	—	1.97
3.00	119,894	24.00	9.86	—	—	—	9.68	0.00	—	—	—	9.68
4.00	187,901	25.00	10.30	—	—	—	10.27	13.00	—	—	—	23.27
5.00	273,114	26.00	10.73	—	—	—	10.67	36.77	—	—	—	47.44

AB PLAN
CREST RISER
21.37
RECORD DRAWING 10/16/02

Reservoir Report

Reservoir No. 2 - Pond w/o outfall

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known values

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	22.00	00	0	0
2.00	24.00	00	0	100,106
3.00	25.00	00	0	168,137
4.00	26.00	00	0	253,350

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	5.00	0.00	0.00
Crest El. ft	= 0.00	24.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= ---	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	22.00	---	---	---	---	---	0.00	---	---	---	0.00
2.00	100,106	24.00	---	---	---	---	---	0.00	---	---	---	0.00
3.00	168,137	25.00	---	---	---	---	---	13.00	---	---	---	13.00
4.00	253,350	26.00	---	---	---	---	---	36.77	---	---	---	36.77

" CLOGGED "
ROUTING
NO PRIMARY
FLOW CONTROL

LAND AT ROAD NO. 5

ORIGINAL
DESIGN
CALCS
(Sheet 1 of 6)

SCS- PEAK DISCHARGES

- 1) PLOT - DUBUQUE AVENUE P.A. = 10.9 ac = 0.917 mi²
- 2) CURVE NUMBER

SOIL NO.	SOIL NAME	SOIL GROUP	CN	AREA	(CN)(AREA)
11C	CLAYTON-UMBER	C	70	7.50 ac	525
15B	EMPORIA COMPLEX	C	70	1.00 ac	70
27	PEAWICK	D	77	1.00 ac	77
23	HUNFLAT	D	77	1.00 ac	107.6
				10.9 ac	779.8

CN = $\frac{779.8}{10.9} = 71.5$

- 3) RAINFALL (2-YR 24-HR) P = 3.6 in.
- 4) INITIAL ABSTRACTION I_a = 0.778 in
- 5) I_a / P = (0.778 in / 3.6 in) = 0.216
- 6) UNIT PEAK DISCHARGE Q_u

SHOULDER FLOW - MANNING'S ROUGHNESS COEF. n = 0.45
 FLOW LENGTH L = 300'
 2-YR 24-HR RAINFALL, P₂ = 3.6 in.
 ROAD SLOPE, S = .0083 FT/FT.

$$T_L = \frac{.007 (nL)^{0.6}}{P_2^{0.5} S^{0.2}} = \frac{(.007) I (A_2) (L)^{0.6}}{(3.6)^{0.5} (.0083)^{0.2}} = 1.27 \text{ HR}$$

SHALLOW CONCENTRATED FLOW - UNPAVED
 FLOW LENGTH L = 400'
 SLOPE S = .0388 FT/FT
 AVERAGE VELOCITY, V = 3.15 FT/SEC

$$T_L = \frac{L}{3600 V} = \frac{400}{(3600)(3.15)} = 0.0353 \text{ HR}$$

CHANNEL FLOW CROSS SECTION AREA = 55 FT²
 WETTED PERIMETER P_w = 110 FT
 HYDRAULIC RADIUS R = $\frac{A}{P_w} = \frac{55}{110} = 0.50$

CHANNEL SLOPE S = .0150 FT/FT.
 MANNING'S ROUGHNESS COEF. n = 0.11

$$V = \frac{1.49 R^{2/3} S^{1/2}}{n} = \frac{1.49 (0.5)^{2/3} (0.0150)^{1/2}}{0.11} = 1.04 \text{ FT/SEC}$$

FLOW LENGTH L = 200'

$$T_L = \frac{L}{(3600) V} = \frac{200}{(3600)(1.04)} = 0.0539 \text{ HR}$$

$$T = 1.27 + .0353 + .0539 = 1.36 \text{ HR}$$

LAKU AT HOLDS AND S. COURT.

6) $g_p = 270 \text{ csm/in}$

7) $Q = \frac{(P - 0.25)^2}{(P + 0.83)}$ $S = \frac{1000}{CN} - 10 = \frac{1000}{78} - 10 = 3.89$

$Q = \frac{[(3.6) - (2)(3.89)]^2}{[3.6 + (2)(3.89)]} = 1.19 \text{ in.}$

8) POND AND SWAMP ADJUSTMENT FACTOR, $F_p = 1.00$

9) PEAK DISCHARGE, $Q_p = 90 \text{ AN } Q F_p$

$Q_p = (270 \text{ csm/in})(0.017 \text{ mi}^2)(1.19 \text{ in})(1.0) = \underline{5.46 \text{ cfs (2 HR PEAK)}}$

1) POST-DEVELOPMENT D.A. = 15.03 AC = 0.0235 mi²

2) CURVE NUMBER

SOIL GROUP	CN	AREA	(CN)(AREA)
D, OPEN SPACE	80	6.08 AC	486.4
C, WOODS	70	3.07 AC	214.9
C, RFS, 1/2 → 1 AC	79	3.12 AC	246.5
D, RFS, 1/2 → 1 AC	84	1.84 AC	154.6
D, PAVEMENT	93	0.92 AC	85.6
		15.03 AC	1188.0
CN = $\frac{1188.0}{15.03}$	79.04		

3) RAINFALL (100-YR 24-HR) $P = 8.1 \text{ in.}$

(5.7 in, 10 yr)

4) INITIAL ABSTRACTION, $I_a = 0.532 \text{ in.}$

($I_a = 0.532 \text{ in, } \frac{10}{yr}$)

5) $I_a/P = (0.532 \text{ in} / 8.1 \text{ in}) = 0.07$

($I_a/P = 0.09, 10 \text{ yr}$)

6) $T_c = \text{SHOULDER} + 2 \text{ min.} = 1.30 \text{ hr}$
 $g_u = 350 \text{ csm/in}$

($g_u = 340 \text{ csm/in, } 10 \text{ yr}$)

7) $S = \frac{1000}{79} - 10 = 2.66$ $Q = \frac{(P - 0.25)^2}{(P + 0.83)} = 5.60$

($S = 2.66$ $Q = \frac{(5.7 - 0.2(2.66))^2}{5.7 + 0.8(2.66)} = \frac{26.7}{7.83} = 3.41$
 10 year.)

8) POND AND SWAMP ADJUSTMENT FACTOR, $F_p = 0.72$

9) PEAK DISCHARGE, $Q_p = (350 \text{ csm/in})(0.0235 \text{ mi}^2)(5.60)(0.72) = \underline{33.14 \text{ cfs (100 YR PEAK)}}$

(11.61 cfs 10 yr)

LAKES AT HULL NO. 3 CONT.

- 1) $Q_0 = 5.46 \text{ CFS (2 YR. PLG)}$
- 2) $Q_1 = 33.14 \text{ CFS (100 YR POST (19,310 CFS @ 10 yr))}$
- 3) $\frac{Q_0}{Q_1} = \frac{5.46 \text{ CFS}}{33.14 \text{ CFS}} = 0.16$ $\frac{V_0}{V_1} = 0.49$ (0.39 10 yr)
- 4) $V_r = 53.83 \text{ A.M.} = (53.83)(5.60)(1.0235) = 7.02 \text{ Ac Ft.} = 305,714 \text{ CU. FT. (FUNO.F.F.)}$
(4.27 Ac Ft 186,158 CU FT, 10 year)
- 5) $V_s = V_r \left(\frac{V_0}{V_1} \right) = (7.02)(0.49) = 3.44 \text{ Ac Ft.} = 149,838 \text{ CU. FT. (REQUIRED STORAGE VOLUME)}$
(2.09 Ac Ft 91,140 CU FT, 10 year)

NORMAL POOL OF LAKE TO BE SET AT 22.00'
 SURFACE AREA AT ELEVATION 22.00' = 0.91 AC. = 39,575 SQ. FT.

