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- STORMW ATER 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: **CC019**

DATE VERIFIED: **January 3, 2019**

QUALITY ASSURANCE TECHNICIAN: **Charles E. Lovett II**

LOCATION: WILLIAMSBURG, VIRGINIA

NOTES: Uploaded and Certified As-Built, Construction, Spillway Retrofit & Repair Study

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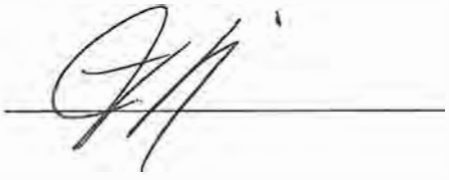
BMP NUMBER: **CC019**

DATE VERIFIED: **July 11, 2017**

QUALITY ASSURANCE TECHNICIAN: **Jonathan Craig**



LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

M E M O R A N D U M

DATE: July 11, 2017

SCANNER: Jonathan Craig, Assistant Environment Coordinator

RE: Files Approved for Scanning

Maintenance Agreements: YES
(in file as of scan date)

General File ID or BMP ID: CC019

PIN: 5010100010 AND 5010300012A.

Owner Name: KINGSMILL

Legal Description: COMMON AREA, KINGSMILL POND

Local Address: KINGSMILL POND, WILLIAMSBURG

Easement:

Recorded Plat:

Comments: Review of electron file. Scanned and added "Kingsmill Pond Water Quality Study" document dated March 2009, and Maintenance agreement 040003727 dated 29 Jan 2004. Hard copies destroyed.

CERTIFICATE OF AUTHENTICITY

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BMP NUMBER: **CC-019**

DATE VERIFIED: **March 21, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 11, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: CC019

PIN: 5010100010

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

Property Description: Common Area

Site Address:

(For internal use only) **Box** 12 **Drawer:** 7

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

Comments
Private Dam

1. Maintenance Agreement

150021398

COUNTY OF JAMES CITY, VIRGINIA

DECLARATION OF COVENANTS
INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

Engineering and Resource Protection Division
101-E Mounts Bay Road
Williamsburg, VA 23185
757-253-6670
jamescitycountyva.gov

Please type or print legibly in black ink. Covenantor(s) should submit this form to the JCC Engineering and Resource Protection Division, 101-E Mounts Bay Road, Williamsburg, VA 23185.

THIS DECLARATION OF COVENANTS, made this 26 day of October, 20 15, between Kingsmill Community Services Association, and all successors in interest, ("COVENANTOR(S)"), owner(s) of the following property:

Parcel Identification Number(s): 5010100010
Legal Description(s): Kingsmill Pond

Project or Subdivision Name: Kingsmill on the James/Spillway Retrofit and Repair
Document/Instrument No(s): _____
or Deed Book 341, Page No. 387,
and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

I (We), the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the SYSTEM to ensure that the SYSTEM is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the SYSTEM for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the SYSTEM for the purpose of inspecting, monitoring, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the SYSTEM in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the SYSTEM for the cost of the work and any applicable penalties.

Prepared by (Name, Address & Phone):
Susan Sickal KCSA
309 McLaws Cr, Suite D
Williamsburg, VA 23188
757-645-3454

Return to:
JCC Attorney's Office
101-D Mount's Bay Road
Williamsburg, VA 23185
(757) 253-6612

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance, repair, operation or use of the SYSTEM.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S) responsibilities for the SYSTEM. The COVENANTOR(S) shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the SYSTEM.

9. This COVENANT shall be recorded in the County Land Records.

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

COVENANTOR(S)

Frank Dooley
Signature

FRANK DOOLEY, PRESIDENT KCSA
Print Name and Title

ACKNOWLEDGMENT

COMMONWEALTH OF VIRGINIA
~~CITY~~/COUNTY OF James City, to wit:

I hereby certify that on this 26 day of October, 2015, before the subscribed, a Notary Public for the Commonwealth of Virginia, personally appeared Frank Dooley and did acknowledge the foregoing instrument to be his/her Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 26 day of October, 2015.

[SEAL]

MONA DANIEL KING
Notary Public
Commonwealth of Virginia
7540961
My Commission Expires Jan 31, 2017

Mona Daniel King
Notary Public

Notary Registration Number: 7540961

My Commission expires: 1/31/17

Approved as to form:

County Attorney

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 11-10-2015
at 3:14 AM/PM. The taxes imposed by Virginia Code Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$	$	$

TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B Woolridge Clerk

2.

Deeds/Easements/Agreements/Property Records

3. Construction Certificate

James City County VIRGINIA Jamestown 1607

Engineering and Resource Protection Division
Stormwater Management/BMP Record Drawing and Construction Certification Review Tracking Form

Project Name: Kingsmill Pond Spillway Repair
County Plan No.: E&S 022-15
Stormwater Management Facility: Wet Pond
BMP Phase #: ☐ I ☐ II ☐ III ☐ IV (These are County assigned phasing/colors on GIS map.)

- ☐ Information/submittal package received. Date/By: _____
- ☐ Completeness Check:
  - ☑ Record drawing (as-built) Date/By: 3/10/17 Stantec
  - ☐ Construction certification Date/By: _____
  - ☐ RD/CC standard forms (Required for all BMPs after Feb 1st 2001Only)
  - ☐ Insp/maint. agreement # / Date: 150021398 10/26/15
  - ☐ BMP Maintenance Plan Location: existing facility not needed
  - ☐ Other: _____
- ☑ Standard County SWPPP Notes on approved plan requiring RD/CC and/or County comment at plan review
  - ☑ Yes ☐ No Location: Pg. 4/9 approved plan
- ☑ Assign **County BMP ID Code #:** Code: CC019
- ☑ Preliminary input/log into Division's "As-Built Tracking Log"
- ☑ Add Location to County GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)
- ☑ Preliminary log into MS Access database (BMP ID #, Plan No., GPIN, Project Name, etc.)
- ☑ Active approved plan project file review (correspondence, H&H, design computations, etc.).
- ☑ Initial As-Built file setup (File label, folder, copy plan/details/design information, etc.).
- ☑ Inspector first check/review of RD/CC (confirmation of what was observed during inspection).
- ☑ Pre-inspection drawing review of the Approved Plan (Quick look prior to Field Inspection).
- ☑ Final inspection (FI) performed Date: 6/22/16
- ☑ Record drawing (RD) review Date: 6/22/16
- ☑ Construction certification (CC) Review Date: 6/22/16
- ☑ Actions based on reviews and inspection:
  - ☐ No comments.
  - ☑ Comments. Letter Forwarded. Date: 7/28/16
  - ☐ Record drawing (RD) issues to resolve.
  - ☐ Construction certification (CC) issues to resolve.
  - ☐ Field construction-related (CR) issues to resolve.
  - ☐ Site issues (SI) to resolve (stabilization, remove E&S measures, etc.)
  - ☐ Other (list): _____
- ☑ Second submission: 6/3/17
- ☑ Re-inspection (if necessary): Date(s): 7/20/17
- ☑ Acceptable for SWPPP/SWM purposes (RD/CC/CR/Other). Ok to proceed with surety release.
- ☑ Complete "Surety Request Form". Released 8/10/17
- ☐ Check/Clean active file of any remaining material and finish "As-Built" file.
- ☑ Put final inspection report into the as-built file.
- ☑ Obtain representative digital photographs of BMP and save into County BMP Inventory electronic file.
- ☑ Request and obtain mylar/reproducible of as-built from As-Built plan preparer.
- ☑ Request and obtain digital file (CD-ROM, etc.) from As-Built plan preparer.
- ☑ Complete "As-built Tracking Log".
- ☑ Last check of BMP Access Database for completeness (County BMP Inventory).
- ☐ VSMP construction general permit, Notice-of-Termination (NOT) protocol.

Final Sign-Off

Inspector: _____ Date: 5/15/18

Chief Engineer: _____ Date: 5.15.18

Stormwater Conveyance and Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

Standard Forms and Instructions

Contents | Page

Record Drawing and Construction Certification Forms

Issue Date: February 1, 2001
Revised: July 1, 2014

Engineering and Resource Protection Division
P: 757-253-6670
Resource.Protection@jamescitycountyva.gov

101-E Mounts Bay Road, P.O. Box 8784
F: 757-259-4032

Williamsburg, VA 23187-8784
jamescitycountyva.gov

Stormwater Conveyance and Stormwater Management / BMP Facilities Record Drawing and Construction Certification Forms

Note: In accordance with the Subdivision and Zoning ordinances of the County Code, plans of development have requirements to ensure that at the completion of the project and prior to release of surety, certified record drawings (as-builts) and construction certifications by a registered Professional Engineer, must be provided for constructed stormwater conveyance/drainage system and stormwater management/Best Management Practice (BMP) facilities. In addition, Sections 8-25 and 8-26 of Article II of Chapter 8 of the County Code, require the submission of construction record drawings and construction certifications for permanent stormwater management/BMP facilities and permanent stormwater conveyance systems such as inlets, pipes and channels. In addition, for stormwater management/BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a professional engineer who performed inspections during construction of the facility.

Section 1 - Site Information:

Project Name: Spillway Retrofit and Repair - Kingsmill Pond
Structure/BMP Name: Kingsmill Pond Dam
Project Location: 144-198 Macaulay Rd. Williamsburg, Virginia 23185
BMP Location: 144-198 Macaulay Rd. Williamsburg, Virginia 23185
County Plan No.: E&S-022-15 VAHU6 HUC Code: JL34

Project Type:
- ☑ Residential ☐ Business
- ☐ Commercial ☐ Office
- ☐ Institutional ☐ Industrial
- ☐ Public ☐ Roadway
- ☑ Other Spillway Repair

Tax Map/Parcel No.: 5010100010
County BMP ID Code (if known): CC019
Zoning District: R4 Residential Planned Community
Land Use: Dam Embankment and Spillway
Site Area (sf or acres): 3.99 AC (0.19 acres disturbed)

Brief Description of Stormwater Conveyance and/or Stormwater Management/BMP Facility:
Repair and retrofit of overflow spillway of Kingsmill Pond to address erosion issues underneath the existing spillway and capacity limitations relative to the Virginia Impounding Structure Regulations. The existing gabion/grouted riprap spillway has been replaced with a gobble lined concrete chute spillway. Additionally, a concrete curb was retrofit along the top edge of the newly constructed spillway to reach full design capacity.

Nearest Visible Landmark to SWM/BMP Facility: Tee box of Hole 13 of Kingsmill Golf Course

Nearest Vertical Ground Control (if known):

☐ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☐ Other

Station Number or Name: See attachment for point numbers
Datum or Reference Elevation: Top of Valve Cover (see attached plot)
Control Description: Iron rods provided by AES
Control Location from Subject Facility:
In response to a request for benchmark information, AES instructed the surveyor to use the top of the valve box (elevation 23.31). Surveyor does not know what vertical datum the benchmark is on. The plans have been designed under the assumption that the elevations provided in AES's survey were based on Vertical Datum NGVD 29, tied to the JCC Benchmark system.

Section 2 – Construction Information

Section 2A - Stormwater Conveyance System Construction Information (Pipes, Channels, etc.):

Pre-Construction Meeting Held: ☑ Yes ☐ No ☐ Unknown
Approx. Construction Start Date for System: November 5, 2015
System Milestone Inspection(s) by County Representative during Construction: ☐ Yes ☑ No ☐ Unknown
Name of Site Work Contractor Who Constructed System: David A. Nice Builders, Inc.
Name of Professional Firm Who Monitored Construction: Stantec Consulting Services Inc., GET Solutions, The Structures Group
Date of Completion of System: April 15, 2017
Date of Record Drawing/Construction Certification Submittal: June 09, 2017

Section 2B - Stormwater Management / BMP Facility Construction Information:

Pre-Construction Meeting Held for Construction of SWM/BMP Facility: ☐ Yes ☐ No ☐ Unknown
Approx. Construction Start Date for SWM/BMP Facility: _____
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☐ Unknown
Name of Site Work Contractor Who Constructed Facility: _____
Name of Professional Firm Who Monitored Construction: _____
Date of Completion for SWM/BMP Facility: _____
Date of Record Drawing/Construction Certification Submittal: _____

(Note: Record drawings and construction certifications are required within thirty (30) days of the completion of the stormwater conveyance system and/or stormwater management/ BMP facility construction. Record drawings and construction certifications must be reviewed and approved by the VESCP/VSMP authority prior to final inspection, acceptance, and surety release or reduction.)

Section 3 - Owner/Designer/Contractor Information:

Owner/Developer: *(Note: Site owner, operator, applicant or permittee responsible for development of the project.)*

Name: Kingsmill Community Services Association
Mailing Address: 309 McLaws Circle, Suite D Williamsburg, VA 23185
Business Phone: 757-603-6015 Fax: 757-603-6005
Email: ssickal@kingsmillcommunity.org
Contact Person: Susan Sickal, CMCA, AMS Title: Director of Operations

Design Professional: *(Note: Professional Engineer, Certified Land Surveyor or other qualified professional responsible for the design and preparation of plans and specifications for the stormwater conveyance system and/or stormwatermanagement/BMP facility.)*

Firm Name: Stantec Consulting Services Inc.
Mailing Address: 5209 Center Street Williamsburg, Virginia 23188
Business Phone/Fax: 757-220-6869/757-229-4507
Email: chris.kuhn@stantec.com
Name of Responsible Plan Preparer: Scott C. Blossom, PE, CFM / W. Douglas Beisch, PE
Title: Senior Engineer/Principal
Plan Name: Spillway Retrofit and Repair - Kingsmill Pond
Firm's Project No. 203400515
Plan/Revision Date: 10/12/2015 (Rev. 11/04/2016)
Plan Sheet No.'s Applicable: 1-9 / R1 / S1 / S2 / _____ / _____ /

Site/Utility Contractor: *(Note: Contractor directly responsible for construction of the stormwater conveyance system and/or stormwater management/BMP facility.)*

Firm Name: David A. Nice Builders, Inc.
Mailing Address: 4571 Ware Creek Road
Williamsburg, Virginia 23188
Business Phone/Fax: 757-566-3032/757-566-4686
Email: bnice@davidnicebuilders.com
Contact Person: T. Warren Hunnicutt
Site Foreman/Supervisor: Skip Woodroffe/Will Apperson
Specialty Subcontractors and Purpose: A+ Concrete, Inc. - Concrete work, Landsaver - E&S Controls

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 drawing, for the stormwater conveyance system for the project including any stormwater management/BMP facilities. A Registered Professional Engineer is responsible for the inspection, monitoring, and certification of stormwater conveyance systems and/or stormwater management / BMP facilities during its construction. See next page for the "simple" County provided certification form that can be used by qualified professionals to provide this information.)*

STANDARD CERTIFICATION FORM

Record Drawing Certification

Firm Name: SEBERT SURVEYING & LAYOUT, LLC
Mailing Address: 173 BARLOW ROAD
WILLIAMSBURG, VA 23188
Business Phone: 757-345-0931
Fax:
Name: A.D. SEBERT
Title: OWNER
Signature:
Date: 04/28/2017

I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the,

☑ Stormwater conveyance system
☐ Stormwater management / BMP facility

and the facility appears to conform to the provisions of the approved design plan, specifications, and stormwater management plan, except as specifically noted here.

COMMONWEALTH OF VIRGINIA
A.D. SEBERT
No. 002221
LAND SURVEYOR

A. D. Sebert 4/28/17 (Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

Firm Name: Stantec Consulting Services Inc
Mailing Address: 5209 Center Street
Williamsburg, VA 23188
Business Phone: 757-220-6869
Fax: 757-229-4507
Name: Cory S. Anderson, PE
Title: Engineer
Signature:
Date: 06/09/2017

I hereby certify to the best of my knowledge and belief that this,

☑ Stormwater conveyance system
☐ Stormwater management / BMP facility

was monitored and constructed in accordance with the provisions of the approved plan, specifications, and stormwater management plan, except as specifically noted here.

COMMONWEALTH OF VIRGINIA
CORY S. ANDERSON
Lic. No. 55811
06-09-2017
PROFESSIONAL ENGINEER

Cory S. Anderson (Seal)

Virginia Registered Professional Engineer

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

☑ Pre-Construction Meeting - Provides an opportunity to review SWM/BMP facility construction, maintenance and operation plans and addresses 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 Engineering and Resource Protection Division is requested. Usually, this requirement can be met simultaneously with Erosion and Sediment Control preconstruction meetings held for the project.

☐ 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, geotextiles, 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 VESCP/VSMP authority 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 VESCP/VSMP authority 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 VESCP/VSMP authority.

☐ 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 Engineering and Resource Protection Division prior to final inspection, acceptance and bond/surety release.

Dual Purpose Facilities (Temporary Sediment Basin & BMP) - 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 Engineering and Resource Protection 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.)

❒ In accordance with Sections 8-25 and 8-27 of the Chapter 8 of the County Code, an ***internal closed-circuit television (CCTV)*** post installation inspection, performed by the operator, is required as part of the asbuilt and construction certification process. CCTV inspections shall follow standards and specifications developed by the VSMP authority administrator.

❒ Record Drawings shall provide, at a minimum, all information as shown within these requirements, in accordance with standard industry practice, and in accordance with applicable **RECORD DRAWING CHECKLISTS** specific to the type of SWM/BMP facility being constructed. Other additional record data may be formally requested by the VESCP/VSMP authority. *(Note: Refer to the Virginia BMP Clearinghouse website and the current edition of the Virginia Stormwater Management Handbook for representative record drawing and construction certification checklists for the specific type of stormwater management/BMP facility being used. If none are available, the VSMP authority can provide this information if specifically requested.)*

❒ 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's BMP database and GIS system, it is requested that the record drawings also be submitted to the VESCP/VSMP authority on a CD-ROM in an acceptable electronic file format such as *.pdf, *.dxf, *.dwg, etc. or in a standard scanned and readable format. The electronic file requirement can be discussed and coordinated with Engineering and Resource Protection Division staff at the time of final submission.

Stantec

Transmittal

Engineering & Resource Protection
JUN 13 2017
RECEIVED

Stantec Consulting Services Inc.
5209 Center Street
Williamsburg VA 23188-2680
Phone: (757) 220-6869
Fax: (757) 229-4507

To:	Ms. Deirdre P. Wells, P.E.	From:	Cory Anderson, PE
Company:	James City County Engineering and Resource Protection	☑	For Your Information
		☐	For Your Approval
		☐	For Your Review
Address:	101 E-Mounts Bay Road Williamsburg, VA 23185	☐	As Requested
Phone:	757-253-6702		
Date:	June 9, 2017	Confirmation	
File:	203400515	of receipt:	_____
Delivery:	Regular Mail		(signature)

Reference: **Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15) Record Drawing and Construction Certification Forms.**

Attachment:

Copies	Doc Date	Pages	Description
1	06/09/2017	41	Stormwater Conveyance and Stormwater Management/BMP Facilities Record Drawing and Construction Certification Forms and Supplemental Documentation
1	~~03/24~~ 04/28/2017	2	Final As-built 04-28-17 after repair (24x36)

Ms. Wells,
The following submittal includes the signed RDCC form for project E&S-022-15 and includes attached documentation related to project benchmark location and geotechnical, structural, and concrete testing performed during construction. A plot of the final as-built graphics received by Stantec are included for reference.

STANTEC CONSULTING SERVICES INC.

Cory Anderson, PE
Engineer
Phone: (757) 220-6869
Fax: (757) 229-4507
cory.anderson@stantec.com

c. Chris Kuhn (Stantec)

4. Record Drawing (as-built plan)

KINGSMILL POND SPILLWAY AND DAM REPAIR

FOR

KINGSMILL COMMUNITY SERVICES ASSOCIATION

JAMES CITY COUNTY, VIRGINIA

GENERAL NOTES

1. THE PROJECT WILL BE CONSTRUCTED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE SPECIFICATIONS, JANUARY 1994 EDITION, EXCEPT FOR REFERENCES TO MEASUREMENT AND PAYMENT WHICH WILL BE OMITTED OR AS NOTED HEREIN.

2. PRIOR TO INSTALLATION, SUBMIT TO THE ENGINEER FOR APPROVAL ALL MATERIALS PROPOSED FOR USE ON THIS PROJECT. APPROVAL DOES NOT RELIEVE THE CONTRACTOR FROM HIS OBLIGATION AND RESPONSIBILITY FOR CONSTRUCTING THE PROJECT IN ACCORDANCE WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.

3. THE ABSENCE OF THE ENGINEER OR A REPRESENTATIVE FROM K.C.S.A. AT THE JOB SITE DOES NOT, IN ANY WAY, RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO PERFORM THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, ADDENDA AND WRITTEN AUTHORIZED PLAN REVISIONS.

4. THIS PROJECT IS A LUMP SUM CONTRACT. FOR BIDDING PURPOSES, THE FOLLOWING ESTIMATES OF MAJOR MATERIALS REQUIRED AND NOT SPECIFICALLY QUANTIFIED ON THE DRAWINGS ARE AS FOLLOWS:

DEMOLITION OF 6" CONCRETE SPILLWAY	470	SQUARE YARDS
STONE FILLED GABIONS	535	CUBIC YARDS
GROUTED RIP-RAP	211	CUBIC YARDS
UNGROUTED RIP-RAP	11	CUBIC YARDS
4" HDPE PERFORATED DRAIN PIPE	474	LINEAR FEET
FILTER FABRIC	537	SQUARE YARDS
EROSION CONTROL MATTING	670	SQUARE YARDS
SEEDING	760	SQUARE YARDS

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FOR THIS PROJECT.

6. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING "MISS UTILITY" (1-800-552-7001) FOR EXISTING UTILITY LOCATIONS PRIOR TO COMMENCING CONSTRUCTION.

7. COMPLY WITH ALL PROVISIONS OF THE VIRGINIA UNDERGROUND UTILITY DAMAGE PREVENTION ACT (SECTION 56-265.14 ET. SEQ. CODE OF VIRGINIA, 1950, AS AMENDED). CONTRACTOR HEREBY AGREES TO HOLD K.C.S.A. HARMLESS AGAINST ANY LOSS, DAMAGE, OR CLAIM OF ANY NATURE WHATSOEVER ARISING FROM THE CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS OF SAID ACT.

8. TO FACILITATE REPAIR OF THE SPILLWAY AND DAM, THE LAKE LEVEL WILL BE LOWERED FOR THE DURATION OF CONSTRUCTION. COORDINATE WITH K.C.S.A. CONSTRUCTION DIVISION, A MINIMUM OF 7 CALENDAR DAYS PRIOR TO BEGINNING WORK, TO ALLOW THE LAKE TO DRAIN SUFFICIENTLY TO COMPLETE THE WORK. MAINTENANCE OF THE LAKE LEVEL DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR.

9. ACCESS TO THE SITE IS PERMITTED ALONG THE PAVED PATH EXTENDING FROM SOUTHALL ROAD, NEAR THE INTERSECTION WITH MOUNTS BAY ROAD, TO THE DAM SITE. A STONE CONSTRUCTION ENTRANCE CONFORMING TO SECTION 3.02 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK WILL BE REQUIRED WHERE THE ACCESS ROUTE LEAVES THE PAVED SURFACE TO MINIMIZE SEDIMENT TRANSPORT ONTO THE PATH. WHERE SEDIMENT IS TRANSPORTED ONTO THE PAVED SURFACE, THE PATH SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY AND THE SEDIMENT REMOVED TO A SUITABLE DISPOSAL AREA. REMOVE THE CONSTRUCTION ENTRANCE UPON COMPLETION OF CONSTRUCTION AND RESTORE THE AREA TO THE ORIGINAL CONDITION. DAMAGE TO THE PAVED PATH SHALL BE REPAIRED TO THE SATISFACTION OF K.C.S.A AND THE ENGINEER.

10. ADJACENT TO THE PROPOSED SPILLWAY LIES THE RUINS OF JOHNSTON'S MILL, A HISTORIC PRESERVATION SITE. IN NO WAY SHALL THE CONTRACTOR DISTURB THE RUINS OF THE MILL THROUGHOUT THE COURSE OF CONSTRUCTION. SPECIAL CARE SHALL BE TAKEN WHEN WORKING IN THE PROXIMITY OF THE RUINS TO AVOID DISTURBANCE. INSTALL SAFETY FENCING AROUND THE MILL RUIN TO DELINEATE THE AREA AND PROVIDE A VISIBLE DETERRENT THROUGHOUT THE COURSE OF CONSTRUCTION.

11. THE CONTRACTOR SHALL ENDEAVOR TO MINIMIZE THE CLEARING REQUIRED AND MAKE EVERY EFFORT TO SAVE TREES AND SHRUBBERY IN THESE AREAS. CONFINE CLEARING TO THE LIMITS INDICATED. REPAIR DAMAGE OUTSIDE OF THESE LIMITS RESULTING FROM CONTRACTOR'S OPERATIONS TO THE SATISFACTION OF THE OWNER AND THE ENGINEER. CLEARLY MARK AREAS THAT ARE NOT TO BE DISTURBED BY FENCING, FLAGS, SIGNS, ETC.

12. RIP RAP SHALL BE CLASS I DRY RIP RAP CONFORMING TO SECTION 414 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. UNGROUTED RIP RAP WILL BE PLACED ON GEOTEXTILE BEDDING MATERIAL AND GROUTED RIP RAP WILL BE PLACED DIRECTLY ON THOROUGHLY COMPACTED GROUND. GROUTED RIP RAP SHALL CONFORM TO SECTION 414.03.D OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS, EXCEPT THAT THE TOP 3 INCHES SHALL NOT CONTAIN GROUT AND THE RIP RAP SHALL BE ALLOWED TO PROTRUDE FROM THE GROUT SURFACE TO THE FINISHED GRADE. BLENDING OF CLASS AI DRY RIP RAP WITH THE CLASS I DRY RIP RAP WILL BE REQUIRED FOR THE GROUTED RIP RAP TO MINIMIZE VOIDS PRIOR TO GROUTING. THE MINIMUM COMPRESSIVE STRENGTH OF THE GROUT SHALL BE 2,000 PSI AT 28 DAYS AND SHALL BE VERIFIED BY SUBMITTAL OF THE GROUT MIX TO THE ENGINEER PRIOR TO PLACEMENT.

13. GABIONS SHALL CONFORM TO, AND BE INSTALLED IN ACCORDANCE WITH SECTION 610 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. STONE FILL FOR THE GABIONS SHALL MATCH THE COLOR AND MINERAL COMPOSITION OF THE RIP RAP PROPOSED FOR THE SPILLWAY BED. GROUT THE GABIONS PLACED ON THE EXPOSED SURFACE OF WEIR WALL NO. 1 AND 2 WITH A MINIMUM OF 4" GROUT PENETRATION. WHERE INDICATED, SOIL REINFORCEMENT MATS SHALL BE INTEGRALLY TIED TO THE FACING GABIONS. THE INDICATED DESIGN OF THE SOIL REINFORCEMENT USES THE SAME GALVANIZED WIRE MESH SPECIFIED FOR CONSTRUCTION OF THE GABIONS. SUBMIT DESIGN CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN VIRGINIA FOR OTHER SOIL REINFORCEMENT SYSTEMS.

14. DEMOLITION OF THE EXISTING 6 INCH THICK CONCRETE SPILLWAY IS REQUIRED. BROKEN CONCRETE FROM THE DEMOLITION OF THE SPILLWAY MAY BE PERMITTED IN THE UNDERLYING COURSES OF THE GROUTED RIP RAP PROVIDED THAT NO PORTION OF THE BROKEN CONCRETE IS EXPOSED AFTER GROUTING. CONCRETE SLABS FROM THE SPILLWAY TO BE USED IN THE GROUTED RIP RAP SHALL BE BROKEN INTO PIECES NO LARGER THAN 18 INCHES MEASURED ALONG ANY DIMENSION. BROKEN CONCRETE IS NOT PERMITTED FOR USE AS GABION FILL.

15. STRIP SUITABLE TOPSOIL FROM THE SITE WHERE EXCAVATION OR GRADING IS INDICATED AND STOCKPILE THE MATERIAL SEPARATELY FROM OTHER EXCAVATED MATERIAL. STOCKPILES SHALL BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES. REPLACE A MINIMUM OF 4 INCHES OF TOPSOIL ON GRADED OR BARE DISTURBED AREAS TO PROMOTE NATIVE VEGETATION GROWTH.

16. SUFFICIENT BACKFILL OF APPROPRIATE CONSISTENCY EXISTS ON THE SITE TO ACHIEVE THE FINISHED GRADES INDICATED. THIS MATERIAL WILL BE CONSIDERED UNCLASSIFIED AND NO TESTING OTHER THAN FOR COMPACTION WILL BE REQUIRED BEFORE USE AS BACKFILL UNLESS OTHERWISE NOTED. EXCESSIVE FILL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER. BACKFILL PLACED BEHIND THE GABIONS AND BETWEEN SOIL REINFORCING MATS SHALL BE COMPACTED, IN MAXIMUM 8 INCH LIFTS, TO 95% OF THE ASTM D 1557 MAXIMUM DENSITY.

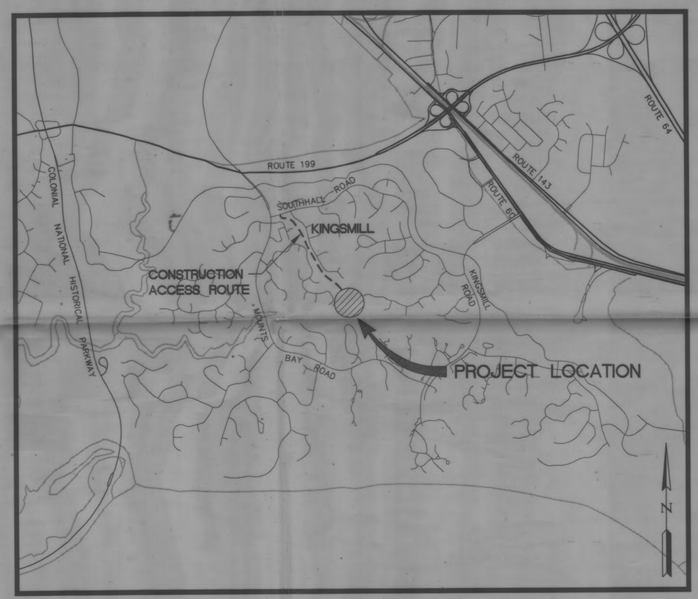
17. EXCAVATED MATERIAL CONTAINING VEGETATION, DEBRIS, DECAYED VEGETABLE MATTER, SOD, MULCH AND RUBBISH OR IS EXCESSIVELY SOFT OR WET IS CONSIDERED UNSUITABLE MATERIAL FOR USE AS BACKFILL OR AS A BASE FOR THE GABION WALLS OR THE SPILLWAY. IN AREAS WHERE EXCAVATION IS REQUIRED TO REMOVE UNSUITABLE MATERIAL BELOW THE ELEVATION OF THE BASE OF THE GROUTED RIP RAP SPILLWAY, BROKEN CONCRETE FROM THE DEMOLITION OF THE EXISTING SPILLWAY OR RIP RAP SHALL BE USED TO REPLACE THE UNSUITABLE MATERIAL. UNDER THE GABION WALLS, REPLACE UNSUITABLE MATERIAL WITH SUITABLE BACKFILL COMPACTED IN MAXIMUM 6 INCH LIFTS TO 95% OF THE ASTM D 1557 MAXIMUM DENSITY.

18. GENERAL GRADING SHALL BE DONE TO GRADES SHOWN ON THE PLANS. WHERE FILL IS REQUIRED AND FINISHED GRADES ARE NOT INDICATED ON THE PLANS, THE DISTURBED AREA SHALL BE BROUGHT TO THE APPROXIMATE ORIGINAL GRADES. ALL GRADED AREAS SHALL BE LEFT CLEAN AND SMOOTH WITH THE SLOPES NEATLY TRIMMED. IN NO CASE SHALL LOW AREAS THAT DO NOT DRAIN BE CREATED AS A RESULT OF THE CONSTRUCTION.

19. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY STABILIZATION SHALL BE PLACED ON AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR MORE THAN 30 DAYS.

20. SEEDING, FERTILIZING AND APPLICATION OF LIME WILL BE IN ACCORDANCE WITH SECTION 603 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS AND RECOMMENDATIONS IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. SEEDING IS REQUIRED ON ALL EXPOSED FACES OF THE DAM AND AREAS DISTURBED BY CONSTRUCTION ACTIVITIES. OVERSEEDING IS REQUIRED OVER THE ENTIRE SURFACE OF THE DAM AND WHERE DIRECTED BY THE ENGINEER. OVERSEED WILL BE AT A MINIMUM RATE OF 50 LBS./AC. THE MINIMUM REGULAR SEEDING RATE IS 150 LBS./AC.

21. EROSION CONTROL MATTING WILL BE REQUIRED ON ALL SLOPES STEEPER THAN 3:1. INSTALLATION WILL BE IN ACCORDANCE WITH SECTION 606 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. MATERIALS WILL CONSIST OF SOIL RETENTION MATS OR SOIL STABILIZATION MATS AS INDICATED IN SECTION 245 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS, SUBJECT TO APPROVAL FROM THE ENGINEER. JUTE MESH IS NOT ACCEPTABLE.



VICINITY MAP (APROX. SCALE 1"=2000')

INDEX OF SHEETS

LEGEND

EXISTING		PROPOSED
EX. W	WATER	W
EX. S	SANITARY SEWER	S
	STORM SEWER	
EX. FM	FORCE MAIN	F.M.
	MANHOLE	
	CURB DROP INLET	
	YARD DROP INLET	
	FLARED END SECTION	
	VALVE	
	FIRE HYDRANT ASSEMBLY	
	BLOW-OFF VALVE	
	AIR RELEASE ASSEMBLY	
	CLEAN OUT	
	WATER METER	
	STREETLIGHT	
	CENTERLINE/BASELINE	
	RIGHT OF WAY	

EXISTING		PROPOSED
	PROPERTY LINE	
	℄ DITCH/SWALE	
	CONCRETE LINED DITCH	
	EC-3 LINED DITCH	
	EXISTING TREELINE	
	LIMITS OF CLEARING	
	SILT FENCE	
	INLET PROTECTION	
	CHECK DAM	
	STRAW BALE BARRIER	
	RIP RAP	
	REVERSE ROLL TOP GUTTER	
80	EXISTING CONTOUR ELEV.	
	PROPOSED CONTOUR ELEV.	80
	GRADING BY OTHERS	80
	GRADING LINE TIE-IN	
25.1	GROUND ELEVATION	24.1
	PROPOSED TOP OF CURB ELEV.	24.1 TOC

EROSION AND SEDIMENTATION CONTROL LEGEND

SF	SILT FENCE	OP	OUTLET PROTECTION
IP	INLET PROTECTION	CIP	CULVERT INLET PROTECTION
CE	CONSTRUCTION ENTRANCE	ST	TEMPORARY SEDIMENT TRAP
CD	CHECK DAM	PS	PERMANENT SEEDING
STB	STRAW BALE BARRIER	SB	TEMPORARY SEDIMENT BASIN
DD	TEMPORARY DIVERSION DIKE	TP	TREE PROTECTION
RR	RIP RAP		

COMMONWEALTH OF VIRGINIA
AARON B. SMALL
No. 030712
4/11/00
PROFESSIONAL ENGINEER

RECORD DRAWING
7/25/01

APRIL 2000
AES PROJECT NO. 7753-12

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

DETENTION/BMP FACILITY CERTIFICATION

I CERTIFY THAT TO THE BEST OF MY JUDGMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

VA PROFESSIONAL ENGINEER — DATE: August 3, 2001 — VA LICENSE NUMBER: 18164

COVER SHEET

CC019

JCC BMP ID JR045 CC019 RECORD DRAWING INFORMATION PROVIDED BY G. NICE AND SONS, INC.

CC019

SITE TBM
NAIL IN 26" WHITE OAK
ELEV=24.33

26" WHITE OAK

STRUCTURE AND OUTFALL PIPE TO BE REMOVED AND/OR GROUTED IN PLACE

APPROXIMATE LOCATION OF RISER (UNDERWATER)

CONCRETE WEIR
ELEV. = 20.36
(TO REMAIN)

INV.=15.0'

LAKE

18" PLUG VALVE

EXISTING CONCRETE CHANNEL TO BE DEMOLISHED. SEE GENERAL NOTES.

GRADING LIMITS

WASHED OUT AREA

FILL TO MATCH EXISTING SLOPE

EDGE OF WATER
ELEV. = 20.66

GRADING LIMITS

WASHED OUT AREA

TOP OF EXPOSED 24" RCP

TOP EDGE OF WASHED OUT AREA

WEIR WALL #1

GRADING LIMITS

PROPOSED GABION WALL (TYPICAL)

PROPOSED GROUTED RIPRAP SPILLWAY (TYPICAL)

WASHED OUT AREA

ANTI-SEEP COLLAR (TYP.)

115 LF 18" DUCTILE IRON PIPE (MECH. JT.)

BRICK WALL RUINS

DO NOT DISTURB MILL RUINS. SEE GENERAL NOTES.

EDGE OF WATER

CONCRETE SLAB & RIP-RAP

2' STONE WALL

WASHED OUT AREA

EDGE WASHED OUT AREA

EDGE OF WATER

GRADING LIMITS

PROPOSED UNGROUTED RIPRAP

DAMAGED SPILLWAY

GRAPHIC SCALE
10' 0' 10' 20'
SCALE: 1" = 10'

N

No.	DATE	REVISION / COMMENT / NOTE	BY
2	1/25/01	RECORD DRAWING	ABS
1	1/02/01	REVISED TO ADD DRAIN LINE PER KCSA COMMENTS	ABS

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
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G. NICE AND SONS, INC.
CONSULTING ENGINEERS

EXISTING NORMAL POOL

EXISTING CONCRETE WEIR (TO REMAIN)

PROPOSED TOP OF GABION WALL, BOTH SIDES OF SPILLWAY

PROPOSED GROUTED RIPRAP SPILLWAY (TYPICAL)

3'L x 3.5'H x 2.5'W CONCRETE ANCHOR

ANTI-SEEP COLLAR (TYP.)

18" PLUG VALVE

18" DUCTILE IRON PIPE @ 5.22%

2.0' DEEP GROUTED RIPRAP

WEIR WALL #1

3.5' DEEP GROUTED RIPRAP

PROPOSED TOP OF GABION WALL, LEFT SIDE OF SPILLWAY

PROPOSED TOP OF GABION WALL, RIGHT SIDE OF SPILLWAY

3.0' DEEP GROUTED RIPRAP

TRANSITION FROM 3.0' DEEP TO 2.0' DEEP GROUTED RIPRAP

EXISTING GROUND

PROPOSED TOP OF GABION WALL, LEFT SIDE OF SPILLWAY

PROPOSED TOP OF GABION WALL, RIGHT SIDE OF SPILLWAY

PROPOSED TOP OF GABION WALL, BOTH SIDES OF SPILLWAY

2.0' DEEP GROUTED RIPRAP

PROPOSED RIPRAP (UNGROUTED)

30 20 10 0 -10 -20

10+00 + 10+50 + 11+00 + 11+50 + 12+00 + 12+50 +

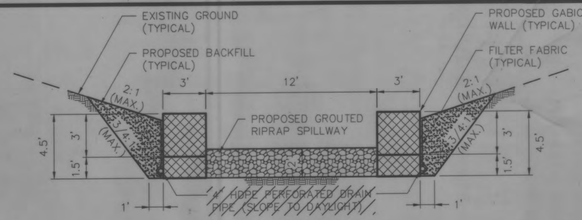
PLAN AND PROFILE - KINGSMILL POND SPILLWAY
KINGSMILL COMMUNITY SERVICES ASSOCIATION
KINGSMILL POND SPILLWAY AND DAM REPAIR
JAMES CITY COUNTY VIRGINIA

Designed	Drawn
ABS	BJU
Scale	Date
1"=10'	APRIL 2000
Project No.	
7753-12	
Drawing No.	
1	

04.10.00-13:24 7753121c1.dwg BJU

CC019_KINGSMILL_POND_DAM - 27 of 130

RECORD DRAWING INFORMATION PROVIDED BY G. NICE AND SONS, INC.



SECTION "A - A"

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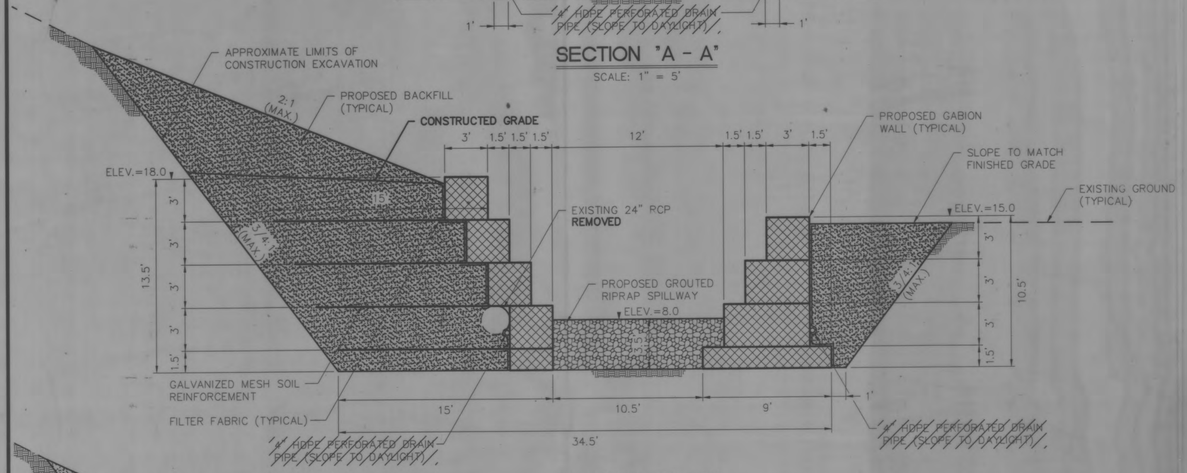

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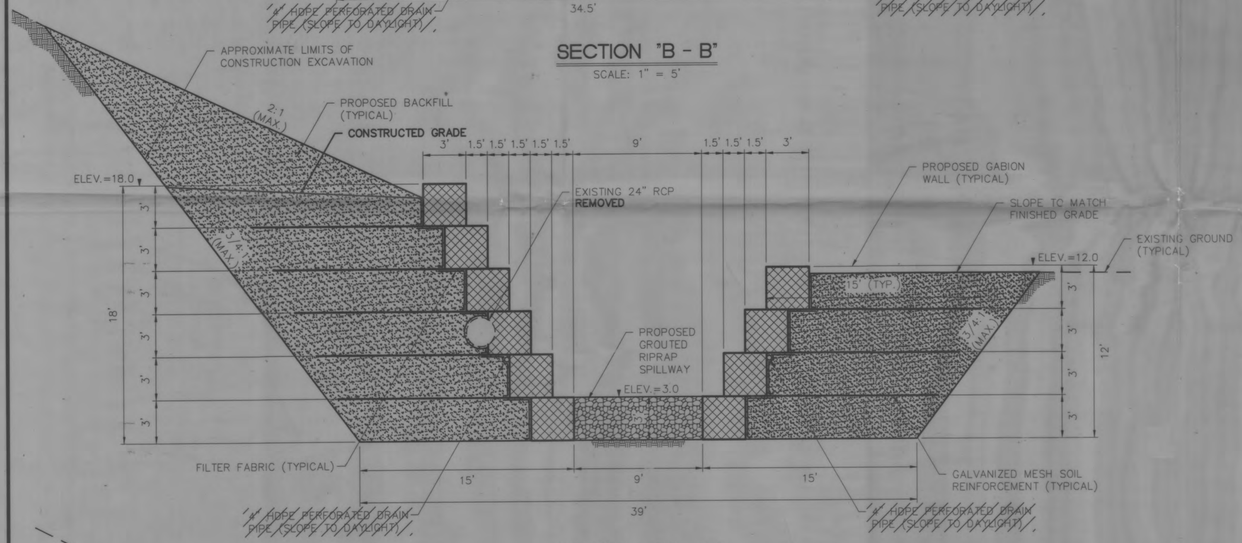

SECTION "C - C"

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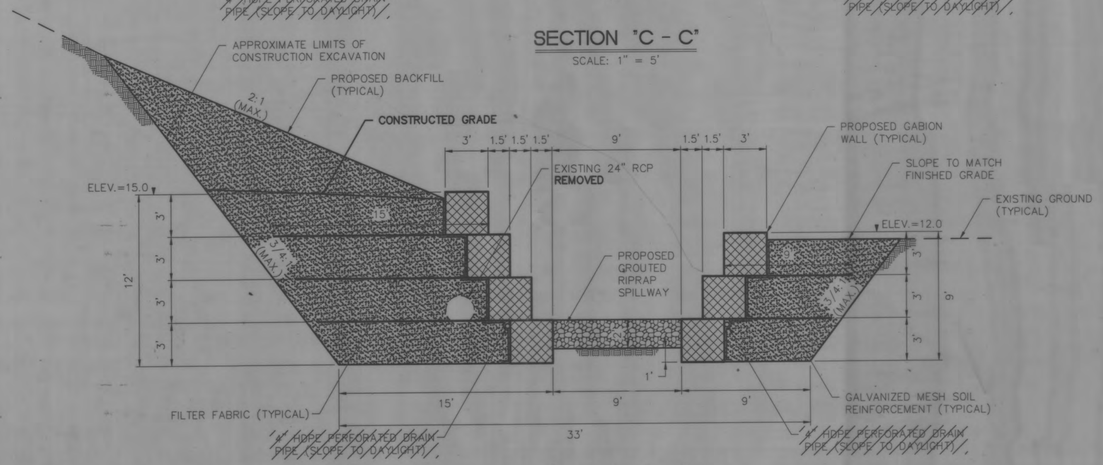

SECTION "D - D"

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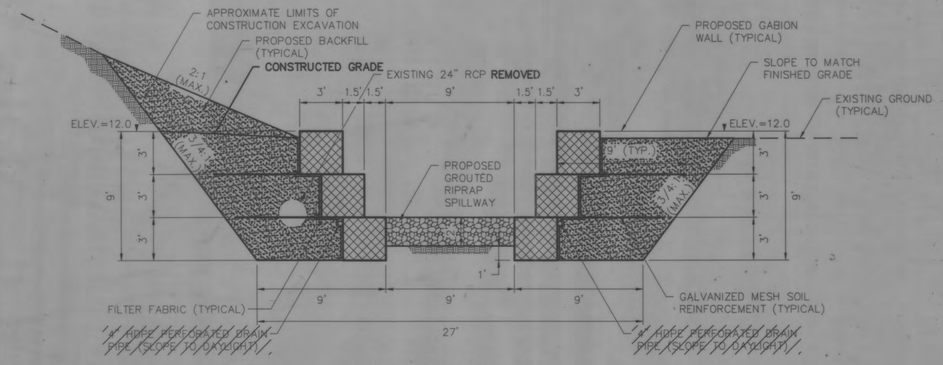

SECTION "E - E"

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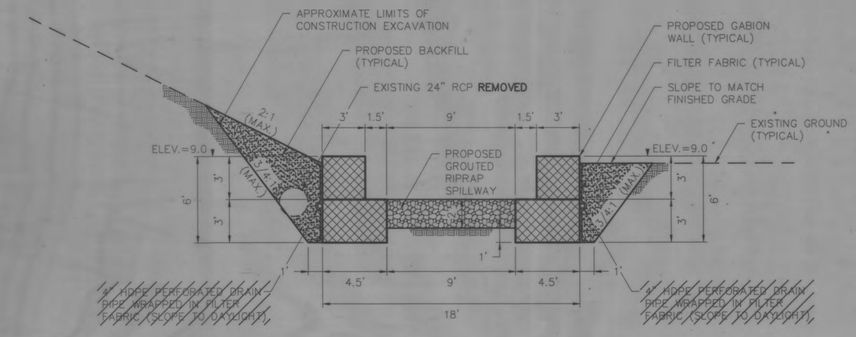

SECTION "F - F"

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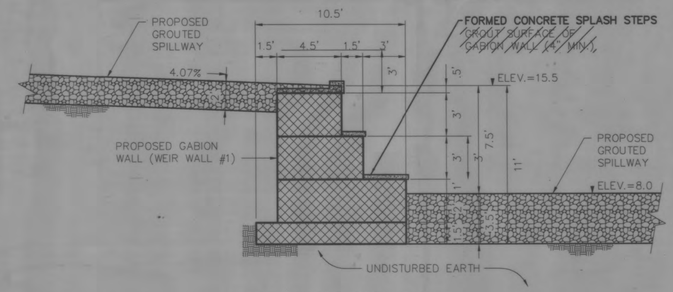
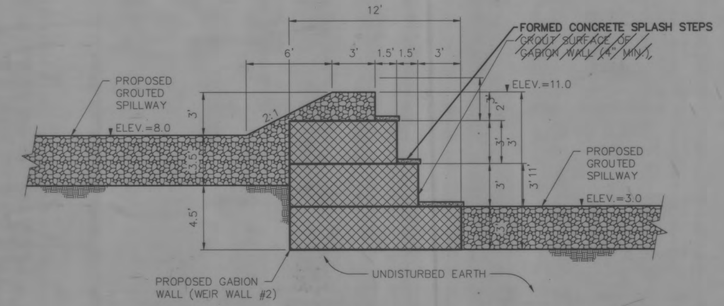


SECTION "W1 - W1"
WEIR WALL 1

SCALE: 1" = 5'



SECTION "W2 - W2"
WEIR WALL 2

SCALE: 1" = 5'

No.	DATE	REVISION / COMMENT / NOTE	BY
2.	7/25/01	RECORD DRAWING	ABS
1.	1/02/01	REVISED PER KCSA COMMENTS (NONE THIS SHEET)	ABS

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

CONSULTING ENGINEERS

SPILLWAY AND WEIR CROSS SECTIONS

KINGSMILL COMMUNITY SERVICES ASSOCIATION

KINGSMILL POND SPILLWAY AND DAM REPAIR

JAMES CITY COUNTY VIRGINIA

Designed ABS	Drawn BJU
Scale 1"=5'	Date APRIL 2000
Project No. 7753-12	
Drawing No. 2	

04.10.00-13:27 7753122.dwg BJU

CC019_KINGSMILL_POND_DAM - 29 of 130

RECORD DRAWING INFORMATION PROVIDED BY G. NICE AND SONS, INC.

STANDARD
EROSION AND SEDIMENT CONTROL NOTES
FOR JAMES CITY COUNTY, VIRGINIA
REVISED 5/5/99

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. 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". THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.

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

3. A PRECONSTRUCTION MEETING SHALL BE HELD ON SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, 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 CONTRACTOR WILL SUPPLY THE ENVIRONMENTAL DIVISION WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.

4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES SHALL BE MADE TO ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY UPON NOTIFICATION BY THE COUNTY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.

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

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

7. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. 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.

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

9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGETATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.

10. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM SEWER, WATERLINES, 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).

11. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

12. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS SITE PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.

13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.

14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.

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

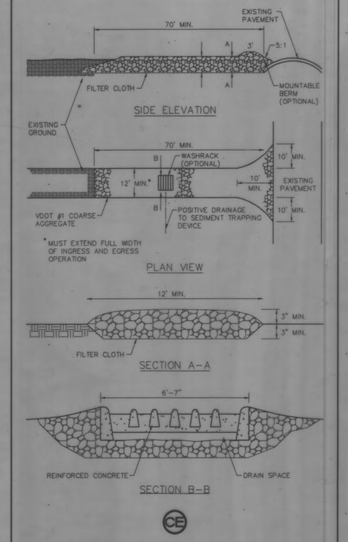
16. PAVED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.

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

18. ALL SEDIMENT TRAPS AND BASINS SHALL REMAIN IN PLACE UNTIL THE MAJORITY OF THE SINGLE-FAMILY HOUSES HAVE BEEN CONSTRUCTED AND SHALL NOT BE REMOVED WITHOUT AUTHORIZATION FROM THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION.

19. AS-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER JUDGMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.

STONE CONSTRUCTION ENTRANCE



CE

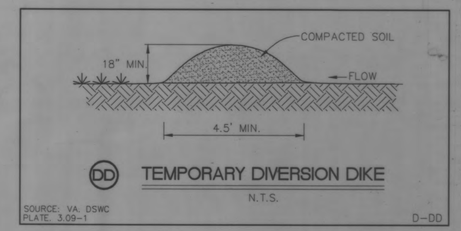
TABLE 3.32-D
SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

	TOTAL LBS. PER ACRE
MINIMUM CARE LAWN	
-COMMERCIAL OR RESIDENTIAL	
-KENTUCKY 31 OR TURF-TYPE TALL FESCUE	175-200 LBS.
OR	
-COMMON BERMUDA GRASS **	75 LBS.
HIGH-MAINTENANCE LAWN	
-KENTUCKY 31 OR TURF-TYPE TALL FESCUE	200-250 LBS.
OR	
-HIGHBRID BERMUDAGRASS (SEED) **	40 LBS. (UNHULLED)
OR	30 LBS. (HULLED)
-HYBRID BERMUDAGRASS (BY OTHER VEGETATIVE ESTABLISHMENT METHOD, SEE STD. & SPEC. 3.34)	
GENERAL SLOPE (3:1 OR LESS)	
-KENTUCKY 31 FESCUE	128 LBS.
-RED TOP GRASS	2 LBS.
-SEASONAL NURSE CROP *	20 LBS.
	150 LBS.
LOW MAINTENANCE SLOPE (STEEPER THAN 3:1)	
-KENTUCKY 31 TALL FESCUE	93-108 LBS.
-COMMON BERMUDAGRASS **	0-15 LBS.
-RED TOP GRASS	2 LBS.
-SEASONAL NURSE CROP *	20 LBS.
-SERICEA LESPEDEZA **	20 LBS.
	150 LBS.

* USE SEASONAL NURSE CROP IN ACCORDANCE WITH SEEDING DATES AS STATED BELOW:
FEBRUARY, MARCH THROUGH APRIL.....ANNUAL RYE
MAY 1ST THROUGH AUGUST.....FOXTAIL MILLET
SEPTEMBER, OCTOBER THROUGH NOVEMBER 15TH.....ANNUAL RYE
NOVEMBER 16TH THROUGH JANUARY.....WINTER RYE
** MAY THROUGH OCTOBER, USE HULLED SEED. ALL OTHER SEEDING PERIODS, USE UNHULLED SEED. WEEPING LOVEGRASS MAY BE ADDED TO ANY SLOPE OR LOW-MAINTENANCE MIX DURING WARMER SEEDING PERIODS; ADD 10-20 LBS./ACRE IN MIXES.

VA DSWC PG. III - 304

D-PS

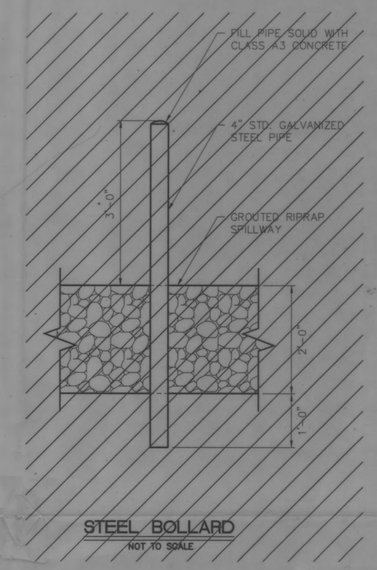


DD

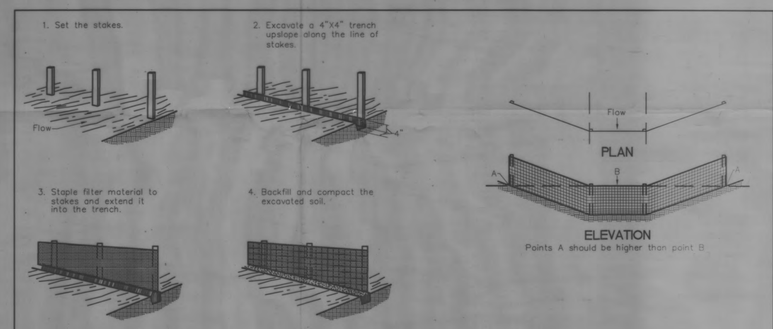
TEMPORARY DIVERSION DIKE
N.T.S.

SOURCE: VA. DSWC PLATE 3.09-1

D-DD

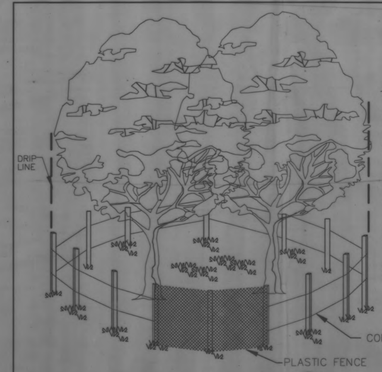


STEEL BOLLARD
NOT TO SCALE



FILTER BARRIER DETAIL
NOT TO SCALE

SF



PLASTIC FENCING-40-INCH HIGH "INTERNATIONAL ORANGE" PLASTIC (POLYETHYLENE) WEB FENCING SECURED TO CONVENTIONAL METAL "T" OR "U" POSTS DRIVEN TO A MINIMUM DEPTH OF 18 INCHES ON 6-FOOT MINIMUM CENTERS SHALL BE INSTALLED AT THE LIMITS OF CLEARING. THE FENCE SHALL HAVE THE FOLLOWING MINIMUM PHYSICAL QUALITIES:

TENSILE YIELD: AVERAGE 2,000 LBS. PER 4-FOOT WIDTH (ASTM D638)

ULTIMATE TENSILE YIELD: AVERAGE 2,900 LBS. PER 4-FOOT WIDTH (ASTM D638)

ELONGATION AT BREAK (%): GREATER THAN 1000% (ASTM D638)

CHEMICAL RESISTANCE: INERT TO MOST CHEMICALS AND ACIDS

TP

TREE PROTECTION

ES\D-TRPRO

No.	DATE	REVISION / COMMENT / NOTE	BY
		RECORD DRAWING	ABS
1.	7/02/01	REVISED PER KCSA COMMENTS (NONE THIS SHEET)	ABS
2.	7/25/01		

COMMONWEALTH OF VIRGINIA ARON B. SHALL No. 030172 PROFESSIONAL ENGINEER

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

ES CONSULTING ENGINEERS

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
KINGSMILL COMMUNITY SERVICES ASSOCIATION
KINGSMILL POND SPILLWAY AND DAM REPAIR
JAMES CITY COUNTY VIRGINIA

Designed ABS	Drawn BJU
Scale 1"=5'	Date APRIL 2000
Project No. 7753-12	
Drawing No. 3	

CC019

BJU 04.10.00-13:30 - 775312e3.dwg

SPILLWAY RETROFIT AND REPAIR

KINGSMILL POND

JAMES CITY COUNTY, VIRGINIA

JAMES CITY COUNTY PLAN E&S-022-15

OWNER/DEVELOPER

KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
P.O. BOX 348
WILLIAMSBURG, VA 23187
PHONE: (757) 253-8207
ATTN: SUSAN SICKAL

ENVIRONMENTAL ENGINEER

STANTEC CONSULTING SERVICES, INC.
5209 CENTER STREET
WILLIAMSBURG, VIRGINIA 23188
PHONE: (757) 220-6869
FAX: (757) 229-4507
ATTN: SCOTT BLOSSOM, P.E. AND CHRIS KUHN

SURVEYOR / BATHYMETRIC

BASE MAP PROVIDED BY
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
PHONE: (877) 342-4237
FAX: (757) 220-8994
ATTN: THOMAS C. SUBLETT, LS

NOTE: BENCHMARK INFORMATION AVAILABLE FROM AES UPON REQUEST

BATHYMETRY PROVIDED BY
SOLITUDE LAKE MANAGEMENT
P.O. BOX 969
VIRGINIA BEACH, VA. 23451
PHONE: (888) 480-5253
FAX: (888) 358-0088
ATTN: KEVIN TUCKER

NOTE: ELEVATIONS SHOWN FOR BATHYMETRY OF KINGSMILL POND ARE RELATIVE TO INVERT OF EXISTING CONCRETE WEIR AT ELEVATION 20.20 FT NGVD29

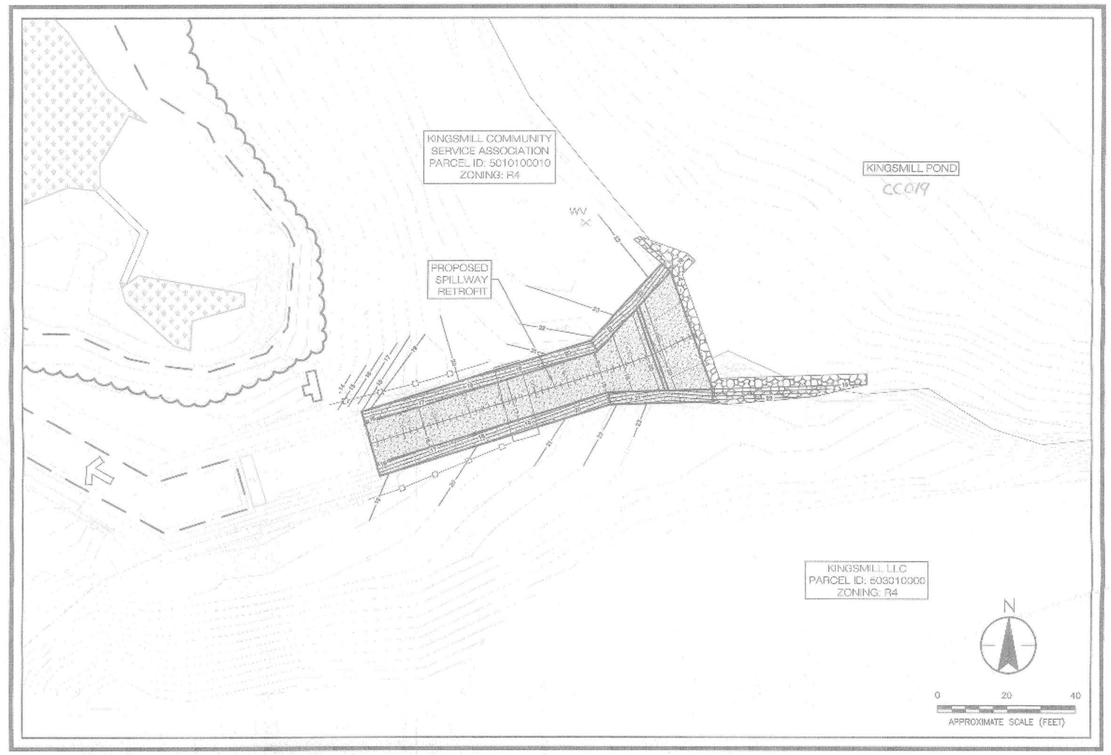
GEOTECHNICAL / STRUCTURAL

GET SOLUTIONS, INC.
1592 PENNIMAN ROAD, SUITE E
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 564-6452
FAX: (757) 564-6453
ATTN: CAMILLE A. KATTAN, P.E.

THE STRUCTURES GROUP
1200 OLD COLONY LANE
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 220-0465
FAX: (757) 220-1546
ATTN: MICHAEL A. MATTHEWS, P.E.

STATISTICAL DATA

HORIZONTAL DATUM:	NAD83
VERTICAL DATUM:	NGVD29
TOTAL PROJECT AREA:	3.99 ACRES
AREA OF DISBURSEMENT:	0.83 ACRES



PROJECT NARRATIVE

THIS PLAN DEPICTS THE PROPOSED RETROFIT AND REPAIR OF THE KINGS SPILLWAY LOCATED WITHIN THE KINGSMILL COMMUNITY IN JAMES CITY VIRGINIA. THE DAM IS LOCATED ON HALFWAY CREEK, APPROXIMATELY UPSTREAM OF THE MOUNTS BAY ROAD CROSSING. HALFWAY CREEK IS COLLEGE CREEK, WHICH IS A TRIBUTARY OF THE JAMES RIVER. THE IMP ORIGINALLY SERVED AS A MILL POND, BUT IS CURRENTLY A RECREATION AESTHETIC FEATURE FOR THE KINGSMILL COMMUNITY. THE EXISTING DA AN EARTHEN EMBANKMENT WITH A SPILLWAY LOCATED AT THE LEFT AB

A DAM BREAK INUNDATION ZONE STUDY WAS COMPLETED BY STANTEC SERVICES, INC. FOR THE KINGSMILL DAM IN MAY 2011. THE STUDY CONC KINGSMILL DAM WILL BE CLASSIFIED AS A LOW HAZARD DAM, WITH A RE SPILLWAY DESIGN FLOOD (SDF) OF THE 100-YR STORM EVENT. THE EXIS OVERTOPS DURING THE 50-YR STORM EVENT, NECESSITATING THE PROP RETROFIT. THE PRIMARY OBJECTIVE OF THIS CONSTRUCTION IS TO INCR CAPACITY OF THE KINGSMILL SPILLWAY TO PASS THE 100-YR 6-HOUR ST WHILE ALSO CORRECTING SOME EXISTING PROBLEMS WHICH ARE CONTI DEGRADATION OF THE STRUCTURE.

REPLACING THE EXISTING GROUTED RIPRAP AND GABION CONSTRUCTION CHANNEL WITH A COBBLE LINED CONCRETE CHANNEL WILL ALLOW THE CONTAIN THE 100-YR 6-HOUR STORM EVENT. ROUGHLY 100 LINEAR FEET WILL BE REBUILT AND THE EXISTING 17 FOOT CONCRETE WEIR REMOVED THROAT WILL BE WIDENED TO A BOTTOM WIDTH OF 35.4 FEET, GRADUAL A BOTTOM WIDTH OF 25 FEET AT THE LOCATION OF THE EXISTING CONC WHERE THE PROPOSED CHANNEL WILL CREST AT AN ELEVATION OF 20.2 BEFORE FURTHER REDUCING TO A BOTTOM WIDTH OF 12 FEET FOR THE F FEET OF PROPOSED CHANNEL. THE EXISTING VERTICAL GABION CHANNE REPLACED WITH CONCRETE WALLS OF 1:1 SIDE SLOPE AND A HEIGHT OF EXISTING INTERNAL EROSION WILL BE REPAIRED DURING REMOVAL OF TH GABIONS AND PREPARATION OF A STABLE FOUNDATION FOR THE PROPO INSTALLATION.

NOTE: WHILE AN INCREMENTAL DAMAGE ANALYSIS (IDA) WOULD SUPPOR OF THE REGULATORY SDF TO THE 50-YR STORM EVENT, THE SELECTED R CONCEPT ALLOWS PROVIDING THE FULL REGULATORY SDF (100-YEAR 6-H EVENT). THUS, THE FULL REGULATORY SDF IS PROVIDED WITH THE PROP

SITE/ZONING DATA

THE PROPERTY SHOWN ON THE LOCATION MAP IS LOCATED AT PIN 5010100010, TAX MAP PAGE 501, LOT 10.

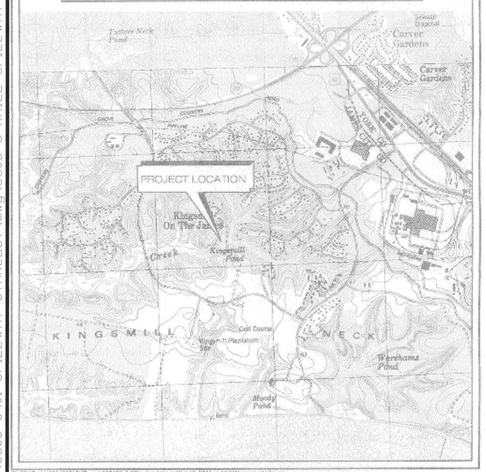
THE PROPERTY IS CURRENTLY ZONED R4.

FLOODPLAIN INFORMATION

THE KINGSMILL POND IS LOCATED ON FEMA FIRM PANEL 51095C-02 SEPTEMBER 28, 2007. SPILLWAY STRUCTURE RETROFIT IS LOCATED OF ZONE AE ASSOCIATED WITH STILL WATER ELEVATIONS FOR JAM

SHEET INDEX

VICINITY MAP: 1" = 2000'



RECORD DRAWING AND CONSTRUCTION CERTIFICATION

THE STORMWATER MANAGEMENT/BMP FACILITY REPAIRS AND RENOVATIONS AS PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. CONTRACTOR TO ENSURE THAT THIS PROJECT IS ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH CURRENT COUNTY REGULATIONS.

PERMITS AND CONFIRMATIONS

AGENCY	DESCRIPTION	REF. #	DATE
CORP	WETLAND DELINEATION	NAO-2011-0662	MAY 31, 2011
COUNTY	WQIA/RPA WAIVER	CRF-16-037	SEPTEMBER 23, 2015
DEQ	VSMP		BELOW THRESHOLD

PROOF OF APPLICATION FOR VSMP PERMIT MUST BE PROVIDED TO JAMES CITY COUNTY PLANNING DEPARTMENT PRIOR TO PLAN APPROVAL.

PROOF OF ALL NECESSARY FEDERAL, STATE, AND LOCAL ENVIRONMENTAL PERMITS MUST BE PROVIDED TO JAMES CITY COUNTY PLANNING DEPARTMENT PRIOR TO PLAN APPROVAL.

DEBRIS REMOVAL

ALL OBJECTIONABLE AND DELETERIOUS MATERIAL IS TO BE REMOVED FROM THE SITE AND DISPOSED OF IN A STATE APPROVED FACILITY MEETING THE REQUIREMENTS OF ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.

WHILE THE GEOTECHNICAL REPORT ENTITLED REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES DAM INUNDATION STUDY - KINGSMILL POND , DATED AUGUST 3 2012, AND THE ADDENDUM NO. 1 TO THIS REPORT, DATED APRIL 23, 2015, BOTH PREPARED BY GET SOLUTIONS, INC., INDICATES THAT SOIL LOSS HAS OCCURRED UNDERNEATH THE EXISTING SPILLWAY, THE EXTENT OF THE SOIL LOSS IS UNKNOWN AND VOID VOLUME SHOWN IS AN ESTIMATE ONLY. EXISTING SPILLWAY WILL BE COMPLETELY REMOVED, AND DEPTH AND SPECIFICATIONS TO BE DETERMINED BY STRUCTURAL AND GEOTECHNICAL ENGINEER DURING CONSTRUCTION. A GEOTECHNICAL ENGINEER SHALL BE PRESENT DURING THE REMOVAL OF THE EXISTING SPILLWAY BOTTOM TO EVALUATE THE EXISTING SOILS UNDERNEATH THE SPILLWAY BOTTOM. IMPACT OF DEMOLITION ON REMAINING STRUCTURES TO BE EVALUATED BY A STRUCTURAL ENGINEER UNDER SEPARATE SCOPE. THE GEOTECHNICAL ENGINEER SHOULD PROVIDE UPDATED RECOMMENDATION FOR SUBGRADE PREPARATION AND FOR THE FILL OPERATION TO PREPARE A SUITABLE SUBGRADE FOR THE CONSTRUCTION OF THE NEW SPILLWAY. THE GEOTECHNICAL ENGINEER SHALL BE PRESENT FOR THE DURATION OF THE SUBGRADE PREPARATION AND FILL OPERATION.

THE DRAINAGE STRUCTURE LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT.

A.D. SEBERT, L.S. — 03/31/2017 / 03/24/2016 DATE

DESIGN DRAWINGS BY:
STANTEC

RECORD DRAWINGS BY:
SEBERT SURVEYING & LAYOUT, LLC

DATE: MARCH 24, 2016

Engineering & Resource Protection
APR 10 2017
RECEIVED

FOR:
KINGSMILL COMMUNITY SER
300 MCLAWS CIRCLE
PO BOX 3
WILLIAMSBURG,

TITLE:
COVE
KINGSMILL
SPILLWAY CONCRE

COMMONWEALTH OF VIRGINIA
03/31/2017
03/24/2016
A.D. SEBERT
NO. 002221
LAND SURVEYOR

E&S-022-15

REVISIONS

1	REVISED DIMENSIONS AFTER TOP SPILLWAY ADJUSTMENTS	03/31/2017

E&S-022-15

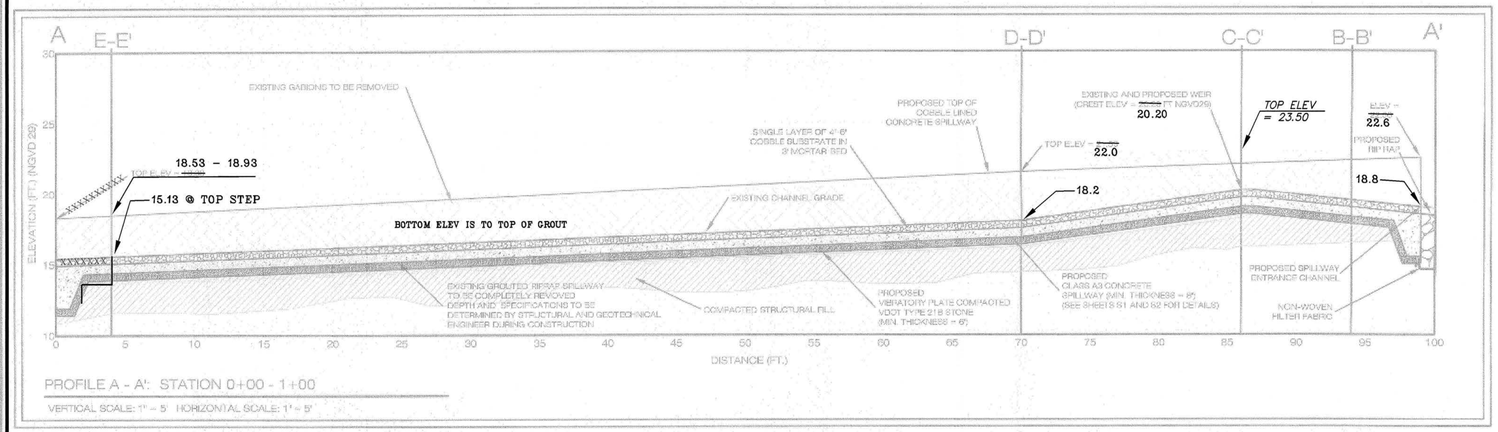
SEBERT SURVEYING & LAYOUT, LLC
173 BARLOW ROAD
WILLIAMSBURG, VA
PHONE (757) 345-0931
CELL: (757) 784-2413

KINGSMILL POND SPILLWAY CONCRETE RETROFIT AND REPAIR

PREPARED FOR DAVID A. NICE BUILDERS, INC
ROBERTS DISTRICT — JAMES CITY COUNTY — VIRGINIA

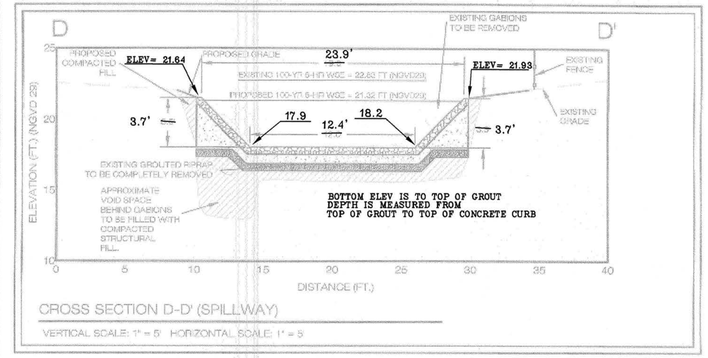
DATE 03/24/2016
SCALE NOTED
SSL PROJECT NO. J503-5
DRAWING NO. 1 OF 2

RECORD DRAWINGS



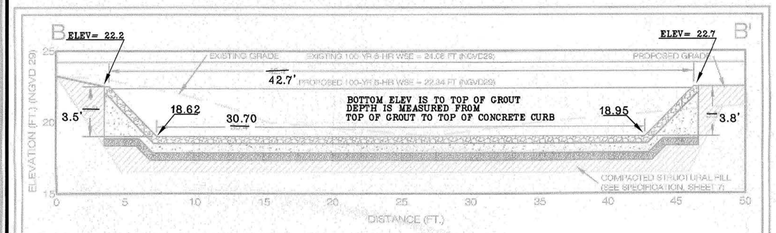
PROFILE A - A': STATION 0+00 - 1+00

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'



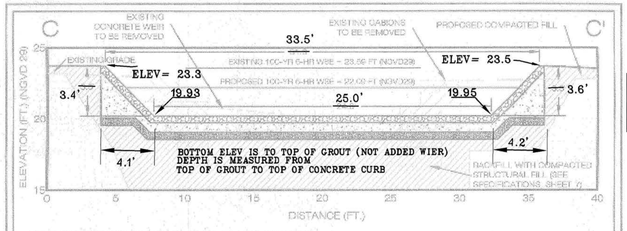
CROSS SECTION D-D' (SPILLWAY)

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'



CROSS SECTION B-B' (SPILLWAY ENTRANCE CHANNEL)

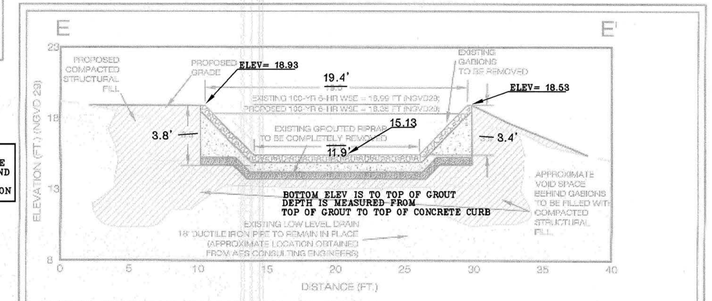
VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'



CROSS SECTION C-C' (SPILLWAY WEIR)

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'

NOTE:
VERTICAL STONE BAFFLES EXTEND 4"–6" ABOVE GROUT ELEVATION



CROSS SECTION E-E' (CORNER STABILIZATION)

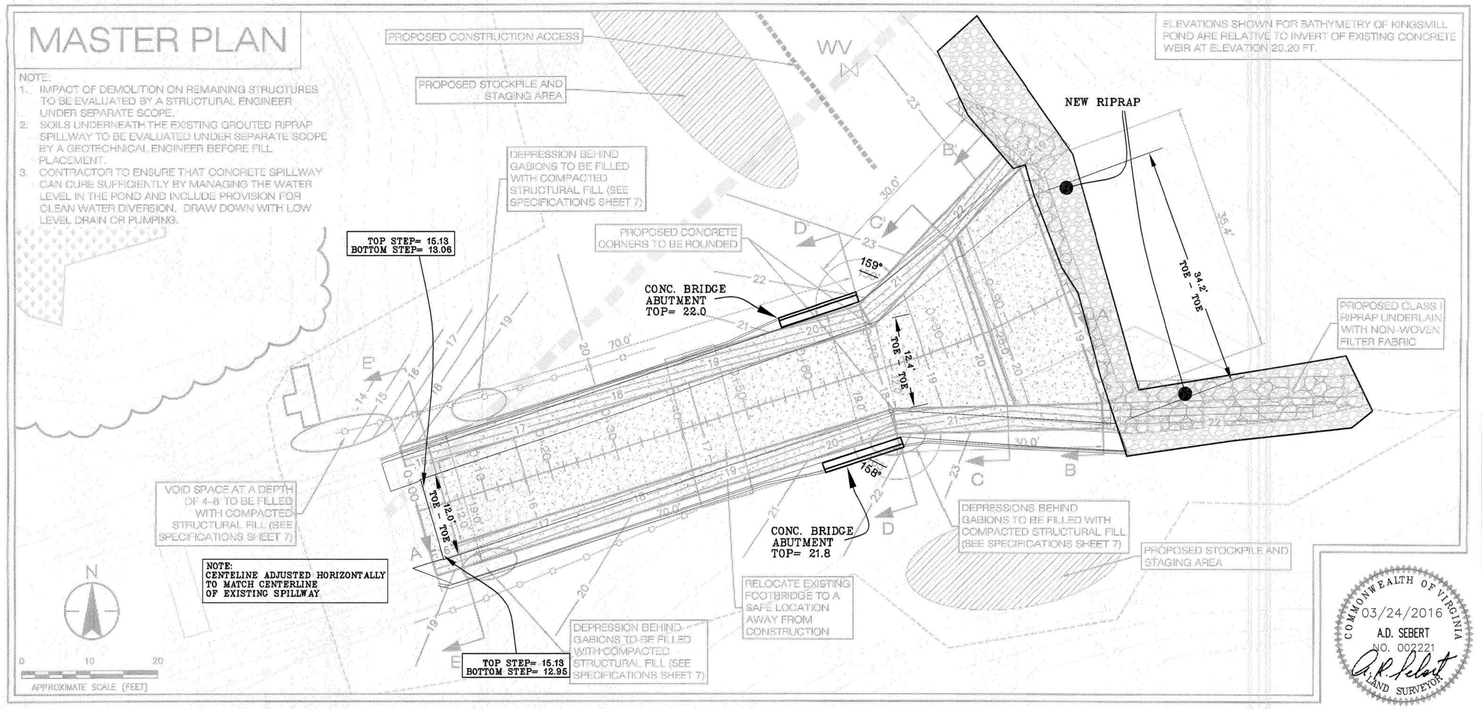
VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'

LEGEND:

- EXISTING CONTOURS
- EXISTING BATHYMETRY
- EXISTING WATER SURFACE
- APPROXIMATE EXISTING TREE LINE
- APPROXIMATE WETLAND LIMITS
- APPROXIMATE OPEN WATER LIMITS
- EXISTING FENCE
- EXISTING HISTORICAL STRUCTURE
- EXISTING GABION
- EXISTING RIPRAP
- PROPOSED CLASS I RIP RAP
- EXISTING LOW LEVEL DRAIN VALVE
- EXISTING LOW LEVEL DRAIN 18" DUCTILE IRON
- PROPOSED GRADING
- PROPOSED FENCE RECONSTRUCTION
- PROPOSED COBBLE LINED CONCRETE SPILLWAY (SEE SHEETS S1 & S2)
- PROPOSED COMPACTED STRUCTURAL FILL
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED CONSTRUCTION ACCESS ROUTE
- PROPOSED TEMP STOCKPILE STAGING AREA
- EXISTING SPOT ELEVATION

MASTER PLAN

NOTE:
1. IMPACT OF DEMOLITION ON REMAINING STRUCTURES TO BE EVALUATED BY A STRUCTURAL ENGINEER UNDER SEPARATE SCOPE.
2. SOILS UNDERNEATH THE EXISTING GROUTED RIPRAP SPILLWAY TO BE EVALUATED UNDER SEPARATE SCOPE BY A GEOTECHNICAL ENGINEER BEFORE FILL PLACEMENT.
3. CONTRACTOR TO ENSURE THAT CONCRETE SPILLWAY CAN CURE SUFFICIENTLY BY MANAGING THE WATER LEVEL IN THE POND AND INCLUDE PROVISION FOR CLEAN WATER DIVERSION. DRAW DOWN WITH LOW LEVEL DRAIN OR PUMPING.



ELEVATIONS SHOWN FOR BATHYMETRY OF KINGSMILL POND ARE RELATIVE TO INVERT OF EXISTING CONCRETE WEIR AT ELEVATION 20.20 FT.

SEE STRUCTURAL INSERT SHEETS S1 AND S2 FOR STRUCTURAL DETAILS.

COMMONWEALTH OF VIRGINIA
03/24/2016
A.D. SEBERT
NO. 002221
LAND SURVEYOR

FOR:
KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 McLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:
MASTER PLAN
PROFILE & SECTIONS
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

ASBLT SCALE: 1" = 10'
DESIGN SCALE: 1" = 10' (APPROXIMATE)

INFORMATION SHOWN HEREON REFLECTS ELEVATION SHOTS TAKEN ON 3/28/2017.

THE DRAINAGE STRUCTURE LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT.

A.D. SEBERT, L.S. — 03/24/2016 DATE

REVISIONS

1	REVISED DIMENSIONS AFTER TOP SPILLWAY ADJUSTMENTS	03/31/2017

SEBERT SURVEYING & LAYOUT, LLC
173 BARLOW ROAD
WILLIAMSBURG, VA
PHONE (757) 345-0931
CELL: (757) 784-2413

KINGSMILL POND SPILLWAY CONCRETE RETROFIT AND REPAIR

PREPARED FOR DAVID A. NICE BUILDERS, INC

ROBERTS DISTRICT — JAMES CITY COUNTY — VIRGINIA

DATE 03/24/2016

SCALE NOTED

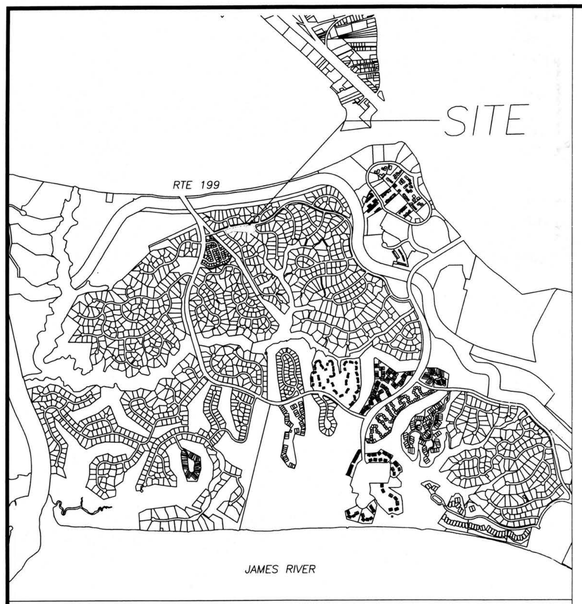
SSL PROJECT NO. J503-5

DRAWING NO. 2 OF 2

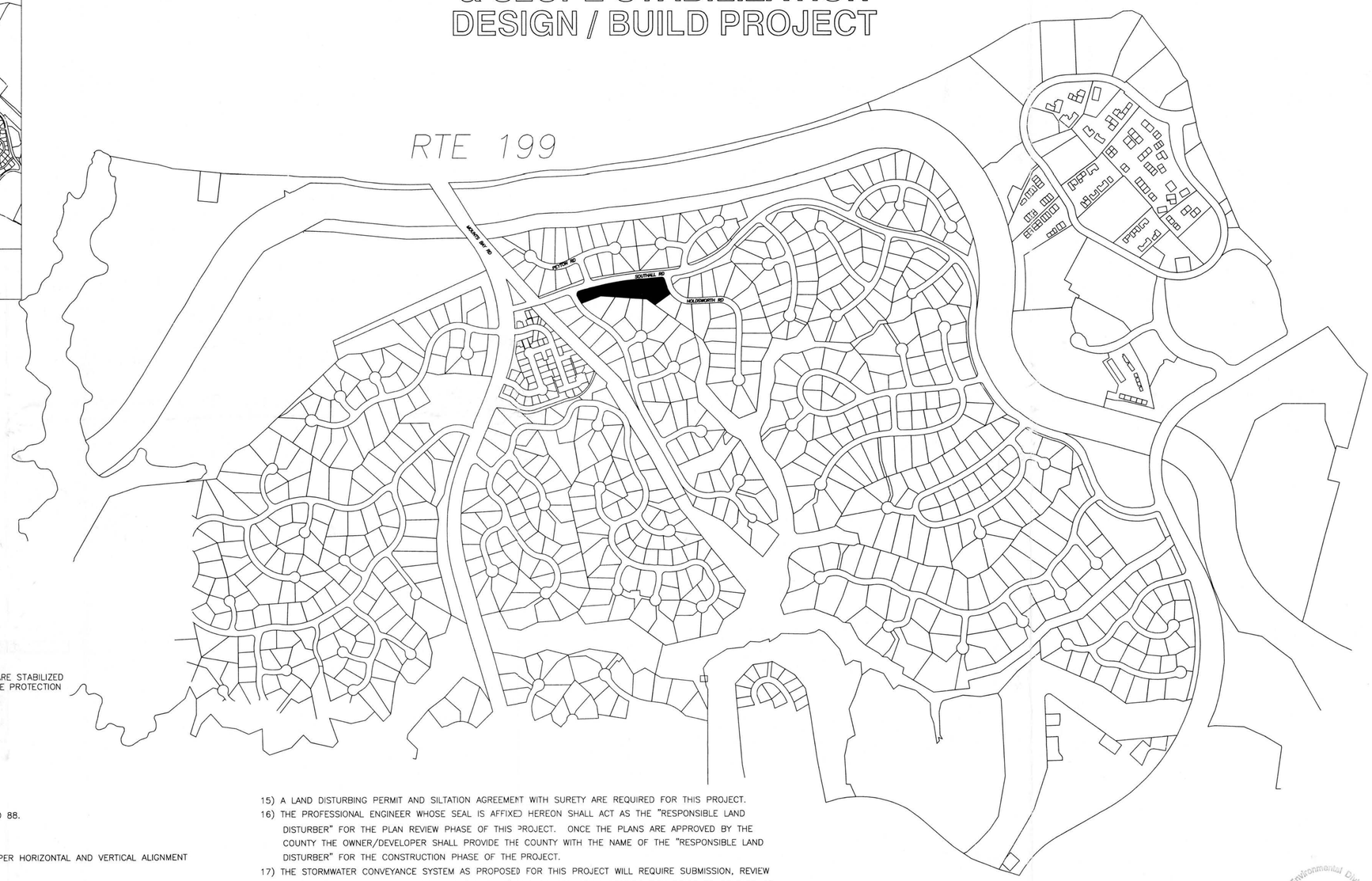
RECORD DRAWINGS

Kingsmill On The James

SOUTHALL ROAD CHANNEL MAINTENANCE & SLOPE STABILIZATION DESIGN / BUILD PROJECT



VICINITY MAP
SCALE: NTS



SITE INFORMATION

PARCEL ID – 5010300012A
– 5010300011A
– 5010300100

TOTAL AREA: 7,153 S.F./0.164 Ac.

ZONING DISTRICT: R4

DISTURBED AREA: 0.22± ACRES

EXISTING SITE IS PARTLY WOODED AS SHOWN.

PROPOSED SEQUENCE OF CONSTRUCTION (TO BE VERIFIED BY CONTRACTOR):

1) CONTACT THE JCC ENGINEERING & RESOURCE MANAGEMENT DIVISION INSPECTOR 24 HOURS PRIOR TO ARRANGE A PRE–CONSTRUCTION MEETING.
2) INSTALL TEMPORARY E&S MEASURES IN ACCORDANCE WITH VESCH, LATEST EDITION.
3) CLEAR, GRUB & DISPOSE OF DESIGNATED TREES TO BE REMOVED.
4) EXECUTE EARTHWORK AND ROUGH / FINAL GRADING OPERATIONS.
5) INSTALL PYRAMAT HPTRM AND EROSION CONTROL MATS.
6) STABILIZE THE DISTURBED AREAS WITH A QUICK GERMINATING GRASS
7) ALL TEMPORARY E&S MEASURES WILL BE REMOVED AFTER ALL DISTURBED AREAS ARE STABILIZED AND AFTER RECEIVING APPROVAL TO DO SO BY THE JCC ENGINEERING & RESOURCE PROTECTION DIVISION.

