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: **PC106**

DATE VERIFIED: **December 21, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: February 24, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

BMP ID or General File ID PC106

PIN: 3210100012

Subdivision, Tract, Business or Owner Name (if known): James City County

Property Description: Warhill Tract Parcel 1

Site Address: 5700 Warhill Trail and 4615 Opportunity Way

(For internal use only) **Box:** JC001 **Drawer:** 1

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

Comments:

Warfill East Pond Dam PC106

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 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: (W) Warhill Site Eastern Pond (PC 106) Dam Renovations
Structure/BMP Name: Eastern Pond Dam (PC 106)
Project Location: Warhill Site, James City Co. Va.
BMP Location: Eastern Pond (PC 106)
County Plan No.: SP - 107 - 05

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

Tax Map/Parcel No.: _____
BMP ID Code (if known): PC 106
Zoning District:: _____
Land Use: _____
Site Area (sf or acres): _____

Brief Description of Stormwater Management/BMP Facility: Eastern Pond Dam to serve a portion of the Warhill PPEA site.

Nearest Visible Landmark to SWM/BMP Facility: _____

Nearest Vertical Ground Control (if known):
☐ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☐ Other
Station Number or Name: _____
Datum or Reference Elevation: _____
Control Description: _____
Control Location from Subject Facility: _____

Section 2 - Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☐ Yes ☐ No ☐ Unknown
Approx. Construction Start Date for SWM/BMP Facility: _____
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☐ Unknown
Name of Site Work Contractor Who Constructed Facility: Curtis Contracting
Name of Professional Firm Who Routinely Monitored Construction: Timmons Group
Date of Completion for SWM/BMP Facility: _____
Date of Record Drawing/Construction Certification Submittal: December 7, 2006

(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: James City County
Mailing Address: 101 E. Mounts Bay Rd, Williamsburg, VA 23187

Business Phone: 757-253-6671 Fax: 757-253-6850
Contact Person: Wayland Bass Title: County Engineer

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: Timmons Group
Mailing Address: 1001 Boulders Pkwy, Suite 300
Richmond, VA 23225
Business Phone: 804-200-6500
Fax: 804-560-1016
Responsible Plan Preparer: Michael L. Clark, P.E.
Title: Senior Project Manager
Plan Name: Warhill Site Eastern Pond (PC106) Dam Renovations
Firm's Project No. 22547
Plan Date: Feb. 24, 2006
Sheet No.'s Applicable to SWM/BMP Facility: All / ____ / ____ / ____ / ____

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

Name: Curtis Contracting, Inc.
Mailing Address: 7481 Theron Road, West Point, VA 23181

Business Phone: 804-843-4633
Fax: 804-843-2545
Contact Person: Andy Curtis
Site Foreman/Supervisor: _____
Specialty Subcontractors & Purpose (for BMP Construction Only): _____

Section 4 - Professional Certifications:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: Timmons Group
Mailing Address: 1001 Boulders Parkway, Suite 300
Richmond, VA 23225
Business Phone: 804-200-6500
Fax: 804-560-1016

Name: Michael L. Claud, P.E.
Title: Senior Project Manager
Signature:
Date: 12-7-2006

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
MICHAEL L. CLAUD
No. 033586
12/7/2006
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

Firm Name: TIMMONS GROUP
Mailing Address: 1001 BOULDERS PARKWAY SUITE 300
Business Phone: 804-200-6574
Fax: 804-794-1899

Name: GENE W. HATCHER PE
Title: QA/QC MANAGER
Signature:
Date: 4/2/07

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.

COMMONWEALTH OF VIRGINIA
GENE W. HATCHER
NO. 13067
4/4/07
PROFESSIONAL ENGINEER

(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.

XX 4. Top widths, berm widths and embankment side slopes.

XX 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.

XX 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.

XX 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.

XX 8. Elevation of the principal spillway crest or outlet crest of the structure.

XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.

XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.

N/A 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.

N/A 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.**

N/A 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**

XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.

XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.

XX 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.

XX 18. Maintenance plan taken from approved design plan transposed onto record drawing set.

N/A 19. Fencing location and type, if applicable to facility.

XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.

XX 21. No visual signs of erosion or channel degradation immediately downstream of facility.

XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

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

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

XX A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.

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

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

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

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

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

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

XX A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.

XX A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.

XX A10. Low flow orifice has a non-clogging mechanism.

N/A A11. A pond drain pipe with valve was provided.

XX A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.

N/A A13. End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.

(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.

N/A B2. Minimum 2:1 length to width flow path provided across the facility.

N/A B3. Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).

N/A B4. Wetland type landscaping provided in accordance with approved plan. Includes correct pondscaping zones, plant species, planting arrangements, wetland beds, etc. Wetland plants include 5 to 7 emergent wetland species. Individual plants at 18 inches on center in clumps.

N/A B5. Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).

N/A B6. No more than one-half (½) of the wetland surface area is planted.

N/A 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.

N/A C2. Facility is not located on fill slopes or on natural ground in excess of six (6) percent.

N/A 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.

N/A 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.

N/A C5. Sides of infiltration practice lined with filter fabric.

N/A 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.

N/A C7. Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.

N/A 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.

N/A C9. Minimum twenty-five (25) foot separation down gradient from any structure.

N/A C10. Stormwater outfalls provided for overflow associated with larger design storms.

N/A C11. No visual signs of erosion or channel degradation immediately downstream of facility.

N/A C12. Facility does not currently cause any apparent surface or subsurface water problems to downgrade properties.

N/A 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.

N/A D2. Sediment pretreatment devices provided.

N/A 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.

N/A 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.

N/A 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.

N/A D6. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed .

N/A D7. Filtering system is off-line from storm drainage conveyance system.

N/A D8. Overflow outlet has adequate erosion protection.

N/A D9. Deflector, diversion, flow splitter or regulator structure provided to divert the water quality volume to the filtering structure.

N/A D10. Minimum four (4) inch perforated underdrain provided in a clean aggregate envelope layer beneath the facility.

N/A 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.

N/A D12. Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.

N/A 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.

N/A E2. Open channel system has constructed longitudinal slope of less than four (4) percent.

N/A E3. No visual signs of erosion in the open channel system's soil and/or vegetative cover.

N/A E4. Open channel side slopes are no steeper than 2H:1V at any location. Preferred channel sideslope is 3H:1V or flatter.

N/A 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).

N/A E6. For E-2 BMPs (Dry Swales), an underdrain system was provided.

N/A E7. Treated timber or rock check dams provided as pretreatment devices for the open channel system.

N/A E8. Gravel diaphragm provided in areas where lateral sheet flow from impervious surfaces are directly connected to the open channel system.

N/A 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.

N/A E10. Open channel system areas with grass covers higher than four (4) to six (6) inches were properly mowed.

N/A 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.

N/A 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.

N/A E13. For E-3 BMPs (Biofilters), the bottom width is six (6) feet maximum at any location.

N/A E14. For E-3 BMPs (Biofilters), sideslopes are 3H:1V maximum at any location.

N/A 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.

N/A F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.

N/A F3. Timber wall BMP used in intermittent stream only. (ie. Prohibited in perennial streams.)

N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.

N/A F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging.

N/A F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.

N/A 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.

N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.

N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.

N/A F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.

N/A F12. Stilling basin or standard outlet protection provided at principal spillway outlet.

N/A 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.

N/A F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.

N/A 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.

N/A 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.

N/A G3. Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection.

N/A G4. Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked).

N/A 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).

(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

EASTERN Pond (PC106)
DAM RENOVATIONS

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities Record Drawing and Construction Certification

Standard Forms & Instructions

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Record Drawing and Construction Certification Forms

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Section 3 - Owner / Designer / Contractor Information		2
Section 4 - Professional Certifications		3
Section 5 - Certification Requirements and Instructions		4

Record Drawing Checklist

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APPROVED
James City County
Environmental Division
By: _____
Date: 04-06-07

RECEIVED
ENVIRONMENTAL
DIVISION

Issue Date
February 1, 2001

WARHILL SITE
EASTERN POND (PC 106) DAM RENOVATIONS

JAMES CITY COUNTY, VA

SITE PLAN #SP-107-05, DAM SAFETY PERMIT # 09529

AS BUILT

SHEET INDEX

TITLE	SHEET
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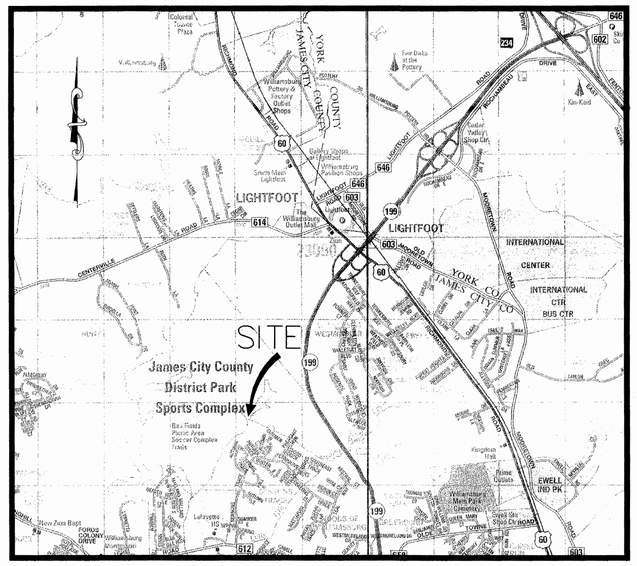
ENVIRONMENTAL INVENTORY	C1.1
DRAINAGE AREA LAYOUT	C1.2
EROSION AND SEDIMENT CONTROL NOTES & DETAILS	C1.3 - C1.5
PLAN & DETAILS	C1.6



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VICINITY MAP

SCALE: 1" = 2,000'

RESPONSIBLE LAND DISTURBER: William E. Richards (0402-21759)

DISTURBED AREA = 1.60 acres

TOTAL AREA OF SITE = 588.21 acres

IMPERVIOUS COVER PROPOSED = 0 sq. ft.

THIS PROJECT IS LOCATED IN THE POWHATAN CREEK WATERSHED (SUBWATERSHED 205 AND CATCHMENT 205-107-1) . SPECIAL STORMWATER CRITERIA APPLIES.

THIS PORTION OF THE PROJECT IS SUBJECT TO THE PROVISION OF CHESAPEAKE BAY EXCEPTION CBE 06-007 AS APPROVED ON MARCH 6, 2006.

NOTE:
AN 8' WIDE CRUSHER PATH WAS PLACED ALONG THE TOP OF THE DAM IN ACCORDANCE WITH APPROVEL COUNTY PLAN #SP-76-05 (WARHILL MULTI-USE TRAIL)

CURTIS CONTRACTING, INC.

DEVELOPER

Contact: Andy Curtis
Phone: (804) 843-4633
Fax: (804) 842-2545
P.O. Box 769
West Point, VA 23181

DATE: 2/24/2006

SP-107-05
PC106

APPROVED
James City County
Environmental Division
By: [signature]
Date: 04-08-07

RECEIVED
APR - 6 2007
ENVIRONMENTAL DIVISION

REVISIONS

DATE	SHEET NUMBERS	DATE	SHEET NUMBERS
4/10/2006	ALL		
12/01/2006	ALL		
3/16/2006	C 1.2		
3/30/2006	C 1.6		

STORMWATER RECORD DRAWINGS-12/01/06

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2007
PROFESSIONAL ENGINEER

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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TIMMONS GROUP

PROJECT
WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

OWNER & DEVELOPER
Curtis Contracting Inc.
Centerville Road
James City County, Virginia
P.O. BOX 769
(804) 843-4633

JOB NO. 22547

SHEET NO. C1.0

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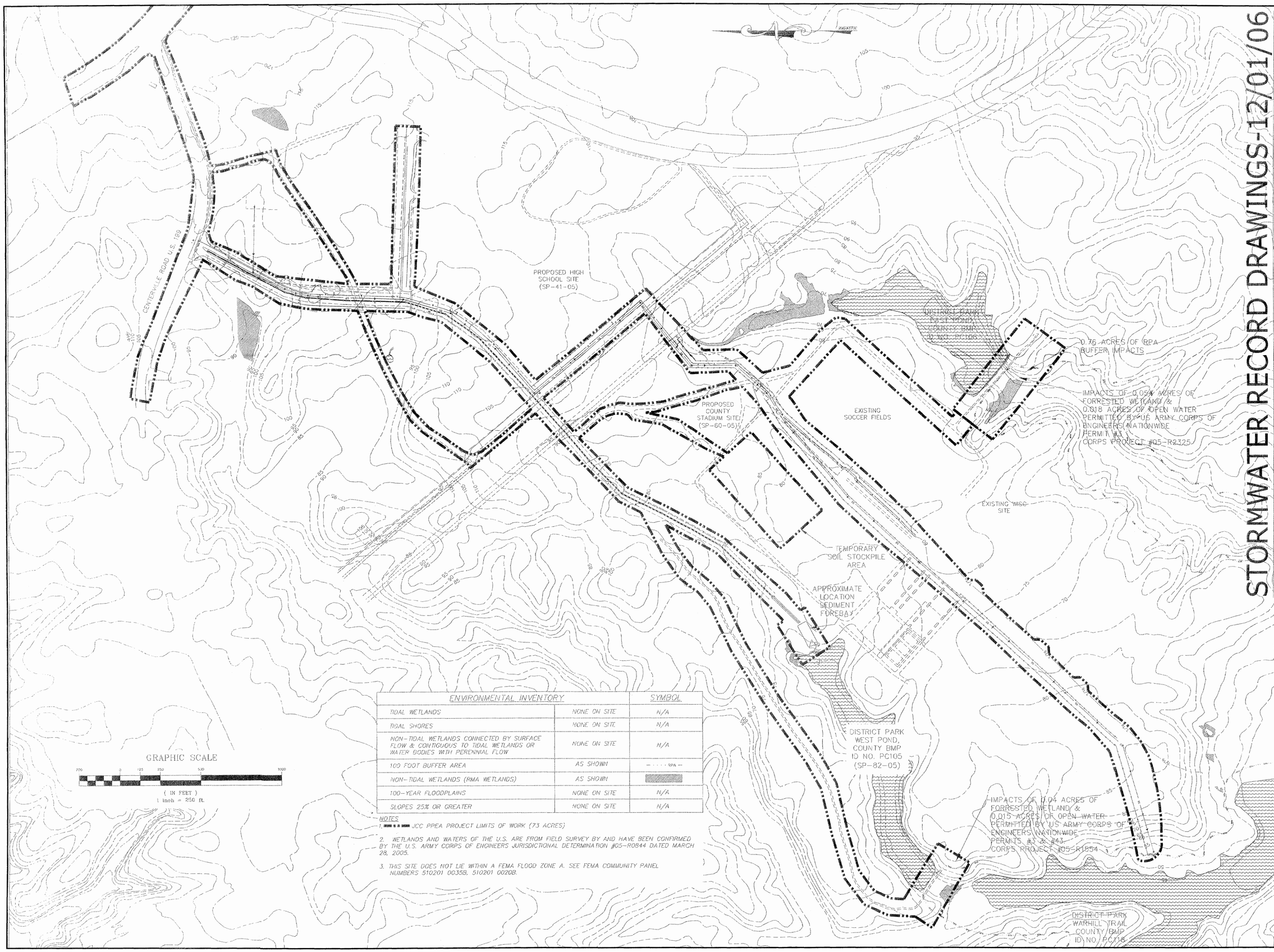

ENVIRONMENTAL INVENTORY		SYMBOL
TIDAL WETLANDS	NONE ON SITE	N/A
TIDAL SHORES	NONE ON SITE	N/A
NON-TIDAL WETLANDS CONNECTED BY SURFACE FLOW & CONTIGUOUS TO TIDAL WETLANDS OR WATER BODIES WITH PERENNIAL FLOW	NONE ON SITE	N/A
100 FOOT BUFFER AREA	AS SHOWN	- - - - RPA - -
NON-TIDAL WETLANDS (RMA WETLANDS)	AS SHOWN	
100-YEAR FLOODPLAINS	NONE ON SITE	N/A
SLOPES 25% OR GREATER	NONE ON SITE	N/A

NOTES

1. JCC PPEA PROJECT LIMITS OF WORK (73 ACRES)
2. WETLANDS AND WATERS OF THE U.S. ARE FROM FIELD SURVEY BY AND HAVE BEEN CONFIRMED BY THE U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION #05-R0844 DATED MARCH 28, 2005.
3. THIS SITE DOES NOT LIE WITHIN A FEMA FLOOD ZONE A. SEE FEMA COMMUNITY PANEL NUMBERS 510201 0035B, 510201 0020B.

STORMWATER RECORD DRAWINGS-12/01/06

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2007
PROFESSIONAL ENGINEER

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY REVIEW COMMENTS
12/01/2006	AS BUILT

DATE	2/24/2006
DRAWN BY	D.ARRINGTON
DESIGNED BY	C.DODSON
CHECKED BY	R.THOMAS
SCALE	1" = 250'

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

ENVIRONMENTAL INVENTORY

JOB NO.	SHEET NO.
22547	C1.1

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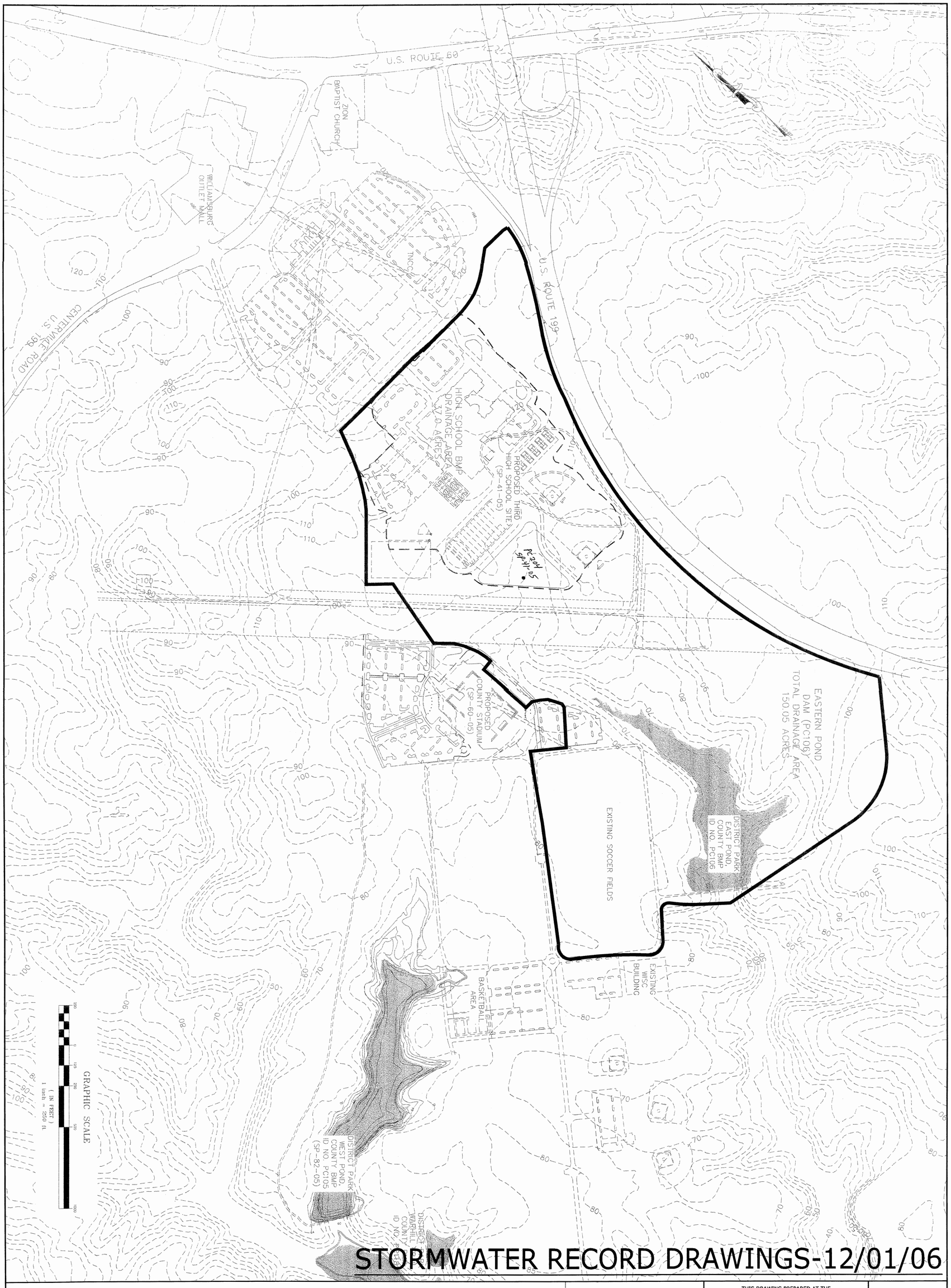

STORMWATER RECORD DRAWINGS-12/01/06

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COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 035586
4/4/2007
PROFESSIONAL ENGINEER

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

DRAINAGE AREA LAYOUT

JOB NO.	SHEET NO.	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
22547	C1.2	1" = 250'	D. GOULD	M. CLAUD	C.ALMARODE	2/24/2006

DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY REVIEW COMMENTS
12/01/2006	AS BUILT
3/16/2006	REVISED AS BUILT DRAWINGS PER COUNTY COMMENTS

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PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 023

DRAINAGE NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, VIRGINIA DEPARTMENT OF TRANSPORTATION'S ROAD AND BRIDGE SPECIFICATIONS DATED 2002, AND ROAD AND BRIDGE STANDARDS, DATED FEBRUARY 2001, AS AMENDED BY CONTRACT PROVISIONS AND THESE PLANS. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH JAMES CITY COUNTY STANDARDS AND SPECIFICATIONS, IF MORE STRINGENT.

2. ALL CONCRETE PIPE JOINTS ARE TO BE SEALED ACCORDING TO VDOT STANDARDS AND SPECIFICATIONS.

3. ALL STORM SEWERS SHALL BE ASTM, C-76, CLASS III, EXCEPT AS NOTED.

4. IF DURING CONSTRUCTION, THE EXISTING GROUND ELEVATIONS SHOWN ON THESE PLANS ARE FOUND TO DIFFER SIGNIFICANTLY FROM THE ELEVATIONS IN THE FIELD, THE CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY FOR AN ADJUSTMENT IN ELEVATIONS.

MAINTENANCE PLAN

A maintenance program is required to ensure the Stormwater Management (SWM)/Best Management Practice (BMP) facility functions as designed and to provide for reasonable aesthetic conditions. Proper maintenance is encouraged to prevent the introduction of debris and sediment at inflow locations, pretreatment areas, the BMP itself, its principal control structures and downstream waterways. Following installation and establishment of vegetation in disturbed site areas, inspections for sediment buildups will be performed at least quarterly. It is anticipated that under normal conditions, sediment removal will be required once every 5 to 10 years. If other construction or related land-disturbing activities are performed upslope of the BMP, adequate protection measures should be implemented with inspections performed at least once weekly.

The Owner or its designated representative will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period.

BMP Description: The Warhill Site District Park East Pond PC106 serves a drainage area of approximately 150 acres associated with development of the Warhill Tract which includes construction of a Community College, High School and Sports Stadium. The facility is a wet-type detention facility. A wet-type detention pond temporarily stores runoff and normally maintains a permanent wet pool during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. Principal structures associated with the BMP consist of a concrete inlet box, a 42" dia. concrete culvert and 50 ft. wide, grass-lined trapezoidal shaped emergency overflow channel. There is 1 notch in the inlet box to provide for water quality drawdown. During the 100-year storm, the maximum water level should rise to about 2.25 feet above the top of the inlet box and within 1.75 feet below the top of dam. During this type of larger storm event, the emergency spillway, which is located through the embankment along the northwest side, will discharge flow. If functioning properly, normal storm events should reach an elevation just below the top of the inlet box and the pond should draw down in about 24 to 36 hours.

Inspection and maintenance of the facility will consist of the following additional measures:

1. At least once per year, clean the pond inlet box and outlet pipe of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area.

2. Perform maintenance mowing of areas surrounding the BMP & Forebay at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not be permitted to grow along or on any part of the embankment that was constructed using engineered (compacted) fills and must be cleared to a point at least 25 feet beyond the toe of slope of the embankment.

3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed by qualified independent soil testing laboratory such as VPI&SU. Apply additional lime and fertilizer in accordance with test recommendations.

4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedlings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations or requirements of the Virginia Erosion and Sediment Control Handbook (VESCH).

5. Perform quarterly inspections of the inlet box and crest spillway for the observance of collected trash and debris. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide an attractive appearance.

6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the concrete inlet box, outlet culvert, concrete outlet channel along the downstream face of the dam and pond embankment. If damage is evident, further investigation by a professional engineer may be required to assess the integrity of the structure.

7. Perform quarterly inspections of the graded side slopes of the facility for signs of animal/rodent borrows or slope erosion. Immediately perform necessary repairs, refilling or reseeding.

8. Perform yearly observations of perimeter areas surrounding the facility to ensure changes in land use, topography or access have not occurred and do not affect the operation, maintenance, access or safety features as provided. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the engineered embankment and principal flow control structures.

9. Record Keeping. The owner or designated representative shall keep reasonable, accurate written records of inspections performed for the structure. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.

10. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County.

11. The pond shall be dredged when sediment deposits have reached elevation 60.85 as measured from the normal pool elevation of 67.7.

EROSION CONTROL NARRATIVE SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AND THE ENGINEER 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES ON THE STORM SEWER TRUNK SYSTEM.

3. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 4 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN ON SHEET C1.6. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. BEGIN CONSTRUCTION OF THE PROPOSED OUTLET STRUCTURES AND GRADING OPERATIONS FOR THE DAM. UPON COMPLETION OF THE PROPOSED OUTLET STRUCTURES, PRESSURE GROUT THE EXISTING CMP DRAINPIPE IN PLACE AND REMOVE THE EXISTING CMP RISER PIPE.

10. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE RIPRAP SLOPE PROTECTION, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

2. MATERIAL USED FOR FILL SHALL BE CLASSIFIED AS SC MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. THE DESIGN HEIGHT OF THE EMBANKMENT SHALL BE INCREASED BY A MINIMUM OF 4 INCHES TO ENSURE THAT THE DESIGN TOP OF FILL ELEVATION WILL BE MAINTAINED AFTER SETTLEMENT HAS TAKEN PLACE.

4. MINIMUM COMPACTION REQUIREMENTS MUST BE MET AT CRITICAL POINTS (AGAINST THE CONCRETE WEIR, WING WALLS, AND OUTLET BARRELS). THE MOISTURE CONTENT OF THE FILL MATERIALS SHALL BE MAINTAINED IN THE RANGE OF +/- TWO TO THREE PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT.

5. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON SHEET C1.1. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER EROSION AND SEDIMENT MEASURES SPECIFIED ON THIS SHEET.

6. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER SEEDING NOTES ON SHEET C1.3.

7. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

8. THE CONTRACTOR SHALL COORDINATE WITH COUNTY PERSONNEL TO IDENTIFY THE LOCATION OF THE EXISTING IRRIGATION LINE NEAR THE DAM IN ORDER TO ENSURE AVOIDANCE OF THESE LINES DURING CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.

INSPECTION REQUIREMENTS

1. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT TO ENGINEER AND COUNTY PRODUCT MATERIAL SUBMITTALS ON ALL PIPE INCLUDING INFORMATION ON PIPE CLASS, DATE AND LOCATION OF MANUFACTURE, AND COMPLIANCE WITH APPROPRIATE ASTM STANDARDS.

2. PRIOR TO FABRICATION, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AND COUNTY FOR REVIEW AND APPROVAL SHOP DRAWINGS ON ALL PRE-MANUFACTURED STRUCTURES.

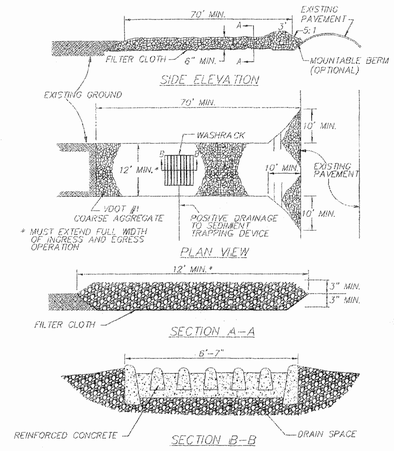
3. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS.

- PIPE JOINTS: NOTE ANY GAPS IN JOINTS AND DISTANCE AT MAXIMUM GAP LOCATION
- JOINTS BETWEEN PIPE AND PRE-MANUFACTURED STRUCTURES
- BACKFILL MATERIAL: NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
- BACKFILL COMPACTION TESTING

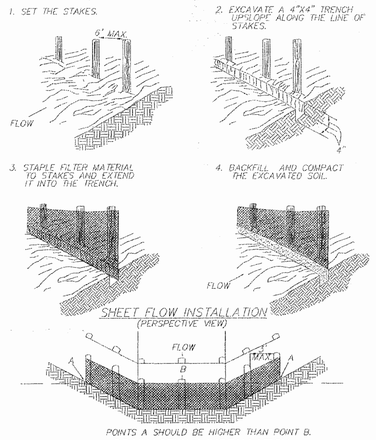
4. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE IN ITEM #3 ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

5. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

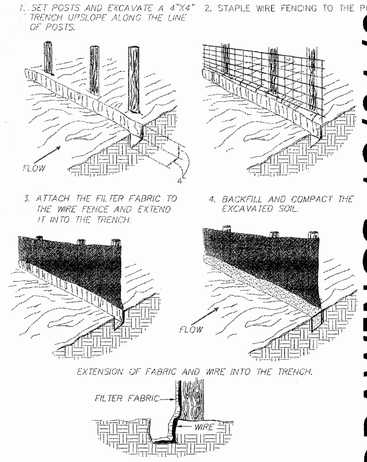
6. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION.



CE STONE CONSTRUCTION ENTRANCE (3.02-1)
NO SCALE



SF CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT) (3.05-2)
NO SCALE



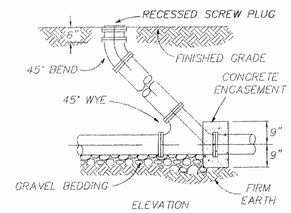
SF CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT) (3.05-1)
NO SCALE

CONSTRUCTION AND INSTALLATION NOTES

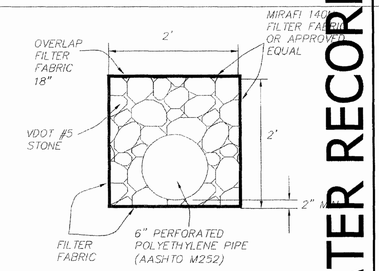
1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION OF STORM DRAINAGE CONVEYANCE SYSTEMS.

2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

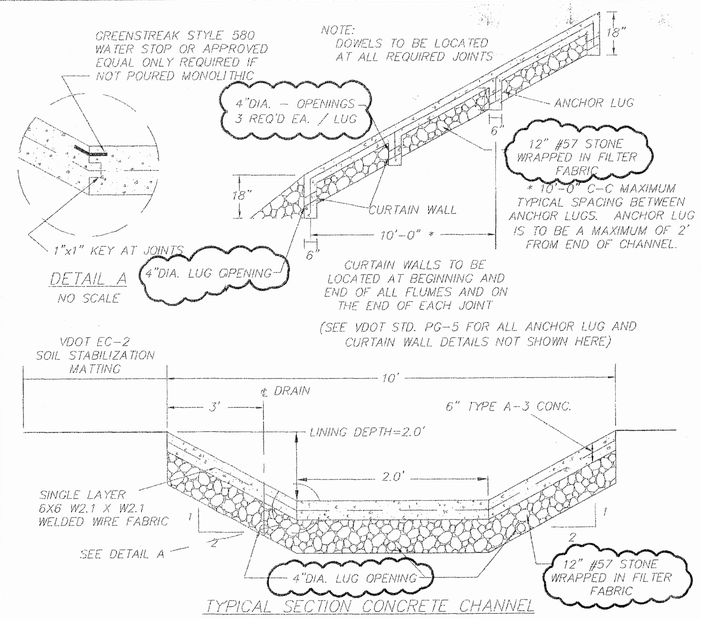
3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.



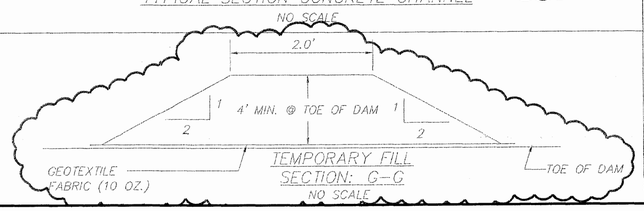
TYPICAL CLEANOUT
NO SCALE



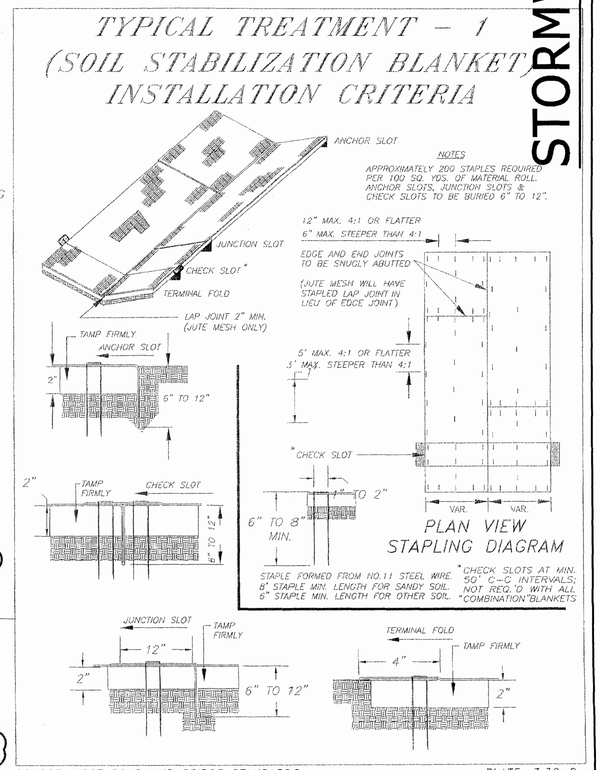
TOE DRAIN DETAIL
NO SCALE



TYPICAL SECTION CONCRETE CHANNEL
NO SCALE



TEMPORARY FILL SECTION: G-G
NO SCALE



SOURCE: VDOT ROAD AND BRIDGE STANDARDS PLATE: 3.36-2

STORMWATER RECORD DRAWINGS-12/01/06

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2017
PROFESSIONAL ENGINEER

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
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TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY REVIEW COMMENTS
6/7/2006	REVISED PER CONSTRUCTION ACCESS
12/01/2006	AS BUILT

DATE	2/24/2006
DRAWN BY	C.ALMARODE
DESIGNED BY	M. CLAUD
CHECKED BY	D. GOULD
SCALE	AS NOTED

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

JOB NO. 22547

SHEET NO. C1.4

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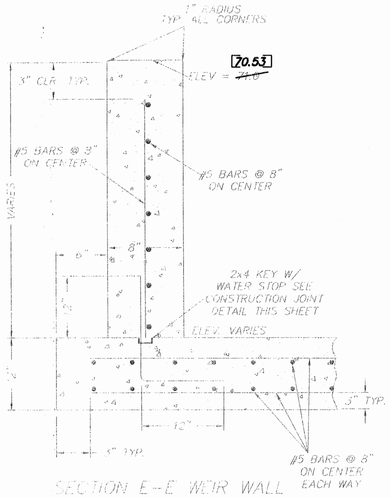
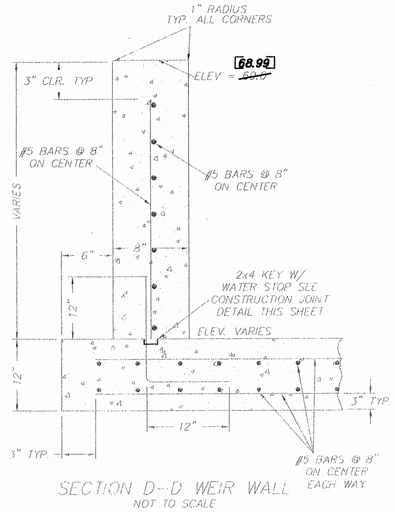
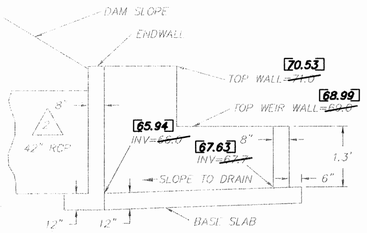


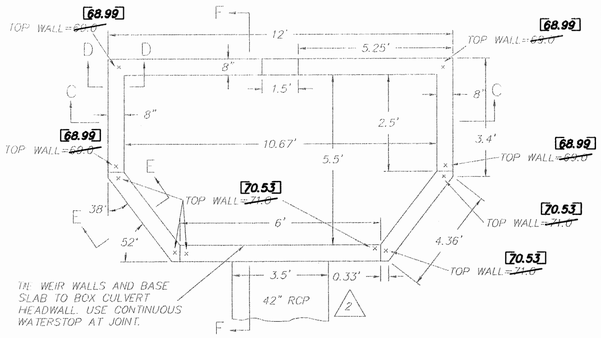
SECTION E-E WEIR WALL
NOT TO SCALE



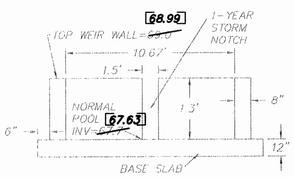
SECTION D-D WEIR WALL
NOT TO SCALE



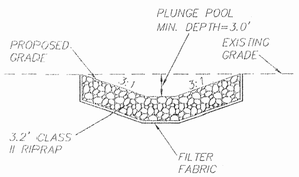
SECTION F-F
NO SCALE



PRINCIPAL SPILLWAY PLAN STRUCTURE #1
NO SCALE



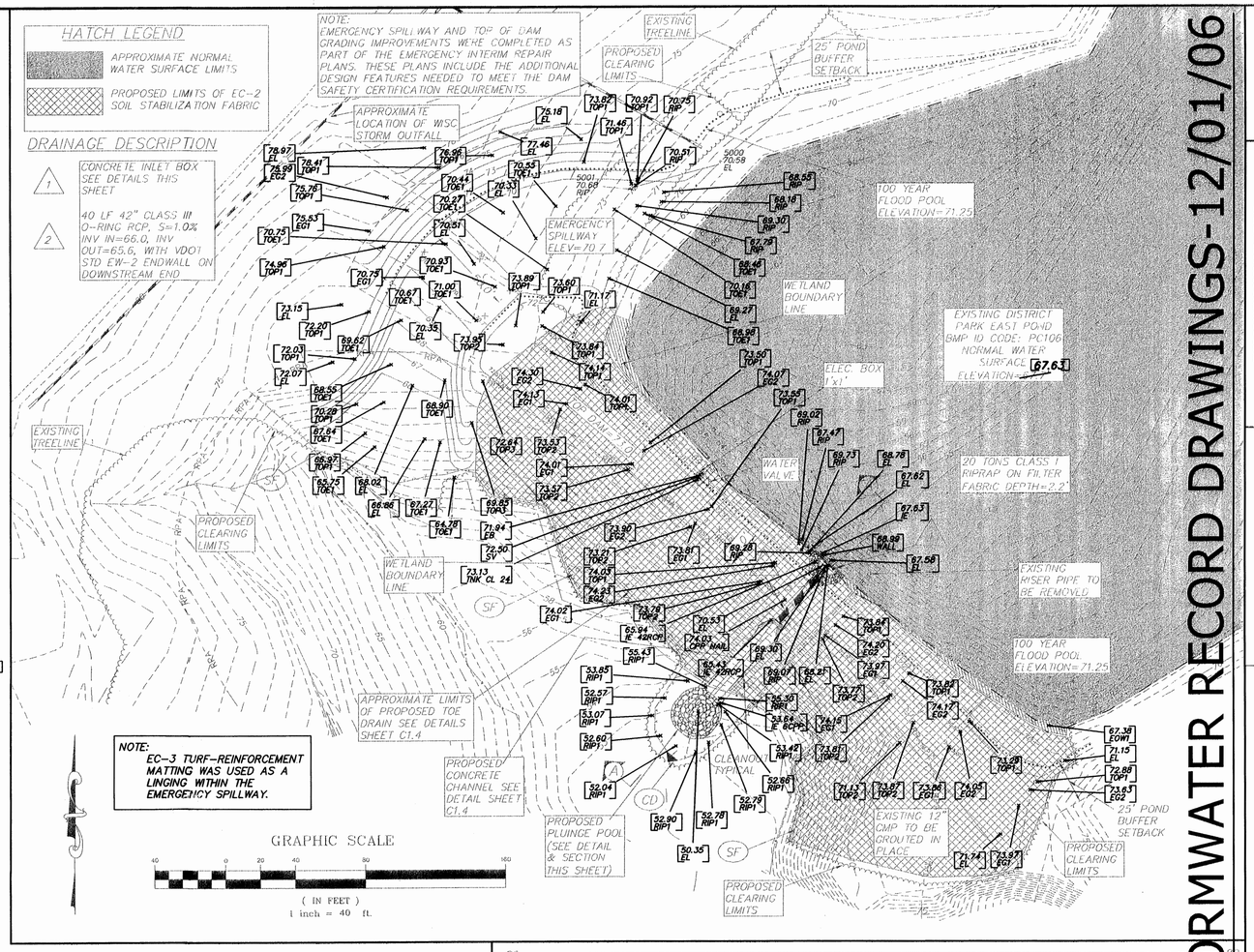
SECTION C-C
NO SCALE

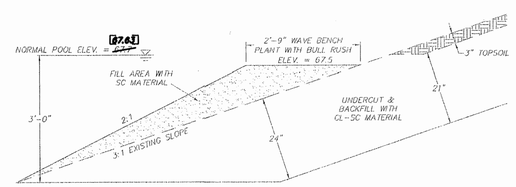


SECTION B-B

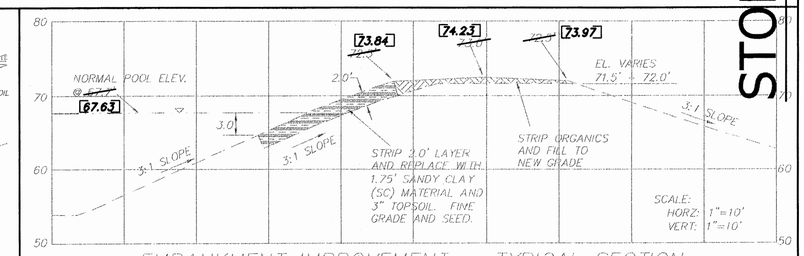
WATER SURFACE ELEVATIONS

NORMAL	67.63
1 YEAR STORM	68.67'
2 YEAR STORM	69.09'
10 YEAR STORM	69.92'
25 YEAR STORM	70.20'
100 YEAR STORM	71.25'

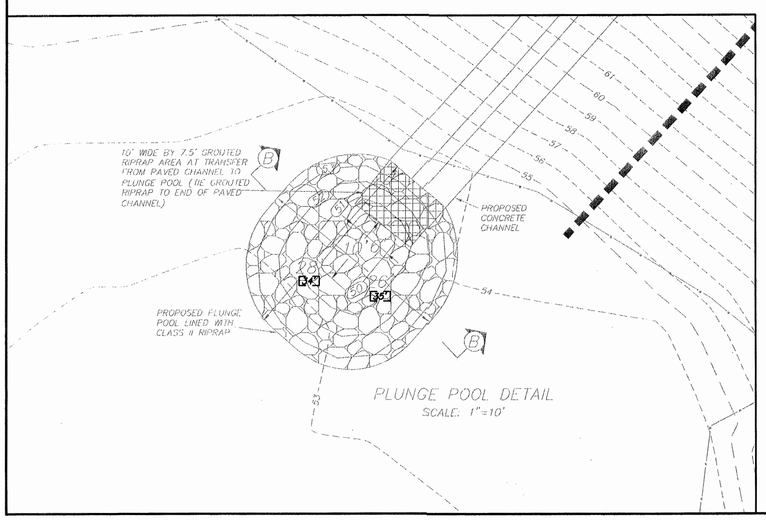




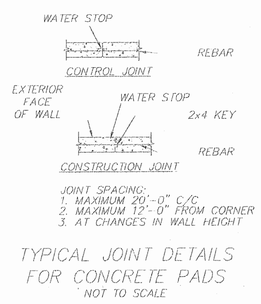
EMBANKMENT SLOPE IMPROVEMENTS
NO SCALE



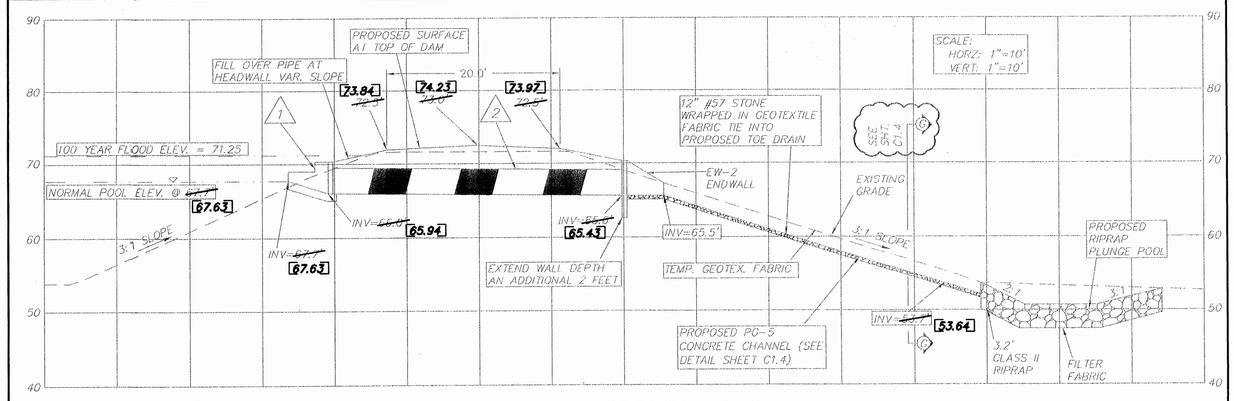
EMBANKMENT IMPROVEMENT – TYPICAL SECTION



PLUNGE POOL DETAIL
SCALE: 1"=10'



TYPICAL JOINT DETAILS FOR CONCRETE PADS
NOT TO SCALE



SECTION A-A
CONSTRUCTION ACCESS

STORMWATER RECORD DRAWINGS-12/01/06

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2007
PROFESSIONAL ENGINEER

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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY COMMENTS
6/22/2006	REVISED PER CONSTRUCTION ACCESS
10/11/2006	REVISED PER AS BUILT
12/01/2006	AS BUILT
3/30/2007	REVISED PER COUNTY REVIEW COMMENTS

DATE	2/24/2006
DRAWN BY	S. MUNIR
DESIGNED BY	M. CLAUD
CHECKED BY	A. GOULD
SCALE	AS SHOWN

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

PLAN & DETAILS

JOB NO.	22547
SHEET NO.	C1.6

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James City County, Virginia
Environmental Division

Warhill Site Roadways & Improvements
Environmental Division Comments

Record Drawings (Asbuilts)
District Park East Pond Dam PC106
DCR Permit No. 09529
SP-107-05

APPROVED
James City County
Environmental Division
By: _____
Date: 04-09-07

WARHILL SITE
EASTERN POND (PC 106) DAM RENOVATIONS

JAMES CITY COUNTY, VA

APR 2006 RECEIVED PLANNING DEPARTMENT

SP-107-05

COUNTY OF JAMES CITY
FINAL SITE PLAN

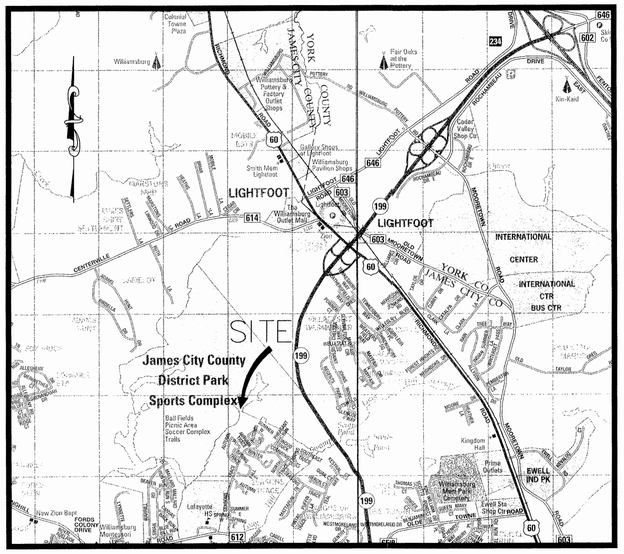
APPROVALS	DATE
Fire Dept.	
Health Dept.	
VDOT	
Planning	
Environ.	
Zoning Adm.	
JCSA	
County Eng.	
REA	
Other	

CBE - 06-007
Approved March 6, 2006

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033568
4/10/2006
PROFESSIONAL ENGINEER

SHEET INDEX

TITLE	SHEET
COVER SHEET	C1.0
ENVIRONMENTAL INVENTORY	C1.1
DRAINAGE AREA LAYOUT	C1.2
EROSION AND SEDIMENT CONTROL NOTES & DETAILS	C1.3 - C1.5
PLAN & DETAILS	C1.6



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VICINITY MAP
SCALE: 1" = 2,000'

RESPONSIBLE LAND DISTURBER: William E. Richards (0402-21759)

DISTURBED AREA = 1.60 acres

TOTAL AREA OF SITE = 588.21 acres

IMPERVIOUS COVER PROPOSED = 0 sq. ft.

THIS PROJECT IS LOCATED IN THE POWHATAN CREEK WATERSHED (SUBWATERSHED 205 AND CATCHMENT 205-107-1) . SPECIAL STORMWATER CRITERIA APPLIES.

THIS PORTION OF THE PROJECT IS SUBJECT TO THE PROVISION OF CHESAPEAKE BAY EXCEPTION CBE 06-007 AS APPROVED ON MARCH 6, 2006.

CURTIS CONTRACTING, INC.
DEVELOPER

Contact: Andy Curtis
Phone: (804) 843-4633
Fax: (804) 842-2545
P.O. Box 769
West Point, VA 23181

DATE: 2/24/2006

APPROVED
James City County
Environmental Division
By: [signature]
Date: 04-20-06
FOR LAND DISTURBING PERMIT PURPOSES.

REVISIONS

DATE	SHEET NUMBERS	DATE	SHEET NUMBERS
4/10/2006	ALL		

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Centerville Road
James City County, Virginia
P.O. BOX 769
(804) 843-4633

TIMMONS GROUP

PROJECT: WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
OWNER & DEVELOPER: Curtis Contracting Inc.
JOB NO. 22547
SHEET NO. C1.0

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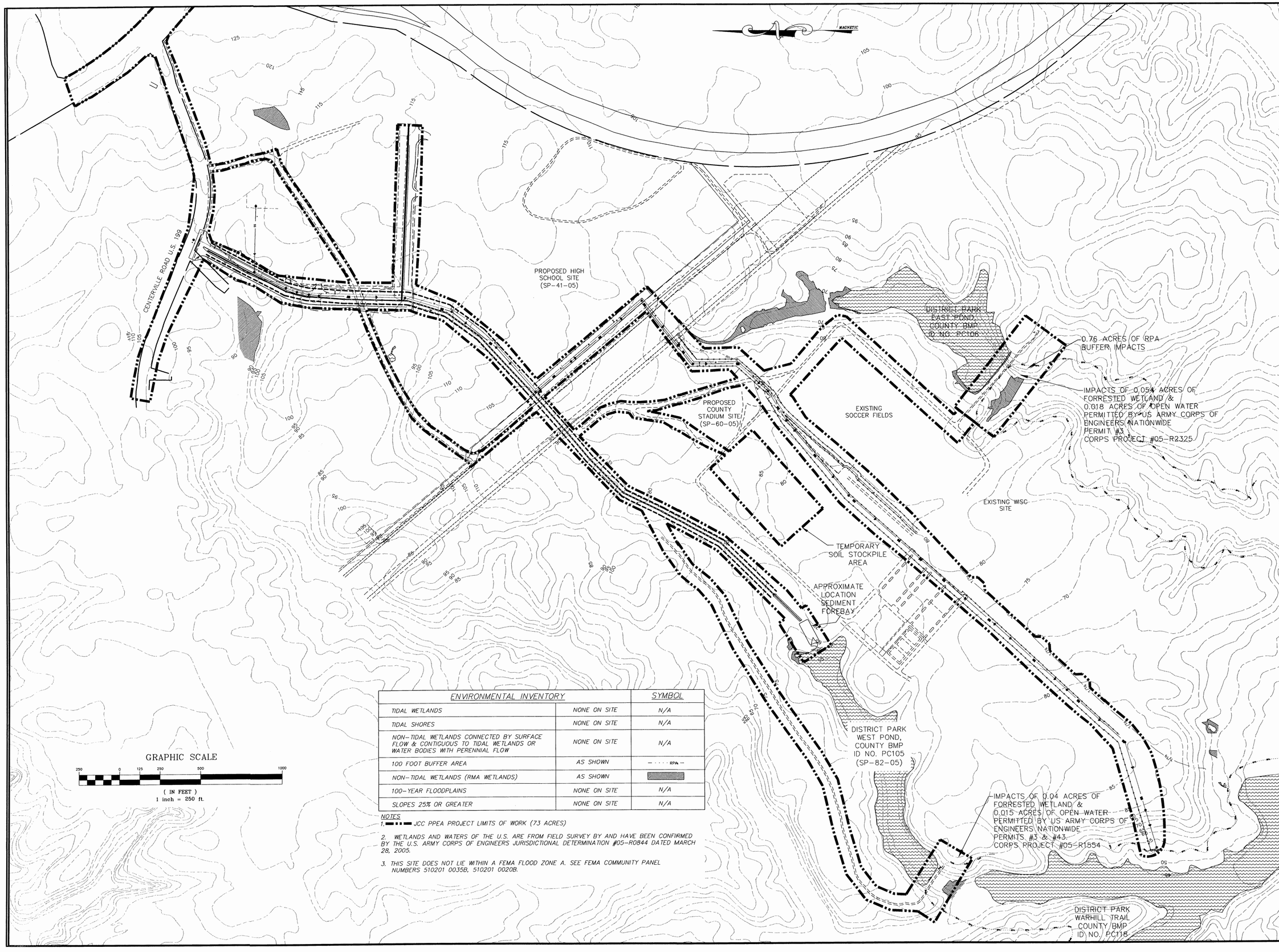
PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 027



ENVIRONMENTAL INVENTORY		SYMBOL
TIDAL WETLANDS	NONE ON SITE	N/A
TIDAL SHORES	NONE ON SITE	N/A
NON-TIDAL WETLANDS CONNECTED BY SURFACE FLOW & CONTIGUOUS TO TIDAL WETLANDS OR WATER BODIES WITH PERENNIAL FLOW	NONE ON SITE	N/A
100 FOOT BUFFER AREA	AS SHOWN	— · · · · RPA —
NON-TIDAL WETLANDS (RMA WETLANDS)	AS SHOWN	
100-YEAR FLOODPLAINS	NONE ON SITE	N/A
SLOPES 25% OR GREATER	NONE ON SITE	N/A

NOTES:

1. JCC PPEA PROJECT LIMITS OF WORK (73 ACRES)
2. WETLANDS AND WATERS OF THE U.S. ARE FROM FIELD SURVEY BY AND HAVE BEEN CONFIRMED BY THE U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION #05-R0844 DATED MARCH 28, 2005.
3. THIS SITE DOES NOT LIE WITHIN A FEMA FLOOD ZONE A. SEE FEMA COMMUNITY PANEL NUMBERS 510201 0035B, 510201 0020B.

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2006
PROFESSIONAL ENGINEER

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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY REVIEW COMMENTS

DATE	2/24/2006
DRAWN BY	D.ARRINGTON
DESIGNED BY	C.DODSON
CHECKED BY	R.THOMAS
SCALE	1" = 250'

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

ENVIRONMENTAL INVENTORY

JOB NO.	SHEET NO.
22547	C1.1

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PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 028

EASTERN POND
DAM (PC106)
TOTAL DRAINAGE AREA
150.05 ACRES

DISTRICT PARK
EAST POND,
COUNTY BMP
ID NO. PC106

EXISTING
WISC
BUILDING

EXISTING SOCCER FIELDS

U.S. ROUTE 199

PROPOSED THIRD
HIGH SCHOOL SITE
(SP-41-05)

HIGH SCHOOL BMP
DRAINAGE AREA
37.0 ACRES

PROPOSED
COUNTY STADIUM
(SP-60-05)

BASKETBALL
AREA

DISTRICT PARK
WARHILL TRAIL
COUNTY BMP
ID NO. PC118

DISTRICT PARK
WEST POND,
COUNTY BMP
ID NO. PC105
(SP-82-05)

U.S. ROUTE 60

TNCC

ZION
BAPTIST CHURCH

WILLIAMSBURG
OUTLET MALL

CENTERVILLE ROAD
U.S. 199

GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)
1 inch = 250 ft.

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
PROFESSIONAL ENGINEER

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4/10/2006	REVISED PER COUNTY REVIEW COMMENTS

DATE	2/24/2006
DRAWN BY	C.ALMARODE
DESIGNED BY	M. CLAUD
CHECKED BY	D. GOULD
SCALE	1" = 250'

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

DRAINAGE AREA LAYOUT

JOB NO.	22547
SHEET NO.	C1.2

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EROSION AND SEDIMENT CONTROL NOTES

James City County Environmental Division
Erosion and Sediment Control Notes
Revised 7/6/01

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

1. All erosion and sediment control measures shall be installed and maintained in accordance with the Virginia Erosion and Sediment Control Handbook, 3rd Edition, 1992. The contractor shall be thoroughly familiar with all applicable measures contained therein that may be pertinent to this project, including Minimum Standards 1 through 19. If the approved Erosion and Sediment Control plan is found to be inadequate in the field, the Minimum Standards will apply in addition to the provisions of the approved plan.

2. As a prerequisite to approval of an erosion and sediment control plan for land-disturbing activities, the name of a Responsible Land-Disturber shall be provided. The Responsible Land-Disturber shall be an individual who holds a valid certificate of competence issued by the Virginia Department of Conservation and is defined as the person in charge of and responsible for carrying out the land-disturbing activity. Permits or plans without this information are deemed incomplete and will not be approved until proper notification is received. Also, if the person designated as Responsible Land-Disturber changes between the time of plan approval and the scheduled preconstruction meeting, the Environmental Division shall be informed of the change, in writing, 24-hours in advance of the preconstruction meeting.

3. A preconstruction meeting shall be held on site between the County, the Developer, the Project Engineer, the Responsible Land-Disturber and the Contractor prior to issuance of the Land Disturbing Permit. The Contractor shall submit a Sequence of Construction to the County for approval prior to the preconstruction meeting. The designated Responsible Land-Disturber is required to attend the preconstruction meeting for the project.

4. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from the Virginia Department of Transportation is required prior to any construction activities within State right-of-ways. Where sediment is transported onto a public road surface, the road shall be thoroughly cleaned at the end of each day (Std & Spec 3.02).

5. Sediment basins and traps (Std & Spec 3.13 and 3.14), perimeter dikes (Std & Spec 3.09 and 3.12), sediment filter barriers (Std. & Spec 3.05) and other measures intended to trap sediment on-site must be constructed as a first step in grading and must be made functional prior to any upslope land disturbance taking place. Earthen structures such as dams, dikes and diversions must be seeded and mulched immediately after installation. Periodic inspections of the erosion control measures by the owner or owners representatives shall be made to assess their condition. Any necessary maintenance of the measures shall be accomplished immediately and shall include the repair of measures damaged by any subcontractor including those of the public utility companies.

6. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) and slope drain (Std. & Spec. 3.15) shall be installed prior to the end of each working day.

7. Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Environmental Division approval will be required for other deviations from the approved plan.

8. The Contractor shall place soil stockpiles at the locations shown on the plan. Soil stockpiles shall be stabilized or protected with sediment trapping measures. Off-site waste or borrow areas shall be approved by the Environmental Division prior to the import of any borrow or export of any waste to or from the project site.

9. The Contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of the same (Std & Spec 3.18). This includes installation of erosion control stone or paved ditches where required. Any drainage outfalls required for a street must be completed before street grading or utility installation begins.

10. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer that 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

11. No more than 300 feet of sanitary sewer, storm drain, water or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).

12. If disturbed area stabilization is to be accomplished during the months of December, January or February, stabilization shall consist of mulching (Std & Spec 3.35). Seeding will then take place as soon as the season permits.

13. The term Seeding, Final Vegetative Cover or Stabilization on this plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime and fertilizer (Std & Spec 3.32). Irrigation shall be required as necessary to ensure establishment of grass cover.

14. All slopes steeper than 3H:1V shall require the use of erosion control blankets and mattings to aid in the establishment of a vegetative cover. Installation shall be in accordance with Std. & Spec. 3.35, Mulching, Std. & Spec. 3.36, Soil Stabilization Blankets and Matting and Manufacturers Instructions. No slopes shall be created steeper than 2H:1V.

15. Inlet protection (Std & Spec 3.07 and 3.08) shall be provided for all storm drain and culvert inlets following construction of the same.

16. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.

17. Paved ditches shall be required wherever accelerated erosion is evident. Particular attention shall be paid to those areas where grades exceed 3 percent.

18. Temporary erosion control measures such as silt fence are not to be removed until all disturbed areas are stabilized. Trapped sediment shall be spread, seeded and mulched. After the project and stabilization is complete, all erosion and sediment control measures shall be removed within 30 days.

19. No sediment trap or sediment basin shall be removed until a) at least 75 percent of the lots within the drainage area to the trap or basin have been sold to a third party (unrelated to the developer) for the construction of homes and/or b) 60 percent of the single family lots within the drainage area to the trap or basin have been completed and the soil stabilized. A bulk sale of the lots to another builder does not satisfy this provision. Sediment traps and sediment basins shall not be removed without the express authorization of the James City County Environmental Division.

20. Record Drawings (As-Builts) and Construction Certifications are both required for newly constructed or modified stormwater management/BMP facilities. Certification activities shall be adequately coordinated and performed before, during and following construction in accordance with the current version of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

21. Design and construction of private-type site drainage systems outside VDOT rights-of-way shall be performed in accordance with the current version of the James City County Environmental Division, Stormwater Drainage Conveyance Systems (Non-BMP related), General Design and Construction Guidelines.

EROSION CONTROL REQUIREMENTS

ADJACENT PROPERTY

The proposed development is located on a 500+ acre parcel that is mostly wooded. The parcel is located to the west of Route 199 just south of the intersection of Route 199 and Route 60. The parcel is bordered to the east by Route 199, to the north by Centerville Road, to the north west by future development, and the southwest by a 200' VEPCO easement.

SOILS

Refer to Soils Map information this sheet.

CRITICAL EROSION AREAS

Early establishment and proper maintenance of perimeter controls will provide sedimentation control. Stabilize and maintain ditches and fill slopes throughout project construction to control erosion.

EROSION AND SEDIMENT CONTROL MEASURES

Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook. The minimum standards of the VESCH shall be adhered to unless otherwise waived or approved by a variance by local authorities having jurisdiction.

STRUCTURAL PRACTICES

1. Outlet Protection – 3.18.
   Riprap shall be placed at the outlet of all pipes as indicated.

2. Silt Fence Barrier – 3.18.
   Silt fence sediment barriers shall be installed downslope of areas with minimal grades to filter sediment-laden runoff from sheet flow as indicated.

VEGETATIVE PRACTICES

1. Topsoiling (Temporary Stockpile) – 3.3
   Topsoil shall be stripped from areas to be graded and stockpiled for later spreading. Stockpile locations shall be located onsite and shall be stabilized with temporary silt fence and vegetation.

2. Temporary Seeding – 3.31
   All denuded areas which will be left dormant for more than 30 days shall be seeded with fast germinating temporary vegetation immediately following grading of those areas. Selection of the seed mixture shall depend on the time of year it is applied.

MANAGEMENT STRATEGIES

1. Provide sediment trapping measures as a first step in grading and seed and mulch immediately following installation.
2. Provide temporary seeding or other stabilization immediately after grading.
3. All erosion and sediment control practices shall be maintained until they are no longer required to comply with the contract documents or state law.

PERMANENT STABILIZATION

All non-paved areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be in accordance with Std. & Spec. 3.32, PERMANENT SEEDING. Seed type shall be as specified for "Minimum Care Lawns" and "General Slopes" in the Handbook. Mulch (straw or fiber) shall be used on all seeded surfaces. In all seeding operations seed, fertilizer and lime shall be applied prior to mulching.

MAINTENANCE (See "Minimum Standards" for additional information).

All erosion and sediment control measures shall be checked daily and after each run-off producing rainfall. The following items shall be checked in particular:

1. Check the silt fence barrier for undermining or deterioration of the fabric. Remove sediment when the level of sediment deposition reaches half way to the top of the barrier.
2. Check the seeding areas to ensure that a stand of grass is maintained. Fertilize and reseed as needed.
3. Establish temporary fill diversions at the top of fill slopes, as required, at the end of each working day.

SPECIAL STORMWATER CRITERIA

Special Stormwater Criteria (SSC) in James City County, Virginia

This project is located in a Special Stormwater Criteria (SSC) Area. Special Stormwater Criteria were developed as a result of goals and priorities as established by approved Watershed Management Plans. Special Stormwater Criteria were developed to achieve two primary goals. The first is to preserve pre-development hydrology to reduce impacts to high quality streams. The second primary goal is to provide enhanced water quality treatment of stormwater runoff. We are disturbing more than 10 acres with this project and therefore require 5 units.

The following Special Stormwater Criteria Practices (SSCP's) will be employed on this project:

SSCP #10 – Construct off-site BMP in a previously "Uncontrolled Area". The existing outlet mall runoff will be diverted to a water quality BMP through construction of this project. (3 UNITS OF CREDITS)

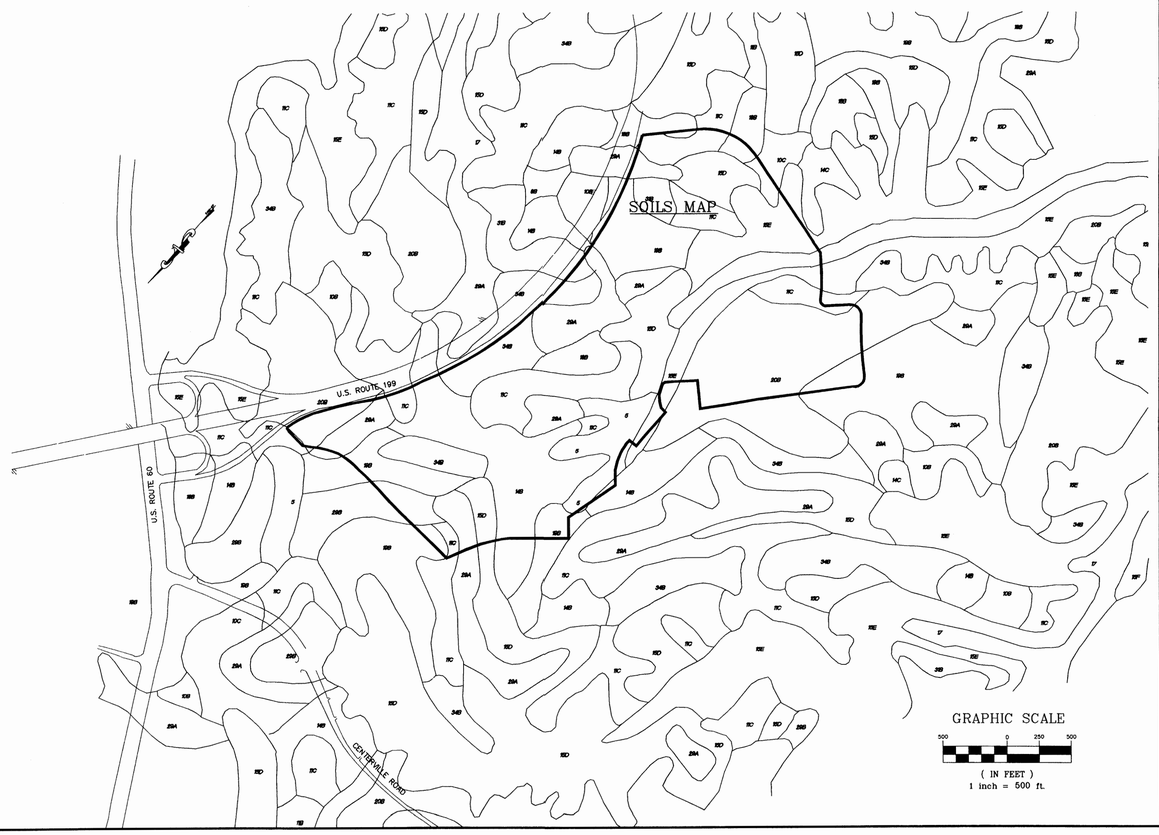
SSCP #20 – Enhanced outlet protection measures at pipe and channel outfalls. This project will employ enhanced outlet protection at the outfall of the regional trunk storm sewer system and at the outfall of the improved dam spillway. (1 UNIT OF CREDIT)

SSCP #25 – Enhanced slope stabilization practices on all graded cut-fill slopes. (1 UNIT OF CREDIT)

SSCP #39 – Provide asbuilt drawings for entire storm drainage system. (0.5 UNIT OF CREDIT)

NOTE: 5.5 UNITS PROVIDED > 5 UNITS REQUIRED.

*SPECIAL STORMWATER CRITERIA FOR THIS CONSTRUCTION HAS BEEN FULFILLED BY OTHER PORTIONS OF THE PPEA PROJECT.



SOILS SUMMARY

MAPPING UNIT	POTENTIAL	SLOPE	MAPPING UNIT NAME	SOIL CHARACTERISTICS
5		0–2%	BETHERA SILT LOAM	DEEP, NEARLY LEVEL, AND POOR DRAINED DARK GRAYISH BROWN AND LIGHT BROWNISH GRAY; SEASONAL HIGH WATER TABLES, PONDING, AND SLOW PERMEABILITY ARE THE MAIN LIMITATIONS OF THE SOIL FOR COMMUNITY DEVELOPMENT.
10	B	2–6%	CRAVEN FINE SANDY LOAM	THIS SOIL IS DEEP, GENTLY SLOPING, AND MODERATELY WELL DRAINED. BROWN FINE SANDY LOAM. PERMEABILITY IS SLOW, AND AVAILABLE WATER CAPACITY IS MODERATE. SEASONAL HIGH WATER TABLE, SLOW PERMEABILITY, MODERATE SHRINK-SWELL ARE THE MAIN LIMINATIONS COMMUNITY.
10	C	6–10%	CRAVEN FINE SANDY LOAM	THIS SOIL IS DEEP, STRONGLY SLOPING, AND MODERATELY WELL DRAINED. GRAYISH BROWN FINE SANDY LOAM. PERMEABILITY IS SLOW, AND AVAILABLE WATER CAPACITY IS MODERATE. SEASONAL HIGH WATER TABLE, SLOW PERMEABILITY, MODERATE SHRINK-SWELL ARE THE MAIN LIMINATIONS.
11	C	6–10%	CRAVEN-UCHEE COMPLEX	COMPLEX OF MODERATELY WELL DRAINED SOILS DEEP STRONG SLOPING SOIL DARK GRAYISH BROWN FINE SANDY LOAM WITH LOW PERMEABILITY; SEASONAL HIGH WATER TABLE, SLOPE, SLOW AND MODERATLY SLOW PERMEABILITY, AND MODERATE SHRINK-SWELL POTENTIAL ARE THE MAIN LIMITATIONS OF THE SOIL FOR COMMUNITY DEVELOPMENT.
14	B	2–6%	EMPORIA FINE SANDY LOAM	DEEP WELL DRAINED DARK GRAYISH BROWN FINE SANDY LOAM. EROSION LEVELS ARE MODERATE, AS WELL AS THE SOILS PERMEABILITY; LOW STRENGTH OF THE SOIL, MODERATE SHRINK-SWELL POTENTIAL, AND A SEASONABLY HIGH WATER TABLE ARE LIMITATIONS.
14	C	6–10%	EMPORIA FINE SANDY LOAM	THIS SOIL IS DEEP, STRONGLY SLOPING, AND WELL DRAINED. DARK GRAYISH BROWN FINE SANDY LOAM. PERMEABILITY IS MODERATE.
15	D	10–15%	EMPORIA COMPLEX	DEEP, MODERATELY STEEP, WELL DRAINED, GRAYISH BROWN FINE SANDY SOILS; INCLUDED IN THESE AREAS ARE SMALL AREAS OF (CAROLINE AND UCHEE) WHICH ARE MODERATLY WELL DRAINED. SLOPE IS LIMITATION.
15	E	15–25%	EMPORIA COMPLEX	THIS COMPLEX CONSISTS OF AREAS OF DEEP, STEEP, WELL DRAINED EMPORIA SOILS AND AREAS OF DARK GRAYISH BROWN FINE SANDY LOAM. PERMEABILITY IS MODERATE.
18	B	2–6%	KEMPSVILLE FINE SANDY LOAM	DEEP, WELL DRAINED, DARK GRAYISH BROWN FINE SANDY LOAM; SOIL HAS MODERATE PERMEABILITY. MODERATE PERMEABILITY AND SLOPE ARE ONLY DEVELOPMENT LIMITATIONS.
19	B	2–6%	KEMPSVILLE-EMPORIA FINE SANDY LOAM	DEEP, GENTLY SLOPING, WELL DRAINED SOILS DARK GRAYISH BROWN FINE SANDY LOAM; ALSO IN THESE AREA ARE SMALL AREAS OF WELL DRAINED (CAROLINE, KENANSVILLE, SUFFOLK, AND UCHEE) SOILS. LOW STRENGTH AND HIGH WATER TABLE ARE LIMITATIONS.
20	B	2–6%	KENANSVILLE LOAMY FINE SAND	DEEP, GENTLY SLOPING, WELL DRAINED SOILS LIGHT YELLOWISH BROWN LOAMY FINE SAND; MODERATELY RAPID PERMEABILITY AND LOW AVAILABLE WATER CAPACITY. HIGH WATER TABLE, RAPID PERMEABILITY, AND SANDY TEXTURE ARE LIMITATIONS.
29	A	0–2%	SLAGLE FINE SANDY LOAM	DEEP, NEARLY LEVEL, AND MODERATELY WELL DRAINED LIGHT YELLOWISH BROWN LOAMY FINE SANDY LOAM; PERMEABILITY IS MODERATE IN THE UPPER PORTION AND SLOW IN THE LOWER PART. HIGH WATER TABLE AND LOW STRENGTH ARE LIMITATIONS.
29	B	2–6%	SLAGLE FINE SANDY LOAM	DEEP, GENTLY SLOPING, AND MODERATELY WELL DRAINED LIGHT YELLOWISH BROWN LOAMY FINE SANDY LOAM; PERMEABILITY IS MODERATE IN THE UPPER PORTION AND SLOW IN THE LOWER PART. HIGH WATER TABLE AND LOW STRENGTH ARE LIMITATIONS.
34	B	2–6%	UCHEE LOAMY FINE SAND	DEEP, GENTLY SLOPING, AND WELL DRAINED DRAINED LIGHT YELLOWISH BROWN AND VERY PALE BROWN LOAMY FINE SAND; PERMEABILITY IS MODERATE IN THE UPPER PORTION AND SLOW IN THE LOWER PART. HIGH WATER TABLE, MODERATELY SLOW PERMEABILITY, SANDY SURFACE, AND SHRINK-SWELL ARE THE MAIN LIMITATIONS.

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2006
PROFESSIONAL ENGINEER

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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY REVIEW COMMENTS

DATE	2/24/2006
DRAWN BY	S. MUNIR
DESIGNED BY	M. CLAUD
CHECKED BY	A. GOULD
SCALE	AS NOTED

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

JOB NO. 22547

SHEET NO. C1.3

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DRAINAGE NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, VIRGINIA DEPARTMENT OF TRANSPORTATION'S ROAD AND BRIDGE SPECIFICATIONS DATED 2002, AND ROAD AND BRIDGE STANDARDS, DATED FEBRUARY 2001, AS AMENDED BY CONTRACT PROVISIONS AND THESE PLANS. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH JAMES CITY COUNTY STANDARDS AND SPECIFICATIONS, IF MORE STRINGENT.

2. ALL CONCRETE PIPE JOINTS ARE TO BE SEALED ACCORDING TO VDOT STANDARDS AND SPECIFICATIONS.

3. ALL STORM SEWERS SHALL BE ASTM, C-76, CLASS III, EXCEPT AS NOTED.

4. IF DURING CONSTRUCTION, THE EXISTING GROUND ELEVATIONS SHOWN ON THESE PLANS ARE FOUND TO DIFFER SIGNIFICANTLY FROM THE ELEVATIONS IN THE FIELD, THE CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY FOR AN ADJUSTMENT IN ELEVATIONS.

MAINTENANCE PLAN

A maintenance program is required to ensure the Stormwater Management (SWM)/Best Management Practice (BMP) facility functions as designed and to provide for reasonable aesthetic conditions. Proper maintenance is encouraged to prevent the introduction of debris and sediment at inflow locations, pretreatment areas, the BMP itself, its principal control structures and downstream waterways. Following installation and establishment of vegetation in disturbed site areas, inspections for sediment buildups will be performed at least quarterly. It is anticipated that under normal conditions, sediment removal will be required once every 5 to 10 years. If other construction or related land-disturbing activities are performed upslope of the BMP, adequate protection measures should be implemented with inspections performed at least once weekly.

The Owner or its designated representative will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period.

BMP Description: The Warhill Site District Park East Pond PC106 serves a drainage area of approximately 150 acres associated with development of the Warhill Tract which includes construction of a Community College, High School and Sports Stadium. The facility is a wet-type detention facility. A wet-type detention pond temporarily stores runoff and normally maintains a permanent wet pool during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. Principal structures associated with the BMP consist of a concrete inlet box, a 42" dia. concrete culvert and 50 ft. wide, grass-lined trapezoidal shaped emergency overflow channel. There is 1 notch in the inlet box to provide for water quality drawdown. During the 100-year storm, the maximum water level should rise to about 2.25 feet above the top of the inlet box and within 1.75 feet below the top of dam. During this type of larger storm event, the emergency spillway, which is located through the embankment along the northwest side, will discharge flow. If functioning properly, normal storm events should reach an elevation just below the top of the inlet box and the pond should draw down in about 24 to 36 hours.

Inspection and maintenance of the facility will consist of the following additional measures:

1. At least once per year, clean the pond inlet box and outlet pipe of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area.

2. Perform maintenance mowing of areas surrounding the BMP & Forebay at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not be permitted to grow along or on any part of the embankment that was constructed using engineered (compacted) fills and must be cleared to a point at least 25 feet beyond the toe of slope of the embankment.

3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed by qualified independent soil testing laboratory such as VPI&SU. Apply additional lime and fertilizer in accordance with test recommendations.

4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedlings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations or requirements of the Virginia Erosion and Sediment Control Handbook (VESCH).

5. Perform quarterly inspections of the inlet box and crest spillway for the observance of collected trash and debris. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide an attractive appearance.

6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the concrete inlet box, outlet culvert, concrete outlet channel along the downstream face of the dam and pond embankment. If damage is evident, further investigation by a professional engineer may be required to assess the integrity of the structure.

7. Perform quarterly inspections of the graded side slopes of the facility for signs of animal/rodent borrows or slope erosion. Immediately perform necessary repairs, refilling or reseeding.

8. Perform yearly observations of perimeter areas surrounding the facility to ensure changes in land use, topography or access have not occurred and do not affect the operation, maintenance, access or safety features as provided. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the engineered embankment and principal flow control structures.

9. Record Keeping. The owner or designated representative shall keep reasonable, accurate written records of inspections performed for the structure. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.

10. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County.

11. The pond shall be dredged when sediment deposits have reached elevation 60.85 as measured from the normal pool elevation of 67.7.

EROSION CONTROL NARRATIVE SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AND THE ENGINEER 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES ON THE STORM SEWER TRUNK SYSTEM.

3. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 4 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN ON SHEET C1.6. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. BEGIN CONSTRUCTION OF THE PROPOSED OUTLET STRUCTURES AND GRADING OPERATIONS FOR THE DAM. UPON COMPLETION OF THE PROPOSED OUTLET STRUCTURES, PRESSURE GROUT THE EXISTING CMP DRAINPIPE IN PLACE AND REMOVE THE EXISTING CMP RISER PIPE.

10. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE RIPRAP SLOPE PROTECTION, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

2. MATERIAL USED FOR FILL SHALL BE CLASSIFIED AS SC MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. THE DESIGN HEIGHT OF THE EMBANKMENT SHALL BE INCREASED BY A MINIMUM OF 4 INCHES TO ENSURE THAT THE DESIGN TOP OF FILL ELEVATION WILL BE MAINTAINED AFTER SETTLEMENT HAS TAKEN PLACE.

4. MINIMUM COMPACTION REQUIREMENTS MUST BE MET AT CRITICAL POINTS (AGAINST THE CONCRETE WEIR, WING WALLS, AND OUTLET BARRELS). THE MOISTURE CONTENT OF THE FILL MATERIALS SHALL BE MAINTAINED IN THE RANGE OF +/- TWO TO THREE PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT.

5. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON SHEET C1.1. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER EROSION AND SEDIMENT MEASURES SPECIFIED ON THIS SHEET.

6. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER SEEDING NOTES ON SHEET C1.3.

7. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

8. THE CONTRACTOR SHALL COORDINATE WITH COUNTY PERSONNEL TO IDENTIFY THE LOCATION OF THE EXISTING IRRIGATION LINE NEAR THE DAM IN ORDER TO ENSURE AVOIDANCE OF THESE LINES DURING CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.

INSPECTION REQUIREMENTS

1. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT TO ENGINEER AND COUNTY PRODUCT MATERIAL SUBMITTALS ON ALL PIPE INCLUDING INFORMATION ON PIPE CLASS, DATE AND LOCATION OF MANUFACTURE, AND COMPLIANCE WITH APPROPRIATE ASTM STANDARDS.

2. PRIOR TO FABRICATION, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AND COUNTY FOR REVIEW AND APPROVAL SHOP DRAWINGS ON ALL PRE-MANUFACTURED STRUCTURES.

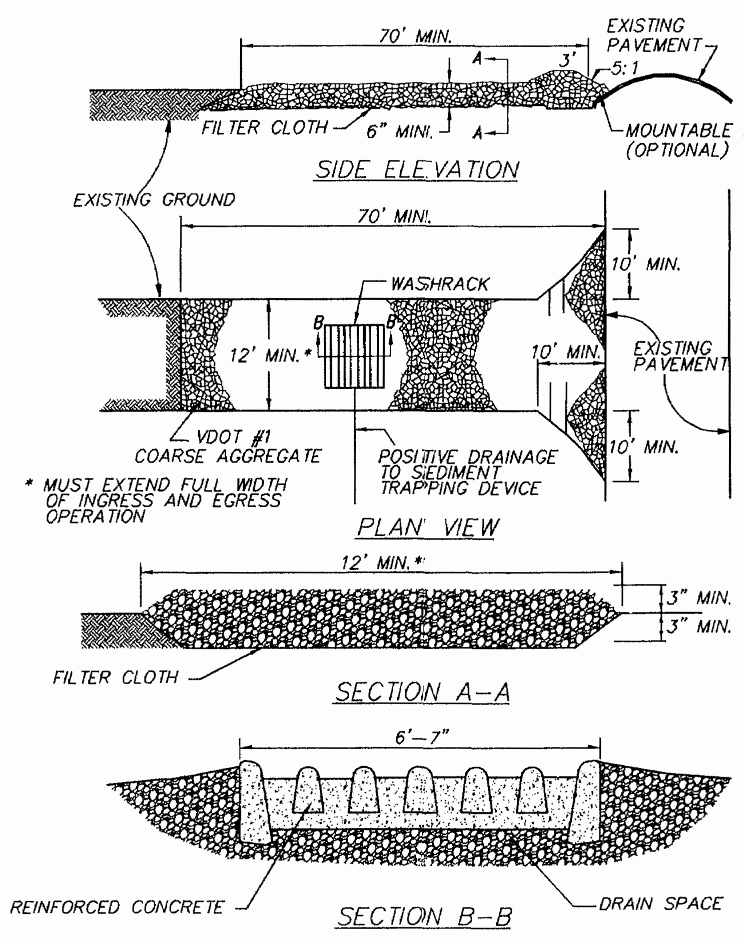
3. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS.

- PIPE JOINTS: NOTE ANY GAPS IN JOINTS AND DISTANCE AT MAXIMUM GAP LOCATION
- JOINTS BETWEEN PIPE AND PRE-MANUFACTURED STRUCTURES
- BACKFILL MATERIAL: NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
- BACKFILL COMPACTION TESTING

4. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE IN ITEM #3 ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

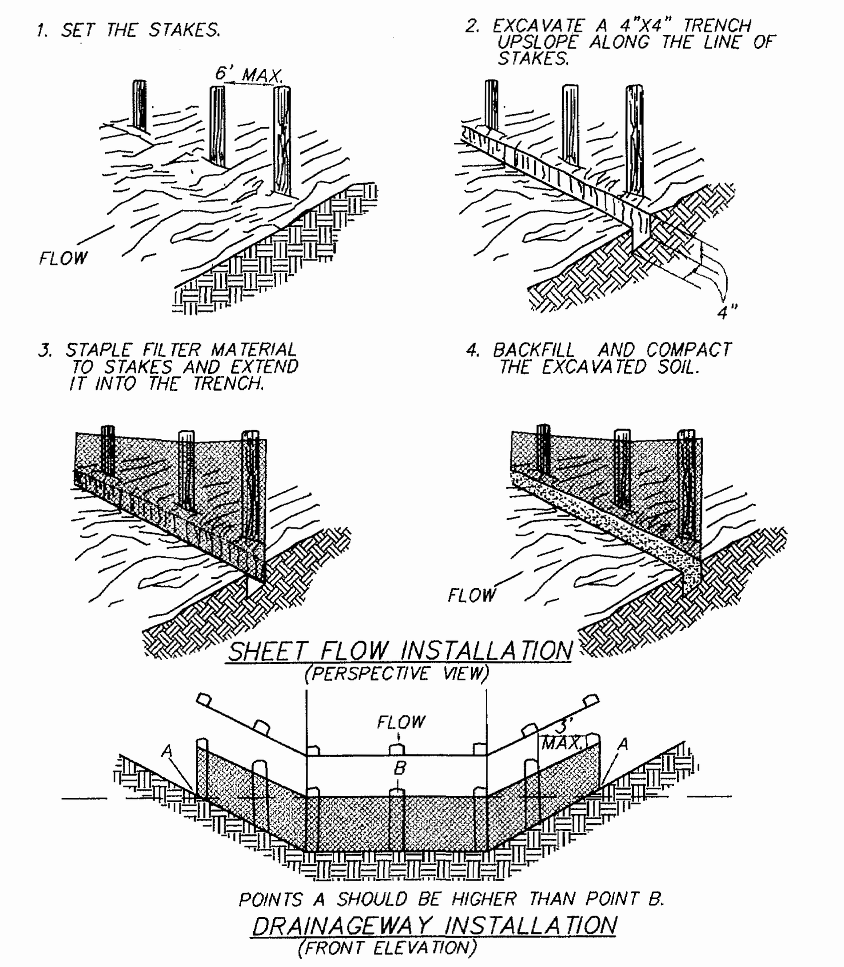
5. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

6. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION.



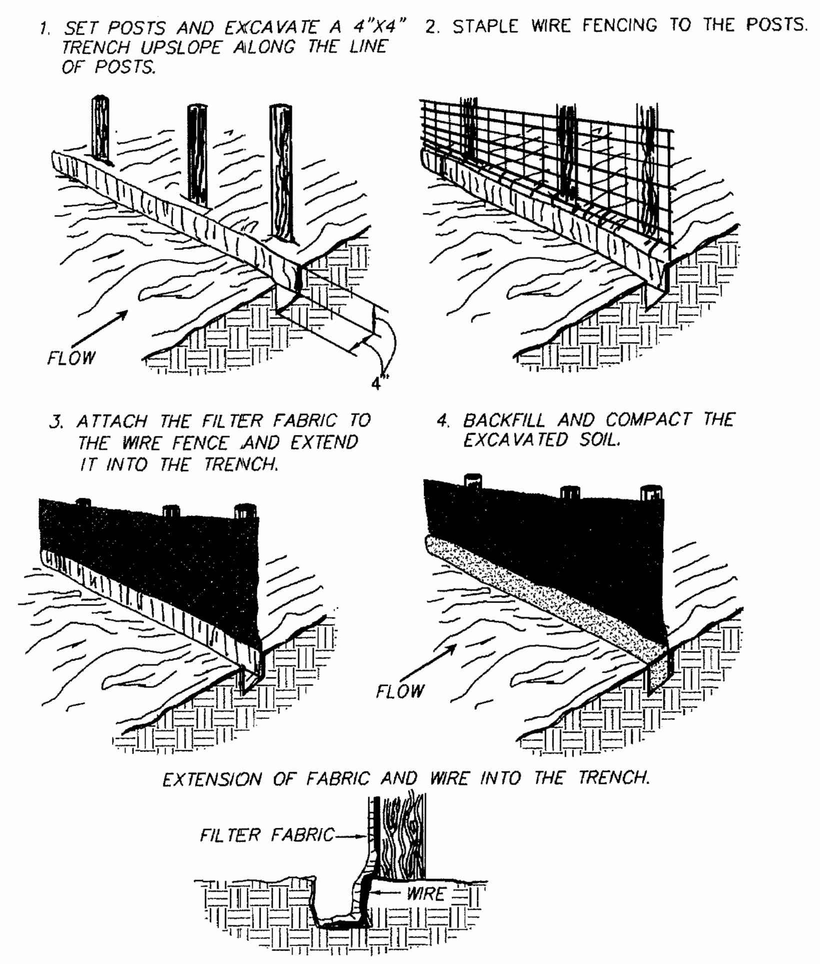
(CE) STONE CONSTRUCTION ENTRANCE (3.02-1)

NO SCALE



(SF) CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT) (3.05-2)

NO SCALE



(SF) CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT) (3.05-1)

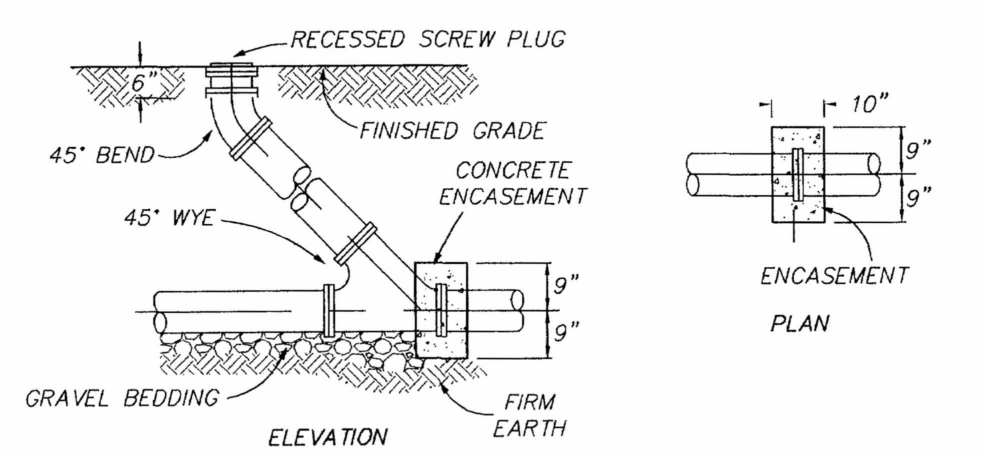
NO SCALE

CONSTRUCTION AND INSTALLATION NOTES

1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION OF STORM DRAINAGE CONVEYANCE SYSTEMS.

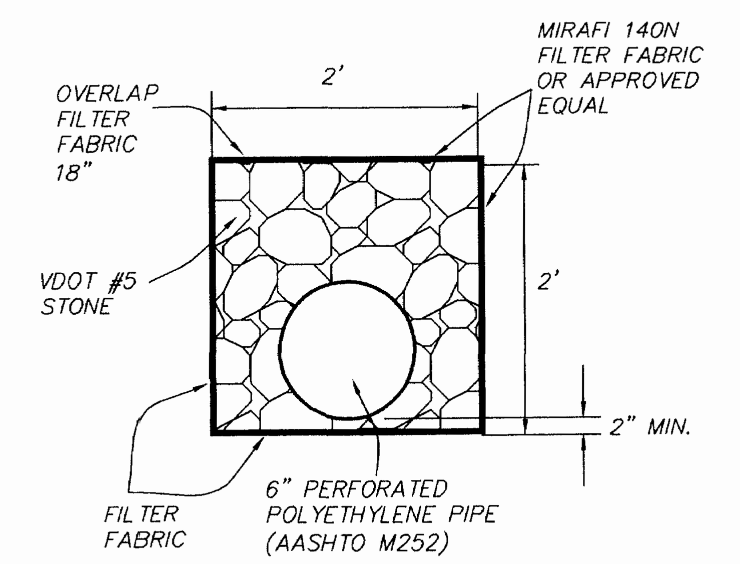
2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.



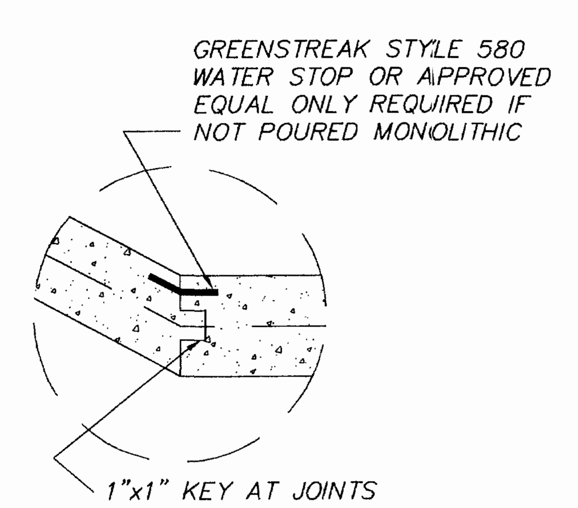
TYPICAL CLEANOUT

NO SCALE



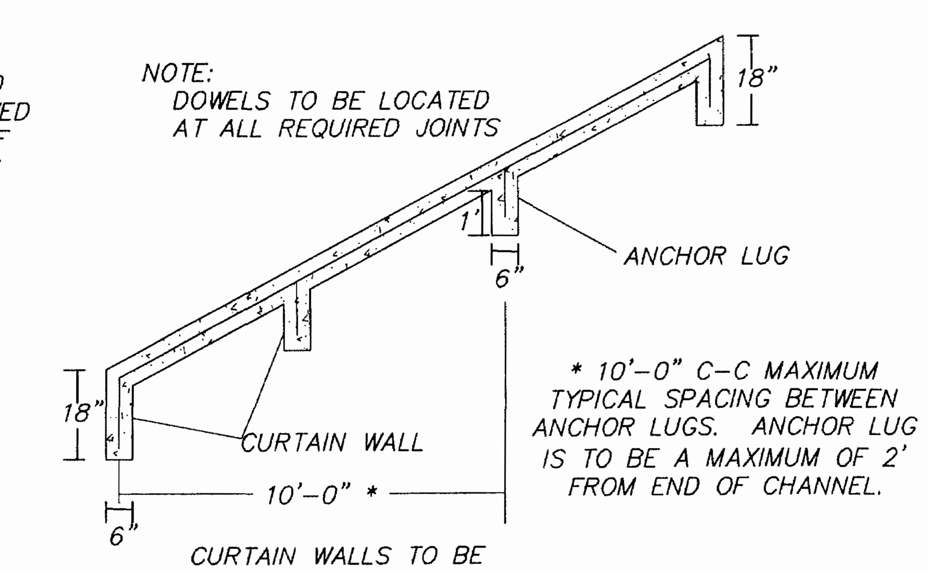
TOE DRAIN DETAIL

NO SCALE



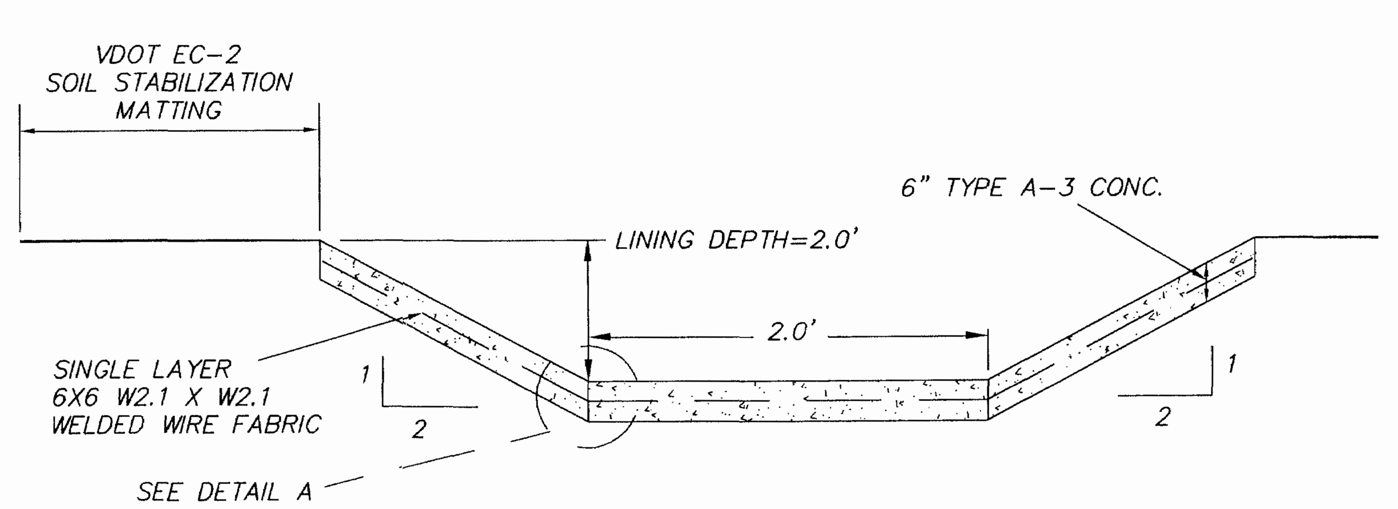
DETAIL A

NO SCALE



CURTAIN WALLS TO BE LOCATED AT BEGINNING AND END OF ALL FLUMES AND ON THE END OF EACH JOINT

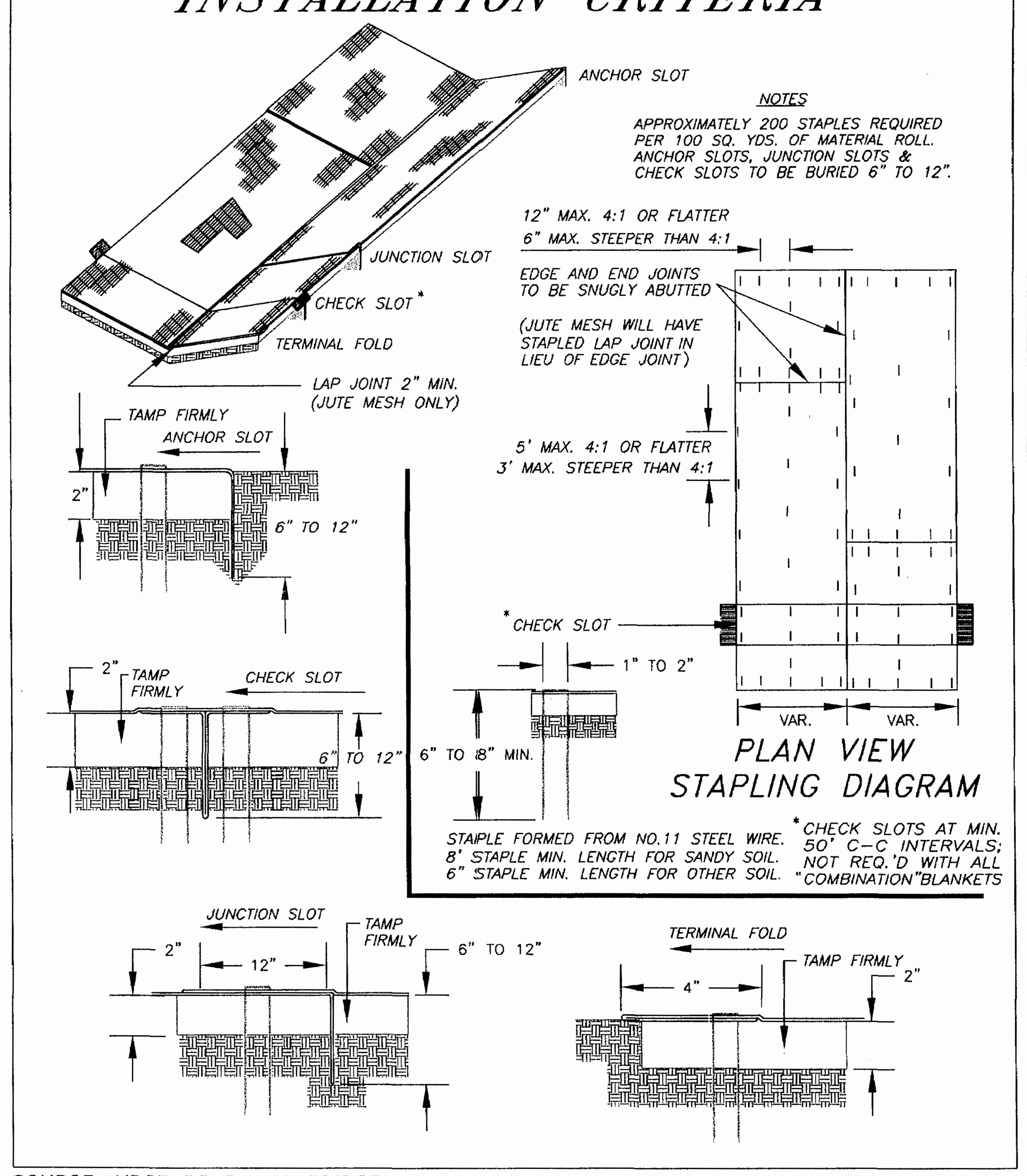
(SEE VDOT STD. PG-5 FOR ALL ANCHOR LUG AND CURTAIN WALL DETAILS NOT SHOWN HERE)



TYPICAL SECTION CONCRETE CHANNEL

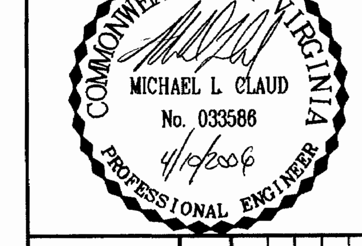
NO SCALE

TYPICAL TREATMENT – 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA



SOURCE: VDOT ROAD AND BRIDGE STANDARDS

PLATE: 3.36-2



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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY REVIEW COMMENTS

DATE: 2/24/2006
DRAWN BY: C.ALMARODE
DESIGNED BY: M. CLAUD
CHECKED BY: D. GOULD
SCALE: AS NOTED

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

JOB NO. 22547
SHEET NO. C1.4

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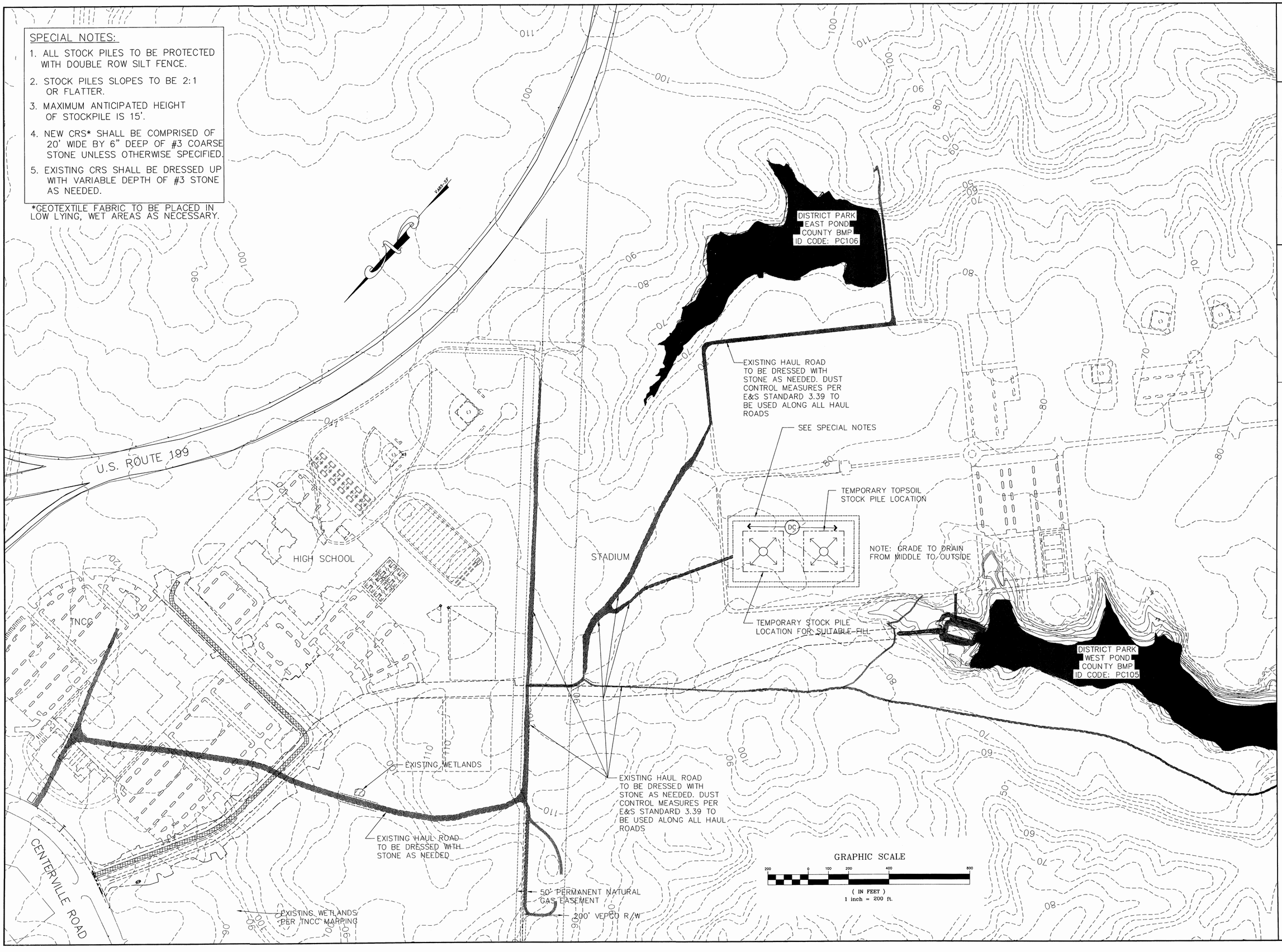
SPECIAL NOTES:

1. ALL STOCK PILES TO BE PROTECTED WITH DOUBLE ROW SILT FENCE.
2. STOCK PILES SLOPES TO BE 2:1 OR FLATTER.
3. MAXIMUM ANTICIPATED HEIGHT OF STOCKPILE IS 15'.
4. NEW CRS* SHALL BE COMPRISED OF 20' WIDE BY 6" DEEP OF #3 COARSE STONE UNLESS OTHERWISE SPECIFIED.
5. EXISTING CRS SHALL BE DRESSED UP WITH VARIABLE DEPTH OF #3 STONE AS NEEDED.

