CERTIFICATE OF AUTHENTICITY

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

BMP NUMBER: **YC029**

DATE VERIFIED: **January 11, 2013**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 13, 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: YC029

PIN: 2320900001C

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

Property Description: Common Open Space #2 Phase 1 Section 2

Site Address:

(For internal use only) **Box** 24 **Drawer:** 9

Agreements: (in file as of scan date) **Y** **Book or Doc#:** 030010553 **Page:**

030000331

Comments

COPY

COUNTY OF JAMES CITY, VIRGINIA

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 2ND day of APRIL, 2003, between COLONIAL HERITAGE LLC, and all successors in interest, ("COVENANTOR(S),") owner(s) of the following property: COLONIAL HERITAGE, project name, COLONIAL HERITAGE PHASE 1 SECTION 2, Document No. —, Deed Book —, Page No. —; Instrument No. 030000331, and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

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

1. The COVENANTOR(S) shall provide maintenance for the 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, 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.

Instrument # 030010553
Recorded on April 8, 2003

Revised 01/02

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) have executed this DECLARATION OF COVENANTS as of the date first above written.

COVENANTOR(S)

Print Name/Title Michael Dillard Vice President

ATTEST:

COVENANTOR(S)

_____

Print Name/Title _____

ATTEST:

_____

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City

I hereby certify that on this 2 day of April, 20 03, before the subscribed, a Notary Public of the State of Virginia, and for the City/County of James City, aforesaid personally appeared Michael Dillard and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 2 day of April, 20 03.

Notary Public

My Commission expires: June 30, 2007

Approved as to form:

County Attorney

This Declaration of Covenants prepared by:

BRIAN J. RETTMAN
(Print Name)

CONSTRUCTION MANAGER
(Title)

6895 RICHMOND RD.
(Address)

WILLIAMSBURG, VA 23188
(City) (State) (Zip)

drainage.pre

James City County Environmental Division
Stormwater Management/BMP Record Drawing & Construction Certification Review
Tracking Form

Project Name: COLONIAL HERITAGE P1 S2
County Plan No.: S-63-02 / SP-88-02
Stormwater Management Facility: WET POND
BMP Phase #: ☑ I ☐ II ☐ III
✓ Information Package Received. Date/By: 7/28/08
✓ Completeness Check:
- ✓ Record Drawing Date/By: 7/25/08 A. HUTTON
- ✓ Construction Certification Date/By: 7/28/08 M GALLI
- ✓ RD/CC Standard Forms (Required for all BMPs after Feb 1st 2001Only)
- ✓ Insp/Maint Agreement # / Date: 030010553 / 4/8/03
- ✓ BMP Maintenance Plan Location: RD SHEET 24
- ☐ Other:

✓ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review
- ✓ Yes ☐ No Location:

✓ Assign **County BMP ID Code #**: Code: YC-029
✓ Preliminary Input/Log into Division's "As-Built Tracking Log"
☐ Add Location to GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)
✓ Preliminary Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
✓ Active Project File Review (correspondence, H&H, design computations, etc.).
✓ Initial As-Built File setup (File label, folder, copy plan/details/design information, etc.).
✓ Inspector Check of RD/CC (forward to Inspector using transmittal for cursory review).
✓ Pre-Inspection Drawing Review of Approved Plan (Quick look prior to Field Inspection).
✓ Final Inspection (FI) Performed Date: 6/23/08
✓ Record Drawing (RD) Review Date: 6/20/08
✓ Construction Certification (CC) Review Date: 6/20/08
✓ Actions:
- ✓ No comments.
- ✓ Comments. Letter Forwarded. Date: N/A
- ☐ Record Drawing (RD)
- ☐ Construction Certification (CC)
- ☐ Construction-Related (CR)
- ☐ Site Issues (SI)
- ☐ Other :

☐ Second Submission: N/A
☐ Reinspection (if necessary): N/A
✓ Acceptable for SWM Purposes (RD/CC/CR/Other). Ok to proceed with bond release.
✓ Complete "Surety Request Form".
✓ Check/Clean active file of any remaining material and finish "As-Built" file.
☐ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
✓ Copy Final Inspection Report into County BMP Inspection Program file.
☐ Obtain Digital Photographs of BMP and save into County BMP Inventory.
✓ Request mylar/reproducible from As-Built plan preparer.
☐ Complete "As-built Tracking Log".
✓ Last check of BMP Access Database (County BMP Inventory).
☐ Add BMP to JCC Hydrology & Hydraulic database (optional).
☐ Add BMP to Municipal BMP list (if a County-owned facility)
✓ Add BMP to PRIDE BMP ratings database.

Final Sign-Off

Inspector: [signature] Date: 7/29/08

Chief Engineer: _____ Date: _____

*** See separate checklist, if needed.

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities Record Drawing and Construction Certification

Standard Forms & Instructions

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Issue Date
February 1, 2001

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

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

Section 1 – Site Information:

Project Name: Colonial Heritage Phase 1 - Section 2
Structure/BMP Name: JCC# YC-029 (SWMP #11 - AES BMP# 2.2)
Project Location: Colonial Heritage
BMP Location: Phase I - Section 2
County Plan No.: S-63-02 - SP-88-02 - _____

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

Tax Map/Parcel No.: (24-3)(1-32)
BMP ID Code (if known): JCC# YC-029
Zoning District: Stonehouse District
Land Use: Mixed Use (MU with proffers)
Site Area (sf or acres): 12.71 Acres

Brief Description of Stormwater Management/BMP Facility: James City County Extended Dry Detention Type F-2

Nearest Visible Landmark to SWM/BMP Facility: Williamsburg Dodge 7277 Richmond Road / Williamsburg Pottery Factory P. O. Box 123 Lightfoot, Va 23090

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

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☒ Yes ☐ No ☐ Unknown
Approx. Construction Start Date for SWM/BMP Facility: _____
Facility Monitored by County Representative during Construction: ☒ Yes ☐ No ☐ Unknown
Name of Site Work Contractor Who Constructed Facility: Jack L. Massie Contractors
Name of Professional Firm Who Routinely Monitored Construction: ECS, Ltd.
Date of Completion for SWM/BMP Facility: 5/28/04
Date of Record Drawing/Construction Certification Submittal: 8/27/04

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

Section 3 – Owner / Designer / Contractor Information:

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

Name: U.S. Homes Corp.
Mailing Address: 6895 Richmond Road
Williamsburg, Virginia 23188
Business Phone: 757-258-2705 Fax:757-258-0516
Contact Person: Mr. Don Fink Title: _____

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

Firm Name: AES Consulting Engineers
Mailing Address: 5284 Olde Towne Road
Suite 1
Business Phone: 757-253-0040
Fax: 757-253-8994
Responsible Plan Preparer: George Archer Marston, III, P.E.
Title: Vice President
Plan Name: Colonial Heritage Phase 1- Section 3
Firm's Project No. 8881-09
Plan Date: 8/13/02
Sheet No.'s Applicable to SWM/BMP Facility: 19 / 24 / _____ / _____ / _____

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

Name: Jack L. Massie Contractors
Mailing Address: 3900 Cokes Lane
Williamsburg, VA 23188-7010
Business Phone: (757) 566-8643
Fax: (757) 566-8566
Contact Person: Mr. Steve Massie
Site Foreman/Supervisor: Mr. Scott Massie
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188
Business Phone: (757) 253 0040
Fax: (757) 220 8994

Name: George Archer Marston, III, P.E.
Title: Vice President
Signature:
Date: 7/25/08

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

COMMONWEALTH OF VIRGINIA
Lic. No. 016232
7/25/08
PROFESSIONAL ENGINEER

_____ (Seal)

Virginia Registered Professional Engineer
Or Certified Land Surveyor

Construction Certification

Firm Name: ECS, Ltd.
Mailing Address: 108 Ingram Road, Unit 1
Williamsburg, VA 23188
Business Phone: (757) 229-6677
Fax: (757) 229-9978

Name: Michael J. Galli, P.E.
Title: Project Manager
Signature:
Date: 7/28/08

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

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
Lic. No. 030684
7/28/08
PROFESSIONAL ENGINEER

_____ (Seal)

Virginia Registered
Professional Engineer

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

- ❑ PreConstruction Meeting – Provides an opportunity to review SWM / BMP facility construction, maintenance and operation plans and address any questions regarding construction and/or monitoring of the structure. The design engineer, certifying professionals (if different), Owner/Applicant, Contractor and County representative(s) are encouraged to attend the preconstruction meeting. Advanced notice to the Environmental Division is requested. Usually, this requirement can be met simultaneously with Erosion and Sediment Control preconstruction meetings held for the project.

- ❑ A fully completed ***STORMWATER MANAGEMENT / BMP FACILITIES, RECORD DRAWING and CONSTRUCTION CERTIFICATION FORM*** **and** ***RECORD DRAWING CHECKLIST***. All applicable sections shall be completed in their entirety and certification statements signed and sealed by the registered professional responsible for individual record drawing and/or construction certification.

- ❑ The Record Drawing shall be prepared by a Registered Professional Engineer or Certified Land Surveyor for the drainage system of the project including any Best Management Practices.

- ❑ Construction Certification. Construction of Stormwater Management / BMP facilities which contain impoundments, embankments and related engineered appurtenances including subgrade preparation, compacted soils, structural fills, liners, geosynthetics, filters, seepage controls, cutoffs, toe drains, hydraulic flow control structures, etc. shall be visually observed and monitored by a Registered Professional Engineer or his/her authorized representative. The Engineer must certify that the structure, embankment and associated appurtenances were built in accordance with the approved design plan, specifications and stormwater management plan and standard accepted construction practice and shall submit a written certification and/or drawings to the Environmental Division as required. Soil and compaction test reports, concrete test reports, inspection reports, logs and other required construction material or installation documentation may be required by the Environmental Division to substantiate the certification, if specifically requested. The Engineer shall have the authority and responsibility to make minor changes to the approved plan, in coordination with the assigned County inspector, in order to compensate for unsafe or unusual conditions encountered during construction such as those related to bedrock, soils, groundwater, topography, etc. as long as changes do not adversely affect the integrity of the structure(s). Major changes to the approved design plan or structure must be reviewed and approved by the original design professional and the James City County Environmental Division.

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

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

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

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

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

- ❑ Record Drawings shall provide, at a minimum, all information as shown within these requirements and the attached **RECORD DRAWING CHECKLIST** specific to the type of SWM/BMP facility being constructed. Other additional record data may be formally requested by the James City County Environmental Division. *(Note: Refer to the current edition of the James City County Guidelines for Design and Construction of Stormwater Management BMP's manual for a complete list of acceptable BMP's. Currently there are over 20 acceptable water quality type BMP's accepted by the County.)*

- ❑ Record Drawings shall consist of blue/black line prints and a reproducible (mylar, sepia, diazo, etc.) set of the approved stormwater management plan including applicable plan views, profiles, sections, details, maintenance plans, etc. as related to the subject SWM / BMP facility. The set shall indicate "**RECORD DRAWING**" in large text in the lower right hand corner of each sheet with record elevations, dimensions and data drawn in a clearly annotated format and/or boxed beside design values. Approved design plan values, dimensions and data shall not be removed or erased. Drawing sheet revision blocks shall be modified as required to indicate record drawing status. Elevations to the nearest 0.1' are sufficiently accurate except where higher accuracy is needed to show positive drainage. Certification statements as shown in Section 4 of the Record Drawing and Construction Certification Form, ***or similar forms thereof***, and professional signatures and seals, with dates matching that of the record drawing status in the revision or title block, are also required on all associated record drawing plans, prints or reproducibles.

- ❑ Submission Requirements. Initial and subsequent submissions for review shall consist of a minimum of one (1) blue/black line set for record drawings and one copy of the construction certification documents with appropriate transmittal. Under certain circumstances, it is understood that the record drawing and construction certification submissions may be performed by different professional firms. Therefore, record drawing submission may be in advance of construction certification or vice versa. Upon approval and prior to release of bond/surety, final submission shall include one (1) reproducible set of the record drawings, one (1) blue/black line set of the record drawings and one (1) copy of the construction certification. Also for current and/or future incorporation into the County BMP database and GIS system, it is requested that the record drawings also be submitted to the Environmental Division on a diskette or CD-ROM in an acceptable electronic file format such as *.dxf, *.dwg, etc. or in a standard scanned and readable format. The electronic file requirement can be discussed and coordinated with Environmental Division staff at the time of final submission.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.

XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.

XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).

XX 4. All plans sheet revision blocks modified to indicate date and record drawing status.

XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

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

XX 1. All requirements of Section I (Methods and Presentation) apply to this section.

XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.

XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.

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

XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.

XX 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

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

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

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

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

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

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

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

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

N/A A10. Low flow orifice has a non-clogging mechanism.

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A B1. Same requirements as Group A Wet Ponds.

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

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

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

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

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

N/A B7. Topsoil or wetland mulch provided to support vigorous growth of wetland plants.

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A C1. All requirements of Section II, Minimum Standards, apply to Group C facilities as applicable.

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

N/A C3. Pretreatment devices provided prior to entry into the infiltration facility. Acceptable pretreatment devices include sediment forebays, sediment basins, sediment traps, sump pits or inlets, grass channels, plunge pools or other acceptable measures.

N/A C4. Three (3) or more of the following pretreatment devices provided to protect long term integrity of structure: grass channel; grass filter strip; bottom sand layer; upper filter fabric layer; use of washed bank run gravel aggregate.

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

N/A C6. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

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

N/A C8. Minimum one hundred (100) foot separation horizontally from any known water supply well and minimum one hundred (100) foot separation upslope from any building.

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

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

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

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

N/A C13. Observation well provided.

N/A C14. Adequate, direct access provided to the facility for future maintenance, operation and inspection.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A D1. All requirements of Section II, Minimum Standards, apply to Group D facilities.

N/A D2. Sediment pretreatment devices provided.

N/A D3. For D-1 BMPs (Bioretention Cells), pretreatment consisting of a grass filter strip below level spreader (deflector); a gravel diaphragm; and mulch and planting soil layers were provided.

N/A D4. For D-1 BMPs (Bioretention Cells), plantings consist of native plant species; vegetation provided was based on zones of hydric tolerances; trees and understory of shrubs and herbaceous materials were provided; woody vegetation is absent from inflow locations; and trees are located around facility perimeter.

N/A D5. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

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

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

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

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

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

N/A D11. Minimum fifty (50) foot separation from any slope fifteen (15) percent or greater. Minimum one hundred (100) foot separation horizontally from any known water supply well. Minimum one hundred (100) foot separation upslope and twenty-five (25) foot separation downslope from any building.

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

N/A D13. No visual signs of erosion or channel degradation immediately downstream of facility.

N/A D14. Adequate, direct access provided to the pretreatment area and/or filter bed for future maintenance.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A E1. All requirements of Section II, Minimum Standards, apply to Group E facilities as applicable.

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

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

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

N/A E5. No visual signs of ponding are present at any location in the open channel system, except at rock check dam locations for E-1 systems (Wet Swales).

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

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

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

N/A E9. Grass cover/stabilization in the open channel system appears adaptable to the specific soils and hydric conditions for the site and along the channel system.

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

N/A E11. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

N/A E12. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

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

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

N/A E15. For E-3 BMPs (Biofilters), the constructed channel slope is less than or equal to three (3) percent at any location.

N/A E16. For E-3 BMPs (Biofilters), the constructed grass channel is approximately equivalent to the constructed roadway length.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

XX G1. All requirements of Section II, Minimum Standards, apply to Group G facilities as applicable.

XX G2. Constructed impervious areas appear to conform with locations indicated on the approved plan and appear less than sixty (60) percent impervious in accordance with the requirements of the James City County Chesapeake Bay Preservation Ordinance.

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

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

XX G5. Adequate protection measures were implemented during construction to protect the defined dedicated open space areas.

XX G6. Dedicated open space areas were not disturbed during construction (ie. cleared, grubbed or graded).

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.

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

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

XX SD4. Material type, size or diameter, class, invert elevations, lengths and slopes for all pipe segments.

XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

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

N/A O1. All requirements of Section II, Minimum Standards, apply to this section.

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

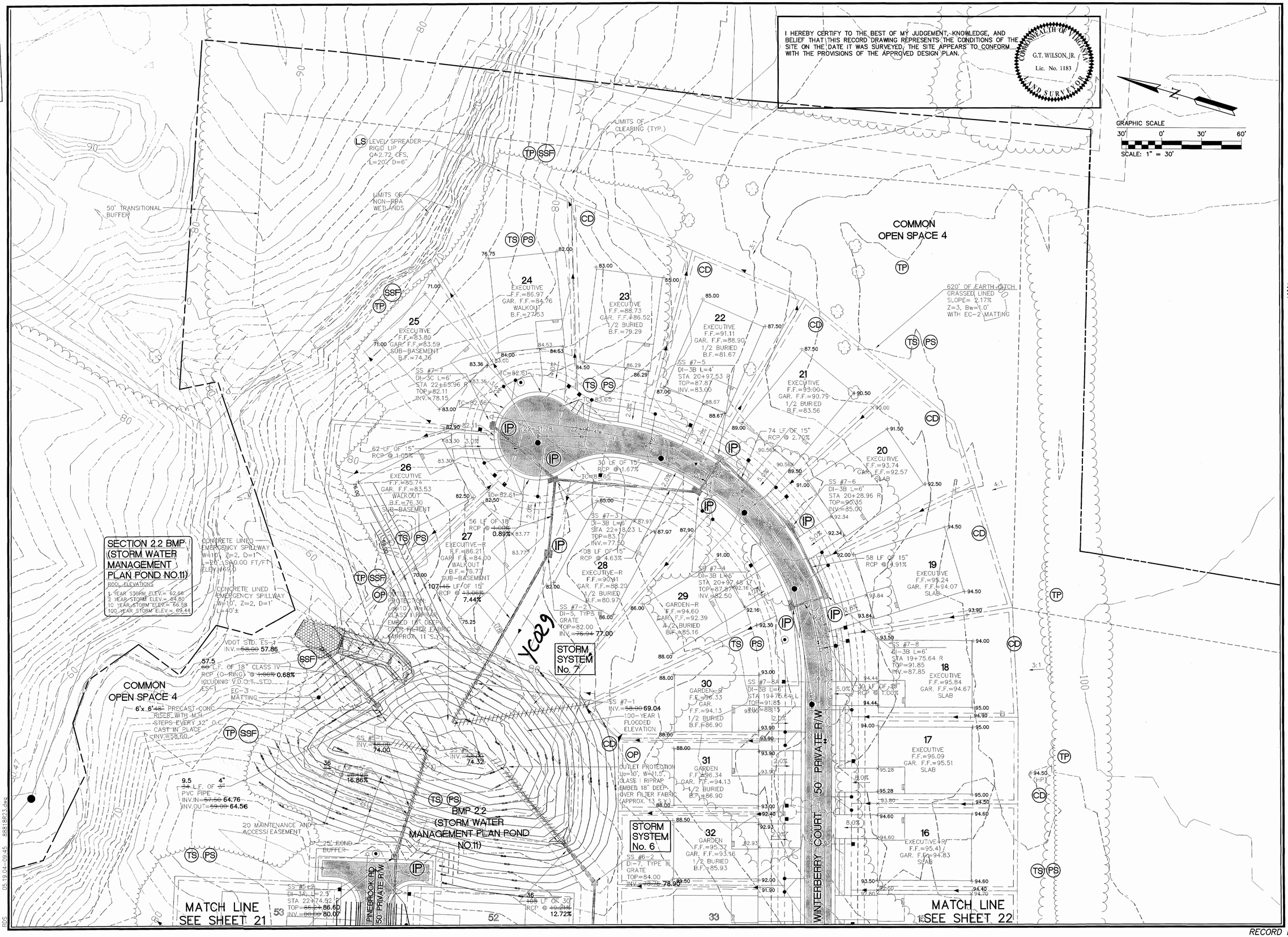
File: Shared\SWMProg\BMP\Certif\RDCC.wpd

RECEIVED
JUL 29 2008
ENVIRONMENTAL DIVISION

I HEREBY CERTIFY TO THE BEST OF MY JUDGEMENT, KNOWLEDGE, AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE CONDITIONS OF THE SITE ON THE DATE IT WAS SURVEYED. THE SITE APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN.

COMMONWEALTH OF VIRGINIA
G.T. WILSON, JR.
Lic. No. 1183
LAND SURVEYOR

GRAPHIC SCALE
30' 0' 30' 60'
SCALE: 1" = 30'



No.	DATE	REVISION / COMMENT / NOTE	BY
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△	12/11/03	REVISED RE-VERSE CURB AND GUTTER	HWP
△	10/31/03	NONE THIS SHEET	HWP
△	10/22/03	REVISIONS TO SITE PLAN AMENDMENT	HWP
△	8/22/03	SITE PLAN AMENDMENT	HWP
3	2/18/03	REVISED PER ACC COMMENTS DATED 2/07/03	HWP
2	12/18/02	REVISED PER ACC COMMENTS	HWP
1	8/26/02		HWP

COMMONWEALTH OF VIRGINIA
C. ARCHER MARSTON, III
No. 016232
1/29/04
PROFESSIONAL ENGINEER

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

DRAINAGE, GRADING AND EROSION-SEDIMENT CONTROL PLAN
PHASE I, SECTION 2
COLONIAL HERITAGE

OWNER/DEVELOPER: US HOME
JAMES CITY COUNTY
STONEHOUSE
VIRGINIA

Designed	Drawn
HWP/LLM	RMS/ARH
Scale	Date
1"=30'	6/26/02
Project No.	
8881-08	
Drawing No.	
23	

RECORD DRAWING–5/5/04

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RDS

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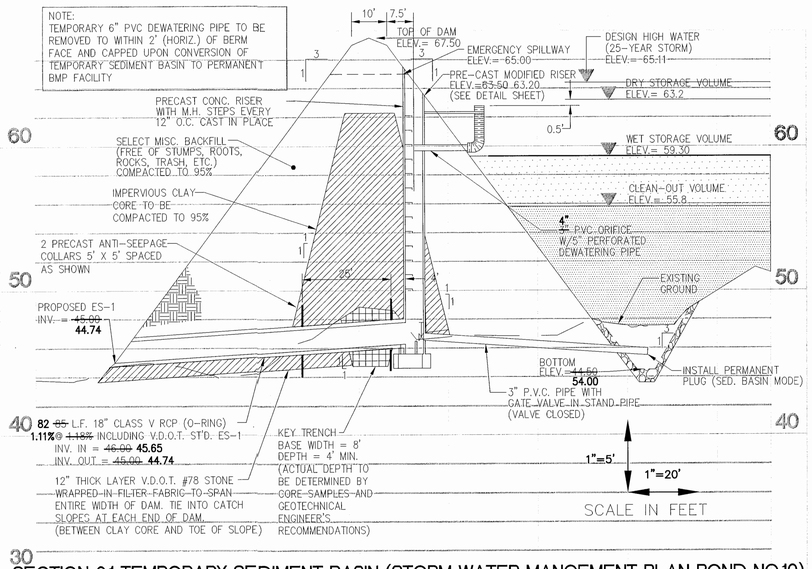
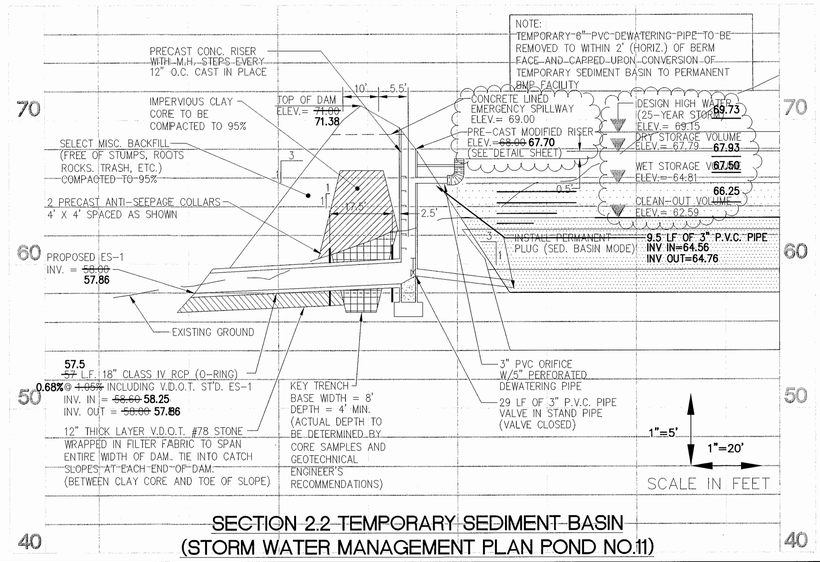
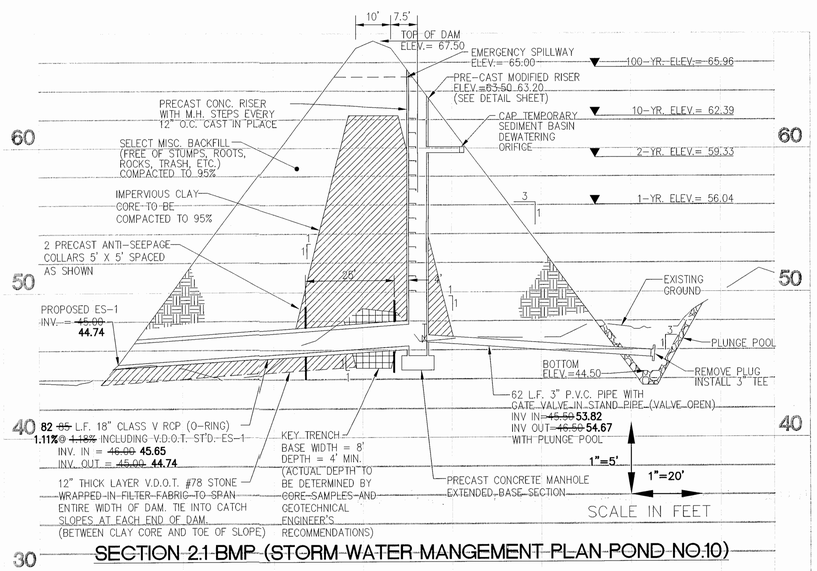


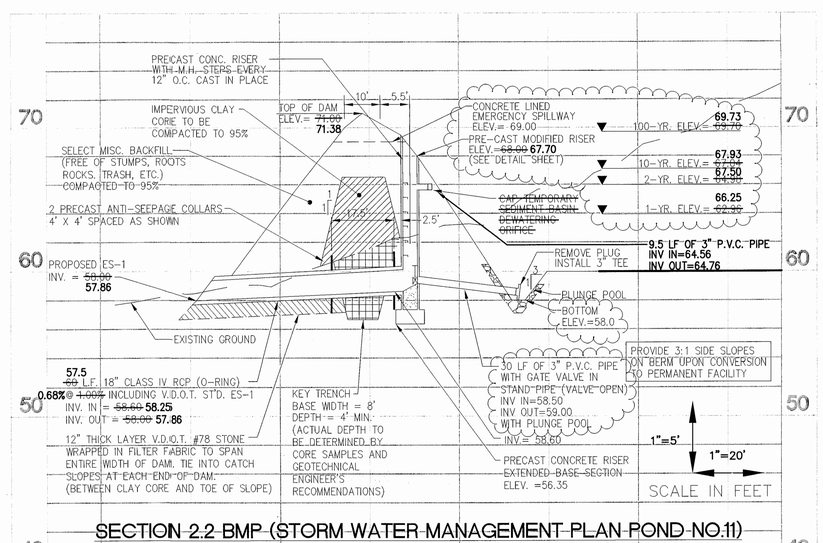
SECTION 2.1 TEMPORARY SEDIMENT BASIN (STORM WATER MANGEMENT PLAN POND NO.10)



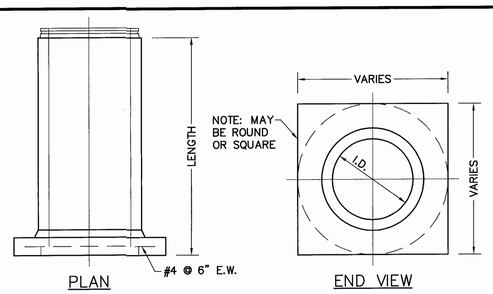
SECTION 2.2 TEMPORARY SEDIMENT BASIN (STORM WATER MANAGEMENT PLAN POND NO.11)



SECTION 2.1 BMP (STORM WATER MANGEMENT PLAN POND NO.10)

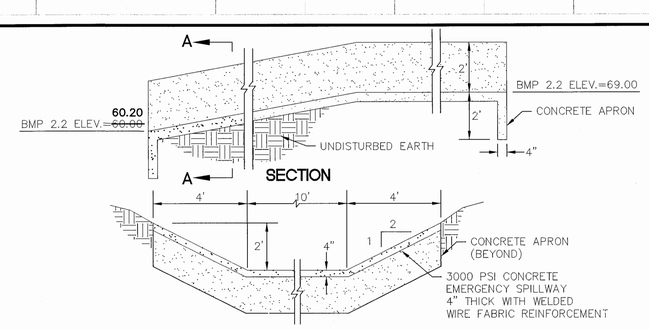


SECTION 2.2 BMP (STORM WATER MANAGEMENT PLAN POND NO.11)



PRE-CAST CONCRETE ANTI-SEEP COLLAR

N.T.S.



SECTION A-A

PAVED SPILLWAY DETAIL BMP 2.2(#11)

NOT TO SCALE

STORMWATER MANAGEMENT/ BMP FACILITY MAINTENANCE PLAN

PROPER MAINTENANCE OF THIS FACILITY IS ENCOURAGED TO PREVENT THE INTRODUCTION OF DEBRIS AND SEDIMENT IN TO THE FACILITY, SPILLWAY(S) AND DOWNSTREAM WATERWAYS. FOLLOWING INSTALLATION OF THE FACILITY AND ESTABLISHMENT OF VEGETATION IN DISTURBED AREAS, INSPECTIONS FOR SEDIMENT BUILDUPS WILL BE PERFORMED AT LEAST QUARTERLY. IT IS ANTICIPATED THAT UNDER NORMAL CONDITIONS, SEDIMENT REMOVAL FROM THE FACILITY WILL BE REQUIRED ONCE EVERY 10 YEARS. IF OTHER CONSTRUCTION OR RELATED ACTIVITIES ARE PERFORMED ON UPSLOPE PARCELS, ADEQUATE PROTECTION SHOULD BE PROVIDED AND INSPECTIONS PERFORMED AT LEAST ONCE WEEKLY OF THESE NEWLY DISTRIBUTED AREAS AS WELL AS INSPECTIONS FOR ACCUMULATED SEDIMENTS AT TWO BMP FACILITY.

A DESIGNATED REPRESENTATIVE OF THE OWNER WILL INSPECT THE BMP STRUCTURE AFTER EACH SIGNIFICANT RAINFALL EVENT OR THE FOLLOWING WORKING DAY IF A WEEKEND OR HOLIDAY OCCURS. A SIGNIFICANT RAINFALL FOR THIS STRUCTURE IS DEFINED AS ONE (1) INCH OR MORE OF GAUGED RAINFALL WITHIN A 24 HOUR PERIOD. ONCE PER YEAR, A REPRESENTATIVE OF THE COUNTY MAY JOINTLY INSPECT THE STRUCTURE. APPROPRIATE ACTION, PERFORMED AT THE COST OF THE OWNER, WILL BE TAKEN TO ENSURE APPROPRIATE MAINTENANCE. KEYS TO LOCKED ACCESS POINTS SHALL BE MADE AVAILABLE TO COUNTY INSPECTION PERSONNEL UPON REQUEST.

INSPECTION AND MAINTENANCE OF THE FACILITY WILL CONSIST OF THE FOLLOWING ADDITIONAL MEASURES:

1. THE INSPECTION FOR SEDIMENT BUILDUP WILL BE PERFORMED BY VISUAL INSPECTION AND A PHYSICAL DETERMINATION OF SEDIMENT DEPTH WITHIN THE STORAGE AREA. SEDIMENT REMOVAL IS REQUIRED USING A RUBBER-WHEELED BACKHOE. AT THE SAME TIME, OR AT LEAST ONCE PER YEAR, THE RISER BOTTOM AND OUTLET PIPE SHALL BE CLEANED OF ACCUMULATED SEDIMENTS. DISPOSE OF SEDIMENTS REMOVED FROM THE FACILITY AT AN ACCEPTABLE DISPOSAL AREA. SEDIMENT SHALL NOT BE ALLOWED TO ACCUMULATE IN DEPTHS GREATER THAN 1-FOOT. NO SEDIMENT SHALL BE ALLOWED TO ACCUMULATE TO PREVENT THE PROPER FUNCTION OF ANY PIPE OR CULVERT.

2. PERFORM MAINTENANCE MOWING OF GRASSED AREAS AT LEAST TWICE EACH YEAR. GRASSES SUCH AS TALL FESCUE SHOULD BE MOWED IN EARLY SUMMER AFTER EMERGENCE OF THE HEADS ON COOL SEASON GRASSES AND IN LATE FALL TO PREVENT SEEDS OF ANNUAL WEEDS FROM MATURING. MOWING OF LEGUMES CAN BE LESS FREQUENT TREES AND SHRUBS SHOULD NOT BE PERMITTED TO GROW ON ANY PART OF THE GRADED EMBANKMENT.

3. PERFORM SOIL SAMPLING ON STABILIZED BMP SOIL AREAS ONCE EVERY FOUR (4) YEARS. SOIL SAMPLING AND TESTING SHOULD BE PERFORMED BY A QUALIFIED INDEPENDENT TESTING LABORATORY. APPLY ADDITIONAL LIME AND FERTILIZER IN ACCORDANCE WITH TEST RECOMMENDATIONS.

4. IN STABILIZED BMP AREAS, IF VEGETATION COVERS LESS THAN 40% OF SOIL SURFACES, LIME, FERTILIZE AND SEED IN ACCORDANCE WITH RECOMMENDATIONS FOR NEW SEEDLINGS, AS LISTED IN DAM CONSTRUCTION NOTES. IF VEGETATION COVERS MORE THAN 40% BUT LESS THAN 70% OF SOIL SURFACES, LIME FERTILIZE AND OVERSEED IN ACCORDANCE WITH CURRENT SEEDLING RECOMMENDATIONS.

5. PERFORM QUARTERLY INSPECTIONS OF THE RELEASE STRUCTURES, RISER SECTION AND CREST OF SPILLWAY FOR THE OBSERVANCE OF COLLECTED DEBRIS. IMMEDIATELY REMOVE ANY DEBRIS TO MAINTAIN THE INTEGRITY OF THE STRUCTURE AND PROVIDE AN ATTRACTIVE APPEARANCE. DURING QUARTERLY INSPECTIONS, THE POND DRAIN VALVE, USUALLY LEFT IN THE VALVE "CLOSED" POSITION, SHALL BE INSPECTED AND OPERATED THROUGH TWO COMPLETE FULL-OPEN TO FULL-CLOSE TO FULL-OPEN CYCLES.

6. PERFORM YEARLY STRUCTURAL INSPECTIONS OF THE FACILITY FOR DAMAGE. STRUCTURAL INSPECTION SHALL BE PERFORMED ON THE CONCRETE RISER, ANTI-VORTEX DEVICE, TRASH RACK, ORIFICE/ WEIR(S), OUTLET BARREL AND POND EMBANKMENT. IF DAMAGE IS EVIDENT, FURTHER INVESTIGATION BY A PROFESSIONAL ENGINEER MAY BE REQUIRED TO ASSESS THE CONTINUED INTEGRITY OF THE STRUCTURE.

7. PERFORM QUARTERLY INSPECTIONS OF THE GRADED SIDE SLOPES OF THE FACILITY FOR SIGNS OF ANIMAL/ RODENT BORROWS OR SLOPE EROSION. IMMEDIATELY PERFORM NECESSARY REPAIRS, REFILLING OR RESEEDING AS APPROPRIATE.

8. RECORD KEEPING. THE LANDOWNER OR DESIGNATED REPRESENTATIVE SHALL KEEP REASONABLE, ACCURATE WRITTEN RECORDS OF INSPECTIONS PERFORMED ON THE STRUCTURE. RECORDS SHALL DOCUMENT ROUTINE MAINTENANCE AND/ OR REPAIRS PERFORMED. COPIES SHALL BE PROVIDED TO THE COUNTY UPON REQUEST.

9. THE FACILITY SHALL NOT BE MODIFIED IN ANY WAY WITHOUT PRIOR CONSENT/ APPROVAL OF THE COUNTY.

GENERAL NOTES FOR CONSTRUCTION OF STORMWATER BASINS

1. THE CONTRACTOR SHALL PROVIDE ALL WORK AND MATERIALS NEEDED TO CONSTRUCT THE STORMWATER BASIN, STORMWATER MANAGEMENT PONDS, BEST MANAGEMENT PRACTICES, SEDIMENT BASINS AND SEDIMENT TRAPS. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND MATERIALS NEEDED FOR THE COMPLETION OF GRADING AND EARTHWORK ASSOCIATED WITH THE CONSTRUCTION.

2. THE CONTRACTOR SHALL CONSULT AND PROVIDE FOR THE SERVICES OF A GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL PROVIDE TEST RESULTS ON PLACED DAM MATERIALS, IDENTIFYING SOIL CLASSIFICATION, PERMEABILITY, PLASTICITY INDEX, AND COMPACTION. ALL TESTS SHALL BE IN CONFORMANCE WITH ASTM STANDARDS. THE COST OF THE SERVICES OF THE GEOTECHNICAL ENGINEER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SATISFACTORY GEOTECHNICAL RESULTS ARE NEEDED PRIOR TO FINAL APPROVAL.

3. ALL INSPECTIONS REQUIRED FOR THE WORK SHALL BE PERFORMED BY A GEOTECHNICAL ENGINEER AT THE EXPENSE OF THE GENERAL CONTRACTOR.

4. ON-SITE EXCAVATED MATERIAL, IF DETERMINED SUITABLE FOR USE IN DAM CONSTRUCTION BY A GEOTECHNICAL ENGINEER, MAY BE USED FOR DAM CONSTRUCTION. SHOULD ADDITIONAL MATERIAL BE REQUIRED, THE CONTRACTOR SHALL IDENTIFY THE NEED FOR MATERIAL TO THE OWNER, AS ADDITIONAL BORROW MATERIAL MAY BE AVAILABLE ON THE PROPERTY. ALL EXCAVATED MATERIAL DETERMINED BY THE GEOTECHNICAL ENGINEER TO BE UNSUITABLE SHALL BE DISPOSED OF PROPERLY AT THE CONTRACTOR'S EXPENSE. ALL EXCAVATED MATERIAL NOT REQUIRED FOR BACKFILLING SHALL EITHER BE DEPOSITED ON SITE AND SPREAD BY THE CONTRACTOR, OR SHALL BE DEPOSITED IN AN AREA ON THE PROPERTY AS DIRECTED BY THE OWNER. THE CONTRACTOR SHALL PROVIDE PROPER STABILIZATION, AND EROSION AND SEDIMENT CONTROL MEASURES NEEDED TO CONTROL AS PER THE VESCH THIRD EDITION.

5. UNDERCUT FOR THE FOUNDATION OF THE DAM EMBANKMENT SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. THE FOUNDATION SHALL BE BACKFILLED WITH SOILS CLASSIFIED AS SM, SC, OR CL UNDER THE UNIFIED SOIL CLASSIFICATION SYSTEM. SOILS SHALL HAVE A MINIMUM OF 15% BY WEIGHT FINES, HAVING A PLASTICITY INDEX OF 30% AND A PERMEABILITY OF 0.0004 IN./SEC. OR LESS. FILL SHALL BE COMPACTED IN 12-INCH LIFTS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER, TO A DRY DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). EXCAVATION FOR THE DAM KEY SHALL BE IN ACCORDANCE TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. HEIGHT, DEPTH, AND WIDTH OF THE KEY SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. THE KEY SHALL BE FORMED USING SOILS CLASSIFIED AS SC OR CL, WITH A PERMEABILITY OF 0.0004 IN./SEC. OR LESS.

6. THE DAM CORE SHALL BE AS CONSTRUCTED WITH NON-EXPANSIVE SC OR CL CLAYEY MATERIAL WITH PERMEABILITY OF 0.0004 IN./SEC. OR LESS. THE FILL OF THE CORE SHALL BE MADE IN 12-INCH LIFTS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER, TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). SIZE, SHAPE, WIDTH, DEPTH, AND HEIGHT OF THE DAM CORE SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. TO COVER THE DAM CORE, A SILTY FINE SAND OR CLAYEY SOIL (SM, SC, OR CL) SHALL BE PLACED. A VEGETATIVE COVER USING VDOT EC-2 EROSION CONTROL BLANKETS SHALL BE PLACED ON DAM SLOPES AND CREST TO PREVENT EROSION.

7. THE STORMWATER MANAGEMENT / BMP FACILITIES SHOWN ON THESE PLANS REQUIRE THE SUBMISSION, REVIEW AND APPROVAL OF RECORD DRAWING(S) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND / SURETY. THE GEOTECHNICAL ENGINEER IS TO ENSURE THAT HIS / HER INSPECTION OF THE SWM / BMP CONSTRUCTION ACTIVITY IS PERFORMED DURING AND FOLLOWING CONSTRUCTION OF THE SWM / BMP IN ACCORDANCE WITH THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION STORMWATER MANAGEMENT / BMP FACILITIES DESIGN GUIDELINES HANDBOOK, DATED AUGUST 30, 2000.

8. THE CONTRACTOR SHALL PROVIDE INTERIM CERTIFICATION OF TEMPORARY SEDIMENT BASIN IN ACCORDANCE WITH SECTION 5 OF THE JAMES CITY COUNTY BMP, EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT DESIGN GUIDES.