GENERAL NOTES

1) A TITLE REPORT HAS NOT BEEN FURNISHED TO THIS FIRM.
2) THIS FIRM MADE NO ATTEMPT TO LOCATE ALL UNDERGROUND UTILITIES.
3) ELEVATIONS AS SHOWN HEREON ARE IN FEET AND ARE CLOSELY RELATED TO NAVD 88.
4) TOPOGRAPHIC, UTILITY, & TREE LOCATIONS ARE SHOWN AS LOCATED BY LANDTECH RESOURCES, INC.
5) CONTRACTOR IS REQUIRED TO HIRE A LICENSED LAND SURVEYOR TO ENSURE PROPER HORIZONTAL AND VERTICAL ALIGNMENT OF THE CHANNEL LANDTECH RESOURCES, INC.
6) CONTRACTOR IS TO COMPLY WITH ALL LOCAL BUILDING AND ENVIRONMENTAL CODES AND REGULATIONS.
7) PYRAMAT HIGH PERFORMANCE TURF REINFORCEMENT MAT (HPTRMs) AND ALL ASSOCIATED PRODUCTS ARE TO BE DELIVERED, STORED, HANDLED & STORED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND INSTALLATION INSTRUCTIONS.
8) BACKFILL MUST BE COMPACTED TO 90% STANDARD PROCTOR.
9) GROUND WATER MAY BE PRESENT WITHIN THE SOIL DUE TO SURFACE INFILTRATION OR WATER TABLE FLUCTUATION.
10) THE MAIN EROSION AND SEDIMENT CONTROL FOR THE PROJECT WILL BE SILT FENCE. THIS WILL BE INSTALLED PRIOR TO ANY LAND DISTURBANCE.
11) THE CONTRACTOR WILL MAINTAIN ALL DRAINAGE, EROSION AND SEDIMENT CONTROLS UNTIL THE DISTURBED AREAS ARE 75% STABILIZED.
12) CONTRACTOR IS TO REVEGITATE ALL DENUDED AREAS WITH STANDARD EC–3, TYPE A, SOIL STABILIZATION MAT, OR APPROVED EQUIVALENT.
13) CONTRACTOR IS TO LINE CHANNELS WITH PYRAMAT HPTRM AS DEPICTED IN THE TYPICAL CHANNEL DETAIL.
14) THE HOMEOWNER'S ASSOCIATION WILL BE RESPONSIBLE FOR OBTAINING ANY / ALL TEMPORARY CONSTRUCTION EASEMENTS.
15) A LAND DISTURBING PERMIT AND SILTATION AGREEMENT WITH SURETY ARE REQUIRED FOR THIS PROJECT.
16) THE PROFESSIONAL ENGINEER WHOSE SEAL IS AFFIXED HEREON SHALL ACT AS THE "RESPONSIBLE LAND DISTURBER" FOR THE PLAN REVIEW PHASE OF THIS PROJECT. ONCE THE PLANS ARE APPROVED BY THE COUNTY THE OWNER/DEVELOPER SHALL PROVIDE THE COUNTY WITH THE NAME OF THE "RESPONSIBLE LAND DISTURBER" FOR THE CONSTRUCTION PHASE OF THE PROJECT.
17) THE STORMWATER CONVEYANCE SYSTEM AS PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW AND APPROVAL OF A RECORD DRAWING (AS–BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. CONTRACTOR SHALL ENSURE THAT THESE ACTIVITIES ARE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH CURRENT COUNTY GUIDELINES.
18) THE OWNER WILL BE REQUIRED TO OBTAIN A VSMP PERMIT FROM THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION IF THE DISTURBED AREA IS GREATER THAN 2,500 SF. THIS PERMIT WILL REQUIRE A STORMWATER POLLUTION PREVENTION PLAN.
19) PER SOIL SURVEY OF JAMES CITY AND YORK COUNTIES AND THE CITY OF WILLIAMSBURG VIRGINIA THE ONSITE SOIL APPEARS TO BE EMPORIA COMPLEX (15E) WITH A SEVERE EROSION HAZARD AND EROSION FACTORS OF K=0.20–0.28 AND T=4.
20) THE SITE APPEARS TO BE IN FLOOD ZONE "X" PER FEMA MAP #51095C0210C, DATED 9/28/07.

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

COVER SHEET

Environmental Division
JAN 13 2012
RECEIVED

Proj No: 2010–05158
Date: 08.19.2011
Drawn By: SWS
Sheet No: C1

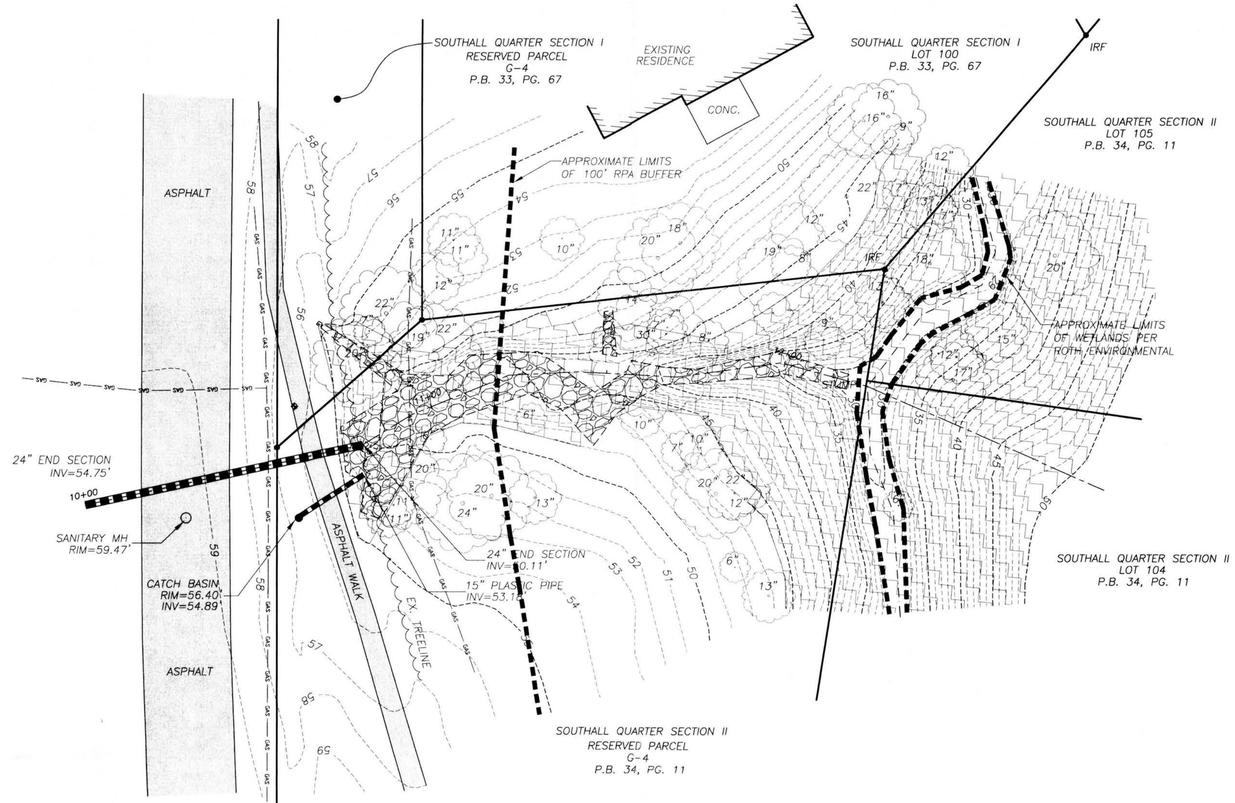
CORNERSTONE DESIGN GROUP
Consulting Engineers
www.cdgva.com
1311 Jamestown Road, Suite 102
Williamsburg, Virginia 23185
Phone: 1.757.564.8898
Fax: 1.757.564.8897

NO.	DATE	REVISION / COMMENT / NOTE
1	1/10/12	REV PER JCC LTR DTD 10/12/11

COMMONWEALTH OF VIRGINIA
STEVEN W. STAFFORD
Lic. No. 028158
01.12.2012
PROFESSIONAL ENGINEER

Kingsmill On The James
SOUTHALL ROAD CHANNEL MAINTENANCE & SLOPE STABILIZATION DESIGN / BUILD PROJECT

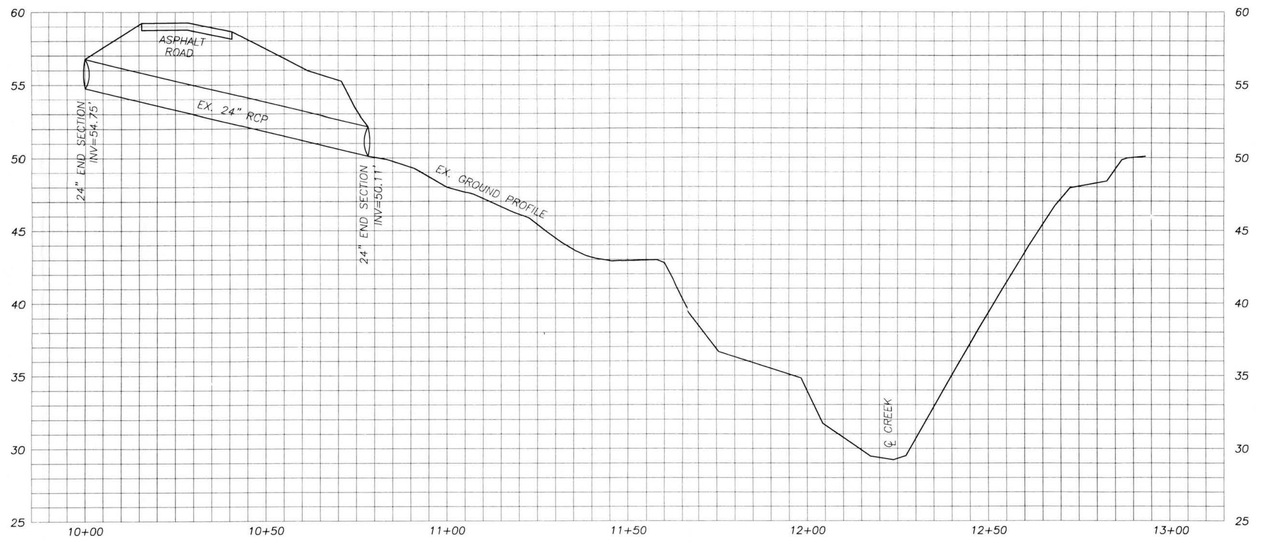
C1



PLAN VIEW
SCALE: 1"=20'

RECORD MERIDIAN
P.B. 34, PG. 11

0 20 40 60
SCALE: 1"=20'



PROFILE
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

LEGEND

TBM SURVEY NAIL ELEV=56.46'	BENCHMARK
	SANITARY MH
GAS	UNDERGROUND GAS
SS	UNDERGROUND SEWER
	C STREAM
	EXISTING RIPRAP
6"	EXISTING TREE (APPROX. DIAMETER)
IRF	=IRON ROD FOUND
	25% OR GREATER SLOPE

NOTES:
1. UNDERGROUND UTILITIES SHOWN ARE AS MARKED IN THE FIELD BY OTHERS.
2. ELEVATIONS SHOWN HEREON ARE IN FEET AND ARE RELATIVE TO THE JCC GIS.
3. PROPERTY LINES ARE SHOWN PER NOTED REFERENCES.

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

EXISTING SITE CONDITIONS

Proj No: 2010-05158
Date: 08.19.2011
Drawn By: SWS
Sheet No: C2

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C2

DEMOLITION NOTES:

1) UNLESS OTHERWISE INDICATED, DEMOLITION WASTE BECOMES PROPERTY OF CONTRACTOR.

2) PROPERTY OWNER(S) WILL OCCUPY PORTIONS OF SITE IMMEDIATELY ADJACENT TO SELECTIVE DEMOLITION AREA. CONDUCT WORK SUCH THAT OWNER('S) OPERATIONS WILL NOT BE DISRUPTED.

3) MAINTAIN EXISTING UTILITIES AND PROTECT THEM AGAINST DAMAGE DURING DEMOLITION AND CONSTRUCTION PROCESS.

4) TRANSPORT DEMOLISHED MATERIALS OFF OWNER('S) PROPERTY AND LEGALLY DISPOSE OF THEM. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE FOR PERIODS LONGER THAN 72-HOURS.

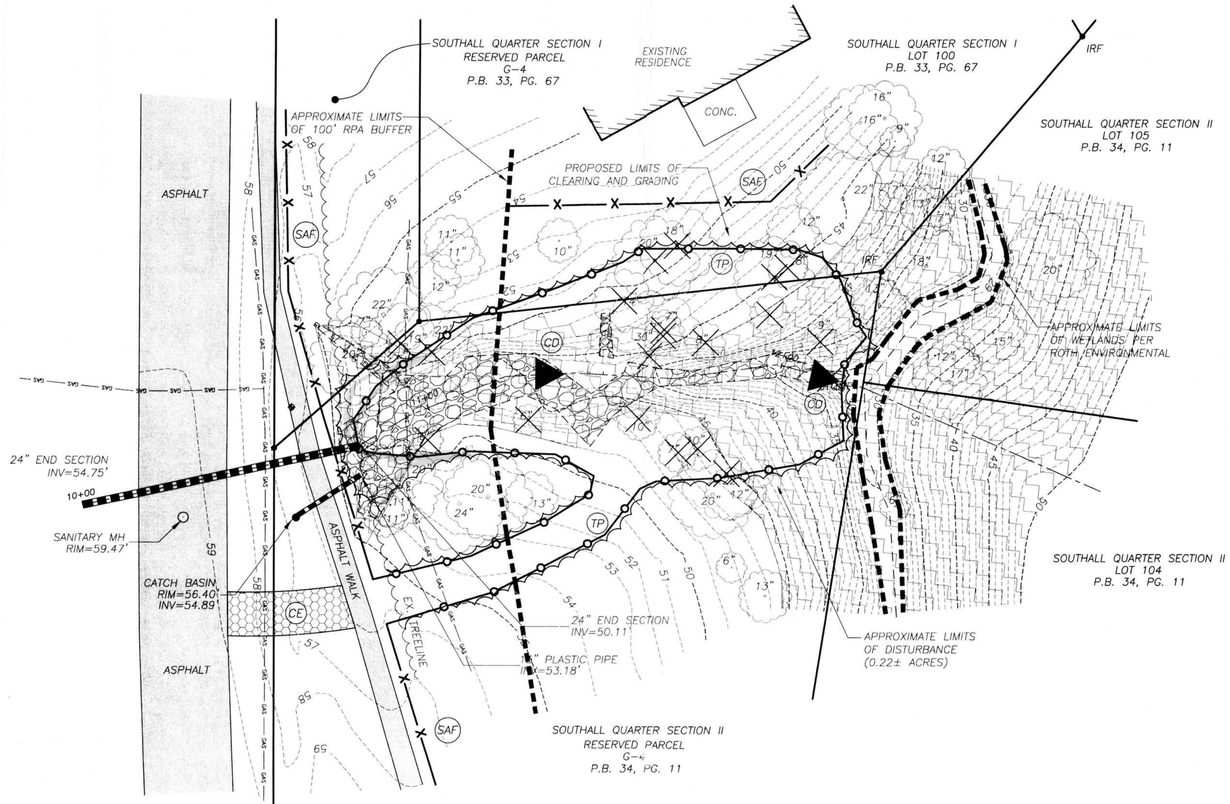
5) IF ANY UNANTICIPATED ELEMENTS THAT CONFLICT WITH INTENDED FUNCTION OR DESIGN ARE ENCOUNTERED, CONTACT CORNERSTONE DESIGN GROUP IMMEDIATELY.

ITEMS TO BE REMOVED.

1) REMOVE TREES WHICH ARE LABELED TO BE REMOVED.
2) REMOVE RIPRAP MATERIALS.

LEGEND

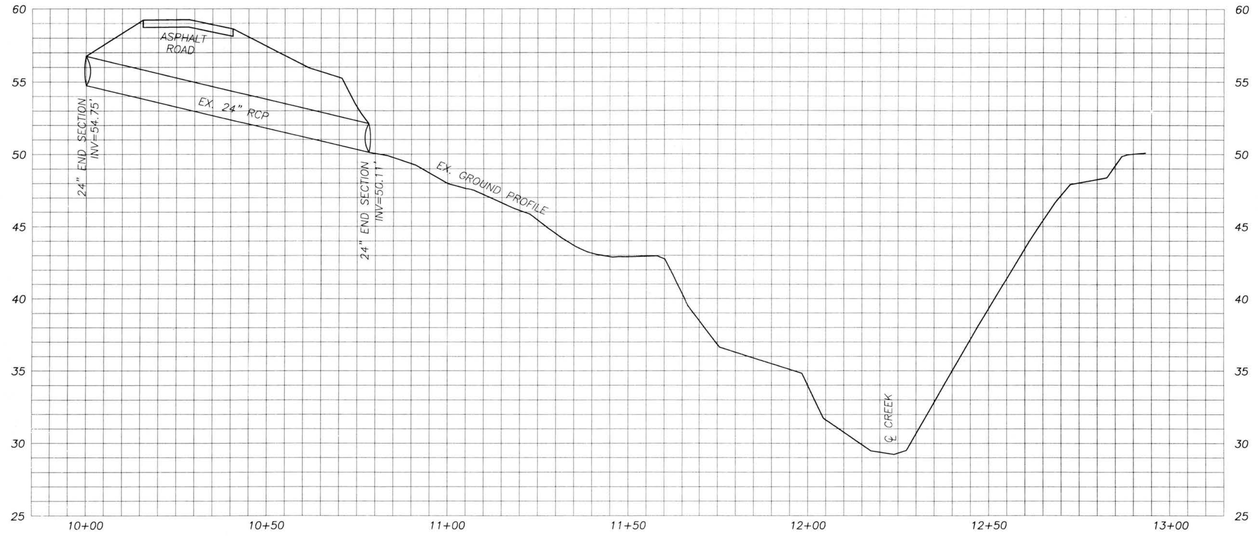
TITLE	SYMBOL	KEY	NO.
SAFETY FENCE	—— X ——	SAF	3.01
CONSTRUCTION ENTRANCE		CE	3.02
OUTLET PROTECTION		OP	3.18
ROCK CHECK DAM		CD	3.20
PERMANENT SEEDING	—— PS ——	PS	3.32
SOIL STABILIZATION BLANKETS & MATTING		B/M	3.36
TREE PRESERVATION AND PROTECTION	—— 0 ——	TP	3.38



PLAN VIEW
SCALE: 1"=20'

0 20 40 60
SCALE: 1"=20'

PERMANENT STABILIZATION
ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO STD. & SPEC. 3.32, "PERMANENT SEEDING", OF THE VESCH. EROSION BLANKETS WILL BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDED TO PROTECT THE SLOPES FROM RILL AND GULLY EROSION TO ALLOW THE SEED TO GERMINATE PROPERLY. MULCH (STRAW OR FIBER) WILL BE USED ON RELATIVELY FLAT AREAS. IN ALL SEEDING OPERATIONS. SEED, FERTILIZER, AND LIME WILL BE APPLIED PRIOR TO MULCHING. SOIL STABILIZATION MATTING TO BE VESCH TYPICAL TREATMENT-1 (JUTE MESH).



PROFILE
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

LEGEND

- TBM SURVEY NAIL ELEV=56.46' — BENCHMARK
- SANITARY MH
- GAS — UNDERGROUND GAS
- SS — UNDERGROUND SEWER
- C STREAM
- EXISTING RIPRAP
- 6" — EXISTING TREE
- IRF — =IRON ROD FOUND
- EXISTING TREE TO BE REMOVED
- 25% OR GREATER SLOPE

NOTES:
1. UNDERGROUND UTILITIES SHOWN ARE AS MARKED IN THE FIELD BY OTHERS.
2. ELEVATIONS SHOWN HEREON ARE IN FEET AND ARE RELATIVE TO THE JCC GIS.
3. PROPERTY LINES ARE SHOWN PER NOTED REFERENCES.

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

DEMOLITION PLAN

Proj No: 2010-05158
Date: 08.19.2011
Drawn By: SWS
Sheet No: C3

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01.12.2012
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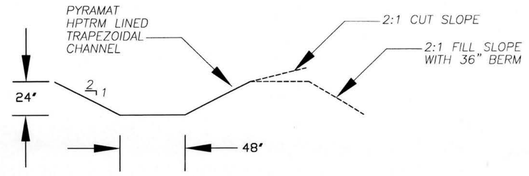
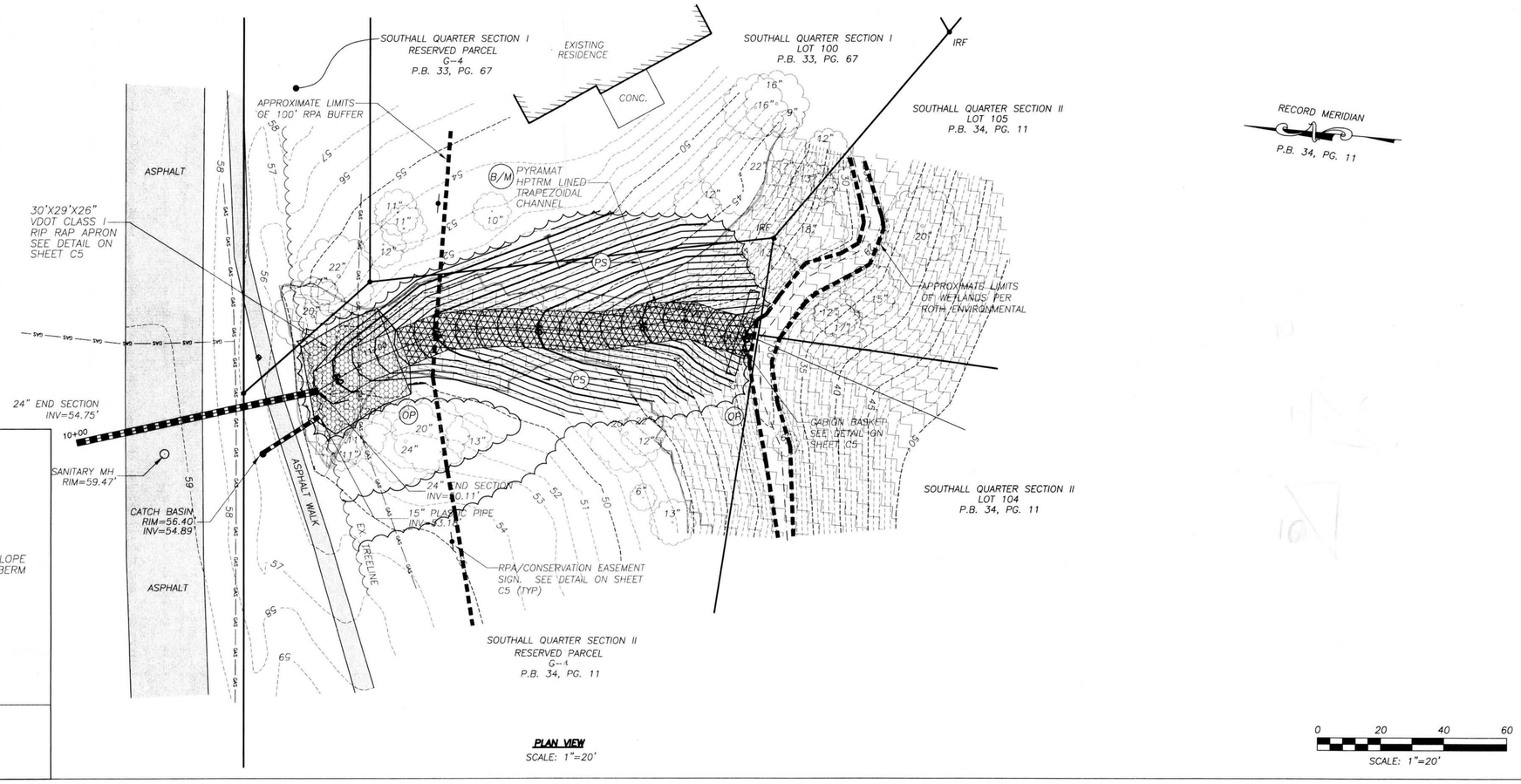
C3

LEGEND

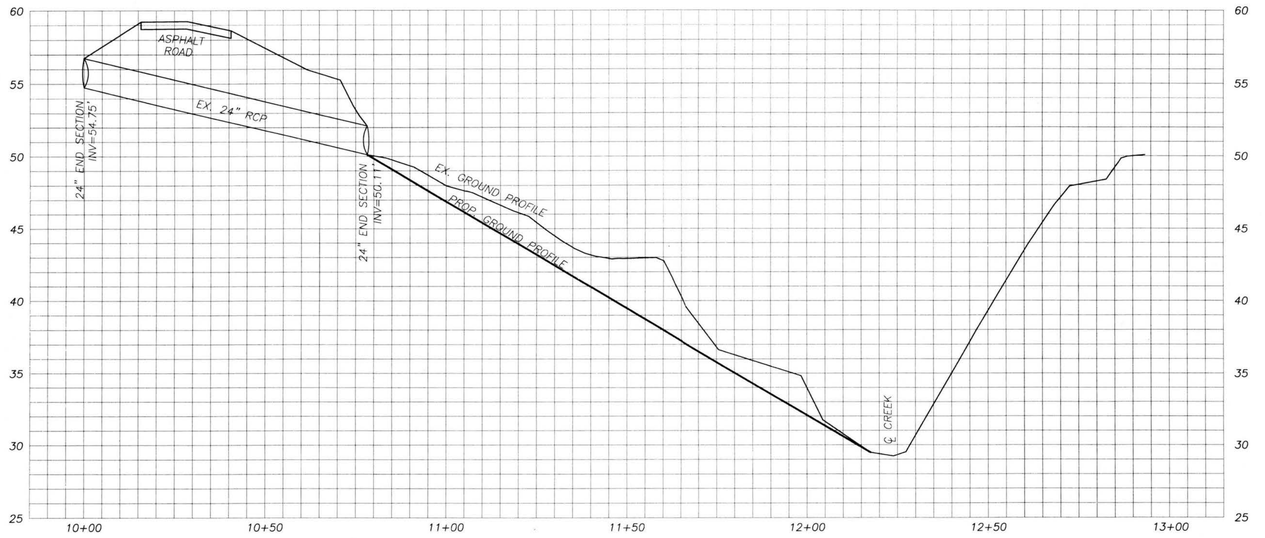
TITLE	SYMBOL	KEY	NO.
SAFETY FENCE	— X —	SAF	3.01
CONSTRUCTION ENTRANCE		CE	3.02
OUTLET PROTECTION		OP	3.18
ROCK CHECK DAM		CD	3.20
PERMANENT SEEDING	— PS —	PS	3.32
SOIL STABILIZATION BLANKETS & MATTING		B/M	3.36
TREE PRESERVATION AND PROTECTION	— 0 —	TP	3.38



TYPICAL CHANNEL SECTION
SCALE: NTS



PLAN VIEW
SCALE: 1"=20'



PROFILE
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

LEGEND

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- SANITARY MH
- GAS — UNDERGROUND GAS
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- C STREAM
- EXISTING RIPRAP
- 6" — EXISTING TREE
- IRF =IRON ROD FOUND
- 25% OR GREATER SLOPE

NOTES:
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3. PROPERTY LINES ARE SHOWN PER NOTED REFERENCES.

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

PROPOSED CONDITIONS

Proj No: 2010-05158
Date: 08.19.2011
Drawn By: SWS
Sheet No: C4

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NO.	DATE	REVISION / COMMENT / NOTE
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COMMONWEALTH OF VIRGINIA
STEVEN W. STAFFORD
Lic. No. 028158
01.12.12
PROFESSIONAL ENGINEER

Kingsmill On The James
SOUTHALL HEAD CHANNEL MAIN CHANNEL & SLOPE STABILIZATION DESIGN / BUILD PROJECT

C4

GENERAL
EROSION AND SEDIMENT CONTROL NOTES

JAMES CITY COUNTY ENVIRONMENTAL DIVISION

REVISED 10/1/09

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 SEDIMENTS 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 WILL APPLY TO THIS PROJECT.

1. ALL THE PROVISIONS OF VIRGINIA EROSION AND SEDIMENT CONTROL LAW AND REGULATIONS, MINIMUM STANDARDS, HANDBOOKS, AND TECHNICAL BULLETINS AS PUBLISHED BY THE VIRGINIA SOIL AND WATER CONSERVATION BOARD AND/OR THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION, DIVISION OF SOIL AND WATER CONSERVATION SHALL APPLY TO THE PROJECT.

2. MINIMUM STANDARDS #1 THROUGH #19 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS (4VAC50–30–40) SHALL APPLY TO THE PROJECT.

3. THE OWNER OR APPLICANT SHALL BE RESPONSIBLE TO REGISTER FOR COVERAGE UNDER THE GENERAL PERMIT FOR DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES, IN ACCORDANCE WITH CURRENT REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) AND THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION.

4. THE OWNER OR APPLICANT SHALL PROVIDE THE NAME OF AN INDIVIDUAL HOLDING A VALID RESPONSIBLE LAND DISTURBER (RLD) CERTIFICATE OF COMPETENCE WHO WILL BE RESPONSIBLE FOR THE LAND–DISTURBING ACTIVITY PRIOR TO ENGAGING IN THE LAND–DISTURBING ACTIVITY. THIS WILL BE NECESSARY PRIOR TO ISSUANCE OF A LAND–DISTURBING PERMIT FOR THE PROJECT. THE RLD IS REQUIRED TO ATTEND THE PRECONSTRUCTION CONFERENCE FOR THE PROJECT.

5. THE CONTRACTOR IS RESPONSIBLE TO CONTACT MISS UTILITY (DIAL 811 IN VA OR 1–800–552–7001) PRIOR TO ANY UTILITY OR SITE WORK EXCAVATIONS.

6. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PLANNED, DESIGNED, IMPLEMENTED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PROVISIONS OF THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). THE CONTRACTOR SHALL MAINTAIN, INSPECT AND REPAIR ALL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED THROUGHOUT THE LIFE OF THE PROJECT TO ENSURE CONTINUED ACCEPTABLE PERFORMANCE.

7. A PRECONSTRUCTION CONFERENCE (MEETING) SHALL BE HELD ON SITE BETWEEN THE COUNTY ENVIRONMENTAL DIVISION, THE OWNER–APPLICANT, THE RESPONSIBLE LAND–DISTURBER (RLD), THE CONTRACTOR AND OTHER RESPONSIBLE AGENCIES, AS APPLICABLE, PRIOR TO ISSUANCE OF A LAND–DISTURBING PERMIT. THE OWNER OR APPLICANT IS REQUIRED TO COORDINATE SCHEDULING OF THE PRECONSTRUCTION CONFERENCE BETWEEN ALL APPLICABLE PARTIES. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY ENVIRONMENTAL DIVISION FOR REVIEW AND APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING.

8. ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND–DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

9. ADDITIONAL SAFETY FENCE OR DUST CONTROL MEASURES, IN ACCORDANCE WITH THE PROVISIONS OF MINIMUM STANDARDS & SPEC. 3.01 AND 3.39 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), MAY BE REQUIRED TO BE IMPLEMENTED IN ADDITION TO THAT SHOWN ON THE APPROVED PLAN IN ORDER TO ENSURE ADEQUATE PROTECTION OF THE HEALTH, SAFETY AND WELFARE OF THE PUBLIC OR IF SITE CONDITIONS CHANGE, BECOME APPARENT OR ALTER SIGNIFICANTLY FOLLOWING THE DATE OF PLAN APPROVAL.

10. EROSION AND SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT OR FOLLOWING TIME OF CONSTRUCTION TO ENSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED, TO ENSURE ADEQUATE PROTECTION OF THE HEALTH, SAFETY AND WELFARE OF THE PUBLIC, OR IF SITE CONDITIONS CHANGE, BECOME APPARENT OR ALTER SIGNIFICANTLY FOLLOWING THE DATE OF PLAN APPROVAL. COUNTY ENVIRONMENTAL DIVISION APPROVAL SHALL BE REQUIRED FOR ANY DEVIATION OF EROSION AND SEDIMENT CONTROL MEASURES FROM THE APPROVED PLAN.

11. OFF–SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE COUNTY ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

12. CULVERT AND STORM DRAIN INLET PROTECTIONS, IN ACCORDANCE WITH THE PROVISIONS OF MINIMUM STANDARDS & SPEC. 3.07 & 3.08 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), MAY BE REMOVED AT THE DISCRETION OF THE ASSIGNED COUNTY ENVIRONMENTAL DIVISION INSPECTOR SHOULD PLACEMENT OF THE MEASURE RESULT IN EXCESSIVE ROAD FLOODING OR TRAFFIC HAZARD OR RESULT IN THE REDIRECTION OF DRAINAGE ONTO OR TOWARD EXISTING LOTS, DRIVEWAYS OR STRUCTURES. DECISIONS SHALL BE MADE ON A CASE–BY–CASE BASIS BASED IN FIELD SITUATIONS ENCOUNTERED.

13. DRAINAGE FACILITIES SHALL BE INSTALLED AND FUNCTIONAL WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT.

14. NO MORE THAN 300 FEET OF TRENCH MAY BE OPEN AT ONE TIME FOR UNDERGROUND UTILITY LINES, INCLUDING STORM WATER CONVEYANCES. ALL OTHER PROVISIONS OF MINIMUM STANDARD #16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS APPLY.

15. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH MINIMUM STANDARD & SPEC. 3.35 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

16. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION ON THE APPROVED PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED, IN ACCORDANCE WITH MINIMUM STANDARDS & SPECS. 3.29 THROUGH 3.37 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), AS APPLICABLE. IRRIGATION, IF NECESSARY, SHALL COMPLY WITH ALL APPLICABLE OUTDOOR WATER USE RESTRICTIONS OF THE JAMES CITY SERVICE AUTHORITY.

17. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. REMOVAL SHALL NOT OCCUR WITHOUT AUTHORIZATION BY THE COUNTY ENVIRONMENTAL DIVISION. DISTURBANCES ASSOCIATED WITH THE REMOVAL OF TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROPERLY STABILIZED.

18. NO SEDIMENT TRAP OR SEDIMENT BASIN SHALL BE REMOVED UNTIL A) AT LEAST 75 PERCENT OF THE SINGLE–FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN SOLD TO A THIRD PARTY FOR THE CONSTRUCTION OFHOMES (UNRELATED TO THE DEVELOPER; AND/OR, B) 60 PERCENT OF THE SINGLE–FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN ARE COMPLETED AND 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 AUTHORIZATION OF THE COUNTY ENVIRONMENTAL DIVISION.

19. APPLICABLE PROVISIONS OF THE COUNTY BMP MANUAL (JAMES CITY COUNTY GUIDELINES FOR DESIGN AND CONSTRUCTION OF STORMWATER MANAGEMENT BMPS) AND THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK (VSMH) APPLY TO THE PROJECT.

20. 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.

21. RECORD DRAWINGS (AS–BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE REQUIRED FOR ALL STORMWATER FACILITIES INCLUDING STORMWATER MANAGEMENT/BMP FACILITIES AND STORM DRAINAGE CONVEYANCE SYSTEMS. RECORD DRAWINGS AND CONSTRUCTION CERTIFICATIONS MUST MEET ESTABLISHED PROGRAM REQUIREMENTS OF BOTH THE COUNTY ENVIRONMENTAL AND STORMWATER DIVISIONS.

22. ALL STORMWATER FACILITIES INCLUDING BMPS, STORM DRAINAGE PIPES, STORMWATER CONVEYANCES, INLETS, MANHOLES, OUTFALLS AND ROADSIDE AND OTHER OPEN CHANNELS SHALL BE INSPECTED BY THE COUNTY STORMWATER DIVISION AND GEOTECHNICAL ENGINEER IN ADVANCE IN ACCORDANCE WITH ESTABLISHED COUNTY STORMWATER DIVISION PROGRAM REQUIREMENTS.

TABLE 3.32–D
SITE SPECIFIC SEDDING MIXTURES FOR COASTAL PLAIN AREA

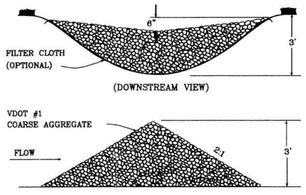
	TOTAL LBS. PER ACRE
MINIMUM CARE LAWN	
– COMMERCIAL OR RESIDENTIAL	
– KENTUCKY 31 OR TURF–TYPE TALL FESCUE	125–200 LBS.
OR	
– COMMON BERMUDAGRASS **	75 LBS.
HIGH–MAINTENANCE LAWN	
– KENTUCKY 31 OR TURF–TYPE TALL FESCUE	
OR	
– HYBRID BERMUDAGRASS (SEED) **	40 LBS. (UNHULLED) 30 LBS. (HALLED)
OR	
– HYBRID BERMUDAGRASS (BY OTHER VEGETATIVE ESTABLISHMENT METHOD, SEE STD. & SPEC. 3.34)	
GENERAL SLOPE (3:1 OR LESS)	
– KENTUCKY 31 FESCUE	120 LBS.
– RED TOP GRASS	2 LBS.
– SEASONAL NURSE CROP *	20 LBS.
	150 LBS.
LOW MAINTENANCE SLOPE (STEEPER THAN 3:1)	
– KENTUCKY 31 TALL FESCUE	93–108 LBS.
– COMMON BERMUDAGRASS **	0–15 LBS.
– RED TOP GRASS	2 LBS.
– SEASONAL NURSE CROP *	20 LBS.
– SERICEA LESPEDEZA **	20 LBS.
	150 LBS.

* USE SEASONAL NURSE CROP IN ACCORDANCE WITH SEEDING DATES AS STATED BELOW:
FEBRUARY, MARCH THROUGH APRIL ..... ANNUAL RYE
MAY 1ST THROUGH AUGUST ..... FOXTAIL MILLET
SEPTEMBER, OCTOBER THROUGH NOVEMBER 15TH ..... ANNUAL RYE
NOVEMBER 16TH THROUGH JANUARY ..... WINTER RYE

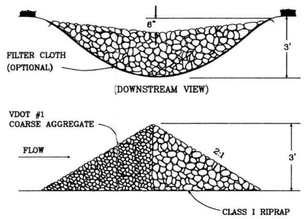
** MAY THROUGH OCTOBER, USE HULLED SEED. ALL OTHER SEEDING PERIODS, USE UNHULLED SEED. WEEPING LOVEGRASS MAY BE ADDED TO ANY SLOPE OR LOW–MAINTENANCE MIX DURING WARM SEEDING PERIODS; ADD 10–20 LBS./ACRE IN MIXES.

TEMPORARY ROCK CHECK DAM

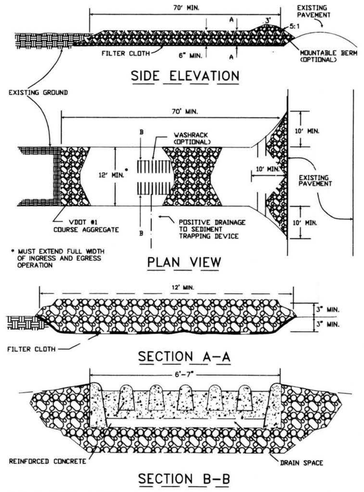
2 ACRES OR LESS OF DRAINAGE AREA:



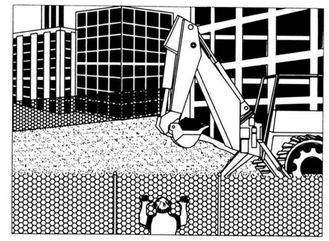
2–10 ACRES OF DRAINAGE AREA:



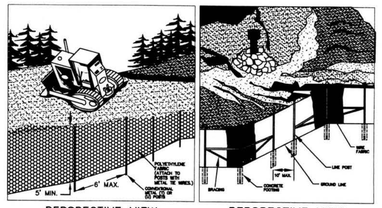
STONE CONSTRUCTION ENTRANCE



SAFETY FENCE



PERSPECTIVE VIEW



PERSPECTIVE VIEW
PLASTIC FENCE

PERSPECTIVE VIEW
METAL FENCE

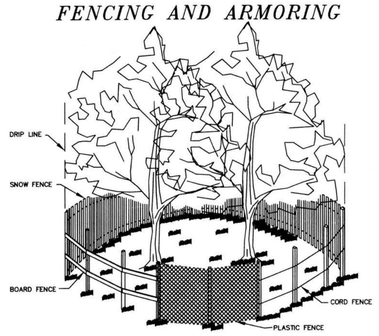
SOURCE: ADAPTED from 1983 Maryland Standards for Soil erosion and Sediment Control and Va. DSWC

Plate 3.02–1

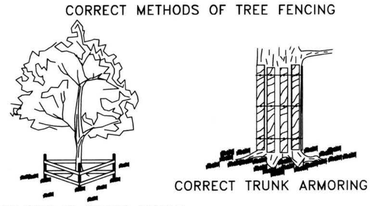
SOURCE: CONWED PLASTICS
VDOT ROAD AND BRIDGE STANDARDS
VA. DSWC

PLATE. 3.1–1

FENCING AND ARMORING



CORRECT METHODS OF TREE FENCING



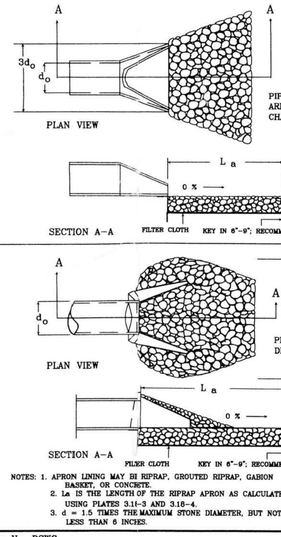
CORRECT TRUNK ARMORING

TRIANGULAR BOARD FENCE

Source: Va. DSWC

Plate 3.38–2

PIPE OUTLET CONDITIONS

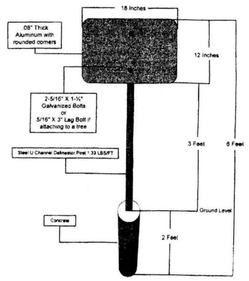


NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18–3 AND 3.18–4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

Source: Va. DSWC

Plate 3.18–1

James City County
RPA/CONSERVATION EASEMENT SIGN INSTALLATION GUIDELINES
(18 Inches X 12 Inches)



JCC RPA/CONSERVATION EASEMENT SIGN GUIDELINES

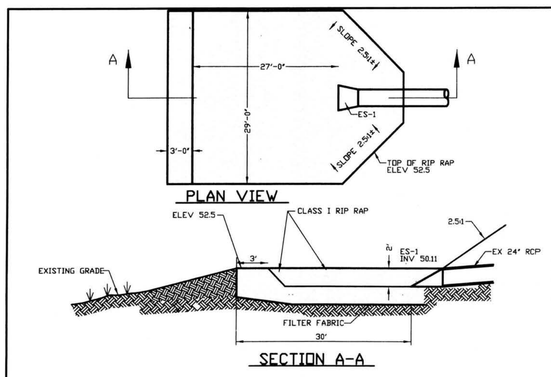
- SIGNS AND POSTS SHALL BE OF MATERIAL THAT IS DURABLE, WEATHERPROOF AND ABLE TO WITHSTAND VANDALISM.
- SIGNS SHALL BE 12" HIGH X 18" WIDE OR 6" HIGH X 8" WIDE DEPENDING ON LOCATION, SITE, and SPECIFIC SUBMITTALS ARE REQUIRED.
- SIGNS SHALL CONTAIN COUNTY STANDARD MESSAGE AND LETTERING; MESSAGES SHALL BE WATERSHED, EASEMENT, and RPA SPECIFIC.
- SIGN BLANKS SHALL BE 0.08" THICK ALUMINUM WITH ROUNDED CORNERS (R.3/4")
- BLANKS SHALL BE SPRAY PAINTED BOTH SIDES WITH GREEN ACRYLIC AUTOMOTIVE ENAMEL PAINT TONE #34.3C.
- JCC STD MESSAGE SHALL BE PAINTED WITH WHITE ENAMEL INK.
- SIGNS SHALL BE DRILLED WITH 3/8" HOLES TOP AND BOTTOM
- POSTS SHALL BE STEEL U CHANNEL DELINEATOR POSTS WEIGHING 1.33 LBS / FT
- POSTS SHALL BE PAINTED WITH GREEN ACRYLIC AUTOMOTIVE ENAMEL PAINT TONE #34.3C OR GALVANIZED.
- POSTS SHALL BE PUNCHED W/ 3/8" HOLES ON 1" CENTERS FULL LENGTH.
- SIGN MOUNTING HEIGHT SHALL BE 1 FT TO 4 FT ABOVE GROUND DEPENDING ON LOCATION, SITE SPECIFIC HORIZONTAL SIGN LOCATIONS AND PLACEMENT SHALL BE IN ACCORDANCE WITH APPROVED PLAN. SUBMITTALS ARE REQUIRED.
- POSTS SHALL BE DRIVEN INTO THE GROUND 2 FT.
- SIGNS SHALL BE ATTACHED TO POSTS WITH 2 - 5/16" X 1-1/4" GALVANIZED BOLTS.
- SIGNS MAY BE MOUNTED ON TREES NOT LESS THAN 12" IN DIAMETER USING 9/16" X 3" GALVANIZED LAG SCREWS.

DEVIATIONS FROM JCC/CSE GUIDELINES MAY BE REQUESTED IN WRITING TO THE DEPARTMENT OF DEVELOPMENT MANAGEMENT.

SUGGESTED RPA SIGN RESOURCES:

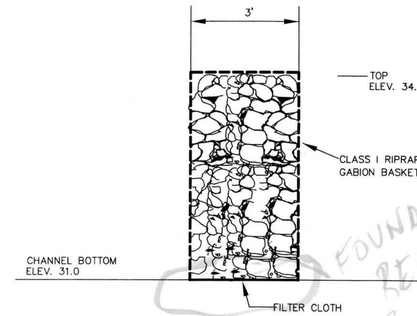
WRIGHT SIGN SHOP 8008 Hankins Industrial Park Toano, Va. 23168 757-566-8329 757-566-8616 (Fax)	THE SIGN SHOP 725-A Blue Crab Rd. Newport News, Va. 23606 757-873-1157 757-873-0131 (Fax)

OUTFALL RIP–RAP APRON



NOTE: RIP RAP BOTTOM AND SIDES TO BE A MINIMUM 26" THICK. NOT TO SCALE

PERMANENT GABION BASKET



BASKET TO BE EMBEDDED 6" INTO BOTTOM OF CHANNEL AND 12" INTO SIDE OF CHANNEL

FOUNDATION RECOMMENDED?

CROSS SECTION OF BASKET

DETAIL SHEET

CORNERSTONE DESIGN GROUP
Consulting Engineers
www.cdgva.com
1311 Jamestown Road, Suite 102
Williamsburg, Virginia 23185
Phone. 1.757.564.8898
Fax: 1.757.564.8897

Proj No: 2010–05158
Date: 08.19.2011
Drawn By: SWS
Sheet No: C5

NO.	DATE	REVISION / COMMENT / NOTE
1	1/10/12	REV PER JCC LTR DTD 10/12/11

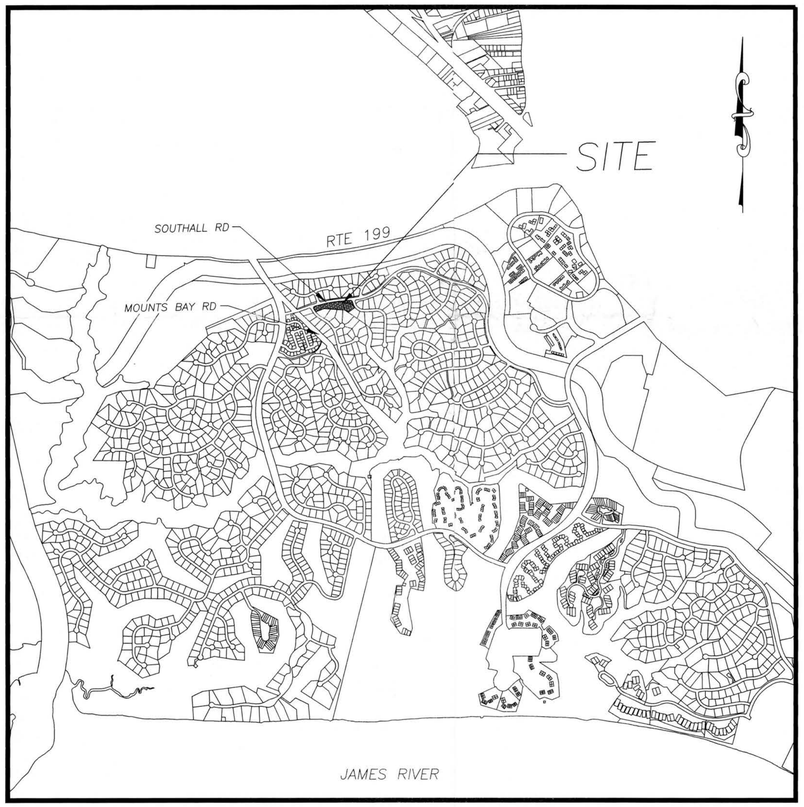
COMMONWEALTH OF VIRGINIA
STEVEN W. STAFFORD
Lic. No. 028158
01.12.2012
PROFESSIONAL ENGINEER

Kingsmill On The James
SOUTHFALL, ROAD CHAMBERS, MOUNT ROMANCE
JAMES CITY COUNTY, VIRGINIA
RESIDENTIAL / MIXED USE DEVELOPMENT

C5

Kingsmill On The James

DRAINAGE AS-BUILT FOR SOUTHALL ROAD CHANNEL MAINTENANCE & SLOPE STABILIZATION DESIGN / BUILD PROJECT



VICINITY MAP
SCALE: N.T.S.

SITE INFORMATION

PARCEL ID – 5010300012A
– 5010300011A
– 5010300100

TOTAL AREA: 6,293 S.F. / 0.145 Ac.

ZONING DISTRICT: R4

DISTURBED AREA: 0.145± ACRES

SITE IS PARTLY WOODED AS SHOWN.

GENERAL NOTES:

1) A TITLE REPORT HAS NOT BEEN FURNISHED TO THIS FIRM.
2) THIS FIRM MADE NO ATTEMPT TO VERIFY UNDERGROUND UTILITIES EXCEPT THOSE SHOWN.
3) TOPOGRAPHIC DATA AS SHOWN IS BASED ON A CURRENT FIELD SURVEY.
4) ELEVATIONS SHOWN ARE RELATIVE TO THE APPROVED SITE PLAN (NAVD 88).
5) (D) = DESIGN INFORMATION / (A) = AS-BUILT INFORMATION
6) PROPERTY LINES ARE SHOWN PER APPROVED SITE PLAN.

RECORD DRAWING CERTIFICATION:

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE 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.

04/18/12
MATTHEW H. CONNOLLY, LIC NO. 2053 DATE

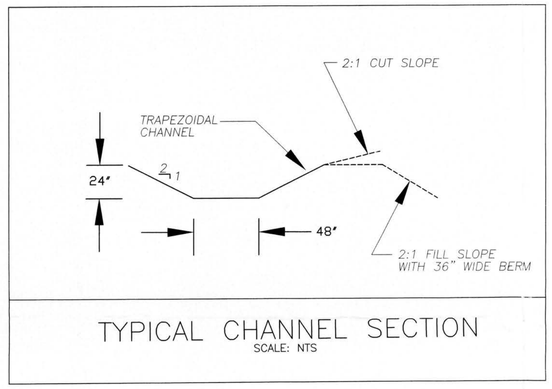
Kingsmill On The James
DRAINAGE AS-BUILT FOR SOUTHALL ROAD CHANNEL MAINTENANCE & SLOPE STABILIZATION DESIGN / BUILD PROJECT
JAMES CITY COUNTY VIRGINIA

NO.	DATE	REVISION / COMMENT / NOTE

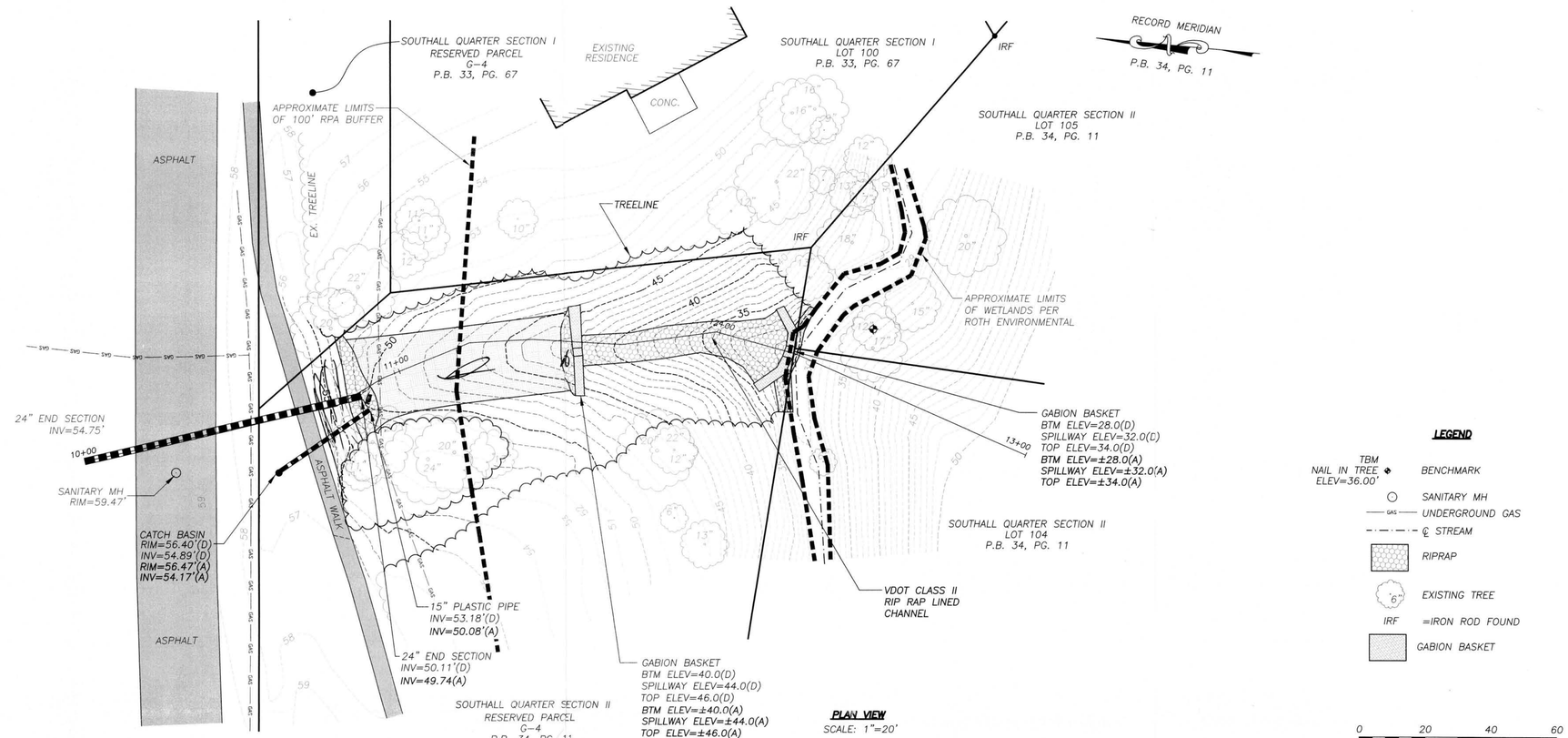
COMMONWEALTH OF VIRGINIA
MATTHEW H. CONNOLLY
Lic. No. 2053
04/18/12
LAND SURVEYOR

LandTech Resources, Inc.
Surveying • GPS • Engineering
205 Bulifants Blvd., Ste. E, Williamsburg, VA 23188
Phone: (757) 565-1677 Fax: (757) 565-0782
web: landtechresources.com

SCALE: 1" = 20'
DATE: 04/18/12
JOB: 11-306
DRAWN BY: DMS
SHEET: 1 OF 2



TYPICAL CHANNEL SECTION
SCALE: NTS



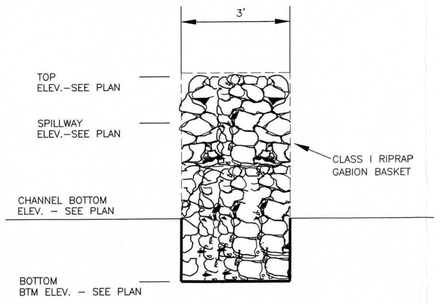
Kingsmill On The James

DRAINAGE AS-BUILT FOR
SOUTHALL ROAD CHANNEL MAINTENANCE
& SLOPE STABILIZATION
DESIGN / BUILD PROJECT

JAMES CITY COUNTY VIRGINIA

NO.	DATE	REVISION / COMMENT / NOTE

PERMANENT GABION BASKET

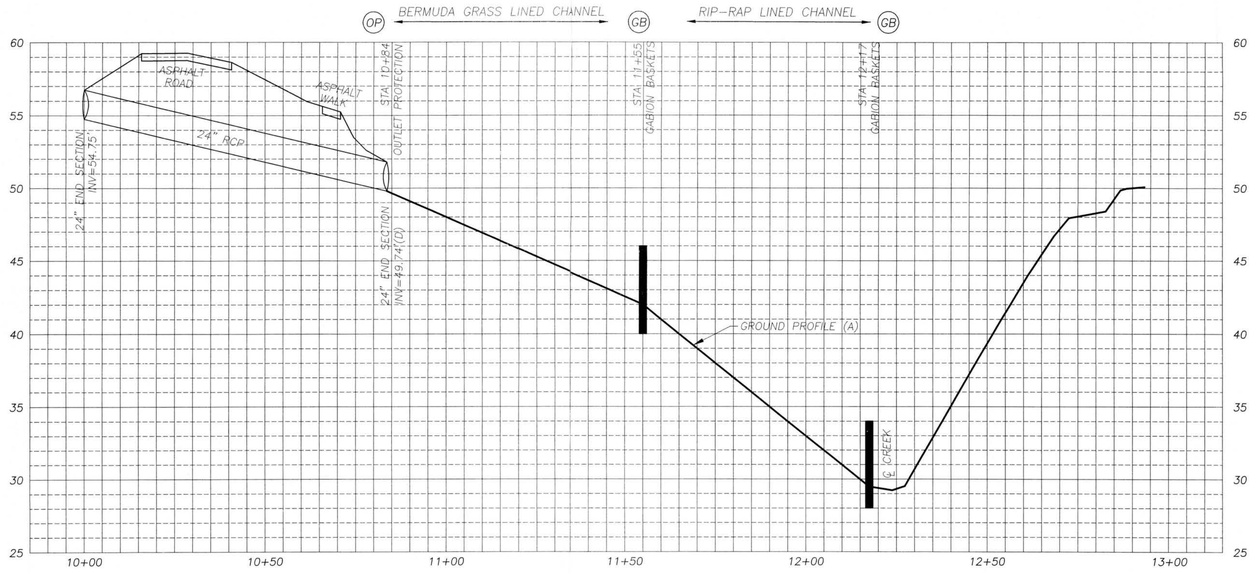


CROSS SECTION OF BASKET

RECORD DRAWING CERTIFICATION:

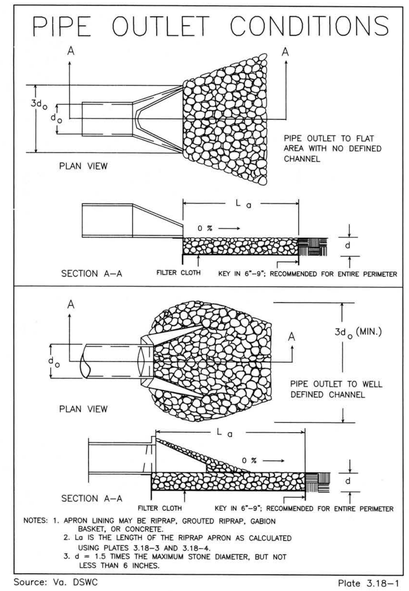
I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

MATTHEW H. CONNOLLY, LIC NO. 2053 — DATE 04/18/12



PROFILE
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

PIPE OUTLET CONDITIONS



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

Source: Va. DSWC — Plate 3.18–1

COMMONWEALTH OF VIRGINIA
MATTHEW H. CONNOLLY
Lic. No. 2053
04/18/12
LAND SURVEYOR

LandTech Resources, Inc.
Surveying • GPS • Engineering
205 Bulifants Blvd., Ste. E, Williamsburg, VA 23188
Phone: (757) 565-1677 Fax: (757) 565-0782
web: landtechresources.com

SCALE: 1" = 20'
DATE: 04/18/12
JOB: 11–306
DRAWN BY: DMS
SHEET: 2 OF 2

5. Construction Drawings

SPILLWAY RETROFIT AND REPAIR
KINGSMILL POND
JAMES CITY COUNTY, VIRGINIA
JAMES CITY COUNTY PLAN E&S-022-15

OWNER/DEVELOPER

KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
P.O. BOX 348
WILLIAMSBURG, VA 23187
PHONE: (757) 253-8207
ATTN: SUSAN SICKAL

ENVIRONMENTAL ENGINEER

STANTEC CONSULTING SERVICES, INC.
5209 CENTER STREET
WILLIAMSBURG, VIRGINIA 23188
PHONE: (757) 220-6869
FAX: (757) 229-4507
ATTN: DOUG BEISCH, P.E. AND CHRIS KUHN

SURVEYOR / BATHYMETRIC

BASE MAP PROVIDED BY
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
PHONE: (877) 342-4237
FAX: (757) 220-8994
ATTN: THOMAS C. SUBLETT, LS

NOTE: BENCHMARK INFORMATION AVAILABLE FROM AES UPON REQUEST

BATHYMETRY PROVIDED BY
SOLITUDE LAKE MANAGEMENT
P.O. BOX 969
VIRGINIA BEACH, VA. 23451
PHONE: (888) 480-5253
FAX: (888) 358-0088
ATTN: KEVIN TUCKER

NOTE: ELEVATIONS SHOWN FOR BATHYMETRY OF KINGSMILL POND ARE RELATIVE TO INVERT OF EXISTING CONCRETE WEIR AT ELEVATION 20.20 FT NGVD29

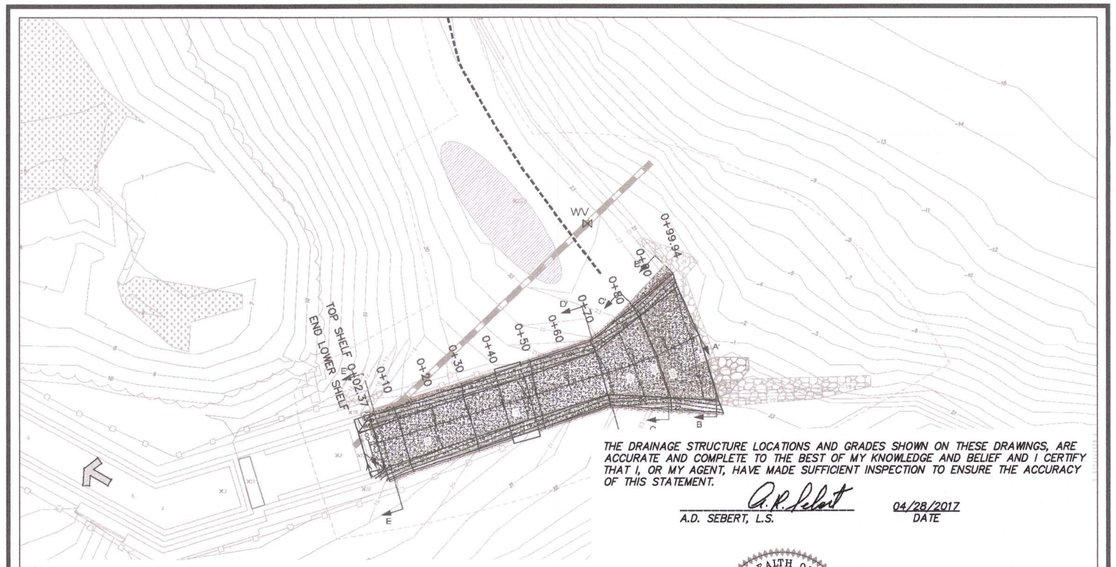
GEOTECHNICAL / STRUCTURAL

GET SOLUTIONS, INC.
1592 PENNIMAN ROAD, SUITE E
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 564-6452
FAX: (757) 564-6453
ATTN: CAMILLE A. KATTAN, P.E.

THE STRUCTURES GROUP
1200 OLD COLONY LANE
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 220-0465
FAX: (757) 220-1546
ATTN: MICHAEL A. MATTHEWS, P.E.

STATISTICAL DATA

HORIZONTAL DATUM:	NAD83
VERTICAL DATUM:	NGVD29
TOTAL PROJECT AREA:	3.99 ACRES
AREA OF DISTURBANCE:	0.83 ACRES



THE DRAINAGE STRUCTURE LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT.

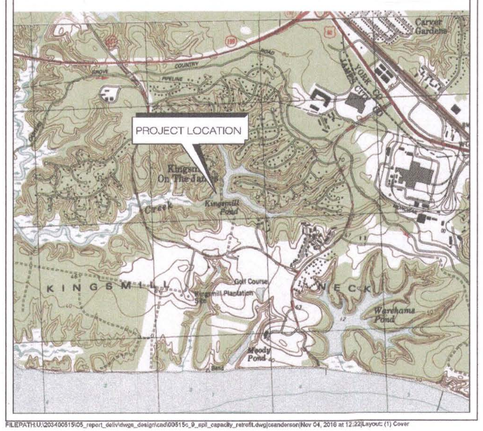
A.D. SEBERT, L.S. — 04/28/2017 DATE

COMMONWEALTH OF VIRGINIA
04/28/2017
A.D. SEBERT
NO. 002221
LAND SURVEYOR

AS-BUILT INFORMATION SHOWN HEREON WAS COLLECTED ON 03/28/17 AND PREPARED BY SEBERT SURVEYING AND LAYOUT, LLC

N
0 20 40
APPROXIMATE SCALE (FEET)

VICINITY MAP: 1" = 2000'



FILEPATH:U:\203400515\05_report_qa\civil\dwgs_design\cad\609815c_9_spil_capacity_retrofit.dwg[ceanderson]Nov 04, 2016 at 12:32[Layout: (1) Cover

\\J503-5 KMILL SPILLWAY REPAIR.DWG 4/28/2017 5:19:05 PM EDT

RECORD DRAWING AND CONSTRUCTION CERTIFICATION

THE STORMWATER MANAGEMENT/BMP FACILITY REPAIRS AND RENOVATIONS AS PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. CONTRACTOR TO ENSURE THAT THIS PROJECT IS ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH CURRENT COUNTY REGULATIONS.

PERMITS AND CONFIRMATIONS

AGENCY	DESCRIPTION	REF. #	DATE
CORP	WETLAND DELINEATION	NAO-2011-0662	MAY 31, 2011
COUNTY	WQIA/RPA WAIVER	CRF-16-037	SEPTEMBER 23, 2015
DEQ	VSMP		BELOW THRESHOLD

PROOF OF APPLICATION FOR VSMP PERMIT MUST BE PROVIDED TO JAMES CITY COUNTY PLANNING DEPARTMENT PRIOR TO PLAN APPROVAL.

PROOF OF ALL NECESSARY FEDERAL, STATE, AND LOCAL ENVIRONMENTAL PERMITS MUST BE PROVIDED TO JAMES CITY COUNTY PLANNING DEPARTMENT PRIOR TO PLAN APPROVAL.

DEBRIS REMOVAL

ALL OBJECTIONABLE AND DELETERIOUS MATERIAL IS TO BE REMOVED FROM THE SITE AND DISPOSED OF IN A STATE APPROVED FACILITY MEETING THE REQUIREMENTS OF ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.

WHILE THE GEOTECHNICAL REPORT ENTITLED REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES DAM INUNDATION STUDY - KINGSMILL POND, DATED AUGUST 3 2012, AND THE ADDENDUM NO. 1 TO THIS REPORT, DATED APRIL 23, 2015, BOTH PREPARED BY GET SOLUTIONS, INC., INDICATES THAT SOIL LOSS HAS OCCURRED UNDERNEATH THE EXISTING SPILLWAY, THE EXTENT OF THE SOIL LOSS IS UNKNOWN AND VOID VOLUME SHOWN IS AN ESTIMATE ONLY. EXISTING SPILLWAY WILL BE COMPLETELY REMOVED, AND DEPTH AND SPECIFICATIONS TO BE DETERMINED BY STRUCTURAL AND GEOTECHNICAL ENGINEER DURING CONSTRUCTION. A GEOTECHNICAL ENGINEER SHALL BE PRESENT DURING THE REMOVAL OF THE EXISTING SPILLWAY BOTTOM TO EVALUATE THE EXISTING SOILS UNDERNEATH THE SPILLWAY BOTTOM. IMPACT OF DEMOLITION ON REMAINING STRUCTURES TO BE EVALUATED BY A STRUCTURAL ENGINEER UNDER SEPARATE SCOPE. THE GEOTECHNICAL ENGINEER SHOULD PROVIDE UPDATED RECOMMENDATION FOR SUBGRADE PREPARATION AND FOR THE FILL OPERATION TO PREPARE A SUITABLE SUBGRADE FOR THE CONSTRUCTION OF THE NEW SPILLWAY. THE GEOTECHNICAL ENGINEER SHALL BE PRESENT FOR THE DURATION OF THE SUBGRADE PREPARATION AND FILL OPERATION.

RESPONSIBLE LAND DISTURBER STATEMENT

THE RESPONSIBLE LAND DISTURBER FOR THIS PROJECT SHALL BE SELECTED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION

PROJECT NARRATIVE

THIS PLAN DEPICTS THE PROPOSED RETROFIT AND REPAIR OF THE KINGSMILL DAM SPILLWAY LOCATED WITHIN THE KINGSMILL COMMUNITY IN JAMES CITY COUNTY, VIRGINIA. THE DAM IS LOCATED ON HALFWAY CREEK, APPROXIMATELY 0.45 MILES UPSTREAM OF THE MOUNTS BAY ROAD CROSSING. HALFWAY CREEK IS A TRIBUTARY OF COLLEGE CREEK, WHICH IS A TRIBUTARY OF THE JAMES RIVER. THE IMPOUNDMENT ORIGINALLY SERVED AS A MILL POND, BUT IS CURRENTLY A RECREATIONAL AND AESTHETIC FEATURE FOR THE KINGSMILL COMMUNITY. THE EXISTING DAM CONSISTS OF AN EARTHEN EMBANKMENT WITH A SPILLWAY LOCATED AT THE LEFT ABUTMENT.

A DAM BREAK INUNDATION ZONE STUDY WAS COMPLETED BY STANTEC CONSULTING SERVICES, INC. FOR THE KINGSMILL DAM IN MAY 2011. THE STUDY CONCLUDED THAT THE KINGSMILL DAM WILL BE CLASSIFIED AS A LOW HAZARD DAM, WITH A REGULATORY SPILLWAY DESIGN FLOOD (SDF) OF THE 100-YR STORM EVENT. THE EXISTING SPILLWAY OVERTOPS DURING THE 50-YR STORM EVENT, NECESSITATING THE PROPOSED SPILLWAY RETROFIT. THE PRIMARY OBJECTIVE OF THIS CONSTRUCTION IS TO INCREASE THE CAPACITY OF THE KINGSMILL SPILLWAY TO PASS THE 100-YR 6-HOUR STORM EVENT WHILE ALSO CORRECTING SOME EXISTING PROBLEMS WHICH ARE CONTRIBUTING TO THE DEGRADATION OF THE STRUCTURE.

REPLACING THE EXISTING GROUTED RIPRAP AND GABION CONSTRUCTION OF THE UPPER CHANNEL WITH A COBBLE LINED CONCRETE CHANNEL WILL ALLOW THE SPILLWAY TO CONTAIN THE 100-YR 6-HOUR STORM EVENT. ROUGHLY 100 LINEAR FEET OF CHANNEL WILL BE REBUILT AND THE EXISTING 17 FOOT CONCRETE WEIR REMOVED. THE INLET THROAT WILL BE WIDENED TO A BOTTOM WIDTH OF 35.4 FEET, GRADUALLY REDUCING TO A BOTTOM WIDTH OF 25 FEET AT THE LOCATION OF THE EXISTING CONCRETE WEIR, WHERE THE PROPOSED CHANNEL WILL CREST AT AN ELEVATION OF 20.20 FT NGVD29 BEFORE FURTHER REDUCING TO A BOTTOM WIDTH OF 12 FEET FOR THE FINAL 70 LINEAR FEET OF PROPOSED CHANNEL. THE EXISTING VERTICAL GABION CHANNEL WALLS WILL BE REPLACED WITH CONCRETE WALLS OF 1:1 SIDE SLOPE AND A HEIGHT OF 3.5 FEET. EXISTING INTERNAL EROSION WILL BE REPAIRED DURING REMOVAL OF THE EXISTING GABIONS AND PREPARATION OF A STABLE FOUNDATION FOR THE PROPOSED CONCRETE INSTALLATION.

NOTE: WHILE AN INCREMENTAL DAMAGE ANALYSIS (IDA) WOULD SUPPORT A REDUCTION OF THE REGULATORY SDF TO THE 50-YR STORM EVENT, THE SELECTED RETROFIT CONCEPT ALLOWS PROVIDING THE FULL REGULATORY SDF (100-YEAR 6-HOUR STORM EVENT). THUS, THE FULL REGULATORY SDF IS PROVIDED WITH THE PROPOSED RETROFIT.

SITE/ZONING DATA

THE PROPERTY SHOWN ON THE LOCATION MAP IS LOCATED AT PIN 5010100010, TAX MAP PAGE 501, LOT 10.

THE PROPERTY IS CURRENTLY ZONED R4.

FLOODPLAIN INFORMATION

THE KINGSMILL POND IS LOCATED ON FEMA FIRM PANEL 51095C-0210C, DATED SEPTEMBER 28, 2007. SPILLWAY STRUCTURE RETROFIT IS LOCATED OUTSIDE OF ZONE AE ASSOCIATED WITH STILL WATER ELEVATIONS FOR JAMES RIVER.

SHEET INDEX

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	7/20/2015	EDITORIAL CHANGES PER CLIENT REQUEST	TT	CK	SB
2	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB
3	10/28/16	RETROFIT TO ADDRESS AS-BUILT CAPACITY DEFICIENCY (EHT, R1)	CSA	CK	WDB

PREPARED BY:
Stantec
5209 Center Street
Williamsburg, VA 23188
PHONE. (757) 220-6869 FAX. (757) 229-4507

FOR:
KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:
COVER
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
W.D.BEISCH, JR.
Lic. No. 34050
11/4/16
PROFESSIONAL ENGINEER

NOTE:
THIS SUBMITTAL (COVER AND SHEET R1) HAVE BEEN MODIFIED TO REFLECT AGREED-UPON FIELD CHANGES. THE SUBMITTAL IS ACCOMPANIED BY A REVISED HYDRAULIC ANALYSIS DEPICTING THE ADJUSTED SPILLWAY CONFIGURATION.

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
11/4/16
PROFESSIONAL ENGINEER

DRAWN BY: C. ANDERSON	DESIGNED BY: C. KUHN
CHECKED BY: C. KUHN	APPROVED BY: W.D. BEISCH
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: NOVEMBER 4, 2016	FILE PATH: U:\203400515\07_cad

SHEET:
COVER 1 OF 12

PROPOSED DESIGN NARRATIVE:

STANTEC REVIEWED THE AS-BUILT SURVEY DRAWINGS OF THE KINGSMILL POND DAM SPILLWAY RETROFIT AND REPAIRS RECEIVED IN MAY 2016 AND FOUND THAT AS CONSTRUCTED, THE SPILLWAY DID HAVE SOME DEVIATIONS FROM THE DESIGN:

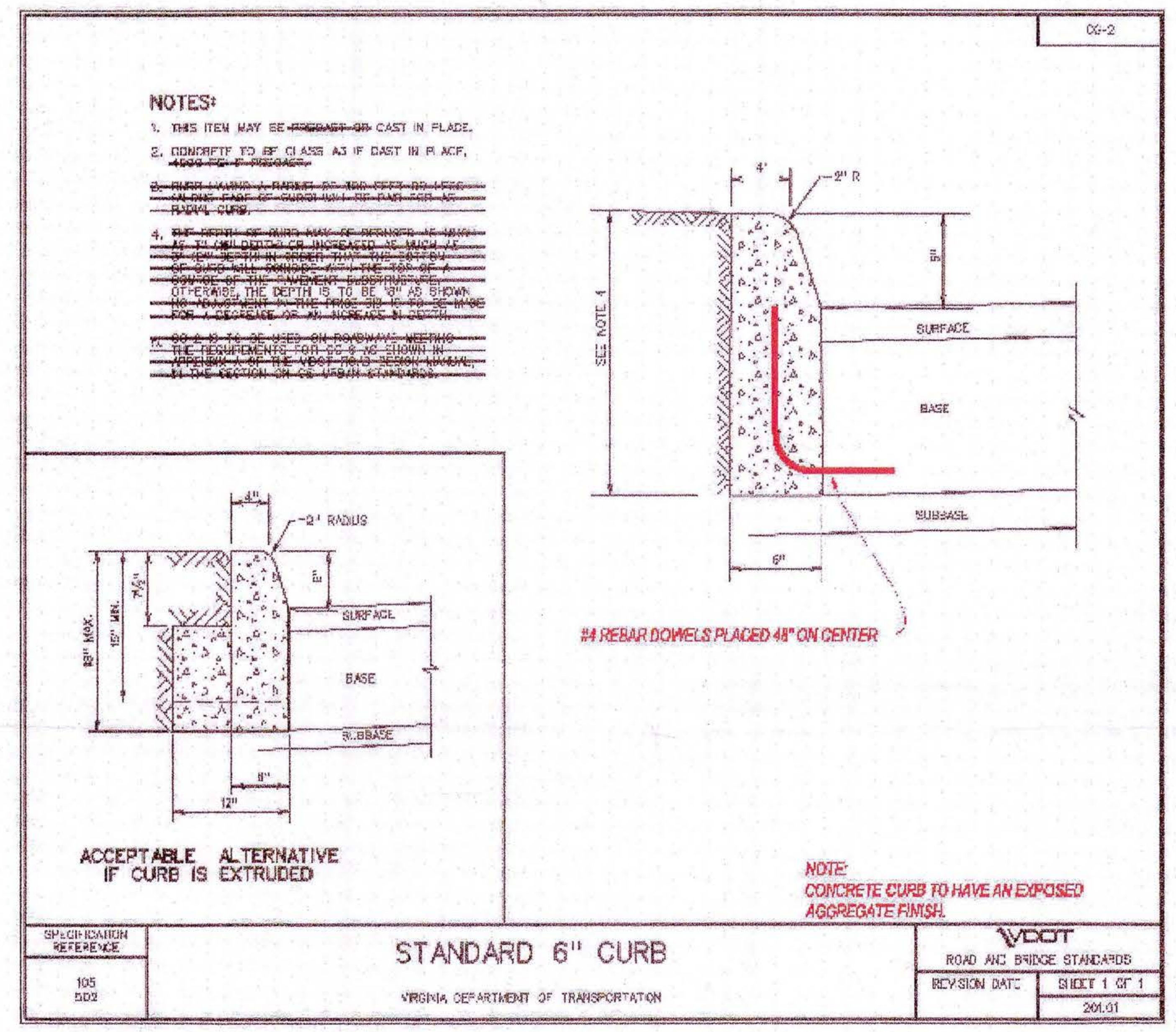
- PLAN FORM
  - A SLIGHT ROTATION IN THE SPILLWAY ALIGNMENT WAS INTRODUCED BETWEEN THE THROAT AND CHANNEL.
- ELEVATIONS
  - THE CONTROL SECTION IS THREE INCHES LOWER THAN DESIGNED.
  - CHUTE SIDE WALLS WERE CONSTRUCTED SLIGHTLY LOWER THAN DESIGNED.

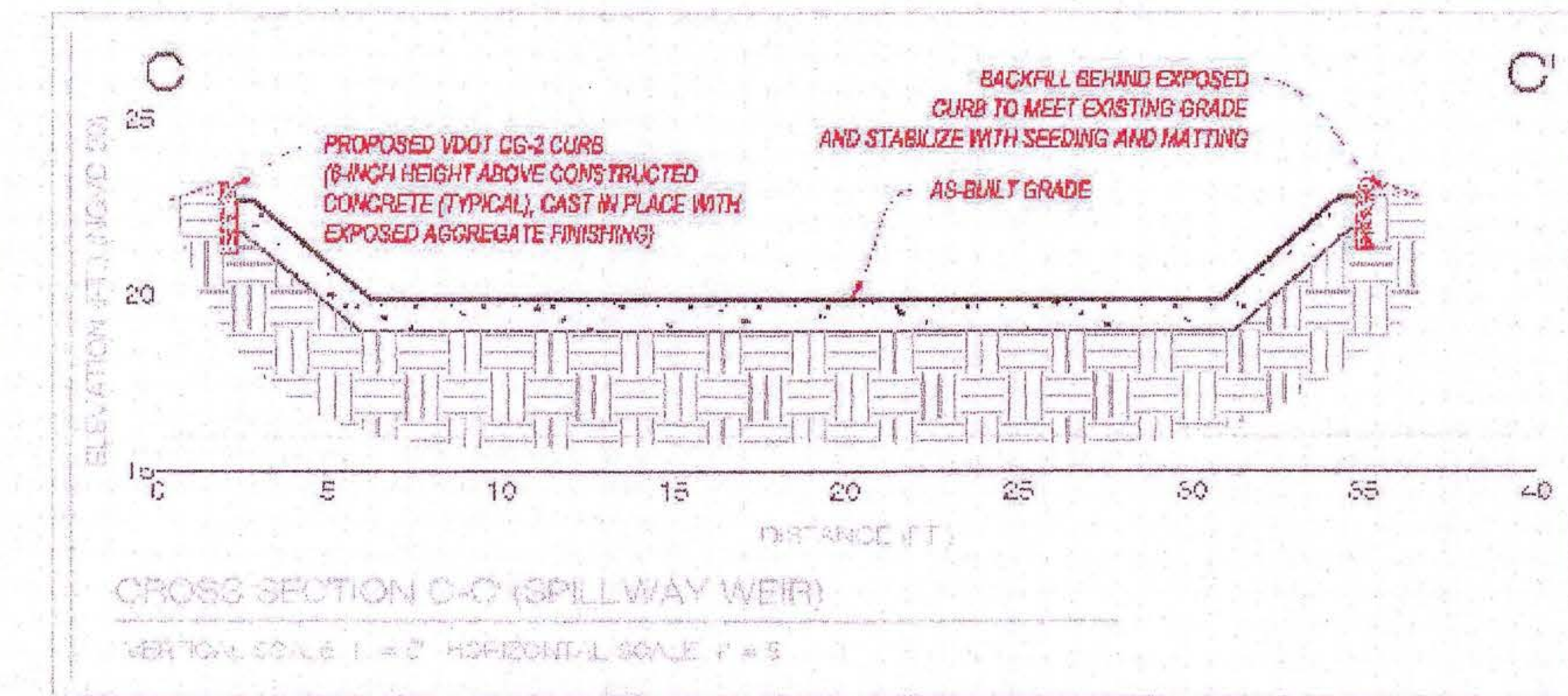
STANTEC REQUESTED AND RECEIVED ADDITIONAL FIELD SURVEY SUCH THAT SUFFICIENT AS-BUILT DATA WAS AVAILABLE TO MODEL THE CONSTRUCTED CONDITIONS IN US ARMY CORPS' HEC-RAS V5.0.0 SOFTWARE FOR ACTUAL CAPACITY.

HYDRAULIC MODELING INDICATED THAT THE CHUTE SIDEWALLS WERE 0.38 FEET TOO LOW TO SATISFY THE CAPACITY REQUIREMENTS FOR THE 100-YEAR 6-HOUR DESIGN EVENT. STANTEC AND THE KINGSMILL COMMUNITY SERVICES ASSOCIATION (KCSA) DISCUSSED THE ADDITION OF A CONCRETE CURB TO THE TOP OF THE SPILLWAY CHUTE WALLS TO ENSURE WE HAVE SUFFICIENT CAPACITY FOR THE SPILLWAY.

KCSA INDICATED THEIR PREFERENCE FOR A CONCRETE CURB CAP ON THE CHUTE. THE CURB CAP WILL INCREASE THE TOP ELEVATION OF THE SIDEWALLS BY 6 INCHES USING THE VDOT STANDARD CG-2 CURB CAST IN PLACE AND TIED INTO THE EXISTING CHUTE VIA UPSWEPT REBAR DOWELS BORED INTO THE

CONSTRUCTED CONCRETE STRUCTURE. THIS RETROFIT IS INTENDED TO MEET THE DESIGN CAPACITY OF THE SPILLWAY IN A WAY THAT AVOIDS TOTAL RECONSTRUCTION OF THE SPILLWAY.





AS-BUILT INFORMATION SHOWN HEREON WAS COLLECTED ON 03/28/17 AND PREPARED BY SEBERT SURVEYING AND LAYOUT, LLC

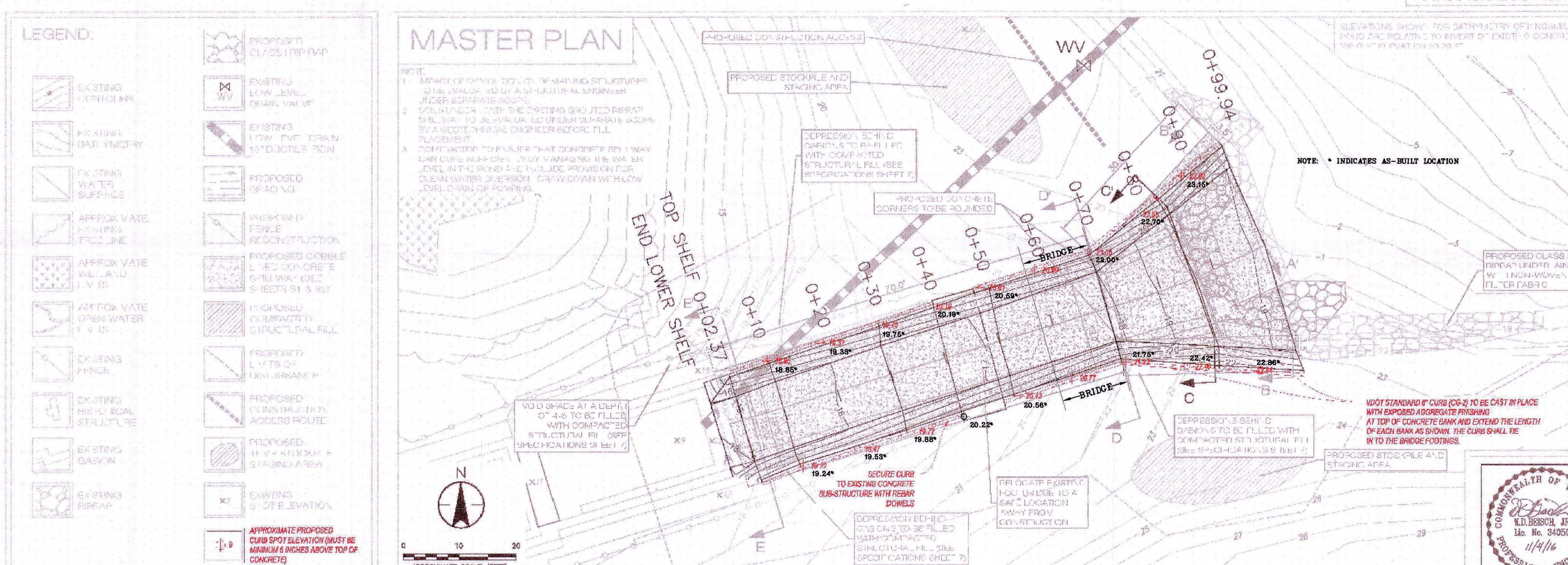
THE DRAINAGE STRUCTURE LOCATIONS AND GRADES SHOWN ON THESE DRAWINGS, ARE ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I CERTIFY THAT I, OR MY AGENT, HAVE MADE SUFFICIENT INSPECTION TO ENSURE THE ACCURACY OF THIS STATEMENT.

A.D. SEBERT, L.S. — 04/28/2017 DATE

COMMONWEALTH OF VIRGINIA — 04/28/2017 — A.D. SEBERT — NO. 002221 — LAND SURVEYOR

SEE STRUCTURAL INSERT SHEETS S1 AND S2 FOR STRUCTURAL DETAILS.

NOTE: THIS SUBMITTAL (COVER AND SHEET R1) HAVE BEEN MODIFIED TO REFLECT AGREED-UPON FIELD CHANGES. THE SUBMITTAL IS ACCOMPANIED BY A REVISED HYDRAULIC ANALYSIS DEPICTING THE ADJUSTED SPILLWAY CONFIGURATION.



