CERTIFICATE OF AUTHENTICITY

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

BMP NUMBER: **PC216**

DATE VERIFIED: **September 19, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

Date: March 23, 2012

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

From: Leah Hardenbergh

PO: 110426

Re: Files Approved for Scanning

General File ID or BMP ID:	**PC216**
PIN:	**3131600001A**
Owner Name (if known):	**WAR HILL GREEN CONDOMINIUMS**
Legal Property Description:	**CA P-1 WAR HILL GREEN CONDOMINIUMS**
Site Address:	**COMMON AREA PARCEL 1**

(For internal use only):

Box # 1

Agreements (in file as of scan date): Y Book or Doc #: 060029873/070002216

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

1. As-built plan
2. Completed construction certification
3. Construction Plan
4. Design Calculations
5. Watershed Map
6. Maintenance Agreement
7. Correspondence with owners
8. Inspection Records
9. Enforcement Actions
10. Offsite drainage easement

COUNTY OF JAMES CITY, VIRGINIA

COPY

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 5th day of January, 20 07, between Warhill Green Home Owners Association, and all successors in interest, ("COVENANTOR(S),") owner(s) of the following property:

Parcel Identification Number: (31-3)(1-34)
Legal Description: 5450 Centerville Road, Wbg, VA 23188
Project or Subdivision Name: WARHILL GREEN
Document No. 060029873
OR Deed Book _____, Page No. _____,
and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

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

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

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

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

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the SYSTEM for the purpose of inspecting, 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

Instrument #070002216
Recorded on Jan. 24, 2007

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)

War Hill Green Home Owners Association

By _____

Print Name/Title Henry H. Stephens, president

ATTEST:

Heidi Latimer

COVENANTOR(S)

_____

Print Name/Title _____

ATTEST:

_____

COMMONWEALTH OF VIRGINIA

CITY/~~COUNTY~~ OF Newport News

I hereby certify that on this 5th day of January, 2007, before the subscribed, a Notary Public for the Commonwealth of Virginia, personally appeared Henry H. Stephens and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 5th day of January, 2007.

Carol Lynn Andrews
Notary Public

My Commission expires: May 31, 2008

Approved as to form:

ASST. County Attorney

This Declaration of Covenants prepared by:

Carol Lynn Andrews
(Print Name)

Office Manager
(Title)

5300 Mercury Blvd Drawer 18
(Address) Parkview Station

Newport News VA 23605
(City) (State) (Zip)

757-838-2739
(Phone Number)

drainage1.pre

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

Project Name: Warhill Green
County Plan No.: SP-098-04
Stormwater Management Facility: Dry Swale/Basin combo
BMP Phase #: ☐ I ☐ II ☒ III

- ☒ Information Package Received. Date/By: 3/14/08
- ☒ Completeness Check:
  - ☒ Record Drawing — Date/By: Pre-liminary 3-8-08 - Final 3-21-09, Archer-Marston, III, PE
  - ☒ Construction Certification — Date/By: 3/21/09 ECS, Mid-Atlantic - Michael Galli, PE
  - ☒ RD/CC Standard Forms (Required for all BMPs after Feb 1st 2001Only)
  - ☒ Insp/Maint Agreement # / Date: 1/24/07 Instrument # 070002216
  - ☒ BMP Maintenance Plan Location: Sheet 7
  - ☐ Other:
- ☒ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review
  - ☒ Yes ☐ No — Location: Sheet 12
- ☒ Assign **County BMP ID Code #**: Code: PC-216
- ☒ 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: 3/19/08
- ☒ Record Drawing (RD) Review — Date: 3/19/09
- ☒ Construction Certification (CC) Review — Date: 3/19/09
- ☒ Actions:
  - ☐ No comments.
  - ☒ Comments. Letter Forwarded. Date: 3/20/08 Letter
  - ☒ Record Drawing (RD)
  - ☒ Construction Certification (CC)
  - ☒ Construction-Related (CR)
  - ☐ Site Issues (SI)
  - ☐ Other :
- ☒ Second Submission: 3/27/09
- ☒ Reinspection (if necessary): 3/23/09 JB+Amy B 3/8/10 AyP
- ☒ 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. already on file 3/27/08
- ☒ 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: Amy Parker — Date: 3/17/10

Chief Engineer: _____ — Date: _____

*** See separate checklist, if needed.

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification

Standard Forms & Instructions

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Issue Date
February 1, 2001

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MAR 27 2008
ENVIRONMENTAL DIVISION

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: Warhill Green
Structure/BMP Name: Dry Detention Facility
Project Location: #5450 Centerville Road, Tax Parcel (31-3)(1-34)
BMP Location: Dry swale along north and south boundary, outlet structure at northeast corner (rear) of project.
County Plan No.: SP - 98 - 04

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

Tax Map/Parcel No.: (31-3),(1-34)
BMP ID Code (if known): UNKNOWN
Zoning District: R-5
Land Use: Condominium
Site Area (sf or acres): 160,982 S.F./ 3.70 Ac.

Brief Description of Stormwater Management/BMP Facility: Dry swale with modified EW-11 Outlet Structure

Nearest Visible Landmark to SWM/BMP Facility: Northeast corner of Condominium building #3 is 40' west of outlet structure. Ew-11

Nearest Vertical Ground Control (if known):
☒ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☐ Other
Station Number or Name: JCC STATION NO. 309
Datum or Reference Elevation: NGVD (1929) - ELEVATION = 101.76
Control Description: 3 1/4" DISK IN CONCRETE
Control Location from Subject Facility: APPROXIMATELY 650' EAST ON CENTREVILLE ROAD (RTE 614)

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: H.B. HANKINS, INC.
Name of Professional Firm Who Routinely Monitored Construction: _____
Date of Completion for SWM/BMP Facility: _____
Date of Record Drawing/Construction Certification Submittal: _____

(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: Associated Developers, Inc.
Mailing Address: Drawer 18 Parkview Station
Newport News, Va. 23605
Business Phone: 757-838-2739 Fax:757-838-6337
Contact Person: Henry Stephens Title:President

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

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Va 23188
Business Phone: 757-253-0040
Fax: 757-220-8994
Responsible Plan Preparer: Charles B. Records, P.E.
Title: Project Engineer
Plan Name: Site Plan for Warhill Green
Firm's Project No. 9427-00
Plan Date: 8/04/04
Sheet No.'s Applicable to SWM/BMP Facility: 5 / 12 / _____ / _____ / _____

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

Name: H.B. Hankins, Inc.
Mailing Address: 739 Thimble Shoals Blvd.,Suite 704
Newport News,Va 23606
Business Phone: (757) 566-4535
Fax: (757) 873-0943
Contact Person: Hank Mullins
Site Foreman/Supervisor:
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

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

Name: Archer Marston, P.E.
Title: Vice President

Signature:
Date: March 21, 2008

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

COMMONWEALTH OF VIRGINIA
C. ARCHER MARSTON, III
Lic. No. 018232
3/21/08
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered Professional Engineer
Or Certified Land Surveyor

Construction Certification

Firm Name: ECS, Mid-Atlantic, LLC
Mailing Address: 108 Ingram Road
Williamsburg, Virginia 23185
Business Phone: 757-229-6677
Fax: 757-229-9978

Name: Michael J. Galli, P.E.
Title: Hampton Roads Area Manager

Signature:
Date: March 21, 2008

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

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
Lic. No. 030684
3/21/08
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered
Professional Engineer

RECORD DRAWING

FOR

WARHILL GREEN

JAMES CITY COUNTY, VIRGINIA

LEGEND

EXISTING		PROPOSED
EX. W	WATER	W
EX. S	SANITARY SEWER	S
	STORM SEWER	
EX. FM	FORCE MAIN	FM
	MANHOLE	
	CURB DROP INLET	
	YARD DROP INLET	
	FLARED END SECTION	
	VALVE	
	FIRE HYDRANT ASSEMBLY	
	BLOW-OFF VALVE	
SCO	AIR RELEASE ASSEMBLY	
WM	CLEAN OUT	
	WATER METER	
	STREETLIGHT	
	CENTERLINE/BASELINE	
	RIGHT OF WAY	
	PROPERTY LINE	
	℄ DITCH/SWALE	
	CONCRETE LINED DITCH	
	EXISTING TREELINE	
	LIMITS OF CLEARING	
	RIP RAP	
	CURB	
	CURB AND GUTTER	
	REVERSE GUTTER PAN	
	EDGE OF PAVEMENT	
+25.1	EXISTING GROUND ELEVATION	
	PROPOSED SPOT GRADE	TC0.00
80	CONTOUR	80
	HIGH POINT	HP
	LOW POINT	LP

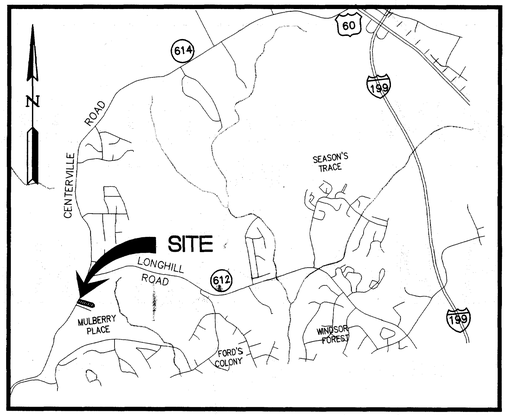
INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	ENVIRONMENTAL INVENTORY AND DEMOLITION PLAN
3	SITE AND UTILITY PLAN
4	PHASE I EROSION AND SEDIMENT CONTROL AND OVERALL DRAINAGE PLAN
5	DRAINAGE, GRADING AND EROSION AND SEDIMENT CONTROL PLAN
6	SANITARY SEWER PROFILE
7	WATER LINE PROFILE, NOTES & DETAILS
8	OFF-SITE STORM SEWER PLAN AND PROFILE
9	LANDSCAPE PLAN
10	LIGHTING PLAN
11	NOTES AND DETAILS
12	NOTES AND DETAILS

CERTIFIED RESPONSIBLE LAND DISTURBER:

CHARLES B. RECORDS, P.E.
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
TELEPHONE: 757-253-0040

* FOR SITE PLAN REVIEW PROCESS ONLY. OWNER OR CONTRACTOR SHALL NAME RESPONSIBLE LAND DISTURBER FOR CONSTRUCTION PROCESS.



VICINITY MAP (APROX. SCALE 1"=2,000')

DATE: AUGUST 4, 2004
REVISED: DECEMBER 22, 2004
AES PROJECT NO.: 9427-0

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

THOMAS C. SUBLETT — DATE 3/08/08

COMMONWEALTH OF VIRGINIA
3/08/08
THOMAS C. SUBLETT
No. 1886
LAND SURVEYOR

GENERAL NOTES

1. **SITE TAX PARCEL AND ADDRESS: (31-3)(1-34) #5450 CENTERVILLE ROAD**
2. THE SITE IS CURRENTLY ZONED MULTI-FAMILY RESIDENTIAL DISTRICT, R-5.
3. **ALL UTILITIES SHALL BE PLACED UNDERGROUND.**
4. **ALL UTILITIES SHALL HAVE 36" MIN. COVER.**
5. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SHALL NOTIFY MISS UTILITY (1-800-552-7001) PRIOR TO ANY EXCAVATION OR DEMOLITION.
6. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO ALL SITE CONDITIONS PRIOR TO CONSTRUCTION.
7. EXISTING UTILITY LOCATIONS INDICATED ARE APPROXIMATE. FIELD VERIFY PRIOR TO COMMENCING WORK.
8. VERIFY ALL DIMENSIONS AND NOTIFY JAMES CITY SERVICE AUTHORITY PRIOR TO ANY EXCAVATION OR DEMOLITION WITHIN UTILITY CORRIDORS.
9. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS PRIOR TO COMMENCEMENT OF WORK TO INCLUDE, BUT NOT LIMITED TO JAMES CITY COUNTY LAND DISTURBANCE, BUILDING, UTILITY (JCSA).
10. A LAND DISTURBING PERMIT AND SILTATION AGREEMENT, WITH SURETY ARE REQUIRED FOR THIS PROJECT.
11. IT IS THE OWNER'S RESPONSIBILITY TO REGISTER FOR A GENERAL VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES) PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES, IN ACCORDANCE WITH CURRENT REQUIREMENTS OF THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY AND 9 VAC 25-180-10 ET SEQ. CONTACT THE TIDEWATER REGIONAL OFFICE OF THE DEQ AT 757-518-2000 OR THE CENTRAL OFFICE AT 804-698-4000 FOR FURTHER INFORMATION.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF CONSTRUCTION EFFORTS WITH VIRGINIA NATURAL GAS, VIRGINIA POWER, C&P TELEPHONE, APPROPRIATE CABLE COMPANY, JAMES CITY SERVICE AUTHORITY, AND OTHERS THAT MAY BE REQUIRED.
13. SITE TO BE SERVED BY PUBLIC WATER & SEWER OWNED BY THE JAMES CITY COUNTY SERVICE AUTHORITY, J.C.S.A.
14. PARKING SPACES SHALL BE DELINEATED BY PAVEMENT STRIPING. HANDICAP PARKING SPACES SHALL BE DESIGNATED BY ABOVE GROUND SIGNS PER USBC REQUIREMENTS.
15. NO WETLANDS EXIST ON THIS SITE.
16. THIS SITE DOES NOT LIE WITHIN ANY RESOURCE PROTECTION AREAS.
17. NO HYDRIC OR SIMILAR SOILS EXIST ON THIS SITE.
18. CONTOUR INTERVAL IS 1 FOOT.
19. ANY NEW SIGNS SHALL BE IN ACCORDANCE WITH ARTICLE II, DIVISION 3 OF JCC ZONING ORDINANCE.
20. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE DETENTION/ RETENTION POND OR ITS STRUCTURE, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGES.
21. THIS PROPERTY LIES IN ZONE "X" (AREAS DETERMINED TO BE OUTSIDE THE 500 YEAR FLOOD PLAIN) AS SHOWN ON COMMUNITY PANEL #510201 0035 B, DATED 2/6/1991 OF THE FLOOD INSURANCE RATE MAPS FOR JAMES CITY COUNTY, VIRGINIA.
22. ANY EXISTING UNUSED WELLS SHALL BE ABANDONED IN ACCORDANCE WITH STATE PRIVATE WELL REGULATIONS AND JAMES CITY COUNTY CODE.
23. **ALL COMPONENTS OF THE WATER DISTRIBUTION AND SANITARY SEWER SYSTEM SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH THE LATEST EDITION OF THE JAMES CITY SERVICE AUTHORITY STANDARDS AND SPECIFICATIONS FOR WATER DISTRIBUTION AND SANITARY SEWER SYSTEMS, THE HAMPTON ROADS PLANNING DISTRICT COMMISSION (HRPDC) REGIONAL STANDARDS, AND THE COMMONWEALTH OF VIRGINIA WATERWORKS AND SEWERAGE REGULATIONS. THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS AND PRODUCTS ON ALL PROJECTS. ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE WORK. A COPY OF THE JCSA STANDARDS AND REGIONAL STANDARDS MUST BE KEPT ON-SITE BY THE CONTRACTOR DURING THE FULL TIME OF INSTALLING, TESTING, AND CONVEYING THE FACILITIES TO JCSA/HOA.**
24. A DUMPSTER WILL NOT BE UTILIZED FOR GARBAGE DISPOSAL PURPOSES, BUT RATHER EACH INDIVIDUAL SHALL BE RESPONSIBLE FOR THEIR OWN TRASH COLLECTION.
25. TOWNHOUSES SHALL BE VARIED IN DEPTH OF FRONT YARDS, BUILDING MATERIALS AND DESIGN SO THAT NO MORE THAN TWO ABUTTING UNITS SHALL BE OF LIKE APPEARANCE.
26. THE UNITS SHALL BE 3 STORIES, USE GROUP R, AND CONSTRUCTION TYPE 3B. MAXIMUM BUILDING HEIGHT IS 35 FEET.
27. OVERALL SITE DENSITY IS 7.84 UNITS/ACRE. THE MAXIMUM ALLOWABLE DENSITY IS 8 UNITS/ACRE.
28. **OWNER/DEVELOPER: ASSOCIATED DEVELOPERS, INC.**
    CONTACT: HENRY STEPHENS
    ADDRESS: DRAWER 18 PARKVIEW STATION
    NEWPORT NEWS, VA 23605
    PHONE: (757) 838-2739
    FAX: (757) 838-6337
29. THIS PROJECT IS SITUATED IN SUBWATERSHED 204, CATCHMENT 204-101-1 OF THE POWHATAN CREEK WATERSHED OF JAMES CITY COUNTY.
30. **THE STORMWATER MANAGEMENT/BMP FACILITY & ENTIRE OFF-SITE DRAINAGE SYSTEM WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AS-BUILT SURVEY BEFORE, DURING AND FOLLOWING CONSTRUCTION SUCH THAT THE RECORD DRAWINGS CAN BE PREPARED IN ACCORDANCE WITH THE CURRENT COUNTY GUIDELINES.**

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

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

1 SITE PLAN AMENDMENT #1, OCTOBER 19, 2005

THE PURPOSE OF THIS AMENDMENT TO ORIGINAL SITE PLAN NUMBER SP-028-04 IS TO:

1. SHOW BUILDING FOOTPRINTS PER ARCHITECTURAL PLANS.
2. SHOW REVISED SANITARY SEWER CLEANOUT LOCATIONS DUE TO ARCHITECTURAL PLANS.
3. SHOW DOMESTIC WATER LINE DESIGN.
4. THE TOTAL NUMBER OF UNITS IS DECREASED BY ONE.

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ENVIRONMENTAL DIVISION

APPROVAL DATE	No.	DATE		BY
	2	10/19/05	SITE PLAN AMENDMENT #1	CBR
	1	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR
		9/17/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR

WARHILL GREEN
MAP # 31-3(1-34)

S:\Jobs\9427\00-ADI 4 oc Centerville Road\dwg\DRAINAGE R01.dwg 3/8/2008 8:47:36 AM EST

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 012

N OR F
LONGHILL GROVE, L.P.
INST. #030010239
P.B. 32, PG. 81
T.M.# (31-3)(1-12)
ZONING: R-5
COUNTY PLAN #SP-44-03

TO JAMESTOWN

CENTERVILLE ROAD (STATE ROUTE 614)
(VARIABLE WIDTH R.O.W.)

SEE SHEET 8 FOR CONTINUATION OF E & S SEDIMENT CONTROL MEASURES AND OFF-SITE DRAINAGE SYSTEM

DRAINAGE DIVIDE (TYP.)

LIMITS OF DISTURBANCE

PLACE CHECK DAMS AT 100' INTERVALS

BEGIN DRY SWALE ELEV=100.56

DRY SWALE WIDTH=3.5

TIMBER CHECK DAM #1
HEIGHT=~~12"~~ 2"
INV. OF SWALE=~~100.00~~ 99.77
TOP OF WEIR=~~101.00~~ 99.94

6' WIDE NATIVE MATERIAL IN COMPLIANCE WITH VOLUME I OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK FIRST EDITION DATED 1999

100 YR DESIGN HIGHWATER ELEVATION= 101.32

630
~~599~~ LF OF DRY SWALE @ ~~0.45%~~ 0.37%
~~7.0~~, Bw=~~7~~ VARIES, MIN 3.5
~~DEPTH=2~~

COUNTY TYPE E-2 BMP

6' BOARD WOOD FENCE ALONG P/L

TIMBER BRIDGE

TIMBER CHECK DAM #2
HEIGHT=~~15~~" 2.5"
INV. OF SWALE=~~98.50~~ 98.24
TOP OF WEIR=~~100.00~~ 98.44

SS#1-4

SS#1-5

N OR F
MULBERRY PLACE
HOMEOWNERS ASSOC.
"OPEN SPACE A"
INST. #010020054 &
P.B. 82, PG. 15
T.M.# (31-3)(13-1B)
ZONING: R-2

10' WIDE EC-3 LINED SPILLWAY
ELEV=~~101.5~~ 101.9

DRY DETENTION FACILITY
2 YR ELEV=100.22
10 YR ELEV=100.89
100 YR ELEV=101.32

END DRY SWALE ELEV=98.25

BEGIN DRY SWALE ELEV=97.77

49 LF OF DRY SWALE @ 0.20%

MODIFIED EW-11 OUTLET STRUCTURE
4' WIDE WEIR ELEV=~~98.50~~ 100.32
2' WIDE WEIR ELEV=~~100.25~~ 101.06
18" HDPE INV=~~94.00~~ 93.99
(SEE DETAIL SHEET 12)

END DRY SWALE ELEV=97.87

20 ~~16~~ LF OF 12" HDPE=~~HDPE~~ @ ~~0.63%~~ 1.20%
INV. IN= ~~98.10~~ 97.92
INV. OUT= ~~98.30~~ 98.16

END DRY SWALE ELEV=98.23

100 YR DESIGN HIGHWATER ELEVATION= 101.32

8' WOODEN FENCE ALONG OVER P/L

BUILDING PAD A
FF ELEV = 104.30

BUILDING PAD B
FF ELEV = 104.00

BUILDING PAD C
FF ELEV = 104.00

71 LF OF GRASS LINED SWALE @ 0.62%

DRY SWALE WIDTH=2.5

DRY SWALE WIDTH=4.0

DRY SWALE WIDTH=2.0

DRY SWALE WIDTH=3.5

DRY SWALE WIDTH=2.5

DRY SWALE WIDTH=2.0

DRY SWALE WIDTH=4.0

BEGIN DRY SWALE ELEV=102.28

PLACE CHECK DAMS AT 100' INTERVALS

N OR F
CORA LEE GREEN
D.B. 17, PG. 514
T.M.# (31-3)(1-35)
ZONING: R-8

COUNTY TYPE E-2 BMP

711
~~609~~ LF OF DRY SWALE @ ~~0.62%~~ 0.57%
~~2.5~~, Bw=~~2~~ VARIES, MIN WIDTH 2.5
~~DEPTH=1~~

TIMBER CHECK DAM #5
HEIGHT=~~6"~~ 2.5"
INV. OF SWALE=~~101.7~~ 101.5
TOP OF WEIR=~~102.2~~ 101.7

SEE DETAIL ON SHEET 12 FOR DRY SWALE AND TIMBER CHECK DAMS

TIMBER CHECK DAM #4
HEIGHT=~~12"~~ 8.5"
INV. OF SWALE=~~100.45~~ 100.13
TOP OF WEIR=~~101.45~~ 100.50

100 YR DESIGN HIGHWATER ELEVATION= 101.32

2' WIDE ENGINEERED MEDIA IN COMPLIANCE WITH VOLUME I OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK FIRST EDITION DATED 1999

PLACE CHECK DAMS AT 100' INTERVALS

TIMBER CHECK DAM #3
HEIGHT=~~15"~~ 1"
INV. OF SWALE=~~99.15~~ 99.18
TOP OF WEIR=~~100.50~~ 99.25

N/F
MULBERRY PLACE
SUBDIVISION
DOC.# 010011381
P.B.# 82, PG. 12-15
ZONING: R-2

DRAINAGE DIVIDE (TYP.)

SEE SHEET 7 FOR STORMWATER MANAGEMENT (SWM) FACILITY MAINTENANCE PLAN.

INSTALLATION OF DRY SWALE FILTRATION MEDIA SHALL BE INSPECTED BY GEOTECHNICAL ENGINEER.

NOTE: ROOF DRAINAGE SHALL NOT BE CONNECTED DIRECTLY TO DRY SWALE UNDERDRAIN. DOWNSPOUT SHALL SHEETFLOW INTO DRY SWALES.

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

EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION:

THE PROPOSED WARHILL GREEN SITE CONSISTS OF 3.70 ACRES LOCATED APPROXIMATELY 500 FEET SOUTH OF THE INTERSECTION OF LONGHILL ROAD (ROUTE 612) AND CENTERVILLE ROAD (ROUTE 614) IN JAMES CITY COUNTY, VIRGINIA. THIS DEVELOPMENT WILL INCLUDE THREE MULTI-UNIT BUILDINGS AND A PARKING LOT.

EXISTING SITE CONDITIONS:

THE SITE IS CURRENTLY DEVOID OF TREES AND CONSISTS OF MOSTLY DENSE, HEAVY GRASS. THE TERRAIN IS FLAT TO GENTLY SLOPING. STORMWATER RUNOFF FLOWING TO THE NORTH OF THE SITE FLOWS INTO A PROPOSED DITCH DESIGNED FOR LONGHILL GROVE. RUNOFF FLOWING SOUTH OF THE SITE SHEETS OFF ONTO ADJACENT PROPERTY. THE REST OF THE RUNOFF FLOWS NORTHEAST INTO A NATURAL CHANNEL BEHIND MULBERRY PLACE.

ADJACENT AREAS:

LONGHILL GROVE (UNDER CONSTRUCTION) IS LOCATED TO THE NORTH OF THE PROJECT SITE. TO THE SOUTH AND EAST IS MULBERRY PLACE AND OTHER RESIDENTIAL PROPERTIES.

OFF-SITE AREAS:

THE SWM OUTFALL PIPE SYSTEM REQUIRES WORK OFFSITE. TO THE SOUTHEAST, APPROXIMATELY 70' OF SANITARY SEWER PIPE WILL BE LOCATED DOWNSTREAM OF THE OUTFALL AREA. FLAT TOPPED TYPE MH EXISTING SANITARY MANHOLE. APPROXIMATELY 800 S.F. OF THE PROPOSED ENTRANCE IS LOCATED OUTSIDE OF THE PROPERTY LINE AS THE GRADING CONNECTS TO CENTERVILLE ROAD. FINALLY, TWO TEMPORARY ON-SLOPES JUST OUTSIDE THE PROJECT AREA WILL NEED TO BE REMOVED.

SOILS:

THE SOIL CONSERVATION SERVICE HAS IDENTIFIED THIS SITE AS CONTAINING SOIL TYPES "11C", "29B", "18B" AND "19B" (SEE SHEETS 2 AND 8 OF THE PLANS FOR MORE INFORMATION ON THESE SOILS).

CRITICAL AREAS:

THERE ARE NO 25% OR GREATER SLOPES ON THE SITE, HOWEVER, THERE IS APPROXIMATELY 0.07 ACRES OF HIGHLY ERODABLE SOILS ON THE SITE LOCATED PREDOMINANTLY ALONG THE PROPERTY LINES.

EROSION AND SEDIMENT CONTROL MEASURES:

SILT FENCE AND CHECK DAMS HAVE BEEN PROVIDED TO PREVENT SILT-LADEN RUNOFF FROM REACHING ADJOINING AREAS. A SEDIMENT BASIN WILL BE PLACED AT THE ON-SITE OUTFALL WHICH THEN CONNECTS TO THE PROPOSED OFF-SITE DRAINAGE PIPE SYSTEM.

PERMANENT STABILIZATION:

PERMANENT SEEDING WILL BE USED TO STABILIZE THE SITE AFTER CONSTRUCTION IS COMPLETE. A SCHEDULE HAS BEEN PROVIDED ON SHEET 12.

STORMWATER RUNOFF CONSIDERATIONS:

STORMWATER MANAGEMENT FOR THE PROPOSED PROJECT WILL BE ACHIEVED THROUGH THE USE OF TWO DRY SWALES LOCATED TO THE NORTH AND SOUTH OF THE SITE. THE SWALES WILL DETAIN POST-DEVELOPMENT STORMWATER RUNOFF THROUGH FILTRATION TO A 4" PERFORATED UNDERDRAIN AND BY AN OUTLET STRUCTURE AT THE OUTFALL OF THE SITE.

EROSION AND SEDIMENTATION CONTROL LEGEND

THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING ROAD AND UTILITY CONSTRUCTION.

SAFETY FENCE (SPEC. 3.01)

CONSTRUCTION ENTRANCE (SPEC. 3.02)

SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)

STORM DRAIN INLET PROTECTION (SPEC. 3.07)

TEMPORARY DIVERSION DIKE (SPEC 3.08)

SEDIMENT BASIN (SPEC. 3.14)

OUTLET PROTECTION (SPEC. 3.18)

ROCK CHECK DAMS (SPEC. 3.20)

PERMANENT SEEDING (SPEC. 3.32)

DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

NO.	DATE	REVISION	BY
1	10/19/05	SITE PLAN AMENDMENT #1	CBR
2	11/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/04/04	CBR
3	10/27/04	REVISED PER JCC COMMENTS DATED 7/15/04	CBR

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Fax (757) 220-8994

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND • VIRGINIA

DRAINAGE, GRADING, AND EROSION AND SEDIMENT CONTROL PLAN
WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

AES	MEG
1"=30'	8/4/04
9427-0	
5 AS-BUILT	

RECORD DRAWINGS: 3-08-2008

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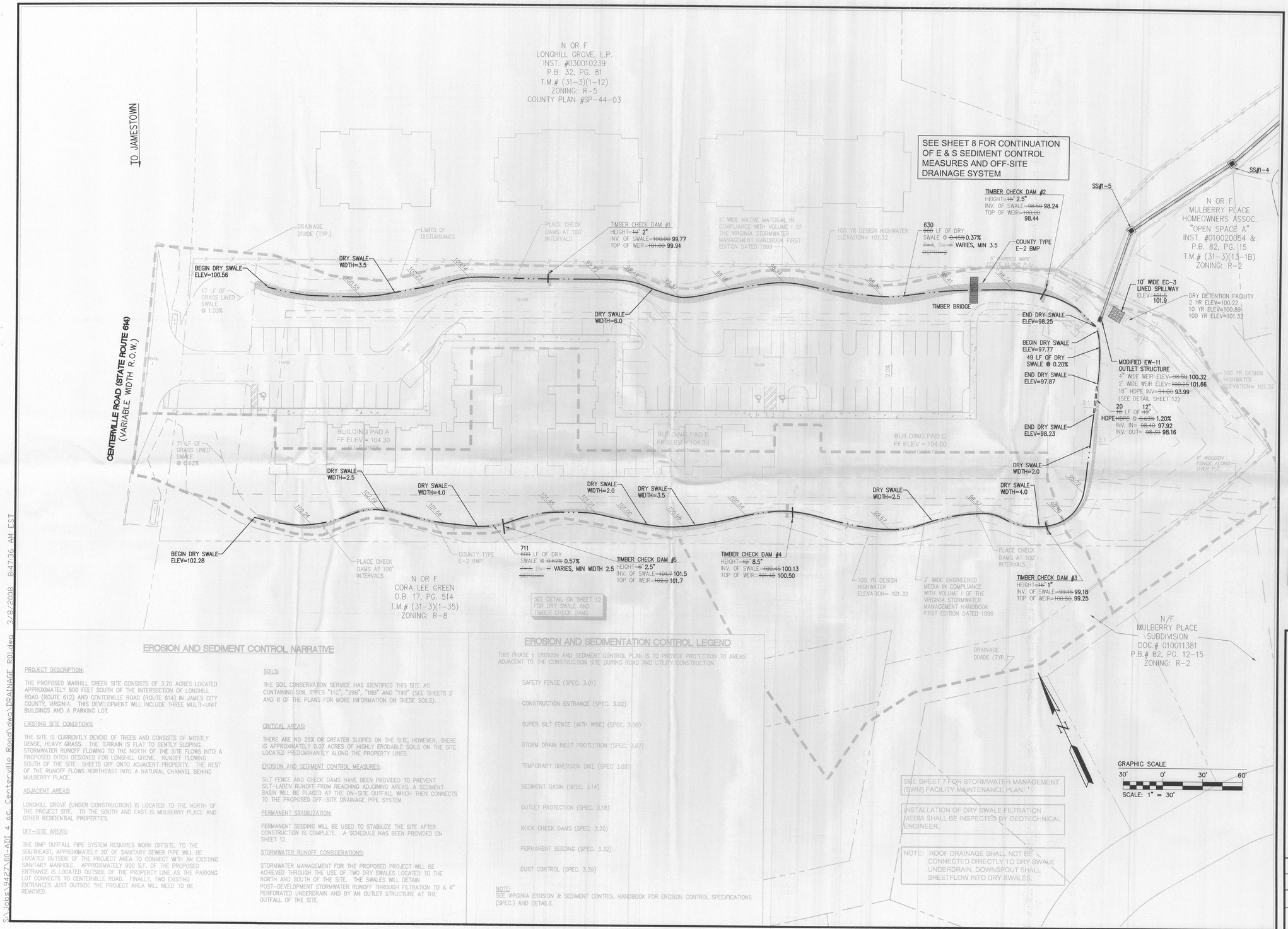
PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 013



EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION:

THE PROPOSED WARHILL GREEN SITE CONSISTS OF 3.70 ACRES LOCATED APPROXIMATELY 800 FEET SOUTH OF THE INTERSECTION OF LONGHILL ROAD (ROUTE 612) AND CENTERVILLE ROAD (ROUTE 614) IN JAMES CITY COUNTY, VIRGINIA. THIS DEVELOPMENT WILL INCLUDE THREE MULTI-UNIT BUILDINGS AND A PARKING LOT.

EXISTING SITE CONDITIONS:

THE SITE IS CURRENTLY DEVOID OF TREES AND CONSISTS OF MOSTLY DENSE, HEAVY GRASS. THE TERRAIN IS FLAT TO GENTLY SLOPING. STORMWATER RUNOFF FLOWING TO THE NORTH OF THE SITE FLOWS INTO A PROPOSED DITCH DESIGNED FOR LONGHILL GROVE. RUNOFF FLOWING SOUTH OF THE SITE SHEETS OFF ONTO ADJACENT PROPERTY. THE REST OF THE RUNOFF FLOWS NORTHEAST INTO A NATURAL CHANNEL BEHIND MULBERRY PLACE.

ADJACENT AREAS:

LONGHILL GROVE (UNDER CONSTRUCTION) IS LOCATED TO THE NORTH OF THE PROJECT SITE. TO THE SOUTH AND EAST IS MULBERRY PLACE AND OTHER RESIDENTIAL PROPERTIES.

OFF-SITE AREAS:

THE BMP OUTFALL PIPE SYSTEM REQUIRES WORK OFFSITE. TO THE SOUTHEAST, APPROXIMATELY 30' OF SANITARY SEWER PIPE WILL BE LOCATED OUTSIDE OF THE PROJECT AREA TO CONNECT WITH AN EXISTING SANITARY MANHOLE. APPROXIMATELY 900 S.F. OF THE PROPOSED ENTRANCE IS LOCATED OUTSIDE OF THE PROPERTY LINE AS THE PARKING LOT CONNECTS TO CENTERVILLE ROAD. FINALLY, TWO EXISTING ENTRANCES JUST OUTSIDE THE PROJECT AREA WILL NEED TO BE REMOVED.

SOILS:

THE SOIL CONSERVATION SERVICE HAS IDENTIFIED THIS SITE AS CONTAINING SOIL TYPES "11C", "29B", "18B" AND "19B" (SEE SHEETS 2 AND 8 OF THE PLANS FOR MORE INFORMATION ON THESE SOILS).

CRITICAL AREAS:

THERE ARE NO 25% OR GREATER SLOPES ON THE SITE, HOWEVER, THERE IS APPROXIMATELY 0.07 ACRES OF HIGHLY ERODABLE SOILS ON THE SITE LOCATED PREDOMINANTLY ALONG THE PROPERTY LINES.

EROSION AND SEDIMENT CONTROL MEASURES:

SILT FENCE AND CHECK DAMS HAVE BEEN PROVIDED TO PREVENT SILT-LADEN RUNOFF FROM REACHING ADJOINING AREAS. A SEDIMENT BASIN WILL BE PLACED AT THE ON-SITE OUTFALL WHICH THEN CONNECTS TO THE PROPOSED OFF-SITE DRAINAGE PIPE SYSTEM.

PERMANENT STABILIZATION:

PERMANENT SEEDING WILL BE USED TO STABILIZE THE SITE AFTER CONSTRUCTION IS COMPLETE. A SCHEDULE HAS BEEN PROVIDED ON SHEET 12.

STORMWATER RUNOFF CONSIDERATIONS:

STORMWATER MANAGEMENT FOR THE PROPOSED PROJECT WILL BE ACHIEVED THROUGH THE USE OF TWO DRY SWALES LOCATED TO THE NORTH AND SOUTH OF THE SITE. THE SWALES WILL DETAIN POST-DEVELOPMENT STORMWATER RUNOFF THROUGH FILTRATION TO A 4" PERFORATED UNDERDRAIN AND BY AN OUTLET STRUCTURE AT THE OUTFALL OF THE SITE.

EROSION AND SEDIMENTATION CONTROL LEGEND

THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING ROAD AND UTILITY CONSTRUCTION.

- SAFETY FENCE (SPEC. 3.01)
- CONSTRUCTION ENTRANCE (SPEC. 3.02)
- SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)
- STORM DRAIN INLET PROTECTION (SPEC. 3.07)
- TEMPORARY DIVERSION DIKE (SPEC 3.09)
- SEDIMENT BASIN (SPEC. 3.14)
- OUTLET PROTECTION (SPEC. 3.18)
- ROCK CHECK DAMS (SPEC. 3.20)
- PERMANENT SEEDING (SPEC. 3.32)
- DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

NO.	DESCRIPTION	BY
1	1ST SUBMITTAL	MEG
2	2ND SUBMITTAL	MEG
3	REVISED PER JCC COMMENTS 7/29/04	MEG
4	REVISED PER JCC COMMENTS 8/19/04	MEG
5	AS-BUILT	MEG

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Fax (757) 220-8994

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

DRAINAGE, GRADING, AND EROSION AND SEDIMENT CONTROL PLAN
WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

AES	MEG
1"=30'	8/4/04
9427-0	
5 AS-BUILT	

RECORD DRAWINGS: 3-08-2008

S:\Jobs\9427-00-APT 4 ac Centerville Road\dwg\DRAINAGE R01.dwg 3/8/2008 8:47:36 AM EST

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 014

NOTE: 6" HIGH, 3:1 SS GRASS BERM SHALL BE PROVIDED ON THE DOWNSTREAM SIDE OF PROPOSED DI-7 INLETS. BERMS SHALL BE CONSTRUCTED WITHIN EASEMENT ONLY.

8' WOODEN FENCE

SS #1-3
24" NYLOPLAST BASIN
STANDARD GRATE
TOP=~~89.31~~ 89.36
INV IN=~~86.31~~(24") 86.11
INV IN=~~86.31~~(15") 86.11
INV OUT=~~86.21~~ 86.11

SS #1-2
VDOT STD DI-7
TOP=~~84.31~~ 83.93
INV IN=~~81.06~~(24") 80.93
INV IN=~~81.56~~(15") 80.93
INV OUT=~~80.99~~ 80.93

53 ~~53~~ LF OF 24" ~~24"~~ HDPE @ ~~6.91%~~ 6.49%

SS #1-1
24" ES-1
INV=~~77.00~~ 77.49

(SEE DETAIL ON SHEET 12)

70 ~~70~~ LF OF 18" ~~18"~~ HDPE @ ~~1.61%~~ 1.69%

SS #1-5
VDOT STD DI-7
TOP=~~97.88~~ 97.66
INV=~~92.87~~ 92.81

91 ~~91~~ LF OF 24" ~~24"~~ HDPE 1.09%

SS #1-4
VDOT STD DI-7
TOP=~~94.96~~ 94.82
INV IN=~~91.96~~ 91.82
INV OUT=~~91.86~~ 91.82

167 ~~167~~ LF OF 15" ~~24"~~ HDPE @ ~~3.72%~~ 3.42%

10' DRAINAGE AND UTILITY EASEMENT

19 ~~20~~ LF OF 15" ~~15"~~ HDPE @ ~~4.00%~~ 2.89%

157 ~~159~~ LF OF 24" ~~24"~~ HDPE @ ~~3.58%~~ 3.30%

10' DRAINAGE AND UTILITY EASEMENT

10' DRAINAGE AND UTILITY EASEMENT

SS #1-3A
VDOT STD DI-7
TOP=~~89.51~~ 89.26
INV=~~86.61~~ 86.66

N OR F
MULBERRY PLACE
SUBDIVISION
PB. 82, PG. 12-15
ZONING: R-2

3' PICKET FENCE

39 ~~40~~ LF OF 15" ~~15"~~ HDPE @ ~~1.50%~~ 1.38%

SS #1-6
VDOT STD DI-7
TOP=~~85.28~~ 85.12
INV IN=~~81.59~~ 81.47
INV OUT=~~81.40~~ 81.47

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

(SEE GENERAL NOTE #1)

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

5' MIN. SEPARATION

EXISTING DWELLING

EXISTING DWELLING

DURING ROAD AND UTILITY CONSTRUCTION

SS #1-7
15" NYLOPLAST BASIN
STANDARD GRATE
TOP=~~90.00~~ 90.50
INV IN=~~87.0~~ 86.95
INV OUT=~~86.9~~ 86.95

83 ~~84~~ LF OF 15" ~~15"~~ HDPE @ ~~6.47%~~ 6.60%

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

GRAPHIC SCALE
20' 0' 20' 40'
SCALE: 1" = 20'

SEE SHEET 5 FOR CONTINUATION OF ON-SITE DRAINAGE SYSTEM

SS #1-8
(CAST-IN-PLACE)
VDOT STD
DI-3B, L=6'
TOP=~~98.74~~ 98.87
INV=~~95.27~~ 95.22

21 ~~23~~ LF OF 15" ~~15"~~ HDPE @ ~~1.90%~~ 2.90%
EX SS#1-21
STM DI
TOP=~~98.54~~ 98.66
INV=~~95.04~~ 94.61

FLOW

MULBERRY LANE
(50' R/W)

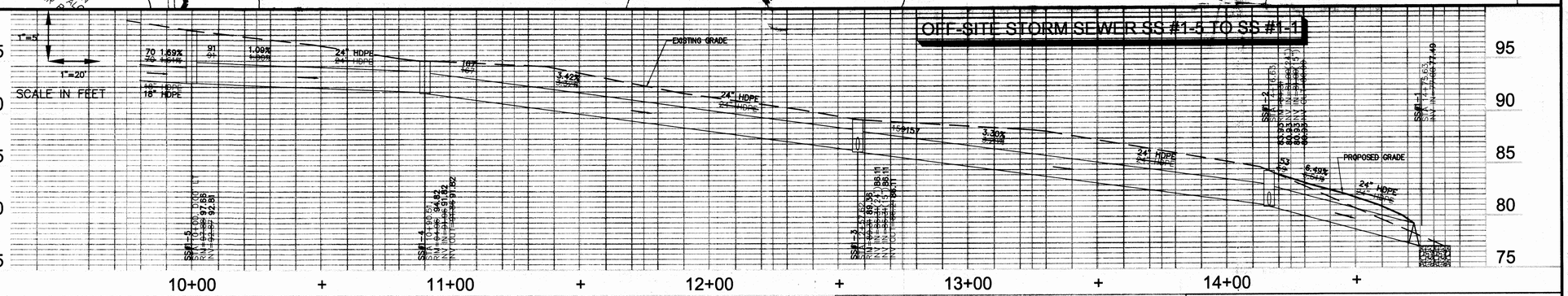
98 ~~98~~ LF OF 15" ~~15"~~ HDPE @ ~~8.47%~~ 7.82%

LOT 24

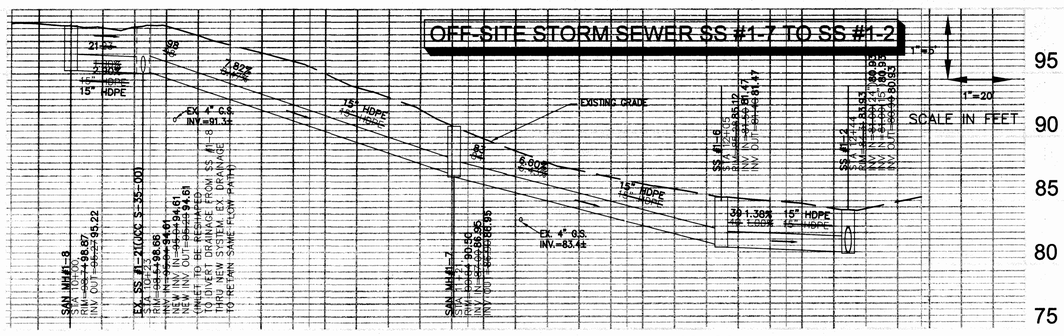
6' WOODEN FENCE OVER R.C.P.

NOTE:
1. UPON PIPE INSTALLATION ALONG THE LOT 23 PROPERTY LINE, A 6" DEEP, 3:1 SS GRASS SWALE SHALL BE PROVIDED ABOVE THE PIPE TO DRAIN TO SS #1-6.
2. SEE SHEET 11 FOR HDPE PIPE INSTALLATION DETAILS.
3. PROVIDE PIPE CONNECTION TO D.I. STRUCTURES PER VDOT ROAD AND BRIDGE STANDARDS.
4. SEE SHEET 2 FOR SOIL LEGEND.
5. ALL VDOT DI-7 GRATES SHALL BE TYPE III.
6. ANY TREES THAT ARE REMOVED OR DIE, DUE TO THE OFF-SITE DRAINAGE SYSTEM CONSTRUCTION, SHALL BE REPLACED AT A 5:1 (NEW:EXISTING) RATIO. MATERIAL TO BE PLANTED SHALL BE AS SPECIFIED ON SHEET 9 IN THE TREE SECTION OF THE PLANT SCHEDULE. (ONE KNOWN TREE MUST BE REMOVED).

OFF-SITE STORM SEWER SS #1-5 TO SS #1-1



OFF-SITE STORM SEWER SS #1-7 TO SS #1-2



EROSION AND SEDIMENTATION CONTROL LEGEND

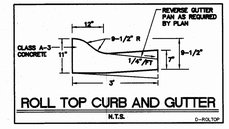
THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING OFFSITE DRAINAGE CONSTRUCTION.

(SAF)	SAFETY FENCE (SPEC. 3.01)	(SB)	SEDIMENT BASIN (SPEC. 3.14)
(CE)	CONSTRUCTION ENTRANCE (SPEC. 3.02)	(OP)	OUTLET PROTECTION (SPEC. 3.18)
(SSF)	SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)	(CD)	ROCK CHECK DAMS (SPEC. 3.20)
(IP)	STORM DRAIN INLET PROTECTION (SPEC. 3.07)	(PS)	PERMANENT SEEDING (SPEC. 3.32)
(DD)	TEMPORARY DIVERSION DIKE (SPEC 3.09)	(DC)	DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

GENERAL NOTES:

1. LOT 23 SANITARY SEWER LATERAL SHALL BE EXPOSED BY THE CONTRACTOR AND COMFIRM WITH THE DESIGN ENGINEER THAT PROPER CLEARANCES WILL BE MAINTAINED AT THE CROSSING OF THE PROPOSED STORM SEWER SYSTEM. CLEARANCE SHALL BE VERIFIED BY JCSA INSPECTORS PRIOR TO STORM SEWER INSTALLATION.
2. THE PRIMARY EROSION AND SEDIMENT CONTROL MEASURE FOR THE OFFSITE UTILITY LINE INSTALLATION WILL BE RAPID INSTALLATION AND STABILIZATION IN ACCORDANCE WITH MINIMUM STANDARD #16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
3. IF PROPOSED INLET PROTECTION MEASURES RESULT IN UNDESIRED YARD OR PROPERTY FLOODING, THESE MEASURES MAY BE REMOVED WITH THE APPROVAL OF THE ASSIGNED ENVIRONMENTAL DIVISION INSPECTOR.
4. IN ORDER TO PROTECT THE SAFETY OF THE PUBLIC A SAFETY FENCE, IN ACCORDANCE WITH MINIMUM STANDARD AND SPEC. 3.01 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, SHALL BE INSTALLED IN CASES WHERE OVERNIGHT OR PROLONGED INLET OR UTILITY TRENCH EXCAVATIONS OCCUR.



ROLL TOP CURB AND GUTTER
N.T.S. D-ROLTOP

No.	DATE	REVISION / COMMENT / NOTE	BY
3	10/19/05	SITE PLAN AMENDMENT #1	GBR
2	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	GBR
1	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	GBR

RECORD DRAWINGS: 3-08-2008

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Williamsburg, Virginia 23188
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CONSULTING ENGINEERS

OFF-SITE STORM SEWER PLAN AND PROFILE

WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC. VIRGINIA
POWHATAN DISTRICT JAMES CITY COUNTY

Designed AES	Drawn MEG
Scale NOTED	Date 8/4/04
Project No. 9427-0	
Drawing No. 8 AS-BUILT	

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PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 015

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

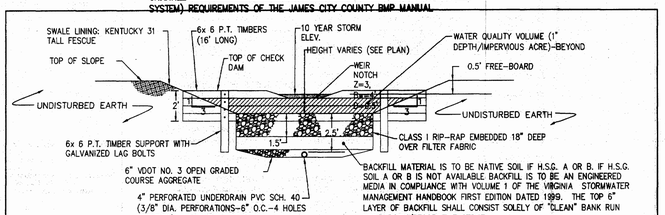
18. TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. TRAPPED SEDIMENT SHALL BE SPREAD, SEEDED AND MULCHED. AFTER THE PROJECT AND STABILIZATION IS COMPLETE, ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS.

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

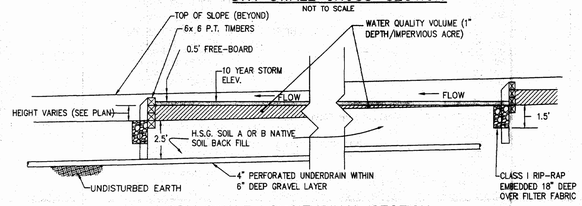
20. RECORD DRAWINGS (AS-BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE BOTH REQUIRED FOR NEWLY CONSTRUCTED OR MODIFIED STORMWATER MANAGEMENT/BMP FACILITIES. CERTIFICATION ACTIVITIES SHALL BE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT VERSION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

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

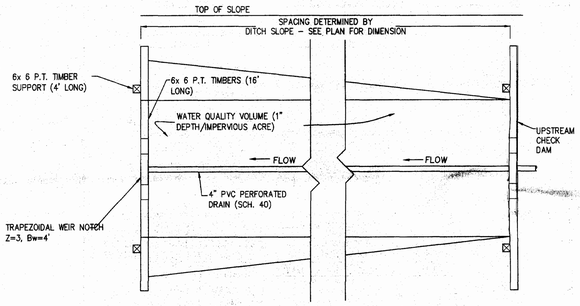
NOTE:
FOR DRY SWALE DETAIL, REFERENCE MINIMUM STANDARD & SPECIFICATION 3.13 OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK AND GROUP E (OPEN SYSTEM) REQUIREMENTS OF THE JAMES CITY COUNTY BMP MANUAL



DRY SWALE CROSS-SECTION
NOT TO SCALE



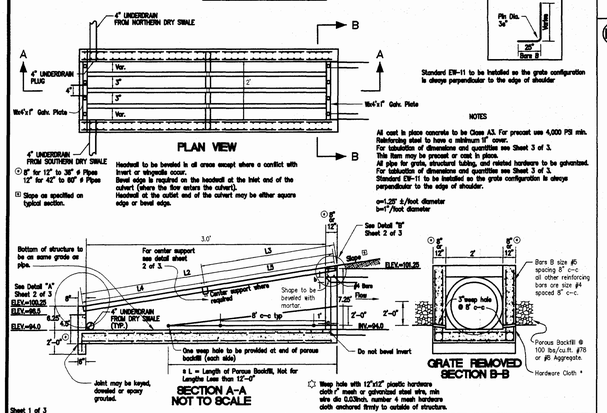
DRY SWALE LONGITUDINAL SECTION
NOT TO SCALE



DRY SWALE - PLAN
NOT TO SCALE

EW-11

STORM HIGHWATER ELEVATIONS
2YR =100.22
10YR =100.89
100YR =101.32



Sheet 1 of 3

MODIFIED EW-11 OUTLET STRUCTURE
FOR 12"-60" PIPES
VIRGINIA DEPARTEMENT OF TRANSPORTATION

101.26

SPECIFICATION REFERENCES
105.04
3.41
302

(PS) SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

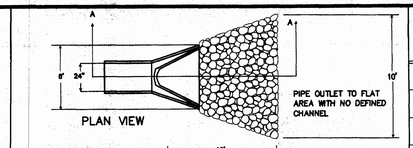
	TOTAL LBS. PER ACRE
MINIMUM CARE LAWN	
COMMERCIAL OR RESIDENTIAL	
-KENTUCKY 31 OR TURF-TYPE TALL FESCUE	175-200 LBS.
OR	
-COMMON BERMUDA GRASS **	75 LBS.
HIGH-MAINTENANCE LAWN	
-KENTUCKY 31 OR TURF-TYPE TALL FESCUE	200-250 LBS.
OR	
-HYBRID BERMUDAGRASS (SEED)**	40 LBS. (UNHULLED)
OR	
-HYBRID BERMUDAGRASS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

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

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

VA DSWC PG. III - 304

D-PS



NOTES: 1. APRON LINING WILL BE CLASS I RIPRAP.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18-3 AND 3.18-4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

(OP) PIPE OUTLET CONDITIONS

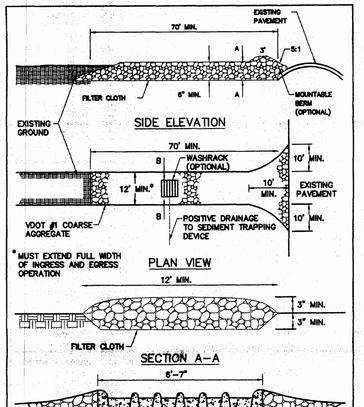
SOURCE: VA. DSWC PLATE. 3.18-1 — N.T.S. — D-OP.dwg

SPECIES	SEEDING RATE Acre	SEEDING RATE 1000 ft²	SOUTH[b] 2/15 to 4/30	SOUTH[b] 5/1 to 9/1	SOUTH[b] 9/1 to 11/15	PLANT CHARACTERISTICS
OATS (Avena sativa)	3 bu. (up to 100 lbs., not less than 50 lbs.)	2 lbs.	X	–	–	Use spring varieties (e.g., Noble).
RYE (Secale cereale)	2 bu. (up to 110 lbs., not less than 50 lbs.)	2.5 lbs.	X	–	X	Use for late fall seedings, winter cover. Tolerates cold and low moisture.
GERMAN MILLET (Setaria italica)	50 lbs.	approx. 1 lb.	–	X	–	Warm-season annual. Dies at first frost. May be added to summer mixes.
ANNUAL RYEGRASS (Lolium multi-florum)	60 lbs.	1-1/2 lbs.	X	–	X	May be added in mixes. Will mow out of most stands.
WEEPING LOVEGRASS (Eragrostis curvula)	15 lbs.	5-1/2 ozs.	–	X	–	Warm-season perennial. May bunch. Tolerates hot, dry slopes and cold, infertile soils. May be added to mixes.
KOREAN LESPEDEZA (Lespedeza stipulacea)	25 lbs.	approx. 1-1/2 lbs.	X	X	–	Warm-season annual legume. Tolerates cold soils. May be added to mixes.

SOUTHERN PIEDMONT AND COASTAL PLAIN.
MAY BE USED AS A COVER CROP WITH SPRING SEEDING.
MAY BE USED AS A COVER CROP WITH FALL SEEDING.
MAY BE PLANTED BETWEEN THESE DATES.
MAY NOT BE PLANTED BETWEEN THESE DATES.

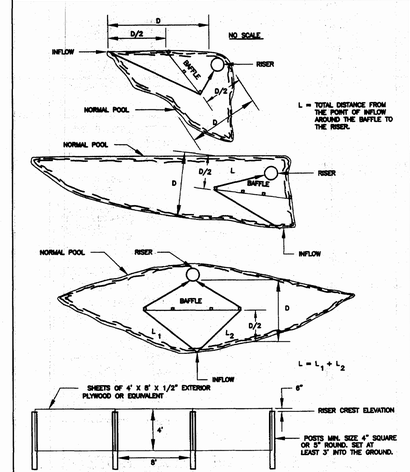
(TS) TEMPORARY SEEDING
N.T.S.

SOURCE: VA. DSWC TABLE 3.31-C — d-ts.dwg



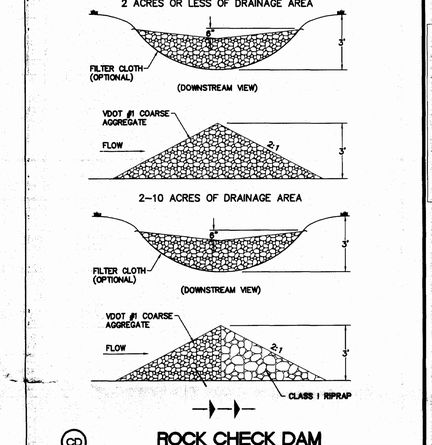
(CE) STONE CONSTRUCTION ENTRANCE

SOURCE: VA. DSWC PLATE. 3.02-1 — N.T.S. — D-CE.dwg



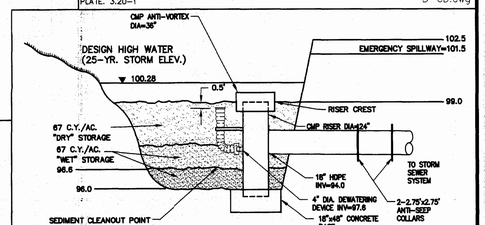
EXAMPLE PLAN VIEWS OF BAFFLE LOCATIONS IN SEDIMENT BASINS

SOURCE: USDA SCS PLATE. 3.14-8 — N.T.S. — D-BAFFLE



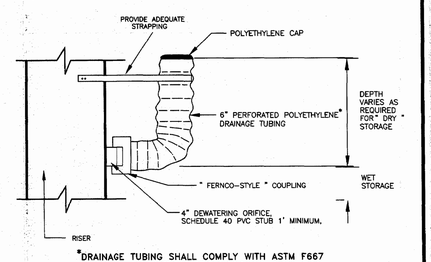
(CD) ROCK CHECK DAM

SOURCE: VA. DSWC PLATE. 3.20-1 — N.T.S. — D-CD.dwg



SEDIMENT BASIN #1 SCHEMATIC ELEVATIONS

SOURCE: VA. DSWC PLATE. 3.14-2 — N.T.S. — D-SB.dwg



*DRAINAGE TUBING SHALL COMPLY WITH ASTM F667 AND AASHTO M294

TYPICAL DEWATERING DEVICE

SOURCE: VA. DSWC — PLATE. 3.14-15

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	DBR
2	10/29/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	DBR
3	10/19/05	SITE PLAN AMENDMENT #1	DBR

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

NOTES AND DETAILS

WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC. VIRGINIA
JAMES CITY COUNTY
POWHATAN DISTRICT

Designed	Drawn
HWP	AES
Scale	Date
NOTED	8/4/04
Project No.	
9427-0	
Drawing No.	
AS-BUILT	

RECORD DRAWINGS: 3-08-2008

SS#1-23
DI-5
GRATE INV=~~101.90~~ 101.75
INV=~~99.40~~ 99.31

100 LF OF 15"
STORM SEWER @ 1.05%

SS#1-22
DI-5
GRATE INV=~~104.2~~ 103.87
INV=~~98.35~~ 98.27

20' DRAINAGE
EASEMENT

50 LF OF 15"
STORM SEWER
@ 0.50%

140 L.F. OF
GRASS SWALE
@ 1.67%
(MIN 8" DEEP)

149 LF OF 15"
STORM SEWER
@ 3.15%

230 LF OF 18"
STORM SEWER
@ 0.76%

95 LF OF 18"
STORM SEWER
@ 0.79%

SS#1-20
STA 29+74 LT.
VDOT STD
DI-3B, L=4'
RIM=~~106.50~~ 100.68
INV=~~93.90~~ 94.37

118 LF OF 15"
STORM SEWER
@ 0.51%

SS#1-21
STA 30+84 LT.
VDOT STD DI-3C, L=6'
RIM=~~98.50~~ 98.47
INV=~~94.50~~ 94.04

2'x25' SEDIMENT TRAP #2
4' DEEP, 3:1SS
(APPROX. 22 CY)
(SEE DETAIL SHT 18)
INV=94.0

SS#1-19
STA 29+27
VDOT STD DI-3B, L=4'
RIM=~~101.50~~ 101.53
INV=~~93.65~~ 93.38

SS#1-18
STA 26+90 LT.
VDOT STD DI-3BB, L=4'
RIM=~~103.15~~
INV=~~91.90~~ 91.45

SS#1-3
STA 25+79 LT.
VDOT STD DI-3AA
RIM=~~102.45~~ 102.41
INV=~~91.15~~ 90.61

28 LF OF 30"
STORM SEWER
@ 1.79%

#1-1B
A-25+95 RT.
OT STD MH-1
=~~105.00~~ 104.58
V=~~90.02~~
=89.21
OF 30" STORM
@ 5.31%

SS#1-1A
STA 25+95 RT.
VDOT STD MH-1
RIM=~~87.00~~ 86.98
INV=~~82.00~~ 82.20

75
72 LF OF 30" STORM
SEWER @ 8.33%

SS#1-1
30" RCP
INV=~~76.00~~ 75.33

8' MIN.
8' WIDE GRASS-LINED TRAPEZOIDAL
EMERGENCY SPILLWAY WITH 4:1 SIDE
SLOPES, 1' DEEP ELEV @ CONTROL
SECTION=~~84.30~~ 84.0

FG=
85.3

FG=
84.3

10 PT.
WET POND
BMP.

VARIABLE WIDTH
JCSA EASEMENT

APPROXIMATE
LIMITS OF WETLANDS AS
DELINEATED BY STOKES
ENVIRONMENTAL

CONTRACTOR SHALL PROVIDE EC-2
MATTING ON ENTIRE 2.5 TO 1
BACKSLOPE OF DAM. (SEE SHEET 17,
JCC E&S NOTE #13)

APARTMENT BLDG

SPENCER
LOT 23

LOT 24

JCSA SANITARY

ASBUILT
MULBERRY PLACE

MULBERRY LANE (50' R/W)

LOT 18
LOT 19
LOT 20
LOT 21
LOT 25
LOT 27

LONGHILL GROVE

BURTON WOODS

WARHILL GREEN

MULBERRY PLACE

BUILDING PAD
FF ELEV = 104.00
10 UNITS

8
0.15 AC.

