CERTIFICATE OF AUTHENTICITY

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

BMP NUMBER: **JR022**

DATE VERIFIED: **June 12, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 11, 2010

TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: JR022

PIN: 4410100006

Subdivision, Tract, Business or Owner Name (if known): Governors Land

Property Description: Golf Course

Site Address:

(For internal use only) **Box** 14 **Drawer:** 7

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

Comments
Located behind 3007 Nathaniels Green

JR-022

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

James City County, Virginia
Environmental Division

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

County Plan No.: SP-145-89
Project Name: GOV LAND Hornes LAKE
Stormwater Management Facility: WET POND
Phase: ☒ I ☐ II ☐ III

- ☒ Information Received. Date: 5/02/02 AES
- ☐ Administrative Check.
  - ☒ Record Drawing Date: 5/02/02 AES
  - ☐ Construction Certification Date: Need Geotech Report ECS
  - ☐ RD/CC Standard Forms (Required after Feb 1st 2001Only)
  - ☑ Insp/Maint Agreement Info: GLOBAL
  - ☐ BMP Maintenance Plan Location: NA
  - ☐ Other:
- ☑ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
  ☐ Yes ☒ No Location: CC REQUIRED NITE ON SEC A-A SHEET 10.
- ☑ Assign County BMP ID Code Code: JR022
- ☑ 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. NO
- ☑ Pre-Inspection Drawing Review - Approved Plan (Quick look prior to field inspection).
- ☑ Final Inspection (FI) Performed Date: 3/25/03 RH; 2/5/03 AES
- ☑ Record Drawing (RD) Review Date: 5/15/03 SJT
- ☑ Construction Certification (CC) Review Date: 5/15/03 SJT
- ☑ Actions:
  - ☐ No comments.
  - ☐ Comments. Letter Forwarded. Date: May 16 '03
    - ☑ 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 managment facility purposes (RD/CC/CR/Other). Proceed with bond release.
- ☒ Notify Darryl/Joan/Pat of acceptability using email (preferred), form or verbal.
- ☒ Check/Clean active file of any remaining material and finish "As-Built" file.
- ☑ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
- ☑ Copy Final Inspection Report into County BMP Inspection Program file.
- ☑ Digital Photographs obtained.
- ☐ Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable

Plan Reviewer: [signature] P.E. Date: 6/26/03

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 -
Structure/BMP Name: HORNE'S LAKE
Project Location: ROUTE 5
BMP Location: BETWEEN NATHANIEL'S GREEN & HORNE'S LAKE (ROADS)
County Plan No.: SP - 145 - 09

Project Type: ☒ Residential ☐ Business ☐ Commercial ☐ Office ☐ Institutional ☐ Industrial ☐ Public ☐ Roadway ☐ Other _____

Tax Map/Parcel No.: (43-2)(3-0-1F) & (44-1)(1-6)
BMP ID Code (if known): JR022
Zoning District:: POWHATAN DISTRICT
Land Use: RESIDENTIAL
Site Area (sf or acres):

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

Nearest Visible Landmark to SWM/BMP Facility: IRRIGATION PUMP HOUSE TO EAST TWO RIVERS ROAD TO NORTH

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: APPROXIMATELY 9000 FEET TO NORTHWEST

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: SUMMER 1990
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☑ Unknown
Name of Site Work Contractor Who Constructed Facility: WINDSWORTH 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: APRIL [redacted] 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: C. ARCHER MASTER III
Title: VICE PRESIDENT
Plan Name: GOVERNOR'S LAND - TWO RIVERS GOLF COURSE
Firm's Project No. 7173
Plan Date: 12/22/89
Sheet No.'s Applicable to SWM/BMP Facility: 5 / 10 / ____ / ____ / ____

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

Name: WINDSWORTH GOLF CONSTRUCTION COMPANY
Mailing Address: 1901 VAN DYKE ROAD
PLAINFIELD, ILLINOIS 60544
Business Phone: 815-436-8400
Fax: 815-436-8404
Contact Person: BRIAN R. CUSTER
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: 5248 OLDE TOWNE RD, SUITE 1
WILLIAMSBURG VIRGINIA 23188
Business Phone: 757-253-0040
Fax: 757-220-0994

Name: V. MARC BENNETT
Title: SENIOR PROJECT MANAGER

Signature: V. Marc Bennett
Date: 4/1/02

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.

COMMONWEALTH OF VIRGINIA
VAN MARC BENNETT
No. 26828

(Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

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

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 reproducibles.

- ☐ 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.

XY	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.
XY	10.	Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
XY	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.**
XY	14.	Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
XY	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.
XY	20.	BMP vicinity properly cleaned of stockpiles and construction debris.
XY	21.	No visual signs of erosion or channel degradation immediately downstream of facility.
XY	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.

INC A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

N/A A3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.

N/A A4. Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.

N/A A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.

N/A A6. Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.

N/A A7. Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).

INC 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)*

N/A 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 (½) of the wetland surface area is planted.

___ B7. Topsoil or wetland mulch provided to support vigorous growth of wetland plants.

N/A B8. Planting zones staked or flagged in field and locations subsequently established by appropriate field surveying methods for record drawing presentation.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

V. Group C - Infiltration Practices

(Includes C-1 Infiltration Trench; C-2 Infiltration Trench; C-3 Infiltration Basin; and C-4 Infiltration Basin)

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)

N/A 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.

N/A 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)

N/A 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.

N/A 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)*

N/A 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.

N/A 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.

N/A SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.

N/A SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).

N/A 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.

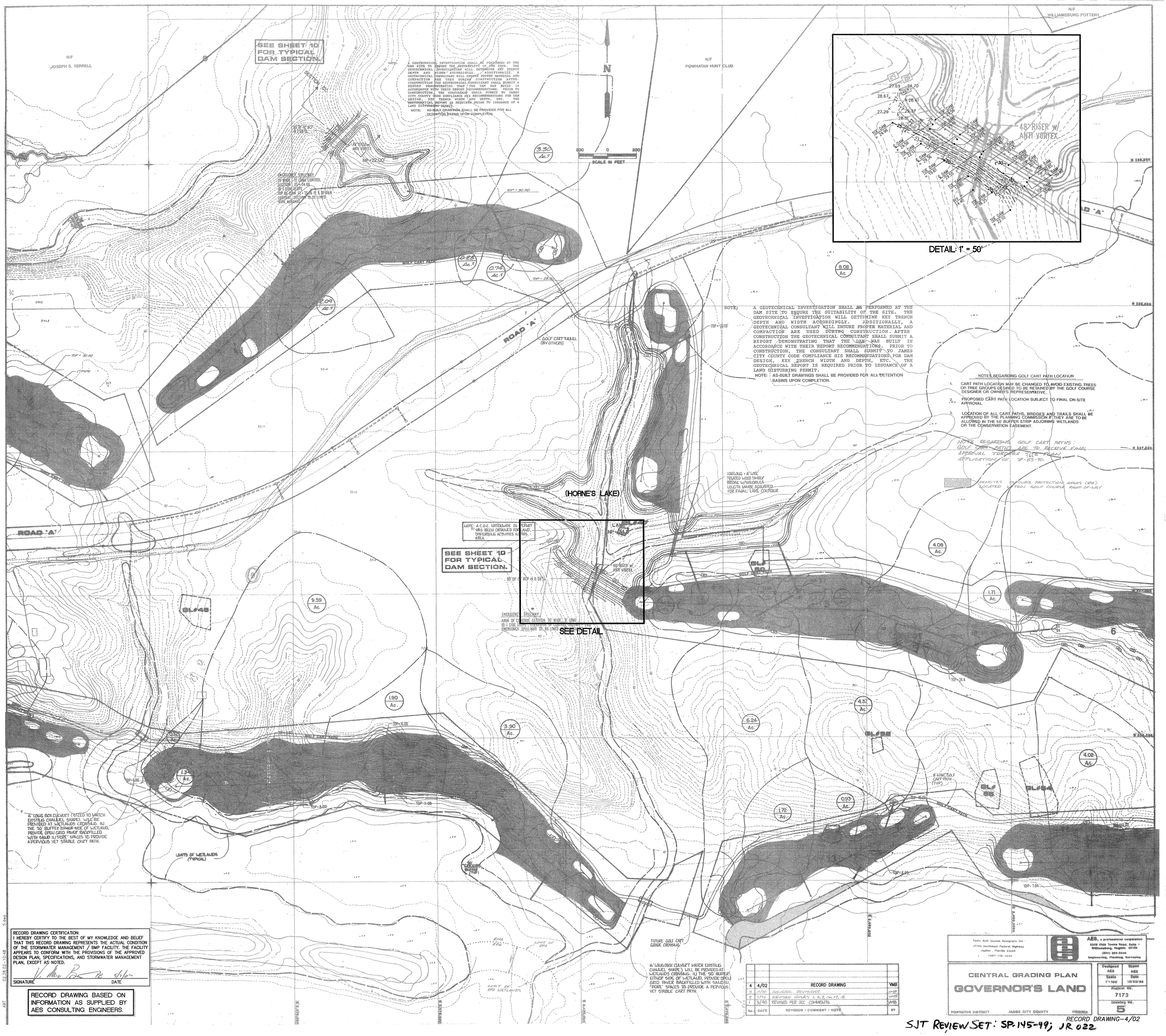
N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

XIII. References

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

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

File: Shared\SWMProg\BMP\Certif\RDCC.wpd



RECORD DRAWING-4/02

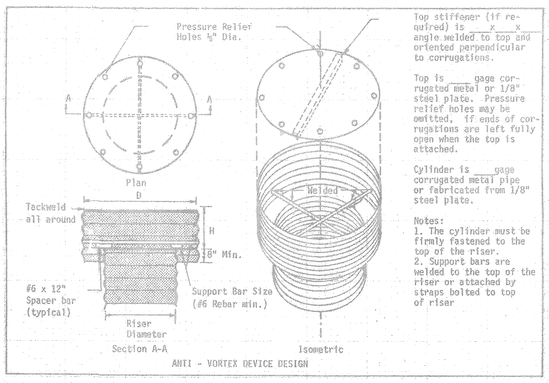
SJT Review Set: SP-145-99; JR 022

JR022_GOVERNORS_LAND_HORNES_LAKE - 021

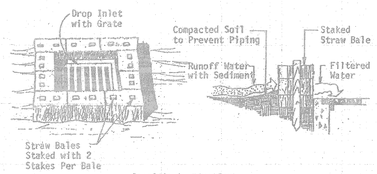
EROSION AND SEDIMENT CONTROL NOTES

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.

1. All erosion and sediment control measures shall be installed and maintained in accordance with the "Virginia Erosion and Sediment Control Handbook". The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.
2. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within State right-of-ways.
3. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before upslope land disturbance takes place. Earthen structures such as dams, dikes, and diversions must be seeded and mulched 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.
4. 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.
5. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 1.16) shall be installed prior to the end of each working day.
6. 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.
7. The contractor shall strip and pile topsoil at the locations shown on this plan or as directed by the engineer. Silt fence shall be placed at the toe of the stockpile after stripping of topsoil is complete.
8. The contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of same. This includes installation of erosion control stone where required. Any drainage outfalls required for a street must be completed before street grading begins.
9. 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 dormant (undisturbed) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
10. No more than 300' 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).
11. If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 1.75. Seeding will then take place as soon as the season permits.
12. The term Seeding, Final Vegetative Cover or Stabilization, on this site plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime, and fertilizer in accordance with Specification 1.66, Permanent Seeding. Irrigation shall be required as necessary to ensure establishment of grass cover.
13. All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 1.75, Mulching and Manufacturer's Instructions.
14. Inlet protection in accordance with Specification 1.08 shall be provided for all storm drain inlets as soon as practical following construction of same.
15. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.
16. Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to these areas where grades exceed 3%.
17. Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.
18. 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.
19. All paved and/or piped outfalls will be constructed before road grading and utility installation begins.
20. AS-BUILT DRAWINGS SHALL BE PROVIDED FOR ALL DENTENTION BASINS UPON COMPLETION.



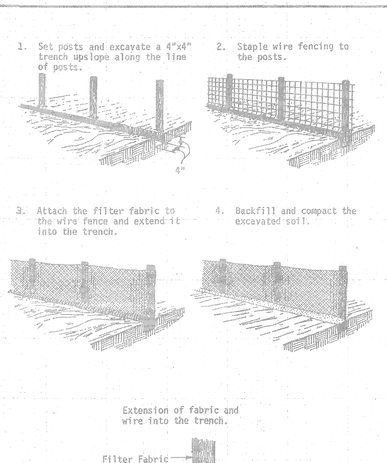
ANTI - VORTEX DEVICE DESIGN



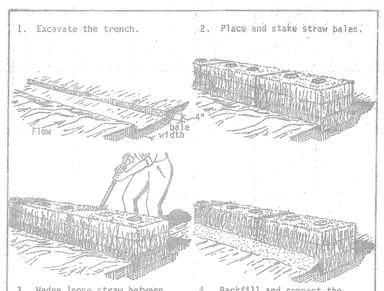
Specific Application

This method of inlet protection is applicable where the inlet drains a relatively flat area (slopes no greater than 5 percent) where sheet or overland flows (not exceeding 0.5 cfs) are typical. The method shall not apply to inlets receiving concentrated flows, such as in street or highway medians.

(IP) STRAW BALE DROP INLET SEDIMENT FILTER

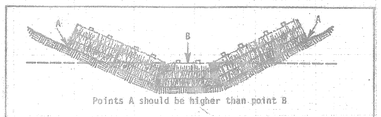


(SF) CONSTRUCTION OF A SILT FENCE

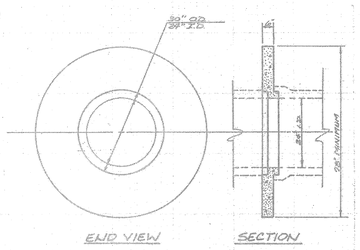


CONSTRUCTION OF A STRAW BALE BARRIER

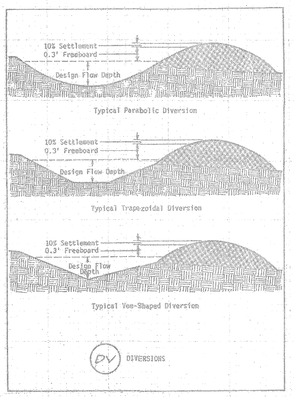
Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant — Plate 1.05c



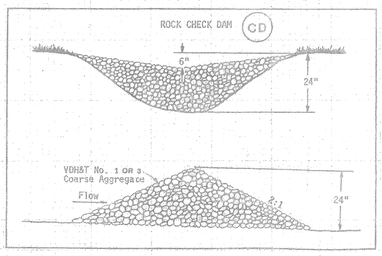
PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY

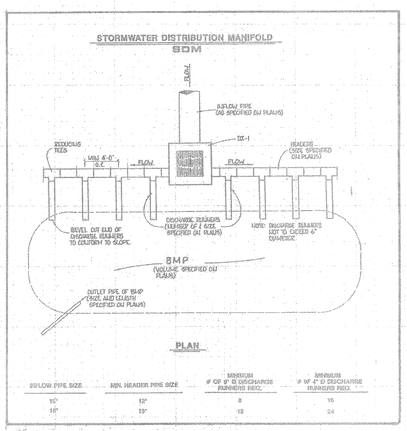


ANTI-SEEP COLLAR DETAIL
N.T.S.

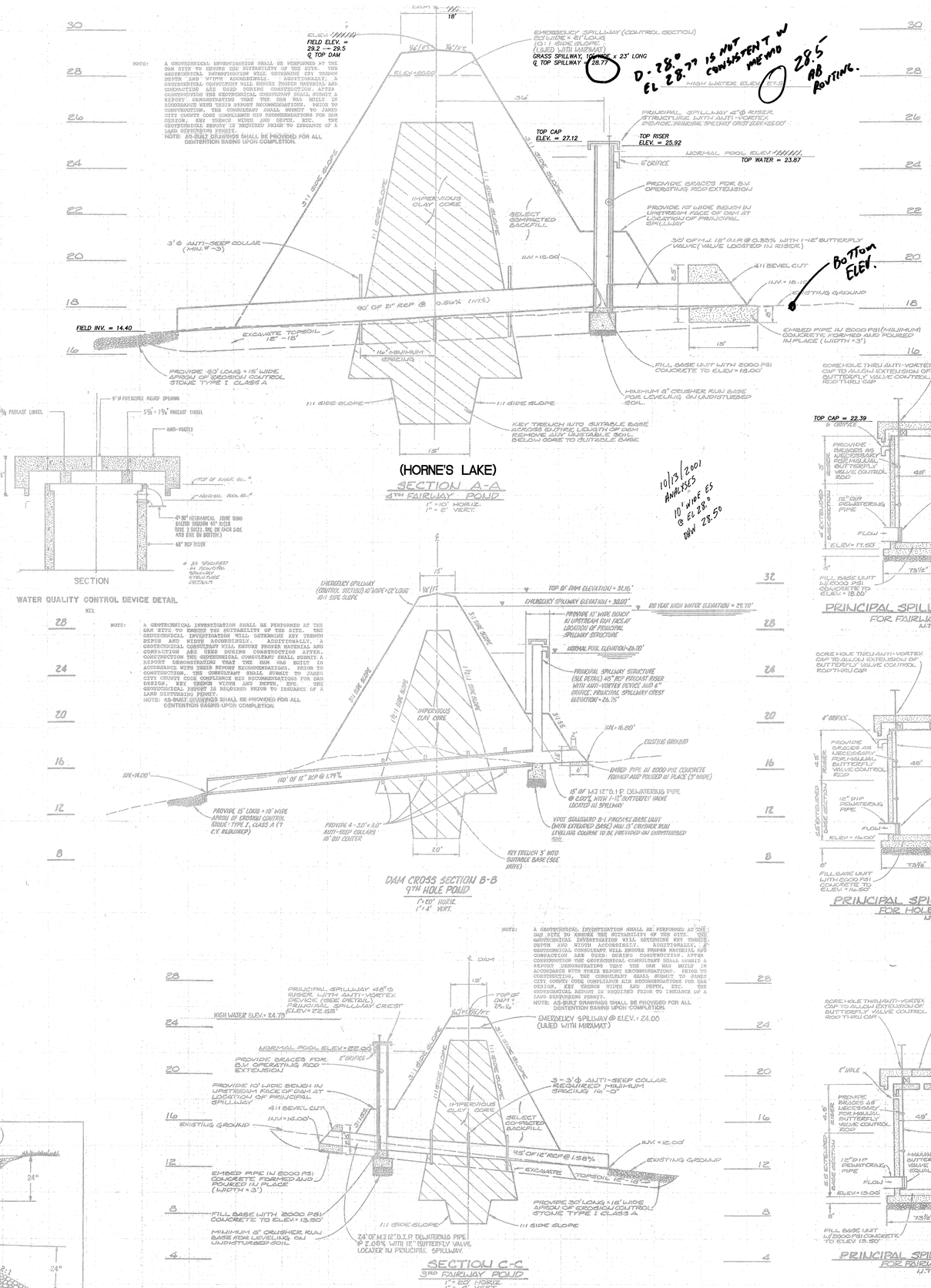


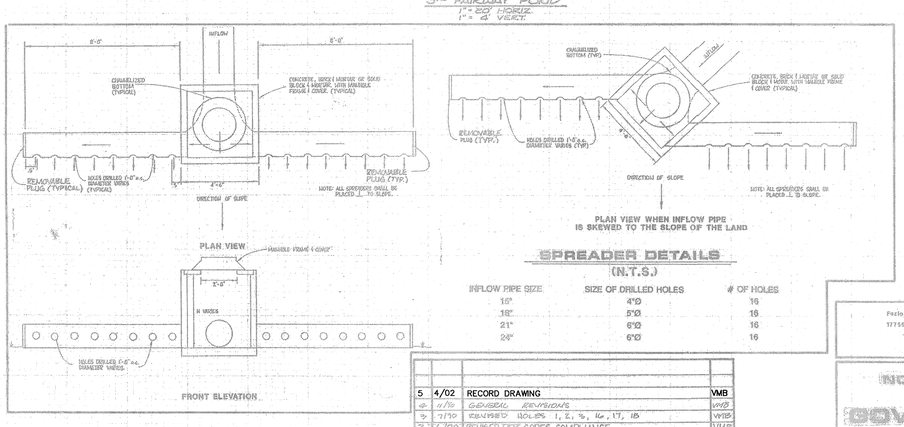
(DV) DIVERSIONS





INFLOW PIPE SIZE	MIN. HEADER PIPE SIZE	MINIMUM # OF 6" Ø DISCHARGE PERFORATED PIPES REQ.	MINIMUM # OF 4" Ø DISCHARGE PERFORATED PIPES REQ.
12"	12"	8	16
18"	15"	12	24





SPREADER DETAILS
(N.T.S.)

INFLOW PIPE SIZE	SIZE OF DRILLED HOLES	# OF HOLES
15"	4"Ø	16
18"	5"Ø	16
21"	6"Ø	16
24"	6"Ø	16

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

_____ (SEAL)
VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
5	4/02	RECORD DRAWING	VMB
4	11/10	GENERAL REVISIONS	VMB
3	7/10	REVISED HOLES 1, 2, 3, 16, 17, 18	VMB
2	6/90	REVISED PER CODES COMPLIANCE.	VMB
1	5/90	REVISED PER JCC COMMENTS	VMB

Fazio Golf Course Designers, Inc.
17756 Southeast Federal Highway
Jupiter, Florida 33468
(407) 746-4339

AES, a professional corporation
6248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23185
(804) 253-0040
Engineering, Planning, Surveying

NOTES AND DETAILS

GOVERNOR'S LAND

BOTTOMTAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed: AES	Drawn: SAN
Scale: 1"=20'	Date: 12/13/00
Project No. 2172	
Drawing No. 10	

RECORD DRAWING—4/02

AWT 05.02.02 - 13:25 10.dwg

JR022_GOVERNORS_LAND_HORNES_LAKE - 022

EROSION AND SEDIMENT CONTROL NOTES

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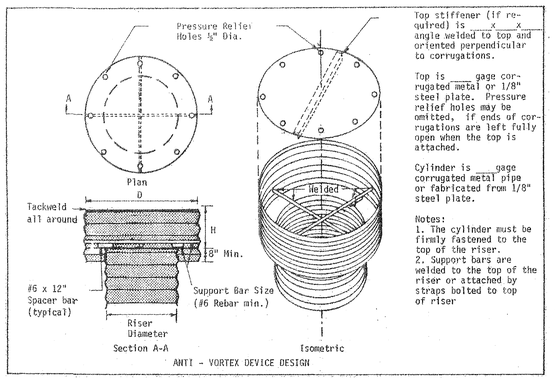


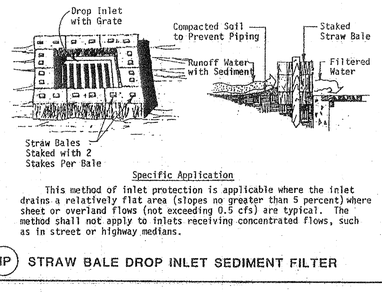
Top stiffener (if required) is ___x___x___ angle welded to top and oriented perpendicular to corrugations.

Top is ___ gage corrugated metal or 1/8" steel plate. Pressure relief holes may be omitted, if ends of corrugations are left fully open when the top is attached.

Cylinder is ___ gage corrugated metal pipe or fabricated from 1/8" steel plate.