No.	DATE	REVISION / COMMENT / NOTE	BY
4	5/5/04	RECORD DRAWING	HWP
△1	11/11/03	REDESIGNED/REVISE ENVIR. AMENDMENT	HWP
△0	10/31/03	NONE THIS SHEET	HWP
△0	10/22/03	REVISIONS TO SITE PLAN AMENDMENT	HWP
△1	8/22/03	SITE PLAN AMENDMENT	HWP
3	2/18/03	REVISED PER JCC COMMENTS DATED 2/07/03	HWP
2	12/18/02	REVISED PER JCC COMMENTS	HWP

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CONSULTING ENGINEERS

STORMWATER MANAGEMENT
SECTIONS AND NOTES
PHASE I, SECTION 2
COLONIAL HERITAGE
OWNER/DEVELOPER: US HOME
STONEHOUSE — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
JAG	ARH
Scale	Date
NONE	6/26/02

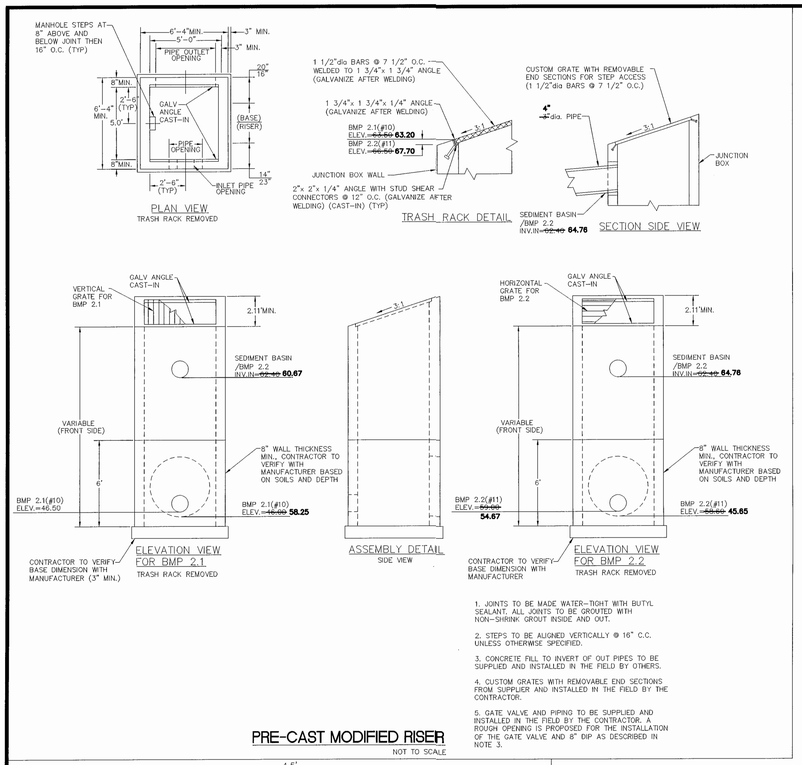
Project No. 8881-08

Drawing No. 25

RECORD DRAWING-5/5/04

05.19.04-10:46 8881RR25.dwg RMS

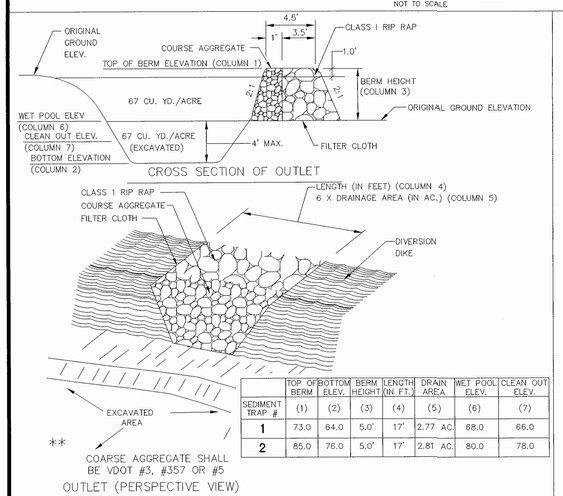
YC029_COLONIAL_HERITAGE_P1_S2 - 025



1. JOINTS TO BE MADE WATER-TIGHT WITH BUTYL SEALANT. ALL JOINTS TO BE GROUTED WITH NON-SHRINK GROUT INSIDE AND OUT.
2. STEPS TO BE ALIGNED VERTICALLY @ 16" C.C. UNLESS OTHERWISE SPECIFIED.
3. CONCRETE FILL TO INVERT OF OUT PIPES TO BE SUPPLIED AND INSTALLED IN THE FIELD BY OTHERS.
4. CUSTOM GRATES WITH REMOVABLE END SECTIONS FROM SUPPLIER AND INSTALLED IN THE FIELD BY THE CONTRACTOR.
5. GATE VALVE AND PIPING TO BE SUPPLIED AND INSTALLED IN THE FIELD BY THE CONTRACTOR. A ROUGH OPENING IS PROPOSED FOR THE INSTALLATION OF THE GATE VALVE AND 8" DIP AS DESCRIBED IN NOTE 3.

PRE-CAST MODIFIED RISER

NOT TO SCALE



SEDIMENT TRAP #	TOP OF BERM	BOTTOM ELEV.	BERM HEIGHT	LENGTH (IN FT.)	DRAIN AREA	WET POOL ELEV.	CLEAN OUT ELEV.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	73.0	64.0	5.0'	17'	2.77 AC.	68.0	66.0
2	85.0	76.0	5.0'	17'	2.81 AC.	80.0	78.0

(ST) TEMPORARY SEDIMENT TRAP

N.T.S.

SOURCE: VA. DSWC PLATE. 3.13-2

UTILITIES INSTALLATION NOTES

GENERAL NOTES FOR WATER DISTRIBUTION AND SANITARY SEWER SYSTEMS

THE FOLLOWING NOTES SHALL BE PROVIDED ON ALL DEVELOPER CONSTRUCTED WATER DISTRIBUTION AND SANITARY SEWER SYSTEM FACILITY CONSTRUCTION PLANS AND SPECIFICATIONS, AND COMPLIANCE IS REQUIRED BY THE CONTRACTOR/DEVELOPER.

A. ALL COMPONENTS OF THE WATER DISTRIBUTION AND SANITARY SEWER SYSTEM SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AUTHORITY STANDARDS AND SPECIFICATIONS FOR WATER DISTRIBUTION AND SANITARY SEWER SYSTEMS, THE HRPDC REGIONAL STANDARDS, AND THE COMMONWEALTH OF VIRGINIA WATERWORKS AND SANITARY SEWERAGE REGULATIONS. THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS, AND PRODUCTS ON ALL PROJECTS. ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE WORK. A COPY OF THE JCSA STANDARDS AND REGIONAL STANDARDS MUST BE KEPT ON-SITE BY THE CONTRACTOR DURING FULL TIME OF INSTALLING, TESTING, AND CONVEYING FACILITIES TO THE JCSA.

B. THE DEVELOPER'S REPRESENTATIVE SHALL SUBMIT SHOP DRAWINGS FOR ALL MATERIALS FOR APPROVAL TO THE AUTHORITY PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL MATERIALS ORDERED AND INSTALLED PRIOR TO THE AUTHORITY'S REVIEW AND ACCEPTANCE WILL BE AT THE CONTRACTOR'S/DEVELOPER'S RISK.

C. PIPE LINES AND SERVICES SHALL BE INSTALLED AFTER GRADING TO WITHIN 6-INCHES OF FINAL GRADE AND PRIOR TO PLACEMENT OF BASE MATERIAL.

D. ALL APPROVED EROSION AND SEDIMENT CONTROL REQUIREMENTS SHALL BE ADHERED TO DURING CONSTRUCTION.

E. ALL WATER MAINS SHALL BE DISINFECTED AND PRESSURE TESTED, AND SATISFACTORY BACTERIOLOGICAL SAMPLES OBTAINED, IN ACCORDANCE WITH THE AUTHORITY STANDARDS.

F. AFTER TESTING IS COMPLETE AND ALL COMPONENTS OF THE WATER AND SANITARY SEWER SYSTEM ARE ACCEPTABLE, THEN THE RECORD DRAWINGS SHALL BE SUBMITTED TO THE AUTHORITY. NO WATER METERS WILL BE INSTALLED UNTIL COMPLIANCE WITH SECTION 3 HAS BEEN FOUND SATISFACTORY BY THE AUTHORITY. ANY DISCREPANCIES NOTED DURING THE FINAL INSPECTION SHALL BE CORRECTED BY THE DEVELOPER'S REPRESENTATIVE WITHIN 30 DAYS.

G. ROUTINE PERIODIC INSPECTIONS DURING CONSTRUCTION WILL BE PROVIDED BY THE AUTHORITY. THESE INSPECTIONS DO NOT RELIEVE THE DEVELOPER FROM HIS OBLIGATION AND RESPONSIBILITY FOR CONSTRUCTING A WATER DISTRIBUTION AND SANITARY SEWER SYSTEM IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE AUTHORITY.

H. ANY CHANGES TO THE FINAL PLANS SHALL BE APPROVED BY THE AUTHORITY AND SHALL BE ACCURATELY INDICATED ON THE RECORD DRAWINGS.

I. ALL LOTS SHALL BE PROVIDED WITH WATER SERVICE AND SANITARY SEWER CONNECTIONS. THE CONNECTIONS SHALL BE EXTENDED FROM THE MAIN TO THE PROPERTY LINE OR EASEMENT LINE, AND SHALL TERMINATE WITH A YOKE IN A METER BOX, OR AT THE CLEAN OUT, SET AT FINAL FINISHED GRADE. METERS FOR ALL LOTS (UNITS) SHALL BE PAID FOR BY THE DEVELOPER OR BUILDER AND INSTALLED BY THE AUTHORITY.

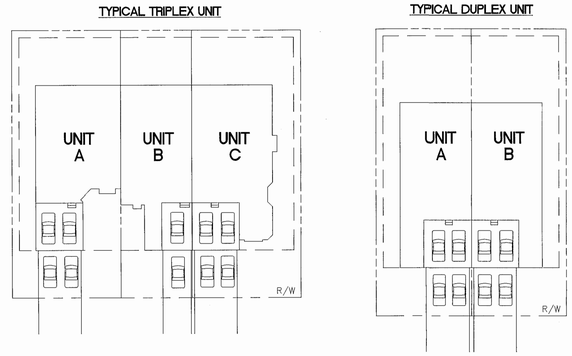
J. THE DEVELOPER IS REQUIRED TO SUBMIT WATER AND SANITARY SEWER DATA SHEETS.

K. THE CONTRACTOR/DEVELOPER SHALL ACQUIRE A CERTIFICATE TO CONSTRUCT WATER AND SEWER FACILITIES FROM THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION OF THE OFFICE OF DEVELOPMENT MANAGEMENT, PRIOR TO COMMENCEMENT OF CONSTRUCTION.

L. ANY REQUIRED EASEMENTS, PERMITS, AND APPROVALS SHALL BE ACQUIRED BY THE DEVELOPER PRIOR TO COMMENCEMENT OF WATER MAIN OR SANITARY SEWER CONSTRUCTION.

M. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDER'S OF ANY PUBLIC BODY HAVING JURISDICTION. THE CONTRACTOR SHALL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION. THE CONTRACTOR SHALL ALSO NOTIFY "MISS UTILITY" PRIOR TO PERFORMING ANY UNDERGROUND EXCAVATION.

TYPICAL TRIPLEX UNIT / TYPICAL DUPLEX UNIT



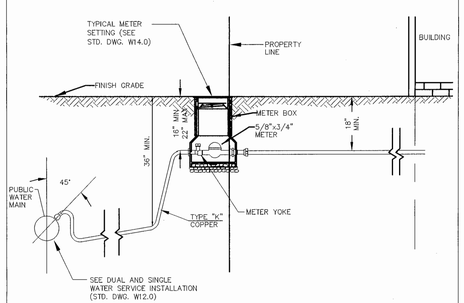
TYPE OF RESIDENTIAL UNIT	MIN. # SPACES REQUIRED	TOTAL REQUIRED	TOTAL PROVIDED
TOWNHOUSE UNIT (TRIPLEX)	2.5	7.5	10
SINGLE FAMILY ATTACHED UNIT (DUPLEX)	2	4	8

RESIDENTIAL OFF-SITE PARKING SCHEMATIC

SCALE: 1"=30'

COLONIAL HERITAGE
'OUTLINE OF THE INSPECTION PROCEDURE FOR CONSTRUCTION OF PRIVATE STREETS'

1. THE ENGINEER WILL CONTACT A SOILS TESTING FIRM (GEOTECHNICAL ENGINEER) TO OBTAIN REPRESENTATIVE CBR SAMPLES. THE LOCATION AND NUMBER OF THE CBR (CALIFORNIA BEARING RATIO) SAMPLES IS TO BE DETERMINED BY THE SOILS ENGINEER. THE SOILS ENGINEER SHALL THEN PREPARE A REPORT WHICH SHALL INCLUDE AS A MINIMUM THE FOLLOWING:
   - A) NUMBER AND LOCATION (INCLUDING MAP) OF CBR SAMPLES AND TEST RESULTS OF THE SAMPLES.
   - B) SOILS ENGINEERING ANALYSIS.
   - C) RECOMMENDATIONS INCLUDING REQUIRED ALTERATIONS OF THE BASE MATERIAL APPLICATION RATE, MODIFICATIONS TO THE SUBBASE IF REQUIRED, ETC. FROM THOSE DESIGNS SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS.
2. UPON COMPLETION OF ROAD GRADING TO SUBGRADE, THE GEOTECHNICAL ENGINEER SHALL BE PRESENT FOR A PROOFROLL TO DETERMINE ADEQUACY OF COMPACTION. ANY RECOMMENDATIONS FOR UNSUITABLE MATERIAL WILL BE GIVEN AT THIS TIME.
3. SUBBASE AND BASE MATERIAL WILL BE SUPPLIED AND CERTIFIED BY A VDOT CERTIFIED AND BONDED SOURCE. EVIDENCE OF THIS WILL BE PROVIDED VIA INVOICES FROM SUPPLIER.
4. A COPY OF THE GEOTECHNICAL ENGINEERING REPORT SHALL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO THE PLACEMENT OF SUBBASE AND BASE MATERIAL. AFTER THE COUNTY ENGINEER HAS REVIEWED AND APPROVED THE GEOTECHNICAL ENGINEER'S REPORT, SUBBASE AND BASE MATERIAL WILL BE APPLIED AT THE DEPTHS NECESSARY TO PROVIDE REQUIRED DEPTH (EITHER BY PLAN OR BY GEOTECHNICAL ENGINEER'S RECOMMENDATION) AFTER COMPACTION. THE CONTRACTOR, IN THE PRESENCE OF THE ENGINEER, WILL TEST THE DEPTH OF THE SUBBASE AND BASE MATERIAL AT LEAST ONCE EVERY 250 LINEAR FEET AND REPORT THE RESULTS. INADEQUATE DEPTHS WILL REQUIRE ADDITIONAL MATERIAL AND SUBSEQUENT RETESTING. THE ENGINEER WILL PROVIDE THE TEST RESULTS TO THE COUNTY ENGINEER.
5. BITUMINOUS CONCRETE WILL BE SUPPLIED AND CERTIFIED BY A VDOT CERTIFICATE AND BONDED SOURCE. EVIDENCE OF THIS WILL BE PROVIDED VIA INVOICES FROM SUPPLIER.
6. DURING THE PLACEMENT OF THE BITUMINOUS CONCRETE AND PRIOR TO ITS COMPACTION, PRE-ROLLED DEPTH MEASUREMENTS OF THE ASPHALT SHALL BE INSPECTED BY THE ENGINEER, IN THE PRESENCE OF THE CONTRACTOR, AT A MINIMUM OF 500 FT. INTERVALS. FOR PURPOSES OF DETERMINING THE PRE-ROLLED DEPTH ADD AN ADDITIONAL 1/4 INCH OF PRE-ROLLED ASPHALT FOR EACH 1.5 INCHES OF ROLLED/COMPACTED DEPTH CALLED FOR ON THE PLANS. INADEQUATE DEPTHS WILL REQUIRE ADDITIONAL BITUMINOUS CONCRETE TO BE IMMEDIATELY INSTALLED BY THE CONTRACTOR AT THE APPROPRIATE LOCATIONS. THE ENGINEER WILL PRESENT THE TEST RESULTS TO THE COUNTY ENGINEER. THE INSTALLATION OF MULTIPLE COURSES WILL REQUIRE THE TESTING/INSPECTION OF EACH INDIVIDUAL COURSE.
7. REPORTING WILL BE PERFORMED BY A CONTRACTOR AND THE LICENSED ENGINEER AS OUTLINED ABOVE. THE NUMBER OF SAMPLES IN EACH CASE WILL BE, AS A MINIMUM, THE TOTAL LENGTH OF ROADS TESTED DIVIDED BY THE REQUIRED INTERVAL. IN ORDER TO PRESERVE THE INTEGRITY OF THE PROJECT'S CONSTRUCTION, A PLAN DEPICTING THE SAMPLING LOCATIONS WILL BE PROVIDED TO THE COUNTY PRIOR TO THE ACTUAL INSPECTIONS.
8. INTERIM STATEMENTS FROM THE ENGINEER, WITH ACCOMPANYING DOCUMENTATION, WILL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO PARTIAL RELEASE OF SURETY.
9. APPLICATION FOR FINAL RELEASE OF SURETY WILL BE ACCOMPANIED BY THE CONTRACTOR'S STATEMENT AND CERTIFICATION THAT THE SPECIFICALLY NAMED PRIVATE STREETS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND APPLICABLE VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARDS. CONTRACTOR'S CERTIFICATION SHALL BE SUPPORTED BY THE INSPECTIONS PERFORMED BY THE ENGINEER (SEE ABOVE).



NOTES:
1. SERVICE PIPELINES SHALL BE INSTALLED PERPENDICULAR TO THE WATER PIPELINE, EXCEPT IN THE ENDS OF CUL-DE-SACS.
2. METERS SHALL BE LOCATED IN NON-TRAFFIC AREAS. METER RELOCATION'S FROM TRAFFIC AREAS SHALL BE AT CUSTOMERS EXPENSE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 18 INCHES OF A WATER METER.

REVISION DATE	COMMENT

JCSA JAMES CITY SERVICE AUTHORITY

TYPICAL WATER METER INSTALLATION

DWG.NO. W13.0 | SCALE: NONE

DWN BY: RED | DATE: 11-23-97

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

No.	DATE	REVISION / COMMENT / NOTE	BY
4	5/5/04	RECORD DRAWING	HWP
4	11/11/03	REVISED REVERSE CURB AND GUTTER	HWP
4	10/31/03	NONE THIS SHEET	HWP
4	10/22/03	REVISIONS TO SITE PLAN AMENDMENT	HWP
4	8/22/03	SITE PLAN AMENDMENT	HWP
3	2/18/03	REVISED PER JCC COMMENTS DATED 2/07/03	HWP
2	12/18/02	REVISED PER JCC COMMENTS	HWP

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON, III
No. 018232
1/29/04
PROFESSIONAL ENGINEER

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GENERAL NOTES AND DETAILS
PHASE I, SECTION 2
COLONIAL HERITAGE
OWNER/DEVELOPER: US HOME
STONEHOUSE | JAMES CITY COUNTY | VIRGINIA

Designed	Drawn
HWP	RMS
Scale	Date
AS SHOWN	6/26/02

Project No. 8881-08

Drawing No. 27

RECORD DRAWING-5/5/04

RDS 05.07.04-14:25 8881BR27.dwg

YC029_COLONIAL_HERITAGE_P1_S2 - 026

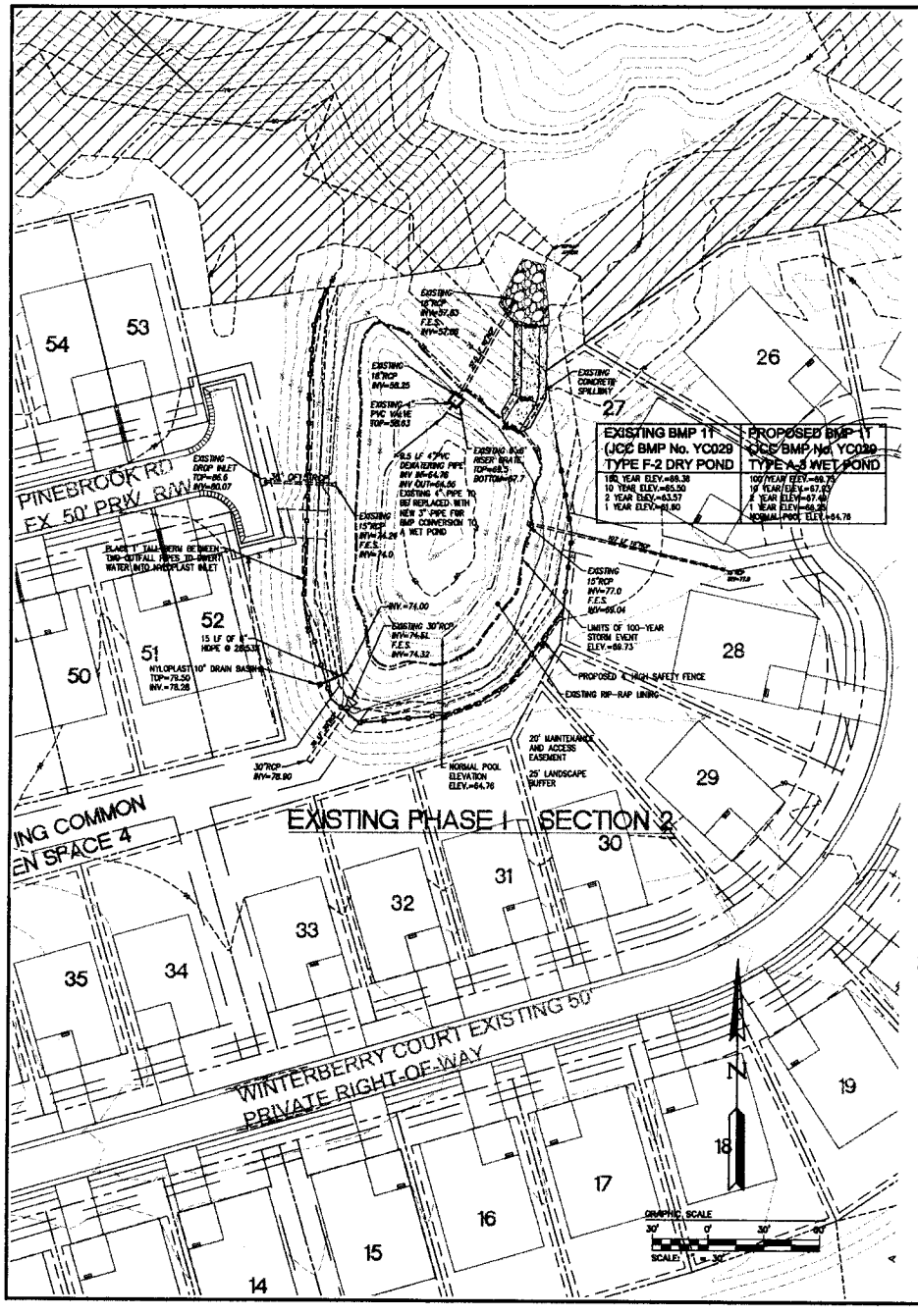
Colonial Heritage
Phase 1, Section 2

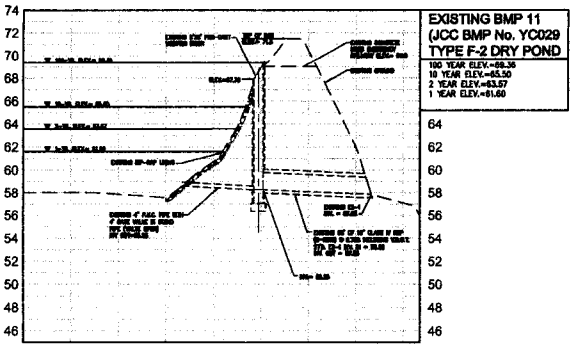
Colonial Heritage

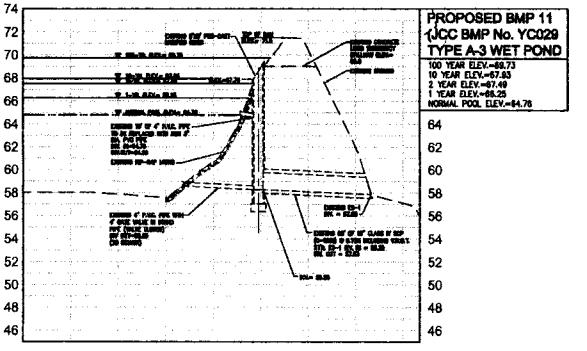
BMP 2.2
As-Built Report

James City County Environmental

June 14, 2006

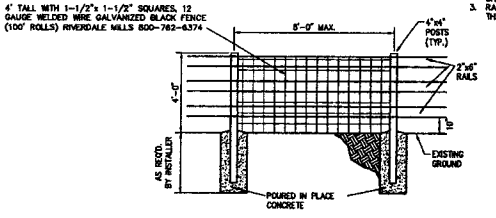






CONSTRUCTION SEQUENCE

1. THE CONTRACTOR IS TO INSTALL THE LOW-FLOW ORIFICE AT THE ELEVATION SHOWN ON THIS PLAN IN THE BMP SECTION.
2. AFTER INSTALLATION OF THE LOW-FLOW ORIFICE THE CONTRACTOR MAY NOW CLOSE THE VALVE ON THE EXISTING 4" DRAIN, AND ALLOW WATER TO NATURALLY START ACCUMULATING IN THE BASIN.
3. THE CONTRACTOR CAN NOW INSTALL THE 4' HIGH CHAINLINK FENCE AND LANDSCAPING.
4. THE CONTRACTOR IS REQUIRED TO TOPSOIL, SEED, AND/OR MULCH ANY AREAS DISTURBED DUE TO THE INSTALLATION OF THE FENCE AND LANDSCAPING.



3-RAIL WOOD FENCE DETAIL
N.T.S.

NOTES:
1. ALL RAIL JOINTS SHALL BE CENTERED AT THE POSTS.
2. ALL JOINTS SHALL BE ATTACHED WITH (3) 12d NAILS AND TWO ADJACENT RAILS SHALL NOT END ON THE SAME POST.
3. RAILS SHALL BE FLUSH TO THE POSTS AT THE END POSTS.

SECTION
N.T.S.

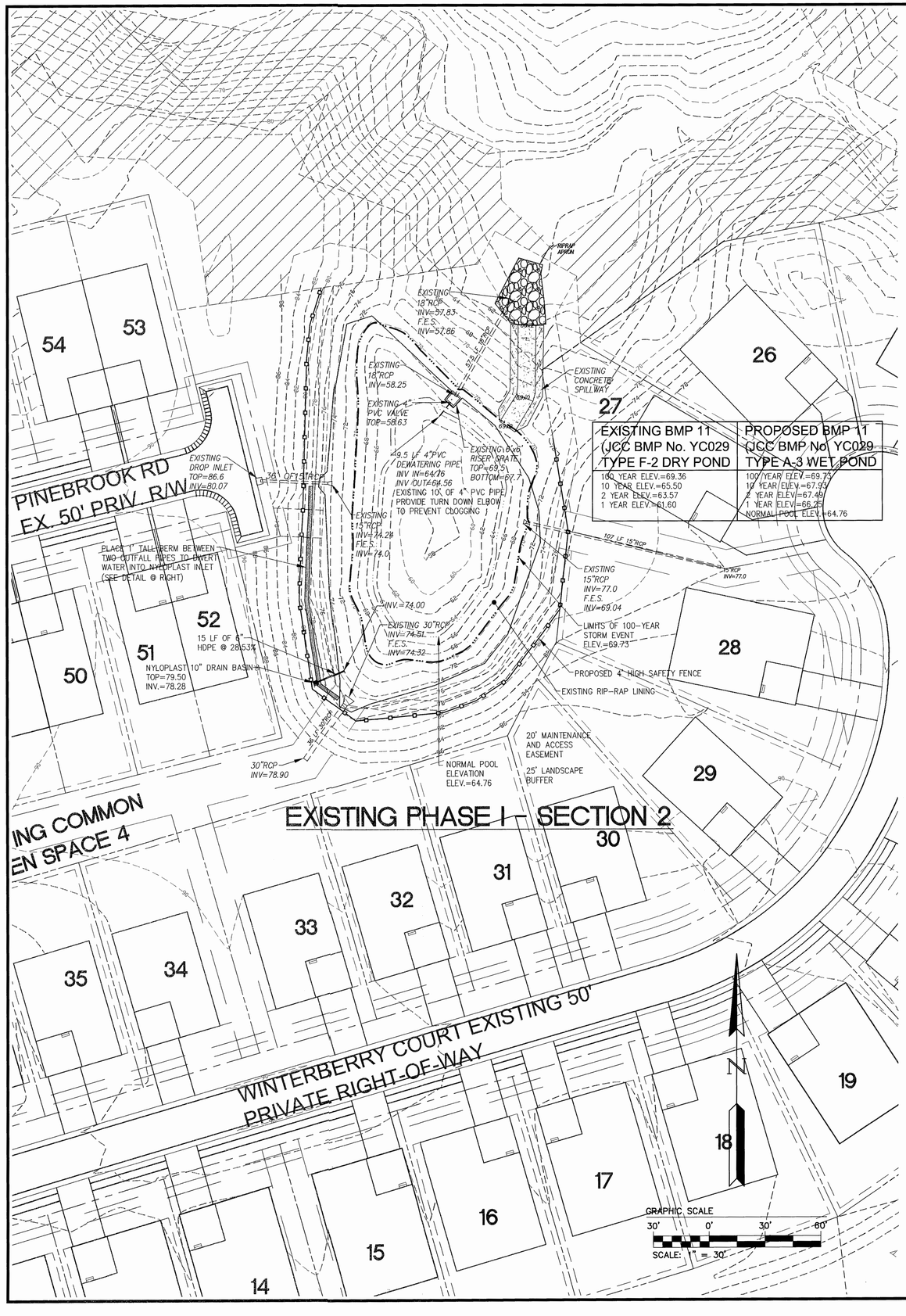
THIS PLAN HAS NOT RECEIVED FINAL APPROVAL, AND IS NOT APPROVED FOR CONSTRUCTION.

No.	DATE	REVISION / COMMENT / NOTE	BY	REV.
2	4/6/07	REVISIONS FOR WET POND CONVERSION	BMP	HBP
1	1/4/06	REVISIONS PER COUNTY COMMENTS	RBS	HBP

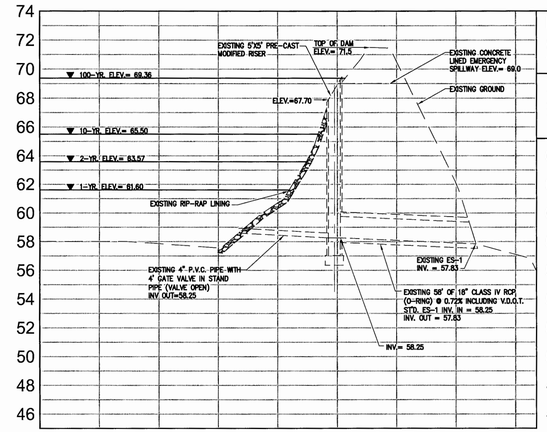
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8594
CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND • GLOUCESTER

PHASE I - SECTION 2
COLONIAL HERITAGE
OWNER/DEVELOPER: COLONIAL HERITAGE L.L.C.
STONEHOUSE — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
RDS	RDS
Scale 1"=30'	Date 1/8/06
Project No. 5001-08	
Drawing No. 2	

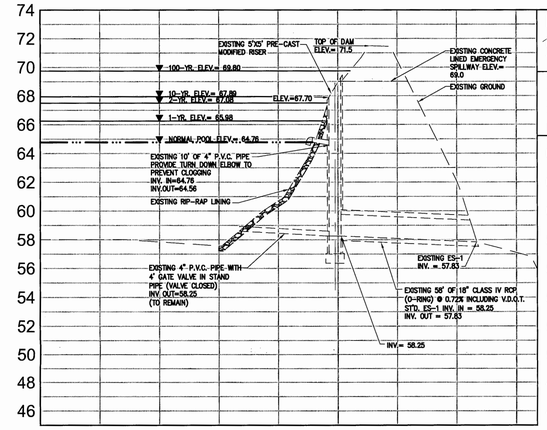


EXISTING BMP 11 (JCC BMP No. YC029 TYPE F-2 DRY POND	PROPOSED BMP 11 (JCC BMP No. YC029 TYPE A-3 WET POND
100 YEAR ELEV.=69.36	100 YEAR ELEV.=69.73
10 YEAR ELEV.=65.50	10 YEAR ELEV.=67.93
2 YEAR ELEV.=63.57	2 YEAR ELEV.=67.49
1 YEAR ELEV.=61.60	1 YEAR ELEV.=66.25
	NORMAL POOL ELEV.=64.76



EXISTING BMP 11
(JCC BMP No. YC029
TYPE F-2 DRY POND

100 YEAR ELEV.=69.36
10 YEAR ELEV.=65.50
2 YEAR ELEV.=63.57
1 YEAR ELEV.=61.60

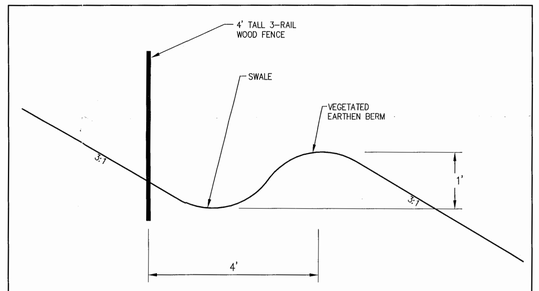


PROPOSED BMP 11
(JCC BMP No. YC029
TYPE A-3 WET POND

100 YEAR ELEV.=69.73
10 YEAR ELEV.=67.93
2 YEAR ELEV.=67.49
1 YEAR ELEV.=66.25
NORMAL POOL ELEV.=64.76

CONSTRUCTION SEQUENCE

1. THE CONTRACTOR IS TO INSTALL THE LOW-FLOW ORIFICE AT THE ELEVATION SHOWN ON THIS PLAN IN THE BMP SECTION.
2. AFTER INSTALLATION OF THE LOW-FLOW ORIFICE THE CONTRACTOR MAY NOW CLOSE THE VALVE ON THE EXISTING 4" DRAIN, AND ALLOW WATER TO NATURALLY START ACCUMULATING IN THE BASIN.
3. THE CONTRACTOR CAN NOW INSTALL THE 4' HIGH CHAINLINK FENCE AND LANDSCAPING.
4. THE CONTRACTOR IS REQUIRED TO TOPSOIL, SEED, AND/OR MULCH ANY AREAS DISTURBED DUE TO THE INSTALLATION OF THE FENCE AND LANDSCAPING.



TYPICAL SECTION ON WEST SIDE BMP 2.2
BETWEEN OUTFALL PIPES
N.T.S.

NOTES:
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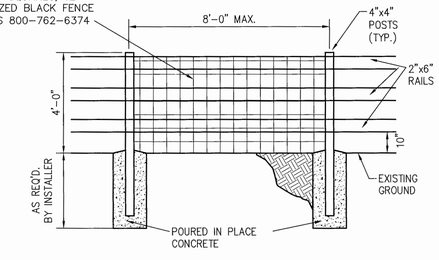
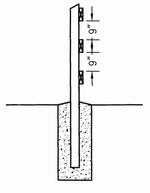
4' TALL WITH 1-1/2"x 1-1/2" SQUARES, 12 GAUGE WELDED WIRE GALVANIZED BLACK FENCE (100' ROLLS) RIVERDALE MILLS 800-762-6374



3-RAIL WOOD FENCE DETAIL
N.T.S.



SECTION
N.T.S.

APPROVED
James City County
Environmental Division
By: [signature]
Date: 6/5/07

THIS PLAN HAS NOT RECEIVED FINAL APPROVAL, AND IS NOT APPROVED FOR CONSTRUCTION.

RECEIVED
MAY 23 2007
ENVIRONMENTAL DIVISION

No.	DATE	REVISION / COMMENT / NOTE	REVISED BY	REVIEWED BY
4	5/15/07	REVISED PER JAMES CITY COUNTY COMMENTS	HMP	HMP
3	4/25/07	ADDED BERM DETAIL PER JAMES CITY COUNTY COMMENTS	HMP	HMP
2	4/10/07	REVISIONS FOR WET POND CONVERSION	HMP	HMP
1	1/4/06	REVISIONS PER COUNTY COMMENTS	TRS	HMP

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON, III
No. 018232
PROFESSIONAL ENGINEER
1/4/06

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Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND • GLOUCESTER

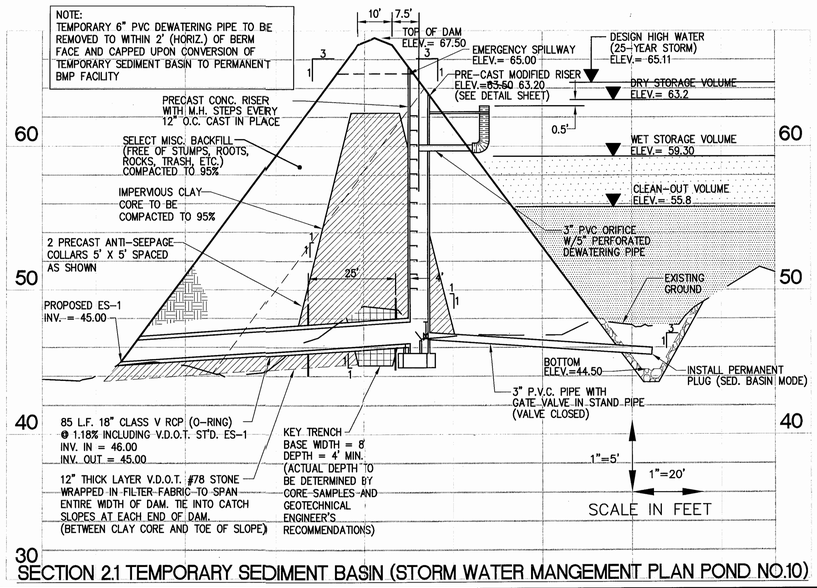
PHASE I -SECTION 2
COLONIAL HERITAGE

OWNER/DEVELOPER: COLONIAL HERITAGE L.L.C.
STONEHOUSE — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
RDS	RDS
Scale	Date
1"=30'	1/6/06

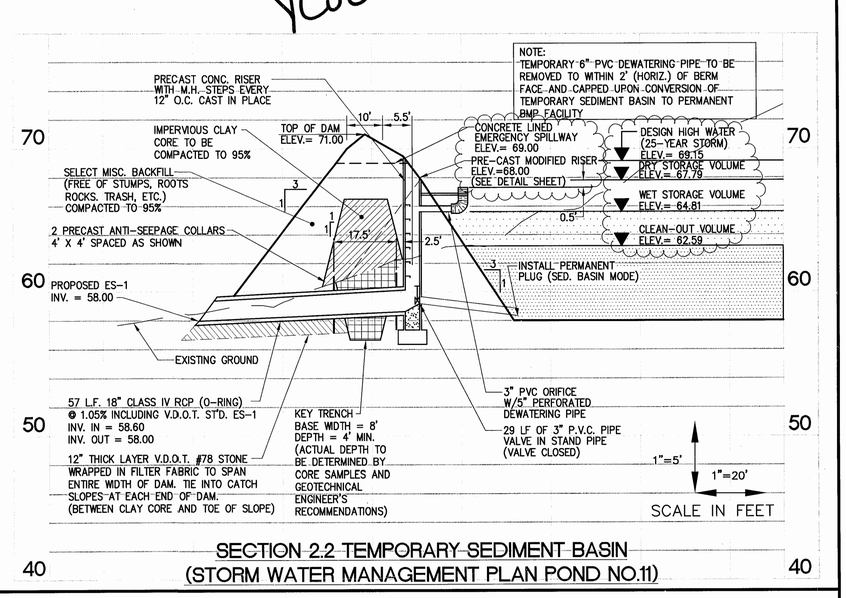
Project No.
8881-08

Drawing No.
2

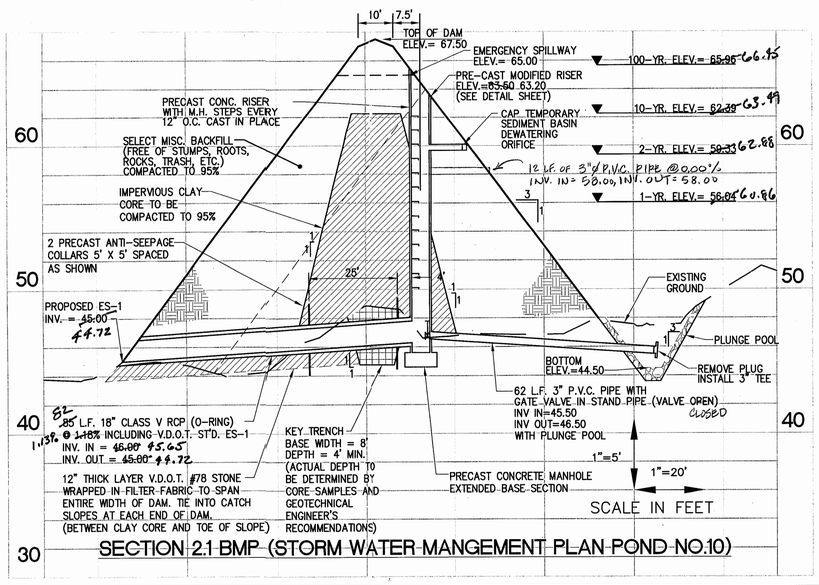


SECTION 2.1 TEMPORARY SEDIMENT BASIN (STORM WATER MANGEMENT PLAN POND NO.10)

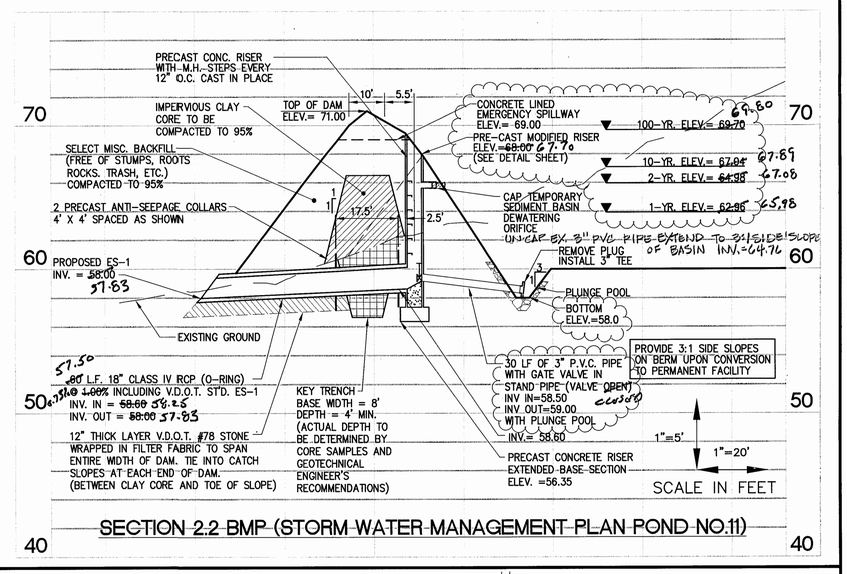
YC029



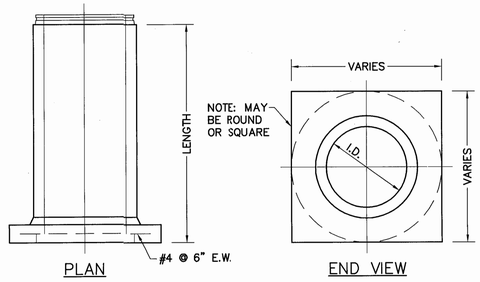
SECTION 2.2 TEMPORARY SEDIMENT BASIN (STORM WATER MANAGEMENT PLAN POND NO.11)



SECTION 2.1 BMP (STORM WATER MANGEMENT PLAN POND NO.10)



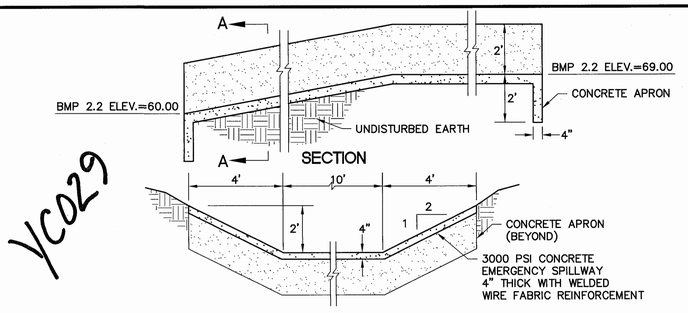
SECTION 2.2 BMP (STORM WATER MANAGEMENT PLAN POND NO.11)



PRE-CAST CONCRETE ANTI-SEEP COLLAR

N.T.S.