5
0.10 AC.

3
0.14 AC.

7
0.61 AC.

6
1.01 AC.

4
0.60 AC.

2
0.14 AC.

1
0.20 AC.

C=0.51

C=0.69

C=0.40

C=0.44

C=0.49

N OR F
MULBERRY PLACE
SUBDIVISION
T.M.# (31-3)(13-1B)
ZONING: R-2

EXISTING DWELLING

MULBERRY LANE

CONC DRIVE

BRICK PATIO

TIMBER LINED MULCH BED

MULCH BED

GRASS DITCH

SAN MH
RIM=98.52
INV=90.90

STM DI
TOP=98.62
INV=94.85

6' WOODEN FENCE ALONG P/L

8' WOODEN FENCE

THE ON-SITE PRE AND POST DEVELOPMENT DRAINAGE AREAS ARE SHOWN ON THE CONSTRUCTION PLANS.

DOESN'T REFLECT RESID. CONDITIONS BUT THIS TC WOULD BE QUICKER, THUS MORE CONSERVATIVE.

GRAPHIC SCALE
60' 0' 60' 120'
SCALE: 1" = 60'

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/21/04	REVISED PER JCC COMMENTS DATED ??	CBR

COMMONWEALTH OF VIRGINIA
CHARLES B. RECORDS
No. 038172
PROFESSIONAL ENGINEER
10/21/04

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

ES
CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

OFFSITE DRAINAGE MAP
WARHILL GREEN
OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
TRS/HEB	RMS
Scale	Date
1"=60'	8/4/04
Project No.	
9427-0	
Drawing No.	
1	

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 018

SITE PLAN
FOR
WARHILL GREEN
JAMES CITY COUNTY, VIRGINIA

LEGEND

EXISTING		PROPOSED
— EX. W —	WATER	— W —
— EX. S —	SANITARY SEWER	— S —
═══	STORM SEWER	═══
— EX. FM —	FORCE MAIN	— FM —
	MANHOLE	
	CURB DROP INLET	
	YARD DROP INLET	
	FLARED END SECTION	
	VALVE	
	FIRE HYDRANT ASSEMBLY	
	BLOW-OFF VALVE	
⊗ SCO	AIR RELEASE ASSEMBLY	
	CLEAN OUT	
WM	WATER METER	
	STREETLIGHT	
	CENTERLINE/BASELINE	
	RIGHT OF WAY	
	PROPERTY LINE	
	℄ DITCH/SWALE	
	CONCRETE LINED DITCH	
	EXISTING TREELINE	
	LIMITS OF CLEARING	
	RIP RAP	
	CURB	
	CURB AND GUTTER	
	REVERSE GUTTER PAN	
	EDGE OF PAVEMENT	
+25.1	EXISTING GROUND ELEVATION	
	PROPOSED SPOT GRADE	100.00
— 80 —	CONTOUR	80
	HIGH POINT	HP
	LOW POINT	LP

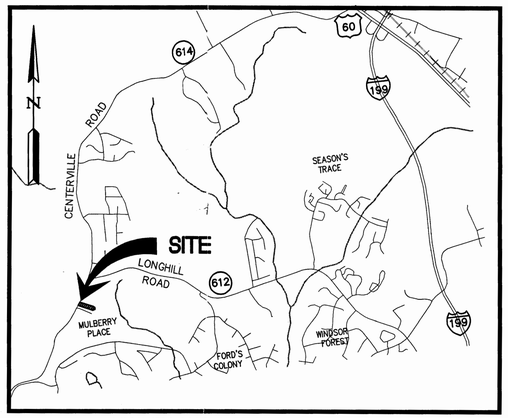
INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	ENVIRONMENTAL INVENTORY AND DEMOLITION PLAN
3	SITE AND UTILITY PLAN
4	PHASE I EROSION AND SEDIMENT CONTROL AND OVERALL DRAINAGE PLAN
5	DRAINAGE, GRADING AND EROSION AND SEDIMENT CONTROL PLAN
6	SANITARY SEWER PROFILE
7	WATER LINE PROFILE, NOTES & DETAILS
8	OFF-SITE STORM SEWER PLAN AND PROFILE
9	LANDSCAPE PLAN
10	LIGHTING PLAN
11	NOTES AND DETAILS
12	NOTES AND DETAILS

CERTIFIED RESPONSIBLE LAND DISTURBER:

CHARLES B. RECORDS, P.E.
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA. 23188
TELEPHONE: 757-253-0040

* FOR SITE PLAN REVIEW PROCESS ONLY. OWNER OR CONTRACTOR SHALL NAME RESPONSIBLE LAND DISTURBER FOR CONSTRUCTION PROCESS.



VICINITY MAP (APROX. SCALE 1"=2,000')

DATE: AUGUST 4, 2004
REVISED: DECEMBER 22, 2004
AES PROJECT NO.: 9427-0

COMMONWEALTH OF VIRGINIA
CHARLES B. RECORDS
No. 038172
12/22/04
PROFESSIONAL ENGINEER

AES CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

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

Remove #1
+ flow needed - #2
#3 OK
Remove #4
Place (CD) material under #5 & sediment underneath
#6 OK
#7 Remove #9 Remove
#8 Remove #10

DEC 2004
RECEIVED
PLANNING DEPARTMENT

SP-098-04

COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS		DATE
Fire Dept.	cs/mda	8/3/05
Health Dept.		
VDOT	BW/mda	8/8/05
Planning		2/22/05
Environ.	DGC	2/4/05
Zoning		2/25/05
Jcsa	MV/mda	1/11/05
County Engr.	wnp/mda	2/17/05
RFA		
Other		

GENERAL NOTES

1. SITE TAX PARCEL AND ADDRESS: (31-3)(1-34) #5450 CENTERVILLE ROAD
2. THE SITE IS CURRENTLY ZONED MULTI-FAMILY RESIDENTIAL DISTRICT, R-5
3. ALL UTILITIES SHALL BE PLACED UNDERGROUND.
4. ALL UTILITIES SHALL HAVE 36" MIN. COVER.
5. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SHALL NOTIFY MISS UTILITY (1-800-552-7001) PRIOR TO ANY EXCAVATION OR DEMOLITION.
6. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO ALL SITE CONDITIONS PRIOR TO CONSTRUCTION.
7. EXISTING UTILITY LOCATIONS INDICATED ARE APPROXIMATE. FIELD VERIFY PRIOR TO COMMENCING WORK.
8. VERIFY ALL DIMENSIONS AND NOTIFY JAMES CITY SERVICE AUTHORITY PRIOR TO ANY EXCAVATION OR DEMOLITION WITHIN UTILITY CORRIDORS.
9. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS PRIOR TO COMMENCEMENT OF WORK TO INCLUDE, BUT NOT LIMITED TO JAMES CITY COUNTY LAND DISTURBANCE, BUILDING, UTILITY (JCSA).
10. A LAND DISTURBING PERMIT AND SILTATION AGREEMENT, WITH SURETY ARE REQUIRED FOR THIS PROJECT.
11. IT IS THE OWNER'S RESPONSIBILITY TO REGISTER FOR A GENERAL VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES) PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES, IN ACCORDANCE WITH CURRENT REQUIREMENTS OF THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY AND 9 VAC 25-180-10 ET SEQ. CONTACT THE TIDEWATER REGIONAL OFFICE OF THE DEQ AT 757-518-2000 OR THE CENTRAL OFFICE AT 804-698-4000 FOR FURTHER INFORMATION.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF CONSTRUCTION EFFORTS WITH VIRGINIA NATURAL GAS, VIRGINIA POWER, C&P TELEPHONE, APPROPRIATE CABLE COMPANY, JAMES CITY SERVICE AUTHORITY, AND OTHERS THAT MAY BE REQUIRED.
13. SITE TO BE SERVED BY PUBLIC WATER & SEWER OWNED BY THE JAMES CITY COUNTY SERVICE AUTHORITY, J.C.S.A.
14. PARKING SPACES SHALL BE DELINEATED BY PAVEMENT STRIPING. HANDICAP PARKING SPACES SHALL BE DESIGNATED BY ABOVE GROUND SIGNS PER USBC REQUIREMENTS.
15. NO WETLANDS EXIST ON THIS SITE.
16. THIS SITE DOES NOT LIE WITHIN ANY RESOURCE PROTECTION AREAS.
17. NO HYDRIC OR SIMILAR SOILS EXIST ON THIS SITE.
18. CONTOUR INTERVAL IS 1 FOOT.
19. ANY NEW SIGNS SHALL BE IN ACCORDANCE WITH ARTICLE II, DIVISION 3 OF JCC ZONING ORDINANCE.
20. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE DETENTION/ RETENTION POND OR ITS STRUCTURE, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGES.
21. THIS PROPERTY LIES IN ZONE "X" (AREAS DETERMINED TO BE OUTSIDE THE 500 YEAR FLOOD PLAIN) AS SHOWN ON COMMUNITY PANEL #510201 0035 B, DATED 2/6/1991 OF THE FLOOD INSURANCE RATE MAPS FOR JAMES CITY COUNTY, VIRGINIA.
22. ANY EXISTING UNUSED WELLS SHALL BE ABANDONED IN ACCORDANCE WITH STATE PRIVATE WELL REGULATIONS AND JAMES CITY COUNTY CODE.
23. ALL COMPONENTS OF THE WATER DISTRIBUTION AND SANITARY SEWER SYSTEM SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH THE LATEST EDITION OF THE JAMES CITY SERVICE AUTHORITY STANDARDS AND SPECIFICATIONS FOR WATER DISTRIBUTION AND SANITARY SEWER SYSTEMS, THE HAMPTON ROADS PLANNING DISTRICT COMMISSION (HRPDC) REGIONAL STANDARDS, AND THE COMMONWEALTH OF VIRGINIA WATERWORKS AND SEWERAGE REGULATIONS. THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS AND PRODUCTS ON ALL PROJECTS. ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE WORK. A COPY OF THE JCSA STANDARDS AND REGIONAL STANDARDS MUST BE KEPT ON-SITE BY THE CONTRACTOR DURING THE FULL TIME OF INSTALLING, TESTING, AND CONVEYING THE FACILITIES TO JCSA/HOA.
24. A DUMPSTER WILL NOT BE UTILIZED FOR GARBAGE DISPOSAL PURPOSES, BUT RATHER EACH INDIVIDUAL SHALL BE RESPONSIBLE FOR THEIR OWN TRASH COLLECTION.
25. TOWNHOUSES SHALL BE VARIED IN DEPTH OF FRONT YARDS, BUILDING MATERIALS AND DESIGN SO THAT NO MORE THAN TWO ABUTTING UNITS SHALL BE OF LIKE APPEARANCE.
26. THE UNITS SHALL BE 3 STORIES, USE GROUP B, AND CONSTRUCTION TYPE 3B. MAXIMUM BUILDING HEIGHT IS 35 FEET.
27. OVERALL SITE DENSITY IS 7.84 UNITS/ACRE. THE MAXIMUM ALLOWABLE DENSITY IS 8 UNITS/ACRE.
28. OWNER/DEVELOPER: ASSOCIATED DEVELOPERS, INC.
CONTACT: HENRY STEPHENS
ADDRESS: DRAWER 18 PARKVIEW STATION
NEWPORT NEWS, VA 23605
PHONE: (757) 838-2739
FAX: (757) 838-6337
29. THIS PROJECT IS SITUATED IN SUBWATERSHED 204, CATCHMENT 204-101-1 OF THE POWHATAN CREEK WATERSHED OF JAMES CITY COUNTY.
30. [redacted] TO RELEASE OF THE POSTED BOND/SURETY. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AS-BUILT SURVEY BEFORE, DURING AND FOLLOWING CONSTRUCTION SUCH THAT THE RECORD DRAWINGS CAN BE PREPARED IN ACCORDANCE WITH THE CURRENT COUNTY GUIDELINES.

APPROVAL DATE	No.	DATE		BY
	2	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR
	1	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR

WARHILL GREEN
JOB # 9427-0

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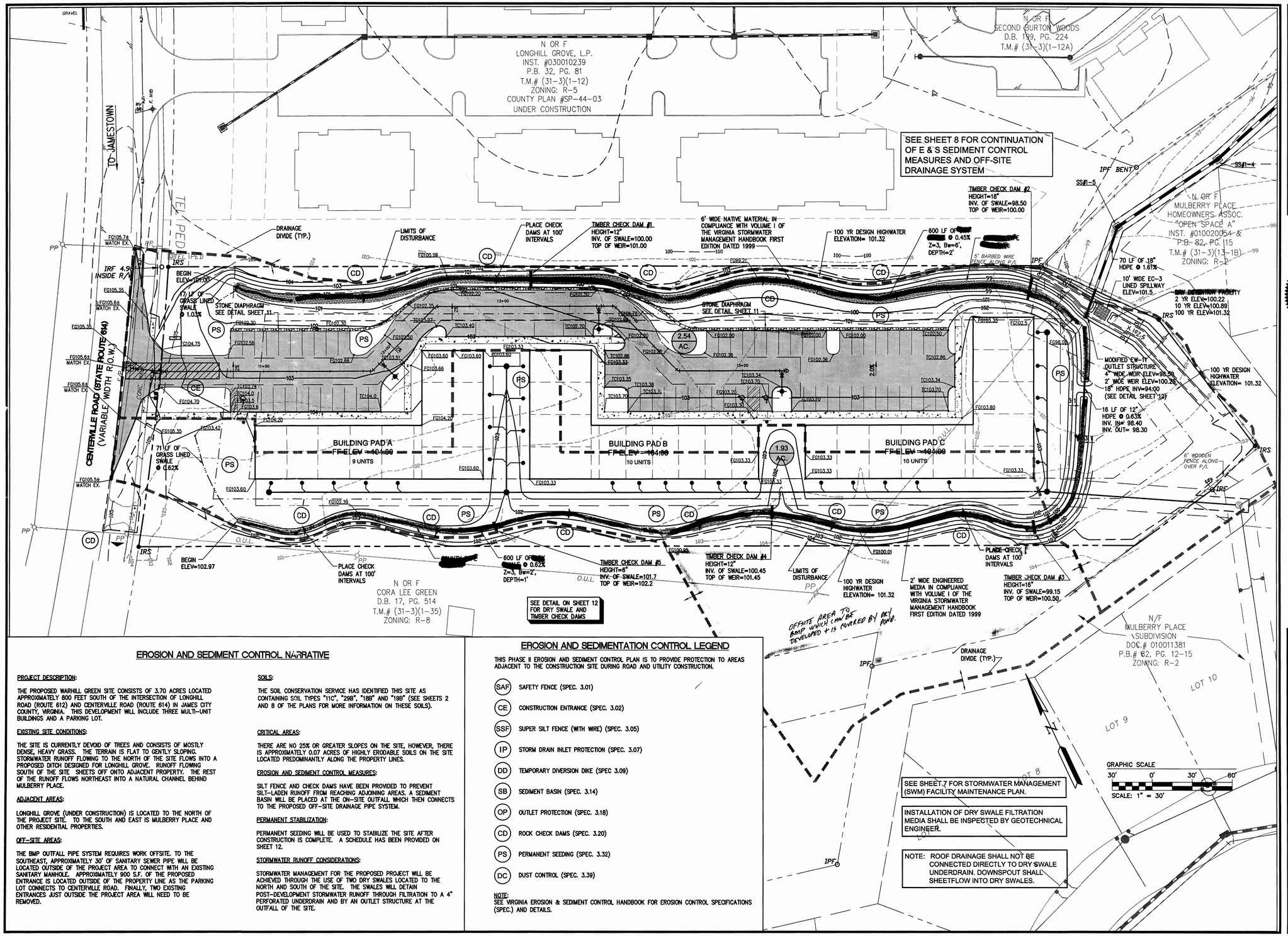
PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 019

No.	DATE	REVISION / COMMENT / NOTE	BY
3	12/22/04	REVISED PER JCC AND VDSA COMMENTS DATED 11/29/04	CBR
2	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR
1			



EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION:

THE PROPOSED WARHILL GREEN SITE CONSISTS OF 3.70 ACRES LOCATED APPROXIMATELY 800 FEET SOUTH OF THE INTERSECTION OF LONGHILL ROAD (ROUTE 612) AND CENTERVILLE ROAD (ROUTE 614) IN JAMES CITY COUNTY, VIRGINIA. THIS DEVELOPMENT WILL INCLUDE THREE MULTI-UNIT BUILDINGS AND A PARKING LOT.

EXISTING SITE CONDITIONS:

THE SITE IS CURRENTLY DEVOID OF TREES AND CONSISTS OF MOSTLY DENSE, HEAVY GRASS. THE TERRAIN IS FLAT TO GENTLY SLOPING. STORMWATER RUNOFF FLOWING TO THE NORTH OF THE SITE FLOWS INTO A PROPOSED DITCH DESIGNED FOR LONGHILL GROVE. RUNOFF FLOWING SOUTH OF THE SITE SHEETS OFF ONTO ADJACENT PROPERTY. THE REST OF THE RUNOFF FLOWS NORTHEAST INTO A NATURAL CHANNEL BEHIND MULBERRY PLACE.

ADJACENT AREAS:

LONGHILL GROVE (UNDER CONSTRUCTION) IS LOCATED TO THE NORTH OF THE PROJECT SITE. TO THE SOUTH AND EAST IS MULBERRY PLACE AND OTHER RESIDENTIAL PROPERTIES.

OFF-SITE AREAS:

THE BMP OUTFALL PIPE SYSTEM REQUIRES WORK OFFSITE. TO THE SOUTHEAST, APPROXIMATELY 30' OF SANITARY SEWER PIPE WILL BE LOCATED OUTSIDE OF THE PROJECT AREA TO CONNECT WITH AN EXISTING SANITARY MANHOLE. APPROXIMATELY 900 S.F. OF THE PROPOSED ENTRANCE IS LOCATED OUTSIDE OF THE PROPERTY LINE AS THE PARKING LOT CONNECTS TO CENTERVILLE ROAD. FINALLY, TWO EXISTING ENTRANCES JUST OUTSIDE THE PROJECT AREA WILL NEED TO BE REMOVED.

SOILS:

THE SOIL CONSERVATION SERVICE HAS IDENTIFIED THIS SITE AS CONTAINING SOIL TYPES "11C", "29B", "18B" AND "19B" (SEE SHEETS 2 AND 8 OF THE PLANS FOR MORE INFORMATION ON THESE SOILS).

CRITICAL AREAS:

THERE ARE NO 25% OR GREATER SLOPES ON THE SITE, HOWEVER, THERE IS APPROXIMATELY 0.07 ACRES OF HIGHLY ERODABLE SOILS ON THE SITE LOCATED PREDOMINANTLY ALONG THE PROPERTY LINES.

EROSION AND SEDIMENT CONTROL MEASURES:

SILT FENCE AND CHECK DAMS HAVE BEEN PROVIDED TO PREVENT SILT-LADEN RUNOFF FROM REACHING ADJOINING AREAS. A SEDIMENT BASIN WILL BE PLACED AT THE ON-SITE OUTFALL WHICH THEN CONNECTS TO THE PROPOSED OFF-SITE DRAINAGE PIPE SYSTEM.

PERMANENT STABILIZATION:

PERMANENT SEEDING WILL BE USED TO STABILIZE THE SITE AFTER CONSTRUCTION IS COMPLETE. A SCHEDULE HAS BEEN PROVIDED ON SHEET 12.

STORMWATER RUNOFF CONSIDERATIONS:

STORMWATER MANAGEMENT FOR THE PROPOSED PROJECT WILL BE ACHIEVED THROUGH THE USE OF TWO DRY SWALES LOCATED TO THE NORTH AND SOUTH OF THE SITE. THE SWALES WILL DETAIN POST-DEVELOPMENT STORMWATER RUNOFF THROUGH FILTRATION TO A 4" PERFORATED UNDERDRAIN AND BY AN OUTLET STRUCTURE AT THE OUTFALL OF THE SITE.

EROSION AND SEDIMENTATION CONTROL LEGEND

THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING ROAD AND UTILITY CONSTRUCTION.

- (SAF) SAFETY FENCE (SPEC. 3.01)
- (CE) CONSTRUCTION ENTRANCE (SPEC. 3.02)
- (SSF) SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)
- (IP) STORM DRAIN INLET PROTECTION (SPEC. 3.07)
- (DD) TEMPORARY DIVERSION DIKE (SPEC 3.09)
- (SB) SEDIMENT BASIN (SPEC. 3.14)
- (OP) OUTLET PROTECTION (SPEC. 3.18)
- (CD) ROCK CHECK DAMS (SPEC. 3.20)
- (PS) PERMANENT SEEDING (SPEC. 3.32)
- (DC) DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

COMMONWEALTH OF VIRGINIA
CHARLES B. RICHARDS
No. 038172
PROFESSIONAL ENGINEER
12/22/04

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

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

DRAINAGE, GRADING, AND EROSION AND SEDIMENT CONTROL PLAN
WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
TRS	HEB
Scale	Date
1"=30'	8/4/04
Project No.	
9427-0	
Drawing No.	
5	

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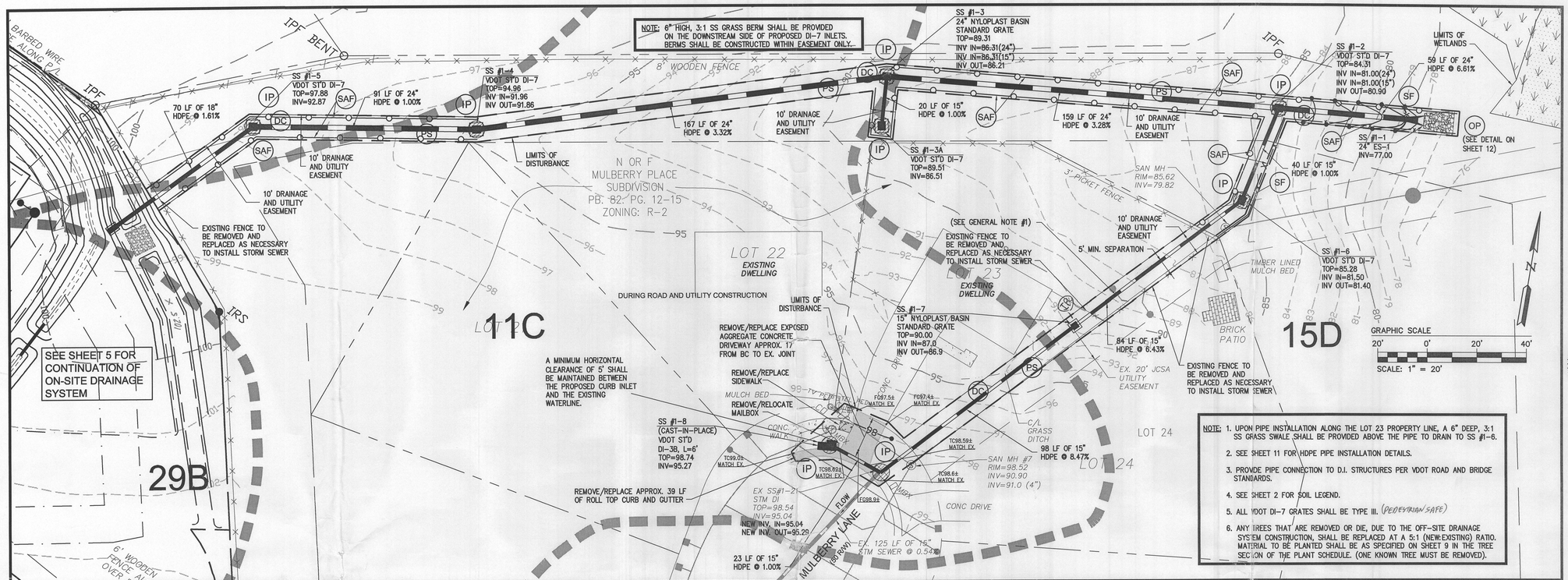
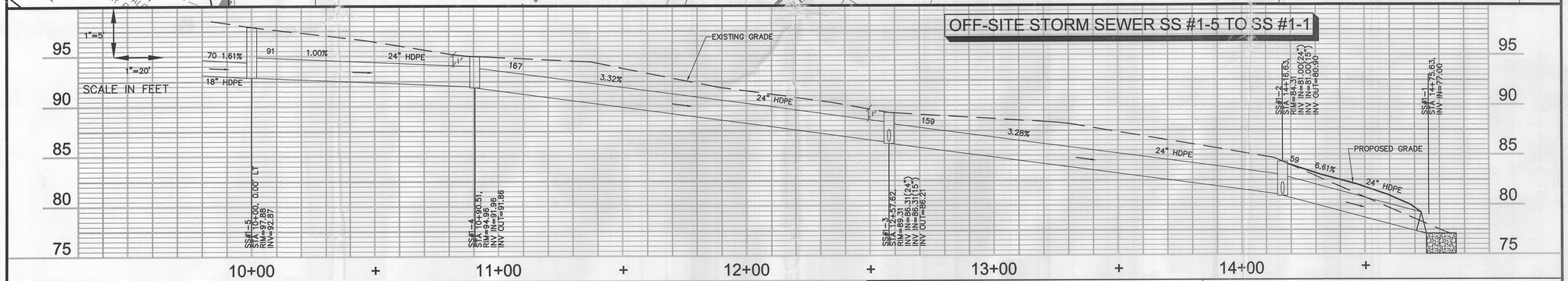
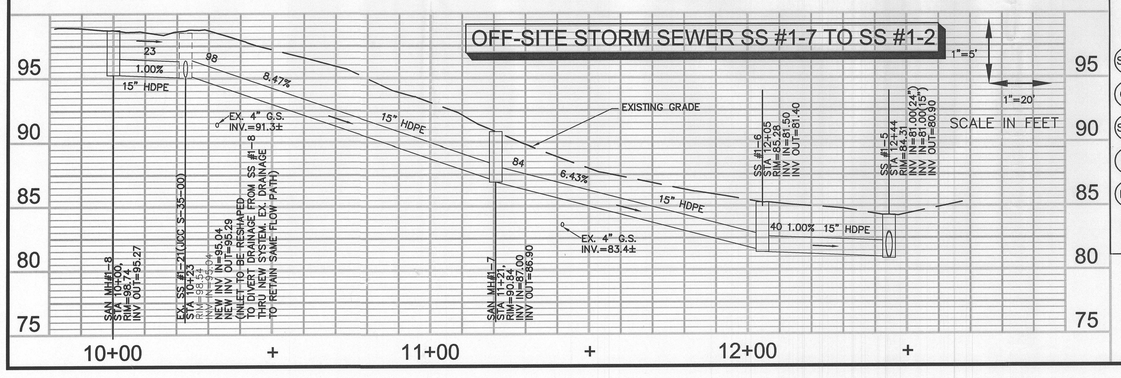


NOTE:
1. UPON PIPE INSTALLATION ALONG THE LOT 23 PROPERTY LINE, A 6" DEEP, 3:1 SS GRASS SWALE SHALL BE PROVIDED ABOVE THE PIPE TO DRAIN TO SS #1-6.
2. SEE SHEET 11 FOR HDPE PIPE INSTALLATION DETAILS.
3. PROVIDE PIPE CONNECTION TO D.I. STRUCTURES PER VDOT ROAD AND BRIDGE STANDARDS.
4. SEE SHEET 2 FOR SOIL LEGEND.
5. ALL VDOT DI-7 GRATES SHALL BE TYPE III. (PEDESTRIAN/SAFE)
6. ANY TREES THAT ARE REMOVED OR DIE, DUE TO THE OFF-SITE DRAINAGE SYSTEM CONSTRUCTION, SHALL BE REPLACED AT A 5:1 (NEW:EXISTING) RATIO. MATERIAL TO BE PLANTED SHALL BE AS SPECIFIED ON SHEET 9 IN THE TREE SECTION OF THE PLANT SCHEDULE. (ONE KNOWN TREE MUST BE REMOVED).





EROSION AND SEDIMENTATION CONTROL LEGEND

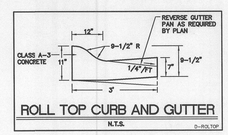
THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING OFFSITE DRAINAGE CONSTRUCTION.

(SAF)	SAFETY FENCE (SPEC. 3.01)	(SB)	SEDIMENT BASIN (SPEC. 3.14)
(CE)	CONSTRUCTION ENTRANCE (SPEC. 3.02)	(OP)	OUTLET PROTECTION (SPEC. 3.18)
(SSF)	SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)	(CD)	ROCK CHECK DAMS (SPEC. 3.20)
(IP)	STORM DRAIN INLET PROTECTION (SPEC. 3.07)	(PS)	PERMANENT SEEDING (SPEC. 3.32)
(DD)	TEMPORARY DIVERSION DIKE (SPEC 3.09)	(DC)	DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

GENERAL NOTES:

1. LOT 23 SANITARY SEWER LATERAL SHALL BE EXPOSED BY THE CONTRACTOR AND COMFIRM WITH THE DESIGN ENGINEER THAT PROPER CLEARANCES WILL BE MAINTAINED AT THE CROSSING OF THE PROPOSED STORM SEWER SYSTEM. CLEARANCE SHALL BE VERIFIED BY JCSA INSPECTORS PRIOR TO STORM SEWER INSTALLATION.
2. THE PRIMARY EROSION AND SEDIMENT CONTROL MEASURE FOR THE OFFSITE UTILITY LINE INSTALLATION WILL BE RAPID INSTALLATION AND STABILIZATION IN ACCORDANCE WITH MINIMUM STANDARD #16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
3. IF PROPOSED INLET PROTECTION MEASURES RESULT IN UNDESIRED YARD OR PROPERTY FLOODING, THESE MEASURES MAY BE REMOVED WITH THE APPROVAL OF THE ASSIGNED ENVIRONMENTAL DIVISION INSPECTOR.
4. IN ORDER TO PROTECT THE SAFETY OF THE PUBLIC A SAFETY FENCE, IN ACCORDANCE WITH MINIMUM STANDARD AND SPEC. 3.01 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, SHALL BE INSTALLED IN CASES WHERE OVERNIGHT OR PROLONGED INLET OR UTILITY TRENCH EXCAVATIONS OCCUR.



ROLL TOP CURB AND GUTTER
N.T.S.

No.	DATE	REVISION / COMMENT / NOTE	BY
2	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR
1	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR

COMMONWEALTH OF VIRGINIA CHARLES B. HEROUS No. 038172 PROFESSIONAL ENGINEER 12/22/04

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

OFF-SITE STORM SEWER PLAN AND PROFILE

WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.

JAMES CITY COUNTY VIRGINIA

POWHATAN DISTRICT

Designed	Drawn
TRS/HEB	RMS
Scale	Date
NOTED	8/4/04
Project No.	
9427-0	
Drawing No.	
8	

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PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 021

VDOT GENERAL NOTES

REVISED 08/02

1. A Land Use Permit must be obtained from VDOT before any construction is started within the existing state right of way. Contact the VDOT Residency for the permit fee and bond amount. All Land Use Permit applications must have two (2) sets of approved plans, a check for the processing fee made payable to VDOT, and surety in the required amount.

2. The developer is responsible for the relocation of any utilities or pavement markings within the existing right of way or proposed right of way required by the development of the site/subdivision.

3. The developer is responsible for the cost of a traffic signal or any modifications to an existing traffic signal that are determined to be necessary. These costs will be charged under an Operational Project (Accounts Receivable) Number. Contact the VDOT Residency for the proper procedure.

4. Prior to any construction, the contractor shall consult with the developer's engineer to verify the final approval of the plans, or any revised plans, by the various agencies (County, VDOT, etc.).

5. VDOT approval of these plans will expire in five (5) years from the date of approval.

6. VDOT is to receive written notification 48 hours prior to the start of any work. A pre-construction meeting will be required prior to any land disturbance of the site. The developer, his engineer, geotechnical (soils) engineer, and contractor shall attend the pre-construction meeting. The developer's contractor shall have a proposed progress schedule of work.

7. Any errors, conflicts, or discrepancies found on the approved plans shall be reported to the developer's engineer and VDOT for resolution before proceeding further with the work.

8. The developer's engineer and contractor (sub-contractor) shall verify in the field the elevations of all points of connection of proposed work to existing curbs, sanitary sewer, storm sewer, drainage structures, waterlines, etc., prior to the construction in the field.

9. An Operational Project (accounts receivable) Number may be assigned to the site/subdivision. The developer will be responsible for this by providing the necessary information requested by VDOT.

10. All materials and construction within the proposed public right of way shall be in accordance with the current VDOT specifications and standards.

11. Any request for a change of specified materials or design from the approved plans will need to be submitted to VDOT. A letter must accompany the proposed changes and revised plan sheets and/or drainage calculations for review and approval by the VDOT Resident Engineer.

12. The developer will be responsible for providing the Geotechnical (soils) Engineer. A professional engineer or professional geologist will submit a complete report with boring data and recommendations to VDOT for approval of his proposed method of construction. This report shall include shrink swell values of the soils, moisture sensitive soils, sieve analyses, dry and wet CBR values, standard proctor and Attenberg Limits. The report will show the bore locations, types of soils encountered, and stabilization recommendations for soils with poor support values, high moisture, mica, and silt content. The report shall include a pavement structural design recommendation based on laboratory tests of the actual soils and approved traffic volume for the site/subdivision in accordance with the latest VDOT 'Pavement Design Guide for Subdivision and Secondary Roads in Virginia'.

13. When soils occur that are unsuitable for foundations, embankment fill, pipe backfill, subgrade, or other roadway purposes, the developer's contractor shall excavate said material under the direction of the developer's soils engineer, by undercutting such material below the proposed grades shown on the plans. The contractor shall notify the developer's engineer and VDOT upon the discovery of the unsuitable material. Concurrence of the engineer shall be obtained before additional work is undertaken.

14. All erosion and sediment control measures shall be the responsibility of the contractor. All erosion control measures will be in place and reviewed by the contractor daily and after all inclement weather to insure compliance for the control of any erosion and siltation. Any corrections or repairs will be made immediately. In accordance with 'Road and Bridge Specifications, VDOT requires an individual certified by the Virginia Department of Conservation and Recreation, holding a Responsible Land Disturber Certification, to be in charge of the land disturbing activity and on the work site at all times.

15. The contractor and subcontractor(s) shall have a copy of the current VDOT 'Road and Bridge Specifications' and the VDOT 'Road and Bridge Standards'. The contractor shall have at least one (1) set of approved plans with all approved revisions. The Land Use Permit will be at the site at all times.

16. The contractor shall be responsible for locating and protecting all underground and overhead utilities, whether or not they are shown on the plans. The contractor will be responsible for repairs at his own expense of any utilities damaged by his construction methods. MISS UTILITY must be contacted at 1-800-552-7001 at least 72 hours prior to the commencement of construction.

17. The contractor will be responsible for replacing, with matching materials, any pavement, curb and gutter, driveway, pipe, sidewalk, etc. that are damaged during the construction of the site/subdivision.

18. Certification and source of materials are to be submitted to VDOT. All materials must meet VDOT specifications and standards.

19. The developer's Geotechnical Engineer and/or his certified materials technicians will perform compaction (density) tests for review by VDOT. All tests will be performed in accordance with the current VDOT specifications and standards. Backfill material for pipe, structures, and utilities located within the proposed right of way will be compacted and tested as the fill material is placed in uniform lifts. A minimum of 95% density with the soils standard proctor will be obtained with the proper moisture content on embankment and fills material. For the final 6" of the finished subgrade, 100% density will be obtained. The test results will be submitted to VDOT for review and compliance of the materials, prior to the developer's contractor requesting an inspection for a proof roll on the subgrade, aggregate stone, base mix (asphalt) or the placement of the surface mix.

20. All drainage easements shall be labeled as either "Drainage Easements" or "County Drainage Easements" and shall not be dedicated to VDOT or become the responsibility of VDOT.

21. Temporary drainage measures will be maintained by the contractor during construction to relieve areas that may cause damage to the right of way, roadway, or adjacent properties.

22. Dry gutter (rip rap) is not allowed in the ditches on VDOT right of way.

23. All storm sewer pipes shall be reinforced concrete pipe (tongue and groove) in accordance with ASTM-C-76 or an alternative that has been approved on the plans.

24. Installation of pipe culverts, storm sewers, and drainage structures shall have bedding material placed under the pipes and structures in accordance with VDOT specifications (a minimum of 4" under pipes and a minimum of 6" under drainage structures). The backfill material shall be suitable material free of debris, silt, tree roots (organic material), and excess moisture. The fill material will be compacted in uniform lifts and tested for density.

25. All vegetation (organic material, roots, stumps) and overburden are to be removed from the shoulders prior to the construction of the road's subgrade.

26. All concrete shall be Class A3-AE (3000PSI with air entrained additive) and tested by the developer's Geotechnical Engineer for conformance to VDOT specifications and standards.

27. There shall be a minimum of 6" of compacted 21-B aggregate material under the curb and gutter and this material shall extend 1' beyond the back of the curb and gutter. Density tests shall be taken prior to a proof roll of the material and placement of the curb/curb and gutter. Underdrains will be installed on raised curb medians in accordance with current VDOT specifications and standards.

28. All streets with curb and gutter shall have a standard CG entrance installed in accordance with the current VDOT 'Road and Bridge Specifications and Standards'. The curb and gutter pan shall be removed prior to the installation of the entrance unless a wipe-down of the curb was made during the installation of the curb and gutter. The saw cutting and removal of only the curb portion is not allowed. It is the developer's responsibility to insure that the builders have installed all concrete entrances in accordance with VDOT specifications and standards.

29. All underground utilities are to be in place prior to the placement of the base material and shall have a minimum covering of 36". On curb and gutter streets, the area directly behind the curb to the right of way line shall be relatively flat at the private entrance location. The developer's contractor should cut embankments to the right of way line prior to the installation of all underground utilities to insure a minimum 36" of cover.

30. The sub-base and/or base material shall have a roller pattern and a control strip with densities performed on the material and the test results submitted to VDOT prior to the proof roll of the material and the placement of the asphalt (Hot Mix) course. The material shall be at finished grade, have the template as shown on the pavement typical, and have a stone depth and proof roll performed by VDOT and the developer's soils engineer. Density (compaction) tests will be performed using a roller pattern and a control strip in accordance with current VDOT specifications and standards to acquire the theoretical density of the material. Optimum moisture shall come from the supplier of the material. Any yield material must be corrected prior to the placement of the Hot Mix (asphalt). The Hot Mix shall be placed within 72 hours after the proof roll has been completed satisfactorily. Any significant rainfall prior to the placement of the prime coat and/or Hot Mix will require another proof roll to insure the material is stabilized and non-yielding.

31. In accordance with Section 311 of the VDOT 'Road and Bridge Specifications', a prime coat of .30 gal. /sq. yd. will be required for any pavement typical with less than 4" of Hot Mix prior to the placement of the surface course.

32. All Hot Mix (asphalt) courses shall be placed in accordance with Section 315 of the current VDOT 'Road and Bridge Specifications'. The weather limitations of a 40° F surface temperature or 50° F and rising air temperature shall be followed. The developer's Geotechnical Engineer shall test the material to insure compliance with current VDOT specifications and the supplier's job mix design. The developer's Geotechnical Engineer shall also perform a roller pattern and a control strip for the theoretical density (compaction) of the material in conformance with the current VDOT specifications.

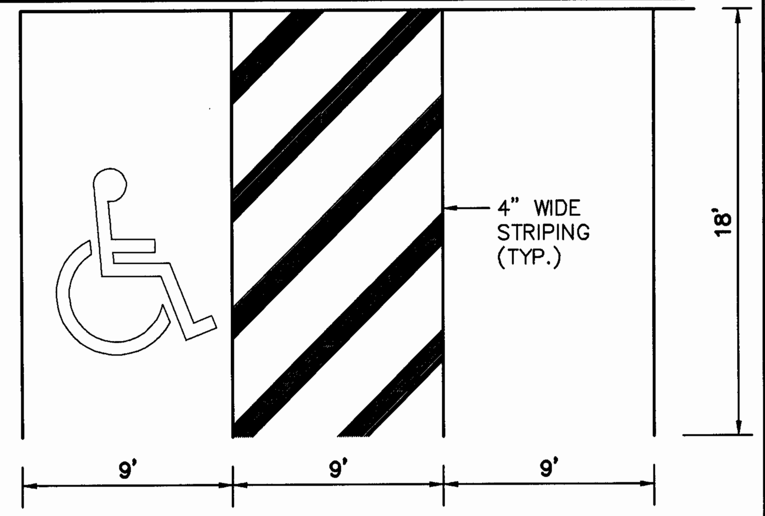
33. All utility cabinets, pedestals, and streetlights shall be located in accordance with VDOT requirements, as noted in the Road Design Manual. There shall not be any cabinets, pedestals, or fire hydrants located on the shoulder.

34. All storm pipe, drop inlet structures, ditches, and curb and gutter shall be cleaned of debris and silt during the last stages of construction.

35. Flowers, shrubs, and trees shall not be placed within the proposed right of way by the developer or homeowner without an approved set of plans and an approved planting agreement. No irrigation (sprinkler) systems shall be located within the proposed right of way. Any irrigation system found within the right of way will be removed prior to the acceptance of the streets and all costs will be borne by the owner. No easements shall encroach upon the proposed right of way; any easements located within the proposed right of way must be removed from the plat prior to the recordation of the plat. A Deed of Quit Claim will be required on any easements located within the proposed right of way prior to the acceptance of the streets into the State Secondary Road system. No brick columns, endwalls, and/or brick mailboxes will be constructed or installed in the proposed right of way. Any of the above items found in the proposed right of way will be removed, and all costs of the removal will be borne by the owner and/or developer.

36. Contact Mr. Sal Sibilia 72 hours in advance of all pavement markings/sign installations at (757) 925-1679. Failure to do so may result in additional cost to the developer.

37. Contact Traffic Engineering at (757) 925-2693 a minimum of 48 hours in advance whenever an open cut or boring of a utility line across a road is within 400 feet of a traffic signal, so the lines can be marked. Failure to do so could be a costly repair for the developer.

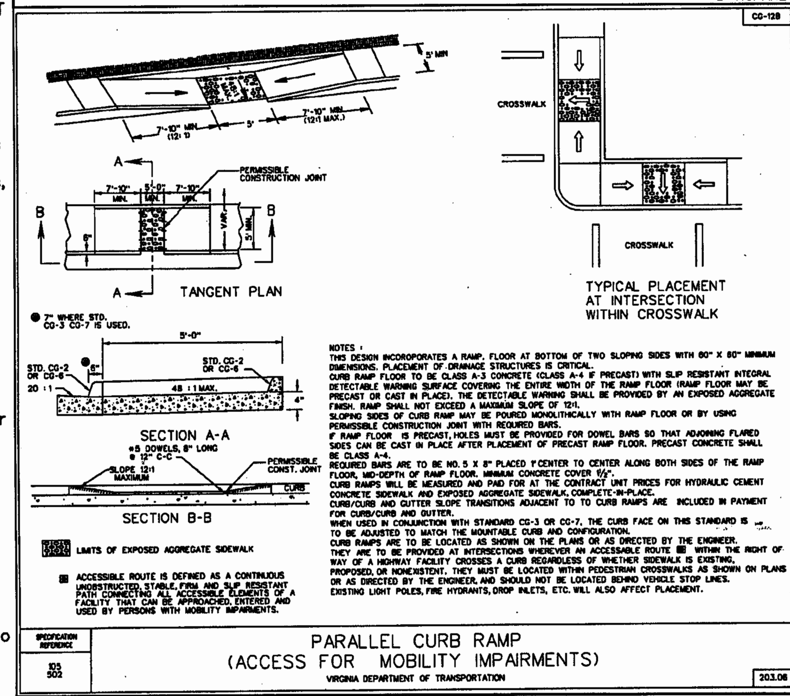


PARKING SPACE DETAIL

(VAN ACCESSIBLE)

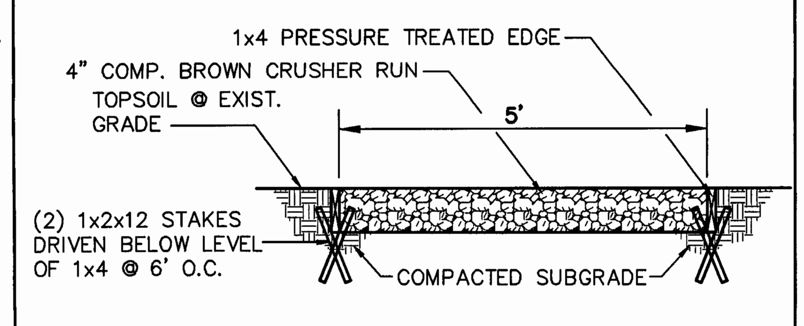
N.T.S.

D-HCPAR2



PARALLEL CURB RAMP (ACCESS FOR MOBILITY IMPAIRMENTS)

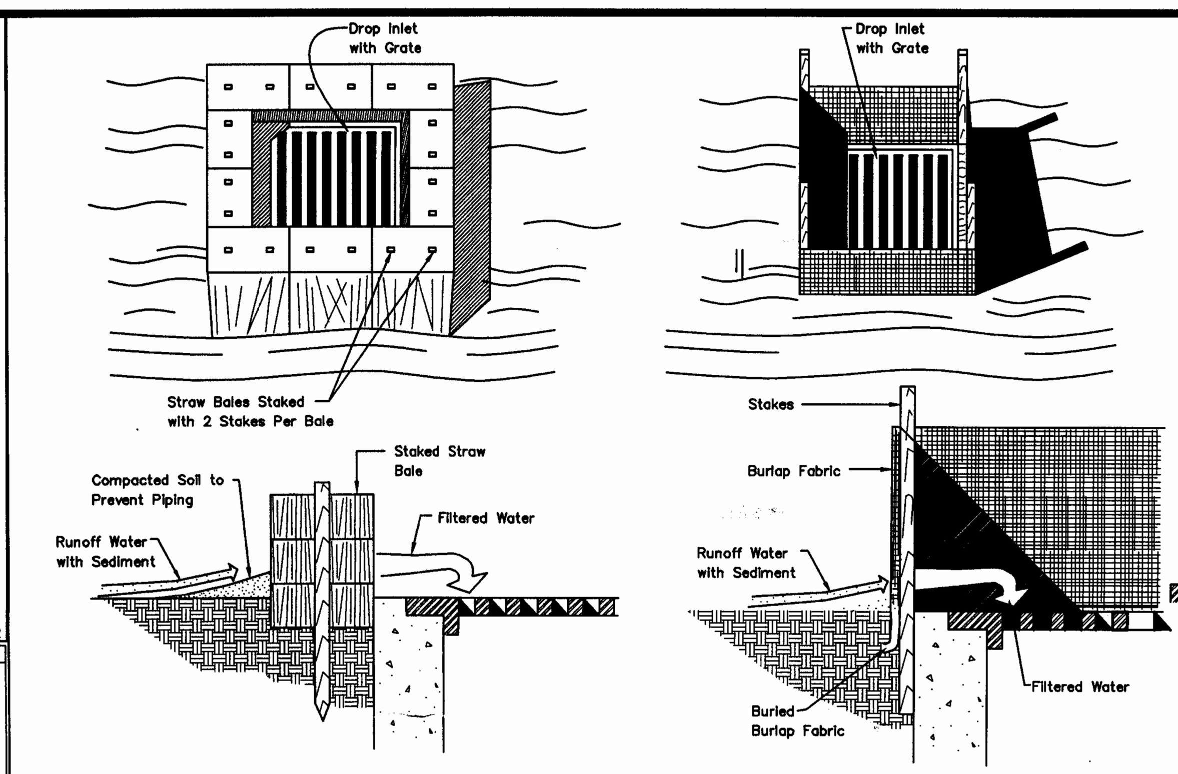
VIRGINIA DEPARTMENT OF TRANSPORTATION



TYPICAL GRAVEL PATH DETAIL

N.T.S.

d-gravsw.dwg

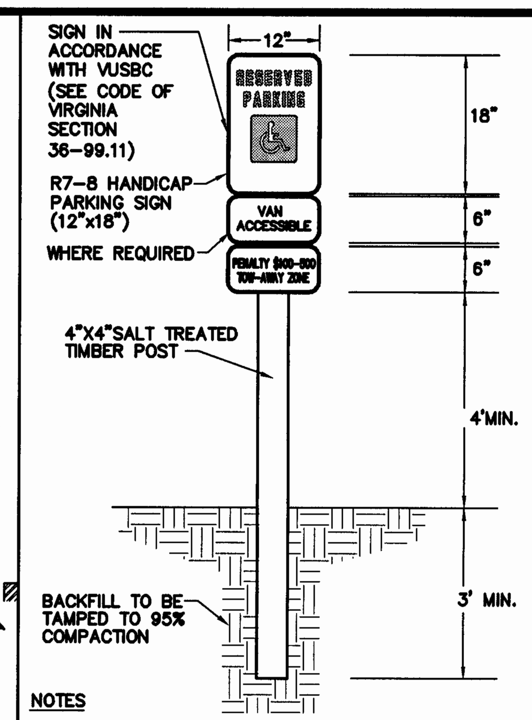


STRAW BALE DROP INLET SEDIMENT FILTER — BURLAP DROP INLET SEDIMENT FILTER

(IP) INLET PROTECTION

N.T.S.

D-IP.dwg

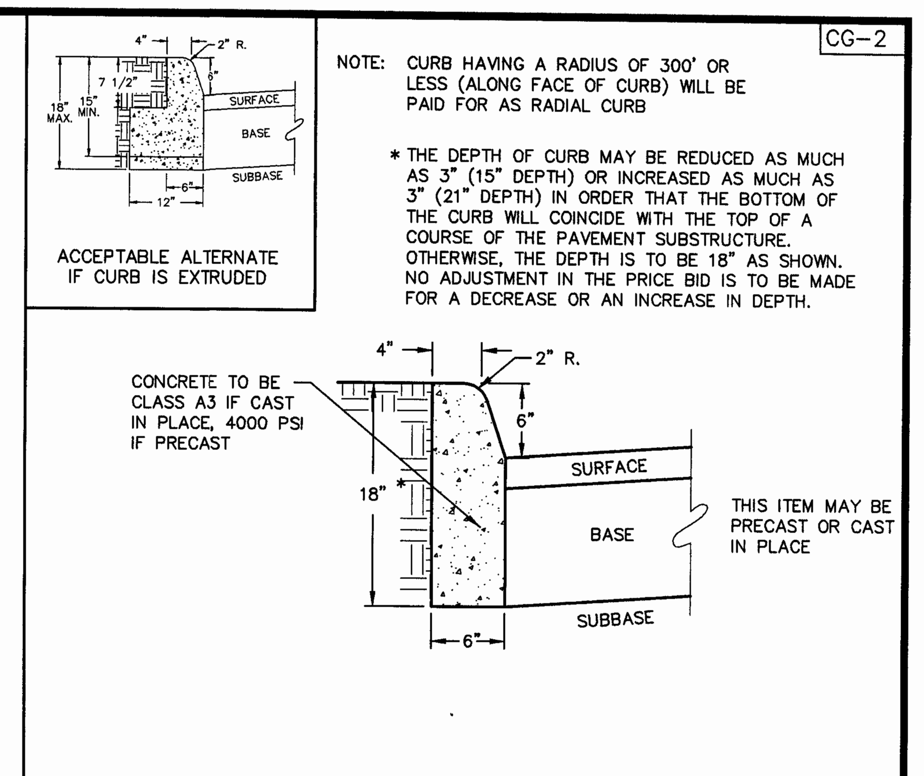


NOTES

1. THE SIGN SHALL BE FABRICATED IN ACCORDANCE WITH SECTION 701 AND INSTALLED PER INSTALLATION DETAIL WSP-1 TYPE C OF THE VDOT ROAD AND BRIDGE STANDARDS AND SPECIFICATIONS.
2. VAN ACCESSIBLE SPACES SHALL HAVE ADDITIONAL SIGNAGE READING "VAN ACCESSIBLE".

HANDICAP SIGN DETAIL

N.T.S.



CG-2

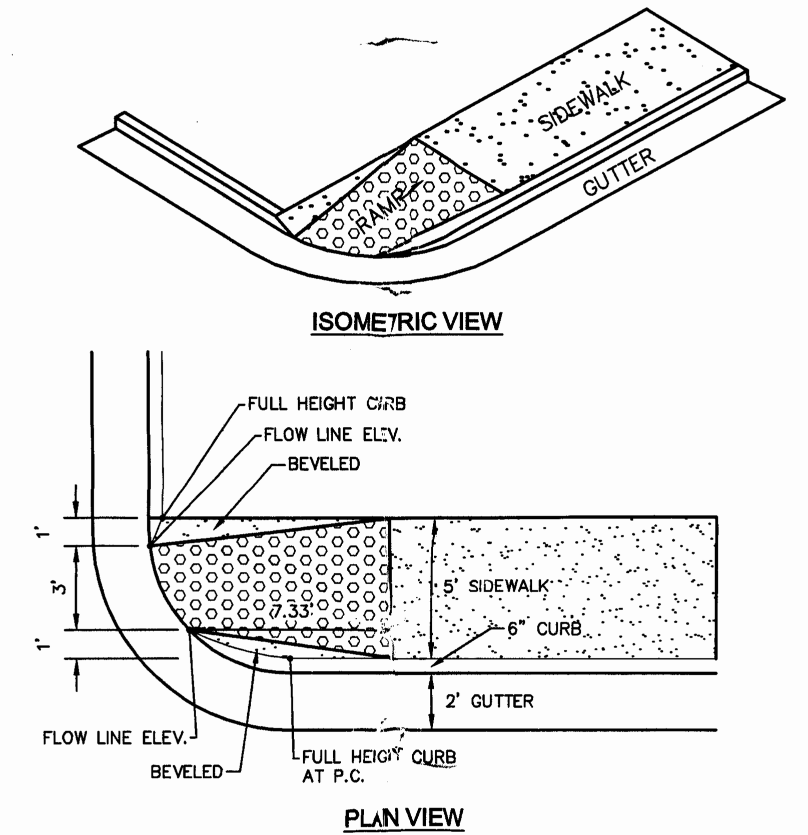
NOTE: CURB HAVING A RADIUS OF 300' OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB

* THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (15" DEPTH) OR INCREASED AS MUCH AS 3" (21" DEPTH) IN ORDER THAT THE BOTTOM OF THE CURB WILL COINCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE, THE DEPTH IS TO BE 18" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.

STANDARD 6" CURB

N.T.S.

D-CG2



MODIFIED CG-12

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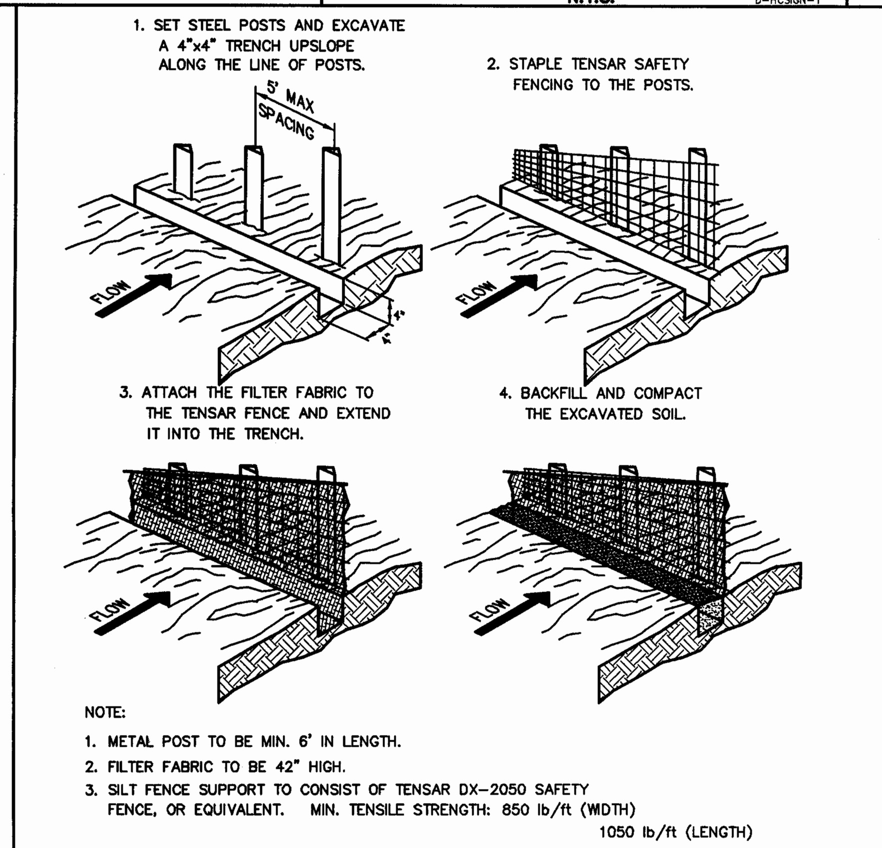


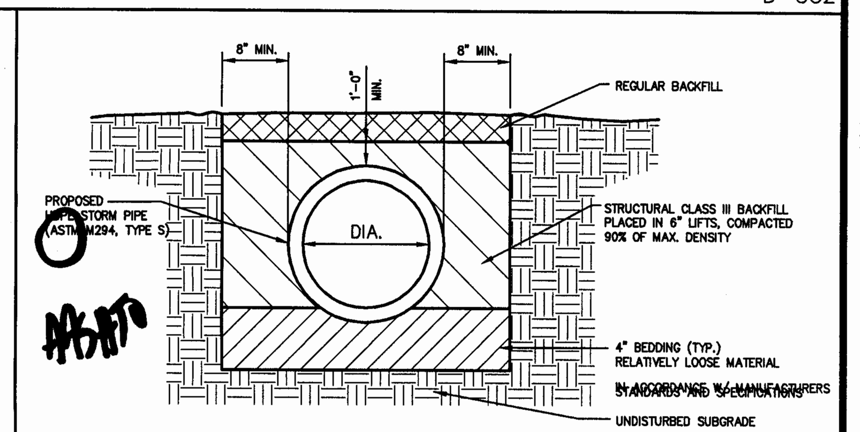
NOTE:

1. METAL POST TO BE MIN. 6' IN LENGTH.
2. FILTER FABRIC TO BE 42" HIGH.
3. SILT FENCE SUPPORT TO CONSIST OF TENSAR DX-2050 SAFETY FENCE, OR EQUIVALENT. MIN. TENSILE STRENGTH: 650 lb/ft (WIDTH) 1050 lb/ft (LENGTH)

(SSF) CONSTRUCTION OF SUPER SILT FENCE (WITH TENSAR SUPPORT)

N.T.S.