*GEOTEXTILE FABRIC TO BE PLACED IN LOW LYING, WET AREAS AS NECESSARY.



COMMONWEALTH OF VIRGINIA
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No. 033586
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4/10/2006	REVISED PER COUNTY REVIEW COMMENTS

DATE	2/24/2006
DRAWN BY	C.ALMARODE
DESIGNED BY	M. CLAUD
CHECKED BY	D. GOULD
SCALE	1" = 200'

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

E & S CONTROL PLAN FOR HAUL ROADS & TEMPORARY STOCK PILES

JOB NO.	22547
SHEET NO.	C1.5

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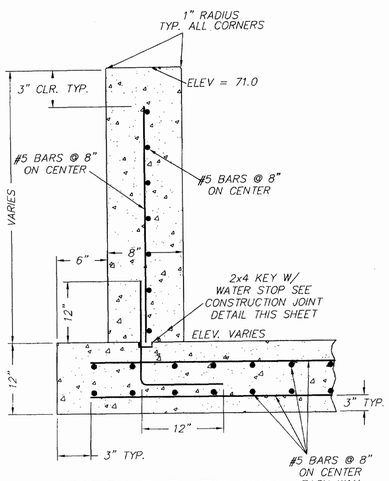
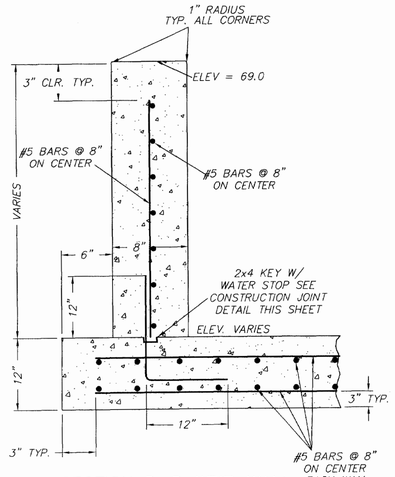
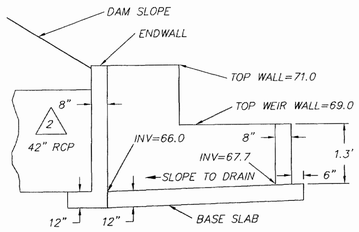


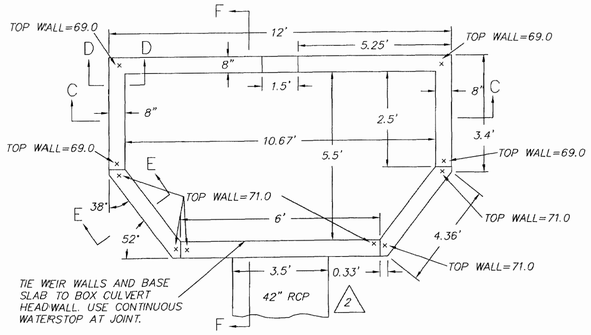
SECTION E–E WEIR WALL
NOT TO SCALE



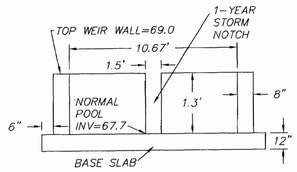
SECTION D–D WEIR WALL
NOT TO SCALE



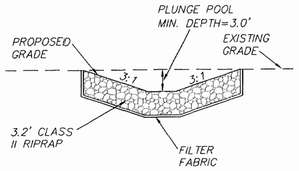
SECTION F–F
NO SCALE



PRINCIPAL SPILLWAY PLAN STRUCTURE #1
NO SCALE



SECTION C–C
NO SCALE



SECTION B–B

WATER SURFACE ELEVATIONS

NORMAL	67.70'
1 YEAR STORM	68.67'
2 YEAR STORM	69.08'
10 YEAR STORM	69.92'
25 YEAR STORM	70.20'
100 YEAR STORM	71.25'

HATCH LEGEND

APPROXIMATE NORMAL WATER SURFACE LIMITS

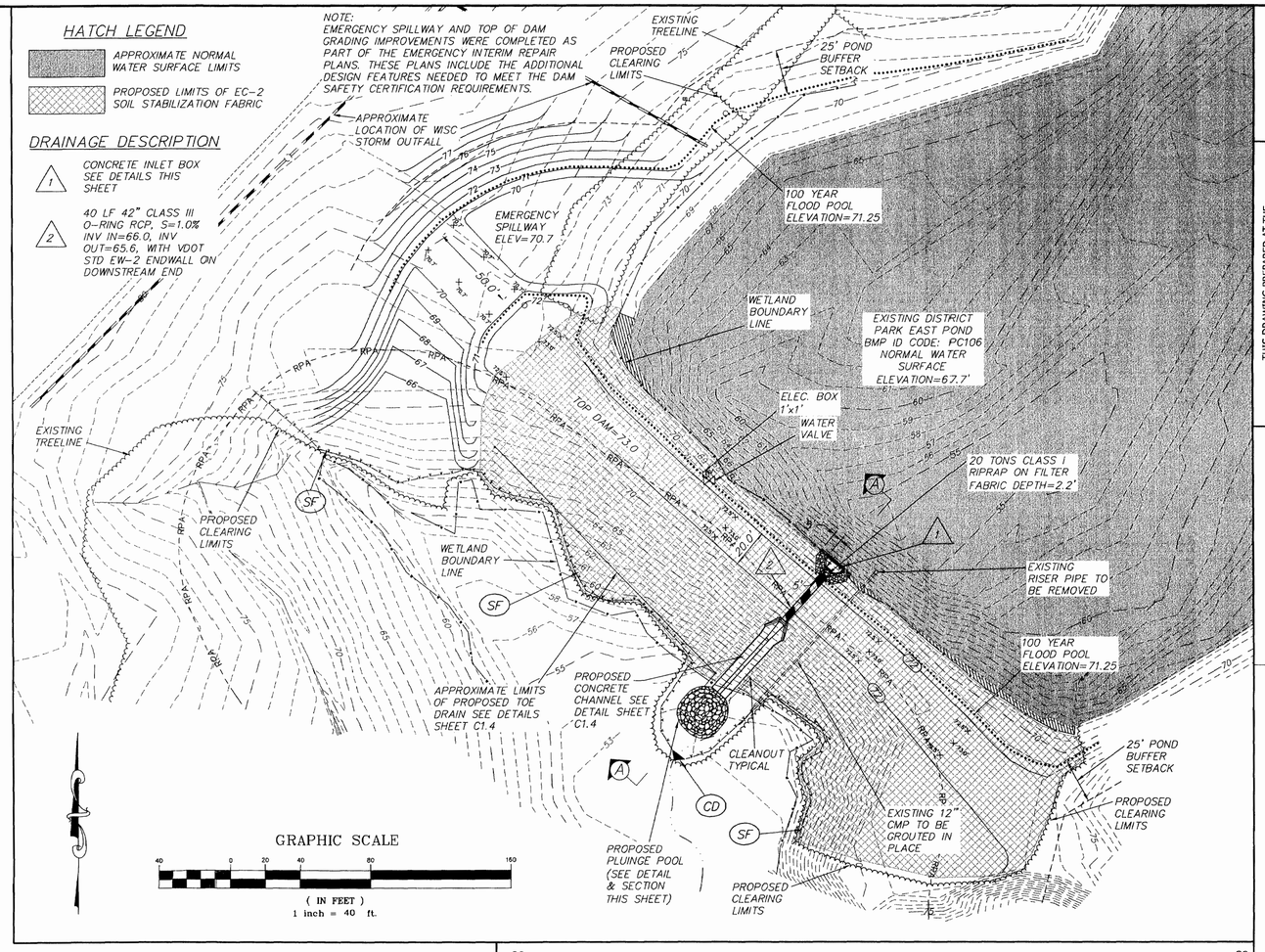
PROPOSED LIMITS OF EC–2 SOIL STABILIZATION FABRIC

DRAINAGE DESCRIPTION

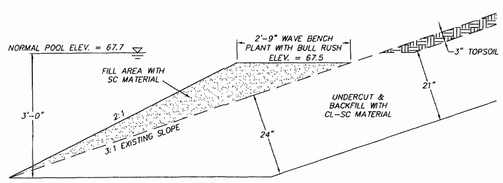
1 CONCRETE INLET BOX SEE DETAILS THIS SHEET

2 40 LF 42" CLASS III O–RING RCP, S=1.0% INV IN=66.0, INV OUT=65.6, WITH VDOT STD EW–2 ENDWALL ON DOWNSTREAM END

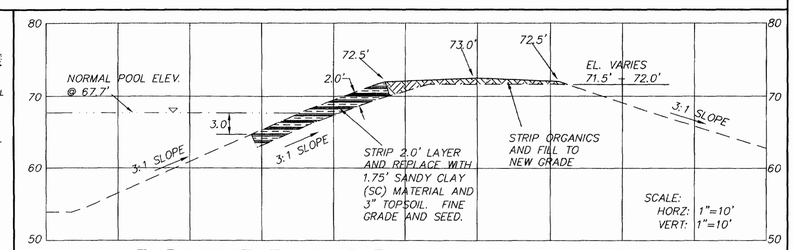
NOTE:
EMERGENCY SPILLWAY AND TOP OF DAM GRADING IMPROVEMENTS WERE COMPLETED AS PART OF THE EMERGENCY INTERIM REPAIR PLANS. THESE PLANS INCLUDE THE ADDITIONAL DESIGN FEATURES NEEDED TO MEET THE DAM SAFETY CERTIFICATION REQUIREMENTS.



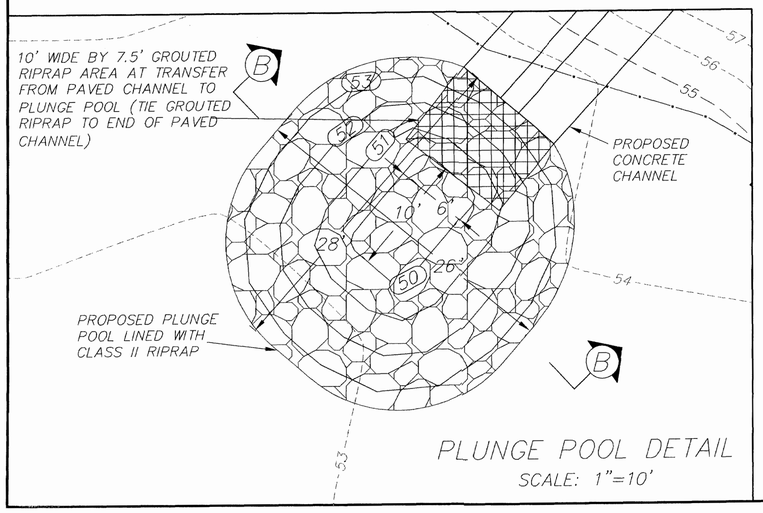
GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.



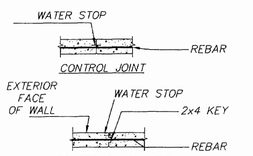
EMBANKMENT SLOPE IMPROVEMENTS
NO SCALE



EMBANKMENT IMPROVEMENT – TYPICAL SECTION

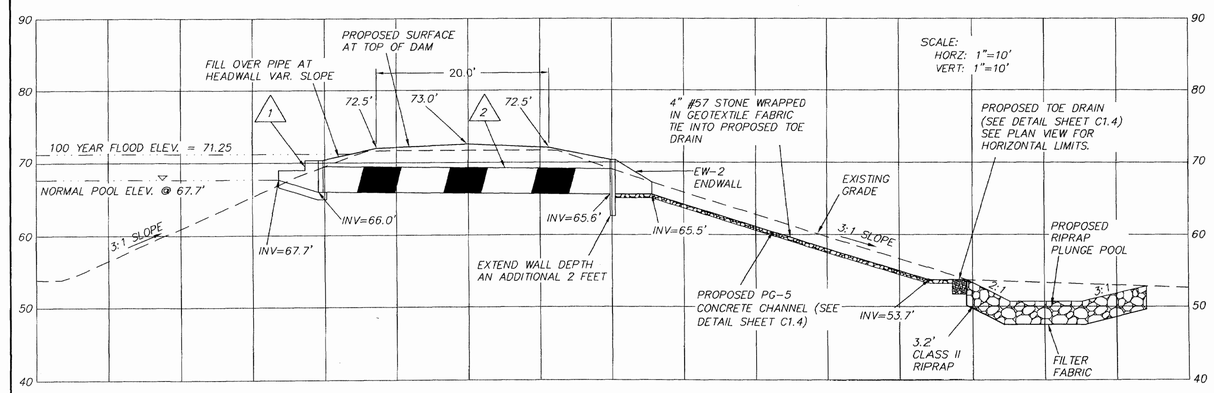


PLUNGE POOL DETAIL
SCALE: 1"=10'



JOINT SPACING:
1. MAXIMUM 20'–0" C/C
2. MAXIMUM 12'–0" FROM CORNER
3. AT CHANGES IN WALL HEIGHT

TYPICAL JOINT DETAILS FOR CONCRETE PADS
NOT TO SCALE



SECTION A–A

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/10/2006
PROFESSIONAL ENGINEER

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CORPORATE OFFICE
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TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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DATE	REVISION DESCRIPTION
4/10/2006	REVISED PER COUNTY COMMENTS

DATE	2/24/2006
DRAWN BY	S. MUNIR
DESIGNED BY	M. CLAUD
CHECKED BY	A. GOULD
SCALE	AS SHOWN

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

PLAN & DETAILS

JOB NO. 22547

SHEET NO. C1.6

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GENERAL NOTE:

1. THIS PROJECT IS SITUATED IN SUBWATERSHED 205 AND CATCHMENT 205-107-1 OF THE POWHATAN CREEK WATERSHED.

EROSION CONTROL NARRATIVE SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AND THE ENGINEER 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.

3. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 3 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

INSPECTION REQUIREMENTS

1. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS.

- BACKFILL MATERIAL: NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
- BACKFILL COMPACTION TESTING

2. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

3. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

4. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION AFTER COMPLETION OF THE INTERIM IMPROVEMENTS.

CONSTRUCTION AND INSTALLATION NOTES

1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION.

2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.

GENERAL DAM CONSTRUCTION NOTES:

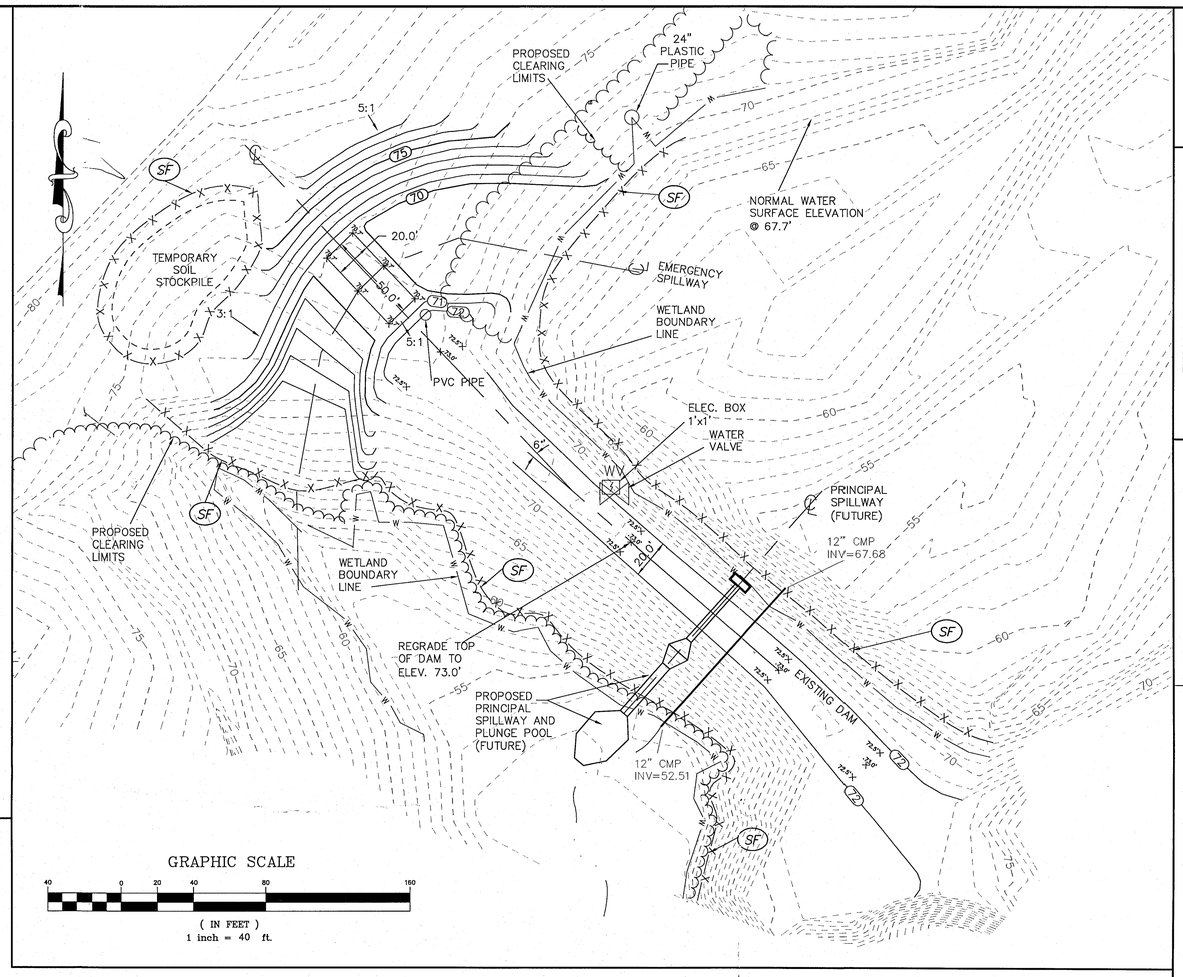
1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

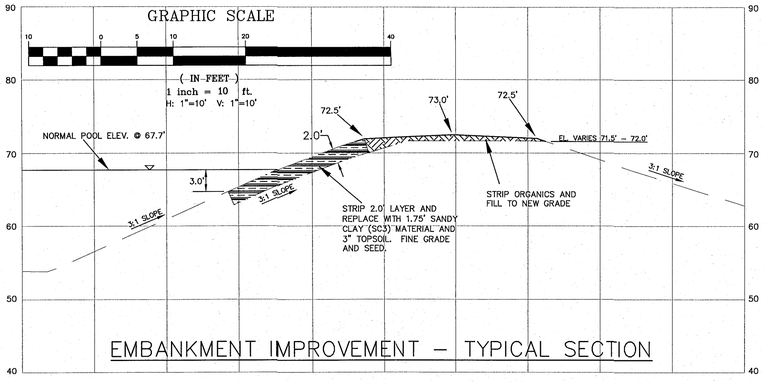
2. MATERIAL USED FOR FILL SHALL BE SELECT MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON THIS SHEET. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

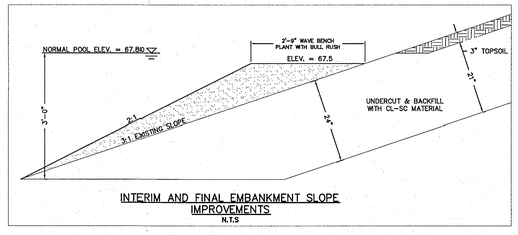
4. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.

5. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

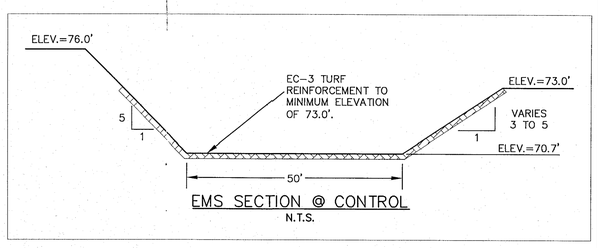




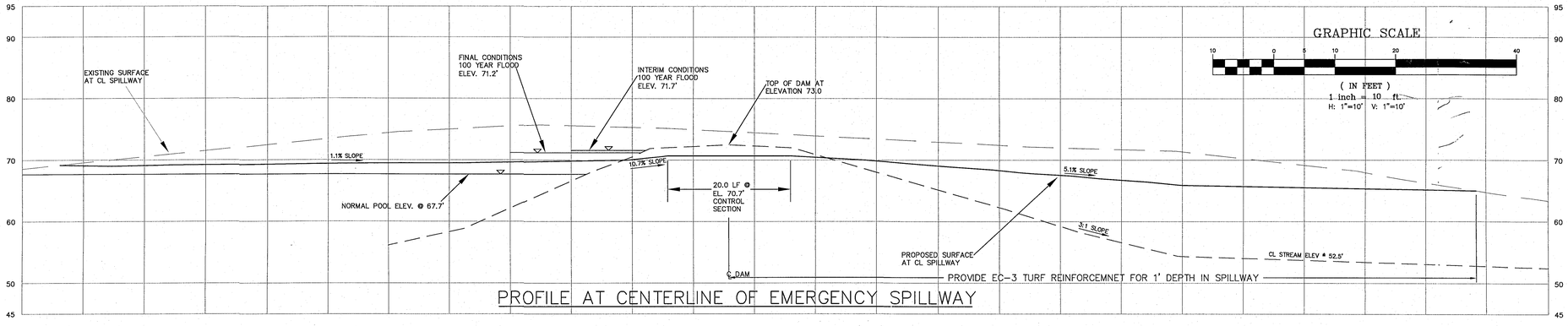
EMBANKMENT IMPROVEMENT – TYPICAL SECTION



INTERIM AND FINAL EMBANKMENT SLOPE IMPROVEMENTS
N.T.S



EMS SECTION @ CONTROL
N.T.S.



PROFILE AT CENTERLINE OF EMERGENCY SPILLWAY

INTERIM

COMMONWEALTH OF VIRGINIA
ANDREW P. GOULD
NO. 030531
10-3-05
PROFESSIONAL ENGINEER

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DATE	REVISION DESCRIPTION
9/26/05	REVISED PER COUNTY COMMENTS & ADDITIONAL TOPO
10-3-05	Revised top of Dam elev.

DATE	9-15-05
DRAWN BY	D. WILMOTH
DESIGNED BY	D. WILMOTH
CHECKED BY	A.GOULD
SCALE	AS SHOWN

TIMMONS GROUP

JAMES CITY COUNTY PPEA
JAMES CITY COUNTY, VIRGINIA
EMERGENCY INTERIM REPAIRS TO EAST DAM (PC106 DAM)

JOB NO. 22547

SHEET NO. 1 OF 1

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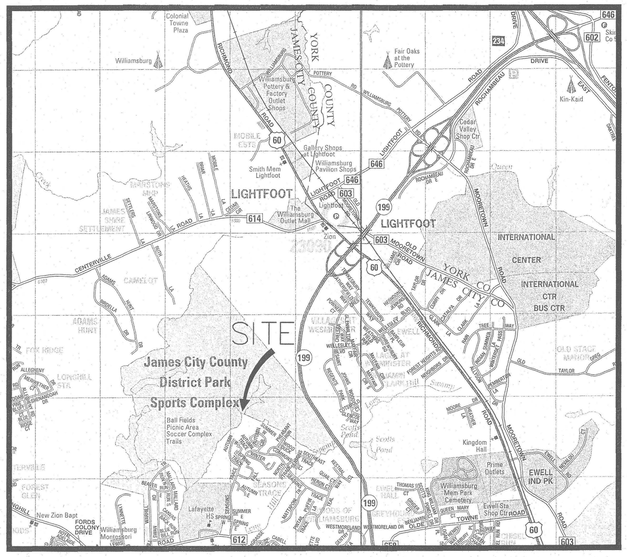
WARHILL SITE
EASTERN POND (PC 106) DAM RENOVATIONS

JAMES CITY COUNTY, VA

SHEET INDEX

TITLE	SHEET
COVER SHEET	C1.0
ENVIRONMENTAL INVENTORY	C1.1
DRAINAGE AREA LAYOUT	C1.2
EROSION AND SEDIMENT CONTROL NOTES & DETAILS	C1.3 - C1.5
PLAN & DETAILS	C1.6



VICINITY MAP
SCALE: 1" = 2,000'

RESPONSIBLE LAND DISTURBER: William E. Richards (0402-21759)

DISTURBED AREA = 1.60 acres

TOTAL AREA OF SITE = 588.21 acres

IMPERVIOUS COVER PROPOSED = 0 sq. ft.

THIS PROJECT IS LOCATED IN THE POWHATAN CREEK WATERSHED (SUBWATERSHED 205 AND CATCHMENT 205-108-1) . SPECIAL STORMWATER CRITERIA APPLIES.

STORMWATER MANAGEMENT FOR THIS PORTION OF THE PROJECT WILL BE SATISFIED BY MASTER STORMWATER PLANNING FOR THE WARHILL TRACT WHICH INCLUDES PROPOSED UPGRADES TO THE DISTRICT PARK EAST POND, COUNTY BMP ID CODE: PC106.

CURTIS CONTRACTING, INC.
DEVELOPER

Contact: Andy Curtis
Phone: (804) 843-4633
Fax: (804) 842-2545
P.O. Box 769
West Point, VA 23181

DATE: 2/24/2006

REVISIONS

DATE	SHEET NUMBERS	DATE	SHEET NUMBERS

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
2/24/2006
PROFESSIONAL ENGINEER

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PROJECT
WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
Centerville Road
James City County, Virginia

OWNER & DEVELOPER
Curtis Contracting Inc.
P.O. BOX 769
(804) 843-4633

JOB NO. 22303

SHEET NO. C1.0

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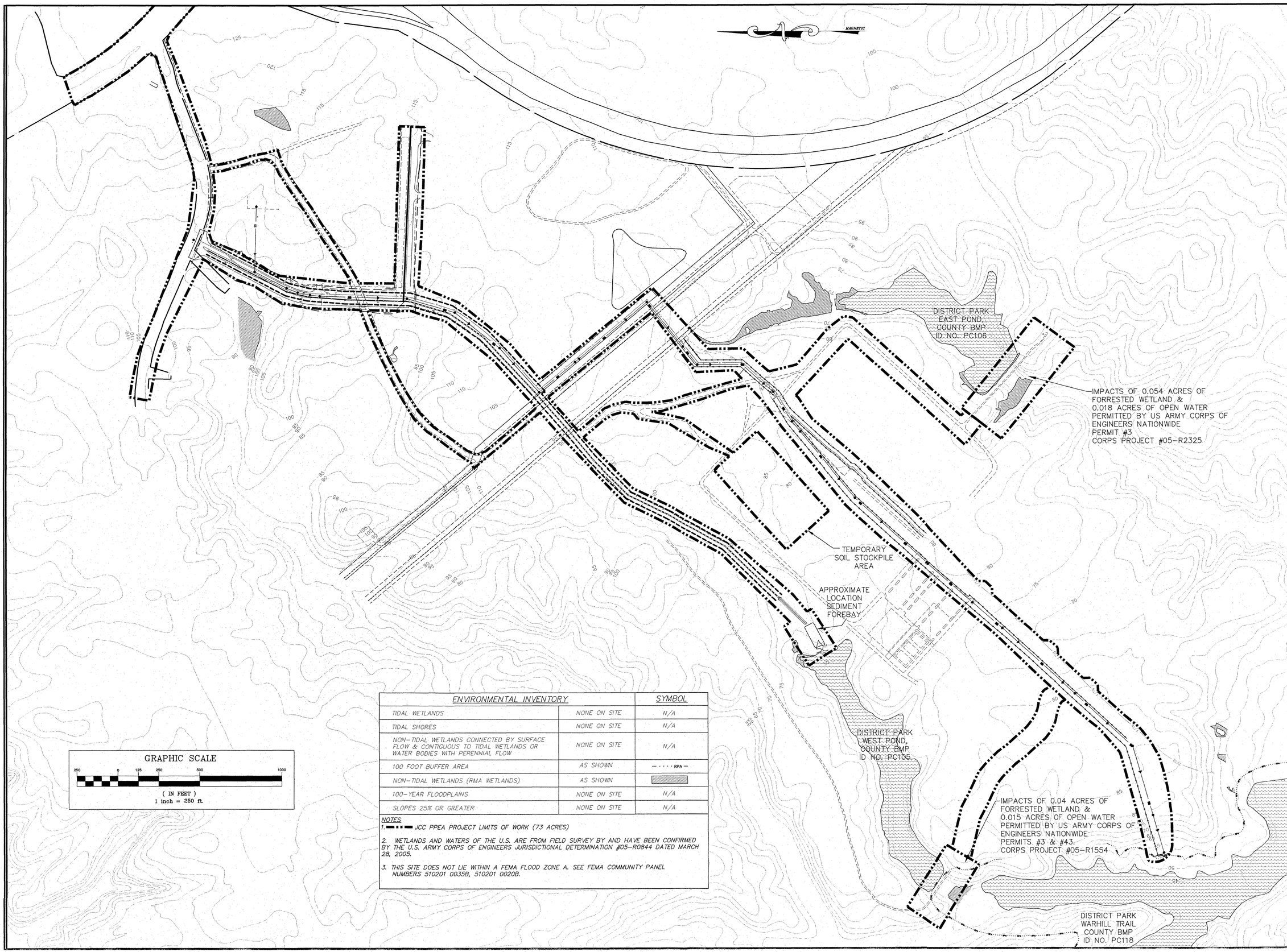

ENVIRONMENTAL INVENTORY		SYMBOL
TIDAL WETLANDS	NONE ON SITE	N/A
TIDAL SHORES	NONE ON SITE	N/A
NON-TIDAL WETLANDS CONNECTED BY SURFACE FLOW & CONTIGUOUS TO TIDAL WETLANDS OR WATER BODIES WITH PERENNIAL FLOW	NONE ON SITE	N/A
100 FOOT BUFFER AREA	AS SHOWN	— · · · · RPA —
NON-TIDAL WETLANDS (RMA WETLANDS)	AS SHOWN	
100-YEAR FLOODPLAINS	NONE ON SITE	N/A
SLOPES 25% OR GREATER	NONE ON SITE	N/A

NOTES

1. JCC PPEA PROJECT LIMITS OF WORK (73 ACRES)
2. WETLANDS AND WATERS OF THE U.S. ARE FROM FIELD SURVEY BY AND HAVE BEEN CONFIRMED BY THE U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION #05-R0844 DATED MARCH 28, 2005.
3. THIS SITE DOES NOT LIE WITHIN A FEMA FLOOD ZONE A. SEE FEMA COMMUNITY PANEL NUMBERS 510201 0035B, 510201 0020B.

GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)
1 inch = 250 ft.

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
2/24/2006
PROFESSIONAL ENGINEER

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DATE	REVISION DESCRIPTION

DATE	2/24/2006
DRAWN BY	D.ARRINGTON
DESIGNED BY	C.DODSON
CHECKED BY	R.THOMAS
SCALE	1" = 250'

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

ENVIRONMENTAL INVENTORY

JOB NO. 22547

SHEET NO. C1.1

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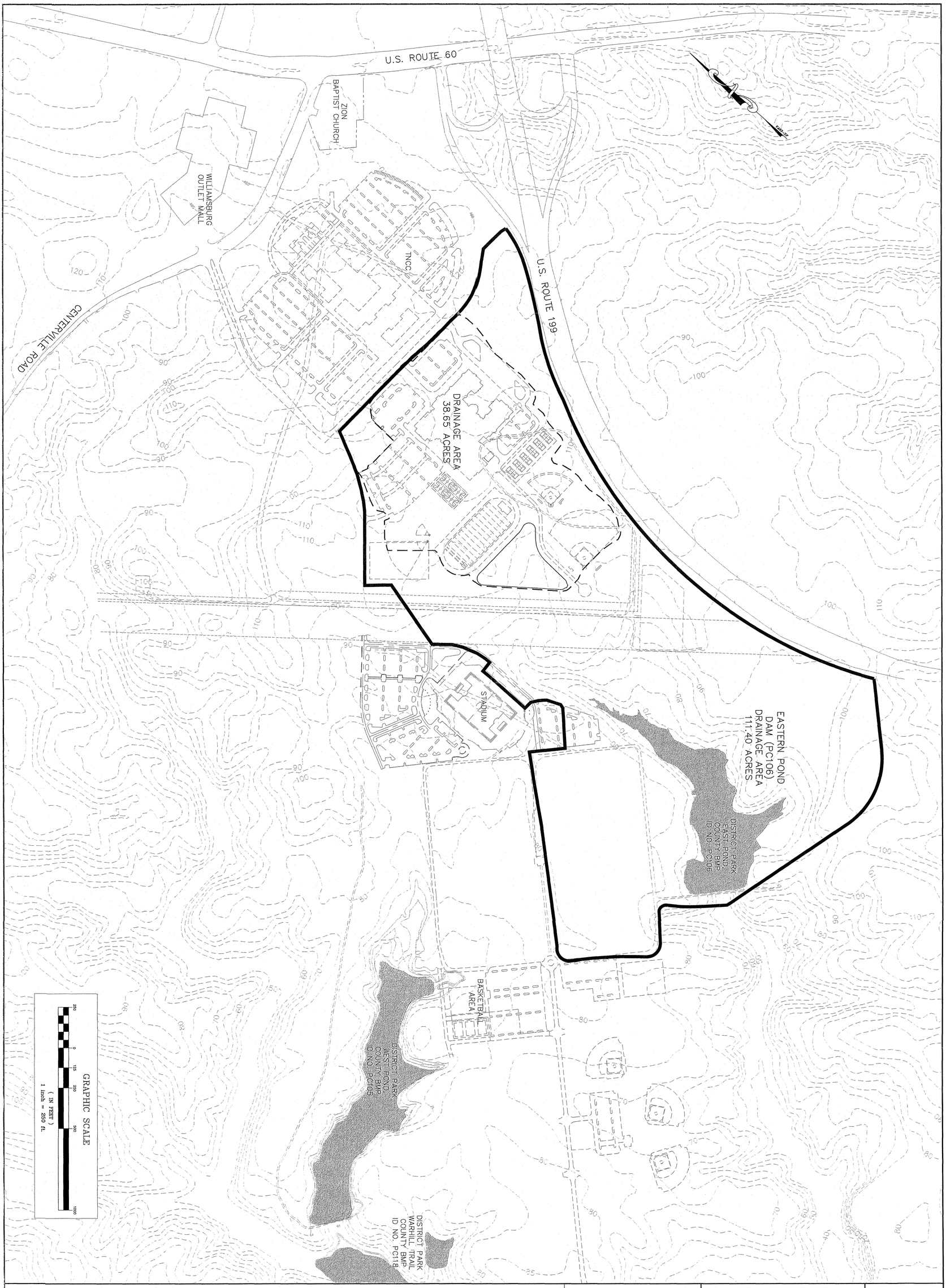
R:\200 - Municipal\22547\dwg\Final Plans\22303CD1-1.dwg, 2/20/2006 9:55:26 AM



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COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
Professional Engineer
2/24/2006

SHEET NO.	C1.2
JOB NO.	22547
SCALE	1" = 250'
CHECKED BY	D. GOULD
DESIGNED BY	M. CLAUD
DRAWN BY	C.ALMARODE
DATE	2/24/2006

DATE	REVISION DESCRIPTION

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

DRAINAGE AREA LAYOUT

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EROSION AND SEDIMENT CONTROL NOTES

James City County Environmental Division
Erosion and Sediment Control Notes
Revised 7/6/01

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

1. All erosion and sediment control measures shall be installed and maintained in accordance with the Virginia Erosion and Sediment Control Handbook, 3rd Edition, 1992. The contractor shall be thoroughly familiar with all applicable measures contained therein that may be pertinent to this project, including Minimum Standards 1 through 19. If the approved Erosion and Sediment Control plan is found to be inadequate in the field, the Minimum Standards will apply in addition to the provisions of the approved plan.

2. As a prerequisite to approval of an erosion and sediment control plan for land-disturbing activities, the name of a Responsible Land-Disturber shall be provided. The Responsible Land-Disturber shall be an individual who holds a valid certificate of competence issued by the Virginia Department of Conservation and is defined as the person in charge of and responsible for carrying out the land-disturbing activity. Permits or plans without this information are deemed incomplete and will not be approved until proper notification is received. Also, if the person designated as Responsible Land-Disturber changes between the time of plan approval and the scheduled preconstruction meeting, the Environmental Division shall be informed of the change, in writing, 24-hours in advance of the preconstruction meeting.

3. A preconstruction meeting shall be held on site between the County, the Developer, the Project Engineer, the Responsible Land-Disturber and the Contractor prior to issuance of the Land Disturbing Permit. The Contractor shall submit a Sequence of Construction to the County for approval prior to the preconstruction meeting. The designated Responsible Land-Disturber is required to attend the preconstruction meeting for the project.

4. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from the Virginia Department of Transportation is required prior to any construction activities within State right-of-ways. Where sediment is transported onto a public road surface, the road shall be thoroughly cleaned at the end of each day (Std & Spec 3.02).

5. Sediment basins and traps (Std & Spec 3.13 and 3.14), perimeter dikes (Std & Spec 3.09 and 3.12), sediment filter barriers (Std. & Spec 3.05) and other measures intended to trap sediment on-site must be constructed as a first step in grading and must be made functional prior to any upslope land disturbance taking place. Earthen structures such as dams, dikes and diversions must be seeded and mulched immediately after installation. Periodic inspections of the erosion control measures by the owner or owners representatives shall be made to assess their condition. Any necessary maintenance of the measures shall be accomplished immediately and shall include the repair of measures damaged by any subcontractor including those of the public utility companies.

6. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) and slope drain (Std. & Spec. 3.15) shall be installed prior to the end of each working day.

7. Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Environmental Division approval will be required for other deviations from the approved plan.

8. The Contractor shall place soil stockpiles at the locations shown on the plan. Soil stockpiles shall be stabilized or protected with sediment trapping measures. Off-site waste or borrow areas shall be approved by the Environmental Division prior to the import of any borrow or export of any waste to or from the project site.

9. The Contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of the same (Std & Spec 3.18). This includes installation of erosion control stone or paved ditches where required. Any drainage outfalls required for a street must be completed before street grading or utility installation begins.

10. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer that 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

11. No more than 300 feet of sanitary sewer, storm drain, water or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).

12. If disturbed area stabilization is to be accomplished during the months of December, January or February, stabilization shall consist of mulching (Std & Spec 3.35). Seeding will then take place as soon as the season permits.

13. The term Seeding, Final Vegetative Cover or Stabilization on this plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime and fertilizer (Std & Spec 3.32). Irrigation shall be required as necessary to ensure establishment of grass cover.

14. All slopes steeper than 3H:1V shall require the use of erosion control blankets and mattings to aid in the establishment of a vegetative cover. Installation shall be in accordance with Std. & Spec. 3.35, Mulching, Std. & Spec. 3.36, Soil Stabilization Blankets and Matting and Manufacturers Instructions. No slopes shall be created steeper than 2H:1V.

15. Inlet protection (Std & Spec 3.07 and 3.08) shall be provided for all storm drain and culvert inlets following construction of the same.

16. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.

17. Paved ditches shall be required wherever accelerated erosion is evident. Particular attention shall be paid to those areas where grades exceed 3 percent.

18. Temporary erosion control measures such as silt fence are not to be removed until all disturbed areas are stabilized. Trapped sediment shall be spread, seeded and mulched. After the project and stabilization is complete, all erosion and sediment control measures shall be removed within 30 days.

19. No sediment trap or sediment basin shall be removed until a) at least 75 percent of the lots within the drainage area to the trap or basin have been sold to a third party (unrelated to the developer) for the construction of homes and/or b) 60 percent of the single family lots within the drainage area to the trap or basin have been completed and the soil stabilized. A bulk sale of the lots to another builder does not satisfy this provision. Sediment traps and sediment basins shall not be removed without the express authorization of the James City County Environmental Division.

20. Record Drawings (As-Builts) and Construction Certifications are both required for newly constructed or modified stormwater management/BMP facilities. Certification activities shall be adequately coordinated and performed before, during and following construction in accordance with the current version of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

21. Design and construction of private-type site drainage systems outside VDOT rights-of-way shall be performed in accordance with the current version of the James City County Environmental Division, Stormwater Drainage Conveyance Systems (Non-BMP related), General Design and Construction Guidelines.

EROSION CONTROL REQUIREMENTS

ADJACENT PROPERTY

The proposed development is located on a 500+ acre parcel that is mostly wooded. The parcel is located to the west of Route 199 just south of the intersection of Route 199 and Route 60. The parcel is bordered to the east by Route 199, to the north by Centerville Road, to the north west by future development, and the southwest by a 200' VEPCO easement.

SOILS

Refer to Soils Map information this sheet.

CRITICAL EROSION AREAS

Early establishment and proper maintenance of perimeter controls will provide sedimentation control. Stabilize and maintain ditches and fill slopes throughout project construction to control erosion.

EROSION AND SEDIMENT CONTROL MEASURES

Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook. The minimum standards of the VESCH shall be adhered to unless otherwise waived or approved by a variance by local authorities having jurisdiction.

STRUCTURAL PRACTICES

1. Outlet Protection – 3.18.
   Riprap shall be placed at the outlet of all pipes as indicated.

2. Silt Fence Barrier – 3.18.
   Silt fence sediment barriers shall be installed downslope of areas with minimal grades to filter sediment-laden runoff from sheet flow as indicated.

VEGETATIVE PRACTICES

1. Topsoiling (Temporary Stockpile) – 3.3
   Topsoil shall be stripped from areas to be graded and stockpiled for later spreading. Stockpile locations shall be located onsite and shall be stabilized with temporary silt fence and vegetation.

2. Temporary Seeding – 3.31
   All denuded areas which will be left dormant for more than 30 days shall be seeded with fast germinating temporary vegetation immediately following grading of those areas. Selection of the seed mixture shall depend on the time of year it is applied.

MANAGEMENT STRATEGIES

1. Provide sediment trapping measures as a first step in grading and seed and mulch immediately following installation.
2. Provide temporary seeding or other stabilization immediately after grading.
3. All erosion and sediment control practices shall be maintained until they are no longer required to comply with the contract documents or state law.

PERMANENT STABILIZATION

All non-paved areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be in accordance with Std. & Spec. 3.32, PERMANENT SEEDING. Seed type shall be as specified for "Minimum Care Lawns" and "General Slopes" in the Handbook. Mulch (straw or fiber) shall be used on all seeded surfaces. In all seeding operations seed, fertilizer and lime shall be applied prior to mulching.

MAINTENANCE (See "Minimum Standards" for additional information).

All erosion and sediment control measures shall be checked daily and after each run-off producing rainfall. The following items shall be checked in particular:

1. Check the silt fence barrier for undermining or deterioration of the fabric. Remove sediment when the level of sediment deposition reaches half way to the top of the barrier.
2. Check the seeding areas to ensure that a stand of grass is maintained. Fertilize and reseed as needed.
3. Establish temporary fill diversions at the top of fill slopes, as required, at the end of each working day.

SPECIAL STORMWATER CRITERIA

Special Stormwater Criteria (SSC) in James City County, Virginia

This project is located in a Special Stormwater Criteria (SSC) Area. Special Stormwater Criteria were developed as a result of goals and priorities as established by approved Watershed Management Plans. Special Stormwater Criteria were developed to achieve two primary goals. The first is to preserve pre-development hydrology to reduce impacts to high quality streams. The second primary goal is to provide enhanced water quality treatment of stormwater runoff. We are disturbing more than 10 acres with this project and therefore require 5 units.

The following Special Stormwater Criteria Practices (SSCP's) will be employed on this project:

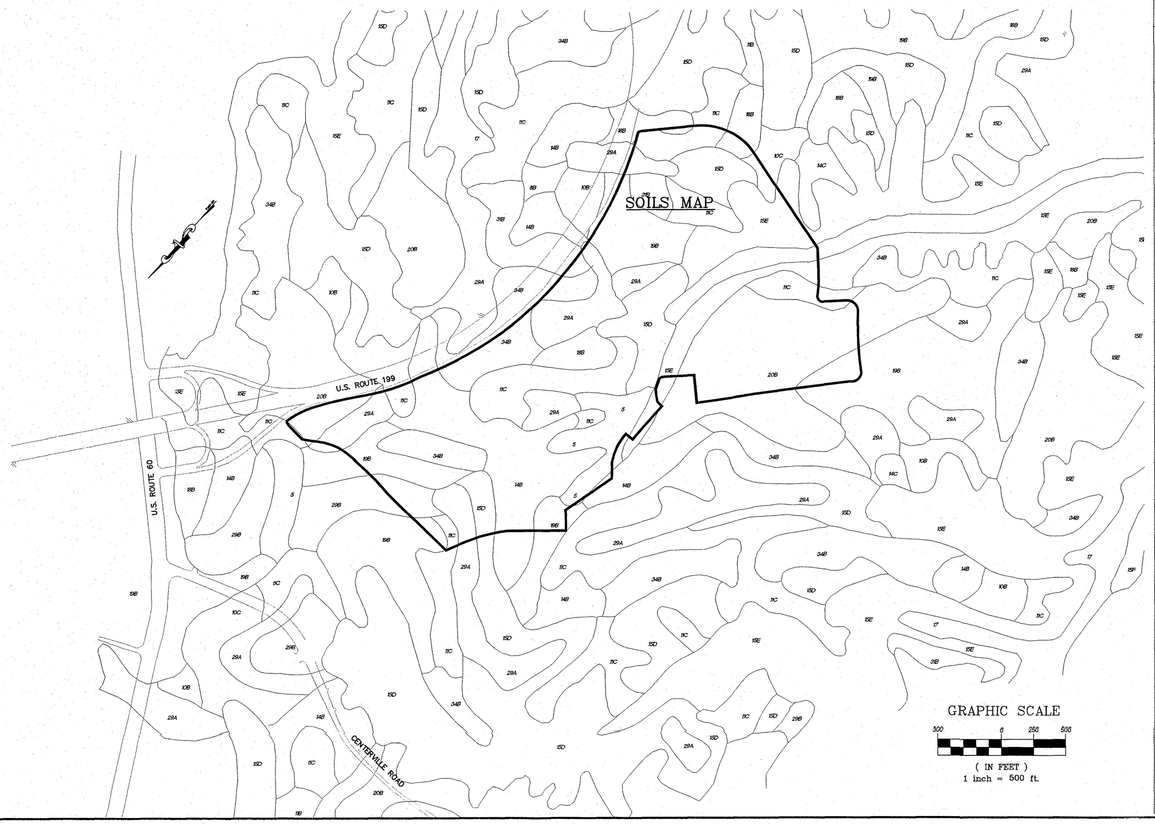
SSCP #10 – Construct off-site BMP in a previously "Uncontrolled Area". The existing outlet mall runoff will be diverted to a water quality BMP through construction of this project. (3 UNITS OF CREDITS)

SSCP #20 – Enhanced outlet protection measures at pipe and channel outfalls. This project will employ enhanced outlet protection at the outfall of the regional trunk storm sewer system and at the outfall of the improved dam spillway. (1 UNIT OF CREDIT)

SSCP #25 – Enhanced slope stabilization practices on all graded cut-fill slopes. (1 UNIT OF CREDIT)

SSCP #39 – Provide asbuilt drawings for entire storm drainage system. (0.5 UNIT OF CREDIT)

NOTE: 5.5 UNITS PROVIDED > 5 UNITS REQUIRED.



SOILS SUMMARY

MAPPING UNIT	POTENTIAL	SLOPE	MAPPING UNIT NAME	SOIL CHARACTERISTICS
5		0–2%	BETHERA SILT LOAM	DEEP, NEARLY LEVEL, AND POOR DRAINED DARK GRAYISH BROWN AND LIGHT BROWNISH GRAY; SEASONAL HIGH WATER TABLES, PONDING, AND SLOW PERMEABILITY ARE THE MAIN LIMITATIONS OF THE SOIL FOR COMMUNITY DEVELOPMENT.
10	B	2–6%	CRAVEN FINE SANDY LOAM	THIS SOIL IS DEEP, GENTLY SLOPING, AND MODERATELY WELL DRAINED. BROWN FINE SANDY LOAM. PERMEABILITY IS SLOW, AND AVAILABLE WATER CAPACITY IS MODERATE. SEASONAL HIGH WATER TABLE, SLOW PERMEABILITY; MODERATE SHRINK-SWELL ARE THE MAIN LIMINATIONS COMMUNITY.
10	C	6–10%	CRAVEN FINE SANDY LOAM	THIS SOIL IS DEEP, STRONGLY SLOPING, AND MODERATELY WELL DRAINED. GRAYISH BROWN FINE SANDY LOAM. PERMEABILITY IS SLOW, AND AVAILABLE WATER CAPACITY IS MODERATE. SEASONAL HIGH WATER TABLE, SLOW PERMEABILITY, MODERATE SHRINK-SWELL ARE THE MAIN LIMINATIONS.
11	C	6–10%	CRAVEN-UCHEE COMPLEX	COMPLEX OF MODERATELY WELL DRAINED SOILS DEEP STRONG SLOPING SOIL DARK GRAYISH BROWN FINE SANDY LOAM WITH LOW PERMEABILITY; SEASONAL HIGH WATER TABLE, SLOPE, SLOW AND MODERATLY SLOW PERMEABILITY, AND MODERATE SHRINK-SWELL POTENTIAL ARE THE MAIN LIMITATIONS OF THE SOIL FOR COMMUNITY DEVELOPMENT.
14	B	2–6%	EMPORIA FINE SANDY LOAM	DEEP WELL DRAINED DARK GRAYISH BROWN FINE SANDY LOAM; EROSION LEVELS ARE MODERATE, AS WELL AS THE SOILS PERMEABILITY; LOW STRENGTH OF THE SOIL, MODERATE SHRINK-SWELL POTENTIAL, AND A SEASONABLY HIGH WATER TABLE ARE LIMITATIONS.
14	C	6–10%	EMPORIA FINE SANDY LOAM	THIS SOIL IS DEEP, STRONGLY SLOPING, AND WELL DRAINED. DARK GRAYISH BROWN FINE SANDY LOAM. PERMEABILITY IS MODERATE.
15	D	10–15%	EMPORIA COMPLEX	DEEP, MODERATELY STEEP, WELL DRAINED, GRAYISH BROWN FINE SANDY SOILS; INCLUDED IN THESE AREAS ARE SMALL AREAS OF (CAROLINE AND UCHEE) WHICH ARE MODERATLY WELL DRAINED. SLOPE IS LIMITATION.
15	E	15–25%	EMPORIA COMPLEX	THIS COMPLEX CONSISTS OF AREAS OF DEEP, STEEP, WELL DRAINED EMPORIA SOILS AND AREAS OF DARK GRAYISH BROWN FINE SANDY LOAM. PERMEABILITY IS MODERATE.
18	B	2–6%	KEMPSVILLE FINE SANDY LOAM	DEEP, WELL DRAINED, DARK GRAYISH BROWN FINE SANDY LOAM; SOIL HAS MODERATE PERMEABILITY. MODERATE PERMEABILITY AND SLOPE ARE ONLY DEVELOPMENT LIMITATIONS.
19	B	2–6%	KEMPSVILLE-EMPORIA FINE SANDY LOAM	DEEP, GENTLY SLOPING, WELL DRAINED SOILS DARK GRAYISH BROWN FINE SANDY LOAM; ALSO IN THESE AREA ARE SMALL AREAS OF WELL DRAINED (CAROLINE, KENANSVILLE, SUFFOLK, AND UCHEE) SOILS. LOW STRENGTH AND HIGH WATER TABLE ARE LIMITATIONS.
20	B	2–6%	KENANSVILLE LOAMY FINE SAND	DEEP; GENTLY SLOPING, WELL DRAINED SOILS LIGHT YELLOWISH BROWN LOAMY FINE SAND; MODERATELY RAPID PERMEABILITY AND LOW AVAILABLE WATER CAPACITY. HIGH WATER TABLE, RAPID PERMEABILITY, AND SANDY TEXTURE ARE LIMITATIONS.
29	A	0–2%	SLAGLE FINE SANDY LOAM	DEEP, NEARLY LEVEL, AND MODERATELY WELL DRAINED LIGHT YELLOWISH BROWN LOAMY FINE SANDY LOAM; PERMEABILITY IS MODERATE IN THE UPPER PORTION AND SLOW IN THE LOWER PART. HIGH WATER TABLE AND LOW STRENGTH ARE LIMITATIONS.
29	B	2–6%	SLAGLE FINE SANDY LOAM	DEEP, GENTLY SLOPING, AND MODERATELY WELL DRAINED LIGHT YELLOWISH BROWN LOAMY FINE SANDY LOAM; PERMEABILITY IS MODERATE IN THE UPPER PORTION AND SLOW IN THE LOWER PART. HIGH WATER TABLE AND LOW STRENGTH ARE LIMITATIONS.
34	B	2–6%	UCHEE LOAMY FINE SAND	DEEP, GENTLY SLOPING, AND WELL DRAINED DRAINED LIGHT YELLOWISH BROWN AND VERY PALE BROWN LOAMY FINE SAND; PERMEABILITY IS MODERATE IN THE UPPER PORTION AND SLOW IN THE LOWER PART. HIGH WATER TABLE, MODERATELY SLOW PERMEABILITY, SANDY SURFACE, AND SHRINK-SWELL ARE THE MAIN LIMITATIONS.

COMMONWEALTH OF VIRGINIA
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No. 033586
2/24/2006
PROFESSIONAL ENGINEER

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Site Development | Residential | Infrastructure | Technology

DATE	REVISION DESCRIPTION

DATE 2/24/2006
DRAWN BY S. MUNIR
DESIGNED BY M. CLAUD
CHECKED BY A. GOULD
SCALE AS NOTED

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

JOB NO. 22547
SHEET NO. C1.3

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DRAINAGE NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, VIRGINIA DEPARTMENT OF TRANSPORTATION'S ROAD AND BRIDGE SPECIFICATIONS DATED 2002, AND ROAD AND BRIDGE STANDARDS, DATED FEBRUARY 2001, AS AMENDED BY CONTRACT PROVISIONS AND THESE PLANS. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH JAMES CITY COUNTY STANDARDS AND SPECIFICATIONS, IF MORE STRINGENT.

2. ALL CONCRETE PIPE JOINTS ARE TO BE SEALED ACCORDING TO VDOT STANDARDS AND SPECIFICATIONS.

3. ALL STORM SEWERS SHALL BE ASTM, C-76, CLASS III, EXCEPT AS NOTED.

4. IF DURING CONSTRUCTION, THE EXISTING GROUND ELEVATIONS SHOWN ON THESE PLANS ARE FOUND TO DIFFER SIGNIFICANTLY FROM THE ELEVATIONS IN THE FIELD, THE CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY FOR AN ADJUSTMENT IN ELEVATIONS.

MAINTENANCE PLAN

A maintenance program is required to ensure the Stormwater Management (SWM)/Best Management Practice (BMP) facility functions as designed and to provide for reasonable aesthetic conditions. Proper maintenance is encouraged to prevent the introduction of debris and sediment at inflow locations, pretreatment areas, the BMP itself, its principal control structures and downstream waterways. Following installation and establishment of vegetation in disturbed site areas, inspections for sediment buildups will be performed at least quarterly. It is anticipated that under normal conditions, sediment removal will be required once every 5 to 10 years. If other construction or related land-disturbing activities are performed upslope of the BMP, adequate protection measures should be implemented with inspections performed at least once weekly.

The Owner or its designated representative will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period.

BMP Description: The Warhill Site District Park East Pond PC106 serves a drainage area of approximately 150 acres associated with development of the Warhill Tract which includes construction of a Community College, High School and Sports Stadium. The facility is a 10 point, wet-type detention facility. A wet-type detention pond temporarily stores runoff and normally maintains a permanent wet pool during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. Principal structures associated with the BMP consist of a concrete inlet box, a 42" dia. concrete culvert and 50 ft. wide, grass-lined trapezoidal shaped emergency overflow channel. There is 1 notch in the inlet box to provide for water quality drawdown. During the 100-year storm, the maximum water level should rise to about 2.25 feet above the top of the inlet box and within 1.75 feet below the top of dam. During this type of larger storm event, the emergency spillway, which is located through the embankment along the northwest side, will discharge flow. If functioning properly, normal storm events should reach an elevation just below the top of the inlet box and the pond should draw down in about 24 to 36 hours.

Inspection and maintenance of the facility will consist of the following additional measures:

1. At least once per year, clean the pond inlet box and outlet pipe of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area.

2. Perform maintenance mowing of areas surrounding the BMP & Forebay at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not be permitted to grow along or on any part of the embankment that was constructed using engineered (compacted) fills and must be cleared to a point at least 25 feet beyond the toe of slope of the embankment.

3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed by qualified independent soil testing laboratory such as VPI&SU. Apply additional lime and fertilizer in accordance with test recommendations.

4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedlings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations or requirements of the Virginia Erosion and Sediment Control Handbook (VESCH).

5. Perform quarterly inspections of the inlet box and crest spillway for the observance of collected trash and debris. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide an attractive appearance.

6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the concrete inlet box, outlet culvert, concrete outlet channel along the downstream face of the dam and pond embankment. If damage is evident, further investigation by a professional engineer may be required to assess the integrity of the structure.

7. Perform quarterly inspections of the graded side slopes of the facility for signs of animal/rodent borrows or slope erosion. Immediately perform necessary repairs, refilling or reseeding.

8. Perform yearly observations of perimeter areas surrounding the facility to ensure changes in land use, topography or access have not occurred and do not affect the operation, maintenance, access or safety features as provided. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the engineered embankment and principal flow control structures.

9. Record Keeping. The owner or designated representative shall keep reasonable, accurate written records of inspections performed for the structure. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.

10. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County.

EROSION CONTROL NARRATIVE
SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AND THE ENGINEER 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES ON THE STORM SEWER TRUNK SYSTEM.

3. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 4 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN ON SHEET C1.6. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. BEGIN CONSTRUCTION OF THE PROPOSED OUTLET STRUCTURES AND GRADING OPERATIONS FOR THE DAM. UPON COMPLETION OF THE PROPOSED OUTLET STRUCTURES, PRESSURE GROUT THE EXISTING CMP DRAINPIPE IN PLACE AND REMOVE THE EXISTING CMP RISER PIPE.

10. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE RIPRAP SLOPE PROTECTION, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

2. MATERIAL USED FOR FILL SHALL BE CLASSIFIED AS SC MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. THE DESIGN HEIGHT OF THE EMBANKMENT SHALL BE INCREASED BY A MINIMUM OF 4 INCHES TO ENSURE THAT THE DESIGN TOP OF FILL ELEVATION WILL BE MAINTAINED AFTER SETTLEMENT HAS TAKEN PLACE.

4. MINIMUM COMPACTION REQUIREMENTS MUST BE MET AT CRITICAL POINTS (AGAINST THE CONCRETE WEIR, WING WALLS, AND OUTLET BARRELS). THE MOISTURE CONTENT OF THE FILL MATERIALS SHALL BE MAINTAINED IN THE RANGE OF +/- TWO TO THREE PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT.

5. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON SHEET C1.1. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER EROSION AND SEDIMENT MEASURES SPECIFIED ON THIS SHEET.

6. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER SEEDING NOTES ON SHEET C1.3.

7. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

INSPECTION REQUIREMENTS

1. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT TO ENGINEER AND COUNTY PRODUCT MATERIAL SUBMITTALS ON ALL PIPE INCLUDING INFORMATION ON PIPE CLASS, DATE AND LOCATION OF MANUFACTURE, AND COMPLIANCE WITH APPROPRIATE ASTM STANDARDS.

2. PRIOR TO FABRICATION, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AND COUNTY FOR REVIEW AND APPROVAL SHOP DRAWINGS ON ALL PRE-MANUFACTURED STRUCTURES.

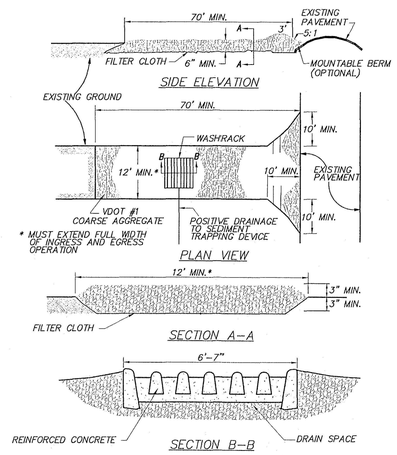
3. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS.

- PIPE JOINTS: NOTE ANY GAPS IN JOINTS AND DISTANCE AT MAXIMUM GAP LOCATION
- JOINTS BETWEEN PIPE AND PRE-MANUFACTURED STRUCTURES
- BACKFILL MATERIAL: NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
- BACKFILL COMPACTION TESTING

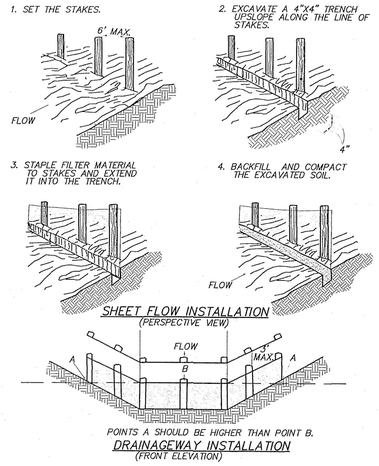
4. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE IN ITEM #3 ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

5. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

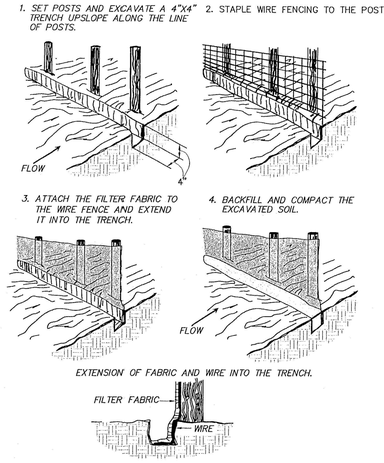
6. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION.



CE STONE CONSTRUCTION ENTRANCE (3.02-1)
NO SCALE



SF CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT) (3.05-2)
NO SCALE



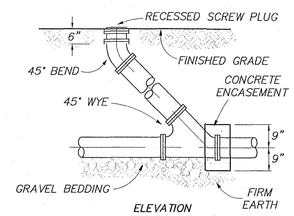
SF CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT) (3.05-1)
NO SCALE

CONSTRUCTION AND INSTALLATION NOTES

1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION OF STORM DRAINAGE CONVEYANCE SYSTEMS.

2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.



TYPICAL CLEANOUT
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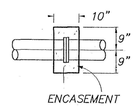

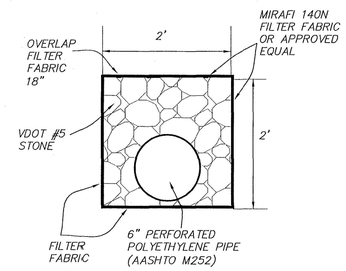

TOE DRAIN DETAIL
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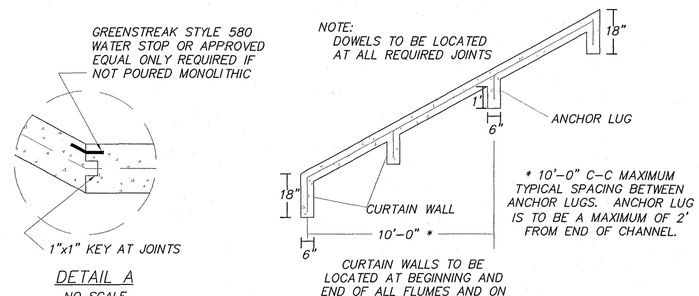
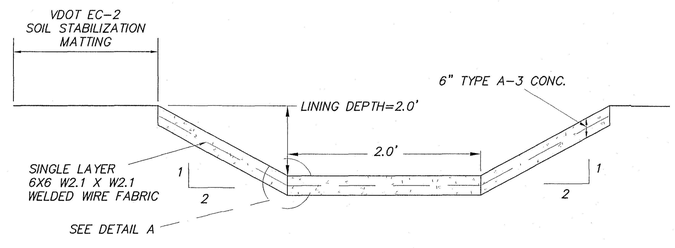
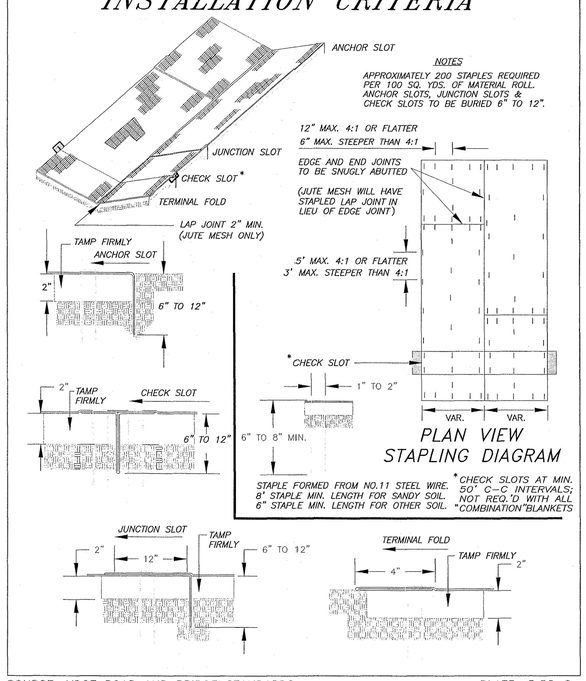


DETAIL A
NO SCALE



TYPICAL SECTION CONCRETE CHANNEL
NO SCALE

TYPICAL TREATMENT - 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA



SOURCE: VDOT ROAD AND BRIDGE STANDARDS — PLATE: 3.36-2

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
2/24/2006
PROFESSIONAL ENGINEER

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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DATE	REVISION DESCRIPTION

DATE	2/24/2006
DRAWN BY	C.ALMARODE
DESIGNED BY	M. CLAUD
CHECKED BY	D. GOULD
SCALE	AS NOTED

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

JOB NO.	22547
SHEET NO.	C1.4

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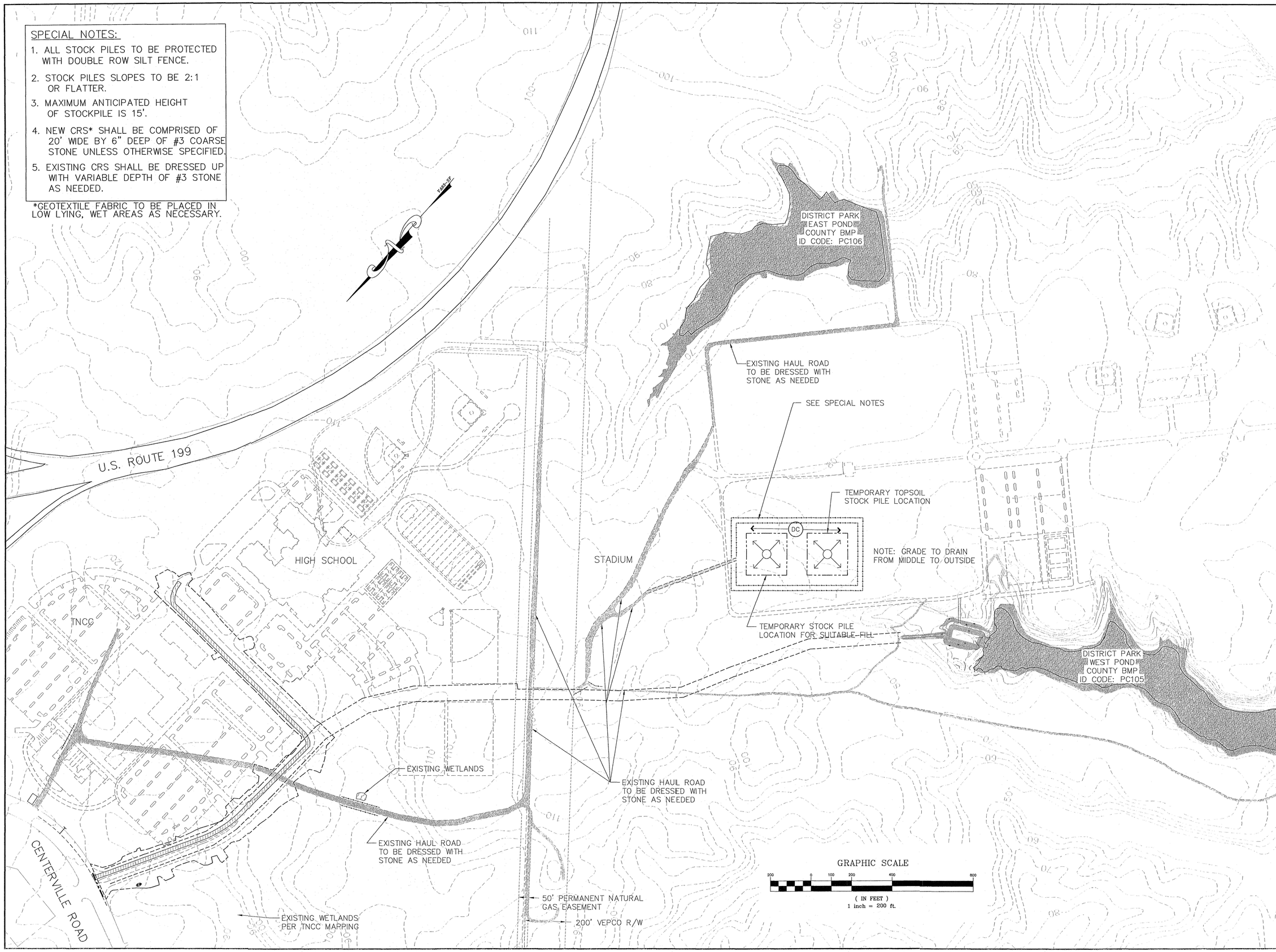
SPECIAL NOTES:

1. ALL STOCK PILES TO BE PROTECTED WITH DOUBLE ROW SILT FENCE.
2. STOCK PILES SLOPES TO BE 2:1 OR FLATTER.
3. MAXIMUM ANTICIPATED HEIGHT OF STOCKPILE IS 15'.
4. NEW CRS* SHALL BE COMPRISED OF 20' WIDE BY 6" DEEP OF #3 COARSE STONE UNLESS OTHERWISE SPECIFIED.
5. EXISTING CRS SHALL BE DRESSED UP WITH VARIABLE DEPTH OF #3 STONE AS NEEDED.

*GEOTEXTILE FABRIC TO BE PLACED IN LOW LYING, WET AREAS AS NECESSARY.



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DESIGNED BY	M. CLAUD
CHECKED BY	D. GOULD
SCALE	1" = 200'

TIMMONS GROUP

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS

JAMES CITY COUNTY, VIRGINIA

E & S CONTROL PLAN FOR HAUL ROADS & TEMPORARY STOCK PILES

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SHEET NO.	C1.5

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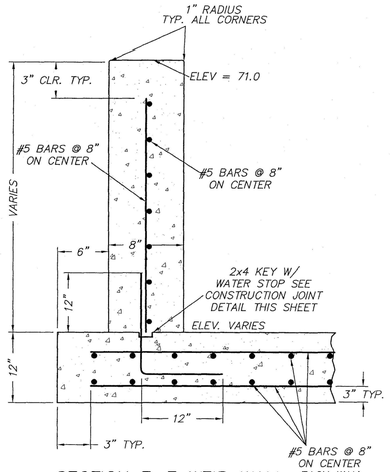
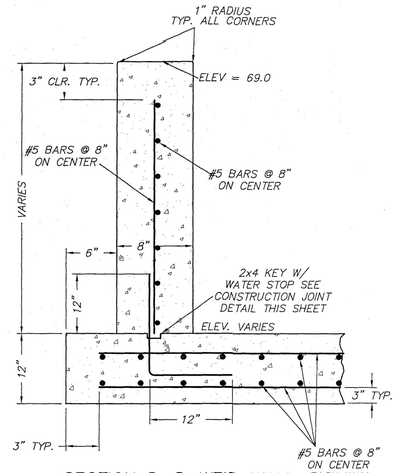
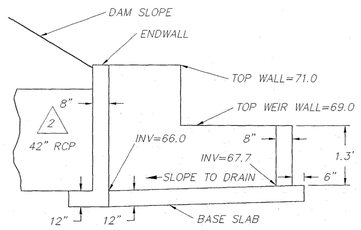


SECTION E–E WEIR WALL
NOT TO SCALE



SECTION D–D WEIR WALL
NOT TO SCALE



SECTION F–F
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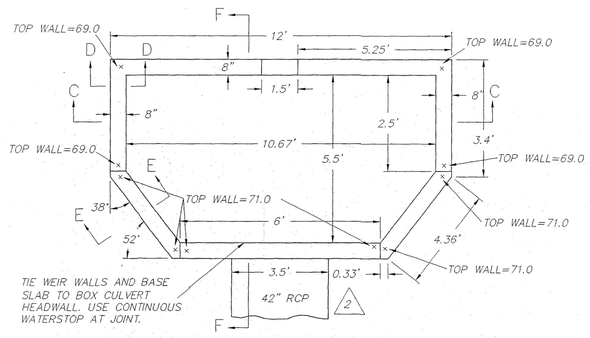
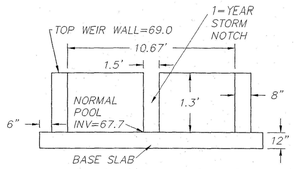
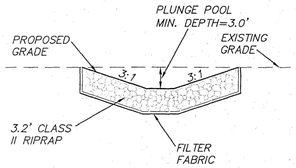


PRINCIPAL SPILLWAY PLAN STRUCTURE #1
NO SCALE

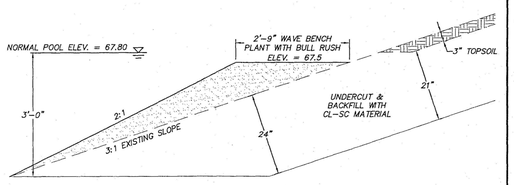


SECTION C–C
NO SCALE

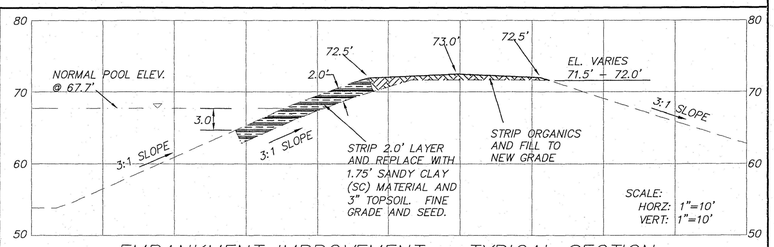


SECTION B–B

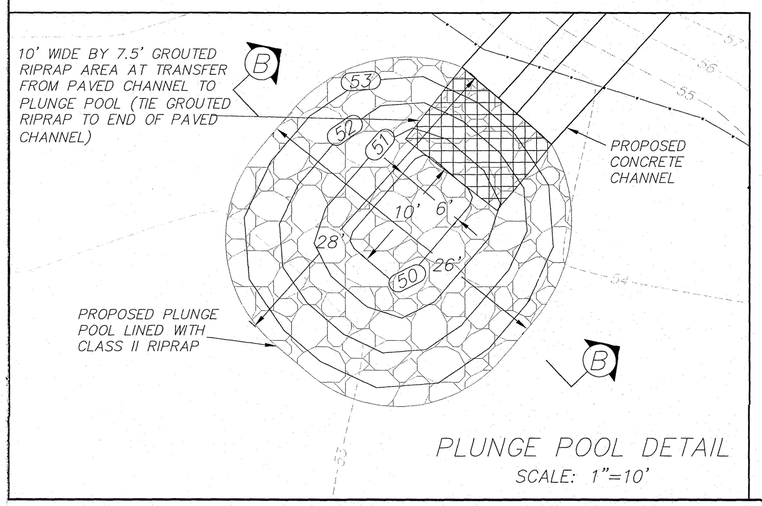
WATER SURFACE ELEVATIONS	
NORMAL	67.70'
1 YEAR STORM	68.67'
2 YEAR STORM	69.08'
10 YEAR STORM	69.92'
100 YEAR STORM	71.25'



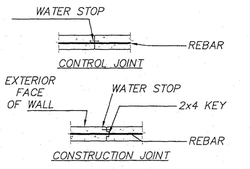
EMBANKMENT SLOPE IMPROVEMENTS
NO SCALE



EMBANKMENT IMPROVEMENT – TYPICAL SECTION

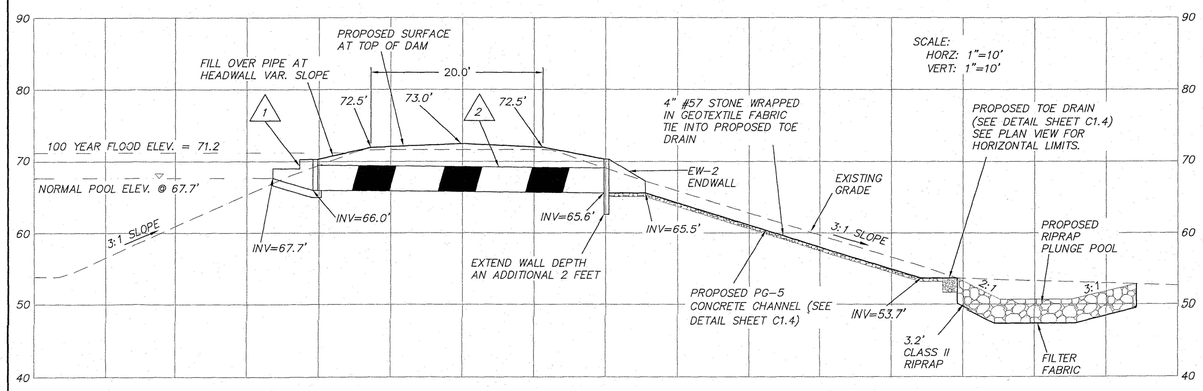


PLUNGE POOL DETAIL
SCALE: 1"=10'



JOINT SPACING:
1. MAXIMUM 20'–0" C/C
2. MAXIMUM 12'–0" FROM CORNER
3. AT CHANGES IN WALL HEIGHT

TYPICAL JOINT DETAILS FOR CONCRETE PADS
NOT TO SCALE



SECTION A–A

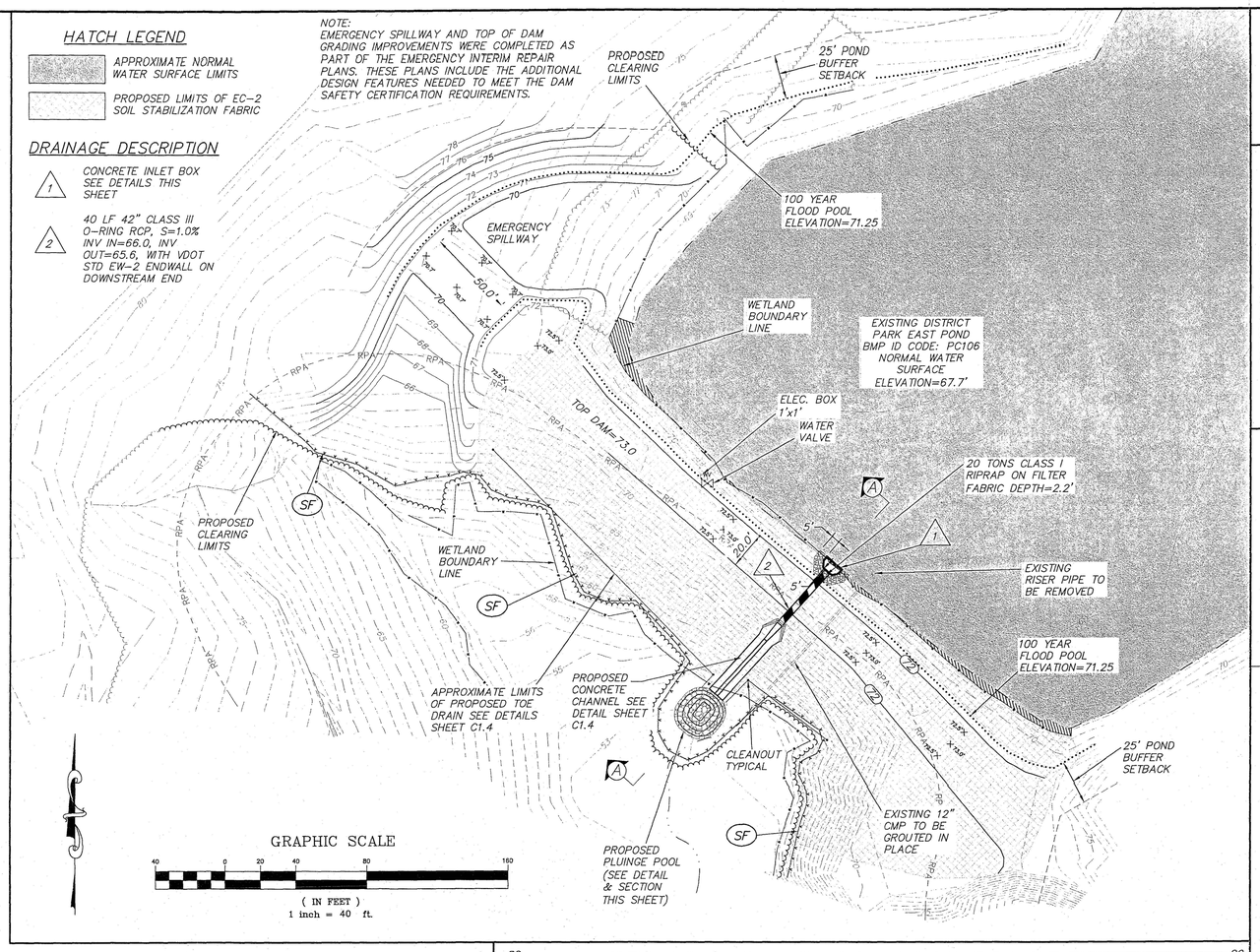
HATCH LEGEND

- APPROXIMATE NORMAL WATER SURFACE LIMITS
- PROPOSED LIMITS OF EC–2 SOIL STABILIZATION FABRIC

DRAINAGE DESCRIPTION

1. CONCRETE INLET BOX SEE DETAILS THIS SHEET
2. 40 LF 42" CLASS III O–RING RCP, S=1.0% INV IN=66.0, INV OUT=65.6, WITH VDOT STD EW–2 ENDWALL ON DOWNSTREAM END

NOTE:
EMERGENCY SPILLWAY AND TOP OF DAM GRADING IMPROVEMENTS WERE COMPLETED AS PART OF THE EMERGENCY INTERIM REPAIR PLANS. THESE PLANS INCLUDE THE ADDITIONAL DESIGN FEATURES NEEDED TO MEET THE DAM SAFETY CERTIFICATION REQUIREMENTS.



COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
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2/24/2006
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DATE	REVISION DESCRIPTION
9/26/05	REVISED PER COUNTY COMMENTS & ADDITIONAL TOPO

DATE	2/24/2006
DRAWN BY	S. MUNIR
DESIGNED BY	M. CLAUD
CHECKED BY	A. GOULD
SCALE	AS SHOWN

TIMMONS GROUP .:. VISIONS

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA
PLAN & DETAILS

JOB NO. 22547
SHEET NO. C1.6

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RECEIVED
AUG 17 2005
ENVIRONMENTAL DIVISION

Preliminary Engineering Report

For

East Dam (PC #106) at Warhill District Park
James City County, Virginia

August 15, 2005

SP-107-05
PER

Prepared By: Robert G. Roop, PE
Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

Table of Contents

Summary **1**

Evaluation **2**

Existing Conditions 2

Regulatory Requirements 2

Purpose 2

Geotechnical Evaluation 3

Hydrologic and Hydraulic Evaluation 3

Conclusions and Recommendations **5**

Recommendations 5

Appendices:

A – Geotechnical Report

B – Hydrologic / Hydraulic Calculations

C – Plan of Improvements

SUMMARY

The East Dam is located within the Warhill Tract & District Park Sports Complex downstream of pending construction related to the New High School and the proposed Stadium complex for the Park on an unnamed tributary to Long Hill Swamp. This dam is regulated by the State Code of Virginia. The pending construction will add additional stress to the dam which has historically been overtopped during intense rainfall events. In order to receive approval from the State Dam Safety Division, the dam must safely pass the 100-year storm event under final development conditions within the watershed.

The dam currently does not meet Dam Safety Requirements and Interim Protection is recommended as an Emergency Action until final plans can be approved by the State.

A hydrologic evaluation of the watershed was completed to establish the flood issues related to both final construction and interim construction conditions. An evaluation of the hydraulic performance of various primary and emergency spillway configurations was also completed. The results indicate that suitable spillways can be constructed in two phases to accommodate interim and final conditions as follows:

DHW 71.64

1. Interim Conditions; Install a 50ft. wide Emergency Spillway at the right abutment (west) at elev. 70.7. This creates a 100 year flood pool elev. Of 71.7. The top of Dam will be raised 1 ft. to elev. 72.5 which provides a 0.8 ft. freeboard during the 100 year storm.
2. Final conditions; Install an additional primary spillway consisting of a weir box and outlet pipe and channel. This will maintain normal pool and retain the 1"- 24 hour rainfall.

The geotechnical analysis indicates that the structure is stable during conditions of rapid drawdown with a factor of safety of 1.3 or greater. The upstream face of the dam has both settled non-uniformly and eroded. The settlement is attributed to loose sandy material near the surface subject to rapid-drawdown conditions.

This requires some upstream slope modification by replacing the top 24" of material with suitable fill (SC-CL) and topsoil materials and re-establishing vegetation which will contain the loose sands. The upstream slope at the pool elevation should be stabilized with rip-rap.

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 037

EVALUATION

Existing Conditions

The East Dam is located on an unnamed tributary to Long Hill Swamp in the James City County Warhill District Park Sports Complex. The dam is approximately 20 ft. high and 400 ft. long. Construction occurred around 1990. The embankment slopes are approximately 3:1 and the dam has a variable top width of 2 5-30 ft. The spillway consists of a 15 inch CMP riser and 12 inch outlet pipe.

Historically, the dam has been overtopped during periods of intense rainfall, particularly during Hurricane Floyd in 1999. The dam is in good condition without evidence of overtopping. The upstream face of the dam exhibits non-uniform settlement and some erosion.

In May of 2005 probing of the embankment by county staff indicated a soft or loose soil condition at an eroded area. Subsequent investigation by Curtis Contracting Inc. (CCI) by backhoe excavation of this area revealed an area of loose saturated sand approximately at normal pool level.

Regulatory Requirements

This dam has now become a State regulated dam as of the recent regulation change effective July, 2003. As a result the regulations require this size to pass the 100-year storm.

The current dam will not pass the 100-year storm without overtopping flood routing (Appendix B – Existing Conditions) indicate an average of 0.5 ft. overtopping, and will be additionally impacted by the upstream clearing for construction.

Achieving final dam repairs approval and construction will take over 6 months. As a result an Interim Emergency Repair is recommended and is addressed in this report.

Purpose

The watershed for this dam is currently planned to be developed with a new High School and a new Stadium complex for the Park. This development will increase runoff from rainfall events, and create additional stress on the dam. This will likely cause failure during storm events of a frequency exceeding 25 years.

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 038

The dam is intended to be used by James City County for stormwater management in support of the watershed development. Additionally, the pond will be utilized for water quality requirements by retaining the 24 hour 1 inch rainfall event. This is all in accord with the Powhatan Creek Management Plan.

This PER will evaluate the requirements to provide a safe operating condition for the dam during interim construction and final watershed conditions. The interim conditions will allow emergency repairs during watershed construction activity that will facilitate a 100-year rainfall event with a cleared site. Final dam improvements must be approved by the state Dam safety division and will address final site development conditions. This process will not be complete until November or later.

Geotechnical Evaluation

A geotechnical evaluation of the dam embankment was performed by GET Solutions. This report is located in Appendix A. The report indicates that 6 borings were made and the findings indicate a non homogeneous earth embankment with materials ranging from sandy clay (CL) to silty sand (SM). Except for the upstream slope the top 5 ft. appears to be relatively dense, and is under lain by soft to loose sands. Both a stability analysis and settlement analysis indicate that the dam is a stable embankment.

The phreactic water surface is located 4-6ft. below the surface of the downstream slope, and there is no evidence of this water profile migrating to the surface at or near the toe of the downstream slope.

Loose sand are located along the upstream slope at varying locations, and have created settlement to varying degrees along the upstream face of dam above the normal pool elevation of 68.7.

Recommendations include:

1. Remove and replace the upstream slope with a CL-SC material to reduce the impacts of rapid drawdown on the loose sands. This will include from the dam top to 2 ft below the water surface.
2. Re-establish vegetation on the eroded and disturbed areas.

Hydrologic and Hydraulic Evaluation

The dam and pond are needed to support both interim and final construction conditions. The existing conditions of the dam and spillway are such that the dam will be overtopped during the 100-year flood event under current conditions. The watershed areas will be cleared in the early fall of this year to support the new construction, and final construction is scheduled for completion in mid 2007. In order to address these requirements, an interim solution will be evaluated to support land clearing activities that can be addressed by September of this year,

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 039

and can be integrated into a final solution that will be constructed in the Spring of 2006.

In order to permit this dam with the State Dam Safety requirements, this structure must safely pass the 100-year storm event with 1 ft. of freeboard. Because of the size of this pond (> 50 ac-ft) the structure must be permitted.

An evaluation of the watershed, and flood routing of the 100-year storm event has been completed for both conditions, and is located in Appendix B. The analysis was made using a Pond Pack routing program with a SCS unit hydrograph watershed model. Hydrologic assumptions made during the analysis include:

1. Existing conditions:
   - TC = 1.46
   - Runoff Coeff. CN= 75
2. Interim Conditions:
   - TC= 1.38 hours
   - Runoff Coeff. CN = 76 & 78
3. Final Conditions:
   - TC= 0.40 hours
   - Runoff Coeff. CN = 91

These hydrologic models were routed through various spillway configurations along with a 24 hour 1" rainfall retention. During final conditions a 25 year storm event was routed to ensure that the Emergency spillway was not activated until storms of a less frequency (>25 year event) occurred.

Optimization of the spillway configurations is shown in the table below. It should be noted that the Dam must be increased in height by an average of 1 ft. from elev. 71.5 to elev. 72.5 in order to maintain the desired 1 ft. freeboard during the100 year rainfall.

71.6
1.0
72.6

SUMMARY OF FLOOD ROUTING					T.O.D.	FB
Condition	Spillway Description	Maximum Pool Elevation @ Rainfall				
Top of Dam = 73	Normal Pool = Elev. 67.7	1 year	25 year	100 year		
Interim (Stadium only)	50' – Earth EMS @ Elev. 70.7 + 15" Rise	68.89	71.17	71.73	72.5	0.77'
Interim (School & Stadium)		68.71	71.03	* 71.64	72.5	0.86
Final	15" inlet @ Elev. 67.7 + 5' x 12' spillway @ Elev. 69.0 + 50' EMS @ Elev. 70.7	68.70	70.22	71.25		

* LOWER DVE TO HS (SB)

CONCLUSIONS AND RECOMMENDATIONS

Based on the hydrologic/hydraulic evaluation it is concluded that the dam can safely pass the 100-year storm event during both interim and final conditions with the following provisions:

Interim Conditions (Emergency Repair):

EC-2 FOR 2H:1V

1. Stabilize upstream face of dam
2. Raise Dam height 1.5 ft. to elev. 73
3. Construct a 50ft. wide Emergency Spillway at elevation 70.7 w/ EC-3 MATTING

15" OUTFALL FROM WISC.

Final Conditions:

1. Construct new principal spillway (5'x12') at elevation 69.0 (1.3' above normal pool
2. Construct a low flow orifice (15") at Elevation 67.7 to control the 24 hour 1" rainfall event

Recommendations

1. A plan showing both the interim and final solutions is shown in the Appendix C. This plan is not intended as a construction plan, but is conceptual and adequate to allow cost estimates to be developed.
2. Submit Plans to County and construct interim improvements as an emergency repair as soon as possible to meet State dam safety regulations and address land clearing activities.
3. Prepare an Interim Plan with land disturbing activity requirements and interim dam improvements.
4. Submit plans to County and State Dam Safety Division and construct final improvements prior to placing impervious pavement improvements within the watershed.
5. Plans for both Interim and Final Improvements to dam shall comply with all James City County Requirements and Virginia Dam Safety Regulations.

Timmons Group

Your Vision Achieved Through Ours

Memorandum

To: Mike Claud

From: Will Bassett WWB

Date: 8/17/04

Project: Lightfoot/Warhill Stormwater Study – James City County, Virginia

Re: Results of Geotechnical Investigation

This memorandum presents the findings of our geotechnical investigation for the above-referenced project. The purpose of the investigation was to provide a basic geotechnical evaluation of the existing Lightfoot/Warhill Dam as part of a comprehensive stormwater study of the area.

Field Investigation and Laboratory Testing program - The field investigation consisted of two soil test borings advanced to a depth of 25 feet each. The boring locations are shown on the attached boring location plan. Standard penetration tests (SPT) were conducted at two to five foot intervals in each of the borings. The drilling of the test borings was subcontracted to Ayers & Ayers of Powhatan, Virginia, and was continuously monitored in the field by a member of our geotechnical staff. Upon completion of each test boring and after checking groundwater elevations, the boreholes were grouted full-depth. Upon completion of the field investigation a limited laboratory testing program was conducted. The laboratory testing consisted of natural moisture content, gradation, and Atterberg limits tests. The results of the laboratory tests are attached. Detailed visual soil descriptions, SPT data, laboratory test data, and other relevant information obtained from the borings are shown on the attached boring logs.

Subsurface Conditions – The borings encountered three distinct strata, as described below.

Stratum I – Stratum I is the existing fill material of the dam and was encountered to depths of 17.0 feet and in Boring B-1 and 12.5 feet in Boring B-2. The fill material consists of medium dense to very loose clayey/silty fine sand (SC,SM). SPT N-values in the fill ranged from 3 to 22 blows per foot (bpf), with the majority between 7 and 14 bpf. Laboratory tests on representative samples of the fill material resulted in liquid limits of 21 to 30, plasticity indices of 10 to 17, 25% to 43% fines, and natural moisture contents of 12.7% to 18.2%.

Stratum II – Stratum II is the original ground beneath the dam fill and consists of medium stiff fine sandy clay of moderate plasticity (CL) and medium dense to very loose fine sand with silt (SP-SM) which was encountered from the base of the dam fill to depths of between 21.0 and 22.0 feet. The three SPT N-values obtained in Stratum II were 1, 7, and 11 bpf. No laboratory tests were conducted on the Stratum II soils.

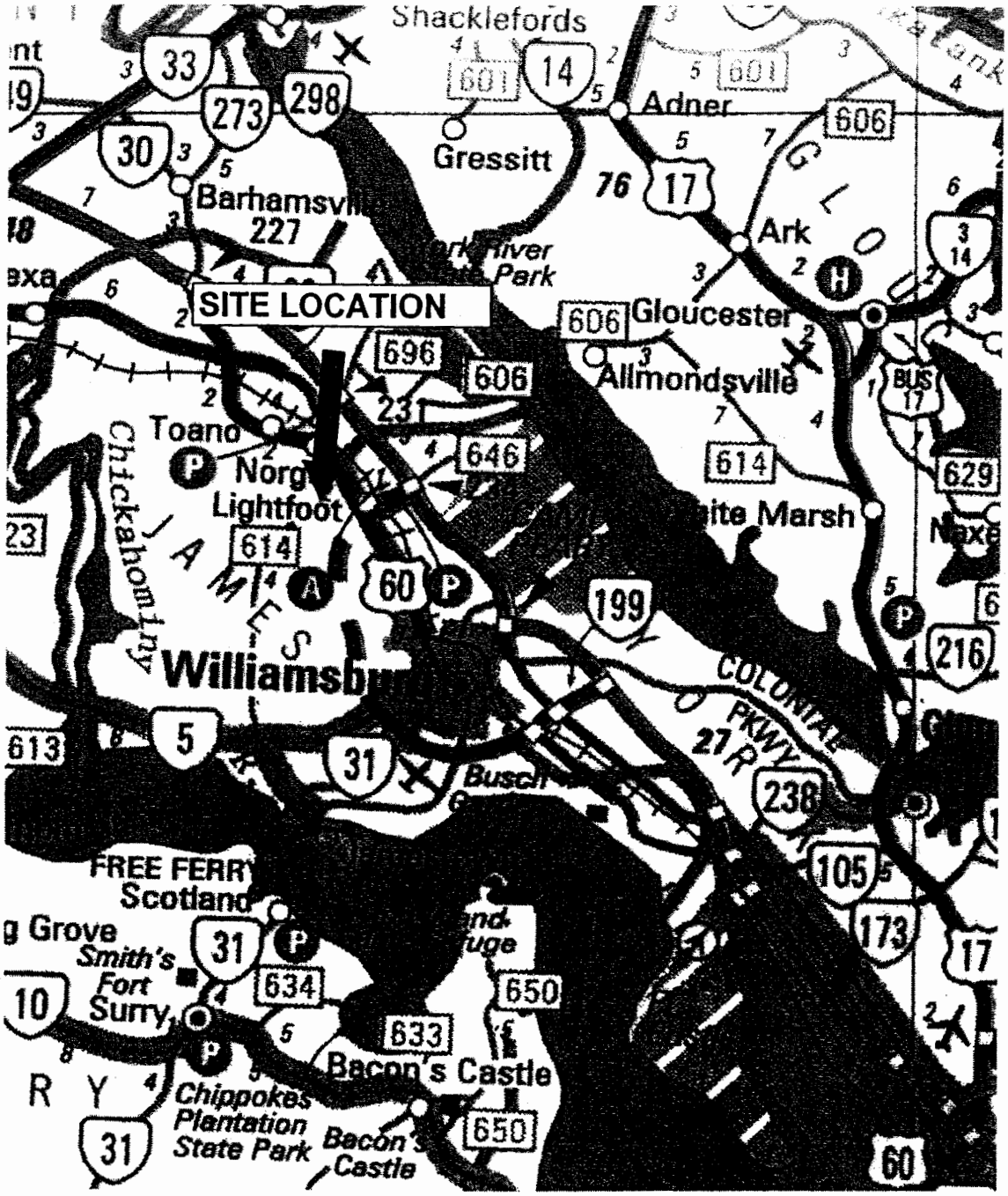
Stratum III – Stratum III consists of medium dense fine sand with silt and shell fragments (SP-SM), which was encountered from the base of Stratum II to the maximum exploration depth of 25 feet. The two SPT N-values obtained in Stratum III were 15 and 21 bpf. No laboratory tests were conducted on the Stratum III soils.

Neither of the borings encountered auger refusal, weathered rock, or rock.

Groundwater was encountered in borings B-1 and B-2 at depths of 20.5 feet and 21.2 feet, respectively. The boreholes were grouted immediately upon obtaining cave-in readings. Therefore, no long-term groundwater readings were obtainable. Groundwater table elevations are influenced by precipitation amounts and durations and are thus subject to short-term and seasonal fluctuations.

Conclusions/Recommendations – Based on the soil classifications and the SPT N-values the existing fill material is considered to be suitable as general embankment fill for the dam. However, the fill does not meet any criteria for clay core material. If a clay core is required as part of the project, the existing dam would have to be partially excavated and a clay core installed in properly placed and compacted lifts. As an alternative method of achieving an in-situ cutoff in the dam, a grout curtain could be installed. In either case the cutoff would have to be extended below the existing dam due to the high permability of the undisturbed sand underneath the dam. Additionally, the stability of the dam slopes would have to be analyzed under several conditions (full hydrostatic pressure, rapid drawdown, etc). Additional embankment material would likely be required to achieve adequate slopes. Any fill material that is placed against the existing dam slopes should be properly benched in accordance with VDOT specifications.

c: Geotechnical Project File (JN 21725)



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

LIGHTFOOT WARHILL ATHLETIC COMPLEX	
SITE LOCATION MAP	
Date: 7/15/04	Scale: 1" = 5.5 mi
Drawn By: DRG	Checked By: WWB
Job No.: 21725	

N

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

LIGHTFOOT WARHILL ATHLETIC COMPLEX	
BORING LOCATION MAP	
Date: 7/15/04	Scale: 1" = 345'
Drawn By: DRG	Checked By: WWB
Job No.: 21725	

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Fill
	Low plasticity clay
	Poorly graded sand with silt
Misc. Symbols	
▽	Water table during drilling
C	Depth to caving
	Description not given for: "X"

Notes:

1. Exploratory borings were drilled on 6/29/04 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

TIMMONS GROUP
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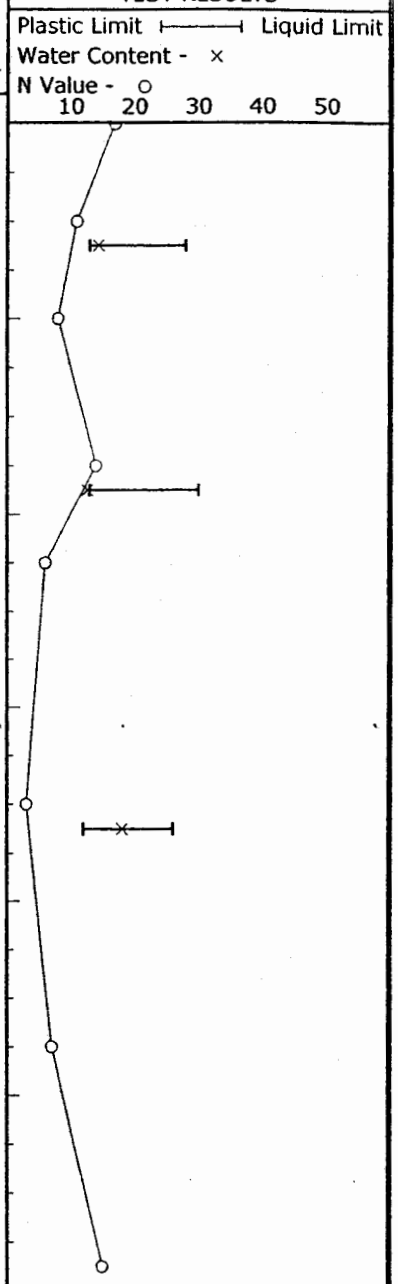
BORING LOG
BORING NUMBER: B-1

PROJECT: LIGHTFOOT/WARHILL STORMWATER STUDY **PROJECT NO.:** 21725
CLIENT: JAMES CITY COUNTY **DATE:** 6/29/04
LOCATION: EASTERN THIRD POINT OF DAM
DRILLER: AYERS & AYERS **ELEVATION:**
DRILL RIG: 2-1/4" ID HSA - TRUCK MOUNTED **LOGGED BY:** W. DAVIS
DEPTH TO - WATER> INITIAL: ▽ 20.5 FT **CAVING>** ∠ 23.5 FT

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Depth (feet)	Graphic	Description	Blow Counts	NM	LL	PI	% FINES	MDD	OM	CBR
0		MEDIUM DENSE BROWN CLAYEY SILTY FINE SAND (FILL), MOIST	9 6 11							
		2.0								
		MEDIUM DENSE TO VERY LOOSE BROWN CLAYEY FINE SAND (FILL), MOIST TO VERY MOIST	5 5 6	14.4	28	15	35.0			
4			2 4 4							
8			6 7 7	12.7	30	17	24.8			
			4 3 3							
12										
16			2 1 2	18.2	26	14	43.2			
		17.0								
		MEDIUM STIFF BROWN AND GRAY FINE SANDY CLAY (CL), VERY MOIST								
20			2 3 4							
		21.0								
		MEDIUM DENSE OLIVE FINE SAND WITH SILT AND SHELL FRAGMENTS (SP-SM), WET								
24			7 7 8							
		Boring terminated at 25 ft.								
28										

TEST RESULTS



TIMMONS GROUP
YOUR VISION ACHEIVED THROUGH OURS

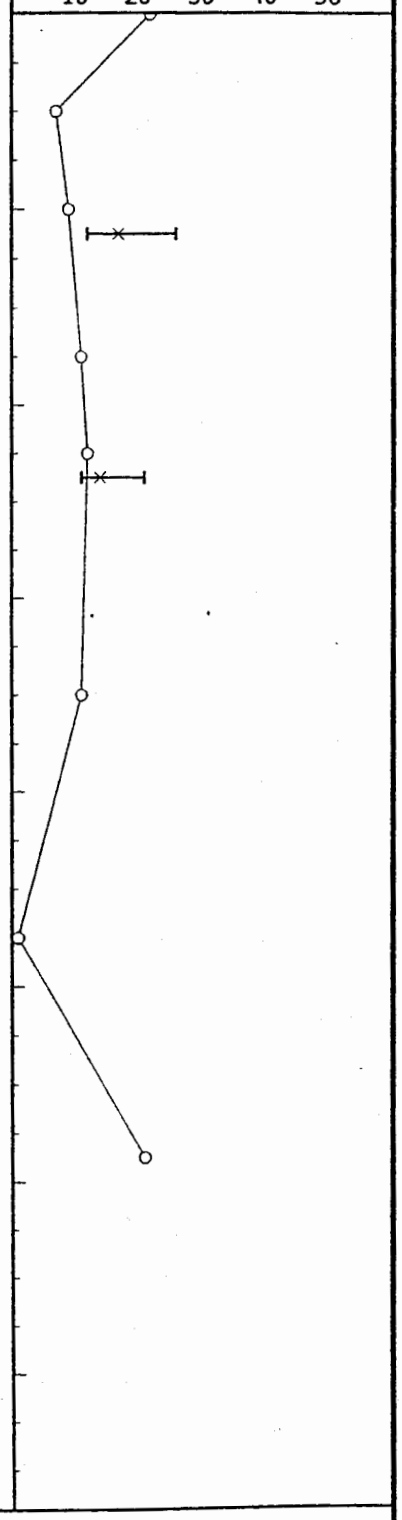
BORING LOG
BORING NUMBER: B-2

PROJECT: LIGHTFOOT/WARHILL STORMWATER STUDY **PROJECT NO.:** 21725
CLIENT: JAMES CITY COUNTY **DATE:** 6/29/04
LOCATION: WESTERN THIRD POINT OF DAM
DRILLER: AYERS & AYERS **ELEVATION:**
DRILL RIG: 2-1/4" ID HSA - TRUCK MOUNTED **LOGGED BY:** W. DAVIS
DEPTH TO - WATER> INITIAL: ▽ 21.2 FT **CAVING>** ⊏ 9.0 FT

This information pertains only to this boring and cannot be interpreted as being indicitive of the site.