YC029



SECTION A-A

PAVED SPILLWAY DETAIL BMP 2.2(#11)

NOT TO SCALE

STORMWATER MANAGEMENT/ BMP FACILITY MAINTENANCE PLAN

PROPER MAINTENANCE OF THIS FACILITY IS ENCOURAGED TO PREVENT THE INTRODUCTION OF DEBRIS AND SEDIMENT IN TO THE FACILITY. SPILLWAY(S) AND DOWNSTREAM WATERWAYS. FOLLOWING INSTALLATION OF THE FACILITY AND ESTABLISHMENT OF VEGETATION IN DISTURBED AREAS, INSPECTIONS FOR SEDIMENT BUILDUPS WILL BE PERFORMED AT LEAST QUARTERLY. IT IS ANTICIPATED THAT UNDER NORMAL CONDITIONS, SEDIMENT REMOVAL FROM THE FACILITY WILL BE REQUIRED ONCE EVERY 10 YEARS. IF OTHER CONSTRUCTION OR RELATED ACTIVITIES ARE PERFORMED ON UPSLOPE PARCELS, ADEQUATE PROTECTION SHOULD BE PROVIDED AND INSPECTIONS PERFORMED AT LEAST ONCE WEEKLY OF THESE NEWLY DISTRIBUTED AREAS AS WELL AS INSPECTIONS FOR ACCUMULATED SEDIMENTS AT TWO BMP FACILITY.

A DESIGNATED REPRESENTATIVE OF THE OWNER WILL INSPECT THE BMP STRUCTURE AFTER EACH SIGNIFICANT RAINFALL EVENT OR THE FOLLOWING WORKING DAY IF A WEEKEND OR HOLIDAY OCCURS. A SIGNIFICANT RAINFALL FOR THIS STRUCTURE IS DEFINED AS ONE (1) INCH OR MORE OF GAUGED RAINFALL WITHIN A 24 HOUR PERIOD. ONCE PER YEAR, A REPRESENTATIVE OF THE COUNTY MAY JOINTLY INSPECT THE STRUCTURE. APPROPRIATE ACTION, PERFORMED AT THE COST OF THE OWNER, WILL BE TAKEN TO ENSURE APPROPRIATE MAINTENANCE. KEYS TO LOCKED ACCESS POINTS SHALL BE MADE AVAILABLE TO COUNTY INSPECTION PERSONNEL UPON REQUEST.

INSPECTION AND MAINTENANCE OF THE FACILITY WILL CONSIST OF THE FOLLOWING ADDITIONAL MEASURES:

1. THE INSPECTION FOR SEDIMENT BUILDUP WILL BE PERFORMED BY VISUAL INSPECTION AND A PHYSICAL DETERMINATION OF SEDIMENT DEPTH WITHIN THE STORAGE AREA. SEDIMENT REMOVAL IS REQUIRED USING A RUBBER-WHEELED BACKHOE. AT THE SAME TIME, OR AT LEAST ONCE PER YEAR, THE RISER BOTTOM AND OUTLET PIPE SHALL BE CLEANED OF ACCUMULATED SEDIMENTS. DISPOSE OF SEDIMENTS REMOVED FROM THE FACILITY AT AN ACCEPTABLE DISPOSAL AREA. SEDIMENT SHALL NOT BE ALLOWED TO ACCUMULATE IN DEPTHS GREATER THAN 1-FOOT. NO SEDIMENT SHALL BE ALLOWED TO ACCUMULATE TO PREVENT THE PROPER FUNCTION OF ANY PIPE OR CULVERT.

2. PERFORM MAINTENANCE MOWING OF GRASSED AREAS AT LEAST TWICE EACH YEAR. GRASSES SUCH AS TALL FESCUE SHOULD BE MOWED IN EARLY SUMMER AFTER EMERGENCE OF THE HEADS ON COOL SEASON GRASSES AND IN LATE FALL TO PREVENT SEEDS OF ANNUAL WEEDS FROM MATURING. MOWING OF LEGUMES CAN BE LESS FREQUENT TREES AND SHRUBS SHOULD NOT BE PERMITTED TO GROW ON ANY PART OF THE GRADED EMBANKMENT.

3. PERFORM SOIL SAMPLING ON STABILIZED BMP SOIL AREAS ONCE EVERY FOUR (4) YEARS. SOIL SAMPLING AND TESTING SHOULD BE PERFORMED BY A QUALIFIED INDEPENDENT TESTING LABORATORY. APPLY ADDITIONAL LIME AND FERTILIZER IN ACCORDANCE WITH TEST RECOMMENDATIONS.

4. IN STABILIZED BMP AREAS, IF VEGETATION COVERS LESS THAN 40% OF SOIL SURFACES, LIME, FERTILIZE AND SEED IN ACCORDANCE WITH RECOMMENDATIONS FOR NEW SEEDLINGS, AS LISTED IN DAM CONSTRUCTION NOTES. IF VEGETATION COVERS MORE THAN 40% BUT LESS THAN 70% OF SOIL SURFACES, LIME FERTILIZE AND OVERSEED IN ACCORDANCE WITH CURRENT SEEDLING RECOMMENDATIONS.

5. PERFORM QUARTERLY INSPECTIONS OF THE RELEASE STRUCTURES, RISER SECTION AND CREST OF SPILLWAY FOR THE OBSERVANCE OF COLLECTED DEBRIS. IMMEDIATELY REMOVE ANY DEBRIS TO MAINTAIN THE INTEGRITY OF THE STRUCTURE AND PROVIDE AN ATTRACTIVE APPEARANCE. DURING QUARTERLY INSPECTIONS, THE POND DRAIN VALVE, USUALLY LEFT IN THE VALVE "CLOSED" POSITION, SHALL BE INSPECTED AND OPERATED THROUGH TWO COMPLETE FULL-OPEN TO FULL-CLOSE TO FULL-OPEN CYCLES.

6. PERFORM YEARLY STRUCTURAL INSPECTIONS OF THE FACILITY FOR DAMAGE. STRUCTURAL INSPECTION SHALL BE PERFORMED ON THE CONCRETE RISER, ANTI-VORTEX DEVICE, TRASH RACK, ORIFICE/ WEIR(S), OUTLET BARREL AND POND EMBANKMENT. IF DAMAGE IS EVIDENT, FURTHER INVESTIGATION BY A PROFESSIONAL ENGINEER MAY BE REQUIRED TO ASSESS THE CONTINUED INTEGRITY OF THE STRUCTURE.

7. PERFORM QUARTERLY INSPECTIONS OF THE GRADED SIDE SLOPES OF THE FACILITY FOR SIGNS OF ANIMAL/ RODENT BORROWS OR SLOPE EROSION. IMMEDIATELY PERFORM NECESSARY REPAIRS, REFILLING OR RESEEDING AS APPROPRIATE.

8. RECORD KEEPING. THE LANDOWNER OR DESIGNATED REPRESENTATIVE SHALL KEEP REASONABLE, ACCURATE WRITTEN RECORDS OF INSPECTIONS PERFORMED ON THE STRUCTURE. RECORDS SHALL DOCUMENT ROUTINE MAINTENANCE AND/ OR REPAIRS PERFORMED. COPIES SHALL BE PROVIDED TO THE COUNTY UPON REQUEST.

9. THE FACILITY SHALL NOT BE MODIFIED IN ANY WAY WITHOUT PRIOR CONSENT/ APPROVAL OF THE COUNTY.

GENERAL NOTES FOR CONSTRUCTION OF STORMWATER BASINS

1. THE CONTRACTOR SHALL PROVIDE ALL WORK AND MATERIALS NEEDED TO CONSTRUCT THE STORMWATER BASIN, STORMWATER MANAGEMENT PONDS, BEST MANAGEMENT PRACTICES, SEDIMENT BASINS AND SEDIMENT TRAPS. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND MATERIALS NEEDED FOR THE COMPLETION OF GRADING AND EARTHWORK ASSOCIATED WITH THE CONSTRUCTION.

2. THE CONTRACTOR SHALL CONSULT AND PROVIDE FOR THE SERVICES OF A GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL PROVIDE TEST RESULTS ON PLACED DAM MATERIALS, IDENTIFYING SOIL CLASSIFICATION, PERMEABILITY, PLASTICITY INDEX, AND COMPACTION. ALL TESTS SHALL BE IN CONFORMANCE WITH ASTM STANDARDS. THE COST OF THE SERVICES OF THE GEOTECHNICAL ENGINEER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SATISFACTORY GEOTECHNICAL RESULTS ARE NEEDED PRIOR TO FINAL APPROVAL.

3. ALL INSPECTIONS REQUIRED FOR THE WORK SHALL BE PERFORMED BY A GEOTECHNICAL ENGINEER AT THE EXPENSE OF THE GENERAL CONTRACTOR.

4. ON-SITE EXCAVATED MATERIAL, IF DETERMINED SUITABLE FOR USE IN DAM CONSTRUCTION BY A GEOTECHNICAL ENGINEER, MAY BE USED FOR DAM CONSTRUCTION. SHOULD ADDITIONAL MATERIAL BE REQUIRED, THE CONTRACTOR SHALL IDENTIFY THE NEED FOR MATERIAL TO THE OWNER, AS ADDITIONAL BORROW MATERIAL MAY BE AVAILABLE ON THE PROPERTY. ALL EXCAVATED MATERIAL DETERMINED BY THE GEOTECHNICAL ENGINEER TO BE UNSUITABLE SHALL BE DISPOSED OF PROPERLY AT THE CONTRACTOR'S EXPENSE. ALL EXCAVATED MATERIAL NOT REQUIRED FOR BACKFILLING SHALL EITHER BE DEPOSITED ON SITE AND SPREAD BY THE CONTRACTOR, OR SHALL BE DEPOSITED IN AN AREA ON THE PROPERTY AS DIRECTED BY THE OWNER. THE CONTRACTOR SHALL PROVIDE PROPER STABILIZATION, AND EROSION AND SEDIMENT CONTROL MEASURES NEEDED TO CONTROL AS PER THE VESCH THIRD EDITION.

5. UNDERCUT FOR THE FOUNDATION OF THE DAM EMBANKMENT SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. THE FOUNDATION SHALL BE BACKFILLED WITH SOILS CLASSIFIED AS SM, SC, OR CL UNDER THE UNIFIED SOIL CLASSIFICATION SYSTEM. SOILS SHALL HAVE A MINIMUM OF 15% BY WEIGHT FINES, HAVING A PLASTICITY INDEX OF 30% AND A PERMEABILITY OF 0.0004 IN./SEC. OR LESS. FILL SHALL BE COMPACTED IN 12-INCH LIFTS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER, TO A DRY DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). EXCAVATION FOR THE DAM KEY SHALL BE IN ACCORDANCE TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. HEIGHT, DEPTH, AND WIDTH OF THE KEY SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. THE KEY SHALL BE FORMED USING SOILS CLASSIFIED AS SC OR CL, WITH A PERMEABILITY OF 0.0004 IN./SEC. OR LESS.

6. THE DAM CORE SHALL BE AS CONSTRUCTED WITH NON-EXPANSIVE SC OR CL CLAYEY MATERIAL WITH PERMEABILITY OF 0.0004 IN./SEC. OR LESS. THE FILL OF THE CORE SHALL BE MADE IN 12-INCH LIFTS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER, TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). SIZE, SHAPE, WIDTH, DEPTH, AND HEIGHT OF THE DAM CORE SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. TO COVER THE DAM CORE, A SILTY FINE SAND OR CLAYEY SOIL (SM, SC, OR CL) SHALL BE PLACED. A VEGETATIVE COVER USING VDOT EC-2 EROSION CONTROL BLANKETS SHALL BE PLACED ON DAM SLOPES AND CREST TO PREVENT EROSION.

7. THE STORMWATER MANAGEMENT / BMP FACILITIES SHOWN ON THESE PLANS REQUIRE THE SUBMISSION, REVIEW AND APPROVAL OF RECORD DRAWING(S) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND / SURETY. THE GEOTECHNICAL ENGINEER IS TO ENSURE THAT HIS / HER INSPECTION OF THE SWM / BMP CONSTRUCTION ACTIVITY IS PERFORMED DURING AND FOLLOWING CONSTRUCTION OF THE SWM / BMP IN ACCORDANCE WITH THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION STORMWATER MANAGEMENT / BMP FACILITIES DESIGN GUIDELINES HANDBOOK, DATED AUGUST 30, 2000.

8. THE CONTRACTOR SHALL PROVIDE INTERIM CERTIFICATION OF TEMPORARY SEDIMENT BASIN IN ACCORDANCE WITH SECTION 5 OF THE JAMES CITY COUNTY BMP, EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT DESIGN GUIDES.

No.	DATE	REVISION / COMMENT / NOTE	BY
4	5/10/04	NONE THIS SHEET	HMP
3	11/11/03	REVISED REVERSE CURB AND GUTTER	HMP
2	10/31/03	NONE THIS SHEET	HMP
1	10/22/03	REVISIONS TO SITE PLAN AMENDMENT	HMP
3	8/22/03	SITE PLAN AMENDMENT	HMP
2	2/18/03	REVISED PER JCC COMMENTS DATED 2/07/03	HMP
1	12/18/02	REVISED PER JCC COMMENTS	HMP

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON, III
No. 18632
1/20/04
PROFESSIONAL ENGINEER

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

RECEIVED
NOV 17 2006
ENVIRONMENTAL DIVISION

STORMWATER MANAGEMENT
SECTIONS AND NOTES
PHASE I, SECTION 2
COLONIAL HERITAGE
OWNER/DEVELOPER: US HOME
STONEHOUSE — JAMES CITY COUNTY — VIRGINIA

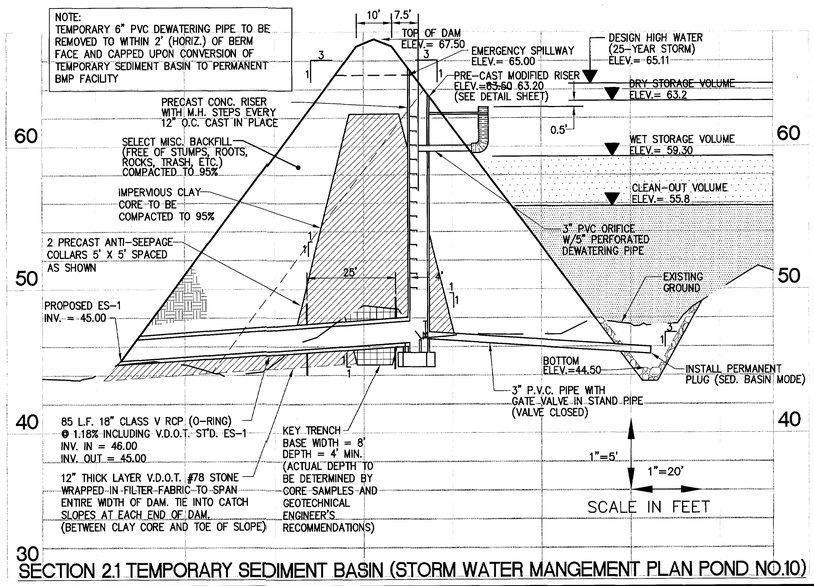
Designed	Drawn
JAG	ARH
Scale	Date
NONE	6/26/02

Project No. 8881-08

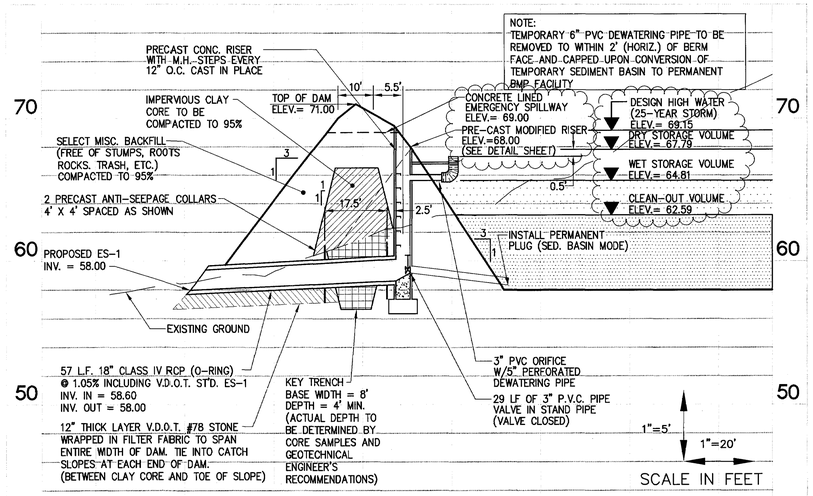
Drawing No. 25

RMS 04.02.04-16:08 88818c25.dwg

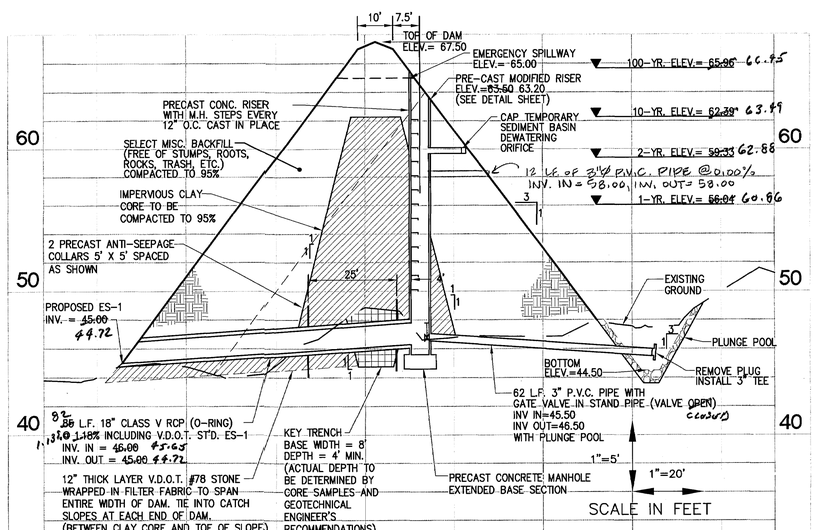
YC029_COLONIAL_HERITAGE_P1_S2 - 030



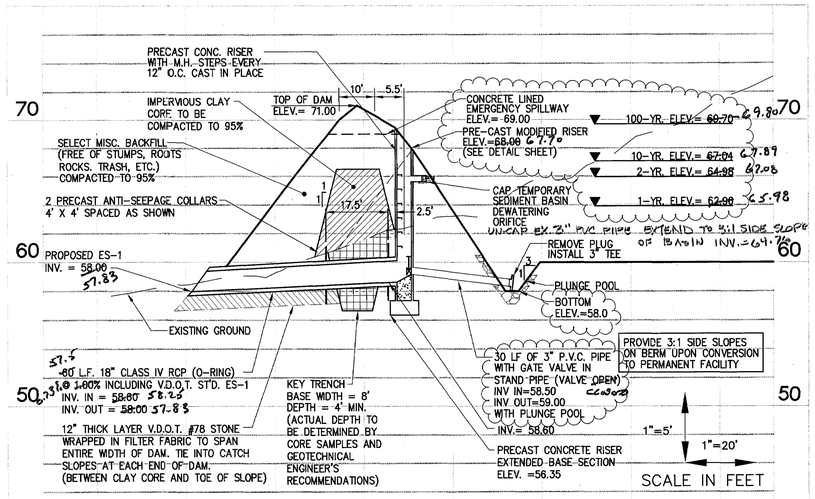
SECTION 2.1 TEMPORARY SEDIMENT BASIN (STORM WATER MANGEMENT PLAN POND NO.10)



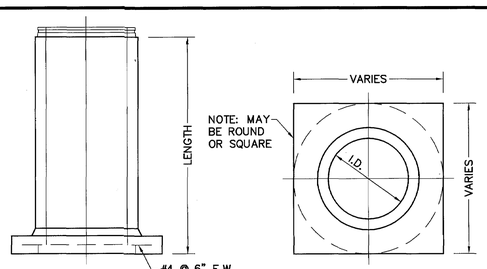
SECTION 2.2 TEMPORARY SEDIMENT BASIN (STORM WATER MANAGEMENT PLAN POND NO.11)



SECTION 2.1 BMP (STORM WATER MANGEMENT PLAN POND NO.10)

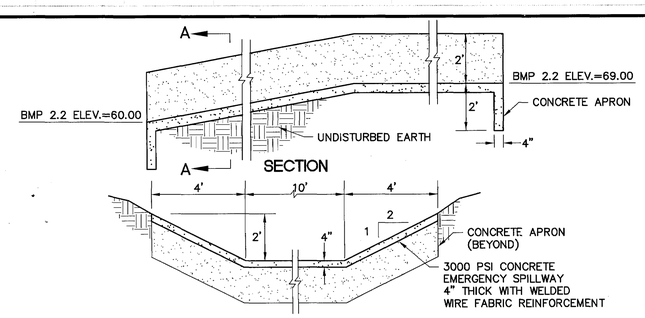


SECTION 2.2 BMP (STORM WATER MANAGEMENT PLAN POND NO.11)



PRE-CAST CONCRETE ANTI-SEEP COLLAR

N.T.S.



SECTION A-A

PAVED SPILLWAY DETAIL BMP 2.2(#11)

NOT TO SCALE

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INSPECTION AND MAINTENANCE OF THE FACILITY WILL CONSIST OF THE FOLLOWING ADDITIONAL MEASURES:

1. THE INSPECTION FOR SEDIMENT BUILDUP WILL BE PERFORMED BY VISUAL INSPECTION AND A PHYSICAL DETERMINATION OF SEDIMENT DEPTH WITHIN THE STORAGE AREA. SEDIMENT REMOVAL IS REQUIRED USING A RUBBER-WHEELED BACKHOE. AT THE SAME TIME, OR AT LEAST ONCE PER YEAR, THE RISER BOTTOM AND OUTLET PIPE SHALL BE CLEANED OF ACCUMULATED SEDIMENTS. DISPOSE OF SEDIMENTS REMOVED FROM THE FACILITY AT AN ACCEPTABLE DISPOSAL AREA. SEDIMENT SHALL NOT BE ALLOWED TO ACCUMULATE IN DEPTHS GREATER THAN 1-FOOT. NO SEDIMENT SHALL BE ALLOWED TO ACCUMULATE TO PREVENT THE PROPER FUNCTION OF ANY PIPE OR CULVERT.

2. PERFORM MAINTENANCE MOWING OF GRASSED AREAS AT LEAST TWICE EACH YEAR. GRASSES SUCH AS TALL FESCUE SHOULD BE MOWED IN EARLY SUMMER AFTER EMERGENCE OF THE HEADS ON COOL SEASON GRASSES AND IN LATE FALL TO PREVENT SEEDS OF ANNUAL WEEDS FROM MATURING. MOWING OF LEGUMES CAN BE LESS FREQUENT TREES AND SHRUBS SHOULD NOT BE PERMITTED TO GROW ON ANY PART OF THE GRADED EMBANKMENT.

3. PERFORM SOIL SAMPLING ON STABILIZED BMP SOIL AREAS ONCE EVERY FOUR (4) YEARS. SOIL SAMPLING AND TESTING SHOULD BE PERFORMED BY A QUALIFIED INDEPENDENT TESTING LABORATORY. APPLY ADDITIONAL LIME AND FERTILIZER IN ACCORDANCE WITH TEST RECOMMENDATIONS.

4. IN STABILIZED BMP AREAS, IF VEGETATION COVERS LESS THAN 40% OF SOIL SURFACES, LIME, FERTILIZE AND SEED IN ACCORDANCE WITH RECOMMENDATIONS FOR NEW SEEDLINGS, AS LISTED IN DAM CONSTRUCTION NOTES. IF VEGETATION COVERS MORE THAN 40% BUT LESS THAN 70% OF SOIL SURFACES, LIME FERTILIZE AND OVERSEED IN ACCORDANCE WITH CURRENT SEEDLING RECOMMENDATIONS.

5. PERFORM QUARTERLY INSPECTIONS OF THE RELEASE STRUCTURES, RISER SECTION AND CREST OF SPILLWAY FOR THE OBSERVANCE OF COLLECTED DEBRIS. IMMEDIATELY REMOVE ANY DEBRIS TO MAINTAIN THE INTEGRITY OF THE STRUCTURE AND PROVIDE AN ATTRACTIVE APPEARANCE. DURING QUARTERLY INSPECTIONS, THE POND DRAIN VALVE, USUALLY LEFT IN THE VALVE "CLOSED" POSITION, SHALL BE INSPECTED AND OPERATED THROUGH TWO COMPLETE FULL-OPEN TO FULL-CLOSE TO FULL-OPEN CYCLES.

6. PERFORM YEARLY STRUCTURAL INSPECTIONS OF THE FACILITY FOR DAMAGE. STRUCTURAL INSPECTION SHALL BE PERFORMED ON THE CONCRETE RISER, ANTI-VORTEX DEVICE, TRASH RACK, ORIFICE/ WEIR(S), OUTLET BARREL AND POND EMBANKMENT. IF DAMAGE IS EVIDENT, FURTHER INVESTIGATION BY A PROFESSIONAL ENGINEER MAY BE REQUIRED TO ASSESS THE CONTINUED INTEGRITY OF THE STRUCTURE.

7. PERFORM QUARTERLY INSPECTIONS OF THE GRADED SIDE SLOPES OF THE FACILITY FOR SIGNS OF ANIMAL/ RODENT BORROWS OR SLOPE EROSION. IMMEDIATELY PERFORM NECESSARY REPAIRS, REFILLING OR RESEEDING AS APPROPRIATE.

8. RECORD KEEPING. THE LANDOWNER OR DESIGNATED REPRESENTATIVE SHALL KEEP REASONABLE, ACCURATE WRITTEN RECORDS OF INSPECTIONS PERFORMED ON THE STRUCTURE. RECORDS SHALL DOCUMENT ROUTINE MAINTENANCE AND/ OR REPAIRS PERFORMED. COPIES SHALL BE PROVIDED TO THE COUNTY UPON REQUEST.

9. THE FACILITY SHALL NOT BE MODIFIED IN ANY WAY WITHOUT PRIOR CONSENT/ APPROVAL OF THE COUNTY.

GENERAL NOTES FOR CONSTRUCTION OF STORMWATER BASINS

1. THE CONTRACTOR SHALL PROVIDE ALL WORK AND MATERIALS NEEDED TO CONSTRUCT THE STORMWATER BASIN, STORMWATER MANAGEMENT PONDS, BEST MANAGEMENT PRACTICES, SEDIMENT BASINS AND SEDIMENT TRAPS. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND MATERIALS NEEDED FOR THE COMPLETION OF GRADING AND EARTHWORK ASSOCIATED WITH THE CONSTRUCTION.

2. THE CONTRACTOR SHALL CONSULT AND PROVIDE FOR THE SERVICES OF A GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL PROVIDE TEST RESULTS ON PLACED DAM MATERIALS, IDENTIFYING SOIL CLASSIFICATION, PERMEABILITY, PLASTICITY INDEX, AND COMPACTION. ALL TESTS SHALL BE IN CONFORMANCE WITH ASTM STANDARDS. THE COST OF THE SERVICES OF THE GEOTECHNICAL ENGINEER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SATISFACTORY GEOTECHNICAL RESULTS ARE NEEDED PRIOR TO FINAL APPROVAL.

3. ALL INSPECTIONS REQUIRED FOR THE WORK SHALL BE PERFORMED BY A GEOTECHNICAL ENGINEER AT THE EXPENSE OF THE GENERAL CONTRACTOR.

4. ON-SITE EXCAVATED MATERIAL, IF DETERMINED SUITABLE FOR USE IN DAM CONSTRUCTION BY A GEOTECHNICAL ENGINEER, MAY BE USED FOR DAM CONSTRUCTION. SHOULD ADDITIONAL MATERIAL BE REQUIRED, THE CONTRACTOR SHALL IDENTIFY THE NEED FOR MATERIAL TO THE OWNER, AS ADDITIONAL BORROW MATERIAL MAY BE AVAILABLE ON THE PROPERTY. ALL EXCAVATED MATERIAL DETERMINED BY THE GEOTECHNICAL ENGINEER TO BE UNSUITABLE SHALL BE DISPOSED OF PROPERLY AT THE CONTRACTOR'S EXPENSE. ALL EXCAVATED MATERIAL NOT REQUIRED FOR BACKFILLING SHALL EITHER BE DEPOSITED ON SITE AND SPREAD BY THE CONTRACTOR, OR SHALL BE DEPOSITED IN AN AREA ON THE PROPERTY AS DIRECTED BY THE OWNER. THE CONTRACTOR SHALL PROVIDE PROPER STABILIZATION, AND EROSION AND SEDIMENT CONTROL MEASURES NEEDED TO CONTROL AS PER THE VESCH THIRD EDITION.

5. UNDERCUT FOR THE FOUNDATION OF THE DAM EMBANKMENT SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. THE FOUNDATION SHALL BE BACKFILLED WITH SOILS CLASSIFIED AS SM, SC, OR CL UNDER THE UNIFIED SOIL CLASSIFICATION SYSTEM. SOILS SHALL HAVE A MINIMUM OF 15% BY WEIGHT FINES, HAVING A PLASTICITY INDEX OF 30% AND A PERMEABILITY OF 0.0004 IN./SEC. OR LESS. FILL SHALL BE COMPACTED IN 12-INCH LIFTS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER, TO A DRY DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). EXCAVATION FOR THE DAM KEY SHALL BE IN ACCORDANCE TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. HEIGHT, DEPTH, AND WIDTH OF THE KEY SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. THE KEY SHALL BE FORMED USING SOILS CLASSIFIED AS SC OR CL, WITH A PERMEABILITY OF 0.0004 IN./SEC. OR LESS.

6. THE DAM CORE SHALL BE AS CONSTRUCTED WITH NON-EXPANSIVE SC OR CL CLAYEY MATERIAL WITH PERMEABILITY OF 0.0004 IN./SEC. OR LESS. THE FILL OF THE CORE SHALL BE MADE IN 12-INCH LIFTS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER, TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698). SIZE, SHAPE, WIDTH, DEPTH, AND HEIGHT OF THE DAM CORE SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. TO COVER THE DAM CORE, A SILTY FINE SAND OR CLAYEY SOILS (SM, SC, OR CL) SHALL BE PLACED. A VEGETATIVE COVER USING VDOT EC-2 EROSION CONTROL BLANKETS SHALL BE PLACED ON DAM SLOPES AND CREST TO PREVENT EROSION.

7. THE STORMWATER MANAGEMENT / BMP FACILITIES SHOWN ON THESE PLANS REQUIRE THE SUBMISSION, REVIEW AND APPROVAL OF RECORD DRAWING(S) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND / SURETY. THE GEOTECHNICAL ENGINEER IS TO ENSURE THAT HIS / HER INSPECTION OF THE SWM / BMP CONSTRUCTION ACTIVITY IS PERFORMED DURING AND FOLLOWING CONSTRUCTION OF THE SWM / BMP IN ACCORDANCE WITH THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION STORMWATER MANAGEMENT / BMP FACILITIES DESIGN GUIDELINES HANDBOOK, DATED AUGUST 30, 2000.

8. THE CONTRACTOR SHALL PROVIDE INTERIM CERTIFICATION OF TEMPORARY SEDIMENT BASIN IN ACCORDANCE WITH SECTION 5 OF THE JAMES CITY COUNTY BMP, EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT DESIGN GUIDES.

No.	DATE	REVISION / COMMENT / NOTE	BY
4	5/10/04	NONE THIS SHEET	HWP
4	11/11/03	REVISED REVERSE CURB AND GUTTER	HWP
4	10/31/03	NONE THIS SHEET	HWP
4	10/22/03	REVISIONS TO SITE PLAN AMENDMENT	HWP
4	8/22/03	SITE PLAN AMENDMENT	HWP
3	2/18/03	REVISED PER JCC COMMENTS DATED 2/07/03	HWP
2	12/18/02	REVISED PER JCC COMMENTS	HWP
1			

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON, III
No. 018232
1/29/04
PROFESSIONAL ENGINEER

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Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994
CONSULTING ENGINEERS

STORMWATER MANAGEMENT
SECTIONS AND NOTES
PHASE I, SECTION 2
COLONIAL HERITAGE
OWNER/DEVELOPER: US HOME
STONEHOUSE
JAMES CITY COUNTY
VIRGINIA

Designed	Drawn
JAG	ARH
Scale	Date
NONE	6/26/02

Project No. 8881-08

Drawing No. 25

RMS 04.02.04-16:08 8881&c25.dwg

YC029_COLONIAL_HERITAGE_P1_S2 - 031

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	0.84	2.28	-------	-------	4.38	-------	-------	18.99	Pre
2	SCS Runoff	-------	5.50	11.11	-------	-------	18.05	-------	-------	60.08	Post
10	Reservoir	2	0.43	0.62	-------	-------	1.91	-------	-------	45.96	WET BMP 2.2 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.84	2	742	7,540	----	------	------	Pre
2	SCS Runoff	5.50	2	726	22,547	----	------	------	Post
10	Reservoir	0.43	2	908	22,352	2	65.98	33,977	WET BMP 2.2 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.28	2	738	14,774	----	------	------	Pre
2	SCS Runoff	11.11	2	726	39,220	----	------	------	Post
10	Reservoir	0.62	2	934	38,999	2	67.08	44,191	WET BMP 2.2 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	4.38	2	738	24,325	----	------	------	Pre
2	SCS Runoff	18.05	2	726	60,048	----	------	------	Post
10	Reservoir	1.91	2	788	59,807	2	67.89	52,620	WET BMP 2.2 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	18.99	2	736	87,901	----	------	------	Pre
2	SCS Runoff	60.08	2	724	188,232	----	------	------	Post
10	Reservoir	45.96	2	732	187,978	2	69.80	75,750	WET BMP 2.2 Routing

Pond Report

Hydraflow Hydrographs by Intelisolve — Thursday, Jun 15 2006, 10:0 AM

Pond No. 10 - Wet Pond 2.2

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	58.00	469	0	0
1.00	59.00	1,363	916	916
2.00	60.00	2,304	1,834	2,750
3.00	61.00	3,215	2,760	5,509
4.00	62.00	4,143	3,679	9,188
5.00	63.00	5,126	4,635	13,823
6.00	64.00	6,165	5,646	19,468
7.00	65.00	7,225	6,695	26,163
8.00	66.00	8,650	7,938	34,101
9.00	67.00	9,798	9,224	43,325
10.00	68.00	10,999	10,399	53,723
11.00	69.00	12,277	11,638	65,361
12.00	70.00	13,672	12,975	78,336
13.00	71.00	15,165	14,419	92,754

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 58.25	64.76	0.00	0.00
Length (ft)	= 57.50	24.00	0.00	0.00
Slope (%)	= 0.73	4.20	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.13	10.00	0.00	0.00
Crest El. (ft)	= 67.70	69.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	0.00
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	58.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
1.00	916	59.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
2.00	2,750	60.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
3.00	5,509	61.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
4.00	9,188	62.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
5.00	13,823	63.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
6.00	19,468	64.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
7.00	26,163	65.00	0.12	0.11	---	---	0.00	0.00	---	---	---	0.11
8.00	34,101	66.00	0.44	0.44	---	---	0.00	0.00	---	---	---	0.44
9.00	43,325	67.00	0.62	0.60	---	---	0.00	0.00	---	---	---	0.60
10.00	53,723	68.00	3.03	0.74	---	---	2.26	0.00	---	---	---	3.00
11.00	65,361	69.00	21.20	0.82	---	---	20.39	0.00	---	---	---	21.20
12.00	78,336	70.00	27.73	0.26	---	---	27.47	26.00	---	---	---	53.73
13.00	92,754	71.00	29.29	0.16	---	---	29.12	73.54	---	---	---	102.82

Hydrograph Plot

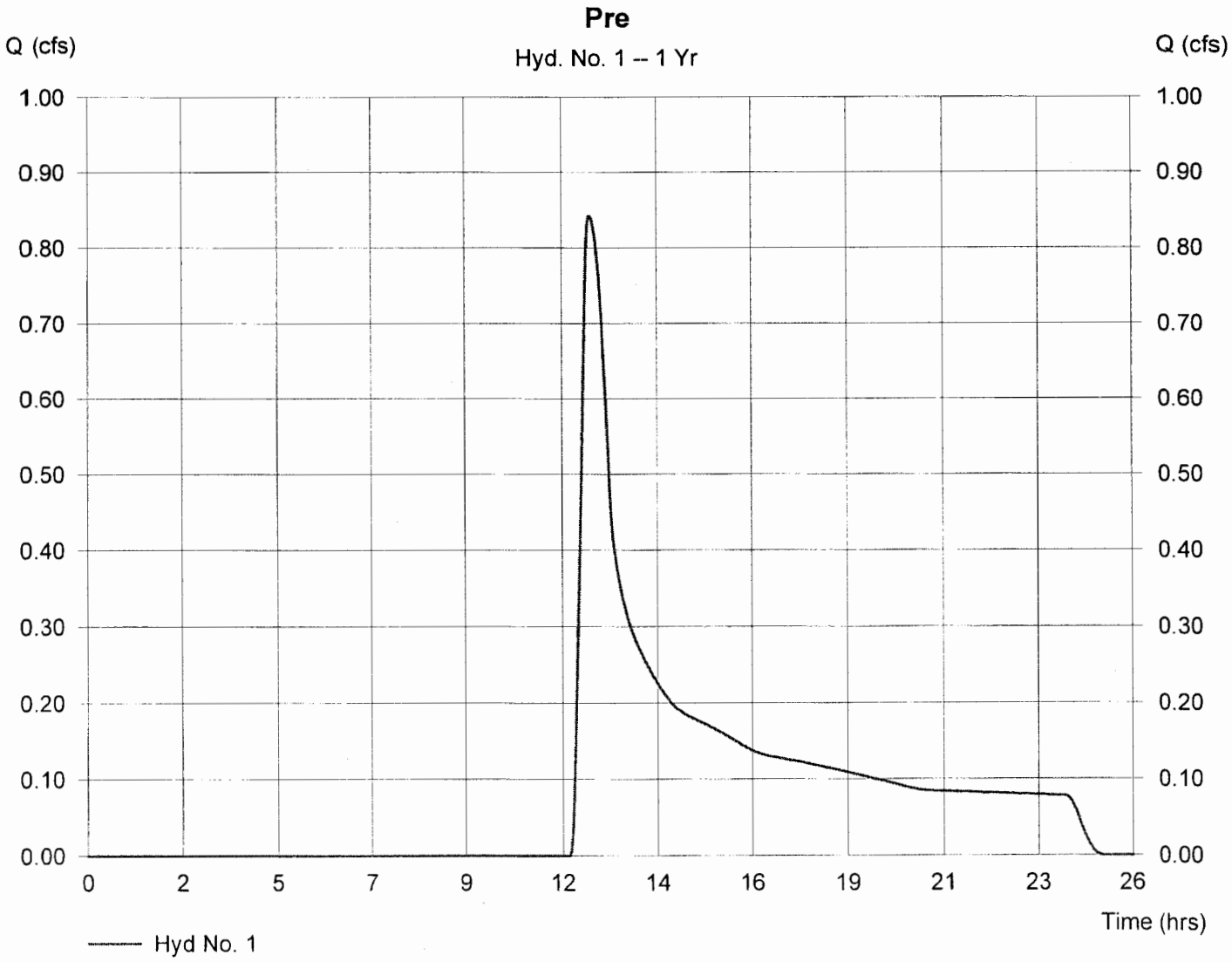
Hydraflow Hydrographs by Intelisolve — Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 0.84 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7,540 cuft