ELEVATION	SURFACE AREA (SQ. FT.)	STORAGE (CU. FT.)	TOTAL STORAGE (CU. FT.)
22.00'	39,575	0	0
24.00'	60,531	100,106	100,106
25.00'	75,484	68,031	168,137
26.00'	94,941	85,213	253,350

ELEVATION FOR 100 YR POST IN 24 HR

24.00	100,106	49,752	$\frac{49,752}{100,106} = 0.49$
X	149,838	68,031	$\frac{68,031}{149,838} = 0.45$
25.00	168,137		

X = 24.73' HIGH WATER

THE PRINCIPAL SPILLWAY WILL CONSIST OF A 46" RISER STRUCTURE WITH ANTI-VORTEX COLLAR, OUTLET BARGE WILL BE 95' OF 12" RCP @ 1.58% INV. IN: 13.50'
 INV. OUT: 12.00'

EMERGENCY SPILLWAY WILL BE PROVIDED AT 24.73

LAKES AT MOUNTAIN NO 3 CONT.

REQUIRED SEDIMENT STORAGE

$$(67 \text{ cu. yd/acre})(15.03 \text{ acres}) = 1007 \text{ cu. yd. REQUIRED} = 27,189 \text{ cu. ft.}$$

OCCURS AT ELEV. 17.50" WITH QUADRATION

WATER QUALITY

$$\frac{(67 \text{ cu. yd})(27 \text{ cu. ft./cu. yd})}{43,560 \text{ sq. ft.}} = 0.04 \text{ FT} = \frac{1}{2}''$$

RETAIN FIRST 1/2" OF RUNOFF AND RELEASE IN 48 HRS.

$$(15.03 \text{ ac.})(43,560 \text{ sq. ft./acre})\left(\frac{0.5 \text{ in}}{12 \text{ in./ft.}}\right) = 27,279.45 \text{ cu. ft. REQUIRED TO STORE } \frac{1}{2}'' \text{ OF RUNOFF.}$$

AT ELEV. 22.00', SURFACE AREA: 39,575 SQ. FT.

$$y \frac{5}{2} = \frac{22.00'}{2} \quad x = \underline{22.55'} \quad \frac{27,279.45}{100,106} \quad \frac{y}{2} = \frac{27,279.45}{100,106} \quad y = 0.55'$$

RAISED ELEV. = 22.55'

TO RELEASE IN 48 HRS.

$$\frac{(27,279.45 \text{ cu. ft.})}{(48 \text{ HRS})(60 \text{ min./HR})(60 \text{ sec./min.})} = 0.16 \text{ CFS}$$

SIEM ORIFICE

$$q = 0.6 a \sqrt{2gh}$$

$$0.16 = 0.6 a \sqrt{2(32.2)(0.55)}$$

$$a = 0.0448 \quad d = \sqrt{\frac{4a}{\pi}} = \sqrt{\frac{4(0.0448)}{\pi}} \quad d = 0.2389 = 2.39 \text{ INCHES.}$$

USE 2" HOLES

$$a = 0.0218$$

$$q = (0.6)(0.0218) \sqrt{2(32.2)(0.55)} = 0.0778 \text{ CFS}$$

$$\frac{27,279.45 \text{ cu. ft.}}{(0.0778 \text{ CFS})(60 \text{ sec./min})(60 \text{ min./HR.})} = 97.4 \text{ HRS.}$$

FIRST 1/2" OF RUNOFF WILL BE RELEASED IN 97.4 HRS.

PLAN OF ROAD NO. 3 CONT.

ANTI-SWEEP COLLARS

$$L_3 = Y(Z+4) \left(1 + \frac{S}{0.25-S}\right)$$

Y = DEPTH AT PRINCIPAL SPILLWAY CREST = 22.55 - 13.50 = 9.05'

Z = SLOPE OF UPSTREAM FACE OF EMBANKMENT (Z:1) = 3

S = SLOPE OF BANK IN FT/FT = 0.0158

$$L_3 = (9.05)(3+4) \left(1 + \frac{0.0158}{0.25-0.0158}\right) = 67.62'$$

USE 3 COLLARS 3' IN DIAMETER

MINIMUM SPACING = 16'

BUOYANCY CALCULATIONS OF PRINCIPAL SPILLWAY

VOLUME AND WEIGHT OF STRUCTURE

$$\begin{aligned} V_{RISER} &= \pi R^2 H = \pi (R_{OUTSIDE}^2 - R_{INSIDE}^2) H \\ &= \pi (2.42^2 - 2.00^2) (9.05) \\ &= 52.78 \text{ CU. FT.} \end{aligned}$$

$$V_{BASE} = \pi (3.06)^2 (0.67) = 19.7 \text{ CU. FT.}$$

VOLUME (EXCLUDING CONCRETE IN BASE AND ANTI-VORTEX DEVICE) = 72.48 CU. FT.

$$\begin{aligned} \text{WEIGHT OF STRUCTURE} &= (72.48 \text{ CU. FT.}) (150 \text{ #/CU. FT. OF CONC.}) + 7422 (\text{ANTI-VORTEX}) \\ &\quad + 150 (\pi) (2)^2 (0.5) (\text{CONC. IN BASE}) \\ &= 10,872 \text{ lbs} + 7422 \text{ lbs} + 942.48 \text{ lbs.} = 19,236.48 \text{ lbs.} \end{aligned}$$

WEIGHT OF WATER DISPLACED BY AIR

$$\begin{aligned} W_{H_2O} &= (62.4 \text{ #/CU. FT.}) (\pi) (2)^2 (9.05) \\ &= 7096.48 \text{ lbs.} \end{aligned}$$

WEIGHT OF STRUCTURE >> WEIGHT OF WATER DISPLACED BY AIR

WEIGHT OF EARTH DISPLACED BY AIR

$$W_{SOIL} = (120 \text{ #/CU. FT.}) (\pi) (2)^2 (4.53) = 6831 \text{ lbs.}$$

WEIGHT OF STRUCTURE >> WEIGHT OF SOIL DISPLACED BY AIR

STRUCTURE WILL NOT FLOAT!

LANE AT USEN NO. 3 LOW

THIS LANE HAS BEEN DESIGNED FOR A 100 YR. POST-DEVELOPMENT STORM WITH LESS THAN THE 2 YR. PRE-DEVELOPMENT BEING RELEASED. A 12" OUTLET PIPE HAS BEEN USED TO MINIMIZE THE DISTURBANCE IN THE DOWNSLOPE CHANNEL DURING THE POST-DEVELOPMENT STORMS. WATER QUALITY HAS BEEN ~~BEING~~ MAINTAINED BY OBTAINING THE FIRST 1/2" OF RUNOFF AND RELEASING IT THRU A 2" ORIFICE IN APPROXIMATELY 97 HRS. THE NORMAL POOL IS 22.00' WITH THE TOP OF THE LANE AT 22.55' TO OBTAIN WATER QUALITY. THE HIGH WATER ELEV. IS 24.73 AND NO EMERGENCY SAILWAY IS NEEDED.

American
Excelstor
Company

Earth Science Division

Tri-Lock[®]

Articulated Erosion Control System

The Tri-Lock Erosion Control System represents the most advanced and versatile system in the erosion control industry. Tri-Lock provides the engineered alternative to conventional erosion control materials for revetment and channel protection as an effective, economical and environmentally sound method of combating severe erosion problems.

Tri-Lock is a flexible, permeable erosion control system that has the capacity to allow revegetation. It employs a superior, specially engineered woven filter fabric in combination with an interlocking articulated concrete block armor. Tri-Lock is a system of pre-cast concrete blocks made up of two components: a "lock block" and a "key block." Each component is keyed into other components, giving both stability and integrity.

Tri-Lock blocks are manufactured for ease of installation. Tri-Lock is normally installed in dry conditions by hand placing on to filter fabric. Where site conditions dictate (i.e. underwater applications) Tri-Lock can be supplied on pre-assembled mats utilizing special installation techniques and conventional construction equipment. In either application, the Tri-Lock system is easily installed with minimal manpower and equipment.