REV	DATE	DESCRIPTION	DSN	CHK	APP
1	[illegible]	[illegible]	TT	CK	SB
2	[illegible]	[illegible] COUNTY COMMENTS	TT	CK	SB
3	[illegible]	RETROFIT TO ADDRESS AS-BUILT CAPACITY DEFICIENCY (SHT R1)	CSA	CK	WDB

PREPARED BY:

Stantec

5209 Center Street
Williamsburg, VA [illegible]
PHONE: (757) 220-6869 FAX: (757) 229-[illegible]

FOR:

KINGSMILL COMMUNITY SERVICES ASSOCIATION
500 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:

CURB RETROFIT PLAN, PROFILE, & DETAIL
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA — W.D. BEISCH, JR. — Lic. No. 34050 — 11/4/16 — PROFESSIONAL ENGINEER

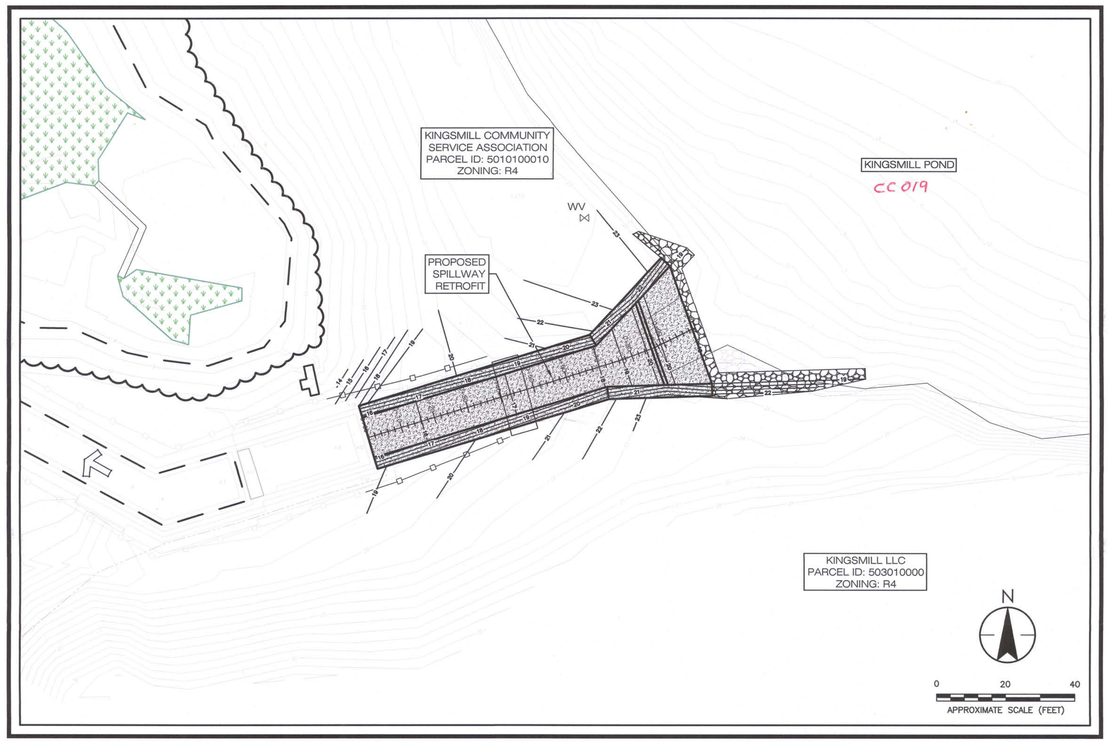
DRAWN BY: C. ANDERSON	DESIGNED BY: C. KUHN
CHECKED BY: C. KUHN	APPROVED BY: W.D. BEISCH
PROJECT NUMBER: 203400615	SCALE: AS SHOWN
DATE: NOVEMBER 4, 2016	FILE PATH: [illegible]

SHEET

SHEET R1

J503-5 KMILL SPILLWAY REPAIR.DWG 4/28/2017 5:19:05 PM EDT

SPILLWAY RETROFIT AND REPAIR
KINGSMILL POND
JAMES CITY COUNTY, VIRGINIA
JAMES CITY COUNTY PLAN E&S-022-15



OWNER/DEVELOPER

KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
P.O. BOX 348
WILLIAMSBURG, VA 23187
PHONE: (757) 253-8207
ATTN: SUSAN SICKAL

ENVIRONMENTAL ENGINEER

STANTEC CONSULTING SERVICES, INC.
5209 CENTER STREET
WILLIAMSBURG, VIRGINIA 23188
PHONE: (757) 220-6869
FAX: (757) 229-4507
ATTN: SCOTT BLOSSOM, P.E. AND CHRIS KUHN

SURVEYOR / BATHYMETRIC

BASE MAP PROVIDED BY
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
PHONE: (877) 342-4237
FAX: (757) 220-8994
ATTN: THOMAS C. SUBLETT, LS

NOTE: BENCHMARK INFORMATION AVAILABLE FROM AES UPON REQUEST

BATHYMETRY PROVIDED BY
SOLITUDE LAKE MANAGEMENT
P.O. BOX 969
VIRGINIA BEACH, VA. 23451
PHONE: (888) 480-5253
FAX: (888) 358-0088
ATTN: KEVIN TUCKER

NOTE: ELEVATIONS SHOWN FOR BATHYMETRY OF KINGSMILL POND ARE RELATIVE TO INVERT OF EXISTING CONCRETE WEIR AT ELEVATION 20.20 FT NGVD29

GEOTECHNICAL / STRUCTURAL

GET SOLUTIONS, INC.
1592 PENNIMAN ROAD, SUITE E
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 564-6452
FAX: (757) 564-6453
ATTN: CAMILLE A. KATTAN, P.E.

THE STRUCTURES GROUP
1200 OLD COLONY LANE
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 220-0465
FAX: (757) 220-1546
ATTN: MICHAEL A. MATTHEWS, P.E.

STATISTICAL DATA

HORIZONTAL DATUM:	NAD83
VERTICAL DATUM:	NGVD29
TOTAL PROJECT AREA:	3.99 ACRES
AREA OF DISTURBANCE:	0.83 ACRES

VICINITY MAP: 1" = 2000'

FILEPATH:U:\203400515\07_cad\00515C-9-SPIL.dwg[tolaylor]Oct 12, 2015 at 10:37]Layout: (1) Cover

RECORD DRAWING AND CONSTRUCTION CERTIFICATION

THE STORMWATER MANAGEMENT/BMP FACILITY REPAIRS AND RENOVATIONS AS PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. CONTRACTOR TO ENSURE THAT THIS PROJECT IS ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH CURRENT COUNTY REGULATIONS.

PERMITS AND CONFIRMATIONS

AGENCY	DESCRIPTION	REF. #	DATE
CORP	WETLAND DELINEATION	NAO-2011-0662	MAY 31, 2011
COUNTY	WQIA/RPA WAIVER	CRF-16-037	SEPTEMBER 23, 2015
DEQ	VSMP		BELOW THRESHOLD

PROOF OF APPLICATION FOR VSMP PERMIT MUST BE PROVIDED TO JAMES CITY COUNTY PLANNING DEPARTMENT PRIOR TO PLAN APPROVAL.

PROOF OF ALL NECESSARY FEDERAL, STATE, AND LOCAL ENVIRONMENTAL PERMITS MUST BE PROVIDED TO JAMES CITY COUNTY PLANNING DEPARTMENT PRIOR TO PLAN APPROVAL.

DEBRIS REMOVAL

ALL OBJECTIONABLE AND DELETERIOUS MATERIAL IS TO BE REMOVED FROM THE SITE AND DISPOSED OF IN A STATE APPROVED FACILITY MEETING THE REQUIREMENTS OF ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.

WHILE THE GEOTECHNICAL REPORT ENTITLED REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES DAM INUNDATION STUDY - KINGSMILL POND , DATED AUGUST 3 2012, AND THE ADDENDUM NO. 1 TO THIS REPORT, DATED APRIL 23, 2015, BOTH PREPARED BY GET SOLUTIONS, INC., INDICATES THAT SOIL LOSS HAS OCCURRED UNDERNEATH THE EXISTING SPILLWAY, THE EXTENT OF THE SOIL LOSS IS UNKNOWN AND VOID VOLUME SHOWN IS AN ESTIMATE ONLY. EXISTING SPILLWAY WILL BE COMPLETELY REMOVED, AND DEPTH AND SPECIFICATIONS TO BE DETERMINED BY STRUCTURAL AND GEOTECHNICAL ENGINEER DURING CONSTRUCTION. A GEOTECHNICAL ENGINEER SHALL BE PRESENT DURING THE REMOVAL OF THE EXISTING SPILLWAY BOTTOM TO EVALUATE THE EXISTING SOILS UNDERNEATH THE SPILLWAY BOTTOM. IMPACT OF DEMOLITION ON REMAINING STRUCTURES TO BE EVALUATED BY A STRUCTURAL ENGINEER UNDER SEPARATE SCOPE. THE GEOTECHNICAL ENGINEER SHOULD PROVIDE UPDATED RECOMMENDATION FOR SUBGRADE PREPARATION AND FOR THE FILL OPERATION TO PREPARE A SUITABLE SUBGRADE FOR THE CONSTRUCTION OF THE NEW SPILLWAY. THE GEOTECHNICAL ENGINEER SHALL BE PRESENT FOR THE DURATION OF THE SUBGRADE PREPARATION AND FILL OPERATION.

RESPONSIBLE LAND DISTURBER STATEMENT

UNTIL FURTHER NOTICE, THE RESPONSIBLE LAND DISTURBER FOR THIS PROJECT IS:
SCOTT C. BLOSSOM, P.E., LIC. #040287

STANTEC CONSULTING SERVICES, INC
5209 CENTER STREET WILLIAMSBURG, VA 23188
(757) 220-6869

RESPONSIBLE LAND DISTURBER LISTED IS FOR PLAN APPROVAL PURPOSES ONLY. THE OWNER SHALL DESIGNATE A NEW RESPONSIBLE LAND DISTURBER PRIOR TO COMMENCEMENT OF CONSTRUCTION.

PROJECT NARRATIVE

THIS PLAN DEPICTS THE PROPOSED RETROFIT AND REPAIR OF THE KINGSMILL DAM SPILLWAY LOCATED WITHIN THE KINGSMILL COMMUNITY IN JAMES CITY COUNTY, VIRGINIA. THE DAM IS LOCATED ON HALFWAY CREEK, APPROXIMATELY 0.45 MILES UPSTREAM OF THE MOUNTS BAY ROAD CROSSING. HALFWAY CREEK IS A TRIBUTARY OF COLLEGE CREEK, WHICH IS A TRIBUTARY OF THE JAMES RIVER. THE IMPOUNDMENT ORIGINALLY SERVED AS A MILL POND, BUT IS CURRENTLY A RECREATIONAL AND AESTHETIC FEATURE FOR THE KINGSMILL COMMUNITY. THE EXISTING DAM CONSISTS OF AN EARTHEN EMBANKMENT WITH A SPILLWAY LOCATED AT THE LEFT ABUTMENT.

A DAM BREAK INUNDATION ZONE STUDY WAS COMPLETED BY STANTEC CONSULTING SERVICES, INC. FOR THE KINGSMILL DAM IN MAY 2011. THE STUDY CONCLUDED THAT THE KINGSMILL DAM WILL BE CLASSIFIED AS A LOW HAZARD DAM, WITH A REGULATORY SPILLWAY DESIGN FLOOD (SDF) OF THE 100-YR STORM EVENT. THE EXISTING SPILLWAY OVERTOPS DURING THE 50-YR STORM EVENT, NECESSITATING THE PROPOSED SPILLWAY RETROFIT. THE PRIMARY OBJECTIVE OF THIS CONSTRUCTION IS TO INCREASE THE CAPACITY OF THE KINGSMILL SPILLWAY TO PASS THE 100-YR 6-HOUR STORM EVENT WHILE ALSO CORRECTING SOME EXISTING PROBLEMS WHICH ARE CONTRIBUTING TO THE DEGRADATION OF THE STRUCTURE.

REPLACING THE EXISTING GROUTED RIPRAP AND GABION CONSTRUCTION OF THE UPPER CHANNEL WITH A COBBLE LINED CONCRETE CHANNEL WILL ALLOW THE SPILLWAY TO CONTAIN THE 100-YR 6-HOUR STORM EVENT. ROUGHLY 100 LINEAR FEET OF CHANNEL WILL BE REBUILT AND THE EXISTING 17 FOOT CONCRETE WEIR REMOVED. THE INLET THROAT WILL BE WIDENED TO A BOTTOM WIDTH OF 35.4 FEET, GRADUALLY REDUCING TO A BOTTOM WIDTH OF 25 FEET AT THE LOCATION OF THE EXISTING CONCRETE WEIR, WHERE THE PROPOSED CHANNEL WILL CREST AT AN ELEVATION OF 20.20 FT NGVD29 BEFORE FURTHER REDUCING TO A BOTTOM WIDTH OF 12 FEET FOR THE FINAL 70 LINEAR FEET OF PROPOSED CHANNEL. THE EXISTING VERTICAL GABION CHANNEL WALLS WILL BE REPLACED WITH CONCRETE WALLS OF 1:1 SIDE SLOPE AND A HEIGHT OF 3.5 FEET. EXISTING INTERNAL EROSION WILL BE REPAIRED DURING REMOVAL OF THE EXISTING GABIONS AND PREPARATION OF A STABLE FOUNDATION FOR THE PROPOSED CONCRETE INSTALLATION.

NOTE: WHILE AN INCREMENTAL DAMAGE ANALYSIS (IDA) WOULD SUPPORT A REDUCTION OF THE REGULATORY SDF TO THE 50-YR STORM EVENT, THE SELECTED RETROFIT CONCEPT ALLOWS PROVIDING THE FULL REGULATORY SDF (100-YEAR 6-HOUR STORM EVENT). THUS, THE FULL REGULATORY SDF IS PROVIDED WITH THE PROPOSED RETROFIT.

SITE/ZONING DATA

THE PROPERTY SHOWN ON THE LOCATION MAP IS LOCATED AT PIN 5010100010, TAX MAP PAGE 501, LOT 10.

THE PROPERTY IS CURRENTLY ZONED R4.

FLOODPLAIN INFORMATION

THE KINGSMILL POND IS LOCATED ON FEMA FIRM PANEL 51095C-0210C, DATED SEPTEMBER 28, 2007. SPILLWAY STRUCTURE RETROFIT IS LOCATED OUTSIDE OF ZONE AE ASSOCIATED WITH STILL WATER ELEVATIONS FOR JAMES RIVER.

SHEET INDEX

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	7/20/2015	EDITORIAL CHANGES PER CLIENT	TT	CK	SB
2	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:
Stantec
5209 Center Street
Williamsburg, VA 23188
PHONE: (757) 220-6869 FAX: (757) 229-4507

FOR:
KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:
COVER
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

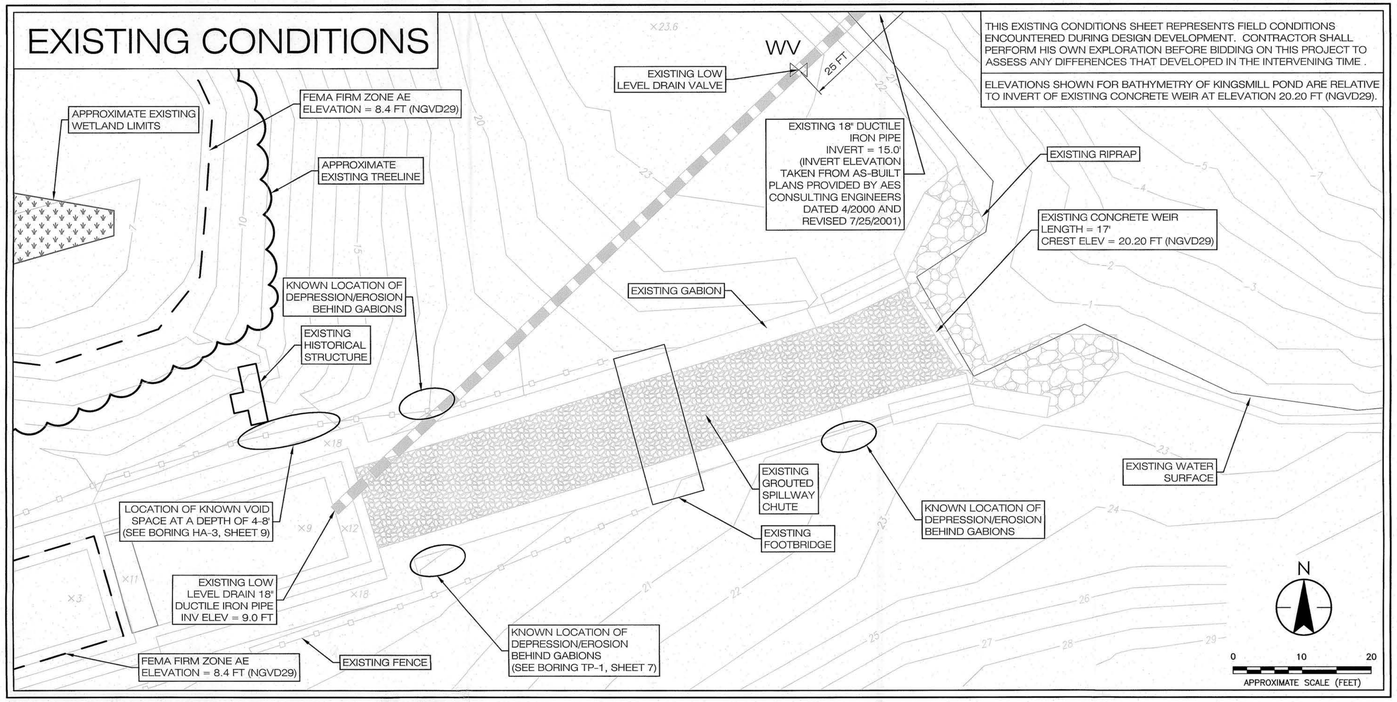
APPROVED
James City County
Eng & Res Protection
By: _____
Date: 10-19-15
E+S-022-15

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/6/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad
SHEET: **COVER 1 OF 9**	

E+S-022-15
CC019
CC watershed
HUC Code JL34

EXISTING CONDITIONS



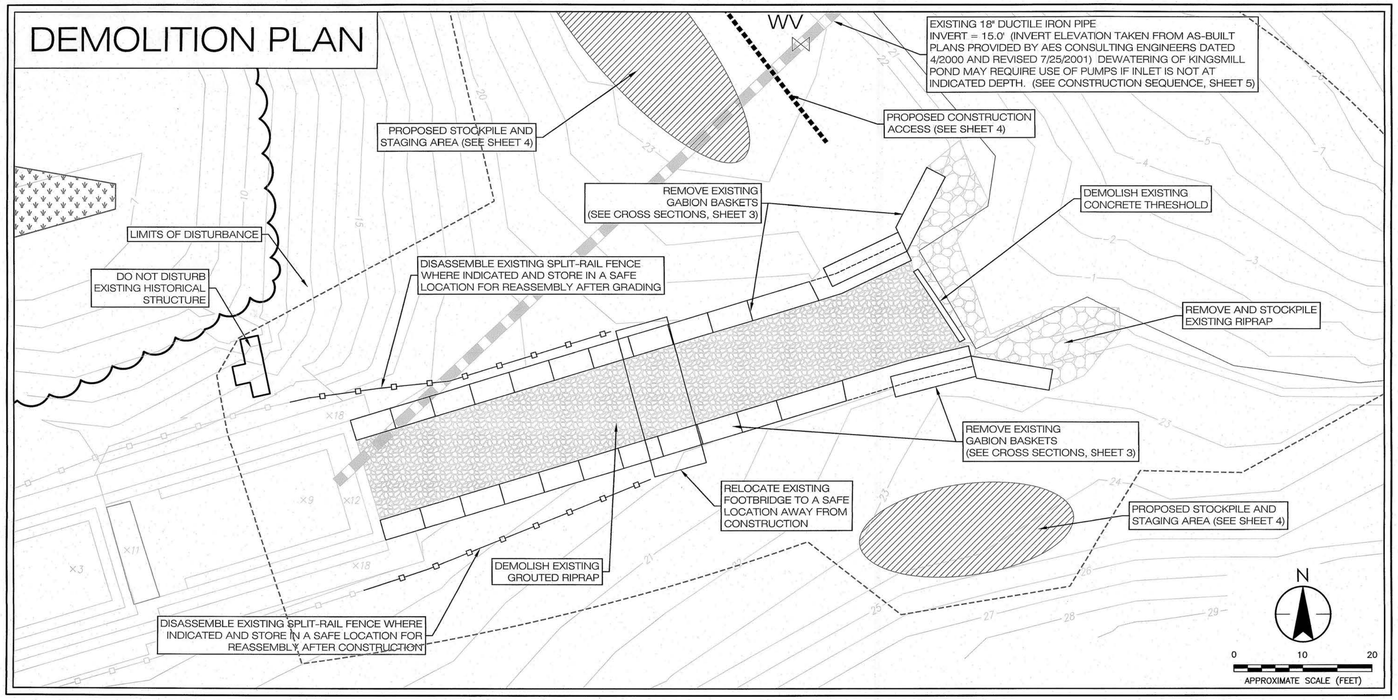
THIS EXISTING CONDITIONS SHEET REPRESENTS FIELD CONDITIONS ENCOUNTERED DURING DESIGN DEVELOPMENT. CONTRACTOR SHALL PERFORM HIS OWN EXPLORATION BEFORE BIDDING ON THIS PROJECT TO ASSESS ANY DIFFERENCES THAT DEVELOPED IN THE INTERVENING TIME .

ELEVATIONS SHOWN FOR BATHYMETRY OF KINGSMILL POND ARE RELATIVE TO INVERT OF EXISTING CONCRETE WEIR AT ELEVATION 20.20 FT (NGVD29).

LEGEND:

- EXISTING CONTOURS
- EXISTING BATHYMETRY
- EXISTING WATER SURFACE
- FEMA FIRM ZONE AE (PANEL 51095C-0210C, DATED SEPTEMBER 28, 2007)
- APPROXIMATE TREE LINE
- APPROXIMATE WETLAND LIMITS (DELINEATION PERFORMED BY WILLIAMSBURG ENVIRONMENTAL GROUP IN 2011, CONFIRMATION NAO 2011-0662, MARCH 31, 2011)
- EXISTING FENCE
- EXISTING FENCE TO BE REMOVED
- EXISTING HISTORICAL STRUCTURE
- EXISTING GABION
- ×9 EXISTING SPOT ELEVATION
- EXISTING GABION TO BE REMOVED
- EXISTING WEIR TO BE REMOVED
- EXISTING RIPRAP TO BE REMOVED
- EXISTING GROUTED SPILLWAY TO BE REMOVED
- WV EXISTING LOW LEVEL DRAIN VALVE
- EXISTING LOW LEVEL DRAIN 18" DUCTILE IRON PIPE
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED CONSTRUCTION ACCESS ROUTE (SEE SHEET 4)
- PROPOSED TEMPORARY STOCKPILE STAGING AREA
- PROPOSED TEMPORARY CONSTRUCTION ENTRANCE (SEE SHEET 4) CE

DEMOLITION PLAN



NARRATIVE

KINGSMILL POND DAM CONSISTS OF AN EARTHEN EMBANKMENT WITH AN OVERFLOW SPILLWAY FOLLOWED BY GROUTED RIPRAP CHANNEL WITH GABION BASKET SIDE WALLS. THE CREST OF THE DAM VARIES FROM 15 FEET TO 37 FEET WIDE AND IS APPROXIMATELY 350 FEET AND TAILWATER ELEVATION OF 4 FT (NGVD29) FOR AN APPROXIMATE DAM HEIGHT OF 19 FT. THE EXISTING PRINCIPAL SPILLWAY IS AN OVERFLOW WEIR STRUCTURE, WITH APPROXIMATE TOP WIDTH OF 17 FEET, RECTANGULAR FOR A DEPTH OF APPROXIMATELY 1.1 FEET AND THEN TRAPEZOIDAL IN CROSS-SECTION, WITH A CREST ELEVATION OF 20.20 FT (NGVD29). THE SPILLWAY CHUTE IS A SERIES OF THREE RECTANGULAR CHANNELS WITH A DROP STRUCTURE LOCATED BETWEEN EACH CHANNEL. THE CHANNELS AND DROP STRUCTURES ARE LINED WITH GROUTED RIPRAP BOTTOMS AND GABION BASKETS FOR THE BANKS.

DAM SAFETY EVALUATION OF THE KINGSMILL POND DAM HAS REVEALED THAT THIS DAM WILL QUALIFY AS A LOW HAZARD DAM. HOWEVER, THE ANALYSIS HAS FURTHER REVEALED THAT THE CURRENT SPILLWAY CONFIGURATION DOES NOT PROVIDE SUFFICIENT CAPACITY TO PASS THIS STORM EVENT WITHOUT OVERTOPPING OF THE DAM EMBANKMENT. FURTHER, THE GEOTECHNICAL EVALUATION OF THE DAM AND SPILLWAY HAS REVEALED THAT INTERNAL EROSION HAS OCCURRED UNDERNEATH THE BOTTOM OF THE SPILLWAY AND IN THE ADJACENT SOILS. VOID SPACES ARE DOCUMENTED, AND IT APPEARS THAT VOIDS HAVE PREVIOUSLY BEEN BACKFILLED WITH GRAVEL AND OTHER MATERIALS. IT APPEARS THAT FLOW THROUGH THE GABION BASKETS IS CAUSING THE OBSERVED INTERNAL EROSION. HOWEVER, THE HYDRAULIC ANALYSIS ALSO INDICATES THAT THE SPILLWAY SIDE WALLS ARE OVERTOPPED DURING LESS FREQUENT FLOW CONDITIONS.

THE FOLLOWING WORK IS PROPOSED TO REMEDY THE OBSERVED DEFICIENCIES:

- REMOVE THE EXISTING GROUTED RIPRAP AND GABIONS.
- LEVEL AND FILL EXISTING INTERNAL EROSION WITH COMPACTED STRUCTURAL FILL.
- WIDEN THE INLET THROAT TO THE SPILLWAY CHUTE TO INCREASE THE HYDRAULIC PERFORMANCE OF THE SPILLWAY.
- REPLACE THE EXISTING GROUTED RIPRAP SPILLWAY WITH A COBBLE LINED CONCRETE CHUTE TO REDUCE THE CHANNEL ROUGHNESS AND INCREASE SPILLWAY CAPACITY.
- REPLACE THE EXISTING VERTICAL WALL GABIONS WITH CONCRETE WALLS INCLINED TO A 1:1 SIDE SLOPE TO INCREASE THE SPILLWAY FLOW AREA.

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	7/20/15	EDITORIAL CHANGES PER CLIENT	TT	CK	SB
2	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:
Stantec
5209 Center Street
Williamsburg, VA 23188
PHONE: (757) 220-6869 FAX: (757) 229-4507

FOR:

KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:

EXISTING CONDITIONS AND DEMOLITION PLAN KINGSMILL POND SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/26/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: 1 INCH = 10 FEET
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad

SHEET:

2 OF 9

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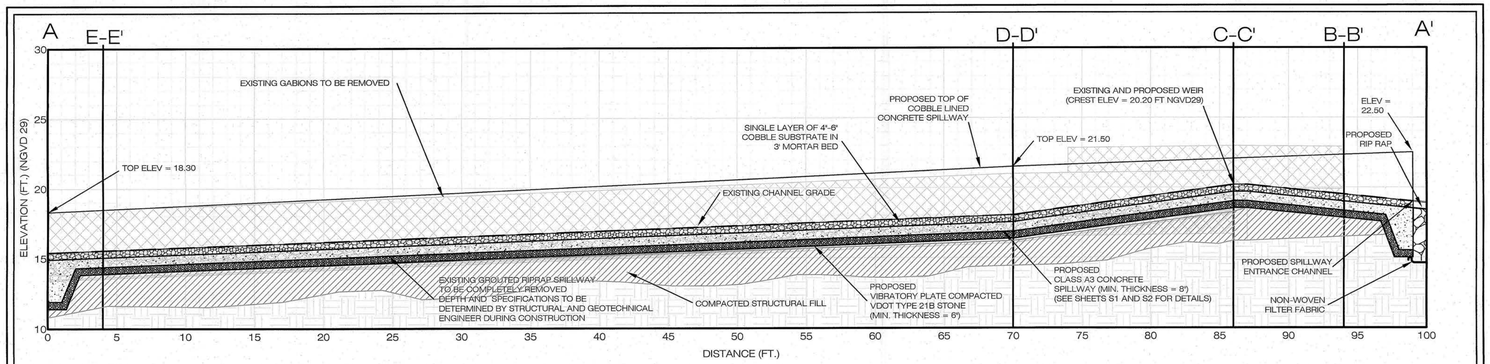
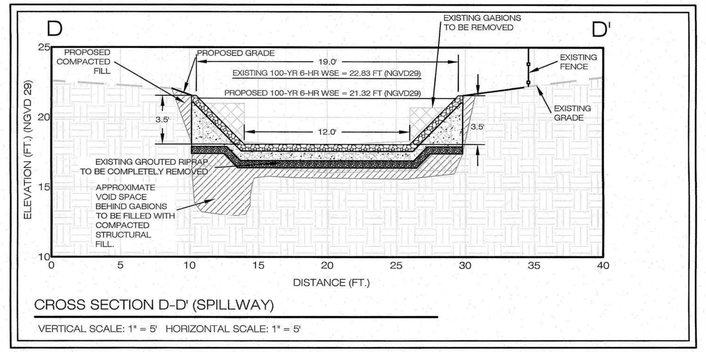


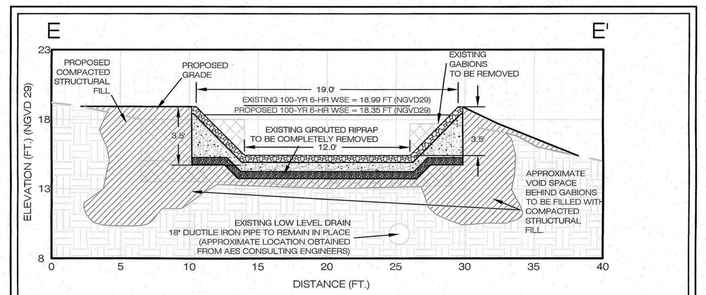
PROFILE A - A': STATION 0+00 - 1+00

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'



CROSS SECTION D-D' (SPILLWAY)

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'



CROSS SECTION E-E' (CORNER STABILIZATION)

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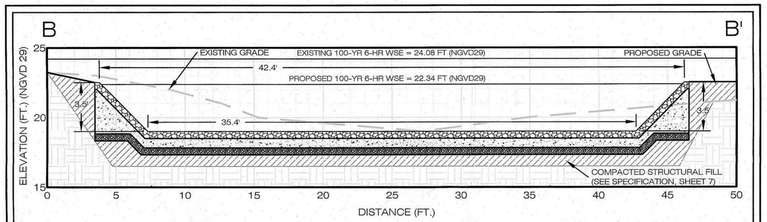
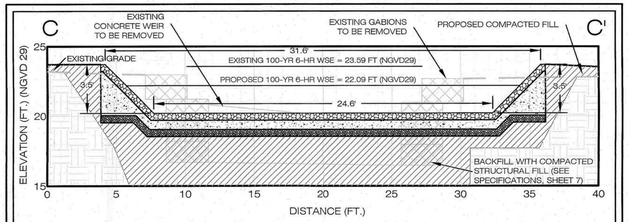


CROSS SECTION B-B' (SPILLWAY ENTRANCE CHANNEL)

VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'



CROSS SECTION C-C' (SPILLWAY WEIR)

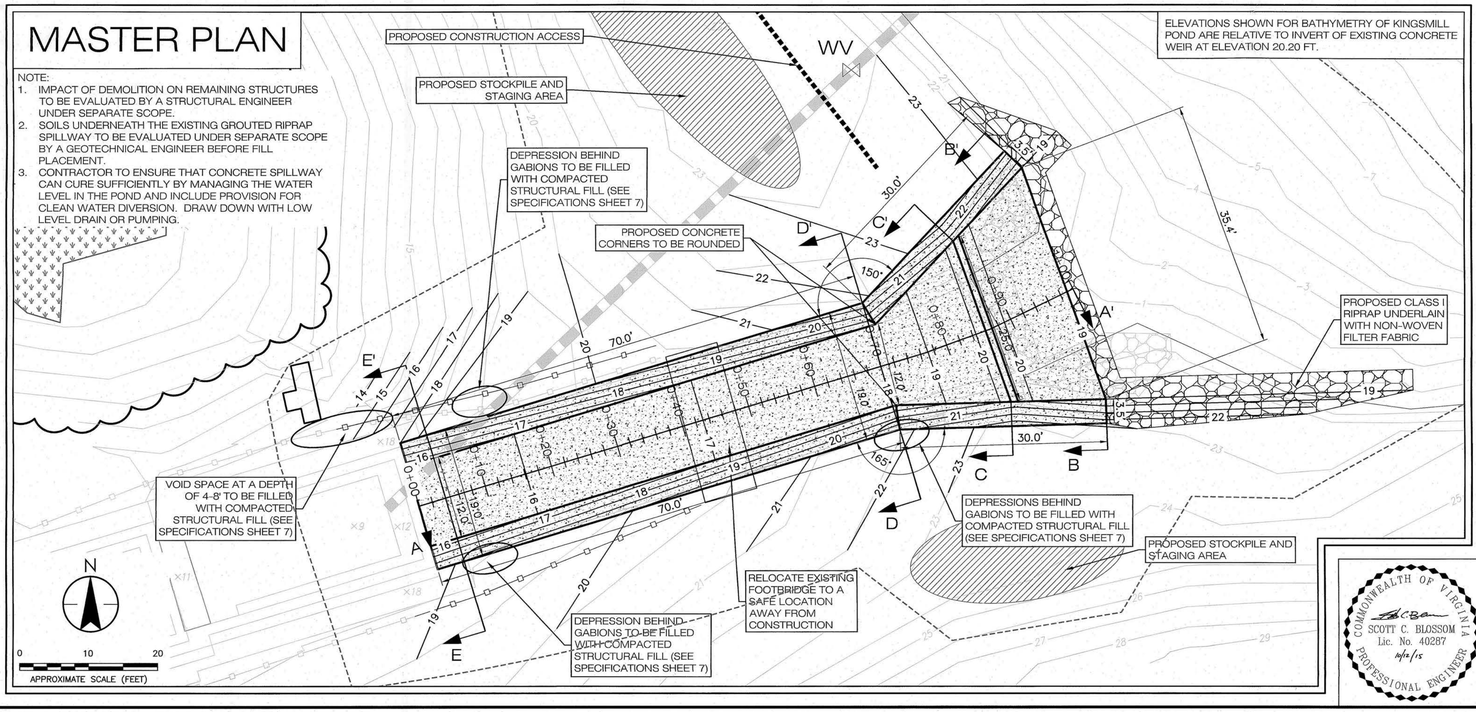
VERTICAL SCALE: 1" = 5' HORIZONTAL SCALE: 1" = 5'

LEGEND:

- EXISTING CONTOURS
- EXISTING BATHYMETRY
- EXISTING WATER SURFACE
- APPROXIMATE EXISTING TREE LINE
- APPROXIMATE WETLAND LIMITS
- APPROXIMATE OPEN WATER LIMITS
- EXISTING FENCE
- EXISTING HISTORICAL STRUCTURE
- EXISTING GABION
- EXISTING RIPRAP
- PROPOSED CLASS I RIP RAP
- EXISTING LOW LEVEL DRAIN VALVE (WV)
- EXISTING LOW LEVEL DRAIN 18" DUCTILE IRON
- PROPOSED GRADING
- PROPOSED FENCE RECONSTRUCTION
- PROPOSED COBBLE LINED CONCRETE SPILLWAY (SEE SHEETS S1 & S2)
- PROPOSED COMPACTED STRUCTURAL FILL
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED CONSTRUCTION ACCESS ROUTE
- PROPOSED TEMP STOCKPILE STAGING AREA
- EXISTING SPOT ELEVATION (×9)

MASTER PLAN

NOTE:
1. IMPACT OF DEMOLITION ON REMAINING STRUCTURES TO BE EVALUATED BY A STRUCTURAL ENGINEER UNDER SEPARATE SCOPE.
2. SOILS UNDERNEATH THE EXISTING GROUTED RIPRAP SPILLWAY TO BE EVALUATED UNDER SEPARATE SCOPE BY A GEOTECHNICAL ENGINEER BEFORE FILL PLACEMENT.
3. CONTRACTOR TO ENSURE THAT CONCRETE SPILLWAY CAN CURE SUFFICIENTLY BY MANAGING THE WATER LEVEL IN THE POND AND INCLUDE PROVISION FOR CLEAN WATER DIVERSION. DRAW DOWN WITH LOW LEVEL DRAIN OR PUMPING.



SEE STRUCTURAL INSERT SHEETS S1 AND S2 FOR STRUCTURAL DETAILS.

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	7/20/15	EDITORIAL CHANGES PER CLIENT	TT	CK	SB
2	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:
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FOR:
KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:
MASTER PLAN
PROFILE & SECTIONS
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/12/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad

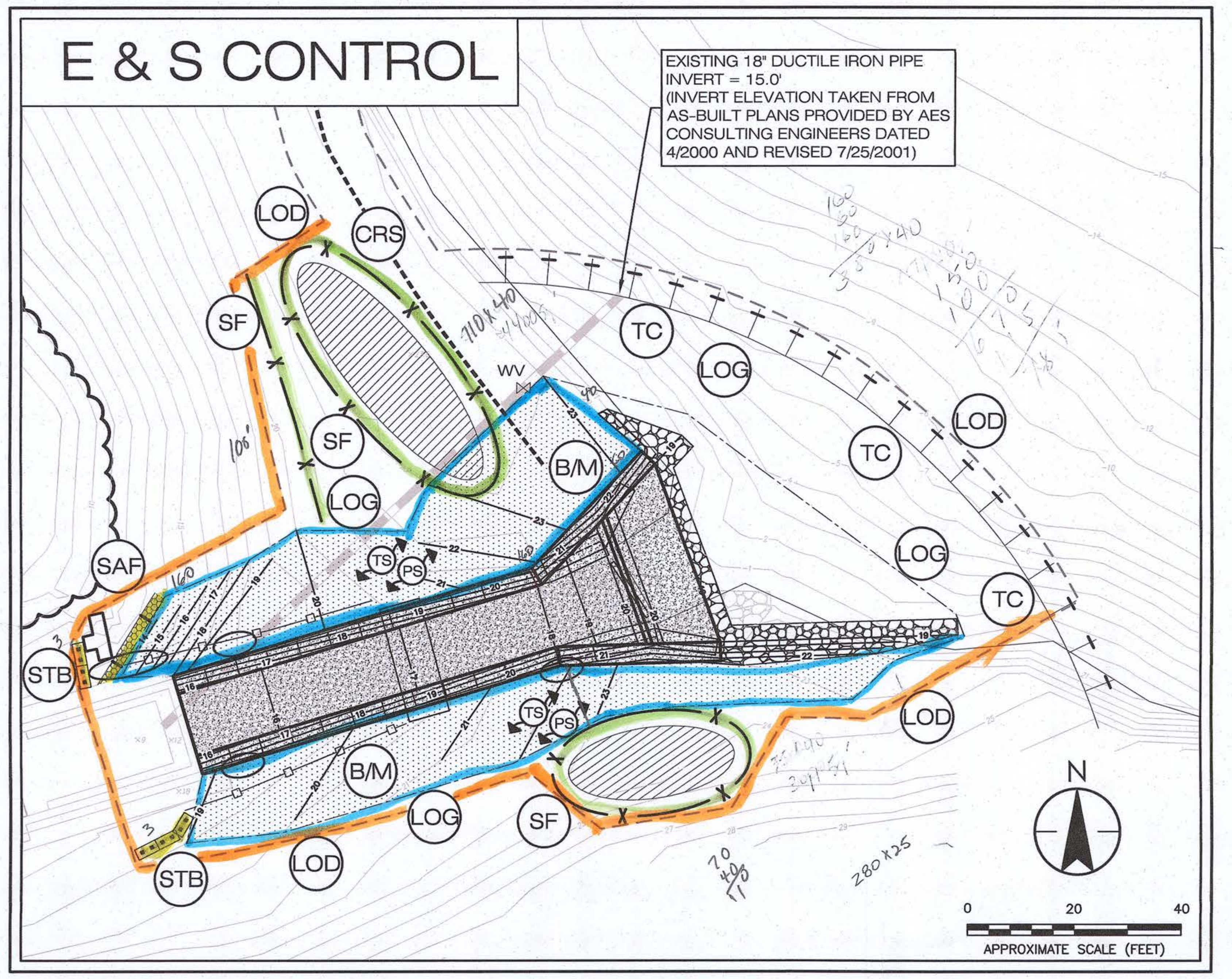
SHEET:
3 OF 9

FILEPATH:U:\203400515\07_cad\005150-9-SPIL.dwg(totaylor)Oct 12, 2015 at 10:38(Layout: (3) Master Plan Profile & Sections

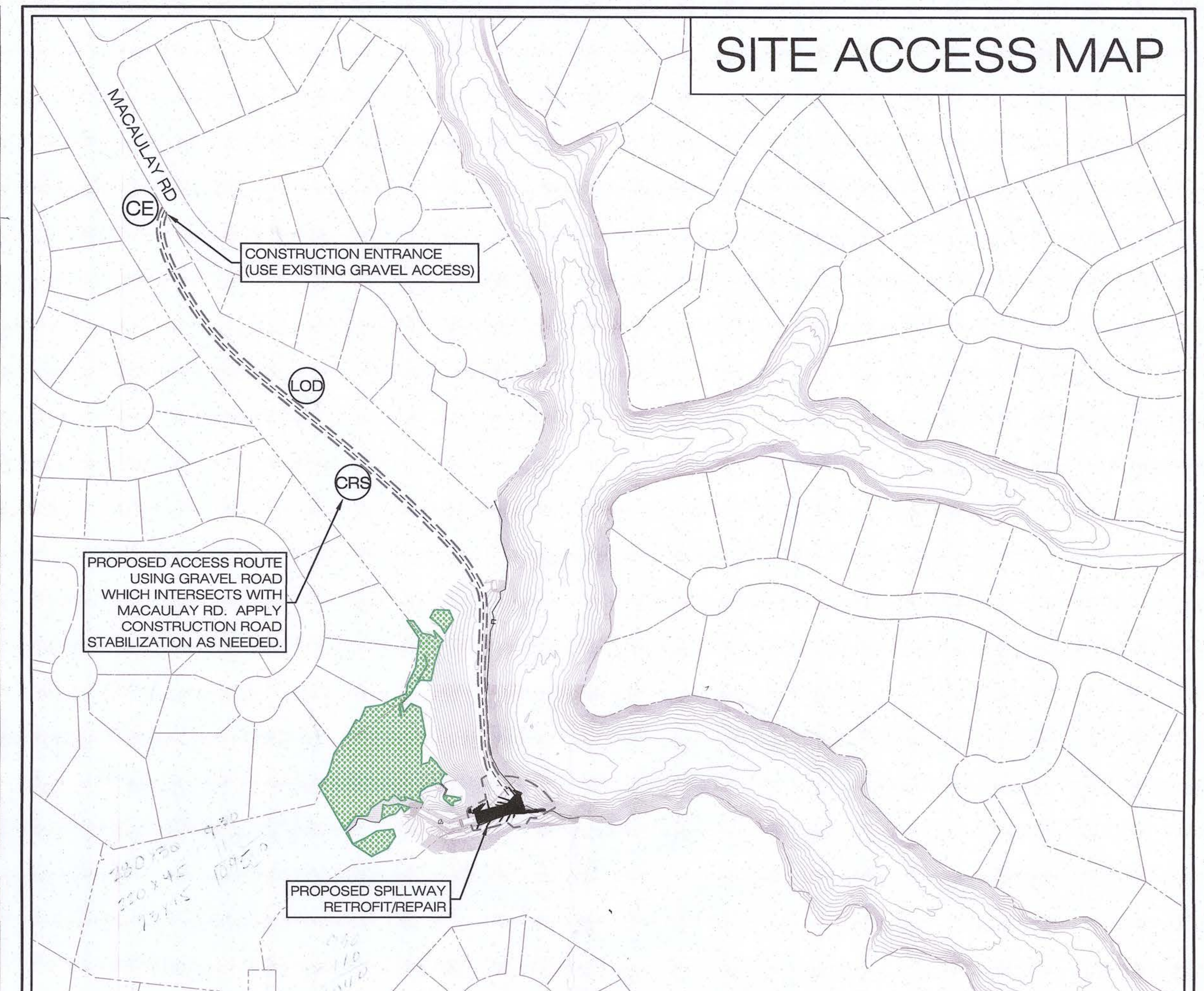
LEGEND:

- APPROXIMATE TREELINE
- APPROXIMATE WETLAND LIMITS
- EXISTING HISTORICAL STRUCTURE
- EXISTING GABION TO BE REMOVED
- EXISTING WEIR TO BE REMOVED
- EXISTING RIRAP TO BE REMOVED
- EXISTING LOW LEVEL DRAIN
- PROPOSED GRADING
- PROPOSED FENCE RECONSTRUCTION
- PROPOSED COBBLE LINED SPILLWAY
- PROPOSED SAFETY FENCE (SAF)
- PROPOSED STRAW BALE (STB)
- PROPOSED SILT FENCE (SF)
- PROPOSED LIMITS OF DISTURBANCE (LOD)
- PROPOSED LIMITS OF GRADING (LOG)
- PROPOSED SEEDING
- PROPOSED EC-2 STABILIZATION MATTING (B/M)
- PROPOSED CONSTRUCTION ENTRANCE (CE)
- PROPOSED CONSTRUCTION ACCESS ROUTE
- PROPOSED CONSTRUCTION ROAD STABILIZATION (CRS)
- PROPOSED TEMPORARY STOCKPILE STAGING AREA
- PROPOSED TURBIDITY CURTAIN (TC)

E & S CONTROL



SITE ACCESS MAP



NOTES:

1. CONTRACTOR TO PROVIDE A SOIL STOCKPILE OPERATIONS PLAN CONSISTENT WITH SECTION 24-66 OF THE JAMES CITY COUNTY ZONING ORDINANCE. CONTRACTOR TO OPERATE SOIL STOCKPILES IN ACCORDANCE WITH THIS PLAN.
2. ADJACENT TO THE PROPOSED SPILLWAY LIES THE RUINS OF JOHNSTON'S MILL, A HISTORIC PRESERVATION SITE. IN NO WAY SHALL THE CONTRACTOR DISTURB THE RUINS OF THE MILL THROUGHOUT THE COURSE OF CONSTRUCTION. SPECIAL CARE SHALL BE TAKEN WHEN WORKING IN THE PROXIMITY OF THE RUINS TO AVOID DISTURBANCE. INSTALL SAFETY FENCING AROUND THE MILL RUIN TO DELINEATE THE AREA AND PROVIDE A VISIBLE DETERRENT THROUGHOUT THE COURSE OF CONSTRUCTION.

N

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APPROXIMATE SCALE (FEET)

Standard County Stormwater Pollution Prevention Plan Notes (Revised: July 1, 2014)

James City County Virginia Jamestown 1607

1. ALL THE PROVISIONS OF VIRGINIA EROSION AND SEDIMENT CONTROL (E&SC) LAW AND REGULATIONS, THE VIRGINIA STORMWATER MANAGEMENT ACT AND REGULATIONS (VSMP), THE VIRGINIA BMP CLEARINGHOUSE WEBSITE, STATE EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT HANDBOOKS, AND ANY ASSOCIATED TECHNICAL BULLETINS AND GUIDANCE DOCUMENTS AS PUBLISHED BY THE STATE WATER CONTROL BOARD, THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ), AND THE LOCAL VESCP AND VSMP AUTHORITY SHALL APPLY TO THE PROJECT.
2. MINIMUM STANDARDS NO. 1 THROUGH NO. 19 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS 9VAC25- 840 ET SEQ. SHALL APPLY TO THE PROJECT.
3. THE OWNER, APPLICANT, OPERATOR, OR PERMITTEE SHALL BE RESPONSIBLE TO REGISTER FOR CONSTRUCTION GENERAL PERMIT (CGP) COVERAGE, AS APPLICABLE, IN ACCORDANCE WITH THE GENERAL VPDES PERMIT FOR DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES (VAR10) CHAPTER 880; THE VIRGINIA STORMWATER MANAGEMENT PROGRAM REGULATIONS CHAPTER 870; AND IN ACCORDANCE WITH CURRENT REQUIREMENTS OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP), THE STATE WATER CONTROL BOARD, THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, CHAPTER 8 OF THE COUNTY CODE AND THE LOCAL VESCP/VSMP AUTHORITY.
4. THE OWNER, APPLICANT, OPERATOR OR PERMITTEE SHALL PROVIDE THE NAME OF AN INDIVIDUAL HOLDING A VALID RESPONSIBLE LAND DISTURBER (RLD) CERTIFICATE OF COMPETENCE WHO WILL BE RESPONSIBLE FOR THE LAND DISTURBING ACTIVITY PRIOR TO ENGAGING IN THE LAND DISTURBING ACTIVITY. THIS WILL BE NECESSARY PRIOR TO ISSUANCE OF A LOCAL LAND DISTURBING AND/OR STORMWATER CONSTRUCTION PERMIT FOR THE PROJECT. THE RLD IS REQUIRED TO ATTEND THE PRECONSTRUCTION CONFERENCE FOR THE PROJECT.
5. THE CONTRACTOR IS RESPONSIBLE TO CONTACT MISS UTILITY (DIAL 811 IN VA OR 1-800-552-7001) PRIOR TO ANY UTILITY OR SITE WORK EXCAVATIONS.
6. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PLANNED, DESIGNED, IMPLEMENTED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PROVISIONS OF THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). THE CONTRACTOR SHALL MAINTAIN, INSPECT, AND REPAIR ALL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED THROUGHOUT THE LIFE OF THE PROJECT TO ENSURE CONTINUED ACCEPTABLE PERFORMANCE.
7. A PRECONSTRUCTION CONFERENCE (MEETING) SHALL BE HELD ON SITE AND INCLUDE REPRESENTATIVES FROM THE LOCAL VESCP/VSMP AUTHORITY, THE OWNER/APPLICANT/OPERATOR/PERMITTEE, THE RESPONSIBLE LAND-DISTURBER (RLD), AND THE CONTRACTOR, ENGINEER, AND OTHER RESPONSIBLE AGENCIES, AS APPLICABLE, PRIOR TO AUTHORIZATION AND ISSUANCE OF A LOCAL LAND DISTURBING OR STORMWATER CONSTRUCTION PERMIT. THE OWNER, APPLICANT, OPERATOR OR PERMITTEE IS REQUIRED TO COORDINATE SCHEDULING OF THE PRECONSTRUCTION CONFERENCE BETWEEN ALL APPLICABLE PARTIES. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION AND A REVISED POLLUTION PREVENTION PLAN (P2 PLAN OR PPP), IF APPLICABLE, TO THE LOCAL VESCP/VSMP AUTHORITY FOR REVIEW AND APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING.
8. A POLLUTION PREVENTION PLAN (P2 PLAN OR PPP), IF REQUIRED, SHALL BE DEVELOPED, IMPLEMENTED AND UPDATED AS NECESSARY AND MUST DETAIL THE DESIGN, INSTALLATION, IMPLEMENTATION, AND MAINTENANCE OF EFFECTIVE POLLUTION PREVENTION MEASURES TO: MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER AND OTHER WASH WATERS; MINIMIZE THE EXPOSURE OF ALL MATERIALS ON THE SITE (SUCH AS BUILDING MATERIALS AND PRODUCTS, CONSTRUCTION WASTE, TRASH, LANDSCAPE MATERIALS, FERTILIZERS, PESTICIDES, HERBICIDES, DETERGENTS, SANITARY WASTE, ETC.) TO PRECIPITATION AND STORMWATER; MINIMIZE THE DISCHARGE OF POLLUTANTS FROM SPILLS AND LEAKS; IMPLEMENT CHEMICAL SPILL AND LEAK PREVENTION AND RESPONSE PROCEDURES; AND INCLUDE EFFECTIVE BEST MANAGEMENT PRACTICES TO PROHIBIT THE DISCHARGE OF WASTEWATER FROM: CONCRETE WASHOUT AREAS, DISCHARGE OF WASTEWATER FROM WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS; DISCHARGE OF FUELS, OILS, OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE ACTIVITIES; AND THE DISCHARGE OF SOAPS AND SOLVENTS USED FOR VEHICLE AND EQUIPMENT WASHING. THIS PLAN SHALL BE AVAILABLE ONSITE FOR REVIEW AT REASONABLE TIMES BY THE LOCAL VESCP/VSMP AUTHORITY WHEN REQUESTED.
9. THE OWNER, APPLICANT, OPERATOR, OR PERMITTEE IS RESPONSIBLE FOR ALL OPERATOR SELF-INSPECTIONS AS REQUIRED IN THE POLLUTION PREVENTION PLAN (P2 PLAN OR PPP) OR AS REQUIRED AS PART OF A DEVELOPED STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THESE INSPECTIONS SHALL BE MADE AVAILABLE, UPON REQUEST, BY THE LOCAL VESCP/VSMP AUTHORITY.
10. ALL PERIMETER EROSION AND SEDIMENT CONTROL (E&SC) MEASURES SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND- DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE ACTIVITY TAKES PLACE.
11. ADDITIONAL SAFETY FENCE OR DUST CONTROL MEASURES, IN ACCORDANCE WITH THE PROVISIONS OF MINIMUM STANDARDS & SPECS. 3.01 AND 3.39 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), MAY BE REQUIRED TO BE IMPLEMENTED ON THE SITE IN ADDITION TO THAT SHOWN ON THE APPROVED PLAN AND SPECIFICATIONS IN ORDER TO ENSURE ADEQUATE PROTECTION OF THE HEALTH, SAFETY AND WELFARE OF THE PUBLIC OR IF SITE CONDITIONS CHANGE, BECOME APPARENT OR ALTER SIGNIFICANTLY FOLLOWING THE DATE OF PLAN APPROVAL.
12. EROSION AND SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT OR FOLLOWING TIME OF CONSTRUCTION TO ENSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED, TO ENSURE ADEQUATE PROTECTION OF THE HEALTH, SAFETY, AND WELFARE OF THE PUBLIC, OR IF SITE CONDITIONS CHANGE, BECOME APPARENT OR ALTER SIGNIFICANTLY FOLLOWING THE DATE OF PLAN APPROVAL. LOCAL VESCP/VSMP AUTHORITY APPROVAL SHALL BE REQUIRED FOR ANY DEVIATION OF EROSION AND SEDIMENT CONTROL MEASURES FROM THE APPROVED PLAN.
13. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE LOCAL VESCP/VSMP AUTHORITY PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
14. TEMPORARY SOIL STOCKPILES SHALL COMPLY WITH THE PROVISIONS OF SECTION 24-46 OF THE COUNTY CODE.
15. CULVERT AND STORM DRAIN INLET PROTECTIONS, IN ACCORDANCE WITH THE PROVISIONS OF MINIMUM STANDARDS & SPECS. 3.07 AND 3.08 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), MAY BE REMOVED AT THE DISCRETION OF THE ASSIGNED LOCAL VESCP/VSMP AUTHORITY COMPLIANCE INSPECTOR, SHOULD PLACEMENT OF THE MEASURE RESULT IN EXCESSIVE ROAD FLOODING, TRAFFIC OR SAFETY HAZARD, OR RESULT IN THE REDIRECTION OF DRAINAGE ONTO OR TOWARD EXISTING LOTS, HOMES, DRIVEWAYS, GARAGES OR OTHER STRUCTURES. DECISIONS SHALL BE MADE BY THE VESCP/VSMP AUTHORITY ON A CASE-BY-CASE BASIS BASED ON FIELD SITUATIONS ENCOUNTERED.
16. DRAINAGE FACILITIES SHALL BE INSTALLED AND FUNCTIONAL WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT.
17. NO MORE THAN 300 FEET OF TRENCH MAY BE OPEN AT ONE TIME FOR UNDERGROUND UTILITY LINES, INCLUDING STORM WATER CONVEYANCES. ALL OTHER PROVISIONS OF MINIMUM STANDARD NO. 16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS APPLY.
18. PERMANENT OR TEMPORARY STABILIZATION OF DISTURBED SOIL AREAS SHALL COMPLY WITH MINIMUM STANDARD # 1 AND # 3 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS.
19. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION ON THE APPROVED PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED, IN ACCORDANCE WITH MINIMUM STANDARD # 1 AND # 3 FROM THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, MINIMUM STANDARDS & SPECS. 3.29 THROUGH 3.37 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), AND ANY TECHNICAL BULLETINS ISSUED BY THE STATE WATER CONTROL BOARD OR VIRGINIA DEQ, AS APPLICABLE. IRRIGATION, IF NECESSARY, SHALL COMPLY WITH ALL APPLICABLE SEASONAL OUTDOOR WATER USE RESTRICTIONS OF THE JAMES CITY SERVICE AUTHORITY.
20. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH MINIMUM STANDARD & SPEC. 3.35 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH). SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.
21. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. REMOVAL SHALL NOT OCCUR WITHOUT AUTHORIZATION BY THE LOCAL VESCP/VSMP AUTHORITY. DISTURBANCES ASSOCIATED WITH THE REMOVAL OF TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROPERLY STABILIZED.
22. NO SEDIMENT TRAP OR SEDIMENT BASIN SHALL BE REMOVED UNTIL A) AT LEAST 75 PERCENT OF THE SINGLE-FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN SOLD TO A THIRD PARTY FOR THE CONSTRUCTION OF HOMES (UNRELATED TO THE DEVELOPER); AND/OR, B) 60 PERCENT OF THE SINGLE-FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN ARE COMPLETED AND 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 AUTHORIZATION OF THE LOCAL VESCP/VSMP AUTHORITY.
23. DESIGN AND CONSTRUCTION OF PRIVATE-TYPE STORM DRAINAGE SYSTEMS, OUTSIDE VDOT RIGHT-OF-WAY, SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY, ENGINEERING AND RESOURCE PROTECTION DIVISION, STORMWATER DRAINAGE CONVEYANCE SYSTEMS (NON-BMP RELATED), GENERAL DESIGN AND CONSTRUCTION GUIDELINES (IE. COUNTY DRAINAGE STANDARDS).
24. RECORD DRAWINGS (ASBUILTS) AND CONSTRUCTION CERTIFICATIONS ARE REQUIRED FOR ALL STORMWATER FACILITIES INCLUDING STORMWATER MANAGEMENT/BMP FACILITIES AND STORM DRAINAGE CONVEYANCE SYSTEMS. THE CERTIFICATION PROCESS SHALL INCLUDE AN INTERNAL CLOSED-CIRCUIT TELEVISION CAMERA (CCTV) POST INSTALLATION INSPECTION PERFORMED BY THE OWNER IN ACCORDANCE WITH STANDARDS AND SPECIFICATIONS DEVELOPED BY THE VSMP AUTHORITY. RECORD DRAWINGS AND CONSTRUCTION CERTIFICATIONS MUST MEET ESTABLISHED PROGRAM REQUIREMENTS OF THE COUNTY'S CHAPTER 8 EROSION AND SEDIMENT CONTROL AND VSMP ORDINANCE AND THE LOCAL VESCP/VSMP AUTHORITY.
25. ALL STORMWATER FACILITIES INCLUDING BMPS, STORM DRAINAGE PIPES, STORMWATER CONVEYANCES, INLETS, MANHOLES, OUTFALLS AND ROADSIDE AND OTHER OPEN CHANNELS SHALL BE INSPECTED BY THE LOCAL VESCP/VSMP AUTHORITY, THE OWNER, AND THE APPLICANT/OPERATOR/PERMITTEE DESIGNATED GEOTECHNICAL ENGINEER FOR THE PROJECT IN ACCORDANCE WITH ESTABLISHED COUNTY STORMWATER FACILITY INSPECTION PROGRAM REQUIREMENTS.

EROSION AND SEDIMENT CONTROL NOTES

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, 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. JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION SITE INSPECTOR MUST APPROVE AND CAN DIRECT ANY ADDITIONAL MEASURES TO BE USED.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM 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).
3. 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.
4. 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.
5. 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.
6. 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.
7. FOLLOWING INSTALLATION OF ANY PORTION OF UNDERGROUND UTILITIES, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E., THE SAME DAY).
8. 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.
9. 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, AT THE DISCRETION OF THE JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION SITE INSPECTOR, WITHIN 30 DAYS.
10. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
11. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
12. FOR ANY SOIL STOCKPILES, SILT FENCE MUST BE PROVIDED AROUND THE PERIMETER IF THE STOCKPILE IS LOCATED OUTSIDE THE PERIMETER EROSION CONTROL FOR THE SITE.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE DRAINAGE OR OTHER PROTECTION WHENEVER WATER SEEPS FROM A SLOPE FACE.
14. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, A TEMPORARY STONE CONSTRUCTION ENTRANCE WILL BE CONSTRUCTED IN A LOCATION TO BE DETERMINED BY THE OWNER. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A DISPOSAL AREA.
15. ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN, OR CROSSING, A LIVE WATERCOURSE SHALL BE MET.
16. CONTRACTOR SHALL NOTIFY OPERATORS WHO MAINTAIN EXISTING UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATION OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NO MORE THAN TEN (10) WORKING DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION. CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 1-800-552-7001 PRIOR TO COMMENCEMENT OF ANY EXCAVATION.
17. PERIODIC INSPECTIONS OF ALL EROSION CONTROL MEASURES SHALL BE MADE BY THE CONTRACTOR TO ASSESS THEIR CONDITION. THIS INCLUDES INSPECTION AFTER EVERY ERODIBLE RAINFALL EVENT AND THE REPAIR OF MEASURES DAMAGED BY SUB-CONTRACTORS. ANY NECESSARY REPAIRS OR CLEAN UP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
18. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE JAMES CITY COUNTY ENVIRONMENTAL ENGINEERING DEPARTMENT.
19. ALL EROSION CONTROL DEVICES SHALL BE IN PLACE AND FUNCTIONAL AT ALL TIMES AND IF REMOVED FOR CONSTRUCTION PROGRESS, SHALL BE REPLACED BY THE CLOSE OF EACH WORKDAY.
20. THE TEMPORARY STONE CONSTRUCTION ENTRANCE, SILT FENCE, AND ALL OTHER TEMPORARY E&S MEASURES SHALL BE REMOVED AND DISPOSED OF OFF-SITE AFTER FINAL APPROVAL AND ACCEPTANCE OF THE SITE BY THE ENGINEER. TRAPPED SEDIMENT SHALL BE SPREAD AND RESEEDED. CONSTRUCTION ROAD STABILIZATION SHALL REMAIN ON EXISTING GRAVEL PATHS.

STRUCTURAL PRACTICES

1. THE MINIMUM STANDARDS OF THE SEDIMENT CONTROL REGULATIONS, LATEST EDITION SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE.
2. SAFETY FENCE - STD. & SPEC. 3.01 - PLASTIC SAFETY FENCE SHALL BE INSTALLED AS SHOWN TO CREATE A PROTECTIVE BARRIER BETWEEN THE HISTORICAL STRUCTURE AND PROPOSED CONSTRUCTION.
3. TEMPORARY STONE CONSTRUCTION ENTRANCE - STD. & SPEC. 3.02 - A CONSTRUCTION ENTRANCE SHALL BE INSTALLED WHERE CONSTRUCTION ACCESS MEETS PAVED SURFACE TO REDUCE THE AMOUNT OF MATERIAL TRANSPORTED OFF-SITE BY CONSTRUCTION VEHICLES. THE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED FOR THE DURATION OF THE CONSTRUCTION AND STABILIZATION.
4. STRAW BALE BARRIER - STD. & SPEC. 3.04 - STRAW BALE BARRIERS WILL BE INSTALLED AT LOCATIONS SHOWN ON THIS SHEET IN ORDER TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT AND DECREASE THE VELOCITY OF SHEET FLOWS.
5. SILT FENCE - STD. & SPEC. 3.05 - SILT FENCE WILL BE INSTALLED AT LOCATIONS AS SHOWN ON THIS SHEET IN ORDER TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT FROM THE DISTURBED AREAS DURING CONSTRUCTION OPERATIONS IN ORDER TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE.
6. TURBIDITY CURTAIN - STD. & SPEC. 3.27 - TURBIDITY CURTAIN WILL BE INSTALLED IN THE POND AS SHOWN ON THIS SHEET TO PROVIDE SEDIMENTATION PROTECTION DURING THE PROPOSED DREDGING ACTIVITIES.
7. SOIL STABILIZATION BLANKETS & MATTING - STD. & SPEC. 3.36 - EC-2 STABILIZATION MATTING WILL BE INSTALLED ON ALL DISTURBED SLOPES GREATER THAN 3:1 ABOVE THE WATERLINE.

VEGETATIVE PRACTICES

1. TOPSOIL (STOCKPILE) -STD. & SPEC. 3.30 TOPSOIL SHALL BE STRIPPED FROM PROPOSED GRADING AREAS AND TEMPORARILY STOCKPILED PER THE OWNER WITHIN THE PROPOSED AREAS FOR LATER USE. STOCKPILE IN SUCH A MANNER THAT NATURAL DRAINAGE WILL NOT BE OBSTRUCTED AND NO OFF-SITE SEDIMENT DAMAGE WILL RESULT.
2. TEMPORARY SEEDING - STD. & SPEC. 3.31 - ALL EXPOSED SOIL SURFACES THAT ARE NOT TO BE FINE-GRADED FOR PERIODS LONGER THAN 7 DAYS SHALL RECEIVE TEMPORARY SEEDING. SELECTION OF THE TEMPORARY SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992.
3. MULCHING - STD & SPEC. 3.36 - MULCH SHALL BE APPLIED TO AREAS THAT REQUIRE TEMPORARY SEEDING TO PREVENT EROSION BY PROTECTING THE SOIL SURFACE FROM RAINDROP IMPACT AND REDUCING THE VELOCITY OF OVERLAND FLOW. IN ADDITION, THE MULCH WILL FOSTER THE GROWTH OF VEGETATION BY INCREASING AVAILABLE MOISTURE AND PROVIDING INSULATION AGAINST EXTREME HEAT OR COLD.
4. PERMANENT SEEDING - ALL DISTURBED AREAS TO BE STABILIZED WITH STABILIZATION SEED MIX. SEE STABILIZATION SEED MIXTURE DEPICTED ON SHEET 5.
5. IF THE ENTIRE SITE WILL NOT BE PERMANENTLY STABILIZED BEFORE DECEMBER 1, THE RESPONSIBLE LAND DISTURBER SHALL CONTACT THE COUNTY EROSION AND SEDIMENT CONTROL STAFF TO SCHEDULE A PRE-WINTER MEETING TO OCCUR BEFORE OCTOBER 1.

MAINTENANCE PRACTICES

IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL BY THE CONTRACTOR. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:

1. THE TEMPORARY STONE CONSTRUCTION ENTRANCE AND CONSTRUCTION ROAD STABILIZATION SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE WASHING AND REWORKING OF EXISTING STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY STRUCTURES USED TO TRAP SEDIMENT. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY. THE USE OF WATER TRUCKS TO REMOVE MATERIALS DROPPED, WASHED, OR TRACKED ONTO ROADWAYS WILL NOT BE PERMITTED UNDER ANY CIRCUMSTANCES.
2. SILT FENCE SHALL BE INSPECTED AFTER EACH RAIN EVENT AND DAILY DURING PROLONGED RAINFALL FOR SEDIMENT ACCUMULATION, UNDERCUTS, AND/OR BREACHES. SEDIMENT MAY ACCUMULATE TO ONLY HALF THE FENCE HEIGHT BEFORE SEDIMENT REMOVAL IS REQUIRED, REMOVAL AFTER EACH RAIN EVENT IS PREFERRED. REMOVED SEDIMENT IS TO BE STORED WITHIN TEMPORARY STOCKPILE STAGING AREAS. UNDERCUTS AND BREACHES ARE TO BE REPAIRED IMMEDIATELY.

ADDITIONAL NOTES

PRIOR TO CONSTRUCTION ACTIVITIES THE FOLLOWING REQUIREMENTS SHALL BE MET:

- A LAND DISTURBING PERMIT MUST BE OBTAINED FROM JAMES CITY COUNTY.
- EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING "MISS UTILITY" (1-800-552-7001) FOR EXISTING UTILITY LOCATIONS PRIOR TO COMMENCING CONSTRUCTION.
- COMPLY WITH ALL PROVISIONS OF THE VIRGINIA UNDERGROUND UTILITY DAMAGE PREVENTION ACT (SECTION 56-265.14 ET. SEQ. CODE OF VIRGINIA, 1950, AS AMENDED). CONTRACTOR HEREBY AGREES TO HOLD K.C.S.A. HARMLESS AGAINST ANY LOSS, DAMAGE, OR CLAIM OF ANY NATURE WHATSOEVER ARISING FROM THE CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS OF SAID ACT.

A COPY OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992 AND A COPY OF THE EROSION AND SEDIMENT CONTROL PLANS INCLUDED IN THIS PLAN SET MUST BE ON THE CONSTRUCTION SITE AT ALL TIMES.

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/12/15
PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:

Stantec
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FOR:

KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE: **EROSION & SEDIMENT CONTROL PLAN KINGSMILL POND SPILLWAY CONCRETE RETROFIT**

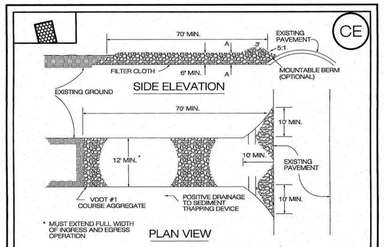
DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad

SHEET: **4 OF 9**

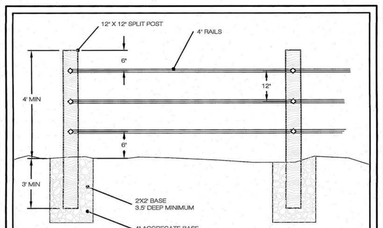
CONSTRUCTION SEQUENCE

THE PRIMARY OBJECTIVE OF THIS CONSTRUCTION IS TO INCREASE THE CAPACITY OF THE KINGSMILL SPILLWAY TO PASS THE 50-YR 6-HOUR STORM EVENT WHILE ALSO CORRECTING SOME EXISTING PROBLEMS WHICH ARE CONTRIBUTING TO THE DEGRADATION OF THE STRUCTURE. THE DESIGN IS INTENDED TO BE A LOW IMPACT RETROFIT WITH MINIMAL DISTURBANCE TO THE SURROUNDING AREA. THE GROUTED RIPRAP AND GABION WALLS OF THE EXISTING STRUCTURE'S UPPER CHUTE WILL BE REMOVED, INLET THROAT WIDENED, AND EXISTING 17 FOOT CONCRETE WEIR REMOVED AND DISPOSED OFFSITE IN COORDINATION WITH KCSA. THE POND WATER SURFACE WILL NEED TO BE LOWERED TO THE INLET ELEVATION OF THE LOW LEVEL DRAIN BEFORE THE INLET THROAT CAN BE ENLARGED AND WEIR REPLACED. INTERNAL EROSION AND OBSERVED VOIDS ALONG THE OUTSIDE PERIMETER OF THE EXISTING STRUCTURE WILL BE LEVELED AND FILLED WITH COMPACTED STRUCTURAL FILL. REPLACING THE EXISTING GROUTED RIPRAP AND GABION WALL SPILLWAY WITH A COBBLE LINED CONCRETE CHUTE WITH INCLINED SIDE SLOPES WILL PROVIDE THE SPILLWAY CAPACITY NEEDED TO CONTAIN THE 50-YR 6-HOUR STORM EVENT.

1. A PRE-CONSTRUCTION MEETING MUST BE HELD, INCLUDING ALL RELEVANT AGENCY, CONTRACTOR AND ENGINEERING PERSONNEL.
2. LOWER THE POND WATER SURFACE TO THE INLET ELEVATION OF THE LOW LEVEL DRAIN, PREFERABLY BY MEANS OF THE LOW LEVEL DRAIN VALVE LOCATED ON THE RIGHT BANK OF THE SPILLWAY. IF BASED ON ENCOUNTERED SOILS CONDITIONS DURING CONSTRUCTION THE WATER LEVEL NEEDS TO BE LOWERED FURTHER, THIS SHALL BE ACCOMPLISHED BY MEANS OF PUMPING OR A SIPHON SYSTEM. (SEE EXISTING CONDITIONS PLAN VIEW ON SHEET 2)
3. INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES: CONSTRUCTION ENTRANCE(S), CONSTRUCTION ACCESS ROAD STABILIZATION, SAFETY FENCE, SILT FENCE, STRAW BALE BARRIERS, AND TURBIDITY CURTAIN. (SEE SHEET 4)
4. RELOCATE THE FOOT BRIDGE AND SECTIONS OF THE SPLIT RAIL FENCE TO A PROPOSED STOCKPILE AREA FOR REINSTALLATION AFTER CONSTRUCTION. IF AN OFFSITE STORAGE AREA IS USED, PROVIDE LOCATION AND INFORMATION CONCERNING PROPER EROSION AND SEDIMENT CONTROL TO THE JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION DIVISION SITE INSPECTOR.
5. REMOVE THE EXISTING GABION BASKETS AND GROUTED RIPRAP CHANNEL OF THE UPPER SPILLWAY CHUTE FROM STATIONS 0+00 TO 0+99. REMOVE THE EXISTING CONCRETE WEIR AT STATION 0+86. ALL REMOVED MATERIALS TO BE HAULED OFFSITE FOR DISPOSAL. (SEE DEMOLITION PLAN VIEW ON SHEET 2)
6. GRADE/DREDGE THE INLET THROAT AS SHOWN IN PLAN VIEW AND DEWATER THE DREDGE MATERIAL WITHIN THE STOCKPILE STAGING AREA(S) SHOWN ON SHEET 2. DEWATERING TIME MAY BE REDUCED IF THE POND WATER SURFACE IS LOWERED A MONTH PRIOR TO CONSTRUCTION. IF THE DREDGE MATERIAL IS OVERLY SLOPPY, A CONSTRUCTED BERM AND/OR EXCAVATED BOWL MAY BE NEEDED TO KEEP THE MATERIAL CONTAINED. ONCE DRY, DREDGE MATERIAL MAY BE USED AS FILL WITH APPROVAL BY THE GEOTECH.
7. LEVEL AND FILL EXISTING INTERNAL EROSION AND VOIDS ALONG THE OUTSIDE PERIMETER OF THE SPILLWAY.
8. BRIING SUBGRADE TO REQUIRED ELEVATION (14 INCHES BELOW FINAL ELEVATION) WITH COMPACTED STRUCTURAL FILL.
9. EXCAVATE FOOTER TRENICHES OF A MINIMUM 24-INCH WIDTH AND MINIMUM 42-INCH DEPTH AT LOCATIONS OF SPILLWAY TURN DOWN SECTIONS. (REFER TO STRUCTURAL ENGINEER PLANS)
10. WHEN READY, NOTIFY GEOTECH FOR SUBGRADE INSPECTION.
11. FOLLOWING GEOTECH INSPECTION, INSTALL A 6-INCH LAYER OF VIBRATORY PLATE COMPACTED VDOT TYPE 21B STONE.
12. REFER TO STRUCTURAL ENGINEER PLANS FOR INSTALLATION OF CONCRETE WEIR, SPILLWAY CONCRETE TURN DOWNS, SPILLWAY CONCRETE SLAB, AND SPILLWAY CONCRETE WALLS.
13. BACKFILL BEHIND THE NEWLY INSTALLED CONCRETE SPILLWAY AND FINE GRADE, CREATING THE PROPOSED FINISHED GRADE AS SHOWN ON SHEET 3.
14. APPLY PERMANENT SEED TO ALL EXPOSED SOIL SURFACES.
15. REMOVE PERIMETER EROSION AND SEDIMENT CONTROL MEASURES. EROSION AND SEDIMENT CONTROL MEASURES MAY BE REMOVED ONLY WITH THE APPROVAL OF THE JAMES CITY COUNTY ENGINEERING AND RESOURCE PROTECTION SITE INSPECTOR.
16. RESTORE THE POND WATER SURFACE ELEVATION BY CLOSING THE LOW LEVEL DRAIN.
17. REINSTALL SPLIT RAIL FENCE AND FOOT BRIDGE.

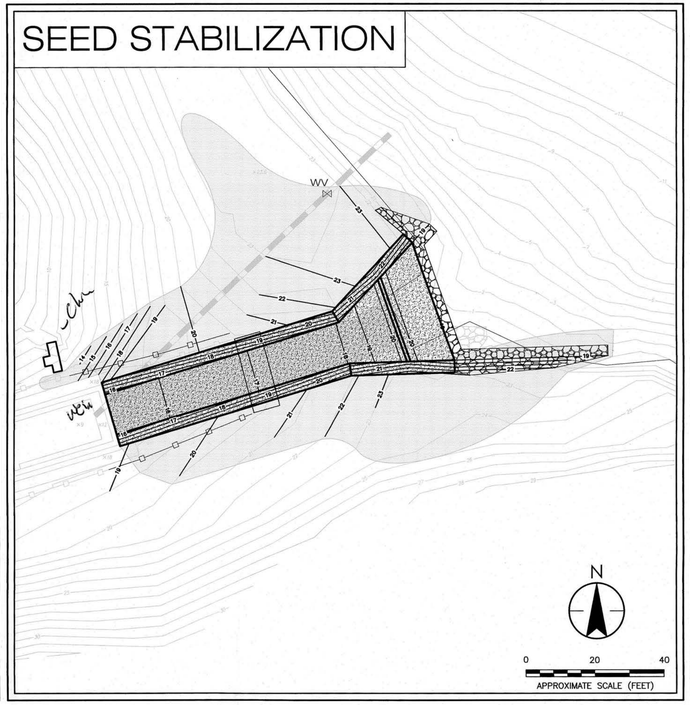


2/5 DETAIL: TEMPORARY STONE CONSTRUCTION ENTRANCE
NTS



3/5 DETAIL: WOODEN SPLIT-RAIL FENCE
NTS

SEED STABILIZATION



PROPOSED PLANTING PALETTE

LEGEND	QUANTITY	BOTANICAL NAME	COMMON NAME	SPECIFICATION	INDICATOR
GENERAL STABILIZATION SEED MIX (0.13 AC)					
	5%	AGROSTIS PERENNANS	AUTUMN BENTGRASS	SEED	FACU
	20%	ELYMUS VIRGINICUS	VIRGINIA WILD RYE	SEED	FACW-
	30%	LOLIUM MULTIFLORUM	ANNUAL RYE	SEED	NI
	11%	PANICUM VIRGATUM	SWITCH GRASS	SEED	FAC
	5%	MONARDA FISTULOSA	WILD BERGAMOT	SEED	UPL
	15%	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	SEED	FACU-
	5%	RUDBECKIA HIRTA	BLACK EYED SUSAN	SEED	FACU-
	9%	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	SEED	FACU

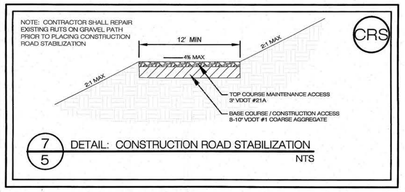
NOTE: SEED MIX SHALL BE APPLIED AT A RATE OF 30 LBS./AC. STRAW MULCH SHALL BE APPLIED TO ALL SEEDED AREAS NOT RECEIVING EC-2 MATTING AT A RATE OF 2 TONS/ACRE.

PLANTING NOTES

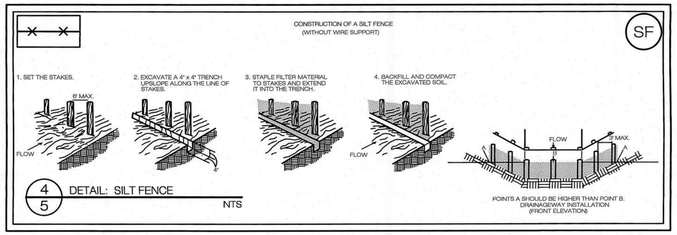
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS OF ALL EXISTING UTILITIES WITHIN THE PROJECT AREA PRIOR TO THE COMMENCEMENT OF PLANTING OPERATIONS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH STANTEC AND THE SURVEYOR THE LAYOUT OF ALL WORK COVERED UNDER THESE PLANS.
3. NO SUBSTITUTIONS IN SIZE OR VARIETY OF PLANT MATERIAL WITHOUT THE PRIOR APPROVAL OF STANTEC.
4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD. NOTIFY STANTEC OF ANY VARIANCE FROM PLAN.
5. NO PLANTING IS TO OCCUR WHEN THE SOIL IS FROZEN.
6. THE CONTRACTOR MAY BE RESPONSIBLE FOR REPLANTING ANY PLANT MATERIAL INSTALLED WITHOUT APPROVAL BY STANTEC.
7. THE CONTRACTOR SHALL RESTORE DISTURBED AREAS TO INDICATED FINAL GRADES IF DISTURBED BY THE INSTALLATION OF PLANT MATERIAL.
8. SEED CONTAINING PROHIBITED OR RESTRICTED NOXIOUS WEEDS WILL NOT BE ACCEPTED. SEED SHALL NOT CONTAIN IN EXCESS OF 0.5% WEED SEED.
9. CONTRACTOR SHALL PROVIDE SEED BAG TAGS TO ENGINEER/LANDSCAPE ARCHITECT PRIOR TO SEED APPLICATION.
10. GENERAL STABILIZATION SEED MIX SHALL BE APPLIED TO ALL DISTURBED AREAS. CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXACT AMOUNT OF STABILIZATION SEED MIX REQUIRED BASED ON ACTUAL DISTURBANCE.

PROJECT MAINTENANCE AND WARRANTY:

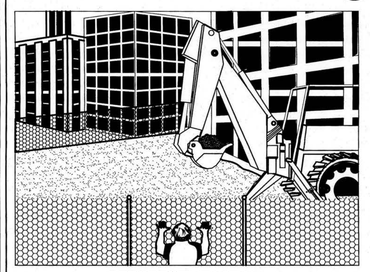
1. CONTRACTOR TO ENSURE A MINIMUM OF 80% COVERAGE IN ALL SEEDED AREAS FOR A PERIOD OF ONE (1) YEAR WITHIN THE PROJECT LIMITS.
2. CONTRACTOR SHALL MAINTAIN ALL SEEDED AREAS WITHIN THE PROJECT LIMITS UNTIL FINAL ACCEPTANCE OF THE PROJECT BY STANTEC.
3. FINAL PAYMENT TO THE CONTRACTOR SHALL BE AUTHORIZED, FOLLOWING PLANTING, ONCE A SITE INSPECTION HAS BEEN COMPLETED AND APPROVED BY STANTEC.



7/5 DETAIL: CONSTRUCTION ROAD STABILIZATION
NTS

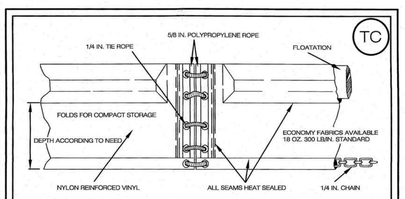


4/5 DETAIL: SILT FENCE
NTS

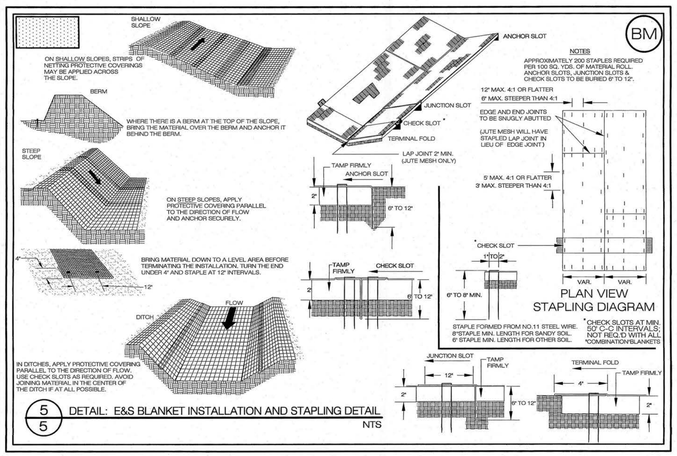


PERSPECTIVE VIEW PLASTIC FENCE

6/5 DETAIL: SAFETY FENCE
NTS



8/5 DETAIL: TURBIDITY CURTAIN (TYPE I)
NTS



1/5 DETAIL: STRAW BALE BARRIER
NTS

5/5 DETAIL: E&S BLANKET INSTALLATION AND STAPLING DETAIL
NTS

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:

Stantec
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PHONE: (757) 220-6869 FAX: (757) 229-4507

FOR:

KINGSMILL COMMUNITY SERVICES ASSOCIATION
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TITLE:

NOTES & DETAILS
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad
SHEET:	**5 OF 9**

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/12/15
PROFESSIONAL ENGINEER

FILEPATH:U:\203400515\07_cad\00515C-9-SPIL.dwg[dtaylor]Oct 12, 2015 at 10:38|Layout: (5) Notes & Details

HYDROLOGIC AND HYDRAULIC NOTES

HYDROLOGIC ANALYSIS FOR THE DEVELOPMENT OF INFLOW HYDROGRAPHS TO KINGSMILL POND WAS PERFORMED WITH THE U.S. ARMY CORPS OF ENGINEERS HYDROLOGIC ENGINEERING CENTERS HYDROLOGIC MODELING SYSTEM (HEC-HMS) VERSION 3.5.

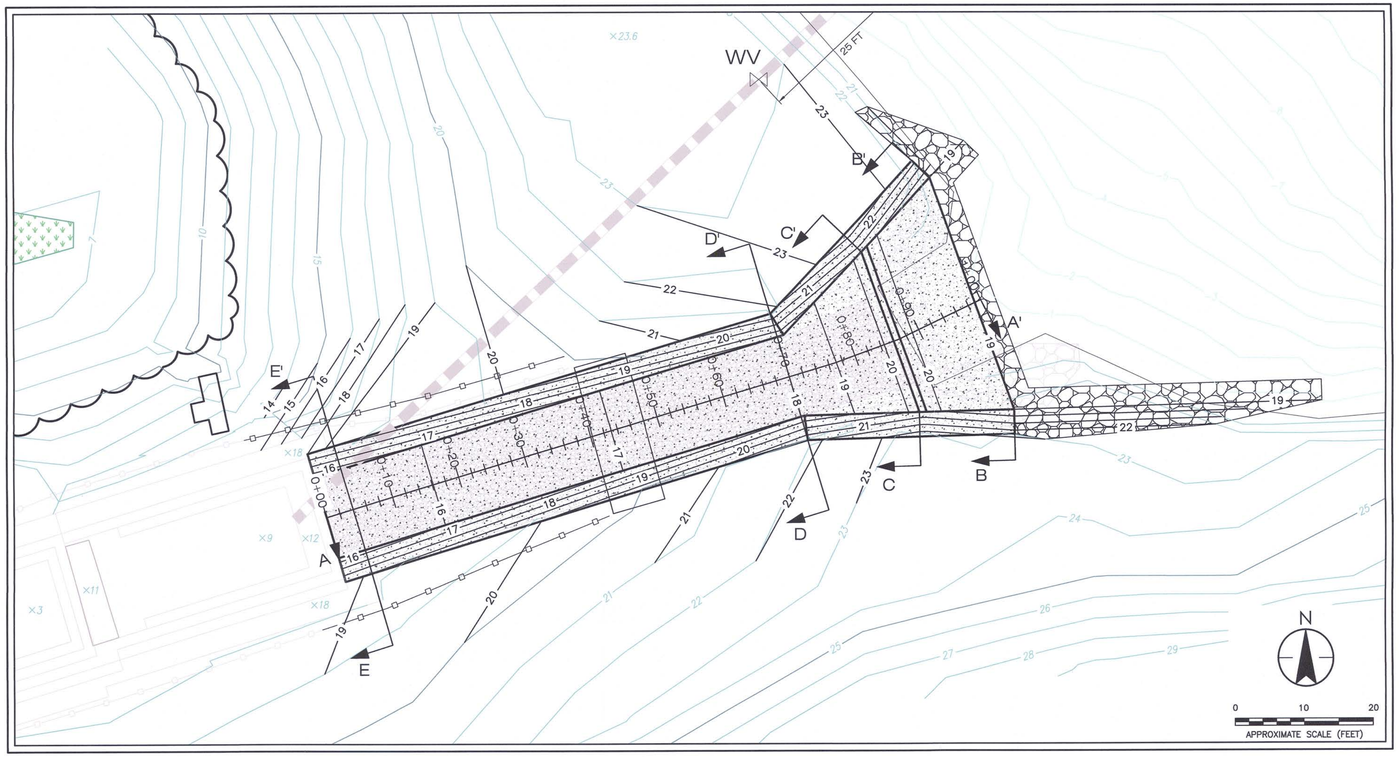
HYDRAULIC ANALYSIS WAS PERFORMED WITH THE U.S. ARMY CORPS OF ENGINEERS HYDROLOGIC ENGINEERING CENTERS RIVER ANALYSIS SYSTEM (HEC-RAS) VERSION 4.1. THE SPILLWAY WAS REPRESENTED BY A SINGLE REACH STARTING AT THE FIRST DROP STRUCTURE WITH CROSS SECTIONS EVERY 10 FEET UP TO THE EXISTING WEIR AT STATION 86, THE END OF EXISTING GABIONS AT STATION 98, AND A CROSS SECTION BETWEEN THE TWO AT STATION 92.

UNSTEADY FLOW WAS MODELED, WITH THE FLOW HYDROGRAPH INTO THE STORAGE AREA REPRESENTED BY KINGSMILL POND FROM THE HEC-HMS MODEL AS THE UPSTREAM BOUNDARY CONDITION. AN INITIAL FLOW OF 10 CFS AND STARTING WATER SURFACE ELEVATION OF 20.25 FT (NGVD29) WERE USED TO KEEP THE MODEL STABLE. ROUGHNESS COEFFICIENTS OF 0.025 (CHANNEL) AND 0.030 (SIDE SLOPES) WERE USED TO REPRESENT THE PROPOSED COBBLE LINED CONCRETE SPILLWAY.

SEE 50-YR 6-HOUR WATER SURFACE ELEVATIONS IN REPRESENTATIVE PROFILE AND CROSS SECTIONS ON SHEET 3.