Hydrograph Plot

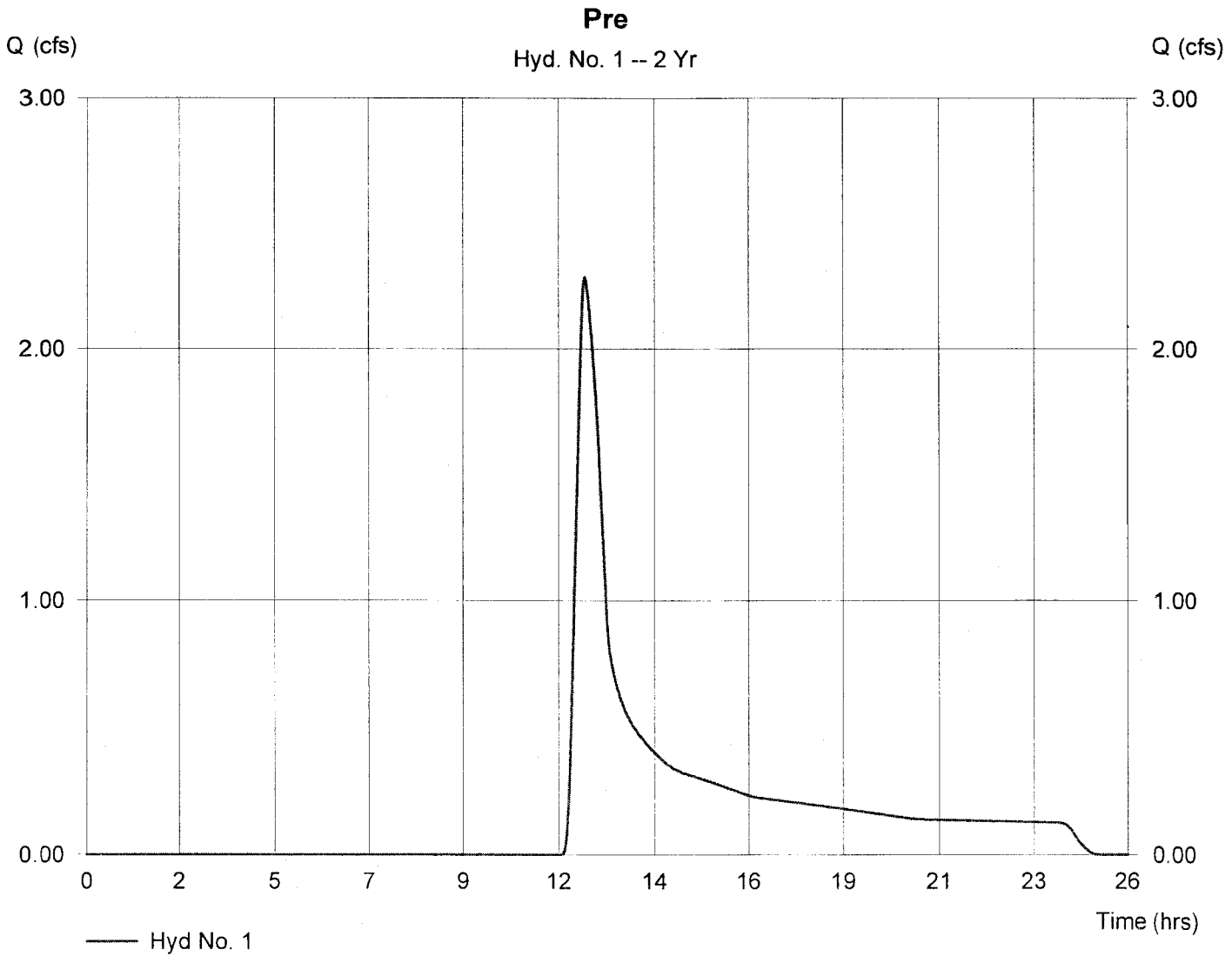
Hydraflow Hydrographs by Intelisolve — Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 2.28 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 14,774 cuft



Hydrograph Plot

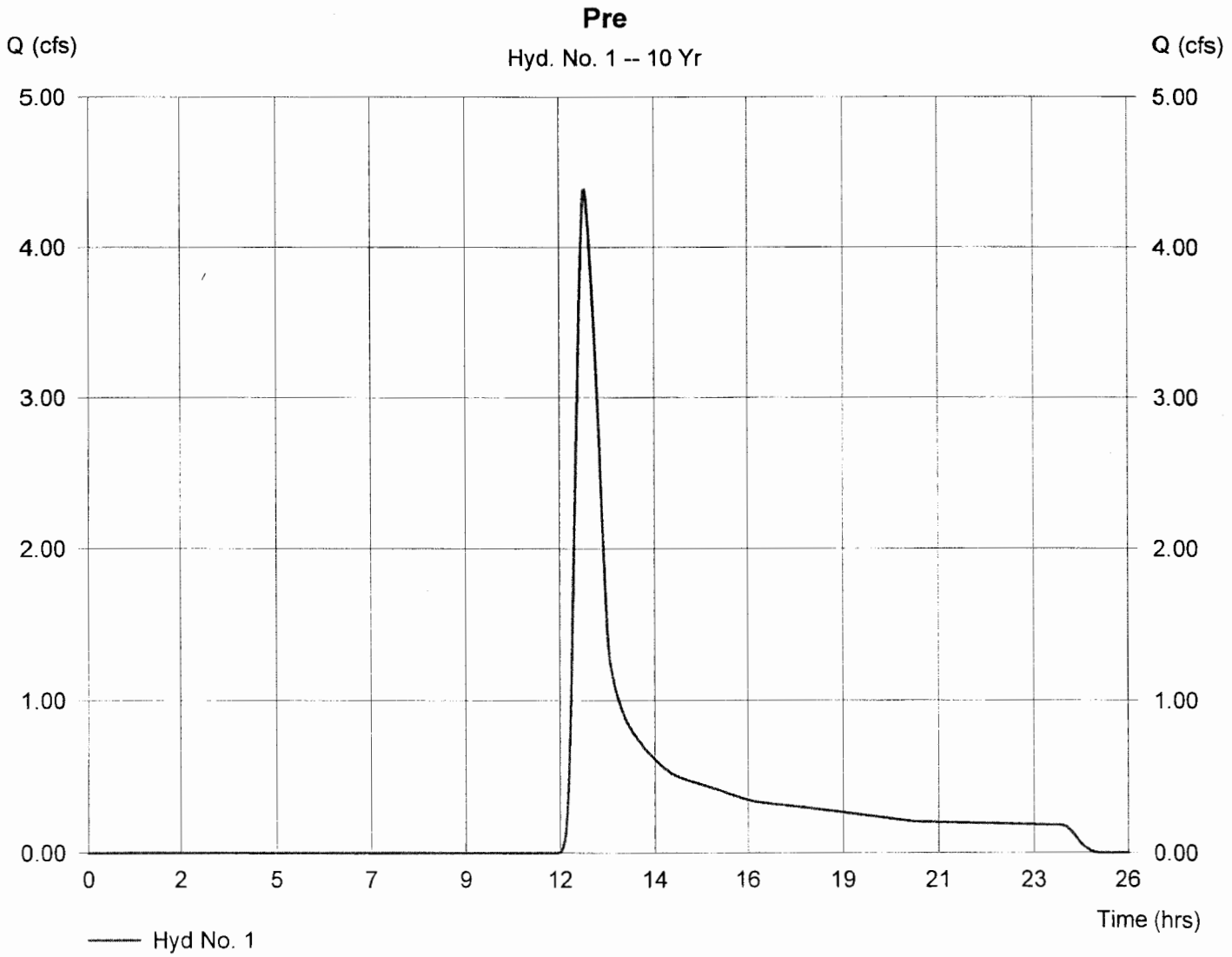
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 4.38 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 24,325 cuft



Hydrograph Plot

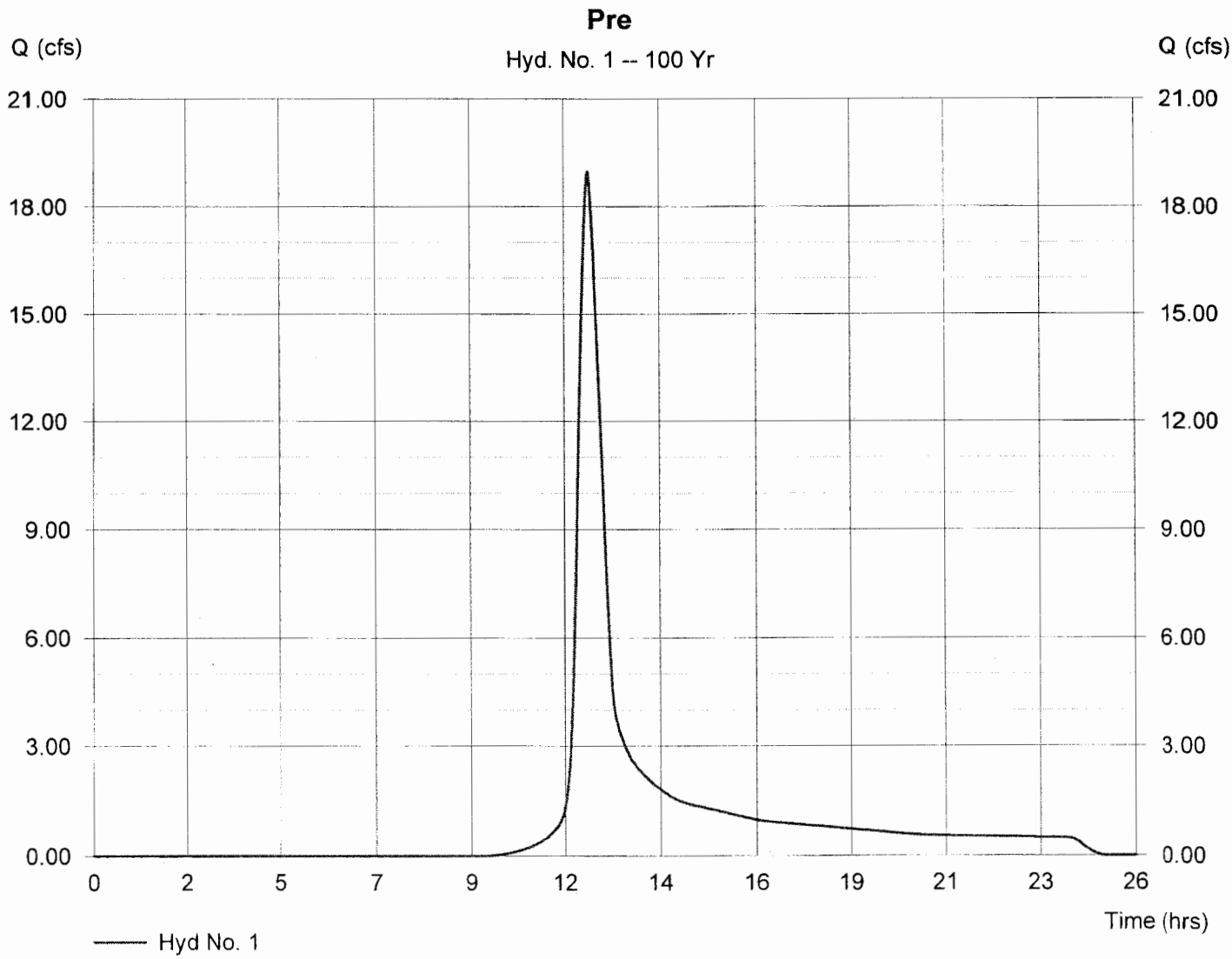
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 18.99 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 87,901 cuft



Hydrograph Plot

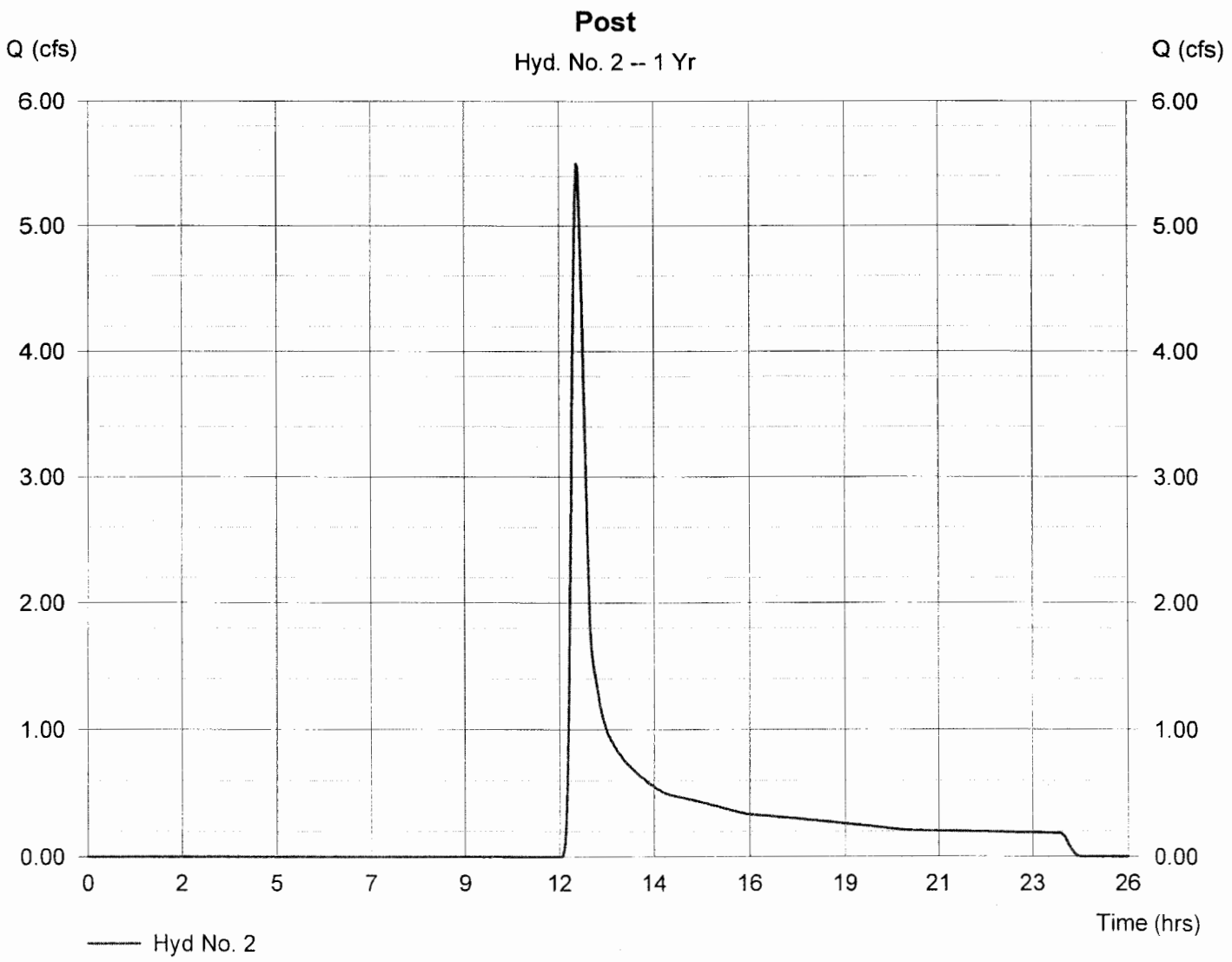
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 5.50 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 22,547 cuft



Hydrograph Plot

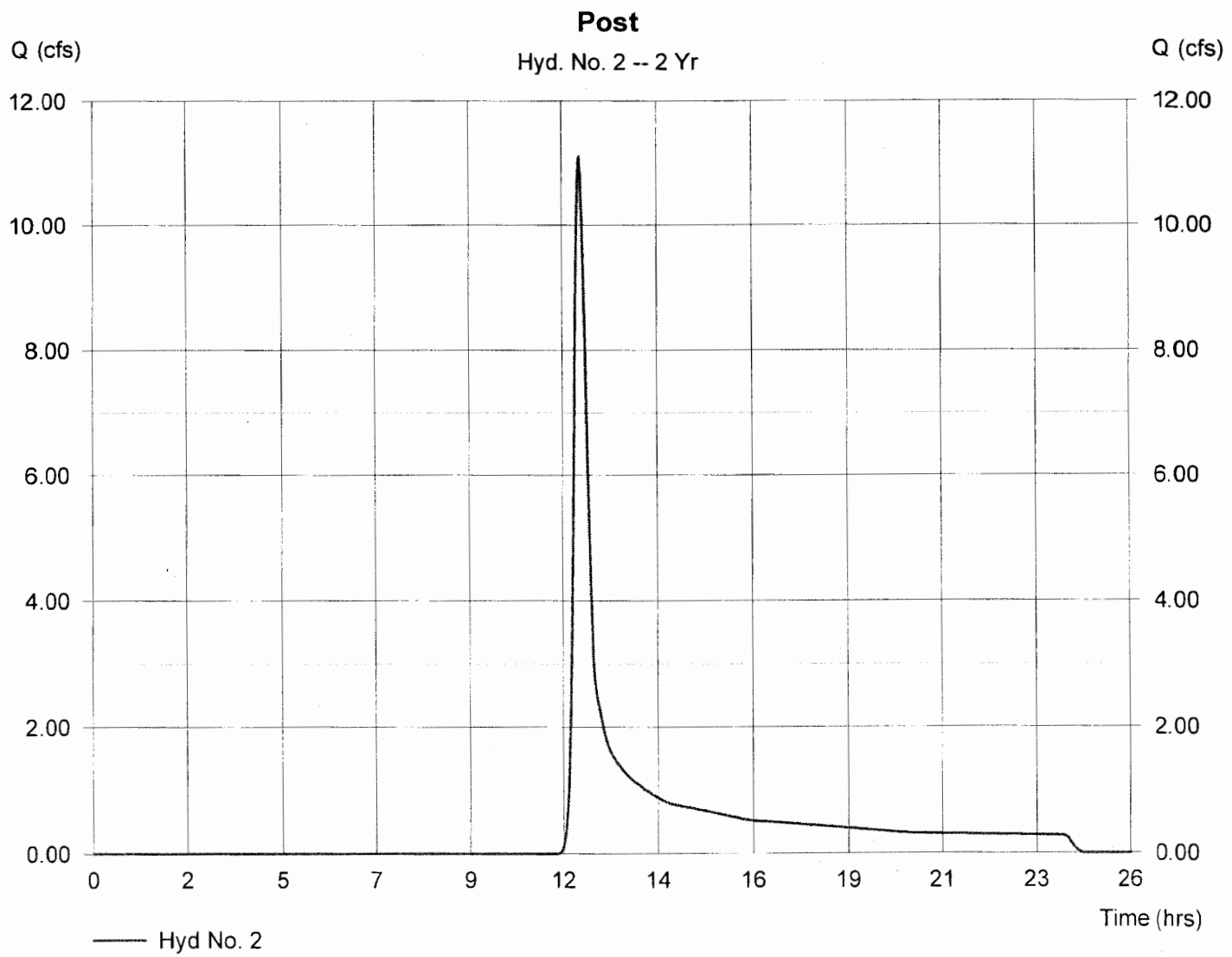
Hydraflow Hydrographs by Intelisolve — Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 11.11 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 39,220 cuft



Hydrograph Plot

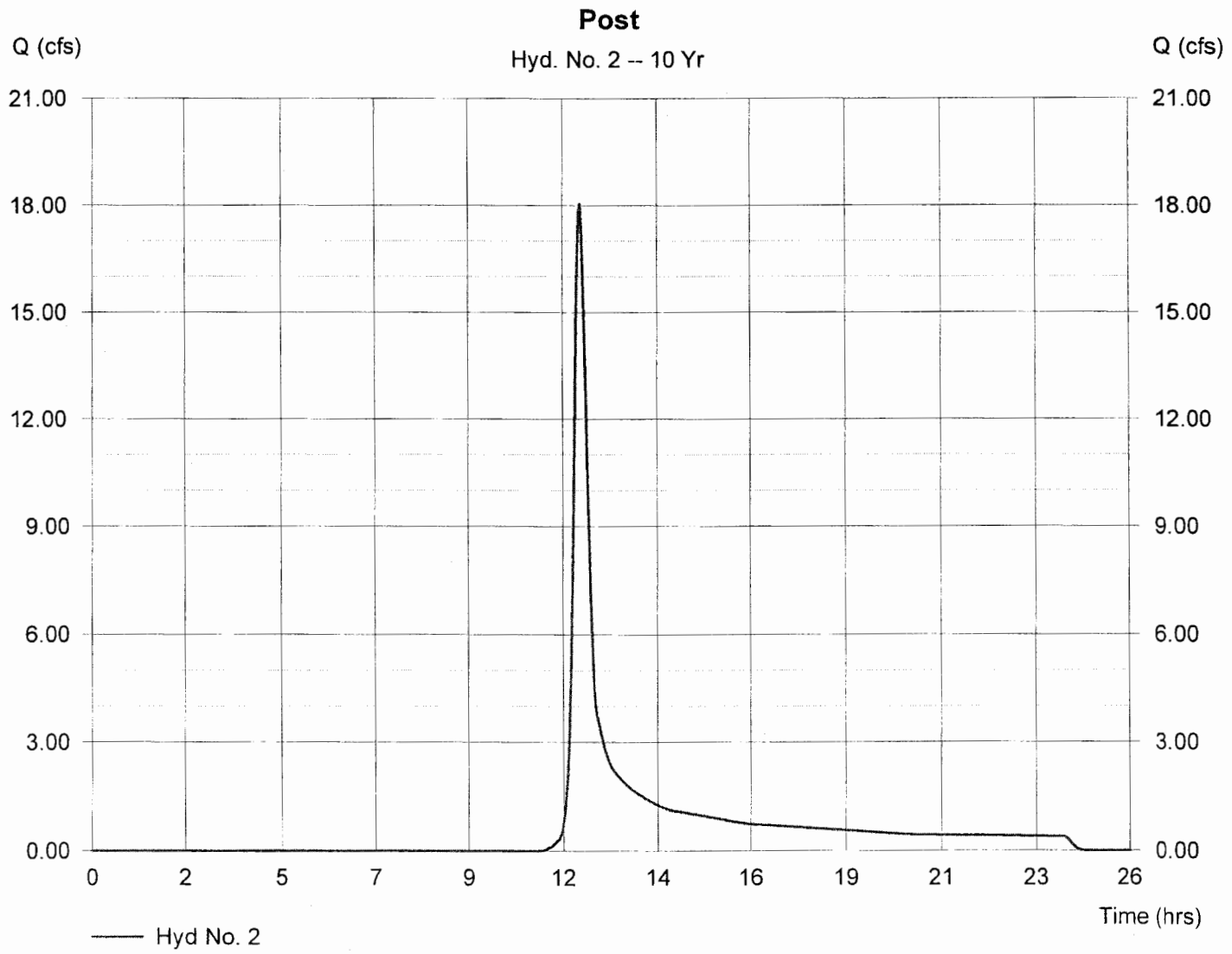
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 18.05 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 60,048 cuft



Hydrograph Plot

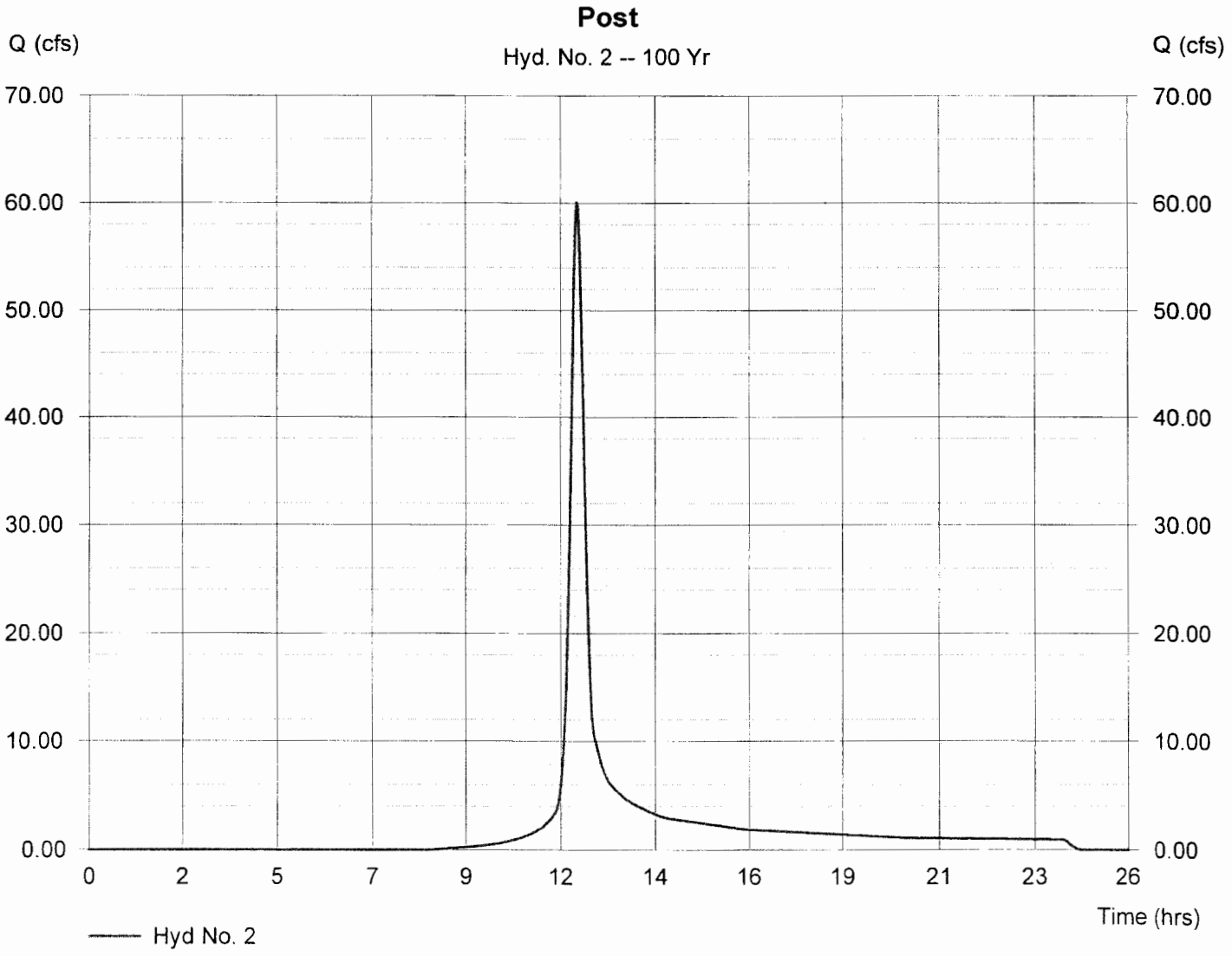
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 60.08 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 188,232 cuft



Hydrograph Plot

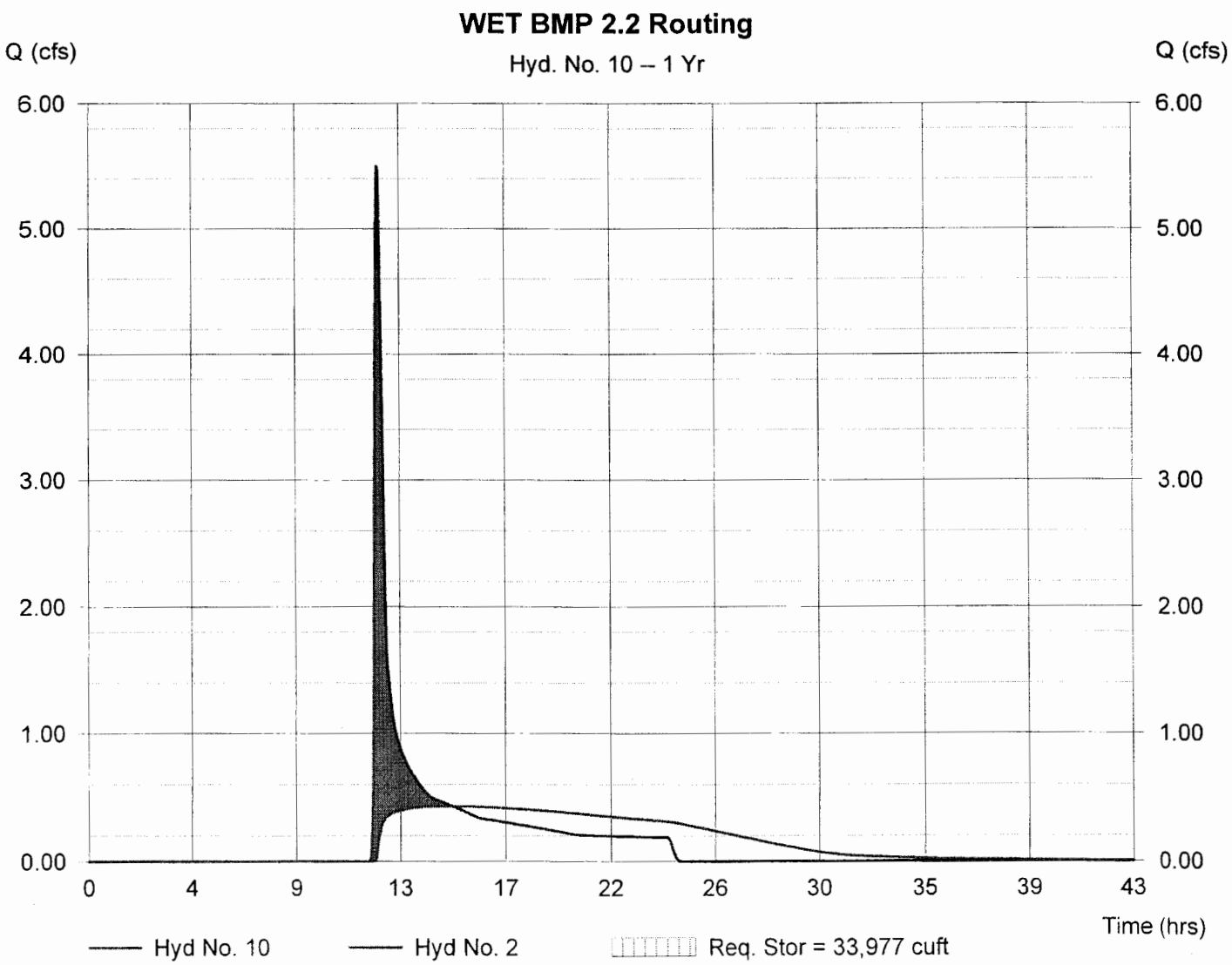
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.43 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 65.98 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 33,977 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 22,352 cuft



Hydrograph Plot

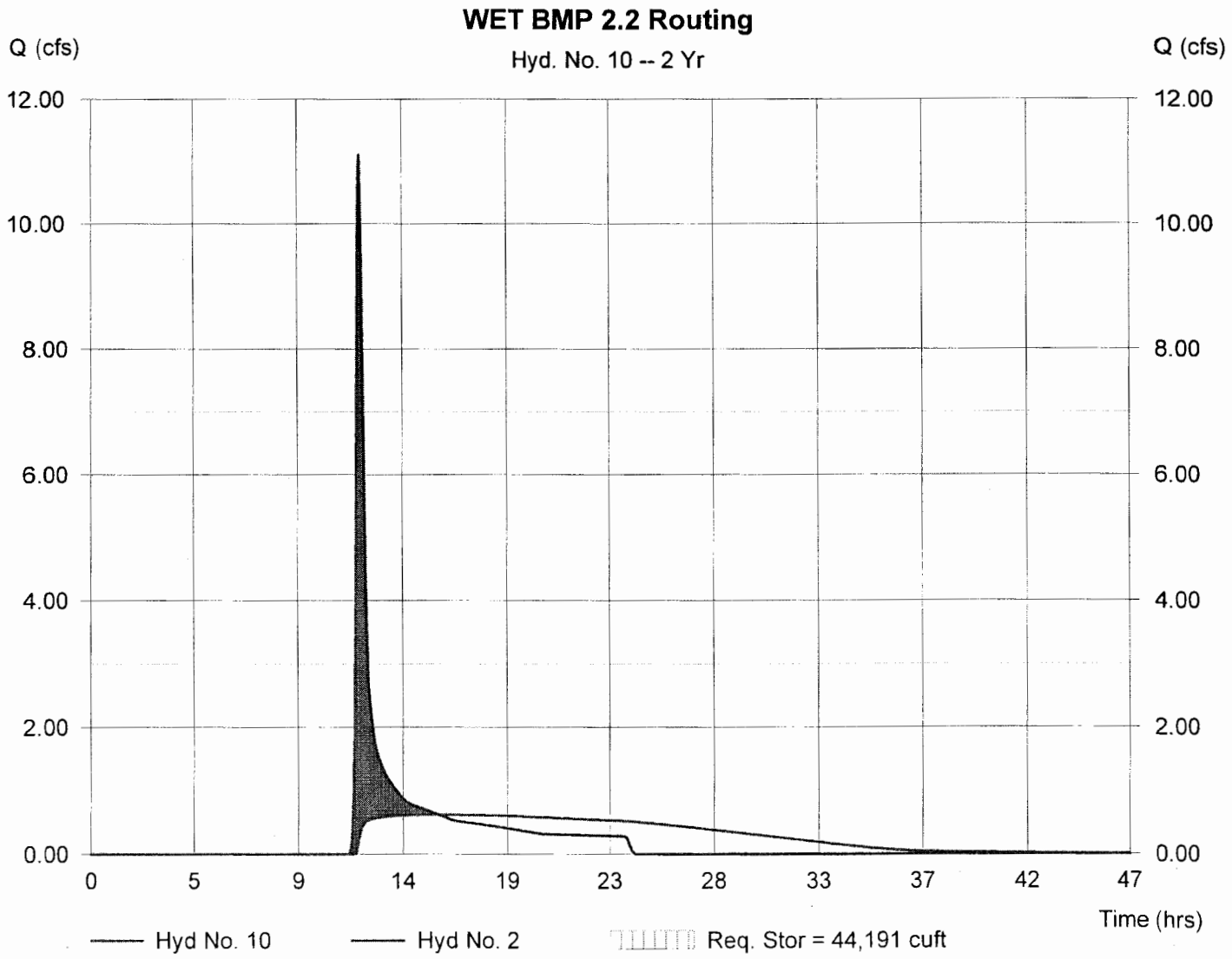
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.62 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 67.08 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 44,191 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 38,999 cuft



Hydrograph Plot

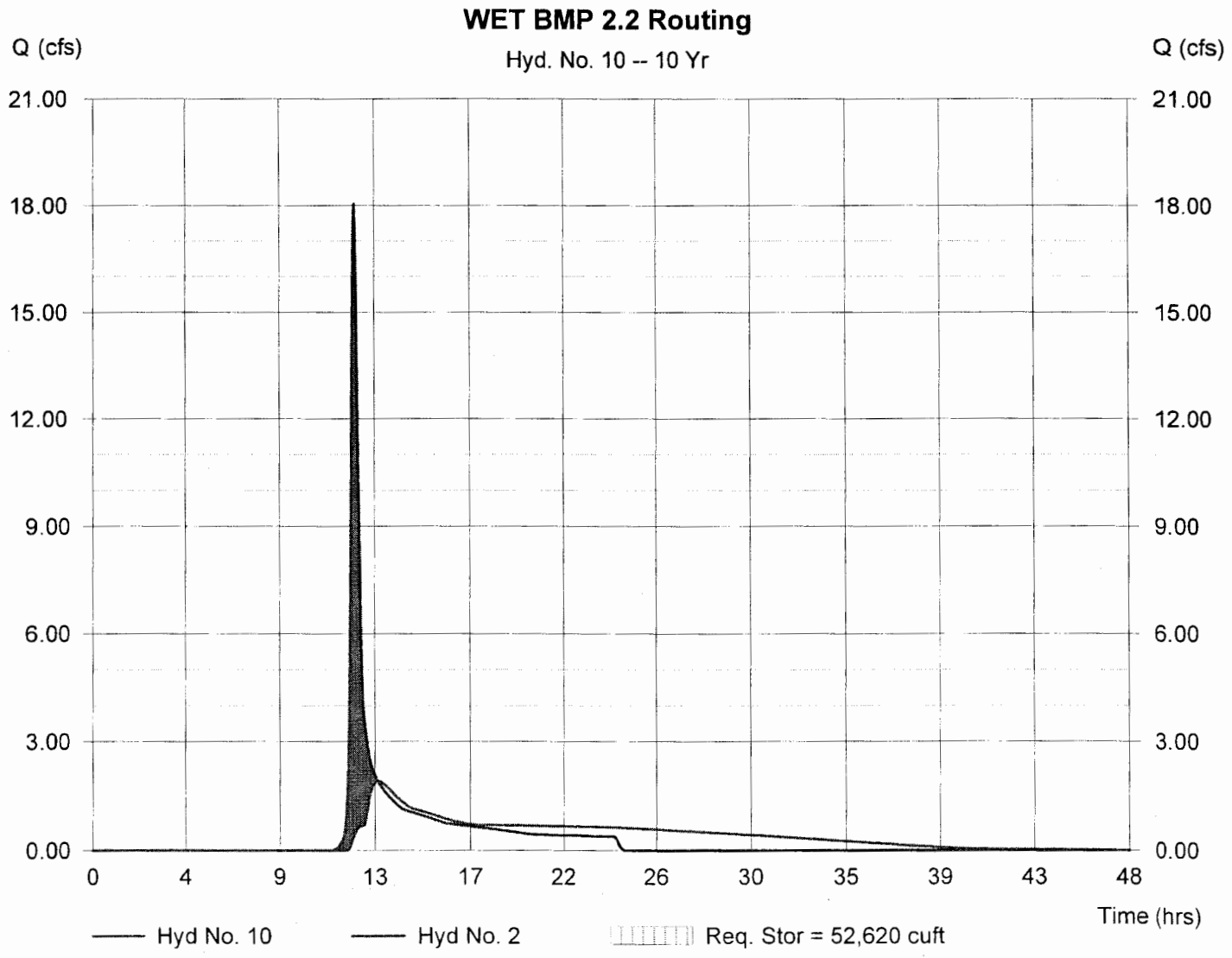
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10: 1 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 1.91 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 67.89 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 52,620 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 59,807 cuft



Hydrograph Plot

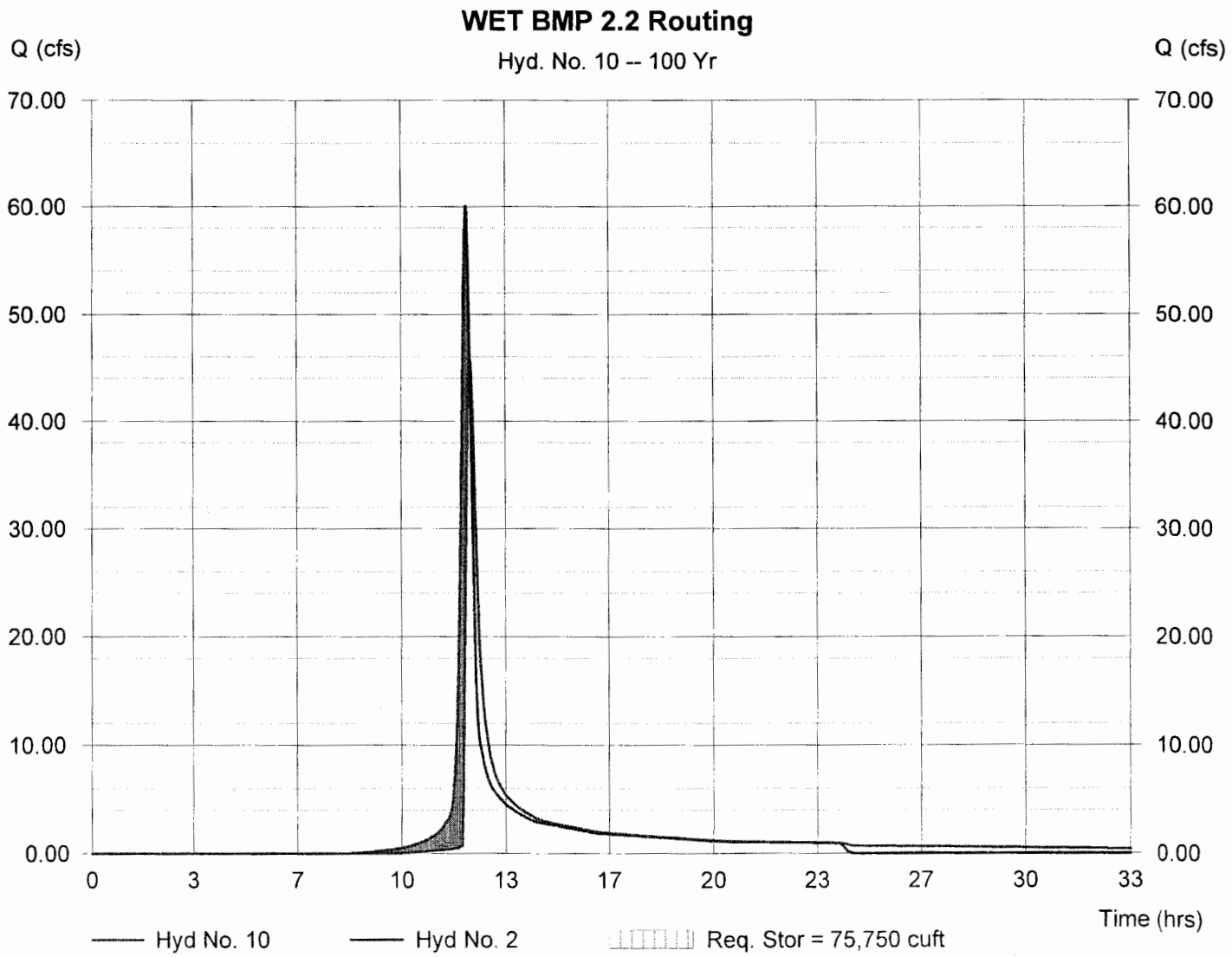
Hydraflow Hydrographs by Intelisolve | Thursday, Jun 15 2006, 10:1 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 45.96 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 69.80 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 75,750 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 187,978 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Monday, Oct 30 2006, 9:45 AM

Pond No. 10 - Wet Pond 2.2

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	58.00	469	0	0
1.00	59.00	1,363	916	916
2.00	60.00	2,304	1,834	2,750
3.00	61.00	3,215	2,760	5,509
4.00	62.00	4,143	3,679	9,188
5.00	63.00	5,126	4,635	13,823
6.00	64.00	6,165	5,646	19,468
7.00	65.00	7,225	6,695	26,163
8.00	66.00	8,650	7,938	34,101
9.00	67.00	9,798	9,224	43,325
10.00	68.00	10,999	10,399	53,723
11.00	69.00	12,277	11,638	65,361
12.00	70.00	13,672	12,975	78,336
13.00	71.00	15,165	14,419	92,754