Notes:
1. The cylinder must be firmly fastened to the top of the riser.
2. Support bars are welded to the top of the riser or attached by straps bolted to top of riser

ANTI - VORTEX DEVICE DESIGN



Specific Application

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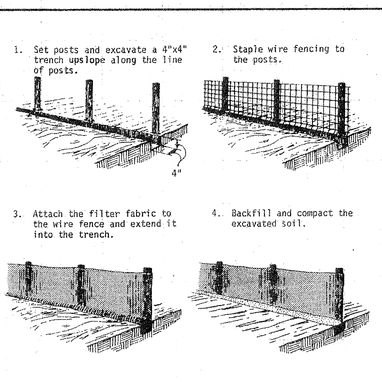
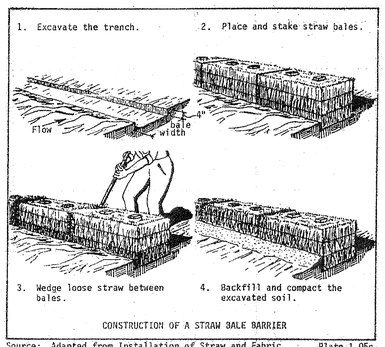
IP STRAW BALE DROP INLET SEDIMENT FILTER

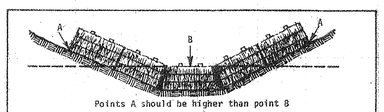


SF CONSTRUCTION OF A SILT FENCE



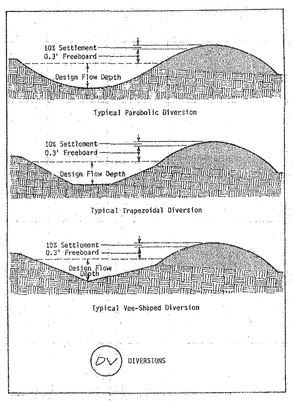
CONSTRUCTION OF A STRAW BALE BARRIER

Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant — Plate 1.05c

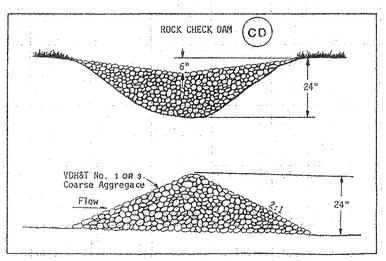


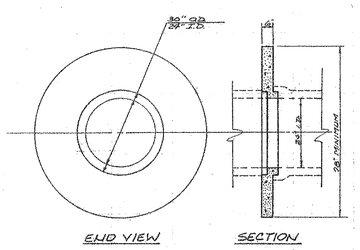
Points A should be higher than point B

PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY

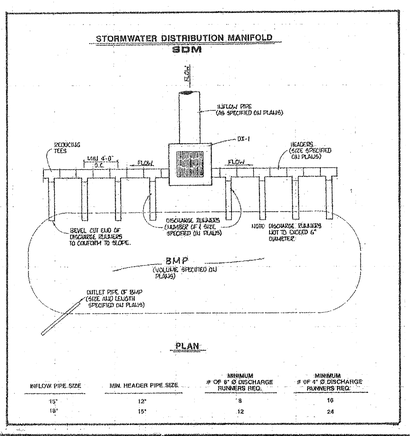


DV DIVERSIONS

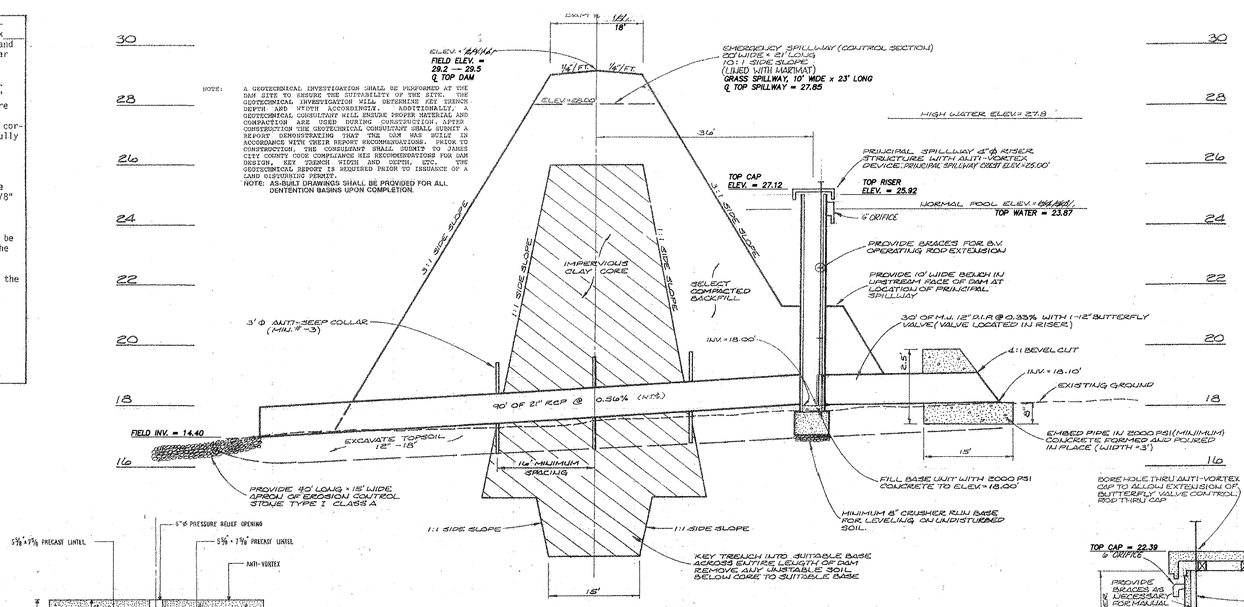




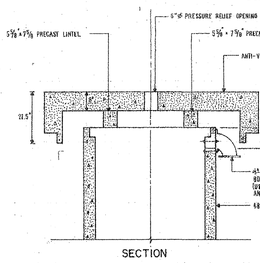
ANTI-SEEP COLLAR DETAIL
N.T.S.



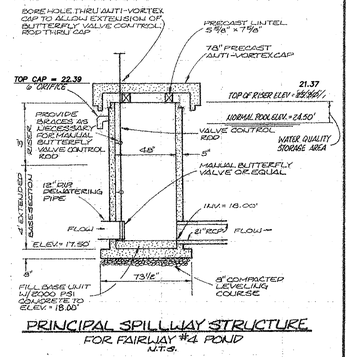
INFLOW PIPE SIZE	MIN. HEADER PIPE SIZE	MINIMUM # OF 8" Ø DISCHARGE RUNNERS REQ.	MINIMUM # OF 6" Ø DISCHARGE RUNNERS REQ.
15"	12"	8	16
18"	15"	12	24



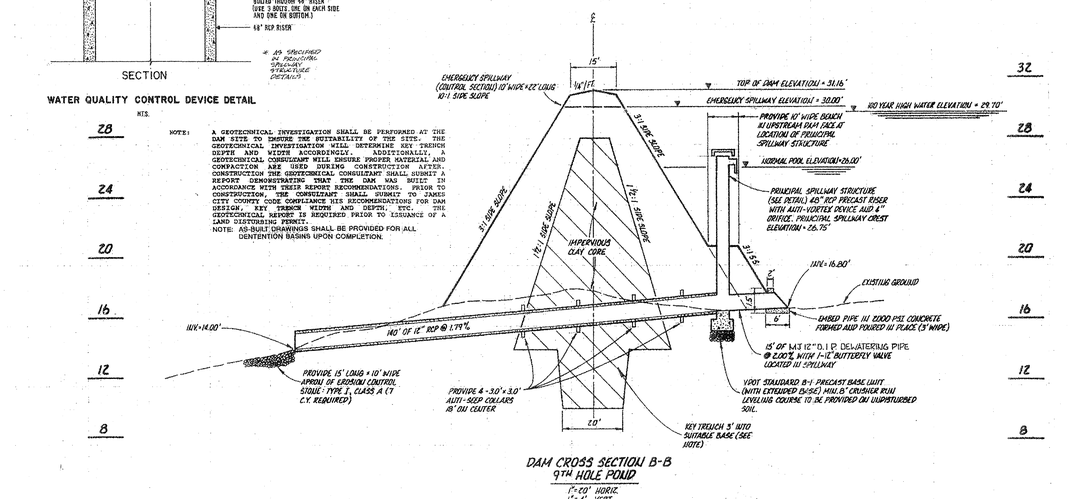
(HORNE'S LAKE)
SECTION A-A
4TH FAIRWAY POND
1" = 10' HORIZ.
1" = 2' VERT.



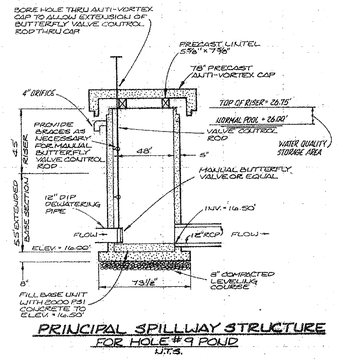
WATER QUALITY CONTROL DEVICE DETAIL
N.T.S.



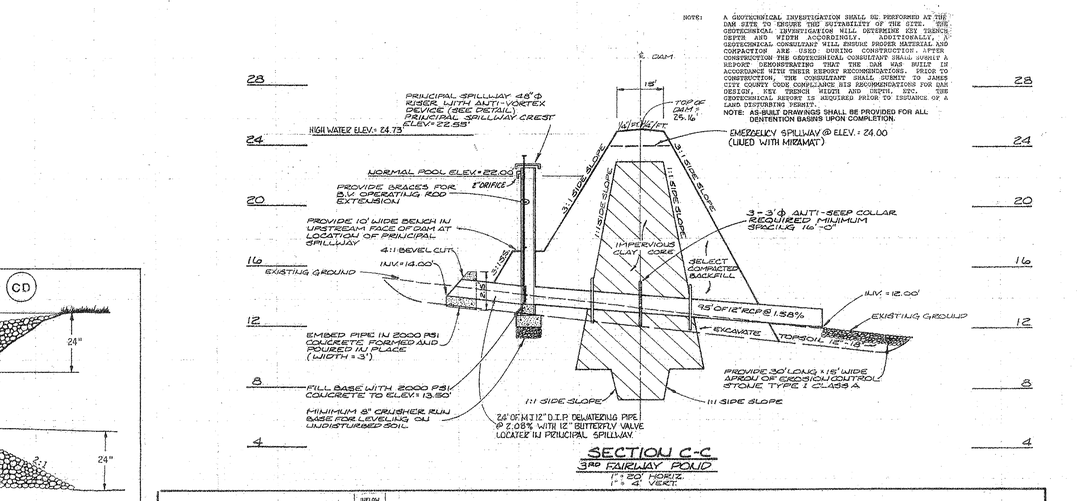
PRINCIPAL SPILLWAY STRUCTURE
FOR FAIRWAY #4 POND
N.T.S.



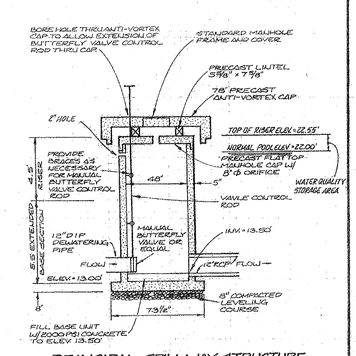
DAM CROSS SECTION B-B
9TH HOLE POND
1" = 20' HORIZ.
1" = 4' VERT.



PRINCIPAL SPILLWAY STRUCTURE
FOR HOLE #9 POND
N.T.S.

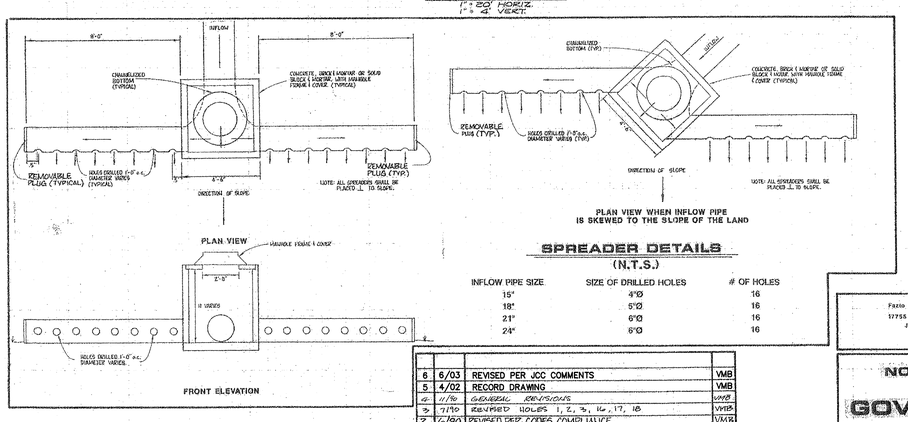


SECTION C-C
3RD FAIRWAY POND
1" = 20' HORIZ.
1" = 4' VERT.



PRINCIPAL SPILLWAY STRUCTURE
FOR FAIRWAY #3 POND
N.T.S.

APPROVED
James City County
Environmental Division
By: [signature]
Date: 6-25-03



SPREADER DETAILS
(N.T.S.)

INFLOW PIPE SIZE	SIZE OF DRILLED HOLES	# OF HOLES
15"	4"Ø	16
18"	5"Ø	16
21"	6"Ø	16
24"	6"Ø	16

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

(SEAL)
VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
6	6/03	REVISED PER JCC COMMENTS	VMB
5	4/02	RECORD DRAWING	VMB
4	11/96	GENERAL REVISIONS	VMB
3	7/96	REVISED HOLES 1, 2, 3, 16, 17, 18	VMB
2	6/96	REVISED PER CODES COMPLIALICE.	VMB
1	5/96	REVISED PER JCC COMMENTS	VMB

Fazio Golf Course Designers, Inc.
12755 Southeast Federal Highway
Jupiter, Florida 33458
(407) 746-4939

AES, a professional corporation
8248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Engineering, Planning, Surveying

NOTES AND DETAILS

GOVERNOR'S LAND

POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed: AES	Drawn: C.A.N.
Scale: 1"=100'	Date: 12/23/96
Project No. 7173	
Drawing No. 10	

RECORD DRAWING-4/02

AWF 02.26.03-16:51 HornesLakeDetail.dwg
JR022_GOVERNORS_LAND_HORNES_LAKE - 023

AES CONSULTING ENGINEERS
Engineering, Surveying and Planning
5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

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

LETTER OF TRANSMITTAL

DATE	JOB NO.
5/02/02	7173-00

ATTENTION

RE: Governor's Land BMP As-Builts

TO James City Environmental Division

SP-45-89
JR022

RECEIVED MAY 2002 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
1			Excerpt from Geo-Technical Report for Fowler's Lake
1			Excerpt from Geo-Technical Report for Winfield Lake
2			Record Drawings for Timber Structures #1, #2, #3, #4 in Phase 1
2			Record Drawings for Winfield Lake
2			Record Drawings for Hornes Lake
2			Record Drawings for Marina BMP
2			Record Drawings for The Harbor BMP
2			Record Drawings for Wythe Hamlet BMP
2			Record Drawings for Nathaniel's Green Timber Structure BMP

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

The Record Drawings in Governor's Land should be the finish of the BMP

COPY TO _____ SIGNED: V. Mac B

If enclosures are not as noted, kindly notify us at once.

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

RECEIVED JUN 2003 ENVIRONMENTAL DIVISION

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

[ ] Shop drawings [X] Prints [X] Plans [ ] Samples [ ] Specifications

[X] Copy of letter [ ] Change order [X] 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:

[X] 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.

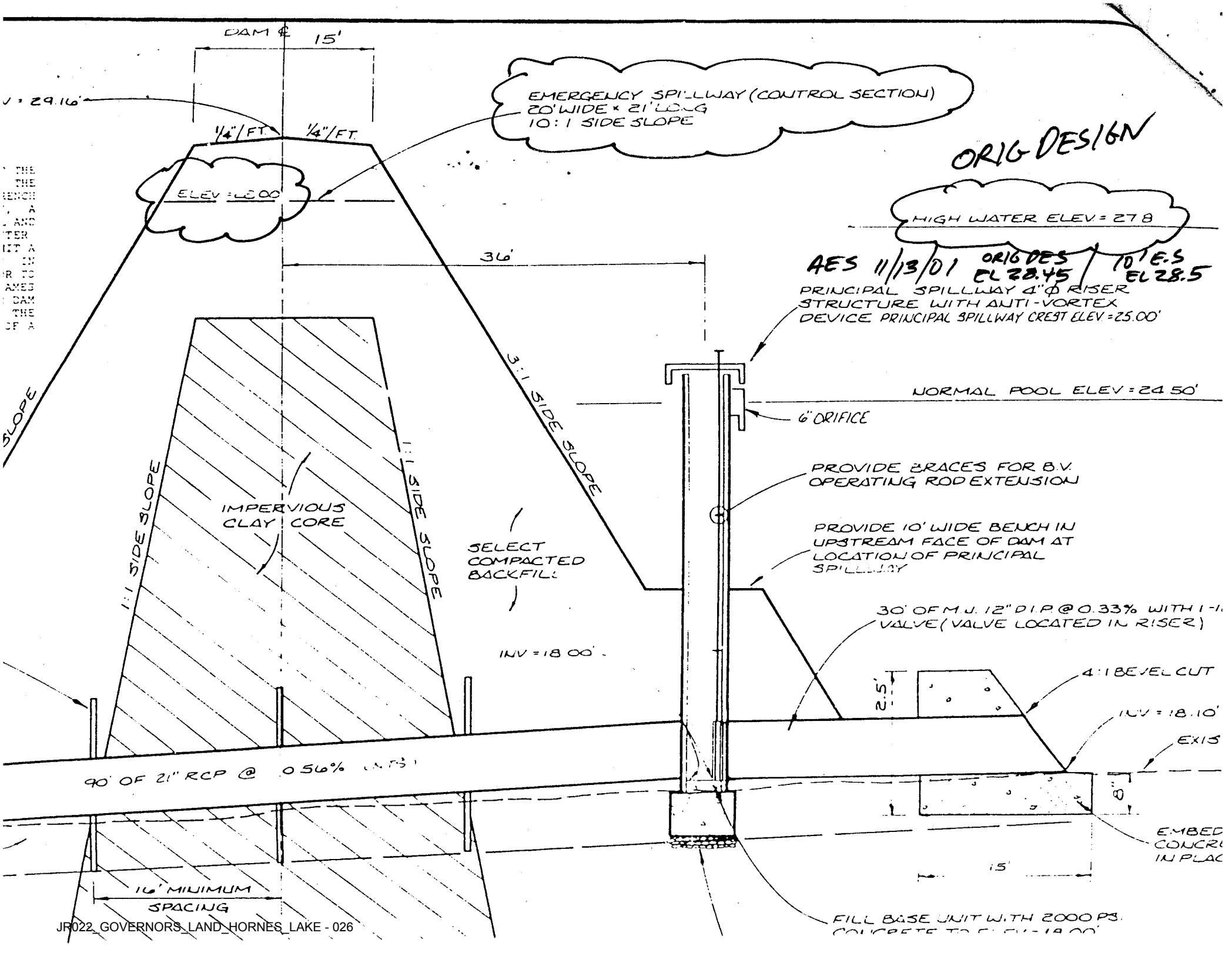
COPIES TO: file

SIGNED: Victoria Bains
Victoria Bains

Rev. 6/17/03

S:\JOBS\7173\09\Wordproc\Document\JCC Transmittal4.doc

JR022_GOVERNORS_LAND_HORNES_LAKE - 025


DAM ℄
15'
V = 29.16'
1/4"/FT.
1/4"/FT.
EMERGENCY SPILLWAY (CONTROL SECTION)
20' WIDE × 21' LONG
10 : 1 SIDE SLOPE
ORIG DESIGN
ELEV = 22.00
HIGH WATER ELEV. = 27.8
36'
AES 11/13/01 ORIG DES EL 28.45 / TO E.S EL 28.5
PRINCIPAL SPILLWAY 4"Φ RISER STRUCTURE WITH ANTI-VORTEX DEVICE PRINCIPAL SPILLWAY CREST ELEV = 25.00'
3:1 SIDE SLOPE
NORMAL POOL ELEV = 24.50'
6" ORIFICE
SLOPE
1:1 SIDE SLOPE
IMPERVIOUS CLAY CORE
1:1 SIDE SLOPE
SELECT COMPACTED BACKFILL
PROVIDE BRACES FOR B.V. OPERATING ROD EXTENSION
PROVIDE 10' WIDE BENCH IN UPSTREAM FACE OF DAM AT LOCATION OF PRINCIPAL SPILLWAY
INV = 18.00'
30' OF M.J. 12" D.I.P. @ 0.33% WITH 1-1
VALVE (VALVE LOCATED IN RISER)
2.5'
4:1 BEVEL CUT
INV = 18.10'
EXIS
90' OF 21" RCP @ 0.56%
8"
EMBED
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15'
16' MINIMUM SPACING
FILL BASE UNIT WITH 2000 PS.

