

# Stormwater Division

## MEMORANDUM

**DATE:** March 12, 2010  
**TO:** Michael J. Gillis, Virginia Correctional Enterprises Document Management Services  
**FROM:** Jo Anna Ripley, Stormwater  
**PO:** 270712  
**RE:** Files Approved for Scanning

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**General File ID or BMP ID:** WC102

**PIN:** 1330800201

**Subdivision, Tract, Business or Owner**

**Name (if known):**

Wellington

**Property Description:**

Recreation Area Section 2

**Site Address:**

3927 Bournemouth Bend

*(For internal use only)*

**Box** 22

**Drawer:** 9

**Agreements:** (in file as of scan date)

Y

**Book or Doc#:**

080008380

**Page:**

Comments

Date Record Created: 3/2/2010

WS BMPNO: WC102

Print Form

Created By: Michael Majdeski

**PRINTED ON:**  
Friday, March 12, 2010  
3:21:41 PM

WATERSHED WC  
 BMP ID NO 102  
 PLAN NO SP-128-07  
 TAX PARCEL 1330800201  
 PIN NO  
 CONSTRUCTION DATE 10/20/2008  
 PROJECT NAME Wellington Clubhouse  
 FACILITY LOCATION Wellington Subdivision-3927 Bournemouth  
 CITY-STATE Toano, VA  
 CURRENT OWNER Wellington HOA  
 OWNER ADDRESS 632 Hampton Hwy  
 OWNER ADDRESS 2  
 CITY-STATE-ZIP CODE Yorktown VA 23693  
 OWNER PHONE 757-867-8800  
 MAINT AGREEMENT Yes  
 EMERG ACTION PLAN No

Get Last BMP No

Return to Menu

**MAINTENANCE PLAN**

SITE AREA acre

LAND USE

old BMP TYP

JCC BMP CODE

POINT VALUE

Yes

3.59

Residential

F2 Dry ED with forebay

CTRL STRUC DESC

CTRL STRUC SIZE inches

OTLT BARREL DESC

OTLT BARREL SIZE inch

12

EMERG SPILLWAY

DESIGN HW ELEV

PERM POOL ELEV

2-YR OUTFLOW cfs

10-YR OUTFLOW cfs

REC DRAWING

0.34

1.68

Yes

SERVICE AREA DESCRI

IMPERV AREA acres

RECV STREAM

EXT DET-WQ-CTRL

WTR QUAL VOL acre-ft

CHAN PROT CTRL

CHAN PROT VOL acre-ft

SW/FLOOD CONTROL

GEO TECH REPORT

Mixed impervious and grassed areas

0.82

LAST INSP DATE 1/6/2010

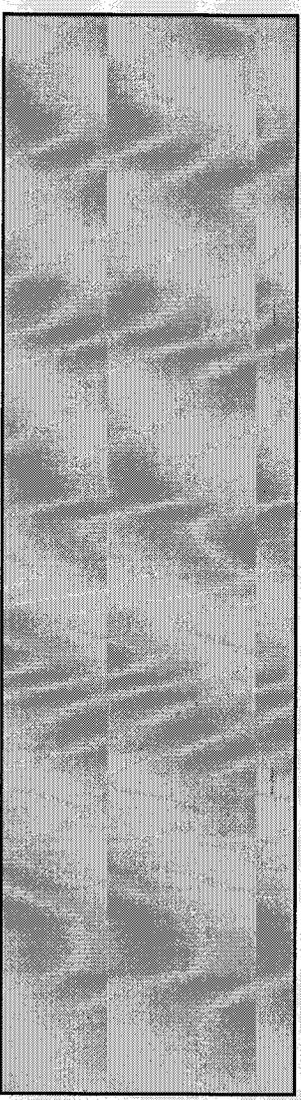
INTERNAL RATING 3/5

MISC/COMMENTS

Inspected by:

Michael Majdeski

Additional Comments:



080 008380

Return to:  
County Attorney's Office  
James City County  
101-C Mounts Bay Road  
Williamsburg, VA 23185

COUNTY OF JAMES CITY, VIRGINIA

**COPY**

DECLARATION OF COVENANTS  
INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 6<sup>TH</sup> day of MARCH, 2008, between WELLINGTON ESTATES HOA, and all successors in interest, ("COVENANTOR(S)"), owner(s) of the following property:

Parcel Identification Number: 1330800201  
Legal Description: RECREATION 5-2 WELLINGTON  
Project or Subdivision Name: WELLINGTON COMMUNITY CLUBHOUSE & POOL  
Document No. 050023792  
OR Deed Book \_\_\_\_\_, Page No. \_\_\_\_\_,  
and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

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

1. The COVENANTOR(S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.
2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the SYSTEM to ensure that the SYSTEM is properly maintained.
3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the SYSTEM for the COUNTY, its agent and its contractor.
4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the SYSTEM for the purpose of inspecting, monitoring, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM.
5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the SYSTEM in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the SYSTEM for the cost of the work and any applicable penalties.

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)

H.R. ASHE

Print Name

PRESIDENT

Title

ACKNOWLEDGMENT

COMMONWEALTH OF VIRGINIA  
CITY/COUNTY OF YORK, to wit:

I hereby certify that on this 6 day of MARCH, 2008, before the subscribed, a Notary Public for the Commonwealth of Virginia, personally appeared H.R. ASHE and did acknowledge the foregoing instrument to be his/her Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 6 day of MARCH, 2008.

[SEAL]

Notary Registration Number: # 339803

My Commission expires: 5/31/2011

[Signature]  
Notary Public



COVENANTOR(S)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

ACKNOWLEDGMENT

COMMONWEALTH OF VIRGINIA  
CITY/COUNTY OF \_\_\_\_\_, to wit:

I hereby certify that on this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before the subscribed, a Notary Public for the Commonwealth of Virginia, personally appeared \_\_\_\_\_ and did acknowledge the foregoing instrument to be his/her Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

[SEAL]

\_\_\_\_\_  
Notary Public

Notary Registration Number: \_\_\_\_\_

My Commission expires: \_\_\_\_\_

Approved as to form:

Alankuraman  
County Attorney

This Declaration of Covenants prepared by:

Name: Philip V. Doggett

Print Name: PHILIP V. DOGGETT

Title: PROJECT MANAGER

Address: 632 HAMPTON HIGHWAY  
YORKTOWN, VA. 23693

Phone Number: 757-867-8800

**VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY**

This document was admitted to record on 25 Mar 08  
at 2:51 AM/PM. The taxes imposed by Virginia Code  
Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

STATE TAX LOCAL TAX ADDITIONAL TAX

\$ \_\_\_\_\_ \$ \_\_\_\_\_ \$ \_\_\_\_\_  
TESTE: BETSY B. WOOLRIDGE, CLERK

BY: Betsy B. Woolridge Clerk

(drainage1.pre)

COMMONWEALTH OF VIRGINIA



OFFICIAL RECEIPT  
WILLIAMSBURG/JAMES CITY COUNTY CIRCUIT  
DEED RECEIPT

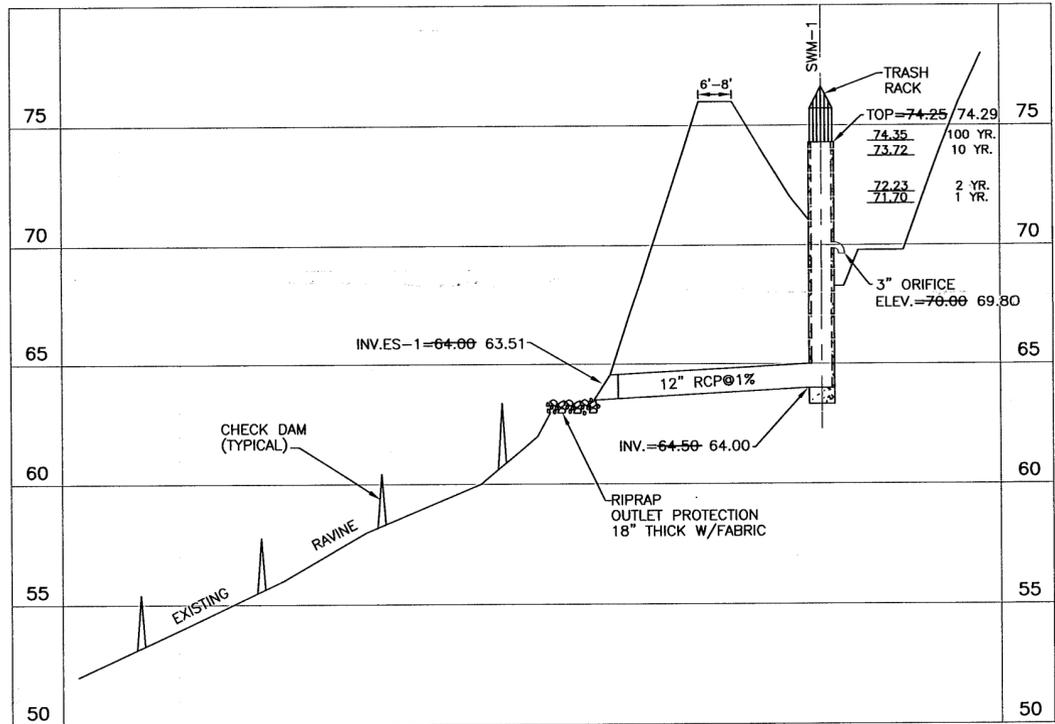
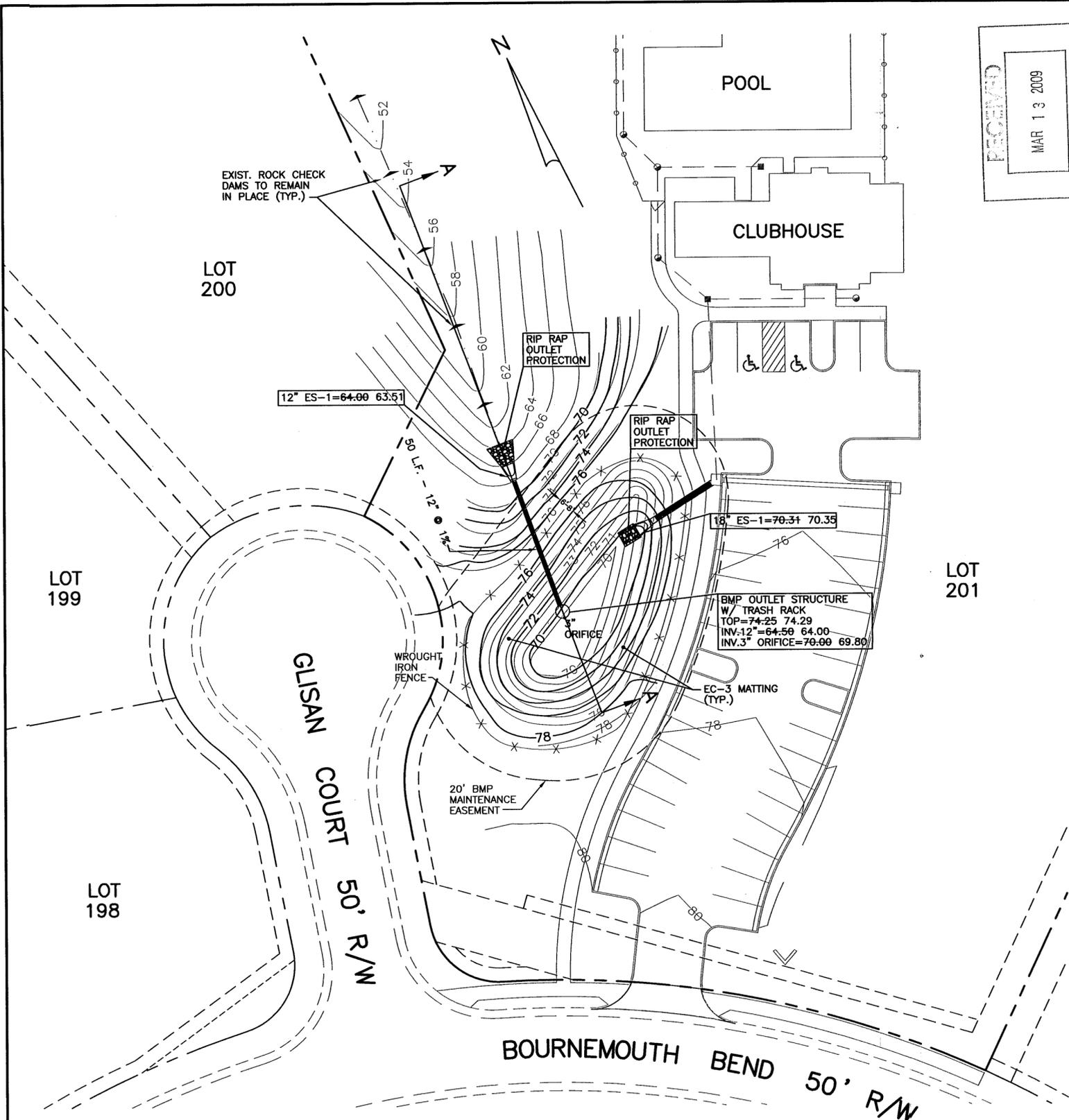
DATE: 09/25/08 TIME: 14:51:22 ACCOUNT: 830CLR090008980 RECEIPT: 0800001205E  
CASHIER: CHB REG: WD45 TYPE: DEC PAYMENT: FULL PAYMENT  
INSTRUMENT : 080008980 BOOK: PAGE: RECORDED: 09/25/08 AT 14:51  
GRANTOR: WELLINGTON ESTATES HOA EX: N LOC: 00  
GRANTEE: COUNTY OF JAMES CITY EX: N PCT: 100%  
AND ADDRESS :  
RECEIVED OF : 0000 DATE OF DEED: 09/06/08  
CHECK: \$16.00  
DESCRIPTION 1: WELLINGTON COMMUNITY CLUBHOUSE & POOL PAGES: 3  
2: NAMES: 0  
CONSIDERATION: .00 A/VAL: .00 MAP:  
PIN:  
90: DEEDS 14.50 145 VSLF 1.50  
TENDERED : 16.00  
AMOUNT PAID: 16.00  
CHANGE AMT : .00

CLERK OF COURT: BETSY B. WOOLAIDGE

RECORDED  
MAR 13 2009  
ENVIRONMENTAL DIVISION

**STORMWATER POND MAINTENANCE PLAN (FROM SP-128-07)**  
BOTH ROUTINE AND NON-ROUTINE MAINTENANCE ARE REQUIRED TO ENSURE THE PERFORMANCE OF THESE FACILITIES.

1. ROUTINE MAINTENANCE - THE STORMWATER BASIN WILL BE INSPECTED AFTER HEAVY RAINS BETWEEN THE TIME OF CONSTRUCTION AND FULL VEGETATION ESTABLISHMENT. INSPECTION FOR OTHER CONDITIONS WILL BE MADE TWICE PER YEAR. WHEN NECESSARY, REPAIRS WILL BE PERFORMED WITHIN THIRTY (30) DAYS OF DEFICIENCY REPORT.
  - A. SITE INSPECTIONS - INSPECTIONS ARE THE BASE OF THE ROUTINE MAINTENANCE PROGRAM. THEY SHOULD FOCUS ON BOTH THE AESTHETIC QUALITY AND STRUCTURAL INTEGRITY OF THE FACILITY. RECORDS OF ALL INSPECTIONS ARE TO BE KEPT DETAILING CONDITIONS FOUND AND ANY REQUIRED ACTIONS ALONG WITH WHEN ALL MAINTENANCE IS ACCOMPLISHED.
  - B. GRASS MOWING - THE GRASS SHOULD BE MAINTAINED AT A HEIGHT OF 3-9 INCHES.
  - C. BANK STABILIZATION - ANY AREAS THAT HAVE BECOME UNSTABLE SHOULD BE PROTECTED AND STABILIZED.
  - D. WEED CONTROL - ANY WEEDS OR UNDESIRABLE PLANTS FOUND GROWING ON THE SITE ARE TO BE REMOVED.
  - E. INSECT/MOSQUITO CONTROL - INSECT ACTIVITY, INCLUDING MOSQUITO SHOULD BE MONITORED AND APPROPRIATE ACTION TAKEN.
  - F. TRASH AND LITTER WILL BE REMOVED FROM THE SITE AS REQUIRED. INLET AND OUTLET STRUCTURES SHALL RECEIVE EXTRA ATTENTION.
  - G. VEGETATION SURVIVAL WILL BE MONITORED TO ENSURE ADEQUATE COVERAGE OF THE FACILITY. DENUDED AREAS OR DEAD PLANT STOCK WILL BE REPLANTED AS NEEDED.
2. NON-ROUTINE MAINTENANCE - THESE TASKS SHOULD BE ACCOMPLISHED AS REQUIRED TO MAINTAIN THE FACILITY'S STRUCTURAL INTEGRITY AND EFFECTIVENESS. REPAIR AND/OR REPLACEMENT OF THE OUTFALL AND INLET PIPING SYSTEMS EVERY 10-15 YEARS. PARTICULAR ATTENTION WILL BE GIVEN TO THE ACCUMULATION OF SEDIMENT IN THE FOREBAY AND WITHIN THE FLOOR AND MICRO POOL AREAS. IT IS ANTICIPATED THAT CLEAN-OUT OF THE FOREBAY WILL BE NEEDED EVERY 5-7 YEARS. SPOIL MATERIAL WILL BE TAKEN OFF-SITE. PROPER SEDIMENTATION AND EROSION CONTROL PRACTICES WILL BE FOLLOWED.



SECTION A - A  
SCALE: HORIZ.: 1"=30'  
VERT.: 1"=5'

NOTE: EXISTING CONTOURS TAKEN FROM WELLINGTON CLUBHOUSE SITE PLAN BY LAND PLANNING SOLUTIONS DATED NOVEMBER 30, 2007.

# 3927 BOURNEMOUTH BEND

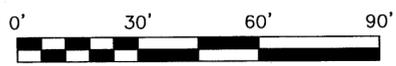
**BMP AS-BUILT**

**WELLINGTON CLUBHOUSE**  
WELLINGTON - SECTION II  
PARCEL 201  
JAMES CITY COUNTY, VIRGINIA, VIRGINIA

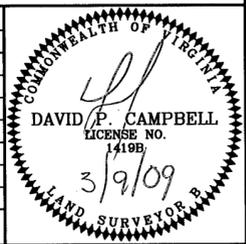
CAMPBELL LAND SURVEYING, INC.		SCALE	DATE
P.O. BOX 855, YORKTOWN, VA. 23692		1"=30'	3/9/09
(757) 890-0837		DESIGN BY	SHEET
DPC	MJM	CHK'D. BY	1 OF 1
WELL-2-REC-CTR.DWG		DPC	09-0057
F.B. 385, PG. 60			

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.

*[Signature]*  
DAVID P. CAMPBELL, C.L.S. 1419B



NO.	DATE	REVISIONS	BY





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

Project Name: WELLINGTON CLUBHOUSE  
County Plan No.: SP-128-07  
Stormwater Management Facility: DRY DETENTION BASIN  
BMP Phase #:  I  II  III  
 Information Package Received. Date/By: 3/13/09 M. MADDESKI  
 Completeness Check:  
 Record Drawing Date/By: 4/14/2009 MPM  
 Construction Certification Date/By: \_\_\_\_\_  
 RD/CC Standard Forms (Required for all BMPs after Feb 1<sup>st</sup> 2001 Only)  
 Insp/Maint Agreement # / Date: 0500 28792 / 3/6/09  
 BMP Maintenance Plan Location: ON AS-BUILT DRAWINGS  
 Other: \_\_\_\_\_  
 Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review  
 Yes  No Location: PLAN REVIEW COMMENTS  
 Assign County BMP ID Code #: Code: W C 102  
 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: 4/16/2009  
 Record Drawing (RD) Review Date: 4/14/2009  
 Construction Certification (CC) Review Date: 4/15/2009  
 Actions:  
 No comments.  
 Comments. Letter Forwarded. Date: EMAIL + PHONE 6/19/09  
 Record Drawing (RD)  
 Construction Certification (CC)  
 Construction-Related (CR) RE INSPECTION OKAY  
 Site Issues (SI) RE INSPECTION OKAY  
 Other: \_\_\_\_\_  
 Second Submission: \_\_\_\_\_  
 Reinspection (if necessary): 3/14/2009  
 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: M MADDESKI

Date: 3/2/10

Chief Engineer: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*\* See separate checklist, if needed.



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

County BMP ID Code (if known): ~~WIC102~~ **WIC102**

Name of Facility: WELLINGTON CLUBHOUSE DRY POND BMP No.: 1 of 1 Date: 4/15/2009

Location: WELLINGTON SUBDIVISION - 3927 BOURNEMOUTH BEND

Name of Owner: WELLINGTON HOA / AMERICAN EASTERN (DEVELOPER)

Name of Inspector: M. MAJDESKI

Type of Facility: DRY DETENTION BASIN

Weather Conditions: CLOUDY / 51° 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.