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 58.25	64.76	0.00	0.00
Length (ft)	= 57.50	24.00	0.00	0.00
Slope (%)	= 0.73	4.20	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.13	10.00	0.00	0.00
Crest El. (ft)	= 67.70	69.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	0.00
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	58.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
1.00	916	59.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
2.00	2,750	60.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
3.00	5,509	61.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
4.00	9,188	62.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
5.00	13,823	63.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
6.00	19,468	64.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
7.00	26,163	65.00	0.12	0.11	---	---	0.00	0.00	---	---	---	0.11
8.00	34,101	66.00	0.44	0.44	---	---	0.00	0.00	---	---	---	0.44
9.00	43,325	67.00	0.62	0.60	---	---	0.00	0.00	---	---	---	0.60
10.00	53,723	68.00	3.03	0.74	---	---	2.26	0.00	---	---	---	3.00
11.00	65,361	69.00	21.20	0.82	---	---	20.39	0.00	---	---	---	21.20
12.00	78,336	70.00	27.73	0.26	---	---	27.47	26.00	---	---	---	53.73
13.00	92,754	71.00	29.29	0.16	---	---	29.12	73.54	---	---	---	102.82

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	0.84	2.28	-------	-------	4.38	-------	-------	18.99	Pre
2	SCS Runoff	-------	5.50	11.11	-------	-------	18.05	-------	-------	60.08	Post
10	Reservoir	2	0.43	0.62	-------	-------	1.91	-------	-------	45.96	WET BMP 2.2 Routing

Proj. file: Pond 2-2-As-built 6-14-06.gpw | Monday, Oct 30 2006, 9:44 AM

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.84	2	742	7,540	----	------	------	Pre
2	SCS Runoff	5.50	2	726	22,547	----	------	------	Post
10	Reservoir	0.43	2	908	22,352	2	65.98	33,977	WET BMP 2.2 Routing

Pond 2-2-As-built 6-14-06.gpw | Return Period: 1 Year | Monday, Oct 30 2006, 9:44 AM

Hydraflow Hydrographs by Intelisolve

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.28	2	738	14,774	----	------	------	Pre
2	SCS Runoff	11.11	2	726	39,220	----	------	------	Post
10	Reservoir	0.62	2	934	38,999	2	67.08	44,191	WET BMP 2.2 Routing

Pond 2-2-As-built 6-14-06.gpw	Return Period: 2 Year	Monday, Oct 30 2006, 9:44 AM

Hydraflow Hydrographs by Intelisolve

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	4.38	2	738	24,325	----	------	------	Pre
2	SCS Runoff	18.05	2	726	60,048	----	------	------	Post
10	Reservoir	1.91	2	788	59,807	2	67.89	52,620	WET BMP 2.2 Routing

Pond 2-2-As-built 6-14-06.gpw | Return Period: 10 Year | Monday, Oct 30 2006, 9:44 AM

Hydraflow Hydrographs by Intelisolve

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	18.99	2	736	87,901	----	------	------	Pre
2	SCS Runoff	60.08	2	724	188,232	----	------	------	Post
10	Reservoir	45.96	2	732	187,978	2	69.80	75,750	WET BMP 2.2 Routing

Pond 2-2-As-built 6-14-06.gpw | Return Period: 100 Year | Monday, Oct 30 2006, 9:44 AM

Hydraflow Hydrographs by Intelisolve

Hydrograph Plot

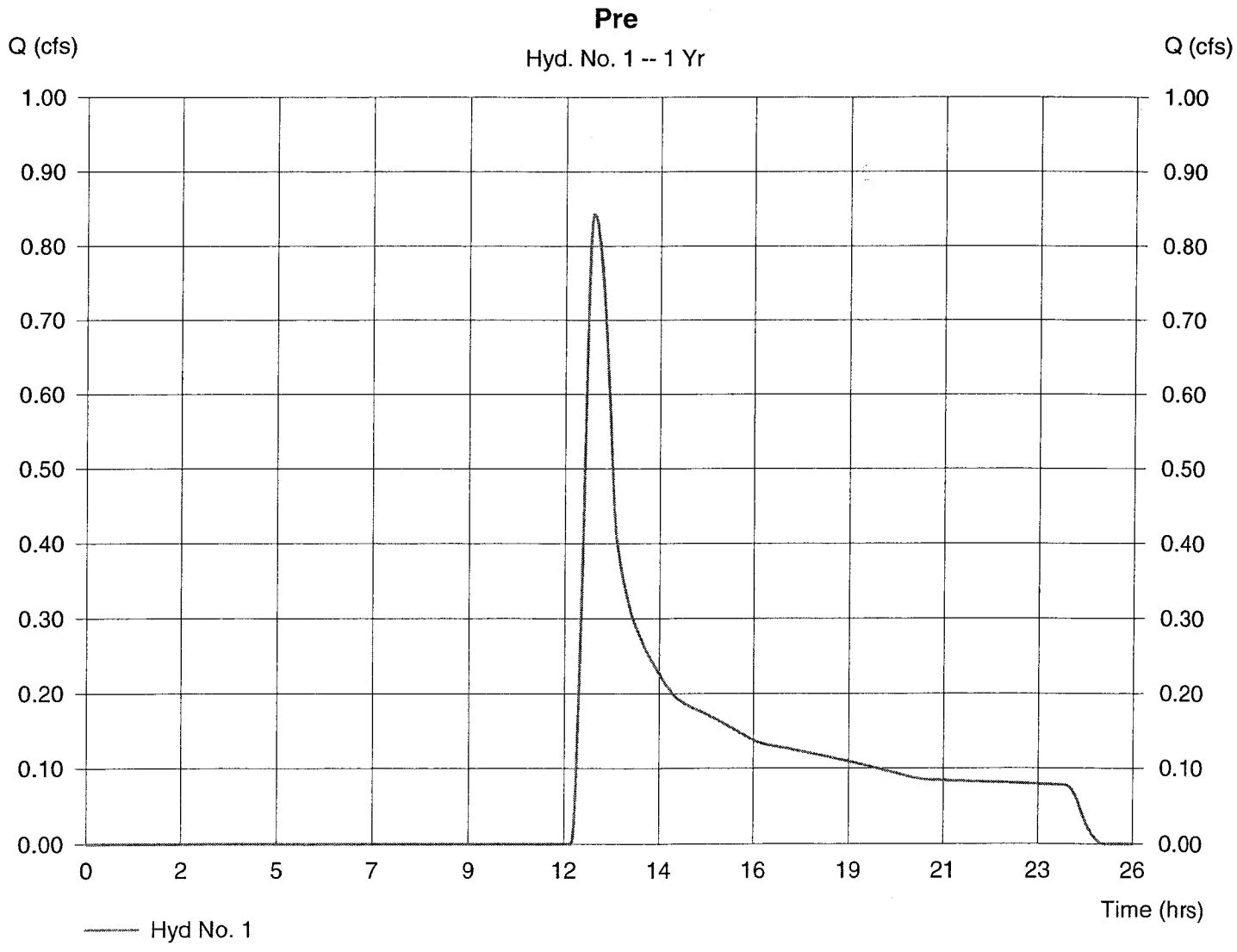
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:44 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 0.84 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7,540 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

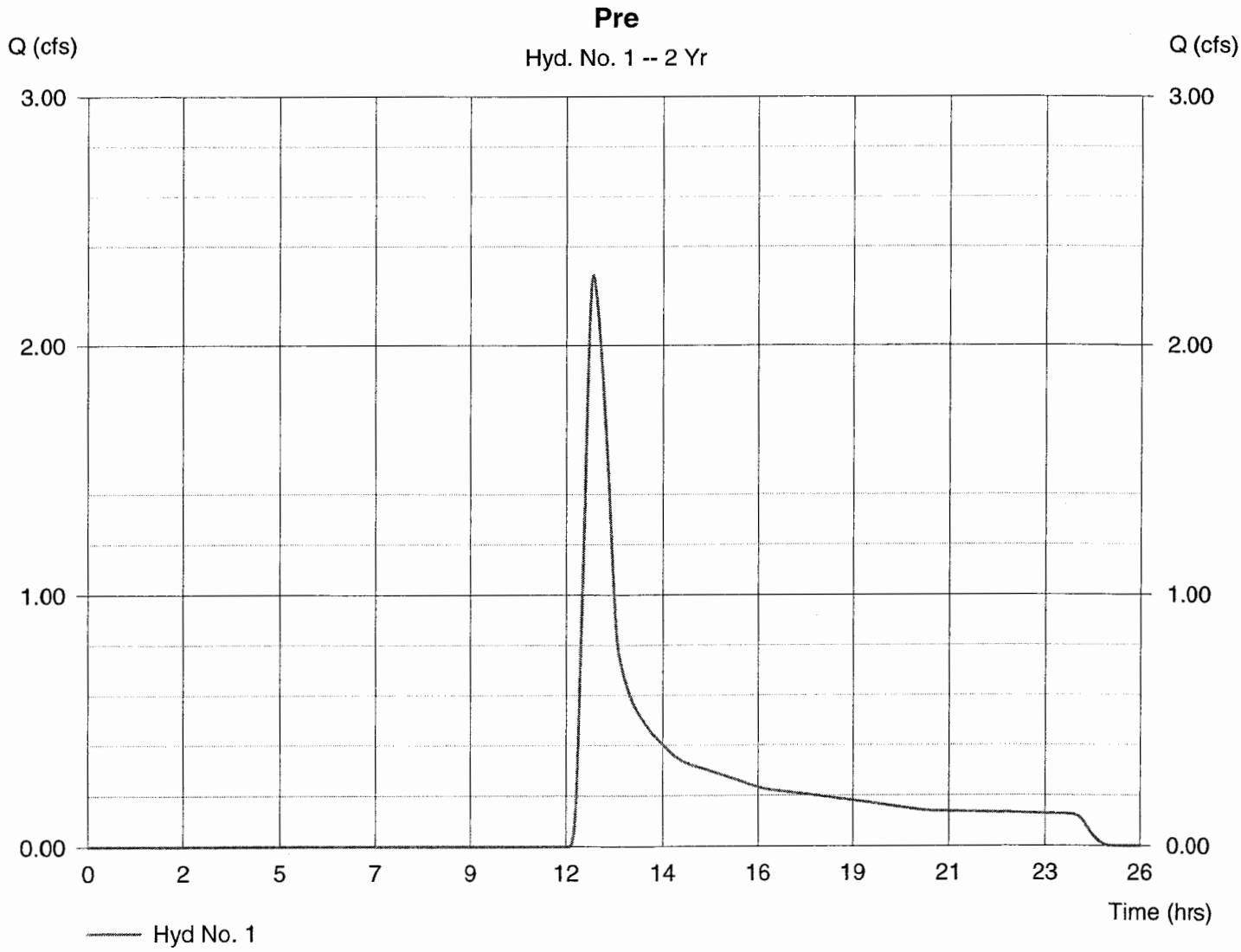
Monday, Oct 30 2006, 9:44 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 2.28 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 14,774 cuft



Hydrograph Plot

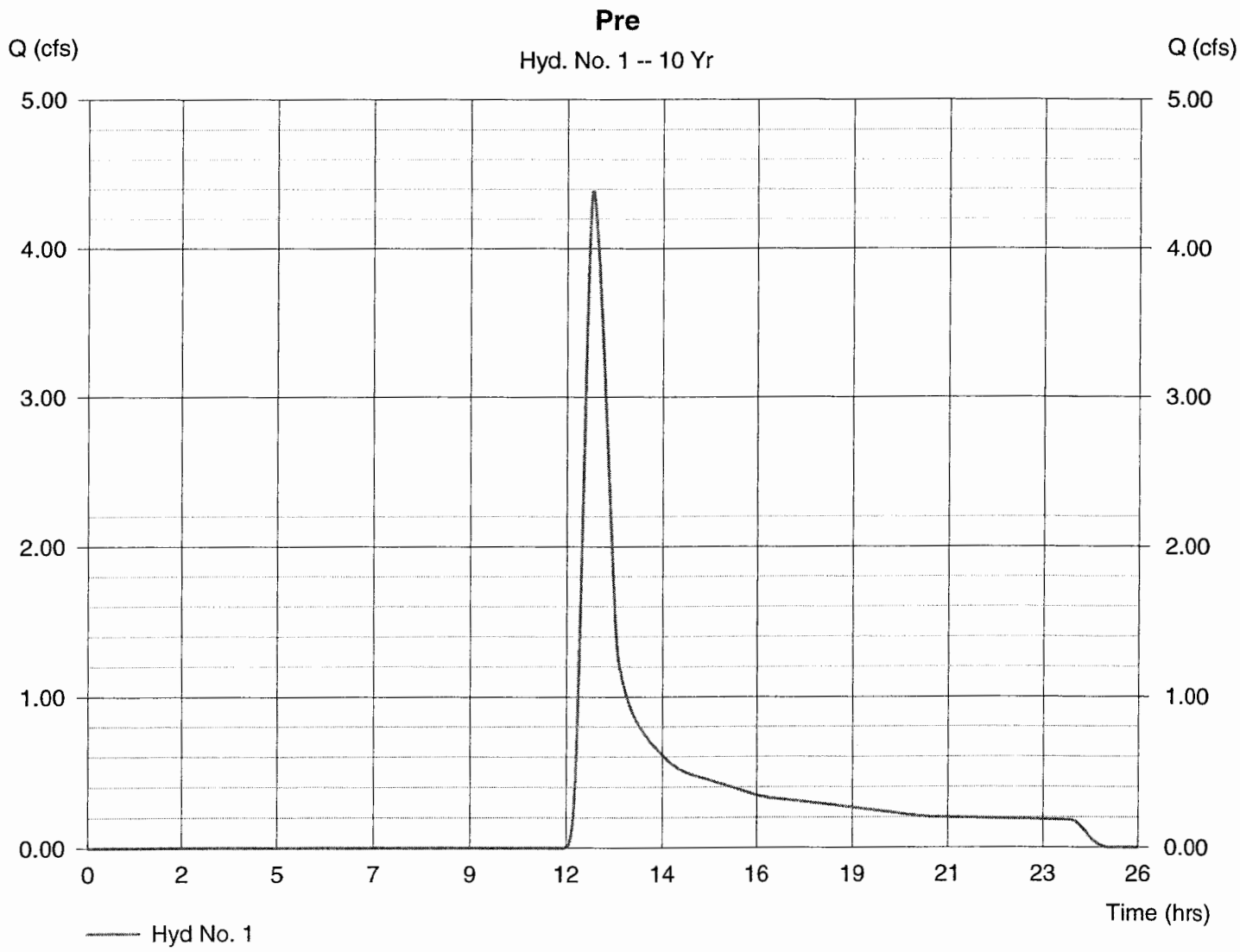
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:44 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 4.38 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 24,325 cuft



Hydrograph Plot

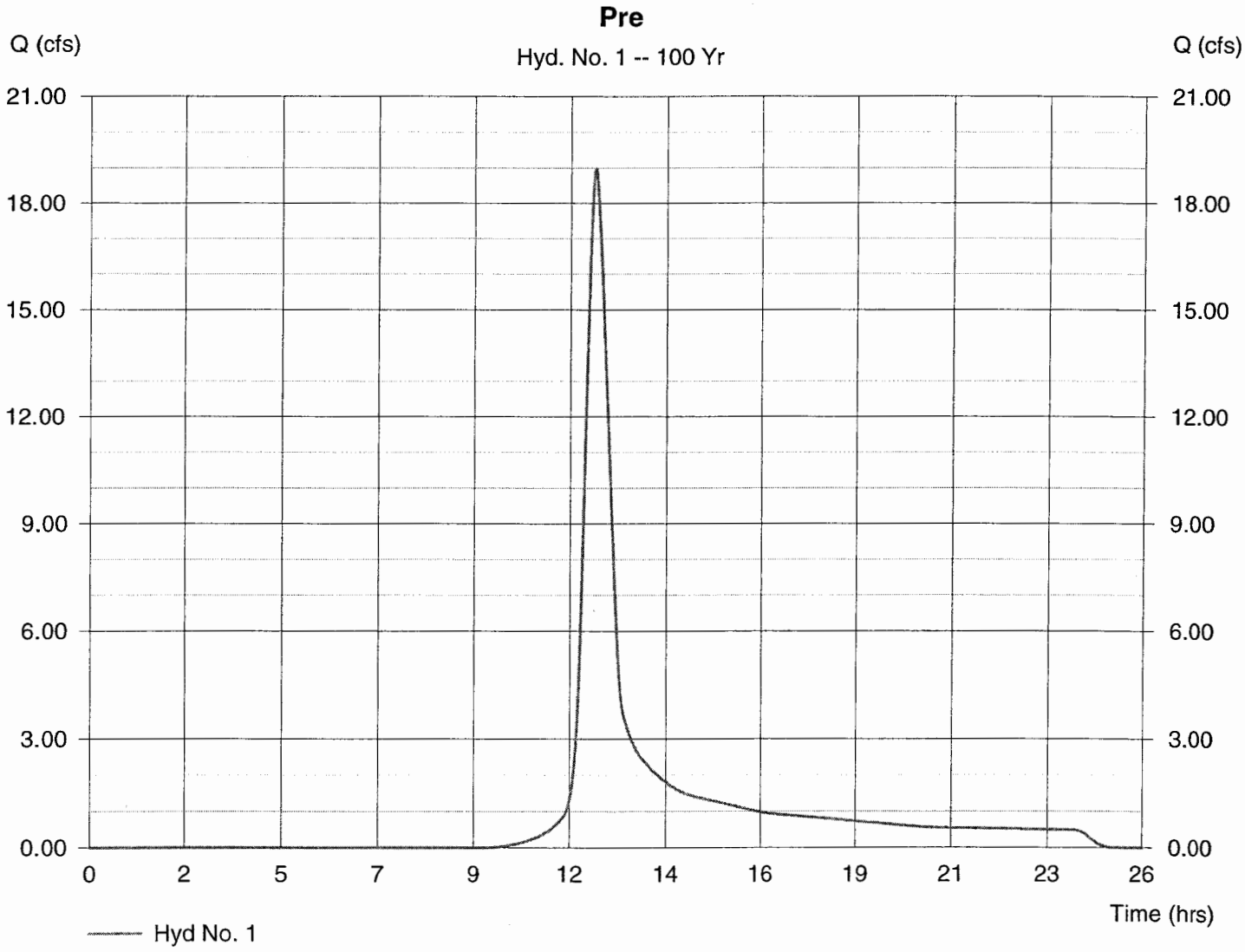
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:44 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 18.99 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 7.19 ac	Curve number	= 61
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 87,901 cuft



Hydrograph Plot

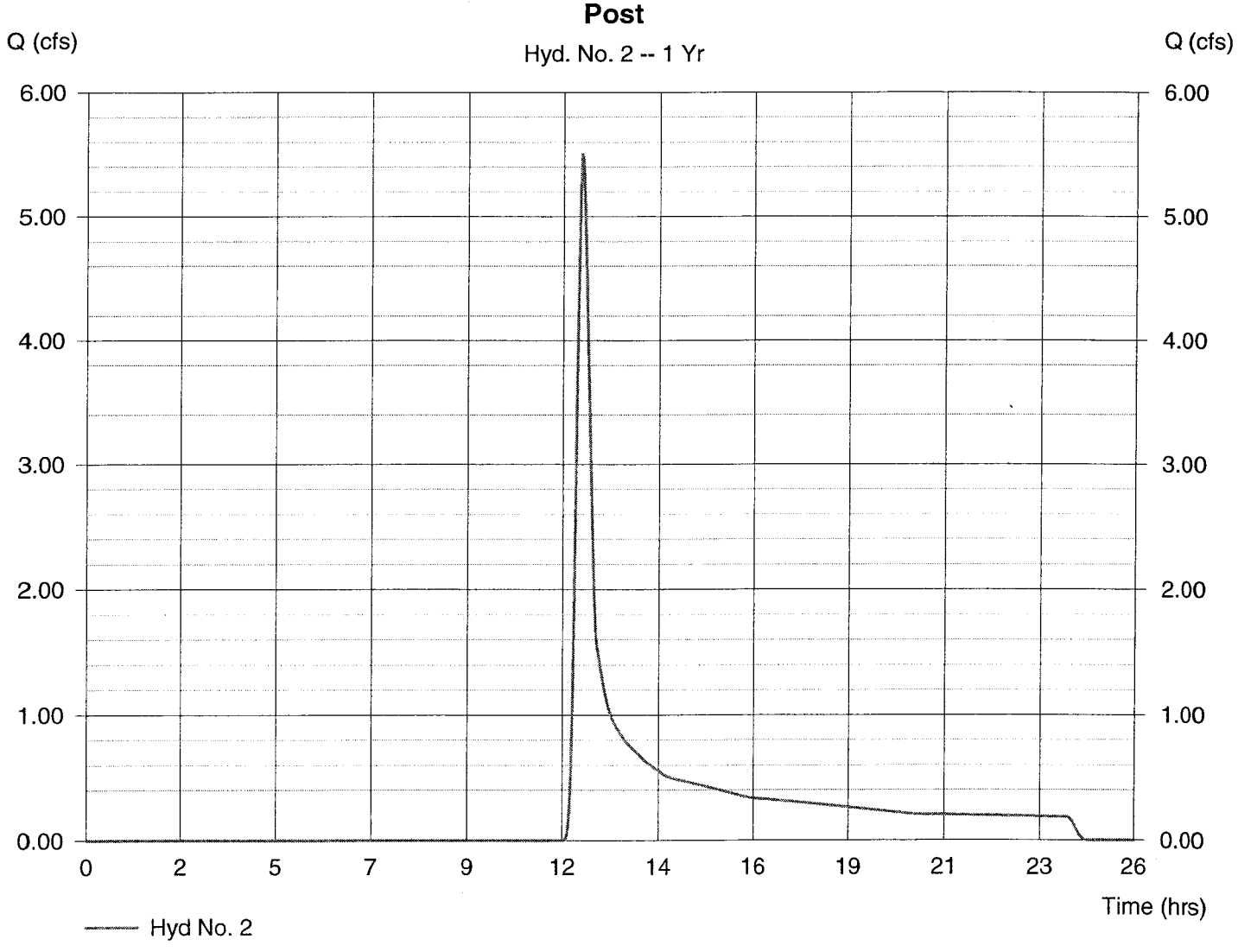
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:44 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 5.50 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 22,547 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

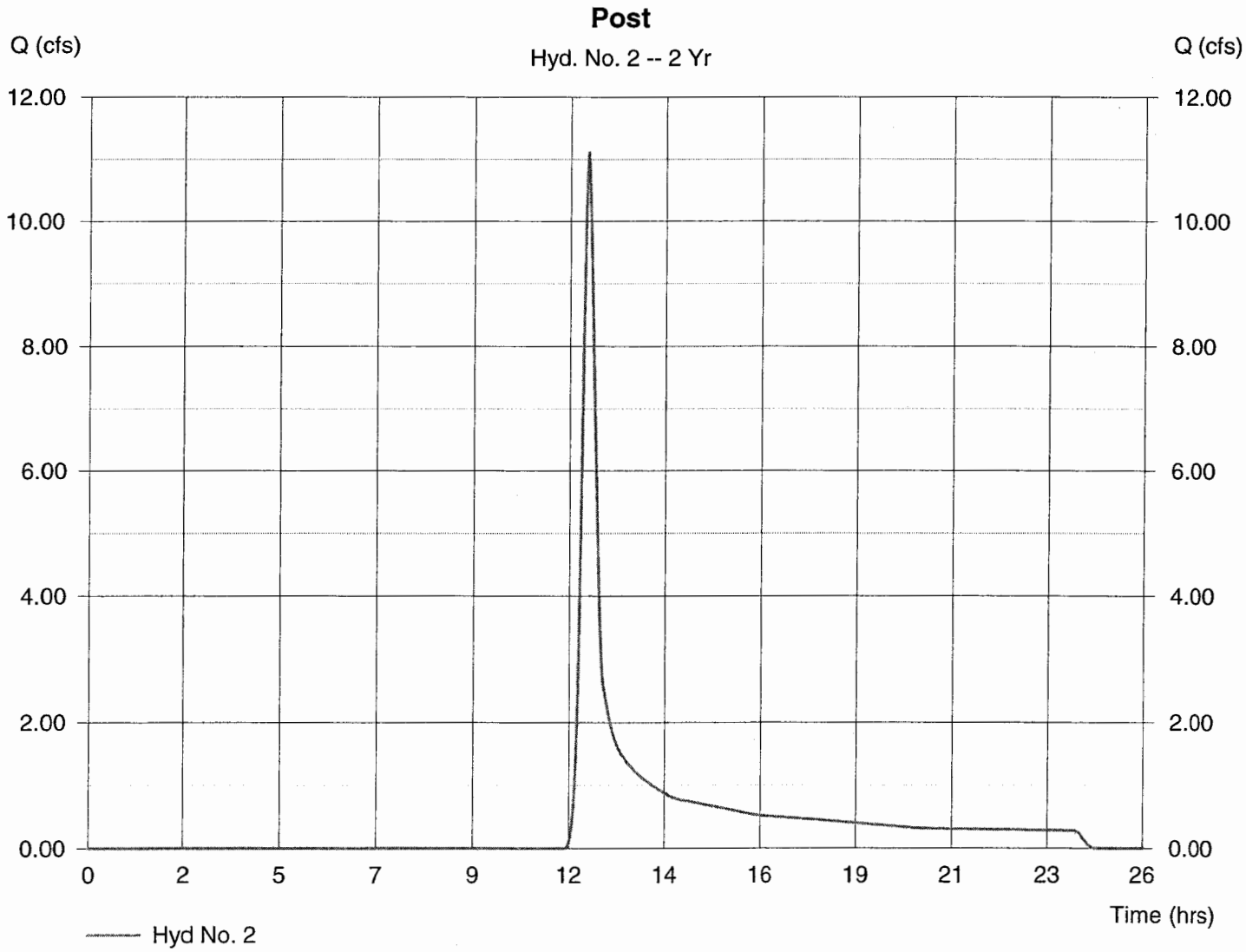
Monday, Oct 30 2006, 9:45 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 11.11 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 39,220 cuft



Hydrograph Plot

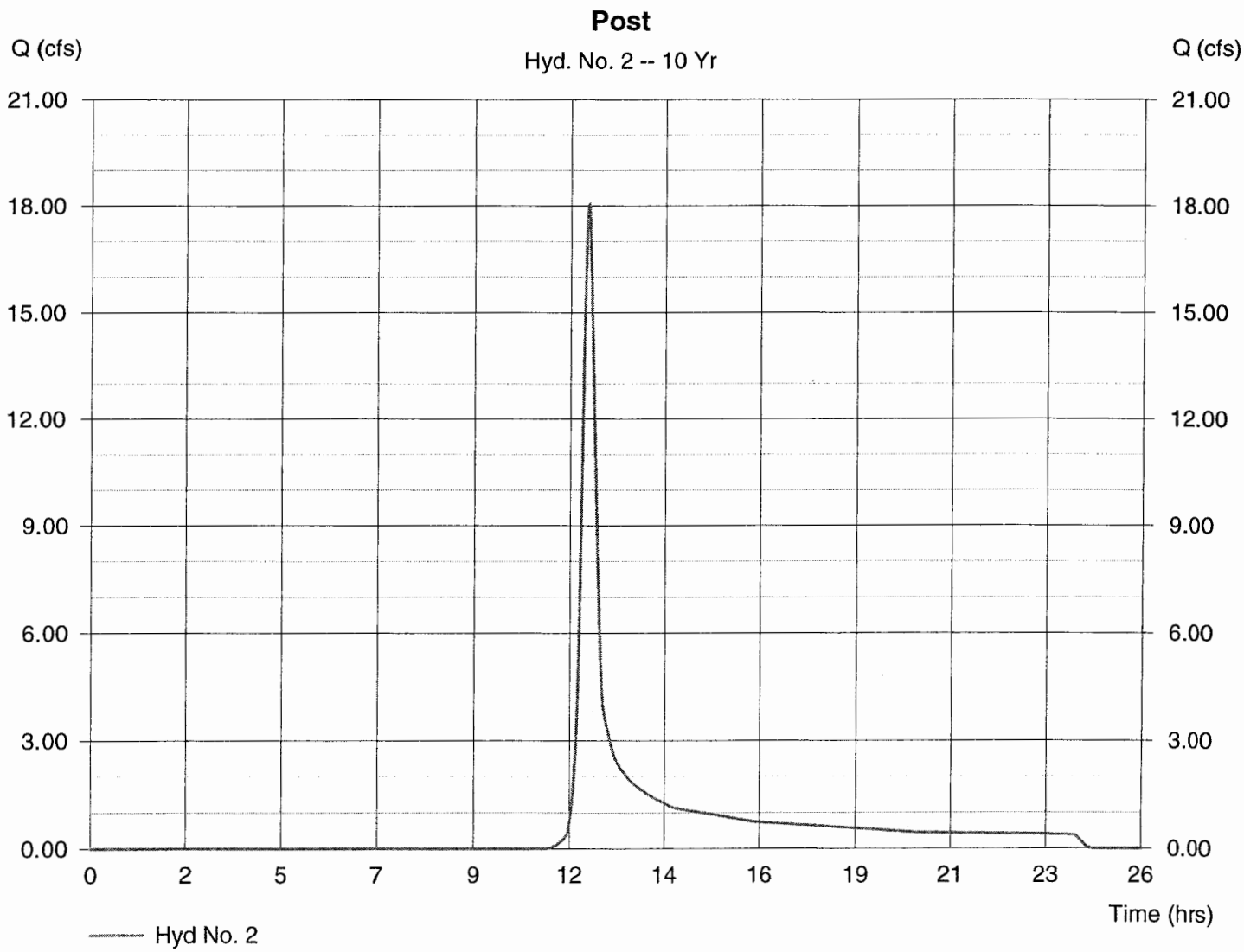
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:45 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 18.05 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 60,048 cuft



Hydrograph Plot

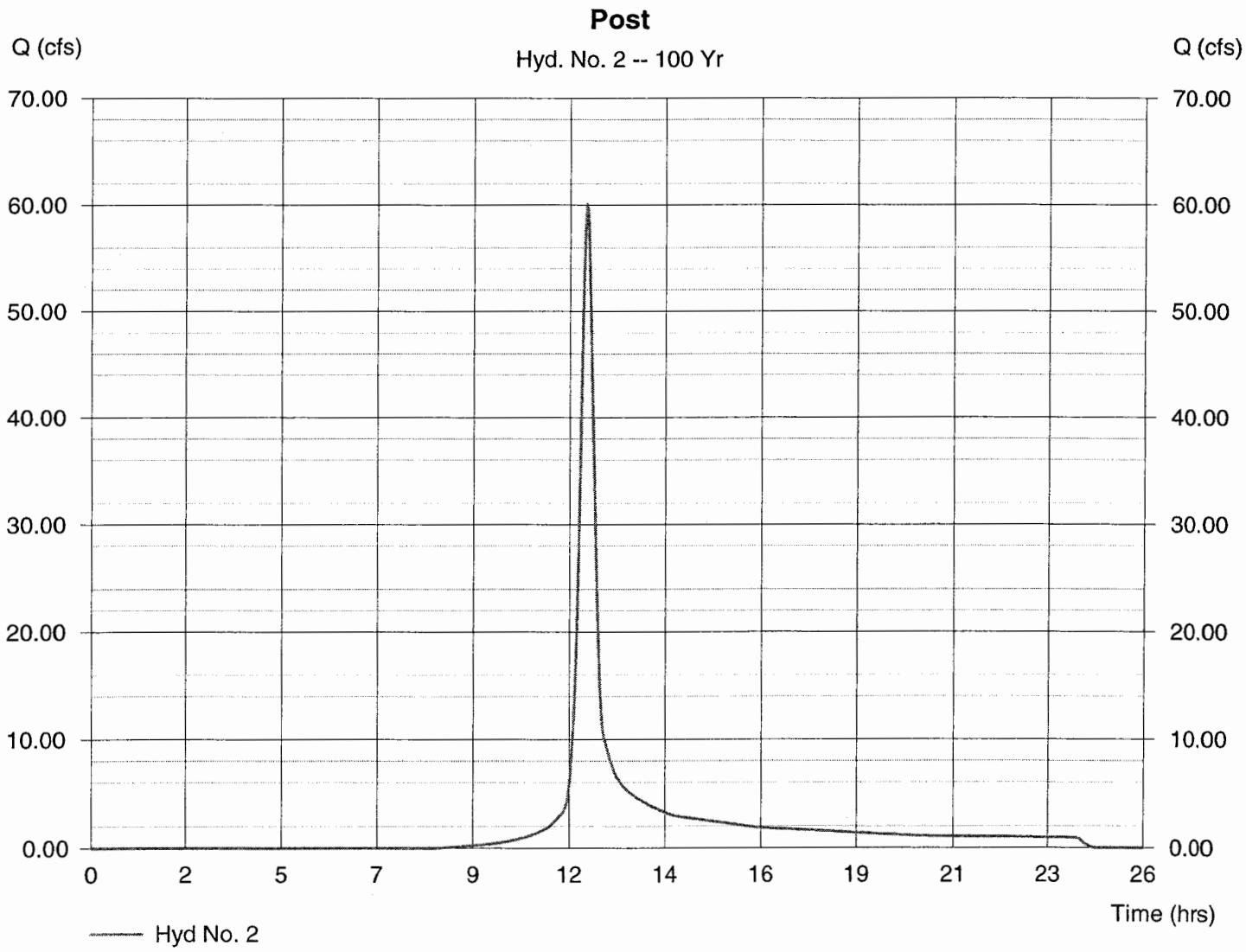
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:45 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 60.08 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 12.71 ac	Curve number	= 67
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 188,232 cuft



Hydrograph Plot

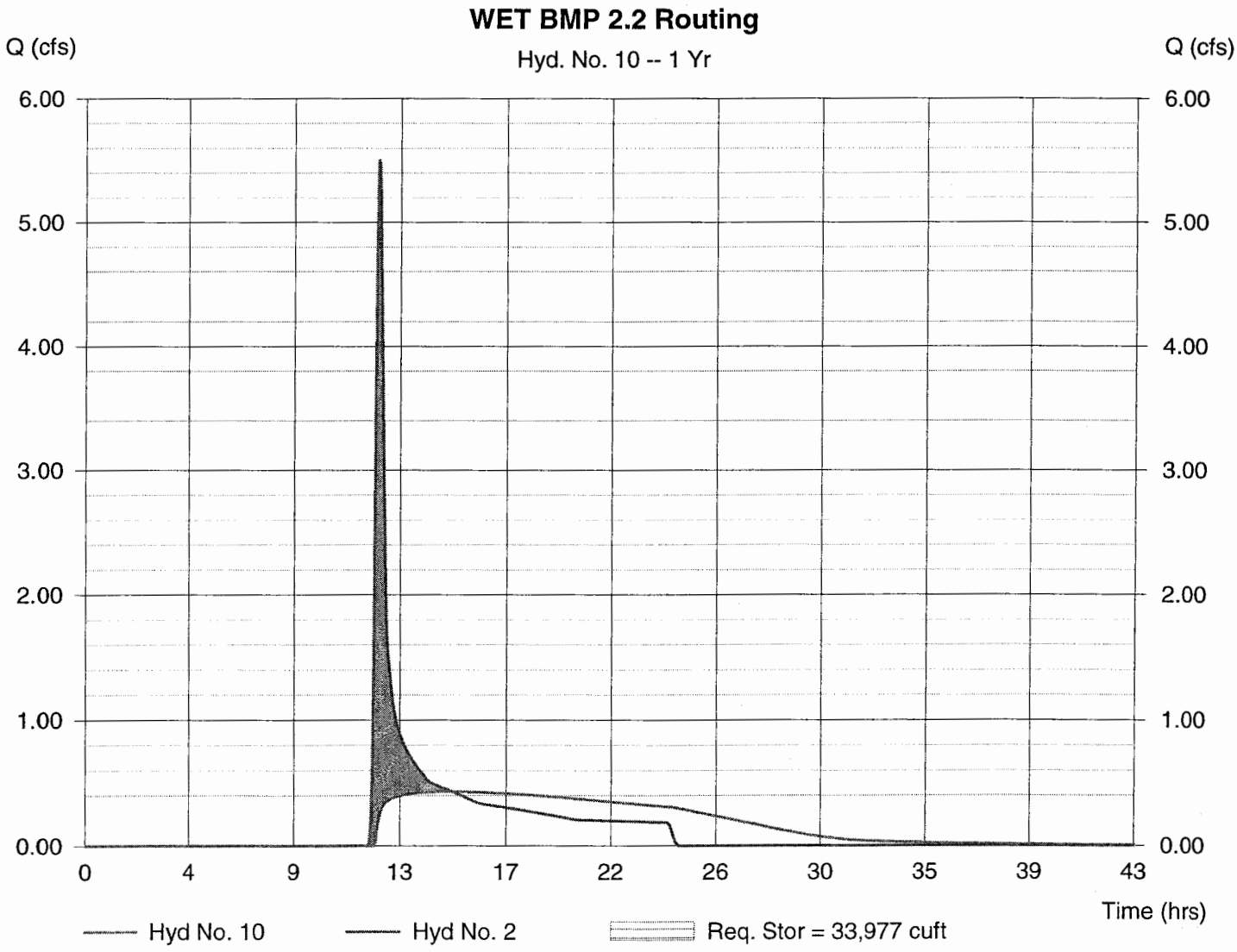
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:45 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.43 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 65.98 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 33,977 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 22,352 cuft



Hydrograph Plot

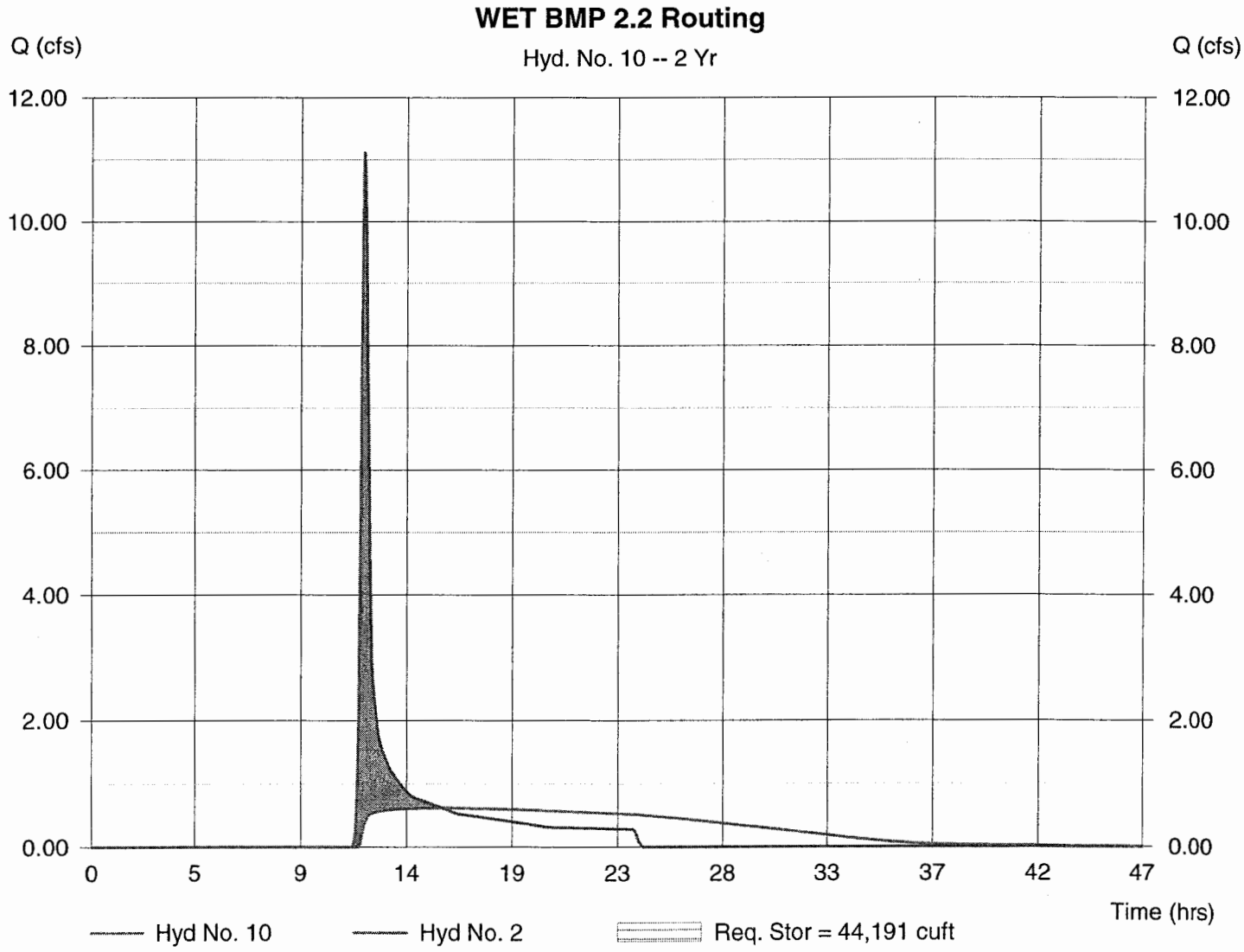
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:45 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.62 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 67.08 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 44,191 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 38,999 cuft