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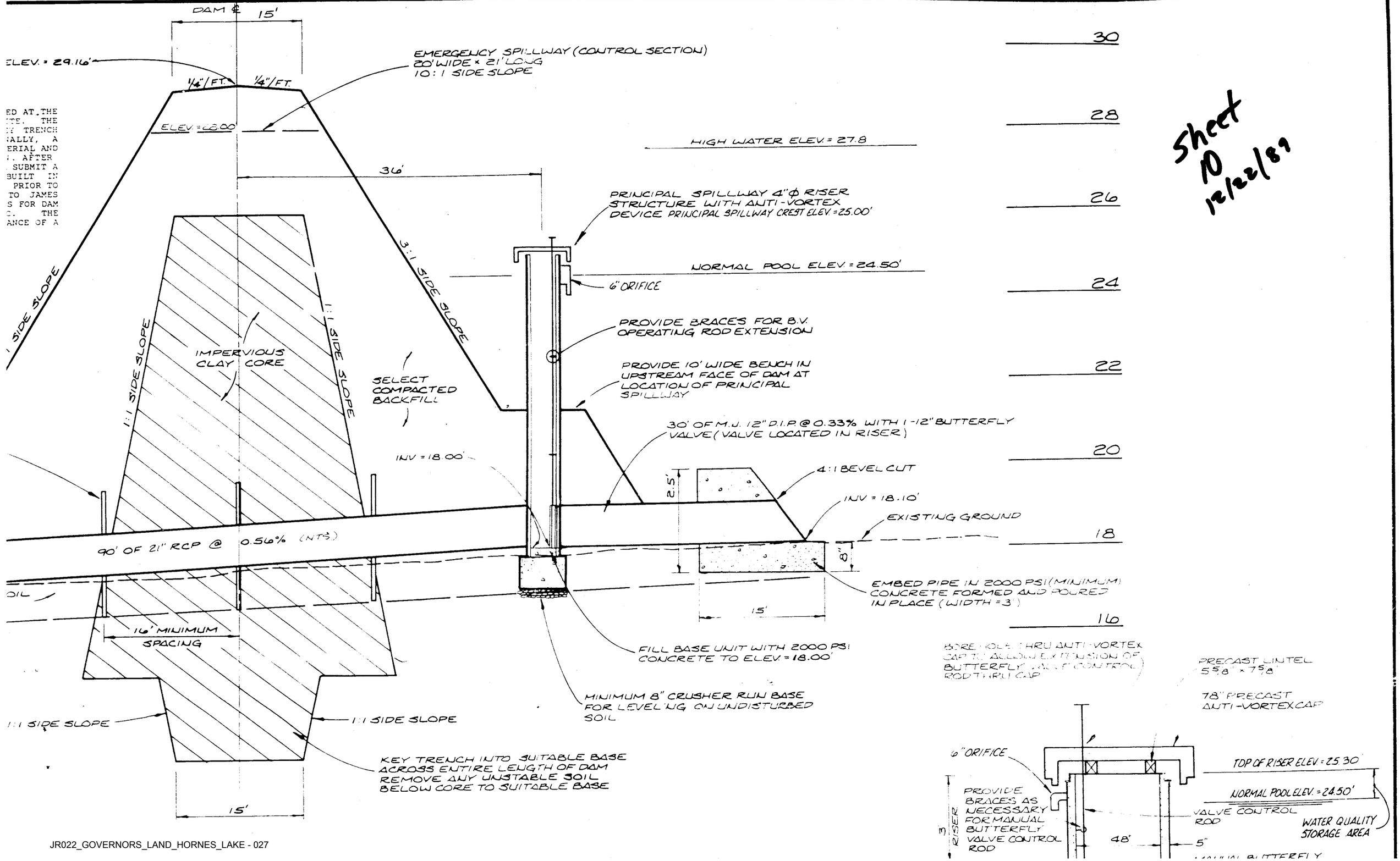
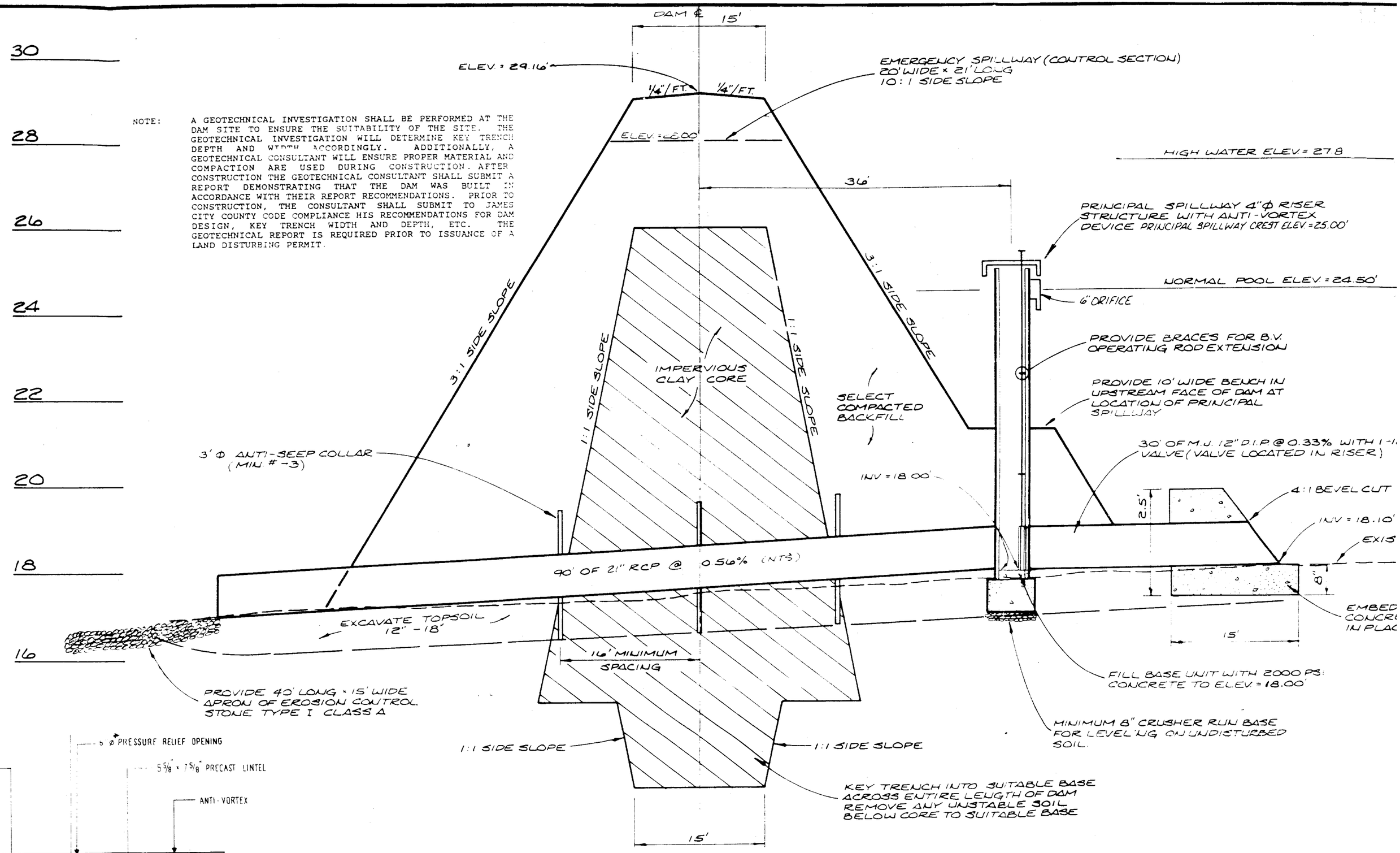
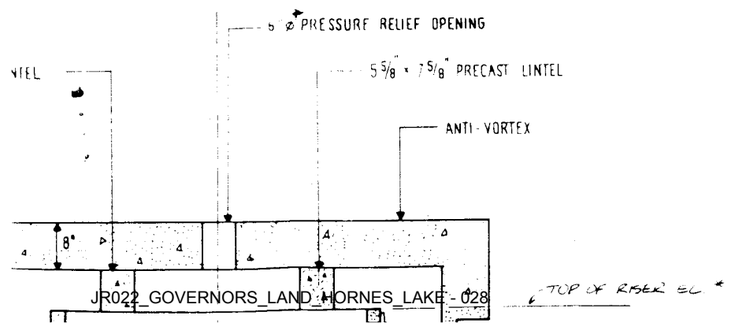


Sheet 10 12/22/89

JR022_GOVERNORS_LAND_HORNES_LAKE - 027

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.

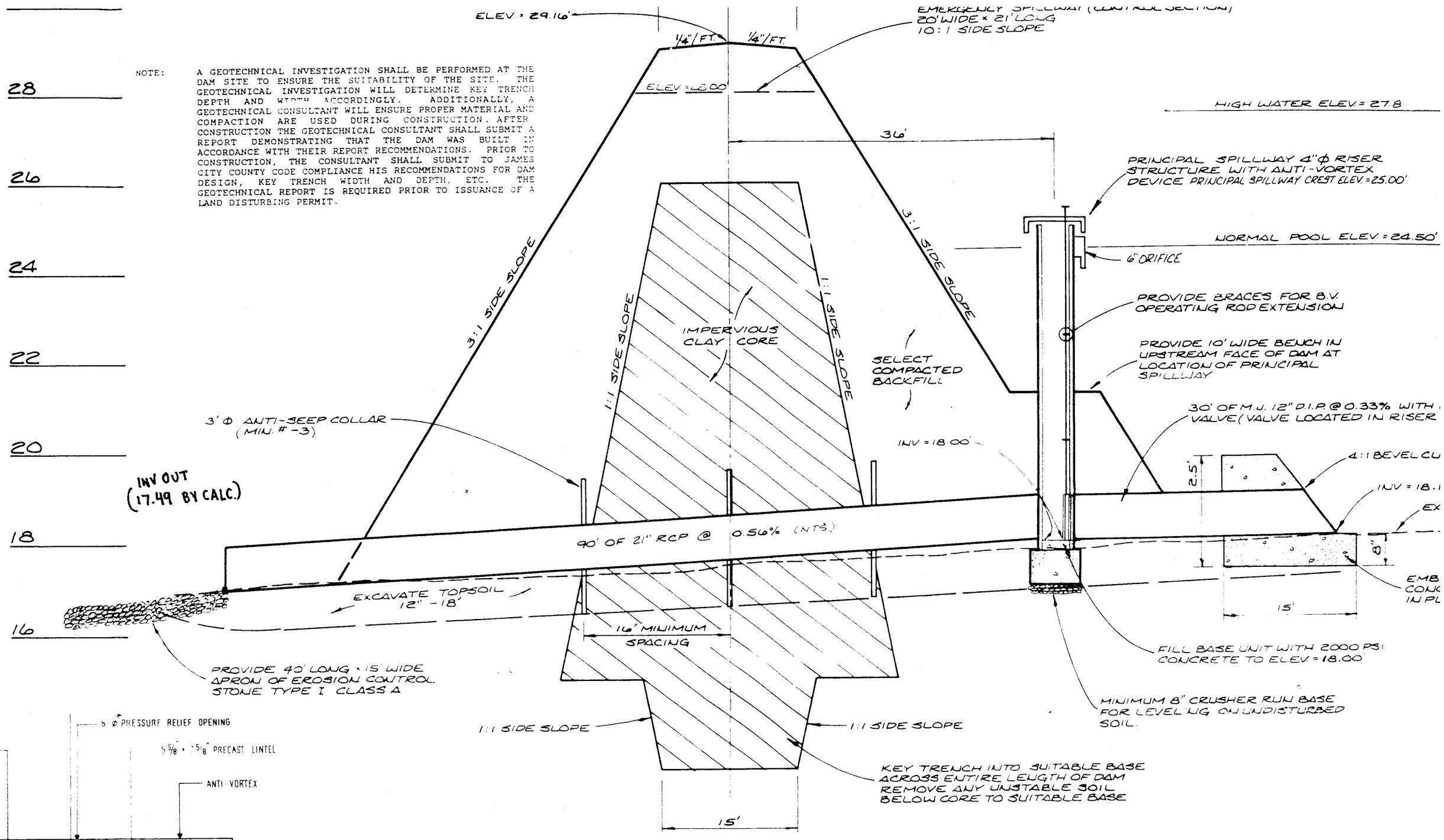


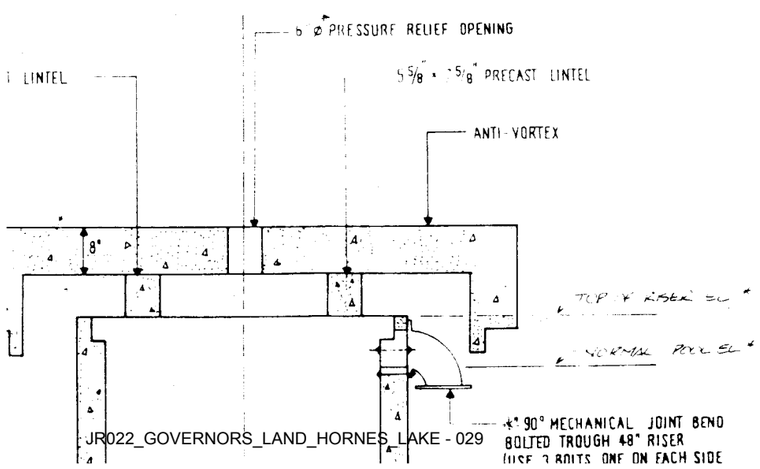


SECTION A-A

JR022_GOVERNORS_LAND_HORNES_LAKE - 028

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.





SECTION A-A
4TH FAIRWAY POND

1" = 10' HORIZ.
1" = 2' VERT.

HORNES LAKE

Horner

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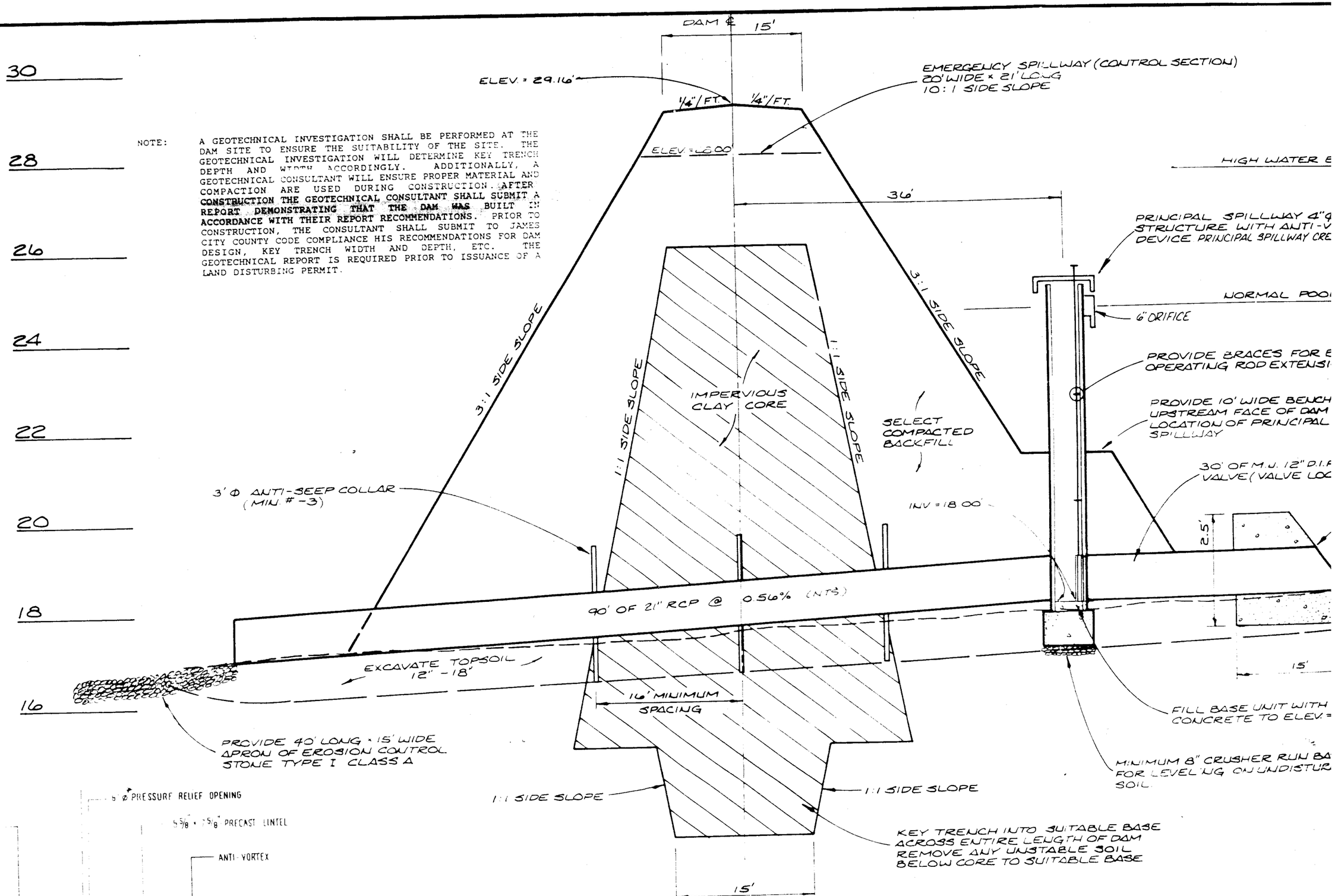
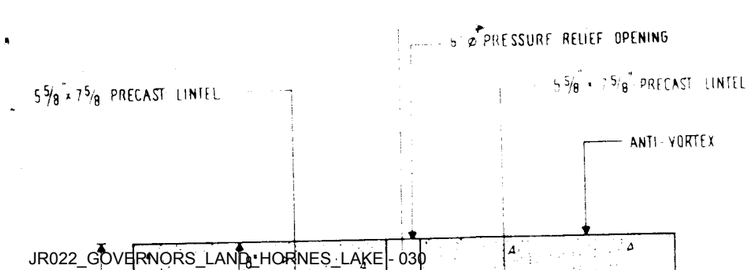
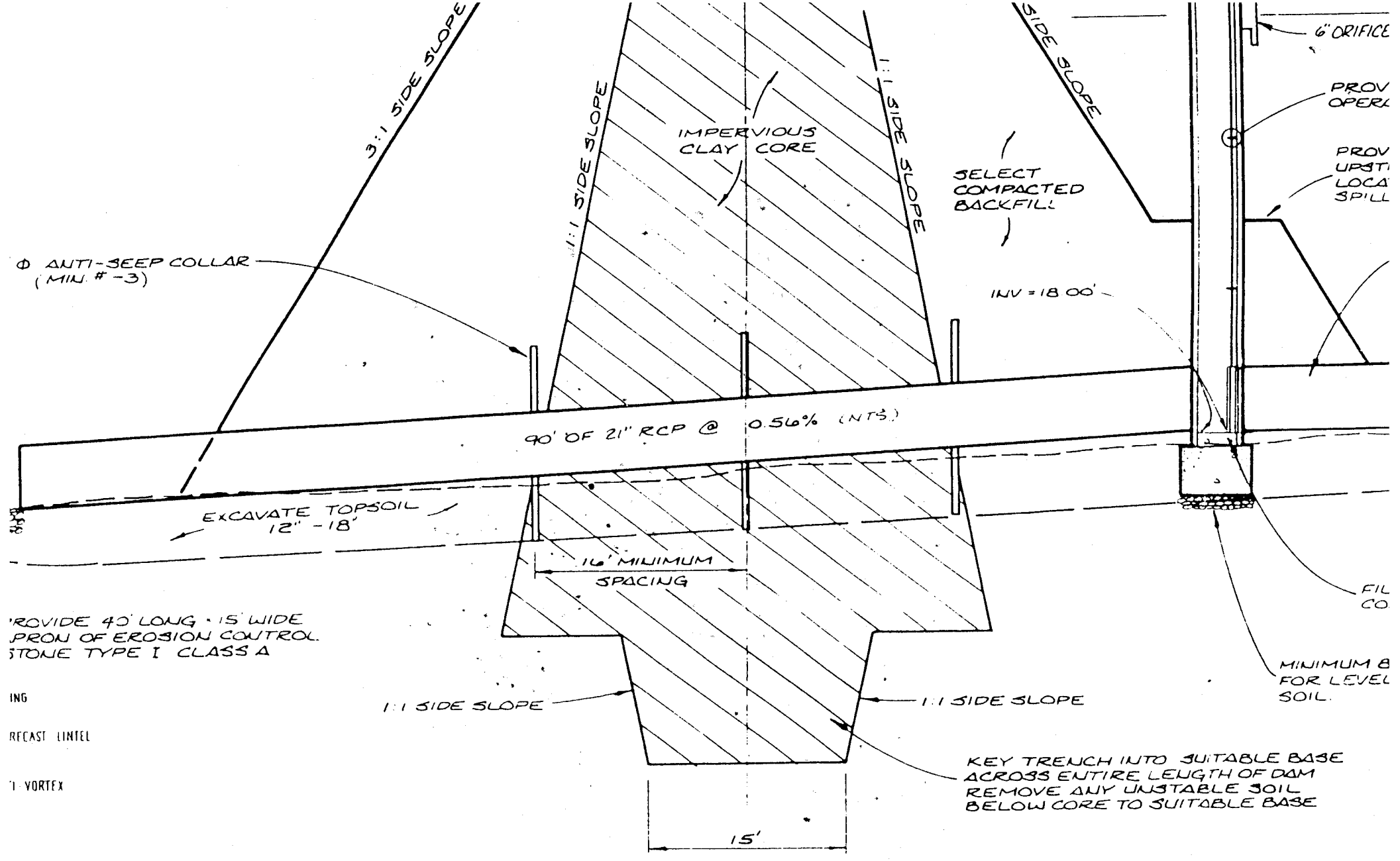
NOTE: A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED AT THE DAM SITE TO ENSURE THE SUITABILITY OF THE SITE. THE GEOTECHNICAL INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. ADDITIONALLY, A GEOTECHNICAL CONSULTANT WILL ENSURE PROPER MATERIAL AND COMPACTION ARE USED DURING CONSTRUCTION. **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.







PROVIDE 40' LONG · 15' WIDE
APRON OF EROSION CONTROL
STONE TYPE I CLASS A

ING

RECAST LINTEL

'I VORTEX

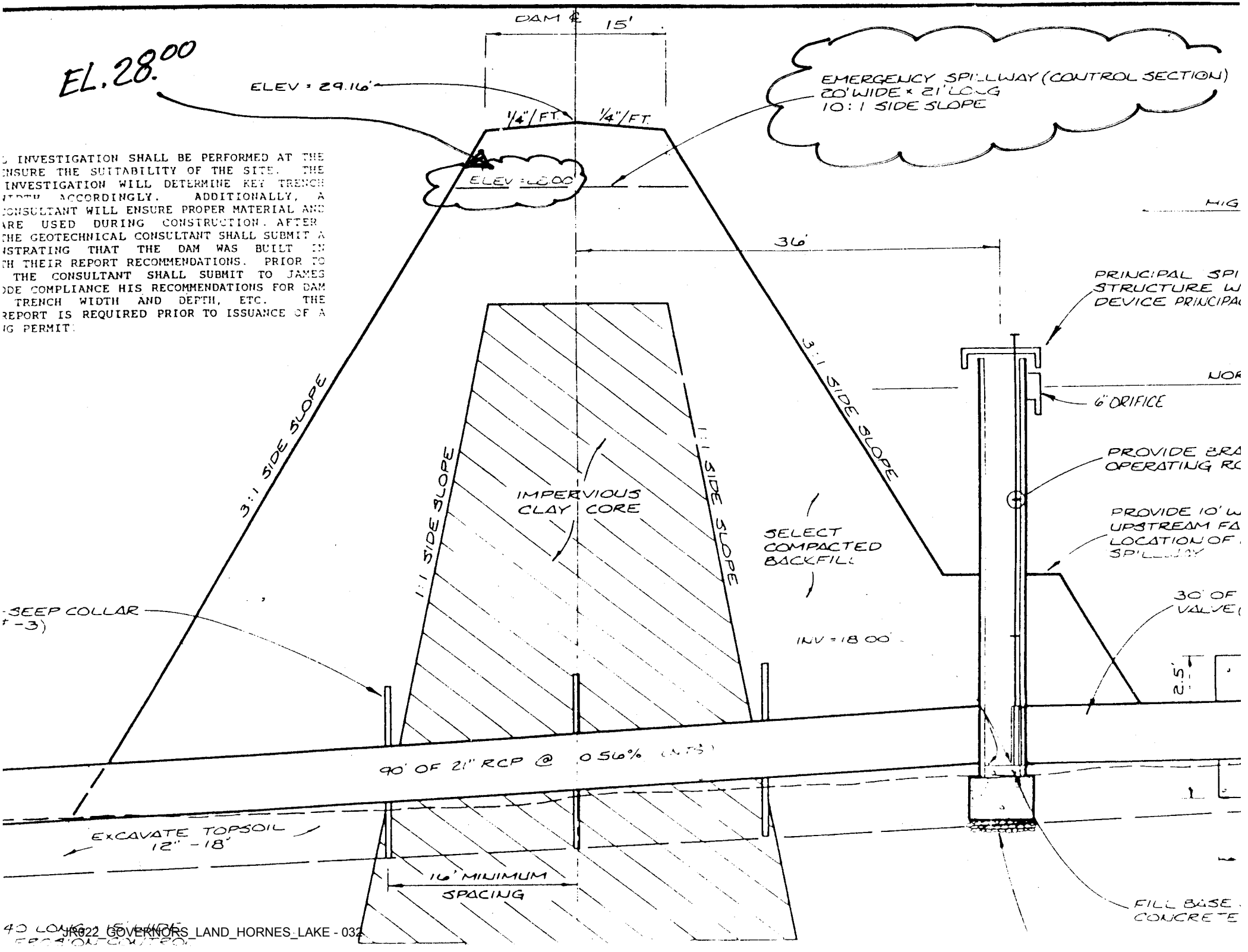
- 4" 90° MECHANICAL JOINT BEND
BOLTED TROUGH 48" RISER
USE 2 BOLTS ONE ON EACH SIDE