The Tri-Lock system, a total membrane of erosion control, varies from any other system in that it is completely self-contained. Tri-Lock offers an additional, significant advantage over other systems through its unique shape. Its structure and shape give it the ability to negotiate changes of direction without the necessity of added labor or additional product applications.

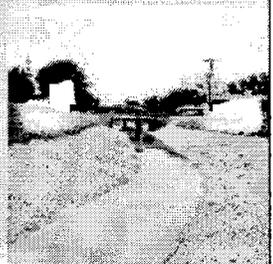
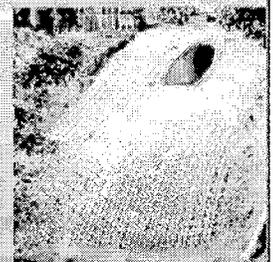
MATERIAL CHARACTERISTICS

Tri-Lock is highly stable, long lasting revetment blocks. Available in a variety of sizes and weights for maximum protection with differing wave climates or flow velocities. Flexibility is achieved by a bevel at the inter-lock of the Tri-Lock block enabling the system to conform to changing land contours and grades. Tri-Lock has adequate open area to relieve any hydrostatic pressure across the revetment. Voids are evenly and closely spaced. The voids in the Tri-Lock system should be filled with top soil and seeded with grass or other vegetation to restore the embankment to its natural state. The Tri-Lock system will actually promote this regrowth process. There are no projections or abrupt unevenness, permitting easy maintenance with conventional grass cutting equipment. The evenness of Tri-Lock revetments provides a safe surface for both vehicle and pedestrian traffic.

Tri-Lock is made from concrete, nothing else. No metal to corrode, no other fastening device subject to abrasion, just concrete, made as required for the conditions to be encountered. Tri-Lock is a total membrane, not a set of separate mats functioning independently. Every unit in the Tri-Lock system is firmly locked into the adjacent units allowing the entire revetment to act as one. This feature, as well as enhancing the hydraulic characteristics, prevents revetment failure.

TYPICAL APPLICATIONS

- Coastal Shoreline Protection
- Dike and Levee Protection
- Drainage Ditch Lining
- Lake Shoreline Protection
- Bridge Abutment Protection
- Pipeline and Buried Cable Watercourse Crossing Protection
- River Bank Protection
- Spillway Lining
- Boat Launching Ramps
- Reservoir Embankment Protection
- Culvert Inlet and Outfall Protection
- Channel Lining
- Slope Protection
- Parking Areas



U.S. PAT. # 4,816,325
FOREIGN COUNTRY PATENTS APPLIED FOR



SPECIFICATIONS

TRI-LOCK BLOCKS

HEIGHT
MODULE
WEIGHT PER SQ. FT. (Approx.)
WEIGHT OF BLOCK PAIR (Approx.)
COVERAGE OF BLOCK PAIR (Approx.)
CONCRETE STRENGTH, 4000 psi
OPEN AREA (Approx.) 20%

4010

4 inches
16 inches
32 lbs.
50 lbs.
1.54 sf

4110

4 inches
17.440 inches
36 lbs.
70 lbs.
2.00 sf

4015

6 inches
16 inches
45 lbs.
70 lbs.
2.00 sf

4020

6 inches
16 inches
60 lbs.
90 lbs.
1.54 sf

TRI-LOCK MATS Available Dimensions:

STANDARD WIDTH
STANDARD LENGTHS

4 ft. - 8 in.
16 ft.
18 ft. - 8 in.

Information
Available
Upon Request

4 ft. - 8 in.
16 ft.
18 ft. - 8 in.

Information
Available
Upon Request

NOTE: Special lengths made to order in large quantities.

MAT WEIGHTS

PER LINEAR FOOT
16 FT. MAT
18 FT. - 8 INCH MAT

150 lbs.
2400 lbs.
2800 lbs.

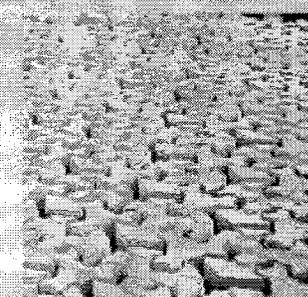
Varies

210 lbs.
3360 lbs.
3900 lbs.

Varies

GENERAL

Tri-Lock flexible erosion control systems shall be comprised of three directional interlocking concrete components of the sizes shown above, overlaying a filter fabric, as specified. The Tri-Lock System may be hand assembled on the bank by interlocking the components in a manner that allows maximum flexibility but discourages vertical movement of any single component. The concrete components shall be precast units having a compressive strength of not less than 4,000 psi. The oven-dry weight shall be not less than 125 lbs. per cubic foot, except that not more than 5% of components on any single mat shall be accepted under this minimum. Compressive testing shall be conducted on cubes cut from random samples of Tri-Lock components, per ASTM C-140.



The carrier filter fabric shall be of sufficient strength to support not less than 1 1/2 times the weight of the mat when slung by lifting at the ends. The carrier filter fabric shall consist of a suitable fabric, as separately specified, reinforced if required for the duty of the carrier as indicated above. A side flap of not less than 9' shall be provided to assure overlap of the filter panels assuring integrity of the filter blanket.

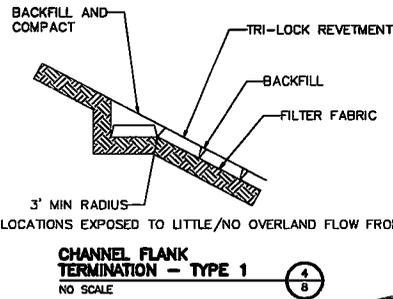
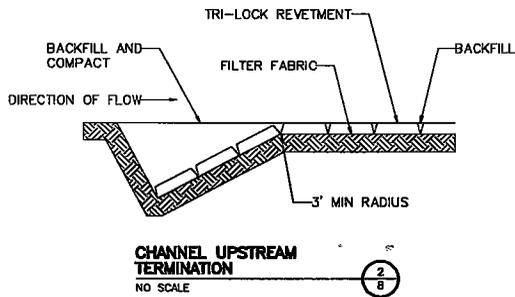
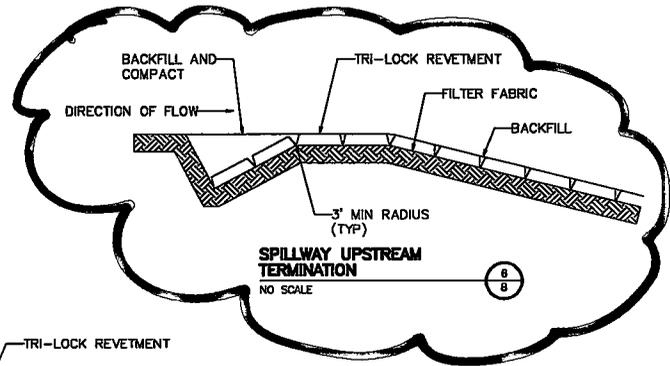
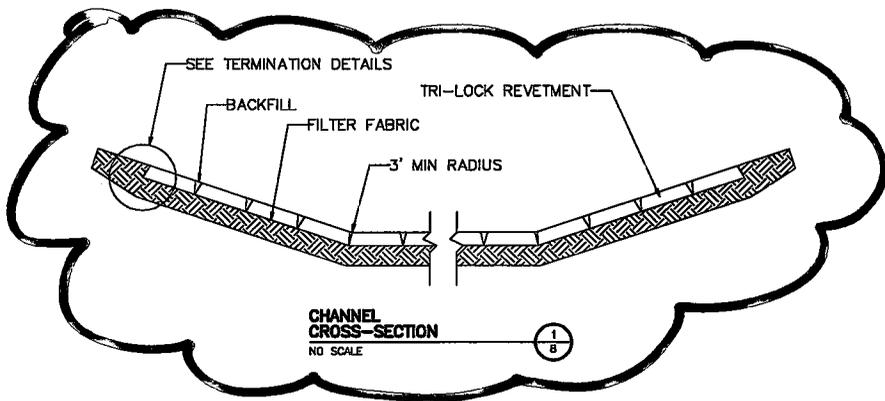
INSTALLATION

Tri-Lock is installed by contractor's personnel using standard equipment whether the system is installed by hand placing or through the use of pre-assembled mats. A Tri-Lock representative is generally available to advise and assist the contractor. It is not necessary for the contractor's crew to have previous experience or special skills in order to economically install Tri-Lock.