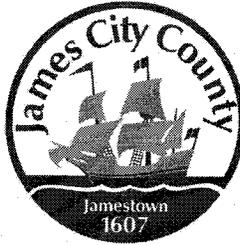
Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
<b>Embankments and Side Slopes:</b>				
Grass Height		✓		re-seed w/ slopes
Vegetation Condition		✓		
Tree Growth	✓			
Erosion	✓			
Trash & Debris		✓		remove trash
Seepage	✓			
Fencing or Benches	N/A			
<b>Interior Landscaping/Planted Areas:</b> <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input checked="" type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions		✓		re-seed slopes
Trash & Debris		✓		
Floating Material	✓			
Erosion	✓			
Sediment		✓		remove sed from outlet into ponds
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
<b>Water Pools:</b> <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			
Trash & Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
<b>Inflows (Describe Types/Locations):</b>				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
<b>Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):</b>				
Condition of Structure		✓		GROUT INSIDE BLOCK
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
<b>Principal Outlet Structure - Barrel, Conduit, etc. :</b>				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
<b>Emergency Spillway (Overflow):</b>				
Vegetation				
Lining	N/A			
Erosion				
Trash & Debris				
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
<b>Nuisance Type Conditions:</b>				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
<b>Surrounding Perimeter Conditions:</b>				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			
Other				
<b>Remarks:</b>				
<p>REPAIR EROSION NEAR POND NEAR ENTRANCE  REPAIR WASHOUT NEAR OUTFALL (ABOVE)</p>				
Overall Environmental Division Internal Rating: <u>3/5</u>				
Signature: <u>M. P. Hill</u>			Date: <u>4/15/2009</u>	
Title: <u>ENVIRONMENTAL INSPECTOR</u>				

SWMPProg\BMP\CoInspProg\InspForms\DetRet.wpd



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: WELLINGTON CLUBHOUSE  
Structure/BMP Name: DRY DETENTION  
Project Location: WELLINGTON SUBDIVISION - SECTION II, 3927 BOURNEMOUTH BEND  
BMP Location: ADJACENT TO PARKING LOT  
County Plan No.: SP - 128 - 07

Project Type:  Residential  Business Tax Map/Parcel No.: 1330800201  
 Commercial  Office BMP ID Code (if known):  
 Institutional  Industrial Zoning District:: R1  
 Public  Roadway Land Use: RESIDENTIAL  
 Other Site Area (sf or acres): 3.59 AC

Brief Description of Stormwater Management/BMP Facility:

NEW  
DRY DETENTION POND TO SERVE CLUBHOUSE + PARKING LOT

Nearest Visible Landmark to SWM/BMP Facility: WELLINGTON CLUBHOUSE

Nearest Vertical Ground Control ( if known ):

JCC Geodetic Ground Control  USGS  Temporary  Arbitrary  Other

Station Number or Name:

Datum or Reference Elevation: NGVD

Control Description: EXISTING SUBDIVISION - BENCHMARKS

Control Location from Subject Facility: TOP OF CURB AT SITE

**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: AMERICAN EASTERN  
Name of Professional Firm Who Routinely Monitored Construction: \_\_\_\_\_  
Date of Completion for SWM/BMP Facility: \_\_\_\_\_  
Date of Record Drawing/Construction Certification Submittal: 3/9/09

*( 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: WELLINGTON H.O.A. American Eastern  
Mailing Address: 632 Hampton Hwy  
Yorktown VA 23693  
Business Phone: 867-8800 Fax: 867-7188  
Contact Person: Dick Ashe Title: Pres.

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: LAND PLANNING SOLUTIONS  
Mailing Address: 5857 HARBOUR VIEW BLVD SUITE 202  
SUFFOLK, VA 23435-2657  
Business Phone: 935-9014  
Fax: 935-9015  
Responsible Plan Preparer: JEFFREY HUENTELMAN, PE  
Title: PE  
Plan Name: WELLINGTON CUBHOUSE  
Firm's Project No. AEAC003  
Plan Date: 11/30/07  
Sheet No.'s Applicable to SWM/BMP Facility: C001 / C300 / C500 / /

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*  
Name: AMERICAN EASTERN  
Mailing Address: 632 HAMPTON HIGHWAY  
YORKTOWN, VA 23693  
Business Phone: 867-8800  
Fax: 867-7188  
Contact Person: H.R. ASHE  
Site Foreman/Supervisor: MATTHEW LUSK  
Specialty Subcontractors & Purpose (for BMP Construction Only): \_\_\_\_\_

**Section 4 - Professional Certifications:**

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

**Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities**

**Record Drawing Certification**

Firm Name: CAMPBELL LAND SURVEYING  
Mailing Address: P.O. BOX 855  
Yorktown, VA 23692-0855  
Business Phone: 890-0837  
Fax: 898-4537

Name: DAVID P. CAMPBELL  
Title: LAND SURVEYOR  
Signature: [Signature]  
Date: 3/9/09

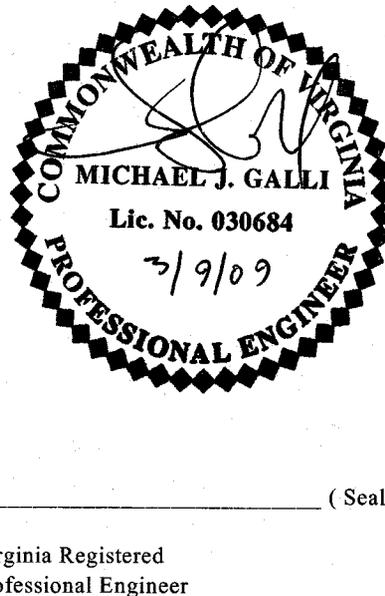
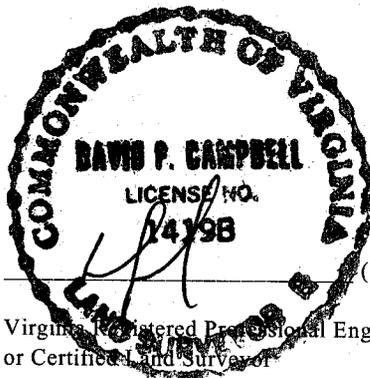
**Construction Certification**

Firm Name: ECS Mid-Atlantic, LLC  
Mailing Address: 108 Ingram Rd, St. 1  
Williamsburg, VA 23188  
Business Phone: (757) 229-6677  
Fax: 229-9978

Name: M. chael J. Galli  
Title: Principal Engineer  
Signature: [Signature]  
Date: 3/9/09

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.

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.



**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.)

X

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.)*

X

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.

X

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

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

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

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

- XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plan sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

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

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- XX 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.
- N/A 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.
- \_\_\_ 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- \_\_\_ 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- ~~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.
- ~~XX~~ 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.



# ECS MID-ATLANTIC, LLC

Geotechnical • Construction Materials • Environmental • Facilities



February 4, 2008

Mr. Scott Ashe  
American Eastern  
632 Hampton Hwy.  
Yorktown, Virginia 23693

SP-128-07

ECS Project No. 07:9623

Reference: Geotechnical Exploration and Engineering Analysis  
Proposed BMP  
Wellington Recreation Area  
James City County, Virginia

Dear Mr. Ashe,

ECS Mid-Atlantic, LLC has completed a subsurface exploration and engineering evaluation of the proposed BMP located at the above referenced site. We have been requested to issue recommendations with respect to infiltration rates at the site for the proposed BMP based on hand auger information and visual classification. This portion of the project has been completed in general accordance with our proposal No. 07:13740 dated January 29, 2008 and signed by you.

### Infiltration

Based on the provided plan, boring locations HA-1 and HA-2 are located within a proposed BMP next to the recreation center. The following table summarizes estimated infiltration rates based on the USDA textural classification. One basic soil type was encountered at the hand auger boring locations:

- *Soil type I: Silty Sand (SM)* – Estimated Infiltration rate is 0.5 to 2 inches per hour (or greater), Hydrologic Soil Grouping A to B

Boring Location	Soil type I depth (feet)	Water Table Depth (feet)
HA-1	0-6	Not Encountered
HA-2	0-6	Not Encountered

Typically, soils with the Hydrologic Soil Group designations of A and B are considered suitable for infiltration purposes. Some soils designated as C type soils are considered suitable for infiltration practices but these soils would need to be evaluated on a case specific basis. Soils with group designations of D are not considered suitable.

108 Ingram Road, Unit 1 • Williamsburg, Virginia 23188 • (757) 229-6677 • Fax (757) 229-9978 • www.ecslimited.com

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\*testing services only

Wellington Recreation Area  
James City County, Virginia  
ECS Project No. 07-9623  
Page 2

The water table was not encountered through the depths explored of 6 feet below existing ground surface at the hand auger locations.

**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. 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 soil and foundation characteristics.

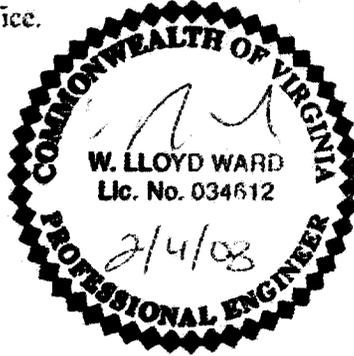
We have appreciated being of service to you during the design phase of this project and look forward to its successful construction. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ECS MID-ATLANTIC, LLC.

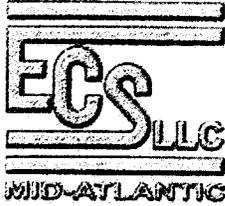


W. Lloyd Ward, P.E.  
Principal Engineer



- Attachments: - Boring Location Plan (1)
- Hand Auger Boring Logs (1)
- Unified Soil Classification System (1)

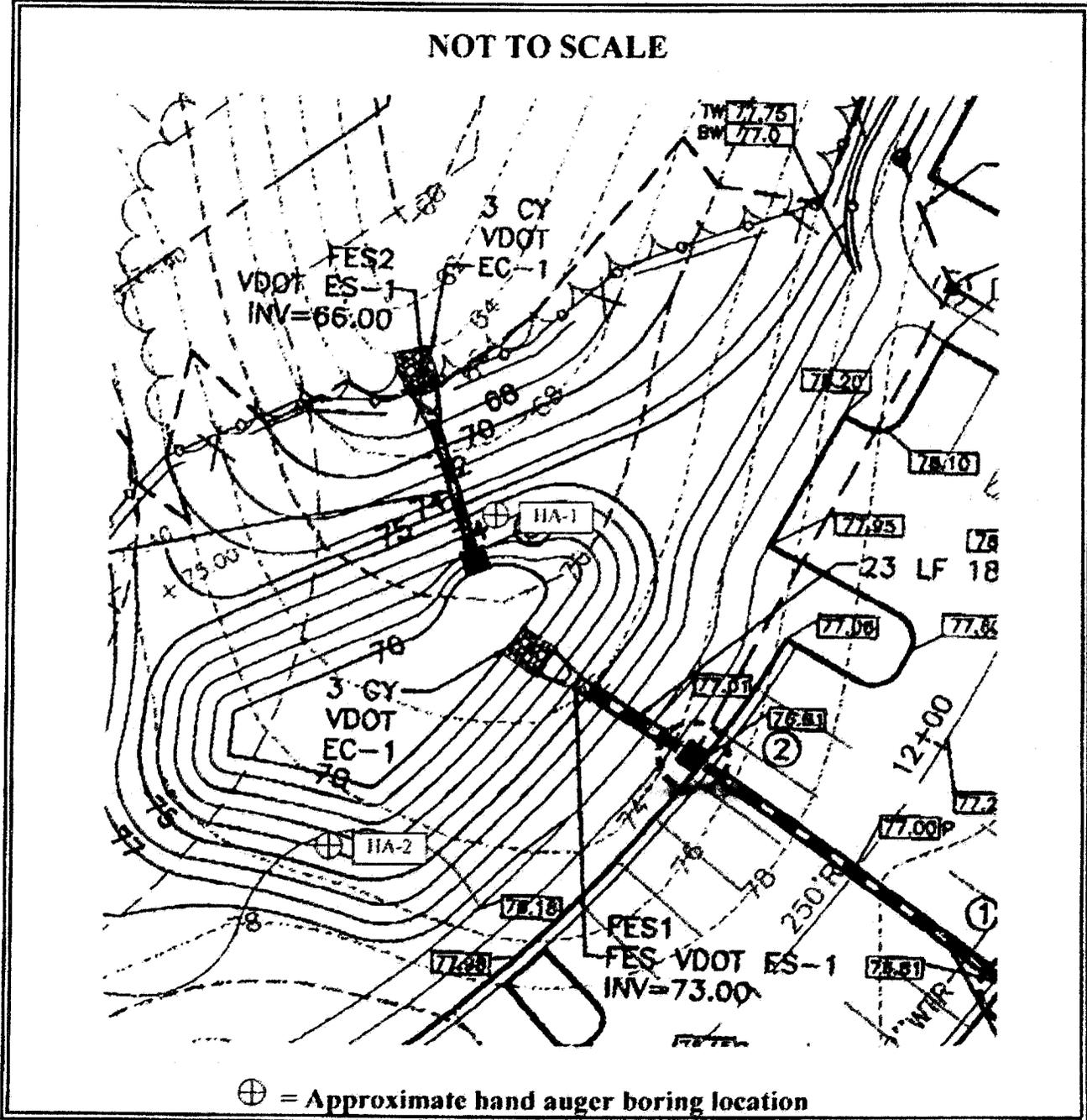
**APPENDIX I**  
**HAND AUGER BORING LOCATION PLAN**



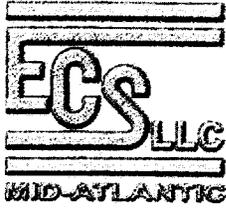
# HAND AUGER BORING LOCATION DIAGRAM

PROJECT: WELLINGTON REC AREA  
 COUNTY, STATE: JAMES CITY COUNTY, VIRGINIA

ECS PROJECT #: 07: 9623



**APPENDIX II**  
**HAND AUGER BORING LOGS**



# HAND AUGER BORING LOGS

PROJECT: WELLINGTON REC AREA  
 COUNTY, STATE: JAMES CITY COUNTY, VIRGINIA

ECS PROJECT #: 07: 9623

DEPTH (inches)	LOCATION: HA-1
	DESCRIPTION OF MATERIALS
0-24	Fine to Medium Silty SAND (SM), Brown, Moist
24-48	Fine to Medium Silty SAND (SM), Brown, Moist
48-72	Fine to Medium Silty SAND (SM), Brown, Moist
	GROUNDWATER NOT ENCOUNTERED
	END OF BORING AT 72 INCHES

DEPTH (inches)	LOCATION: HA-2
	DESCRIPTION OF MATERIALS
0-24	Fine to Medium Silty SAND (SM), Brown, Moist
24-48	Fine to Medium Silty SAND (SM), Brown, Moist
48-72	Fine to Medium Silty SAND (SM), Brown, Moist
	GROUNDWATER NOT ENCOUNTERED
	END OF BORING AT 72 INCHES

**APPENDIX III**  
**UNIFIED SOIL CLASSIFICATION SYSTEM**

### Unified Soil Classification System (ASTM D-2487)

Major Divisions		Group Symbols	Typical Names	Laboratory Classification Criteria			
<p style="text-align: center;">Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)</p> <p style="text-align: center;">Gravels (More than half of coarse fraction is larger than No. 4 sieve size)</p> <p style="text-align: center;">Sands (More than half of coarse fraction is smaller than No. 4 sieve size)</p>	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = D_{60}/D_{10}$ greater than 4 $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ between 1 and 3			
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines			Not meeting all gradation requirements for GW  Atterberg limits below "A" line or P.I. less than 4	
		Gravels with fines (Appreciable amount of fines)	GM <sup>a</sup>	d	Silty gravels, gravel-sand mixtures		
			u				
	Clean sands (Little or no fines)	GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below "A" line or P.I. less than 7		
		SW	Well-graded sands, gravelly sands, little or no fines				$C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ between 1 and 3
		SP	Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW  Atterberg limits above "A" line or P.I. less than 4		
		Sands with fines (Appreciable amount of fines)	SM <sup>a</sup>	d			Silty sands, sand-silt mixtures
			u				
		SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7		
<p style="text-align: center;">Fine-grained soils (More than half material is smaller than No. 200 Sieve)</p> <p style="text-align: center;">Silt and clays (Liquid limit less than 50)</p> <p style="text-align: center;">Silt and clays (Liquid limit greater than 50)</p> <p style="text-align: center;">Highly Organic soils</p>	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity		<div style="text-align: center;"> <p>Plasticity Chart</p> </div>			
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays					
	OL	Organic silts and organic silty clays of low plasticity					
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts					
	CH	Inorganic clays of high plasticity, fat clays					
	OH	Organic clays of medium to high plasticity, organic silts					
	Pt	Peat and other highly organic soils					

Determine percentage of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:  
 Less than 5 percent GW, GP, SW, SP  
 More than 5 percent GM, GC, SM, SC  
 More than 12 percent Border 4 line cases requiring dual symbols\*  
 5 to 12 percent

\* Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits, suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.  
 \* Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.  
 From Winterkorn and Fang, 1975.

DRAINAGE & STORMWATER  
MANAGEMENT CALCULATIONS

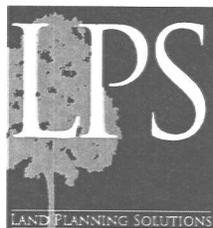
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WELLINGTON CLUBHOUSE  
JAMES CITY COUNTY, VIRGINIA

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FEBRUARY 6, 2008

PREPARED FOR:  
WELLINGTON ESTATES HOA



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LAND PLANNING SOLUTIONS

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5857 HARBOUR VIEW BLVD. STE. 202  
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Suffolk, Virginia 23435  
O. 757.935.9014 F. 757.935.9015

### ***Memorandum***

To: James City County – Environmental Division  
From: Jeffrey P. Huentelman PE, Land Planning Solutions  
Date: November 30, 2007 – REVISED February 6, 2008  
Subject: Drainage & Stormwater Management Calculations for the Wellington Clubhouse

### **DRAINAGE NARRATIVE**

The Wellington Estates Homeowners Association plans to develop the 3.59-acre recreation site located at 3927 Bournemouth Bend into a Recreational Clubhouse with a Pool and Tot lot. The site is currently vacant/wooded and is located inside the Chesapeake Bay Preservation Overlay District. A total of 1.27± acres will be disturbed during construction.

This site/lot was created as part of the Wellington Subdivision and was considered in the overall Stormwater Quality BMP Point System. Therefore, no additional Water Quality BMPs are required for this site. However, this site is required to meet the requirements of the state minimum standard #19 for Water Quantity control and provide 24-hour detention of the 1-year 24-hour storm event.

### **Existing Conditions**

The existing site consists of flat and hilly terrain and drains towards the northern, eastern & western boundary. The site is wooded with wetlands adjacent to the northern & eastern portions of the site. The site is divided into two distinct drainage areas as identified on the drainage area map. Area 1 drains west & north into the wetlands at the northeast corner of the site and into a tributary of France Swamp; comprised of sheet flow, shallow flow and channel flow with slopes 5% to 30%. Area 2 drains towards north & east into the wetlands and then into a tributary of France Swamp; comprised of sheet flow with slopes around 2-5% and then into shallow flow with slopes of 5% to 25%.

The site is bounded to the north & east by vacant land, to the west by single family residences and Glisan Court R/W and to the south by Bournemouth Bend R/W. Due to the topography & control measures, no negative erosion & sediment control impacts are anticipated to affect adjacent properties. The soil two types for the drainage area are "Emporia complex" and "Uchee loamy fine sand" with a Soil Group Classification of C and A respectively. A SGC of C was used in the calculations for this project.

The proposed development is situated on the flat plateau in the middle of the site with minimal development in the semi-hilly area on the west side for the BMP. No development is proposed within the 100-RPA buffer or the 25% slope areas that surround the rest of the site.

The existing drainage divide for the site falls in the middle of the plateau. Drainage area 1 (EX-1) consists of 1.42 acres and drainage area 2 (EX-2) consists of 2.19 acres. The proposed development will only discharge to the EX-1 location, so pre/post calculations for EX-2 have not been performed.

EX-1 has a CN of 73 and a time of concentration of 14.9 minutes.

Pre-Developed Peak Runoff Rates

The Peak Runoff Rates (cfs) for the pre-developed conditions for EX-1 for the 24hr storms are as follows:

<u>Area</u>	<u>1-year</u>	<u>2-year</u>	<u>10-year</u>	<u>100-year</u>
EX-1	0.50	0.91	2.59	4.41

Proposed Conditions

As indicated above, the proposed development will only discharge to Drainage Area 1. Drainage Area 2 will decrease from 2.19 acres to 1.84 acres with no increase in impervious surface area.

Drainage Area 1 will be divided into three areas (A, B & C) in the proposed condition. Area A consists of the area downstream of our site that will not be disturbed and contains 0.68 acres with the existing CN of 73. Area B consists of the parking lot, clubhouse and pool area; contains 0.82 acres with a CN of 94 (85% impervious), subareas 1B, 2B, 3B, 7B, 8B & 9B. Area C consists of the BMP and the tot lot area; contains 0.27 acres with a CN of 79.

Areas B & C are routed through the BMP and are combined with Area A with a Link Hydrograph (POST) for the total post developed flow.