LEGEND:

- EXISTING CONTOURS
- EXISTING SPOT ELEVATION
- EXISTING BATHYMETRY
- EXISTING WATER SURFACE
- EXISTING TREE LINE
- EXISTING FENCE
- EXISTING GABION
- EXISTING WEIR TO BE REMOVED
- EXISTING GROUTED SPILLWAY TO BE REMOVED
- EXISTING RIPRAP
- EXISTING LOW LEVEL DRAIN VALVE (WV)
- EXISTING LOW LEVEL DRAIN 18" DUCTILE IRON PIPE
- PROPOSED GRADING
- PROPOSED FENCE RECONSTRUCTION
- PROPOSED CLASS A3 CONCRETE
- PROPOSED RIPRAP
- EXISTING HISTORICAL STRUCTURE



HYDROLOGIC AND HYDRAULIC RESULTS

EXISTING 1-YR 24-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	1.17	19.87	20.30	0.21	5.50	17.01	0.07
92	1.17	19.87	20.30	0.19	6.26	20.15	0.06
86	EXISTING 17' CONCRETE WEIR AT ELEVATION 20.20' (NGVD29)						
	1.04	20.20	20.22	2.79	0.37	16.98	3.32
80	1.94	19.87	19.90	6.22	0.31	12.00	6.81
70	1.94	19.31	19.34	6.39	0.30	12.00	7.08
60	1.94	18.75	18.78	6.21	0.31	12.00	6.78
50	1.94	18.19	18.22	6.41	0.30	12.00	7.12
40	1.94	17.63	17.66	6.19	0.31	11.98	6.75
30	1.93	17.08	17.11	6.31	0.31	11.98	6.95
20	1.93	16.52	16.55	6.29	0.31	11.98	6.93
10	1.93	15.96	15.99	6.31	0.31	11.98	6.96
0	1.93	15.40	15.43	6.29	0.31	11.98	6.93

PROPOSED 1-YR 24-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	4.06	19.09	20.26	0.10	41.99	36.95	0.02
92	4.05	19.65	20.26	0.22	18.53	30.87	0.05
86	PROPOSED 25' WEIR AT ELEVATION 20.20' (NGVD29)						
	3.59	20.20	20.23	5.54	0.65	24.65	6.02
80	0.91	19.39	19.41	2.08	0.44	19.91	2.47
70	5.22	18.05	18.11	7.29	0.72	12.12	5.26
60	5.04	17.67	17.72	7.66	0.66	12.11	5.77
50	4.88	17.29	17.35	7.13	0.69	12.11	5.27
40	4.74	16.91	16.96	7.82	0.61	12.10	6.14
30	4.62	16.54	16.60	6.63	0.70	12.12	4.86
20	4.51	16.16	16.20	8.36	0.54	12.09	6.96
10	4.45	15.78	15.84	5.95	0.75	12.12	4.20
0	4.44	15.40	15.44	9.00	0.49	12.08	7.83

EXISTING 50-YR 6-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	526.14	19.87	23.64	5.23	100.51	36.89	0.56
92	526.14	19.87	23.27	7.21	72.95	29.72	0.81
86	EXISTING 17' CONCRETE WEIR AT ELEVATION 20.20' (NGVD29)						
	526.14	20.20	23.06	10.06	52.31	19.99	1.10
80	526.14	19.87	22.87	13.30	39.57	20.48	1.69
70	526.14	19.31	22.31	13.26	39.69	20.63	1.68
60	526.14	18.75	21.76	13.20	39.85	20.84	1.68
50	526.14	18.19	21.20	13.13	40.06	21.05	1.68
40	526.14	17.63	20.65	13.06	40.30	21.34	1.67
30	526.14	17.08	20.10	13.03	40.37	21.62	1.68
20	526.14	16.52	19.55	12.96	40.59	21.98	1.68
10	526.14	15.96	19.00	12.89	40.81	22.35	1.69
0	526.14	15.40	18.44	12.83	41.02	22.84	1.69

PROPOSED 50-YR 6-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	853.28	19.09	22.10	7.89	113.12	40.65	0.80
92	867.31	19.65	21.94	12.34	73.20	34.38	1.44
86	PROPOSED 25' WEIR AT ELEVATION 20.20' (NGVD29)						
	867.31	20.20	21.73	22.35	40.16	27.92	3.18
80	867.31	19.39	21.33	21.51	42.42	23.95	2.72
70	867.31	18.05	20.86	23.20	41.68	17.63	2.44
60	867.30	17.67	20.48	23.22	41.63	17.62	2.44
50	867.30	17.29	20.09	23.28	41.52	17.61	2.45
40	867.30	16.91	19.70	23.37	41.35	17.59	2.46
30	867.30	16.54	19.30	23.64	40.83	17.53	2.51
20	867.30	16.16	18.89	24.00	40.17	17.45	2.56
10	867.29	15.78	18.44	24.66	39.00	17.32	2.66
0	867.29	15.40	17.93	26.07	36.73	17.06	2.89

EXISTING 2-YR 24-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	4.48	19.87	20.36	0.68	6.59	18.02	0.20
92	4.48	19.87	20.36	0.60	7.48	21.45	0.18
86	EXISTING 17' CONCRETE WEIR AT ELEVATION 20.20' (NGVD29)						
	4.47	20.20	20.24	6.57	0.68	16.98	5.79
80	4.47	19.87	19.93	6.26	0.71	12.00	4.52
70	4.47	19.31	19.37	6.36	0.70	12.00	4.63
60	4.46	18.75	18.81	6.23	0.72	12.00	4.50
50	4.46	18.19	18.25	6.39	0.70	12.00	4.67
40	4.45	17.63	17.69	6.20	0.72	11.98	4.46
30	4.45	17.08	17.14	6.31	0.70	11.98	4.58
20	4.44	16.52	16.58	6.30	0.71	11.98	4.57
10	4.44	15.96	16.02	6.31	0.70	11.98	4.59
0	4.43	15.40	15.46	6.29	0.70	11.98	4.57

PROPOSED 2-YR 24-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	8.01	19.09	20.32	0.18	44.23	37.08	0.03
92	7.98	19.65	20.32	0.40	20.37	31.00	0.09
86	PROPOSED 25' WEIR AT ELEVATION 20.20' (NGVD29)						
	1.40	20.20	20.24	1.57	0.89	24.67	1.45
80	7.97	19.39	19.41	17.63	0.45	19.91	20.60
70	7.96	18.05	18.14	7.41	1.08	12.18	4.37
60	7.96	17.67	17.76	7.45	1.07	12.18	4.41
50	7.96	17.29	17.38	7.36	1.08	12.18	4.33
40	7.94	16.91	17.00	7.50	1.06	12.18	4.46
30	7.93	16.54	16.63	7.00	1.14	12.19	4.02
20	7.92	16.16	16.24	8.03	0.99	12.16	4.94
10	7.91	15.78	15.89	6.21	1.28	12.21	3.37
0	7.91	15.40	15.47	8.99	0.88	12.15	5.86

EXISTING 100-YR 6-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	741.59	19.87	24.08	6.33	117.18	38.00	0.64
92	741.64	19.87	23.73	8.50	87.22	32.23	0.91
86	EXISTING 17' CONCRETE WEIR AT ELEVATION 20.20' (NGVD29)						
	741.64	20.20	23.59	11.81	62.80	20.00	1.17
80	741.64	19.87	23.38	14.59	50.84	23.07	1.73
70	741.64	19.31	22.83	14.52	51.07	23.36	1.73
60	741.64	18.75	22.27	14.44	51.35	23.73	1.73
50	741.64	18.19	21.72	14.37	51.62	24.00	1.73
40	741.64	17.63	21.16	14.27	51.98	24.00	1.71
30	741.64	17.08	20.62	14.17	52.33	24.00	1.69
20	741.64	16.52	20.06	14.10	52.60	24.00	1.68
10	741.64	15.96	19.50	14.07	52.72	24.00	1.67
0	741.64	15.40	18.94	13.99	53.02	24.00	1.66

PROPOSED 100-YR 6-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	1135.96	19.09	22.34	9.67	123.19	41.14	0.95
92	1135.96	19.65	22.29	13.95	85.32	35.11	1.51
86	PROPOSED 25' WEIR AT ELEVATION 20.20' (NGVD29)						
	1135.96	20.20	22.09	23.49	50.41	28.70	3.01
80	1135.96	19.39	21.75	22.89	52.77	24.84	2.62
70	1135.96	18.05	21.32	25.72	49.96	18.54	2.51
60	1135.95	17.67	20.94	25.77	49.86	18.53	2.51
50	1135.95	17.29	20.55	25.85	49.68	18.51	2.52
40	1135.95	16.91	20.15	25.99	49.40	18.48	2.54
30	1135.95	16.54	19.74	26.32	48.73	18.41	2.59
20	1135.95	16.16	19.32	26.74	47.90	18.32	2.65
10	1135.95	15.78	18.86	27.46	46.51	18.17	2.76
0	1135.94	15.40	18.35	28.87	44.05	17.89	2.96

EXISTING 10-YR 24-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	26.15	19.87	20.72	1.92	13.62	21.37	0.42
92	26.12	19.87	20.71	1.74	14.99	21.48	0.37
86	EXISTING 17' CONCRETE WEIR AT ELEVATION 20.20' (NGVD29)						
	26.10	20.20	20.48	5.45	4.79	16.98	1.81
80	26.08	19.87	20.21	6.30	4.14	12.00	1.89
70	26.06	19.31	19.65	6.31	4.13	12.00	1.89
60	26.03	18.75	19.09	6.30	4.13	12.00	1.89
50	26.00	18.19	18.53	6.32	4.12	12.00	1.90
40	25.98	17.63	17.98	6.23	4.17	11.98	1.86
30	25.95	17.08	17.42	6.30	4.12	11.98	1.90
20	25.93	16.52	16.86	6.30	4.11	11.98	1.90
10	25.90	15.96	16.30	6.31	4.11	11.98	1.90
0	25.87	15.40	15.74	6.29	4.11	11.98	1.89

PROPOSED 10-YR 24-HR STORM CONDITIONS

STATION	Q (CFS)	MIN CH ELEV (FT)	MAX WSE (FT)	VELOCITY CHNL (FT/S)	FLOW AREA (SQ.FT.)	TOP WIDTH (FT)	FROUDE # CHNL
98	51.44	19.09	20.63	0.95	55.67	37.69	0.13
92	51.39	19.65	20.59	1.82	28.79	31.56	0.33
86	PROPOSED 25' WEIR AT ELEVATION 20.20' (NGVD29)						
	51.37	20.20	20.37	12.58	4.10	24.95	5.45
80	51.36	19.39	19.56	14.92	3.46	20.22	6.33
70	51.33	18.05	18.59	7.76	6.77	13.08	1.86
60	51.31	17.67	18.21	7.75	6.78	13.08	1.86
50	51.29	17.29	17.83	7.76	6.77	13.08	1.86
40	51.26	16.91	17.45	7.69	6.83	13.09	1.84
30	51.24	16.54	17.08	7.75	6.77	13.08	1.86
20	51.21	16.16	16.70	7.76	6.76	13.08	1.86
10	51.19	15.78	16.33	7.60	6.90	13.10	1.81
0	51.15	15.40	15.87	8.85	5.90	12.95	2.27

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:

Stantec

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PHONE: (757) 220-6869 FAX: (757) 229-4507

FOR:

KINGSMILL COMMUNITY SERVICES ASSOCIATION
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PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:

HYDROLOGY & HYDRAULICS
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/6/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: 1 INCH = 10 FEET
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad

SHEET: **6 OF 9**

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1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION
GET SOLUTIONS, INC. HAS COMPLETED OUR SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES FOR THE DAM INUNDATION STUDY FOR KINGSMILL POND LOCATED IN JAMES CITY COUNTY, VIRGINIA. THE GEOTECHNICAL ENGINEERING SERVICES WERE CONDUCTED IN GENERAL ACCORDANCE WITH GET PROPOSAL NO. PWM12-216G, DATED MAY 1, 2012. AUTHORIZATION TO PROCEED WITH OUR SERVICES WAS RECEIVED FROM THE CLIENT IN THE FORM OF A SUBCONTRACTOR
AGREEMENT.

1.2 PROJECT LOCATION AND SITE DESCRIPTION
THE PROJECT SITE IS LOCATED WITHIN THE KINGSMILL ON THE JAMES DEVELOPMENT IN JAMES CITY COUNTY, VIRGINIA. THE SITE IS LOCATED ALONG THE WEST SIDE OF KINGSMILL POND, JUST NORTH OF YEARDLEY'S GRANT AND SOUTH OF MACAULAY ROAD.
THE PROJECT SITE IS COMPRISED OF AN EXISTING DAM EMBANKMENT ALONG THE WESTERN SIDE OF KINGSMILL POND. FROM OUR UNDERSTANDING, THE CURRENT OVERFLOW SPILLWAY IS NOT DESIGNED FOR A 100 YEAR STORM EVENT. THE SPILLWAY WILL NEED TO BE UPDATED FOR A 100 YEAR STORM EVENT. THE EXISTING DAM EMBANKMENT IS AN EARTHEN TYPE DAM. BASED ON THE PROVIDED TOPOGRAPHIC SURVEY, THE TOP OF DAM IS AT AN ELEVATION OF 24 FEET MEAN SEA LEVEL (MSL); WHEREAS THE POND'S WATER LEVEL IS AT AN ELEVATION OF ABOUT 20 FEET MSL. THE SURVEY ALSO INDICATES THE SLOPES ALONG THE DAM EMBANKMENT ARE AT A 3:1 (HORIZONTAL: VERTICAL) OR FLATTER. THE DAM ITSELF IS WELL VEGETATED WITH GRASS AND NO VISUAL SIGNS OF WATER SEEPAGE OBSERVED ON THE DOWNSTREAM SIDE OF THE DAM AT THE TIME OF OUR INVESTIGATION. NO WOODY VEGETATION WAS PRESENT ALONG THE DAM EMBANKMENT.
THE EXISTING OVERFLOW SPILLWAY, WHICH IS LOCATED TOWARDS THE SOUTHERN END OF THE DAM EMBANKMENT, CONSISTS OF A GROUTED RIP RAP TYPE SPILLWAY WITH GABION WALLS AND TWO WEIRS. THERE IS A WOODEN FOOTBRIDGE THAT CROSSES OVER A PORTION OF THE SPILLWAY. DURING OUR SITE RECONNAISSANCE, SEVERAL 1 TO 3 FOOT DEEP DEPRESSIONS WERE OBSERVED ALONG THE GROUND SURFACE DIRECTLY ADJACENT TO THE OUTSIDE FACES OF THE GABIONS UPSTREAM OF THE FIRST WEIR. ALSO, IT APPEARS THAT A CRUSHED STONE HAS BEEN USED IN THE PAST TO FILL SOME OF THESE HOLES. THESE DEPRESSIONS ARE BELIEVED TO BE THE RESULT OF SOIL EROSION/LOSS (FINE MIGRATION) THROUGH THE GABION WALLS.

1.3 PROJECT CONSTRUCTION DESCRIPTION
AS PREVIOUSLY STATED, THE CURRENT OVERFLOW SPILLWAY WAS NOT DESIGNED FOR A 100 YEAR STORM EVENT. CONSEQUENTLY AND IN ORDER TO MEET REGULATIONS, THE EXISTING SPILLWAY WILL NEED TO BE UPDATED FOR A 100 YEAR STORM EVENT.
THE EXISTING OVERFLOW SPILLWAY CONSISTS OF A GROUTED RIP RAP TYPE SPILLWAY WITH GABION WALLS AND TWO WEIRS. THE PREFERRED APPROACH WOULD BE TO UPDATE THIS EXISTING SPILLWAY. HOWEVER, DUE TO PERMITTING ISSUES AND A NEARBY HISTORICAL FEATURE, EXPANDING THE SIZE OF THE SPILLWAY IS LIMITED. THIS APPROACH WOULD POTENTIALLY CONSIST OF ONE OR MORE OF THE FOLLOWING:

- EXPANDING ONLY THE ENTRANCE OF THE SPILLWAY (OUTFALL CHANNEL).
- INCREASING THE SLOPE OF THE SPILLWAY FROM THE ENTRANCE TO THE FIRST WEIR.
- REPLACING THE RIP RAP AND GABION SYSTEM WITH A CONCRETE TYPE SPILLWAY
- INCREASING THE HEIGHT OF THE GABIONS.

IF ANY OF THE NOTED INFORMATION IS INCORRECT OR HAS CHANGED, PLEASE INFORM GET SOLUTIONS, INC. SO THAT WE MAY AMEND THE RECOMMENDATIONS PRESENTED IN THIS REPORT, IF APPROPRIATE.

1.4 PURPOSE AND SCOPE OF SERVICES
THE PURPOSE OF THIS STUDY WAS TO OBTAIN INFORMATION ON THE GENERAL SUBSURFACE CONDITIONS AT THE PROJECT SITE. THE SUBSURFACE CONDITIONS ENCOUNTERED WERE EVALUATED WITH RESPECT TO THE AVAILABLE PROJECT CHARACTERISTICS AS RELATED TO THE SPILLWAY CONSTRUCTION. IN THIS REGARD, ENGINEERING ASSESSMENTS FOR THE FOLLOWING ITEMS WERE FORMULATED:

1. GENERAL ASSESSMENT OF THE SOILS REVEALED BY THE BORINGS PERFORMED ALONG THE EXISTING DAM EMBANKMENT IN THE VICINITY OF THE EXISTING SPILLWAY AND ALTERNATIVE SPILLWAY LOCATIONS.
2. GENERAL LOCATION AND DESCRIPTION OF POTENTIALLY DELETERIOUS MATERIAL ENCOUNTERED IN THE BORINGS THAT MAY INTERFERE WITH CONSTRUCTION PROGRESS OR STRUCTURE PERFORMANCE, INCLUDING EXISTING FILLS OR SURFICIAL/SUBSURFACE ORGANICS.
3. EARTHWORK REQUIREMENTS FOR EXCAVATION, SUBGRADE PREPARATION, AND PLACEMENT AND COMPACTION OF APPROVED DAM EMBANKMENT FILL MATERIAL.
4. EVALUATION OF THE SOIL CONDITIONS IN THE VICINITY OF THE EXISTING SPILLWAY AND DAM EMBANKMENT.
5. EARTHWORK/CONSTRUCTION DESIGN RECOMMENDATIONS FOR RETROFITTING THE EXISTING SPILLWAY.

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 DESIGN PERIMETERS, THREE (3) 20 TO 30-FOOT DEEP STANDARD PENETRATION TEST (SPT) BORINGS (DESIGNATED AS B-1 THROUGH B-3) WERE DRILLED ADJACENT TO THE EXISTING SPILLWAY AND ONE (1) 30-FOOT DEEP SPT BORING (DESIGNATED AS B-4) WAS DRILLED WITHIN THE DAM EMBANKMENT. ALSO, A TOTAL OF FOUR (4) 3 TO 9-FOOT DEEP HAND AUGER BORINGS WERE PERFORMED DIRECTLY ADJACENT TO GABIONS OF THE EXISTING SPILLWAY. IT SHOULD BE NOTED THAT HAND AUGER REFUSAL WAS ENCOUNTERED AT A DEPTH OF 4.75 FEET AND 3 FEET AT BORING LOCATIONS HA-2 AND HA-4, RESPECTIVELY. IN ADDITION, ONE TEST PIT (DESIGNATED AS TP-1) WAS EXCAVATED DIRECTLY ADJACENT TO A GABION TO OBSERVE THE INTERFACE ALONG THE OUTSIDE FACE AND UNDERNEATH THE GABIONS.

THE SPT BORINGS WERE PERFORMED WITH THE USE OF ROTARY WASH "MUD" DRILLING PROCEDURES IN GENERAL ACCORDANCE WITH ASTM D 1586. THE TESTS WERE PERFORMED CONTINUOUSLY FROM THE EXISTING GROUND SURFACE TO A DEPTH OF 12 FEET, AND AT 5-FOOT INTERVALS THEREAFTER. THE SOIL SAMPLES WERE OBTAINED WITH A STANDARD 1.4" I.D., 2" O.D., 30" LONG SPLIT-SPOON SAMPLER. THE SAMPLER WAS DRIVEN WITH BLOWS OF A 140 LB. HAMMER FALLING 30 INCHES, USING AN AUTOMATIC HAMMER. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER EACH 6-INCH INCREMENT OF PENETRATION WAS RECORDED AND IS SHOWN ON THE BORING LOGS. THE SUM OF THE SECOND AND THIRD PENETRATION INCREMENTS IS TERMED THE SPT N-VALUE (UNCORRECTED FOR AUTOMATIC HAMMER). A REPRESENTATIVE PORTION OF EACH DISTURBED SPLIT-SPOON SAMPLE WAS COLLECTED WITH EACH SPT, PLACED IN A GLASS JAR, SEALED, LABELED, AND RETURNED TO OUR LABORATORY FOR REVIEW.
THE HAND AUGER BORINGS WERE PERFORMED USING A TEE HANDLED CARBON STEEL HAND AUGER. THE SOIL SAMPLES WERE OBTAINED WITH A 3" I.D., 3.25" O.D., 6.5" LONG AUGER BUCKET. THE TESTS WERE PERFORMED CONTINUOUSLY FROM THE EXISTING GROUND SURFACE TO DEPTHS OF 3 TO 9 FEET. THE SAMPLER WAS ADVANCED GENERALLY IN 6" INCREMENTS. A REPRESENTATIVE PORTION OF EACH DISTURBED 6-INCH SAMPLE WAS COLLECTED WITH EACH HAND AUGER BORING, PLACED IN PLASTIC BAGS, SEALED, LABELED, AND RETURNED TO OUR LABORATORY FOR REVIEW AND TESTING.

THE BORING LOCATIONS WERE ESTABLISHED AND LOCATED IN THE FIELD BY A REPRESENTATIVE OF G E T SOLUTIONS, INC. THE APPROXIMATE BORING LOCATIONS ARE SHOWN ON THE ATTACHED BORING LOCATION PLAN IN APPENDIX I, WHICH WAS REPRODUCED, BASED ON A SITE PLAN PREPARED BY AES CONSULTING ENGINEERS, DATED APRIL 7, 2012.

2.2 LABORATORY TESTING
REPRESENTATIVE PORTIONS OF ALL SOIL SAMPLES COLLECTED DURING DRILLING WERE SEALED IN GLASS JARS OR PLASTIC BAGS, LABELED, AND TRANSFERRED TO OUR LABORATORY FOR CLASSIFICATION AND ANALYSIS. THE SOIL CLASSIFICATION WAS PERFORMED BY A GEOLOGIST IN ACCORDANCE WITH ASTM D2488. THE CLASSIFICATION SYSTEM FOR SOIL EXPLORATION IS INCLUDED IN APPENDIX II. THREE (3) REPRESENTATIVE 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. THESE TEST RESULTS (SEE SHEET 7) ARE TABULATED BELOW AND ARE ALSO PRESENTED ON THE "BORING LOG" SHEETS IN APPENDIX III.

3.0 SUBSURFACE CONDITIONS

3.1 SITE GEOLOGY
THE PROJECT SITE LIES WITHIN A MAJOR PHYSIOGRAPHIC PROVINCE CALLED THE ATLANTIC COASTAL PLAIN. NUMEROUS TRANSGRESSIONS AND REGRESSIONS OF THE ATLANTIC OCEAN HAVE DEPOSITED MARINE, LAGOONAL, AND FLUVIAL (STREAM LAIN) SEDIMENTS GENERALLY IN BANDS PARALLELING THE COAST. THE REGIONAL GEOLOGY IS VERY COMPLEX, AND GENERALLY CONSISTS OF INTERBEDDED LAYERS OF VARYING
MIXTURES OF SANDS, SILTS AND CLAYS. NEAR SURFACE MATERIALS ARE CLAY AND SAND FLUVIAL AND ALLUVIAL SEDIMENTS WHICH WERE GENERALLY DEPOSITED WITHIN THE LAST 20,000 YEARS. ANCIENT STREAM CHANNELS NOW BURIED AND CONTAINING SOFT MARINE SEDIMENTS ARE PRESENT THROUGHOUT THE AREA.

3.2 SUBSURFACE SOIL CONDITIONS
THE TOPSOIL DESIGNATION REFERENCES THE PRESENCE OF SURFICAL ORGANIC LADEN SOIL, AND DOES NOT REPRESENT ANY PARTICULAR QUALITY SPECIFICATION. THIS MATERIAL SHOULD BE TESTED FOR APPROVAL PRIOR TO ITS USE.
THE SUBSURFACE DESCRIPTION IS OF A GENERALIZED NATURE PROVIDED TO HIGHLIGHT THE MAJOR SOIL STRATA ENCOUNTERED. THE RECORDS OF THE SUBSURFACE EXPLORATION (SEE SHEET 7) ARE INCLUDED IN APPENDIX III (BORING LOGS) AND IN APPENDIX IV (GENERALIZED SOIL PROFILE), 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 OR OCCUR BETWEEN SAMPLE INTERVALS.

3.3 TEST PIT EXCAVATION OBSERVATIONS
A TEST PIT WAS COMPLETED WITHIN ONE OF THE EXISTING HOLES LOCATED ALONG THE OUTSIDE FACE OF A GABION AND JUST UPSTREAM OF THE FIRST WEIR. THE APPROXIMATE TEST PIT LOCATION IS SHOWN ON THE ATTACHED BORING LOCATION PLAN (SEE THIS SHEET) IN APPENDIX I. IT APPEARS THAT CRUSHED STONE HAS BEEN PREVIOUSLY USED IN ATTEMPTS TO FILL IN THIS PARTICULAR HOLE (AND ALSO OTHER LOCATIONS). FILTER FABRIC WAS OBSERVED ALONG THE OUTSIDE FACE OF THE GABION AT THIS LOCATION. ALSO, SIGNS OF FILTER FABRIC WERE OBSERVED FROM THE GROUND SURFACE ALONG THE OUTSIDE FACE OF THE GABIONS ELSEWHERE AS WELL. THE RIGID SPILLWAY SLAB DID NOT EXTEND UNDERNEATH THE GABION AT THIS PARTICULAR TEST PIT LOCATION. PHOTOGRAPHIC DOCUMENTATION OF THE TEST PIT EXCAVATION IS ILLUSTRATED IN
FIGURE 2.
ON THE OPPOSITE SIDE OF THE GABION AT THE TEST PIT LOCATION, AN OPENING IN THE SPILLWAY WAS NOTICED WHERE WATER WAS FREELY FLOWING OFF THE SIDE OF THE SPILLWAY SLAB AND UNDERNEATH THE GABION INTO THE TEST PIT EXCAVATION AREA. PHOTOGRAPHIC DOCUMENTATION OF THIS CONDITION IS ILLUSTRATED IN FIGURE 3.

3.4 GROUNDWATER INFORMATION
GROUNDWATER WAS OBSERVED AT THE BORING LOCATIONS DURING DRILLING AND AS OBSERVED THROUGH THE RELATIVE WETNESS OF THE RECOVERED SOIL SAMPLES DURING THE DRILLING OPERATIONS. GROUNDWATER IS ESTIMATED TO OCCUR AT DEPTHS RANGING FROM 4 TO 8.5 FEET BELOW CURRENT GRADES AT THE BORING LOCATIONS (CORRESPONDING TO ELEVATIONS RANGING FROM 9.5 TO 15 FEET MSL). ELEVATIONS ARE ESTIMATED BASED ON THE PROVIDED PLAN. HOWEVER, DURING WET SEASONAL
CONDITIONS, PERCHED WATER CONDITIONS MAY OCCUR AT SHALLOWER DEPTHS PARTICULARLY ABOVE THE COHESIVE SOILS (PERCHED CONDITIONS) DUE TO THEIR LOW INFILTRATION RATES. GROUNDWATER WAS NOT OBSERVED AT HAND AUGER BORINGS LOCATIONS HA-2 AND HA-4 TO THE DEPTHS EXPLORED. THE BOREHOLES WERE BACKFILLED UPON COMPLETION FOR SAFETY REASONS. THEREFORE, THESE RESULTS
MAY NOT BE INDICATIVE OF WHERE GROUNDWATER WILL BE ENCOUNTERED AT THE TIME OF CONSTRUCTION.
GROUNDWATER CONDITIONS WILL VARY WITH ENVIRONMENTAL VARIATIONS AND SEASONAL CONDITIONS, SUCH AS THE FREQUENCY AND MAGNITUDE OF RAINFALL PATTERNS, AS WELL AS MAN-MADE INFLUENCES, SUCH AS EXISTING SWALES, DRAINAGE PONDS, UNDERDRAINS, AND AREAS OF COVERED SOIL (PAVED PARKING LOTS, SIDE WALKS, ETC.). IN THE PROJECT AREA, SEASONAL GROUNDWATER FLUCTUATIONS OF +/- 3 FEET ARE COMMON; HOWEVER, GREATER FLUCTUATIONS HAVE BEEN DOCUMENTED. WE RECOMMEND THAT THE CONTRACTOR DETERMINE THE ACTUAL GROUNDWATER LEVELS AT THE TIME OF THE CONSTRUCTION TO DETERMINE GROUNDWATER IMPACT ON THE CONSTRUCTION PROCEDURES, IF NECESSARY.

4.0 EVALUATION AND RECOMMENDATIONS
OUR RECOMMENDATIONS ARE BASED ON THE PREVIOUSLY DISCUSSED PROJECT INFORMATION, OUR INTERPRETATION OF THE SPT AND HAND AUGER BORINGS AND LABORATORY DATA, AND OUR OBSERVATIONS DURING OUR SITE RECONNAISSANCE. IF THE PROPOSED CONSTRUCTION SHOULD VARY FROM WHAT HAS BEEN DESCRIBED HEREIN, OR SHOULD DIFFERING CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION, WE REQUEST THE OPPORTUNITY TO REVIEW OUR RECOMMENDATIONS AND MAKE ANY NECESSARY CHANGES.

4.1 CLEARING AND GRADING
SOME MINIMAL CLEARING AND GRADING WILL BE REQUIRED DIRECTLY ADJACENT TO EXISTING SPILLWAY. WHERE RE-GRADING IS NEEDED, ALL VEGETATION, ROOT MAT, TOPSOIL, AND OTHER DELETERIOUS MATERIALS SHOULD BE STRIPPED FROM THESE AREAS. IT IS ESTIMATED THAT A CUT UP TO 11 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.
CONTROL OF SURFACE WATER IS VERY IMPORTANT TO THE SUCCESSFUL COMPLETION OF THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHOULD PLAN HIS GRADING ACTIVITIES TO CONTROL SURFACE WATER AND MINIMIZE EROSION OF EXPOSED CUT OR FILL MATERIAL. THIS MAY INCLUDE CONSTRUCTING TEMPORARY BERMS, DITCHES, AND SWALES TO INTERCEPT RUNOFF AND DISCHARGE IT IN A CONTROLLED FASHION.

4.2 SUBGRADE PREPARATION
IF IS EXPECTED THAT SOME RE-GRADING MAY BE REQUIRED AROUND THE EXISTING SPILLWAY. FOLLOWING THE CLEARING OPERATION AND PRIOR TO COMMENCING FILL PLACEMENT WITHIN THE VICINITY OF THE EXISTING SPILLWAY, THE EXPOSED SUBGRADE SOILS SHOULD BE EVALUATED BY GET SOLUTIONS, INC. FOR STABILITY AND PROPER REMOVAL OF UNSUITABLE MATERIALS (ROOTS 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.

4.3 DAM EMBANKMENT FILL AND PLACEMENT
ANY MATERIAL TO BE USED FOR FILL ON THE DAM EMBANKMENT ASSOCIATED WITH THE PROPOSED SPILLWAY CONSTRUCTION SHOULD BE EVALUATED AND TESTED BY GET SOLUTIONS, INC. PRIOR TO PLACEMENT TO DETERMINE IF THEY ARE SUITABLE FOR THE INTENDED USE. SUITABLE DAM EMBANKMENT FILL MATERIAL SHOULD CONSIST OF CLAY CONTAINING 60% OR MORE BY WEIGHT OF FINES (CL, CL-ML, AND CH), AND BE FREE OF RUBBLE, GRAVEL, ORGANICS, DEBRIS AND OTHER UNSUITABLE MATERIAL.
ALL DAM EMBANKMENT FILL SHOULD BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY, IN ACCORDANCE WITH ASTM D 698. THE MOISTURE CONTENT OF THE DAM EMBANKMENT FILL SHOULD BE WITHIN +/- 3% OF THE OPTIMUM MOISTURE CONTENT AT THE TIME OF PLACEMENT. IN GENERAL, THE COMPACTION SHOULD BE ACCOMPLISHED BY PLACING THE FILL IN MAXIMUM 8-INCH LOOSE LIFTS AND MECHANICALLY COMPACTING EACH LIFT TO AT LEAST THE SPECIFIED MINIMUM DRY DENSITY.
NEWLY CONSTRUCTED SLOPES ALONG THE EMBANKMENT SHOULD BE "BENCHED" INTO THE EXISTING CLEARED EMBANKMENT SIDES IN ACCORDANCE WITH VDOT ROAD AND BRIDGE SPECIFICATION SECTION 303.04(H) IN ORDER TO MINIMIZE THE POTENTIAL FOR A SLIPPAGE FAILURE ALONG THAT INTERFACE. SURFACE WATER CONTROL MEASURES SHOULD BE INSTITUTED TO PROTECT THE NEW FILL FROM EROSION. A PROTECTIVE COVER OF GRASS OR OTHER VEGETATION SHOULD BE ESTABLISHED ON PERMANENT SLOPES AS SOON AS POSSIBLE DURING CONSTRUCTION.
WE RECOMMEND THAT FILL PLACEMENT BE MONITORED ON A FULL-TIME BASIS BY A QUALIFIED GEOTECHNICAL ENGINEERING FIRM TO VERIFY THAT THE SPECIFIED MATERIALS ARE USED AND THE REQUIRED DEGREE OF COMPACTION IS ACHIEVED.
DEWATERING MAY BE REQUIRED WHILE DURING CONSTRUCTION OF THE SPILLWAY. IT IS RECOMMENDED TO LOWER THE POND LEVEL DURING SPILLWAY CONSTRUCTION. AT A MINIMUM, SUMP PUMPS WILL BE REQUIRED THROUGHOUT THE SPILLWAY CONSTRUCTION. DEWATERING AT DEPTHS BELOW THE GROUNDWATER LEVEL MAY REQUIRE WELL POINTING. PRIOR TO BIDDING AND/OR CONSTRUCTION, THE CONTRACTOR SHOULD
DETERMINE ACTUAL GROUNDWATER CONDITIONS AND POND WATER LEVEL AT THE SPILLWAY LOCATION SO ITS IMPACT ON THE PROJECT CAN BE DETERMINED.

4.4 RETROFITTING EXISTING SPILLWAY
THE EXISTING OVERFLOW SPILLWAY, WHICH IS LOCATED TOWARDS THE SOUTHERN END OF THE DAM EMBANKMENT, CONSISTS OF A GROUTED RIP RAP TYPE SPILLWAY WITH GABION WALLS AND TWO WEIRS. SEVERAL HOLES WERE LOCATED ALONG THE OUTSIDE FACES OF THE GABIONS UPSTREAM OF THE FIRST WEIR AS A RESULT OF WHAT APPEARS TO BE AN EROSION/SCOUR ISSUE ASSOCIATED WITH THE POND DRAINAGE ALONG THE SPILLWAY ALIGNMENT. SOME OF THE OBSERVED HOLES ALONG THE OUTSIDE FACES
OF THE GABIONS WERE OBSERVED TO HAVE BEEN FILLED IN OR AT LEAST PARTIALLY FILLED IN WITH AN OPEN GRADED STONE TO PREVENT A FALL HAZARD AND POSSIBLY MINIMIZE FURTHER EROSION. ALSO, THERE WAS ONE LOCATION OBSERVED WITHIN THE VICINITY OF THE TEST PIT LOCATION WHERE WATER ALONG THE SPILLWAY WAS FREELY FLOWING INTO A HOLE OFF THE EDGE OF SPILLWAY AND UNDERNEATH A GABION.
THE EXISTING SPILLWAY CHANNEL IS ALLOWING FOR THE MOVEMENT OF WATER ALONG THE SIDES AND LIKELY BENEATH THE SPILLWAY SLAB ITSELF. A 4-FOOT DEEP VOID WAS OBSERVED AT BORING LOCATION HA-3, WHICH IS BELIEVED TO BE THE RESULT OF THIS WATER MOVEMENT OCCURRING BENEATH THE GROUND SURFACE. THIS BORING WAS COMPLETED DIRECTLY ADJACENT TO THE OUTSIDE FACE OF THE GABION NEAR THE FIRST WEIR AND ITS LOCATION IS SHOWN ON THE BORING LOCATION PLAN (SEE THIS SHEET) IN APPENDIX I.
IN THE DESIGN OF THE SPILLWAY RETROFIT, PROVISIONS SHOULD BE TAKEN TO PREVENT WATER FLOWING OFF THE SIDES OF THE SPILLWAY ALONG THE GABION AND UNDERNEATH THE SPILLWAY. THIS COULD BE ACCOMPLISHED BY CONSTRUCTING CONCRETE CURTAINS WALLS ALONG THE EDGES OF THE SPILLWAY OR OTHER METHODS TO MAINTAIN PROPER WATER FLOW WITHIN THE LIMITS OF THE SPILLWAY. CONSIDERING THE OBSERVED CONDITIONS, PARTICULARLY THE LARGE VOID BENEATH THE GROUND SURFACE, IT IS
RECOMMEND TO FILL ALL VOIDS ALONG THE SIDES AND UNDERNEATH THE SPILLWAY PRIOR TO RETROFITTING THIS EXISTING SPILLWAY. RECOMMENDATIONS AND INSTALLATION RECOMMENDATIONS FOR GROUT INJECTIONS SHOULD BE PROVIDED BY OTHERS.

5.0 CONSTRUCTION CONSIDERATIONS

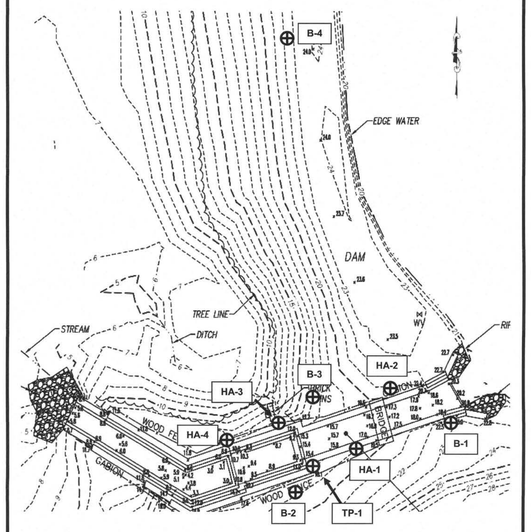
5.1 DRAINAGE AND GROUNDWATER CONCERNS
IT IS EXPECTED THAT DEWATERING MAY BE REQUIRED FOR EXCAVATIONS THAT EXTEND NEAR OR BELOW THE GROUNDWATER TABLE. DEWATERING ABOVE THE GROUNDWATER LEVEL COULD PROBABLY BE ACCOMPLISHED BY PUMPING FROM SUMPS. DEWATERING AT DEPTHS BELOW THE GROUNDWATER LEVEL WILL REQUIRE WELL POINTING.
IT WOULD BE ADVANTAGEOUS TO CONSTRUCT ALL FILLS EARLY IN THE CONSTRUCTION. IF THIS IS NOT ACCOMPLISHED, DISTURBANCE OF THE EXISTING SITE DRAINAGE COULD RESULT IN COLLECTION OF SURFACE WATER IN SOME AREAS, THUS RENDERING THESE AREAS WET AND VERY LOOSE. TEMPORARY DRAINAGE DITCHES SHOULD BE EMPLOYED BY THE CONTRACTOR TO ACCENTUATE DRAINAGE DURING CONSTRUCTION. WE RECOMMEND THAT THE CONTRACTOR DETERMINE THE ACTUAL GROUNDWATER LEVELS AT THE TIME OF 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. GET 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 GET SOLUTIONS, INC. AND THE INFORMATION SUPPLIED BY THE CLIENT AND ITS 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, GET SOLUTIONS, INC. SHOULD BE NOTIFIED IMMEDIATELY TO DETERMINE IF CHANGES IN THE FOUNDATION
RECOMMENDATIONS ARE REQUIRED. IF GET SOLUTIONS, INC. IS NOT RETAINED TO PERFORM THESE FUNCTIONS, GET 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.

Locations are approximate based on site visit sketch.



Boring Location Plan

Project:	**Dam Inundation Study – Kingsmill Pond** **Kingsmill on the James** **James City County, Virginia**	**Scale: As Drawn**
Project No:	**WM12-129G**	**Date: 8/3/2012**
Client:	**NRW Engineering, P.C.**	**Plot By: JW**

EXTRACTED FROM GET SOLUTIONS, INC. GEOTECHNICAL REPORT:
"REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES, DAM INUNDATION STUDY - KINGSMILL POND"; KINGSMILL ON THE JAMES, JAMES CITY COUNTY, VIRGINIA; GET PROJECT NO. WM12-129G; AUGUST 3, 2012.

REFER TO THE REFERENCES FOR ALL CITED TABLES, PHOTO DOCUMENTATION, AND APPENDICES.

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:
Stantec
5209 Center Street
Williamsburg, VA 23188
PHONE: (757) 220-6869 FAX: (757) 229-4507

FOR:
KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:
GEOTECHNICAL REPORT
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/12/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad
SHEET: **7 OF 9**	

I:\EXPATH\U:\203400515\07_cad\00515C-9-SPIL.dwg[totaylor]Oct 12, 2015 at 10:39[Layout: (7) Geotechnical Report

BORING LOG B-1

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia — **PROJECT NO.:** WM12-129G
BORING LOCATION: See Attached Boring Location Plan — **SURFACE ELEVATION:** 23'
DRILLER: GET Solutions, Inc. — **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" — **DATE:** 7-2-12
DEPTH TO WATER - INITIAL*: ▽ 8' **AFTER 24 HOURS:** ▽ NT **CAVING>** ▽ No Cave

Elevation (MSL) ft.	Depth (Feet)	Depth (Meters)	Description	Graphic	Sample No.	Sample Type	Sample Recovery	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
	0	0	6 inches of Topsoil								
			[FILL] Orangish brown, moist, Silty, fine to medium SAND (SM), loose		1	SS	16	1 2 2	4		
	2	1	[FILL] Orangish brown, moist, Silty, fine to medium SAND (SM), with trace fine gravel and clay, medium dense		2	SS	20	7 8 8	16		
			[FILL] Gray and brown, moist, Lean CLAY (CL), with sand and trace organics and marine shell fragments, stiff		3	SS	16	4 5 4	9	71	
	5	2			4	SS	18	5 7 5	12		
	10	3	Gray and brown, wet, Silty, fine to medium SAND (SM), with varying amounts of marine shell fragments, loose to medium dense		5	SS	16	5 6 5	11		
					6	SS	14	6 5 5	10		
	15	4			7	SS	14	4 3 3	6		
	20	6	Gray, wet, Silty, fine to medium SAND (SM), with trace marine shell fragments, loose, [Yorktown Formation]		8	SS	20	4 4 4	8		
	25	8	Boring terminated at 20 ft.								
	30	9									
	35	10									

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

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

*The initial groundwater reading may not be indicative of the static groundwater level.

PAGE 1 of 1

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

BORING LOG B-2

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia — **PROJECT NO.:** WM12-129G
BORING LOCATION: See Attached Boring Location Plan — **SURFACE ELEVATION:** 19'
DRILLER: GET Solutions, Inc. — **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" — **DATE:** 7-2-12
DEPTH TO WATER - INITIAL*: ▽ 8' **AFTER 24 HOURS:** ▽ NT **CAVING>** ▽ No Cave

Elevation (MSL) ft.	Depth (Feet)	Depth (Meters)	Description	Graphic	Sample No.	Sample Type	Sample Recovery	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
	0	0	4 inches of Topsoil								
	5	1	[FILL] Dark brown, moist, Silty, fine to medium SAND (SM), with trace organics, very loose		1	SS	16	1 2 2	4		
			[FILL] Orangish brown, moist, Clayey, fine to medium SAND (SC), with trace fine gravel, loose		2	SS	10	3 4 3	7	49	
	10	3	[FILL] Orangish brown and gray, moist, Sandy, Lean CLAY (CL), with trace fine gravel, medium stiff to stiff		3	SS	12	4 5 4	9		
					4	SS	12	4 4 4	8		
	15	4	Orangish brown and gray, wet, Clayey, fine to medium SAND (SC), very loose		5	SS	12	1 2 1	3		
	20	6	Brown, wet, Silty, fine to medium SAND (SM), with trace marine shell fragments, loose		6	SS	24	3 4 6	10		
	25	8	Gray, wet, Silty, fine to medium SAND (SM), with trace marine shell fragments, loose [Yorktown Formation]		7	SS	14	3 4 6	10		
	30	9	Boring terminated at 20 ft.		8	SS	22	5 9 9	8		
	35	10									

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

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

*The initial groundwater reading may not be indicative of the static groundwater level.

PAGE 1 of 1

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

BORING LOG B-3

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia — **PROJECT NO.:** WM12-129G
BORING LOCATION: See Atttached Boring Location Plan — **SURFACE ELEVATION:** 18'
DRILLER: GET Solutions, Inc. — **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" — **DATE:** 7-2-12
DEPTH TO WATER - INITIAL*: ▽ 8.5' **AFTER 24 HOURS:** ▽ NT **CAVING>** ▽ No Cave

Elevation (MSL) ft.	Depth (Feet)	Depth (Meters)	Description	Graphic	Sample No.	Sample Type	Sample Recovery	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
	0	0	6 inches of Topsoil								
			[FILL] Brown to orangish brown, moist, Clayey, fine to medium SAND (SC), with trace gravel, organics, and marine shell fragments, loose		1	SS	20	2 3 4	7		
	5	2			2	SS	6	4 5 4	9		
			[FILL] Brown, moist, Sandy, Lean CLAY (CL), with trace marine shell fragments, medium stiff		3	SS	10	3 3 3	6		
	10	3	[FILL] Brown and gray, moist, Clayey, fine to medium SAND (SC), with trace marine shell fragments, very loose to loose		4	SS	12	3 4 3	7		
			Dark gray and greenish gray, wet, Sandy, Lean CLAY (CL), very soft		5	SS	16	1 1 1	2		
	15	4	Brown and gray, wet, Silty, fine to medium SAND (SM), with marine shell fragments, very loose		6	SS	14	1 1 1	2		
	20	6			7	SS	6	1 0 0	1		
			Gray, wet, Sandy, Lean CLAY (CL), with trace marine shell fragments, soft [Yorktown Formation]		8	SS	20	2 2 2	4		
	25	8	Gray, wet, Silty, fine to medium SAND (SM), with marine shell fragments, medium dense [Yorktown Formation]		9	SS	14	6 9 11	20		
	30	9	Boring terminated at 30 ft.		10	SS	24	6 12 13	25		
	35	10									

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

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

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PAGE 1 of 1

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

BORING LOG B-4

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia — **PROJECT NO.:** WM12-129G
BORING LOCATION: See Atttached Boring Location Plan — **SURFACE ELEVATION:** 23'
DRILLER: GET Solutions, Inc. — **LOGGED BY:** J. Wheeler
DRILLING METHOD: Rotary Wash "Mud" — **DATE:** 7-2-12
DEPTH TO WATER - INITIAL*: ▽ 8' **AFTER 24 HOURS:** ▽ NT **CAVING>** ▽ No Cave

Elevation (MSL) ft.	Depth (Feet)	Depth (Meters)	Description	Graphic	Sample No.	Sample Type	Sample Recovery	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
	0	0	4 inches of Topsoil								
			[FILL] Brown, moist, Silty, fine SAND (SM), with trace organics and marine shell fragments, medium dense		1	SS	14	3 5 6	11		
	5	2	[FILL] Orangish brown to brownish gray, moist, Lean CLAY (CL), with sand, stiff		2	SS	16	4 5 4	9		
					3	SS	14	5 6 6	12		
	10	3	[FILL] Gray and orangish brown, moist, Lean CLAY (CL), with trace organics and marine shell fragments, medium stiff		4	SS	20	3 4 4	8		
			Mottled, gray with orangish brown, wet, Lean CLAY (CL), with sand, soft to medium stiff		5	SS	24	1 2 3	5		
	15	4			6	SS	24	1 1 2	3	71	
	20	6	Dark gray and greenish gray, wet, Sandy, Lean CLAY (CL), very soft		7	SS	24	1 0 1	1		
			Gray, wet, Clayey, fine to medium SAND (SC), very loose		8	SS	20	1 1 1	2		
	25	8	Dark brown, wet, Silty, fine to medium SAND (SM), with organics, very loose		9	SS	22	1 1 2	2		
	30	9	Boring terminated at 30 ft.		10	SS	22	1 2 2	4		
	35	10									

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

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

*The initial groundwater reading may not be indicative of the static groundwater level.

PAGE 1 of 1

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

GET Solutions, Inc.
Geotechnical · Environmental · Testing

April 23, 2015

TO: **Stantec**
5209 Center Street
Williamsburg, VA 23188-2680

Attn: Mr. Chris Kuhn

RE: Addendum No. 1
Report of Subsurface Investigation and Geotechnical Engineering Services
Dam Inundation Study - Kingsmill Pond
Kingsmill on the James
James City County, Virginia
G E T Project No: WM12-129G

Dear Mr. Kuhn:

The following is an addendum to our Report of Subsurface Investigation and Geotechnical Engineering Services for the above referenced project (**G E T** Project No. WM12-129G, dated August 3, 2012). The purpose of this addendum is to provide foundation and slab design recommendations for the proposed concrete spillway.

The project site is comprised of an existing dam embankment along the western side of Kingsmill Pond. The current overflow spillway's is not designed for a 100 year storm event. Consequently and in order to meet current regulations modifications to the existing spillway will be required. Based on the preliminary plans (undated) provided by The Structures Group, Inc. these modifications will include removal of the initial 100 linear feet of the rip rap grouted spillway that is lined with gabion baskets on either side and replacement with a concrete type spillway that includes turn down sections. The turn down sections will be a minimum of 12 inches wide and extend a minimum of 3 feet below finish grades. The spillway has been designed with a maximum live load of 400 psf, which would occur during a 100 year flood event.

Spillway Foundation Design Recommendations and Considerations

Based on the provided loading information and provided that the construction procedures are properly performed, the proposed turn down sections of the proposed concrete spillway can be supported by a shallow foundation bearing upon firm soil or well compacted structural fill material and approved by **G E T Solutions, Inc.** It is noted that up to 8.5 feet of FILL/Possible FILL materials were encountered at our boring locations directly adjacent to the spillway. These FILL/Possible FILL materials were likely installed when the dam embankment was originally constructed.

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info@getsolutionsinc.com

Since FILL materials are present, G E T Solutions, Inc. will be required to verify foundation bearing conditions at the time of construction. It is possible that some foundation undercutting will be required to exposed firm soils suitable of supporting the proposed spillway structure.

The footings can be designed using a net allowable soil pressure of 1,000 pounds per square foot (psf) bearing on firm soil or well compacted structural fill. Again, this will need to be inspected and approved by **G E T Solutions, Inc.** at the time of construction. In using net pressures, the weight of the footings and balanced backfill over the footings, including the weight of the slab, need not be considered. Hence, only loads applied at or above the finished spillway need to be used for dimensioning the footings. The only loads applied above the finished spillway would be live loads. Based on the preliminary plans this would be a maximum live load of 400 psf, which would occur during a 100 year flood event.

Based on the provided drawings, the turn down sections (footings) have been designed to have a minimum width of 12 inches and a minimum embedment depth of 36 inches below finish grades. This design is considered suitable to provide the allowable soil pressure of 1,000 psf and deep enough to accommodate for frost penetration (heave).

Due to the presence of FILL materials, the foundation bearing capacities will need to be verified by **G E T Solutions, Inc.** in the field during construction by means of performing an inspection of all footings (turn down sections). At that time, the Geotechnical Engineer will explore the extent of excessively loose, soft, or otherwise unsuitable material within the exposed excavations. Also, at the time of the footing observations, **G E T Solutions, Inc.** will perform hand auger borings or use a hand penetration device in the bases of the foundation excavations. The necessary depth of penetration will be established during the subgrade observations.

Where foundation undercut is performed, the design footing elevation should be re-established by backfilling with flowable fill with a minimum compressive strength of 200 psi. Immediately prior to foundation concrete placement, it is suggested that the bearing surfaces of all foundations be compacted using hand operated mechanical tampers. In this manner, any localized areas, which have been loosened by excavation operations, should be adequately recompacted. The compaction testing in the base of the foundation may be waived by the Geotechnical Engineer where firm bearing soils are observed during the foundation inspections.

Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in condition such as from physical disturbance, rain or frost. Surface run-off water should be drained away from the foundation excavations and slab areas and not be allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected.

Slab-on-Grade Design

The spillway slab may be constructed as a slab-on-grade member provided the previously recommended earthwork activities and evaluations are properly accomplished. It is our understanding that the spillway slab will include turn down sections (footings) that will be structurally connected.

Based on the provided plans, the spillway slab will be directly supported by 6 inches of compacted VDOT Type 21A Stone. The VDOT Type 21A Stone is required to be compacted to a minimum of 95% of the Standard Proctor's maximum dry density (ASTM D698). This 6-inch bedding layer appears to be adequate; however, considering the presence of FILL materials at this site, **it is essential that all subgrade be inspected by G E T Solutions, Inc. prior to placement of the VDOT Type 21A Stone. Some undercutting and placement with additional VDOT Type 21A Stone may be required.** This will need to be determined at the time of construction.

The spillway slab-on-grade constructed as discussed herein can be designed assuming a subgrade modulus of 150 psi per inch.

It is noted that our scope of services did not include a scour analysis. It is recommended that the structural engineer incorporate any scour protection that may be required for this project into their design to avoid potential undermining of the spillway and its turn down sections.

CLOSING

Our recommendations are based on the previously discussed project information, our interpretation of the soil test borings and laboratory data, and our observations during our site reconnaissance. If the proposed construction should vary from what was described, we request the opportunity to review our recommendations and make any necessary changes.

The reader is referred to the previously submitted subsurface investigation and laboratory testing services report for more detailed information. This addendum report should be permanently attached to the referenced subsurface investigation and laboratory testing services report.

Thank you for the opportunity to work with you on this project. We trust that the information contained herein meets your immediate needs. Should you have any questions or if we can be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,
G E T Solutions, Inc.

James R. Wheeler
Project Geologist

Camille A. Kattan, P.E.
Principal Engineer
VA Reg. # 018045

COMMONWEALTH OF VIRGINIA
CAMILLE A. KATTAN
Lic. No. 018045
PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:

Stantec
5209 Center Street
Williamsburg, VA 23188
PHONE: (757) 220-6869 FAX: (757) 229-4507

FOR:

KINGSMILL COMMUNITY SERVICES ASSOCIATION
300 MCLAWS CIRCLE, SUITE 106
PO BOX 348
WILLIAMSBURG, VA 23187

TITLE:

SOIL BORINGS
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/12/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad

SHEET:

8 OF 9

FILEPATH:U:\203400515\07_cad\00515C-9-SPIL.dwg[tolaylor]Oct 12, 2015 at 10:40[Layout: (8) Soil Borings

BORING LOG HA-1

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLER: GET Solutions, Inc.
DRILLING METHOD: Hand Auger
DEPTH TO WATER - INITIAL*: ▽ 4' **AFTER 24 HOURS:** ▽ NT **CAVING>** 7'
PROJECT NO.: WM12-129G
SURFACE ELEVATION: 19'
LOGGED BY: J. Wheeler
DATE: 6-15-12

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
19	0	0	11 inches of Topsoil		1	6	HA				
			-0.92		2	6	HA				
			[FILL] Orangish brown, moist, Clayey, fine to coarse SAND (SC), with trace organics and marine shell fragments		3	6	HA				
	0.8	2			4	6	HA				
			[FILL] Orangish brown, moist, Clayey, fine to medium SAND (SC), with trace organics and marine shell fragments		5	6	HA				
					6	6	HA				
					7	6	HA				
	1.6	4 ▽			8	6	HA				
			[FILL] Orangish brown and gray, moist, Clayey, fine to medium SAND (SC), with marine shell fragments		9	6	HA				
					10	6	HA				
			Orangish brown and gray, moist, Silty, fine to medium SAND (SM), with marine shell fragments		11	6	HA				
	2.4	8			12	6	HA				
					13	6	HA				
					14	6	HA				
	3.2	10									
			Boring terminated at 7 ft.								
		12									
		14									

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

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

*The initial groundwater reading may not be indicative of the static groundwater level.

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

BORING LOG HA-2

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLER: GET Solutions, Inc.
DRILLING METHOD: Hand Auger
DEPTH TO WATER - INITIAL*: ▽ NE **AFTER 24 HOURS:** ▽ NT **CAVING>** No Cave
PROJECT NO.: WM12-129G
SURFACE ELEVATION: 21'
LOGGED BY: J. Wheeler
DATE: 6-15-12

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
21	0	0	8 inches of Topsoil		1	6	HA				
			0.67		2	6	HA				
			[FILL] Orangish brown, moist, Sandy, Lean CLAY (CL), with trace marine shell fragments		3	6	HA				
	0.8	2			4	6	HA				
					5	6	HA				
					6	6	HA				
					7	6	HA				
	1.6	4			8	6	HA				
					9	6	HA				
			Boring terminated at 4.75 ft.		10	3	HA				
	2.4	8									
	3.2	10									
		12									
		14									

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

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

*The initial groundwater reading may not be indicative of the static groundwater level.

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

BORING LOG HA-3

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLER: GET Solutions, Inc.
DRILLING METHOD: Hand Auger
DEPTH TO WATER - INITIAL*: ▽ 8' **AFTER 24 HOURS:** ▽ NT **CAVING>** 9'
PROJECT NO.: WM12-129G
SURFACE ELEVATION: 16'
LOGGED BY: J. Wheeler
DATE: 6-15-12

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
16	0	0	[FILL] Mottled, gray to orangish brown, moist, Sandy, Lean CLAY (CL), with trace organics and marine shell fragments		1	6	HA				
			1		2	6	HA				
			[FILL] Orangish brown, moist, Lean CLAY (CL), with fine sand, gravel, and trace marine shell framgments		3	6	HA				
	0.8	2	2		4	6	HA				
			[FILL] Orangish brown, moist, Sandy, Lean CLAY (CL), with trace fine gravel and marine shell fragments		5	6	HA				
			3		6	6	HA				
			[Possible FILL] Orangish brown, moist, Clayey, fine to medium SAND (SC), with marine shell fragments		7	6	HA				
	1.6	4	4		8	6	HA				
			Void encountered in hand auger boring from about 4 to 8 feet.								
	2.4	8 ▽			9	6	HA				
			Orangish brown, wet, Clayey, fine to medium SAND (SC), with trace fine gravel and organics		10	6	HA				
	3.2	10	Boring terminated at 9 ft.								
		12									
		14									

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

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

*The initial groundwater reading may not be indicative of the static groundwater level.

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

BORING LOG HA-4

PROJECT: Dam Inundation Study - Kingsmill Pond
CLIENT: Williamsburg Environmental Group, Inc.
PROJECT LOCATION: James City County, Virginia
BORING LOCATION: See Attached Boring Location Plan
DRILLER: GET Solutions, Inc.
DRILLING METHOD: Hand Auger
DEPTH TO WATER - INITIAL*: ▽ NE **AFTER 24 HOURS:** ▽ NT **CAVING>** No Cave
PROJECT NO.: WM12-129G
SURFACE ELEVATION: 13'
LOGGED BY: J. Wheeler
DATE: 6-15-12

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS: Plastic Limit ⊢ Liquid Limit; Moisture Content - ◆; N-Value - ▨ (10 20 30 40 50 60 70)
13	0	0	3 inches of Topsoil		1	6	HA				
			-0.25		2	6	HA				
			Brown and orangish brown, moist, Clayey, fine to medium SAND (SC), with marine shell fragments and trace organics		3	6	HA				
	0.8	2			4	6	HA				
					5	6	HA				
					6	6	HA				
	1.6	4									
			Boring terminated at 3 ft.								
	2.4	8									
	3.2	10									
		12									
		14									

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

Notes: Elevations have been estimated based on the elevations provided on the provided plans.

SS = Split Spoon Sample
ST = Shelby Tube Sample
HA = Hand Auger Sample
BS = Bulk Sample
WOH = Weight of Hammer

*The initial groundwater reading may not be indicative of the static groundwater level.

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.

WHILE THE GEOTECHNICAL REPORT ENTITLED REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES DAM INUNDATION STUDY - KINGSMILL POND , DATED AUGUST 3 2012, AND THE ADDENDUM NO. 1 TO THIS REPORT, DATED APRIL 23, 2015, BOTH PREPARED BY GET SOLUTIONS, INC., INDICATES THAT SOIL LOSS HAS OCCURRED UNDERNEATH THE EXISTING SPILLWAY, THE EXTENT OF THE SOIL LOSS IS UNKNOWN AND VOID VOLUME SHOWN IS AN ESTIMATE ONLY. A GEOTECHNICAL ENGINEER SHALL BE PRESENT DURING THE REMOVAL OF THE EXISTING SPILLWAY BOTTOM TO EVALUATE THE EXISTING SOILS UNDERNEATH THE SPILLWAY BOTTOM. THE GEOTECHNICAL ENGINEER SHOULD PROVIDE UPDATED RECOMMENDATION FOR SUBGRADE PREPARATION AND FOR THE FILL OPERATION TO PREPARE A SUITABLE SUBGRADE FOR THE CONSTRUCTION OF THE NEW SPILLWAY. THE GEOTECHNICAL ENGINEER SHALL BE PRESENT FOR THE DURATION OF THE SUBGRADE PREPARATION AND FILL OPERATION.

REV	DATE	DESCRIPTION	DSN	CHK	APP
1	10/12/15	ADDRESS COUNTY COMMENTS	TT	CK	SB

PREPARED BY:
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TITLE:
SOIL BORINGS
KINGSMILL POND
SPILLWAY CONCRETE RETROFIT

COMMONWEALTH OF VIRGINIA
SCOTT C. BLOSSOM
Lic. No. 40287
10/12/15
PROFESSIONAL ENGINEER

DRAWN BY: D TREESE	DESIGNED BY: C KUHN
CHECKED BY: S BLOSSOM	APPROVED BY: S BLOSSOM
PROJECT NUMBER: 203400515	SCALE: AS SHOWN
DATE: 06/26/15	FILE PATH: U:\203400515\07_cad

SHEET:
9 OF 9

FILEPATH:U:\203400515\07_cad\00515C-9-SPIL.dwg[btaylor]Oct 12, 2015 at 10:40[Layout: (9) Soil Borings

GENERAL NOTES

1. WORK PERFORMED SHALL COMPLY WITH THE FOLLOWING:
   A. THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE (VUSBC): 2012 EDITION
   B. THE INTERNATIONAL BUILDING CODE (IBC), 2012 EDITION AS AMENDED BY THE VUSBC.
   C. ALL APPLICABLE STATE AND LOCAL CODES, ORDINANCES AND REGULATIONS.

2. DESIGN LOADS:
   A. BUILDING RISK CATEGORY_____I
   B. GROUND SNOW, Pg_____20 PSF
   C. WIND SPEED_____105 MPH
      EXPOSURE_____B
   D. LIVE LOADS:

	UNIFORM
50 YEAR FLOOD LEVEL SURCHARGE LOAD	400 PSF

   E. SEISMIC DESIGN:

SEISMIC IMPORTANCE FACTOR, I	1.0
MAPPED SPECTRAL RESPONSE ACCELERATION Ss	0.112
MAPPED SPECTRAL RESPONSE ACCELERATION S1	0.051
SITE SOIL CLASS	D
SPECTRAL COEFFICIENT, Sds	0.120
SPECTRAL COEFFICIENT, Sd1	0.082
SEISMIC DESIGN CATEGORY	B
BASIC STRUCTURAL SYSTEM	MAT SLAB
SEISMIC FORCE RESISTING SYSTEM	STRUCTURE NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE(TABLE 1617.6.2)
DESIGN BASE SHEAR	10 KIPS
SEISMIC RESPONSE COEFFICIENT Cs	0.04
RESPONSE MODIFICATION FACTOR R	3
SEISMIC ANALYSIS	EQUIV. LATERAL FORCE PROCEDURE

3. THE CONTRACTOR SHALL VERIFY DIMENSIONS IN FIELD PRIOR TO FABRICATION OF MEMBERS AND COMMENCING WORK.

4. PROVIDE TEMPORARY BRACING AS REQUIRED TO RESIST WIND AND OTHER LOADS DURING CONSTRUCTION.

5. FOR SHOP DRAWING SUBMITTALS, CONTRACTOR SHALL SUBMIT ONE (1) ELECTRONIC (PDF) SET OF SHOP DRAWINGS & PRODUCT SUBMITTALS. REPRODUCTIONS OF CONTRACT DRAWINGS ARE NOT TO BE SUBMITTED AS SHOP DRAWINGS.

6. THE CONTRACTOR SHALL PROTECT EXISTING STRUCTURES, EQUIPMENT, ADJACENT GROUNDS AND PLANTS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL REPAIR AND/OR REPLACE, AT NO ADDITIONAL COSTS TO THE OWNER, ANY ITEMS DAMAGED DURING THE CONSTRUCTION.

DEMOLITION

7. PROVIDE ADEQUATE SHORING, BRACING, AND OTHER TEMPORARY SUPPORT DURING DEMOLITION.

8. CONTRACTOR SHALL VERIFY THAT EXISTING CONSTRUCTION CORRESPONDS TO THAT SHOWN ON THE DRAWINGS. DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER.

FOUNDATIONS:

9. CONTRACTOR SHALL NOTIFY "MISS UTILITY OF VIRGINIA" PRIOR TO BEGINNING EXCAVATION FOR LOCATIONS OF UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BEAR SOLE RESPONSIBILITY FOR COSTS ASSOCIATED WITH DAMAGE AND REPAIR OF ANY LINES MARKED BY MISS UTILITY OF VIRGINIA.

10. CONCRETE SLAB ON GRADE TURNDOWNS WERE DESIGNED TO BEAR ON UNDISTURBED SOIL BELOW THE FROST LINE AND A MINIMUM OF 3'-0" BELOW EXISTING GRADE WITH A MINIMUM SOIL BEARING PRESSURE OF 1,000 PSF. THE OWNER SHALL EMPLOY A GEOTECHNICAL ENGINEER TO VERIFY THAT THIS ALLOWABLE SOIL BEARING PRESSURE IS ATTAINABLE. IF THIS IS NOT ATTAINABLE, OWNER TO VERIFY THE OWNER/CONTRACTOR SHALL CONTACT ENGINEER FOR REDESIGN.

11. CONCRETE SLABS ON GRADE SHALL BEAR ON A MINIMUM OF 6" COMPACTED NO. 21A STONE. WHERE REQUIRED, SOIL UNDER SLAB SHALL BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM METHOD D-698 (STANDARD PROCTOR).

12. FOUNDATION DESIGN HAS BEEN BASED ON GEOTECHNICAL REPORT PREPARED BY GET SOLUTIONS, INC. & DATED AUGUST 3, 2012 AND THE ADDENDUM DATED APRIL 22, 2015. CONSULT GEOTECHNICAL REPORT AND ADDENDUM FOR ADDITIONAL INFORMATION.

13. BACKFILL WITHIN SPILLWAY SHALL BE SM OR BETTER MATERIAL. SEE GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.

CONCRETE

14. CONCRETE FOR SLABS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS AND A MAXIMUM WATER CEMENT RATIO OF 0.45 UNLESS NOTED OTHERWISE.

15. ALL CONCRETE SHALL BE MIXED, PLACED, AND TESTED IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318.

16. ALL CONCRETE SHALL HAVE A SLUMP OF 4" ± 1" UNLESS NOTED OTHERWISE.

17. CONCRETE MIX DESIGNS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER OF RECORD FOR APPROVAL PRIOR TO USE.

18. ALL CONCRETE TO BE POURED IN COLD WEATHER, AS DEFINED IN SECTION 1.1 OF ACI 306R, COLD WEATHER CONCRETING, SHALL FULLY COMPLY WITH ACI 306.1, STANDARD SPECIFICATIONS FOR HOT WEATHER CONCRETING, AND ACI 306R.

19. ALL CONCRETE TO BE POURED IN HOT WEATHER, AS DEFINED IN SECTION 1.2 OF ACI 305R, HOT WEATHER CONCRETING, SHALL FULLY COMPLY WITH ACI 305.1, STANDARD SPECIFICATIONS FOR HOT WEATHER CONCRETING, AND ACI 305R.

20. REINFORCING BARS SHALL BE ASTM A-615, GRADE 60. EPOXY COATED BARS SHALL BE ASTM A-775 GRADE 60.

21. ALL CONCRETE REINFORCING SHALL BE DETAILED AND CONSTRUCTED PER ACI 318.

22. CONTRACTOR SHALL SUBMIT REINFORCING SHOP DRAWINGS FOR CONCRETE REINFORCING STEEL FOR APPROVAL.

23. ALL CONCRETE REINFORCING STEEL SHALL HAVE CORNER OR "Z" BARS OF THE SAME DIAMETER AT ALL CORNERS AND CHANGES IN DIRECTION. CORNER AND "Z" BARS SHALL LAP CONTINUOUS BARS A MINIMUM OF 48 TIMES THE NOMINAL BAR DIAMETER ON BOTH ENDS.

24. ALL CONCRETE SHALL BE AIR-ENTRAINED 6% BY VOLUME ± 1% UNLESS SHOWN OTHERWISE ON DRAWING.

25. SPECIAL INSPECTIONS SHALL BE REQUIRED FOR THE CAST IN PLACE CONCRETE MATERIALS AND INSTALLATIONS, INCLUDING BUT NOT LIMITED TO REINFORCEMENT, FORMWORK, PLACEMENT, CURING, AND STRENGTH AS IDENTIFIED IN THE SCHEDULE OF SPECIAL INSPECTIONS & SECTION 1704.4 OF THE IBC.

GROUT & RIVER COBBLES:

26. GROUT SHALL BE NON-SHRINK AND NON-METALLIC, AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

27. RIVER COBBLES SHALL BE 4"-6" WITH LESS THAN 5% FINES.

28. GROUT SHALL ONLY BE PLACED WHEN THE TEMPERATURE IS BETWEEN 40 AND 90 DEGREES FAHRENHEIT. WHEN FREEZING CONDITIONS PREVAIL, ROCK TO BE GROUTED MUST BE COVERED AND HEATED TO A RANGE OF 50 TO 90 DEGREES FAHRENHEIT FOR A MINIMUM OF 24 HOURS BEFORE PLACING GROUTING MATERIAL.

29. RIVER COBBLES TO BE GROUTED SHALL BE KEPT MOIST FOR A MINIMUM OF TWO (2) HOURS BEFORE GROUTING.

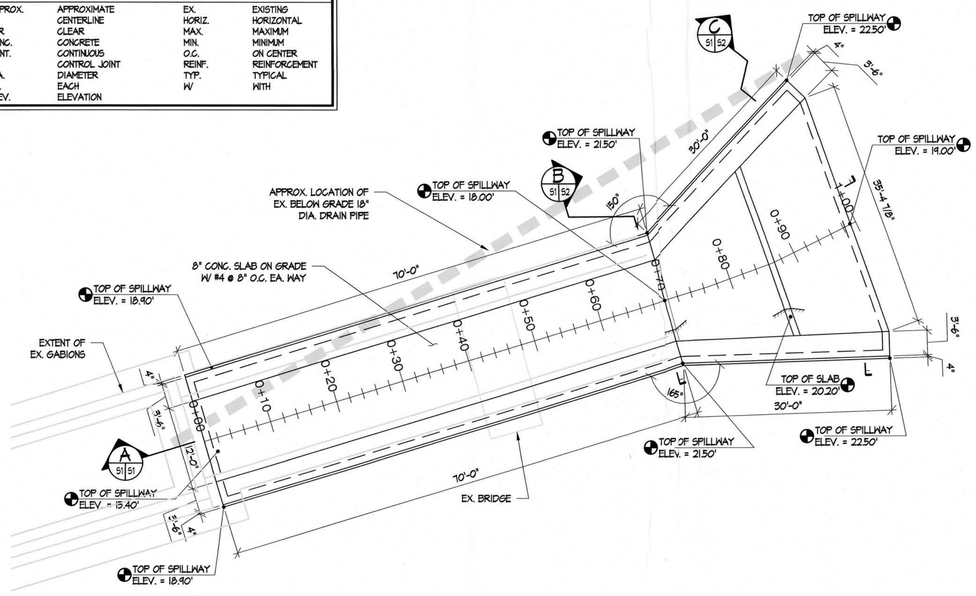
30. RIVER COBBLES SHALL BE FLUSHED WITH WATER BEFORE PLACING THE GROUT TO REMOVE THE FINES FROM THE ROCK SURFACES.

31. FRESHLY PLACED GROUT SHALL BE MAINTAINED IN A MOIST CONDITION FOR A MINIMUM CURING PERIOD OF SEVEN (7) DAYS.

32. SPECIAL INSPECTIONS SHALL BE REQUIRED FOR THE GROUT & RIVER COBBLE MATERIAL AND INSTALLATION, INCLUDING BUT NOT LIMITED TO FORMWORK, PLACEMENT, CURING, AND STRENGTH AS IDENTIFIED IN THE SCHEDULE OF SPECIAL INSPECTIONS & SECTION 1704.4 OF THE IBC.

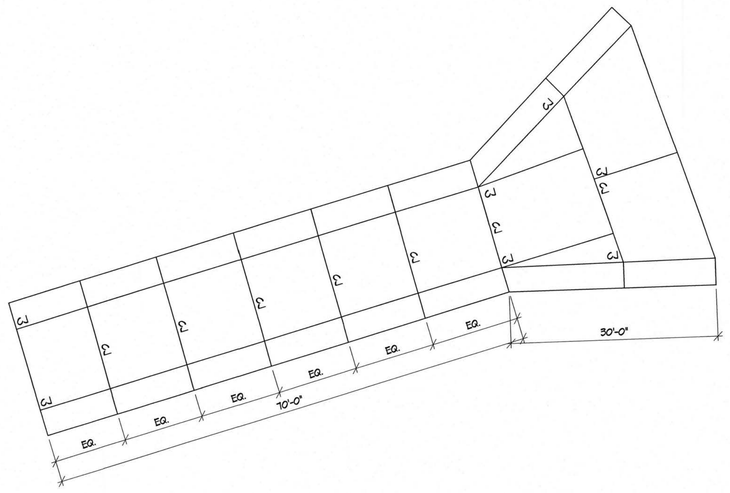
ABBREVIATIONS

APPROX.	APPROXIMATE	EX.	EXISTING
℄	CENTERLINE	HORIZ.	HORIZONTAL
CLR	CLEAR	MAX.	MAXIMUM
CONC.	CONCRETE	MIN.	MINIMUM
CONT.	CONTINUOUS	O.C.	ON CENTER
CJ	CONTROL JOINT	REINF.	REINFORCEMENT
DIA.	DIAMETER	TYP.	TYPICAL
EA.	EACH	W/	WITH
ELEV.	ELEVATION		



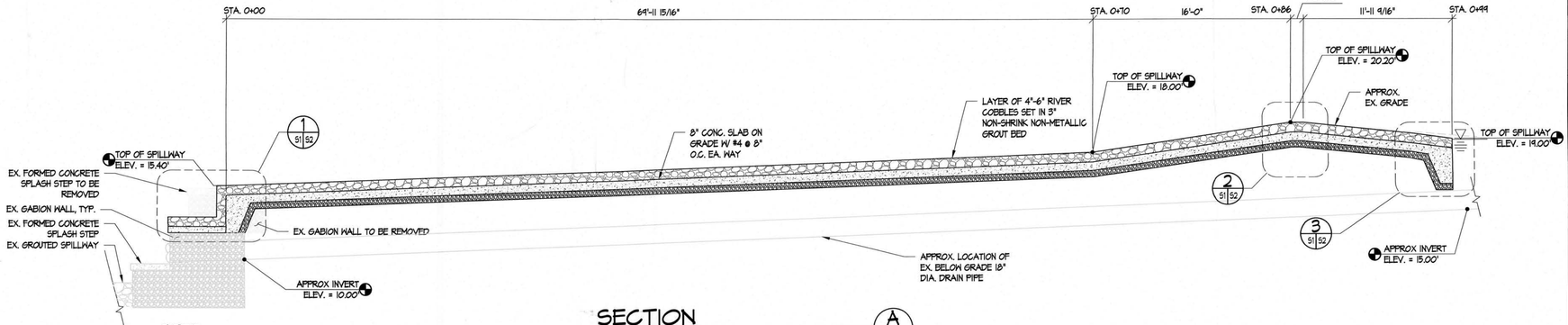
SPILLWAY PLAN

SCALE: 1" = 10'-0"



SPILLWAY CONTROL JOINT PLAN

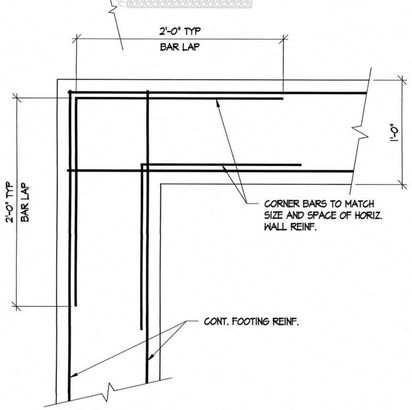
SCALE: 1" = 10'-0"



SECTION

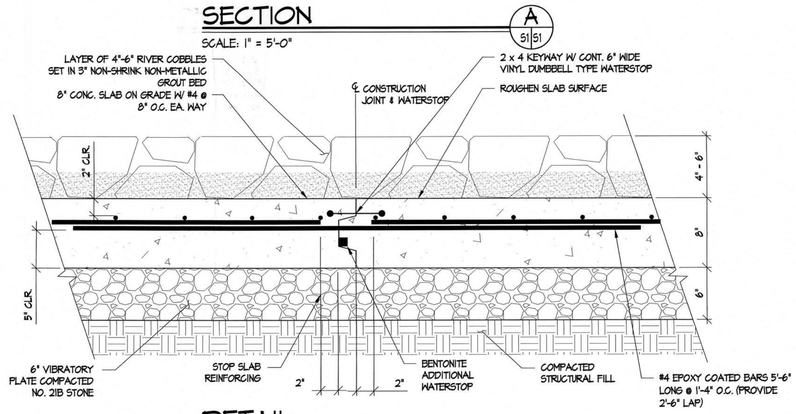
A 51|51

SCALE: 1" = 5'-0"



DETAIL — FOOTING CORNER

SCALE: 1 1/2" = 1'-0"



DETAIL — CONSTRUCTION JOINT (CJ)

SCALE: 1 1/2" = 1'-0"

The Structures Group, Inc.
1200 Old Colony Lane ● Williamsburg, VA 23185
(757)220-0465 ● Fax (757)220-1546
www.thestructuresgroup.com

Reviewed by: BTW
Drawn by: KJP
Project #: VA1417.DES
Date: 6/26/15

COMMONWEALTH OF VIRGINIA — BRIAN T. WELLS — Lic. No. 052322 — 6/26/15 — PROFESSIONAL ENGINEER

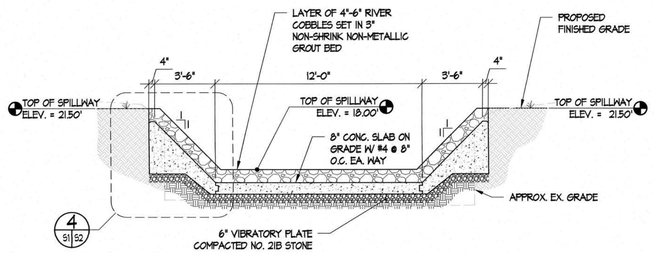
No.	Revisions	Date

GENERAL NOTES, ABBREVIATION, SPILLWAY PLANS, SECTIONS AND DETAILS

SPILLWAY RETROFIT ALTERNATIVE KINGSMILL POND

JAMES CITY COUNTY — VIRGINIA

Sheet S1 — 1 of 2



SECTION B

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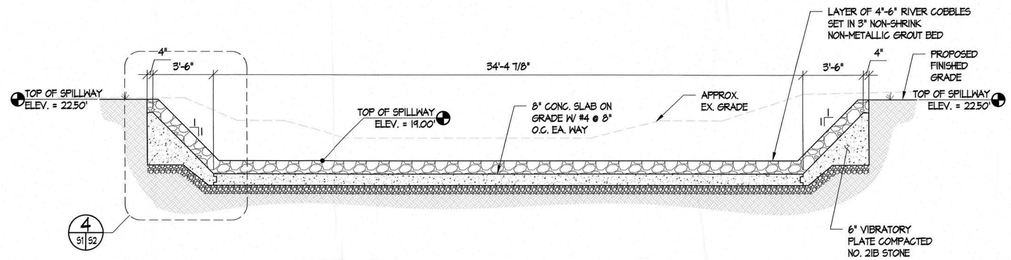
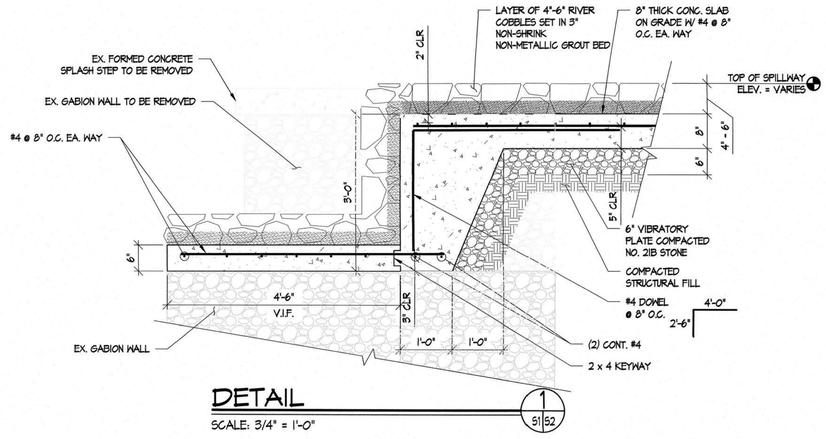


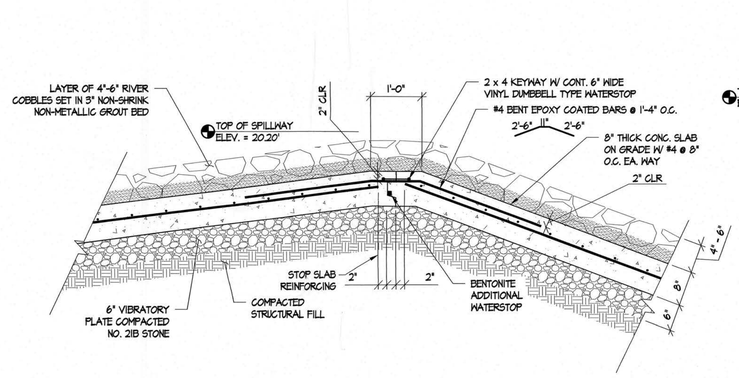
SECTION C

SCALE: 1/4" = 1'-0"



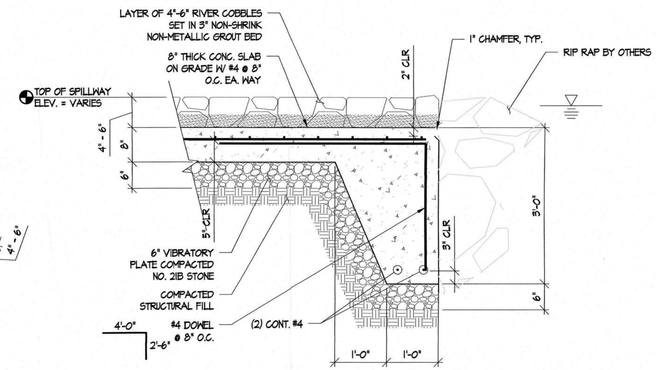
DETAIL 1

SCALE: 3/4" = 1'-0"



DETAIL 2

SCALE: 3/4" = 1'-0"



DETAIL 3

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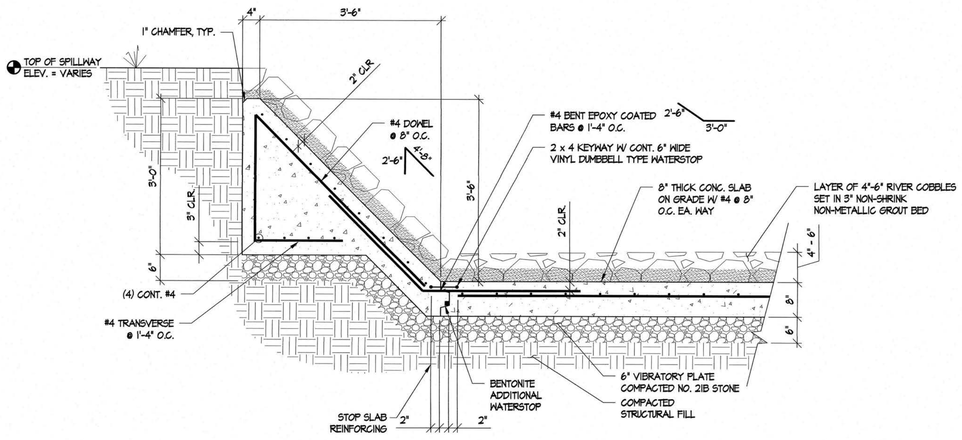

DETAIL 4

SCALE: 3/4" = 1'-0"

The Structures Group, Inc.
1200 Old Colony Lane ● Williamsburg, VA 23185
(757)220-0465 ● Fax (757)220-1546
www.thestructuresgroup.com

Date: 6/26/15
Project #: VA14170.DES
Drawn by: KJP
Reviewed by: BTW

COMMONWEALTH OF VIRGINIA
BRIAN T. WELLS
Lic. No. 052322
6/26/15
PROFESSIONAL ENGINEER

No.	Revisions	Date

SPILLWAY SECTIONS & DETAILS

SPILLWAY RETROFIT ALTERNATIVE KINGSMILL POND

JAMES CITY COUNTY VIRGINIA

Sheet S2 2 of 2

6. Design Calculations

7. Reports

Community Development
101-A Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784
P: 757-253-6671
F. 757-253-6822
community.development@jamescitycountyva.gov

jamescitycountyva.gov

Building Safety & Permits	Engineering & Resource Protection	Neighborhood Development	Planning	Zoning Enforcement
757-253-6620	757-253-6670	757-253-6640	757-253-6685	757-253-6671

July 21, 2017

Ms. Susan Sickal
Kingsmill Community Services Association (KCSA)
309 McLaws Circle, Suite D
Williamsburg, Virginia 23185
Via email: ssickal@kingsmillcommunity.org

Re: Kingsmill Pond Spillway Retrofit and Repair, Curb Addition
E&S-022-2015
County BMP ID Code: CC019, Wet Pond

Dear Ms. Sickal:

The Engineering and Resource Protection Division received the revised as-built drawings and certification documents for the curb addition to the Spillway project. Based on our review of the project, record drawing submittal, and concurrent field inspection as performed on July 20, 2017, the following items require additional information be submitted:

Field Related Issues:

1. Pond Drain Valve. The pond drain is currently in the "open" position and the pond is draining. Staff assumes the drain was opened in order to facilitate the curb remediation work. Regardless of reason, the valve must be closed immediately in order to maintain the proper water level in the pond. A photo of the downstream pond drain outlet is below.

2. Missing Fence Sections. The missing fence sections must be replaced. Staff notes that two sections are missing, with areas identified in the following pictures: looking downstream - to the left of the channel just past the bridge and to the left of channel along the gabion wall. One rail remains leaning against the fencing.

3. Caution Tape. Remaining remnants of caution tape along the fencing and work area must be removed. One such area is shown in the picture below, however, tape was noted in several places.

Following the completion of these minor items, please alert our offices. Staff will reinspect the facilities. Should it be confirmed by staff that all items have been satisfactorily completed, a final submittal of the record drawing information will be requested on CD or DVD containing full sized pdf's of the record drawings and other relative information. Once all required information has been provided, staff will then proceed with final release of the surety and/or closing out the project.

Should you have any comments or questions, please contact me at your convenience at 757-253-6702 or via email at Deirdre.Wells@jamescitycountyva.gov.

Sincerely,

Deirdre P. Wells, P.E.
Chief Civil Engineer
Engineering and Resource Protection

Cc: Joe Buchite (JCC Inspector – via email)
Chris Kuhn (Stantec – via email)
Art Sebert (Sebert Surveying and Layout – via email)
Brandon Nice (David Nice Builders – via email)

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James City County
VIRGINIA
Jamestown 1607

Development Management
Engineering and Resource Protection Division
101 Mounts Bay Road, Bldg E
Williamsburg, VA 23185

Resource.Protection@jamescitycountyva.gov

Building Safety and Permits Enforcement	Engineering and Resource Protection	Planning	Zoning
757-253-6620	757-253-6670	757-253-6685	757-253-6671

July 28, 2016

Ms. Susan Sickal
Kingsmill Community Services Association (KCSA)
309 McLaws Circle, Suite D
Williamsburg, Virginia 23185
Via email: ssickal@kingsmillcommunity.org

Re: Kingsmill Pond Spillway Retrofit and Repair
E&S-022-2015
County BMP ID Code: CC019, Wet Pond

Dear Ms. Sickal:

The Engineering and Resource Protection Division received a memo (via email) from Chris Kuhn of Stantec regarding the as-built conditions of the Spillway project. The memo detailed the conditions of the spillway, the current hydraulic status of the spillway, and presented a possible remediation for the spillway chute. While this memo was not meant as an as-built submittal, I have taken the liberty of logging the memo and provided record drawing as an as-built submittal to best facilitate all discussion regarding the various issues. The items and topics mentioned below will help all parties best determine the appropriate solution for this project.

Record Drawings (asbuilts) and construction certifications are required for the entirety of the stormwater conveyance and attenuation system which includes any stormwater management/BMP(s) and the associated conveyance system(s). Certifying to the construction of these systems and components indicates that all items were constructed in accordance with the associated plans and specifications. Record drawings and construction certifications must meet established program requirements of both the county Engineering and Resource Protection and Stormwater divisions.

Based on our review of the project memo dated June 22, 2016, record drawing submittal, and concurrent field inspection as performed on July 28, 2016 the following items require additional information be submitted:

Record Drawing:

1. Water Surface Elevation. Indicate both the previous, existing water surface elevation and the now as-built water surface elevation. While the spillway crest elevation is lower by a mere 3", the water surface elevation seems lower than previously recorded. Our office has received several inquiries from property owners along the pond as to why the level is noticeably lower. Please remember that during the design review, the maintenance of the water surface elevation was paramount.

2. Gabion Tie-In. Provide additional as-built information on the gabion tie-in location. The as-built survey shows the chute shifted to the left (viewing downstream) and assurance is needed that a linear and consistent section has been maintained.

Construction Certifications:

3. Certification Forms. Following any remediation to the spillway chute and surrounding area, standard construction certification forms will be required, stamped and sealed by the appropriate parties.

Capacity Related Items:

4. Erosive Force Calculation. The discussion within the *Capacity for As-Built Configuration* states the "overtopping depth is shallow and …not much erosive force [is] expected". Please detail the erosive force anticipated at the top edge of the chute and the basis for erosive determination.

5. Velocity at Soil/ Spillway Interface Calculation. Please provide the anticipated velocities at the interface of the spillway edge and proposed soil berm. This will weigh into the decision regarding berm appropriateness and/ or berm surface treatment.

6. 100- Year/ 6- Hour Calculations. During review of these improvements, the designer noted the regulatory requirement for dam safety to pass the 50- year, 6- hour event. Staff did not disagree, but further noted the County BMP standards that call for containment of the 100-year event with appropriate freeboard (i.e. 1 foot). After much discussion, the County allowed for containment of 100-year event with considerably less than 1 foot of free board. The current as-built now shows that the 100- year storm is not contained within the hardened channel. This is not what was approved.

7. Berm Detail. Please reference the standard or source for the suggested retrofit (berm). Is the presented detail an approved design of the USACOE?

8. Berm/ Fencing Interface. Please provide information regarding any berm retrofit solution and the existing wooden safety fence. The fence appears to be located within the footprint of a retrofit and will need to be adjusted/ relocated. The fence posts will not be allowed within the berm for stability reasons.

Construction Related Items:

Note: The assumption is that these items will be addressed after a solution for the spillway top elevation issue is determined. Corrective actions needed and listed below may be handled at the time of spillway top elevation retrofit.

9. Debris Removal. A sheet of plywood and other various timbers are within the chute and must be removed. Additionally, several sections of netted matting are lying on the ground and should be properly disposed.

10. Backfill at Posts. Several posts, most notably those at the bridge abutments, have not been backfilled. Staff noted at least three such instances.

11. Sinkholes. The approved plan called for the many depressions behind the gabions to be filled with compacted structural fill. Several such areas are still evident.

12. Bridge Abutment. A depression exists at the right front bridge abutment. This will encourage undermining of the bridge, as well as the channel.

13. Backfill Along the Channel/ Chute. Most notably at the spillway/chute entrance, the ground is a lower elevation than the top edge of the chute. Other sections along the chute length are evident. This will encourage impoundment and undermining.