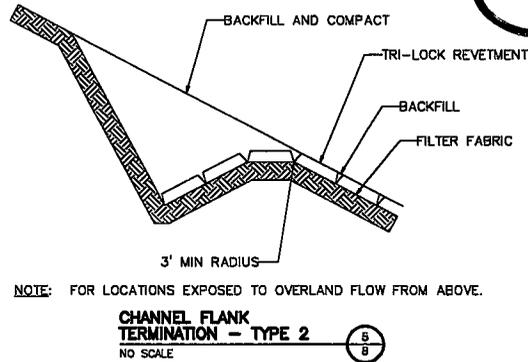
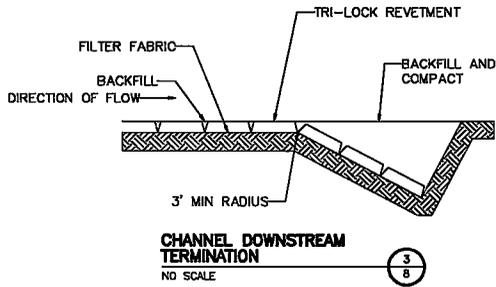
Prepare site before placing the Tri-Lock system. The slope shall be inspected to insure that it is free from obstructions such as tree roots, projecting stones or other foreign matter. Voids or soft areas should be filled with suitable materials and well compacted. Although some variation in contour will be allowed, no sudden changes in level can be accepted. Hand dress where necessary. Tri-Lock revetment systems are normally backfilled with topsoil at the rate of 1 cu. y. of topsoil to 200 sq. ft. (4' blocks). In the event that revegetation is not provided for, then the revetment may be backfilled to an average of 1" cover on the filter fabric for the protection of the filter fabric against UV rays. This backfilling should be executed within 7 days of completion of revetment.

Disclaimer: Tri-Lock Articulated Erosion Control System is for erosion control protection and revegetation. American Excelsior Company (AEC) believes that the information contained herein to be reliable and accurate for use in erosion control and revegetation applications. However, since physical conditions vary from job site to job site and even within a given job site, AEC makes no performance guarantees and assumes no obligation or liability for the reliability or accuracy of information contained herein, for the results, safety or suitability of using Tri-Lock, or for damages occurring in connection with the installation of any erosion control product whether or not made by AEC or its affiliates, except as separately and specifically made in writing by AEC. These specifications are subject to change without advance notice.

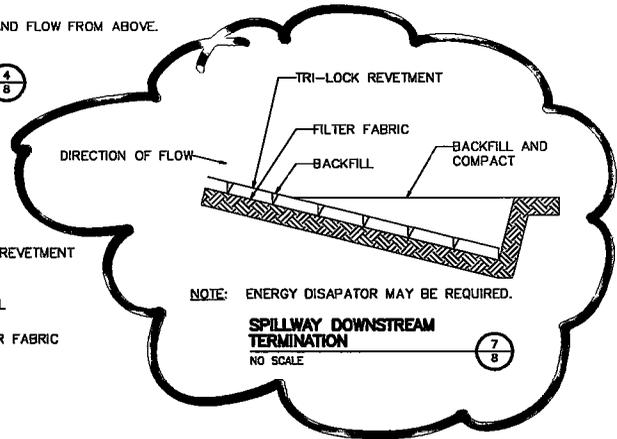
American Excelsior Company
Arlington, TX (800-777-7645)
www.curlex.com



NOTE: FOR LOCATIONS EXPOSED TO LITTLE/NO OVERLAND FLOW FROM ABOVE.



NOTE: FOR LOCATIONS EXPOSED TO OVERLAND FLOW FROM ABOVE.



NOTE: ENERGY DISAPATOR MAY BE REQUIRED.

American
Excelsior
Company®
Earth Science Division

NO.	BY	DATE	REVISIONS	PROJECT MANAGER
				CHECKED BY
				APPROVED BY

AMERICAN EXCELSIOR COMPANY
ARLINGTON, TEXAS

SHEET DESCRIPTION
TRI-LOCK
INSTALLATION DETAIL

DATE 4/8/03	DRAWN BY: RANJLK
SCALE	PROJECT NO.
NONE	SHEET NO. 8

Scott Thomas

Modified:

Mon 10/28/2002 3:23 PM

Governors Land Fowler Lake Dam Modification
SP-63-02

Special Note for Bond Computation and Construction Purposes

The "Soil Reinforced Channel" as shown on the plan is intended to be an articulated concrete revetment block specifically designed to provide erosion resistance, prevent uplift and resist other hydraulic forces associated with emergency spillway applications. Hard armor protection is required in this type of application, as flow through the emergency spillway could be up to 142 cubic feet per second (cfs) and up to 10-20 feet per second (fps) velocity. Typical matting or cosmetic blocks are not suitable for this application.

The plans call for Tri-Lock 4010 (American Excelsior) Concrete Revetment or Approved Equal. This specification is for 4-inch thick block. The system can be cabled or uncabled.

Some other approved equals would include:

Armorloc (Armortec)
Armorflex (Armortec)
Geolink (Petrattech)
ConLock Class 424 (Hydro-Turf and Assoc.)

Two Important Things to Know for this project before Land-Disturbing Begins:

1. Precon - Ensure correct type of block is being installed. My want to get prior approval. Submit product data sheets to Environmental Division before installation.
2. Bond Cost - Use \$ 50 per square yard as an estimating price for articulated concrete block.

MODIFICATIONS
TO FOWLERS
LAKE DAM
SP6302

June 8, 2004



Mr. Scott Thomas
Senior Engineer, Environmental Division
101 Mounts Bay Road
Williamsburg, VA 23187

Dear Scott:

Attached is the As-built Survey for the Fowler's Lake Dam Modification project we just completed in Governor's Land. Please review it and let us know if you have any questions.

Thanks for your assistance.

Sincerely,

PRITCHARD & COMPANY BUILDERS, INC.

Gregory E. Pritchard

Enc.

24-176



JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670

Fax Number: 757-259-4032

DATE SENT: 03/06/02

Name: Marc Bennett
Firm or Company: AES Consulting Engineers
Facsimile Number: _____
Number of pages including this transmittal: 3
From: Scott Thomas

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

Comments: County database information for GOV LAND
FOWLEYS LAKE - JRO18. MAY NEED TO
CONFIRM.