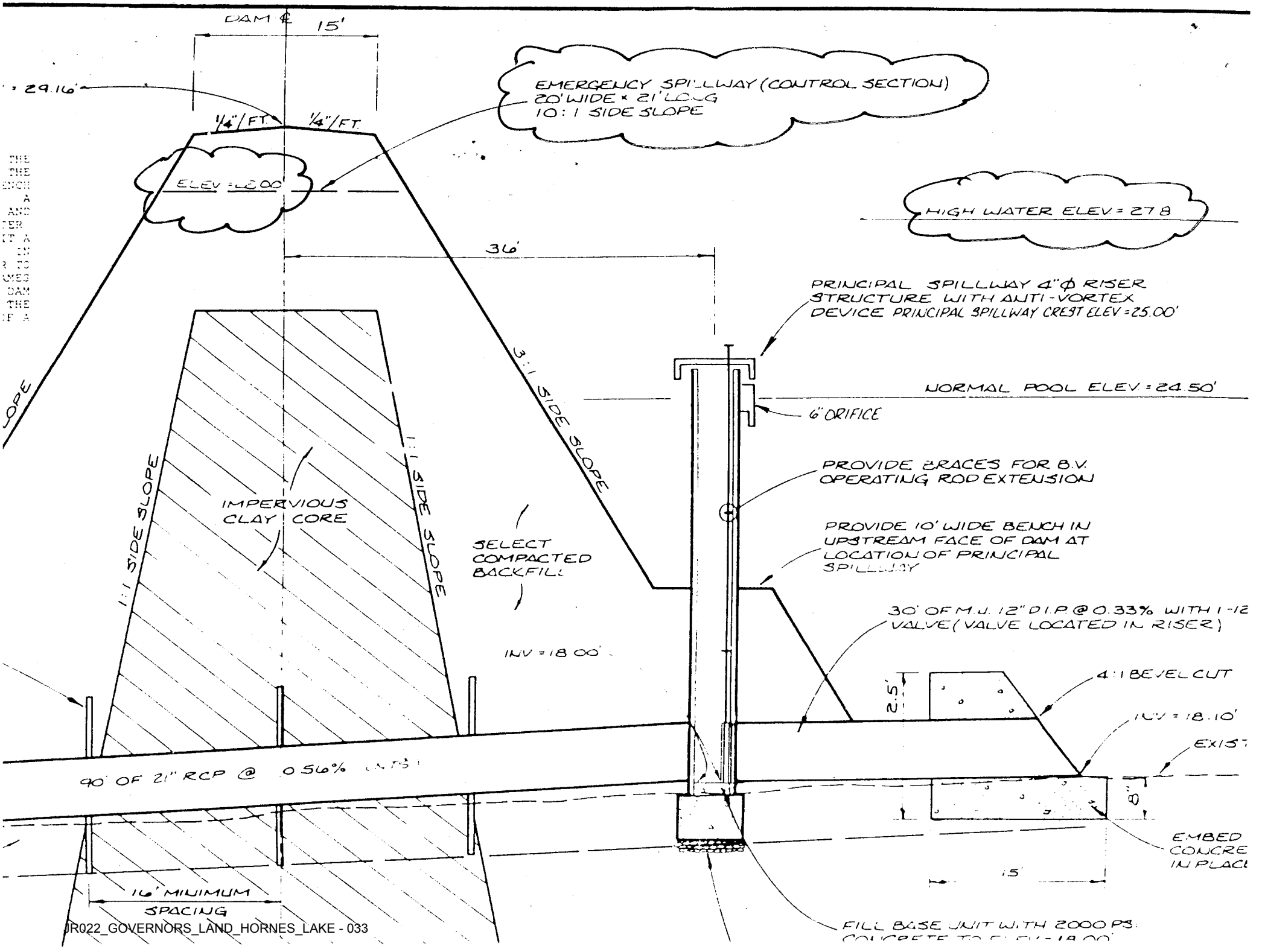
SECTION A-A
4TH FAIRWAY POND

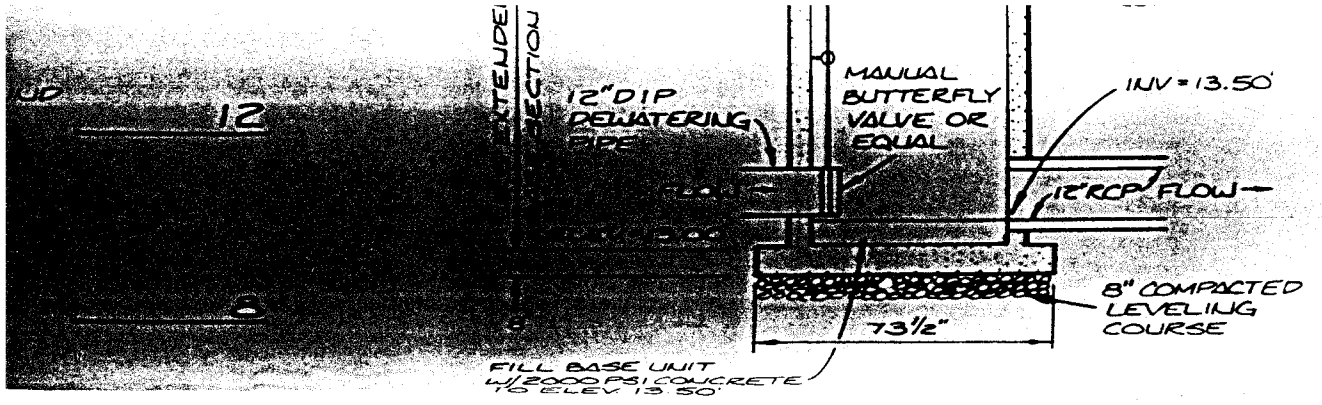
1" = 10' HORIZ.
1" = 2' VERT.

Hornes

JAN02 GOVERNORS_LAND_HORNES_LAKE - 031


EL. 28.00
DAM ℄
15'
ELEV = 29.16'
1/4"/FT.
1/4"/FT.
EMERGENCY SPILLWAY (CONTROL SECTION)
20' WIDE × 21' LONG
10 : 1 SIDE SLOPE
ELEV = 28.00
INVESTIGATION SHALL BE PERFORMED AT THE
ENSURE THE SUITABILITY OF THE SITE. THE
INVESTIGATION WILL DETERMINE KEY TRENCH
ACCORDINGLY. ADDITIONALLY, A
CONSULTANT WILL ENSURE PROPER MATERIAL AND
ARE USED DURING CONSTRUCTION. AFTER
THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A
STRATING THAT THE DAM WAS BUILT IN
TH THEIR REPORT RECOMMENDATIONS. PRIOR TO
THE CONSULTANT SHALL SUBMIT TO JAMES
DE COMPLIANCE HIS RECOMMENDATIONS FOR DAM
TRENCH WIDTH AND DEPTH, ETC. THE
REPORT IS REQUIRED PRIOR TO ISSUANCE OF A
G PERMIT.
36'
3 : 1 SIDE SLOPE
3 : 1 SIDE SLOPE
1 : 1 SIDE SLOPE
1 : 1 SIDE SLOPE
IMPERVIOUS CLAY CORE
SELECT COMPACTED BACKFILL
INV = 18.00'
SEEP COLLAR
-3)
90' OF 21" RCP @ 0.56%
EXCAVATE TOPSOIL 12" - 18"
16' MINIMUM SPACING
PRINCIPAL SPI
STRUCTURE W
DEVICE PRINCIPA
6" ORIFICE
PROVIDE BRA
OPERATING RO
PROVIDE 10' W
UPSTREAM FA
LOCATION OF
SPILLWAY
30' OF
VALVE
2.5'
FILL BASE
CONCRETE


DAM ℄
15'
= 29.16'
1/4"/FT
1/4"/FT
EMERGENCY SPILLWAY (CONTROL SECTION)
20' WIDE × 21' LONG
10 : 1 SIDE SLOPE
ELEV = 28.00'
HIGH WATER ELEV = 27.8
36'
PRINCIPAL SPILLWAY 4"Φ RISER STRUCTURE WITH ANTI-VORTEX DEVICE PRINCIPAL SPILLWAY CREST ELEV = 25.00'
3 : 1 SIDE SLOPE
NORMAL POOL ELEV = 24.50'
6" ORIFICE
1 : 1 SIDE SLOPE
1 : 1 SIDE SLOPE
IMPERVIOUS CLAY CORE
SELECT COMPACTED BACKFILL
PROVIDE BRACES FOR B.V. OPERATING ROD EXTENSION
PROVIDE 10' WIDE BENCH IN UPSTREAM FACE OF DAM AT LOCATION OF PRINCIPAL SPILLWAY
30' OF M.J. 12" D.I.P. @ 0.33% WITH 1-12 VALVE (VALVE LOCATED IN RISER)
INV = 18.00'
4 : 1 BEVEL CUT
2.5'
INV = 18.10'
EXIST
90' OF 21" RCP @ 0.56% (N.T.S.)
8"
EMBED CONCRE IN PLACE
15'
16' MINIMUM SPACING
FILL BASE UNIT WITH 2000 PSI CONCRETE TO ELEV = 18.00'



4

PRINCIPAL SPILLWAY STRUCTURE
FOR FAIRWAY #3 POND
N.T.S.

Fazio Golf Course Designers, Inc
17755 Southeast Federal Highway
Jupiter, Florida 33458
(407) 746-4539

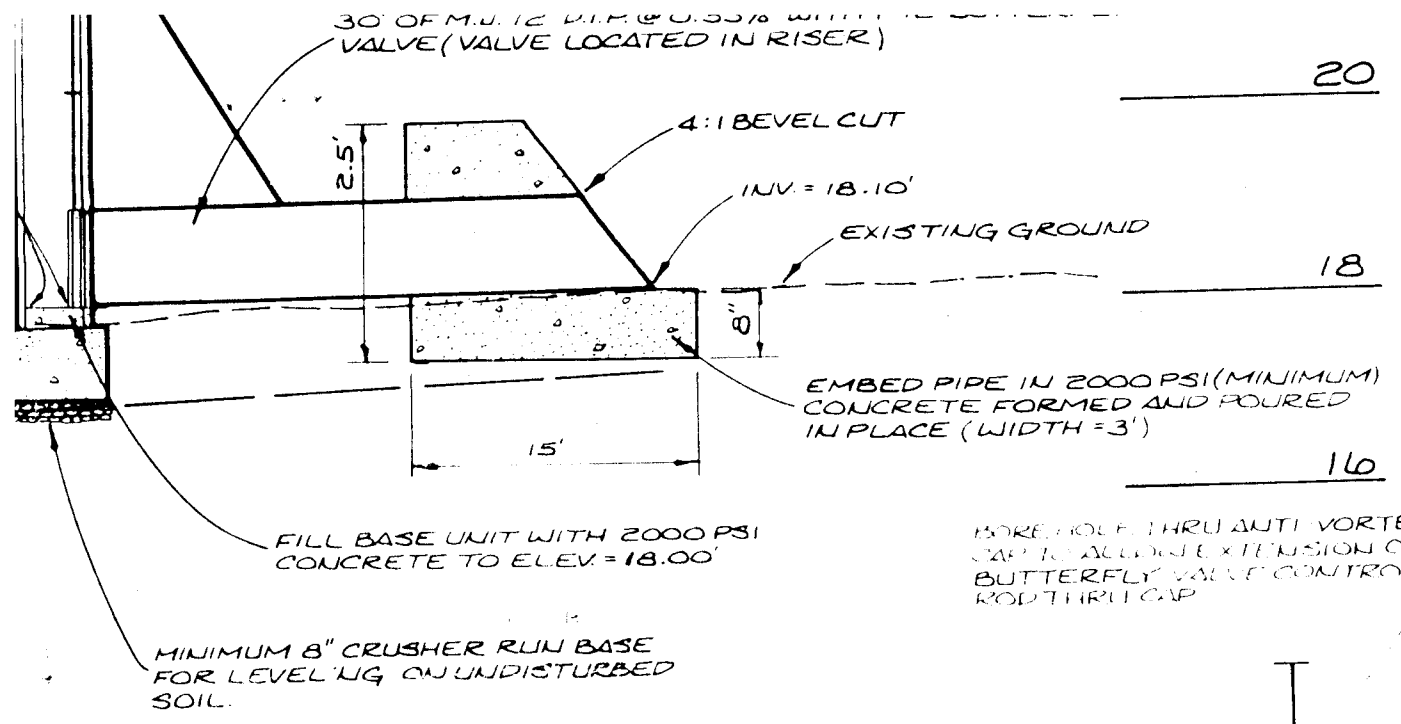
AES, a professional corporation
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23185
(804) 253-0040
Engineering, Planning, Surveying

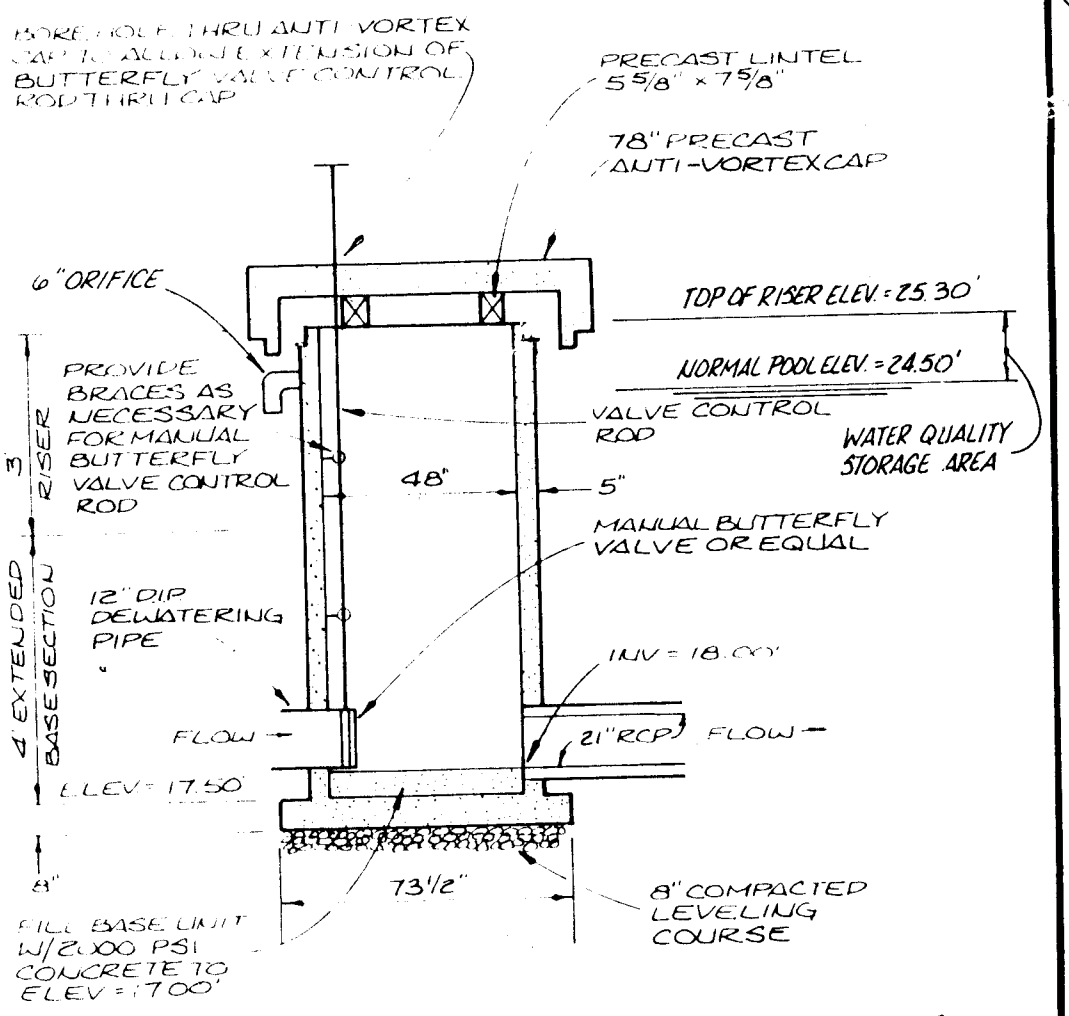
NOTES AND DETAILS

GOVERNOR'S LAND

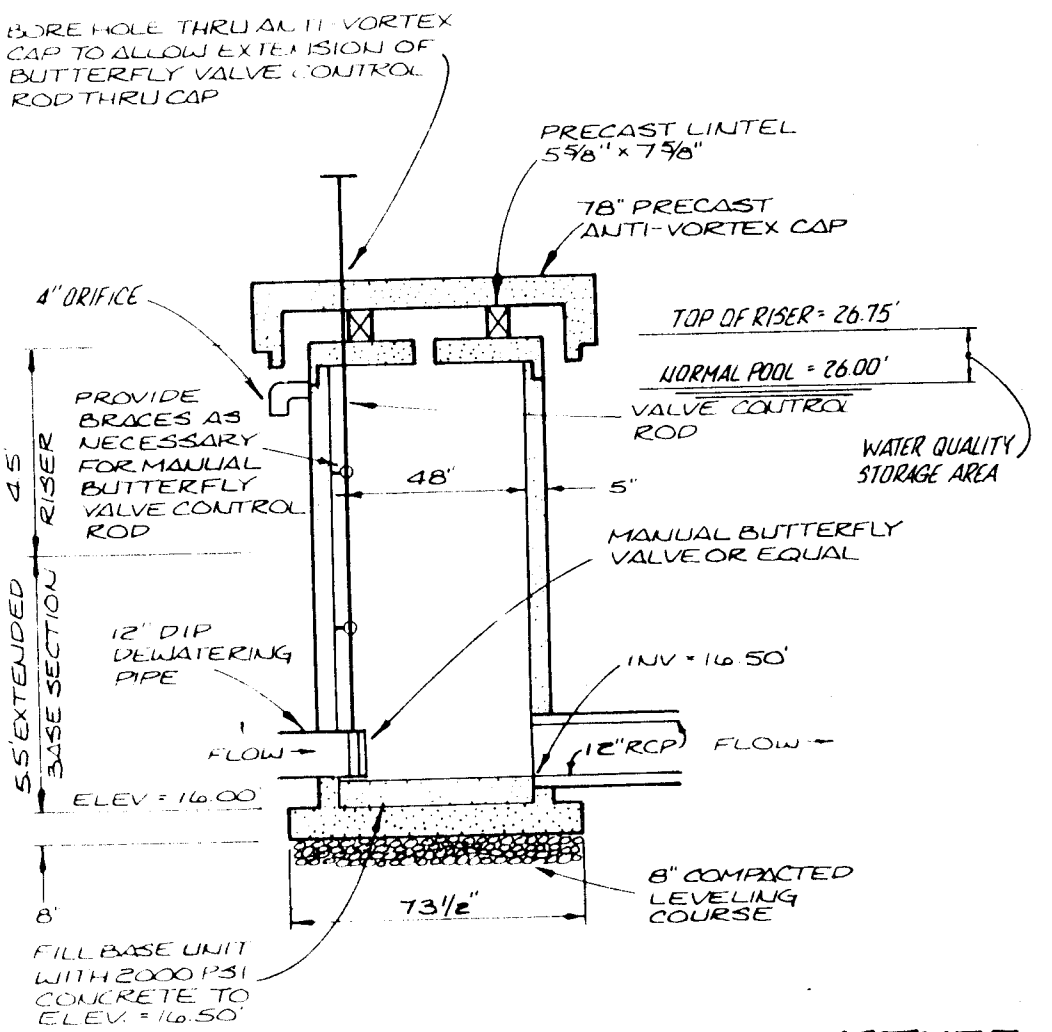
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed AES	Drawn C.A.N.
Scale 1"=100'	Date 12/22/89
Project No. 7173	
Drawing No. 10	





PRINCIPAL SPILLWAY STRUCTURE
FOR FAIRWAY #4 POND
N.T.S.



PRINCIPAL SPILLWAY STRUCTURE
FOR HOLE #9 POND
N.T.S.

32

EVATION = 31.16'

VATION = 30.00'

100 YEAR HIGH WATER ELEVATION = 29.70'

28

'10' WIDE BENCH
EAM DAM FACE AT
' OF PRINCIPAL
' STRUCTURE

POOL ELEVATION = 26.00'

24

CIPAL SPILLWAY STRUCTURE
DETAIL) 48" RCP PRECAST RISER
ANTI-VORTEX DEVICE AND 4"
E. PRINCIPAL SPILLWAY CREST
TION = 26.75'

20

INV. = 16.80'

EXISTING GROUND

16

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

'12" PVC DEWATERING PIPE
7% WITH 1-6" BUTTERFLY VALVE
ED IN SPILLWAY

12

ARD 8' PRECAST BASE UNIT
DED BASE) MIN. 8" CRUSHER RUN
URSE TO BE PROVIDED ON UNDISTURBED

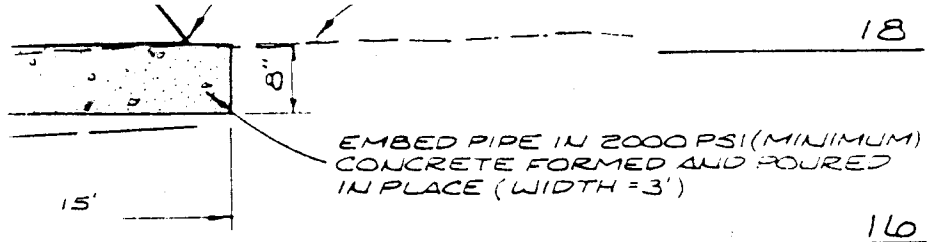
8

INVESTIGATION SHALL BE PERFORMED AT THE
SURE THE SUITABILITY OF THE SITE.
NVESTIGATION WILL DETERMINE KEY TRE
DTH ACCORDINGLY. ADDITIONALLY,
NSULTANT WILL ENSURE PROPER MATERIAL AND
E USED DURING CONSTRUCTION.
E GEOTECHNICAL CONSULTANT SHALL
TRATING THAT THE DAM WAS BUILT IN
THEIR REPORT RECOMMENDATIONS PRIOR TO
THE CONSULTANT SHALL SUBMIT TO JAMES
E COMPLIANCE HIS RECOMMENDATIONS FOR DAM
TRENCH WIDTH AND DEPTH, ETC. THE
PORT IS REQUIRED PRIOR TO ISSUANCE OF A
PERMIT.