14. Gabion Tie-In. The right tie-in point has a large void space between the existing sidewall gabion and the new chute. This area will need to be appropriately dressed, as erosion and washout are already evident.

15. Steps for Bridge. A covered stack of wood is located on the bridge. The assumption is that this wood is to become the steps for the bridge. Please confirm.

We ask that you work closely with Mr. Kuhn to determine the most appropriate and acceptable solution for any spillway retrofit. It is important that the KCSA be comfortable with the final solution. Once a determination has been reached, new details and calculations must be submitted to our office for review and discussion.

Following the approved retrofit construction work and the addressing of Construction Related Items, please resubmit **one** copy of the record drawing information for review and approval. Staff will reinspect the facilities. Should it be confirmed by staff that all items have been satisfactorily completed, a final submittal of the record drawing information will be requested on CD or DVD containing full sized pdf's of the record drawings and other relative information. Once all required information has been provided, staff will then proceed with final release of the surety and/or closing out the project.

Should you have any comments or questions, please contact me at your convenience at 757-253-6702 or via email at Deirdre.Wells@jamescitycountyva.gov.

Sincerely,

Deirdre P. Wells, P.E.
Chief Civil Engineer
Engineering and Resource Protection

Cc: Joe Buchite (JCC Inspector – via email)
Chris Kuhn (Stantec – via email)
Art Sebert (Sebert Surveying and Layout – via email)
Brandon Nice (David Nice Builders – via email)

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Stantec

Memo

To:	Chris Kuhn BC 2034	From:	Daniel Treese BC 2034
File:	203400515	Date:	May 9, 2016

Reference: Kingsmill Pond Spillway Concrete Retrofit As-built Review

I've completed a review of the as-built plans for the Kingsmill Pond spillway concrete retrofit. Although there is a slight rotation between the plan views of the design plans and as-built survey, the geospatial difference is likely due to the survey benchmark being disturbed during construction and I don't see an issue as long as the downstream tie-in is even with the existing spillway. Of more importance are the cross sectional flow areas of the as-built survey. A comparison of the design and as-built maximum flows is provided below.

The design plans specified a spillway channel (XS D-D' and XS E-E') with 12' bottom width, 19' top width, and 3.5' depth; resulting in a **flow area of 54.25 sqft**. The channel between XS D-D' and XS E-E' was to have a **4% slope**. The spillway entrance was to be set at a **crest elevation of 20.20'** (Profile A-A'). The spillway entrance (XS B-B') was to have a 35.4' bottom width, 42.4' top width, and 3.5' depth.

The start of the constructed spillway channel (XS D-D') has a 12.4' bottom width, 19.8' top width, and 2.9' depth; resulting in a **flow area of 46.69 sqft.** The end of the constructed spillway channel (XS E-E') has a 11.9' bottom width, 19.4' top width, and 2.9' depth; resulting in a **flow area of 45.39 sqft.** The constructed channel between XS D-D' and XS E-E' has a **4% slope**. The constructed spillway entrance is set at a **crest elevation of 19.95'** (Profile A-A'). The constructed spillway entrance (XS B-B') has a 30.70' bottom width, 42.7' top width, and 3.0' depth.

As summarized above, the constructed concrete spillway channel is 84% the size of the designed flow area and sets the water elevation of the pond 3 inches lower than intended. The left bank of the start of the spillway channel and the right bank of the end of the spillway channel are 7 inches lower than intended. The deviations at the start of the channel are not of concern because a slightly lower pond water surface elevation will increase the detention capacity of the facility and the existing elevated landscape on both sides of the constructed spillway entrance will funnel any overflow back into the spillway channel.

WETLAND IMPACTS?

The lower right bank at the end of the spillway is of concern because the landscape is sloped downward at that point and any overflow will cause erosion on the slope and threaten the structural integrity of the concrete retrofit. The spillway channel was designed for a 100-yr 6-hr peak flow of **1,136 cfs**. Single section analysis in FlowMaster estimates a maximum flow of **1,181 cfs** for the spillway channel design cross section, **923 cfs** for XS D-D', and **891 cfs** for XS E-E'. Given these estimates, we can expect the constructed concrete spillway channel to convey roughly 75-80% of the 100-yr 6-hr storm event before overtopping the right bank at the end of the spillway channel.

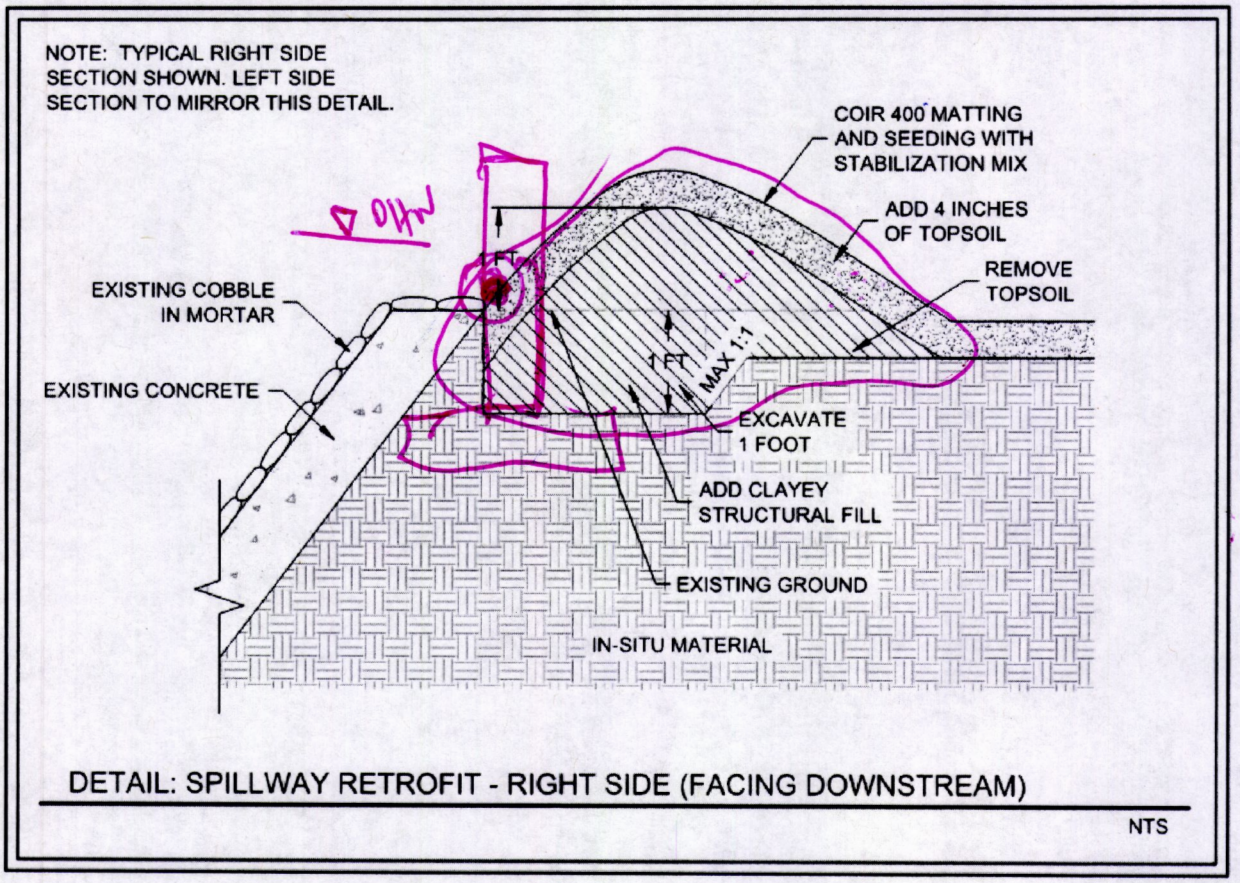
Reference: Kingsmill Pond Spillway Concrete Retrofit As-built Review

STANTEC CONSULTING SERVICES INC.

Dan Treese
Engineer In Training
Phone: (757) 220-6869
Fax: (757) 229-4507
dan.treese@stantec.com

Reference: Kingsmill Pond Dam – As-Built Hydraulic Evaluation

Figure 1: Spillway Retrofit



The retrofit would need to be properly tied-in to the abutments of the pedestrian bridge. At the bridge the abutments are providing the same function as the earthen berm. Such a retrofit will fully contain the original design storm event without requiring modification of the existing concrete chute.

'evee 1-0

Reference: Kingsmill Pond Dam – As-Built Hydraulic Evaluation

Thank you for providing Stantec the opportunity to fully evaluate the final as-built and to continue our joint efforts to ensure the long-term environmental stewardship of the Kingsmill Community. As always, should any questions arise regarding this report please do not hesitate to contact us at the number listed below.

STANTEC CONSULTING SERVICES INC.

Chris Kuhn
Senior Project Manager
Phone: (757) 220-6869
Fax: (757) 229-4507
chris.kuhn@stantec.com

cc: Toni Small, P.E.
Megan McCollough, P.E.

Stantec

Memo

To:	Susan Sickal Kingsmill Community Services Association (KCSA) 309 McLaws Circle, Suite D Williamsburg, Virginia 23185	From:	Chris Kuhn Williamsburg VA Office
File:	203400515	Date:	June 22, 2016

Reference: Kingsmill Pond Dam – As-Built Hydraulic Evaluation

This memo serves as a summary of Stantec's hydraulic analysis of the as-built spillway configuration of the Kingsmill Pond Dam spillway. As previously reported, the as-built survey indicates that 1) the control elevation of the spillway is 0.3 feet lower than designed, and 2) that the top of the sidewalls of the spillway vary irregularly from the design elevations. These observations have called into question the effectively available spillway capacity and whether potential overtopping of the spillway chute creates a long-term maintenance and/or stability issue.

It should be noted that the spillway as designed would pass the 100-year 6-hour storm event without overtopping of the spillway. As indicated, the design shown in the plans is sufficient to pass the 100-year 6-hour design storm without overtopping of the dam, and without overtopping of the spillway walls on the whole length of the spillway chute. The final draft of the construction documents showed a language discrepancy between notes included in the plans and the third party sheets. The third party sheets indicated that the spillway design flood is the 100-year storm event while the Stantec sheets stated that the design is meant to meet the dam safety spillway requirement of passing the 50-year storm without overtopping of the dam. To eliminate the difference in language, Stantec adjusted the notes on their plan sheets to indicate that the spillway was designed to pass the 100-year storm event. Nevertheless, the actual regulatory requirement from a dam safety perspective is the 50-year 6-hour storm event.

It should be noted that the regulations required passing the spillway design flood without overtopping of the dam, not that the spillway design flood is contained within the structural portion of the dam spillway. Overtopping of the spillway, however, may potentially affect the long-term stability of the spillway configuration and ultimately, the dam. The top of dam elevation is currently 32.0 feet and the dam is not overtopped for any of the scenarios evaluated by Stantec.

Capacity for Design Configuration

As indicated, the design shown in the plans is sufficient to pass the 100-year 6-hour design storm. Table 1 shows that the 100-year 6-hour storm is contained throughout the spillway chute. Minimal freeboard[1] (less than one inch) occurs at the spillway entrance. At the control section (Station 86), the freeboard is 1.61 feet, and throughout the spillway chute past the control section the freeboard is 0.23 feet (minimum).

[1] Freeboard is a vertical measurement between the top of the evaluated water surface and the top of the design channel. Higher freeboard values indicate greater containment of flow.

Table 2 summarizes the hydraulic routing through the spillway for the 50-year 6-hour storm event. For this storm event the freeboard at the spillway entrance increases to 0.25 feet. At the control section the freeboard is 1.97 feet, and throughout the spillway chute the freeboard is a minimum of 0.69 feet. Note that all directional designations herein should be considered facing downstream.

Table 1: Summary Table for 100-Year 6-Hour Storm Event (Design)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	19.00	22.44	3.44	22.5	0.06	22.5	0.06
98	19.09	22.34	3.25	22.59	0.25	22.59	0.25
97	19.18	22.33	3.15	22.68	0.35	22.68	0.35
96	19.28	22.33	3.05	22.78	0.45	22.78	0.45
95	19.37	22.32	2.95	22.87	0.55	22.87	0.55
94	19.46	22.31	2.85	22.96	0.65	22.96	0.65
93	19.55	22.3	2.75	23.05	0.75	23.05	0.75
92	19.65	22.28	2.63	23.15	0.87	23.15	0.87
91	19.74	22.27	2.53	23.24	0.97	23.24	0.97
90	19.83	22.25	2.42	23.33	1.08	23.33	1.08
89	19.92	22.22	2.3	23.42	1.20	23.42	1.20
88	20.02	22.19	2.17	23.52	1.33	23.52	1.33
87	20.11	22.15	2.04	23.61	1.46	23.61	1.46
86	20.2	22.09	1.89	23.7	1.61	23.7	1.61
80	19.39	21.75	2.36	22.89	1.14	22.89	1.14
70	18.05	21.32	3.27	21.55	0.23	21.55	0.23
60	17.67	20.93	3.26	21.17	0.24	21.17	0.24
50	17.29	20.54	3.25	20.79	0.25	20.79	0.25
40	16.91	20.15	3.24	20.41	0.26	20.41	0.26
30	16.54	19.74	3.2	20.04	0.30	20.04	0.30
20	16.16	19.32	3.16	19.66	0.34	19.66	0.34
10	15.78	18.86	3.08	19.28	0.42	19.28	0.42
0	15.4	18.34	2.94	18.90	0.56	18.90	0.56
			Minimum Freeboard Left		0.06	Right	0.06

Reference: Kingsmill Pond Dam – As-Built Hydraulic Evaluation

Table 2: Summary Table for 50-Year 6-Hour Storm Event (Design)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	19.00	22.25	3.25	22.50	0.25	22.50	0.25
98	19.09	22.10	3.01	22.59	0.49	22.59	0.49
97	19.18	21.98	2.80	22.68	0.70	22.68	0.70
96	19.28	21.98	2.70	22.78	0.80	22.78	0.80
95	19.37	21.97	2.60	22.87	0.90	22.87	0.90
94	19.46	21.96	2.50	22.96	1.00	22.96	1.00
93	19.55	21.95	2.40	23.05	1.10	23.05	1.10
92	19.65	21.94	2.29	23.15	1.21	23.15	1.21
91	19.74	21.92	2.18	23.24	1.32	23.24	1.32
90	19.83	21.90	2.07	23.33	1.43	23.33	1.43
89	19.92	21.87	1.95	23.42	1.55	23.42	1.55
88	20.02	21.84	1.82	23.52	1.68	23.52	1.68
87	20.11	21.79	1.68	23.61	1.82	23.61	1.82
86	20.20	21.73	1.53	23.70	1.97	23.70	1.97
80	19.39	21.32	1.93	22.89	1.57	22.89	1.57
70	18.05	20.86	2.81	21.55	0.69	21.55	0.69
60	17.67	20.48	2.81	21.17	0.69	21.17	0.69
50	17.29	20.09	2.80	20.79	0.70	20.79	0.70
40	16.91	19.70	2.79	20.41	0.71	20.41	0.71
30	16.54	19.30	2.76	20.04	0.74	20.04	0.74
20	16.16	18.88	2.72	19.66	0.78	19.66	0.78
10	15.78	18.44	2.66	19.28	0.84	19.28	0.84
0	15.40	17.92	2.52	18.90	0.98	18.90	0.98
			Minimum Freeboard Left		0.25	Right	0.25

Capacity for As-built Configuration

On June 7, 2016, the as-built surveyor provided additional survey data that allows for the detailed modeling of the as-built spillway configuration. Given that the spillway walls are not as high as designed, it is not surprising that the 100-year 6-hour storm event is not contained within the spillway chute. Overtopping of the spillway walls occurs on both sides at the spillway entrance for the first 5 feet on the left side and for the first 2 feet on the right side, based on this modeling effort. Maximum overtopping is 0.37 feet on the left side and 0.12 feet on the right side. This overtopping is not regarded as critical because the terrain on both sides is higher than the top of the spillway walls, thus while a portion the flow is occurs outside of the spillway, it is contained within the overall spillway section. Any overflow here is funneled back into the spillway chute before the control section is reached. At the control section the freeboard on the left side is 0.94 feet and on the right side the freeboard is 1.08 feet.

However, the top of the spillway is overtopped on both sides after the control section. To the left, overtopping occurs from station 70 to station 20 (where zero represents the downstream end), with overtopping depths between 0.03 feet and 0.38 feet. Flows here will pass along the spillway chute and then funnel towards the gravel trail on the left side of the spillway. This overtopping is not regarded as critical, but erosion occurring, caused by large storm events, should be repaired immediately. To the right, the overtopping occurs from station 70 to station 0 and overtopping depths range from 0.08 feet to 0.19 feet. Overtopping to the right has a higher likelihood to cause erosion that potentially can undercut the spillway. The overtopping depth is shallow and therefore minimal erosive forces are anticipated. However, after large storm events the spillway should be inspected and newly eroded areas should be repaired without delay. Table 3 below shows the modeled hydraulic results for the 100-year 6-hour storm event using as-built survey elevations. Note that negative freeboard indicates overtopping.

Table 3: Summary Table for 100-Year 6-Hour Storm Event (As-Built)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	18.62	21.98	3.36	21.61	-0.37	21.86	-0.12
98	18.72	21.97	3.25	21.69	-0.28	21.93	-0.04
97	18.82	21.97	3.15	21.77	-0.20	22.01	0.04
96	18.92	21.96	3.04	21.85	-0.11	22.08	0.12
95	19.01	21.95	2.94	21.94	-0.01	22.15	0.20
94	19.11	21.94	2.83	22.02	0.08	22.23	0.29
93	19.21	21.93	2.72	22.10	0.17	22.30	0.37
92	19.31	21.92	2.61	22.18	0.26	22.37	0.45
91	19.41	21.90	2.49	22.26	0.36	22.44	0.54
90	19.51	21.88	2.37	22.34	0.46	22.52	0.64
89	19.60	21.85	2.25	22.43	0.58	22.59	0.74
88	19.70	21.82	2.12	22.51	0.69	22.66	0.84
87	19.80	21.78	1.98	22.59	0.81	22.74	0.96
86	19.90	21.73	1.83	22.67	0.94	22.81	1.08
80	19.10	21.40	2.30	21.90	0.50	22.08	0.68
70	17.78	21.00	3.22	20.62	-0.38	20.86	-0.14
60	17.44	20.65	3.21	20.27	-0.38	20.49	-0.16
50	17.09	20.28	3.19	19.92	-0.36	20.11	-0.17
40	16.75	19.88	3.13	19.57	-0.31	19.69	-0.19
30	16.41	19.45	3.04	19.22	-0.23	19.28	-0.17
20	15.98	19.00	3.02	18.97	-0.03	18.82	-0.18
10	15.55	18.53	2.98	18.72	0.19	18.35	-0.18
0	15.15	18.00	2.85	18.44	0.44	17.92	-0.08
			Minimum Freeboard Left		-0.38	Right	-0.19

Reference: Kingsmill Pond Dam – As-Built Hydraulic Evaluation

Review of the 50-year 6-hour storm event reveals that minimal overtopping occurs only to the left side of the spillway (see Table 4 below). In the spillway approach section the top of the spillway chute is overtopped from station 99 to station 98 with overtopping depths ranging from 0.01 feet to 0.09 feet. Overtopping at this location is not critical as the adjacent terrain rises as previously noted. There is also overtopping to the left side from station 70 to station 50 with overtopping depths between 0.01 feet and 0.03 feet. Such small overtopping will not have significant erosive force. The spillway chute as-built has practical capacity for the 50-year 6-hour storm event and thus meets the regulatory requirement defined by means of an incremental damage analysis.

Table 4: Summary Table for 50-Year 6-Hour Storm Event (As-Built)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	18.62	21.70	3.08	21.61	-0.09	21.86	0.16
98	18.72	21.70	2.98	21.69	-0.01	21.93	0.23
97	18.82	21.69	2.87	21.77	0.08	22.01	0.32
96	18.92	21.69	2.77	21.85	0.16	22.08	0.39
95	19.01	21.68	2.67	21.94	0.26	22.15	0.47
94	19.11	21.67	2.56	22.02	0.35	22.23	0.56
93	19.21	21.66	2.45	22.10	0.44	22.30	0.64
92	19.31	21.64	2.33	22.18	0.54	22.37	0.73
91	19.41	21.63	2.22	22.26	0.63	22.44	0.81
90	19.51	21.61	2.10	22.34	0.73	22.52	0.91
89	19.60	21.58	1.98	22.43	0.85	22.59	1.01
88	19.70	21.55	1.85	22.51	0.96	22.66	1.11
87	19.80	21.51	1.71	22.59	1.08	22.74	1.23
86	19.90	21.44	1.54	22.67	1.23	22.81	1.37
80	19.10	21.07	1.97	21.90	0.83	22.08	1.01
70	17.78	20.65	2.87	20.62	-0.03	20.86	0.21
60	17.44	20.30	2.86	20.27	-0.03	20.49	0.19
50	17.09	19.93	2.84	19.92	-0.01	20.11	0.18
40	16.75	19.54	2.79	19.57	0.03	19.69	0.15
30	16.41	19.12	2.71	19.22	0.10	19.28	0.16
20	15.98	18.67	2.69	18.97	0.30	18.82	0.15
10	15.55	18.21	2.66	18.72	0.51	18.35	0.14
0	15.15	17.69	2.54	18.44	0.75	17.92	0.23
			Minimum Freeboard Left		-0.09	Right	0.14

Capacity for As-built Configuration with Modified Control Section

As documented, the control section of the spillway was built at elevation 19.90 feet instead of the design elevation of 20.20 feet. Stantec was tasked to evaluate what effect the correction of the control elevation to 20.20 feet would have on the current capacity, potentially with the addition of grout. Table 5 summarizes the analysis for such a scenario. The extent of overtopping of the chute in the spillway approach would somewhat increase due to the higher routed water surface elevation in the pond. On the left side overtopping will occur from station 99 to station 94, with overtopping depths ranging between 0.08 feet and 0.52 feet. On the right side the overtopping will occur from station 99 to station 96, with overtopping ranging from 0.03 feet to 0.27 feet. This overtopping is not regarded as critical since the terrain on both sides is higher than the top of the spillway walls, thus while a portion the flow is occurs outside of the spillway, it is contained within the overall spillway section. Any overflow is funneled back into the spillway chute before the control section is reached. At the control section the freeboard on the left side is 0.83 feet and 0.97 feet on the right.

Similar to the as-built configuration, the top of the spillway is overtopped to both sides after the control section. To the left, overtopping occurs from station 70 to station 20, with overtopping depths between 0.06 feet and 0.42 feet. Flows here will pass along the spillway chute and then funnel towards the gravel trail on the left side of the spillway. This overtopping is not regarded as critical, but erosion occurring for large storm events should be repaired immediately. To the right the overtopping occurs from station 70 to station 0 and overtopping depths range from 0.12 feet to 0.22 feet. Overtopping to the right has a higher likelihood to cause erosion that potentially can undercut the spillway. The overtopping depth is shallow and thus there is not much erosive force expected. But after larger storm events the spillway should be inspected and erosion repaired without delay. Table 5 below shows the hydraulic modeling results for the 100-year 6-hour storm event using the modified geometry where the control section has been raised to match the existing elevation.

DID they calc. this

Review of the 50-year 6-hour storm event reveals that minimal overtopping occurs to the left side of the spillway (see Table 6 below). In the spillway approach the top of the spillway chute is overtopped from station 99 to station 96 with overtopping depths ranging from 0.01 feet to 0.27 feet. Minimal overtopping also occurs on the right side at station 99, with an overtopping depth of 0.02 feet. Overtopping at this location is not critical as the adjacent terrain rises. There is also overtopping to the left side from station 70 to station 40 with overtopping depths between 0.01 feet and 0.07 feet. Such small overtopping will not have any significant erosive force. The spillway chute as-built has practical capacity for the 50-year 6-hour storm event and thus meets the regulatory requirement defined by means of an incremental damage analysis.

Reference: Kingsmill Pond Dam – As-Built Hydraulic Evaluation

Table 5: Summary Table for 100-Year 6-Hour Storm Event (As-Built Modified)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	18.62	22.13	3.51	21.61	-0.52	21.86	-0.27
98	18.74	22.13	3.39	21.69	-0.44	21.93	-0.20
97	18.86	22.12	3.26	21.77	-0.35	22.01	-0.11
96	18.98	22.11	3.13	21.85	-0.26	22.08	-0.03
95	19.11	22.11	3.00	21.94	-0.17	22.15	0.04
94	19.23	22.10	2.87	22.02	-0.08	22.23	0.13
93	19.35	22.08	2.73	22.10	0.02	22.30	0.22
92	19.47	22.07	2.60	22.18	0.11	22.37	0.30
91	19.59	22.05	2.46	22.26	0.21	22.44	0.39
90	19.71	22.03	2.32	22.34	0.31	22.52	0.49
89	19.84	22.00	2.16	22.43	0.43	22.59	0.59
88	19.96	21.97	2.01	22.51	0.54	22.66	0.69
87	20.08	21.92	1.84	22.59	0.67	22.74	0.82
86	20.20	21.84	1.64	22.67	0.83	22.81	0.97
80	19.10	21.43	2.33	21.90	0.47	22.08	0.65
70	17.78	21.04	3.26	20.62	-0.42	20.86	-0.18
60	17.44	20.69	3.25	20.27	-0.42	20.49	-0.20
50	17.09	20.31	3.22	19.92	-0.39	20.11	-0.20
40	16.75	19.91	3.16	19.57	-0.34	19.69	-0.22
30	16.41	19.48	3.07	19.22	-0.26	19.28	-0.20
20	15.98	19.03	3.05	18.97	-0.06	18.82	-0.21
10	15.55	18.56	3.01	18.72	0.16	18.35	-0.21
0	15.15	18.04	2.89	18.44	0.40	17.92	-0.12
			Minimum Freeboard Left		-0.52	Right	-0.27

Table 6: Summary Table for 50-Year 6-Hour Storm Event (As-Built Modified)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	18.62	21.88	3.26	21.61	-0.27	21.86	-0.02
98	18.74	21.87	3.13	21.69	-0.18	21.93	0.06
97	18.86	21.87	3.01	21.77	-0.10	22.01	0.14
96	18.98	21.86	2.88	21.85	-0.01	22.08	0.22
95	19.11	21.85	2.74	21.94	0.09	22.15	0.30
94	19.23	21.85	2.62	22.02	0.17	22.23	0.38
93	19.35	21.83	2.48	22.10	0.27	22.30	0.47
92	19.47	21.82	2.35	22.18	0.36	22.37	0.55
91	19.59	21.81	2.22	22.26	0.45	22.44	0.63
90	19.71	21.79	2.08	22.34	0.55	22.52	0.73
89	19.84	21.76	1.92	22.43	0.67	22.59	0.83
88	19.96	21.72	1.76	22.51	0.79	22.66	0.94
87	20.08	21.67	1.59	22.59	0.92	22.74	1.07
86	20.20	21.58	1.38	22.67	1.09	22.81	1.23
80	19.10	21.10	2.00	21.90	0.80	22.08	0.98
70	17.78	20.69	2.91	20.62	-0.07	20.86	0.17
60	17.44	20.34	2.90	20.27	-0.07	20.49	0.15
50	17.09	19.97	2.88	19.92	-0.05	20.11	0.14
40	16.75	19.58	2.83	19.57	-0.01	19.69	0.11
30	16.41	19.15	2.74	19.22	0.07	19.28	0.13
20	15.98	18.71	2.73	18.97	0.26	18.82	0.11
10	15.55	18.24	2.69	18.72	0.48	18.35	0.11
0	15.15	17.72	2.57	18.44	0.72	17.92	0.20
			Minimum Freeboard Left		-0.27	Right	-0.02

Recommendations

If the KCSA desires that the spillway configuration be modified to accommodate the originally intended design flood of the 100-year 6-hour storm event, we recommend that the adjacent grade be graded to contain flows exceeding the capacity of the concrete chute. This can be accomplished with the addition of an approximately 12 inch high compacted earthen berm along the top to the spillway chute. For the installation of such a berm, the fill material should be keyed into the existing ground by removing the grass and topsoil and excavating to a depth of about 1 foot. The berm would have a height of about 12 inches above the top of the spillway chute plus an additional 3 to 4 inch layer of topsoil. To ensure proper stabilization, the berm should be covered with Coir 400 matting and seeded with a general stabilization mix. Figure 1 below illustrates the proposed spillway retrofit.

Stantec

Stantec Consulting Services Inc.
1011 Boulder Springs Drive Suite 225, Richmond VA 23225-4951

November 4, 2016
File: 203400515

Attention: Ms. Deirdre Wells
James City County Engineering and Resource Protection Division
101-E Mounts Bay Road
Williamsburg, VA 23185

Greetings Ms. Wells,

Reference: Spillway Retrofit and Repair – Calculation Summary

This letter serves as a summary of Stantec's hydraulic analysis of the modified spillway configuration of the Kingsmill Pond Dam spillway and the proposed retrofit to address capacity deficiencies found during initial as-built review. As previously reported, the as-built survey received by Stantec indicates that the top of the sidewalls of the spillway vary irregularly from the design elevations. These observations called into question the effectively available spillway capacity and whether potential overtopping of the spillway chute creates a long-term maintenance and/or stability issue. Because of our concerns we have analyzed a retrofit to meet original design capacity.

Stantec evaluated three geometric configurations in the US Army Corps HEC-RASv5.0 software using the 100-year 6-hour discharge identified in the design of the constructed spillway repair/retrofit under unsteady flow conditions.

1. Design configuration
2. As-built based on post-construction survey
3. As-built retrofitted with 6" curb cap on spillway walls and corrected control elevation

The results of hydraulic modeling of these configurations is summarized below.

Capacity for Design Configuration

As indicated, the design shown in the plans is sufficient to pass the 100-year 6-hour design storm as directed by the County. Table 1 shows that the 100-year 6-hour storm is contained throughout the spillway chute. Minimal freeboard occurs at the spillway entrance. At the control section (Station 86), the freeboard is 1.61 feet, and throughout the spillway chute past the control section the freeboard is 0.23 feet (minimum).

Note that all directional designations herein should be considered facing downstream.

Reference: Spillway Retrofit and Repair – Calculation Summary

Table 1: Summary Table for 100-Year 6-Hour Storm Event (Design)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	19.00	22.44	3.44	22.5	0.06	22.5	0.06
98	19.09	22.34	3.25	22.59	0.25	22.59	0.25
97	19.18	22.33	3.15	22.68	0.35	22.68	0.35
96	19.28	22.33	3.05	22.78	0.45	22.78	0.45
95	19.37	22.32	2.95	22.87	0.55	22.87	0.55
94	19.46	22.31	2.85	22.96	0.65	22.96	0.65
93	19.55	22.3	2.75	23.05	0.75	23.05	0.75
92	19.65	22.28	2.63	23.15	0.87	23.15	0.87
91	19.74	22.27	2.53	23.24	0.97	23.24	0.97
90	19.83	22.25	2.42	23.33	1.08	23.33	1.08
89	19.92	22.22	2.3	23.42	1.20	23.42	1.20
88	20.02	22.19	2.17	23.52	1.33	23.52	1.33
87	20.11	22.15	2.04	23.61	1.46	23.61	1.46
86	20.2	22.09	1.89	23.7	1.61	23.7	1.61
80	19.39	21.75	2.36	22.89	1.14	22.89	1.14
70	18.05	21.32	3.27	21.55	0.23	21.55	0.23
60	17.67	20.93	3.26	21.17	0.24	21.17	0.24
50	17.29	20.54	3.25	20.79	0.25	20.79	0.25
40	16.91	20.15	3.24	20.41	0.26	20.41	0.26
30	16.54	19.74	3.2	20.04	0.30	20.04	0.30
20	16.16	19.32	3.16	19.66	0.34	19.66	0.34
10	15.78	18.86	3.08	19.28	0.42	19.28	0.42
0	15.4	18.34	2.94	18.90	0.56	18.90	0.56
			Minimum Freeboard Left		0.06	Right	0.06

Reference: Spillway Retrofit and Repair – Calculation Summary

Capacity for As-built Configuration

On June 7, 2016, the as-built surveyor provided additional survey data that allowed for the detailed modeling of the as-built spillway configuration. The spillway walls were not built to the full design height and the 100-year 6-hour storm event is not contained within the spillway chute. Overtopping of the spillway walls occurs on both sides at the spillway entrance for the first 5 feet on the left side and for the first 2 feet on the right side, based on this modeling effort. Maximum overtopping is 0.37 feet on the left side and 0.12 feet on the right side. This overtopping is not regarded as critical because the terrain on both sides is higher than the top of the spillway walls, thus while a portion the flow occurs outside of the spillway, it is contained within the overall spillway section. Any overflow here is funneled back into the spillway chute before the control section is reached. At the control section the freeboard on the left side is 0.94 feet and on the right side the freeboard is 1.08 feet.

However, the top of the spillway is overtopped on both sides after the control section. To the left, overtopping occurs from station 70 to station 20 (where zero represents the downstream end), with overtopping depths between 0.03 feet and 0.38 feet. Flows here will pass along the spillway chute and then funnel towards the gravel trail on the left side of the spillway. To the right, the overtopping occurs from station 70 to station 0 and overtopping depths range from 0.08 feet to 0.19 feet. Overtopping to the right has a higher likelihood to cause erosion that potentially can undercut the spillway. Table 2 below shows the modeled hydraulic results for the 100-year 6-hour storm event using as-built survey elevations. Note that negative freeboard indicates overtopping.

Reference: Spillway Retrofit and Repair – Calculation Summary

Table 2: Summary Table for 100-Year 6-Hour Storm Event (As-Built)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	18.62	21.98	3.36	21.61	-0.37	21.86	-0.12
98	18.72	21.97	3.25	21.69	-0.28	21.93	-0.04
97	18.82	21.97	3.15	21.77	-0.20	22.01	0.04
96	18.92	21.96	3.04	21.85	-0.11	22.08	0.12
95	19.01	21.95	2.94	21.94	-0.01	22.15	0.20
94	19.11	21.94	2.83	22.02	0.08	22.23	0.29
93	19.21	21.93	2.72	22.10	0.17	22.30	0.37
92	19.31	21.92	2.61	22.18	0.26	22.37	0.45
91	19.41	21.90	2.49	22.26	0.36	22.44	0.54
90	19.51	21.88	2.37	22.34	0.46	22.52	0.64
89	19.60	21.85	2.25	22.43	0.58	22.59	0.74
88	19.70	21.82	2.12	22.51	0.69	22.66	0.84
87	19.80	21.78	1.98	22.59	0.81	22.74	0.96
86	19.90	21.73	1.83	22.67	0.94	22.81	1.08
80	19.10	21.40	2.30	21.90	0.50	22.08	0.68
70	17.78	21.00	3.22	20.62	-0.38	20.86	-0.14
60	17.44	20.65	3.21	20.27	-0.38	20.49	-0.16
50	17.09	20.28	3.19	19.92	-0.36	20.11	-0.17
40	16.75	19.88	3.13	19.57	-0.31	19.69	-0.19
30	16.41	19.45	3.04	19.22	-0.23	19.28	-0.17
20	15.98	19.00	3.02	18.97	-0.03	18.82	-0.18
10	15.55	18.53	2.98	18.72	0.19	18.35	-0.18
0	15.15	18.00	2.85	18.44	0.44	17.92	-0.08
				Minimum Freeboard Left	-0.38	Right	-0.19

Capacity for As-built with Curb Retrofit

After reviewing the results of as-built hydraulic analysis Stantec and KCSA discussed potential retrofit alternatives. KCSA indicated their preference for a concrete curb cap on the chute. The curb cap will increase the top elevation of the sidewalls by 6 inches using the VDOT standard GC-2 curb cast in place and tied into the existing chute via upswept rebar dowels bored into the constructed concrete structure. This retrofit is intended to meet the design capacity of the spillway in a way that avoids total reconstruction of the spillway.

Stantec modeled the design depicted in the submitted drawings in a manner consistent with the previous efforts. A 6-inch vertical extension was added to each section modeled from as-built geometry and run under unsteady flow conditions. In this iteration of the modeling, flows do not overtop the curb retrofit along the length of the spillway. The modeled hydraulic results of the 100-year 6-hour storm event are summarized in Table 3 below.

Reference: Spillway Retrofit and Repair – Calculation Summary

Table 3: Summary Table for 100-Year 6-Hour Storm Event (As-Built Modified)

Station	Min. Channel Elev.	WS Elev.	Water Depth	Top Elev. Left	Freeboard Left	Top Elev. Right	Freeboard Right
99	18.62	22.11	3.49	22.11	0.00	22.36	0.25
98	18.74	22.11	3.37	22.19	0.08	22.43	0.32
97	18.86	22.10	3.24	22.27	0.17	22.51	0.41
96	18.98	22.09	3.11	22.35	0.26	22.58	0.49
95	19.11	22.09	2.98	22.44	0.35	22.65	0.56
94	19.23	22.08	2.85	22.52	0.44	22.73	0.65
93	19.35	22.07	2.72	22.60	0.53	22.80	0.73
92	19.47	22.05	2.58	22.68	0.63	22.87	0.82
91	19.59	22.04	2.45	22.76	0.72	22.94	0.90
90	19.71	22.01	2.30	22.84	0.83	23.02	1.01
89	19.84	21.99	2.15	22.93	0.94	23.09	1.10
88	19.96	21.95	1.99	23.01	1.06	23.16	1.21
87	20.08	21.90	1.82	23.09	1.19	23.24	1.34
86	20.20	21.82	1.62	23.17	1.35	23.31	1.49
80	19.10	21.40	2.30	22.40	1.00	22.58	1.18
70	17.78	21.01	3.23	21.12	0.11	21.36	0.35
60	17.44	20.66	3.22	20.77	0.11	20.99	0.33
50	17.09	20.29	3.20	20.42	0.13	20.61	0.32
40	16.75	19.89	3.14	20.07	0.18	20.19	0.30
30	16.41	19.46	3.05	19.72	0.26	19.78	0.32
20	15.98	19.01	3.03	19.47	0.46	19.32	0.31
10	15.55	18.54	2.99	19.22	0.68	18.85	0.31
0	15.15	18.01	2.86	18.94	0.93	18.42	0.41
			Minimum Freeboard Left		0.00	Right	0.25

Reference: Spillway Retrofit and Repair – Calculation Summary

Based on the analysis, and discussions with the owner, Stantec recommends installation of the 6-inch curbing retrofit to provide the original design capacity. A revised cover and insert sheet have been provided for the County's review, approval, and documentation purposes. The modeling referenced in this memo demonstrates that the spillway will provide the requisite capacity. Additional model documentation can be provided upon request by the County. We appreciate your time in reviewing this matter.

Regards,

STANTEC CONSULTING SERVICES INC.

Doug Beisch, P.E.
Principal
Phone: (804) 267-3474
Fax: (804) 267-3470
doug.beisch@stantec.com

c. Chris Kuhn, Cory Anderson (Stantec); Scott Thomas (James City County)

csa u:\203400515\05_report_deliv\deliverables\submittals\let_asblt_retrofit_calcs_201611.docx

Deirdre Wells

From: Deirdre Wells
Sent: Friday, April 14, 2017 9:43 AM
To: 'Susan Sickal'; Blossom, Scott
Cc: 'A.D. Sebert (L.S,)'; Joseph Buchite; Ashley Tatge
Subject: Kingsmill Spillway Repair Record Drawing and As-built Process

All,

The record drawing/ as-built for the latest repair, including the additional curbing, has been delivered to our office. We have not yet received the standard Certification form for record drawing prep and construction oversight. Please have this form, available on our website, completed and submitted to our office. We prefer an original signature, so a hard copy is needed. Once the form has been received, our office can schedule an on-site inspection and proceed with the project release and close out procedure.

Thank you very much,

Deirdre P. Wells, P.E.
Chief Civil Engineer

James City County
VIRGINIA
Jamestown 1607

Engineering and Resource Protection
101-E Mounts Bay Road
Williamsburg, VA 23185
P: 757-253-6702
Deirdre.Wells@jamescitycountyva.gov

GET Solutions, Inc.
Geotechnical • Environmental • Testing

Daily Field Report
Subgrade Inspection

Project Name:	Kingsmill Pond	Date	12/3/15
Project Location:	Williamsburg, Virginia	Bldg. Permit #:	N/A
Project No:	WM15-180T	Client:	Stantec
Geo-Report No:	WM12-129G	Contractor:	David Nice

Project Drawings: Date: N/A DWG #'s: N/A Details: N/A

General Location: Base of Spillway
Specific Location: See Attached Sketch

According to the contractor the observed area is:
☐ At grade elevation ☒ At grade elevation with 6-12 inches of fill required to reach design grade

Proofroll equipment used:
☐ Smooth drum roller
☐ Loaded tandem dump truck
☐ Loaded off-road dump truck
☒ Other (specify) Probe Rod

Visual Classification of Soils: CLAY (CL) and SAND (SM, SC)

Are the recovered soils consistent with the geotechnical report?
☒ Yes ☐ No ☐ Report unavailable/not performed

Remarks/Recommendations:
☒ Area(s) observed appeared to be suitable for the next phase of construction
☐ Deficiency/Discrepancy(s) noted (see remarks)
☒ General Contractor Notified

Remarks:
As requested, a **G E T** representative arrived on-site to observe the base of the spillway excavation prior to fill placement. The base of the excavation was probed along with advancing several hand auger borings. Probe penetrations revealed stable subgrade conditions with minimal penetrations. The soils recovered were consistent with the soils in our geotechnical report. Based on our field observations, the areas observed were considered suitable fill placement.

Copy of Report left on site: ☐ Yes ☐ No

GET Solutions, Inc. Representative:

Copy Given to (Name): N/A Sign: On File

Contracting Company: David Nice Builders Print: Alonzo Libby

1592 Penniman Road, Suite E • Williamsburg, Virginia 23185 • Phone: (757)-564-6452 • Fax: (757)-564-6453
info@getsolutionsinc.com

GET Solutions, Inc.
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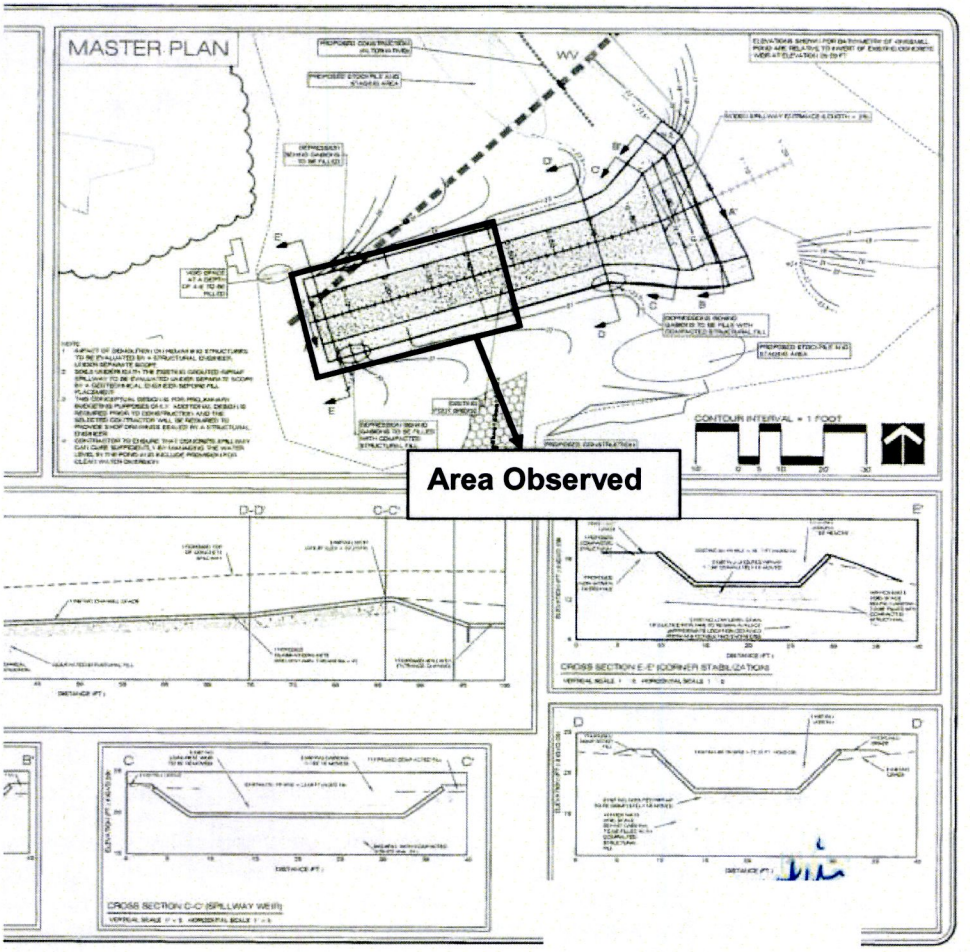
Daily Field Report
Subgrade Inspection

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT: Kingsmill Pond
Williamsburg, Virginia
PROJECT NO: WM15-180T
Client: Stantec

SCALE: NTS
DATE: 12/3/15
PLOT BY: AL

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GET Solutions, Inc.
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Daily Field Report
Subgrade Inspection

Project Name:	Kingsmill Pond	Date	12/7/15
Project Location:	Williamsburg, Virginia	Bldg. Permit #:	N/A
Project No:	WM15-180T	Client:	Stantec
Geo-Report No:	WM12-129G	Contractor:	David Nice

Project Drawings: Date: N/A DWG #'s: N/A Details: N/A

General Location: Base of Spillway
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☐ Deficiency/Discrepancy(s) noted (see remarks)
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Remarks:
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Copy Given to (Name): N/A Sign: On File

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GET Solutions, Inc.
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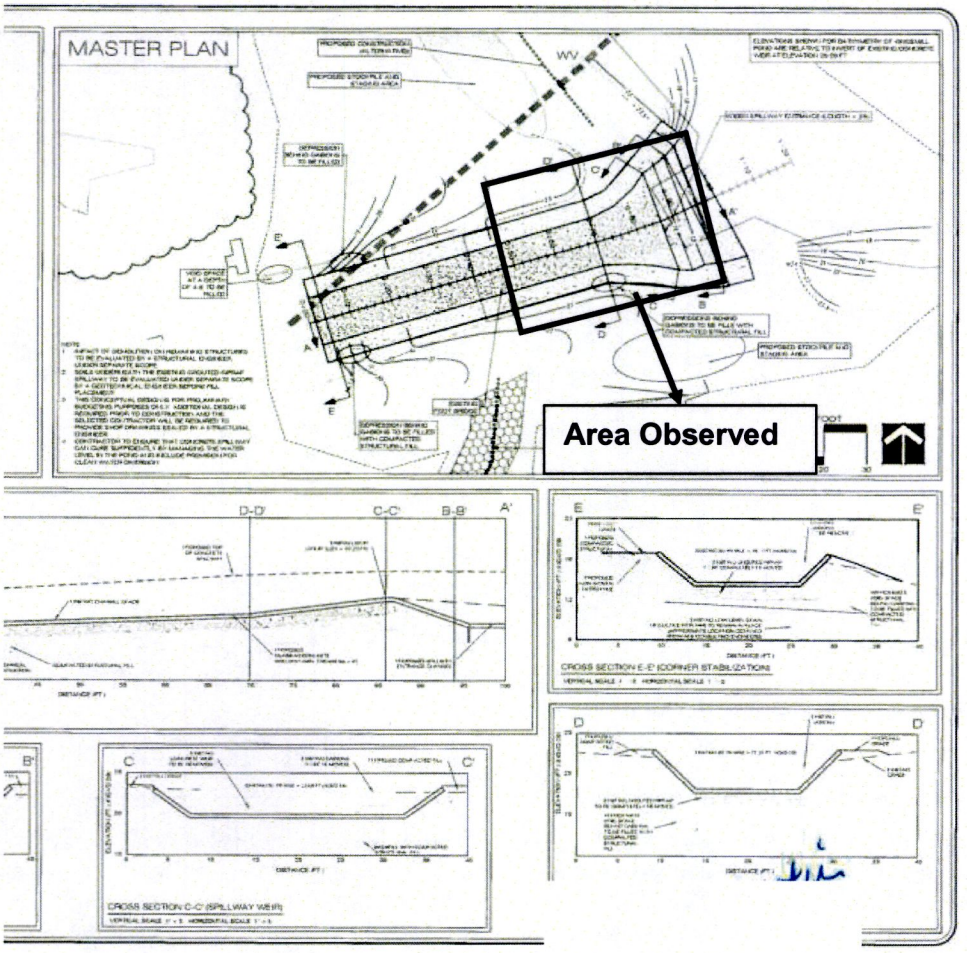
Daily Field Report
Subgrade Inspection

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT: Kingsmill Pond
Williamsburg, Virginia
PROJECT NO: WM15-180T
Client: Stantec

SCALE: NTS
DATE: 12/7/15
PLOT BY: AL

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GET Solutions, Inc.
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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Stantec
Job No.: WM15-180T
Date Poured 12-11-15 Time Tested 1:15pm
Sampled by AL Weather/Temp: Sunny/60°F
Time Batched 12:30pm Time Emptied 1:59pm
Concrete Temp. 70°F Slump 4.0 (in.)
Location of Pour Spillway Replacement – See Placement Report
Quantity Represented 9 cy
Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete
Truck No. 185 Ticket No. N/A
Measured Air Content 5.0 %
Water Withheld 2 gals/yd Water Added 0 gals
Admixture Mid Range
Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

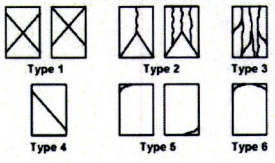
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-1	A	12-12	12-18	8.60	54,670	4.00	12.57	4340	7	3
	B	12-12	12-18	8.55	49,850	4.00	12.57	3960	7	3
	C	12-12	1-8	8.60	69,250	4.00	12.57	5500	28	2
	D	12-12	1-8	8.55	72,190	4.00	12.57	5740	28	3
	E	12-12	1-8	8.50	69,480	4.00	12.57	5520	28	2
	F	12-12	SP						H	

Remarks:

TYPES OF FRACTURE



Reviewed By:

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GET Solutions, Inc.
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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement Project Location: Williamsburg, Virginia

Client: Stantec Job No.: WM15-180T

Date Poured 12-15-15 Time Tested 3:20pm Sampled by TV Weather/Temp: Sunny/71°F

Time Batched 2:59pm Time Emptied 3:45pm Concrete Temp. 71°F Slump 5.75 (in.)

Location of Pour Spillway Replacement – See Placement Report

Quantity Represented 9 cy Spec. Req. 4000 Psi @ 28 days

Concrete Supplier Branscome Concrete Truck No. 184 Ticket No. 10035628

Measured Air Content 3.7 % Water Withheld 2 gals/yd Water Added 0 gals

Admixture Viscocrete Mid Range Initial Curing Conditions Exposed

Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

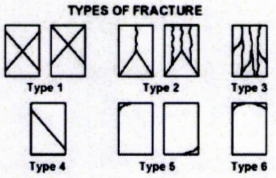
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-2	A	12-16	12-22	8.60	60,650	4.00	12.57	4820	7	2
	B	12-16	12-22	8.65	64,510	4.00	12.57	5130	7	2
	C	12-16	1-12	8.65	81,450	4.00	12.57	6470	28	3
	D	12-16	1-12	8.60	84,920	4.00	12.57	6750	28	3
	E	12-16	1-12	8.55	84,420	4.00	12.57	6710	28	3
	F	12-16	SP						H	

Remarks:

TYPES OF FRACTURE



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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 12-17-15 Time Tested 7:15am — Sampled by AL Weather/Temp: Clear 65°F
Time Batched 7:06am Time Emptied 7:45am — Concrete Temp. 70°F Slump 4.5 (in.)
Location of Pour Spillway Replacement – See Placement Report
Quantity Represented 9 of 14cy — Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete — Truck No. 196 Ticket No. 35679
Measured Air Content 5.0% — Water Withheld 2 gals/yd Water Added 0 gals
Admixture Viscocrete Mid Range, AE — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

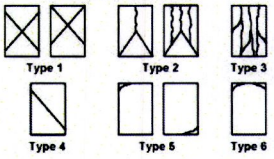
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-3	A	12-19	12-24	8.40	53,580	4.01	12.63	4240	7	2
	B	12-19	12-24	8.40	52,390	4.00	12.57	4160	7	3
	C	12-19	1-14						28	
	D	12-19	1-14						28	
	E	12-19	1-14						28	
	F	12-19	SP						H	

Remarks:

TYPES OF FRACTURE



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GET Solutions, Inc.
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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 12-29-15 Time Tested 12:30pm — Sampled by BS Weather/Temp: Cloudy/70°F
Time Batched 11:56am Time Emptied 1:07pm — Concrete Temp. 75°F Slump 3.25 (in.)
Location of Pour Spillway Replacement – See Placement Report
Quantity Represented 6.5 cy — Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete — Truck No. 177 Ticket No. 10035804
Measured Air Content 5.5% — Water Withheld 2 gals/yd Water Added 0 gals
Admixture Air Entrained — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

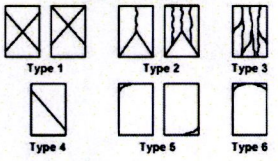
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-4	A	12-30	1-5	8.45	58,550	4.00	12.57	4650	7	3
	B	12-30	1-5	8.35	60,580	4.00	12.57	4810	7	3
	C	12-30	1-26	8.45	74,790	4.00	12.57	5940	28	5
	D	12-30	1-26	8.45	77,070	4.00	12.57	6130	28	2
	E	12-30	1-26	8.40	71,230	4.01	12.63	5630	28	5
	F	12-30	SP						H	

Remarks:

TYPES OF FRACTURE



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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 12-30-15 Time Tested 11:36am — Sampled by TV Weather/Temp: Sunny/70°F
Time Batched 10:28am Time Emptied 12:05pm — Concrete Temp. 72°F Slump 0.25 (in.)
Location of Pour Spillway Walls – See Placement Report
Quantity Represented 6.5 of 13 cy — Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete — Truck No. 187 Ticket No. 10035820
Measured Air Content 4.0% — Water Withheld 2 gals/yd Water Added 0 gals
Admixture Air Entrained — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

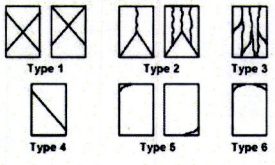
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-5	A	12-31	1-6	8.45	53,750	4.01	12.63	4250	7	2
	B	12-31	1-6	8.25	53,990	4.00	12.57	4290	7	2
	C	12-31	1-27	8.40	56,420	4.00	12.57	4480	28	2
	D	12-31	1-27	8.35	56,740	4.00	12.57	4510	28	5
	E	12-31	1-27	8.40	58,000	4.01	12.63	4590	28	5
	F	12-31	SP						H	

Remarks:

TYPES OF FRACTURE



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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Stantec
Job No.: WM15-180T
Date Poured 1-6-16 Time Tested 4:00pm
Sampled by JH Weather/Temp: Cloudy/46°F
Time Batched 3:16pm Time Emptied 4:35pm
Concrete Temp. 55°F Slump 2.0 (in.)
Location of Pour Spillway – See Placement Report
Quantity Represented 9 of 18 cy
Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete
Truck No. 198 Ticket No. 30006766
Measured Air Content 5.5%
Water Withheld 2 gals/yd Water Added 0 gals
Admixture Air Entrained
Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

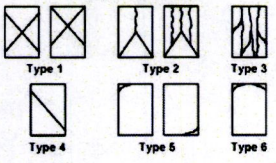
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-6	A	1-7	1-13	8.25	53,420	4.00	12.57	4240	7	2
	B	1-7	1-13	8.20	50,540	4.00	12.57	4020	7	2
	C	1-7	2-3	8.15	76,240	4.00	12.57	6060	28	2
	D	1-7	2-3	8.20	77,860	4.00	12.57	6190	28	3
	E	1-7	2-3	8.20	76,680	4.00	12.57	6100	28	2
	F	1-7	SP						H	

Remarks:

TYPES OF FRACTURE



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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 1-7-16 Time Tested 2:15pm — Sampled by EB Weather/Temp: Overcast/48°F
Time Batched 1:57pm Time Emptied 3:05pm — Concrete Temp. 70°F Slump 3.0 (in.)
Location of Pour Spillway Walls – See Placement Report
Quantity Represented 9 of 9 cy — Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete — Truck No. 191 Ticket No. 10035880
Measured Air Content 6.0% — Water Withheld 2 gals/yd Water Added 0 gals
Admixture Air Entrained — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

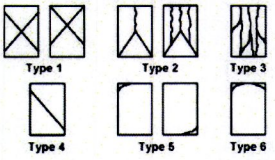
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-7	A	1-8	1-14	8.35	52,870	4.00	12.57	4200	7	2
	B	1-8	1-14	8.25	50,160	4.00	12.57	3990	7	2
	C	1-8	2-4	8.35	78,080	4.00	12.57	6210	28	2
	D	1-8	2-4	8.35	79,770	4.01	12.63	6310	28	2
	E	1-8	2-4	8.40	82,440	4.00	12.57	6550	28	3
	F	1-8	SP						H	

Remarks:

TYPES OF FRACTURE



Reviewed By:

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Fax: (757) 564-6453

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CONCRETE COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 1-8-16 — Time Tested 2:10pm — Sampled by BS — Weather/Temp: Cloudy/58°F
Time Batched 1:43pm — Time Emptied 2:50pm — Concrete Temp. 75°F — Slump 3.5 (in.)
Location of Pour Spillway – See Placement Report
Quantity Represented 9 cy — Spec. Req. 4000 Psi @ 28 days
Concrete Supplier Branscome Concrete — Truck No. 191 — Ticket No. 10035898
Measured Air Content 5.5% — Water Withheld 2 gals/yd — Water Added 0 gals
Admixture Air Entrained — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

COMPRESSIVE STRENGTH

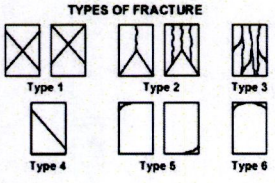
Tests made according to ASTM Standard Specifications: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

4" X 8" CYLINDER

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CYLINDER WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	Diameter (inches)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KP-8	A	1-9	1-15	8.45	64,200	4.01	12.63	5080	7	3
	B	1-9	1-15	8.40	65,920	4.00	12.57	5240	7	3
	C	1-9	2-5	8.40	77,370	4.00	12.57	6150	28	2
	D	1-9	2-5	8.45	76,410	4.00	12.57	6070	28	2
	E	1-9	2-5	8.40	75,450	4.00	12.57	6000	28	5
	F	1-9	SP						H	

Remarks:

TYPES OF FRACTURE



Reviewed By:

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CONCRETE PLACEMENT REPORT – SHEET 1 of 2

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Stantec
General Contractor: A+ Concrete, Inc.
Mix Type: 202122 (4000 psi)
Admixture: Mid Range, Air Entrained
Water Withheld: 2 gallons per yard of concrete
General Placement Location: Spillway Base
ASTM Procedure: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

Date: 12-11-15
Job No.: WM15-180T
Weather/Temp.: Sunny/60°F
Concrete Supplier: Branscome
Method of Placement: Tailgate
Technician: A. Libby
Field Curing Conditions:* Exposed

Load #	Truck #	Order #	Time Batched	Time Tested	Time Emptied	Conc. Temp. (°F)	Air Temp. (°F)	Slump (in)	Air (%)	Water Added on site (gal)	Placement Location Exact Grid Coordinate & Level or Elevation	Cum c.y. Placed	Set #	# of Cylinders
1	185	N/A	12:30pm	1:15pm	1:59pm	70	60	4.0	5.0	0	Spillway Base (See Attached Sketch)	9	1	6
2	198	35569	1:27pm	2:00pm	2:30pm	N/T	N/T	N/T	N/T	0	Spillway Base (See Attached Sketch)	18	0	0

**Exposed curing conditions indicate cylinders are not cured inside a cure-box.*

Total Yds: 13 Cubic Yards
Remarks::

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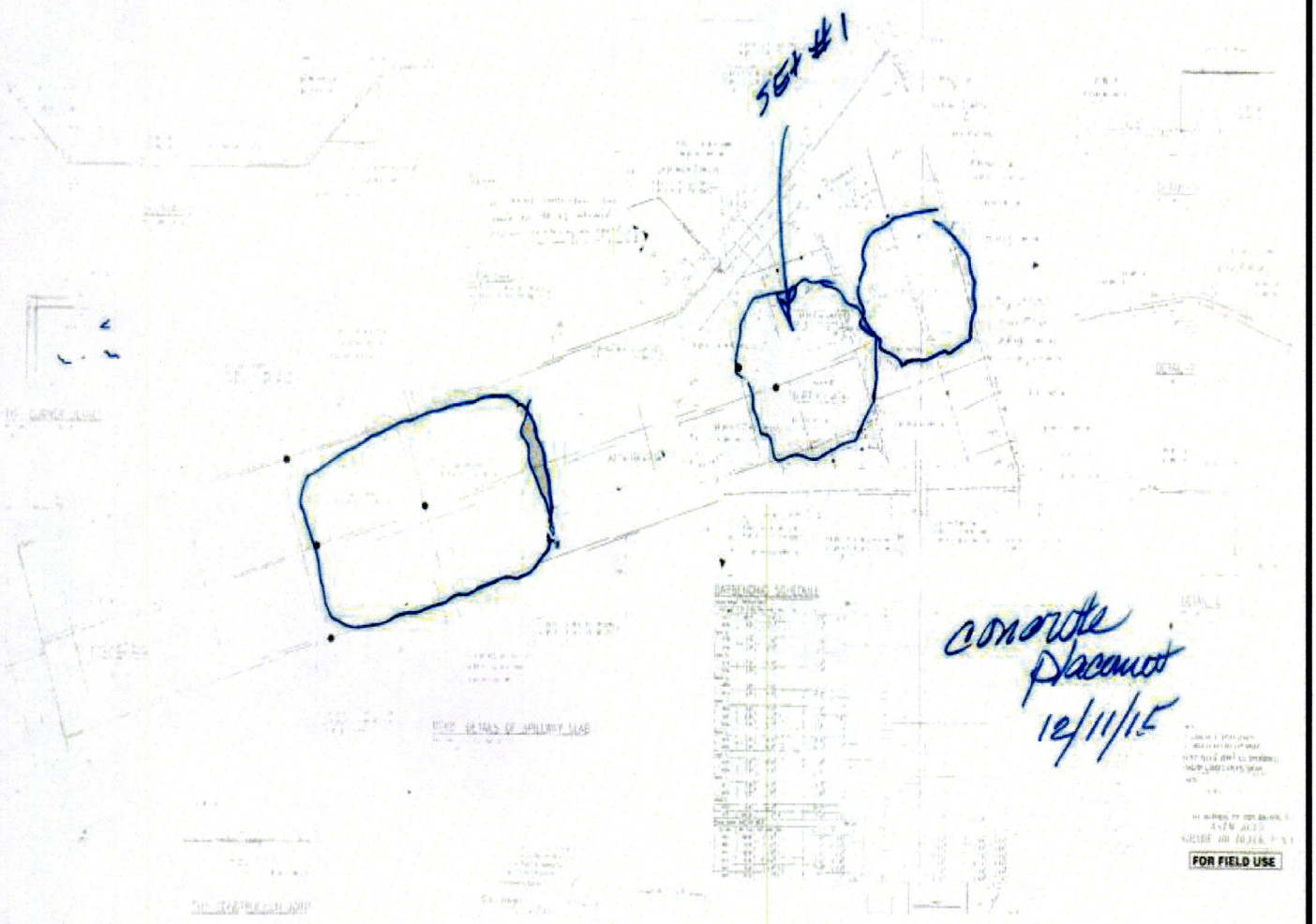
CONCRETE PLACEMENT REPORT – SHEET 2 of 2

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT:	**Kingsmill Pond Spillway Williamsburg, Virginia**	**SCALE: NTS**
PROJECT NO:	**WM15-180T**	**DATE: 12-11-15**
CLIENT:	**Stantec**	**PLOT BY: AL**

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CONCRETE PLACEMENT REPORT – SHEET 1 of 2

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Stantec
General Contractor: A+ Concrete, Inc.
Mix Type: 202726 (4000 psi)
Admixture: Air Entrained
Water Withheld: 2 gallons per yard of concrete
General Placement Location: Walls for Spillway

Date: 12-30-15
Job No.: WM15-180T
Weather/Temp.: 60ºF
Concrete Supplier: Branscome
Method of Placement: Tailgate
Technician: T. Vaughn
Field Curing Conditions:* Exposed

ASTM Procedure: C31, C39, C138, C143, C172, C173 or C231, C511, C1064, C1231 or C617

Load #	Truck #	Order #	Time Batched	Time Tested	Time Emptied	Conc. Temp. (°F)	Air Temp. (°F)	Slump (in)	Air (%)	Water Added on site (gal)	Placement Location Exact Grid Coordinate & Level or Elevation	Cum c.y. Placed	Set #	# of Cylinders
1	187	10035820	10:28am	11:36pm	12:05pm	72	60	0.25	4	0	Walls for Spillway (See Attached Sketch)	6.5	1	6
2	194	10025821	11:25pm	N/T	N/T	N/T	N/T	N/T	N/T	0	Walls for Spillway (See Attached Sketch)	13	0	0

**Exposed curing conditions indicate cylinders are not cured inside a cure-box.*

Total Yds: 13 Cubic Yards
Remarks:: It is noted that he contractor added water without notifying the technician and we were not able to determine amount of water added.

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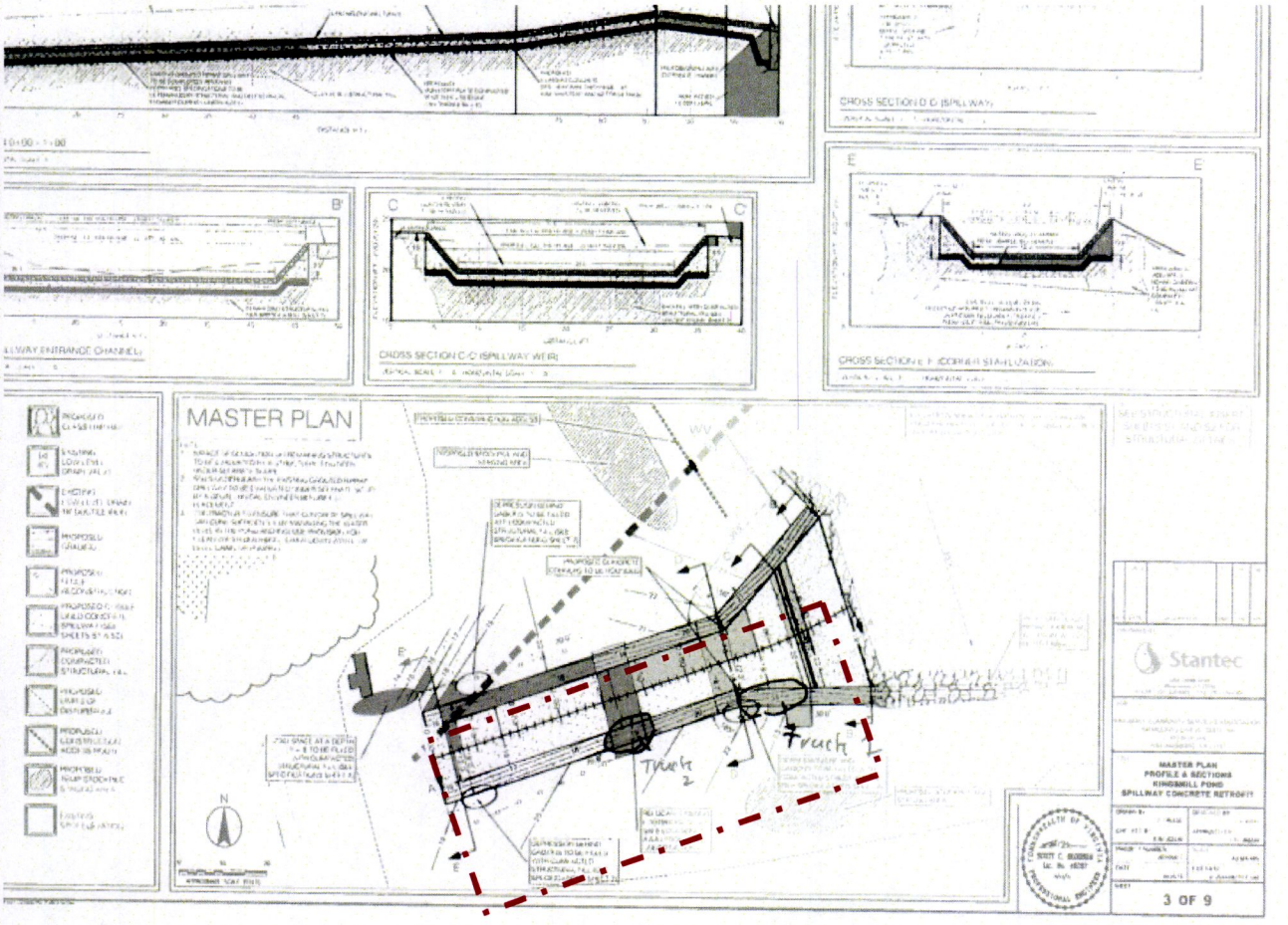
CONCRETE PLACEMENT REPORT – SHEET 2 of 2

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT:	**Kingsmill Pond Spillway** **Williamsburg, Virginia**	
PROJECT NO:	**WM15-180T**	**SCALE: NTS**
CLIENT:	**Stantec**	**DATE: 12-30-15** **PLOT BY: TV**

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COMPACTION TEST REPORT - Sheet 1 of 2

Project:	Kingsmill Pond Spillway Replacement	Date:	12/9/15
Project Location:	Williamsburg, Virginia	Technician:	B. Sampe
Client:	Kingsmill Community Services Association	Job Number:	WM15-180T
General Contractor:	David A. Nice Builders	Weather:	Cloudy Temp. (°F) 52°
Grading Contractor:	David A. Nice Builders	General Test Location:	Kingsmill Pond Spillway

Test Number	Moisture (%)	Wet Density (pcf)	Dry Density (pcf)	Proctor Number	% Proctor		Pass	Fail	Test Elevation*	Test Location (Grid, Coordinates, Roadway Station, etc.)
					Spec	Actual				
1	3.7	128.4	123.6	1	95	89		X	Subgrade	See Sketch -- 4 inch test
2	3.6	127.4	123.0	1	95	89		X	Subgrade	See Sketch -- 4 inch test
3	3.4	127.7	123.5	1	95	89		X	Subgrade	See Sketch -- 4 inch test
4	3.6	127.6	123.2	1	95	89		X	Subgrade	See Sketch -- 4 inch test
5	3.5	130.0	125.6	1	95	91		X	Subgrade	See Sketch -- 2 inch test
6	3.4	128.6	124.3	1	95	89		X	Subgrade	See Sketch -- 2 inch test
7	3.4	128.2	128.2	1	95	90		X	Subgrade	See Sketch -- 2 inch test
8	3.6	130.2	130.2	1	95	91		X	Subgrade	See Sketch -- 2 inch test

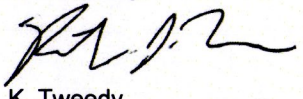
Compaction Equipment Used:	Trench Roller	Proctor Number:	1
Field Testing Procedure:	ASTM D6938	Proctor Type:	ASTM D698A
Testing Depth:	4 to 2 inches	Material Description:	GRAVEL (GP-GM)
Test Conducted on:	Spillway Subbase	Max. Dry Density (pcf):	134.4
		Optimum Moisture (%):	8.2%

Remarks: The structural engineer (Michael P. Matthews, P.E. with The Structures Group) was notified of our compaction test results and indicated these results were acceptable

Test locations and test elevations are approximate and are established in the field by the GET Solutions, Inc. technician.

* Note: BFF = Below Finish Floor, BFG = Below Finish Grade, FG = Finish Grade, BFS = Below Footing Subgrade

Reviewed By:



K. Tweedy
G E T Solutions, Inc.

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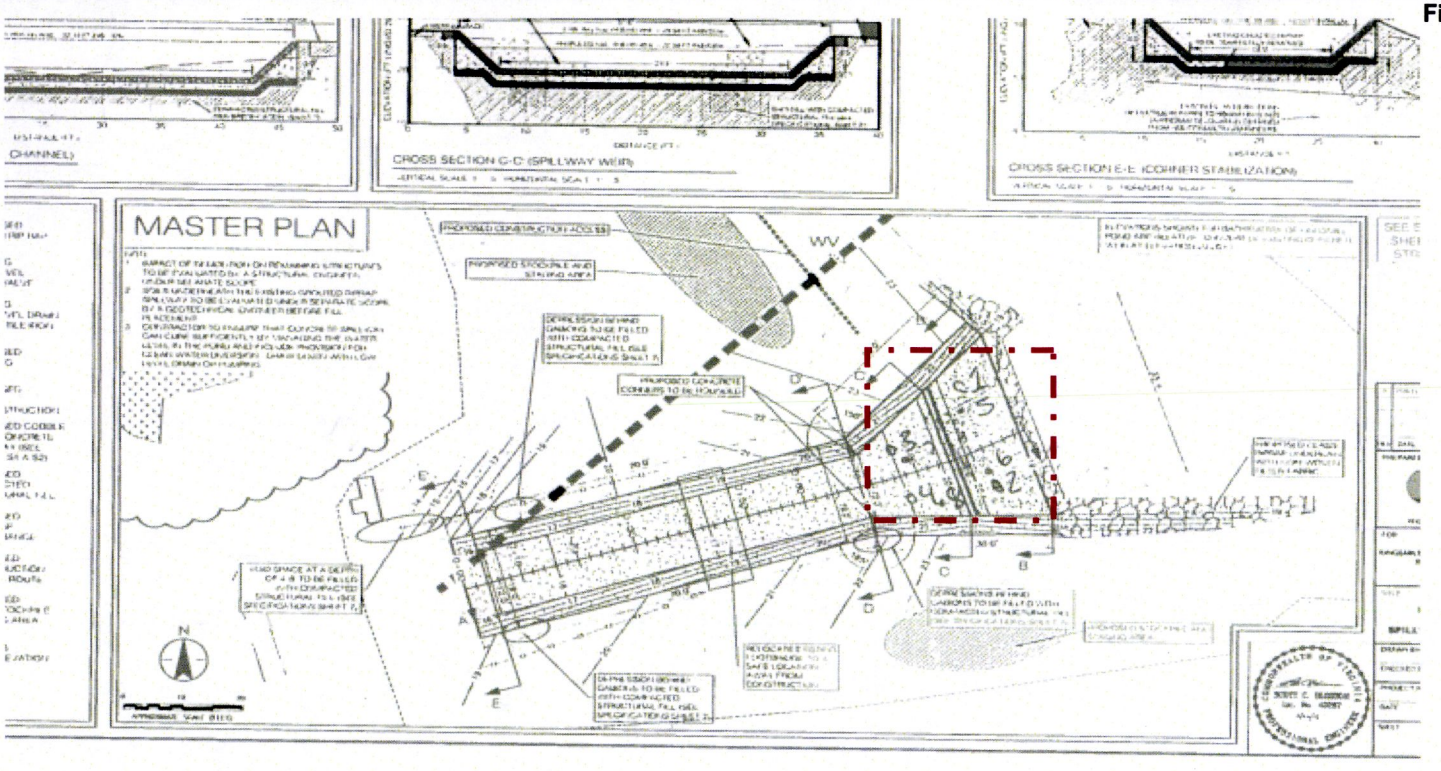
COMPACTION TEST REPORT - Sheet 2 of 2

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT:	**Kingsmill Pond Spillway Replacement Williamsburg, Virginia**	**SCALE:**	**NTS**
PROJECT NO:	**WM15-180T**	**DATE:**	**12/9/2015**
CLIENT:	**Kingsmill Comm. Svcs. Assoc.**	**PLOT BY:**	**BS**

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COMPACTION TEST REPORT - Sheet 1 of 2

Project:	Kingsmill Pond Spillway Replacement	Date:	12/11/15
Project Location:	Williamsburg, Virginia	Technician:	A.Libby
Client:	Kingsmill Community Services Association	Job Number:	WM15-180T
General Contractor:	David A. Nice Builders	Weather:	Sunny Temp. (°F) 62°
Grading Contractor:	David A. Nice Builders	General Test Location:	Kingsmill Pond Spillway

Test Number	Moisture (%)	Wet Density (pcf)	Dry Density (pcf)	Proctor Number	% Proctor		Pass	Fail	Test Elevation*	Test Location (Grid, Coordinates, Roadway Station, etc.)
					Spec	Actual				
1	3.8	123.3	118.8	1	95	88		X	Subgrade	See Attached Sketch
2	5.3	127.3	120.9	1	95	90		X	Subgrade	See Attached Sketch

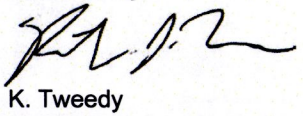
Compaction Equipment Used:	Trench Roller	Proctor Number:	1
Field Testing Procedure:	ASTM D6938	Proctor Type:	ASTM D698A
Testing Depth:	6 inches	Material Description:	GRAVEL (GP-GM)
Test Conducted on:	Spillway Subbase	Max. Dry Density (pcf):	134.4
		Optimum Moisture (%):	8.2%

Remarks: The structural engineer (Michael P. Matthews, P.E. with The Structures Group) was notified of our compaction test results and indicated these results were acceptable

Test locations and test elevations are approximate and are established in the field by the GET Solutions, Inc. technician.

* Note: BFF = Below Finish Floor, BFG = Below Finish Grade, FG = Finish Grade, BFS = Below Footing Subgrade

Reviewed By:



K. Tweedy
G E T Solutions, Inc.

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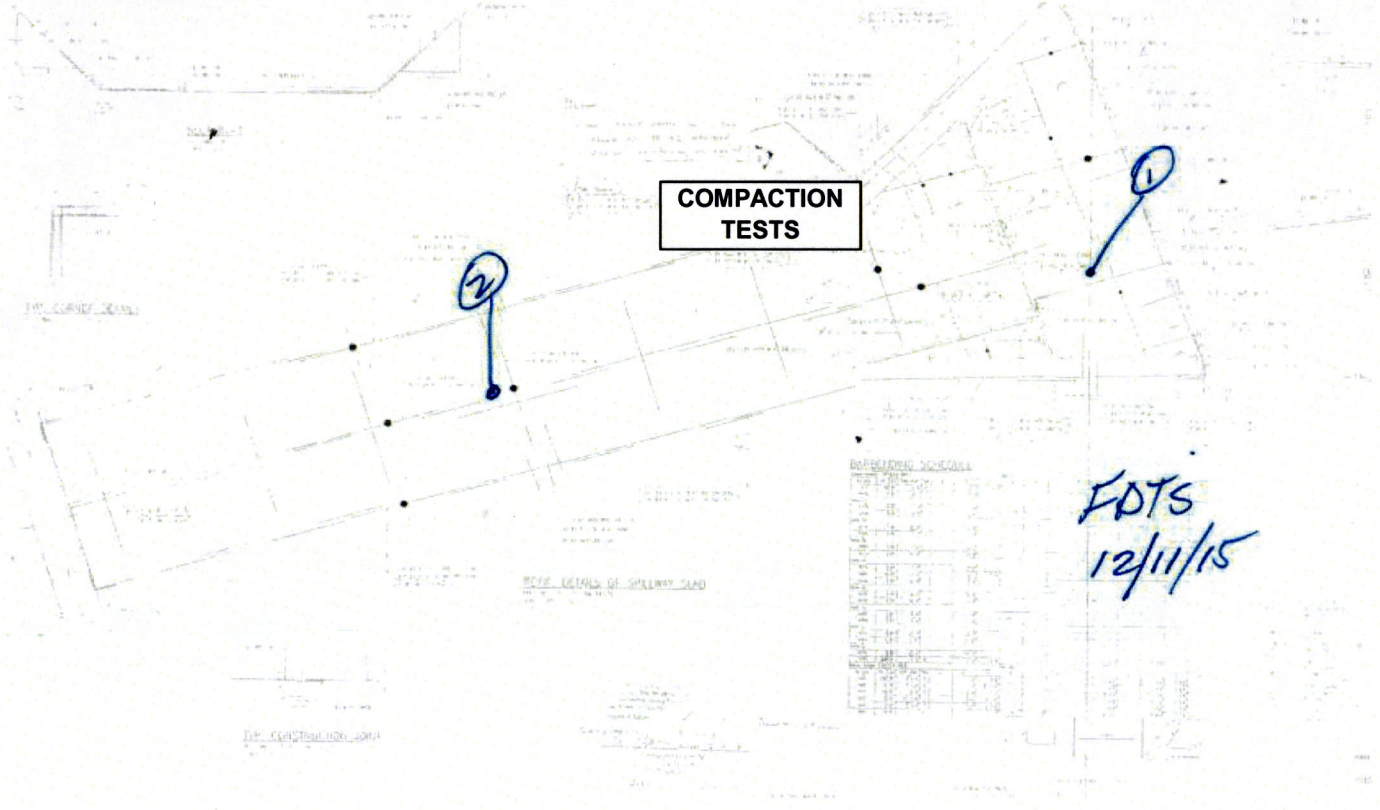
COMPACTION TEST REPORT - Sheet 2 of 2

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT:	**Kingsmill Pond Spillway Replacement Williamsburg, Virginia**	**SCALE:**	**NTS**
PROJECT NO:	**WM15-180T**	**DATE:**	**12/11/2015**
CLIENT:	**Kingsmill Comm. Svcs. Assoc.**	**PLOT BY:**	**BS**

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GET Solutions, Inc.
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GROUT COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Stantec
Job No.: WM15-180T
Date Poured 1-15-16 Time Tested 1:30pm
Sampled by AD Weather/Temp: Sunny/53°F
Time Batched 1:30pm Time Emptied N/A
Grout Temp. 60 °F Slump N/T (in.)
Location of Pour Spillway – See Placement Report
Quantity Represented N/T
Spec. Req. 4000 Psi @ 28 days
Grout Supplier Mixed On-Site
Truck No. N/T Ticket No. N/T
Measured Air Content N/T %
Water Withheld 0 gals/yd Water Added 0 gals
Admixture N/T
Initial Curing Conditions Exposed
Min/Max Temp N/T °F

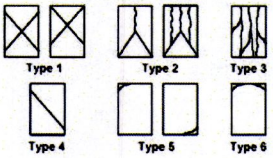
COMPRESSIVE STRENGTH

Tests made according to ASTM C1019 Standard Specifications:

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	PRISM WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KG-1	A	1-16	1-22	290	16,690	4	4170	7	1
	B	1-16	1-22	289	17,570	4	4390	7	1
	C	1-16	1-22	286	18,540	4	4630	7	1
	D	1-16	2-12	288	19,930	4	4990	28	3
	E	1-16	2-12	288	16,490	4	4120	28	3
	F	1-16	2-12	288	18,530	4	4630	28	3
	G	1-16	SP					H	
	H	1-16	SP					H	

Remarks:

TYPES OF FRACTURE



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GROUT COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 2-29-16 Time Tested 1:30pm — Sampled by AD Weather/Temp: Sunny/50°F
Time Batched 1:30pm Time Emptied 1:45pm — Grout Temp. 54 °F Slump N/T (in.)
Location of Pour Spillway Wall – See Placement Report
Quantity Represented N/A — Spec. Req. 4000 Psi @ 28 days
Grout Supplier Mixed On-Site — Truck No. N/A Ticket No. N/A
Measured Air Content N/T % — Water Withheld 0 gals/yd Water Added 0 gals
Admixture N/A — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

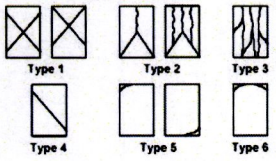
COMPRESSIVE STRENGTH

Tests made according to ASTM C1019 Standard Specifications:

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	PRISM WEIGHT (lbs.)	MAXIMUM LOAD (lbs.)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KG-3	A	3-2	3-7	260	13,230	4	3300	7	2
	B	3-2	3-7	260	9,080	4	2270	7	1
	C	3-2	3-7	259	14,820	4	3700	7	1
	D	3-2	3-28					28	
	E	3-2	3-28					28	
	F	3-2	3-28					28	
	G	3-2	SP					H	
	H	3-2	SP					H	

Remarks:

TYPES OF FRACTURE



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GROUT COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 3-9-16 — Time Tested 1:30pm — Sampled by TD — Weather/Temp: Sunny/80°F
Time Batched 1:30pm — Time Emptied 1:45pm — Grout Temp. 76 °F — Slump N/T (in.)
Location of Pour Spillway Base – See Placement Report
Quantity Represented N/A — Spec. Req. 4000 Psi @ 28 days
Grout Supplier Mixed On-Site — Truck No. N/A — Ticket No. N/A
Measured Air Content N/T % — Water Withheld 0 gals/yd — Water Added 0 gals
Admixture N/A — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

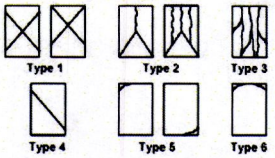
COMPRESSIVE STRENGTH

Tests made according to ASTM C109 & C780 Standard Specifications:

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CUBE WEIGHT (grams.)	MAXIMUM LOAD (lbs.)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KG-4	A	3-11	3-16	260	18,570	4	4640	7	1
	B	3-11	3-16	260	15,420	4	3850	7	1
	C	3-11	3-16	265	13,180	4	3290	7	2
	D	3-11	4-6	257	15,980	4	3990	28	3
	E	3-11	4-6	262	18,430	4	4600	28	1
	F	3-11	4-6	269	21,260	4	5310	28	1
	G	3-11	SP					H	
	H	3-11	SP					H	

Remarks:

TYPES OF FRACTURE



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GROUT COMPRESSIVE STRENGTH TEST REPORT

Project: Kingsmill Pond Spillway Replacement — Project Location: Williamsburg, Virginia
Client: Stantec — Job No.: WM15-180T
Date Poured 3-10-16 — Time Tested 12:10pm — Sampled by BS — Weather/Temp: P. Cloudy/70°F
Time Batched 12:08pm — Time Emptied _____ — Grout Temp. 75 °F — Slump N/T (in.)
Location of Pour Spillway Base – See Placement Report
Quantity Represented N/A — Spec. Req. 4000 Psi @ 28 days
Grout Supplier Mixed On-Site — Truck No. N/A — Ticket No. N/A
Measured Air Content N/T % — Water Withheld 0 gals/yd — Water Added 0 gals
Admixture N/A — Initial Curing Conditions Exposed
Min/Max Temp N/A °F

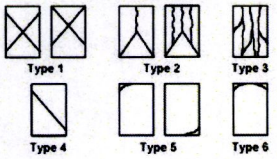
COMPRESSIVE STRENGTH

Tests made according to ASTM C109 & C780 Standard Specifications:

LAB #	CYLINDER IDENTIFICATION	DATE RECEIVED	DATE TESTED	CUBE WEIGHT (grams)	MAXIMUM LOAD (lbs.)	AREA (Sq. In.)	UNIT LOAD (lbs./Sq.In.)	AGE (Days)	Break Type
KG-5	A	3-11	3-17	289	9,040	4	2260	7	3
	B	3-11	3-17	298	15,100	4	3770	7	3
	C	3-11	3-17	300	16,340	4	4080	7	3
	D	3-11	4-7	292	21,410	4	5350	28	1
	E	3-11	4-7	307	20,420	4	5100	28	3
	F	3-11	4-7	307	15,040	4	3760	28	3
	G	3-11	SP					H	
	H	3-11	SP					H	

Remarks: _____

TYPES OF FRACTURE



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GROUT PLACEMENT REPORT – SHEET 1 of 2

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Kingsmill Community Services Association
General Contractor: David Nice Builders
Mix Type: Non-shrink
Admixture: N/A
Water Withheld: 0 gallons per yard of grout
General Placement Location: Spillway Base

Date: 3-9-16
Job No.: WM15-180T
Weather/Temp.: Sunny/80°F
Grout Supplier: On-site
Method of Placement: Bucket
Technician: T. Dudley
Field Curing Conditions:* Exposed
ASTM Procedure: ASTM C1019

Load #	Truck #	Ticket #	Time Batched	Time Tested	Time Emptied	Grout Temp. (°F)	Air Temp. (°F)	Slump (in)	Air (%)	Water Added on site (gal)	Placement Location Exact Grid Coordinate & Level or Elevation	Cum c.y. Placed	Set #	# of Prisms
1	N/A	N/A	1:30pm	1:30pm	1:45pm	76	80	N/T	N/T	0	See Attached Sketch	N/A	1	6

**Exposed curing conditions indicate cylinders are not cured inside a cure-box.*

Total Yds: N/A
Remarks:

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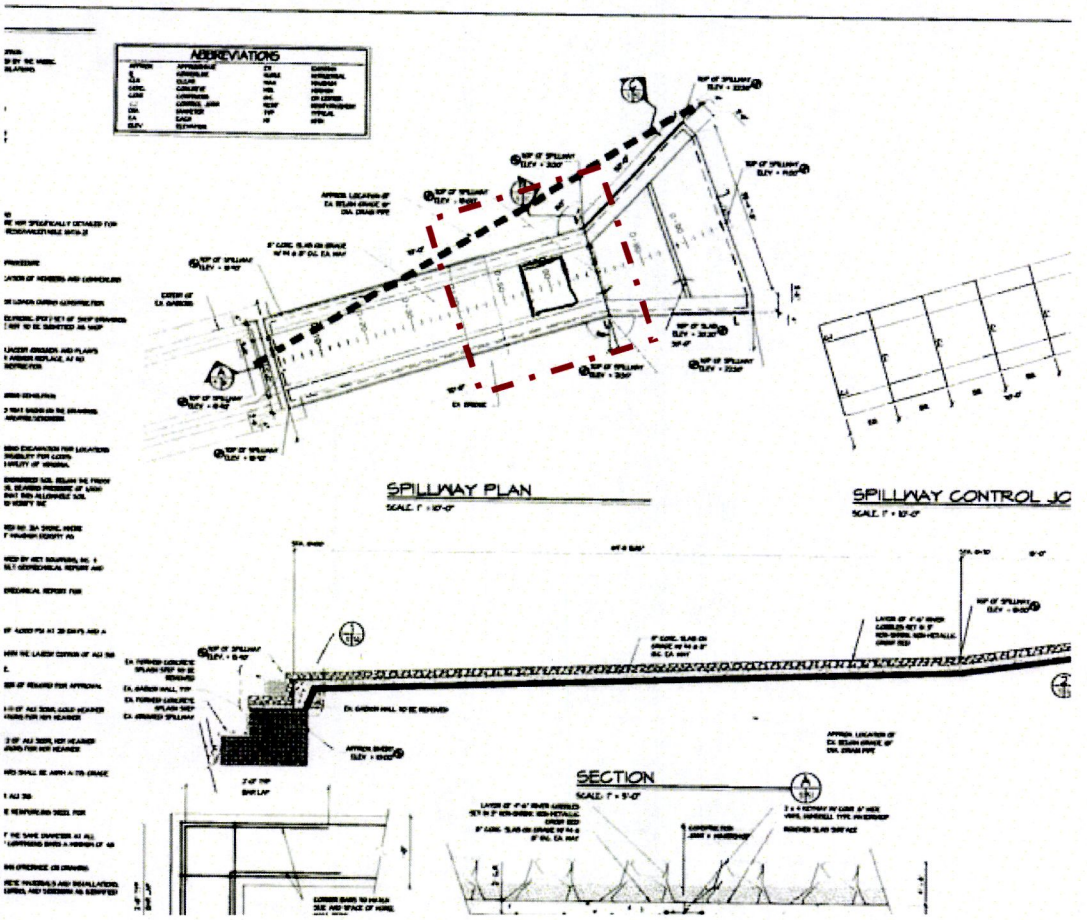
GROUT PLACEMENT REPORT – SHEET 2 of 2

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT: Kingsmill Pond Spillway Replacement
Williamsburg, Virginia
PROJECT NO: WM15-180T
CLIENT: Kingsmill Community Services Association

SCALE: NTS
DATE: 3/9/16
PLOT BY: TD

G E T Solutions, Inc.
1592 Penniman Road, Suite E
Williamsburg, VA 23185
Phone: (757)-564-6452
Fax: (757)-564-6453

GROUT PLACEMENT REPORT – SHEET 1 of 2

Project: Kingsmill Pond Spillway Replacement
Project Location: Williamsburg, Virginia
Client: Stantec
General Contractor: David A. Nice
Mix Type: Non-shrink
Admixture: N/A
Water Withheld: 0 gallons per yard of grout
General Placement Location: Spillway Base

Date: 3-10-16
Job No.: WM15-180T
Weather/Temp.: P. Cloudy/70°F
Grout Supplier: On-site
Method of Placement: Trowel
Technician: B. Sampe
Field Curing Conditions:* Outdoors
ASTM Procedure: ASTM C1019

Load #	Truck #	Ticket #	Time Batched	Time Tested	Time Emptied	Grout Temp. (°F)	Air Temp. (°F)	Slump (in)	Air (%)	Water Added on site (gal)	Placement Location Exact Grid Coordinate & Level or Elevation	Cum c.y. Placed	Set #	# of Prisms
1	N/A	N/A	12:08pm	12:10pm	N/T	75	70	N/T	N/T	0	See Attached Sketch	N/A	1	6

**Exposed curing conditions indicate cylinders are not cured inside a cure-box.*

Total Yds:
Remarks:

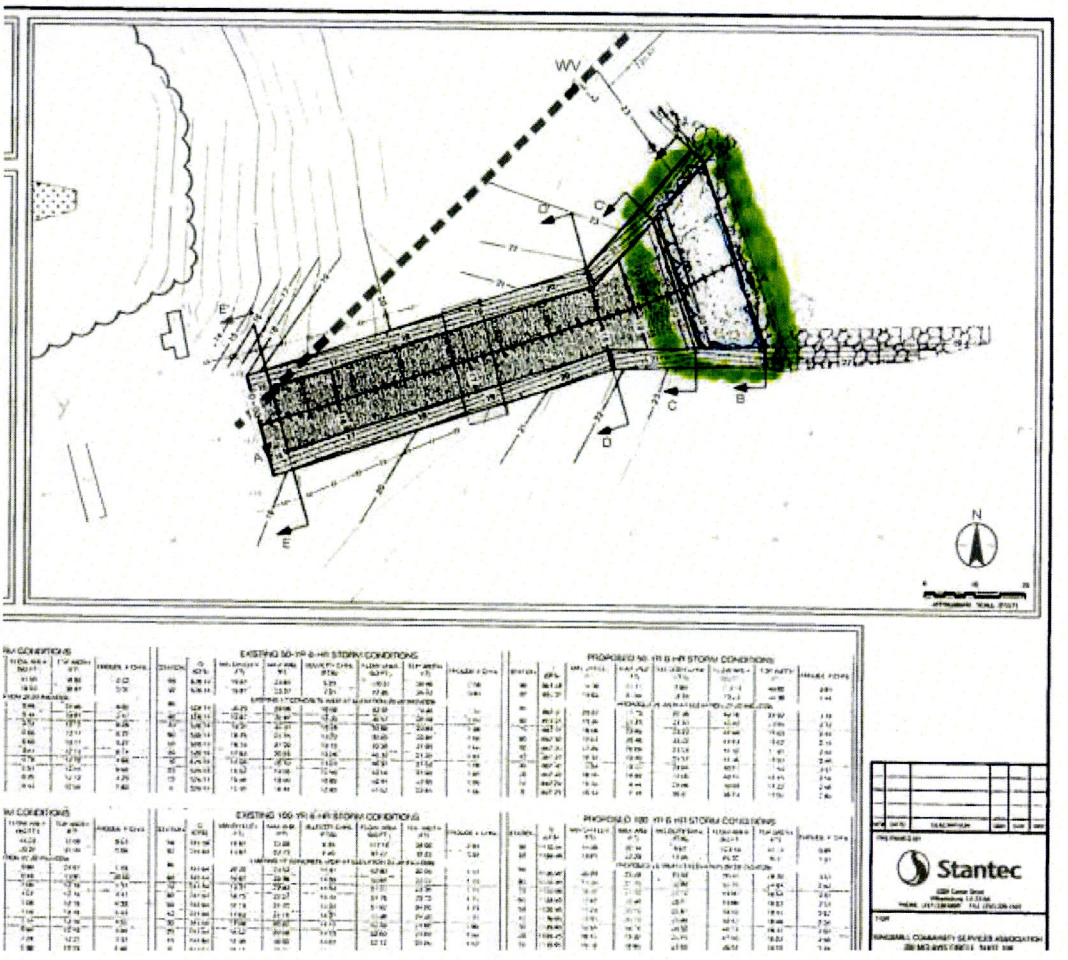
Reviewed By:

K. Tweedy
G E T Solutions, Inc

G E T Solutions, Inc.
1592 Penniman Road, Suite E
Williamsburg, VA 23185
Phone: (757)-564-6452
Fax: (757)-564-6453

GROUT PLACEMENT REPORT – SHEET 2 of 2

Figure 1



Locations are approximate

LOCATION SKETCH

PROJECT: Kingsmill Pond Spillway Replacement
Williamsburg, Virginia

SCALE: NTS

PROJECT NO: WM15-180T

DATE: 3/10/16

CLIENT: Stantec

PLOT BY: BS

The Structures Group, Inc.