D-SSFWW.dwg

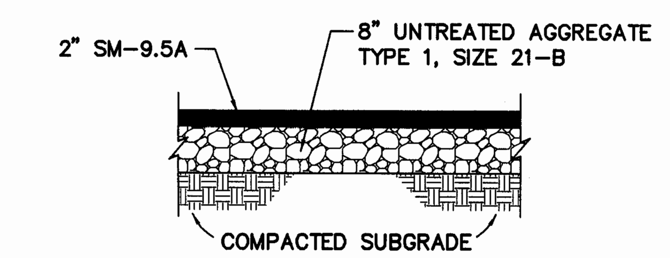


NOTES:

1. CONTRACTOR SHALL MAINTAIN 36" OF COVER OVER ALL HDPE STORM PIPES BEFORE ALLOWING CONSTRUCTION TRAFFIC TO CROSS INSTALLATION.
2. IF UNSUITABLE BACKFILL MATERIAL IS ENCOUNTERED, CONTRACTOR SHALL REPLACE USING CLASS I, II, OR III MATERIAL ONLY.
3. CONTRACTOR SHALL NOT EXCEED FILL HEIGHTS OF 30 FEET.
4. INSTALLATION SHALL BE IN ACCORDANCE WITH ASTM D2321 AND THE CORRUGATED POLYETHYLENE PIPE ASSOCIATION.
5. THIS DETAIL PERTAINS TO STORMWATER CONVEYANCE PIPING ONLY.

PIPE TRENCH AND BEDDING DETAIL

N.T.S.



TYPICAL PAVEMENT SECTION

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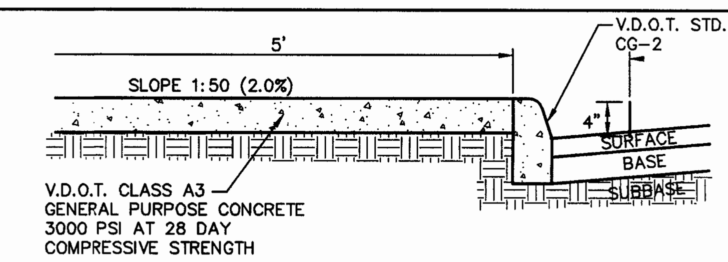


HORIZONTAL CRACK CONTROL JOINTS SHALL BE 5' O.C.

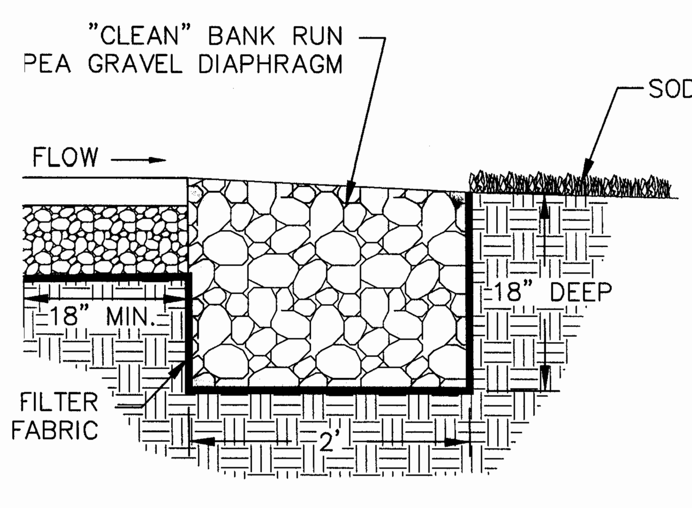
NOTE:

THIS CURB TO BE USED WHEN DESIGN SPEED IS 40 MPH OR LESS ON RURAL HIGHWAYS AND 45 MPH OR LESS IN URBAN AND SUBURBAN AREAS.

SIDEWALK DETAIL

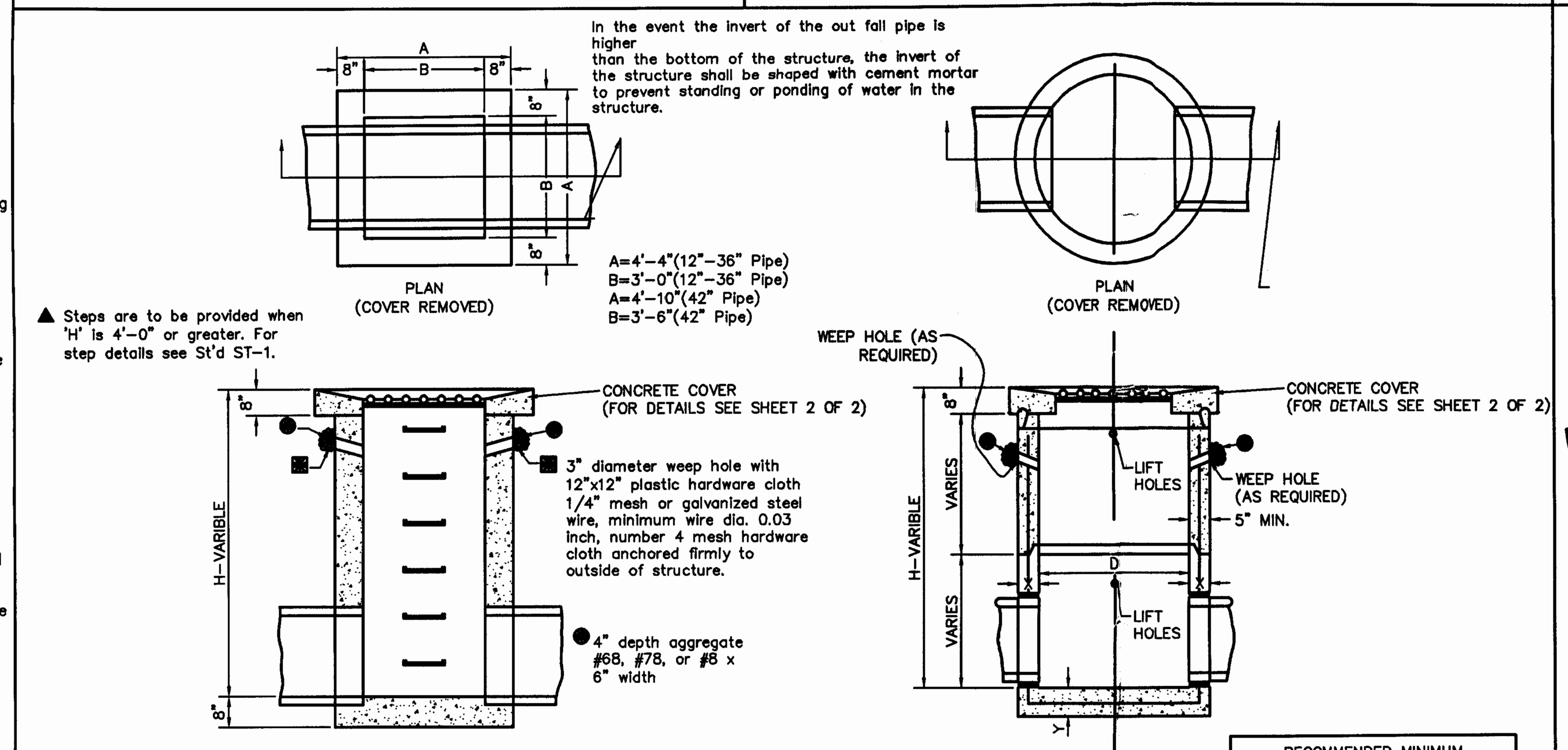
N.T.S.

D-SWCG2.dwg



STONE DIAPHRAGM

N.T.S.



In the event the invert of the out fall pipe is higher than the bottom of the structure, the invert of the structure shall be shaped with cement mortar to prevent standing or ponding of water in the structure.

Pipe Size	12"	15"	18"	24"	30"	36"	42"
Minimum Depth H	2'-0"	2'-3 1/4"	2'-6 1/2"	3'-1"	3'-7 1/2"	4'-2"	4'-8 1/2"
Cu. Yds. Conc.	.947	1.045	1.143	1.339	1.535	1.731	1.927

Increment per foot of additional depth (H) { =0.362 cu. yds. (12"-36" Pipe) =0.410 cu. yds. (42" Pipe)

Reinforcing concrete footing may be pre cast or cast in place. Two lifting hooks of fabricators design to be provided in pre cast footing.

For details of Pre cast DI-7 not shown hereon see Pre cast Unit Assembly Diagram, page 103.01, Pre cast General Notes, page 103.02 and Applicable Pre cast Base, Riser, and Top Details, pages 103.07 thru 103.12.

RECOMMENDED MINIMUM HEIGHT CHART		
PIPE SIZE	H. DIMENSION CONC.	H. DIMENSION CORR. METAL
12"	2'-6"	2'-5"
15"	2'-9 1/4"	2'-8"
18"	3'-1/2"	2'-11"
21"	3'-3 3/4"	3'-2
24"	3'-7"	3'-5"
27"	3'-10 1/4"	3'-8"
30"	4'-1 1/2"	3'-11"
33"	4'-4 3/4"	4'-2"
36"	4'-8"	4'-5"
42"	5'-2 1/2"	4'-11"

DI-7 -- No gutter
DI-7A -- Single gutter when drop inlet is on a grade.
DI-7B -- Double gutter when drop inlet is in a sag between two grades.
The type of inlet detailed hereon to be constructed will be at the option of the contractor.

GENERAL NOTES

When specified on plans the invert is to be shaped in accordance with St'd. IS-1.

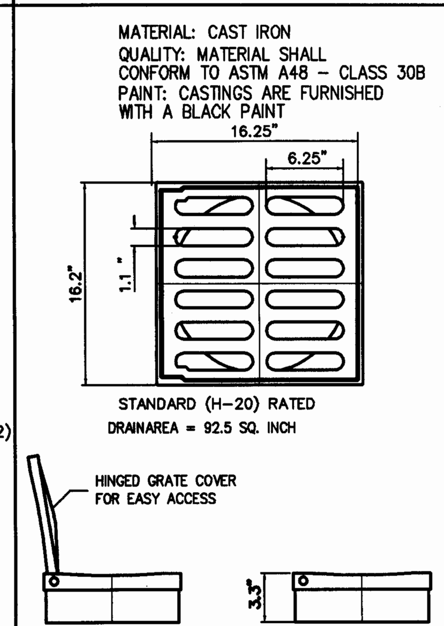
For details of concrete cover, collar and grate, and method of placing approach gutter see sheet 2 of 2.

Increments shown are for inlets without pipes. Pipe displacements must be deducted to obtain true quantities. Paved ditches are to be transitioned to meet inlet gutter as shown in St'd. PG-1.
Safety Slabs are to be provided at 8' minimum and 12' maximum vertical intervals and are to be spaced so as not to conflict with openings for pipes as directed by the Engineer.

STANDARD MEDIAN DROP INLET

N.T.S.

VIRGINIA DEPARTMENT OF TRANSPORTATION



15" CAST IRON GRATE

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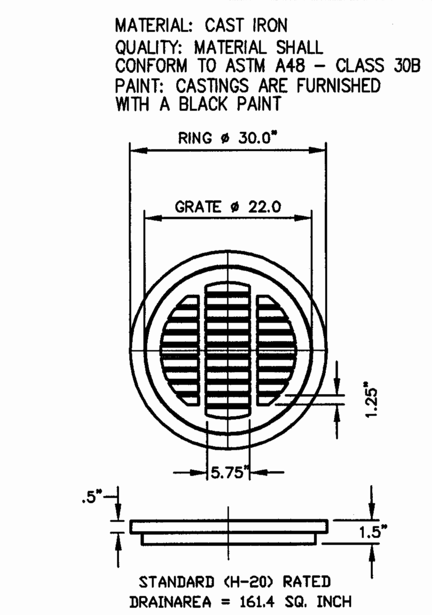
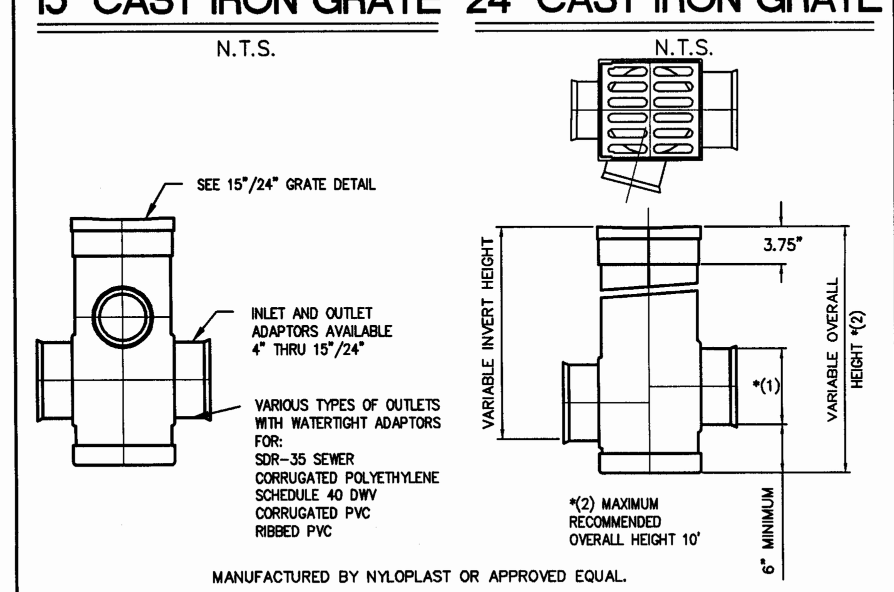


24" CAST IRON GRATE

N.T.S.



15"/24" DRAIN BASIN

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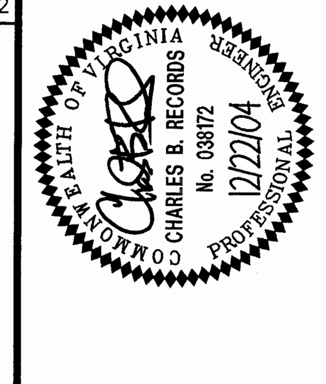

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/21/04	REVISED PER JCC AND JCSA COMMENTS DATED 8/18/04	CBR
2	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR

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

NOTES AND DETAILS

WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.

POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
HWP	AES
Scale	Date
AS SHOWN	8/4/04
Project No.	
9427-0	
Drawing No.	
11	

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

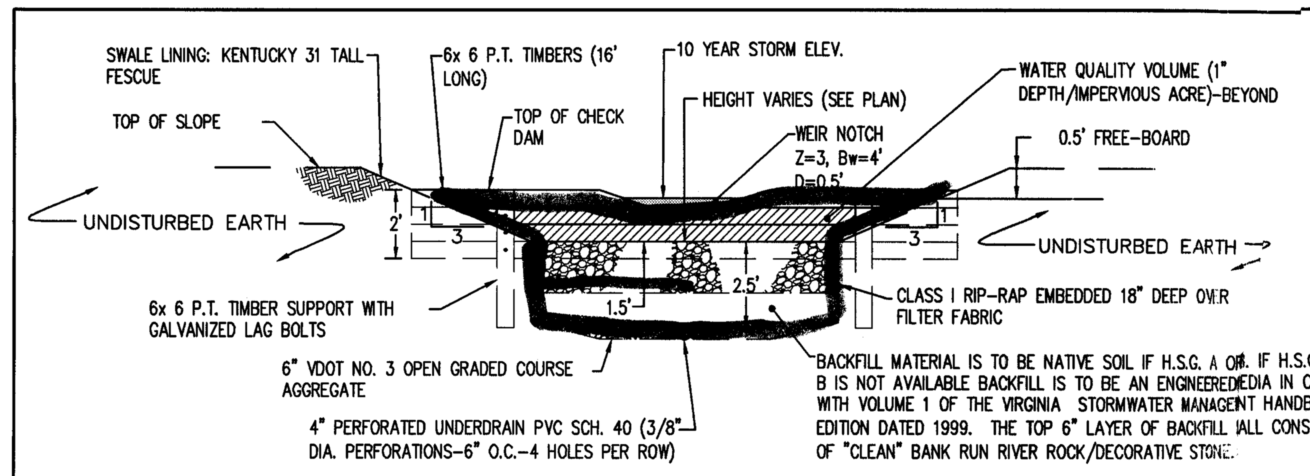
18. TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. TRAPPED SEDIMENT SHALL BE SPREAD, SEEDED AND MULCHED. AFTER THE PROJECT AND STABILIZATION IS COMPLETE, ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS.

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

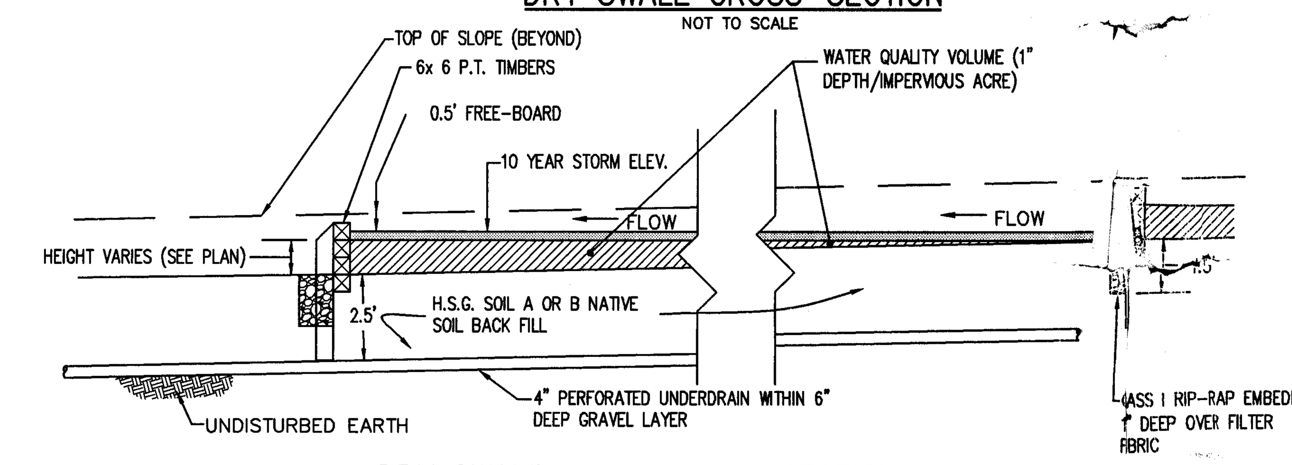
20. RECORD DRAWINGS (AS-BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE BOTH REQUIRED FOR NEWLY CONSTRUCTED OR MODIFIED STORMWATER MANAGEMENT/BMP FACILITIES. CERTIFICATION ACTIVITIES SHALL BE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT VERSION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

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

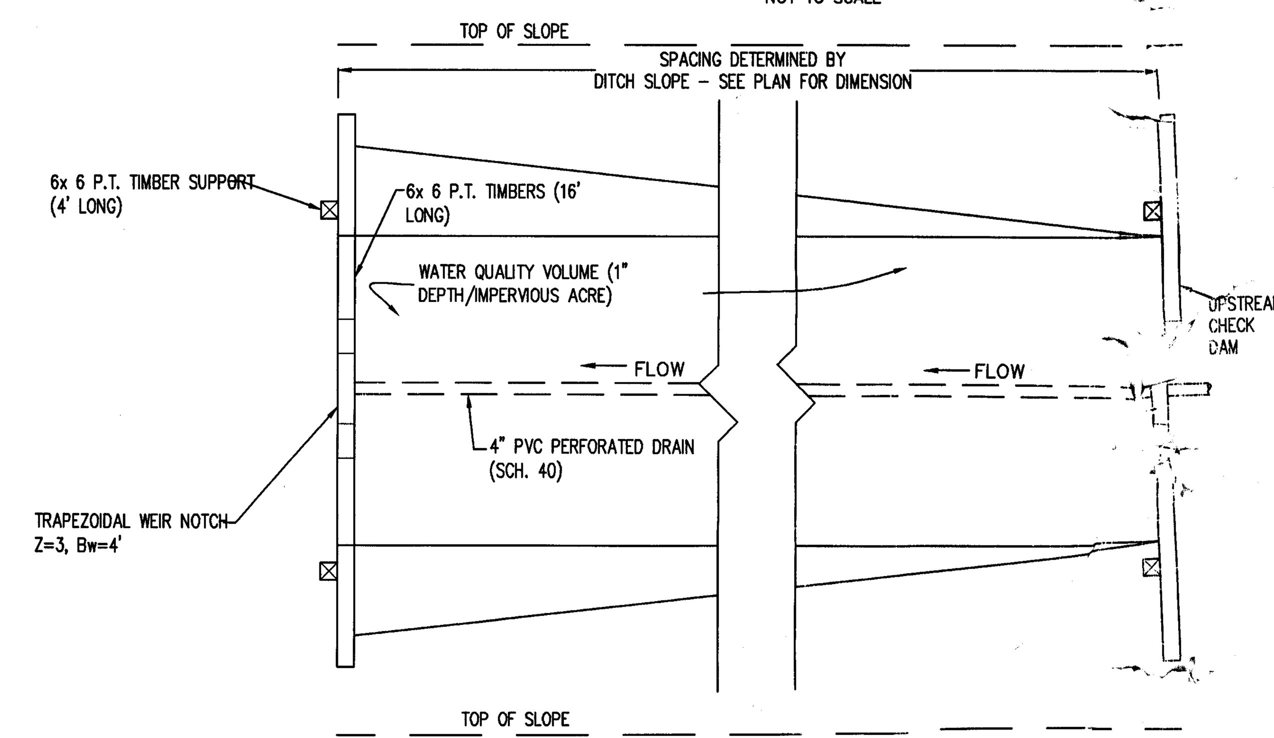
NOTE:
FOR DRY SWALE DETAIL, REFERENCE MINIMUM STANDARD & SPECIFICATION 3.13 OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK AND GROUP E (OPEN CHANNEL SYSTEM) REQUIREMENTS OF THE JAMES CITY COUNTY BMP MANUAL



DRY SWALE CROSS-SECTION
NOT TO SCALE



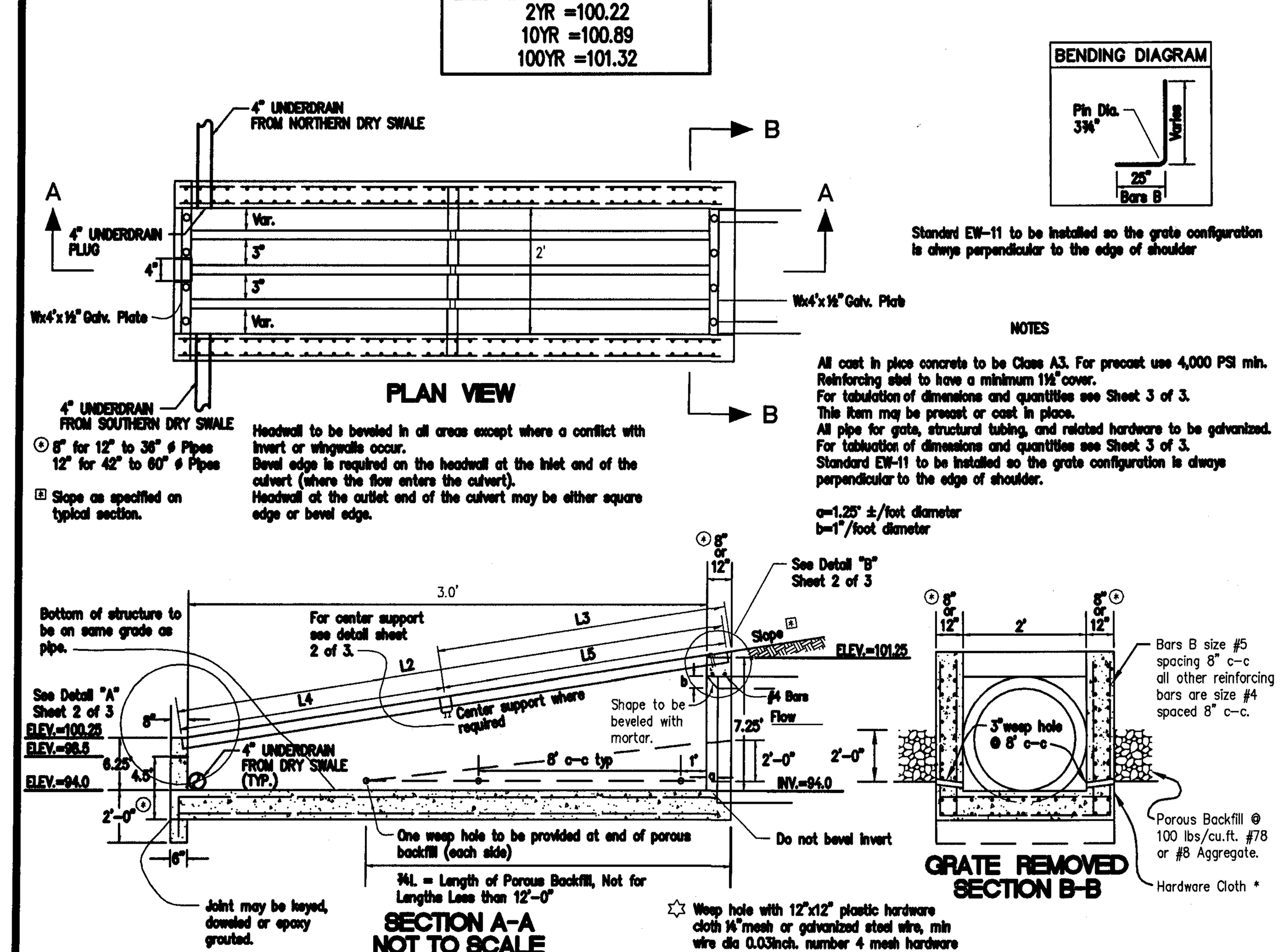
DRY SWALE LONGITUDINAL SECTION
NOT TO SCALE



DRY SWALE - PLAN
NOT TO SCALE

EW-11

STORM HIGHWATER ELEVATIONS
2YR =100.22
10YR =100.89
100YR =101.32



MODIFIED EW-11 OUTLET STRUCTURE
FOR 12"-60" PIPES
VIRGINIA DEPARTMENT OF TRANSPORTATION

101.26

SPECIFICATION REFERENCE
105.04 2.41 302

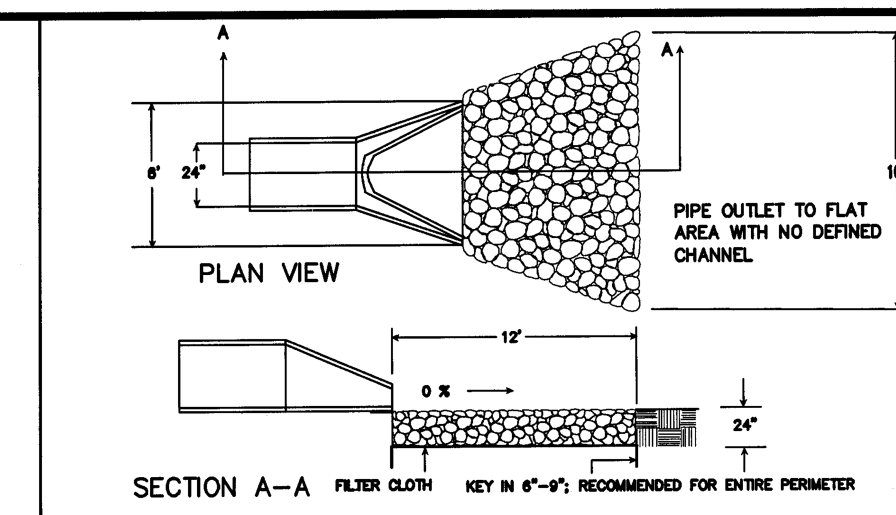
(PS) SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

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

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

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

VA DSWC
PG. III - 304
D-PS



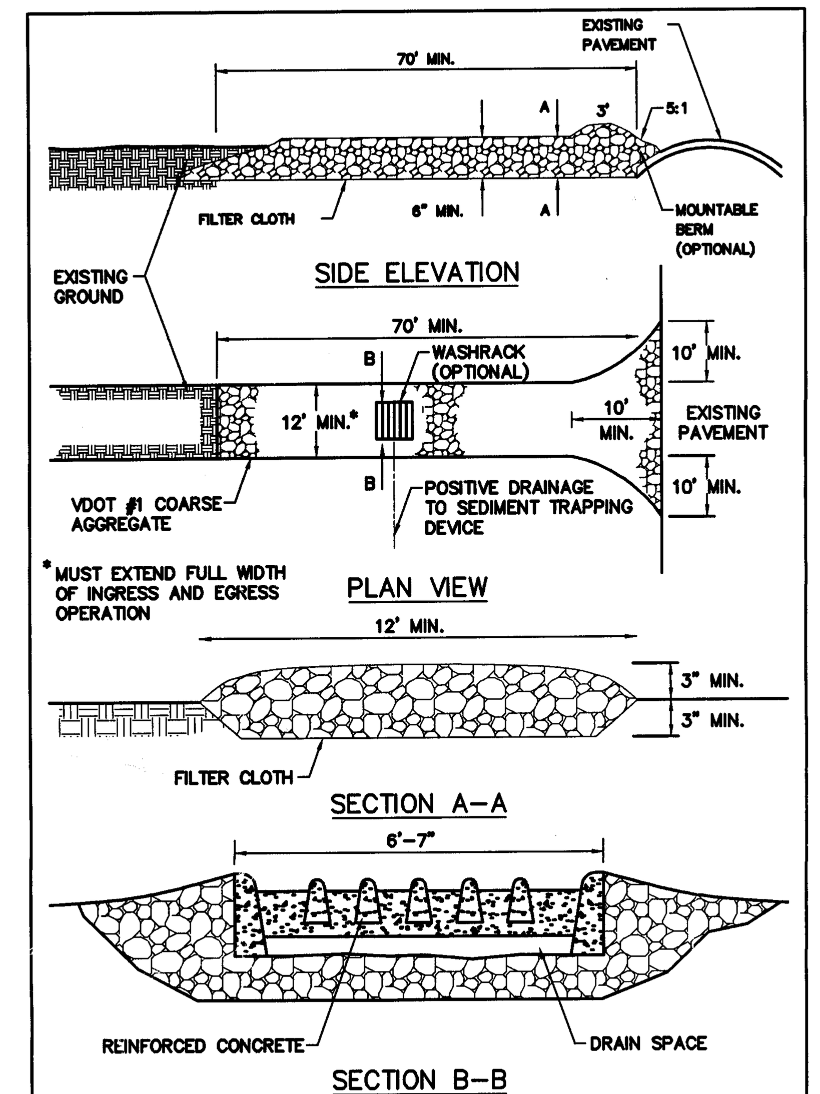
NOTES: 1. APRON LINING WILL BE CLASS I RIPRAP.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18-3 AND 3.18-4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

(OP) PIPE OUTLET CONDITIONS
N.T.S.
SOURCE: VA. DSWC
PLATE. 3.18-1
D-OP.dwg

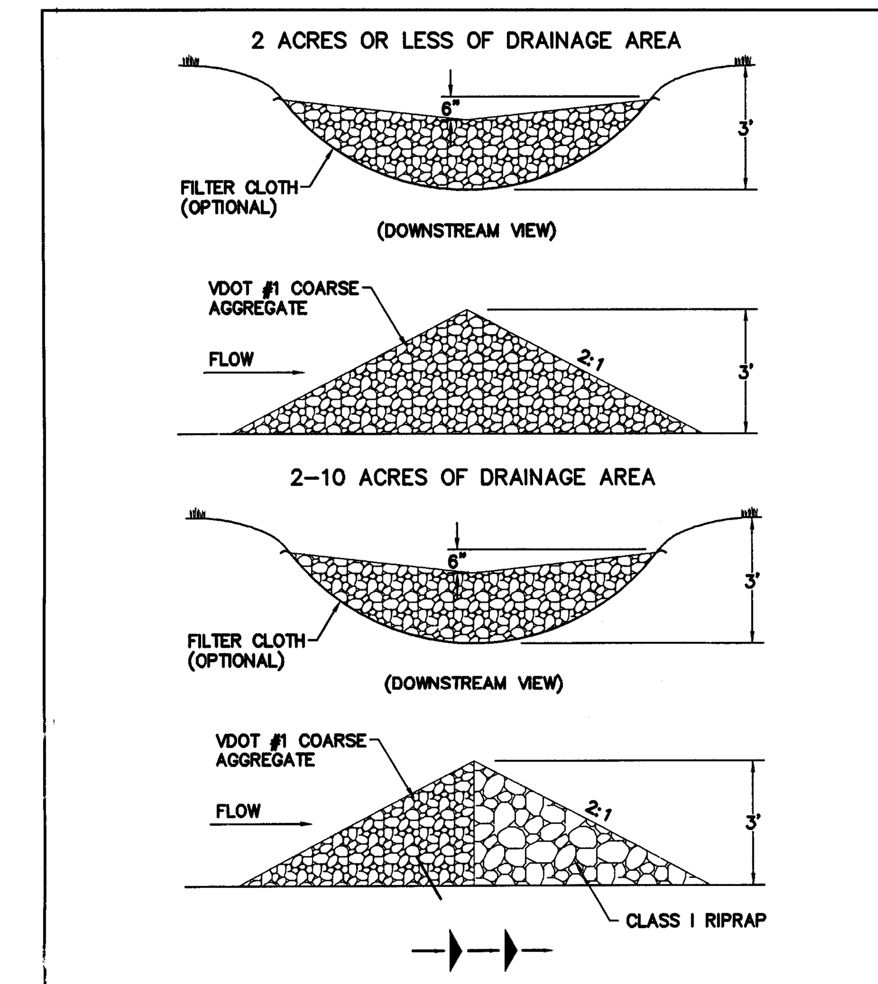
SPECIES	SEEDING RATE		SOUTH[b]			PLANT CHARACTERISTICS
	Acre	1000 ft²	2/15 to 4/30	5/1 to 9/1	9/1 to 11/15	
OATS (Avena sativa)	3 bu. (up to 100 lbs., not less than 50 lbs.)	2 lbs.	X	–	–	Use spring varieties (e.g., Noble).
RYE (Secale cereale)	2 bu. (up to 110 lbs., not less than 50 lbs.)	2.5 lbs.	X	–	X	Use for late fall seedings, winter cover. Tolerates cold and low moisture.
GERMAN MILLET (Setaria italica)	50 lbs.	approx. 1 lb.	–	X	–	Warm-season annual. Dies at first frost. May be added to summer mixes.
ANNUAL RYEGRASS (Lolium multi-florum)	60 lbs.	1-1/2 lbs.	X	–	X	May be added in mixes. Will mow out of most stands.
WEEPING LOVEGRASS (Eragrostis curvula)	15 lbs.	5-1/2 ozs.	–	X	–	Warm-season perennial. May bunch. Tolerates hot, dry slopes and acid, infertile soils. May be added to mixes.
KOREAN LESPEDEZA (Lespedeza stipulacea)	25 lbs.	approx. 1-1/2 lbs.	X	X	–	Warm-season annual legume. Tolerates acid soils. May be added to mixes.

SOUTHERN PIEDMONT AND COASTAL PLAIN.
MAY BE USED AS A COVER CROP WITH SPRING SEEDING.
MAY BE USED AS A COVER CROP WITH FALL SEEDING.
MAY BE PLANTED BETWEEN THESE DATES.
MAY NOT BE PLANTED BETWEEN THESE DATES.

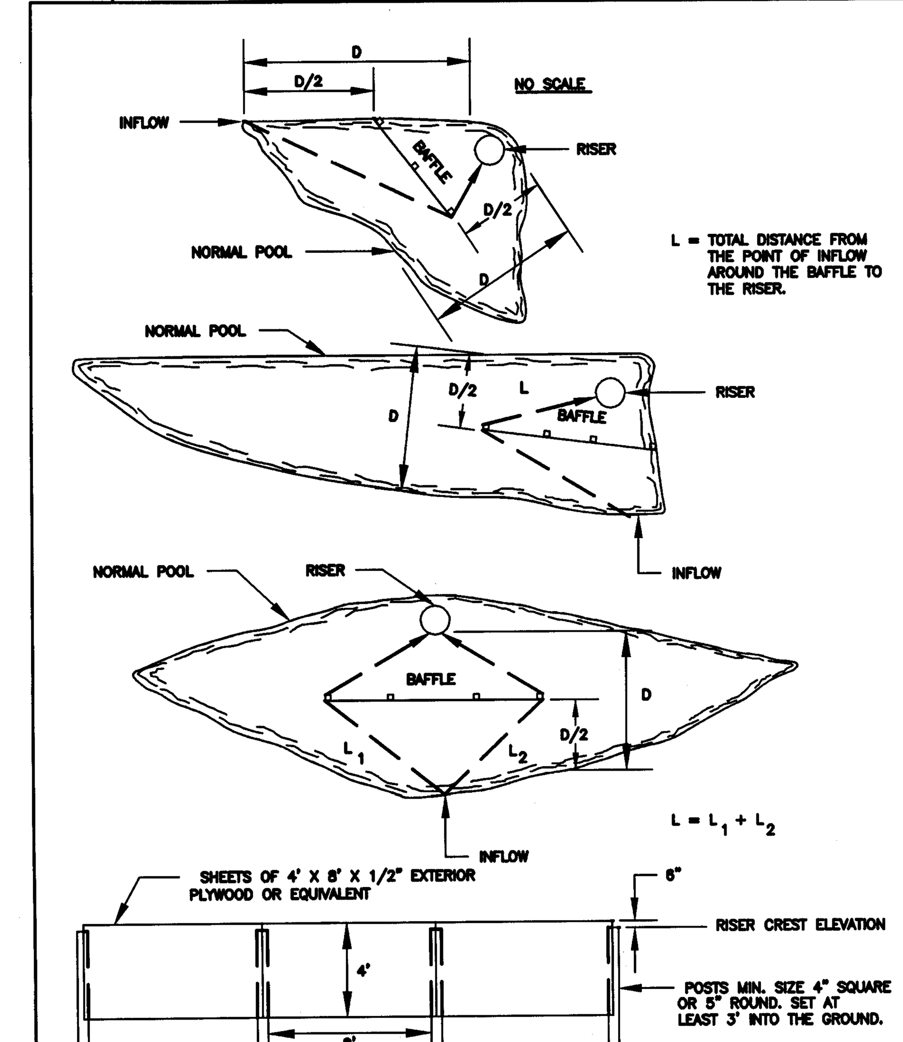
(TS) TEMPORARY SEEDING
N.T.S.
SOURCE: VA. DSWC
TABLE 3.3-C
d-ts.dwg



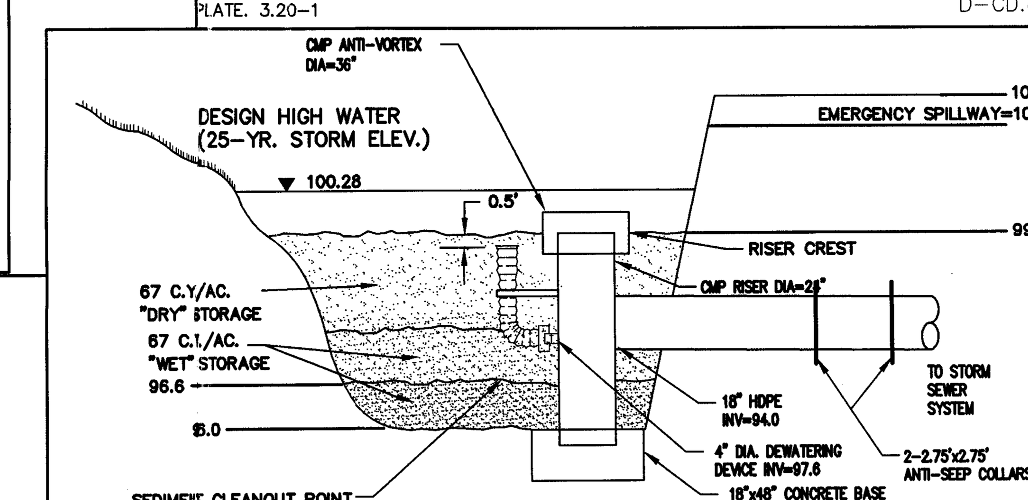
(CE) STONE CONSTRUCTION ENTRANCE
N.T.S.
SOURCE: VA. DSWC
PLATE. 3.02-1
D-CE.dwg



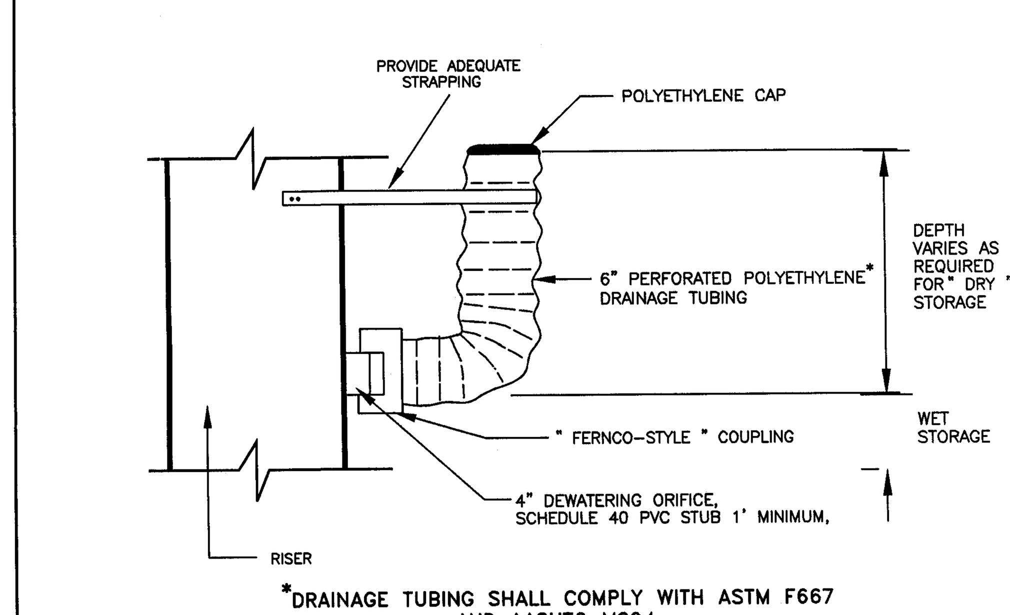
(CD) ROCK CHECK DAM
N.T.S.
SOURCE: VA. DSWC
PLATE. 3.20-1
D-CD.dwg



EXAMPLE PLAN VIEWS OF BAFFLE LOCATIONS IN SEDIMENT BASINS
N.T.S.
SOURCE: USDA SCS
PLATE. 3.14-6
D-BAFFLE



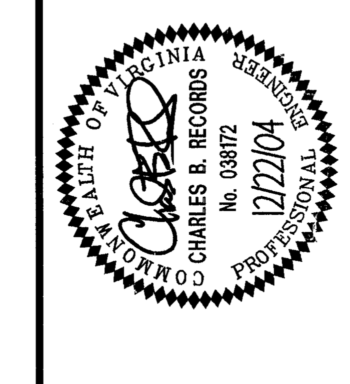
(SB) SEDIMENT BASIN #1 SCHEMATIC ELEVATIONS
N.T.S.
SOURCE: VA. DSWC
PLATE. 3.14-1
D-SB.dwg



*DRAINAGE TUBING SHALL COMPLY WITH ASTM F667 AND AASHTO M294

TYPICAL DEWATERING DEVICE
SOURCE: VA. DSWC
PLATE. 3.14-15

No.	DATE	REVISION / COMMENT / NOTE	BY
2	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR
1	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR



AES CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-9994

NOTES AND DETAILS

WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
HWP	AES
Scale	Date
NOTED	8/4/04
Project No.	
9427-0	
Drawing No.	
12	

S:\Jobs\9427\00-ADI 4 ac. Centerville Road\dwg\Cad\9427OC12.dwg, 12/22/2004 1:42:40 PM, lba

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 023

LONGHILL GROVE

BURTON WOODS

WARHILL GREEN

MULBERRY PLACE

BUILDING PAD
FF ELEV = 104.00
10 UNITS

8
0.15
AC.

5
0.10
AC.

3
0.14
AC.

7
0.61
AC.

6
1.01
AC.

4
0.60
AC.

2
0.14
AC.

1
0.20
AC.

C=0.51

C=0.69

C=0.40

C=0.44

C=0.49

N OR F
MULBERRY PLACE
SUBDIVISION
T.M.# (31-3)13-18
ZONING R-2

EXISTING DWELLING

EXISTING DWELLING

BRICK PATIO

TIMBER LINED MULCH BED

MULCH BED

CONC WALK

C/L GRASS DITCH

SAN MH
RIM=98.52
INV=90.90

STM DI
TOP=98.62
INV=94.85

CONC DRIVE

MULBERRY LANE

5' BARBED WIRE FENCE

6' WOODEN FENCE OVER P/L

WOODEN FENCE

S' PICKET FENCE

IPF

IP

DOESN'T REFLECT REQ'D. CONDITIONS BUT THIS TC WOULD BE QUICKER, THUS MORE CONSERVATIVE.

THE ON-SITE PRE AND POST DEVELOPMENT DRAINAGE AREAS ARE SHOWN ON THE CONSTRUCTION PLANS.

GRAPHIC SCALE
60' 0' 60' 120'
SCALE: 1" = 60'

N

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/21/04	REVISED PER JCC COMMENTS DATED ??	CBR

COMMONWEALTH OF VIRGINIA
CHARLES B. RICHARDS
No. 036172
10/21/04
PROFESSIONAL ENGINEER

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

OFFSITE DRAINAGE MAP
WARHILL GREEN
OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
TRS/HEB	RMS
Scale	Date
1"=60'	8/4/04
Project No.	
9427-0	
Drawing No.	
1	

LONGHILL GROVE

BURTON WOODS

WARHILL GREEN

MULBERRY PLACE

BUILDING PAD
FF ELEV = 104.00
10 UNITS

8
0.15 AC.

5
0.10 AC.

3
0.14 AC.

7
0.61 AC.

6
1.01 AC.

4
0.60 AC.

2
0.14 AC.

1
0.20 AC.

C=0.51

C=0.69

C=0.40

C=0.44

C=0.49

1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8

21 20 19 18 17

5' WOODEN FENCE ALONG P/L

8' WOODEN FENCE

3'-RAIL FENCE

TIMBER LINED MULCH BED

BRICK PATIO

MULCH BED

GRASS DITCH

CONC DRIVE

SAN MH
RIM=98.52
INV=90.90

DROP INLET
TOP=96.62
INV=94.85

DOESN'T REFLECT RESID. CONDITIONS BUT THIS TC WOULD BE QUICKER, THUS MORE CONSERVATIVE.

THE ON-SITE PRE AND POST DEVELOPMENT DRAINAGE AREAS ARE SHOWN ON THE CONSTRUCTION PLANS.

N

GRAPHIC SCALE

60' 0' 60' 120'

SCALE: 1" = 60'

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE_2005

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/21/04	REVISED PER JCC COMMENTS DATED 9/7	CBR

COMMONWEALTH OF VIRGINIA
CHARLES H. BROWN
No. 13817
REGISTERED
PROFESSIONAL ENGINEER
10/21/04

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CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

OFFSITE DRAINAGE MAP
WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.

POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
TRS/HEB	RMS
Scale	Date
1"=60'	8/4/04
Project No.	
9427-0	
Drawing No.	
1	

NOTE: 6' HIGH, 3:1 SS GRASS BERM SHALL BE PROVIDED ON THE DOWNSTREAM SIDE OF PROPOSED DI-7 INLETS. BERMS SHALL BE CONSTRUCTED WITHIN EASEMENT ONLY.

SS #1-3
24" NYLOPLAST BASIN STANDARD GRATE
TOP=89.31
INV IN=86.31(24")
INV IN=86.31(15")
INV OUT=86.21

SS #1-5
VDOT STD DI-7
TOP=97.88
INV=92.87

70 LF OF 18" HDPE @ 1.61%

91 LF OF 24" HDPE @ 1.00%

SS #1-4
VDOT STD DI-7
TOP=94.96
INV IN=91.96
INV OUT=91.86

167 LF OF 24" HDPE @ 3.32%

20 LF OF 15" HDPE @ 1.00%

159 LF OF 24" HDPE @ 3.28%

SS #1-2
VDOT STD DI-7
TOP=84.31
INV IN=81.00(24")
INV IN=81.00(15")
INV OUT=80.90

59 LF OF 24" HDPE @ 6.61%

LIMITS OF WETLANDS

SS #1-1
24" ES-1
INV=77.00

40 LF OF 15" HDPE @ 1.00%

(OP) (SEE DETAIL ON SHEET 12)

SS #1-3A
VDOT STD DI-7
TOP=89.51
INV=86.51

SS #1-6
VDOT STD DI-7
TOP=85.28
INV IN=81.50
INV OUT=81.40

SS #1-7
15" NYLOPLAST BASIN STANDARD GRATE
TOP=90.00
INV IN=87.0
INV OUT=86.9

84 LF OF 15" HDPE @ 6.43%

SS #1-8
(CAST-IN-PLACE)
VDOT STD DI-3B, L=6'
TOP=98.74
INV=95.27

23 LF OF 15" HDPE @ 1.00%

EX SS#1-2: STM DI TOP=98.54 INV=95.04
NEW IN=95.04
NEW IN=95.29
EX. 125 LF OF 15" STM SEWER @ 0.54%

98 LF OF 15" HDPE @ 8.47%

SAN MH #7
RIM=98.52
INV=90.90
INV=91.0 (4")

SAN MH
RIM=85.62
INV=79.82

10' DRAINAGE AND UTILITY EASEMENT

5' MIN. SEPARATION

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

(SEE GENERAL NOTE #1)

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

LIMITS OF DISTURBANCE DURING ROAD AND UTILITY CONSTRUCTION

N OR F MULBERRY PLACE SUBDIVISION
PB. 82, PG. 12-15
ZONING: R-2

LOT 22 EXISTING DWELLING

LOT 23 EXISTING DWELLING

LOT 24

LOT 29C

LOT 29B

LOT 15D

SEE SHEET 5 FOR CONTINUATION OF ON-SITE DRAINAGE SYSTEM

A MINIMUM HORIZONTAL CLEARANCE OF 5' SHALL BE MAINTAINED BETWEEN THE PROPOSED CURB INLET AND THE EXISTING WATERLINE.

REMOVE/REPLACE EXPOSED AGGREGATE CONCRETE DRIVEWAY APPROX. 17' FROM BC TO EX. JOINT

REMOVE/REPLACE SIDEWALK

REMOVE/RELOCATE MAILBOX

REMOVE/REPLACE APPROX. 39 LF OF ROLL TOP CURB AND GUTTER

EX. 20' JCSA UTILITY EASEMENT

TIMBER LINED MULCH BED

BRICK PATIO

3' PICKET FENCE

8' WOODEN FENCE

6' WOODEN FENCE OVER R/W

BARBED WIRE FENCE ALONG P/L

IPF BENT

IRS

C/L GRASS DITCH

CONC DRIVE

CONC WALK

MULBERRY LANE (PUBLIC 50' R/W)

GRAPHIC SCALE
20' 0' 20' 40'
SCALE: 1" = 20'

N

NOTE: 1. UPON PIPE INSTALLATION ALONG THE LOT 23 PROPERTY LINE, A 6" DEEP, 3:1 SS GRASS SWALE SHALL BE PROVIDED ABOVE THE PIPE TO DRAIN TO SS #1-6.

2. SEE SHEET 11 FOR HDPE PIPE INSTALLATION DETAILS.

3. PROVIDE PIPE CONNECTION TO D.I. STRUCTURES PER VDOT ROAD AND BRIDGE STANDARDS.

4. SEE SHEET 2 FOR SOIL LEGEND.

5. ALL VDOT DI-7 GRATES SHALL BE TYPE III. (PEDESTRIAN SAFE)

6. ANY TREES THAT ARE REMOVED OR DIE, DUE TO THE OFF-SITE DRAINAGE SYSTEM CONSTRUCTION, SHALL BE REPLACED AT A 5:1 (NEW:EXISTING) RATIO. MATERIAL TO BE PLANTED SHALL BE AS SPECIFIED ON SHEET 9 IN THE TREE SECTION OF THE PLANT SCHEDULE. (ONE KNOWN TREE MUST BE REMOVED).

OFF-SITE STORM SEWER SS #1-5 TO SS #1-1

SCALE IN FEET: 1"=5' (vertical), 1"=20' (horizontal)

70 1.61% 18" HDPE
91 1.00% 24" HDPE
167 3.32% 24" HDPE
159 3.28% 24" HDPE
59 6.61% 24" HDPE

EXISTING GRADE
PROPOSED GRADE

SS #1-5 STA. 10+00.0 0.00' LT RIM=97.88 INV=92.87
SS #1-4 STA. 11+70.51 RIM=94.96 INV IN=91.96 INV OUT=91.86
SS #1-3 STA. 12+57.62 RIM=89.31 INV IN=86.31(24") INV IN=86.31(15") INV OUT=86.21
SS #1-2 STA. 13+76.63 RIM=84.31 INV IN=81.00(24") INV IN=81.00(15") INV OUT=80.90
SS #1-1 STA. 14+75.63 INV=77.00

10+00 + 11+00 + 12+00 + 13+00 + 14+00 +

OFF-SITE STORM SEWER SS #1-7 TO SS #1-2

SCALE IN FEET: 1"=5' (vertical), 1"=20' (horizontal)

23 1.00% 15" HDPE
98 8.47% 15" HDPE
84 6.43% 15" HDPE
40 1.00% 15" HDPE

EXISTING GRADE

EX. 4" G.S. INV.=91.3±
EX. 4" G.S. INV.=83.4±

SAN MH #8 STA 10+00 RIM=98.74 INV OUT=95.27
EX. SS #1-2 (1.00% S=35.00') STA 10+35.00 RIM=98.54
NEW INV IN=95.04
NEW INV OUT=95.29
(INLET TO BE RESHAPED TO DIVERT DRAINAGE FROM SS #1-8 THROUGH NEW INLET ON LINE TO RETAIN SAME FLOW PATH)
SAN MH #7 STA 11+84.24 RIM=90.64 INV IN=87.00 INV OUT=86.90
SS #1-6 STA 12+41.05 RIM=85.28 INV IN=81.50 INV OUT=81.40
SS #1-5 STA 12+81.44 RIM=84.31 INV IN=81.00(24") INV IN=81.00(15") INV OUT=80.90

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

EROSION AND SEDIMENTATION CONTROL LEGEND

THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING OFFSITE DRAINAGE CONSTRUCTION.

- (SAF) SAFETY FENCE (SPEC. 3.01)
- (SB) SEDIMENT BASIN (SPEC. 3.14)
- (CE) CONSTRUCTION ENTRANCE (SPEC. 3.02)
- (OP) OUTLET PROTECTION (SPEC. 3.18)
- (SSF) SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)
- (CD) ROCK CHECK DAMS (SPEC. 3.20)
- (IP) STORM DRAIN INLET PROTECTION (SPEC. 3.07)
- (PS) PERMANENT SEEDING (SPEC. 3.32)
- (DD) TEMPORARY DIVERSION DIKE (SPEC 3.09)
- (DC) DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

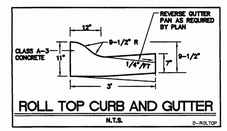
GENERAL NOTES:

1. LOT 23 SANITARY SEWER LATERAL SHALL BE EXPOSED BY THE CONTRACTOR AND COMFIRM WITH THE DESIGN ENGINEER THAT PROPER CLEARANCES WILL BE MAINTAINED AT THE CROSSING OF THE PROPOSED STORM SEWER SYSTEM. CLEARANCE SHALL BE VERIFIED BY JCSA INSPECTORS PRIOR TO STORM SEWER INSTALLATION.

2. THE PRIMARY EROSION AND SEDIMENT CONTROL MEASURE FOR THE OFFSITE UTILITY LINE INSTALLATION WILL BE RAPID INSTALLATION AND STABILIZATION IN ACCORDANCE WITH MINIMUM STANDARD #16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

3. IF PROPOSED INLET PROTECTION MEASURES RESULT IN UNDESIRED YARD OR PROPERTY FLOODING, THESE MEASURES MAY BE REMOVED WITH THE APPROVAL OF THE ASSIGNED ENVIRONMENTAL DIVISION INSPECTOR.

4. IN ORDER TO PROTECT THE SAFETY OF THE PUBLIC A SAFETY FENCE, IN ACCORDANCE WITH MINIMUM STANDARD AND SPEC. 3.01 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, SHALL BE INSTALLED IN CASES WHERE OVERNIGHT OR PROLONGED INLET OR UTILITY TRENCH EXCAVATIONS OCCUR.