28

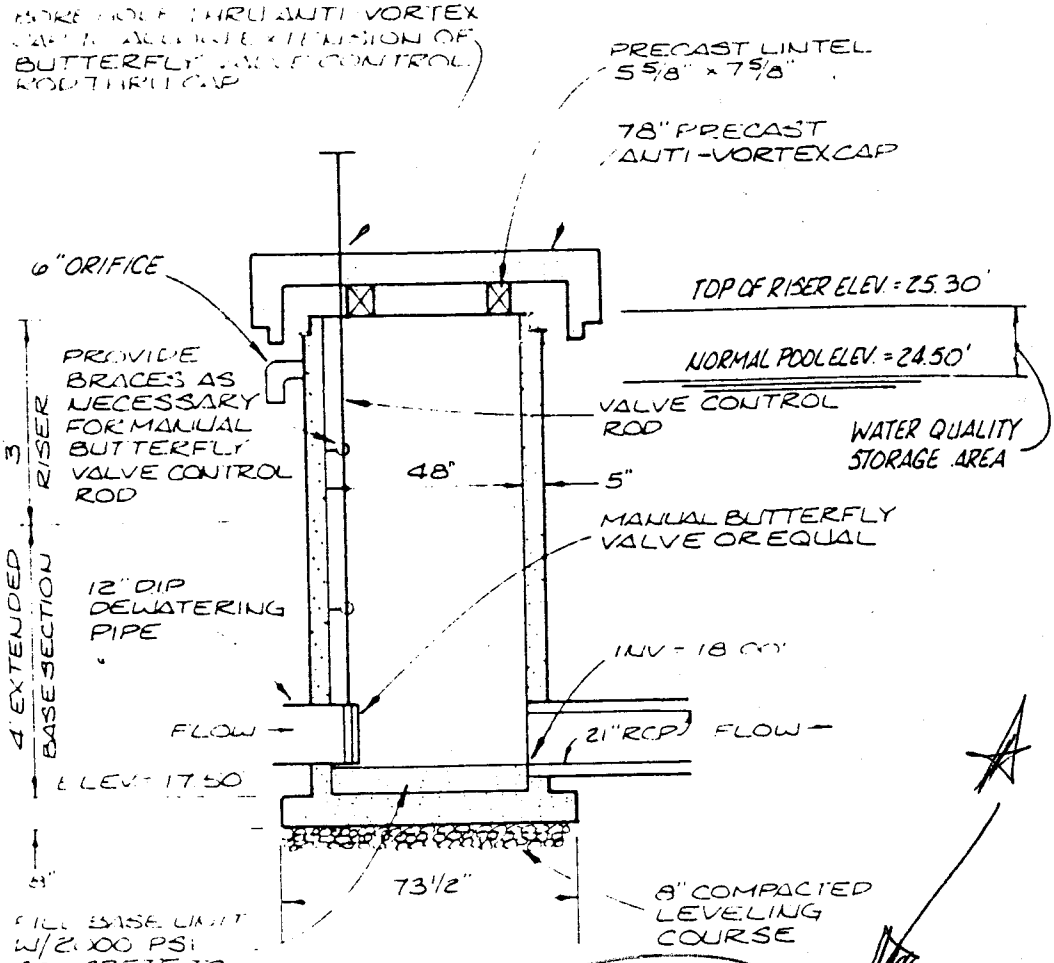
BORE HOLE THRU ANTI-VORTEX
CAP TO ALLOW EXTENSION OF
BUTTERFLY VALVE CONTROL

STANDARD MANHOLE
FRAME AND COVER



IT WITH 2000 PSI
D ELEV = 18.00'

RUN BASE
NDISTURBED



32

ELEVATION = 29.70'

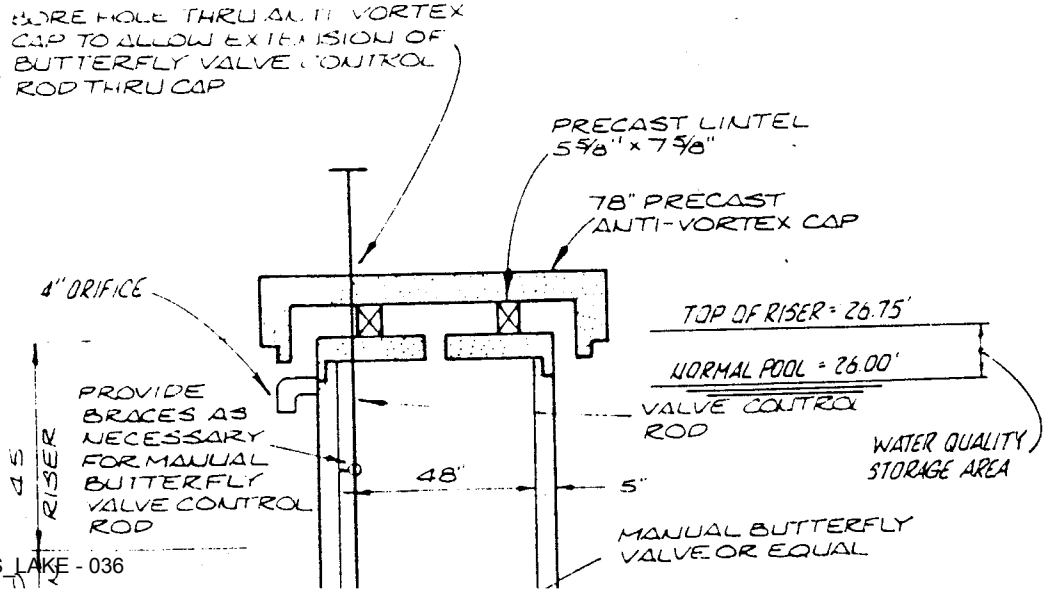
28

PRINCIPAL SPILLWAY STRUCTURE

FOR FAIRWAY #4 POND

N.T.S.

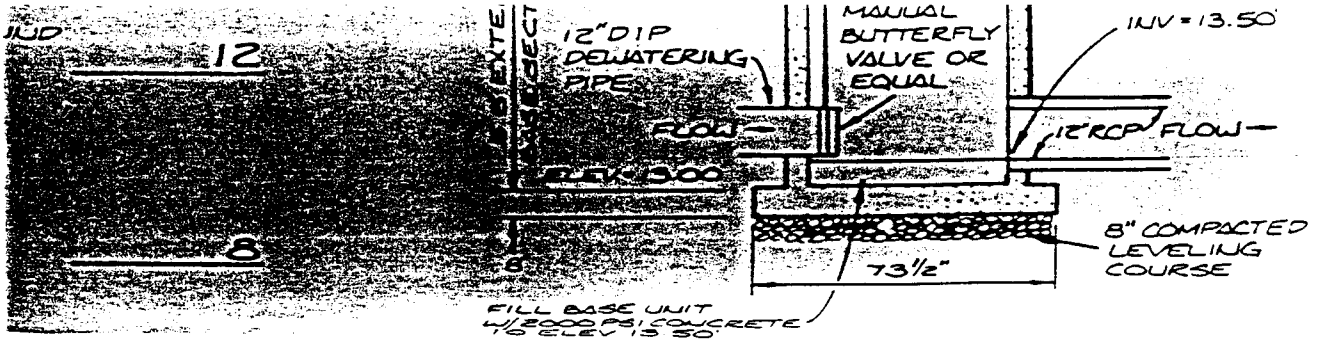
24



20

16

TE
IDE)



4

PRINCIPAL SPILLWAY STRUCTURE
FOR FAIRWAY #3 POND
N.T.S

INFO ON THIS PLAN:

- DESIGN PLAN ES ELEV = 28.00
- TOP OF DAM ELEV = 29.16
- RISER CREST ELEV = 25.00
- ES @ CONTROL SECTION
  W = 20'
  L = 21'
  SS = 10H:1V
- DESIGN HIGH WATER (100-YR.)
  EL. 27.8

Fazio Golf Course Designers, Inc
17755 Southeast Federal Highway
Jupiter, Florida 33458
(407) 746-4539

AES, a professional corporation
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23185
(804) 253-0040
Engineering, Planning, Surveying

NOTES AND DETAILS

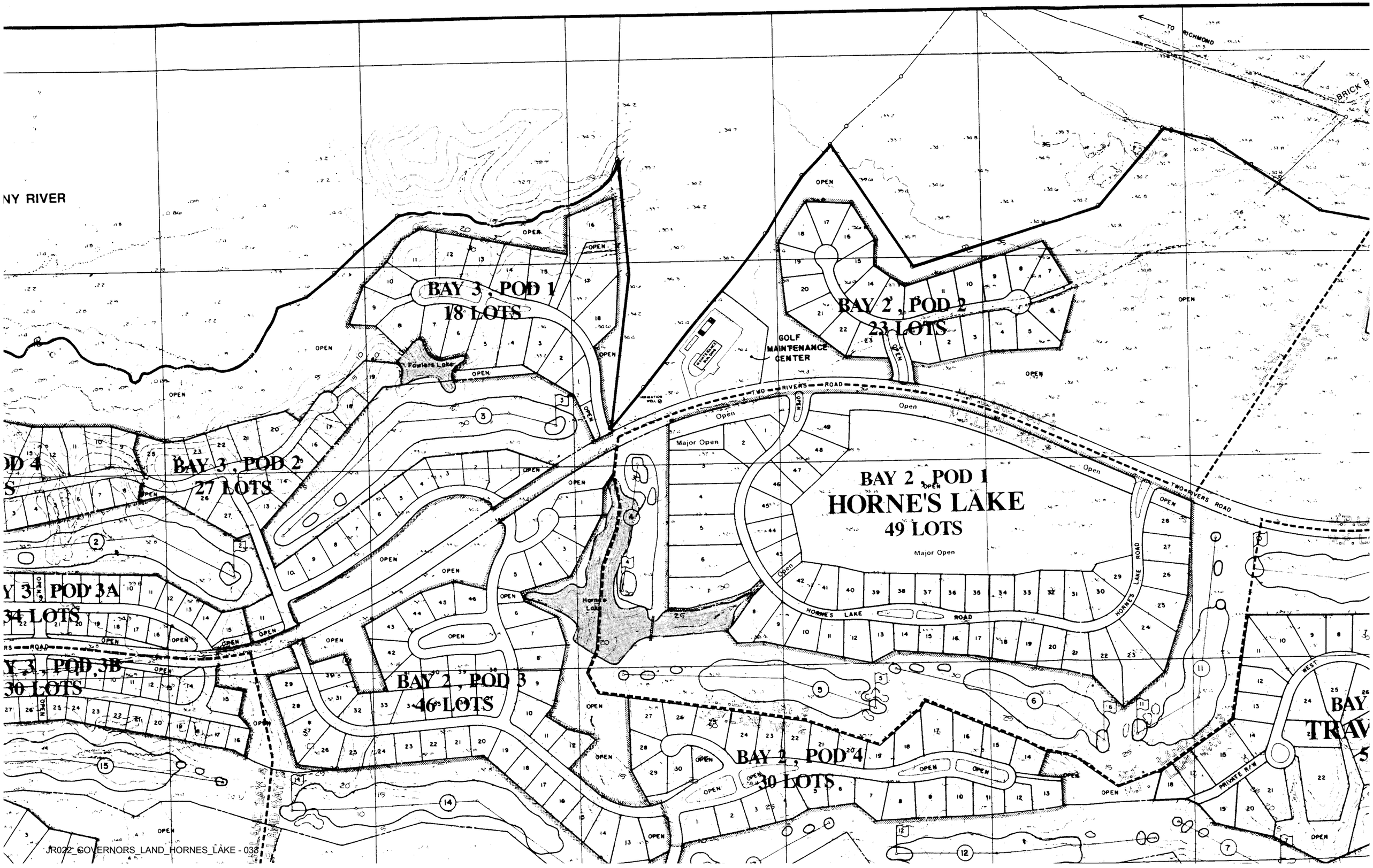
GOVERNOR'S LAND

POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
AES	C.A.N.
Scale	Date
1"=100'	12/22/89

Project No. 7173

Drawing No. 10



JR022_GOVERNORS_LAND_HORNES_LAKE - 038

Job File: S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW
Rain Dir: C:\HAESTAD\PPKW\RAINFALL\

==========
JOB TITLE
==========

Re-evaluation of Horne's Lake
Examination of the Width of Emergency Spillway
on High Water Elevation

Project Number 7173-00
October 16, 2001

20-FOOT WIDE EMERGENCY SPILLWAY (PER PLANS + SPECS)

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MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID SCSSTORM.RNQ JAMESCITY

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
Dev100	8.1000	Synthetic Curve	SCSTYPES	TypeII 24hr

8.1" > 8.0" OK, CONSERV.

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
HORNE'S LAKE IN	POND	100	57.213		12.6500	303.86		
HORNE'S LAKE OUT	POND	100	49.294		14.4000	54.97	28.45	35.440
*OUTFALL	JCT	100	49.294		14.4000	54.97		
POST-DEVELOPMENT	AREA	100	57.213		12.6500	303.86		

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID SCSSTORM.RNQ JAMESCITY

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
Dev100	8.1000	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
HORNE'S LAKE IN	POND	100	57.213		12.6500	303.86		
HORNE'S LAKE OUT	POND	100	49.276		14.6000	47.64	28.50 DHW	35.995
*OUTFALL	JCT	100	49.276		14.6000	47.64		
POST-DEVELOPMENT AREA		100	57.213		12.6500	303.86		

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = SCSSTORM.RNQ JAMESCITY

Storm Tag Name = Dev100
Description: 100-Year, 24-Hour SCS Storm

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.1000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
	HORNE'S LAKE IN	POND	57.213		12.6500	303.86	
	HORNE'S LAKE OUT	POND	49.294		14.4000	54.97	28.45
Outfall	OUTFALL	JCT	49.294		14.4000	54.97	
	POST-DEVELOPMENT	AREA	57.213		12.6500	303.86	

DESIGN STORMS SUMMARY

Design Storm File,ID = SCSSTORM.RNQ JAMESCITY

Storm Tag Name = Dev100
Description: 100-Year, 24-Hour SCS Storm

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.1000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Type.... Runoff CN-Area
Name.... POST-DEV.

File.... S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW
Title... Post-Development

RUNOFF CURVE NUMBER DATA

Post-Development

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
1/2 acre lots	86	74.000			86.00
impervious areas	98	12.200			98.00
wooded	73	3.000			73.00
wooded	73	5.100			73.00
1/2 acre lots	81	12.500			81.00
COMPOSITE AREA & WEIGHTED CN --->		106.800			85.80 (86)

✓(105.36 AC.)

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 8.1000 in
Rain Dir      = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII  24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = S:\JOBS\7173\00\TECHNCAL\POND\
HYG File - ID =  - POST-DEVELOPMENT Dev100
Tc            = 1.2500 hrs
Drainage Area = 106.800 acres  Runoff CN= 86

============================================
Computational Time Increment   =   .16667 hrs
Computed Peak Time             =  12.6667 hrs
Computed Peak Flow             =   304.57 cfs

Time Increment for HYG File    =    .0500 hrs
Peak Time, Interpolated Output =  12.6500 hrs
Peak Flow, Interpolated Output =   303.86 cfs
============================================

                DRAINAGE AREA
             -------------------
             ID:POST-DEV.
             CN   =   86
             Area =     106.800 acres
             S    =   1.6279 in
             0.2S =    .3256 in

              Cumulative Runoff
             -------------------
                     6.4284 in
                     57.212 ac-ft

HYG Volume...        57.213 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc =  1.25000 hrs (ID: POST-DEV.)
Computational Incr, Tm =   .16667 hrs = 0.20000 Tp

Unit Hyd. Shape Factor =  483.432 (37.46% under rising limb)
K =  483.43/645.333,  K =    .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp =   1.6698 (solved from K =   .7491)

Unit peak,          qp =    96.81 cfs
Unit peak time      Tp =   .83333 hrs
Unit receding limb, Tr =  3.33333 hrs
Total unit time,    Tb =  4.16667 hrs
```

(75 min.)

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

DEFINITION OF TERMS: ----------

```
 At    = Total area (acres):  At = Ai+Ap
 Ai    = Impervious area (acres)
 Ap    = Pervious area (acres)
 CNi   = Runoff curve number for impervious area
 CNp   = Runoff curve number for pervious area
 fLoss = f loss constant infiltration (depth/time)
 dt    = Computational increment (duration of unit excess rainfall)
         Default dt is smallest value of 0.1333Tc, rtm, and th
         (Smallest dt is then adjusted to match up with Tp)
UDdt   = User specified override computational main time increment
         (only used if UDdt is => .1333Tc)
 D(t)  = Point on distribution curve (fraction of P) for time step t

 K     = 2 / (1 + (Tr/Tp)):  default K = 0.75: (for Tr/Tp = 1.67)
 Ks    = Hydrograph shape factor
       = Unit Conversions * K:
       = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K
         Default Ks = 645.333 * 0.75 = 484

 Lag   = Lag time from center of excess runoff (dt) to Tp:  Lag = 0.6Tc
 P     = Total precipitation depth, inches
 Pa(t) = Accumulated rainfall at time step t
 Pi(t) = Incremental rainfall at time step t
 qp    = Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi.
       = (Ks * A * Q) / Tp   (where Q = 1in. runoff, A=sq.mi.)
 Qu(t) = Unit hydrograph ordinate (cfs) at time step t
 Q(t)  = Final hydrograph ordinate (cfs) at time step t
 Rai(t)= Accumulated runoff (inches) at time step t for impervious area
 Rap(t)= Accumulated runoff (inches) at time step t for pervious area
 Rii(t)= Incremental runoff (inches) at time step t for impervious area
 Rip(t)= Incremental runoff (inches) at time step t for pervious area
 R(t)  = Incremental weighted total runoff (inches)
 Rtm   = Time increment for rainfall table (.RNF file)
 Si    = S for impervious area:  Si = (1000/CNi) - 10
 Sp    = S for pervious area:    Sp = (1000/CNp) - 10
 t     = Time step (row) number
 Tc    = Time of concentration
 Tb    = Time (hrs) of entire unit hydrograph:  Tb = Tp + Tr
 Tp    = Time (hrs) to peak of a unit hydrograph:  Tp = (dt/2) + Lag
 Tr    = Time (hrs) of receding limb of unit hydrograph:  Tr = ratio of Tp
```

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

PRECIPITATION: ----------
Column (1): Time for time step t
Column (2): D(t) = Point on distribution curve for time step t
Column (3): Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)
Column (4): Pa(t) = D(t) x P: Col.(2) x P

PERVIOUS AREA RUNOFF (using SCS Runoff CN Method) ----------
Column (5): Rap(t) = Accumulated pervious runoff for time step t
If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0
If (Pa(t) is > 0.2Sp) then use:

Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6): Rip(t) = Incremental pervious runoff for time step t
Rip(t) = Rap(t) - Rap(t-1)
Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

IMPERVIOUS AREA RUNOFF ----------
Column (7 & 8)... Did not specify to use impervious areas.

INCREMENTAL WEIGHTED RUNOFF: ----------
Column (9): R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t)
R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS UNIT HYDROGRAPH METHOD: ----------
Column (10): Q(t) is computed with the SCS unit hydrograph method
using R() and Qu().

File.... S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW
Title... Existing Horne's Lake

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
23.87	-----	6.5370	.0000	.000	.000
24.00	-----	6.5691	19.6591	.852	.852
26.00	-----	7.1328	20.5471	13.698	14.550
28.00	-----	9.3585	24.6615	16.441	30.991
30.00	-----	14.4974	35.5038	23.669	54.660

(NP D-24.50)

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

WQV 6" @ EL 23.87

Riser 25.92

24 0.852
(25.92 + 14.5
26

$\frac{25.92-24}{2} = \frac{x-0.852}{14.5-0.852}$

$2x - 1.70 = 26.2$
13.95 Ac-FT @ Riser Crest

File.... S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 23.87 ft
Increment = .10 ft
Max. Elev.= 30.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

	Structure	No.		Outfall	E1, ft	E2, ft	
(ES)	Weir-Rectangular	W	--->	TW	28.000	30.000	D-28.00
(Riser)	Stand Pipe	SP	--->	CC	25.920	30.000	D-25.0
(ORIF)	Orifice-Circular	OR	--->	CC	23.870	30.000	D-24.50
	Culvert-Circular	CC	--->	TW	18.000	30.000	
	TW SETUP, DS Channel						

File.... S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = W
Structure Type     = Weir-Rectangular
-----------------------------------
# of Openings      =          1
Crest Elev.        =      28.00 ft
Weir Length        =      20.00 ft
Weir Coeff.        =   3.000000

Weir TW effects      (Use adjustment equation)
```

ES

D = 28.16

```
Structure ID       = SP
Structure Type     = Stand Pipe
-----------------------------------
# of Openings      =          1
Invert Elev.       =      25.92 ft
Diameter           =     4.0000 ft
Orifice Area       =    12.5664 sq.ft
Orifice Coeff.     =       .600
Weir Length        =      12.57 ft
Weir Coeff.        =      3.000
K, Submerged       =       .000
K, Reverse         =      1.000
Kb,Barrel          =    .000000  (per ft of full flow)
Barrel Length      =        .00 ft
Mannings n         =      .0000
```

Riser

D = 25.00
D = 48"

```
Structure ID       = OR
Structure Type     = Orifice-Circular
-----------------------------------
# of Openings      =          1
Invert Elev.       =      23.87 ft
Diameter           =      .5000 ft
Orifice Coeff.     =       .600
```

6"

(D = 24.50)

File.... S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID	=	W
Structure Type	=	Weir-Rectangular
# of Openings	=	1
Crest Elev.	=	28.00 ft
Weir Length	=	10.00 ft
Weir Coeff.	=	3.000000

Weir TW effects (Use adjustment equation)

Structure ID	=	SP
Structure Type	=	Stand Pipe
# of Openings	=	1
Invert Elev.	=	25.92 ft
Diameter	=	4.0000 ft (48")
Orifice Area	=	12.5664 sq.ft
Orifice Coeff.	=	.600
Weir Length	=	12.57 ft
Weir Coeff.	=	3.000
K, Submerged	=	.000
K, Reverse	=	1.000
Kb,Barrel	=	.000000 (per ft of full flow)
Barrel Length	=	.00 ft
Mannings n	=	.0000

Structure ID	=	OR
Structure Type	=	Orifice-Circular
# of Openings	=	1
Invert Elev.	=	23.87 ft
Diameter	=	.5000 ft (6")
Orifice Coeff.	=	.600

NEED TO CHECK EL'S.