Consulting Engineers

CONSTRUCTION ADMINISTRATION
Field Report No. 1

To: Chris Kuhn
Stantec
5209 Center Street
Williamsburg, VA 23188

Job No.: VA14170.CA
Date: 11/25/15 **Time:** 11:15 a.m.
Project: Kingsmill Spillway
Location: James City County
Owner: Kingsmill
Weather: Sunny **Temp:** 53°F
Present at Site: Michael A. Matthews, P.E. (The Structures Group, Inc.)
Skip Woodroffe (David Nice Builders, Inc.)
John Garrett (David Nice Builders, Inc.)
Ricky Collins (David Nice Builders, Inc.)

GENERAL:
At the request of the General Contractor, David Nice Builders, Inc. we provided a site visit on Wednesday morning, November 25, 2015, to review the cast-in-place concrete spillway structure under construction for the earthen dam along the West side of the Kingsmill Pond just north of Yardley Grant and south of Macaulay Road within the Kingsmill on the James subdivision of James City County, Virginia. The purpose of our review was to review the extent of demolition and tie in of the existing spillway and gabion system for the cast-in-place concrete spillway structure.

ITEMS OF DISCUSSION:

Item No. 1 – Demolition
Our review revealed that demolition of the existing spillway had been 90% completed up to the proposed new spillway and stepped gabion location.

Item No. 2 – Existing Slab
We reviewed the location of the existing two (2) step concrete slab/gabion location with the G.C. For ease of construction, as well as to reduce the potential to damage the gabion below the lower slab, it was determined that the existing lower slab would remain in place with the upper slab and its gabion support to be removed. TSG will provide a dowel detail under separate cover to attach the last section of new slab below the proposed new exit turndown to the existing slab to remain.

Photographs were taken and will be kept on file. We are pleased to be of service in this matter. If you have any questions, please do not hesitate to contact our office.

Sincerely,
The Structures Group, Inc.

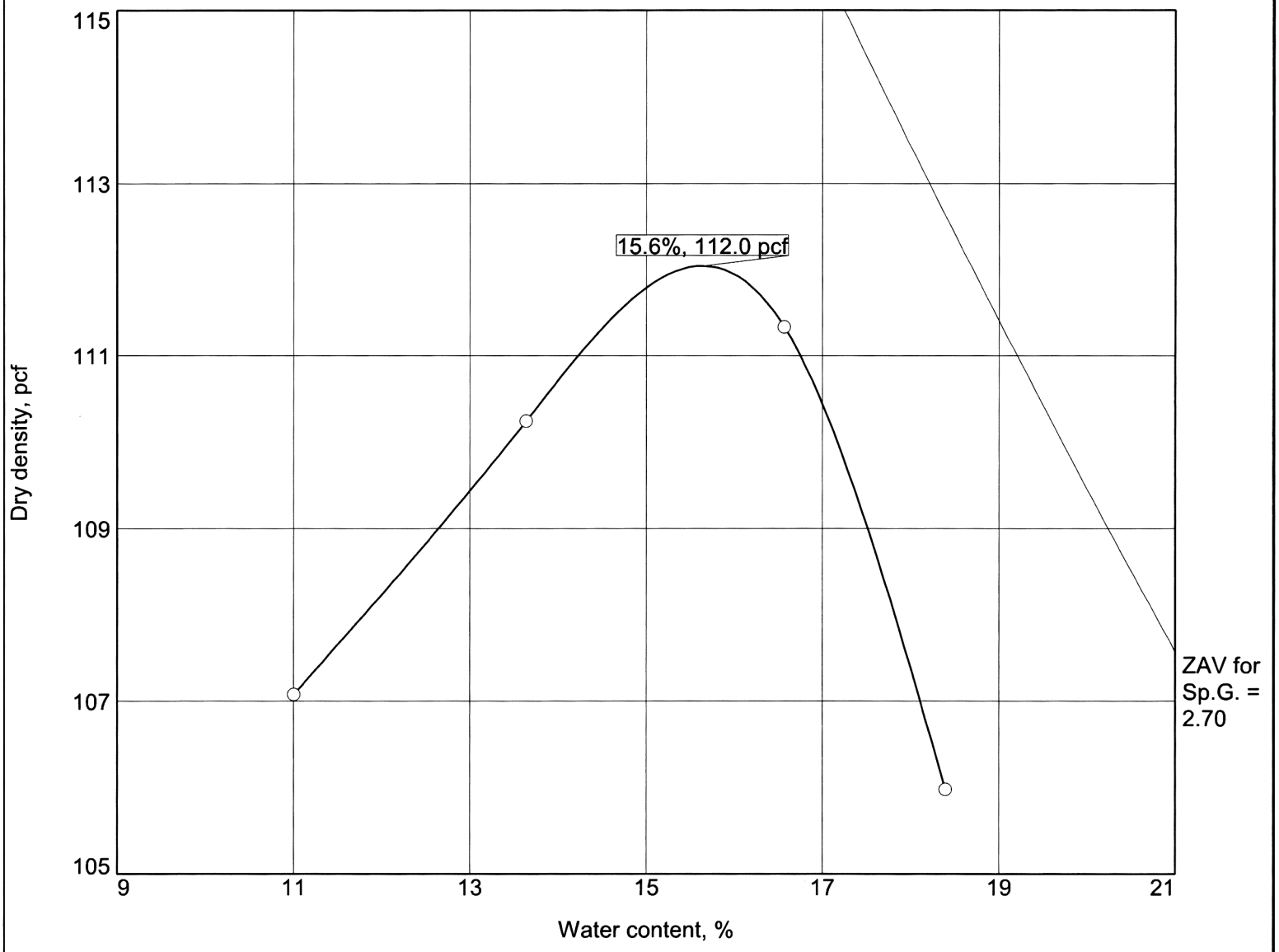
Michael A. Matthews, P.E.
President

COMMONWEALTH OF VIRGINIA
MICHAEL A. MATTHEWS
Lic. No. 017653
11/25/15
PROFESSIONAL ENGINEER

cc: Warren Hunnicutt (David Nice Builders, Inc.)
John Garrett (David Nice Builders, Inc.)

1200 Old Colony Lane
Williamsburg, VA 23185
Phone (757) 220-0465
Fax (757) 220-1546

MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



Test specification: ASTM D 698-07 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
Stock Pile	SC	A-6	16	2.5	29	12	0	37.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 112.0 pcf Optimum moisture = 15.6 %	Brown, Clayey fine to medium SAND (SC)

Project No. WM5-180T **Client:** Stantec
Project: Kingsmill Pond Spillway Improvement

○ **Location:** On-Site Material **Sample Number:** PR #1

GET Solutions, Inc.

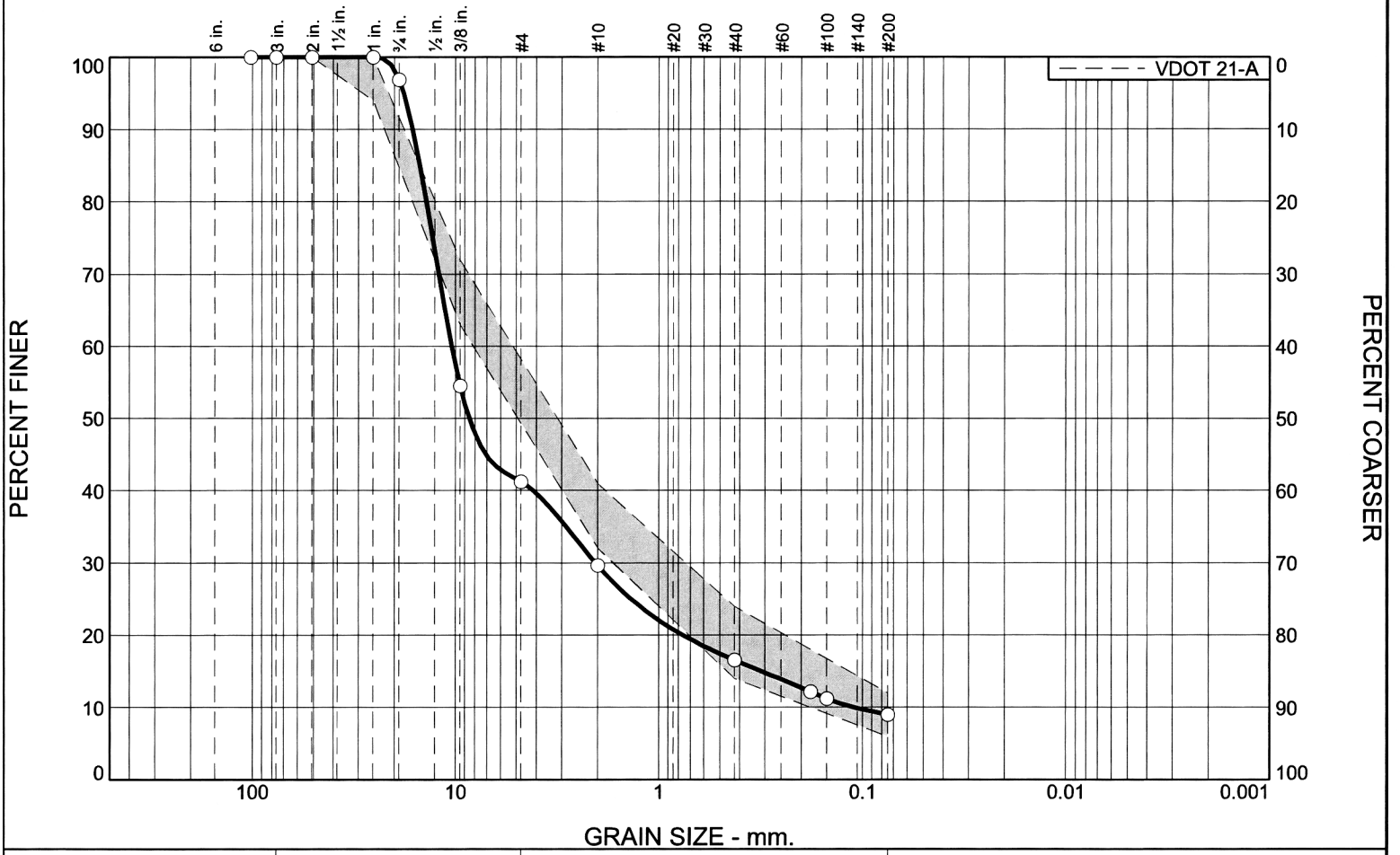
Williamsburg, VA

Remarks:
Proctor #1
Sample Obtained: 12/4/2015
Sample Tested: 12/4/2015

Figure 1

Tested By: A. Katyk **Checked By:** K. Tweedy

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.1	55.7	11.6	13.0	7.6	9.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100.0		
3"	100.0		
2"	100.0	100.0	
1"	100.0	94.0 - 100.0	
0.75"	96.9		
0.375"	54.5	63.0 - 72.0	X
#4	41.2		
#10	29.6	32.0 - 41.0	X
#40	16.6	14.0 - 24.0	
#80	12.2		
#100	11.2		
#200	9.0	6.0 - 12.0	

* VDOT 21-A

Material Description

Gray, Poorly graded fine to coarse GRAVEL (GP-GM) with few Silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 16.3220 D_{85}= 15.0378 D_{60}= 10.4843
D_{50}= 8.5775 D_{30}= 2.0528 D_{15}= 0.3132
D_{10}= 0.1090 C_u= 96.19 C_c= 3.69

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

Proctor #2
Sample Obtained: 12/9/2015
Sample Tested: 12/9/2015

Location: Base Aggregate Material
Sample Number: PR #2 **Depth:** Stock Pile **Date:** 12/9/2015

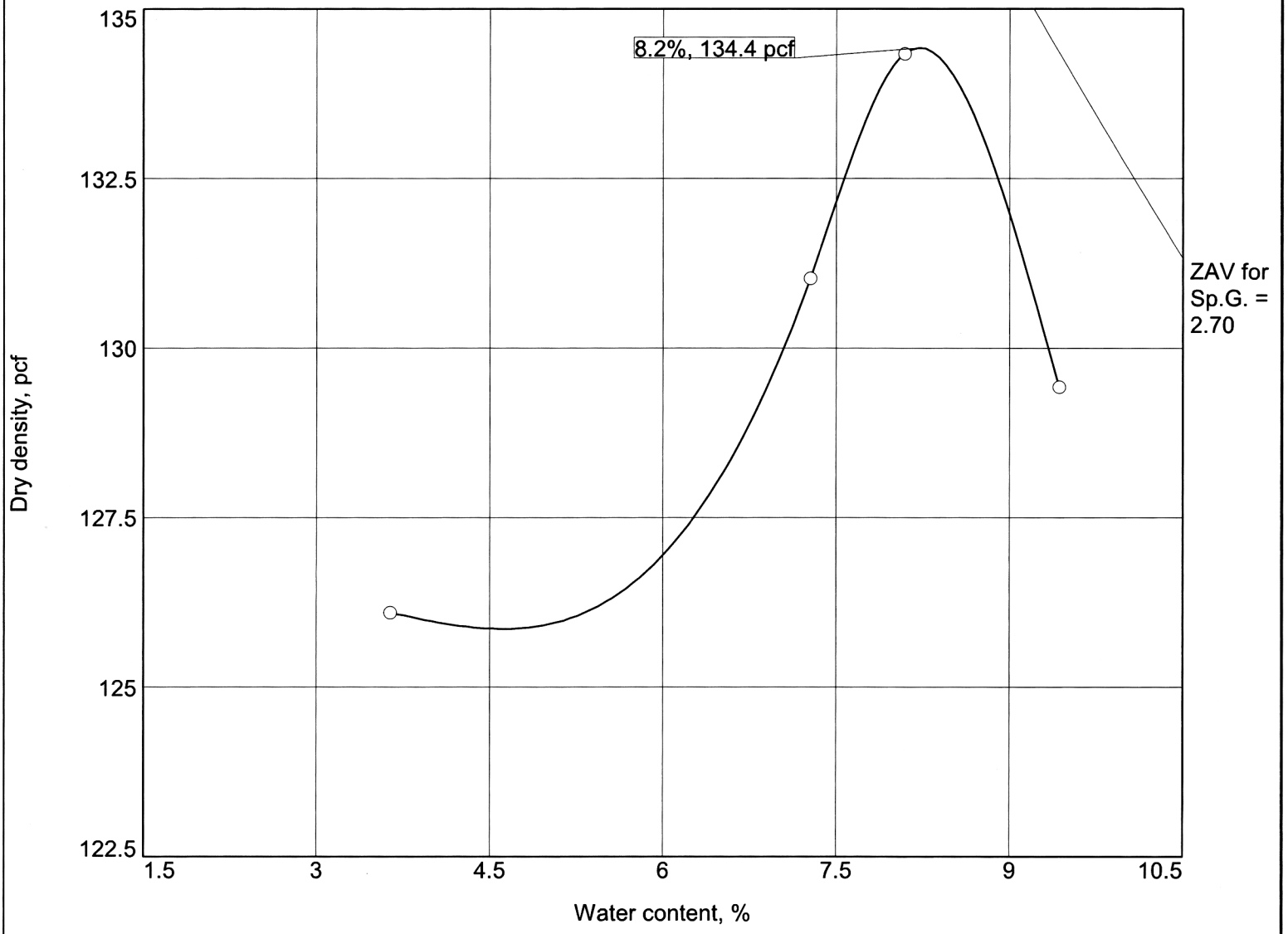
GET Solutions, Inc.

Williamsburg, VA

Client: Stantec
Project: Kingsmill Pond Spillway Improvement
Project No: WM5-180T **Figure** 2

Tested By: A. Katyk **Checked By:** K. Tweedy

MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



Test specification: ASTM D 698-07 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
Stock Pile	GP-GM	A-1-a	4	2.5	NP	NP	3.1	9.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 134.4 pcf Optimum moisture = 8.2 %	Gray, Poorly graded fine to coarse GRAVEL (GP-GM) with few Silt

Project No. WM5-180T **Client:** Stantec
Project: Kingsmill Pond Spillway Improvement

○ **Location:** Base Aggregate Material **Sample Number:** PR #2

GET Solutions, Inc.

Williamsburg, VA

Remarks:
Proctor #2
Sample Obtained: 12/9/2015
Sample Tested: 12/9/2015

Figure 2

Tested By: A. Kotyk **Checked By:** K. Tweedy

E&S 022-15

Stantec 5209 Center Street, Williamsburg VA 23188-2680

Engineering & Resource Protection
OCT 13 2015
RECEIVED

October 12, 2015
File: 203400515

Attention: Ms. Deirdre Wells
James City County
Engineering and Resource Protection Division
101-E Mounts Bay Road
Williamsburg, VA 23185

Dear Ms. Wells,

Reference: Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15)

This letter addresses review comments made by the James City County Engineering and Resource Protection Division on the Spillway Retrofit and Repair Plans for Kingsmill Pond, with letter dated September 28, 2015.

1. A local Land Disturbing/Stormwater Construction Permit (VESCP/VSMP authority permit) and Siltation Agreement, with surety, are required for this project.

   Acknowledged, a land disturbing permit application was submitted in conjunction with the plans. The client will provide for a siltation agreement.

2. Stormwater Inspections. This project includes stormwater conveyance and/or stormwater management facilities. Completion of a Stormwater Facilities Data Sheet and payment of Stormwater Facilities Inspection Fees may be applicable prior to issuance of a local land disturbing/stormwater construction (VESCP/VSMP authority) permit. For more information, contact the James City County Engineering and Resource Protection Division at (757) 253-6670.

   The purpose of this project is to improve the spillway characteristics to conform to state dam safety requirements, not to upgrade this facility to comply with current JCC stormwater management facility design criteria.

   Based on discussions with you, it is likely that completion of a Stormwater Facilities Data Sheet and payment of Stormwater Facilities Inspection Fees will be needed.

3. Debris Removal. Provide a note on the title sheet of the plans providing that all objectionable and deleterious material is to be removed from the site and disposed of in a state approved facility meeting the requirements of all applicable local, state, and federal regulations.

   We have added such a note on the cover sheet.

Reference: Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15)

4. Miss Utility. Provide standard notes requiring contact of Miss Utility prior to any utility or site work excavations.

   A reference to notification of Miss Utility is included in the E&S notes on Sheet 5. See Note #16 (re-numbered to #17).

5. Record Drawing and Construction Certification. The stormwater management/BMP facility repairs and renovations as proposed for this project 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.

   We have added such a note on the cover sheet.

6. VSMP/VPDES Construction. Effective July 1, 2014 the County is designated a local VSMP authority and is responsible to administrate and enforce certain provisions of the state's nonpoint source pollution programs including the Virginia Stormwater Management Program (VSMP) and VPDES construction general permit programs. Refer to Article II of Chapter 8 (Erosion and Sediment Control and Virginia Stormwater Management Program ordinance) of the County Code.

   The disturbance associated with this project is below the threshold necessitating VPDES construction general permit coverage and compliance with the Virginia Stormwater Management Program (VSMP). Erosion and Sediment Control Plans as required for the land disturbance activity permit are included in the plans. This has been confirmed in phone call with County staff on October 8, 2015.

7. P2 Plan. A pollution prevention plan (PPP or P2 plan) is required to be submitted for review and approval by the County prior to registration for a state VPDES construction general permit. Refer to Section 8-26(c) of the County's Chapter 8 ordinance.

   A P2 Plan is part of the VPDES Stormwater Pollution Prevention Plan, which is not required for this project. See note above.

8. Plan Number. Please reference the assigned County plan number, E&S-022-15 on all subsequent submissions.

   We have added the County plan number to the cover sheet.

9. Site Tabulation. Provide a disturbed area estimate for the project in the site tabulation on the cover sheet.

   The site disturbed area is provided on the cover sheet under the heading "Statistical Data" in the left hand column. The area of disturbance has been reduced slightly to 0.83 acres with optimization of the limits of disturbance.

Reference: Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15)

EROSION & SEDIMENT CONTROL PLAN:

10. Standard Notes. Replace erosion control notes provided on Sheet 4 of 9 and replace with James City County Engineering and Resource Protection Division standard Stormwater Pollution Prevention Plan Notes dated July 1, 2014. These are available on the ERP website and have been the standard notes for all plans since July 1, 2014.

    We have substituted the Standard Stormwater Pollution Prevention Plan Notes, dated July 1, 2014 for the 2009 standard erosion and sediment control notes shown previously.

11. Existing Drainage. Describe how flow over the spillway will be handled during construction. While dewatering will occur prior to

    This comment was apparently cut short. During construction the water level will be kept below the construction site by using the low level drain. When inclement weather is expected the drawdown can be supplemented with pumping and/or a syphon system. This is means and methods for the contractor, as specified in the plans and the bid documents.

12. Temporary Stockpile Areas. Show any temporary soil stockpile and equipment staging or material storage areas (with required erosion and sediment controls) or indicate on the plans that none are anticipated for the project site.

    Temporary stockpile areas are shown on the E&S plan on Sheet 5. We have added labels for clarification.

13. Soil Stockpiles. Provide a soil stockpile operations plan consistent with Section 24-46 of the Zoning ordinance.

    We have added a note requiring the contractor to provide such a plan and to adhere to the plan.

14. Offsite Land Disturbing Areas. Identify any offsite land disturbing areas including borrow, waste, or disposal sites (with required erosion and sediment controls) or indicate on the plans that none are anticipated for this project.

    No offsite land disturbing areas outside of otherwise approved borrow, waste, or disposal sites are anticipated. We have added a corresponding note on Sheet 5 in the Sequence of Construction.

15. Limits of Work. The site access is indicated, but not shown in its entirety. Please provide an inset of the access, along with a total disturbed area calculation to include the access.

    Site access is shown in its entirety on the "Site Access Map" on Sheet 5. We have rescaled this access map for clarity and added the limits of disturbance.

16. Erosion and Sediment Control Notes, Sheet 4 of 9.

Reference: Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15)

a. The last sentence of note 1 should be revised to include that the JCC Engineering and Resource Protection Division site inspector must approve and can direct any additional measures to be used.

We have added a corresponding note on Sheet 5 as Note 1.

b. Note 9 should be revised to state…all disturbed area are stabilized, and then only at the discretion of the JCC Engineering and Resource Protection Division site inspector.

We have edited this note as requested.

17. Sequence of Construction. The following adjustments should be made to the sequence found on Sheet 5 of 9:

a. Step 1 should be to contact the JCC Engineering and Resource Protection Division site inspector to schedule a pre-construction meeting with appropriate project parties and agencies.

We have added a pre-construction meeting as Step 1 in the construction sequence.

b. Step 3 should call for fence to be stored on proposed stockpile area and the term safe location should be removed. If an offsite storage area is being utilized, provide location and information concerning proper erosion and sediment controls.

We have edited this step as requested.

c. Step 4 should specify if the gabions and rip rap being removed are to be hauled offsite for disposal.

We have edited this note as requested.

d. Step 14 should include a statement that controls may be removed only with the approval of the JCC inspector.

We have edited this note as requested.

e. Step 15 needs clarification as to how the water surface level will be restored.

We have edited this note as requested. The water level will be restored by closing the low level drain and natural refill by rain events.

18. Historic Structure Protection. Please provide information and/ or plan for stabilization and protection of existing historic brick structure during construction activities. Vibrations caused by construction activities pose a threat to the integrity of the structure.

Based on information available this historic structure is not under any kind of federal, state, or local protection and any measures to safeguard the structure is voluntary. The client is aware that this structure may be at risk, whether construction commences or not. At this time the client has declined to make specific arrangements to protect the structure

Reference: Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15)

beyond directing the selected contractor to use caution. However, we have added a note to the plans requesting safeguarding the structure.

STORMWATER MANAGEMENT / DRAINAGE:

19. Tie-In to Existing Channel Section. More information, details, and notes are needed at the tie-in point of the proposed channel to the existing section. Provide necessary information concerning demolition at this location, preparation of remaining channel for proper merging, and any other information regarding the connection.

The Structural Engineer has provided the following note:

✓ As shown in Detail 1 on Sheet S2 of the Construction Drawings dated June 26, 2015, the existing topmost concrete splash block and gabion wall spanning the width of the existing channel is to be removed. Additionally, the next concrete splash block down from the existing spillway is proposed to be removed and replaced with the new concrete slab shown in Detail 1. It should be noted that this proposed concrete slab is to be cast in direct contact with the existing gabion wall.

20. Freeboard. As no emergency spillway exists for this pond, a minimum of 1 foot of freeboard from the 100-year, 24 hour design water surface elevation to top of channel is needed. This design parameter may be translated to the appropriate 6 hour design elevation, if preferred. The present design shows the 100-year, 6 hour elevation exactly at or only minimally below top of channel side elevations for stations 10+00 through 60+00.

✓ We are aware that the facility does not meet the current JCC SWM design requirements, but it never was the intent of the project to bring an outdated (from an SWM perspective) facility into compliance. The only compliance that is targeted is compliance with the state dam safety regulations. As discussed and agreed upon during the phone conference on October 8, 2015, the spillway improvements will improve the overall capacity performance of the spillway, and no further improvements are needed at this time.

Reference: Spillway Retrofit and Repair – Kingsmill Pond (E&S-022-15)

Sincerely,

Stantec Consulting Services Inc.

Chris Kuhn
Senior Project Manager
Phone: (757) 220-6869
Fax: (757) 229-4507
chris.kuhn@stantec.com

c. Scott Blossom, P.E., CFM, LEED AP, Toni Small, P.E., Stantec

ck u:\203400515\05_report_deliv\deliverables\submittals\land_disturbance_permit_app\county_comments\let_plan_comments_es-022-15.0_response.docx

SWM-001-12

2004-2006 Water Quality Evaluation Summary
2009 Bank and Channel Stability Assessment

CC019

Kingsmill Pond Water Quality Study

Williamsburg, Virginia

Prepared for **Kingsmill Community Services Association**
300 McLaws Circle, Suite 105
P.O. Box 348
Williamsburg, Virginia 23187

Prepared by VHB *Vanasse Hangen Brustlin, Inc.*
Environmental, Transportation, Land Development Services
351 McLaws Circle, Suite 3
Williamsburg, Virginia 23185

March, 2009

Table of Contents

Appendices

Figures

Tables

Executive Summary

Executive Summary

Kingsmill Pond is a 22.8 acre man made water body nestled in the northeast portion of the Kingsmill Residential/Resort community, located along the James River in James City County, Virginia (See **Figure 1**). Since 1988 a number of Kingsmill residents have expressed concern over the potential deterioration of Kingsmill Pond due to development of the watershed and the mismanagement of vegetative communities along the Pond's shoreline and major tributaries feeding the Pond. In order to properly address these concerns, the Kingsmill Community Services Association (KCSA) hired a consultant, Vanasse Hangen Brustlin (VHB), Inc. with extensive expertise in surface and groundwater hydrology as well as water quality assessment. Working collaboratively with the KCSA, VHB developed a scope of work (SOW) specifically designed to address community concerns and answer the following four key questions:

- What are the primary functions of Kingsmill Pond?
- Is Kingsmill Pond operating at full potential for each identified function?
- Are any of the identified functions in decline, and if so, what are the causes?
- What future actions should be taken to monitor and improve the Pond's performance?

The SOW developed by KCSA and VHB includes appropriate methods for data collection and analysis sufficient to address community concerns and the aforementioned four key questions. Tasks performed under the SOW include: a review of historical maps, photographs and other relevant documents to determine degree and timing of land use changes impacting the Pond; water quality sampling and testing to determine the Pond's current physical, biological and chemical composition; characterization and mapping of vegetation and exposed or unstable areas along the Pond's perimeter; cross-section surveys at critical siltation zones in the Pond to establish current water depths and a baseline for future siltation monitoring; focused observations of the fish population made during water quality sampling as well as by interviewing avid fisherman of Kingsmill Pond to determine abundance and diversity of fisheries; and stability assessment of stream corridors feeding the Pond to identify and map areas of excessive erosion and sedimentation.

Findings

Primary Pond Functions

The primary functions of Kingsmill Pond revealed by the Study are Flood/Stormwater Control, Boating, Fishing, and serving as an Aesthetic Amenity in

the community. A qualitative assessment of how well the Pond is performing for each of the identified functions is given below based upon the limited quantity of data collected and analyzed to date. Recommended future monitoring will determine the validity of these assessments.

Flood/Stormwater Control – Flood or stormwater control is not an intended function of Kingsmill Pond since the facility only has one spillway that serves as both the primary and auxiliary outlet for the facility. Typical designs for flood control or stormwater management ponds include at least two spillways set at different elevations providing flood storage in the area between the spillways or outlets. The mere presence of the Kingsmill Pond surface area, however, acts to attenuate flows from significant runoff events by slowing and spreading all water entering the Pond. This reduction in peak flow rates downstream is of little consequence, however, since all development lies well above the floodplain.

Boating – The potential for enjoying non-motorized boating activities was determined to be good throughout most of the Pond. A community boating dock with storage facilities is located at the North end of the Pond and many residents with waterfront property have created access and boat launches from their own properties. The depth of water throughout most of the Pond was observed and measured to be more than adequate for supporting boating activities. The only exceptions to this condition were experienced at the mouth of several primary tributaries feeding the Pond where natural siltation is expected to occur over time (**Figures 2, 2a**, and **2b**). These areas may have supported deeper water 10 to 20 years ago but have since silted in naturally or in an accelerated fashion due to inadequate control of erosion from construction sites and/or excessive stream channel erosion in the tributaries that feed the subject areas.

Fishing – Opportunities for catching an abundance and variety of fish appear to be plentiful based upon field observations made by VHB environmental scientists and interviews with several individuals who reported having fished the Pond for 10 years or more. Quality habitat features for nesting and breeding are abundant and appear to be promoting the growth and development of small and large mouth bass, black crappie, gizzard shad, Israel carp, bluegill, pumpkinseed, brim, and channel catfish. Although additional data is needed to establish an accurate water quality baseline, sampling and testing performed to date suggests that the Pond's physical, biological and chemical water quality parameters are generally conducive to supporting a viable and diverse fish population.

Aesthetic Amenity – Pond aesthetics overall were judged by the VHB Environmental Team to be very good (**Figure 3**). Approximately 62 percent of the Pond's shoreline consists of mature native forest with multiple vegetative layers. About 23 percent of the shoreline is mature native forest with a cleared under story that in some cases has been replanted with native or ornamental materials having a lower profile, presumably to enhance property owner views of the Pond. The remaining 15 percent of shoreline is landscaped with ornamental and/or native shrub plant materials, or

turf grasses as observed on the Pond embankment and golf course areas abutting the Pond. Only a few small isolated areas were observed to be exposed and eroding. These areas exist primarily along pathways created by individual landowners to facilitate access to the Pond from their properties.

Predicted Trends in Pond Functions

In order to definitively determine whether any of the identified functions of Kingsmill Pond are in decline, a long term monitoring program as described in the full report and under the **Recommendations Section** of this Summary must be implemented. In the interim, however, qualitative predictions in trends can be made based upon field observations and data collected to date.

As stated previously, flood and stormwater control is an unintended function of the Pond and has no particular significance in this Study. The Pond in its present form will continue to attenuate the full range of significant discharge events occurring in the watershed. Hence, peak discharge rates downstream will continue to be less when compared to rates that would occur in the absence of the Pond.

Potential boating opportunities will decline as water depths in the Pond decrease through natural siltation/sedimentation. A slow filling in of the Pond over many decades is a natural process and can only be reversed through dredging. Dredging operations, however, should not be required for the foreseeable future assuming siltation is occurring at natural rates throughout the watershed. Unnatural or accelerated siltation rates occur when erosion from construction sites is not adequately checked, and/or stream channels feeding the Pond contribute excessive amounts of sediment due to instability created by land use change and direct manipulation of the stream channels. Regular monitoring of the permanent cross-sections established under this Study will determine whether natural or unnatural siltation is occurring (**Figures 2, 2a,** and **2b**).

Fisheries are also impacted by excessive siltation as well as other physical, biological and chemical water quality attributes. The recommended long term monitoring program will determine rates of siltation and detect significant changes in water quality parameters that can impact the quality of fisheries.

Aesthetic quality or visual value of the Pond's perimeter is high and will remain so as long as the natural native plant communities are allowed to thrive. Natural forested areas currently dominate the Pond's shoreline ensuring the persistence of stable side slopes, natural beauty, and quality terrestrial habitat features.

Landowner Concerns

Landowner concerns received by the KCSA over the past several years indicate perceptions and concerns regarding unabated siltation; polluted runoff; fecal-

coliform contamination; stagnant pools; pungent orders; mosquito breeding; dumping of residential landscape debris; and unnecessary removal of trees and vegetation from the shoreline.

The rate of siltation today is likely significantly less than it was 10 or 20 years ago when construction was relatively heavy in the watershed. The primary tributary mouths have silted in over the years and continue to receive silt and sediment primarily from the bed and banks of eroding stream channels upstream. Monitoring the permanent cross sections established under this study will reveal whether siltation is extreme and what measures should be taken to implement controls.

Runoff from paved surfaces typically contains pollutants such as petroleum based products. Laboratory analysis of water samples taken from key locations in the Pond indicated no detectable levels of petroleum based products. Obviously, monitoring for this parameter needs to be a part of the long term Monitoring Plan to ensure that this is not a water quality issue for the Pond.

Fecal-coliform samples were taken at numerous locations within Kingsmill Pond during the summer and fall monitoring periods. All samples taken within the Pond revealed fecal-coliform concentrations below the James City County threshold value for recreational ponds. Based upon sampling and testing performed to date, fecal-coliform levels do not appear to be a problem within Kingsmill Pond. Long term monitoring, however, as indicated under the **Recommendations** section of this document, is necessary to determine whether fecal-coliform concentrations are consistently below acceptable levels.

Slow moving water is present in the upper extremities of the Pond, particularly at the mouths of primary tributaries. This is normal and should not be construed as a problem or something to be corrected. Though water may appear stagnant, it is continuously entering the Pond as ground water and surface water and moving slowly towards the spillway at the far southwest end of the Pond embankment. Ideal breeding grounds for mosquitoes include stagnant water, slow moving water, and low lying moist vegetated areas. Hence, the upper extremities of any lake or pond where emergent wetlands naturally develop create opportunities for mosquitoes to breed.

An accumulation of silt/sediment and organic matter naturally occurs at the mouths of the primary tributaries. Heavy deposits of fine soils and organic matter become anaerobic over time and develop gases such as methane (CH^4) and hydrogen sulfide (H^2S). These gases are periodically released to the atmosphere, particularly when the decomposing material is stirred by animals or humans moving through it. The release of these gases is probably what some landowners have referred to as pungent or foul odors emanating from the Pond. Decomposition of algal biomass during summer blooms may be the main contributor to these odors.

From a habitat, aesthetic, and stability perspective, the overall condition of the shoreline was judged to be very good. Removal of native trees and vegetation from the Pond shoreline does not appear to have been excessive over the years as most of the shoreline is composed of natural forested areas. Even though some landowners have replaced the natural vegetation with ornamentals and mulch, few areas were observed to be void of vegetation or eroding.

While no landscape debris piles were observed around the Ponds perimeter, the dumping of landscape debris is definitely a problem along the tributaries feeding the Pond. Many landowners appear to be dumping yard clippings, tree prunings and large logs from felled trees into the stream channels. These large deposits of debris create blockages in the stream channels that act to redirect flows, undermine utilities and recreational areas, exacerbate erosion, and contribute undue sediment to the Pond. A stream channel stability assessment was performed on the 2.6 miles of tributary streams feeding the Pond (**Figure 4**). Approximately 46 percent of these channels were classified as severely eroded and actively degrading, which indicates they have already contributed significant sediment loads to downstream areas and continue to contribute significant loads to the Pond. The dumping of debris in these channels only increases the magnitude of the problem.

Conclusions

Primary Pond functions identified in the Study were determined to be operating at an above average level. Indeed, boating and fishing opportunities were judged to be relatively good based upon access, depth of water (over the main body of the Pond), and the abundance of a variety of fishes. Aesthetic quality was also judged to be high based upon the stability of the shoreline and the predominance of natural forest around the Pond's perimeter.

Analysis and evaluation of four seasons of water quality monitoring data suggests that Kingsmill Pond water quality is relatively high, especially considering the nature of its suburban/urban watershed. Values for dissolved oxygen, pH, and temperature exceed State water quality standards, which helps to explain the high level of biological activity that appears to support an abundant and diverse fish community. Conversely, an abundance of nitrogen, presumably a result of excessive fertilizer application on residential lawns and the community golf course, is creating algae blooms in significantly large areas of the Pond. Algal blooms produce large amounts of organic biomass that eventually die and sink to the bottom. The resulting large-scale decomposition of that material could lead to water quality problems, specifically affecting dissolved oxygen levels and potentially posing a threat to the biological processes and organisms within the Pond.

Indicators suggesting potential future problems and degradation of the Pond's primary functions were also revealed by the study. Specifically, active severe erosion occurring in approximately 46 percent of the total length of tributaries feeding the

Pond was observed to be contributing undue sediment loads. Excessive dumping of landscape debris in these tributary channels is exacerbating erosion and increasing deposits of sediment and organic matter downstream. Sedimentation at the mouths of the primary tributaries serves to expand the developing emergent wetland areas, decreasing the total deep water area of the Pond while increasing breeding area for mosquitoes. Additionally, the anaerobic decomposition occurring in these depositional areas may contribute to unpleasant odors experienced in the vicinity of the pond.

Recommendations

Implement a long term monitoring program (minimum of five years) in order to establish a scientifically defensible baseline for all Pond attributes and a sound basis for making intelligent decisions regarding management of the Pond and its watershed. The Monitoring Plan should include as a minimum: water quality sampling and testing protocols designed to determine long term water quality trends, detect land use activities that may be having a negative impact on the Pond, and determine the levels of pollutants and nutrients leaving the Pond and impacting areas downstream such as the James River and Chesapeake Bay; photographic and narrative documentation of any significant changes in shoreline stability or vegetation; monitoring of critically eroding tributary channels in order to estimate annual volume of erosion and sedimentation; and regular monitoring of permanent Pond cross-sections to determine magnitude and rate of siltation as well as expansion of emergent wetland areas.

In addition to the Monitoring Program outlined above, an Educational Outreach Program should be developed and implemented to provide citizens of the watershed with information necessary for developing knowledge and understanding of the connection between the watershed and its ponds and streams. Examples of effective outreach activities could include: periodic distribution of educational materials on "how to develop an effective and environmentally friendly fertilization plan for lawns and recreational areas"; providing the community with Kingsmill Pond water quality updates through the KCSA newsletter; and encouraging community volunteers to participate in various aspects of the Monitoring Plan such as benthic macroinvertebrate collection, identification, and assessment. Volunteer monitoring of debris disposal is another important role for residents to undertake. The primary goal of the Educational Outreach Program should be to spark interest in the community to learn more about how land use choices impact water quality and ultimately the quality of our lives.

2009 Bank and Channel Stability Assessment

2004-2006 Water Quality Evaluation Summary

Introduction

Kingsmill Pond is a 22.88 acre manmade water body located within the Community of Kingsmill, South of Southall Road, west of Kingsmill Road, and north of the Kingsmill Country Club. The Pond receives flows from numerous freshwater springs and tributaries, draining west to Halfway Creek and south to the James River. The Pond also receives stormwater from the Busch Corporate Center, Anheuser Busch Brewery, and other smaller sub watersheds; however, five primary tributaries provide the majority of inflow to the pond. See the Site Location Map (**Figure 1**) for location and orientation of the study area.

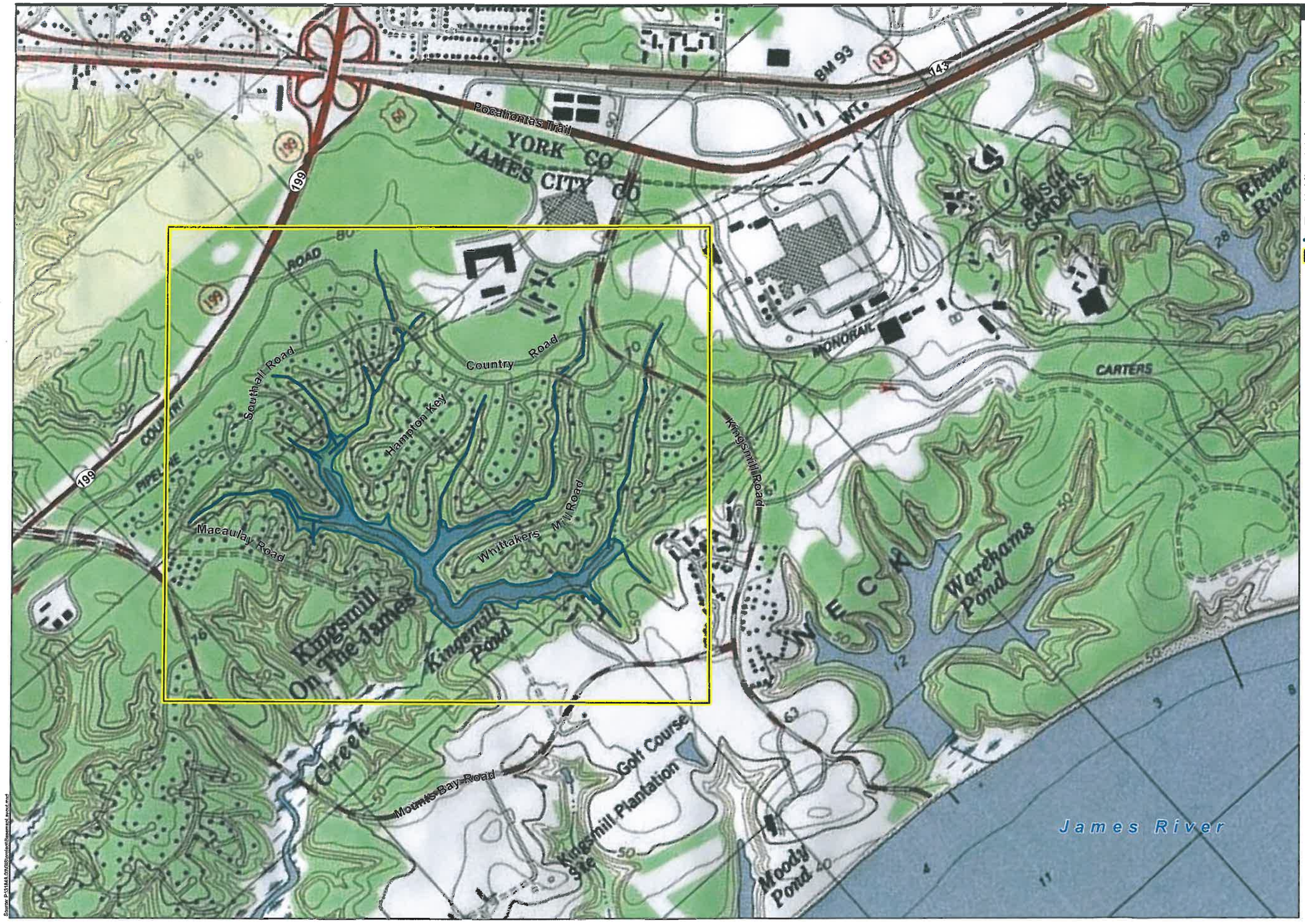
Since 1988, Kingsmill residents have expressed concerns regarding the potential deterioration of Kingsmill Pond, most notably recognizing the slow siltation of tributary mouths due to steady development within the watershed over the past 30 years. Other common concerns have also been reported, including the perception of stagnant areas, resulting in pungent odors and breeding grounds for mosquitoes. Reports of excessive amounts of woody debris accumulating in the pond and oily runoff from adjacent roadways have also raised resident concerns.

In response to these concerns, the Kingsmill Community Service Association (KCSA) has contracted Vanasse Hangen Brustlin (VHB), Inc. to conduct a multi-level assessment of existing conditions with regard to water quality and habitat value in the Pond. Components of the evaluation include a review of historic land use, bathymetric survey of the Pond, shoreline vegetation assessment, stream channel classification, and physical, chemical, biological, and bacteriological assessments of water quality.

This report provides a summary of the annual monitoring carried out during 2004, 2005, and 2006. The shoreline vegetation assessment and stream channel classification have been re-evaluated during January of 2009 to provide a more up to date representation of the condition of the pond. The information represented herein will be used to establish an ambient water quality baseline for the Pond. For the immediate future, this information will likely be utilized to respond to citizen concerns, determine the need for long-term monitoring, and to develop a plan for managing and maintaining the pond to insure its health and vitality.

Historic Land Use

Land use changes surrounding the Pond were assessed through available historic data obtained and analyzed from local government sources. A review of historic mapping, aerial photographs, and other relevant documents was conducted at the



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Legend

- Tributaries to Kingsmill Pond
- Kingsmill Pond Study Area

0 500 1,000 Feet

Figure 1

Kingsmill Pond Water Quality Analysis & Evaluation

Site Location Map

NOTES:

USGS Quad: Hog Island.

Source: P:\51648.01\GIS\Invoice\Basemap_invoice.mxd

Natural Resources Conservation Service (NRCS) office in New Kent County, Virginia.

NRCS aerial photographs from the 1940's and 1950's displayed the Pond residing in a considerably less developed watershed. These aerial images revealed much larger areas of unfragmented forest and very little commercial and residential development. It was not until the 1970's and 80's that commercial and residential development proliferated. Images from the Kingsmill Creek Dam Project, initiated in the 1970's by Bush Properties, clearly showed a shift in land use compared to the 1950's images. Conversely, images dated from the 1990 show substantially less new development in the watershed; however, construction activities in Kingsmill continue today.

Cross-sectional Pond Survey

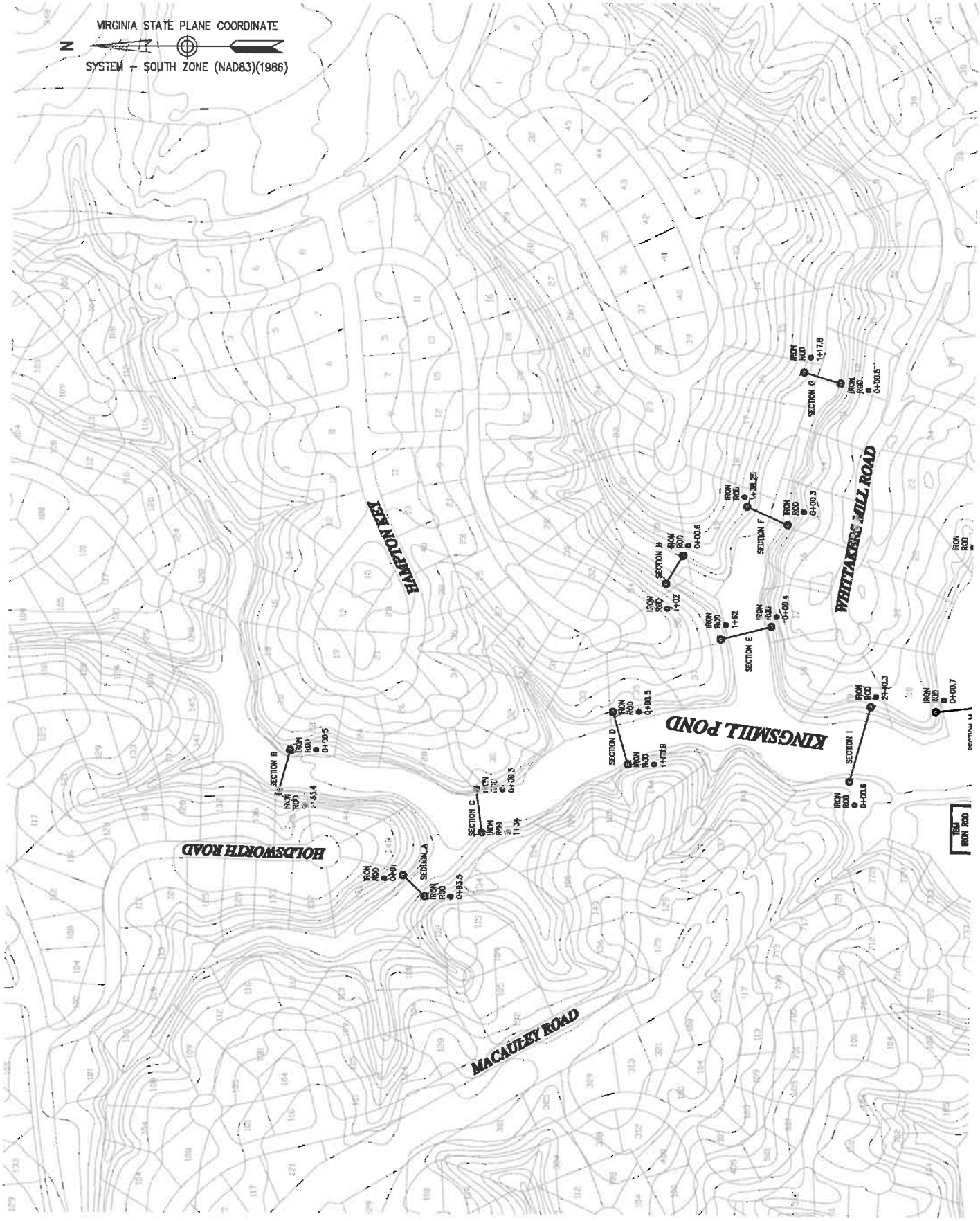
Bathymetric survey of Kingsmill Pond was conducted during 2005 and 2006 to quantify the sedimentation occurring within the Pond. Cross-sectional locations are shown on **Figure 2**. **Figures 2a** and **2b** show a comparison of pond bed elevations at these locations during the two study years.

The purpose of establishing these cross-sections was to provide a baseline from which to measure future changes in the pond bed at strategic locations due to sedimentation. Thirteen cross-sections (A through M) were selected in an effort to provide adequate coverage of the Pond and to refine our monitoring strategy for areas of expressed public concern. The ends of each cross-section were permanently marked using re-bar end pins. Each end pin was located using a Trimble™ GPS unit to provide accurate graphic representation of cross-section locations, and to ensure that future cross-section measurements will be precisely duplicated.

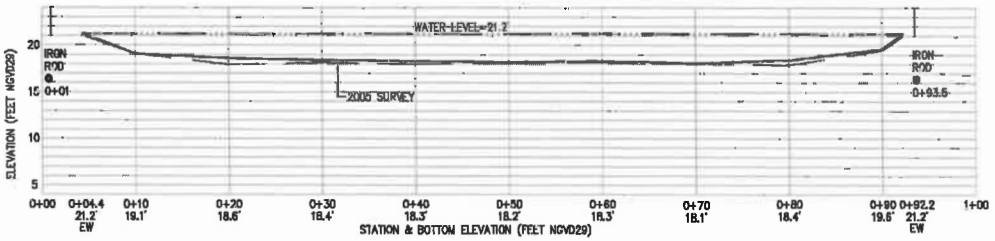
At each cross-section, a graduated survey tape was extended across the Pond. Horizontal and vertical readings were taken at the endpins, edge of water, and every ten feet between the end pins. Vertical measurements were made by extending a standard survey rod into the water until level on the pond's substrate. This method was duplicated at every cross-section location.

Because water levels in the Pond fluctuate over time, as they did during this survey, vertical measurements were referenced to the National Geodetic Vertical Datum 1929, based on the James City County Geodetic Control Network. Therefore, all plotted cross-sections indicate actual elevations of the Pond bottom at the time the survey was performed.

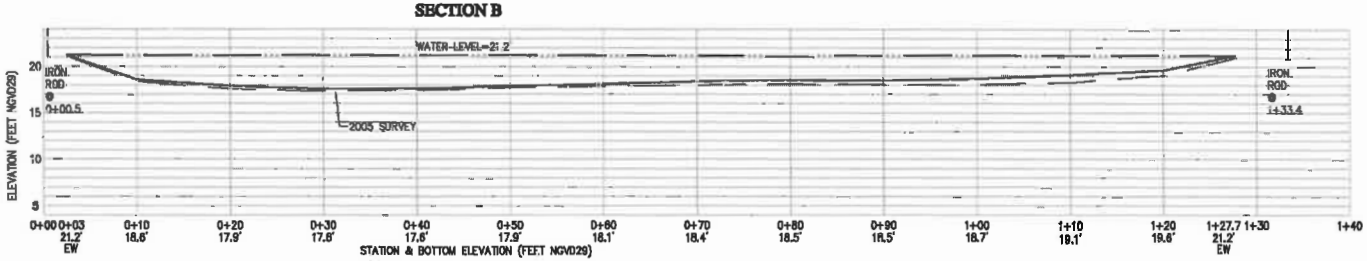
In general, **Figures 2a** and **2b** show notable sedimentation occurring between 2005 and 2006. Depositional features are apparent in most cross-sections and are especially pronounced in Sections F, G, H, I, and K where the entire pond bed appears to have risen in elevation. Additionally, large sediment deposits (deltas) are observable at


VIRGINIA STATE PLANE COORDINATE
N
SYSTEM - SOUTH ZONE (NAD83)(1986)
BAMTON KEY
WHITTAKERS MILL ROAD
KINGSMILL POND
HOLDSWORTH ROAD
MACAULEY ROAD
SECTION A
SECTION B
SECTION C
SECTION D
SECTION E
SECTION F
SECTION G
SECTION H
SECTION I
IRON ROD

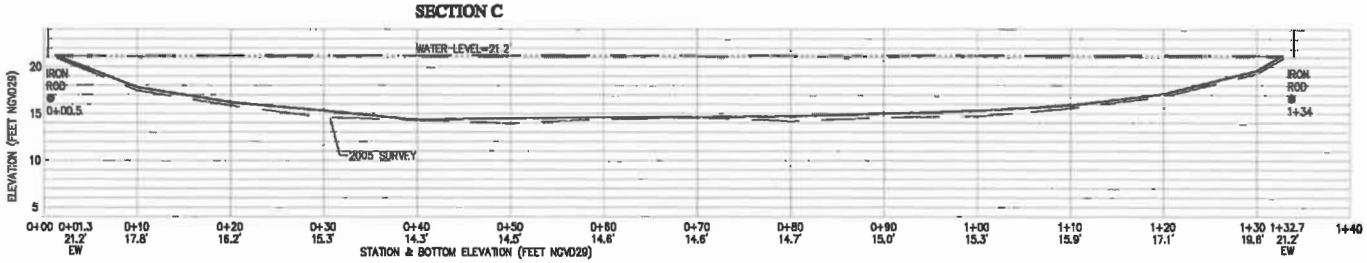
SECTION A



SECTION B



SECTION C



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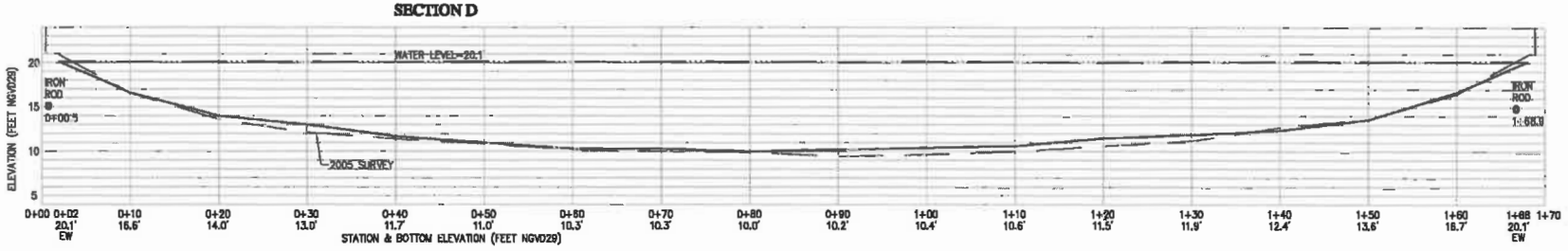
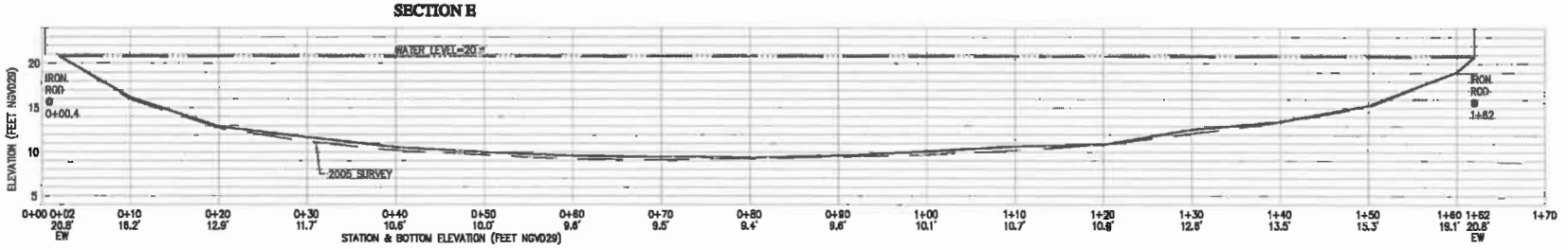
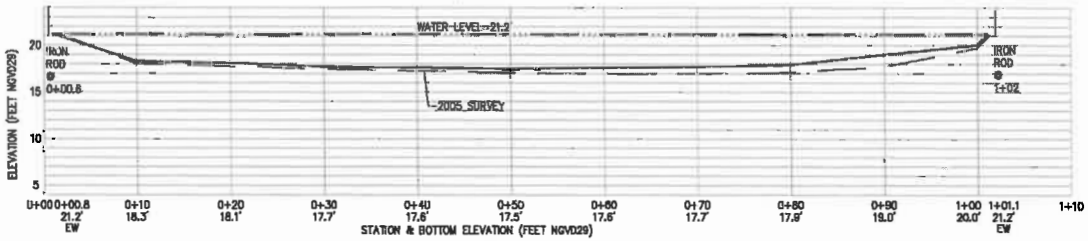


SECTION E

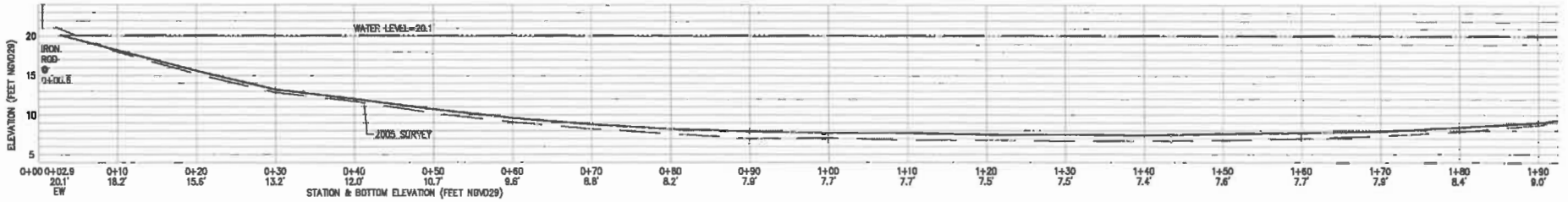


SECTION F

SECTION H



SECTION I



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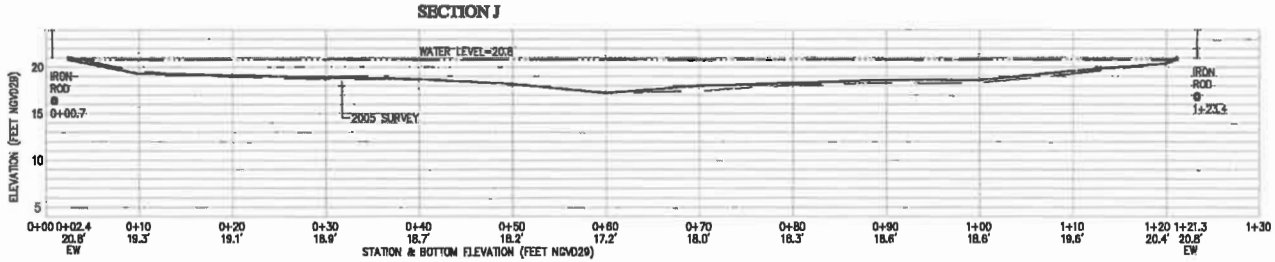

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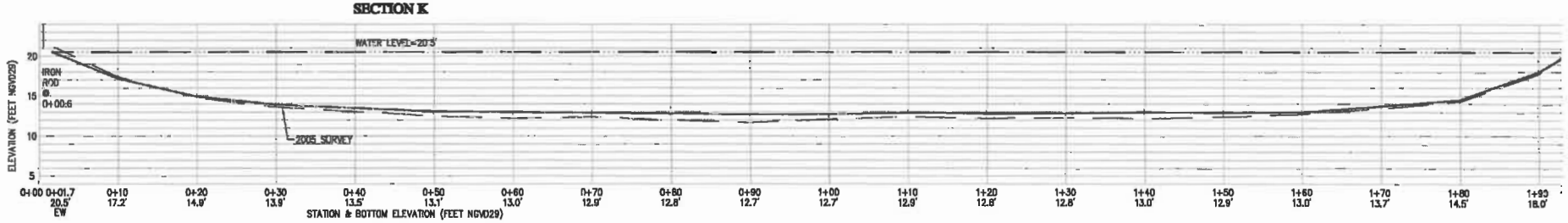
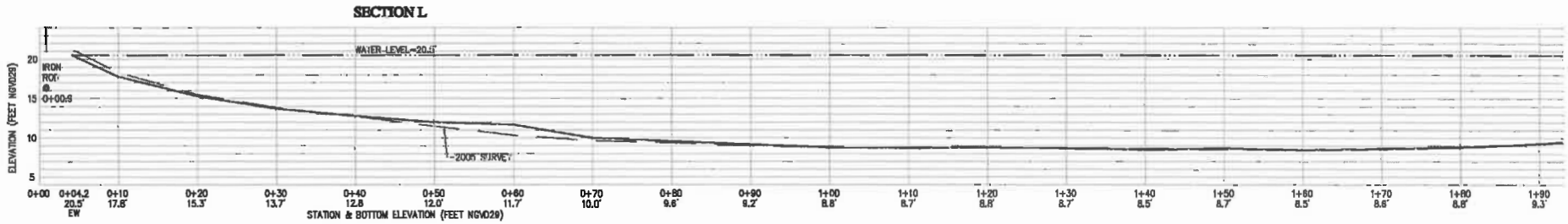


SECTION L



SECTION M

tributary mouths, encroaching on the open water portion of the Pond. These depositional features are now so well established that herbaceous and shrub vegetation have begun to take root in areas that were previously submerged.

This apparent rising of the Pond bed and the creation of deltas are likely the result of development higher in the watershed; however, this does not mean that current construction activities are to blame. Past development of buildings, roads, parking areas, sidewalks, and driveways have increased impervious surfaces within the watershed, which, in turn, have increased peak runoff volumes and rates. These changes in watershed conditions ultimately result in stream channel instability due to erosive forces now attempting to return stream channels feeding the Pond to a state of equilibrium, as described by the Channel Evolution Model. The adjustment process produces large sediment loads that are discharged downstream into the Pond. Detailed discussion of the Channel Evolution Model and channel stability within the project area can be found in the **Stream Channel Classification** section of this report.

Shoreline Vegetation Assessment

A shoreline vegetation assessment was conducted in 2005 and again in 2009 in response to landowner concerns regarding excessive removal of vegetation around Kingsmill Pond. No significant changes were observed between 2005 and 2009. Only 2009 data are represented in this report.

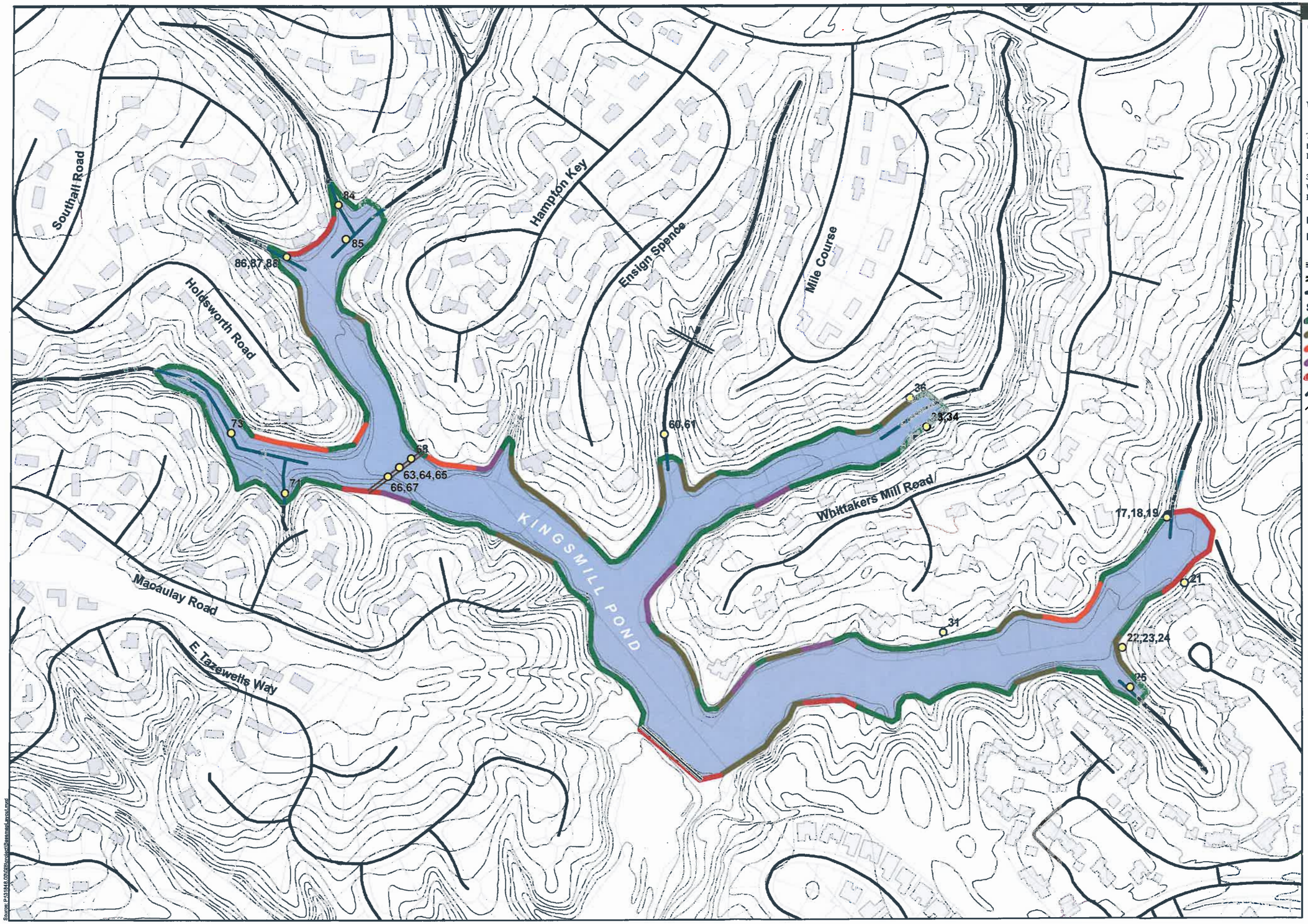
Riparian buffers provide important functions including bank stability, wildlife habitat, toxicant removal, nutrient retention, and bank shading; however, removal or thinning of the natural buffer is a common problem surrounding lakes, due to landowner desire for improved views. The results of the shoreline vegetation assessment on Kingsmill Pond revealed both natural and unnatural areas, areas that had been cleared and/or landscaped, as well as areas where the riparian buffer had been completely removed.

Shoreline Cover Types

For purposes of assessment, shoreline habitat was divided into the five categories listed below (**Figure 3**). Representative photographs for each cover type are included in **Appendix C**.

Natural Shoreline - Multiple Vegetative Layers

This is the dominant shoreline cover type on Kingsmill Pond (approximately 62 percent). These areas contain a native overstory composed mainly of tulip poplar (*Liriodendron tulipifera*), white oak (*Quercus alba*) and American beech (*Fagus grandifolia*). Understory vegetation includes dogwood (*Cornus florida*), eastern



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Legend

Bank Viewpoint Photograph Locations
- Photo Numbers Referenced on Map
- Dam
- Footbridge
- Tributaries to Kingsmill Pond

Shorline Cover Type
- Natural - Multiple Vegetated Layers
- Forested, Cleared Understory
- Forested, Landscaped Understory
- Ornamental, Landscaped
- Mowed Grass
- Streets
- Topographic Contours
- Tax Parcels
- Kingsmill Pond
- Buildings

0 150 300 Feet

Figure 3

Kingsmill Pond Water Quality Analysis & Evaluation

Shoreline Vegetation Assessment

NOTES:

Buildings and Tax Parcels may not reflect new development and/or subdivision in the project area.
Bank viewpoint photo numbers on map reference images included on the attached data compact disk.

redbud (*Cercis Canadensis*), sourwood (*Oxydendrum arboreum*), and American holly (*Ilex opaca*). These areas also contain a dense herbaceous layer (50-80 percent groundcover) composed of native vegetation. Natural shoreline provides all of the functions previously listed for riparian buffers, with minor habitat exceptions related to residential proximity. This cover type is favorable surrounding Kingsmill Pond.

Natural Shoreline - Cleared Understory

This habitat type contains the same overstory community as the Natural-Multiple Vegetated Layers designation; however, the understory has been cleared, most often to enhance a property owner's view of the pond or to facilitate future planting of ornamental and/or native vegetation. The method of clearing in these areas typically involves mowing or pruning rather than grubbing, a comparatively destructive type of clearing that involves removing root systems. This habitat type comprises approximately 18 percent of the shoreline.

Natural Shoreline - Landscaped Understory

Overstory vegetation is still intact and consists of native species; however, the understory has been cleared and replanted with ornamental and/or native vegetation. This habitat type comprises approximately 5.3 percent of the shoreline.

Ornamental/Landscaped

These areas have been cleared, mulched and replanted with ornamental and/or native vegetation. Overstory trees have been removed and root systems are most often grubbed. These areas do not provide a functional buffer due to sparse plantings and removal of herbaceous groundcover. Ornamental/Landscaped areas comprise approximately 5.7 percent of the shoreline.

Mowed Grass

Mowed grass provides very little function and value for wildlife, bank stability, and water quality. This cover type may have a few scattered trees along the bank but is mostly cleared and regularly maintained. Largely associated with the Kingsmill Golf Course and the dam at the Pond's outlet, there are a few other instances of this complete depletion of buffer adjacent to the pond; however, in some instances there is a minimal shrub buffer between the mowed edge and the edge of water. Shrub vegetation largely functions for bank stability purposes. Mowed grass represents only about 9 percent of the shoreline.

Conclusions

Overall, the shoreline of Kingsmill Pond is aesthetically pleasing and relatively stable. Because areas immediately adjacent to the Pond are steep and difficult to

access, the majority of clearing conducted by property owners has occurred where the terrain levels off and provides easy access for pruning and mowing. This has allowed the steeper areas abutting the Pond to develop naturally and support a stable fringe of native grasses and shrubs. The few isolated areas of erosion observed along the shoreline are associated with fallen trees, and more significantly, structures built by homeowners to access the shoreline for boating or passive recreation. Raw areas created by fallen trees will typically heal without intervention, or minor grading and seeding & mulching can be performed to jump-start the healing process. Eroding areas associated with shoreline access structures are a bit more difficult to stabilize because they are generally larger and consistently impacted by pedestrian traffic. Stabilization of these areas, however, can be accomplished through proper seedbed preparation, planting appropriate native species, and designating access routes with stable pathways and signage. In addition, by minimizing disturbance to the soil during clearing activities, particularly along the side slopes, the shoreline should remain relatively stable.

Stream Channel Classification

In order to further understand the source and extent of sediment contribution to Kingsmill Pond, a universal stream classification system was applied to the five primary tributaries flowing into the Pond. Totaling approximately 2.6 miles of channel, each tributary was broken up into segments based on field indicators of stability/instability relevant to the Channel Evolution Model (CEM) (Schumm, Harvey and Watson, 1984).

The Channel Evolution Model

The CEM employees a variety of field indictors that can be applied to qualitatively describe morphological conditions and degree of departure from equilibrium. Such indicators include active and abandoned floodplain features, headcutting/downcutting, vertical and concave streambanks, bank slumping, meander-bend migration, and streambed aggradation. Each of these indicators helps to define existing conditions and predict future morphological adjustments. The CEM Worksheet is included in **Appendix A**.

The CEM is comprised of five geomorphic Stages that can be identified through application of the field indicators described above. Stage I represents the stable/equilibrium condition where energy contained in stream flow is balanced by resistance of sediment flow and other channel features. This balance in energy distribution is achieved through appropriate integration of the physical characteristics associated with channel plan-form, cross-sectional shape, and streambed profile. Stage I systems typically possess a relatively small main channel capable of handling the full range of flows up to and including channel forming and maintaining (bankfull) discharge. This channel is well connected to an active

floodplain that serves to spread and dissipate energy in flows exceeding bankfull. Stage I systems are usually relatively easy to identify because they demonstrate consistency and predictability in channel form while exhibiting minimal signs of erosion and sedimentation.

A disruption in the balance between stream flow and sediment flow typically initiates Stage II, or Incision. Excess energy contained in more frequent high velocity flows is transferred to the streambed resulting in headcutting and/or downcutting. As the stream cuts a course deeper in the valley floor, streambanks become higher and steeper ultimately reaching a critical bank height or threshold of stability. When the critical bank height is exceeded streambanks begin to fail through slumping and mass wasting processes. Slumped material is washed away during significant discharge events as the system transitions from Stage II to Stage III, Widening. Streambank slumping and channel widening continue until the stream achieves a cross-sectional area large enough to distribute energy more uniformly and allow for colonization of vegetation on slumped and depositional materials. During the late phases of Stage III, channel cross-sectional area begins to stabilize as the stream migrates laterally to adjust plan form and slope. Lateral migration and the development of floodplain features within the incised channel marks the beginning of Stage IV, Stabilizing. During Stage IV, the base flow, bankfull and floodplain channels develop as the stream begins carving a predictable pattern and streambed morphology. Streambank slumping and erosional processes are minimal in Stage IV except along the outside of meander bends. As accelerated meander bend migration subsides and floodplain features become fully developed, the stream achieves a new state of equilibrium recognized as Stage V in the CEM. The Stage V stream has developed a predictable and self-maintaining pattern, dimension and profile capable of handling the full range of flows produced by its watershed. It is typically a reflection of Stage I but on a larger scale and at a lower elevation in the valley.

Degraded stream systems typically exhibit an overlap of the evolutionary stages of adjustment, and, at times several stages may occur concurrently in the system. For example, it is not unusual for Stage II (Downcutting) and Stage III (Widening) to occur at the same time in a given stream reach, especially in an urbanizing watershed experiencing radical changes in hydrologic and sediment regimes. A methodical approach, however, in applying the Model using field indicators associated with each evolutionary stage of adjustment, will generally yield the dominant geomorphic processes occurring. Recognizing and understanding these geomorphic processes allows one to accomplish the following: define the current physical state or condition of a stream; predict future morphological adjustments that are likely to occur; rank and prioritize sites for restoration based on economics, environmental sensitivity, future potential for damage to infrastructure, etc.; match appropriate restoration alternatives to instability problems; and identify a model or blueprint that represents future equilibrium potential.

Field Assessment and Conclusions

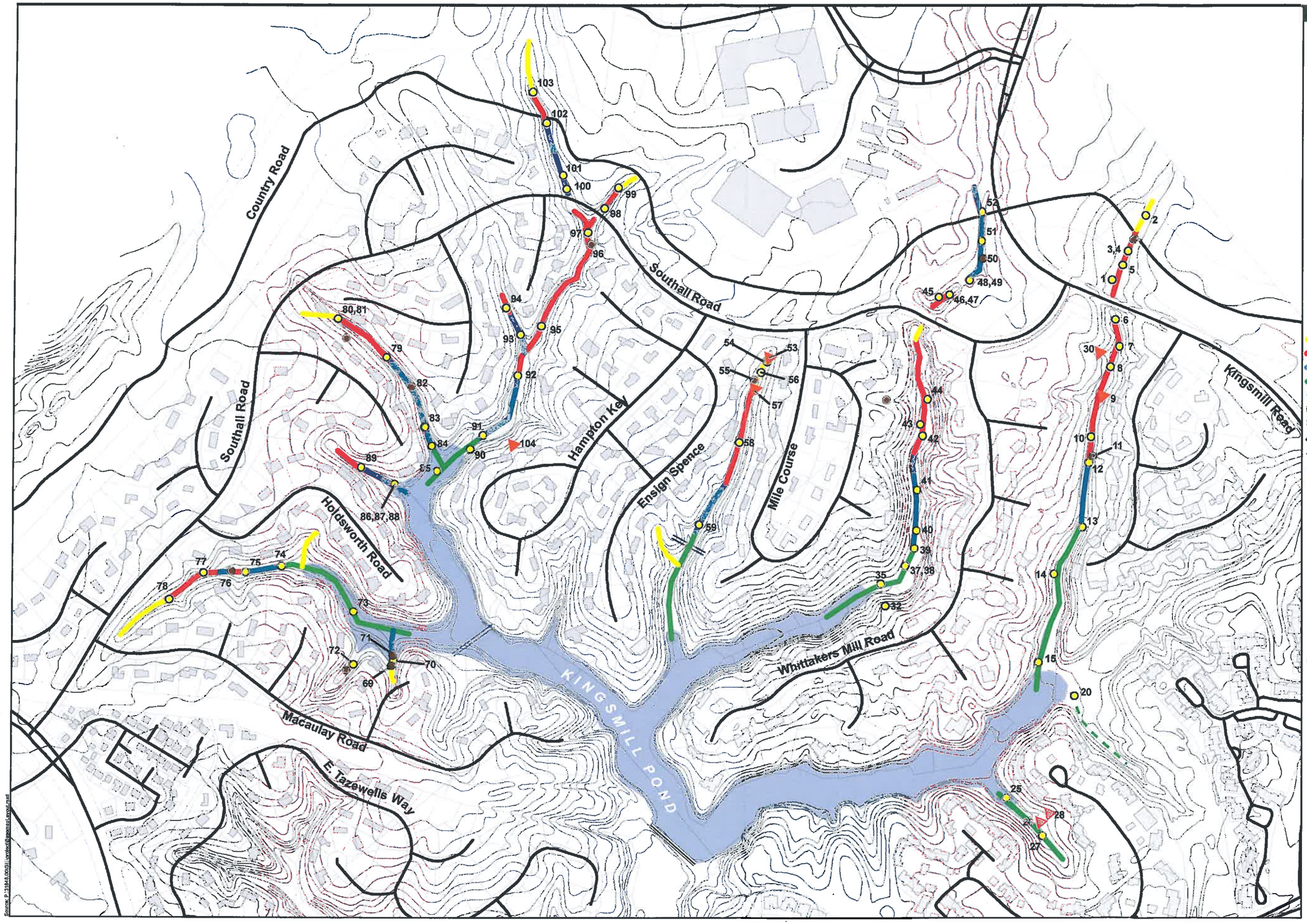
During 2005 and 2009, VHB environmental scientists performed a field survey of existing conditions along the five primary tributary channels draining to Kingsmill Pond. Only 2009 data is presented in this report. By walking the length of each stream, field indicators consistent with the CEM were used to segment and classify channel evolutionary stage corresponding to qualitative stability ratings. Stream channels classified as Stage II (incision) or as Stage III (widening), are unstable, and thus are contributing significant amounts of sediment to downstream locations through streambed and streambank erosion. Stream channels classified as Stage IV, or Stage I/V are stabilizing or stable, respectively, and hence, are not contributing as much sediment to downstream areas. Stream classifications in the study area are represented in **Figure 4**. Representative photographs of each CEM stage are included in **Appendix A**. **Table 1** shows the total distribution of CEM stages draining into Kingsmill Pond.

Table 1. CEM stream class totals draining to Kingsmill Pond.

CEM Classification	Total Length (sf)	Total Length (mi)	Contribution (%)
Stage II	1,679	0.32	12.2
Stage III	4,605	0.87	33.4
Stage IV	3,791	0.72	27.5
Stage I/V	3,722	0.70	27
Total	13,797	2.61	

The results of the field assessment showed that approximately 46% of the tributaries flowing into Kingsmill Pond are unstable due to channel incision (Stage II) and/or widening (Stage III). As shown in **Figure 4**, most of these areas are located at the upstream headwaters or immediately downstream of an impoundment, roadway crossing, or other blockage. These are the areas of greatest concern, related to sedimentation in Kingsmill Pond. Although new development in the watershed has not increased significantly in the last two to three decades, these areas continue to adjust to present stormwater flows. Downcutting in the upstream portions of these main channels also results in headcutting in side channels, creating new, deeply-cut drainage channels in place of shallow surface swales in the forested topography. Under current conditions, the majority of the sedimentation occurring in Kingsmill Pond is directly related to the erosion taking place in the upstream portions of its tributaries and side channels.

The most stable areas (Stage I/V) are located furthest downstream, just prior to entering Kingsmill Pond. These areas represent approximately 27 percent of the principal channels in the watershed. Sedimentation over many years of channel adjustment has created relatively broad, flat floodplains readily accessible by the stream with stable, vegetated banks and greater sinuosity. The lower gradient and channel elongation, caused by increased sinuosity, helps to dissipate the energy of flow and reduce excessive erosive forces.



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Legend

Channel Photograph Locations
- Photo Numbers Referenced on Map

Woody Debris/Blockages
- Photo Numbers Referenced on Map

Headcutting/Erosion
- Photo Numbers Referenced on Map

Stream Classification (CEM)
- STAGE-2: Incising
- STAGE-3: Widening
- STAGE-4: Stabilizing
- STAGE-5: Stable
- Mowed Grass Swale
- Dam
- Footbridge
- Streets
- Topographic Contours
- Tax Parcels
- Kingsmill Pond
- Buildings

0 210 420 Feet

Figure 4

Kingsmill Pond Water Quality Analysis & Evaluation

Stream Classification

NOTES:

Buildings and Tax Parcels may not reflect new development and/or subdivision in the project area.
"Stream Classification" depicts channel stability by identifying the stages of the Channel Evolution Model (CEM) (Schumm, Harvey and Watson 1984).
Photo numbers assigned to mapped point features are referenced to the images on the compact data disk attached to the report.

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Typically, channels stabilize from downstream to upstream, because downstream blockages, constrictions, and outlets to open water cause deposition of sediment loads carried from upstream erosion. Over time, this deposition is utilized as the stream reconfigures its geometry through the formation of a new main channel and floodplain area consistent with the CEM. As shown in **Figure 4** and reflected in **Table 1**, a large percentage of the tributaries flowing into Kingsmill Pond are moving in the direction of stabilization (Stage IV); however, the largest percentage (33.4%) of stream channel is currently in a widening stage (Stage III) and will continue to contribute substantial amounts of sediment for some time to come. Stage II and Stage III channel segments are priority sites for potential restorative action related to sedimentation in Kingsmill Pond. Stabilization of key stream reaches will have a significant effect on the rate of sedimentation and filling-in of the Pond.

Water Quality

Kingsmill Pond is a dynamic system that is continually undergoing physical, chemical, and biological changes, as with other urban lentic bodies with similar physiographic and biological attributes. Fluctuations are continually occurring on seasonal, daily, and hourly time scales, while large scale shifts may be occurring over a broader time frame as the system adapts to a changing watershed. Within the last 50 years, limnologists such as Robert Wetzel have documented the growing relationship of human activity to biological change in lake systems (1983). Through the evaluation of the pond's physical, chemical and biological attributes, we can make assumptions about the overall health of the Pond as it correlates to existing conditions in the surrounding watershed.

Sampling Methodology

Water quality sampling involved the assessment of physical, chemical, biological, and bacteriological conditions within Kingsmill Pond. Physical and chemical analyses were conducted annually at three locations between 2004 and 2006. Biological monitoring, benthic macroinvertebrate, zooplankton, and periphyton sampling was carried out only during 2004. In addition to gathering the annual physical and chemical data, 2005 sampling added a lake-wide fish population survey and fecal-coliform testing at a total of 14 locations. Eight of these locations were within Kingsmill Pond and an additional six locations sampled other surface waters in the watershed. The eight fecal-coliform sampling locations within Kingsmill Pond were replicated during 2006 monitoring, as well.

Sampling protocols for all years of monitoring were consistent with the Kingsmill Pond Sampling Plan (**Appendix B**). All sampling locations are shown on **Figure 5**.

Physical and Chemical

Physical assessment was performed at three locations (PC01, PC02, and PC03) during 2004, 2005, and 2006. Parameters included temperature, dissolved oxygen (DO), pH, conductivity, and turbidity. Readings were taken at three depths in order to produce a vertical gradient representative of conditions in the Pond's various strata. The Hach™ Sension 156 Portable Multiparameter Meter used for sample collection was pre- and post-calibrated for each field sampling event. Turbidity was measured using a Secchi disk. This was accomplished by lowering the disk into the water until it disappears from view. The depth threshold at which it disappears is the measure of turbidity, or the relative amount of suspended sediment and algae in the water column affecting light penetration.