ROLL TOP CURB AND GUTTER
N.T.S. D-ROLTOP

No.	DATE	REVISION / COMMENT / NOTE	BY
2	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR
1	10/21/04	REVISED PER JCC COMMENTS DATED 9/18/04	CBR

COMMONWEALTH OF VIRGINIA — CHARLES B. RICORDS — No. 038172 — PROFESSIONAL ENGINEER — 12/22/04

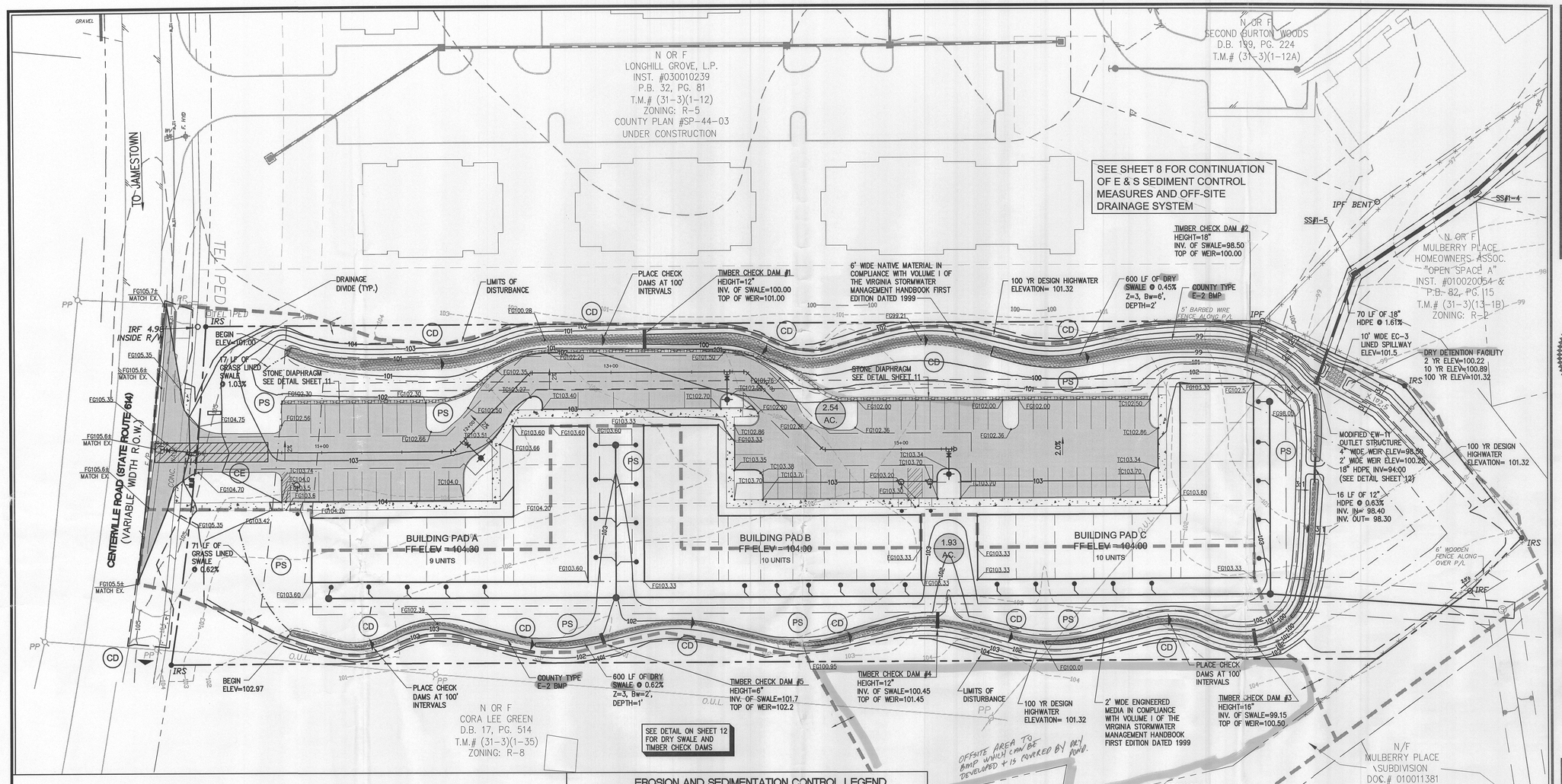
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994
CONSULTING ENGINEERS

OFF-SITE STORM SEWER PLAN AND PROFILE
WARHILL GREEN
OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
TRS/HEB	RMS
Scale	Date
NOTED	8/4/04
Project No.	
9427-0	
Drawing No.	
8	

S:\Jobs\9427\00-ADI 4 sec. Centerville Road\dwg\Cad\9427OC08.dwg, 12/22/2004 2:15:49 PM, tba

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 026



EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION:

THE PROPOSED WARHILL GREEN SITE CONSISTS OF 3.70 ACRES LOCATED APPROXIMATELY 800 FEET SOUTH OF THE INTERSECTION OF LONGHILL ROAD (ROUTE 612) AND CENTERVILLE ROAD (ROUTE 614) IN JAMES CITY COUNTY, VIRGINIA. THIS DEVELOPMENT WILL INCLUDE THREE MULTI-UNIT BUILDINGS AND A PARKING LOT.

EXISTING SITE CONDITIONS:

THE SITE IS CURRENTLY DEVOID OF TREES AND CONSISTS OF MOSTLY DENSE, HEAVY GRASS. THE TERRAIN IS FLAT TO GENTLY SLOPING. STORMWATER RUNOFF FLOWING TO THE NORTH OF THE SITE FLOWS INTO A PROPOSED DITCH DESIGNED FOR LONGHILL GROVE. RUNOFF FLOWING SOUTH OF THE SITE SHEETS OFF ONTO ADJACENT PROPERTY. THE REST OF THE RUNOFF FLOWS NORTHEAST INTO A NATURAL CHANNEL BEHIND MULBERRY PLACE.

ADJACENT AREAS:

LONGHILL GROVE (UNDER CONSTRUCTION) IS LOCATED TO THE NORTH OF THE PROJECT SITE. TO THE SOUTH AND EAST IS MULBERRY PLACE AND OTHER RESIDENTIAL PROPERTIES.

OFF-SITE AREAS:

THE BMP OUTFALL PIPE SYSTEM REQUIRES WORK OFFSITE. TO THE SOUTHEAST, APPROXIMATELY 30' OF SANITARY SEWER PIPE WILL BE LOCATED OUTSIDE OF THE PROJECT AREA TO CONNECT WITH AN EXISTING SANITARY MANHOLE. APPROXIMATELY 900 S.F. OF THE PROPOSED ENTRANCE IS LOCATED OUTSIDE OF THE PROPERTY LINE AS THE PARKING LOT CONNECTS TO CENTERVILLE ROAD. FINALLY, TWO EXISTING ENTRANCES JUST OUTSIDE THE PROJECT AREA WILL NEED TO BE REMOVED.

SOILS:

THE SOIL CONSERVATION SERVICE HAS IDENTIFIED THIS SITE AS CONTAINING SOIL TYPES "11C", "29B", "18B" AND "19B" (SEE SHEETS 2 AND 8 OF THE PLANS FOR MORE INFORMATION ON THESE SOILS).

CRITICAL AREAS:

THERE ARE NO 25% OR GREATER SLOPES ON THE SITE, HOWEVER, THERE IS APPROXIMATELY 0.07 ACRES OF HIGHLY ERODABLE SOILS ON THE SITE LOCATED PREDOMINANTLY ALONG THE PROPERTY LINES.

EROSION AND SEDIMENT CONTROL MEASURES:

SILT FENCE AND CHECK DAMS HAVE BEEN PROVIDED TO PREVENT SILT-LADEN RUNOFF FROM REACHING ADJOINING AREAS. A SEDIMENT BASIN WILL BE PLACED AT THE ON-SITE OUTFALL WHICH THEN CONNECTS TO THE PROPOSED OFF-SITE DRAINAGE PIPE SYSTEM.

PERMANENT STABILIZATION:

PERMANENT SEEDING WILL BE USED TO STABILIZE THE SITE AFTER CONSTRUCTION IS COMPLETE. A SCHEDULE HAS BEEN PROVIDED ON SHEET 12.

STORMWATER RUNOFF CONSIDERATIONS:

STORMWATER MANAGEMENT FOR THE PROPOSED PROJECT WILL BE ACHIEVED THROUGH THE USE OF TWO DRY SWALES LOCATED TO THE NORTH AND SOUTH OF THE SITE. THE SWALES WILL DETAIN POST-DEVELOPMENT STORMWATER RUNOFF THROUGH FILTRATION TO A 4" PERFORATED UNDERDRAIN AND BY AN OUTLET STRUCTURE AT THE OUTFALL OF THE SITE.

EROSION AND SEDIMENTATION CONTROL LEGEND

THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING ROAD AND UTILITY CONSTRUCTION.

- (SAF) SAFETY FENCE (SPEC. 3.01)
- (CE) CONSTRUCTION ENTRANCE (SPEC. 3.02)
- (SSF) SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)
- (IP) STORM DRAIN INLET PROTECTION (SPEC. 3.07)
- (DD) TEMPORARY DIVERSION DIKE (SPEC 3.09)
- (SB) SEDIMENT BASIN (SPEC. 3.14)
- (OP) OUTLET PROTECTION (SPEC. 3.18)
- (CD) ROCK CHECK DAMS (SPEC. 3.20)
- (PS) PERMANENT SEEDING (SPEC. 3.32)
- (DC) DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

No.	DATE	REVISION / COMMENT / NOTE	BY
2.	12/22/04	REVISED PER JCC AND JCSA COMMENTS DATED 11/29/04	CBR
1.	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR

COMMONWEALTH OF VIRGINIA
CHARLES B. REDDOCK
No. 038172
PROFESSIONAL ENGINEER
12/22/04

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

DRAINAGE, GRADING, AND EROSION AND SEDIMENT CONTROL PLAN
WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC.
POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed TRS	Drawn HEB
Scale 1"=30'	Date 8/4/04
Project No. 9427-0	
Drawing No. 5	

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PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 027

NOTE: 6" HIGH, 3:1 SS GRASS BERM SHALL BE PROVIDED ON THE DOWNSTREAM SIDE OF PROPOSED DI-7 INLETS. BERMS SHALL BE CONSTRUCTED WITHIN EASEMENT ONLY.

BARBED WIRE ALONG P/L

8' WOODEN FENCE

SS #1-5
VDOT STD DI-7
TOP=~~97.86~~ 97.66
INV=~~92.87~~ 92.81

70 LF OF ~~75~~ 18" HDPE @ ~~1.11%~~ 1.69%

91 LF OF ~~91~~ 24" HDPE @ ~~1.00%~~ 1.09%

SS #1-4
VDOT STD DI-7
TOP=~~94.06~~ 94.82
INV IN=~~91.86~~ 91.82
INV OUT=~~91.86~~ 91.82

167 LF OF ~~177~~ 15" HDPE @ ~~3.72%~~ 3.42%

10' DRAINAGE AND UTILITY EASEMENT

SS #1-3
24" NYLOPLAST BASIN
STANDARD GRATE
TOP=~~89.31~~ 89.36
INV IN=~~86.31~~(24") 86.11
INV IN=~~86.31~~(15") 86.11
INV OUT=~~86.21~~ 86.11

19 LF OF ~~20~~ 15" HDPE @ ~~1.00%~~ 2.89%

SS #1-3A
VDOT STD DI-7
TOP=~~89.51~~ 89.26
INV=~~86.51~~ 86.66

N OR F
MULBERRY PLACE
SUBDIVISION
PB. 82. PG. 12-15
ZONING: R-2

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

EXISTING DWELLING

DURING ROAD AND UTILITY CONSTRUCTION

SEE SHEET 5 FOR CONTINUATION OF ON-SITE DRAINAGE SYSTEM

SS #1-7
15" NYLOPLAST BASIN
STANDARD GRATE
TOP=~~90.00~~ 90.50
INV IN=~~87.00~~ 86.95
INV OUT=~~86.9~~ 86.95

83 LF OF ~~84~~ 15" HDPE @ ~~6.67%~~ 6.60%

(SEE GENERAL NOTE #1)
EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

5' MIN. SEPARATION

SS #1-8
(CAST-IN-PLACE)
VDOT STD DI-3B, L=6'
TOP=~~98.74~~ 98.87
INV=~~95.27~~ 95.22

21 LF OF ~~25~~ 15" HDPE @ ~~1.00%~~ 2.90%

EX SS#1-21
STM DI
TOP=~~98.54~~ 98.66
INV=~~95.04~~ 94.61

FLOW

MULBERRY LANE
(50' R/W)

98 LF OF ~~98~~ 15" HDPE @ ~~8.47%~~ 7.82%

LOT 24

SS #1-2
VDOT STD DI-7
TOP=~~84.31~~ 83.93
INV IN=~~81.06~~(24") 80.93
INV IN=~~81.06~~(15") 80.93
INV OUT=~~80.98~~ 80.93

157 LF OF ~~159~~ 24" HDPE @ ~~3.20%~~ 3.30%

10' DRAINAGE AND UTILITY EASEMENT

3" PICKET FENCE

53 LF OF ~~53~~ 24" HDPE @ ~~6.21%~~ 6.49%

SS #1-1
24" ES-1
INV=~~77.00~~ 77.49

(SEE DETAIL ON SHEET 12)

39 LF OF ~~40~~ 15" HDPE @ ~~1.50%~~ 1.38%

SS #1-6
VDOT STD DI-7
TOP=~~85.28~~ 85.12
INV IN=~~81.50~~ 81.47
INV OUT=~~81.40~~ 81.47

EXISTING FENCE TO BE REMOVED AND REPLACED AS NECESSARY TO INSTALL STORM SEWER

GRAPHIC SCALE
20' 0' 20' 40'
SCALE: 1" = 20'

N

NOTE:
1. UPON PIPE INSTALLATION ALONG THE LOT 23 PROPERTY LINE, A 6" DEEP, 3:1 SS GRASS SWALE SHALL BE PROVIDED ABOVE THE PIPE TO DRAIN TO SS #1-6.
2. SEE SHEET 11 FOR HDPE PIPE INSTALLATION DETAILS.
3. PROVIDE PIPE CONNECTION TO D.I. STRUCTURES PER VDOT ROAD AND BRIDGE STANDARDS.
4. SEE SHEET 2 FOR SOIL LEGEND.
5. ALL VDOT DI-7 GRATES SHALL BE TYPE III.
6. ANY TREES THAT ARE REMOVED OR DIE, DUE TO THE OFF-SITE DRAINAGE SYSTEM CONSTRUCTION, SHALL BE REPLACED AT A 5:1 (NEW:EXISTING) RATIO. MATERIAL TO BE PLANTED SHALL BE AS SPECIFIED ON SHEET 9 IN THE TREE SECTION OF THE PLANT SCHEDULE. (ONE KNOWN TREE MUST BE REMOVED).

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/21/04	REVISED PER JCC COMMENTS DATED 8/18/04	CBR
2	12/22/04	REVISED PER JCSA AND JCC COMMENTS DATED 11/29/04	CBR
3	10/19/05	SITE PLAN AMENDMENT #1	CBR

OFF-SITE STORM SEWER SS #1-5 TO SS #1-1

1"=5'
1"=20'
SCALE IN FEET

70 1.69% 18" HDPE
91 1.09% 24" HDPE
167 3.42% 24" HDPE
157 3.30% 24" HDPE
53 6.49% 24" HDPE

EXISTING GRADE
PROPOSED GRADE

SS#1-5 STA 10+00.00 LT
RIM=~~97.86~~ 97.66
INV=~~92.87~~ 92.81

SS#1-4 STA 11+90.75
INV IN=~~91.86~~ 91.82
INV OUT=~~91.86~~ 91.82

SS#1-3 STA 12+75.25
RIM=~~89.31~~ 89.36
INV IN=~~86.31~~(24") 86.11
INV IN=~~86.31~~(15") 86.11
INV OUT=~~86.21~~ 86.11

SS#1-2 STA 14+16.65
83.93
INV IN=~~81.06~~(24") 80.93
INV IN=~~81.06~~(15") 80.93
INV OUT=~~80.98~~ 80.93

SS#1-1 STA 14+75.63
INV IN=~~77.00~~ 77.49

95 90 85 80 75
10+00 + 11+00 + 12+00 + 13+00 + 14+00 +

OFF-SITE STORM SEWER SS #1-7 TO SS #1-2

1"=5'
1"=20'
SCALE IN FEET

21 2.90% 15" HDPE
98 7.82% 15" HDPE
83 6.60% 15" HDPE
39 1.38% 15" HDPE

EXISTING GRADE

EX. 4" C.S. INV.=91.3±
EX. 4" C.S. INV.=83.4±

SAN MH#1-8
RIM=~~98.74~~ 98.87
INV OUT=~~95.27~~ 95.22

EX. SS #1-21(USC S-35-00)
INV IN=~~95.04~~ 94.61
NEW INV OUT=~~95.04~~ 94.61
(INLET TO BE RESHAPED TO DIVERT DRAINAGE FROM SS #1-8 THRU NEW SYSTEM; EX. DRAINAGE TO REMAIN SAME FLOW PATH)

SAN MH#1-7
RIM=~~90.00~~ 90.50
INV IN=~~87.00~~ 86.95
INV OUT=~~86.90~~ 86.95

SS #1-6
STA 13+75.00 LT
RIM=~~85.28~~ 85.12
INV IN=~~81.50~~ 81.47
INV OUT=~~81.40~~ 81.47

SS #1-2
STA 14+16.65
RIM=~~84.31~~ 83.93
INV IN=~~81.06~~(24") 80.93
INV IN=~~81.06~~(15") 80.93
INV OUT=~~80.98~~ 80.93

95 90 85 80 75
10+00 + 11+00 + 12+00 +

EROSION AND SEDIMENTATION CONTROL LEGEND

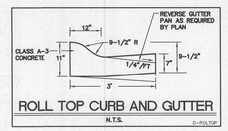
THIS PHASE II EROSION AND SEDIMENT CONTROL PLAN IS TO PROVIDE PROTECTION TO AREAS ADJACENT TO THE CONSTRUCTION SITE DURING OFFSITE DRAINAGE CONSTRUCTION.

(SAF)	SAFETY FENCE (SPEC. 3.01)	(SB)	SEDIMENT BASIN (SPEC. 3.14)
(CE)	CONSTRUCTION ENTRANCE (SPEC. 3.02)	(OP)	OUTLET PROTECTION (SPEC. 3.18)
(SSF)	SUPER SILT FENCE (WITH WIRE) (SPEC. 3.05)	(CD)	ROCK CHECK DAMS (SPEC. 3.20)
(IP)	STORM DRAIN INLET PROTECTION (SPEC. 3.07)	(PS)	PERMANENT SEEDING (SPEC. 3.32)
(DD)	TEMPORARY DIVERSION DIKE (SPEC 3.09)	(DC)	DUST CONTROL (SPEC. 3.39)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.) AND DETAILS.

GENERAL NOTES:

1. LOT 23 SANITARY SEWER LATERAL SHALL BE EXPOSED BY THE CONTRACTOR AND COMFIRM WITH THE DESIGN ENGINEER THAT PROPER CLEARANCES WILL BE MAINTAINED AT THE CROSSING OF THE PROPOSED STORM SEWER SYSTEM. CLEARANCE SHALL BE VERIFIED BY JCSA INSPECTORS PRIOR TO STORM SEWER INSTALLATION.
2. THE PRIMARY EROSION AND SEDIMENT CONTROL MEASURE FOR THE OFFSITE UTILITY LINE INSTALLATION WILL BE RAPID INSTALLATION AND STABILIZATION IN ACCORDANCE WITH MINIMUM STANDARD #16 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
3. IF PROPOSED INLET PROTECTION MEASURES RESULT IN UNDESIRED YARD OR PROPERTY FLOODING, THESE MEASURES MAY BE REMOVED WITH THE APPROVAL OF THE ASSIGNED ENVIRONMENTAL DIVISION INSPECTOR.
4. IN ORDER TO PROTECT THE SAFETY OF THE PUBLIC A SAFETY FENCE, IN ACCORDANCE WITH MINIMUM STANDARD AND SPEC. 3.01 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, SHALL BE INSTALLED IN CASES WHERE OVERNIGHT OR PROLONGED INLET OR UTILITY TRENCH EXCAVATIONS OCCUR.



ROLL TOP CURB AND GUTTER
N.T.S. D-ROLTOP

RECORD DRAWINGS: 3-08-2008

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

OFF-SITE STORM SEWER PLAN AND PROFILE

WARHILL GREEN

OWNER/DEVELOPER: ADI ASSOCIATED DEVELOPERS, INC. VIRGINIA
POWHATAN DISTRICT JAMES CITY COUNTY

Designed AES	Drawn MEG
Scale NOTED	Date 8/4/04
Project No. 9427-0	
Drawing No. 8 AS-BUILT	

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PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 028

MAR 2005
RECEIVED
PLANNING DEPARTMENT

CERTIFICATION OF SOURCE OF TITLE

THE PROPERTY SHOWN ON THIS PLAT WAS CONVEYED AS FOLLOWS:

TAX MAP PARCEL #(31-3)(13-23)

TO EDWARD T. & KARIN SPENCER, FROM WAYNE HARBIN BUILDER, INC., A VIRGINIA CORPORATION, BY DEED DATED SEPTEMBER 9, 2003 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY AT DOCUMENT 030031210.

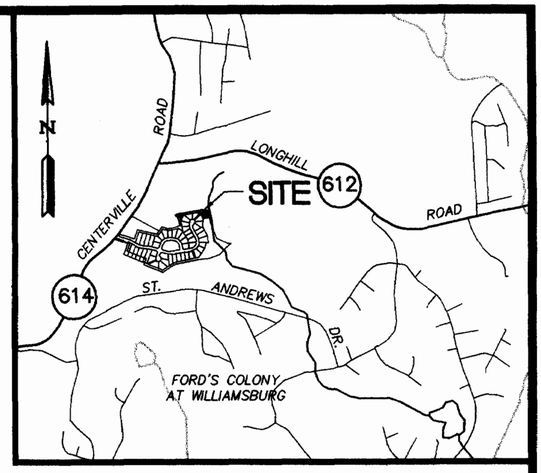
TAX MAP PARCEL #(31-3)(13-1B)

TO MULBERRY PLACE HOMEOWNERS ASSOCIATION, A VIRGINIA CORPORATION, FROM MULBERRY PLACE, L.L.C., A VIRGINIA LIMITED LIABILITY COMPANY, BY DEED DATED OCTOBER 16, 2001 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY AT DOCUMENT 010020054.

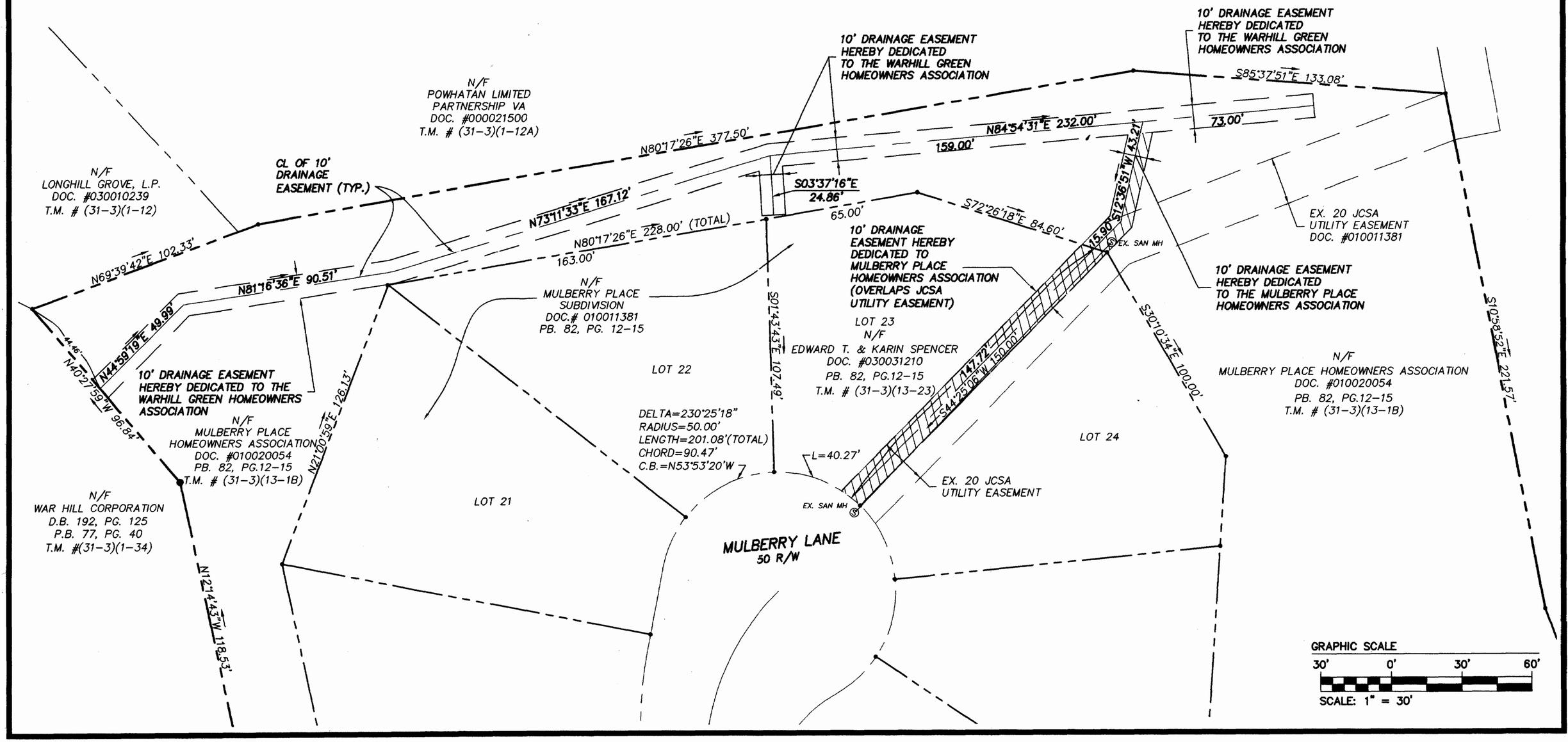
STATE OF VIRGINIA
CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY CIRCUIT COURT. THIS _____ DAY OF _____, 200__.
THE PLAT SHOWN HEREON WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS. @ _____AM/PM
INSTRUMENT # _____

TESTE: _____
BETSY B. WOOLRIDGE, CLERK

JAMES CITY COUNTY GEODETIC CONTROL MERIDIAN



VICINITY MAP
SCALE 1"=2000'



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

PLAT OF EASEMENT DEDICATION TO MULBERRY PLACE HOMEOWNERS ASSOCIATION AND WARHILL GREEN HOMEOWNERS ASSOCIATION

POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
10/19/04
G.T. WILSON, JR.
No. 1183
LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed CBR	Drawn DLD
Scale 1"=30'	Date 10/19/04
Project No. 9427-0	
Drawing No. 1	

CERTIFICATION OF SOURCE OF TITLE

THE PROPERTY SHOWN ON THIS PLAT WAS CONVEYED AS FOLLOWS:

TAX MAP PARCEL #(31-3)(13-23)

TO EDWARD T. & KARIN SPENCER, FROM WAYNE HARBIN BUILDER, INC., A VIRGINIA CORPORATION, BY DEED DATED SEPTEMBER 9, 2003 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY AT DOCUMENT 030031210.

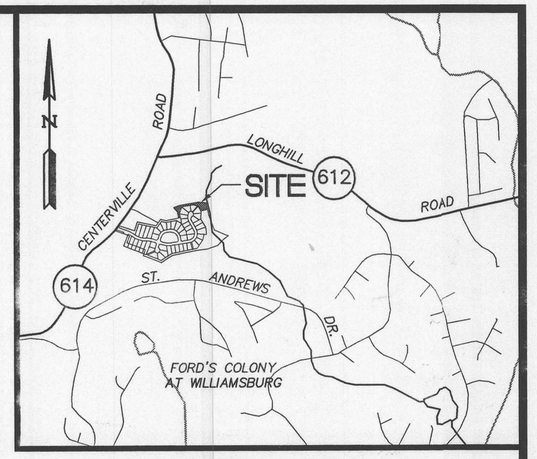
TAX MAP PARCEL #(31-3)(13-1B)

TO MULBERRY PLACE HOMEOWNERS ASSOCIATION, A VIRGINIA CORPORATION, FROM MULBERRY PLACE, L.L.C., A VIRGINIA LIMITED LIABILITY COMPANY, BY DEED DATED OCTOBER 16, 2001 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY AT DOCUMENT 010020054.

STATE OF VIRGINIA
CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY CIRCUIT COURT. THIS _____ DAY OF _____, 200__.
THE PLAT SHOWN HEREON WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS. @ _____AM/PM
INSTRUMENT # _____

TESTE: _____
BETSY B. WOOLRIDGE, CLERK

JAMES CITY COUNTY GEODETIC CONTROL MERIDIAN



VICINITY MAP
SCALE 1"=2000'

0.10 pts. 0.15

10' DRAINAGE EASEMENT HEREBY DEDICATED TO THE WARHILL GREEN HOMEOWNERS ASSOCIATION

10' DRAINAGE EASEMENT HEREBY DEDICATED TO THE WARHILL GREEN HOMEOWNERS ASSOCIATION

S85°37'51"E 133.08'

N/F POWHATAN LIMITED PARTNERSHIP VA DOC. #000021500 T.M. # (31-3)(1-12A)

N80°17'26"E 377.50'

N84°54'31"E 232.00'

159.00'

73.00'

N/F LONGHILL GROVE, L.P. DOC. #030010239 T.M. # (31-3)(1-12)

CL OF 10' DRAINAGE EASEMENT (TYP.)

N73°11'33"E 167.12'

S03°37'16"E 24.86'

65.00'

S72°26'18"E 84.60'

S12°36'51"W 43.21'

15.90'

EX. SAN MH

EX. 20 JCSA UTILITY EASEMENT DOC. #010011381

N80°17'26"E 228.00' (TOTAL)

163.00'

N69°39'42"E 102.33'

N81°16'36"E 90.51'

10' DRAINAGE EASEMENT HEREBY DEDICATED TO MULBERRY PLACE HOMEOWNERS ASSOCIATION (OVERLAPS JCSA UTILITY EASEMENT)

10' DRAINAGE EASEMENT HEREBY DEDICATED TO THE MULBERRY PLACE HOMEOWNERS ASSOCIATION

N/F MULBERRY PLACE SUBDIVISION DOC.# 010011381 PB. 82, PG. 12-15

S01°43'43"E 107.49'

LOT 23
N/F
EDWARD T. & KARIN SPENCER
DOC. #030031210
PB. 82, PG.12-15
T.M. # (31-3)(13-23)

S30°19'34"E 100.00'

S10°58'52"E 221.57'

N/F MULBERRY PLACE HOMEOWNERS ASSOCIATION DOC. #010020054 PB. 82, PG.12-15 T.M. # (31-3)(13-1B)

N44°59'19"E 49.99'

44.46'

N40°27'59"W 96.84'

10' DRAINAGE EASEMENT HEREBY DEDICATED TO THE WARHILL GREEN HOMEOWNERS ASSOCIATION

N/F MULBERRY PLACE HOMEOWNERS ASSOCIATION DOC. #010020054 PB. 82, PG.12-15 T.M. # (31-3)(13-1B)

N21°00'59"E 126.13'

LOT 22

DELTA=230°25'18"
RADIUS=50.00'
LENGTH=201.08'(TOTAL)
CHORD=90.47'
C.B.=N53°53'20"W

L=40.27'

S44°25'06"W 150.00'

147.72'

LOT 24

EX. 20 JCSA UTILITY EASEMENT

EX. SAN MH

LOT 21

N/F WAR HILL CORPORATION D.B. 192, PG. 125 P.B. 77, PG. 40 T.M. #(31-3)(1-34)

N12°43'43"W 118.53'

MULBERRY LANE
50 R/W

DEDICATED NOS POINT CREDIT NO EFFECT

OCT 2004
RECEIVED
PLANNING DEPARTMENT

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

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

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

PLAT OF EASEMENT DEDICATION TO MULBERRY PLACE HOMEOWNERS ASSOCIATION AND WARHILL GREEN HOMEOWNERS ASSOCIATION

POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

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

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed CBR	Drawn DLD
Scale 1"=30'	Date 10/19/04
Project No. 9427-0	
Drawing No. 1	

S:\Jobs\9427\00-ADI 4 ac. Centerville Road\dwg\Plats\9427000sm101.DWG, 10/19/2004 11:51:01 AM

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 030

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

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

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

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

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

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

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

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

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

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

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

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

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

STORMWATER MANAGEMENT (SWM) FACILITY MAINTENANCE PLAN

PROPER MAINTENANCE OF THE STORMWATER MANAGEMENT FACILITIES WILL PREVENT THE INTRODUCTION OF DEBRIS AND SEDIMENT INTO THE FACILITIES AND SPILLWAYS. IT IS ANTICIPATED THAT UNDER NORMAL CONDITIONS, SEDIMENT REMOVAL AND POTENTIAL REPLACEMENT OF THE FILTRATION MEDIA WILL BE REQUIRED APPROXIMATELY EVERY 10 YEARS. IF OTHER CONSTRUCTION RELATED ACTIVITIES ARE PERFORMED ON UPSLOPE AREAS, ADEQUATE BASIN PROTECTION SHOULD BE PROVIDED AND INSPECTIONS PERFORMED ONCE A WEEK DURING CONSTRUCTION.

A DESIGNATED REPRESENTATIVE WILL INSPECT THE STORMWATER MANAGEMENT FACILITIES AFTER EACH SIGNIFICANT RAINFALL EVENT. A SIGNIFICANT RAINFALL EVENT IS DEFINED AS ONE INCH OR MORE OF GAUGED RAINFALL WITHIN A 24-HOUR PERIOD. THE HOME OWNERS ASSOCIATION WILL BE RESPONSIBLE FOR THE INSPECTION AND SUBSEQUENT MAINTENANCE OF THE PROPOSED STORMWATER MANAGEMENT FACILITIES.

INSPECTION AND MAINTENANCE OF THE FACILITIES WILL CONSIST OF THE FOLLOWING MEASURES:

A. AFTER EACH SIGNIFICANT RAINFALL EVENT OR AT LEAST MONTHLY, INSPECTIONS SHALL BE MADE FOR THE PRESENCE OF COLLECTED DEBRIS, LITTER, CLOGGING AND/OR BLOCKAGE OF THE OUTLET SYSTEM.
B. A MONTHLY INSPECTION FOR SEDIMENT BUILDUP AND/OR EROSION WILL BE PERFORMED BY A VISUAL INSPECTION.
C. ANNUAL INSPECTIONS SHALL BE MADE OF THE GRADED SIDE SLOPES OF THE FACILITY FOR SIGNS OF ANIMAL BORROWS OR SLOPE EROSION.
D. AT LEAST ONCE A YEAR, THE MAINTENANCE CREW WILL CLEAN THE RISER BOTTOM AND OUTLET PIPE OF ACCUMULATED SEDIMENTS. ADDITIONALLY, YEARLY STRUCTURAL INSPECTIONS FOR DAMAGE SHALL BE MADE OF THE STORAGE FACILITY. STRUCTURAL INSPECTIONS SHALL BE PERFORMED ON THE CONCRETE RISER, ORIFICE/WEIRS, OUTLET BARREL AND POND EMBANKMENT. IF DAMAGE IS EVIDENT, FURTHER INVESTIGATION BY A PROFESSIONAL ENGINEER WILL BE CONDUCTED TO ASSESS THE INTEGRITY OF THE STRUCTURE.
E. TREES, SHRUBS AND OTHER VEGETATION WITH STRUCTURALLY DAMAGING ROOT SYSTEMS WILL NOT BE PERMITTED TO GROW ON ANY PART OF THE GRADED EMBANKMENT.
F. SOIL SAMPLING WILL BE PERFORMED ON THE FILTRATION MEDIA ONCE EVERY THREE YEARS TO ASSESS THE CAPABILITIES OF THE FILTRATION SYSTEM.
G. IF ANY OF THE ABOVE ITEMS ARE IDENTIFIED AS PROBLEMS DURING THE INSPECTION, CORRECTIVE MAINTENANCE OR REPAIR ACTIONS WILL BE MADE AS SOON AS POSSIBLE.

WATER LINE PROFILE, NOTES & DETAILS

WARHILL GREEN

OWNER/DEVELOPER: AMERICAN ASSOCIATED DEVELOPERS, LLC

Designed	Drawn
TRS/HEB	RMS
Scale	Date
NOTED	8/4/
Project No.	
9427-0	
Drawing No.	
7	

Warhill Green

Stormwater Management Design Calculations

Date: August 4, 2004
Revised: October 20, 2004

SP-98-04
2ND SUB

Prepared by:

AES Consulting Engineers
5248 Olde Towne Road. Suite 1
Williamsburg, VA 23188
(757) 253-0040 Fax: (757) 220-8994
http://www.aesva.com

OCT 2004
RECEIVED
PLANNING DEPARTMENT

Warhill Green

Stormwater Management Design Calculations

Date: August 4, 2004
Revised: October 20, 2004

Prepared by:

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5248 Olde Towne Road. Suite 1
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Narrative and Supporting Data

Warhill Green

STORMWATER MANAGEMENT/BMP NARRATIVE

General:

This project is comprised of the construction of roadway/parking lot, water and sanitary utilities, and stormwater management systems in the development of a 29-unit, condominium development, to be known as Warhill Green, located in James City County, Virginia. ✓

The existing terrain is gently rolling to flat with elevations ranging from 105 to 98 feet. The site drains naturally to the north, south and east. The proposed stormwater system is comprised of two dry swale facilities which converge at the eastern end of the site and drain through a proposed off-site piping system through the existing Mulberry Place subdivision. There is a Modified EW-11 outlet structure at the on-site outfall of the dry swale which is the primary mechanism to provide attenuation for the 2, 10 and 100 year design storms. All of the proposed impervious area on-site will be captured by the dry swale system including a portion of off-site drainage from the Cora Lee Green and Mulberry Place properties.

Water Quality Considerations:

TYPE E-2 CAN DO SINCE OFFSITE RECEIVING CHANNEL WAS PROVIDED.

The water quality requirements for the site are being met by the use of the previously mentioned dry swale stormwater management facility. The dry swales have a 10-point value. The overall site has a 12.08 point value, due to the contributing off-site drainage area, which exceeds the JCC water quality requirements. Please see the Overall BMP Plan and Worksheet. ✓ 4.47AC DA TO DRYSWAL

Water Quantity Considerations:

The dry swale stormwater management facility also functions as a water quantity stormwater management facility. A modified EW-11 outlet structure has been proposed to attenuate the 2, 10 and 100 year design storms. These larger storm events are impounded above the dry swale media and ultimately are conveyed through an off-site piping system through the Mulberry Place subdivision. The off-site drainage system has been proposed due to potential channel adequacy issues identified by the JCC Environmental Division. It is also important to note that these facilities capture and provide attenuation for areas of off-site drainage from the Cora Lee Green and Mulberry Place properties.

Additional Information:

As part of the off-site drainage piping design, additional drainage measures are being provided at the terminus of Mulberry Lane in the Mulberry Place subdivision. The remainder of this report includes calculations for the dry swale stormwater management facility and a temporary sediment basin.

Stormwater Management/BMP Facility

CALCULATION FOR SCS HYDROGRAPH GENERATION
STORMWATER MANAGEMENT PLAN - DRY SWALES
WARHILL GREEN
AES Project No.: 9427-00
Date: July 30, 2004
Revised: October 6, 2004

I. PRE-DEVELOPMENT CONDITIONS TO POINT OF CONCERN

A. Pre-Development Drainage Area to Point of Concern = **1.69 Acres**

B. Pre-development Land Use, Soil Classification and Calculation of Composite Curve Number

	Soil Type	Soil Hydrologic Group	Pre-Development Land Use	Area of Land Use (in Acres)	Curve Number for Land Use (CN)	Adjusted (CN)
1)	11C - Craven-Uchee complex	C	Grassland, Fair Condition	0.02	79 ✓	2
2)	18B - Kempsville fine sandy loam	B	Grassland, Fair Condition	0.32	69 ✓	22
3)	29B - Slagle fine sandy loam	C	Grassland, Fair Condition	1.35	79 ✓	107
	Totals =			1.69		130
	Composite CN =					**77**

C. Pre-Development Time of Concentration Calculations

1)	Overland Flow (maximum 300 feet)	
	Surface description (table 5-7)	Dense grasses
	Manning's roughness coefficient., n (table 5-7)	0.24
	Length of overland flow, L	100 Feet
	2-year 24-hour rainfall, P2	3.5 inches
	Average slope of overland flow , s	0.018 feet per foot
	Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.24 hours
2)	Shallow concentrated flow (maximum 300 feet)	
	Surface description, paved or unpaved	Unpaved
	Length of shallow concentrated flow, L	220 Feet
	Average slope of shallow concentrated flow, s	0.019 feet per foot
	Average velocity, v	2.2 feet per second
	Travel time, Tt = L/(3600*v)	0.03 hours
3)	Channel or Pipe Flow	
	Length of channel flow, L	0 Feet
	Average velocity of channel flow, v	0 feet per second
	Travel time, Tt = L/(3600*v)	0.00 hours
	Total Time of Concentration =	**0.26 hours**

GOOD
C - 74
B - 61

VSMH SAYS USE CN'S BASED ON "GOOD" CONDITIONS. "FAIR" RATING IS CONSISTENT WITH SITE.

II. POST-DEVELOPMENT CONDITIONS TO POINT OF CONCERN (for total site and Off-site Contributing Areas)

A. Post-Development Drainage Area to Point of Concern = **4.47 Acres**

B. Post-development Land Use, Soil Classification and Calculation of Composite Curve Number

	Soil Type	Soil Hydrologic Group	Post-Development Land Use	Area of Land Use (in Acres)	Curve Number for Land Use (CN)	Adjusted (CN)
1)	11C - Craven-Uchee complex	C	Buildings & Pavement	0.10	98	10
2)	18B - Kempsville fine sandy loam	B	Buildings & Pavement	0.35	98	34
3)	29B - Slagle fine sandy loam	C	Buildings & Pavement	1.05 (1.50 AC.)	98	103
4)	18B - Kempsville fine sandy loam	B	Open space, Fair Condition	0.29	69	20
5)	19B - Kempsville-Emporia fine sandy loam	C	Open space, Fair Condition	0.05	79	4
6)	29B - Slagle fine sandy loam	C	Open space, Fair Condition	2.63	79	208
	Totals =			4.47		379
	Composite CN =					**85**

C. Post-Development Time of Concentration Calculations

1)	Overland Flow (maximum 300 feet)	
	Surface description (table 5-7)	Short grass
	Manning's roughness coefficient., n (table 5-7)	0.15
	Length of overland flow, L	100 Feet
	2-year 24-hour rainfall, P2	3.5 inches
	Average slope of overland flow , s	0.0235 feet per foot
	Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.15 hours
2)	Shallow concentrated flow (maximum 300 feet)	
	Surface description, paved or unpaved	Unpaved
	Length of shallow concentrated flow, L	0 Feet
	Average slope of shallow concentrated flow, s	0 feet per foot
	Average velocity, v	0.00 feet per second
	Travel time, Tt = L/(3600*v)	0.00 hours
3)	Channel or Pipe Flow	
	Length of channel flow, L	800 Feet
	Average velocity of channel flow, v	2 feet per second
	Travel time, Tt = L/(3600*v)	0.11 hours
	Total Time of Concentration =	**0.26 hours**

(SAME AS PRE

-10
.35
1.05
1.50 AC ~ 65,340 SF

1.50 / 3.7 ~ 40% OK.

1.43 AC ON CONC SHED

III. DETERMINING REQUIRED WATER QUALITY VOLUME

Percent Impervious of the BMP Watershed, Post-Development	33.6%		
Drainage Area of the BMP Watershed	4.47	acres	
Impervious Acres of BMP Watershed	1.50	acres	

EQUALS SITE IMPERV. W/ OFFSITE CREDIT FOR OFFSITE (i.e. CORA LEE) MUST MAKE ASSUMPTIONS FOR IMPERV

Calculation for Water Quality Volume, WQ_v

WQ_v = (1.0 inches per impervious acre) *(impervious acres of BMP watershed)

WQv = (1.0 inches)*(1 ft / 12 inches) * (43560 sq. Ft per acre) * (impervious acres of BMP watershed)

WQ_v = (1.0 inches)*(1 ft / 12 inches) * (43560 sq. Ft per acre) *	1.50	=	5445 cu. Ft
WQ_v =	5,445 cu. Ft		Required Volume
WQ_v =	5,445 cu. Ft		Volume Provided at Elevation 24.00

IV. DETERMINING PROVIDED WATER QUALITY VOLUME

Water Quality Volume is provided by five individual check dams and a sump area in front of Modified EW-11 outlet device.
All proposed side slopes of dry swales are 3:1.

Check Dam #	Height of Check Dam (ft)	Bottom Width (ft)	Length of storage behind Check Dams (ft)	Area of Swale at Check Dam (sf)	Volume Provided (cf)	
1	1	6	222	9.00	999	
2	1.5	6	333	15.75	2622	
3	1.33	2	200	7.97	797	
4	1	2	161	5.00	403	
5	0.5	2	81	1.75	71	
Outlet*					770	*Volume from Hydraflow

Cumulative Total Volume Provided= 5661 cu.ft.

OK Volume provided is greater than Volume required.

SITE IMPERV 1.43AC.
OA IMPERV. 1.50AC.
CORA LEE 0.07

OA SIZE: CORA LEE
60 x 290 = 17,400 = 0.39AC
0.60(0.39) = 0.23 AC.

0.07 / 0.50 = 14% IMPERV.

III.

AES CONSULTING ENGINEERS
Williamsburg • Richmond

Williamsburg (757) 253-0040
Richmond (804) 330-8040

PROJECT WARHILL GREEN
PROJECT NO. 9427
SUBJECT DEWATERING CALCS
SHEET NO. 1 OF 1
CALCULATED BY CBR DATE 10/19/07

DRY SWALE DEWATERING CALCULATIONS

VOLUME OF RUNOFF THAT FILTRATES/INFILTRATES
= 5661 CF

ALL COMPONENTS OF DRY SWALE MEDIA/UNDERDRAIN SYSTEM MUST HAVE FLOWRATE GREATER THAN

$$Q = \frac{5661\ CF}{48\ hrs} \cdot \frac{1\ hr}{3600\ s} = 0.0328\ CFS$$

CAPACITY OF 4" UNDERDRAIN @ 0.4% = 0.13 CFS > 0.033 CFS
∴ OK

INFILTRATION RATE OF IN-SITU SOIL = 1.74 IN/HR ←
INFILTRATABLE AREA = 6' (@ 550') $\frac{1.74''}{HR} \cdot \frac{1'}{12''} \cdot \frac{1\ HR}{3600\ s}$ = 0.13 CFS > 0.033 CFS
∴ ok

⇒ ASSUME ENGINEERED MEDIA IN ACCORDANCE W/ VSMA WILL DEWATER IN LESS THAN 48 HOURS.

DOES NOT ACCOUNT FOR DEWATERING THRU UNDERDRAIN.
∴ OK.

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM
Warhill Green, AES PROJECT No. 9427-00
TOTAL AREA = 3.7 ACRE(s)

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Drainage Area	BMP Points		Fraction of Site Served by BMP (BMP Drainage Area/Total Area)		Weighted BMP Points
Dry Swales	4.47	10	X	1.208	=	12.08
			X		=	
			X		=	
			X		=	
		TOTAL WEIGHTED STRUCTURAL BMP POINTS:				12.08

B. NATURAL OPEN SPACE CREDIT

Open Space Area	Fraction of Site (Open Space Area/Total Area)	Natural Open Space Credit		Points for Natural Open Space (Fraction of Site * Natural Open Space Credit %)
		(0.1 per 1%)	=	
		(0.15 per 1%)	=	
		TOTAL OPEN SPACE POINTS:		0.00

C. TOTAL WEIGHTED POINTS

12.08	+	0.00	=	12.08
Structural BMP Points		Natural Open Space Points		TOTAL

MULT-FAMILY
RS

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	———	———	2.59	———	———	6.18	———	———	9.85	Pre-Development
2	SCS Runoff	———	———	9.98	———	———	20.20	———	———	30.05	Post-Development
5	Reservoir	2	———	2.49	———	———	7.43	———	———	12.64	Dry Swales

2.49 2.59

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.59	6	720	8,227	—	——	——	Pre-Development
2	SCS Runoff	9.98	6	720	30,673	—	——	——	Post-Development
5	Reservoir	2.49	6	738	29,899	2	100.22	12,305	Dry Swales

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

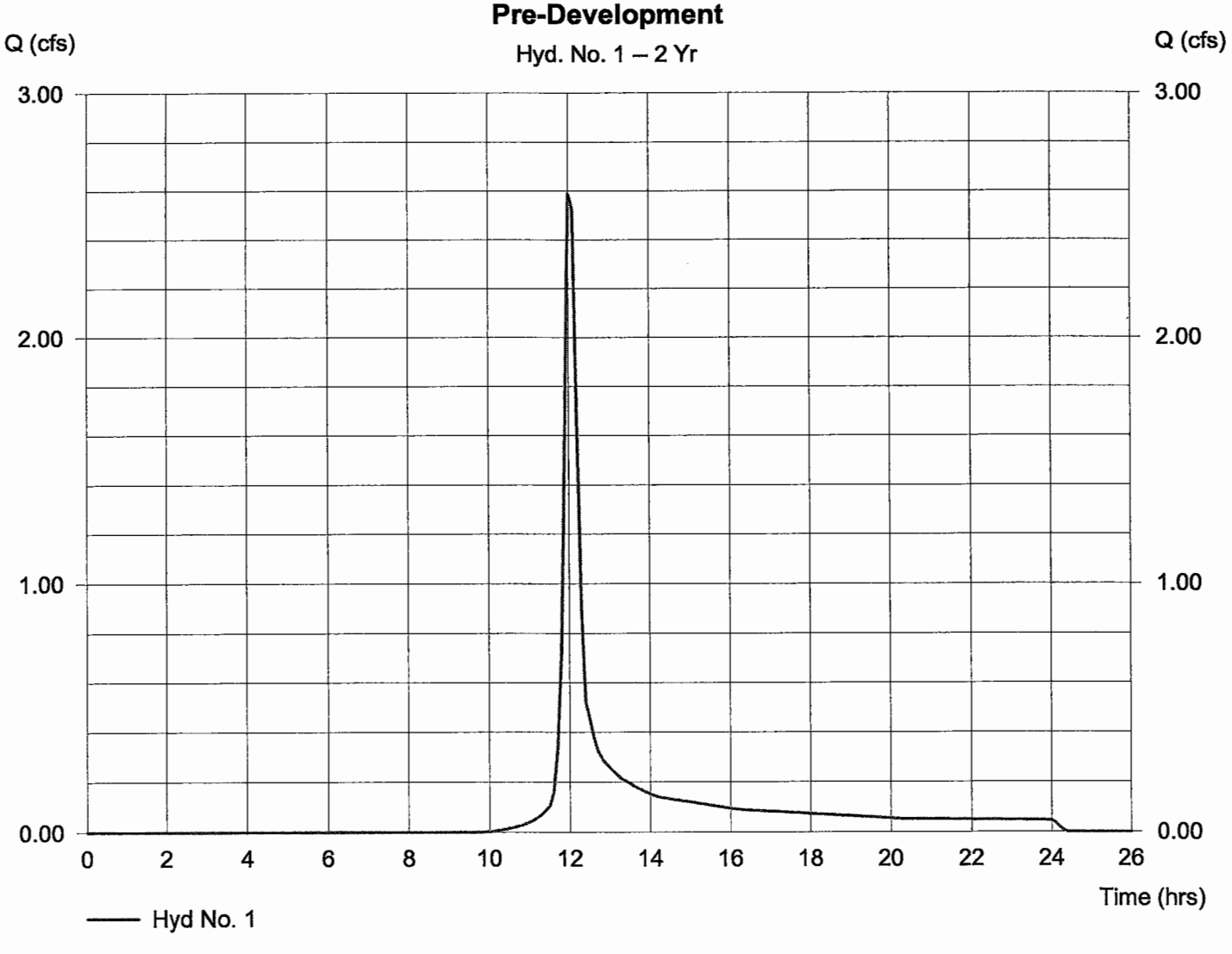
Wednesday, Oct 20 2004, 2:6 PM

Hyd. No. 1

Pre-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 2.59 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Drainage area	= 1.69 ac	Curve number	= 77
Basin Slope	= 2.0 %	Hydraulic length	= 297 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 8,227 cuft



Hydrograph Plot

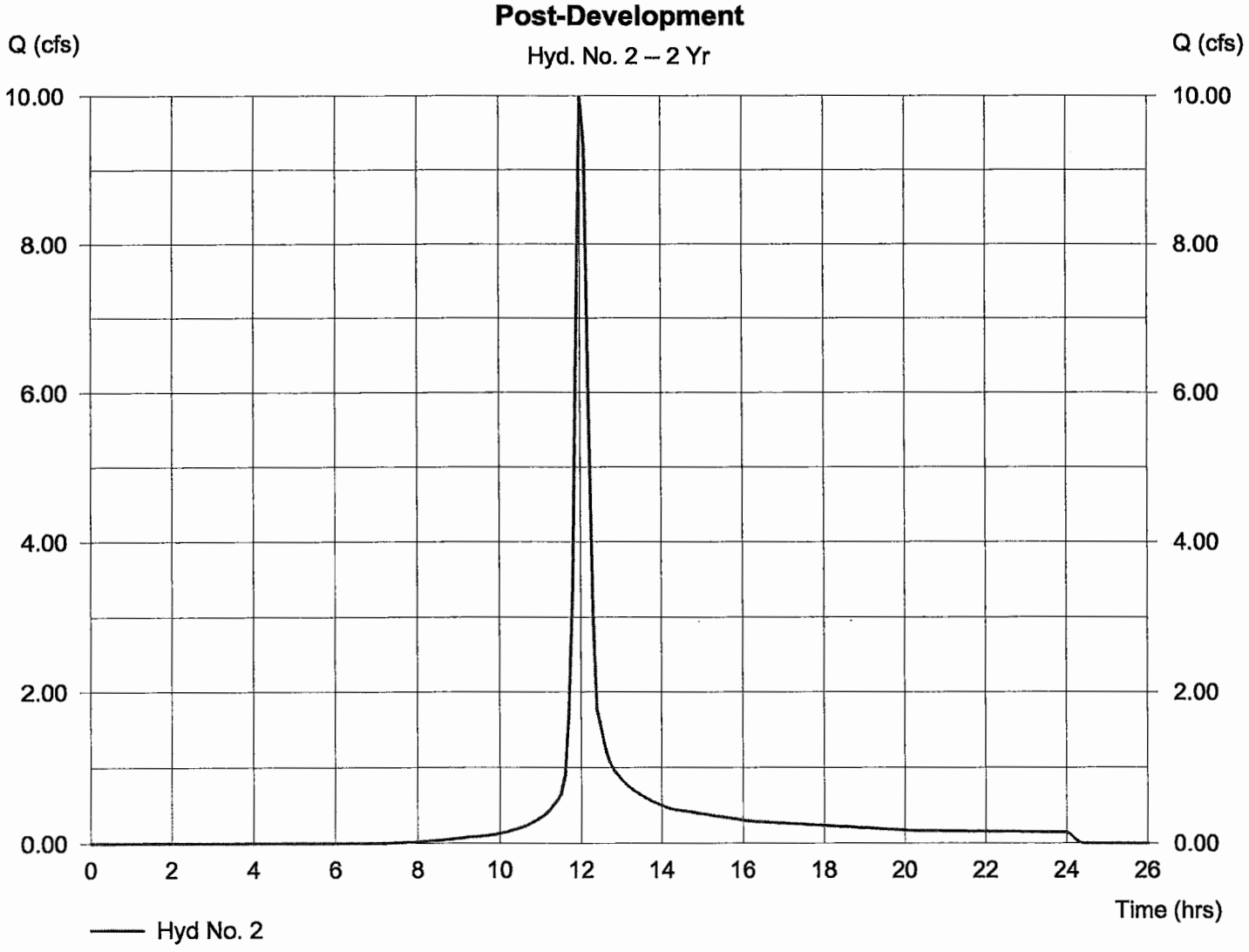
Hydraflow Hydrographs by Intelisolve | Wednesday, Oct 20 2004, 2:6 PM

Hyd. No. 2

Post-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 9.98 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Drainage area	= 4.47 ac	Curve number	= 85
Basin Slope	= 0.6 %	Hydraulic length	= 695 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 30,673 cuft



Hydrograph Plot

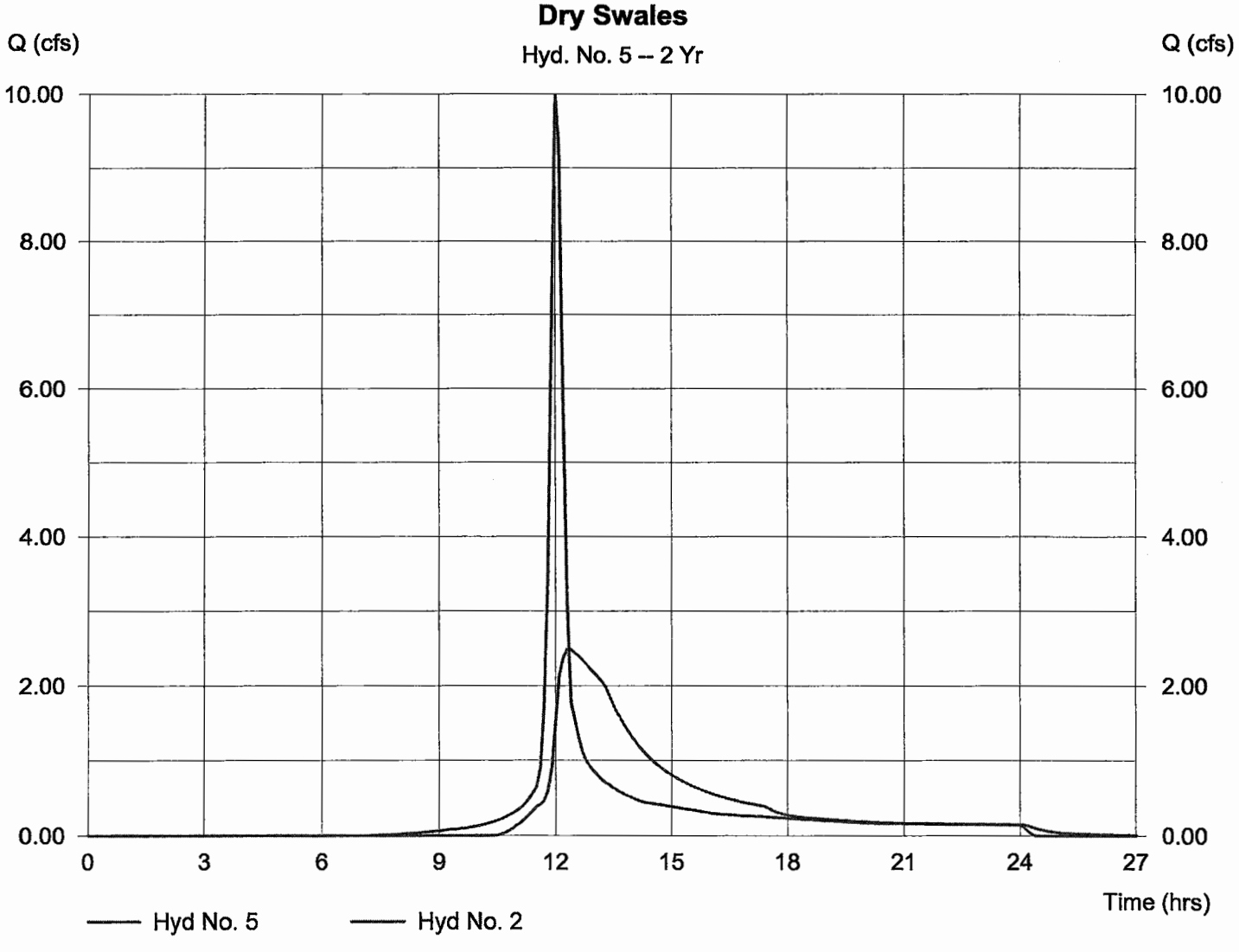
Hydraflow Hydrographs by Intelisolve | Wednesday, Oct 20 2004, 2:6 PM

Hyd. No. 5

Dry Swales

Hydrograph type	= Reservoir	Peak discharge	= 2.49 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Inflow hyd. No.	= 2	Max. Elevation	= 100.22 ft
Reservoir name	= Dry Swales	Max. Storage	= 12,305 cuft

Storage Indication method used. | Hydrograph Volume = 29,899 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Oct 20 2004, 2:6 PM

Pond No. 1 - Dry Swales

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	98.00	00	0	0
1.00	99.00	3,079	1,540	1,540
2.00	100.00	10,919	6,999	8,539
3.00	101.00	23,447	17,183	25,722
4.00	102.00	23,500	23,474	49,195

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 18.00 ✓	0.00	0.00	0.00
Span (in)	= 18.00 ✓	0.00	0.00	0.00
No. Barrels	= 1 ✓	0	0	0
Invert El. (ft)	= 94.00 ✓	0.00	0.00	0.00
Length (ft)	= 70.00 ✓	0.00	0.00	0.00
Slope (%)	= 1.61 ✓	0.00	0.00	0.00
N-Value	= .013 ✓	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

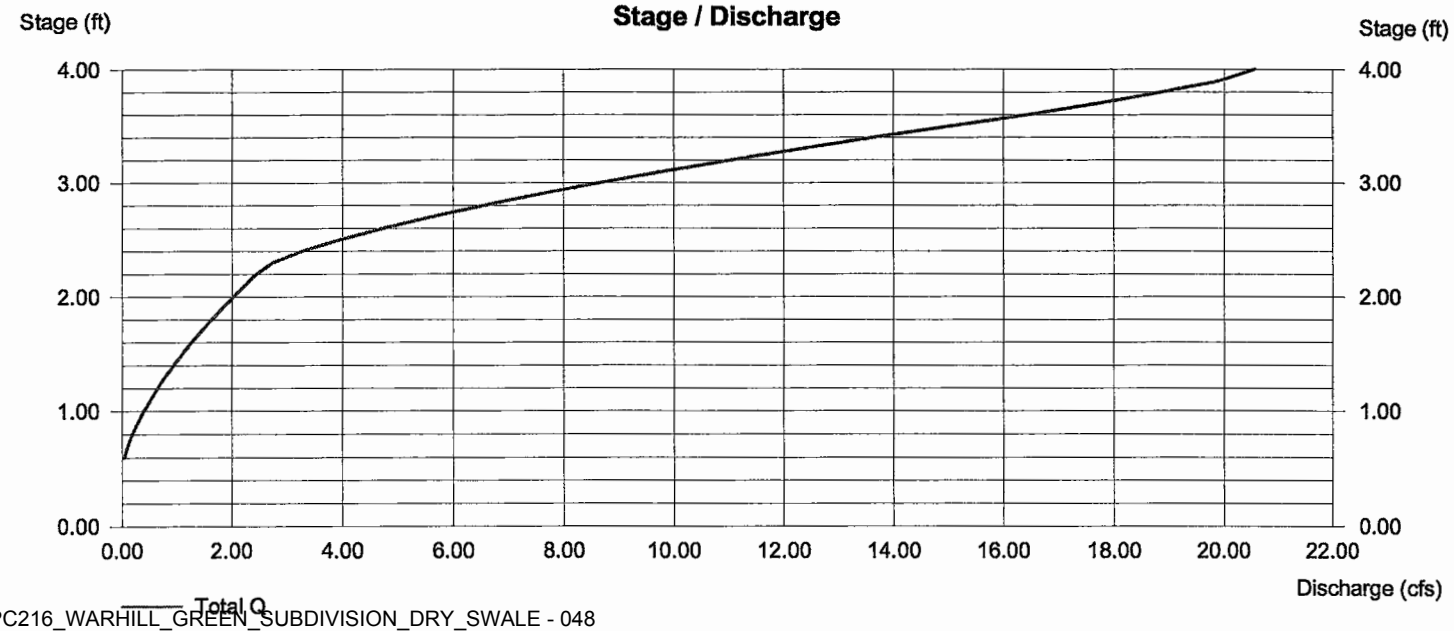
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.33	2.00	0.00	0.00
Crest El. (ft)	= 98.50	100.25	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	0.00
Weir Type	= Rect	Cipiti	—	—
Multi-Stage	= Yes	Yes	No	No

1' deep?