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



SCOTT J. THOMAS. P.E.
CIVIL ENGINEER

ENVIRONMENTAL DIVISION

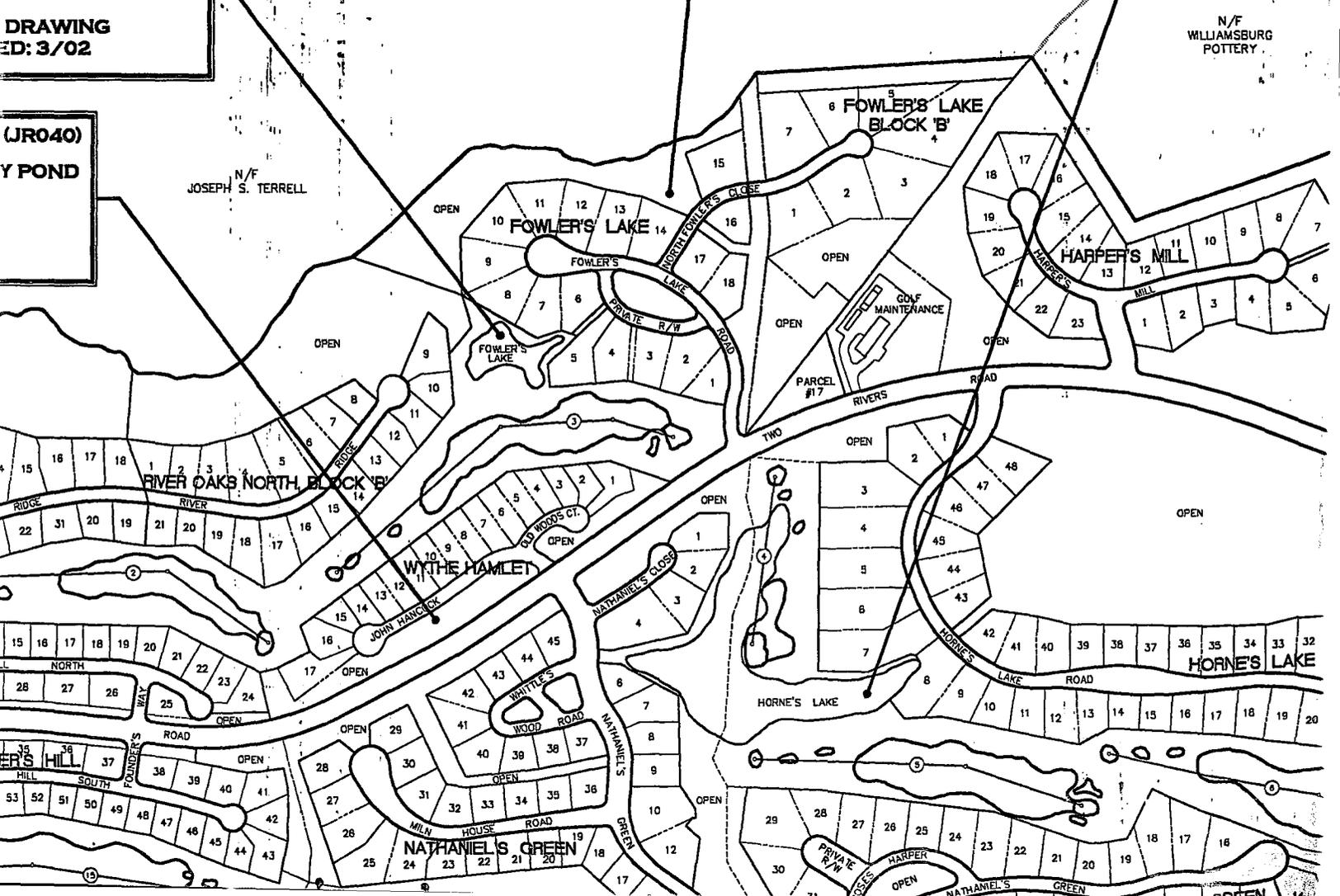
101 MOUNTS BAY ROAD, P.O. Box 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

(JR018)
S LAKE
DRAWING
ED: 3/02

(JR040)
Y POND

BMP #5 (JR054)
TIMBER STRUCTURE
RECORD DRAWING
PREPARED:

BMP #13
HORNE'S LAKE
RECORD DRAWING
PREPARED:



N/F
JOSEPH S. TERRELL

N/F
WILLIAMSBURG
POTTERY

RIVER OAKS NORTH BLOCK 'B'

FOWLER'S LAKE

FOWLER'S LAKE
BLOCK 'B'

HARPER'S MILL

HORNE'S LAKE

NATHANIEL'S GREEN

AES CONSULTING ENGINEERS

Engineering, Surveying and Planning

5248 Olde Towne Road, Suite 1

Williamsburg, Virginia 23188

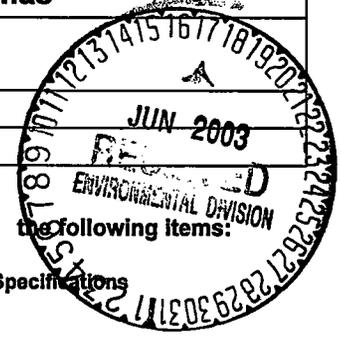
Phone: (757) 253-0040

Fax: (757) 220-8994

LETTER OF TRANSMITTAL

DATE: 17-Jun-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	6-16-03		As-Built drawing (Mylar) – Fowler's Lake	JR018
1	6-16-03		As-Built drawing (Black line) – Fowler's Lake	JR018
1	6-16-03		Memo responding to letter from County – Fowler's Lake	JR018
1	6-16-03		As-Built drawing (Mylar) – Horne's Lake	JR022
1	6-16-03		As-Built drawing (Black line) – Horne's Lake	JR022
1	6-16-03		Memo responding to letter from County – – Horne's Lake	JR022
1	6-16-03		As-Built drawing (Mylar) – Marina Village	JR032
1	6-16-03		As-Built drawing (Black line) – Marina Village	JR032
1	6-16-03		Memo responding to letter from County – Marina Village	
1	6-16-03		As-Built drawing (Mylar) – Travis Pond Dry Pond #1	
1	6-16-03		As-Built drawing (Black line) – Travis Pond Dry Pond #1	
1	6-16-03		Memo responding to letter from County – Travis Pond Dry Pond #1	

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:

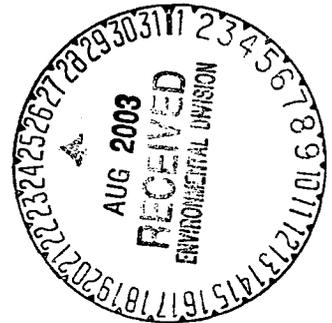
If you have any questions please contact me. Thank you.

COPIES TO: file _____

SIGNED: Victoria Bains

Victoria Bains

**John W. Woltjen
37 South Watch Road
Meredith, New Hampshire
03253-5642**



August 22, 2003

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

Dear Scott:

It was good to have a telephone conversation with you yesterday. I appreciate the help you have given relative to our lot at Governor's Land - Lot # 8, 3229 Fowlers Lake Road. At this time it is anticipated that the land modification (previously approved) will begin in early October. The contractor associated with this work will follow the plans approved by the county.

Upon completion of the land modification, Pritchard and Company, Builders will begin construction of the house. It is my understanding that a small portion of the house (part of the rear terrace and porch) will be within the 40 foot buffer area from the edge of Fowlers Lake.

I request that a variance be granted to allow the small intrusion into the defined buffer area. I gather from our discussion yesterday that this request will be acceptable.

As agreed I will assure that we will maintain the environmental buffer of 20 feet from the edge of the lake as it impacts the property. We will follow the county's guidelines relative to the planting of native plants within this 20 foot defined area. I will await to receive the list of approved plants

I am assuming that you will mail to me the letter of response. I will provide a copy of the letter to the contractor.

We will begin residency in Williamsburg by early October. I look forward to seeing you shortly after our arrival.

Sincerely,

cc: Pritchard and Company

**JR018
APPROVED
James City County
Environmental Division
By: Scott J. Thomas
Date: 8-26-03
"Use native plants in restored buffer zones."**

Record Drawing/Construction Certification Submittal for a BMP Facility

Date:

11/29 2002

Inspector:

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

Project:

GOVERNORS LAND

BMP Facility:

FOWLERS LAKE

Plan No.