Hydrograph Plot

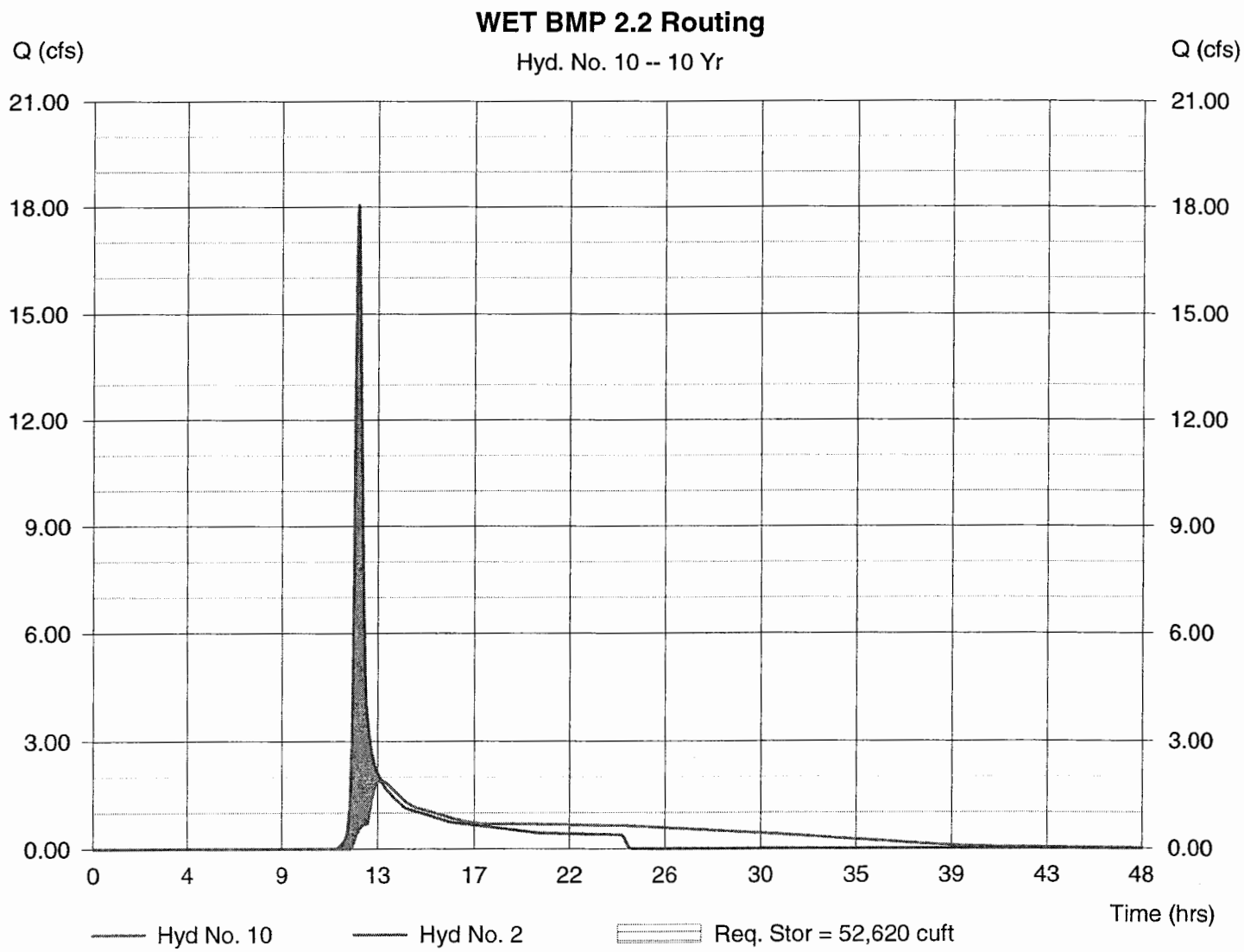
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:45 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 1.91 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 67.89 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 52,620 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 59,807 cuft



Hydrograph Plot

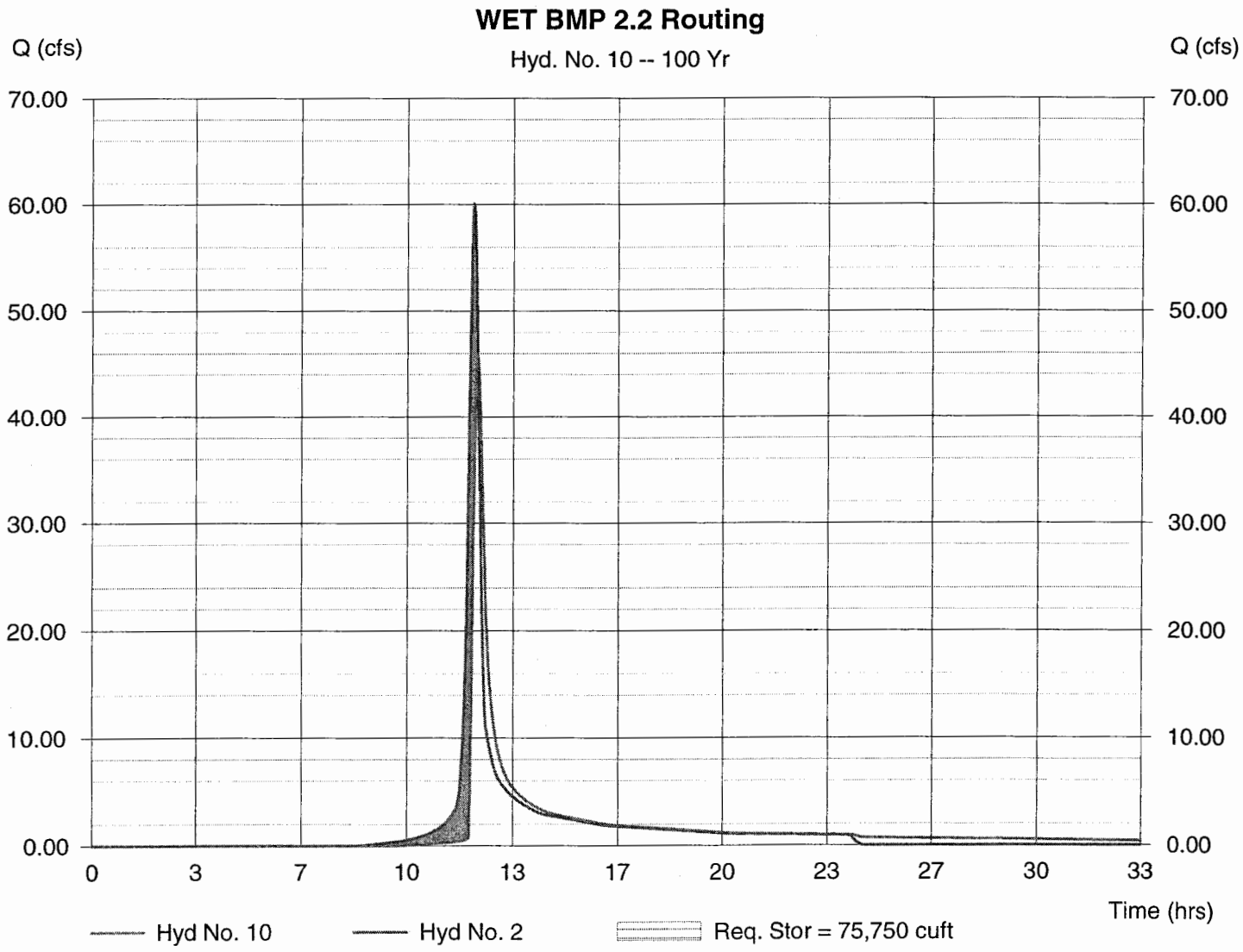
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:45 AM

Hyd. No. 10

WET BMP 2.2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 45.96 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 69.80 ft
Reservoir name	= Wet Pond 2.2	Max. Storage	= 75,750 cuft

Storage Indication method used. Wet pond routing start elevation = 64.70 ft. | Hydrograph Volume = 187,978 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Monday, Oct 30 2006, 5:47 PM

Pond No. 1 - Wet Pond 2.1

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	53.00	286	0	0
1.00	54.00	3,204	1,745	1,745
2.00	55.00	3,825	3,515	5,260
3.00	56.00	4,471	4,148	9,408
4.00	57.00	5,130	4,801	14,208
5.00	58.00	5,811	5,471	19,679
6.00	59.00	6,528	6,170	25,848
7.00	60.00	7,418	6,973	32,821
8.00	61.00	8,429	7,924	40,745
9.00	62.00	9,516	8,973	49,717
10.00	63.00	10,681	10,099	59,816
11.00	64.00	11,911	11,296	71,112
12.00	65.00	16,897	14,404	85,516
13.00	66.00	23,584	20,241	105,756
14.00	67.00	25,824	24,704	130,460
15.00	68.00	28,578	27,201	157,661

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	3.00	0.00	0.00
Span (in)	= 18.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 45.65	58.00	0.00	0.00
Length (ft)	= 82.00	28.00	0.00	0.00
Slope (%)	= 1.13	1.00	0.00	0.00
N-Value	= .013 flat	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.13	10.00	0.00	0.00
Crest El. (ft)	= 63.20	65.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	0.00
Weir Type	= Rect	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	53.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
1.00	1,745	54.00	21.38	0.00	---	---	0.00	0.00	---	---	---	0.00
2.00	5,260	55.00	21.38	0.00	---	---	0.00	0.00	---	---	---	0.00
3.00	9,408	56.00	21.38	0.00	---	---	0.00	0.00	---	---	---	0.00
4.00	14,208	57.00	21.38	0.00	---	---	0.00	0.00	---	---	---	0.00
5.00	19,679	58.00	21.38	0.00	---	---	0.00	0.00	---	---	---	0.00
6.00	25,848	59.00	21.38	0.22	---	---	0.00	0.00	---	---	---	0.22
7.00	32,821	60.00	21.38	0.32	---	---	0.00	0.00	---	---	---	0.32
8.00	40,745	61.00	21.38	0.40	---	---	0.00	0.00	---	---	---	0.40
9.00	49,717	62.00	21.38	0.47	---	---	0.00	0.00	---	---	---	0.47
10.00	59,816	63.00	21.38	0.52	---	---	0.00	0.00	---	---	---	0.52
11.00	71,112	64.00	21.38	0.57	---	---	9.84	0.00	---	---	---	10.41
12.00	85,516	65.00	33.55	0.34	---	---	33.21	0.00	---	---	---	33.55
13.00	105,756	66.00	36.43	0.07	---	---	20.61	15.73	---	---	---	36.42
14.00	130,460	67.00	37.41	0.04	---	---	17.10	20.23	---	---	---	37.36
15.00	157,661	68.00	38.31	0.02	---	---	15.71	22.52	---	---	---	38.26

RECEIVED
ENVIRONMENTAL DIVISION

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	0.35	1.54	-------	-------	3.86	10.83	-------	24.00	Pre
2	SCS Runoff	-------	8.89	17.26	-------	-------	27.53	51.09	-------	89.00	Post
5	Reservoir	2	0.39	0.52	-------	-------	2.72	23.96	-------	36.87	BMP 2.1 Routing

Proj. file: Pond 2-1 -Redesign As-built 10-30-06.gpw | Monday, Oct 30 2006, 5:46 PM

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.35	2	760	6,052	----	------	------	Pre
2	SCS Runoff	8.89	2	726	34,964	----	------	------	Post
5	Reservoir	0.39	2	1126	34,933	2	60.86	39,646	BMP 2.1 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.54	2	742	14,467	----	------	------	Pre
2	SCS Runoff	17.26	2	726	59,871	----	------	------	Post
5	Reservoir	0.52	2	1182	59,841	2	62.88	58,653	BMP 2.1 Routing

Pond 2-1 -Redesign As-built 10-30-06.gpw Return Period: 2 Year Monday, Oct 30 2006, 5:46 PM

Hydraflow Hydrographs by Intelisolve

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.86	2	738	26,470	----	------	------	Pre
2	SCS Runoff	27.53	2	726	90,744	----	------	------	Post
5	Reservoir	2.72	2	792	90,713	2	63.49	65,367	BMP 2.1 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	10.83	2	736	58,057	----	------	------	Pre
2	SCS Runoff	51.09	2	724	162,455	----	------	------	Post
5	Reservoir	23.96	2	738	162,425	2	64.62	80,087	BMP 2.1 Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	24.00	2	736	115,072	----	------	------	Pre
2	SCS Runoff	89.00	2	724	278,559	----	------	------	Post
5	Reservoir	36.87	2	740	278,528	2	66.45	116,865	BMP 2.1 Routing

Hydrograph Plot

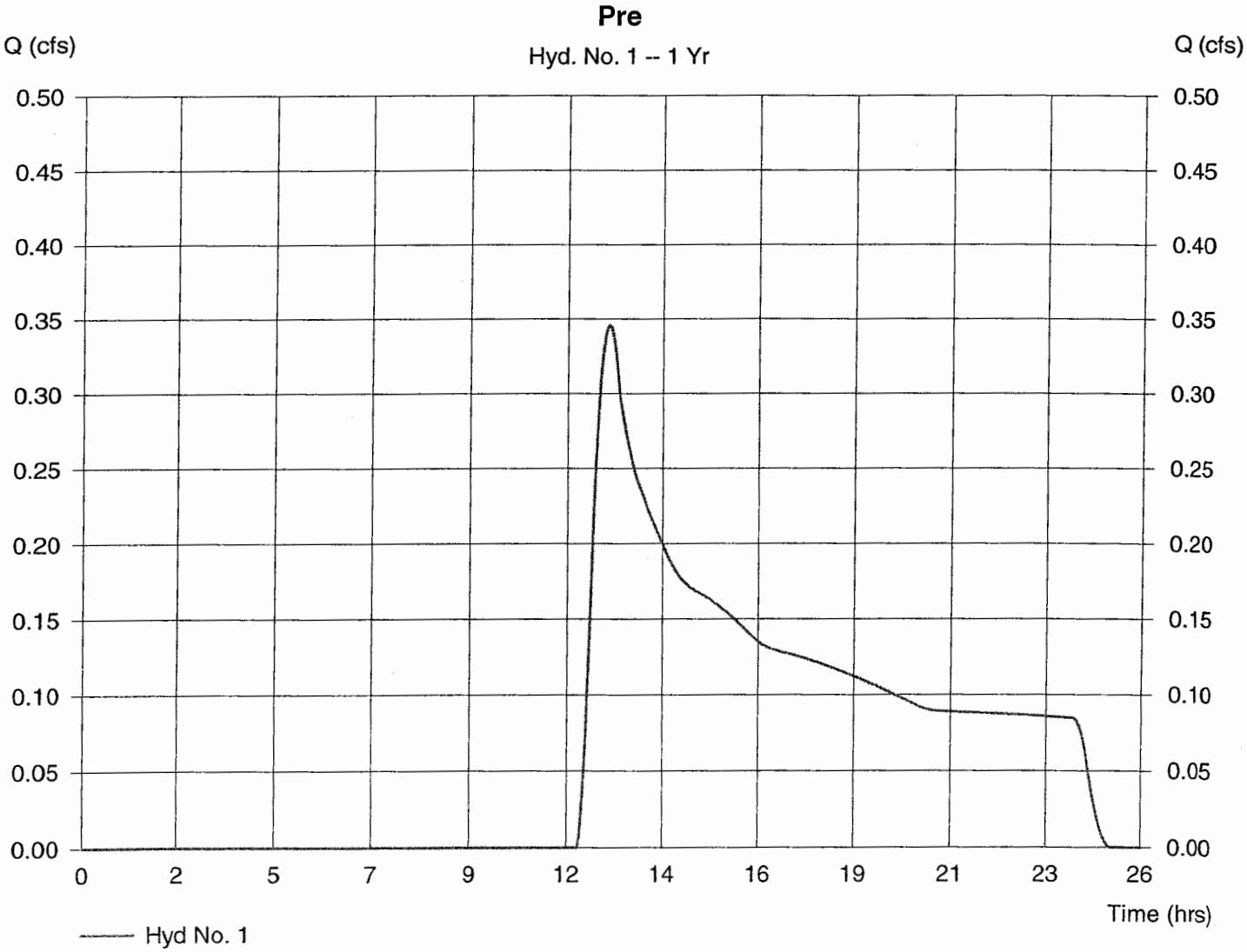
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:57 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 0.35 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 11.66 ac	Curve number	= 55
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6,052 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

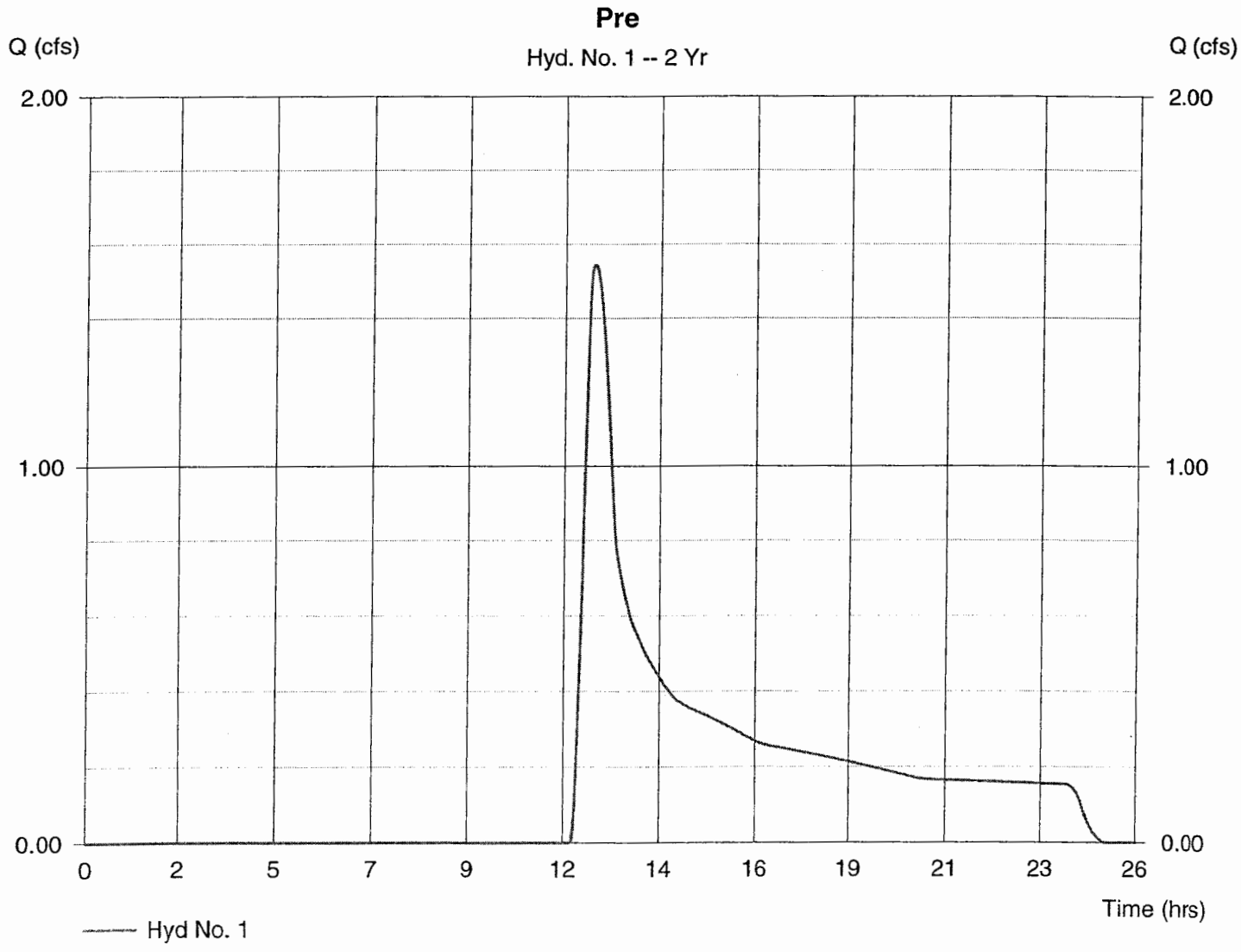
Monday, Oct 30 2006, 9:57 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 1.54 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 11.66 ac	Curve number	= 55
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 14,467 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

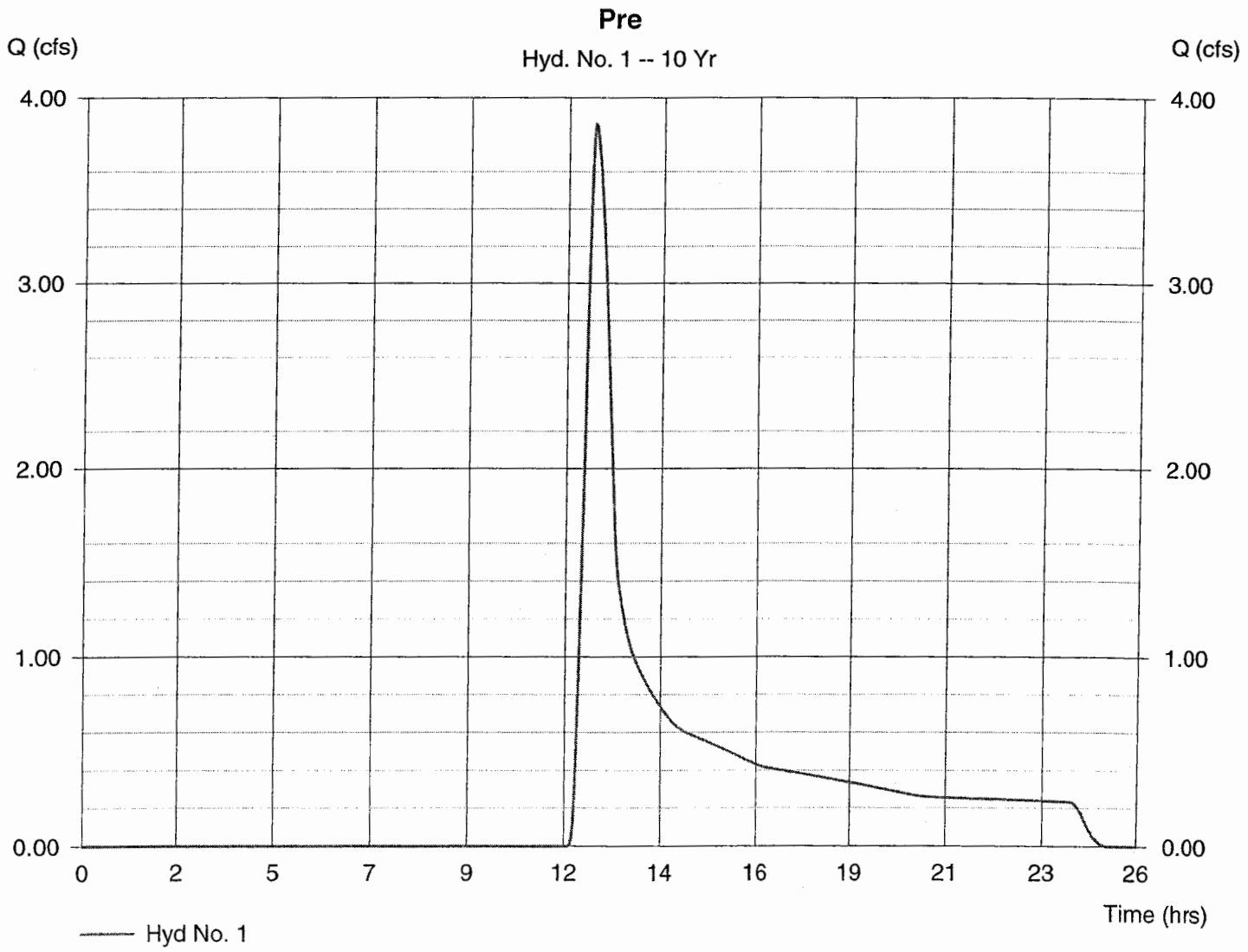
Monday, Oct 30 2006, 9:57 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 3.86 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 11.66 ac	Curve number	= 55
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 26,470 cuft



Hydrograph Plot

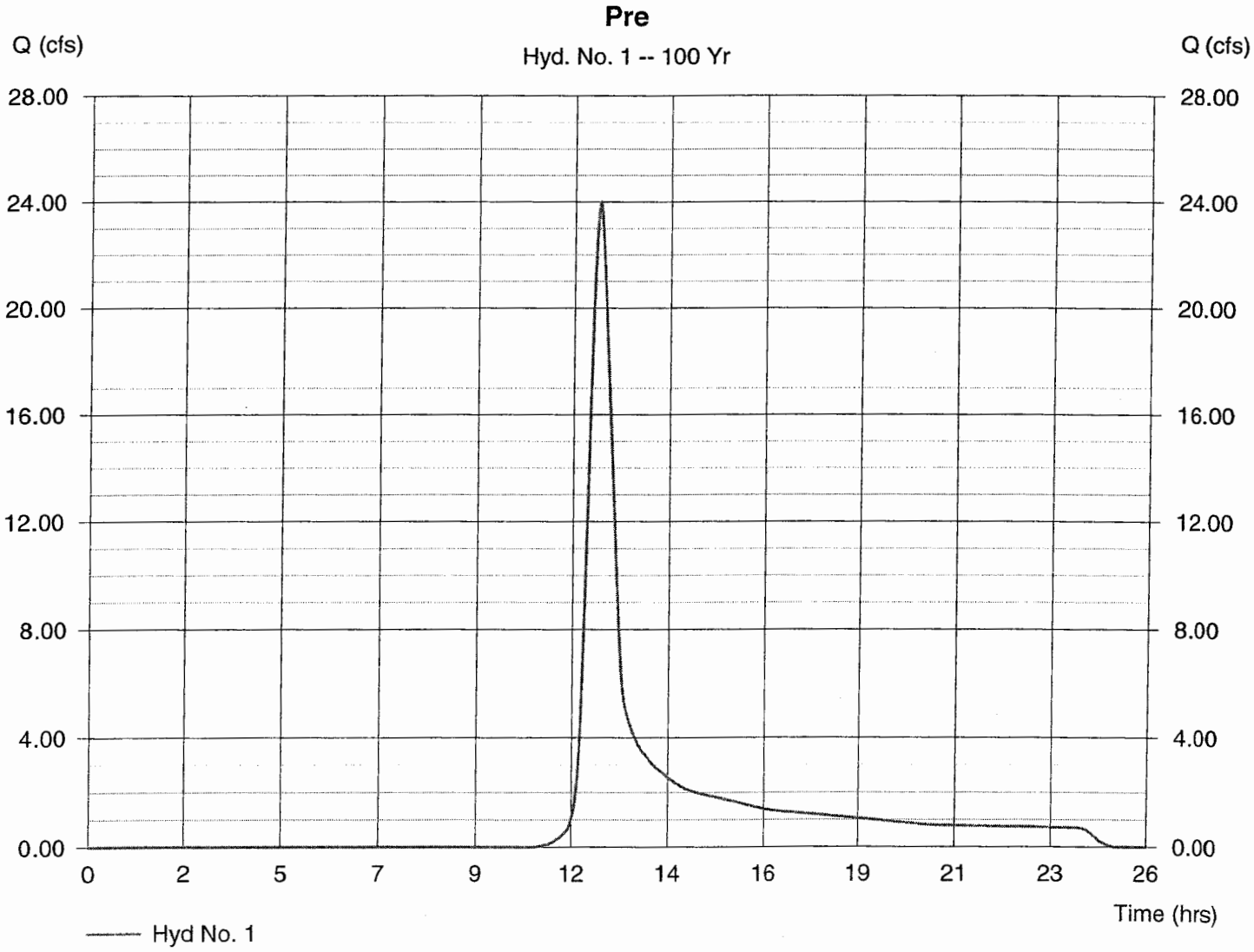
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:57 AM

Hyd. No. 1

Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 24.00 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 11.66 ac	Curve number	= 55
Basin Slope	= 4.0 %	Hydraulic length	= 2000 ft
Tc method	= USER	Time of conc. (Tc)	= 36 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 115,072 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

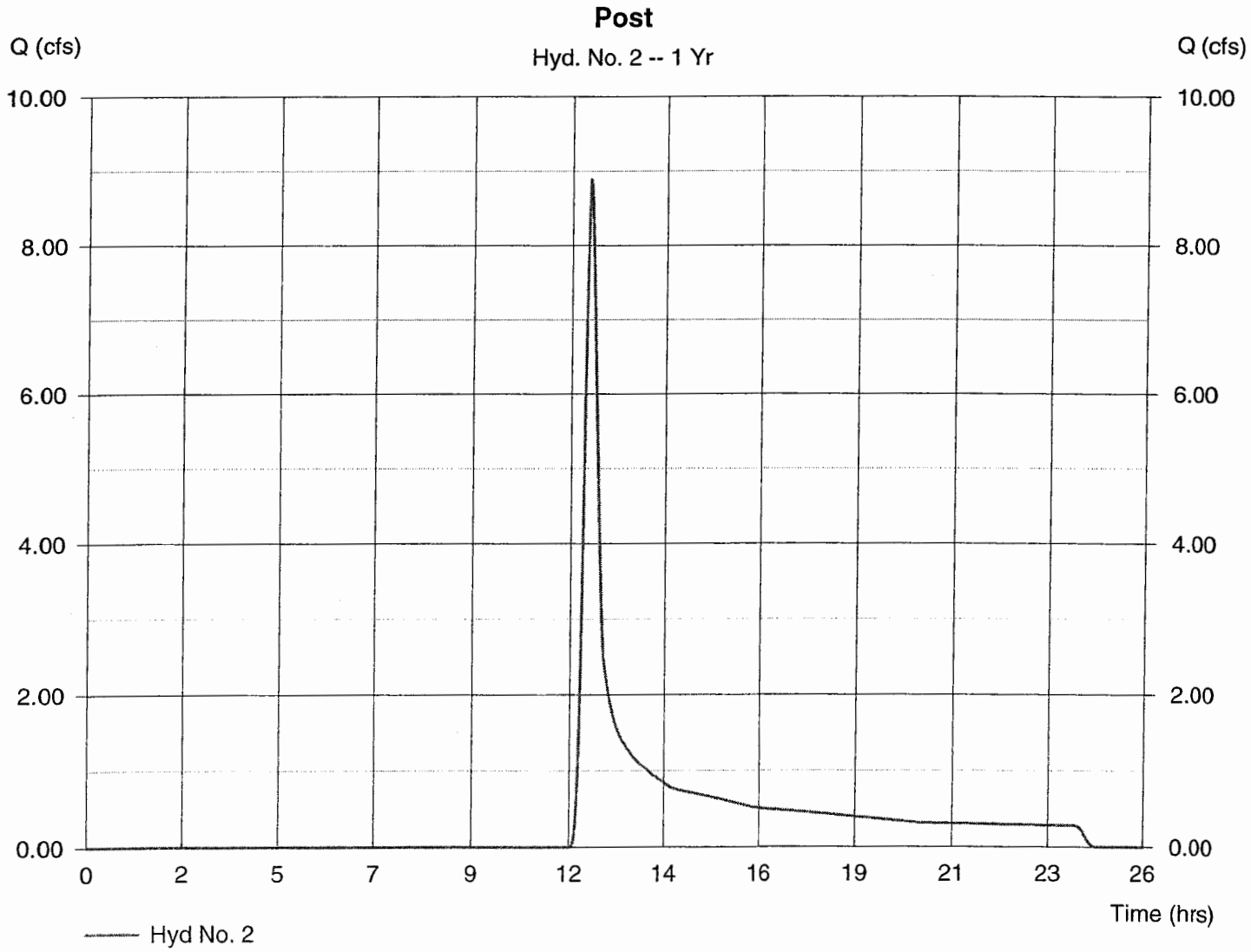
Monday, Oct 30 2006, 9:57 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 8.89 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 18.30 ac	Curve number	= 68
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 34,964 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

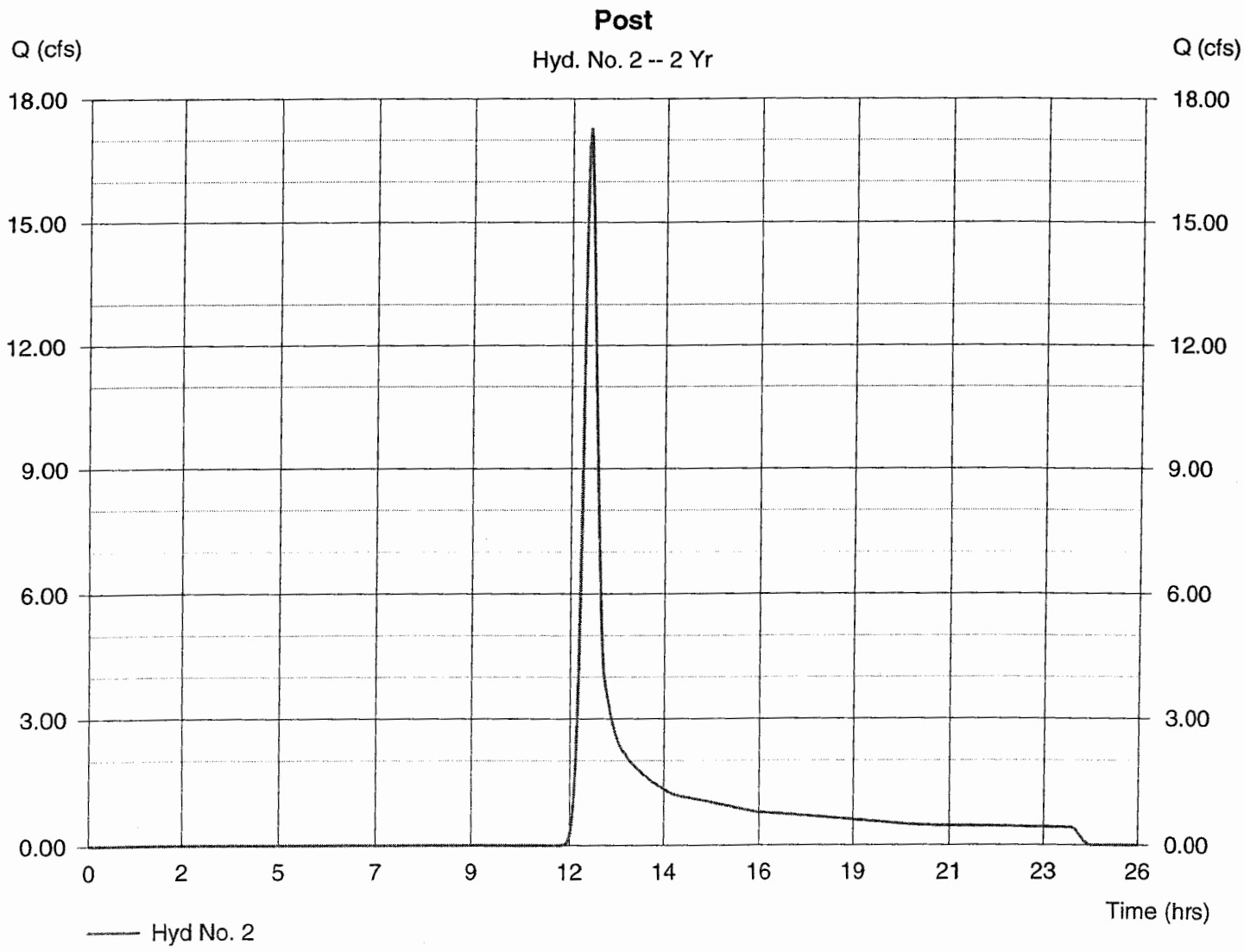
Monday, Oct 30 2006, 9:57 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 17.26 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 18.30 ac	Curve number	= 68
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 59,871 cuft



Hydrograph Plot

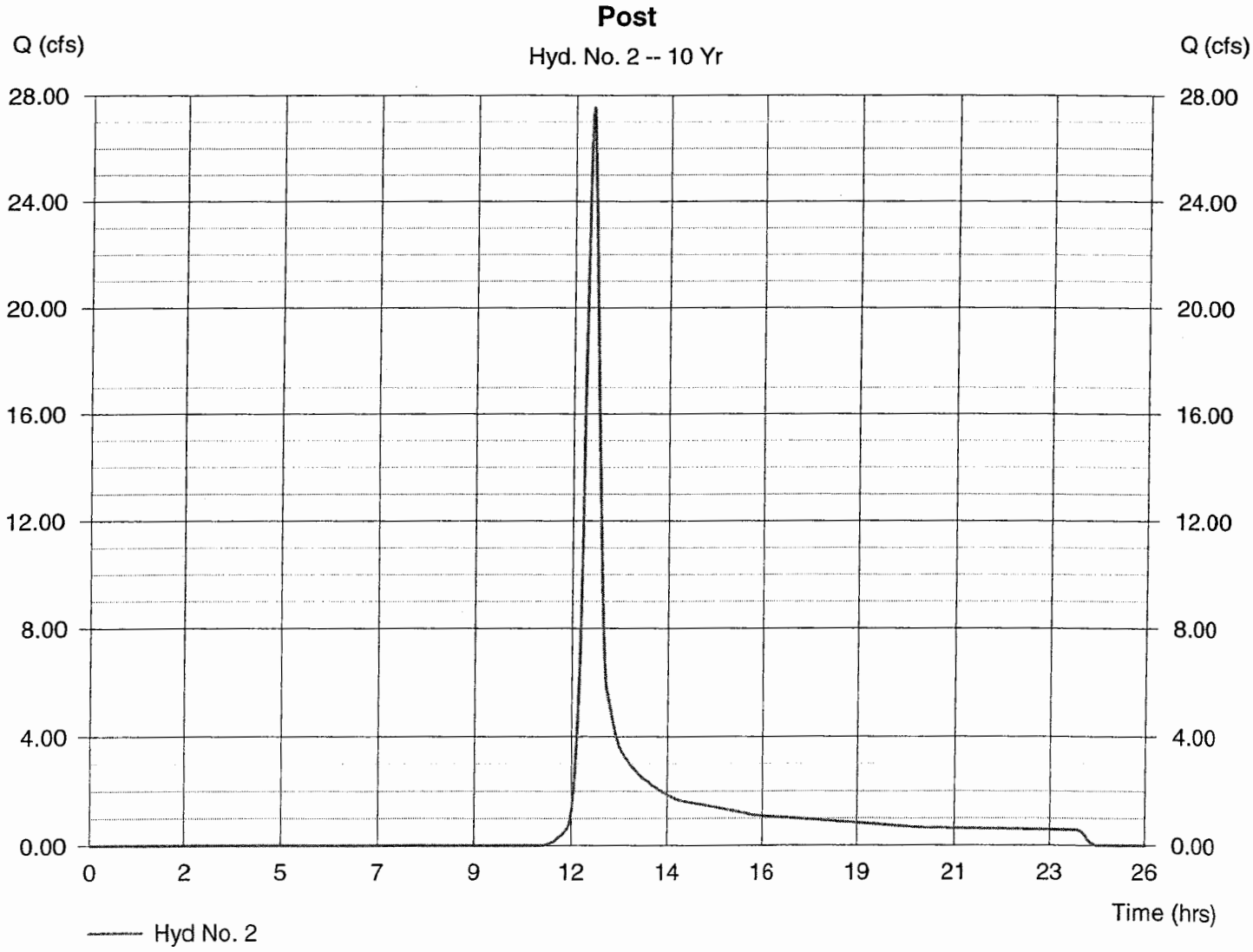
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:57 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 27.53 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 18.30 ac	Curve number	= 68
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 90,744 cuft



Hydrograph Plot

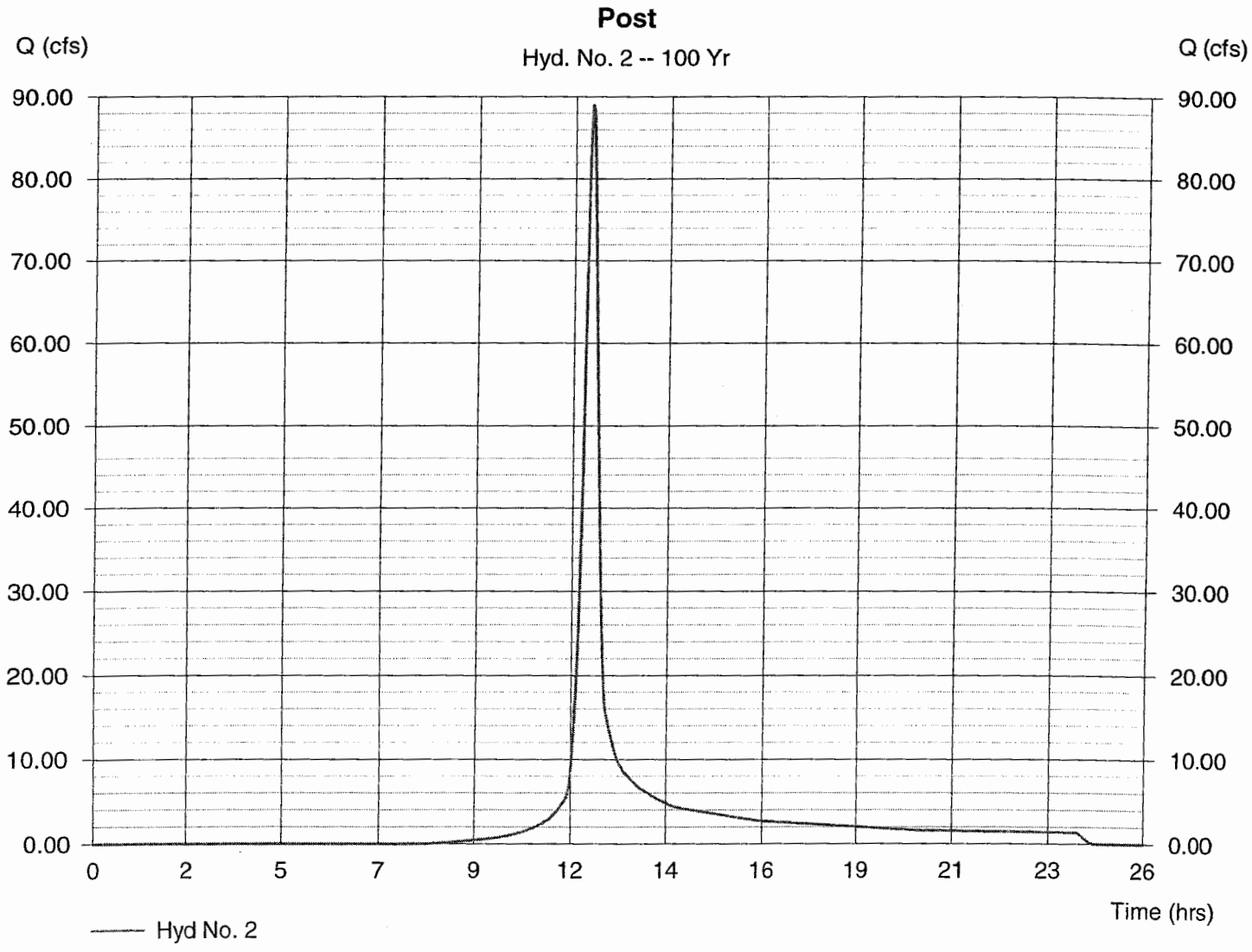
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 9:58 AM

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 89.00 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 18.30 ac	Curve number	= 68
Basin Slope	= 2.0 %	Hydraulic length	= 3600 ft
Tc method	= USER	Time of conc. (Tc)	= 19 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 278,559 cuft