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

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



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	6.18	6	720	19,008	—	——	——	Pre-Development
2	SCS Runoff	20.20	6	720	62,585	—	——	——	Post-Development
5	Reservoir	7.43	6	738	61,811	2	100.89	23,760	Dry Swales

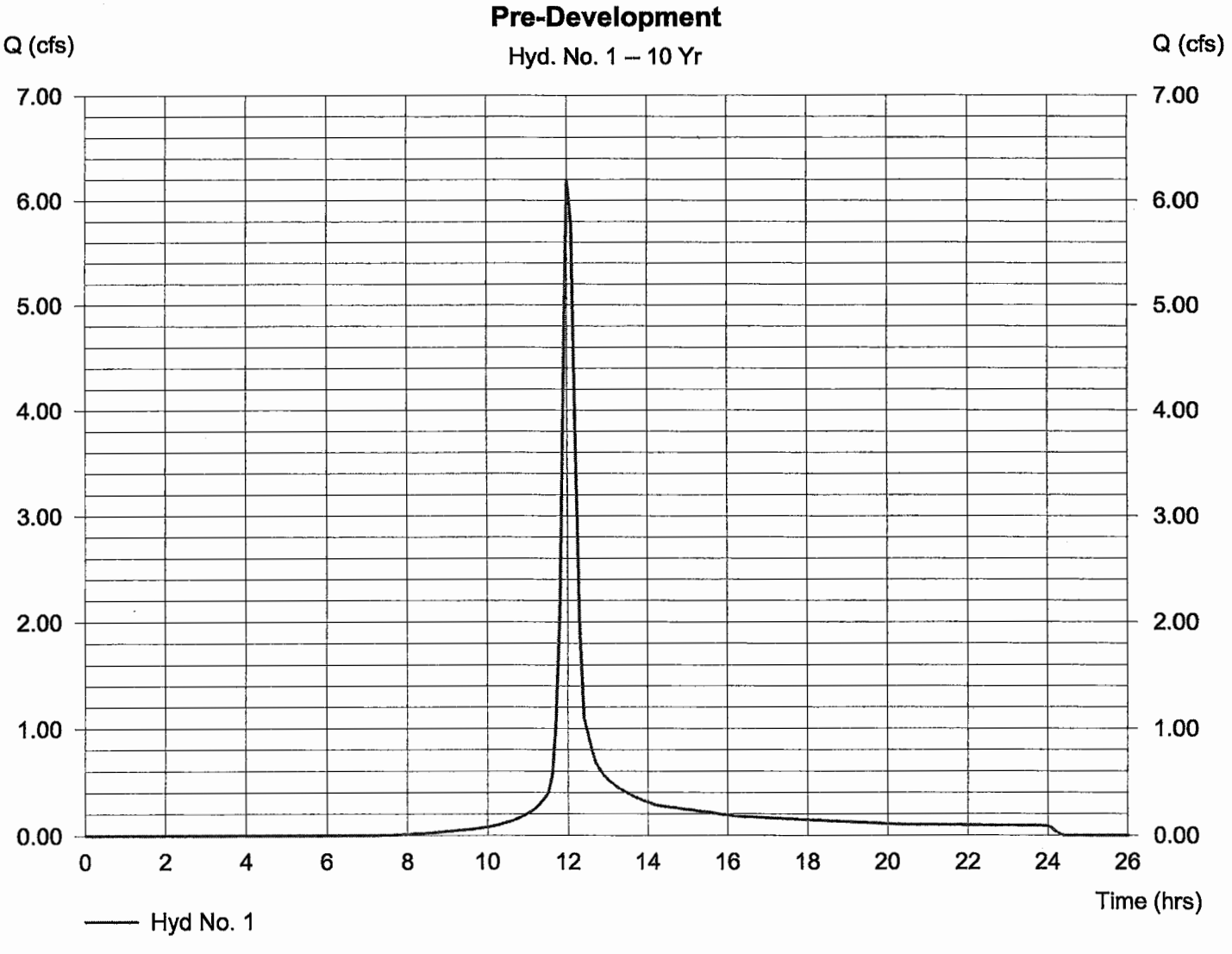
Hydrograph Plot

Hyd. No. 1

Pre-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 6.18 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 1.69 ac	Curve number	= 77
Basin Slope	= 2.0 %	Hydraulic length	= 297 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 19,008 cuft



Hydrograph Plot

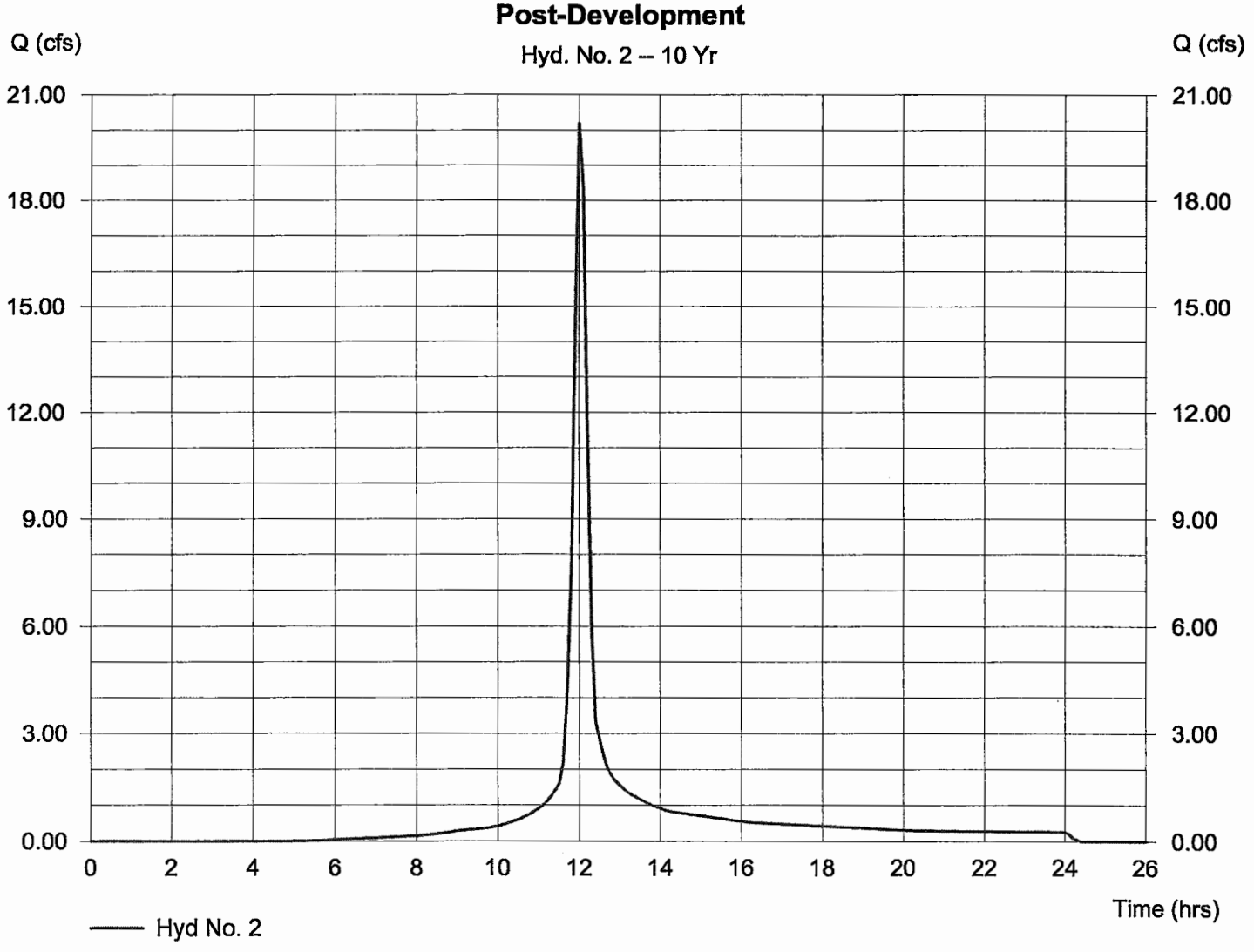
Hydraflow Hydrographs by Intelisolve | Wednesday, Oct 20 2004, 2:6 PM

Hyd. No. 2

Post-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 20.20 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 4.47 ac	Curve number	= 85
Basin Slope	= 0.6 %	Hydraulic length	= 695 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 62,585 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Oct 20 2004, 2:6 PM

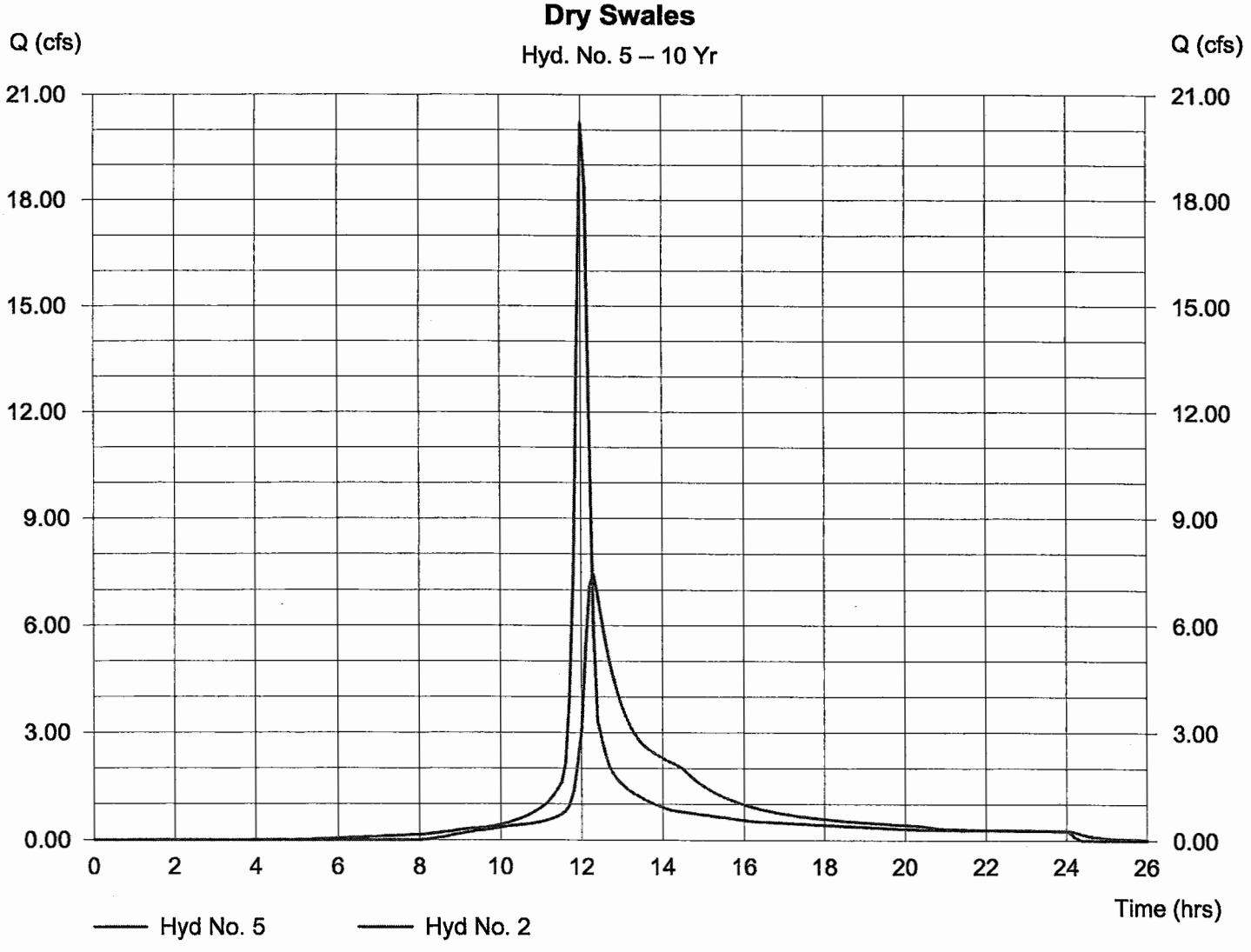
Hyd. No. 5

Dry Swales

Hydrograph type	= Reservoir	Peak discharge	= 7.43 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Inflow hyd. No.	= 2	Max. Elevation	= 100.89 ft
Reservoir name	= Dry Swales	Max. Storage	= 23,760 cuft

Storage Indication method used.

Hydrograph Volume = 61,811 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Oct 20 2004, 2:6 PM

Pond No. 1 - Dry Swales

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	98.00	00	0	0
1.00	99.00	3,079	1,540	1,540
2.00	100.00	10,919	6,999	8,539
3.00	101.00	23,447	17,183	25,722
4.00	102.00	23,500	23,474	49,195

Culvert / Orifice Structures

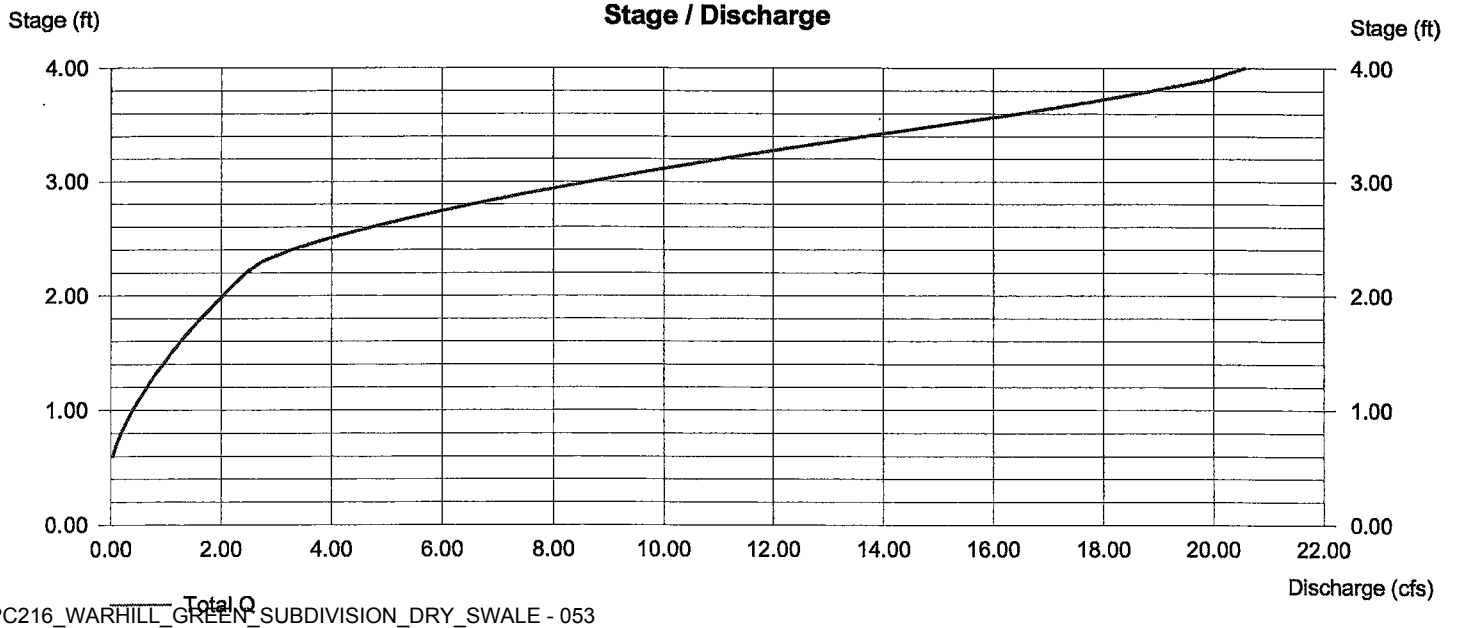
	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 94.00	0.00	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.61	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.33	2.00	0.00	0.00
Crest El. (ft)	= 98.50	100.25	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	0.00
Weir Type	= Rect	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

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

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



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	9.85	6	720	30,334	---	-----	-----	Pre-Development
2	SCS Runoff	30.05	6	720	94,515	---	-----	-----	Post-Development
5	Reservoir	12.64	6	738	93,742	2	101.32 ✓ OHW	33,336	Dry Swales

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

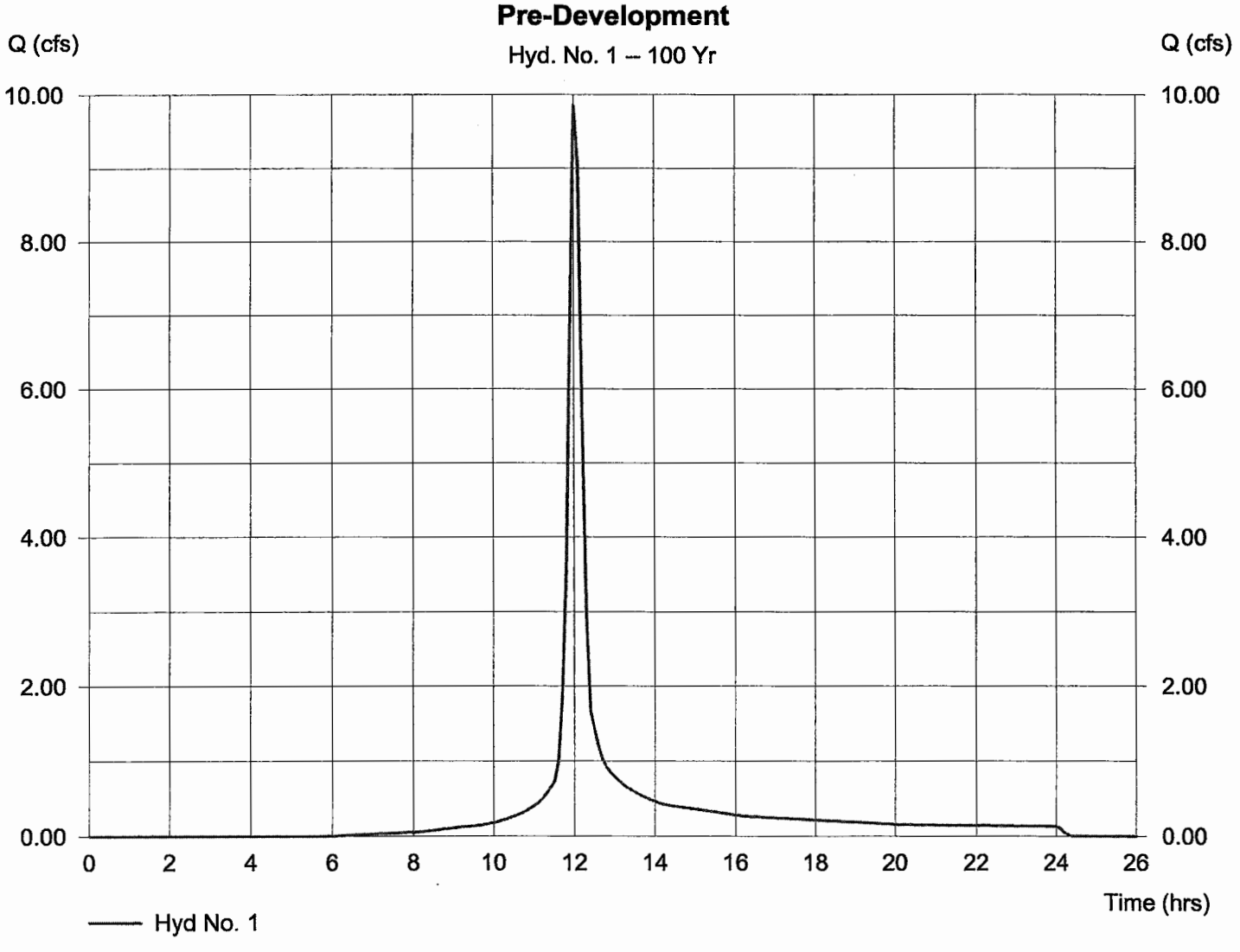
Wednesday, Oct 20 2004, 2:6 PM

Hyd. No. 1

Pre-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 9.85 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 1.69 ac	Curve number	= 77
Basin Slope	= 2.0 %	Hydraulic length	= 297 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 30,334 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

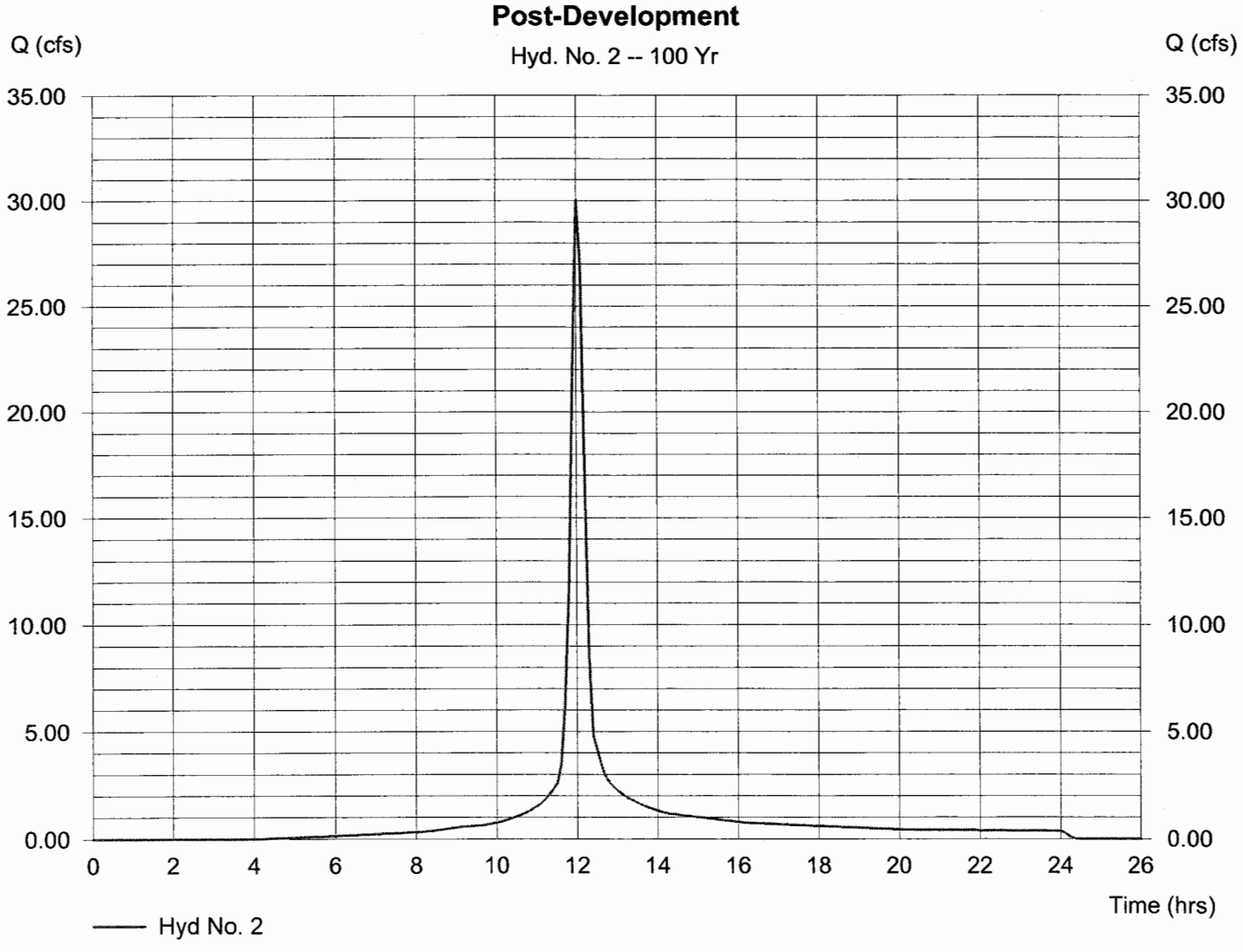
Wednesday, Oct 20 2004, 2:6 PM

Hyd. No. 2

Post-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 30.05 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 4.47 ac	Curve number	= 85
Basin Slope	= 0.6 %	Hydraulic length	= 695 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 94,515 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Oct 20 2004, 2:6 PM

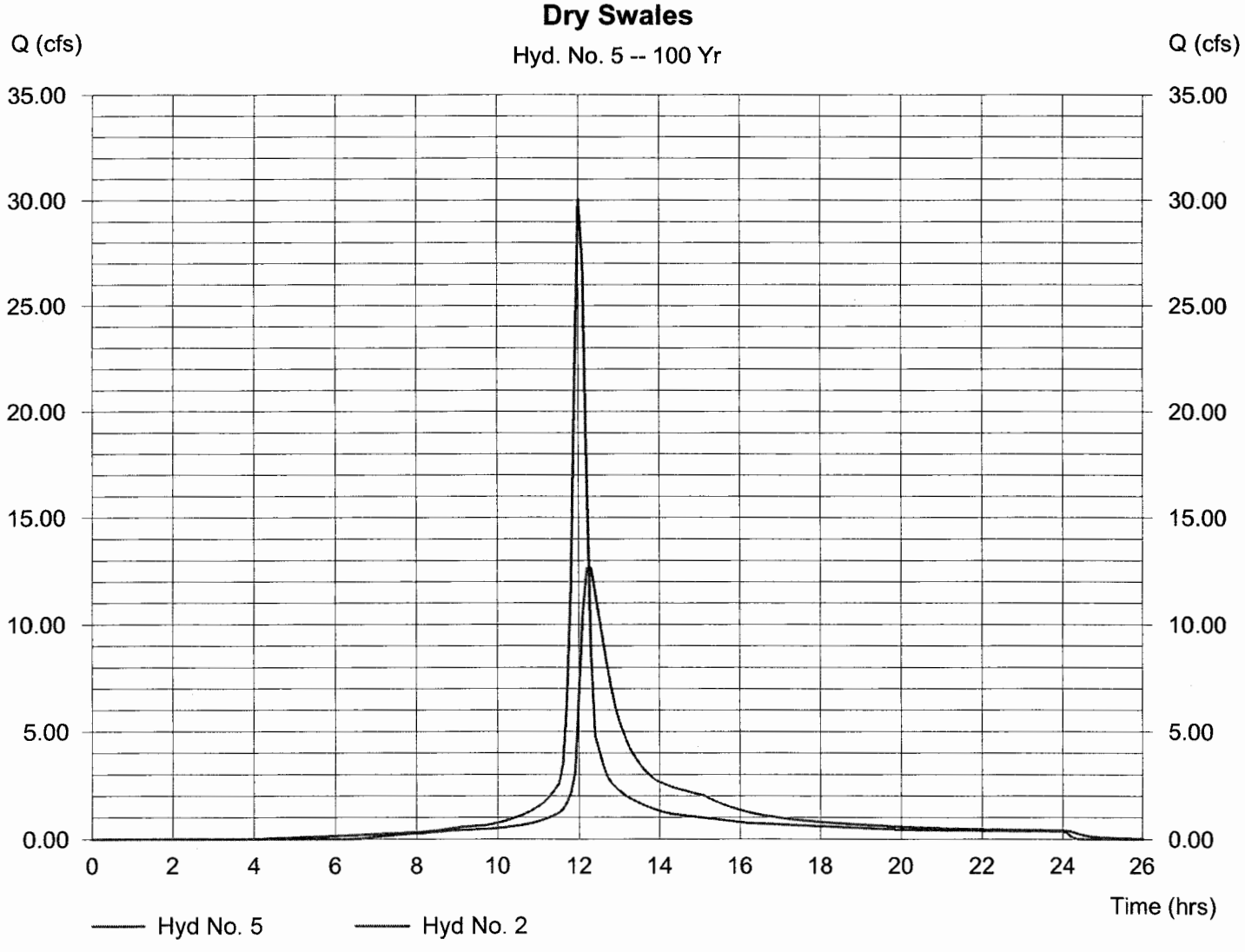
Hyd. No. 5

Dry Swales

Hydrograph type	= Reservoir	Peak discharge	= 12.64 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Inflow hyd. No.	= 2	Max. Elevation	= 101.32 ft
Reservoir name	= Dry Swales	Max. Storage	= 33,336 cuft

Storage Indication method used.

Hydrograph Volume = 93,742 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Oct 20 2004, 2:6 PM

Pond No. 1 - Dry Swales

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	98.00	00	0	0
1.00	99.00	3,079	1,540	1,540
2.00	100.00	10,919	6,999	8,539
3.00	101.00	23,447	17,183	25,722
4.00	102.00	23,500	23,474	49,195

Culvert / Orifice Structures

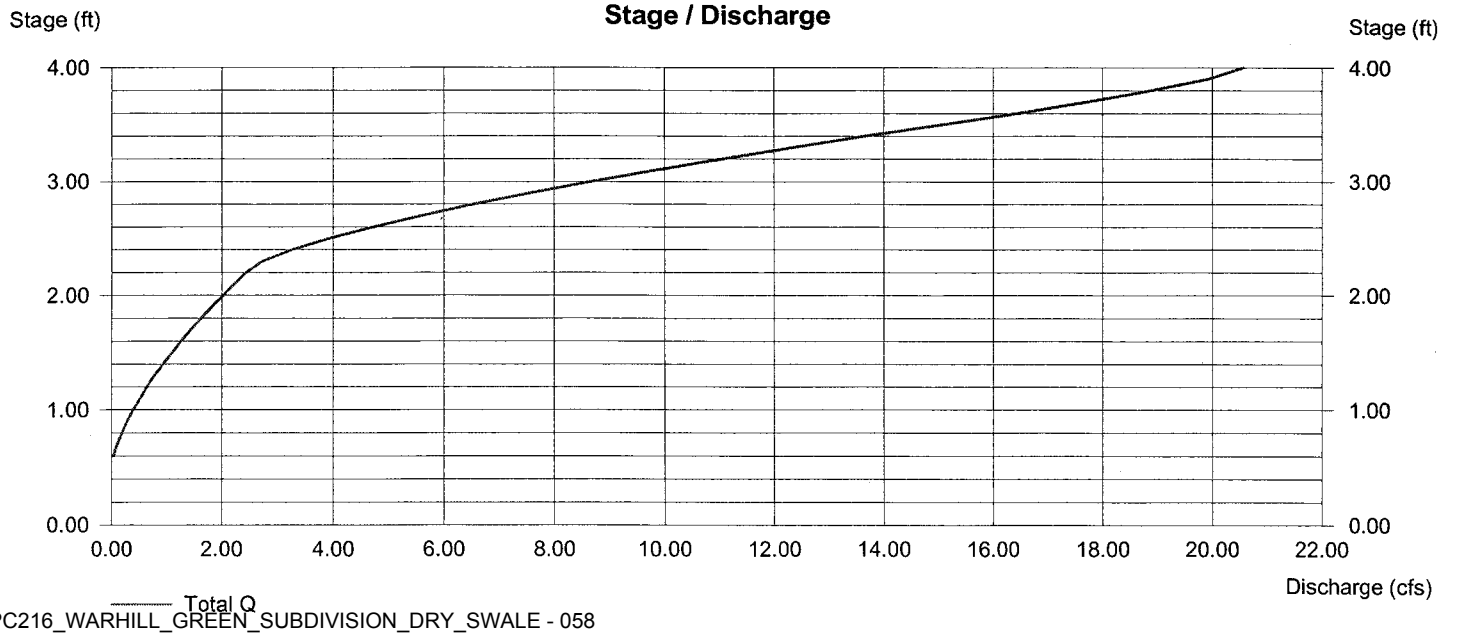
	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 94.00	0.00	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.61	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

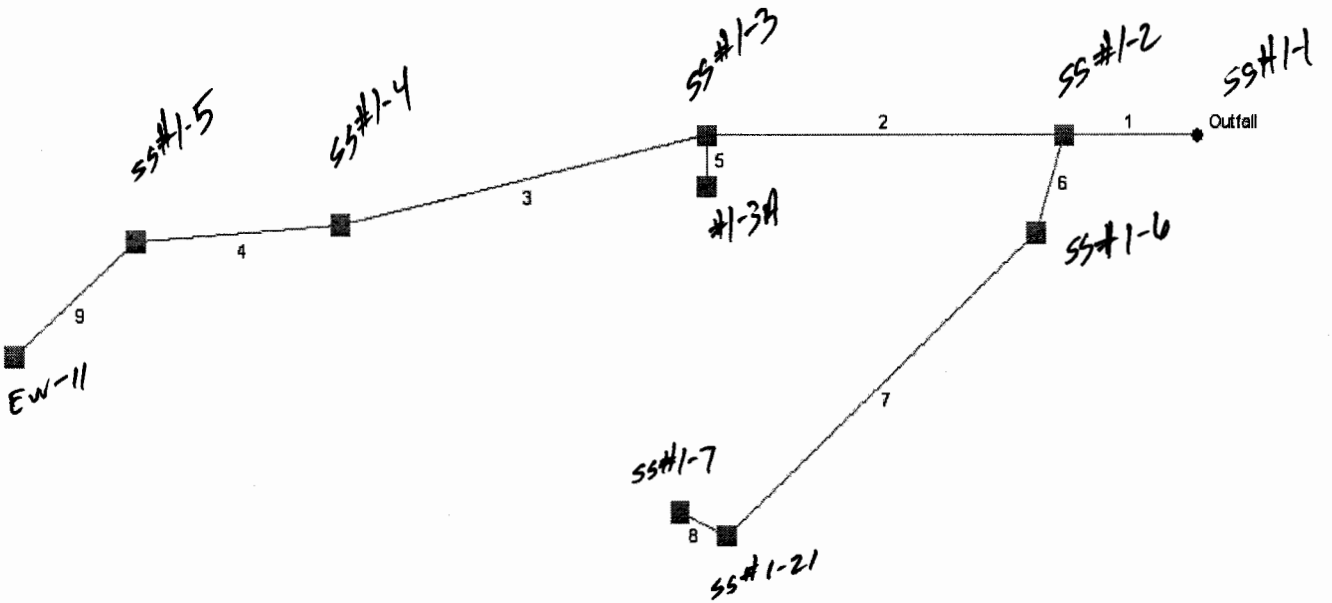
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.33	2.00	0.00	0.00
Crest El. (ft)	= 98.50	100.25	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	0.00
Weir Type	= Rect	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

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

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



Hydraflow Plan View



Project file: 942700-offsite storm system.stm	No. Lines: 9	10-20-2004

Hydraflow Storm Sewers 2003

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	59.0	180.0	Grate	0.00	0.14	0.43	7.0	77.00	6.61	80.90	24	Cir	0.013	0.50	84.31	SS#1-2 TO SS#1-1
2	1	159.0	0.0	Grate	0.00	0.10	0.51	7.0	81.00	3.28	86.21	24	Cir	0.013	0.50	89.31	SS#1-3 TO SS#1-2
3	2	167.0	-12.0	Grate	0.00	0.61	0.40	10.0	86.31	3.32	91.86	24	Cir	0.013	0.70	94.96	SS#1-4 TO SS#1-3
4	3	91.0	8.0	Grate	0.00	0.15	0.36	9.0	91.96	1.00	92.87	24	Cir	0.013	0.50	97.88	SS#1-5 TO SS#1-4
5	2	20.0	-91.0	Grate	0.00	1.01	0.44	9.0	86.31	1.00	86.51	15	Cir	0.013	1.50	89.51	SS#1-3A TO SS#1-3
6	1	40.0	-72.0	Grate	0.00	0.60	0.49	8.0	81.00	1.00	81.40	15	Cir	0.013	1.25	85.28	SS#1-6 TO SS#1-2
7	6	182.0	31.0	Curb	0.00	0.20	0.87	5.0	81.50	7.47	95.10	15	Cir	0.013	0.70	98.62	SS#1-7 TO SS#1-6
8	7	23.0	65.0	Curb	0.00	0.14	0.69	8.0	94.85	1.00	95.08	15	Cir	0.013	1.25	98.74	SS#1-8 TO SS#1-7
9	4	70.0	-36.0	Curb	7.43	0.00	0.00	0.0	92.87	1.61	94.00	18	Cir	0.013	0.75	98.50	POND TO SS#1-5

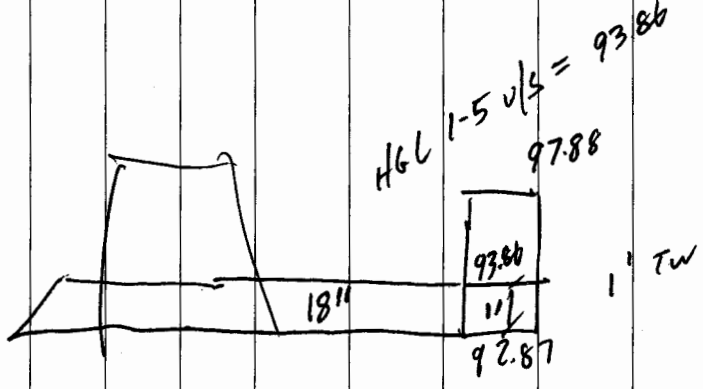
Project File: 942700-offsite storm system.stm | Number of lines: 9 | Date: 10-20-2004

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	59.0	0.14	2.95	0.43	0.06	1.42	7.0	11.6	5.7	15.47	58.15	5.77	24	6.61	80.90	77.00	82.29	79.00	84.31	77.00	SS#1-2 TO SS#1 - 1
2	1	159.0	0.10	1.87	0.51	0.05	0.79	7.0	10.9	5.8	12.03	40.94	5.16	24	3.28	86.21	81.00	87.44	82.63	89.31	84.31	SS#1-3 TO SS#1 - 2
3	2	167.0	0.61	0.76	0.40	0.24	0.30	10.0	10.0	6.0	9.21	41.23	4.63	24	3.32	91.86	86.31	92.93	87.71	94.96	89.31	SS#1-4 TO SS#1 - 3
4	3	91.0	0.15	0.15	0.36	0.05	0.05	9.0	9.0	6.2	7.76	22.62	4.33	24	1.00	92.87	91.96	93.86	93.25	97.88	94.96	SS#1-5 TO SS#1 - 4
5	2	20.0	1.01	1.01	0.44	0.44	0.44	9.0	9.0	6.2	2.74	6.46	2.24	15	1.00	86.51	86.31	87.75	87.71	89.51	89.31	SS#1-3A TO SS# 1-3
6	1	40.0	0.60	0.94	0.49	0.29	0.56	8.0	10.9	5.8	3.27	6.46	2.67	15	1.00	81.40	81.00	82.74	82.63	85.28	84.31	SS#1-6 TO SS#1 - 2
7	6	182.0	0.20	0.34	0.87	0.17	0.27	5.0	8.8	6.2	1.68	17.65	2.43	15	7.47	95.10	81.50	95.62	82.87	98.62	85.28	SS#1-7 TO SS#1 - 6
8	7	23.0	0.14	0.14	0.69	0.10	0.10	8.0	8.0	6.4	0.62	6.46	0.79	15	1.00	95.08	94.85	95.75	95.75	98.74	98.62	SS#1-8 TO SS#1 - 7
9	4	70.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	7.43	13.34	5.32	18	1.61	94.00	92.87	95.04	94.05	98.50	97.88	POND TO SS#1 - 5

PLANS 5.74%

MATCHES 10-YEAR BMP OUTFLOW

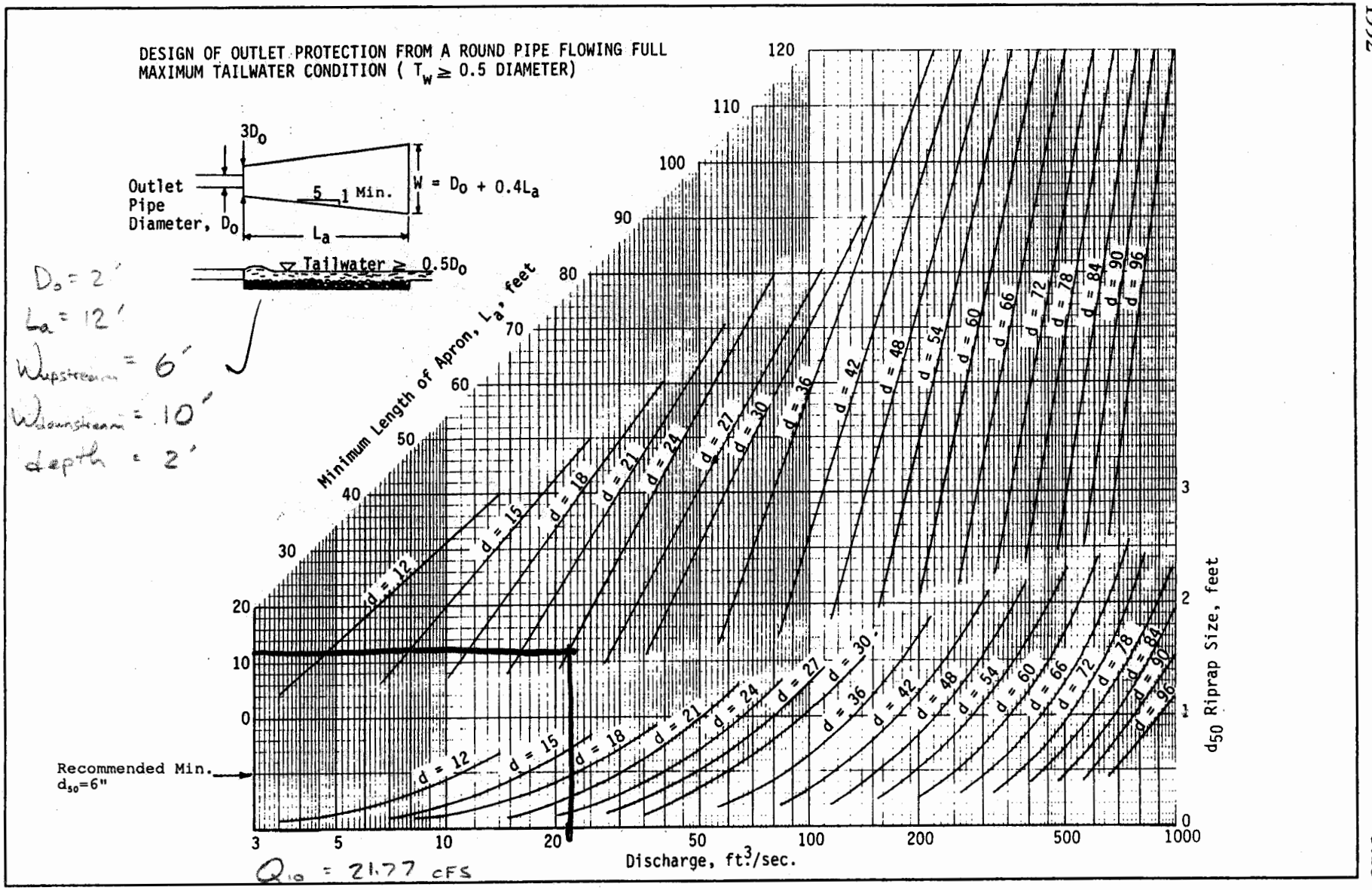


Project File: 942700-offsite storm system.stm

Number of lines: 9

Run Date: 10-20-2004

NOTES: Intensity = 143.72 / (Inlet time + 19.20) ^ 0.94; Return period = 10 Yrs.



Source: USDA-SCS

Plate 3.18-4

Sediment Basin

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project Warhill Green

Basin # 1 Location _____

Total area draining to basin 4.47 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 4.47 acres = 299.5 cu. yds. ✓ (8086CF)

2. Available basin volume = 302 cu. yds. at elevation 97.6 . (From ✓ storage - elevation curve)

3. Excavate 302 cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 4.47 acres = 147.5 cu. yds. ~ 3982

5. Elevation corresponding to cleanout level = 96.8 . ✓

   (Form Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 0.8 ft. ✓
   (Min. = 1.0 ft.) * CLEANOUT ELEVATION TO BE LOWERED TO 96.6 TO PROVIDE 1.0' SEPERATION

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 4.47 acres = 299.5 cu. yds. (8086)

8. Total available basin volume at crest of riser* = 612 cu. yds. at elevation 99. (From Storage - Elevation Curve) 16524 7 16173 ✓

*Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 4 in. ✓

10. Diameter of flexible tubing = 6 in. (diameter of dewatering orifice plus 2 inches). ✓

Preliminary Design Elevations

11. Crest of Riser = 99 ✓

Top of Dam = 102.5 ✓

Design High Water = 100.3 ✓

Upstream Toe of Dam = 96 ✓

Basin Shape

12. Length of Flow / Effective Width = L / We = _____

If > 2, baffles are not required _____

If < 2, baffles are required ✓ ✓

Runoff

13. Q_2 = _____ cfs (From Chapter 5)

14. Q_{25} = _____ cfs (From Chapter 5)

* SEE ROUTING CALCULATIONS FOR DESIGN OF OUTFLOW STRUCTURES

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = 0 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ 0 cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = _____ ft. (Using Q_2)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = _____ ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = _____ in. Actual head (h) = _____ ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = _____ ft.

Head (H) on barrel through embankment = _____ ft.

(From Plate 3.14-7).

19. Barrel diameter = _____ in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = _____ inches.

Height = _____ inches.

(From Table 3.14-D).

Emergency Spillway Design

TOKEN SPILLWAY PROVIDED AT ELEVATION=101.5

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = 0 cfs.

22. Bottom width (b) = _____ ft.; the slope of the exit channel (s) = _____ ft./foot; and the minimum length of the exit channel (x) = _____ ft.
(From Table 3.14-C)

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 3 ft.

Slope of upstream face of embankment (Z) = 2 :1.

Slope of principal spillway barrel (S_b) = 1.61 %

Length of barrel in saturated zone (L_s) = 20 ft.

24. Number of collars required = 2 dimensions = 2.75(sq)

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 102.5

Design High Water = 100.3

Emergency Spillway Crest = 101.5

Principal Spillway Crest = 99

Dewatering Orifice Invert = 97.6

Cleanout Elevation = 96.6

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 96

CONSULTING ENGINEERS
Williamsburg • Richmond

Willamsburg (757) 253-0040
Richmond (804) 330-8040

PROJECT WARHILL GREEN
PROJECT NO. 9427-00
SUBJECT CALCULATION OF DEWATERING DI
SHEET NO. 1 OF 1
CALCULATED BY JSM DATE 10/20/

FORMULAS FROM PAGE III-108 OF VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION 1992.

$$A = \frac{Q}{(64.32 \times h)^{1/2}(0.6)}$$

$$d = 2 \times \left(\frac{A}{3.14}\right)^{1/2}$$

A = AREA OF DEWATERING ORIFICE, SF
d = DIAMETER OF ORIFICE, FT
h = AVERAGE DRIVING HEAD, FT
Q = VOLUMETRIC FLOWRATE FOR 6-HOUR DEWATERING, CFS
S = DRY STORAGE VOLUME, CF
Q = S/21,600 SECONDS

h = 0.64 FT $\left[99-\left(97.6+\left(\frac{1.5\text{ in}}{12\text{ in/ft}}\right)\right)\right]$
S = 299.5 CY = 8086.5 CF
Q = 0.37 CFS

$$A = \frac{0.37}{(64.32 \times 0.64)^{1/2}(0.6)} = 0.097 \text{ SF}$$

$$d = (2)\left(\frac{0.097}{3.14}\right)^{1/2} = 0.352 \text{ FT} \times 12 \text{ in}$$

$$= 4.22 \text{ in} \quad \checkmark$$

$d = 4$ in

* CANNOT BE LESS THAN 3 IN DUE TO CLOGGING

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	-------	12.83	-------	-------	23.05	25.69	-------	-------	Post-Development
4	Reservoir	1	-------	10.36	-------	-------	18.81	19.48	-------	-------	Routed Post-dev.

2 PRE

2.59

77 GREATER THAN POST USED FOR OFFSITE STORM DESIGN

7.43 CFS

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	12.83	6	720	40,110	----	------	------	Post-Development
4	Reservoir	10.36	6	726	40,087	1	99.60	20,678	Routed Post-dev.

Hydrograph Plot

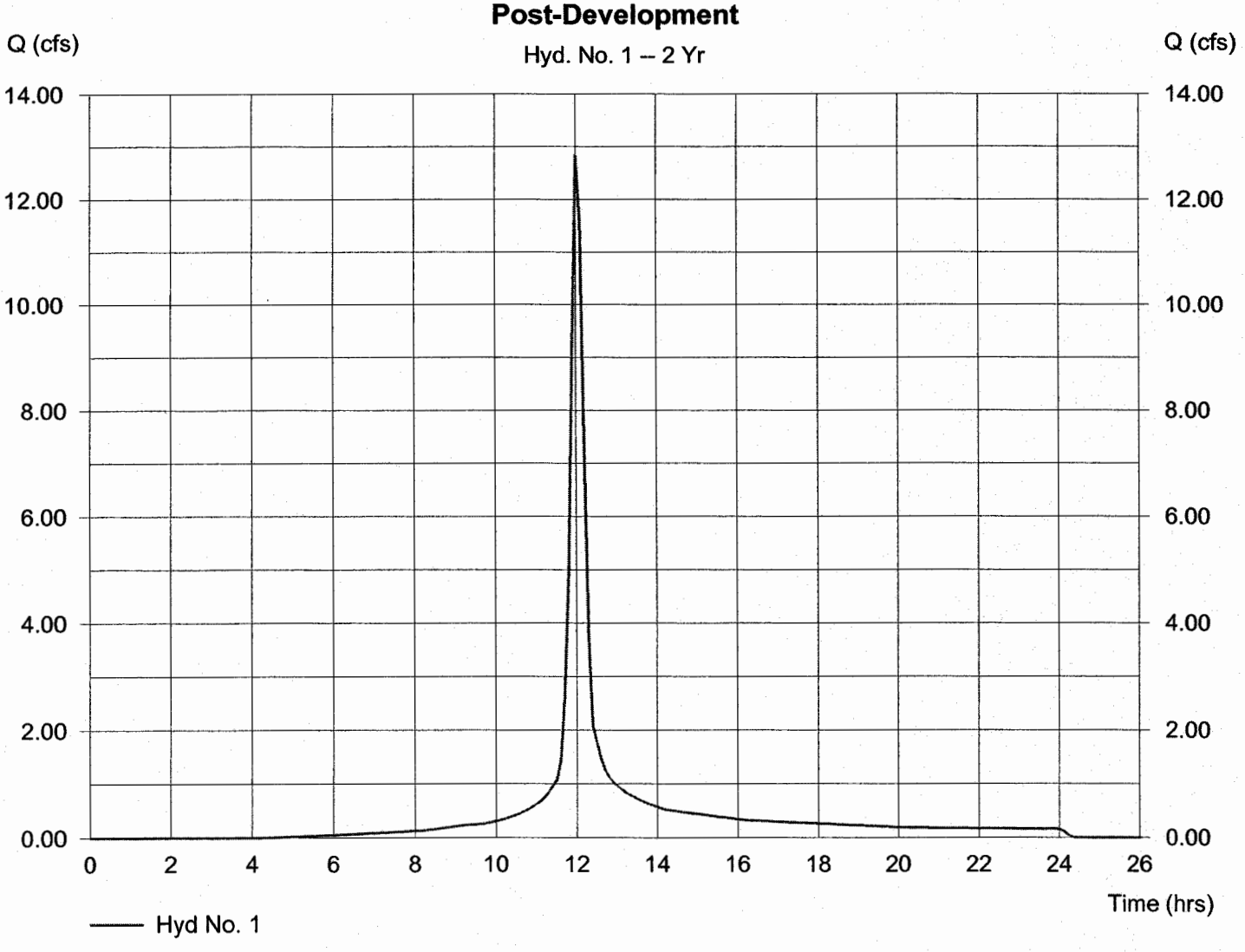
Hydraflow Hydrographs by Intelisolve | Wednesday, Oct 20 2004, 2:7 PM

Hyd. No. 1

Post-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 12.83 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Drainage area	= 4.47 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 40,110 cuft



Hydrograph Plot

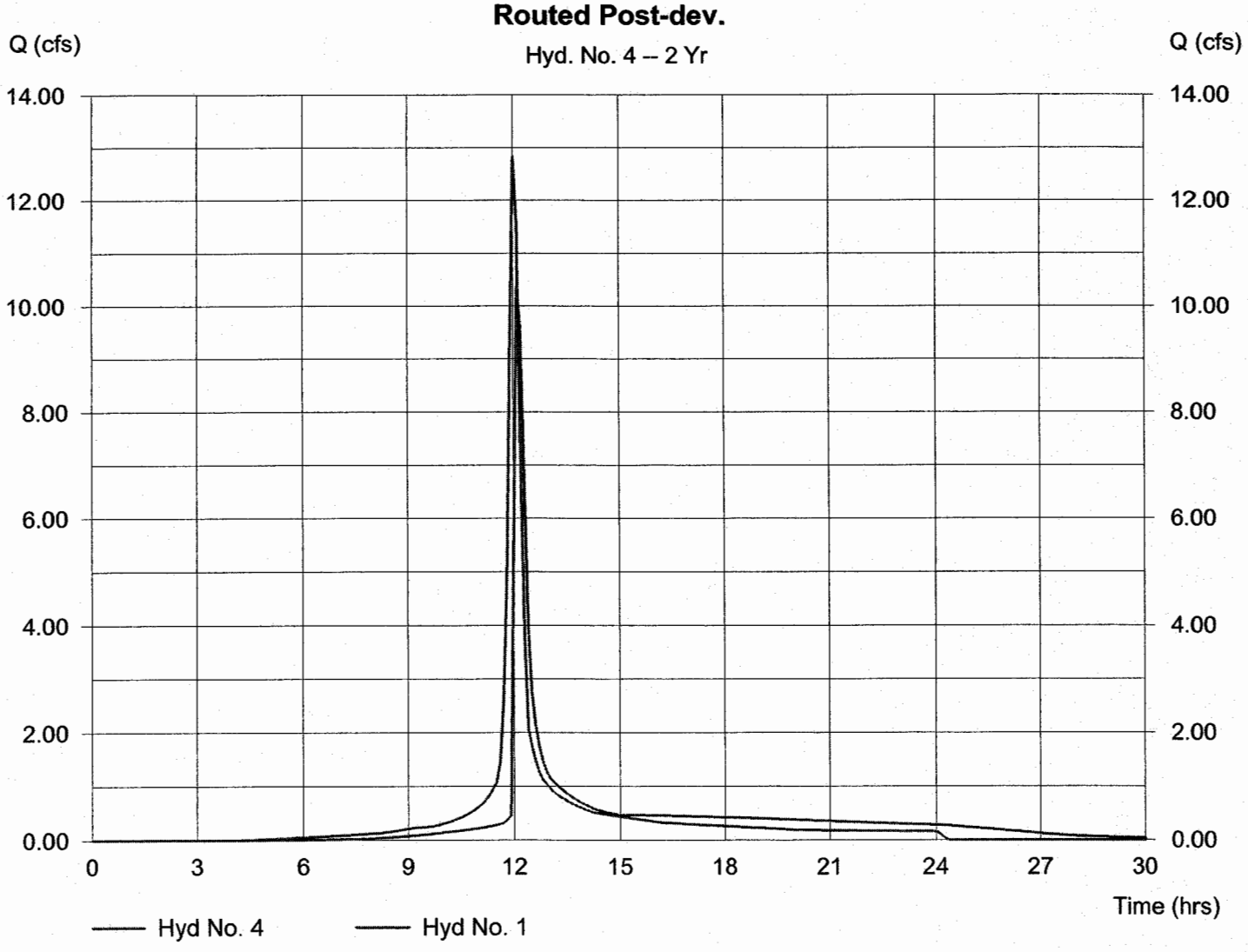
Hydraflow Hydrographs by Intelisolve | Wednesday, Oct 20 2004, 2:7 PM

Hyd. No. 4

Routed Post-dev.