Depth (feet)	Graphic	Description	Blow Counts	NM	LL	PI	% FINES	MDD	OM	CBR
0		MEDIUM DENSE TO LOOSE BROWN CLAYEY FINE SAND (FILL), MOIST TO VERY MOIST	10 10 12							
			7 3 4							
4			5 3 6	17.0	26	14	32.4			
			8 6 5							
8			5 6 6	14.0	21	10	26.7			
12		12.5								
		MEDIUM DENSE TO VERY LOOSE BROWN FINE SAND WITH SILT (SP-SM), MOIST TO WET	5 5 6							
16										
			1 1 WOH							
20		22.0								
		MEDIUM DENSE OLIVE FINE SAND WITH SILT AND SHELL FRAGMENTS (SP-SM), WET	9 10 11							
24		Boring terminated at 25 ft.								
28										

TEST RESULTS
Plastic Limit ⊢—⊣ Liquid Limit
Water Content - ×
N Value - ○



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

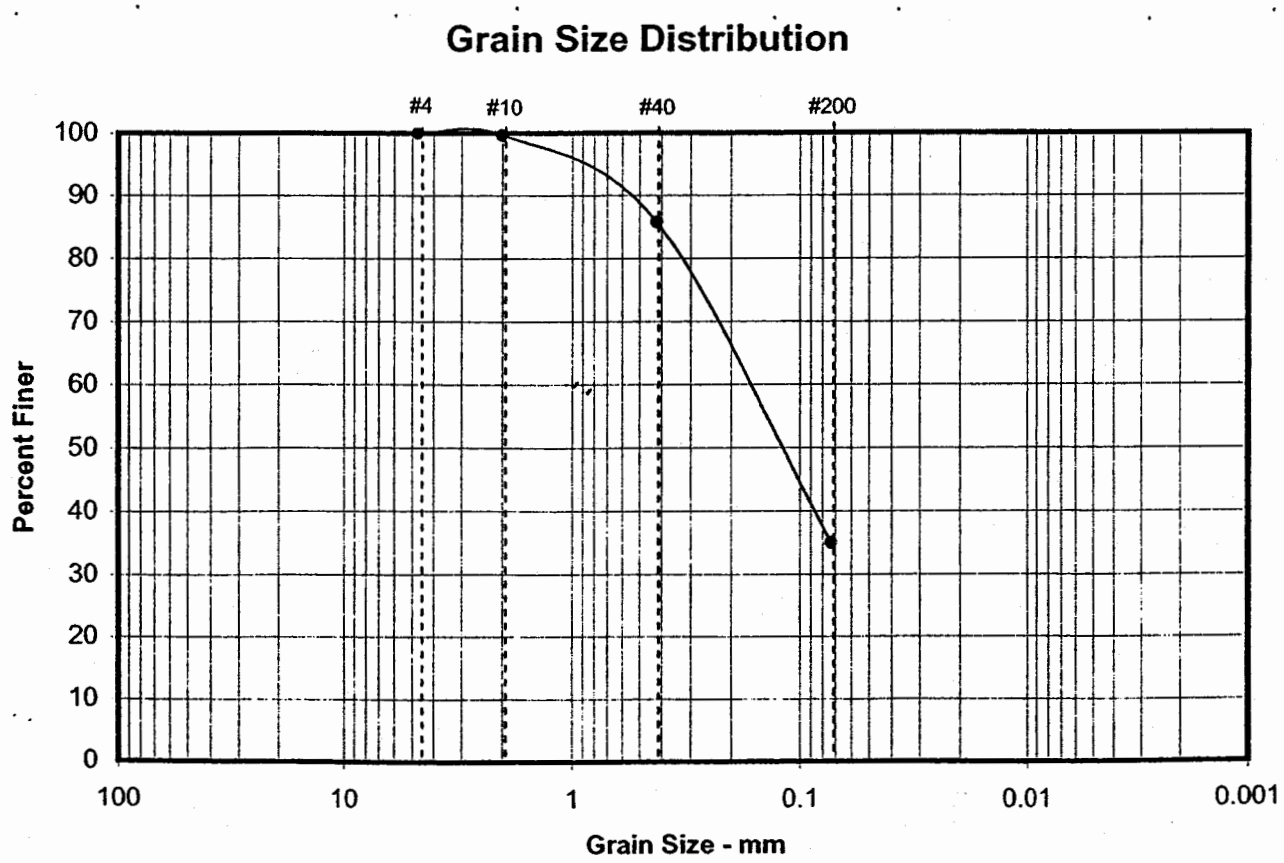
GRAIN SIZE DISTRIBUTION TEST REPORT

Project Number	21725
Project Name	LIGHTFOOT WARHILL S/W
Location	B-1,2.0'-3.5'

Liquid Limit	Plastic Index	USCS	AASHTO
28	**15**	**SC**	**A-2-6(0.0)**

Percent Gravel	Percent Sand	Percent Silt and Clay
0.0%	**65.0%**	**35.0%**

Material Description	BROWN CLAYEY FINE SAND
Natural Moisture	14.4%
SPT Blow Counts	5-5-6



DATE 7/7/04

FIGURE NUMBER GS1

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

GRAIN SIZE DISTRIBUTION TEST REPORT

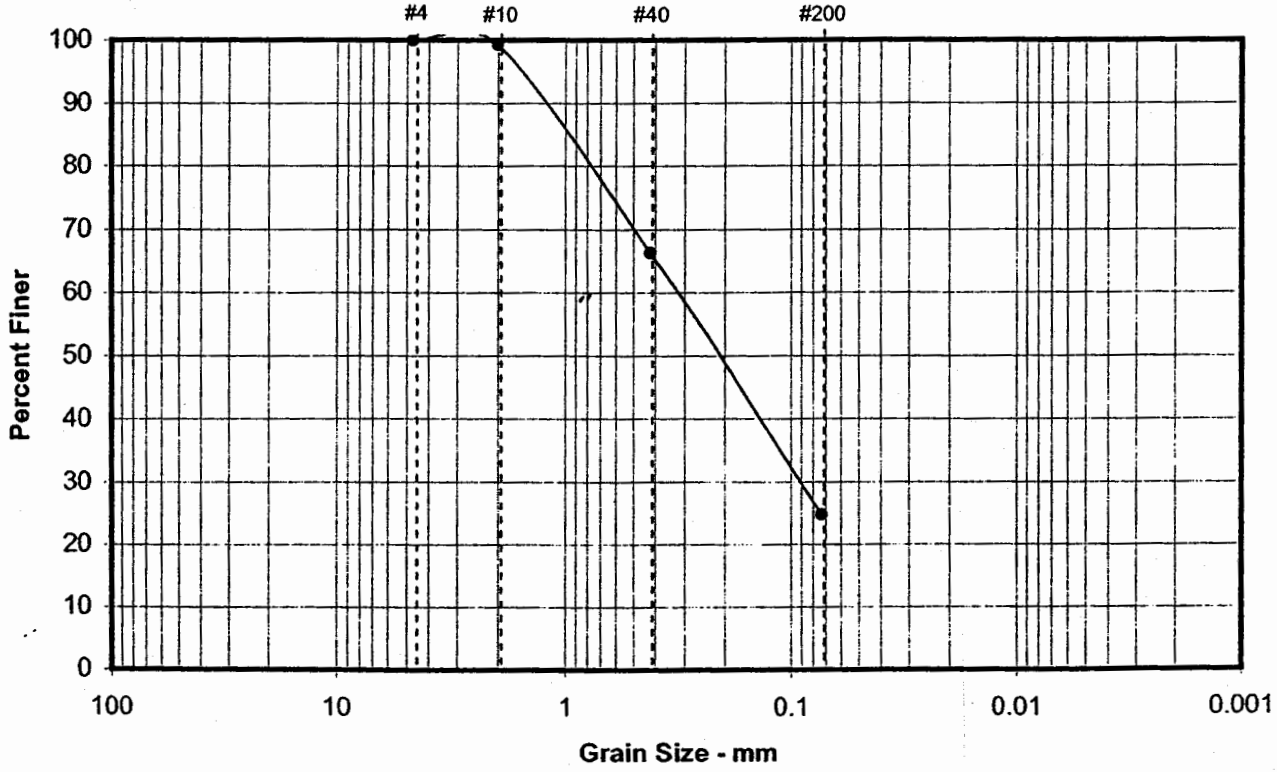
Project Number	21725
Project Name	LIGHTFOOT WARHILL S/W
Location	B-1,7.0'-8.5'

Liquid Limit	Plastic Index	USCS	AASHTO
30	**17**	**SC**	**A-2-6(0.0)**

Percent Gravel	Percent Sand	Percent Silt and Clay
0.0%	**75.2%**	**24.8%**

Material Description	BROWN CLAYEY FINE TO MEDIUM SAND
Natural Moisture	12.7%
SPT Blow Counts	6-7-7

Grain Size Distribution



DATE 7/7/04

FIGURE NUMBER GS2

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

GRAIN SIZE DISTRIBUTION TEST REPORT

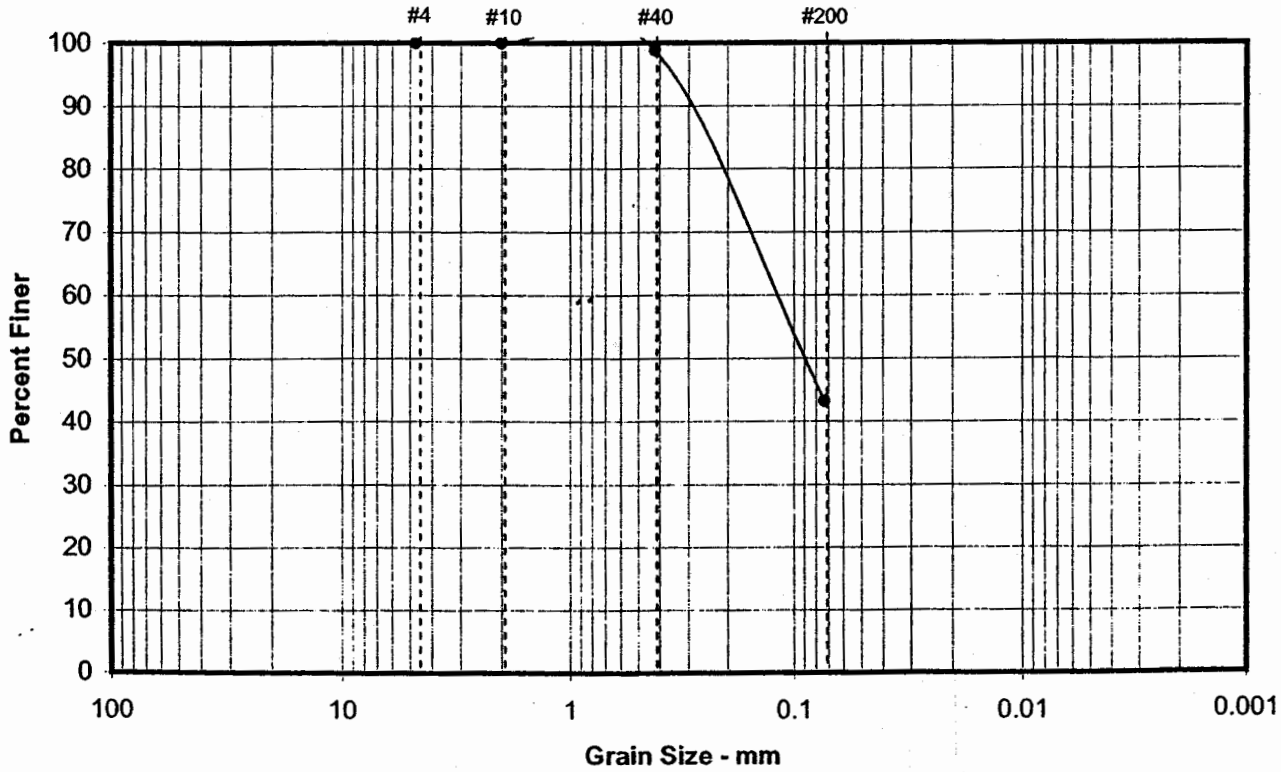
Project Number	21725
Project Name	LIGHTFOOT WARHILL S/W
Location	B-1,14.0'-15.5'

Liquid Limit	Plastic Index	USCS	AASHTO
26	**14**	**SC**	**A-6(1.1)**

Percent Gravel	Percent Sand	Percent Silt and Clay
0.0%	**56.8%**	**43.2%**

Material Description	BROWN W/ GRAY CLAYEY SAND
Natural Moisture	18.2%
SPT Blow Counts	2-1-2

Grain Size Distribution



DATE 7/7/04

FIGURE NUMBER GS3

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

GRAIN SIZE DISTRIBUTION TEST REPORT

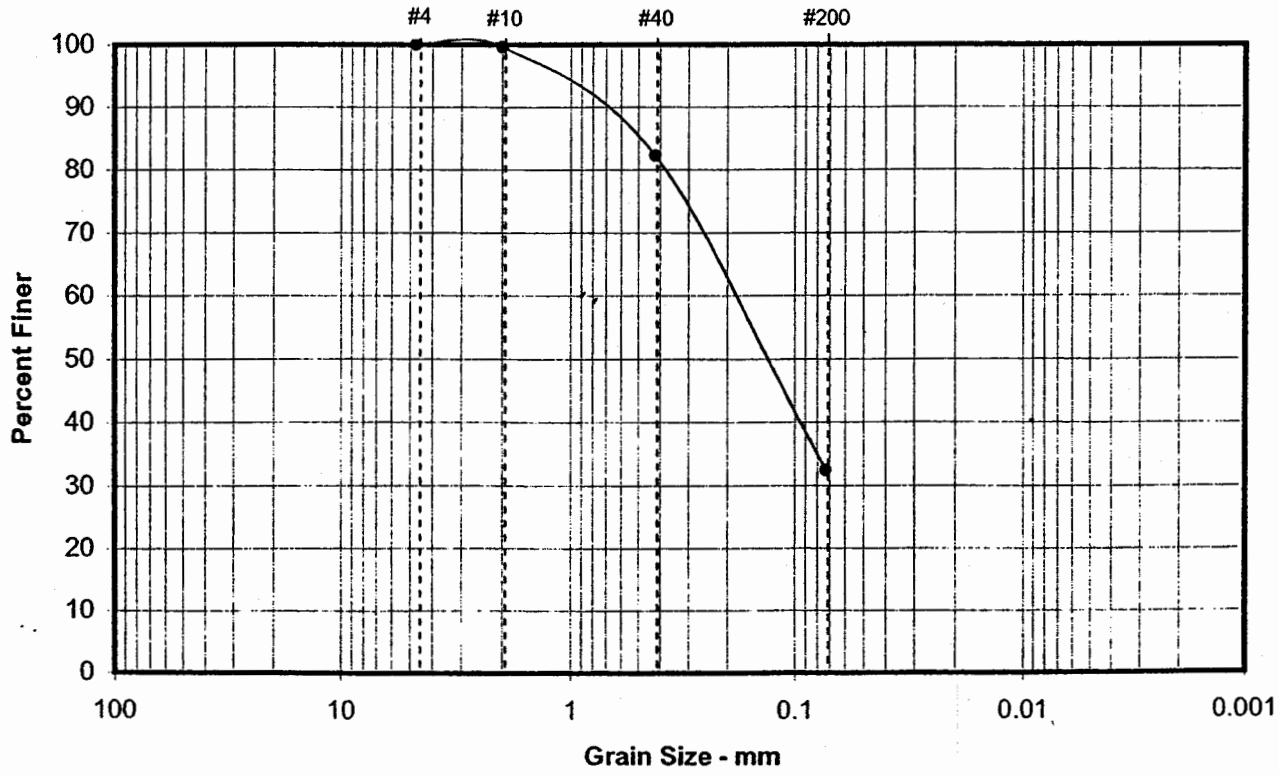
Project Number	21725
Project Name	LIGHTFOOT WARHILL S/W
Location	B-2,4.0'-5.5'

Liquid Limit	Plastic Index	USCS	AASHTO
26	**14**	**SC**	**A-2-6(0.0)**

Percent Gravel	Percent Sand	Percent Silt and Clay
0.0%	**67.6%**	**32.4%**

Material Description	BROWN W/ REDDISH BROWN CLAYEY FINE SAND
Natural Moisture	17.0%
SPT Blow Counts	5-3-6

Grain Size Distribution



DATE 7/7/04

FIGURE NUMBER GS4

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

GRAIN SIZE DISTRIBUTION TEST REPORT

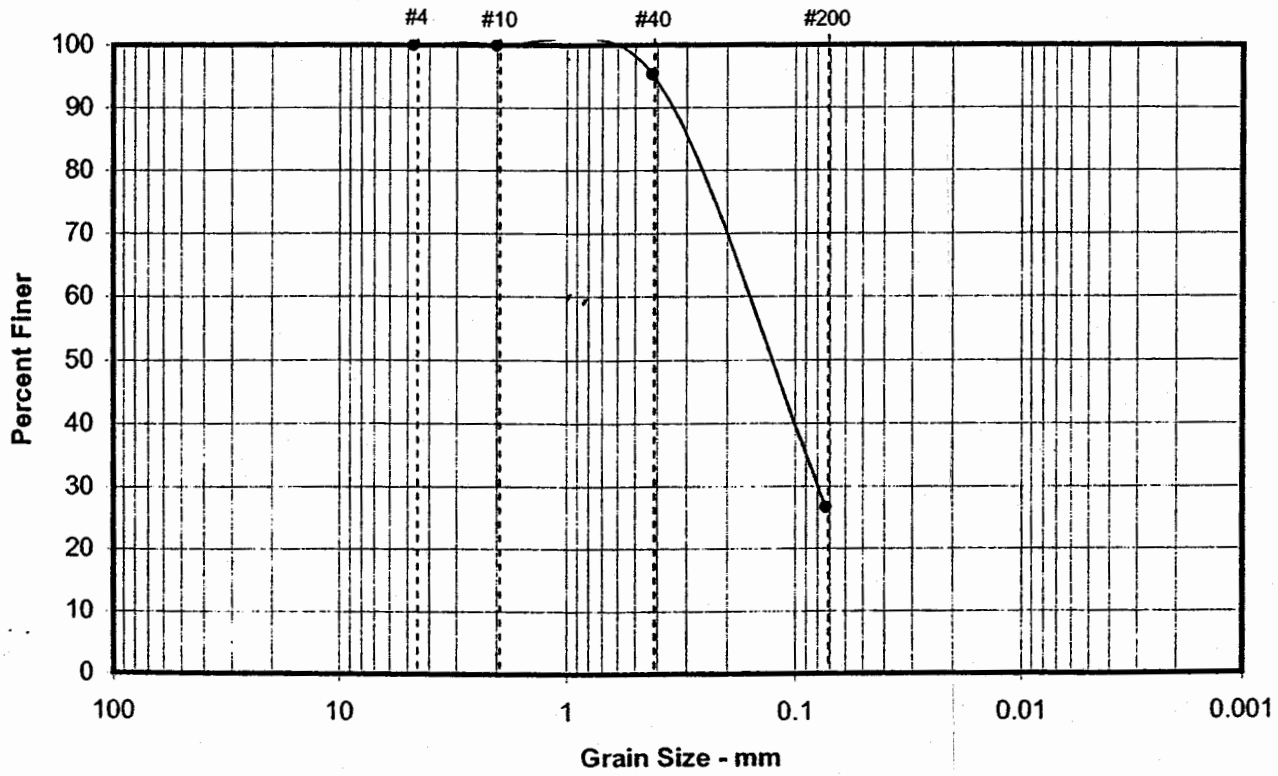
Project Number	21725
Project Name	LIGHTFOOT WARHILL S/W
Location	B-2,9.0'-10.5'

Liquid Limit	Plastic Index	USCS	AASHTO
21	**10**	**SC**	**A-2-4**

Percent Gravel	Percent Sand	Percent Silt and Clay
0.0%	**73.3%**	**26.7%**

Material Description	BROWN CLAYEY FINE SAND
Natural Moisture	14.0%
SPT Blow Counts	5-6-6

Grain Size Distribution



DATE 7/7/04

FIGURE NUMBER GS5

APPENDIX A

Geotechnical

Report of Subsurface Exploration and Geotechnical Engineering Services
East Dam Alignment
JCC District Park Sports Complex
James City County, Virginia
GET Project No: WM05-169G
August 8, 2005
Prepared For: Timmons Group

GET
Solutions, Inc.

Geotechnical ·Environmental ·Testing

GET
Solutions, Inc.

Geotechnical· Environmental· Testing

August 8, 2005

TO: **Timmons Group**
1001 Boulders Parkway
Richmond, Virginia 23225

Attn: Mr. Bob Roop

RE: Report of Subsurface Investigation and Geotechnical Engineering Services
East Dam Alignment
JCC District Park Sports Complex
James City County, Virginia
GET Project No: WM05-169G

Dear Mr. Roop:

In compliance with your instructions, we have completed our Geotechnical Engineering Services for the referenced project. The results of this study, together with our recommendations, are presented in this report.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. **G E T Solutions, Inc.** would be pleased to continue its role as Geotechnical Engineer during the project final design phase and implementation.

We trust that the information contained herein meets your immediate need, and we would ask that you call this office with any questions that you may have.

Respectfully Submitted,
G E T Solutions, Inc.

James R. Wheeler
Project Geologist

D. Mark Scholefield, P.E.
Senior Geotechnical Engineer
VA Reg. # 033932

COMMONWEALTH OF VIRGINIA
DAVID MARK SCHOLEFIELD
No.033932
8/8/05
PROFESSIONAL ENGINEER

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info@getsolutionsinc.com

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GET Solutions, Inc.

EXECUTIVE SUMMARY

A dam has been previously constructed at this project site approximately 15 years ago, which has been identified as the East Dam. There has been some concern of potentially loose soils (Sand) within the upstream portion of the dam alignment.

- The existing crest of the dam (top of bank) is approximately 25 to 30 feet in width at an elevation of 71 feet.
- The existing pond normal water surface elevation along with the invert elevation of the existing riser structure is at 67.68 feet, while the outfall pipe invert elevation is 52.51 feet.
- The slopes of the upstream and downstream sides of the dam currently are generally flatter than a 2:1 (H:V) slope.
- During our site reconnaissance, some visual signs of erosion were observed along the upstream slope (pond side) of the dam. One area along the upstream slope of the dam contained a small "wash out" ranging from 0.5 to 2.5 feet in width and 0.5 to 2 feet in depth. In addition, approximately 5 feet along the toe of the slope along a portion of the upstream side of the dam appears to have eroded from construction activity.

Our field exploration program included five (5) 20 to 40-foot deep SPT borings and two (2) 9 to 10-foot deep hand auger borings within the existing dam alignment. A brief description of the subsurface soil conditions is listed below:

AVERAGE DEPTH (feet)	STRATUM	DESCRIPTION	RANGES OF SPT(1) N-VALUES
Borings: B-1 through B-7			
0 to 0.17-0.25	-	2 to 3 Inches of Topsoil	-
0.17-0.25 to 19-23	I	SAND (SP-SM, SM, SM-SC, SC) with varying amounts of Clay and Silt * **(Some layers of Very Soft to Very Stiff, Sandy CLAY (CL)were encountered interbedded within the granular soils)*	2 to 20 (Sand) WOH(2) to 22 (Clay)
19-23 to 20-40	II	Silty, fine to medium SAND (SM) with marine shell fragments, "Yorktown Formation", Very Loose to Medium Dense	4 to 24

Note (1) SPT = Standard Penetration Test, N-Values in Blows-per-foot: (2) WOH = Weight Of Hammer

- The groundwater table was encountered at the location of the borings along the crest (top of bank) and upstream side of the dam at elevations ranging from 63.5 to 65.5 feet after a 24 hour period. While the groundwater table was encountered at the location of the boring along the downstream side of the dam at an elevation of 59.5 feet after a 24 hour period.

The results of the field exploration activities in conjunction with a laboratory testing program were used in determining various construction scenarios/ recommendations as listed below:

- Considering the dam has been in place for approximately 15 years, the majority of the settlement associated with the placement of up to 20 feet of fill has already occurred.
- Some minor settlement on the order of 1 inch or less may occur within the dam alignment as a result of the consolidation of a very soft SILT (ML) layer that was encountered at a depth of 18 to 23 feet at Boring B-1 (only).
- Due to encountering loose Sands within the dam alignment, we recommend replacing the upstream face of the dam with a minimum of 24 inches of Clayey SAND (SC) or CLAY (CL/CH) material
- The fill material (SC, CL, CH) should contain at least 40% or greater fines (Silt and Clay), Liquid Limits (LL) generally greater than 30 and Plasticity Indexes (PI) greater than 15
- This fill should be properly benched into the slope to an elevation of 2 feet below the normal pool elevation.
- The newly placed fills should then be properly compacted and re-graded to maintain the minimum 2:1 slope or greater.
- The construction of an emergency spillway is recommended.

All materials and construction procedures should comply with the VDOT Road and Bridge Specifications. This summary briefly discusses some of the major topics mentioned in the attached report. Accordingly, this report should be read in its entirety to thoroughly evaluate the contents.

1.0 PROJECT INFORMATION

1.1 Project Authorization:

G E T Solutions, Inc. has completed our Geotechnical Engineering study for the East Dam Alignment investigation at the James City County District Park Sports Complex located in James City County Virginia. The Geotechnical Engineering Services were conducted in accordance with the scope presented in **G E T** proposal No. PWM05-127G.

1.2 Project Description:

A dam has been previously constructed at this project site approximately 15 years ago, which has been identified as the east dam. There has been some concern of potentially loose soils (Sand) within the upstream portion of the dam alignment.

Based on the provided plans, the existing crest of the dam (top of bank) is approximately 25 to 30 feet in width at an elevation of 71 feet. The existing pond normal water surface elevation along with the invert elevation of the existing riser structure is at 67.68 feet, while the outfall pipe invert elevation is 52.51 feet. The slopes of the upstream and downstream sides of the dam currently are generally flatter than a 2:1 (H:V) slope.

View of Dam Facing West

View of Dam Facing East

If any of the noted information is incorrect or has changed, please inform **G E T Solutions, Inc.** so that we may amend the recommendations presented in this report, if appropriate.

1.3 Purpose and Scope of Services:

The purpose of this study was to obtain information of the general subsurface conditions at the proposed project site. The subsurface conditions encountered were then evaluated with respect to the available project characteristics. In this regard, engineering assessments for the following items were formulated:

1. General assessment of the soils revealed by the borings performed within the existing dam alignment.

2. General location and description of potentially deleterious material encountered in the borings that may interfere with construction progress, including existing fills or surficial/subsurface organics.

3. Soil subgrade preparation, including stripping, grading and compaction. Engineering criteria for placement and compaction of approved structural fill material.

4. Construction considerations for clearing, grading, fill placement and subgrade preparation.

5. Long-term and short-term embankment settlement analysis.

6. Embankment stability analysis.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic material in the soil, bedrock, surface water, groundwater or air, on or below or around this site. Prior to development of this site, an environmental assessment is advisable.

2.0 FIELD AND LABORATORY PROCEDURES

2.1 Field Exploration:

In order to explore the general subsurface soil types and to aid in developing associated soil parameters for the slope stability analysis, five (5) 20 to 40-foot deep Standard Penetration Test (SPT) borings (designated as B-1, B-3 through B-6) and two (2) 10-foot deep hand auger borings (designated as B-2 and B-7) were drilled by **G E T Solutions, Inc.** within the existing dam alignment. The SPT borings were performed with the use of a power drill rig using rotary wash "mud" drilling procedures. The soil samples were obtained with a Split-Spoon Sampler in general accordance with the Standard Penetration Test (SPT) ASTM D-1586. These samples were taken continuously from the ground surface to a depth of 10 feet, and at 5-foot intervals thereafter.

The boring locations were identified and staked in the field by a representative of **G E T Solutions, Inc.** These approximate boring locations are shown on the "Boring Location Plan" (Figure 1, Appendix I), which was developed based on the plan provided by Timmons Group.

2.2 Laboratory Testing:

Representative portions of all soil samples collected during drilling were sealed in glass jars, labeled and transferred to our laboratory for further analysis. The soil classification was performed by a Geotechnical Engineer in accordance with ASTM D2488.

A total of 12 representative split spoon soil samples were selected and subjected to natural moisture, #200 sieve wash, and Atterberg Limits testing and analysis in order to corroborate the visual classification and determine the characteristics of the plastic soils. These test results are presented in the following table, and are shown on the "Log of Boring" sheets (Appendix II), included with this report.

Table 1 - Laboratory Test Results

Boring No.	Depth (Ft)	Natural Moisture Content (%)	#200 Sieve (%)	Organic Content (%)	Atterberg Limits (LL/PL/PI)	Classification
B-1	4-6	25.5	52.9	Not Tested	33/22/11	CL
B-1	6-8	19.6	19.8	Not Tested	Non Plastic	SM
B-1	8-10	19.0	25.6	Not Tested	Non Plastic	SM
B-1	13-15	18.3	27.1	Not Tested	Non Plastic	SM
B-1	18-20	64.5	72.9	4.3	Non Plastic	ML
B-3	4-6	15.5	54.9	Not Tested	Not Tested	CL
B-3	6-8	18.9	54.5	Not Tested	29/18/11	CL
B-3	13-15	22.9	37.8	Not Tested	Non Plastic	SM
B-5	2-4	12.8	20.3	Not Tested	Non Plastic	SM
B-5	6-8	14.5	26.3	Not Tested	Non Plastic	SM
B-5	8-10	18.4	21.1	Not Tested	Non Plastic	SM
B-5	13-15	25.3	24.1	Not Tested	Non Plastic	SM

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Location and Description:

The project site located within the northeastern portion of the James City County District Sports Complex and can be accessed by Warhill Trail. Specifically, the project site is located to the northeast of the existing WISC building and to the east of the existing soccer fields. Some vegetation growth, in the form of grass and newly developed saplings (less than 1 year old) were observed along the top of bank and slopes of the dam.

Based on the provided plans, the existing crest of the dam (top of bank) is approximately 25 to 30 feet in width at an elevation of 71 feet. The existing pond normal water surface elevation along with the invert elevation of the existing riser structure is at 67.68 feet, while the outfall pipe invert elevation is 52.51 feet. Based on the provided plans, the slopes of the upstream and downstream sides of the dam were designed to meet a minimum 2:1 (H:V) slope.

During our site reconnaissance, some visual signs of failure (erosion) were observed along the upstream slope (pond side) of the dam. One area along the upstream slope of the dam contained a small "wash out" ranging from 0.5 to 2.5 feet in width and 0.5 to 2 feet in depth. In addition, approximately 5 feet of the toe of the slope along a portion of the upstream side of the dam appears to have eroded. It is our understanding that this area eroded at the time heavy construction equipment was used to install an underground irrigation utility line in this area. No visual signs of failures, distress, or seepage were observed along the downstream slope of the dam at the time of our site reconnaissance.

Upstream Slope of Dam Showing Area Eroded Around Irrigation Pipe

3.2 Subsurface Soil Conditions:

The results of our field exploration program indicated the presence of approximately 2 to 3 inches of topsoil material at the boring locations. The topsoil thickness could vary at other locations. Underlying the topsoil materials, the natural subsurface soils were arranged in a 2-layer configuration.

The initial soil layer extended to depths ranging from 19 to 23 feet below existing grades. These soils were primarily comprised of SAND (SP-SM, SM, SM-SC, SC) with varying amounts of Clay and Silt. Borings B-2, B-3, and B-7 were terminated within this granular layer. The Standard Penetration Test (SPT) results, N-values, recorded within these granular soils ranged from 2 to 20 blows-per-foot (BPF) indicating a very loose to medium dense relative density. As an exception, a Sandy CLAY (CL) layer was encountered at a depth of 4 to 6 feet below existing grades at boring location B-1, 4 to 8 feet below existing grades at boring location B-3, 0.17 to 2 feet below existing grades at boring location B-5, and 14 to 23 feet below existing grades at boring location B-6. In addition, an Organic SILT (OL) layer was encountered at a depth of 18 to 23 feet below existing grades at boring location B-1. The Standard Penetration Test (SPT) results, N-values, recorded within these Clay and Silt soils ranged from Weight-of Hammer (WOH) to 22 BPF indicating a very soft to very stiff consistency.

The final soil layer extended beneath the initial layer to SPT boring termination depths ranging from 20 to 40 feet below existing grades. The soils of this layer were primarily comprised of Silty, fine to medium SAND (SM) with marine shell fragments, "Yorktown Formation". The N-values recorded within these granular soils ranged from 4 to 24 BPF indicating a very loose to medium dense relative density.

The subsurface description is of a generalized nature provided to highlight the major soil strata encountered. The records of the subsurface exploration are included in Appendix II (Log of Boring sheets) and in the Generalized Soil Profile presented in Appendix III, which should be reviewed for specific information as to the individual borings. The stratifications shown on the records of the subsurface exploration represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

3.3 Groundwater Information:

The groundwater table was encountered at the location of the borings along the crest (top of bank) and upstream side of the dam at elevations ranging from 63.5 to 65.5 feet after a 24 hour period. While the groundwater table was encountered at the location of the boring along the downstream side of the dam at an elevation of 59.5 feet after a 24 hour period. Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns resulting in a change in the pond surface water level thus resulting in a change in the dam's groundwater levels.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 Embankment Settlement and Stability Analyses:

Based on the provided plans and the boring logs, the existing dam required fills up to 20 feet in order to establish the dam's crest height (top of bank). It is our understanding that the existing dam has been in-place for approximately 15 years. We have evaluated settlement at the point of maximum fill height for the dam alignment (at boring location B-1) to aid our assessment of the potential settlement. This section was considered representative of the conditions where the settlement would be the greatest and the time to substantial completion of settlement would be the longest. The magnitude and duration of the settlement at locations with lesser fill heights is expected to be less than the values calculated for these locations. The soil parameters used in the settlement analysis were obtained based on the soils recovered at the location of Boring B-1, which was extended to a depth of 40 feet below existing grades.

The subsurface conditions at the analysis section were estimated by using the boring SPT boring data (Boring B-1) and the results of our laboratory classification tests. Considering the dam has been in place for approximately 15 years, the majority of the settlement associated with the placement of up to 20 feet of fill has already occurred. However, some minor settlement on the order of 1 inch or less may occur within the dam alignment as a result of the consolidation of the very soft SILT (ML) layer encountered at a depth of 18 to 23 feet at Boring B-1 (only).

In addition to the settlement analysis we also conducted stability analyses (including a rapid drawdown situation) of the sloped dam fill. The stability analysis was conducted using PCSTABL6 computer software. Circular potential failure surfaces were evaluated using the Modified Bishop method of analysis. The soil parameters used were estimated from SPT borings and associated laboratory test data of the existing soils and from our experience with typical fill materials for other dam projects. The results of the stability analyses indicate that fill slopes of 2:1 (H:V) have an acceptable safety factor (>1.3). Flatter slopes of 2.5 or 3:1 are typically more easily maintained from an erosion and vegetation standpoint. Refer to Appendix VI of this report for the slope stability analysis data.

4.2 Dam Improvement Recommendations:

The majority of the existing slopes along the dam alignment do not appear to have experienced any failures, with the exception of two isolated areas along the upstream slope (pond side) of the dam. One of the areas along the upstream slope of the dam contained a small "wash-out" ranging from 0.5 to 2.5 feet in width and 0.5 to 2 feet in depth. In addition, the toe of the slope along the upstream side of the dam in the location of an irrigation pipe appeared to have eroded a portion of the bank back about 5 feet. It is our understanding that this eroded area was the result of heavy construction equipment used at the time an underground irrigation utility line was installed. In addition, is it our understanding that the surface water level of the pond rises above the crest (top of bank) for a brief period at a rate of once every year or so as a result of significant rainfall events. Consequently, some of the observed failures (erosion) along the upstream slope (pond side) of the dam could be attributed to the loose Sands encountered within the dam alignment migrating to the surface as a result of the pond level rising over the top of the dam and then receding relatively quickly (rapid drawdown).

Due to encountering loose Sands within the dam alignment, we recommend replacing the upstream face of the dam with a minimum of 24 inches of Clayey SAND (SC) or CLAY (CL/CH) material containing at least 40% or greater fines (Silt and Clay), with Liquid Limits (LL) generally greater than 30 and Plasticity Indexes (PI) greater than 15, which should be properly benched into the slope to an elevation of 2 feet below the normal pool elevation. The purpose of the new (SC/CL/CH) slope is to contain the loose Sands encountered within the dam alignment. Additionally, drainage patterns and paths should be established along the top of the embankments in order to collect and divert run off water from the face of the slopes, as well as preventing water collection and infiltration into the embankments. The newly placed fills should then be properly compacted and re-graded to maintain the minimum 2:1 slope or greater.

Due to encountering loose Sands at non-uniform locations throughout the upstream slope of the dam alignment, we recommend in order to further prevent future erosion along the dam alignment and to prevent the dam from being breeched from a significant rain event, the construction of an emergency spillway is recommended.

4.3 Clearing and Grading:

Areas which are proposed to receive fill (upsteam face of dam) should be cleared by means of removing trees, root mat, topsoil, and properly "benched" into the existing embankment sides. It is estimated that a cut ranging from 2 to 3 inches in depth will be required to remove the topsoil materials. This cut is expected to extend deeper in isolated areas to remove deeper deposits of organic soils, or unsuitable soils which become evident during the clearing.

Combinations of excess surface moisture from precipitation ponding on the site and the construction traffic, including heavy compaction equipment, may create pumping and general deterioration of the surface soils. Therefore, undercutting to remove very soft soils should be expected. The extent of the undercut will be determined in the field during construction based on the outcome of the field testing procedures (proofroll). In this regard, and in order to reduce undercutting, care should be exercised during the grading and construction operations at the site. Furthermore, wet subgrade soils combined with potential poor site drainage make this site particularly susceptible to subgrade and exposed soil deterioration. Thus, construction should be performed during a dry season if at all possible. This should minimize these potential problems, although they may not be eliminated.

4.4 Subgrade Preparation:

Following the clearing operation and prior to commencing fill placement, the exposed subgrade soils should be evaluated by **G E T Solutions, Inc.** for stability and proper removal of unsuitable materials (roots, trees, and topsoil). Any unstable areas observed during field exploration (beyond the initial cut) should be undercut and/or stabilized at the direction of the Geotechnical Engineer. Following the field exploration activities and approval by the engineer, fill placement to achieve proper slope and grades can proceed.

4.5 Suitable Fill and Placement:

Any material to be used for backfill/fill should be evaluated and tested by **G E T Solutions, Inc.** Fill material used along the slopes of the embankment should be free of rubble, organics, debris and other unsuitable material. We recommend that fill materials to replace the areas where erosion has occurred and to re-grade embankment slopes consist of SC, CL, or CH as defined by the Unified Soil Classification System (ASTM D2487) containing a fines (Silt and Clay) content of 40% or greater, with Liquid Limits (LL) generally greater than 30 and Plasticity Indexes (PI) greater than 15. Again, prior to receiving fill along the upstream slope of the dam, the subgrade should be properly stripped to remove topsoil, trees, and root mat.

All fill within the new slope should be compacted to a dry density of at least 95 percent of the standard Proctor maximum dry density (ASTM D698). In general, the compaction should be accomplished by placing the fill in maximum 10- to 12-inch loose lifts and mechanically compacting each lift to at least the specified minimum dry density. A representative of **G E T Solutions, Inc.** should perform field density tests on each lift as necessary to assure that adequate compaction is achieved.

The newly constructed sloped embankments are to be "benched" into the existing embankment sides in order to minimize the potential for a slippage failure along that interface. Additionally, drainage patterns and paths should be established along the top of the embankments in order to collect and divert run off water from the face of the slopes, as well as preventing water collection and infiltration into the embankments.

All fill and embankment construction activities are recommended to conform to Section 303 of the VDOT Road and Bridge Specifications.

Care should be used when operating the compactors near existing structures to avoid transmission of the vibrations that could cause settlement damage or disturb occupants. In this regard, it is recommended that the vibratory roller remain at least 25 feet away from existing structures; these areas should be compacted with small, hand-operated compaction equipment.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Drainage and Groundwater Concerns:

Groundwater was encountered at the boring locations ranging from 4 to 7.5 feet below current site grades. Therefore, dewatering is expected to be required for excavations, which extend beneath the groundwater level. We recommend that the contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on this project.

5.2 Excavations:

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new (OSHA) guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. **G E T Solutions, Inc.** is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by **G E T Solutions, Inc.** and the information supplied by the client and their consultants for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, **G E T Solutions, Inc.** should be notified immediately to determine if changes in the foundation recommendations are required. If **G E T Solutions, Inc.** is not retained to perform these functions, **G E T Solutions, Inc.** can not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete the Geotechnical Engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents, in order that the earthwork and foundation recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Timmons Group and their consultants for the specific application to the East Dam Alignment at the James City County District Sports Complex located in James City County, Virginia.

APPENDICES

I. BORING LOCATION PLAN

II. LOG OF BORINGS

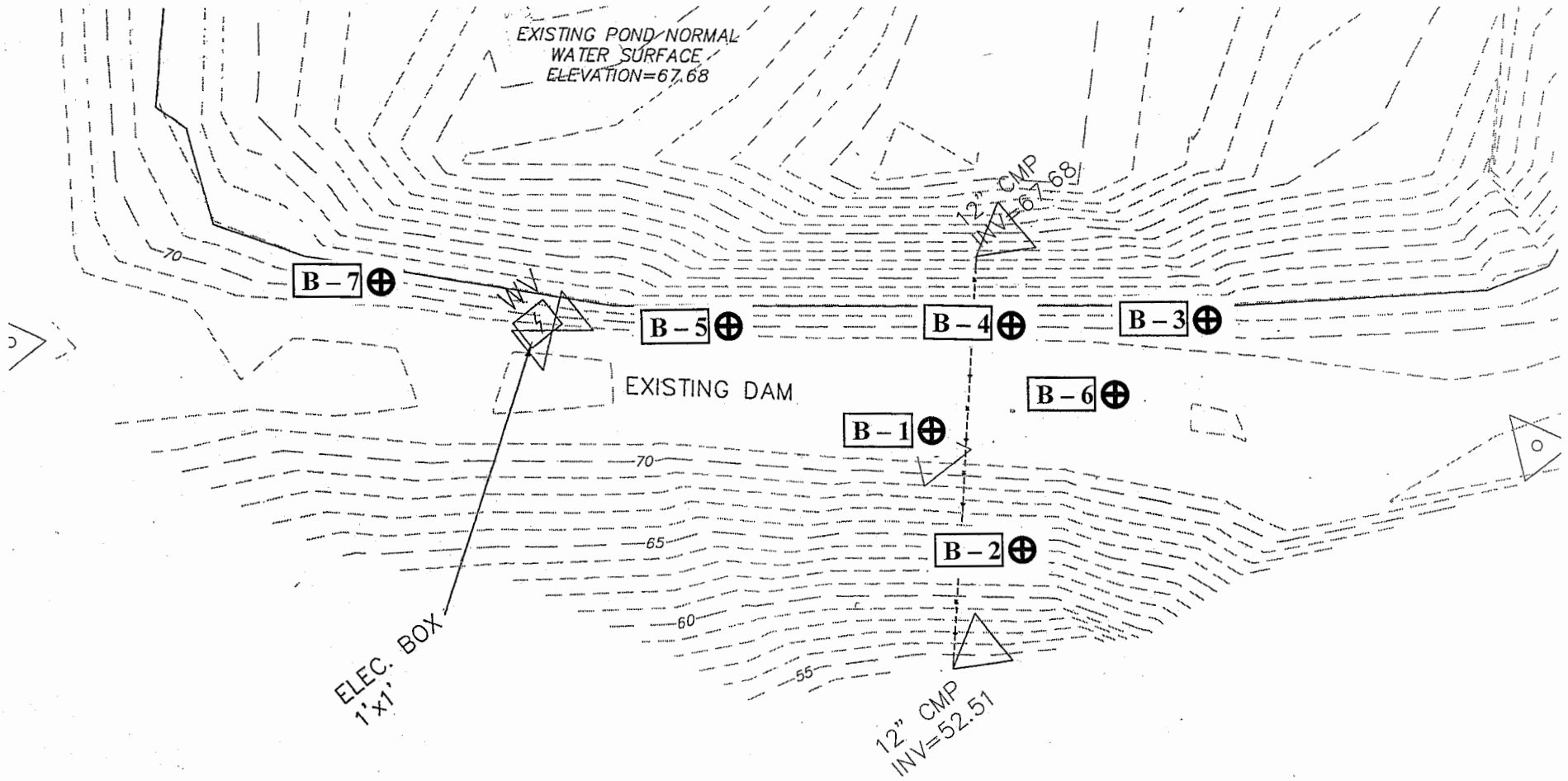
III. GENERALIZED SOIL PROFILE

IV. SLOPE STABILITY ANALYSIS DATA

APPENDIX I-

BORING LOCATION PLAN

Figure 1



Locations are approximate

BORING LOCATION PLAN

PROJECT: East Dam Alignment –
JCC District Park Sports Complex
James City County, Virginia

PROJECT NO: WM05-169G

CLIENT: Timmons Group

SCALE: NTS

DATE: 7/26/05

PLOT BY: JW

APPENDIX II-

LOG OF BORINGS

Geotechnical Environmental Testing Solutions, Inc.

LOG OF BORING No. B-1

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 71 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" Drilling **DATE:** 7/5/05
DEPTH TO - WATER> INITIAL: ▽ 7.5 **AFTER 24 HOURS:** ▽ 7.5 **CAVING>** C

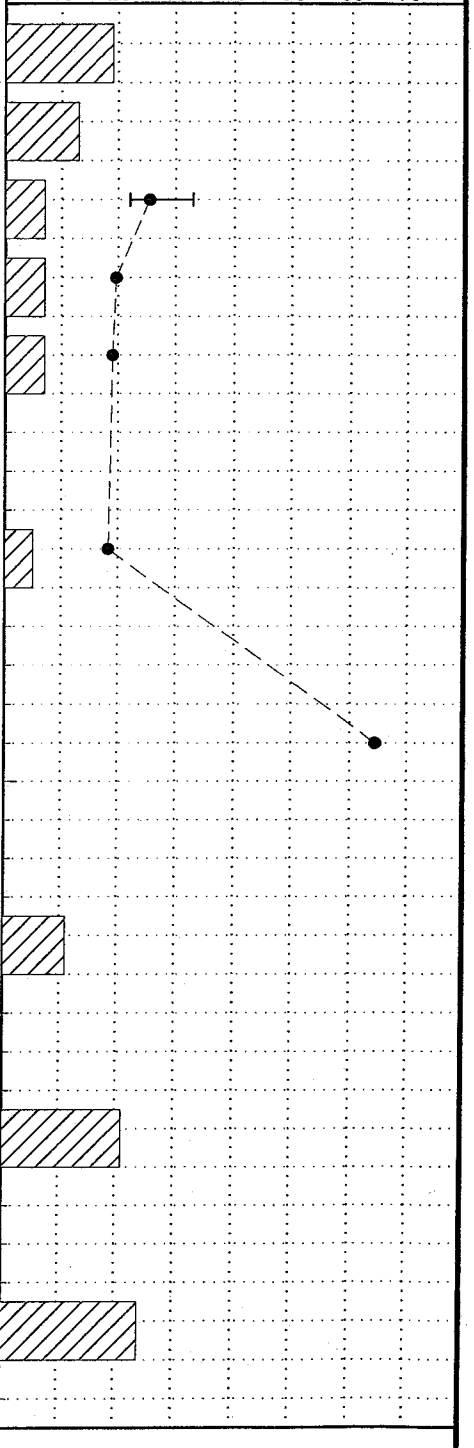
This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Depth (feet)	Description	Sample No.	Blow Counts	% < #200
0				
	3 Inches of Topsoil (0.25)	1	14 9 10	
	Orangish brown, moist, Silty, Clayey, fine to medium SAND (SM-SC), Medium Dense	2	9 7 6	
5	Brown, moist, Sandy CLAY (CL), Medium Stiff (4)	3	3 4 3	53
	Orangish brown, moist to wet, Silty, fine to medium SAND (SM) with trace Clay, Very Loose to Loose (6)	4	5 5 2	20
10		5	4 4 3	26
15		6	3 2 3	27
	Dark brown, wet, SILT (ML) with some Sand and trace organics, Very Soft (Organic Content 4.3%) (18)	7	0 0 0	73
20				
	Gray, wet, Silty, fine to medium SAND (SM) with marine shell fragments, "Yorktown Formation", Medium Dense (23)	8	6 5 6	
25				
30		9	11 10 11	
35		10	9 10 14	

Graphic

TEST RESULTS

Plastic Limit ├──┤ Liquid Limit
Water Content - ●
Penetration - ▨



Geotechnical Environmental Testing Solutions, Inc.

LOG OF BORING No. B-1

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 71 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" Drilling **DATE:** 7/5/05
DEPTH TO - WATER> INITIAL: ▽ 7.5 **AFTER 24 HOURS:** ▼ 7.5 **CAVING>** C

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS (Plastic Limit ⊢—⊣ Liquid Limit; Water Content - ●; Penetration - ▨; 10 20 30 40 50 60 70)
	Gray, wet, Silty, fine to medium SAND (SM) with marine shell fragments, "Yorktown Formation", Medium Dense		11	4 5 6		
40	Boring terminated at 40 ft.					
45						
50						
55						
60						
65						
70						

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Geotechnical Environmental Testing Solutions, Inc.

LOG OF BORING No. B-2

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 65 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Hand Auger **DATE:** 7/8/05
DEPTH TO - WATER> INITIAL: 7 **AFTER 24 HOURS:** 5.5 **CAVING>** C

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS (Plastic Limit — Liquid Limit; Water Content - ●; Penetration - ▨; 10 20 30 40 50 60 70)
0						
	4 Inches of Topsoil (0.33)					
	Orangish brown, moist, Clayey, fine to medium SAND (SC) (2)					
	Orangish brown, moist to wet, Silty, Clayey, fine to medium SAND (SM-SC)					
5						
	(8.5)					
	Orangish brown to brown, wet, Clayey, fine to medium SAND (SC)					
10	Boring terminated at 10 ft.					
15						
20						
25						
30						
35						

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Figure

Geotechnical Environmental Testing Solutions, Inc.

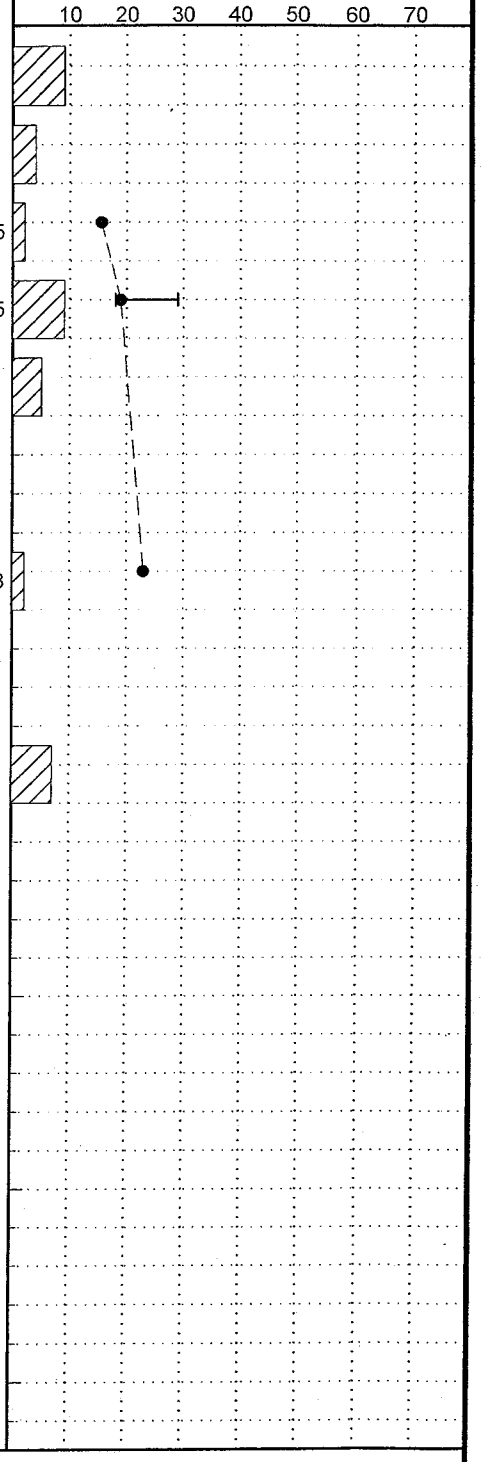
LOG OF BORING No. B-3

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 69 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" Drilling **DATE:** 7/5/05
DEPTH TO - WATER> INITIAL: ▽ 6 **AFTER 24 HOURS:** ▼ 4 **CAVING>** C

Depth (feet)	Description	Sample No.	Blow Counts	% < #200
0	2 Inches of Topsoil (0.17)	1	6 5 4	
	Orangish brown, moist, Silty, Clayey, fine to medium SAND (SM-SC), Loose (2)	2	3 2 2	
5	Orangish brown, moist, Clayey, fine to medium SAND (SC), Very Loose (4)	3	0 0 2	55
	Slightly mottled, orangish brown-gray, moist to wet, Sandy CLAY (CL), Very Soft to Medium Stiff (8)	4	4 4 5	55
10	Slightly mottled, orangish brown-gray to brown, wet, Silty, Clayey, fine to medium SAND (SM-SC), Very Loose to Loose (18)	5	2 2 3	
15		6	2 1 1	38
20	Tan, wet, Silty, fine to medium SAND (SM) with marine shell fragments, Very Loose	7	1 1 2	
	Boring terminated at 20 ft.			

TEST RESULTS

Plastic Limit ├──┤ Liquid Limit
Water Content - ●
Penetration - ▨



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Geotechnical Environmental Testing Solutions, Inc.

LOG OF BORING No. B-4

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 70 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" Drilling **DATE:** 7/6/05
DEPTH TO - WATER> INITIAL: ▽ 6 **AFTER 24 HOURS:** ▽ **CAVING>** C

Depth (feet)	Description	Sample No.	Blow Counts	% < #200
0	2 Inches of Topsoil (0.17)	1	6 9 11	
	Orangish brown, moist, Silty, Clayey, fine to medium SAND (SM-SC), Medium Dense (4)	2	4 5 6	
5	Orangish brown to brown, moist to wet, Silty, fine to medium SAND (SM) with trace Clay, Very Loose to Medium Dense	3	6 7 7	
		4	5 6 7	
10		5	2 3 4	
15		6	2 1 1	
20	Gray, wet, Silty, Clayey, fine to medium SAND (SM-SC) with trace Gravel and marine shell fragments, "Yorktown Formation", Very Loose (19)	7	2 2 2	
	Boring terminated at 20 ft.			
25				
30				
35				

TEST RESULTS
Plastic Limit ⊢——⊣ Liquid Limit
Water Content - ●
Penetration - ▨
10 20 30 40 50 60 70

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Geotechnical Environmental Testing Solutions, Inc.

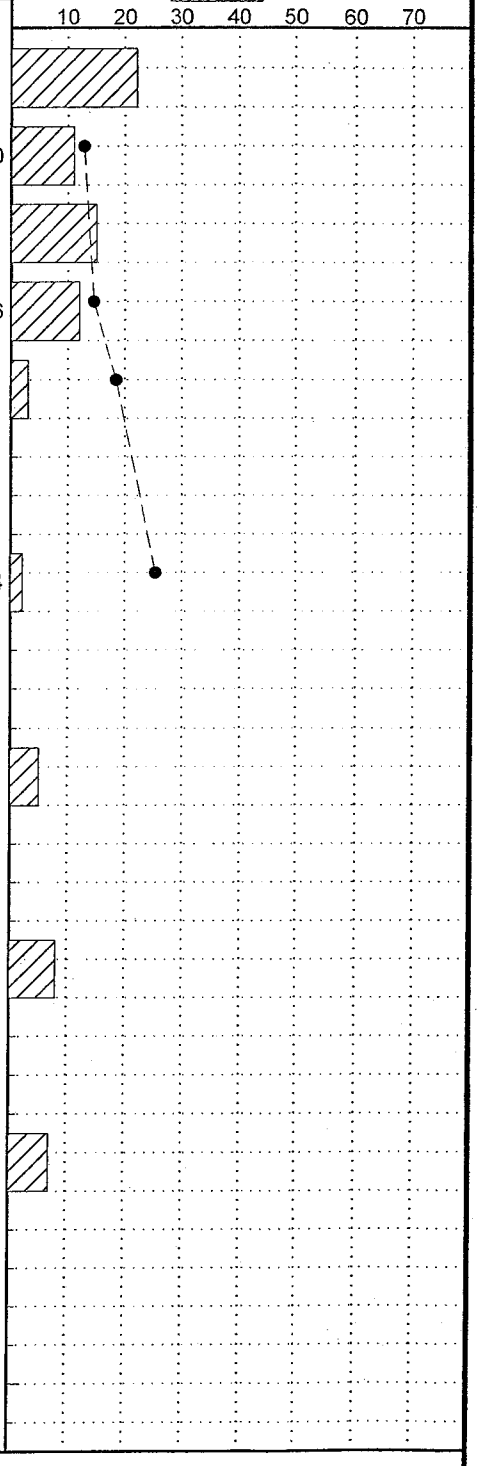
LOG OF BORING No. B-5

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 70 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" Drilling **DATE:** 7/6/05
DEPTH TO - WATER> INITIAL: ▽ 6 **AFTER 24 HOURS:** ▽ 5.5 **CAVING>** C

Depth (feet)	Description	Sample No.	Blow Counts	% < #200
0	2 Inches of Topsoil (0.17)	1	7 10 12	
	Slightly mottled, orangish brown, Sandy CLAY (CL), Very Stiff (2)	2	7 6 5	20
	Orangish brown, moist, Silty, fine to medium SAND (SM) with trace Clay, Medium Dense (4)	3	6 7 8	
5	Orangish brown, moist to wet, Silty, Clayey, fine to medium SAND (SM-SC), Medium Dense (8)	4	4 5 7	26
	Orangish brown, wet, Silty, fine to medium SAND (SM) with trace Clay, Very Loose (13)	5	1 2 1	21
10				
	Brown, wet, Silty, fine to medium SAND (SM), Very Loose (19)	6	1 1 1	24
15				
	Gray, wet, Silty, fine to medium SAND (SM) with marine shell fragments, "Yorktown Formation", Very Loose to Loose	7	1 2 3	
20				
		8	3 4 4	
25				
		9	3 4 3	
30	Boring terminated at 30 ft.			
35				

TEST RESULTS

Plastic Limit ⊢—⊣ Liquid Limit
Water Content - ●
Penetration - ▨



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Geotechnical Environmental Testing Solutions, Inc.

LOG OF BORING No. B-6

PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 71 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" Drilling **DATE:** 7/6/05
DEPTH TO - WATER> INITIAL: ▽ 6 **AFTER 24 HOURS:** ▽ 5.5 **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS (Plastic Limit ⊢—⊣ Liquid Limit; Water Content - ●; Penetration - ▨; 10 20 30 40 50 60 70)
0						
	2 Inches of Topsoil					
	.17					
	Orangish brown to brown, moist to wet, Silty, Clayey, fine to medium SAND (SM-SC), Very Loose to Medium Dense		1	8 8 8		
			2	6 5 5		
5			3	3 2 2		
			4	4 3 3		
	8					
	Orangish brown, wet, Silty, fine to medium SAND (SM) with trace Clay, Very Loose to Loose		5	3 3 5		
10						
	14					
15	Orangish brown, wet, Sandy CLAY (CL) with trace organics, Very Soft		6	0 0 0		
	18					
	Gray, wet, Sandy CLAY (CL) Very Soft		7	1 2 1		
20						
	23					
	Gray, wet, Silty, fine to medium SAND (SM) with marine shell fragments, "Yorktown Formation", Loose		8	4 4 6		
25						
			9	5 5 5		
30						
	Boring terminated at 30 ft.					
35						

Figure

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 082

Geotechnical Environmental Testing Solutions, Inc.

LOG OF BORING No. B-7

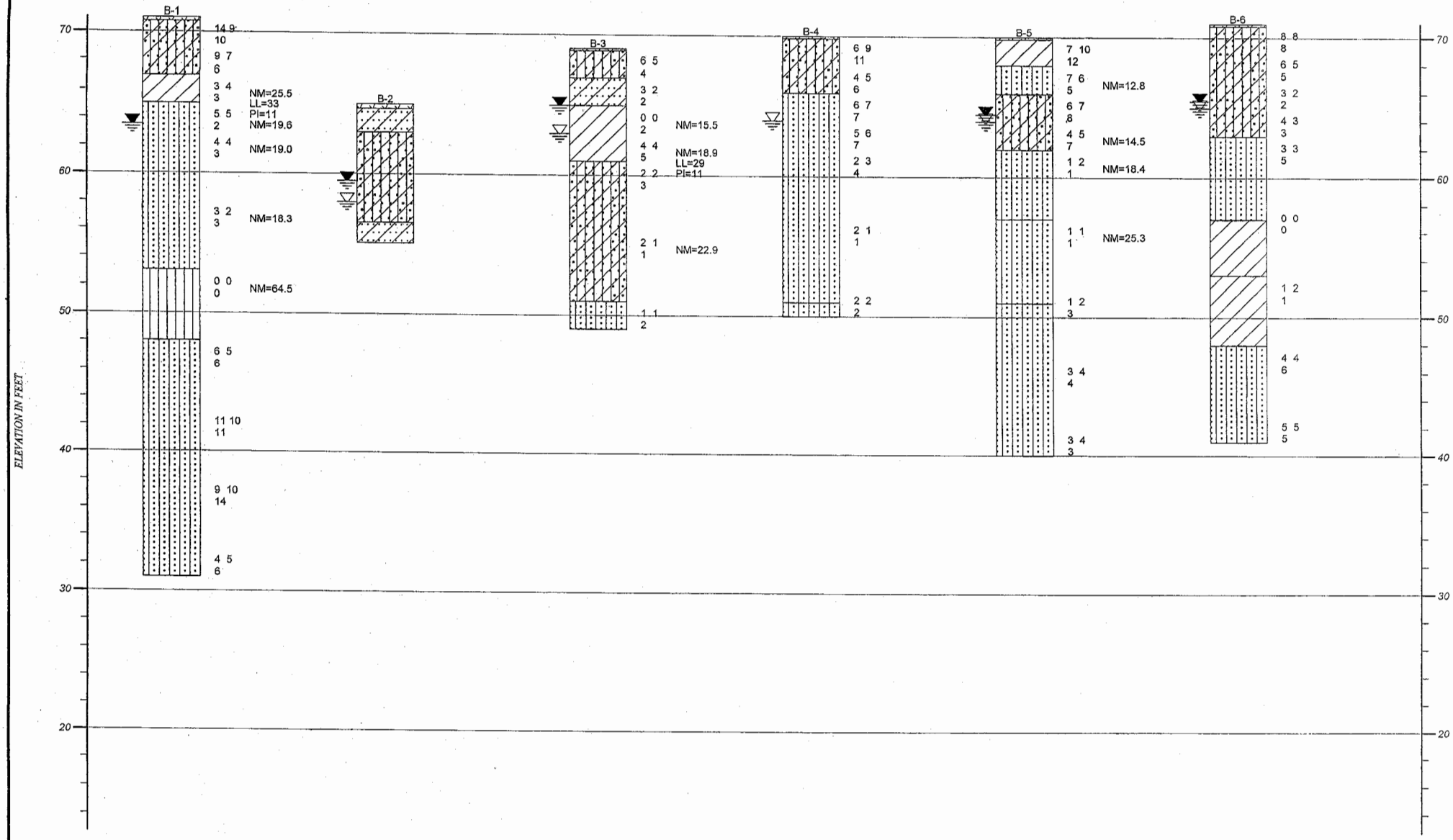
PROJECT: East Dam Alignment - JCC District Sports Complex **PROJECT NO.:** WM05-169G
CLIENT: Timmons Group
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:** 69 feet
DRILLER: GET Solutions, Inc. **LOGGED BY:** J. Wheeler
DRILLING METHOD: Hand Auger **DATE:** 7/8/05
DEPTH TO - WATER> INITIAL: ▽ 6 **AFTER 24 HOURS:** ▼ 5 **CAVING>** C 9

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS (Plastic Limit ⊢—⊣ Liquid Limit; Water Content - ●; Penetration - ▨; 10 20 30 40 50 60 70)
0	4 Inches of Topsoil					
	0.33					
	Orangish brown, moist, Silty, fine to medium SAND (SM)					
2	2					
	Orangish brown, moist to wet, Silty, Clayey, fine to medium SAND (SM-SC)					
4						
6						
	6.5					
	Gray to brown, wet, Silty, fine to medium SAND (SM), with trace organcis at 8 to 9 feet					
8						
	Boring terminated at 9 ft.					
10						
12						
14						

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

APPENDIX III-

GENERALIZED SOIL PROFILE



Strata symbols

- Topsoil
- Poorly graded clayey silty sand
- Low plasticity clay
- Silty sand
- Silt
- Clayey sand

GET Solutions, Inc.

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	JW	7/29/2005

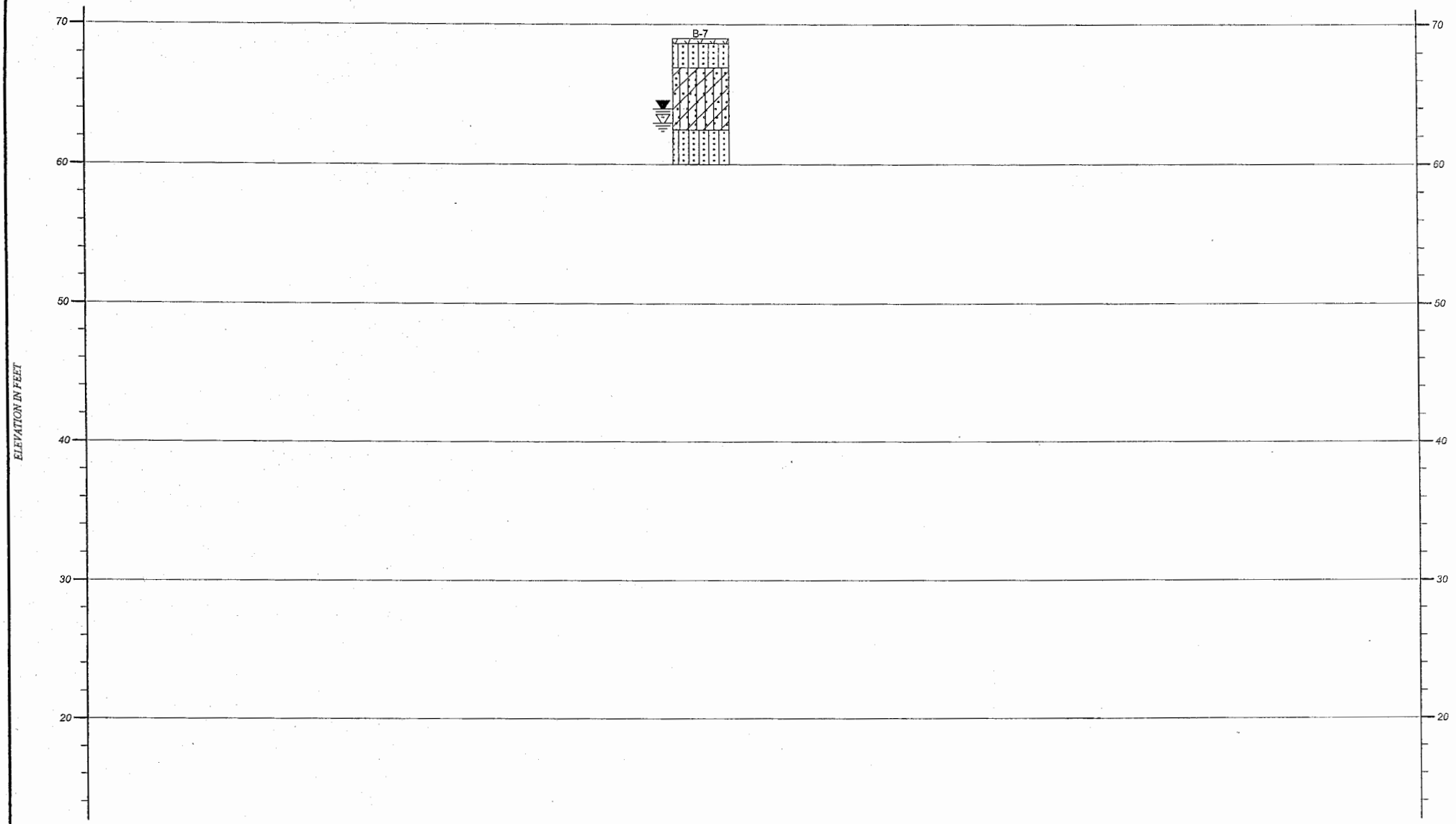
East Dam Alignment - JCC District Sports Comple

James City County, Virginia

PROJECT NO. WM05-169G

FIGURE NUMBER

1



Strata symbols

- Topsoil
- Poorly graded clayey silty sand
- Low plasticity clay
- Silty sand
- Silt
- Clayey sand

GET Solutions, Inc.

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	JW	7/29/2005

East Dam Alignment - JCC District Sports Comple
James City County, Virginia

PROJECT NO. WM05-169G

FIGURE NUMBER 2

PC166_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 086

APPENDIX IV-

SLOPE STABLITY ANALYSIS DATA

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION WM05-169G East Dam Alignment

BOUNDARY COORDINATES

7 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	30.00	80.00	30.00	2
2	80.00	30.00	88.00	34.00	2
3	88.00	34.00	120.00	50.00	1
4	120.00	50.00	150.00	50.00	1
5	150.00	50.00	195.00	35.00	2
6	195.00	35.00	216.00	26.00	2
7	216.00	26.00	300.00	26.00	2
8	88.00	34.00	195.00	35.00	2
9	0.00	25.00	300.00	25.00	3
10	0.00	0.00	300.00	0.00	3

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	0.0	28.0	0.00	0.0	1
2	110.0	110.0	150.0	10.0	0.00	0.0	1
3	120.0	120.0	0.0	32.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	47.00
2	115.00	45.00
3	216.00	26.00
4	300.00	26.00

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

50 Trial Surfaces Have Been Generated.

5 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 40.00 ft.
and X = 80.00 ft.

Each Surface Terminates Between X = 120.00 ft.
and X = 160.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 3.00 ft.

3.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	80.00	30.00
2	82.64	28.58
3	85.43	27.46
4	88.32	26.66
5	91.28	26.19
6	94.28	26.06
7	97.27	26.25
8	100.23	26.78
9	103.10	27.64
10	105.86	28.81
11	108.48	30.28
12	110.91	32.03
13	113.13	34.05
14	115.12	36.30
15	116.84	38.75
16	118.28	41.39
17	119.41	44.17
18	120.23	47.05
19	120.72	50.00

Circle Center At X = 94.0 ; Y = 52.9 and Radius, 26.9

*** 1.435 ***

Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.6	398.4	2751.2	3050.0	0.0	0.0	0.0	0.0	0.0
2	2.8	1223.9	2626.1	3278.6	0.0	0.0	0.0	0.0	0.0
3	2.6	1768.0	2177.2	3060.9	0.0	0.0	0.0	0.0	0.0
4	0.3	259.2	253.6	387.7	0.0	0.0	0.0	0.0	0.0
5	3.0	2786.9	2177.5	3558.0	0.0	0.0	0.0	0.0	0.0
6	3.0	3454.4	1880.3	3605.3	0.0	0.0	0.0	0.0	0.0
7	3.0	3978.1	1554.6	3590.1	0.0	0.0	0.0	0.0	0.0
8	3.0	4332.1	1216.6	3512.4	0.0	0.0	0.0	0.0	0.0
9	2.9	4501.4	882.2	3373.3	0.0	0.0	0.0	0.0	0.0
10	2.8	4482.6	566.4	3174.5	0.0	0.0	0.0	0.0	0.0
11	2.6	4283.8	282.5	2918.5	0.0	0.0	0.0	0.0	0.0
12	2.4	3924.5	41.3	2608.4	0.0	0.0	0.0	0.0	0.0
13	2.2	3434.0	0.0	2248.2	0.0	0.0	0.0	0.0	0.0
14	0.2	249.0	0.0	171.0	0.0	0.0	0.0	0.0	0.0
15	1.7	2421.5	0.0	1572.9	0.0	0.0	0.0	0.0	0.0
16	0.1	161.2	0.0	96.5	0.0	0.0	0.0	0.0	0.0
17	1.7	2161.5	0.0	1341.3	0.0	0.0	0.0	0.0	0.0
18	1.4	1501.3	0.0	818.3	0.0	0.0	0.0	0.0	0.0
19	1.1	904.3	0.0	276.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.6	327.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.2	91.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.5	86.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Failure Surface Specified By 30 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	62.22	30.00
2	65.02	28.93
3	67.87	27.98
4	70.76	27.16
5	73.68	26.48
6	76.63	25.92
7	79.60	25.50
8	82.58	25.21
9	85.58	25.06
10	88.58	25.04
11	91.58	25.16
12	94.57	25.41
13	97.54	25.80
14	100.50	26.32
15	103.42	26.97
16	106.32	27.75
17	109.18	28.66
18	111.99	29.70
19	114.76	30.87
20	117.47	32.15
21	120.12	33.56
22	122.70	35.09
23	125.21	36.73
24	127.65	38.48
25	130.00	40.34
26	132.27	42.30
27	134.44	44.37
28	136.53	46.53
29	138.51	48.78
30	139.49	50.00

Circle Center At X = 87.5 ; Y = 91.7 and Radius, 66.7

*** 1.486 ***

1

Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	30.00
2	65.05	29.00
3	67.92	28.11
4	70.81	27.33
5	73.74	26.66
6	76.68	26.10
7	79.65	25.65
8	82.63	25.32
9	85.62	25.10
10	88.62	25.00
11	91.62	25.01
12	94.62	25.13
13	97.61	25.37
14	100.59	25.73
15	103.55	26.19

16	106.50	26.77
17	109.42	27.46
18	112.31	28.27
19	115.16	29.18
20	117.98	30.20
21	120.76	31.33
22	123.50	32.56
23	126.19	33.90
24	128.82	35.33
25	131.40	36.87
26	133.91	38.51
27	136.36	40.23
28	138.75	42.06
29	141.06	43.97
30	143.30	45.96
31	145.46	48.05
32	147.33	50.00

Circle Center At X = 89.8 ; Y = 103.6 and Radius, 78.6

*** 1.545 ***

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.78	30.00
2	60.55	28.85
3	63.37	27.83
4	66.24	26.96
5	69.15	26.23
6	72.10	25.65
7	75.06	25.22
8	78.05	24.93
9	81.05	24.79
10	84.05	24.80
11	87.04	24.96
12	90.03	25.26
13	92.99	25.72
14	95.93	26.32
15	98.84	27.07
16	101.70	27.96
17	104.52	28.99
18	107.28	30.16
19	109.98	31.47
20	112.61	32.91
21	115.17	34.48
22	117.65	36.17
23	120.04	37.99
24	122.33	39.92
25	124.53	41.96
26	126.62	44.11
27	128.61	46.36
28	130.48	48.70
29	131.41	50.00

Circle Center At X = 82.3 ; Y = 85.1 and Radius, 60.4

*** 1.557 ***

1

Failure Surface Specified By 30 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	66.67	30.00
2	69.57	29.23
3	72.49	28.57
4	75.44	28.02
5	78.41	27.59
6	81.39	27.26
7	84.39	27.05
8	87.38	26.95
9	90.38	26.96
10	93.38	27.09
11	96.37	27.33
12	99.35	27.68
13	102.32	28.14
14	105.26	28.72
15	108.18	29.40
16	111.07	30.20
17	113.93	31.10
18	116.76	32.11
19	119.55	33.22
20	122.29	34.44
21	124.98	35.76
22	127.62	37.19
23	130.21	38.71
24	132.73	40.32
25	135.20	42.03
26	137.60	43.84
27	139.93	45.73
28	142.18	47.70
29	144.36	49.76
30	144.59	50.00

Circle Center At X = 88.5 ; Y = 106.6 and Radius, 79.7

*** 1.586 ***

Failure Surface Specified By 31 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	30.00
2	64.94	28.73
3	67.71	27.58
4	70.54	26.58

5	73.41	25.71
6	76.32	24.98
7	79.26	24.39
8	82.23	23.94
9	85.21	23.64
10	88.21	23.48
11	91.21	23.47
12	94.20	23.60
13	97.19	23.87
14	100.16	24.29
15	103.11	24.85
16	106.03	25.56
17	108.90	26.40
18	111.74	27.38
19	114.52	28.50
20	117.25	29.75
21	119.91	31.13
22	122.51	32.64
23	125.03	34.27
24	127.46	36.02
25	129.81	37.88
26	132.07	39.86
27	134.23	41.94
28	136.28	44.13
29	138.23	46.41
30	140.07	48.78
31	140.92	50.00

Circle Center At X = 90.0 ; Y = 85.6 and Radius, 62.2

*** 1.592 ***

1

Failure Surface Specified By 30 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	30.00
2	64.84	28.54
3	67.54	27.23
4	70.31	26.08
5	73.15	25.09
6	76.03	24.26
7	78.95	23.59
8	81.91	23.09
9	84.89	22.76
10	87.89	22.60
11	90.89	22.61
12	93.88	22.79
13	96.86	23.14
14	99.82	23.65
15	102.74	24.34
16	105.62	25.19
17	108.44	26.20
18	111.20	27.37
19	113.90	28.69
20	116.51	30.16

21	119.03	31.78
22	121.46	33.54
23	123.79	35.44
24	126.00	37.47
25	128.10	39.61
26	130.07	41.87
27	131.91	44.24
28	133.61	46.72
29	135.17	49.28
30	135.55	50.00

Circle Center At X = 89.2 ; Y = 75.4 and Radius, 52.8

*** 1.618 ***

Failure Surface Specified By 31 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	53.33	30.00
2	56.17	29.02
3	59.04	28.16
4	61.95	27.41
5	64.88	26.77
6	67.83	26.26
7	70.81	25.86
8	73.80	25.58
9	76.79	25.41
10	79.79	25.37
11	82.79	25.45
12	85.78	25.64
13	88.77	25.95
14	91.74	26.38
15	94.69	26.93
16	97.61	27.60
17	100.51	28.38
18	103.37	29.27
19	106.20	30.28
20	108.98	31.40
21	111.72	32.63
22	114.40	33.97
23	117.03	35.41
24	119.60	36.95
25	122.11	38.60
26	124.55	40.34
27	126.92	42.18
28	129.22	44.11
29	131.44	46.14
30	133.57	48.24
31	135.21	50.00

Circle Center At X = 79.4 ; Y = 101.0 and Radius, 75.6

*** 1.689 ***

1

Failure Surface Specified By 30 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.56	30.00
2	78.46	29.23
3	81.38	28.57
4	84.33	28.00
5	87.29	27.55
6	90.27	27.20
7	93.26	26.96
8	96.26	26.82
9	99.26	26.79
10	102.26	26.87
11	105.25	27.06
12	108.24	27.35
13	111.21	27.75
14	114.17	28.25
15	117.11	28.86
16	120.02	29.58
17	122.91	30.39
18	125.76	31.31
19	128.58	32.34
20	131.37	33.46
21	134.11	34.68
22	136.80	35.99
23	139.45	37.41
24	142.04	38.91
25	144.58	40.51
26	147.06	42.20
27	149.48	43.97
28	151.84	45.83
29	154.12	47.77
30	154.81	48.40

Circle Center At X = 98.6 ; Y = 110.8 and Radius, 84.0

*** 1.702 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.56	30.00
2	77.96	28.20
3	80.51	26.62
4	83.19	25.28
5	85.98	24.18
6	88.86	23.33
7	91.80	22.74
8	94.78	22.42
9	97.78	22.36

10	100.77	22.58
11	103.74	23.05
12	106.64	23.79
13	109.47	24.79
14	112.20	26.03
15	114.81	27.52
16	117.28	29.23
17	119.58	31.15
18	121.70	33.27
19	123.63	35.57
20	125.34	38.03
21	126.83	40.64
22	128.08	43.36
23	129.08	46.19
24	129.82	49.10
25	129.97	50.00

Circle Center At X = 96.9 ; Y = 56.0 and Radius, 33.6

*** 1.718 ***

1

```
              Y            A     X     I     S            F     T

              0.00      37.50     75.00     112.50     150.00     187.50

X        0.00 *------**-+--W------+---------+---------+---------+
              -
              -
              -
              -
              -
        37.50 +       .
              -     ...
              -    ....
              -   ....4
              -  ....42
              -  ....25
A       75.00 + ....725
              - ....62*
              - ....61.*
              - ....61..
              - ....615.
              - ....021..
X      112.50 + .....3211.W
              -  .....32111*
              -  .....92244.
              -   .....33244
              -    .....9322
              -     ....9933
I      150.00 +      ....99*
              -        ....9
              -           .
              -
              -
              -
S      187.50 +
              -        *
```

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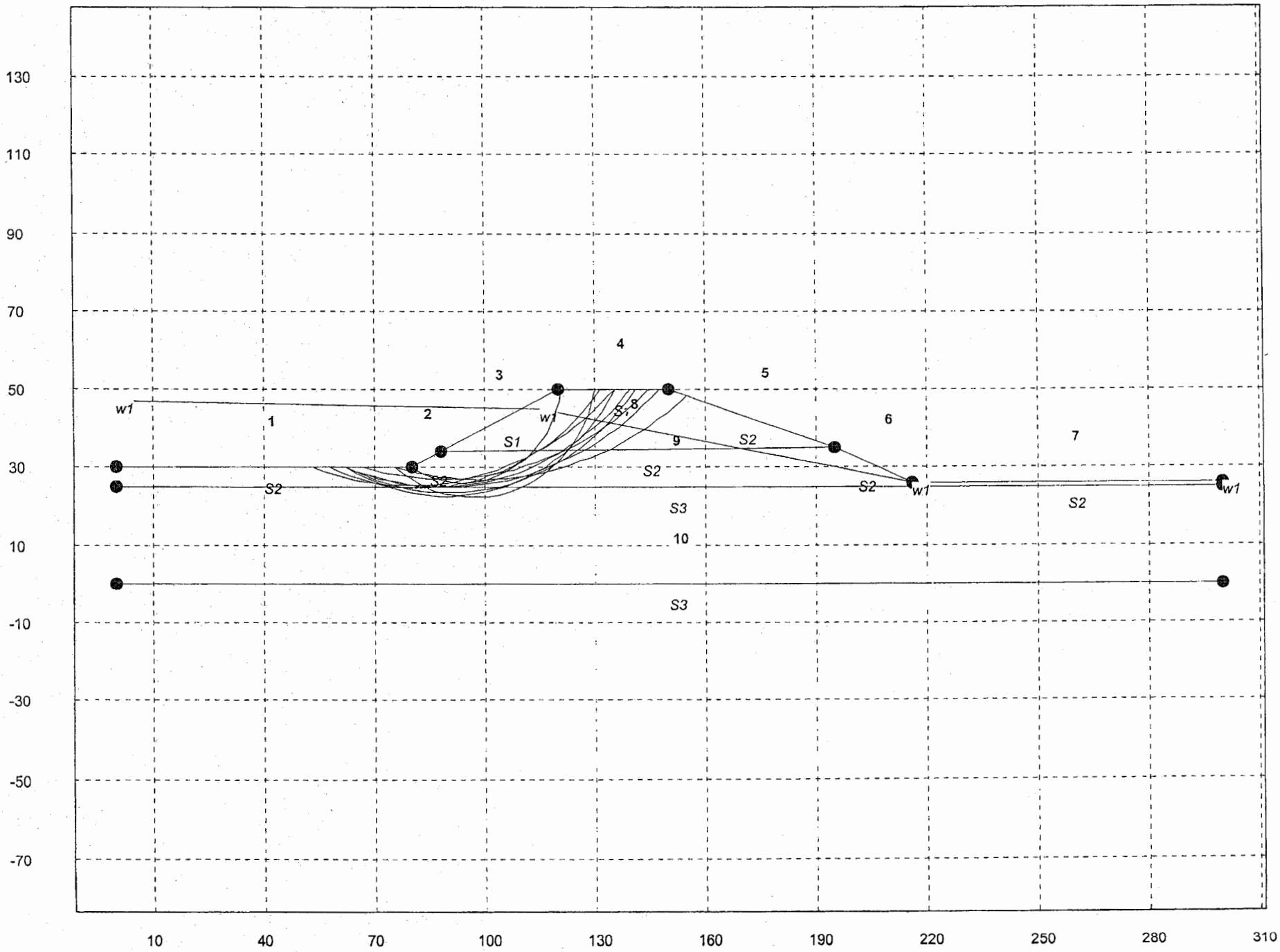
                -
                -
                -
                -        *
        225.00 +
                -
                -
                -
                -
                -
F       262.50 +
                -
                -
                -
                -
                -
T       300.00 *        *
```

WM05-169G East Dam Alignment - FS Min = 1.435



result.out

** PCSTABL6 **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: ENGLISH
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION WM05-169G East Dam Alignment

BOUNDARY COORDINATES

7 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	30.00	80.00	30.00	2
2	80.00	30.00	88.00	34.00	2
3	88.00	34.00	120.00	50.00	1
4	120.00	50.00	150.00	50.00	1
5	150.00	50.00	195.00	35.00	2
6	195.00	35.00	216.00	26.00	2
7	216.00	26.00	300.00	26.00	2
8	88.00	34.00	195.00	35.00	2
9	0.00	25.00	300.00	25.00	3
10	0.00	0.00	300.00	0.00	3

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	0.0	28.0	0.00	0.0	1
2	110.0	110.0	150.0	10.0	0.00	0.0	1
3	120.0	120.0	0.0	32.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	50.00
2	150.00	50.00
3	216.00	26.00
4	300.00	26.00

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

50 Trial Surfaces Have Been Generated.

5 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 40.00 ft.
and X = 80.00 ft.

Each Surface Terminates Between X = 120.00 ft.
and X = 170.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 3.00 ft.

3.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	80.00	30.00
2	82.96	29.50
3	85.95	29.21
4	88.94	29.13
5	91.94	29.26
6	94.92	29.59
7	97.87	30.13
8	100.78	30.87
9	103.63	31.81
10	106.41	32.95
11	109.10	34.27
12	111.69	35.78
13	114.17	37.47
14	116.53	39.32
15	118.76	41.33
16	120.84	43.49
17	122.77	45.79
18	124.53	48.22
19	125.65	50.00

Circle Center At X = 88.6 ; Y = 72.4 and Radius, 43.3

*** 1.472 ***

Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.0	321.4	3975.6	3790.4	0.0	0.0	0.0	0.0	0.0
2	3.0	941.5	3702.6	3863.9	0.0	0.0	0.0	0.0	0.0
3	2.1	971.9	2367.3	2669.7	0.0	0.0	0.0	0.0	0.0
4	0.9	530.8	1038.3	1229.0	0.0	0.0	0.0	0.0	0.0
5	3.0	2022.9	3090.4	3894.7	0.0	0.0	0.0	0.0	0.0
6	3.0	2471.0	2763.1	3851.8	0.0	0.0	0.0	0.0	0.0
7	3.0	2829.0	2429.7	3770.3	0.0	0.0	0.0	0.0	0.0
8	2.9	3092.0	2096.2	3650.5	0.0	0.0	0.0	0.0	0.0
9	2.8	3257.5	1768.2	3493.0	0.0	0.0	0.0	0.0	0.0
10	2.8	3325.9	1451.1	3298.6	0.0	0.0	0.0	0.0	0.0
11	2.5	3108.1	1090.2	2897.5	0.0	0.0	0.0	0.0	0.0
12	0.2	192.0	59.6	170.8	0.0	0.0	0.0	0.0	0.0
13	2.6	3164.8	868.9	2803.0	0.0	0.0	0.0	0.0	0.0
14	2.5	2932.1	612.0	2504.1	0.0	0.0	0.0	0.0	0.0
15	2.4	2629.4	382.5	2173.1	0.0	0.0	0.0	0.0	0.0
16	2.2	2270.4	182.8	1811.5	0.0	0.0	0.0	0.0	0.0
17	1.2	1149.0	26.9	895.8	0.0	0.0	0.0	0.0	0.0
18	0.8	700.7	0.0	525.2	0.0	0.0	0.0	0.0	0.0
19	1.9	1239.4	0.0	1003.5	0.0	0.0	0.0	0.0	0.0
20	1.8	634.1	0.0	561.1	0.0	0.0	0.0	0.0	0.0
21	1.1	119.4	0.0	117.1	0.0	0.0	0.0	0.0	0.0

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	66.67	30.00
2	69.45	28.89
3	72.30	27.94
4	75.19	27.14
5	78.12	26.49
6	81.08	26.01
7	84.06	25.69
8	87.06	25.53
9	90.06	25.53
10	93.06	25.70
11	96.04	26.02
12	99.00	26.51
13	101.93	27.16
14	104.82	27.96
15	107.66	28.92
16	110.44	30.04
17	113.17	31.30
18	115.82	32.71
19	118.38	34.26
20	120.87	35.94
21	123.25	37.76
22	125.54	39.70
23	127.71	41.77
24	129.77	43.95
25	131.71	46.24
26	133.53	48.63
27	134.45	50.00

Circle Center At X = 88.5 ; Y = 80.9 and Radius, 55.4

*** 1.532 ***

1

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.00	30.00
2	82.94	29.42
3	85.91	28.98
4	88.90	28.68
5	91.89	28.53
6	94.89	28.52
7	97.89	28.65
8	100.88	28.93
9	103.85	29.36
10	106.79	29.92
11	109.71	30.63
12	112.59	31.48
13	115.42	32.46
14	118.20	33.58
15	120.93	34.83
16	123.59	36.21
17	126.19	37.72
18	128.70	39.35
19	131.14	41.10
20	133.49	42.97

21	135.75	44.95
22	137.91	47.03
23	139.96	49.21
24	140.63	50.00

Circle Center At X = 93.6 ; Y = 90.8 and Radius, 62.3

*** 1.555 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	71.11	30.00
2	73.82	28.70
3	76.62	27.64
4	79.50	26.81
5	82.45	26.23
6	85.43	25.90
7	88.43	25.82
8	91.42	25.99
9	94.39	26.42
10	97.32	27.09
11	100.17	28.01
12	102.94	29.16
13	105.60	30.54
14	108.14	32.14
15	110.53	33.95
16	112.77	35.96
17	114.82	38.14
18	116.69	40.49
19	118.35	42.99
20	119.79	45.62
21	121.01	48.36
22	121.58	50.00

Circle Center At X = 87.9 ; Y = 61.4 and Radius, 35.6

*** 1.560 ***

1

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.56	30.00
2	78.16	28.51
3	80.88	27.24
4	83.70	26.22
5	86.60	25.44
6	89.55	24.92

7	92.54	24.66
8	95.54	24.66
9	98.53	24.92
10	101.48	25.43
11	104.38	26.20
12	107.20	27.22
13	109.93	28.48
14	112.53	29.97
15	115.00	31.68
16	117.30	33.60
17	119.43	35.71
18	121.38	38.00
19	123.11	40.44
20	124.63	43.03
21	125.91	45.74
22	126.96	48.55
23	127.36	50.00

Circle Center At X = 94.1 ; Y = 59.2 and Radius, 34.6

*** 1.566 ***

Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	30.00
2	64.99	28.85
3	67.82	27.83
4	70.69	26.97
5	73.60	26.25
6	76.55	25.68
7	79.52	25.27
8	82.51	25.01
9	85.50	24.90
10	88.50	24.94
11	91.50	25.14
12	94.48	25.49
13	97.43	25.99
14	100.36	26.65
15	103.25	27.45
16	106.10	28.40
17	108.89	29.50
18	111.63	30.73
19	114.29	32.11
20	116.88	33.62
21	119.40	35.26
22	121.82	37.02
23	124.15	38.91
24	126.38	40.92
25	128.51	43.04
26	130.52	45.26
27	132.42	47.58
28	134.19	50.00

Circle Center At X = 86.1 ; Y = 83.4 and Radius, 58.5

*** 1.599 ***

1

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	66.67	30.00
2	69.53	29.10
3	72.43	28.34
4	75.37	27.72
5	78.33	27.25
6	81.31	26.91
7	84.30	26.72
8	87.30	26.68
9	90.30	26.78
10	93.29	27.02
11	96.27	27.40
12	99.22	27.93
13	102.15	28.60
14	105.03	29.41
15	107.88	30.36
16	110.68	31.44
17	113.42	32.66
18	116.10	34.00
19	118.72	35.48
20	121.25	37.07
21	123.71	38.79
22	126.09	40.62
23	128.37	42.57
24	130.56	44.62
25	132.64	46.78
26	134.62	49.03
27	135.39	50.00

Circle Center At X = 86.8 ; Y = 89.1 and Radius, 62.4

*** 1.601 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	71.11	30.00
2	74.09	29.62
3	77.08	29.36
4	80.07	29.23
5	83.07	29.22
6	86.07	29.34
7	89.06	29.58
8	92.04	29.95

9	95.00	30.44
10	97.93	31.05
11	100.84	31.79
12	103.72	32.64
13	106.56	33.62
14	109.35	34.71
15	112.09	35.92
16	114.79	37.24
17	117.42	38.68
18	120.00	40.22
19	122.50	41.86
20	124.94	43.62
21	127.30	45.47
22	129.58	47.42
23	131.78	49.46
24	132.32	50.00

Circle Center At X = 81.8 ; Y = 101.1 and Radius, 71.9

*** 1.743 ***

1

Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	30.00
2	64.95	28.76
3	67.74	27.65
4	70.58	26.67
5	73.45	25.82
6	76.37	25.10
7	79.31	24.51
8	82.27	24.07
9	85.26	23.76
10	88.25	23.58
11	91.25	23.55
12	94.25	23.65
13	97.24	23.89
14	100.22	24.27
15	103.17	24.79
16	106.10	25.44
17	109.00	26.22
18	111.85	27.14
19	114.67	28.18
20	117.43	29.36
21	120.13	30.66
22	122.77	32.08
23	125.34	33.63
24	127.84	35.29
25	130.26	37.06
26	132.60	38.94
27	134.84	40.93
28	136.99	43.02
29	139.05	45.21
30	141.00	47.49
31	142.84	49.85

32	142.95	50.00

Circle Center At X = 90.5 ; Y = 88.7 and Radius, 65.2

*** 1.770 ***

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.56	30.00
2	78.54	29.68
3	81.53	29.45
4	84.53	29.32
5	87.53	29.27
6	90.53	29.32
7	93.52	29.47
8	96.51	29.70
9	99.50	30.03
10	102.47	30.45
11	105.42	30.96
12	108.36	31.57
13	111.28	32.26
14	114.18	33.04
15	117.05	33.92
16	119.89	34.88
17	122.70	35.93
18	125.47	37.06
19	128.21	38.29
20	130.92	39.59
21	133.57	40.98
22	136.19	42.45
23	138.76	44.00
24	141.28	45.63
25	143.74	47.34
26	146.16	49.12
27	147.28	50.00

Circle Center At X = 87.4 ; Y = 126.2 and Radius, 96.9

*** 1.812 ***

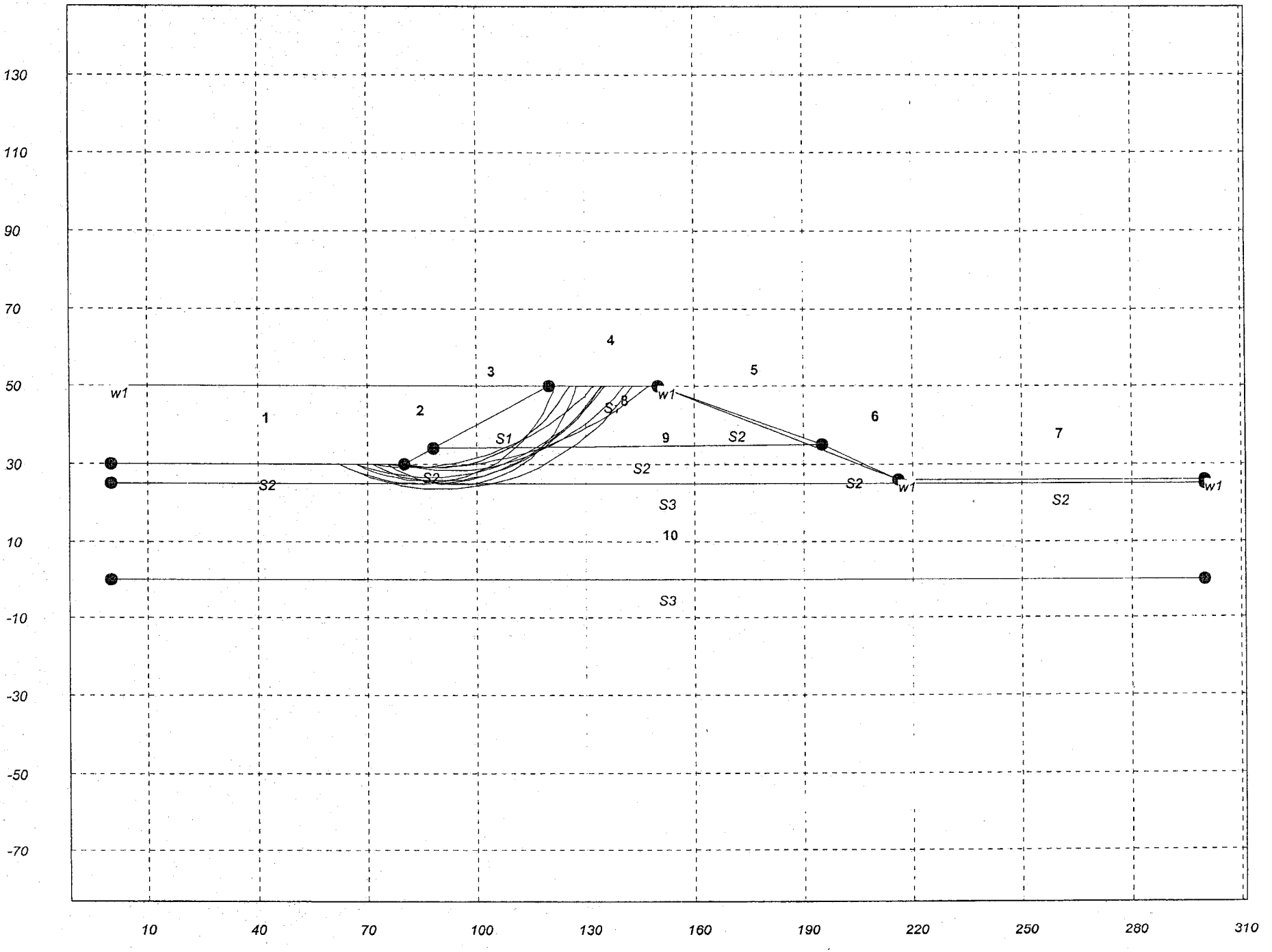
1

```
            Y            A     X     I     S            F     T

            0.00      37.50     75.00     112.50     150.00     187.50
X       0.00 *------**-+--W------+---------+---------+---------+
             -
             -
             -
             -
```

```
                 -
        37.50 +       .
              -     ...
              -     ...
              -    ....
              -   ....6
              -   ...62
A       75.00 +  ....24
              -  ...92*
              - ....921*
              - ....921
              - ....921.
              - .....211
X      112.50 +  ....9231
              -  .....92111*
              -  ......92211
              -   ......3322
              -   .......932
              -    .......03
I      150.00 +     .......*
              -      .......
              -        ....
              -         ...
              -
              -
S      187.50 +
              -        *
              -
              -
              -
              -      *
       225.00 +
              -
              -
              -
              -
              -
F      262.50 +
              -
              -
              -
              -
              -
T      300.00 *      *
```

WM05-169G East Dam Alignment - FS Min = 1.472



APPENDIX B

Hydrologic and Hydraulic Models

EXIS TING

MASTER DESIGN STORM SUMMARY

Network Storm Collection: James City Count

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.8000	Synthetic Curve	TypeII 24hr
2	3.5000	Synthetic Curve	TypeII 24hr
10	5.5000	Synthetic Curve	TypeII 24hr
25	6.0000	Synthetic Curve	TypeII 24hr
100	8.0000	Synthetic Curve	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)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10		JCT	1	10.364	R	21.8000	3.24		
*OUT 10		JCT	2	16.146	R	23.5500	4.23		
*OUT 10		JCT	10	34.261	R	19.6000	11.43		
*OUT 10		JCT	25	39.469	R	16.2000	23.33		
*OUT 10		JCT	100	61.278	R	13.8000	131.51		
PC-106	IN	POND	1	10.409		12.9000	44.38		
PC-106	IN	POND	2	16.276		12.8500	73.33		
PC-106	IN	POND	10	35.764		12.8500	169.07		
PC-106	IN	POND	25	41.034		12.8500	194.68		
PC-106	IN	POND	100	63.033		12.8500	300.24		
PC-106	OUT	POND	1	10.364	R	21.8000	3.24	68.81	42.577
PC-106	OUT	POND	2	16.146	R	23.5500	4.23	69.52	47.359
PC-106	OUT	POND	10	34.261	R	19.6000	11.43	71.63	62.996
PC-106	OUT	POND	25	39.469	R	16.2000	23.33	71.74	63.809
PC-106	OUT	POND	100	61.278	R	13.8000	131.51	72.23	67.761

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
PC106 DAM	AREA	1	10.409		12.9000	44.38		
PC106 DAM	AREA	2	16.276		12.8500	73.33		
PC106 DAM	AREA	10	35.764		12.8500	169.07		
PC106 DAM	AREA	25	41.034		12.8500	194.68		
PC106 DAM	AREA	100	63.033		12.8500	300.24		

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM EX COND.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: 1.4630 hrs

==========
Total Tc: 1.4630 hrs
==========

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM EX COND.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM EX COND.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Electric Station	96	2.830			96.00
Sports Fields	88	22.210			88.00
Utility Easement	75	11.880			75.00
Forested Land	70	106.090			70.00
Water	100	7.040			100.00
COMPOSITE AREA & WEIGHTED CN --->		150.050			74.96 (75)

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM EX COND.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
54.00	-----	.0044	.0000	.000	.000
55.00	-----	.1513	.1815	.061	.061
56.00	-----	.3340	.7101	.237	.297
57.00	-----	.8249	1.6838	.561	.858
58.00	-----	1.1335	2.9254	.975	1.834
59.00	-----	1.4462	3.8600	1.287	3.120
60.00	-----	1.7836	4.8359	1.612	4.732
61.00	-----	2.1651	5.9138	1.971	6.703
62.00	-----	2.6852	7.2615	2.420	9.124
63.00	-----	3.4069	9.1167	3.039	12.163
64.00	-----	4.0515	11.1737	3.725	15.887
65.00	-----	4.7153	13.1376	4.379	20.267
66.00	-----	5.4762	15.2730	5.091	25.358
67.00	-----	6.0363	17.2619	5.754	31.112
68.00	-----	6.3456	18.5709	6.190	37.302
69.00	-----	6.7300	19.6106	6.537	43.839
70.00	-----	7.1209	20.7736	6.925	50.763
71.00	-----	7.5453	21.9962	7.332	58.095
72.00	-----	8.0924	23.4518	7.817	65.913
73.00	-----	8.3709	24.6938	8.231	74.144
74.00	-----	8.6581	25.5423	8.514	82.658
75.00	-----	8.9477	26.4075	8.803	91.461
76.00	-----	9.2396	27.2798	9.093	100.554

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 54.00 ft
Increment = 1.00 ft
Max. Elev.= 76.00 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
Stand Pipe	1	--->	2	67.680	76.000
Culvert-Circular	2	--->	TW	53.510	76.000
Weir-XY Points	3	--->	TW	71.590	76.000

TW SETUP, DS Channel

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM EX COND.PPW

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = 1
Structure Type    = Stand Pipe
-----------------------------------
# of Openings     =         1
Invert Elev.      =     67.68 ft
Diameter          =    1.0000 ft
Orifice Area      =     .7854 sq.ft
Orifice Coeff.    =      .500
Weir Length       =      3.14 ft
Weir Coeff.       =     2.800
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = 2
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    1.0000 ft
Upstream Invert    =     53.51 ft
Dnstream Invert    =     52.51 ft
Horiz. Length      =    100.00 ft
Barrel Length      =    100.01 ft
Barrel Slope       =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0030
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .001665  (per ft of full flow)
Kr                 =     .5000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         1
Inlet Control K    =     .0340
Inlet Control M    =    1.5000
Inlet Control c    =    .05530
Inlet Control Y    =     .5400
T1 ratio (HW/D)    =     1.257
T2 ratio (HW/D)    =     1.420
Slope Factor       =     -.500
Calc inlet only    = Yes
```