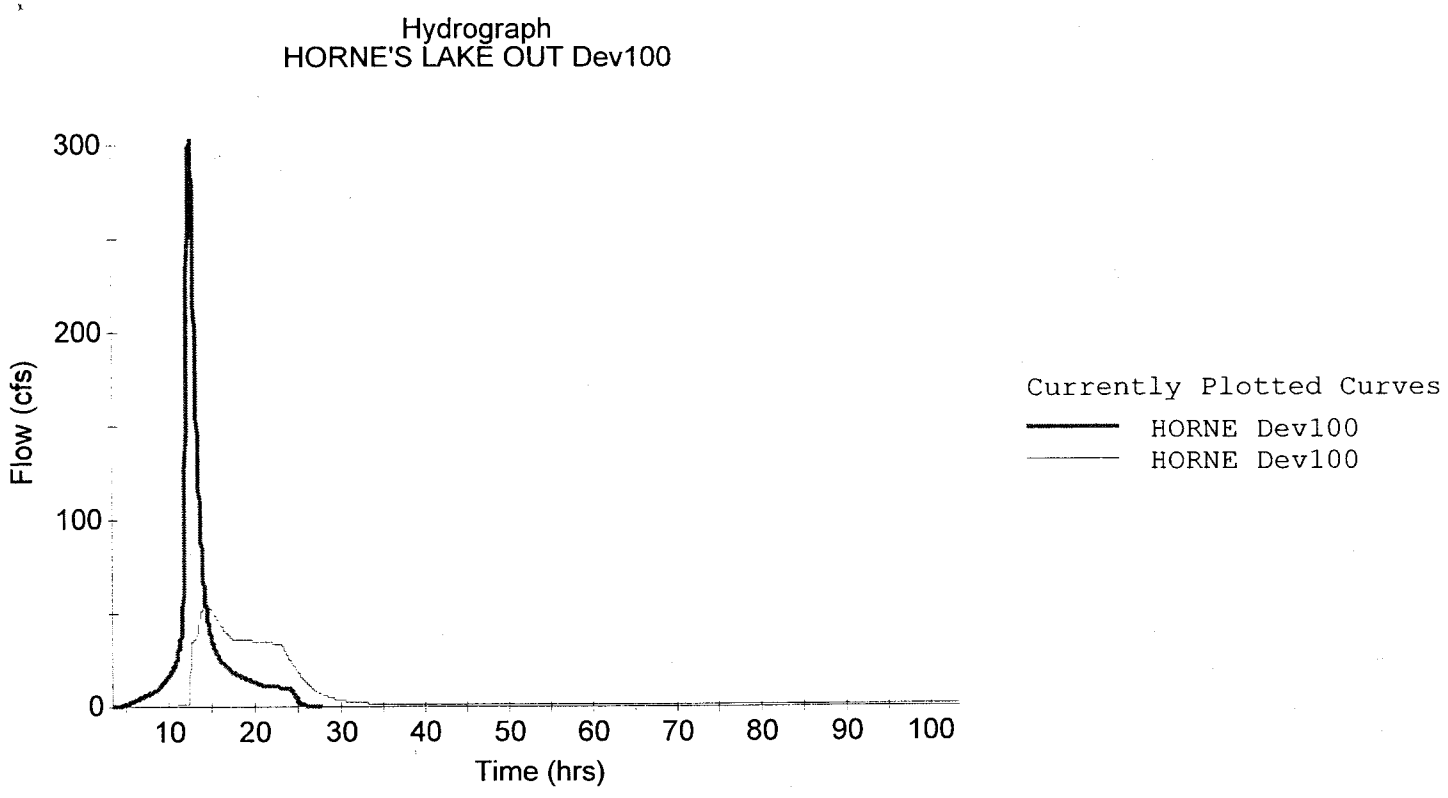
File.... S:\JOBS\7173\00\TECHNCAL\POND\717300HORNES.PPW

