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: **CC-028**

DATE VERIFIED: **May 4, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 10, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: CC028

PIN: 4820100002

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

Property Description: Senior Care/Retirment Facility

Site Address: 5700 Williamsburg Landing Drive

(For internal use only) **Box** 10 **Drawer:** 6

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

Comments

CC028

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

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

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

Project Name: Williamsburg Landing
County Plan No.: SP-135-04
Stormwater Management Facility: Dry ~~wet~~ pond - modification mircopool
BMP Phase #: ☐ I ☐ II ☒ III
☒ Information Package Received. Date/By: 9/15/06
☐ Completeness Check:
- ☒ Record Drawing Date/By: 8/31/06
- ☒ Construction Certification Date/By: ~~9/15/06~~ wavied
- ☒ RD/CC Standard Forms (Required for all BMPs after Feb 1st 2001Only)
- ☒ Insp/Maint Agreement # / Date: 11/14/02
- ☒ BMP Maintenance Plan Location: C-1 SP-135-04
- ☐ Other:

☒ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review
- ☒ Yes ☐ No Location: pg. C-6 note 20

☒ Assign **County BMP ID Code #**: Code: CC-028
☒ Preliminary Input/Log into Division's "As-Built Tracking Log"
☒ Add Location to GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)
☒ Preliminary Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
☒ Active Project File Review (correspondence, H&H, design computations, etc.).
☒ Initial As-Built File setup (File label, folder, copy plan/details/design information, etc.).
☒ Inspector Check of RD/CC (forward to Inspector using transmittal for cursory review).
☒ Pre-Inspection Drawing Review of Approved Plan (Quick look prior to Field Inspection).
☒ Final Inspection (FI) Performed Date: 4/27/2007
☒ Record Drawing (RD) Review Date: 4/27/2007
☒ Construction Certification (CC) Review Date: Waived
☒ Actions:
- ☒ No comments.
- ☐ Comments. Letter Forwarded. Date:
- ☐ Record Drawing (RD)
- ☐ Construction Certification (CC)
- ☐ Construction-Related (CR)
- ☐ Site Issues (SI)
- ☐ Other :

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

Final Sign-Off

Plan Reviewer: Joe Beuchler Date: 5/1/2007

*** See separate checklist, if needed.

James City County, Virginia
Environmental Division

RECEIVED
SEP 15 2006
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: Williamsburg Landing Parking Lot Addition
Structure/BMP Name: Extended Dry-Detention Facility
Project Location: 5700 Williamsburg Landing Drive
BMP Location: 5700 Williamsburg Landing Drive
County Plan No.: SP - 135 - 04

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

Tax Map/Parcel No.: 4820100002
BMP ID Code (if known): CC028
Zoning District:: R5
Land Use: Retirement Home
Site Area (sf or acres): 71.63

Brief Description of Stormwater Management/BMP Facility: The existing BMP outfall structure was revised to provide a micro pool.

Nearest Visible Landmark to SWM/BMP Facility:

Nearest Vertical Ground Control (if known):
☐ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☒ Other
Station Number or Name: EX DI Rim in Parking Lot Adjacent BMP
Datum or Reference Elevation: Elev 63.57
Control Description: Rim of Existing DI
Control Location from Subject Facility: DI located adjacent existing BMP.

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: 3/06
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☑ Unknown
Name of Site Work Contractor Who Constructed Facility: Toano Contractors, Inc.
Name of Professional Firm Who Routinely Monitored Construction: Unkown
Date of Completion for SWM/BMP Facility: 8/06
Date of Record Drawing/Construction Certification Submittal: 8/31/06

(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: Williamsburg Landing, Inc
Mailing Address: 5700 Williamsburg Landing Drive
Williamsburg, Va. 23185
Business Phone: 253-0303 Fax:
Contact Person: Title:

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

Firm Name: LandMark Design Group
Mailing Address: 4029 Ironbound Rd, Suite 100
Williamsburg, Va. 23188
Business Phone: (757) 253-2975
Fax: (757) 229-0049
Responsible Plan Preparer: Stephen Romeo
Title: Land Surveyor
Plan Name: Plan of Development Williamsburg Landing
Firm's Project No. Parking Lot Addition 2000312-000.08
Plan Date: May 31, 2005
Sheet No.'s Applicable to SWM/BMP Facility: C3 / ____ / ____ / ____ / ____

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

Name: Toano Contractors, Inc.
Mailing Address: 8589 Richmond Rd.
Toano, Va. 23168
Business Phone: (757) 566-0097
Fax: (757) 566-8874
Contact Person: Randy Taylor
Site Foreman/Supervisor: Randy Taylor
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 - Professional Certifications:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: LandTech Resources Inc.
Mailing Address: 5810-F Mooretown Rd.
Williamsburg, Va. 23188
Business Phone: (757) 565-1677
Fax: (757) 565-0782

Name: Matthew Connolly
Title: Land Surveyor

Signature: [signature]
Date: 9-15-2006

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

COMMONWEALTH OF VIRGINIA
MATTHEW H. CONNOLLY
No. 002053
9/15/06
LAND SURVEYOR

_____ (Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

Firm Name: _____
Mailing Address: _____
_____
Business Phone: _____
Fax: _____

Name: _____
Title: _____

Signature: _____
Date: _____

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.

_____ (Seal)

Virginia Registered Professional Engineer

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

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

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

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

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

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

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

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

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

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

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

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

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

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

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

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

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

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

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

N/A 4. Top widths, berm widths and embankment side slopes.

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

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

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

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

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

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

XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacings (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

NA 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**

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

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

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

NA 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.

NA 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.

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

NA 19. Fencing location and type, if applicable to facility.

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.

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

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

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

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

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

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

XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.

NA F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.

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

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

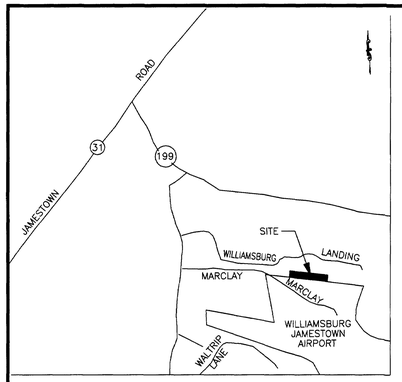
XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.

XX F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable.

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

XX F15. No visual signs of erosion or channel degradation immediately downstream of facility.

XX F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.



STORM WATER GENERAL PERMIT NOTES

THE CONTRACTOR SHALL ENSURE COMPLIANCE WITH THE REQUIREMENTS OF VR 680–14–19– VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

IMPLEMENTION, DOCUMENTATION, AND INSPECTIONS NECESSARY FOR THE COMPLIANCE WITH STORM WATER GENERAL PERMIT

1. IMPLEMENTATION OF THE STORM WATER POLLUTION PREVENTION PLAN AS DEVELOPED FOR THE SITE AND IN ACCORDANCE WITH THE GENERAL PERMIT REQUIREMENTS WITH RECORD TO EROSION AND SEDIMENT CONTROL, POST– CONSTRUCTION STORM WATER MANAGEMENT, AND OTHER CONTROLS RECORDING SOLID MATERIALS, SEDIMENTS AND DUST, AND THE DEMONSTRATED COMPLIANCE WITH APPLICABLE STATE AND/OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.

2. RETENTION OF THE STORM WATER POLLUTION PREVENTION PLAN AT THE CONSTRUCTION SITE. THE PLAN AND OTHER RELATED DOCUMENTS SHALL BE MADE AVAILABLE UPON REQUEST TO AUTHORIZED LOCAL,STATE,OR FEDERAL REPRESENTATIVES.

3. AMENDMENT OF THE STORM WATER POLLUTION PREVENTION PLAN WHENEVER THERE IS A CHANGE IN DESIGN, CONSTRUCTION, OPERATION, OR MAINTENANCE, WHICH HAS A SIGNIFICANT EFFECT ON THE POTENTIAL FOR THE DISCHARGE OF POLLUTANTS T THE SURFACE WATERS OF THE STATE, OR IF THE STORM WATER POLLUTION PREVENTION PLAN PROVES TO BE INEFFECTIVE IN ELIMINATING OR SIGNIFICANTLY MINIMIZING POLLUTANTS FROM THE CONSTRUCTION ACTIVITY.

4. DOCUMENTATION OF THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR, WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE, AND WHEN STABILIZATION MEASURES ARE IMPLEMENTED.

5. INSPECTIONS OF DISTURBED AREAS OF THE CONSTRUCTION SITE AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION THAT HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL CONTROL MEASURES, AND LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE CONDUCTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT THAT PRODUCES SURFACE RUNOFF AS REQUIRED BY THE GENERAL PERMIT REGULATIONS REPORTS SUMMARIZING THE INSPECTIONS SHALL BE MADE IN ACCORDANCE TO THE REGULATIONS S AND RETAINED AS PART OF THE STORM WATER POLLUTION PREVENTION PLAN.

6. ALL CONTRACTORS AND SUBCONTRACTORS SHALL SIGN A COPY OF THE CERTIFICATION STATEMENT AS DESCRIBED IN THE GENERAL PERMIT BEFORE CONDUCTING ANY PROFESSIONAL SERVICES AT THE SITE IDENTIFIED IN THE POLLUTION PREVENTION PLAN. ALL CERTIFICATIONS SHALL BE INCLUDED IN THE STORM WATER POLLUTION PREVENTION PLAN.

7. ALL DOCUMENTS, RECORDS, REPORTS, AND OTHER INFORMATION RELEVANT TO THE GENERAL PERMIT REGULATIONS SHALL BE GIVEN TO THE OWNER FOLLOWING FINAL STABILIZATION OF THE SITE.

8. WHERE THE SITE HAS BEEN FINALLY STABILIZED AND ALL STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES THAT ARE AUTHORIZED BY THE GENERAL PERMIT ARE ELIMINATED, A NOTICE OF TERMINATION SHALL BE PREPARED FOR THE OWNER TO SIGN AND SUBMIT TO THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, WATER DIVISION.

9. THE STRUCTURAL STABILITY OF THE PERMITTED FACILITIES SHALL BE ENSURED.

PROHIBITION AND REPORTING OF RELEASES OF SUBSTANCES OTHER THAN STORM WATER

10. EXECUTION OF REPORTING REQUIREMENTS ON THE EVENT OF NONCOMPLIANCE OF THE GENERAL PERMIT OR IF ANY UNPERMITTED, UNUSUAL OR EXTRAORDINARY DISCHARGE ENTERS OR COULD BE EXPECTED TO ENTER SURFACE WATERS OF THE STATE.

11. PROHIBITION OF NON–STORMWATER DISCHARGES EXCEPT AS PROVIDED FOR IN THE GENERALPERMIT. APPROPRIATE POLLUTION PREVENTION MEASURES FOR NON – STORM WATER COMPONENTS OF DISCHARGE SHALL BE IMPLEMENTED

12. EXECUTION OF REPORTING REQUIREMENTS OF 40 CFR PART 117 (1992) AND 40 CFR PART 302 (1992). IN ADDITION, THE DISCHARGE OF HAZARDOUS SUBSTANCES OR OIL IN THE STORM WATER DISCHARGE FROM THE CONSTRUCTION SITE SHALL BE PREVENTED OR MINIMIZED IN ACCORDANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN.

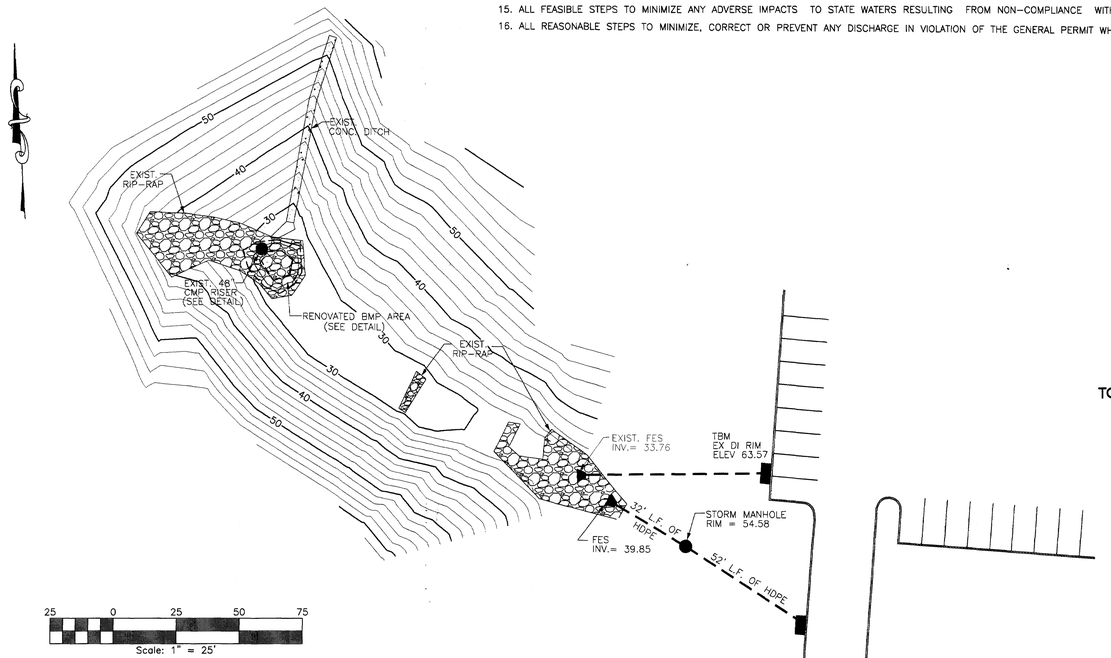
13. PROHIBITION OF DISCHARGE OF HAZARDOUS SUBSTANCE, OIL, OR POLLUTANTS RESULTING FROM ON – SITE SPRILLS OR RELEASE.

MANAGEMENT MEASURES AND RESPONSE TO UNINTENTIONAL RELEASES

14. ALL WASTE COLLECTION, CONTROL, TREATMENT OF POLLUTANT ACTIVITIES AND DISPOSAL FACILITIES SHALL BE OPERATED IN A MANNER CONSISTENT WITH THE GENERAL PERMIT REGULATIONS.

15. ALL FEASIBLE STEPS TO MINIMIZE ANY ADVERSE IMPACTS TO STATE WATERS RESULTING FROM NON–COMPLIANCE WITH CONDITIONS SPECIFIED IN THE GENERAL PERMIT SHALL BE TAKEN.

16. ALL REASONABLE STEPS TO MINIMIZE, CORRECT OR PREVENT ANY DISCHARGE IN VIOLATION OF THE GENERAL PERMIT WHICH HAS A REASONABLE LIKELYHOOD OF ADVERSELY AFFECTING HUMAN HEALTH OR THE ENVIRONMENT SHALL BE TAKEN.