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 = 54.77 ft ---> Flow = 2.75 cfs
At T2 Elev = 54.93 ft ---> Flow = 3.14 cfs

OUTLET STRUCTURE INPUT DATA

Structure ID = 3
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	76.00
12.00	72.00
32.00	71.59
82.00	71.59
102.00	72.00
114.00	76.00

Lowest Elev. = 71.59 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

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

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
54.00	.00	Free Outfall		(no Q: 1,2,3)
55.00	.00	Free Outfall		(no Q: 1,2,3)
56.00	.00	Free Outfall		(no Q: 1,2,3)
57.00	.00	Free Outfall		(no Q: 1,2,3)
58.00	.00	Free Outfall		(no Q: 1,2,3)
59.00	.00	Free Outfall		(no Q: 1,2,3)
60.00	.00	Free Outfall		(no Q: 1,2,3)
61.00	.00	Free Outfall		(no Q: 1,2,3)
62.00	.00	Free Outfall		(no Q: 1,2,3)
63.00	.00	Free Outfall		(no Q: 1,2,3)
64.00	.00	Free Outfall		(no Q: 1,2,3)
65.00	.00	Free Outfall		(no Q: 1,2,3)
66.00	.00	Free Outfall		(no Q: 1,2,3)
67.00	.00	Free Outfall		(no Q: 1,2,3)
67.68	.00	Free Outfall		(no Q: 1,2,3)
68.00	1.59	Free Outfall		1,2 (no Q: 3)
69.00	3.62	Free Outfall		1,2 (no Q: 3)
70.00	4.80	Free Outfall		1,2 (no Q: 3)
71.00	5.74	Free Outfall		1,2 (no Q: 3)
71.59	6.23	Free Outfall		1,2 (no Q: 3)
72.00	53.70	Free Outfall		1,2,3
73.00	395.76	Free Outfall		1,2,3
74.00	932.02	Free Outfall		1,2,3
75.00	1625.32	Free Outfall		1,2,3
76.00	2461.45	Free Outfall		1,2,3

MASTER DESIGN STORM SUMMARY

INTERIM CONDITIONS
(1) SCHOOL SITE UNDEVELOPED
(2) STADIUM SITE CLEARED
with EMERGENCY
Spillway @ w=50'

Network Storm Collection: James City Count

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.8000	Synthetic Curve	TypeII 24hr
10	5.5000	Synthetic Curve	TypeII 24hr
25	6.0000	Synthetic Curve	TypeII 24hr
100	8.0000	Synthetic Curve	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)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10	JCT	1	10.988	R	21.9500	3.39		
*OUT 10	JCT	10	36.298	R	14.9000	33.18		
*OUT 10	JCT	25	41.614	R	14.2500	57.48		
*OUT 10	JCT	100	63.761	R	13.4500	182.41		
PC-106 IN	POND	1	11.039		12.8500	49.92		
PC-106 IN	POND	10	36.924		12.7000	183.93		
PC-106 IN	POND	25	42.265		12.7000	211.41		
PC-106 IN	POND	100	64.494		12.7000	324.48		
PC-106 OUT	POND	1	10.988	R	21.9500	3.39	68.89	43.078
PC-106 OUT	POND	10	36.298	R	14.9000	33.18	71.03	58.319
PC-106 OUT	POND	25	41.614	R	14.2500	57.48	71.17	59.391
PC-106 OUT	POND	100	63.761	R	13.4500	182.41	71.73	63.785

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
PC106 DAM	AREA	1	11.039		12.8500	49.92		
PC106 DAM	AREA	10	36.924		12.7000	183.93		
PC106 DAM	AREA	25	42.265		12.7000	211.41		
PC106 DAM	AREA	100	64.494		12.7000	324.48		

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM_NO RETENTION.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: 1.3800 hrs

==========
Total Tc: 1.3800 hrs
==========

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM_NO RETENTION.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM_NO RETENTION.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Electric Station	96	2.830			96.00
Sports Fields	88	22.210			88.00
Utility Easement	75	11.880			75.00
Forested Land	70	100.160			70.00
Water	100	7.040			100.00
Stadium Site	93	5.930			93.00
COMPOSITE AREA & WEIGHTED CN --->		150.050			75.87 (76)

::

Name.... PC106-ALT50

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM_NO RETENTION.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 54.00 ft
Increment = 1.00 ft
Max. Elev.= 76.00 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
Stand Pipe	1	--->	2	67.680	76.000
Culvert-Circular	2	--->	TW	53.510	76.000
Weir-XY Points	4	--->	TW	70.710	76.000
Weir-XY Points	3	--->	TW	71.590	76.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = 1
Structure Type    = Stand Pipe
-----------------------------------
# of Openings     =         1
Invert Elev.      =     67.68 ft
Diameter          =    1.0000 ft
Orifice Area      =     .7854 sq.ft
Orifice Coeff.    =      .500
Weir Length       =      3.14 ft
Weir Coeff.       =     2.800
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = 2
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    1.0000 ft
Upstream Invert    =     53.51 ft
Dnstream Invert    =     52.51 ft
Horiz. Length      =    100.00 ft
Barrel Length      =    100.01 ft
Barrel Slope       =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0030
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .001665  (per ft of full flow)
Kr                 =     .5000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         1
Inlet Control K    =     .0340
Inlet Control M    =    1.5000
Inlet Control c    =    .05530
Inlet Control Y    =     .5400
T1 ratio (HW/D)    =     1.257
T2 ratio (HW/D)    =     1.420
Slope Factor       =     -.500
Calc inlet only    = Yes
```

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 = 54.77 ft ---> Flow = 2.75 cfs
At T2 Elev = 54.93 ft ---> Flow = 3.14 cfs

OUTLET STRUCTURE INPUT DATA

Structure ID = 4
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	76.00
20.00	72.00
25.00	71.00
26.50	70.71
76.50	70.71
78.00	71.00
83.00	72.00
103.00	76.00

Lowest Elev. = 70.71 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

Structure ID = 3
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	76.00
12.00	72.00
32.00	71.59
82.00	71.59
102.00	72.00
114.00	76.00

Lowest Elev. = 71.59 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

OUTLET STRUCTURE INPUT DATA

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

CONVERGENCE TOLERANCES...
Maximum Iterations=    40
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .00 cfs
Max.  Q tolerance =    .00 cfs
```

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM_NO RETENTION.PPW

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

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
54.00	.00	Free Outfall		(no Q: 1,2,4,3)
55.00	.00	Free Outfall		(no Q: 1,2,4,3)
56.00	.00	Free Outfall		(no Q: 1,2,4,3)
57.00	.00	Free Outfall		(no Q: 1,2,4,3)
58.00	.00	Free Outfall		(no Q: 1,2,4,3)
59.00	.00	Free Outfall		(no Q: 1,2,4,3)
60.00	.00	Free Outfall		(no Q: 1,2,4,3)
61.00	.00	Free Outfall		(no Q: 1,2,4,3)
62.00	.00	Free Outfall		(no Q: 1,2,4,3)
63.00	.00	Free Outfall		(no Q: 1,2,4,3)
64.00	.00	Free Outfall		(no Q: 1,2,4,3)
65.00	.00	Free Outfall		(no Q: 1,2,4,3)
66.00	.00	Free Outfall		(no Q: 1,2,4,3)
67.00	.00	Free Outfall		(no Q: 1,2,4,3)
67.68	.00	Free Outfall		(no Q: 1,2,4,3)
68.00	1.59	Free Outfall		1,2 (no Q: 4,3)
69.00	3.62	Free Outfall		1,2 (no Q: 4,3)
70.00	4.80	Free Outfall		1,2 (no Q: 4,3)
70.71	5.48	Free Outfall		1,2 (no Q: 4,3)
71.00	28.07	Free Outfall		1,2,4 (no Q: 3)
71.59	129.74	Free Outfall		1,2,4 (no Q: 3)
72.00	279.01	Free Outfall		1,2,4,3
73.00	968.64	Free Outfall		1,2,4,3
74.00	1981.01	Free Outfall		1,2,4,3
75.00	3277.85	Free Outfall		1,2,4,3
76.00	4846.94	Free Outfall		1,2,4,3

NEW H.S. Discharge & INFlow to EAST DAM

MASTER DESIGN STORM SUMMARY

Network Storm Collection: James City Count

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.8000	Synthetic Curve	TypeII 24hr
10	5.5000	Synthetic Curve	TypeII 24hr
25	6.0000	Synthetic Curve	TypeII 24hr
100	8.0000	Synthetic Curve	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)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
HS-BMP	AREA	1	6.077		12.1000	69.93		
HS-BMP	AREA	10	14.401		12.1000	160.66		
HS-BMP	AREA	25	15.976		12.1000	177.33		
HS-BMP	AREA	100	22.316		12.1000	243.55		
HS-BMP	IN POND	1	6.077		12.1000	69.93		
HS-BMP	IN POND	10	14.401		12.1000	160.66		
HS-BMP	IN POND	25	15.976		12.1000	177.33		
HS-BMP	IN POND	100	22.316		12.1000	243.55		
HS-BMP	OUT POND	1	2.709	R	22.9500	.42	96.37	5.667
HS-BMP	OUT POND	10	10.093	R	17.0000	4.23	98.94	10.992
HS-BMP	OUT POND	25	11.641	R	14.0000	9.85	99.12	11.396
HS-BMP	OUT POND	100	17.929	R	12.6500	49.13	100.01	13.463

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10		JCT	1	9.989	R	20.2000	3.44		
*OUT 10		JCT	10	37.099	R	14.1000	50.17		
*OUT 10		JCT	25	42.702	R	14.1000	59.81		
*OUT 10		JCT	100	65.785	R	13.5500	155.76		
PC-106	IN	POND	1	11.888	R	12.8500	42.90		
PC-106	IN	POND	10	39.252	R	12.7000	149.44		
PC-106	IN	POND	25	44.864	R	12.7000	170.74		
PC-106	IN	POND	100	67.975	R	12.7000	300.82		
PC-106	OUT	POND	1	9.989	R	20.2000	3.44	68.70	41.835
PC-106	OUT	POND	10	37.100	R	14.1000	50.17	69.90	50.083
PC-106	OUT	POND	25	42.702	R	14.1000	59.81	70.17	52.016
PC-106	OUT	POND	100	65.785	R	13.5500	155.76	71.24	59.939
PC106 DAM		AREA	1	9.178		12.8500	42.60		
PC106 DAM		AREA	10	29.159		12.7000	146.00		
PC106 DAM		AREA	25	33.224		12.7000	166.78		
PC106 DAM		AREA	100	50.046		12.7000	251.71		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

INTERIM CONDITIONS
(A) POND : RETENTION IN PLACE
(B) STADIUM SITE CLEARED
with Emergency Spillway

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10	JCT	1	11.500	R	22.1500	3.04		
*OUT 10	JCT	10	36.913	R	16.8000	17.50		
*OUT 10	JCT	25	42.438	R	15.2000	32.88		
*OUT 10	JCT	100	65.341	R	13.6000	146.88		
PC-106 IN	POND	1	11.888	R	12.8500	42.90		
PC-106 IN	POND	10	39.252	R	12.7000	149.44		
PC-106 IN	POND	25	44.864	R	12.7000	170.74		
PC-106 IN	POND	100	67.975	R	12.7000	300.82		
PC-106 OUT	POND	1	11.500	R	22.1500	3.04	68.71	41.927
PC-106 OUT	POND	10	36.914	R	16.8000	17.50	70.86	57.075
PC-106 OUT	POND	25	42.438	R	15.2000	32.88	71.03	58.306
PC-106 OUT	POND	100	65.341	R	13.6000	146.88	71.64	63.012
PC106 DAM	AREA	1	9.178		12.8500	42.60		
PC106 DAM	AREA	10	29.159		12.7000	146.00		
PC106 DAM	AREA	25	33.224		12.7000	166.78		
PC106 DAM	AREA	100	50.046		12.7000	251.71		

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: 1.3800 hrs

==========
Total Tc: 1.3800 hrs
==========

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Electric Station	96	2.830			96.00
Sports Fields	88	22.210			88.00
Utility Easement	75	11.880			75.00
Forested Land	70	61.510			70.00
Water	100	7.040			100.00
Stadium Site	93	5.930			93.00
COMPOSITE AREA & WEIGHTED CN --->		111.400			77.90 (78)

::

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 54.00 ft
Increment = 1.00 ft
Max. Elev.= 76.00 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
Stand Pipe	1	--->	2	67.680	76.000
Culvert-Circular	2	--->	TW	53.510	76.000
Weir-XY Points	4	--->	TW	70.710	76.000
Weir-XY Points	3	--->	TW	71.590	76.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = 1
Structure Type    = Stand Pipe
-----------------------------------
# of Openings     =         1
Invert Elev.      =     67.68 ft
Diameter          =    1.0000 ft
Orifice Area      =     .7854 sq.ft
Orifice Coeff.    =      .500
Weir Length       =      3.14 ft
Weir Coeff.       =     2.800
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = 2
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    1.0000 ft
Upstream Invert    =     53.51 ft
Dnstream Invert    =     52.51 ft
Horiz. Length      =    100.00 ft
Barrel Length      =    100.01 ft
Barrel Slope       =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0030
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .001665  (per ft of full flow)
Kr                 =     .5000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         1
Inlet Control K    =     .0340
Inlet Control M    =    1.5000
Inlet Control c    =    .05530
Inlet Control Y    =     .5400
T1 ratio (HW/D)    =     1.257
T2 ratio (HW/D)    =     1.420
Slope Factor       =     -.500
Calc inlet only    = Yes
```

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 =     54.77 ft  --->  Flow =      2.75 cfs
At T2 Elev =     54.93 ft  --->  Flow =      3.14 cfs
```

OUTLET STRUCTURE INPUT DATA

Structure ID = 4
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	76.00
20.00	72.00
25.00	71.00
26.50	70.71
76.50	70.71
78.00	71.00
83.00	72.00
103.00	76.00

Lowest Elev. = 70.71 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

Structure ID = 3
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	76.00
12.00	72.00
32.00	71.59
82.00	71.59
102.00	72.00
114.00	76.00

Lowest Elev. = 71.59 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

OUTLET STRUCTURE INPUT DATA

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

CONVERGENCE TOLERANCES...
Maximum Iterations=    40
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .00 cfs
Max.  Q tolerance =    .00 cfs
```

Name.... PC106-ALT50

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

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

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
54.00	.00	Free Outfall		(no Q: 1,2,4,3)
55.00	.00	Free Outfall		(no Q: 1,2,4,3)
56.00	.00	Free Outfall		(no Q: 1,2,4,3)
57.00	.00	Free Outfall		(no Q: 1,2,4,3)
58.00	.00	Free Outfall		(no Q: 1,2,4,3)
59.00	.00	Free Outfall		(no Q: 1,2,4,3)
60.00	.00	Free Outfall		(no Q: 1,2,4,3)
61.00	.00	Free Outfall		(no Q: 1,2,4,3)
62.00	.00	Free Outfall		(no Q: 1,2,4,3)
63.00	.00	Free Outfall		(no Q: 1,2,4,3)
64.00	.00	Free Outfall		(no Q: 1,2,4,3)
65.00	.00	Free Outfall		(no Q: 1,2,4,3)
66.00	.00	Free Outfall		(no Q: 1,2,4,3)
67.00	.00	Free Outfall		(no Q: 1,2,4,3)
67.68	.00	Free Outfall		(no Q: 1,2,4,3)
68.00	1.59	Free Outfall		1,2 (no Q: 4,3)
69.00	3.62	Free Outfall		1,2 (no Q: 4,3)
70.00	4.80	Free Outfall		1,2 (no Q: 4,3)
70.71	5.48	Free Outfall		1,2 (no Q: 4,3)
71.00	28.07	Free Outfall		1,2,4 (no Q: 3)
71.59	129.74	Free Outfall		1,2,4 (no Q: 3)
72.00	279.01	Free Outfall		1,2,4,3
73.00	968.64	Free Outfall		1,2,4,3
74.00	1981.01	Free Outfall		1,2,4,3
75.00	3277.85	Free Outfall		1,2,4,3
76.00	4846.94	Free Outfall		1,2,4,3

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

DEVELOPED MODEL
with EMS & new Principal spillway

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10	JCT	1	9.937	R	21.2500	3.11		
*OUT 10	JCT	10	36.967	R	14.1500	47.73		
*OUT 10	JCT	25	42.564	R	14.1500	57.84		
*OUT 10	JCT	100	65.637	R	13.5500	156.89		
PC-106 IN	POND	1	11.888	R	12.8500	42.90		
PC-106 IN	POND	10	39.252	R	12.7000	149.44		
PC-106 IN	POND	25	44.864	R	12.7000	170.74		
PC-106 IN	POND	100	67.975	R	12.7000	300.82		
PC-106 OUT	POND	1	9.938	R	21.2500	3.11	68.73	42.062
PC-106 OUT	POND	10	36.967	R	14.1500	47.73	69.95	50.373
PC-106 OUT	POND	25	42.564	R	14.1500	57.84	70.22	52.346
PC-106 OUT	POND	100	65.637	R	13.5500	156.89	71.25	59.978
PC106 DAM	AREA	1	9.178		12.8500	42.60		
PC106 DAM	AREA	10	29.159		12.7000	146.00		
PC106 DAM	AREA	25	33.224		12.7000	166.78		
PC106 DAM	AREA	100	50.046		12.7000	251.71		

ULTIMATE TOD → 72.5'

EM SPILLWAY ELEV → 70.7' 50' WIDE

25 YR WSE → 70.22'

100 YR WSE → 71.25'

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM12.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .4000 hrs

==========
Total Tc: .4000 hrs
==========

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM12.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: 1.3800 hrs

==========
Total Tc: 1.3800 hrs
==========

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM12.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM12.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Cleared Site Conditions	91	38.650			91.00
COMPOSITE AREA & WEIGHTED CN --->		38.650			91.00 (91)

::

Name.... PC106 DAM

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Electric Station	96	2.830			96.00
Sports Fields	88	22.210			88.00
Utility Easement	75	11.880			75.00
Forested Land	70	61.510			70.00
Water	100	7.040			100.00
Stadium Site	93	5.930			93.00
COMPOSITE AREA & WEIGHTED CN --->		111.400			77.90 (78)

::

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM12.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
54.00	-----	.0044	.0000	.000	.000
55.00	-----	.1513	.1815	.061	.061
56.00	-----	.3340	.7101	.237	.297
57.00	-----	.8249	1.6838	.561	.858
58.00	-----	1.1335	2.9254	.975	1.834
59.00	-----	1.4462	3.8600	1.287	3.120
60.00	-----	1.7836	4.8359	1.612	4.732
61.00	-----	2.1651	5.9138	1.971	6.703
62.00	-----	2.6852	7.2615	2.420	9.124
63.00	-----	3.4069	9.1167	3.039	12.163
64.00	-----	4.0515	11.1737	3.725	15.887
65.00	-----	4.7153	13.1376	4.379	20.267
66.00	-----	5.4762	15.2730	5.091	25.358
67.00	-----	6.0363	17.2619	5.754	31.112
68.00	-----	6.3456	18.5709	6.190	37.302
69.00	-----	6.7300	19.6106	6.537	43.839
70.00	-----	7.1209	20.7736	6.925	50.763
71.00	-----	7.5453	21.9962	7.332	58.095
72.00	-----	8.0924	23.4518	7.817	65.913
73.00	-----	8.3709	24.6938	8.231	74.144
74.00	-----	8.6581	25.5423	8.514	82.658
75.00	-----	8.9477	26.4075	8.803	91.461
76.00	-----	9.2396	27.2798	9.093	100.554

67
67.63
68

31.112 AC-FT
+
37.302 AC-FT

$$\frac{67.63-67}{68-67} = \frac{x-31.112}{37.302-31.112}$$

$$\frac{0.63}{1} = \frac{x-31.112}{6.19}$$

$$x - 31.112 = 3.8997$$

$$x = 35.01 \text{ AC-FT.}$$

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 54.00 ft
Increment = 1.00 ft
Max. Elev.= 76.00 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
Inlet Box	2	--->	3	69.000	76.000
Orifice-Circular	1	--->	3	67.680	76.000
Culvert-Circular	3	--->	TW	66.000	76.000
Weir-XY Points	4	--->	TW	70.700	76.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = 2
Structure Type    = Inlet Box
-----------------------------------
# of Openings     =         1
Invert Elev.      =     69.00 ft
Orifice Area      =   25.0000 sq.ft
Orifice Coeff.    =      .500
Weir Length       =     15.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No
```

```
Structure ID      = 1
Structure Type    = Orifice-Circular
-----------------------------------
# of Openings     =         1
Invert Elev.      =     67.68 ft
Diameter          =    1.2500 ft
Orifice Coeff.    =      .500
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = 3
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    3.5000 ft
Upstream Invert    =     66.00 ft
Dnstream Invert    =     65.60 ft
Horiz. Length      =     40.00 ft
Barrel Length      =     40.00 ft
Barrel Slope       =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .005885  (per ft of full flow)
Kr                 =     .5000  (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)    =     1.155
T2 ratio (HW/D)    =     1.302
Slope Factor       =     -.500
Calc inlet only    = Yes
```

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 = 70.04 ft ---> Flow = 63.00 cfs
At T2 Elev = 70.56 ft ---> Flow = 72.00 cfs

OUTLET STRUCTURE INPUT DATA

Structure ID = 4
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	76.00
26.50	70.70
76.50	70.70
113.00	76.00

Lowest Elev. = 70.70 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

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

WS Elev, Elev. ft	Total Q, Q cfs	Notes: TW Elev ft	Converge: Error +/-ft	Contributing Structures
54.00	.00	Free Outfall		
55.00	.00	Free Outfall		
56.00	.00	Free Outfall		
57.00	.00	Free Outfall		
58.00	.00	Free Outfall		
59.00	.00	Free Outfall		
60.00	.00	Free Outfall		
61.00	.00	Free Outfall		
62.00	.00	Free Outfall		
63.00	.00	Free Outfall		
64.00	.00	Free Outfall		
65.00	.00	Free Outfall		
66.00	.00	Free Outfall		
67.00	.00	Free Outfall		
67.68	.00	Free Outfall		
68.00	.37	Free Outfall		1,3 (no Q: 2,4)
69.00	4.10	Free Outfall		1,3 (no Q: 2,4)
70.00	50.26	Free Outfall		2,1,3 (no Q: 4)
70.70	74.29	Free Outfall		2,3 (no Q: 1,4)
71.00	102.43	Free Outfall		2,3,4 (no Q: 1)
72.00	322.60	Free Outfall		2,3,4 (no Q: 1)
73.00	686.98	Free Outfall		2,3,4 (no Q: 1)
74.00	1186.93	Free Outfall		2,3,4 (no Q: 1)
75.00	1824.09	Free Outfall		2,3,4 (no Q: 1)
76.00	2602.77	Free Outfall		2,3,4 (no Q: 1)

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 3 (Culvert-Circular)

Mannings open channel maximum capacity: 108.22 cfs
UPstream ID's= 2, 1
DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
54.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
55.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
56.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
57.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
58.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
59.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
60.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
61.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
62.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
63.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
64.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
65.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
66.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
67.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
67.68	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
68.00	.38	66.22	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL...	Equ.1: HW =.22		dc=.181		Ac=.1892	
69.00	4.10	66.80	Free	Free	.000	.003	Free Outfall	
		INLET CONTROL...	Equ.1: HW =.80		dc=.606		Ac=1.1146	
70.00	50.26	69.42	Free	Free	.000	.001	Free Outfall	
		INLET CONTROL...	Equ.1: HW =3.42		dc=2.216		Ac=6.4220	

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 3 (Culvert-Circular)

Mannings open channel maximum capacity: 108.22 cfs
UPstream ID's= 2, 1
DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
70.70	74.29	70.70	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL...		Submerged:	HW =4.70			
71.00	78.85	71.00	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL...		Submerged:	HW =5.00			
72.00	92.41	72.00	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL...		Submerged:	HW =6.00			
73.00	104.24	73.00	Free	Free	.000	96.306	Free Outfall	
		INLET CONTROL...		Submerged:	HW =7.00			
74.00	114.87	74.00	Free	Free	.000	109.344	Free Outfall	
		INLET CONTROL...		Submerged:	HW =8.00			
75.00	124.57	75.00	Free	Free	.000	121.040	Free Outfall	
		INLET CONTROL...		Submerged:	HW =9.00			
76.00	133.59	76.00	Free	Free	.000	131.708	Free Outfall	
		INLET CONTROL...		Submerged:	HW =10.00			

Worksheet
Worksheet for Trapezoidal Channel

80 cfs
EMS - 5.1 % Slope
80CFS - FINAL

Project Description	
Worksheet	E-Spillway - 80 c
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	200000	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	40.00	ft
Discharge	80.00	cfs

Results		
Depth	0.24	ft
Flow Area	9.6	ft²
Wetted Perim	41.49	ft
Top Width	41.41	ft
Critical Depth	0.49	ft
Critical Slope	0.016881	ft/ft
Velocity	8.34	ft/s
Velocity Head	1.08	ft
Specific Energ	1.32	ft
Froude Numb	3.06	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

170 cfs

Ems - 5.1% Slope
170CFS INTERIM

Project Description	
Worksheet	E-Spillway - 170 (
Flow Element	Trapezoidal Char
Method	Manning's Formu
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	200000	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	40.00	ft
Discharge	170.00	cfs

Results		
Depth	0.37	ft
Flow Area	15.2	ft²
Wetted Perim(	42.34	ft
Top Width	42.22	ft
Critical Depth	0.81	ft
Critical Slope	0.014456	ft/ft
Velocity	11.19	ft/s
Velocity Head	1.94	ft
Specific Energ	2.31	ft
Froude Numb(	3.29	
Flow Type	Supercritical	

V = 11.19 FPS

MATTING

DEV CONDITIONS

EMS @ CONTROL SECTION RATING CURVE

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 4 (Weir-XY Points)

Upstream ID = (Pond Water Surface)
DNstream ID = TW (Pond Outfall)

WS Elev,Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
54.00	.00	Free Outfall		
55.00	.00	Free Outfall		
56.00	.00	Free Outfall		
57.00	.00	Free Outfall		
58.00	.00	Free Outfall		
59.00	.00	Free Outfall		
60.00	.00	Free Outfall		
61.00	.00	Free Outfall		
62.00	.00	Free Outfall		
63.00	.00	Free Outfall		
64.00	.00	Free Outfall		
65.00	.00	Free Outfall		
66.00	.00	Free Outfall		
67.00	.00	Free Outfall		
67.68	.00	Free Outfall		
68.00	.00	Free Outfall WS below an invert; no flow.		
69.00	.00	Free Outfall WS below an invert; no flow.		

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 4 (Weir-XY Points)

Upstream ID = (Pond Water Surface)
DNstream ID = TW (Pond Outfall)

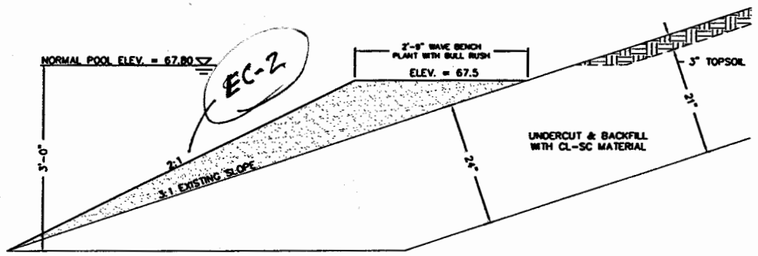
WS Elev,Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
70.00	.00	Free Outfall		WS below an invert; no flow.
70.70	.00	Free Outfall		WS below an invert; no flow.
71.00	23.58	Free Outfall		Max.H=.30; Max.Htw=free out;; W(ft)=53.57
72.00	230.19	Free Outfall		Max.H=1.30; Max.Htw=free out;; W(ft)=65.45
73.00	582.74	Free Outfall		Max.H=2.30; Max.Htw=free out;; W(ft)=77.34
74.00	1072.06	Free Outfall		Max.H=3.30; Max.Htw=free out;; W(ft)=89.23
75.00	1699.52	Free Outfall		Max.H=4.30; Max.Htw=free out;; W(ft)=101.11
76.00	2469.18	Free Outfall		Max.H=5.30; Max.Htw=free out;; W(ft)=113.00

APPENDIX C

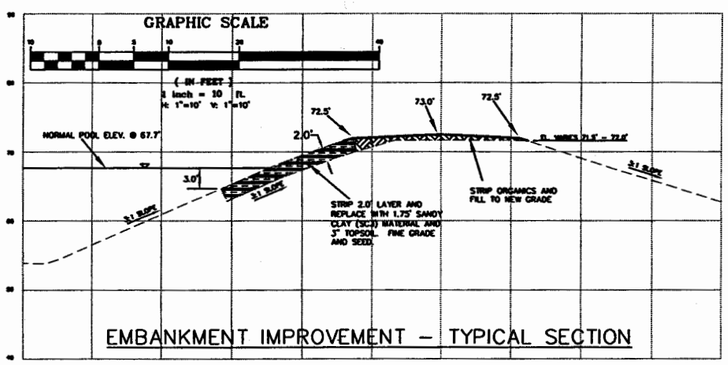
Plan of Improvements

INTERIM

EMS RATING				
		Q (cfs)	V (fps)	D (ft.)
CONTROL SECTION		170	3.1	1.0
5:1 % SLOPE		170	11.19	0.37

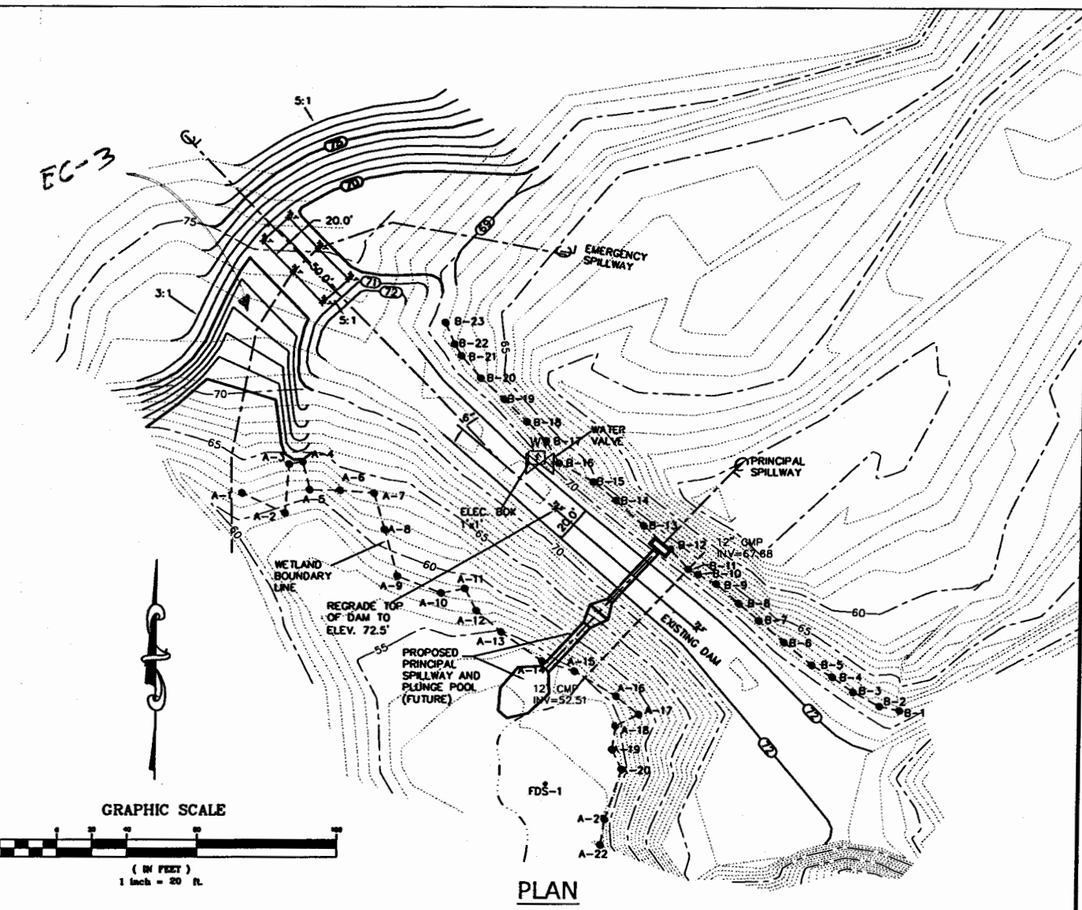


INTERIM AND FINAL EMBANKMENT SLOPE IMPROVEMENTS
N.T.S

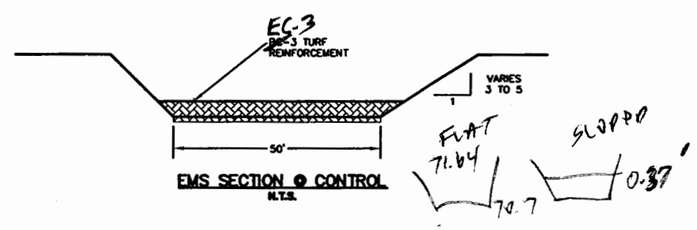


EMBANKMENT IMPROVEMENT – TYPICAL SECTION

RHW 71.64



PLAN



EMS SECTION @ CONTROL
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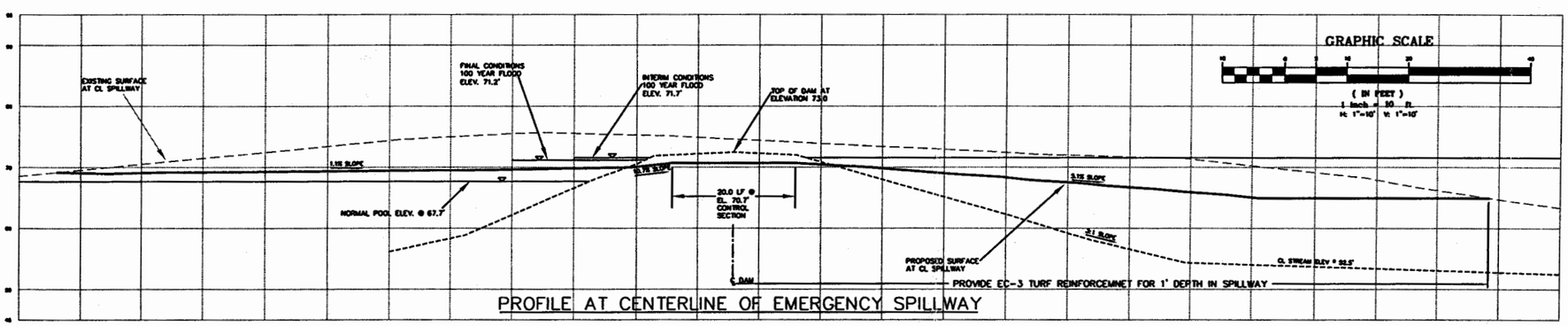

PROFILE AT CENTERLINE OF EMERGENCY SPILLWAY

NOTE:

IMPROCVEMENTS TO CONFORM TO VIRGINIA STORMWATER MANAGEMENT HANDBOOK AND VDOT SPECIFICATIONS.

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TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

Site Development | Residential | Infrastructure | Technology

REVISION DESCRIPTION | DATE

DATE 7/26/05
DRAWN BY D. WILMOTH
DESIGNED BY D. WILMOTH
CHECKED BY M. CLAUD
SCALE AS SHOWN

JAMES CITY COUNTY PPEA
JAMES CITY COUNTY, VIRGINIA
PROPOSED INTERIM IMPROVEMENTS TO EAST DAM (PC106 DAM)

JOB NO. 22547
SHEET NO. 1 OF 1

EROSION CONTROL NARRATIVE
SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AND THE ENGINEER 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.

3. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 3 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

INSPECTION REQUIREMENTS

1. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS:
   - BACKFILL MATERIAL: NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
   - BACKFILL COMPACTION TESTING

2. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

3. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

4. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION AFTER COMPLETION OF THE FINAL IMPROVEMENTS.

INTERIM

CONSTRUCTION AND INSTALLATION NOTES

1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION.

2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.

GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

2. MATERIAL USED FOR FILL SHALL BE SELECT MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON THIS SHEET. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

4. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.

5. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

UNRESOLVED ISSUES

1. ADDITIONAL FIELD TOPOGRAPHY NEEDS TO BE OBTAINED TO FINALIZE THIS PLAN. THIS IS SCHEDULED FOR 9/22/05.

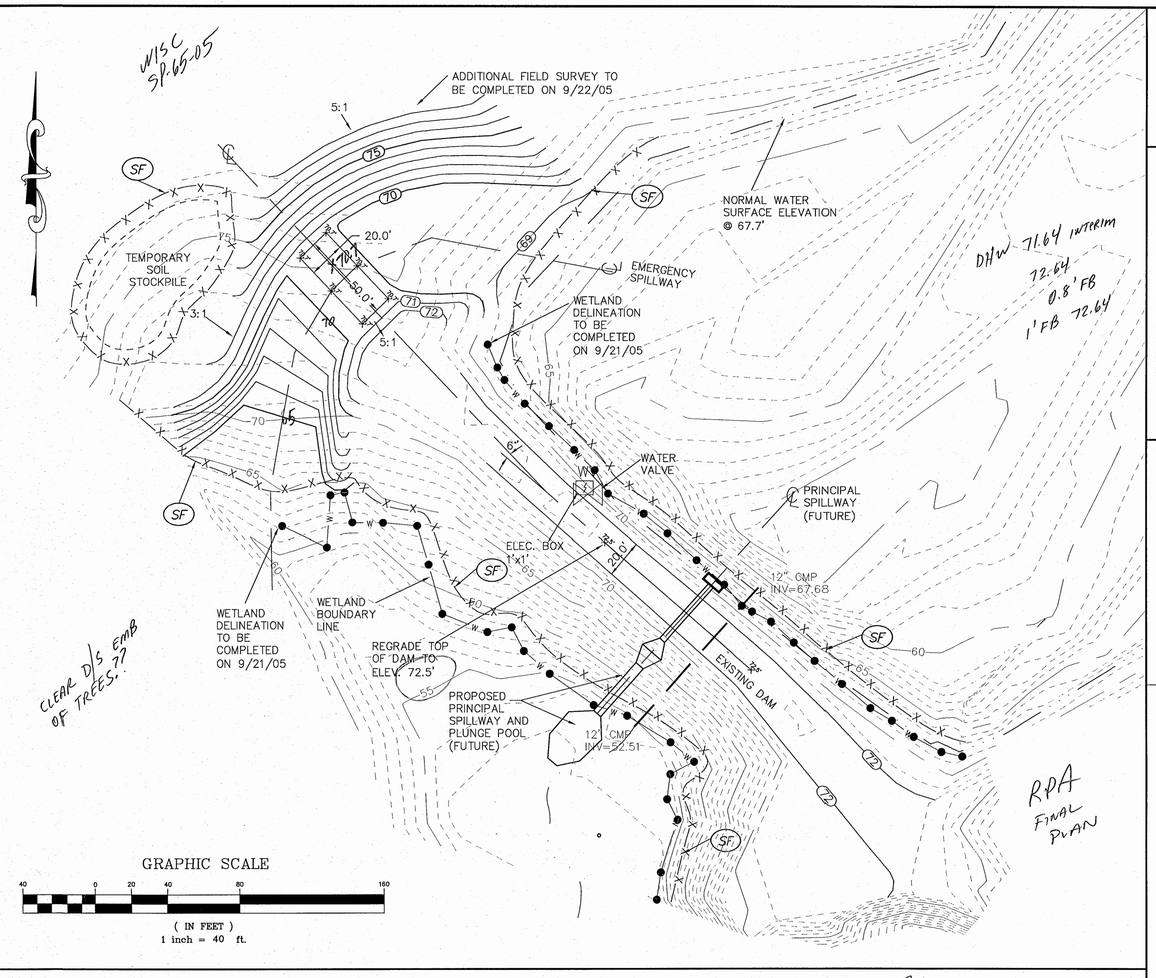
2. WETLAND DELINEATION LIMITS SHOWN NEED TO BE EXPANDED IN THE AREAS OF THE PROPOSED EMERGENCY SPILLWAY TO ENSURE NO IMPACTS DURING THIS INTERIM PHASE. THIS WILL BE DONE ON 9/21/05.

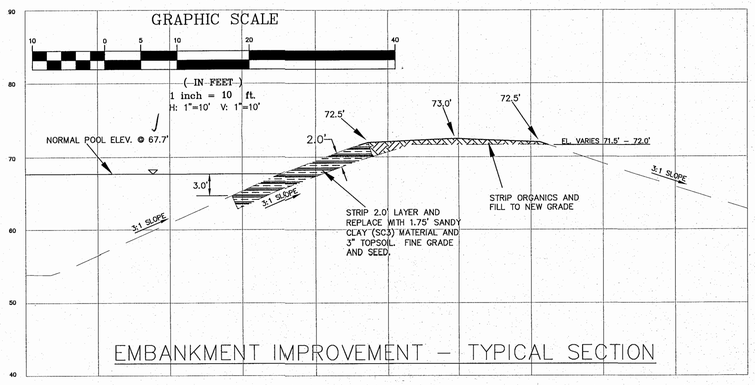
3. CLEARING LIMITS NEED TO BE SHOWN ONCE THE EXISTING WOODS LINE HAS BEEN SURVEYED.

4. THE WETLAND DELINEATION WILL BE CONFIRMED BY THE US ARMY CORPS OF ENGINEERS ON 9/26/05.

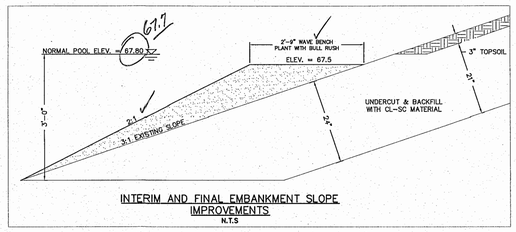
5. AN ENVIRONMENTAL PERMIT APPLICATION WILL BE SUBMITTED TO THE US ARMY CORPS OF ENGINEERS ON 9/26/05 FOR THE IMPACTS ASSOCIATED WITH THE IMPROVEMENTS.

6. THERE IS A PROPOSED STORM SEWER OUTFALL PIPE PROPOSED WITH THE WISC FACILITY IMPROVEMENTS. THIS NEEDS TO BE ADDED TO THIS PLAN SO ANY CONFLICTS WITH THE PROPOSED EMERGENCY SPILLWAY CAN BE RESOLVED. SP-65-05

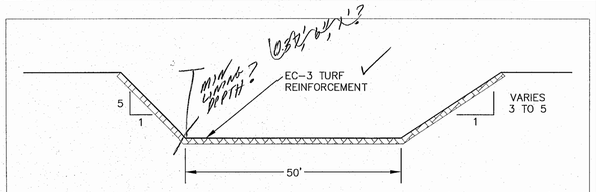




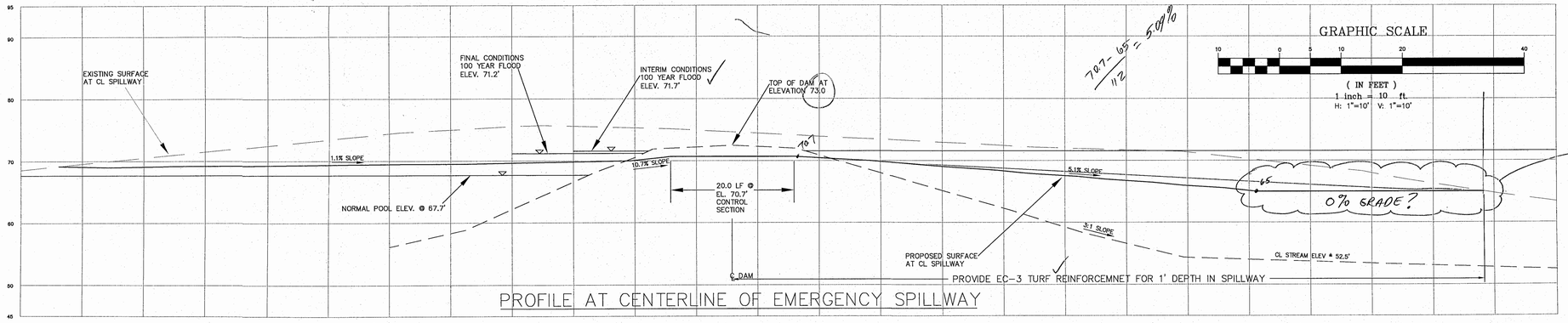
EMBANKMENT IMPROVEMENT – TYPICAL SECTION



INTERIM AND FINAL EMBANKMENT SLOPE IMPROVEMENTS
N.T.S.



EMS SECTION @ CONTROL
N.T.S.



PROFILE AT CENTERLINE OF EMERGENCY SPILLWAY

I TOLD TIMMONS THE GRADING WAS MESSED UP HERE.

EMERGENCY-
INTERIM
REPAIR

SP-107-05

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Site Development | Residential | Infrastructure | Technology

DATE	REVISION DESCRIPTION

DATE	9-15-05
DRAWN BY	D. WILMOTH
DESIGNED BY	D. WILMOTH
CHECKED BY	A.GOULD
SCALE	AS SHOWN

TIMMONS GROUP

JAMES CITY COUNTY PPEA

JAMES CITY COUNTY, VIRGINIA

PROPOSED INTERIM IMPROVEMENTS TO EAST DAM (PC106 DAM)

JOB NO.	22547
SHEET NO.	1 OF 1

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GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS, PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

2. MATERIAL USED FOR FILL SHALL BE SELECT MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON THIS SHEET. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

4. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.

5. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

UNRESOLVED ISSUES

1. ADDITIONAL FIELD TOPOGRAPHY NEEDS TO BE OBTAINED TO FINALIZE THIS PLAN. THIS IS SCHEDULED FOR 9/22/05.

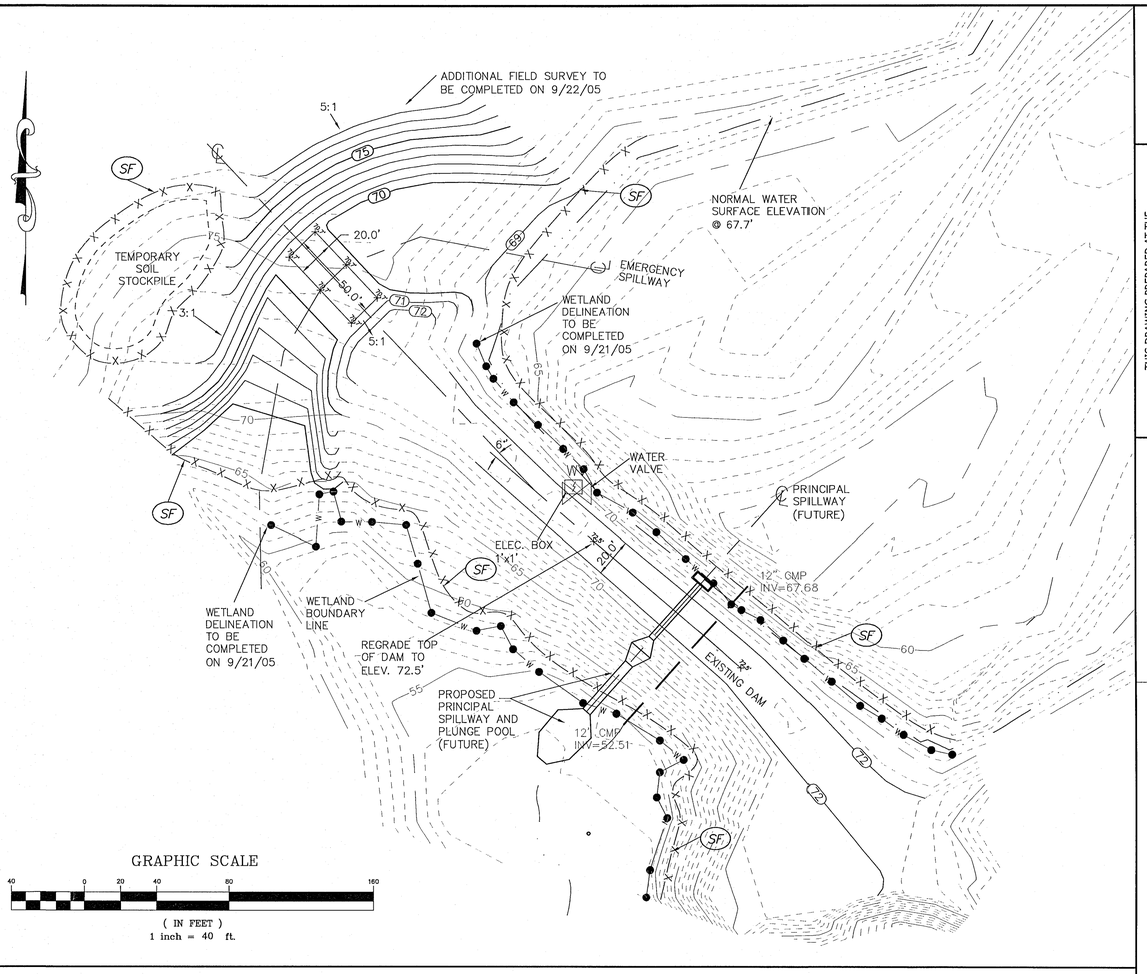
2. WETLAND DELINEATION LIMITS SHOWN NEED TO BE EXPANDED IN THE AREAS OF THE PROPOSED EMERGENCY SPILLWAY TO ENSURE NO IMPACTS DURING THIS INTERIM PHASE. THIS WILL BE DONE ON 9/21/05.

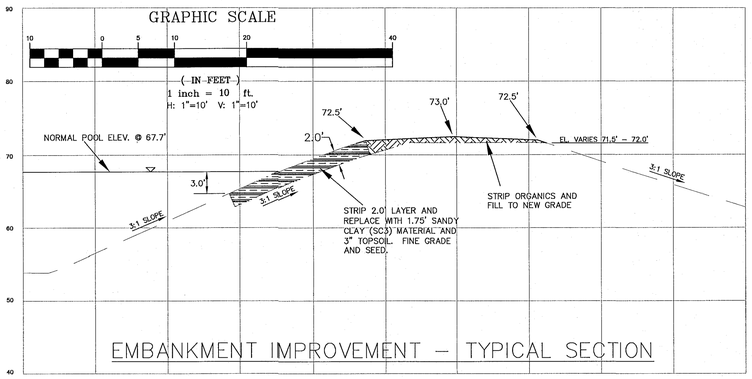
3. CLEARING LIMITS NEED TO BE SHOWN ONCE THE EXISTING WOODS LINE HAS BEEN SURVEYED.

4. THE WETLAND DELINEATION WILL BE CONFIRMED BT THE US ARMY CORPS OF ENGINEERS ON 9/26/05.

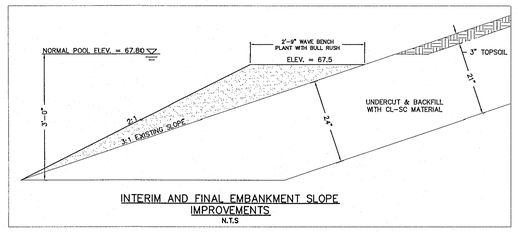
5. AN ENVIRONMENTAL PERMIT APPLICATION WILL BE SUBMITTED TO THE US ARMY CORPS OF ENGINEERS ON 9/26/05 FOR THE IMPACTS ASSOCIATED WITH THE IMPROVEMENTS.

6. THERE IS A PROPOSED STORM SEWER OUTFALL PIPE PROPOSED WITH THE WISC FACILITY IMPROVEMENTS. THIS NEEDS TO BE ADDED TO THIS PLAN SO ANY CONFLICTS WITH THE PROPOSED EMERGENCY SPILLWAY CAN BE RESOLVED.

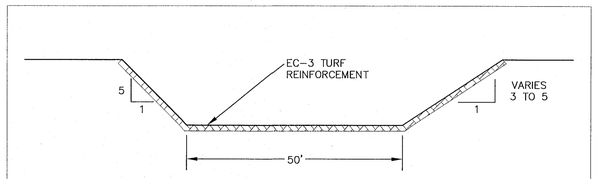




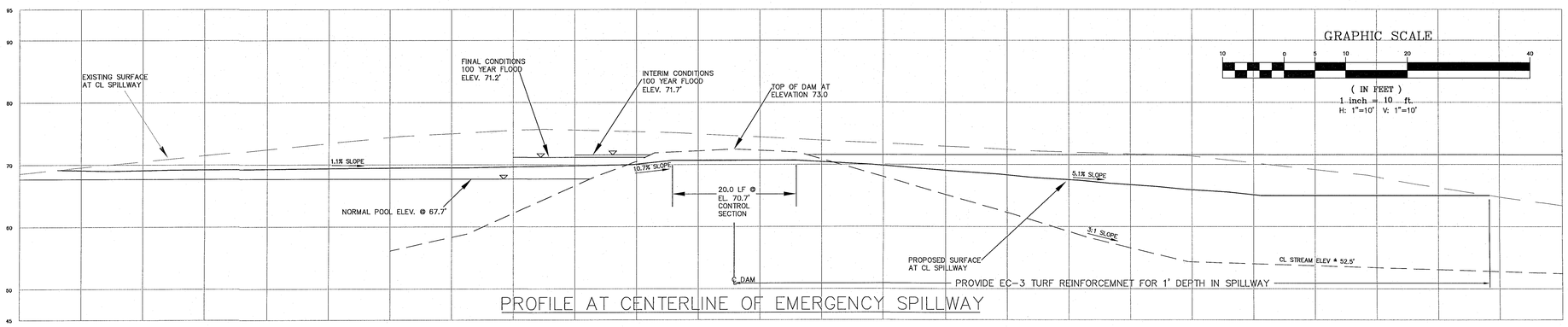
EMBANKMENT IMPROVEMENT – TYPICAL SECTION



INTERIM AND FINAL EMBANKMENT SLOPE IMPROVEMENTS
N.T.S



EMS SECTION @ CONTROL
N.T.S.



PROFILE AT CENTERLINE OF EMERGENCY SPILLWAY

INTERIM

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

Site Development | Residential | Infrastructure | Technology

REVISION DESCRIPTION

DATE
9-15-05
DRAWN BY
D. WILMOTH
DESIGNED BY
D. WILMOTH
CHECKED BY
A.GOULD
SCALE
AS SHOWN

TIMMONS GROUP

JAMES CITY COUNTY PPEA

JAMES CITY COUNTY, VIRGINIA

PROPOSED INTERIM IMPROVEMENTS TO EAST DAM (PC106 DAM)

JOB NO. 22547

SHEET NO. 1 OF 1

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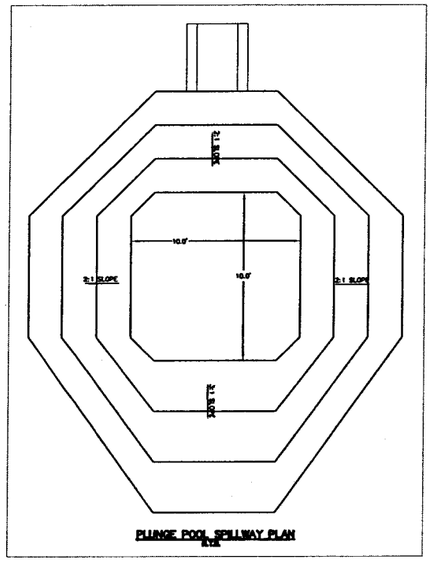
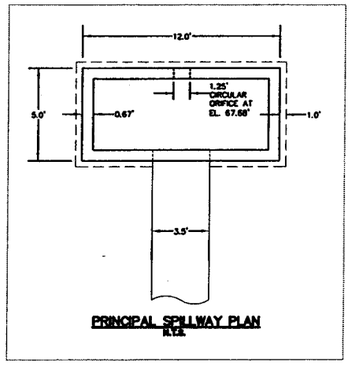
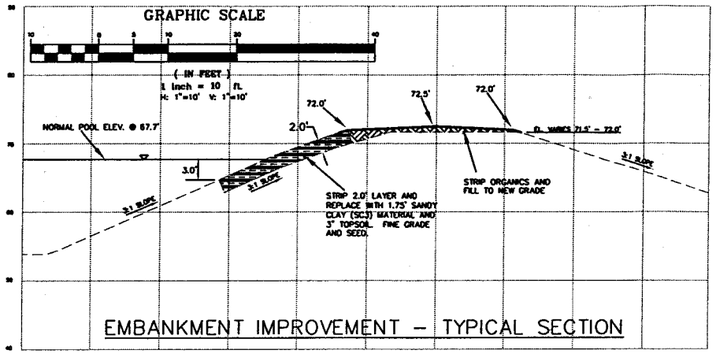


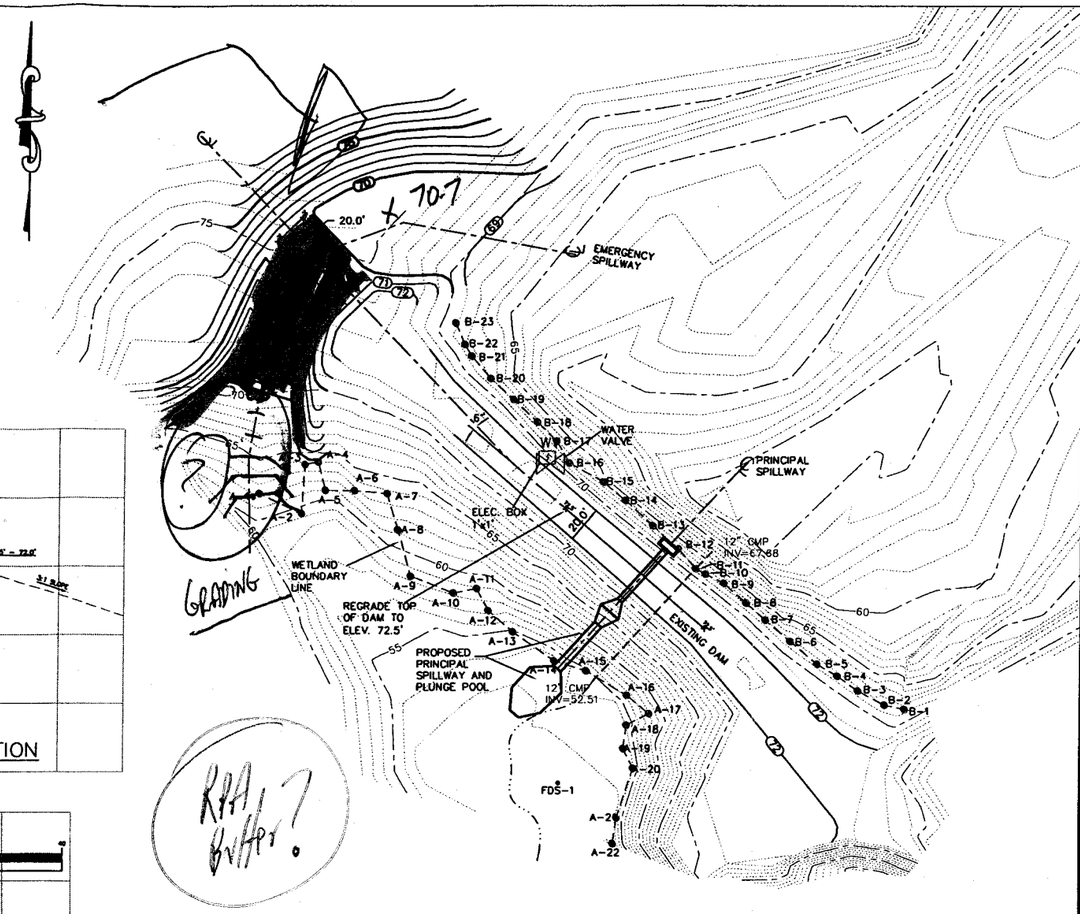
PLUNGE POOL SPILLWAY PLAN
N.T.S.

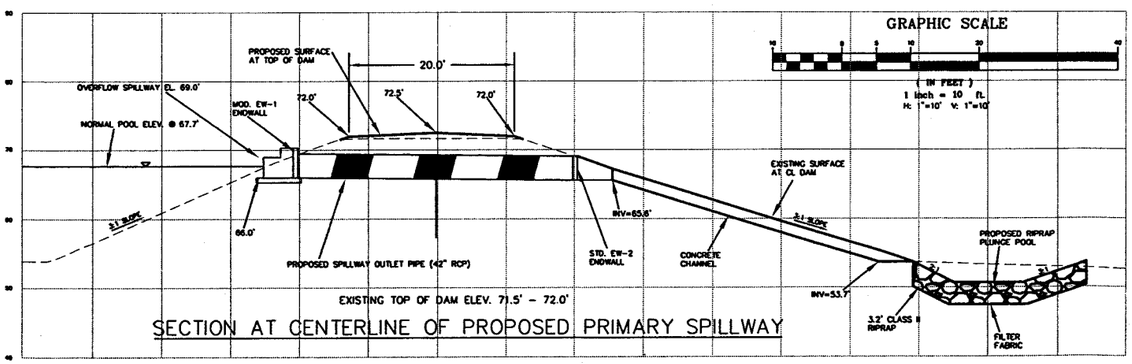


PRINCIPAL SPILLWAY PLAN
N.T.S.

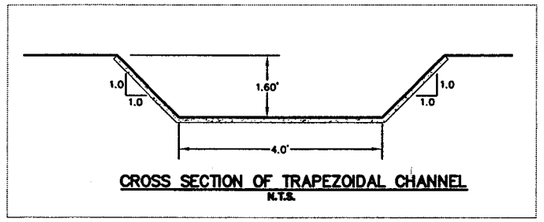


EMBANKMENT IMPROVEMENT – TYPICAL SECTION

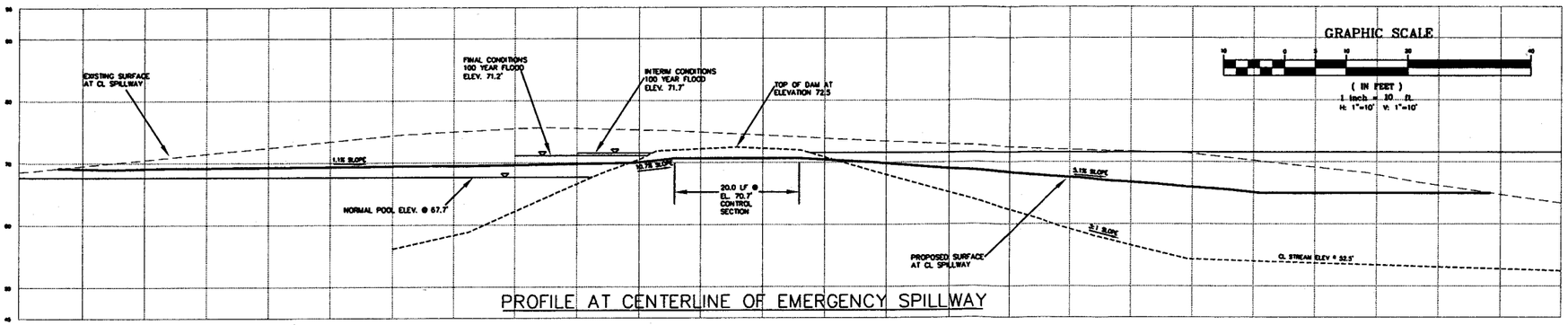




SECTION AT CENTERLINE OF PROPOSED PRIMARY SPILLWAY



CROSS SECTION OF TRAPEZOIDAL CHANNEL
N.T.S.



PROFILE AT CENTERLINE OF EMERGENCY SPILLWAY

TABLE OF 100 YEAR VALUES

ELEV. AT TOP OF DAM: 72.5'

A. INTERIM CONDITIONS (ELEV.)	
1. SCHOOL SITE UNDEVELOPED (NO RETENTION)	71.7 FT
2. STADIUM CLEARED	
B. INTERIM CONDITIONS: SCHOOL SITE	
1. POND & RETENTION BASIN IN PLACE	71.6 FT
2. STADIUM SITE CLEARED	
C. FINAL CONDITIONS	
1. NEW PRIMARY SPILLWAY IN PLACE ON PC106 DAM	71.3 FT
2. SCHOOL & STADIUM CONSTR.	

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

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TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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Site Development | Residential | Infrastructure | Technology

DATE	REVISION DESCRIPTION

TIMMONS GROUP

JAMES CITY COUNTY PPEA
JAMES CITY COUNTY, VIRGINIA
PROPOSED IMPROVEMENTS TO EAST DAM (PC106 DAM)

DATE	7/26/05
DRAWN BY	D. WILMOTH
DESIGNED BY	D. WILMOTH
CHECKED BY	M. CLAUD
SCALE	AS SHOWN
JOB NO.	22547
SHEET NO.	1 OF 1

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RECEIVED
ENVIRONMENTAL DIVISION

Warhill PPEA:
District Park East Pond PC106
Final Improvements

APPROVED
James City County
Environmental Division
By: _____
Date: 04-08-07

Prepared by:

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, Virginia 23225

SP-107-05
PC106
DCR 09529

Warhill PPEA:
District Park East Pond PC106 Final Improvements

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Project Narrative	1
Design Calculations / Pond Routing	2
Dam Safety Reports / Correspondence	3
WQIA / Design Waiver Letters	4
Environmental Permitting	5

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 033586
4/4/2007
PROFESSIONAL ENGINEER

SECTION 1

Project Narrative

The Warhill Site District Park East Pond PC106 serves a drainage area of approximately 150 acres associated with development of the Warhill Tract which includes construction of a Community College, High School and Sports Stadium.

The Warhill Site District Park East Pond PC106 is a wet-type detention facility. A wet-type detention pond temporarily stores runoff and normally maintains a permanent wet pool during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. Principal structures associated with the BMP consist of a concrete inlet box, a 42 inch diameter concrete culvert and 50 foot wide, grass-lined trapezoidal shaped emergency overflow channel. There is 1′notch in the inlet box to provide for water quality drawdown.

During the 100-year storm, the maximum water level should rise to about 2.25 feet above the top of the inlet box and within 1.75 feet below the top of dam. During this type of larger storm event, the emergency spillway, which is located through the embankment along the northwest side, will discharge flow. Normal storm events should reach an elevation just below the top of the inlet box and the pond should draw down in about 24 to 36 hours. This design is to help protect the existing natural downstream channel from erosion.

SECTION 2

Warhill Site Eastern Pond (PC106) Dam
Worksheet for Trapezoidal Channel

OUTFLOW CHANNEL ON DOWNSTREAM FACE OF DAM

Project Description	
Worksheet	Principal Spillway Outfall Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Slope	0.283200	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	105.00	cfs

Results		
Depth	0.77	ft
Flow Area	2.7	ft²
Wetted Perimeter	5.45	ft
Top Width	5.09	ft
Critical Depth	2.35	ft
Critical Slope	0.002503	ft/ft
Velocity	38.40	ft/s
Velocity Head	22.92	ft
Specific Energy	23.69	ft
Froude Number	9.23	
Flow Type	Supercritical	

WARHILL SITE EASTERN POND DAM
(PC106)

ULTIMATE DEV Cond.
DESIGN ROUTING

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PC106 DAM..... Runoff CN-Area 3.02

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********** OUTLET STRUCTURES **********

PC106-DEV2..... Outlet Input Data 6.01

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********** POND ROUTING **********

PC-106 OUT 1
Pond Routing Summary 7.01

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Pond Routing Summary 7.02

PC-106 OUT 10
Pond Routing Summary 7.03

PC-106 OUT 25
Pond Routing Summary 7.04

PC-106 OUT 100
Pond Routing Summary 7.05

MASTER DESIGN STORM SUMMARY

Network Storm Collection: James City Count

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.8000	Synthetic Curve	TypeII 24hr
2	3.5000	Synthetic Curve	TypeII 24hr
10	5.5000	Synthetic Curve	TypeII 24hr
25	6.0000	Synthetic Curve	TypeII 24hr
100	8.0000	Synthetic Curve	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)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
HS-BMP		AREA	1	6.077		12.1000	69.93		
HS-BMP		AREA	2	8.189		12.1000	93.50		
HS-BMP		AREA	10	14.401		12.1000	160.66		
HS-BMP		AREA	25	15.976		12.1000	177.33		
HS-BMP		AREA	100	22.316		12.1000	243.55		
HS-BMP	IN	POND	1	6.077		12.1000	69.93		
HS-BMP	IN	POND	2	8.189		12.1000	93.50		
HS-BMP	IN	POND	10	14.401		12.1000	160.66		
HS-BMP	IN	POND	25	15.976		12.1000	177.33		
HS-BMP	IN	POND	100	22.316		12.1000	243.55		
HS-BMP	OUT	POND	1	2.709	R	22.9500	.42	96.37	5.667
HS-BMP	OUT	POND	2	4.318	R	23.9500	1.42	97.07	7.040
HS-BMP	OUT	POND	10	10.093	R	17.0000	4.23	98.94	10.992
HS-BMP	OUT	POND	25	11.641	R	14.0000	9.85	99.12	11.396
HS-BMP	OUT	POND	100	17.929	R	12.6500	49.13	100.01	13.463

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 10		JCT	1	10.861	R	19.4500	3.92		
*OUT 10		JCT	2	17.003	R	16.3000	9.15		
*OUT 10		JCT	10	37.840	R	14.1000	49.35		
*OUT 10		JCT	25	43.438	R	14.1500	59.02		
*OUT 10		JCT	100	66.513	R	13.5500	155.77		
PC-106	IN	POND	1	11.888	R	12.8500	42.90		
PC-106	IN	POND	2	18.218	R	12.7000	67.46		
PC-106	IN	POND	10	39.252	R	12.7000	149.44		
PC-106	IN	POND	25	44.864	R	12.7000	170.74		
PC-106	IN	POND	100	67.975	R	12.7000	300.82		
PC-106	OUT	POND	1	10.861	R	19.4500	3.92	68.67	41.620
PC-106	OUT	POND	2	17.003	R	16.3000	9.15	69.08	44.353
PC-106	OUT	POND	10	37.840	R	14.1000	49.35	69.92	50.200
PC-106	OUT	POND	25	43.438	R	14.1500	59.02	70.20	52.161
PC-106	OUT	POND	100	66.513	R	13.5500	155.77	71.25	59.973
PC106 DAM		AREA	1	9.178		12.8500	42.60		
PC106 DAM		AREA	2	13.901		12.7000	67.06		
PC106 DAM		AREA	10	29.159		12.7000	146.00		
PC106 DAM		AREA	25	33.224		12.7000	166.78		
PC106 DAM		AREA	100	50.046		12.7000	251.71		

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .4000 hrs

==========
Total Tc: .4000 hrs
==========

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: 1.3800 hrs

==========
Total Tc: 1.3800 hrs
==========

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Cleared Site Conditions	91	38.650			91.00
COMPOSITE AREA & WEIGHTED CN --->		38.650			91.00 (91)

::

File.... R:\200 - Municipal\22547\Calcs\PondPack\Third HS\PC 106 DAM.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Electric Station	96	2.830			96.00
Sports Fields	88	22.210			88.00
Utility Easement	75	11.880			75.00
Forested Land	70	61.510			70.00
Water	100	7.040			100.00
Stadium Site	93	5.930			93.00
COMPOSITE AREA & WEIGHTED CN --->		111.400			77.90 (78)

::

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
6.8500	67.70	67.70	67.70	67.70	67.70
7.1000	67.70	67.70	67.70	67.70	67.70
7.3500	67.70	67.70	67.70	67.70	67.70
7.6000	67.70	67.70	67.70	67.70	67.70
7.8500	67.70	67.70	67.70	67.70	67.70
8.1000	67.70	67.70	67.70	67.70	67.70
8.3500	67.70	67.70	67.70	67.70	67.70
8.6000	67.70	67.70	67.70	67.70	67.70
8.8500	67.70	67.70	67.70	67.70	67.70
9.1000	67.70	67.70	67.70	67.70	67.70
9.3500	67.70	67.70	67.70	67.70	67.70
9.6000	67.70	67.70	67.70	67.70	67.70
9.8500	67.70	67.70	67.70	67.70	67.70
10.1000	67.70	67.70	67.70	67.70	67.70
10.3500	67.70	67.70	67.70	67.70	67.70
10.6000	67.70	67.70	67.70	67.70	67.70
10.8500	67.70	67.70	67.70	67.70	67.70
11.1000	67.70	67.70	67.70	67.70	67.70
11.3500	67.70	67.70	67.70	67.70	67.70
11.6000	67.70	67.70	67.71	67.71	67.71
11.8500	67.71	67.71	67.72	67.72	67.73
12.1000	67.74	67.74	67.76	67.77	67.78
12.3500	67.80	67.82	67.84	67.86	67.89
12.6000	67.91	67.94	67.97	68.00	68.02
12.8500	68.05	68.08	68.10	68.13	68.15
13.1000	68.17	68.20	68.22	68.24	68.26
13.3500	68.28	68.30	68.31	68.33	68.34
13.6000	68.36	68.37	68.38	68.39	68.41
13.8500	68.42	68.43	68.44	68.45	68.45
14.1000	68.46	68.47	68.48	68.49	68.49
14.3500	68.50	68.51	68.51	68.52	68.52
14.6000	68.53	68.53	68.54	68.54	68.55
14.8500	68.55	68.56	68.56	68.56	68.57
15.1000	68.57	68.57	68.58	68.58	68.58
15.3500	68.59	68.59	68.59	68.59	68.60
15.6000	68.60	68.60	68.60	68.61	68.61
15.8500	68.61	68.61	68.62	68.62	68.62
16.1000	68.62	68.62	68.62	68.63	68.63
16.3500	68.63	68.63	68.63	68.63	68.63
16.6000	68.64	68.64	68.64	68.64	68.64
16.8500	68.64	68.64	68.64	68.65	68.65
17.1000	68.65	68.65	68.65	68.65	68.65
17.3500	68.65	68.65	68.65	68.65	68.65

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
17.6000	68.65	68.66	68.66	68.66	68.66
17.8500	68.66	68.66	68.66	68.66	68.66
18.1000	68.66	68.66	68.66	68.66	68.66
18.3500	68.66	68.66	68.66	68.66	68.66
18.6000	68.66	68.66	68.66	68.67	68.67
18.8500	68.67	68.67	68.67	68.67	68.67
19.1000	68.67	68.67	68.67	68.67	68.67
19.3500	68.67	68.67	68.67	68.67	68.67
19.6000	68.67	68.67	68.67	68.67	68.67
19.8500	68.67	68.67	68.67	68.67	68.67
20.1000	68.67	68.67	68.67	68.67	68.67
20.3500	68.67	68.67	68.66	68.66	68.66
20.6000	68.66	68.66	68.66	68.66	68.66
20.8500	68.66	68.66	68.66	68.66	68.66
21.1000	68.66	68.66	68.66	68.66	68.66
21.3500	68.66	68.66	68.66	68.66	68.66
21.6000	68.66	68.66	68.66	68.65	68.65
21.8500	68.65	68.65	68.65	68.65	68.65
22.1000	68.65	68.65	68.65	68.65	68.65
22.3500	68.65	68.65	68.65	68.65	68.65
22.6000	68.65	68.65	68.65	68.65	68.64
22.8500	68.64	68.64	68.64	68.64	68.64
23.1000	68.64	68.64	68.64	68.64	68.64
23.3500	68.64	68.64	68.64	68.64	68.64
23.6000	68.64	68.64	68.64	68.63	68.63
23.8500	68.63	68.63	68.63	68.63	68.63
24.1000	68.63	68.63	68.63	68.63	68.63
24.3500	68.63	68.63	68.63	68.63	68.63
24.6000	68.62	68.62	68.62	68.62	68.62
24.8500	68.62	68.62	68.62	68.62	68.61
25.1000	68.61	68.61	68.61	68.61	68.61
25.3500	68.61	68.60	68.60	68.60	68.60
25.6000	68.60	68.60	68.59	68.59	68.59
25.8500	68.59	68.59	68.58	68.58	68.58
26.1000	68.58	68.58	68.58	68.57	68.57
26.3500	68.57	68.57	68.57	68.56	68.56
26.6000	68.56	68.56	68.56	68.56	68.55
26.8500	68.55	68.55	68.55	68.55	68.54
27.1000	68.54	68.54	68.54	68.54	68.54
27.3500	68.53	68.53	68.53	68.53	68.53
27.6000	68.52	68.52	68.52	68.52	68.52
27.8500	68.52	68.51	68.51	68.51	68.51
28.1000	68.51	68.51	68.50	68.50	68.50
28.3500	68.50	68.50	68.50	68.49	68.49

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
28.6000	68.49	68.49	68.49	68.49	68.48
28.8500	68.48	68.48	68.48	68.48	68.48
29.1000	68.47	68.47	68.47	68.47	68.47
29.3500	68.47	68.46	68.46	68.46	68.46
29.6000	68.46	68.46	68.45	68.45	68.45
29.8500	68.45	68.45	68.45	68.45	68.44
30.1000	68.44	68.44	68.44	68.44	68.44
30.3500	68.43	68.43	68.43	68.43	68.43
30.6000	68.43	68.43	68.42	68.42	68.42
30.8500	68.42	68.42	68.42	68.42	68.41
31.1000	68.41	68.41	68.41	68.41	68.41
31.3500	68.41	68.40	68.40	68.40	68.40
31.6000	68.40	68.40	68.40	68.39	68.39
31.8500	68.39	68.39	68.39	68.39	68.39
32.1000	68.38	68.38	68.38	68.38	68.38
32.3500	68.38	68.38	68.37	68.37	68.37
32.6000	68.37	68.37	68.37	68.37	68.37
32.8500	68.36	68.36	68.36	68.36	68.36
33.1000	68.36	68.36	68.36	68.35	68.35
33.3500	68.35	68.35	68.35	68.35	68.35
33.6000	68.35	68.34	68.34	68.34	68.34
33.8500	68.34	68.34	68.34	68.34	68.33
34.1000	68.33	68.33	68.33	68.33	68.33
34.3500	68.33	68.33	68.32	68.32	68.32
34.6000	68.32	68.32	68.32	68.32	68.32
34.8500	68.32	68.31	68.31	68.31	68.31
35.1000	68.31	68.31	68.31	68.31	68.31
35.3500	68.30	68.30	68.30	68.30	68.30
35.6000	68.30	68.30	68.30	68.30	68.29
35.8500	68.29	68.29	68.29	68.29	68.29
36.1000	68.29	68.29	68.29	68.28	68.28
36.3500	68.28	68.28	68.28	68.28	68.28
36.6000	68.28	68.28	68.28	68.27	68.27
36.8500	68.27	68.27	68.27	68.27	68.27
37.1000	68.27	68.27	68.27	68.26	68.26
37.3500	68.26	68.26	68.26	68.26	68.26
37.6000	68.26	68.26	68.26	68.25	68.25
37.8500	68.25	68.25	68.25	68.25	68.25
38.1000	68.25	68.25	68.25	68.24	68.24
38.3500	68.24	68.24	68.24	68.24	68.24
38.6000	68.24	68.24	68.24	68.24	68.23
38.8500	68.23	68.23	68.23	68.23	68.23
39.1000	68.23	68.23	68.23	68.23	68.23
39.3500	68.23	68.22	68.22	68.22	68.22

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
39.6000	68.22	68.22	68.22	68.22	68.22
39.8500	68.22	68.22	68.21	68.21	68.21
40.1000	68.21	68.21	68.21	68.21	68.21
40.3500	68.21	68.21	68.21	68.21	68.20
40.6000	68.20	68.20	68.20	68.20	68.20
40.8500	68.20	68.20	68.20	68.20	68.20
41.1000	68.20	68.20	68.19	68.19	68.19
41.3500	68.19	68.19	68.19	68.19	68.19
41.6000	68.19	68.19	68.19	68.19	68.19
41.8500	68.18	68.18	68.18	68.18	68.18
42.1000	68.18	68.18	68.18	68.18	68.18
42.3500	68.18	68.18	68.18	68.17	68.17
42.6000	68.17	68.17	68.17	68.17	68.17
42.8500	68.17	68.17	68.17	68.17	68.17
43.1000	68.17	68.17	68.16	68.16	68.16
43.3500	68.16	68.16	68.16	68.16	68.16
43.6000	68.16	68.16	68.16	68.16	68.16
43.8500	68.16	68.16	68.15	68.15	68.15
44.1000	68.15	68.15	68.15	68.15	68.15
44.3500	68.15	68.15	68.15	68.15	68.15
44.6000	68.15	68.15	68.14	68.14	68.14
44.8500	68.14	68.14	68.14	68.14	68.14
45.1000	68.14	68.14	68.14	68.14	68.14
45.3500	68.14	68.14	68.14	68.13	68.13
45.6000	68.13	68.13	68.13	68.13	68.13
45.8500	68.13	68.13	68.13	68.13	68.13
46.1000	68.13	68.13	68.13	68.13	68.13
46.3500	68.12	68.12	68.12	68.12	68.12
46.6000	68.12	68.12	68.12	68.12	68.12
46.8500	68.12	68.12	68.12	68.12	68.12
47.1000	68.12	68.12	68.12	68.11	68.11
47.3500	68.11	68.11	68.11	68.11	68.11
47.6000	68.11	68.11	68.11	68.11	68.11
47.8500	68.11	68.11	68.11	68.11	68.11
48.1000	68.11	68.10	68.10	68.10	68.10
48.3500	68.10	68.10	68.10	68.10	68.10
48.6000	68.10	68.10	68.10	68.10	68.10
48.8500	68.10	68.10	68.10	68.10	68.10
49.1000	68.10	68.09	68.09	68.09	68.09
49.3500	68.09	68.09	68.09	68.09	68.09
49.6000	68.09	68.09	68.09	68.09	68.09
49.8500	68.09	68.09	68.09	68.09	68.09
50.1000	68.09	68.09	68.08	68.08	68.08
50.3500	68.08	68.08	68.08	68.08	68.08

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
50.6000	68.08	68.08	68.08	68.08	68.08
50.8500	68.08	68.08	68.08	68.08	68.08
51.1000	68.08	68.08	68.08	68.08	68.07
51.3500	68.07	68.07	68.07	68.07	68.07
51.6000	68.07	68.07	68.07	68.07	68.07
51.8500	68.07	68.07	68.07	68.07	68.07
52.1000	68.07	68.07	68.07	68.07	68.07
52.3500	68.07	68.07	68.07	68.06	68.06
52.6000	68.06	68.06	68.06	68.06	68.06
52.8500	68.06	68.06	68.06	68.06	68.06
53.1000	68.06	68.06	68.06	68.06	68.06
53.3500	68.06	68.06	68.06	68.06	68.06
53.6000	68.06	68.06	68.06	68.05	68.05
53.8500	68.05	68.05	68.05	68.05	68.05
54.1000	68.05	68.05	68.05	68.05	68.05
54.3500	68.05	68.05	68.05	68.05	68.05
54.6000	68.05	68.05	68.05	68.05	68.05
54.8500	68.05	68.05	68.05	68.05	68.05
55.1000	68.05	68.04	68.04	68.04	68.04
55.3500	68.04	68.04	68.04	68.04	68.04
55.6000	68.04	68.04	68.04	68.04	68.04
55.8500	68.04	68.04	68.04	68.04	68.04
56.1000	68.04	68.04	68.04	68.04	68.04
56.3500	68.04	68.04	68.04	68.04	68.04
56.6000	68.03	68.03	68.03	68.03	68.03
56.8500	68.03	68.03	68.03	68.03	68.03
57.1000	68.03	68.03	68.03	68.03	68.03
57.3500	68.03	68.03	68.03	68.03	68.03
57.6000	68.03	68.03	68.03	68.03	68.03
57.8500	68.03	68.03	68.03	68.03	68.03
58.1000	68.03	68.03	68.03	68.02	68.02
58.3500	68.02	68.02	68.02	68.02	68.02
58.6000	68.02	68.02	68.02	68.02	68.02
58.8500	68.02	68.02	68.02	68.02	68.02
59.1000	68.02	68.02	68.02	68.02	68.02
59.3500	68.02	68.02	68.02	68.02	68.02
59.6000	68.02	68.02	68.02	68.02	68.02
59.8500	68.02	68.02	68.02	68.01	68.01
60.1000	68.01	68.01	68.01	68.01	68.01
60.3500	68.01	68.01	68.01	68.01	68.01
60.6000	68.01	68.01	68.01	68.01	68.01
60.8500	68.01	68.01	68.01	68.01	68.01
61.1000	68.01	68.01	68.01	68.01	68.01
61.3500	68.01	68.01	68.01	68.01	68.01

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
61.6000	68.01	68.01	68.01	68.01	68.01
61.8500	68.01	68.01	68.00	68.00	68.00
62.1000	68.00	68.00	68.00	68.00	68.00
62.3500	68.00	68.00	68.00	68.00	68.00
62.6000	68.00	68.00	68.00	68.00	68.00
62.8500	68.00	68.00	68.00	68.00	68.00
63.1000	68.00	68.00	68.00	68.00	68.00
63.3500	68.00	68.00	68.00	68.00	68.00
63.6000	68.00	68.00	68.00	68.00	68.00
63.8500	68.00	68.00	68.00	68.00	68.00
64.1000	67.99	67.99	67.99	67.99	67.99
64.3500	67.99	67.99	67.99	67.99	67.99
64.6000	67.99	67.99	67.99	67.99	67.99
64.8500	67.99	67.99	67.99	67.99	67.99
65.1000	67.99	67.99	67.99	67.99	67.99
65.3500	67.99	67.99	67.99	67.99	67.99
65.6000	67.99	67.99	67.99	67.99	67.99
65.8500	67.99	67.99	67.99	67.99	67.99
66.1000	67.99	67.99	67.99	67.99	67.99
66.3500	67.98	67.98	67.98	67.98	67.98
66.6000	67.98	67.98	67.98	67.98	67.98
66.8500	67.98	67.98	67.98	67.98	67.98
67.1000	67.98	67.98	67.98	67.98	67.98
67.3500	67.98	67.98	67.98	67.98	67.98
67.6000	67.98	67.98	67.98	67.98	67.98
67.8500	67.98	67.98	67.98	67.98	67.98
68.1000	67.98	67.98	67.98	67.98	67.98
68.3500	67.98	67.98	67.98	67.98	67.98
68.6000	67.98	67.97	67.97	67.97	67.97
68.8500	67.97	67.97	67.97	67.97	67.97
69.1000	67.97	67.97	67.97	67.97	67.97
69.3500	67.97	67.97	67.97	67.97	67.97
69.6000	67.97	67.97	67.97	67.97	67.97
69.8500	67.97	67.97	67.97	67.97	67.97
70.1000	67.97	67.97	67.97	67.97	67.97
70.3500	67.97	67.97	67.97	67.97	67.97
70.6000	67.97	67.97	67.97	67.97	67.97
70.8500	67.97	67.97	67.97	67.97	67.97
71.1000	67.97	67.96	67.96	67.96	67.96
71.3500	67.96	67.96	67.96	67.96	67.96
71.6000	67.96	67.96	67.96	67.96	67.96
71.8500	67.96	67.96	67.96	67.96	67.96
72.1000	67.96	67.96	67.96	67.96	67.96
72.3500	67.96	67.96	67.96	67.96	67.96

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
72.6000	67.96	67.96	67.96	67.96	67.96
72.8500	67.96	67.96	67.96	67.96	67.96
73.1000	67.96	67.96	67.96	67.96	67.96
73.3500	67.96	67.96	67.96	67.96	67.96
73.6000	67.96	67.96	67.96	67.96	67.95
73.8500	67.95	67.95	67.95	67.95	67.95
74.1000	67.95	67.95	67.95	67.95	67.95
74.3500	67.95	67.95	67.95	67.95	67.95
74.6000	67.95	67.95	67.95	67.95	67.95
74.8500	67.95	67.95	67.95	67.95	67.95
75.1000	67.95	67.95	67.95	67.95	67.95
75.3500	67.95	67.95	67.95	67.95	67.95
75.6000	67.95	67.95	67.95	67.95	67.95
75.8500	67.95	67.95	67.95	67.95	67.95
76.1000	67.95	67.95	67.95	67.95	67.95
76.3500	67.95	67.95	67.95	67.95	67.95
76.6000	67.94	67.94	67.94	67.94	67.94
76.8500	67.94	67.94	67.94	67.94	67.94
77.1000	67.94	67.94	67.94	67.94	67.94
77.3500	67.94	67.94	67.94	67.94	67.94
77.6000	67.94	67.94	67.94	67.94	67.94
77.8500	67.94	67.94	67.94	67.94	67.94
78.1000	67.94	67.94	67.94	67.94	67.94
78.3500	67.94	67.94	67.94	67.94	67.94
78.6000	67.94	67.94	67.94	67.94	67.94
78.8500	67.94	67.94	67.94	67.94	67.94
79.1000	67.94	67.94	67.94	67.94	67.94
79.3500	67.94	67.94	67.94	67.94	67.93
79.6000	67.93	67.93	67.93	67.93	67.93
79.8500	67.93	67.93	67.93	67.93	67.93
80.1000	67.93	67.93	67.93	67.93	67.93
80.3500	67.93	67.93	67.93	67.93	67.93
80.6000	67.93	67.93	67.93	67.93	67.93
80.8500	67.93	67.93	67.93	67.93	67.93
81.1000	67.93	67.93	67.93	67.93	67.93
81.3500	67.93	67.93	67.93	67.93	67.93
81.6000	67.93	67.93	67.93	67.93	67.93
81.8500	67.93	67.93	67.93	67.93	67.93
82.1000	67.93	67.93	67.93	67.93	67.93
82.3500	67.93	67.93	67.93	67.93	67.93
82.6000	67.93	67.93	67.93	67.92	67.92
82.8500	67.92	67.92	67.92	67.92	67.92
83.1000	67.92	67.92	67.92	67.92	67.92
83.3500	67.92	67.92	67.92	67.92	67.92

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
83.6000	67.92	67.92	67.92	67.92	67.92
83.8500	67.92	67.92	67.92	67.92	67.92
84.1000	67.92	67.92	67.92	67.92	67.92
84.3500	67.92	67.92	67.92	67.92	67.92
84.6000	67.92	67.92	67.92	67.92	67.92
84.8500	67.92	67.92	67.92	67.92	67.92
85.1000	67.92	67.92	67.92	67.92	67.92
85.3500	67.92	67.92	67.92	67.92	67.92
85.6000	67.92	67.92	67.92	67.92	67.92
85.8500	67.92	67.92	67.92	67.92	67.92
86.1000	67.92	67.91	67.91	67.91	67.91
86.3500	67.91	67.91	67.91	67.91	67.91
86.6000	67.91	67.91	67.91	67.91	67.91
86.8500	67.91	67.91	67.91	67.91	67.91
87.1000	67.91	67.91	67.91	67.91	67.91
87.3500	67.91	67.91	67.91	67.91	67.91
87.6000	67.91	67.91	67.91	67.91	67.91
87.8500	67.91	67.91	67.91	67.91	67.91
88.1000	67.91	67.91	67.91	67.91	67.91
88.3500	67.91	67.91	67.91	67.91	67.91
88.6000	67.91	67.91	67.91	67.91	67.91
88.8500	67.91	67.91	67.91	67.91	67.91
89.1000	67.91	67.91	67.91	67.91	67.91
89.3500	67.91	67.91	67.91	67.91	67.91
89.6000	67.91	67.91	67.91	67.91	67.91
89.8500	67.90	67.90	67.90	67.90	67.90
90.1000	67.90	67.90	67.90	67.90	67.90
90.3500	67.90	67.90	67.90	67.90	67.90
90.6000	67.90	67.90	67.90	67.90	67.90
90.8500	67.90	67.90	67.90	67.90	67.90
91.1000	67.90	67.90	67.90	67.90	67.90
91.3500	67.90	67.90	67.90	67.90	67.90
91.6000	67.90	67.90	67.90	67.90	67.90
91.8500	67.90	67.90	67.90	67.90	67.90
92.1000	67.90	67.90	67.90	67.90	67.90
92.3500	67.90	67.90	67.90	67.90	67.90
92.6000	67.90	67.90	67.90	67.90	67.90
92.8500	67.90	67.90	67.90	67.90	67.90
93.1000	67.90	67.90	67.90	67.90	67.90
93.3500	67.90	67.90	67.90	67.90	67.90
93.6000	67.90	67.90	67.90	67.90	67.89
93.8500	67.89	67.89	67.89	67.89	67.89
94.1000	67.89	67.89	67.89	67.89	67.89
94.3500	67.89	67.89	67.89	67.89	67.89

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
94.6000	67.89	67.89	67.89	67.89	67.89
94.8500	67.89	67.89	67.89	67.89	67.89
95.1000	67.89	67.89	67.89	67.89	67.89
95.3500	67.89	67.89	67.89	67.89	67.89
95.6000	67.89	67.89	67.89	67.89	67.89
95.8500	67.89	67.89	67.89	67.89	67.89
96.1000	67.89	67.89	67.89	67.89	67.89
96.3500	67.89	67.89	67.89	67.89	67.89
96.6000	67.89	67.89	67.89	67.89	67.89
96.8500	67.89	67.89	67.89	67.89	67.89
97.1000	67.89	67.89	67.89	67.89	67.89
97.3500	67.89	67.89	67.89	67.89	67.89
97.6000	67.89	67.89	67.89	67.89	67.89
97.8500	67.89	67.89	67.89	67.89	67.89
98.1000	67.89	67.88	67.88	67.88	67.88
98.3500	67.88	67.88	67.88	67.88	67.88
98.6000	67.88	67.88	67.88	67.88	67.88
98.8500	67.88	67.88	67.88	67.88	67.88
99.1000	67.88	67.88	67.88	67.88	67.88
99.3500	67.88	67.88	67.88	67.88	67.88
99.6000	67.88	67.88	67.88	67.88	67.88
99.8500	67.88	67.88	67.88	67.88	67.88
100.1000	67.88	67.88	67.88	67.88	67.88
100.3500	67.88	67.88	67.88	67.88	67.88
100.6000	67.88	67.88	67.88	67.88	67.88
100.8500	67.88	67.88	67.88	67.88	67.88
101.1000	67.88	67.88	67.88	67.88	67.88
101.3500	67.88	67.88	67.88	67.88	67.88
101.6000	67.88	67.88	67.88	67.88	67.88
101.8500	67.88	67.88	67.88	67.88	67.88
102.1000	67.88	67.88	67.88	67.88	67.88
102.3500	67.88	67.88	67.88	67.88	67.88
102.6000	67.88	67.88	67.88	67.88	67.88
102.8500	67.87	67.87	67.87	67.87	67.87
103.1000	67.87	67.87	67.87	67.87	67.87
103.3500	67.87	67.87	67.87	67.87	67.87
103.6000	67.87	67.87	67.87	67.87	67.87
103.8500	67.87	67.87	67.87	67.87	67.87
104.1000	67.87	67.87	67.87	67.87	67.87
104.3500	67.87	67.87	67.87	67.87	67.87
104.6000	67.87	67.87	67.87	67.87	67.87
104.8500	67.87	67.87	67.87	67.87	67.87
105.1000	67.87	67.87	67.87	67.87	67.87
105.3500	67.87	67.87	67.87	67.87	67.87

TIME vs. ELEVATION (ft)

Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
105.6000	67.87	67.87	67.87	67.87	67.87
105.8500	67.87	67.87	67.87	67.87	67.87
106.1000	67.87	67.87	67.87	67.87	67.87
106.3500	67.87	67.87	67.87	67.86	67.86
106.6000	67.86	67.86	67.86	67.86	67.86
106.8500	67.86				

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
54.00	-----	.0044	.0000	.000	.000
55.00	-----	.1513	.1815	.061	.061
56.00	-----	.3340	.7101	.237	.297
57.00	-----	.8249	1.6838	.561	.858
58.00	-----	1.1335	2.9254	.975	1.834
59.00	-----	1.4462	3.8600	1.287	3.120
60.00	-----	1.7836	4.8359	1.612	4.732
61.00	-----	2.1651	5.9138	1.971	6.703
62.00	-----	2.6852	7.2615	2.420	9.124
63.00	-----	3.4069	9.1167	3.039	12.163
64.00	-----	4.0515	11.1737	3.725	15.887
65.00	-----	4.7153	13.1376	4.379	20.267
66.00	-----	5.4762	15.2730	5.091	25.358
67.00	-----	6.0363	17.2619	5.754	31.112
68.00	-----	6.3456	18.5709	6.190	37.302
69.00	-----	6.7300	19.6106	6.537	43.839
70.00	-----	7.1209	20.7736	6.925	50.763
71.00	-----	7.5453	21.9962	7.332	58.095
72.00	-----	8.0924	23.4518	7.817	65.913
73.00	-----	8.3709	24.6938	8.231	74.144

Elevations With Areas Interpolated From
The Closest Two Planimeter Readings

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
67.70	-----	6.2520	18.4315	4.301	35.412

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

Interpolated area from closest two given contour areas
is computed using the relationship:

IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))**2

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 54.00 ft
Increment = 1.00 ft
Max. Elev.= 73.00 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
Inlet Box	2	--->	3	69.000	73.000
Weir-Rectangular	1	--->	3	67.700	73.000
Culvert-Circular	3	--->	TW	66.000	73.000
Weir-XY Points	4	--->	TW	70.700	73.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = 2
Structure Type    = Inlet Box
-----------------------------------
# of Openings     =         1
Invert Elev.      =     69.00 ft
Orifice Area      =   25.0000 sq.ft
Orifice Coeff.    =      .500
Weir Length       =     15.00 ft
Weir Coeff.       =     3.100
K, Reverse        =     1.000
Mannings n        =     .0000
Kev,Charged Riser =      .000
Weir Submergence  = No