Stormwater BMP

As indicated above, Stormwater Quality is not required for this site as it was included in the master design of the Wellington Subdivision. See Section III (page 44) of this report for original BMP Worksheet for Wellington.

The Stormwater Quantity required for the BMP/Detention Pond to store is the difference between the pre-developed and post-developed peak flow rates for Drainage Area 1. The Detention Pond was modeled using the SCS Methodology with *HydroCAD, Version 7.10 software, by HydroCAD Software Solutions, LLC.*

The post-development results are summarized below. The detailed Stormwater Quantity Calculations are included in Section I (page 4) of this report.

Post-Developed Peak Runoff Rates

The Peak Runoff Rates (cfs) for the post-developed conditions for each subarea for the 24hr storms are as follows:

<u>Area</u>	<u>1-year</u>	<u>2-year</u>	<u>10-year</u>	<u>100-year</u>
1	0.25	0.45	1.28	2.18
2&3 (Pond in)	1.46	1.99	3.74	5.41
2&3 (Pond out)	0.29	0.33	0.79	1.41
POST	0.51	0.75	1.68	3.38
<b>Pond Elevation</b>	<b>71.60'</b>	<b>72.13'</b>	<b>73.40'</b>	<b>74.22'</b>

Channel Erosion Control (24-hr Detention of the 1-year 24-hr storm event)

Calculations for the Channel Erosion Control have been provided in Section I on page 8 of this report. The calculations show a required orifice diameter of 1.24 in. due to the small site size. Therefore, a 3" orifice has been provided to reduce the potential for clogging. This 3" orifice was modeled and produced a post development flow (POST) of 0.51 cfs versus the pre-developed flow (EX-1) of 0.50 cfs; therefore, the increase in size was determined to be acceptable.

Channel Adequacy Computations

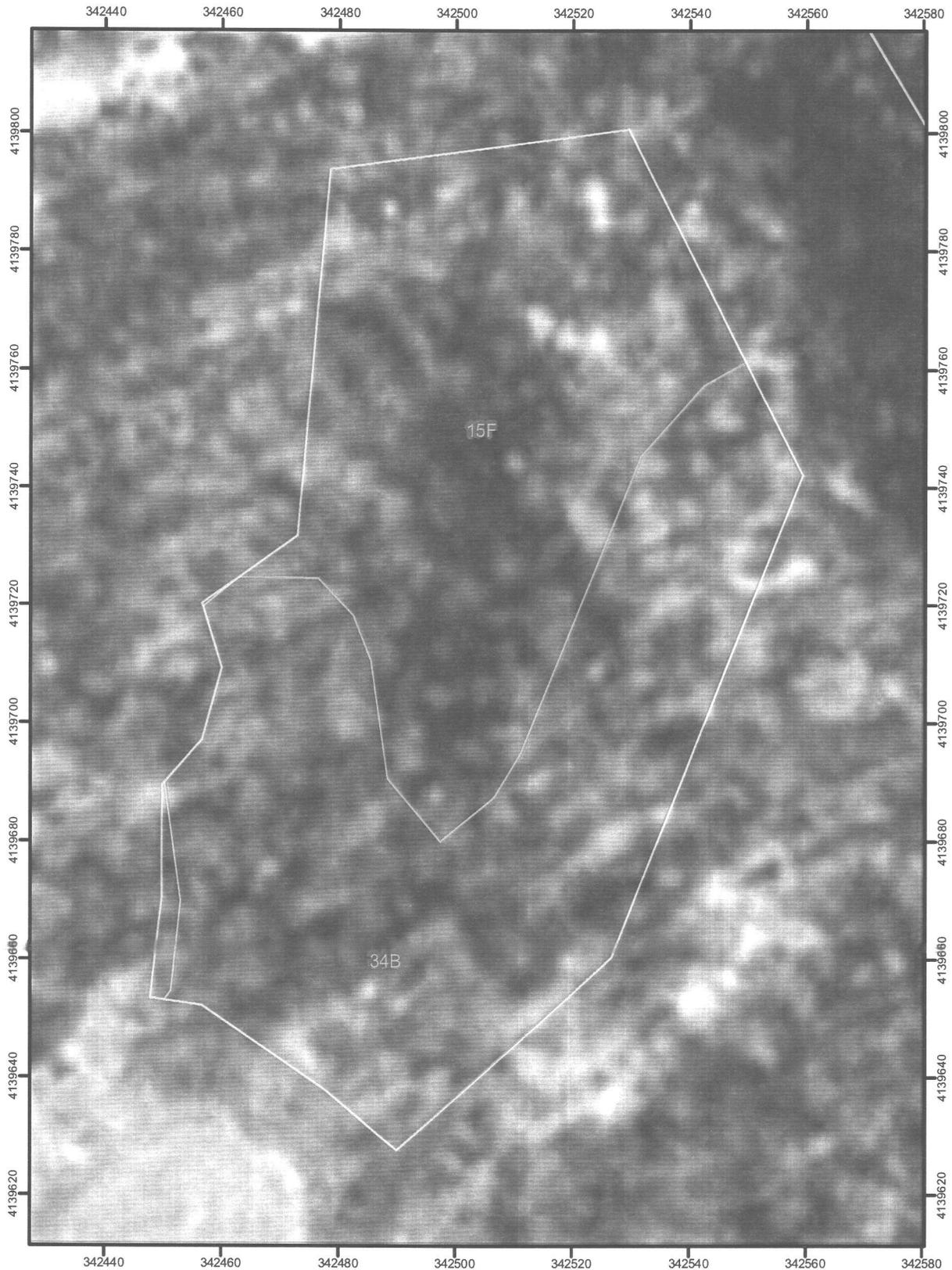
Calculations for the Channel Adequacy have been provided in Section I on page 9 of this report.

Storm Sewer Design

The Storm Sewer Design Computations (SSDC) and Hydraulic Grade Line Computations (HGLC) were performed using the *Hydraflow Storm Sewers 2005, Version 11.0.0.8 software, by Intelisolve.* The SSDC utilized the Rational Method for the 10-year storm. The HGLC use the starting 10-year tailwater elevation 73.72', based on the 10-year rise in the BMP/Pond indicated above.

The SSDC, HGLC & Drainage Area Map are included in Section II (page 39) of this report.

SECTION I  
STORMWATER QUANTITY CALCULATIONS



## MAP LEGEND

 Area of Interest (AOI)	 Area of Interest (AOI)	 Very Stony Spot
 Soils	 Soil Map Units	 Wet Spot
<b>Special Point Features</b>	<b>Special Line Features</b>	 Other
 Blowout	 Gully	 Short Sleep Slope
 Borrow Pit	 Other	<b>Political Features</b>
 Clay Spot	 Cities	 Urban Areas
 Closed Depression	<b>Water Features</b>	 Oceans
 Gravel Pit	 Streams and Canals	<b>Transportation</b>
 Gravelly Spot	 Rails	<b>Roads</b>
 Landfill	 Interstate Highways	 US Routes
 Lava Flow	 State Highways	 Local Roads
 Marsh	 Other Roads	
 Mine or Quarry		
 Miscellaneous Water		
 Perennial Water		
 Rock Outcrop		
 Saline Spot		
 Sandy Spot		
 Severely Eroded Spot		
 Sinkhole		
 Slide or Slipp		
 Sodic Spot		
 Spoil Area		
 Stony Spot		

## MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: UTM Zone 18N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: James City and York Counties and the City of Williamsburg, Virginia  
 Survey Area Data: Version 8, Mar 16, 2007

Date(s) aerial images were photographed: 1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

James City and York Counties and the City of Williamsburg, Virginia (VA695)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15F	Emponia complex, 25 to 50 percent slopes	1.4	47.4%
34B	Uchee loamy fine sand, 2 to 6 percent slopes	1.6	52.6%
Totals for Area of Interest (AOI)		3.0	100.0%

**Channel Erosion Control Volume and Orifice Design**

Prepared by Land Planning Solutions

By: Jeffrey P. Huentelman, PE

**Detain 1-YR, 24-HR Storm for 24 Hours, VSMH - Method 2\***

1-yr Rainfall (P) = 2.8 in.

CN = 90

Acres = 1.09 ac.

$S = (1000 / CN) - 10 = 1.11$

Runoff Equation,  $Q_a = (P - 0.2S)^2 / (P + 0.8S)$

Qa = 1.80 in.

**Channel Erosion Control Volume, Vce**

$V_{ce} = A * Q_a * (1\text{ft}/12\text{in})$

Vce = 0.16 ac.ft.

**Reduce for Routing Effect by 0.6**

$0.6 * V_{ce} = 0.10 \text{ ac.ft.} \quad \text{OR} \quad 4,276 \text{ CF}$

**Stage - Storage Calculations**

Stage	Elevation	Area (SF)	Avg. Vol.	Cum. Vol (CF)	Cum. Vol (Ac.Ft.)
1	70	706	923	923	0.021
2	71	1,140	1,385	2,308	0.053
3	72	1,630	1,903	4,211	0.097
4	73	2,176	2,478	6,689	0.154
5	74	2,780	3,110	9,799	0.225
6	75	3,440			

**Vce Occurs at Elev = 73**

$h(\text{avg}) = (V_{ce} \text{ Elevation} - \text{Bottom Pond}) / 2$

h(avg) = 1.5

Avg. Discharge,  $Q_{avg} = V_{ce} / 24\text{hr} / (3,600 \text{ sec/hr})$

Qavg = 0.05 cfs

**Required Orifice Diameter**

area,  $a = Q_{avg} / (C(2gh)^{(1/2)})$

a = 0.01 Sq.Ft.

diameter,  $d = (4a / 3.1415)^{(1/2)} * 12\text{in}/\text{ft}$

d = 1.24 in

C = 0.6, g = 32.2 ft/sec<sup>2</sup>, h = h(avg)

USE 3"

\* Calculations based on the Virginia Stormwater Management Handbook, 1st Ed., Vol. II, page 5-39, Method 2

**Channel Adequacy Computation\***

Prepared by Land Planning Solutions

By: Jeffrey P. Huentelman, PE

February 6, 2008

**Roughness Coefficient**

## Physical Characteristics of the Stream Channel

Basic "n" value, n1 =	0.020	(Table 5-16)
Surface Irregularity, n2 =	0.010	(Table 5-17)
Variations in Section, n3 =	0.000	(Table 5-18)
Effect of Obstructions, n4 =	0.020	(Table 5-19)
Vegetation and Flow, n5 =	0.060	(Table 5-20)
ns = n1+n2+n3+n4+n5 =	0.110	
Degree of Meander, n6 =	0.150	(Table 5-21)
Roughness Coefficient, n = ns * n6 + ns		
n =	0.127	

**Peak Runoff Rate for 2-year Storm, Post-Development**

Q, 2-yr = 0.34 cfs (From HydroCAD calculation)

**Channel Reach Geometry (Parabolic Channel)**

Top Width, T =	13.0	FT	
Depth, d =	1.0	FT	
Hydraulic Radius, R =	0.656	FT	(Plate 5-38)
Slope, m =	9.3	%	
Permissible Velocity, v =	2.50	ft/s	(Table 5-22)
Reduction in Velocity, 1 =	13%	2.175	ft/s (Table 5-23)
Reduction in Velocity, 2 =	0.96	2.088	ft/s (Plate 5-39)
Bankfull Velocity, V =	2.71	fps	
Bankfull Capacity, Q =	23.45	cfs	

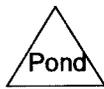
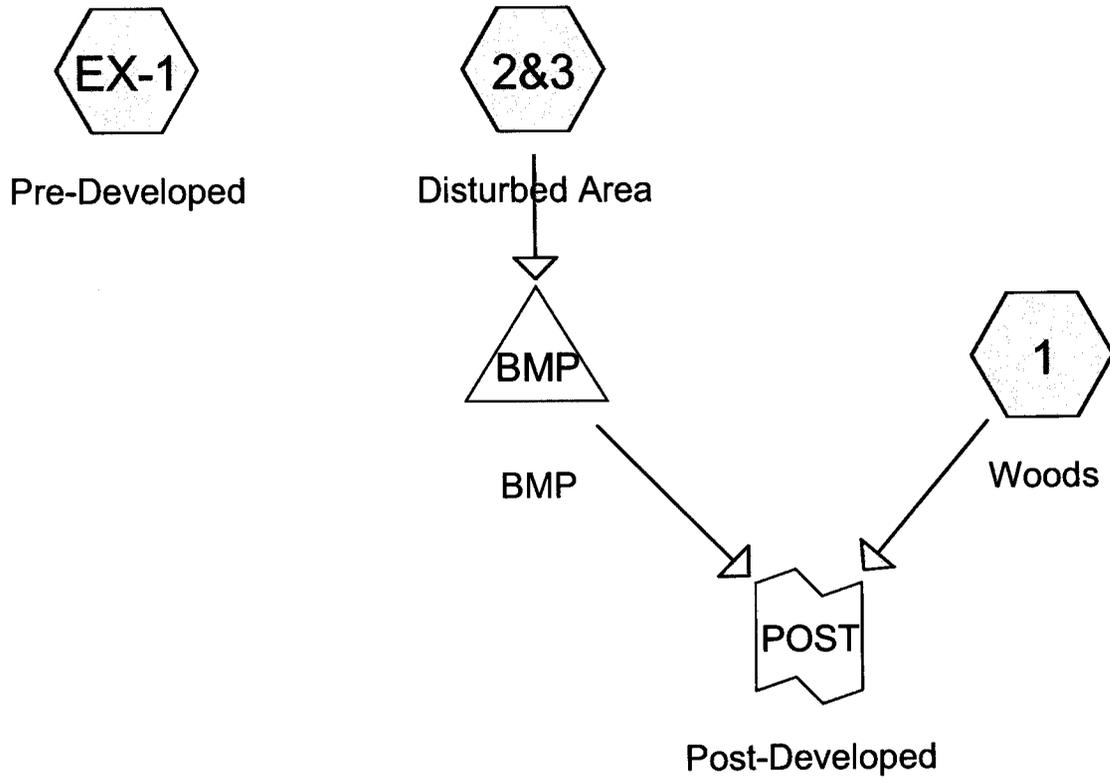
**Compare Actual Channel Capacity with Peak Rate of Runoff**

Channel Capacity is greater than Peak Runoff; therefore, check Velocity using actual depth

Top width, T =	3.5	FT
depth, d =	0.18	FT
Hydraulic Rad, R =	0.119	FT
Capacity, Q =	0.4	cfs
Velocity, V =	0.9	fps

Adequate
----------

\* Calculations based on the Virginia Erosion and Sediment Control Handbook, 3rd Ed., pages V-122 through V-141



**AEA003 - Pond***Type I 24-hr 1-YR Rainfall=2.80"*

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Page 2

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1: Woods**

Runoff Area=0.680 ac Runoff Depth=0.74"

Flow Length=315' Tc=13.8 min CN=73 Runoff=0.25 cfs 0.042 af

**Subcatchment 2&3: Disturbed Area**

Runoff Area=1.090 ac Runoff Depth=1.80"

Tc=10.0 min CN=90 Runoff=1.46 cfs 0.164 af

**Subcatchment EX-1: Pre-Developed**

Runoff Area=1.420 ac Runoff Depth=0.74"

Flow Length=435' Tc=14.9 min CN=73 Runoff=0.50 cfs 0.087 af

**Pond BMP: BMP**

Peak Elev=71.70' Storage=0.038 af Inflow=1.46 cfs 0.164 af

Outflow=0.30 cfs 0.164 af

**Link POST: Post-Developed**

Inflow=0.52 cfs 0.205 af

Primary=0.52 cfs 0.205 af

**Total Runoff Area = 3.190 ac Runoff Volume = 0.293 af Average Runoff Depth = 1.10"**

Ryoel

**AEA003 - Pond**

Type I 24-hr 1-YR Rainfall=2.80"

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**Subcatchment 1: Woods**

Runoff = 0.25 cfs @ 10.07 hrs, Volume= 0.042 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 1-YR Rainfall=2.80"

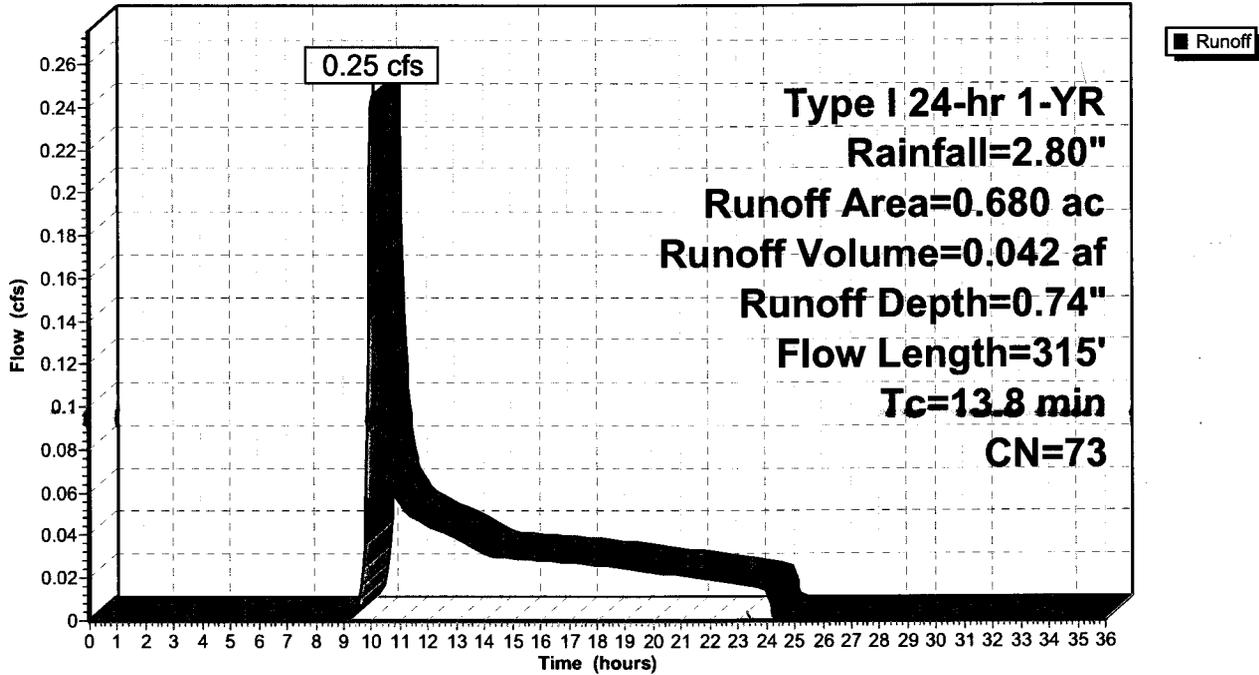
Area (ac)	CN	Description
0.680	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	215	0.0930	2.1	198.88	<b>Parabolic Channel,</b> W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
13.8	315	Total			

**Subcatchment 1: Woods**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 1-YR Rainfall=2.80"

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**Subcatchment 2&3: Disturbed Area**

Runoff = 1.46 cfs @ 10.01 hrs, Volume= 0.164 af, Depth= 1.80"

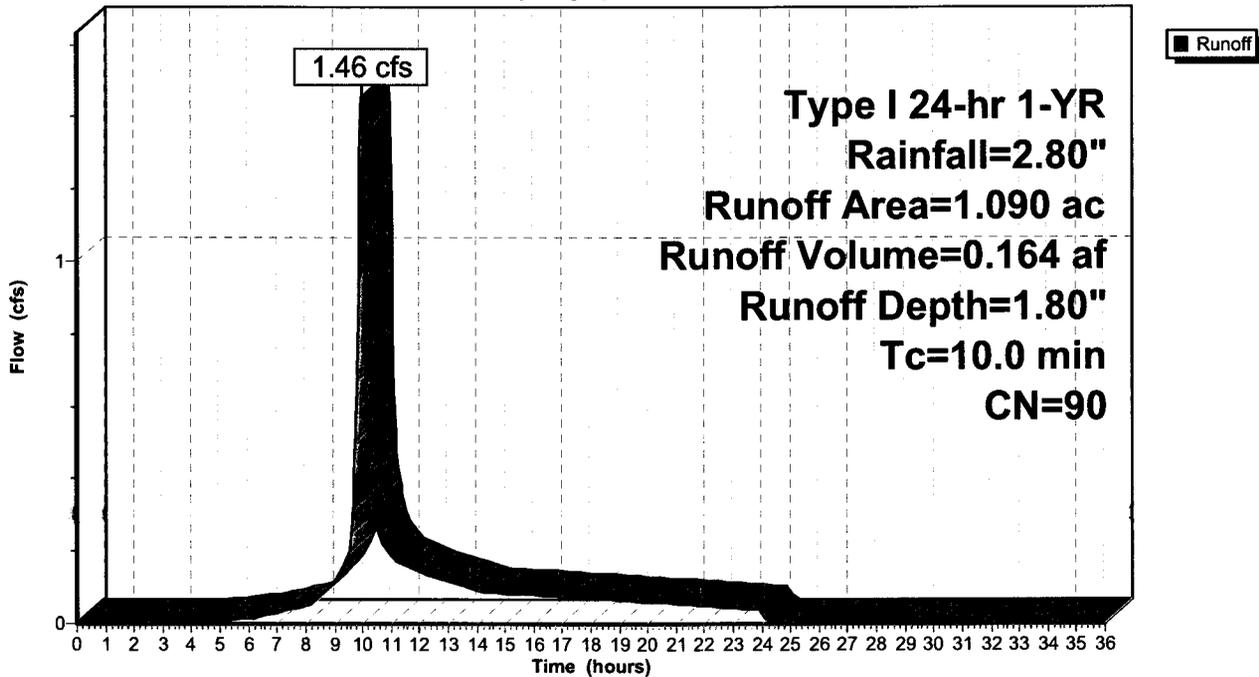
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 1-YR Rainfall=2.80"