Hydrograph type	= Reservoir	Peak discharge	= 10.36 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Inflow hyd. No.	= 1	Max. Elevation	= 99.60 ft
Reservoir name	= Sediment Basin #1	Max. Storage	= 20,678 cuft

Storage Indication method used. Wet pond routing start elevation = 97.60 ft. | Hydrograph Volume = 40,087 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Oct 20 2004, 2:7 PM

Pond No. 4 - Sediment Basin #1

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	96.00	4,559	0	0
1.00	97.00	5,172	4,866	4,866
2.00	98.00	5,824	5,498	10,364
3.00	99.00	6,514	6,169	16,533
4.00	100.00	7,242	6,878	23,411
5.00	101.00	8,009	7,626	31,036
6.00	102.00	8,814	8,412	39,448

Culvert / Orifice Structures

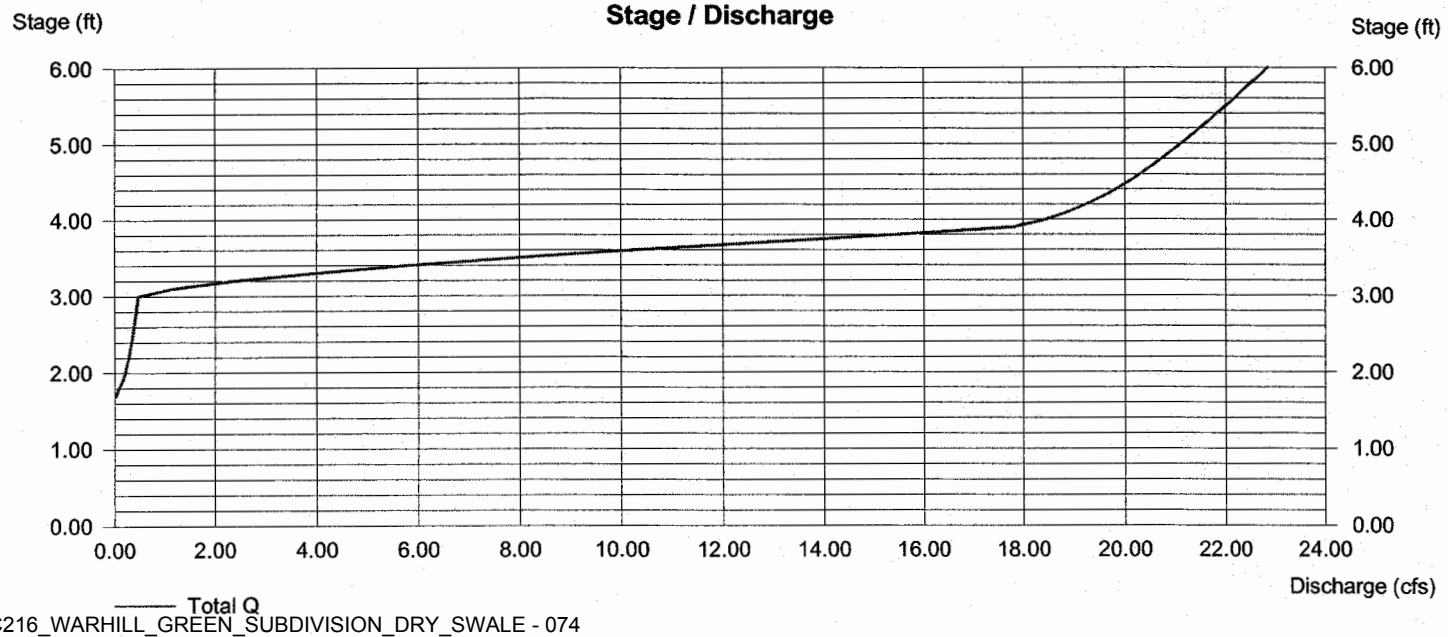
	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 94.00	97.60	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.61	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.28	0.00	0.00	0.00
Crest El. (ft)	= 99.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

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

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



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	23.05	6	720	74,127	----	------	------	Post-Development
4	Reservoir	18.81	6	726	74,103	1	100.08	24,021	Routed Post-dev.

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

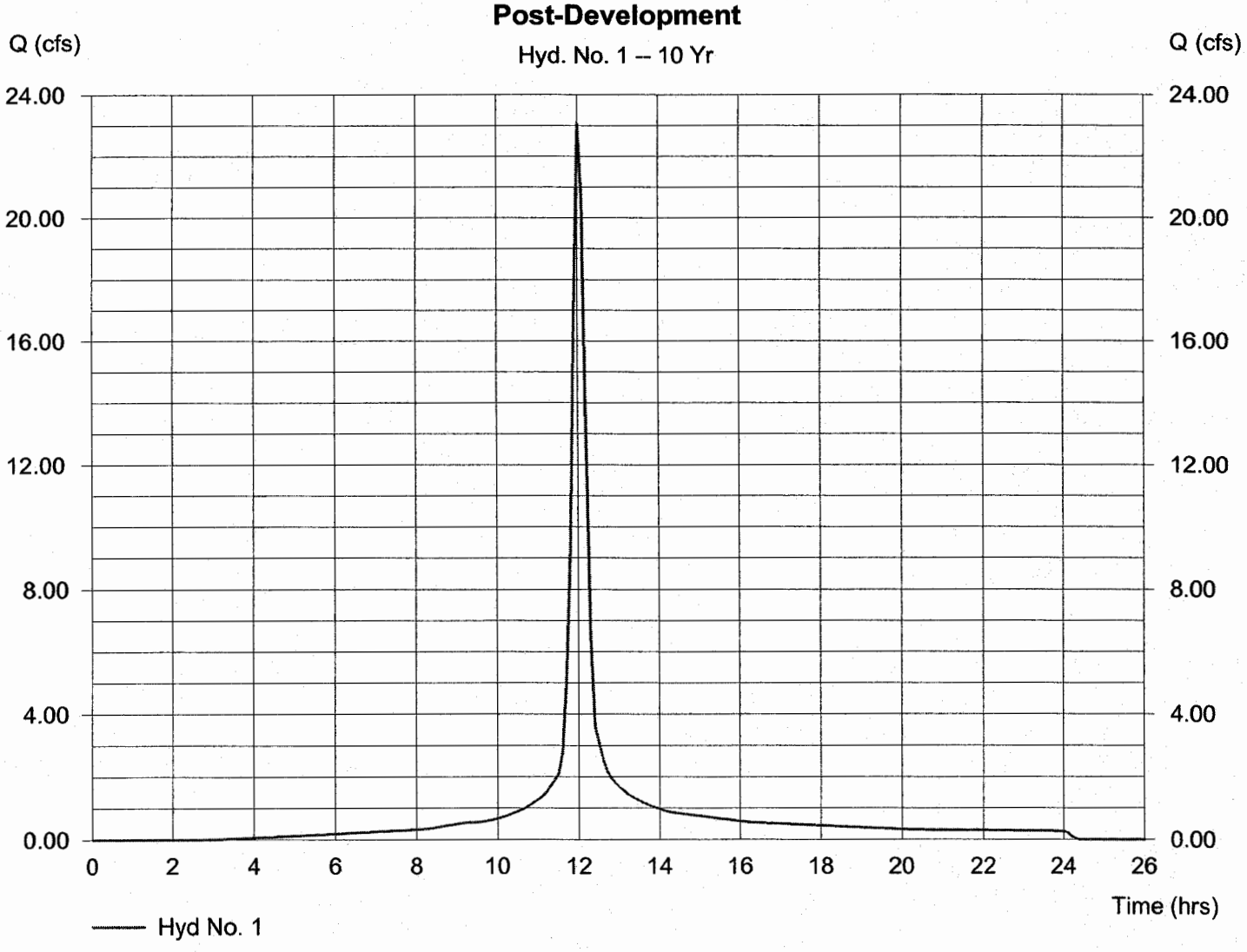
Wednesday, Oct 20 2004, 2:7 PM

Hyd. No. 1

Post-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 23.05 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 4.47 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 74,127 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve | Wednesday, Oct 20 2004, 2:7 PM

Hyd. No. 4

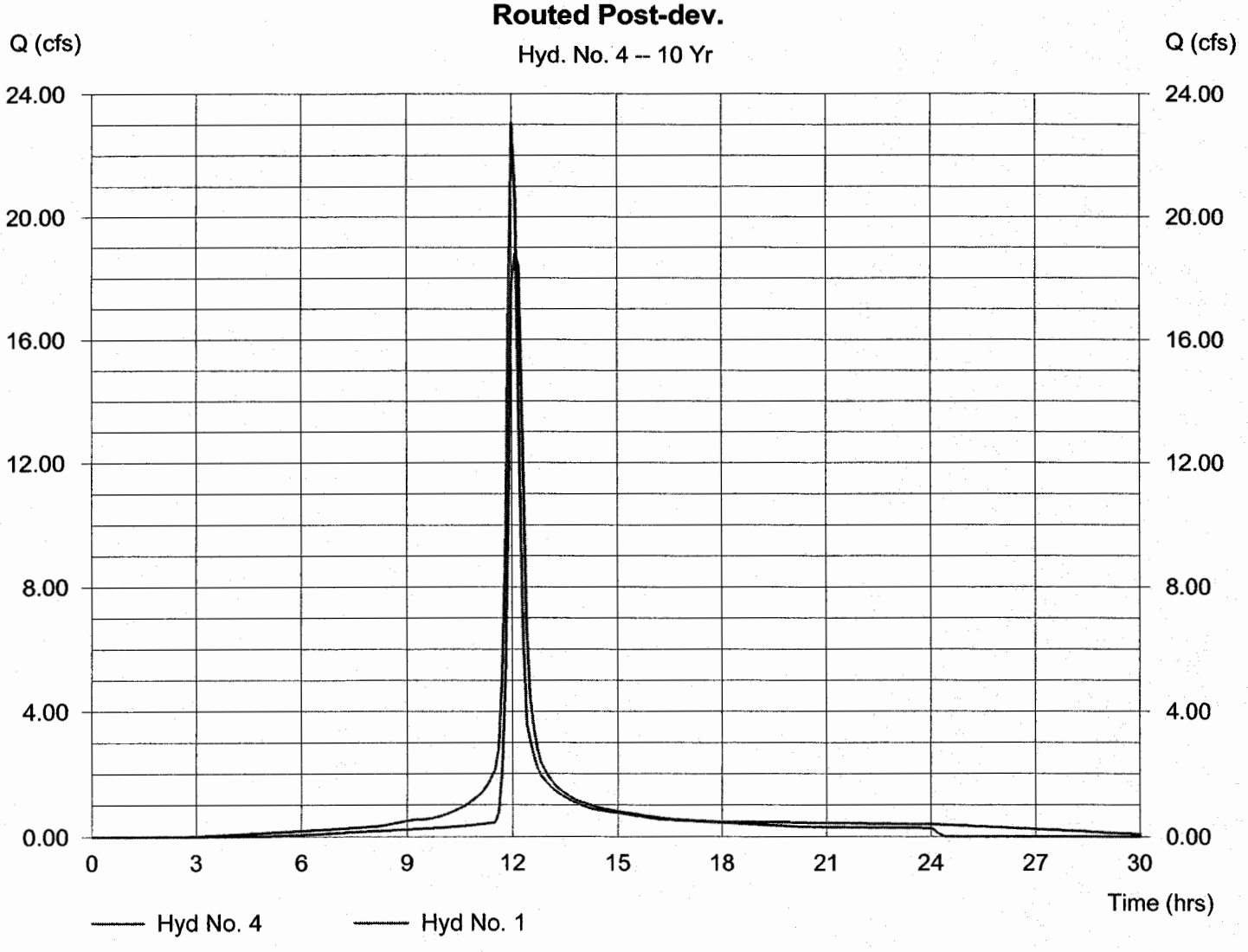
Routed Post-dev.

Hydrograph type	= Reservoir	Peak discharge	= 18.81 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Inflow hyd. No.	= 1	Max. Elevation	= 100.08 ft
Reservoir name	= Sediment Basin #1	Max. Storage	= 24,021 cuft

T 7.43

Storage Indication method used. Wet pond routing start elevation = 97.60 ft.

Hydrograph Volume = 74,103 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Oct 20 2004, 2:7 PM

Pond No. 4 - Sediment Basin #1

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	96.00	4,559	0	0
1.00	97.00	5,172	4,866	4,866
2.00	98.00	5,824	5,498	10,364
3.00	99.00	6,514	6,169	16,533
4.00	100.00	7,242	6,878	23,411
5.00	101.00	8,009	7,626	31,036
6.00	102.00	8,814	8,412	39,448

Culvert / Orifice Structures

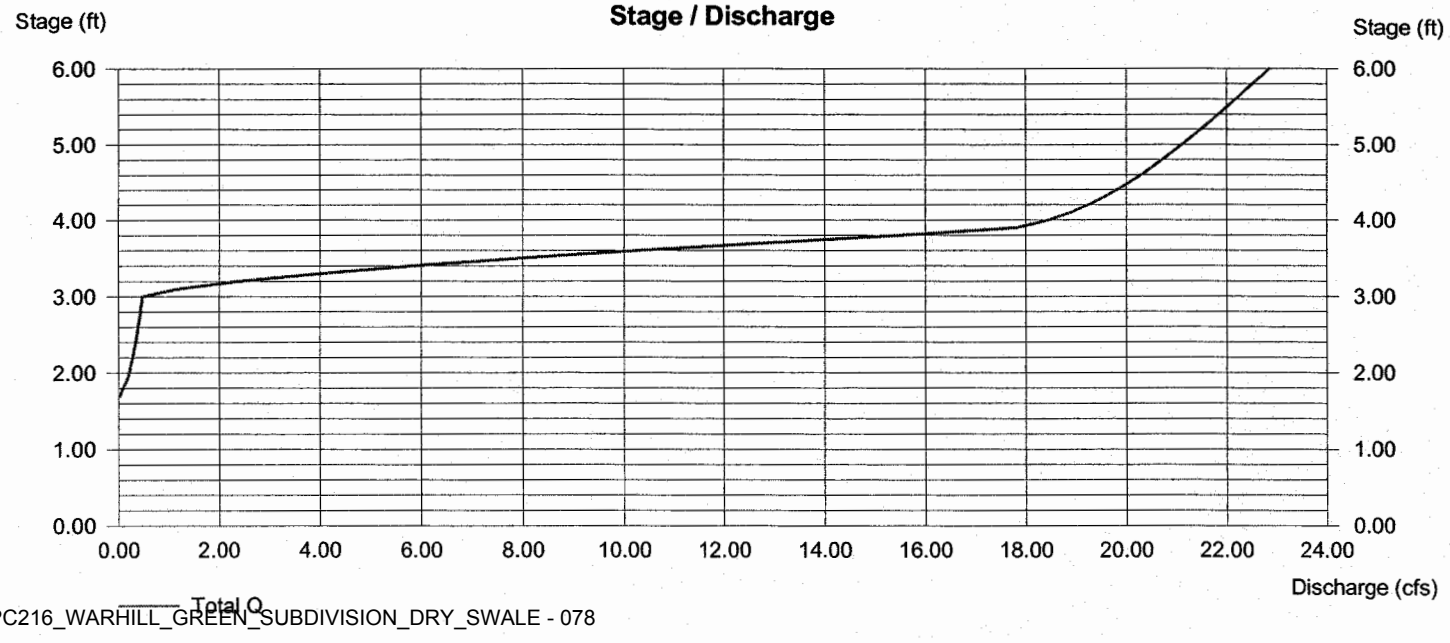
	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 94.00	97.60	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.61	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.28	0.00	0.00	0.00
Crest El. (ft)	= 99.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

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

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



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	25.69	6	720	83,104	----	------	------	Post-Development
4	Reservoir	19.48	6	726	83,081	1	100.28	25,515	Routed Post-dev.

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

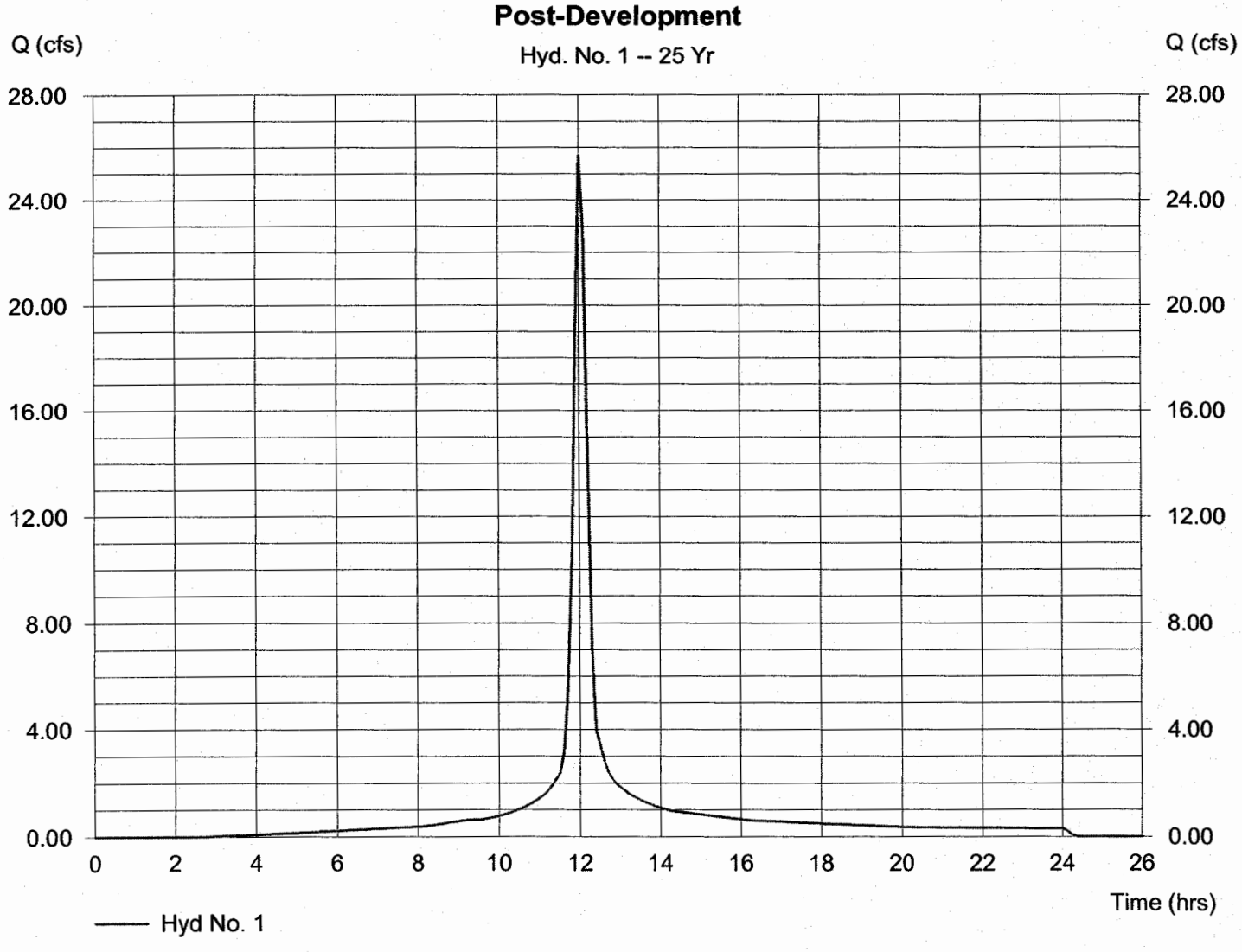
Wednesday, Oct 20 2004, 2:7 PM

Hyd. No. 1

Post-Development

Hydrograph type	= SCS Runoff	Peak discharge	= 25.69 cfs
Storm frequency	= 25 yrs	Time interval	= 6 min
Drainage area	= 4.47 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.6 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 83,104 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Oct 20 2004, 2:7 PM

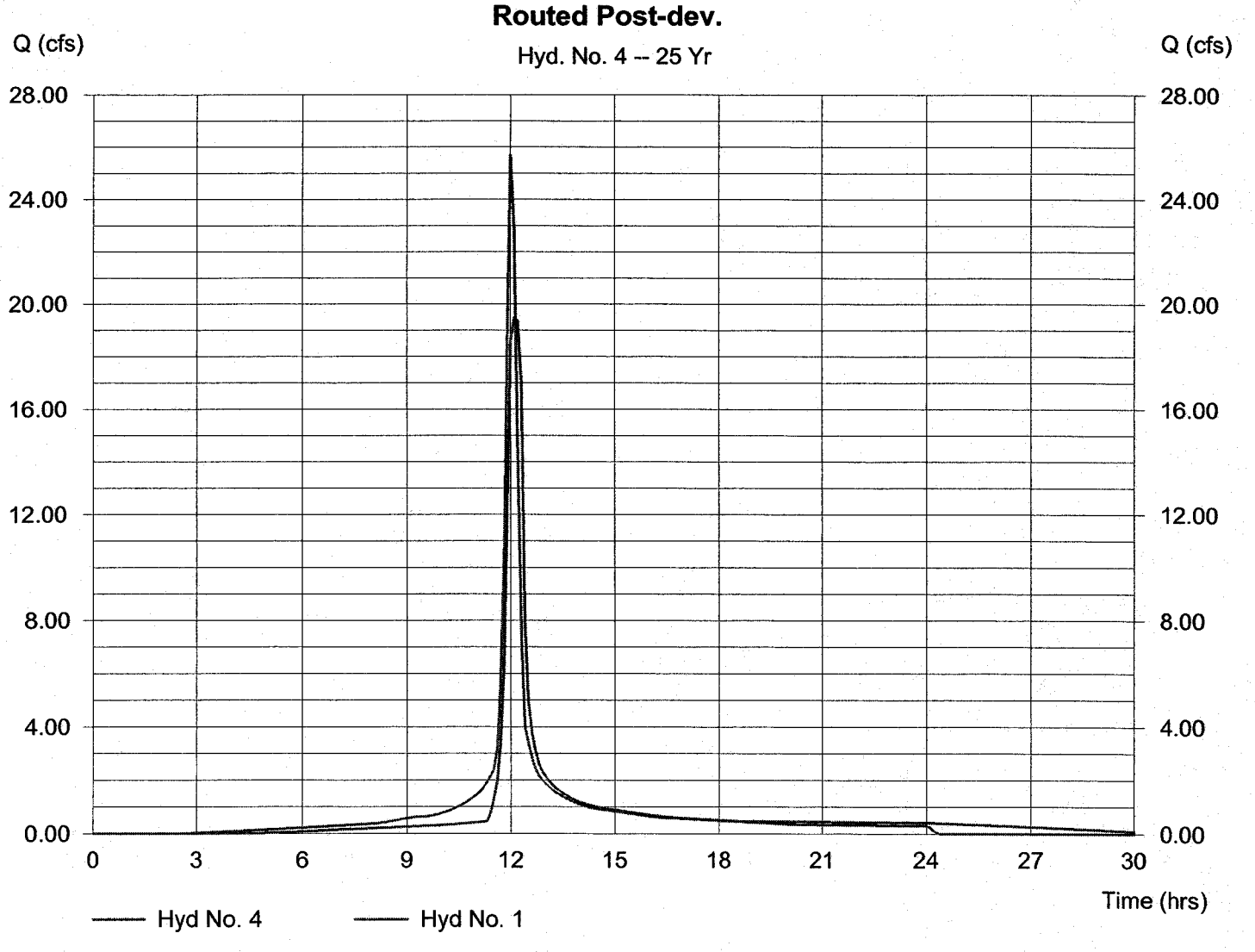
Hyd. No. 4

Routed Post-dev.

Hydrograph type	= Reservoir	Peak discharge	= 19.48 cfs
Storm frequency	= 25 yrs	Time interval	= 6 min
Inflow hyd. No.	= 1	Max. Elevation	= 100.28 ft
Reservoir name	= Sediment Basin #1	Max. Storage	= 25,515 cuft

Storage Indication method used. Wet pond routing start elevation = 97.60 ft.

Hydrograph Volume = 83,081 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Oct 20 2004, 2:7 PM

Pond No. 4 - Sediment Basin #1

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	96.00	4,559	0	0
1.00	97.00	5,172	4,866	4,866
2.00	98.00	5,824	5,498	10,364
3.00	99.00	6,514	6,169	16,533
4.00	100.00	7,242	6,878	23,411
5.00	101.00	8,009	7,626	31,036
6.00	102.00	8,814	8,412	39,448

Culvert / Orifice Structures

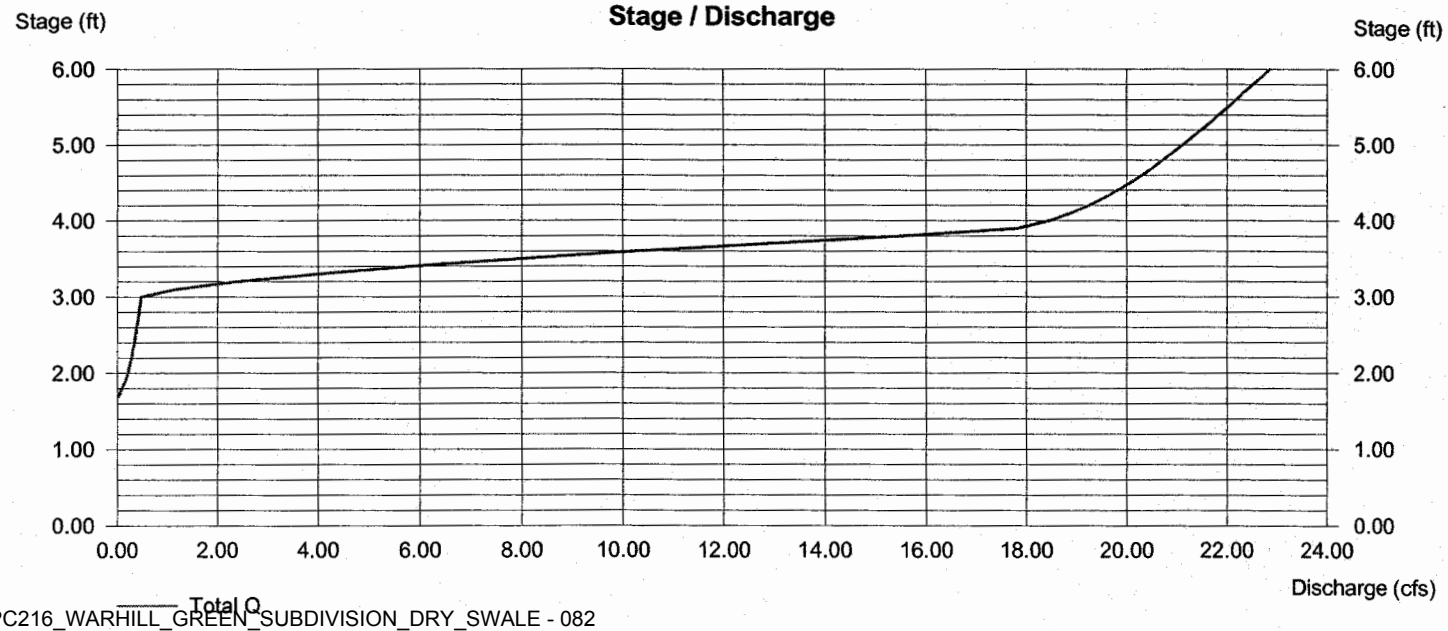
	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 94.00	97.60	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.61	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.28	0.00	0.00	0.00
Crest El. (ft)	= 99.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

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

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



Warhill Green

Stormwater Management Design Calculations
Addenda #1

Date: August 4, 2004
Revised: October 20, 2004
December 22, 2004

Prepared by:

AES Consulting Engineers
5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188
(757) 253-0040 Fax: (757) 220-8994
http://www.aesva.com

III. **DETERMINING REQUIRED WATER QUALITY VOLUME**

Percent Impervious of the BMP Watershed, Post-Development	33.6%		
Drainage Area of the BMP Watershed	4.47	acres	
Impervious Acres of BMP Watershed	1.50	acres	

Calculation for Water Quality Volume, WQ_v

WQ_v = (1.0 inches per impervious acre) *(impervious acres of BMP watershed)

WQv = (1.0 inches)*(1 ft / 12 inches) * (43560 sq. Ft per acre) * (impervious acres of BMP watershed)

WQ_v = (1.0 inches)*(1 ft / 12 inches) * (43560 sq. Ft per acre) *	1.50	=	5445 cu. Ft
WQ_v =	5,445 cu. Ft		Required Volume
WQ_v =	5,445 cu. Ft		Volume Provided at Elevation 24.00

IV. **DETERMINING PROVIDED WATER QUALITY VOLUME**

Water Quality Volume is provided by five individual check dams and a sump area in front of Modified EW-11 outlet device.
All proposed side slopes of dry swales are 3:1.

Check Dam #	Height of Check Dam (ft)	Bottom Width (ft)	Length of storage behind Check Dams (ft)	Area of Swale at Check Dam (sf)	Volume Provided (cf)	
1	1	6	222	9.00	999	
2	1.5	6	333	15.75	2622	
3	1.33	2	200	7.97	797	
4	1	2	161	5.00	403	
5	0.5	2	81	1.75	71	
Outlet*					770	*Volume from Hydraflow

Cumulative Total Volume Provided= 5661 cu.ft.

OK Volume provided is greater than Volume required.

$$5661\,CF = 1'' \left(\frac{1'}{12''}\right) \frac{43{,}560\,SF}{1\,Ac} (X\ Ac)$$

$$X = 1.56\ Ac.$$

⇒ WATER QUALITY VOLUME PROVIDED WILL TREAT 1.56 AC OF IMPERVIOUS AREA.

ON-SITE IMPERVIOUS AREA = 1.43 ACRES
(PER SP-098-04 dated 12/22/04)

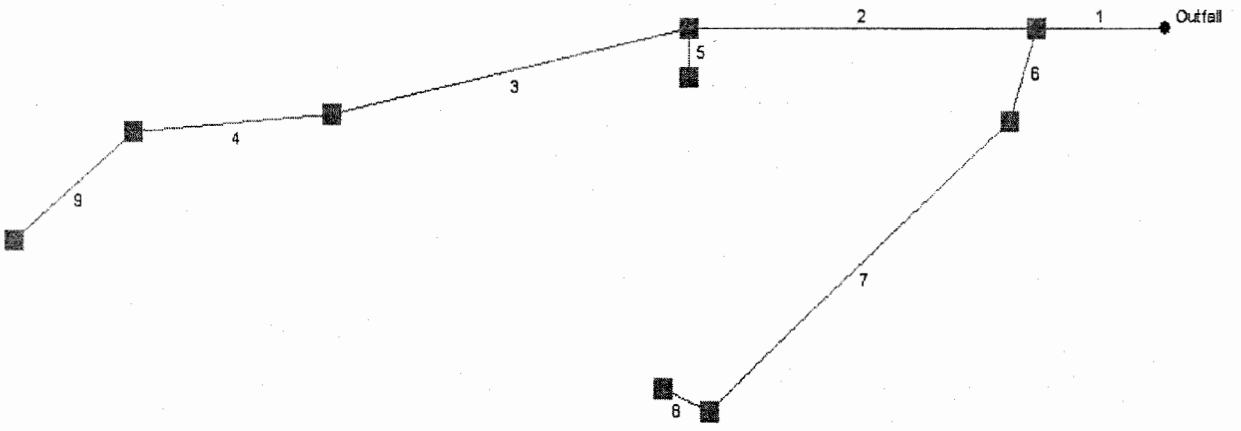
RESIDUAL (OFF-SITE) IMPERVIOUS AREA ALLOWED = 0.13 ACRES

mat. CAP FOR OFFSITE IMPERV AREA. ANY MORE WILL REQUIRE BMPS FOR WQ ON SITE

⇒ THE WARHILL GREEN FACILITY WILL TREAT APPROXIMATELY 0.13 ACRES OF ADDITIONAL IMPERVIOUS AREA FROM OFF-SITE. THIS IS APPROXIMATELY 21% OF THE TOTAL OFF-SITE DRAINAGE AREA OF 0.62 ± ACRES.

III.

Hydraflow Plan View



Project file: 942700-offsite storm system(comments).stm	No. Lines: 9	01-03-2005

Hydraflow Storm Sewers 2003

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	59.0	0.14	2.95	0.43	0.06	1.42	7.0	11.2	5.8	26.97	58.15	8.80	24	6.61	80.90	77.00	82.71	79.00	84.31	77.00	SS#1-2 TO SS#1
2	1	159.0	0.10	1.87	0.51	0.05	0.79	7.0	10.4	5.9	23.48	40.94	7.82	24	3.28	86.21	81.00	87.93	83.34	89.31	84.31	SS#1-3 TO SS#1
3	2	167.0	0.61	0.76	0.40	0.24	0.30	10.0	10.0	6.0	20.59	41.23	7.08	24	3.32	91.86	86.31	93.47	88.45	94.96	89.31	SS#1-4 TO SS#1
4	3	91.0	0.15	0.15	0.36	0.05	0.05	9.0	9.0	6.2	19.14	22.62	6.32	24	1.00	92.87	91.96	94.63	94.10	97.88	94.96	SS#1-5 TO SS#1
5	2	20.0	1.01	1.01	0.44	0.44	0.44	9.0	9.0	6.2	2.74	6.46	2.23	15	1.00	86.51	86.31	88.49	88.45	89.51	89.31	SS#1-3A TO SS#
6	1	40.0	0.60	0.94	0.49	0.29	0.56	8.0	10.9	5.8	3.27	6.46	2.67	15	1.00	81.40	81.00	83.45	83.34	85.28	84.31	SS#1-6 TO SS#1
7	6	182.0	0.20	0.34	0.87	0.17	0.27	5.0	8.8	6.2	1.68	17.65	2.43	15	7.47	95.10	81.50	95.62	83.58	98.62	85.28	SS#1-7 TO SS#1
8	7	23.0	0.14	0.14	0.69	0.10	0.10	8.0	8.0	6.4	0.62	6.46	0.79	15	1.00	95.08	94.85	95.75	95.75	98.74	98.62	SS#1-8 TO SS#1
9	4	70.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	18.81	13.34	10.65	18	1.61	94.00	92.87	97.21	94.96	98.50	97.88	POND TO SS#1-

POND OK.

@ for temp sed. basin mode which is > final 10-yr discharge (7.43cfs). Check comps.

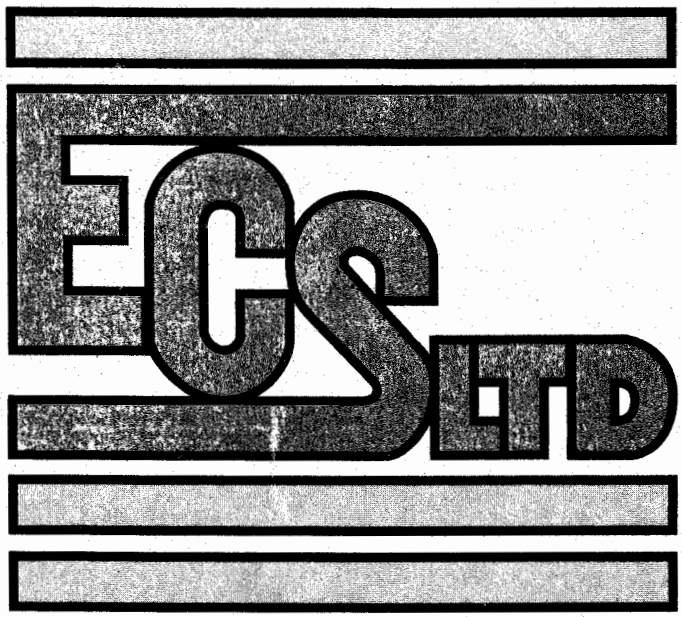
'98
84
182'

FINAL - OFFSITE STORM SYSTEM (SHEET 8)

OK.

Project File: 942700-offsite storm system(comments).stm | Number of lines: 9 | Run Date: 01-03-2005

NOTES: Intensity = 143.72 / (Inlet time + 19.20) ^ 0.94; Return period = 10 Yrs.



REPORT OF

SUBSURFACE EXPLORATION
AND GEOTECHNICAL ENGINEERING ANALYSIS

WARHILL GREEN
WILLIAMSBURG, VIRGINIA

FOR

Mr. Henry H. Stephens

July 25, 2004

ECS Project No. 07:7004

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

OCT 2004
RECEIVED
PLANNING DEPARTMENT

August 6, 2004

RECEIVED
AUG 13 2004
AES CONSULTING ENGINEERS

Mr. Henry H. Stephens
Associated Developers, Inc.
5300 Mercury Boulevard
P.O. Drawer 18, Parkview Station
Newport News, Virginia 23605

ECS Project No. 07:7004

Reference: Subsurface Exploration and Geotechnical Engineering Analysis Addendum
Warhill Green – Infiltration Trenches
Williamsburg, Virginia

Dear Mr. Stephens:

Engineering Consulting Services, Ltd. has completed a subsurface exploration and engineering evaluation of the above referenced project. This report presents the results of infiltration testing for trench design. We were provided with a portion of a plan from AES illustrating the proposed infiltration trenches. This project has been completed in accordance with our proposal No. 07:10890 dated July 12, 2004. Our geotechnical report was previously submitted on July 26, 2004 which included preliminary soil characteristics for infiltration purposes.

Infiltration Trenches

Two infiltration trenches are proposed within the planned development. We performed six soil borings in these areas and two infiltration tests on the encountered Clayey and Silty Sand (SC/SM) soils. The infiltration testing was performed utilizing an Amoozemeter Model 1059 by KSAT, Inc. The Amoozemeter is a Compact Constant Head Permeameter that is used to measure in-situ saturated hydraulic conductivity (Ksat).

The North infiltration trench containing boring locations B-12 through B-14 has a measured infiltration rate for the Silty Sand material of 1.74 in/hr. These clayey and silty sand soils have a Hydrologic Soil Group designation of A to B. This rate of infiltration is slightly higher than previously estimated.

The South infiltration trench contains boring locations B-15 through B-17. No recordable infiltration rate was observed after approximately 1 hour. Therefore, the approximated infiltration rate for the clayey sand material is approximately 0.09 in/hr. We estimate these clayey sand soils have a Hydrologic Soil Group designation of D.

E-3 FILTER NOT PVRE INFIL. UNDERDRAIN SYSTEM.

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

Offices: Richmond, VA • Chesapeake, VA • Washington, D.C. • Williamsburg, VA • Roanoke, VA • Fredericksburg, VA • Danville, VA • Winchester, VA
Aberdeen, MD • Baltimore, MD • Frederick, MD • Research Triangle Park, NC • Wilmington, NC • Charlotte, NC • Greensboro, NC • Greenville, SC • Atlanta, GA

Typically, soil with the Hydrologic Soil Group designations of A and B are considered to be suitable for Best Management Practices (BMP) that may utilize on-site infiltration in their designs. 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 generally not considered suitable for infiltration practices.

The subgrade soils encountered in the southern trench will likely require manipulation to increase the rate of infiltration.

General Comments:

This addendum report 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 addendum or if we can be of any further assistance, please contact our office.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

David Gordinier, E.I.T.
Project Engineer

W. Lloyd Ward, P.E.
Senior Engineer

DJG:WLW/kks

I:\Projects\2004 Projects\Geotechnical\7004 War Hill Green\Report\7004 Infiltration Addendem.doc

ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical Construction Materials Environmental

Mr. Henry H. Stephens
Associated Developers, Inc.
5300 Mercury Boulevard
P.O. Drawer 18, Parkview Station
Newport News, Virginia 23605

ECS Project No. 07:7004

Reference: Subsurface Exploration and Geotechnical Engineering Analysis
Warhill Green
Williamsburg, Virginia

Dear Mr. Stephens:

Engineering Consulting Services, Ltd. has completed a subsurface exploration and engineering evaluation of the above referenced project. This report presents the results of the subsurface exploration and engineering analyses including pavement, and building foundation design recommendations and soil parameters for infiltration trench design. We were provided with a portion of a plan from AES illustrating the proposed buildings, parking area, and infiltration trenches. This project has been completed in accordance with our proposal No. 07:10890 dated July 12, 2004.

Introduction:

The project site is located adjacent to the existing Mulberry Place off of Centerville Road in Williamsburg, Virginia. At the time of our site reconnaissance, the site was relatively level and grass covered.

The proposed project will consist of the development of three (3) two to three story residential structures with associated parking areas and two infiltration trenches. The purpose of this exploration was to explore the soil and groundwater conditions at the site and to develop soils-related engineering recommendations to guide design and construction of the planned buildings, parking areas, and infiltration trenches. Our investigation included drilling seventeen (17) soil borings to explore the subsurface soil and groundwater conditions, performing a site reconnaissance to observe general topography, and analyzing field data to develop appropriate geotechnical engineering recommendations regarding the proposed building, parking area, and infiltration trench construction. A Boring Location Plan is included in Appendix I.

Field Exploration Procedures:

Nine (9) soil test borings were performed in the proposed building areas (B-1 through B-9), six (6) borings were performed in the proposed infiltration trenches (B-12 through B-17), and two (2) soil test boring was performed in each of the parking areas (B-10, B-11). The soil test borings were performed with a ATV-mounted drill rig utilizing continuous flight, hollow stem augers to advance the borehole. Drilling slurry fluid was not used in this process.

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

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

Subsurface Conditions:

Experienced personnel from our office classified each soil sample in accordance with the Unified Soil Classification System (USCS) and/or the United States Department of Agriculture (USDA) textural classification system, as applicable. Select samples from the test borings were subjected to classification testing to confirm our visual classifications. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. The geotechnical engineer grouped the various soil types into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in situ, the transitions may be gradual. A brief explanation of the USCS and a Reference Notes for Boring Log sheet is provided in Appendix IV of this report.

Our subsurface exploration and site reconnaissance determined that the surface of the site is generally covered with about 6 to 9 inches of topsoil. Underlying the surficial topsoil, we encountered stratum I, which consisted of interbedded deposits of very loose to medium dense density Silty and Clayey Fine SANDS (SM, SC) and medium stiff to very stiff consistency Sandy CLAY (CL, CH) that extended to boring termination depth of 10 to 15 feet below ground surface (bgs). The Standard Penetration Test (SPT) N-values recorded within this layer ranged from 2 to 34 blows-per-foot (bpf). Laboratory Analysis were completed for these soils. We have attached these results in Appendix III.

Groundwater was not encountered at any of the boring locations. Please note that groundwater levels are influenced by seasonal conditions and by periods of significant precipitation or prolonged drought. Due to the depth of groundwater, it does not appear that it will pose a problem during the proposed building or parking area, however it may be encountered during infiltration trench construction. If groundwater is encountered, groundwater control can likely be accomplished by pumping from gravel lined sump pumps.

Subgrade Preparation and Earthwork Operations:

The average depth of topsoil recorded in the test borings was about 6 to 9 inches. Therefore, for project planning purposes, we recommend a 10-inch stripping depth for this site to remove topsoil and associated organic matter. Isolated areas may require further cuts of an additional 12 inches or more due to tree stumps or root mat. The stripping depth should be evaluated at the time of construction by representatives of the Geotechnical Engineer. If the undercuts extend into large areas, the undercut volume could be reduced by the use of geotextiles or geogrids. The use of geosynthetic reinforcement should be evaluated by the geotechnical engineer at the time of construction. Cut and fill operations should extend a minimum of 5 feet beyond the pavement, including parking area shoulders, and building pad limits.

After stripping or cutting to the desired grade, and prior to fill placement, subgrades should be observed by the Geotechnical Engineer. Proofrolling using a loaded tandem axle dump truck having an axle weight of at least 10 tons should be used at this time to aid in identifying localized soft or unsuitable material. An outcome of the proofrolling operations may be to again scarify, aerate, and recompact the soils at a moisture content near the soils optimum moisture content.

Any soft or unsuitable materials encountered during proofrolling, which cannot be stabilized by reworking the soil as discussed above, should be removed and replaced with an approved structural fill. Undercut volumes should be determined by cross-sectioning the area before and after undercut. We have found that calculating undercut volumes by truck counts is less accurate and generally results in additional expense to the owner. In order to minimize undercutting we recommend earthwork operations be performed during the drier times of the year.

We recommend the contract documents include an allowance for undercutting and/or reworking soft near surface soils (if encountered) and replacement with engineered fill. Add/deduct unit prices should also be established so adjustment for the actual volume of undercut can be made.

The soils on the site which will likely be excavated and re-used as structural fill material will be the sands of Stratum I. These soils should be suitable for re-use as fill or backfill if properly prepared. All proposed select fill soils should be submitted to the geotechnical engineer for approval prior to their use on the project.

We recommend engineered fill (select) material to raise pavement subgrade or building pad elevations or for use in backfilling operations. This material should consist of an approved inorganic material classified as CL, SM, SM-SP, SP, SC or better containing less than about 70% by weight Silt or Clay and free of debris. Most of the on-site soils meet these classifications. This material should be placed in horizontal lifts not exceeding 8 inches in loose thickness, moisture conditioned to within +/- 3% of the optimum moisture content, and compacted to a minimum of 95% of the maximum dry density obtained in accordance with ASTM D698, Standard Proctor method. Select fill should extend a minimum of 5 feet beyond the edge of pavement or building pad limits and then slope no greater than 2 horizontal to 1 vertical. Dense graded aggregate placed as pavement base course should be compacted to at least 100 percent of maximum dry density per ASTM D698, Standard Proctor.

Seismic Design

We have evaluated the seismic site coefficient in accordance with IBC 2000. We consider the soils to match Site-Class Type E based on the IBC 2000 "Site Class Definitions", Section 1615.1.1.

Foundations

Based on the results of our exploration and analysis, it is our opinion that the proposed building can be supported by shallow spread footings or a turned-down slab bearing on suitable natural soils or in properly compacted select fill extending to stable, undisturbed subgrade. For footings or turn-downs placed on suitable natural soils or compacted engineered fill, we recommend that a net allowable soil bearing pressure of 2000 psf be utilized for proportioning the foundations. The base of the footings should be a minimum of 20 inches wide for wall footings and 30 inches wide for column footings to minimize potential failure of the bearing soils by local or punching shear action. The near-surface soils are considered to have a low to moderate shrink-swell potential. As such, we recommend foundations be embedded a minimum of 24 inches below final site grades for shrink-swell, frost protection and bearing capacity considerations. It is also recommended that the footings bear in stable original, undisturbed subgrade or select controlled fill (extending to stable original, undisturbed subgrade). There is no minimum width requirement for a turned-down slab edge; however, the turn-down should be wide enough to

allow cleaning of the subgrade and placement of the reinforcing steel with proper clearance and concrete cover.
Select controlled fill should be compacted to at least 95% of the material's maximum dry density as determined by the Standard Proctor method (ASTM D-698). Spread footing foundations should be evaluated as an independent system which are not rigidly connected to the floor slab-on-grade. In addition, we recommend that all continuous (strip type) footings be adequately reinforced and be of sufficient thickness so as to better distribute the foundation structural loading and to span soft zones or other inconsistencies in the subgrade bearing soils.

In a turned-down slab foundation system, the concrete for the foundations and the floor slab is poured monolithically. We recommend that all turn-downs and thickened slab sections be adequately reinforced and be of sufficient thickness so as to better distribute the foundation structural loading and to span soft zones or other inconsistencies in the subgrade bearing soils.

The net allowable soil bearing pressure refers to that pressure which may be transmitted to the foundation bearing soils in excess of the final minimum surrounding overburden pressure. Based on foundations designed and constructed herein utilizing a net allowable bearing pressure of 2000 psf, the total long term settlement for the building is estimated to not exceed one inch, with differential settlements between adjacent columns estimated to not exceed one-half inch.

Floor Slab Design

For the design and construction of the floor slab-on-grade for the proposed building, it is recommended that all topsoil, rootmatting, unsuitable or unstable uncontrolled fill (if encountered) and any other soft or unsuitable materials be removed from below the bottom of the floor slab. The stripped area should be observed by an experienced Geotechnical Engineer during the time of construction in order to aid in locating any such unsuitable materials which should be removed. In an effort to densify the loose surficial subgrade soils, the stripped area should be proofrolled with a smooth drum roller with a minimum of two passes in two perpendicular directions, provided in-situ moisture contents are within $\pm$3% of optimum in order to facilitate compaction.

In conditioned office areas, we recommend the slab-on-grade be directly supported by a minimum of 4 inches of a well graded, clean granular material (porous fill) having a maximum aggregate size of 1.5 inch and no more than 15% passing the #200 Sieve (GM, GW, GP, SM, SW, SP). Both VDOT No. 57 stone and VDOT Grade A Fine Aggregate meet the criteria for porous fill.

These granular layers below the floor slab will facilitate the fine grading of the subgrade, provide more uniform bearing conditions, and help minimize the rise of water to the bottom of the slab via capillary action. The slab should also be directly underlain by a suitable polyethylene vapor retarder to minimize moisture intrusion into the slab. Provided the design and construction recommendations discussed herein are followed, the slab may be designed assuming a Modulus of Subgrade Reaction, K_S, of 200 psi per inch.

Pavements:

Once the design pavement subgrade elevation is reached, the subgrade should be proofrolled and carefully observed at the time of construction in order to aid in identifying any localized soft or unsuitable materials. An outcome of the proofrolling may be a recommendation to scarify, aerate, and recompact the soils at near the soil's optimum moisture content. Soils which are still unstable will require undercutting and replacement with structural fill material under the direction of the geotechnical engineer. If site work is performed during the wetter winter months, we anticipate that slightly cohesive and moisture-sensitive subgrade soils subjected to wet conditions and/or ponding water will become unstable and require undercuts and replacement with dryer, suitable material. Ideally, site work should be performed during the dryer late summer and early fall months to minimize potential undercuts due to moisture intrusion and facilitate compaction. Exposed subgrade soils should be graded to drain surface moisture, and covered as soon as possible with full design depths of select materials that are compacted in accordance with project design criteria.

An important consideration with the design and construction of new pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrade and other problems related to the deterioration of the pavement can be expected. Furthermore, good drainage should minimize the possibility of the subgrade materials becoming saturated over a long period of time. Based upon the results of the soil test borings, the groundwater table should not significantly affect the performance of pavements; however, surface runoff water that is trapped during construction on the exposed subgrade soils could create localized deterioration of the soil's bearing capacity. Standing water that may develop on the surface of the pavement may be minimized by adequate design (surface graded to control runoff to desired locations - catch basins, drain inlets, gutters, etc.), adequate compaction of each lift of pavement material (to minimize localized settlements that result in ponding), and accurate fine grading of each lift of pavement material (to achieve the desired design grades). Standing water that tends to develop within the base course layer may be minimized by installing temporary weep holes in drainage structures, construction of drainage swales and diversion ditches, and proper backfill and grading behind curbs to minimize water intrusion from behind the curbs.

Subgrade samples obtained in the proposed roadway alignment consisted primarily of Silty SAND (SM) material. The soaked CBR value for this soil ranged from 13 to 29, which is a typical range for this type of material. We recommend a design CBR value of 14 for pavement

design. This value is determined by calculating the truncated value of two-thirds the average of the CBR test results. This reduction in CBR value is an attempt to account for typical variations in the soils across the site. A Resiliency Factor (RF) of 2.5 and the resulting Soil Support Value (SSV) of 35 should also be used in this design.

The following pavement sections are based on VDOT minimum section requirements, Vaswani design methods, available laboratory information, and our local experience in the project area. We recommend the following two or three layer section for the project roadways depending on proposed traffic volumes:

2 Layer Flexible Pavement - (up to 650 VPD):

Asphalt Surface	- 2.0 inches Asphalt Concrete Surface Mix, Type SM-9.5.
Aggregate Base	- 8.0 inches untreated Aggregate Base Material, Type I, Size 21A/B.
Subbase	- Variable Select Material (Sand); If Required.
Subgrade	- Stable and compacted to a dry density of at least 95% of the soil's Standard Proctor maximum dry density (ASTM D698)

3 Layer Flexible Pavement - (up to 1800 VPD):

Asphalt Surface	- 1.5 inches Asphalt Concrete Surface Mix, Type SM-9.5.
Asphalt Base	- 3.0 inches Asphalt Concrete Base Mix, Type BM-25.
Aggregate Subbase	- 8.0 inches untreated Aggregate Base Material, Type I, Size 21A/B.
Subgrade	- Stable and compacted to a dry density of at least 95% of the soil's Standard Proctor maximum dry density (ASTM D698)

Recommended pavement design criteria reflects a general roadway and parking area pavement construction only. Areas where high wheel and/or dynamic loading is expected, such as a dumpster pad, should be constructed with thicker pavement sections or should be substituted with concrete pavement.

Compaction testing may be waived by the Geotechnical Engineer based on the results of the proofrolling operations. It should be noted that pavement sections recommended herein are considered to be minimums with regard to recognized pavement design practices, and any reductions in the pavement sections could result in less than satisfactory pavement performance.

Infiltration Trenches

Two infiltration trenches are proposed for the planned construction. We performed six (6) soil borings in these areas and encountered Clayey and Silty Sand (SC,SM) soils. At the writing of this report we have not completed the measured infiltration rates for the two trenches. When these test results are available we will forward to them to you under a separate cover. We have utilized the department of agriculture's soil properties chart classified by soil texture (gradation) to provide estimated infiltration rates.

The North infiltration trench containing boring locations B-12 through B-14 has estimated infiltration rates of 0.17 to 0.52 in/hr. These clayey and silty sand soils have a Hydrologic Soil Group designation of B to C.

The South infiltration trench containing boring locations B-15 through B-17 has estimated infiltration rates of 0.09 to 0.52 in/hr. These clayey and silty sand soils have a Hydrologic Soil Group designation of B to D.

Typically, soil with the Hydrologic Soil Group designations of A and B are considered to be suitable for Best Management Practices (BMP) that may utilize on-site infiltration in their designs. 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 generally not considered suitable for infiltration practices.

Construction Considerations:

The subgrade materials are moisture sensitive, and exposure to the environment may weaken the soils at the pavement subgrade level if the excavations remain open for too long a time; therefore, the subgrades should be covered the same day they are excavated. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed and replaced by suitable select fill material.

In a dry, re-worked, and compacted state, the soil at the site will provide good subgrade support for fill placement and construction operations; however, when wet, this soil will degrade quickly with disturbance from contractor operations. Good site drainage should be maintained during earthwork operations which would help maintain the integrity of the soil.

Proper compaction control of fill is an important aspect of this project. Therefore, we recommend that all fill operations be observed full-time by a qualified soil technician to determine if minimum compaction requirements are being met.

We do not anticipate groundwater being encountered during roadway or building construction however, it may be encountered in the infiltration trench excavation and may require shallow sump pumps or well pointing. Groundwater should be kept a minimum of 2 feet below the planned excavations.

General Comments:

This report 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,

ENGINEERING CONSULTING SERVICES, LTD.

David Gordinier, E.I.T.
Project Engineer

COMMONWEALTH OF VIRGINIA
W. LLOYD WARD
No. 034612
7/28/04
PROFESSIONAL ENGINEER

W. Lloyd Ward, P.E.
Senior Engineer

Appendix:
I. Boring Location Diagram (1)
II. Soil Test Boring Logs (17)
III. Laboratory Test Summary and Results (3)
IV. Unified Soil Classification System/Reference Notes for Boring Logs (2)

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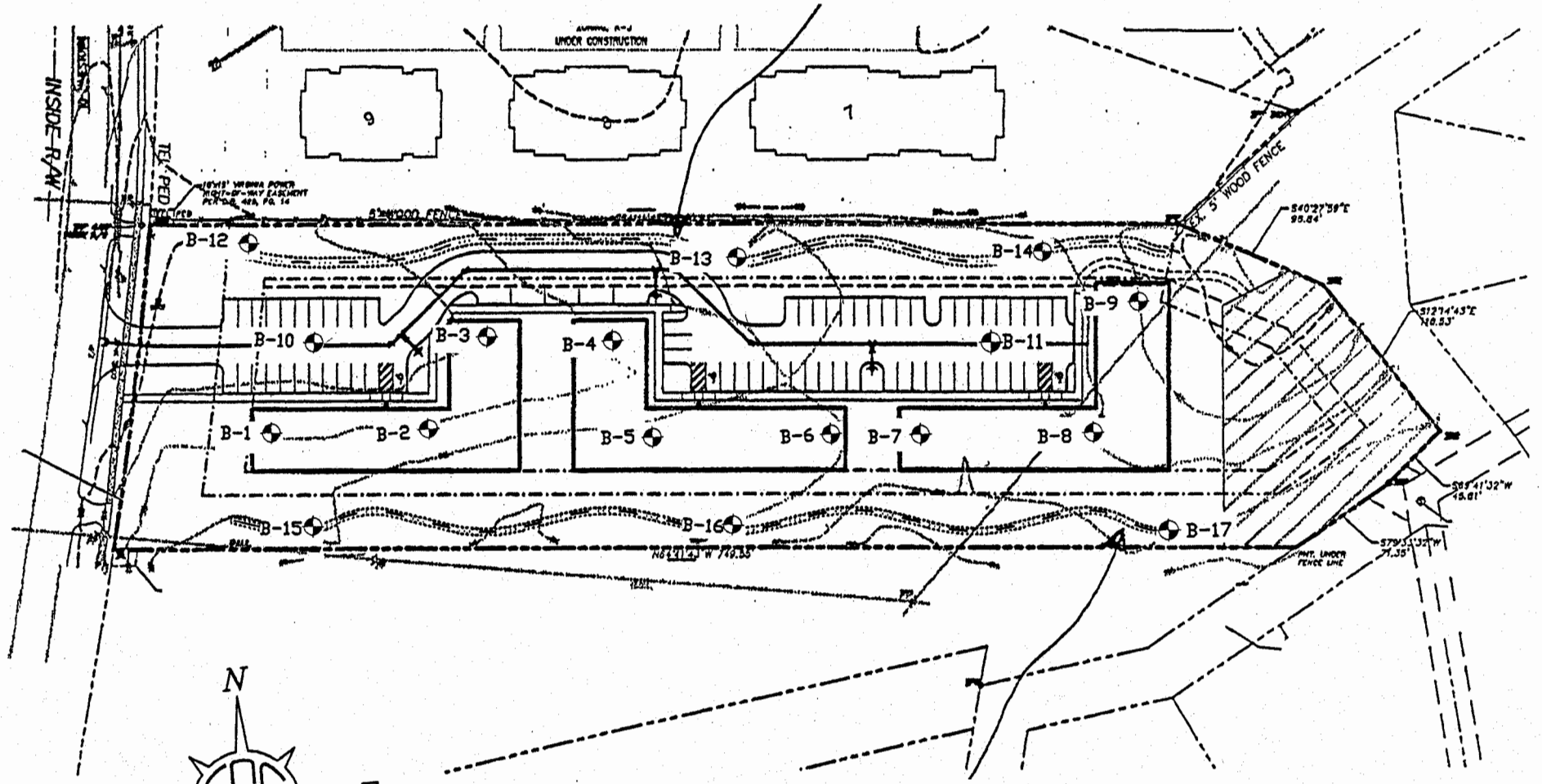
APPENDIX I

BORING LOCATION PLAN

ECS LTD



LEGEND:
⊕ –APPROXIMATE BORING LOCATION

REVISIONS	ECS LTD ENGINEERING CONSULTING SERVICES, LTD	Boring Location Plan Warhill Green Associated Developers, Inc.				
		DJG	DJG	7/26/04	1"=100'	7004	1 of 1

APPENDIX II

SOIL TEST BORING LOGS

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS / SURFACE ELEVATION)	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	Topsoil Depth 8"		6 (2-3-3-3)
	2	SS	24	24	Fine to Medium Clayey SAND, Trace Organics sampled as Root Material, Brown, Moist, Loose, (SC)		4 (2-2-2-2)
5	3	SS	24	24	Fine to Medium Clayey SAND, Brown with Orange-Brown Mottling, Moist, Very Loose, (SC)		7 (2-2-5-6)
	4	SS	24	24			20 (6-10-10-4)
	5	SS	24	24	Fine to Medium Clayey SAND, Orange-Brown, Moist, Loose to Medium Dense, (SC)		21 (8-11-10-13)
10					Fine to Coarse Clayey SAND, Orange-Brown, Moist, Medium Dense, (SC)		
	6	SS	24	24	Sandy CLAY, Yellow-Brown, Moist, Very Stiff, (CL)		18 (8-8-10-13)
15					Fine to Coarse, Silty SAND, Orange-Brown, Moist, Medium Dense, (SM)		
20					END OF BORING @ 15.00'		
25							
30							

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

▽WL WS OR ▽WD	BORING STARTED 7/15/04	
▼WL(AB) ▼WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 9"		6 (3-3-3-3)
	2	SS	24	24	Fine to Medium Clayey SAND, Dark Brown, Moist, Loose, (SC)		4 (2-2-2-2)
5	3	SS	24	24	Fine to Medium Silty Clayey SAND, Red-Brown, Moist, Very Loose to Medium Dense, (SC-SM)		7 (3-3-4-3)
	4	SS	24	24			12 (8-4-8-9)
	5	SS	24	24	Fine to Medium Clayey SAND, Red-Brown, Moist, Medium Dense, (SC)		14 (8-7-7-10)
10							
	6	SS	24	24	Fine to Medium Silty SAND, Light Brown, Moist, Medium Dense, (SM)		22 (8-11-11-12)
15					END OF BORING @ 15.00'		
20							
25							
30							

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

▽WL WS OR ⓓ	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KS (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-29-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-3	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		⊗ 5 (2-2-3-3)
	2	SS	24	24	Sandy CLAY, Trace Organics sampled as Root Material, Brown to Red-Brown, Moist, Medium Stiff to Stiff, (CL)		⊗ 9 (4-4-5-6)
5	3	SS	24	24	Fine to Medium Silty Clayey SAND, Red-Brown with Brown Mottling, Moist, Medium Dense, (SC-SM)		⊗ 24 (9-11-13-15)
	4	SS	24	24			⊗ 22 (11-9-13-18)
	5	SS	24	24	Fine to Coarse Silty SAND, Orange-Brown to Red-Brown, Moist, Medium Dense, (SM)		⊗ 24 (11-13-11-15)
10							
	6	SS	24	24			⊗ 20 (7-12-8-8)
15					END OF BORING @ 15.00'		
20							
25							
30							

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

▽WL WS OR ▽WD	BORING STARTED 7/15/04	
▼WL(AB) ▼WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\0 (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-4	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

ENGLISH UNITS

SURFACE ELEVATION

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

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

10 20 30 40 50+

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	Topsoil Depth 6"		⊗ 4 (2-2-2-2)
	2	SS	24	24	Fine to Medium Clayey SAND, Brown, Moist, Very Loose, (SC)		⊗ 10 (3-4-6-8)
5	3	SS	24	24	Sandy CLAY, Red-Brown, Moist, Stiff, (CL)		⊗ 23 (8-10-13-12)
	4	SS	24	24	Silty Clayey SAND, Red-Brown, Moist, Medium Dense, (SC-SM)		⊗ 27 (14-14-13-15)
	5	SS	24	24	Silty SAND, Trace Clay, Red-Brown, Moist, Medium Dense, (SM)		⊗ 25 (10-12-13-17)
10							
	6	SS	24	24	Sandy CLAY, Yellow-Brown with Red-Brown Mottling, Moist, Very Stiff, (CH)		⊗ 17 (9-6-11-11)
15					END OF BORING @ 15.00'		
20							
25							
30							

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

▽WL WS OR (FD)	BORING STARTED 7/15/04	
▼WL(AB) ▼WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-28-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-5	1 OF 1
PROJECT NAME	**ARCHITECT-ENGINEER**		
Warhill Green	AES Consulting Engineers, Inc.		