Water samples for laboratory chemical analysis were collected at the same locations as physical field measurements (**Figure 5**). Sampling protocols followed EPA standards (USEPA 1994) and were consistent with the Kingsmill Sampling Plan attached in **Appendix B**. Parameters measured by the contracted laboratory include total nitrogen, total phosphorus, dissolved organic carbon, dissolved inorganic carbon, chlorophyll-a, and total petroleum hydrocarbons (oil and grease). The implications of each parameter, as it relates to water quality, are discussed in the **Water Quality Findings** section of this report.

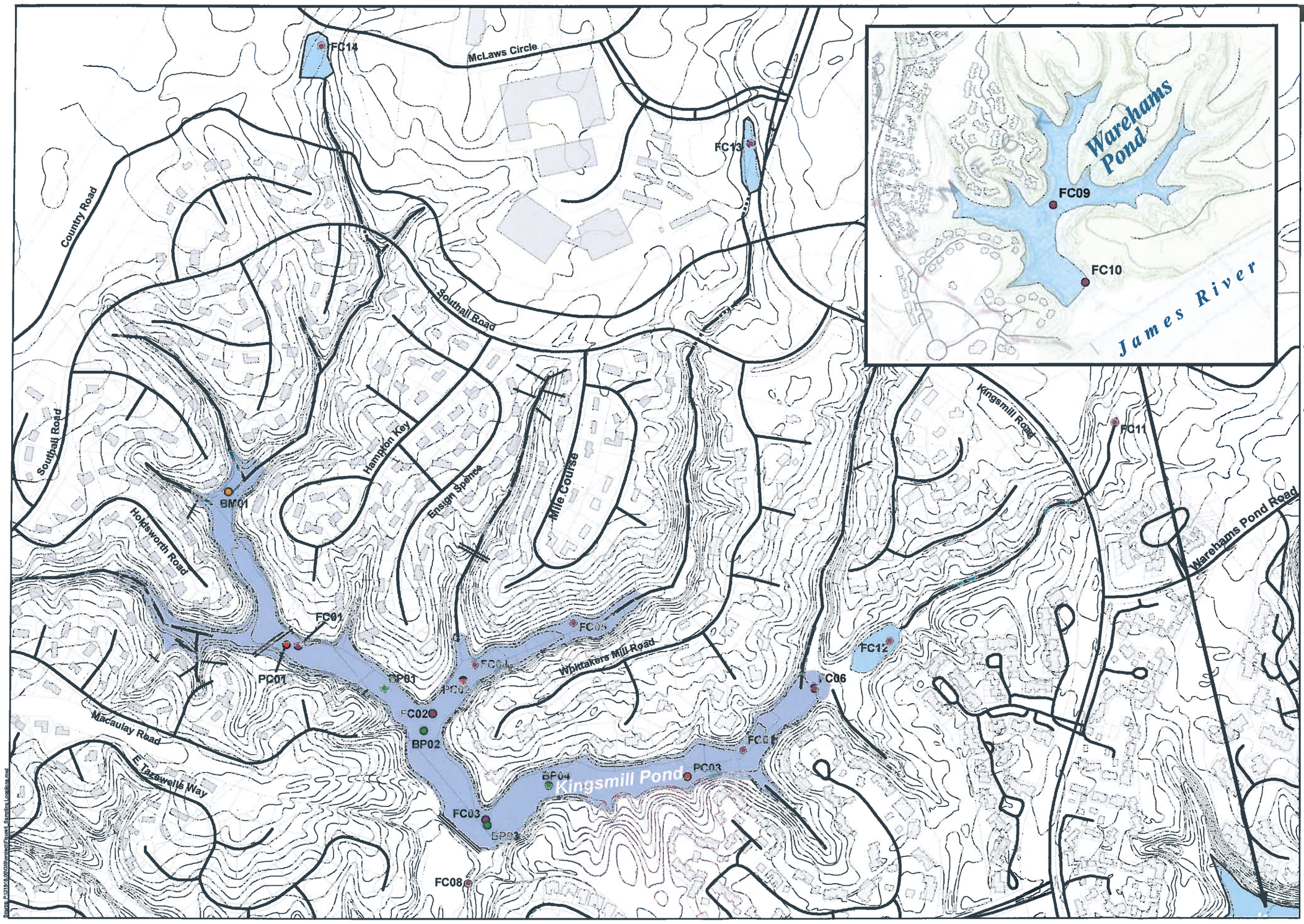
Biological

Biological assessment involved several components, including a pond-wide fish population suvey, benthic macroinvertebrate collection, zooplankton collection, and periphyton sampling. The purpose of performing this range of analyses was to represent biological conditions at all trophic stages in the pond. Individually and as a group, these elements help to make important inferences about ecological integrity and water quality. Guidance was provided by the USEPA Lake and Reservoir Bioassessment and Biocriteria Technical Guidance Document (1996).

Fish

A fish population survey was conducted in collaboration with the Williamsburg District Office of the Virginia Department of Game and Inland Fisheries (VDGIF) during 2005. Sampling involved boat-mounted electro-fishing techniques, covering the sub-litoral zone around the periphery of the pond for the duration of one hour. The investigation focused on exploring favorable fish habitat, including coves and inlets containing snags, subterranean caves, subsurface benches, and sand and gravel beds. The objective of the survey was to create a species list representative of the diversity and community structure currently inhabiting the pond.

All specimens collected along the Pond's periphery were identified to the species level, counted, measured, weighed, and examined for external anomalies, (i.e. deformities, eroded fins, lesions, and growths). Young-of-the-year were noted as



VHB

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Legend

Sampling Locations

Analyses

- Physical and Chemical
- Biological - Periphyton
- Biological - Macroinvertebrate
- Bacteriological (Fecal Coliform)

- Tributary to Unnamed Pond
- Tributaries to Kingsmill Pond
- Culverted Channel
- Dam
- Footbridge
- Streets
- Topographic Contours
- Tax Parcels
- Kingsmill Pond
- Other Ponds
- Buildings

0 240 480 Feet

Figure 5

Kingsmill Pond Water Quality Analysis & Evaluation

Water Quality Sample Locations

NOTES:

Buildings and Tax Parcels may not reflect new development and/or subdivision in the project area.

indicators of reproductive success in the Pond. All fish sampled during the survey were later returned to the pond.

Aquatic Macroinvertebrates

Aquatic macroinvertebrates were collected from a single location in the northwestern portion of the pond during 2004. This area was selected for sampling because of its broad, shallow habitat conducive to kick sampling. Collection methods were consistent with NYDEC sampling protocols for lake habitats (NYDEC 1999).

Aquatic macroinvertebrates include aquatic insects, crustaceans, gastropods, bivalves and worms. Using a mesh No. 30, 4'x4' kick seine in the shallow sub-littoral zone of the pond, kick samples were collected and composited from random stops along the shoreline and mud flats. The composite sample was then preserved in ethanol. In the laboratory, the sample was sorted completely, removing all invertebrates from woody debris and sediment. Individuals were then identified to taxonomic family level.

Zooplankton

The term zooplankton is a general classification referring to many different types and sizes of organisms. For the purpose of this report, Zooplankton are all drifting heterotrophic organisms in Kingmill Pond, including Cladocera, copepods, and rotifers.

Zooplankton collection was performed with a mesh No. 80, 30 cm vertical tow net pulled behind the sampling vessel during physical and chemical sampling. The construction of the net prevented the escape of active organisms during stationary sampling. At the completion of collection activities, specimens were preserved in ethanol for later identification. In the laboratory, individuals were identified to taxonomic genus level or to the lowest practicable level, depending on specimen condition and life stage. Zooplankton sampling was conducted only during 2004 monitoring.

Periphyton

Periphyton is a complex of algae, cyanobacteria, heterotrophic microbes, and detritus which is attached to submerged surfaces in the Pond, such as woody debris or rocks. In order to sample periphyton in Kingsmill Pond, artificial substrate sampling devices (Hester-Dendy multiplates) were deployed at four locations (**Figure 5**). The devices were suspended from a buoy at the surface and weighted to the Pond's bottom, to allow mid-water column placement. Suspended at various depths, periphyton would colonize the plates' surfaces over the course of several weeks. Later, the plates were scraped and samples were preserved in Lugol's solution. Periphyton sampling was conducted only during 2004 monitoring.

Bacteriological (Fecal-coliform)

Fecal-coliform analysis was added to the Scope of Work in 2005, sampling at eight locations throughout Kingsmill Pond and six additional locations in other surface waters within the watershed. During 2006, the eight sampling locations within the Pond were replicated; however, location FC08 was moved to a location downstream of the dam's spillway. Sampling locations from both years are shown in **Figure 5.**

Sampling protocols followed EPA standards (USEPA 1994) and were consistent with the Kingsmill Sampling Plan attached in **Appendix B.** An independent laboratory was responsible for processing all samples. Results and interpretation of the data are included in the **Water Quality Findings** section below.

Water Quality Findings

The following sections will report the results of each assessment parameter and will discuss the implications of these findings as they relate to water quality and ecological integrity within Kingsmill Pond.

Physical

The purpose of conducting a physical assessment was to describe current conditions in the Pond. At three representative locations, temperature, DO, pH, conductivity, and turbidity were measured. As these parameters may fluctuate greatly on a seasonal and even hourly basis, the data collected here provides a snap-shot look at water quality conditions in Kingsmill Pond. Sampling events were selected at various times of the year in an attempt to capture seasonal variation in existing conditions. As previously stated, readings were taken at three different depths in order to produce a vertical gradient representative of conditions within the various strata of the Pond. Physical data collected in-situ during all three years of study can be found in **Table 2.**

Temperature

Deeper lentic water bodies are typically broken down into three main layers: the epilimnion, the thermocline, and the hypolimnion. The epilimnion is the surface layer of the pond and the zone of light penetration. The majority of productivity and photosynthesis occur in this zone. This is also the layer that is most susceptible to heating and cooling by atmospheric changes in temperature, especially season to season. Therefore, temperature and dissolved oxygen may have a wide range of variability in this layer. The deeper hypolimnion is more stable in terms of temperature and dissolved oxygen. It is usually warmer in the winter and cooler in the summer than the epilimnion. The thermocline is a small but distinct layer in which temperature changes more rapidly with depth than the layers above and below it. It is the region transitioning between the epilimnion and the hypolimnion.

Table 2. Physical Field Sampling Data

		10/12/2004		12/6/2004		2/23/2005		3/17/2005		6/9/2005		6/24/2005		9/7/2005		6/22/2006		12/7/2006	
Location	Parameter	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result
PC01	Temperature	2'	65.8°F	2'	53.7°F	2'	49.1°F	2'	47.1°F	2'	81°F	surface	79.5°F	2	93°F	2.1	83.8°F	2	50°F
		4'	66.2°F	4'	50.3°F	4'	47.3°F	4'	46.5°F	3'	82.2°F			4	87.3°F	4.2	82.4°F	4	48.2°F
		5.5'	65.4°F	5.5'	50.3°F	5.5'	46.9°F	5.5'	46.5°F	5.5'	78.8°F			5.5	77.9°F	6.5	82.6°F	6	48.2°F
	Dissolved Oxygen	2'	6.63 mg/L	2'	6.71 mg/L	2'	10.9 mg/L	2'	12.9 mg/L	2'	8.8 mg/L	surface	11.2 mg/L	2	6.21 mg/L	2.1	12.6 mg/L	2	7.1 mg/L
		4'	6.35 mg/L	4'	6.50 mg/L	4'	14.4 mg/L	4'	12.8 mg/L	3'	8.0 mg/L			4	5.81 mg/L	4.2	9.5 mg/L	4	6.9 mg/L
		5.5'	6.30 mg/L	5.5'	6.80 mg/L	5.5'	14.8 mg/L	5.5'	12.5 mg/L	5.5'	6.3 mg/L			5.5	5.7 mg/L	6.5	11.6 mg/L	6	7.3 mg/L
	pH	2'	7.07	2'	8.76	2'	8.2	2'	8.33	2'	7.4	surface	7.5	2	6.84	2.1	8.06	2	7.42
		4'	7.24	4'	7.85	4'	8.3	4'	8.43	3'	7.7			4	7.25	4.2	8.06	4	7.38
		5.5'	7.5	5.5'	7.84	5.5'	8.31	5.5'	8.46	5.5'	7.77			5.5	7.53	6.5	8.06	6	7.33
	Conductivity	2'	305	2'	333	2'	393	2'	392	2'	344	surface	336	2	233	2.1	241	2	276
		4'	308	4'	332	4'	393	4'	376	3'	342			4	246	4.2	241	4	276
		5.5'	317	5.5'	335	5.5'	395	5.5'	382	5.5'	350			5.5	250	6.5	241	6	294
	Total Dissolved Solids	2'	146 mg/L	2'	160 mg/L	2'	NA	2'	188.9mg/L	2'	165.8mg/L	surface	161.5mg/L	2	112.5 mg/L	2.1	115.7 mg/L	2	132.6 mg/L
		4'	148 mg/L	4'	159.1 mg/L	4'	189.5 mg/L	4'	181.2 mg/L	3'	164.8 mg/L			4	118.1 mg/L	4.2	115.7 mg/L	4	132.5 mg/L
		5.5'	150.4 mg/L	5.5'	161.2 mg/L	5.5'	190.5 mg/L	5.5'	183.9 mg/L	5.5'	168.7 mg/L			5.5	118 mg/L	6.5	115.7 mg/L	6	141.1 mg/L
	Sechi Depth		1.8'		3.7'		3.5'		3.5'		3.5'		2.0'		1.9'		*		*

* NA - Not Available

		10/12/2004		12/6/2004		2/23/2005		3/17/2005		6/9/2005		6/24/2005		9/7/2005		6/22/2006		12/7/2006	
Location	Parameter	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result
PC02	Temperature	1'	68.7°F	1'	50.3°F	1'	48.3°F	1'	47.3°F	1'	81.9°F	surface	79.5°F	1	87.5°F	3.5	82.9°F	3	50°F
		4'	67.2°F	4'	50.1°F	4'	47.6°F	4'	46.5°F	4'	79.1°F			4	79.8°F	7	76.6°F	6	50°F
		7.0'	67.2°F	7.0'	50.0°F	8.0'	46.5°F	7.0'	46.9°F	7'	71.5°F			7	76.8°F	10.5	75.0°F	9	50°F
	Dissolved Oxygen	1'	6.70 mg/L	1'	7.88 mg/L	1'	14.0 mg/L	1'	11.7 mg/L	1'	8.3 mg/L	surface	10.7 mg/L	1	6.65 mg/L	3.5	8.2 mg/L	3	7.3 mg/L
		4'	6.28 mg/L	4'	7.25 mg/L	4'	14.0 mg/L	4'	11.8 mg/L	4'	8.3 mg/L			4	6.28 mg/L	7	5.28 mg/L	6	6.3 mg/L
		7.0'	5.92 mg/L	7.0'	6.50 mg/L	8.0'	12.5 mg/L	7.0'	11.6 mg/L	7'	4.0 mg/L			7	6.1 mg/L	10.5	7.95 mg/L	9	7.3 mg/L
	pH	1'	7.65	1'	7.72	1'	8.41	1'	8.59	1'	8.02	surface	7.2	1	7.85	3.5	7.37	3	7.4
		4'	7.66	4'	7.77	4'	8.4	4'	8.59	4'	8.01			4	7.24	7	7.37	6	7.4
		7.0'	7.66	7.0'	7.8	8.0'	8.4	7.0'	8.42	7'	7.66			7	6.99	10.5	7.37	9	7.46
	Conductivity	1'	305	1'	324	1'	390	1'	372	1'	338	surface	332	1	255	3.5	269	3	274
		4'	302	4'	326	4'	389	4'	373	4'	345			4	235	7	269	6	275
		7.0'	301	7.0'	325	8.0'	388	7.0'	382	7'	340			7	251	10.5	269	9	275
	Total Dissolved Solids	1'	146.1 mg/L	1'	150.6 mg/L	1'	188.1 mg/L	1'	179.5 mg/L	1'	162.7mg/L	surface	160 mg/L	1	117.8 mg/L	3.5	129 mg/L	3	131.6 mg/L
		4'	146.0 mg/L	4'	157.0 mg/L	4'	187.7 mg/L	4'	179.6 mg/L	4'	166.2 mg/L			4	112.5 mg/L	7	129 mg/L	6	132.0 mg/L
		7.0'	144.5 mg/L	7.0'	156.3 mg/L	8.0'	187.3 mg/L	7.0'	184.2 mg/L	7'	163.7 mg/L			7	120.8 mg/L	10.5	129 mg/L	9	131.9 mg/L
	Sechi Depth		1.8'		3.7'		3.5'		2'		3.7		2.8'		1.9'		*		*

		10/12/2004		12/6/2004		2/23/2005		3/17/2006		6/9/2005		6/24/2005		9/7/2005		6/22/2006		12/7/2006	
Location	Parameter	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result	Depth	Result
PC03	Temperature	1'	67.2°F	1'	50.1°F	1'	49.4°F	1'	47.1°F	Van Dorn Sampler lost samples not taken		surface	78.4°F	1	86.5°F	4.8	82.0°F	3	50°F
		4'	68.1°F	4'	50.1°F	4'	48.2°F	4'	46.7°F					4	81.1°F	9.6	74.7°F	6	51.8°F
		7.5'	67.2°F	7.5'	49.6°F	7.5'	47.8°F	7.5'	47.1°F					7.5	70.7°F	14.5	72.0°F	9	50°F
	Dissolved Oxygen	1'	6.34 mg/L	1'	6.60 mg/L	1'	14.7 mg/L	1'	N/A			surface	14.7 mg/L	1	6.13 mg/L	4.8	9.2 mg/L	3	7.3 mg/L
		4'	6.72 mg/L	4'	6.10 mg/L	4'	14.3 mg/L	4'	N/A					4	5.97 mg/L	9.6	2.1 mg/L	6	7.5 mg/L
		7.5'	5.85 mg/L	7.5'	6.76 mg/L	7.5'	14.5 mg/L	7.5'	N/A					7.5	5.89 mg/L	14.5	2.48 mg/L	9	7.7 mg/L
	pH	1'	7.66	1'	7.2	1'	8.41	1'	8.57			surface	7.4	1	6.61	4.8	7.05	3	7.47
		4'	7.75	4'	7.36	4'	8.44	4'	8.6					4	6.56	9.6	7.05	6	7.38
		7.5'	7.67	7.5'	7.53	7.5'	8.45	7.5'	8.4					7.5	6.38	14.5	7.05	9	7.3
	Conductivity	1'	299	1'	333	1'	397	1'	373			surface	330	1	234	4.8	342	3	276
		4'	309	4'	326	4'	398	4'	379					4	272	9.6	342	6	276
		7.5'	326	7.5'	327	7.5'	401	7.5'	386					7.5	305	14.5	342	9	275
	Total Dissolved Solids	1'	144.9 mg/L	1'	160.1 mg/L	1'	191.3 mg/L	1'	179.7 mg/L			surface	161.9 mg/L	1	112 mg/L	4.8	164.8 mg/L	3	132.6 mg/L
		4'	148.2 mg/L	4'	157.7 mg/L	4'	191.3 mg/L	4'	182.8 mg/L					4	80 mg/L	9.6	164.8 mg/L	6	132.6 mg/L
		7.5'	156.7 mg/L	7.5'	157.6 mg/L	7.5'	193.4 mg/L	7.5'	186.3 mg/L					7.5	86.1 mg/L	14.5	164.8 mg/L	9	132.2 mg/L
	Sechi Depth		2.0'		4.5'		3.5'		1.7'		3.1'		2.3'		2.4'		*		*

* NA - Not Available

Kingsmill Pond, with an average depth of less than ten feet, consists of a single mixed layer. The data from the physical assessment shows that temperatures are more or less consistent throughout the depth profile for all three sampling locations, and they shift consistently with the seasons. Summer water temperatures (June and September) were slightly elevated in the top two feet; however, winter water temperatures (December and February) were not notably different depending on depth. This may be attributable to increased turbidity from algal growth during summer months, preventing light penetration to deeper waters. Secchi disk readings support this assumption, showing an average depth of 2.62 feet in summer compared to an average depth of 3.73 in winter.

Dissolved Oxygen

Dissolved oxygen in Kingsmill Pond is highly variable, as it is in most lentic water bodies, because it is very much dependent on temperature and the process of photosynthesis. Both of these factors fluctuate greatly throughout a single day and change from season to season. Nonetheless, dissolved oxygen is perhaps the most limiting factor for the biology of the pond.

It can be assumed that dissolved oxygen will be at its highest level between 10:00AM and 2:00PM, when the sun is at its brightest and photosynthesis is most productive. During photosynthesis, carbon dioxide is consumed and oxygen is released. It is not uncommon for mid-day dissolved oxygen levels to reach supersaturated conditions (>100%) in eutrophic environments. Conversely, dissolved oxygen levels plummet in these environments during the night, as photosynthesis ceases. A high biological oxygen demand continues to consume the dissolved oxygen for decomposition processes, again releasing carbon dioxide as a byproduct. Drastic swings in dissolved oxygen can be detrimental to the biota, causing major fish kills. These conditions do not; however, appear to be representative of Kingsmill Pond.

During the summer, dissolved oxygen ranged from 2.1 to 12.6 mg/L. The span of these data is likely due to the time of day sampling was performed. Winter dissolved oxygen levels also varied greatly between 6.5 and 14.8 mg/L; however, values were consistent across sites and throughout the vertical profile. In review of the data, it appears that the December values are more similar to those in October and are consistently lower than the values in February. This may be attributable to a higher biological oxygen demand in the fall, as leaf drop provides large amounts of organic material and warmer temperatures increase bacterial productivity, and, in turn, decomposition rates.

Generally, dissolved oxygen within Kingsmill Pond has been well above the Virginia Water Quality Standard of 4.0 mg/L (9 VAC 25-260). Over the course of this three-year study, dissolved oxygen levels measured at or below this threshold on two occasions. Site PC02 on June 9, 2005 and site PC03 on June 22, 2005 had DO measurements of 4.0 mg/L and 2.1/2.48 mg/L, respectively. On both of these occasions, low values were observed >4 feet below the water's surface, while water

near the surface showed levels well above the threshold. The low readings are inconsistent with simultaneous readings at other locations in the Pond. Therefore, it may be possible that they were measured in error. These data should not be regarded as reflective of conditions within the pond.

pH

The pH of a solution is a measure of how acidic or alkaline it is. On a scale from 0-14, acidic solutions fall below 6.9 and alkaline solutions fall above 7.1. Neutral pH is at 7.0. The pH of an aquatic habitat can have an effect on the biota, however, there is a relatively large span of acceptable values, as defined by the Virginia Water Quality Standards. Standards range from no less than pH of 6.0 and no more than pH 9.0. Levels of pH within Kingsmill Pond were relatively consistent over time and across sampling locations, ranging from 6.38 to 8.76. These values appear to be at acceptable levels and reflect healthy ecological conditions in the Pond.

Conductivity

Conductivity is a measure of the ability of water to pass an electrical current. The presence of dissolved chloride, nitrate, sulfate, phosphate, magnesium, calcium, iron, and aluminum increase conductivity in direct relation with increased concentrations. Generally, conductivity is most affected by chloride entered into the system from roadway runoff.

Conductivity in the pond is only slightly high by conventional limnology standards. Measurements below 100 micromhos/cm are considered relatively low, while measurements of 300 micromhos/cm and above are considered relatively high. Habitats with low conductivity are generally represented by nutrient poor systems, such as alpine streams, with very little productivity. We would not expect Kingsmill pond to have conductivity measurements within the low range. The Pond's values ranged from 233micromhos/cm to 401 micromhos/cm with a mean of 307.8 micromhos/cm. Conductivity values within the Pond are consistent with predicted values and appear to be within the normal range.

Chemical

Water samples collected at locations PC01, PC02, and PC03 were analyzed by an independent laboratory for total nitrogen, total phosphorus, dissolved organic carbon, dissolved inorganic carbon, chlorophyll-a, and total petroleum hydrocarbons (oil and grease). Chemical data from 2004, 2005, and 2006 are included in **Tables 3, 4, and 5**, respectively.

Concentrations for chlorophyll-a had the greatest range during October, 2004 sampling. Values varied between from 8.4 mg/m^3 at Site PC01 to 16.0 mg/m^3 at Site PC03. Concentrations above 4.0 mg/m^3 typically indicate algal blooms conditions.

Table 3. 2004 Chemical Sampling Results

Location	Date	Parameter	Results
PC01	10-12-04	Chlorophyll-a	8.4 mg/m^3
		Dissolved Organic Carbon	3.6 mg/L
		Dissolved Inorganic Carbon	4.1 mg/L
		Total Phosphorus	0.08 mg/L
		Total Nitrogen	1.6 mg/L
PC02	10-12-04	Chlorophyll-a	15.5 mg/m^3
		Dissolved Organic Carbon	3.8 mg/L
		Dissolved Inorganic Carbon	3.9 mg/L
		Total Phosphorus	0.06 mg/L
		Total Nitrogen	1.6 mg/L
PC03	10-12-04	Chlorophyll-a	16.0 mg/m^3
		Dissolved Organic Carbon	4.0 mg/L
		Dissolved Inorganic Carbon	4.1 mg/L
		Total Phosphorus	0.08 mg/L
		Total Nitrogen	1.3 mg/L

Table 4. 2005 Chemical Sampling Results

Location	Date	Parameter	Results
PC01	06-09-05	Chlorophyll-a	8.1mg/m^3
		Dissolved Organic Carbon	9.8 mg/L
		Dissolved Inorganic Carbon	14.5 mg/L
		Total Phosphorus	BDL
		Total Nitrogen	0.9 mg/L
PC02	06-09-05	Chlorophyll-a	8.0 mg/m^3
		Dissolved Organic Carbon	4.3 mg/L
		Dissolved Inorganic Carbon	4.1 mg/L
		Total Phosphorus	BDL
		Total Nitrogen	0.6 mg/L
PC03	06-24-05	Chlorophyll-a	*
		Dissolved Organic Carbon	4.3 mg/L
		Dissolved Inorganic Carbon	5.6 mg/L
		Total Phosphorus	BDL
		Total Nitrogen	0.3 mg/L

* NA – Not Available
BDL – Below Detectable Limit

Table 5. 2006 Chemical Sampling Results

Location	Date	Parameter	Results
PC01	12-06-06	Chlorophyll-a	1.46 mg/m^3
		Dissolved Organic Carbon	9.7 mg/L
		Dissolved Inorganic Carbon	31.0 mg/L
		Total Phosphorus	BDL
		Total Nitrogen	0.7 mg/L
PC02	12-06-06	Chlorophyll-a	2.18 mg/m^3
		Dissolved Organic Carbon	18.8 mg/L
		Dissolved Inorganic Carbon	36.4 mg/L
		Total Phosphorus	BDL
		Total Nitrogen	0.8 mg/L
PC03	12-06-06	Chlorophyll-a	1.45 mg/m^3
		Dissolved Organic Carbon	32.7 mg/L
		Dissolved Inorganic Carbon	34.8 mg/L
		Total Phosphorus	BDL
		Total Nitrogen	1.0 mg/L

BDL – Below Detectable Limit

Based upon the results of the laboratory testing, it appears that algal biomass is more concentrated in the portion of the pond closest to the golf course, which is likely the result of excess nutrients entering the system from fertilizers used on the fairway. Spring concentrations in 2005 showed an approximate 50 percent decrease in chlorophyll-a concentrations. Concentrations in June 2005 ranged from 9.2 mg/m^3 to 8.0 mg/m^3. Cholorphyll-a appears to steadily increase toward late spring and continues until the first frost. These findings are consistent with the growing season. Warmer weather results in increased productivity and algal blooms are generally most prolific at the peak of the summer.

Total Nitrogen was relatively consistent throughout both the water column and within the pond itself in October 2004. However, results indicate total nitrogen was most concentrated at both PC01 and PC02 with a result of 1.6 mg/L. Presence of total nitrogen at a concentration of greater than 1.0 mg/L is typically a strong indicator of algal growth within the water column. Total phosphorus is often manifested in the water column both as soluble and organic phosphorous. However, sample results in October 2004 revealed total phosphorus was evenly concentrated throughout each sampling location ranging from 0.06 mg/L at PC02 to 0.08 mg/L at PC01 and at PC03, respectively. Both total nitrogen and total phosphorus decreased in concentration in the June 2005 sampling results. Total phosphorus remained below detectable limits (<0.1mg/L) for PC01, PC02, and PC03 in 2006, as well, and total nitrogen concentrations dropped by nearly 40 percent from October 2004 levels.

Dissolved organic carbon and dissolved inorganic carbon are usually more concentrated in a pond when leaf litter is present. As leaf material decomposes, it becomes less buoyant and sinks to the bottom of the pond. Prior to decomposition, leaf material contains carbon in its organic form. As the material breaks down, the organic carbon is transformed into its inorganic form, dissolved in water. Concentrations for both dissolved organic carbon and dissolved inorganic carbon were relatively consistent at all sampling locations in October 2004. Dissolved inorganic carbon, at 4.1 mg/L, was higher at PC01 and PC03, while dissolved organic carbon, at 4.0 mg/L, was highest at PC03. Organic carbon and inorganic carbon levels were similar between October 2004 and June 2005 at PC02 and PC03; however; the level of 14.5 mg/L for dissolved inorganic carbon and 9.8 mg/L at PC01 in June 2005 were two to three times higher than concentrations observed in October 2004. Both dissolved organic carbon and dissolved inorganic carbon reached the highest levels seen during this three-year investigation in December of 2006. Levels were approximately seven times the values of the previous year at sampling locations PC02 and PC03.

Samples for total petroleum hydrocarbons were only collected at PC01, PC02, and PC03 on March 17, 2004. All three samples collected exhibited concentrations below laboratory detection limits (BDL).

Oil and grease samples were collected at PC01, PC02, and PC03 on March 17, 2005, June 24, 2005, and September 8, 2005. Additional samples were collected at five

locations within Kingmill Pond, and in the receiving waters beyond the emergency spillway. Six additional locations outside of the Pond were sampled on September 8, 2005. Highest concentrations of 28 mg/L and 24 mg/L occurred at PC02 and PC03 on June 24, 2005.

Samples for oil and grease collected outside of Kingsmill Pond were deemed to be at or below detection limits (i.e. 5 mg/L) and were thus likely will not require any additional sampling.

Biological

Fish

A total of nine fish species were identified during the 2005 fish population survey with the Virginia Department of Game and Inland Fisheries (VDGIF). These species are listed below:

- Redear Sunfish (*Lepomis microlophus*)
- Bluegill (*Lepomis macrochirus*)
- American eel (*Anguilla rostrata*)
- Largemouth Bass (*Micropterus salmoides*)
- Black Crappie (*Pomoxis nigromaculates*)
- Gizzard Shad (*Dorosoma cepedianum*)
- Golden shiner (*Notemigonus crysoleucas*)
- Brown Bullhead (*Ictalurus nebulosus*)
- Common Carp (*Cyprinus carpio*)

The most prevalent species observed during the survey were bluegill and largemouth bass. Largemouth bass were most prevalent in shallower, shaded areas in coves and inlets adjacent to shoreline canopy habitat. Gizzard shad appeared to prefer deeper, less shaded areas between the principal spillway and lower reach of the golf course. Blugill were observed near the surface in both shallow and deeper waters close to the shoreline in secluded habitat.

Fish breeding habitat at Kingsmill Pond is most prominent in the sub-littoral zone in heavily shaded and protected areas along the shoreline. These areas provide excellent protective cover essential for spawning. Freshwater fish prefer cooler, well-oxygenated waters with cobble or gravel substrates and submerged cover objects. During the survey, redds were observed with excess silt, particularly downstream of the dam spillway; however, these areas did not appear to be extensively impacted, and in some cases, these breeding habitats appeared to be in recovery.

The results of the fish survey concluded that Kingsmill Pond supports an abundant and healthy fish community. During the one hour of sampling, a total of two-hundred-eighty-one individuals were captured, identified, examined, and released. Bluegills were most abundant, representing approximately fifty-one percent of the

community. Largemouth bass represented twenty-eight percent. The reproductive success of large predatory fish, such as largemouth bass, speaks to the stability of the trophic levels within the pond. Furthermore, the bluegill population appeared to be mainly composed of juveniles. This may be an indication that while they continue to have reproductive success in the Pond, predatory fish, specifically largemouth bass, may be predating them at a high rate.

A total of seventy-nine largemouth bass were collected during the survey. This abundance is similar to those of other regional waters sampled by VDGIF using similar methods. Of the number of LMB collected, nearly sixty-six percent were in their first year, while approximately thirty percent of the largemouth bass sampled exceeded fourteen inches in length. Relative Stock Density (RSD) was assessed for largemouth bass. This is a count of individuals longer than eight inches and with a width exceeding twelve centimeters. The purpose of the count is to assess the abundance of game fish in a water body. The RSD in Kingsmill Pond is relatively high, at 78. This value is above average for regionally similar ponds. In addition, a Relative Weight (RW) value of ninety-eight was calculated for the largemouth bass in Kingsmill Pond. According to VDGIF, this value reflects a healthy bass population. The largest bass collected was twenty inches long and weighed 6.4 pounds.

Black crappie were less prevalent in the survey. Only eight individuals were collected. Eighty percent were less than fourteen centimeters in length. Black crappie are typically hard to captured because they tend to reside in schools in deeper waters, thus the survey may have underestimated their true contribution in the community.

The common carp population is strong with Kingsmill Pond. Approximately fifty-one individuals were collected along the shoreline. Most specimens were large, reaching up to sixty-seven centimeters. Average size was approximately fifty-six centimeters.

Forty-four gizzard shad were collected from the Pond. The majority of these specimens ranged from thirty-three to forty centimeters. The abundant zooplankton population appears to be factor in explaining the large numbers of shad in the Pond.

According to VDGIF, the electrofishing sample in Kingsmill Pond indicates a typical fishery similar to other small water bodies found within the region. The largemouth bass population is in good condition with numerous individuals over fifteen inches. The only concern is the relative low number of individuals less than twelve inches. As the older population reaches mortality, these numbers could be further reduced.

The bluegill population is also strong mostly comprised of individuals six inches or less. As a general rule, gizzard shad are not recommended for small ponds, as they can offset the balance between largemouth bass and bluegill. The bass will prefer predation of shad, resulting in overpopulation of bluegill.

With respect to overall species abundance, survey observations, and VDGIF historic area fisheries documentation, Kingsmill Pond appears to be a healthy and thriving fishery.

Aquatic Macroinvertebrates

Aquatic macroinvertebrates include aquatic insects, crustaceans, gastropods, bivalves and worms. Individual taxa within these groups are used as indicators of water quality, reflected by taxa richness, community structure, and taxa tolerance to pollution and other environmental factors. The presence or absence of key taxa provides insights into the ecological condition of a system. The macroinvertebrate sampling location is shown in **Figure 5.**

The results of aquatic macroinvertebrate sampling on Kingsmill Pond showed a somewhat limited community. Only midge larvae (*Chironomidae*) and aquatic worms (*Tubificidae*) were collected from the substrate using the kick seine. Water boatmen (*Corixidae*) were collected from mid-water column, and adult whirligig beetles (*Girinidae*) and water striders (*Gerridae*) were sampled from the water's surface. These surface-living organisms are only semi-aquatic, as they breathe atmospheric oxygen; however, it is likely that their fully aquatic larval forms developed within Kingsmill Pond.

All of these taxa are common to pond habitats of good to fair water quality. While none of them provide specific insights as indicators, their presence reflects the stable trophic regime in the Pond. Their proliferation provides an abundant food source for smaller fish and other pond organisms.

Chironomids and tubificids are commonly found in sediments rich in organic matter, feeding on detritus and its associated microflora. Pond beds provide ideal habitat for these organisms due to the accumulation of decomposing woody debris and leaf material. Tubificids are especially tolerant organisms, as they respire cutaneously, and they characteristically live in habitats that receive organic pollution (Downes 2003). Tubificids require very little dissolved oxygen for survival, and some taxa can even tolerate anoxic conditions. Nonetheless, tubificids are the most common freshwater oligochaete, and they can be found in high water quality habitats as well as severely impaired ones. Similarly, chironomids can be found in nearly every habitat type, though many are very tolerant and are even associated with organic pollution. They are one of the most diverse taxonomic groups with over 100 genera and 2,000 species in North America. Unfortunately, taxonomic identification to genus/species level requires oil submersion microscopy and highly trained practitioners.

Without further taxonomic analysis to genus or species, it is difficult to rely on the presence of either tuberificids or chironomids as indicators of water quality.

Zooplankton

For the purposes of this report, zooplankton refers to all drifting heterotrophic organisms found in Kingmill Pond, including Cladocera, copepods, and rotifers.

The most prevalent cladoceran found within the pond was *Daphnia*. These organisms are commonly known as 'water fleas'. They are small crustaceans belonging to the taxonomic family *Daphniidae*. There are approximately one-hundred-fifty known species found in North America; however, due to the nature and scope of this study, individuals were not keyed to the species level.

The copepod *Sapphirina sp.* was another prevalent organism observed during monitoring. These *Sappharina* were found in large groups throughout the Pond, but were most prevalent in the shallow mixing zones near the mouths of tributaries. They appear to be feeding on the abundant algae populations, especially during seasonal blooms.

A third zooplankton commonly found in Kingsmill Pond was the rotifer, *Keratella sp.* This genus contains sixteen known species and projects a variable lorica form. *Keratella* exhibit morphological variability transitioning to different forms, thus making them difficult to identify; however, large numbers of the genus were found in several samples, especially in the areas closest to the dam.

Periphyton

Periphyton is a complex of algae, cyanobacteria, heterotrophic microbes, and detritus which attaches to submerged surfaces. It is an important food source for invertebrates and fish, and as primary production, periphyton can be an important indicator of nutrient enrichment in lakes and ponds. Periphyton growth, like algae, is limited by nutrients in the system. Thus, there is a direct correlation between the concentration of nitrogen and phosphorus in the water column and amount of periphyton present. Periphyton sampling locations are shown in **Figure 5**.

Based on field observations, particularly in the fall, a green algae population was prevalent in the Pond, particularly in the more shallow areas near tributary mouths. This population appears to be predominated by *Spirogyra sp.*, a filamentous alga prevalent in shallow streams, lakes, and ponds, typically rich in nutrients. In the spring, this alga will likely grow just under the water's surface producing elevated dissolved oxygen conditions. It will eventually proliferate and rise to the surface forming visible blooms. Conversely, algae blooms do not form as readily in colder temperatures, windy conditions, turbid waters, or where organic nutrients are less available. This is why algal blooms most commonly occur during summer months in Kingsmill Pond.

Other less prevalent periphyton forms were also observed. These forms were dominated by the algae *Cladophora sp.*, *Hydrodictyon sp.*, and *Anabaena sp.*

Bacteriological (Fecal-coliform)

Fecal-coliform bacteria are a group of bacteria that inhabit the intestinal tract of warm-blooded animals. The presence of fecal-coliform bacteria in water indicates fecal contamination of the water by a warm-blooded animal and harmful bacteria associated with fecal contamination may also be present. Elevated levels of fecal-coliform bacteria in lakes and ponds are a result of fecal contamination from warm-blooded animals. Fecal-coliform bacteria may enter a water body through many pathways. Fecal-coliform bacteria from cattle may be washed into a stream from a pasture during rainfall or water fowl may defecate directly into a lake or pond while feeding. Bacteria may even come from human sources in the form of sewage spills, leaking sewer lines, or malfunctioning septic systems.

There are federal, state, and county standards and criteria for fecal-coliform bacteria in water. The specific standard depends on the water use designation (whether the waterbody has been classified as a drinking water supply or for recreation). The recreational water standard in James City County for fecal-coliform bacteria is a geometric mean of 200 colonies per 100 ml of pond water year round. From May to October, the time when most water recreation occurs, waters designated drinking water supply and fishing also have a 200 colonies per 100 ml standard; however, during the winter, fecal-coliform bacteria levels in waters classified for drinking water supply and fishing cannot exceed 1,000 colonies per 100 ml. Usually these numbers are based on a geometric mean of at least 4 samples collected over a 30-day period. Although Kingsmill Pond is not designated as a water supply, it does support a recreational fishing use, and must adhere to this standard.

Recently, the USEPA has suggested that all states begin using E. coli as a standard, rather than the general group of fecal-coliform bacteria. E. coli is one species of bacteria within this group, and it has been shown as a better indicator of disease causing conditions. The criterion based on E. coli levels suggested by the USEPA is 177 colonies per 100 ml for recreational water.

All samples taken within Kingsmill Pond in 2005 and again in 2006 revealed fecal-coliform concentrations below the James City County threshold value for recreational ponds (**Figure 6**). Three samples taken outside of Kingsmill Pond during the 2005 sampling exceeded the County threshold value. Site FC10 had the highest bacteria levels measured during this study with a measurement of greater than 1,600 MPN/100mL. This value may have been reached in error, as it is far in excess of expected levels. It should be regarded as an outlier, but future testing may be warranted. Sites FC12 and FC13 also showed values above the allowable threshold of 200MPN/100mL. At these locations, high habitat values promote wildlife activity and coupled with the small size of the water bodies, fecal-coliform contamination may be possible from wildlife inhabitants alone. It is unlikely that the contamination is from anthropogenic sources. Sanitary sewer lines in the vicinity of all sampling stations were recently inspected by James City County to determine if leaking lines may be contributing to fecal-coliform readings. The County reported the lines to be

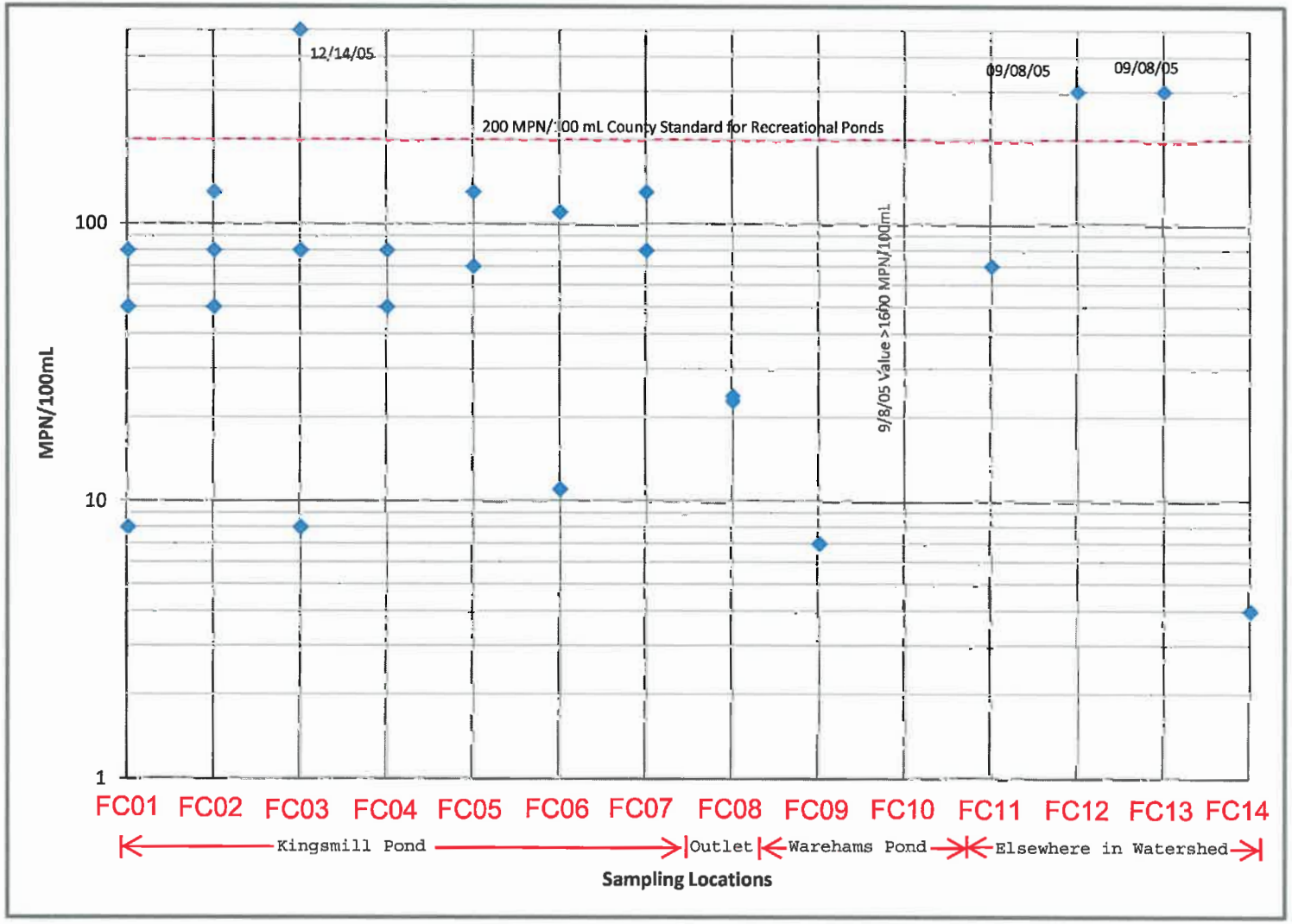

Figure 6. Fecal-coliform concentrations in the vicinity of Kingsmill Pond.

in good operating condition with no apparent leaks. Long term monitoring as recommended at the selected stations will help to reveal the primary sources of fecal-coliform and whether concentrations exceed acceptable levels. Based upon sampling and testing performed to date, fecal-coliform levels do not appear to be a problem within Kingsmill Pond.

Water Quality Discussion

Kingsmill Pond is a biologically dynamic system. It supports a diverse and integral population of organisms essential to the overall success of its life functions. Inter-dependant interactions between biological communities appear to be providing stability to the Pond's ecosystem. Combined with above average available habitat, external impacts seem to be having a minimal affect on the Pond's biological integrity, at this time.

Overall, in terms of water quality, the Pond is in reasonably good shape based upon a limited dataset. Temperatures appear to be moderate throughout most of the year, with limited change throughout the water column, while DO levels tend to be above average. Abundant DO typically is an indicator of good water quality. However, it could also be leading to a vibrant population of primary producers represented by the abundant presence of plankton and periphyton. Prevalent biomass (particularly following the advent of the growing season and susbsequent use of fertilizers) is manifesting itself in lentic waters primarily in the form of algal blooms. Large areas from early October to mid November were covered with green algae specifically in shallower areas near the north end of the Pond.

Conventional limnology thinking is that the presence of algae blooms in lakes and ponds is an indicator of nutrient enrichment which can lead to a decrease in water quality. Eventually, the algal blooms die and sink to the bottom, and anaerobic microbial activity will begin depleting some of the dissolved oxygen present in Pond. The Chesapeake Bay Preservation Act (CBPA) has set its stress threshold for shellfish at 2 mg/L as a bear minimum. CBPA defines "hypoxic waters" as waters displaying DO measured at 1 mg/L, and "anoxic waters" as waters with readings less than 1 mg/L. Most living organisms can not persist in hypoxic, nor survive in anoxic waters. If the input of nutrients to the Pond becomes extensive, decreases in DO can result in stresses being introduced to existing biological communities.

The modern paradigm of limnology theory believes that the DO stress threshold in ponds and lakes is 4 mg/L and below. The first effect of low dissolved oxygen is the limited growth of plankton species. As a result, when food source is limited, fish begin to predate on each other. Additionally, lower dissolved oxygen forces smaller fish to move from protective habitat deeper in the water column into shallower, open predaceous waters. As this trend continues, the overall fish population becomes smaller, reducing the number of larger specimens.

However, data gathered to date does not suggest this is occurring in the Pond. Additional information in the future will be necessary to further evaluate this aspect.

DO levels are well above the stress threshold. In addition several visual observations noted a variable inherent fish population that appears to be diverse in terms of size and species distribution. Additionally, the water column profile for dissolved oxygen exhibits no variability, with relatively constant values occurring between the surface and lake bottom. Levels of dissolved oxygen above 6 mg/L provide fish and benthic populations a stable oxygen source that promotes nesting, breeding, and reproduction. This is typically a sound indicator biologically of above average water quality.

High specific conductivity throughout the Pond indicates the presence of ionized natural inorganic minerals such as chloride, sulfate, sodium, calcium, iron, magnesium, and aluminum. This appears to be the result of pond waters running primarily through base clay soils. However, immediately following rainfall events, pond waters are indicative of high turbidity (>300) and low clarity (1-2'). This is a strong indicator that sediment is being conveyed into the pond and remains suspended for some period of time. Observations have been made several days after these events have revealed extensive amounts of suspended solids in the water column. Depending on the particular event, this condition appears to last up to a week or more. If this is a short term phenomenon as it appears, its overall affect on water quality is considered minimal. Embeddness can have some adverse affect on fish nesting and breeding. It is, however, uncertain as to the effect that sediment deposition might be having on the biota within the Pond, and particularly its effect on the fish population.

Based on the cross-sectional pond survey conducted in 2005, it was determined that the upper portions of the Pond are shallower nearest to the tributaries. These areas have most likely been impacted by historic sediment deposition. However, sedimentation is less apparent within the mainstem of the Pond with depths ranging from 7-9 feet. The deepest portion of the Pond fluctuates between 14.5 and 16 feet at the dam. It is unlikely that siltation has been proportionately greater over the last 30 years within the mainstem than has been manifested in the shallower areas in the upper portion of the Pond.

The State of Virginia has established generalized water quality standards for determining the overall health of the Commonwealth's waters. The Virginia General Assembly has established Virginia Administrative Code (VAC) defining these standards as found in 9 VAC 25-260. Various water quality parameters are defined with threshold values for aquatic life and human health. Under the criteria stated in state standards, thresholds for dissolved oxygen, pH, and temperature have been defined by physiographic region. Kingsmill Pond meets these allowable standards designated for recreational ponds.

Samples results obtained for FC exhibited wide variation and in specific terms were inconclusive. In general, colony counts within Kingsmill Pond were well within the County-established threshold value for recreation lakes and ponds of 200 mpn/100mL; however, colony counts were higher in samples obtained in the surrounding watershed than those found within the Pond. After completing this round of sampling, it is unclear as to the specific sources of FC; however, the presence of abundant seasonal waterfowl and mammal populations might be considered a strong contributor.

In conclusion, VHB has determined through a limited dataset consisting of physical, chemical, biological, and bacteriological indicators that overall water quality in the Pond is average to slightly above average, compared to other man-made ponds with similar watershed conditions. Available data shows that the Pond exceeds water quality standards for dissolved oxygen, pH, temperature, and fecal-coliform, indicating, in general terms, that the water quality in the Pond is good. These positive indicators have likely been responsible for the enhanced biological activity; however, in contrast, negative water quality indicators are also present. Large sediment loads transported from degrading upstream channels appear to be depositing in shallower portions of the Pond. It is in these areas that homeowners are observing a "filling in" effect, pungent odors, and an increase in mosquito populations.

Nutrient enrichment from the surrounding watershed is also proving to be a problem, and is likely the cause of seasonal algal blooms. Eventually, the algae will die, sink, and decompose on the Pond's substrate. Additionally, sedimentation containing ionic minerals is being conveyed in the Pond under turbid conditions. This has been reflected in the high TDS readings. Extensive mineralization of pond waters is an indicator of impacted water quality and is reflected through reduced water clarity, water staining, and a decrease in the Pond's aesthetical quality.

From a water quality standpoint (based on predictable standards for urban impoundments), Kingsmill Pond appears to be functioning relatively well.

Summary

Upon completion of this phase of study, data collected and analyzed has assisted VHB in being able to identify and assess the ponds functions and intended use as it relates directly with storm water management, floodwater control, recreation, aesthetics, and overall water quality.

In terms of storm water management, the pond appears to be successfully functioning as a facility for receiving, retaining, and conveying watershed runoff. Kingsmill Pond has not been designed to function as a flood control facility; however, the pond's shape and size allow it to collect and convey incoming storm

water. Overbanks surrounding the Pond are both steep and stable maintaining an adequate mixture of deciduous and coniferous riparian canopy and diverse understory vegetation.

At tributary inflow and Pond interface locations, the conveyance portions of these tributary channels are acting as forebays receiving sediment deposition prior to draining into the Pond. Deposition appears to be encroaching into the shallower areas of the pond, particularly in the north end and surrounding the golf course. This is where some of the homeowners have observed the accumulation of siltation leading to the slow conversion to emergent wetlands. At these same locations, gas bubbles are being emitted into the atmosphere from dormant sediments containing methane (CH^4) and hydrogen sulfide (H^2S). This is produced by the decomposition of organic matter such as detritus and iron-ferrous reductions in the soils. The release of these gases might be attributing to the pungent odors reported by adjacent property owners.

Highly concentrated values for chlorophyll-a, adequate dissolved oxygen and pH values, prevalence of ionic minerals, and a diverse zooplankton population indicate primary producers (i.e. zooplankton, periphyton algae) appear to be supporting a healthy, biological community within the Pond.

From a recreational standpoint, the fish survey, visual observation, interviews, and biological sampling data, suggest Kingsmill Pond likely supports a viable fish population. The relatively high number of individuals above nineteen inches and four pounds noted during the fish survey suggest the Pond provides the necessary environment for their long-term survival. In addition, multiple field observations revealed quality habitat in the form of spawning grounds, nursery and rearing areas, food supply areas, and migration routes within the pond. A sandy substrate is prevalent throughout the pond providing fish with appropriate habitat with which to place their eggs. Small underwater caverns along embankments give yearling populations the necessary protection from predators. These are found in areas where the slope embankment is steep and sharply protrudes through the water column. The plentiful plankton population throughout moderately deep (3-8') to deeper portions (>10 feet) of the pond provides an excellent food supply to fish. Deeper portions of the tributary inflows are significant migration areas creating routes for fish to protect their young from larger predators in deeper portions of the Pond.

Based upon observation, the quality habitat may promote the growth and development of a diverse population of largemouth bass, black crappie, gizzard shad, Israeli carp, bluegill, and catfish. However, additional annual data collection in the form of electro-fishing and inventorying should be done in order to gather necessary information to further evaluate species abundance, diversity, and habitat over the next several years.

Aesthetically, the Pond adequately reflects the intended rustic atmosphere of Kingsmill. The combination of a well dispersed and mature canopy species along

with a well-rooted understory provide both stability and the necessary shading conducive to successful natural habitat. Well managed side slopes and sub littoral areas work in harmony to enhance the overall biological integrity of the Pond.

Although aesthetics are acceptable, high conductivity and TDS measurements obtained during field observations indicate extensive ionized mineralization and turbidity that can be associated with the pond at times. This suggests sediment is being conveyed to the Pond and is remaining suspended within the water column following storm events. Brackish coloration (i.e. orange, dark brown), low transparency (secchi readings), and high turbidity (TDS readings) have been observed 7-12 days following rainfall. Sediment appears to be conveyed into the Pond from various sources. The most unstable contributions are from the higher portions of the watershed.

Sediment deposition is most apparent in the northernmost end of the pond in shallow areas near the mouths of three tributaries. Water levels in these areas are less than a foot in depth leading to what might appear to be stagnant surface water conditions. However, there is actually a steady base flow in these areas. Deposition in the above-mentioned areas gives the visual impression the Pond is filling in. In reviewing aerial photography, it appears emergent wetland vegetation has increased in recent years where mudflats and organic soil materials are most prevalent.

In general terms, the Pond's overall water quality is considered to be somewhere between average and good. On the one hand, although nutrient enrichment is apparent, it tends to be only seasonal (as indicated in presence of nutrients and chlorophyll-a), as does temperature change. In addition, suspended materials during and after storm events may also be impacting biological communities, as some of this matter is settling and being embedded on the pond substrate. However, the extent and rate is unknown.

Conversely, favorable dissolved oxygen concentrations, abundant ionic material, and available food sources spark population growth. It is this side of the equation that leads to viability in the upper end of the food web, particularly with the fish population. The increase in biomass provides adequate food to fish and reduces predation rates, thus leading to a more viable existing population.

Considering the limited dataset, little is known at this time regarding the diversity of biological communities. Additional data should be collected and assessed over a longer period of time in order to more effectively evaluate population dynamics. It is this aspect of the evaluation that limits the ability to assess biological trends occurring within the Pond's ecosystem.

Response to Landowner Concerns

A landowner petition dated June 28, 2003, expresses several concerns regarding the overall biological health of Kingsmill Pond. Much of the concern centered around such issues as: unabated siltation, polluted runoff, fecal-coliform contamination, stagnant pools, mosquito breeding, pungent odors, dumping of residential landscape debris, and unnecessary removal of trees and vegetation from the shoreline.

The most significant concern appears to be the perception that siltation has been occurring at accelerated rates for the past several decades. Several landowners, particularly on the north-end have expressed concerns about the Pond "filling in" as water depths appear to be decreasing at the mouths of several tributaries entering the Pond. It is highly probable that the present rate of siltation is significantly less than it was 10 or 20 years ago. The likely cause of excessive siltation in the past can be attributed to heavy construction activities occurring within the watershed. Over this period of time, primary tributary mouths interfacing the Pond have likely silted in and they continue to receive silt and sediment from the bed and banks of eroding stream channels located further upstream. In addition to the observed siltation, emergent wetland areas have established in shallow forebay areas at the mouth of the upper tributaries. Upon conducting the assessment, VHB has recommended the monitoring of permanent cross sections to help determine the full extent of erosion impacting the Pond. In addition, monitoring activities could lead to the implementation of specific measures designed to control silt and sediment reaching the Pond.

A second prominent concern was the potential for contaminants and enriched nutrients reaching the Pond from adjacent roadways, curb and gutter systems, driveways, and sidewalks. In addition, the use of landscaping equipment, lawnmowers, and de-icing of roadways during winter storms could also be a source of pollution potentially impacting the Pond. Nitrates, phosphates, oils and greases, and petroleum products collected in these drainage systems producing runoff and later flushing these contaminants into the Pond. Furthermore, nutrients such as nitrogen and phosphorous typically prevalent in fertilizers are most likely being conveyed to and deposited in the Pond from storm water originating from various points within the surrounding watershed. In order to address the issue, VHB collected multiple water samples during two separate seasons (i.e. fall, spring) from within the Pond to determine the presence and/or absence as well as potentially concentrated areas within the Pond. Results indicated that both petroleum-based contaminants and nutrients are having a limited impact on the Pond.

The potential for fecal-coliform contamination was another significant concern expressed by landowners. Initially, the focus of this concern was in the potential for leakage stemming from sanitary sewer lines located within the Pond's watershed. In response to this concern KCSA tasked VHB to conduct bacteriological monitoring within the Pond, as well as outside of the Pond in order to evaluate this issue. Fecal-

coliform monitoring was undertaken at eight (8) locations within the Pond, and additional six locations outside of the Pond during the summer and fall monitoring periods. James City County has established concentration threshold values at 200 colonies per count per 100 milleters for lakes and ponds. Upon completion of monitoring activities, it was determined that fecal counts from sampling locations within the Pond fell below the County's regulatory threshold. As a result, to date fecal-coliform levels within the Pond itself appear not to be a problem.

Landowners have indicated that stagnant pools occur within shallower portions of the Pond particularly during certain times of the year. It is in these areas that complaints regarding noticeable pungent odors and potential mosquito breeding areas have been lodged. Very shallow and slow moving water is present in the upper extremities of the Pond, particularly at the mouths of primary tributaries. Though water may appear not to be flowing, it is continuously entering the Pond as ground water and surface water and moving slowly towards the spillway at the far southwest end of the Pond embankment. The upper extremities of any lake or pond where emergent wetlands naturally develop create opportunities for mosquitoes to breed. This is normal and should not be construed as a problem or something to be corrected.

Distinct odors that appear to occur in the shallower portions of the Pond have been noted by several landowners. Results of this study conclude that the accumulation of silt/sediment and organic matter naturally occurring at the mouths of the primary tributaries are a main contributing factor in the unpleasant smells noted around the Pond. Heavy deposits of fine soils and organic matter become anaerobic over time and develop gases such as methane (CH^4) and hydrogen sulfide (H^2S). These gases are periodically released to the atmosphere, particularly when the decomposing material is stirred by animals or humans moving through it. The release of these gases, particularly during drier summer months, is a partial explanation for what some landowners have referred to as "pungent or foul odors emanating from the Pond." Another cause for these smells may be attributable to algal blooms, which are associated with excess nutrients in the pond. Algal blooms contribute a strong odor both from decomposition and from the high level of algal production occurring at the surface of the Pond, especially during summer months.

Another problem is caused by landowners dumping yard clippings, tree prunings and large logs from felled trees into the stream channels. These large deposits of debris create blockages in the stream channels that act to redirect flows, undermine utilities and recreational areas, exacerbate erosion, and contribute undue sediment to the Pond. A stream channel stability assessment was performed on the 6,550 linear feet of tributary streams feeding the Pond (**Figure 4**). Approximately 50% of these channels were classified as severely eroded and actively degrading, which indicates they have already contributed significant sediment loads to downstream areas and continue to contribute significant loads to the Pond. The dumping of debris in these channels only increases the magnitude of the problem.

Excessive and unnecessary tree removal along the Pond's periphery is another landowner concern, specifically in the aftermath of Hurricane Isabel. Downed trees and branches have been observed throughout the Pond in shallow coves and inlets. Homeowners believe these trees are cluttering up the Pond and reducing the aesthetical value. However, from a habitat, aesthetic and stability perspective, the overall condition of the shoreline was judged to be very good by the Assessment Team. Removal of native trees and vegetation from the Pond shoreline does not appear to have been excessive over the years as most of the shoreline is composed of natural forested areas. Even though some landowners have replaced the natural vegetation with ornamentals and mulch, few areas were observed to be void of vegetation or eroding.

Recommendations

In concluding the Kingsmill Pond Water Quality Assessment and Evaluation study, VHB has prepared recommendations to further define a course of action that KCSA might consider for future assessment of the Pond. These recommendations include: implementing long-term monitoring, vegetative buffer creation, stabilizing stream channels, alleviating debris-dumping practices, and developing an educational public outreach program.

Long-Term Monitoring

As previously discussed, future phases would include supplemental physical, chemical, biological, and bacteriological water quality monitoring and assessment. As the one-years baseline monitoring has been completed, additional monitoring will be needed in order to evaluate and assess long-term water quality trends. Work accomplished to date only represents a "snap shot" of existing conditions and is the basic requirement for establishing a water quality baseline. Beyond this point, KCSA should continue the established monitoring program for an additional four complete years. This along with additional data collection, habitat evaluation, and water quality analysis will provide KCSA will a 5-year cycle of which basic trends and conditions can effectively be evaluated.

Aquatic Macroinvertebrate Biomonitoring

By examining taxa richness, community structure, and taxa tolerance to pollution and other environmental factors, aquatic macroinvertebrates can provide a semi-quantitative assessment of water quality and ecological integrity in the Kingsmill Pond. For the purposes of this report, a single collection site was used as a snap-shot of the existing community; however, a full representation of the potential analytical power of biomonitoring was somewhat limited by the Scope of Work. The single collection location, method of collection, and level of taxonomy may have significantly underestimated the benthic community in the Pond.

By expanding the macroinvertebrate portion of the study to include a greater number of sampling locations, replicate sampling, and additional methods of collection (petite ponar, suspended multi-plates, dip-net shoreline sweeps), a more accurate representation of community structure can be produced. Taxonomic identification should also be carried to genus/species level to facilitate a greater resolution of analysis. Additionally, water quality multi-metrics can be calculated, based on genus-level identification, to provide a quantitative analysis of impairment. Further taxomonic resolution, particularly with chironomids, can also be used to produce an "Impact Source Determination." This determination will help to pinpoint the types of pollution causing impairment in the system.

Furthermore, resident volunteers could be utilized to produce long-term monitoring data. Sampling methods and taxa identification training workshops could be hosted by VHB aquatic biologists and taxonomists. In addition to the benefit of producing a large-scale annual monitoring strategy, this is an opportunity for landowners to get personally involved in the stewardship of their Pond.

Stream Channel Restoration

Considering the erosion contribution from tributary channels, VHB recommends the application of stream channel restoration techniques in stabilizing head-cuts of streams as a means of reducing sedimentation reaching the Pond. Although wetland areas will continue to expand as a natural process, in stabilizing these channels and re-establishing their floodplain, this effort will help lead to reductions in erosion activity causing siltation in the Pond's upper portions and mainstem.

Debris-Dumping Control

The community should also consider undertaking measures to alleviate the dumping of debris into the inflow stream channels. Effective measures can be developed and implemented in the form of more public scrutiny through the administering of educational outreach activities, community incident enforcement, and land management incentives.

Educational Outreach

Through the development of an effective educational outreach program, KCSA has the opportunity to educate landowners about proper land management practices and landscaping techniques. Implementation of these techniques will lead to long-term improvements in water quality and overall conditions in the Pond.

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Appendix A

Channel Evolutionary Stage Representative Photographs
and Channel Evolution Model Worksheet

Kingsmill Pond Tributary Channel Evolution Model, Stage I/V Representative Photographs

Kingsmill Pond Tributary Channel Evolution Model, Stage II Representative Photographs

Kingsmill Pond Tributary Channel Evolution Model, Stage III Representative Photographs

Kingsmill Pond Tributary Channel Evolution Model, Stage IV Representative Photographs

CHANNEL EVOLUTION MODEL
(Schumm, Harvey and Watson, 1984)

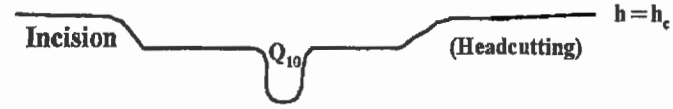
CHANNEL STABILITY INDICATORS

I

- ☐ well developed baseflow & bankfull channel
- ☐ consistent floodplain features easily identified
- ☐ min. of one terrace apparent above active floodplain
- ☐ predictable pattern & streambed morphology
- ☐ floodplain covered by diverse vegetation
- ☐ stable streambank slopes / no apparent slumping

COMMENTS: _____

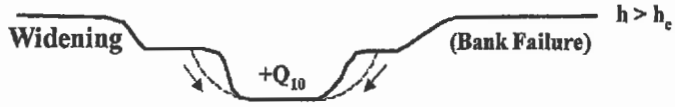
II



- ☐ headcuts / downcutting
- ☐ exposed cultural features
- ☐ sediment deposits absent or sparse
- ☐ exposed bedrock
- ☐ streambank slopes vertical at toe
- ☐ streambank failure imminent

COMMENTS: _____

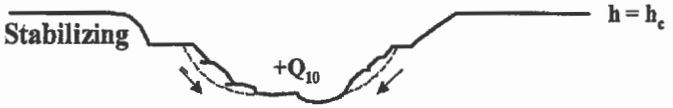
III



- ☐ streambank slumping
- ☐ slumped material eroding
- ☐ undercut streambank slopes on both sides of channel
- ☐ erosion on inside of meander bends
- ☐ accelerated meander bend migration

COMMENTS: _____

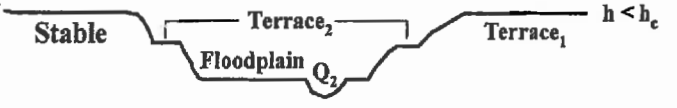
IV



- ☐ streambed aggrading
- ☐ slumped streambank material not eroding
- ☐ slumped material colonized by vegetation
- ☐ baseflow, bankfull & floodplain channel developing
- ☐ predictable sinuous pattern developing
- ☐ streambank slopes beginning to stablize / slumping is minimal or absent

COMMENTS: _____

V



- ☐ well developed baseflow & bankfull channel
- ☐ consistent floodplain features easily identified
- ☐ min. of two terraces apparent above active floodplain
- ☐ predictable pattern & streambed morphology
- ☐ streambank slopes are stable / no apparent slumping

COMMENTS: _____

h = stream bank height

h_c = critical bank height (bank failure imminent)

Q# = frequency of runoff event

STREAM REACH ASSESSMENT SUMMARY:

_____

Field Worksheet developed by C.R. Sewell, 1999 (Revised 2002)

I ADDITIONAL COMMENTS: _____

II ADDITIONAL COMMENTS: _____

III ADDITIONAL COMMENTS: _____

IV ADDITIONAL COMMENTS: _____

V ADDITIONAL COMMENTS: _____

REACH ASSESSMENT SUMMARY ADDITIONAL COMMENTS: _____

Appendix B

Kingsmill Pond Sampling Plan

KINGMILL POND
SAMPLING PLAN

Introduction

The Board of Directors of the Kingsmill Community Service Association (KCSA) have expressed an interest in having Kingsmill Pond's water quality assessed for the purpose of determining its baseline condition. This information will likely be utilized to evaluate future monitoring trends, analyze control measures, and for decision-making efforts. Kingsmill Pond is a 22.88-acre manmade waterbody receiving flows from numerous freshwater springs draining into Halfway Creek and the James River.

The pond receives storm water drainage from the Busch Corporate Center and other smaller sub watersheds. In addition, there are numerous inflows found at the base of steep ravines throughout the circumference of the Pond. Because of steady development and urbanization of such large surrounding watershed, the inflows have been slowly silting in over the years. As a result, KCSA has been conducting evaluation's Pond's water quality. These efforts date back to 1988.

Project Description

It is surmised that Kingsmill Pond has been experiencing the accumulation of sediment loads associated with golf course and other watershed-related activities. As a result, the Pond's water quality could be undergoing physical and biological changes. Furthermore, conceivably consistent sediment deposition might be impacting biological activity within the Pond. The water quality assessment and evaluation project has been designed to analyzed physical, chemical, and biological interactivity by means of in-situ sample collection and data gathering.

A significant component of the project will involve a biological survey of the Pond's various photic zones and its tributaries. Monthly and seasonal data can be used to evaluate the Pond's resident aquatic communities for determining community structure and function. Field observations will lead to potentially identifying causes of impairment and their affect on the pond's biological integrity. The main focus of the survey will be the effect human activities are having on energy sources, physical and chemical attributes, habitat structure, hydrologic regimen, and biotic interactions.

The assessment will involve a multi-metric approach designed to evaluate aquatic organism pollution tolerances, abundance and diversity, and ecological functions. Methods applied during the assessment will target multiple species and assemblages with emphasis on species structure, trophic order, and system function.

Pond Monitoring Overview

The primary objective of the project's monitoring effort will be to conduct a precursory evaluation of physical, biological, and chemical functions within the Pond. Composite depth samples and associated data will be collected at multiple stations between the Fall of 2004 and Spring of 2005. All sampling will be conducted during dry weather conditions at site selected locations.

Monitoring data will be inputted into various statistical indices to determine the overall biological integrity of the Pond. The results will provide KCSA board members with ambient basic baseline water quality information that can be utilized in future lake management decision making.

Dry Weather Sampling

The project will involve physical and chemical sampling various depths within the water column during dry weather conditions only. Chemical sampling will include samples collected for total nitrogen (TN), total phosphorous (TP), dissolved organic carbon (DOC), dissolved inorganic carbon (DIC), and chlorophyll-a (CHL-a). With the exception of samples collected for chlorophyll-a, all samples obtained will be depth measured, and probed for temperature, dissolved oxygen, specific conductivity, and pH. In collaboration with chlorophyll-a sampling, seechi depth (SD) measurements will also be gathered at each individual sampling location. Dry weather sampling will require a 72-hour dry period from the time of the last measured rainfall prior to sampling.

Sampling Parameters

Listed below in Table 1 are the physical and chemical parameters required for the Kingsmill Pond Water Quality Assessment and Evaluation Program.

Table 1. Sampling Parameters

Parameter	Abbreviation	Type
Total Phosphorous	TP	Chemical
Total Nitrogen	TN	Chemical
Dissolved Organic Carbon	DOC	Chemical
Dissolved Inorganic Carbon	DIC	Chemical
Chlorophyll-a	CHL-a	Chemical
pH	-	In-situ
Specific Conductivity	SC	In-situ
Temperature	TEMP	In-situ
Dissolved Oxygen	DO	In-situ
Turbidity	TU	In-situ

Roles and Responsibilities

Roles and responsibilities represent an important aspect of the Kingsmill Pond Water Quality Assessment and Evaluation Program. Listed below in Table 2 are the program's organization and defined responsibilities.

Title/Role	Contact	Responsibility
Project Manager	Randy Sewell	Overall program management
Pond Monitoring Task Manager	Mark Romulus	Sampling and field data collection management and program design; scheduling and monitoring coordination
Equipment Manager	Jesse Baldwin	Responsible for maintaining and overseeing all field monitoring equipment

Data Manager	Aaron Sutton	Responsible for field logistics, QA/QC, and all data collection during dry weather monitoring
Laboratory Analysis Manager	Ana-Marie McKinley	Review of analytical data

Data Quality Objectives

The overall objective for the water quality assessment and evaluation is to ensure the sampling data generated are of documented quality. The intended uses of the data collected are for defining baseline conditions, assessing erosional and sedimentation impacts on the Pond's biota, and for analyzing both spatial and seasonal variations in the pond's water quality.

Precision

Precision is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Field duplicated samples will provide a measure of the contribution to overall variability of field- and laboratory-related sources. For composite sampling, field duplicates and splits will be collected at a target frequency of one in 20. The precision of in-situ water quality probes will be assessed by comparisons with portable field instruments during maintenance and calibration inspections.

Accuracy

Accuracy is a comparison of a measured value with a known or true value. Accuracy is also a measure of the bias in a system. Quality control (QC) criteria for accuracy are primarily related to laboratory results of analyses of method blanks, reagent/preparation blanks, and matrix spike/duplicate samples that will not require collection of additional samples in the field. For composite samples, accuracy will be assessed by collection of one field blank during each survey. The accuracy of in-situ water quality probes will be assessed on an ongoing basis by analysis of calibration drift during field maintenance and calibration inspections.

Representativeness

Representativeness is the degree to which data accurately and precisely represents the true value of a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition, intended to be characteristic. In general, the representativeness of the water quality data collected under the Kingsmill Pond Water Quality Assessment and Evaluation Program will be ensured as a result of careful consideration of:

- Proper design of the monitoring progam;
- Selection of appropriate field methodologies;
- Proper sample preparation;
- Preservation and handling;

- Selection and execution of appropriate analytical methodology; and
- Proper sample identification and reporting of results

Dry weather composite sampling will be preceded by a minimal 72-hour period with no rainfall.

Completeness

Completeness is a measure of the amount of valid data expressed as a percentage obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Completeness criteria for dry weather sampling events will focus on the overall performance of the monitoring program. The completeness of the in-situ water quality measurements is especially important during dry weather sampling. At a particular location, the completeness criteria for dry weather samples is to collect over 90 percent of the sampling frequency.

Comparability

Comparability is the confidence with which one data set can be compared to another. Comparability may be assessed by comparing sampling and analytical methodology, and units of reported data. The comparability of water quality data collected at various locations under the Kingmill Pond Water Quality Assessment and Evaluation Program is not an issue since the identical sampling, analytical, and reporting methodologies will be used.

Sampling Location and Frequency

This section describes the overall design of the Kingmill Pond Water Quality Assessment and Evaluation Program. The location of selected sampling sites is described below. Sampling frequency typically varies by parameter series and type of monitoring station. However, the objectives of the monitoring program have defined both the sampling interval as well as the frequency. In-situ parameters will be monitored on a monthly basis, while chemical samples will be collected during the Fall of 2004 and the Spring of 2005.

Sampling Site Selection

Selection of sampling site locations was an iterative process that was jointly performed by project planners and field technicians. In general, the site selection process consisted of initially locating potential sites through the use of mapping, followed by a field assessment. Sites were approximated on applied mapping sources, then located on the pond in relation to sites where inflow confluenced with the pond. The field assessment verified locations where it was most feasible in collecting well mixed, representative samples, field personnel would have safe access, and where a flow pattern could be estimated.

Composite Sampling Sites

The primary objective of composite sampling sites is to provide water quality information at strategic locations within Kingsmill Pond. Four sampling sites are located throughout the Pond at depths of approximately 7.5 feet where Pond adequately mixes with adjacent inflows. The selected sites are located downstream of watershed inflow pipes, swales, and other drainage features.

Prior to sampling, wooden stakes with flags will be placed at the approximate mixing zone at locations where the banks are within the closest range to each other. A location buoy will be placed at the center point in the horizontal transect at the 7.5-foot depth. Global positioning system (GPS) coordinates will be determined at each of these four locations within the Pond.

Figure 5 displays the approximate location of each of the composite sampling sites.

Sampling Methods

This section describes the sampling methods to be employed for the Kingsmill Pond Water Quality Assessment and Evaluation Program. All sampling activities will take place under dry weather conditions. Samples obtained at each of the four sites will be discretely collected at defined intervals from within the water column and later composited prior to shipment to a certified laboratory. Described below are the specified procedures form collecting water samples from the Pond including both chemical and in-situ monitoring.

Manual Sampling Methods

Upon reaching the buoyed monitoring locations, manual sampling within Kingsmill Pond will be performed by a field crew through the utilization of a depth-initiated glass water sampler and several in-situ water quality probes. The field crew will be responsible for making observations relative to the water quality of the Pond; manually collecting samples from a specified location; and measuring in-situ water quality parameters with portable instruments. Water column samples for TN, TP, DOC, and DIC will be collected using a clear glass Van-Doren bottle sampler. Discrete samples will be obtained at three distinct depths (i.e. just below surface, 3-feet, 6 feet) within the water column. Upon retrieving the sampler from the water column at each designated depth, one-third of the water contents will be emptied into a cleansed, polyethylene.container. The remainder of the sample water will be emptied into a retainer bucket and probed for temperature, dissolved oxygen, pH, and specific conductivity. Upon completion of sample-to-bottle distribution for each of the chemical sampling parameters, the bucket will be cleansed and decontaminated prior to sample collection at the next sampling depth.

Seechi Disk/Cholorphyll-a Monitoring

Prior to collecting the Chlorophyll-a sample, the seechi disk (SD) will be employed to determine the appropriate depth to which to obtain the sample. The SD should be inserted into the water column on the side of the boat that contains the most sunlight. The SD is lower slowly into the water column until the reflected portion of the disk is no longer visible. The SD operator will then note the appropriate depth at which this occurs.

Upon completion of the SD depth determination, the Van-Doren sampler will be lowered into the water at the depth equivalent to one-third of the measured SD. For example, if the SD is 3 feet, then the Chlorophyll-a sample would be collected at a depth of 1-foot. The contents of the sampler will be immediately emptied into a 1000 ml amber polyethylene container, labeled properly, and transferred into an iced cooler. Samples were filtered for in the environmental laboratory for chlorophyll-a extraction. The samples were vacuum-filtered on glass-fiber paper, and stored frozen in the dark.

It should be noted, that the holding time for Chlorophyll-a is 24 hours. Upon pond sampling completion, the samples containing Chlorophyll-a will be immediately prepped at EnviroCompliance Laboratories and shipped to laboratory in Florida for analysis.

In-situ Sampling Procedures

The following parameters (i.e. temperature, dissolved oxygen, pH, and specific conductivity) will be measured at three depths (surface, 3 feet, 6 feet) within the water column per sampling location. The sensION 156 meter will be employed to gather data at each sampling depth interval. Collected water samples will be probed after sample water is discharged into the sampling bucket. Specifications for calibrating and operating this instrument are found between Sections 3-5 of the "Portable Multiparameter Meter Instruction Manual" pgs. 27-66.

A potable seechi disk will be utilized for determining the extent of suspended solids within the water column. The black and white pied disk is attached to a nylon cord that is marked incrementally in half-foot and foot intervals. The disk will be lowered at or near the sampling buoy and dropped from the bow of the boat on the side where the sunlight is most direct. The interval where the disk disappears is noted and recorded either on the data collection form or in the field notebook.

Data Collection

In-situ and temporal sampling data will be recorded in field notebooks as information is made available during each sample depth recovery. The data collected in the field will be transferred to a database input file that will be prepared for receiving field data.

Field Documentation

Thorough documentation of all field activities is essential for ensuring that data quality objectives are being achieved. Field crews will be encouraged to document unusual or anomalous conditions that may be useful later for data interpretation and analyses. Data collected for this project will include field measurements and analytical sampling. Field data will be recorded on standardized forms and notebooks. These forms are listed below.

- Data Collection Forms
- Site Assessment Forms
- Laboratory Forms
- Data Handling Forms
- Field Notebooks

Sample Custody and Documentation

Sample chain-of-custody protocols shall be maintained through the receipt of the sample containers, sample collection, transfer between personnel, shipment to the laboratory, and final disposal of the sample. The purpose of the protocols and procedures is to ensure that the integrity of the samples, from collection to analysis, is maintained. Sample custody shall be properly documented to provide a mechanism for tracking each sample submitted for laboratory analysis.

Chain-of-Custody Protocols

Chain-of-custody protocol is established to provide for sample integrity. This protocol is based upon agreed upon procedures for handling and transferring samples collected in the field between the field technicians and laboratory receiving. The protocol is defined as stated below.

- A sample is considered to be in the sample handler's custody when it is in the person's possession;
- It is in the person's view;
- It is placed in a secure location; and
- It is located in a designated secure area.

Chain-of-Custody Field Procedures

Chain-of-custody procedures are as follows:

- The field crew is personally responsible for the care and custody of the samples until they are transferred or properly dispatched . As few people as possible will handle the samples
- Sample labels will be filled out using waterproof ink for each sample
- All bottles will be labeled with sample numbers and locations
- The samples will be delivered to a certified laboratory for analytical work. Split samples will be delivered directly by field staff to the laboratory. The laboratory coordinator will review all field activities to determine whether proper custody procedures were followed.

Transfer of Custody and Shipment Procedures

Transfer-of-custody procedures are as followed:

- Samples will be accompanied by properly completed chain-of-custody documentation. Sample numbers and locations will be listed on the appropriate forms. When transferring the possession of the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the record. The record documents transfer-of-custody of samples from the field technician to another person, to/from a secure storage area, and to the laboratory.

- Samples will be properly packaged for shipment and dispatched to the laboratory for analysis with a signed custody record enclosed in the sample storage container. Samples which are shipped will be secured with strapping tape in at least two locations prior to laboratory shipment.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment. A copy will be retained by the sampler and returned to the project files.

Sample Designation

Samples will be designated with the following numbering scheme based upon the selected sampling location:

- KPCS#1
- KPCS#2
- KPCS#3
- KPCS#4

Additional basic information required includes: day, month, year the sample was taken, hour and minute the sample was taken, an the type of sample composite water sample, field duplicate, field blank, or split sample.

Sample Handling and Shipping

This section describes sampling handling and shipping. Methods and procedures will be in accordance with those specified in an EPA or other standard references.

Sample Handling

All samples collected will be placed in appropriate sampling bottles, with preservative if necessary, and stored in an ice chest or refrigerator immediately after collection. The samples will be delivered to the analytical laboratory in a timely manner to allow analyses within the required holding times. Proper information to be contained on the sample containers prior to relinquishing them to the laboratory are as follows:

- Volume of sample
- Type of sample container
- Preservative
- Holding Time

Table 3 depicts sample volumes, containers, and preservatives to be utilized during the field composite sampling.

Table 3. Sample Volumes, Containers, and Preservatives

Bottle Type	Bottle Volume	Parameter	Preservative	Hold Time	Comments
Polyethylene	500 ml	TN	H_2SO_4	28 Days	
Polyethylene	500 ml	TP	H_2SO_4	28 Days	
Polyethylene	250 ml	DOC	H_2SO_4	28 Days	
Polyethylene	250 ml	DIC	H_2SO_4	28 Days	
Polyethylene	1000 ml	Chlorophyll-a	None	24 Hours	Ship to FL

Analytical Methods

Five analytical methods will be employed during the Kingsmill Pond Water Quality Assessment and Evaluation Program. The analytical parameters and EPA method reference numbers for the samples to be collected are presented below in Table 4.

Table 4. Analytical Methods

Parameter	EPA Method
Total Nitrogen	EPA 351.2 (Plus subtraction)
Total Phosphorous	EPA 365.4
Dissolved Organic Carbon	EPA 415.1
Dissolved Inorganic Carbon	EPA 415.1
Chlorophyll-a	EPA 445.0

Quality Assurance/Quality Control

To ensure the accuracy of the data collected, QA/QC procedures will be followed. Resulting samples will be transported for laboratory analysis. Associated field and laboratory protocols are discussed herein.

Field Procedures

The field personnel responsible obtaining field samples will be trained and familiar with the contents of this sampling plan prior to any fieldwork conducted.

QA/QC Samples

QA/QC samples will be generated in the field. The labeling system described earlier will ensure that QC samples are identified properly. This is to ensure that the laboratory will not be able to differentiate the field QA/QC samples from the original samples. Therefore, the QA/QC samples will be handled as if they were original samples by the laboratory.

The following QA/QC samples will be submitted for analysis:

- Field blanks
- Field duplicates
- Split samples

Field Blanks. Field blanks will be employed to determine potential sample contamination during:

- Field collection
- Handling
- Shipment
- Storage
- Laboratory handling and analysis of samples

Field blanks are created by filling sampling containers with reagent-grade distilled water in the field and handling them with procedures identical to those used for the original samples. Field blanks for each container type will be prepared.

Field Duplicates. Field duplicates will be used to assess natural sample variability, or variability attributable to:

- Field collection
- Sample handling
- Shipment and storage methods
- Laboratory handling and analysis

Field duplicates are created by filling grab sample containers at the same location at the same time. Duplicate samples will be prepared and analyzed at a frequency of one per 20 samples collected.

Appendix C

Shoreline Cover Types Representative Photographs

Kingsmill Pond Shoreline Cover Types, Natural, Multiple Vegetated Layers

Kingsmill Pond Shoreline Cover Types, Forested, Cleared Understory

Kingsmill Pond Shoreline Cover Types, Forested, Landscaped Understory

Kingsmill Pond Shoreline Cover Types, Ornamental, Landscaped

Kingsmill Pond Shoreline Cover Types, Mowed Grass

8. Correspondence

9. Inspection Records

James City County VIRGINIA Jamestown 1607

Engineering and Resource Protection Division
Wet Pond/ Retention BMP Construction Inspection Form

Facility ID		**Apr. JCC Project ID**	E/S - 22-15
Facility Type:	EXIST RETRO ☐ Level 1		☐ Level 2
Inspection Date:	7-28-16	**Inspector(s)**	JCB / DPW / JCM
Accessibility Issues	☒ None	☐ Could not Access	☐ Could not Locate
Accessibility Notes			
Most Recent Rainfall Event	☐ < 3 days	☐ ≥ 3 and < 5 days	☐ ≥ 5 days
Inspection Stage	☐ ROUGH GRADE	☐ FINISH GRADE	☐ ACCEPTANCE

	Inlet Conditions	Not Started	Early Stage	Substantially Complete	Complete	Failed
☐	Pre Treatment	☐	☐	☐	☐	☐
☐	Open Channel	☐	☐	☐	☐	☐
☐	Pipe	☐	☐	☐	☐	☐
☐	Curb Cut	☐	☐	☐	☐	☐
☐	Sheet Flow	☐	☐	☐	☐	☐
☐	Rip Rap Apron	☐	☐	☐	☐	☐

Inlet Condition Notes

- ✓ • Plywood in chute / Timbers @ crest
- ✓ • Backfill @ post for walkway/bridge
- ✓ • Rmv debris matting
- • Wood on bridge to be removed.
- ✓ • Sinkhole at fence post.
- ✓ • Right front bridge abutment fill & stabilize

	Basin Conditions	Not Started	Early Stage	Substantially Complete	Complete	Failed
☐	Forebay	☐	☐	☐	☐	☐
☐	Basin/Cells [1]	☐	☐	☐	☐	☐
☐	Side Slopes [2]	☐	☐	☐	☐	☐
☐	Aeration [3]	☐	☐	☐	☐	☐
☐	Embankment	☐	☐	☐	☐	☐
☐	Safety Fence	☐	☐	☐	☐	☐
☐	Stabilization	☐	☐	☐	☐	☐

Normal Water Elevation	Normal ☐	Abnormal ☐	Distance from :		+/-
Aquatic/Safety Bench/ Wetlands	Safety Bench ☐	Aquatic Bench ☐	Plants ☐	Width Bench:	

Basin Condition Notes	

Outlet Conditions		Not Started	Early Stage	Substantially Complete	Complete	Failed
☐	Riser/ EW	☐	☐	☐	☐	☐
☐	Barrel Pipe	☐	☐	☐	☐	☐
☐	Weir	☐	☐	☐	☐	☐
☐	Dewatering Orifice [3]	☐	☐	☐	☐	☐
☐	Anti-Vortex Trash Rack	☐	☐	☐	☐	☐
☐	E. Spillway	☐	☐	☐	☐	☐
☐	Outfall Protection	☐	☐	☐	☐	☐
Outlet Condition Notes						

Note: [1] The basin or multi-cell length/width ratio should be 2:1 for a level 1 pond and 3:1 for a level 2 pond.
[2] Side slopes should be 4:1 or flatter.
[3] Extended Detention volume, dewatering orifice and aeration are part of a Level 2 design criteria only.

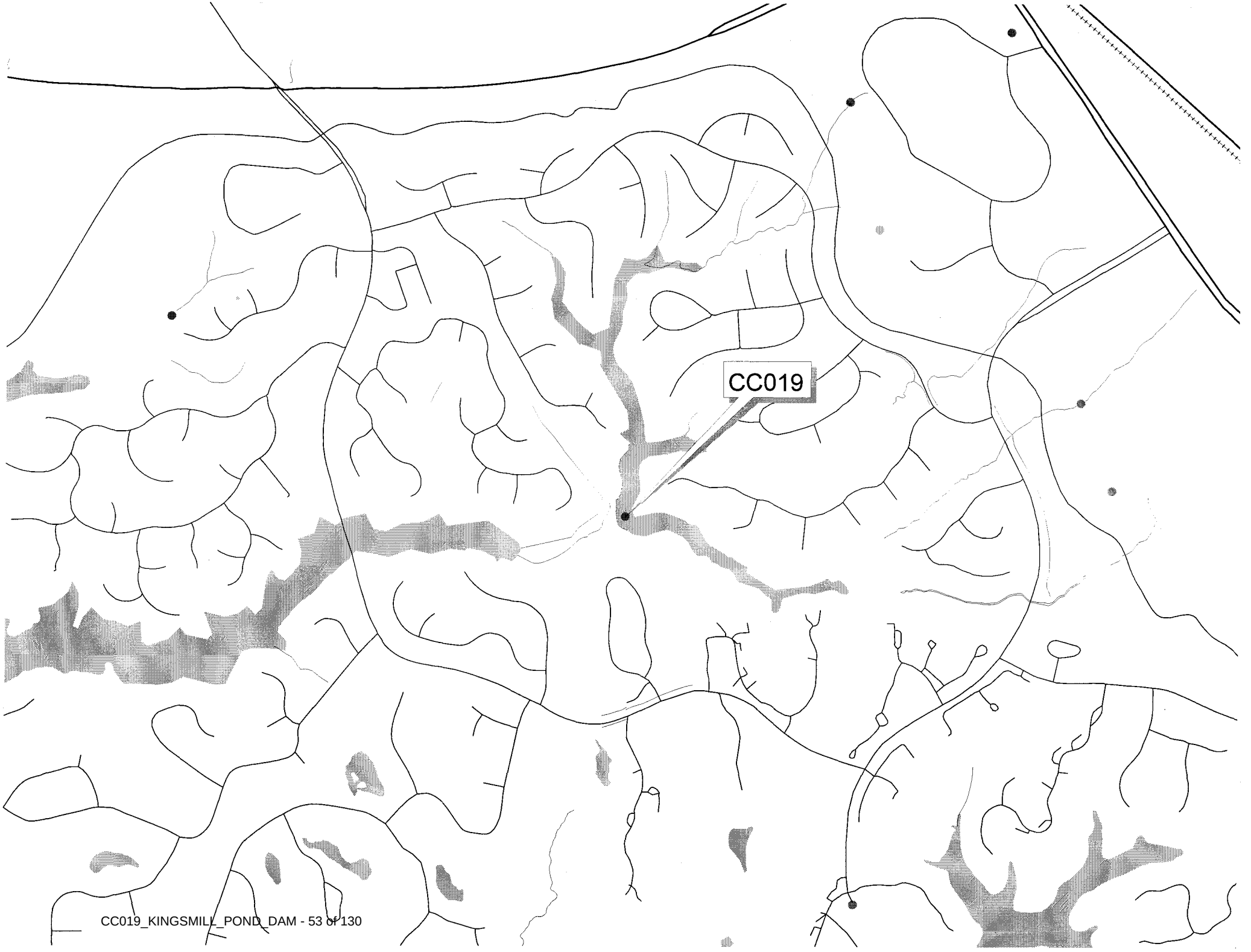
√ Fence + berm?

Gabion interface

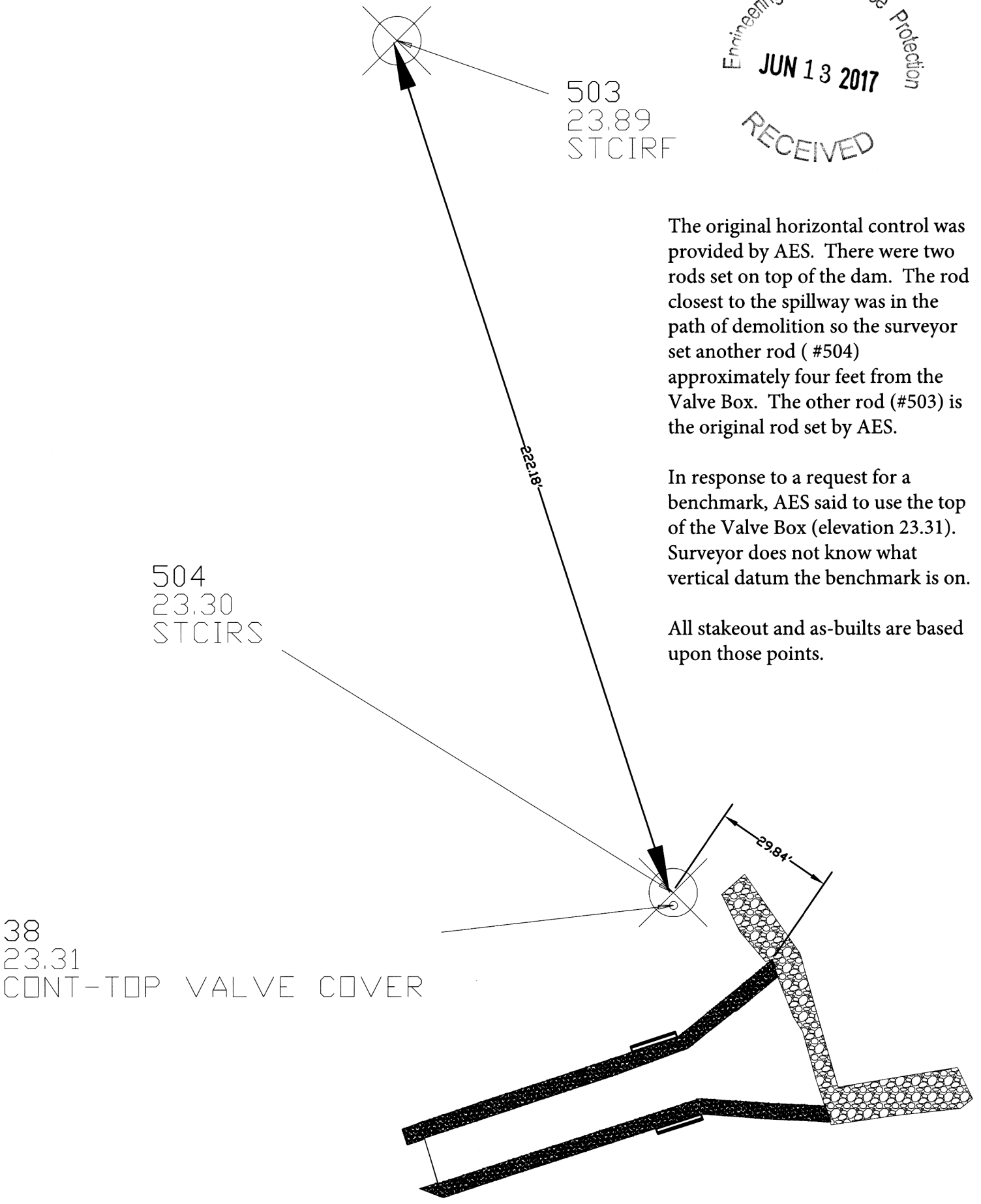
Steps

10. Misc. (ex. photos)

WATERSHED	CC	MAINTENANCE PLAN	No	CTRL STRUC DESC	Gabion
BMP ID NO	019	SITE AREA acre	22.88	CTRL STRUC SIZE inches	
PLAN NO		LAND USE	Res Planned Com	OTLT BARRL DESC	
TAX PARCEL		old BMP TYP		OTLT BARRL SIZE inch	
PIN NO	510100010	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Kingsmill Pond-Private Dam			DESIGN HW ELEV	
FACILITY LOCATION	End Macauley Rd @ 13th Hole River Course			PERM POOL ELEV	
CITY-STATE	Williamsburg, Va. 23185	SVC DRAIN AREA acres	900	2-YR OUTFLOW cfs	0.00
CURRENT OWNER	Kingsmill Community Services Assoc.			10-YR OUTFLOW cfs	0.00
OWNER ADDRESS	P.O. Box 348			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI			
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187	IMPERV AREA acres	0.00	CONSTR CERTIF	No
OWNER PHONE		RECV STREAM			
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	No	LAST INSP DATE	3/27/2001
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
Get Last BMP No		CHAN PROT VOL acre-ft		Spillway & Dam plan 4/11/00, completed 3/2001.	
		SW/FLOOD CONTROL	No		
Return to Menu		GEOTECH REPORT	No		


CC019

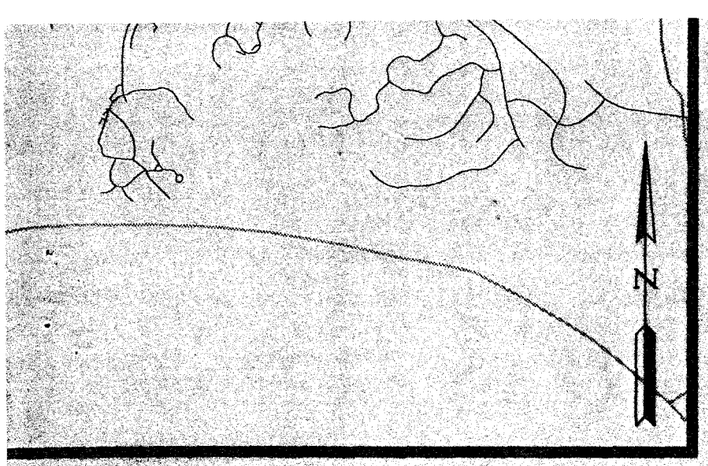

CC019



The original horizontal control was provided by AES. There were two rods set on top of the dam. The rod closest to the spillway was in the path of demolition so the surveyor set another rod (#504) approximately four feet from the Valve Box. The other rod (#503) is the original rod set by AES.

In response to a request for a benchmark, AES said to use the top of the Valve Box (elevation 23.31). Surveyor does not know what vertical datum the benchmark is on.

All stakeout and as-builts are based upon those points.



SCALE 1"=2000')

FLARED END SECTION
VALVE
FIRE HYDRANT ASSEMBLY
BLOW-OFF VALVE
AIR RELEASE ASSEMBLY
CLEAN OUT
WATER METER
STREETLIGHT
CENTERLINE/BASELINE
RIGHT OF WAY

SILT FENCE
INLET PROTECTION
CHECK DAM
STRAW BALE BARRIER
RIP RAP
REVERSE ROLL TOP GUTTER
80 EXISTING CONTOUR ELEV.
PROPOSED CONTOUR ELEV. 80
GRADING BY OTHERS 80
GRADING LINE TIE-IN
25.1 GROUND ELEVATION
PROPOSED TOP OF CURB ELEV.

EROSION AND SEDIMENTATION CONTROL LEGEND

SF — SILT FENCE
IP — INLET PROTECTION
CE — CONSTRUCTION ENTRANCE
CD — CHECK DAM
STB — STRAW BALE BARRIER
DD — TEMPORARY DIVERSION DIKE
RR — RIP RAP
OP — OUTLET PROTECTION
CIP — CULVERT INLET PROTECTION
ST — TEMPORARY SEDIMENT TRAP
PS — PERMANENT SEEDING
SB — TEMPORARY SEDIMENT BASIN
TP — TREE PROTECTION

CC 019
KINGSMILL DAM
(PRIVATE)
REFER TO MYLAR

RAWING
01
000
O. 7753-12

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

DETENTION/BMP FACILITY CERTIFICATION

I CERTIFY THAT TO THE BEST OF MY JUDGMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

VA PROFESSIONAL ENGINEER — DATE August 3, 2001 — VA LICENSE NUMBER

COVER SHEET

JCC BMP ID JR045 CC019 RECORD DRAWING INFORMATION PROVIDED BY G. NICE AND SONS, INC.

GENERAL NOTES

1. THE PROJECT WILL BE CONSTRUCTED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE SPECIFICATIONS, JANUARY 1994 EDITION, EXCEPT FOR REFERENCES TO MEASUREMENT AND PAYMENT WHICH WILL BE OMITTED OR AS NOTED HEREIN.

2. PRIOR TO INSTALLATION, SUBMIT TO THE ENGINEER FOR APPROVAL ALL MATERIALS PROPOSED FOR USE ON THIS PROJECT. APPROVAL DOES NOT RELIEVE THE CONTRACTOR FROM HIS OBLIGATION AND RESPONSIBILITY FOR CONSTRUCTING THE PROJECT IN ACCORDANCE WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.

3. THE ABSENCE OF THE ENGINEER OR A REPRESENTATIVE FROM K.C.S.A. AT THE JOB SITE DOES NOT, IN ANY WAY, RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO PERFORM THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, ADDENDA AND WRITTEN AUTHORIZED PLAN REVISIONS.

4. THIS PROJECT IS A LUMP SUM CONTRACT. FOR BIDDING PURPOSES, THE FOLLOWING ESTIMATES OF MAJOR MATERIALS REQUIRED AND NOT SPECIFICALLY QUANTIFIED ON THE DRAWINGS ARE AS FOLLOWS:

DEMOLITION OF 6" CONCRETE SPILLWAY	470	SQUARE YARDS
STONE FILLED GABIONS	535	CUBIC YARDS
GROUTED RIP-RAP	211	CUBIC YARDS
UNGROUTED RIP-RAP	11	CUBIC YARDS
4" HDPE PERFORATED DRAIN PIPE	474	LINEAR FEET
FILTER FABRIC	537	SQUARE YARDS
EROSION CONTROL MATTING	670	SQUARE YARDS
SEEDING	760	SQUARE YARDS

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FOR THIS PROJECT.

6. EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING "MISS UTILITY" (1-800-552-7001) FOR EXISTING UTILITY LOCATIONS PRIOR TO COMMENCING CONSTRUCTION.

7. COMPLY WITH ALL PROVISIONS OF THE VIRGINIA UNDERGROUND UTILITY DAMAGE PREVENTION ACT (SECTION 56-265.14 ET. SEQ. CODE OF VIRGINIA, 1950, AS AMENDED). CONTRACTOR HEREBY AGREES TO HOLD K.C.S.A. HARMLESS AGAINST ANY LOSS, DAMAGE, OR CLAIM OF ANY NATURE WHATSOEVER ARISING FROM THE CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS OF SAID ACT.

8. TO FACILITATE REPAIR OF THE SPILLWAY AND DAM, THE LAKE LEVEL WILL BE LOWERED FOR THE DURATION OF CONSTRUCTION. COORDINATE WITH K.C.S.A. CONSTRUCTION DIVISION, A MINIMUM OF 7 CALENDAR DAYS PRIOR TO BEGINNING WORK, TO ALLOW THE LAKE TO DRAIN SUFFICIENTLY TO COMPLETE THE WORK. MAINTENANCE OF THE LAKE LEVEL DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR.

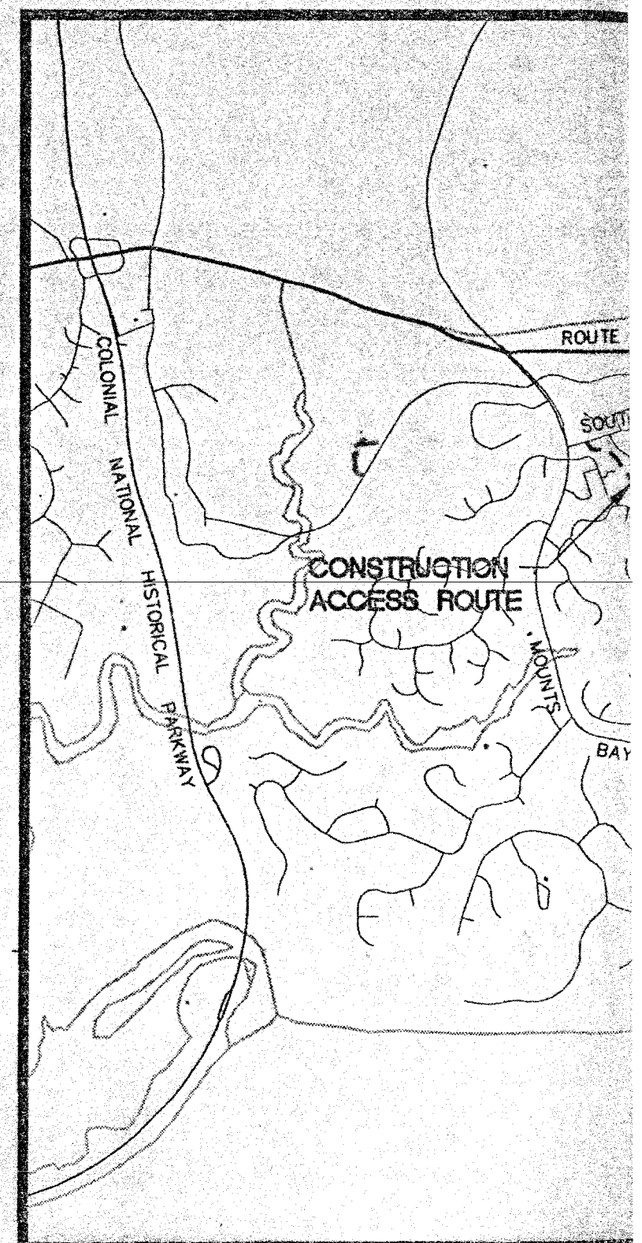
9. ACCESS TO THE SITE IS PERMITTED ALONG THE PAVED PATH EXTENDING FROM SOUTHALL ROAD, NEAR THE INTERSECTION WITH MOUNTS BAY ROAD, TO THE DAM SITE. A STONE CONSTRUCTION ENTRANCE CONFORMING TO SECTION 3.02 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK WILL BE REQUIRED WHERE THE ACCESS ROUTE LEAVES THE PAVED SURFACE TO MINIMIZE SEDIMENT TRANSPORT ONTO THE PATH. WHERE SEDIMENT IS TRANSPORTED ONTO THE PAVED SURFACE, THE PATH SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY AND THE SEDIMENT REMOVED TO A SUITABLE DISPOSAL AREA. REMOVE THE CONSTRUCTION ENTRANCE UPON COMPLETION OF CONSTRUCTION AND RESTORE THE AREA TO THE ORIGINAL CONDITION. DAMAGE TO THE PAVED PATH SHALL BE REPAIRED TO THE SATISFACTION OF K.C.S.A AND THE ENGINEER.

10. ADJACENT TO THE PROPOSED SPILLWAY LIES THE RUINS OF JOHNSTON'S MILL, A HISTORIC PRESERVATION SITE. IN NO WAY SHALL THE CONTRACTOR DISTURB THE RUINS OF THE MILL THROUGHOUT THE COURSE OF CONSTRUCTION. SPECIAL CARE SHALL BE TAKEN WHEN WORKING IN THE PROXIMITY OF THE RUINS TO AVOID DISTURBANCE. INSTALL SAFETY FENCING AROUND THE MILL RUIN TO DELINEATE THE AREA AND PROVIDE A VISIBLE DETERRENT THROUGHOUT THE COURSE OF CONSTRUCTION.

11. THE CONTRACTOR SHALL ENDEAVOR TO MINIMIZE THE CLEARING REQUIRED AND MAKE EVERY EFFORT TO SAVE TREES AND SHRUBBERY IN THESE AREAS. CONFINE CLEARING TO THE LIMITS INDICATED. REPAIR DAMAGE OUTSIDE OF THESE LIMITS RESULTING FROM CONTRACTOR'S OPERATIONS TO THE SATISFACTION OF THE OWNER AND THE ENGINEER. CLEARLY MARK AREAS THAT ARE NOT TO BE DISTURBED BY FENCING, FLAGS, SIGNS, ETC.

12. RIP RAP SHALL BE CLASS I DRY RIP RAP CONFORMING TO SECTION 414 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. UNGROUTED RIP RAP WILL BE PLACED ON GEOTEXTILE BEDDING MATERIAL AND GROUTED RIP RAP WILL BE PLACED DIRECTLY ON THOROUGHLY COMPACTED GROUND. GROUTED RIP RAP SHALL CONFORM TO SECTION 414.03.D OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS, EXCEPT THAT THE TOP 3 INCHES SHALL NOT CONTAIN GROUT AND THE RIP RAP SHALL BE ALLOWED TO PROTRUDE FROM THE GROUT SURFACE TO THE FINISHED GRADE. BLENDING OF CLASS AI DRY RIP RAP WITH THE CLASS I DRY RIP RAP WILL BE REQUIRED FOR THE GROUTED RIP RAP TO MINIMIZE VOIDS PRIOR TO GROUTING. THE MINIMUM COMPRESSIVE STRENGTH OF THE GROUT SHALL BE 2,000 PSI AT 28 DAYS AND SHALL BE VERIFIED BY SUBMITTAL OF THE GROUT MIX TO THE ENGINEER PRIOR TO PLACEMENT.

13. GABIONS SHALL CONFORM TO, AND BE INSTALLED IN ACCORDANCE WITH SECTION 610 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. STONE FILL FOR THE GABIONS SHALL MATCH THE COLOR AND MINERAL COMPOSITION OF THE RIP RAP PROPOSED FOR THE SPILLWAY BED. GROUT THE GABIONS PLACED



VICINITY MAP (

CONSTRUCTION DIVISION A MINIMUM OF 7 CALENDAR DAYS PRIOR TO BEGINNING WORK, TO ALLOW THE LAKE TO DRAIN SUFFICIENTLY TO COMPLETE THE WORK. MAINTENANCE OF THE LAKE LEVEL DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR.

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14. DEMOLITION OF THE EXISTING 8 INCH THICK CONCRETE SPILLWAY IS REQUIRED. BROKEN CONCRETE FROM THE DEMOLITION OF THE SPILLWAY MAY BE PERMITTED IN THE UNDERLYING COURSES OF THE GROUTED RIP RAP PROVIDED THAT NO PORTION OF THE BROKEN CONCRETE IS EXPOSED AFTER GROUTING. CONCRETE SLABS FROM THE SPILLWAY TO BE USED IN THE GROUTED RIP RAP SHALL BE BROKEN INTO PIECES NO LARGER THAN 18 INCHES MEASURED ALONG ANY DIMENSION. BROKEN CONCRETE IS NOT PERMITTED FOR USE AS GABION FILL.

15. STRIP SUITABLE TOPSOIL FROM THE SITE WHERE EXCAVATION OR GRADING IS INDICATED AND STOCKPILE THE MATERIAL SEPARATELY FROM OTHER EXCAVATED MATERIAL. STOCKPILES SHALL BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES. REPLACE A MINIMUM OF 4 INCHES OF TOPSOIL ON GRADED OR BARE DISTURBED AREAS TO PROMOTE NATIVE VEGETATION GROWTH.

16. SUFFICIENT BACKFILL OF APPROPRIATE CONSISTENCY EXISTS ON THE SITE TO ACHIEVE THE FINISHED GRADES INDICATED. THIS MATERIAL WILL BE CONSIDERED UNCLASSIFIED AND NO TESTING OTHER THAN FOR COMPACTION WILL BE REQUIRED BEFORE USE AS BACKFILL UNLESS OTHERWISE NOTED. EXCESSIVE FILL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER. BACKFILL PLACED BEHIND THE GABIONS AND BETWEEN SOIL REINFORCING MATS SHALL BE COMPACTED, IN MAXIMUM 6 INCH LIFTS, TO 95% OF THE ASTM D 1557 MAXIMUM DENSITY.

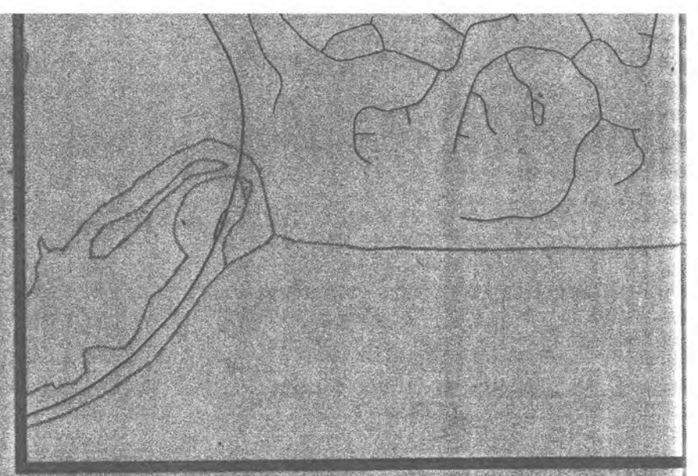
17. EXCAVATED MATERIAL CONTAINING VEGETATION, DEBRIS, DECAYED VEGETABLE MATTER, SOD, MULCH AND RUBBISH OR IS EXCESSIVELY SOFT OR WET IS CONSIDERED UNSUITABLE MATERIAL FOR USE AS BACKFILL OR AS A BASE FOR THE GABION WALLS OR THE SPILLWAY. IN AREAS WHERE EXCAVATION IS REQUIRED TO REMOVE UNSUITABLE MATERIAL BELOW THE ELEVATION OF THE BASE OF THE GROUTED RIP RAP SPILLWAY, BROKEN CONCRETE FROM THE DEMOLITION OF THE EXISTING SPILLWAY OR RIP RAP SHALL BE USED TO REPLACE THE UNSUITABLE MATERIAL. UNDER THE GABION WALLS, REPLACE UNSUITABLE MATERIAL WITH SUITABLE BACKFILL COMPACTED IN MAXIMUM 6 INCH LIFTS TO 95% OF THE ASTM D 1557 MAXIMUM DENSITY.

18. GENERAL GRADING SHALL CONFORM TO GRADES SHOWN ON THE PLANS. WHERE FILL IS REQUIRED AND FINISHED GRADES ARE NOT INDICATED ON THE PLANS, THE AFFECTED AREA SHALL BE BROUGHT TO THE APPROXIMATE ORIGINAL GRADES. ALL GRADED AREAS SHALL BE LEFT CLEAN AND SMOOTH WITH THE SURFACE READY TO BE MOWED. IN NO CASE SHALL LOW AREAS THAT DO NOT DRAIN BE CREATED AS A RESULT OF THE CONSTRUCTION.

19. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY STABILIZATION SHALL BE PLACED ON AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS.

20. SEEDING, FERTILIZING AND MULCHING OF DISTURBED AREAS WILL BE IN ACCORDANCE WITH SECTION 603 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS AND RECOMMENDATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. SEEDING IS REQUIRED ON ALL EXPOSED FACES OF THE DAM AND AREAS DISTURBED BY CONSTRUCTION ACTIVITY. OVERSEEDING IS REQUIRED OVER THE ENTIRE SURFACE OF THE DAM AND WHERE DIRECTED BY THE ENGINEER. PERMANENT SEEDING WILL BE AT A MINIMUM RATE OF 50 LBS./AC. THE MINIMUM REGULAR SEEDING RATE IS 150 LBS./AC.

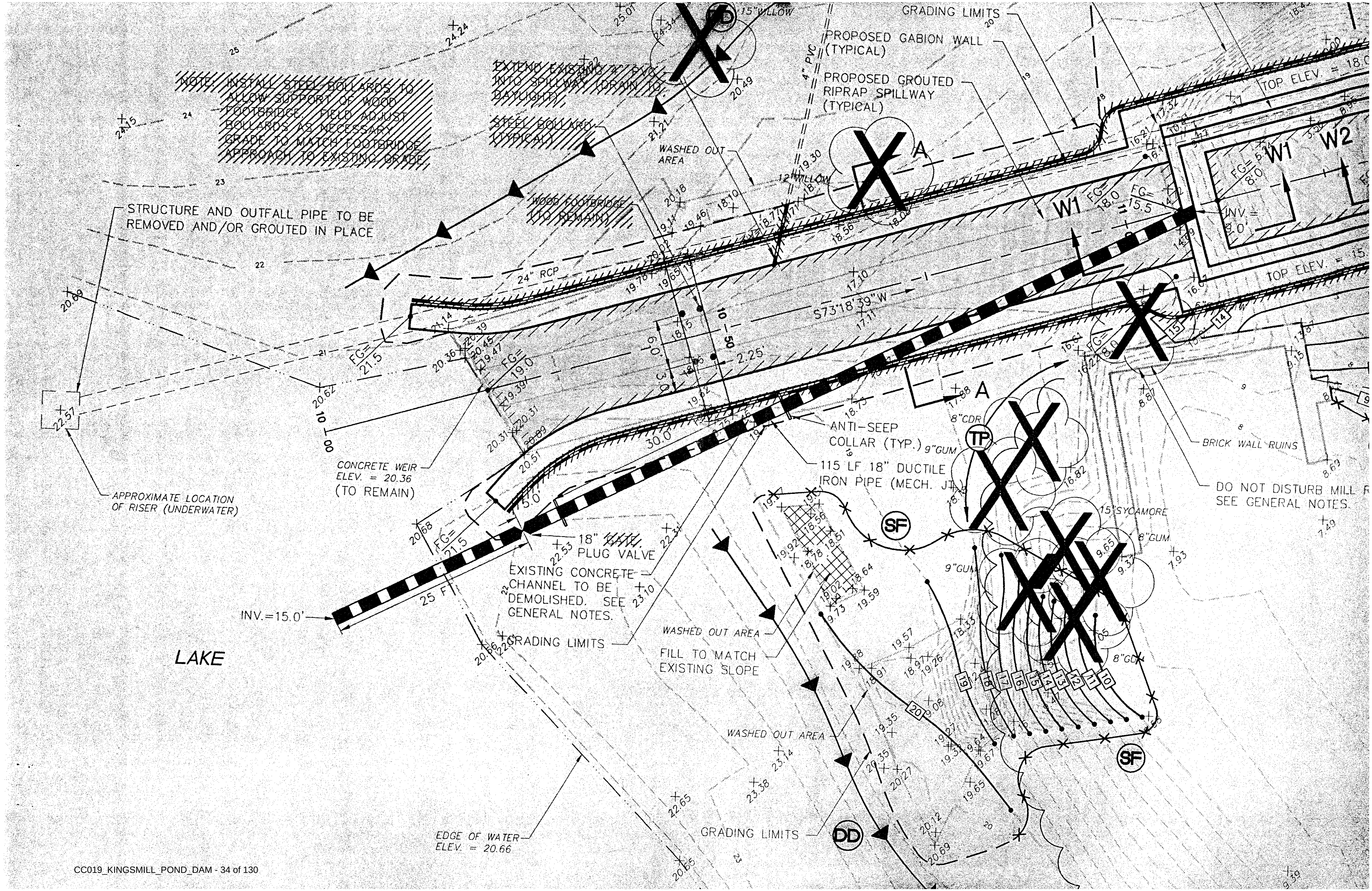
21. EROSION CONTROL MATTING SHALL BE APPLIED ON SLOPES STEEPER THAN 3:1. INSTALLATION WILL BE IN ACCORDANCE WITH SECTION 606 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. MATERIALS SHALL CONSIST OF SOIL RETENTION MATS OR SOIL STABILIZATION MATS AS INDICATED IN SECTION 245 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS. SUBMIT SAMPLES FROM THE ENGINEER. JUTE MESH IS NOT ACCEPTABLE.

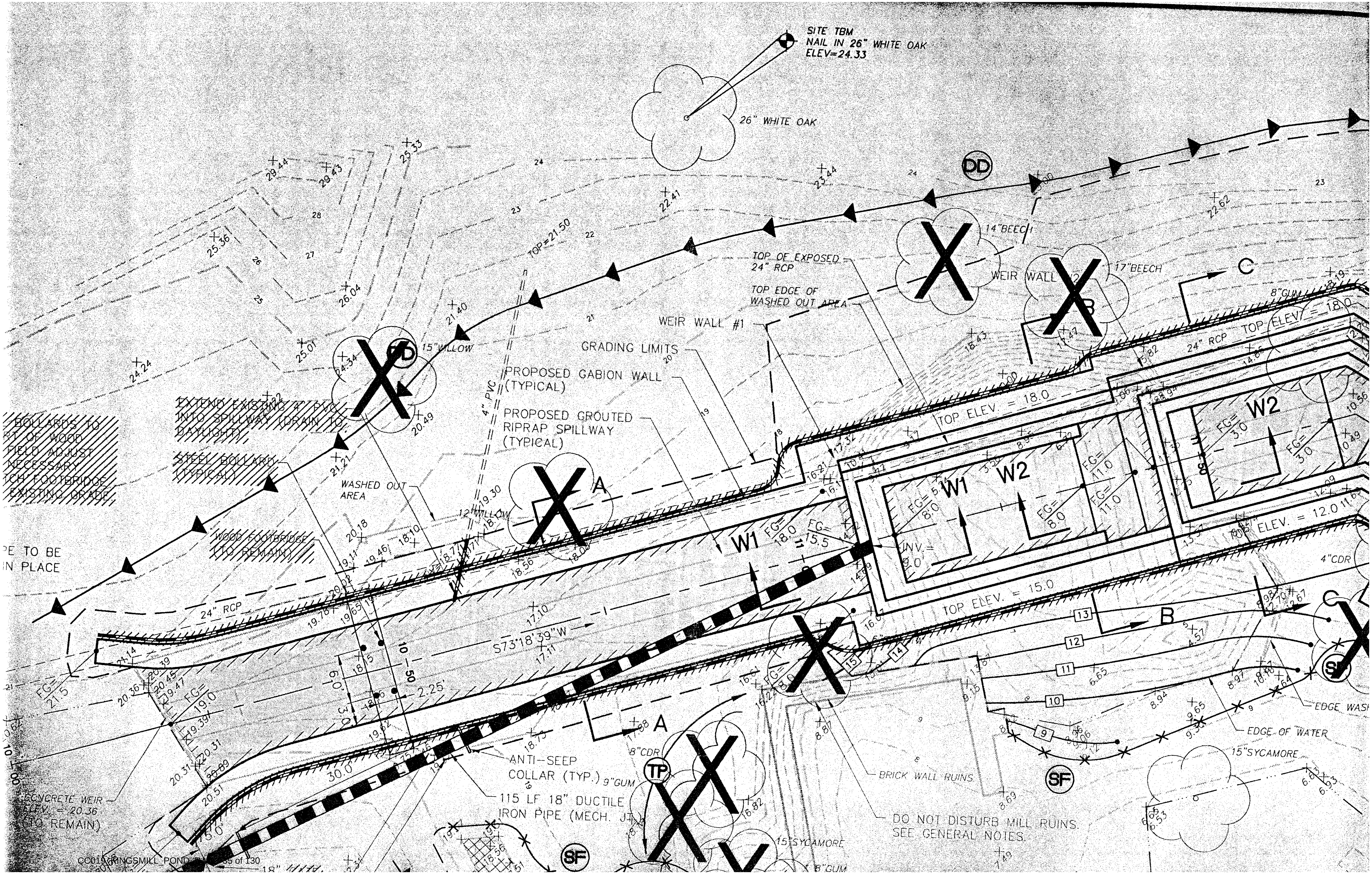


VICINITY MAP (AP

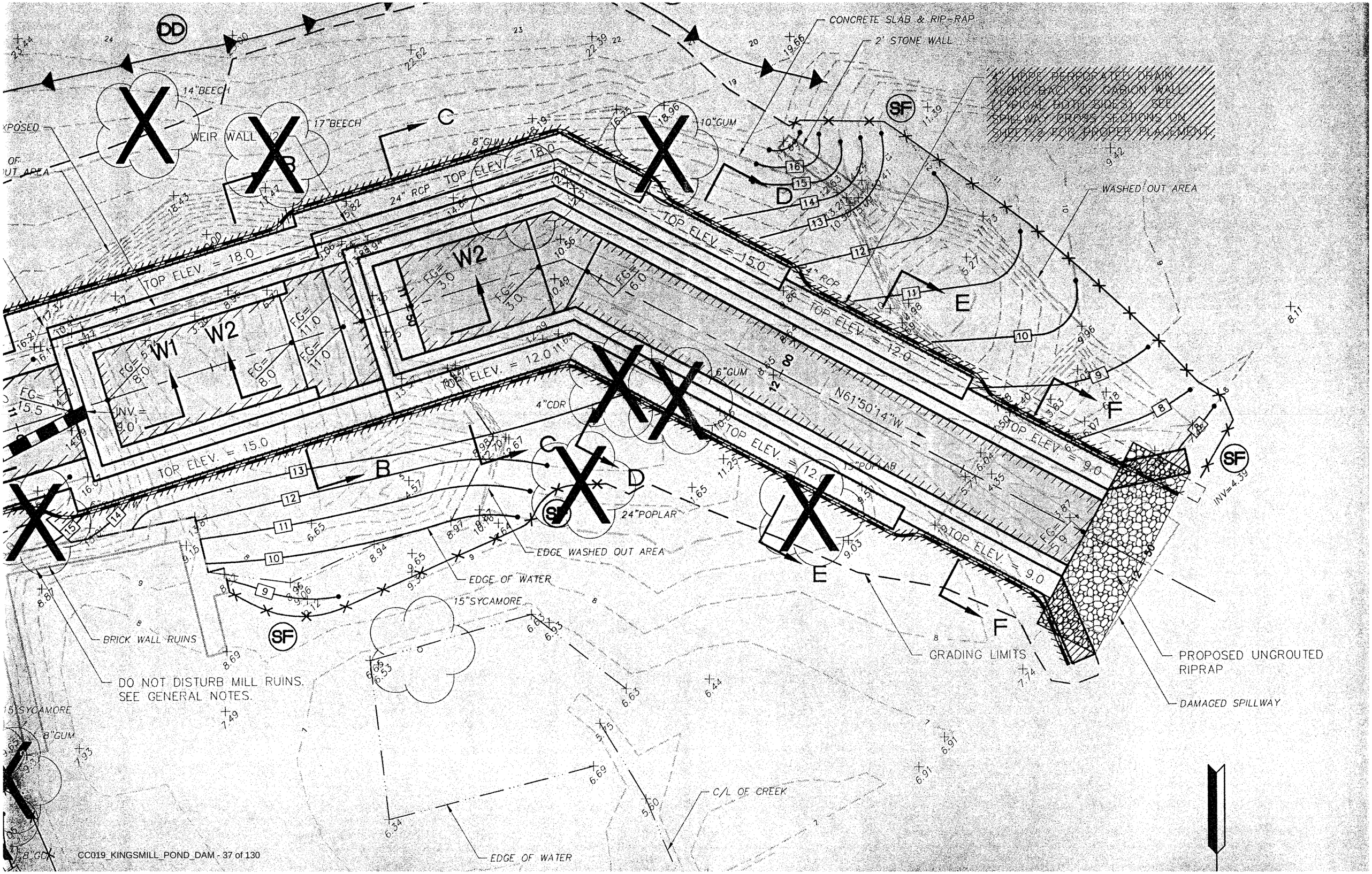
RECOF
7
APF
AES PROJE

AES
CONSULTING ENGINEER

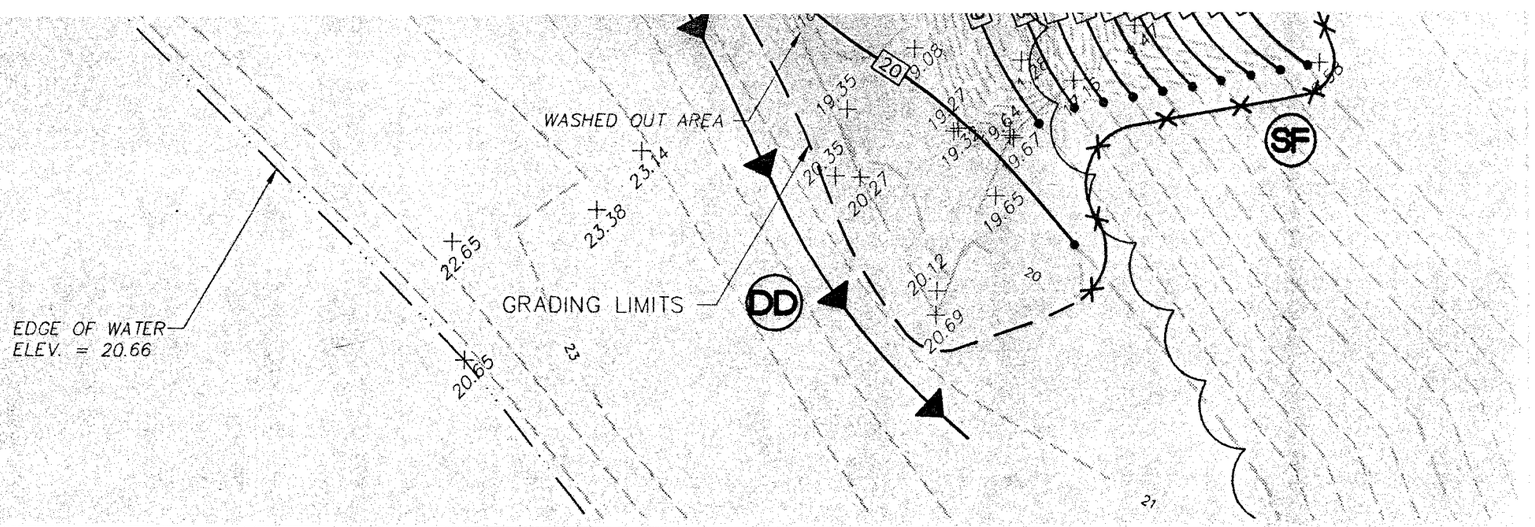

NOTE: INSTALL STEEL BOLLARDS TO ALLOW SUPPORT OF WOOD FOOTBRIDGE. FIELD ADJUST BOLLARDS AS NECESSARY. GRADE TO MATCH FOOTBRIDGE APPROACH TO EXISTING GRADE.
EXTEND EXISTING 4" PVC INTO SPILLWAY (DRAIN TO DAYLIGHT)
STEEL BOLLARD (TYPICAL)
WOOD FOOTBRIDGE (TO REMAIN)
GRADING LIMITS
PROPOSED GABION WALL (TYPICAL)
PROPOSED GROUTED RIPRAP SPILLWAY (TYPICAL)
15" WILLOW
12" WILLOW
4" PVC
WASHED OUT AREA
TOP ELEV. = 18.0
TOP ELEV. = 15
W1
W2
INV. = 9.0'
STRUCTURE AND OUTFALL PIPE TO BE REMOVED AND/OR GROUTED IN PLACE
24" RCP
S73°18'39"W
10+50
10+00
2.25'
6.0'
3.0'
30.0'
5.0'
FG= 21.5
FG= 19.0
FG= 18.0
FG= 15.5
FG= 8.0
A
ANTI-SEEP COLLAR (TYP.)
115 LF 18" DUCTILE IRON PIPE (MECH. JT.)
8"CDR
9"GUM
TP
SF
15"SYCAMORE
8"GUM
BRICK WALL RUINS
DO NOT DISTURB MILL R
SEE GENERAL NOTES.
CONCRETE WEIR ELEV. = 20.36 (TO REMAIN)
APPROXIMATE LOCATION OF RISER (UNDERWATER)
18" GATE PLUG VALVE
EXISTING CONCRETE CHANNEL TO BE DEMOLISHED. SEE GENERAL NOTES.
INV.=15.0'
25 LF
LAKE
GRADING LIMITS
WASHED OUT AREA
FILL TO MATCH EXISTING SLOPE
WASHED OUT AREA
GRADING LIMITS
DD
EDGE OF WATER ELEV. = 20.66

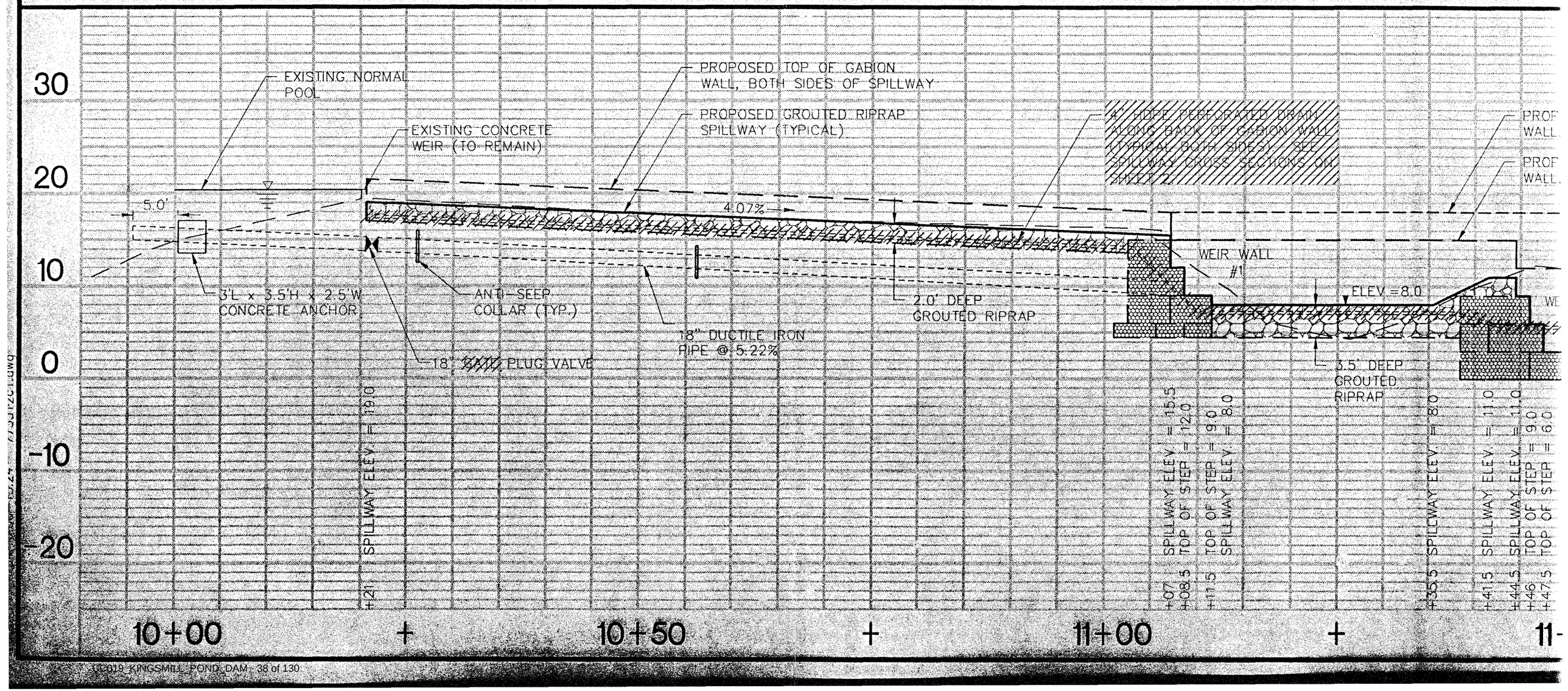

SITE TBM
NAIL IN 26" WHITE OAK
ELEV=24.33
26" WHITE OAK
DD
14"BEECH
17"BEECH
WEIR WALL #2
TOP OF EXPOSED 24" RCP
TOP EDGE OF WASHED OUT AREA
WEIR WALL #1
GRADING LIMITS
PROPOSED GABION WALL (TYPICAL)
PROPOSED GROUTED RIPRAP SPILLWAY (TYPICAL)
15"WILLOW
TOP=21.50
4" PVC
EXTEND EXISTING 4" PVC INTO SPILLWAY (DRAIN TO DAYLIGHT)
STEEL BOLLARD (TYPICAL)
WASHED OUT AREA
12"WILLOW
WOOD FOOTBRIDGE (TO REMAIN)
PE TO BE
IN PLACE
24" RCP
24" RCP TOP ELEV. = 18.0
TOP ELEV. = 18.0
TOP ELEV. = 12.0
TOP ELEV. = 15.0
8"GUM
W1
W2
INV.= 9.0
4"CDR
S73°18'39"W
ANTI-SEEP COLLAR (TYP.)
115 LF 18" DUCTILE IRON PIPE (MECH. JT.)
CONCRETE WEIR ELEV. = 20.36 (TO REMAIN)
8"CDR
9"GUM
TP
SF
BRICK WALL RUINS
DO NOT DISTURB MILL RUINS.
SEE GENERAL NOTES.
15"SYCAMORE
EDGE OF WATER
EDGE WASH
8"GUM
A
B
C

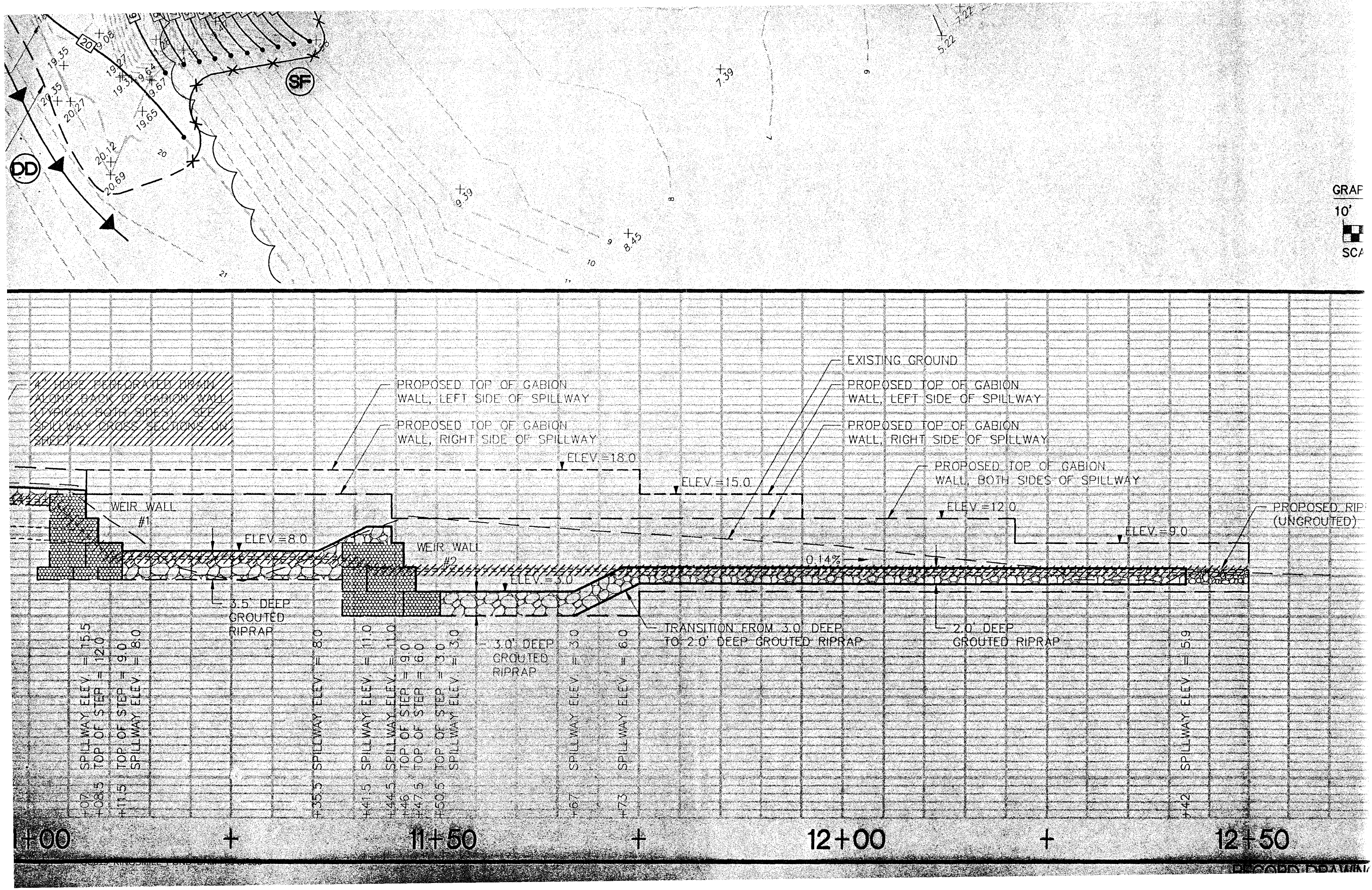
WEIR WALL #1
GRADING LIMITS
PROPOSED GABION WALL (TYPICAL)
PROPOSED GROUTED RIPRAP SPILLWAY (TYPICAL)
EDGE OF WASHED OUT AREA
TOP ELEV. = 18.0
TOP ELEV. = 15.0
TOP ELEV. = 12.0
W1
W2
FG= 18.0
FG= 15.5
FG= 8.0
FG= 11.0
FG= 3.0
FG= 16.0
INV. = 8.0'
15"WILLOW
12"WILLOW
4" PVC
24" RCP
18" RCP
4"CDR
6"GUM
15"POPLAR
24"POPLAR
S73°18'39"W
N61°50'14"W
2.25'
50'
ANTI-SEEP COLLAR (TYP.)
9"GUM
8"CDR
115 LF 18" DUCTILE IRON PIPE (MECH. JT.)
15"SYCAMORE
8"GUM
BRICK WALL RUINS
DO NOT DISTURB MILL RUINS. SEE GENERAL NOTES.
EDGE WASHED OUT AREA
EDGE OF WATER
C/L OF CREEK
TO MATCH TING SLOPE
WASHED OUT AREA
GRADING LIMITS
A
B
C
D
E
SF
TP
DD


CONCRETE SLAB & RIP-RAP
2' STONE WALL
4" HDPE PERFORATED DRAIN ALONG BACK OF GABION WALL (TYPICAL BOTH SIDES). SEE SPILLWAY CROSS SECTIONS ON SHEET 2 FOR PROPER PLACEMENT.
WASHED OUT AREA
14"BEECH
17"BEECH
10"GUM
8"GUM
24" RCP
TOP ELEV. = 18.0
TOP ELEV. = 15.0
TOP ELEV. = 12.0
TOP ELEV. = 9.0
W1
W2
FG= 8.0
FG= 11.0
FG= 3.0
FG= 6.0
INV.= 9.0
4"CDR
6"GUM
N61°50'14"W
15"POPLAR
24"POPLAR
EDGE WASHED OUT AREA
EDGE OF WATER
15"SYCAMORE
BRICK WALL RUINS
DO NOT DISTURB MILL RUINS. SEE GENERAL NOTES.
GRADING LIMITS
PROPOSED UNGROUTED RIPRAP
DAMAGED SPILLWAY
INV=4.39
C/L OF CREEK
EDGE OF WATER
5"SYCAMORE
8"GUM
8"GUM
DD
SF
A
B
C
D
E
F

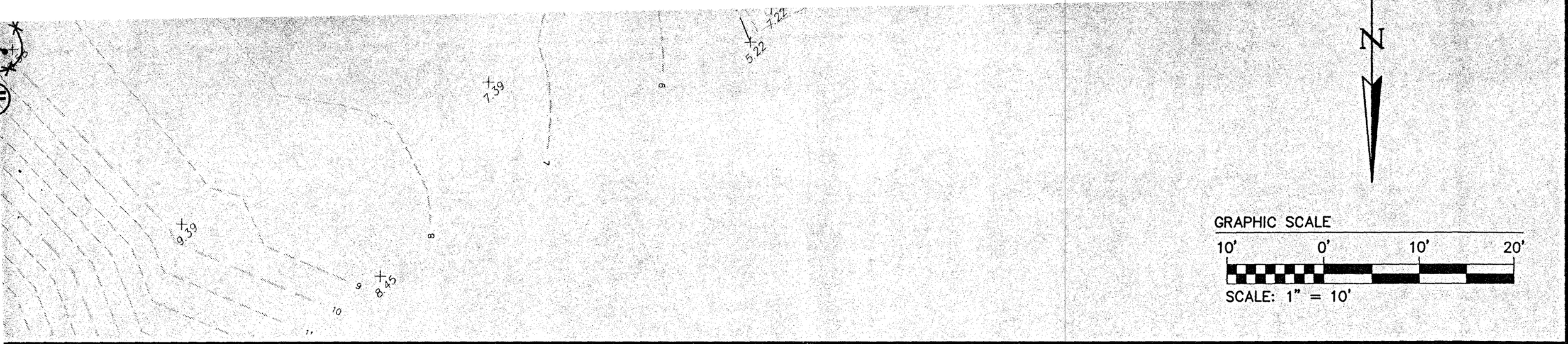
LAKE

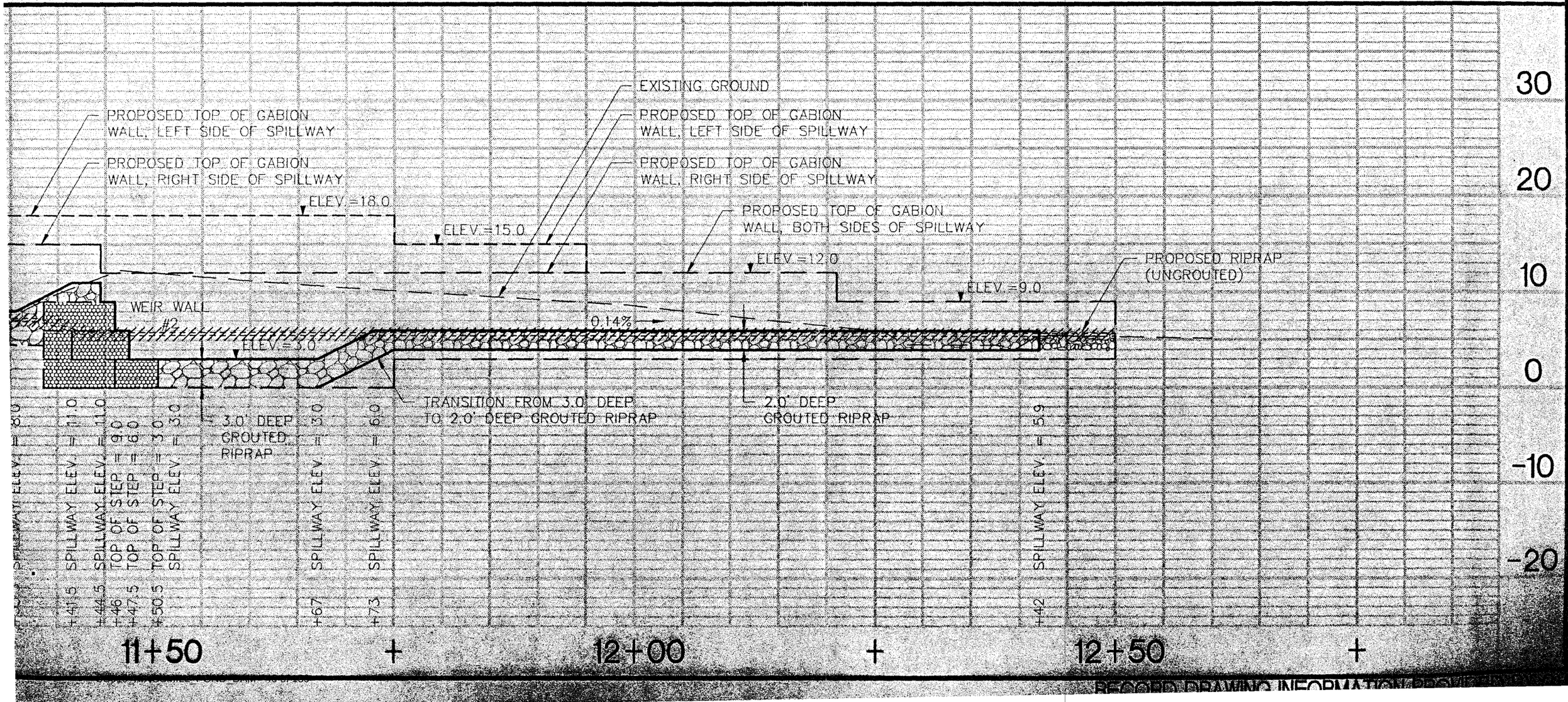

WASHED OUT AREA
EDGE OF WATER
ELEV. = 20.66
GRADING LIMITS
DD
SF
22.65
20.65
23.14
23.38
19.35
20.27
19.27
19.64
19.67
19.65
20.12
20.69
20
23
21


30
20
10
0
-10
-20
EXISTING NORMAL POOL
EXISTING CONCRETE WEIR (TO REMAIN)
PROPOSED TOP OF GABION WALL, BOTH SIDES OF SPILLWAY
PROPOSED GROUTED RIPRAP SPILLWAY (TYPICAL)
4" HDPE PERFORATED DRAIN ALONG BACK OF GABION WALL (TYPICAL BOTH SIDES) - SEE SPILLWAY CROSS SECTIONS ON SHEET 2
PROF WALL
PROF WALL
5.0'
4.07%
3'L x 3.5'H x 2.5'W CONCRETE ANCHOR
ANTI-SEEP COLLAR (TYP.)
18" DUCTILE IRON PIPE @ 5.22%
18" BAYO PLUG VALVE
2.0' DEEP GROUTED RIPRAP
WEIR WALL #1
ELEV. = 8.0
WE
3.5' DEEP GROUTED RIPRAP
+21 SPILLWAY ELEV. = 19.0
+07 SPILLWAY ELEV. = 15.5
TOP OF STEP = 12.0
+08.5
+11.5 TOP OF STEP = 9.0
SPILLWAY ELEV. = 8.0
+35.5 SPILLWAY ELEV. = 8.0
+41.5 SPILLWAY ELEV. = 11.0
+44.5 SPILLWAY ELEV. = 11.0
+46 TOP OF STEP = 9.0
+47.5 TOP OF STEP = 6.0
10+00
10+50
11+00
11-



SF
DD
GRAF
10'
SCA
4" HDPE PERFORATED DRAIN ALONG BACK OF GABION WALL (TYPICAL BOTH SIDES). SEE SPILLWAY CROSS SECTIONS ON SHEET 7
PROPOSED TOP OF GABION WALL, LEFT SIDE OF SPILLWAY
PROPOSED TOP OF GABION WALL, RIGHT SIDE OF SPILLWAY
EXISTING GROUND
PROPOSED TOP OF GABION WALL, LEFT SIDE OF SPILLWAY
PROPOSED TOP OF GABION WALL, RIGHT SIDE OF SPILLWAY
PROPOSED TOP OF GABION WALL, BOTH SIDES OF SPILLWAY
ELEV.=18.0
ELEV.=15.0
ELEV.=12.0
ELEV.=9.0
ELEV.=8.0
ELEV.=3.0
WEIR WALL #1
WEIR WALL #2
0.14%
PROPOSED RIP (UNGROUTED)
3.5' DEEP GROUTED RIPRAP
3.0' DEEP GROUTED RIPRAP
TRANSITION FROM 3.0' DEEP TO 2.0' DEEP GROUTED RIPRAP
2.0' DEEP GROUTED RIPRAP
+07 SPILLWAY ELEV. = 15.5
+08.5 TOP OF STEP = 12.0
+11.5 TOP OF STEP = 9.0
SPILLWAY ELEV. = 8.0
+35.5 SPILLWAY ELEV. = 8.0
+41.5 SPILLWAY ELEV. = 11.0
+44.5 SPILLWAY ELEV. = 11.0
+46 TOP OF STEP = 9.0
+47.5 TOP OF STEP = 6.0
+50.5 TOP OF STEP = 3.0
SPILLWAY ELEV. = 3.0
+67 SPILLWAY ELEV. = 3.0
+73 SPILLWAY ELEV. = 6.0
+42 SPILLWAY ELEV. = 5.9
11+00
11+50
12+00
12+50
RECORD DRAWING





RECORD DRAWING INFORMATION PROVI

(TYPICAL)

PROPOSED BACKFILL (TYPICAL)

PROPOSED GABION WALL (TYPICAL)

FILTER FABRIC (TYPICAL)

3' 12' 3'

2:1 (MAX.)

3/4:1 (MAX.)

PROPOSED GROUTED RIPRAP SPILLWAY

3' 1.5' 4.5'

1' 1'

HDPE PERFORATED DRAIN PIPE (SLOPE TO DAYLIGHT)

SECTION "A - A"

SCALE: 1" = 5'

APPROXIMATE LIMITS OF CONSTRUCTION EXCAVATION

PROPOSED BACKFILL (TYPICAL)

2:1 (MAX.)

CONSTRUCTED GRADE

ELEV.=18.0

3' 1.5' 1.5' 1.5' 12' 1.5' 1.5' 3' 1.5'

PROPOSED GABION WALL (TYPICAL)

SLOPE TO MATCH FINISHED GRADE

EXISTING GROUND (TYPICAL)

ELEV.=15.0

EXISTING 24" RCP REMOVED

PROPOSED GROUTED RIPRAP SPILLWAY

ELEV.=8.0

3/4:1 (MAX.)

13.5' 3' 3' 3' 3' 1.5' 10.5'

GALVANIZED MESH SOIL REINFORCEMENT

FILTER FABRIC (TYPICAL)

15' 10.5' 9'

34.5'

1'

HDPE PERFORATED DRAIN PIPE (SLOPE TO DAYLIGHT)

HDPE PERFORATED DRAIN PIPE (SLOPE TO DAYLIGHT)

SECTION "B - B"

SCALE: 1" = 5'

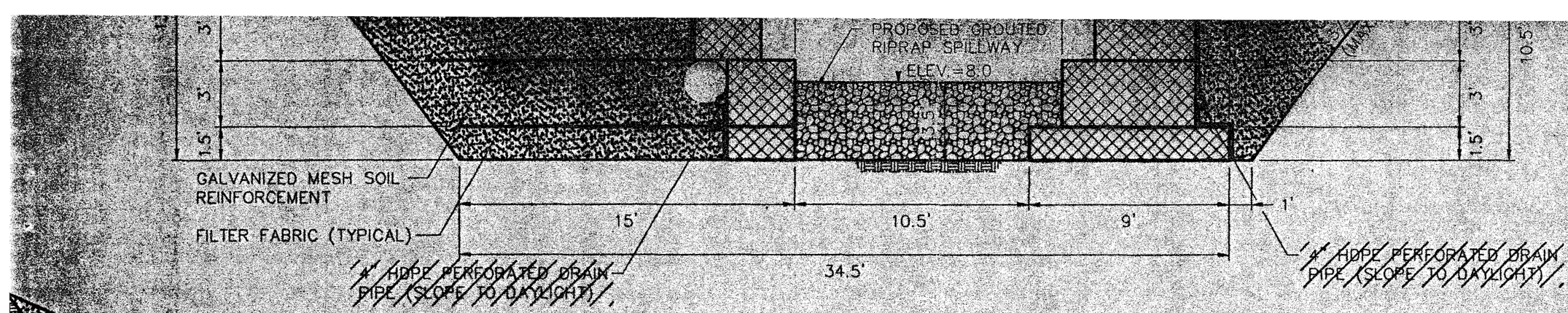
APPROXIMATE LIMITS OF CONSTRUCTION EXCAVATION

PROPOSED BACKFILL (TYPICAL)

2:1 (MAX.)

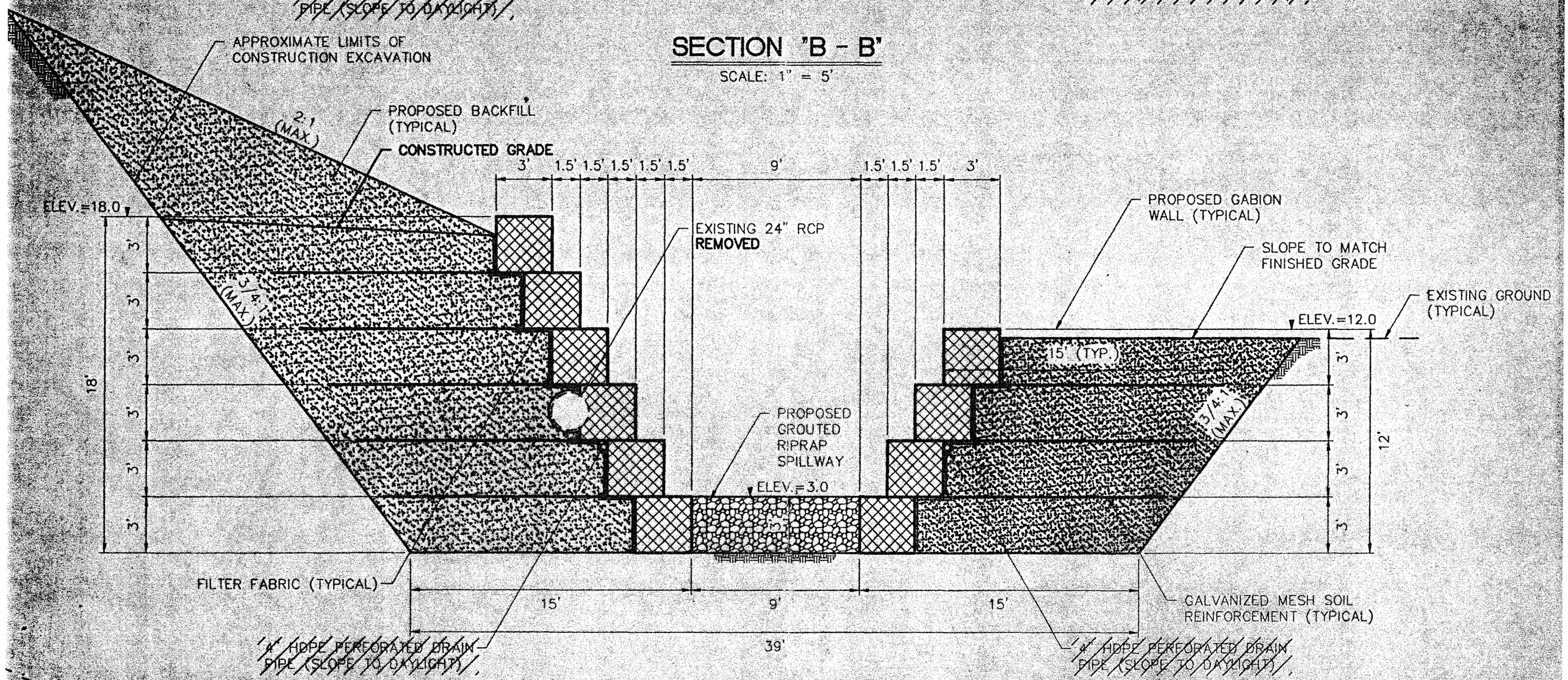
CONSTRUCTED GRADE

3' 1.5' 1.5' 1.5' 1.5' 1.5' 9' 1.5' 1.5' 1.5' 3'



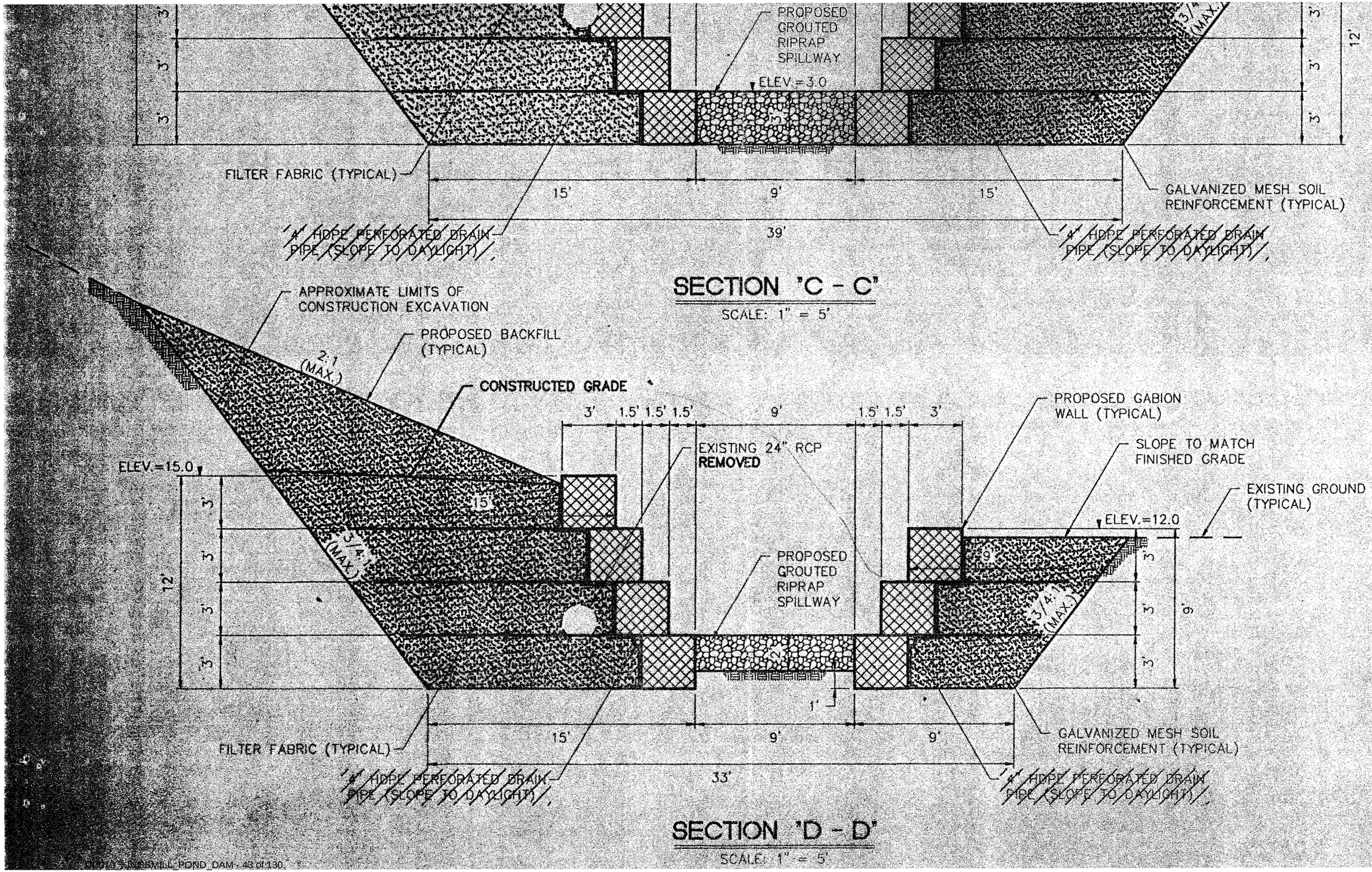
SECTION "B - B"

SCALE: 1" = 5'



SECTION "C - C"

SCALE: 1" = 5'

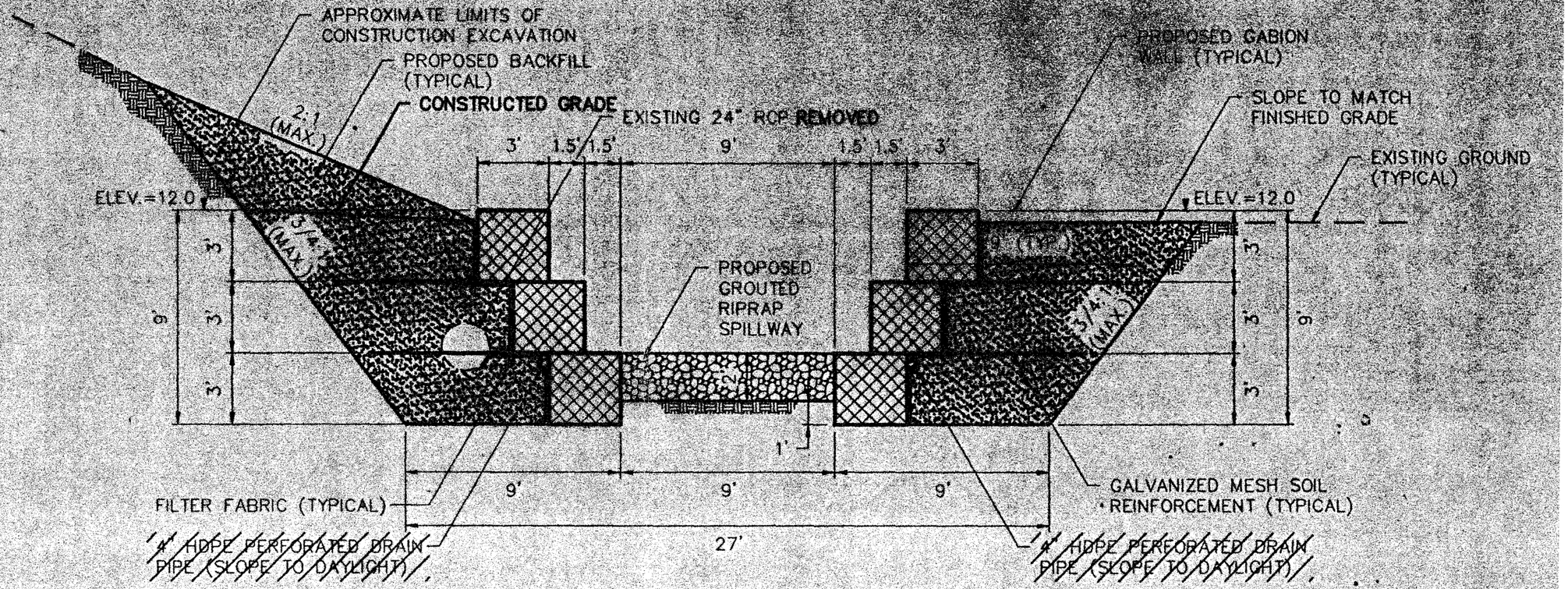


SECTION 'C - C'

SCALE: 1" = 5'

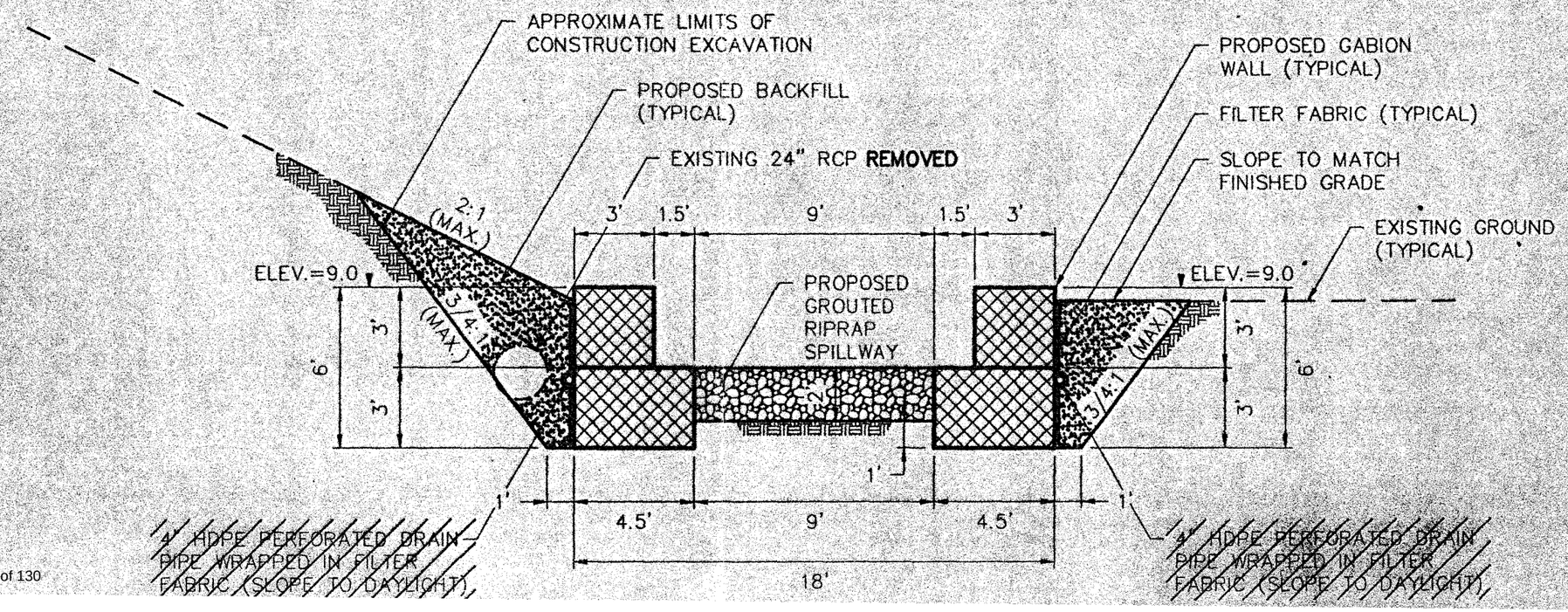
SECTION 'D - D'

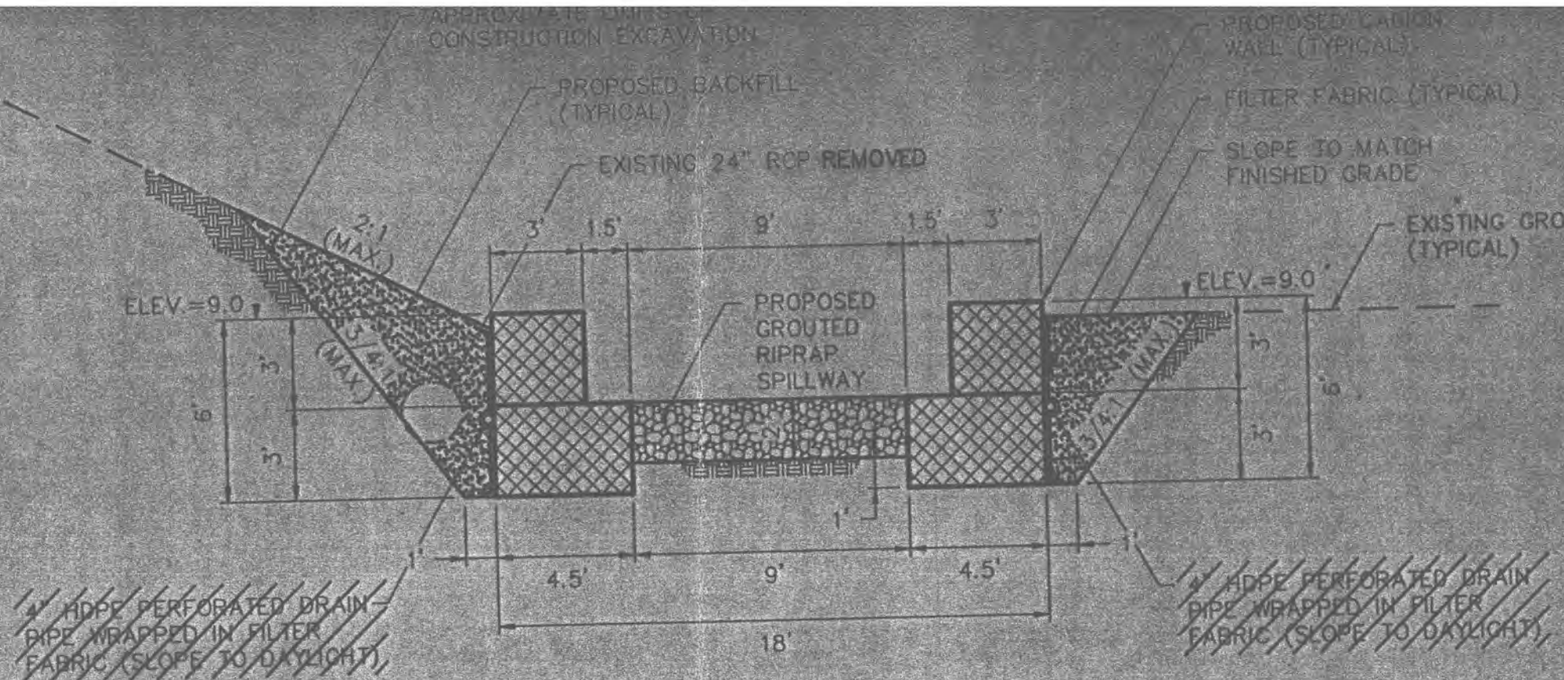
SCALE: 1" = 5'



SECTION "E - E"

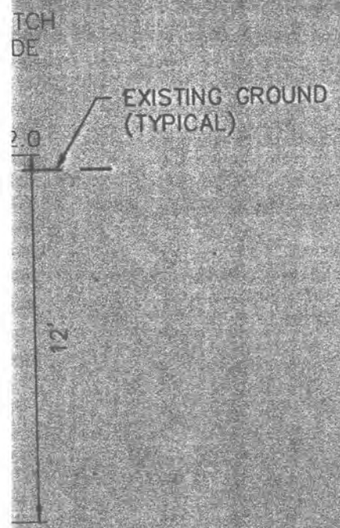
SCALE: 1" = 5'

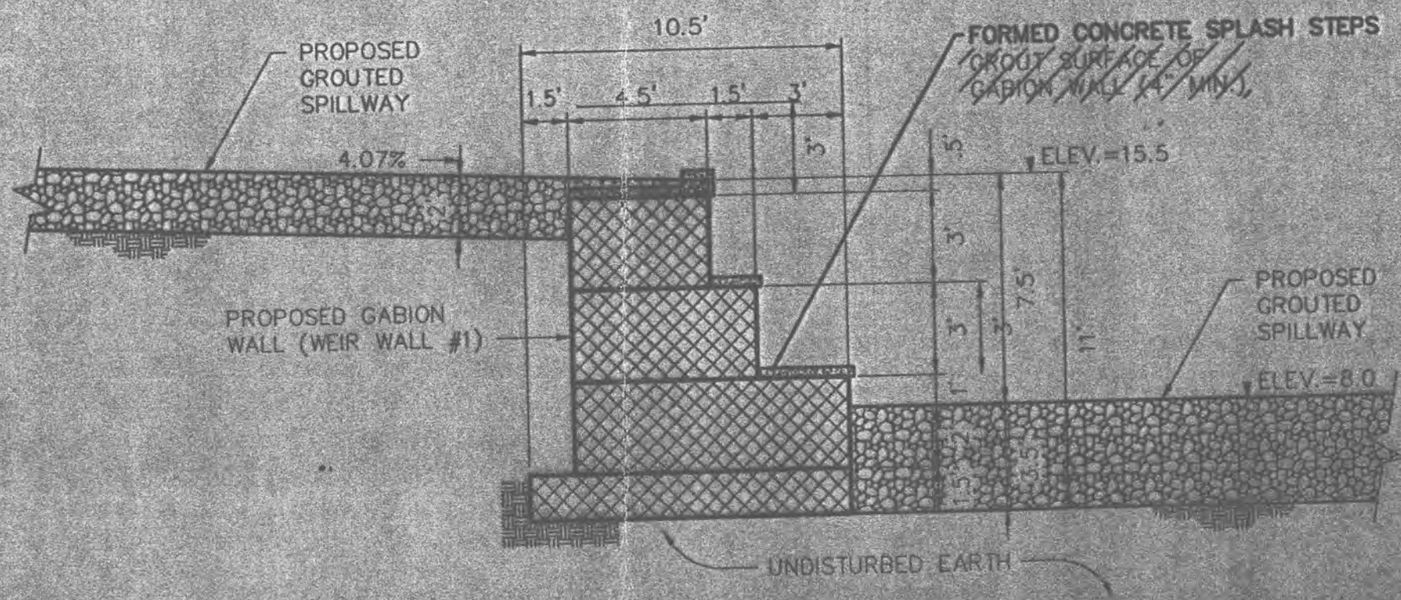




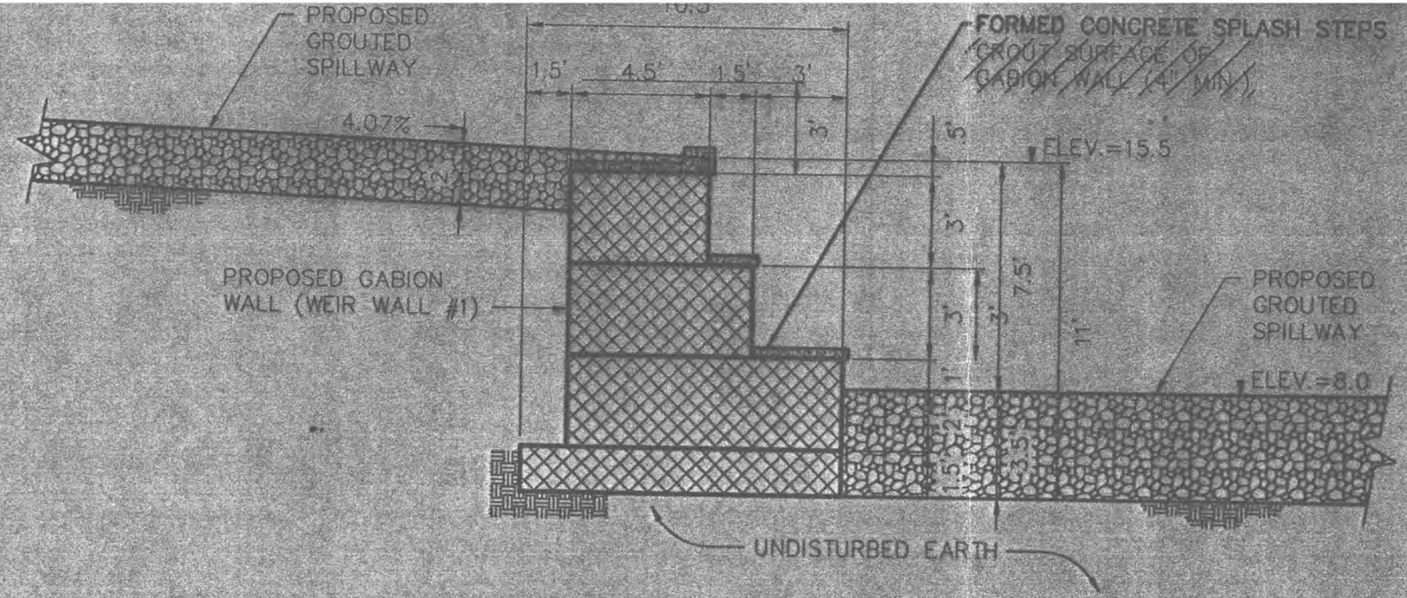
SECTION "F - F"

SCALE: 1" = 5'



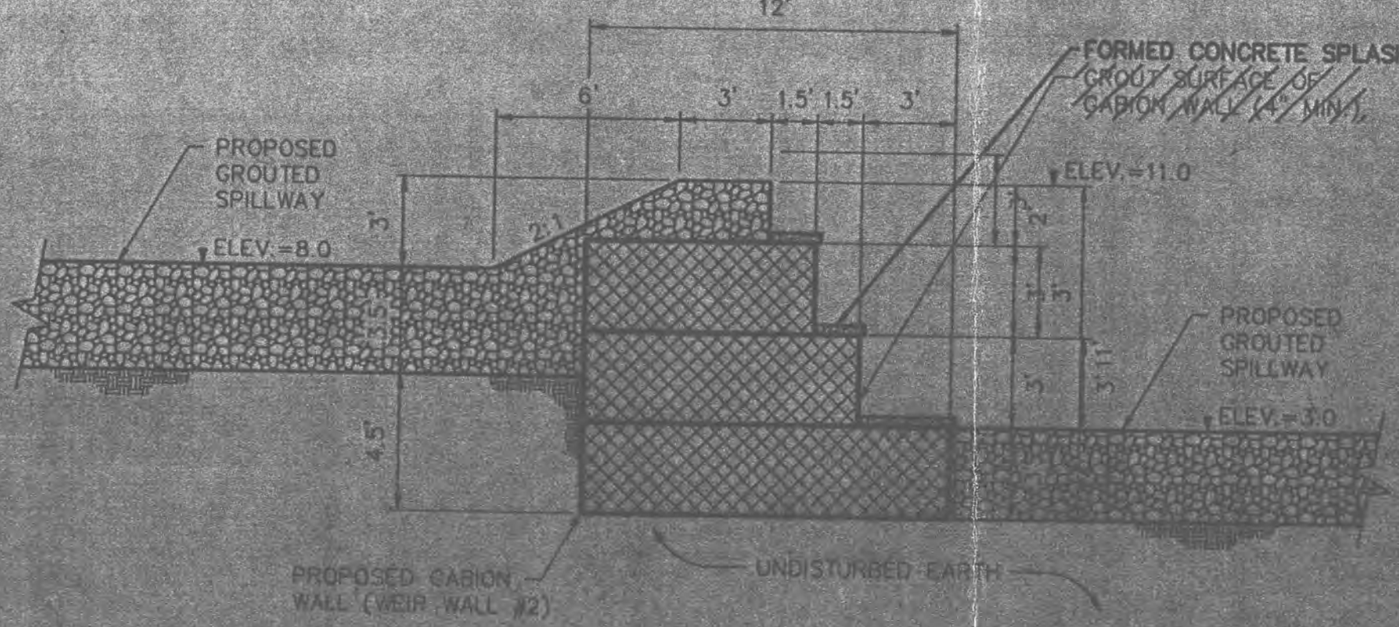


SECTION "W1 - W1"
WEIR WALL 1



SECTION "W1 - W1"
WEIR WALL 1

SCALE: 1" = 5'



SECTION "W2 - W2"
WEIR WALL 2

SCALE: 1" = 5'

KINGSMILL COMMUNITY ASSOCIATION

KINGSMILL POND SPILLWAY AND DAM REPAIR

SPILLWAY AND WEB CROSS SECTIONS

CONSULTING ENGINEERS

VIRGINIA

Designed ABS	Drawn EAJ
Scale 1"=5'	Date

Project No. 7784