25 0 25 50 75

Scale: 1" = 25'

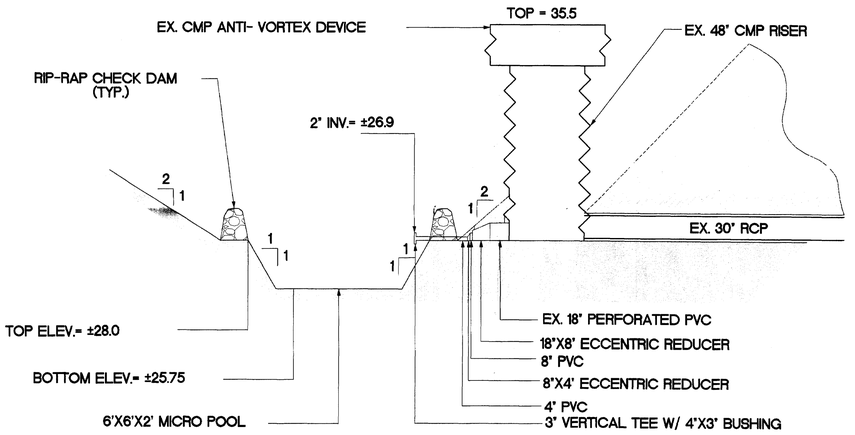
BMP RECORD DRAWING

COUNTY PLAN NO. SP–135–04

RECORD DRAWING CERTIFICATION

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

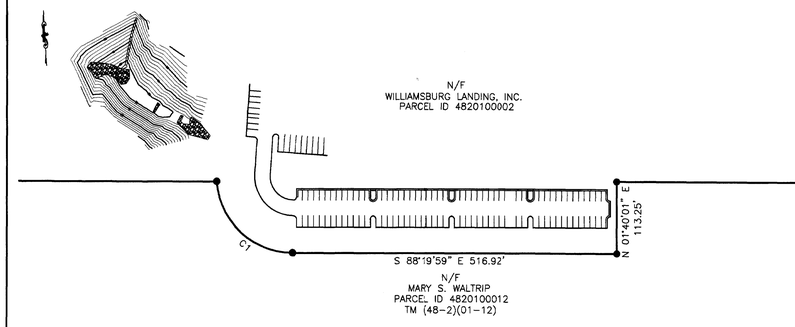
COMMONWEALTH OF VIRGINIA
MATTHEW H. CONNOLLY
No. 002053
9/15/06
LAND SURVEYOR



RENOVATED BMP OUTFALL SECTION

N.T.S.

PROPERTY INFORMATION – SCALE: 1" = 100'



NUMBER	DELTA	CHORD BEARING	TANGENT	RADIUS	ARC	CHORD
C1	86°00'46"	S 45°19'36" E	112.39	120.50	180.90	164.38

RECORD DRAWING

RECEIVED
SEP 15 2006
ENVIRONMENTAL DIVISION

WILLIMSBURG LANDING PARKING ADDITION
BMP RECORD DRAWING

EXTENDED DRY–DETENTION FACILITY – JCC TYPE F2 BMP

COUNTY PLAN NO. SP–135–04

James City County Virginia

NO.	DATE	REVISION / COMMENT / NOTE

LandTech Resources, Inc.
Surveying · GPS · Engineering
5810–F Mooretown Road, Williamsburg, VA 23188
Phone: (757) 565–1677 Fax: (757) 565–0782
web: landtechresources.com

SCALE: 1" = 25'

DATE: 08–31–06

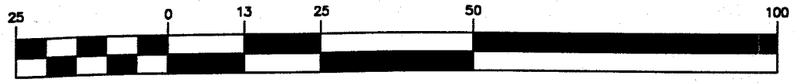
JOB: 06–156

DRAWN BY: MHC

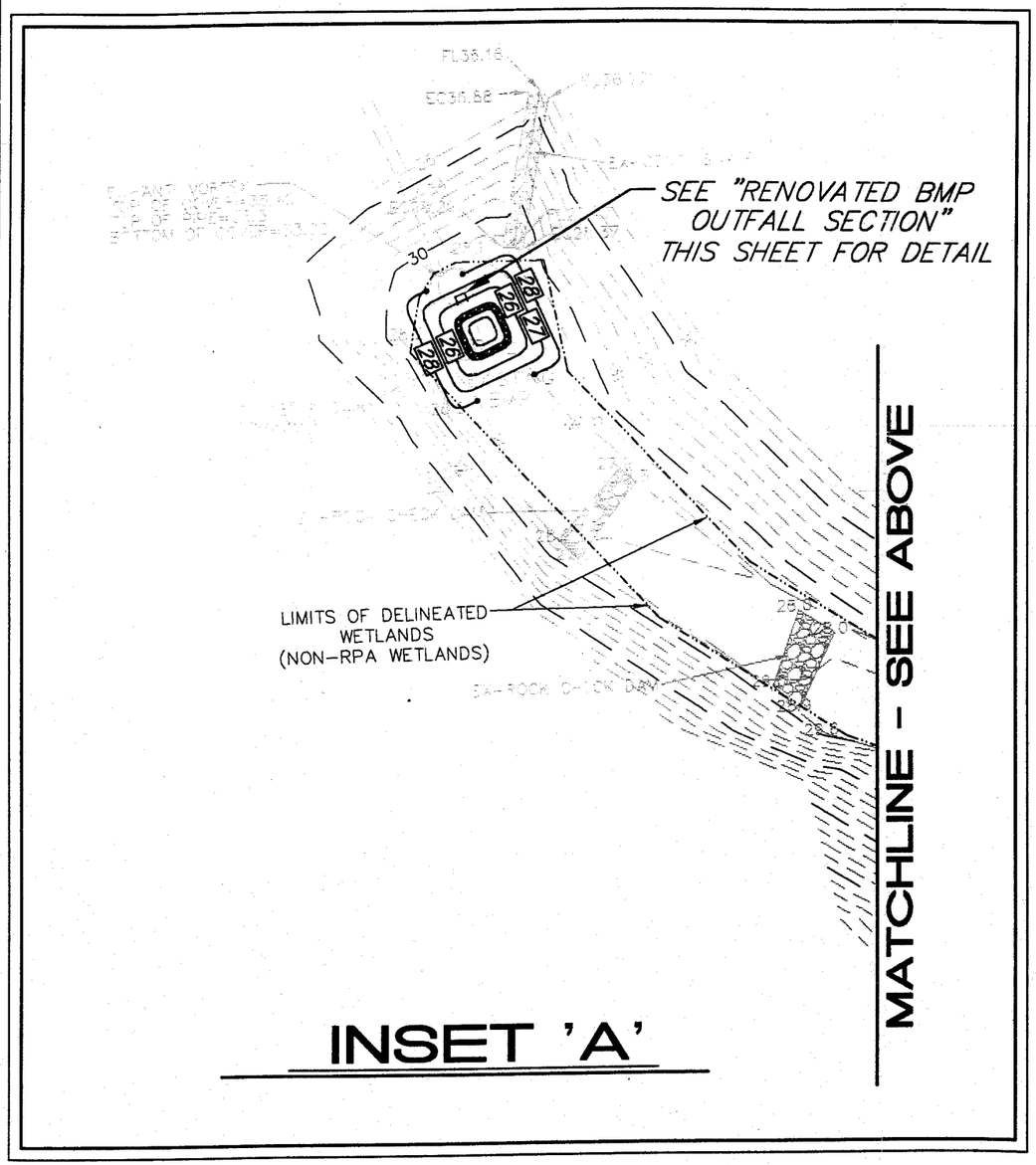
SHEET: 1 OF 1

CC028 SP-135-04

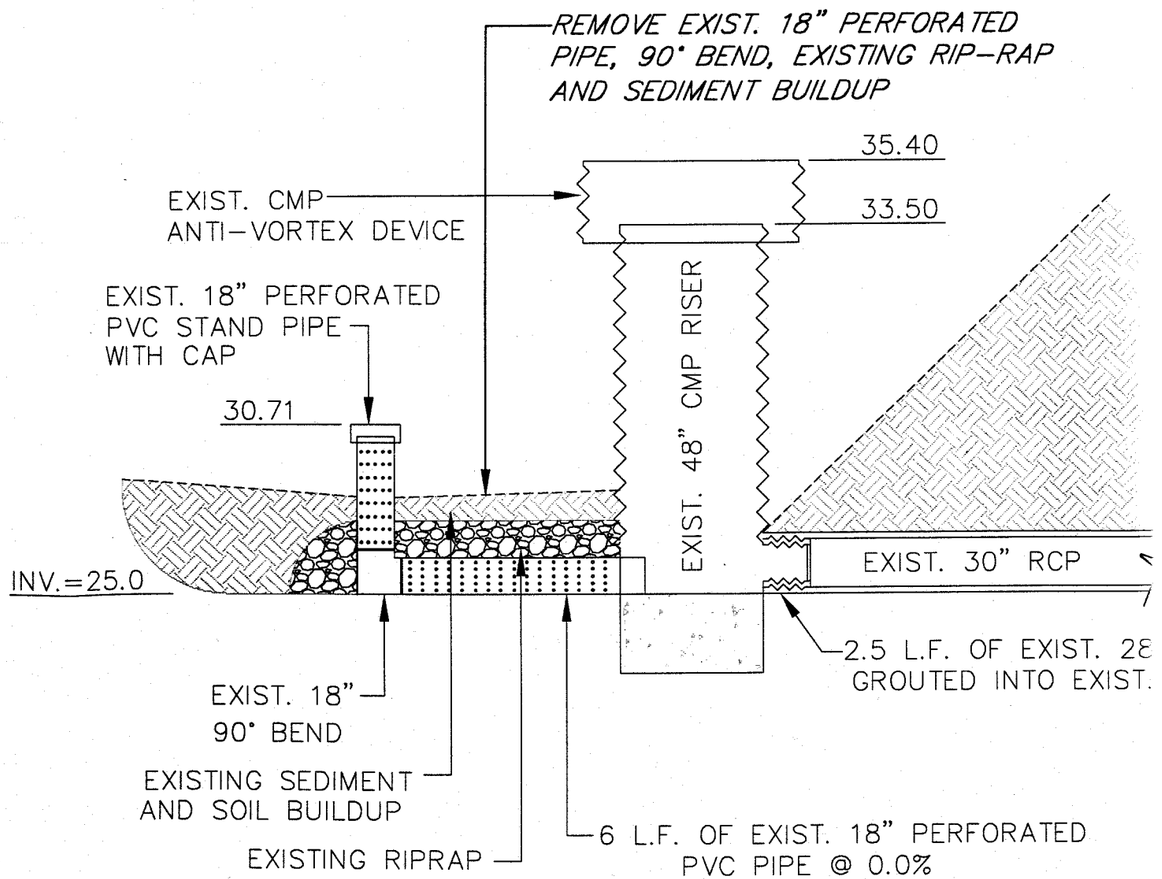
GRAPHIC SCALE



(IN FEET)
1 inch = 25 ft.

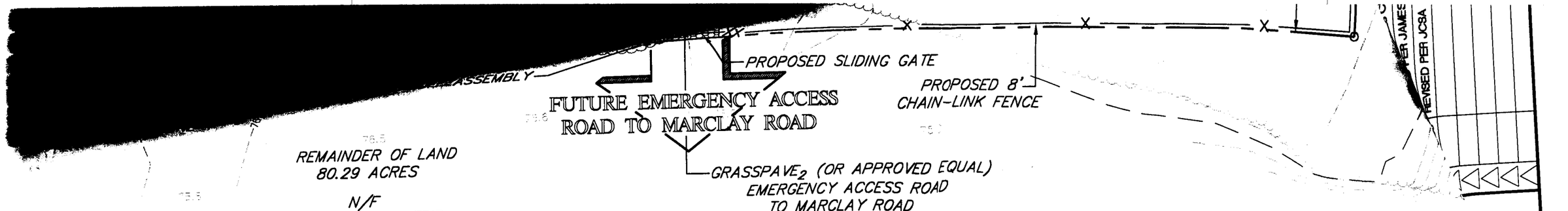


INSET 'A'

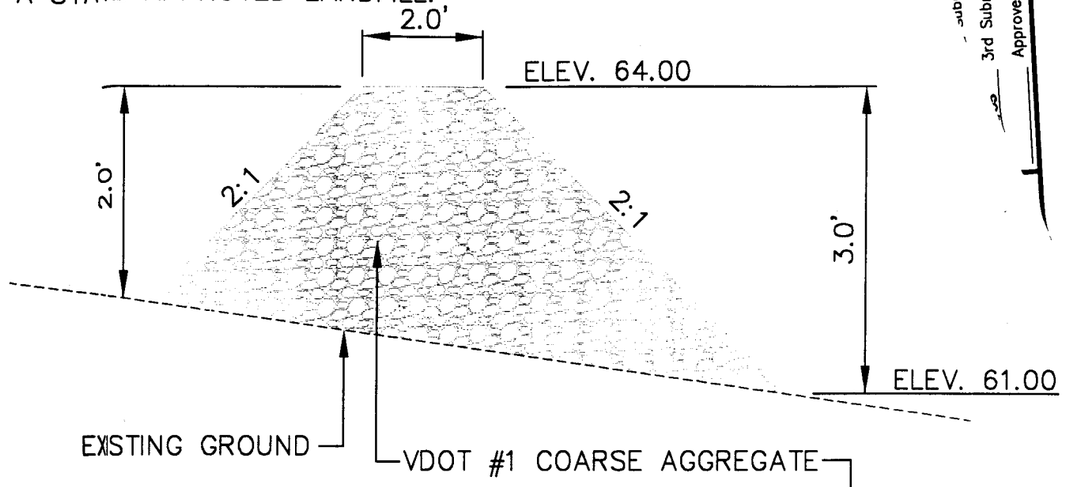


EXISTING BMP OUTFALL SECTION

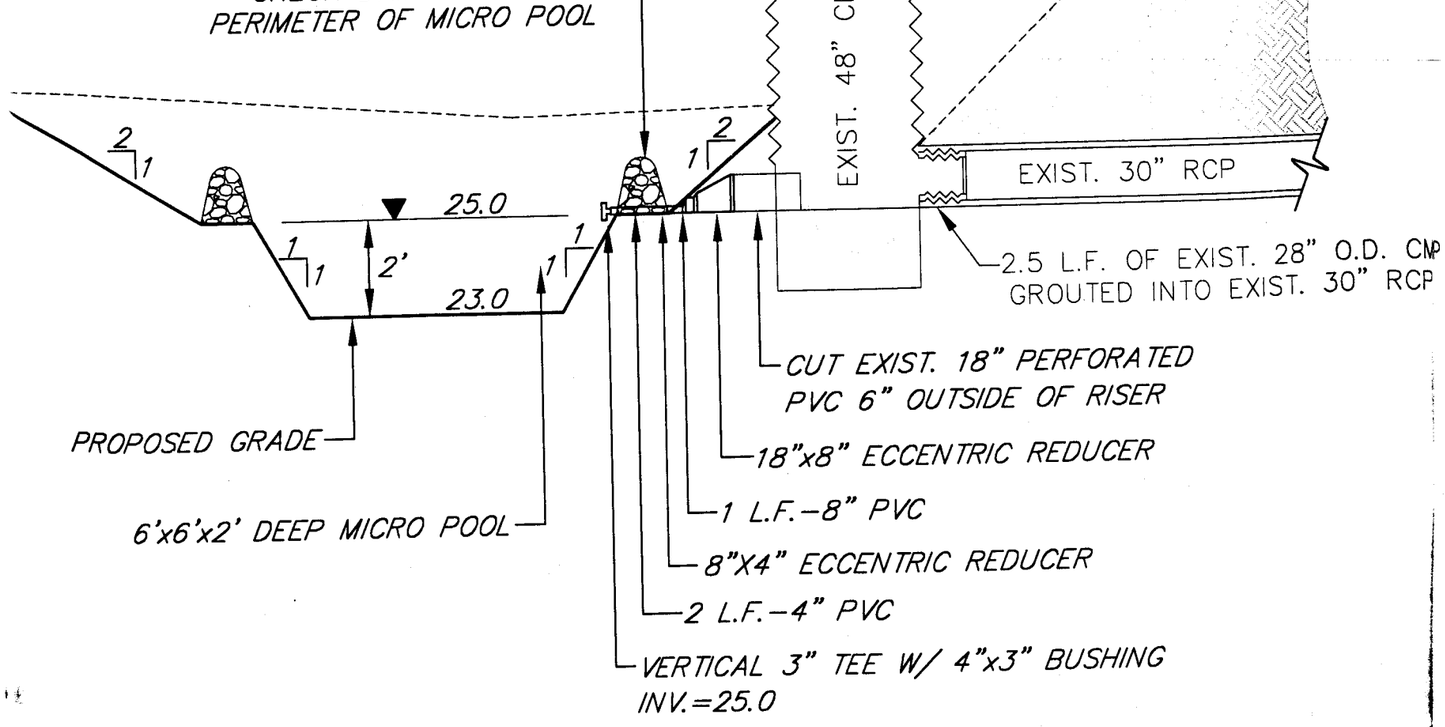
N.T.S.

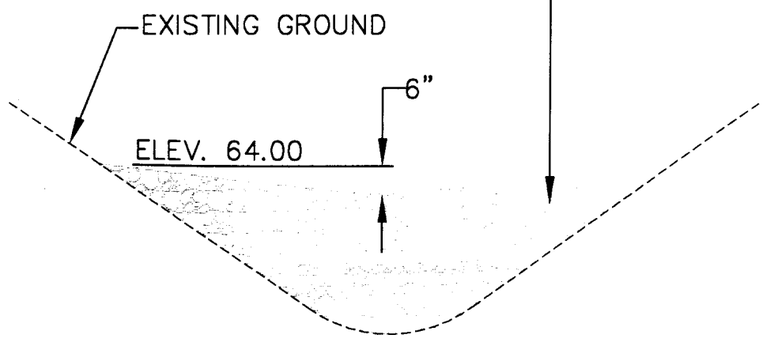


NOTE: ALL DELETERIOUS MATERIAL FOUND ON SITE SHALL BE REMOVED AND DISPOSED OFF SITE IN A STATE APPROVED LANDFILL.



SECTION A-A
RIPRAP CHECK DAM
N.T.S.





SECTION B-B
RIPRAP CHECK DAM
N.T.S.

SITE P

Designed: GSW
Checked: SAR
File Mgr./Drawn: GSW
Project Number: 2000312-000.0
Drawing Number:

RENOVATED BMP OUTFALL SECTION

LAND MARK DESIGN GROUP
Engineers ♦ Planners ♦ Surveyors
5544 Greenwich Road
Virginia Beach, VA 23
Tel. (757) 473-2000

THE OWNER OR ITS DESIGNATED REPRESENTATIVE WILL INSPECT THE SWM/BMP STRUCTURES AFTER EACH SIGNIFICANT RAINFALL EVENT OR THE FOLLOWING WORKING DAY IF A WEEKEND OR HOLIDAY OCCURS. A SIGNIFICANT RAINFALL FOR THIS STRUCTURE IS DEFINED AS ONE (1) INCH OR MORE OF GAUGED RAINFALL WITHIN A 24-HOUR PERIOD. ONCE PER YEAR, A REPRESENTATIVE OF THE COUNTY MAY JOINTLY INSPECT THE STRUCTURE.

THIS BASIN SERVES A DRAINAGE AREA OF 7.51 ACRES ASSOCIATED WITH "THE LANDING" AT WILLIAMSBURG LANDING DEVELOPMENT. THIS FACILITY IS A 4-POINT, EXTENDED DRY-DETENTION FACILITY. TYPICAL DRAWDOWN FOR THIS BASIN RANGES FROM 24 TO 72 HOURS AFTER A STORM EVENT. PRINCIPAL STRUCTURES ASSOCIATED WITH THIS BMP CONSIST OF ONE 3-INCH LOW FLOW ORIFICE, A 48-INCH VERTICAL CMP RISER AND A 30-INCH RCP OUTLET BARREL. THERE IS NO EMERGENCY SPILLWAY ASSOCIATED WITH THIS BASIN. DURING THE 100-YEAR STORM EVENT, THE MAXIMUM WATER LEVEL SHOULD RISE TO ABOUT 0.5 ABOVE THE TOP OF THE RISER AND WITHIN 15 FEET OF THE TOP OF THE DAM. IF FUNCTIONING PROPERLY, NORMAL STORM EVENTS SHOULD REACH THE ELEVATION AT THE TOP OF THE RISER.

<u>INSPECTION AND MAINTENANCE OF THE FACILITY WILL CONSIST OF THE FOLLOWING ADDITIONAL MEASURES:</u>

- INSPECT FOR SEDIMENT BUILDUP BY VISUAL OBSERVATION AND A PHYSICAL DETERMINATION OF SEDIMENT DEPTH WITHIN THE POND STORAGE AREAS. IF THE DEPTH OF THE SEDIMENT REACHES THE DEPTH OF 2'-6" ABOVE THE BOTTOM OF THE POND, REMOVAL IS REQUIRED. AT THE SAME TIME, OR AT LEAST ONCE PER YEAR, CLEAN THE MICRO POOL, THE RISER BOTTOMS AND OUTLET PIPES OF ACCUMULATED SEDIMENTS. DISPOSE OF SEDIMENTS REMOVED FROM THE FACILITY AT AN ACCEPTABLE DISPOSAL AREA.

- PERFORM MAINTENANCE MOWING OF POND GRASSES AT LEAST TWICE EACH YEAR. GRASSES SUCH AS TALL FESCUE SHOULD BE MOWED IN EARLY SUMMER AFTER EMERGENCE OF THE HEADS OF COOL SEASON GRASSES AND IN LATE FALL TO PREVENT SEEDS OF ANNUAL WEEDS FROM MATURING. MOWING OF LEGUMES CAN BE LESS FREQUENT. TREES, SHRUBS AND WOODY VEGETATION ARE NOT PERMITTED TO GROW ALONG OR ON ANY PART OF THE EMBANKMENT THAT WAS CONSTRUCTED USING ENGINEERED (COMPACTED) FILLS.

- PERFORM SOIL SAMPLING ON STABILIZED POND SOIL AREAS AT LEAST ONCE EVERY 4 YEARS. SOIL SAMPLING AND TESTING SHOULD BE PERFORMED BY A QUALIFIED SOIL TESTING LABORATORY SUCH AS VPI&SU. CONTACT THE LOCAL OFFICE OF THE VIRGINIA COOPERATIVE EXTENSION FOR FURTHER INFORMATION. APPLY LIME AND FERTILIZER IN ACCORDANCE WITH TEST RECOMMENDATIONS.

- IN STABILIZED POND AREAS, IF VEGETATION COVERS LESS THAN 40% OF SOIL SURFACES, LIME, FERTILIZE AND SEED IN ACCORDANCE WITH RECOMMENDATIONS FOR NEW SEEDLINGS. IF VEGETATION COVERS MORE THAN 40% BUT LESS THAN 70% OF SOIL SURFACES, LIME, FERTILIZE AND OVER SEED IN ACCORDANCE WITH CURRENT SEEDING RECOMMENDATIONS OR REQUIREMENTS OF THE VESCH.

- PERFORM QUARTERLY INSPECTIONS OF THE RISER SECTION FOR THE OBSERVANCE OF COLLECTED TRASH AND DEBRIS. IMMEDIATELY REMOVE ANY TRASH OR DEBRIS THAT PREVENTS THE MOVEMENT OF WATER. REMOVE ANY TRASH AND LITTER DOWNSTREAM AND AT STORM DRAIN OR CHANNEL INFLOW LOCATIONS TO MAINTAIN THE INTEGRITY OF THE STRUCTURE AND PROVIDE AN ATTRACTIVE APPEARANCE.

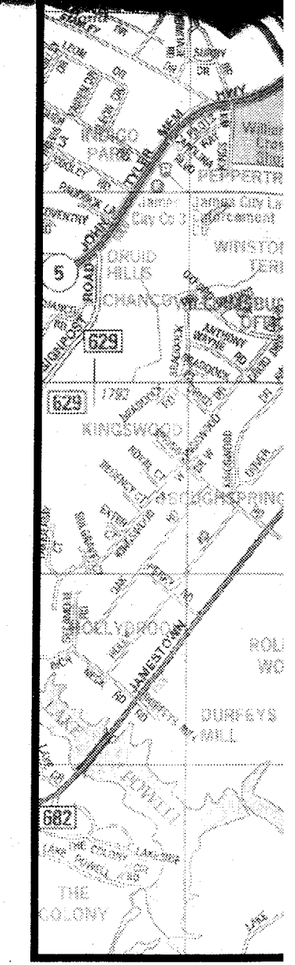
- PERFORM YEARLY INSPECTIONS OF THE FACILITY FOR DAMAGE. STRUCTURAL INSPECTION SHALL BE PERFORMED ON THE CMP RISER, ANTI-VORTEX DEVICE, TRASH RACK, ORIFICES/WEIRS, OUTLET BARREL, AND POND EMBANKMENT. EXPOSED METAL SURFACES SHALL BE RE-PAINTED OR RE-GALVANIZED TO MINIMIZE RUST DAMAGE OR REPLACED IF RUST DAMAGE IS IRREVERSIBLE. IF DAMAGE IS EVIDENT, FURTHER INVESTIGATION BY A QUALIFIED PROFESSIONAL MAY BE REQUIRED TO ASSESS THE INTEGRITY OF THE STRUCTURE.

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

- PERFORM YEARLY OBSERVATIONS OF PERIMETER AREAS SURROUNDING THE FACILITY TO ENSURE CHANGES IN LAND USE, TOPOGRAPHY OR ACCESS HAVE NOT OCCURRED AND DO NOT AFFECT THE OPERATION, MAINTENANCE, ACCESS OR SAFETY FEATURES AS PROVIDED. APPROPRIATE ACTION IS REQUIRED TO ENSURE ADEQUACY AND TO PROVIDE A CLEAR, SAFE PASSAGE FOR MAINTENANCE VEHICLES TO THE ENGINEERED EMBANKMENT AND PRINCIPAL FLOW CONTROL STRUCTURES.

<u>RECORD KEEPING</u>. THE OWNER OR DESIGNATED REPRESENTATIVE SHALL KEEP REASONABLE, ACCURATE WRITTEN RECORDS OF INSPECTIONS PERFORMED FOR THE STRUCTURE. RECORDS SHALL DOCUMENT ROUTINE MAINTENANCE AND/OR REPAIRS PERFORMED. COPIES SHALL BE PROVIDED TO THE COUNTY UPON REQUEST.

THE FACILITY SHALL NOT ACCEPT ADDITIONAL DRAINAGE OR BE MODIFIED IN ANY WAY WITHOUT PRIOR CONSENT OR APPROVAL BY THE ENVIRONMENTAL DIVISION OF JAMES CITY COUNTY



SP-135-04

Supporting Engineering Documents for Williamsburg Landing Parking Addition at "The Landing"

November 24, 2004
Revised: March 3, 2005

- **Erosion and Sediment Control Narrative**
- **Storm Drainage Calculations**
- **BMP Calculations**
- **Drainage Area Maps**

CC028
WMBG LANDING
PARK LOT
THE LANDING
(PH 2) CC028

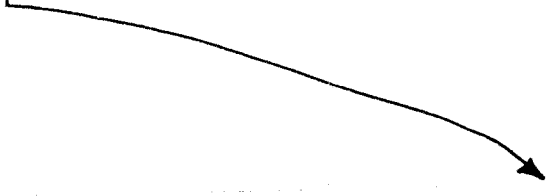
LANDMARK DESIGN GROUP

LMDG Project No.
2000312-000.08

SCOTT

HERE'S A NEW BMP FOR THE INVENTORY. LANDMARK IS GOING TO BRING IT UP TO CURRENT STD'S.

CALCS ARE ATTACHED.



CC 028

Need to put in GIS. ALREADY IN MS ACCESS

CREATE FILE ONLY ROAD BMP

WILLIAMSBURG LANDING
PARKING LOT ADDITION
AT THE LANDING

EROSION AND SEDIMENT CONTROL NARRATIVE
NOVEMBER, 2004
Revised: MARCH, 2005

PROJECT DESCRIPTION

Williamsburg Landing, Inc. proposes an additional parking area behind the existing "Landing" building in the Williamsburg Landing Retirement Community. Additional land in the amount of 1.5709 Acres will need to be acquired from Mary S. Waltrip to accommodate the proposed parking addition. Williamsburg Landing is also proposing to extend an emergency access road to existing Marclay Road, as well as extend an 8" waterline for fire service to the Waltrip property.

The existing Williamsburg Landing property is zoned R-5 (Mulifamily Residential District) and is identified as tax parcel (48-2) (01-02). The additional property (Mary S. Waltrip) to be acquired is zoned R-8 (Rural Residential District) and is identified as tax parcel (48-2) (01-12). As shown on the site plan, approximately 1.23 Acres will be disturbed for the proposed parking, water utilities, emergency access road and storm drainage system. The proposed storm drainage system will discharge into an existing dry detention BMP facility located to the west of the proposed parking addition.

EXISTING SITE CONDITIONS

The proposed site is undeveloped and lightly wooded with limited understory. The landform in the general area is a rolling terrain with slopes varying from relatively flat (2% to 10%) to steeper slopes (10% to 60%) along the BMP facility to the west of the project and also to the east of the site along an existing ravine. Elevations within the overall project limits range from elevation 40 to elevation 76. Overland drainage from the site is divided by two natural drainage ridges. On the western side of the of the west drainage ridge, drainage is directed through surface runoff to the existing BMP facility. On the eastern side of the east drainage ridge, drainage is directed through surface runoff to an existing ravine the flows directly into College Creek. Between the west and east drainage ridges, drainage is directed through surface runoff to an existing parking lot and storm drainage system behind the existing "Landing" building that inevitably drains to the existing BMP facility to the west of the site.

STORMWATER MANAGEMENT

The proposed parking addition runoff will be directed through surface runoff to a proposed storm drainage system that will discharge into an existing BMP (Basin 5) to the northwest of the proposed site. LandMark Design Group has prepared an Exhibit entitled "Chesapeake Bay Preservation Ordinance Compliance Map – Williamsburg Landing", which shows that with the additional property (1.57 Acres) being added to the overall Williamsburg Landing property, the County's requirement of 10 BMP Points has been achieved. Therefore no further stormwater management measures are required with this parking addition project. Although, per a request by the James City County Environmental Division we are bringing the facility up to current standards to help achieve the release of the 1-year, 24-hour storm event over a 24 hour period.

SOILS

The predominate soil types which will be disturbed during the project construction are Craven-Uchee complex, Emporia fine sandy loam, Emporia Complex and Udorthents-Dumps complex, as depicted on soil mapping contained in the USDA – Soil Conservation Service, Soil Survey of James City and York Counties and the City of Williamsburg, Virginia.

11C – Craven-Uchee Complex, 6% to 10% slopes

Craven-Uchee complex consists of moderately well drained Craven soils and well-drained Uchee soils. Areas of this complex are on side slopes and narrow ridge tops. Typically, the surface layer of the Craven soils is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale olive fine sandy loam 5 inches thick. The subsoil extends to a depth of 42 inches. It is yellowish brown clay in the upper part and yellowish brown sandy loam mottled with gray in the middle and lower parts. The substratum is brownish yellow fine sandy loam mottled with gray in the upper part and gray loamy fine sand with yellow mottles in the lower part, and extends to a depth of at least 72 inches.

Typically, the surface layer of Uchee soils is dark grayish brown and very pale brown loamy fine sand 19 inches thick. The subsoil extends to a depth of 56 inches. It is strong brown sandy clay loam and clay mottled with gray and red from 36 to 56 inches. The substratum from 56 to at least 65 inches is variegated red, brown and gray stratified sandy loam and sandy clay loam. In the Carven soils, permeability is slow, and in the Uchee soils, it is moderate in the upper part of the subsoil and moderately slow in the lower part. The available water capacity is moderate of the Caven soils and low or moderate for the Uchee soils. Surface runoff is rapid. The erosion hazard is severe. The subsoil of both soils has moderate shrink-swell potential. During winter and early spring a seasonal high water table is at a depth of 2 to 3 feet in the Craven soil and 3 ½ feet to 5 feet in the Uchee soil. This soil is in capability subclass IVe. The shrink-swell potential for the Craven and Uchee soils are low to moderate. The erosion factor "K" is from 0.32 to 0.37 for the Craven soil and 0.20 to 0.28 for the Uchee soil. Craven soils are in hydrological soils, Group "C"; Uchee soils are in hydrological soils, Group "A".

14B - Emporia Fine Sandy Loam, 2% to 6% slopes

The Emporia soil is well drained.

Typically, the surface layer is dark grayish brown fine sandy loam. The subsurface layer is pale brown loam. The subsoil is yellowish brown loam with mostly strong brown mottles in the upper part; yellowish brown, firm sandy clay loam with strong brown and gray mottles in the middle part; and mottled gray and brown, firm sandy loam in the lower part. The substratum is variegated gray, brown and red firm sandy clay loam.

The shrink/swell potential for the Emporia soils are low to moderate. The erosion factor "K" is form 0.20 to 0.28. Emporia soils are in hydrologic group "C".

15F – Emporia Complex, 25% to 50% slopes

Emporia complex appears on side slopes along drainage ways. Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of 45-50 inches and is yellowish brown loam with mostly strong brown mottles in the upper parts; yellowish brown, firm sandy clay loam with strong brown and gray mottles in the middle part; and mottled gray and brown, firm sandy clay loam in the lower part. The substratum is variegated gray, brown, and red, firm sandy clay loam to a depth of at least 75 inches. In this Emporia soil, permeability is moderate in the upper part of the subsoil and moderately slow to slow in the lower part. The available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The subsoil has moderate shrink-swell potential. A perched high water table is at a depth of 3 to 4 ½ feet in winter and spring. This soil is in capability subclass VIIe. The hydrologic soil group for this soil is C.

36 - Udorthents-Dumps Complex

This complex consists of shallow to deep, excessively drained to moderately well drained soil material in areas that were disturbed during excavation. The excavations are partly filled with garbage, trees, stumps, metal, fly ash, or dredgings.

The permeability of the Udorthents in this complex ranges from moderately rapid to slow. The erosion hazard is light to severe.

CRITICAL EROSION AREAS

The soils identified on the site exhibit a moderate to severe erosion hazard. All disturbed slopes will be stabilized by vegetative cover.

EROSION AND SEDIMENT CONTROL MEASURES

Unless otherwise indicated all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook, 1992.

STRUCTURAL PRACTICE

The following practices are shown on the development plan sheets and detailed on the Erosion and Sediment Control Notes and Details sheet.

1. TEMPORARY CONSTRUCTION ENTRANCE (3.02)

   A temporary construction entrance will be installed at the south west corner of the project site on Route 634.

2. SILT FENCE (3.05)

   Silt fence will be installed where shown on the plan.

3. STORM DRAIN INLET PROTECTION (3.07)

   Storm drain inlet protection will be installed for all drainage inlet structures where shown on the plan.

4. TEMPORARY DIVERSION DIKE (3.09)

   Temporary diversion dike will be installed where shown on the plan.

5. TEMPORARY RIGHT-OF-WAY DIVERSION (3.11)

   Temporary right-of-way diversion will be installed where shown on the plan.

6. TEMPORARY SEDIMENT TRAP (3.13)

   Temporary sediment traps will be installed where shown on the plan to detain sediment-laden runoff from small disturbed areas.

7. OUTLET PROTECTION (3.18)

Outlet protection is be installed at all storm outlet conditions where shown on the plan.

8. TEMPORARY SEEDING (3.31)

All disturbed areas will be seeded per state minimum standards and specifications section 3.31.

9. PERMANENT SEEDING (3.32)

All disturbed areas will be fertilized, seeded and mulched per state minimum standards and specifications section 3.32.

10. SOIL STABILIZATION BANKET (3.36-1)

Soil stabilization blanket – Treatments 1 and 2 will be used as a protective covering for steep slopes as shown on the plan per minimum standards and specifications section 3.36.

11. TREE PRESERVATION AND PROTECTION (3.38)

Tree preservation and protection is to be installed along the "limits of clearing" shown on the plan per minimum standards and specifications section 3.38.

MANAGEMENT STRATEGIES AND CONSTRUCTION SEQUENCE

1. Mark limits of clearing and establish tree protection as shown on the plans.
2. Install temporary construction entrance as indicated on the plans. The construction entrance shall be in place immediately (no later than 24 hours) upon the start of construction.
3. Begin clearing operation for sediment trap #1 and storm sewer outfall (structures A-5 to A-7).
4. Install perimeter silt fence and diversion dikes where called for on the plans.
5. Install storm drainage outfall (structures A-5 to A-7) and associated outlet protection.

6. Construct sediment trap #1.

7. Begin clearing operation for remainder of storm drainage system and proposed temporary sediment traps #2 and #3.

8. Install remainder of storm drainage system.

9. Begin construction of sediment traps #2 and #3 and associated diversion dikes.

10. Once all sediment traps are in place and functioning properly, begin the remainder of clearing and grubbing operation.

11. If temporary stockpiles are used, the contractor shall install silt fence at the base to prevent sediment runoff.

12. Proceed with preparations of the sub-grade for the parking areas and drive aisles.

13. Install water utilities, curb and gutter and sub-base materials.

14. Apply permanent and temporary seeding where required.

15. During all phases of construction, the contractor shall perform daily inspections of erosion and sediment control measures. Accumulated sediment build up is to be removed and disposed of on-site after each storm event.

16. Upon achieving final site stabilization, the contractor shall remove all erosion and sediment measures and dispose of properly.

LANDMARK DESIGN GROUP INC
Storm Sewer Design Computations
Williamsburg Landing Parking Addition - The Landing

DATE: 10/13/04

PROJECT N: 2000312-000.08

185 =a 20.81 =b 10 YR STM		AREA DRAIN. "A"	RUNOFF COEF.	CA		INLET TIME	RAIN FALL	RUNOFF "Q"		INVERT ELEVATIONS		PIPE LNGTH	SLOPE	DIA	CAPA-CITY	VEL.	FLOW TIME	REMARKS
FROM POINT	TO POINT	ACRES	C	INCRE-MENT	ACCUM-ULATED	MIN-UTES	IN.\HR	INCRE-MENT	ACCUM-ULATED	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	MIN.	
A-1	A-2	1.99	0.25	0.00	0.50	19.00	4.65	2.31	2.31	68.00	66.84	10	0.1160	15	23.82	19.42	0.01	ES-1
A-2	A-3	0.56	0.64	0.36	0.86	19.00	4.65	1.67	3.98	66.74	65.85	178	0.0050	15	4.95	4.03	0.74	Top=70.66
A-3	A-4	0.00	0.00	0.00	0.86	19.00	4.65	0.00	3.98	65.75	64.75	200	0.0050	15	4.95	4.03	0.83	Rim-74.90
A-4	A-5	0.82	0.56	0.46	1.32	19.00	4.65	2.13	6.11	64.65	61.83	188	0.0150	15	8.57	6.98	0.45	Rim=71.52
A-5	A-6	0.26	0.58	0.15	1.47	19.00	4.65	0.70	6.81	58.00	49.00	62	0.1452	15	26.65	21.73	0.05	Rim=66.10
A-6	A-7	0.00	0.00	0.00	1.47	19.00	4.65	0.00	6.81	40.12	40.00	25	0.0050	18	8.04	4.55	0.09	ES-1

PROJECT **2000312-000.08**
HEC12 Version: V2.91 Run Date: 10-13-2004

Williamsburg Landing Parking Addition

==========

INLET NUMBER A-2 LENGTH 2.5 STATION 16+24.73

DRAINAGE AREA =	0.220 ACRES	C VALUE = .900	CA = 0.198
DRAINAGE AREA =	0.020 ACRES	C VALUE = .500	CA = 0.010
DRAINAGE AREA =	0.100 ACRES	C VALUE = .250	CA = 0.025
DRAINAGE AREA =	0.080 ACRES	C VALUE = .900	CA = 0.072
DRAINAGE AREA =	0.030 ACRES	C VALUE = .500	CA = 0.015
DRAINAGE AREA =	0.110 ACRES	C VALUE = .250	CA = 0.027

.56

FOR THE FIRST SIDE
SUM CA= 0.233 INT= 5.17 CFS= 1.205 CO= 0.000 GUTTER FLOW= 1.205
FOR THE OTHER SIDE
SUM CA= 0.115 INT= 5.17 CFS= 0.592 CO= 0.000 GUTTER FLOW= 0.592
AT THE INLET

SUM CA= 0.348 INT= 5.17 CFS= 1.797 CO= 0.000 GUTTER FLOW= 1.797

GUTTER SLOPE = 0.0050 FT/FT PAVEMENT CROSS SLOPE = 0.0360 FT/FT

SPREAD AT A SLOPE OF .005 (ft./ft.) AND 1.20 (cfs) IS 5.19 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 6.10 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.25 SPREAD (ft) = 7.05

INLET NUMBER A-4 LENGTH 4.0 STATION 12+44.48

DRAINAGE AREA =	0.110 ACRES	C VALUE = .900	CA = 0.099
DRAINAGE AREA =	0.040 ACRES	C VALUE = .500	CA = 0.020
DRAINAGE AREA =	0.090 ACRES	C VALUE = .250	CA = 0.023
DRAINAGE AREA =	0.280 ACRES	C VALUE = .900	CA = 0.252
DRAINAGE AREA =	0.060 ACRES	C VALUE = .500	CA = 0.030
DRAINAGE AREA =	0.270 ACRES	C VALUE = .250	CA = 0.068

.86

FOR THE FIRST SIDE
SUM CA= 0.141 INT= 5.03 CFS= 0.712 CO= 0.000 GUTTER FLOW= 0.712
FOR THE OTHER SIDE
SUM CA= 0.350 INT= 5.03 CFS= 1.758 CO= 0.000 GUTTER FLOW= 1.758
AT THE INLET

SUM CA= 0.491 INT= 5.03 CFS= 2.470 CO= 0.000 GUTTER FLOW= 2.470

GUTTER SLOPE = 0.0050 FT/FT PAVEMENT CROSS SLOPE = 0.0200 FT/FT

SPREAD AT A SLOPE OF .005 (ft./ft.) AND 1.76 (cfs) IS 8.71 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 7.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.27 SPREAD (ft) = 13.55

INLET NUMBER A-5 LENGTH 6.0 STATION 10+19.81

DRAINAGE AREA =	0.110 ACRES	C VALUE = .900	CA = 0.099
DRAINAGE AREA =	0.060 ACRES	C VALUE = .500	CA = 0.030
DRAINAGE AREA =	0.090 ACRES	C VALUE = .250	CA = 0.023

SUM CA= 0.151 INT= 5.03 CFS= 0.762 CO= 0.000 GUTTER FLOW= 0.762

GUTTER SLOPE = 0.0300 FT/FT PAVEMENT CROSS SLOPE = 0.0200 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
2.50	2.0	0.80	0.0833	4.2	1.00	3.5	0.147	0.166

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 6.8 EFFICIENCY= 0.98
CFS INTERCEPTED= 0.75 CFS CARRYOVER= 0.02

A-1 to A-2
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wl park-.fm2
Worksheet	A-1 to A-2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.116000	ft/ft
Diameter	15.00	in
Discharge	2.31	cfs

Results		
Depth	0.26	ft
Flow Area	0.19	ft^2
Wetted Perimeter	1.19	ft
Top Width	1.02	ft
Critical Depth	0.61	ft
Percent Full	21.03	
Critical Slope	0.004802	ft/ft
Velocity	12.31	ft/s
Velocity Head	2.35	ft
Specific Energy	2.62	ft
Froude Number	5.05	
Maximum Discharge	25.64	cfs
Full Flow Capacity	23.83	cfs
Full Flow Slope	0.001090	ft/ft
Flow is supercritical.		

Notes:

A-1
VDOT ST'D ES-1
INV.=68.00

10 L.F.-15" HDPE (N-12) @ 11.60%

A-2 to A-3
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wl park-.fm2
Worksheet	A-2 to A-3
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.005000	ft/ft
Diameter	15.00	in
Discharge	3.98	cfs

Results		
Depth	0.85	ft
Flow Area	0.89	ft^2
Wetted Perimeter	2.42	ft
Top Width	1.17	ft
Critical Depth	0.81	ft
Percent Full	67.93	
Critical Slope	0.005760	ft/ft
Velocity	4.48	ft/s
Velocity Head	0.31	ft
Specific Energy	1.16	ft
Froude Number	0.91	
Maximum Discharge	5.32	cfs
Full Flow Capacity	4.95	cfs
Full Flow Slope	0.003235	ft/ft
Flow is subcritical.		

Notes:

A-2
VDOT ST'D DI-3A, L=2.5'
TOP=70.66
INV. IN=66.84
INV. OUT=66.74

178 L.F.-15" HDPE (N-12) @ 0.50%

A-3 to A-4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wl park-.fm2
Worksheet	A-3 to A-4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.005000	ft/ft
Diameter	15.00	in
Discharge	3.98	cfs

Results		
Depth	0.85	ft
Flow Area	0.89	ft^2
Wetted Perimeter	2.42	ft
Top Width	1.17	ft
Critical Depth	0.81	ft
Percent Full	67.93	
Critical Slope	0.005760	ft/ft
Velocity	4.48	ft/s
Velocity Head	0.31	ft
Specific Energy	1.16	ft
Froude Number	0.91	
Maximum Discharge	5.32	cfs
Full Flow Capacity	4.95	cfs
Full Flow Slope	0.003235	ft/ft
Flow is subcritical.		

Notes:

A-3
VDOT ST'D MH-1
RIM=74.90
INV. IN=65.85
INV. OUT=65.75

200 L.F.-15" HDPE (N-12) @ 0.50%

A-4 to A-5
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wl park-.fm2
Worksheet	A-4 to A-5
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.015000	ft/ft
Diameter	15.00	in
Discharge	6.11	cfs

Results		
Depth	0.78	ft
Flow Area	0.81	ft²
Wetted Perimeter	2.28	ft
Top Width	1.21	ft
Critical Depth	1.00	ft
Percent Full	62.41	
Critical Slope	0.007996	ft/ft
Velocity	7.59	ft/s
Velocity Head	0.89	ft
Specific Energy	1.67	ft
Froude Number	1.64	
Maximum Discharge	9.22	cfs
Full Flow Capacity	8.57	cfs
Full Flow Slope	0.007624	ft/ft
Flow is supercritical.		

Notes:

A-4
VDOT ST'D DI-3C, L=6'
TOP=71.52
INV. IN=63.91
INV. OUT=63.81

188 L.F.-15" HDPE (N-12) @ 1.50%

A-5 to A-6
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wl park-.fm2
Worksheet	A-5 to A-6
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.145200	ft/ft
Diameter	15.00	in
Discharge	6.81	cfs

Results		
Depth	0.43	ft
Flow Area	0.37	ft²
Wetted Perimeter	1.57	ft
Top Width	1.19	ft
Critical Depth	1.05	ft
Percent Full	34.46	
Critical Slope	0.009111	ft/ft
Velocity	18.17	ft/s
Velocity Head	5.13	ft
Specific Energy	5.56	ft
Froude Number	5.70	
Maximum Discharge	28.68	cfs
Full Flow Capacity	26.66	cfs
Full Flow Slope	0.009471	ft/ft
Flow is supercritical.		

Notes:

A-5
VDOT ST'D DI-3B, L=6'
(TOP ON 4.2% SLOPE)
TOP=65.97
INV. IN=61.83
INV. OUT=58.00

62 L.F.-15" HDPE (N-12) @ 14.52%

A-6 to A-7
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wl park-.fm2
Worksheet	A-6 to A-7
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.005000	ft/ft
Diameter	18.00	in
Discharge	6.81	cfs

Results		
Depth	1.06	ft
Flow Area	1.33	ft^2
Wetted Perimeter	2.99	ft
Top Width	1.37	ft
Critical Depth	1.01	ft
Percent Full	70.59	
Critical Slope	0.005669	ft/ft
Velocity	5.11	ft/s
Velocity Head	0.41	ft
Specific Energy	1.46	ft
Froude Number	0.91	
Maximum Discharge	8.66	cfs
Full Flow Capacity	8.05	cfs
Full Flow Slope	0.003582	ft/ft
Flow is subcritical.		

Notes:

A-6
VDOT ST'D. MH-1
RIM=54.25
INV. IN=49.00
INV. OUT=40.12

25 L.F.-15" HDPE (N-12) @ 0.50%

PROJECT: Williamsburg Landing Parking Addition

LOCATION: James City County, Virginia

JOB NO.: 2000312-000.08

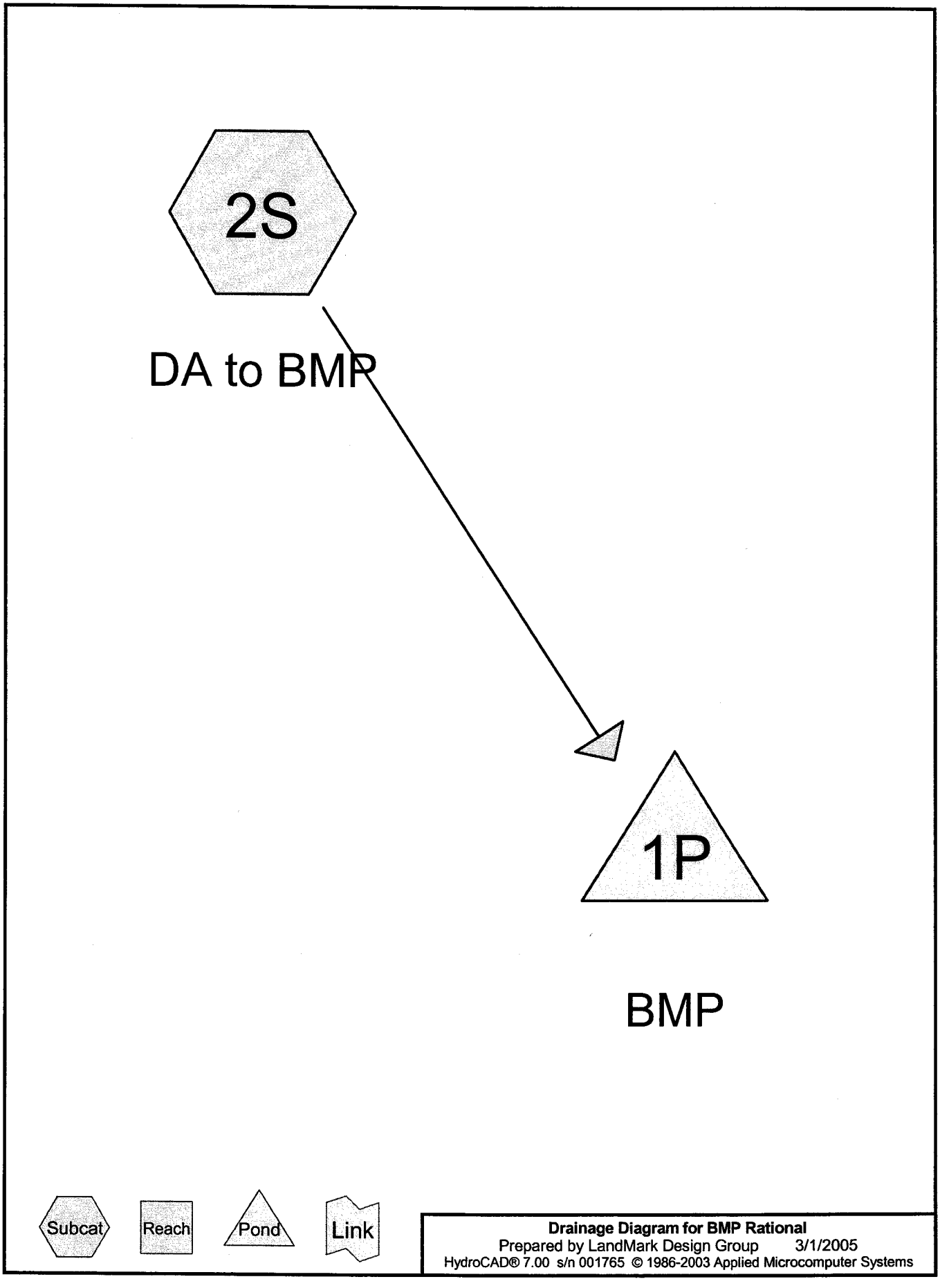
DATE: 11/10/2004

REVISION: 02-Mar-05

HYDRAULIC GRADE LINE

CONC PIPE n= 0.012

INLET STATION	OUTLET SURFACE ELEV	D(O)	Q(O)	L(O)	SF(O)	H(F)	JUNCTION LOSS														FINAL H	INLET SURFACE ELEV	RIM ELEV
							V(O)	H(O)	Q(I)	D(I)	V(I)	Q*V	V^2/2G	H(I)	ANGLE	E K	H(>)	H(T)	1*3 H(T)	0.5* H(T)			
A-6	40.00	18	6.8	25	0.0036	0.09	3.85	0.06	6.8	18	3.85	26	0.23	0.08	0	0.00	0.00	0.14	0.18	0.09	0.18	40.18	54.25
A-5	40.18	15	6.8	62	0.0095	0.59	5.54	0.12	6.1	15	4.97	30	0.38	0.13	30	0.00	0.00	0.25	0.33	0.16	0.75	40.93	66.10
A-4	40.93	15	6.1	190	0.0077	1.45	4.97	0.10	4.0	15	3.24	13	0.16	0.06	14	0.00	0.00	0.15	0.20	0.10	1.55	42.49	71.52
A-3	42.49	15	4.0	378	0.0033	1.23	3.24	0.04	4.0	15	3.24	13	0.16	0.06	0	0.00	0.00	0.10	0.13	0.06	1.30	43.78	74.90
A-2	43.78	15	4.0	378	0.0033	1.23	3.24	0.04	2.3	15	1.88	4	0.06	0.02	30	0.00	0.00	0.06	0.08	0.04	1.27	45.06	70.66
A-1	45.06	15	2.3	378	0.0011	0.42	1.88	0.01	0.0	15	0.00	0	0.00	0.00	0	0.00	0.00	0.01	0.02	0.01	0.42	45.48	68.00



Drainage Diagram for BMP Rational
Prepared by LandMark Design Group 3/1/2005
HydroCAD® 7.00 s/n 001765 © 1986-2003 Applied Microcomputer Systems

Subcatchment 2S: DA to BMP

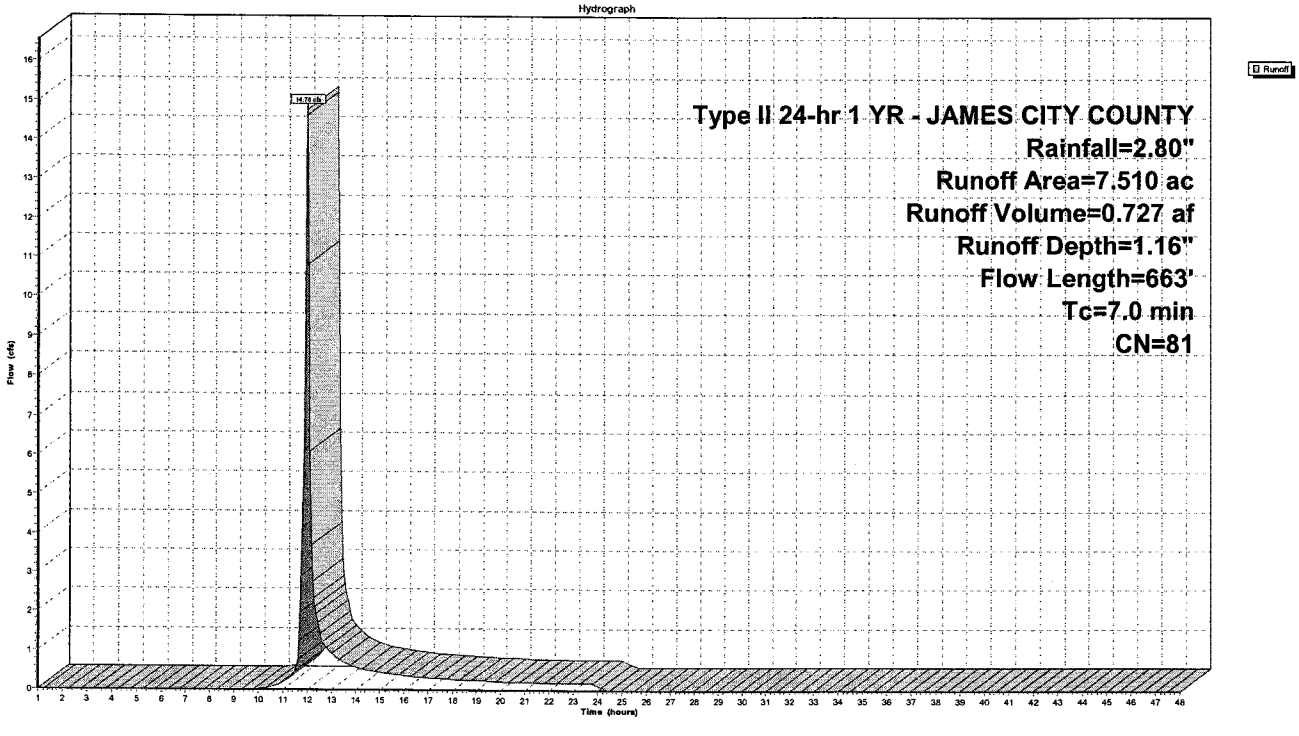
Runoff = 14.78 cfs @ 11.99 hrs, Volume= 0.727 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR - JAMES CITY COUNTY Rainfall=2.80"

Area (ac)	CN	Description
2.730	98	Paved parking & roofs
1.460	74	>75% Grass cover, Good, HSG C
3.320	70	Woods, Good, HSG C
7.510	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Flow to A-1**
0.0	10	0.1160	19.4	23.83	**Circular Channel (pipe), A-1 to A-2 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.7	178	0.0050	4.0	4.95	**Circular Channel (pipe), A-2 to A-3 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.8	200	0.0050	4.0	4.95	**Circular Channel (pipe), A-3 to A-4 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	188	0.0150	7.0	8.57	**Circular Channel (pipe), A-4 to A-5 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.0	62	0.1452	21.7	26.67	**Circular Channel (pipe), A-5 to A-6 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	25	0.0050	4.6	8.05	**Circular Channel (pipe), A-6 to A-7 HDPE Pipe**
					Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
7.0	663	Total			

Subcatchment 2S: DA to BMP



Pond 1P: BMP

Pre-developed 2 YR = 13.84 cfs
Pre-developed 10 YR = 26.73 cfs

Inflow Area = 7.510 ac, Inflow Depth = 1.16" for 1 YR - JAMES CITY COUNTY event
Inflow = 14.78 cfs @ 11.99 hrs, Volume= 0.727 af
Outflow = 0.66 cfs @ 13.67 hrs, Volume= 0.727 af, Atten= 96%, Lag= 100.8 min
Primary = 0.66 cfs @ 13.67 hrs, Volume= 0.727 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 32.86' @ 13.67 hrs Surf.Area= 5,025 sf Storage= 15,543 cf
Plug-Flow detention time= 261.2 min calculated for 0.727 af (100% of inflow)
Center-of-Mass det. time= 260.6 min (1,104.6 - 844.0)

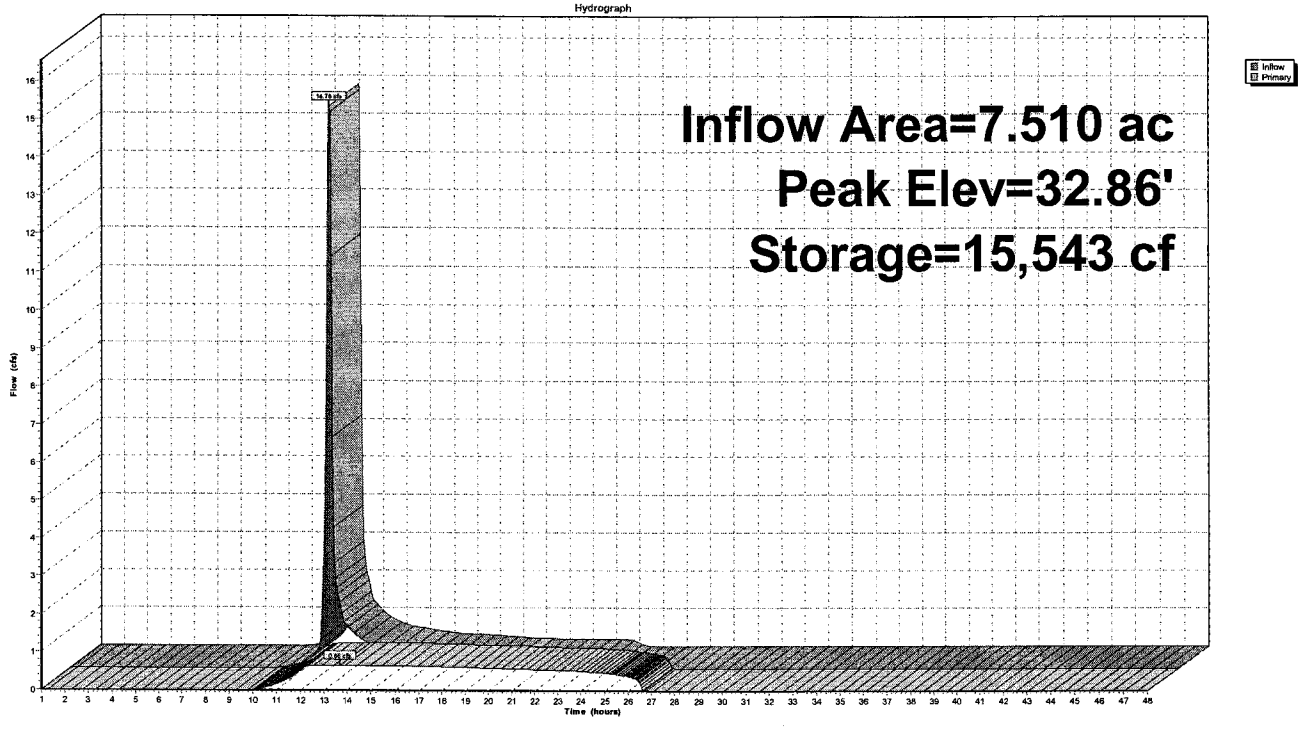
#	Invert	Avail.Storage	Storage Description
1	25.00'	28,401 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	67	32.0	40.0	0	0	67
26.00	307	72.0	40.0	69	69	402
27.00	515	117.0	40.0	163	232	1,085
28.00	722	162.0	100.0	616	847	2,094
29.00	1,964	297.0	100.0	1,292	2,139	7,031
30.00	2,749	328.0	100.0	2,346	4,485	8,604
31.00	3,523	349.0	100.0	3,128	7,613	9,785
32.00	4,259	372.0	100.0	3,885	11,498	11,153
33.00	5,148	414.0	100.0	4,696	16,195	13,809
34.00	6,092	454.0	100.0	5,613	21,808	16,606
35.00	7,107	485.0	100.0	6,593	28,401	18,969

#	Routing	Invert	Outlet Devices
1	Device 4	25.00'	**28.0" x 2.5' long CMP Connection** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 25.00' S= 0.0000 '/' n= 0.024 Cc= 0.900
2	Device 1	25.00'	**3.0" Vert. Orifice/Grate** C= 0.600
3	Device 1	33.50'	**48.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
4	Primary	25.00'	**30.0" x 52.0' long Culvert** RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 24.48' S= 0.0100 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.66 cfs @ 13.67 hrs HW=32.86' (Free Discharge)
└**4=Culvert** (Passes 0.66 cfs of 75.97 cfs potential flow)
└**1=CMP Connection** (Passes 0.66 cfs of 53.27 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.66 cfs @ 13.4 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: BMP


Hydrograph
Inflow
Primary
Inflow Area=7.510 ac
Peak Elev=32.86'
Storage=15,543 cf
Flow (cfs)
Time (hours)

Subcatchment 2S: DA to BMP

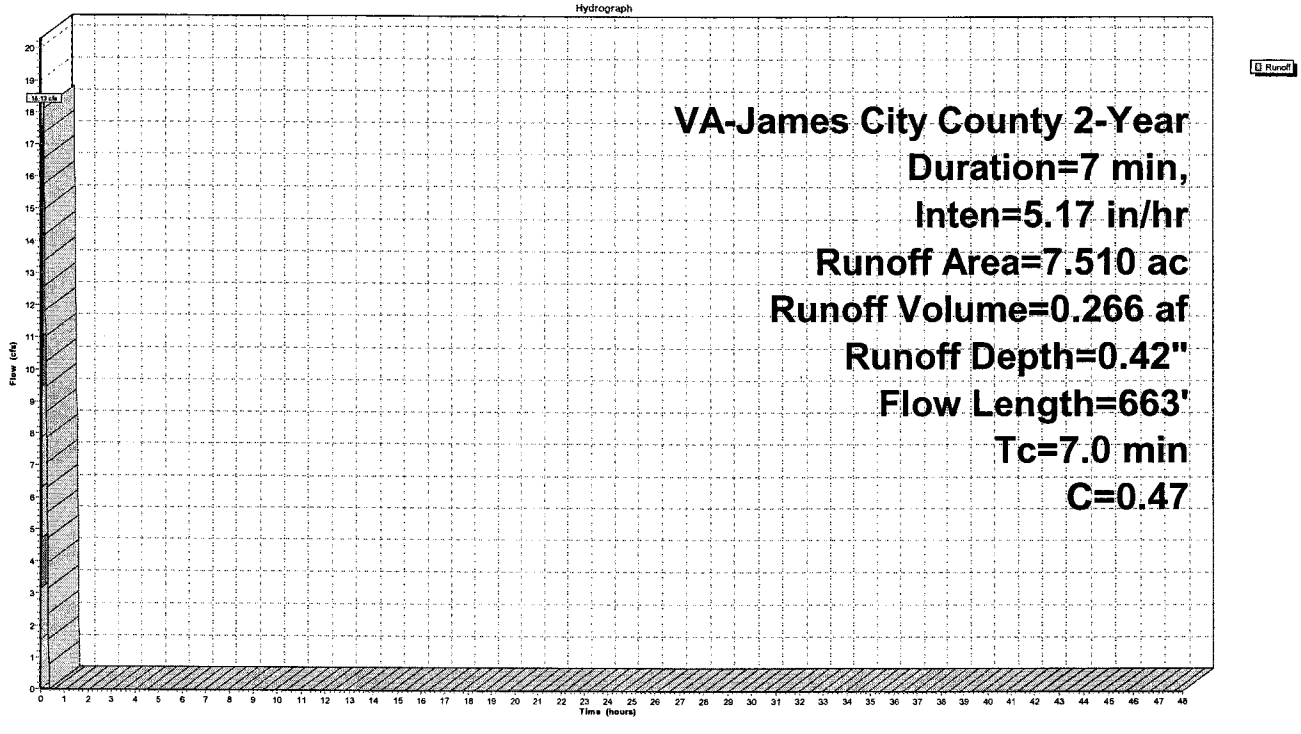
Runoff = 18.13 cfs @ 0.12 hrs, Volume= 0.266 af, Depth= 0.42"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
VA-James City County 2-Year Duration=7 min, Inten=5.17 in/hr

Area (ac)	C	Description
2.730	0.90	Impervous
1.460	0.30	Grass
3.320	0.20	Woods
7.510	0.47	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Flow to A-1**
0.0	10	0.1180	19.6	24.04	**Circular Channel (pipe), A-1 to A-2 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.7	178	0.0050	4.0	4.95	**Circular Channel (pipe), A-2 to A-3 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.8	200	0.0050	4.0	4.95	**Circular Channel (pipe), A-3 to A-4 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	188	0.0150	7.0	8.57	**Circular Channel (pipe), A-4 to A-5 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.0	62	0.1452	21.7	26.67	**Circular Channel (pipe), A-5 to A-6 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	25	0.0050	4.6	8.05	**Circular Channel (pipe), A-6 to A-7 HDPE Pipe** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
7.0	663	Total			

Subcatchment 2S: DA to BMP



Pond 1P: BMP

Pre-developed 2 YR = 13.84 cfs
Pre-developed 10 YR = 26.73 cfs

Inflow Area = 7.510 ac, Inflow Depth = 0.83" for 2-Year event
Inflow = 4.40 cfs @ 0.12 hrs, Volume= 0.518 af
Outflow = 1.04 cfs @ 1.54 hrs, Volume= 0.518 af, Atten= 76%, Lag= 85.5 min
Primary = 1.04 cfs @ 1.54 hrs, Volume= 0.518 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 33.54' @ 1.54 hrs Surf.Area= 5,660 sf Storage= 19,239 cf
Plug-Flow detention time= 262.0 min calculated for 0.518 af (100% of inflow)
Center-of-Mass det. time= 261.8 min (308.1 - 46.3)

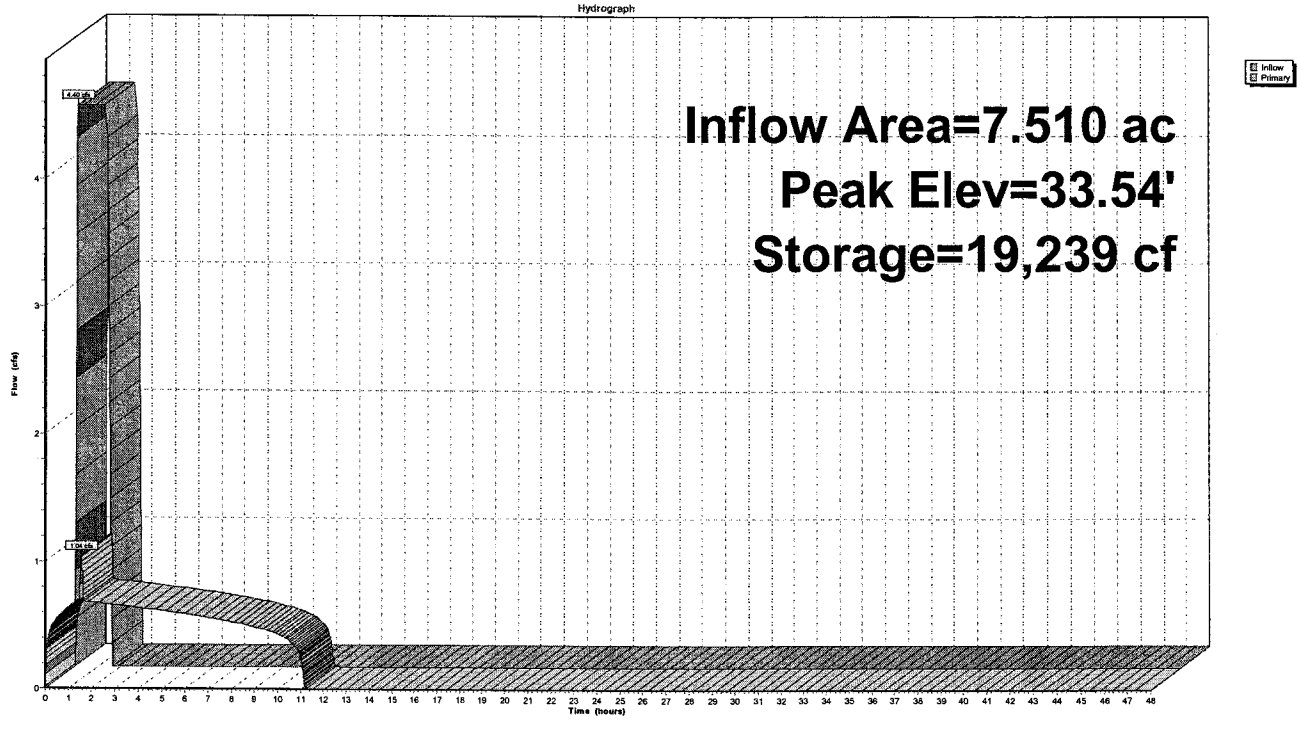
#	Invert	Avail.Storage	Storage Description
1	25.00'	28,401 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	67	32.0	40.0	0	0	67
26.00	307	72.0	40.0	69	69	402
27.00	515	117.0	40.0	163	232	1,085
28.00	722	162.0	100.0	616	847	2,094
29.00	1,964	297.0	100.0	1,292	2,139	7,031
30.00	2,749	328.0	100.0	2,346	4,485	8,604
31.00	3,523	349.0	100.0	3,128	7,613	9,785
32.00	4,259	372.0	100.0	3,885	11,498	11,153
33.00	5,148	414.0	100.0	4,696	16,195	13,809
34.00	6,092	454.0	100.0	5,613	21,808	16,606
35.00	7,107	485.0	100.0	6,593	28,401	18,969

#	Routing	Invert	Outlet Devices
1	Device 4	25.00'	**28.0" x 2.5' long CMP Connection** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 25.00' S= 0.0000 '/' n= 0.024 Cc= 0.900
2	Device 1	25.00'	**3.0" Vert. Orifice/Grate** C= 0.600
3	Device 1	33.50'	**48.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
4	Primary	25.00'	**30.0" x 52.0' long Culvert** RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 24.48' S= 0.0100 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=1.04 cfs @ 1.54 hrs HW=33.54' (Free Discharge)
└**4=Culvert** (Passes 1.04 cfs of 80.25 cfs potential flow)
└**1=CMP Connection** (Passes 1.04 cfs of 55.92 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.69 cfs @ 14.0 fps)
└**3=Orifice/Grate** (Weir Controls 0.36 cfs @ 0.7 fps)

Pond 1P: BMP


Hydrograph
Inflow Area=7.510 ac
Peak Elev=33.54'
Storage=19,239 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Subcatchment 2S: DA to BMP

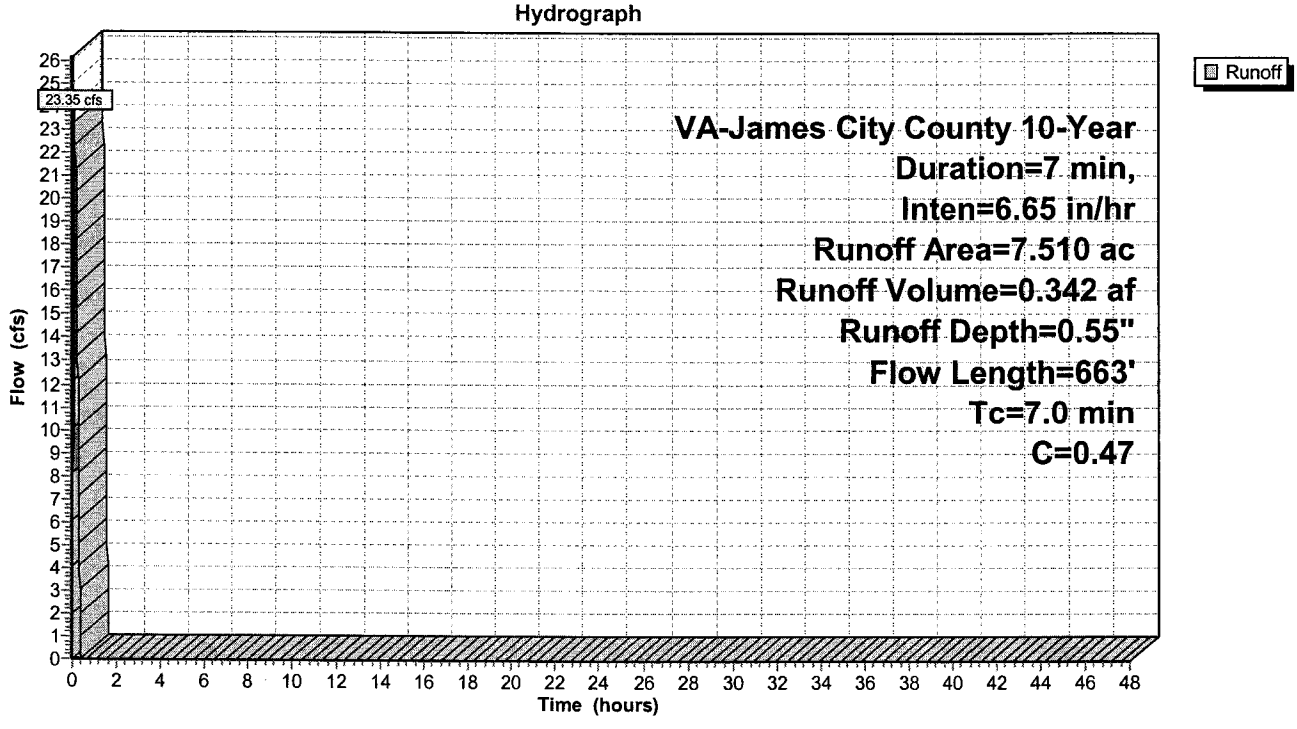
Runoff = 23.35 cfs @ 0.12 hrs, Volume= 0.342 af, Depth= 0.55"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
VA-James City County 10-Year Duration=7 min, Inten=6.65 in/hr

Area (ac)	C	Description
2.730	0.90	Impervous
1.460	0.30	Grass
3.320	0.20	Woods
7.510	0.47	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Flow to A-1**
0.0	10	0.1180	19.6	24.04	**Circular Channel (pipe), A-1 to A-2 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.7	178	0.0050	4.0	4.95	**Circular Channel (pipe), A-2 to A-3 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.8	200	0.0050	4.0	4.95	**Circular Channel (pipe), A-3 to A-4 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	188	0.0150	7.0	8.57	**Circular Channel (pipe), A-4 to A-5 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.0	62	0.1452	21.7	26.67	**Circular Channel (pipe), A-5 to A-6 HDPE Pipe**
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	25	0.0050	4.6	8.05	**Circular Channel (pipe), A-6 to A-7 HDPE Pipe**
					Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
7.0	663	Total			

Subcatchment 2S: DA to BMP



Pond 1P: BMP

Pre-developed 2 YR = 13.84 cfs
Pre-developed 10 YR = 26.73 cfs

Inflow Area = 7.510 ac, Inflow Depth = 1.04" for 10-Year event
Inflow = 10.66 cfs @ 0.12 hrs, Volume= 0.653 af
Outflow = 9.45 cfs @ 0.71 hrs, Volume= 0.653 af, Atten= 11%, Lag= 35.4 min
Primary = 9.45 cfs @ 0.71 hrs, Volume= 0.653 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 33.86' @ 0.71 hrs Surf.Area= 5,957 sf Storage= 21,003 cf
Plug-Flow detention time= 202.6 min calculated for 0.653 af (100% of inflow)
Center-of-Mass det. time= 202.7 min (228.6 - 25.9)

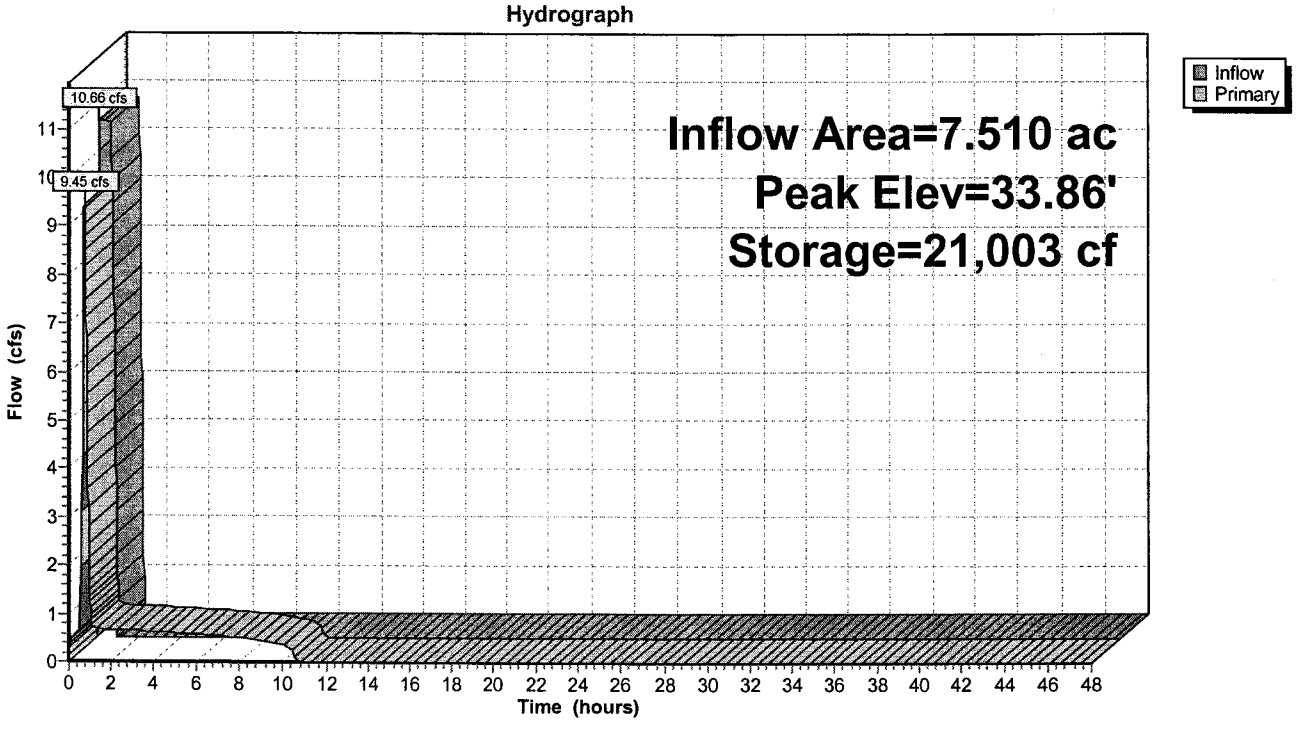
#	Invert	Avail.Storage	Storage Description
1	25.00'	28,401 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	67	32.0	40.0	0	0	67
26.00	307	72.0	40.0	69	69	402
27.00	515	117.0	40.0	163	232	1,085
28.00	722	162.0	100.0	616	847	2,094
29.00	1,964	297.0	100.0	1,292	2,139	7,031
30.00	2,749	328.0	100.0	2,346	4,485	8,604
31.00	3,523	349.0	100.0	3,128	7,613	9,785
32.00	4,259	372.0	100.0	3,885	11,498	11,153
33.00	5,148	414.0	100.0	4,696	16,195	13,809
34.00	6,092	454.0	100.0	5,613	21,808	16,606
35.00	7,107	485.0	100.0	6,593	28,401	18,969

#	Routing	Invert	Outlet Devices
1	Device 4	25.00'	**28.0" x 2.5' long CMP Connection** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 25.00' S= 0.0000 '/' n= 0.024 Cc= 0.900
2	Device 1	25.00'	**3.0" Vert. Orifice/Grate** C= 0.600
3	Device 1	33.50'	**48.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
4	Primary	25.00'	**30.0" x 52.0' long Culvert** RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 24.48' S= 0.0100 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.44 cfs @ 0.71 hrs HW=33.86' (Free Discharge)
└**4=Culvert** (Passes 9.44 cfs of 82.15 cfs potential flow)
└**1=CMP Connection** (Passes 9.44 cfs of 57.09 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.70 cfs @ 14.2 fps)
└**3=Orifice/Grate** (Weir Controls 8.75 cfs @ 2.0 fps)

Pond 1P: BMP


Hydrograph
Inflow
Primary
10.66 cfs
9.45 cfs
Inflow Area=7.510 ac
Peak Elev=33.86'
Storage=21,003 cf
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Subcatchment 2S: DA to BMP

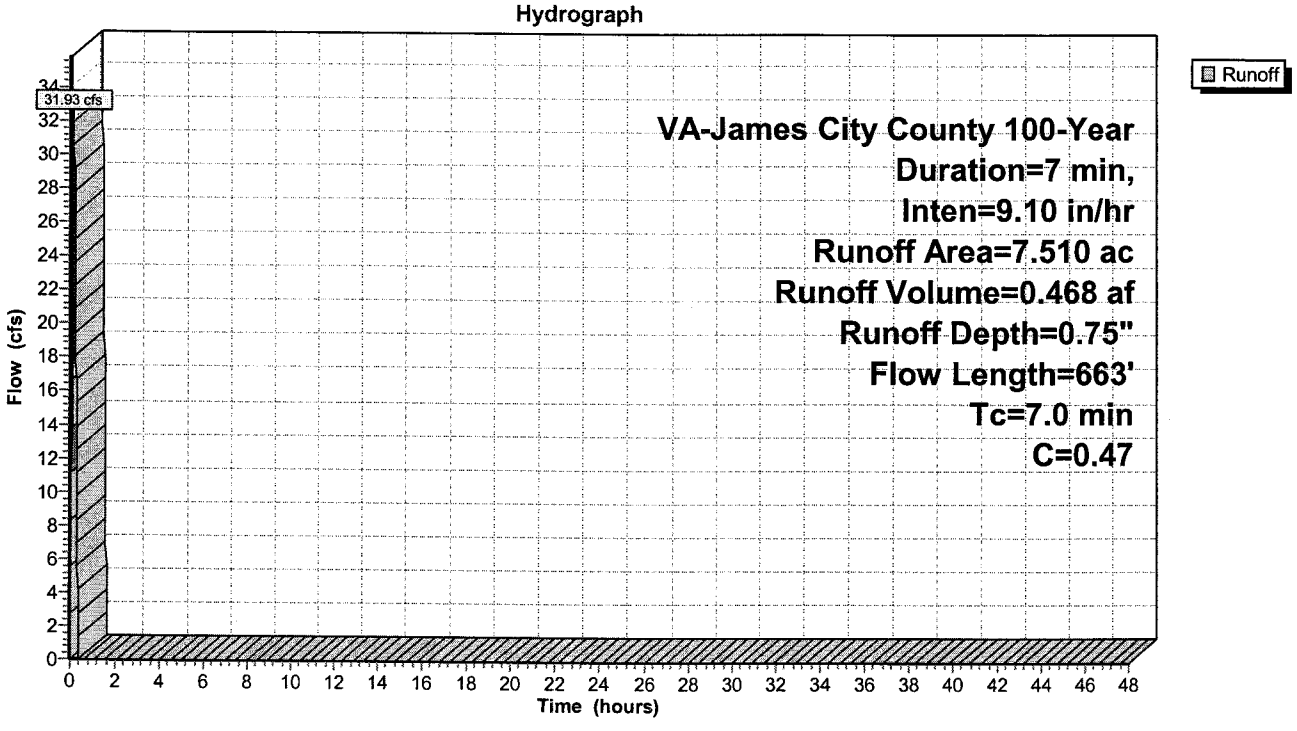
Runoff = 31.93 cfs @ 0.12 hrs, Volume= 0.468 af, Depth= 0.75"

Runoff by Rational method, Rise/Fall=1.0/2.0 xTc, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
VA-James City County 100-Year Duration=7 min, Inten=9.10 in/hr

Area (ac)	C	Description
2.730	0.90	Impervous
1.460	0.30	Grass
3.320	0.20	Woods
7.510	0.47	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Flow to A-1**
0.0	10	0.1180	19.6	24.04	**Circular Channel (pipe), A-1 to A-2 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.7	178	0.0050	4.0	4.95	**Circular Channel (pipe), A-2 to A-3 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.8	200	0.0050	4.0	4.95	**Circular Channel (pipe), A-3 to A-4 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	188	0.0150	7.0	8.57	**Circular Channel (pipe), A-4 to A-5 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.0	62	0.1452	21.7	26.67	**Circular Channel (pipe), A-5 to A-6 HDPE Pipe** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	25	0.0050	4.6	8.05	**Circular Channel (pipe), A-6 to A-7 HDPE Pipe** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
7.0	663	Total			

Subcatchment 2S: DA to BMP



Pond 1P: BMP

Pre-developed 2 YR = 13.84 cfs
Pre-developed 10 YR = 26.73 cfs

Inflow Area = 7.510 ac, Inflow Depth = 1.28" for 100-Year event
Inflow = 20.41 cfs @ 0.12 hrs, Volume= 0.801 af
Outflow = 18.45 cfs @ 0.44 hrs, Volume= 0.801 af, Atten= 10%, Lag= 19.2 min
Primary = 18.45 cfs @ 0.44 hrs, Volume= 0.801 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 34.07' @ 0.44 hrs Surf.Area= 6,164 sf Storage= 22,278 cf
Plug-Flow detention time= 162.5 min calculated for 0.801 af (100% of inflow)
Center-of-Mass det. time= 162.3 min (180.2 - 18.0)

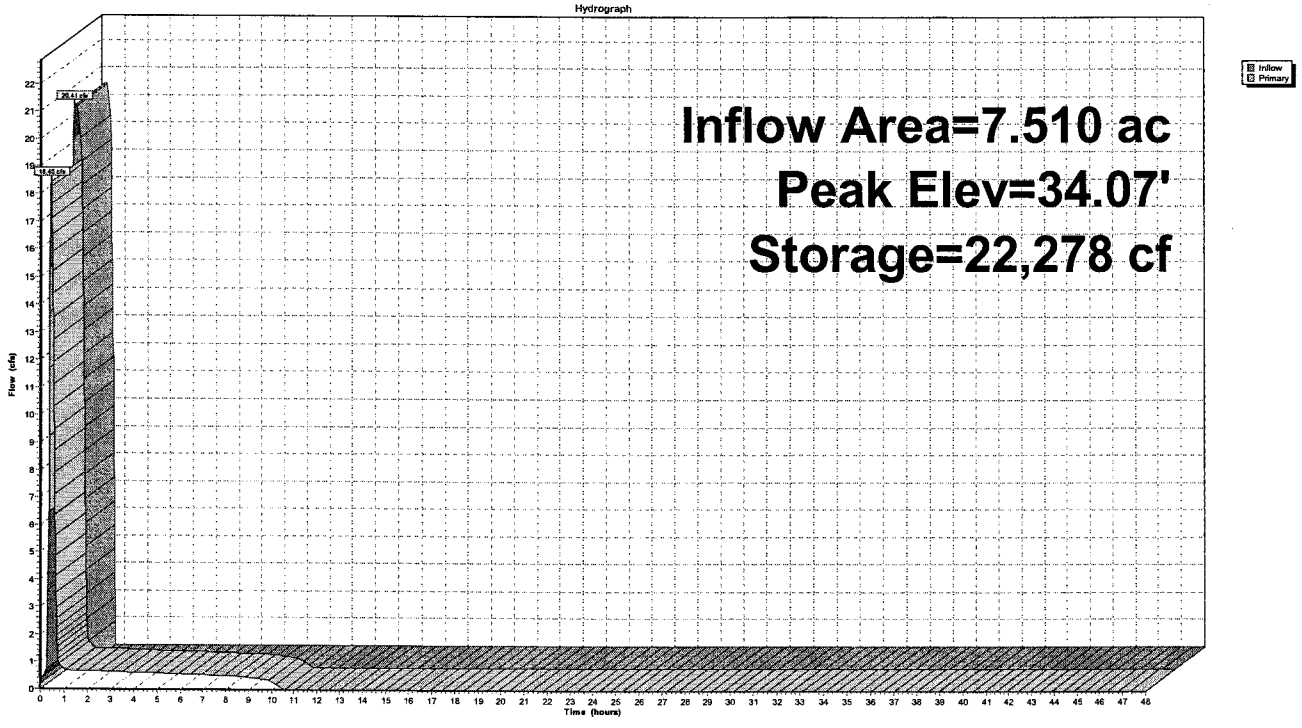
#	Invert	Avail.Storage	Storage Description
1	25.00'	28,401 cf	**Custom Stage Data (Irregular)** Listed below

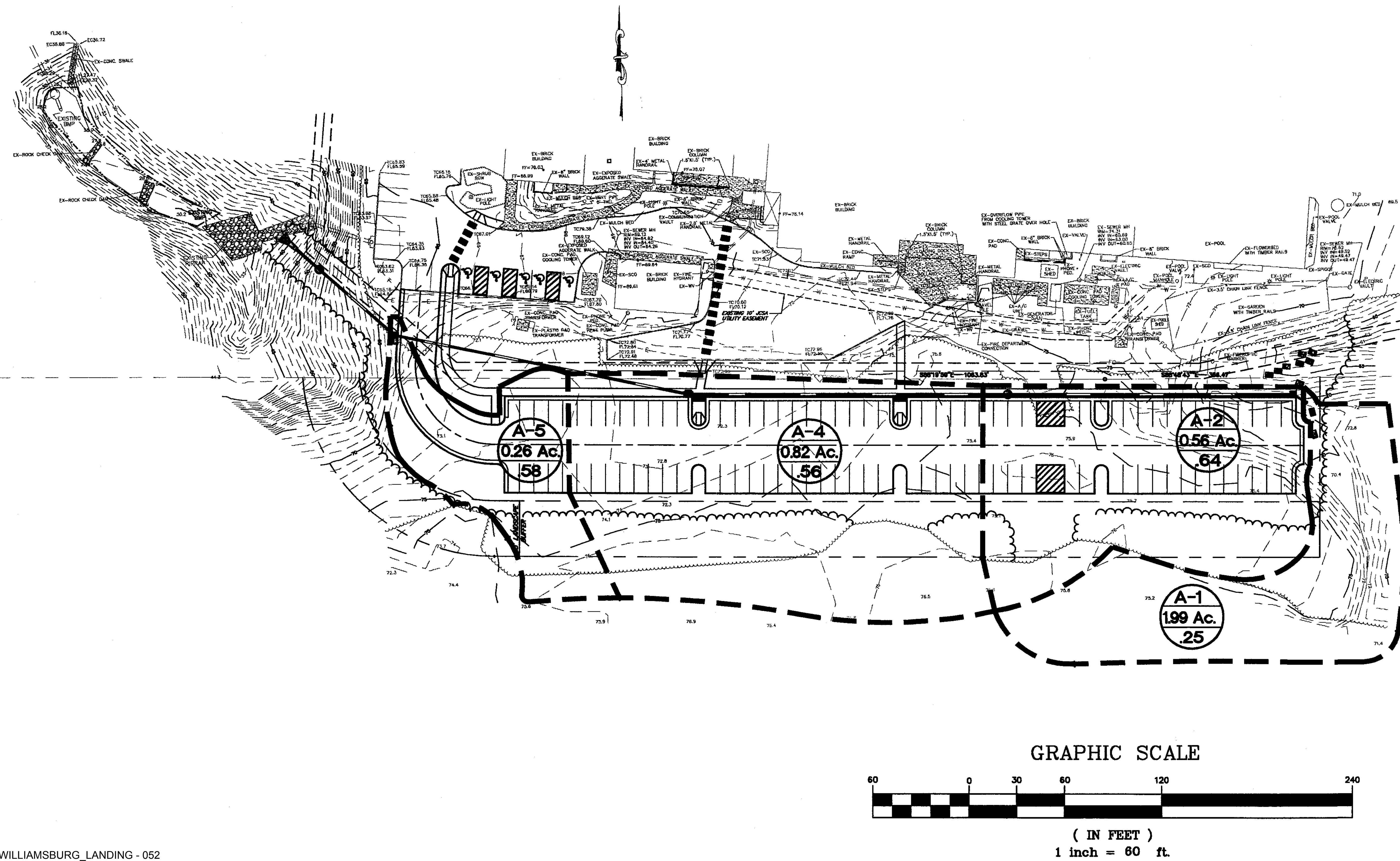
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	67	32.0	40.0	0	0	67
26.00	307	72.0	40.0	69	69	402
27.00	515	117.0	40.0	163	232	1,085
28.00	722	162.0	100.0	616	847	2,094
29.00	1,964	297.0	100.0	1,292	2,139	7,031
30.00	2,749	328.0	100.0	2,346	4,485	8,604
31.00	3,523	349.0	100.0	3,128	7,613	9,785
32.00	4,259	372.0	100.0	3,885	11,498	11,153
33.00	5,148	414.0	100.0	4,696	16,195	13,809
34.00	6,092	454.0	100.0	5,613	21,808	16,606
35.00	7,107	485.0	100.0	6,593	28,401	18,969

#	Routing	Invert	Outlet Devices
1	Device 4	25.00'	**28.0" x 2.5' long CMP Connection** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 25.00' S= 0.0000 '/' n= 0.024 Cc= 0.900
2	Device 1	25.00'	**3.0" Vert. Orifice/Grate** C= 0.600
3	Device 1	33.50'	**48.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
4	Primary	25.00'	**30.0" x 52.0' long Culvert** RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 24.48' S= 0.0100 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=18.45 cfs @ 0.44 hrs HW=34.07' (Free Discharge)
└**4=Culvert** (Passes 18.45 cfs of 83.42 cfs potential flow)
└**1=CMP Connection** (Passes 18.45 cfs of 57.89 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.71 cfs @ 14.4 fps)
└**3=Orifice/Grate** (Weir Controls 17.74 cfs @ 2.5 fps)

Pond 1P: BMP


Hydrograph
Inflow Area=7.510 ac
Peak Elev=34.07'
Storage=22,278 cf
Inflow
Primary
Flow (cfs)
Time (hours)



LANDMARK DESIGN GROUP

Engineers • Planners • Surveyors
Landscape Architects • Environmental Scientists

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Fax (757) 497-7933
Email: lmdg@landmarkdg.com

REVISIONS:

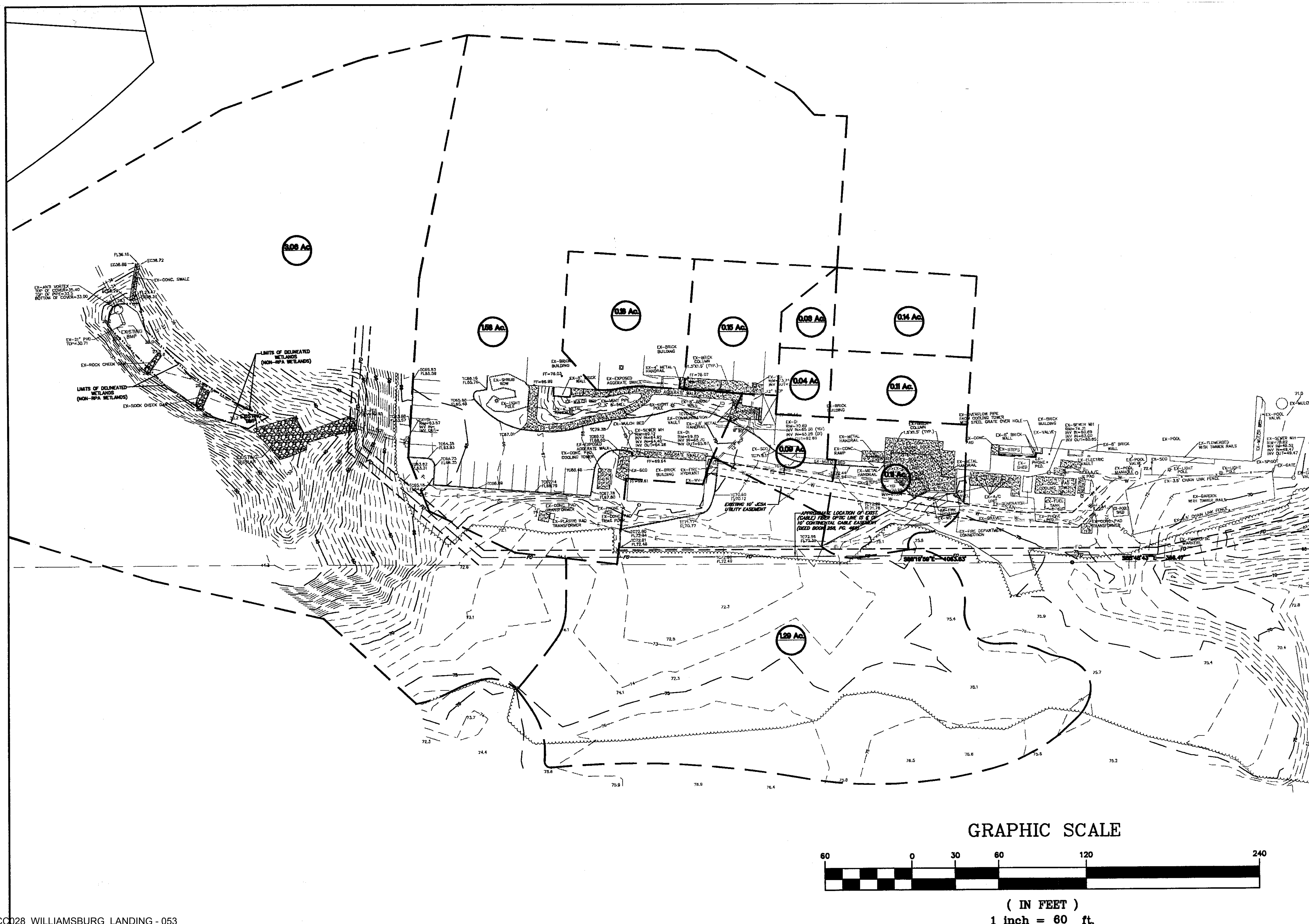
No.	Date	Comment	By
1	8/2/05	REVISED STORM DRAINAGE SYSTEM	GBW

DRAWING STATUS
- Interoffice Review
- Client for Review
- Pre Approval Bidding

COUNTY APPROVAL
- 1st Submitted
- 2nd Submitted
- 3rd Submitted
- Approved

POST DEVELOPMENT DRAINAGE AREA MAP
WILLIAMSBURG LANDING
PARKING ADDTION
JAMES CITY COUNTY, VIRGINIA

Designed: GBW	Date: 10/13/04
Checked: BAR	Scale: 1"=60'
File Mgr./Drawn: GBW	CADD File name: D-2
Project Number: 2000312-000.06	Dwg. File No.:
Drawing Number: D-1	1 OF 1



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Landscape Architects · Environmental Scientists

No.	Date	Comment	By

DRAWING STATUS: Interoffice Review / Client for Review / Pre Approval Meeting

COUNTY APPROVAL: 1st Submittal / 2nd Submittal / 3rd Submittal / Approval

POST DEVELOPMENT DRAINAGE AREA MAP

WILLIAMSBURG LANDING

PARKING ADDTION

JAMES CITY COUNTY, VIRGINIA

Designed: GSW	Date: 10/13/04
Checked: SAR	Scale: 1"=60'
File Mgr./Drawn: GSW	CADD File name: D-2
Project Number: 2000312-000.06	Dwg. File No.:

Drawing Number D-1

1 OF 1

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

County BMP ID Code (if known): CC-028

Name of Facility: Williamsburg Landing BMP No.: ___ of ___ Date: 10/27/06

Location: Micro-pool upstream of principal control structure

Name of Owner: Williamsburg Landing Inc.

Name of Inspector: Joe Buchite

Type of Facility: Extended Dry Detention Facility

Weather Conditions: Sunny 70° Type: ❒ Final Inspection ❒ County BMP Inspection Program ❒ Owner Inspection

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height N/A	~~N/A~~			
Vegetation Condition N/A				
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			Trash and debris removed after site visit
Seepage	✓			
Fencing or Benches N/A				
Interior Landscaping/Planted Areas: ☒ None ❒ Constructed Wetland/Shallow Marsh ❒ Naturally Established Vegetation				
Vegetated Conditions				
Trash & Debris				
Floating Material				
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other				
Notes:				
Water Pools: ❒ Permanent Pool (Retention Basin) ❒ Shallow Marsh (Detention Basin) ☒ None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				

Facility Item	O.K.	Routine	Urgent	Comments
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations):				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Outlet Protection				
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other micro-pool	✓			
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure				
Settlement				
Trash & Debris				
Erosion/Sediment				
Outlet Protection				
Other				
Emergency Spillway (Overflow):				
Vegetation				
Lining				
Erosion				
Trash & Debris				
Other				
Notes:				
Nuisance Type Conditions:				
Mosquito Breeding				
Animal Burrows				

Facility Item	O.K.	Routine	Urgent	Comments
Graffiti				
Other				
Surrounding Perimeter Conditions:				
Land Uses				
Vegetation				
Trash & Debris				
Aesthetics				
Access /Maintenance Roads or Paths				
Other				

Remarks:

Overall Environmental Division Internal Rating: 3

Signature: James G Burkitt **Date:** 5/1/2007

Title: Inspector

SWMProg\BMP\CoInspProg\DetRet.wpd

Date Record Created:

Created By:

WS_BMPNO: CC028

Print Record

PRINTED ON
Wednesday, March 10, 201
2:35:08 PM

WATERSHED	CC
BMP ID NO	028
PLAN NO	SP-135-04
TAX PARCEL	(48-02)(01-02)
PIN NO	4820100002
CONSTRUCTION DATE	8/6/2006
PROJECT NAME	Williiamsburg Landing Parking
FACILITY LOCATION	South of Williamsburg Landing Drive
CITY-STATE	James City County
CURRENT OWNER	Williamsburg Landing, INC.
OWNER ADDRESS	5700 Williamsburg Landing
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, VA 23185
OWNER PHONE	(757) 253-2975
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu

MAINTENANCE PLAN	Yes
SITE AREA acre	1.57
LAND USE	Residential
old BMP TYP	Dry Pond
JCC BMP CODE	F2 Dry ED with forebay
POINT VALUE	3
SVC DRAIN AREA acres	7.51
SERVICE AREA DESCRI	Roads and residential
IMPERV AREA acres	0.84
RECV STREAM	CC
EXT DET-WQ-CTRL	No
WTR QUAL VOL acre-ft	
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	
SW/FLOOD CONTROL	No
GEOTECH REPORT	No

CTRL STRUC DESC	CMP
CTRL STRUC SIZE inches	48
OTLT BARRL DESC	RCP
OTLT BARRL SIZE inch	30
EMERG SPILLWAY	No
DESIGN HW ELEV	34.07
PERM POOL ELEV	n/a
2-YR OUTFLOW cfs	1.04
10-YR OUTFLOW cfs	9.45
REC DRAWING	Yes
CONSTR CERTIF	No
LAST INSP DATE	4/27/2007
Inspected by:	
INTERNAL RATING	3

MISC/COMMENTS

The Landing, parking addition. Dry pond BMP to be upgraded.

Additional Comments:

04/30/2007

CC028_WILLIAMSBURG_LANDING - 059

Stormwater Division

MEMORANDUM

Date: May 4, 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:	**CC-028**
PIN:	**4820100002**
Owner Name (if known):	**WILLIAMSBURG LANDING**
Legal Property Description:	**PT RICH NECK**
Site Address:	**5700 WILLIAMSBURG LANDING DR**

(For internal use only):

Box # 1

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

This is a supplemental file for CC028, so it must be merged into the existing file.