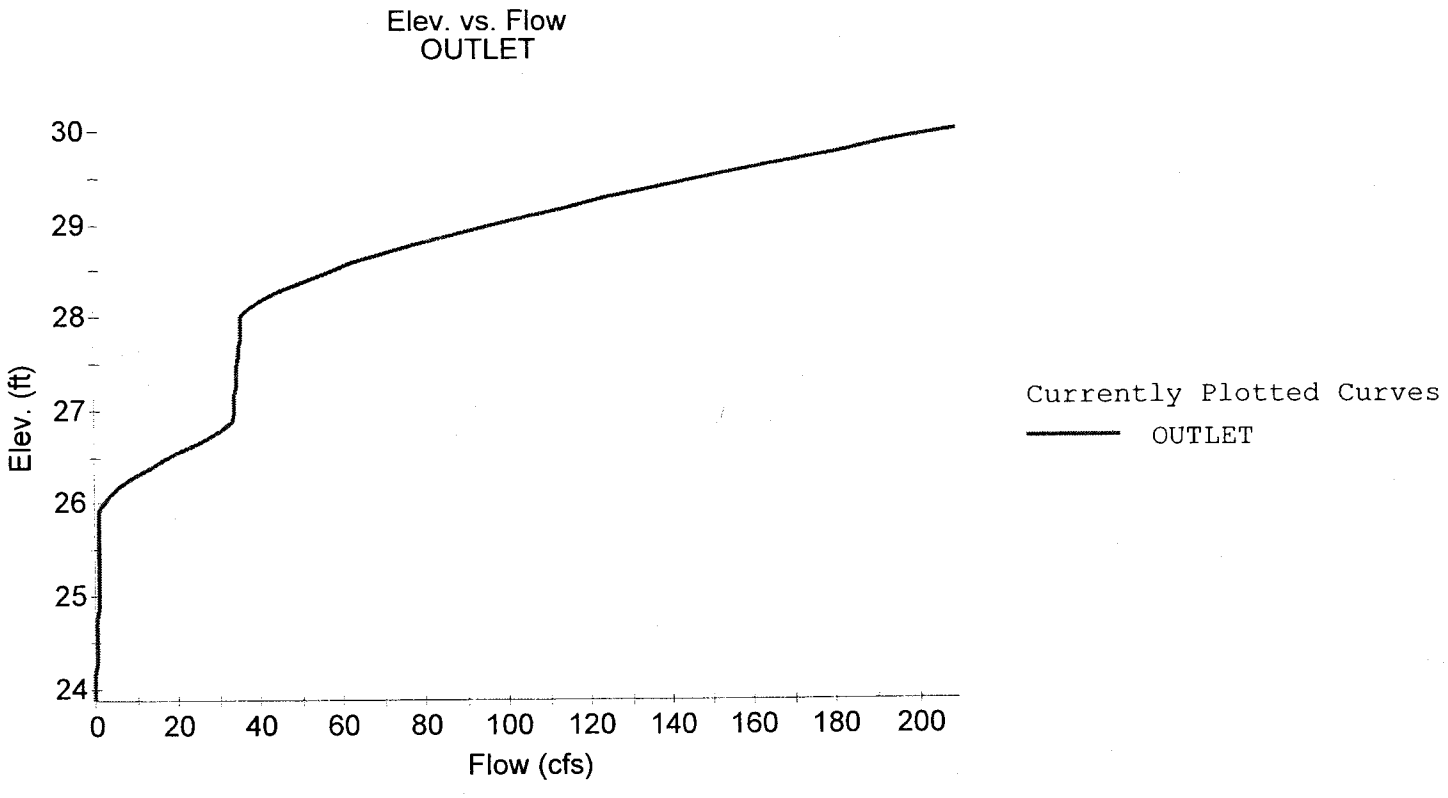
OUTLET STRUCTURE INPUT DATA

```
Structure ID       = CC
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    1.7500 ft    (21" PER PLAN)
Upstream Invert    =     18.00 ft    (EL 18.0 PER PLAN)
Dnstream Invert    =     14.40 ft    (EL. 17.5 PER PLAN)
Horiz. Length      =     90.00 ft
Barrel Length      =     90.07 ft
Barrel Slope       =    .04000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .2000  (forward entrance loss)
Kb                 =   .014830  (per ft of full flow)
Kr                 =     .2000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         1
Inlet Control K    =     .0098
Inlet Control M    =    2.0000
Inlet Control c    =    .03980
Inlet Control Y    =     .6700
T1 ratio (HW/D)    =     1.140
T2 ratio (HW/D)    =     1.287
Slope Factor       =     -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =     20.00 ft  --->  Flow =     11.14 cfs
At T2 Elev =     20.25 ft  --->  Flow =     12.73 cfs


Structure ID       = TW
Structure Type     = TW SETUP, DS Channel
-----------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = S:\JOBS\7173\00\TECHNCAL\POND\
Inflow  HYG file = NONE STORED - HORNE'S LAKE IN  Dev100
Outflow HYG file = NONE STORED - HORNE'S LAKE OUT Dev100

Pond Node   Data = HORNE'S LAKE
Pond Volume Data = HORNE'S LAKE
Pond Outlet Data = OUTLET

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    23.87 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0500 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =    303.86 cfs    at   12.6500 hrs
Peak Outflow      =     47.64 cfs    at   14.6000 hrs
-----------------------------------------------------
Peak Elevation    =     28.50 ft
Peak Storage =         35.995 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      57.213
- Infiltration =        .000
- HYG Vol OUT  =      49.276
- Retained Vol =       7.937
                  ----------
Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```


Hydrograph
HORNE'S LAKE OUT Dev100
300
200
100
0
Flow (cfs)
10
20
30
40
50
60
70
80
90
100
Time (hrs)
Currently Plotted Curves
HORNE Dev100
HORNE Dev100


Elev. vs. Flow
OUTLET
Elev. (ft)
30
29
28
27
26
25
24
0
20
40
60
80
100
120
140
160
180
200
Flow (cfs)
Currently Plotted Curves
OUTLET

Index of Starting Page Numbers for ID Names

----- H -----
HORNE'S LAKE... 6.01, 8.01, 3.01

----- O -----
OUTLET... 7.01

----- P -----
POST-DEV.... 4.01

----- W -----
Watershed... 1.01, 2.01

BY: SJT DATE: 11/1/01 SHEET 1 OF 2

CHKD: _____ DATE: _____ PROJECT NO.

APRVD: _____ DATE: _____ JR 022

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

(1) REF ELEV = 17.50 PER ORIGINAL DESIGN. INVERT OUT 21" BARREL THROUGH DAM.

	DESIGN	AS-BUILT	DIFFERENCE
EMERG SPILLWAY CREST	28.0	30.70	2.7'
TOP OF DAM CREST	29.16	32.74	3.58'
WSEL NORMAL POOL	24.50	27.95	3.45'

DESIGN EMER. SPILLWAY CREST TO TOP OF DAM = 1.16'

ASBUILT " " " " " " " = 2.04

∴ APPEARS EMER. SPILLWAY CREST @ 0.88' BELOW DESIGN HOWEVER BARREL INV OUT MAY NOT MATCH DESIGN

(2) TRY TIE TO GRADE STAKE, EL 29.6 @ T.O.D. * = POINT #8 ASBUILT SURVEY BY JCC ON 10/31/01.

EL. GROUND = 29.6
(−) SIGHT 2.90 FEET
HI ELEV ∴ 32.50

∴ TRY HI = 32.50

* NOTE: THIS GRADE STAKE WAS SET BY OTHERS ON TOP OF DAM. MARKED AS EL. 29.6 AT GROUND.

HI = 32.50

ASSUME POINT 8 = EL. 29.6 BY OTHERS.
BACK CALCULATE USING FIELD SHOTS.

		+	HI	−	ELEV	ORIGINAL DESIGN
			32.5			
	1 NAIL TBM ON TREE BY OTHERS			7.97	24.53	
*	2 EM. SPILL CREST D/S SIDE			4.94	27.56	28.00
	7 TOP OF DAM			2.64	29.86	29.16
	8 TOP OF DAM			2.90	29.60	29.16
	10 TP 1 (FS)			4.12	28.38	
BS TP 1 POINT 10		3.13	31.51			
	11 WSEL			6.70	24.81	24.50
	12 TP 2 (FS)			1.38	30.13	
BS TP 2 POINT 12		4.98	35.11			
	13 TOP DI-1 INLET YARD 2031 HORNES LAKE ROAD LOT 43			6.65	28.46	0.90' HIGHER THAN ES CREST
	15 ℄ ROAD HORNES LAKE RD			4.87	30.24	2.44' HIGHER THAN DESIGN HIGH WATER. (LETTER 10/30/00 = 30.20)
	17 TBM ON TREE 2024 HORNES LAKE RD LOT 5			0.49	34.62	2.68' HIGHER THAN ES CREST.
	18 TOP DI-1 INLET BACK YARD 2031 HORNES LAKE RD			6.88	28.23	

NOTES:

DESIGN HIGH WATER (100-YR) EL. 27.8

* CONSISTENT WITH GLF LETTER DATED OCT 30, 2000.

- Is SCS RAINFALL OF 8.1" as used in the model provide for conservancy. JCI is 8.0" for 100-yr 24 hour.

- SS curve EL. 30.00 based on AB Surv. Design TOD is EL. 29.16

is START EL. 23.87 SS curve = AB Norm Pool EL.

- ORIF 6" @ EL. 23.87. Design = 24.50

(OUTFALL END OF BARREL Riser (Stand Pipe) and 6" orifice appear to be AB Elev in model; however ES El. matches Design Plan. Is ES elev in model AB or per design.

- was an AB Surv. Performed by AES. including TOD, EM SP crest, inv. out 21" barrel.

- Are the following Elev. in the model dated 11/13/01. based on AB surv data.

		design
TOD	EL. 30.	29.16
EM SP Crest	EL. 28.0	28.00
Riser Crest	EL. 25.92	25.00
6" ORIF	EL. 23.87	24.50
21" OUTLET BARREL INV. OUT	EL. 14.40	17.49

HORNES LAKE ES / 2031

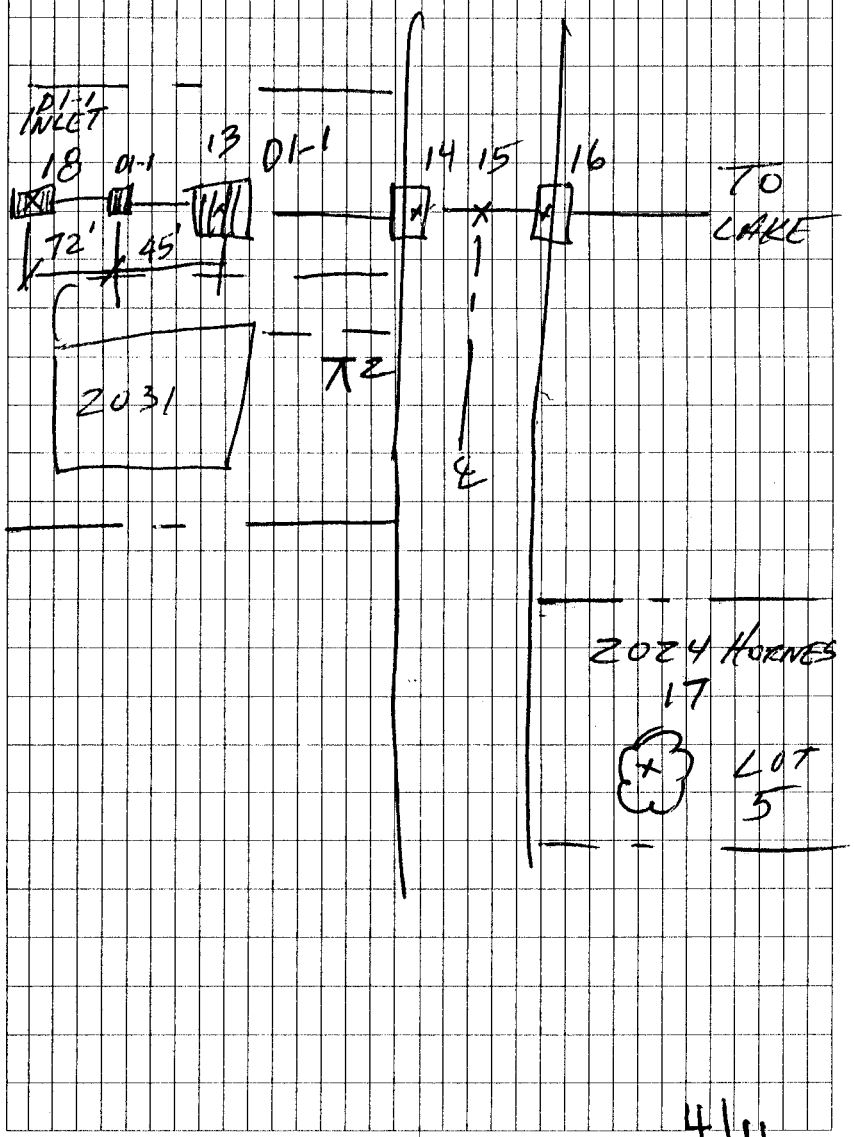
	+	HI	−	ELEV	
BS TP2 (Point 12)	4.98	38.25		33.27	
13 DI-1 INLET			6.65	31.60	TOP INLET 2031 HORNES LAK RD.
14 CURB INLET			5.46	32.79	CURB INLET HOUSE SIDE
15 ℄ ROAD			4.87	33.38	℄ ROAD TOP
16 CURB INLET			5.53	32.72	CURB INLET POND SIDE
17 TBM ON TREE			0.49	37.76	TBM @ TREE 2024 HORNES LAKE LOT 5 RR SPK. 14" OAK
18 TOP INLET BACK LOT 43			6.88	31.37	TOP INLET YARD DI-1

NOTE: ALL THESE SHOTS AT EAST WING OF POND IN BACK @ HORNES LAKE RD.

3/4

HORNES LAKE ROAD (JR022)

10/31/01



4/4

HORNES LAKE ES / 2031

	+	HI	−	ELEV	
BS TP2 (Point 12)	4.98	38.25		33.27	
13 DI-1 INLET			6.65	31.60	TOP INLET 2031 HORNES LAK RD.
14 CURB INLET			5.46	32.79	CURB INLET HOUSE SIDE
15 ℄ ROAD			4.87	33.38	℄ ROAD TOP
16 CURB INLET			5.53	32.72	CURB INLET POND SIDE
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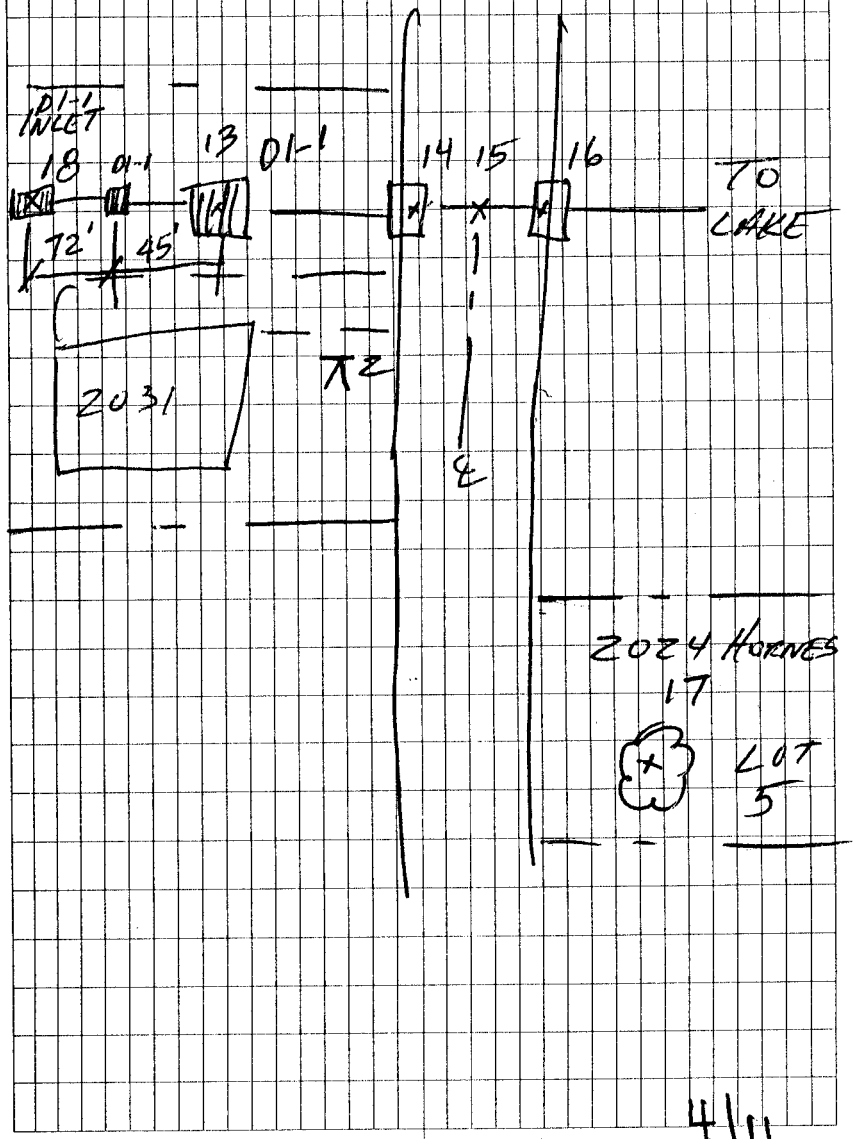
3/4

HORNES LAKE ROAD (JR022)

10/31/01



4/4

BARREL

21-inch

U/S INV 18.00 (D-18.0)

D/S INV 14.40 (D-17.5)

P = 8.1"
(100-YEAR IS 8.0")

Riser

INV. 25.92 CREST?

DIA 48"

(D-25.0)

ORIF

1 @ EL 23.87 (6")
(D = 24.00)

ES

CREST EL. 28.00
D= 28.0

(SJT 27.56)

TOD

30.° from SS Curve
D= 29.16

(SJT 29.60)

AES New MODEL.

Horne's Lake

CLIENT	JOB #	BORING #	SHEET
DOMINION LAND MANAGEMENT CO.	6221	B-1	1 OF 1

PROJECT NAME: GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)

ARCHITECT-ENGINEER: AES, INC.

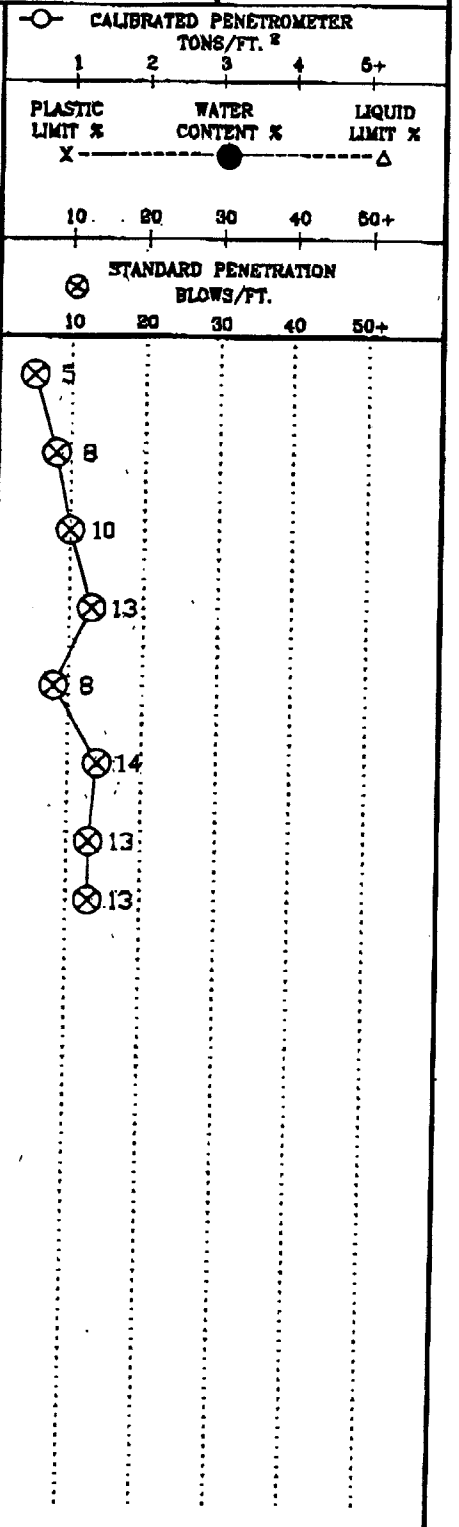
SITE LOCATION: HORNE'S LAKE DAM, JAMES CITY CO., VIRGINIA

ENGLISH UNITS

SURFACE ELEVATION 29.10

SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL
1	SS	24	24	Topsoil-3", (FILL)
2	SS	24	24	Fine Sandy Lean CLAY With Roots, Orangish Brown and Gray, Moist, Soft, (CL-FILL)
3	SS	24	24	Fine Sandy Fat CLAY With Wood Fragments and Roots, Orangish Brown and Gray, Moist, Medium Stiff, (OH-FILL)
4	SS	24	24	
5	SS	24	24	Fat CLAY, Trace Fine Sand, Orangish Brown and Gray, Moist, Stiff to Medium Stiff, (CH-FILL)
6	SS	24	24	
7	SS	24	24	Fat CLAY With Fine Sand and Fine Sandy Layers, Orangish Brown and Gray, Moist, Stiff, (CH)
8	SS	12	12	
				Fat CLAY With Fine Sand and Clayey Fine to Medium Sand Pocket, Orangish Brown and Gray Moist, Stiff, (CH)

END OF BORING @ 15.0'



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

DRY WS OR WD	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	JOB #	BORING #	SHEET
DOMINION LAND MANAGEMENT CO.	6221	B-2	1 OF 1

PROJECT NAME: GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)

ARCHITECT-ENGINEER: AES, INC.

SITE LOCATION: HORNE'S LAKE DAM, JAMES CITY CO., VIRGINIA

ENGLISH UNITS

SURFACE ELEVATION 29.10

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	Topsoil-3", (FILL)	8
	2	SS	24	24	Fine Sandy Lean CLAY With Roots, Orangish Brown and Medium Gray, Moist, Medium Stiff, (CL-FILL)	8
5	3	SS	24	24	Fat CLAY With Decomposed Roots, Trace Fine Sand, Orangish Brown and Gray, Moist to Wet Medium Stiff to Stiff, (CL-CH-FILL) [Decomposed roots encountered at approximately 4.0 feet]	11
	4	SS	24	24		13
	5	SS	24	24		12
10	6	SS	24	24		14
	7	SS	24	24		15
15	8	SS	24	24		5
	9	SS	24	24	Clayey Fine to Medium SAND, Orangish Brown and Gray Mottled, Moist, Medium Dense, (SC)	15
	10	SS	24	24		20
20	11	SS	24	24	Clayey Fine to Medium SAND, Orangish Brown and Gray, Wet, Medium Dense to Loose, (SC)	23
	12	SS	24	24		8
25	13	SS	24	24	Silty Fine SAND, Reddish Brown, Wet, Medium Dense, (SM)	28
	14	SS	24	24		20
30	15	SS	24	24	Silty Fine to Coarse SAND With Fine Gravel, Yellowish Brown, Saturated, Medium Dense, (SM)	25

WATER LEVELS — ELEVATION (FT): 25, 20, 15, 10, 5, 0

CALIBRATED PENETROMETER TONS/FT.^{2}: 1, 2, 3, 4, 5+

PLASTIC LIMIT % X — WATER CONTENT % ● — LIQUID LIMIT % Δ: 10, 20, 30, 40, 50+

END OF BORING @ 30.0'

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

WL DRY	WS OR WD	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	JOB #	BORING #	SHEET
DOMINION LAND MANAGEMENT CO.	6221	B-3	1 OF 1

PROJECT NAME: GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)

ARCHITECT-ENGINEER: AES, INC.

SITE LOCATION: HORNE'S LAKE DAM, JAMES CITY CO., VIRGINIA

ECS LTD

ENGLISH UNITS

SURFACE ELEVATION 29.10

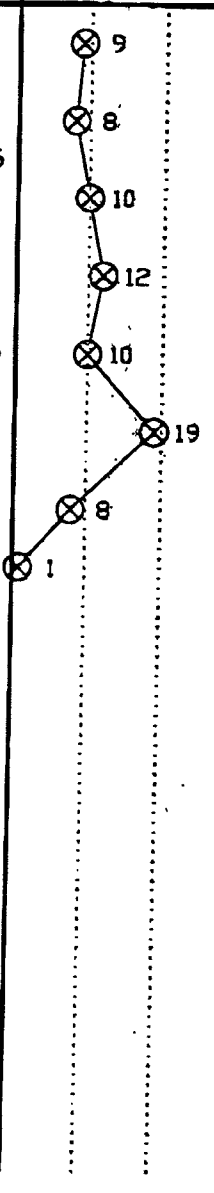
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL
0	1	SS	24	24	Topsoil-3", (FILL)
	2	SS	24	24	Fine Sandy Fat CLAY, Orangish Brown and Gray, Moist, Medium Stiff, (CH-FILL)
5	3	SS	24	24	Fat CLAY With Fine Sand and Trace Small Roots, Orangish Brown and Gray, Moist, Medium Stiff to Very Stiff, (CH-FILL)
	4	SS	24	24	
	5	SS	24	24	
10	6	SS	24	24	
	7	SS	24	24	
15	8	SS	12	12	Clayey Fine to Medium SAND With Marine Shell Fragments, Reddish Brown and Gray, Wet, Loose, (SM)
20					END OF BORING @ 15.0'
25					
30					

WATER LEVELS ELEVATION (FT): 25, 20, 15, 10, 5, 0

CALIBRATED PENETROMETER TONS/FT.^{2}: 1, 2, 3, 4, 5+

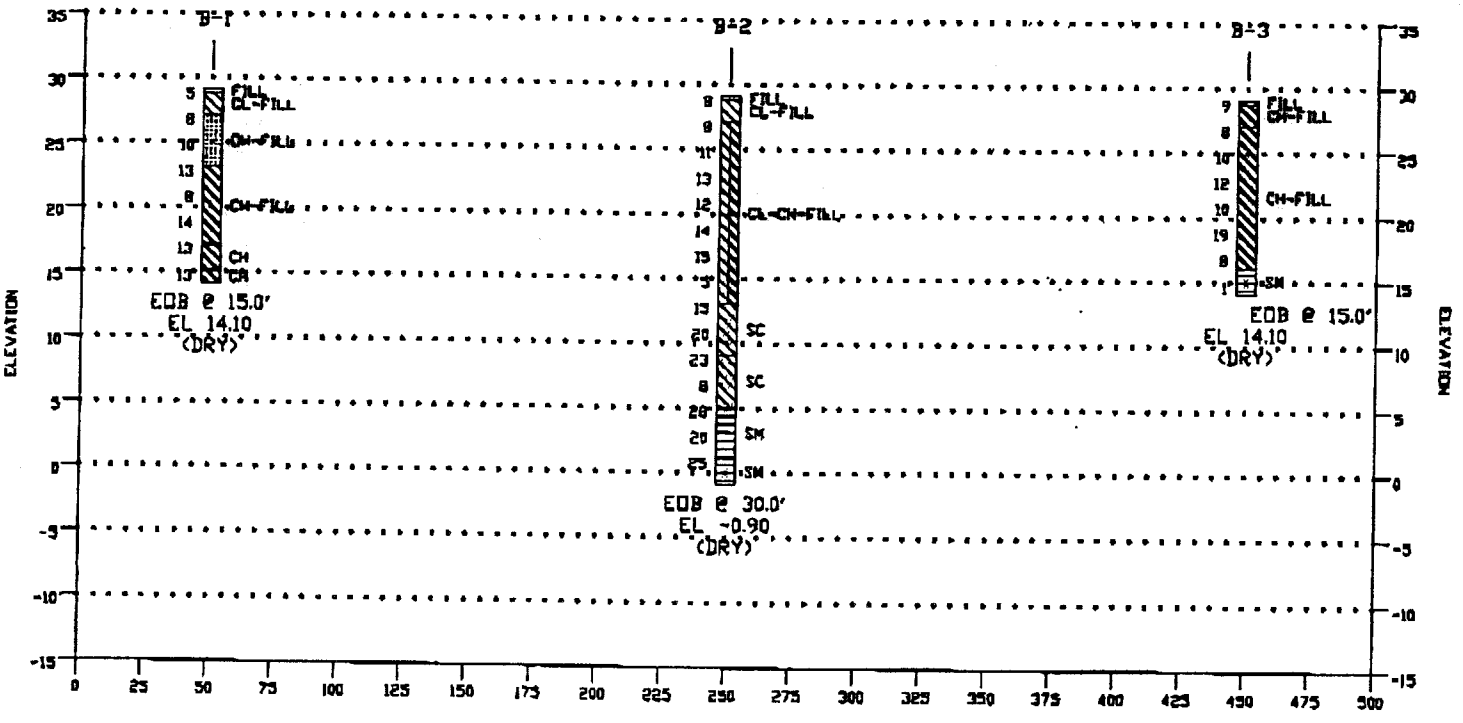
PLASTIC LIMIT % X — WATER CONTENT % ● — LIQUID LIMIT % △

STANDARD PENETRATION BLOWS/FT.: 10, 20, 30, 40, 50+



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

DRY WS OR ⓦ	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



PREPARED FOR:

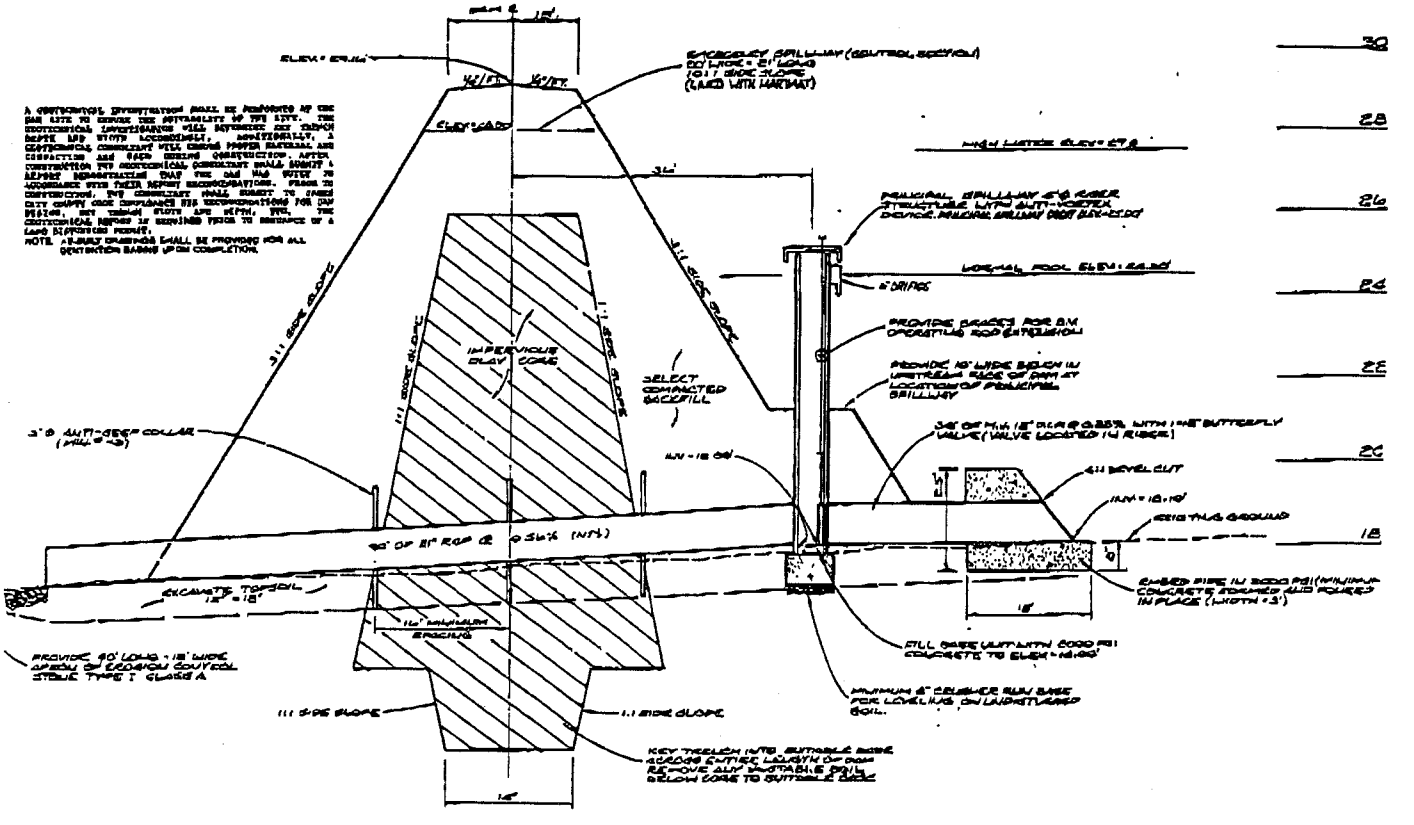
DOMINION LAND MGMNT. CO.

ECS LTD
ENGINEERING CONSULTING SERVICES, LTD

GENERALIZED CROSS SECTION

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

ECS, LTD. PROJECT NO. 6221



SECTION A-A
4TH FAIRWAY POND

PREPARED FOR:

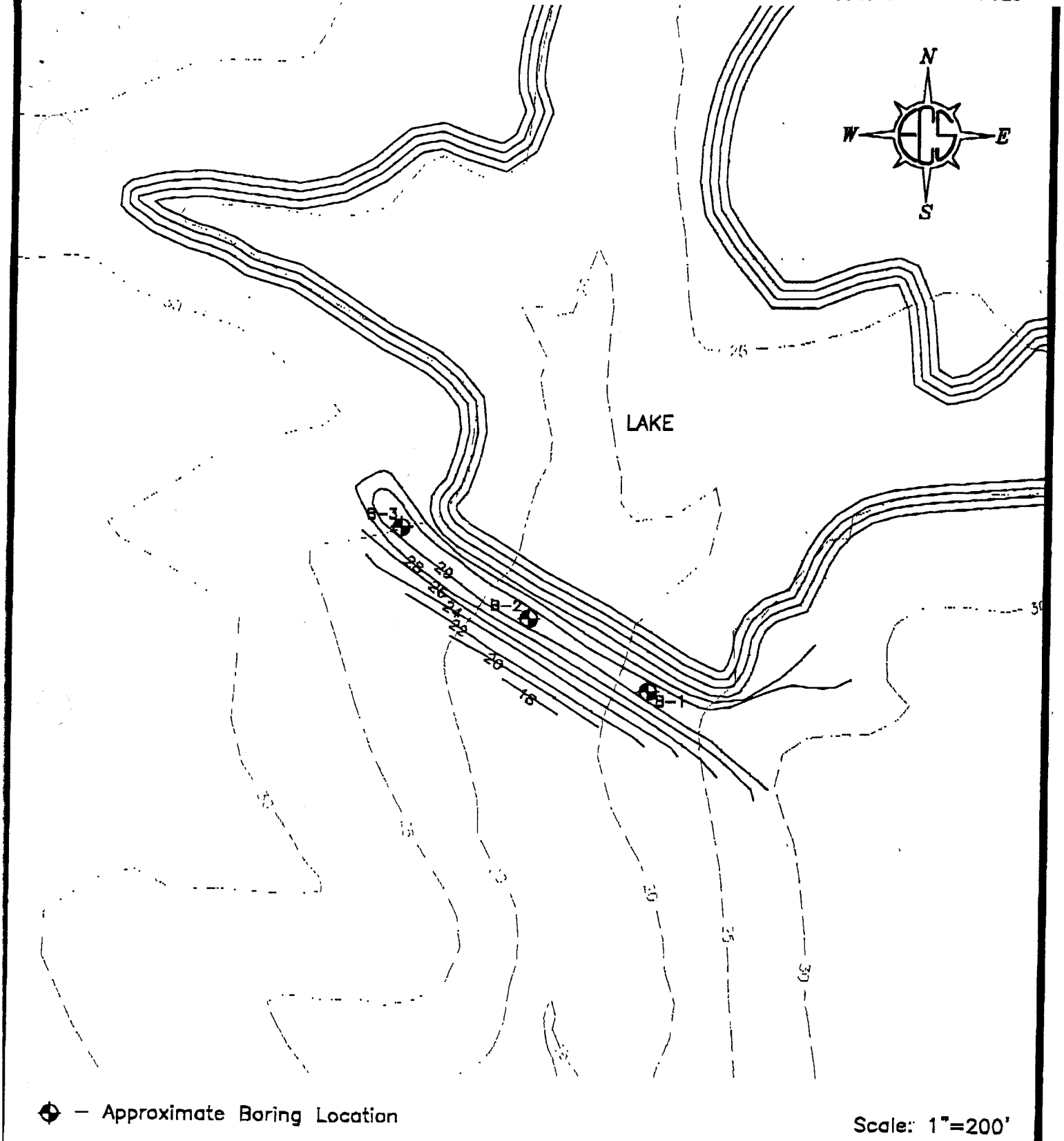
DOMINION LAND MANAGEMENT

ECS LTD
ENGINEERING CONSULTING SERVICES, LTD

DAM SCHEMATIC

GOVERNOR'S LAND
HORNE'S LAKE DAM
JAMES CITY COUNTY, VIRGINIA

ECS, LTD. PROJECT NO. 6221



⊕ – Approximate Boring Location

Scale: 1"=200'

PREPARED FOR:

DOMINION LAND MANAGEMENT

ECS LTD
ENGINEERING CONSULTING SERVICES, LTD

BORING LOCATION DIAGRAM

GOVERNOR'S LAND
HORNE'S LAKE
JAMES CITY COUNTY, VIRGINIA

ECS, LTD. PROJECT NO. 6221

Scott Thomas

From: Marc Bennett [mbennett@aesva.com]
Sent: Monday, November 26, 2001 6:35 PM
To: scottt@james-city.va.us
Subject: RE: Hornes Lake

Thanks for the email. Here are the answers to the questions you posed, along with some added information...

Question 1.
The nail in the tree is a TBM with an elevation of 20.47. To established
this TBM, another TBM, the invert of the discharge pipe from the lake, was
used. It has an elevation of 14.40.

Question 2.
We did complete some field work several months ago, and we have compiled
some of this work to depict "as-built" elevations. This is when we noticed
a higher-than-design emergency spillway elevation. The invert of the
discharge barrel was noted at this time as 14.40. Also, elevations along
the crest of the dam were obtained.

Question 3.
You are correct in stating that some work was completed on the dam. This
work was completed to lower the emergency spillway elevation to the design
elevation, and to help shape the emergency spillway. Prior to the recent
work, our filed measurement suggested the earth at the emergency spillway
needed to be lowered by about 8 inches.
There are plans to conduct more field work to check the emergency spillway
elevation again, and to complete the as-builts.

Question 4.
The model is based on as-built information (previously obtained) for the following:
Starting pool elevation of 23.87
6-inch orifice invert of 23.87
Riser crest elevation of 25.92
Discharge barrel invert elevation of 14.4

Scott, please note that the top of dam elevation is approximate in the
hydraulic model. Actual top of dam elevations range from elevation 29.2 to
elevation 29.5.

The most useful purpose of the hydraulic model was to demonstrate that the
width of the emergency spillway did not significantly alter the high water
elevation of the lake. IF ES EL IS AT 28.0

I hope this information proves useful.

Thanks for the email.

Marc

-----Original Message-----
From: scottt@james-city.va.us [mailto:scottt@james-city.va.us]
Sent: Monday, November 26, 2001 3:20 PM
To: mbennett@aesva.com
Subject: Hornes Lake

Rather than play phone tag, I will forward to you my questions about the Hornes Lake Emergency Spillway Evaluation memo as prepared by AES and dated November 13th 2001.

My original question posed to Jim Bennett was that based on our field investigation (October 31st 2001) it did not appear the emergency spillway for Hornes Lake was constructed in accordance with the approved design plan. Also, some field work was also recent work was also performed at the spillway (sodding, fine grading, etc.) yet it still appears the spillway does not meet the provisions of the approved plan. Either the spillway needed to be built in accordance with elevations/dimensions per the approved plan; or alternatively, a hydraulic model needed submitted to our office showing adequacy in the dam hydraulics based on as-built data. Although the emergency spillway currently has a 10 ft. wide bottom width, if set at a lower elevation and if the upper part of the spillway had more cross-sectional area than the design plan section, there may be no negligible difference in the basin's hydraulics, specifically the 100-year WSEL.

Here's my questions at this point in time:

1) There is a flagged nail in a tree set just southeast of the emergency spillway along the woods line at the downstream embankment toe. Is this an AES TBM and if so, what is the elevation of the TBM?

2) Was an as-built survey performed on the dam by AES. In specific, did you obtain elevations for the outfall end of the 21-inch barrel through the dam, the emergency spillway crest and top of dam.

3) Recently some minor work was performed at the emergency spillway (minor grading, sodding, etc.). Would the as-built data, if obtained by AES and used in the model, reflect the most current conditions. The crest elevation of the emergency spillway in the model should reflect current conditions.

The revised model shows two hydraulic routings, one for an emergency spillway with bottom width of 20 ft. (per original design) and one for current conditions with a bottom width of 10 feet. Conservancy is noted by use of an SCS rainfall value 8.1 inches rather than 8.0 inches for the 100-year storm. My questions about the model are whether the following elevations reflect as-built data:

Emergency spillway crest elevation at El. 28.0.
Top of dam used in the Stage-Storage data at El. 30.0.

Starting elevation (normal pool) based on the Stage-Storage data at El. 23.87.
The crest of the 6-inch orifice and riser crest elevation at El. 23.87 and
El. 25.92, respectively.
Invert out elevation of the 21-inch barrel through the dam at El. 14.4.

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

Scott Thomas

From: Scott Thomas
Sent: Monday, November 26, 2001 3:20 PM
To: 'mbennett@aesva.com'
Subject: Hornes Lake

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Starting elevation (normal pool) based on the Stage-Storage data at El. 23.87.
The crest of the 6-inch orifice and riser crest elevation at El. 23.87 and El. 25.92, respectively.
Invert out elevation of the 21-inch barrel through the dam at El. 14.4.

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

Joan Etchberger

From: Scott Thomas
Sent: Thursday, October 25, 2001 1:30 PM
To: Darryl Cook; Joan Etchberger
Cc: Joe Buchite
Subject: Gov Land-Hornes Lake

In response to a call from Dave King I need to answer this question. **Do we still hold bond for the Hornes Lake construction?**

They have been dealing with a issue from two residents about whether the emergency spillway was constructed right. I was able to find the drawings (some time ago) and forwarded Dave information on what the plan specifications should have been. When I was searching for the information, it did not appear that we still held bond. I didn't tell them that at the time in hope that if the emergency spillway dimensions/elevations were not to spec, they would perform necessary corrections.

Well, they did perform some work. Dave said they sodded the spillway and the spillway bottom width, which was supposed to be 20' wide, is now 15' or so and they lowered the crest elevation to where it was supposed to be in the first place, maybe lower. I guess the residents are still irrate that it does meet the original 20' wide spec.

The question is if we still hold bond and would the county have any recourse to require making the spillway to meet the 20' wide specification.

(Note: I suggested in either case that their engineer which is AES, run the hydraulic model with the spillway as it is now to show the WSEL for the design high water storm has not increased from original design or as compared to the high water for Floyd. This would put the issue to rest by showing a narrower bottom width spillway at a lower elevation would function properly. I don't think he is going to go that route due to costs involved.)

Scott

October 30, 2000

Mr. John Horne
Development Management Division
James City County
P.O. Box 8784
Williamsburg, VA 23187-8784

RE: TRAVIS AND HORNE'S LAKE POND

Dear Mr. Horne,

The Governor's Land Foundation understands that Governor's Land Associates, the developer of our subdivision is currently seeking return of surety bonds for the various retention pond dams built within Governor's Land. Of particular concern to The Foundation is the finished, as-built height and dimensions of the emergency spillways on Travis Pond and Horne's Lake.

10' OCT 31 2001

HORNES LAKE

During the heavy rains experienced with Hurricane Floyd both of these ponds backed up to the point of blocking roads and endangering houses. Subsequent investigations revealed that the emergency spillway on Horne's Lake is over 7 inches higher than designed. It also appears that the width of the emergency spillway is significantly shorter than the designed width of 20 feet. Both of these factors played a role in the water broaching Horne's Lake Road in the vicinity of 2032 Horne's Lake Road. Please note that the top of the drop inlets on the opposite side of this road are all less than 28.5 feet above sea level and the center of the road is at 30.20 feet. The designed height of the emergency spillway is 28.0 feet and the survey conducted by AES Consulting Engineers in May of this year determined the actual height to be 28.62 feet. As designed, water would have been flowing out the spillway before backing into the storm water system and endangering homes with little margin for error. As built, Horne's Lake Road was flooded and water was within an inch of entering homes.

30.24 OCT 31 2001

CONFIRMED OCT 31 2001

27.56 OCT 31 2001 HOWEVER WAS MODIFIED

A similar, but even more critical condition exists on Travis Pond. Flooding from this pond caused Two Rivers Road, the only access into and out of Governor's Land to be impassable. Residents west of the Two Rivers Road and Travis Pond Road intersection were forced to use the Developer's construction road to get to Route 5. Unfortunately, the Developer is required to remove the construction road and it looks like that will happen by January 2001thus removing any alternative passageway in future flooding. The Travis Pond emergency spillway was measured in the same survey cited above to be 29.10 feet above sea level. The tops of the drop inlets along Two Rivers Road are as low as 28.95 feet and the center of the road is 31.14 feet. Again, the height and width of the spillway played a role in the flooding.

In our previous conversation, you indicated that the County is typically interested in making sure emergency spillways are "at least" as high as that designed. Doing so helps minimize the frequency they are broached. In this case though, any height above the design standard has serious detrimental effects on this community. I request that as part of the inspection process for Travis Pond and Horne's Lake dams, the design height and width of the emergency spillways be closely examined. Any alteration from the design that reduces the flow in relation to the specified engineering design should be corrected before bonds are released and the dams accepted. I ask that you contact me directly should you contemplate accepting the dams in their current condition.

Sincerely,

Dave King
General Manager

CC: Mr. Ron Nervitt, James City County Board of Supervisors
Mr. Sandy Wanner, James City County Administrator
Mr. Lawrence Myers, Governor's Land Associates

GOVERNOR'S LAND FOUNDATION

October 30, 2000

NOV 2000
RECEIVED
DEVELOPMENT
MANAGEMENT

Mr. John Horne
Development Management Division
James City County
P.O. Box 8784
Williamsburg, VA 23187-8784

RE: TRAVIS AND HORNE'S LAKE POND

Dear Mr. Horne,

The Governor's Land Foundation understands that Governor's Land Associates, the developer of our subdivision is currently seeking return of surety bonds for the various retention pond dams built within Governor's Land. Of particular concern to The Foundation is the finished, as-built height and dimensions of the emergency spillways on Travis Pond and Horne's Lake.

During the heavy rains experienced with Hurricane Floyd both of these ponds backed up to the point of blocking roads and endangering houses. Subsequent investigations revealed that the emergency spillway on Horne's Lake is over 7 inches higher than designed. It also appears that the width of the emergency spillway is significantly shorter than the designed width of 20 feet. Both of these factors played a role in the water broaching Horne's Lake Road in the vicinity of 2032 Horne's Lake Road. Please note that the top of the drop inlets on the opposite side of this road are all less than 28.5 feet above sea level and the center of the road is at 30.20 feet. The designed height of the emergency spillway is 28.0 feet and the survey conducted by AES Consulting Engineers in May of this year determined the actual height to be 28.62 feet. As designed, water would have been flowing out the spillway before backing into the storm water system and endangering homes with little margin for error. As built, Horne's Lake Road was flooded and water was within an inch of entering homes.

A similar, but even more critical condition exists on Travis Pond. Flooding from this pond caused Two Rivers Road, the only access into and out of Governor's Land to be impassable. Residents west of the Two Rivers Road and Travis Pond Road intersection were forced to use the Developer's construction road to get to Route 5. Unfortunately, the Developer is required to remove the construction road and it looks like that will happen by January 2001thus removing any alternative passageway in future flooding. The Travis Pond emergency spillway was measured in the same survey cited above to be 29.10 feet above sea level. The tops of the drop inlets along Two Rivers Road are as low as 28.95 feet and the center of the road is 31.14 feet. Again, the height and width of the spillway played a role in the flooding.

2700 Two Rivers Road 23185 Phone (757) 253-6976 Fax (757) 253-0320