S-145-89 (S-110-98)

BMP ID Code:

JR 018

I have received a transmittal for a Record Drawing and Construction Certification for the above referenced facility on 11/29 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

SWMProg\BMP\ConInsp\Insp.trans

(JR018)
S LAKE
DRAWING
ED: 3/02

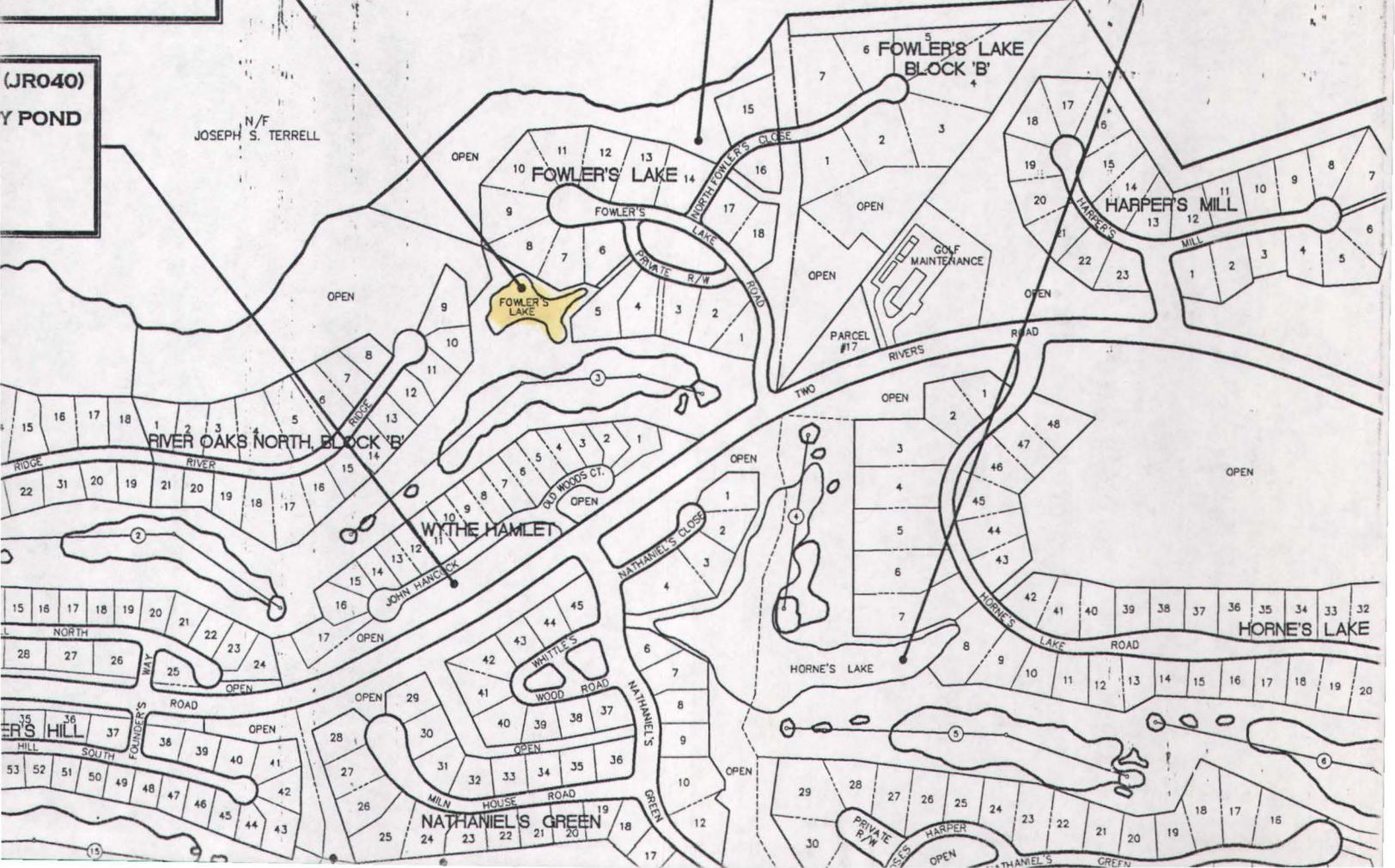
(JR040)
Y POND

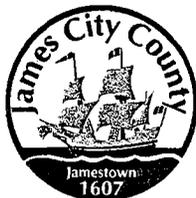
BMP #5 (JR054)
TIMBER STRUCTURE
RECORD DRAWING
PREPARED:

BMP #13
HORNE'S LAKE
RECORD DRAWING
PREPARED:

N/F
JOSEPH S. TERRELL

N/F
WILLIAMSBURG
POTTERY





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) 259-4116

April 20, 2001

Pritchard & Company Builders, Inc.
 135 Loblolly Drive
 Yorktown, Va. 23692
 Atten: Mr. Charlie Dunn, Director of Construction

Re: Letter of Request
 Minor Modification to an Existing BMP Embankment
 Fowlers Lake at Governors Land (County BMP ID Code: JR 018)

Dear Mr. Dunn:

The Environmental Division is in receipt of your written request (and related approval letters from Governors Land Foundation and Two Rivers Country Club) to perform a minor modification to an existing earthen "mound" located on the existing embankment of the above referenced facility. Based on a visit to the site, the subject mound appears to be an ornamental mound situated above the constructed top of dam elevation and was previously installed for screening purposes.

Based on our review, the request is hereby *approved* with the following conditions:

1. All work and stabilization is to proceed in accordance with the work plan as outlined in your letter dated April 12th 2001 and in compliance with applicable County and State erosion and sediment control regulations. Work is to be fully coordinated with the assigned Environmental Division inspector.
2. Access to the mound shall be performed in conjunction with work activities on Lot # 9. Work equipment shall not cause structural damage to the existing fill embankment of the pond and clearing shall be limited to the greatest extent possible when accessing the mound area.
3. At no time shall excavation be below the 24" depth as indicated in the work plan nor below constructed top of dam elevation.

Please note that approval of this request, with the conditions stated, in no way implies final approval of the single family site plan for Lot # 9. This approval letter should be a part of the formal single family building permit and/or site plan application for Lot # 9 when submitted. Approval is also contingent upon no major (substantial) changes in the work plan, proposed sequence of construction; or if site conditions change, become apparent or alter significantly following the date of this approval.

Sincerely,

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

SJT/sjt

April 12, 2001

Mr. Scott Thomas
JCC Environmental Division
101 E. Mounts Bay Road
Williamsburg, VA 23187



Dear Mr. Thomas,

In reference to a letter from David King of the Governor's Land Foundation concerning the removal of the mound on the ~~east~~ side of Fowler's Lake (code #JR018), we plan to do the following: *WEST?*

1. Remove approximately 18-24 inches off the top.
2. Move the excess dirt to the lot #9 to be used as fill during construction.
3. Apply topsoil & re-seed area after grading is complete. Apply wheat straw.
4. Excavation work to be done with a wheel backhoe.

Sincerely,

Charlie Dunn
Director of Construction

GOVERNOR'S LAND FOUNDATION

April 10, 2001

Mr. Scott Thomas
JCC Environmental Divison
101 E Mounts Bay Rd.
Williamsburg, VA 23187

Dear Mr. Thomas

The Governor's Land Foundation approves the removal of 18-24 inches off the mound on the east side of Fowler's Lake (Code #JR018), behind Lot 9, River Oaks North, B.


David King
General Manager





TWO RIVERS COUNTRY CLUB



April 11, 2001

Mr. Scott Thomas
Civil Engineer
James City County Environmental Division
101 East Mounts Bay Road
Williamsburg, VA 23187

Dear Mr. Thomas:

This letter will confirm that Two Rivers Country Club does not have a problem with lowering the mound behind Lot No. 9, River Oaks North, Block "B," Code No. JR018.

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

Sincerely,

Brian R. O'Day
Vice President of Operations

Copy to:
Mr. Dave King

FILE UNDER
ASSAULT FILE
JR018
FOWLERS LAKE
GOV LANN

**John and Kaye Vickerman
1913 Whittle's Wood Road
Williamsburg, VA 23185
(757) 345-2549
Fax: (757) 345-2560**

February 5, 2003

Mr. Scott Thomas
James City County Environmental Division
Williamsburg, VA 23185

Re: Lot 5, Fowler's Lake Development Plan, 3217 Fowler's Lake, Governor's Land

Dear Mr. Thomas:

In accordance with the comments received from the James City County Environmental Division for subject property. We are requesting a variance from the 25' pond buffer regulations due to minimal impact and encroachment as described below and indicated on the lot development site plan.