Hydrograph Plot

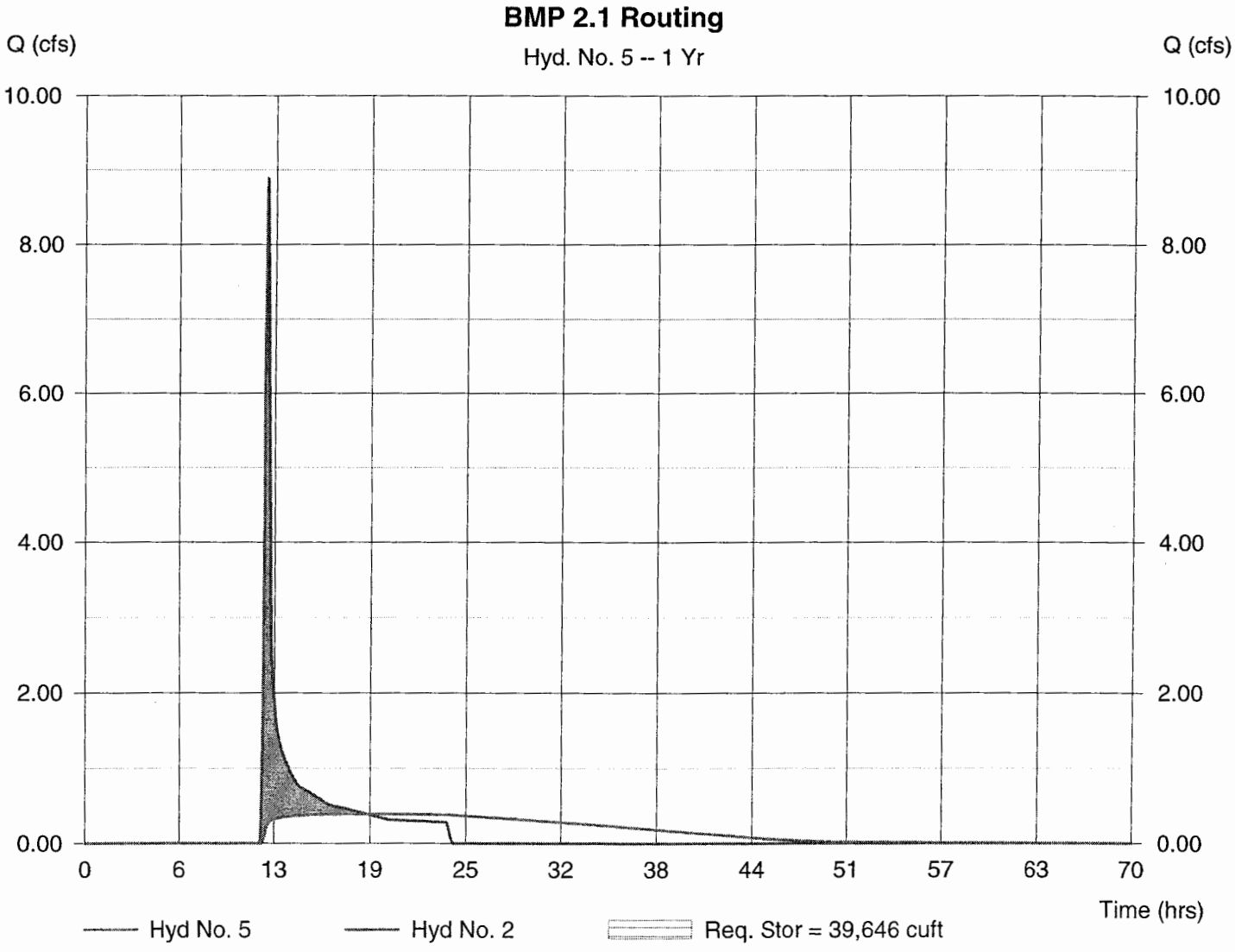
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 5:47 PM

Hyd. No. 5

BMP 2.1 Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.39 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 60.86 ft
Reservoir name	= Wet Pond 2.1	Max. Storage	= 39,646 cuft

Storage Indication method used. Wet pond routing start elevation = 58.00 ft. | Hydrograph Volume = 34,933 cuft



Hydrograph Plot

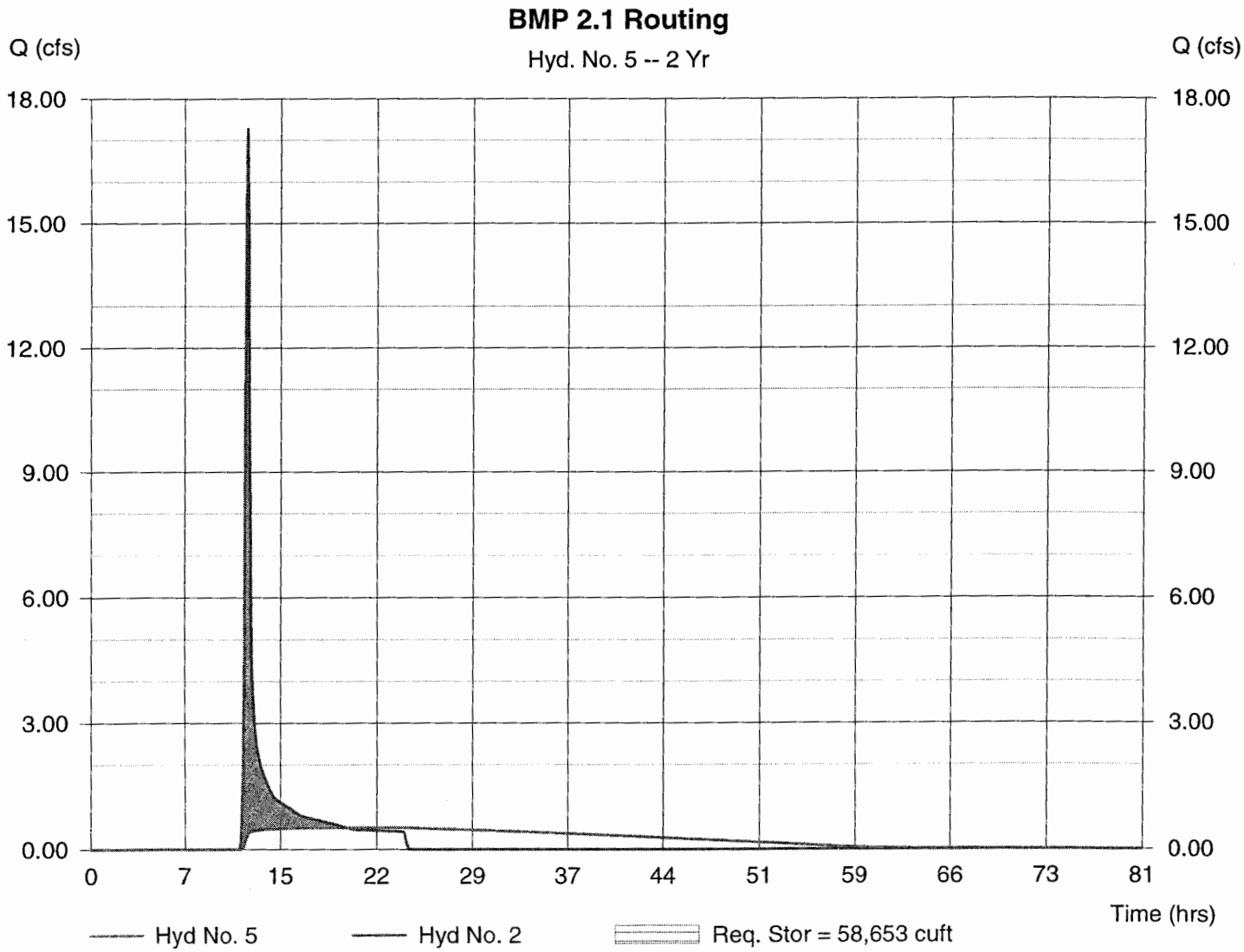
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 5:47 PM

Hyd. No. 5

BMP 2.1 Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.52 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 62.88 ft
Reservoir name	= Wet Pond 2.1	Max. Storage	= 58,653 cuft

Storage Indication method used. Wet pond routing start elevation = 58.00 ft. | Hydrograph Volume = 59,841 cuft



Hydrograph Plot

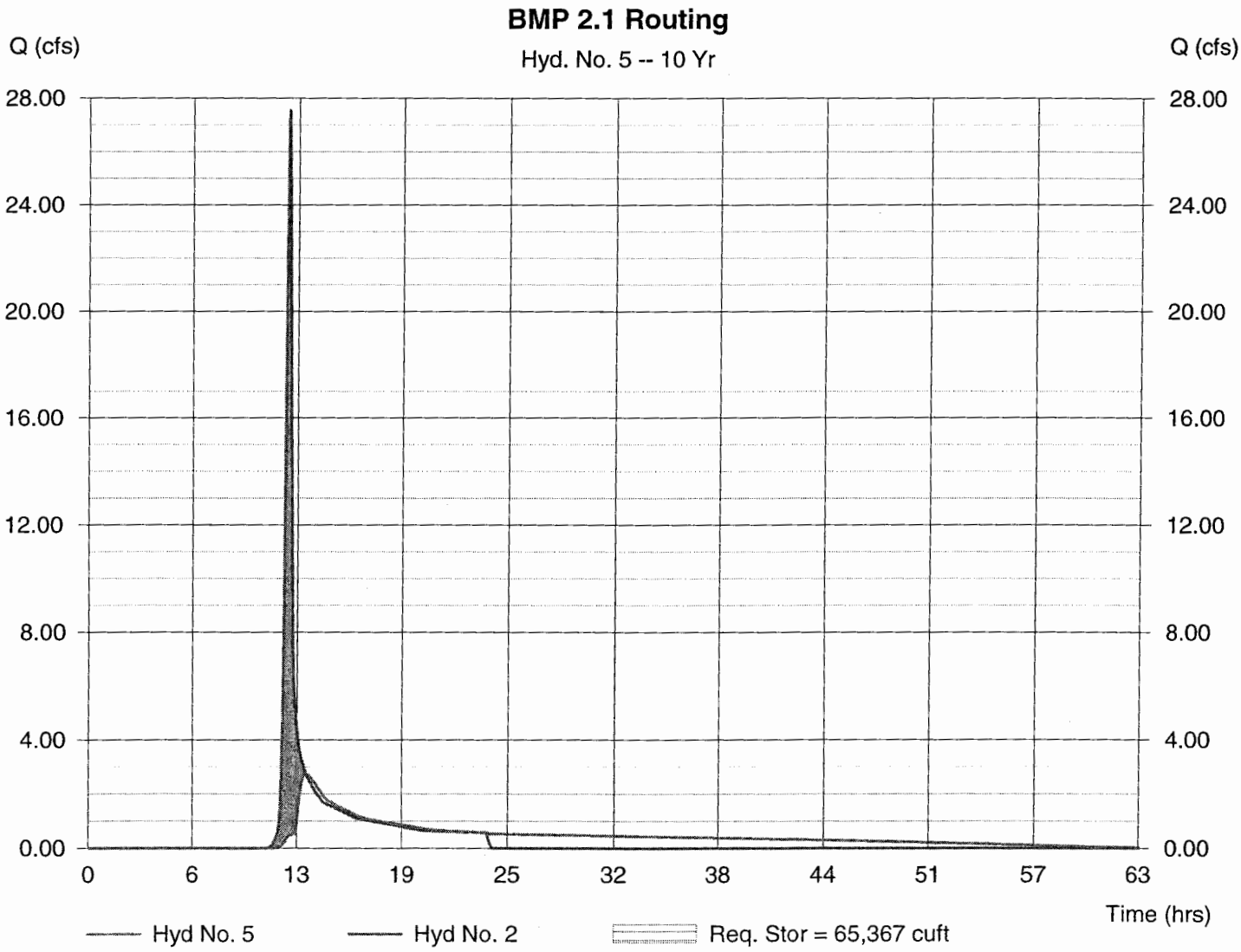
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 5:47 PM

Hyd. No. 5

BMP 2.1 Routing

Hydrograph type	= Reservoir	Peak discharge	= 2.72 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 63.49 ft
Reservoir name	= Wet Pond 2.1	Max. Storage	= 65,367 cuft

Storage Indication method used. Wet pond routing start elevation = 58.00 ft. | Hydrograph Volume = 90,713 cuft



Hydrograph Plot

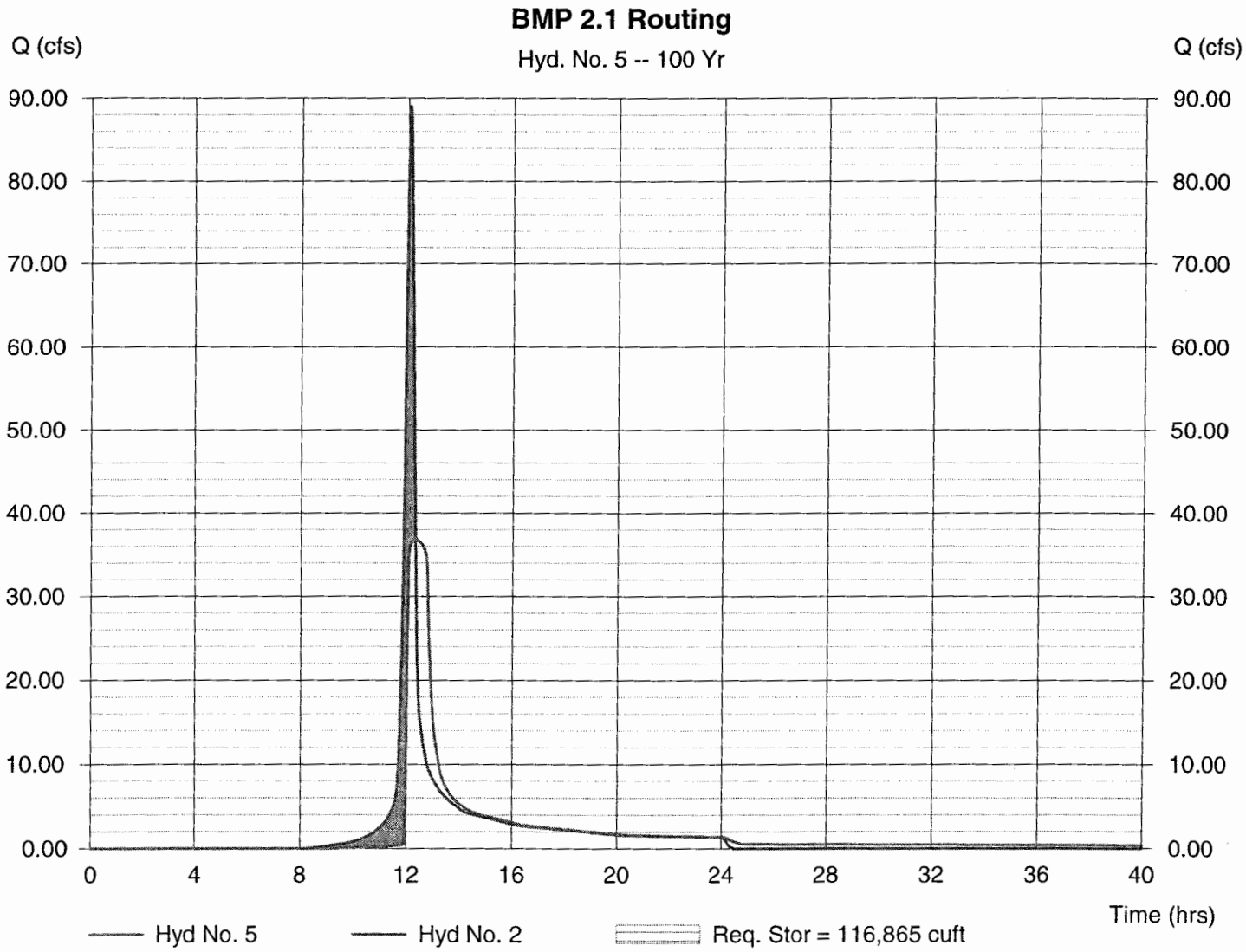
Hydraflow Hydrographs by Intelisolve | Monday, Oct 30 2006, 5:47 PM

Hyd. No. 5

BMP 2.1 Routing

Hydrograph type	= Reservoir	Peak discharge	= 36.87 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 2	Max. Elevation	= 66.45 ft
Reservoir name	= Wet Pond 2.1	Max. Storage	= 116,865 cuft

Storage Indication method used. Wet pond routing start elevation = 58.00 ft. | Hydrograph Volume = 278,528 cuft



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

October 18, 2002

Mr. Brian Rettman
U.S. Home Corporation
6920 Netherstone Court
Gainsville, Virginia 20155

ECS Project No. 07:5867

Re: Subsurface Exploration and Geotechnical Engineering Analysis
Colonial Heritage Phase I - Section 2, 3, and 3A
BMP Evaluation
Richmond Road
James City County, Virginia

RECEIVED
OCT 18 2002
AES CONSULTING ENGINEERS

Dear Mr. Rettman:

Engineering Consulting Services, Ltd. has completed a subsurface exploration of the above referenced project. This report presents the results of our subsurface exploration program on this site and provides engineering and earthwork recommendations for the proposed stormwater management pond facilities. During this study, we also performed subsurface explorations within the proposed roadways and collected samples of the soil subgrade to perform California Bearing Ratio testing for use in pavement design recommendations. These tests are in progress. A separate report discussing our roadway recommendations will be issued once this testing is completed.

Introduction

Design for Colonial Heritage Phase I, Sections 2, 3, and 3A are underway. This stage of the project will consist of the development of the planned roadways and stormwater management pond facilities. Currently, there are four (4) BMP facilities proposed. Two are located in Section 2, with one each in Sections 3 and 3A. We understand each of the facilities will require an earth berm constructed between 10 to 20 feet in height to form a dry pond detention basin.

The purposes of this exploration were to explore the soil and groundwater conditions at the sites and to develop soils-related engineering recommendations to guide design and construction of the earth berms. We accomplished these purposes by drilling soil borings to explore the subsurface soil and groundwater conditions, performing a site reconnaissance to observe general

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topography, and analyzing field data to develop appropriate geotechnical engineering recommendations regarding the proposed construction. A Boring Location Diagram is included in Enclosure 1.

Field Exploration Procedures:

The soil test borings were performed with an ATV-mounted auger drill rig utilizing continuous flight, hollow stem augers to advance the borehole. Drilling fluid was not used in this process.

Representative soil samples were obtained by means of the split-barrel sampling procedure in accordance with ASTM Specification D-1586. In this procedure, a 2-inch outside diameter split-barrel sampler is driven into the soil a distance of 24 inches by a 140-pound hammer falling 30 inches. After a 6-inch seating interval, the number of blows required to drive the sampler through the next 12-inch interval is termed the Standard Penetration Test (SPT) value and is indicated for each sample on the boring log. This value can be used as a qualitative indication of the in-place relative density and relative consistency of cohesionless soils and cohesive soils, respectively. This indication is qualitative, since many factors can significantly affect the standard penetration resistance value and prevent a direct correlation between drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies.

Field logs of the soils encountered in the borings were maintained by the drill crew. After recovery, each sample was removed from the sampler and visually classified. Representative portions of each sample were sealed in glass jars and delivered to our laboratory in Williamsburg, Virginia, for further visual examination and laboratory testing.

Subsurface Conditions:

Experienced personnel from our office classified each splitspoon soil sample on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS). The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. The geotechnical engineer grouped the various soil types into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in situ, the transitions may be gradual. A brief explanation of the USCS and Reference Notes for Boring Logs are provided in Enclosure 3 of this report.

Our subsurface exploration and site reconnaissance determined that the surface of the site is generally covered with about 2 to 4 inches of topsoil. Underlying the surficial topsoil, we encountered mixed deposits of medium stiff consistency Sandy and Silty CLAY (CL) and loose to medium dense density Clayey and Silty SAND (SC and SM) that extended to depths of about 12 feet below the existing site grades, except at Boring B-26, where these interbedded layers extended to the depth of the boring at 20 feet below grade. The Standard Penetration Test (SPT)

N-values recorded within these layers varied from 3 to 11 blows-per-foot (BPF).

Underlying the mixed deposits in Borings B-24, B-25, and B-27, we encountered medium stiff consistency Sandy and Silty CLAY (CL) and medium dense density Clayey SAND (SC) with marine shell fragments extending to the depth of these borings at 20 feet (boring termination). SPT N-values recorded within this stratum were 9 or 10 BPF.

We encountered the groundwater during drilling of the Borings B-24 and B-25 at depths of 12.5 to 13 feet below the ground surface. Please note that groundwater levels are influenced by seasonal conditions and by periods of significant precipitation or prolonged drought. Additionally, a perched water table could be encountered due to the near-surface fine-grained layers. If groundwater is encountered during the construction of excavations, it should be pumped from sumps excavated adjacent to the construction excavations.

Earthen Embankments and Slope Stability

We understand the stormwater management basins will require earth berms varying from 10 to 20 feet in height. These basins currently are planned to be used as dry ponds for temporary detention of stormwater runoff. Based on the planned construction, we recommend the berms be constructed with an 8-foot wide key trench excavated to a minimum depth of about 4 feet below the stripped subgrades. The key trench may extend deeper if the underlying soils are not considered suitable for support of the fill at the time of construction. The subgrades should be stripped of all organics and soft soils and be observed by the geotechnical engineer prior to the placement of compacted structural fill.

Please note, we encountered the groundwater table at 12.5 and 13 feet below site grades at two of the boring locations at the time of our subsurface exploration. However, we do not believe the ground water table will impact construction.

The near-surface soils located within the basin areas generally consisted of Silty and Clayey SAND (SC and SM) soils. We also encountered mixed deposits of fine- and coarse-grained soils at varying locations and depths across the project site. Generally, any type of clayey soils would be considered suitable as core material. The soil test borings for the roadways should be reviewed with respect to planned cuts across the site to evaluate a potential borrow source for suitable core material. Boring logs for the roadway borings will be included in a separate report once that phase of testing is complete. Suitable core material would be classified as SC, CL, or CH material. This material should be placed in horizontal lifts not exceeding 8 inches in loose thickness, moisture conditioned to within -1% to +3% of the optimum moisture content, and compacted to a minimum 95% of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor method. Slopes should be constructed no greater than 3 horizontal to 1 vertical. Also, the side slopes should be seeded to promote vegetation growth and further add to the stability of the slopes.

Construction Considerations

Exposure to the environment may weaken the soils at the bearing level if the excavations remain open for too long a time. Therefore, excavations should be backfilled the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed immediately prior to placement of the next lift.

Proper compaction control of fill is an important aspect of this project. All fill materials should be placed, compacted and tested in accordance with the recommendations contained in this report. We recommend that all cut and fill operations be observed full-time by a qualified Soil Technician to determine if minimum earthwork and compaction requirements are being met.

In a dry and undisturbed state, the subgrade soils at the site will provide adequate subgrade support for fill placement and construction operations. When over optimum moisture, the moisture sensitive subgrade soils may degrade quickly with disturbance from contractor operations. Therefore, good site drainage should be maintained during earthwork operations so as to help maintain the stability of the soil.

General Comments

This letter has been prepared in order to aid in the evaluation of this site and to assist the Contractor, Architect and Engineer in the design and planning of the project stormwater management facilities. The report scope is limited to the specific project and locations described, and the project description represents our understanding of the significant aspects relevant to soil and foundation characteristics.

We have appreciated being of service to you during the design phase of this project and look forward to its successful construction. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

Michael J. Galli, P.E.
Geotechnical Engineer

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
No. 030684
PROFESSIONAL ENGINEER

Maureen E Mallory for

Gary R. Witsman, P.E.
Principal Engineer

Enclosures:
- Location Plan
- Boring Logs
- Unified Soil Classification System and Reference Notes for Boring Logs

Copies: (2) U.S. Homes Corporation (Mr. Brian Rettman)
(2) AES Consulting Engineers (Mr. Howard Price)

I:letters/mjg/5867-BMP.doc

ECS LTD

BMP 2.2
SWM Plan Pond 11

LEGEND:

⊕ –APPROX. BORING LOCATION

REVISIONS

COLONIAL HERITAGE
PHASE 1
SECTION 2
RICHMOND ROAD
WILLIAMSBURG, VIRGINIA

ECS CARP
ENGINEERING CONSULTING

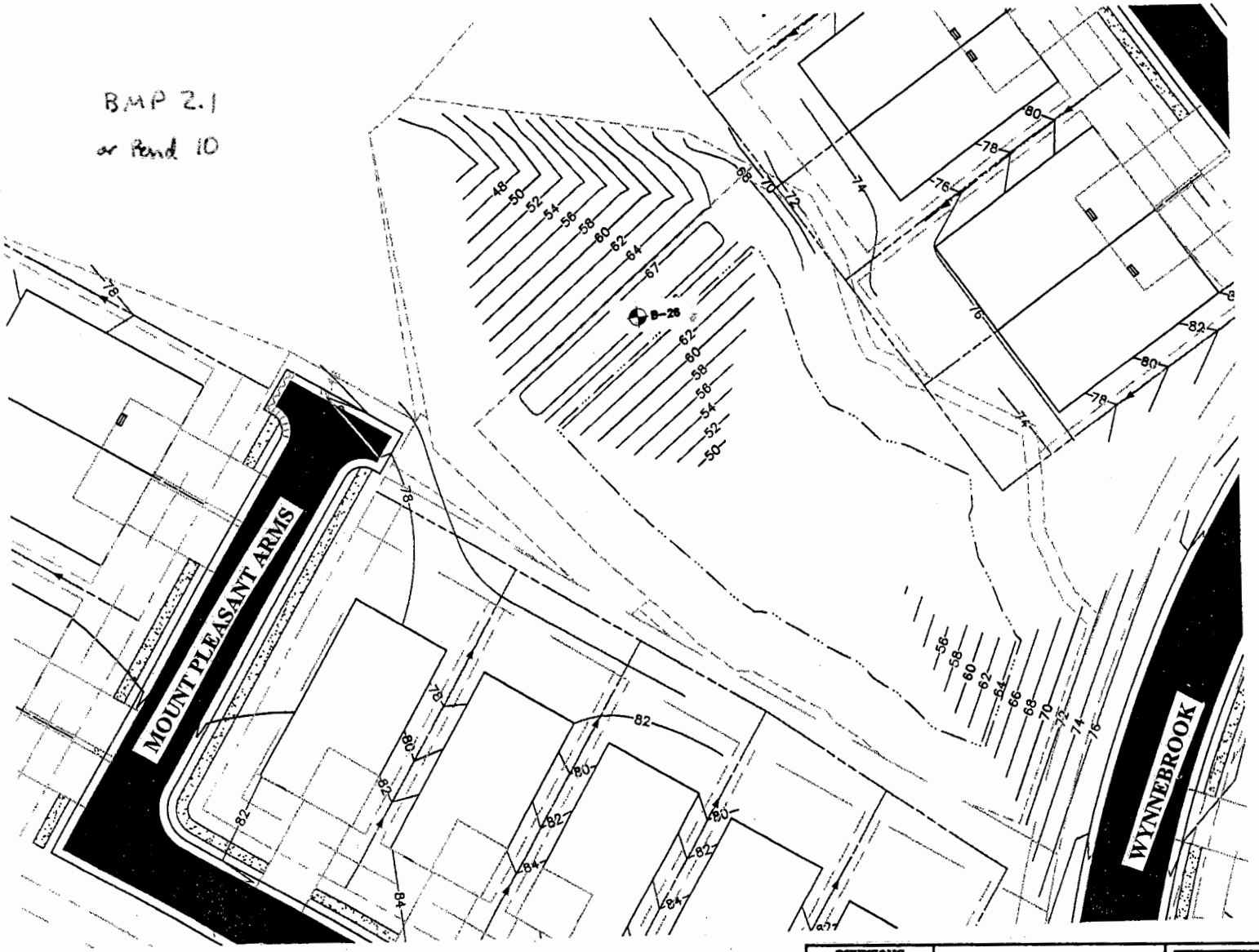
FIGURE 1

BORING LOCATION PLAN

ECS PROJECT NO. 07:5867

ECS LTD

BMP 2.1
or Pond 10



LEGEND:

⊕ –APPROX. BORING LOCATION

REVISIONS

COLONIAL HERITAGE
PHASE 1
SECTION 2
RICHMOND ROAD
WILLIAMSBURG, VIRGINIA

ECS
ENGINEERING CONSULTING

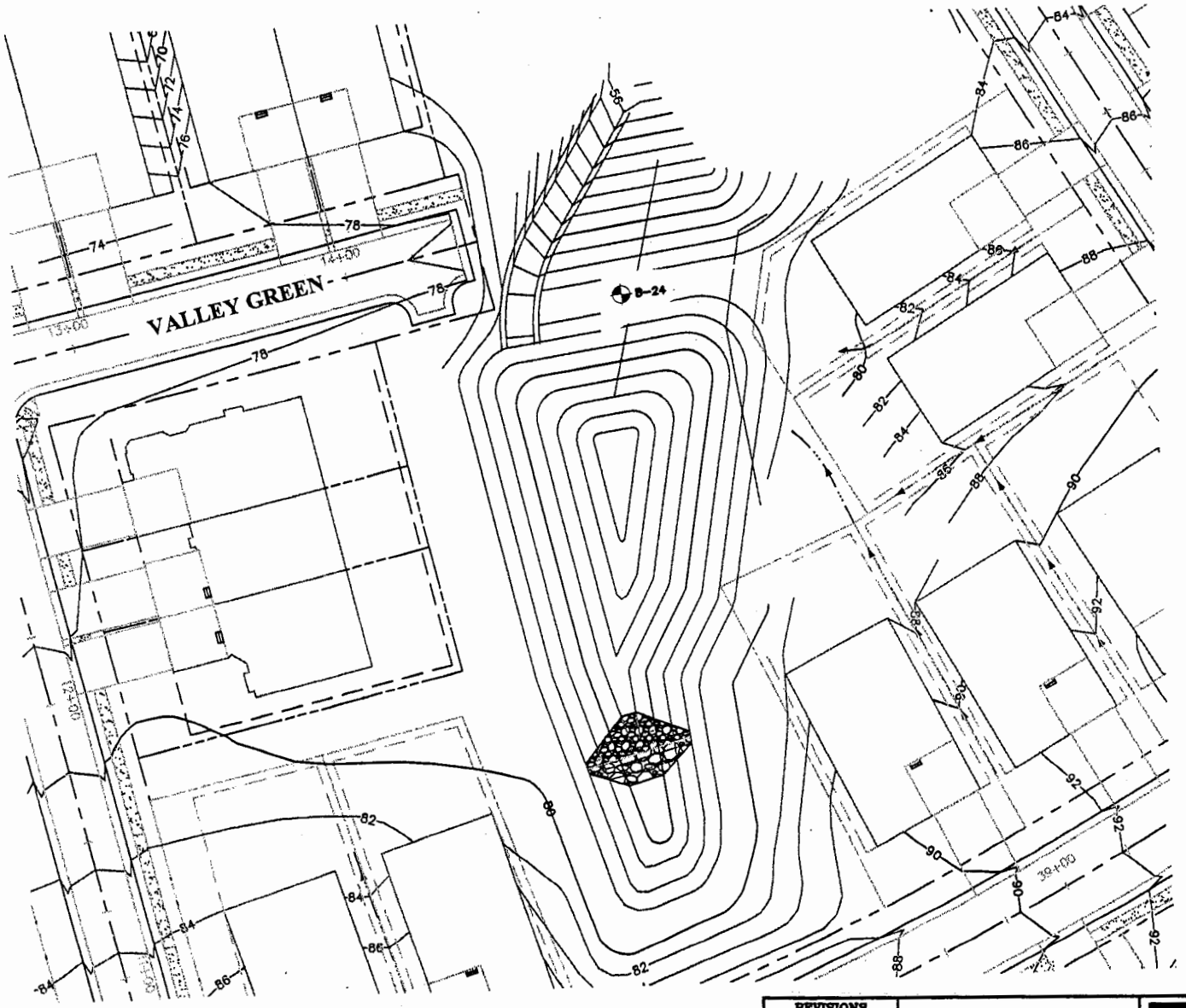
FIGURE 2

BORING LOCATION PLAN

ECS PROJECT NO. 07:5867

YC029_COLONIAL_HERITAGE_P1_S2 - 094

ECS LTD



BMP 3.1

LEGEND:

⊕ –APPROX. BORING LOCATION

REVISIONS

COLONIAL HERITAGE
PHASE 1
SECTION 3 and 3A
RICHMOND ROAD
WILLIAMSBURG, VIRGINIA

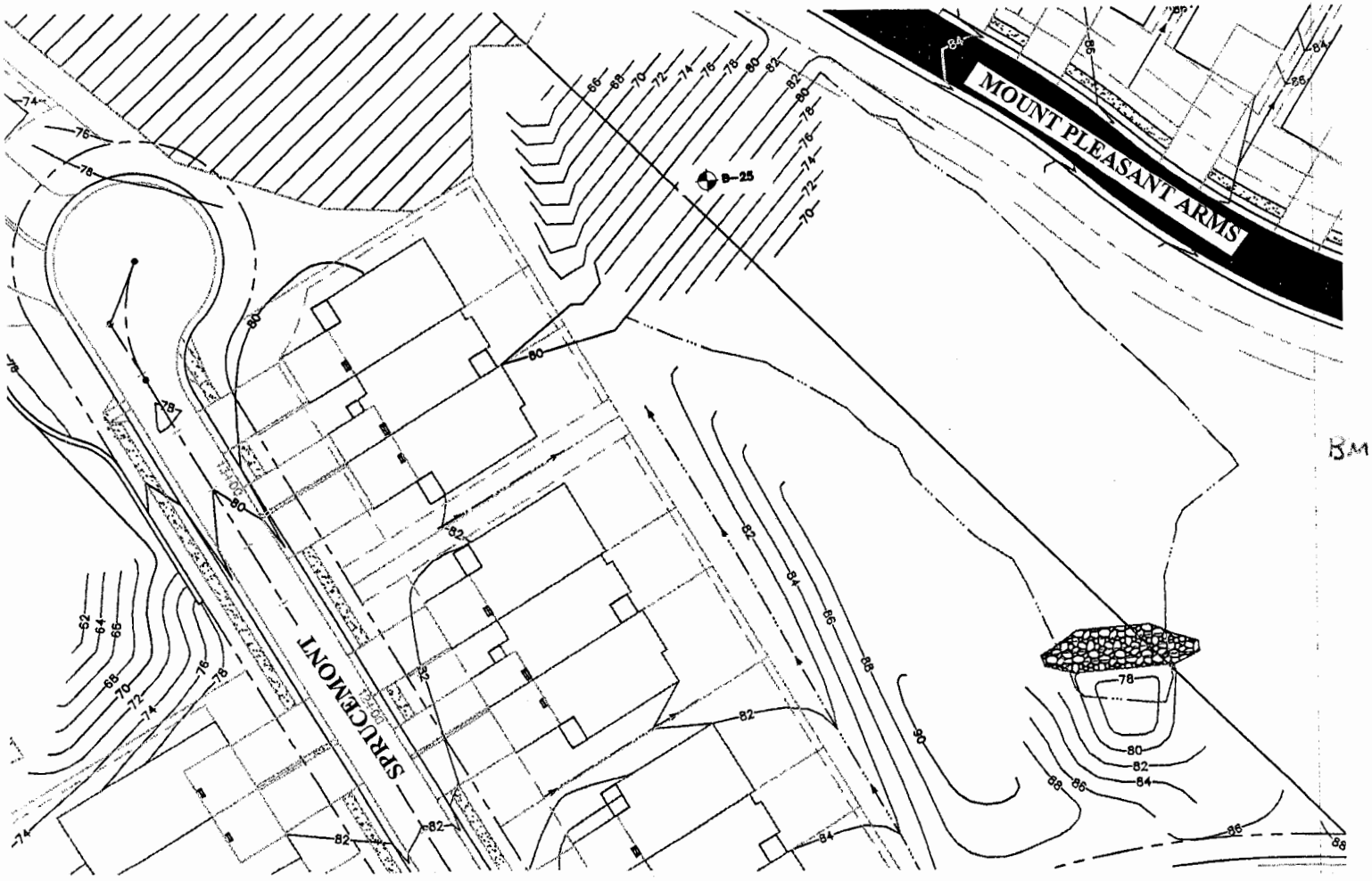
ECS LTD
ENGINEERING CONSULTING SERVICES LTD.

FIGURE 3

BORING LOCATION PLAN

ECS PROJECT NO. 07:5867

ECS LTD



BMP 3.2

LEGEND:
⊕ –APPROX. BORING LOCATION

REVISIONS

COLONIAL HERITAGE
PHASE 1
SECTION 3 and 3A
RICHMOND ROAD
WILLIAMSBURG, VIRGINIA

ECS
ENGINEERING CONSULTING SERVICES LTD

FIGURE 4

BORING LOCATION PLAN

ECS PROJECT NO. 07:5867

YC029_COLONIAL_HERITAGE_P1_S2 - 096

CLIENT	JOB #	BORING #	SHEET
U. S. HOME CORPORATION	07:5867	B-24	1 OF 1

PROJECT NAME COLONIAL HERITAGE PHASE I, SECTS. 2, 3, AND 3A

ARCHITECT-ENGINEER AES CONSULTING ENGINEERS

SITE LOCATION ROUTE 60, JAMES CITY COUNTY, VIRGINIA

ECS LTD

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

PLASTIC LIMIT % X — WATER CONTENT % ● — LIQUID LIMIT % △ (10, 20, 30, 40, 50+)

STANDARD PENETRATION BLOWS/FT. ⊗ (10, 20, 30, 40, 50+)

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS; SURFACE ELEVATION)	WATER LEVELS	ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	TOPSOIL DEPTH 2"			3
	2	SS	24	24	Fine Silty SAND, With Roots, Medium Brown, Moist, Very Loose to Loose, (SM)			6
5	3	SS	24	24				8
	4	SS	24	24	Fine Sandy CLAY, Orangish Brown, Moist, Medium Stiff, (CL)			9
	5	SS	24	24	Fine Silty SAND, Orangish Brown, Moist, Loose, (SM)			9
10								
	6	SS	24	24	Fine Clayey SAND, With Marine Shell Fragments, Greenish Brown, Moist to Saturated, Medium Dense, (SC)	▽		10
15								
	7	SS	24	24				10
20					END OF BORING @ 20.00'			
25								
30								

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

▽WL 13' (WS) OR WD	BORING STARTED 09-12-02	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 09-12-02	CAVE IN DEPTH ● 19.5'
▽WL	RIG ATV FOREMAN SDS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
U. S. HOME CORPORATION	07:5867	B-25	1 OF 1

PROJECT NAME: COLONIAL HERITAGE PHASE I, SECTS. 2, 3, AND 3A

ARCHITECT-ENGINEER: AES CONSULTING ENGINEERS

SITE LOCATION: ROUTE 60, JAMES CITY COUNTY, VIRGINIA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS / SURFACE ELEVATION)	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	TOPSOIL DEPTH 2"		3
	2	SS	24	24	Fine Silty SAND, With Roots, Light Brown, Moist, Very Loose to Loose, (SM)		5
5	3	SS	24	24	Fine Sandy CLAY, Orangish Brown, Moist, Stiff, (CL)		12
	4	SS	24	24	Fine Silty SAND, Tan, Moist, Medium Dense, (SM)		12
	5	SS	24	24	Fine Sandy CLAY, Orangish Brown, Moist, Stiff, (CL)		11
10					Fine Sandy CLAY, With Marine Shell Fragments, Orangish Brown, Moist to Saturated, Medium Stiff, (CL)	▽	
	6	SS	24	24			10
15							
	7	SS	24	24			10
20					END OF BORING @ 20.00'		
25							
30							

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

▽WL 12.5' WS OR WD	BORING STARTED 09-12-02	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 09-12-02	CAVE IN DEPTH @ 18.5'
▽WL 12' after 2 hrs.	RIG ATV FOREMAN SDS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
U. S. HOME CORPORATION	07:5867	B-26	1 OF 1

PROJECT NAME COLONIAL HERITAGE PHASE I, SECTS. 2, 3, AND 3A

ARCHITECT-ENGINEER AES CONSULTING ENGINEERS

SITE LOCATION ROUTE 60, JAMES CITY COUNTY, VIRGINIA

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

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

10 20 30 40 50+

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS / SURFACE ELEVATION)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	TOPSOIL DEPTH 2"	4
	2	SS	24	24	Fine Silty SAND, Light Brown, Dry to Moist, Loose, (SM)	7
5	3	SS	24	24	Fine Clayey SAND, Orangish Brown, Moist, Loose, (SC)	9
	4	SS	24	24	Silty CLAY, With Fine Sand Seams, Gray and Tan, Moist, Medium Stiff, (CL)	8
	5	SS	24	24	Fine Silty SAND, With Clay Seams, Tan and Gray, Moist, Loose, (SM-SC)	9
10					Silty CLAY, With Fine Sand Seams, Gray, Tan and Orangish Brown, Moist, Medium Stiff to Stiff, (CL)	
	6	SS	24	24		10
15						
	7	SS	24	24		12
20					END OF BORING @ 20.00'	
25						
30						

WATER LEVELS ELEVATION (FT)

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

▽WL DRY (WS) OR WD	BORING STARTED 09-13-02	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 09-13-02	CAVE IN DEPTH ● 16'
▽WL	RIG ATV FOREMAN SDS	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
U. S. HOME CORPORATION	07:5867	B-27	1 OF 1

PROJECT NAME: COLONIAL HERITAGE PHASE I, SECTS. 2, 3, AND 3A

ARCHITECT-ENGINEER: AES CONSULTING ENGINEERS

SITE LOCATION: ROUTE 60, JAMES CITY COUNTY, VIRGINIA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS / SURFACE ELEVATION)	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	TOPSOIL DEPTH 4"		7
	2	SS	24	24	Fine Clayey SAND, Tan, Moist, Loose, (SC)		8
5	3	SS	24	24	Fine Sandy CLAY, Orange and Red, Moist, Medium Stiff, (CL)		10
	4	SS	24	24	Fine Silty SAND, With Clay Lenses, Orange, Moist, Medium Dense, (SM)		11
10	5	SS	24	24	Silty CLAY, With Fine Sand Seams, Light Gray and Tan, Moist, Stiff, (CL)		11
15	6	SS	24	24	Fine Sandy CLAY, With Marine Shell Fragments, Orangish Brown, Wet to Saturated, Medium Stiff, (CL)		9
20	7	SS	24	24			10
25					END OF BORING @ 20.00'		
30							

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

▽WL DRY (WS) OR WD	BORING STARTED 09-13-02	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 09-13-02	CAVE IN DEPTH ● 17'
▽WL	RIG ATV FOREMAN SDS	DRILLING METHOD HSA

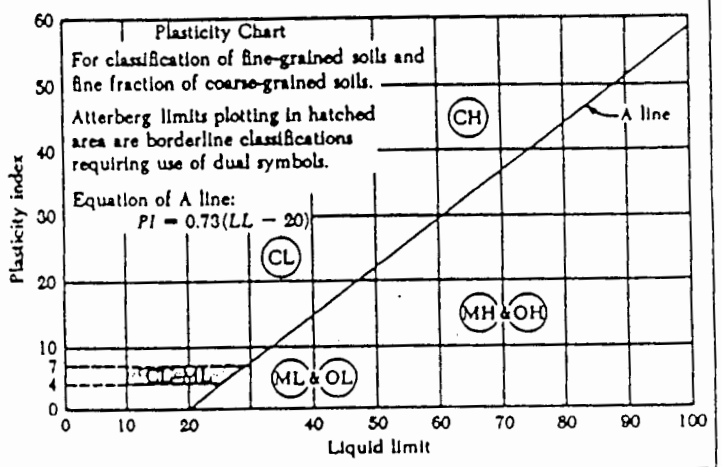
UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

Table Unified System of Classification

Major divisions			Group symbols	Typical names
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils 50% or more passes No. 200 sieve	Silts and Clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

Table (Continued)

Classification criteria		
Classification on basis of percentage of fines: Less than 5% pass No. 200 sieve — GW, GP, SW, SP; More than 12% pass No. 200 sieve — GM, GC, SM, SC; 5% to 12% pass No. 200 sieve — Borderline classification requiring use of dual symbols	$C_u = D_{60}/D_{10}$ Greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
	Not meeting both criteria for GW	
	Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
	Atterberg limits plot above "A" line and plasticity index greater than 7	
	$C_u = D_{60}/D_{10}$ Greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
	Not meeting both criteria for SW	
	Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
	Atterberg limits plot above "A" line and plasticity index greater than 7	



Visual-manual identification, see ASTM Designation D2488.