WILLIAMSBURG, VIRGINIA

In our previous conversation, you indicated that the County is typically interested in making sure emergency spillways are "at least" as high as that designed. Doing so helps minimize the frequency they are broached. In this case though, any height above the design standard has serious detrimental effects on this community. I request that as part of the inspection process for Travis Pond and Horne's Lake dams, the design height and width of the emergency spillways be closely examined. Any alteration from the design that reduces the flow in relation to the specified engineering design should be corrected before bonds are released and the dams accepted. I ask that you contact me directly should you contemplate accepting the dams in their current condition.

Sincerely,

Dave King
General Manager

CC: Mr. Ron Nervitt, James City County Board of Supervisors
Mr. Sandy Wanner, James City County Administrator
Mr. Lawrence Myers, Governor's Land Associates

Approval

Variance to JCC BMP Manual pond buffer and setback requirements and supporting documentation as submitted on May 21st by the applicant found to be acceptable. Efforts should be made to restore impacted buffer area with landscaping or to restore back to meadow or forest condition with trees, shrubs and native ground cover to the greatest extent possible.

Scott J. Thomas
Civil Engineer
Environmental Division

5-21-02
Date

via fax
(757) 898-1162

JR 022
Hornes Lake

5402A Lake Washington Blvd, NE
Kirkland, WA 98033

Zoning Department
James City County
c/o Pritchard & Company

Re: Governor's Land
Nathaniel's Green Lot 2

Gentlemen:

We request permission to remove certain underbrush and small trees which are within the 25-ft. setback from the pond at the back of our lot. There is very little growth within 20 ft. of the pond's edge, so our request pertains mainly to the portion of the setback which is 20 to 25 feet from the pond.

This area will be very visible from the house and patio and will be attractively landscaped.

Sincerely yours,

David G. Campbell

via fax
(757) 898-1162

5402A Lake Washington Blvd, NE
Kirkland, WA 98033

Zoning Department
James City County
c/o Pritchard & Company

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Sincerely yours,

David G. Campbell

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 16, 2003

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

Re: Governor's Land - Horne's Lake
County Plan No. SP-145- 89
Stormwater Management Facility
County BMP ID Code: JR 022

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 between the Horne's Lake and Nathaniel's Green sections 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 the note at Section A-A on 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 Horne's Lake 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. 18.10 or approximately 5.8 ft. below current normal pool.

3. Emergency Spillway. This issue surfaced back in November of 2001 and still does not appear to have been adequately resolved. The original design plan and specifications showed a 20 ft. wide, 10H:1V emergency spillway at crest El. 28.0. It was previously determined that the emergency spillway was not constructed per the original plan requirements. Subsequently, some followup field work was performed at the spillway in conjunction with a memo and subsequent emails between AES Consulting Engineers and the Environmental Division dated November 13th and November 26th 2001, respectively. The correspondence showed that use of a 10 ft. wide emergency spillway as compared to a 20 ft. wide section (per plan) would have no adverse effect on the function of and would not significantly increase the 100-year design water surface elevation of the BMP. It was clearly stated that the width of the emergency spillway did not significantly alter the high water elevation of the lake. However, this was based on the understanding that the emergency spillway crest was to be at crest El. 28.00. Current asbuilt information shows dimensions of the emergency spillway at 10 ft. width, rather than 20 ft., which is not a major concern based on hydraulic information as submitted in November 2001; however, the crest elevation is shown at El. 28.77 on the asbuilt, rather than El. 28.00 as assumed in the model. It was originally confirmed that the emergency spillway crest elevation needed lowered about 8 inches, but it does not appear that this was performed. Therefore, regardless of whether the 10 ft. or 20 ft. wide crest section was used, the emergency spillway crest elevation must be at El. 58.0 or the asbuilt hydraulic model needs evaluated again using a emergency spillway crest at El. 28.77. Results of the hydraulic model will need to adequately show that acceptable freeboard is maintained to top of dam elevation and that there is no major increase in the 100-year water design high water elevation, which may could have a significant impact on properties and structures along the periphery of the lake's shoreline.

Construction - Related Items:

4. At the time of inspection, there was considerable wet area on the top of dam presumably due to a leaking joint or valve associated with the irrigation piping system (non-stormwater related). This condition may result in saturation of dam embankment soils or erosion on the downstream face. Either condition could eventually threaten the structural integrity of the dam. Investigate and repair as necessary.

5. Mow grass on the top of dam and the downstream face to a height of 2- 4 inches to promote growth of desirable grasses and to allow for proper future inspection.

6. Stabilize with seed and mulch or matting all disturbed soil areas present on the top of dam, the downstream embankment face and the emergency spillway, either existing or due to corrective field-related activities .

7. Restore the rock outlet protection pad at the downstream end of the pipe barrel through the dam to approved plan dimensions and specifications.

8. Remove any silt fence present along the downstream toe of dam or in the vicinity of the outfall end of the pipe barrel through the dam.

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

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

Sincerely,

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

cc: Marc Bennett, AES - via fax

G:\AsBuilts\Review\GovLand\SP14589.jr022

DEVELOPMENT MANAGEMENT

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

May 16, 2003

Re-Reinspect 6/2/03

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

Re: Governor's Land - Horne's Lake
County Plan No. SP-145- 89
Stormwater Management Facility
County BMP ID Code: JR 022

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 between the Horne's Lake and Nathaniel's Green sections 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

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1. In accordance with the note at Section A-A on 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 Horne's Lake appears to satisfy any outstanding construction certification requirements for the facility.

OK ECS 12/31/00

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. 18.10 or approximately 5.8 ft. below current normal pool.

6/6/03 SPT 5/9/15 GIVEN

16.6-19

3. Emergency Spillway. This issue surfaced back in November of 2001 and still does not appear to have been adequately resolved. The original design plan and specifications showed a 20 ft. wide, 10H:1V emergency spillway at crest El. 28.0. It was previously determined that the emergency spillway was not constructed per the original plan requirements. Subsequently, some followup field work was performed at the spillway in conjunction with a memo and subsequent emails between AES Consulting Engineers and the Environmental Division dated November 13th and November 26th 2001, respectively. The correspondence showed that use of a 10 ft. wide emergency spillway as compared to a 20 ft. wide section (per plan) would have no adverse effect on the function of and would not significantly increase the 100-year design water surface elevation of the BMP. It was clearly stated that the width of the emergency spillway did not significantly alter the high water elevation of the lake. However, this was based on the understanding that the emergency spillway crest was to be at crest El. 28.00. Current asbuilt information shows dimensions of the emergency spillway at 10 ft. width, rather than 20 ft., which is not a major concern based on hydraulic information as submitted in November 2001; however, the crest elevation is shown at El. 28.77 on the asbuilt, rather than El. 28.00 as assumed in the model. It was originally confirmed that the emergency spillway crest elevation needed lowered about 8 inches, but it does not appear that this was performed. Therefore, regardless of whether the 10 ft. or 20 ft. wide crest section was used, the emergency spillway crest elevation must be at El. 28.0 or the asbuilt hydraulic model needs evaluated again using a emergency spillway crest at El. 28.77. Results of the hydraulic model will need to adequately show that acceptable freeboard is maintained to top of dam elevation and that there is no major increase in the 100-year water design high water elevation, which may could have a significant impact on properties and structures along the periphery of the lake's shoreline.

Built + Re-Asbuilt To Show At El. 27.85

28.0

AB 27.85

Construction - Related Items:

4. At the time of inspection, there was considerable wet area on the top of dam presumably due to a leaking joint or valve associated with the irrigation piping system (non-stormwater related). This condition may result in saturation of dam embankment soils or erosion on the downstream face. Either condition could eventually threaten the structural integrity of the dam. Investigate and repair as necessary.

OK 6-2-03

5. Mow grass on the top of dam and the downstream face to a height of 2- 4 inches to promote growth of desirable grasses and to allow for proper future inspection.

OK

6. Stabilize with seed and mulch or matting all disturbed soil areas present on the top of dam, the downstream embankment face and the emergency spillway, either existing or due to corrective field-related activities .

OK 6-2-03

7. Restore the rock outlet protection pad at the downstream end of the pipe barrel through the dam to approved plan dimensions and specifications.

OK 6-2-03

8. Remove any silt fence present along the downstream toe of dam or in the vicinity of the outfall end of the pipe barrel through the dam.

OK 6-2-03

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

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

Sincerely,

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

cc: Marc Bennett, AES - via fax

G:\AsBuilts\Review\GovLand\SP14589.jr022

Memorandum

DATE: **June 13, 2003**

TO: **Scott Thomas**

FROM: **Victoria Bains**

SUBJECT: **Horne's Lake, County BMP ID Code: JR022**

In response to your letter dated May 16, 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.

Spot elevations and contours have been added to as built to show the regraded emergency spillway. From this information, the emergency spillway has been built to the approved plan.

Construction – Related Items:
The golf coarse maintenance has fixed the leak in the irrigation system and stabilized the disturbed area on the top of dam.

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

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

AES CONSULTING ENGINEERS

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

Post const. geotech Report

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
- Horne's Lake (JR022)
- #12 Tee Box Dry Detention Pond (JR025)
- Travis Pond
- Whittaker's Lake
- Bennett's Pond
- Founder's Hill Pond (JR034, RIVER OAKS NORTH BMP #3)
- 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.

[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.

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.

Memorandum

DATE: November 13, 2001

TO: Mr. James H. Bennett, Stonehouse Development Company, LLC

CC: Mr. Scott J. Thomas, James City County Environmental Division

FROM: Marc Bennett

SUBJECT: Governor's Land at Two Rivers
Horne's Lake Emergency Spillway Evaluation
AES Project 7173-00

NOV 2001
RECEIVED
ENVIRONMENTAL DIVISION

At the request of Mr. Jim Bennett, the staff at AES Consulting Engineers re-evaluated emergency spillway widths for Horne's Lake, one of the primary lakes in the Governor's Land at Two Rivers project. Two emergency spillway widths where evaluated, a 20-foot width and a 10-foot width. The 20-foot emergency spillway width was used in the original design of the facility. The 10-foot width is representative of the current conditions of the spillway.

To make this evaluation, the 100-year, 24-hour SCS design storm is used in the modeling, as this storm would generate sufficient volumes of runoff to cause a need of the emergency spillway. Curve numbers for the post-development conditions of the Horne's Lake watershed are also used in the evaluation. Haestead Methods Pondpak is used as the computer modeling performed for the evaluation.

Based upon the computer modeling, the following results are noted:

For the 20-foot wide emergency spillway.... ORIG DES ES Crest EL. 28.00 (DESIGN)

- Peak Inflow 303.9 cfs
- Peak Outflow from Horne's Lake (principal and emergency spillways) 55.0 cfs
- Peak Water Surface Elevation 28.45 (El.)
- Peak Storage of Horne's Lake 35.44 Ac-ft.

For the 10-foot wide emergency spillway.... ACTUAL BUILT ES Crest EL 28.00

- Peak Inflow 303.9 cfs
- Peak Outflow from Horne's Lake (principal and emergency spillways) 47.6 cfs
- Peak Water Surface Elevation 28.50 (El.) DHW
- Peak Storage of Horne's Lake 35.99 Ac-ft.

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

It is noted from the results of the computer modeling that a reduction in the width of the emergency from 20 feet to 10 feet does not significantly increase the Water Surface Elevation of Horne's Lake for the 100-year, 24-hour storm event. This is due in large part of the available volumes of the lake at high water surface elevations.

With the results of the modeling noting only very slight increases in the elevation of the 100-year water surface elevation of the Horne's lake due to a narrower emergency spillway, it is our opinion no further action is needed to increase the spillway width, should the spillway width be 10 feet in width currently, and at the current elevation.

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

County BMP ID Code (if known): JR022

Name of Facility: HORNE'S LAKE BMP No.: 7 of 25 Date: 2/5/03

Location: GOVERNOR'S LAND

Name of Owner: DOMINION LAND MANAGEMENT CO.

Name of Inspector: VICTORIA BAINS

Type of Facility: LAKE

Weather Conditions: CLOUDY Type: ☐ Final Inspection ☐ County BMP Inspection Program ☒ Owner Inspection

FEB 2003 RECEIVED ENVIRONMENTAL DIVISION

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
Tree Growth		✓		NEED TO REMOVE SAPLINGS & BUSHES ALONG SHOLINE @ DAM
Erosion		✓		NEED TO STABILIZE BARE SPOTS
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches	N/A			
Interior Landscaping/Planted Areas: ☒ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions				
Trash & Debris				
Floating Material				
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ 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		✓		REMOVE SILT FENCE & FALLEN TREE
Erosion/Sediment		✓		NEED TO STABILIZE BANKS IN SEVERAL PLAC
Outlet Protection		✓		NEED TO REPLACE RIPRAP
Other				
Emergency Spillway (Overflow):				
Vegetation		✓		TOPSOIL & SEED BARE SPOTS
Lining	✓			
Erosion		✓		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 THAT NEED TOPSOIL & SEED. CLEAN-UP AROUND OUTFALL PIPE, REMOVE SILT FENCE AND CLEAR & REMOVE FALLEN TREE. USE RIP RAP FROM TEMPORARY CHECK DAM TO IMPROVE OUTFALL PROTECTION AND STABILIZE A SECTION OF CHANNEL

Overall Environmental Division Internal Rating: 2

Signature: Victoria Baino **Date:** 2/5/03

Title: PROJECT ENGINEER

SWMProg\BMP\CoInspProg\DetRet.wpd

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

County BMP ID Code (if known): JR022

Name of Facility: Governor's Land BMP No.: ____ of ____ Date: 3/25/03

Location: Horne'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	✓			Numerous pine stumps
Vegetation Condition	✓			3"-6" dia.
Tree Growth	✓			Wet area top of
Erosion	✓			emb. and at toe
Trash & Debris	✓			of slope - groundwater?
Seepage	✓	?		see remarks
Fencing or Benches				
Interior Landscaping/Planted Areas: ☒ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions	✓			Deep pond -
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

JR022_GOVERNORS_LAND_HORNES_LAKE - 098

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			Fountain aerator
Algae		✓		
Trash & Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations): Various submerged pipes not observed				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Outlet Protection				
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): RCP riser & cap				
Condition of Structure	✓			No valve control
Corrosion	✓			apparent
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓			Outlet channel
Settlement	✓			recently repaired
Trash & Debris	✓			and relined w/
Erosion/Sediment	✓			rip rap
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			Located +
Lining	✓			directed towards
Erosion	✓			backyard of
Trash & Debris	✓			residents
Other				
Notes:				

Item	O.K.	Routine	Urgent	Comments
Maintenance 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:

Wet area on top of emb. due to leaking valve in irrigation system — sprinklers. To be repaired soon.
Wet area at base of emb. may be from several yards and downspout drain on ground. Not sure of significance.

Overall Environmental Division Internal Rating: 4

Signature: [signature] **Date:** 3/25/03

Title: Envir. Spec.

SWMProg\BMP\CoInspProg\DetRet.wpd

BY: SAT DATE: _____ SHEET ___ OF _____

CHKD: _____ DATE: _____ PROJECT NO.

APRVD: _____ DATE: _____

DEVELOPMENT MANAGEMENT BMP POND BUFFER / SB DETER.

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

LOT 2 NATHANIELS GREEN – GOVERNOR LAND

NATHANIELS CLOSE

(43-02)(03-02)

1912 NATHANIELS CLOSE

Robert M + Elizabeth A. Bysshe

0.439AC

R4

LOT 2 NATHANIEL'S GREEN THE GOVERNOR'S LAND

BMP ID Code: JR 022 (HORNES LAKE)

ORIG DESIGN (20' E/S): EL. 27.8

AES ANALYSES NOV 13 2001 28.45 (20' E.S.)

AES ANALYSES NOV 13 2001 28.50 (10' ACTUAL E.S.)

Joe

WATERSHED	JR
BMP ID NO	022
PLAN NO	
TAX PARCEL	(43-02)(03-8)
PIN NO	4320300008
CONSTRUCTION DATE	1/1/1990
PROJECT NAME	Hornes Lake
FACILITY LOCATION	3007 Nathaniel's Green
CITY-STATE	Williamsburg, VA
CURRENT OWNER	Governors Land Foundation
OWNER ADDRESS	2700 Two Rivers Road
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, VA 23185
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No

Return to Menu

MAINTENANCE PLAN	No
SITE AREA acre	1444
LAND USE	SF Residential
old BMP TYP	Wet Pond-Lake
JCC BMP CODE	
POINT VALUE	11
SVC DRAIN AREA acres	106.8
SERVICE AREA DESCRI	SF Lots & Roadways
IMPERV AREA acres	
RECV STREAM	UT of James River
EXT DET-WQ-CTRL	No
WTR QUAL VOL acre-ft	13.95
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	0
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

CTRL STRUC DESC	RCP Riser
CTRL STRUC SIZE inches	48
OTLT BARRL DESC	RCP Barrel
OTLT BARRL SIZE inch	21
EMERG SPILLWAY	Yes
DESIGN HW ELEV	27.8
PERM POOL ELE	23.87
2-YR OUTFLOW cfs	
10-YR OUTFLOW cfs	
REC DRAWING	No
CONSTR CERTI	No
LAST INSP DATE	4/12/2001
INTERNAL RATING	4

MISC/COMMENTS

CN 86. AES report 11/13/01 for rev 100-yr at 28.45 (20' ES) and 28.5 (10' ES).

Project: GOVERNOR'S LAND - LAND BAY 2 - POD 1 - HORNE'S LAKE

Site Plan No: S-28-91 **Geo No:** 356

Fee Paid? ✔ **Fee Due:** $1,000

Date Paid: 4/29/1991

Released? ✔ **Release Date:** 3/23/1999

Comments: **Notations**

*L/C FILED IN GOV.LAND - PHASE 1

LD Permit No: 92-10 **Fiscal Year:** 1992

Acres Disturbed: 5 **Declaration of Covenant:**

LD Issue Date: 8/8/1991

LD Expire Date:

LD Comment: RELEASED 6-16-94

Cert Const? No **CC Iss Date:**

CC Expiration Date:

CC Comment:

Subdivisions

Issue Date: 10/3/1991 **Agreement?** Yes

Surety: L/C-180,000 RA*R

Surety Type: L/C **Amount:** $180,000

Notation: RA*R **Surety Released?** ✔

Expiration Date:

Comment:

Surety Number: SB36566

Surety Company: ABN-AMRO

Siltation

Agreement? Yes **Surety:** L/C-73,000 RA*R

Surety Type: L/C **Amount:** $73,000

Notation: RA*R **Surety Released:** ✔

Expiration Date:

Comments:

Surety Number: SB36608

Surety Company: ABN-AMRO

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

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

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

DATE SENT: 08/27/01

Name: DAVE KING

Firm or Company:

Facsimile Number:

Number of pages including this transmittal:

From: SCOTT THOMAS

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

Comments: I'm 99% sure this is the design drawing (Does 4th FAIRWAY POND RING A BELL TO YOU AS HORNES LAKE) CAN'T FIND THE ACTUAL "AS-BUILT" YET. WILL CONTINUE LOOKING.

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

DRAFT LETTER
TO DKING TO
RESPOND
· Agree w/ AES
· ES only 10'
NEED 20' OR
NRW HTR. ANALYSES

2024 Hornes Lake
(Lot 5)
2031 Hornes
Lake (Lot 43)

Lot 2
DHW Orig Des (20' ES) 27.8
AES 11/2001: 28.45 (20' ES)
AES 11/2001: 28.50 (10' ES)
JR022
N.P. Design 24.5
AsBuilt Info 11/2001: El. 23.87
Hornes Lake

ENVIRONMENTAL DIVISION PROJECT REVIEW and COMMENTS - TRACKING SLIP

Plan Type:
- ☐ C (Concept Plan)
- ☐ SP (Site Plan)
- ☐ S (Subdivision Plan)
- ☐ M (Master Plan)
- ☐ SUP (Special Use Permit)
- ☐ Z (Rezoning)
- ☐ AFD (Agricultural Forest District)
- ☐ Other, Specify _____
- ☐ EXPEDITED REVIEW STATUS (TOP PRIORITY)
- ☐ D.R.C. REVIEW STATUS

Project Information:

Case No.: _____ - _____ - _____

Project Name: _____

Planner: _____ Extension: _____

- ☐ Original Plan (1st Submission, 1st Plan Review)
- ☐ Revised Plan 1 (2nd Submission, 2nd Plan Review)
- ☐ Revised Plan 2 (3rd Submission, 3rd Plan Review)
- ☐ Revised Plan 3 (4th Submission, 4th Plan Review)
- ☐ "Slip-Sheet to Env. Div.
- ☐ Amendment to Prev. Approved Plan _____

Date Tracking:

	Date	
Transmittal Date:	_____	(from Planning)
Received Environmental Division:	_____	(Date Stamped Env Div)
Due / Return Date (Planning):	_____	(Planning Return Date)
21 days from Transmittal Date:	_____	(Env Div Goal Date)
Erosion & Sediment Control Plan Review Complete:	_____	(E&SC Review Complete)
Stormwater Management/Drainage Review Complete:	_____	(SWM Review Complete)
Environmental Division Completion Date:	_____	(All Personnel)
☐ Forwarded to Planning	_____	
☐ Email/Fax to Professional	_____	

Environmental Review Computer File Setup:

☐ Old Files	(Previous Reviews, Old files)	File: _____
☐ Original Plan	(1st Submission, 1st Review)	File: _____ .0
☐ Revised Plan 1	(2nd Submission, 2nd Review)	File: _____ .1
☐ Revised Plan 2	(3rd Submission, 3rd Review)	File: _____ .2
☐ Revised Plan 3	(4th Submission, 4th Review)	File: _____ .3

Erosion & Sediment Control Plan Review (Mike D. Woolson)

Date Received: _____ (Received for E&SC Plan Review)

Review Complete: _____ (E&SC Plan Review Complete)

Stormwater Management / Drainage Plan Review (Scott J. Thomas)

Date Received: _____ (Received for SWM Plan Review)

Review Complete: _____ (SWM Plan Review Complete)

Comments: _____

ES
EL 28.0

CHECK HYDRAULIC
ROUTING
HORNES LAKE
JR022
ABDATA

Ignacio T. Cruz, P.E., C.S.P., MBA
President

Cruz Associates, Inc.
2024 Horne's Lake Road
Williamsburg, VA 23185-7687

Phone: (757) 258-0604
Fax: (757) 258-5244