No part of the home to be built encroaches on the 25' pond buffer zone. A minute amount (less than 8 square feet) of the ground level patio extends beyond the buffer line, as well as the need for normal and customary yard grading in that area. The grading utilizes existing grades, and therefore no significant filling or cutting is necessary. Only three fence posts and minimal required security fencing is within the zone all of which do not encroach in the zone more than 12 feet. The grade along the edge of the home and patio shall be five feet or more above the 100 year flood elevation and eight feet above the normal pond elevation.

Efforts shall be made to preserve existing trees and vegetation in the buffer during construction and manage the buffer as a meadow or forested area. The landscaping plan will stabilize existing and new grades and use native or similar trees, shrubs and ground cover to the greatest extent possible. Any disturbed buffer area will be restored to meadow or forest condition consistent with the landscape plan.

Sincerely,


M. John Vickerman

APPROVED
James City County
Environmental Division
By: 
Date: 2-6-03

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot 5, Fowler's Lake Governor's Land (3217 Fowler's Lake Road)

Clearing, grading and permanent structures (fence and posts) are shown within the pond setback/buffer as required per page 38 of the James City County BMP manual. A pond buffer should be provided that extends 25 feet outward from the maximum water surface elevation of the pond. Based on information as available in our record files, it appears the 100-year design high water surface elevation for the adjacent stormwater management facility (Fowler's Lake, County BMP ID Code: JR 018) is at Elevation 24.73; however, a plan for Fowler's Lake emergency spillway modifications was approved under County Plan No. SP-63-02 which would lower the design high water of the BMP to Elevation 24.04. Therefore, for pond buffer purposes on this parcel, design high water Elevation 24.04 may be used.

Reconfigure the limits of clearing/construction as shown on the plan to avoid disturbance and grading of the buffer; or alternatively, submit a written request for waiver to the Environmental Division with supporting information as required including: stabilization or landscaping plan to restore disturbed buffer area back to meadow or forest condition using native trees, shrubs or ground cover to the greatest extent possible. The variance request needs to be from the owner or tenant, current or future, rather than the builder or contractor.

Efforts should be made to preserve existing trees and vegetation in the buffer during construction and to manage the buffer as meadow or forested area.



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

County BMP ID Code (if known): JR018

Name of Facility: FOWLER'S LAKE BMP No.: 3 of 25 Date: 2/6/03

Location: GOVERNOR'S LAND

Name of Owner: DOMINION LAND MANAGEMENT CO.

Name of Inspector: VICTORIA BAINS

Type of Facility: LAKE

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



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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			
Vegetation Condition		✓		NEED TO TOPSOIL & SEED ON DAM AR
Tree Growth		✓		PINE SAPLINGS IN AREA OF SHORELINE
Erosion		✓		NEED TO STABILIZE BARE SPOTS
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: <input checked="" type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	N/A			PERMANENT POOL
Trash & Debris	N/A			NO TRASH OR DEBRIS SEEN IN LAKE
Floating Material	N/A			NO FLOATING OBJECTS
Erosion	N/A			NO SIGN FROM VISUAL INSPECTION
Sediment	N/A			NO SIGN FROM VISUAL INSPECTION
Dead Plant	N/A			NO SIGN OF DEAD PLANTS
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input checked="" type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			
Trash & Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations):				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Outlet Protection				
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris		✓		NEED TO REMOVE SILT FENCE
Erosion/Sediment		✓		NEED TO FIX OUTLET PROTECTION
Outlet Protection		✓		NEED TO REPLACE THE RIPRAP & FILTER FABRIC
Other				
Emergency Spillway (Overflow):				
Vegetation		✓		NEED TO TOP SOIL & SEED
Lining	✓			
Erosion		✓		NEED TO STABILIZE BARE SPOTS
Trash & Debris	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
Surrounding Perimeter Conditions:				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths				
Other				

Remarks:

FOUND BARE SPOTS ON DAM & EMERGENCY SPILLWAY
 PINE SAPLINGS GROWING AT SHORELINE OF DAM AREA
 NO OUTLET PROTECTION FOR OUTFALL PIPE.
 PLACE FILTER FABRIC AND USE RIP RAP FROM TEMPORARY
 CHECK DAM AND REMOVE SILT FENCE LOCATED DOWNSTREAM
 FROM CHECK DAM.

Overall Environmental Division Internal Rating: 3

Signature: Victoria Bains
 Title: PROJECT ENGINEER

Date: 2/6/03

WATERSHED	JR	MAINTENANCE PLAN	No	CTRL STRUC DESC	RCP Riser
BMP ID NO	018	SITE AREA acre	1444	CTRL STRUC SIZE inches	48
PLAN NO	S-110-98	LAND USE	SF Residential	OTLT BARRL DESC	RCP Barrel
TAX PARCEL	(43-2)(4-8)	old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	12
PIN NO	4320400008	JCC BMP CODE			
CONSTRUCTION DATE	1/1/1990	POINT VALUE	11	EMERG SPILLWAY	Yes
PROJECT NAME	Governors Land-Fowlers Lake			DESIGN HW ELEV	24.73
FACILITY LOCATION	Behind 3229 Fowlers Lake Road			PERM POOL ELE	21.3
CITY-STATE	Williamsburg, VA. 23188	SVC DRAIN AREA acres	15.03	2-YR OUTFLOW cfs	
CURRENT OWNER	Governors Land Foundation			10-YR OUTFLOW cfs	
OWNER ADDRESS	1400 Two Rivers Road			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI	Governors Land	CONSTR CERTI	No
CITY-STATE-ZIP CODE	Williamsburg, VA 23185	IMPERV AREA acres		LAST INSP DATE	4/13/2001
OWNER PHONE		RECV STREAM	UT of James River	INTERNAL RATING	2
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	Yes	MISC/COMMENTS	
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0.62	Modification Proposal SP-63-02. DHW to 24.19 & new ES. Refer to file.	
		CHAN PROT CTRL	No		
		CHAN PROT VOL acre-ft	0		
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

[Get Last BMP No](#)

[Return to Menu](#)

WATERSHED	JR	MAINTENANCE PLAN	No	CTRL STRUC DESC	48 R.P. Riser
BMP ID NO	018	SITE AREA acre	1444	CTRL STRUC SIZE inches	48
PLAN NO	5-110-9B	LAND USE	SFRES	OTLT BARRL DESC	RCP
TAX PARCEL	(43-2)(4-8)	old BMP TYP	WET POND	OTLT BARRL SIZE Inch	12
PIN NO	4320400008	JCC BMP CODE		EMERG SPILLWAY	No YES
CONSTRUCTION DATE	1/1/1990	POINT VALUE	11	DESIGN HW ELEV	24.19
PROJECT NAME	Fowlers Lake			PERM POOL ELE	21.3
FACILITY LOCATION	Behind 3229 Fowlers Lake Road			2-YR OUTFLOW cfs	
CITY-STATE	Williamsburg, VA	SVC DRAIN AREA acres	16.9 1503	10-YR OUTFLOW cfs	
CURRENT OWNER	Governors Land Foundation			REC DRAWING	No YES
OWNER ADDRESS	1400 Two Rivers Road	SERVICE AREA DESCR	ACREAGE-GOVERNORS LAND	CONSTR CERTI	No
OWNER ADDRESS 2		IMPERV AREA acres		LAST INSP DATE	4/13/2001
CITY-STATE-ZIP CODE	Williamsburg, VA 23185	RECV STREAM	JAMES RIVER	INTERNAL RATING	2
OWNER PHONE		EXT DET-WQ-CTRL	No YES	MISC/COMMENTS	DNW # 24.73 old. MODIFIED SP-63-02
MAINT AGREEMENT	Yes	WTR QUAL VOL acre-ft	3.67 0.62		
EMERG ACTION PLAN	No	CHAN PROT CTRL	No		
		CHAN PROT VOL acre-ft	0.0		
		SW/FLOOD CONTROL	No YES		
		GEOTECH REPORT	No		

Fowlers LAKE
JR 018 -

Get Last BMP No

Return to Menu

ADJACENT SUBJECT PARCEL:

LOT 8
GPIN 4320400008
3229 Fowlers LAKE
0.69 AC.

WATERSHED	JR	MAINTENANCE PLAN	No	CTRL STRUC DESC	48 RIP Riser
BMP ID NO	018	SITE AREA acre	1444	CTRL STRUC SIZE inches	48
PLAN NO	S-110-98	LAND USE	SFRES	OTLT BARRL DESC	RCP
TAX PARCEL	(43-2)(4-8)	old BMP TYP	WET POND	OTLT BARRL SIZE inch	12
PIN NO	4320400008	JCC BMP CODE		EMERG SPILLWAY	No YES
CONSTRUCTION DATE	1/1/1990	POINT VALUE	11	DESIGN HW ELEV	24.19
PROJECT NAME	Fowlers Lake			PERM POOL ELE	21.3
FACILITY LOCATION	Behind 3229 Fowlers Lake Road			2-YR OUTFLOW cfs	
CITY-STATE	Williamsburg, VA	SVC DRAIN AREA acres	16.9 15.03	10-YR OUTFLOW cfs	
CURRENT OWNER	Governors Land Foundation			REC DRAWING	No YES
OWNER ADDRESS	1400 Two Rivers Road	SERVICE AREA DESCRI	ACREAGE-GOVERNORS LAND	CONSTR CERTI	No
OWNER ADDRESS 2		IMPERV AREA acres		LAST INSP DATE	4/13/2001
CITY-STATE-ZIP CODE	Williamsburg, VA 23185	RECV STREAM	JAMES RIVER	INTERNAL RATING	2
OWNER PHONE		EXT DET-WQ-CTRL	No YES	MISC/COMMENTS	
MAINT AGREEMENT	Yes	WTR QUAL VOL acre-ft	3.67 0.62		DHW 24.73 old.
EMERG ACTION PLAN	No	CHAN PROT CTRL	No		MODIFIED SP-63-02
		CHAN PROT VOL acre-ft	0.0		
		SW/FLOOD CONTROL	No YES		
		GEOTECH REPORT	No		

Fowlers LAKE
JR 018

Get Last BMP No

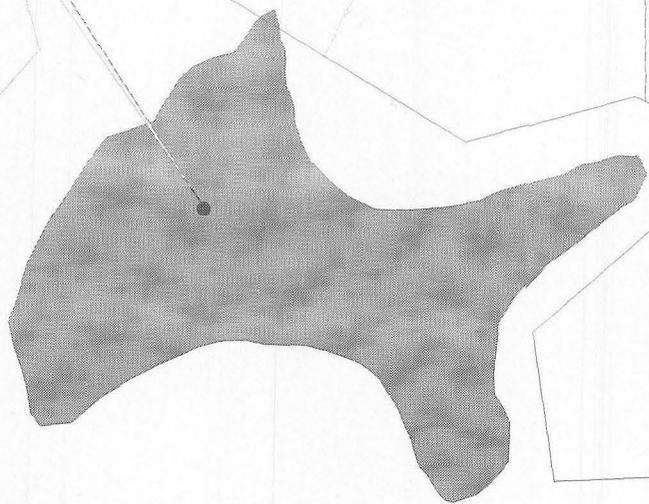
Return to Menu

ADJACENT SUBJECT PARCEL:

LOT 8
GPIN 4320400008
3229 Fowlers LAKE
0.69 AC.

JR018

Site



Facsimile Cover Sheet

Name: Mr. Scott Thomas
Company: JCC Environmental Division
Phone:
Fax: (757) 259-4032

From: Scott Cleckley
Company: Cleckley & Smith, Inc.
Phone: 757-838-2900
Fax: 757-826-3507

Date: 02-06-03
**Pages including this
cover page:** 2

Re: Letter from Mr. and Mrs. Vickerman requesting variance.

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

DATE <i>March 11, 2002</i>	JOB NO. <i>7173</i>
ATTENTION <i>MIKE WOODSON</i>	
RE: <i>GOVERNOR'S LAND</i>	

TO *JAMES CITY COUNTY ENVIRONMENTAL DIVISION*



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

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

COPIES	DATE	NO.	DESCRIPTION
<i>1</i>			<i>RECORD DRAWING CHECKLIST FOR <u>WUITMACKER'S LAKE</u>, WITH EXCEPT FROM GEO-TECHNICAL INVESTIGATION, BLACKLINE DRAWINGS OF RECORD DRAWINGS (JR019)</i>
<i>1</i>			<i>RECORD DRAWING CHECKLIST FOR <u>TIMBER STRUCTURE #1</u> TWO RIVERS COUNTRY CLUB WITH BLACKLINE RECORD DRAWINGS (JR035)</i>
<i>1</i>			<i>TRAVIS POND <u>RECORD</u> DRAWINGS, CHECKLIST, EXCEPT FROM GEO-TECHNICAL INVESTIGATION (JR016)</i>
<i>1</i>			<i>RE FOWLER'S LAKE <u>RECORD</u> DRAWINGS, CHECKLIST, EXCEPT FROM GEO-TECHNICAL INVESTIGATION ??? NOT INCLUDED (JR018)</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. Marc B...*

E of E. spillway is
less than 1.0' below
E of dam -

Plan

NOTE: A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO ENSURE THE SUITABILITY OF THE SITE. THE GEOTECHNICAL INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. ADDITIONALLY, A GEOTECHNICAL CONSULTANT WILL ENSURE PROPER MATERIAL AND COMPACTION ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A REPORT DEMONSTRATING THAT THE DAM WAS BUILT IN ACCORDANCE WITH THEIR REPORT RECOMMENDATIONS. PRIOR TO CONSTRUCTION, THE CONSULTANT SHALL SUBMIT TO JAMES CITY COUNTY CODE COMPLIANCE HIS RECOMMENDATIONS FOR DAM DESIGN, KEY TRENCH WIDTH AND DEPTH, ETC. THE GEOTECHNICAL REPORT IS REQUIRED PRIOR TO ISSUANCE OF A LAND DISTURBING PERMIT.

28

24

20

16

12

8

4

PRINCIPAL SPILLWAY 48" Ø RISER WITH ANTI-VORTEX DEVICE (SEE DETAIL)
 PRINCIPAL SPILLWAY CREST ELEV. = 22.55'

HIGH WATER ELEV. = 24.73
 (APPROVED 24.04) FUTURE
 NORMAL POOL ELEV. = 22.00'

PROVIDE BRACES FOR 2" DRIFICE
 B.V. OPERATING ROD EXTENSION

PROVIDE 10' WIDE BENCH IN UPSTREAM FACE OF DAM AT LOCATION OF PRINCIPAL SPILLWAY

4:1 BEVEL CUT
 INV. = 14.00'

EXISTING GROUND

EMBED PIPE IN 2000 PSI CONCRETE FORMED AND POURED IN PLACE (WIDTH = 3')

FILL BASE WITH 2000 PSI CONCRETE TO ELEV. = 13.50'

MINIMUM 8" CRUSHER RUN BASE FOR LEVELING ON UNDISTURBED SOIL

2 DAM

15'
 TOP OF DAM = 26.00
 1/4" FT. / 1/4" FT.

EMERGENCY SPILLWAY @ ELEV. = 24.75

3:1 SIDE SLOPE
 1:1 SIDE SLOPE
 1:1 SIDE SLOPE
 3:1 SIDE SLOPE

3-3' Ø ANTI-SEEP COLLAR REQUIRED MINIMUM SPACING 16'-0"

IMPERVIOUS CLAY CORE

SELECT COMPACTED BACKFILL

95' OF 12" RCP @ 1.58%

INV. = 12.00'

EXISTING GROUND

EXCAVATE

TOPSOIL 12"-18"

PROVIDE 30' LONG x 15' WIDE APRON OF EROSION CONTROL STONE TYPE I CLASS A

1:1 SIDE SLOPE

1:1 SIDE SLOPE

SECTION C-C
3RD FAIRWAY POND

1" = 20' HORIZ.
 1" = 4' VERT.

Fowler's Lake

Approved Plan