Structure ID      = 1
Structure Type    = Weir-Rectangular
-----------------------------------
# of Openings     =         1
Crest Elev.       =     67.70 ft
Weir Length       =      1.50 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = 3
Structure Type     = Culvert-Circular
-----------------------------------
No. Barrels        =         1
Barrel Diameter    =    3.5000 ft
Upstream Invert    =     66.00 ft
Dnstream Invert    =     65.60 ft
Horiz. Length      =     40.00 ft
Barrel Length      =     40.00 ft
Barrel Slope       =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .005885  (per ft of full flow)
Kr                 =     .5000  (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)    =     1.155
T2 ratio (HW/D)    =     1.302
Slope Factor       =     -.500
Calc inlet only    = Yes
```

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 = 70.04 ft ---> Flow = 63.00 cfs
At T2 Elev = 70.56 ft ---> Flow = 72.00 cfs

OUTLET STRUCTURE INPUT DATA

Structure ID = 4
Structure Type = Weir-XY Points

# of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	73.00
11.50	70.70
61.50	70.70
73.00	73.00

Lowest Elev. = 70.70 ft

Weir Coeff. = 2.800000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

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

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
54.00	.00	Free Outfall		
55.00	.00	Free Outfall		
56.00	.00	Free Outfall		
57.00	.00	Free Outfall		
58.00	.00	Free Outfall		
59.00	.00	Free Outfall		
60.00	.00	Free Outfall		
61.00	.00	Free Outfall		
62.00	.00	Free Outfall		
63.00	.00	Free Outfall		
64.00	.00	Free Outfall		
65.00	.00	Free Outfall		
66.00	.00	Free Outfall		
67.00	.00	Free Outfall		
67.70	.00	Free Outfall		
68.00	.71	Free Outfall		1,3 (no Q: 2,4)
69.00	5.52	Free Outfall		1,3 (no Q: 2,4)
70.00	53.12	Free Outfall		2,1,3 (no Q: 4)
70.70	74.29	Free Outfall		2,3 (no Q: 1,4)
71.00	102.34	Free Outfall		2,3,4 (no Q: 1)
72.00	319.00	Free Outfall		2,3,4 (no Q: 1)
73.00	672.00	Free Outfall		2,3,4 (no Q: 1)

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = R:\200 - Municipal\22547\Calcs\PondPack\Third HS\
Inflow  HYG file = NONE STORED - PC-106       IN  1
Outflow HYG file = NONE STORED - PC-106       OUT 1

Pond Node   Data = PC-106
Pond Volume Data = PC-106
Pond Outlet Data = PC106-DEV2

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    67.70 ft
Starting Volume    =   35.412 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       =     42.90 cfs    at   12.8500 hrs
Peak Outflow      =      3.92 cfs    at   19.4500 hrs
-----------------------------------------------------
Peak Elevation    =     68.67 ft
Peak Storage =         41.620 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =      35.412
+ HYG Vol IN   =      11.888
- Infiltration =        .000
- HYG Vol OUT  =      10.861
- Retained Vol =      36.436
                  ----------
Unrouted Vol =       -.004 ac-ft  (.030% of Inflow Volume)


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```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = R:\200 - Municipal\22547\Calcs\PondPack\Third HS\
Inflow  HYG file = NONE STORED - PC-106       IN  2
Outflow HYG file = NONE STORED - PC-106       OUT 2

Pond Node   Data = PC-106
Pond Volume Data = PC-106
Pond Outlet Data = PC106-DEV2

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    67.70 ft
Starting Volume    =   35.412 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       =     67.46 cfs    at   12.7000 hrs
Peak Outflow      =      9.15 cfs    at   16.3000 hrs
-----------------------------------------------------
Peak Elevation    =     69.08 ft
Peak Storage =         44.353 ac-ft
=====================================================


MASS BALANCE (ac-ft)
---------------------------
+ Initial Vol  =      35.412
+ HYG Vol IN   =      18.218
- Infiltration =        .000
- HYG Vol OUT  =      17.003
- Retained Vol =      36.624
                  ----------
Unrouted Vol =       -.003 ac-ft  (.017% of Inflow Volume)


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```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = R:\200 - Municipal\22547\Calcs\PondPack\Third HS\
Inflow  HYG file = NONE STORED - PC-106       IN  10
Outflow HYG file = NONE STORED - PC-106       OUT 10

Pond Node   Data = PC-106
Pond Volume Data = PC-106
Pond Outlet Data = PC106-DEV2

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    67.70 ft
Starting Volume    =   35.412 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       =    149.44 cfs    at   12.7000 hrs
Peak Outflow      =     49.35 cfs    at   14.1000 hrs
-----------------------------------------------------
Peak Elevation    =     69.92 ft
Peak Storage =         50.200 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =      35.412
+ HYG Vol IN   =      39.252
- Infiltration =        .000
- HYG Vol OUT  =      37.840
- Retained Vol =      36.821
                  ----------
Unrouted Vol =       -.003 ac-ft  (.007% of Inflow Volume)


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```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = R:\200 - Municipal\22547\Calcs\PondPack\Third HS\
Inflow  HYG file = NONE STORED - PC-106       IN  25
Outflow HYG file = NONE STORED - PC-106       OUT 25

Pond Node   Data = PC-106
Pond Volume Data = PC-106
Pond Outlet Data = PC106-DEV2

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    67.70 ft
Starting Volume    =   35.412 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       =    170.74 cfs    at   12.7000 hrs
Peak Outflow      =     59.02 cfs    at   14.1500 hrs
-----------------------------------------------------
Peak Elevation    =     70.20 ft
Peak Storage =         52.161 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =      35.412
+ HYG Vol IN   =      44.864
- Infiltration =        .000
- HYG Vol OUT  =      43.438
- Retained Vol =      36.836
                 ----------
Unrouted Vol =       -.003 ac-ft  (.006% of Inflow Volume)


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LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = R:\200 - Municipal\22547\Calcs\PondPack\Third HS\
Inflow  HYG file = NONE STORED - PC-106       IN  100
Outflow HYG file = NONE STORED - PC-106       OUT 100

Pond Node   Data = PC-106
Pond Volume Data = PC-106
Pond Outlet Data = PC106-DEV2

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =    67.70 ft
Starting Volume    =   35.412 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       =    300.82 cfs    at   12.7000 hrs
Peak Outflow      =    155.77 cfs    at   13.5500 hrs
-----------------------------------------------------
Peak Elevation    =     71.25 ft
Peak Storage =         59.973 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =      35.412
+ HYG Vol IN   =      67.975
- Infiltration =        .000
- HYG Vol OUT  =      66.513
- Retained Vol =      36.872
                  ----------
Unrouted Vol =       -.003 ac-ft  (.004% of Inflow Volume)


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SECTION 3

reston Bryant, Jr.
...etary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 206
Richmond, Virginia 23219-2010
Phone (804) 371-6095 Fax (804) 371-2630

PC 106

April 21, 2006

Steve Hicks
James City County
101 Mounts Bay Road
Williamsburg, VA 23187-8784

RE: Eastern Pond Dam, Inventory Number 09529

Dear Mr. Hicks:

The Alteration Permit Application for Eastern Pond Dam, Inventory Number 09529 and the required supporting documents have been reviewed for compliance with the provisions of the Code of Virginia, Dam Safety Act (Section 10.1-604 et. seq.) and the regulations promulgated by the Virginia Soil and Water Conservation Board (Board). Based on this information, on March 16, 2006, the Board issued a four month (03/16/2006 – 07/31/2006) Alteration Permit. The Permit and other pertinent data are enclosed.

The referenced Alteration Permit only authorizes the dam alteration parameters contained in the plans and specifications prepared by Michael L. Claud, P.E. #033586. All other permits and/or licenses required by the federal, state or local governments are the responsibility of the owner. The Alteration Permit also requires that an engineer ensure there are sufficient on-site inspections during alteration activities and be able to certify that alteration conforms to the plans and specifications submitted and approved by the Board. Inspections are to be under the guidance of a licensed, professional engineer for all critical alteration work (e.g. placement of earth fill, forming for concrete, pouring of concrete, etc.). Any needed changes to the Board approved plans and specifications during alteration are to be made under the engineer of record and submitted to the Department of Conservation and Recreation for review and approval by this office in advance of alteration activity.

Please direct all questions and plan and specification reviews/approvals to James M. Robinson, P.E., Dam Safety Program Manager, Department of Conservation and Recreation, Dam Safety and Floodplain Management Division, 203 Governor Street, Suite 206, Richmond, Virginia 23219, telephone 804-786-2886, or e-mail jim.robinson@dcr.virginia.gov.

Sincerely,

William G. Browning
Director, Dam Safety & Floodplain Management Division

Enclosures
c: James M. Robinson, P.E., Dam Safety Program Manager
DS&FM Region 2 Files

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION
DIVISION OF DAM SAFETY
VIRGINIA SOIL AND WATER CONSERVATION BOARD

DAM SAFETY CERTIFICATE
ALTERATION PERMIT NUMBER 09529

This permit entitles James City County to alter Eastern Pond (PC 106) Dam in James City County pursuant to the provisions of the Dam Safety Act (Section 10.1-604 et seq., Code of Virginia) and the Virginia Soil and Water Conservation Board (Board) Regulations promulgated thereunder and other requirements of the Board.

This permit is issued to make the improvements listed on the Alteration Permit Data Sheet dated March 10, 2006, and is effective March 16, 2006 and expires July 31, 2006.

Joseph H. Maroon
Secretary, Virginia Soil and Water
Conservation Board

ALTERATION PERMIT-DATA SHEET
Department of Conservation & Recreation
Dam Safety and Floodplain Management
203 Governor Street, Suite 402
Richmond, VA 23219

Name of Dam: **Eastern Pond (PC 106) Dam**	Inventory Number: **09529**
Location: **Tributary to Longhill Swamp Creek**	City/County: **James City County**
Owner: **James City County** **ATTN: Steve Hicks** **101 Mounts Bay Road** **Williamsburg, VA 23187-8784**	Designed by: **Unknown** Constructed by: **Unknown** Year Constructed (Modified): **Unknown**
Type of Dam: **Earthen Embankment**	Purpose: **Recreation/irrigation**
Drainage Area (Sq. Mi.): **0.23**	Type of Watershed: **Forested & grassed fields**
Total Height (Ft.): **18**	Elevation: **71**
Normal Pool Height (Ft.): **14.7**	Elevation: **67.7**
Maximum Capacity (Acre Ft.): **58**	Maximum Area (Acres): **7.5**
Normal Capacity (Acre Ft.): **35.4**	Normal Area (Acres): **6.25**
Size Classification: **Small**	Hazard Classification: **III**
Required Spillway Design Flood: **100 Year**	Available Spillway Design Flood: **< 100 Year**
Type of Spillway: **Earthen**	*(Note if Section 130):*

Operation and Maintenance Plans & Schedule by: **Michael L. Claud, P.E. VA# 033586**
( ) Reinspection or (X) Inventory Report by : **Michael L. Claud, P.E. VA# 033586**

Emergency Action Plan filed with:
( ) Virginia Dept. of Emergency Management
( ) Local Coordinator of Emergency Services City/County: **James City County**
Application Reviewed and Recommended for: **4 month Conditional O&M Certificate (3/16/06-7/31/06)**

If Conditional Certificate, the conditions are: **Install a new discharge pipe and construction of a clay bench on the upstream side of dam.**

By: **James M. Robinson, P.E. VA# 013057** Date: **March 10, 2006**
Concurrence with the Recommendation:

By: **William G. Browning, Director** Date: 3/14/06

Preston Bryant, Jr.
Secretary of Natural Resources

RECEIVED
APR 27 2006
BY:

Wayland Bass

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 206
Richmond, Virginia 23219-2010
Phone (804) 371-6095 Fax (804) 371-2630

April 25, 2006

Mr. Steve Hicks
James City County
101 Mounts Bay Road
Williamsburg, VA 23187-8784

RE: Eastern Pond Dam, Inventory Number 09529

Dear Mr. Hicks:

The Operation and Maintenance Certificate Application for Eastern Pond Dam, Inventory Number 09529, and the required supporting documents have been reviewed for compliance with the provisions of the Code of Virginia, Dam Safety Act, (Section 10.1-604 et. seq.) and the regulations promulgated by the Virginia Soil and Water Conservation Board (Board). Based on this information, on March 16, 2006, the Board issued a four month (3/16/2006 – 7/31/2006) Conditional Class III Operation and Maintenance Certificate (Certificate). The Certificate and other pertinent data are enclosed.

The Dam Safety Act requires dam owners to maintain their dam in a condition to prevent unreasonable threats to life and property of others. The classification of your dam and the Certificate issued were based on the current known downstream hazard potential from upstream characteristics, a re-inspection/inventory/as-built report, operation and maintenance plan, inspection schedule and an emergency action plan. The Board issued a Conditional Operation and Maintenance Certificate because your dam does not meet the requirements of the Dam Safety Act and the Board's Regulations.

Should you have questions, please direct them to James M. Robinson, P.E., Dam Safety Program Manager, Department of Conservation and Recreation, Dam Safety and Floodplain Management Division, 203 Governor Street, Suite 206, Richmond, Virginia 23219, telephone 804-786-2886, or e-mail jim.robinson@dcr.virginia.gov.

Sincerely,

William G. Browning
Director, Dam Safety & Floodplain Management Division

Enclosures
c: James M. Robinson, P.E., Dam Safety Program Manager
DS&FM Region 2 Files
Members, Virginia Soil and Water Conservation Board

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION
DIVISION OF DAM SAFETY
VIRGINIA SOIL AND WATER CONSERVATION BOARD

DAM SAFETY CERTIFICATE
CONDITIONAL
CLASS III OPERATION & MAINTENANCE CERTIFICATE NUMBER 09529

James City County, owner of Eastern Pond (PC 106) Dam in James City County, is entitled to operate and maintain this dam pursuant to the provisions of the Dam Safety Act (Section 10.1-604 et seq., Code of Virginia) and Regulations promulgated thereunder.

This Conditional Operation and Maintenance Certificate is issued because the dam does not satisfy the current Regulations. The conditions that must be corrected to qualify for a Regular Operation and Maintenance Certificate are listed on the Data Sheet dated March 10, 2006.

This certificate is for a term of four months, effective March 16, 2006 and expires July 31, 2006. The Certificate may be renewed in accordance with §4VAC50-20-150C of the Virginia Impounding Regulations.

For William S. Browning

Joseph H. Maroon
Secretary, Virginia Soil and Water
Conservation Board

DATA SHEET - OPERATION AND MAINTENANCE CERTIFICATE

Department of Conservation & Recreation
Dam Safety and Floodplain Management
203 Governor Street, Suite 402
Richmond, VA 23219

Name of Dam: **Eastern Pond (PC 106) Dam**	Inventory Number: **09529**
Location: **Tributary to Longhill Swamp Creek**	City/County: **James City County**
Owner: **James City County** **ATTN: Steve Hicks** **101 Mounts Bay Road** **Williamsburg, VA 23187-8784**	Designed by: **Unknown** Constructed by: **Unknown** Year Constructed (Modified): **Unknown**
Type of Dam: **Earthen Embankment**	Purpose: **Recreation/irrigation**
Drainage Area (Sq. Mi.): **0.23**	Type of Watershed: **Forested & grassed fields**
Total Height (Ft.): **18**	Elevation: **71**
Normal Pool Height (Ft.): **14.7**	Elevation: **67.7**
Maximum Capacity (Acre Ft.): **58**	Maximum Area (Acres): **7.5**
Normal Capacity (Acre Ft.): **35.4**	Normal Area (Acres): **6.25**
Size Classification: **Small**	Hazard Classification: **III**
Required Spillway Design Flood: **100 Year**	Available Spillway Design Flood: **< 100 Year**
Type of Spillway: **Earthen**	*(Note if Section 130):*

Operation and Maintenance Plans & Schedule by: **Michael L. Claud, P.E. VA# 033586**
( ) Reinspection or (X) Inventory Report by : **Michael L. Claud, P.E. VA# 033586**

Emergency Action Plan filed with:
( ) Virginia Dept. of Emergency Management
( ) Local Coordinator of Emergency Services City/County: **James City County**
Application Reviewed and Recommended for: **4 month Conditional O&M Certificate (3/16/06-7/31/06)**

If Conditional Certificate, the conditions are: **Install a new discharge pipe and construction of a clay bench on the upstream side of dam.**

By: **James M. Robinson, P.E. VA# 013057** Date: **March 10, 2006**

Concurrence with the Recommendation:

By: **William G. Browning, Director** Date: 3/14/06

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

February 24, 2006

Mr. Jim Robinson
Commonwealth of Virginia
Department of Conservation & Recreation
Division of Dam Safety
203 Governor Street
Richmond, VA 23219-2010

Re: Eastern Pond (PC 106) Dam Renovations, James City County

Dear Jim;

Enclosed is a copy of the Inventory Report, Design Report, Operation and Maintenance Application, Emergency Action Plan and engineering design plans for proposed renovations to the Eastern Pond Dam (PC 106) at the Warhill Tract within James City County. We are also including a copy of pond routing calculations and a downstream inundation area map.

Based on our previous conversation, we would like to have this project included on the Soil and Water Conservation District Board agenda for the March meeting. Construction needs to begin as soon as possible in order to allow the pond to refill prior to the summer months as the water in the pond is used to irrigate the adjacent sports fields.

In addition, development of the surrounding land for the proposed High School and Stadium site will divert additional stormwater runoff to this pond. These improvements are designed to safely convey the storm flows through the dam.

If you should have any questions or need any additional information please feel free to contact me at (804) 200-6413.

Sincerely,

Michael L. Claud, P.E.

cc: Andy Curtis – Curtis Contracting, Inc.
Andrew Gould, P.E. – Timmons Group

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
Site Development | Residential | Infrastructure | Technology
www.timmons.com

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

DESIGN REPORT FOR THE CONSTRUCTION/ALTERATION OF IMPOUNDING STRUCTURES

Reference: Impounding Structure Regulations, 4VAC50-20-00 et seq., Virginia Soil & Water Conservation Board

Please fill out and mail to:
Department of Conservation and Recreation
Division of Dam Safety
203 Governor Street
Richmond, Virginia 23219-2094

1. Project Information:
   a. Proposed Construction: construction of a new principal outlet spillway.

      Alteration: _____

   b. Name of Impounding Structure: Eastern Pond (PC 106) Dam

   c. Inventory Number: _____ (Leave blank if new Construction)

   d. Name or Reservoir: District Park East Pond BMP

   e. Purpose of Reservoir: Recreational/Irrigation

2. Impounding Structure Classification:
   a. Size Classification Table I Impounding Structure Regulations

      Large Medium (Small) (Circle One)

   b. Hazard Potential Classification Table I Impounding Structure Regulations

      Class I Class II (Class III) Class IV (Circle One)

3. Location of Impounding Structure:
   a. City/County: James City County Magisterial District: _____

   b. Located 4,800 feet upstream of Highway # State Route 612 Longhill Road

   c. Name of River of Stream: tributary to Longhill Swamp Creek

   d. Latitude: 37° 19' 28" Longitude: 76° 45' 39"

4. Ownership:
   a. Owner's Name: James City County

   b. Mailing Address: 101 Mounts Bay Road, Williamsburg, VA 23187-8784

   c. Telephone: (757) 253-6671

(DCR 199-101) (12/01)

5. Design Engineer:

a. Design Engineer/Design Firm: Michael L. Claud, P.E. / Timmons Group

b. Design Engineer Virginia Number: 033586

c. Mailing Address: 1001 Boulders Parkway, Suite 300, Richmond VA 23225

d. Telephone: (804) 200-6413

6. Impounding Structure Data

a. Type of material _X_ earth _____ concrete _____ masonry _____ other

Note: All elevations NGVD unless noted.
For new construction complete the design configuration column
For alteration complete both the existing and design configuration column

		Existing Configuration	Design Configuration
b.	Top of Dam	71	73 Elev.
c.	Downstream Toe (Lowest)	53	53 Elev.
d.	Height of Dam	18	20 Feet
e.	Crest Length(Less Spillway)	380±	422± Feet
f.	Crest Width	25±	20 Feet.
g.	Upstream Slope	3 H: 1 V	3 H: 1 V
h.	Downstream Slope	3 H: 1 V	3 H: 1 V

7. Reservoir Data:

		Existing Configuration	Design Configuration
a.	Maximum Capacity	58	74 Acre-Feet
b.	Maximum Pool	71	73 Elev.
c.	Maximum Pool Surface Area	7.5	8.3 Acres
d.	Normal Capacity	35.4	35.4 Acre-Feet
e.	Normal Pool	67.7	67.7 Elev.
f.	Normal Pool Surface Area	6.25	6.25 Acres
g.	Freeboard (Normal Pool to Top)	3.3	5.3 Feet

8. Spillway Data:

		Type	Construction Material	Design Configuration
a.	Low Level Drain	n/a		
b.	Principal Spillway	weir.	concrete	
c.	Emergency Spillway	weir	earthen	

		Existing Configuration	Design Configuration
d.	Low Level Drain (low inlet)	n/a	n/a Elev.
e.	Principal Spillway (high inlet)	67.7	67.7 Elev.
f.	Emergency Spillway (crest)	70±	70.7 Elev.

9. Watershed Data:

a. Drainage Area 150 Acres

b. Type and extent of Watershed Development: existing land is combination forested and grass fields.

c. Time of Concentration: 83 minutes Method: TR-55

d. Spillway Design Flood used (check and state source)

_____PMF, source: _____

_____1/2PMF, source: _____

__X__100 Year, source: TR-55/HEC-1 Hydrologic Analysis

_____50 year, source: _____

_____Other, source: _____

e. Design inflow hydrograph: Volume 67.9 acre-feet: Peak inflow 300.82 CFS
Rainfall duration of design inflow hydrograph 12.70 hours

f. Freeboard during passage of spillway design flood 1.75 feet.

10. Additional Information:

Provide as attachments to the Design Report the following information. Note: For alteration permits the detail of this information is to be in accordance with the scope of the proposed alteration:

a. A description of properties located in the inundation zone downstream from the site of the impounding structure, including the location and number of residential structures, buildings, roads, utilities and other property that would be endangered should the impounding structure fail.
b. A statement from the governing body of the local political subdivision or other evidence confirming that this body is aware of the proposal to build or alter an impounding structure and of the land use classifications applicable to the inundation zone.
c. Maps showing the location of the impounding structure that include: the county or

city in which the impounding structure is located, the location of roads, access to the site and the outline of the impoundment.

d. A report of the geotechnical investigation(s) of the foundation soils or bedrock and of the materials to be used to construct the impounding structure.
e. Design assumptions and analyses sufficient to indicate that the impounding structure will be stable during construction and during the life of the impounding structure under all conditions of reservoir operations, including rapid filling and rapid drawdown of the impoundment.
f. Confirmation of the stability of the reservoir rim area in order to safeguard against reservoir rim slides of such magnitude as to create waves capable of overtopping the impounding structure and confirmation of rim stability during seismic activity.
g. Design assumptions and analyses sufficient to indicate that seepage in, around, through, or under the impounding structure, foundation, and abutments will be reasonably and practically controlled so that internal or external forces or results thereof will not endanger the stability of the impounding structure.
h. Calculations and assumptions relative to design of the spillway(s).
i. A description of provisions to insure that the impounding structure and appurtenances will be protected against deterioration or erosion due to freezing and thawing, wind and rain, or any combination thereof.
j. List and provide any other pertinent design data, assumptions, and analyses commensurate with the nature of the impounding structure and specific site conditions:

_____

_____

_____

k. A proposed schedule indicating construction sequence and time to completion.
l. A proposed impoundment and impounding structure operating schedule.
m. A proposed impoundment and impounding structure maintenance schedule.
n. A proposed inspection schedule to be utilized in making periodic safety inspections during the life of the project.

11. SUMMARY DATA SHEET

Name of Dam: Eastern Pond (PC 106) Dam Inventory Number: _____

Location (stream): unnamed tributary County: James City County

Owner: James City County

Address: 101 Mounts Bay Road

City/Town: Williamsburg, Virginia Zip Code: 23187-8784

Designed By: Timmons Group, Michael L. Claud, P.E. Design Year: 2006

Constructed By: _____ Completion Year: _____

Alteration Designed By: _____ Alteration Design Year _____

Alteration Construction By: _____ Alteration Completion Year: _____

Type of Dam: earthen Purpose: recreational/irrigation

Drainage Area (Acres.): 150 Type of Watershed: rural

Total Height; Crest (Ft.): 20 Elevation: 73

Normal Pool Height (Ft.): 14.7 Elevation: 67.7

Maximum Capacity (Acre Ft.): 74 Maximum Area (Acres): 8.3

Normal Capacity (Acre Ft.): 35.4 Normal Area (Acres): 6.25

Size Classification: Small Hazard Classification: Class III

Required Spillway Design Flood: 100-year

Available Spillway Design Flood: 100-year

Type of Emergency Spillway: weir

Emergency Action Plan filed with:

( ) Virginia Department of Emergency Management

( ) Local Coordinator of Emergency Services County/City: James City County

CERTIFICATION BY OWNER'S ENGINEER

I hereby certify that the information provided in this form and the attachments to this form have been examined by me and found to be true and correct in my professional judgment.

Signed: _____

(Professional Engineer)

Virginia Number: 033586

This 24TH day of February, 2006.

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

INVENTORY REPORT FOR CLASS III AND CLASS IV IMPOUNDING STRUCTURES

Reference: Impounding Structure Regulations, 4VAC50-20-00 et seq., Virginia Soil and Water Conservation Board

1. Project Information:
   - a. Name of Impounding Structure Eastern Pond Dam (PC 106)
   - b. Inventory Number _____ Other Name (if any) _____
   - c. Name of Reservoir District Park East Pond BMP
   - d. Purpose of Reservoir recreational/irrigation

2. Location of Impounding Structure:
   - a. City/County James City County _____ Magisterial District _____
   - b. Located 4,800 feet upstream of Highway. No. 612 Longhill Road
   - c. Name of River or Stream tributary to Longhill Swamp Creek
   - d. Latitude 37° 19' 28" _____ Longitude 76° 45' 39' _____

3. Ownership:
   - a. Owner's Name James City County
   - b. Mailing Address 101 Mounts Bay Road, Williamsburg, Virginia 23187-8784
   - c. Telephone (757) 253-6671

4. Owner's Engineer:
   - a. Engineering Firm/Engineer Timmons Group / Michael L. Claud, P.E.
   - b. Professional Engineer Virginia Number 033586
   - c. Mailing Address 1001 Boulders Parkway, Suite 300, Richmond, Virginia 23225
   - d. Telephone (804) 200-6413

5. Impounding Structure Data (All elevations NGVD unless noted):
   - a. Type of Material earth X concrete _____ masonry _____
     Other _____

	Design Configuration	
b. Top of Dam	71±	Elev. (if known)
c. Downstream Toe (Lowest)	53±	Elev. (if known)
d. Height of Dam	18±	Feet

(DCR 199-104) (12/01)

e. Crest Length (Exclusive of Spillway) 380± Feet

f. Crest Width 25± Feet

g. Upstream Slope 3.0 H: 1 V

h. Downstream Slope 3.0 H: 1 V

6. Reservoir Data — Design Configuration

a. Maximum Capacity 58 Acre-feet

b. Maximum Pool 71 Elev. (if known)

c. Maximum Pool Surface Area 7.5 Acres

d. Normal Capacity 35.4 Acre-feet

e. Normal Pool 67.7 Elev. (if known)

f. Normal Pool Surface Area 6.25 Acres

g. Freeboard (Normal Pool to Top) 3.3 Feet

h. Freeboard (Normal Pool to Emergency) 2± Feet

7. Spillway Data

	Type	Construction Material	Maximum Capacity
a. Low Level Drain	N/A		
b. Principal Spillway	Riser	CMP	
c. Emergency Spillway	Weir	grass	

Design Configuration

d. Low Level Drain N/A Elev. (if known)

e. Principal Spillway 67.70 Elev. (if known)

f. Emergency Spillway 70± Elev. (if known)

g. Briefly describe the low level drain and principal spillway to include dimensions, materials of construction, trash guards, location in reservoir and through dam, and orientation of intake and discharge to dam if looking downstream: The principal outlet for the dam is a 12" CMP riser with a 12" CMP outlet pipe. The riser is located in approximately the centerline of the dam.

h. Describe the emergency spillway to include dimensions, whether the spillway is an earth channel or other construction, spillway surface protection, and orientation to dam if looking downstream: The emergency spillway is a low earthen area on the southeast end of the dam approximately 80feet wide. The spillway is sparsely grass lined and is located on the left abutment of the dam looking downstream.

8. Watershed Data (Class III only):

a. Drainage Area 150± Acres

b. Type and Extent of Watershed Development forested land and grass fields

c. Time of Concentration 83 minutes Method TR-55

d. Spillway Design Flood used (mark appropriate box)

_____PMF, source _____

_____1/2 PMF, source _____

_X___100 Year, source HEC-1 Analysis_____

_____50 Year, source _____

_____Other, source _____

e.. Design inflow hydrograph: Volume _67.9_ acre-feet;

Peak inflow __300.82_C.F.S.;

Rainfall duration of design inflow hydrograph __12.70____hours

f. Freeboard during passage of spillway design flood ___0____feet

9. Impounding Structure History

a. Date construction completed unknown_____

b. Design by _unknown_____ Date:_____

c. Built by __unknown_____ Date:_____

d. Inspection dates _unknown_____

e. Inspections by ___unknown_____

f. Description of repairs __unknown_____

g. Has the impounding structure ever been overtopped? _____ Yes _____ No Unknown

10. Impounding Structure Assessment:

a. Provide brief descriptions for each item:

i. Condition of the impounding structure: the existing impoundment structure is in good condition but overgrown with trees along the downstream face.

ii. Condition of the reservoir: the existing reservoir area is in good condition.

iii. Condition of the upstream area: the upstream area is mainly undeveloped forested land with adjacent soccer fields from the County sport complex.

iv. Condition of the downstream area: The downstream are is mainly forested land.

b. Provide a narrative describing any recent changes in the impounding structure, reservoir, upstream area, and downstream area: The dam recently was renovated to construct an emergency spillway section on the north end of the dam and to raise the top to a consistent elevation of 73.0. These changes were made as emergency repairs to protect the dam from overtopping due to upstream development that will increase the total drainage area to the dam. There is a development plan for the upstream area that will include construction of a community college, high school and sports stadium.

c. Recommendations for remedial measures: the dam currently does overtop during the 100-year storm event. Future development within the watershed will divert additional drainage to this pond. The pond will also need to serve as a stormwater BMP for the County. Based on these requirements the dam will need to be raised and the outlet structures redesigned in order to convey the 100-year storm event without overtopping the dam.

11. Provide a sketch of the impounding structure. (see attached sheet)

CERTIFICATION BY OWNER'S ENGINEER (Class III only)

I hereby certify that the information provided in this Inventory Report has been examined by me and found to be true and correct in my professional judgment.

Signed _____
(Professional Engineer)

Virginia Number 033586

This 24th day of February, 2006.

CERTIFICATION BY OWNER (Class IV only)

I hereby certify that the information provided in this Inventory Report is true and correct.

Signed _____
(Owner)

This _____ day of _____,2006

Please fill out and mail to:
Department of Conservation and Recreation
Division of Dam Safety
203 Governor Street
Richmond, Virginia 232192094

proposed Erosion and Sediment Control Program for the Town of Hillsville. The Board concurs with the staff recommendation and approves the Erosion and Sediment Control Program for the Town of Hillsville as being consistent with the requirements of the Erosion and Sediment Control Law and Regulations. The Board requests the DCR staff to monitor the implementation of the erosion and sediment control program by the Town to ensure consistency with the law and regulations.

SECOND: Ms. Dalbec

DISCUSSION: None

VOTE: Motion carried unanimously

Dam Safety Certificates and Permits

Mr. Browning presented the Dam Safety Certificates and Permits.

Compliance Issues

Mr. Browning gave an update on the Enforcement Actions. A copy of the update is available from DCR. There were no recommended Board actions.

Conditional Operational and Maintenance Certificate Recommendations

Mr. Browning presented the Conditional Certificates recommendations.

02102 Crab Orchard Creek Dam	BLAND	Class II Regular	3/31/09
06101 Warrenton Dam	FAUQUIER	Class II Regular	3/31/08
06109 Kinlock Farm Dam	FAUQUIER	Class I Regular	3/31/08
06143 Lower Warrenton Lakes Dam	FAUQUIER	Class III	9/30/08
10939 Willow Ridge Dam	LOUISA	Class III	9/30/09

MOTION: Ms. Maitland moved that the Virginia Soil and Water Conservation Board approve the Conditional Operation & Maintenance Certificate Recommendations as presented by DCR staff and directs staff to communicate the Board actions to the affected dam owners.

SECOND: Ms. Hansen

DISCUSSION: None

VOTE: Motion carried unanimously

Mr. Browning gave an update on Lake of the Woods Association (LOWA) dam. He reported that this Board is aware of a communication that was transmitted to Lake of the Woods dated August 6. As a result of that communication, on August 30, Lake of the Woods and DCR met to work through the issues that were cited. On September 13, DCR received submissions from LOWA and their engineers that had documents for furthering the engineering work dealing with the alternative spillway design. Staff reviewed those materials and the submission revealed that substantial progress had been made toward the completion of the engineering design plan specifications and financial plan for that particular spillway to pass the PMF. It is anticipated that work will progress over the next few months utilizing a different rainfall distribution methodology to determine spillway gate size. Staff will communicate acknowledgement of the progress that has been made to the owner and if necessary provide a list of additional information that is needed.

Regular Operation and Maintenance Certificate Recommendations

Mr. Browning presented the recommendations for regular certificates.

MOTION: Mr. Altizer moved that the Virginia Soil and Water Conservation Board approve the Regular Operation & Maintenance Certificate recommendations as presented by DCR staff and directs staff to communicate the Board actions to the affected dam owners.

00334	Birdwood #2 Dam	ALBEMARLE	Class I	9/30/13
00346	Birdwood #13 Dam	ALBEMARLE	Class III	9/30/13
00384	North Fork Park Dam	ALBEMARLE	Class II	9/30/13
04702	Mountain Run Dam #11	CULPEPER	Class II Regular	9/30/13
04703	Mountain Run Dam #50	CULPEPER	Class I Regular	9/30/13
06521	Fluvanna Correctional Ctr.	FLUVANNA	Class III Conditional	9/30/13
06904	Cherokee Dam	FREDERICK	Class II Conditional	9/30/13
09529	**Eastern Pond Dam**	JAMES CITY	**Class III Conditional**	**9/30/13**
10738	Red Cedar Lake 2 Dam	LOUDOUN	Class III Construction	9/30/13
16503	Lower North River #83 Dam	ROCKINGHAM	Class I Conditional	9/30/13
16507	Lower North River #82 Dam	ROCKINGHAM	Class I Conditional	9/30/13
17719	Hunting Run Dam	SPOTSYLVANIA	Class I	9/30/13

SECOND: Mr. Maitland

DISCUSSION: None

VOTE: Motion carried with Ms. Campbell abstaining.

Construction and Alternation Permits

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

OPERATION AND MAINTENANCE APPLICATION
CLASS I, II AND III IMPOUNDING STRUCTURES

Reference: Impounding Structures Regulations, 4VAC 50-20-00 et seq., Virginia Soil and Water Conservation Board

1. Name of Impounding Structure: Eastern Pond (PC 106) Dam

   Inventory Number: _____ Other Name (if any)_____

2. Hazard Potential Classification from Table 1, Impounding Structure Regulations:

   (Circle One) Class I Class II (Class III)

3. Name of Owner: James City County

   Address: 101 Mounts Bay Road, Williamsburg Virginia 23187-8784

   Telephone: (Business) (757) 253-6671 (Residential) (___) _____

4. Operating Plan and Schedule.

   Provide a narrative for each item:

   a. Operation of control gates and spillways. No gates present at the dam site. The spillway is to be kept clear of debris at all times to ensure proper conveyance of the storm design flows.

   b. Operation of Reservoir Drain (not to exceed ½ foot drawdown per day on embankment dams). No low level drain installed in dam. Lake to be lowered by pumping or siphoning.

5. Maintenance Plan and Schedule

   Provide a narrative for each item:

   a. Embankment Dams:

      (1) embankment: shall be examined a minimum of twice each year. Once in the spring and once in the fall to ensure proper vegetative cover. Any trees growing on or within 25 feet of the embankment should be removed and the area regraded and seeded. The embankment should be seeded and fertilized at a minimum once every 2 years.

      (2) principal spillway: shall be examined by the owner once every three months for signs of concrete cracking, spalling, settling or deterioration. Debris shall be removed immediately upon discovery as necessary.

      (3) emergency spillway: The emergency spillway area shall be maintained in a like manner as the embankment area. Any trees growing within the emergency spillway area shall be removed and the area regraded and seeded. The emergency spillway area shall be examined after any rainfall event that produces sufficient flow to engage the spillway.

      (4) low level outlet: not-applicable

      (5) reservoir area: debris shall be removed from the lake perimeter and surface area as necessary.

      (6) downstream channel: shall be maintained in its present natural condition.

      (7) other: _____

   b. Concrete dams (including masonry and others): **Not Applicable**

      (1) upstream face: _____

(DCR 199-099) (12/01)

(2) downstream face: _____

(3) crest: _____

(4) galleries: _____

(5) tunnels, etc.: _____

(6) abutments: _____

(7) spillways: _____

(8) gates and outlets: _____

(9) other: _____

6. Inspection schedule (attach schedule and checklist):

   (1) operator inspection (daily, weekly, etc.) once each month by dam owner or owners agent.

   (2) maintenance inspection (monthly, quarterly, semi-annual, annual) annually by dam owner or owners agent.

   (3) technical safety reinspection by a professional engineer. (required for certification update: Class I dams every two years, Class II dams every three years. All dams inspected after overtopping). Once every 6 years by a licensed Professional Engineer, after a significant rainfall event as outlined by the Emergency Action Plan or more often as necessary.

7. Emergency Action Plan Schedule.

   Provide the information that initiates the Emergency Action Plan:

   a. rainfall amounts and/or: 6 inches of rainfall within a 24 hour period.

   b. spillway flows: 5.3 feet depth of flow within the spillway

   c. frequency of observation: every 30 minutes

8. For a newly constructed impounding structure, provide certification from a Professional Engineer who has inspected the impounding structure during construction that, to the best of the engineer's judgment, knowledge and belief, the impounding structure and all appurtenances have been constructed in conformance with the plans, specifications and drawings submitted to the Department of Conservation and Recreation.

   Not applicable at this time. Construction has not begun.

OPERATION AND MAINTENANCE PERMIT APPLICATION

OPERATION AND MAINTENANCE SCHEDULES
CERTIFICATION BY OWNER

I hereby certify that the operation and maintenance plans and schedules provided herewith will be adhered to during the life of the project except in cases of unanticipated emergency requiring departure therefrom in order to mitigate hazards to life and property, at which time my engineer and the Department of Conservation and Recreation will be notified.

Signed: _____
(Owner)

This _____ day of _____, 2006.

CERTIFICATE BY OWNER'S ENGINEER

I hereby certify that the information provided in this form has been examined by me and found in my professional judgment to be appropriate to operation and maintenance considerations for this dam.

Signed: _____ Virginia Number: 033586
Professional Engineer

This 24TH day of February, 2006.

Remarks: _____

Please fill out and mail this form to:
Department of Conservation and Recreation
Division of Dam Safety
203 Governor Street
Richmond, Virginia 23219-2094

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

EMERGENCY ACTION PLAN FOR CLASS I, CLASS II AND CLASS III IMPOUNDING STRUCTURES

Reference: Impounding Structure Regulations, 4VAC52-20-00 et seq., Virginia Soil and Water Conservation Board

1. Name of Impounding Structure: Eastern Pond (PC 106) Dam

   Inventory Number: _____ Other Name (if any): _____

2. Hazard Potential Classification from Table I, Virginia Dam Safety Regulations:
   Class I Class II Class III (Underline One)

3. Name of Owner: James City County

   Address: 101 Mounts Bay Road, Williamsburg, VA 23187-8784

   Telephone: (Business)(757) 253-6671 (Residential)(_____)_____

4. Name of Dam Operator: Steve Hicks, General Services Manager

   Address: 113 Tewning Road, Williamsburg, VA 23188

   Telephone: (Business)(757) 259-4127 (Mobile)(757) 592-8664

   Name of Alternate Operator: Craig Nordeman

   Telephone: (Business)(757) 259-4083 (Mobile)(757) 592-6024

5. Name of Rainfall or Staff Gage Observer for Dam: Steve Hicks, General Services Manager

   Address: 113 Tewning Road, Williamsburg, VA 23188

   Telephone: (Business)(757) 259-4127 (Mobile)(757) 592-8664

   Name of Alternate Operator: Craig Nordeman

   Telephone: (Business)(757) 259-4083 (Mobile)(757) 592-6024

6. 24-Hour Dispatch Center Nearest Dam-Police/Fire/Sheriff's Departments: Central Dispatch

   Address: 3127 Forge Road, Williamsburg, VA 23168

   Telephone: (Business)(757) 566-0112

7. Name of City/County Emergency Services Coordinator(s): Wilton Bobo

Address: 3127 Forge Road, Williamsburg, VA 23168

Telephone: (Business)(757) 564-2141 (Mobile)(757) 592-7264

8. Name, address and telephone number of all occupied dwellings that would be affected in the event of a dam failure, and/or inundation mapping of affected areas.

Name	Address	Telephone Number
None		

9. Name, address and telephone numbers of owners of all commercial or recreational establishments that would be affected in the event of dam failure, and/or an inundation mapping of affected areas.

Name	Address	Telephone Number
None		

10. Name, address and telephone number of owners of property, land and unoccupied buildings that would be affected in the event of a dam failure, and/or an inundation mapping of the affected area.

Name	Address	Telephone Number
See Inundation area map included		

11. If there are public roads downstream from the impounding structure, identify by highway number and distance below dam:

Route # 612, 4,800 Feet; Route # _____, _____Miles;
Route # _____, _____Miles; Route # _____, _____Miles.

Provide name of resident engineer, VA Dept. of Transportation, (or City/County engineer)

_____

Address: _____

Telephone: (Business)(_____) _____(Residential)(_____)_____

NOTE: Items 12 and 13 should be provided from the Operation and Maintenance Application.

Definitions:
Stage I Condition – A flood watch, or heavy continuous rain or excessive flow of water from ice or snow melt.

Stage II Condition – A flood warning; or emergency spillway activated or dam overtopping/ breach may be possible.

Stage III Condition – Emergency spillway activated, dam overtopping or imminent failure is probable.

12. Amount of rainfall that will initiate a:

Stage II Condition	_____	inches per 6 hrs.
	_____	inches per 12 hrs.
	6	inches per 24 hrs.
Stage III Condition	_____	inches per 6 hrs.
	_____	inches per 12 hrs.
	8	inches per 24 hrs.

And/or the amount of flow in the emergency spillway that will initiate a:

Stage II Condition	3.0	feet (depth of flow)
Stage III Condition	5.3	feet (depth of flow)

Total depth of emergency spillway available before crest of dam is overtopped:
5.3 feet.

13. Frequency of observations by rainfall/staff gage observer during a:
Stage I Condition hourly Stage II every 30 minutes
Stage III continuous (recommend continuous)
Please identify access route and means of travel during flood conditions.
Along State Route 612 away from the dam and District Sports Park site.
Note: It is recommended that the Observer remain on post until pool elevation starts to recede.

14. Surveillance and Notification
    a. The dam owner/operator **IS RESPONSIBLE** for notifying local government of any problem or potential problem at the dam site.
    b. The dam owner/operator **WILL INITIATE** dam surveillance under Stage I conditions, ie, when a flood watch is issued.
    c. The dam owner/operator **WILL NOTIFY** the 24-hour dispatch center and the local Emergency Services Coordinator when Stage II conditions are met in order to alert them to review actions that may be required for the safety and protection of people and property.
    d. The dam owner/operator **WILL NOTIFY** the 24-hour dispatch center and the local Emergency Services Coordinator to initiate warning of residents when Stage III conditions or imminent dam failure are probable.

e. The owner/operator **WILL BE RESPONSIBLE** for operating such devices as spillway gates and low level outlets such as to cause the dam to function effectively. Attach narrative if required.

f. 24-hour dispatch center should prepare Standard Operating Procedures (SOP's) to implement dam overtopping/failure evacuation plans.

15. Evacuation Procedures:
Note: The dam owner/operator should notify the City/County 24-hour Dispatch Center, as required in paragraph 14d above. Phone # should be listed in [a (1)].

Note: Once the local government has been notified of any problem at a dam site, it should take appropriate protective measures in accordance with the local Emergency Operations Plan and accompanying Emergency Action Plan and Standing Operations Procedures. Other local government actions might include:

(1) Notify the individuals who are directly downstream and in immediate danger. A list of the names, addresses, and telephone numbers of these individuals should be listed in [a (2]).
(2) Monitoring the situation and, if time permits, review of evacuation plans.
(3) Begin Alert, Notification, and Warning
(4) Immediately evacuating the inundation areas, if conditions warrant.
(5) Expanding Direction and Control as well as beginning Emergency Public Information and operating shelters.
(6) Provide Situation Reports to the State Emergency Operations Center (804-674-2400 or 800-468-8892)

a. Once the local government has been notified of a condition requiring evacuation, the dam owner/operator and local government are mutually responsible for effecting evacuation.

(1) The dam owner/operator will: Notify the 24-hour dispatch center as required in paragraph 14, provide surveillance and notification

(2) Local government will: Take appropriate protective measures in accordance with the local Emergency Operations Plan and accompanying Emergency Action Plan

Individuals who are directly downstream and in immediate danger include:

NAME	ADDRESS	TELEPHONE
None		

b. Methods for notification and warning to evacuate include:
Check appropriate method(s)

_____ (1) Telephone
_____ (2) Police/fire/sheriff radio dispatch vehicles with loudspeakers, bullhorns, etc.
_____ (3) Personal runners for door-to-door alerting
__X__ (4) Radio/television broadcasts for area involved

16. Certification of Coordination between Owner/Operator and Local Government

Certification by Owner/Operator

I certify that procedures for implementation of this plan have been coordinated with James City County and the local Emergency Services Coordinator. Also, that a copy of this Form has been filed with the State Department of Emergency Management; that this plan shall be adhered to during the life of the project; and that the information contained herein is current and correct to the best of my knowledge.

_____

(Signature of Owner/Operator)

This _____ day of _____ 2006.

Printed Name _____

Certification by Local Government

I certify that procedures for the warning and evacuation of James City County residents as required in the event of actual or impending failure of the Eastern Pond (PC106) Dam have been coordinated with the dam owner/operator.

_____

(Signature of City/County Official)

This _____ day of _____, 2006.

Printed Name _____

Position _____

Please fill out and mail to:

Virginia Department of Emergency Management
Emergency Services
10501 Trade Ct.
Richmond, Virginia 23236-3713

Dept. of Conservation and Recreation
Division of Dam Safety
203 Governor Street
Richmond, Virginia 23219-2094

EMERGENCY ACTION PLAN WORK/DATA SHEET

1. Name of Impounding Structure: Eastern Pond (PC 106) Dam

2. Inventory #: _____ Other Name (if any): _____

3. Total Height: 20 feet (Measured vertically from top of structure to streambed at downstream toe).

4. Total Impoundment Capacity at top of structure: 74 acre-feet.

5. Size Classification (Circle one): Large Medium (Small)

6. Hazard Classification (Circle one): Class I Class II (Class III)

7. Spillway Design (Circle one): PMF ½ PMF (100-YR) 50-YR

8. Downstream Inundation Area determined by (Mark one):

   _____ (1) Judgement

   _____ (2) Empirical Formulas Type used: _____

   X (3) Computer Programs Type used: HEC-1 & HEC-RAS

9. Critical Conditions used for structure failure (Mark one):

   X (1) Failure due to overtopping using:

   _____ PMF

   _____ % PMF

   X 100-YR

   _____ Other

   _____ (2) Failure not due to flooding

   Describe: _____

Eastern Pond (PC106) Dam
Inundation Area
Downstream Property Owners List
February 27, 2006

Owner	Address	City	State	Zip	GPIN	PIN
KENNEDY, DAVID	5517 SOUTH MALLARD R	WMSBURG	VA	231889416	4T4	3140600029
MCCLAINE, LEE V &	108 WHITEHALL COURT	WMSBURG	VA	23188-1543	4B6	3231300008
SARMIERE, LAWRENCE R &	106 WHITEHALL COURT	WMSBURG	VA	23188-1543	4B6	3231300009
LONGHILL GATE INVESTMENT COMPANY LLC			VA		4B3	3140400001
JAMES CITY COUNTY	5700 WARHILL TRAIL	WMSBURG	VA	23188	434	3210100012
HORNSBY, LOIS SAUNIER	4559 LONGHILL ROAD	WMSBURG	VA	23188-1532	426	3230100004A
ADAM, MARK D	4816 BLUE BILL RUN	WMSBURG	VA	231889410	4T4	3140600005
WELLS, THOMAS M; TR	4451 LONGHILL ROAD	WMSBURG	VA	23188-1534	413	3230100003
ANDERSON, DAVID T & SUSAN R	4820 BLUE BILL RUN	WMSBURG		231889410	4T4	3140600006
HIEGL, STEPHEN F & MARGARET M	4817 BLUE BILL RUN	WMSBURG	VA	231889411	4T4	3140600008
SINGER, GARY L & THERESA M	4821 BLUE BILL RUN	WMSBURG	VA	231889411	4T4	3140600007
ISHAM, EDWARD W	5508 SWAN ROAD	WMSBURG	VA	23188-9406	4T4	3140600011
ROBERTS, CURTIS L & JOANNE M	4812 CANVAS BACK RUN	WMSBURG	VA	231889409	4T4	3140600016
WINFIELD, MARK A & LISA M	5516 SWAN ROAD	WMSBURG	VA	231889406	4T4	3140600012
ROBERTS, CURTIS L & JOANNE M	4808 CANVAS BACK RUN	WMSBURG	VA	231889409	4T4	3140600015
O'ROARK, RICHARD W & EARLEEN H	4804 CANVAS BACK RUN	WMSBURG	VA	23188-9409	4T4	3140600014
YELICH, JOHN M & JOANNE M	4813 CANVAS BACK RUN	WMSBURG	VA	231889409	4T4	3140600017
PERI, FRANK JR & STEPHANIE E T	4809 CANVAS BACK RUN	WMSBURG	VA	231889409	4T4	3140600018
BEUSHEL, LANCE R & KATHLEEN M	5516 SOUTH MALLARD R	WMSBURG	VA	23188-9416	4T4	3140600028
SLYFIELD, STEPHEN S & LINDA C	5509 SOUTH MALLARD R	WMSBURG	VA	23188-9416	4T4	3140600031
GLEAVES, LEON R & ELIZABETH A	5513 SOUTH MALLARD R	WMSBURG		231889416	4T4	3140600030
GAUDREAUX, THOMAS R & ANN C	5501 SOUTH MALLARD R	WMSBURG	VA	23188-9416	4T4	3140600033
ROSELLI, MICHAEL P & EILEEN M	5505 SOUTH MALLARD R	WMSBURG	VA	231889416	4T4	3140600032
BEUSCHEL, NORMA LIVING TRUST	4809 BEAVER RUN EAST	WMSBURG	VA	231889414	4T4	3120300043
CARR, BENJAMIN E & CAROLYN S	5504 NORTH MALLARD R	WMSBURG		231889415	4T4	3120300035
GARRITY, DAVID P & MINYO	5500 NORTH MALLARD R	WMSBURG	VA	231889415	4T4	3120300034
DRAYTON, MOSES & MINERVA	5508 NORTH MALLARD R	WMSBURG	VA	231889415	4T4	3120300036
SHERMAN, HAROLD J & NANCY C	5512 NORTH MALLARD R	WMSBURG	VA	23188-9415	4T4	3120300037
TMB SERVICE CORPORATION			VA		434	3140600001B
DROST-HANSEN, WALTER & MARTHA H	5516 NORTH MALLARD R	WMSBURG	VA	231889415	4T4	3120300038
REVOLINSKY, RICHARD W & LINDA S	5520 NORTH MALLARD R	WMSBURG	VA	231889415	4T4	3120300039
WILLIAMSBURG-JAMES CITY	4460 LONGHILL ROAD	WMSBURG	VA	23188-1535	4E4	3230100001
JAMES CITY COUNTY	5700 WARHILL TRAIL	WMSBURG	VA	23188	434	3210100012
SEASONS TRACE REC ASSOC	301 SEASONS TRACE	WMSBURG	VA	23188-1607	4J4	3210100001C

Owner	Address	City	State	Zip	GPIN	PIN
SEASONS TRACE DEV, INC			VA		4J4	3210100001
LOWDER, JOSEPH C & DINA S	874 SUGARLOAF RUN	WMSBURG		231889410		3210900074
JAMESTOWN BUILDING CORP., INC.	SUGARLOAF RUN	WMSBURG	VA	231880000		3210900001C
JAMES CITY COUNTY	5700 WARHILL TRAIL	WMSBURG	VA	23188	434	3210100012

Minor Water Quality Impact Assessment for James City County PPEA Project (District Park East Pond Dam PC106)

James City County, Virginia

Prepared by:
TIMMONS GROUP
February 24, 2006

Introduction

The James City County PPEA project is located on the Warhill tract near the intersection of Route 60 and Centerville Road in Lightfoot, Virginia. It consists of the installation of road, water, sewer, storm sewer and dam improvements associated with the future development of the site. Ultimately this site will include a community college, a high school and a regional sports stadium.

This Minor Water Quality Impact Assessment specifically addresses impacts to the Resource Protection Area (RPA) resulting from proposed improvements to the existing District Park East Pond Dam (PC 106). This dam must be improved in order to comply with dam safety regulations imposed by the Virginia Department of Conservation and Recreation's Division of Dam Safety.

A wetland delineation was performed along the proposed utility corridors, and was confirmed by the U.S. Army Corps of Engineers on March 28, 2005. Some minor adjustments to the utility alignments were made during the design, and these additional areas were also examined.

Existing Conditions

The Warhill Tract is bordered by Centerville Road to the north, Route 199 to the east, and private property to both the south and west. There is an existing Dominion Virginia Power utility easement that bisects the property. There are also three large ponds on the property, the District Park West Pond (ID # PC 105), the District Park East Pond (ID # PC 106), and the Warhill Trail Pond (ID # PC 118). The topography in this area is gently sloping (approximately 5%) to flat (less than 5%).

This area is mostly forested land with some existing natural grass fields as well as four existing athletic fields. The hydrology in this area is primarily sheet flow into each pond. There is a small amount of storm sewer serving the existing athletic fields that drains to the District Park East Pond. The ponds outfall into unnamed tributaries of Longhill Swamp Creek. The areas of existing impervious development include some existing runoff from a shopping center and Centerville Road at the north end of the site.

Proposed Improvements

The proposed improvements include the installation of road, water, sewer, storm sewer and dam improvements associated with the future development of the site. Ultimately this site will include a community college, a high school and a regional sports stadium.

Stormwater management for the proposed high school site and a portion of the regional sports stadium complex will be provided by the systems that will outfall into the District Park East Pond. The District Park East Dam will serve as the stormwater management BMP for these existing areas as well as the proposed site improvements.

The existing pond has suitable water quality volume to serve as the stormwater management BMP, but will require some improvements to the spillway and impoundment. The improvements will be designed and constructed according to James City County Guidelines for the Design and Construction of Stormwater Managements BMPs as well as the design standards of the Virginia department of Conservation and Recreation's Division of Dam Safety. We have included in our proposal improving the principal spillway to pass the post developed 10-year storm and providing 24 hour extended detention of the post developed 1-year storm. We have also included removing the existing vegetation on the back side of the dam and revegetating the slope.

In order to handle the additional inputs into the pond and to meet dam safety requirements, the earthen dam will need to be upgraded. The majority of the structural improvements will be made to the pond side of the dam. The downstream side of the dam will also require some grading as well as removal of existing trees which are not permitted along the dam. The outfall structure of the dam will need to be improved as the current drop inlet and outfall are inadequate.

Impact Avoidance and Minimization

The dam's structural improvements were primarily designed to occur on the pond side, based on the condition of the existing dam slope the proposed improvement will impact a small wetland bench currently located along the slope at the waters edge. There is a large forested wetland located on the downstream side of the dam which was avoided to the greatest extent possible. The pond's existing water surface elevation will be maintained with no increase and the structural improvements only require grading of the slope and not filling. Therefore there will be no reduction of the pond's surface area. There is some minor grading and tree removal being conducted on the downstream side, but these activities have been limited to the minimum amount required by the Virginia Department of Conservation and Recreation's Division of Dam Safety. The plunge pool has been sized to be as small as possible while still meeting dam safety and County standards and providing protection to the downstream wetland system.

Impact Scenario

Construction of the upstream face improvements will impact 782 square feet (0.018 acres) of wetlands, none of which lie within the Resource Protection Area. A portion of the wetland impact is the result of the outfall structure necessary to pass flows from the pond. The installation of the plunge pool located on the downstream side of the dam will require 2,349 square feet (0.054 acres) of forested wetlands impacts. The limits of clearing and grading on the downstream side of the dam will impact 33,166 square feet (0.76 acres) of the RPA.

Mitigation of Impacts

The resulting impacts to the RPA will be more than off-set by the additional water quality treatment provided for the impervious area from the existing sports fields, proposed high school and sports stadium sites that will now drain to the District Park Eastern Pond.

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

FEB 2006 RECEIVED PLANNING DEPARTMENT

February 24, 2006

Mr. Scott Thomas, P.E.
James City County
101 Mounts Bay Road
P O Box 8784
Williamsburg, VA 23187-8784

RE: Design Waiver Request for District Park East Pond Dam (PC 106)

Dear Scott:

We have not included pond benches nor 4:1 slopes in all areas of the proposed improvements for the District Park East Pond Dam (PC 106). We are requesting a design waiver of these requirements due to wetland constraints at the downstream toe of the dam, a desire to maintain at least a 15' wide top of dam width, and a desire to avoid regrading the entire face of the dam down to the upstream toe of the dam. Regrading the face of the dam would require extensive dewatering and very difficult construction on potentially saturated soils on the upstream face of the dam.

If you have any questions, or need additional information, please do not hesitate to contact me at (804) 200-6413. We would be happy to meet with you to answer any questions that you may have.

Thank you for your assistance with this project.

Sincerely,

Michael L. Claud, P.E.

APPROVED
James City County
Environmental Division
By: [signature]
Date: 03-13-06

A DAM SAFETY PERMIT IS NECESSARY FOR PROPOSED IMPROVEMENTS.

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
Site Development | Residential | Infrastructure | Technology
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DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 259-4032 E-MAIL: devtman@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
MOSQUITO CONTROL (757) 259-4116

March 6, 2006

Mr. Michael Claud
Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

RE: RPA Exception Request for Improvements to District Park East Pond Dam
County Plan No. SP-107-05; County BMP No. PC106

Dear Mr. Claud:

Pursuant to your letter request of February 24, 2006, a waiver from the Chesapeake Bay Preservation Ordinance to allow encroachment into the Resource Protection Area (RPA) for modifications to an existing dam embankment is **approved**. The project impacts 33,166 square feet of the RPA involving clearing, grading and improvements to the spillways to allow the pond to function as a stormwater BMP and to meet state dam safety requirements.

The Ordinance allows for waivers to be granted administratively for modifications to existing nonconforming structures in the RPA such as the pond and its dam embankment provided certain findings are made. The findings presented in Section 23-12(1) are that there will be no increase in nonpoint source pollution load and that any land disturbance exceeding 2500 square feet comply with the erosion and sediment control requirements of the Ordinance. In this situation, the RPA begins at the base of the dam so the RPA impacts are to an engineered fill section, not a natural buffer. In addition, the work involves improving the ability of the pond to serve as a BMP facility and improving its safety. Finally, the site plan for the work includes the erosion control measures necessary to comply with the Ordinance.

Therefore, approval of the waiver is only conditioned on the implementation of the approved site plan for the work, SP-107-05. Please note that this waiver does not constitute approval for any work on the dam improvements, that will have to wait until the land disturbing permit is issued for the project. The exception request will become null and void if construction of the improvements have not commenced within 12 months of the date of this letter. Please contact me at 253-6670 if you have any questions.

Sincerely,

Darryl E Cook

Darryl E. Cook, P.E.
Environmental Director

SECTION 5

Chris Dodson

From: Berg, Robert A NAO [Robert.A.Berg@nao02.usace.army.mil]

Sent: Tuesday, November 08, 2005 9:12 AM

To: Chris Dodson

Subject: NWP 3 for dam improvements (05-R2325)

Our NWP 3 for the proposed work cites a site plan showing the proposed work dated 7/26/05. I was provided a new drawing via email, revised date 9/26/05, which I thought was the same drawing as the one mentioned in the permit only with some additional information. The newer drawing shows additional wetland areas that were delineated and shows the permitted work more accurately. Therefore, our permit issued on 11/3/05 will cover the work shown on the site plan dated 9/26/05. Hopefully this email clarifies this and if any additional information in required email or call me. Thanks.

U.S. Army Corps of Engineers
Norfolk District, Western Virginia Regulatory Section
803 Front Street
Norfolk, Virginia 23510

November 3, 2005

Pr Number: 05-R2325

Waterway: Long Hill Swamp

1. Participant:
Curtis Contracting
Attn: Mr. Andy Curtis
Post Office Box 769
West Point, Virginia 23181

2. Authorized Agent:
Timmons Group
Attn: Ben Virts
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

3. Address of Job Site:
South of Lightfoot, on the War Hill Tract adjacent to the soccer complex.

4. Project Description:
Improvements to an existing dam consisting of construction of a wave bench, improving the spillway and constructing an emergency spillway to meet new state dam safety standards (as shown in the site plans entitled "Proposed Interim Improvements to East Dam (PC106 Dam)" and dated 7/26/05).

5. Findings

This is regarding your request to perform work in the waters of the United States, as described in part 4 above. This activity has been reviewed and found to satisfy the criteria contained in the Corps Nationwide Permit Number (3), attached. (The Corps Nationwide Permits were published in the Federal Register (67 FR 2020) on January 15, 2002 as corrected by Federal Register (67 FR 6692) on February 13, 2002 and Federal Register (67 FR 8579) on February 25, 2002 and the regulations governing their use can be found in 33 CFR 330 published in Volume 56, Number 226 of the Federal Register dated November 22, 1991.)

Provided the enclosed conditions are met, an individual Department of the Army Permit will not be required. In addition, the Virginia Department of Environmental Quality has provided 401 certification for Nationwide Permit Number (3). However, a permit may be required from the Virginia Marine Resources Commission and/or your local wetlands board, and this verification is not valid un' u obtain their approval, if necessary. You may contact the Virginia Marine Resources Commission at (757) 247-2200 for further information concerning their permit requirements.

This authorization does not relieve your responsibility to comply with local requirements pursuant to the Chesapeake Bay Preservation Act (CBPA), nor does it supersede local government authority and responsibilities pursuant to the Act. You should contact your local government before you begin work to find out how the CBPA applies to your project.

Enclosed is a "compliance certification" form, which must be signed and returned within 30 days of completion of the project, including any required mitigation (see nationwide permit condition number 14). Your signature on this form certifies that you have completed the work in accordance with the nationwide permit terms and conditions.

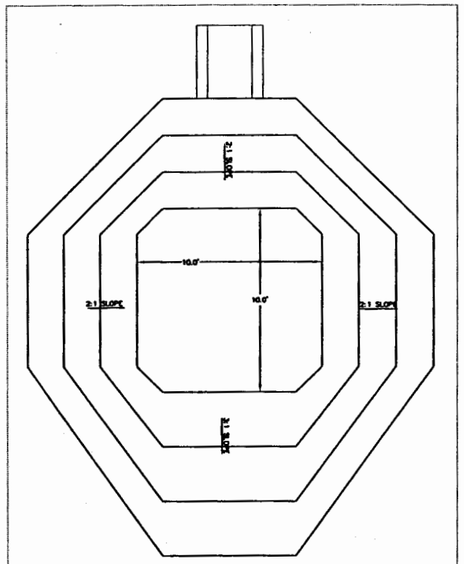
This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 18, 2007. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant nationwide permit is modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this nationwide permit, unless the Norfolk District Engineer uses discretionary authority to modify, suspend or revoke this verification. It is your responsibility to remain informed of changes to the nationwide permits. We will issue a special public notice announcing any changes to the nationwide permits when they occur.

6. C ps Contact: Robert Berg at (757) 201-7793.

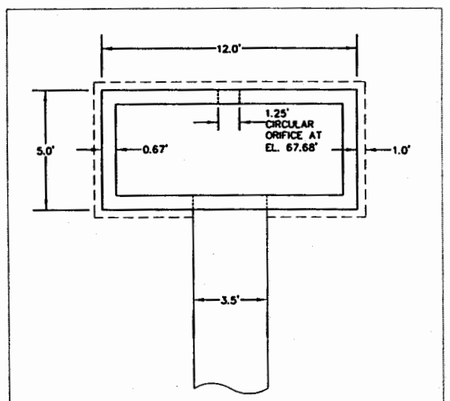
For Michael A. Schwinn
Chief, Western Virginia Regulatory Section

AO FL 13 REVISED DEC 90

FINAL



PLUNGE POOL SPILLWAY PLAN
N.T.S.



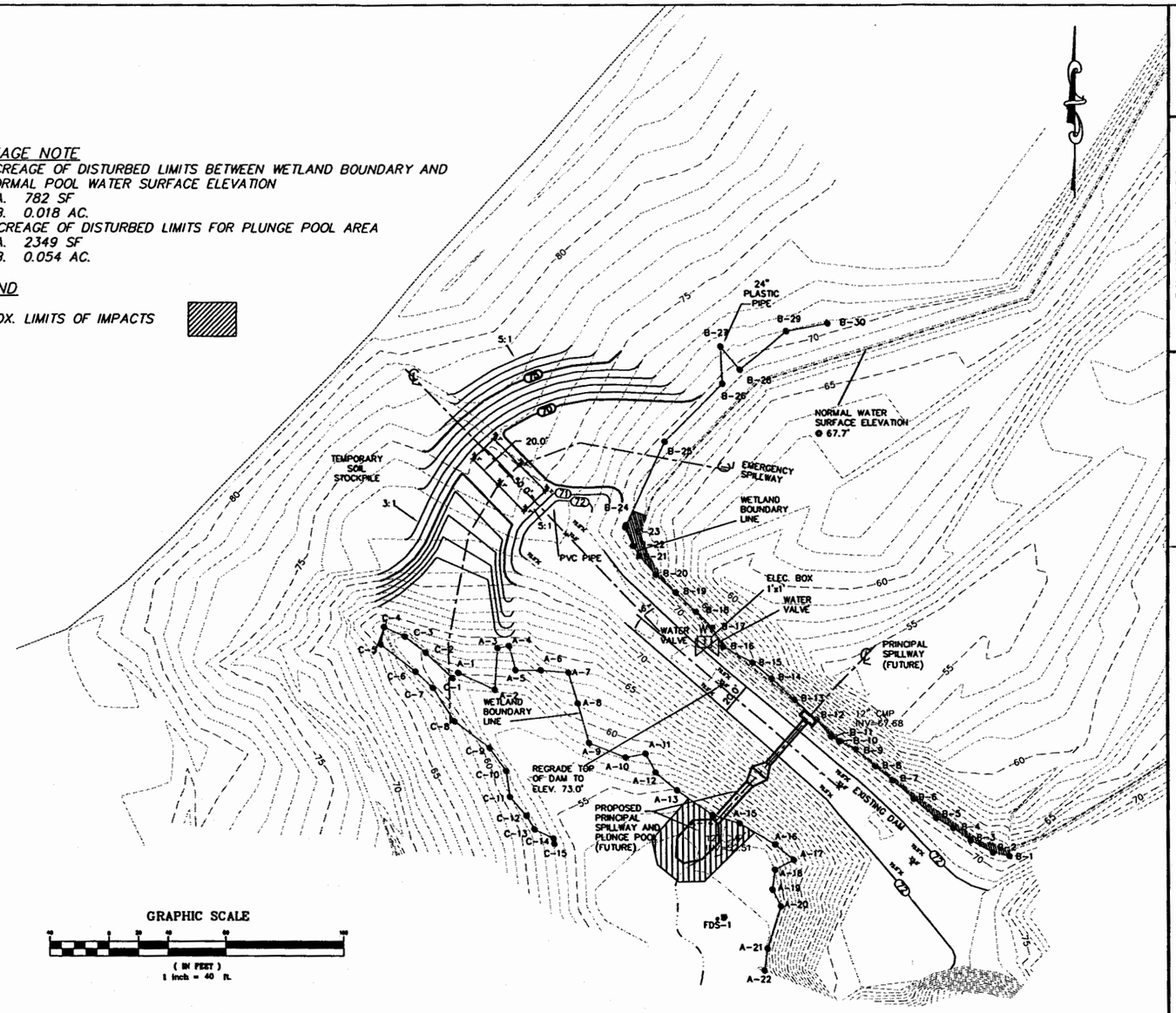
PRINCIPAL SPILLWAY PLAN
N.T.S.

ACREAGE NOTE

1. ACREAGE OF DISTURBED LIMITS BETWEEN WETLAND BOUNDARY AND NORMAL POOL WATER SURFACE ELEVATION
   A. 782 SF
   B. 0.018 AC.
2. ACREAGE OF DISTURBED LIMITS FOR PLUNGE POOL AREA
   A. 2349 SF
   B. 0.054 AC.

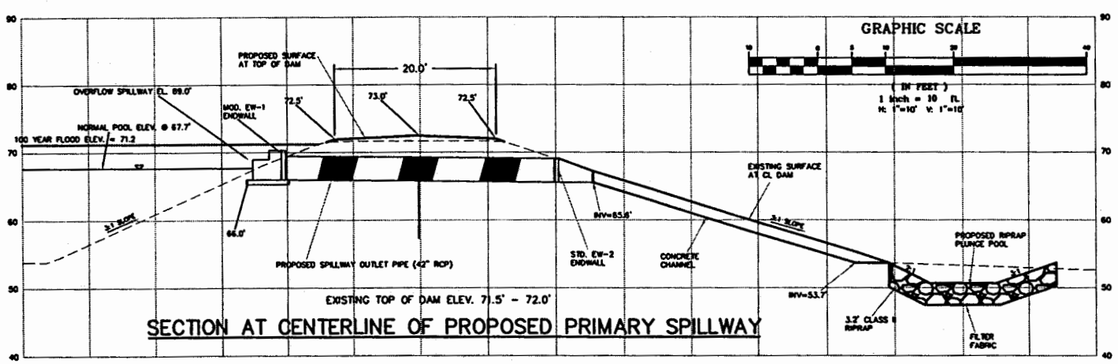
LEGEND

APPROX. LIMITS OF IMPACTS

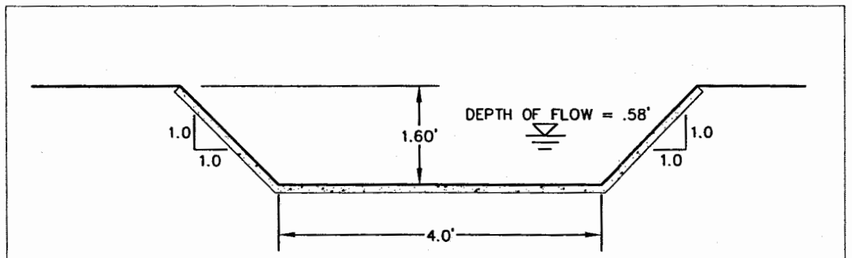


GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.



SECTION AT CENTERLINE OF PROPOSED PRIMARY SPILLWAY



CROSS SECTION OF TRAPEZOIDAL CHANNEL
N.T.S.

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

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DATE	REVISION DESCRIPTION
9/26/05	REVISED PER COUNTY COMMENTS & ADDITIONAL TOPO

DATE	9-15-05
DRAWN BY	D. WILMOTH
DESIGNED BY	D. WILMOTH
CHECKED BY	M. CLAUD
SCALE	AS SHOWN

TIMMONS GROUP

JAMES CITY COUNTY PPEA
JAMES CITY COUNTY, VIRGINIA
EMERGENCY FINAL REPAIRS TO EAST DAM (PC106 DAM)

JOB NO. 22547
SHEET NO. 1 OF 1

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

July 25, 2005

Mr. Robert Berg
Norfolk District Office
U.S. Army Corps of Engineers
803 Front St.
Norfolk, VA 23510

Re: Jurisdictional Determination
Eastern Dam Analysis
James City County, Virginia

Applicant: Curtis Contracting, Inc.
P.O. Box 769
West Point, VA 23181
Attention: Andy Curtis

Dear Mr. Berg,

Enclosed please find a wetland delineation package for the above referenced property. We are submitting this information to you in order to obtain confirmation of the wetland delineation performed at the site. Timmons Group is submitting this package on behalf of Curtis Contracting, Inc.

The study area is located at a storm water pond dam located south of the town of Lightfoot in James City County (See enclosed Site Vicinity Map and Environmental Inventory Map). The study area contains wetlands located above and below an existing pond dam which will be receiving storm water drainage from a proposed stadium complex for James City County and Williamsburg High School #3. The land below the pond is a wetland primarily comprised of mature hardwood forest. The eastern boundary for the study area is defined by a soccer field, and the northern boundary is defined by the pond that has contributed to the formation of the existing wetlands. The site lies within the Lower James Watershed (Hydrologic Unit Code 02080206) and drains to Powhatan Creek prior to discharging to the James River. The subject property is being investigated for improvements to the dam structure to facilitate increased storm water drainage from the proposed stadium complex for James City County High School.

Using the soils, vegetation, and hydrology per the USACOE delineation manual a preliminary wetland delineation map was produced and is attached for your review (see attached). During our field investigation on the subject property, the part of the wetland directly below the dam was delineated. The entire wetland area below the dam was not delineated because proposed dam improvements will only affect areas of the wetland that are directly adjacent to the dam. The wetland fringe located above the dam was also delineated. The soils at the site are characterized primarily by wetland soils showing evidence of hydric soils on-site. The mapped soils on the site consisted primarily of very poorly drained Johnston Complex.

The soils featured low chroma soils and other hydric soil indicators that matched those mapped on the site. Attached is 1 data sheet which provides representative vegetation, hydrology, and soil classifications for the wetland area documented on-site.

Upland portions of the surrounding property are largely characterized by a soccer field and mature hardwood forest. As noted above wetland soils were the predominant soils on the site, characterized by very poorly drained soils of the Johnston Complex. The wetland area is primarily formed from seeps and high groundwater table conditions created by the dam.

Please review this wetland delineation package material in support of the delineation presented on the attached Preliminary Wetland Delineation Map and contact me at (804) 200-6442 so that we may schedule a site visit to review the delineation.

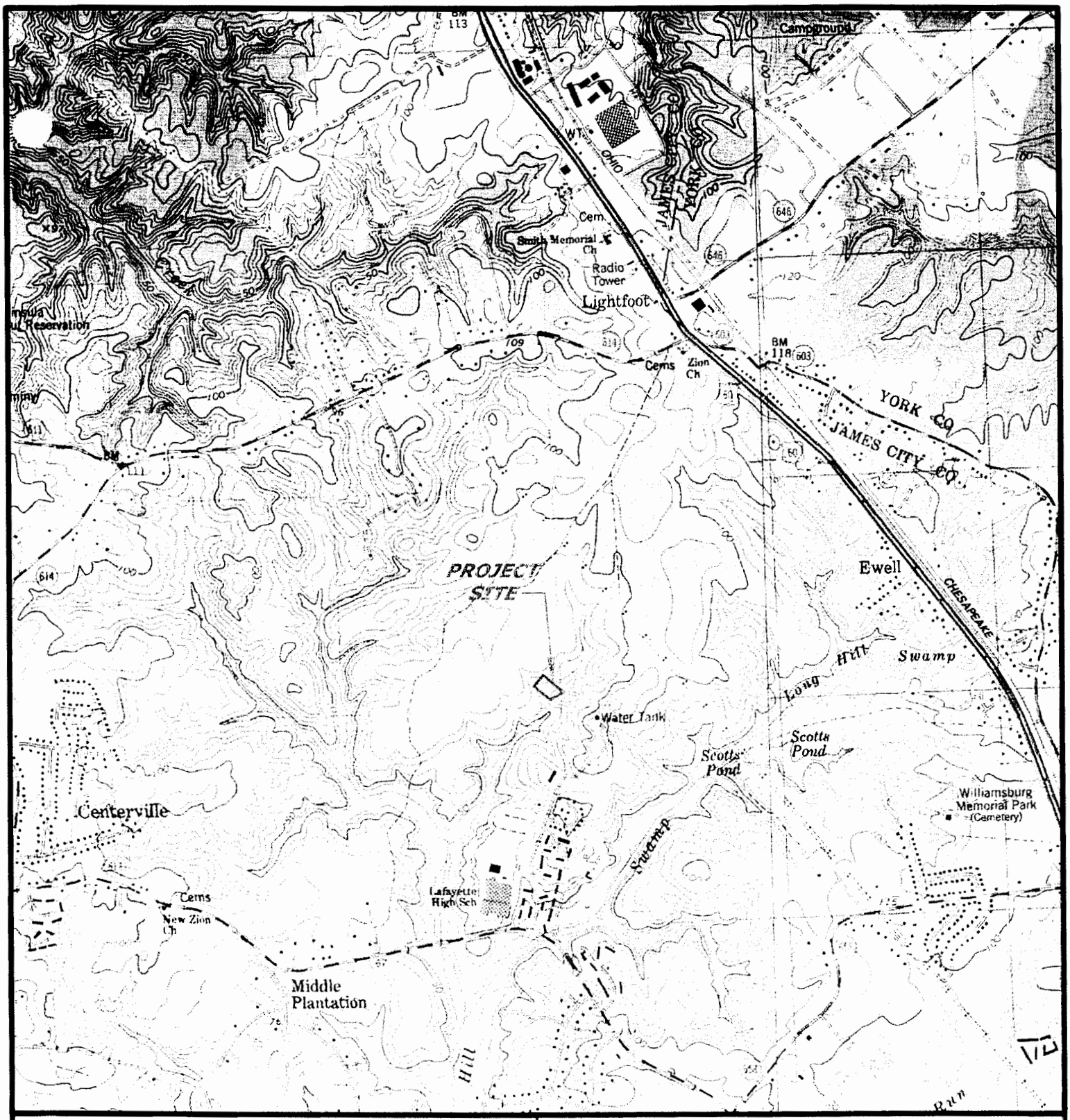
Sincerely,
Timmons Group

Ben Virts
Environmental Scientist

Chris Dodson, PWS
Environmental Services Manager

Attachments:
Vicinity Map
Environmental Inventory Map
Preliminary Wetland Delineation Map
Field Data Sheets (1)

CC: Mike Claud, Timmons Group



VICINITY MAP OF EASTERN DAM ANALYSIS

JAMES CITY COUNTY, VIRGINIA

JOB NUMBER: 22547 DATE: 7/14/05

LATITUDE: 37°19'28" N
LONGITUDE: 76°45'40" W

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

GRAPHIC SCALE

1,000 0 500 1,000 2,000 4,000

(IN FEET)
1 inch = 2,000 ft.

U.S.G.S. QUADRANGLES: NORGE

LOWER JAMES WATERSHED (HUC 02080206)

DATA FORM
ROUTINE WETLAND DETERMINATION METHOD
(1987 COE WETLANDS DELINEATION MANUAL)

Project/Site:	Eastern Dam Analysis	Date:	6/27/05
Applicant/Owner:	Curtis Contracting, Inc	County:	James City
Investigator(s):	C. Dodson, B. Virts, and E. Virts	State:	VA

Do Normal Circumstances exist on the site? Yes
Is the site significantly disturbed (Atypical Situation)? No
Is the area a potential Problem Area? No

Community ID: Wetland

Plot ID: 1 of 1

VEGETATION

	Dominant Plant Species	Stratum	Ind. Status		Dominant Plant Species	Stratum	Ind. Status
1.	*Platanus occidentalis*	Tree	FACW-	9.	*Lindera benzoin*	Shrub	FACW-
2.	*Acer rubrum*	Tree	FAC	10.	*Arisaema triphyllum*	Shrub	FACW-
3.	*Nyssa sylvatica*	Tree	FAC	11.	*Saururus cernuus*	Herb	OBL
4.	*Alnus serrulata*	Sap	OBL	12.	*Woodwardia areolata*	Herb	FACW+
5.	*Magnolia virginiana*	Sap	FACW+	13.	*Smilax rotundifolia*	Vine	FAC
6.	*Carpinus carolina*	Sap	FAC	14.	*Toxicodendron radicans*	Vine	FAC
7.	*Rosa palustris*	Shrub	OBL	15.	*Vitus rotundifolia*	Vine	FAC-
8.	*Ilex opaca*	Shrub	FACU+	16.			

Percent of Dominant Species that is OBL, FACW, or FAC (excluding FAC-) 87%

Remarks: Greater than 50% of the dominant vegetation was hydrophytic.

HYDROLOGY

Primary Indicators:

	Inundated
X	Saturated Upper 12"
	Water Marks
	Drift Lines
	Sediment Deposits
X	Drainage Patterns

Secondary Indicators:

	Oxidized Root Channels
X	Water Stained Leaves
X	FAC-Neutral Test
	Other

Recorded Data (Describe in Remarks):

	Stream, Lake or Tidal Gauges
	Aerial Photographs
	Other
	No Recorded Data Available

Field Observations:

Depth of Surface Water:	
Depth to Free Water in Pit:	
Depth to Saturated Soil:	

Remarks: There were hydrologic indicators in this data station.

SOILS

Map Unit Name (Series and Phase): Johnston Complex	
Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	thermic Cumulic Humaquepts
Field Observation Confirms Mapped Soil Type:	Yes

Profile Description:

Depth (in.)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture Structure
0-8"	Organic	N/A	N/A	N/A	N/A
8-12"	A	2.5Y 3/1	N/A	N/A	Silt Clay

Hydric Soil Indicators:

X	Histisol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		
	Aquic Moisture Regime		Organic Streaking in Sandy Soils
	Reducing Conditions		On National Hydric Soils List
	Gleyed or Low Chroma		Other (Explain in Remarks)

Remarks: There were indicators of hydric soils in this data station.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes
Wetland Hydrology Present? Yes
Hydric Soils Present? Yes Is the Sampling Point within a Wetland? Yes

Remarks: This field data point represents field data for the location indicated by FDS-1 on the enclosed Preliminary Wetland Delineation Map.

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   10MAY05  TIME  11:15:54  *
 *                                      *
 ****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   HEC-1 MODEL
  2           ID   James City County Dam Study
  3           ID   INPUT FILE - JCCex.TXT
  4           ID   100 yr Flows
  5           ID   5-10-2005
  6           ID   Existing LANDUSE
  7           ID
  8           ID   100-Year 24 Hour Storm (8.0 in)
  9           ID
              *DIAGRAM
 10           IT       5  011305    0000     300
 11           IO       5       0
 12           IN      15
 13           JR    PREC  1.0000
```

```
14          KK      D1
15          KM        RUNOFF HYDROGRAPH FOR SUBBASIN D1
16          PB     8.0
17          PC   .0000   .0020   .0050   .0080   .0110   .0140   .0170   .0200   .0230   .0260
18          PC   .0290   .0320   .0350   .0380   .0410   .0440   .0480   .0520   .0560   .0600
19          PC   .0640   .0680   .0720   .0760   .0800   .0850   .0900   .0950   .1000   .1050
20          PC   .1100   .1150   .1200   .1260   .1330   .1400   .1470   .1550   .1630   .1720
21          PC   .1810   .1910   .2030   .2180   .2360   .2570   .2830   .3870   .6630   .7070
22          PC   .7350   .7580   .7760   .7910   .8040   .8150   .8250   .8340   .8420   .8490
23          PC   .8560   .8630   .8690   .8750   .8810   .8870   .8930   .8980   .9030   .9080
24          PC   .9130   .9180   .9220   .9260   .9300   .9340   .9380   .9420   .9460   .9500
25          PC   .9530   .9560   .9590   .9620   .9650   .9680   .9710   .9740   .9770   .9800
26          PC   .9830   .9860   .9890   .9920   .9950   .9980  1.0000  1.0000  1.0000  1.0000
27          BA    0.22
28          LS       0    74.3       0
29          UD   0.878

30          KK   POND1
31          RS       1    ELEV   67.68
32          SA    6.24    6.34    6.73    7.12    7.55    7.80    8.09
33          SE   67.68    68.0    69.0    70.0    71.0    71.6    72.0
34          SQ     0.0    1.59    3.62    4.80    5.74    6.23   51.10
35          SE   67.68    68.0    69.0    70.0    71.0    71.6    72.0
36          ST    72.0   387.0     2.8     1.5
37          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    14          D1
                 V
                 V
    30       POND1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   10MAY05  TIME  11:15:54   *

 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *

*                                       *
*****************************************
```

```
                    HEC-1 MODEL
                    James City County Dam Study
                    INPUT FILE - JCCex.TXT
                    100 yr Flows
                    5-10-2005
                    Existing LANDUSE

                    100-Year 24 Hour Storm (8.0 in)


 11 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1113 5  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    5  ENDING DATE
                   NDTIME       0055  ENDING TIME
                   ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

    JP        MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

    JR        MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                 1.00
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00
HYDROGRAPH AT					
+	D1	.22	1	FLOW	293.
				TIME	12.75
ROUTED TO					
+	POND1	.22	1	FLOW	118.
				TIME	13.83

** PEAK STAGES IN FEET **

1	STAGE	72.13
	TIME	13.83

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION POND1
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	67.68	72.00	72.00
STORAGE	0.	31.	31.
OUTFLOW	0.	51.	51.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	72.13	.13	32.	118.	1.67	13.83	.00

*** NORMAL END OF HEC-1 ***

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   10MAY05  TIME  11:19:13  *
 *                                      *
 ****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   HEC-1 MODEL
  2           ID   James City County Dam Study
  3           ID   INPUT FILE - JCCdev.TXT
  4           ID   100 yr Flows
  5           ID   5-10-2005
  6           ID   Clearing for School and Stadium Sites
  7           ID
  8           ID   100-Year 24 Hour Storm (8.0 in)
  9           ID
              *DIAGRAM
 10           IT       5  011305    0000     300
 11           IO       5       0
 12           IN      15
 13           JR    PREC  1.0000
```

```
14          KK      D1
15          KM        RUNOFF HYDROGRAPH FOR SUBBASIN D1
16          PB     8.0
17          PC   .0000   .0020   .0050   .0080   .0110   .0140   .0170   .0200   .0230   .0260
18          PC   .0290   .0320   .0350   .0380   .0410   .0440   .0480   .0520   .0560   .0600
19          PC   .0640   .0680   .0720   .0760   .0800   .0850   .0900   .0950   .1000   .1050
20          PC   .1100   .1150   .1200   .1260   .1330   .1400   .1470   .1550   .1630   .1720
21          PC   .1810   .1910   .2030   .2180   .2360   .2570   .2830   .3870   .6630   .7070
22          PC   .7350   .7580   .7760   .7910   .8040   .8150   .8250   .8340   .8420   .8490
23          PC   .8560   .8630   .8690   .8750   .8810   .8870   .8930   .8980   .9030   .9080
24          PC   .9130   .9180   .9220   .9260   .9300   .9340   .9380   .9420   .9460   .9500
25          PC   .9530   .9560   .9590   .9620   .9650   .9680   .9710   .9740   .9770   .9800
26          PC   .9830   .9860   .9890   .9920   .9950   .9980  1.0000  1.0000  1.0000  1.0000
27          BA    0.22
28          LS       0    84.4       0
29          UD   0.438

30          KK   POND1
31          RS       1    ELEV   67.68
32          SA    6.24    6.34    6.73    7.12    7.55    7.80    8.09
33          SE   67.68    68.0    69.0    70.0    71.0    71.6    72.0
34          SQ     0.0    1.59    3.62    4.80    5.74    6.23   51.10
35          SE   67.68    68.0    69.0    70.0    71.0    71.6    72.0
36          ST    72.0   387.0     2.8     1.5
37          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    14          D1
                 V
                 V
    30       POND1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   10MAY05  TIME  11:19:13   *

 *                                       *
 *****************************************

 ****************************************
 *                                      *
 *    U.S. ARMY CORPS OF ENGINEERS      *
 *    HYDROLOGIC ENGINEERING CENTER     *
 *          609 SECOND STREET           *
 *       DAVIS, CALIFORNIA 95616        *
 *           (916) 756-1104             *

 *                                      *
 ****************************************
```

```
                    HEC-1 MODEL
                    James City County Dam Study
                    INPUT FILE - JCCex.TXT
                    100 yr Flows
                    5-10-2005
                    Existing LANDUSE

                    100-Year 24 Hour Storm (8.0 in)


 11 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1113 5  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    5  ENDING DATE
                     NDTIME        0055  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   1.00
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00
HYDROGRAPH AT					
+	D1	.22	1	FLOW	562.
				TIME	12.33
ROUTED TO					
+	POND1	.22	1	FLOW	342.
				TIME	12.67

** PEAK STAGES IN FEET **
1 STAGE 72.37
TIME 12.67

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION POND1
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	67.68	72.00	72.00
STORAGE	0.	31.	31.
OUTFLOW	0.	51.	51.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	72.37	.37	34.	342.	2.08	12.67	.00

*** NORMAL END OF HEC-1 ***

CURTIS CONTRACTING, INC.
Post Office 769
West Point, Virginia 23181
(804) 843-4633/FAX: (804) 843-2545
curtis@visi.net

FACSIMILE TRANSMISSION

DATE: Sept. 29 2005

TOTAL PAGES: 8

TO: Scott Thomas
James City - Environmental

PHONE: (757) 253-6639

FAX: (757) 259-4032

FROM: Andy Curtis

REFERENCE: EC-3 Material Specs.
East Pond Dam Spillway

MESSAGE: Scott, the above product has been approved by VDOT for EC-3 applications type A, B and C.

Andy

MIRAFI® TECHNICAL DATA SHEET

Mirafi® Miramat® TM8

Miramat® TM8 is a 3-dimensional, synthetic, erosion control mat, which provides bare soil retention, vegetation nurturing and turf reinforcement.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Wide Width Tensile Strength	ASTM D 4595	kN/m (lbs/ft)	9.6 (660)	7.0 (480)
Wide Width Elongation	ASTM D 4595	%	20	12
UV Resistance (after 500 hours)	Utah State	%	90	
Velocity - Bare Soil (0.5 hours)	Utah State	m/s (ft/s)	4.3 (14)	
Velocity - Bare Soil (50 hours)	Utah State	m/s (ft/s)	2.4 (8)	
Velocity - Vegetated (0.5 hours)	Utah State	m/s (ft/s)	6.1 (20)	
Velocity - Vegetated (50 hours)	Utah State	m/s (ft/s)	4.0 (13)	
Limiting Shear Stress - Bare Soil (0.5 hours)	Utah State	kPa (psf)	0.287 (6)	
Limiting Shear Stress - Bare Soil (50 hours)	Utah State	kPa (psf)	0.144 (3)	
Limiting Shear Stress - Vegetated (0.5 hours)	Utah State	kPa (psf)	0.383 (8)	
Limiting Shear Stress - Vegetated (50 hours)	Utah State	kPa (psf)	0.239 (5)	

ALLOWED 13-20 20 ft/s

Physical Properties	Test Method	Unit	Typical Value
Mass/Unit Area	ASTM D 5261	g/m²(oz/yd²)	407 (12)
Roll Dimensions (width x length)	--	m (ft)	3.7 (12) x 30.5 (100)
Roll Area	--	m² (yd²)	111 (133)
Color	--	--	Black or Green
Estimated Roll Weight	---	kg (lbs)	45 (100)

Disclaimer: MIRAFI® Construction Products assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. MIRAFI® disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

Ten Cate Nicolon

JPSS000417
EfQR1

Installation Guidelines MIRAFI

Installation Guidelines for Miramat® TM8 Used in Slope and Channel Applications

Prepared by

MIRAFI®
Construction Products

365 South Holland Drive
Pendergrass, GA 30567
Tel: (706) 693-2226
Fax: (706) 693-2044
www.mirafi.com

Installation Guidelines for Miramat® TM8 Used in Slope and Channel Applications

General

Miramat® TM8 is shipped in rolls 12' (3.7m) wide and 100' (30.5 m) long. A full roll can be easily handled and installed by two people using the following procedures.

Site Preparation:

Grade the surface of installation areas so ground is smooth and compact. When seeding prior to installation, prepare the ground surface by loosening 2" (5.08 cm) to 3" (7.62 cm) of topsoil. All gullies, rills and any other disturbed areas must be leveled and fine graded prior to installation. Spread seed before mat installation for erosion control and after mat installation for turf reinforcement. (IMPORTANT: Remove all large rocks, dirt clods, stumps, roots, grass clumps, trash and other materials that would obstruct the mat from lying in direct contact with the soil surface).

Initial and terminal anchor trenches are required at the mat ends and intermittent trenches must be constructed across channels at 40' (12.2 m) intervals. Initial and terminal anchor trenches should be a minimum 12" (30.48 cm) deep and 6" (15.24 cm) wide (Fig. 1 and 2). Intermittent trenches need be only 6" (15.24 cm) deep and 6" (15.24 cm) wide (Fig. 3).

Channel Installation:

Excavate initial and terminal trenches 12" (30.48 cm) deep and 6" (15.24 cm) wide (Figure 1 and 2) across the channel at the upper and lower end of the lined channel sections. Excavate intermittent trenches, 6" (15.24 cm) wide and deep (Figure 3) across the channel at 40' (12.2 m) intervals. Excavate longitudinal trenches 6" (15.24 cm) (Figure 4) deep and wide along channel edges in order to anchor the mat outside edges. Place the first mat at the downstream end of the channel. Place the end of the first mat in the initial trench and pin it at 1' (0.305 m) intervals along the bottom of the trench (Figure 1). (Note: Miramat® TM8®should be placed upside down in the trench - loops against the ground- with the roll on the downstream side of the trench).

Once pinned and backfilled, the mat is deployed by wrapping over the top of the trench and unrolling upstream with the loops now facing up (Figure 1). If the channel is wider than 12' (3.7 m), place ends of adjacent rolls in the terminal trench, overlapping the adjacent rolls a minimum of 6" (15.24 cm). Side slope shingling should be avoided (Figure 5). Pin at 1' (0.305 m) intervals, backfill and compact. Unroll Miramat® TM8 in the upstream direction until reaching the first intermittent trench (Figure 3). Unroll the mat back over itself, positioning the roll on the downstream side of the trench, and allowing the mat to conform to the trench. Then pin the mat (two layers) to the bottom of the trench, backfill and compact (Figure 3).

Continue up the channel (wrapping over the top of the intermittent trench) repeating this step at other intermittent trenches, until reaching the upper terminal trench (Figure 2). At the upper terminal trench, allow the mat to conform to the trench, secure with pins or staples, backfill, compact and them bring the mat back over the top of the trench and onto the existing mat using a 2'(0.61 m) to 3' (0.915 m) overlap in the downstream direction, and pin at 1' (0.305 m) intervals across the mat.

When starting installation of a new roll, begin in a trench or shingle-lap end of rolls a minimum of 1' (0.305 m) with upstream mat on top of downstream mat to prevent uplifting. Place the outside edges of the mat(s) in longitudinal trenches, pin, backfill and compact.

Slope Installation:

Place mat 2' (0.61 m) to 3' (0.915 m) over the top of the slope and into an excavated trench measuring at least 6" (15.24 cm) deep and wide (Figure 4). Pin the mat at 1' (0.305 m) intervals along the bottom of the trench, backfill and compact. (See note above for details of mat placement in trench). Unroll the mat down the slope, maintaining intimate contact between the soil and the smooth side of the mat (loops up). Overlap adjacent rolls a minimum of 6" (15.24 cm). Pin the mat to ground using staples or pins in a 3' (0.915 m) pattern. Less frequent stapling/ pinning is acceptable on moderate slopes.

Securing Devices:

11 Gauge, 6" (15.24 cm) x 1" x 6" (15.24 cm) metal staples or 18" (45.72 cm) pins, having 3/16" (.476 cm) shank diameter and an attached 1 _" (3.81 cm) washer, are recommended for fastening Miramat® TM8 to the ground. Drive staples or pins so that the top of the staple or washer is flush with ground surface. Staple or pin each mat as outlined in the above sections. Longitudinal overlaps must be a minimum of 3" (7.62 cm) and uniform along the entire length of the overlap and stapled or pinned every 3' (0.915 m) along the overlap length. Roll ends may be spliced be overlapping 1' (0.305 m) in the direction of water flow, with the upstream mat placed on top of the downstream mat. This overlap should be secured by staples or pins at 1' (0.305 m) spacing across the mat overlaps.

Figure 1: Initial Trench

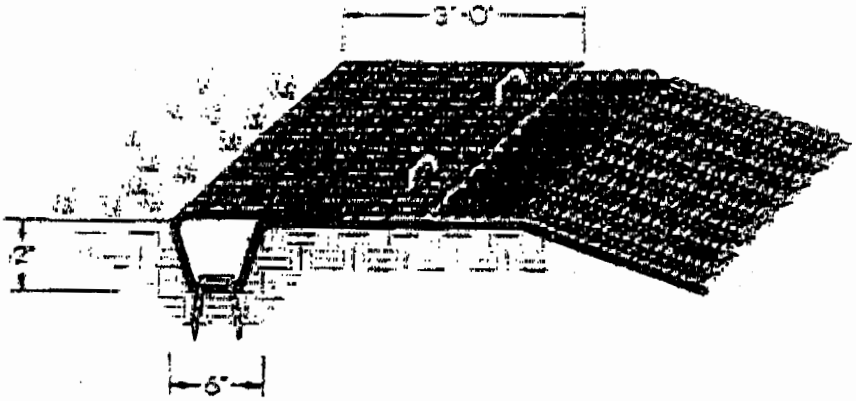


Figure 2: Terminal Anchor Trench

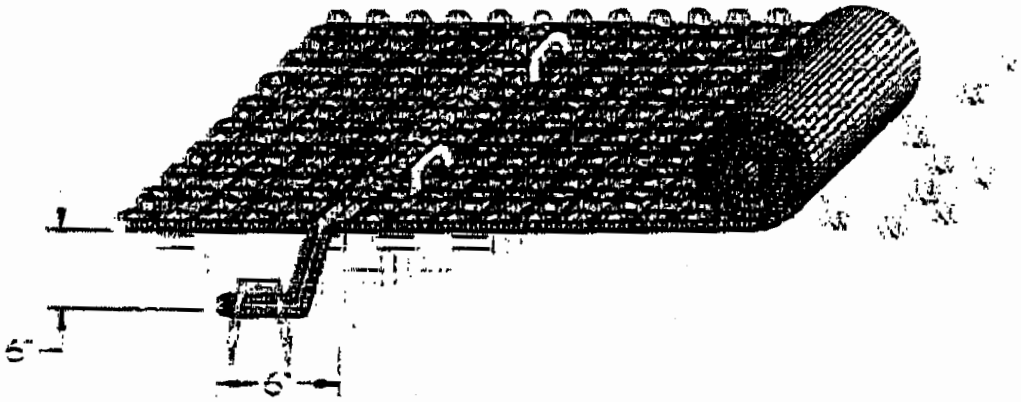


Figure 3: Intermittent Trench

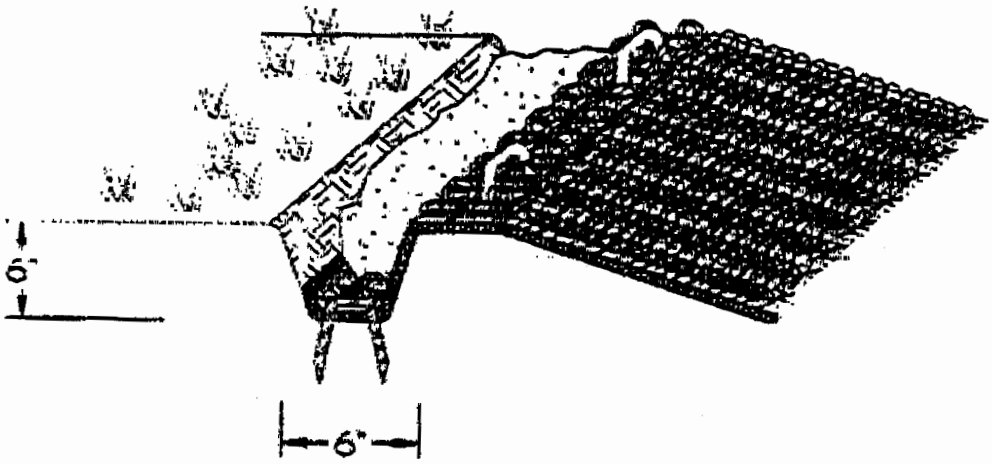


Figure 4: Longitudinal Trench

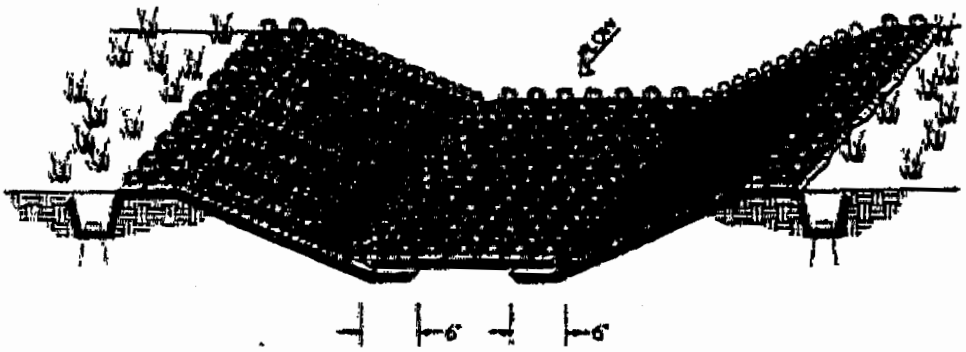


Figure 5: Typical Channel Overlap

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RECEIVED
MAR 0 3 2006

BY:_____

February 24, 2006

STEVE HICKS

RECEIVED
FEB 2 8 2006
DEVELOPMENT MANAGEMENT

Mr. Wayland Bass, P.E.
James City County
Department of Development Management
101 E. Mounts Bay Road
Williamsburg, Virginia 23187-8784

RE: Eastern Pond (PC 106) Dam Renovations

Dear Wayland:

Enclosed is a set of design plans for the Eastern Pond (PC106) Dam Renovations project. In addition, we have included copies of the DCR Dam Safety Inventory Report, Design Report, Operation and Maintenance Application and Emergency Action Plan.

We need to get the owners signature on the Operation and Maintenance Application and the Emergency Action Plan. In addition, we need to have the Emergency Action Plan signed by the Emergency Services Coordinator for the County. Please return a copy of the signed forms for our files.

If you have any questions or need any additional information, please do not hesitate to contact me at (804) 200-6413.

Sincerely,

Michael L. Claud, P.E.

enclosures

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
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YOUR VISION ACHIEVED THROUGH OURS.

February 24, 2006

Mr. Scott Thomas P.E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

RECEIVED
FEB 28 2006
DEVELOPMENT MANAGEMENT

RE: Eastern Pond (PC 106) Dam Renovations

Dear Scott:

Enclosed are two sets of design plans for the Eastern Pond (PC106) Dam Renovations project. In addition, we have included a copy of the pond routing calculations, the Minor Water Quality Impact Assessment and a copy of the Chesapeake Bay Exemption Request for impacts to the RPA.

Copies of the design plans and calculations have been submitted to the DCR Division of Dam Safety for their review and approval. Please review the enclosed construction plans and calculations and provide us with any comments or questions. We would be happy to meet with you to provide any additional information regarding the construction plans and or calculations.

Sincerely,

Michael L. Claud, P.E.

cc: Wayland Bass, P.E. – James City County
Andrew Gould, P.E. – Timmons Group
Andy Curtis – Curtis Contracting

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
Site Development | Residential | Infrastructure | Technology
www.timmons.com

Scott Thomas

From: Mike Claud [Mike.Claud@timmons.com]
Sent: Wednesday, June 27, 2007 11:12 AM
To: Steven W. Hicks
Cc: Andrew Gould; Wayland Bass; Scott Thomas; Paul Trapp
Subject: DCR Dam Safety - East Pond Dam

Steven,

Here is the information we would suggest sending David Conniff for the extension request. David's email address is david.conniff@dcr.virginia.gov. Let me know if you have any questions or need any additional information.

thanks, Mike

Michael L. Claud, P.E.
Timmons Group
YOUR VISION ACHIEVED THROUGH OURS
1001 Boulders Parkway, Suite 300
Richmond, Virginia 23225
Phone: (804) 200-6413
Fax: (804) 560-1438
Email: mike.claud@timmons.com
Web: www.timmons.com

Mr. Conniff,

James City County would like to formally request an extension of the current construction certificate for the Eastern Pond (PC-106) Dam, Inventory number 09529. The dam construction has been completed and final as-built documents are being prepared for submittal to the Division of Dam Safety. This information had not been previously submitted as there were concerns regarding establishment of the embankment grass cover and clearing of additional trees within the emergency spillway area. Timmons Group personnel will be making a site visit on June 28, to inspect the embankment vegetation. In addition, Timmons Group will be providing Dam Safety with a letter regarding the existing trees within the emergency spillway area and the basis for why these trees do not need to be removed. As-built drawings, and updated Dam Safety reports signed by County and Emergency Services personnel will be forwarded to your office for final certification. We would request a minimum extension of 30 days for the construction permit in order to get this information assembled and forwarded to your office.

Please feel free to contact me or Mike Claud at Timmons Group if you have any questions or need any additional information.

Sincerely,

Scott Thomas

From: Scott Thomas
Sent: Tuesday, June 26, 2007 2:09 PM
To: 'Andrew Gould'; Steven W. Hicks
Cc: Wayland Bass
Subject: DCR Dam Safety - East Pond Dam

Got a call (voicemail) from David Coniff 804-786-1359 with DCR dam safety saying to me that the current dam certification is about to expire and wanted to know our intent. He said it may be too late to do anything other than submit a request for extension and give reasons why. As this is part of the current Warhill PPEA project and I haven't signed the DCR documents as representative of the owner, I don't believe that it my responsibility, at this late hour, to pursue renewals on this dam certification. My guess is that we need to get Timmons involved on this as they filed all paperwork on our behalf. It sounded pretty urgent.

Who calls him back on this one?

David Coniff 804-786-1359

Scott J. Thomas, P.E.
Chief Engineer - Stormwater
James City County
Environmental Division

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

TIMMONS GROUP
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Transmittal

To:
Scott Thomas P. E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

Date: April 11, 2007

Job No.: 22547

RECEIVED
APR 12 2007
ENVIRONMENTAL DIVISION

Regarding: Warhill Site East and West Pond Dams As-built Drawings

We are sending you the following items: ☒ Attached ☐ Under separate cover via _____

☐ Shop Drawings ☐ Prints ☒ Plans ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ Other _____

Copies	Date	Description
1		Set of updated plans for the West Pond Dam
2		Sets of final as-built plans for the East Pond Dam
1		Sets of mylar as-built plans for the East Pond Dam

This information is 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/comment ☐ Other _____ ☐ for bids due _____
☐ Prints returned after loan to us

Remarks:
Scott,

Here are the plans you requested for the East Pond Dam and also a set of plans to address your latest comments for the West Pond dam. If you are satisfied with the West Pond dam plans we will get the additional sets printed and sent to you. Let me know if you have any questions.

thanks, Mike

Copy to:

Signed: _____
Michael L. Claud, P.E.
Phone: (804) 200-6413

If enclosures are not as noted, please notify us at once

1001 Boulders Parkway, Suite 300 | Richmond, VA 23225

Site Development | Residential | Infrastructure | Technology

Scott Thomas

From: Scott Thomas
Sent: Monday, February 13, 2006 3:22 PM
To: Darryl Cook
Subject: FW: Eastern Pond Dam James City County

FYI – we will probably see a WQIA for final improvements to the east pond dam shortly, similar to that which you saw and approved for the west pond dam. The work that was done on the east pond dam so far was emergency repair, mainly grading in a properly sized EC-3 lined emergency spillway. Due to needing to move on the east pond quickly because of the Warhill PPEA and the 3rd High School, we reserved the WQIA – RPA exception process to the final plan for the dam. DCR will need to review the final repair plan also.

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

-----Original Message-----
From: Scott Thomas
Sent: Monday, February 13, 2006 3:18 PM
To: 'Andrew Gould'
Subject: RE: Eastern Pond Dam James City County

No problems here. Reminder -- We would need the WQIA for the final improvement plan, similar to that done for the west pond. That is a final approval issue and should have no effect on dam safety review. I would initially assume the same conditions will apply to the east dam as the west dam as far as stabilization, matting, stilling basin, etc. Use the west pond RPA exception as a template.

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

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

-----Original Message-----
From: Andrew Gould [mailto:Andrew.Gould@timmons.com]
Sent: Monday, February 13, 2006 1:45 PM
To: Bill Richards
Cc: Paul Trapp; Mike Claud; Bob Roop; Scott Thomas; Wayland Bass
Subject: FW: Eastern Pond Dam James City County

Gentlemen - Please see the schedule that Mike has outlined below regarding the Final Improvements to the James City County District Park East Dam.

If anyone has any questions or comments, please feel free to call me, or Mike directly.

Thanks

Drew

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Drew Gould, P.E.
1001 Boulders Parkway
Suite 300
Richmond, VA 23225
Tel: 804.200.6412
Fax: 804.560.1438
Cell: 804.334.9284
E-mail: andrew.gould@timmons.com
www.timmons.com

From: Mike Claud
Sent: Wednesday, February 08, 2006 10:51 AM
To: Andrew Gould
Subject: Eastern Pond Dam James City County

Drew,

I spoke with Dam Safety regarding submittal and review of the plans for the Eastern Pond Dam. According to Jim Robinson the Dam Safety representative, the next SWCDB meeting is scheduled for March 16 and typically they require submittals to be in 6 weeks prior in order to make the meeting agenda. However, Jim told me that if we can have the plans to him by February 24, he will work with me to get this project on the board agenda for the March meeting.

Based on this information we will prepare the plans for submittal to Dam Safety and James City County on February 24. In order to meet the construction schedule, the County and State approvals will need to take place concurrently.

Let me know if you need any additional information.
thanks,

Michael L. Claud, P.E.
Timmons Group
YOUR VISION ACHIEVED THROUGH OURS
1001 Boulders Parkway, Suite 300
Richmond, Virginia 23225
Phone: (804) 200-6413
Fax: (804) 560-1438
Email: mike.claud@timmons.com
Web: www.timmons.com

Scott Thomas

From: Scott Thomas
Sent: Tuesday, December 27, 2005 9:52 AM
To: Steven W. Hicks
Subject: RE: WISC/PPEA/Curtis
Importance: High

Unfortunately, this may be the case. To me it looked to be about 75 feet of additional 15-inch corrugated polyethylene pipe to avoid the matted east pond spillway placed under the interim repair plan.

Just to give you some background dates and information, the WISC Expansion plan (SP-65-05) was first commented on by our Division on June 16, 2005 with subsequent review and approval on July 11, 2005. The preconstruction meeting for that project was held on July 21, 2005.

For the PPEA project, the East Pond Interim repair plan was first submitted for review on August 12, 2005. This was a few weeks after we approved the WISC plan and consisted of review of the PER by Timmons as forwarded to us on August 9, 2005. I issued an email to everyone with comments on August 12, 2005. In that set of emailed comments, I offered the following comment to Timmons/CCI:

A storm pipe outfall is proposed just to the north of the proposed emergency spillway for the WISC Building Expansion SP-65-05. This plan was approved by our Division on July 11, 2005 and a preconstruction meeting was held on July 21, 2005. There may be a conflict between grading proposed for the interim emergency spillway and the location of this outfall which consists of a 15-inch corrugated polyethylene pipe and Class I riprap protection. The owner contact is Williamsburg Indoor Sports Complex LLC (Chris Haywood) at 564-3767. The contractor contact is Bruce Gilliam with Henderson Inc. at 565-1090.

We then went on to issue a subsequent formal set of comments on the PPEA interim pond repair plan on September 20, 2005. The plan was then approved just after that and, given the nature of the design/build contract, of course work moved forward quickly and was done before WISC could put in their outfall storm drainage system. In summary the WISC plan came along before I had any idea what Timmons/CCI was proposing for interim repairs on the dam. However, although the WISC plan was reviewed and approved before we even reviewed the PPEA East Pond Interim repair plan, the work for the East Pond moved forward first, before the outfall for the WISC site and the WISC plan would have encroached into the already placed and matted emergency spillway; therefore it had to be realigned. I got a sketch from the engineer for the WISC project on December 1st 2005 which showed the revised alignment. I emailed this sketch on to CCI and Timmons. The sketch showed an outfall pipe system shift to the north, requiring about 75 feet of additional 15-inch corrugated polyethylene pipe.

Also, I would like to state that I made both parties WISC and CCI aware of this conflict as quick as I knew about it and clearly instructed both that they needed to get together and work this out. I sent an email to Bill Richards with CCI on December 1st, clearly stating ***"You (or your onsite people) will need to review this sketch, coordinate with the owner/engineer and watch this work to ensure there is no impact to our new emergency spillway, matting or other aspects of the East Pond interim repairs."***

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

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

-----Original Message-----
From: Steven W. Hicks

Sent: Tuesday, December 27, 2005 8:53 AM
To: John Carnifax, Jr
Cc: Doug Powell; John McDonald; Sandy Wanner; Scott Thomas
Subject: RE: PPEA/Curtis

I'll need to look in to this. Scott I will give you a call.

-Steven

From: John Carnifax, Jr
Sent: Tuesday, December 27, 2005 8:46 AM
To: Steven W. Hicks
Cc: Doug Powell; John McDonald; Sandy Wanner
Subject: PPEA/Curtis

Good Morning Steve,

Chris Haywood from WISC called this a.m. concerning a "change" or "modification" to the pond near his building. Chris said he had an approved set of plans that Henderson was working from and Curtis had to make some changes which caused him an extra expense. Pete Henderson told him that that should not be at his expense that it should come from the county or Curtis. I told him that I was not aware of any of these changes and that you or someone on your staff would contact him.

Sandy has asked that I prepare a memo and resolution for the Jan BOS meeting to reimburse WISC for partial payment on the parking lot (if it is completed). I can include this cost, if we are responsible for any additional expenses caused by the PPEA project.

Please let me know what action to take, if any is needed on my part.

Thanks!

Scott Thomas

From: Scott Thomas
Sent: Thursday, December 01, 2005 11:55 AM
To: 'Bill Richards'
Cc: Andrew Gould (andrew.gould@timmons.com)
Subject: FW: WISC field changes

Bill – I got a phone call on Thursday Dec 1 from Mark Richardson with AES Consulting Engineers (757-253-0040) about their intent for the outfall of the storm piping system from the WISC Building Expansion. I then got this email showing me location. You (or your onsite people) will need to review this sketch, coordinate with owner/engineer and watch this work to ensure there is no impact to our new emergency spillway, matting or other aspects of the East Pond interim repairs. I have no issues with the sketch at this time.

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

-----Original Message-----
From: Richardson, Mark A. [mailto:mrichardson@aesva.com]
Sent: Wednesday, November 30, 2005 12:12 PM
To: Scott Thomas
Subject: WISC field changes

Here is the only solution we had given the flat slopes on the pipe. I think it works fine. We stayed out of the emergency spillway as illustrated in the photos. I've given the contractor the go-ahead and they are starting the installation today.

Mark A. Richardson, P.E.
Senior Project Manager

AES Consulting Engineers
Williamsburg | Richmond | Gloucester
(757) 253-0040
www.aesva.com

AES Consulting Engineers Confidentiality Note: This e-mail and any attachments are confidential and may be protected by legal privilege. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of this e-mail or any attachment is prohibited. If you have received this e-mail in error, please notify us immediately by returning it to the sender and deleting this copy from your system. Thank you for your cooperation.

Scott Thomas

From: Scott Thomas
Sent: Thursday, September 29, 2005 11:10 AM
To: 'Andrew Gould'; Steven W. Hicks; 'Bill Richards'
Cc: Matthew Arcieri; Wayland Bass
Subject: RE: Revised Emergency Interim Improvements for East Pond Dam

RE: Warhill PPEA: District Park East Pond Dam PC106
Emergency-Interim Repair Plan
SP-107-05

Previous comment # 7 was not addressed as indicated. The 40 scale plan still shows "regrade top of dam to Elev. 72.5" yet the emergency spillway profile shows "top of dam at Elevation 73". Make this correction and reissue the INTERIM plan to our Division and CCI. However, it is pretty minor comment and does not hold up approval of the INTERIM plan by our Division. Therefore, our Division authorizes land-disturbing associated for construction of the emergency spillway as shown. Work on the upstream face of dam and dam filling as proposed cannot commence until the environmental (wetland) issue is resolved.

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

-----Original Message-----
From: Andrew Gould [mailto:Andrew.Gould@timmons.com]
Sent: Tuesday, September 27, 2005 5:24 PM
To: Scott Thomas
Cc: Paul Trapp; Bob Roop; Mike Claud; Andy Curtis
Subject: Revised Emergency Interim Improvements for East Pond Dam
Importance: High

Scott - Please find attached a revised plan sheet for the Emergency Interim improvements for the East pond dam. I have also attached a copy of your original comment letter indicating how we addressed each item.

Please note that the work on the upstream face of the dam cannot proceed until we have the environmental permit for this work. The wetland delineation has been confirmed and the permit application has been submitted, but we do not have the permit in hand yet. We expect to have it shortly.

Please let me know if you have any questions or if further information is needed.

Thanks for your help with this important project.

Sincerely,

Drew

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
Drew Gould, P.E.
1001 Boulders Parkway
Suite 300
Richmond, VA 23225
Tel: 804.200.6412
Fax: 804.560.1438

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

March 1, 2006

RECEIVED

MAR 2 2006

ENVIRONMENTAL DIVISION

Mr. Scott Thomas P.E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

RE: Eastern Pond (PC 106) Dam Renovations

Dear Scott:

Per your email message dated February 27, 2006, we have enclosed a copy of the Preliminary Engineering Report for the Eastern Pond (PC106) Dam Renovations project. In addition, a set of the construction plans will be sent to Matt Arcieri for final site plan review and approval.

If you have any questions or need any additional information, please do not hesitate to contact me at (804) 200-6413.

Sincerely,

Michael L. Claud, P.E.

enclosure

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
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L. Preston Bryant, Jr.
Secretary of Natural Resources

RECEIVED
AUG - 9 2007
DEVELOPMENT MANAGEMENT

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 206
Richmond, Virginia 23219-2010
(804) 371-6095 Fax (804) 371-2630

August 2, 2007

James City County
Department of Development Management
Attn: Wayland Bass
101 Mounts Bay Road
Williamsburg, VA 23187

RE: Eastern Pond Dam, Inventory Number 09529

Dear Mr. Bass:

On July 19, 2007, the Virginia Soil and Water Conservation Board (Board) approved a four-month extension to the Class III Conditional Operation and Maintenance Certificate for Eastern Pond Dam, Inventory Number 09529. The Extension Certificate is enclosed. Please submit all the required documentation for certificate renewal to David D. Conniff, P.E., Dam Safety Regional Engineer, Department of Conservation and Recreation, Dam Safety and Floodplain Management Division, 203 Governor Street, Suite 206, Richmond, VA 23219, by October 15, 2007.

This information needs to be received before the Board can issue a new Operation and Maintenance Certificate. The tentative date for the Board to consider such action is the third Thursday of the month in which the extension expires. Please direct all questions to David D. Conniff at 804-786-1359, or e-mail david.conniff@dcr.virginia.gov.

Sincerely,

William G. Browning
Director, Division of Dam Safety & Floodplain Management

Enclosure

c: James M. Robinson, P.E., Dam Safety Program Manager
David D. Conniff, P.E., Regional Engineer

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION
DIVISION OF DAM SAFETY
VIRGINIA SOIL AND WATER CONSERVATION BOARD

DAM SAFETY CERTIFICATE
EXTENSION
CLASS III OPERATION & MAINTENANCE CERTIFICATE NUMBER 09529

James City County, owner of Eastern Pond Dam in James City County County, was issued a Conditional Certificate to operate and maintain this dam pursuant to the provisions of the Dam Safety Act (Section 10.1-604 et seq., Code of Virginia) and Regulations promulgated thereunder.

This certificate was issued for a term of four-month, effective March 16, 2006 through July 31, 2006; with a four-month extension granted on May 24, 2006; and a ten-month extension granted on September 28, 2006.

On July 19, 2007, the Virginia Soil and Water Conservation Board granted a four-month Certificate extension with an expiration date of November 30, 2007.

Joseph H. Maroon
Secretary, Virginia Soil and Water Conservation Board
Director, Department of Conservation and Recreation

Scott Thomas

From: Steven W. Hicks
Sent: Wednesday, June 27, 2007 2:26 PM
To: Mike Claud
Cc: Andrew Gould; Wayland Bass; Scott Thomas; Paul Trapp
Subject: RE: DCR Dam Safety - East Pond Dam

Thanks to all!

From: Mike Claud [mailto:Mike.Claud@timmons.com]
Sent: Wednesday, June 27, 2007 11:12 AM
To: Steven W. Hicks
Cc: Andrew Gould; Wayland Bass; Scott Thomas; Paul Trapp
Subject: DCR Dam Safety - East Pond Dam

Steven,

Here is the information we would suggest sending David Conniff for the extension request. David's email address is david.conniff@dcr.virginia.gov. Let me know if you have any questions or need any additional information.

thanks, Mike

Michael L. Claud, P.E.
Timmons Group
YOUR VISION ACHIEVED THROUGH OURS
1001 Boulders Parkway, Suite 300
Richmond, Virginia 23225
Phone: (804) 200-6413
Fax: (804) 560-1438
Email: mike.claud@timmons.com
Web: www.timmons.com

Mr. Conniff,

James City County would like to formally request an extension of the current construction certificate for the Eastern Pond (PC-106) Dam, Inventory number 09529. The dam construction has been completed and final as-built documents are being prepared for submittal to the Division of Dam Safety. This information had not been previously submitted as there were concerns regarding establishment of the embankment grass cover and clearing of additional trees within the emergency spillway area. Timmons Group personnel will be making a site visit on June 28, to inspect the embankment vegetation. In addition, Timmons Group will be providing Dam Safety with a letter regarding the existing trees within the emergency spillway area and the basis for why these trees do not need to be removed. As-built drawings, and updated Dam Safety reports signed by County and Emergency Services personnel will be forwarded to your office for final certification. We would request a minimum extension of 30 days for the construction permit in order to get this information assembled and forwarded to your office.

Please feel free to contact me or Mike Claud at Timmons Group if you have any questions or need any additional information.

Sincerely,

L. Preston Bryant, Jr.
Secretary of Natural Resources

Scott Thomas
Let's discuss.
Stu 10/30/06

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 206
Richmond, Virginia 23219-2010
(804) 371-6095 Fax (804) 371-2630

October 18, 2006

Steven Hicks, General Services Manager
James City County
101 Mounts Bay Road
Williamsburg, VA 23187

RE: Eastern Pond Dam, Inventory Number 09529

Dear Mr. Hicks:

On September 28, 2006 the Virginia Soil and Water Conservation Board (Board) approved a ten-month extension to the Class III Conditional Certificate for Eastern Pond Dam, Inventory Number 09529. The Extension Certificate is enclosed. Please submit all the required documentation for certificate renewal to David D. Conniff, P.E., Dam Safety Regional Engineer, Department of Conservation and Recreation, Dam Safety and Floodplain Management Division, 203 Governor Street, Suite 206, Richmond, Virginia 23219, by June 15, 2007.

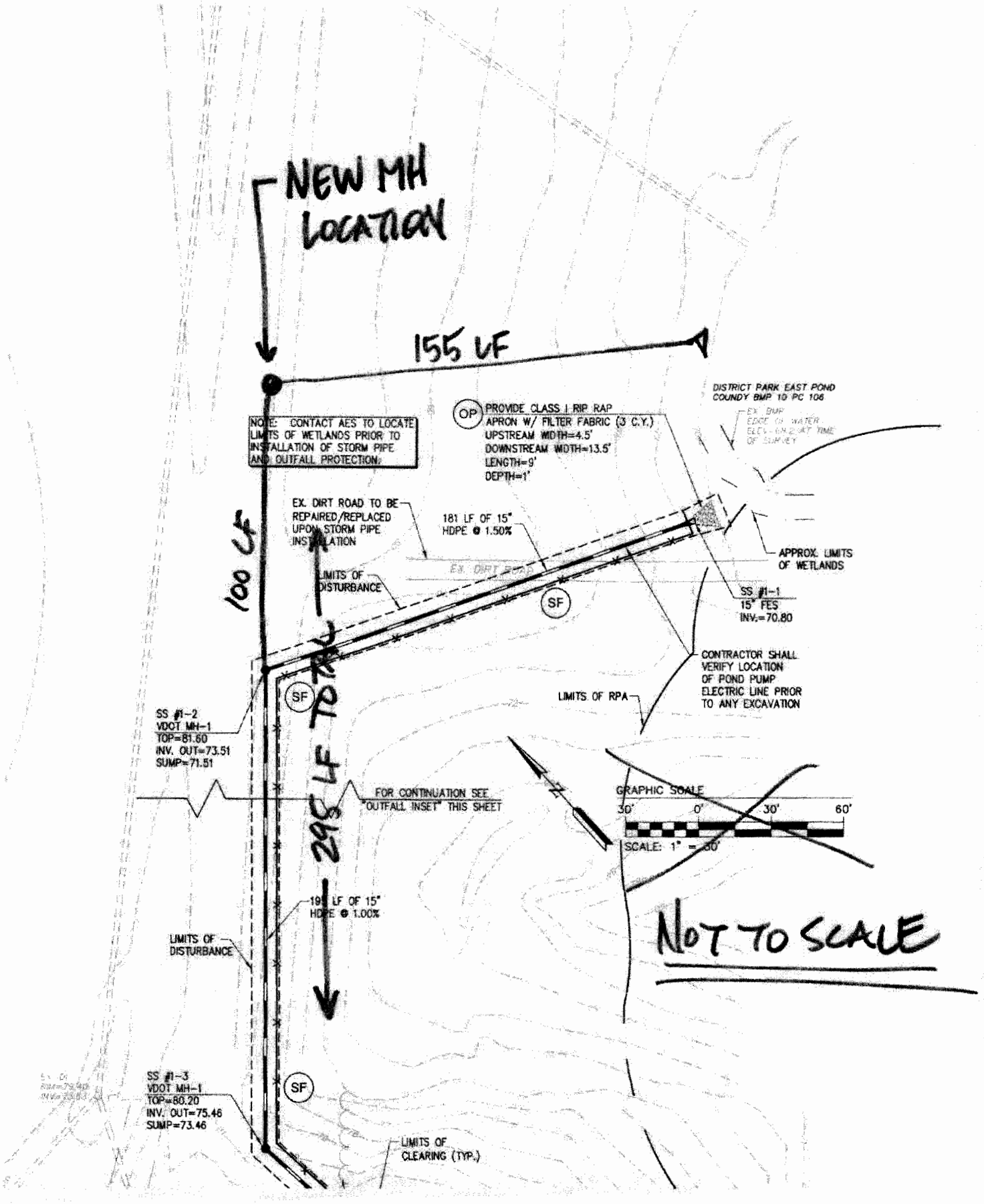
This information needs to be received before the Board can issue a new Operation and Maintenance Certificate. The tentative date for the Board to consider such action is the third Thursday of the month in which the extension expires. Please direct all questions to David D. Conniff at 804-786-1359, or e-mail david.conniff@dcr.virginia.gov.

Sincerely,

William G. Browning

William G. Browning
Director, Division of Dam Safety & Floodplain Management

Enclosure
c: James M. Robinson, P.E., Dam Safety Program Manager
David D. Conniff, P.E., Region 2 Engineer


NEW MH LOCATION
155 LF
100 LF
295 LF TO MH
DISTRICT PARK EAST POND
COUNDY BMP 10 PC 106
OP
PROVIDE CLASS I RIP RAP
APRON W/ FILTER FABRIC (3 C.Y.)
UPSTREAM WIDTH=4.5'
DOWNSTREAM WIDTH=13.5'
LENGTH=9'
DEPTH=1'
NOTE: CONTACT AES TO LOCATE LIMITS OF WETLANDS PRIOR TO INSTALLATION OF STORM PIPE AND OUTFALL PROTECTION.
EX. DIRT ROAD TO BE REPAIRED/REPLACED UPON STORM PIPE INSTALLATION
181 LF OF 15" HDPE @ 1.50%
LIMITS OF DISTURBANCE
SF
APPROX. LIMITS OF WETLANDS
SS #1-1
15" FES
INV.=70.80
CONTRACTOR SHALL VERIFY LOCATION OF POND PUMP ELECTRIC LINE PRIOR TO ANY EXCAVATION
LIMITS OF RPA
SS #1-2
VDOT MH-1
TOP=81.60
INV. OUT=73.51
SUMP=71.51
FOR CONTINUATION SEE "OUTFALL INSET" THIS SHEET
GRAPHIC SCALE
30' 0' 30' 60'
SCALE: 1" = 30'
NOT TO SCALE
LIMITS OF DISTURBANCE
SS #1-3
VDOT MH-1
TOP=80.20
INV. OUT=75.46
SUMP=73.46
LIMITS OF CLEARING (TYP.)

NEW OUTFALL
ORIGIONAL OUTFALL
NEW LINE

ORIGINAL MH
LOCATION
NEW MH
LOCATION

Home of America's 400th Anniversary
James City County 1607-2007 Jamestown

STORMWATER DIVISION

287 McLaws Circle, Suite 1, Williamsburg, Virginia 23185-5649
(757) 259-1460

E-mail: stormwater@james-city.va.us
Fax: (757) 259-5833

November 16, 2009

Mr. Steve Snell
Department of Conservation and Recreation
Dam Safety and Floodplain Management
203 Governor Street, Suite 210
Richmond, VA 23219-2094

RE: Annual Inspection Reports for James City County Dams

Dear Mr. Snell:

Attached are Annual Inspection Reports for two dams owned by James City County. The two dams are the **Eastern Pond Dam at Warhill District Park (PC105)**, Inventory Number 09529; and the Western Pond Dam at Warhill District Park (PC106), Inventory Number 09528.

You can contact me at 757-259-1442 if you have any questions about the reports or need additional information.

Sincerely,

Darryl E. Cook, P.E.
County Engineer

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Transmittal

To:
Scott Thomas P. E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

Date: April 11, 2007

Job No.: 22547

RECEIVED
APR 12
ENVIRONMENTAL DIVISION

Regarding: Warhill Site East and West Pond Dams As-built Drawings

We are sending you the following items: ☒ Attached ☐ Under separate cover via _____

☐ Shop Drawings ☐ Prints ☒ Plans ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ Other _____

Copies	Date	Description
1		Set of updated plans for the West Pond Dam
2		Sets of final as-built plans for the East Pond Dam
1		Sets of mylar as-built plans for the East Pond Dam

This information is 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/comment ☐ Other _____ ☐ for bids due _____
☐ Prints returned after loan to us

Remarks:
Scott,

Here are the plans you requested for the East Pond Dam and also a set of plans to address your latest comments for the West Pond dam. If you are satisfied with the West Pond dam plans we will get the additional sets printed and sent to you. Let me know if you have any questions.

thanks, Mike

Copy to:

Signed: _____
Michael L. Claud, P.E.
Phone: (804) 200-6413

If enclosures are not as noted, please notify us at once

1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016
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TIMMONS GROUP

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April 4, 2007

RECEIVED

APR - 5 2007

ENVIRONMENTAL DIVISION

Mr. Scott Thomas P.E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

pc106

RE: Warhill Site Roadways & Improvements
East Pond Dam – As-built Drawing Review
County Plan #SP-107-05

Dear Scott:

We are submitting two sets of revised as-built plans for the above referenced project. In regards to your review comment letter dated March 6, 2007 for the above referenced project, we offer the following responses:

Record Drawings

1. General Notes. Add the following notes to the cover sheet of the record drawing (as-built) set.

   1a. Reference the approved site plan number (SP-107-05).
   1b. Reference DCR Dam Safety Permit No. 09529.
   1c. Provide a note to state that an 8 ft. wide crusher run path was placed on top of the dam in accordance with approved County Plan No. SP-76-05 (Warhill Multi-Use Trail).

   - This information was added to the cover sheet as requested.

2. Drainage Divide. The drainage divide for the 150 acre drainage area to the East Pond could not be found on Sheet C1.2. Show or darken the drainage divide.

   - The drainage divide has been darkened for clarity.

3. Information. It does not appear that Sheets C1.3 and C1.5 are necessary for the record drawing package. Sheets C1.1 and C1.2 show enough site vicinity, location, drainage area and adjacent site information.

   - Sheets C1.3 and C1.5 have been removed from the as-built plan set.

4. Final Report. Provide a final set of stamped and sealed computations for the District Park East Pond PC 106 design. This was a comment from review of the plan of development (Comment # 32; March 13, 2006). The computations should be in an organized fashion with applicable drainage maps; hydrology, water quality and PondPack hydraulic routings for the 1-, 2-, 10- and 100-year design storm events.

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
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The design report shall have a brief narrative explaining the design and it's assumptions, a table of contents and a cover sheet entitled "Warhill PPEA: District Park East Pond PC106 Final Improvements". The Environmental Division will require two copies, one for the Warhill PPEA file and one for the asbuilt file for the dam.

- Bound copies of all computations for the East Pond Dam project have been included with this submittal.

5. Construction Certification. Note # 20 on Sheet C1.3 and Inspection Note # 6 on Sheet C1.4 required a construction certification for improvements associated with the District Park East Pond. None was provided. The standard form from the *James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification Forms* can be used for this purpose. *(The construction certification portion of the County template form was not completed.)*

   - A copy of the certification form has been included with this submittal.

6. Temporary Fill. The temporary fill information can be removed from Sheet C1.6 as it will only confuse the reader. This was only a temporary feature necessary to construct the plunge pool due to embankment soil conditions. The Section G-G reference line and detail on Sheet C1.4 should not be deleted to provide record of what temporary controls were used during construction.

   - The temporary fill information has been removed from sheet C1.6 as requested.

7. Plunge Pool. No asbuilt spot elevation data was provided to show that the plunge pool was constructed to a minimum of 3 ft. depth per the approved design plan. Also, verify the dimensions of the constructed plunge pool as compared to required design plan dimensions.

   - The updated plunge pool information has been added to sheet C1.6.

8. Emergency Spillway. Provide labels on the pond plan on Sheet C1.6 to indicate that EC-3 turf-reinforcement matting was used as a lining within the emergency spillway.

   - A note was added to sheet C1.6 to indicate the EC-3 turf matting in the emergency spillway area.

Field-Related:

9. The Environmental Division representative on the Warhill PPEA team has monitored the East Pond Dam improvement project on a regular basis since the preconstruction meeting for this portion of the project on May 25, 2006. Field related comments that must be addressed include the following:

   9a. Ensure EC-3 turf-reinforcement matting, which was damaged due to pond dewatering operations, is fully repaired and replaced.

9b. Ensure that regraded dam side slope and top of dam areas adjacent to the crusher run gravel road are stabilized and a good stand of grass is present.

9c. Clean and remove any obstructive debris and sediments from the principal spillway weir slot, overflow box, 42-inch culvert, paved flume and plunge pool.

- The field related comments have been passed on to Curtis Contracting to be addressed.

At this time we are only submitting one set of the revised plans. If there are no additional comments that need to be addressed, we will get you one additional set of prints and one set of Mylar's for your use. Please feel free to contact Drew Gould at (804) 200-6412 or me at (804) 200-6413 if you have any questions or need any additional information.

Sincerely,

Michael L. Claud, P.E.

cc: Wayland Bass, P.E. – James City County
Andrew Gould, P.E. – Timmons Group
Andy Curtis – Curtis Contracting

Scott Thomas

From: Scott Thomas
Sent: Monday, April 09, 2007 11:27 AM
To: 'Mike Claud'; 'andrew.gould@timmons.com'
Cc: Wayland Bass; Steven W. Hicks; Andy Curtis (b.richards@curtiscontracting.net)
Subject: Warhill PPEA: Certification Documents for Warhill East Pond Dam PC106

I have reviewed the latest submittal from Timmons dated April 4, 2007 for asbuilts and construction certification associated with the Warhill-District Park East Pond Dam (SP-107-05; PC 106). The documents (asbuilt and construction certification) are now approved by our Division as all outstanding comments have been addressed. Curtis Contracting Inc. will need to address the field-related items from comment # 9 (EC-3 matting, stabilization and obstructions). Timmons please forward me two additional sets of blue/black line drawings and one reproducible mylar.

As I now understand it, asbuilts and construction certification for the storm trunk, forebay and East Pond dam are now approved by our Division. The West Pond Dam is still outstanding. Comments were issued on the West Pond Dam on May 5, 2006.

Call me if you have any questions.

Scott J. Thomas, P.E.
Chief Engineer - Stormwater
James City County
Environmental Division

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

PPEA – EAST POND DAM ASBUILTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Transmittal

SP-107-05
PC 106

To:
Scott Thomas P.E.
James City County
Environmental Division
101 E. Mounts Bay Road
Williamsburg, Virginia 23187-8784

Date: December 7, 2006

Job No.: 22547-202

RECEIVED
ENVIRONMENTAL DIVISION

Regarding: Eastern Pond Dam (PC106) As-built drawings

We are sending you the following items: ☒ Attached ☐ Under separate cover via _____

☐ Shop Drawings ☐ Prints ☒ Plans ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ Other _____

Copies	Date	Description
2	December 7, 2006	As-built plans

This information is 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/comment ☐ Other _____ ☐ for bids due _____
☐ Prints returned after loan to us

Remarks:
Scott,

Here are the as-built drawings for the eastern pond dam renovations. Please let me know if you need any additional information.

thanks, Mike

Copy to: Wayland Bass

Signed: _____
Michael L. Claud, P.E.
Phone: (804) 200-6413

If enclosures are not as noted, please notify us at once

1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
Site Development | Residential | Infrastructure | Technology

Scott Thomas

From: Bob Roop [Bob.Roop@timmons.com]
Sent: Friday, June 09, 2006 9:26 AM
To: a.curtis@curtiscontracting.net
Cc: Scott Thomas; Wayland Bass; Gene Hatcher; Mike Claud
Subject: FW: Eastern Pond Dam
Attachments: 20060609073737.tif

Andy,

The attached soil classification indicates that the material you requested for use on the upstream face of the Eastern Dam is SC material and suitable for placement on the dam.
Please advise our inspector of the location in order for proctors to be run.

Bob

Robert G. Roop, PE
Timmons Group
1001 Boulders Parkway
Richmond, Va. 23235
Tel: 804-200-6379
Fax: 804-560-1438
bob.roop@timmons.com
www.Timmons.com

From: Gene Hatcher
Sent: Friday, June 09, 2006 7:44 AM
To: Bob Roop
Subject: Eastern Pond Dam

Bob:

Attached is the classification for the sample in question. It looks like it meets the criteria you mentioned. Let me know if further questions. I think they may have already started using this material yesterday.

Gene

TIMMONS GROUP
Your Vision Achieved Through Ours
Gene W. Hatcher, PE
Construction Services Manager
1001 Boulders Parkway
Suite 300
Richmond, VA 23225-5512
Tel: (804) 200-6574
Fax: (804) 794-1899
Mobile: (804) 334-9240
e-mail: gene.hatcher@timmons.com
Web: www.timmons.com

TIMMONS GROUP

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GRAIN SIZE DISTRIBUTION TEST REPORT

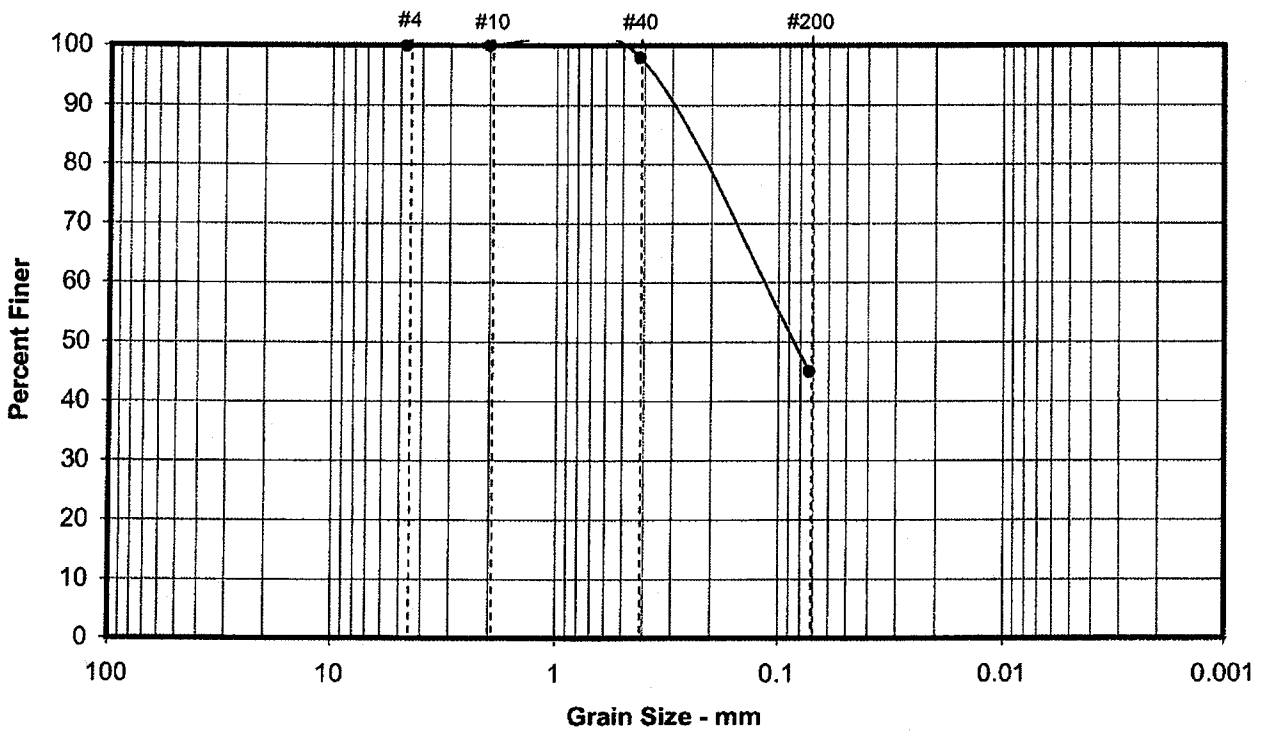
Project Number	22303-801
Project Name	WARHILL PPEA
Location	EASTERN DAM IMPROVEMENETS

Liquid Limit	Plastic Index	USCS	AASHTO
37	**22**	**SC**	**A-6(3.6)**

Percent Gravel	Percent Sand	Percent Silt and Clay
0.0%	**55.0%**	**45.0%**

Material Description	REDDISH BROWN AND BROWN CLAYEY FINE SAND
Natural Moisture	N/A
SPT Blow Counts	N/A

Grain Size Distribution



DATE 6/8/06

FIGURE NUMBER GS1

Scott Thomas

From: Bob Roop [Bob.Roop@timmons.com]
Sent: Thursday, June 08, 2006 3:32 PM
To: Wayland Bass; Scott Thomas
Cc: a.curtis@curtiscontracting.net
Subject: FW: East dam
Attachments: CD1-4.pdf; CD1-6.pdf

Wayland and Scott,

Attached are pdf"s of recommended changes. Please note that the site was not as difficult as anticipated, and we were able to bridge the slope safely with a temporary fill of SC material without the Chimney drain and surge stone. To address spillway construction after the plunge pool is constructed and temporary fill removed, we increased the channel underdrain to 1' thickness which will be at 3ft. below dam slope surface. This will tie into the plunge pool and act as a chimney drain providing better slope stability and pull water further away from the dam surface.

Please advise if there are any questions,

Bob

Robert G. Roop, PE
Timmons Group
1001 Boulders Parkway
Richmond, Va. 23235
Tel: 804-200-6379
Fax: 804-560-1438
bob.roop@timmons.com
www.Timmons.com

From: Chip Almarode
Sent: Thursday, June 08, 2006 3:17 PM
To: Bob Roop
Subject: RE: East dam

ATTACHED 11x17 PDF'S

From: Bob Roop
Sent: Thursday, June 08, 2006 3:00 PM
To: Chip Almarode
Subject: East dam

Chip,
Looks good, can you send me a PDF of the 2 sheets.
Thanks

Robert G. Roop, PE
Timmons Group
1001 Boulders Parkway
Richmond, Va. 23235
Tel: 804-200-6379
Fax: 804-560-1438
bob.roop@timmons.com

RECEIVED
JUN 05
ENVIRONMENTAL DIVISION

DRAINAGE NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, VIRGINIA DEPARTMENT OF TRANSPORTATION'S ROAD AND BRIDGE SPECIFICATIONS DATED 2002, AND ROAD AND BRIDGE STANDARDS, DATED FEBRUARY 2001, AS AMENDED BY CONTRACT PROVISIONS AND THESE PLANS. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM WITH JAMES CITY COUNTY STANDARDS AND SPECIFICATIONS, IF MORE STRINGENT.

2. ALL CONCRETE PIPE JOINTS ARE TO BE SEALED ACCORDING TO VDOT STANDARDS AND SPECIFICATIONS.

3. ALL STORM SEWERS SHALL BE ASTM, C-76, CLASS III, EXCEPT AS NOTED.

4. IF DURING CONSTRUCTION, THE EXISTING GROUND ELEVATIONS SHOWN ON THESE PLANS ARE FOUND TO DIFFER SIGNIFICANTLY FROM THE ELEVATIONS IN THE FIELD, THE CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY FOR AN ADJUSTMENT IN ELEVATIONS.

MAINTENANCE PLAN

A maintenance program is required to ensure the Stormwater Management (SWM)/Best Management Practice (BMP) facility functions as designed and to provide for reasonable aesthetic conditions. Proper maintenance is encouraged to prevent the introduction of debris and sediment at inflow locations, pretreatment areas, the BMP itself, its principal control structures and downstream waterways. Following installation and establishment of vegetation in disturbed site areas, inspections for sediment buildups will be performed at least quarterly. It is anticipated that under normal conditions, sediment removal will be required once every 5 to 10 years. If other construction or related land-disturbing activities are performed upslope of the BMP, adequate protection measures should be implemented with inspections performed at least once weekly.

The Owner or its designated representative will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period.

BMP Description: The Warhill Site District Park East Pond PC106 serves a drainage area of approximately 150 acres associated with development of the Warhill Tract which includes construction of a Community College, High School and Sports Stadium. The facility is a wet-type detention facility. A wet-type detention pond temporarily stores runoff and normally maintains a permanent wet pool during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. Principal structures associated with the BMP consist of a concrete inlet box, a 42" dia. concrete culvert and 50 ft. wide, grass-lined trapezoidal shaped emergency overflow channel. There is 1 notch in the inlet box to provide for water quality drawdown. During the 100-year storm, the maximum water level should rise to about 2.25 feet above the top of the inlet box and within 1.75 feet below the top of dam. During this type of larger storm event, the emergency spillway, which is located through the embankment along the northwest side, will discharge flow. If functioning properly, normal storm events should reach an elevation just below the top of the inlet box and the pond should draw down in about 24 to 36 hours.

Inspection and maintenance of the facility will consist of the following additional measures:

1. At least once per year, clean the pond inlet box and outlet pipe of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area.

2. Perform maintenance mowing of areas surrounding the BMP & Faraway at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not be permitted to grow along or on any part of the embankment that was constructed using engineered (compacted) fills and must be cleared to a point at least 25 feet beyond the toe of slope of the embankment.

3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed by qualified independent soil testing laboratory such as VPI&SU. Apply additional lime and fertilizer in accordance with test recommendations.

4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations or requirements of the Virginia Erosion and Sediment Control Handbook (VESCH).

5. Perform quarterly inspections of the inlet box and crest spillway for the observance of collected trash and debris. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide an attractive appearance.

6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the concrete inlet box, outlet culvert, concrete outlet channel along the downstream face of the dam and pond embankment. If damage is evident, further investigation by a professional engineer may be required to assess the integrity of the structure.

7. Perform quarterly inspections of the graded side slopes of the facility for signs of animal/rodent burrows or slope erosion. Immediately perform necessary repairs, refilling or reseeding.

8. Perform yearly observations of perimeter areas surrounding the facility to ensure changes in land use, topography or access have not occurred and do not affect the operation, maintenance, access or safety features as provided. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the engineered embankment and principal flow control structures.

9. Record Keeping. The owner or designated representative shall keep reasonable, accurate written records of inspections performed for the structure. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.

10. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County.

11. The pond shall be dredged when sediment deposits have reached elevation 60.85 as measured from the normal pool elevation of 67.7.

EROSION CONTROL NARRATIVE
SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AT LEAST TWO WORKING DAYS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES ON THE STORM SEWER TRUNK SYSTEM.

3. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 4 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN ON SHEET C1.6. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. BEGIN CONSTRUCTION OF THE PROPOSED OUTLET STRUCTURES AND GRADING OPERATIONS FOR THE DAM. UPON COMPLETION OF THE PROPOSED OUTLET STRUCTURES, PRESSURE GROUT THE EXISTING CMP DRAINPIPE IN PLACE AND REMOVE THE EXISTING CMP RISER PIPE.

10. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE RIPRAP SLOPE PROTECTION, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

2. MATERIAL USED FOR FILL SHALL BE CLASSIFIED AS SC MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

3. THE DESIGN HEIGHT OF THE EMBANKMENT SHALL BE INCREASED BY A MINIMUM OF 4 INCHES TO ENSURE THAT THE DESIGN TOP OF FILL ELEVATION WILL BE MAINTAINED AFTER SETTLEMENT HAS TAKEN PLACE.

4. MINIMUM COMPACTION REQUIREMENTS MUST BE MET AT CRITICAL POINTS (AGAINST THE CONCRETE WEIR, WING WALLS, AND OUTLET BARRELS). THE MOISTURE CONTENT OF THE FILL MATERIALS SHALL BE MAINTAINED IN THE RANGE OF +/- TWO TO THREE PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT.

5. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON SHEET C1.1. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER EROSION AND SEDIMENT MEASURES SPECIFIED ON THIS SHEET.

6. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER SEEDING NOTES ON SHEET C1.3.

7. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

8. THE CONTRACTOR SHALL COORDINATE WITH COUNTY PERSONNEL TO IDENTIFY THE LOCATION OF THE EXISTING IRRIGATION LINE NEAR THE DAM IN ORDER TO ENSURE AVOIDANCE OF THESE LINES DURING CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.

INSPECTION REQUIREMENTS

1. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT TO ENGINEER AND COUNTY PRODUCT MATERIAL SUBMITTALS ON ALL PIPE INCLUDING INFORMATION ON PIPE CLASS, DATE AND LOCATION OF MANUFACTURE, AND COMPLIANCE WITH APPROPRIATE ASTM STANDARDS.

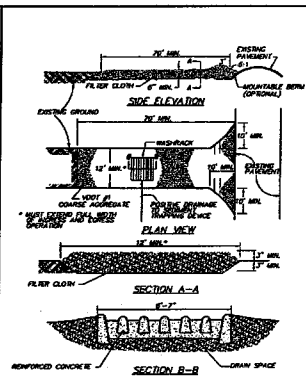
2. PRIOR TO FABRICATION, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AND COUNTY FOR REVIEW AND APPROVAL SHOP DRAWINGS ON ALL PRE-MANUFACTURED STRUCTURES.

3. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS.
- PIPE JOINTS: NOTE ANY GAPS IN JOINTS AND DISTANCE AT MAXIMUM CAP LOCATION
- JOINTS BETWEEN PIPE AND PRE-MANUFACTURED STRUCTURES
- BACKFILL MATERIAL: NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
- BACKFILL COMPACTION TESTING

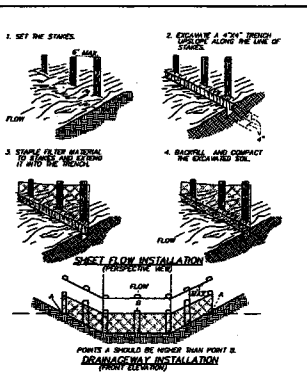
4. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE IN ITEM #3 ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

5. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

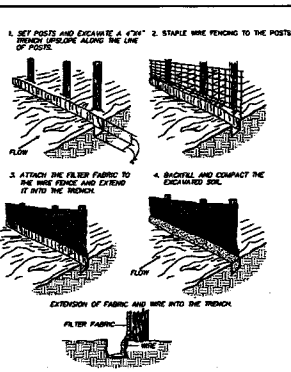
6. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION.



CE STONE CONSTRUCTION ENTRANCE (1.02-1) NO SCALE



SF CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT) (1.05-2) NO SCALE



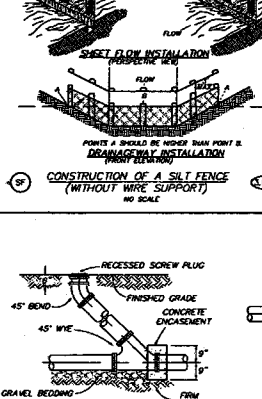
SF CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT) (1.05-1) NO SCALE

CONSTRUCTION AND INSTALLATION NOTES

1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION OF STORM DRAINAGE CONVEYANCE SYSTEMS.

2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.



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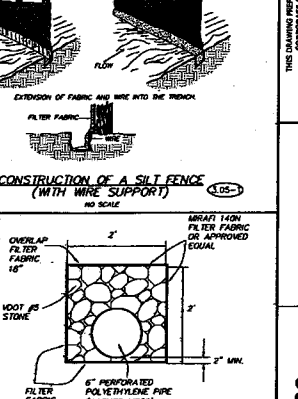
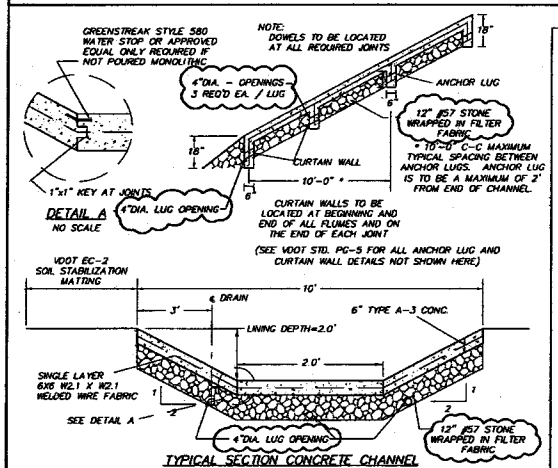
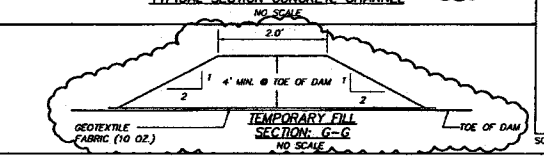


TOE DRAIN DETAIL NO SCALE

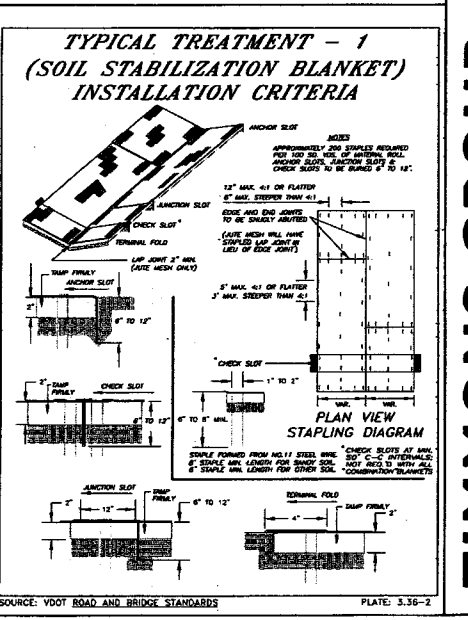


TYPICAL SECTION CONCRETE CHANNEL NO SCALE



TEMPORARY FILL SECTION: G-G NO SCALE

TYPICAL TREATMENT - 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA



SOURCE: VDOT ROAD AND BRIDGE STANDARDS PLATE: 3.36-2

COMMONWEALTH OF VIRGINIA
MICHAEL L. CLAUD
No. 103306
PROFESSIONAL ENGINEER

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1901 Roanoke Parkway, Suite 300 | Richmond, VA 23230
TEL 804.262.8100 FAX 804.262.8115 | timmonsgroup.com

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TIMMONS GROUP

REVISION DESCRIPTION	DATE
REVISED FOR COUNTY REVIEW COMMENTS	5/20/2006
REVISED FOR CONSTRUCTION ACCESS	6/27/2006

Site Development | Residential | Infrastructure | Technology

WARHILL SITE EASTERN POND (PC106) DAM RENOVATIONS
JAMES CITY COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL NOTES & DETAILS

DATE	2/24/2006
DRAWN BY	C.ALMARODE
DESIGNED BY	M. CLAUD
CHECKED BY	D. GOULD
SCALE	AS NOTED
JOB NO.	22547
SHEET NO.	C1.4

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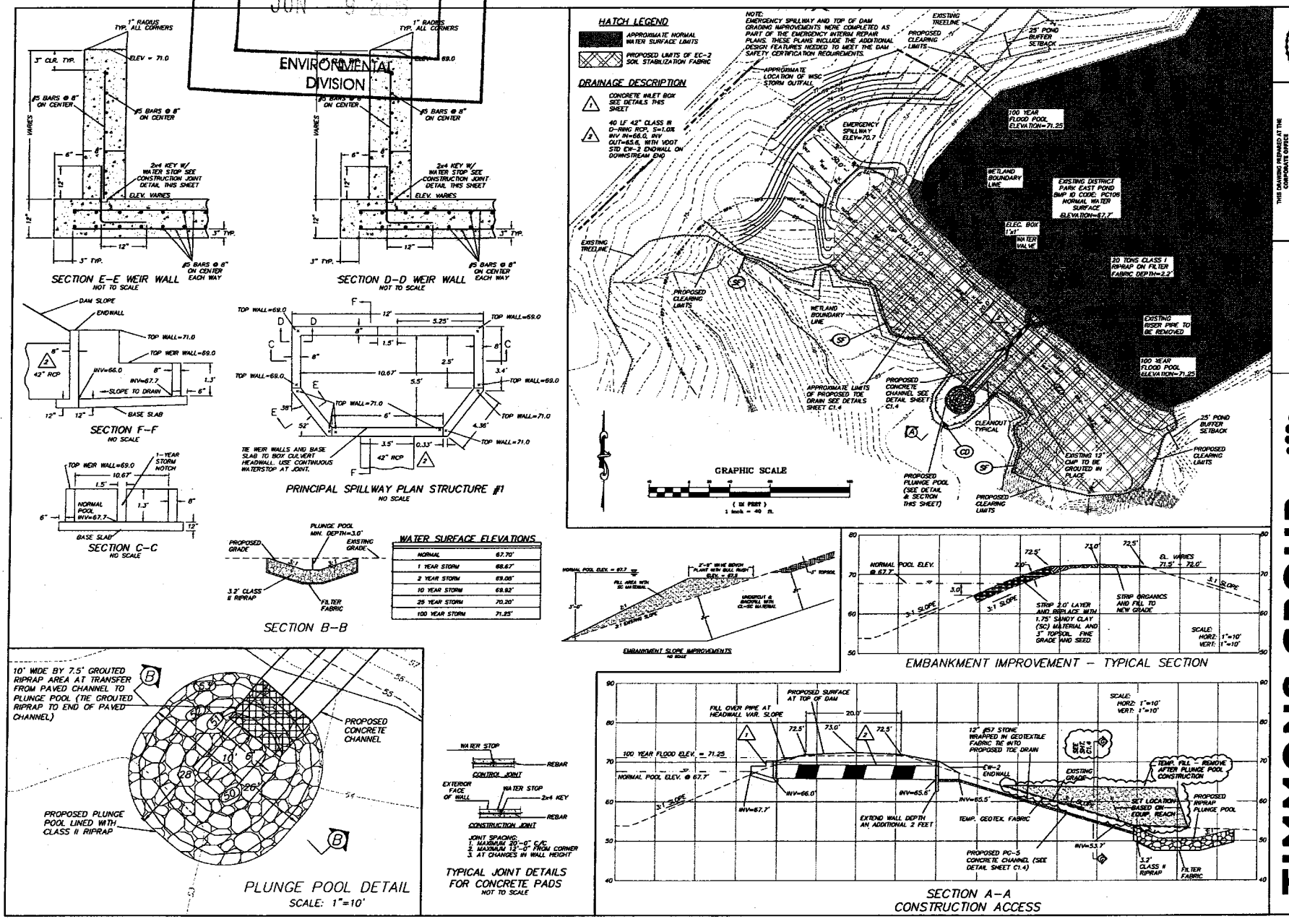
JUN 9 2006
ENVIRONMENTAL DIVISION



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Scott Thomas

From: Scott Thomas
Sent: Thursday, June 08, 2006 10:36 AM
To: Steven W. Hicks
Cc: Wayland Bass
Subject: RE: Eastern Pond Analysis

The final approved East Pond Dam plan (SP-107-05) shows the total drainage area to the east pond at 150.05 acres. This letter report shows 140 acres. Their assumptions for 35.4 acre-feet of volume available at normal pool El. 67.7 looks ok.

Scott J. Thomas, P.E.
Chief Engineer - Stormwater
James City County
Environmental Division

From: Steven W. Hicks
Sent: Monday, June 05, 2006 1:04 PM
To: John Horne; Doug Powell; Ned Cheely; John Carnifax, Jr; Wayland Bass; Scott Thomas
Cc: Sandy Wanner; John McDonald
Subject: FW: Eastern Pond Analysis

According to this report, the East Pond can serve both Warhill Sports Complex fields and the H.S. for irrigation requirements.

From: Robertson, Alan [mailto:ROBERTSONA@wjcc.k12.va.us]
Sent: Monday, June 05, 2006 11:49 AM
To: Steven W. Hicks; Shawn Gordon
Subject: FW: Eastern Pond Analysis

FYI...

Alan

-----Original Message-----
From: Tommy Edwards [mailto:Tommy.Edwards@timmons.com]
Sent: Tuesday, May 23, 2006 11:21 AM
To: Robertson, Alan
Cc: Steve Raugh
Subject: Eastern Pond Analysis

Alan, please find attached the completed analysis of the Eastern Pond at Warhill Sports Complex as it relates to the 3rd High School irrigation requirements. Please let me know if you have any additional questions. Thanks.

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
Tommy Edwards
1001 Boulders Parkway
Suite 300
Richmond, VA 23225

Tel: 804.200.6451
Fax: 804.560.1464
Cell: 804.615.2145
E-mail: tommy.edwards@timmons.com
www.timmons.com

Scott Thomas

From: Steven W. Hicks
Sent: Monday, June 05, 2006 1:04 PM
To: John Horne; Doug Powell; Ned Cheely; John Carnifax, Jr; Wayland Bass; Scott Thomas
Cc: Sandy Wanner; John McDonald
Subject: FW: Eastern Pond Analysis
Attachments: East Pond Analysis 5-22-06.pdf

According to this report, the East Pond can serve both Warhill Sports Complex fields and the H.S. for irrigation requirements.

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E-mail: tommy.edwards@timmons.com
www.timmons.com

TIMMONS GROUP
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May 22, 2006

Alan Robertson
Facilities Manager
WJCC & James City County Schools
597 Jolly Pond Road
Williamsburg, VA 23188

Re: Eastern Pond Analysis for Irrigation System
Third High School Williamsburg- James City County

Dear Alan,

The following report presents the results of an evaluation of the Eastern Pond located at the Warhill Sports Complex as a potential water source for the irrigation system for competition athletic fields and multi-purpose field at the Third High School.

The first section of the report is an analysis of the irrigation requirements for the school fields. The second part of the report addresses the current irrigation demands at the Warhill Sports Complex. The third section discusses the analysis of the Eastern Pond.

Part I- Irrigation requirements for Third High School

The assumed irrigated area of the site consists of a competition football, baseball and softball field and a 360'x220' multi-purpose field. The total of the irrigated area is 6.58 acres. The irrigation requirements will differ between the 4 fields. It is assumed that the football field will have sports turf grass and the baseball, softball and multi-purpose fields will have fescue grass. The following chart is a breakdown of the 4 fields and the water requirements necessary to sustain the individual turf types. These requirements are based upon a worst case scenario of zero rainfall in July which historically has the highest rates of water loss through evapotranspiration (ET).

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Field	Acres Irrigated	ET (in/wk required)	Weekly Demand in Gallons
Football	2.43	1.26	83,327
Baseball	1.70	1.53	70,850
Softball	.65	1.53	27,100
Multi-Purpose	1.80	1.53	75,000
TOTAL	6.58		256,277

The irrigation season for this area of Virginia typically runs from April to Mid-October. The total number of weeks in this time period is 28. The total gallon demand for the 28 week period would be: 7,175,756.

Part II- Irrigation requirements for existing Warhill Sports Complex

Currently the irrigated area at the existing sports complex totals 21.5 acres. The majority of the fields have sports turf grass. The water requirements necessary to sustain the sports turf are again based upon a worst case scenario of zero rainfall in July which historically has the highest rates of water loss through evapotranspiration (ET). The amounts required are

Field	Acres Irrigated	ET (in/wk required)	Weekly Demand in Gallons
Soccer	16.50	1.26	575,064
Baseball	5.00	1.26	162,198
TOTAL	21.50		737,262

Estimated

The irrigation season for this area of Virginia typically runs from April to Mid-October. The total number of weeks in this time period is 28. The total gallon demand for the 28 week period would be: 20,643,361.

Please note that information obtained from Craig Nordeman with James City County based upon actual water usage suggests that the irrigation requirements are considerably less. Based upon the watering scheduled provided by Craig, the following assumption was determined:

Field	Acres Irrigated	Irrigation Days	Weekly Demand in Gallons
Soccer	16.50	4	153,600
Baseball	5.00	3	46,000
TOTAL	21.50		199,600

Actual Data

These figures are based upon the existing irrigation system producing roughly 80 gallons per minute at 60 psi at the base of the sprinkler head with an irrigation cycle of 3 to 4 days per week with zone run times of 10 to 20 minutes each. The total gallon amount for the irrigation season (28 weeks) would be: 5,588,800.

Part III- Eastern Pond Analysis

35.44

Based upon data supplied it is estimated that the pond has approximately 35.4 acre feet of volume (11,539,000 gallons of water). Based upon the assumption that the drainage area is roughly 140 acres and a replenishment rate of ½ cfs, the recovery rate is approximately 323,000 gallons per day or 2.2ML gallons per week. This amounts to 224 gallons per minute.

DA 150.5 AC.

NP 67.7

67 - 31.12 A-F

68 - 37.30 A-F

The weekly drawdown on the pond from the existing irrigation demands and the addition of the school fields would amount to about 7.77 inches of pond surface; this also includes a factor of .33 inches per day of evaporation. It would require approximately 130 gallons per minute for 24 hours to recharge the pond.

It should be also noted that both Craig Nordeman and Bernie Farmer remarked that even during drought conditions, the pond experienced no significant drawdown from irrigating.

Conclusion

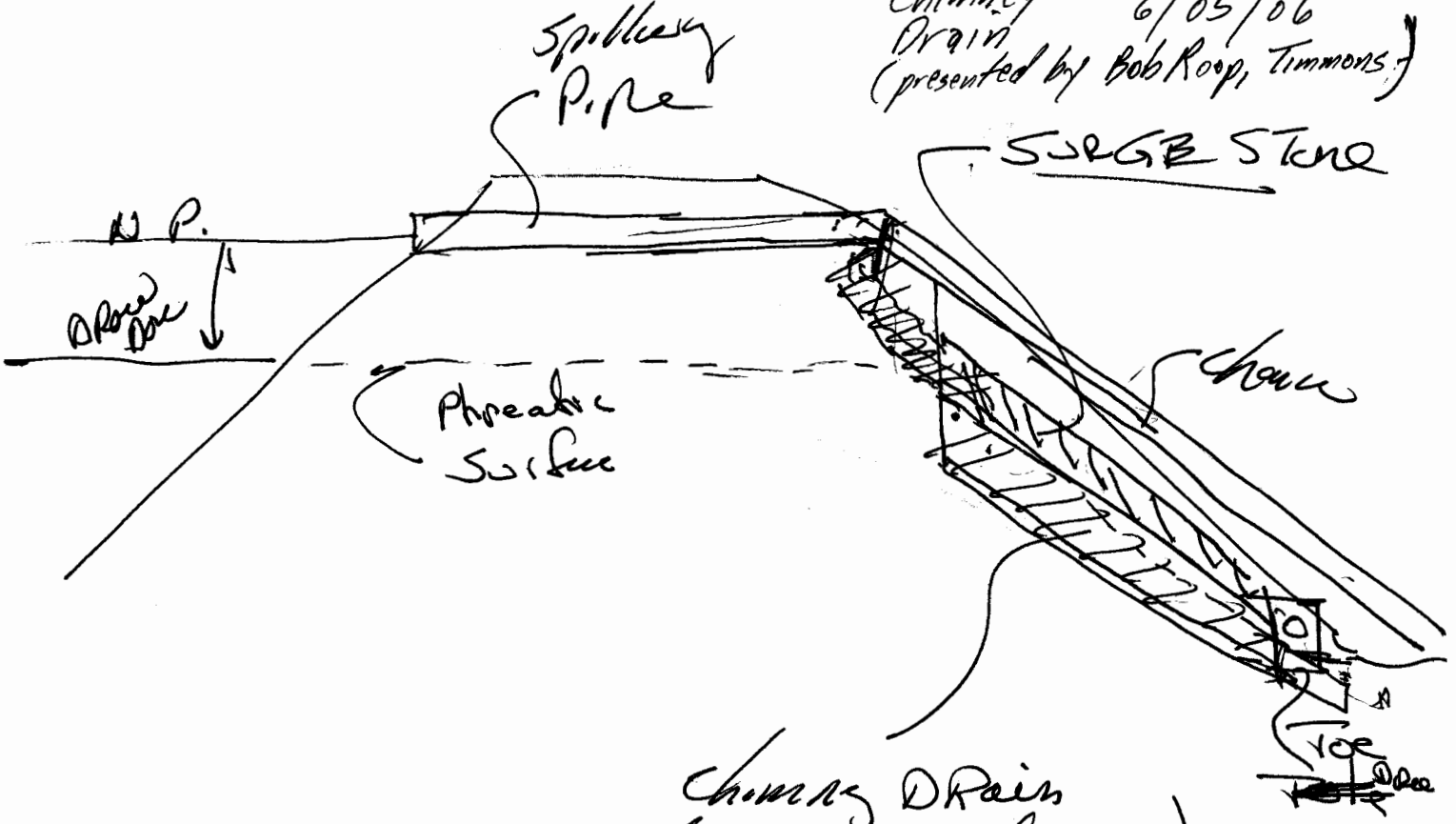
The increased irrigation demand for the school fields should have no significant impact on the pond. It is recommended that a separate irrigation system with pump station be installed as opposed to connecting to the existing system at Warhill Complex should it be determined that the pond is the desired water source for the school fields.

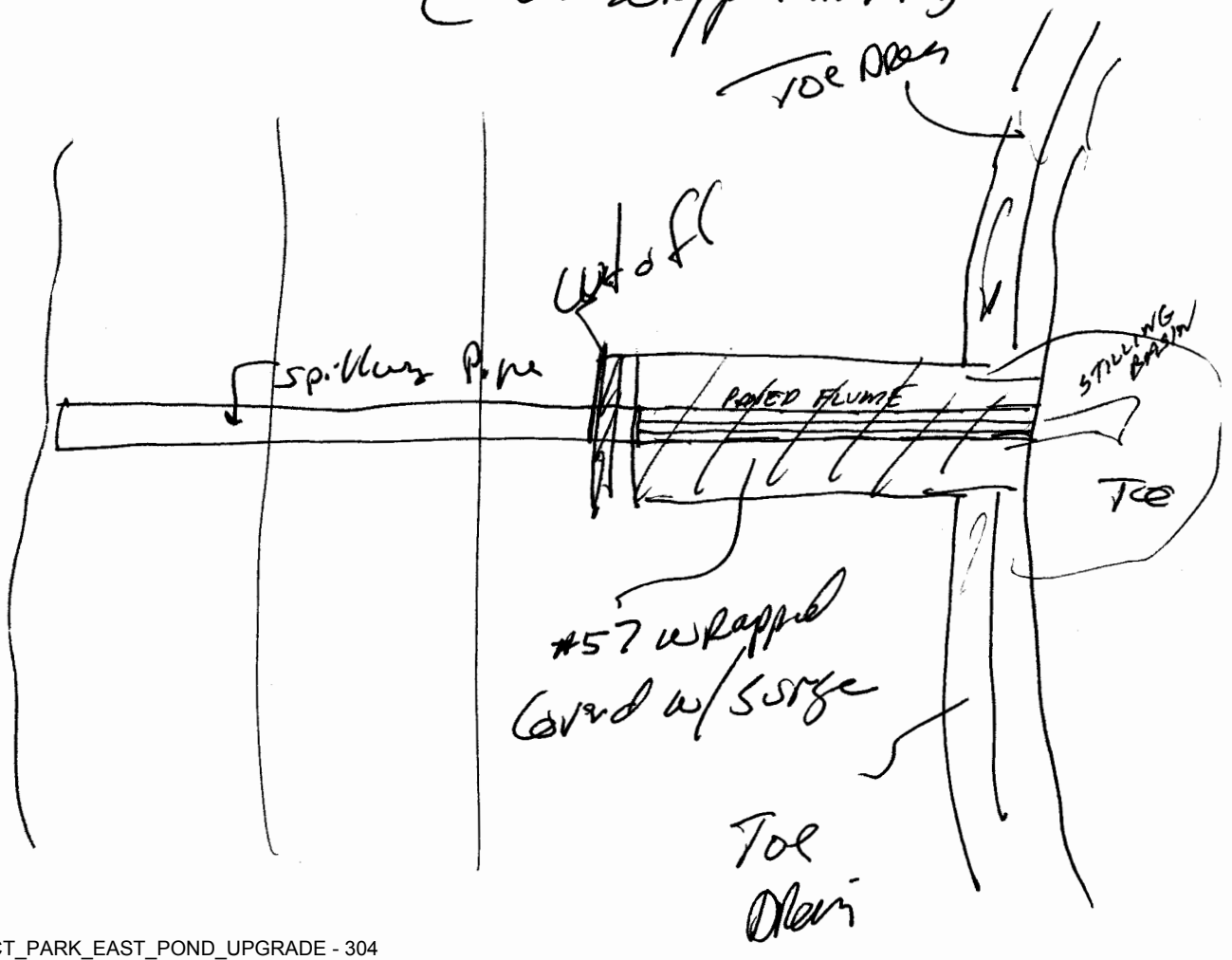
Please contact me with any questions you may have regarding this analysis at 804-200-6451 (direct) or 804-615-2145 (cell)

Sincerely,

Tommy Edwards
Irrigation Specialist

Prelim Sketch
East Pond Dam
Chimney Drain
6/05/06
(presented by Bob Roop, Timmons)





TRANSMITTAL

DATE: April 19, 2006

TO: Environmental

FROM: Matthew Smolnik, Planner

SUBJECT: **SP-107-05, Warhill – Eastern Pond Dam Renovations** (WARHILL PPEA)

ITEMS ATTACHED: Revised Plan

ACTION: Please review and return comments by April 28, 2006

Approved. A LAND-DISTURBING Permit is required for this portion of the PPEA project. Also, once the dam safety permit is received from the Virginia Department of Conservation + Recreation, a copy must be forwarded to our Division.

Scott J Thomas
04-20-06

Scott Thomas

From: Scott Thomas
Sent: Thursday, April 20, 2006 11:38 AM
To: Steven W. Hicks; 'Bill Richards'; 'Andrew Gould'; 'Mike Claud'
Cc: Matthew J. Smolnik; Wayland Bass; William Porter; Darryl Cook; Bernard M. Farmer
Subject: Warhill PPEA: District Park East Pond PC 106
Importance: High

Revised plans on the Warhill PPEA District Park East Pond PC 106 Dam Improvements, County Plan SP-107-05, are now considered **approved** by our Division. I still need the Land-Disturbing Application forms for this portion of the project before a preconstruction meeting can be scheduled. I want to have a preconstruction meeting on this portion of work as one was not held for the interim repair and this work involves a Chesapeake Bay Exception and a DCR dam safety permit.

Once the DCR Dam Safety Permit is received, our Division will need a copy. Wayland Bass and myself are both ok with the starting the process to dewater the East Pond; however, I believe CCI will do this at their own risk in advance of the preconstruction meeting, issuance of the land-disturbing permit and receipt of the DCR dam safety permit. Dewatering (drawdown) of the East Pond should be coordinated with Bernie Farmer.

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

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

April 17, 2006

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APR 18 2006
ENVIRONMENTAL DIVISION

Mr. Scott Thomas P.E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

RE: Eastern Pond (PC 106) Dam Renovations
County Plan #SP-107-05

Dear Scott:

In regards to your review comments dated March13, 2006, for the Eastern Pond (PC106) Dam Renovations project we are resubmitting two sets of revised construction plans for your approval. We have made revisions to the plans in accordance with the discussion at our meeting on April 10, 2006. We are also resubmitting revised plans to the planning department for their use.

If you have any questions or need any additional information, please do not hesitate to contact me at (804) 200-6413.

Sincerely,

Michael L. Claud, P.E.

enclosure

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
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Scott Thomas

From: Scott Thomas

Sent: Monday, March 13, 2006 9:26 AM

To: 'Andrew Gould'; 'Mike Claud'; Steven W. Hicks

Cc: Matthew Arcieri; Wayland Bass; Bernard M. Farmer; Darryl Cook

Subject: Warhill PPEA: District Park East Pond - Final Improvements

Attached are County Environmental Division comments for the final improvements to the District Park East Pond PC106, County Plan No. SP-107-05. This is our first review of the project in it's final form. The EMERGENCY-INTERIM repair plan was previously approved.

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

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MAR 1 2006
ENVIRONMENTAL DIVISION

TRANSMITTAL

DATE: February 28, 2006

TO: Environmental

FROM: Matthew Arcieri, Planner

SUBJECT: **SP-107-05, Warhill – Eastern Pond Dam Renovations** PC106

ITEMS ATTACHED: Plan

ACTION: Please review and return comments by March 14, 2006

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

FEB 2006
RECEIVED
PLANNING DEPARTMENT

February 24, 2006

Mr. Scott Thomas, P.E.
James City County
101 Mounts Bay Road
P O Box 8784
Williamsburg, VA 23187-8784

RE: Design Waiver Request for District Park East Pond Dam (PC 106)

Dear Scott:

We have not included pond benches nor 4:1 slopes in all areas of the proposed improvements for the District Park East Pond Dam (PC 106). We are requesting a design waiver of these requirements due to wetland constraints at the downstream toe of the dam, a desire to maintain at least a 15' wide top of dam width, and a desire to avoid regrading the entire face of the dam down to the upstream toe of the dam. Regrading the face of the dam would require extensive dewatering and very difficult construction on potentially saturated soils on the upstream face of the dam.

If you have any questions, or need additional information, please do not hesitate to contact me at (804) 200-6413. We would be happy to meet with you to answer any questions that you may have.

Thank you for your assistance with this project.

Sincerely,

Michael L. Claud, P.E.

APPROVED
James City County
Environmental Division
By: _____
Date: 03-13-06

A DAM SAFETY PERMIT IS NECESSARY FOR PROPOSED IMPROVEMENTS.

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YOUR VISION ACHIEVED THROUGH OURS.

February 24, 2006

RECEIVED
FEB 28 2006
ENVIRONMENTAL DIVISION

Mr. Scott Thomas P.E.
James City County
Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia 23187-8784

RE: Eastern Pond (PC 106) Dam Renovations

Dear Scott:

Enclosed are two sets of design plans for the Eastern Pond (PC106) Dam Renovations project. In addition, we have included a copy of the pond routing calculations, the Minor Water Quality Impact Assessment and a copy of the Chesapeake Bay Exemption Request for impacts to the RPA.

Copies of the design plans and calculations have been submitted to the DCR Division of Dam Safety for their review and approval. Please review the enclosed construction plans and calculations and provide us with any comments or questions. We would be happy to meet with you to provide any additional information regarding the construction plans and or calculations.

Sincerely,

Michael L. Claud, P.E.

cc: Wayland Bass, P.E. – James City County
Andrew Gould, P.E. – Timmons Group
Andy Curtis – Curtis Contracting

FEB 2006
RECEIVED
PLANNING DEPARTMENT

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www.timmons.com

SP-107-05

Scott Thomas

From: Andrew Gould [Andrew.Gould@timmons.com]
Sent: Tuesday, September 27, 2005 5:24 PM
To: Scott Thomas
Cc: Paul Trapp; Bob Roop; Mike Claud; Andy Curtis
Subject: Revised Emergency Interim Improvements for East Pond Dam
Importance: High

Scott - Please find attached a revised plan sheet for the Emergency Interim improvements for the East pond dam. I have also attached a copy of your original comment letter indicating how we addressed each item.

Please note that the work on the upstream face of the dam cannot proceed until we have the environmental permit for this work. The wetland delineation has been confirmed and the permit application has been submitted, but we do not have the permit in hand yet. We expect to have it shortly.

CAN DO SPILLWAY.

Please let me know if you have any questions or if further information is needed.

Thanks for your help with this important project.

Sincerely,

Drew

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.
Drew Gould, P.E.
1001 Boulders Parkway
Suite 300
Richmond, VA 23225
Tel: 804.200.6412
Fax: 804.560.1438
Cell: 804.334.9284
E-mail: andrew.gould@timmons.com
www.timmons.com

From: timmons [mailto:dt-canon@timmons.com]
Sent: Tuesday, September 27, 2005 5:07 PM
To: Andrew Gould
Subject: Attached Image
Importance: High

GENERAL NOTE:

1. THIS PROJECT IS SITUATED IN SUBWATERSHED 205 AND CATCHMENT 205-107-1 OF THE POWHATAN CREEK WATERSHED.

EROSION CONTROL NARRATIVE SEQUENCE OF CONSTRUCTION:

1. THIS PROJECT SHALL BE GENERALLY CONSTRUCTED ACCORDING TO THE SEQUENCE OF CONSTRUCTION PROVIDED BELOW. IF THE CONTRACTOR NEEDS TO DEVIATE FROM THIS SEQUENCE, HE SHALL NOTIFY THE COUNTY.

2. THE CONTRACTOR SHALL ARRANGE A PRECONSTRUCTION MEETING WITH THE COUNTY AND THE ENGINEER 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.

3. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL CALL MISS UTILITY TO LOCATE ALL EXISTING UTILITIES IN THE WORK AREA.

4. DURING CONSTRUCTION ACTIVITIES MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT THE DURATION OF THE WORK AND INSPECT AFTER ALL RUNOFF PRODUCING RAINFALL EVENTS.

5. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL THE SITE IS STABILIZED AND APPROVED BY THE COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

6. TIMBER AREAS OF SITE AS NEEDED TO INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. PERIMETER EROSION & SEDIMENT CONTROL MEASURES MUST BE IN PLACE AND FUNCTIONAL PRIOR TO CLEARING & GRADING OF UPSTREAM AREAS.

7. DRAW DOWN THE WATER ELEVATION APPROXIMATELY 3 FEET. MAINTAIN THE WATER ELEVATION AT THIS ELEVATION THROUGHOUT CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICABLE TO KEEP THE WORK AREA DRY.

8. BEGIN CLEARING AND GRUBBING OPERATIONS WITHIN THE LIMITS SHOWN. PROVIDE TEMPORARY SEEDING AS SOON AS PRACTICABLE ONCE FINAL GRADES HAVE BEEN ACHIEVED.

9. ONCE THE DAM FILL HAS REACHED THE DESIGN HEIGHT, PLACE TOPSOIL AND SEED ALL DISTURBED AREAS.

INSPECTION REQUIREMENTS

1. TO VERIFY GENERAL COMPLIANCE WITH THE CONSTRUCTION SPECIFICATIONS, FIELD OBSERVATION BY THE SITE INSPECTOR OF THE FOLLOWING ITEMS SHALL TAKE PLACE ON A DAILY BASIS:

- BACKFILL MATERIAL; NOTE TYPE OF MATERIAL AND BACKFILL LIFT HEIGHTS
- BACKFILL COMPACTION TESTING

2. THE SITE INSPECTOR SHALL RECORD THE INFORMATION LISTED ABOVE ON A DAILY BASIS AND SHALL SUBMIT REPORTS TO THE ENGINEER AND COUNTY ON A WEEKLY BASIS FOR REVIEW.

3. IF AT ANY POINT THE INSPECTOR HAS ANY QUESTIONS REGARDING WHETHER OR NOT THE INSTALLATION CONFORMS WITH THE PROJECT SPECIFICATIONS, HE SHALL NOTIFY THE ENGINEER AND COUNTY IMMEDIATELY.

4. THESE DAM IMPROVEMENTS WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION AFTER COMPLETION OF THE INTERIM IMPROVEMENTS.

CONSTRUCTION AND INSTALLATION NOTES

1. THE CONTRACTOR SHALL KEEP THE COUNTY ENVIRONMENTAL DIVISION NOTIFIED OF PROGRESS AT ALL MILESTONE STAGES OF CONSTRUCTION AND/OR IF ANY UNUSUAL SITE OR SOIL CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION.

2. THE CONTRACTOR IS REQUIRED TO CONTACT MISS UTILITY AT 1-800-552-7001 AND HAVE EXISTING UTILITIES LOCATED PRIOR TO UNDERTAKING ANY EXCAVATIONS. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF INDEPENDENT VERIFICATION OF EXISTING UTILITIES BY HAND EXCAVATION, TEST HOLES OR OTHER METHODS BY THEIR OWN FORCE.

3. THE CONTRACTOR SHALL ATTEMPT TO SCHEDULE CONSTRUCTION ACTIVITIES DURING DRY OR PERIODS OF LOW FLOW TO THE GREATEST EXTENT POSSIBLE.

GENERAL DAM CONSTRUCTION NOTES:

1. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON-SITE DURING ALL FILLING OPERATIONS. PLACEMENT AND COMPACTION OF THE GENERAL DAM FILL SHALL BE MONITORED AND TESTED BY THE GEOTECHNICAL ENGINEER. ALL SUBGRADES TO RECEIVE FILL SHALL BE EXAMINED BY THE GEOTECHNICAL ENGINEER.

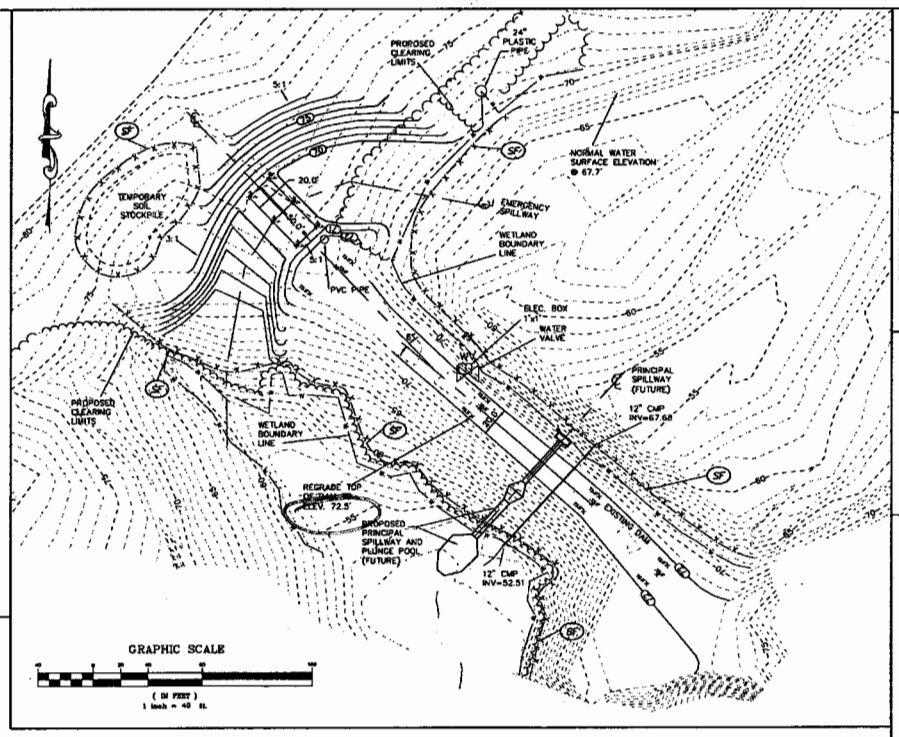
2. MATERIAL USED FOR FILL SHALL BE SELECT MATERIAL FREE FROM ROCKS, ROOT MASS OR CLODS. FILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 6" AND EACH LIFT SHALL BE COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR. GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING IF MATERIAL IS SUITABLE FOR USE AS FILL ON THE DAM.

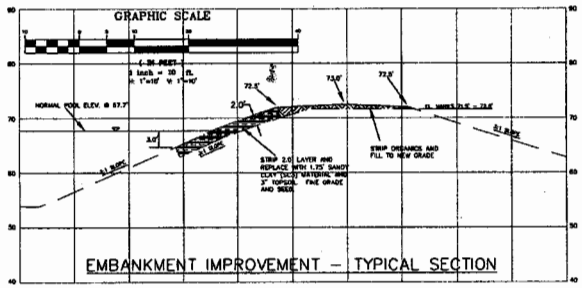
3. CONTRACTOR SHALL PLACE EXCAVATED MATERIAL THAT IS UNSUITABLE FOR USE AS FILL WITHIN THE TEMPORARY SOIL STOCKPILE AREA LOCATION SHOWN ON THIS SHEET. CONTRACTOR SHALL GRADE AND SEED EXCESS MATERIAL PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

4. PLACE THREE INCHES OF TOPSOIL ON DAM SLOPES AFTER GRADING COMPLETION. TOPSOIL SHALL BE TRACKED (PERPENDICULAR TO THE AXIS OF THE DAM) WITH TRACKING EQUIPMENT. PERMANENTLY SEED THE DAM SLOPE PER VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.

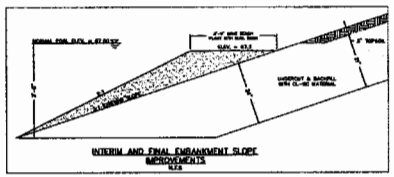
5. THE DAM SHALL BE CONSTRUCTED ACCORDING TO THE REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

COMMONWEALTH OF VIRGINIA
ANDREW P. GOULD
NO. 030501
9-27-05
PROFESSIONAL ENGINEER

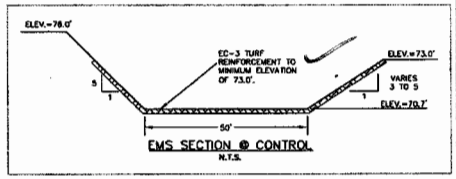




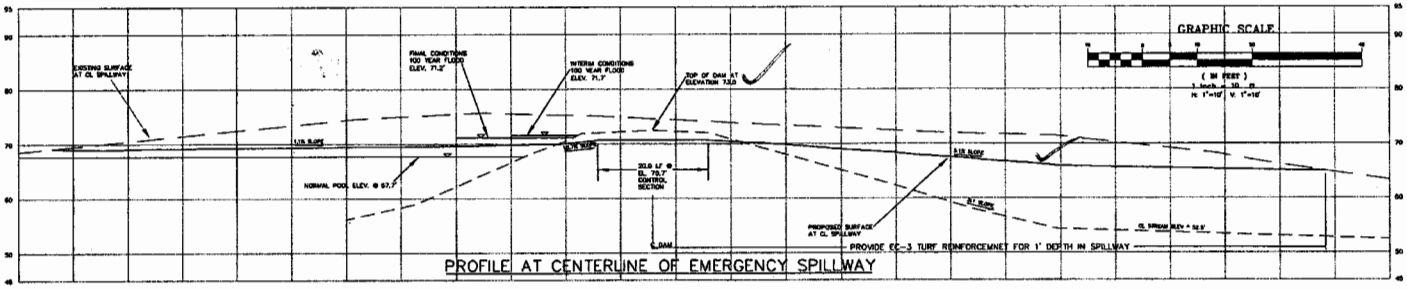
EMBANKMENT IMPROVEMENT – TYPICAL SECTION



INTERIM AND FINAL EMBANKMENT SLOPE IMPROVEMENTS
N.T.S.



EMS SECTION @ CONTROL
N.T.S.



PROFILE AT CENTERLINE OF EMERGENCY SPILLWAY

INTERIM

THIS DRAWING PREPARED AT THE CORPORATE OFFICE:
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

Site Development | Residential | Infrastructure | Technology

DATE	REVISION DESCRIPTION
9/27/05	REVISED PER COUNTY COMMENTS & INTERIM TOPO

DATE	9-15-05
DRAWN BY	D. WILMOTH
DESIGNED BY	D. WILMOTH
CHECKED BY	A.GOULD
SCALE	AS SHOWN

TIMMONS GROUP

JAMES CITY COUNTY PPEA

EMERGENCY INTERIM REPAIRS TO EAST DAM (PC106 DAM)

JAMES CITY COUNTY, VIRGINIA

JOB NO. 22547

SHEET NO. 1 OF 1

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RECEIVED

BY:

CURTIS CONTRACTING, INC.

Post Office 769
West Point, Virginia 23181
(804) 843-4633/FAX: (804) 843-2545
curtis@visi.net

RECEIVED
SEP - 1 2005
DEVELOPMENT MANAGEMENT

August 29, 2005

James City County
Department of General Services
113 Tewning Road
Williamsburg, VA 23188

ATTN: Mr. Steven W. Hicks
Project Manager

Dear Mr. Hicks:

We are pleased to furnish you a quotation for the improvements to the eastern pond dam located at the Warhill Tract. We have broken down the costs for the interim measures and final improvements as recommended and approved in the Preliminary Engineering Report prepared by Timmons Group/Curtis Contracting, Inc. dated August 15, 2005. APPROVED VIA EMAIL 8/18

Upon your review and approval, Curtis Contracting is prepared to mobilize and begin construction on the interim improvements. It is our understanding that upon commencement of the interim improvements, your Environmental Division will approve the Land Disturbance Permits both to remainder of the sports stadium and Phase II of the third high school site.

Interim Improvements:

- Engineering — Most is done.
- Permit coordination ?
- Survey
- Construction stakeout
- Inspection
- Materials testing
- Reduction of pool elevation
- Construction of emergency spillway
- EC-3 soil stabilization material
- Vehicular travel way (stone)
- Excavation of unsuitable material along face of dam
- Armoring of dam face with an impermeable (clay) material
- Construction of an energy dissipation shelf along face of dam

provide Better breakdown

Soil FILL PLACEMENT?

VRTBA Virginia Road And Transportation Builders Association

- Topsoil, seed, lime, fertilizer
- EC-2 soil retention matting
- As-built drawings

$ 195,653.83 Lump Sum

Permanent Improvements:

- Engineering
- Permit coordination
- Survey
- Construction stake out
- Inspection
- Material testing
- Reduction of pool elevation
- Construction of plunge pool
- Concrete drainage flume
- 42" RCP outlet pipe
- Anti-Seep collars
- Special designs Weir box
- Removal of organic materials from top of dam
- Increase dam elevation to 73.00
- Topsoil, seed, lime, fertilizer
- EC-2 soil stabilization material
- As-built drawings

$ 207,340.83 Lump Sum

Should you have any questions regarding this proposal, please contact me so this project can proceed and curtail the impacts it has on the other projects.

Sincerely,

Andrew R. Curtis, Jr.
Project Manager

Scott Thomas

From: Scott Thomas
Sent: Tuesday, September 20, 2005 5:29 PM
To: Steven W. Hicks; 'bob.roop@timmons.com'; 'Bill Richards'; 'Andrew Gould'
Cc: Wayland Bass; Matthew Arcieri
Subject: Warhill PPEA: East Pond Dam Interim Plan
Importance: High

Attached are County Environmental Division and County Engineer comments for the ***EMERGENCY - INTERIM*** construction plan for the District Park East Pond Dam PC106, County Plan No. SP-107-05. Again, this is for the INTERIM, not the final plan.

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

Scott Thomas

SP-107-05

From: Scott Thomas

Sent: Thursday, August 18, 2005 3:14 PM

To: Steven W. Hicks; 'Bill Richards'; 'bob.roop@timmons.com'; 'Andrew Gould (andrew.gould@timmons.com)'

Cc: Matthew Arcieri; Wayland Bass; Bernard M. Farmer; William Porter

Subject: RE: Warhill PPEA: East Pond Dam PER Report

Our Division has reviewed the revisions to the PER for the District Park East Pond PC 106 and now considers it as **approved.** As Wayland is currently not available, I believe that I am the only one who has thoroughly reviewed this report. The INTERIM (EMERGENCY) repair, as approved and outlined in the PER, is to consist of the following:

- Stabilize upstream face of dam with suitable compacted fill and topsoil. The 2H:1V slope as proposed shall be matted with EC-2 matting.
- Raise dam height 1.5 feet to minimum Elev. 73 with suitable compacted fill. All work shall follow applicable County, Virginia Stormwater Management Handbook and VDOT requirements.
- Construct a 50 ft. wide (bottom width) emergency spillway at Elev. 70.7. The sloped portion of the spillway (ie. downstream part) shall be matted with EC-3 turf reinforcement matting a minimum depth of 0.37 feet, say 6 inches.
- Asbuilts and construction certification will be necessary for the INTERIM repairs once completed.

I am now ok with a cost and scope to be developed in accordance with the repair plan per Timmons recommendation. It must be demonstrated that the INTERIM plan is going to move forward in a timely manner as it relates to clearing and grubbing on the Phase 2 High School site (lower part) and the east part of the stadium site. In addition to this approval, both those sites will need approval of their respective erosion and sediment control plans. It is my thought that the sequence of construction for each of those erosion and sediment control plans will need to have the following step clearly outlined in the sequence of construction.

INTERIM-EMERGENCY repairs for the District Park East Pond PC 106, as outlined in the approved PER for the District Park East Pond PC106 and being a part of the Warhill PPEA project, must be in place and functional prior to <u>or concurrently with</u> the start of land-disturbing activities associated with this site. If the INTERIM repairs are not performed in a timely manner as this project proceeds, the Environmental Division may take action to delay or halt land-disturbing activity until such time as the INTERIM-EMERGENCY repairs are completed on the East Pond.

This is the only way that I can see that will enable the stadium and HS to move forward before the east pond interim repairs are started, but knowing they are imminent, and give a mechanism by which if work goes to far and the INTERIM repairs are not done, then the upland disturbance can be regulated. If upland disturbance moves too far ahead of the east pond INTERIM repairs, then the whole reason and purpose we went through this has been for naught. Remember it is a matter of dam safety and protection of the public and infrastructure downstream.

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

-----Original Message-----
From: Scott Thomas
Sent: Friday, August 12, 2005 3:28 PM
To: Steven W. Hicks; 'Bill Richards'; 'bob.roop@timmons.com'; Andrew Gould (andrew.gould@timmons.com)
Cc: Matthew Arcieri; Wayland Bass; Bernard M. Farmer

Subject: Warhill PPEA: East Pond Dam PER Report
Importance: High

Sorry for our Division being "offline" for awhile during our recent move into Building E. My phone number and email are not changed.

I have reviewed the Preliminary Engineering Report for the District Park East Pond Dam PC 106 as forwarded to me on August 9th 2005. Here are my comments:

1) Page 1 and Page 4 of the narrative report are in conflict. Page 1 says that top of dam will be raised 1 foot to El. 72.5 to provide 0.8 feet of freeboard under interim conditions. Page 4 says top of dam to be raised 1 foot to El. 72.5 to achieve 1 foot of freeboard. County and VSMH standards would require 1 foot of freeboard on dams with emergency spillways. This would apply to the INTERIM as well as final conditions. Therefore, as the 100-year design high water elevation for INTERIM conditions is at El. 71.73, minimum top of dam elevation needs to be at 72.75, which means raising top of dam around 1.25 feet during the INTERIM phase.

2) Page 2 of the narrative report indicates the dam was overtopped during TS Gaston (2004). It is unclear where this information came from. If this was indeed witnessed by County administration, Parks and Rec or Facilities Management staff or the County Engineer, then it is ok to leave in the report. The dam may have overtopped during Hurricane Floyd in 1999.

3) Provide computations as required for INTERIM emergency spillway design. The PER proposes an emergency spillway with a 50 ft. bottom width during INTERIM conditions. The PER should also specify what sideslopes are intended (ie. 3H:1V, 2H:1V, etc.) and what lining is required through the control and sloped spillway section. As the interim condition model shows that the spillway will have approximately 1 ft. depth of flow through the section for the 100-year event, it is preferred that an erosion control matting be used through the section, even if computations show that grass is acceptable for erosion resistance. EC-3 turf-reinforcement matting is preferred over EC-2 type matting for this specific application. *(As the emergency spillway will discharge a significant amount of flow during the 100-year storm and is an important flow control structure, erosion resistance and dam safety would be a higher consideration than the inability to perform mowing operations. EC-3 lined emergency spillway channels can be cut and maintained using alternative methods rather than typical mowing equipment.)*

4) A storm pipe outfall is proposed just to the north of the proposed emergency spillway for the WISC Building Expansion SP-65-05. This plan was approved by our Division on July 11, 2005 and a preconstruction meeting was held on July 21, 2005. There may be a conflict between grading proposed for the interim emergency spillway and the location of this outfall which consists of a 15-inch corrugated polyethylene pipe and Class I riprap outlet protection. The owner contact is Williamsburg Indoor Sports Complex, LLC (Chris Haywood) at 564-3767. The contractor contact is Bruce Gilliam with Henderson, Inc. at 565-1090.

5) The geotechnical report by GET Solutions, Inc. (WM05-169G, August 8th 2005) indicates the upstream face of dam to receive 24-inches of cover. Page 1 of the PER narrative says 21-inches.

6) The geotechnical report by GET Solutions, Inc. (WM05-169G, August 8th 2005) indicates all fill and embankment construction activities to be in accordance with VDOT Road and Bridge Specifications. Although acceptable, INTERIM construction needs to follow requirements from the Virginia Stormwater Management Handbook and specific recommendations from the geotechnical report.

7) If upstream face of dam fill slope exceeds 3H:1V, then erosion control matting would be required in accordance with County Standard Erosion Control Note # 14. At a minimum, EC-2 would be required.

8) All INTERIM work proposed will require submission, review and approval of a record drawing (as-built) and construction certification upon completion. Provide notes in the PER and Sketch Plan accordingly to ensure this activity is adequately coordinated and performed before, during and following construction in accordance with current County guidelines.

Overall I am please with the analyses performed and for the recommendations given for both INTERIM and final conditions. Making the east dam safe for increased runoff expected during land-disturbing operations for upland projects has always been an important concern to Division staff. Performing the INTERIM work as proposed will enable us to move forward with land-disturbing on the east part of the stadium site and the 3rd High School site **once those erosion and sediment control plans are approved** and it appears the interim work will move forward in a timely manner under the PPEA program.

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

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

RECEIVED
AUG 17 2005
ENVIRONMENTAL DIVISION

August 15, 2005

SP-107-05

Mr. Scott J. Thomas, PE
Environmental Division
James City County
101-A Mounts Bay Road
Williamsburg, VA 23187

Re: Preliminary Engineering Report
East Dam (PC #106) at Warhill District Park

Dear Mr. Thomas,

Enclosed are three copies of the revised (8-15-05) Preliminary Engineering Report for the East Dam (PC #106) at Warhill District Park for your review. We have incorporated your comments from 8-12-05. Additionally, we have divided the plan into two parts (final and Interim), and once this PER is approved, will submit a phase 4 scope and cost for the repairs. Please note that we will also submit construction plans with all requirements for your review for both Interim and Final plans.

Please advise or call if you have any questions.

Very truly yours,

Robert G. Roop

Enclosures (3)

cc: Andy Curtis
Steve Hicks

1001 Boulders Parkway, Suite 300 | Richmond, Virginia 23225
TEL 804.200.6500 FAX 804.560.1016
Site Development | Residential | Infrastructure | Technology
www.timmons.com

Scott Thomas

From: Wayland Bass
Sent: Tuesday, June 14, 2005 2:58 PM
To: Scott Thomas; Steven W. Hicks
Cc: John Horne; William Porter
Subject: RE: Timmons/Curtis - East Dam Proposal

I RECOMMEND THAT WE PROCEED WITH THE PER .

-----Original Message-----
From: Scott Thomas
Sent: Tuesday, June 14, 2005 2:57 PM
To: Wayland Bass; Steven W. Hicks
Cc: John Horne; William Porter
Subject: Timmons/Curtis - East Dam Proposal

I've reviewed the Timmons/Curtis District Park East Dam proposal and have no comments. It's pretty much what I expected for the situation. The proposal is assuming that work to improve the dam will be covered under a Nationwide Permit # 3. This is a good assumption if this project was stand-alone and not part of a bigger whole. I stated this at our first team meeting in Building F some time ago and have voiced it many times since that I am worried at some point the USACOE is going to put this whole thing together as one big project and not allow the issuance of multiple Nationwide Permits.

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

Scott Thomas

CURTIS CONTRACTING, INC.

Post Office 769
West Point, Virginia 23181
(804) 843-4633/FAX: (804) 843-2545
curtis@visi.net

June 7, 2005

James City County
P.O. 8784
Williamsburg, VA 23187-8784

Attention: Mr. Steven W. Hicks
Project Manager

RE: Proposal for Engineering and Environmental Services for the Existing County Sports Complex Dam

Dear Mr. Hicks:

In conjunction with our Engineering Consultant (Timmons Group), please find the attached proposal as it outlines our understanding of the project purpose, scope, fee and schedule for our services. Our proposal includes the following services:

- Geotechnical Evaluation of the Dam ✓
- Preliminary Engineering Report for Interim and final solutions ✓
- Topographic survey of the Dam site ✓
- Coordination with DCR Division of Dam Safety ✓
- Environmental Permitting ✓

The intent of this report is to:

1. Determine the structural integrity of the Dam, ✓
2. Recommend appropriate measures for stabilization, ✓
3. Determine any reasonable interim hydraulic solution that will allow the High School and Stadium sites to be cleared and graded without jeopardizing the Dam ✓
4. Evaluate permanent solutions for Dam operation ✓
5. Provide a basis for pricing of final dam improvements ✓

Sincerely,

Andrew R. Curtis, Jr.
Project Manager

VRTBA Virginia Road And Transportation Builders Association

Proposal for Preliminary Engineering Report (PER) and Environmental Services
for the Existing County Sports Complex Dam
June 7, 2005

Project Understanding

pc 106

James City County requires renovations and upgrades to the existing County Sports Complex Dam (eastern pond) in order to meet the current County Stormwater Guidelines and Virginia Impounding Structure Regulations. A preliminary on-site investigation of the structure on May 25, 2005, revealed wet/soft areas 4-7ft. below the surface on the upstream face of the dam. This has raised concern about the structural integrity of the structure, and it's ability to continue service without developing a failure condition during intense rainfall events. Particularly in view of proposed watershed improvements and construction operations.

We recommend a two stage approach to the facility remediation as follows;

1. Stage 1- Develop a PER based on subsurface investigation and hydrologic analysis that will evaluate an interim solution and allow cost development for stage 2. This also includes site survey, environmental and water quality permitting
2. Stage2- Provide final design and construction based on the PER recommendations

Proposed Scope of Services Stage 1

1. Geotecnical Evaluation and subsurface investigation-

   a) Contact the local underground utility service company prior to beginning our field services, in order to identify the location of underground utilities in the work area.

   b) Locate and advance on average six (6) 20-foot Standard Penetration Test (SPT) borings (on average) located within the existing dam alignment. At this time, the dam height is not known, but we recommend drilling to a depth of at least twice the height of the dam in order to properly provide our stability analysis.

   c) Install two (2) monitoring wells within the dam alignment to determine the groundwater table. This will include additional site visits to measure the groundwater level.

   d) Perform laboratory tests on selected soil samples collected from the borings in order to determine in-situ moisture content, moisture-plasticity relationships (Atterberg Limits), and full sieve analysis, as deemed necessary.

   e) Conduct a geotechnical engineering evaluation of the available data with respect to dam stability using STABL6 software for stability analysis.

   f) Prepare an engineering report signed by a registered professional engineer presenting data, soil boring logs, observations, evaluations and recommendations.

2. Preliminary Engineering Report (PER)
    a) Alternative solutions and recommendations for structural stabilization of slope and overall dam stability
    b) Hydrologic evaluation of the watershed, and storm routings of the 2, 10, 25, 50, 100 year events
    c) Alternative solutions and recommendation for interim modifications to the dam to address watershed modifications during construction
    d) Alternative solutions and recommendation for permanent modifications to meet dam safety and county requirements
    e) 10 copies of the final report bound

3. Field Topographic Survey – perform a field survey of the site to obtain additional topographic information needed for regrading of the dam and preparing the design plans. Field topographic information will be based on James City County horizontal and vertical datum and tied to the previous survey data collected for this site.
4. Wetland Delineation

    a) Review existing, readily obtainable environmental information for the study area such as the existing wetland mapping, USGS mapping, National Wetlands Inventory Mapping, aerial photographs and soil survey information.
    b) Perform a wetland delineation of the subject property in accordance with the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual.
    c) Prepare a preliminary wetland delineation map showing the approximate size, shape and location of wetlands and or waters of the U.S. present on the subject property.
5. Corps of Engineering Confirmation

    d) Prepare and submit a Jurisdictional Determination (JD) package consisting of a narrative, wetland delineation map and wetland delineation field data sheets to the Corps of Engineers (COE) in order to obtain a confirmation of the wetland delineation.
    e) Conduct a site visit with COE to review the site conditions and confirm findings.
    f) Obtain JD letter for the wetland delineation from the COE.
    g) Coordinate with survey on wetland flag location

1. Environmental Permitting

    How long will this last?

    a) Prepare and submit a Pre-Construction Notification (PCN) for a Nationwide Permit (NWP) 3 to the U. S. Army Corps of Engineers (COE). The NWP 3 is for maintenance of existing structures.

The COE has 45 days from the receipt of the application to review the application and decide whether or not to issue a permit for the proposed activity. Usually, there will be one request for additional information (RAI) which will stop the COE's 45-day timeline until receipt of the requested material, where upon receipt of the RAI, the timeline will resume. There is also a 45 day review period for the COE

with regards to historical and endangered species issues. This clock also begins upon receipt of the permit application. The COE will coordinate with the U.S. Fish and Wildlife Service (USFWS) and Virginia Department of Historic Resources (DHR) on these issues. Although the NWP program is administered by the COE, the Virginia Department of Environmental Quality (DEQ) may review this project and provide comments concurrent with the COE's permit application review regarding water quality issues associated with this proposed activity.

The PCN submittal will contain a narrative describing in detail the purpose and need of the project such that it would warrant the proposed disturbance. A drawing depicting the proposed work will also accompany the notification.

b) Responses to Requests for Additional Information (RAI) will be prepared to answer any questions posed by the COE as a result of the PCN.

* This fee proposal is based on the assumption that the proposed project and associated wetland impacts will qualify for the requested permit, and that the COE will be the only permitting agency involved. This fee proposal does not include the preparation of any other permit in the event that one is necessary or additional submittals, deliverables, or notifications required in association with the permit outside of those detailed above. Further, this fee proposal specifically excludes Endangered Species and Phase I Archaeological and Historical Resource Studies, Phase I Environmental Site Assessment, preparation of stormwater maintenance plans, surveying of any kind, and or any sort of mitigation design. In the event that any of the above conditions change, this scope of services and fee proposal will need to be revisited. This fee estimate is valid for 45 days.

2. Minor Water Quality Impact Assessment

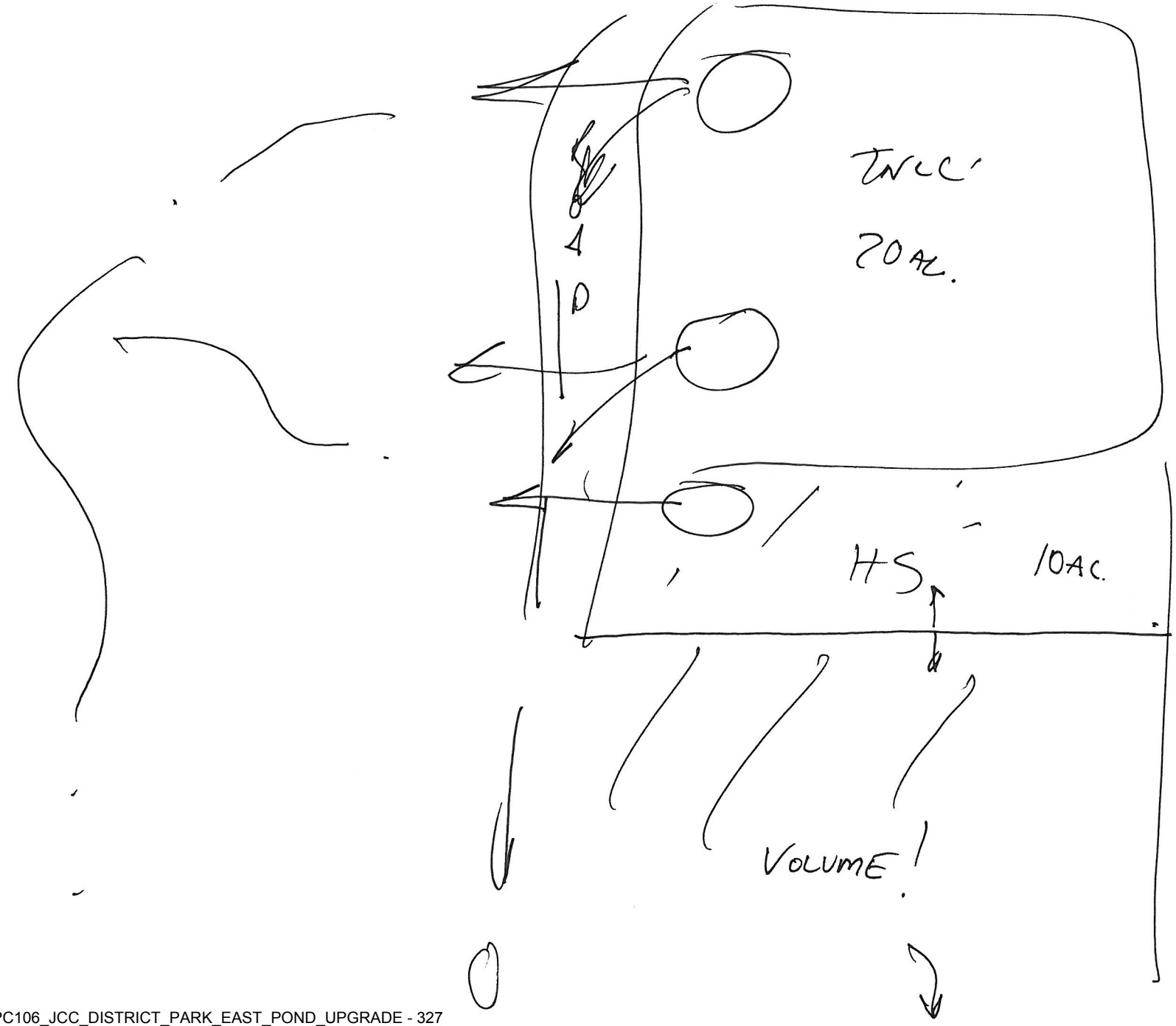
   i. Perform a Minor Water Quality Impact Assessment (WQIA) for the proposed activity as it is to occur in a Resource Protection Area (RPA).
   ii. Prepare a report documenting the water quality impacts associated with the project.
   iii. Coordinate with the County and obtain approval for the proposed work.

Proposed Schedule

The PER and Geotechnical report can be completed (including reviews) within 4 weeks of authorization to proceed.

Proposed Fee

1. Geotechnical Investigation		$ 8,050
2. PER		$ 9,775
3. Field Topographic Survey		$ 2,875
4. Wetland Delineation		$ 1,725
5. Corp of Engineers Confirmation		$ 1,725
6. Environmental Permitting		$ 4,025
7. Minor Water Quality Impact Assessment		$ 2,875
	Total Fee =	$31,050


TWCC
20AC.
HS
10AC.
VOLUME!

Scott Thomas

From: Scott Thomas
Sent: Friday, June 03, 2005 5:11 PM
To: Wayland Bass
Cc: John Horne; William Porter
Subject: For East Pond Meeting on Monday

Here is some information for you as I will be out for the meeting Monday with Timmons:

District Park Warhill Trail Pond (County BMP ID Code: PC 118) Drainage Area = 1211 acres
District Park East Pond (County BMP ID Code: PC 106) Drainage Area = 140 acres
District Park West Pond (County BMP ID Code: PC 105) Drainage Area = Unknown, will know shortly with PPEA Design, includes outlet mall, TNCC, etc.

District Park East Dam Information

The District Park East Pond (County BMP Code: PC 106), otherwise known as the soccer field or irrigation pond, is technically considered a BMP due to the following previous plan approvals:

1. **District Park Improvements SP-61-98/SP-125-00**: Ten BMP points were achieved for this plan by open space credit for undeveloped lands and structural BMP credit for the three onsite lakes. These ponds were known as Pond # 1 (Warhill Trail), Pond # 2 (West Pond) and Pond # 3 (East Pond). The soccer field and road area at the north part of the District Park site drains to the east pond. Water quality achieved for the project by use of the east pond.
2. **District Park Concession Building (Concession Building A) SP-40-00:** Impervious cover from this site drains overland flow to the soccer field drainage system in the east pond.
3. **WISC SP-137-99:** The original site plan using an onsite piping system to drain to the east pond.

Future known areas which will drain to the east pond also are: about ½ of the stadium site (uncontrolled); the WISC expansion currently under review as County Plan No. SP-65-05; the future JCSA water tank (SUP approved, site plan not submitted yet); and the high school (although water quality and quantity control will be achieved onsite). Part of the linear projects for the Warhill PPEA project (ie. water & sewer, etc.) may drain to the pond but very small percentage. The High School in a cleared condition could represent about 42 percent of drainage area to the pond.

Authority over the East Dam

Professional – ethics to protect the public health, safety and welfare.
County – responsibility to protect the public's health, safety and welfare and the natural resources of the County.
Chesapeake Bay Preservation Ordinance, Section 23-10(8)(a) – If compliance for a development is based in whole or part on the use of existing downstream onsite or offsite structural BMPs, evidence shall be provided that facilities are currently in good working order and performing at the design level of service. The manager may require a review of both the original design and maintenance plans to verify this provision. A new maintenance agreement may be required to ensure compliance with this chapter;
Dam Safety – it was already identified that the dam falls under the state's impounding structure regulations. Duty to upgrade as necessary as upland development occurs.
Minimum Standard # 19 – Erosion and sediment control regulations 4VAC50-30. Limited argument, but still applies. It is questionable whether the existing dam/lake is an adequate receiving facility both hydraulically and structurally.

Past Inspections

Past and recent inspections and analyses of the dam have shown that it is questionable whether it is hydraulically adequate or has sufficient structural integrity to serve as a receiving facility, especially for expected increases in

runoff and volume from just clearing the HS site. Estimated increases in volume is doubled to the pond just by clearing and grubbing a portion of the high school site.

Recent County Observations – Insufficiently sized and degraded riser/barrel; barrel piping; embankment piping and seepage; no emergency spillway.
Wednesday May 25th – PPEA meeting at dam, barrel piping observed; possible embankment piping test pit dug
Timmons Study (Feasibility Study for the Regional Stormwater Management Plan for the Lightfoot/Warhill Area; 11/18/04):

- A hydraulic routing of the current dam outlet structures indicated that the dam would be overtopped during rainfall events greater than the 50-year event.
- Observations and borings to indicate a lack of a impervious core
- Stability of dam slopes would have to be analyzed under several conditions (full hydrostatic pressure, rapid drawdown, etc.)

County Inspection 10/24/00: Rated 2/5; trees on dam; beaver activity; debris on riser

So far my thinking has been that the Warhill PPEA project has been linear in nature, a very small percentage of drainage to the east pond. At some point, mass clearing and grading of large land tracts would trigger the need for upgrades. This could be the High School, the stadium, the WISC expansion or a combination of them all. Options include interim upgrades, permanent upgrades, or at a minimum a full dam break and HEC-RAS analyses of the downstream areas to evaluate the potential for loss of life or property dam should the east dam fail. Maybe if the sites increase volume or runoff and the dam fails there may be no impacts downstream except environmental. Potential downstream impacts on residential areas (Winterpark, Mallard Hill, Villages at Westminster, etc.) could occur and a threat to Longhill Road exists.

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

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

Scott Thomas

From: Mike Claud [Mike.Claud@timmons.com]
Sent: Tuesday, May 10, 2005 1:17 PM
To: Wayland Bass; Scott Thomas
Cc: Andrew Gould; Steve Raugh; Bob Roop; Paul Trapp
Subject: Lightfoot Warhill site Dam

IS 141 ACRES REASONABLE.

Wayland/Scott,

We have performed a preliminary analysis of the existing dam adjacent to the soccer fields at the Lightfoot Warhill site. We have calculated a curve number for the existing drainage area to the pond and a curve number considering clearing for the high school and stadium areas.

PREVIOUS TIMMONS STUDY OVERTOPS FOR 50-YR!

The HEC-1 analysis indicated that under existing development conditions the dam would overtop by approximately 0.13 feet for a duration of approximately 1.67 hours. Under the scenario considering clearing for the high school and stadium site areas, the dam would overtop by approximately 0.37 feet for a duration of approximately 2.08 hours. DON'T FEEL COMFORTABLE WITH THIS RISK.

We are looking into possible design scenarios for temporary work that can be performed at the dam to prevent overtopping of the embankment until future corrective repairs can be made to the dam. I have attached copies of our calculation sheets for your review and comment.

Please contact either Drew Gould or me if you have questions or require any additional information.

thanks,

FIND EMAIL TO WAYLAND GEOTECH

Michael L. Claud, P.E.
Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, Virginia 23225
Phone: (804) 200-6413
Fax: (804) 560-1438
Email: mike.claud@timmons.com
Web: www.timmons.com

DISTRICT PARK EAST POND (PC105)
SOCCER FIELD POND

EX. DAM
SURF AREA = 6 AC.
NP = 67.68
VOLUME NP = 35 ACRE-FT.

UPGRADES
FOREBAY RECONSTRUCTION
AQUATIC BENCH
USACOE WETLANDS PERMIT

12" RISER / 18" BARREL (CMP)
TOP DAM EL. 72 (66 AC-FT)
20' HIGH
DAM SAFETY REGULATED
CLASS II HAZARD
100-YR TO ½ PMF
DAM OVERTOPS FOR 50-YR.
NO SEEPS OBSERVED
NO IMPERM. CORE MATERIAL
BAD CONDITION

GEOTECH RECOMMEND TIMMONS 8/17/04

- CONSTRUCT CLAY CORE OR TOE DRAIN SYSTEM
- NEW FLOW CONTROL STRUCTURE (RISER, BARREL, ES)
- RAISE DAM 4FT.; $300-350K
- COMB. WEIR/ES; RAISE DAM 2'; $250-300K

2-SOIL BORINGS DONE
- CLAY CORE NOT ENCOUNTERED
- OK AS GENERAL DAM FILL
- GROUT CURTAIN?
- DAM STABILITY NOT ANALYZED OR ADDRESSED.

~~DA = 234.70 AC.~~
~~CN = 80~~
~~Tc = 0.7315 HRS~~

WJCC 3RD HS WRITE-UP

ONSITE SWM BUT NO MENTION OF D/S DAM IMPROVEMENTS.

? ⇒ A = 141.0 AC
CN 74 PRE; CN 84 (DISTURBED)

TIMMONS STORM TRUNK

p. 19 recommend O-RING Joints for RCB. STORM LINE

Worksheet 2: Runoff Curve Number & Runoff

Project: Soccer Pond Dam Analysis Calc.: ____ Date: 5-10-2005
Location: James City County Checked: ____ Date: ____

Circle one: (Present) Developed Drainage Area: 141 acres

1. Runoff Curve Number (CN)

Soil Group	Cover Description (MAYBE LOWER)	CN (1) Table 2.2	CN (1) Fig. 2-3	CN (1) Fig. 2-4	Area ☒ acre ☐ s ☐ mi^2	Product of CN x Area
	Woods	70			88.5	6195
	Utility Easement	75			11.9	892.5
	Power Station	96			2.5	240
	Soccer Fields	80			19.0	1520
	Brush & Grass Field area	75			11.0	825
	Existing Pond	100			8.1	810
				Totals =	141	10482.5

(1) Use only one source per line.

CN (weighted) = total product / total area = 74.3 ; use CN = 74

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24 hour)..... in			
Runoff, Q ..... in			

Worksheet 2: Runoff Curve Number & Runoff

Project: Soccer Pond Dam Analysis Calc.: ____ Date: 5-10-2005
Location: James City County Checked: ____ Date: ____

Circle one: Present (Developed) Drainage Area: 141 acres

1. Runoff Curve Number (CN)

Soil Group	Cover Description (MAY BE LOWER)	CN (1) Table 2.2	CN (1) Fig. 2-3	CN (1) Fig. 2-4	Area [X] acre [ ] s [ ] mi²	Product of CN x Area
	Woods	70			29.5	2065
	Utility Easement	75	✓		11.9 ✓	892.5
	Power Station	96	✓		2.5 ✓	240
	Soccer Fields	80	✓		19.0 ✓	1520
	Existing Pond	100			8.1	810
	Clearing for School Site	91	✓		60	5460
	Clearing for Stadium Site	91	✓		10	910
				Totals =	141	11897.5

(1) Use only one source per line.

70 ACRES DISTURBED
IS 60 AC. CORRECT.?
COULD BE MORE ONCE GRADING/DRAINAGE IS IN SITE DISTURBED & BMP NO FUNCTIONAL

CN (weighted) = total product / total area = 84.4 ; use CN = 84

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24 hour)..... in			
Runoff, Q ..... in			

WARHILL STORMWATER DISCUSSION; MAY 16; 10 AM
DRAFT OUTLINE

1. IRRIGATION POND UPGRADE TRIGGERS

   A. STATE DAM SAFETY REGULATIONS; THE DAM CURRENTLY HAS A 12 " RISER/CULVERT AND NO EMERGENCY SPILLWAY

   B. STADIUM CLEARING/DRAINAGE

   C. HS CLEARING/DRAINAGE

2. LAND DISTURBING PERMIT ISSUES

   A. CHANNEL STABILIZATION

   B. DAM ADEQUACY

   C. OTHERS

3. PHASE STADIUM CLEARING?

4. PHASE HS CLEARING?

5. COMBINE STADIUM AND HS OUTFALLS?

6. TEMPORARY DAM IMPROVEMENTS?

7. START DESIGN/PERMITING OF PERMANENT DAM UPGRADE?

8. FUNDING SOURCES; PHASE 1V? STADIUM? CIP?

10.

11.

Meeting 5-16-05 after PPEA standing meeting.

5.4 Evaluation of Existing Dam

In conjunction with the stormwater treatment analysis, the existing pond dam was analyzed to determine repairs that will be necessary in order for the pond to serve as a Best Management Practice (BMP) for the County. A field inspection of the existing dam was performed along with soil borings to determine the existing material qualities of the embankment fill. A copy of the site pictures are included on the following pages and soil boring information is included in the Geotechnical Report in Appendix IV.

According to the Virginia Department of Conservation (DCR) Division of Dam Safety, an impoundment greater than 6 feet in height, as measured from the downstream toe, and with an impounding capacity to the top of the dam greater than 50 acre-feet is considered to meet the requirements for State regulation. The top of the existing pond dam was measured at approximately elevation 72.0. According to the volume survey information the total capacity of the pond at elevation 72.0 is approximately 66 acre-feet. In addition the downstream toe was measured at elevation 52.0, making the dam approximately 20 feet in total height. Therefore, this dam would meet the requirements for a state regulated facility.

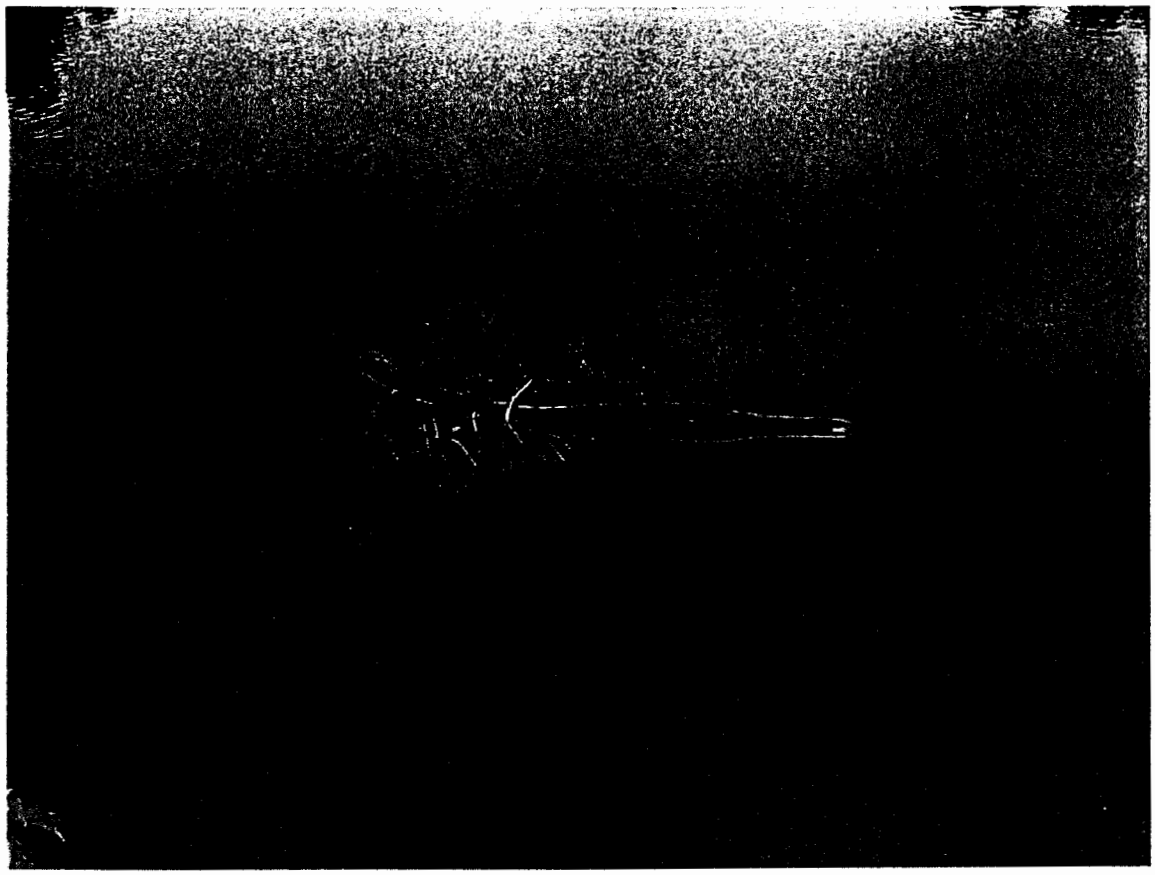
According to the James City County Guidelines for Design and Construction of Stormwater Management BMP's handbook, in order for the existing pond to serve as a BMP, the principal spillway must be able to regulate the 1-year post development flow to pre-developed conditions. In addition, in order to meet State Dam Safety requirements the outlet structures must be able to safely pass the design storm flood event based on the hazard classification of the dam. The hazard classification is based on several factors including:

- Hazard potential to downstream properties if impounding structure fails
- Size classification (based on total impounding volume to top of dam)
- Total height of dam (as measured from the downstream toe elevation)

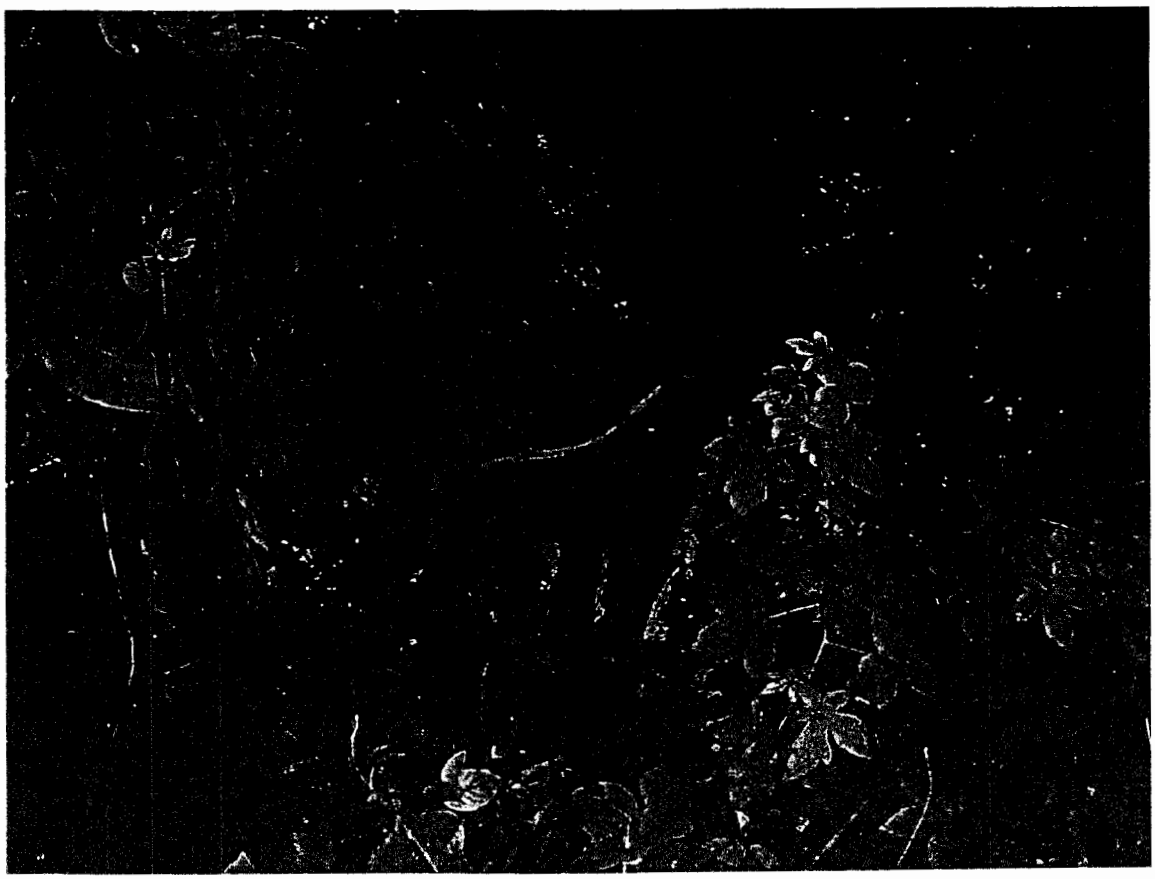
Based on preliminary information gathered for the existing dam, this impoundment would fall within a Class II hazard category. Class II hazard dams are required to pass a spillway design flood of between the 100-year to ½ Probable Maximum Flood (PMF).

A hydraulic routing of the current dam outlet structures indicated that the dam would be overtopped during rainfall events greater than the ~~50-year storm.~~ Improvements to the dam and outlet structures will be required in order to meet the Division of Dam Safety Impounding Structure Regulations.

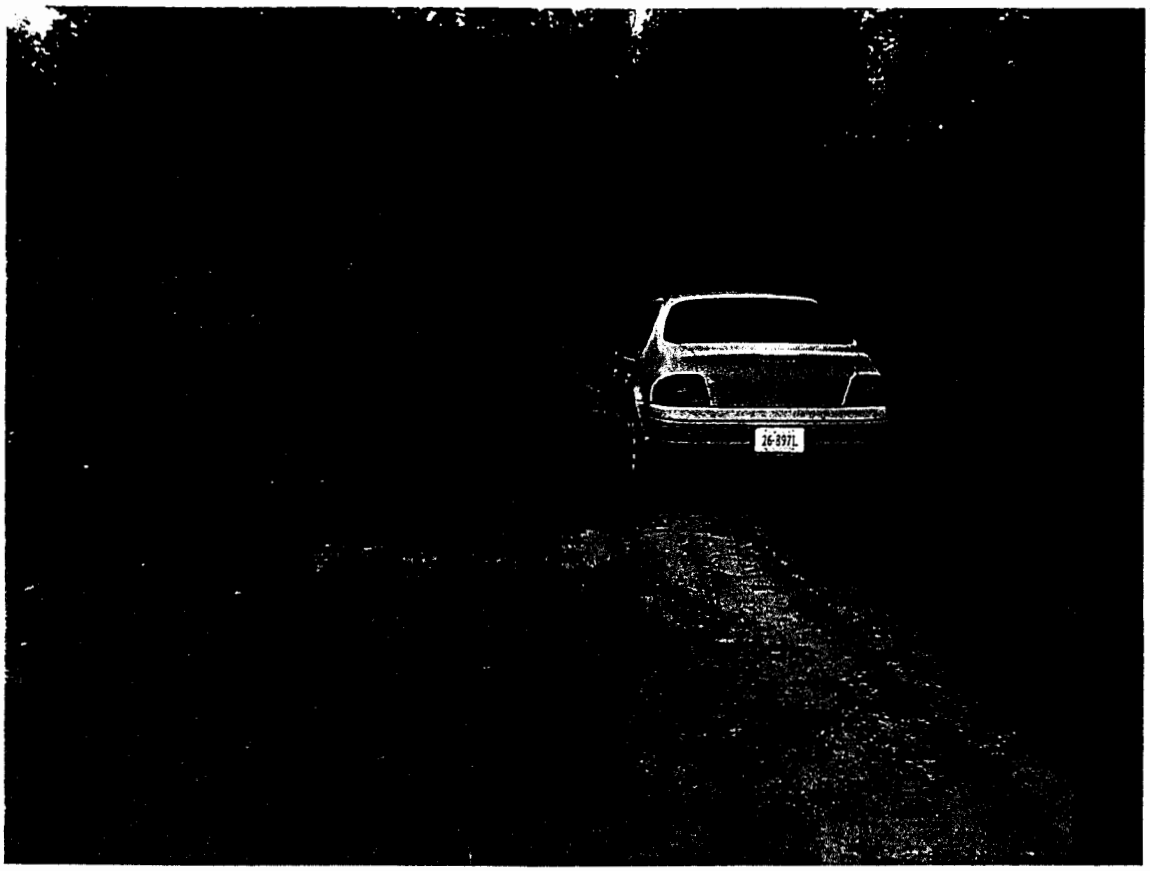
During the field investigation, no visible evidence of seepage was observed along the downstream face of the dam. However, the soil boring analysis indicated that there was no presence of impermeable core material within the existing impoundment. In order to ensure the integrity of the impoundment it is recommended that a clay core be constructed within the interior of the dam or a blanket and toe drain system be installed along the downstream face of the dam. These systems will ensure the collection and safe passage of groundwater seepage through the impoundment to the existing outlet channel downstream of the dam. The installation



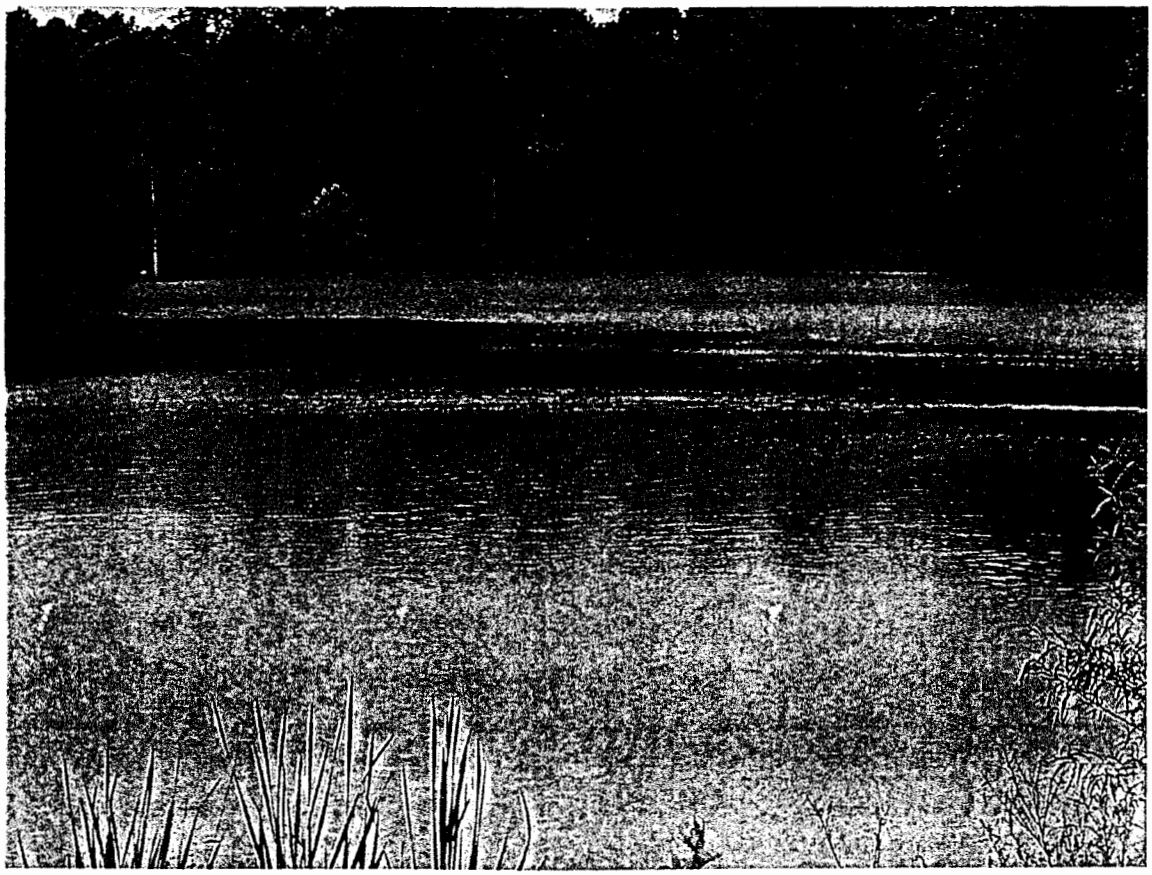
Existing 12" CMP Riser Pipe



Existing 12" CMP Outlet Pipe



Top of Existing Dam



Existing Pond

of a blanket drain system would require clearing of trees along the downstream toe of the dam and regrading of the downstream slope to install the blanket drain material.

In order to provide safe passage of the required flood storm event, two alternatives were considered. The alternatives that were evaluated include the following:

- Construction of a new inlet structure, outlet pipe, and emergency spillway within the existing impoundment.
- Construction of a combination weir/emergency spillway structure within the existing impoundment.

These alternatives are presented, and then evaluated in terms of their ability to solve the problems, their relative cost, environmental permitting issues, impacts to surrounding properties during construction, and maintenance requirements. A summary of the alternatives that were considered during this analysis is presented below.

The costs provided for each alternative are for comparison between the alternatives only. These costs should not be considered an estimate of the total construction cost. Once an alternative is chosen and a detailed design prepared for the project, a detailed cost estimate can be prepared.

Option 1: Construction of a new inlet structure, outlet pipe and emergency spillway within the existing impoundment.

NOT OUR CRITERIA!

This option considered the possibility of constructing a new concrete intake structure within the lake as the principal outlet structure for the pond. This structure would be designed with a notch for reducing the 1-year post-developed storm flows to pre-developed conditions. The inlet box would outfall through a concrete pipe culvert installed through the dam. In addition, an emergency grass lined spillway to control storms above the 50-year event would need to be constructed along the northwest end of the existing dam (see Figure Pond-1).

This option would require dewatering of the existing lake to a level where a cofferdam could be constructed around the inlet box area to ensure a dry work zone. The entire dam would need to be open cut in order to install the concrete outlet pipe. During installation of the outlet pipe, consideration should be given to the installation of a clay core or cutoff wall within the interior of the dam. The clay core would provide an impermeable zone for protecting the downstream dam face from seepage.

DHW 74.33 +1 = 75.33

Preliminary calculations performed for this option indicated that the height of the dam would need to be increased to elevation 76.0, approximately 4 feet above the existing top of dam. In order to minimize the environmental impacts to the downstream channel the additional fill material can be placed along the upstream face of the dam as shown in Figure Pond-1. This additional amount of fill material would not affect the water quality volume requirements previously discussed. Some downstream disturbance along the toe of dam will be necessary for installation of the outlet pipe, toe drain and emergency spillway outfall.

The cost to construct these improvements would be between $300,000 to $350,000. This estimate does include mobilization, clearing and grubbing, dewatering, earthwork, seeding and erosion control measures. This estimate does not include costs associated with mitigation of impacts that may be required by the U.S. Army Corps of Engineers.

Option 2: Construction of a combination weir/emergency spillway structure within the existing impoundment.

This option considered the possibility of constructing a new concrete spillway section within the existing dam as the principal outlet structure for the pond. This structure would be designed with a weir notch for reducing the 1-year post-developed storm flows to pre-developed conditions. The spillway would outfall along the downstream face of the dam (see Figure Pond-2).

This option would require dewatering of the existing lake to a level where a cofferdam could be constructed to ensure a dry work zone. Preliminary calculations performed for this alternative indicated that the height of the dam would need to be increased to elevation 74.0 approximately 2 feet above the existing top of dam. In order to minimize the environmental impacts to the downstream channel the additional fill material can be placed along the upstream face of the dam as shown in Figure Pond-2. This additional amount of fill material would not affect the water quality volume requirements previously discussed. Some downstream disturbance along the toe of dam will be necessary for installation of the spillway and outfall pool.

It is recommended that a blanket and toe drain system be installed with this alternative. The soil boring analysis indicated that there was no presence of impermeable core material within the existing impoundment. This system will ensure the collection and safe passage of groundwater seepage through the impoundment to the existing outlet channel downstream of the dam. The installation of a blanket drain system would require clearing of trees along the downstream toe of the dam and regrading of the downstream slope to install the blanket drain material.

The cost to construct these improvements would be between $250,000 to $300,000. This estimate does include mobilization, clearing and grubbing, dewatering, earthwork, seeding and erosion control measures. This estimate does not include costs associated with mitigation of impacts that may be required by the U.S. Army Corps of Engineers.

Construction Phasing

Phased construction can be readily accommodated into the regional stormwater management approach. The storm sewer design can be modified to meet current requirements while allowing for future development through system upgrades or additions.

This could be accomplished by designing a main trunk storm sewer system for ultimate development, and constructing as much of the main system as possible. If the Community College site construction will be staged, a small diameter storm sewer system can be provided for current needs, and once additional capacity is required, constructing additional smaller storm sewer sections.

File.... R:\200 - Municipal\21725\hd\PROP POND RATIONAL METHOD.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
54.00	-----	.0044	.0000	.000	.000
55.00	-----	.1513	.1815	.061	.061
56.00	-----	.3340	.7101	.237	.297
57.00	-----	.8249	1.6838	.561	.858
58.00	-----	1.1335	2.9254	.975	1.834
59.00	-----	1.4462	3.8600	1.287	3.120
60.00	-----	1.7836	4.8359	1.612	4.732
61.00	-----	2.1651	5.9138	1.971	6.703
62.00	-----	2.6852	7.2615	2.420	9.124
63.00	-----	3.4069	9.1167	3.039	12.163
64.00	-----	4.0515	11.1737	3.725	15.887
65.00	-----	4.7153	13.1376	4.379	20.267
66.00	-----	5.4762	15.2730	5.091	25.358
67.00	-----	6.0363	17.2619	5.754	31.112
68.00	-----	6.3456	18.5709	6.190	37.302
69.00	-----	6.7300	19.6106	6.537	43.839
70.00	-----	7.1209	20.7736	6.925	50.763
71.00	-----	7.5453	21.9962	7.332	58.095
72.00	-----	8.0924	23.4518	7.817	65.913
73.00	-----	8.3709	24.6938	8.231	74.144
74.00	-----	8.6581	25.5423	8.514	82.658
75.00	-----	8.9477	26.4075	8.803	91.461
76.00	-----	9.2396	27.2798	9.093	100.554

N.P. 67.68
31.7 AC-FT.

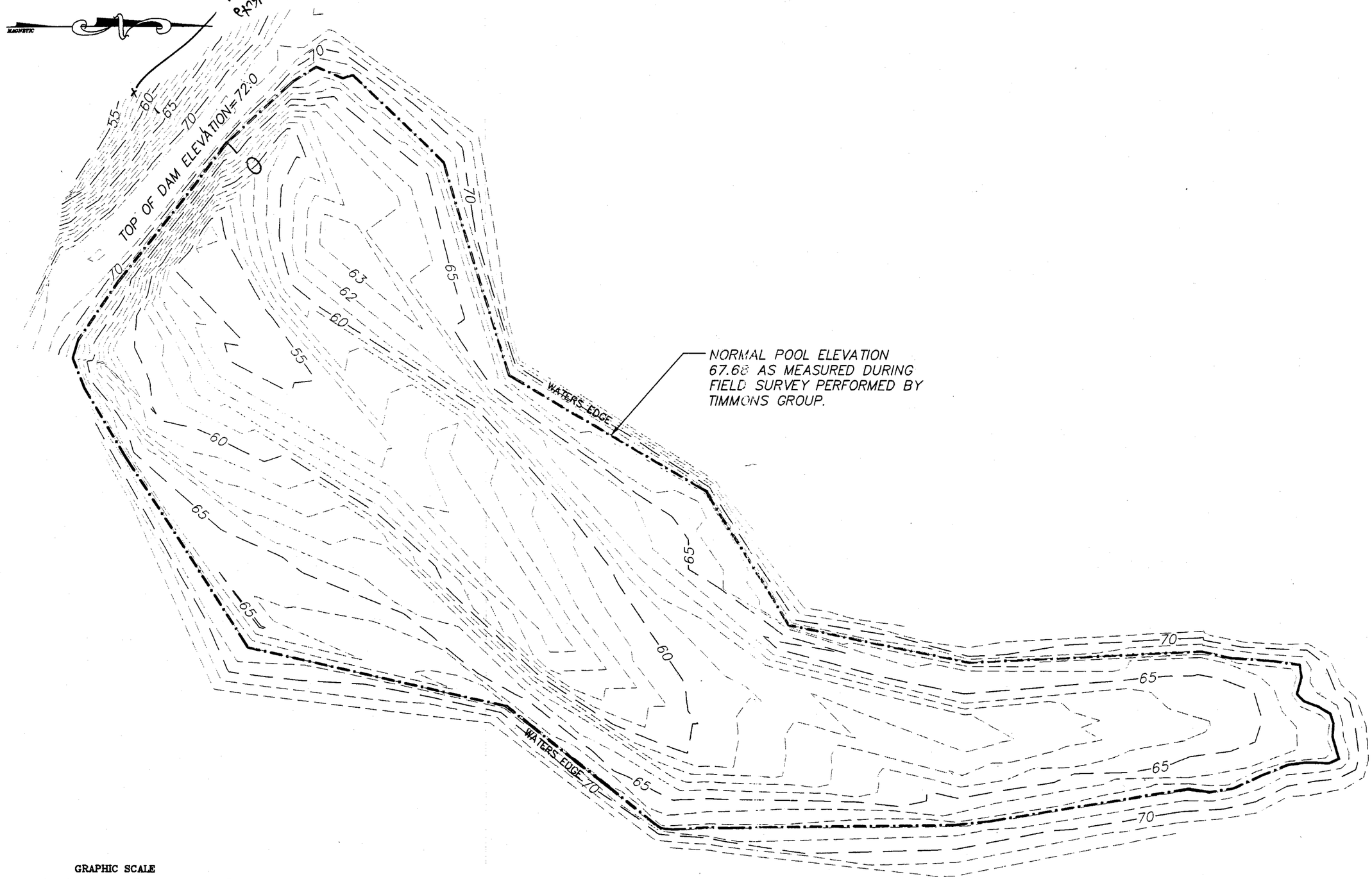
EX. T.O.D.

NEW T.O.D.

Elevations With Areas Interpolated From
The Closest Two Planimeter Readings

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
67.68	-----	6.2458	18.4222	4.176	35.287

N.P.



GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 340

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

VIRGINIA | NORTH CAROLINA | WEST VIRGINIA

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TEL 804.794.3500 FAX 804.794.7639 www.timmons.com

Site Development | Residential | Infrastructure | Technology

LIGHTFOOT/WARHILL STORMWATER STUDY

JAMES CITY COUNTY, VIRGINIA

EXISTING TOPOGRAPHY OF DAM AND POND BOTTOM

REVISION DESCRIPTION	DATE

DATE	08/31/04
DRAWN BY	C.ALMARODE
DESIGNED BY	B.EPPS
CHECKED BY	M.CLAUD
SCALE	AS SHOWN
JOB NO.	21725
SHEET NO.	POND-3

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File.... C:\HAESTAD\PPKW\SAMPLE\PROJECT1.PPW
Title... Retro Exist District Park Basin PC 106 to R205-4 (150 ac.)

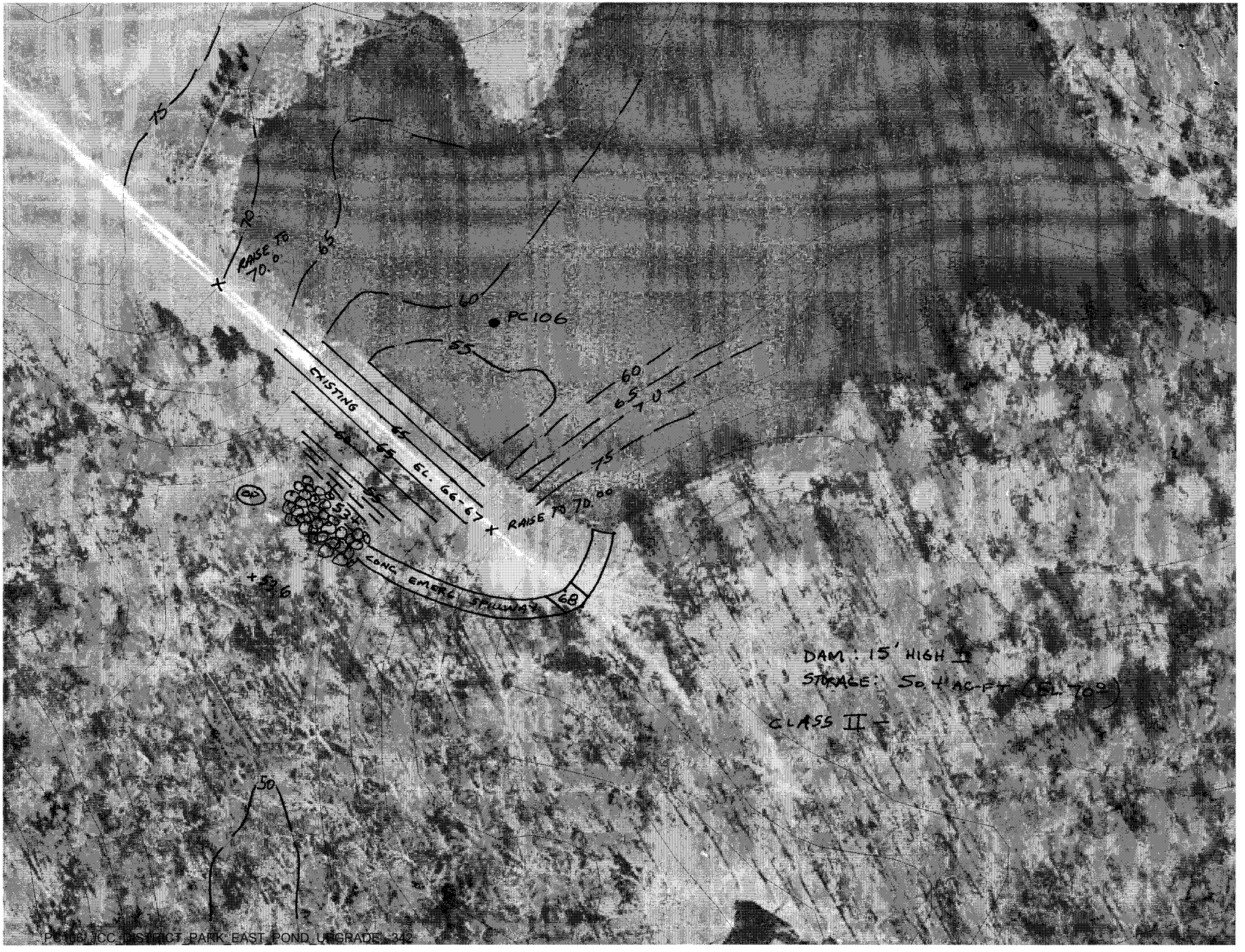
Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
55.00	-----	.1090	.0000	.000	.000
60.00	-----	1.7800	2.3295	3.882	3.882
65.00	-----	4.7900	9.4900	15.817	19.699
70.00	-----	7.6370	18.4752	30.792	50.491
75.00	-----	10.6390	27.2899	45.483	95.974

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


75
70
RAISE TO 70.0
65
60
PC106
55
EXISTING
65
EL. 66-67
RAISE TO 70.00
60
65
70
75
53.6
LONG EMERG. SPILLWAY
68
50
DAM: 15' HIGH
STORAGE: 50.4 AC-FT (EL. 70.0)
CLASS II

Scott Thomas

From: Scott Thomas
Sent: Thursday, March 11, 2004 11:14 AM
To: Wayland Bass
Cc: Darryl Cook; William A. Cain
Subject: Community College/School Site

Wayland

Storm Drainage
We've looked at the storm drainage information for the College/School. Overall the conceptual comps appear in order; however, the pipe diameter's selected may be a size low, especially if we need to add in drainage from the Outlet Mall. Due to lack of fall, the need for large diameter (or multiple small diameter) storm drains is going to greatly increase the cost of storm drainage piping for the site, beyond that normally anticipated for commercial/business sites. Based on some rough numbers, cost for storm drainage piping will be about **$600,000.**

Dam Safety Permit
Based on storage at the District Park BMP, it would appear that storage volume to proposed top of dam will exceed 50 acre-ft. Based on dam safety regulations, if the dam if over 6 feet in height and more than 50 acre-ft, then the impoundment falls under dam safety regulations. This appears to be the case. The two big things I see that would affect the cost estimate is 1) additional work for dam safety permitting, including looking at inundation downstream for dam break purposes; 2) Due to the presence of Longhill Road downstream of the dam, I feel certain they would classify the dam as a Class II dam (Possible Loss of Life; Appreciable Economic Loss). Due to Class II rating, the spillway needs to be sized for either the 100-year storm or ½ PMF. DCR will make this determination. I feel my size in the cost estimate for the BMP retrofit covers this as I assumed a 20 ft. wide, 2 ft. deep, 3H:1V concrete emergency spillway. However, to be on the safe side I would create a line item for Dam Safety Permitting and add in **$20,000**.

Special Stormwater Criteria
This area is in SSC. Being a County project we should lead by example and apply SSC. Although we are still developing SSC, it can be anticipated that additional measures will be necessary within the site footprint to achieve SSC. To cover this I would create a separate line item for Special Stormwater Criteria. Based purely on "guess-timation" I would add **$ 65,000** to cover construction costs for SSC.

-----Original Message-----
From: William A. Cain
Sent: Thursday, March 11, 2004 10:51 AM
To: Scott Thomas
Subject: Stormwater Calculations for the community college

Scott,

I've run through Wayland's calculations and it appears that Wayland's numbers were off just enough that the pipe sizes will need to be increased by one size. I have also looked at what potential issues may arise at the systems outfall. Where the two systems combine into one, the combined flow will be 318 CFS and will require a 7' diameter pipe. I feel that it would be in our best interest to keep these systems separate, and even split the system up so that more runs of smaller pipe could be used to get around the existing water mains. The cost difference would more than likely be minimal, but the benefits would be great. Smaller pipe requires less depth resulting in higher inverts and less fall through the system. This will help get around the water mains. Any additional questions pertaining to this matter, please let me know.

Bill Cain
James City County
Environmental Division
(757)253-6702

PRELIMINARY COST ESTIMATE

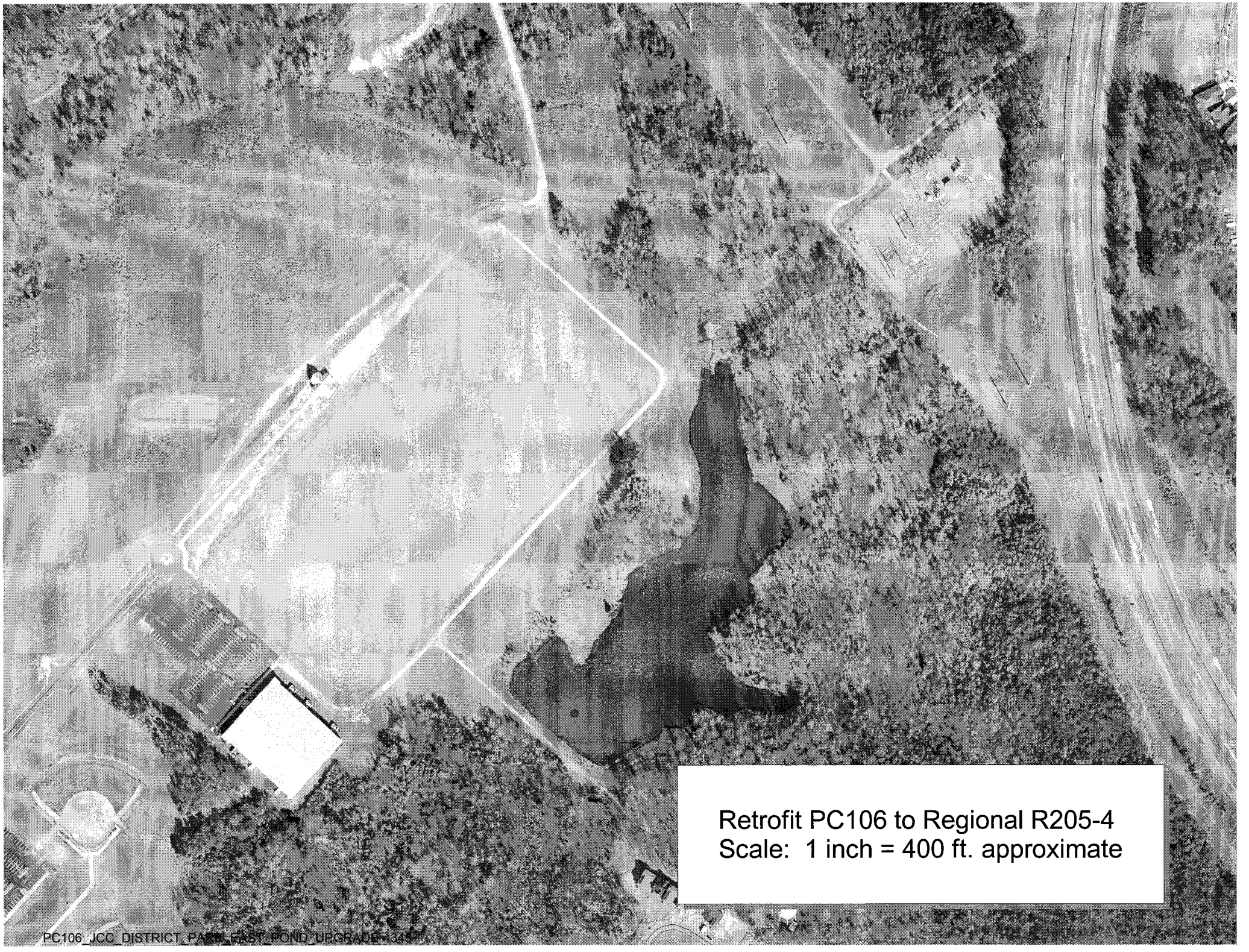
Retrofit Existing District Park Pond (PC 106) to Regional Basin R205-4

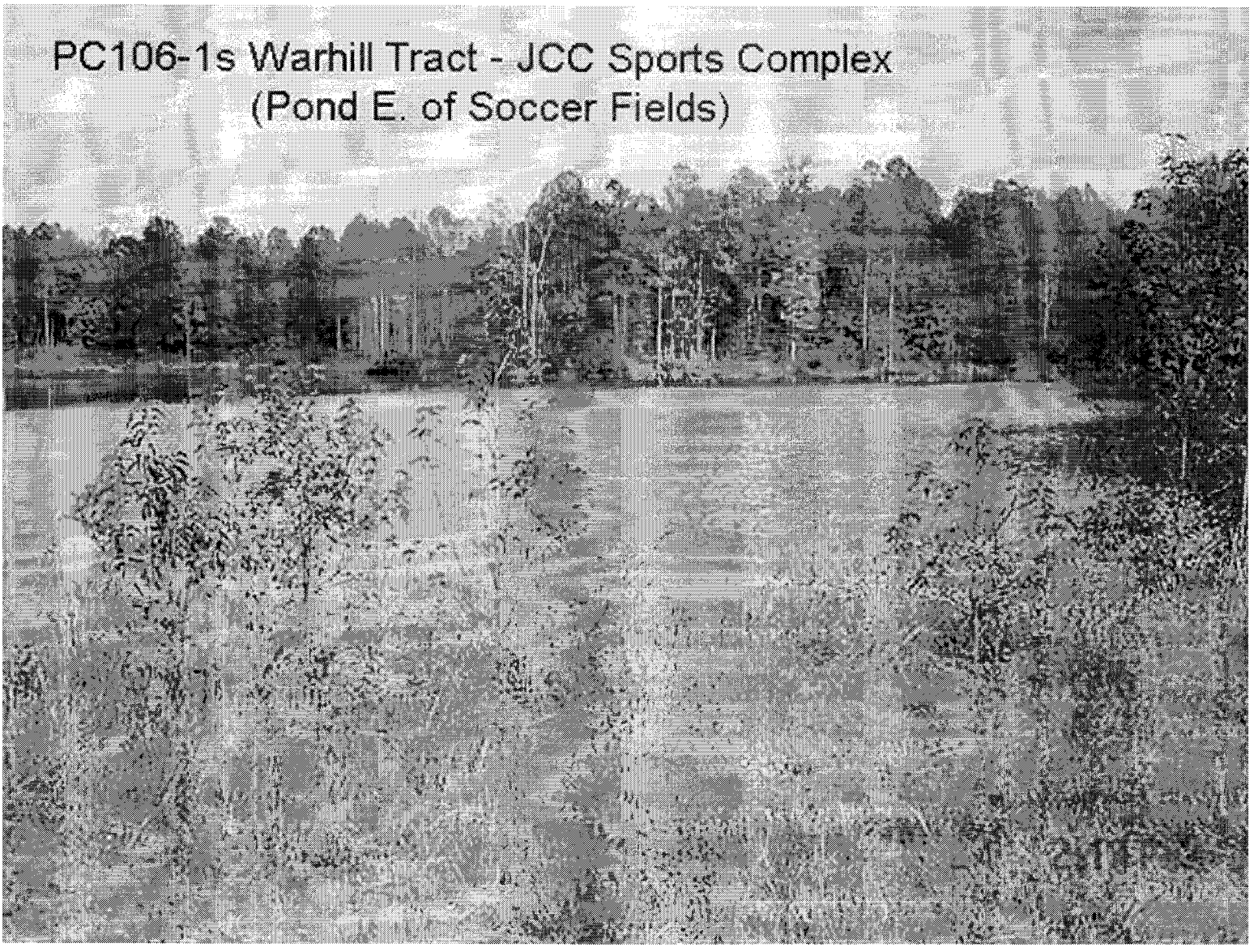
Assumptions:

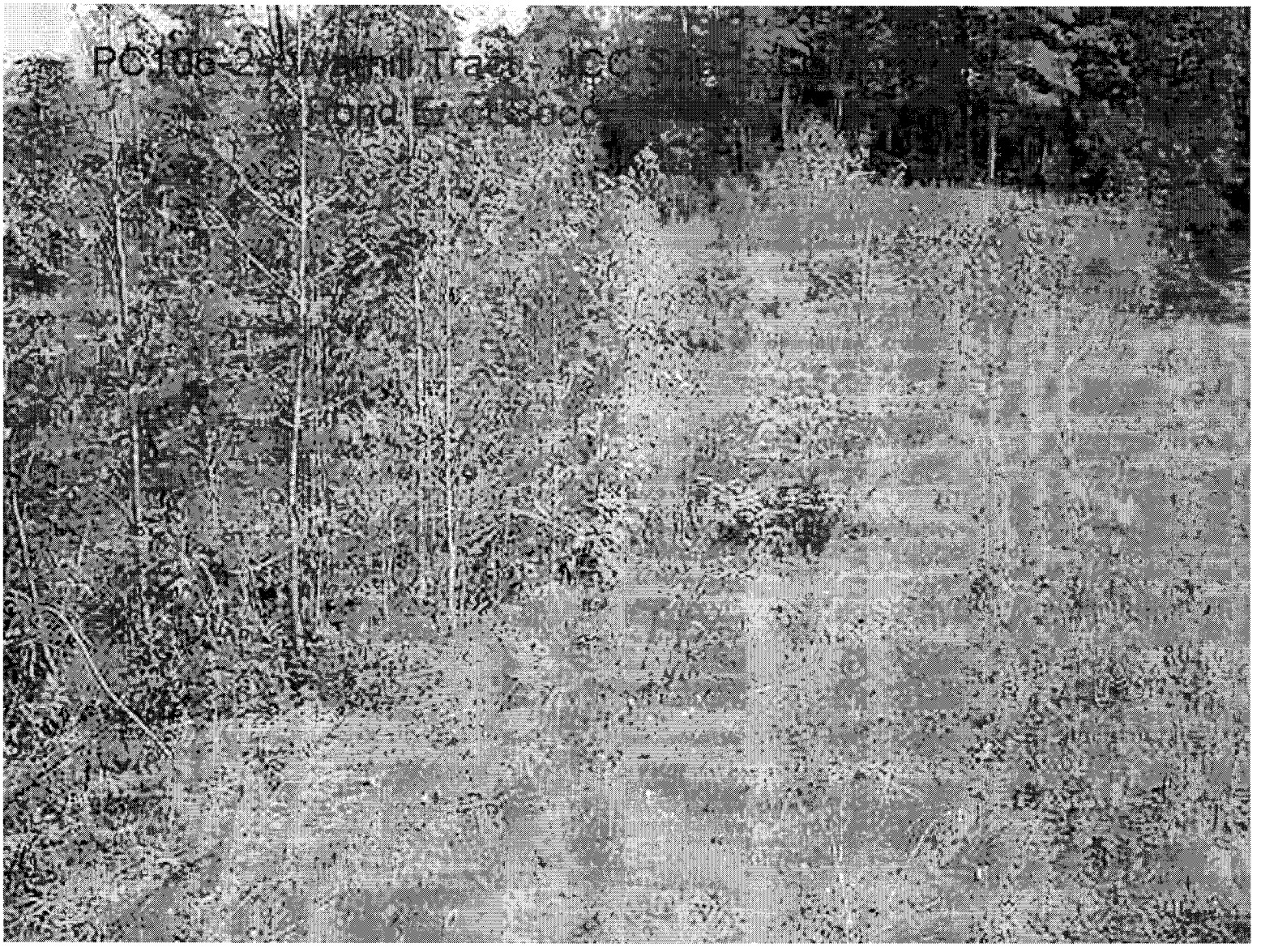
- Convert existing lake to handle stormwater management for future school-college development on upper Warhill Tract. Large drainage area to existing dam (150 acres).
- Stormwater quantity and quality control
- 1-year, 24-hour stream channel protection volume and wet pond quality device
- Special stormwater criteria will apply to new site development.
- No mass grading of normal pool slope areas around existing lake.
- Existing Dam: 500 ft. length abutment to abutment; 100 ft. wide toe-to-toe; 3H:1V sideslopes; top of dam 15 ft.; upstream 6 ft. high; downstream 15 ft. high.
- Improvements: raise existing dam embankment 1-2 ft., new concrete emergency spillway, reline or install new riser/barrel structure and shoreline erosion protection on upstream dam face (at normal pool). Achieve 1 ft. freeboard, minimum top of dam width at 10 ft. Minor improvements to upland forebay.
- Full geotechnical investigation would be necessary to determine structural integrity of existing earthen embankment and for dam improvement features.

Preliminary Estimate - Retrofit PC 106 to Regional Basin R205-4

Item	Description	Unit	Quantity	Unit Cost	Total
1-1	Geotechnical Investigation	L.S.	1	10,000.00	$10,000
1-2	Mobilization & Preparatory	L.S.	1	2,000.00	$2,000
1-3	Access and Top of Dam Clearing/Grubbing	Acre	1.5	3,850.00	$5,775
1-4	Minor Top of Dam Grading	L.S.	1	2,000.00	$2,000
1-5	Imported Compacted Fill Placement	C.Y.	400	15.00	$6,000
1-6	Riser/Barrel - Reline or replace	L.S.	1	15,000.00	$15,000
1-7	New Concrete Emergency Spillway (230 ft.)	C.Y.	180	200.00	$36,000
1-8	Shoreline Erosion Protection (200 ft.)	S.Y.	25	80.00	$2,000
1-9	Outlet Protection Pad (Basic)	S.Y.	100	50.00	$5,000
1-10	Upland Forebay Improvements	L.S.	1	5,000.00	$5,000
1-11	Erosion & Sediment Control	L.S.	1	1,500.00	$1,500
1-12	Geotechnical Testing	L.S.	1	4,000.00	$4,000
1-13	Contingency (15%)				$14,141
	TOTAL				**$108,416**
			Say		**$110,000**


Retrofit PC106 to Regional R205-4
Scale: 1 inch = 400 ft. approximate
PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE_3.4.5


PC106-1s Warhill Tract - JCC Sports Complex
(Pond E. of Soccer Fields)


PC106-2 Livehill Trail - JCC
Pond Expansion

DEVELOPMENT MANAGEMENT

R 205-4

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

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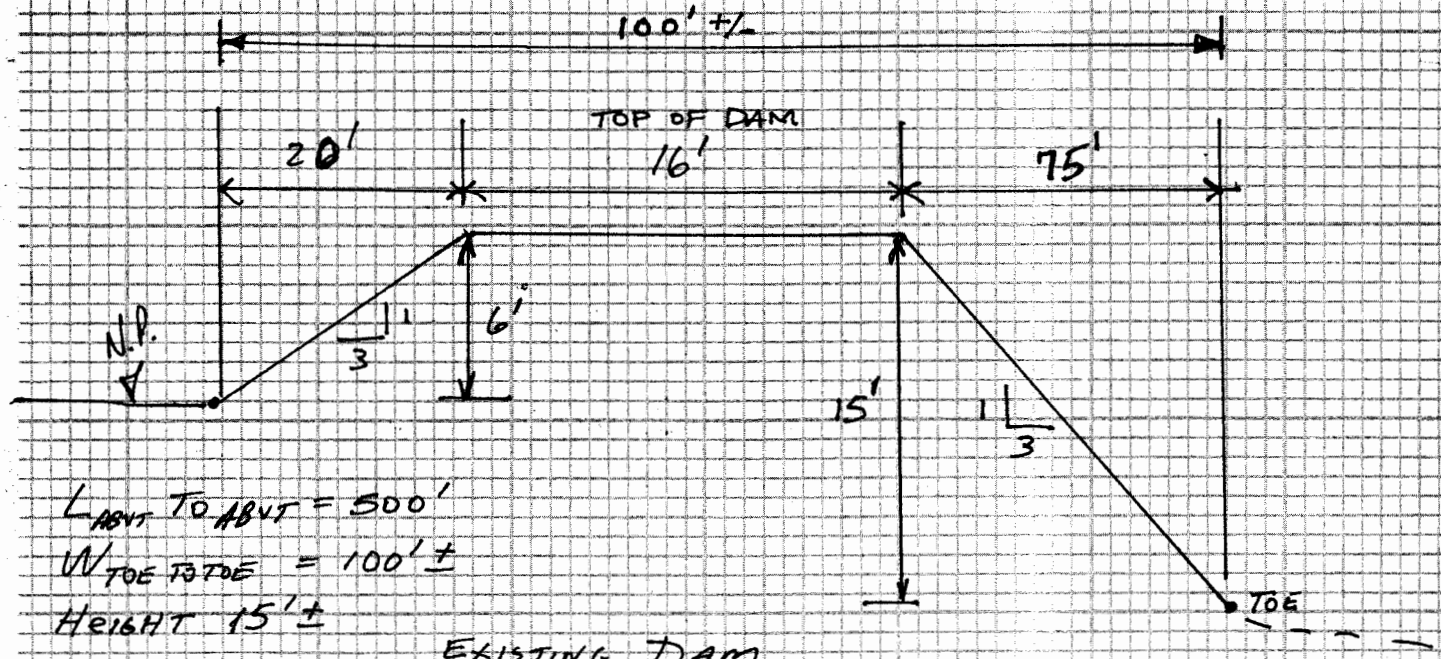
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

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

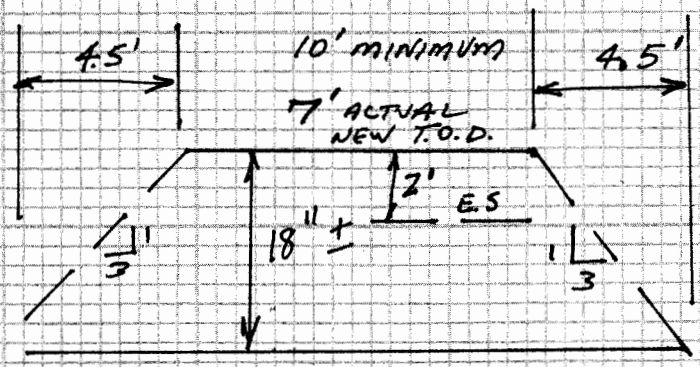
COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620



$L_{ABUT\ TO\ ABUT}$ = 500'
$W_{TOE\ TO\ TOE}$ = 100' ±
HEIGHT 15' ±

EXISTING DAM



21.75 SF/FT
× 500 FT
10,875 CF/FT
402 C.Y.

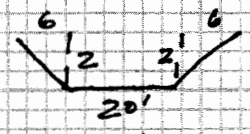
RAISE TOP OF DAM

MINIMUM TOP OF DAM (VSMH)

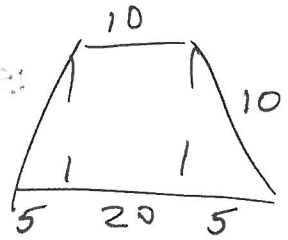
14' HIGH OR LESS = 8'
15-19' HIGH = 10'

NEW E.S.

20' BW
2' DEEP
3H:1V SS
TW = 32'



32 [redacted]/FT WIDE
L = 230'
7360 SF × [redacted] 8"
4906 CF 180 CY



250 SF = 30 SY

20' x 10' = 200 SF

25 SY

PO108_JOC_DISTRICT_PARK_EAST_POND_UPGRADE_350

PRELIMINARY COST ESTIMATE

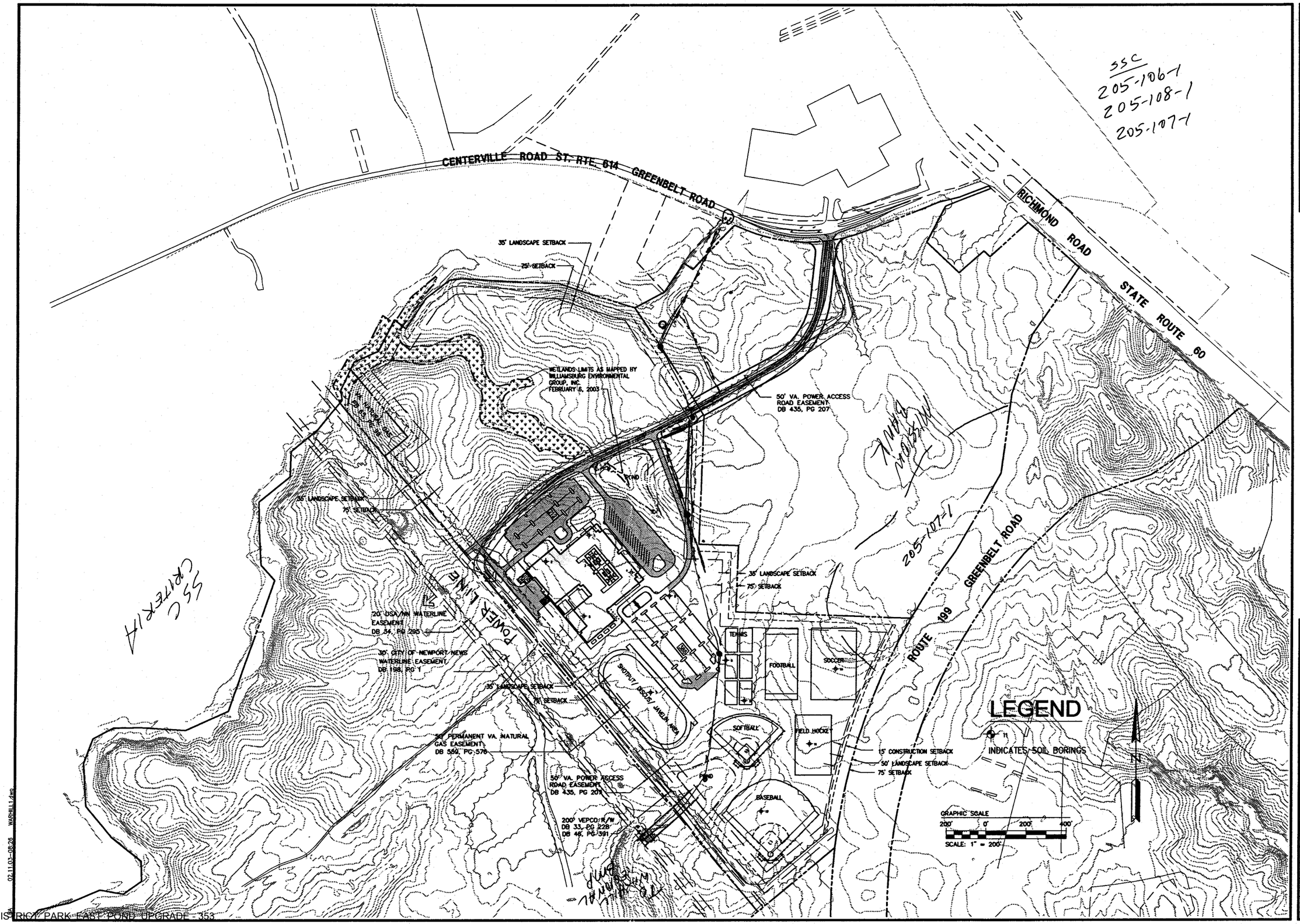
Retrofit Existing District Park Pond (PC 106) to Regional Basin R205-4

Assumptions:

- Convert existing lake to handle stormwater management for future school-college development on upper Warhill Tract. Large drainage area to existing dam (150 acres).
- Stormwater quantity and quality control
- 1-year, 24-hour stream channel protection volume and wet pond quality device
- Special stormwater criteria will apply to new site development.
- No mass grading of normal pool slope areas around existing lake.
- Existing Dam: 500 ft. length abutment to abutment; 100 ft. wide toe-to-toe; 3H:1V sideslopes; top of dam 15 ft.; upstream 6 ft. high; downstream 15 ft. high.
- Improvements: raise existing dam embankment 1-2 ft., new concrete emergency spillway, reline or install new riser/barrel structure and shoreline erosion protection on upstream dam face (at normal pool). Achieve 1 ft. freeboard, minimum top of dam width at 10 ft. Minor improvements to upland forebay.
- Full geotechnical investigation would be necessary to determine structural integrity of existing earthen embankment and for dam improvement features.

Preliminary Estimate - Retrofit PC 106 to Regional Basin R205-4

Item	Description	Unit	Quantity	Unit Cost	Total
1-1	Geotechnical Investigation	L.S.	1	10,000.00	$10,000
1-2	Mobilization & Preparatory	L.S.	1	2,000.00	$2,000
1-3	Access and Top of Dam Clearing/Grubbing	Acre	1.5	3,850.00	$5,775
1-4	Minor Top of Dam Grading	L.S.	1	2,000.00	$2,000
1-5	Imported Compacted Fill Placement	C.Y.	400	15.00	$6,000
1-6	Riser/Barrel - Reline or replace	L.S.	1	15,000.00	$15,000
1-7	New Concrete Emergency Spillway (230 ft.)	C.Y.	180	200.00	$36,000
1-8	Shoreline Erosion Protection (200 ft.)	S.Y.	25	80.00	$2,000
1-9	Outlet Protection Pad (Basic)	S.Y.	100	50.00	$5,000
1-10	Upland Forebay Improvements	L.S.	1	5,000.00	$5,000
1-11	Erosion & Sediment Control	L.S.	1	1,500.00	$1,500
1-12	Geotechnical Testing	L.S.	1	4,000.00	$4,000
1-13	Contingency (15%)				$14,141
	TOTAL				**$108,416**
		Say			**$110,000**



No.	DATE	REVISION / COMMENT / NOTE	BY

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

WARHILL
AES TOPO INFORMATION

Designed	Drawn
000	000
Scale	Date
1"=200'	2/7/03
Project No.	
9245-00	
Drawing No.	

02.11.03-08:26 WARHILL1.dwg

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

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

DATE SENT: 6/14/02

Name: Robert Cummings or J. Douglas Coenen
Firm or Company: PBS&J
Facsimile Number: 757-596-8660
Number of pages including this transmittal: 9
From: Scott J. Thomas

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

Comments: WARHILL R205-4 REGIONAL FACILITY. THIS IS ALL I CAN OFFER ON THE SPECIAL STORMWATER CRITERIA OBJECTIVE FOR THE POWHATAN CREEK WATERSHED MANAGEMENT PLAN (PCWMP)

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

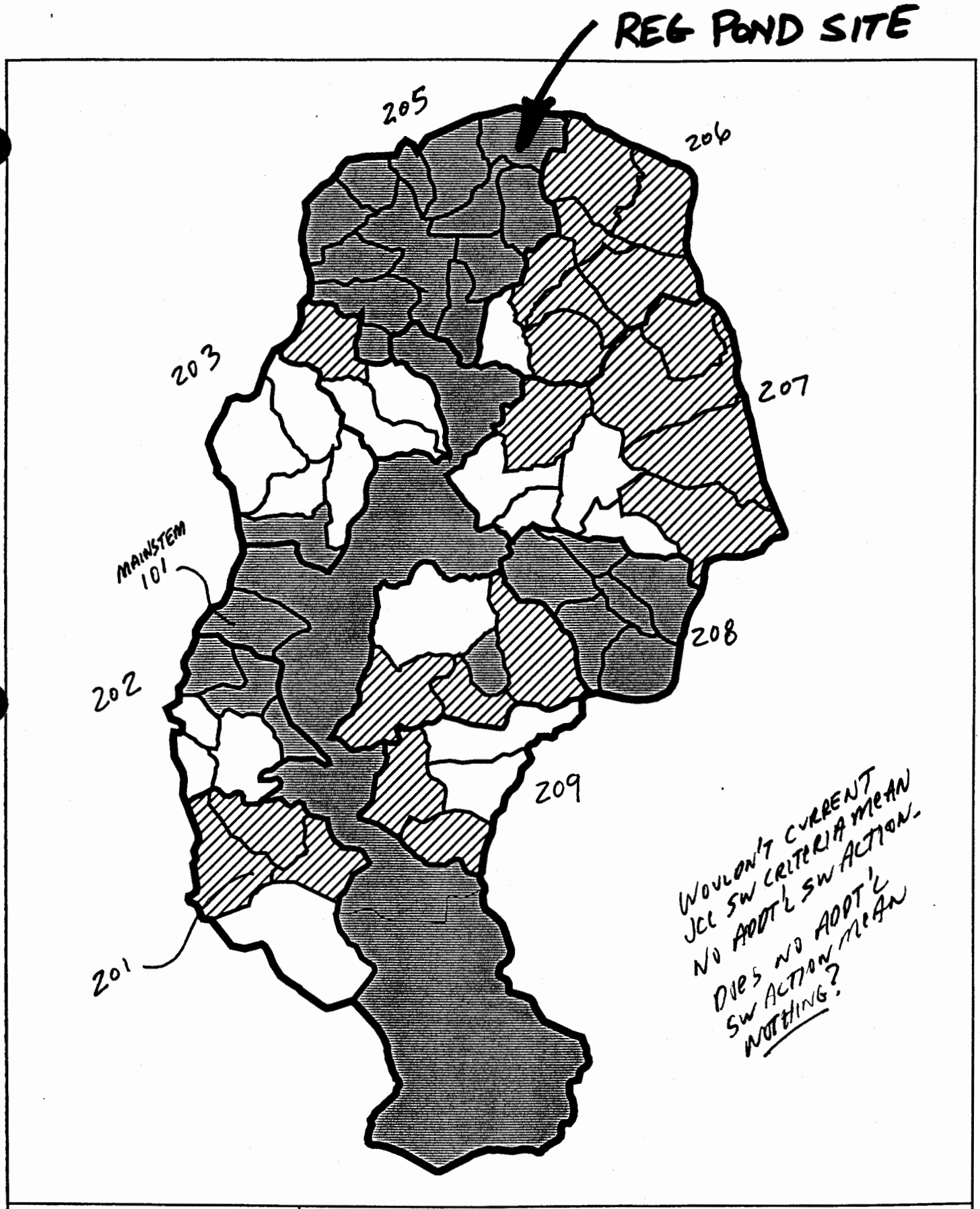
- THE ATTACHED ARE EXERPTS FROM THE STORMWATER MASTER PLAN PORTION OF THE PCWMP.
- AS YOU CAN SEE THE WARHILL R205-4 FACILITY IS SITUATED WITHIN CATCHMENT 205-106-1, WHICH SLATED FOR SPECIAL STORMWATER CRITERIA (SSC).
- WE ARE WORKING ON ASSEMBLING A LOCAL TEAM TO ASSESS & DEVELOP THE "SSC" CRITERIA IN FINAL FORM. MAY BE A YEAR OR SO TILL DEVELOPED FOR THE DEVELOPMENT COMMUNITY.
- HOWEVER, COUNTY DESIGN OF THE WARHILL R205-4 FACILITY SHOULD KEEP THIS IN MIND TO LEAD BY EXAMPLE. THE SSC IS NOT OFFICIAL AS OF YET!
- PLEASE DISREGARD MY HANDWRITTEN NOTES ON THE PAGES AS FORWARDED.

(HOPE THE FILES/INFORMATION I GAVE YOU WAS USEFUL.)

SCOTT J. THOMAS, P.E.
CIVIL ENGINEER

ENVIRONMENTAL DIVISION

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

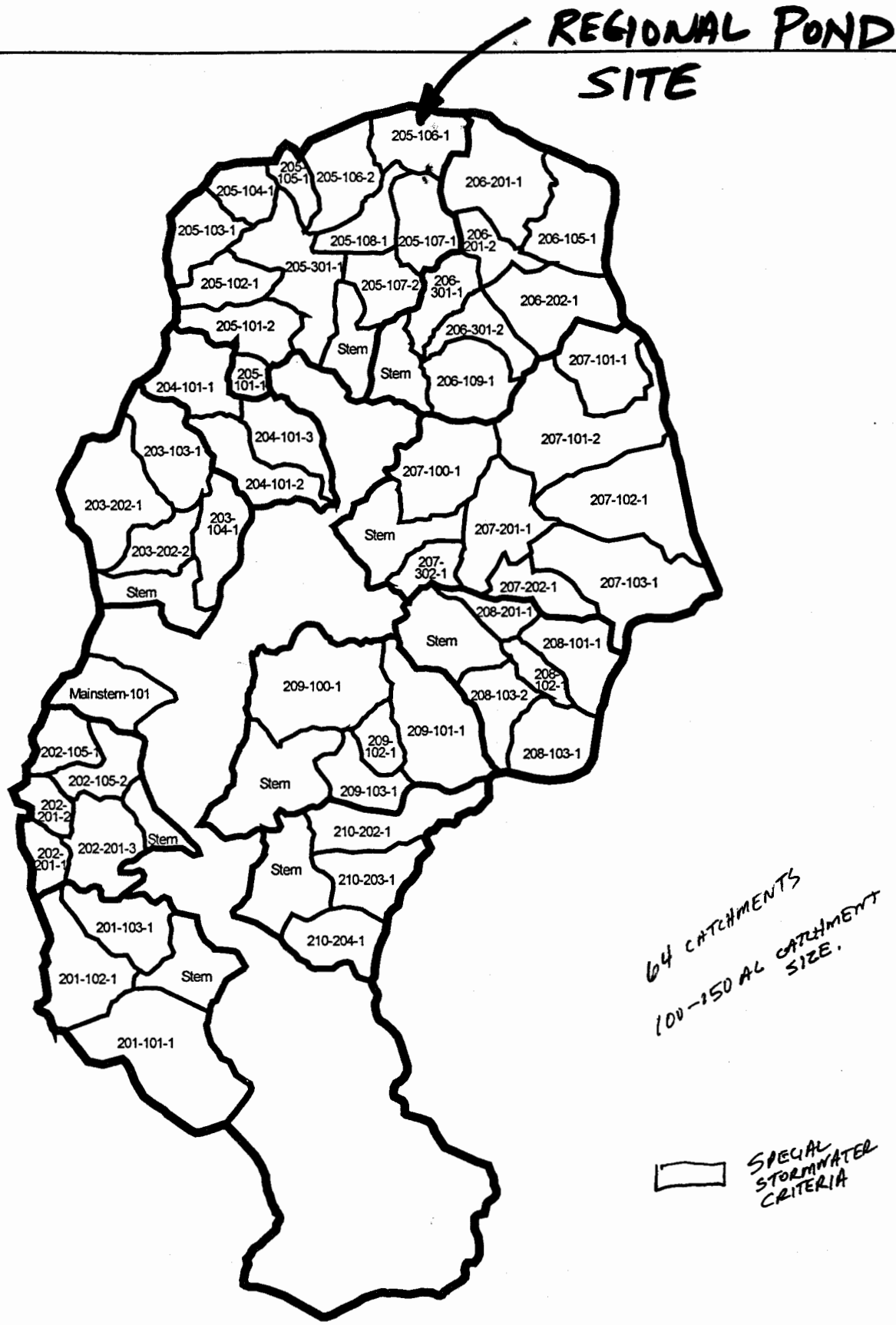


LEGEND

- Watershed Boundary
- Subwatershed Boundary
- Catchment Boundary
- Current JCC Stormwater Criteria
- No Additional Stormwater Action
- Special Stormwater Criteria

Figure 2. Powhatan Creek Watershed Stormwater Criteria Designations

5500 0 5500 Feet

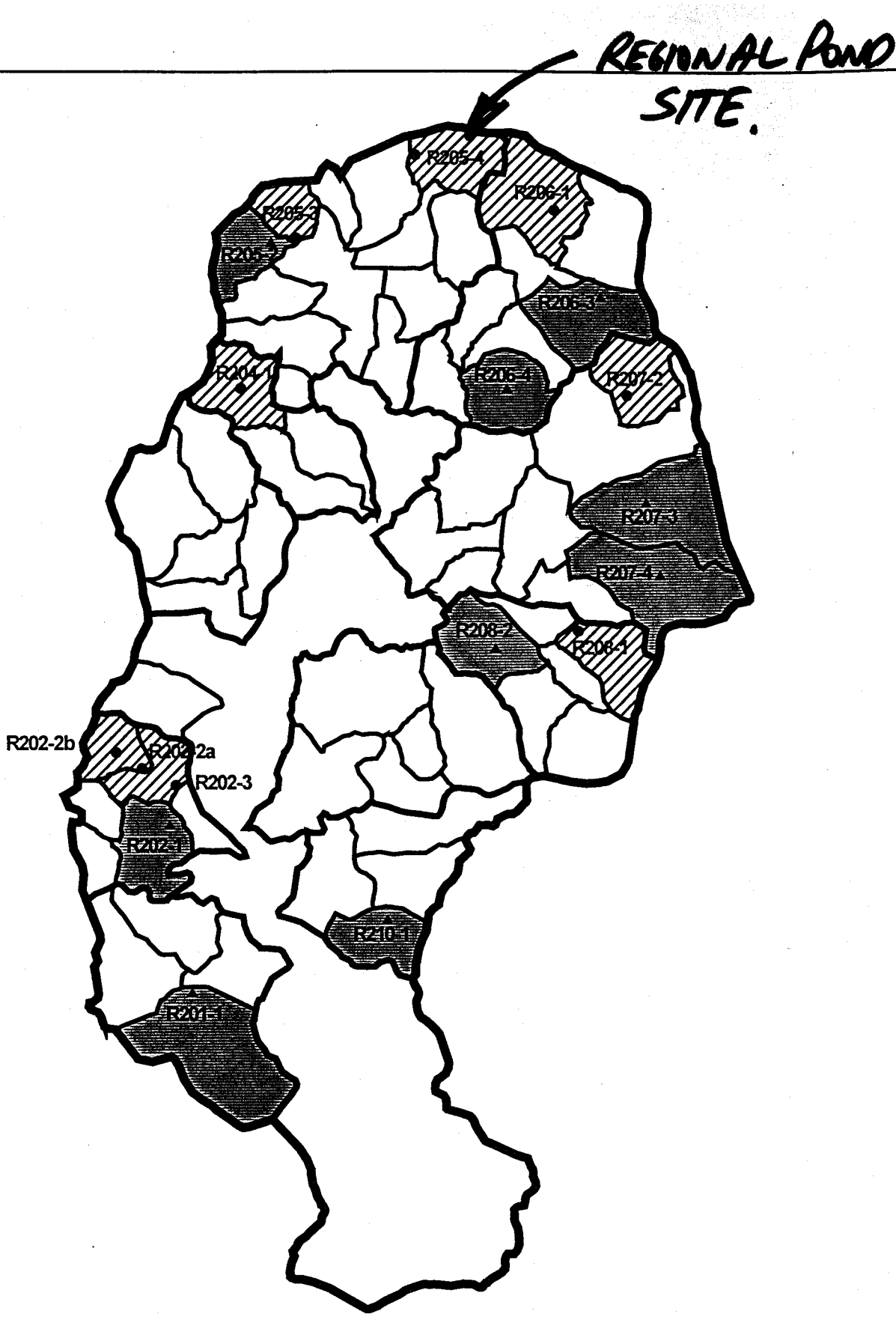


LEGEND

- Watershed Boundary
- Subwatershed Boundary
- Catchment Boundary

Figure 1. Powhatan Creek Watershed Catchment Delineation

5500 0 5500 Feet



LEGEND

- Watershed Boundary
- Subwatershed Boundary
- Catchment Boundary
- Regional Pond Catchment
- Priority Retrofit Catchment
- ▲ Priority Retrofit Location
- ● Regional Pond Location

Figure 3. Powhatan Creek Watershed Regional Pond and Priority Retrofit Locations

5500 0 5500 Feet

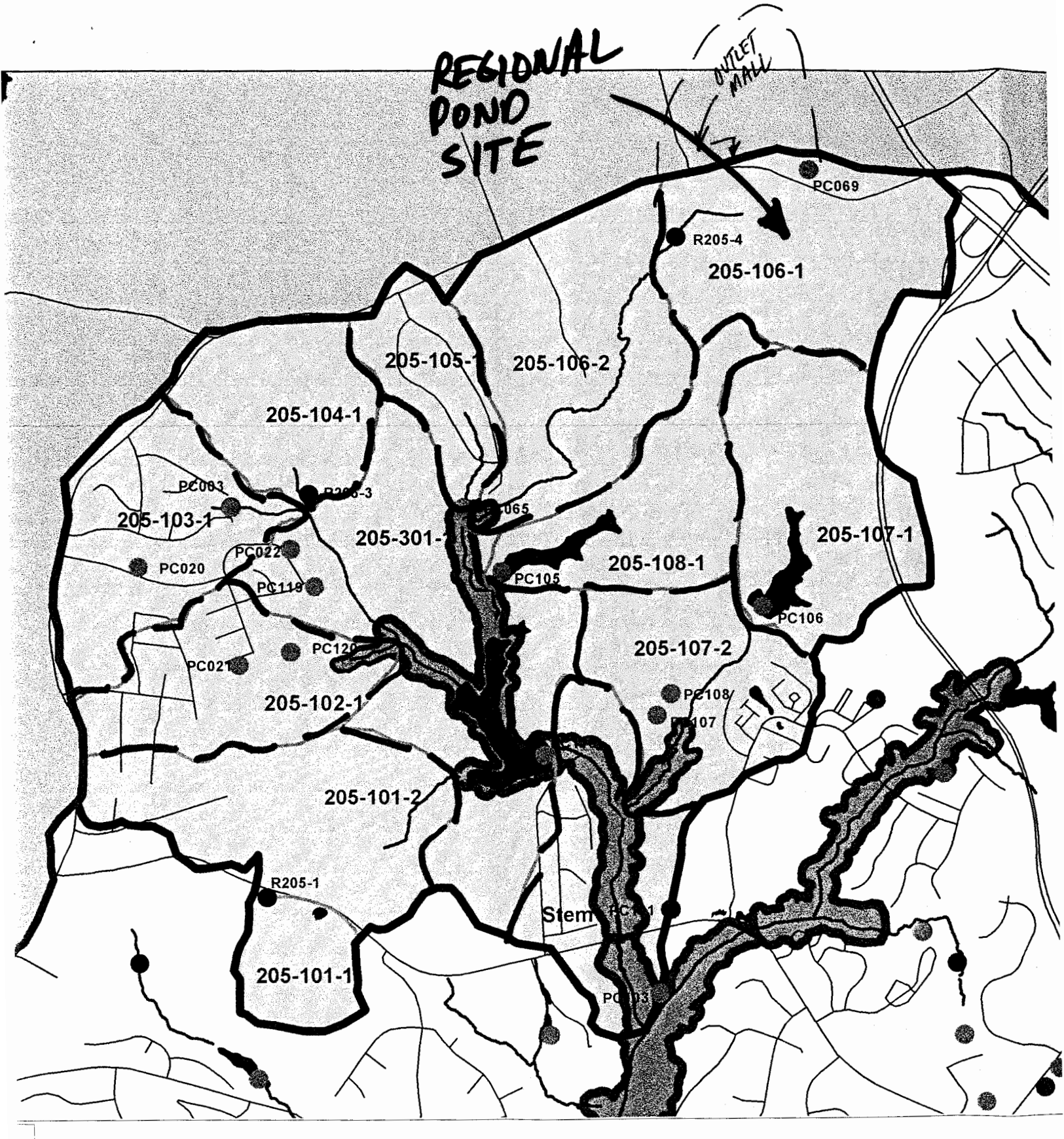


Figure 9
Subwatershed 205

1500 0 1

[redacted]

Arc Specrac

E. Subwatershed 205

Subwatershed 205 has been divided into 13 catchments (Figure 9). The streams in subwatershed 205 received the highest rating in the stream assessment and are characterized by intact forested stream valleys, stable streambanks, good to excellent in-stream habitat and little or no evidence of channel instability. As such, all are recommended for Stream Protection Area status. Also, the subwatershed is considered the best candidate for preservation in the watershed. The major stormwater management strategy for the catchments is to employ Special Stormwater Criteria. This recommended approach strongly rewards better site design techniques to limit impervious cover, reduce stormwater runoff, and minimize disturbance to recommended conservation areas and stream valleys.

Subwatershed Overview

Drainage Area	2.53 sq mi (1,619.2 acres)
Overall Stream Quality	Excellent
2000 Impervious Cover	6.4%
Current Stream Classification	Sensitive
Maximum Impervious Cover	13.3%
Projected Stream Classification	Impacted
Target Stream Classification	Sensitive
Developed Area	1,159.5 acres
Approximate No. of Stormwater Practices	14

*

Catchment 205-101-1 Description ✓ ok Agree

Catchment 205-101-1 drains to conservation area C-12, a wetland containing Torrey's peatmoss and possibly New Jersey Rush. The majority of catchment has recently been cleared for the development of single-family residential within Ford's Colony. A stormwater pond for the new development will drain to the wetland. Development has the potential to adversely influence this wetland area.

Stormwater Strategy:

Special Stormwater Criteria

New development should implement the water quality and recharge criteria discussed in the SSC for Parcel Development outlined in Appendix B. Channel protection is not a high priority in this

Stormwater Strategy:

Special Stormwater Criteria
New development should implement on-site stormwater practices per the SSC for Parcel Development. In addition, on-lot stormwater management per the SSC for On-Lot / Infill Development should be provided as the remaining platted lots are developed.

Regional Stormwater Management
R205-3 (ranked 8 of 9) is the location of a potential regional facility to manage runoff from future development. The decision to preserve the recommended conservation area, C-13, may preclude this retrofit location, or move it upstream outside of the conservation area.

Catchment 205-105-1 Description ✓ OK

Catchment 205-105-1 is developed as the single-family residential subdivision, Adams Hunt. About a quarter of the platted lots have not been constructed. Stormwater management is provided by a dry pond, PC065.

Stormwater Strategy:

Special Stormwater Criteria
On-lot stormwater management per the SSC for On-Lot / Infill Development should be provided as the remaining platted lots are developed. The catchment is recommended for Stream Protection Area designation.

Catchment 205-106-1 Description ✓ OK

Catchment 205-106-1 is largely undeveloped with young, contiguous forest on land zoned for limited business / industrial and commercial planned unit development. Less than a quarter of the land is developed as rural residential along Centerville Road, and a portion of the Williamsburg Outlet Mall is located at the upper end of the catchment. Williamsburg Outlet Mall drains to a dry pond, PC069. The catchment is recommended for Stream Protection Area designation.

Stormwater Strategy:

*

Special Stormwater Criteria
New development should implement on-site stormwater practices per the SSC for Parcel Development.

Regional Stormwater Management
R205-4 is the location of a potential regional pond (ranked 3 out of 9) to manage runoff from future

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 360

development as well as from the existing rural residential development. The regional pond may be constructed in lieu of on-site stormwater for new development, and parallel piping to the facility should be considered. *

Catchment 205-106-2 Description ✓ ok

Land use north of the stream in catchment 205-106-2 consists of rural residential development off of Centerville Road and Ruth Lane. Only three lots have not been developed, and there is no apparent stormwater management associated with this development. The area south of the stream is part of the James City County District Park Sports Complex. The catchment is recommended for Stream Protection Area designation.

Stormwater Strategy:

Special Stormwater Criteria
If zoning changes result in further development, or if development takes place in what is currently the James City County District Park Sports Complex, the SSC for Parcel should be applied.

Catchment 205-107-1 Description ✓ ok

The upper third of catchment 205-107-1 includes forested land zoned for limited business / industrial development; a small stretch of Route 199; and developable medium density residential parcel east of Route 199. The lower third of the catchment is part of the James City County District Park Sports Complex. An on-line stormwater pond at the mouth of the catchment (PC106) captures all drainage.

Stormwater Strategy:

Special Stormwater Criteria
Any new development should implement the SSC for Parcel Development. Alternatively, the existing wet pond (PC106) may be incorporated into the stormwater management plan for future development, and parallel pipes should be used to convey stormwater runoff to PC106.

Catchment 205-107-2 Description

The catchment northwest of the stream falls entirely within the James City County District Park Sports Complex. Southeast of the stream, the land use includes Season's Trace and Lafayette High School. Two wet ponds owned by the County (PC107 and PC108) are in the catchment. This is recommended for Stream Protection Area designation.

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 361

* APPENDIX B – SPECIAL SW CRITERIA

SSC

FLOW CHART FOR STAFF TO FOLLOW COMPLIANCE
1. IN SSC CATCHMENT
2. PARCEL OR BNLVT/INFILL
3. ↓

II. SSC for Parcel Development in SPAs

A. Recommended SSC for Parcel Development in SPAs

The Parcel Development criteria described in this section applies to development projects 2 acres or more for:

- Land that is subdivided into two or more lots
- Land that is developed as commercial or industrial land use

DOUBLED WQV to 20 points.

To protect environmentally sensitive areas, Parcel Development within Stream Protection Areas must apply the current James City County stormwater criteria. In addition, the stormwater plan for a site must achieve an additional 10 BMP points, resulting in a total of 20 BMP points that must be attained, and must provide groundwater recharge. These criteria are outlined in Table B-1.

Table B-1: Summary of the Special Stormwater Criteria for Stream Protection Areas

Sizing Criteria	Description of Stormwater Sizing Criteria
For Parcel Development:	
Water Quality Volume (WQ_v)	A stormwater management plan must attain at least 20 BMP points through a combination of structural BMPs, preservation of natural open space, and application of site design credits.
Channel Protection Volume (Cp_v)	24 hour detention of the 1 year, 24 storm event per current James City County standards.
Recharge Volume (Re_v)	Provide recharge of stormwater runoff based on Hydrologic Soil Group and impervious cover of the development site.
Note: The criteria outlined above is to protect environmentally sensitive areas. Additional hydrologic control (e.g., flood control) may be warranted in some areas, and should be applied per the current James City County stormwater criteria.	

SIMILAR TO MID STATE REGS.

QUANTITY CONTROL – SAME

The Cp_v is currently required in James City County and described in detail in the publication, *James City County Guidelines for Design and Construction of Stormwater Management BMPs*. The proposed WQ_v follows the model of the current County water quality requirements, but is more stringent. The Re_v is new to James City County, as are the site design credits. More detail on the recommended WQ_v, Re_v, and site design credits is provided below.

B. Description of the Water Quality Volume Requirement for Parcel Development in SPAs

In SPAs for parcel development, a stormwater plan must attain at least 20 points through a combination of structural BMPs, preservation of natural open space, and application of site design credits. No more than 10 points may be achieved by any one structural BMP. However, up to 10 points may be achieved through the application of open space and site design credits.

NOT INCLUDING OFFSITE AREA (LIMIT 10 pts.)

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 362

WHAT ABOUT REDUCED EFFICIENCY IN 2nd PART SERIES APPROACH? WAS IT CONSIDERED?

The purpose of the increased points required for water quality in stream protection areas is to encourage the use of a treatment train approach to stormwater management though a combination of BMPs in series and better site design practices. Better site design practices alone, by reducing impervious cover and preserving natural vegetative cover, can significantly reduce stormwater runoff and pollutant loading from a site. Also, BMPs in series can serve to provide enhanced water quality treatment.

C. Description of the Recharge Volume Requirement for Parcel Development

As described earlier, preservation of pre-development hydrology to reduce impacts to SPAs is a primary goal of the SSC. As such, a simplified approach to mimic what is a complicated physical process is proposed. The recommended criteria for maintaining recharge is based on the average annual recharge rate of the hydrologic soil group(s) (HSG) present at a site as determined from USDA, NRCS Soil Surveys or from detailed site investigations.

To determine whether sufficient recharge is achieved at a site, a certain number of BMP points must be attained. The number of BMP points required is dependent on the site's impervious cover and the types of soils present. When applying this criteria to a site, the designer must first determine the number of BMP points that must be achieved by the stormwater plan for the site. The BMP points for recharge that must be provided at a site is calculated as follows:

BMP Points Required = $S * I_a * 10$

Where: S = Soil Specific Recharge Factor (see below)
I_a = Site Impervious Cover Fraction (e.g., for 50% impervious cover, use 0.50)
10 = Factor

CANVSE BMPs FOR WQV CAN BE USED FOR RECHARGE.

Hydrologic Soil Group	Soil Specific Recharge Factor (S)
A	0.4
B	0.3
C	0.2
D	0.0 0.1

RECOMMEND EXCLUDE

If more than one HSG is present at a site, a composite soil specific recharge factor should be computed based on the proportion of total site area within each HSG. For example, if a site is 50% impervious, and half of the impervious cover is over soil that is HSG-B, and half of the impervious cover is over soil that is HSG-C, the BMP points required would be calculated as follows:

B C

BMP Points Required = (0.3 * 0.25 * 10) + (0.2 * 0.25 * 10) = 1.25 BMP Points Required

The BMP points can be attained through a combination of structural practices, open space preservation, and site design credits. The recharge volume that must be provided is considered part of the total WQ_v that must be provided at a site. As such structural BMPs, open space preservation and site design credits used to achieve the BMP points for water quality may also be used to attain the BMP points for recharge. However, the points applied to stormwater BMPs for recharge varies from the points applied to stormwater BMPs for water quality. The recommended BMP Points for Recharge for the allowable stormwater BMPs in James City County is provided in Table B-2.

The recharge volume recommendation does not apply to any portion of a site designated as a stormwater hotspot.

Table B-2: Recommended Recharge Point Values for Water Quality BMPs

BMP	Treatment Volume (WQ_v)	Average Total P Removal Efficiency	Recommended Points for Re_v
C. Infiltration			
1. Infiltration Trench	0.5 in / imp acre	50%	10
2. Infiltration Trench	1.0 in / imp acre	60%	10
3. Infiltration Basin	0.5 in / imp acre	50%	10
4. Infiltration Basin	1.0 in / imp acre	60%	10
D. Filtering Systems			
1. Bioretention *	1.0 in / imp acre	60%	10
2. Surface SF	1.0 in / imp acre	60%	10[1]
5. Organic Filter	1.0 in / imp acre	60%	10[1]
6. Pocket SF	1.0 in / imp acre	40%	10[1]
E. Open Channel Systems			
2. Dry Swale	1.0 in / imp acre	60%	10
3. Biofilters	1.0 in / imp acre	30%	10
G. Open Space Conservation Easements			
1. Accepts & treats stormwater runoff from development site per design specification.			0.15 per 1% of site area
2. Adjacent to a wetland, mature forest, or RPA.			0.15 per 1% of site area
3. All other open space.			0.10 per 1% of site area

1. Re_v may be provided by exfiltration.

IF UNDERDRAINS ARE REMOVED & INFILTRATED INTO SOIL.

* WITH NO UNDERDRAINS

D. Description of the Site Design Credits for Parcel Development

Non-structural practices and more sensitive site design can play a significant role in reducing water quality and hydrologic impacts resulting from development. In most cases, they must be combined with structural practices to meet stormwater requirements. However, one of the key benefits of non-structural practices is that they reduce the generation of stormwater runoff from the site, thereby reducing the size and cost of stormwater practices. Also, they can provide partial removal of pollutants.

Stormwater credits are one way to encourage greater use of non-structural practices in new development. Implementation of non-structural practices on a site receive a credit, or a reduction in the stormwater runoff that must be treated and managed. The following credits are proposed for the Powhatan Creek watershed:

LID?

- Stream Bank Stabilize
- Other Bmps (Maint) Supplied from Employee Trash Streetsweeping

- Disconnection of Rooftop Runoff
- Disconnection of Non-Rooftop Runoff
- Forestation
- Green Rooftop
- Environmentally Sensitive Development
- Other (per GWD Div) only for Emerging Innovative Technology.

ADD

The first four credits may receive points that may be applied towards the BMP points required for water quality and recharge. In addition, these credits may be applied to the channel protection volume by adjusting hydrologic parameters to reflect woods in good condition.

The application of environmentally sensitive development meets the recharge and water quality requirements for a site.

General guidance on each of the five credits is attached.

{ DID NOT FORWARD }

WERE OTHER MEASURES CONSIDERED FOR CREDITS (PARCEL DEV) SBS

#2100

RECEIVED

BY:.....

CURTIS CONTRACTING, INC.
Post Office 769
West Point, Virginia 23181
(804) 843-4633/FAX: (804) 843-2645
curtis@visi.net

RECEIVED
SEP - 1 2005
DEVELOPMENT MANAGEMENT

August 29, 2005

James City County
Department of General Services
113 Tewning Road
Williamsburg, VA 23188

ATTN: Mr. Steven W. Hicks
Project Manager

Dear Mr. Hicks:

We are pleased to furnish you a quotation for the improvements to the eastern pond dam located at the Warhill Tract. We have broken down the costs for the interim measures and final improvements as recommended and approved in the Preliminary Engineering Report prepared by Timmons Group/Curtis Contracting, Inc. dated August 15, 2005.

Upon your review and approval, Curtis Contracting is prepared to mobilize and begin construction on the interim improvements. It is our understanding that upon commencement of the interim improvements, your Environmental Division will approve the Land Disturbance Permits both to remainder of the sports stadium and Phase II of the third high school site.

Interim Improvements:

- Engineering
- Permit coordination
- Survey
- Construction stakeout
- Inspection
- Materials testing
- Reduction of pool elevation
- Construction of emergency spillway
- EC-3 soil stabilization material
- Vehicular travel way (stone)
- Excavation of unsuitable material along face of dam
- Armoring of dam face with an impermeable (clay) material
- Construction of an energy dissipation shelf along face of dam

APPROVED
SWH
9/14/05
$195,653.83

- Topsoil, seed, lime, fertilizer
- EC-2 soil retention matting
- As-built drawings

$ 195,653.83 Lump Sum

Permanent Improvements:

- Engineering
- Permit coordination
- Survey
- Construction stake out
- Inspection
- Material testing
- Reduction of pool elevation
- Construction of plunge pool
- Concrete drainage flume
- 42" RCP outlet pipe
- Anti-Seep collars
- Special designs Weir box
- Removal of organic materials from top of dam
- Increase dam elevation to 73.00
- Topsoil, seed, lime, fertilizer
- EC-2 soil stabilization material
- As-built drawings

$ 207,340.83 Lump Sum

Should you have any questions regarding this proposal, please contact me so this project can proceed and curtail the impacts it has on the other projects.

Sincerely,

Andrew R. Curtis, Jr.
Project Manager

L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 206
Richmond, Virginia 23219-2010
(804) 371-6095 Fax (804) 371-2630

RECEIVED
OCT 10 2007
ENVIRONMENTAL DIVISION

October 1, 2007

James City County
Attn: Wayland Bass
Department of Development Management
101 Mounts Bay Road
Williamsburg, VA 23187

RE: Eastern Pond Dam, Inventory Number 09529

Dear Mr. Bass:

The Operation and Maintenance Certificate Application for Eastern Pond Dam, Inventory Number 09529, and the required supporting documents have been reviewed for compliance with the provisions of the Code of Virginia, Dam Safety Act, (Section 10.1-604 et. seq.) and the regulations promulgated by the Virginia Soil and Water Conservation Board (Board). Based on this information, on September 20, 2007, the Board issued a six-year (09/20/2007 - 09/30/2013) Conditional Class III Operation and Maintenance Certificate (Certificate). The Certificate and other pertinent data are enclosed.

The Dam Safety Act requires dam owners to maintain their dam in a condition to prevent unreasonable threats to life and property of others. The classification of your dam and the Certificate issued were based on the current known downstream hazard potential from upstream characteristics, a re-inspection report, operation and maintenance application, and an emergency action plan. The actions contained in the documents accompanying your Certificate Application must be adhered to for the duration of the terms contained in the Certificate. To assist you in adhering to the terms of the Certificate, the following table provides a schedule of dates to submit required documents.

Annual Owner's Inspection Report	Owner's Engineer Inventory Report	Renewal Certification Six Year Application by Owner and Owner's Engineer
09/30/2008		
09/30/2009		
09/30/2010		
09/30/2011		
09/30/2012	06/30/2013	06/30/2013

Should you have questions, please direct them to David D. Conniff, P.E., Dam Safety Regional Engineer, Department of Conservation and Recreation, Dam Safety and Floodplain Management Division, 203 Governor Street, Suite 206, Richmond, Virginia 23219, telephone 804-786-1359 or via e-mail at David.Conniff@dcr.virginia.gov.

Sincerely,

William G. Browning
Director, Dam Safety & Floodplain Management Division

Enclosures

c: James M. Robinson, P.E., Dam Safety Program Manager
David D. Conniff, P. E. Regional Engineer

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION
DIVISION OF DAM SAFETY
VIRGINIA SOIL AND WATER CONSERVATION BOARD

DAM SAFETY CERTIFICATE
REGULAR
CLASS III OPERATION & MAINTENANCE CERTIFICATE NUMBER 09529

James City County, owner of Eastern Pond Dam in James City County, is entitled to operate and maintain this dam pursuant to the provisions of the Dam Safety Act (Section 10.1-604 et seq., Code of Virginia) and Regulations promulgated thereunder.

This certificate is for a term of six years. It becomes effective September 20, 2007 and expires September 30, 2013. In accordance with §4VAC50-20-100F of the Regulations, the owner shall apply for a new certificate 90 days prior to its expiration.

Joseph H. Maroon
Secretary, Virginia Soil and Water Conservation Board
Director, Department of Conservation and Recreation

DATA SHEET - OPERATION AND MAINTENANCE CERTIFICATE

Department of Conservation & Recreation
Division of Dam Safety & Floodplain Management
203 Governor Street, Suite 206
Richmond, VA 23219-2094

Name of Dam: **Eastern Pond Dam**	Inventory Number: **09529**
Location: **tributary of Long Hill Creek**	City/County: **James City County**
Owner: **James City County** **Attn: Steven Hicks, General Services Mgr** Address: **101 Mounts Bay Road** City/Town/Zip: **Williamsburg VA 23187**	Designed by: **Timmons Group** Constructed by: **unk** Year Constructed (Modified): **unk (2006)**
Type of Dam: **Earthen**	Purpose: **Recreation / Irrigation**
Drainage Area (Sq. Mi.): **150**	Type of Watershed: **agricultural / wooded**
Total Height (Ft.): **20**	Elevation: **73**
Normal Pool Height (Ft.): **14.7**	Elevation: **67.7**
Maximum Capacity (Acre Ft.): **74**	Maximum Area (Acres): **8.3**
Normal Capacity (Acre Ft.): **35.4**	Normal Area (Acres): **6.3**
Size Classification: **Small**	Hazard Classification: **III**
Required Spillway Design Flood: **100-yr**	Available Spillway Design Flood: **100 - yr**
Type of Spillway: **vegetated earth channel**	*(Note if Section 130):*

Operation and Maintenance Plans & Schedule by: **Michael L. Claud, Va. P.E. #033586**

( ) Reinspection or (X) Inventory Report by: **Michael L. Claud, Va. P.E. #033586**

Emergency Action Plan filed with:
(**X**) Virginia Dept. of Emergency Management
(**X**) Local Coordinator of Emergency Services City/County: **James City Co.**

Application Reviewed. Recommended for: **Six-yr Regular O & M Certificate (9/20/07 – 9/30/13)**

If Conditional Certificate, the conditions are:

By: **David D. Conniff, P.E. VA #033641** Date: **September 17, 2007**

Concurrence with the Recommendation:

By: **William G. Browning, Director** Date: **September 19, 2007**

L. Preston Bryant, Jr.
Secretary of Natural Resources

RECEIVED
AUG - 9 2007
DEVELOPMENT MANAGEMENT

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 206
Richmond, Virginia 23219-2010
(804) 371-6095 Fax (804) 371-2630

RECEIVED
AUG 16 2007

Scott, Timmons handled the last renewal
Any suggestions?
9/11/07

August 2, 2007

James City County
Department of Development Management
Attn: Wayland Bass
101 Mounts Bay Road
Williamsburg, VA 23187

RE: Eastern Pond Dam, Inventory Number 09529

Dear Mr. Bass:

On July 19, 2007, the Virginia Soil and Water Conservation Board (Board) approved a four-month extension to the Class III Conditional Operation and Maintenance Certificate for Eastern Pond Dam, Inventory Number 09529. The Extension Certificate is enclosed. Please submit all the required documentation for certificate renewal to David D. Conniff, P.E., Dam Safety Regional Engineer, Department of Conservation and Recreation, Dam Safety and Floodplain Management Division, 203 Governor Street, Suite 206, Richmond, VA 23219, by October 15, 2007.

This information needs to be received before the Board can issue a new Operation and Maintenance Certificate. The tentative date for the Board to consider such action is the third Thursday of the month in which the extension expires. Please direct all questions to David D. Conniff at 804-786-1359, or e-mail david.conniff@dcr.virginia.gov.

Sincerely,

William G. Browning
Director, Division of Dam Safety & Floodplain Management

Enclosure

c: James M. Robinson, P.E., Dam Safety Program Manager
David D. Conniff, P.E., Regional Engineer

Virginia Department of Conservation & Recreation

State Parks • Soil & Water Conservation • Natural Heritage
Chesapeake Bay Local Assistance • Land Conservation
Outdoor Recreation Planning • Dam Safety & Floodplains

Date Prepared: November 10, 2009
Prepared By: Darryl Cook

ANNUAL INSPECTION REPORT FOR VIRGINIA REGULATED IMPOUNDING STRUCTURES

Reference: Impounding Structures Regulations, 4VAC 50-20-10 et seq., including 4VAC 50-20-105, Virginia Soil and Water Conservation Board

Owner's Information

Name of Dam: Eastern Pond Dam - Warhill District Park (PC106)
Inventory Number: 09529
Owner's Name: James City County
Location-County/City: James City County
Contact Person (if different from above): Darryl Cook - County Engineer, James City County
Owner's Address: 287 McLaws Circle, Suite 1, Williamsburg, Va 23185
Hazard Classification: Low
Name of reservoir: Eastern Pond - Warhill District Park
Purpose of reservoir: Stormwater management, recreation, irrigation
Telephone No.: (Residential) (Business) 757-259-1442
Other means of communication: email - decook@james-city.va.us

Owner's Engineer

Name of Engineering Firm and Engineer:
Professional Engineer Virginia License Number:
Mailing Address:

Telephone No.: (Business)

Directions: Make note of all pertinent conditions and changes since the last inspection, or, if this is the first inspection, since the filing of a design report.

Date of This Inspection 11/10/2009
Date of Last Inspection Unknown

1. EMBANKMENT
   a. Any alteration made to the embankment? None
   b. Erosion on embankment? No erosion found at time of inspection
   c. Settlement, misalignment or cracks in embankment? No settlement found at time of inspection
   d. Seepage? If so, seepage flow rate and location (describe any turbidity and observed color within the flow): Yes - see item 7 on next page for description

2. UPSTREAM SLOPE
   a. Woody vegetation discovered? None observed at time of inspection.
   b. Rodent burrows discovered? None observed at time of inspection.
   c. Remedial work performed? No, but continue to perform routine maintenance (mowing, trash removal) at least twice per year.

3. INTAKE STRUCTURE
   a. Deterioration of concrete? No - spillway structure is only 2 years old.
   b. Exposure of rebar reinforcement? None
   c. Is there a need to repair or replace the trash rack? No
   d. Any problems with debris? None
   e. Was the drawdown valve operated? N/A - there are no low level drains for the dam.

4. **ABUTMENT CONTACTS**

a. Any seepage? If so, estimate the flow rate and describe the location of the seep or damp areas (describe any turbidity and observed color within the flow):

None observed at time of inspection.

5. **EARTHEN EMERGENCY SPILLWAY**

a. Obstructions to flow? If so, describe plans to correct: Small trees and shrubs need to be removed from the entrance to the emergency spillway.

b. Rodent burrows discovered? None observed at time of inspection.

c. Any deterioration in the approach or discharge channel? None observed.

6. **CONCRETE ~~EMERGENCY~~ SPILLWAY ****

a. Deterioration of concrete? None observed at time of inspection.

b. Exposed steel reinforcement? None observed at time of inspection.

c. Any leakage below concrete spillway? None observed at time of inspection.

d. Obstructions to flow? If so, lists plans to correct: None. **Note that the principal spillway consists of a pipe that outlets into a concrete flume.

7. **DOWNSTREAM SLOPE**

a. Woody vegetation discovered? None observed at time of inspection.

b. Rodent burrows discovered? None observed at time of inspection.

c. Are seepage drains flowing? Not able to observe - end of drains located beneath riprap and submerged in the plunge pool.

d. Any seepage or wet areas? Yes - 25' right of concrete flume is a 10'x25' wet area with some standing water. There is some discoloration of water from iron bacteria

8. **OUTLET PIPE**

a. Any water flowing outside of discharge pipe through the Impounding Structure? None observed at time of inspection.

b. Describe any deflection or damage to the pipe: None observed at time of inspection.

9. **STILLING BASIN**

a. Deterioration of concrete structures? None but there is minor undermining (6" in depth) of the principal spillway's concrete flume at its discharge point into basin.

b. Exposure of rebar reinforcement? None observed at time of inspection.

c. Deterioration of the basin slopes? None observed at time of inspection.

d. Repairs made? None observed at time of inspection.

e. Any obstruction to flow? None observed at time of inspection.

10. **GATES**

a. Gate malfunctions or repairs? There are no gates or low level drains for this dam.

b. Corrosion or damage? N/A

c. Were any gates operated? If so, how often and to what extreme? N/A

11. **RESERVOIR/WATERSHED**

a. New developments upstream of dam? None since improvements were made to the dam in 2006.

b. Slides or erosion of lake banks around the rim? None observed at time of inspection.

c. General comments to include silt, algae or other influence factors: The reservoir is in good condition with no trash or debris - has good water clarity.

12. INSTRUMENTS

a. List all instruments: None

b. Any readings of instruments? N/A

c. Any installation of new instruments? None

13. DOWNSTREAM/HAZARD ISSUES

a. New development in downstream inundation zone? No - downstream area is a wooded floodplain that is also a resource protection area (RPA).

b. Note the maximum storm water discharge or peak elevation during the previous year. Unknown

c. Was general maintenance performed on dam? If so, when? Yes - based on the condition of the dam, it receives maintenance several time a year.

d. List actions that need to be accomplished before the next inspection: The dam embankment needs to be mowed at least twice per year. The principal and emergency spillways need to be kept free of trash and debris. At the entrance to the emergency spillway, vegetation needs to be mowed all the way to the water's edge. There is a distance of about 10 to 15 feet in depth that has been allowed to grow up in small trees and shrubs across the width of the spillway.

14. OVERALL EVAULATION OF IMPOUNDING STRUCTURE AND APPURTENANCES

(Check one) ☒ EXCELLENT ☐ GOOD ☐ POOR

General Comments: The dam is generally in excellent condition with good vegetation and no signs of erosion with only minor seepage. The dam was altered about three years ago (2006) to meet dam safety requirements. The dam has received regular, routine maintenance since that time and it will continue to do so given it's location in a county park.

Recommendations:

The dam embankment needs to be mowed at least twice per year. The principal and emergency spillways need to be kept free of trash and debris. At the entrance to the emergency spillway, vegetation needs to be mowed all the way to the water's edge. There is a distance of about 10 to 15 feet in depth that has been allowed to grow up in small trees and shrubs across the width of the spillway. The vegetation needs to be maintained in grass like the rest of the spillway. The wet area needs to be kept under observation to detect any change in the size or amount of flow. The last joint in the concrete spillway needs to be monitored for movement which would require sealing.

CERTIFICATION BY OWNER'S ENGINEER (required only when an inspection by an engineer is required)

I hereby certify that the information provided in this report has been examined by me and found to be true and correct in my professional judgment.

Signed: _____ Virginia Number: _____
Professional Engineer's Signature Print Name

This _____ day of _____ , 20 _____ .

Engineer's Virginia Seal:

CERTIFICATION BY OWNER

I hereby certify that the information provided in this report has been examined by me.

Signed: Daryl E Cook DARRYL E. COOK
Owner's Signature Print Name

This 16th day of November , 20 09 .

Mail the executed form to the appropriate
Department of Conservation and Recreation
Division of Dam Safety and Floodplain Management
Regional Engineer

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	Unk
BMP ID NO	106	SITE AREA acre	521.7	CTRL STRUC SIZE inches	
PLAN NO	SP-61-98	LAND USE	Public Park	OTLT BARRL DESC	Unk
TAX PARCEL	(32-01)(01-12)	old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	
PIN NO	3210100012	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	No
PROJECT NAME	Warhill Tract-JCC Sports Complex			DESIGN HW ELEV	
FACILITY LOCATION	Exist Large Pond (East of Soccer Fields)			PERM POOL ELE	
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	150	2-YR OUTFLOW cfs	0.00
CURRENT OWNER	James City County, Virginia			10-YR OUTFLOW cfs	0.00
OWNER ADDRESS	101 Mounts Bay Road			REC DRAWING	No
OWNER ADDRESS 2	P.O. Box 8784	SERVICE AREA DESCRI	Public Park & Woods		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187	IMPERV AREA acres	0.00	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT to Longhill Swamp		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	No	LAST INSP DATE	10/24/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0	INTERNAL RATING	2
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	Phase I Insp. Exist Wet Pond #3 near Seasons Tr Water Tank. Sta. 57+50 100' Rt.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

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Date Record Created:

Created By:

WS_BMPNO: PC106

PRINTED ON
Thursday, March 04, 2010
4:50:38 PM

WATERSHED	PC
BMP ID NO	106
PLAN NO	SP-61-98
TAX PARCEL	(32-1)(1-12)
PIN NO	3210100012
CONSTRUCTION DATE	
PROJECT NAME	JCC-District Park East Pond Dam
FACILITY LOCATION	Exist Large Pond (East of Soccer Fields)
CITY-STATE	Williamsburg, Va. 23188
CURRENT OWNER	James City County
OWNER ADDRESS	101 Mounts Bay Road
OWNER ADDRESS 2	P.O. Box 8784
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187
OWNER PHONE	
MAINT AGREEMENT	No
EMERG ACTION PLAN	Yes

MAINTENANCE PLAN	Yes
SITE AREA acre	521.7
LAND USE	Public Park
old BMP TYP	Wet Pond
JCC BMP CODE	A2 Wet Pond
POINT VALUE	
SVC DRAIN AREA acres	150.05
SERVICE AREA DESCRI	3rd HS, Park & Woods (not a BMP)
IMPERV AREA acres	0.00
RECV STREAM	UT to Longhill Swamp
EXT DET-WQ-CTRL	Yes
WTR QUAL VOL acre-ft	35.01
CHAN PROT CTRL	Yes
CHAN PROT VOL acre-ft	11.88
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	Yes

CTRL STRUC DESC	Conc HW wit
CTRL STRUC SIZE inches	18
OTLT BARRL DESC	RCP
OTLT BARRL SIZE inch	42
EMERG SPILLWAY	Yes
DESIGN HW ELEV	71.25
PERM POOL ELEV	67.63
2-YR OUTFLOW cfs	9.15
10-YR OUTFLOW cfs	49.35
REC DRAWING	Yes
CONSTR CERTIF	Yes

LAST INSP DATE 4/5/2007 Inspected by:

INTERNAL RATING 3

MISC/COMMENTS

Upgraded as part of Warhill PPEA project 2005-2007. DCR Permit No. 09529.

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Additional Comments:

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	Unk
BMP ID NO	106	SITE AREA acre	521.7	CTRL STRUC SIZE inches	
PLAN NO	SP-61-98	LAND USE	Public Park	OTLT BARRL DESC	Unk
TAX PARCEL	(32-01)(01-12)	old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	
PIN NO	3210100012	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	No
PROJECT NAME	Warhill Tract-JCC Sports Complex			DESIGN HW ELEV	
FACILITY LOCATION	Exist Large Pond (East of Soccer Fields)			PERM POOL ELEV	
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	0.00
CURRENT OWNER	James City County, Virginia			10-YR OUTFLOW cfs	0.00
OWNER ADDRESS	101 Mounts Bay Road			REC DRAWING	No
OWNER ADDRESS 2	P.O. Box 8784	SERVICE AREA DESCRI	Public Park & Woods		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187	IMPERV AREA acres	0	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT to Longhill Swamp		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	No	LAST INSP DATE	10/24/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0	INTERNAL RATING	2
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	Phase I Insp. Exist Wet Pond #3 near Seasons Tr Water Tank. Sta. 57+50 100' Rt.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	CMP
BMP ID NO	106	SITE AREA acre	521.7	CTRL STRUC SIZE inches	12
PLAN NO	SP-61-98	LAND USE	Public Park	OTLT BARRL DESC	CMP
TAX PARCEL	(32-01)(01-12)	old BMP TYP	Lake - Wet Pond	OTLT BARRL SIZE inch	12
PIN NO	3210100012	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	No
PROJECT NAME	Warhill Tract-JCC Sports Complex			DESIGN HW ELEV	72.13
FACILITY LOCATION	Exist Large Pond (East of Soccer Fields)			PERM POOL ELEV	67.68
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	140	2-YR OUTFLOW cfs	0.00
CURRENT OWNER	James City County, Virginia			10-YR OUTFLOW cfs	0.00
OWNER ADDRESS	101 Mounts Bay Road			REC DRAWING	No
OWNER ADDRESS 2	P.O. Box 8784	SERVICE AREA DESCRI	Public Park & Woods		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187	IMPERV AREA acres	0.00	CONSTR CERTIF	No
OWNER PHONE		RECV STREAM	UT to Longhill Swamp		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	No	LAST INSP DATE	10/24/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0	INTERNAL RATING	2
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	East Pond; Wet Pond #3 near Seasons Tr Water Tank. Failed barrel	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

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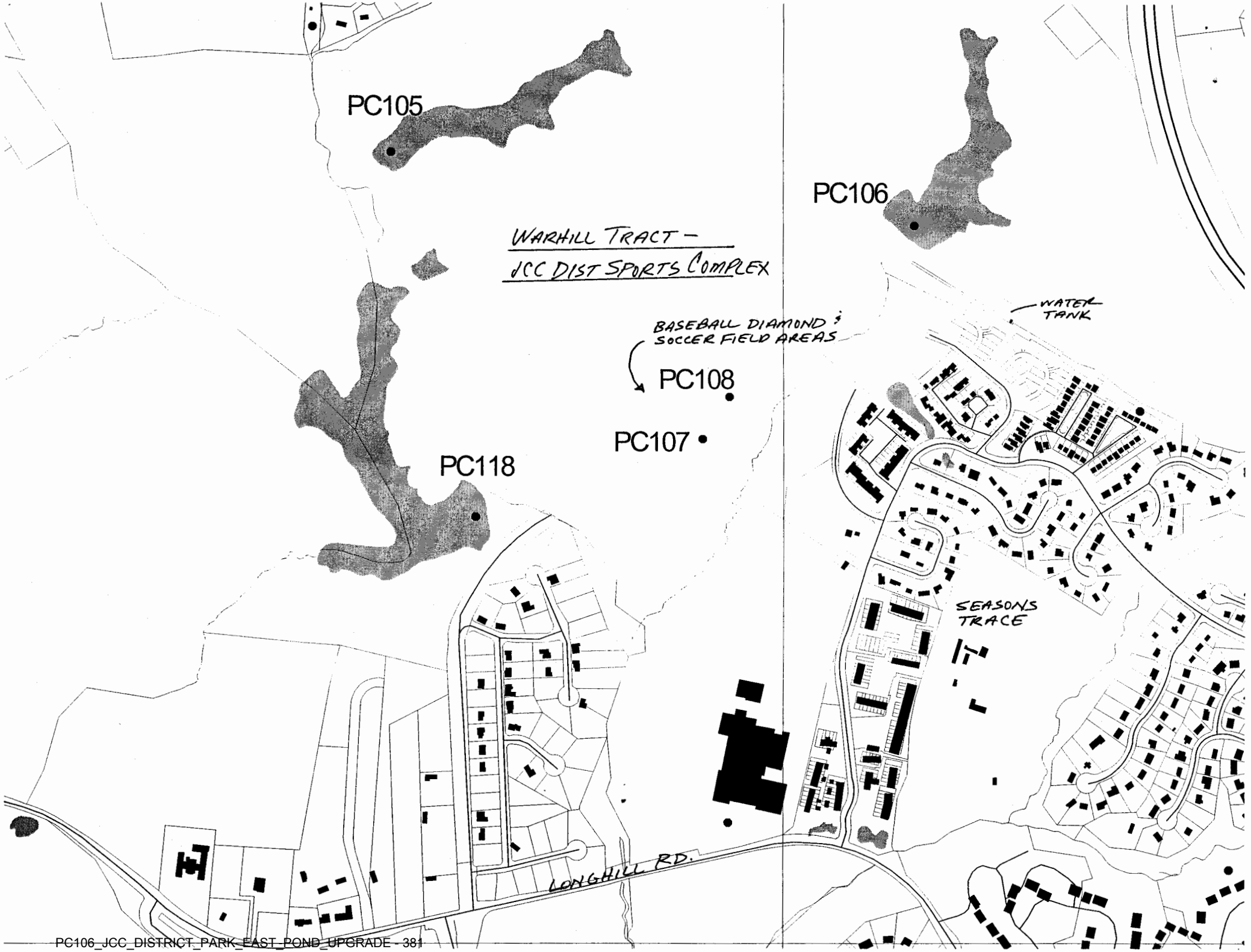
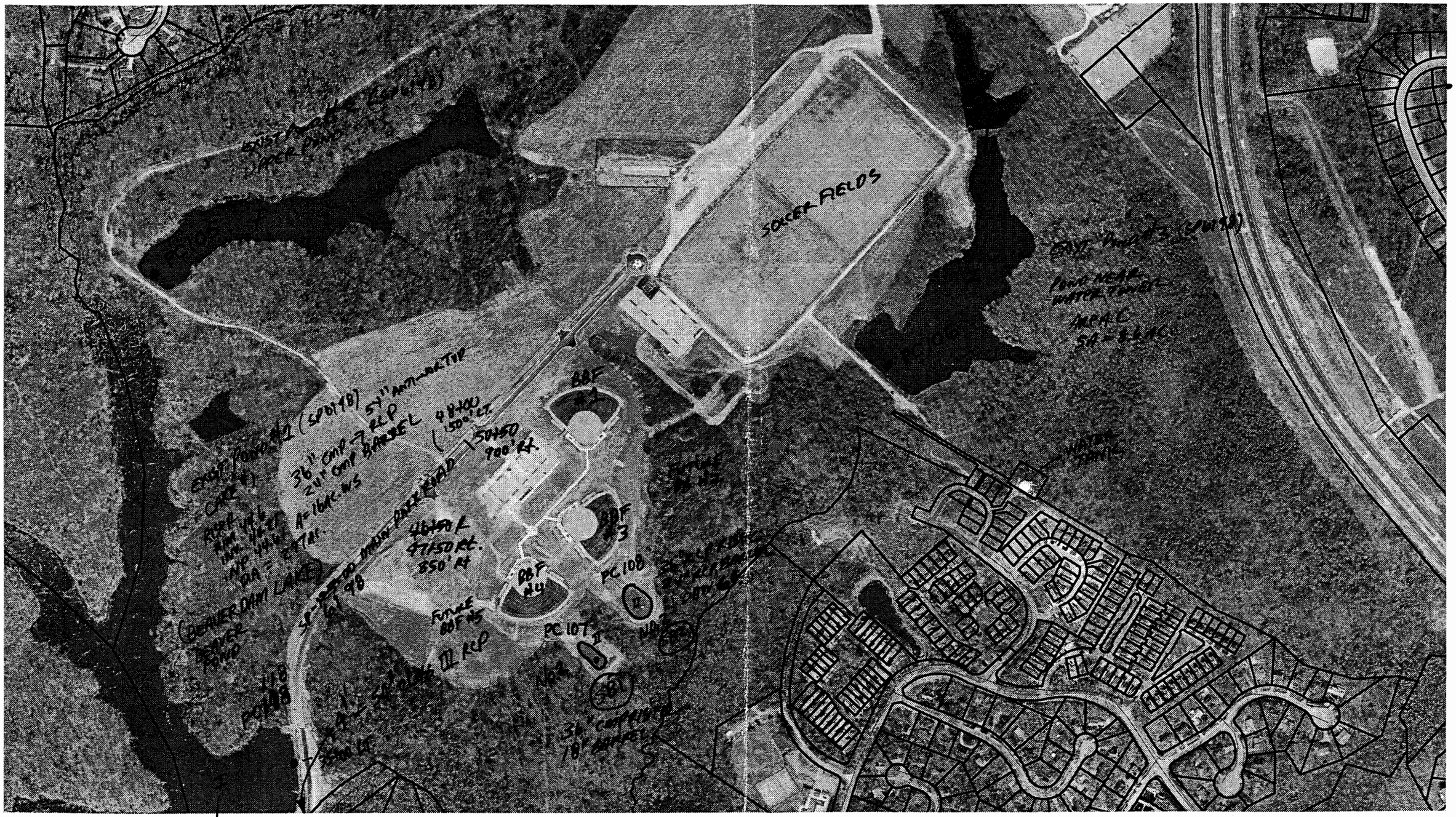

PC105
PC106
WARHILL TRACT –
JCC DIST SPORTS COMPLEX
WATER TANK
BASEBALL DIAMOND & SOCCER FIELD AREAS
PC108
PC107
PC118
SEASONS TRACE
LONGHILL RD.

WARHILL TRACT

JCC - SPORTS COMPLEX
SP-61-98



Form 10-0Y4

SP-61-98 2

GPIN 3210100012
5700 WARHILL TRAIL
JCC
PO BOX 8784
PARCEL-1 WH TRACT

SAMPLE WEST POND

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
WEST POND DAM IMPROVEMENTS: E&SC # 3B
COUNTY PLAN NO. SP – 82 - 05
July 6, 2005

Note: This review is associated with proposed improvements to the District Park West Pond, County BMP ID Code: PC 105. Applicable plan sheets include: cover C1.0, C1.1, C1.2, C1.3, C1.4, C1.5 and C1.6 .

General:

1. A Land-Disturbing permit and preconstruction conference is required for this portion of the project.

2. The cover sheet should include the phasing number in accordance with the PPEA general phasing map. It appears this portion is E&SC # 3B.

3. Provide a note on the cover sheet of the plan to indicate this project is situated in subwatershed 205 and catchment 205-108-1 of the Powhatan Creek watershed. Also, fix the note on the cover to indicate "Powhatan Creek" rather than "Powhatan Circle".

4. Dam Permit. It appears the impounding structure is subject to the provisions of Virginia Dam Safety Program and 4 VAC 50-20 Impounding Structure Regulations. Evidence of a construction permit from the Virginia Soil and Water Conservation Board will be required prior to final approval of the plan of development by the Environmental Division, unless the impounding is specifically excluded from the regulations. *(Note: A Land-Disturbing permit may not be issued for the project until approval of the project concept from the DCR Dam Safety Program director is verified).*

5. Record Drawing and Construction Certification. The stormwater management/BMP facility will require submission, review and approval of a record drawing (as-built) and construction certification prior to release of the posted bond/surety. Provide notes on the plan accordingly to ensure this activity is adequately coordinated and performed before, during and following construction in accordance with current County guidelines.

6. VSMP. It appears construction activity for the site will exceed 2,500 square feet. Therefore, it is the owner's responsibility to register for coverage under the General Permit for Discharge of Stormwater from Construction Activities, in accordance with current requirements of the Virginia Department of Conservation and Recreation and the Virginia Stormwater Management Program. Visit http://www.dcr.virginia.gov/sw/vsmp.htm or contact the DCR Central Office at 804-371-7330 for additional information.

7. A geotechnical report is necessary to support the design of proposed dam improvements as presented in the plans and computations.

PC106_JCC_DISTRICT_PARK_EAST_POND_UPGRADE - 383

Chesapeake Bay Preservation:

8. Provide a note referencing the correct FEMA FIRM panel and any designated special flood hazard areas or zone designations associated with this site, as applicable.

9. The wetland permit was just recently received for the Warhill PPEA project, which also includes improvements to this particular dam. Add applicable wetland permit information (05-R1554, June 16th 2005) to Environmental Inventory sheet C1.1.

10. Label the District Park West Pond site area on Environmental Inventory Sheet C1.1.

11. Show the approximate location of the pretreatment sediment forebay at the end of the regional storm trunk line on Environmental Inventory Sheet C1.1.

12. Label the District Park West Pond (PC 105), the District Park East Pond (PC 106) and the District Park Warhill Trail Pond (PC 118) on Environmental Inventory Sheet C1.1 and all other sheets as applicable.

13. It is assumed that access to the Phase 3B west pond dam area will be west off of the existing district park road (ie. Warhill Trail). The environmental inventory must include the work area associated with an access road.

14. As proposed dam improvements are situated in a defined Resource Protection Area buffer, an administrative Chesapeake Bay exception will be required. Submit a Chesapeake Bay Preservation exception request, in writing, and a Water Quality Impact Assessment (WQIA). *(Note: An email was previously issued on this topic on May 26, 2005. Refer to the email for further guidance and information.).*

15. Show the approximate location of RPA buffer on the dam on Environmental Inventory Sheet C-1.1 and show further detailed information on the limit of wetlands and RPA buffer on Sheet C-1.5 respectively. Also on Sheet C-1.5, label the design 100-year water surface elevation for the Warhill Trail Pond (lower pond) based on the most current computations.

Erosion & Sediment Control Plan:

16. E&S Plan. Currently the erosion and sediment control plan shows no provisions for access to the west pond dam work area. Provide an erosion and sediment control plan for disturbed area associated with an access road corridor from the district park road (Warhill Trail) to the west pond dam. Measures may include: construction entrance, silt fence, fill diversions/slope drains, temporary culverts and construction road stabilization.

17. Stockpile Area. General Dam Construction Note # 5 indicates placing unsuitable material from the dam improvement site at designated areas. The designated area for this project is the previously approved topsoil stockpile location. Indicate this in the general note and label the temporary stockpile area on Sheet C1.1.

18. Sequence. Provide a sequence of construction specific to installation of erosion and sediment control measures and dam improvement activities.

19. Slope Labels. Label all graded dam fill slopes on plan Sheets C-1.5 and C-1.6 with slope indicators as intended (i.e. 3H:1V, 2H:1V, etc.).

20. Access Road. Indicate whether geotextile filter fabric is necessary under the 10 ft. wide, 21B access road on the detail on Sheet C-1.5. This would only be for that portion across the top of dam, approximately 500 ft. in length.

Stormwater Management / BMP Plan:

21. Label proposed design water surface elevations for the west pond for the water quality, 1-, 2-, 10- and 100-year storm events on the plan and Section B-B on Sheet C-1.5.

22. Label existing contours within the existing normal pool area on plan Sheet C-1.5.

23. Show proposed spot elevations for top of dam on plan Sheet C-1.5. It appears minimum top of dam elevation is El. 63.81 based off of 1 foot separation from 100-year design high water; however, Section A-A on Sheet C-1.6 shows top of dam elevation at El. 65.

24. Normal Pool. Label the normal pool elevation (El. 58.2) on Section C-C on Sheet C-1.5.

25. Drainage Area. As runoff curve number and impervious cover computations now show contributions from existing/proposed Zion Baptist Church (GPIN 2430100047; 6373 Richmond Road), show and label the approximate location of the church parcel on drainage area map Sheet C1.2.

26. Stadium Site. Currently, TR-55 worksheets in the design report shows about 12.6 acres from the stadium site contributory to the west pond and drainage map Sheet C1.2 shows about 20 acres. Based on a pre-application meeting held for the stadium between County staff and representatives from Clough, Harbour & Associates on June 30th 2005, it appears that contributing drainage area to the storm trunk and west pond could be substantially more than that shown on the drainage map and the design report. Proper coordination is necessary between Timmons Group and CHA to ensure design parameters for the storm trunk and west pond are not exceeded.

27. VSMH Reference. Add references to the Virginia Stormwater Management Handbook to Drainage Note # 1 and also the General Dam Construction Notes on Sheet C1.4.

28. SSC. Although Special Stormwater Criteria is required for this phase of work (1.23 acres of disturbed area), it appears that no additional SSCP measures will be required as this project still falls under SSCPs as previously provided as from the L-Road portion of the project. The L-Road project provided 5.5 unit measures which covers up to 50 acres disturbed. So far, total disturbed project area for the Warhill PPEA project, including this project, is about 30 acres.

29. Pond Hydraulics. The following comments pertain to the pond's hydraulic analyses as provided in the design report.

29a. It is unclear why the stage-storage curve, page 4.01 of the PondPack model, starts at Elevation 50.0 when existing pond contours shown on Sheet C-1.5 appear to go to at least Elevation 45.0.

29b. Tailwater setup in the hydraulic model appears to use "free outfall" conditions. Ensure that water surface elevations for the lower pond (Warhill Trail dam) would have no adverse effect on the hydraulic routing for the west pond, especially for the 100-year storm design storm event.

29c. It is noted that based on models presented for the west pond, the 1-, 2- and 10-year design discharges from the dam are significantly increased between current conditions and proposed modification conditions, mostly due to the type of principal spillway chosen for the project. This comment does not have to be addressed but is noted.

29d. Computations were provided in the design report to show County SCPV requirements were achieved. It would appear that VSMH, Section 5-6.2 is not the correct reference as this pertains to water quality, not stream channel protection volume. It seems as though Section 5.-6.3 is the proper reference and methodology. Also, the computations show that a 3.01 square feet orifice area is necessary based on an average of 2.12 feet of head and that the 2.7 ft. high by 1.1 ft. wide slot (rectangular weir) fulfills that requirement. This would not seem to be the case as there is a distinct difference between a circular orifice under a constant head condition and a rectangular weir under a variable head condition. Look at the actual pond inflow-outflow rating curve to see if there is indeed 24 hours of time difference between the peak inflow and outflow values of the rectangular weir, from the 1-year WSEL down to normal pool. Further discussion may be necessary on this matter. *(Note: It would seem that the drawdown time from the 1-year storm elevation of 60.32 back to normal pool elevation of 58.2 through the 2.7' high x 1.1' wide slot would be well less than 24 hours.)*

30. Principal Spillway. The following comments pertain to the design for the principal spillway for the west pond, as shown on Sheet C-1.5.

30a. The plan section detail should indicate the bottom concrete portion of the structure as "slope to drain" from the weir wall to the invert elevation of the 4 ft. x 4 ft. box culvert. The bottom should not be flat.

30b. Pipe schedule information for the concrete inlet box on the top center of Sheet C-1.6 should reference Sheet C-1.5, not "this sheet".

31. PG-5 Spillway. Provide computations to show adequacy of the VDOT PG-5 concrete channel which carries flow from the 4' x 4' box culvert to the plunge pool. It must be shown that primary flows within the channel are contained within the 1.5 ft. of lined depth and that velocities are not excessive. Also, although design computations were not provided, it would appear that velocities at the end of the paved channel would be excessive as the slope of the paved channel is about 30 percent. It is unclear if a portion of the Class II riprap plunge pool at the end of the paved channel

should be grouted to prevent scour and undermining of the toe of dam.

32. Box Culvert. A 4 ft. by 4 ft. VDOT BCS-05 box culvert is proposed as the principal outflow control structure for the dam. Provide an indication of what joint type is to be used for the box culvert. The County BMP manual would require that joints for the outlet barrel be watertight.

33. Emergency Spillway. Clearly show a proposed spot elevation for the crest of the emergency spillway situated at the north side of the dam. Also, provide a typical section for the emergency spillway (or show construction information on plan Sheet C-1.5) to clearly show minimum bottom width, side slopes and minimum depth. As no specifications are shown, it is assumed that the emergency spillway is to be "grass-lined". Provide computations to support that erosion control matting or armoring is not required in the emergency spillway section.

34. Toe Drain. The following comments pertain to the toe drain system as shown on plan Sheets C-1.5 and C-1.6.

    34a. The geotechnical report must provide recommendations for toe drain placement and especially that Mirafi 140N is the proper filter fabric to be used in that application based on in-situ soils.

    34b. Show specifications (AASHTO M252, etc.) for perforated corrugated polyethylene pipe to be used in the toe drain application.

35. Pond Benches. As the west pond is to be used as a master planned BMP for the Warhill PPEA and other Warhill site tract projects, in order to obtain 10-point credit as a County type A-3 wet extended detention pond, the BMP must have all appropriate design features associated with a wet pond design. This would include, but is not limited to: a permanent pool; extended detention for water quality and stream channel protection; an aquatic and safety bench; 3H:1V or flatter interior side slopes; a pretreatment sediment forebay; and a pond buffer/setback. Most of these features are being provided; however, in order to provide 3H:1V or flatter interior side slopes and an aquatic/safety bench around the entire pond perimeter would result in the destruction of existing established pond buffer vegetation and extensive grading that would not be consistent with performance standards of the Chesapeake Bay Preservation ordinance. Therefore, pond interior grading and installation of required aquatic and safety benches will not be required for this specific review case only. However, as the upslope face of dam is proposed to be regraded with a 3H:1V fill slope, this portion <u>can</u> incorporate the aquatic and safety bench as required. This would also be a safety feature incorporated into the BMP design, should the dam area be accessed by unauthorized personnel. This would be for the 150 ft. portion on the upslope face of dam near normal pool. The County BMP manual requires a minimum 15 ft. wide safety bench extending outward from normal pool and a minimum 15 ft. wide aquatic bench extending inward from normal pool. If the graded upslope side slope of the dam is graded at 4H:1V or flatter, the safety bench can be waived. *(Note: If it is determined that benches need to be less than the 15 ft. minimum required, say 8 or 10 feet in width, a waiver request would be required in writing to the Environmental Division. The waiver request would need to provide information to support or substantiate granting of the waiver.)*

36. Plunge Pool. The following comments pertain to the plunge pool energy dissipater at the outfall of the primary flow control box culvert/PG-5 structure.

36a. Show minimum depth required for the plunge pool on Section D-D on Sheet C-1.6.

36b. Label all existing and proposed plunge pool contours on Sheet C-1.6.

36c. Show proposed bottom of plunge pool spot elevations on Sheet C-1.6.

37. Pond Buffer. Label the 25 ft. pond buffer/setback line on plan Sheet C-1.5. The pond buffer/setback is off of the 100-year design high water elevation.

38. Previous Comments. All preliminary comments for the District Park West Pond, as issued by our Division during the review of computations for the regional storm trunk plan (E&SC # 3; SP-59-05), appear properly addressed with this submission.

SAMPLE WEST POND

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
WEST POND DAM IMPROVEMENTS (PC 105): E&SC # 3B
COUNTY PLAN NO. SP – 82 - 05
August 1, 2005

Note: This review is associated with proposed improvements to the District Park West Pond, County BMP ID Code: PC 105. Applicable plan sheets include: cover C1.0, C1.1, C1.2, C1.3, C1.4, C1.4A, C1.5 and C1.6. This is the second review of the plan .

General:

1. Dam Permit. Evidence of a dam safety permit will be required for this portion of the project. Release of land-disturbing and/or final site plan approval will be at the discretion of Environmental Division staff.

2. Pursuant to the response to previous comment # 5 (ie. record drawings and construction certification for BMPs), the "Inspection" note # 6 on Sheet C1.4 needs revised. As this project does not require a posted bond/surety, the last words in the note need to be removed.

3. Response to previous comment # 7 has not been addressed. A geotechnical report, supporting the intended design, is required to be submitted, reviewed and approved by our Division prior to final approval of the plan. Also, per response to previous comment # 34a, the geotechnical report must address toe drain construction, specifically geotextile requirements.

Chesapeake Bay Preservation:

4. Response to previous comment # 8 is noted. Although it appears correct that the project site is situated on FEMA FIRM Map panels # 35 and # 20, it is unclear if Special Flood Hazard Area Zone A is situated within the project site. A determination must be made, using FEMA FIRM map data, whether or not the delineation for Zone A is in the vicinity of this project and if so, what implications that may have to the project. *(Note: If SFHA Zone A is within the project limits it must be shown on Sheet C1.1 and C1.5 respectively.).*

   If it is found that FEMA SFHA Zone A exists within the District Park West Pond project area, then this is a condition which has become apparent and wasn't previously portrayed on any of the environmental inventories for the PPEA project. The environmental inventory on Sheet C1.1 must be revised to show the approximate location of FEMA SFHA Zone A (or AE) delineations and, if present on the site and the project area, the environmental inventory table on Sheet C1.1 must indicate SFHA areas that exist instead of "none on site" as currently indicated.

5. Label the District Park Warhill Trail Pond (PC 118) on plan view Sheet C1.5.

6. Exception Request. Previous comment # 14 was not addressed. A Chesapeake Bay exception request and WQIA are required for the project. *(Note: An email was previously issued on this topic on May 26, 2005. Also, to save time and effort, it is recommended that multi-use trail improvements as proposed by County Parks and Recreation under County Plan No. SP-76-05 be incorporated into this item.)*

Erosion & Sediment Control Plan:

7. Disturbed Area. Since the last submission, disturbed area for the project appears to have decreased one-tenth of an acre from 1.23 acres to 1.13 acres. It is unclear how disturbed area could reduce as disturbed area for the access road should have now been included into the tabulation and the dam improvement area (near the embankment) has not changed significantly.

8. E&S Plan. Other than that shown on Sheet C1.4A (stone) and that shown on the 1 inch = 30 ft. scale inset plan at the west pond dam, no other information could be found about erosion and sediment control measures necessary for the access road to the dam. Therefore, previous comment # 16 is considered not addressed. Based on County GIS, there appears to be a low area situated about 800 feet from the Warhill Trail paved road which drains to an existing small pond. Topography would show that a line of silt fence may be necessary along the south side of the proposed access road area in addition to a construction entrance and construction road stabilization (haul road stone).

9. Sequence. A sequence of construction was provided on Sheet C1.4 to address previous comment # 18. In order to show compliance with Minimum Standard # 4 of the Virginia Erosion and Sediment Control regulations, Step # 6 of the sequence must clearly state that perimeter erosion and sediment control measures must be in place and functional prior to mass clearing and grading operations in upslope areas. *(Note: This sequence will also be important item for the required Chesapeake Bay exception to show that disturbance will be minimized and appropriate control measures will be put in place.)*

Stormwater Management / BMP Plan:

10. Water surface elevations for the 1-, 2-, 10- and 100-year design storm events must match between the PondPack model dated 7/07/05, plan Sheet C1.5 and details on Sheet C1.6. Currently there are some discrepancies. Also, it would be helpful if design water surface elevations were listed in tabular format on plan Sheet C1.5.

11. Stadium Site. Any changes to drainage divides on the Warhill Stadium Site (E&SC # 4; SP-60-04) beyond that shown on Sheet C1.2 may require revisiting current stormwater computations to check for adequacy of the 72-inch storm trunk line, outfall channel, forebay and the District Park West Pond designs.

12. Seepage Control. Address what seepage controls, if any, are required through the dam along the proposed 4 x 4 box culvert alignment.

13. Trash Rack. Staff from the Environmental Division and Timmons extensively discussed the type of principal spillway structure being proposed for the dam. Normally the County recommends sloped grates recessed into and matching grade with the upslope face of the dam embankment, or secondly a traditional riser/barrel type system with an anti-vortex/trash rack cap. However, this type of structure was recommended by the engineer due to their historical success with this type of design, especially on larger dam projects. One question remains as it pertains to the type of structure. Please indicate if a trash rack structure, such as inclined DI-7 type bars perpendicular to face of dam or another equal mechanism, is warranted on top of the 7' x 7' weir box opening or along the 2.7 ft. high x 1.1 ft. wide rectangular weir slot.

14. Outlet Structures. It does not appear that outlet structure data for the upper District Park West Pond (PC 105) was included (or summarized for review) in the PondPack model dated 7/07/05. This information should be in the hydraulic model unless interconnected pond model scenarios do not require upper pond data to be input into the model. This would be for the weir box structure and 4' x 4' box culvert out of the West Pond dam.

15. SCPV. The response to previous comment # 29d was as follows: *"It would seem that the drawdown time from the 1-year storm elevation of 60.32 back to normal pool elevation of 58.2 through the 2.7' high x 1.1' wide slot would be well less than 24 hours."* Firstly, water surface elevation for the 1-year storm is at El. 60.14 not 60.32. Secondly, this statement does not show compliance with the County's stream channel protection requirements and is contrary to computations shown on the very last page of the design report. It must be clearly demonstrated that the design achieves a minimum of 24-hour detention for the 1-year, postdevelopment 24 hour storm event. Reference the County BMP manual or the Virginia Stormwater Management Handbook for additional guidance. ***(Note: Refer to Item # 9 of the Joint Team Meeting Minutes dated March 3, 2003. One of the first, early decisions made by the County about the PPEA approach was that stream channel protection requirements would not be waived for the upper, west pond design contrary to a specific request made by CCI. It was decided that "design will provide for the standard 24 hour extended detention of a one year storm in the upper pond." Stream channel protection is a measure incorporated into BMP designs to protect the downstream natural receiving channel. This is required by ordinance and is the standard by which all development projects in the County must strive to achieve. Not meeting SCP requirements on the upper, District Park West pond would subject the lower District Park Warhill Trail pond to the requirements and this was not the preference by the County early in the process.)***

16. PG-5 Spillway. The second part of previous comment # 31 was not addressed. It would appear that velocities at the end of the paved channel would be quite excessive, about 40 feet per second for the 100-year storm event. It would appear that the northeast end (nearest the embankment) of the plunge pool interior slope and about ½ (5 feet) of the bottom area of the plunge pool should be grouted to prevent scour and undermining of the toe of dam and to provide a transition from the paved channel into the riprap plunge pool

17. Emergency Spillway. No proposed spot elevations were found on the 30 scale inset plan on Sheet C1.5 to show crest elevation of the emergency spillway (El. 63.0). Also, as depth of flow in the emergency spillway is 0.81 ft. for the 100-year storm event, the spillway is considered a design spillway, rather than a token spillway. Computations are required to show that grass-lining is adequate to provide erosion resistance in the emergency spillway.

18. Pond Benches. Previous comment # 35 was not fully addressed. An aquatic/safety bench could not be found on plan Sheet C1.5 or Section A-A on detail sheet C1.6. The benches were mentioned for along an approximate 150 ft. segment next to permanent pool on the 3H:1V interior graded side slope on the upstream face of dam. Although an aquatic bench may cause additional environmental impacts, a safety bench would not as it would already be situated in area to be graded. A 4H:1V or flatter slope would negate the need for a safety bench. *(Note: If it is determined that benches need to be less than the 15 ft. minimum required or the benches are not in the best interest of this specific BMP design, then a waiver request would be required in writing*

to the Environmental Division. The waiver request would need to provide information to support or substantiate granting of the waiver.)

19. Plunge Pool. Label all existing and proposed contours on the 3 ft. scale plunge pool plan on Sheet C1.6

20. Maintenance Plan. Inspection notes on Sheet C1.4 are more geared toward inspection and maintenance requirements during construction of the dam improvements. Section 23-10(4)(b) of the Chesapeake Bay Preservation Ordinance requires stormwater management plans to include a long-term schedule for inspection and maintenance of stormwater management/BMP facilities. The plan should be specific for a wet extended detention pond facility.

21. Report. It is requested that once the plans and computations are deemed acceptable, that a final set of stamped and sealed computations be provided for the west pond design. The computations should be in an organized fashion with applicable drainage maps; hydrology, water quality and stream channel protection computations; and PondPack hydraulic routings for the 1-, 2-, 10- and 100-year design storm events. The design report shall have a brief narrative explaining the design, a table of contents and a cover sheet entitled "Warhill PPEA: District Park West Pond PC105 Improvements". The Environmental Division will require two copies, one for the Warhill PPEA file and one for the asbuilt file for the dam.

Previous Comments

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
EAST POND DAM - ASBUILT DRAWING REVIEW
COUNTY PLAN NO. SP – 107 - 05
March 6, 2007

Note: This review is associated with record drawings (asbuilts) as provided for the East Pond Dam, County BMP ID Code PC 106. Applicable drawing sheets include cover C1.0 through C1.6.

Record Drawings

1. General Notes. Add the following notes to the cover sheet of the record drawing (asbuilt) set.

   1a. ✓ Reference the approved site plan number (SP-107-05).
   1b. ✓ Reference DCR Dam Safety Permit No. 09529.
   1c. ✓ Provide a note to state that an 8 ft. wide crusher run path was placed on top of the dam in accordance with approved County Plan No. SP-76-05 (Warhill Multi-Use Trail).

2. ✓ Drainage Divide. The drainage divide for the 150 acre drainage area to the East Pond could not be found on Sheet C1.2. Show or darken the drainage divide. DA = 150.05 AC.

3. ✓ Information. It does not appear that Sheets C1.3 ✓ and C1.5 ✓ are necessary for the record drawing package. Sheets C1.1 and C1.2 show enough site vicinity, location, drainage area and adjacent site information. C1.3 + C.15 Removed.

4. ✓ Final Report. Provide a final set of stamped and sealed computations for the District Park East Pond PC 106 design. This was a comment from review of the plan of development (Comment # 32; March 13, 2006). The computations should be in an organized fashion with applicable drainage maps; hydrology, water quality and and PondPack hydraulic routings for the 1-, 2-, 10- and 100-year design storm events. The design report shall have a brief narrative explaining the design and it's assumptions, a table of contents and a cover sheet entitled "Warhill PPEA: District Park East Pond PC106 Final Improvements". The Environmental Division will require two copies, one for the Warhill PPEA file and one for the asbuilt file for the dam.

   Looks OK

5. ✓ Construction Certification. Note # 20 on Sheet C1.3 and Inspection Note # 6 on Sheet C1.4 required a construction certification for improvements associated with the District Park East Pond. None was provided. The standard form from the *James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification Forms* can be used for this purpose. *(The construction certification portion of the County template form was not completed.)*

   Looks OK

6. ✓ Temporary Fill. The temporary fill information can be removed from Sheet C1.6 as it will only confuse the reader. This was only a temporary feature necessary to construct the plunge pool due to embankment soil conditions. The Section G-G reference line and detail on Sheet C1.4 should not be deleted to provide record of what temporary controls were used during construction.

7. Plunge Pool. No asbuilt spot elevation data was provided to show that the plunge pool was constructed to a minimum of 3 ft. depth per the approved design plan. Also, verify the dimensions of the constructed plunge pool as compared to required design plan dimensions.

8. Emergency Spillway. Provide labels on the pond plan on Sheet C1.6 to indicate that EC-3 turf-reinforcement matting was used as a lining within the emergency spillway.

Field-Related:

9. The Environmental Division representative on the Warhill PPEA team has monitored the East Pond Dam improvement project on a regular basis since the preconstruction meeting for this portion of the project on May 25, 2006. Field related comments that must be addressed include the following:

CCI TO ADDRESS

9a. Ensure EC-3 turf-reinforcement matting, which was damaged due to pond dewatering operations, is fully repaired and replaced.

9b. Ensure that regraded dam side slope and top of dam areas adjacent to the crusher run gravel road are stabilized and a good stand of grass is present.

9c. Clean and remove any obstructive debris and sediments from the principal spillway weir slot, overflow box, 42-inch culvert, paved flume and plunge pool.

Previous Comments

Meeting April 10 @ Timmons.

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
DISTRICT PARK EAST POND DAM (PC 106) - FINAL IMPROVEMENTS
COUNTY PLAN NO. SP – 107 - 05
March 13, 2006

Note: This review is associated with proposed final improvements to the District Park East Pond, County BMP ID Code: PC 106. Applicable plan sheets include: cover C1.0, C1.1, C1.2, C1.3, C1.4, C1.5 and C1.6. This is the first review of final dam improvement plan .

General:

1. ✓ A Land-Disturbing permit and preconstruction conference are required for this portion of the project.

Have not got yet. Imminent. OK for LD SJT & WNB

2. Dam Permit. It appears the impounding structure is subject to the provisions of Virginia Dam Safety Program and 4 VAC 50-20 Impounding Structure Regulations. Evidence of a construction permit from the Virginia Soil and Water Conservation Board will be required.

should have gotten by now.

3. ✓ Wetland Permit. This portion of the project is subject to any applicable provisions of Nationwide Permit # 3 (05-R2325) as obtained from the U.S. Army Corp. of Engineers.

4. ✓ VSMP. It appears construction activity for the site will exceed 2,500 square feet. Therefore, it is the owner's responsibility to register for coverage under the General Permit for Discharge of Stormwater from Construction Activities, in accordance with current requirements of the Virginia Department of Conservation and Recreation and the Virginia Stormwater Management Program.

INFORMED.

5. ✓ Record Drawing and Construction Certification. A record drawing (as-built) and construction certification is required for pond modifications as proposed. Provide notes on the plan accordingly to ensure this activity is adequately coordinated and performed before, during and following construction in accordance with current County guidelines. Sheet C1.4

6. ✓ Powhatan Creek. Revise Powhatan Creek watershed information on the cover sheet to reflect the project is situated in catchment 205-107-1, not 205-108-1. Cover

7. ✓ Presentation. For general reference, label U.S. 199; Centerville Road, the existing soccer fields, and the WISC site on environmental inventory Sheet C1.1. Also, label the Third High School (SP-41-05); the County Stadium (SP-60-05), and the District Park West Pond (SP-82-05) on Sheets C1.1 and C1.2 with County approved site plan numbers as provided.

8. ✓ General Notes. Remove the "boxed" stormwater management note on the bottom right-hand corner of the cover sheet as there is no impervious cover associated with this project, only dam improvements. Removed

9. Irrigation Line. Show the approximate location of the pond irrigation line present on the west side of the dam (if known). Note #8 GEN DAM CONST NOTES, Sheet C1.4.

Sheet C1.6

10. WISC Storm Outfall. Show the approximate location of the new storm drain outfall associated with the recent WISC Building Expansion. This outfall is situated to the north of the emergency spillway constructed as part of the EMERGENCY-INTERIM east pond dam improvements.

Chesapeake Bay Preservation:

11. CBE. Provide a "boxed" note on the cover sheet of the plans to indicate that this portion of the project is subject to the provision of Chesapeake Bay exception CBE 06-007 as approved on March 6, 2006. *(Note: This portion of the project required submission of a WQIA due to minor impacts to RPA buffer. The WQIA was submitted to the Environmental Division on February 24, 2006.)*

12. RPA Buffer. Delineate and label the RPA buffer line on environmental inventory Sheet C1.1.

13. RPA Impacts. List (quantify) impacts to the RPA buffer on environmental inventory Sheet C1.1, consistent with information as provided in the WQIA (0.76 acres).

14. FEMA FIRM. Ensure there is no FEMA SFHA Zone A or AE present at the downstream toe of the existing dam. If present, it must be so indicated on the environmental inventory. Refer to FEMA Panels # 20 or # 35 to determine if SFHA is present at the site. ~1,000' D/S OFF INV MAP
Timmons gave me info @ meeting.

15. WQIA. The last two sentences of the first paragraph on Page 2 of the WQIA indicated the following: "we have included in our proposal improving the principal spillway to pass the postdevelopment 10-year storm and providing 24-hour extended detention of the postdeveloped 1-year storm". Based on our involvement with the Warhill PPEA project, it is our understanding that at no time was the District Park East Pond ever designed to meet stream channel protection criteria and service as a BMP for upstream improvements associated with the Warhill PPEA. The Third High School has onsite stormwater management to meet SCPV and Water Quality control criteria. The East Pond interim and final upgrades were only performed to meet dam safety requirements and to safely pass increased runoff from large storm events safety through the dam and to maintain structural integrity of the dam. This statement in the WQIA may be incorrect and copied over from the West Pond WQIA as the PER for the East Pond has no computations to support the pond meets SCPV criteria. *(Note: If incorrect, provide a revision to page 2 of the WQIA.)* Per Timmons Meeting will meet SCPV rqmnts
No need to update WQIA.

16. Limit of Work. Environmental inventory Sheet C1.1 shows incorrect information with respect to the limit of work for the District Park West Pond PC105. Access to the west pond was revised, coming in from the existing haul road to the west, not the area to the east of the pond which goes to Warhill Trail. The access toward Warhill Trail road was never used. Correct now.

Erosion & Sediment Control Plan:

17. Dust Control. Due to the proximity of the site to nearby subdivisions and the District Park soccer fields, add dust control measures to the erosion and sediment control plan. This will be especially important as the existing haul road along the soccer fields is a highly used area and is incorporated into the east pond final improvement work plan. DC Sheet C1.5

18. Limits of Work. Although proposed clearing limits are shown on Sheet C1.6, the information is

incomplete. Show a limit of work (clearing and grading) around the entire site periphery including the upstream side of dam, the east dam abutment and connecting to the limits of work to the existing haul road. Low ok.

19. Toe Drain. Show minimum bedding depth of stone required beneath the perforated polyethylene pipe on the toe drain detail on Sheet C1.4. 2" min.

20. Check Dam. Provide a single rock check dam within the proposed limits of work just downstream of the proposed location of the plunge pool. This will provide for erosion and sediment control during dewatering operations and during initial construction activities for the plunge pool, concrete channel, outlet barrel and principal spillway device. sheet C1.6

Stormwater Management / BMP Plan:

21. Emergency Spillway. Clearly show emergency spillway crest elevation (El. 70.7) on the pond plan or details. Text + ELEV DATA EL 70.7

22. WSELs. The following comments pertain to design water surface elevations as shown on the construction plan.

    22a. Show design water surface elevations for the 1-, 2-, 10-, 25- and 100-year storms on Sheet C1.6. Done

    22b. Water surface elevations on the WSEL table on Sheet C1.6 do not match the Preliminary Engineering Report (PER) for the 1- and 10-year storms. DISCUSSED. FINAL DESIGN OVERRULES PER.

    22c. Correctly label the proposed 100-year WSEL on the "Section A-A" detail as El. 71.25.

23. Normal Pool. Ensure all normal pool elevations shown on Sheet C1.6 are consistent. The normal pool elevation on the "Embankment Slope Improvements" detail do not match others on the sheet. It is believed, based on the pond model and previous investigations that normal pool elevation is at El. 67.7 and this will not change between pre- and final improvement conditions.

24. Wave Bench. Specify the type of soil material necessary in the "dot-hatched" portion of the wave bench as indicated on the "Embankment Slope Improvements" detail on Sheet C1.6. It is unclear if this is topsoil, compacted material or clay. SC Material

25. Pond Design. Provide a brief narrative and computational summary which reflects design parameters associated with the final east pond design including drainage area, runoff curve number, time of concentration and upland conditions considered in the design of the principal and emergency spillway, especially that related to assumptions for the Third High School. Curve numbers as shown in the design report under "developed conditions" show both disturbed conditions and a developed condition. It was unclear what CN was actually used in the final hydraulic model. Also, it is unclear if the large stormwater basin on the high school site was considered in the hydrology model. will provide final report

26. Low Flow Device. The final "developed condition" outlet connectivity model in the Preliminary Engineering Report (PER) shows a circular orifice (15-inch at El. 67.68); however, the pond

construction drawings show a 1.5 ft. slot in the weir box. Ensure the PER, Final Hydraulic Model and Construction Plans reflect consistent information. WILL BE WEIR SLOT.

27. Outlet Structure. There appears to be some discrepancy between information called for in the PER and that reflected on the final improvement construction plan. The PER called for a 5 x 12 box culvert spillway, not a 42-inch circular as shown on construction plan Sheet C1.6. See the summary of "Flood Routing Table" on Page 4 and the "Conclusion and Recommendations (Final Condition)" on Page 5 of the PER to see information which reflects use of a 5 x 12 box structure. Ensure the PER, Final Hydraulic Model and Construction Plans reflect consistent information. *(Note: It was our understanding that the principal spillway and outlet barrel configuration for the East Pond would be very similar to that completed on the District Park West Pond.)*
WILL BE #2" RCP

28. Drainage Divides. Ensure drainage divides on Sheet C1.2 reflect the most recent drainage plan designs for the Third High School (SP-41-05) and the County Stadium (SP-60-05) and that the total drainage area to the East Pond (ultimate) is correct at 111.40 acres. The drainage area shown on the map and the drainage area shown on the composite RCN computation for the Third High School site do not seem to match.

29. Waiver Request. A waiver request dated February 24, 2006 to waive side slope and bench requirements, consistent with the County BMP manual requirements, is acknowledged. It should be noted that the District Park East Pond was not intended to be upgraded to serve as a BMP or to provide stream channel protection for the Warhill PPEA project. Upgrades were only intended to bring the basin into compliance with state dam safety criteria and to safely pass large storm events without threatening the structural integrity of the dam. Even though the waiver was not necessary, it will still be processed by Environmental Division staff as this is a County project.
ISSUED WAIVER

30. Maintenance Plan. In the "BMP Description" on the Maintenance Plan on Sheet C1.4, the following must be revised or corrected.

30a. ✓ The East Pond is not technically a 10-point, wet-type BMP facility for the Warhill PPEA project. It is a wet pond, but not a 10-point facility.

30b. ✓ Correct the drainage area to be consistent with the final design. Currently it shows 150 acres.

30c. ✓ Ensure all information in the narrative in the "BMP Description" is correct with respect to final pond features and function.

30d. It does not appear a cleanout elevation or depth were specified in the maintenance plan. EL 60.85 6.85' below N.P.

31. ✓ SSC. Although Special Stormwater Criteria was required for this phase of work, it appears that no additional SSCP measures are required as this portion of the project still falls under SSCPs as previously provided from the L-Road portion of the project. Provide a note at the end of the Special Stormwater Criteria portion of Sheet C1.3 to indicate that SSC was fulfilled by other portions of the PPEA project so that state review agencies are not confused about SSC and whether it is required on this particular project. Note sheet C1.3

32. Final Report. It is requested that once the plans and computations are deemed acceptable, that a final set of stamped and sealed computations be provided for the District Park East Pond PC 106 design. The computations should be in an organized fashion with applicable drainage maps; hydrology, water quality and and PondPack hydraulic routings for the 1-, 2-, 10- and 100-year design storm events. The design report shall have a brief narrative explaining the design and it's assumptions, a table of contents and a cover sheet entitled "Warhill PPEA: District Park East Pond PC106 Final Improvements". The Environmental Division will require two copies, one for the Warhill PPEA file and one for the asbuilt file for the dam.

WILL BE DONE.

BEM/SJT

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
DISTRICT PARK EAST POND DAM (PC 106) - FINAL IMPROVEMENTS
COUNTY PLAN NO. SP – 107 - 05
March 13, 2006

Note: This review is associated with proposed final improvements to the District Park East Pond, County BMP ID Code: PC 106. Applicable plan sheets include: cover C1.0, C1.1, C1.2, C1.3, C1.4, C1.5 and C1.6. This is the first review of final dam improvement plan .

General:

1. A Land-Disturbing permit and preconstruction conference are required for this portion of the project.

2. Dam Permit. It appears the impounding structure is subject to the provisions of Virginia Dam Safety Program and 4 VAC 50-20 Impounding Structure Regulations. Evidence of a construction permit from the Virginia Soil and Water Conservation Board will be required.

3. Wetland Permit. This portion of the project is subject to any applicable provisions of Nationwide Permit # 3 (05-R2325) as obtained from the U.S. Army Corp. of Engineers.

4. VSMP. It appears construction activity for the site will exceed 2,500 square feet. Therefore, it is the owner's responsibility to register for coverage under the General Permit for Discharge of Stormwater from Construction Activities, in accordance with current requirements of the Virginia Department of Conservation and Recreation and the Virginia Stormwater Management Program.

5. Record Drawing and Construction Certification. A record drawing (as-built) and construction certification is required for pond modifications as proposed. Provide notes on the plan accordingly to ensure this activity is adequately coordinated and performed before, during and following construction in accordance with current County guidelines.

6. Powhatan Creek. Revise Powhatan Creek watershed information on the cover sheet to reflect the project is situated in catchment 205-107-1, not 205-108-1.

7. Presentation. For general reference, label U.S. 199; Centerville Road; the existing soccer fields; and the WISC site on environmental inventory Sheet C1.1. Also, label the Third High School (SP-41-05); the County Stadium (SP-60-05); and the District Park West Pond (SP-82-05) on Sheets C1.1 and C1.2 with County approved site plan numbers as provided.

8. General Notes. Remove the "boxed" stormwater management note on the bottom right-hand corner of the cover sheet as there is no impervious cover associated with this project, only dam improvements.

9. Irrigation Line. Show the approximate location of the pond irrigation line present on the west side of the dam (if known).

10. WISC Storm Outfall. Show the approximate location of the new storm drain outfall associated with the recent WISC Building Expansion. This outfall is situated to the north of the emergency spillway constructed as part of the EMERGENCY-INTERIM east pond dam improvements.

Chesapeake Bay Preservation:

11. CBE. Provide a "boxed" note on the cover sheet of the plans to indicate that this portion of the project is subject to the provision of Chesapeake Bay exception CBE 06-007 as approved on March 6, 2006. *(Note: This portion of the project required submission of a WQIA due to minor impacts to RPA buffer. The WQIA was submitted to the Environmental Division on February 24, 2006.)*

12. RPA Buffer. Delineate and label the RPA buffer line on environmental inventory Sheet C1.1.

13. RPA Impacts. List (quantify) impacts to the RPA buffer on environmental inventory Sheet C1.1, consistent with information as provided in the WQIA (0.76 acres).

14. FEMA FIRM. Ensure there is no FEMA SFHA Zone A or AE present at the downstream toe of the existing dam. If present, it must be so indicated on the environmental inventory. Refer to FEMA Panels # 20 or # 35 to determine if SFHA is present at the site.

15. WQIA. The last two sentences of the first paragraph on Page 2 of the WQIA indicated the following: "we have included in our proposal improving the principal spillway to pass the postdevelopment 10-year storm and providing 24-hour extended detention of the postdeveloped 1-year storm". Based on our involvement with the Warhill PPEA project, it is our understanding that at no time was the District Park East Pond ever designed to meet stream channel protection criteria and service as a BMP for upstream improvements associated with the Warhill PPEA. The Third High School has onsite stormwater management to meet SCPV and Water Quality control criteria. The East Pond interim and final upgrades were only performed to meet dam safety requirements and to safely pass increased runoff from large storm events safety through the dam and to maintain structural integrity of the dam. This statement in the WQIA may be incorrect and copied over from the West Pond WQIA as the PER for the East Pond has no computations to support the pond meets SCPV criteria. *(Note: If incorrect, provide a revision to page 2 of the WQIA.)*

16. Limit of Work. Environmental inventory Sheet C1.1 shows incorrect information with respect to the limit of work for the District Park West Pond PC105. Access to the west pond was revised, coming in from the existing haul road to the west, not the area to the east of the pond which goes to Warhill Trail. The access toward Warhill Trail road was never used.

Erosion & Sediment Control Plan:

17. Dust Control. Due to the proximity of the site to nearby subdivisions and the District Park soccer fields, add dust control measures to the erosion and sediment control plan. This will be especially important as the existing haul road along the soccer fields is a highly used area and is incorporated into the east pond final improvement work plan.

18. Limits of Work. Although proposed clearing limits are shown on Sheet C1.6, the information is incomplete. Show a limit of work (clearing and grading) around the entire site periphery including

the upstream side of dam, the east dam abutment and connecting to the limits of work to the existing haul road.

19. Toe Drain. Show minimum bedding depth of stone required beneath the perforated polyethylene pipe on the toe drain detail on Sheet C1.4.

20. Check Dam. Provide a single rock check dam within the proposed limits of work just downstream of the proposed location of the plunge pool. This will provide for erosion and sediment control during dewatering operations and during initial construction activities for the plunge pool, concrete channel, outlet barrel and principal spillway device.

Stormwater Management / BMP Plan:

21. Emergency Spillway. Clearly show emergency spillway crest elevation (El. 70.7) on the pond plan or details.

22. WSELs. The following comments pertain to design water surface elevations as shown on the construction plan.

    22a. Show design water surface elevations for the 1-, 2-, 10-, 25- and 100-year storms on Sheet C1.6.

    22b. Water surface elevations on the WSEL table on Sheet C1.6 do not match the Preliminary Engineering Report (PER) for the 1- and 10-year storms.

    22c. Correctly label the proposed 100-year WSEL on the "Section A-A" detail as El. 71.25.

23. Normal Pool. Ensure all normal pool elevations shown on Sheet C1.6 are consistent. The normal pool elevation on the "Embankment Slope Improvements" detail do not match others on the sheet. It is believed, based on the pond model and previous investigations that normal pool elevation is at El. 67.7 and this will not change between pre- and final improvement conditions.

24. Wave Bench. Specify the type of soil material necessary in the "dot-hatched" portion of the wave bench as indicated on the "Embankment Slope Improvements" detail on Sheet C1.6. It is unclear if this is topsoil, compacted material or clay.

25. Pond Design. Provide a brief narrative and computational summary which reflects design parameters associated with the final east pond design including drainage area, runoff curve number, time of concentration and upland conditions considered in the design of the principal and emergency spillway, especially that related to assumptions for the Third High School. Curve numbers as shown in the design report under "developed conditions" show both disturbed conditions and a developed condition. It was unclear what CN was actually used in the final hydraulic model. Also, it is unclear if the large stormwater basin on the high school site was considered in the hydrology model.

26. Low Flow Device. The final "developed condition" outlet connectivity model in the Preliminary Engineering Report (PER) shows a circular orifice (15-inch at El. 67.68); however, the pond construction drawings show a 1.5 ft. slot in the weir box. Ensure the PER, Final Hydraulic Model

and Construction Plans reflect consistent information.

27. Outlet Structure. There appears to be some discrepancy between information called for in the PER and that reflected on the final improvement construction plan. The PER called for a 5 x 12 box culvert spillway, not a 42-inch circular as shown on construction plan Sheet C1.6. See the summary of "Flood Routing Table" on Page 4 and the "Conclusion and Recommendations (Final Condition)" on Page 5 of the PER to see information which reflects use of a 5 x 12 box structure. Ensure the PER, Final Hydraulic Model and Construction Plans reflect consistent information. *(Note: It was our understanding that the principal spillway and outlet barrel configuration for the East Pond would be very similar to that completed on the District Park West Pond.)*

28. Drainage Divides. Ensure drainage divides on Sheet C1.2 reflect the most recent drainage plan designs for the Third High School (SP-41-05) and the County Stadium (SP-60-05) and that the total drainage area to the East Pond (ultimate) is correct at 111.40 acres. The drainage area shown on the map and the drainage area shown on the composite RCN computation for the Third High School site do not seem to match.

29. Waiver Request. A waiver request dated February 24, 2006 to waive side slope and bench requirements, consistent with the County BMP manual requirements, is acknowledged. It should be noted that the District Park East Pond was not intended to be upgraded to serve as a BMP or to provide stream channel protection for the Warhill PPEA project. Upgrades were only intended to bring the basin into compliance with state dam safety criteria and to safely pass large storm events without threatening the structural integrity of the dam. Even though the waiver was not necessary, it will still be processed by Environmental Division staff as this is a County project.

30. Maintenance Plan. In the "BMP Description" on the Maintenance Plan on Sheet C1.4, the following must be revised or corrected.

    30a. The East Pond is not technically a 10-point, wet-type BMP facility for the Warhill PPEA project. It is a wet pond, but not a 10-point facility.

    30b. Correct the drainage area to be consistent with the final design. Currently it shows 150 acres.

    30c. Ensure all information in the narrative in the "BMP Description" is correct with respect to final pond features and function.

    30d. It does not appear a cleanout elevation or depth were specified in the maintenance plan.

31. SSC. Although Special Stormwater Criteria was required for this phase of work, it appears that no additional SSCP measures are required as this portion of the project still falls under SSCPs as previously provided from the L-Road portion of the project. Provide a note at the end of the Special Stormwater Criteria portion of Sheet C1.3 to indicate that SSC was fulfilled by other portions of the PPEA project so that state review agencies are not confused about SSC and whether it is required on this particular project.

32. Final Report. It is requested that once the plans and computations are deemed acceptable, that a final set of stamped and sealed computations be provided for the District Park East Pond PC 106 design. The computations should be in an organized fashion with applicable drainage maps; hydrology, water quality and and PondPack hydraulic routings for the 1-, 2-, 10- and 100-year design storm events. The design report shall have a brief narrative explaining the design and it's assumptions, a table of contents and a cover sheet entitled "Warhill PPEA: District Park East Pond PC106 Final Improvements". The Environmental Division will require two copies, one for the Warhill PPEA file and one for the asbuilt file for the dam.

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
DISTRICT PARK EAST POND DAM PC106
EMERGENCY - INTERIM REPAIR
COUNTY PLAN NO. SP – 107 - 05
September 30, 2005

Note: This review is associated with proposed emergency – interim improvements to the District Park East Pond, County BMP ID Code: PC 106. Applicable specifications are found on plan Sheet 1 of 1 and the Preliminary Engineering Report (PER) as previously approved..

General:

1. All "unresolved" issues as outlined on the interim construction plan must be resolved before land-disturbing activities can commence, especially the wetlands issue.

   These have been resolved and the notes have been removed from the plan. The wetland delineation shown on the plan has been confirmed by the Corps and a permit application has been submitted for he wetland fringe impacts associated with the work on the upstream face of the dam. The grading for the emergency spillway has been adjusted slightly to avoid any wetland impacts.

   The work on the upstream face of the dam CANNOT proceed until the environmental permit is obtained.

2. The sheet needs to be referred to as an EMERGENCY-INTERIM repair plan, rather than just an INTERIM repair plan; otherwise, a land-disturbing permit and Chesapeake Bay exception would be required.

   done

3. Inspection Requirement Note # 4 needs to indicate that asbuilts and construction certification are required after the interim repairs are completed. As permanent improvements may not occur until some time after the emergency – interim repairs are completed, there must be assurances that interim improvements as proposed on the plan were constructed properly until such time as final improvements are performed. *(Our Division routinely requires interim construction certification of basin that may be in sediment basin mode but may not be converted to a final BMP for an extended period of time. Refer to pages 4 and 5 of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing & Construction Certification Forms*

   done

4. Provide a note on the plan to indicate this project is situated in subwatershed 205 and catchment 205-107-1 of the Powhatan Creek watershed.

   Done – See General Note

5. Provide a status report for permitting of the dam under the Virginia Dam Safety regulations.

We will notify DCR of these emergency interim improvements, but will not go through the formal process until the final design improvements are made. ✓

Chesapeake Bay Preservation:

6. Work as proposed under the final dam improvement plan will require an administrative Chesapeake Bay exception. Use the same format and template as completed for the District Park West Pond PC105. The inventory for the final plan will need to show delineated wetlands, RPA and RPA buffer associated with the work site.

   agreed ✓

Repair Plan:

7. Top of dam elevation as shown conflicts between the emergency spillway profile and the 1 inch = 40 ft. plan view. One says El. 73, the other says El. 72.5. According to the approved PER, top of dam needs to be at El. 73.

   The top of dam has been adjusted to elevation 73.0'

8. Show minimum lining depth for EC-3 matting on the "EMS SECTION @ CONTROL" detail.

   Done ✓

9. Based on information shown on the EMERGENCY SPILLWAY PROFILE, the last portion of the centerline of spillway appears to be at zero grade or reverse grade from proposed El. 65 back to original ground. It is unclear if this is acceptable.

   We have modified the grading to eliminate the proposed 65' contour. This results is a positive grade throughout the spillway profile.

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
DISTRICT PARK EAST POND DAM PC106
EMERGENCY - INTERIM REPAIR
COUNTY PLAN NO. SP – 107 - 05
September 20, 2005

Note: This review is associated with proposed emergency – interim improvements to the District Park East Pond, County BMP ID Code: PC 106. Applicable specifications are found on plan Sheet 1 of 1 and the Preliminary Engineering Report (PER) as previously approved..

General:

1. All "unresolved" issues as outlined on the interim construction plan must be resolved before land-disturbing activities can commence, especially the wetlands issue.

2. The sheet needs to be referred to as an EMERGENCY-INTERIM repair plan, rather than just an INTERIM repair plan; otherwise, a land-disturbing permit and Chesapeake Bay exception would be required.

3. Inspection Requirement Note # 4 needs to indicate that asbuilts and construction certification are required after the interim repairs are completed. As permanent improvements may not occur until some time after the emergency – interim repairs are completed, there must be assurances that interim improvements as proposed on the plan were constructed properly until such time as final improvements are performed. *(Our Division routinely requires interim construction certification of basin that may be in sediment basin mode but may not be converted to a final BMP for an extended period of time. Refer to pages 4 and 5 of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing & Construction Certification Forms*

4. Provide a note on the plan to indicate this project is situated in subwatershed 205 and catchment 205-107-1 of the Powhatan Creek watershed.

5. Provide a status report for permitting of the dam under the Virginia Dam Safety regulations.

Chesapeake Bay Preservation:

6. Work as proposed under the final dam improvement plan will require an administrative Chesapeake Bay exception. Use the same format and template as completed for the District Park West Pond PC105. The inventory for the final plan will need to show delineated wetlands, RPA and RPA buffer associated with the work site.

Repair Plan:

7. Top of dam elevation as shown conflicts between the emergency spillway profile and the 1 inch = 40 ft. plan view. One says El. 73, the other says El. 72.5. According to the approved PER, top of dam needs to be at El. 73.

8. Show minimum lining depth for EC-3 matting on the "EMS SECTION @ CONTROL" detail.

9. Based on information shown on the EMERGENCY SPILLWAY PROFILE, the last portion of the centerline of spillway appears to be at zero grade or reverse grade from proposed El. 65 back to original ground. It is unclear if this is acceptable.

SAMPLE

INTERIM COMM

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
DISTRICT PARK EAST POND DAM PC106
EMERGENCY - INTERIM REPAIR
COUNTY PLAN NO. SP – 107 - 05
March 1, 2006

Note: This review is associated with proposed emergency – interim improvements to the District Park East Pond, County BMP ID Code: PC 106. Applicable specifications are found on plan Sheet 1 of 1 and the Preliminary Engineering Report (PER) as previously approved.

General:

1. All "unresolved" issues as outlined on the interim construction plan must be resolved before land-disturbing activities can commence, especially the wetlands issue.

2. The sheet needs to be referred to as an EMERGENCY-INTERIM repair plan, rather than just an INTERIM repair plan; otherwise, a land-disturbing permit and Chesapeake Bay exception would be required.

SEE NOTE SHEET 1.6

3. Inspection Requirement Note # 4 needs to indicate that asbuilts and construction certification are required after the interim repairs are completed. As permanent improvements may not occur until some time after the emergency – interim repairs are completed, there must be assurances that interim improvements as proposed on the plan were constructed properly until such time as final improvements are performed. *(Our Division routinely requires interim construction certification of basin that may be in sediment basin mode but may not be converted to a final BMP for an extended period of time. Refer to pages 4 and 5 of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing & Construction Certification Forms*

MAY BE O.K. SEE NOTE #6

4. Provide a note on the plan to indicate this project is situated in subwatershed 205 and catchment 205-107-1 of the Powhatan Creek watershed.

5. Provide a status report for permitting of the dam under the Virginia Dam Safety regulations.

Chesapeake Bay Preservation:

6. Work as proposed under the final dam improvement plan will require an administrative Chesapeake Bay exception. Use the same format and template as completed for the District Park West Pond PC105. The inventory for the final plan will need to show delineated wetlands, RPA and RPA buffer associated with the work site.

Repair Plan:

NONE SHOWN

7. Top of dam elevation as shown conflicts between the emergency spillway profile and the 1 inch = 40 ft. plan view. One says El. 73, the other says El. 72.5. According to the approved PER, top of dam needs to be at El. 73.

8. Show minimum lining depth for EC-3 matting on the "EMS SECTION @ CONTROL" detail.

9. Based on information shown on the EMERGENCY SPILLWAY PROFILE, the last portion of the centerline of spillway appears to be at zero grade or reverse grade from proposed El. 65 back to original ground. It is unclear if this is acceptable.

BEM / SVI

Meeting @ Timmons 4/10 M. CLAVD D. GOULD

ENVIRONMENTAL DIVISION REVIEW COMMENTS
WARHILL SITE ROADWAYS AND IMPROVEMENTS
DISTRICT PARK EAST POND DAM (PC 106) - FINAL IMPROVEMENTS
COUNTY PLAN NO. SP – 107 - 05

March 13, 2006

Note: This review is associated with proposed final improvements to the District Park East Pond, County BMP ID Code: PC 106. Applicable plan sheets include: cover C1.0, C1.1, C1.2, C1.3, C1.4, C1.5 and C1.6. This is the first review of final dam improvement plan .

General:

1. ✓ A Land-Disturbing permit and preconstruction conference are required for this portion of the project.

2. ✓ Dam Permit. It appears the impounding structure is subject to the provisions of Virginia Dam Safety Program and 4 VAC 50-20 Impounding Structure Regulations. Evidence of a construction permit from the Virginia Soil and Water Conservation Board will be required.

3. ✓ Wetland Permit. This portion of the project is subject to any applicable provisions of Nationwide Permit # 3 (05-R2325) as obtained from the U.S. Army Corp. of Engineers.

4. ✓ VSMP. It appears construction activity for the site will exceed 2,500 square feet. Therefore, it is the owner's responsibility to register for coverage under the General Permit for Discharge of Stormwater from Construction Activities, in accordance with current requirements of the Virginia Department of Conservation and Recreation and the Virginia Stormwater Management Program.

5. ✓ Record Drawing and Construction Certification. A record drawing (as-built) and construction certification is required for pond modifications as proposed. Provide notes on the plan accordingly to ensure this activity is adequately coordinated and performed before, during and following construction in accordance with current County guidelines.

6. ✓ Powhatan Creek. Revise Powhatan Creek watershed information on the cover sheet to reflect the project is situated in catchment 205-107-1, not 205-108-1.

7. Presentation. For general reference, label U.S. 199; Centerville Road; ✓ the existing soccer fields; ✓ and the WISC site on environmental inventory Sheet C1.1. ✓ Also, label the Third High School (SP-41-05); the County Stadium (SP-60-05); and the District Park West Pond (SP-82-05) on Sheets C1.1 and C1.2 with County approved site plan numbers as provided.

8. ✓ General Notes. Remove the "boxed" stormwater management note on the bottom right-hand corner of the cover sheet as there is no impervious cover associated with this project, only dam improvements.

9. Irrigation Line. Show the approximate location of the pond irrigation line present on the west side of the dam (if known).

Location Unknown, Add GEN NOTE To Sheet C1.4

PC106 will HAVE SCPV, NOT RQD.

10. ✓ WISC Storm Outfall. Show the approximate location of the new storm drain outfall associated with the recent WISC Building Expansion. This outfall is situated to the north of the emergency spillway constructed as part of the EMERGENCY-INTERIM east pond dam improvements.

Chesapeake Bay Preservation:

11. ✓ CBE. Provide a "boxed" note on the cover sheet of the plans to indicate that this portion of the project is subject to the provision of Chesapeake Bay exception CBE 06-007 as approved on March 6, 2006. *(Note: This portion of the project required submission of a WQIA due to minor impacts to RPA buffer. The WQIA was submitted to the Environmental Division on February 24. 2006.)*

12. ✓ RPA Buffer. Delineate and label the RPA buffer line on environmental inventory Sheet C1.1.

13. ✓ RPA Impacts. List (quantify) impacts to the RPA buffer on environmental inventory Sheet C1.1, consistent with information as provided in the WQIA (0.76 acres).

Resp. 14. FEMA FIRM. Ensure there is no FEMA SFHA Zone A or AE present at the downstream toe of the existing dam. If present, it must be so indicated on the environmental inventory. Refer to FEMA Panels # 20 or # 35 to determine if SFHA is present at the site.

15. WQIA. The last two sentences of the first paragraph on Page 2 of the WQIA indicated the following: "we have included in our proposal improving the principal spillway to pass the postdevelopment 10-year storm and providing 24-hour extended detention of the postdeveloped 1-year storm". Based on our involvement with the Warhill PPEA project, it is our understanding that at no time was the District Park East Pond ever designed to meet stream channel protection criteria and service as a BMP for upstream improvements associated with the Warhill PPEA. The Third High School has onsite stormwater management to meet SCPV and Water Quality control criteria. The East Pond interim and final upgrades were only performed to meet dam safety requirements and to safely pass increased runoff from large storm events safety through the dam and to maintain structural integrity of the dam. This statement in the WQIA may be incorrect and copied over from the West Pond WQIA as the PER for the East Pond has no computations to support the pond meets SCPV criteria. *(Note: If incorrect, provide a revision to page 2 of the WQIA.)*

WILL DO SCPV DO NOT CHANGE WQIA. WILL PROVIDE SCPV

16. ✓ Limit of Work. Environmental inventory Sheet C1.1 shows incorrect information with respect to the limit of work for the District Park West Pond PC105. Access to the west pond was revised, coming in from the existing haul road to the west, not the area to the east of the pond which goes to Warhill Trail. The access toward Warhill Trail road was never used.

Erosion & Sediment Control Plan:

17. ✓ Dust Control. Due to the proximity of the site to nearby subdivisions and the District Park soccer fields, add dust control measures to the erosion and sediment control plan. This will be especially important as the existing haul road along the soccer fields is a highly used area and is incorporated into the east pond final improvement work plan.

18. ✓ Limits of Work. Although proposed clearing limits are shown on Sheet C1.6, the information is incomplete. Show a limit of work (clearing and grading) around the entire site periphery including

the upstream side of dam, the east dam abutment and connecting to the limits of work to the existing haul road.

19. ✓ Toe Drain. Show minimum bedding depth of stone required beneath the perforated polyethylene pipe on the toe drain detail on Sheet C1.4.

20. ✓ Check Dam. Provide a single rock check dam within the proposed limits of work just downstream of the proposed location of the plunge pool. This will provide for erosion and sediment control during dewatering operations and during initial construction activities for the plunge pool, concrete channel, outlet barrel and principal spillway device.

Stormwater Management / BMP Plan:

21. ✓ Emergency Spillway. Clearly show emergency spillway crest elevation (El. 70.7) on the pond plan or details.

22. WSELs. The following comments pertain to design water surface elevations as shown on the construction plan.

    22a. ✓ Show design water surface elevations for the 1-, 2-, 10-, 25- and 100-year storms on Sheet C1.6.

    22b. ✓ Water surface elevations on the WSEL table on Sheet C1.6 do not match the Preliminary Engineering Report (PER) for the 1- and 10-year storms. DETAILED DESIGN PER IS VOID.

    22c. ✓ Correctly label the proposed 100-year WSEL on the "Section A-A" detail as El. 71.25.

23. ✓ Normal Pool. Ensure all normal pool elevations shown on Sheet C1.6 are consistent. The normal pool elevation on the "Embankment Slope Improvements" detail do not match others on the sheet. It is believed, based on the pond model and previous investigations that normal pool elevation is at El. 67.7 and this will not change between pre- and final improvement conditions. ✓

24. ✓ Wave Bench. Specify the type of soil material necessary in the "dot-hatched" portion of the wave bench as indicated on the "Embankment Slope Improvements" detail on Sheet C1.6. It is unclear if this is topsoil, compacted material or clay.

25. ✓ Pond Design. Provide a brief narrative and computational summary which reflects design parameters associated with the final east pond design including drainage area, runoff curve number, time of concentration and upland conditions considered in the design of the principal and emergency spillway, especially that related to assumptions for the Third High School. Curve numbers as shown in the design report under "developed conditions" show both disturbed conditions and a developed condition. It was unclear what CN was actually used in the final hydraulic model. Also, it is unclear if the large stormwater basin on the high school site was considered in the hydrology model. 150 AC. COMBINE FOR FINAL REPORT.

26. ✓ Low Flow Device. The final "developed condition" outlet connectivity model in the Preliminary Engineering Report (PER) shows a circular orifice (15-inch at El. 67.68); however, the pond construction drawings show a 1.5 ft. slot in the weir box. Ensure the PER, Final Hydraulic Model

USING SLOT

and Construction Plans reflect consistent information.

27. ✓ Outlet Structure. There appears to be some discrepancy between information called for in the PER and that reflected on the final improvement construction plan. The PER called for a 5 x 12 box culvert spillway, not a 42-inch circular as shown on construction plan Sheet C1.6. See the summary of "Flood Routing Table" on Page 4 and the "Conclusion and Recommendations (Final Condition)" on Page 5 of the PER to see information which reflects use of a 5 x 12 box structure. Ensure the PER, Final Hydraulic Model and Construction Plans reflect consistent information. *(Note: It was our understanding that the principal spillway and outlet barrel configuration for the East Pond would be very similar to that completed on the District Park West Pond.)* 48" RCP TO BE USED.

28. ✓ Drainage Divides. Ensure drainage divides on Sheet C1.2 reflect the most recent drainage plan designs for the Third High School (SP-41-05) and the County Stadium (SP-60-05) and that the total drainage area to the East Pond (ultimate) is correct at 111.40 acres. The drainage area shown on the map and the drainage area shown on the composite RCN computation for the Third High School site do not seem to match. 37 AC PER HS PLAN.

29. ✓ Waiver Request. A waiver request dated February 24, 2006 to waive side slope and bench requirements, consistent with the County BMP manual requirements, is acknowledged. It should be noted that the District Park East Pond was not intended to be upgraded to serve as a BMP or to provide stream channel protection for the Warhill PPEA project. Upgrades were only intended to bring the basin into compliance with state dam safety criteria and to safely pass large storm events without threatening the structural integrity of the dam. Even though the waiver was not necessary, it will still be processed by Environmental Division staff as this is a County project. APPROVED 3-13-06

30. Maintenance Plan. In the "BMP Description" on the Maintenance Plan on Sheet C1.4, the following must be revised or corrected.

30a. ✓ The East Pond is not technically a 10-point, wet-type BMP facility for the Warhill PPEA project. It is a wet pond, but not a 10-point facility.

30b. ✓ Correct the drainage area to be consistent with the final design. Currently it shows 150 acres. 150 AC.

30c. ✓ Ensure all information in the narrative in the "BMP Description" is correct with respect to final pond features and function.

30d. It does not appear a cleanout elevation or depth were specified in the maintenance plan. 1/2 PERM POOL ELEV.

31. ✓ SSC. Although Special Stormwater Criteria was required for this phase of work, it appears that no additional SSCP measures are required as this portion of the project still falls under SSCPs as previously provided from the L-Road portion of the project. Provide a note at the end of the Special Stormwater Criteria portion of Sheet C1.3 to indicate that SSC was fulfilled by other portions of the PPEA project so that state review agencies are not confused about SSC and whether it is required on this particular project.

32. Final Report. It is requested that once the plans and computations are deemed acceptable, that a final set of stamped and sealed computations be provided for the District Park East Pond PC 106 design. The computations should be in an organized fashion with applicable drainage maps; hydrology, water quality and and PondPack hydraulic routings for the 1-, 2-, 10- and 100-year design storm events. The design report shall have a brief narrative explaining the design and it's assumptions, a table of contents and a cover sheet entitled "Warhill PPEA: District Park East Pond PC106 Final Improvements". The Environmental Division will require two copies, one for the Warhill PPEA file and one for the asbuilt file for the dam.

WILL PROVIDE

SP-41-03
BMP#1
TIPE B-3 BMP

100.02 Diffu

1-WK 96.36
IV WK 98.94
OA

PC 106
Worhill Eastern Pond
Dam

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

June 3, 2016

Re: Regular Operations and Maintenance Certificate

Dear Dam Owner:

Attached is the Regular Operation and Maintenance (O & M) Certificate, valid for six years, approved by the Virginia Soil and Water Conservation Board. For general responsibilities regarding inspections, reporting requirements, maintenance, dam break inundation zone maps, and emergency action plans and exercises, please check the latest Dam Safety Act, Impounding Structure Regulations, and Guidance Documents available at http://www.dcr.virginia.gov/dam-safety-and-floodplains/.

We also want you and your engineer to be aware that in March of 2016, the Board's new Probable Maximum Precipitation (PMP) Study for Virginia dated November 2015 (and the associated PMP Evaluation Tool and Database) are expected to become effective. The 2015 Virginia PMP values upon their effective date shall replace the several decades old PMP values currently required for use in the design of impounding structures in Virginia. Information regarding the status of the new PMP values adopted by the Board at their December 2015 meeting and a link to download the new PMP Tool and Database may be found at the two PMP links provided on the dam safety web page provided above. An estimated 95% of the PMP values across the Commonwealth have been reduced and may potentially result in a change to your impoundment's spillway design flood. It is also possible that upon performing updates to your dam break inundation zone maps that it may be found that the hazard classification of your structure may also change and the properties identified as impacted under your Emergency Action Plan or Emergency Preparedness Plan, as applicable, may be altered. It is important that you as an owner and your engineer review these new Dam Safety Program PMP values to see how they might affect the design and hazard classification of your impounding structure.

If you have any questions regarding your Certificate or the new PMP values, please contact your Regional Dam Safety Engineer or me at david.dowling@dcr.virginia.gov.

Sincerely,

David C. Dowling

David C. Dowling
Deputy Director of Soil and Water Conservation
and Dam Safety and Floodplain Management

Enclosure: Regular O & M Certificate

Engineering & ... Protection
JUN 14 2016
RECEIVED

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

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June 3, 2016

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Sincerely,

David C. Dowling

David C. Dowling
Deputy Director of Soil and Water Conservation
and Dam Safety and Floodplain Management

Enclosure: Regular O & M Certificate

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

DAM SAFETY AND FLOODPLAIN MANAGEMENT

Dam Safety Regular Operation and Maintenance Certificate
Low Hazard Dam, Inventory Number 09529

James City County, owner of Eastern Pond (PC 106) Dam in James City County, is entitled to operate and maintain this dam pursuant to the provisions of the Dam Safety Act (Section 10.1-604 et seq., Code of Virginia) and Virginia Soil and Water Conservation Board Regulations (Regulations) promulgated thereunder.

This certificate is for a term of six years. It becomes effective May 15, 2016 and expires May 31, 2022. In accordance with §4VAC50-20-105B of the Regulations, the owner shall apply for a new certificate 90 days prior to its expiration.

David C. Dowling, Deputy Director
Division of Dam Safety and Floodplain Management

James City County
VIRGINIA
Jamestown 1607

Development Management
101-A Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784
P: 757-253-6671
F. 757-253-6822
devman@james-city.va.us

jamescitycountyva.gov

Building Safety and Permits 757-253-6620
Engineering and Resource Protection 757-253-6670
Planning 757-253-6685
Zoning Enforcement 757-253-6671

February 18, 2016

Mr. Steve Snell, P.E.
Regional Engineer
Virginia Department of Conservation and Recreation
Dam Safety & Floodplain Management
600 East Main Street, 24th Floor
Richmond, VA 23219

Re: Warhill Sport Complex – Eastern Pond Dam # 09529
DCR Inventory # 09529; James City County, Virginia

Dear Mr. Snell:

Pursuant to email and letter correspondence received from DCR Dam Safety and Floodplain Management on September 15, 2015 and October 23, 2015 respectively, attached are items requested in order for James City County to secure a regular 6-year Operation and Maintenance Certificate for the Warhill Eastern Pond Dam, DCR Inventory No. 09529. The items requested and included with this cover letter are as follows:

- Original - Completed DCR Form 199-192: "Certificate and Permit Application Fee Form"
- Original - Completed DCR Form 199-099: "Operation and Maintenance Certificate Application"
- Check #90173224 dated 01/14/16 made payable to "Treasurer of VA" in the amount of three hundred and 00/100 dollars ($300.00)
- Copies of DCR email and letter dated 09/15/15 and 10/23/15

Please note that earlier this year we attempted to send the check for the permit fee, as instructed, to the address stated on DCR Form 199-192 "Certificate and Permit Application Fee Form" and the mail was returned to us. Therefore, we are attaching the check in this correspondence. Also please note that work to provide a dam break inundation zone analysis and report for the above referenced facility was subject to terms and conditions of grant agreement DSFP-65-13 under the Dam Safety, Flood Prevention and Protection Assistance Fund.

The County thanks the Virginia Department of Conservation and Recreation, Dam Safety and Floodplain Management Division for all their assistance to keep the Warhill Sports Complex, Western Pond Dam in compliance with Virginia Dam Safety Act and Impounding Structure Regulations.

Sincerely,

Scott J. Thomas, P.E.
Director
Engineering and Resource Protection

SJT/sjt
Attachments

cc: Erik Allen, Watershed Consulting PLLC (via email)

EasternPondDam/DCRLetter.021816

James City County, VA.

Warhill Sports Complex

Eastern Pond Dam #09529

Virginia Department of Conservation & Recreation

DEPARTMENT OF CONSERVATION AND RECREATION CERTIFICATE AND PERMIT APPLICATION FEE FORM

Reference: Impounding Structure Regulations, 4VAC 50-20-10 et seq., including 4VAC 50-20-340 through 400, Virginia Soil and Water Conservation Board

NOTE:
Fees for all application submittals required pursuant to 4VAC50-20-370 through 4VAC50-20-390 are due prior to issuance of a certificate or permit. No application for an Operation and Maintenance Certification or a Construction Permit will be acted upon by the Board without full payment of the required fee per § 10.1-613.5 of the Code of Virginia.

INSTRUCTIONS:
Submit a separate form for each impounding structure. Fees shall be paid by check, draft, or postal money order payable to the Treasurer of Virginia, and must be in U.S. currency, except that agencies and institutions of the Commonwealth of Virginia may submit Interagency Transfers for the amount of the fee. All fees should note the inventory number of the impounding structure to which it relates, if known, and shall be sent to the following address:

Virginia Department of Conservation and Recreation
Division of Finance
Accounts Payable
600 E. Main St., 24th Floor
Richmond, Virginia 23219

All fee payments shall be accompanied by the following information:
Applicant Name: Scott J. Thomas, P.E. (James City County, Virginia)
Address: 101-E Mounts Bay Road, P.O. Box 8784
Williamsburg, VA 23187
Daytime Phone: (757) 253-6639 Email: Scott.Thomas@jamescitycountyva.go
Name of the dam: Eastern Pond Dam
DCR Dam Safety Dam Inventory Number (5 digit no.): # 09529
Location of the dam (name of county or city): 5700 Warhill Trail GPIN 3210100012
Lat 37.325097 Long -76.759147

Type of Submittal:
XXX Regular Operation and Maintenance Certificate (A)
_____ Conditional Operation and Maintenance Certificate (B)
_____ Construction Permit (C)
_____ Extension of a Regular or Conditional Certificate (D)
_____ Incremental Analysis Review (E)

The amount of fee submitted: $300.00

Note: No permit fees remitted to the Department shall be subject to refund except as credits provided for in 4VAC50-20-390(C).

Financial Codes: 0926-74101-50314-402

Any application from submitted pursuant to 4VAC50-20-70 for permitting a proposed impounding structure construction shall be accompanied by a payment:

Construction Permit Application Fee	
High or Significant Potential Impounding Structures	$2,500
Low Hazard Potential Impounding Structures	$1,000

Any application for a six-year Regular Operation and Maintenance Certificate submitted pursuant to 4VAC50-20-105 shall be accompanied by a payment:

Regular Operation and Maintenance Certificate Fees	
High Hazard Potential	$600
Significant Hazard Potential	$600
Low Hazard Potential (except those exempted from fees by 4VAC50-20-51)	$300 *******

The fee for an extension of a Regular Operation and Maintenance Certificate shall be $250 per year or portion thereof.

Any application for a Conditional Operation and Maintenance Certificate submitted pursuant to 4VAC50-20-150 shall be accompanied by a payment:

Conditional Operation and Maintenance Certificate Fees	
More Than One Year But No More Than Two Years	$300
For One Year or Less	$150

The fee for an extension of a Conditional Operation and Maintenance Certificate shall be $250 per year or portion thereof.

Pursuant to 4VAC50-20-390(C), the Board may allow a partial credit towards the Regular Operation and Maintenance Certificate fee if the owner of the impounding structure has completed, to the Director's satisfaction, the conditions of the Conditional Certificate prior to its expiration.

Pursuant to 4VAC50-20-400, should the Department determine that outside expertise to assist with the review of an incremental damage analysis is necessary, the applicant shall be responsible for the cost of such outside expertise. The Department and the applicant shall agree upon such costs in advance.

Financial Codes: 0926-74101-50314-402

THIS DOCUMENT CONTAINS A COLORED BACKGROUND, FLUORESCENT FIBERS, AND A WATERMARK.

James City County
General Fund
PO Box 8701
Williamsburg, VA 23187-8701
757-253-6636

SUNTRUST
SunTrust Bank

Check No 90173224
Date 14-Jan-16
68-02/510

Pay Three Hundred Dollars and No Cents

To The Order Of

TREASURER OF VA
VA DEPT OF CONSERV & RECR.
600 E MAIN STREET 24TH FL
RICHMOND VA 23219

CHECK AMOUNT
$**********300.00

Jennifer D Tom
Treasurer
Bryan Hill
County Administrator

Void after 180 days

⑈90173224⑈ ⑆051000020⑆ 2016108 68⑈

Invoice		PO	Date	Amt Paid
1102215	WARHILL SPORTS COMPLEX-EASTE		02-Nov-15	$300.00
			Check Total:	$300.00

Virginia Department of Conservation & Recreation

State Parks • Soil & Water Conservation • Natural Heritage
Chesapeake Bay Local Assistance • Land Conservation
Outdoor Recreation Planning • Dam Safety & Floodplains

Date Prepared: 11-9-15
Prepared By: Erik Allen

OPERATION AND MAINTENANCE CERTIFICATE APPLICATION FOR VIRGINIA REGULATED IMPOUNDING STRUCTURES

Note: Any executed Application for an Operation and Maintenance Certificate must be mailed to the appropriate Regional Engineer. In addition, a completed Certificate and Permit Application Fee Form (DCR199-192) and the required fee must be mailed under separate cover to: Virginia Department of Conservation and Recreation, Division of Finance, Accounts Payable, 203 Governor Street, 4th Floor, Richmond, Virginia 23219.

Reference: Impounding Structures Regulations, 4VAC 50-20-10 et seq., including 4VAC 50-20-105 and 4VAC 50-20-150, Virginia Soil and Water Conservation Board

1. **Name of Dam:** Eastern Pond Dam Warhill Sports Complex (PC 106) Inventory Number: 09529
   Other Name (if any):

2. **Hazard Potential Classification** (See 4VAC 50-20-40 Hazard Classifications of the Virginia Impounding Structure Regulations):
   (Check one) ☐ HIGH ☐ SIGNIFICANT ☒ LOW

3. **Name of Owner(s):** James City County
   If a corporation, name of representative: Scott Thomas
   Mailing address: 101 E Mounts Bay Road, Williamsburg, VA 23185
   Telephone: (Business) 757 253-6639 (Residential)
   Other means of communication: EMAIL-scott.thomas@jamescitycountyva.gov
   Cell (757) 592-2599

4. **Operating Plan and Schedule:**
   Provide a narrative for each item:
   a. Operation of control gates and spillways: N/A
   b. Operation of Impoundment Drain: N/A

5. **Maintenance Plan and Schedule:**
   Provide a narrative explaining the Maintenance Plan and Schedule.
   a. Earthen Embankment Impounding Structures:
      (1) embankment: Mow embankment 2 times per year. Fall, and Spring. Inspect embankment for rodent holes, seeps and erosion.
      (2) principal spillway: Inspect and clean debris from spillway 2 times per year. If additional repairs are needed document damage and make repairs as needed.
      (3) emergency spillway: Inspect and clean debris from spillway 2 times per year. If additional repairs are needed document damage and make repairs as needed.
      (4) low level outlet: N/A
      (5) impoundment area: Inspect impoundment 2 times per year. Make repairs consistent with design as needed.
      (6) downstream channel: Inspect for erosion 2 times per year. Make repairs consistent with design as needed.
      (7) staff gages: N/A
      (8) other maintenance actions:

b. Concrete Impounding Structures (including masonry and others):

(1) upstream face: N/A

(2) downstream face: N/A

(3) crest of dam: N/A

(4) galleries (tunnels): N/A

(5) abutments: N/A

(6) spillways: N/A

(7) gates and outlets: N/A

(8) staff gages: N/A

(9) other maintenance actions:

6. Inspection schedule (provide appropriate response):

a. Operator inspection (daily, weekly, etc.): 2 times/year

b. Maintenance inspection (monthly, quarterly, semi-annual, annual): 2 times/ year and as needed

c. Technical safety inspection by a professional engineer. (Required for certification update: High Hazard Dams – every two years, Significant Hazard Dams – every three years and Low Hazard Dams – every six years: Every 6 years

d. Inspection by dam owner or designee (years in which a Professional Engineer does not inspect): Every year

e. Note: All dams must be inspected by a professional engineer each time a dam is overtopped or significant flows through the emergency spillway are experienced.

7. Emergency Action Plan Schedule:

Provide the events that initiate the Emergency Action Plan.

a. Rainfall amounts, emergency spillway flow levels or storm event:

Stage 2: 6"= 0-feet in emergency spillway Stage 3: 8" = 0.6-ft in emergency spillway

b. Frequency of observation: Stage I condition: Hourly Stage II condition: 30-min Stage III condition: Continuous

8. State whether or not the current hazard classification for the impounding structure is appropriate and whether or not additional work is needed to make an appropriate hazard designation:

Yes, current hazard classification is appropriate. No additional work is needed.

9. For newly constructed or recently altered impounding structures, provide certification from a Professional Engineer who has inspected the impounding structure during construction or alteration that, to the best of the engineer's judgment, knowledge and belief, the impounding structure and its appurtenances have been constructed or altered in conformance with the plans, specifications, drawings and other requirements approved by the Virginia Soil and Water Conservation Board.

OPERATION AND MAINTENANCE CERTIFICATE APPLICATION

OPERATION AND MAINTENANCE PLAN AND SCHEDULE CERTIFICATION BY OWNER

I hereby certify that the operation and maintenance plan and schedule provided herewith will be adhered to during the certification period except in cases of unanticipated emergency requiring departure therefrom in order to mitigate hazards to life and property, at which time my engineer and the Department of Conservation and Recreation will be notified.

Signed: Scott J. Thomas — Owner's Signature — Print Name

This 18TH day of February, 20 16.

CERTIFICATION BY OWNER'S ENGINEER

I hereby certify that the information provided in this form has been examined by me and found in my professional judgment to be true and correct.

Signed: Erik Allen, PE. — Professional Engineer's Signature — Print Name — Virginia Number: 024783

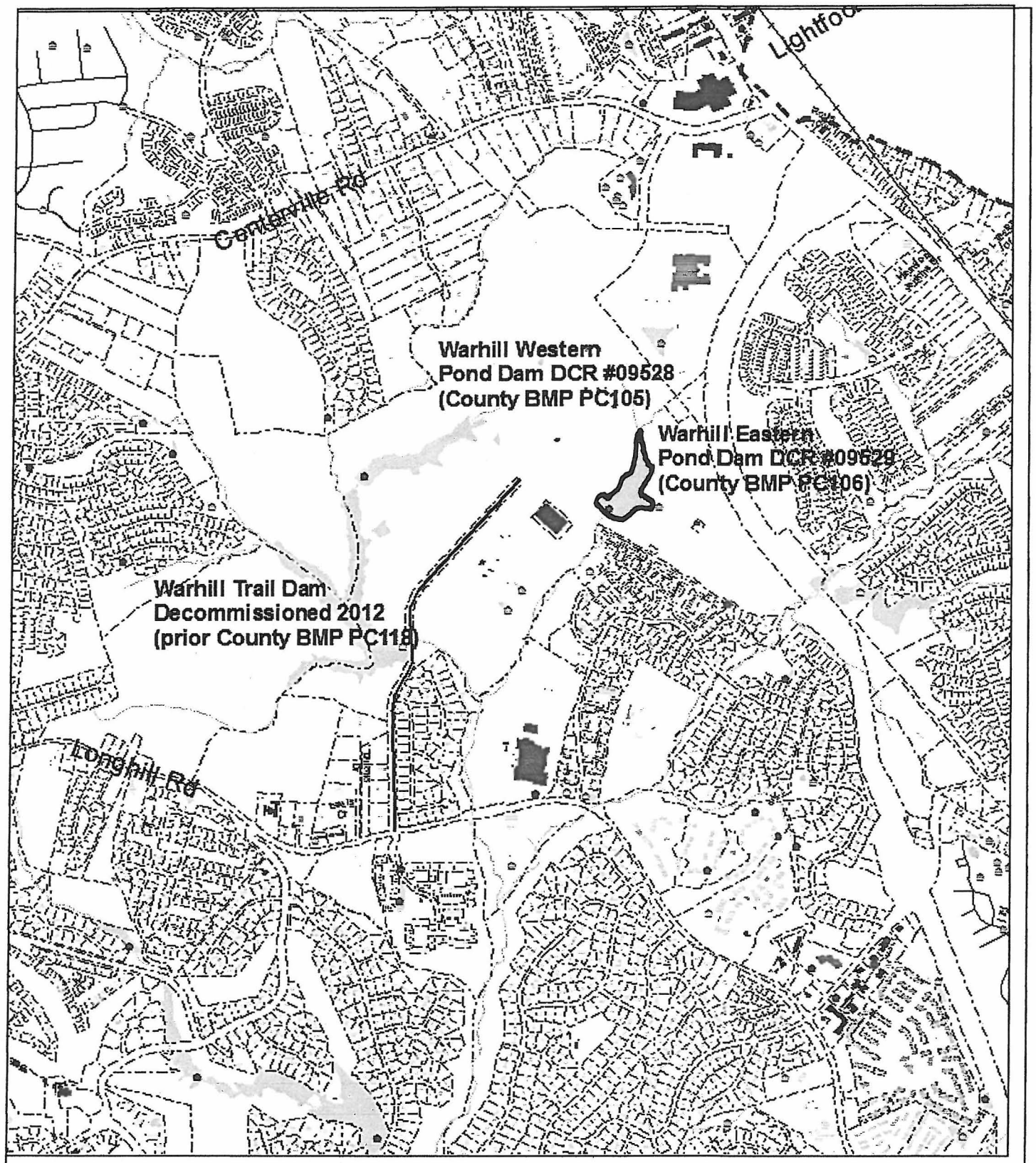
This 11TH day of November, 20 15.

Engineer's Virginia Seal:

COMMONWEALTH OF VIRGINIA
Erik Leon Allen
Lic. No. 024783
11-9-15
PROFESSIONAL ENGINEER

Remarks: DSFP-65-13; County assigned BMP ID Code No. PC106

Mail the executed form to the appropriate
Department of Conservation and Recreation
Division of Dam Safety and Floodplain Management
Regional Engineer



Warhill Sports Complex
DCR Regulated Dams

James City County
Jamestown 1607

N

0 0.05 0.1 Miles

This drawing is neither a legally recorded map nor a survey and is not intended to be used as such. The information displayed is a compilation of records, information, and data obtained from various sources, and James City County is not responsible for its accuracy or how current it may be. If discrepancies are found, please contact the Real Estate Assessment Division of James City County, Mapping/GIS Section.
Aerial Imagery Copyright 2008 James City County.

Scott Thomas

From: Snell, Steven (DCR) <Steven.Snell@dcr.virginia.gov>
Sent: Tuesday, September 15, 2015 12:59 PM
To: Scott Thomas
Cc: ErikAllen (Erik@watershedva.com)
Subject: Eastern Pond Dam
Attachments: DCR199-192.pdf

Scott,

Eastern Pond is approved for a 6 year Regular Certificate this month as a low hazard dam. If not yet submitted please submit the Fee and fee form for a regular certificate.

Thank You,
Steve

Steve Snell, P.E.
Regional Engineer
Virginia Department of Conservation and Recreation
Dam Safety & Floodplain Management
600 East Main St., 24th floor
Richmond, VA 23219
PH (804) 786-1359
FAX (804) 371-2630

Real life threats to your dam:
Hurricane Camille, Nelson County, VA
27" in 5 hours (100% PMP is 28" in 6 hours) over 126 deaths
Can your dam withstand this real life storm event or will it fail?

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

October 23, 2015

Scott Thomas, P.E.
James City County
101-E Mounts Bay Road
Williamsburg, VA 23185

Engineering & Resource Protection
OCT 30 2015
RECEIVED

RE: Eastern Pond Dam (PC 106), Inventory # 09529

Dear Dam Owner:

Our records indicate we have not received payment for an operation and maintenance certificate. Payment is required prior to issuance of a certificate or permit in accordance with the Dam Safety Act and Impounding Structure Regulations. Therefore, the Virginia Department of Conservation and Recreation must delay issuance of your certificate until proof of payment has been received.

You may submit your payment with a completed application and fee form (see attached) to the Department of Conservation and Recreation, Division of Finance/Accounts Payable Office located at 600 East Main Street, 24th Fl. Richmond, VA 23219.

Should you have any questions, please contact your Regional Dam Safety Engineer or myself at 804-786-3914 or via email at Robert.Bennett@dcr.virginia.gov.

Best regards,

Robert T. Bennett

Robert T. Bennett
Director, Dam Safety and Floodplain Management Division

Enclosure

cc: Regional Dam Safety Engineer

James City County
VIRGINIA
Jamestown 1607

TRANSMITTAL SHEET

ENGINEERING & RESOURCE PROTECTION → STORMWATER

Project: ~~SP-107-05~~ Warhill Sports Complex Eastern Pond Dam

County Plan No. SP-107-05

Assigned BMP No.: PC106

BMP Type: Wet Pond

Information Enclosed:

- ☐ Record Drawings (Asbuilts)
- ☐ Construction Certification
- ☐ Computations
- ☒ Other : Please add this copy of Regular six year Operation + Maintenance Certificate, received from DCR Dam Safety + Floodplain Management Division, dated June 3, 2016 to the asbuilt/construction certification file for PC106 Warhill Eastern Pond Dam.

The DCR dam safety inventory number is #09529. Expires May 31, 2022.

Name: Scott J. Thomas

Date: 09/26/16

Signature: Scott J. Thomas