SITE LOCATION Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 6"		4 (2-2-2-2)
	2	SS	24	24	Silty SAND, Trace Organics sampled as Root Material, Brown, Moist, Very Loose, (SM)		8 (3-4-4-5)
5	3	SS	24	24	Fine to Medium Clayey SAND, Red-Brown, Moist, Loose to Medium Dense, (SC)		14 (6-5-9-10)
	4	SS	24	24	Fine to Coarse Silty Clayey SAND, Red-Brown, Moist, Medium Dense, (SC-SM)		16 (13-6-10-11)
	5	SS	24	24			28 (9-13-15-13)
10							
	6	SS	24	24	Fine to Coarse Silty SAND, Yellow-Brown, Moist, Medium Dense, (SM)		13 (8-7-6-6)
15					END OF BORING @ 15.00'		
20							
25							
30							

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

▽WL WS OR (WD)	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\ (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-6	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

ENGLISH UNITS

SURFACE ELEVATION

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	Topsoil Depth 6"		4 (2-2-2-3)
	2	SS	24	24	Fine to Medium Clayey SAND, With Organics sampled as Root Material until 2 feet bgs, Brown to Red-Brown, Moist, Very Loose to Medium Dense, (SC)		11 (4-4-7-7)
5	3	SS	24	24			17 (7-8-9-9)
	4	SS	24	24			17 (7-9-8-10)
	5	SS	24	24			20 (8-11-9-10)
10							
	6	SS	24	24	Sandy CLAY, Yellow-Brown, Moist, Very Stiff, (CH)		26 (10-15-11-13)
15					END OF BORING @ 15.00'		
20							
25							
30							

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

▽WL	WS OR (D)	BORING STARTED 7/15/04	
▽WL(AB)	▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL		RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-7	1 OF 1
PROJECT NAME	**ARCHITECT-ENGINEER**		
Warhill Green	AES Consulting Engineers, Inc.		

SITE LOCATION
Centervill Rd. – James City County, VA

CALIBRATED PENETROMETER TONS/FT.^{2} (1 2 3 4 5+)
PLASTIC LIMIT % (X) — WATER CONTENT % — LIQUID LIMIT % (Δ) (10 20 30 40 50+)
STANDARD PENETRATION BLOWS/FT. (⊗) (10 20 30 40 50+)

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS	
					SURFACE ELEVATION	
0	1	SS	24	24	Topsoil Depth 8"	
	2	SS	24	24	Sandy CLAY, Brown to Red-Brown, Moist, Medium Stiff to Stiff, (CL)	6 (2-3-3-4)
5	3	SS	24	24	Fine to Coarse Silty SAND, Red-Brown, Moist, Loose to Medium Dense, (SM)	9 (3-4-5-6)
	4	SS	24	24		8 (3-3-5-7)
	5	SS	24	24		22 (8-10-12-13)
10						26 (9-11-15-17)
	6	SS	24	24	Fine to Medium Silty SAND, Orange-Brown with Red-Brown and Dark Brown Mottling, Moist, Dense, (SM)	(13-17-16-15) 33
15					END OF BORING @ 15.00'	
20						
25						
30						

WATER LEVELS ELEVATION (FT)

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

▽WL WS OR ▽WD	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJS (07-15-04) DJS (07-22-04) DJS (07-22-04) DJS (07-22-04) IA (07-23-04) DJS (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-8	1 OF 1
PROJECT NAME	**ARCHITECT-ENGINEER**		
Warhill Green	AES Consulting Engineers, Inc.		

SITE LOCATION
Centervill Rd. – James City County, VA

CALIBRATED PENETROMETER TONS/FT.^{2} (1 2 3 4 5+)
PLASTIC LIMIT X — WATER CONTENT ● — LIQUID LIMIT Δ (10 20 30 40 50+)
STANDARD PENETRATION BLOWS/FT. ⊗ (10 20 30 40 50+)

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		6 (1-3-3-3)
	2	SS	24	24	Fine Silty SAND, Brown, Moist, Loose, (SM)		5 (4-2-3-3)
5	3	SS	24	24	Fine to Medium Clayey SAND, Red-Brown, Moist, Loose to Medium Dense, (SC)		(7-9-21-28) 30
	4	SS	24	24	Fine to Coarse Silty SAND, Red-Brown to Pink, Moist, Medium Dense to Dense, (SM)		(13-16-17-21) 33
	5	SS	24	24			(11-15-19-23) 34
10							
	6	SS	24	24			19 (6-8-11-15)
15					END OF BORING @ 15.00'		
20							
25							
30							

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

▽WL WS OR FD	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\0 (03-11-04) DWG (07-15-04) DWG (07-22-04) DWG (07-22-04) DWG (07-22-04) IA (07-23-04) DWG (07-28-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-9	1 OF 1

PROJECT NAME	ARCHITECT–ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

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

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

ENGLISH UNITS

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	STANDARD PENETRATION BLOWS/FT.
0	1	SS	24	24	Topsoil Depth 8"	5 (2-2-3-3)
	2	SS	24	24	Fine to Medium Silty SAND, Trace Organics sampled as Root Material, Brown, Loose, (SM)	2 (2-1-1-2)
5	3	SS	24	24	Fine to Medium Clayey SAND, Dark Brown, Moist, Very Loose, (SC)	4 (1-2-2-4)
	4	SS	24	24	Fine,Medium and Coarse Silty SAND, Red–Brown to Yellow–Brown, Moist, Very Loose, (SM)	9 (3-5-4-6)
	5	SS	24	24		10 (4-5-5-8)
10					Fine,Medium and Coarse Silty SAND, Red–Brown to Yellow–Brown, Moist, Loose, (SM)	
	6	SS	24	24		10 (4-5-5-7)
15					END OF BORING @ 15.00'	
20						
25						
30						

WATER LEVELS ELEVATION (FT)

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

▽WL WS OR WD	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\ (03-11-04) DWG (07-15-04) DWG (07-22-04) DWG (07-22-04) DWG (07-22-04) IA (07-23-04) DWG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-10	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION
Centervill Rd. – James City County, VA

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

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

10 20 30 40 50+

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		⊗ 6 (2-3-3-2)
	2	SS	24	24	Fine to Medium Silty SAND, Dark Brown, Moist, Loose, (SM)		⊗ 5 (2-2-3-4)
5	3	SS	24	24	Sandy CLAY, Orange-Brown, Moist, Medium Stiff, (SC)		⊗ 12 (3-6-6-7)
					Fine Clayey SAND, Red-Brown, Moist, Medium Dense, (SC)		
					END OF BORING @ 6.00'		
10							
15							
20							
25							
30							

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

▽WL WS OR ▽D	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\ (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-11	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION
Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		⊗ 5 (1-3-2-2)
	2	SS	24	24	Fine to Medium Silty SAND, With Trace Organics Sampled as Root Material, Brown, Moist, Loose, (SM)		⊗ 3 (2-1-2-2)
5	3	SS	24	24	Fine to Medium Clayey SAND, With Trace Organics Sampled as Root Material,Red-Brown, Moist, Very Loose, (SC)		⊗ 10 (5-2-8-11)
					Fine to Medium Silty SAND, Red-Brown, Moist, Medium Dense, (SM)		
10					END OF BORING @ 6.00'		
15							
20							
25							
30							

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

▽WL WS OR ▽D	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\0 (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-12	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 6"		6 (2-3-3-3)
	2	SS	24	24	Fine Silty SAND, With Trace Organics Sampled as Root Material, Dark Brown, Moist, Loose, (SM)		10 (4-4-6-8)
5	3	SS	24	24	Fine to Medium Clayey SAND, Red-Brown, Moist, Loose, (SC)		14 (7-8-6-9)
	4	SS	24	24	Fine to Medium Clayey SAND, Red-Brown to Orange-Brown, Moist, Medium Dense, (SC)		18 (6-10-8-13)
	5	SS	24	24			22 (9-10-12-12)
10					END OF BORING @ 10.00'		
15							
20							
25							
30							

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

▽WL WS OR (TD)	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-28-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-13	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

PLASTIC LIMIT % (X) — WATER CONTENT % — LIQUID LIMIT % (Δ)

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 9"		6 (3-3-3-4)
	2	SS	24	24	Fine to Medium Silty SAND, With Trace Organics Sampled as Root Material Until 2' Ft BGS, Dark Brown to Red-Brown, Moist, Loose to Medium Dense, (SM)		9 (3-4-5-4)
5	3	SS	24	24			11 (4-5-6-6)
	4	SS	24	24			16 (6-8-8-4)
	5	SS	24	24	Fine to Medium Silty Clayey SAND, Orange-Brown, Moist, Medium Dense, (SC-SM)		20 (8-9-11-13)
10					END OF BORING @ 10.00'		
15							
20							
25							
30							

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

▽WL WS OR (D)	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-29-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-14	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION: Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 6"		6 (3-3-3-3)
	2	SS	24	24	Fine to Medium Silty SAND, Dark Brown to Orange-Brown, Moist, Very Loose to Loose, (SM)		4 (2-2-2-2)
5	3	SS	24	24			5 (2-2-3-3)
	4	SS	24	24			6 (2-3-3-3)
	5	SS	24	24			6 (3-4-2-3)
10					END OF BORING @ 10.00'		
15							
20							
25							
30							

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

▽WL WS OR ▽WD	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\0 (03-11-04) DWG (07-15-04) DWG (07-22-04) DWG (07-22-04) DWG (07-22-04) IA (07-23-04) DWG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-15	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION
Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		⊗ 5 (1-2-3-3)
	2	SS	24	24	Fine to Medium Silty SAND, Brown, Moist, Loose, (SM)		⊗ 6 (3-3-3-3)
5	3	SS	24	24	Fine to Medium Clayey SAND, Light Brown to Orange-Brown, Moist, Loose to Medium Dense, (SC)		⊗ 7 (3-3-4-4)
	4	SS	24	24			⊗ 14 (4-6-8-9)
	5	SS	24	24			⊗ 16 (6-7-9-4)
10					END OF BORING @ 10.00'		
15							
20							
25							
30							

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

▽WL WS OR ▽D	BORING STARTED 7/15/04	
▼WL(AB) ▼WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

KO (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-16	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION
Centervill Rd. – James City County, VA

CALIBRATED PENETROMETER TONS/FT.^{2}
1 2 3 4 6+

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		5 (3-2-3-3)
	2	SS	24	24	Fine to Medium Silty SAND, Brown to Red-Brown, Moist, Loose to Medium Dense, (SM)		9 (4-5-4-4)
5	3	SS	24	24			13 (4-5-8-8)
	4	SS	24	24			17 (7-8-9-10)
	5	SS	24	24	Fine to Medium Silty Clayey SAND, Red-Brown, Moist, Medium Dense, (SC-SM)		22 (8-11-11-13)
10					END OF BORING @ 10.00'		
15							
20							
25							
30							

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

▽WL WS OR ▽D	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\ (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-26-04) IA (07-27-04) IA (07-28-04)

CLIENT	JOB #	BORING #	SHEET
Associated Developers, Inc.	7004	B-17	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Warhill Green	AES Consulting Engineers, Inc.

SITE LOCATION
Centervill Rd. – James City County, VA

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

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

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

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)	STANDARD PENETRATION BLOWS/FT.
					ENGLISH UNITS		
					SURFACE ELEVATION		
0	1	SS	24	24	Topsoil Depth 8"		⊗ 6 (2-3-3-3)
	2	SS	24	24	Fine to Medium Silty SAND, With Trace Organics Sampled as Root Material, Brown, Moist, Loose, (SM)		⊗ 8 (2-3-5-4)
5	3	SS	24	24	Fine to Medium Clayey SAND, Orange-Brown, Moist, Loose to Dense, (SC)		⊗ 20 (8-9-11-15)
	4	SS	24	24			⊗ 28 (8-13-15-15)
	5	SS	24	24			(11-15-17-20) ⊗ 32
10					END OF BORING @ 10.00'		
15							
20							
25							
30							

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

▽WL WS OR ⓦ	BORING STARTED 7/15/04	
▽WL(AB) ▽WL(AC)	BORING COMPLETED 7/15/04	CAVE IN DEPTH ●
▽WL	RIG ATV FOREMAN FDI	DRILLING METHOD MUD

K:\0 (03-11-04) DJG (07-15-04) DJG (07-22-04) DJG (07-22-04) DJG (07-22-04) IA (07-23-04) DJG (07-28-04) IA (07-27-04) IA (07-28-04)

APPENDIX III

LABORATORY TEST SUMMARY AND RESULTS

Engineering Consulting Services, Ltd.

Williamsburg, VA

Laboratory Testing Summary

Date: 07/27/2004

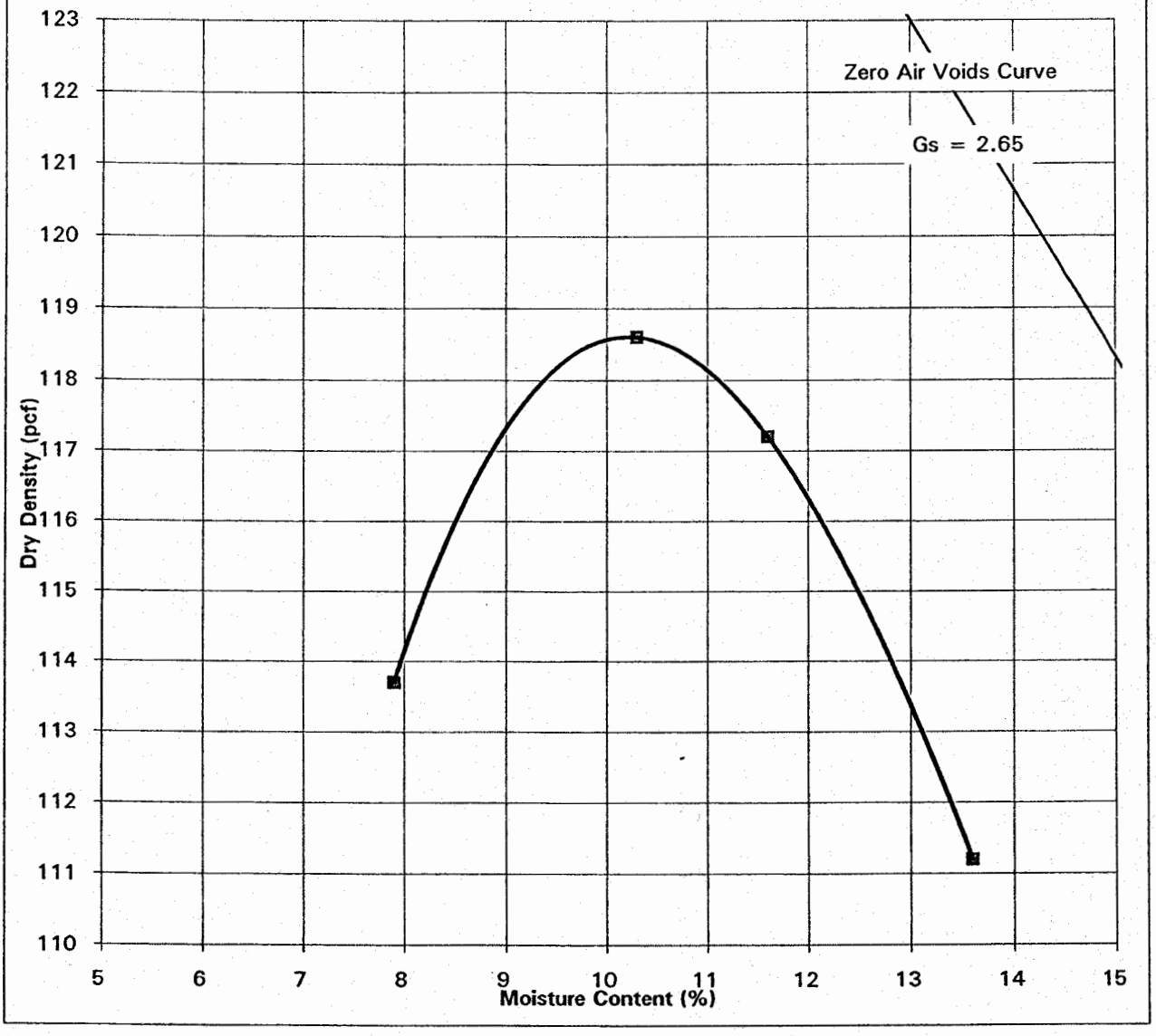
Project Number: 7004 **Project Name:** Warhill Green

Project Engineer: **Principal Engineer:** **Summary By:** Imad

Boring Number	Sample Number	Depth (Feet)	Moisture Content (%)	USC	Liquid Limit	Plastic Limit	Plasticity Index	Percent Passing No. 200 Sieve	Compaction		CBR Value	Other
									Maximum Density (pcf)	Optimum Moisture (%)		
B-11	CBR-2	0-5	9.7	SM	NP	NP	NP	30.6	124.1	10	29.1	
B-10	CBR-1	0-5	11.4	SM	NP	NP	NP	41	118.6	10.3	13.6	
B-2	2	2-4	11.9	SC-SM	25	18	7	32.3	*	*	*	
B-5	2	2-4	18.1	SC	40	20	20	44.6	*	*	*	
B-8	2	2-4	14.0	SC	32	17	15	45.6	*	*	*	
B-15	4	6-8	19.8	SC	42	22	20	43.5	*	*	*	
B-17	4	6-8	17.6	SC	47	23	24	42.6	*	*	*	
B-12	4	6-8	15.8	SC	37	23	14	26.5	*	*	*	
B-14	4	6-8	10.6	SM	NP	NP	NP	20.1	*	*	*	

Summary Key:

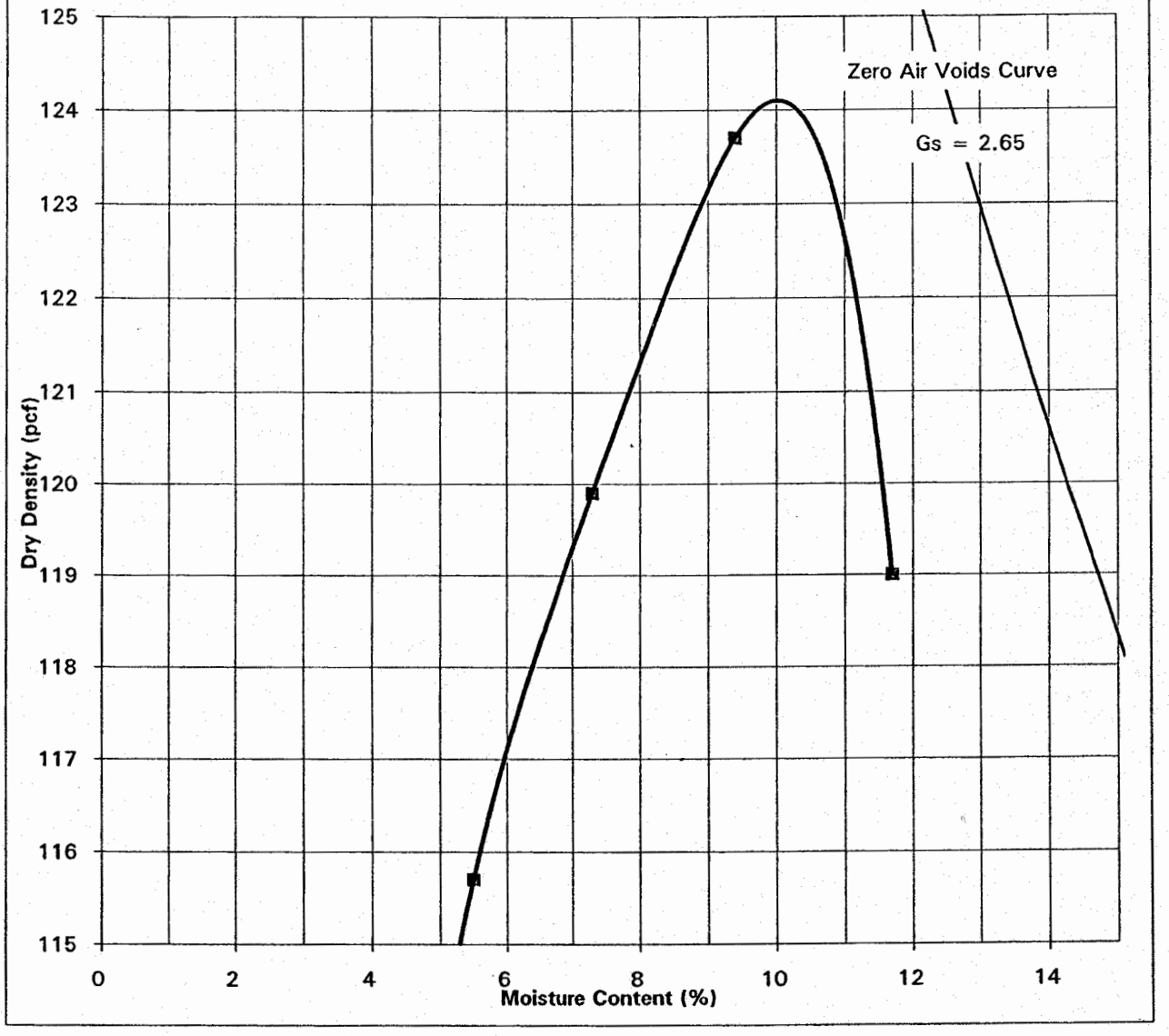
V = Virginia Test Method
S = Standard Proctor
M = Modified Proctor
Hyd = Hydrometer
Con = Consolidation
DS = Direct Shear
GS = Specific Gravity
UCS = Unconfined Compression Soil
UCR = Unconfined Compression Rock
LS = Lime Stabilization
CS = Cement Stabilization
OC = Organic Content
SA = See Attached
NP = Non Plastic
* = Test Not Conducted



Sample No.	B-10 CBR-1	Natural Moisture Content	11.4
Source	On Site	Percent Passing No. 200 Sieve	41.0
Station		Percent Retained on No. 4 Sieve	
Liquid Limit (LL)	NP	Percent Retained on 3/4" Sieve	
Plastic Limit (PL)	Np	Maximum Dry Density (pcf)	118.6
Plasticity Index (PI)	NP	Optimum Moisture Content (%)	10.3
Liquidity Index (LI)		Corr. Maximum Dry Density (pcf)	118.6
Description	Light Brown Clayey Sand	Corr: Optimum Moisture Content (%)	10.3
Classification	SC	Percent (%) Gravel as Tested	0.0
Specific Gravity	2.65	Percent (%) Gravel Total	0.0
Test Standard	ASTM D698	Test Method	A

Project:	**War Hill Green**
Project No.:	**7004**
Date:	**0**

Engineering Consulting Services, Ltd
Williamsburg, Virginia
Moisture Density Relationship Curve



Sample No.	B-11 CBR-2	Natural Moisture Content	
Source	on site	Percent Passing No. 200 Sieve	
Station		Percent Retained on No. 4 Sieve	
Liquid Limit (LL)		Percent Retained on 3/4" Sieve	
Plastic Limit (PL)		Maximum Dry Density (pcf)	124.1
Plasticity Index (PI)		Optimum Moisture Content (%)	10.0
Liquidity Index (LI)		Corr. Maximum Dry Density (pcf)	124.1
Description	Light Brown Silty Sand	Corr. Optimum Moisture Content (%)	10.0
Classification	SM	Percent (%) Gravel as Tested	0.0
Specific Gravity	2.65	Percent (%) Gravel Total	0.0
Test Standard	ASTM D698	Test Method	A

Project: Warhill Green	**Engineering Consulting Services, Ltd**
Project No.: 7004	**Williamsburg, Virginia**
Date: 7/16/04	**Moisture Density Relationship Curve**

APPENDIX IV

UNIFIED SOIL CALSSIFICATION SYSTEM AND REFERENCE NOTES FOR BORING LOGS

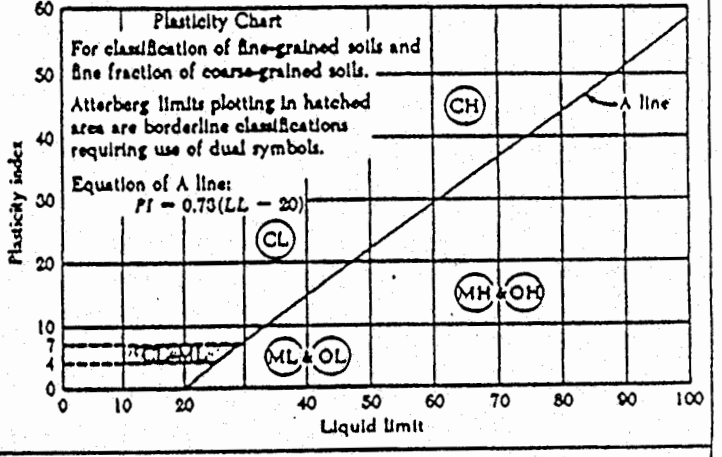
UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

Table Unified System of Classification

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

Table ** (Continued)

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



Visual-manual identification, see ASTM Designation D2488.

REFERENCE NOTES FOR BORING LOGS

I. Drilling and Sampling Symbols:

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

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

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

II. Correlation of Penetration Resistances to Soil Properties:

Relative Density-Sands, Silts

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

Consistency of Cohesive Soils

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

III. Unified Soil Classification Symbols:

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

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

IV. Water Level Measurement Symbols:

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

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

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

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

November 19, 2004

Mr. Charles Records
AES Consulting Engineers
5248 Olde Towne Road, Suite 1
Williamsburg, Va. 23188

Re: Pond Buffer Variance Request
Warhill Green
County Plan No.: SP-98-04

Dear Mr. Records:

The Environmental Division is in receipt of your written request dated October 20th 2004 to obtain a variance from pond buffer/setback requirements of the County BMP Manual for the dry detention basin portion of the pond-dry swale system BMP for the above referenced project. The County BMP manual requires a 25 ft. minimum pond buffer/setback from structures to the design 100-year water surface elevations of BMPs. Although the required buffer width around most of Building Pad C is maintained, there is an area at the north end of the building pad area where the buffer is reduced to less than 5 feet.

Based on our review of information as submitted, the variance as requested is hereby ***approved*** for this specific review case only. The variance was considered appropriate due to information as submitted in the letter request and the revised plan of development including:

- Proper pre-application coordination to advise our Division of this situation.
- Distinct site restraints, mainly width of the land tract and the inability to move the dry detention basin in any direction without significant impact to the development footprint.
- The drainage area to the basin is relatively small, about 4.5 acres.
- There appears to be adequate vertical separation between the proposed 100-year water surface elevation of the BMP (El. 101.32) and proposed building pad finished elevation (El. 104). This results in about 2.7 feet of vertical separation.
- Provision on the design plan for a 10-foot wide token emergency spillway at Elevation 101.5 which is 2.5 feet below the building pad elevation.

<u>The following conditions apply to approval of this waiver request:</u>

1. The applicant and any subsequent owners, tenants, etc. should be made completely aware of reduction of the pond buffer/setback requirement at the north end of Building Pad C, as outlined in this approval.

2. Landscaping requirements around Building Pad C, as outlined on Sheet 9 of the plan set, shall be adhered to in order to provide for adequate screening between the proposed building area and the design high water elevation line of the dry detention basin.

3. A proper maintenance plan is provided for the onsite dry swale BMP, detention pond and offsite stormwater drainage piping system.

3. The variance approval shall become part of the approved site erosion and sediment control and stormwater management plan.

Please note that approval of this variance, with the conditions stated, in no way implies final approval of a site or subdivision plan as required by the Chapter 24 Zoning or Chapter 19 Subdivisions of the County Code; nor, does it constitute final approval of an erosion and sediment control or stormwater management plan as required by Chapter 8 Erosion and Sediment Control and Chapter 23 Chesapeake Bay Preservation of the County Code. Approval of this variance is also contingent upon no major (substantial) changes in the development plan, the subject temporary sediment basin or best management practice facility, or if site conditions change, become apparent or alter significantly following the date of this approval.

Sincerely,

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

SJT/sjt

cc: Matt Arcieri, Planning (via email)

SWMProg/Variances/SPvar/Var111904.SP9804

CONSULTING ENGINEERS

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

RECEIVED
OCT 2004
PLANNING DEPARTMENT

October 20, 2004

Mr. Scott Thomas, P.E.
Civil Engineer
James City County
101-E Mounts Bay Road
Williamsburg, VA 23187

RE: SP-98-04, Warhill Green –BMP Buffer Exception Request
AES Job No. 9427

Dear Mr. Thomas:

AES Consulting Engineers, on behalf of Associated Developers, Incorporated, respectfully requests an exception to the James City County Stormwater Regulations, to allow a reduction in the required 100-year storm buffer for the mentioned project.

As shown on the construction plans for the project, a 25-foot wide buffer has not been maintained at the northeast corner of Building Pad C from the 100-year storm highwater elevation. Although, there will be approximately 2.7 feet of vertical elevation difference between the 100 year storm highwater and the finish floor of the building. As an extra precaution, a "token" emergency spillway has been provided approximately 2.5 lower than the finish floor of the building pad. Any storm events in excess of the 100-year storm will pass through this spillway before overtopping the stormwater embankment. It is also important to note that the top of the embankment is 1.5 feet lower than the Building Pad C finish floor. We believe that with this exception, the design continues to meet the intent of the James City County Stormwater Management Regulations from a safety standpoint.

Your review of this request is greatly appreciated. Please advise me of your decision on this exception at your earliest convenience.

Respectfully requested,

AES Consulting Engineers

Charles B. Records, P.E.
Project Manager

S:\Jobs\9427\00-ADI 4 ac. Centerville Road\Wordproc\Document\942700l03.cbr.doc

CONSULTING ENGINEERS

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

August 23, 2004

Mr. Darryl E. Cook, P.E.
Environmental Division Director
James City County
101-E Mounts Bay Road
Williamsburg, VA 23187

VOID
NEW APPLICATION
11/19/04 NCOATES
REQUEST.

RE: SP-98-04, Warhill Green – 10 point BMP Waiver Request
AES Job No. 9427

Dear Mr. Cook:

AES Consulting Engineers, on behalf of Associated Developers, Incorporated, respectfully requests a waiver to the James City County Stormwater Regulations, to allow the site design for the mentioned project with an overall point value of less than 10 points.

Every effort has been made to capture the proposed runoff and direct it to the on-site stormwater management facilities. Two 10-point dry swales, on the north and south sides of the property, are proposed to treat the stormwater runoff. All of the impervious areas will be directed to these facilities. As designed, the site achieves an overall point value of 9.78 points. Natural open space could be provided, although the existing site is completely devoid of natural vegetation in the form of trees and shrubs. Additionally, the required amount of Open space that would need be provided is insignificant to be beneficial from a land cover perspective. We believe the design meets the intent of the James City County and the Virginia Stormwater Management Regulations from a water quality standpoint.

Your review of this request is greatly appreciated. Please advise me of your decision on this waiver at your earliest convenience.

Respectfully requested,

AES Consulting Engineers

Charles B. Records, P.E.
Project Manager

S:\Jobs\9427\00-ADI 4 ac. Centerville Road\Wordproc\Document\94270001.cbr.doc

Scott Thomas

From: Scott Thomas
Sent: Friday, September 03, 2004 9:39 AM
To: Matthew Arcieri
Cc: Darryl Cook; Mike Woolson
Subject: DRC - Warhill Green
Importance: High

Project: Warhill Green (Centerville Road)
Case No.: SP-98-04

Matt,

The Environmental Division does ***not*** recommend granting preliminary approval for the above referenced project for the September 8th DRC. This case went to the June 14th 2004 Concept Plan Roundtable meeting. Although detailed site design information is not normally required at that meeting, our Division did raise an issue about the BMP outfall point, which appeared to be toward open space currently owned by Mulberry Place HOA. Subsequently, the plan came in for review under case number SP-98-04 and Mike Woolson performed review of the erosion and sediment control plan. At that time, Mike recommended (and I concurred) that the project needed to go to our recently established site plan review meeting on August 23rd 2004, which it did. *(Please reference an email from Mike Woolson to the plan preparer and Planning Division dated August 9, 2004.)* The purpose of this meeting was to discuss three main issues that we initially came across that would cause difficulty in our Division recommending preliminary approval for the project and to see if we could resolve them in advance of DRC on September 8th. These three issues included:

- The site did not meet the requirements of the County's 10 point system for water quality and no waiver request was found.
- Issues with temporary sediment trap # 1 discharging directly on the Cora Lee Green property with no defined channel or easement.
- Issues with no defined natural channel for the outlet of temporary sediment trap # 3 and the primary BMP for the site toward Mulberry Place.

Although we feel that during the site plan review meeting on August 23rd, that we came to adequate resolve and a course of action on the first two issues, issues related to the third item are still currently outstanding. The plan preparer contested that they felt there was a natural defined channel downstream of the BMP outfall location and it was decided that a field meeting was necessary between Environmental Division staff and the plan preparer to confirm this statement. Also, it was felt (by our Division) that if no defined natural channel was present for the BMP outfall, that either an offsite drainage easement and man-made adequate outfall system was necessary or the BMP needed to be designed as an infiltration type basin with no substantial concentrated discharge toward the adjacent open space area. A subsequent field meeting was held on Wednesday August 25th at 11:00 am. Based on field observation, it appears that there is no defined, natural receiving channel from the BMP outfall through the Mulberry Place natural open space, especially in the upper, western part of the open space directly at the BMP outfall point. Furthermore, during the course of this meeting it became apparent that there was a drainage complaint by a resident in Mulberry Place. This lot, at the end of Mulberry Lane (Lot 23), would be in the path of which outflow from the BMP at Warhill Green would traverse through. The Environmental Division is currently investigating this situation which may or may not be exasperated by the Warhill Green plan of development.

Minimum Standard # 19 of the Virginia Erosion and Sediment Control regulations is clear and specific about the need for defined, adequate receiving channels from development sites and BMP outfalls. Per Minimum Standard # 19 of the Virginia Erosion and Sediment Control regulations, concentrated runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. Minimum Standard # 19 also states that outfall from a detention facility shall be discharged to a receiving channel. Technical Bulletin No. 1 by the Virginia DCR further defines that concentrated runoff leaving a

development site, to include discharge from stormwater facilities, must be discharged into an adequate channel and a natural channel is defined as a conveyance with a defined cross-sectional flow area.

It was our hope that the site plan review meeting, the field meeting and follow-up actions by the plan preparer could have resolved this last issue in a timely manner prior to DRC; however, this does not appear to have transpired. Therefore, this is a critical issue that must be resolved prior to our Division recommending preliminary approval of the project. If for some reason the applicant/plan preparer can demonstrate enough information to show that adequate offsite receiving facilities will be provided (improvements, easements, etc.) or that the BMP can be designed such that much of the increased runoff from the site can be infiltrated and not become concentrated surface runoff, then this determination can be reversed. However, proper design and geotechnical information would be necessary to support an infiltration BMP (ie. no discharge) alternative.

I will continue with full technical review of the drainage and stormwater management plan for this project and will issue comments as soon as I can in the next few days In the meantime, if you have any questions email me or call me at 253-6639.

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

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

Scott Thomas

From: Scott Thomas
Sent: Thursday, August 12, 2004 10:54 AM
To: 'Rich Costello'
Subject: RE: Warhill Green, SP-098-04

??????

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

-----Original Message-----
From: Rich Costello [mailto:rcostello@aesva.com]
Sent: Thursday, August 12, 2004 10:35 AM
To: Scott Thomas
Subject: RE: Warhill Green, SP-098-04

Yes, I understand where you are coming from now however John Horne's letter on the additional use of time after the Conceptual Meeting had arrived only 2 days earlier and had not yet been distributed let alone read buy our staff. Then Mike and you say to the Roundtable rather than following the Roundtable mtg.

Richard A. Costello, P.E.
President
AES Consulting Engineers
P: 757-253-0040 F:757-220-8994

Visit us on the Web at aesva.com

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From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Thursday, August 12, 2004 10:15 AM
To: Charles Records; Mike Woolson
Cc: Costello, Richard A.; Darryl Cook; Matthew Arcieri; Patrick Foltz; Christopher Johnson
Subject: RE: Warhill Green, SP-098-04

Matt Arcieri and Chris Johnson talked to Charles yesterday on this issue. The plan will go to the roundtable on August 23rd to discuss our issues. Firstly, I concur with the issues that Mike outlined (below). Secondly, I believe that some of the issues as outlined by Mike (below) were raised by me at the at the original concept plan review meeting. If I remember correctly, I raised the issue that although the stormwater management plan looked workable, an acceptable outfall location would need to be demonstrated. This would also carry over to proposed temporary sediment traps. Secondly, the purpose of the meeting is not to provide further barrier in the plan review process but to help expedite working out some of these issues in advance of the DRC.

Scott J. Thomas, P.E.

James City County
Environmental Division

-----Original Message-----
From: Charles Records [mailto:crecords@aesva.com]
Sent: Wednesday, August 11, 2004 8:37 AM
To: Mike Woolson
Cc: Costello, Richard A.; Darryl Cook; Matthew Arcieri; Scott Thomas; Patrick Foltz
Subject: FW: Warhill Green, SP-098-04

Mike,

As you know, this project went through the conceptual plan roundtable process on June 14, 2004. All of the comments received, which were extremely helpful in preparing full engineering plans, have been incorporated into the plans submitted. At the June roundtable meeting, the conceptual stormwater management plan was presented with no comment from the Environmental Division concerning the most significant issue now raised about the outfall channel at Mulberry Place. It is our position that with full engineering plans submitted and a roundtable discussion having already taken place, that the issues you raise are purely technical in nature and are not appropriate for another conceptual review.

These issues can be resolved between AES and the Environmental Division allowing the project to stay on track, avoid plan approval delay, and not waste the time of the other roundtable members. It has been my understanding that the round table was created to expedite the approval process and unfortunately it appears as though, if we have to have another conceptual meeting, we will be accomplishing the opposite. I look forward to hearing from you so we can work through these issues as we always have.

Charles B. Records, P.E.
Project Manager

AES Consulting Engineers
5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188
(o)757.253.0040
(f) 757.220.8994

Visit us on the web .....www.aesva.com

From: Mike Woolson [mailto:mwoolson@james-city.va.us]
Sent: Monday, August 09, 2004 10:19 AM
To: crecords@aesva.com
Cc: Matthew Arcieri; Scott Thomas; Patrick Foltz
Subject: Warhill Green, SP-098-04

Charles,

The Environmental Division is sending this case to the August 23rd roundtable meeting to discuss the following issues:

1. Site does not meet the 10-point BMP criteria for stormwater management and no waiver request was found.

2. Sediment trap #1 discharges directly onto the Cora Lee Green property with no defined drainage channel or easement.

3. There is no defined drainage channel for the outlet of the BMP/sediment trap #3 within the Mulberry Place HOA Open Space 'A'.

I look forward to having these issues addressed on the 23rd. See you there.

Michael Woolson, CLA
James City County Environmental Division
Senior Watershed Planner
757-253-6823 - office : 757-259-4032 - fax

Visit www.protectedwithpride.org

TRANSMITTAL

RECEIVED
DEC 28 2004
ENVIRONMENTAL DIVISION

DATE: December 28, 2004

TO: Environmental
JCSA (2)

FROM: Matthew Arcieri, Senior Planner

SUBJECT: SP-98-04. Warhill Green

ITEMS ATTACHED: Revised Site Plans

INSTRUCTIONS: Please review and comment.

RETURN BY: January 14, 2005

AGENCY COMMENTS:

RECEIVED JAN 06 2005
DVE JAN 18

Plan is approved. A Land-Disturbing permit cannot be issued for the project until evidence is provided that offsite storm drainage easements as shown on Sheet 8 have been obtained (recorded).

DEC 2/7/05

Is this development served by Newport News Waterworks? ____(JCSA please check if yes)

If checked, planner will fax a copy of preliminary approval letter with Fire Department comments, and the JCSA completed water data sheet to Newport News Waterworks as soon as all three are available.

PROOF OF EASEMENTS RECEIVED SAT 3/8/05

Scott Thomas

From: Scott Thomas
Sent: Thursday, November 18, 2004 3:00 PM
To: 'Charles Records'
Cc: Matthew Arcieri; Mike Woolson
Subject: Warhill Green - Mulberry Place

I know you had called me for Henry about the offsite storm drainage easement plat for Warhill Green. I've really been busy lately; however, I was able to start review of the plan. I decided to review the offsite easement plat for the storm drain and the sewer easement plat first, as the plan will take some time.

At this time I am ok with the offsite storm easement PLAT and the sewer plat (8-1/2 x 14). The storm plat is entitled "Plat of Easement Dedication to Mulberry Place Homeowners Association and Warhill Green Homeowners Association. The sewer plat is entitled "Plat of Proposed 20' JCSA Easement from Mulberry Place Homeowners Association to Associated Developers Inc. However, I will have some comments on the offsite storm drainage PLAN, Sheet 8.

However, Henry and AES can move forward with getting necessary approvals and signatures on the easement plat. At some point we (and Matt) will need a copy of the recordation slip to show the offsite easement is in place for Warhill Green. Of course, we cannot issue Land-Disturbing until this is done. I am not sure yet how we are going to handle the offsite work in advance of LD permit for Warhill Green, I'm gonna have to work this out with Darryl and Joan administratively.

On a side note, the 10 ft. easement width for the storm sewer would not meet our standards for 24-inch pipe. However, the area where the easement is situated in a dedicated Natural Open Space and in an effort to keep disturbance to a minimum, the 10 ft. will be acceptable as long a you (the engineer) can confirm that it can be constructed within the 10 ft. easement. We do not want disruption to other areas of the NOS.

Also, I pulled the BMP worksheet from Mulberry to confirm that loss of the NOS in this area (for the storm easement) will not result in Mulberry going under 10 points. ***Please confirm*** my numbers as outlined below.

> The BMP Worksheet for Mulberry shows a total of 10.36 points of which 7.58 is for structural BMPs and 2.78 is for NOS. Of the 2.78 points for NOS, 0.51 points was taken under the 0.10 method and 2.27 points were taken under the 0.15 point method. This was based on 1.41 acres of NOS (0.10 method) and 4.22 acres of NOS (0.15 method). Ignoring the drainage area change to the BMP from the new inlet and pipe system (actually first flush WQ will still go the direction as originally intended) and based on the offsite plat NOS will change as follows:
>
> 0.10 points: Old 1.41 acres to 1.32 acres; Old 0.51 points now 0.4746 points
> 0.15 points: Old 4.22 acres to 4.13 acres; Old 2.27 points now 2.227 points
>
> Total NOS: Old 2.78 points now 2.7023 points
> Total BMP Points: Old 10.36 points now 10.28 points > 10 points (Still over 10, therefore ok.)

Offsite Storm Drainage Plan (Sheet 8): I will have some comments on this plan and will issue them following my review of the rest of the plan resubmission. However, I will give you some preliminary indication of the nature of comments I will have on the offsite storm plan. They are as follows:

- SS # 1-8 should be labeled as SS # 1-7
- Inlet elevations in the profile for MH SS # 1-21 do not match the asbuilt for Mulberry Place.
- Landscaping/restoration plan for NOS area behind Lot 22.
- SAF on plan to protect rest of NOS area.
- Sheet 8 should have reference to Sheet 11 for installation details for HDPE.
- Pipe specifications for HDPE to be used (ASTM M294, type S, etc.)

- Specifications for type of DI-7 grates to be used on Sheet 8 (Grate B, Type III, etc.)
- I thought we discussed an intermediate inlet (Nyloplast, etc.) on the 182' – 15 inch pipe run between Lots 23/24 Mulberry. This is so house drainage can connect and get into the system rather than running clear down the hill into SS # 1-6.
- Show a flow arrow and existing pipe information for the existing 15-inch pipe which goes southward out of SS # 1-21 in the cul-de-sac for Mulberry Lane.
- We prefer clear specification on the connection between the HDPE pipe segments and the DI-7 concrete structures. We want to ensure no subsequent subsidence at the inlets behind the Mulberry Place lots.

I will get to the rest of the plan as quick as I can; however, this should give you some good starting information.

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

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

Home of America's 400th Anniversary
James City County
1607-2007 Jamestown

DEVELOPMENT MANAGEMENT

101-A MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671
E-MAIL: devman@james-city.va.us
FAX: (757) 253-6822

ENVIRONMENTAL DIVISION (757) 253-6670 EnvDiv@james-city.va.us
PLANNING (757) 253-6685 planning@james-city.va.us
COUNTY ENGINEER (757) 253-6678
INTEGRATED PEST MANAGEMENT (757) 259-4116

March 20, 2008

Warhill Green, LLC
Attn: Mr. Henry Stephens
Drawer 18 Parkview Station
Newport News, VA 23605

Re: Warhill Green; 5450 Centerville Road; Williamsburg, VA.

Dear Mr. Stephens,

A siltation surety review of the above reference site revealed that the following is to be completed before the siltation surety is released:

- Stabilization of all disturbed areas specifically behind building B and C, the park area, and the area between the trash enclosures across the parking lot from building B.
- Submission of the JCC standard stormwater management facility checklist form.
- Submission of the final as-built drawing for the stormwater management facility with a mylar copy. Pre-liminary as-built received on March 14, 2008, is okay.
- Submission of the construction certification for the stormwater management facility.
- Removal of the sediment deposits and stabilization of slopes spotted thru out stormwater management (dry swale).

If you have any questions or want to meet at the site, please give me a call at 259-4026.

Sincerely,

Jason Beck
Environmental Inspector
James City County Environmental Division
101 Mounts Bay Road, P.O. Box 8784
Williamsburg, VA 23187-8784

CC: Thomas Sublett, AES

H.B. Hankins, Inc.
Site & Utility Contractor

TO: Jason Beck
JAMES CITY COUNTY
Via Facsimile 757.259.4032

FROM: Hank Mullins, Vice President

DATE: November 2, 2006

RE: **WARHILL GREEN – DETENTION BASIN**

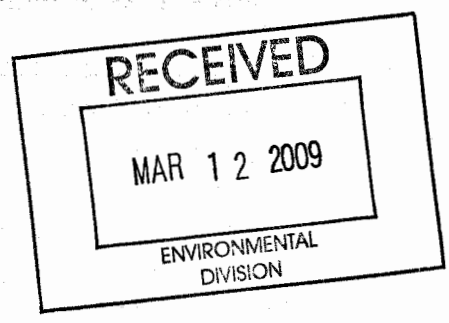
H.B. Hankins, Inc. is requesting that we be allowed to fill the detention basin to complete the infiltration ditches and storm drain system on the above-referenced job.

Please contact me or Marshall Trantham as soon as possible so that we may begin this work.

11/2/06
Approved
JCB

adi
associated developers incorporated
land development, management, planning & investment

March 9, 2009



Mr. Scott J. Thomas
Environmental Director
James City County
P. O. Box 8784
Williamsburg, VA 23187-8784

Re: Warhill Green Letter of Credit 1543011063

Dear Mr. Thomas:

We have completed construction and submitted "as-builts" last March. All work is complete. We request full release of our letter of credit. Attached is a copy of the transmittal from AES showing where the "as-builts" were submitted to the county.

In addition any maintenance work would be the responsibility of the War Hill Green Homeowners Association and James City County should contact them directly. The contact information is David Drexler, United Property Associates, 103 Bulifants Boulevard, Suite A, Williamsburg, VA 23188.

Please let me know if you have any questions. Thank you for your attention to this matter.

Sincerely,

Henry

Henry H. Stephens

Copy to: TowneBank

Enclosure

5300 Mercury Boulevard
Drawer 18 Parkview Station
Newport News, VA 23605
Phone: (757) 838-2739
Fax: (757) 838-6337

68 1/2 Queen Street
Post Office Box 21660 (29413)
Charleston, SC 29401
Phone: (843) 724-3299
Fax: (843) 724-3298

Home of America's 400th Anniversary
James City County 1607-2007 Jamestown

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Sincerely,

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Environmental Inspector
James City County Environmental Division
101 Mounts Bay Road, P.O. Box 8784
Williamsburg, VA 23187-8784

CC: Thomas Sublett, AES

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

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

LETTER OF TRANSMITTAL

ATTN: **James City County Environmental Inspector**

CO.: Jason L. Beck

Address: P.O. Box 8784
101-E Mounts Bay Road
Williamsburg, Virginia 23187-8784

cc:

DATE	JOB NO.
3/27/2008	9427-00

FROM: Matt Good

Drainage Grading and Erosion and Sediment Control Plan
Warhill Record Drawings

WE ARE SENDING YOU THE FOLLOWING ITEMS:

☒ Attached
☐ Under separate cover via

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

☐ Copy of letter(s) ☐ Other:

COPIES	DATE	No. of Pages	DESCRIPTION
3	3/27/2008	4	Drainage Grading and Erosion and Sediment Control Plan Warhill Record Drawings (Paper copies)
1	3/27/2008	4	Drainage Grading and Erosion and Sediment Control Plan Warhill Record Drawings (Mylar copy)
1	3/27/2008	1	Construction Certification

THESE ARE TRANSMITTED as checked below:

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

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

☐ Other:

REMARKS:

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

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

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

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ATTN: **James City County Environmental Inspector**

CO.: Jason L. Beck

Address: P.O. Box 8784
101-E Mounts Bay Road
Williamsburg, Virginia 23187-8784

cc:

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FROM: Matt Good

Drainage Grading and Erosion and Sediment Control Plan
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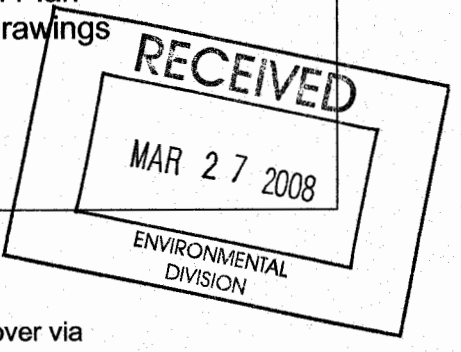

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☐ Other:

REMARKS:

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

Scott Thomas

From: Records, Charles B. [crecords@aesva.com]
Sent: Sunday, February 06, 2005 11:09 AM
To: Scott Thomas
Subject: FW: Warhill Green - Stormwater Calculations

Scott,
Please see the attached email. I apologize this info was previously sent to you although it was not part of the formal submittal to Planning. To answer your other questions – I have already fixed the AASHTO / ASTM reference, so when the drawings are plotted from here on out they will have the correct reference. Also, I believe the off-site easement plat has been signed and recorded although I need to verify and I will make sure Henry sends a copy to your office with the evidence that it has been recorded. Thanks, Charles

Also, I appreciate your speedy turn around on Section 33 – FC.

Charles B. Records, P.E.
Project Manager

AES Consulting Engineers
5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188
(o)757.253.0040
(f) 757.220.8994

Visit us on the web .....www.aesva.com

From: Records, Charles B.
Sent: Tuesday, January 04, 2005 10:45 AM
To: Scott Thomas (scottt@james-city.va.us)
Subject: Warhill Green - Stormwater Calculations

Scott,
Attached is the addendum to the Warhill Green drainage calculations. This addendum includes the off-site water quality volume assumptions and the storm system calculations for the temporary configuration with the sediment basin discharge entering the system. In a nutshell, there is additional water quality volume in the Warhill Green SWM facility for a portion of the off-site area. Due to the constraints of the off-site parcel, it appears as though there will need to be an independent on-site SWM Facility. Additionally, the hydraulic calculations for the off-site storm system during the *temporary* sediment basin configuration does not cause any hydraulic grade line deficiencies. The uppermost pipe segment capacity is exceeded although, the system does not surcharge. Please let me know if you have any questions or need any additional information. Thanks, Charles

Charles B. Records, P.E.
Project Manager

AES Consulting Engineers
5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188
(o)757.253.0040
(f) 757.220.8994

Visit us on the web .....www.aesva.com

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Infiltration Basin and Trench Facilities

County BMP ID Code (if known): PC-216

Name of Facility: Warhill Green BMP No.: 1 Date: 3/14/08 / 3/8/10

Location: around condo complex

Name of Owner: Warhill Green, LLC

Name of Inspector: Jason Beck

Type of Facility: Dry Swale / Basin

Weather Conditions: Windy Cloudy Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owners 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 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
Accessibility:				
Roads	✓			
Parking Areas	✓			
Gates	N/A			
Locks	N/A			
Safety Fencing	N/A			
Observation Wells/Areas:				
Trap Doors	N/A			
Manhole Covers				
Grates				
Steps				
Pretreatment Devices: ☐ Inlet ☐ Sump ☐ Forebay ☐ Other				
Sediment	N/A			
Trash & Debris				
Structure				
Other				

Facility Item	O.K.	Routine	Urgent	Comments
Primary Storage/ Infiltration Area:				
Trash & Debris	✓			
Sediment		✓		small deposits thru out from slope erosion
Ponding / Drawdown	✓			
Surface Aggregates	✓			
Aesthetics	✓			
Other				
Inlet Structure # 1 (Describe Location): five timber check dams (1-5)				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
Inlet Structure # 2 (Describe Location):				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Aesthetics				
Other				
Inlet Structure # 3 (Describe Location):				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Aesthetics				
Other				
Outlets - Overflow or Bypass Control Structures (Describe Location):				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Other				
Nuisance Type Conditions:				

Facility Item	O.K.	Routine	Urgent	Comments
Mosquito Breeding	✓			
Animals, Rodents	✓			
Graffiti	✓			
Other	✓			
Perimeter (Contributing Drainage Area) Conditions:				
Stabilization		✓		some disturbed areas
Vegetation Condition	✓			
Trash and Debris	✓			
Aesthetics	✓			
Other				

Remarks:

3/8/10 - Reinspected - all areas addressed - Released -

Overall Environmental Division Internal Rating: 4

Signature: Jason Beck **Date:** 3/19/08

Title: Environmental Inspector

SWMProg\BMP\CoInspProg\SubDetInfil.wpd

MULBERRY PLACE BMP POINTS DUE TO WARHILL GREEN.

Table 2

Worksheet for BMP Point System

NEGLIGIBLE D.A. CHANGE TO BMP DUE TO CHANGE IN SS #1-21. FIRST FLUSH NO CHANGE STILL TO BMP. DRAFTED TO

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
#1	10	x	17.32+3.76 / 27.81	=	7.58 ✓
		x		=	
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 7.58

B. NATURAL OPEN SPACE CREDIT

REVISED NOS due to 10' EASEMENTS.

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
1.32 / 27.81	1.41 / 27.81 (100)	x 0.1 (0.1 per 1%)	=	~~0.1~~ 0.4746
4.13 / 27.81	1.07+3.15 / 27.81 (100)	x 0.15 (0.15 per 1%)	=	~~2.77~~ 2.227

2.7023

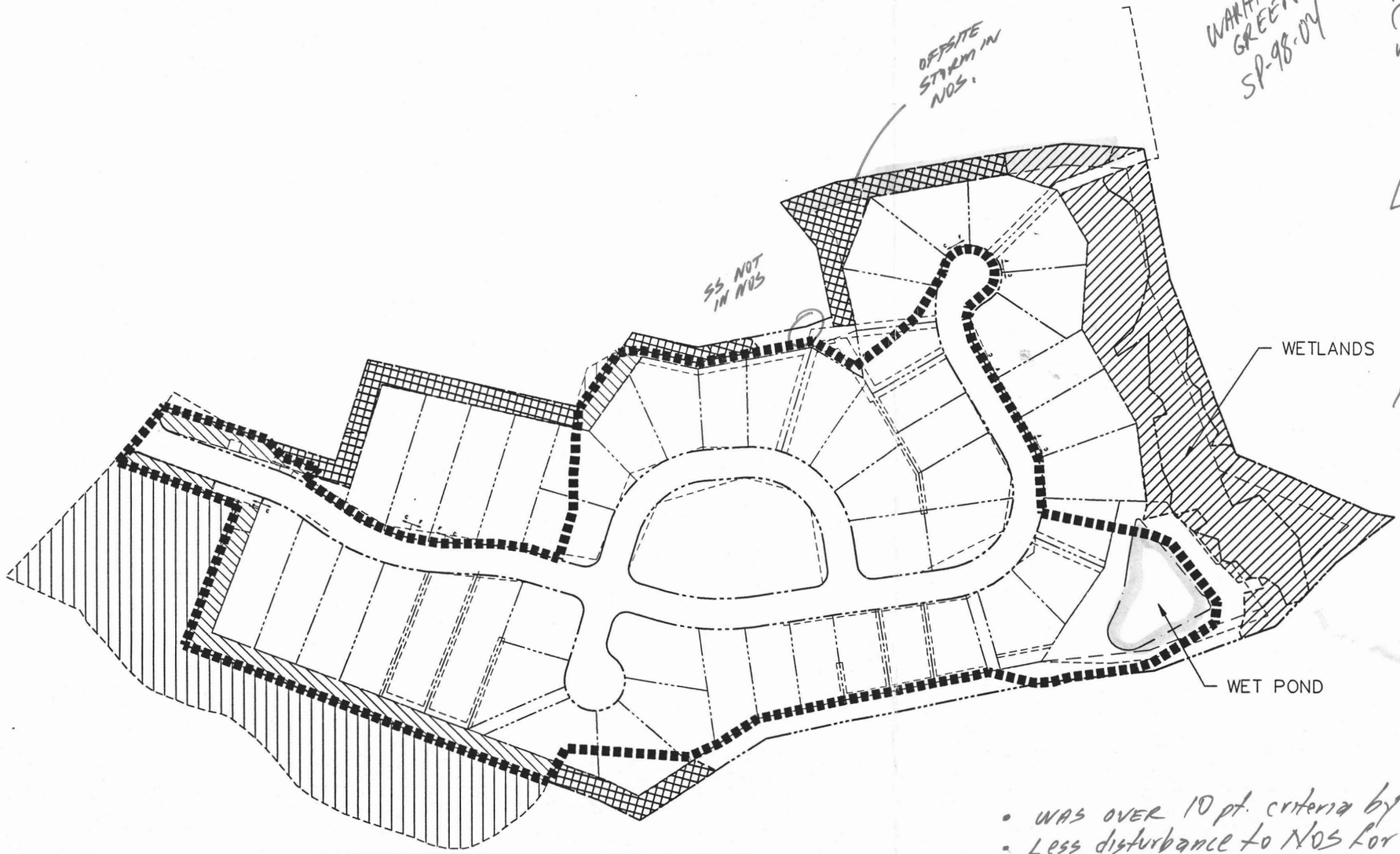
TOTAL NATURAL OPEN SPACE CREDIT: ~~2.78~~

C. TOTAL WEIGHTED POINTS

10.36710

Structural BMP Points	+	Natural Open Space Points	=	Total
7.58 ✓		~~2.78~~ 2.7023 ✓		10.36 ✓ / 10.28

COUNTY NOTES:
SITE AREA = 27.81AC.
WET. EXT DET
JCC BMP TYPE A-3
2" PIA



WARHILL GREEN SP-98-04

POINT COMPLIANCE W/ ENCROACHMENTS INTO NOS.

STRUCTURAL NO CHANGE 7.58 pts.

[Note: First flush WQV will still go to BMP.]

0.15

20 x 170 = 3400 SF

10 x 50 = 500 SF

3900 SF (0.0895 AC.)

1.48 - 0.0895 = 1.32 AC

0.10

370 x 10 = 3700 SF

20 x 10 = 200 SF

3900 SF (0.0895 AC.)

4.22 - 0.0895 = 4.13 AC.

~~1.41 - 0.0895~~

LEGEND

Service Area 21.08ac.

- ONSITE = 17.32 AC
- OFF-SITE = 3.76 AC
- OPEN SPACE = 1.41 AC
- OPEN SPACE TO POND = 1.07 AC
- OPEN SPACE ADJACENT TO AND ENCOMPASSING WETLANDS = 3.15 AC
- TOTAL DRAINAGE AREA TO POND = 21.08 AC

- WAS OVER 10 pt. criteria by 0.36 pts.
- Less disturbance to NOS for 10' easements. IN 0.10 NOS & 0.15 NOS AREAS,

STRUCTURAL 7.58

NOS 2.7023

10.28 > 10

STILL MEET WQ REQUIREMENTS.

N

GRAPHIC SCALE

200' 0' 200' 400'

SCALE: 1" = 200'

No.	DATE	REVISION / COMMENT / NOTE

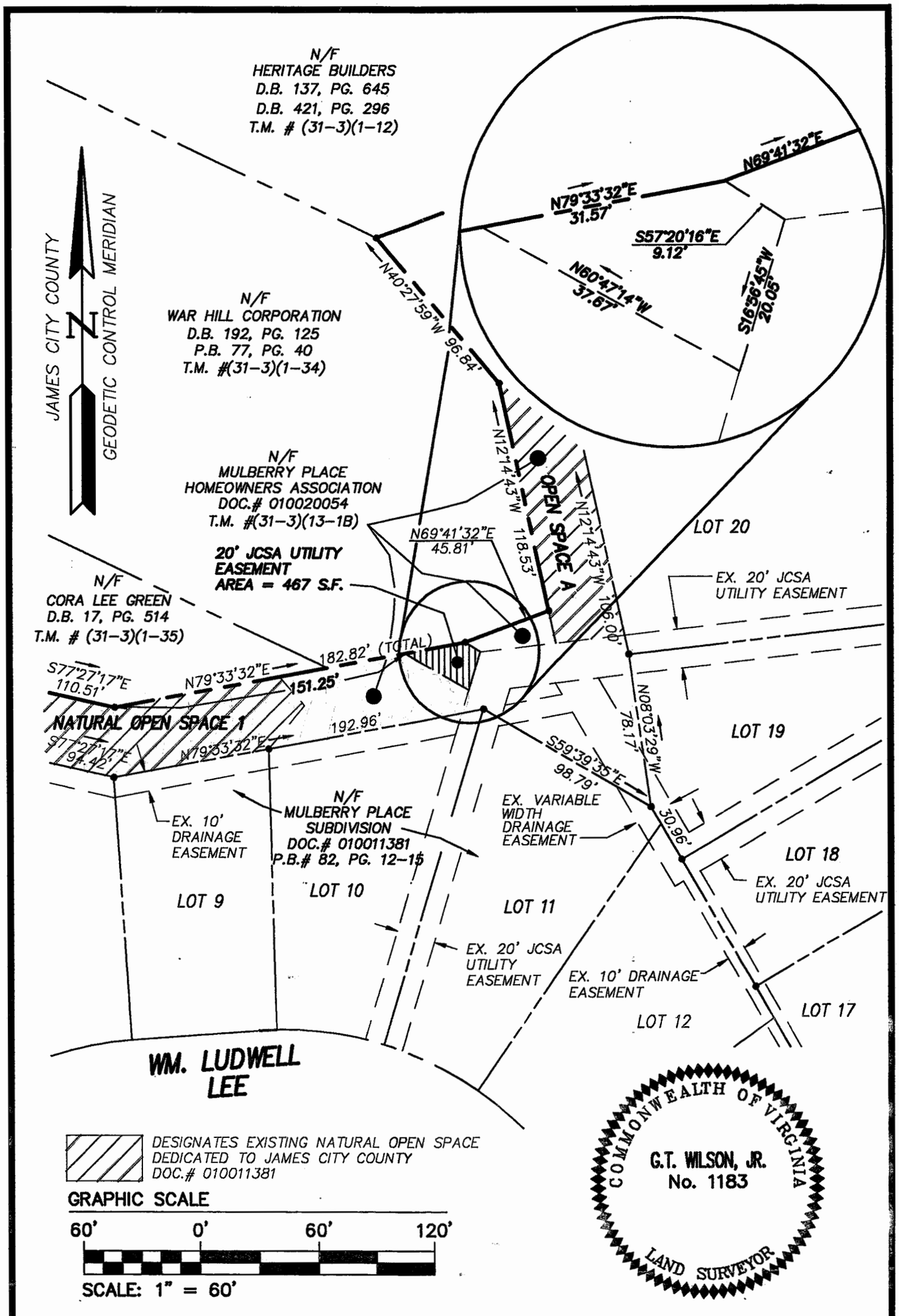
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994

CONSULTING ENGINEERS

MULBERRY PLACE

STORMWATER MANAGEMENT BMP POINT MAP

Designed	Drawn
CBR	CBR/HBK
Scale	Date
1"=200'	4/26/00
Project No.	
8604-01	
Drawing No.	
1OF1	



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

PLAT OF PROPOSED 20' JCSA UTILITY EASEMENT
FROM
MULBERRY PLACE HOMEOWNERS ASSOCIATION
TO
ASSOCIATED DEVELOPERS, INC.

POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

OCT 2004
RECEIVED
PLANNING DEPARTMENT

Scale:	Ref:	Date:	Job No:
1"=60'	DOC. # 010011381, P.B.82, PG.12-15	8/16/04	9427

JAMES CITY COUNTY ENVIRONMENTAL DIVISION

Surety Tracking Sheet Date: _____ Due Date: _____

Project Name: Warhill Green Subdivision

Requested By: Henry Stephens Phone #: _____

Date Notified: _____ **Case Number:** SP-048-04

Siltation Surety: Original $ 42,000 Current $ 20,000 Needed $ _____

*maximum reduction of 80% of original bond amount unless project is to be released

☐Calculate ☒Evaluate/Reduce ☐Release

Work to be completed for SILTATION Surety

☒ Stabilization of all disturbed areas - Behind Build B+C
- ~~Play~~ park / play ground
- area between trash enclosers across parking lot from building B

☐ Removal of temporary erosion control measures

☒ Submission of as-built drawings for stormwater management facility - Need Final as-built + Standard check list Forms

☒ Submission of construction certification for the stormwater management facility

☒ Completion of field-related BMP items Removal of sediment deposits + stabilize erosion from banks spotted thru out BMP

☐ Other –

☐ Comments-

Subdivision Surety: Original $ _____ Current $ _____ Needed $ _____

*maximum reduction of 80% of original bond amount unless project is to be released

☐Calculate ☐Evaluate/Reduce ☐Release

Work to be completed for SUBDIVISION Surety

☐ Paving of streets

VDOT

☐ Dedication of streets to Virginia Dept of Transportation Amount Needed $ _____

JCSA

☐ Completion of water and sewer systems Amount Needed $ _____

☐ Completion of water and sewer punchlist items

☐ Submission of as-built drawings for water and sewer systems

---

☐ Installation of street lights and street signs

☐ Other –

☐ Comments-

INDICATE YOUR APPROVAL BY INITIALING THE APPROPRIATE BLANK:

INSP JLB INSP SUPV ____ CHF ENG ____ DIR ____ RELEASE PROJECT ____

Revised 8/02/07

3-19-08
Mailed letter 3-20-08

DEVELOPMENT MANAGEMENT

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Environmental Inspector
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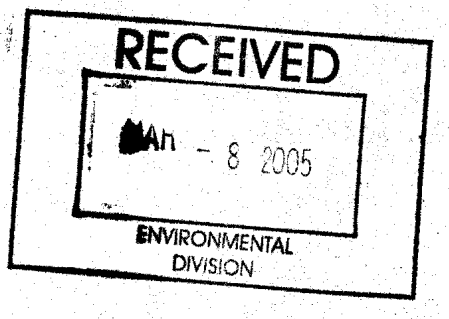
Williamsburg, VA 23187-8784

CC: Thomas Sublett, AES

COMMONWEALTH OF VIRGINIA



OFFICIAL RECEIPT
WILLIAMSBURG/JAMES CITY COUNTY CIRCUIT
DEED RECEIPT

DATE: 03/01/05 TIME: 12:05:29 ACCOUNT: 830CLR050004222 RECEIPT: 05000006765
CASHIER: CHB REG: WD45 TYPE: DE-PL PAYMENT: FULL PAYMENT
INSTRUMENT : 050004222 BOOK: PAGE: RECORDED: 03/01/05 AT 12:05
GRANTOR: MULBERRY PLACE HOMEOWNERS ASSOCIATION EX: N LOC: CO
GRANTEE: JAMES CITY SERVICE AUTHORITY EX: N PCT: 100%
AND ADDRESS : =
RECEIVED OF : CASSEN, S DATE OF DEED: 08/18/04
CHECK : $21.00
DESCRIPTION 1: PERPETUAL & NONEXCLUSIVE EASEMENT PAGES: 0
2: NAMES: 0
CONSIDERATION: .00 ASSUME/VAL: .00 MAP:

CODE	DESCRIPTION	PAID	CODE	DESCRIPTION	PAID
301	DEEDS	14.50	145	VSLF	1.50
106	TECHNOLOGY FUND FEE	5.00			

TENDERED : 21.00
AMOUNT PAID: 21.00
CHANGE AMT : .00

CLERK OF COURT: BETSY B. WOOLRIDGE

DC-18 (7/95)

174797

TAX MAP PARCEL # (31-3)(13-18)

Tax Exempt - Section 58.1-811 C.4., Code of Virginia

DEED OF EASEMENT

THIS DEED OF EASEMENT, Made this 18th day of August, 2004 by and between **MULBERRY PLACE HOMEOWNER'S ASSOCIATION**, a Virginia corporation, **GRANTOR**, and **JAMES CITY SERVICE AUTHORITY**, a municipal body of the Commonwealth of Virginia, **GRANTEE**, whose mailing address is: 101-E Mounts Bay Road, Williamsburg, VA 23185.

WITNESSETH:

That for and in consideration of the sum of TEN AND 00/100 ($10.00) DOLLARS and other good and valuable consideration, receipt of which is hereby acknowledged, **GRANTOR** does hereby grant and convey with GENERAL WARRANTY OF TITLE, unto **GRANTEE**, its successors and assigns, forever, the perpetual right, privilege, easement and right-of-way, hereinafter described, for the purpose of laying, erecting, constructing, operating, maintaining and relocating variable width utility easements for sanitary sewer facilities, hereinafter called "Facilities," on the lands of the **GRANTOR**, said Easement (the "Easement") being further described as follows:

> **PERPETUAL AND NONEXCLUSIVE EASEMENT OVER, UPON AND ACROSS** that certain tract or parcel of land lying situate and being in the County of James City, Virginia, designated and described as: "20' UTILITY EASEMENT AREA = 467 S.F." as shown on that certain plat entitled: "PLAT OF PROPOSED 20' UTILITY EASEMENT FROM MULBERRY PLACE HOMEOWNERS ASSOCIATION TO ASSOCIATED DEVELOPERS, INC., JAMES CITY COUNTY", dated August 16, 2004, and made by AES Consulting Engineers, a copy of which is attached hereto and made a part hereof and to which reference is hereby made for a more particular description.

This easement is subject to the following conditions and provisions:

A. The Facilities existing or constructed on or under the Easement shall remain the property of **GRANTEE**. **GRANTEE** shall have the right to inspect, rebuild, remove, relocate, repair, improve, and make such changes, alterations, additions to or extensions of its Facilities within the boundaries of said right of way as are consistent with the purpose expressed herein. All construction, maintenance, equipment and Facilities shall comply with all applicable laws, ordinances, codes and regulations.

B. Any disturbance of the premises by the **GRANTEE** or its contractor will be restored by the **GRANTEE** as nearly as practicable. This includes paving, fences, backfilling of trenches, grass, reseeding, replacing or replanting landscaping, and removal of trash or debris. Landscaping will be replaced with immature trees, shrubs, and ground cover.

JONES, BLECHMAN, WOLTZ & KELLY,P.C.
701 TOWN CENTER DRIVE, SUITE 800
POST OFFICE BOX 12888
NEWPORT NEWS, VA 23612-2888
PHONE: (757) 873-8000 FAX: (757) 873-8103

C. **GRANTEE** shall have the right to trim, cut and remove trees, shrubbery or other obstructions which interfere with or threaten the efficient and safe operation, construction and maintenance of said Facilities. All trees and limbs cut by **GRANTEE** shall remain the property of **GRANTOR**. All brush, branches, and other debris resulting from any cutting, trimming, or clearing of said right of way shall be removed by **GRANTEE** from lands of **GRANTOR** for disposal.

D. **GRANTEE** shall have the right of ingress to and egress from said right of way over the lands of **GRANTOR**. **GRANTEE** shall exercise such right in such manner as shall not occasion injury and inconvenience to **GRANTOR**. **GRANTEE** shall pay for or repair any injury to any of **GRANTOR**'s land, structures, roads, fences and other improvements caused by **GRANTEE**, its employees, agents or contractors.

E. **GRANTOR**, its successors and assigns, may use said right of way for any purpose not inconsistent with the rights hereby granted, provided such use does not interfere with the safe and efficient construction, operation or maintenance of said Facilities, and further provided that such use is not inconsistent with any laws, ordinances or codes pertaining to the construction, operation or maintenance of said Facilities.

F. It is understood and agreed that the consideration paid to the **GRANTOR** in connection herewith constitutes payment in full for the property hereby conveyed and for damages, if any, to the residue or other property of the **GRANTOR** resulting from the project and use made of the property conveyed.

WITNESS the following signature and seal all as of the day and year first above written.

MULBERRY PLACE HOMEOWNER'S ASSOCIATION

By: Pamela Madden
President

JONES, BLECHMAN, WOLTZ & KELLY,P.C.
701 TOWN CENTER DRIVE, SUITE 800
POST OFFICE BOX 12888
NEWPORT NEWS, VA 23612-2888
PHONE: (757) 873-8000 FAX: (757) 873-8103

STATE OF VIRGINIA
CITY/COUNTY OF James City, to-wit:

The foregoing instrument was acknowledged before me this 30 day of ~~August~~ November, 2004 by Pamela Madden, the President of Mulberry Place Homeowner's Association.

Notary Public

My commission expires: 9-30-06

318479

RECEIVED
MAR - 8 2005
ENVIRONMENTAL
DIVISION

COMMONWEALTH OF VIRGINIA

OFFICIAL RECEIPT
WILLIAMSBURG/JAMES CITY COUNTY CIRCUIT
DEED RECEIPT

DATE: 03/01/05 TIME: 12:02:32 ACCOUNT: 830CLR050004221 RECEIPT: 05000006764
CASHIER: CHB REG: WD45 TYPE: DE PAYMENT: FULL PAYMENT
INSTRUMENT : 050004221 BOOK: PAGE: RECORDED: 03/01/05 AT 12:02
GRANTOR: SPENCER. EDWARD T EX: N LOC: CO
GRANTEE: MULBERRY PLACE HOMEOWNERS ASSOCIATION EX: N PCT: 100%
AND ADDRESS : =
RECEIVED OF : JBWK DATE OF DEED: 10/21/04
CHECK : $23.00
DESCRIPTION 1: PERPETUAL & NONEXCLUSIVE EASEMENT PAGES: 0
2: NAMES: 0
CONSIDERATION: .00 ASSUME/VAL: .00 MAP:

CODE	DESCRIPTION	PAID	CODE	DESCRIPTION	PAID
301	DEEDS	14.50	145	VSLF	1.50
106	TECHNOLOGY FUND FEE	5.00	421	RESERVED	2.00

TENDERED : 23.00
AMOUNT PAID: 23.00
CHANGE AMT : .00

CLERK OF COURT: BETSY B. WOOLRIDGE

DC-18 (7/95)

TAX MAP PARCEL # (31-3)(13-23)

DEED OF EASEMENT

THIS DEED OF EASEMENT, Made this 21st day of October, 2004 by and between **EDWARD T. SPENCER and KARIN SPENCER**, husband and wife, **GRANTOR**, and **MULBERRY PLACE HOMEOWNER'S ASSOCIATION**, a Virginia corporation, **GRANTEE**, whose mailing address is: 5300 Mercury Blvd., Newport News, Virginia 23605.

WITNESSETH:

That for and in consideration of the sum of TEN AND 00/100 ($10.00) DOLLARS and other good and valuable consideration, receipt of which is hereby acknowledged, **GRANTOR** does hereby grant and convey with SPECIAL WARRANTY OF TITLE, unto **GRANTEE**, its successors and assigns, forever, the perpetual right, privilege, easement and right-of-way, hereinafter described, for the purpose of laying, erecting, constructing, operating, maintaining and relocating variable width utility easements for drainage facilities, hereinafter called "Facilities," on the lands of the **GRANTOR**, said Easement (the "Easement") being further described as follows:

> **PERPETUAL AND NONEXCLUSIVE EASEMENT OVER, UPON AND ACROSS** that certain tract or parcel of land lying situate and being in the County of James City, Virginia, designated and described as: "10' DRAINAGE EASEMENT HEREBY DEDICATED TO MULBERRY PLACE HOMEOWNERS ASSOCIATION (OVERLAPS JCSA UTILITY EASEMENT)" as shown on that certain plat entitled: "PLAT OF EASEMENT DEDICATION TO MULBERRY PLACE HOMEOWNERS ASSOCIATION AND WARHILL GREEN HOMEOWNERS ASSOCIATION, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA", dated October 19, 2004, and made by AES Consulting Engineers, a copy of which is recorded immediately prior hereto as Instrument Number _____.

This easement is subject to the following conditions and provisions:

A. The Facilities existing or constructed on or under the Easement shall remain the property of **GRANTEE**. **GRANTEE** shall have the right to inspect, rebuild, remove, relocate, repair, improve, and make such changes, alterations, additions to or extensions of its Facilities within the boundaries of said right of way as are consistent with the purpose expressed herein. All construction, maintenance, equipment and Facilities shall comply with all applicable laws, ordinances, codes and regulations.

B. Any disturbance of the premises by the **GRANTEE** or its contractor will be restored by the **GRANTEE** as nearly as practicable. This includes paving, fences, backfilling of trenches, grass, reseeding, replacing or replanting landscaping, and removal of trash or debris. Landscaping will be replaced with immature trees, shrubs, and ground cover.

JONES, BLECHMAN, WOLTZ & KELLY,P.C.
701 TOWN CENTER DRIVE, SUITE 800
POST OFFICE BOX 12888
NEWPORT NEWS, VA 23612-2888
PHONE: (757) 873-8000 FAX: (757) 873-8103

C. **GRANTEE** shall have the right to trim, cut and remove trees, shrubbery or other obstructions which interfere with or threaten the efficient and safe operation, construction and maintenance of said Facilities. All trees and limbs cut by **GRANTEE** shall remain the property of **GRANTOR**. All brush, branches, and other debris resulting from any cutting, trimming, or clearing of said right of way shall be removed by **GRANTEE** from lands of **GRANTOR** for disposal.

D. **GRANTEE** shall have the right of ingress to and egress from said right of way over the lands of **GRANTOR**. **GRANTEE** shall exercise such right in such manner as shall not occasion injury and inconvenience to **GRANTOR**. **GRANTEE** shall pay for or repair any injury to any of **GRANTOR**'s land, structures, roads, fences and other improvements caused by **GRANTEE**, its employees, agents or contractors.

E. **GRANTOR**, its successors and assigns, may use said right of way for any purpose not inconsistent with the rights hereby granted, provided such use does not interfere with the safe and efficient construction, operation or maintenance of said Facilities, and further provided that such use is not inconsistent with any laws, ordinances or codes pertaining to the construction, operation or maintenance of said Facilities.

F. It is understood and agreed that the consideration paid to the **GRANTOR** in connection herewith constitutes payment in full for the property hereby conveyed and for damages, if any, to the residue or other property of the **GRANTOR** resulting from the project and use made of the property conveyed.

WITNESS the following signature and seal all as of the day and year first above written.

EDWARD T. SPENCER

KARIN SPENCER

JONES, BLECHMAN, WOLTZ & KELLY, P.C.
701 TOWN CENTER DRIVE, SUITE 800
POST OFFICE BOX 12888
NEWPORT NEWS, VA 23612-2888
PHONE: (757) 873-8000 FAX: (757) 873-8103

STATE OF VIRGINIA
CITY/COUNTY OF James City, to-wit:

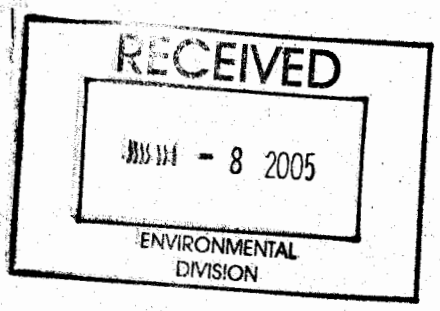
The foregoing instrument was acknowledged before me this 26 day of October, 2004 by Edward T. Spencer and Karin Spencer.

Notary Public

My commission expires: 9-30-06

333178

COMMONWEALTH OF VIRGINIA



OFFICIAL RECEIPT
WILLIAMSBURG/JAMES CITY COUNTY CIRCUIT
DEED RECEIPT

DATE: 03/01/05 TIME: 11:58:48 ACCOUNT: 830CLR050004220 RECEIPT: 05000006763
CASHIER: CHB REG: WD45 TYPE: DE-PL PAYMENT: FULL PAYMENT
INSTRUMENT : 050004220 BOOK: PAGE: RECORDED: 03/01/05 AT 11:58
GRANTOR: MULBERRY PLACE HOMEOWNERS ASSOCIATION EX: N LOC: CO
GRANTEE: WARHILL GREEN HOMEOWNERS ASSOCIATION EX: N PCT: 100%
AND ADDRESS : =
RECEIVED OF : JBWK DATE OF DEED: 10/21/04
CHECK : $42.00
DESCRIPTION 1: PERPETUAL & NONEXCLUSIVE EASEMENT PAGES: 0
2: NAMES: 0
CONSIDERATION: .00 ASSUME/VAL: .00 MAP:

CODE	DESCRIPTION	PAID	CODE	DESCRIPTION	PAID
301	DEEDS	29.00	145	VSLF	3.00
106	TECHNOLOGY FUND FEE	10.00			

TENDERED : 42.00
AMOUNT PAID: 42.00
CHANGE AMT : .00

CLERK OF COURT: BETSY B. WOOLRIDGE

DC-18 (7/95)

TAX MAP PARCEL # (31-3)(13-1B)

DEED OF EASEMENT

THIS DEED OF EASEMENT, Made this 21st day of October, 2004 by and between **MULBERRY PLACE HOMEOWNER'S ASSOCIATION**, a Virginia corporation, **GRANTOR**, and **WARHILL GREEN HOMEOWNERS ASSOCIATION**, a Virginia corporation, **GRANTEE**, whose mailing address is: 5300 Mercury Blvd., Newport News, Virginia 23605.

WITNESSETH:

That for and in consideration of the sum of TEN AND 00/100 ($10.00) DOLLARS and other good and valuable consideration, receipt of which is hereby acknowledged, **GRANTOR** does hereby grant and convey with SPECIAL WARRANTY OF TITLE, unto **GRANTEE**, its successors and assigns, forever, the perpetual right, privilege, easement and right-of-way, hereinafter described, for the purpose of laying, erecting, constructing, operating, maintaining and relocating variable width utility easements for drainage facilities, hereinafter called "Facilities," on the lands of the **GRANTOR**, said Easement (the "Easement") being further described as follows:

> **PERPETUAL AND NONEXCLUSIVE EASEMENT OVER, UPON AND ACROSS** that certain tract or parcel of land lying situate and being in the County of James City, Virginia, designated and described as: "10' DRAINAGE EASEMENT HEREBY DEDICATED TO THE WARHILL GREEN HOMEOWNERS ASSOCIATION" as shown on that certain plat entitled: "PLAT OF EASEMENT DEDICATION TO MULBERRY PLACE HOMEOWNERS ASSOCIATION AND WARHILL GREEN HOMEOWNERS ASSOCIATION, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA", dated October 19, 2004, and made by AES Consulting Engineers, a copy of which is recorded herewith as Instrument Number _____.

This easement is subject to the following conditions and provisions:

JONES, BLECHMAN, WOLTZ & KELLY,P.C.
701 TOWN CENTER DRIVE, SUITE 800
POST OFFICE BOX 12888
NEWPORT NEWS, VA 23612-2888
PHONE: (757) 873-8000 FAX: (757) 873-8103

A. The Facilities existing or constructed on or under the Easement shall remain the property of **GRANTEE**. **GRANTEE** shall have the right to inspect, rebuild, remove, relocate, repair, improve, and make such changes, alterations, additions to or extensions of its Facilities within the boundaries of said right of way as are consistent with the purpose expressed herein. All construction, maintenance, equipment and Facilities shall comply with all applicable laws, ordinances, codes and regulations.

B. Any disturbance of the premises by the **GRANTEE** or its contractor will be restored by the **GRANTEE** as nearly as practicable. This includes paving, fences, backfilling of trenches, grass, reseeding, replacing or replanting landscaping, and removal of trash or debris. Landscaping will be replaced with immature trees, shrubs, and ground cover.

C. **GRANTEE** shall have the right to trim, cut and remove trees, shrubbery or other obstructions which interfere with or threaten the efficient and safe operation, construction and maintenance of said Facilities. All trees and limbs cut by **GRANTEE** shall remain the property of **GRANTOR**. All brush, branches, and other debris resulting from any cutting, trimming, or clearing of said right of way shall be removed by **GRANTEE** from lands of **GRANTOR** for disposal.

D. **GRANTEE** shall have the right of ingress to and egress from said right of way over the lands of **GRANTOR**. **GRANTEE** shall exercise such right in such manner as shall not occasion injury and inconvenience to **GRANTOR**. **GRANTEE** shall pay for or repair any injury to any of **GRANTOR**'s land, structures, roads, fences and other improvements caused by **GRANTEE**, its employees, agents or contractors.

E. **GRANTOR**, its successors and assigns, may use said right of way for any purpose not inconsistent with the rights hereby granted, provided such use does not interfere with the safe and efficient construction, operation or maintenance of said Facilities, and further provided that such use is not inconsistent with any laws, ordinances or codes pertaining to the construction, operation or maintenance of said Facilities.

F. It is understood and agreed that the consideration paid to the **GRANTOR** in connection herewith constitutes payment in full for the property hereby conveyed and for damages, if any, to the residue or other property of the **GRANTOR** resulting from the project and use made of the property conveyed.

WITNESS the following signature and seal all as of the day and year first above written.

MULBERRY PLACE HOMEOWNER'S ASSOCIATION

By: Pamela Madden
President

JONES, BLECHMAN, WOLTZ & KELLY, P.C.
701 TOWN CENTER DRIVE, SUITE 800
POST OFFICE BOX 12888
NEWPORT NEWS, VA 23612-2888
PHONE: (757) 873-8000 FAX: (757) 873-8103

STATE OF VIRGINIA
CITY/~~COUNTY~~ OF Williamsburg, to-wit:

The foregoing instrument was acknowledged before me this 12 day of ~~October,~~ November 2004 by Pamela Madden, the President of Mulberry Place Homeowner's Association.

Bobbi F. Chambers
Notary Public

My commission expires: May 31, 2005

333175

Erosion and Sediment Control Preconstruction Meeting Checklist

Project: Warhill Green

Date: 5/10/05 Time: 9:00 ☑ AM ☐ PM

Permitee: Associated Developers Inc. Address: Owner 18 Parkview Station Newport News, VA 23605

Contractor: H.B. Hankins inc

Phone No.: 873-2196 Fax No.: 873-0943

Address: 739 Thimble Shoals Blvd. Suite 704 Newport News, VA

1. Phasing of Erosion and Sediment Control Practices

   A. Narrative Plan

   B. Contractor-Developed Sequence of Construction

2. Installation Procedure for Primary Erosion and Sediment Control Practices

✓	Construction Entrance	✓	Sediment Basins
✓	Silt Fence		Stormwater Management/BMP Facilities
✓	Rock Check Dams	✓	Diversions
✓	Culvert & Storm Drain Inlet Protection		Soil Blankets & Mattings
	Stormwater Conveyance Channels	✓	Mulching
✓	Temporary Seeding	✓	Permanent Seeding
✓	Outlet Protection		Storm Drainage System
	Sediment Traps		Other

3. Inspection and Enforcement Procedures

   A. Permittee/Contractor Inspections: ✓

   B. County Inspections: ✓

   C. Enforcement Actions: ✓

      1. Inspection Report & Informal Contact: ✓

      2. Notice to Comply: ✓

Revised 1/05

Erosion and Sediment Control
Preconstruction Meeting Checklist

3. Stop Work Order: ✓

4. Legal Proceedings: ✓

4. Limits of Clearing, Tree and Other Critical Areas Protection Measures Inspection

A. Clearing limits properly flagged? ☑ Yes ☐ No

B. Color of Flagging: _____

C. Tree Presservations/Critical Areas protected adequately? ☐ Yes ☑ No

D. Color of Flagging: _____

E. Tree Preservation/Critical Areas Protection Measures, Type: _____

5. Issuance of Stormwater Management/BMP, Record Drawing and Construction Certification, Standard Forms and Instructions (If Applicable to Project)

6. Attendees - Identify Contract Person for Erosion Control

Signature: _____

Printed Name: Henry H. Stephens

Affiliation: Associated Developer Inc
manager Warhill Green LLC

Address: PO Drawer 18
Newport News Va 23605

Phone No. 757 838-2739
M- 757 532-5227

Hank Mullins
H.B. Hankins, Inc
739 Thimble Shoals Blvd. Suite 204
Newport News, Va. 23606

0873-2196
Fax 873-0943
cell 592-3217

7. Comments: _____

County Agent: _____ Date: 5/16/05

Title: Environmental Inspector

espolicy.frm

Revised 1/05

JCC Environmental Division
Preconstruction Meeting

Project Warhill Green **Date** 5/10/05

1. Is the person who will be designated as the *Responsible Land Disturber* for implementation of the approved Erosion Control Plan present?

   YES ☑ NO ☐ Name Billy Adkins

2. Does the person who has been identified above possess a certificate of competence issued by the Department of Conservation and Recreation in Erosion and Sediment Control or are they a licensed Professional Engineer, Land Surveyor, Landscape Architect, or Architect?

   YES ☐ NO ☐ Certificate or License No._____

3. The person designated above, is required by the Virginia Erosion and Sediment Control Regulations to insure the installation and daily maintenance of the erosion and sediment control measures.

4. A copy of the Virginia Erosion and Sediment Control Handbook (VESCH) is required to be on the project site daily.

5. A copy of the approved site plan is required to be on the project site daily.

6. Are there any proposed revisions to the approved plan pending?

   YES ☐ NO ☑

7. Any proposed changes to the approved plan must be submitted to James City County for review and approval prior to implementation.

8. Is the person designated above aware of any discrepancies, errors or deficiencies with the approved plan?

   YES ☐ NO ☑

9. James City County is authorized under the Virginia Erosion and Sediment Control Law to require project monitoring and inspection reports to insure compliance with the approved plan. If James City County determines that inspection reports are required, they shall be submitted to the Environmental Division for review at intervals determined by the Division.

County Agent Todd Anglin

Responsible Land Disturber _____

Preconcover

Rev. 1/05

Super Silt Fence - 14 x 30 = 420
34 x 30 = 1020

Diversion Dike - 6.5 x 30 195
4 x 30 120

Sediment Basin - 164 cu yards = 1148

DRY SWALE - 24 x 30 = 720 L.F.
22 x 30 = 660 L.F.
1340 L.F.

4 ft. wide
1.5 ft. Thick 4 x 1.5 x 1340 = 8040 sq. ft.
297 Sq Yards

Rip Rap - 297 sq yards x 41.00 per sq yards = 12,500
Filter Fabric - 297 sq yards x 10.00 = 3000
VDOT No. 3 stone - 100 sq. yards x 27.00 = 2700

Timber check Dams - = 240 x 5 = 1200

Rock check Dams - 12 x 27.00 = 324

.75 x 3750
Permanent Stabilization =

010011381

EXEMPT FROM RECORDATION TAX UNDER VIRGINIA CODE
SECTION 58.1-811(A) (3), AS AMENDED

DEED OF EASEMENT FOR NATURAL OPEN SPACE

THIS DEED OF EASEMENT, made this 12th day of June, 2001, 19__, by and between MULBERRY PLACE, LLC and its/~~his/her/their~~ heirs, successors and assigns ("Grantor") and the County of James City, Virginia ("Grantee").

WHEREAS, the Grantor is the owner of certain property known as Mulberry Place Subdivision, consisting of a tract of land containing 27.811 acres, more or less, more particularly described herein ("Property");

WHEREAS, Grantee has adopted The Chesapeake Bay Preservation Ordinance, Chapter 19B of the James City County Code, as required by Chapter 21 of Title 10.1 of the Code of Virginia to protect the Chesapeake Bay and its tributaries from nonpoint source pollution within the Chesapeake Bay drainage area; and,

JUN 26 0 04 74

WHEREAS, Grantor wishes to preserve land as natural open space as part of Grantor's efforts to improve the quality of storm water runoff from the Property.

NOW, THEREFORE, in recognition of the foregoing and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, the Grantor does hereby grant and convey to Grantee an easement in perpetuity in

gross, with the right in perpetuity to restrict the use as described below, of the portion herein described of that certain tract, lot, piece or parcel of land ("Easement Property"), to wit:

SEE ATTACHED EXHIBIT A

~~-INSERT PROPERTY DESCRIPTION-~~

The restrictions hereby imposed on the use of the Easement Property, the acts which the Grantor covenants to do or not to do and the restrictions which the Grantee is hereby entitled to enforce, shall be as follows:

1. No building or structure shall be built or maintained on the Easement Property other than such building or structure approved by the County Engineer, in writing;

2. The Easement Property shall be kept free and clear of any junk, trash, rubbish, or other unsightly or offensive material;

3. No new signs, billboards, outdoor advertising, road or utility lines shall be placed on the property without the expressed written consent of the County Engineer;

4. The Easement Property shall remain in its natural condition with respect to natural leaf litter or other ground covering vegetation, understory vegetation or shrub layer, and tree canopy. The activities of Grantor within the Easement Property shall be limited to those which do not remove or damage any vegetation or disturb any soil. Such activities include selective trimming and pruning which will not alter the natural character of the Easement Property. Grantor may install walk trails

JUN 26 = 0475

or remove dead, diseased, poisonous or invasive vegetation with the expressed written consent of the County Engineer;

5. Grantee and its representatives may enter upon the Easement Property from time to time for inspection, to enforce the terms of this Easement and to post a sign or marker identifying Grantee's interest in the Easement Property as natural open space;

6. The Grantee may install and maintain trails for pedestrian and bicycle use including construction and user access areas. The location of trails will be determined by the Grantee. The area disturbed for construction and maintenance shall not exceed 30 feet in width.

7. In the event of a violation of the Easement, the Grantee shall have the right to seek all appropriate legal and equitable relief, including, but not limited to, the right to restore the Easement Property to its natural condition and assess the cost of such restoration as a lien against the Easement Property.

8. Anything herein to the contrary notwithstanding, the Grantor does hereby reserve unto itself, its successors and assigns, the right to construct, maintain and repair subdivision signs and fence entry feature adjacent to Mulberry Lane in Natural Open Space 1 and Natural Open Space 2; the right to dedicate and use underground utility easements over, upon and across Natural Open Space 1, Natural Open Space 5 and Natural Open Space 6; and the right to construct, maintain and repair a fence along the northerly boundary line of Natural Open Space 1 and the westerly and northerly boundary line of Natural Open Space 5.

Although this easement in gross will benefit the public in the ways recited above, nothing herein shall be construed to convey a right to the public of access to or use of the Easement Property, except as provided in Paragraph 6, and the Grantor shall retain exclusive right to such access and use, subject only to the provisions herein recited.

JUN26 04:16

Witness the following signatures and seals on the date first above written.

MULBERRY PLACE, LLC

By _____ (SEAL)
Manager

_____ (SEAL)

Commonwealth of Virginia
City/County of Newport News, to wit:

I, S. J. Lassow, a Notary Public for the Commonwealth of Virginia, do hereby certify that Christopher L. Phillips, whose name is signed to the foregoing Deed, has acknowledged the same before me in the jurisdiction aforesaid.

Given under my hand this 13th day of June, 2001.

_____
Notary Public

My Commission expires: 8/31/2005

JUN 26 01 0477

The form of this deed of easement is approved and, pursuant to Resolution of the Board of Supervisors of James City County, Virginia, duly executed on the 17th day of May, 1993, this conveyance is hereby accepted on behalf of said County.

6-22-01
Date

_____
Approved by County Attorney

Commonwealth of Virginia
City/County of James City, to wit:

I, MARY FRANCES Rieger, a Notary Public for the Commonwealth of Virginia, do hereby certify that Leo P. Rogers, Assistant Co. Atty., whose name is signed to the foregoing Deed, has acknowledged the same before me in the jurisdiction aforesaid.

Given under my hand this 22nd day of June, 2001.

Mary Frances Rieger
Notary Public

My Commission expires: October 31, 2001.

This Deed prepared by:

James City County Staff

Jones, Blechman, Woltz & Kelly, P.C.

600 Thimble Shoals Blvd.

Newport News, VA 23606

JUN 26 0478

openspac.pre

EXHIBIT A

All those certain pieces or parcels of land situate, lying and being in James City County, Virginia, containing in total 5.63 Acres, and being shown and designated on that certain plat entitled, "SUBDIVISION PLAT OF MULBERRY PLACE, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA", dated February 14, 2001, revised May 1, 2001, made by AES Consulting Engineers, as follows:

Natural Open Space 1 - 41,217 S.F.; 0.95 Ac.
Natural Open Space 2 - 8,870 S.F.; 0.20 Ac.
Natural Open Space 3 - 19,296 S.F.; 0.44 Ac.
Natural Open Space 4 - 14,555 S.F.; 0.33 Ac.
Natural Open Space 5 - 33,372 S.F.; 0.77 Ac.
Natural Open Space 6 - 127,933 S.F.; 2.94 Ac.

The said plat having heretofore been recorded in the Clerk's Office of the Circuit Court for James City County and the City of Williamsburg, Virginia in Plat Book _____, page _____.

VIRGINIA: City of Williamsburg and County of James City, to-wit:
This Easement & Plats was presented with certificate annexed and admitted to record on 26 June, 2001, at 3:51 PM in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City.
TESTE: BETSY B. WOOLRIDGE, CLERK
BY Betsy B. Woolridge Deputy Clerk

JUN 26 01 0479

PLAT RECORDED IN
P.B. NO. 82 PAGE 12-15

The demolition callouts for the existing entrances are shown on Sheet 2.

20. Dust Control. Add dust control measures in accordance with Minimum Standard 3.39 of the VESCH to the erosion and sediment control plan for the site. Dust control may be warranted due to the proximity of the project to Centerville Road, Mulberry Place, and Longhill Apartments.

A note concerning the use dust control has been added to Sheet 4 at the end of the sequence of construction.

21. Playground. It would appear a cross-culvert/trail is needed across the south dry swale to access the proposed playground in the east part of the site.

A culvert has been added to the plan in the area where the trail crosses the dry swale.

Stormwater Management/Drainage:

22. BMP Outfall. As a result of a site plan review meeting held between the plan preparer and County staff on August 23rd and a field meeting held between the applicant, plan preparer and County staff on August 25th 2004, the current arrangement of the outfall from the primary BMP for the site onto natural open space (n/f Mulberry Place Homeowner Association) is ***not*** acceptable. Firstly, it is not preferred to clear dedicated natural open space on offsite adjacent property to install 120 ft. of discharge drain pipe for the dry swale BMP. Secondly, if this were the only option, to properly perform this per the current plan, evidence of an offsite drainage easement of adequate width would be necessary from the offsite owner. Thirdly, staff does not feel that an adequate, defined natural receiving channel exists along the natural open space and Lots 21 through 24 in Mulberry Place to properly outflow discharges from the proposed BMP facility. Minimum Standard #19 of the Virginia Erosion and Sediment Control regulations is clear and specific about the need for defined, adequate receiving channels from development sites and BMP outfalls. Per Minimum Standard #19 of the Virginia Erosion and Sediment Control regulations, concentrated runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. Minimum Standard #19 also states that outfall from a detention facility shall be discharged to a receiving channel. Technical Bulletin No. 1 by the Virginia DCR further defines that concentrated runoff leaving a development site, to include discharge from stormwater facilities, must be discharged into an adequate channel and a natural channel is defined as a conveyance with a defined cross-sectional flow area. This is a critical issue that must be resolved prior to any approvals from the Environmental Division. Therefore, provide offsite drainage improvements (and drainage easements) to adequately convey design and overflow discharges from the BMP to an acceptable, defined downstream natural receiving channel

location; or alternatively, provide a site design and/or infiltration type BMP so that increased runoff from the development site can be fully infiltrated and not become surface runoff. This would require providing proper supporting geotechnical and hydraulic design information which clearly show no detrimental effects downstream.

After working with the Environmental Division, JCSA and adjacent property owners in the Mulberry Place subdivision, it appears as though a compromise has been reached for the construction of an off-site pipe system to convey the stormwater from the Warhill Green BMP to the existing ravine on the eastern side of the Mulberry Place subdivision. Please see the attached easement plats for the work necessary on the Mulberry Place subdivision property. These plats have also been forwarded to the Mulberry Place Board of Directors for their approval. A recorded copy of the easement plats will be submitted to your office under separate cover.

23. Site Hydrology. Due to changes in site grading and impervious cover, it would be expected that the time of concentration would change more significantly between pre- and post development conditions. Currently site hydrology shows post development only 36 seconds shorter than predevelopment. (*Note: Currently the predevelopment 2-year storm discharge from the site is shown at 1.73 cfs. It would appear that the length of overland flow for predevelopment time of concentration computations is well more than 100 feet. A longer overland flow length would increase the time in the overland flow component thus increasing the overall time of concentration and lower the peak discharge value. It is our opinion that predevelopment discharge for the 2-year storm is being slightly inflated in an attempt to show that discharge from the BMP is lower than traditional 2-year predevelopment levels*).

Please see the attached time of concentration flow paths to support the times used in the calculations. At a glance, the post development drainage area is approximately 3 times as large as the pre-development area which could certainly warrant a larger time of concentration. It is important to note, that these calculations we in no way "inflated" as you imply in your comment.

24. Dry Swale BMP. The following comments pertain to the dry swale BMP (County Type E-2) designs for the project:

24a. Label the dry swales BMPs as County type E-2 BMPs.

Please see sheet 5.

24b. Provide a typical section for the dry swale BMP, in it's typical arrangement along the north and south property lines, consistent with channel geometry dimensions in the design report (i.e. bottom width, channel depth, side slopes of

the channel and the permeable soil/underdrain arrangement). Reference schematic E-2 (Figure 16) of the County BMP manual.

A typical section was and is provided on Sheet 12.

24c. North and south dry swale applications should have engineered soil media and underdrain throughout their entire length, not just select portions.

The design of the dry swales has been revised and now includes soil media throughout their entire length. The southern swale has been specified to have engineered media in accordance with the Virginia Stormwater Management Handbook. The northern swale is specified to consist of in-situ soil as validated by the geotechnical testing completed. Please see the geotechnical test results supporting the infiltration capabilities in the northern swale. An underdrain has been provided in both swales, although the underdrain on the northern swale has been specified to be plugged. Please see the outlet structure detail on Sheet 12. The plug could be removed in the future if the infiltration capabilities diminish.

North 1.74 in/hr.
South 0.09 in/hr.

24d. The check dams shown in the dry swale BMPs on Sheets 5 and 11 should be temporary for erosion and sediment control purposes, not permanent. Firstly, a check dam is not a feature of a dry swale BMP, but a wet swale per the County BMP manual and the VSMH. Also, page 51 of the County BMP manual does not recommend wet swale applications for residential development as they can create potential nuisance or mosquito-breeding conditions.

Per our meeting on October 11, 2004, the timber check dams are an integral component of the design in obtaining the required water quality volume and have been kept as part of the design. The VSMH does indicate the check dams as a primary component of both the wet and dry swale designs. The typical detail in the JCC BMP manual indicates a cross culvert and driveway across the dry swale which in essence functions the same as the timber check dam.

24e. All dry swale details should provide a note referencing Minimum Standard & Spec. 3.13 of the VSMH and Group E (Open Channel System) requirements of the County BMP manual.

A note has been provided on Sheet 12.

24f. As it appears the access roadway/parking area which drains to the north dry swale does not have curb and gutter and will drain to the swale via overland flow; therefore, a pea-gravel diaphragm or other acceptable form of pretreatment is necessary. Refer to page 51 of the County BMP manual.

A gravel diaphragm has been provided at the edge of the pavement section.

24g. Provide computations to show maximum ponding time in the dry swale is no more than 48 hours.

Please see the attached drainage calculation package.

24h. Landscaping. Trees should not be placed directly in the bottom of the dry swale as they could result in flow obstructions and root systems could affect filtering capability and directly damage the underdrain system.

There are no longer any trees within the bottom of the dry swale.

25. BMP Worksheet. The BMP worksheet provided for the project shows 9.79 BMP points using structural methods. Receipt of a waiver request dated August 23rd 2004 is acknowledged. The waiver request cannot be processed accordingly until many of the issues as outlined above are resolved, especially those associated with the type of BMP and outfall arrangement. (*Note: It is possible that the south dry swale may treat some offsite area from the n/f Cora Lee property or Mulberry Place to make up the point differential; however, no drainage map was provided and existing contour information on the adjacent tract is lacking.*)

Please see the attached, revised BMP worksheet. Based on the JCC topography, there is a small area of off-site drainage from the Cora Lee and Mulberry Place properties which will drain into the southern dry swale. Please null and void the previously submitted BMP Point waiver request letter dated August 23, 2004, as the site achieves 10-points with the contributing off-site area taken into account.

26. Stormwater Channel. Ensure the stormwater conveyance channel, as situated on the Longhill Grove apartment site between Building Units 7, 8 and 9 (per plan SP-44-03) and the north border of the Warhill Green site is in place and functional to serve as an overflow mechanism should the north dry swale fail or overflow for storms greater than the 10-year frequency. Refer to Item #2.12 of the *James City County Environmental Division, Stormwater Drainage Conveyance Systems, General Design and Construction Guidelines*.

The Longhill Grove conveyance channel is in place and functional although overflow from the dry swale system would escape the site at the Mulberry Place end of the project.

27. Other. Describe briefly how the rooftop-downspout drainage will be handled around the three building units, including if it be disconnected into yard areas or discharge directly into the dry swales.

A note has been added to Sheet 5 concerning the downspout drainage.

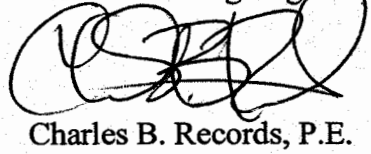
28. Low-Impact Design. Use of low-impact development principles and techniques are fully encouraged for use in site design to reduce and control impacts associated with increased stormwater runoff. This includes minimizing disturbance, minimizing impervious area, disconnection of impervious areas, saving existing trees, preserving existing topography and HSG A&B soils, use of flatter site grades, reduced slope heights, increasing time of concentration flow paths, maintaining sheet flow, increasing surface roughness coefficients, use of wide and flat stormwater conveyance channels, clustering landscaping in flow paths, minimizing use of onsite storm drain pipe, on-lot stormwater management, encouraging infiltration and use of bioretention cells with appropriate landscaping. (*Note: As environmental inventory soils map Sheet 2 shows the east portion of the site is situated on the 11C, Craven-Uchee and 18B, Kempsville fine sandy loam, the feasibility exists to explore use of infiltration and/or filtering system type BMPs at this location*).

    As proposed, the developed site utilizes a stormwater management facility with both filtration and infiltration characteristics. The facility is primarily located in the 11C and 18B soil types.

AES Consulting Engineers hereby submits 12 copies of the construction plans for final approval. If you have any questions or need any additional information, please feel free to contact me.

Sincerely,

AES Consulting Engineers



Charles B. Records, P.E.
Project Manager

cc: Mr. Henry Stephens, Associated Developers, Inc.

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BMP DESIGN

	PRE	POST	ROUTED
2	2.59	9.98	2.49
10	6.18	20.20	7.43 *
100	9.85	30.05	12.64

* 10-YEAR FOR OFFSITE STORM DESIGN.

PROVIDING NEW OUTFALL SYSTEM CHANNEL IMPROVEMENT. DRAINS TO BROAD, FLAT WETLAND. NO ONSITE DETENTION REQUIRED, ONLY PROPERLY SIZED OFFSITE SYSTEM.

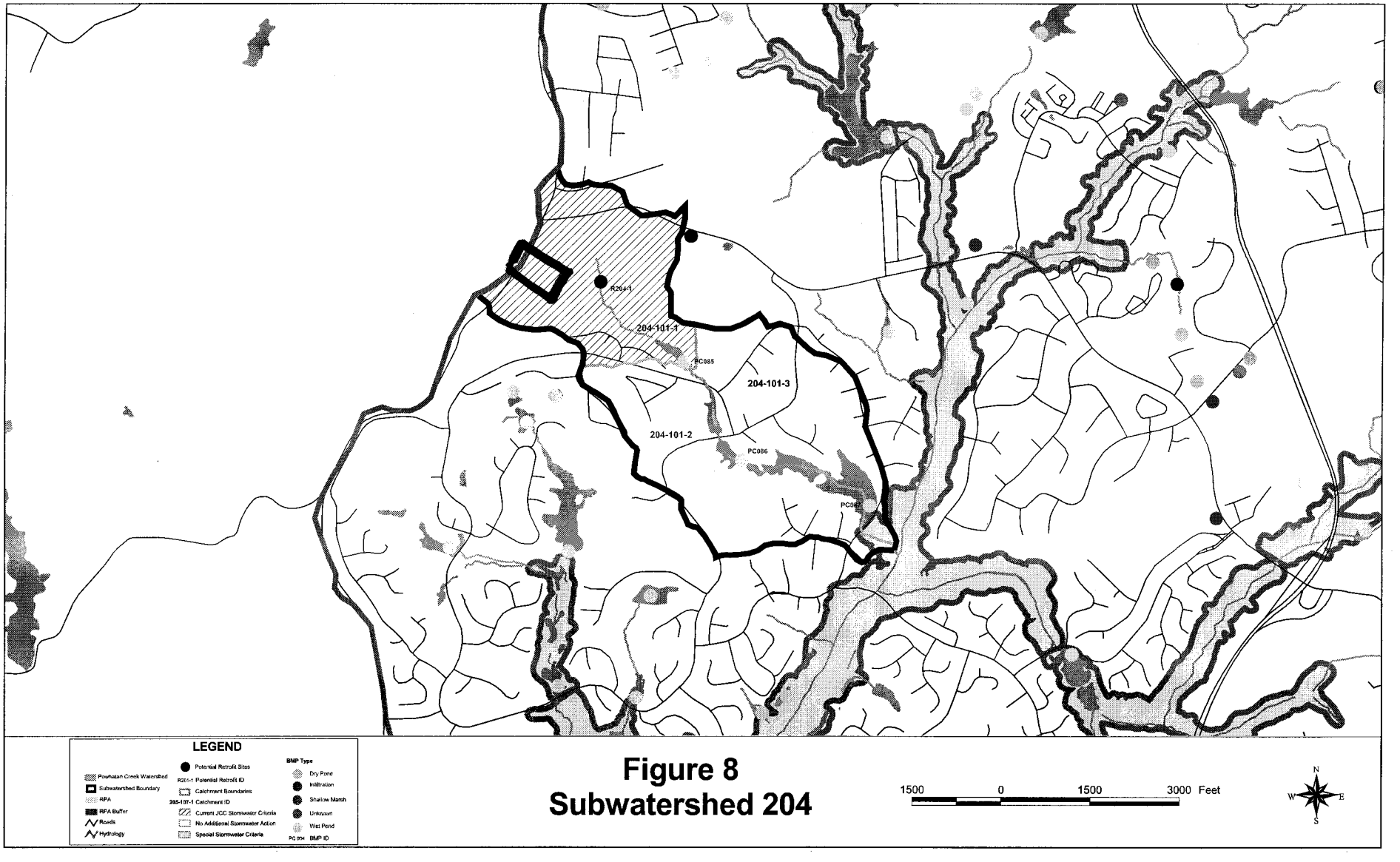

Figure 8
Subwatershed 204

D. Subwatershed 204

Subwatershed 204 was divided into 3 catchments (Figure 8). About two-thirds of the subwatershed fall within Ford's Colony, whereas the remaining areas are lightly developed as rural residential, general agriculture, and limited business. Primary stormwater strategies for the subwatershed include on-site stormwater management for new development to limit disturbance to recommended conservation areas, introducing the use of on-lot practices to reduce stormwater runoff and pollutant loading, pondscaping existing facilities with native wetland species, and reforestation of riparian areas.

Subwatershed Overview

Drainage Area	0.85 sq mi (540.9 acres)
Overall Stream Quality	Fair
2000 Impervious Cover	10.0%
Current Stream Classification	Sensitive
Maximum Impervious Cover	14.2%
Projected Stream Classification	Impacted
Target Stream Classification	Impacted
Developed Area	399.3 acres
Approximate No. of Stormwater Practices	3

Subwatershed-Wide Stormwater Strategy

No additional stormwater action is necessary for future development in the Ford's Colony portion of Subwatershed 204. However, Ford's Colony management, perhaps in conjunction with the Friends of Powhatan Creek, should encourage the use of on-lot practices, such as downspout disconnection, reduced impervious cover, and more responsible turf and landscaping practices, throughout Ford's Colony.

Stormwater ponds within Ford's Colony are excellent candidates for pondscaping with native vegetation, especially for those in or adjacent to the golf course. Also, Ford's Colony management should consider riparian reforestation and plantings along the stream valley corridor.

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 179

Catchment 204-101-1 Description

About two-thirds of this catchment is developed, and land use includes low and medium density residential, rural residential, general agriculture, and limited business. Approximately one-third of the catchment is undeveloped, a portion of these developable areas are platted lots within Ford's Colony. Also, a portion of the developable area falls within conservation area C-11, RPA expansion. The stream channel at the mouth of the catchment contains an on-line stormwater pond (PC085). The stream assessment rated the stream reach within this catchment as "fair."

Stormwater Strategy:

Three options exist for stormwater management for future development in this catchment:

JCC Standards for On-Site SWM

Option 1. If conservation area C-11 is preserved, new development outside the conservation area should implement current JCC stormwater management criteria.

Regional Stormwater Management

Option 2. If conservation area C-11 cannot be preserved, then a regional stormwater management pond could be located at R204-1 (ranked 5 out of 8).

Option 3. A preferred alternative is to direct untreated stormwater runoff from new development in parallel-pipes to the existing downstream pond, PC085. See Appendix G, *Parallel Pipe Systems as a Stream Protection Technique*, for more information on parallel-piping.

Catchment 204-101-2 Description

Catchment 204-101-2 falls entirely within Ford's Colony where only a handful of the platted lots have been developed, but the stream valley has been extensively altered and impounded for golf course and stormwater ponds (PC086 and PC087). In addition, portions of the stream channel in between the ponds have been piped, and there is poor vegetative cover in portions of the RPA. A possible expansion of the RPA (conservation area C-11) has been recommended within the catchment. The stream assessment gave reach 101 a "fair" rating.

Stormwater Strategy:

No Action

No additional stormwater action is necessary for future development. Existing stormwater ponds should be capable of effectively treating stormwater runoff generated by future development.

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Catchment 204-101-3 Description

Catchment 204-101-2 is very similar to the previous catchment in that it falls entirely within Ford's Colony where about half of the platted lots have been developed, and the stream valley has been extensively altered and impounded for golf course and stormwater ponds (PC086 and PC087). In addition, portions of the stream channel in between the ponds have been piped, and there is poor vegetative cover in portions of the RPA. A possible expansion of the RPA (conservation area C-11) has been recommended within the catchment. The stream assessment gave reach 101 a "fair" rating.

Stormwater Strategy:

No Action
No additional stormwater action is necessary for future development. Existing stormwater ponds should be capable of effectively treating stormwater runoff generated by future development.

PC216_WARHILL_GREEN_SUBDIVISION_DRY_SWALE - 181