Area (ac)	CN	Description
0.820	94	Urban commercial, 85% imp, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
1.090	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Subcatchment 2&3: Disturbed Area**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 1-YR Rainfall=2.80"

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**Subcatchment EX-1: Pre-Developed**

Runoff = 0.50 cfs @ 10.09 hrs, Volume= 0.087 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 1-YR Rainfall=2.80"

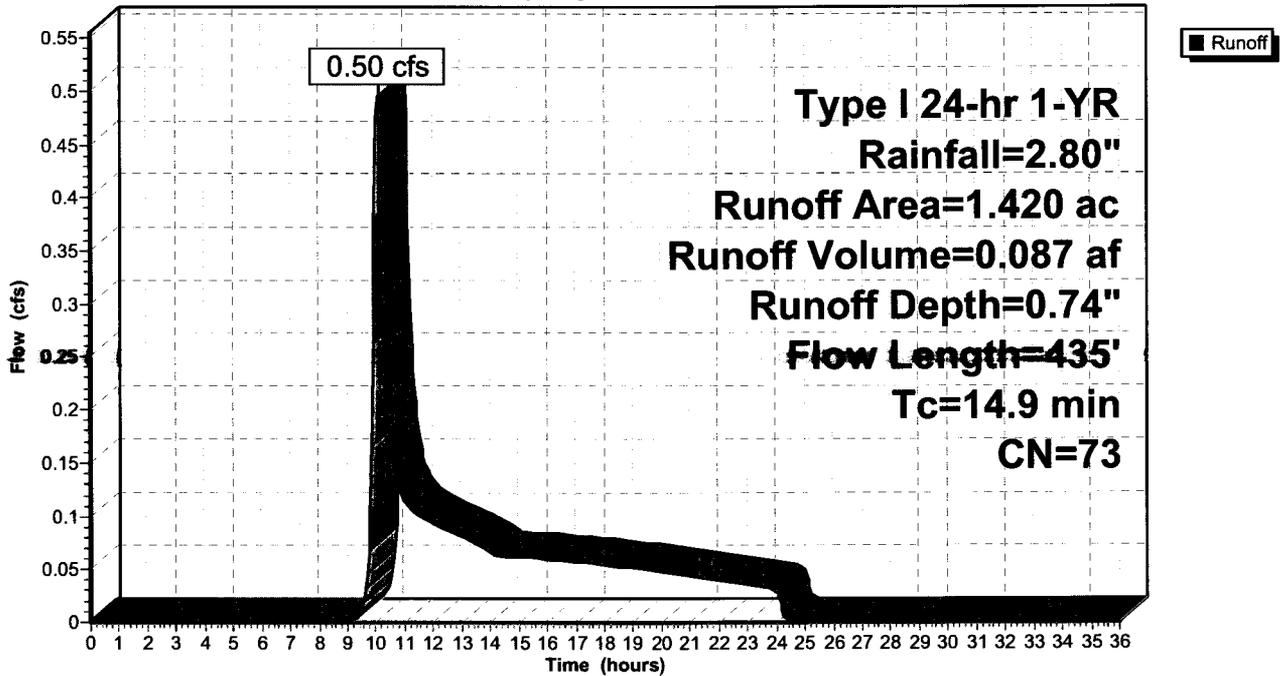
Area (ac)	CN	Description
1.420	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.50"
1.1	120	0.1375	1.9		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.7	215	0.0930	2.1	198.88	<b>Parabolic Channel,</b> W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
14.9	435	Total			

**Subcatchment EX-1: Pre-Developed**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 1-YR Rainfall=2.80"

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**Pond BMP: BMP**

Inflow Area = 1.090 ac, Inflow Depth = 1.80" for 1-YR event  
 Inflow = 1.46 cfs @ 10.01 hrs, Volume= 0.164 af  
 Outflow = 0.30 cfs @ 10.49 hrs, Volume= 0.164 af, Atten= 80%, Lag= 29.0 min  
 Primary = 0.30 cfs @ 10.49 hrs, Volume= 0.164 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
 Peak Elev= 71.70' @ 10.49 hrs Surf.Area= 0.031 ac Storage= 0.038 af  
 Plug-Flow detention time= 55.6 min calculated for 0.163 af (100% of inflow)  
 Center-of-Mass det. time= 55.9 min ( 838.7 - 782.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.217 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.014	0.000	0.000
71.00	0.023	0.019	0.019
72.00	0.035	0.029	0.047
73.00	0.049	0.042	0.090
74.00	0.063	0.056	0.146
75.00	0.079	0.071	0.217

Device	Routing	Invert	Outlet Devices
#1	Primary	64.50'	<b>15.0" x 50.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 64.00' S= 0.0100 1/8" Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Device 1	70.00'	<b>3.0" Vert. Orifice</b> C= 0.600
#3	Device 1	74.25'	<b>4.00' x 4.00' Horiz. Grate</b> Limited to weir flow C= 0.600

**Primary OutFlow** Max=0.30 cfs @ 10.49 hrs HW=71.70' (Free Discharge)

- 1=Culvert (Passes 0.30 cfs of 15.15 cfs potential flow)
- 2=Orifice (Orifice Controls 0.30 cfs @ 6.0 fps)
- 3=Grate ( Controls 0.00 cfs)

**AEA003 - Pond**

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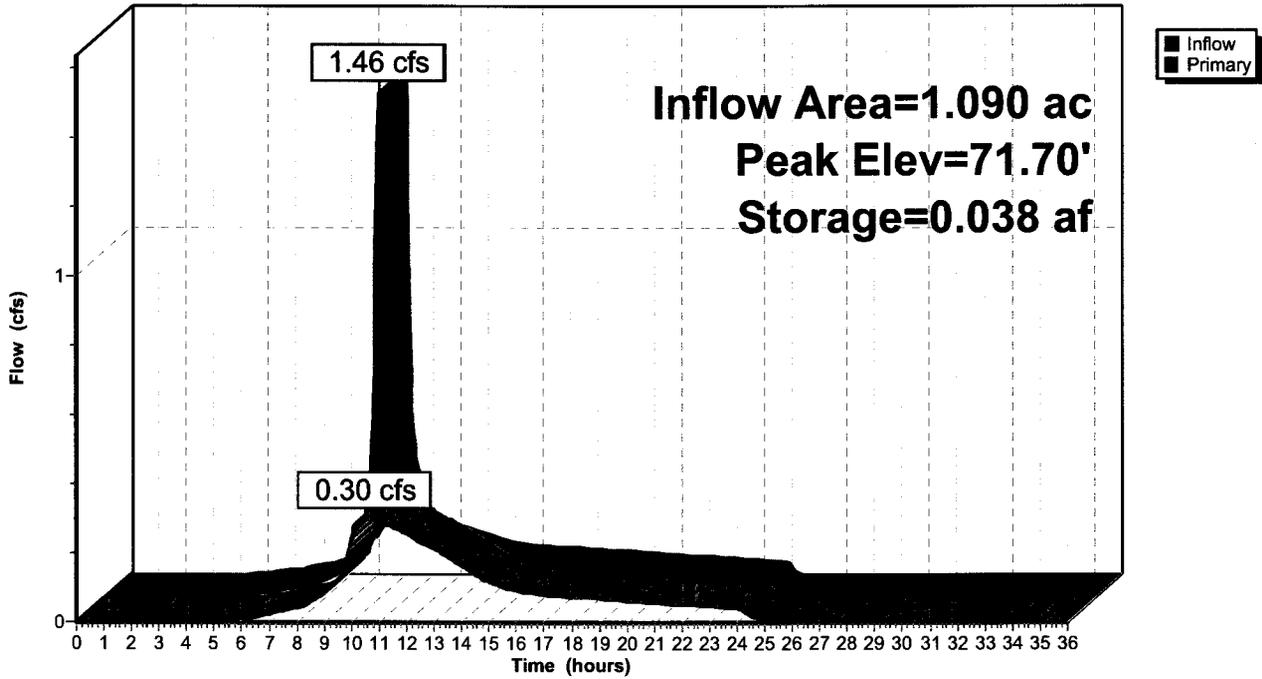
Type I 24-hr 1-YR Rainfall=2.80"

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**Pond BMP: BMP**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 1-YR Rainfall=2.80"

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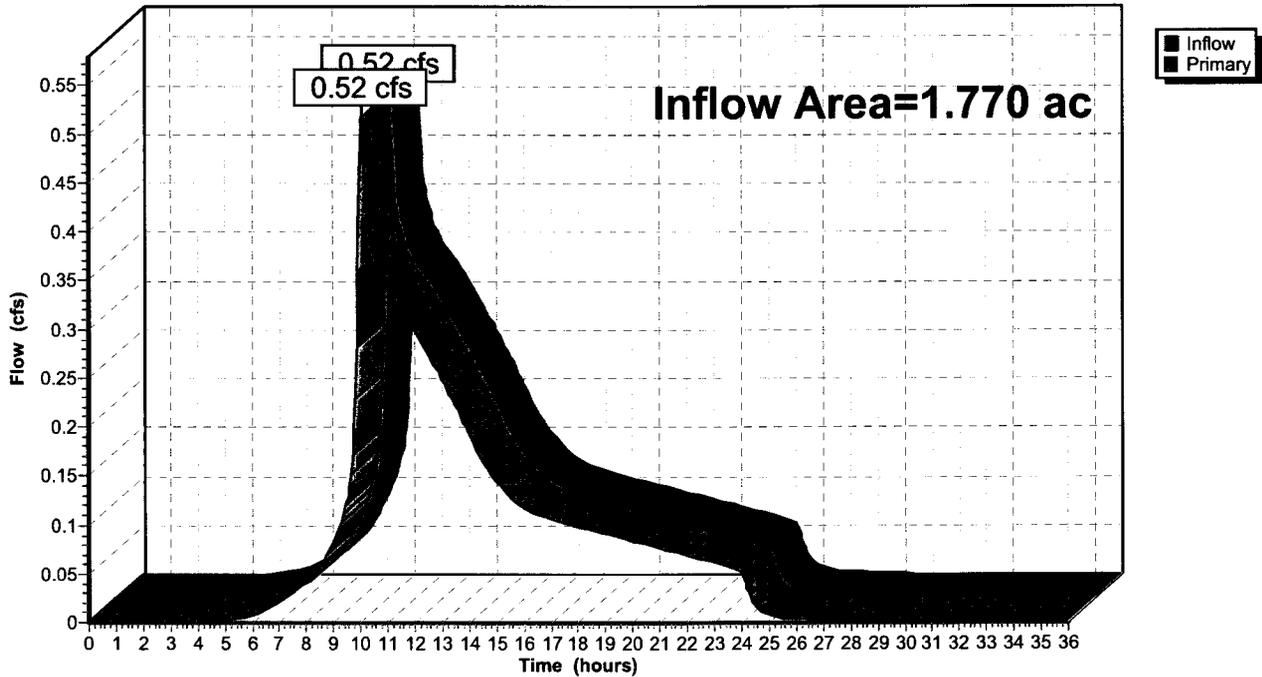
**Link POST: Post-Developed**

Inflow Area = 1.770 ac, Inflow Depth = 1.39" for 1-YR event  
Inflow = 0.52 cfs @ 10.09 hrs, Volume= 0.205 af  
Primary = 0.52 cfs @ 10.09 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

**Link POST: Post-Developed**

Hydrograph



**AEA003 - Pond***Type I 24-hr 2-YR Rainfall=3.50"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1: Woods**

Runoff Area=0.680 ac Runoff Depth=1.18"

Flow Length=315' Tc=13.8 min CN=73 Runoff=0.45 cfs 0.067 af

**Subcatchment 2&3: Disturbed Area**

Runoff Area=1.090 ac Runoff Depth=2.45"

Tc=10.0 min CN=90 Runoff=1.99 cfs 0.222 af

**Subcatchment EX-1: Pre-Developed**

Runoff Area=1.420 ac Runoff Depth=1.18"

Flow Length=435' Tc=14.9 min CN=73 Runoff=0.91 cfs 0.140 af

**Pond BMP: BMP**

Peak Elev=72.23' Storage=0.056 af Inflow=1.99 cfs 0.222 af

Outflow=0.34 cfs 0.222 af

**Link POST: Post-Developed**

Inflow=0.76 cfs 0.289 af

Primary=0.76 cfs 0.289 af

**Total Runoff Area = 3.190 ac Runoff Volume = 0.429 af Average Runoff Depth = 1.61"**

**AEA003 - Pond**

Type I 24-hr 2-YR Rainfall=3.50"

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**Subcatchment 1: Woods**

Runoff = 0.45 cfs @ 10.07 hrs, Volume= 0.067 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 2-YR Rainfall=3.50"

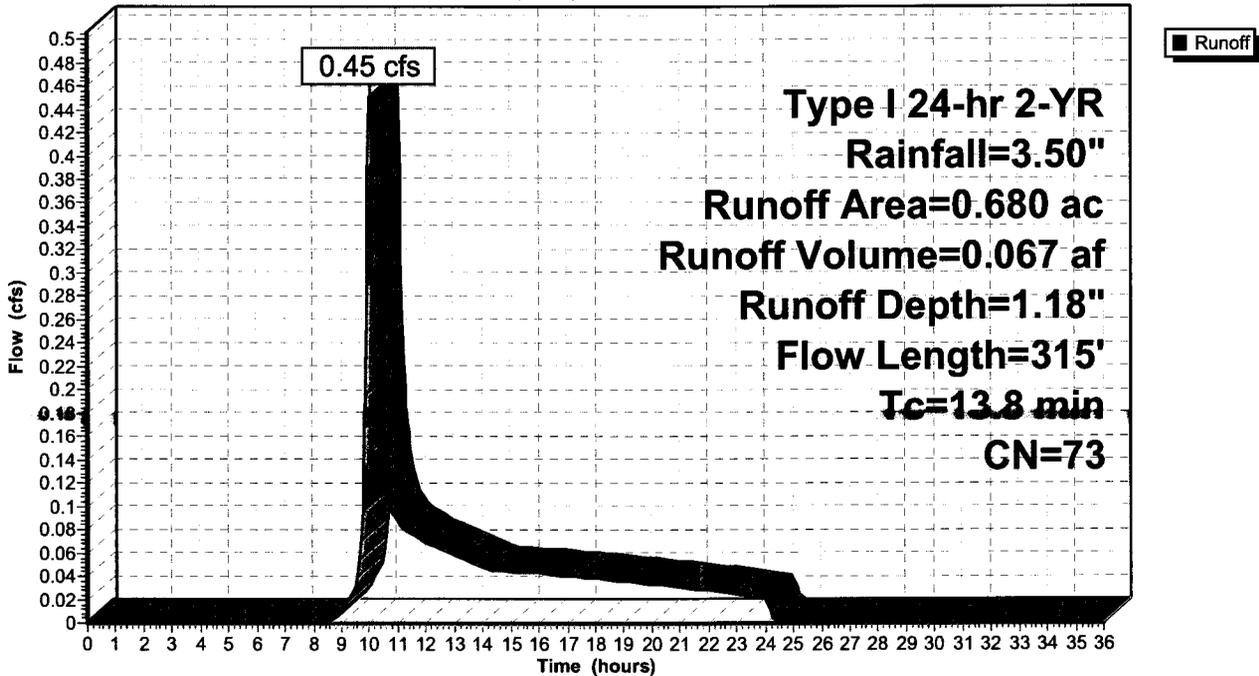
Area (ac)	CN	Description
0.680	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	215	0.0930	2.1	198.88	<b>Parabolic Channel,</b> W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
13.8	315	Total			

**Subcatchment 1: Woods**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 2-YR Rainfall=3.50"

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**Subcatchment 2&3: Disturbed Area**

Runoff = 1.99 cfs @ 10.01 hrs, Volume= 0.222 af, Depth= 2.45"

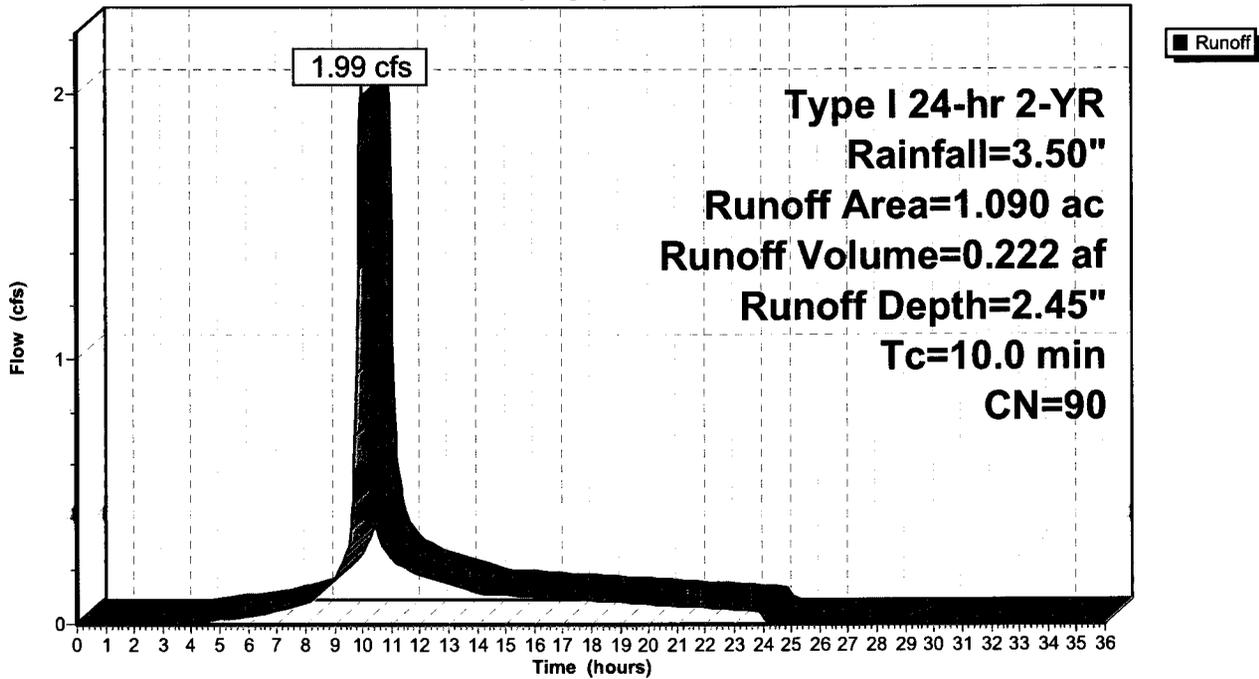
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 2-YR Rainfall=3.50"

Area (ac)	CN	Description
0.820	94	Urban commercial, 85% imp, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
1.090	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Subcatchment 2&3: Disturbed Area**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 2-YR Rainfall=3.50"

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**Subcatchment EX-1: Pre-Developed**

Runoff = 0.91 cfs @ 10.08 hrs, Volume= 0.140 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 2-YR Rainfall=3.50"

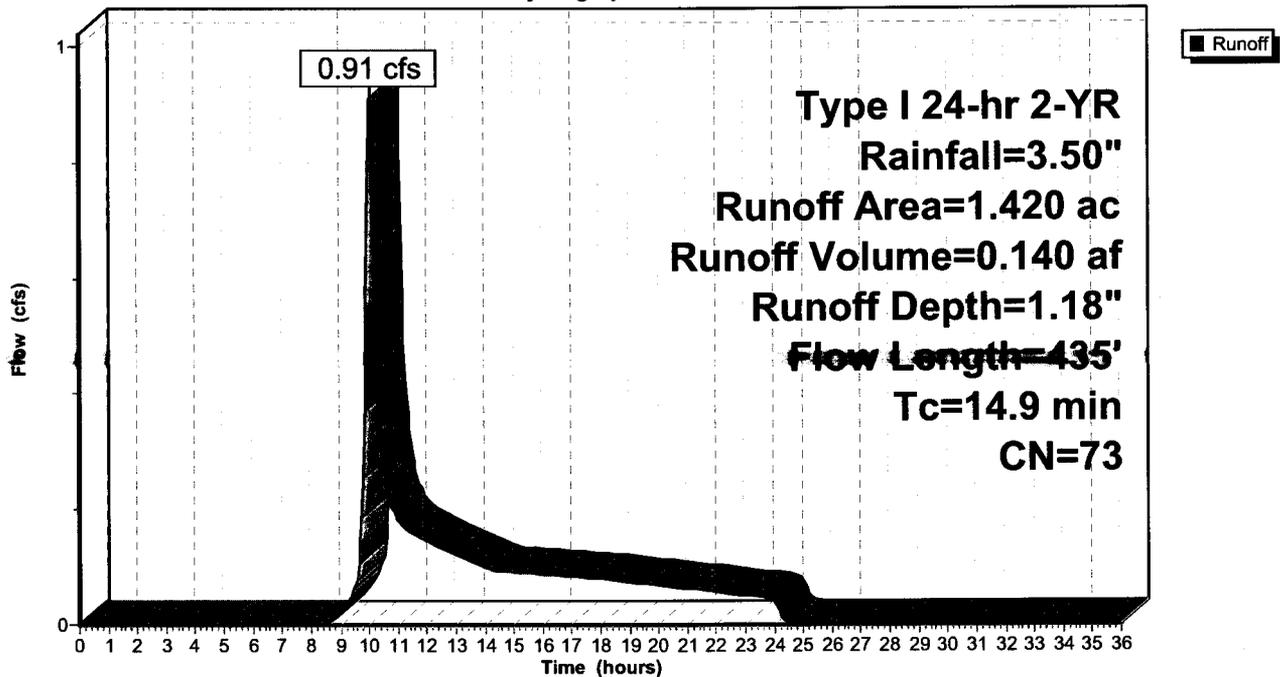
Area (ac)	CN	Description
1.420	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.1	120	0.1375	1.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	215	0.0930	2.1	198.88	Parabolic Channel, W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
14.9	435	Total			

**Subcatchment EX-1: Pre-Developed**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 2-YR Rainfall=3.50"

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**Pond BMP: BMP**

Inflow Area = 1.090 ac, Inflow Depth = 2.45" for 2-YR event  
 Inflow = 1.99 cfs @ 10.01 hrs, Volume= 0.222 af  
 Outflow = 0.34 cfs @ 10.58 hrs, Volume= 0.222 af, Atten= 83%, Lag= 34.6 min  
 Primary = 0.34 cfs @ 10.58 hrs, Volume= 0.222 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
 Peak Elev= 72.23' @ 10.58 hrs Surf.Area= 0.038 ac Storage= 0.056 af  
 Plug-Flow detention time= 69.0 min calculated for 0.222 af (100% of inflow)  
 Center-of-Mass det. time= 69.3 min ( 839.2 - 770.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.217 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.014	0.000	0.000
71.00	0.023	0.019	0.019
72.00	0.035	0.029	0.047
73.00	0.049	0.042	0.090
74.00	0.063	0.056	0.146
75.00	0.079	0.071	0.217

Device	Routing	Invert	Outlet Devices
#1	Primary	64.50'	<b>15.0" x 50.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Device 1	70.00'	<b>3.0" Vert. Orifice</b> C= 0.600
#3	Device 1	74.25'	<b>4.00' x 4.00' Horiz. Grate</b> Limited to weir flow C= 0.600

Primary OutFlow Max=0.34 cfs @ 10.58 hrs HW=72.23' (Free Discharge)

1=Culvert (Passes 0.34 cfs of 15.75 cfs potential flow)  
 2=Orifice (Orifice Controls 0.34 cfs @ 7.0 fps)  
 3=Grate ( Controls 0.00 cfs)

**AEA003 - Pond**

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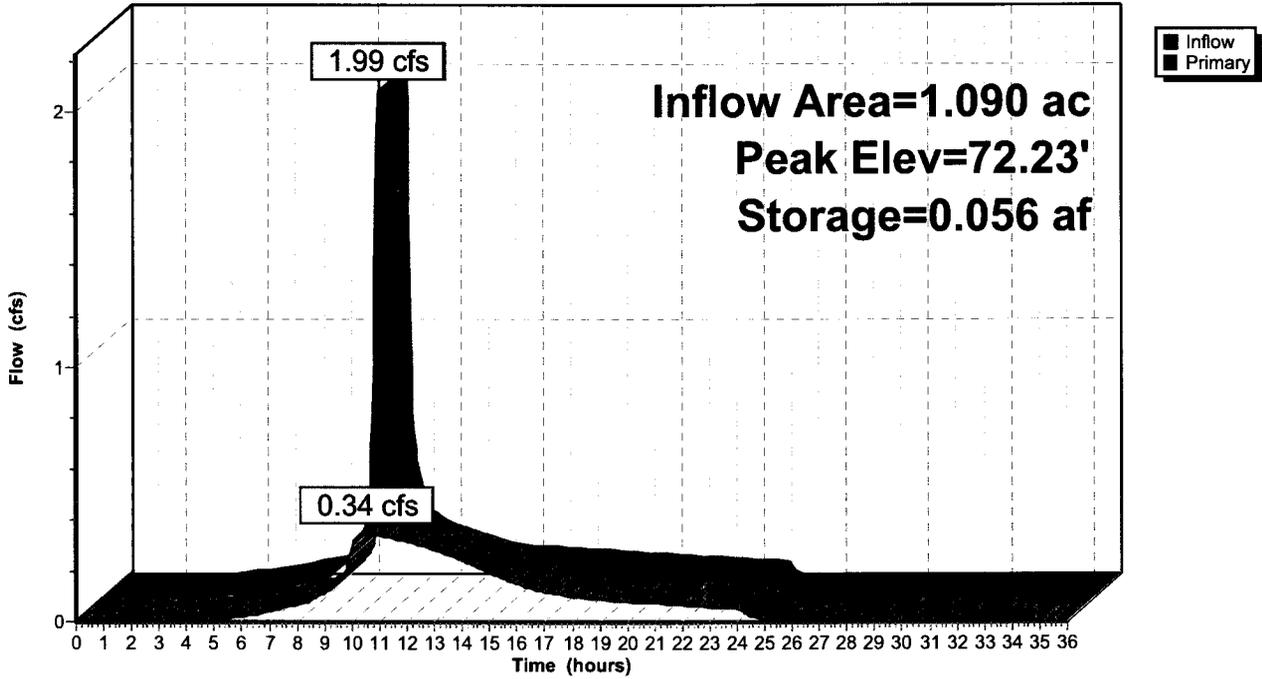
Type I 24-hr 2-YR Rainfall=3.50"

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**Pond BMP: BMP**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 2-YR Rainfall=3.50"

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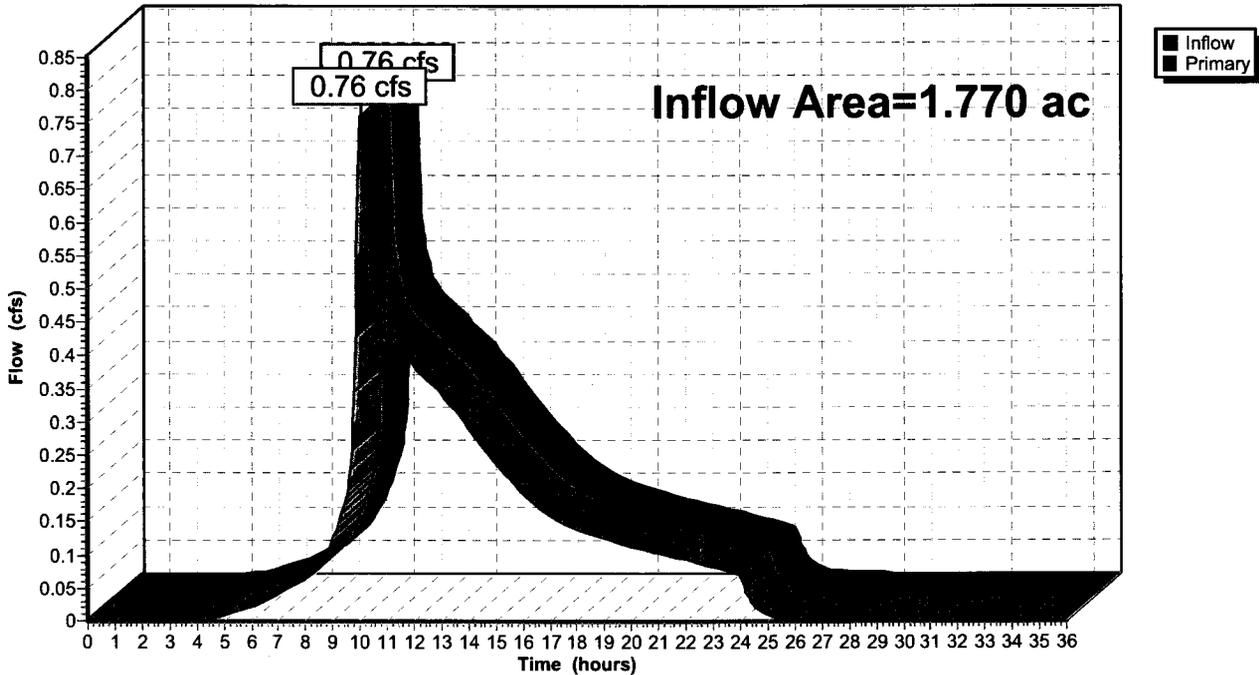
**Link POST: Post-Developed**

Inflow Area = 1.770 ac, Inflow Depth = 1.96" for 2-YR event  
 Inflow = 0.76 cfs @ 10.08 hrs, Volume= 0.289 af  
 Primary = 0.76 cfs @ 10.08 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

**Link POST: Post-Developed**

Hydrograph



**AEA003 - Pond***Type I 24-hr 10-YR Rainfall=5.80"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1: Woods**

Runoff Area=0.680 ac Runoff Depth=2.92"

Flow Length=315' Tc=13.8 min CN=73 Runoff=1.28 cfs 0.166 af

**Subcatchment 2&3: Disturbed Area**

Runoff Area=1.090 ac Runoff Depth=4.65"

Tc=10.0 min CN=90 Runoff=3.74 cfs 0.422 af

**Subcatchment EX-1: Pre-Developed**

Runoff Area=1.420 ac Runoff Depth=2.92"

Flow Length=435' Tc=14.9 min CN=73 Runoff=2.59 cfs 0.346 af

**Pond BMP: BMP**

Peak Elev=73.72' Storage=0.128 af Inflow=3.74 cfs 0.422 af

Outflow=0.45 cfs 0.422 af

**Link POST: Post-Developed**

Inflow=1.68 cfs 0.588 af

Primary=1.68 cfs 0.588 af

**Total Runoff Area = 3.190 ac Runoff Volume = 0.934 af Average Runoff Depth = 3.51"**

**AEA003 - Pond**

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Type I 24-hr 10-YR Rainfall=5.80"

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**Subcatchment 1: Woods**

Runoff = 1.28 cfs @ 10.06 hrs, Volume= 0.166 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 10-YR Rainfall=5.80"

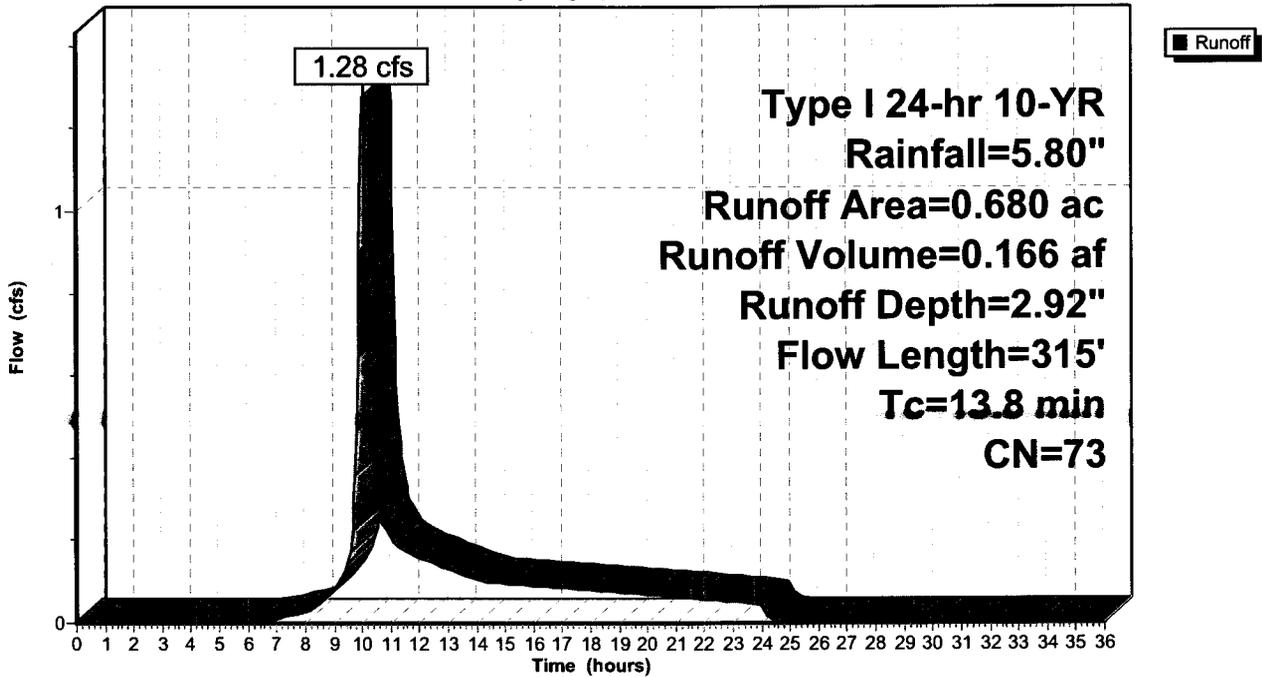
Area (ac)	CN	Description
0.680	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	215	0.0930	2.1	198.88	<b>Parabolic Channel,</b> W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
13.8	315	Total			

**Subcatchment 1: Woods**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 10-YR Rainfall=5.80"

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**Subcatchment 2&3: Disturbed Area**

Runoff = 3.74 cfs @ 10.00 hrs, Volume= 0.422 af, Depth= 4.65"

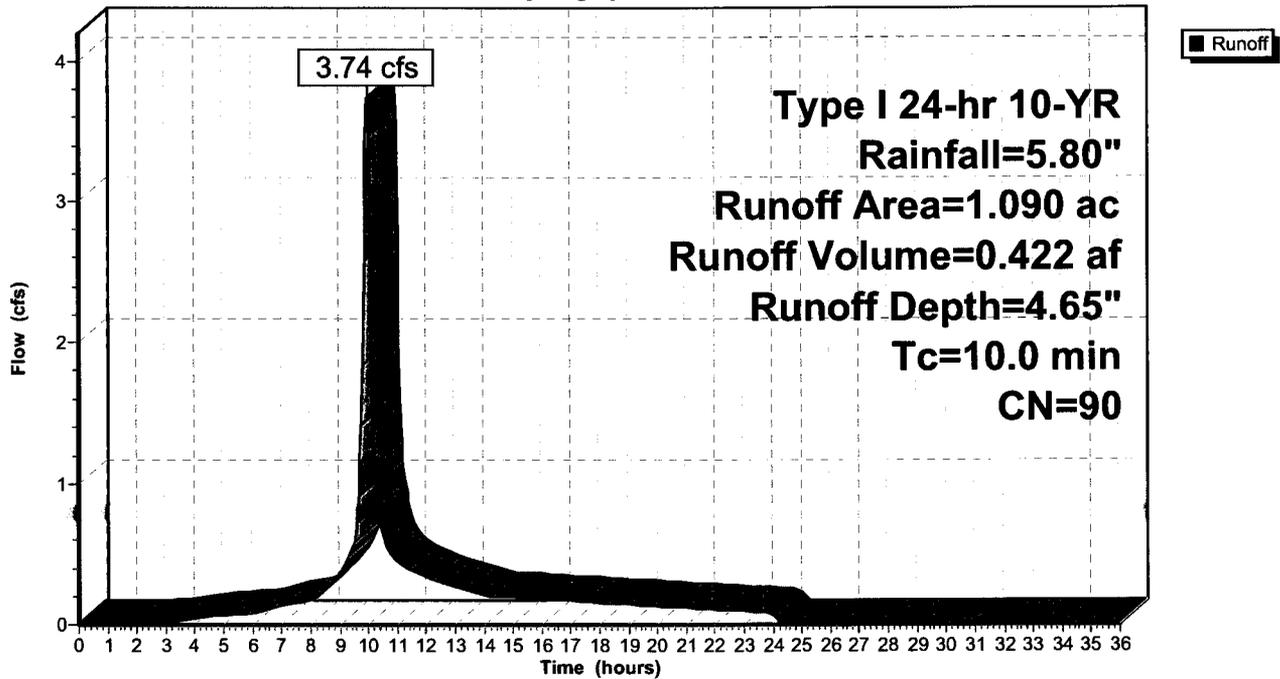
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 10-YR Rainfall=5.80"

Area (ac)	CN	Description
0.820	94	Urban commercial, 85% imp, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
1.090	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Subcatchment 2&3: Disturbed Area**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 10-YR Rainfall=5.80"

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**Subcatchment EX-1: Pre-Developed**

Runoff = 2.59 cfs @ 10.07 hrs, Volume= 0.346 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 10-YR Rainfall=5.80"

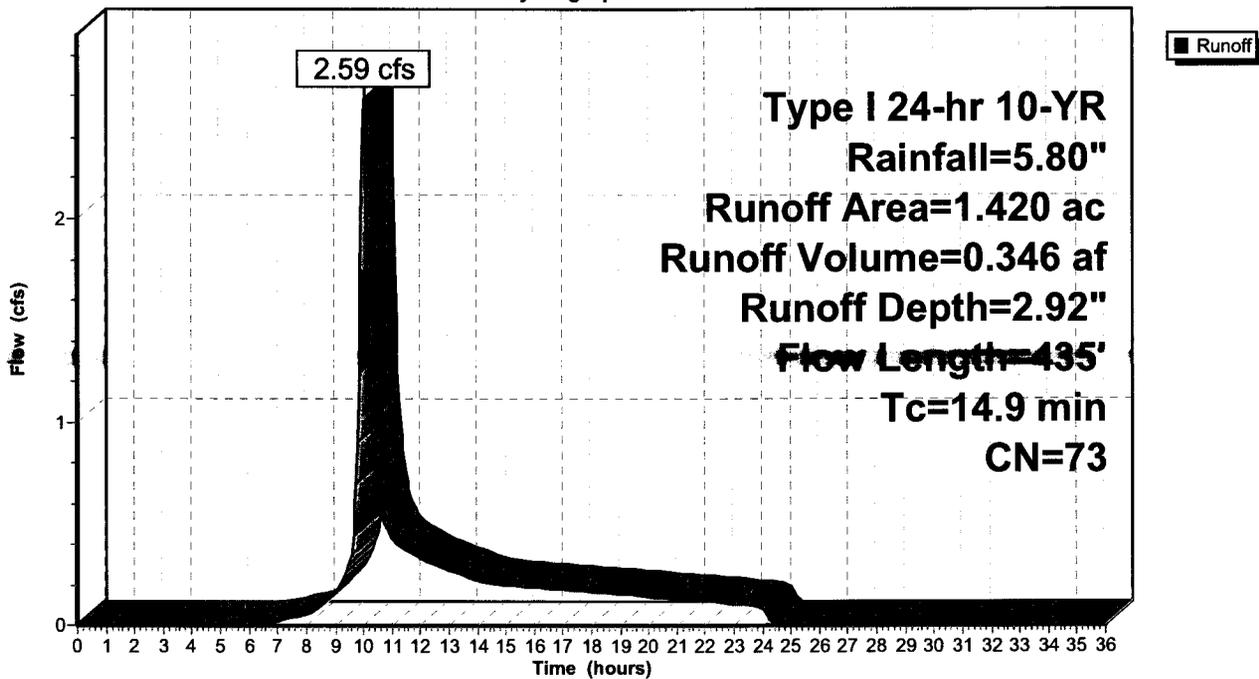
Area (ac)	CN	Description
1.420	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.50"
1.1	120	0.1375	1.9		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.7	215	0.0930	2.1	198.88	<b>Parabolic Channel,</b> W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
14.9	435	Total			

**Subcatchment EX-1: Pre-Developed**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 10-YR Rainfall=5.80"

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**Pond BMP: BMP**

Inflow Area = 1.090 ac, Inflow Depth = 4.65" for 10-YR event  
 Inflow = 3.74 cfs @ 10.00 hrs, Volume= 0.422 af  
 Outflow = 0.45 cfs @ 11.02 hrs, Volume= 0.422 af, Atten= 88%, Lag= 60.9 min  
 Primary = 0.45 cfs @ 11.02 hrs, Volume= 0.422 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
 Peak Elev= 73.72' @ 11.02 hrs Surf.Area= 0.059 ac Storage= 0.128 af  
 Plug-Flow detention time= 125.7 min calculated for 0.422 af (100% of inflow)  
 Center-of-Mass det. time= 125.5 min ( 870.4 - 744.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.217 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.014	0.000	0.000
71.00	0.023	0.019	0.019
72.00	0.035	0.029	0.047
73.00	0.049	0.042	0.090
74.00	0.063	0.056	0.146
75.00	0.079	0.071	0.217

Device	Routing	Invert	Outlet Devices
#1	Primary	64.50'	<b>15.0" x 50.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Device 1	70.00'	<b>3.0" Vert. Orifice</b> C= 0.600
#3	Device 1	74.25'	<b>4.00' x 4.00' Horiz. Grate</b> Limited to weir flow C= 0.600

**Primary OutFlow** Max=0.45 cfs @ 11.02 hrs HW=73.72' (Free Discharge)

1=Culvert (Passes 0.45 cfs of 17.32 cfs potential flow)

2=Orifice (Orifice Controls 0.45 cfs @ 9.1 fps)

3=Grate ( Controls 0.00 cfs)

**AEA003 - Pond**

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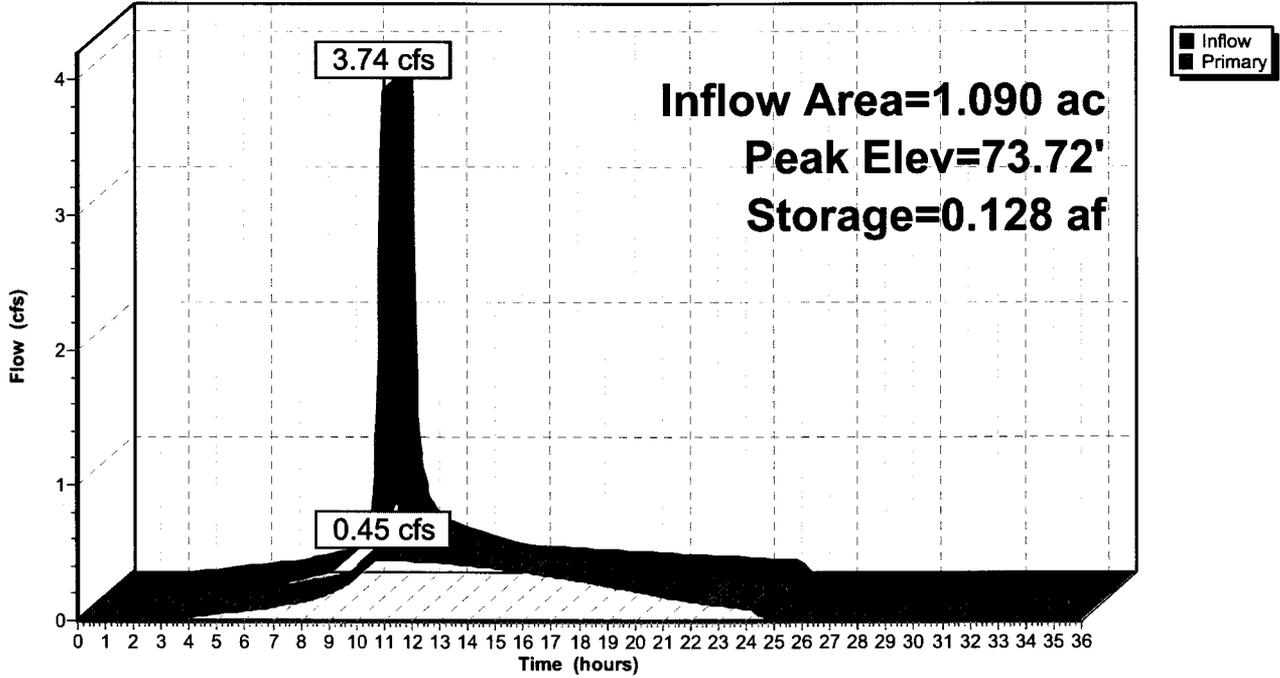
Type I 24-hr 10-YR Rainfall=5.80"

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2/7/2008

**Pond BMP: BMP**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 10-YR Rainfall=5.80"

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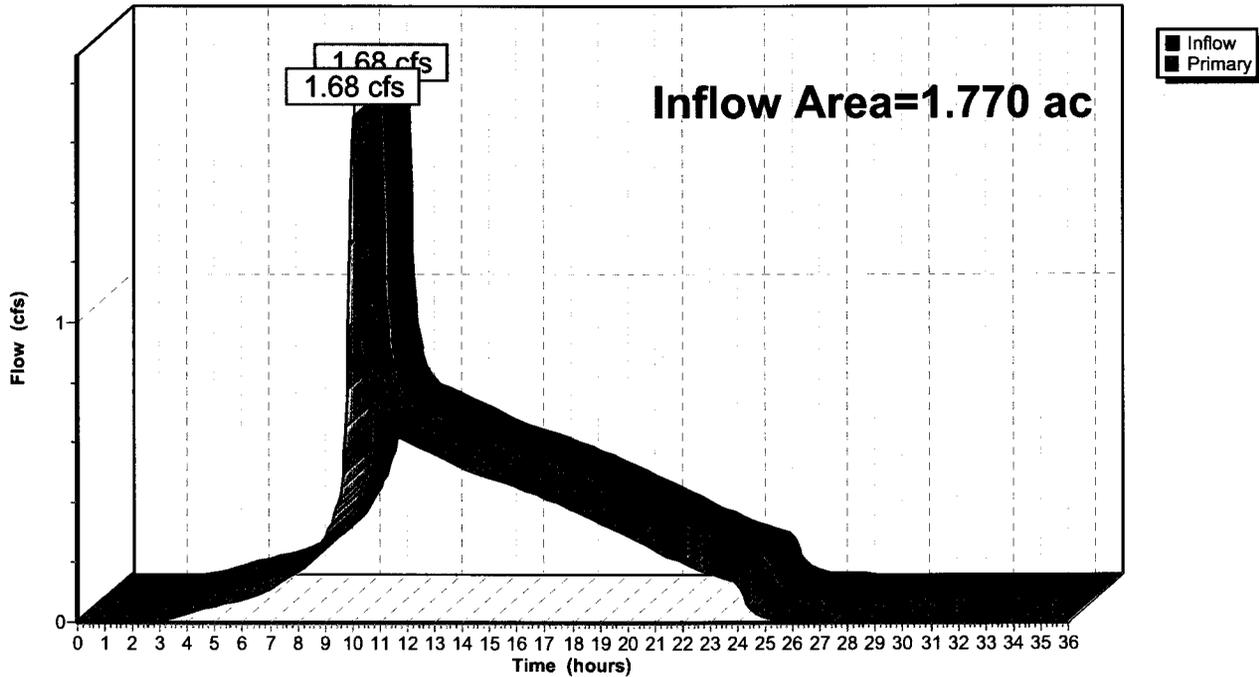
**Link POST: Post-Developed**

Inflow Area = 1.770 ac, Inflow Depth = 3.99" for 10-YR event  
 Inflow = 1.68 cfs @ 10.06 hrs, Volume= 0.588 af  
 Primary = 1.68 cfs @ 10.06 hrs, Volume= 0.588 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

**Link POST: Post-Developed**

Hydrograph



**AEA003 - Pond***Type I 24-hr 100-YR Rainfall=8.00"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1: Woods**

Runoff Area=0.680 ac Runoff Depth=4.81"

Flow Length=315' Tc=13.8 min CN=73 Runoff=2.18 cfs 0.273 af

**Subcatchment 2&3: Disturbed Area**

Runoff Area=1.090 ac Runoff Depth=6.81"

Tc=10.0 min CN=90 Runoff=5.41 cfs 0.618 af

**Subcatchment EX-1: Pre-Developed**

Runoff Area=1.420 ac Runoff Depth=4.81"

Flow Length=435' Tc=14.9 min CN=73 Runoff=4.41 cfs 0.569 af

**Pond BMP: BMP**

Peak Elev=74.35' Storage=0.169 af Inflow=5.41 cfs 0.618 af

Outflow=2.21 cfs 0.618 af

**Link POST: Post-Developed**

Inflow=3.52 cfs 0.891 af

Primary=3.52 cfs 0.891 af

**Total Runoff Area = 3.190 ac Runoff Volume = 1.460 af Average Runoff Depth = 5.49"**

**AEA003 - Pond**

Type I 24-hr 100-YR Rainfall=8.00"

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**Subcatchment 1: Woods**

Runoff = 2.18 cfs @ 10.05 hrs, Volume= 0.273 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 100-YR Rainfall=8.00"

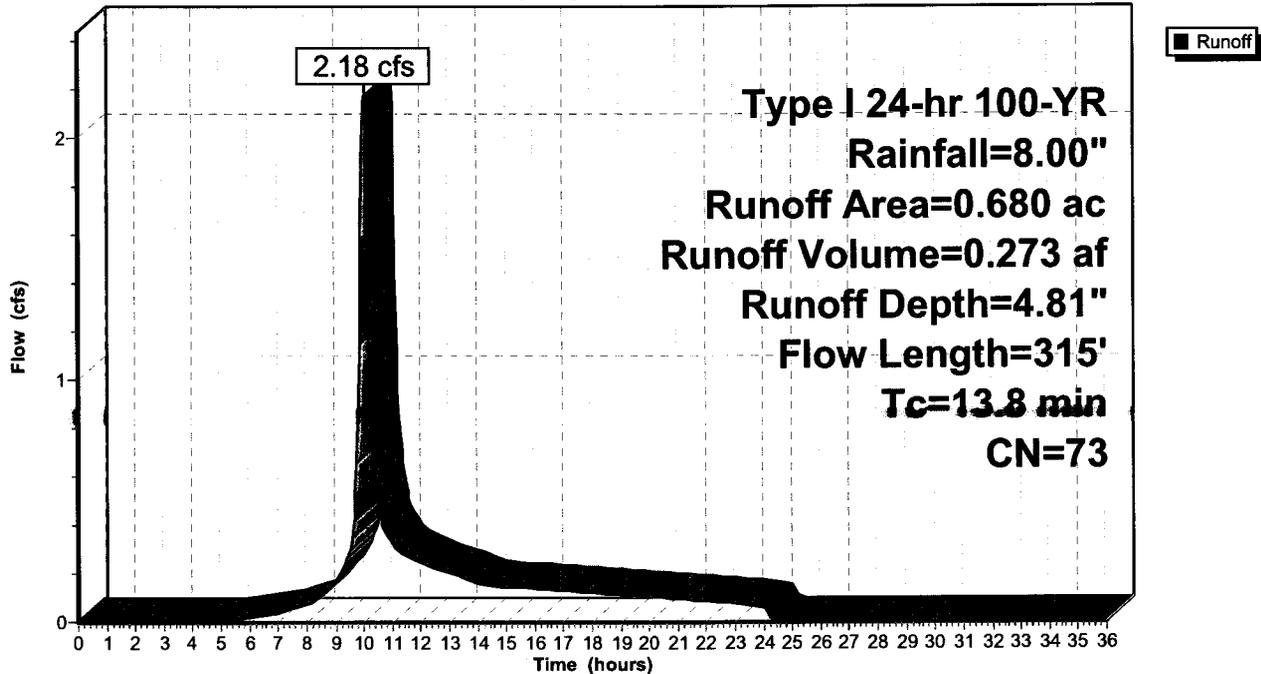
Area (ac)	CN	Description
0.680	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	215	0.0930	2.1	198.88	Parabolic Channel, W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
13.8	315	Total			

**Subcatchment 1: Woods**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 100-YR Rainfall=8.00"

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**Subcatchment 2&3: Disturbed Area**

Runoff = 5.41 cfs @ 10.00 hrs, Volume= 0.618 af, Depth= 6.81"

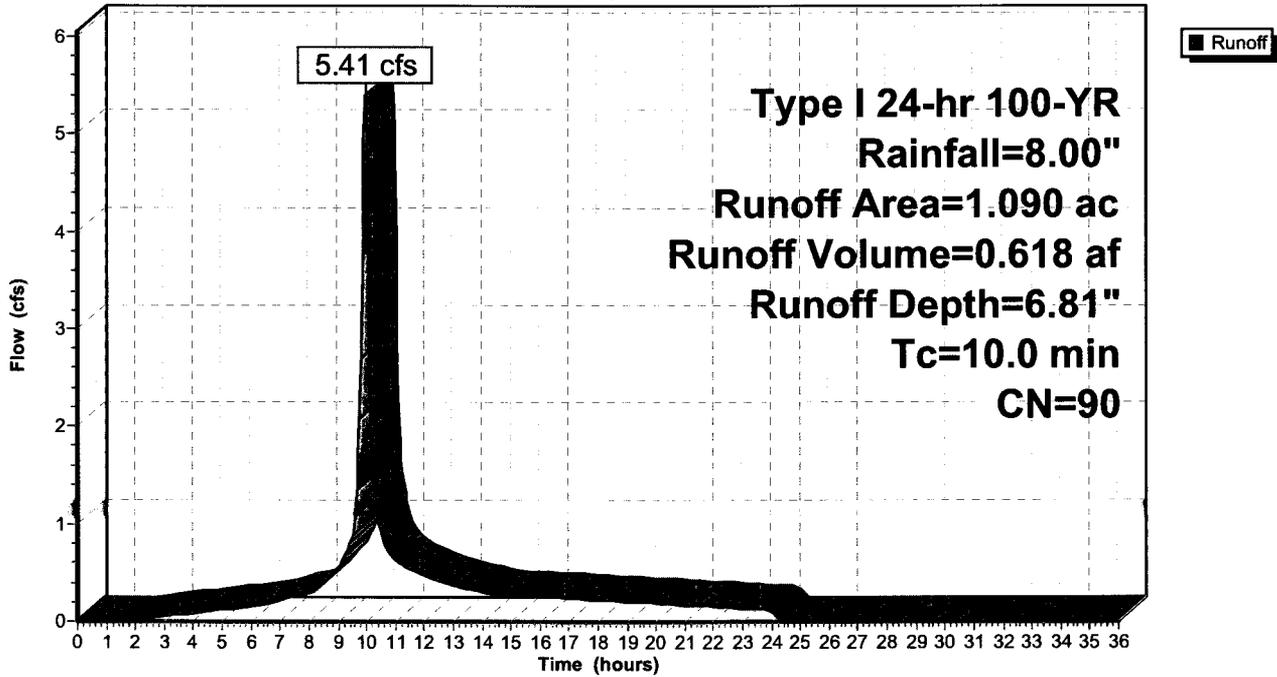
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 100-YR Rainfall=8.00"

Area (ac)	CN	Description
0.820	94	Urban commercial, 85% imp, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
1.090	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Subcatchment 2&3: Disturbed Area**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 100-YR Rainfall=8.00"

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**Subcatchment EX-1: Pre-Developed**

Runoff = 4.41 cfs @ 10.07 hrs, Volume= 0.569 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
Type I 24-hr 100-YR Rainfall=8.00"

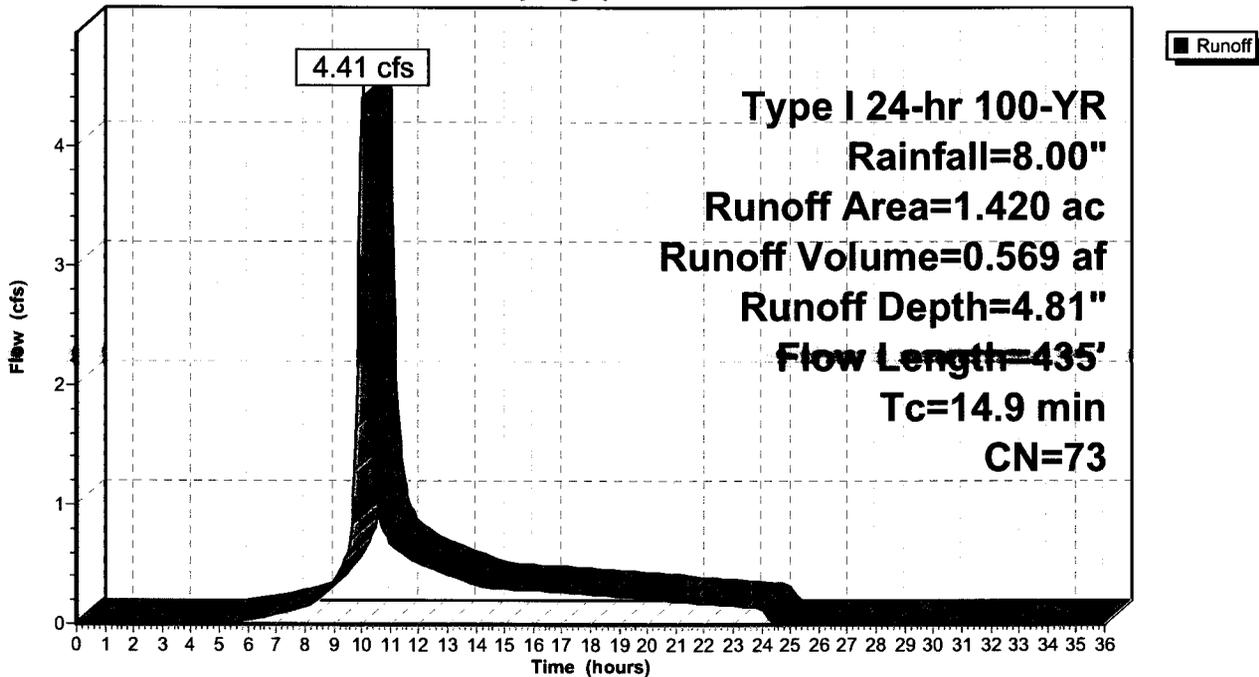
Area (ac)	CN	Description
1.420	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0750	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.50"
1.1	120	0.1375	1.9		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.7	215	0.0930	2.1	198.88	<b>Parabolic Channel,</b> W=35.00' D=4.00' Area=93.3 sf Perim=36.2' n= 0.400 Sheet flow: Woods+light brush
14.9	435	Total			

**Subcatchment EX-1: Pre-Developed**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 100-YR Rainfall=8.00"

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**Pond BMP: BMP**

Inflow Area = 1.090 ac, Inflow Depth = 6.81" for 100-YR event  
 Inflow = 5.41 cfs @ 10.00 hrs, Volume= 0.618 af  
 Outflow = 2.21 cfs @ 10.21 hrs, Volume= 0.618 af, Atten= 59%, Lag= 12.3 min  
 Primary = 2.21 cfs @ 10.21 hrs, Volume= 0.618 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs  
 Peak Elev= 74.35' @ 10.21 hrs Surf.Area= 0.069 ac Storage= 0.169 af  
 Plug-Flow detention time= 145.4 min calculated for 0.617 af (100% of inflow)  
 Center-of-Mass det. time= 145.5 min ( 877.2 - 731.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.217 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.014	0.000	0.000
71.00	0.023	0.019	0.019
72.00	0.035	0.029	0.047
73.00	0.049	0.042	0.090
74.00	0.063	0.056	0.146
75.00	0.079	0.071	0.217

Device	Routing	Invert	Outlet Devices
#1	Primary	64.50'	<b>15.0" x 50.0' long Culvert</b> RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections
#2	Device 1	70.00'	<b>3.0" Vert. Orifice</b> C= 0.600
#3	Device 1	74.25'	<b>4.00' x 4.00' Horiz. Grate</b> Limited to weir flow C= 0.600

**Primary OutFlow** Max=2.13 cfs @ 10.21 hrs HW=74.35' (Free Discharge)  
 1=Culvert (Passes 2.13 cfs of 17.95 cfs potential flow)  
 2=Orifice (Orifice Controls 0.49 cfs @ 9.9 fps)  
 3=Grate (Weir Controls 1.64 cfs @ 1.0 fps)

**AEA003 - Pond**

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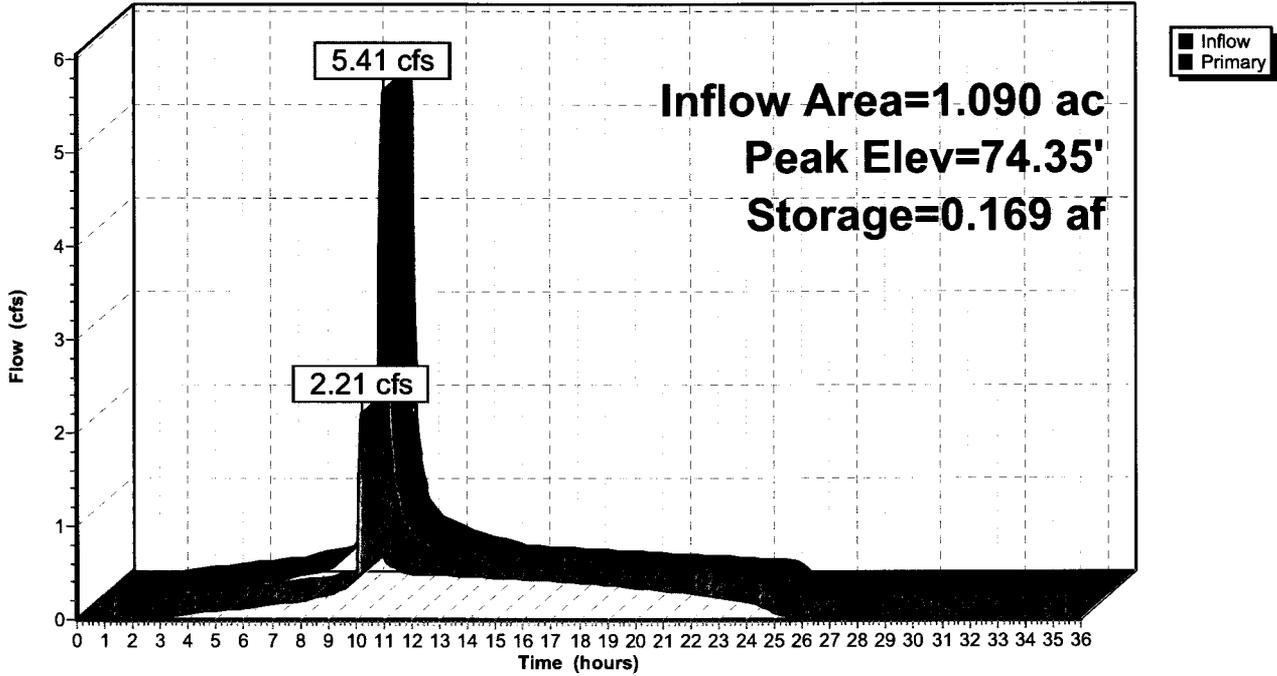
Type I 24-hr 100-YR Rainfall=8.00"

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**Pond BMP: BMP**

Hydrograph



**AEA003 - Pond**

Type I 24-hr 100-YR Rainfall=8.00"

Prepared by Land Planning Solutions

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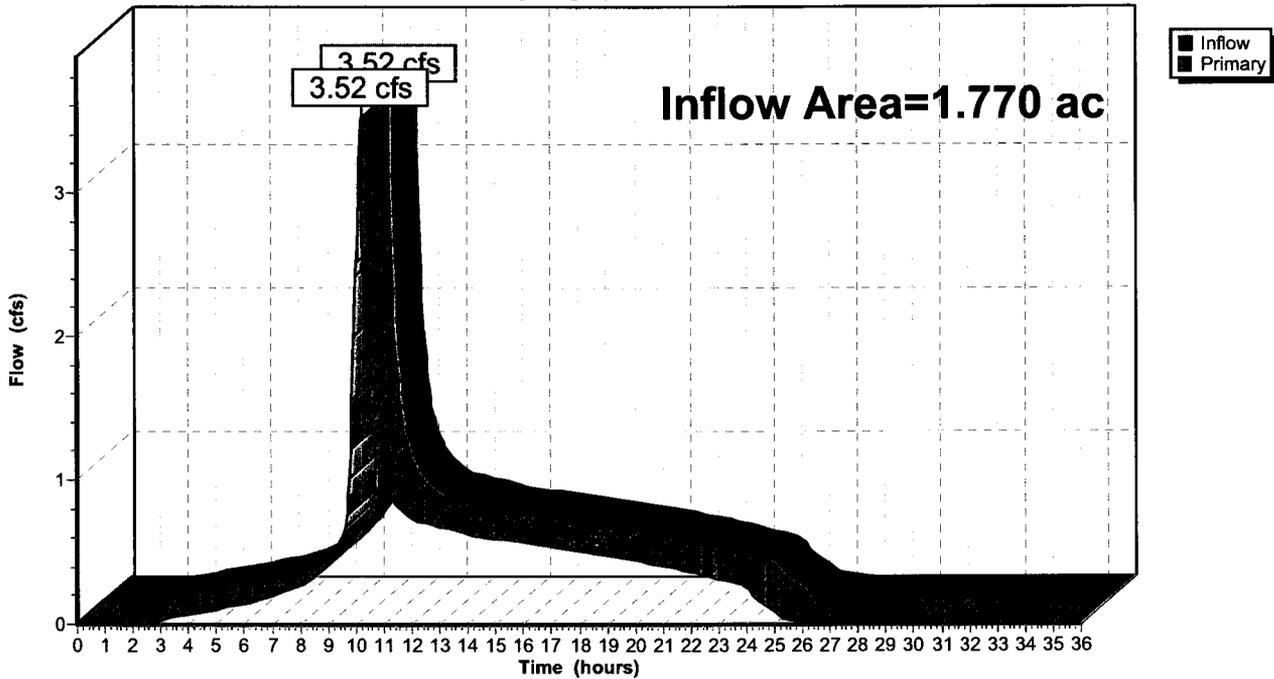
**Link POST: Post-Developed**

Inflow Area = 1.770 ac, Inflow Depth = 6.04" for 100-YR event  
Inflow = 3.52 cfs @ 10.19 hrs, Volume= 0.891 af  
Primary = 3.52 cfs @ 10.19 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

**Link POST: Post-Developed**

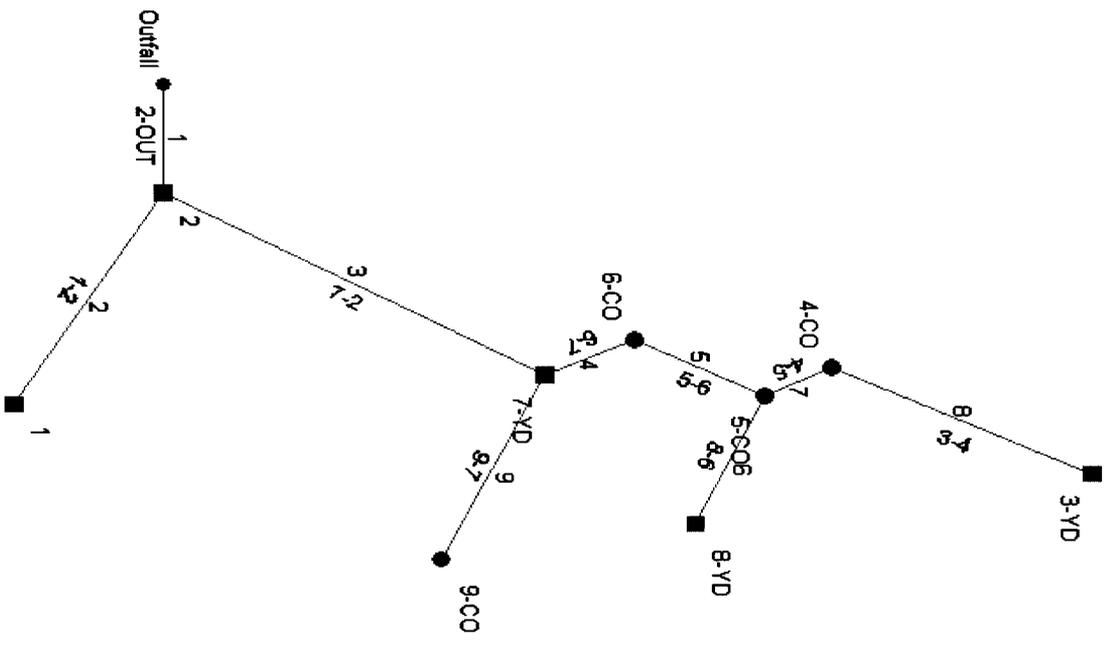
Hydrograph



SECTION II

STORM SEWER DESIGN COMPUTATIONS  
HYDRAULIC GRADE LINE COMPUTATIONS  
INLET SPREAD CALCULATIONS  
&  
DRAINAGE AREA MAP

# Hydraflow Plan View



Wellington Clubhouse

No. Lines: 9

02-07-2008

February 6, 2008

Line No.	Line ID	Drng Area (ac)	Total Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	Inlet Time (min)	Tc (min)	i Sys (in/hr)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Invert Up (ft)	Invert Dn (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	n-val Pipe	Gnd/Rim El Up (ft)	HGL Up (ft)	Gnd/Rim El Dn (ft)	HGL Dn (ft)
1	2-OUT	0.24	0.82	0.80	0.19	0.66	5.0	7.4	6.56	4.30	7.43	2.44	71.14	71.00	28.00	0.50	18	0.013	75.34	73.77	73.00	73.72
2	1-2	0.19	0.19	0.80	0.15	0.15	5.0	5.0	7.17	1.09	4.57	0.89	71.46	71.14	64.00	0.50	15	0.013	75.34	73.99	75.34	73.97
3	7-2	0.04	0.39	0.80	0.03	0.31	5.0	6.8	6.70	2.09	4.21	2.66	72.14	71.14	100.00	1.00	12	0.011	76.20	74.14	75.34	73.89
4	6-7	0.00	0.32	0.00	0.00	0.26	0.0	5.6	7.00	1.79	1.43	5.13	72.37	72.14	23.00	1.00	8	0.011	76.25	74.67	76.20	74.30
5	5-6	0.00	0.32	0.00	0.00	0.26	0.0	5.5	7.03	1.80	1.43	5.15	72.70	72.37	33.00	1.00	8	0.011	76.00	75.51	76.25	74.99
6	8-6	0.16	0.16	0.80	0.13	0.13	5.0	5.0	7.17	0.92	1.43	2.63	73.07	72.70	37.00	1.00	8	0.011	76.25	76.39	76.00	76.23
7	4-5	0.00	0.16	0.00	0.00	0.13	0.0	5.4	7.06	0.90	1.43	2.59	72.87	72.70	17.00	1.00	8	0.011	76.00	76.30	76.00	76.24
8	3-4	0.16	0.16	0.80	0.13	0.13	5.0	5.0	7.17	0.92	1.43	2.63	73.53	72.87	66.00	1.00	8	0.011	75.50	76.66	76.00	76.38
9	9-7	0.03	0.03	0.80	0.02	0.02	5.0	5.0	7.17	0.17	1.43	0.49	72.67	72.14	53.00	1.00	8	0.011	76.25	74.42	76.20	74.41

Wellington Clubhouse

Number of lines: 9

Date: 02-07-2008

February 6, 2008

NOTES: Intensity = 185.06 / (inlet time + 20.81) ^ 1.00 - Return period = 10 Yrs. ; \*\* Critical depth

Line	Size (in)	Q (cfs)	Downstream							Len (ft)	Upstream							Check		JL coeff	Minor loss (ft)	
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)		Sf (%)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)			Ave Sf (%)
1	18	4.30	71.00	73.72	1.50	1.77	2.44	0.09	73.81	0.168	28.0	71.14	73.77	1.50	1.77	2.44	0.09	73.86	0.168	0.047	1.35	0.12
2	15	1.09	71.14	73.97	1.25	1.23	0.89	0.01	73.98	0.028	64.0	71.46	73.99	1.25	1.23	0.89	0.01	74.00	0.028	0.018	1.00	0.01
3	12	2.09	71.14	73.89	1.00	0.79	2.66	0.11	74.00	0.247	100	72.14	74.14	1.00	0.79	2.66	0.11	74.25	0.247	0.247	1.50	0.17
4	8	1.79	72.14	74.30	0.67	0.35	5.13	0.41	74.71	1.576	23.0	72.37	74.67	0.67	0.35	5.13	0.41	75.08	1.576	0.362	0.79	0.32
5	8	1.80	72.37	74.99	0.67	0.35	5.15	0.41	75.40	1.589	33.0	72.70	75.51	0.67	0.35	5.15	0.41	75.93	1.588	0.524	1.00	0.41
6	8	0.92	72.70	76.23	0.67	0.35	2.63	0.11	76.34	0.414	37.0	73.07	76.39	0.67	0.35	2.63	0.11	76.49	0.413	0.153	1.00	0.11
7	8	0.90	72.70	76.24	0.67	0.35	2.59	0.10	76.34	0.401	17.0	72.87	76.30	0.67	0.35	2.59	0.10	76.41	0.400	0.068	0.77	0.08
8	8	0.92	72.87	76.38	0.67	0.35	2.63	0.11	76.49	0.414	66.0	73.53	76.66	0.67	0.35	2.63	0.11	76.77	0.413	0.273	1.00	0.11
9	8	0.17	72.14	74.41	0.67	0.35	0.49	0.00	74.41	0.015	53.0	72.67	74.42	0.67	0.35	0.49	0.00	74.42	0.015	0.008	1.00	0.00

Wellington Clubhouse Number of lines: 9 Run Date: 02-07-2008



SECTION III

ORIGINAL WORKSHEET FOR BMP POINT SYSTEM  
FOR WELLINGTON SUBDIVISION

**TABLE 3**  
**WORKSHEET FOR BMP POINT SYSTEM**  
 Revised to meet 1/1/2000 Regulations

**8223-6**  
**3/27/01**

TOTAL SITE AREA = 277.21 AC.

COPY

**A. STRUCTURAL BMP POINT ALLOCATION**

<u>BMP</u>	<u>BMP Points</u>		<u>Fraction of Site Served by BMP</u>	=	<u>Weighted BMP Points</u>
Wet Pond #1	10	x	(149.35 ÷ 236.16)	=	6.32
Dry Pond #1	4	x	(30.83 ÷ 236.16)	=	0.52
Dry Pond #2	4	x	(22.00 ÷ 236.16)	=	0.37
Dry Pond #3	4	x	(8.00 ÷ 236.16)	=	0.14
Dry Pond #4	6	x	(36.55 ÷ 236.16)	=	<u>0.93</u>
<b>TOTAL WEIGHTED STRUCTURAL BMP POINTS:</b>					<b>8.28</b>

**B. NATURAL OPEN SPACE CREDIT**

<u>Fraction of Site</u>		<u>Natural Open Space Credit</u>		<u>Points for Natural Open Space</u>
$\frac{31.7}{277.21}$	x	$\frac{0.15}{(0.1 \text{ per } 1\%)}$	=	<u>1.72</u>

**C. TOTAL WEIGHTED POINTS**

8.28	+	1.72	=	<u>10.00</u>
Structural BMP Points		Natural Open Space Points		<b>TOTAL</b>

- NOTES:
- 1) 236.16 Acre is area above RPA per discussion with County.
  - 2) Natural open space areas are along the perimeter of the project up to the rear property of the lots.

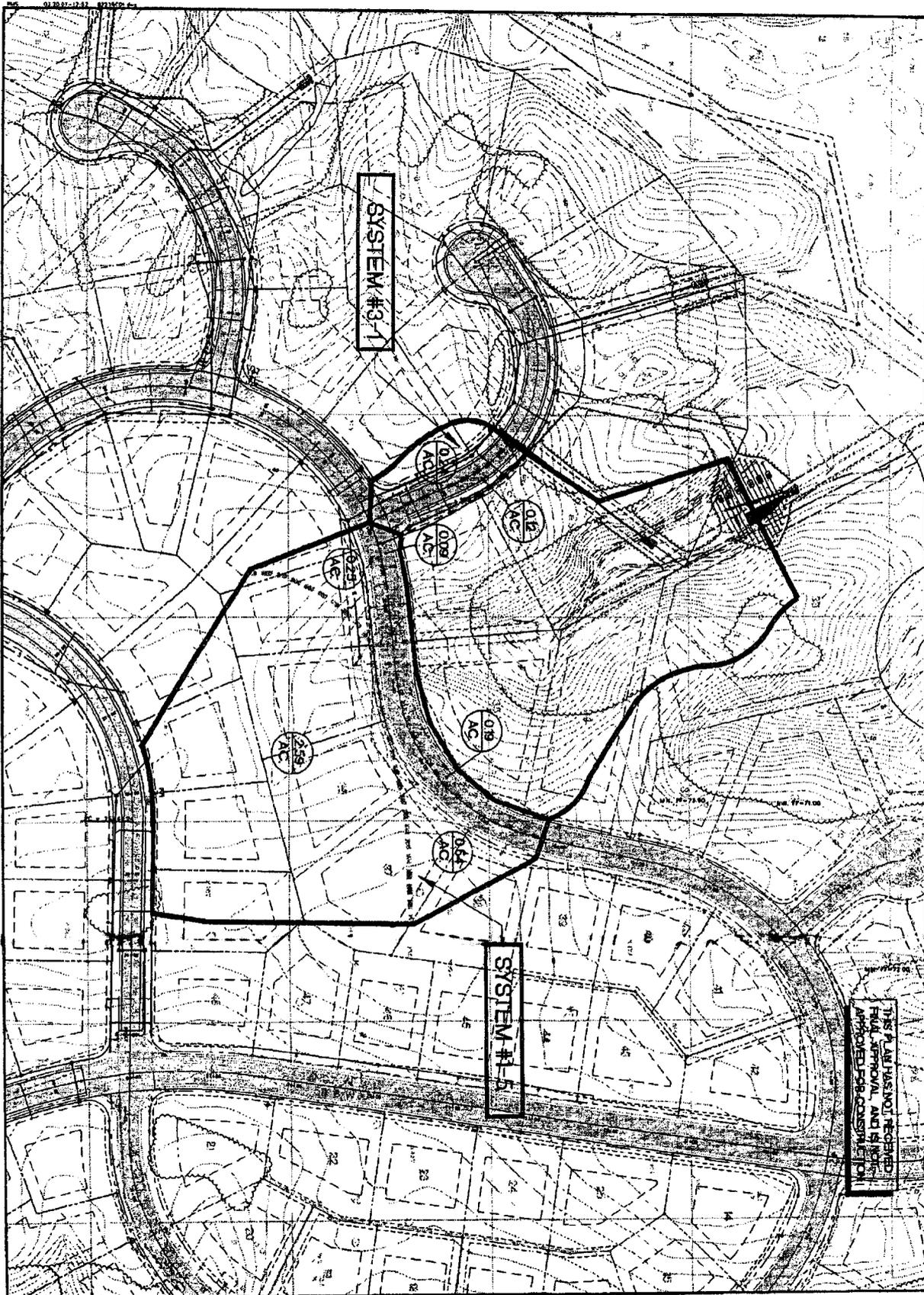
Even though we are grand fathered to a previously approved master plan, our site still conforms to the new regulations.







COPY



SECTION 3 DRY POND DRAINAGE AREA MAP  
**WELLINGTON**  
 SECTION II  
 OWNER/DEVELOPER: WELLINGTON, L.L.C.  
 LAUREL CITY COUNTY WINDSHORE DISTRICT WINDSHORE



6948 Old Towne Road, Suite 1  
 Williamsburg, Virginia 23181  
 (757) 253-0040  
 Fax (757) 250-8064



NO.	DATE	REVISION / CHANGE / MARK	BY

Layout Tab Name: DAM, Images: Bsnight.tif, C400.jpg; Christian Bosnight Seal.jpg; . Xrefs: AEA003 - Topo.dwg; AEA003 - Title.dwg; AEA003 - Seal.dwg; AEA003 - Landscape.dwg; AEA003 - Lighting.dwg  
 LAST SAVED BY Jeff, FEB 06, 2008 - 16:25:47  
 C:\Projects\American Eastern\AEA003 - Wellington Clubhouse\Cadd\Design\AEA003 - Master.dwg, Plotted By: Jeff, Plotted: Feb 06, 2008 - 4:26pm



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 SUFFOLK VA. 23435-2657  
 O 757.935.9014 F 757.935.9015  
 www.landplanningsolutions.com



No.	DATE	REVISION

PROJECT No:	AEA003
DATE	08FEB08
DES.	JPH
DR.	RLR
CKD.	JPH

WELLINGTON CLUBHOUSE  
 SITE PLAN  
 JAMES CITY COUNTY, VIRGINIA  
 DRAINAGE AREA MAP



SHEET NO.

DAM

MAP LEGEND

- EXISTING DRAINAGE AREA
- EXISTING CALLOUT
- PROPOSED DRAINAGE AREA
- PROPOSED CALLOUT
- SUBAREA CALLOUT



Layout Tab Name: Grading; Images: Basnight; C400.jpg; Christian; Basnight; Seol; .jpg; . Xrefs: AEA003 - Topo.dwg; AEA003 - Title.dwg; AEA003 - Seol.dwg; AEA003 - Landscape.dwg; AEA003 - Lighting.dwg  
 LAST SAVED BY: Jeff, FEB 06, 2008 - 16:25:47  
 C:\Projects\American\_Eastern\AEA003 - Wellington Clubhouse - Master.dwg; Plotted By: Jeff; Plotted: Feb 06, 2008 - 4:34pm



**GRADING LEGEND**

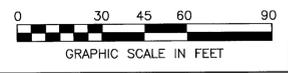
- X SILT FENCE
- INLET PROTECTION
- ▨ VDOT EC-1 RIPRAP
- 10.00 TOP OF CURB
- 10.0 GROUND ELEVATION
- 10.0 P PAVEMENT

**STORM CALLOUTS**

- |  |  |
|--|--|
| 1<br>CB VDOT DI-3A<br>RIM=75.36<br>INV=71.46 | 7<br>YARD DRAIN<br>RIM=76.20<br>INV=72.14        |
| 2<br>CB VDOT DI-3A<br>RIM=75.34<br>INV=71.14 | 8<br>YARD DRAIN<br>RIM=76.25<br>INV=71.14        |
| 3<br>YARD DRAIN<br>RIM=76.20<br>INV=73.53    | 9<br>CO<br>RIM=76.25<br>INV=72.67                |
| 4<br>CO<br>RIM=76.00<br>INV=72.87            | 10<br>FES<br>RIM=74.25<br>INV=71.00              |
| 5<br>CO<br>RIM=76.00<br>INV=72.70            | 11<br>OUTLET STRUCTURE<br>RIM=74.25<br>INV=64.50 |
| 6<br>RIM=76.25<br>INV=72.37                  | 12<br>FES<br>RIM=74.25<br>INV=64.00              |

**GRADING NOTES**

- THE CONTRACTOR IS RESPONSIBLE FOR ADJUSTING ALL VALVE BOXES, INLET TOPS, MANHOLE RIMS AND OTHER APPURTENANCES LOCATED WITHIN THE PROPOSED LIMIT OF CONSTRUCTION. ALL STRUCTURES SHALL MATCH FINISHED GRADES.
- ALL RCP STORM PIPE SHALL BE CLASS III RCP WITH WATERTIGHT JOINTS MEETING THE REQUIREMENTS OF ASTM C361 (OR ASTM C76 WITH C443 GASKETS), UNLESS OTHERWISE NOTED. PROVIDE STORM BEDDING PER VDOT PB-1.
- ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO THE VDOT SUBDIVISION STREET REQUIREMENTS 2005; VDOT ROAD AND BRIDGE SPECIFICATIONS 2002; VDOT ROAD AND BRIDGE STANDARDS 2001; AND THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK, THIRD EDITION.
- CONTRACTOR SHALL MAINTAIN SITE DRAINAGE AT ALL TIMES.
- ALL STRUCTURES ARE TO HAVE IS-1 INLET SHAPING AND ALL STRUCTURES OVER 4 FEET IN DEPTH REQUIRE ST-1 STEPS.
- ALL DISTURBED SLOPES 3:1 OR GREATER SHALL BE PROTECTED WITH VDOT EC-3 EROSION CONTROL MATTING.
- ALL ROOF DRAINAGE SHALL BE PIPED INTO THE STORM SEWER.
- ALL HDPE STORM PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3350. PROVIDE STORM BEDDING AND BACKFILL PER ADS TYPICAL TRENCH DETAIL (SHEET C500).
- YARD DRAINS SHALL BE NYLOPLAST WITH STANDARD GRATE, OR APPROVED EQUAL. CLEANOUTS SHALL BE NYLOPLAST WITH SOLID GRATE.
- SEE SHEET C500 FOR POND SECTION AND OUTLET STRUCTURE DETAIL.
- SEE NOTES ON SHEET C001 FOR EMBANKMENT FILL AND STORMWATER POND MAINTENANCE PLAN.



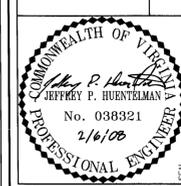
LAND PLANNING SOLUTIONS  
 5857 HARBOUR VIEW BLVD, STE. 202  
 SUDBURY, VA 23455-2657  
 O 757.935.9014 F 757.935.9015  
 www.landplanningsolutions.com



No.	DATE	REVISION

PROJECT No:	AEA003
DATE:	06FEB08
DES:	JPH
DR:	JLR
CKD:	JPH

WELLINGTON CLUBHOUSE  
 SITE PLAN  
 GRADING PLAN  
 JAMES CITY COUNTY, VIRGINIA



SHEET NO.  
**C300**



# Wellington Estates



WC084  
Maintenance Agreement  
Dated 12/24/02

WC082  
Maintenance Agreement  
Dated 12/24/02

WC102  
Maintenance Agreement  
Dated 3/6/08

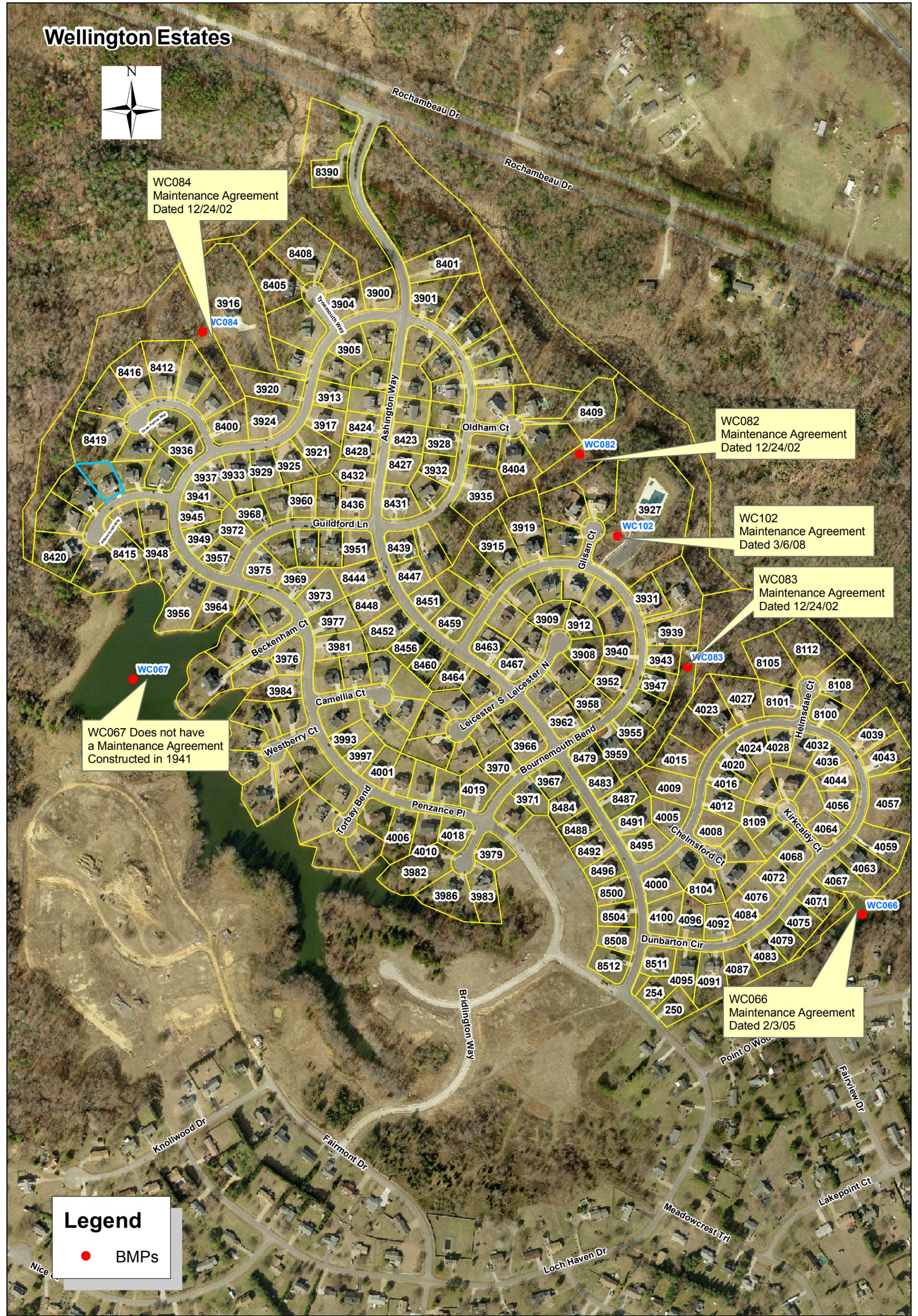
WC083  
Maintenance Agreement  
Dated 12/24/02

WC067 Does not have  
a Maintenance Agreement  
Constructed in 1941

WC066  
Maintenance Agreement  
Dated 2/3/05

## Legend

● BMPs

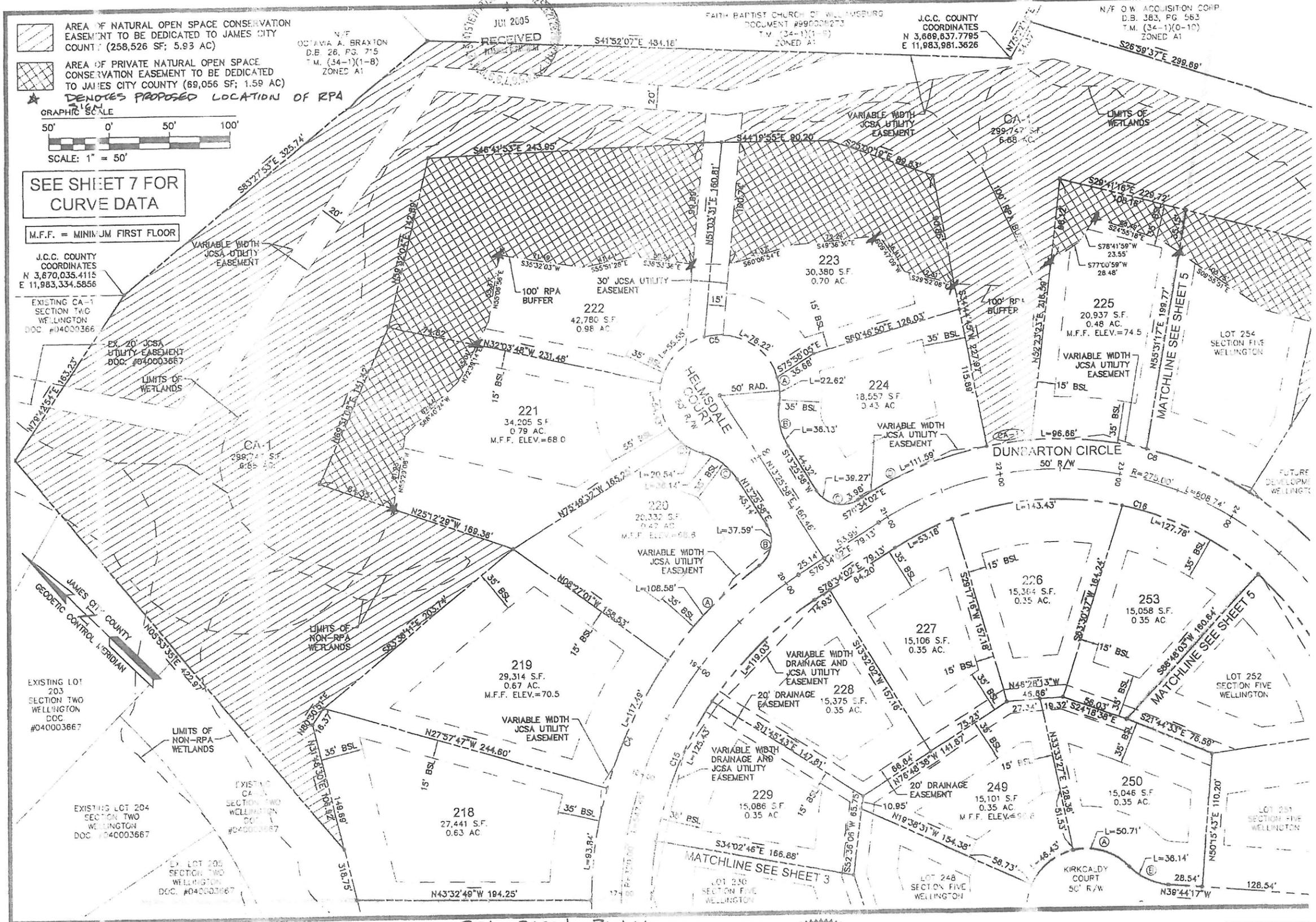






W.C. 6/6

5-29-05



AREA OF NATURAL OPEN SPACE CONSERVATION EASEMENT TO BE DEDICATED TO JAMES CITY COUNTY (258,526 SF; 5.93 AC)

AREA OF PRIVATE NATURAL OPEN SPACE CONSERVATION EASEMENT TO BE DEDICATED TO JAMES CITY COUNTY (69,056 SF; 1.59 AC)

★ DENOTES PROPOSED LOCATION OF RPA

GRAPHIC SCALE  
50' 0' 50' 100'

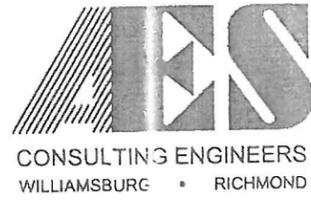
SCALE: 1" = 50'

SEE SHEET 7 FOR CURVE DATA

M.F.F. = MINIMUM FIRST FLOOR

J.C.C. COUNTY COORDINATES  
N 3,670,035.4115  
E 11,983,334.5856

EXISTING CA-1 SECTION TWO WELLINGTON DOC #040003667



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

**RPA SIGN PLAN**

PLAT OF SUBDIVISION  
WELLINGTON  
SECTION FIVE  
LOTS 124-131, 210-254, 258-270 (65 LOTS)  
BEING THE PROPERTY OF  
WELLINGTON, L.L.C.

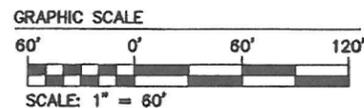
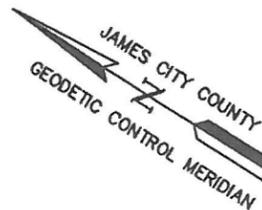
STONEHOUSE DISTRICT      JAMES CITY COUNTY      VIRGINIA



No.	DATE	REVISION / COMMENT / NOTE	BY
1	5/4/05	REVISED PER J.C.C. COMMENT LETTER DATED 4/27/05	VMB

Designed	Drawn
VMB/JAG	AV
Scale	Date
1"=50'	2/2'
Project No.	
8223-9	
Drawing No.	
4 of 7	

20067



- NATURAL OPEN SPACE EASEMENT HEREBY DEDICATED TO JAMES CITY COUNTY

NOTE:  
THE PROPERTY IS SUBJECT TO THE DECLARATION OF COVENANTS, CODES, AND RESTRICTIONS MADE ON FEBRUARY 28, 2000

NOTE:  
JAMES CITY COUNTY COORDINATES REFERENCED ON THIS PLAN ARE BASED UPON JAMES CITY COUNTY CONTROL MONUMENT #302.

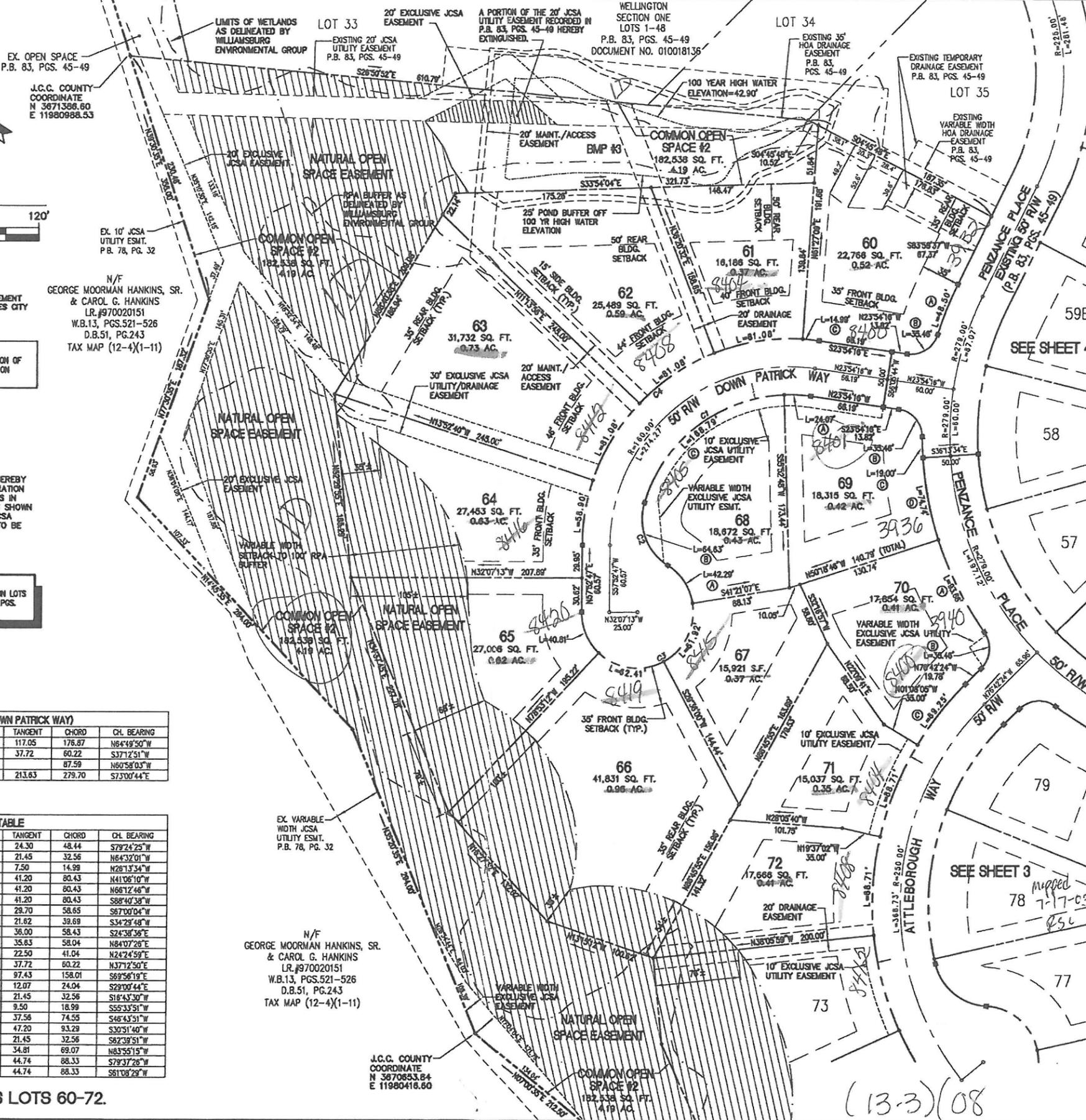
NOTE:  
A FIVE FOOT LANDSCAPE EASEMENT IS HEREBY DEDICATED TO THE HOMEOWNER'S ASSOCIATION ALONG THE RIGHT OF WAY OF ALL ROADS IN SECTION THREE EXCEPT IN THOSE AREAS SHOWN TO BE EASEMENTS DEDICATED TO THE JCSA IN WHICH CASE THE SAID FIVE FOOT IS TO BE ADJACENT TO THE JCSA EASEMENT.

NOTE:  
ADDITIONAL EASEMENTS HAVE BEEN CREATED ON LOTS 33-35 OF WELLINGTON SECTION ONE, P.B. 83, PGS. 45-19 (DOC. NO. 01001838)

NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHL. BEARING
C1	81°51'09"	135.00	192.86	117.05	176.87	N64°49'50"W
C2	74°03'29"	50.00	64.63	37.72	60.22	S37°12'51"W
C3	237°41'41"	50.00	207.43	87.59	180°58'03"W	
C4	98°12'56"	185.00	317.13	213.63	279.70	S73°00'44"E

LOT	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHL. BEARING
60A	9°08'24"	304.00	48.50	24.30	48.44	S79°24'25"W
60B	81°15'31"	25.00	35.46	21.45	32.56	N64°32'01"W
60C	4°38'35"	185.00	14.99	7.50	14.99	N28°13'34"W
61	25°08'36"	185.00	81.08	41.20	80.43	N41°06'10"W
62	25°08'36"	185.00	81.08	41.20	80.43	N66°12'46"W
63	25°08'36"	185.00	81.08	41.20	80.43	S88°40'38"W
64	181°4'33"	185.00	58.90	29.70	58.65	S67°00'04"W
65	48°45'59"	50.00	40.81	21.62	39.69	S34°28'48"W
66	71°30'48"	50.00	62.41	36.00	58.43	S24°38'36"E
67	70°57'07"	50.00	61.92	35.63	58.04	N84°07'28"E
68A	48°27'47"	50.00	42.29	22.50	41.04	N24°24'59"E
68B	74°03'27"	50.00	64.63	37.72	60.22	N37°12'50"E
68C	71°38'13"	135.00	168.79	97.43	158.01	S69°56'19"E
69A	101°2'56"	135.00	24.07	12.07	24.04	S29°00'44"E
69B	81°15'31"	25.00	35.46	21.45	32.56	S18°43'30"W
69C	3°34'49"	304.00	19.00	9.50	18.99	S58°33'51"W
69D	14°05'13"	304.00	74.74	37.56	74.58	S48°43'51"W
70A	17°39'09"	304.00	93.66	47.20	93.28	S30°51'40"W
70B	81°15'31"	25.00	35.46	21.45	32.56	S62°39'51"W
70C	14°25'41"	275.00	69.23	34.81	69.07	N83°55'15"W
71	18°28'57"	275.00	88.71	44.74	88.33	S79°37'28"W
72	18°28'57"	275.00	88.71	44.74	88.33	S61°08'29"W

THIS SHEET ADDRESSES LOTS 60-72.



N/F  
GEORGE MOORMAN HANKINS, SR.  
& CAROL G. HANKINS  
LR.#970020151  
W.B.13, PGS.521-526  
D.B.51, PG.243  
TAX MAP (12-4)(1-11)

J.C.C. COUNTY  
COORDINATE  
N 3671388.60  
E 11980988.53

No.	DATE	REVISION / COMMENT / NOTE	BY
1	4/17/03		JFS



**CONSULTING ENGINEERS**  
5248 Old Towne Road, Suite 1  
Williamsburg, Virginia 23188  
(767) 253-0040  
Fax (767) 220-8994

PLAT OF SUBDIVISION  
WELLINGTON  
SECTION THREE  
LOTS 49-58, 59A, 59B, 60-89 AND 132-140  
BEING THE PROPERTY OF  
WELLINGTON, L.L.C.

STONEHOUSE DISTRICT JAMES CITY COUNTY VIRGINIA

Designed HWP	Drawn JFS
Scale 1"=60'	Date 3/17/03
Project No. 8223-6	
Drawing No. 2 OF 4	

JFS 03.21.03-13:56 822306P02.dwg

(13-3)(08)