Reprinted from the Annual Book of ASTM Standards

Engineering Consulting Services, Ltd.

REFERENCE NOTES FOR BORING LOGS

I. Drilling and Sampling Symbols:

SS - Split Spoon Sampler
ST - Shelby Tube Sampler
RC - Rock Core: NX, BX, AX
PM - Pressuremeter
DC - Dutch Cone Penetrometer

RB - Rock Bit Drilling
BS - Bulk Sample of Cuttings
PA - Power Auger (no sample)
HSA - Hollow Stem Auger
WS - Wash Sample

Standard Penetration (Blows/Ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2 in. O.D. splitspoon sampler, as specified in ASTM D-1586. The blow count is commonly referred to as the N value.

II. Correlation of Penetration Resistances to Soil Properties:

Relative Density-Sands, Silts

SPT-N	Relative Density
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
over 80	Extremely Dense

Consistency of Cohesive Soils

Unconfined Compressive Strength, Qp, tsf	Consistency
Under 0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Firm
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
over 8.00	Very Hard

III. Unified Soil Classification Symbols:

GP - Poorly Graded Gravel
GW - Well Graded Gravel
GM - Silty Gravel
GC - Clayey Gravels
SP - Poorly Graded Sands
SW - Well Graded Sands
SM - Silty Sands
SC - Clayey Sands

ML - Low Plasticity Silts
MH - High Plasticity Silts
CL - Low Plasticity Clays
CH - High Plasticity Clays
OL - Low Plasticity Organics
OH - High Plasticity Organics
CL-ML - Dual Classification (Typical)

IV. Water Level Measurement Symbols:

WL - Water Level
WS - While Sampling
WD - While Drilling

BCR - Before Casing Removal
ACR - After Casing Removal
WCI - Wet Cave In
DCI - Dry Cave In

The water levels are those water levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In Clays and Plastic Silts the accurate determination of water levels may require several days for the water level to stabilize. In such cases additional methods of measurement are generally applied.

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671
E-MAIL: devtman@james-city.va.us
FAX: (757) 259-4032

ENVIRONMENTAL DIVISION
(757) 253-6670
ENVIRON@JAMES-CITY.VA.US

PLANNING
(757) 253-6685
PLANNING@JAMES-CITY.VA.US

COUNTY ENGINEER
(757) 253-6678

MOSQUITO CONTROL
(757) 259-4116

June 5, 2007

Mr. George Renault
Lennar
6600 Wiltshire
Williamsburg, VA 23188

RE: Colonial Heritage – Phase 1, Section 2
BMP 2.2, County BMP No. YC029

Dear Mr. Renault:

This letter serves as **approval** to modify the above referenced BMP facility by converting it to a wet pond from its original design as a dry pond (one that only temporarily impounds water during storm events). The approval is conditioned on following all the requirements of the approved plan prepared by AES entitled *Phase 1 – Section 2 Colonial Heritage, Drawing No. 2* dated January 6, 2006, with a final modification date of May 15, 2007, and the recommendations contained in the letter from ECS Mid-Atlantic dated April 11, 2007, to you concerning slope stability of the BMP.

AES submitted calculations using as-built information for the BMP that demonstrated that the BMP would still be able to perform its stormwater requirements after modification. The modification work will also include revisions to address slope stability problems present in the BMP that are related to stormwater system outfalls in the BMP and surface water runoff at various points around the facility. In addition, a safety fence will be added around the perimeter of the facility except for the dam area to reduce any hazard associated with the permanent pool of water.

In accordance with our earlier conversations, the surety for this BMP facility cannot be released for one year following completion of the work done to address the slope stability issues to ensure that the work successfully corrected the problems. Please coordinate with Michael Majdeski, Environmental Inspector, prior to beginning of the work. If you have any questions, please feel free to contact me at 253-6673.

Sincerely,

Darryl E. Cook, P.E.
Environmental Director

c: Col_Her_BMP YC029_mod.app

Scott Thomas

From: Scott Thomas
Sent: Monday, December 05, 2005 6:02 PM
To: 'Smith, Richard D.'
Cc: Darryl Cook; Mike Woolson
Subject: RE: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

After consulting with Darryl and Mike on this matter, it has been determined that this change would need to come back through Planning as a site plan amendment, complete with revised plans, details and computations for conversion of the dry pond BMP design (as approved under S-63-02) to a wet pond design. Computations would need to show adherence to water quality and stream channel protection volume requirements for a wet, rather than a dry pond BMP. Even though you will not be asking for a change to the assigned point values, water quality volume in the permanent and extended detention pools must follow wet pond, rather than dry pond design. As there will obviously be no forebay or benches, the 4-point value would be in order as opposed to 8 or 10 for a wet pond BMP. *(Note: The subject BMP is BMP # 2.2 in Phase 1 Section 2, off of Pinebrook, Master Plan Pond # 11, County BMP ID Code YC 029).*

Although we have no immediate concerns about use of fencing; however, since a wet pond design requires the benches, a written request for waiver would be needed with the site plan amendment package. The waiver request is where you would mention fencing be used to address safety issues. We would want to see what the planting plan would be for inside the fence and of course, whether the USACOE concurs with a change from a dry pond to a wet pond (ie. are there additional wetland impacts) under the existing wetland permit for Phase 1 Colonial Heritage.

This change would also affect the asbuilts that were submitted for the project, so I would believe that I would not need to review them if a change as such is in order. Perhaps they can be considered as an interim certification.

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

-----Original Message-----
From: Scott Thomas
Sent: Thursday, December 01, 2005 5:27 PM
To: 'Smith, Richard D.'
Subject: RE: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

Rick – I have my thoughts on the matter but I will have to consult with Darryl and Mike as it was their review. I will let you know as soon as I hear from them.

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

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

-----Original Message-----
From: Smith, Richard D. [mailto:rsmith@aesva.com]
Sent: Thursday, December 01, 2005 4:36 PM
To: Scott Thomas
Cc: hprice@aesva.com

Subject: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

Scott,

It has recently come to the attention of U.S. Home that there is an issue of a section of the interior side slope of BMP 2.2 sloughing off. Mike Galli of ECS (the project geo-technical engineer) has been able to determine the cause for this. The results of his investigation have been that water is seeping through the side slope and undermining the slope integrity. This has become an issue since the basin has been converted from a sediment basin to a dry pond, and subsequently the removal of the wet volume of the sediment basin has allowed this water to migrate freely through the side slope. The best solution to remedy this would be to convert this dry pond to a wet pond with a normal pool at the previous sediment basin wet storage volume elevation. U.S. Home will not be asking for an increase in the BMP point value for this pond in the storm water master plan. They are asking, since the residential units are built and in occupied that the aquatic bench/safety bench requirements be waived and a 4' high fence will be erected around the perimeter of the pond. As a plus, water quality volume calculations have been completed here at AES and the total 2" water quality volume will be stored within the normal pool, also the 100-year storm event was raised by less than 0.1'.

Supporting calculations have been completed for the pond, stream channel protection volume, and for water quality and they will be provided to you. Please give me your thoughts on this issue. I decided to use the e-mail format rather than a telephone call initially to allow you time to take this information and use it to review it and the plans together. I will give you a call late tomorrow morning to follow-up this e-mail.

Thank you,
Rick Smith

Richard D. Smith
Project Engineer

AES Consulting Engineers
Williamsburg | Richmond | Gloucester
(757) 253-0040
www.aesva.com

AES Consulting Engineers Confidentiality Note: This e-mail and any attachments are confidential and may be protected by legal privilege. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of this e-mail or any attachment is prohibited. If you have received this e-mail in error, please notify us immediately by returning it to the sender and deleting this copy from your system. Thank you for your cooperation.

FILE - Col Heit
Ph 1 - Sec 2

ECS MID-ATLANTIC, LLC

Geotechnical • Construction Materials • Environmental • Facilities

December 11, 2006

Mr. George Renault
U. S. Homes Corporation
6600 Wiltshire
Williamsburg, Virginia 23188

ECS Project No. 07:6310

Reference: BMP Slope Stability Recommendations
Colonial Heritage Phase I - Section 2
BMP 2.2
James City County, Virginia

Dear Mr. Renault:

ECS Mid-Atlantic, LLC (ECS) was recently requested to observe and comment on the conditions encountered at the existing BMP 2.2 as referenced above. The area had been inspected back in May and September, 2005 and recommendations were forwarded at that time concerning repairs of areas which were experiencing sloughing failures. Based on the previous conditions observed, it was evident that surface runoff was causing or contributing to the slope instabilities. Since that time and subsequent to this report, yard drains were installed and a small earth berm was constructed around the pond area. We had recommended additional rip rap and fabric be installed on all areas up slope that were observed to have a sloughing failure.

ECS personnel visited the site on October 16 and September 17, 2006 to observe the existing conditions of the BMP side slopes as we were informed additional sloughing or failures have occurred. We also understand a county representative has also observed the pond over the last several months and noted that not much has changed since their original observations, which appears to be consistent with ours.

In general, the overall BMP area appeared to be in relatively good condition with a few noted sloughing issues on two sides of the pond. Generally, it appears that the installation of the yard drains and also the soil berm at the top of the pond are functioning as intended, redirecting surface water flow away from the face of the pond slopes. However, we have observed that the rip rap along two faces of the pond slopes, at about the ground water elevation, have sloughed from soils possibly being undermined. Another area near the outfall pipe has eroded around the outfall structure, and we also noticed the concrete spill surface has been undermined. We observed voids underneath the concrete surface. We observed the face of the soils that were

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Williamsburg, VA • Winchester, VA • York, PA

eroded and noticed a sheen on the surface of the soil. We believe this is a result of a layered soil system (as observed during construction) whereby the sandier soils are being washed away from the surface of the clay layers.

The previous recommendations included installing rip-rap and fabric to stabilize the slopes as it appeared and was evident at the time that surface water was creating instabilities on the side slopes. Since that time, the yard drains were installed and the soil berm was placed and it appears to have met its intended purpose. While these implementations have improved the conditions, they have evidently not solved the problem. It now appears that ground water is influencing the underlying soils underneath the rip-rap and the outfall pipe, hence washing the fines from underneath.

We also understand the pond is proposed to be converted to a wet pond. One of the slope issues that are causing distress appears to be due to a high volume of ground water intrusion. In a dry pond condition, there is nothing to stabilize the water pressure at the normalized ground water level, hence the ground water is "pushing" the soils down the slopes or rather through the rip-rap. Additionally, the area underneath the spillway pipe most likely is acting as a conduit for an underground spring or ground water exiting the slope at a higher than normal energy. If the pond is converted to a wet pond, the normalized ground water table should stabilize with the inside pond surface and hence create a balance of pore pressures between the water and side slopes. Thereby, we believe the slopes will be stable below the water line. We further understand in order to convert the pond to a wet condition, either a safety bench or a fence must be installed. We understand there is not enough room to create a safety bench, therefore, a fence is proposed at about the 100 year storm elevation.

Provided the pond can be converted to a wet pond, not much must be done to remediate the areas underneath the normalized pool elevation as these areas will be stabilized by the balance of stresses. In the areas where sloughing has occurred above the normalized pool elevation, we recommend the following.

The contractor and owner have limited access to this region of the site. Most of the operations have to occur with wheel barrel or small hand equipment. Nevertheless, we recommend the areas where the soils have eroded be cleaned and covered with a non-woven geotextile fabric and the surface covered with rip-rap. The purpose of a non-woven geotextile fabric is it will allow water to freely pass through the material, while retaining the soils. The rip-rap will add surface pressure on the fabric to add stability. The rip-rap should be graded similar to other locations. Additionally, in the area that has been undermined at the outfall pipe, we recommend that area be backfilled with flowable fill to fill in the voids.

Alternatively, if and after the pond has been converted to a wet pond condition and the side slopes appears to be continuing to slough from a higher ground water table than the normalized pool elevation, we would then recommend a French Drain be cut into the slope to relieve the

pore pressures faster. The French Drain will allow the water to be released into the basin without washing the fines with it. Drains should consist of No. 57 stone wrapped in non-woven fabric with a minimum thickness of at least 2 ft thick in all dimensions. We recommend a trench be cut into the slope at a point above the observed sloughing (if evident) and terminating below the normalized pool elevation. The trench should be lined with a non-woven fabric and then backfilled with stone. The stone should be wrapped with the fabric with sides overlapping the surface of the trench and then the remaining area should be graded with rip-rap to grade the slope. The trenches should be installed at various locations and points around the two sides of the pond where sloughing was evident. However, we first recommend allowing the pond to get to a normalized pool elevation and observing to see if this alternative is even necessary.

This letter has been prepared in order to aid in the evaluation of this site and to assist the owner, contractor, and designers in determining the appropriate course of action. The report scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to earthwork construction.

We appreciate being of continued service to you during this project and look forward to its successful completion. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ECS Mid-Atlantic, LLC

W. Lloyd Ward, P.E.
Principal Engineer

Michael J. Galli, P.E.
Principal Engineer

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
No. 030684
12/11/06
PROFESSIONAL ENGINEER

Copies: AES Consulting Engineers (Mr. Howard Price)

Scott Thomas

From: Darryl Cook
Sent: Monday, December 05, 2005 2:45 PM
To: Mike Woolson; Scott Thomas
Subject: RE: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

I think it would be appropriate to have a planting plan for the area inside the fence - it could be a compromise between having it be highly maintained turf and a totally natural area. Given the circumstances, we would accept the fence for safety as there is no way to grade in the benches. We would need to look at all the calculations closely, I find it a little hard to believe that there would only be a 0.1 impact to the 100-year storm. Also channel protection would still apply as would the 10-year control through the principal spillway. Having said that, this BMP is located fairly close to the mainstem of Yarmouth north.

-----Original Message-----
From: Mike Woolson
Sent: Friday, December 02, 2005 8:06 AM
To: Scott Thomas; Darryl Cook
Subject: RE: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

As far as the Corps concern you raise, an impact is an impact regardless whether it occurred through the construction of the sediment basin or a permanent BMP pool elevation. That being said however, if you want Steve Martin's official 'no comment', go ahead and ask for it. I can not find the subdivision plan to verify if there were impacts associated with the construction of this basin/BMP, but it appears that there are impacts according to the original SWMP.

As an aside, I find it extremely hard to believe that they would have seepage issues in an area of channel that was determined to not be perennial.

How would we handle this? Everything inside the proposed fence should be allowed to go 'natural', but I can guarantee that they will want to keep it highly maintained and mowed. I would suggest that we also ask for a proposed planting plan and updated maintenance plan.

I believe that this area was one that Jim was having problems with when it was originally installed. We should look at the downstream channel and make sure that it is adequate.

-----Original Message-----
From: Scott Thomas
Sent: Thursday, December 01, 2005 5:26 PM
To: Darryl Cook; Mike Woolson
Subject: FW: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

BMP # 2.2 is in Phase 1 Section 2. It is the BMP just off the end of Pinebrook, identified as master plan Pond # 11 and County BMP ID Code YC 029, County Plan No. S-63-02. I have received a certification package but have not reviewed the asbuilts, construction certification, nor have I performed a final inspection on the BMP.

What are your thoughts under this request? Of the top of my head, I would think a plan amendment (through Planning) would be in order as we would need to see revised computations and confirmation from the USACOE that the dry pond can be converted to a permanent wet pond. Although I'm sure the Corps considered wetland impacts by virtue of the basin being a temporary sediment basin, I do not feel comfortable that the Corp. looked at impacts from a permanent pool situation. In that part of the site, wetlands may not have been an issue though. Also, I would be concerned about safety as the pond is centrally located to lots and road; however, they are proposing a fence.

Mike/Darryl – I believe Phase I Section 2 was your review so it's probably your call ultimately.

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

-----Original Message-----
From: Smith, Richard D. [mailto:rsmith@aesva.com]
Sent: Thursday, December 01, 2005 4:36 PM
To: Scott Thomas
Cc: hprice@aesva.com
Subject: Colonial Heritage Phase I - Section 2 BMP 2.2 conversion from dry pond to wet pond

Scott,

It has recently come to the attention of U.S. Home that there is an issue of a section of the interior side slope of BMP 2.2 sloughing off. Mike Galli of ECS (the project geo-technical engineer) has been able to determine the cause for this. The results of his investigation have been that water is seeping through the side slope and undermining the slope integrity. This has become an issue since the basin has been converted from a sediment basin to a dry pond, and subsequently the removal of the wet volume of the sediment basin has allowed this water to migrate freely through the side slope. The best solution to remedy this would be to convert this dry pond to a wet pond with a normal pool at the previous sediment basin wet storage volume elevation. U.S. Home will not be asking for an increase in the BMP point value for this pond in the storm water master plan. They are asking, since the residential units are built and in occupied that the aquatic bench/safety bench requirements be waived and a 4' high fence will be erected around the perimeter of the pond. As a plus, water quality volume calculations have been completed here at AES and the total 2" water quality volume will be stored within the normal pool, also the 100-year storm event was raised by less than 0.1'.

Supporting calculations have been completed for the pond, stream channel protection volume, and for water quality and they will be provided to you. Please give me your thoughts on this issue. I decided to use the e-mail format rather than a telephone call initially to allow you time to take this information and use it to review it and the plans together. I will give you a call late tomorrow morning to follow-up this e-mail.

Thank you,
Rick Smith

Richard D. Smith
Project Engineer

AES Consulting Engineers
Williamsburg | Richmond | Gloucester
(757) 253-0040
www.aesva.com

AES Consulting Engineers Confidentiality Note: This e-mail and any attachments are confidential and may be protected by legal privilege. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of this e-mail or any attachment is prohibited. If you have received this e-mail in error, please notify us immediately by returning it to the sender and deleting this copy from your system. Thank you for your cooperation.

FILE:

ECS MID ATLANTIC, LLC

Geotechnical Construction Materials Environmental Facilities

May 4, 2005

Mr. Pat Menichino
James City County Environmental Division
P.O. Box 8784
Williamsburg, Virginia 23188

ECS Project No. 07:6310

Reference: BMP Slope Stability Recommendations
Colonial Heritage Phase I - Section 2
BMP2.2
James City County, Virginia

Dear Mr. Menichino:

ECS Mid-Atlantic, LLC (ECS) was recently requested to observe and comment on the conditions encountered at the existing BMP 2.2 as referenced above. We understand several areas of the slopes have experienced sloughing failure. As such the side slopes will need to be repaired prior to the pond being converted to its final design stage.

ECS personnel visited the site on May 2, 2005 to observe the existing conditions of the BMP side slopes. In general, the overall BMP area appeared to be in relatively good condition. The bottom slopes were lined with rip-rap and good vegetation growth was observed throughout. We also observed the entire BMP area was surrounded at the top elevation with silt fence. However, we observed three areas that appeared to have a sloughing failure on the slope. These areas appeared just above the rip-rap zone and appeared to be localized. Based on the conditions observed, the sloughing failure does not appear to be a direct result of ground water influence. Rather, upon further investigation at higher elevations along the slope, it appears that large quantities of surface water was being directed or flowing in the vicinity of the failed areas. The surface water appears to be coming from or being directed by the established grade of the lots and is being channeled in direct paths. At the present time with the silt fence in place, the surface water appears that it is being collected and backing up at distinct points along the silt fence. In one area, the silt fence was actually cut to allow the water to flow out and not back up into the lots.

Based on the observed site conditions, it appears that surface runoff has caused or contributed to the sloughing failure. We recommend a means for collecting the surface water and reducing or distributing the flow energy being transmitted along the slope face. We recommend a minimum of 2 yard drains be installed along the top elevation of the BMP in the areas where it is observed

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dissipate the energy along the slope and hence reduce the potential for sloughing failures. The yard drains should be sized for a minimum of a 12 inch polyethylene pipe to discharge onto the rip-rap barriers. Also, the sloughed/failed areas should be backfilled with similar rip-rap to match the existing slopes.

Lastly, we believe a contributing cause of the sloughing failures is a result of the silt fence entrapping surface water thus creating an excessive volume of water being released at a high energy down the slope. We recommend the silt fence be removed from all areas no longer under construction thus allowing the water to be dissipated or more evenly distributed across the whole slope face.

This letter has been prepared in order to aid in the evaluation of this site and to assist the owner, contractor, and designers in determining the appropriate course of action. The report scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to earthwork construction.

We appreciate being of continued service to you during this project and look forward to its successful completion. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

W. Lloyd Ward, P.E.
Sr. Project Engineer

Michael J. Galli, P.E.
Principal Engineer

Copies: (1) US Home Corporation (Mr. George Renault)
(1) J. L. Massie Contractors (Mr. Mark Massie)
(1) AES Consulting Engineers (Mr. Howard Price)

MJG/let/6310-BMP1-2 Slope.doc

ECS MID-ATLANTIC, LLC
Geotechnical Construction Materials Environmental Facilities

RECEIVED
ENVIRONMENTAL DIVISION

April 11, 2007

Mr. George Renault
Lennar
6600 Wiltshire
Williamsburg, Virginia 23188

ECS Project No. 07:6310

Reference: BMP Slope Stability Recommendations
Colonial Heritage Phase I - Section 2
BMP 2.2
James City County, Virginia

Dear Mr. Renault:

ECS Mid-Atlantic, LLC (ECS) was recently requested to attend a meeting to discuss the conditions encountered at the existing BMP 2.2 and our letter dated December 11, 2006. Present at the meeting were: yourself, John Graziani with Lennar, Howard Price with AES, Darryl Cook with James City County (JCC), and Scott and Mark Massie with Jack L. Massie Contractors. We discussed the recommended remedial measures of surface sloughing and undermining as included in ECS's letter as referenced, in addition to the conversion to a wet pond and the safety fencing. A subsequent site visit was performed at the BMP by all in attendance.

Based on our conversations, it was of the general understanding that JCC approved (verbally) that the pond can be converted to a wet pond condition and for the installation of a safety fence at about the 100 year storm elevation.

We also determined that filter fabric was installed beneath all outfall pipes from the outlet to the toe of the berm (basin elevation). This would include underneath the rip-rap that was grout covered. However, as is evident, voids were observed along and underneath the outfall structures on the west embankment at the southern and north ends. It is also noticeable that some erosion has occurred underneath these areas hence creating the voids. Other areas along this embankment were observed to be similarly showing signs of sloughing as the rip-rap is depressed.

It was agreed with JCC that flowable fill or lean concrete (grout) would be pumped into void areas along and underneath the two outfall structures as referenced above. Grout should be pumped under low pressure continually until it is observed exiting the slope or rip-rap, indicating

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Williamsburg, VA • Winchester, VA • York, PA

the void spaces have been filled; this may take several applications to ensure void spaces are filled.

Our letter had also recommended that the stone in all areas along the western embankment that showed signs of sloughing be removed, the areas cleaned up, and then covered with a non-woven filtration fabric and then covered with stone to grade. However, based on the conditions encountered during the original construction of the pond, the lower elevations were very unstable and hence the soils would likely experience sloughing failures prior to completing the repairs. Conversely, we had a similar situation on the southern embankment whereby part of the problem (besides slope instabilities) was continued soil wash or erosion occurring from surface water runoff from the surrounding grades. In an effort to mitigate problems encountered during construction, a small soil berm was constructed at the top of embankment elevation that forced the surface water from the lots to yard drains that were constructed along the length of the berm at various points. This method of improving drainage conditions to improve slope stability worked as is evident by the previously stabilized slope areas. Areas that had sloughed were then just regraded with rip-rap.

Similarly, it was discussed and approved by JCC to utilize this method of remediation (that proved to be effective in other areas) in this area of the pond. Based on our discussions, a small soil berm will be constructed in conjunction with the safety fence and yard drains will be installed. Based on the area observed, we recommend the berm be constructed from roughly the primary outfall structure on the southern end of the western embankment and extend at least to the secondary outfall pipe on the same side. Prior to constructing the berm, the topsoil should be removed and the berm should be constructed and sloped to direct surface run off to the yard drains. Yard drains should be sized for a minimum of a 6-8 inch polyethylene pipe to discharge onto the rip-rap barriers at about the planned wet pond elevation. Also, the sloughed areas should be backfilled with similar rip-rap to match the existing grades. We recommend this alternate method of repair, as considerable damage to the existing conditions would occur in order to create access for construction equipment to implement a more invasive repair, and hence possibly cause a worse condition.

Need to hold surety for a year after the repairs are completed → However, as discussed in our meeting, if continued sloughing or erosion/undermining issues are still present, the areas must be repaired as originally recommended in our letter whereby the stone is removed and the soils stabilized with filter fabric and regraded with stone.

This letter has been prepared in order to aid in the evaluation of this site and to assist the owner, contractor, and designers in determining the appropriate course of action. The report scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to earthwork construction.

We appreciate being of continued service to you during this project and look forward to its successful completion. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ECS Mid-Atlantic, LLC

FOR

W. Lloyd Ward, P.E.
Principal Engineer

Michael J. Galli, P.E.
Principal Engineer

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
No. 030684
4/11/07
PROFESSIONAL ENGINEER

Attachment: Detail Sheet by AES

Copies: (1) US Home Corporation (Mr. George Renault)
(1) J. L. Massie Contractors (Mr. Mark Massie)
(1) AES Consulting Engineers (Mr. Howard Price)
(1) James City County (Mr. Darryl Cook)

ECS MID-ATLANTIC, LLC
Geotechnical • Construction Materials • Environmental • Facilities

December 11, 2006

Mr. George Renault
U. S. Homes Corporation
6600 Wiltshire
Williamsburg, Virginia 23188

ECS Project No. 07:6310

Reference: BMP Slope Stability Recommendations
Colonial Heritage Phase I - Section 2
BMP 2.2
James City County, Virginia

Dear Mr. Renault:

ECS Mid-Atlantic, LLC (ECS) was recently requested to observe and comment on the conditions encountered at the existing BMP 2.2 as referenced above. The area had been inspected back in May and September, 2005 and recommendations were forwarded at that time concerning repairs of areas which were experiencing sloughing failures. Based on the previous conditions observed, it was evident that surface runoff was causing or contributing to the slope instabilities. Since that time and subsequent to this report, yard drains were installed and a small earth berm was constructed around the pond area. We had recommended additional rip rap and fabric be installed on all areas up slope that were observed to have a sloughing failure.

ECS personnel visited the site on October 16 and September 17, 2006 to observe the existing conditions of the BMP side slopes as we were informed additional sloughing or failures have occurred. We also understand a county representative has also observed the pond over the last several months and noted that not much has changed since their original observations, which appears to be consistent with ours.

In general, the overall BMP area appeared to be in relatively good condition with a few noted sloughing issues on two sides of the pond. Generally, it appears that the installation of the yard drains and also the soil berm at the top of the pond are functioning as intended, redirecting surface water flow away from the face of the pond slopes. However, we have observed that the rip rap along two faces of the pond slopes, at about the ground water elevation, have sloughed from soils possibly being undermined. Another area near the outfall pipe has eroded around the outfall structure, and we also noticed the concrete spill surface has been undermined. We observed voids underneath the concrete surface. We observed the face of the soils that were

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eroded and noticed a sheen on the surface of the soil. We believe this is a result of a layered soil system (as observed during construction) whereby the sandier soils are being washed away from the surface of the clay layers.

The previous recommendations included installing rip-rap and fabric to stabilize the slopes as it appeared and was evident at the time that surface water was creating instabilities on the side slopes. Since that time, the yard drains were installed and the soil berm was placed and it appears to have met its intended purpose. While these implementations have improved the conditions, they have evidently not solved the problem. It now appears that ground water is influencing the underlying soils underneath the rip-rap and the outfall pipe, hence washing the fines from underneath.

We also understand the pond is proposed to be converted to a wet pond. One of the slope issues that are causing distress appears to be due to a high volume of ground water intrusion. In a dry pond condition, there is nothing to stabilize the water pressure at the normalized ground water level, hence the ground water is "pushing" the soils down the slopes or rather through the rip-rap. Additionally, the area underneath the spillway pipe most likely is acting as a conduit for an underground spring or ground water exiting the slope at a higher than normal energy. If the pond is converted to a wet pond, the normalized ground water table should stabilize with the inside pond surface and hence create a balance of pore pressures between the water and side slopes. Thereby, we believe the slopes will be stable below the water line. We further understand in order to convert the pond to a wet condition, either a safety bench or a fence must be installed. We understand there is not enough room to create a safety bench, therefore, a fence is proposed at about the 100 year storm elevation.

Provided the pond can be converted to a wet pond, not much must be done to remediate the areas underneath the normalized pool elevation as these areas will be stabilized by the balance of stresses. In the areas where sloughing has occurred above the normalized pool elevation, we recommend the following.

The contractor and owner have limited access to this region of the site. Most of the operations have to occur with wheel barrel or small hand equipment. Nevertheless, we recommend the areas where the soils have eroded be cleaned and covered with a non-woven geotextile fabric and the surface covered with rip-rap. The purpose of a non-woven geotextile fabric is it will allow water to freely pass through the material, while retaining the soils. The rip-rap will add surface pressure on the fabric to add stability. The rip-rap should be graded similar to other locations. Additionally, in the area that has been undermined at the outfall pipe, we recommend that area be backfilled with flowable fill to fill in the voids.

Alternatively, if and after the pond has been converted to a wet pond condition and the side slopes appears to be continuing to slough from a higher ground water table than the normalized pool elevation, we would then recommend a French Drain be cut into the slope to relieve the

pore pressures faster. The French Drain will allow the water to be released into the basin without washing the fines with it. Drains should consist of No. 57 stone wrapped in non-woven fabric with a minimum thickness of at least 2 ft thick in all dimensions. We recommend a trench be cut into the slope at a point above the observed sloughing (if evident) and terminating below the normalized pool elevation. The trench should be lined with a non-woven fabric and then backfilled with stone. The stone should be wrapped with the fabric with sides overlapping the surface of the trench and then the remaining area should be graded with rip-rap to grade the slope. The trenches should be installed at various locations and points around the two sides of the pond where sloughing was evident. However, we first recommend allowing the pond to get to a normalized pool elevation and observing to see if this alternative is even necessary.

This letter has been prepared in order to aid in the evaluation of this site and to assist the owner, contractor, and designers in determining the appropriate course of action. The report scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to earthwork construction.

We appreciate being of continued service to you during this project and look forward to its successful completion. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ECS Mid-Atlantic, LLC

W. Lloyd Ward, P.E.
Principal Engineer

Michael J. Galli, P.E.
Principal Engineer

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
No. 030684
12/11/06
PROFESSIONAL ENGINEER

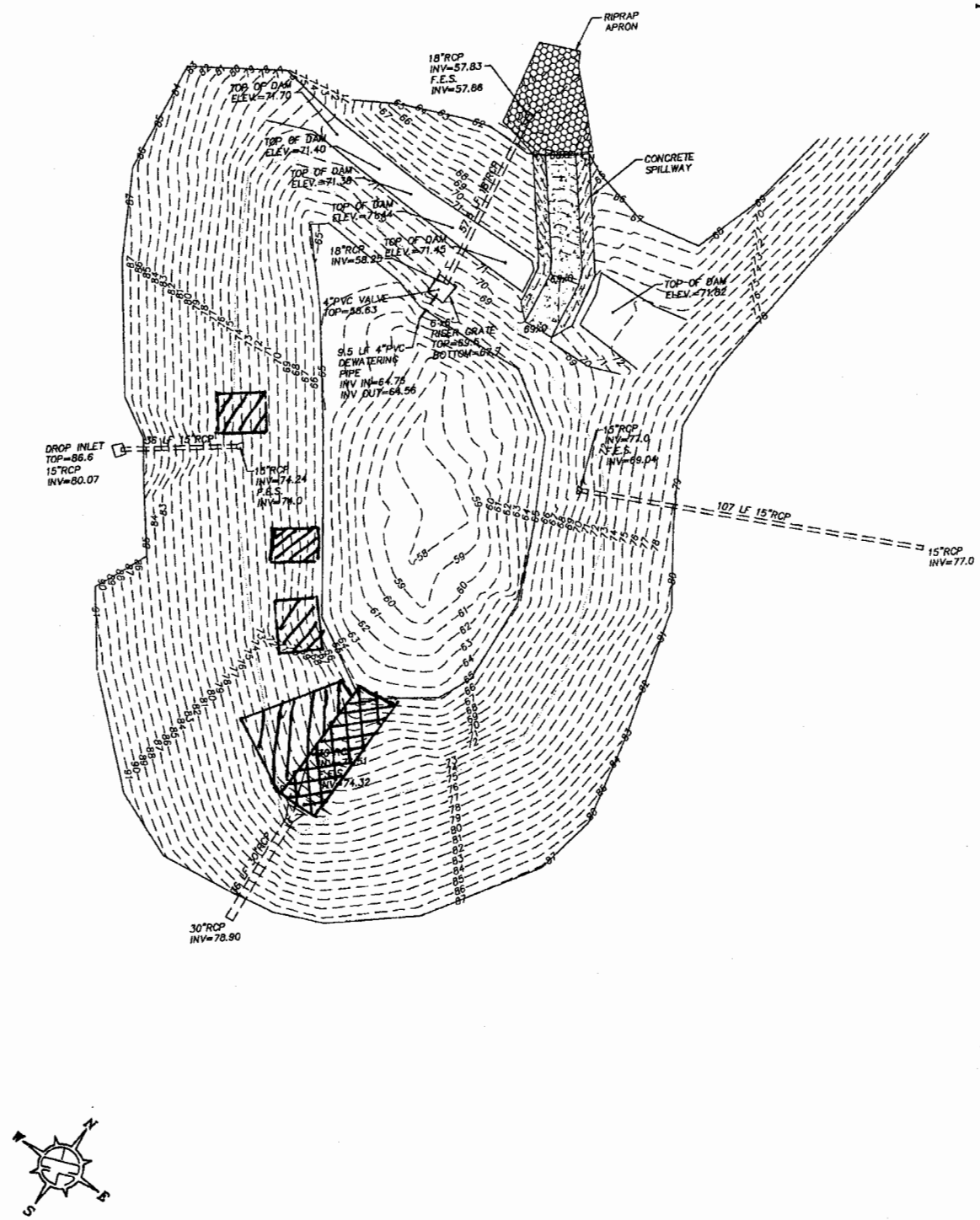
Copies: AES Consulting Engineers (Mr. Howard Price)

COLONIAL HERITAGE
BMP 2.2
JCC, VA

ECS LLC
MID-ATLANTIC

DISTRESSED AREA LOCATION PLAN

ECS REVISIONS	
ENGINEER	MJG
DRAFTING	RNL
SCALE	NTS
PROJECT NO.	07-6310
SHEET	1
DATE	03/29/07



ENVIRONMENTAL – STORMWATER TRANSMITTAL

PROTECTING RESOURCES PRIDE IN DELICATE ENVIRONMENTS

James City County Jamestown 1607

COUNTY PLAN NO: S-63-02 / SP-088-02

BMP ID CODE: YC-029

WATERSHED: YARMOUTH CREEK

- [x] ENTIRE RECORD FILE
- [ ] ASBUILTS
- [ ] CONSTRUCTION CERTIFICATION
- [ ] COMPUTATIONS
- [ ] OTHER: _____

NAME: MIKE MAJDESKI

SIGNATURE: [signature]

DATE: 7/31/08

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

Phone: (757) 253-0040
Fax: (757) 220-8994

LETTER OF TRANSMITTAL

ATTN: **Darryl Cook**

CO.: JCC Env. Div.

Address:

cc:

DATE	JOB NO.
11-17-06	8881-8

FROM: Richard D. Smith

RE
Colonial Heritage, Phase I, Section 2
BMP 2.1 and BMP 2.2 Conversion

WE ARE SENDING YOU THE FOLLOWING ITEMS: ☒ Attached ☐ Under separate cover via

☐ Original(s) ☒ Print(s) ☐ Plan(s) ☐ Specification(s) ☐ Change Order

☐ Copy of letter(s) ☐ Other:

RECEIVED
NOV 17 2006
ENVIRONMENTAL DIVISION

COPIES	DATE	No. of Pages	DESCRIPTION
2	10-30-06		Hydrograph Pond Report
2	10-30-06		Sheet 25 Redline Mark-up

THESE ARE TRANSMITTED as checked below:

☒ For your approval ☐ For your signature ☐ For review and comment

☐ For your use ☐ As you requested ☐ As requested by:

☐ Other:

REMARKS:
Darryl,
The attached items are in response to the telephone conversation you had with Howard Price of AES for the conversion of the exisitng dry ponds to wet ponds. If you need further assitance please contact Howard Price or myself.
Thanks,
Rick Smith

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

File name: S:\Jobs\8881\08-Phase 1 Section 2\Wordproc\Document\Transmittal 11-17-06 BMPS 2-1 2-2.doc
Form Rev. 7/02

BMP 2.1

1. Make new release pipes reverse grade - not flat

2. ~~Compare hydrographs of pre-condition to original plan~~

3. What about as-built on the pond dimensions - top of dam + volume

1 yr vol = 39,646 ft^3

rel = 0.46 cfs - cal.

actual - 0.34 cfs - routing

BMP 2.2

1. Orifice is 3" on plan - 4" in calcs. ✓

2. ~~No as-built info on plan for dewatering device~~

3. Weir coeff. diff for conc. weir 2.6 vs 3.33 for BMP 2.1

4-6 - same as 1-3 for BMP 2.1

1-yr storm volume = 34,000 ft^3

1 yr rel ⇒ 0.39 cfs

calculated → routed = 0.43 cfs

NOV 17

Need to deal w/ pipe outfalls - not in pipes as req'd.

should be conc.-formed ditches

7. Safety - fencing -

5/

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

County BMP ID Code (if known): YC-029

Name of Facility: Colonial Heritage P1 S2 BMP No.: 2 of 2 Date: 6/27/08

Location: Colonial Heritage Retirement Community

Name of Owner: US Homes Corporation

Name of Inspector: M. Majdeski

Type of Facility: Wet Pond - Converted from Dry Detention Basin

Weather Conditions: Sunny 84° Type: ☑ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height		✓		
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: ☑ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions	✓			
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☑ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			
Trash & Debris		✓		
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations):				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow):				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

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

Remarks:

POND IN GOOD CONDITION. NO ISSUES.

Overall Environmental Division Internal Rating: 4/5

Signature: [illegible] **Date:** 6/20/08

Title: ENV. INSPECTOR

SWMProg\BMP\CoInspProg\InspForms\DetRet.wpd

Date Record Created:

Created By:

WS_BMPNO: YC029

Print Form

PRINTED ON:
Saturday, March 13, 2010
3:22:37 PM

WATERSHED	YC
BMP ID NO	029
PLAN NO	S-63-02
TAX PARCEL	(24-3)(1-32)
PIN NO	
CONSTRUCTION DATE	5/28/2004
PROJECT NAME	Colonial Heritage Ph 1 Sec 2
FACILITY LOCATION	Colonial Heritage Retirement Community
CITY-STATE	Williamsburg VA
CURRENT OWNER	US Homes Corporation
OWNER ADDRESS	6895 Richmond Rd
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg VA 23188
OWNER PHONE	757-258-2705
MAINT AGREEMENT	No
EMERG ACTION PLAN	No

Get Last BMP No

Return to Menu

MAINTENANCE PLAN	No	CTRL STRUC DESC	
SITE AREA acre	12.71	CTRL STRUC SIZE inches	72
LAND USE	Mixed Use	OTLT BARRL DESC	
old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	18
JCC BMP CODE	F2 Dry ED with forebay		
POINT VALUE	4	EMERG SPILLWAY	Yes
		DESIGN HW ELEV	69.73
		PERM POOL ELEV	66.25
SVC DRAIN AREA acres	11.5	2-YR OUTFLOW cfs	11.11
		10-YR OUTFLOW cfs	18.05
		REC DRAWING	Yes
SERVICE AREA DESCRI	Residential Community		
IMPERV AREA acres	0.00	CONSTR CERTIF	Yes
RECV STREAM			
EXT DET-WQ-CTRL	No	LAST INSP DATE 6/27/2008	Inspected by:
WTR QUAL VOL acre-ft		INTERNAL RATING 3/5	
CHAN PROT CTRL	No		
CHAN PROT VOL acre-ft		MISC/COMMENTS	
SW/FLOOD CONTROL	No	Master plan pond # 11	
GEOTECH REPORT	No		

Additional Comments: