CERTIFICATE OF AUTHENTICITY

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

BMPNUMBER: **PC236**

DATE VERIFIED: **January 4, 2016**

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

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 11, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC236

PIN: 3831800004

Subdivision, Tract, Business or Owner Name (if known): Casey, CC Limited Company

Property Description: Windsormeade Marketplace

Site Address: 3951 Windsormeade Way

(For internal use only) **Box** 18 **Drawer:** N/A

Agreements: (in file as of scan date) **Y** **Book or Doc#:** 030038496 **Page:**

Comments

Date Record Created:

Created By:

WS_BMPNO: PC236

Print Record

PRINTED ON
Thursday, March 11, 2010
2:57:36 PM

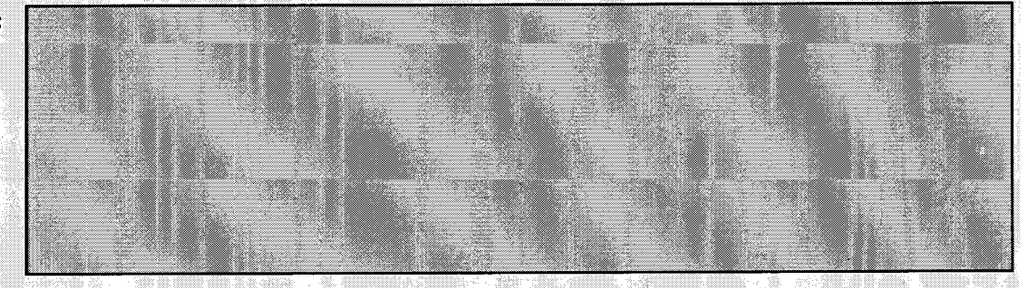
WATERSHED	PC
BMP ID NO	236
PLAN NO	SP-62-02
TAX PARCEL	38-4
PIN NO	01-00-0001
CONSTRUCTION DATE	5/1/2005
PROJECT NAME	WindsorMeade - WindsorMeade Way Rd
FACILITY LOCATION	1400 Feet North of Monticello Ave
CITY-STATE	Williamsburg, VA 23188
CURRENT OWNER	C.C. Casey, LTD, Co
OWNER ADDRESS	721 Richmond Rd
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, Va 23185
OWNER PHONE	757-258-5042
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	Yes

Get Last BMP No | Return to Menu

MAINTENANCE PLAN	Yes
SITE AREA acre	19.5
LAND USE	Roadway
old BMP TYP	Wet Pond
JCC BMP CODE	A2 Wet Pond
POINT VALUE	
SVC DRAIN AREA acres	
SERVICE AREA DESCRI	Road
IMPERV AREA acres	4.36
RECV STREAM	Powhatan Creek
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	Trash Rack
CTRL STRUC SIZE inches	
OTLT BARRL DESC	RCP
OTLT BARRL SIZE inch	24
EMERG SPILLWAY	No
DESIGN HW ELEV	76.3
PERM POOL ELEV	
2-YR OUTFLOW cfs	
10-YR OUTFLOW cfs	17.80
REC DRAWING	No
CONSTR CERTIF	Yes
LAST INSP DATE	3/17/2009
Inspected by:	Greg Johnson
INTERNAL RATING	
MISC/COMMENTS	BMP 1 along south side of road.

Additional Comments:



030038496

COUNTY OF JAMES CITY, VIRGINIA

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 24th day of November, 2003, between C.C. CASEY LIMITED COMPANY, and all successors in interest ("COVENANTOR(S)"), owner(s) of the following property: See Exhibits A and B attached hereto, project name, WindsorMeade Way Road Construction Plan, May 2002, as revised by third revision dated 10-03-03 (the "Plan"), and the County of James City, Virginia ("COUNTY") and VIRGINIA UNITED METHODIST HOMES, INC. ("VUMH").

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 shown on the Plan, including any runoff control facilities, conveyance systems and associated easements serving WindsorMeade Way, hereinafter referred to as the "SYSTEM," to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.

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

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

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

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

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. COVENANTOR(s) contemplate the filing of a Declaration of Protective Covenants for New Town West Side (the "Declaration") which will include the property on which the SYSTEM is to be constructed (the "SYSTEM Property"). The Declaration provides for a Property Owner's Association (the "POA") to be comprised of the owners of all property within New Town West Side. The Declaration shall (i) be reviewed and approved by the County, (ii) require the POA to maintain, repair, replace and operate the SYSTEM except to the extent otherwise performed by a governmental entity after acceptance and dedication thereof, and (iii) contain provisions for assessment of the members of the POA for discharging the POA's responsibilities under the Declaration as well as imposing a charge on the property subject to the POA in the event of nonpayment of the assessments.. Anything herein to the contrary notwithstanding, in the event that the POA is formed and validly existing and COVENANTOR(s) provides the COUNTY with a deed conveying to the POA the undedicated portion of the SYSTEM Property (i.e. that portion which is not accepted by the Virginia Department of Transportation for maintenance), which deed is executed by both COVENANTOR(s) and the POA and confirms the assumption of the maintenance responsibilities for the SYSTEM by the POA, COVENANTOR(s) and its successors and assigns (other than the POA and the POA's successors in title to the SYSTEM Property), shall be released from any liabilities and obligations under this Declaration which accrue subsequent to the assumption by the POA of the maintenance responsibilities of the SYSTEM.

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)

C.C. CASEY LIMITED COMPANY

By: Robert T. Casey

Revised 01/02

I-545702.6
11/21/2003

Virginia United Methodist Homes, Inc. (VUMH) joins in the execution of this Declaration for the sole purpose of confirming that the property acquired by VUMH in the Deed dated July 30, 2003 by and between C. C. Casey Limited Company and VUMH and duly recorded in the Clerk's Office of the Circuit Court of the City of Williamsburg and the County of James City, Virginia on August 5, 2003, as Instrument No. 030023373 will be part of the property subject to the POA.

VIRGINIA UNITED METHODIST HOMES, INC.

By: _____
President

COMMONWEALTH OF VIRGINIA
~~CITY~~/COUNTY OF James City

I hereby certify that on this 26th day of November, 2003, before the subscribed, a Notary Public of the State of Virginia, and for the ~~City~~/County of James City, aforesaid personally appeared Robert T. Casey, Secretary of C.C. Casey Limited Company and did acknowledge the foregoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 26th day of November, 2003.

_____
Notary Public

My Commission expires: 6-30-06

COMMONWEALTH OF VIRGINIA
~~CITY~~/COUNTY OF James City

I hereby certify that on this 24th day of November , 2003, before the subscribed, a Notary Public of the State of Virginia, and for the ~~City~~/County of James City, aforesaid personally appeared Wm. Seay L Fink President of Virginia United Methodist Homes, Inc. and did acknowledge the foregoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 24th day of November, 2003.

Notary Public

My Commission expires: May 31, 2007

Approved as to form:

County Attorney

This Declaration of Covenants prepared by:

Thomas G. Johnson, Jr., Esquire
Willcox & Savage, P.C.
1800 Bank of America Center
One Commercial Place
Norfolk, Virginia 23510

drainage.pre

EXHIBIT A

Description of the Property

All those certain lots, parcels or tracts of land, situate and lying in the Powhatan District of James City County, Virginia, containing a total of 45.640 acres more or less and being the same properties designated as a portion of James City County Tax Map Parcel #(38-3)(1-34 and all of James City County Tax Map Parcel #(38-3)(2-34);

Said parcels are more particularly described by metes and bounds as follows:

Beginning at a point on the easterly right-of-way line of what is now known as Old News Road, said point being approximately 870' in a northwesterly direction from the intersection of the easterly right-of-way line of said Old News Road and the northerly right-of-way line of Monticello Avenue Extended, State Route #321, said point of beginning is a corner to the properties described hereon, a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) and an existing 40' right-of-way now or formerly standing in the name of C. C. Casey Limited Company; thence lying along the easterly right-of-way line of said Old News Road along a curve to the left, having a radius of 251.53' and an arc length of 140.67' to a point; thence N83°28'41"W, 261.99' to a point, a corner to the properties described hereon and a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company; thence leaving said right-of-way line of Old News Road and lying along the line of the property now or formerly standing in the name of James R. Sill, N07°07'38"E, 235.55' to a point, a corner to the properties described hereon and the property now or formerly standing in the name of James R. Sill and being along the line of the property now or formerly standing in the name of Lacy V. and Maurine H. Moon, Trustees; thence continuing along the line of the property now or formerly standing in the name of Lacy V. and Maurine H. Moon, Trustees, N31°01'05"E, 113.73' to a point, a corner to the property described hereon and the property now or formerly standing in the name of Lacy V. and Maurine H. Moon, Trustees; thence leaving said corner and lying along the lines of the properties now or formerly standing in the names of the following: Lacy V. and Maurine H. Moon, Trustees, Steven D. Pratt and Lamar D. Smith, D. Elayne Anderson and Colby A. Maddox, N35°23'28"W, 380.41' to a point, a corner to the property described hereon, the property now or formerly standing in the name of Colby A. Maddox and the property now or formerly standing in the name of William A. and Helen Robertson; thence leaving said corner and lying along the line of a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company, N20°47'32"E, 565.23' to a point; thence S83°50'56"E, 181.30' to a point; thence along a curve to the left, having a radius of 2165.00' and an arc length of 422.02' to a point; thence along a curve to the left, having a radius of 2035.00' and an arc length of 165.24' to a point; thence N64°25'48"E, 141.51' to a point; thence N13°42'44"E, 400.00' to a point; thence S87°05'53"E, 453.14' to a point; thence S66°24'18"E, 744.58' to a point, a corner to the property described hereon and a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company, said corner being along the westerly right-of-way line of State Route #199; thence along the right-of-way line of State Route #199, S08°30'35"E, 574.05' to a point; thence S08°18'36"E, 254.16' to a point, a corner to the property

described hereon and a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company; thence leaving said right-of-way line of State Route #199 and lying along the line of a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company, S63°40'56"W, 565.00' to a point; thence S89°13'21"W, 746.48' to a point; thence along a curve to the right, having a radius of 1387.50' and an arc length of 46.69' to a point; thence along a curve to the left, having a radius of 787.50' and an arc length of 246.68' to a point; thence S11°04'18"E, 34.77' to a point; thence along a curve to the left, having a radius of 587.50' and an arc length of 101.13' to a point; thence along a curve to the left, having a radius of 790.50' and an arc length of 214.79' to a point; thence S36°30'08"E, 123.42' to a point, said point lying along the aforementioned existing 40' right-of-way and the line of a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company; thence continuing along the line of said existing 40' right-of-way and the line of a remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company, S43°12'19"W, 178.71' to the aforesaid point of beginning.

The properties described hereon is a portion of the same property conveyed to C. C. Casey Limited Company by deed dated December 17, 1992 from Robert T. Casey, et als in Deed Book 598, page 231 and by document dated August 3, 1998 from Bernard G. Glass as Instrument #980017372, both being of record in the Clerk's Office of the Circuit Court of the County of James City.

EXHIBIT B

All those certain lots, parcels or tracts of land, situate and lying in the Powhatan District of James City County, Virginia, containing a total of 34.48 acres more or less and being the same properties designated as a portion of James City County Tax Map Parcels #(38-3)(1-2), #(38-3)(1-5), #(38-3)(1-6), (38-3)(1-7), #(38-3)(1-8), and a Portion of Tax Map Parcel #(38-3)(1-34);

Said parcels are more particularly described by metes and bounds as follows:

All of James City County Tax Map Parcels #(38-3)(1-2), #(38-3)(1-5), #(38-3)(1-6), (38-3)(1-7), #(38-3)(1-8) and a Portion of Tax Map Parcel #(38-3)(1-34) Owned by C. C. Casey Limited Company:

Beginning at a point on the northerly right-of-way line of Monticello Avenue Extended, State Route #321, said point being S28°41'04"W, 358.65' from the intersection of the westerly right-of-way line of State Route #199 and the northerly right-of-way line of said Monticello Avenue Extended, State Route #321, a corner to the property described hereon and the property now or formerly standing in the name of the Commonwealth of Virginia; thence leaving said corner of the property now or formerly standing in the name of the Commonwealth of Virginia and lying along the right-of-way line of Monticello Avenue Extended, State Route #321, S46°23'51"W, 530.33' to a point; thence along a curve to the right, having a radius of 869.93' and an arc length of 91.40' to a point; said point being at the intersection of the northerly right-of-way line of said Monticello Avenue Extended, State Route #321 and the easterly right-of-way line of what is now known as Old News Road; thence leaving said right-of-way line of Monticello Avenue Extended, State Route #321 and lying along the easterly right-of-way line of what is now known as Old News Road, N34°54'22"W, 480.33' to a point; thence N33°17'29"W, 275.90' to a point; thence along a curve to the left, having a radius of 400.00' and an arc length of 62.99' to a point; thence N42°18'49"W, 9.79' to a point; thence along a curve to the left, having a radius of 251.53' and an arc length of 40.04' to a point; said point being a corner to the properties described hereon and the remaining portion of James City Tax Map Parcel #(38-3)(1-34) now or formerly standing in the name of C. C. Casey Limited Company; thence along the line of the remaining portion of James City Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company and an existing 40' private right-of-way, N43°12'19"E, 178.71' to a point; thence leaving said 40' private right-of-way and continuing along the line of the remaining portion of James City County Tax Map Parcel #(38-3)(1-34), now or formerly owned by C. C. Casey Limited Company, N36°30'08"W, 123.42' to a point; thence along a curve to the right, having a radius of 790.50' and an arc length of 214.79' to a point; thence along a curve to the right, having a radius of 587.50' and an arc length of 101.13' to a point; thence N11°04'18"W, 34.77' to a point; thence along a curve to the right, having a radius of 787.50' and an arc length of 246.68' to a point; thence along a curve to the right, having a radius of 1387.50' and an arc length of 46.69' to a point; thence N89°13'21"E, 746.48' to a point; thence N63°40'56"E, 565.00' to a point on the westerly right-of-way line of State Route #199, a corner to the properties described hereon and the remaining portion of James City County Tax Map Parcel #(38-3)(1-34) now or formerly owned by C. C. Casey Limited Company; thence leaving said corner of the remaining portion of James City Tax Map Parcel #(38-3)(1-34) now or formerly standing in

the name of C. C. Casey Limited Company and lying along the westerly right-of-way line of State Route #199, S08°18'36"E, 171.61' to a point; thence S04°50'02"W, 654.04' to a point; thence along a curve to the left, having a radius of 903.51' and an arc length of 235.65' to a point, said point being a corner to the property described hereon, the property now or formerly standing in the name of the Commonwealth of Virginia and the intersection of the right-of-way line State Route #199 and Monticello Avenue Extended, State Route #321; thence along the line of the property now or formerly owned by the Commonwealth of Virginia, S28°41'04"W, 358.65' to the aforesaid point of beginning. The properties described above contain an aggregate area of 34.13 acres more or less.

And the following parcel:

Beginning at a point at the intersection of the westerly right-of-way line of State Route #199 and the northerly right-of-way line of Monticello Avenue Extended, State Route #321; thence lying along the northerly right-of-way line of said Monticello Avenue Extended, State Route #321, S46°23'51"W, 276.71' to a point, a corner to the property described hereon and the properties now or formerly owned by C. C. Casey Limited Company; thence leaving said corner of the properties now or formerly owned by C. C. Casey Limited Company and lying along the property owned by the Commonwealth of Virginia, N28°41'04"E, 358.65' to a point, said point being on the westerly right-of-way line of State Route #199; thence lying along the westerly right-of-way line of State Route #199, S13°36'06"E, 71.92' to the aforesaid point of beginning. The property described hereon contains an area of 0.35 acres more or less.

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on Dec. 10, 2003
at 8:43 AM/PM. The taxes imposed by Virginia Code
Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$	$	$

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

I-545702.6
11/21/2003

COMMONWEALTH OF VIRGINIA

OFFICIAL RECEIPT
WILLIAMSBURG/JAMES CITY COUNTY CIRCUIT
DEED RECEIPT

DATE: 12/10/03 TIME: 08:43:54 ACCOUNT: 830CLR030008496 RECEIPT: 03000058867
CASHIER: LAH REG: WI04 TYPE: DEC PAYMENT: FULL PAYMENT
INSTRUMENT : 030008496 BOOK: PAGE: RECORDED: 12/10/03 AT 08:43
GRANTOR: CC CASEY LIMITED COMPANY EX: N LOC: CO
GRANTEE: CC CASEY LIMITED COMPANY EX: N PCT: 100%
AND ADDRESS : N/A N/A
RECEIVED OF : JAME CITY COUNTY DATE OF DEED: 11/24/03
CHECK : $19.00
DESCRIPTION 1: PARCELS 45.640 ACRES 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	3.00			

TENDERED : 19.00
AMOUNT PAID: 19.00
CHANGE AMT : .00

CLERK OF COURT: BETSY B. WOOLRIDGE

DC-18 (10/02)

CONSULTING ENGINEERS

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

PROJECT	WindsorMeade Way
PROJECT NO.	8818-04
SUBJECT	Spread Calc's
SHEET NO.	1
DATE	3/14/2002
BY	R. Smith

STORM WATER INLET COMPUTATIONS FOR WINDSORMEADE WAY

INLET Number	Type	Length	Station	Drainage Area (Ac)	C	CA	Σ CA	i in/hr	Q-Inter (CFS)	Q Carry- Over (CFS)	Qt Gutter Flow	S Gutter Slope (ft/ft)	Sx Cross Slope (ft/ft)	T(Spread)	W (ft)	W/T	Sw (ft/ft)	Sw/Sx	Eo(#10)	n	Local Dep.	a	S'w =a/(12W)	Se (ft/ft) =Sx+SwEo	P Lt (ft) 15 Effec L	d L/Lt (ft)	h E(#16) (ft)	Q Int CFS d/h	Q Carryover Spread	Remark
HIGH POINT																														
⇩			11+15 L	0.14	0.88	0.12	0.12	4	0.49	0	0.49	0	0.02	4.3	Flow Approaching From Down Station 10+00 L																
SUMP	DI-3C	6									0.78	0	0.02		2		0.08								9.6	0.11	0.27	0.41	5.5	
⇧			11+15 L	0.14	0.37	0.05	0.05	4	0.21	0.08	0.29	0	0.02	2.7	Flow Approaching From Up Station 12+00 L																
GRADE	DI-3B	6	12+00 L	0.13	0.77	0.1	0.1	4	0.4	0.09	0.49	0.04	0.02	7.1	2	0.28	0.08	4	0.7	0.02	2	3.44	0.14	0.12	9.6	0.63	0.83	0.41	0.08	
⇧																														
GRADE	DI-3B	8	12+95 L	0.24	0.76	0.18	0.18	4	0.73	0	0.73	0.04	0.02	8.3	2	0.24	0.08	4	0.63	0.02	2	3.44	0.14	0.11	11.6	0.69	0.88	0.64	0.09	
HIGH POINT			16+05 L																											
HIGH POINT			16+05 L																											
GRADE	DI-3B	8	18+25 L	0.24	0.75	0.18	0.18	4	0.72	0	0.72	0.01	0.02	2.5	2	0.8	0.08	4	0.99	0.02	2	3.44	0.14	0.16	11.6	0.69	0.88	0.63	0.09	
GRADE	DI-3B	8	19+25 L	0.12	0.72	0.09	0.09	4	0.35	0.09	0.43	0.05	0.02	6.7	2	0.3	0.08	4	0.7	0.02	2	3.44	0.14	0.12	11.6	0.69	0.88	0.38	0.05	
GRADE	DI-3B	8	21+00 L	0.26	0.63	0.16	0.16	4	0.66	0.05	0.71	0.04	0.02	8.2	2	0.24	0.08	4	0.63	0.02	2	3.44	0.14	0.11	11.6	0.69	0.88	0.62	0.09	
GRADE	DI-3B	8	22+00 L	0.17	0.6	0.1	0.1	4	0.41	0.09	0.49	0.01	0.02	1.6	2	1.25	0.08	4	1	0.02	2	3.44	0.14	0.16	11.6	0.69	0.88	0.43	0.06	
⇩				0.26	0.63	0.16	0.16	4	0.66	0.06	0.72	0	0.02	5.3	Flow Approaching From Down Station 22+00 L																
SUMP	DI-3C	8	23+82 L								1.01	0	0.02		2		0.08								11.6	0.11	0.27	0.42	5.7	
⇧				0.11	0.42	0.05	0.05	4	0.18	0.11	0.29	0	0.02	2.7	Flow Approaching From Up Station 25+40 L																
HIGH POINT			25+40 L																											
HIGH POINT			25+40 L																											
⇩																														
GRADE	DI-3B	4	30+25 L	0.45	0.56	0.25	0.25	4	1.01	0	1.01	0.01	0.02	2.5	2	0.8	0.08	4	0.99	0.02	2	3.44	0.14	0.16	7.6	0.53	0.74	0.75	0.26	
⇩			30+74 L	0.07	0.66	0.05	0.05	4	0.18	0.26	0.45	0	0.02	6.8	Flow Approaching From Down Station 28+50 L																
SUMP	DI-3C	6									0.72	0	0.02		2		0.08								9.6	0.11	0.27	0.41	5.5	
⇧			30+74 L	0.075	0.65	0.05	0.05	4	0.2	0.08	0.27	0	0.02	5.2	Flow Approaching From Up Station 33+69 L																
GRADE	DI-3B	8	31+60 L	0.25	0.65	0.16	0.16	4	0.65	0	0.65	0.02	0.02	1.7	2	1.18	0.08	4	1	0.02	2	3.44	0.14	0.16	11.6	0.69	0.88	0.57	0.08	
HIGH POINT			33+69 L																											

CONSULTING ENGINEERS

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

PROJECT	WindsorMeade Way
PROJECT NO.	8818-04
SUBJECT	Spread Calc's
SHEET NO.	2
DATE	3/14/2002
BY	R. Smith

STORM WATER INLET COMPUTATIONS FOR WINDSORMEADE WAY

INLET Number	Type	Length	Station	Drainage Area (Ac)	C	CA	Σ CA	I in/hr	Q-Inter (CFS)	Q Carry- Over (CFS)	Qt Gutter Flow	S Gutter Slope (ft/ft)	Sx Cross Slope (ft/ft)	T(Spread)	W (ft)	W/T	Sw (ft/ft)	Sw/Sx	Eo(#10)	n	Local Dep.	a	Sw =a/(12W)	Se (ft/ft) =Sx+SwEo	Lt (ft) 15 P Effec L	L/Lt d (ft)	E(#16) h (ft)	Q Int CFS d/h	Q Carryover Spread	Remark
HIGH POINT			33+69 L																											
⇩																														
GRADE	DI-3B	4	36+00 L	0.23	0.64	0.15	0.15	4	0.59	0	0.59	0.02	0.02	7.6	2	0.26	0.08	4	0.67	0.02	2	3.44	0.14	0.12	7.6	0.53	0.74	0.44	0.15	
⇩				0.25	0.72	0.18	0.18	4	0.72	0.15	0.87	0.04	0.02	8.9	Flow Approaching From Down Station 36+00 L															
SUMP	DI-3C	4	37+25 L								1.15	0	0.02		2		0.08								7.6	0.14	0.27	0.52	7	
⇧				0.1	0.68	0.07	0.07	4	0.27	0	0.27	0	0.02	2.5	Flow Approaching From Up Station 37+62 L															
HIGH POINT																														

CONSULTING ENGINEERS

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

PROJECT	WindsorMeade Way
PROJECT NO.	8818-04
SUBJECT	Spread Calc's
SHEET NO.	3
DATE	3/14/2002
BY	R. Smith

STORM WATER INLET COMPUTATIONS FOR WINDSORMEADE WAY

INLET Number	Type	Length	Station	Drainage Area (Ac)	C	CA	Σ CA	I in/hr	Q-Inter (CFS)	Q Carry- Over (CFS)	Qt Gutter Flow	S Gutter Slope (ft/ft)	Sx Cross Slope (ft/ft)	T(Spread)	W (ft)	W/T	Sw (ft/ft)	Sw/Sx	Eo(#10)	n	Local Dep.	a	Sw =a/(12W)	Se (ft/ft) =Sx+SwEo	Lt (ft) 15 P Effec L	L/Lt d (ft)	E(#16) h (ft)	Q Int CFS d/h	Q Carryover Spread	Remark
HIGH POINT																														
GRADE	DI-3B	4	10+75 R	0.38	0.81	0.31	0.31	4	1.23	0	1.23	0.01	0.02	2.9	2	0.69	0.08	4	0.99	0.02	2	3.44	0.14	0.16	7.6	0.53	0.74	0.91	0.32	
⇩				0.15	0.8	0.12	0.12	4	0.48	0.32	0.8	0	0.02	5.7	Flow Approaching From Down Station 22+00 R															
SUMP	DI-3C	6	11+15 R								0.95	0	0.02		2		0.08								9.6	0.12	0.27	0.44	5.9	
⇧				0.1	0.07	0.01	0.01	4	0.03	0.12	0.15	0	0.02	1.7	Flow Approaching From Up Station 25+66 R															
GRADE	DI-3B	4	12+00 R	0.12	0.75	0.09	0.09	4	0.36	0.1	0.46	0.04	0.02	6.8	2	0.29	0.08	4	0.7	0.02	2	3.44	0.14	0.12	7.6	0.53	0.74	0.34	0.12	
⇧																														
GRADE	DI-3B	6	13+00 R	0.12	0.75	0.09	0.09	4	0.36	0.2	0.56	0.04	0.02	7.4	2	0.27	0.08	4	0.67	0.02	2	3.44	0.14	0.12	9.6	0.63	0.83	0.46	0.09	
⇧																														
GRADE	DI-3B	4	14+00 R	0.25	0.75	0.19	0.19	4	0.75	0	0.75	0.04	0.02	8.4	2	0.24	0.08	4	0.6	0.02	2	3.44	0.14	0.11	7.6	0.53	0.74	0.55	0.2	
⇧																														
HIGH POINT			16+05 R																											
HIGH POINT			16+05 R																											
GRADE	DI-3B	6	18+25 R	0.26	0.76	0.2	0.2	4	0.79	0	0.79	0.01	0.02	2.8	2	0.71	0.08	4	0.99	0.02	2	3.44	0.14	0.16	9.6	0.63	0.83	0.66	0.14	
⇩																														
GRADE	DI-3B	6	19+25 R	0.11	0.76	0.08	0.08	4	0.33	0.14	0.47	0.05	0.02	6.9	2	0.29	0.08	4	0.7	0.02	2	3.44	0.14	0.12	9.6	0.63	0.83	0.39	0.08	
⇩																														
GRADE	DI-3B	6	20+00 R	0.1	0.76	0.08	0.08	4	0.3	0.08	0.38	0.04	0.02	6.3	2	0.32	0.08	4	0.74	0.02	2	3.44	0.14	0.13	9.6	0.63	0.83	0.32	0.07	
⇩																														
GRADE	DI-3B	4	22+00 R	0.22	0.73	0.16	0.16	4	0.64	0.07	0.16	0.02	0.02	3.8	2	0.53	0.08	4	0.95	0.02	2	3.44	0.14	0.16	7.6	0.53	0.74	0.12	0.04	
⇩				0.19	0.73	0.14	0.14	4	0.55	0.04	0.6	0	0.02	4.8	Flow Approaching From Down Station 22+00 R															
SUMP	DI-3C	6	23+82 R								1.26	0	0.02		2		0.08								9.6	0.13	0.27	0.5	6.7	
⇧				0.22	0.75	0.17	0.17	4	0.66	0	0.66	0	0.02	5.1	Flow Approaching From Up Station 25+66 R															
HIGH POINT			25+40 R																											
HIGH POINT			25+40 R																											
GRADE	DI-3A	2.8	28+50 R	0.32	0.68	0.22	0.22	4	0.87	0	0.87	0.02	0.02	2.1	2	0.95	0.08	4	1	0.02	2	3.44	0.14	0.16	6.4	0.44	0.65	0.56	0.31	
GRADE	DI-3A	2.8	30+25 R	0.19	0.68	0.13	0.13	4	0.52	0.31	0.83	0.02	0.02	2	2	1	0.08	4	1	0.02	2	3.44	0.14	0.16	6.4	0.44	0.65	0.53	0.29	
⇩				0.05	0.68	0.03	0.03	4	0.14	0.29	0.43	0	0.02	3.9	Flow Approaching From Down Station 30+25 R															
SUMP	DI-3C	6	30+74 R								1.34	0	0.02		2		0.08								9.6	0.14	0.27	0.5	6.8	
⇧				0.36	0.63	0.23	0.23	4	0.91	0	0.91	0	0.02	6.1	Flow Approaching From Up Station 33+69 R															
HIGH POINT			33+69 R																											

CONSULTING ENGINEERS

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

PROJECT	WindsorMeade Way
PROJECT NO.	8818-04
SUBJECT	Spread Calc's
SHEET NO.	4
DATE	3/14/2002
BY	R. Smith

STORM WATER INLET COMPUTATIONS FOR WINDSORMEADE WAY

INLET Number	Type	Length	Station	Drainage Area (Ac)	C	CA	Σ CA	I in/hr	Q-Inter (CFS)	Q Carry- Over (CFS)	Qt Gutter Flow	S Gutter Slope (ft/ft)	Sx Cross Slope (ft/ft)	T(Spread)	W (ft)	W/T	Sw (ft/ft)	Sw/Sx	Eo(#10)	n	Local Dep.	a	S'w =a/(12W)	Se (ft/ft) =Sx+SwEo	P Lt (ft) 15 Effec L	d L/Lt (ft)	h E(#16) (ft)	Q Int CFS d/h	Q Carryover Spread	Remark
HIGH POINT			33+69 R																											
⇩																														
GRADE	DI-3B	6	36+00 R	0.23	0.63	0.14	0.14	4	0.58	0	0.58	0.02	0.02	1.6	2	1.25	0.08	4	1	0.02	2	3.44	0.14	0.16	9.6	0.63	0.83	0.48	0.1	
⇩																														
GRADE	DI-3B	8	37+25 R	0.16	0.65	0.1	0.1	4	0.42	0.1	0.52	0.02	0.02	7.2	2	0.28	0.08	4	0.67	0.02	2	3.44	0.14	0.12	11.6	0.69	0.88	0.45	0.06	

WINDSORMEADE WAY
CALCULATION FOR SCS HYDROGRAPH GENERATION AND CHANNEL PROTECTION
FOR BMP / SWM 2
8818-04
5/14/2003

I. PRE-DEVELOPMENT CONDITIONS TO POINT OF CONCERN

A. Pre-Development Drainage Area to Point of Concern = 2.31 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)	10-C Craven	C	Woods (good)	0.70	72	50
2)	17 - Johnston	D	Pavement and Roofs (Com.)	0.04	98	4
3)	17 - Johnston	D	Woods (good)	0.08	79	6
4)	15-D Emporia	C	Pavement and Roofs (Com.)	0.29	98	28
5)	15-D Emporia	C	Woods (good)	1.20	72	86
6)					0	0
7)					0	0
	Totals =			2.31		175
	Composite CN =					76

C. Pre-Development Time of Concentration Calculations

1) Overland Flow (maximum 300 feet)

Surface description (table 5-7)	Woods (light underbrush)	
Manning's roughness coefficient., n (table 5-7)	0.4	
Length of overland flow, L	300	Feet
2-year 24-hour rainfall, P2	3.6	inches
Average slope of overland flow , s	0.097	feet per foot
Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.43	hours

2) Shallow concentrated flow (maximum 300 feet)

Surface description, paved or unpaved	unpaved	
Length of shallow concentrated flow, L	110	Feet
Average slope of shallow concentrated flow, s	0.054	feet per foot
Average velocity, v	3.6	feet per second
Travel time, Tt = L/(3600*v)	0.01	hours

3) Channel or Pipe Flow

Length of channel flow, L		Feet
Average velocity of channel flow, v	2.5	feet per second
Travel time, Tt = L/(3600*v)	0.00	hours
Total Time of Concentration =	0.44	hours
or	26	minutes

II. POST-DEVELOPMENT CONDITIONS TO POINT OF CONCERN (for total site)

A. Post-Development Drainage Area to Point of Concern = 4.43 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)	15-D Emporia	C	Woods (good)	0.19	72	14
2)	15-D Emporia	C	Road	0.19	98	19
3)	17 - Johnston	D	Woods (good)	0.57	79	45
4)	17 - Johnston	D	Road	0.78	98	76
5)	15-D Emporia	C	Woods (good)	1.50	72	108
6)	15-D Emporia	C	Road	0.51	98	50
7)	10-C Craven	C	Woods (good)	0.69	72	50
8)					0	0
9)					0	0
10)					0	0
11)					0	0
	Total Adjusted CN =			4.43		361
	Composite CN =					82

TOTAL OF IMPERVIOUS AREA = 1.48A

C. Post-Development Time of Concentration Calculations

1) Overland Flow (maximum 300 feet)

Surface description (table 5-7)	Woods (light underbrush)
Manning's roughness coefficient., n (table 5-7)	0.4
Length of overland flow, L	200 Feet
25-year 24-hour rainfall, P25	6.5 inches
Average slope of overland flow , s	0.13 feet per foot
Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.21 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	0.2 feet per second
Travel time, Tt = L/(3600*v)	0.00 hours

3) Channel or Pipe Flow

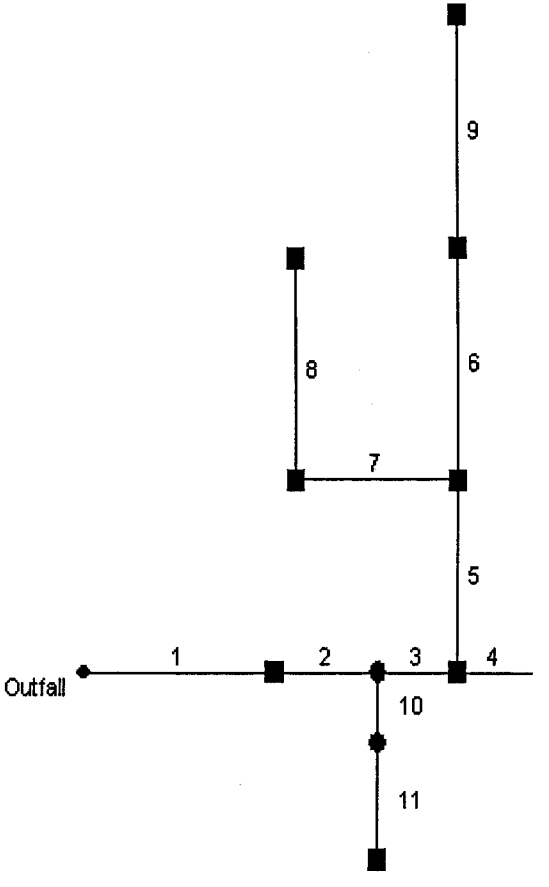
Length of channel flow, L	0 Feet
Average velocity of channel flow, v	2.5 feet per second
Travel time, Tt = L/(3600*v)	0.00 hours

Total Time of Concentration =	0.21 hours	
or		12 minutes

WINDSORMEADE WAY

STORM SYSTEM #1

Hydraflow Plan View



Project file: 8818-04-STRM-SYS-1.JAG.stm	No. Lines: 11	08-27-2003

Storm Sewer Tabulation

STORM SYSTEM # 1

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	92.0	0.28	14.08	0.55	0.15	5.91	5.0	15.6	4.9	29.17	78.36	6.95	36	1.38	77.10	75.83	78.82	77.55	85.39	76.87	SS1-2 TO SS1-1
2	1	50.0	0.00	13.80	0.00	0.00	5.76	5.0	15.4	5.0	28.57	78.35	6.15	36	1.38	77.79	77.10	79.49	79.20	86.14	85.39	SS1-3 TO SS1-2
3	2	38.0	0.25	13.35	0.75	0.19	5.44	5.0	15.2	5.0	27.13	47.16	4.55	36	0.50	77.98	77.79	80.26	80.23	85.46	86.14	SS1-4 TO SS1-3
4	3	36.0	10.70	10.70	0.33	3.53	3.53	15.0	15.0	5.0	17.72	47.16	2.64	36	0.50	78.16	77.98	80.79	80.78	80.21	85.46	SS1-5 TO SS 1-4
5	3	83.0	0.22	2.40	0.75	0.17	1.72	5.0	6.7	6.6	11.29	10.58	9.20	15	2.69	80.63	78.40	83.32	80.78	86.47	85.46	SS1-6 TO SS1-4
6	5	100.0	0.25	0.63	0.75	0.19	0.47	5.0	6.0	6.7	3.17	14.64	3.49	15	5.14	85.77	80.63	86.48	85.29	89.77	86.47	SS1-9 TO SS1-6
7	5	78.0	0.50	1.55	0.70	0.35	1.09	5.0	5.4	6.9	7.48	9.13	6.09	15	2.00	82.19	80.63	86.34	85.29	86.19	86.47	SS1-7 TO SS 1-6
8	7	95.0	1.05	1.05	0.70	0.74	0.74	5.0	5.0	7.0	5.14	12.04	4.19	15	3.47	85.49	82.19	87.80	87.20	89.49	86.19	SS1-8 TO SS1-7
9	6	100.0	0.38	0.38	0.75	0.29	0.29	5.0	5.0	7.0	1.99	10.75	2.95	15	2.77	88.54	85.77	89.11	86.63	92.54	89.77	SS1-9 TO SS1-1
10	2	30.0	0.00	0.45	0.00	0.00	0.32	5.0	5.7	6.8	2.15	20.56	1.21	18	3.83	78.61	77.46	80.25	80.23	86.37	86.14	SS1-2 TO EX1-2
11	10	50.0	0.45	0.45	0.70	0.32	0.32	5.0	5.0	7.0	2.20	28.14	2.43	18	7.18	82.20	78.61	82.77	80.25	86.00	86.37	EX1-1 TO EX1-2

The 15-inch storm drain pipe segment from structure SS#1-6 to SS#1-6 is in pressure flow situation

HGL for inlet SS#1-7 exceeds the rim elevation for the 10-year Outflow storm

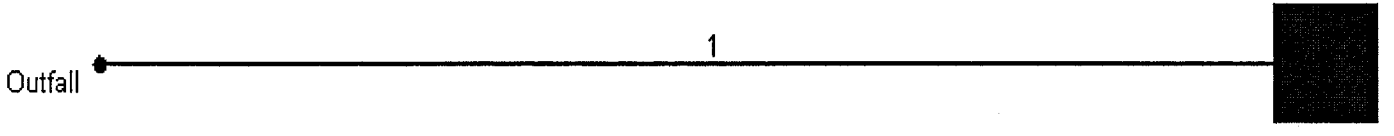
Project File: 8818-04-STRM-SYS-1.JAG.stm | Number of lines: 11 | Run Date: 08-27-2003

NOTES: Intensity = 80.56 / (Inlet time + 14.90) ^ 0.82; Return period = 10 Yrs.

WINDSORMEADE WAY

STORM SYSTEM # 2

Hydraflow Plan View



Project file: 8818-04-STRM-SYS-2.JAG.stm	No. Lines: 1	08-27-2003

Storm Sewer Tabulation

STORM SYSTEM #2

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	24.0	0.38	0.38	0.81	0.31	0.31	5.0	5.0	7.1	2.19	13.18	3.83	15	4.17	80.00	79.00	80.59	79.59	85.00	79.25	SS2-2 TO SS2-1

Project File: 8818-04-STRM-SYS-2.JAG.stm

Number of lines: 1

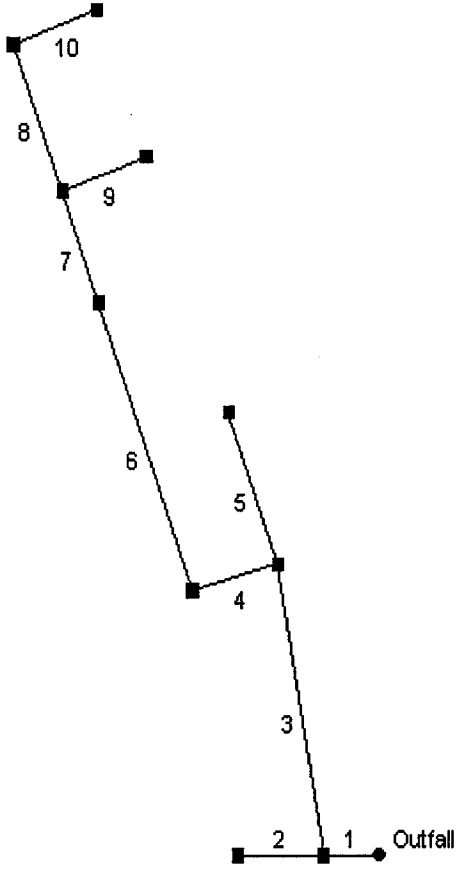
Run Date: 08-27-2003

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

WINDSORMEADE WAY

STORM SYSTEM #3

Hydraflow Plan View



Project file: 8818-04-STRM-SYS-3.jag.stm	No. Lines: 10	08-27-2003

Storm Sewer Tabulation

STORM SYSTEM #3

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	40.0	0.54	5.24	0.50	0.27	3.65	12.0	15.6	5.1	18.47	29.00	3.76	30	0.50	74.20	74.00	76.69	76.61	79.46	76.00	SS3-2 TO SS3-1
2	1	61.0	0.35	0.35	0.85	0.30	0.30	5.0	5.0	7.1	2.12	7.21	1.73	15	1.25	75.46	74.70	77.08	77.02	79.46	79.46	SS3-3 TO SS3-2
3	1	189.0	0.79	4.35	0.50	0.40	3.08	12.0	14.6	5.2	16.03	42.29	4.63	30	1.06	76.21	74.20	77.55	77.02	82.02	79.46	SS3-4 TO SS3-3
4	3	64.0	0.22	2.89	0.85	0.19	2.25	5.0	14.2	5.3	11.86	41.01	3.25	30	1.00	76.85	76.21	78.34	78.39	82.02	82.02	SS3-5 TO SS3-4
5	3	104.0	0.67	0.67	0.65	0.44	0.44	10.0	10.0	6.0	2.60	9.89	3.37	15	2.35	79.90	77.46	80.55	78.39	83.90	82.02	SS3-6 TO SS3-4
6	4	197.0	0.19	2.67	0.85	0.16	2.07	5.0	13.2	5.4	11.17	26.23	5.37	24	1.35	80.00	77.35	81.18	78.69	84.79	82.02	SS3-7 TO SS3-5
7	6	75.0	0.11	2.48	0.85	0.09	1.90	5.0	12.8	5.5	10.41	42.75	4.95	24	3.57	82.68	80.00	83.82	81.44	88.68	84.79	SS3-8 TO SS3-7
8	7	100.0	0.33	1.91	0.85	0.28	1.47	5.0	12.2	5.6	8.17	39.82	3.89	24	3.10	85.78	82.68	86.79	84.56	91.78	88.68	SS3-9 TO SS3-8
9	7	64.0	0.46	0.46	0.75	0.35	0.35	8.0	8.0	6.4	2.20	6.46	2.86	15	1.00	84.07	83.43	84.66	84.56	88.68	88.68	SS3-10 TO SS3-
10	8	64.0	1.58	1.58	0.75	1.19	1.19	12.0	12.0	5.6	6.65	9.02	6.13	15	1.95	87.78	86.53	88.81	87.56	91.78	91.78	SS3-11 TO SS3-

Project File: 8818-04-STRM-SYS-3.jag.stm

Number of lines: 10

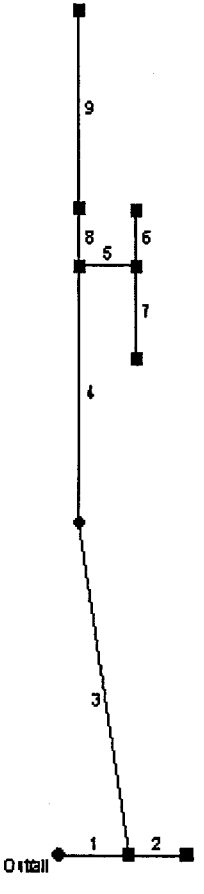
Run Date: 08-27-2003

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

WINDSORMEADE WAY

STORM SYSTEM # 4

Hydraflow Plan View



Project file: 8818-04-STRM-SYS-4.JAG.stm	No. Lines: 9	08-27-2003

Storm Sewer Tabulation

STORM SYSTEM #4

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	71.0	0.23	2.14	0.75	0.17	1.61	5.0	9.5	6.1	9.75	12.00	3.10	24	0.28	59.87	59.67	63.65	63.52	70.80	66.00	SS4-2 TO SS4-1
2	1	58.0	0.21	0.21	0.75	0.16	0.16	5.0	5.0	7.1	1.12	20.42	1.99	15	10.00	65.80	60.00	66.22	63.88	70.80	70.80	SS4-3 TO SS4-2
3	1	303.0	0.00	1.70	0.00	0.00	1.28	0.0	8.4	6.3	8.03	10.50	4.54	18	1.00	62.90	59.87	65.65	63.88	75.50	70.80	SS4-4 TO SS4-2
4	3	231.0	0.38	1.70	0.75	0.29	1.28	5.0	7.8	6.4	8.18	8.95	6.67	15	1.92	67.34	62.90	69.41	65.70	71.55	75.50	SS4-5 TO SS4-4
5	4	58.0	0.13	0.86	0.85	0.11	0.63	5.0	6.4	6.8	4.24	4.57	3.46	15	0.50	67.63	67.34	70.69	70.44	71.55	71.55	SS4-6 TO SS4-5
6	5	48.0	0.52	0.52	0.65	0.34	0.34	5.0	5.0	7.1	2.41	3.49	1.96	15	0.29	67.77	67.63	71.04	70.97	71.77	71.55	SS4-7 TO SS4-6
7	5	84.0	0.21	0.21	0.85	0.18	0.18	5.0	5.0	7.1	1.27	3.30	1.04	15	0.26	67.85	67.63	71.00	70.97	71.77	71.55	SS4-8 TO SS4-6
8	4	50.0	0.18	0.46	0.85	0.15	0.36	5.0	7.4	6.5	2.36	9.22	1.93	15	2.04	68.36	67.34	70.51	70.44	72.28	71.55	SS4-9 TO SS4-5
9	8	178.0	0.28	0.28	0.75	0.21	0.21	5.0	5.0	7.1	1.50	6.46	1.92	15	1.00	70.14	68.36	70.73	70.54	75.07	72.28	SS4-10 TO SS4-

Project File: 8818-04-STRM-SYS-4.JAG.stm

Number of lines: 9

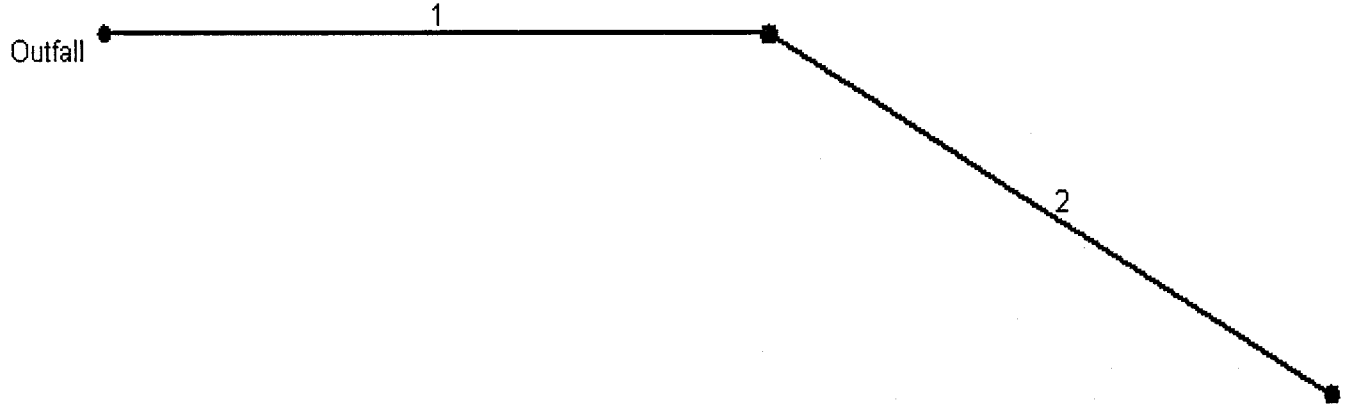
Run Date: 08-27-2003

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

WINDSOR MEADE WAY

STORM SYSTEM # 5

Hydraflow Plan View



Project file: 8818-04-STRM-SYS-5.JAG.stm	No. Lines: 2	08-27-2003

Storm Sewer Tabulation

STORM SYSTEM #5

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	92.0	0.12	0.38	0.90	0.11	0.34	5.0	6.1	6.8	2.34	9.23	1.90	15	2.04	61.55	59.67	63.64	63.52	66.50	60.92	SS5-1 TO SS5-2
2	1	90.0	0.26	0.26	0.90	0.23	0.23	5.0	5.0	7.1	1.67	4.57	1.36	15	0.50	62.00	61.55	63.73	63.67	66.00	66.50	SS5-2 TO SS5-3

Project File: 8818-04-STRM-SYS-5.JAG.stm

Number of lines: 2

Run Date: 08-27-2003

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

Vamp
File - Windsor Meade Way

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

August 23, 2002

Eastern Virginia Regulatory Section
02-V0454-18 (Cool Springs Swamp/Powhatan Creek)

Mr. William Jeryl Fink
Virginia United Methodist Homes
7113 Three Chopt Road
Richmond, Virginia 23226

Dear Mr. Fink:

Enclosed is a Department of the Army permit authorizing you to perform certain work in waters of the United States. Please sign both copies in the space provided for the permittee's signature and return them to this office (Army Corps of Engineers, Regulatory Branch, 803 Front Street, Norfolk, Virginia 23510). Upon receipt, the district engineer or his authorized representative will sign both copies and return an original to you. **The permit is not valid until signed by both parties.**

Please take note of project specific, special and general conditions incorporated in this permit. Enclosed is a "compliance certification" form, which must be signed and returned within 30 days of completion of the project, including any required mitigation. Your signature on this form certifies that you have completed the work in accordance with the permit terms and conditions.

Please note that you cannot begin work until you have obtained a Section 401 Water Quality Certificate/Virginia Water Protection Permit or a waiver. All the conditions in the 401 certificate/Water Protection Permit automatically are conditions of your Department of the Army Permit.

If any material change in the plan of the work is found necessary, revised plans must be submitted for our approval before any work is begun. If you have any questions, you may call Mr. Steven Martin of my staff at (757) 441-7787.

Sincerely,

Steven Martin

for

Nicholas L. Konchuba
Chief, Eastern Virginia
Regulatory Section

Enclosures

Copies Furnished (w/ cy of permit):

Williamsburg Environmental Group, Williamsburg
Planning Department, James City County
Environmental Division, James City County
Virginia Department of Environmental Quality, Virginia Beach
U.S. Fish and Wildlife Service, Gloucester

U.S. Army Corps
Of Engineers
Norfolk District

Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

DEPARTMENT OF THE ARMY PERMIT

Permittee: Virginia United Methodist Homes
Mr. William Jeryl Fink
7113 Three Chopt Road
Richmond, Virginia 23226

August 23, 2002

Permit No.: **02-V0454-18**
Issuing Office: Norfolk District, Corps of Engineers

Note: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

Project Description: You plan to construct a 2 lane primary entrance road to the proposed WindsorMeade of Williamsburg development which will be located on a portion of the Casey Tract/New Town Property. The road design allows for several future spurs off this primary roadway. The roadway will be constructed separately from the WindsorMeade development, because it will provide access to additional future development activities.

Construction of the proposed 3200+ foot long road would entail 4 different areas of fill or crossings of jurisdictional wetlands. The location and extent of the proposed roadway and associated roadway fills are depicted on the drawing entitled "*Wetland Impacts Map, WindsorMeade Way, James City County, Virginia*" prepared by Williamsburg Environmental Group and dated February 15, 2002 (copy attached). The roadway would result in cumulative impacts to approximately 0.38 acres of forested wetlands and 56.58 linear feet (0.04 acres) of intermittent stream channel. The 2 wetland road crossings will be culverted. The culverts will be countersunk a minimum of 2 inches to ensure hydrologic connectivity between the wetlands traversed by this access road.

You have proposed to compensate for the unavoidable project impacts to waters of the United States (including wetlands) at an offsite location. An actual mitigation plan or proposal has not been provided. Project Specific Conditions #5-#9 below address compensatory mitigation requirements.

Project Location: The project site is located at 4692 Old News Road on a larger undeveloped parcel in James City County, Virginia (PIN 3830100034). The work would occur in wetlands located above the headwaters of Cool Springs Swamp, a tributary of Powhatan Creek. The project location map is attached.

Project Specific Conditions:

1. Prior to the commencement of any work authorized by this permit, you shall advise **Mr. Steven Martin** in writing (letter, e-mail, or FAX) at: **Norfolk District, Army Corps of Engineers, Regulatory Branch, 803 Front Street, Norfolk, Virginia 23510**, steven.m.martin@usace.army.mil, **(757) 41-7678 (FAX)** of the time the authorized activity will commence and the name and telephone number of all contractors or other persons performing the work. A copy of this permit and drawings must be provided to the contractor and made available to any regulatory representative during an inspection of the project site.

2. The time limit for completing the work authorized ends on **September 1, 2007**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached. Should you be unable to complete the authorized activity in the time limit provided, you must submit your request for a time extension to this office for consideration at least one month before the permit expiration date.
3. Drawings depicting the culverted road crossings must be submitted for review and approval by this office prior to initiating work in waters of the U.S. (including wetlands) on this property.
4. Any revised drawings for this roadway must be submitted to this office prior to initiation of work in waters of the U.S. (including wetlands) on this property
5. Compensatory mitigation will be required for impacts to 0.38 acres of forested wetlands and 56.58 linear feet (0.04 acres) of intermittent stream channel. You are encouraged to provide compensatory mitigation within the Powhatan Creek watershed. The final mitigation plan must be consistent with Norfolk District's Regulatory Branch Guidance for Wetlands Compensation Permit Conditions and Performance Criteria dated December 1995 (copy enclosed).
6. **No work may be conducted in waters of the U.S. (including wetlands and streambeds) for this roadway until this office approves a final compensatory mitigation plan.** The final compensatory mitigation plan should also include the following provisions:
   a) A map depicting the location and extent of the proposed mitigation site
   b) Sample cross-section drawings of the proposed compensation areas;
   c) Requirement for soil testing and soil amendments; Soils that would be exposed to air by grading or cut and fill operations shall be tested for sulfidic materials/deposits (sulfides, pyrites, etc.), pH, organic carbon content, and potential acidity. Amendments (organics, compost, woody debris, lime, etc.) may be required based on total sulfur and/or carbon levels in site soils.
   d) Requirement for deep ripping, or chisel plowing compacted areas following grading activities and prior to planting;
   e) A monitoring plan for evaluation of wetland creation/restoration activities, including hydrophytic vegetation, development of hydric soils in wetland creation areas (i.e. oxidized rhizospheres around living roots), and wetland hydrology throughout the wetland restoration/creation portion of any mitigation site, and hydrophytic vegetation; At least 5 years of monitoring over the course of 10 years will be required (i.e. monitoring at years 1, 2, 4, 7, and 10 following construction).
   f) Identification of any invasion by undesirable species such as Phragmites, purple loosestrife, cattails, or fescue or animal species such as geese, deer, and beavers. Quantification of the extent of invasion of undesirable plants by either stem counts or percent cover, whichever is appropriate. Describe and/or quantify damage done by animal species. Specify measures to be implemented for the removal, treatment or management of undesirable plant or animal species, including physical removal, use of herbicides, live trapping, etc.
   g) Financial assurances sufficient to ensure that adequate funds could be mobilized to create/restore wetlands on site. The Corps must approve the form and amount of the assurances.
   h) A real estate instrument (restrictive covenant, conservation easement, natural area dedication, etc.) deemed adequate by the Corps to protect the wetland and buffer area in perpetuity.
   i) A copy of the recorded real estate instrument must be forwarded to this office within 60 days of recordation.
8. **Compensatory mitigation activities for this road must be completed not later than completion of work in waters of the U.S. (including wetlands) associated with the proposed WindsorMeade of Williamsburg development** depicted in permit application (02-V1074) and the attached drawing entitled " *Figure 2-1 Wetland Impacts Map, WindsorMeade of Williamsburg, James City County, Virginia*" prepared by Williamsburg Environmental Group and dated February 15, 2002.
9. Should the wetland performance criteria specified in the Corps-approved final compensatory mitigation plan not be met at any time during the monitoring period, you must provide the Corps with a proposal detailing proposed corrective actions and/or maintenance actions and an implementation schedule for said actions. You shall implement the necessary corrective measures following Corps review and approval/modification of these measures. The Corps may require additional remedial actions if these actions do not result in satisfaction of performance criteria during the next subsequent growing season.
10. Enclosed is a "compliance certification" form, which must be signed and returned within 30 days of completion of the project, including any required mitigation. Your signature on this form certifies that you have completed the work in accordance with the permit terms and conditions.

Special Conditions:

1. No discharge of dredged or fill material may consist of unsuitable material (e.g.: trash, debris, car bodies, asphalt etc.) and material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
2. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.
3. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark must be permanently stabilized at the earliest practicable date.
4. The construction or work authorized by this permit will be conducted in a manner so as to minimize any degradation of water quality and/or damage to aquatic life. Also, you will employ measures to prevent or control spills of fuels or lubricants from entering the waterway.
5. Any heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.
6. Failure to comply with the terms and conditions of this permit can result in enforcement actions against the permittee and/or contractor.
7. In granting an authorization pursuant to this permit, the Norfolk District has relied on the information and data provided by the permittee. If, subsequent to notification by the Corps that a project qualifies for this permit, such information and data prove to be materially false or materially incomplete, the authorization may be suspended or revoked, in whole or in part, and/or the Government may institute appropriate legal proceedings.
8. All filling will be done so as to minimize disturbance of the bottom or turbidity increases in the water, which tend to degrade water quality and damage aquatic life.

General Conditions:

1. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Conditions 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
2. If you discover any previously unknown historic or archaeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
3. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.
4. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.
5. The permittee understands and agrees that if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army of his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required upon due notice from the Corps of Engineers to remove, relocate, or alter the structural work or obstructions caused thereby without expense to the United States. No claim shall be made against the Untied States on account of any such removal or alternation.

Further Information:

1. Limits of this authorization:
    a. This permit does not obviate the need to obtain other Federal, state or local authorizations required by law.
    b. This permit does not grant any property rights or exclusive privileges.
    c. This permit does not authorize any injury to the property or rights of others.
    d. This permit does not authorize interference with any existing or proposed Federal projects.

2. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:
    a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
d. Design or construction deficiencies associated with the permitted work.
e. Damage claims associated with any future modification, suspension, or revocation of this permit.

3. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
4. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time that the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
   a. You fail to comply with the terms and conditions of this permit.
   b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 3 above).
   c. Significant new information surfaces, which this office did not consider in reaching the original public interest decision.

   Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.
5. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as a permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

_____
(Permittee)

_____
(Date)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

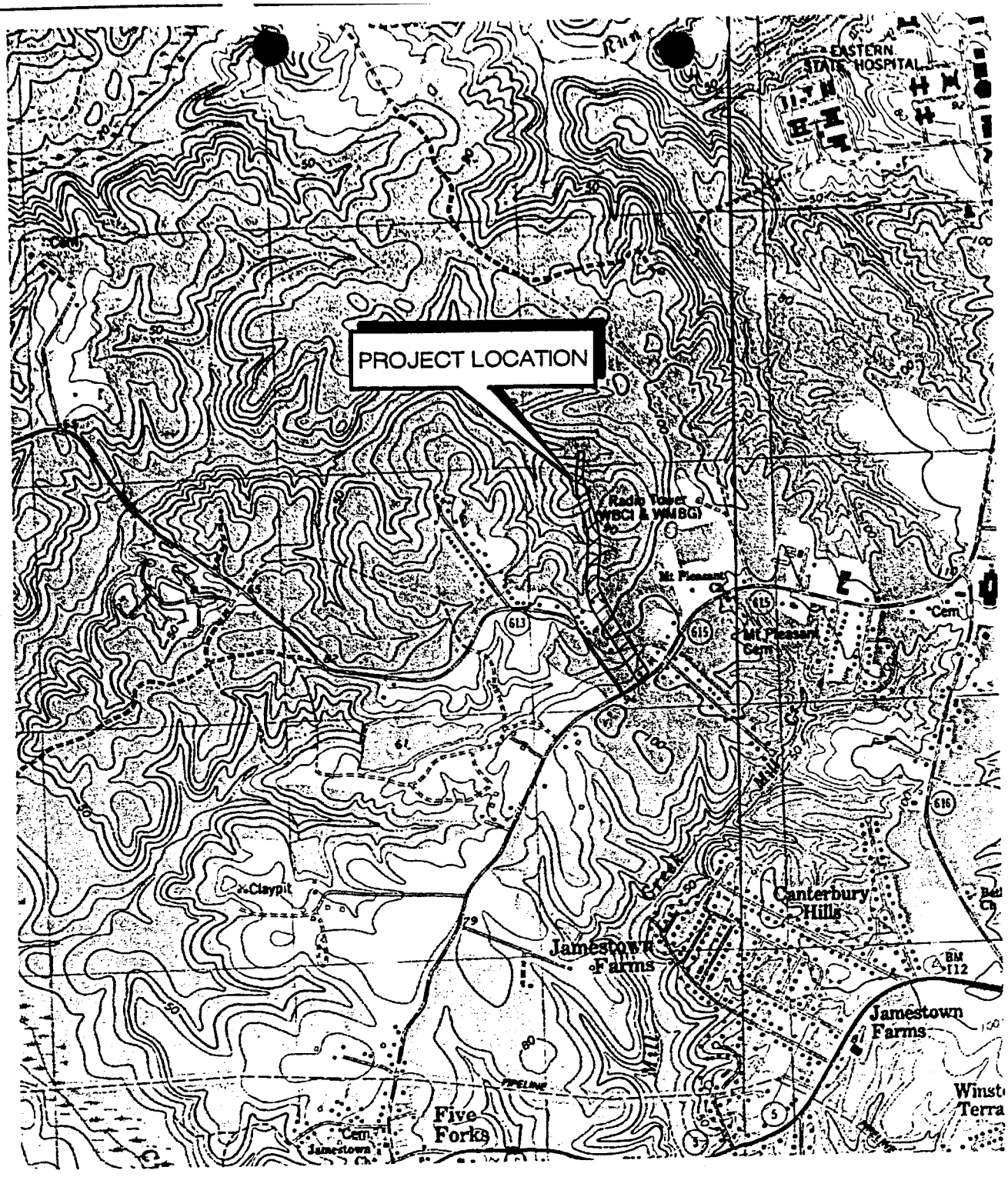
_____
Nicholas L. Konchuba
Chief, Eastern Virginia
Regulatory Section

_____
(Date)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____
(Transferee)

_____
(Date)



2000' 1000' 0' 2000'

SCALE: 1 INCH = 2000 FEET

LATITUDE: 37°16'24"
LONGITUDE: 76°45'18"

SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP, NORGE, VA QUADRANGLE, 1984.

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

FIGURE 1-2

PROJECT LOCATION MAP

WINDSORMEADE WAY

JAMES CITY CO., VA	MARCH 2002

DATE: FEBRUARY 15, 2002

JOB NUMBER: 1161

SCALE: 1 INCH = 250 FEET

WETLAND IMPACTS MAP

WINDSORMEADE WAY

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

3000 Easter Circle
Williamsburg, Virginia 23188
(757) 220-6500

7325 Beaufont Springs Drive, Suite 100
Richmond, Virginia 23225
(804) 897-3474

45030 Manassas Plaza, Suite 180
Sterling, Virginia 20166
(703) 406-1360

LEGEND:

- WETLAND LIMITS
- PROPOSED WETLAND IMPACTS
- INDIVIDUAL SMALL WHORLED POGONIA PLANTS
- CLUSTER OF SMALL WHORLED POGONIA PLANTS AND NUMBER OF PLANTS IN CLUSTER
- 150' BUFFER ZONE (7.11 AC. +/-)
- 50' BUFFER ZONE (11.26 AC. +/-)
- 20' BUFFER ZONE (NO DISTURBANCE) (1.99 AC. +/-)
- ENDANGERED SPECIES PRESERVE (12.84 AC. +/-)

SITE DATA:

PROJECT AREA 113.38 ACRES +/-

JURISDICTIONAL AREAS:

WETLANDS 20.21 ACRES +/-

JURISDICTIONAL AREA IMPACTS:

WETLANDS 0.42 ACRE +/-

DATE: FEBRUARY 15, 2002
REVISED:
JOB NUMBER: 1161
SCALE: 1 INCH = 450 FEET
SOURCE: BASE MAP PROVIDED BY AES CONSULTING ENGINEERS

FIGURE 2-1
WETLAND IMPACTS MAP
WINDSORMEADE OF WILLIAMSBURG
JAMES CITY COUNTY, VIRGINIA

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
3600 Easter Circle
Williamsburg, Virginia 23188
(757) 220-6855
7325 Beaufont Springs Drive, Suite 100
Richmond, Virginia 23225
(804) 267-3474
46030 Manekin Plaza, Suite 160
Sterling, Virginia 20166
(703) 406-1399
Environmental Consultants

File: Windsor Meade Way

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

Environmental Consultants

FACSIMILE TRANSMITTAL

Date: 12/2/2003

To: Mike Woolson

Fax Number: 757-259-4032

From: Shelley S Carlisle

Subject: Windsor Meade Way permits

WEG Project #: 1161

cc: File

Total # of Pages (including this cover sheet): 5

If any part of this fax transmission is missing or not clearly received, please call April at (757) 220-6869.

Message:

Mike-

Hope all is well. Here are the cover pages for the Corps + DEQ permits for WM Way. Let me know if you need the complete permit conditions.

Shelley

U.S. Army Corps
Of Engineers
Norfolk District

Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

DEPARTMENT OF THE ARMY PERMIT

Permittee: Virginia United Methodist Homes
Mr. William Jeryl Fink
7113 Three Chopt Road
Richmond, Virginia 23226

August 23, 2002

Permit No.: **02-V0454-18**
Issuing Office: Norfolk District, Corps of Engineers

Note: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

Project Description: You plan to construct a 2 lane primary entrance road to the proposed WindsorMeade of Williamsburg development which will be located on a portion of the Casey Tract/New Town Property. The road design allows for several future spurs off this primary roadway. The roadway will be constructed separately from the WindsorMeade development, because it will provide access to additional future development activities.

Construction of the proposed 3200+ foot long road would entail 4 different areas of fill or crossings of jurisdictional wetlands. The location and extent of the proposed roadway and associated roadway fills are depicted on the drawing entitled "*Wetland Impacts Map, WindsorMeade Way, James City County, Virginia*" prepared by Williamsburg Environmental Group and dated February 15, 2002 (copy attached). The roadway would result in cumulative impacts to approximately 0.38 acres of forested wetlands and 56.58 linear feet (0.04 acres) of intermittent stream channel. The 2 wetland road crossings will be culverted. The culverts will be countersunk a minimum of 2 inches to ensure hydrologic connectivity between the wetlands traversed by this access road.

You have proposed to compensate for the unavoidable project impacts to waters of the United States (including wetlands) at an offsite location. An actual mitigation plan or proposal has not been provided. Project Specific Conditions #5-#9 below address compensatory mitigation requirements.

Project Location: The project site is located at 4692 Old News Road on a larger undeveloped parcel in James City County, Virginia (PIN 3830100034). The work would occur in wetlands located above the headwaters of Cool Springs Swamp, a tributary of Powhatan Creek. The project location map is attached.

Project Specific Conditions:

1. Prior to the commencement of any work authorized by this permit, you shall advise Mr. Steven Martin in writing (letter, e-mail, or FAX) at: **Norfolk District, Army Corps of Engineers, Regulatory Branch, 803 Front Street, Norfolk, Virginia 23510**, steven.m.martin@usace.army.mil, **(757) 41-7678 (FAX)** of the time the authorized activity will commence and the name and telephone number of all contractors or other persons performing the work. A copy of this permit and drawings must be provided to the contractor and made available to any regulatory representative during an inspection of the project site.

Copy ✓
File —

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

July 8, 2003

REPLY TO
ATTENTION OF:

Eastern Virginia Regulatory Section
02-V0454-18 (Cool Springs Swamp/Powhatan Creek)

Mr. William Jeryl Fink
Virginia United Methodist Homes
7113 Three Chopt Road
Richmond, Virginia 23226

Dear Mr. Fink:

This is in reference to the March 26, 2003 request from your agent, Williamsburg Environmental Group on your behalf to modify permit number 02-V0454. This permit authorizes the placement of fill in wetlands and waters of the United States for the construction of a roadway identified as WindsorMeade Way.

Under this requested modification, the roadway would be widened from 2 to 4 lanes from Monticello Avenue east to the entrance to the Windsor Meade development. A sidewalk would be constructed along the length of the roadway. The location and extent of the proposed work is depicted on the attached drawing entitled "*Jurisdictional Area Impacts Map, WindsorMeade Way, James City County, Virginia*" prepared by Williamsburg Environmental Group and dated March 13, 2003. The planned modifications will increase roadway impacts by an additional 0.47 acres of wetlands and 0.03 acres of other waters of the U.S. The total impacts to waters of the U.S., including wetlands as a result of this modification would be 0.89 acres, including 0.07 acres of headwater intermittent streams. You proposed compensating for the unavoidable project impacts through the following measures:

1) Restoration/creation of 0.89 acres of forested wetlands at the Ruffin Property in Charles City County, Virginia. The location and extent of the proposed wetland mitigation is depicted on the drawing entitled "*Conceptual Offsite Mitigation Plan, New Town, WindsorMeade, and WindsorMeade Way, Charles City County Virginia*" prepared by Williamsburg Environmental Group, dated December 20, 2002, and revised January 22, 2003.

2) Preservation of 0.75 acres of forested upland buffers onsite to offset 0.07 acres of impacts to waters;

3) Preservation of 8.2 acres of forested wetlands and adjoining uplands onsite (the forested uplands are known to support the federally-threatened small whorled pogonia, *Isotria medeoloides*).

After reviewing your proposal and the comments we received in response to our April 25, 2003 public notice describing the proposed modifications, I am modifying your permit to incorporate the modifications as described above and depicted on the attached drawing. Please be advised, that all other conditions of your August 23, 2002 permit remain in effect, including the requirement to complete mitigation site construction not later than completion the work in waters of the U.S. associated with the WindsorMeade development. In addition, as a special condition of this authorization, you are required to install adequate culverts in the wetland crossings identified as "P4" and "P5" on the attached drawing to accommodate expected low and high flows.

This modified project also includes 2 temporary sediment traps that are located in uplands. Once the roadway has been constructed, these features could be converted into engineered Integrated Management Practices (IMPs), such as bioretention facilities that would facilitate infiltration and treatment of stormwater onsite. These features could also reduce future impacts to waters of the U.S. associated with development of the remainder of this property.

If you have any questions, please contact Mr. Steven Martin of my staff at (757) 441-7787 or by e mail at steven.m.martin@usace.army.mil.

Sincerely,

for Nicholas L. Konchuba
Chief, Eastern Virginia
Regulatory Section

Copy Furnished:

Williamsburg Environmental Group, Williamsburg
Environmental Division, James City County
Planning Department, James City County
Department of Environmental Quality, Water Division, Virginia Beach
U.S. Fish and Wildlife Service, Gloucester

LEGEND:

- SURVEYED WETLAND LIMITS
- SURVEYED STREAM CHANNEL LIMITS
- PROPOSED WETLAND IMPACTS
- PROPOSED STREAM CHANNEL IMPACTS

SITE DATA:

PROJECT AREA	42.80 ACRES ±

JURISDICTIONAL AREAS:

WETLANDS	6.82 ACRES ±
STREAM CHANNELS	0.07 ACRE ±
(EXCLUDING WETLANDS)	(164.91 L.F. ±)

JURISDICTIONAL AREA IMPACTS:

WETLANDS	0.82 ACRE ±
STREAM CHANNELS	0.07 ACRE ±
(EXCLUDING WETLANDS)	(154.00 L.F. ±)

NOTE: THE LIMITS OF THE WATERS OF THE U.S., INCLUDING WETLANDS, CONFIRMED BY THE U.S. ARMY CORPS OF ENGINEERS, CONFIRMATION #

PROPOSED SEDIMENT TRAP

CLEARING LIMITS

P1 - 0.07 AC. 154.00 L.F.

P2 - 0.16 AC.

P3 - 0.04 AC.

P4 - 0.42 AC.

P5 - 0.16 AC.

P6 - 0.04 AC.

PROPOSED SEDIMENT TRAP

PROJECT LIMITS

CLEARING LIMITS

PROPOSED SEDIMENT TRAP

PROJECT LIMITS

CLEARING LIMITS

PROJECT LIMITS

MONTICELLO AVENUE

300' 0' 150' 300'

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

3000 Easter Circle
Williamsburg, Virginia 23188
(757) 220-8699

7401 Beaufont Springs Drive, Suite 205
Richmond, Virginia 23225
(804) 267-3474

49030 Manekin Plaza, Suite 160
Sterling, Virginia 20166
(703) 406-1390

Environmental Consultants

JURISDICTIONAL AREA IMPACTS MAP
WINDSORMEADE WAY
JAMES CITY COUNTY, VIRGINIA

DATE: MARCH 13, 2003

JOB NUMBER: 1161

SCALE: 1 INCH = 300 FEET

SOURCE: BASE MAP PROVIDED BY AES CONSULTING ENGINEERS.

RECEIVED
SEP 26 2003
Wmsbg Environmental Grp

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

5636 Southern Boulevard
Virginia Beach, VA 23462
www.deq.state.va.us

Robert G. Burnley
Director

Francis L. Daniel
Tidewater Regional Director
(757) 518-2000

September 25, 2003

Mr. Wm. Jeryl Fink
Virginia United Methodist Homes
c/o Ms. Shelley Carlisle
Williamsburg Environmental Group, Inc.
3000 Easter Circle
Williamsburg, Virginia 23188

RE: Final VWP Individual Permit
Virginia Water Protection Individual Permit Number 02-0454
New Town Development - Windsormeade Way

Dear Mr. Fink:

Pursuant to the Virginia Water Protection (VWP) Permit Program Regulation 9 VAC 25-210-10 and § 401 of the Clean Water Act Amendments of 1977, Public Law 95-217, the Department of Environmental Quality (DEQ) has enclosed the original VWP individual permit for the above-referenced project involving fill for a main entrance road into the New Town master planned development.

The provisions and conditions contained therein according to § 401(a)(1) of the Clean Water Act requires that:

> "any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge in the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate, that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this Act."

This permit is valid for twelve years from the date of issuance. Re-issuance of the permit may be necessary if any portion of the authorized activities or any permit requirement have not been completed. The permit term, including any extensions, cannot exceed the maximum of 15 years.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have **30 calendar days** from the date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Department of Environmental Quality. In the event that this decision is served on you by mail, three days are added to that period. Refer to Part 2A of the Rules of the Supreme Court of Virginia for additional requirements governing appeals from administrative agencies.

Alternatively, any owner under §§62.1-44.16, 62.1-44.17 and 62.1-44.19 of the State Water Control Law aggrieved by any action of the board taken without a formal hearing, or by inaction of the board, may demand in writing a formal hearing of such owner's grievance, provided a petition requesting such hearing is filed with the board. Said petition must meet the requirements set forth in §1.23(b) of the board's Procedural Rule Number 1 (9 VAC 25-230-10 et seq. of the Virginia Administrative Code). In cases involving actions of the board, such petition must be filed within **30 calendar days** after notice of such action is mailed to such owner by certified mail.

If you have any questions, please feel free to contact Sheri Kattan at 757-518-2156 or sakattan@deq.state.va.us.

Sincerely,

Harold J. Winer
Regional Deputy Director

Enclosures: Permit Cover Page, Part I - Special Conditions, Part II - General Conditions

cc: Steve Martin, U.S. Army Corps of Engineers
VWP permit file

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

5636 Southern Boulevard
Virginia Beach, VA 23462
www.deq.state.va.us

Robert G. Burnley
Director

Francis L. Daniel
Tidewater Regional Director
(757) 518-2000

VWP Individual Permit Number 02-0454
Effective Date: September 25, 2003
Expiration Date: September 24, 2015

VIRGINIA WATER PROTECTION PERMIT
ISSUED PURSUANT TO THE STATE WATER CONTROL LAW
AND SECTION 401 OF THE CLEAN WATER ACT

Based upon an examination of the information submitted by the owner and in compliance with § 401 of the Clean Water Act as amended (33 USC 1251 et seq.) and the State Water Control Law and regulations adopted pursuant thereto, the board has determined that there is a reasonable assurance that the activity authorized by this permit, if conducted in accordance with the conditions set forth herein, will protect instream beneficial uses and will not violate applicable water quality standards. The board finds that the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to a significant impairment to state waters or fish and wildlife resources.

Permittee: Virginia United Methodist Homes

Address: 7113 Three Chopt Road
Richmond, Virginia 23226
Attn: Mr. Wm. Jeryl Fink

Activity Location: Along the north side of Monticello Avenue approximately 1000 feet west of Route 199 in James City County, Virginia.

Activity Description: The permittee proposes construction of an entrance road to the proposed Windsormeade of Williamsburg development and to other developments associated with the New Town Development master plan.

The permitted activity shall be in accordance with this Permit Cover Page, Part I - Special Conditions and Part II - General Conditions.

_____ (for)
Director, Department of Environmental Quality

9/25/03
Date

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 12/15/04

Name: Jim Gresock

Firm or Company:

Facsimile Number: 804-330-8924

Number of pages including this transmittal: 5

From: Joan Etchberger

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments: Chris Johnson said you needed a copy of the attached.

Happy Holidays!

If you do not receive all pages, call 757-253-6670 as soon as possible

COUNTY OF JAMES CITY, VIRGINIA

SUBDIVISION AGREEMENT

THIS AGREEMENT, made this day of August 27, 2004 by and between C.C. Casey Limited Company, and all successors in interest ("OWNER"), and the COUNTY OF JAMES CITY, VIRGINIA, a political subdivision ("COUNTY.")

WHEREAS, OWNER is (are) the owner of a certain tract of land (the "Tract") located in the County of James City, Virginia; and

WHEREAS, Owner has entered into an agreement dated June 25, 1999, as amended, with SLN Williamsburg Associates, L.L.C. ("SLN Williamsburg") pursuant to which SLN Williamsburg and Owner have agreed to form a joint venture, SLN Casey Associates, L.L.C. ("SLN Casey") that will improve a portion of the Tract that Owner will contribute to SLN Casey with a shopping center (the "Shopping Center") to be held for investment; and

WHEREAS, Owner has entered into an agreement with Virginia United Methodist Homes, Inc. ("VUMH") dated July 30, 2003, as amended, (the "Offsite Improvements Development Agreement") pursuant to which VUMH agreed among other improvements to construct the Required Improvements, as hereinafter defined, in order that the Required Improvements will be completed on a schedule satisfactory to VUMH for the project to be located on VUMH's property and under the Offsite Improvements Development Agreement under certain circumstances SLN Casey has the right to assume responsibility for completing the Required Improvements if necessary to cause the Required Improvements to be completed on a schedule satisfactory to SLN Casey for the Shopping Center; and

WHEREAS, the said Tract is being subdivided into the subdivision known and designated as Plat of Subdivision and Lot Line Extinguishment Parcels 1 through 5 Being the Property of C.C. Casey Limited Company, and pursuant to the aforesaid agreement SLN Casey has caused a plat of said subdivision dated 7/27/2004, to be prepared by AES Consulting Engineers, Licensed Land Surveyors, or Professional Engineers, which said plat the Owner is required to sign so it can be admitted to record in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City, Virginia; and

WHEREAS the Owner agrees all physical improvements in said subdivision will be constructed by VUMH or SLN Casey, as required by the Subdivision Ordinance of the County of James City, Virginia, or shown on the development plans approved by the Agent, hereinafter referred to as "AGENT"; and

WHEREAS, the Owner has posted, or caused to be posted, sufficient bond, letter of credit, certified check, cashier's check, or escrow fund, ("Security Instrument") pursuant to

existing ordinances, approved as to form by the County Attorney, and with surety satisfactory to the County in the amount of One Million Three Hundred Thousand and 00/100 Dollars ($1,300,000.00) guaranteeing the installation of the aforementioned improvements before August 27, 2005, and

WHEREAS, the County of James City has agreed that it will permit the recordation of the plat of said subdivision upon the execution of this agreement.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH: That for and in consideration of the premises and the approval of said subdivision and the covenants and agreements herein contained, the parties hereto agree as follows:

1. The Owner does covenant and agree that VUMH or SLN Casey will, without cost to the County of James City, before August 27, 2005, construct, or cause to be constructed, to the approval of the County all physical improvements as required by the Subdivision Ordinance of the County, or shown on the development plans approved by the Agent (the "Required Improvements"). If, in the sole judgment of the County, circumstances beyond the control of the Owner prevent VUMH or SLN Casey, as applicable, from completing the improvements in the time set forth herein, then the County may at its sole discretion grant an extension of time for completion of said improvements and in such instance the County shall require a Security Instrument approved as to form by the County Attorney, and with surety satisfactory to the County in an amount to guarantee the installation of the aforementioned improvements. Owner shall be responsible if VUMH or SLN Casey, as applicable, fails to complete said Improvements.

2. It is mutually understood and agreed that in the event the Owner fails to renew or amend the Security Instrument at least 10 days prior to its expiration or VUMH or SLN Casey, as applicable, fails to properly complete the physical improvements provided hereinabove, the County may complete, or cause to have completed, the same and render a bill therefore to the Owner who shall be liable to the County for all proper costs so incurred by the County or the County may draw the amount necessary from the surety to complete or cause to have completed the same.

3. In the event the County calls, collects or otherwise draws on the Security Instrument pledged under this agreement, Owner agrees to either pay, or have the County use the proceeds of the draw to pay a reasonable administrative fee of $35.00 plus any costs actually incurred by the County in drawing on the Security Instrument. The charge for an administrative fee plus costs shall apply regardless of whether the County later accepts a renewal or amendment of the Security Instrument.

4. It is mutually understood and agreed that this agreement does not relieve the Owner of any responsibilities or requirements placed upon it by the various ordinances of the County applicable to such subdivision [and improvement] of the property, and the subdivision

[and improvement] of the property will be done in strict accordance with such ordinances.

5. It is mutually understood and agreed that if the Owner shall faithfully execute, or cause to be executed, each and all requirements of the said Subdivision Ordinance and the provisions of this-agreement, and shall indemnify, protect and save harmless the County of James City from all loss, damage, expense or cost by reason of any claim, suit or action instituted against the County of James City or its agents or employees thereof, on account of, or in consequence of any breach on the part of the Owner, then the aforementioned bond, letter of credit, cashier's check, escrow find, or certified check shall be released by the County to the Owner.

6. The Owner does hereby agree to indemnify, protect and save harmless the County from and against all losses and physical damages to property, and bodily injury or death to any person or persons, which may arise out of or be caused by the construction, maintenance, presence or use of the streets, utilities and public easements required by, and shown on, the development plans and the subdivision plat until such time as the said streets shall be accepted as part of the Virginia Department of Transportation's system and utilities and public easements shall be accepted as a part of the James City Service Authority's or the County's system. To insure such indemnification, the County may require and the owner shall provide, or cause to be provided, by VUMH or SLN Casey or their respective contractor, upon request a Certificate of Public Liability Insurance in an amount approved by the County Attorney as sufficient, including a governmental endorsement thereto, naming the County as an insured, issued by an insurance company licensed to do business in the Commonwealth of Virginia.

7. It is mutually understood and agreed, that the approval on final plat or plats of this subdivision, or section thereof, shall not be deemed to be an acceptance by the County of any street; alley, public space, sewer or other physical improvements shown on the plat or plats for maintenance, repair or operations thereof, and that the Owner shall be fully responsible therefore and assume all of the risks and liabilities therefore until duly accepted by the applicable governmental entity.

IN WITNESS WHEREOF, the parties hereto being first duly authorized, have affixed their signatures on the date first above written.

OWNER:

ATTEST:

C.C. CASEY LIMITED COMPANY

By: _____ (SEAL)
Robert T. Casey, Secretary

Approved as to form:

County Attorney

COUNTY OF JAMES CITY, VIRGINIA

By; _____
County Agent

Revised 1/02

I-599381.3
08/28/2004

BASIN 2

CALCULATION FOR SCS HYDROGRAPH GENERATION AND CHANNEL PROTECTION
FOR DETENTION BASIN / TEMPORARY SEDIMENT BASIN (STA. 35+00)
WINDSORMEADE WAY
AES Project No.: 8818-04
April 5, 2001

I. PRE-DEVELOPMENT CONDITIONS TO POINT OF CONCERN

A. Pre-Development Drainage Area to Point of Concern = 3.00 Acres

MUDPL SHOWS

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)	10-C Craven Fine Sandy Loam	C	Wooded (Good)	0.72	70	50
	Totals =			0.72		50
	Composite CN =					17 ?? 73?

C. Pre-Development Time of Concentration Calculations

1) Overland Flow (maximum 300 feet)
- Surface description (table 5-7): wooded (light underbrush)
- Manning's roughness coefficient., n (table 5-7): 0.4
- Length of overland flow, L: 300 Feet
- 2-year 24-hour rainfall, P2: 3.6 inches
- Average slope of overland flow , s: 0.02 feet per foot
- Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4): 0.81 hours

2) Shallow concentrated flow (maximum 300 feet)
- Surface description, paved or unpaved: unpaved, wooded
- Length of shallow concentrated flow, L: 230 Feet
- Average slope of shallow concentrated flow, s: 0.095 feet per foot
- Average velocity, v: 0.8 feet per second
- Travel time, Tt = L/(3600*v): 0.09 hours

3) Channel or Pipe Flow
- Length of channel flow, L: 0 Feet
- Average velocity of channel flow, v: 2.5 feet per second
- Travel time, Tt = L/(3600*v): 0.00 hours

Total Time of Concentration = 0.90 hours or 54 minutes

LOTS OF Problems IN HYDROLOGY BASIN 2

Pre-

A = 3.00 AC.

Post

1- 3.82 CFS
2- 4.38 CFS
10- 16.41 CFS
100- 26.96 CFS

Routed
1- 0.92 CFS @ EL 62.36
2- 4.69 CFS @ EL 62.75
10- 17.52 CFS @ EL. 63.52
100- 27.67 CFS EL 64.02

II. **POST-DEVELOPMENT CONDITIONS TO POINT OF CONCERN (for total site)**

A. Post-Development Drainage Area to Point of Concern = 4.45 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)	10-C Craven Fine Sandy Loam	C	Wooded (Good)	0.00	70	0
2)	10-C Craven Fine Sandy Loam	C	Commercial and Business	1.00	94	94
3)	15-D Emporia Complex	B	Wooded (Good)	3.00	70	210
4)	15-D Emporia Complex	B	Commercial and Business	0.45	94	42
5)				0.00	0	0
6)				0.00	0	0
7)				0.00	0	0
	Total Adjusted CN =			4.45		346
	Composite CN =					78

C. Post-Development Time of Concentration Calculations

1) Overland Flow (maximum 300 feet)

Surface description (table 5-7)	woods	
Manning's roughness coefficient., n (table 5-7)	0.3	
Length of overland flow, L	300	Feet
25-year 24-hour rainfall, P25	6.5	inches
Average slope of overland flow , s	2	feet per foot
Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.08	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	0.8	feet per second
Travel time, Tt = L/(3600*v)	0.00	hours

3) Channel or Pipe Flow

Length of channel flow, L	390	Feet
Average velocity of channel flow, v	2.5	feet per second
Travel time, Tt = L/(3600*v)	0.04	hours

Total Time of Concentration = 0.12 hours or 7 minutes

III. **PROPOSED ESTIMATED POND(S) VOLUME ABOVE LOWER STAGE or NORMAL POOL BY ELEVATION**

Elevation	Depth	Area (sq. ft.)	Incremental Volume (cu. ft.)	Inc. Volume (cu. yd.)	Sum Volume (cu. ft.)	Sum Volume (cu. yd.)
59.0	0.0	0	0	0	0	0
60.0	1.0	982	491	18	491	18
62.0	2.0	1687	2669	99	3160	117
64.0	2.0	2490	4177	155	7337	272
66.0	2.0	3391	5881	218	13218	490

CALCULATION FOR SCS HYDROGRAPH GENERATION AND CHANNEL PROTECTION
FOR DETENTION BASIN / TEMPORARY SEDIMENT BASIN (STA. 35+00)
WINDSORMEADE WAY
AES Project No.: 8818-04
April 5, 2001

RELEASE RATE OF 1-YEAR, 24-HOUR DETAINED FOR 24 HOURS FOR STREAM CHANNEL PROTECTION

Volume of 1-Year, 24-Hour Storm (based upon Hydrographs) = 11,609 cubic feet

Elevation of water surface associated with 1-Year, 24-Hour Storm Vol. = 66.9

Elevation of Release Inlet for Channel Protection = 57.0

Average Head, in feet, on Release Inlet = 4.9

Average Alowable Release Rate Calculation

$$\frac{11{,}609 \text{ cubic feet}}{(24 \text{ hours} \times 60 \text{ minutes/hour} \times 60 \text{ seconds/ minute})} = 0.1 \text{ cfs}$$

Calculation of Size of Release Inlet

Diameter of Release Inlet = 2 * (Q / ((64.32 * (h / 2)) ^ (1/2) * 0.6 * 3.14))) ^ (1/2)
where, Q equals Average Release Rate, in cfs
h equals Average Head, in feet

Maximum allowable diameter of release inlet = 0.20 feet, or 3 inches

The use of a 4" orifice is sufficent in providing channel protection for the release of the 1 year, 24 hour storm. No modification will be required to the exisitng BMP outfall structure.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

No. 2

Project WINDSOR MEADE WAY AES# 8818-04

Basin # DET. POND/TEMP BSN. Location STA. 35+00±

Total area draining to basin: 4.45 acres.

Basin Volume Design

Wet Storage:

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

   67 cu. yds. x 4.45 acres = 298 cu. yds.

2. Available basin volume = 298 cu. yds. at elevation 60.47. (From storage - elevation curve)

3. Excavate _____ 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 4.45 acres = 147 cu. yds.

5. Elevation corresponding to cleanout level = 58.44. ✓

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 2.03 ft. (Min. = 1.0 ft.)

Dry Storage:

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

   67 cu. yds. x 4.45 acres = 298 cu. yds.

8. Total available basin volume at crest of riser* = 596 cu. yds. at elevation 62.23. (From Storage - Elevation Curve)

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

9. Diameter of dewatering orifice = 3 in.

10. Diameter of flexible tubing = 5 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 62.25 ✓

Top of Dam = 71.50 ✓ 62

Design High Water = 69.21 ✓

Upstream Toe of Dam = 56.0 ✓

Basin Shape

12. Length of Flow / Effective Width — L / We = 0.41

If > 2, baffles are not required _____

If < 2, baffles are required ✓ (L=40')

Runoff

13. Q_2 = N/A cfs (From Chapter 5)

14. Q_{25} = 14.2 cfs (From Chapter 5)

Disturbed? Does it match any model routings?

Principal Spillway Design

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

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = 14.2 cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = N/A ft. (Using Q_2)

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

Without emergency spillway:

Assumed available head (h) = 0.37 ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 36 in. Actual head (h) = 0.4 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 40 ft.

Head (H) on barrel through embankment = 10.13 ft.

(From Plate 3.14-7).

19. Barrel diameter = 12 in.

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

20. Trash rack and anti-vortex device

Diameter = 54 inches.

Height = 17 inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = _____ 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) = 2.3 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 1.44 %

Length of barrel in saturated zone (L_s) = 182 ft.

24. Number of collars required = 1 dimensions = 3.75'x3.75'

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 71.50 ✓

Design High Water = 69.21 ✓

Emergency Spillway Crest = N/A

Principal Spillway Crest = 62.25

Dewatering Orifice Invert = 59.67

Cleanout Elevation = 58.44

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 56.0

Hydrograph Plot

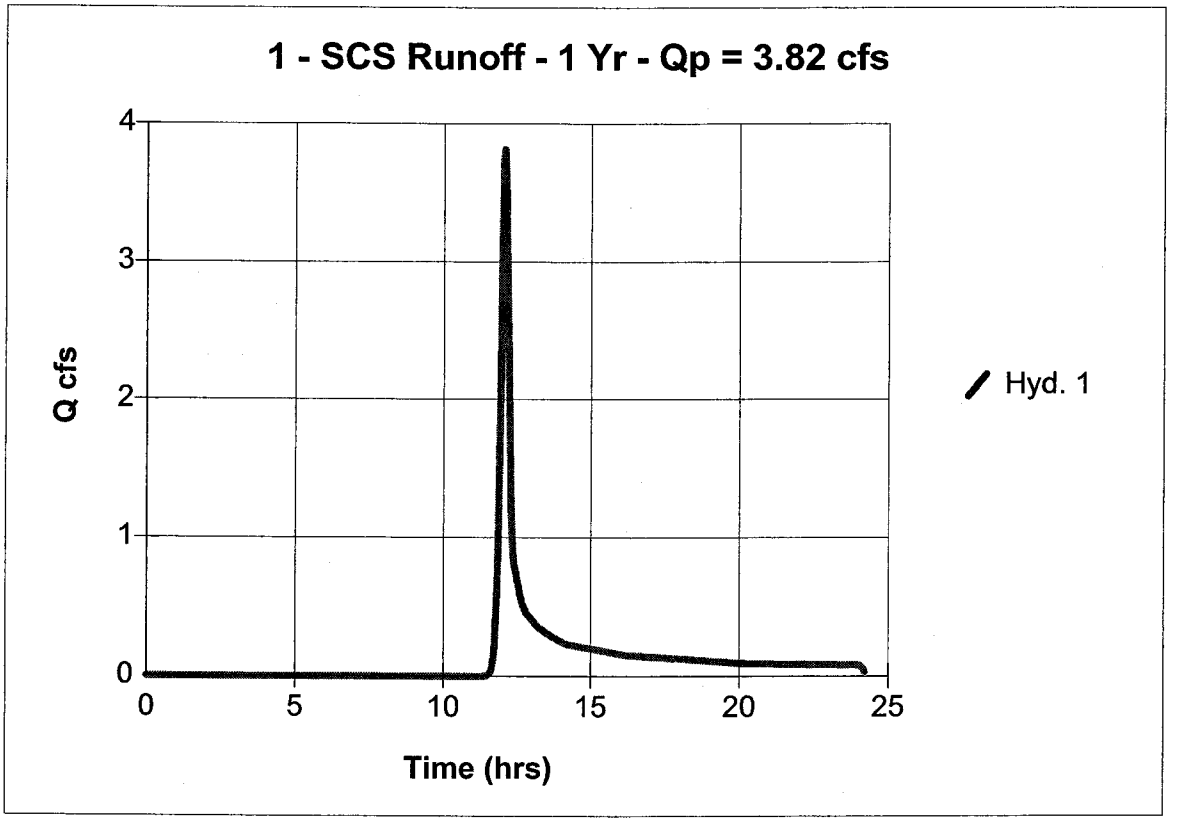
English

Hyd. No. 1

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 3.82 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 73
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 11,609 cuft



Hydrograph Plot

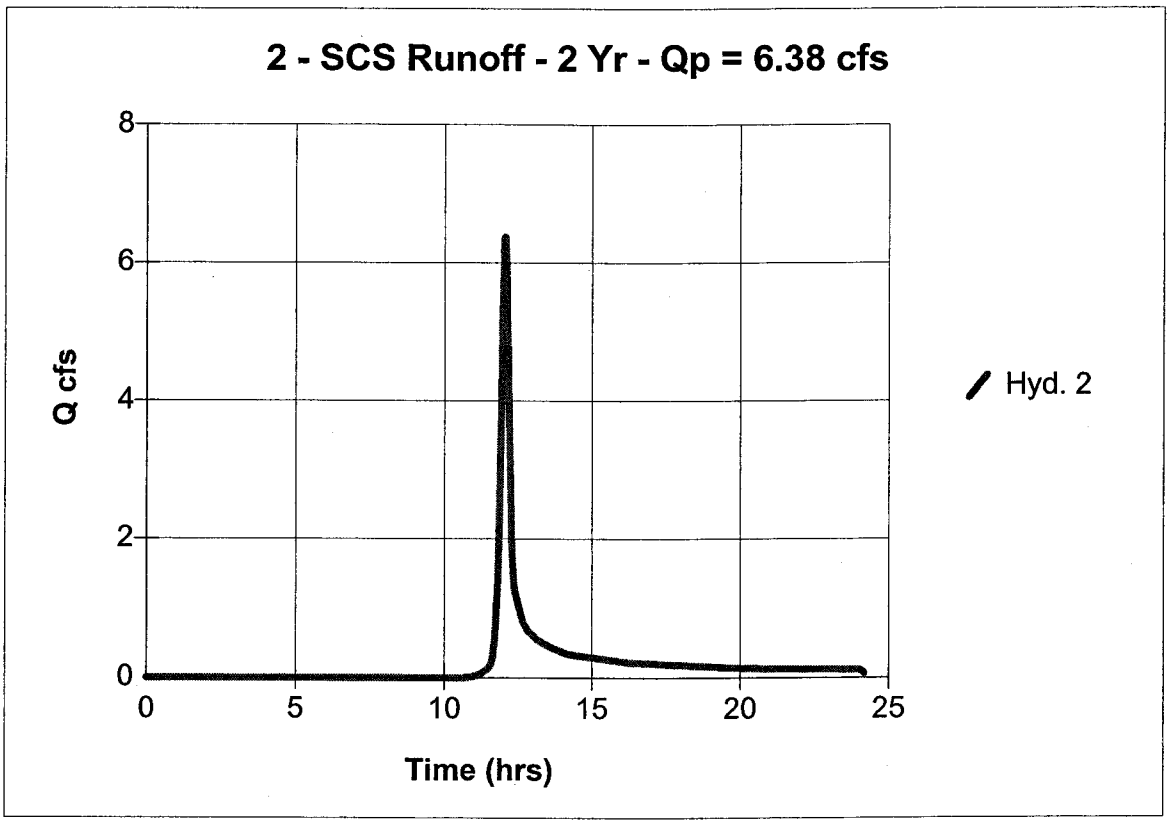
English

Hyd. No. 2

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 6.38 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 73
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 18,579 cuft



Hydrograph Plot

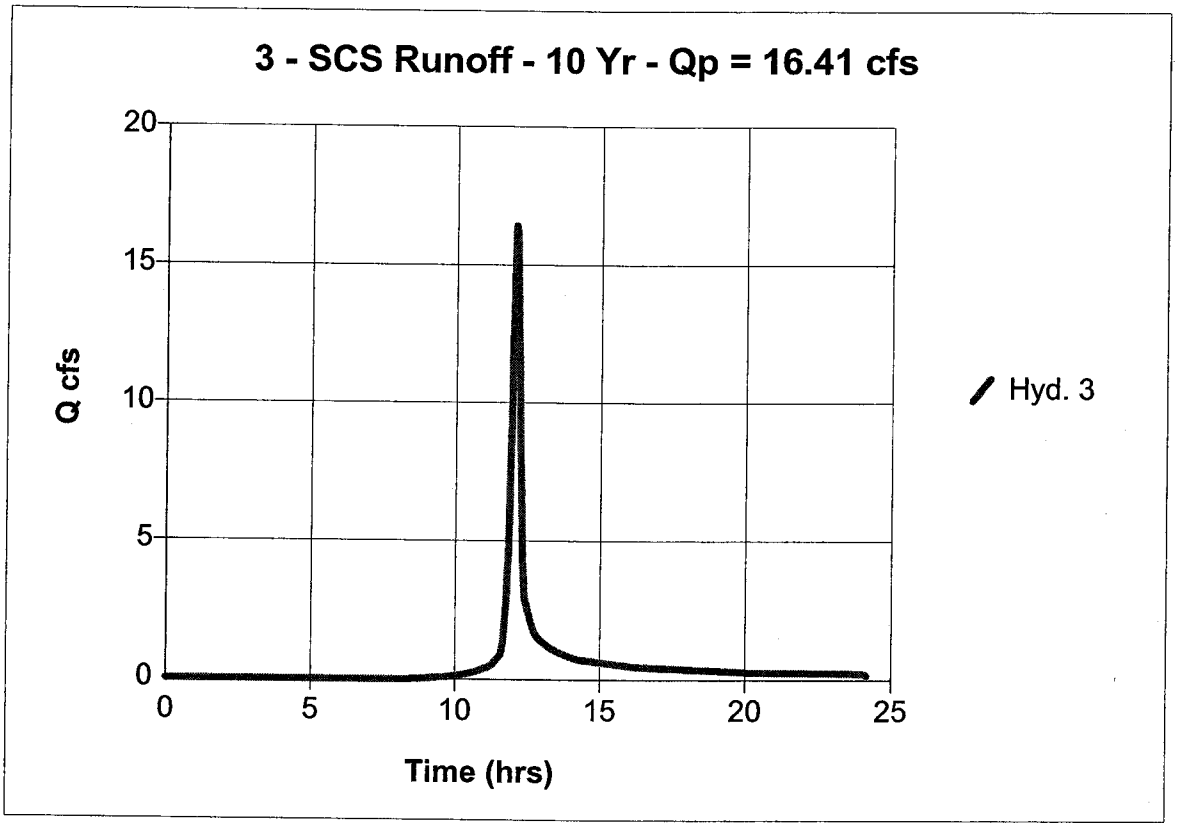
English

Hyd. No. 3

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 16.41 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 73
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 46,044 cuft



Hydrograph Plot

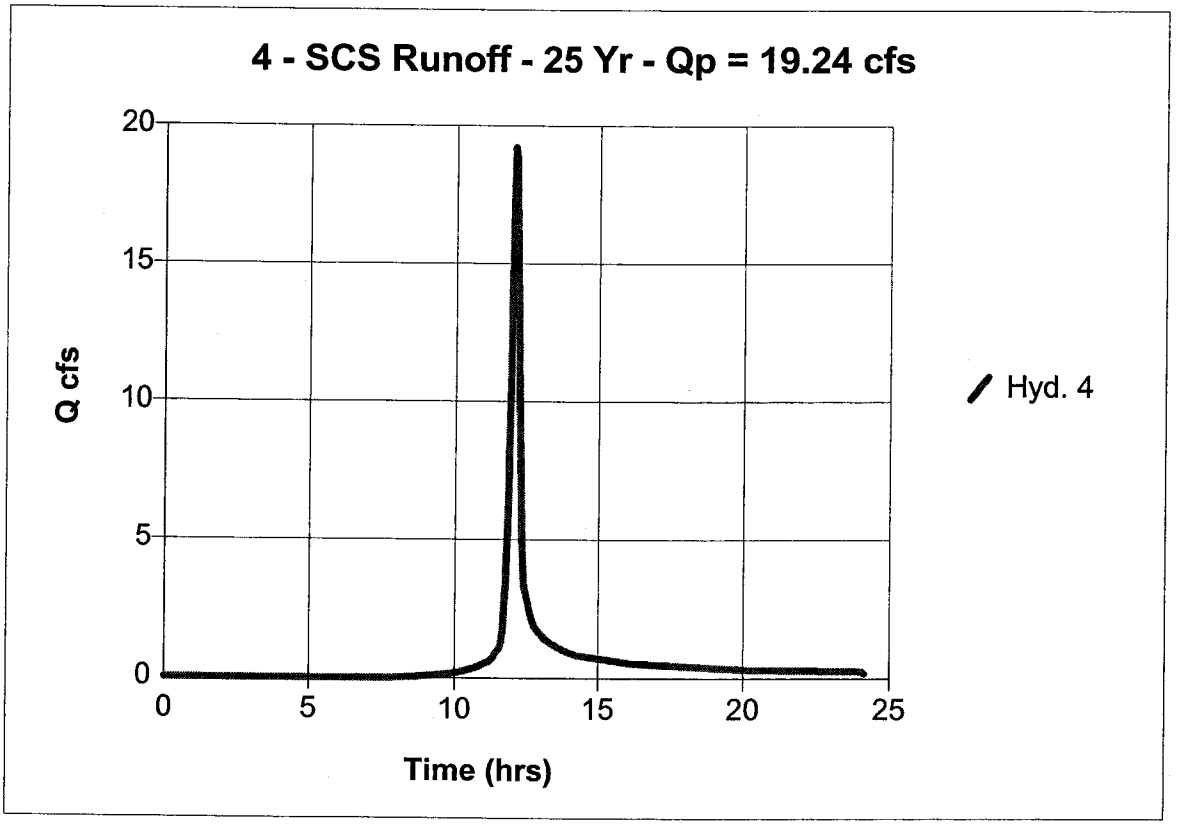
English

Hyd. No. 4

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 19.24 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 73
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 53,916 cuft



Hydrograph Plot

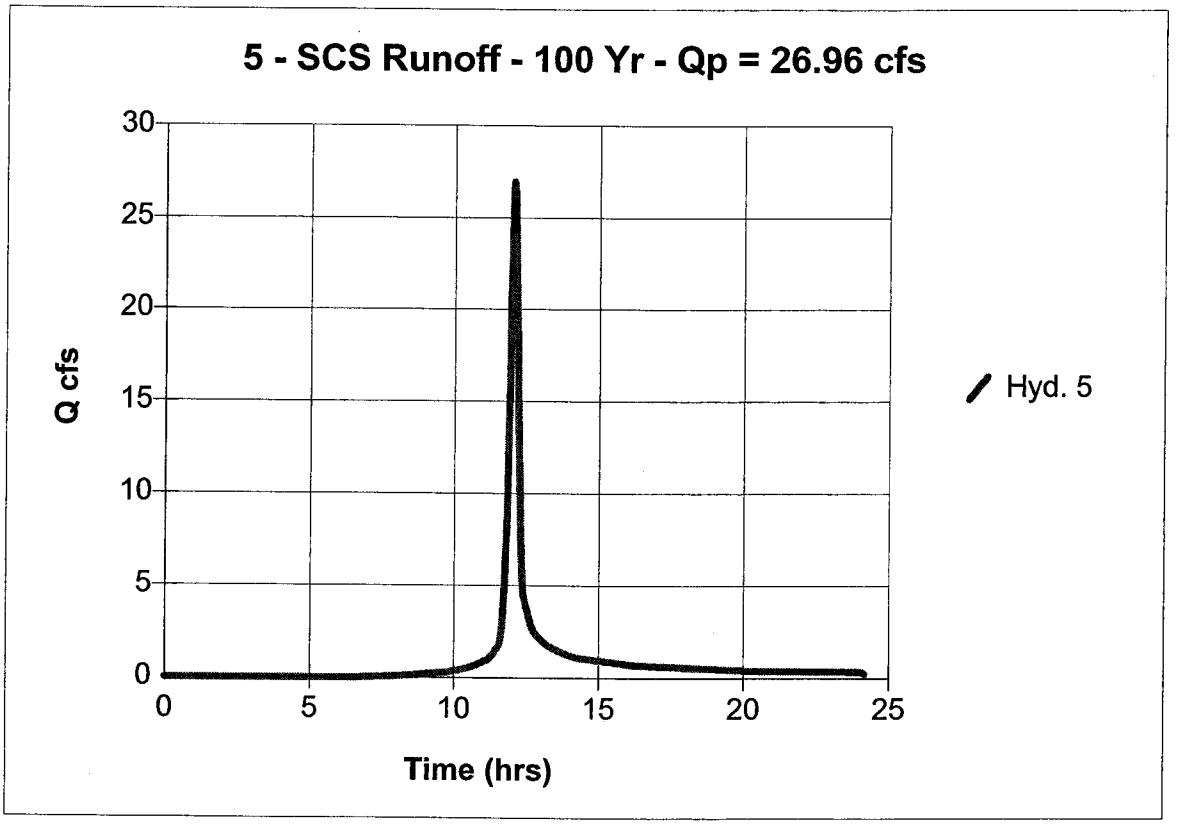
English

Hyd. No. 5

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 26.96 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 73
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 75,755 cuft



Hydrograph Plot

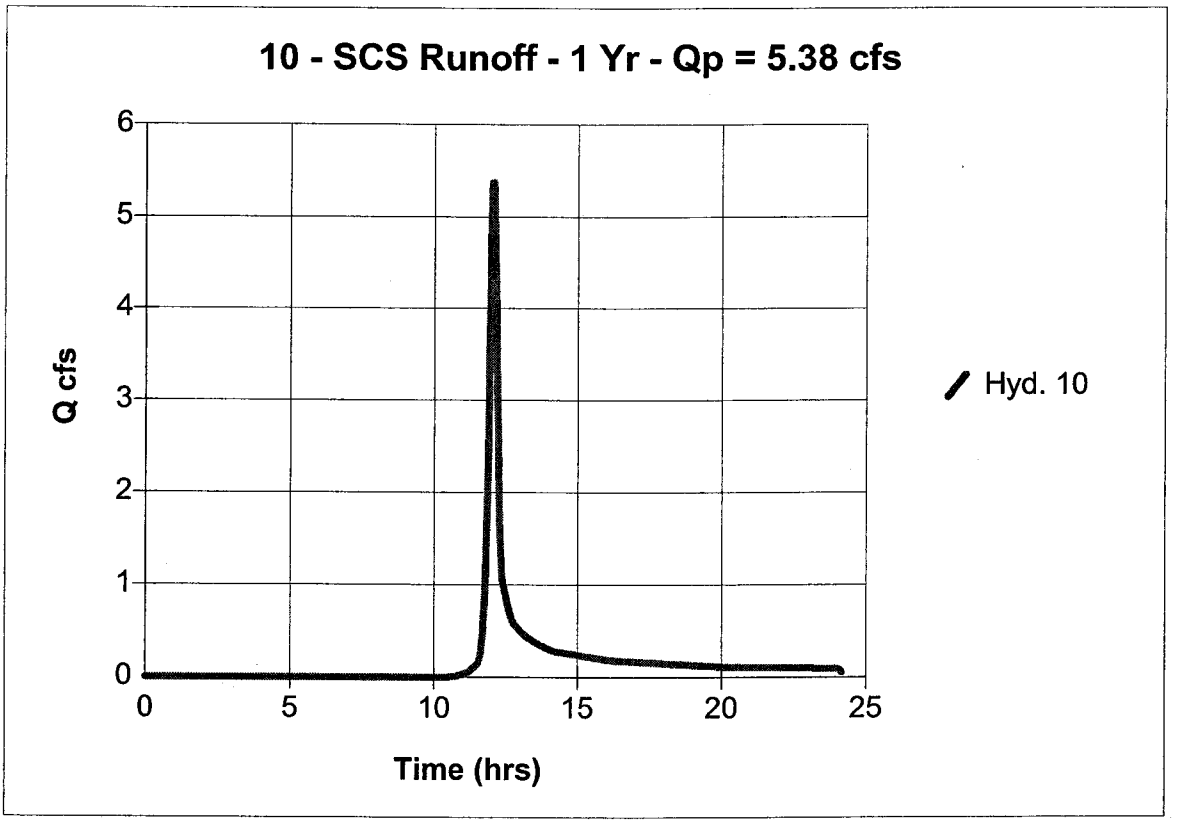
English

Hyd. No. 10

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 5.38 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 78
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 15,572 cuft



Hydrograph Plot

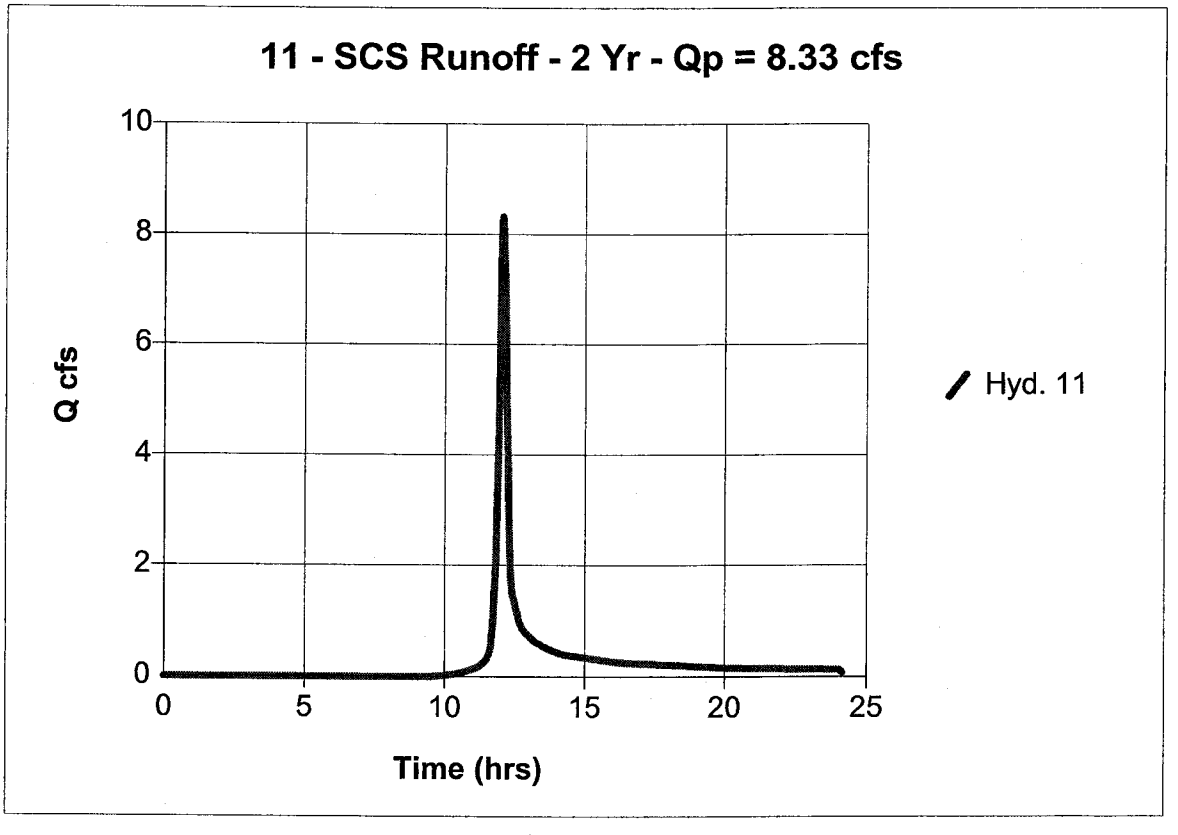
English

Hyd. No. 11

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 8.33 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 78
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 23,583 cuft



Hydrograph Plot

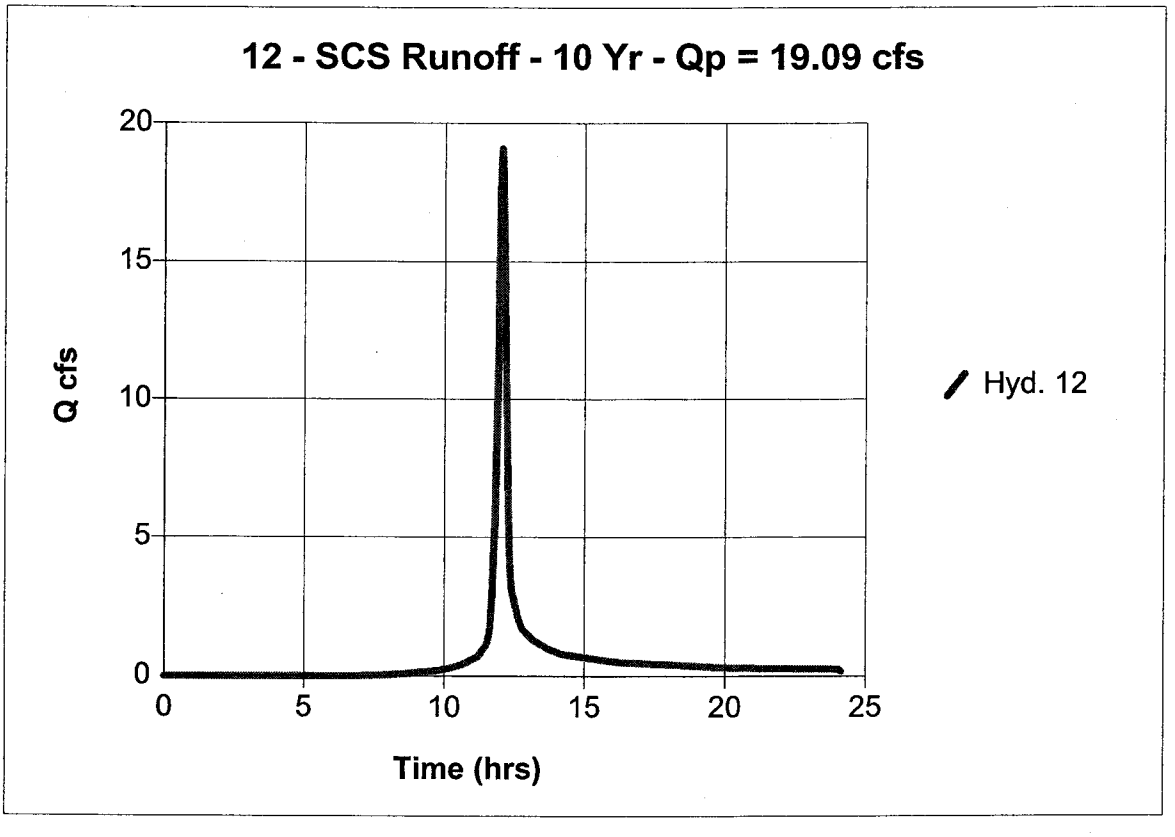
English

Hyd. No. 12

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 19.09 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 78
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 53,594 cuft



Hydrograph Plot

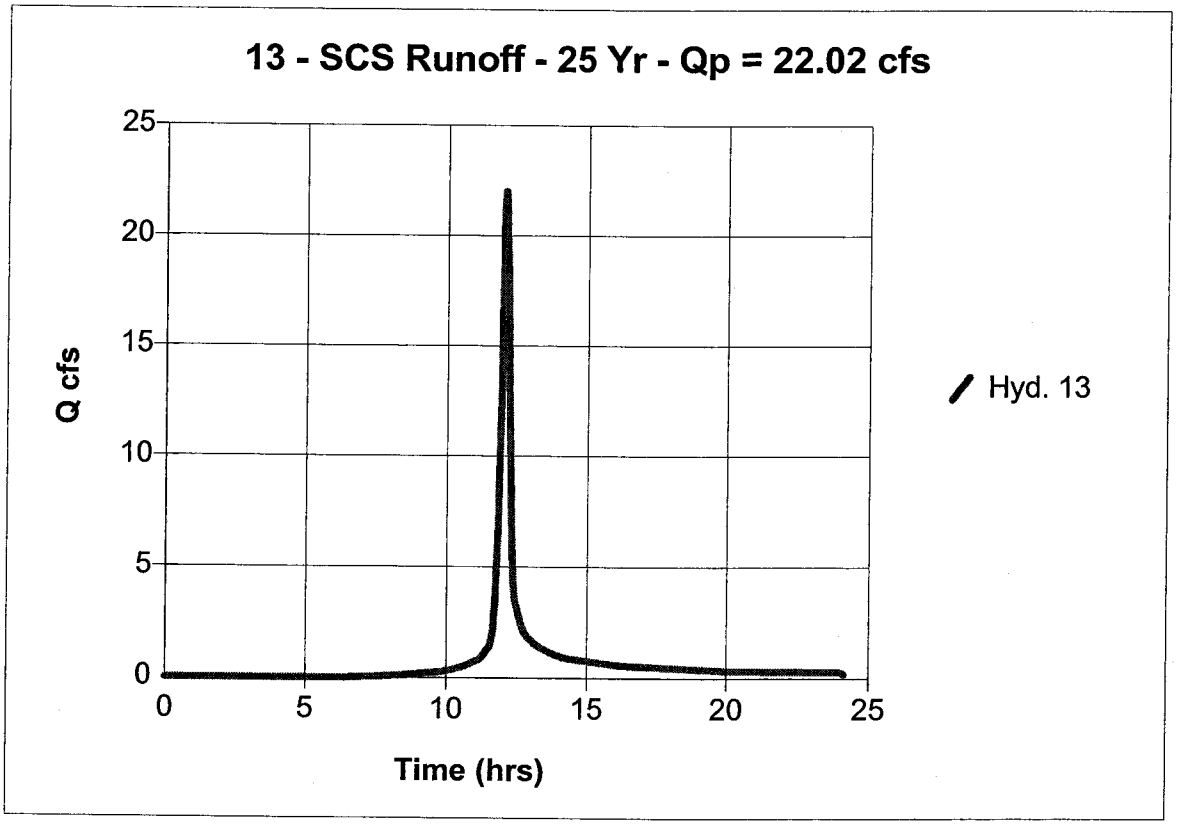
English

Hyd. No. 13

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 22.02 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 78
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 61,965 cuft



Hydrograph Plot

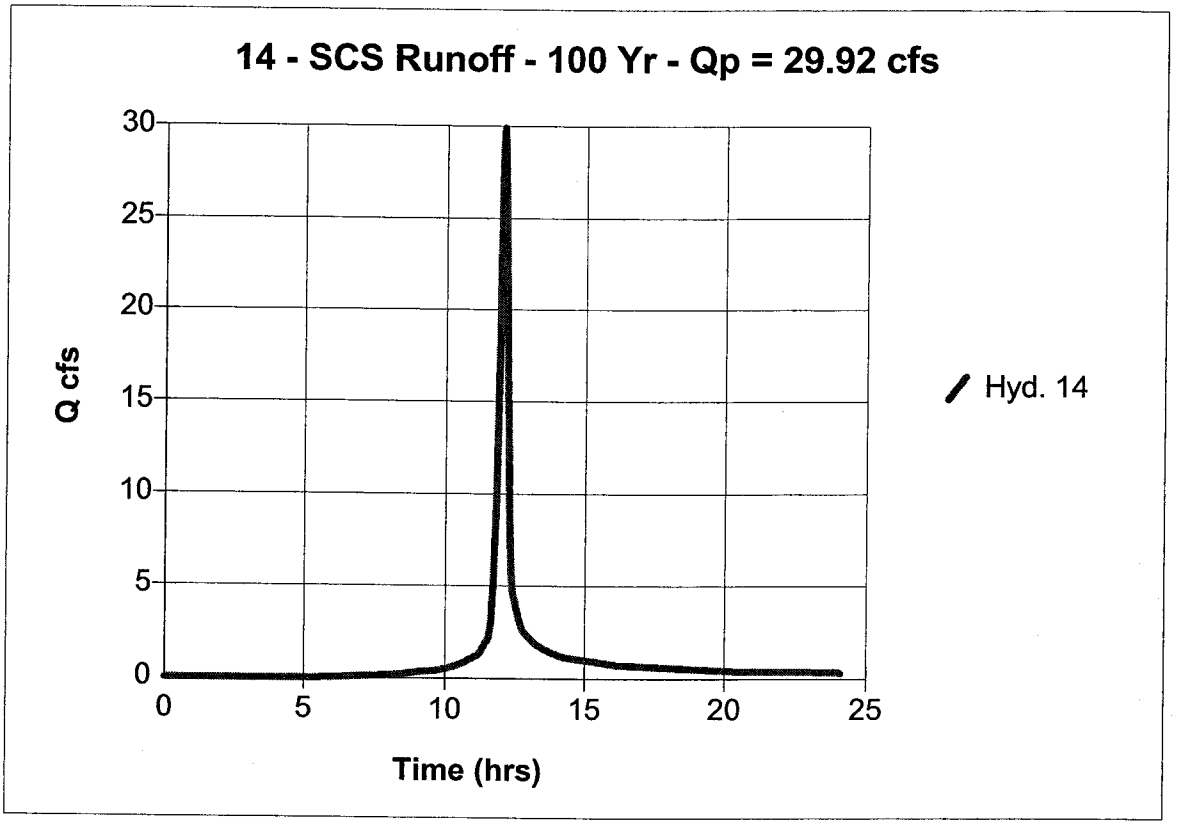
English

Hyd. No. 14

DETENTION BASIN 2

Hydrograph type	= SCS Runoff	Peak discharge	= 29.92 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 4.45 ac	Curve number	= 78
Basin Slope	= 4.0 %	Hydraulic length	= 300 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 84,907 cuft



Hydrograph Plot

English

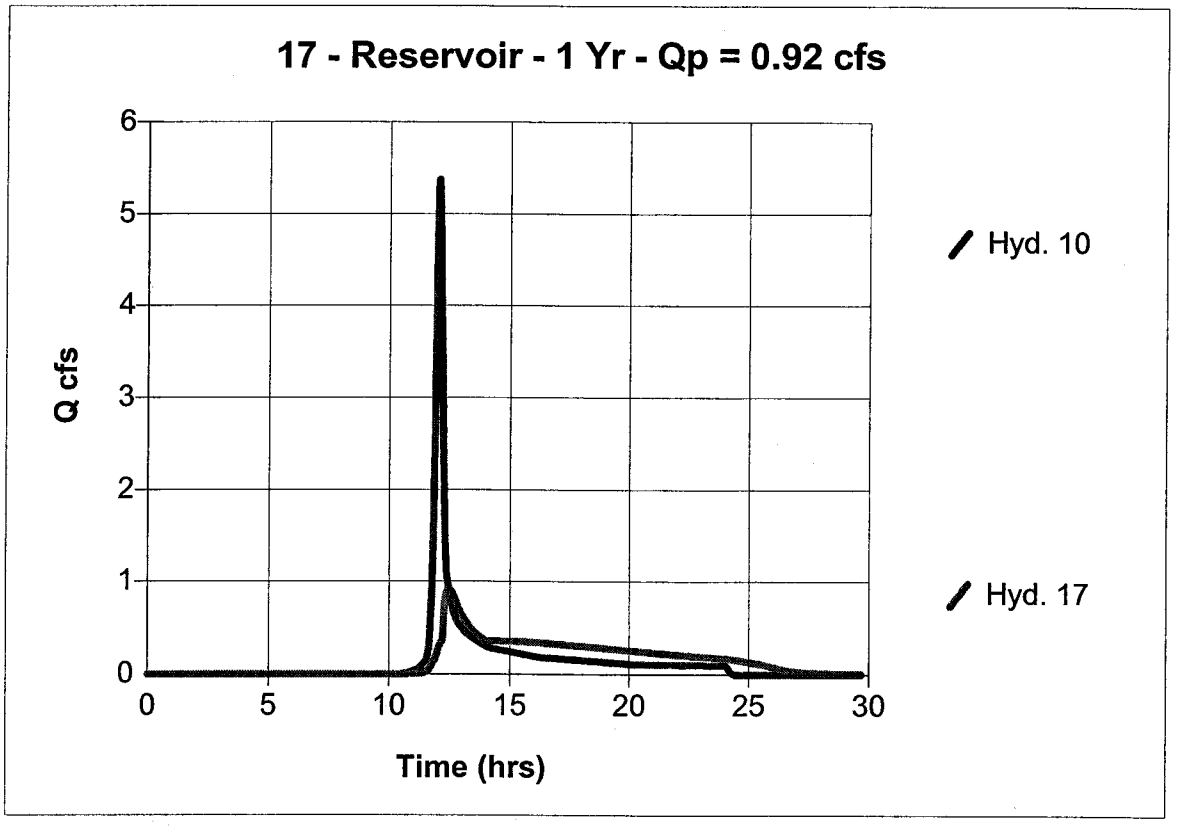
Hyd. No. 17

1 YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 0.92 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 10	Reservoir name	= DETENTION POND
Max. Elevation	= 62.36 ft	Max. Storage	= 6,374 cuft

Storage Indication method used.

Total Volume = 15,569 cuft



Hydrograph Plot

English

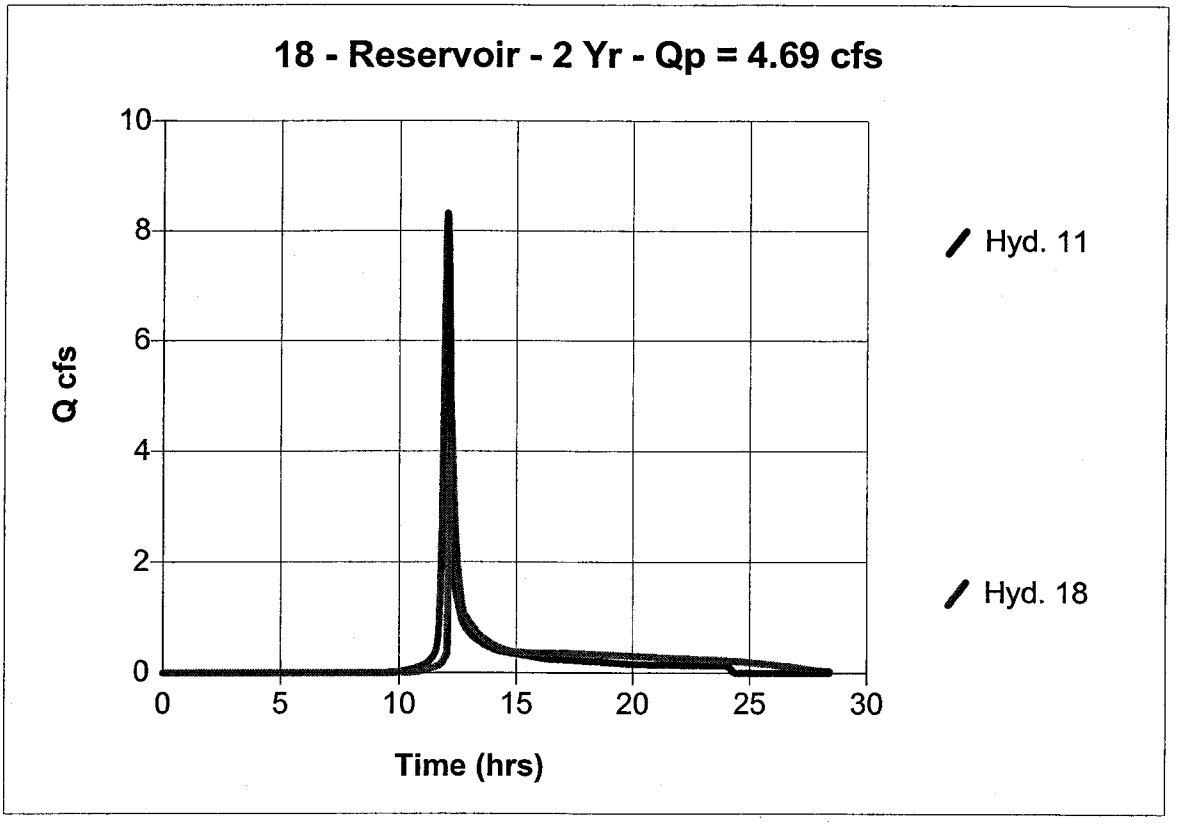
Hyd. No. 18

2 YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 4.69 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 11	Reservoir name	= DETENTION POND
Max. Elevation	= 62.75 ft	Max. Storage	= 7,894 cuft

Storage Indication method used.

Total Volume = 23,580 cuft



Hydrograph Plot

English

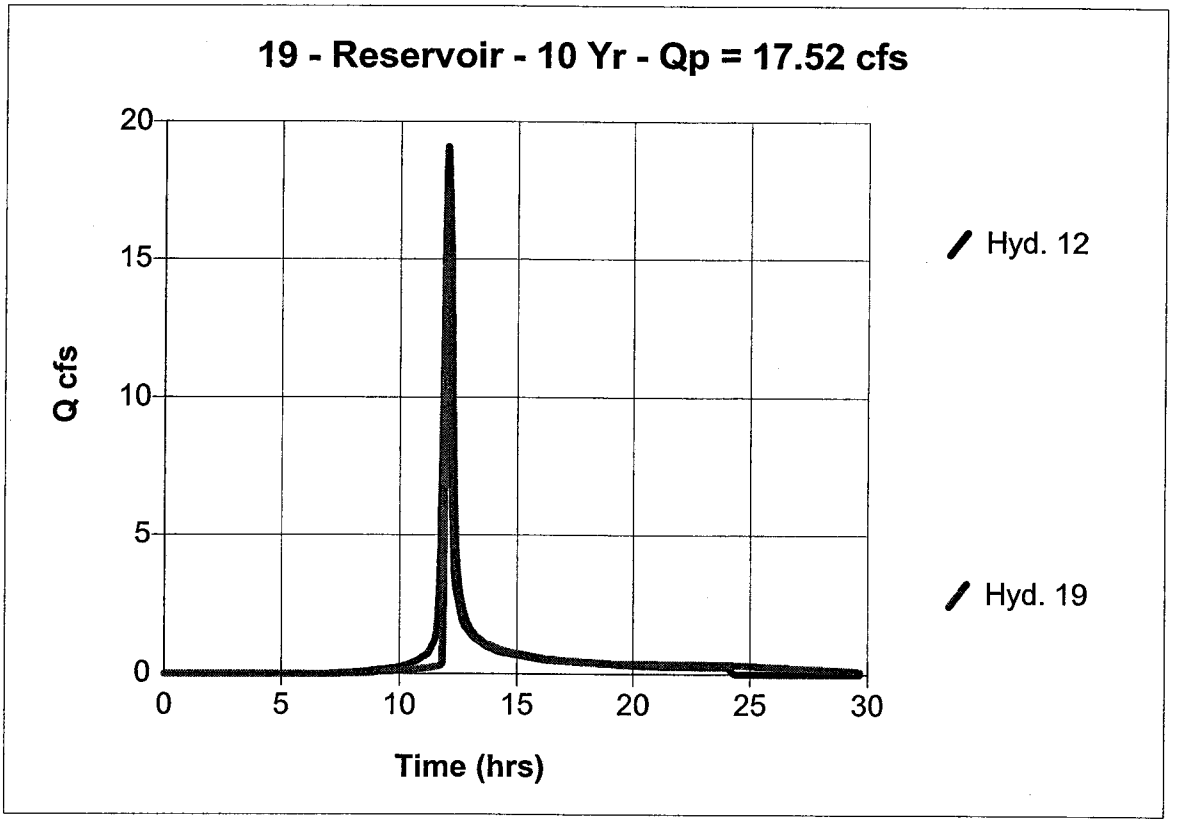
Hyd. No. 19

10 YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 17.52 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 12	Reservoir name	= DETENTION POND
Max. Elevation	= 63.52 ft	Max. Storage	= 10,844 cuft

Storage Indication method used.

Total Volume = 53,589 cuft



Hydrograph Plot

English

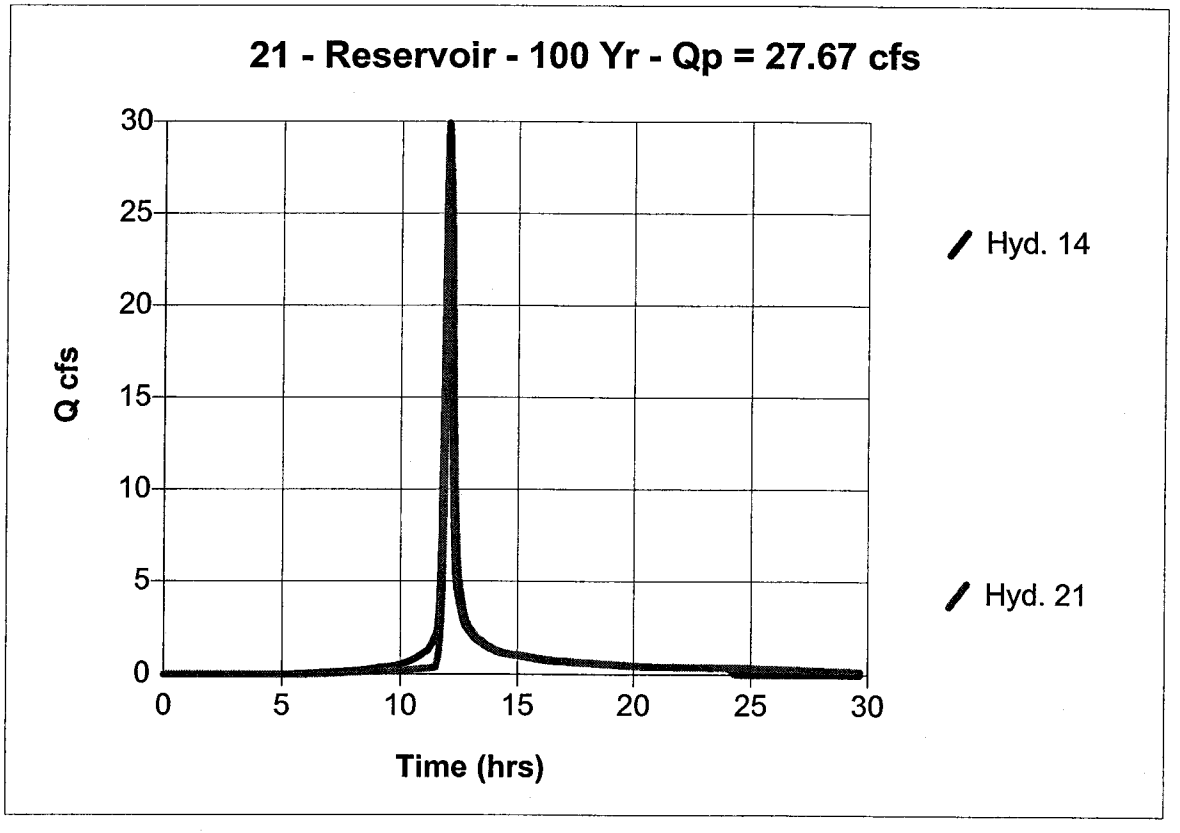
Hyd. No. 21

100 YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 27.67 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 14	Reservoir name	= DETENTION POND
Max. Elevation	= 64.02 ft	Max. Storage	= 12,807 cuft

Storage Indication method used.

Total Volume = 84,901 cuft



Hydrograph Plot

English

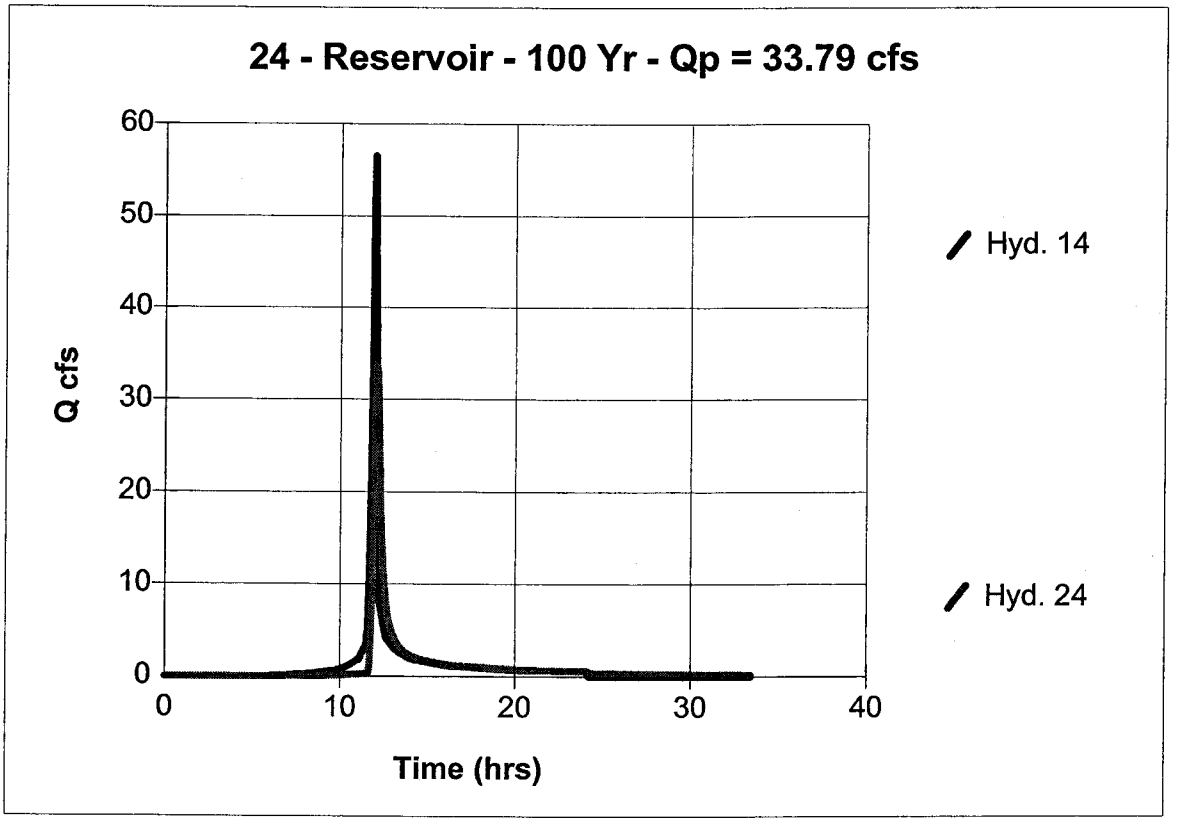
Hyd. No. 24

100-YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 33.79 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 14	Reservoir name	= DETENTION POND
Max. Elevation	= 77.25 ft	Max. Storage	= 41,212 cuft

Storage Indication method used.

Total Volume = 129,368 cuft



Hydrograph Plot

English

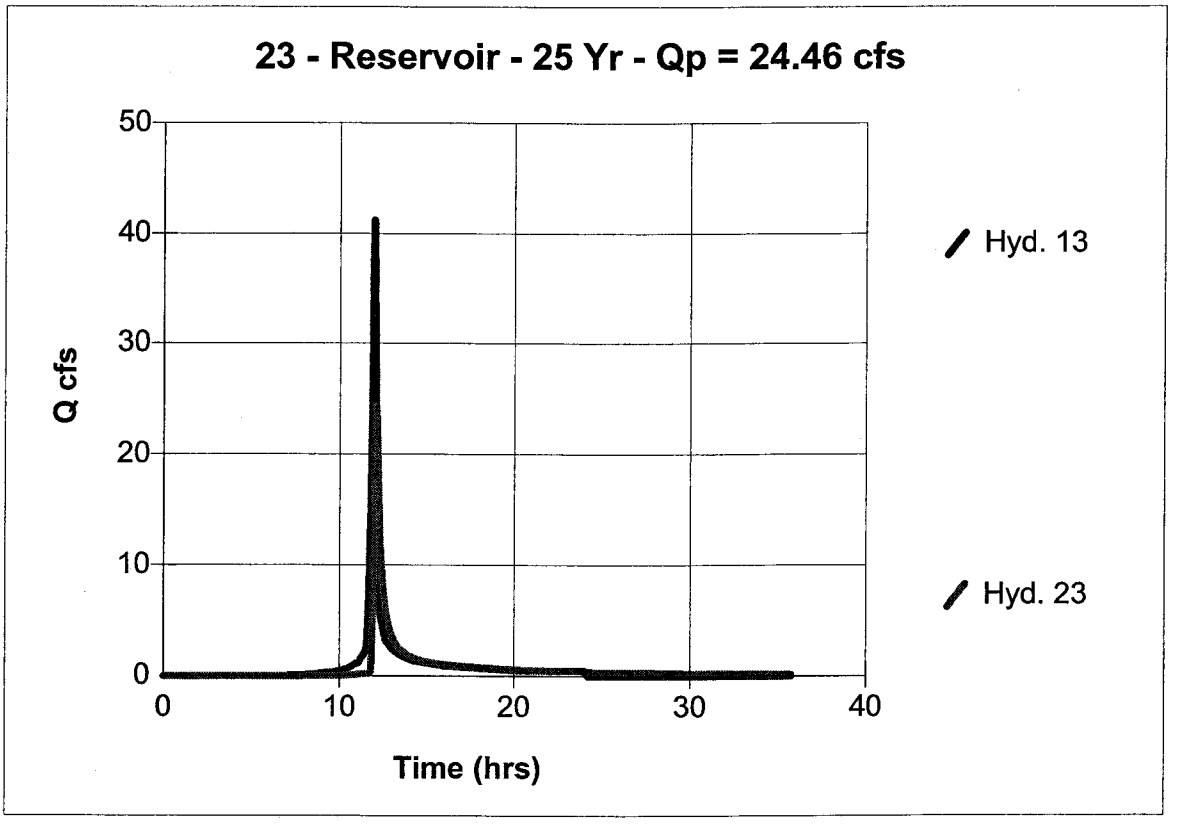
Hyd. No. 23

25-YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 24.46 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Inflow hyd. No.	= 13	Reservoir name	= DETENTION POND
Max. Elevation	= 76.81 ft	Max. Storage	= 32,611 cuft

Storage Indication method used.

Total Volume = 93,041 cuft



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

Project Name: Windsor Meade Way BMP 1
County Plan No.: SP-093-03
Stormwater Management Facility: _____
BMP Phase #: ☐ I ☐ II ☐ III

- [x] Information Package Received. Date/By: 1/22/2009 Marc Bennett
- [ ] Completeness Check:
  - [x] Record Drawing — Date/By: 12/22/2008 Marc Bennett
  - [x] Construction Certification — Date/By: 1/08/2009 Michael Galli
  - [x] RD/CC Standard Forms (Required for all BMPs after Feb 1st 2001Only)
  - [x] Insp/Maint Agreement # / Date: D5001188B3 May 31, 2005
  - [x] BMP Maintenance Plan Location: Sheet 17
  - [ ] Other: _____
- [x] Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review
  - [x] Yes ☐ No — Location: Sheet 14 Item 20
- [x] Assign **County BMP ID Code #**: Code: PC-236
- [x] Preliminary Input/Log into Division's "As-Built Tracking Log"
- [x] Add Location to GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)
- [x] Preliminary Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
- [ ] Active Project File Review (correspondence, H&H, design computations, etc.).
- [x] Initial As-Built File setup (File label, folder, copy plan/details/design information, etc.).
- [x] Inspector Check of RD/CC (forward to Inspector using transmittal for cursory review).
- [x] Pre-Inspection Drawing Review of Approved Plan (Quick look prior to Field Inspection).
- [x] Final Inspection (FI) Performed — Date: 3/17/09
- [x] Record Drawing (RD) Review — Date: 3/17/09
- [x] Construction Certification (CC) Review — Date: 3/17/09
- [x] Actions:
  - ☐ No comments.
  - [x] Comments. Letter Forwarded. Date: _____
  - ☐ Record Drawing (RD)
  - ☐ Construction Certification (CC)
  - [x] Construction-Related (CR)
  - ☐ Site Issues (SI)
  - ☐ Other : _____
- ☐ Second Submission: _____
- ☐ Reinspection (if necessary): _____
- [x] Acceptable for SWM Purposes (RD/CC/CR/Other). Ok to proceed with bond release.
- [x] Complete "Surety Request Form".
- [x] Check/Clean active file of any remaining material and finish "As-Built" file.
- [x] Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
- [x] 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.
- [x] 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: _____ Date: 6/25/09

Chief Engineer: _____ Date: _____

*** See separate checklist, if needed.

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

County BMP ID Code (if known): RC-236

Name of Facility: Windsor Meade Way BMP#1 BMP No.: 1 of 2 Date: _____

Location: Left hand side of Windsor Meade Way just past shopping center

Name of Owner: _____

Name of Inspector: Gregory B. Johnson

Type of Facility: Retention Pond

Weather Conditions: Cold/Overcast 46° Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			
Vegetation Condition	✓			
Tree Growth	NA			
Erosion		✓		Right side and left side of slope
Trash & Debris		✓		Trash; bottles etc. on slopes
Seepage	✓			
Fencing or Benches	✓			
Interior Landscaping/Planted Areas: ☐ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions				
Trash & Debris		✓		Bottles and trash
Floating Material		✓		Bottles
Erosion	✓			
Sediment	✓			
Dead Plant				
Aesthetics		✓		Plantings scarce
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			
Trash & Debris		✓		Bottles and trash
Sediment	✓			
Aesthetics		✓		Dead wood limbs etc.
Other				
Inflows (Describe Types/Locations):				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection				
Other		✓		Rip rap in channel above grade
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):				
Condition of Structure			✓	Seeping at outside joint
Corrosion	✓			
Trash and Debris			✓	Possible stoppage
Sediment	✓			
Vegetation	NA			
Other	NA		✓	One pipe not draining
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure				
Settlement				
Trash & Debris				
Erosion/Sediment				
Outlet Protection			✓	Rip rap in channel above grade
Other				
Emergency Spillway (Overflow):				
Vegetation	NA			
Lining				
Erosion				
Trash & Debris				
Other				
Notes:				

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

Remarks: See "Asbuilt notes"

Overall Environmental Division Internal Rating: ___ _____

Signature: _____ **Date:** _____

Title: _____

SWMProg\BMP\CoInspProg\InspForms\DetRet.wpd

Outfall - rip rap needs to be placed below grade

Form By - needs more stone

Trash Rack - leaves at bottom

Basic Stabilization

Minor Trash

Erosion - Cut area slope

Remove of

Outfall - rip rap below grade

Clear trees

Possible Obstruction

SEE SECTION AA (bottom of Structure to be on same grade as pipe elevation = 74.00

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: Windsormeade Way
Structure/BMP Name: SWM / BMP #1
Project Location: between Monticello Marketplace and Windsormeade Marketplace
BMP Location: 1400 feet north of Monticello Avenue, on left side of Windsormeade Way
County Plan No.: SP - 093 - 03

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

Tax Map/Parcel No.: (38-4) (01-00-0001)
BMP ID Code (if known):
Zoning District: MU (Mixed Use)
Land Use: Roadway
Site Area (sf or acres): 19.85 acres, moreor less

Brief Description of Stormwater Management/BMP Facility: wet pond constructed through excavation (Note: Windsormeade Way is not really the embankment for this facility.)

Nearest Visible Landmark to SWM/BMP Facility: Windsormeade Marketplace (to southeast of site)

Nearest Vertical Ground Control (if known):
☒ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☐ Other
Station Number or Name: 322
Datum or Reference Elevation: 65.61
Control Description: JCC Geodetic Control Monumnet
Control Location from Subject Facility: 3,500 feet, more or less, southwest from site

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☒ Yes ☐ No ☐ Unknown
Approx. Construction Start Date for SWM/BMP Facility: October 2003
Facility Monitored by County Representative during Construction: ☒ Yes ☐ No ☐ Unknown
Name of Site Work Contractor Who Constructed Facility: C. A. Barrs
Name of Professional Firm Who Routinely Monitored Construction: AES Consutling Engineers / ESC Mid-Atlantic, LLC
Date of Completion for SWM/BMP Facility: May 2005
Date of Record Drawing/Construction Certification Submittal: December 2008

(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: C. C. Casey, Ltd. Co.
Mailing Address: 721 Richmond Road
Williamsburg, Virginia 23185
Business Phone: 757-258-5042 Fax:
Contact Person: Robert Casey Title:

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

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Business Phone: 757-253-0040
Fax: 757-220-8994
Responsible Plan Preparer: V. Marc Bennett, P.E.
Title: Senior Project Manager
Plan Name: Windsormeade Way
Firm's Project No. 8818-04
Plan Date: May, 2002
Sheet No.'s Applicable to SWM/BMP Facility: 8 / 9 / 17 / /

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

Name: C.A. Barrs
Mailing Address: P.O. Box 1489
Yorktown, Virginia 23692
Business Phone: 757-898-7282
Fax: 757-898-1282
Contact Person: Erik Turkovich
Site Foreman/Supervisor: Scott St. Clair
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 Consutling Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: Van Marc Bennett
Title: Senior Project Manager
Signature:
Date: December 22, 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
VAN MARC BENNETT
Lic. No. 026628
12/22/08
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered Professional Engineer
Or Certified Land Surveyor

Construction Certification

Firm Name: ECS, Mid-Atlantic, LLC
Mailing Address: 108 Ingram Road, Unit 1
Williamsburg, Virginia 23188
Business Phone: 757-229-6677
Fax: 757-229-9978

Name: Michael J. Galli
Title: Principal Engineer
Signature:
Date: 1/8/09

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
1/8/09
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered
Professional Engineer

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

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

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

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

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

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

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

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

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.

N/A 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.
Inc	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.**
N/A	13.	Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
XX	14.	Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
XX	15.	Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.
XX	16.	Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
XX	17.	BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
XX	18.	Maintenance plan taken from approved design plan transposed onto record drawing set.
N/A	19.	Fencing location and type, if applicable to facility.
XX	20.	BMP vicinity properly cleaned of stockpiles and construction debris.
XX	21.	No visual signs of erosion or channel degradation immediately downstream of facility.
N/A	22.	Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

XX	A1.	All requirements of Section II, Minimum Standards, apply to Group A facilities.
XX	A2.	Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
XX	A3.	Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.
XX	A4.	Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.
N/A	A5.	Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.
N/A	A6.	Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.
XX	A7.	Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).
XX	A8.	No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.
XX	A9.	Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.
XX	A10.	Low flow orifice has a non-clogging mechanism.
N/A	A11.	A pond drain pipe with valve was provided.
XX	A12.	Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.
N/A	A13.	End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A	B1.	Same requirements as Group A Wet Ponds.
N/A	B2.	Minimum 2:1 length to width flow path provided across the facility.
N/A	B3.	Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).
N/A	B4.	Wetland type landscaping provided in accordance with approved plan. Includes correct pondscaping zones, plant species, planting arrangements, wetland beds, etc. Wetland plants include 5 to 7 emergent wetland species. Individual plants at 18 inches on center in clumps.
N/A	B5.	Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).
N/A	B6.	No more than one-half (½) of the wetland surface area is planted.
N/A	B7.	Topsoil or wetland mulch provided to support vigorous growth of wetland plants.
N/A	B8.	Planting zones staked or flagged in field and locations subsequently established by appropriate field surveying methods for record drawing presentation.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A	C1.	All requirements of Section II, Minimum Standards, apply to Group C facilities as applicable.
N/A	C2.	Facility is not located on fill slopes or on natural ground in excess of six (6) percent.
N/A	C3.	Pretreatment devices provided prior to entry into the infiltration facility. Acceptable pretreatment devices include sediment forebays, sediment basins, sediment traps, sump pits or inlets, grass channels, plunge pools or other acceptable measures.
N/A	C4.	Three (3) or more of the following pretreatment devices provided to protect long term integrity of structure: grass channel; grass filter strip; bottom sand layer; upper filter fabric layer; use of washed bank run gravel aggregate.
N/A	C5.	Sides of infiltration practice lined with filter fabric.
N/A	C6.	Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
N/A	C7.	Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.
N/A	C8.	Minimum one hundred (100) foot separation horizontally from any known water supply well and minimum one hundred (100) foot separation upslope from any building.
N/A	C9.	Minimum twenty-five (25) foot separation down gradient from any structure.
N/A	C10.	Stormwater outfalls provided for overflow associated with larger design storms.
N/A	C11.	No visual signs of erosion or channel degradation immediately downstream of facility.
N/A	C12.	Facility does not currently cause any apparent surface or subsurface water problems to downgrade properties.
N/A	C13.	Observation well provided.
N/A	C14.	Adequate, direct access provided to the facility for future maintenance, operation and inspection.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A	D1.	All requirements of Section II, Minimum Standards, apply to Group D facilities.
N/A	D2.	Sediment pretreatment devices provided.
N/A	D3.	For D-1 BMPs (Bioretention Cells), pretreatment consisting of a grass filter strip below level spreader (deflector); a gravel diaphragm; and mulch and planting soil layers were provided.
N/A	D4.	For D-1 BMPs (Bioretention Cells), plantings consist of native plant species; vegetation provided was based on zones of hydric tolerances; trees and understory of shrubs and herbaceous materials were provided; woody vegetation is absent from inflow locations; and trees are located around facility perimeter.
N/A	D5.	Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
N/A	D6.	No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed.
N/A	D7.	Filtering system is off-line from storm drainage conveyance system.
N/A	D8.	Overflow outlet has adequate erosion protection.
N/A	D9.	Deflector, diversion, flow splitter or regulator structure provided to divert the water quality volume to the filtering structure.
N/A	D10.	Minimum four (4) inch perforated underdrain provided in a clean aggregate envelope layer beneath the facility.
N/A	D11.	Minimum fifty (50) foot separation from any slope fifteen (15) percent or greater. Minimum one hundred (100) foot separation horizontally from any known water supply well. Minimum one hundred (100) foot separation upslope and twenty-five (25) foot separation downslope from any building.
N/A	D12.	Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.
N/A	D13.	No visual signs of erosion or channel degradation immediately downstream of facility.
N/A	D14.	Adequate, direct access provided to the pretreatment area and/or filter bed for future maintenance.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

N/A	E1.	All requirements of Section II, Minimum Standards, apply to Group E facilities as applicable.
N/A	E2.	Open channel system has constructed longitudinal slope of less than four (4) percent.
N/A	E3.	No visual signs of erosion in the open channel system's soil and/or vegetative cover.
N/A	E4.	Open channel side slopes are no steeper than 2H:1V at any location. Preferred channel sideslope is 3H:1V or flatter.
N/A	E5.	No visual signs of ponding are present at any location in the open channel system, except at rock check dam locations for E-1 systems (Wet Swales).
N/A	E6.	For E-2 BMPs (Dry Swales), an underdrain system was provided.
N/A	E7.	Treated timber or rock check dams provided as pretreatment devices for the open channel system.
N/A	E8.	Gravel diaphrahm provided in areas where lateral sheet flow from impervious surgaces are directly connected to the open channel system.
N/A	E9.	Grass cover/stabilization in the open channel system appears adaptable to the specific soils and hydric conditions for the site and along the channel system.
N/A	E10.	Open channel system areas with grass covers higher than four (4) to six (6) inches were properly mowed.
N/A	E11.	Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
N/A	E12.	No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.
N/A	E13.	For E-3 BMPs (Biofilters), the bottom width is six (6) feet maximum at any location.
N/A	E14.	For E-3 BMPs (Biofilters), sideslopes are 3H:1V maximum at any location.
N/A	E15.	For E-3 BMPs (Biofilters), the constructed channel slope is less than or equal to three (3) percent at any location.
N/A	E16.	For E-3 BMPs (Biofilters), the constructed grass channel is approximately equivalent to the constructed roadway length.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

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

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

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

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

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

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

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

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

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

N/A SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.

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

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

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

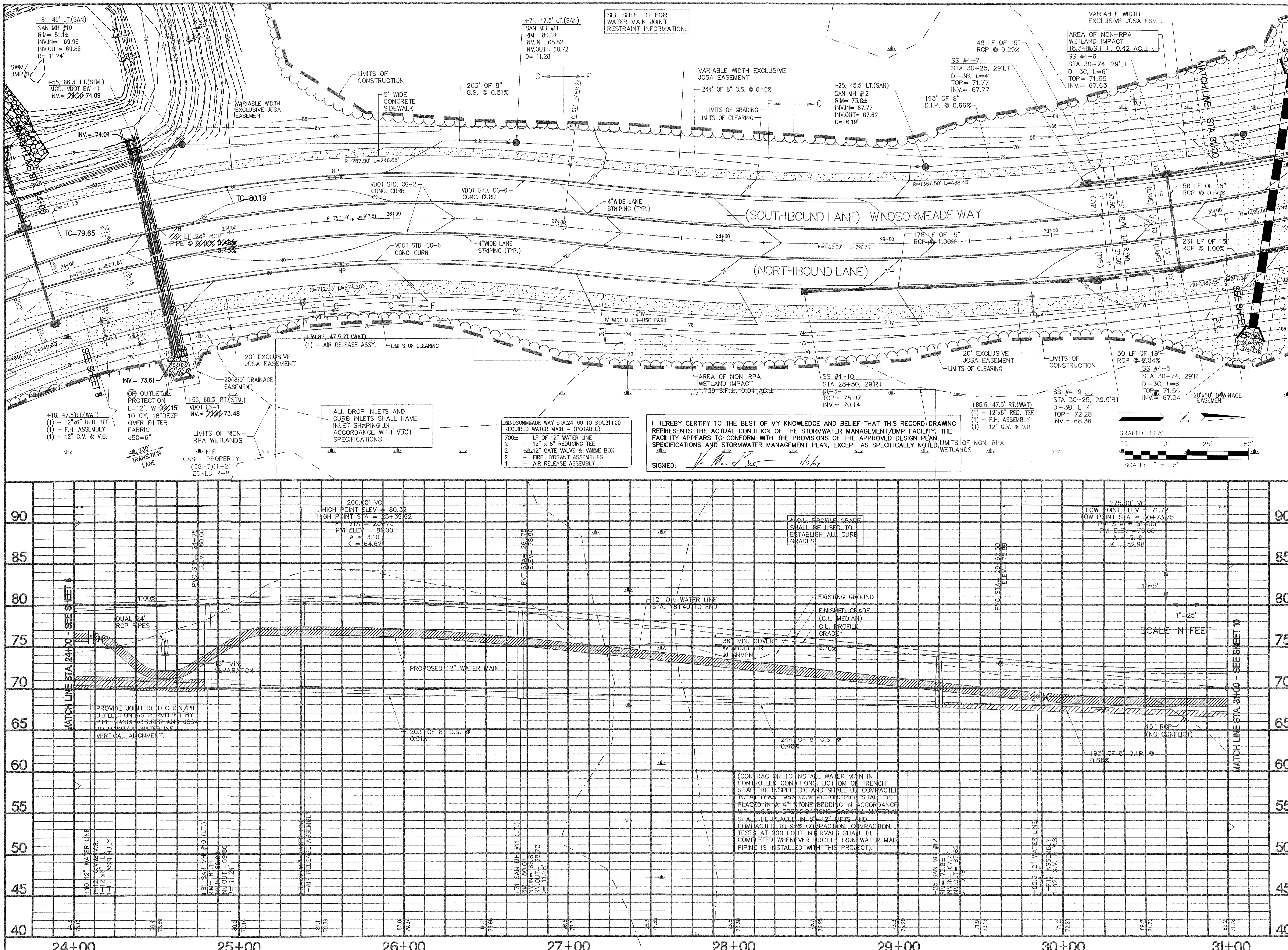
XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

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

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

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



(SOUTHBOUND LANE) WINDSORMEADE WAY
(NORTHBOUND LANE)
MATCHLINE STA. 31+00
SEE SHEET 11 FOR WATER MAIN JOINT RESTRAINT INFORMATION.
+81, 49' LT.(SAN) SAN MH #10 RIM= 81.1± INV.IN= 69.96 INV.OUT= 69.86 D= 11.24'
+71, 47.5' LT.(SAN) SAN MH #11 RIM= 80.0± INV.IN= 68.82 INV.OUT= 68.72 D= 11.28'
+25, 45.5' LT.(SAN) SAN MH #12 RIM= 73.8± INV.IN= 67.72 INV.OUT= 67.62 D= 6.19'
+55, 66.3' LT.(STM.) MOD. VDOT EW-11 INV.= 74.09
+55, 68.3' RT.(STM.) VDOT ES-1 INV.= 73.48
LIMITS OF CONSTRUCTION
5' WIDE CONCRETE SIDEWALK
VARIABLE WIDTH EXCLUSIVE JCSA EASEMENT
203' OF 8" G.S. @ 0.51%
244' OF 8" G.S. @ 0.40%
193' OF 8" D.I.P. @ 0.66%
LIMITS OF GRADING
LIMITS OF CLEARING
48 LF OF 15" RCP @ 0.29%
SS #4-7 STA 30+25, 29'LT DI-3B, L=4' TOP= 71.77 INV.= 67.77
AREA OF NON-RPA WETLAND IMPACT 18,348 S.F.±, 0.42 AC.±
SS #4-6 STA 30+74, 29'LT DI-3C, L=6' TOP= 71.55 INV.= 67.63
VARIABLE WIDTH EXCLUSIVE JCSA ESMT.
VDOT STD. CG-2 CONC. CURB
VDOT STD. CG-6 CONC. CURB
4" WIDE LANE STRIPING (TYP.)
TC=80.19
TC=79.65
128 LF 24" RCP PIPE @ 0.43%
178 LF OF 15" RCP @ 1.00%
58 LF OF 15" RCP @ 0.50%
231 LF OF 15" RCP @ 1.00%
8' WIDE MULTI-USE PATH
+39.62, 47.5' RT.(WAT) (1) - AIR RELEASE ASSY.
20' EXCLUSIVE JCSA EASEMENT
20'x50' DRAINAGE EASEMENT
INV.= 73.61
INV.= 74.04
OP OUTLET PROTECTION L=12', W=15' 10 CY, 18" DEEP OVER FILTER FABRIC d50=6"
+10, 47.5' RT.(WAT) (1) - 12"x6" RED. TEE (1) - F.H. ASSEMBLY (1) - 12" G.V. & V.B.
LIMITS OF NON-RPA WETLANDS
230' TRANSITION LANE
N.F CASEY PROPERTY (38-3)(1-2) ZONED R-8
ALL DROP INLETS AND CURB INLETS SHALL HAVE INLET SHAPING IN ACCORDANCE WITH VDOT SPECIFICATIONS
WINDSORMEADE WAY STA.24+00 TO STA.31+00 REQUIRED WATER MAIN - (POTABLE)
700± - LF OF 12" WATER LINE
2 - 12" x 6" REDUCING TEE
2 - 12" GATE VALVE & VALVE BOX
2 - FIRE HYDRANT ASSEMBLIES
1 - AIR RELEASE ASSEMBLY
AREA OF NON-RPA WETLAND IMPACT 1,739 S.F.±, 0.04 AC.±
SS #4-10 STA 28+50, 29'RT DI-3A TOP= 75.07 INV.= 70.14
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 NOTED.
SIGNED:
+85.5, 47.5' RT.(WAT) (1) - 12"x6" RED. TEE (1) - F.H. ASSEMBLY (1) - 12" G.V. & V.B.
20' EXCLUSIVE JCSA EASEMENT
LIMITS OF CONSTRUCTION
SS #4-9 STA 30+25, 29.5'RT DI-3B, L=4' TOP= 72.28 INV.= 68.36
50 LF OF 18" RCP @ 2.04%
SS #4-5 STA 30+74, 29'RT DI-3C, L=6' TOP= 71.55 INV.= 67.34
20'x60' DRAINAGE EASEMENT
LIMITS OF NON-RPA WETLANDS
GRAPHIC SCALE
SCALE: 1" = 25'
SEE SHEET 8
SEE SHEET 10
200.00' VC HIGH POINT ELEV = 80.32 HIGH POINT STA = 25+39.62 PVI STA = 25+75 PVI ELEV = 81.00 A = 3.10 K = 64.62
275.00' VC LOW POINT ELEV = 71.72 LOW POINT STA = 30+73.75 PVI STA = 31+00 PVI ELEV = 70.00 A = 5.19 K = 52.98
C.L. PROFILE GRADE SHALL BE USED TO ESTABLISH ALL CURB GRADES
MATCH LINE STA 24+00 - SEE SHEET 8
MATCH LINE STA 31+00 - SEE SHEET 10
DUAL 24" RCP PIPES
18" MIN. SEPARATION
PROPOSED 12" WATER MAIN
12" D.I. WATER LINE STA. 18+40 TO END
EXISTING GROUND
FINISHED GRADE (C.L. MEDIAN)
C.L. PROFILE GRADE*
36" MIN. COVER @ SHOULDER ALIGNMENT
2.70%
1.00%
PROVIDE JOINT DEFLECTION/PIPE DEFLECTION AS PERMITTED BY PIPE MANUFACTURER AND JCSA TO MAINTAIN WATERLINE VERTICAL ALIGNMENT.
203' OF 8" G.S. @ 0.51%
244' OF 8" G.S. @ 0.40%
193' OF 8" D.I.P. @ 0.66%
15" RCP (NO CONFLICT)
SCALE IN FEET
1"=5'
1"=25'
(CONTRACTOR TO INSTALL WATER MAIN IN CONTROLLED CONDITIONS. BOTTOM OF TRENCH SHALL BE INSPECTED, AND SHALL BE COMPACTED TO AT LEAST 95% COMPACTION. PIPE SHALL BE PLACED IN A 4" STONE BEDDING IN ACCORDANCE WITH J.C.S.A. SPECIFICATIONS. BACKFILL MATERIAL SHALL BE PLACED IN 8"-12" LIFTS AND COMPACTED TO 95% COMPACTION. COMPACTION TESTS AT 200 FOOT INTERVALS SHALL BE COMPLETED WHENEVER DUCTILE IRON WATER MAIN PIPING IS INSTALLED WITH THIS PROJECT).
90
85
80
75
70
65
60
55
50
45
40
24+00
25+00
26+00
27+00
28+00
29+00
30+00
31+00

No.	DATE	REVISION / COMMENT / NOTE	BY
5	DEC. 2008	BMP RECORD DRAWING	VMB
4	11/5/03	REMOVED LEFT TURN LANE AT STA. 14+00	VMB
3	10/3/03	REVISED PER JCC COMMENT LETTER DATED 10/1/03	VMB
2	8/28/03	REVISED PER JCC COMMENT LETTER	VMB
	6/20/03	REVISED PER JCC COMMENT LETTER & DRB REVIEW	VMB

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

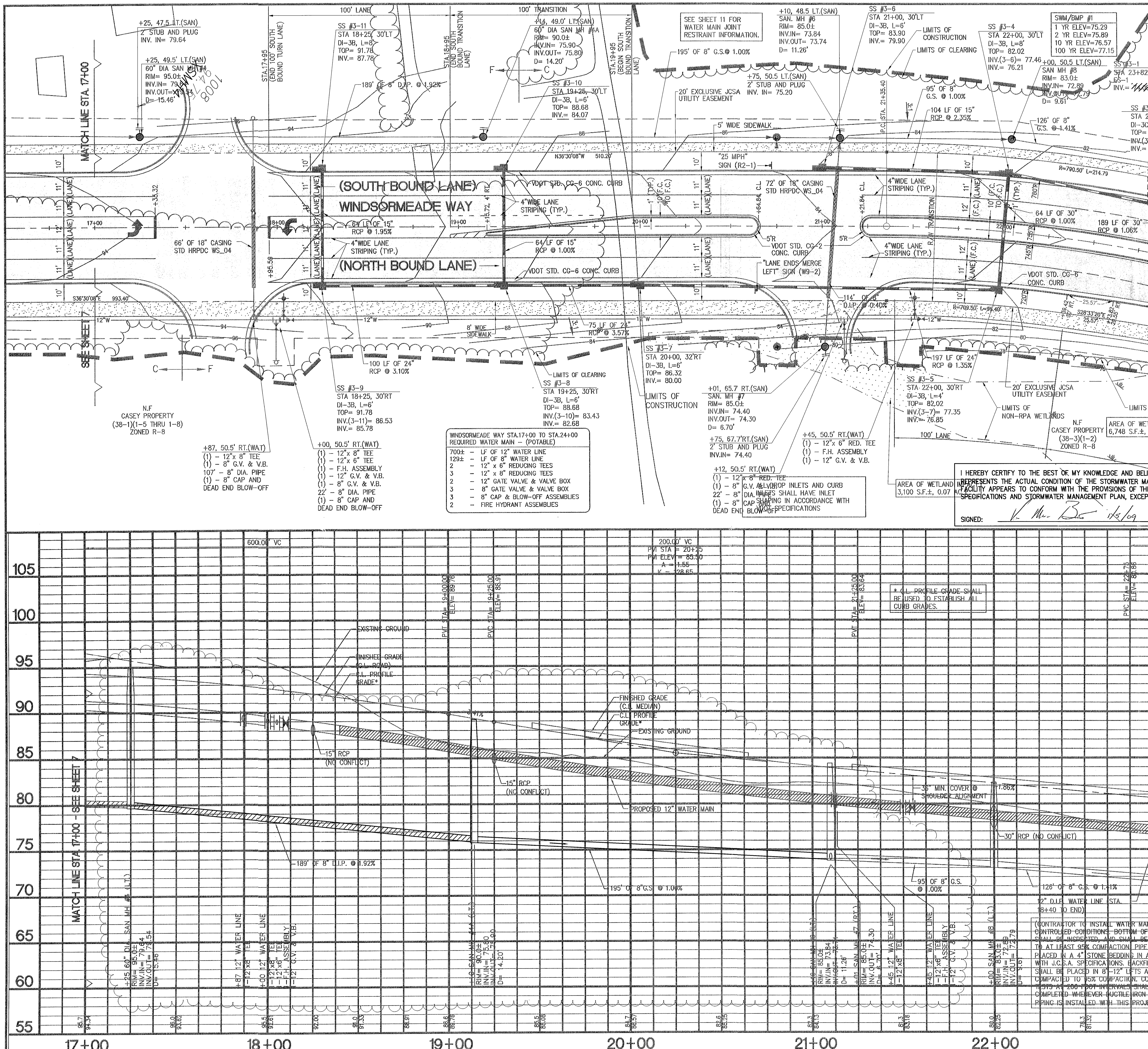
WINDSORMEADE WAY
ROADWAY / UTILITIES PLAN AND PROFILE
STA. 24+00 TO STA. 31+00

BERKELEY DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
HWP/RDS	RDS
Scale 1"=25'	Date 5/2/02
Project No. 8818-04 (AS-BUILT)	
Drawing No. 9	

BMP RECORD DRAWING J.C.C. CASE No. SP-093-03

DECEMBER 2008


WINDSORMEADE WAY
(SOUTH BOUND LANE)
(NORTH BOUND LANE)
MATCH LINE STA. 17+00
SEE SHEET 7
MATCH LINE STA. 24+00
SEE SHEET 11 FOR WATER MAIN JOINT RESTRAINT INFORMATION.
SWM/BMP #1
1 YR ELEV=75.29
2 YR ELEV=75.89
10 YR ELEV=76.57
100 YR ELEV=77.15
100-YEAR HIGH WATER SURFACE ELEV.= 77.15
CLASS 1 RIP RAP
SEDIMENT FOREBAY (SEE DETAIL ON SHEET 17)
18" DEEP GRAVEL (PER CONTRACTOR)
OUTLET PROTECTION L=10'x 6-12'W 5 CY. 18"DEEP OVER FILTER FABRIC d50=6"
SS #3-1 STA 23+82, 71'LT ES-1 INV.= 74.03
SS #3-2 STA 23+82, 30'LT DI-3C, L=6' TOP= 79.53 INV.(3-3)= 74.70 INV.= 74.18
SS #3-3 STA 23+82, 27'RT DI-3C, L=6' TOP= 79.46 INV.= 75.46
SS #3-4 STA 22+00, 30'LT DI-3B, L=8' TOP= 82.02 INV.(3-6)= 77.46 INV.= 76.21
SS #3-5 STA 22+00, 30'RT DI-3B, L=4' TOP= 82.02 INV.(3-7)= 77.35 INV.= 76.85
SS #3-6 STA 21+00, 30'LT DI-3B, L=6' TOP= 83.90 INV.= 79.90
SS #3-7 STA 20+00, 32'RT DI-3B, L=6' TOP= 86.32 INV.= 80.00
SS #3-8 STA 19+25, 30'RT DI-3B, L=6' TOP= 88.68 INV.(3-10)= 83.43 INV.= 82.68
SS #3-9 STA 18+25, 30'RT DI-3B, L=6' TOP= 91.78 INV.(3-11)= 86.53 INV.= 85.78
SS #3-10 STA 19+25, 30'LT DI-3B, L=6' TOP= 88.68 INV.= 84.07
SS #3-11 STA 18+25, 30'LT DI-3B, L=8' TOP= 91.78 INV.= 87.78
+25, 47.5 LT.(SAN) 2' STUB AND PLUG INV. IN= 79.64
+25, 49.5' LT.(SAN) 60" DIA SAN MH #4 RIM= 95.0± D= 15.46'
+14, 49.0' LT.(SAN) 60" DIA SAN MH #5A RIM= 90.0± INV.IN= 75.90 INV.OUT= 75.80 D= 14.20'
+10, 48.5 LT.(SAN) SAN. MH #6 RIM= 85.0± INV.IN= 73.84 INV.OUT= 73.74 D= 11.26'
+75, 50.5 LT.(SAN) 2' STUB AND PLUG INV. IN= 75.20
+00, 50.5 LT.(SAN) SAN MH #8 RIM= 83.0± INV.IN= 72.89 D= 9.61
+18, 50.5 LT.(SAN) SAN MH #9 RIM= 80.0± INV.IN= 71.01 INV.OUT= 70.91 D= 9.09
+01, 65.7 RT.(SAN) SAN. MH #7 RIM= 85.0± INV.IN= 74.40 INV.OUT= 74.30 D= 6.70'
+75, 67.7'RT.(SAN) 2' STUB AND PLUG INV.IN= 74.40
+87, 50.5' RT.(WAT) (1) – 12"x 8" TEE (1) – 8" G.V. & V.B. 107' – 8" DIA. PIPE (1) – 8" CAP AND DEAD END BLOW-OFF
+00, 50.5' RT.(WAT) (1) – 12"x 8" TEE (1) – 12"x 6" TEE (1) – F.H. ASSEMBLY (1) – 12" G.V. & V.B. (1) – 8" G.V. & V.B. 22' – 8" DIA. PIPE (1) – 8" CAP AND DEAD END BLOW-OFF
+12, 50.5' RT.(WAT) (1) – 12"x 8" RED. TEE (1) – 8" G.V. & V.B. 22' – 8" DIA. PIPE (1) – 8" CAP AND DEAD END BLOW-OFF
+45, 50.5' RT.(WAT) (1) – 12"x 6" RED. TEE (1) – F.H. ASSEMBLY (1) – 12" G.V. & V.B.
ALL DROP INLETS AND CURB INLETS SHALL HAVE INLET SHAPING IN ACCORDANCE WITH VDOT SPECIFICATIONS
N.F CASEY PROPERTY (38-1)(1-5 THRU 1-8) ZONED R-8
N.F CASEY PROPERTY (38-3)(1-2) ZONED R-8
AREA OF WETLAND IMPACT 3,100 S.F.±, 0.07 AC.±
AREA OF WETLAND IMPACT 6,748 S.F.±, 0.155 AC.±
20' EXCLUSIVE JCSA UTILITY EASEMENT
20'x50' DRAINAGE EASEMENT
LIMITS OF CLEARING
LIMITS OF CONSTRUCTION
LIMITS OF NON-RPA WETLANDS
VDOT STD. CG-6 CONC. CURB
VDOT STD. CG-2 CONC. CURB
4" WIDE LANE STRIPING (TYP.)
"25 MPH" SIGN (R2-1)
"LANE ENDS MERGE LEFT" SIGN (W9-2)
5' WIDE SIDEWALK
8' WIDE SIDEWALK
100' LANE
100' TRANSITION
66' OF 18" CASING STD HRPDC WS_04
72' OF 18" CASING STD HRPDC WS_04
* C.L. PROFILE GRADE SHALL BE USED TO ESTABLISH ALL CURB GRADES.
600.00' VC
200.00' VC PVI STA = 20+25 PVI ELEV = 85.50 A = 1.55 K = 128.65
200.00' VC LOW POINT ELEV = 79.65 LOW POINT STA = 24+05 PVI STA = 23+75 PVI ELEV = 79.00 A = 2.86 K = 70.00
EXISTING GROUND
FINISHED GRADE
C.L. PROFILE GRADE*
PROPOSED 12" WATER MAIN
15" RCP (NO CONFLICT)
30" RCP (NO CONFLICT)
36" MIN. COVER @ SHOULDER ALIGNMENT
189' OF 8" D.I.P. @ 1.92%
195' OF 8" G.S. @ 1.00%
95' OF 8" G.S. @ 1.00%
126' OF 8" G.S. @ 1.41%
175' OF 8" D.I.P. @ 0.54% W/STEEL CASING STD HRPDC WS_04
12" D.I.P. WATER LINE STA. 18+40 TO END)
(CONTRACTOR TO INSTALL WATER MAIN IN CONTROLLED CONDITIONS. BOTTOM OF TRENCH SHALL BE INSPECTED, AND SHALL BE COMPACTED TO AT LEAST 95% COMPACTION. PIPE SHALL BE PLACED IN A 4" STONE BEDDING IN ACCORDANCE WITH J.C.S.A. SPECIFICATIONS. BACKFILL MATERIAL SHALL BE PLACED IN 8"-12" LIFTS AND COMPACTED TO 95% COMPACTION. COMPACTION TESTS AT 200 FOOT INTERVALS SHALL BE COMPLETED WHENEVER DUCTILE IRON WATER MAIN PIPING IS INSTALLED WITH THIS PROJECT).
1"=5'
1"=25'
SCALE IN FEET
17+00
18+00
19+00
20+00
21+00
22+00
23+00
24+00

WINDSORMEADE WAY STA.17+00 TO STA.24+00 REQUIRED WATER MAIN – (POTABLE)	
700±	LF OF 12" WATER LINE
129±	LF OF 8" WATER LINE
2	12" x 6" REDUCING TEES
3	12" x 8" REDUCING TEES
2	12" GATE VALVE & VALVE BOX
3	8" GATE VALVE & VALVE BOX
3	8" CAP & BLOW-OFF ASSEMBLIES
2	FIRE HYDRANT ASSEMBLIES

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.

SIGNED: 1/5/09

No.	DATE	REVISION / COMMENT / NOTE	BY
5	DEC. 2008	BMP RECORD DRAWING	VMB
1	12/16/03	UTILITY REVISIONS	VMB
4	11/5/03	REMOVED LEFT TURN LANE AT STA. 14+00	VMB
3	10/3/03	REVISED PER JCC COMMENT LETTER DATED 10/1/03	VMB
2	8/28/03	REVISED PER JCC COMMENT LETTER	VMB
1	6/20/03	REVISED PER JCC COMMENT LETTER & DRB REVIEW	VMB

COMMONWEALTH OF VIRGINIA VAN MARC BENNETT No. 026528 11/5/03 PROFESSIONAL ENGINEER

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

WINDSORMEADE WAY
ROADWAY / UTILITIES PLAN AND PROFILE STA. 17+00 TO STA. 24+00

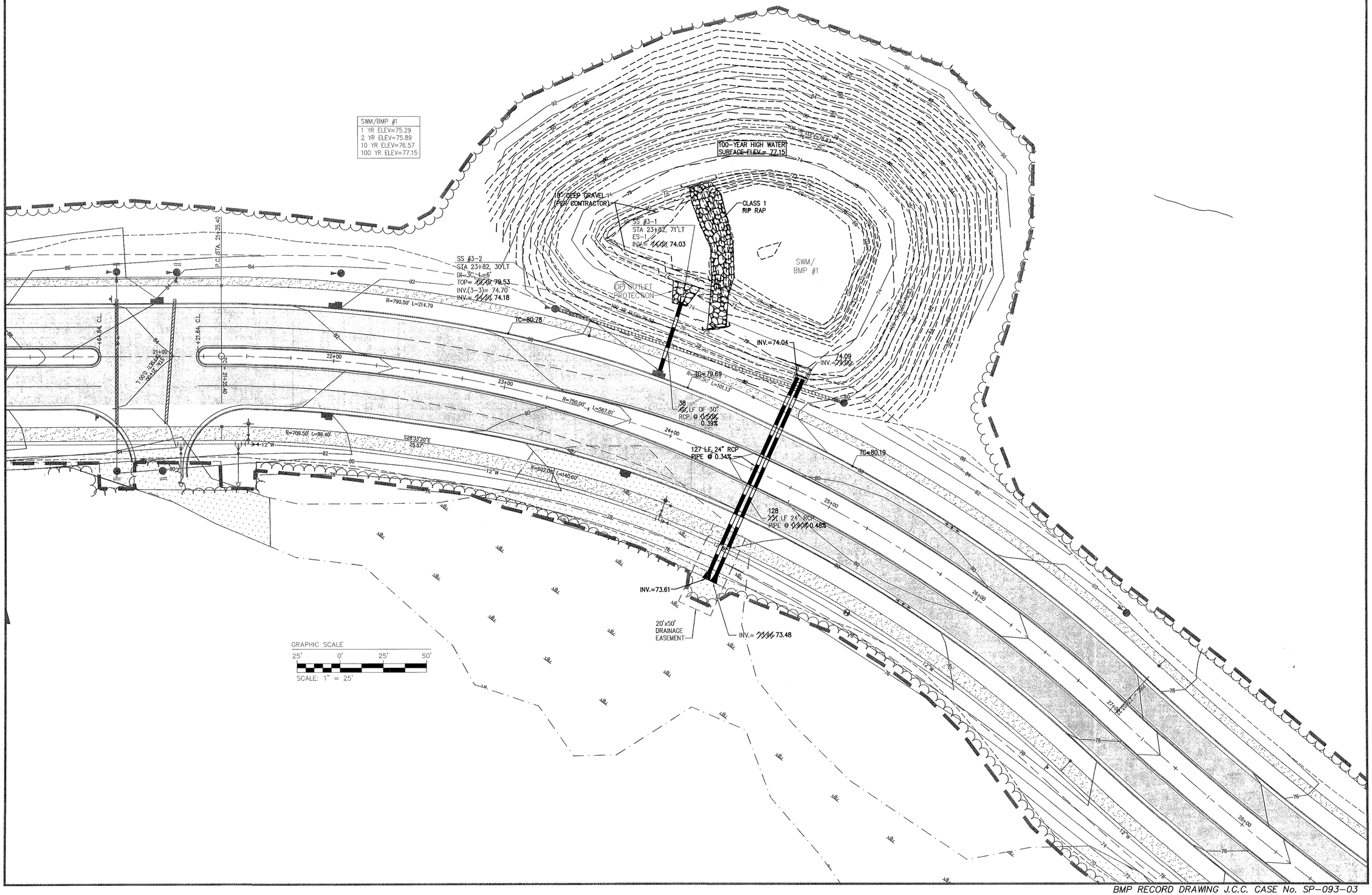
BERKELEY DISTRICT — JAMES CITY COUNTY — VIRGINIA

Designed	Drawn
HWP/RDS	AES
Scale 1"=25'	Date 5/2/02
Project No. 8818-04 (AS-BUILT)	
Drawing No. 8	

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.

SIGNED: _____ 11/5/08

No.	DATE	REVISION / COMMENT / NOTE	BY



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

CONSULTING ENGINEERS

WINDSORMEADE WAY
RECORD DRAWING
SWM/ BMP #1

JAMES CITY COUNTY VIRGINIA

BERKELEY DISTRICT

Designed	Drawn
HWP/RDS	AES
Scale	Date
1"=25'	5/2/02
Project No.	
8818-04 (AS-BUILT)	
Drawing No.	
BMP#1	

BMP RECORD DRAWING J.C.C. CASE No. SP-093-03

DECEMBER 2008

WINDSORMEADE WAY STA.31+00 TO STA.37+66.50 REQUIRED WATER MAIN – (POTABLE)

667±	–	LF OF 12" WATER LINE
22±	–	LF OF 8" WATER LINE
1	–	12" x 8" TEE
1	–	12" x 6" TEE
2	–	12" GATE VALVE & VALVE BOX
1	–	8" GATE VALVE & VALVE BOX
1	–	12" CAP & BLOW-OFF ASSEMBLY
1	–	8" CAP & BLOW-OFF ASSEMBLY
1	–	FIRE HYDRANT ASSEMBLY
1	–	AIR RELEASE ASSEMBLY

No.	DATE	REVISION / COMMENT / NOTE	BY
5	DEC. 2008	BMP RECORD DRAWING	WB
4	11/5/03	REMOVED LEFT TURN LANE AT STA. 14+00	WB
3	10/3/03	REVISED PER ACC COMMENT LETTER DATED 10/1/03	WB
2	8/28/03	REVISED PER JCC COMMENT LETTER	WB
1	6/26/03	REVISED PER JCC COMMENT LETTER & DRB REVIEW	WB

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.

SIGNED: _____ 11/5/03

ALL DROP INLETS AND CURB INLETS SHALL HAVE INLET SHAPING IN ACCORDANCE WITH VDOT STD. EC-1 MODIFIED.

SEE SHEET 11 FOR WATER MAIN JOINT RESTRAINT INFORMATION.

GRAPHIC SCALE
25' 0' 25' 50'
SCALE: 1" = 25'

* C.L. PROFILE GRADE SHALL BE USED TO ESTABLISH ALL CURB GRADES.

SCALE IN FEET
1"=5'
1"=25'

PROVIDE JOINT DEFLECTION/PIPE DEFLECTION AS PERMITTED BY PIPE MANUFACTURER AND JCSA TO MAINTAIN WATERLINE VERTICAL ALIGNMENT.

(CONTRACTOR TO INSTALL WATER MAIN IN CONTROLLED CONDITIONS. BOTTOM OF TRENCH SHALL BE INSPECTED AND SHALL BE COMPACTED TO AT LEAST 95% COMPACTION. PIPE SHALL BE PLACED IN A 4" STONE BEDDING IN ACCORDANCE WITH J.C.S.A. SPECIFICATIONS. BACKFILL MATERIAL SHALL BE PLACED IN 8"-12" LIFTS AND COMPACTED TO 95% COMPACTION. COMPACTION TESTS AT 200 FOOT INTERVALS SHALL BE COMPLETED WHENEVER DUCTILE IRON WATER MAIN PIPING IS INSTALLED WITH THIS PROJECT).

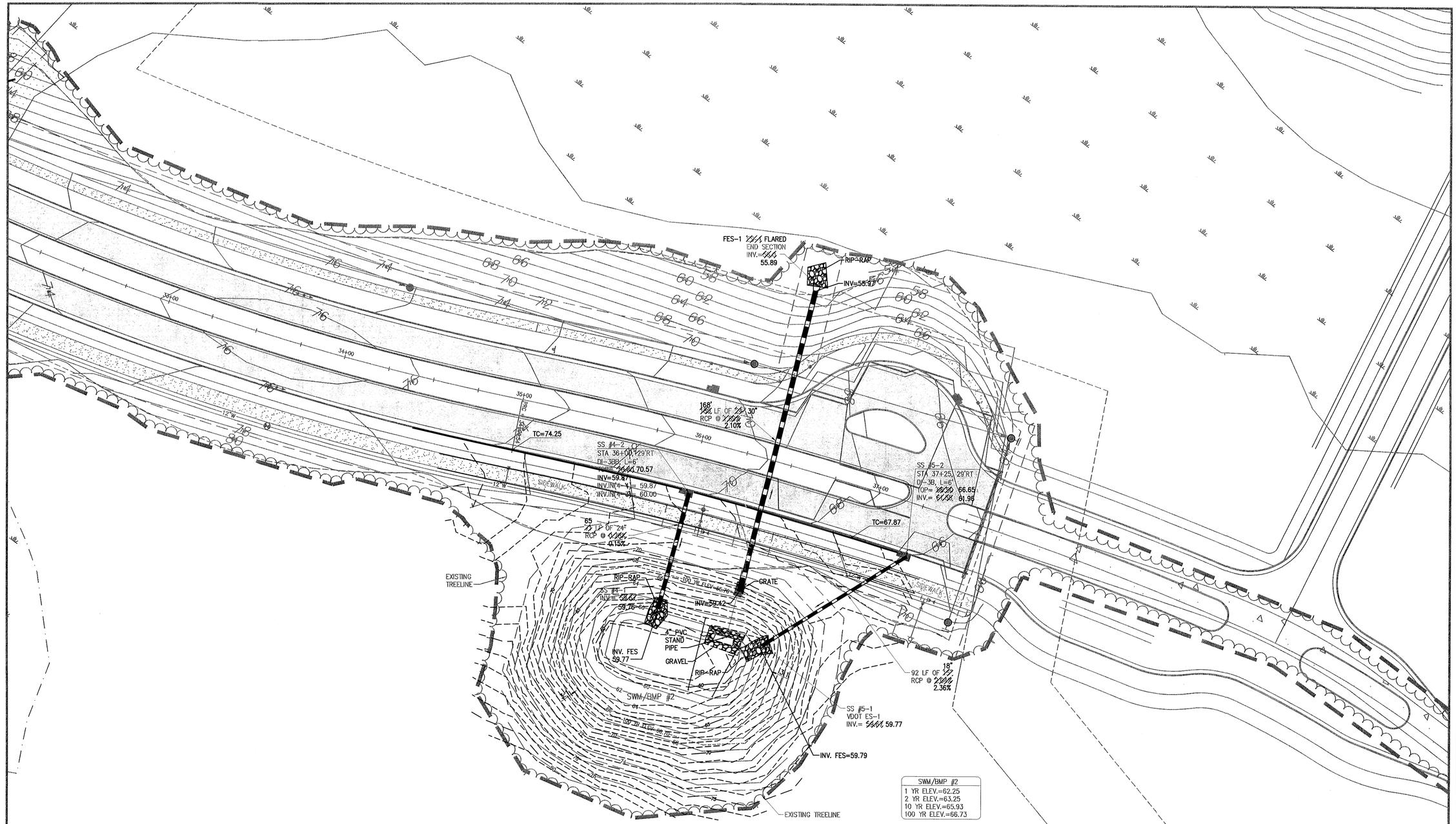
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994
CONSULTING ENGINEERS

WINDSORMEADE WAY
ROADWAY / UTILITIES PLAN AND PROFILE
STA. 31+00 TO STA. 37+62.10
JAMES CITY COUNTY VIRGINIA
BERKELEY DISTRICT

Designed HWP/RDS	Drawn AES
Scale 1"=25'	Date 5/2/02
Project No. 8818-04 (AS-BUILT)	
Drawing No. 10	

BMP RECORD DRAWING J.C.C. CASE No. SP-093-03

DECEMBER 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.

SIGNED: _____ 11/5/08

No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA — VANMARCKE, JR. — LICENSED PROFESSIONAL ENGINEER — 11/5/03

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

CONSULTING ENGINEERS

WINDSORMEADE WAY
RECORD DRAWING
SWM/ BMP #2

JAMES CITY COUNTY — VIRGINIA

BERKELEY DISTRICT

Designed	Drawn
HWP/RDS	AES
Scale	Date
1"=25'	5/2/02

Project No.
8818-04 (AS-BUILT)

Drawing No.
BMP#2

BMP RECORD DRAWING J.C.C. CASE No. SP-093-03

DECEMBER 2008

POND FACILITY MAINTENANCE PLAN

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

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

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

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

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

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

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

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

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

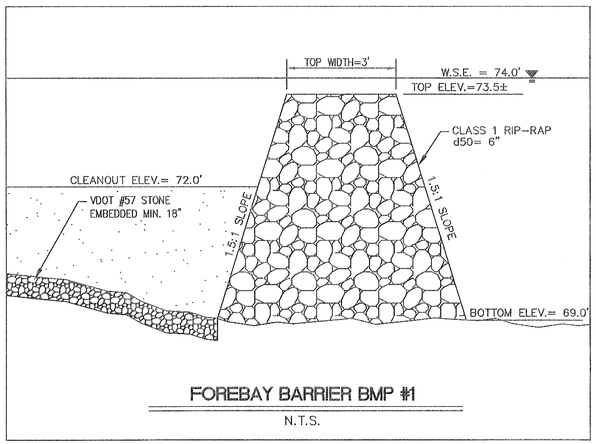
7. PERFORM QUARTERLY INSPECTIONS OF THE GRADED SIDE SLOPES OF THE FACILITY FOR SIGNS OF ANIMAL/ RODENT BORROWS OR SLOPE EROSION. IMMEDIATELY PERFORM NECESSARY REPAIRS, REFILLING OR RESEEDING AS APPROPRIATE.

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

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

CONVERSION OF SEDIMENT BASINS INTO BMP FACILITIES

BMP FACILITIES WILL INITIALLY BE CONSTRUCTED AS SEDIMENT BASINS REQUIRING EXCAVATION TO PROVIDE ADEQUATE STORAGE. ONCE J.C.C. ENVIRONMENTAL DIVISION GIVES CONCURRENCE TO REMOVE THE SEDIMENT BASIN FACILITIES, ANY EXCESS EARTH OR SEDIMENT SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. REMOVE TEMPORARY BARRIERS FROM BASIN 1 AND INSTALL RIP-RAP FOREBAY. SEDIMENT BASIN 2 SHALL BE REGRADED AND SEEDED. THE BAFFLES ORGINIALLY INSTALLED WITH SEDIMENT BASIN 2 SHALL REMAIN UNTIL SUCH TIME AS THE FACILITY IS REMOVED OR MODIFIED.



FOREBAY BARRIER BMP #1

N.T.S.

GENERAL NOTES FOR CONSTRUCTION OF STORMWATER BASINS

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

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

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

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

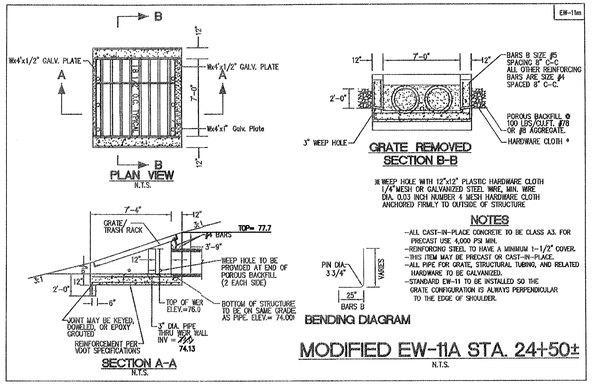
5. UNDERCUT FOR THE FOUNDATION OF THE DAM EMBANKMENT SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATION. THE FOUNDATION SHALL BE BACKFILLED WITH SOILS CLASSIFIED AS SM, SC, OR CL UNDER THE UNIFIED SOIL CLASSIFICATION SYSTEM. SOILS SHALL HAVE A MINIMUM OF 15% BY WEIGHT FINES, HAVING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

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

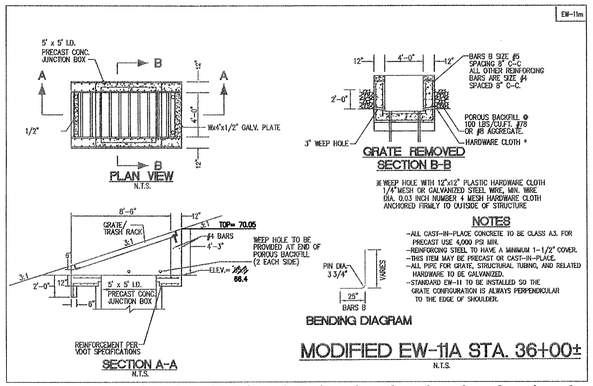
7. THE STORMWATER MANAGEMENT / BMP FACILITIES SHOWN ON THESE PLANS REQUIRE THE SUBMISSION, REVIEW AND APPROVAL OF RECORD DRWAING(S) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND / SURETY. THE GEOTECHNICAL ENGINEER IS TO ENSURE THAT HIS / HER INSPECTION OF THE SWM / BMP CONSTRUCTION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

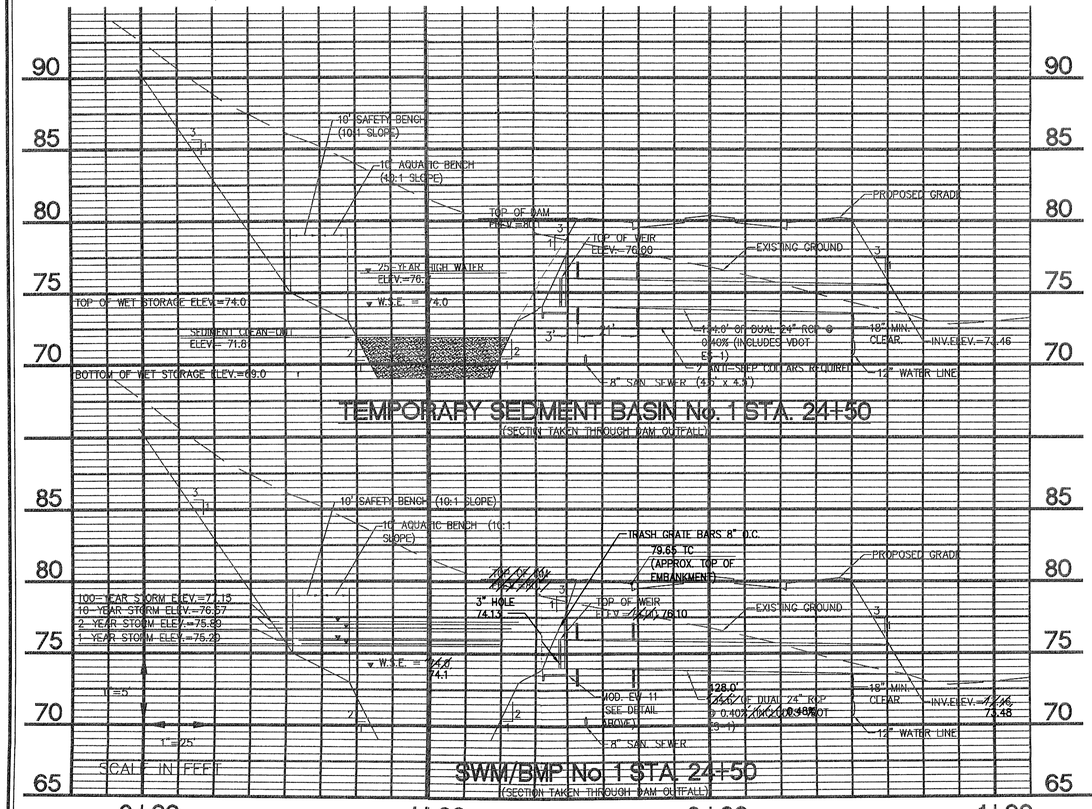
8. THE CONTRACTOR SHALL PROVIDE INTERIM CERTIFICATION OF TEMPORARY SEDIMENT BASINS AT THE DETENTION PONDS 1 AND 2 AND SEDIMENT BASIN No. 3 IN ACCORDANCE WITH SECTION 5 OF THE JAMES CITY COUNTY BMP, EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT DESIGN GUIDES.

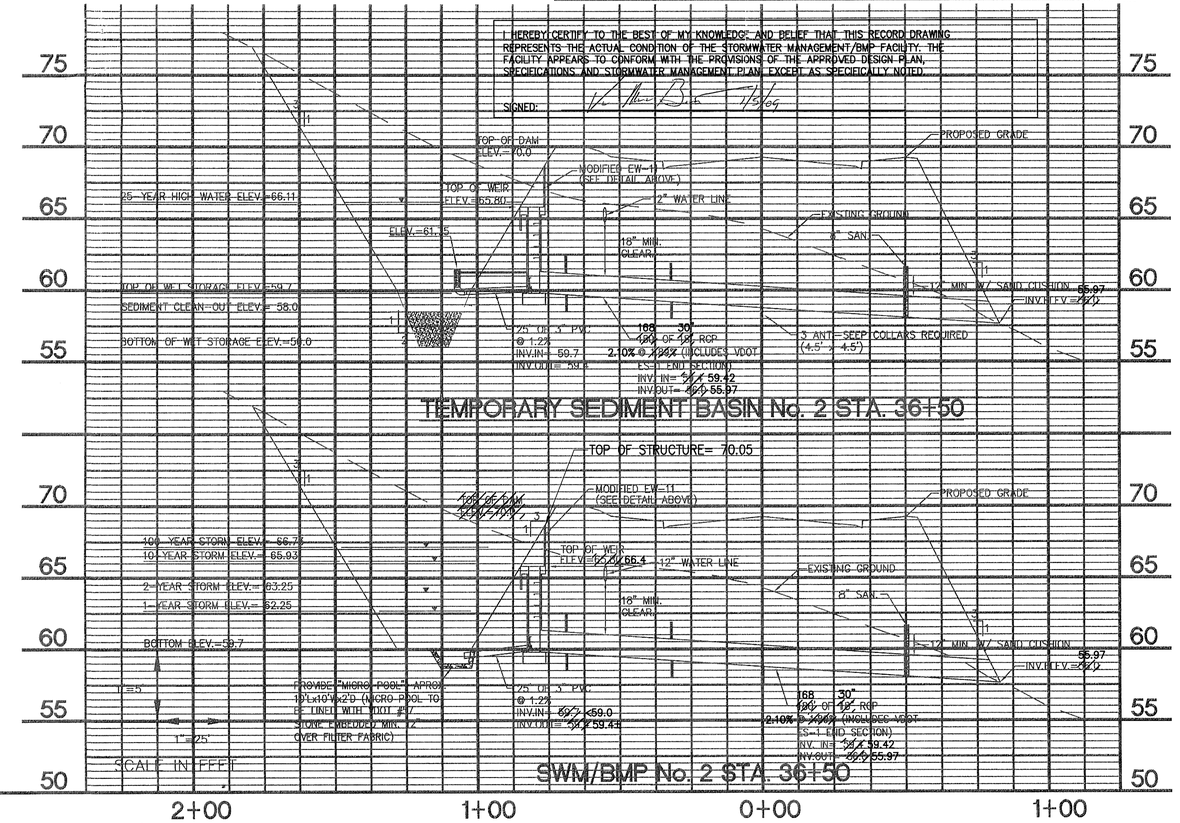
EW-11m



EW-11m







No.	DATE	REVISION / COMMENT / NOTE	BY
5	DEC. 2008	BMP RECORD DRAWING	VMB
4	11/6/03	REMOVED LEFT TURN LANE AT STA. 14+00	VMB
3	10/3/03	REVISED PER JCC COMMENT LETTER DATED 10/1/03	VMB
2	6/28/03	REVISED PER JCC COMMENT LETTER	VMB
1	6/20/03	REVISED PER JCC COMMENT LETTER & DRB REVIEW	VMB

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

WINDSORMEADE WAY
STORMWATER MANAGEMENT DETAILS
JAMES CITY COUNTY VIRGINIA
BERKELEY DISTRICT

Designed	Drawn
HWP/RDS	AES
Scale	Date
1"=50'	5/2/02
Project No.	
8818-04 (AS-BUILT)	
Drawing No.	
17	

BMP RECORD DRAWING J.C.C. CASE No. SP-093-03

DECEMBER 2008

BASIN 1

CALCULATION FOR SCS HYDROGRAPH GENERATION AND CHANNEL PROTECTION
FOR DETENTION BASIN / TEMPORARY SEDIMENT BASIN (STA. 24+50)
WINDSORMEADE WAY
AES Project No.: 9028-09
April 12, 2002

HOOPL Routings show 10.6 AC.

I. **PRE-DEVELOPMENT CONDITIONS TO POINT OF CONCERN**

A. Pre-Development Drainage Area to Point of Concern = 7.00 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)	8-B Caroline Fine Sandy Loam	C	Wooded (Good)	2.04	73	149
2)	10-C Craven Fine Sandy Loam	C	Wooded (Good)	0.05	73	4
3)	14-B Emporia Fine Sandy Loam	C	Wooded (Good)	1.30	73	95
4)	15-D Emporia Complex	C	Wooded (Good)	3.61	73	264
5)						
6)						
7)						
	Totals =			7.00		511
	Composite CN =					73

C. Pre-Development Time of Concentration Calculations

1) Overland Flow (maximum 300 feet)

Surface description (table 5-7)	wooded (light underbrush)
Manning's roughness coefficient., n (table 5-7)	0.4
Length of overland flow, L	300 Feet
2-year 24-hour rainfall, P2	3.6 inches
Average slope of overland flow , s	0.02 feet per foot
Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.81 hours

2) Shallow concentrated flow (maximum 300 feet)

Surface description, paved or unpaved	unpaved, wooded
Length of shallow concentrated flow, L	230 Feet
Average slope of shallow concentrated flow, s	0.095 feet per foot
Average velocity, v	0.8 feet per second
Travel time, Tt = L/(3600*v)	0.09 hours

3) Channel or Pipe Flow

Length of channel flow, L	0 Feet
Average velocity of channel flow, v	2.5 feet per second
Travel time, Tt = L/(3600*v)	0.00 hours

Total Time of Concentration = 0.90 hours or 54 minutes

Pre –
A = 7.0 AC.
CN = 73
HSG = C
T_c = 54 min
1 – 3.79 CFS
2 – 6.53 CFS
10 – 17.22 CFS
100 – 28.52 CFS

Post
A = 7.0 AC.
CN = 77
HSG B, C.

Routed
1 – 0.32 CFS @ EL 75.74
2 – 1.68 CFS @ EL 75.94
10 – 19.05 CFS @ EL. 76.65
100 – 24.46 CFS @ EL. ~~77.29~~ 77.25

II. **POST-DEVELOPMENT CONDITIONS TO POINT OF CONCERN (for total site)**

A. Post-Development Drainage Area to Point of Concern = 7.00 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)	8-B Caroline Fine Sandy Loam	C	Wooded (Good)	2.04	73	149
2)	8-B Caroline Fine Sandy Loam	C	Commercial and Business	0	94	0
3)	10-C Craven Fine Sandy Loam	C	Wooded (Good)	0.05	73	4
4)	10-C Craven Fine Sandy Loam	C	Commercial and Business	0.00	94	0
5)	14-B Emporia Fine Sandy Loam	C	Wooded (Good)	1.30	73	95
6)	14-B Emporia Fine Sandy Loam	C	Commercial and Business	0.00	94	0
7)	15-D Emporia Complex	B	Wooded (Good)	2.20	73	161
8)	15-D Emporia Complex	B	Commercial and Business	1.41	94	133
9)				0.00	0	0
10)				0.00	0	0
11)				0.00	0	0
	Total Adjusted CN =			7.00		541
	Composite CN =					77

B Soils were NOT in pre-dev!

C. Post-Development Time of Concentration Calculations

1) Overland Flow (maximum 300 feet)

Surface description (table 5-7)	woods
Manning's roughness coefficient., n (table 5-7)	0.3
Length of overland flow, L	300 Feet
25-year 24-hour rainfall, P25	6.5 inches
Average slope of overland flow , s	2 feet per foot
Travel time, Tt = (0.007*(n*L)^0.8)/(P2^0.5*s^0.4)	0.08 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	0.8 feet per second
Travel time, Tt = L/(3600*v)	0.00 hours

3) Channel or Pipe Flow

Length of channel flow, L	390 Feet
Average velocity of channel flow, v	2.5 feet per second
Travel time, Tt = L/(3600*v)	0.04 hours
Total Time of Concentration =	0.12 hours
or	7 minutes

III. **PROPOSED ESTIMATED POND(S) VOLUME ABOVE LOWER STAGE or NORMAL POOL BY ELEVATION**

Elevation	Depth	Area (sq. ft.)	Incremental Volume (cu. ft.)	Inc. Volume (cu. yd.)	Sum Volume (cu. ft.)	Sum Volume (cu. yd.)
70.0	0.0	0	0	0	0	0
71.0	1.0	6097	3049	113	3049	113
72.0	1.0	6714	6406	237	9454	350
74.0	2.0	8038	14752	546	21158	784
76.0	2.0	16188	24226	897	45384	1681
78.0	2.0	20919	37107	1374	82491	3055
80.0	2.0	24068	44987	1666	127478	4721
82.0	2.0	22157	46225	1712	173703	6433

CALCULATION FOR SCS HYDROGRAPH GENERATION AND CHANNEL PROTECTION
FOR DETENTION BASIN / TEMPORARY SEDIMENT BASIN (STA. 24+50)
WINDSORMEADE WAY
AES Project No.: 9028-09
April 12, 2002

RELEASE RATE OF 1-YEAR, 24-HOUR DETAINED FOR 24 HOURS FOR STREAM CHANNEL PROTECTION

Volume of 1-Year, 24-Hour Storm (based upon Hydrographs) = 28,361 cubic feet

Elevation of water surface associated with 1-Year, 24-Hour Storm Vol. = 75.8

Elevation of Release Inlet for Channel Protection = 73.8

Average Head, in feet, on Release Inlet = 1.0

Average Alowable Release Rate Calculation

$$\frac{28{,}361 \text{ cubic feet}}{(24 \text{ hours} \times 60 \text{ minutes/hour} \times 60 \text{ seconds/ minute})} = 0.3 \text{ cfs}$$

Calculation of Size of Release Inlet

Diameter of Release Inlet = 2 * (Q / ((64.32 * (h / 2)) ^ (1/2) * 0.6 * 3.14))) ^ (1/2)
where, Q equals Average Release Rate, in cfs
h equals Average Head, in feet

Maximum allowable diameter of release inlet = 0.30 feet, or 4 inches

The use of a 4" orifice is sufficent in providing channel protection for the release of the 1 year, 24 hour storm. No modification will be required to the exisitng BMP outfall structure.

AES JOB# 8818-04

1992

3.14

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project WINDSOR MEADE WAY AES#8818-04 NO. 1

Basin # DET. POND/TEMP BSN. Location STA. 24+50

Total area draining to basin: 7.0 acres.

Basin Volume Design

Wet Storage:

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

   67 cu. yds. x 7.0 acres = 469 cu. yds.

2. Available basin volume = 864 cu. yds. at elevation 75.0. (From storage - elevation curve)

3. Excavate _____ 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 7.0 acres = 231 cu. yds.

5. Elevation corresponding to cleanout level = 71.0.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1.0 ft. (Min. = 1.0 ft.)

Dry Storage:

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

   67 cu. yds. x 7.0 acres = 469 cu. yds.

8. Total available basin volume at crest of riser* = 1369 cu. yds. at elevation 75.8. (From Storage - Elevation Curve)

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

9. Diameter of dewatering orifice = 4 in.

10. Diameter of flexible tubing = N/A in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 75.8 ✓

Top of Dam = 79.53 ✓

Design High Water = 77.29 ✓ 76.81 ROUTED FOR 25-YR.

Upstream Toe of Dam = 71.0 ✓

Basin Shape

12. Length of Flow / Effective Width $\frac{L}{We}$ = 0.31

If > 2, baffles are not required _____

If < 2, baffles are required ✓ (L = 96')

Runoff

13. Q_2 = N/A cfs (From Chapter 5)

14. Q_{25} = 25.5 cfs (From Chapter 5)

distributed?

25.5 cfs doesn't match any of model hydrographs

Principal Spillway Design

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

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = 25.5 cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = N/A ft. (Using Q_2)

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

Without emergency spillway:

Assumed available head (h) = 1.49 ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 96 in. Actual head (h) = 0.5 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 133 ft. 122'

Head (H) on barrel through embankment = 2.13 ft.

(From Plate 3.14-7).

19. Barrel diameter = 24 in. ✓

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

20. Trash rack and anti-vortex device

Diameter = *N/A inches.

Height = *N/A inches.

(From Table 3.14-D).

* TRASH RACK WILL BE BAR GRATE OF MOD. EW-11

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = N/A 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) = 0.58 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 1.0 %

Length of barrel in saturated zone (L_s) = 133 ft.

24. Number of collars required = Ø dimensions = N/A

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 79.53

Design High Water = 77.29

Emergency Spillway Crest = N/A

Principal Spillway Crest = 75.80

Dewatering Orifice Invert = 75.0

Cleanout Elevation = 72.0

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 71.0

Hydrograph Plot

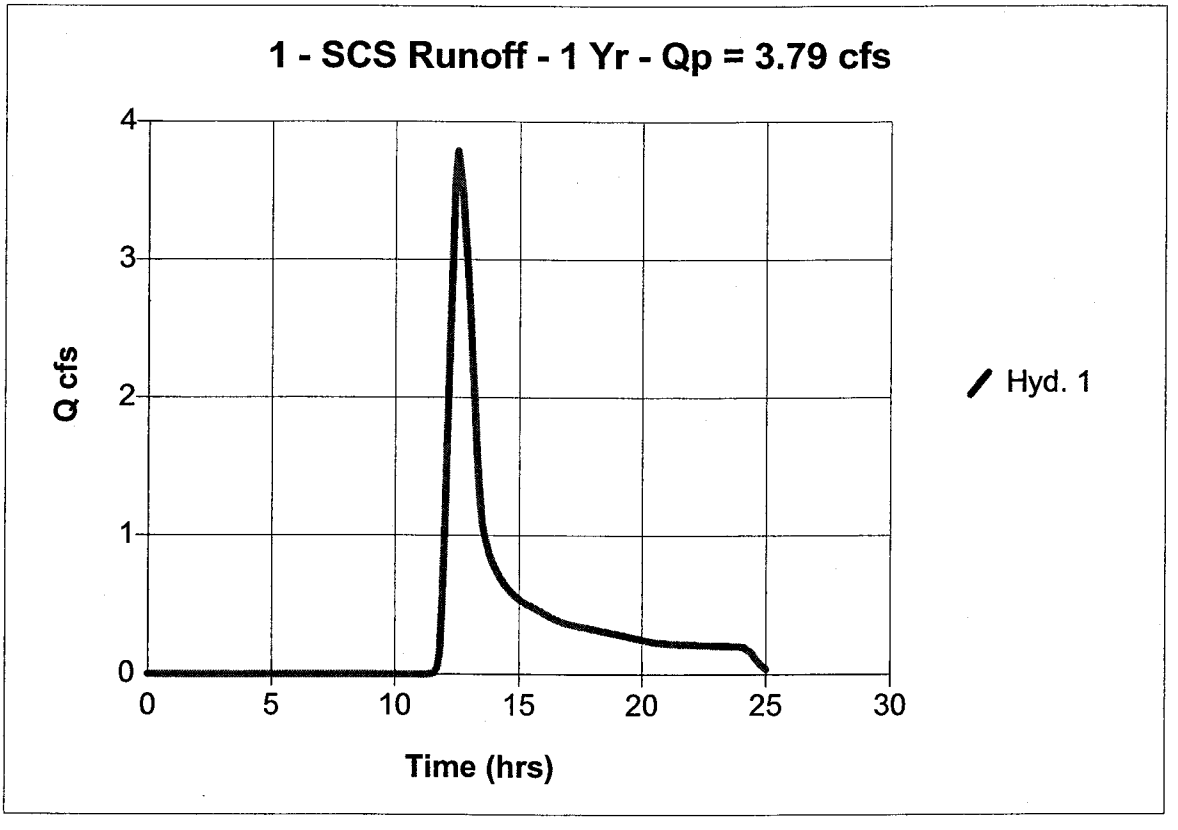
English

Hyd. No. 1

PRE-DEVELOPMENT 1-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 3.79 cfs
Storm frequency	= 1 yrs	Time interval	= 6 min
Drainage area	= 10.60 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 54 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 28,361 cuft



Hydrograph Plot

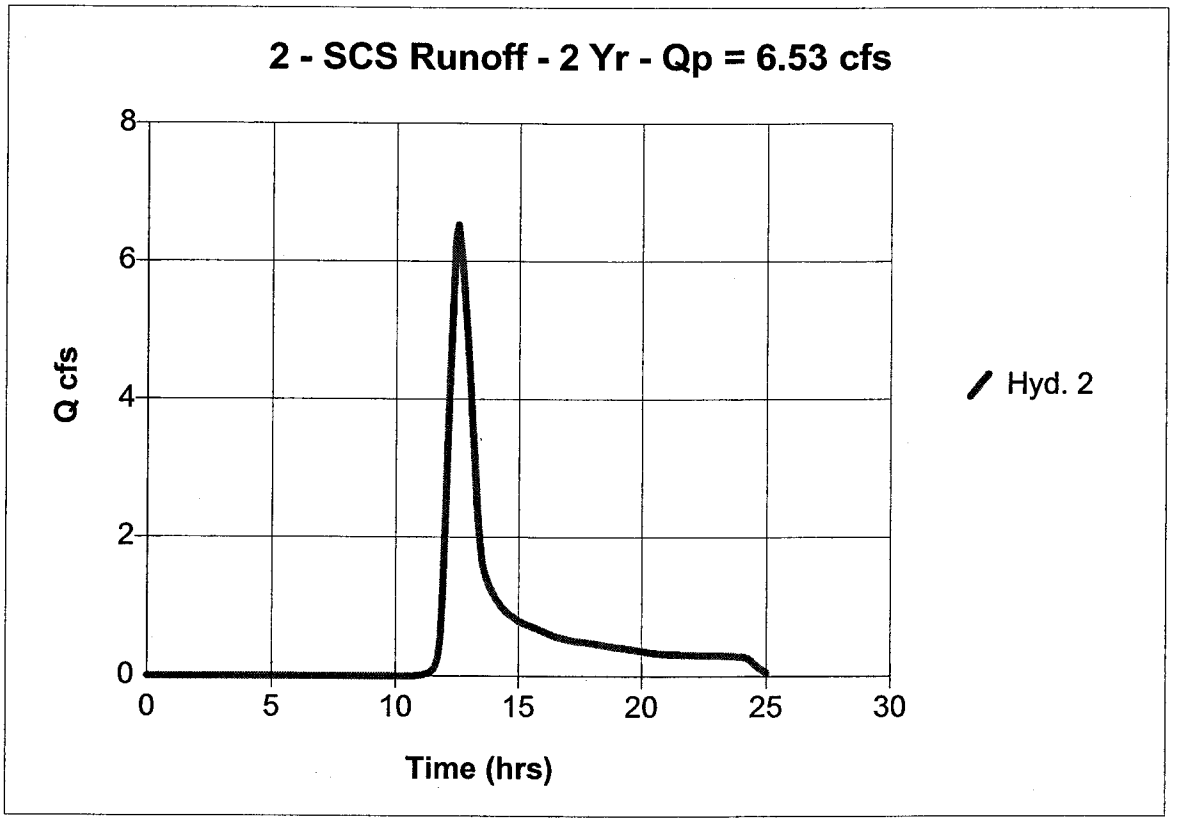
English

Hyd. No. 2

PRE-DEVELOPMENT 2-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 6.53 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Drainage area	= 10.60 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 54 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 45,390 cuft



Hydrograph Plot

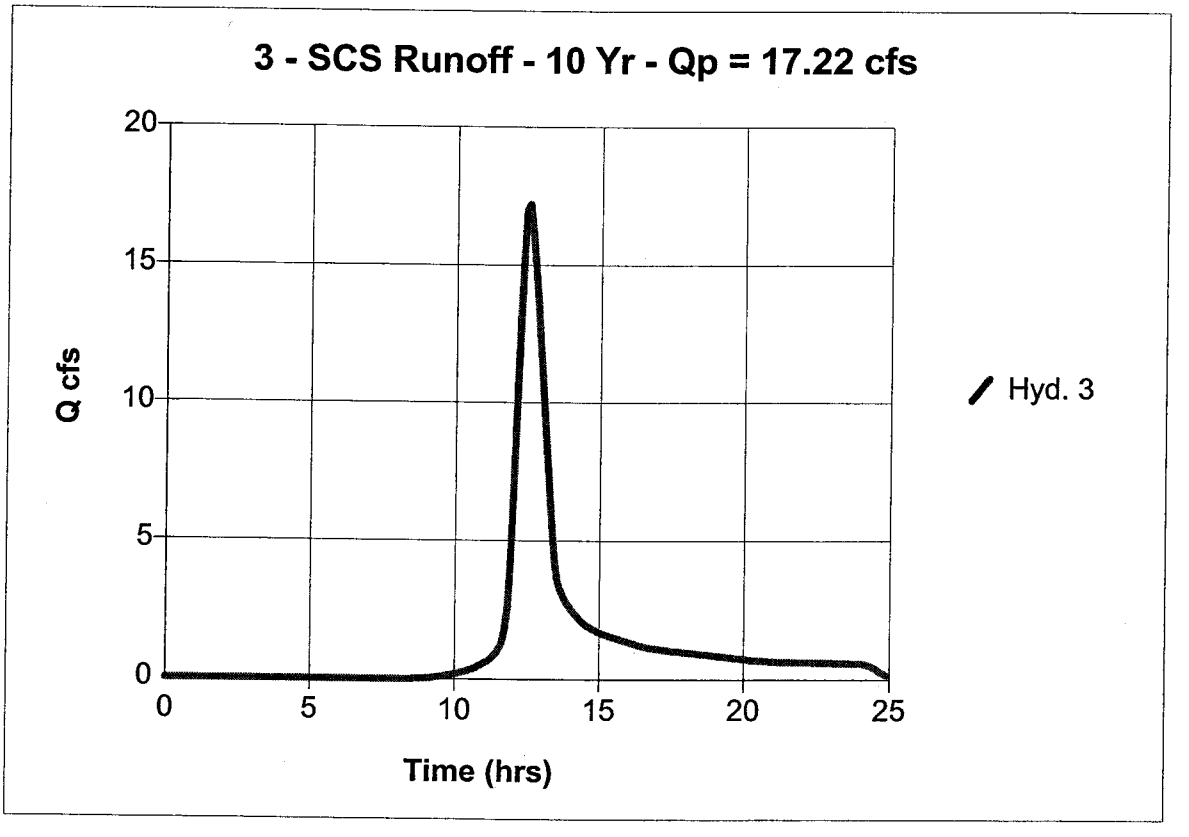
English

Hyd. No. 3

PRE-DEVELOPMENT 10-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 17.22 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 10.60 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 54 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 112,489 cuft



Hydrograph Plot

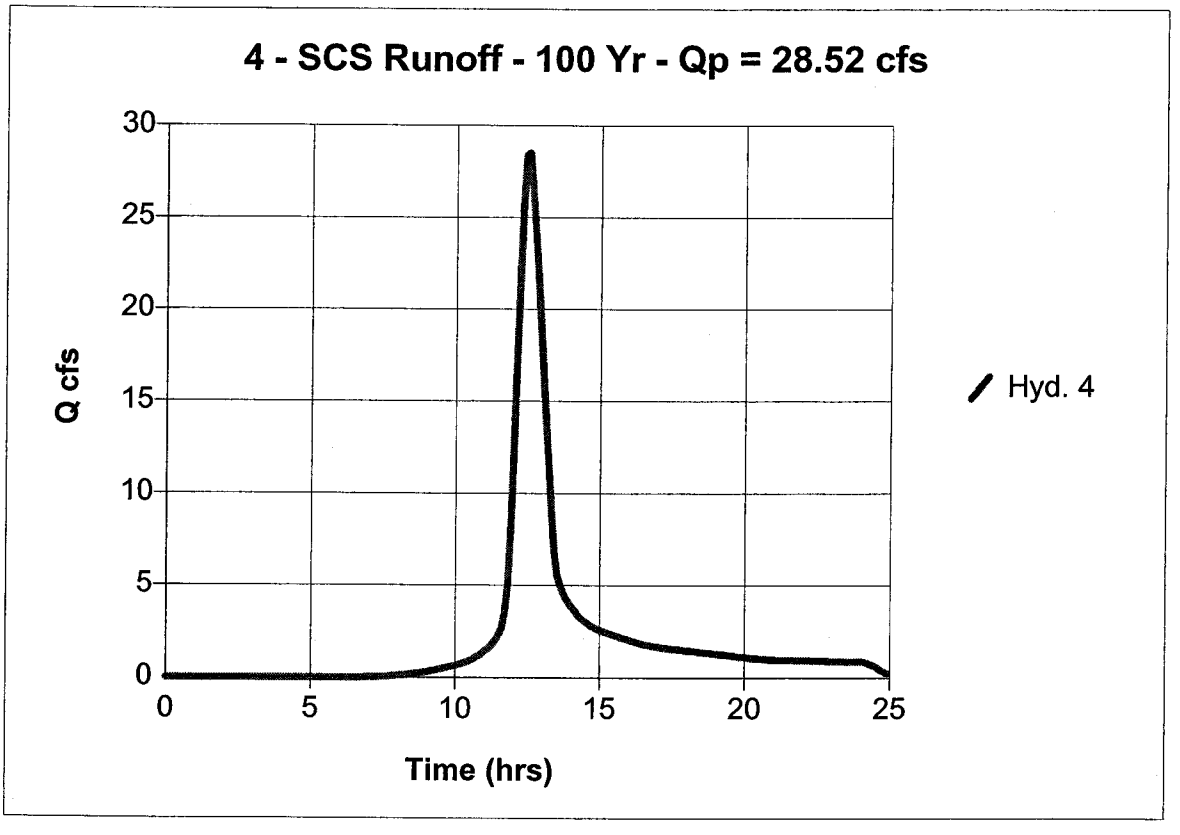
English

Hyd. No. 4

PRE-DEVELOPMENT 100-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 28.52 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 10.60 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 54 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 185,077 cuft



Hydrograph Plot

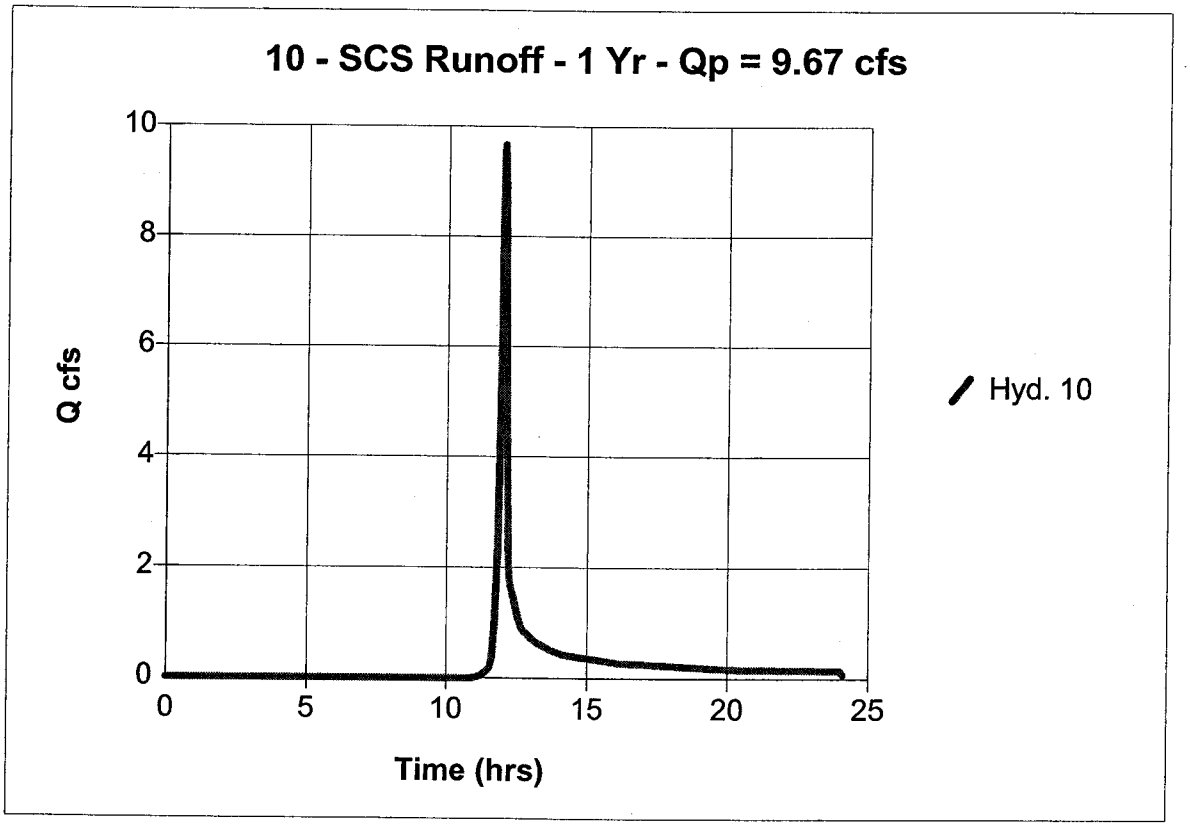
English

Hyd. No. 10

POST-DEVELOPMENT 1-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 9.67 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 7.00 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 22,432 cuft



Hydrograph Plot

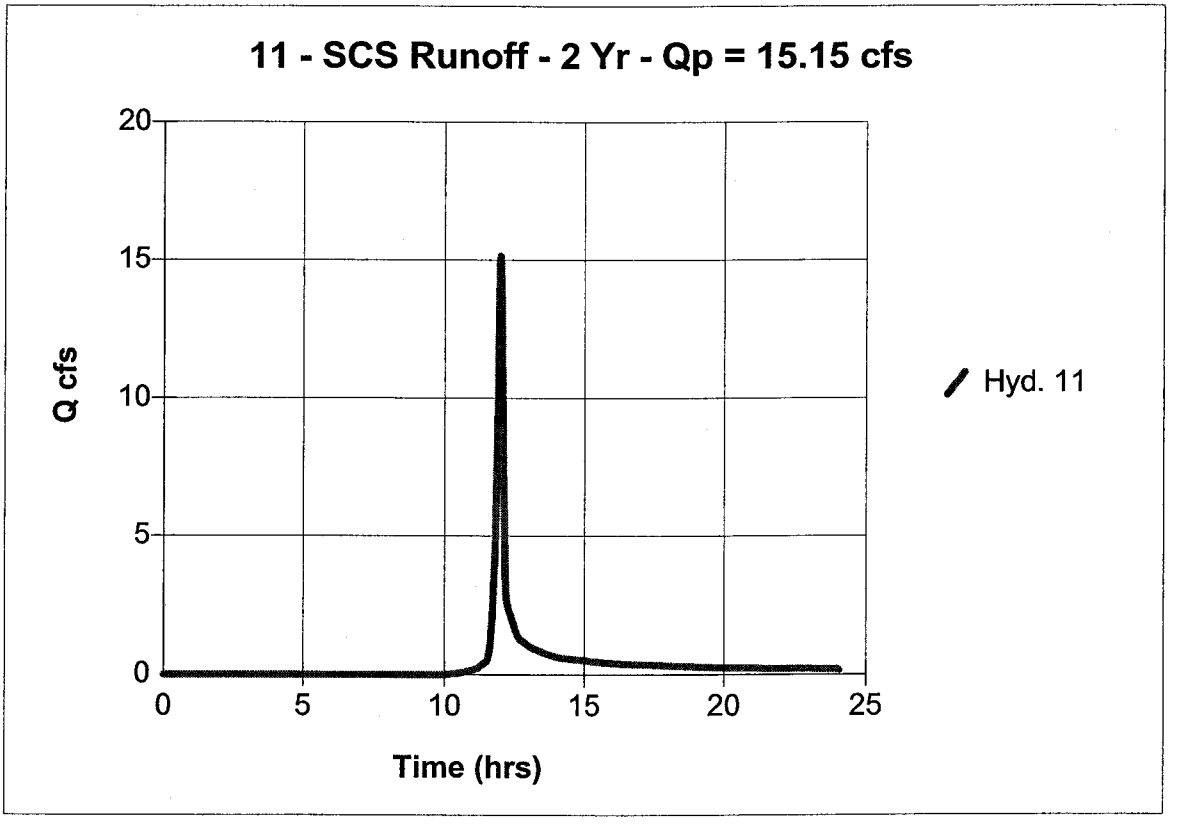
English

Hyd. No. 11

POST-DEVELOPMENT 2-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 15.15 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 7.00 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 34,693 cuft



Hydrograph Plot

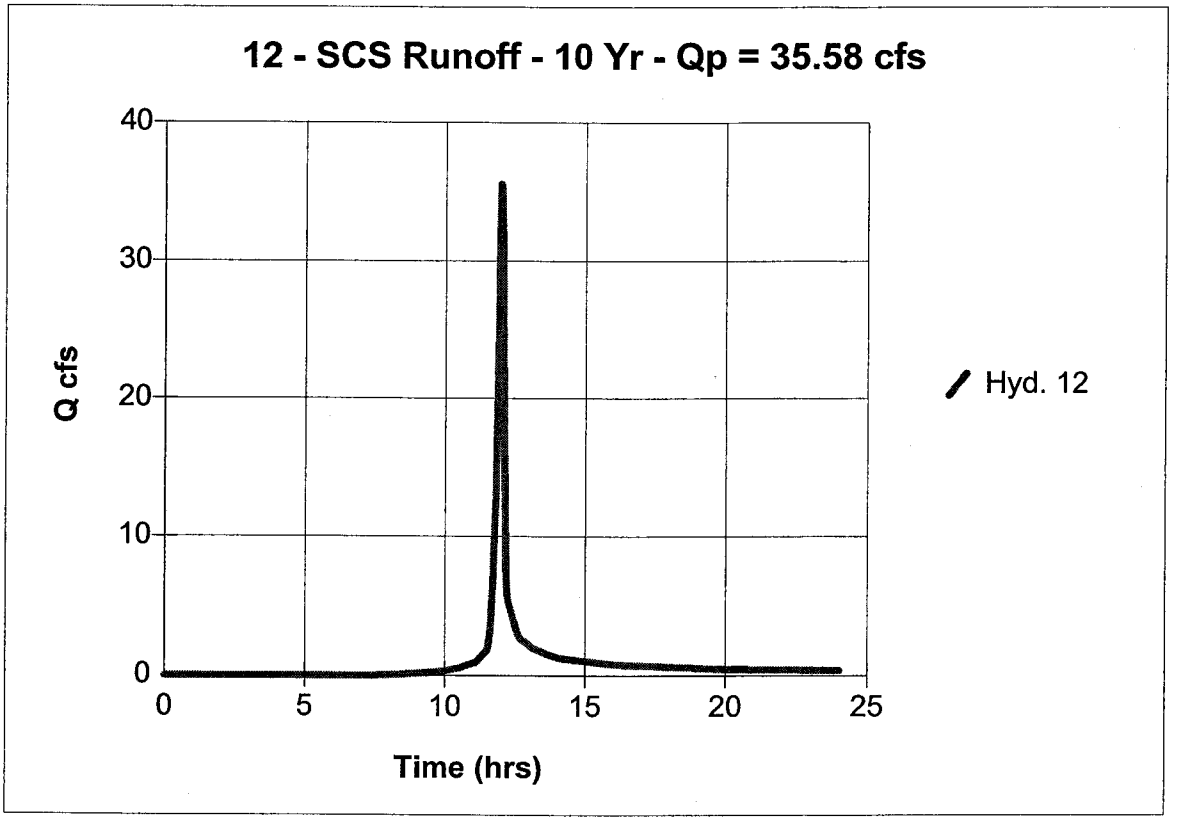
English

Hyd. No. 12

POST-DEVELOPMENT 10-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 35.58 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 7.00 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 81,521 cuft



Hydrograph Plot

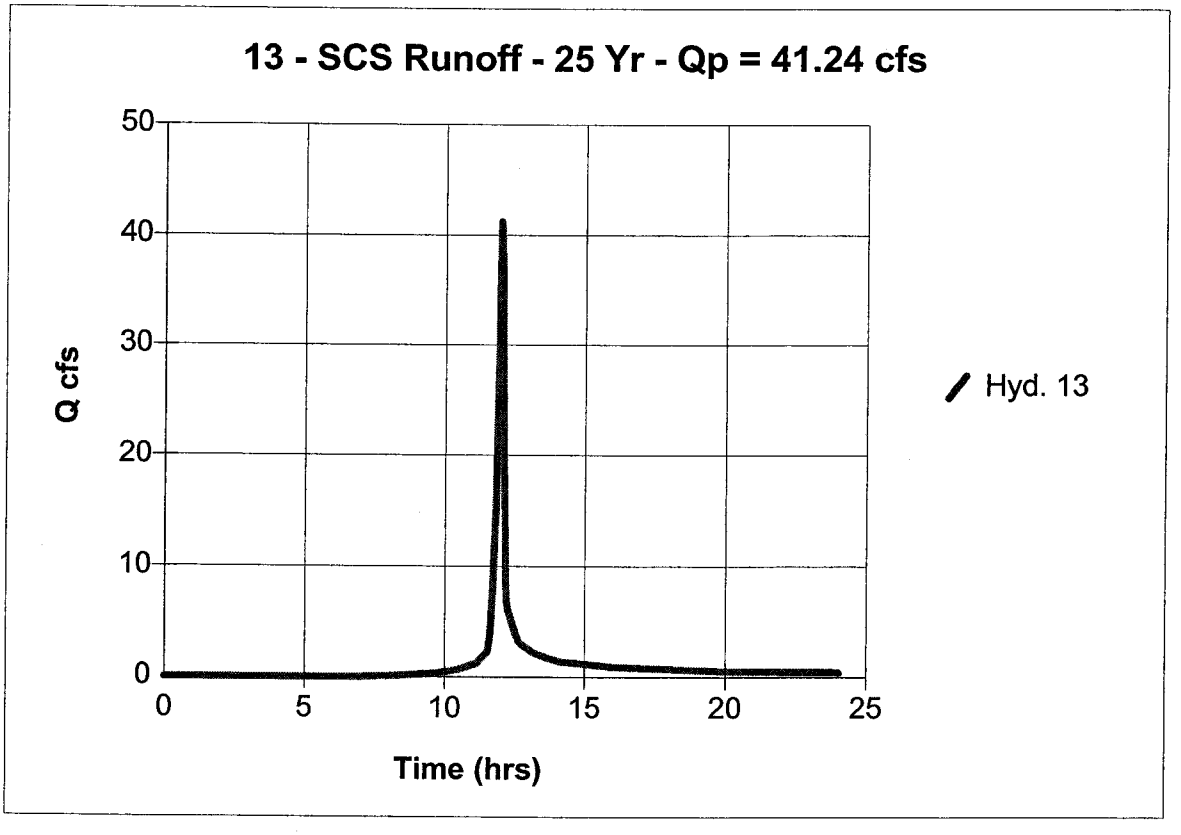
English

Hyd. No. 13

POST-DEVELOPMENT 25-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 41.24 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 7.00 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 94,721 cuft



Hydrograph Plot

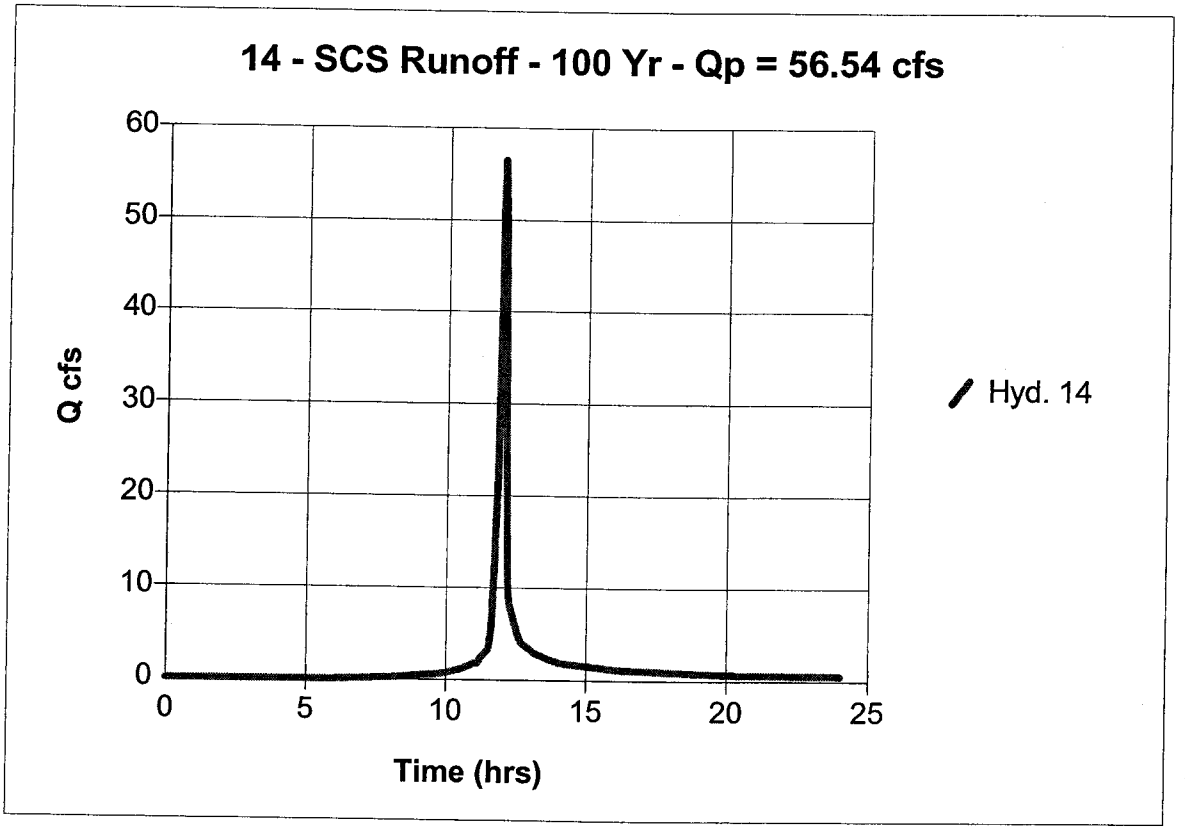
English

Hyd. No. 14

POST-DEVELOPMENT 100-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 56.54 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 7.00 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 131,062 cuft



Hydrograph Plot

English

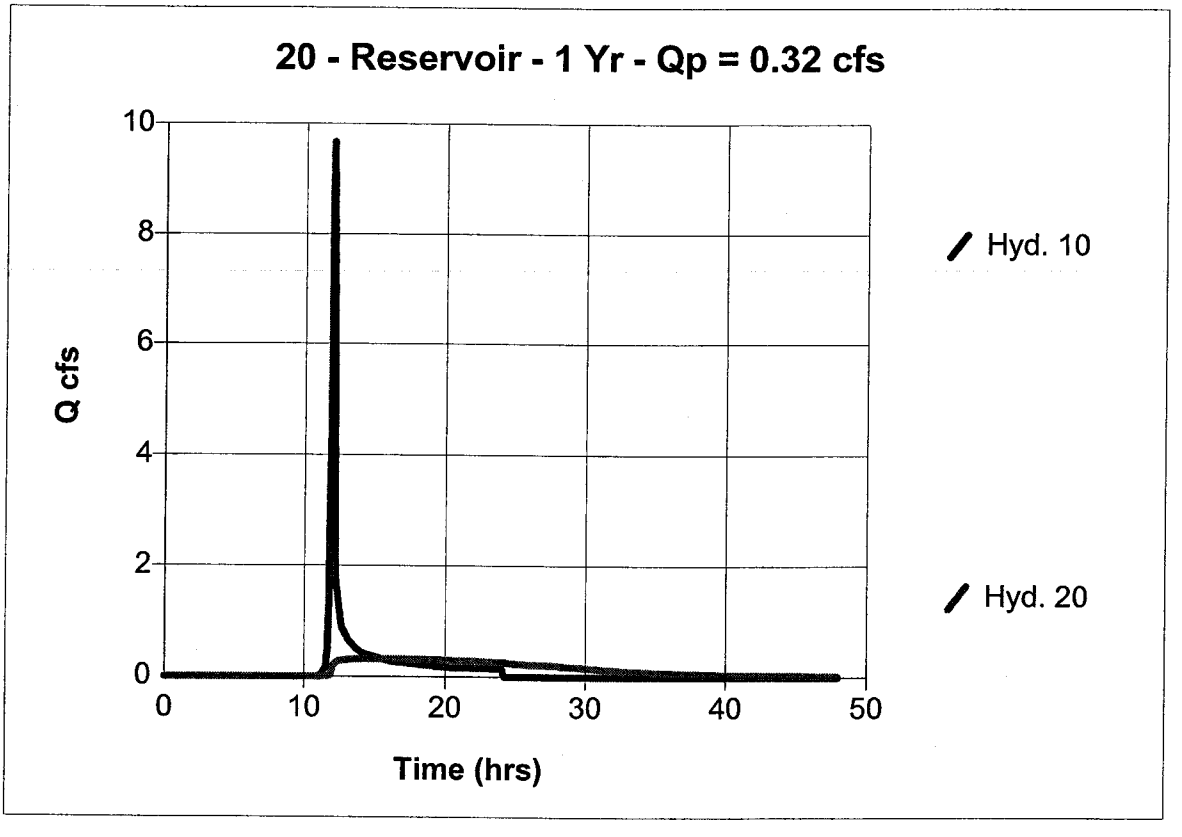
Hyd. No. 20

1-YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 0.32 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 10	Reservoir name	= DETENTION POND
Max. Elevation	= 75.74 ft	Max. Storage	= 12,619 cuft

Storage Indication method used.

Total Volume = 21,071 cuft



Hydrograph Plot

English

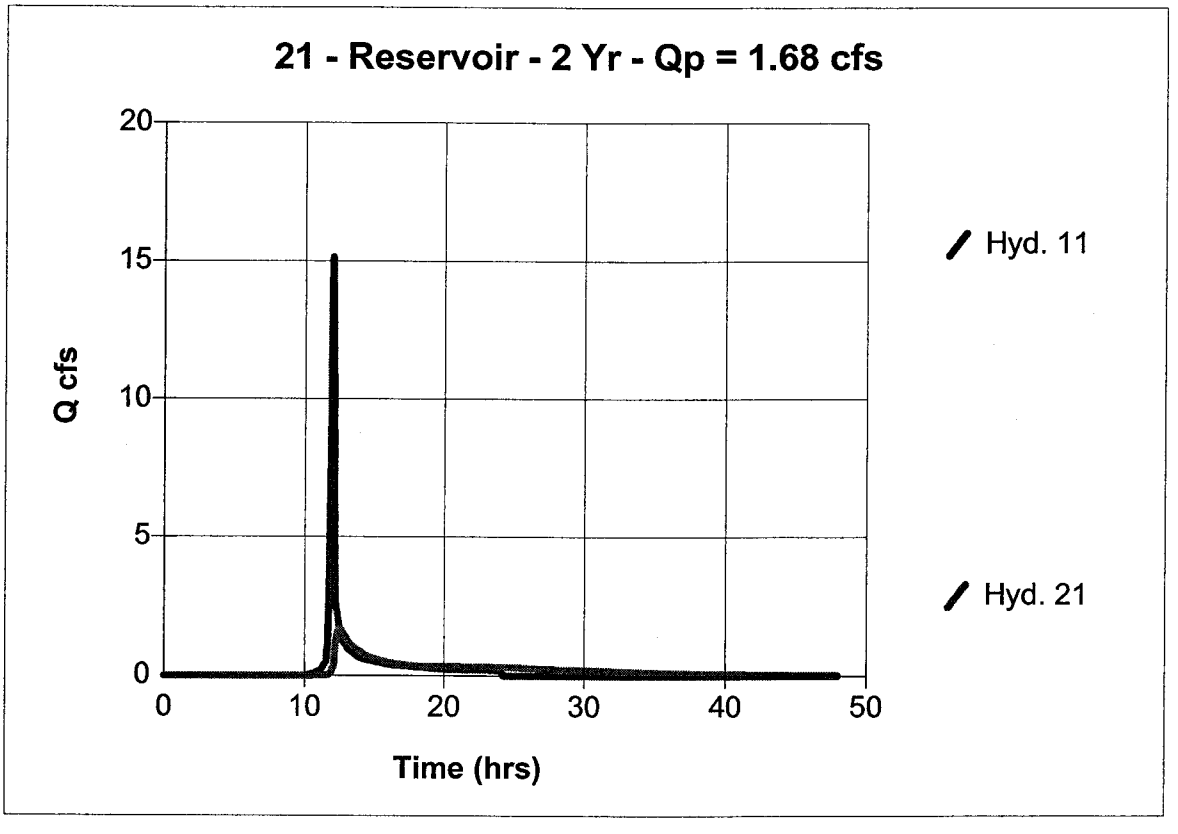
Hyd. No. 21

2-YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 1.68 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 11	Reservoir name	= DETENTION POND
Max. Elevation	= 75.94 ft	Max. Storage	= 15,987 cuft

Storage Indication method used.

Total Volume = 33,167 cuft



Hydrograph Plot

English

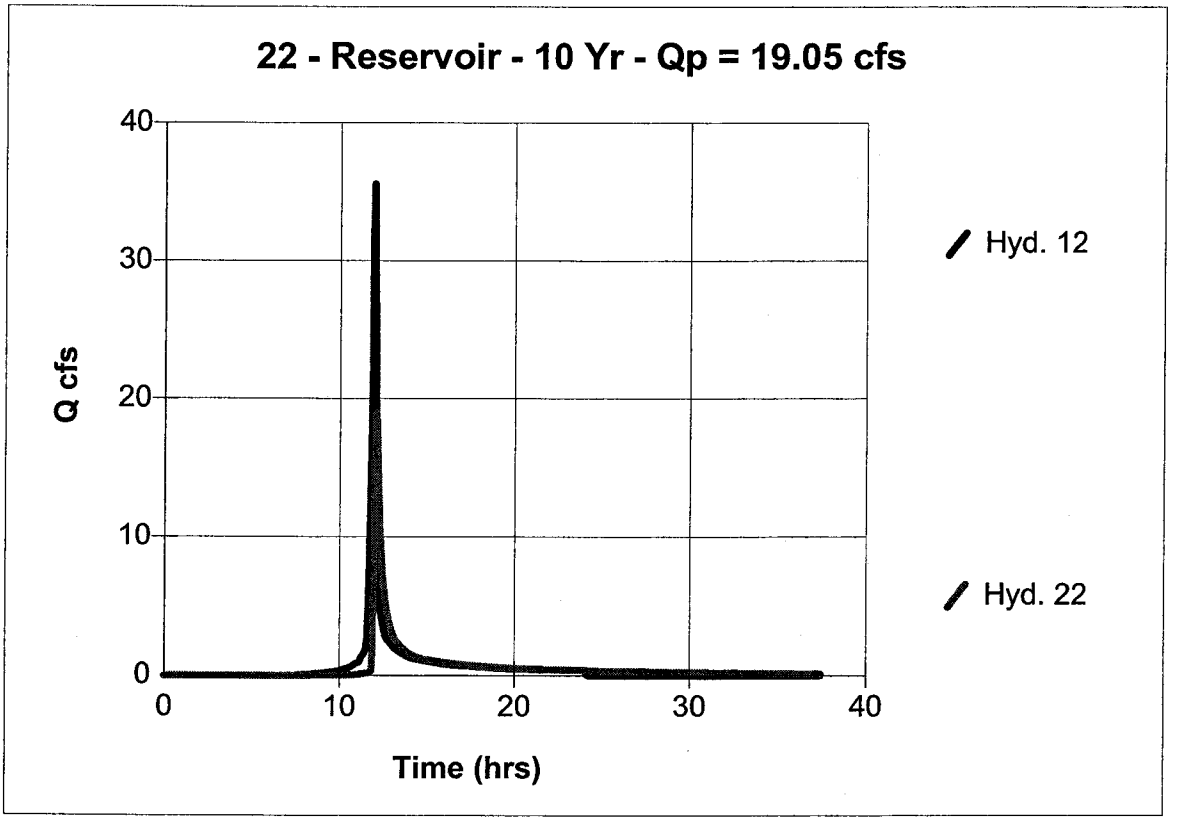
Hyd. No. 22

10-YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 19.05 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 12	Reservoir name	= DETENTION POND
Max. Elevation	= 76.65 ft	Max. Storage	= 29,517 cuft

Storage Indication method used.

Total Volume = 79,847 cuft



Hydrograph Plot

English

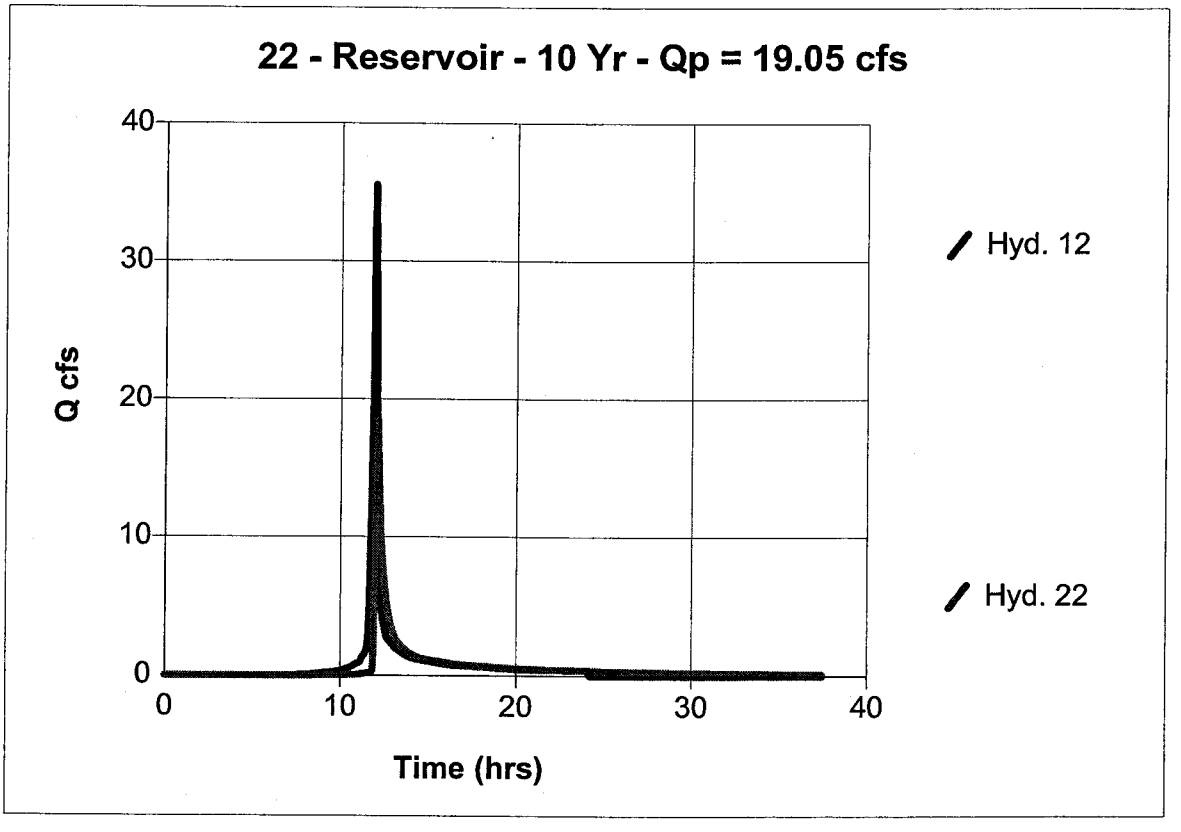
Hyd. No. 22

10-YEAR ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 19.05 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 12	Reservoir name	= DETENTION POND
Max. Elevation	= 76.65 ft	Max. Storage	= 29,517 cuft

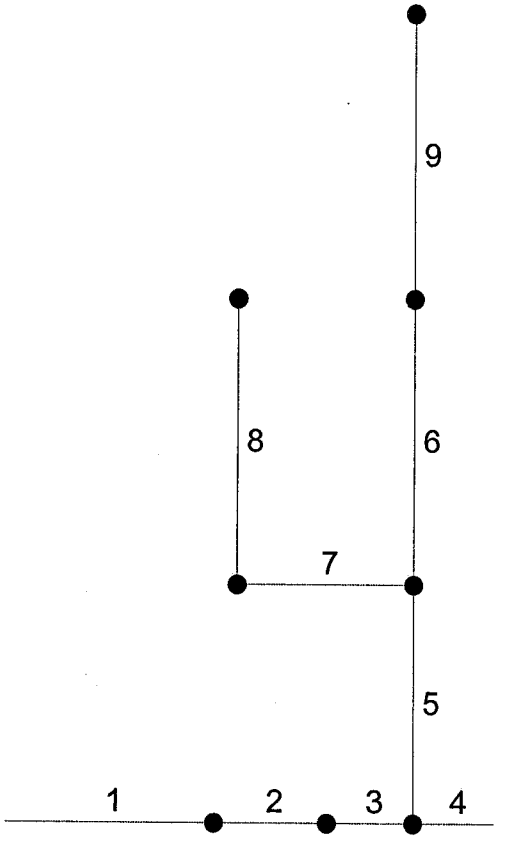
Storage Indication method used.

Total Volume = 79,847 cuft



Hydraflow Plan View

SS#1



Project file: 8818-04-STRM-SYS-1.stm	IDF file: Jccidf.idf	No. Lines: 9	04-16-2002

Hydraflow Storm Sewer Tabulation

SS# 1

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		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	92.0	0.00	0.00	0.00	0.00	0.00	5.0	15.4	0.0	39.05	82.86	7.84	36	1.54	75.29	73.87	77.28	75.86	85.37	76.87	SS1-2 TO SS1-1
2	1	50.0	0.00	0.00	0.00	0.00	0.00	5.0	15.3	0.0	37.87	82.76	7.39	36	1.54	76.06	75.29	78.02	77.43	86.14	85.37	SS1-3 TO SS1-2
3	2	38.0	0.00	0.00	0.00	0.00	0.00	5.0	15.1	0.0	37.87	83.10	7.45	36	1.55	76.65	76.06	78.61	78.16	85.46	86.14	SS1-4 TO SS1-3
4	3	36.0	0.00	0.00	0.00	0.00	0.00	15.0	15.0	0.0	31.50	83.18	5.02	36	1.56	77.21	76.65	79.47	79.54	80.21	85.46	SS1-5 TO SS 1-4
5	3	83.0	0.00	0.00	0.00	0.00	0.00	5.0	7.5	0.0	5.15	16.35	4.79	15	6.41	81.97	76.65	82.88	79.54	87.01	85.46	SS1-6 TO SS1-4
6	5	100.0	0.00	0.00	0.00	0.00	0.00	5.0	6.7	0.0	2.38	14.91	2.94	15	5.33	87.30	81.97	87.92	83.33	94.95	87.01	SS1-9 TO SS1-6 ?
7	5	78.0	0.00	0.00	0.00	0.00	0.00	5.0	6.6	0.0	1.83	6.46	2.22	15	1.00	82.75	81.97	83.38	83.33	86.73	87.01	SS1-7 TO SS 1-6
8	7	95.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.18	13.80	2.30	15	4.57	87.09	82.75	87.52	83.52	91.37	86.73	SS1-8 TO SS1-7
9	6	100.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.22	11.91	2.51	15	3.40	90.70	87.30	91.14	87.95	94.95	94.95	SS1-9 TO SS1-1 ?

2 ? ✓

Doesn't match with current plan

Sheet 47 6

91.09

1-10 TO 1-6

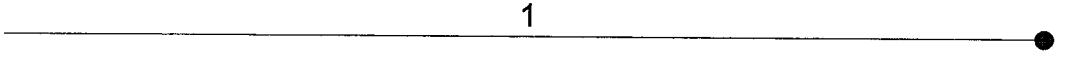
Project File: 8818-04-STRM-SYS-1.stm | IDF File: Jccidf.idf | Total number of lines: 9 | Run Date: 05-01-2002

NOTES: Intensity = 80.56 / (Inlet time + 14.90) ^ 0.82; Return period = 10 Yrs. ; Initial tailwater elevation = 75.86 (ft)

change

Hydraflow Plan View

SS#2



Project file: 8818-04-STRM-SYS-2.stm	IDF file: JCCstormsewer.IDF	No. Lines: 1	04-16-2002

Hydraflow Storm Sewer Tabulation

SS#2

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		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	24.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	2.00	18.64	3.70	15	8.33	80.00	78.00	80.57	78.57	85.00	79.25	SS2-2 TO SS2-1

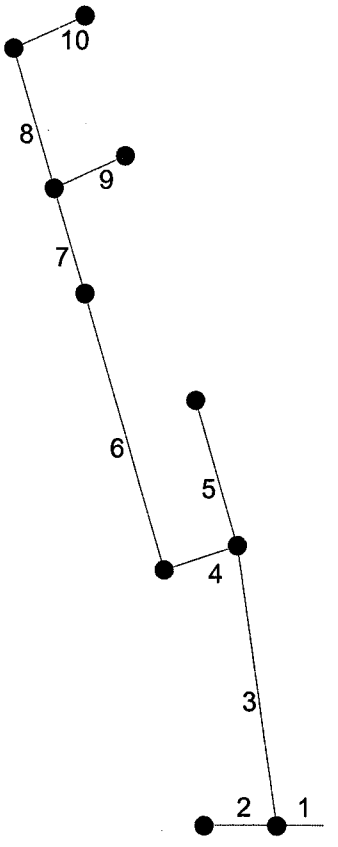
Project File: 8818-04-STRM-SYS-2.stm	IDF File: JCCstormsewer.IDF	Total number of lines: 1	Run Date: 04-16-2002

NOTES: Intensity = 143.72 / (Inlet time + 19.20) ^ 0.94; Return period = 10 Yrs. ; Initial tailwater elevation = 78.57 (ft)

78.57
+ 77.21
1.36' HW

Hydraflow Plan View

SS#3



Project file: 8818-04-STRM-SYS-3.stm	IDF file: JCCstormsewer.IDF	No. Lines: 10	04-16-2002

Hydraflow Storm Sewer Tabulation

SS#3

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	40.0	0.00	0.00	0.00	0.00	0.00	5.0	9.9	0.0	16.79	22.62	6.88	24	1.00	74.40	74.00	75.85	75.45	79.32	76.00	SS3-2 TO SS3-1
2	1	61.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.97	6.40	1.61	15	0.98	75.00	74.40	76.64	76.59	79.34	79.32	SS3-3 TO SS3-2
3	1	189.0	0.00	0.00	0.00	0.00	0.00	5.0	9.0	0.0	11.32	10.14	3.60	24	0.20	74.78	74.40	77.06	76.59	79.10	79.32	SS3-4 TO SS3-3
4	3	64.0	0.00	0.00	0.00	0.00	0.00	5.0	6.3	0.0	10.08	15.99	3.21	24	0.50	75.10	74.78	77.39	77.26	79.10	79.10	SS3-5 TO SS3-4
5	3	104.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.53	7.73	0.47	15	1.43	76.27	74.78	77.27	77.26	80.77	79.10	SS3-6 TO SS3-5
6	4	197.0	0.00	0.00	0.00	0.00	0.00	5.0	5.9	0.0	9.28	10.69	7.67	15	2.74	80.50	75.10	81.67	77.55	84.79	79.10	SS3-7 TO SS3-6
7	6	75.0	0.00	0.00	0.00	0.00	0.00	5.0	5.7	0.0	8.48	13.95	7.07	15	4.67	84.00	80.50	85.14	81.81	88.66	84.79	SS3-8 TO SS3-7
8	7	100.0	0.00	0.00	0.00	0.00	0.00	5.0	5.3	0.0	5.78	14.44	5.21	15	5.00	89.00	84.00	89.96	85.95	93.69	88.66	SS3-9 TO SS3-8
9	7	64.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	2.12	5.93	1.73	15	0.84	84.54	84.00	86.02	85.95	88.66	88.66	SS3-10 TO SS3-8
10	8	64.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	4.05	6.46	3.52	15	1.00	89.64	89.00	90.67	90.47	93.69	93.69	SS3-11 TO SS3-9

? ? ?

SS 3-6 DOES NOT CONNECT ~~IS MISSING~~ TO 3-5 & 3-7

* Pressure Flow HGL OK.

Basis

Project File: 8818-04-STRM-SYS-3.stm	IDF File: JCCstormsewer.IDF	Total number of lines: 10	Run Date: 04-16-2002

NOTES: Intensity = 143.72 / (Inlet time + 19.20) ^ 0.94; Return period = 10 Yrs. ; Initial tailwater elevation = 75.45 (ft)

1.451 0.8(2) 76.0

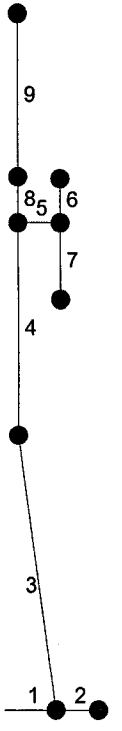
1 YR WSEL = 75.74

75.45 < 75.74 ∴ TW < 1 YEAR STORM

75.45

Hydraflow Plan View

SS#4



Project file: 8818-04-STRM-SYS-4.stm	IDF file: JCCstormsewer.IDF	No. Lines: 9	05-01-2002

Hydraflow 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	71.0	0.00	0.00	0.00	0.00	0.00	5.0	9.8	0.0	9.61	5.57	5.93	18	0.28	59.87	59.67	61.65	60.85	70.80	66.00	SS4-1 TO SS4-2
2	1	58.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.08	10.50	0.61	18	1.00	60.45	59.87	62.12	62.11	70.80	70.80	SS4-2 TO SS4-3
3	1	303.0	0.00	0.00	0.00	0.00	0.00	0.0	8.6	0.0	7.64	7.41	5.04	18	0.50	63.64	62.13	65.34	63.19	75.50	70.80	SS4-2 TO SS4-4
4	3	231.0	0.00	0.00	0.00	0.00	0.00	5.0	8.0	0.0	7.64	6.46	6.23	15	1.00	65.95	63.64	68.62	65.38	71.55	75.50	SS4-4 TO SS4-5
5	4	58.0	0.00	0.00	0.00	0.00	0.00	5.0	7.0	0.0	3.11	4.57	2.53	15	0.50	66.24	65.95	69.36	69.22	71.55	71.55	SS4-5 TO SS4-6
6	5	48.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.64	11.53	1.34	15	3.19	67.77	66.24	69.49	69.46	71.77	71.55	SS4-6 TO SS4-7
7	5	84.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.84	7.05	0.68	15	1.19	67.24	66.24	69.47	69.46	71.77	71.55	SS4-6 TO SS4-8
8	4	50.0	0.00	0.00	0.00	0.00	0.00	5.0	7.6	0.0	2.80	9.79	2.28	15	2.30	67.10	65.95	69.32	69.22	72.28	71.55	SS4-5 TO SS4-9
9	8	178.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.40	6.46	1.76	15	1.00	68.88	67.10	69.49	69.33	75.07	72.28	SS4-9 TO SS4-10

Project File: 8818-04-STRM-SYS-4.stm | IDF File: JCCstormsewer.IDF | Total number of lines: 9 | Run Date: 05-01-2002

NOTES: Intensity = 143.72 / (Inlet time + 19.20) ^ 0.94; Return period = 10 Yrs. ; Initial tailwater elevation = 60.85 (ft)

PLAN 6.33% SS#4

24" 0.50%

PLAN SHOWS 1.24% OK

SS-4-10 to 4-9

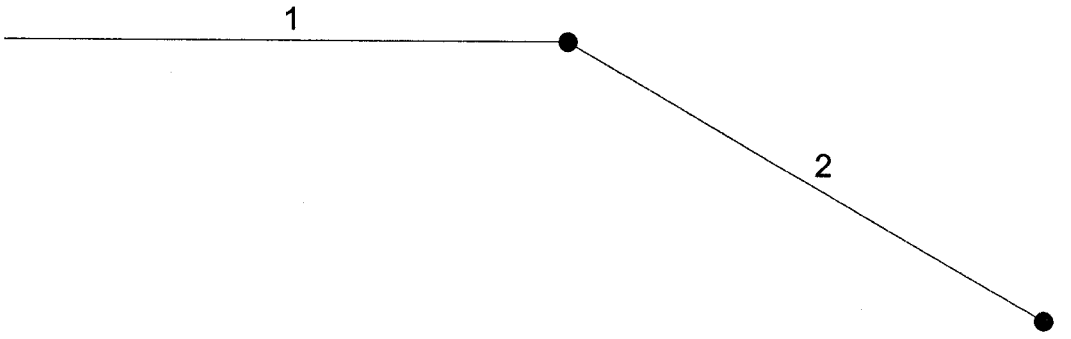
BASIS?

1-YR 62.36 (7.69)

INV 59.67 Depth = 1.18

Hydraflow Plan View

SS#5



Project file: 8818-04-STRM-SYS-5.stm	IDF file: JCCstormsewer.IDF	No. Lines: 2	05-01-2002

Hydraflow Storm Sewer Tabulation

SS#5

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	92.0	0.00	0.00	0.00	0.00	0.00	5.0	6.2	0.0	3.86	9.23	4.75	15	2.04	61.55	59.67	62.34	60.46	66.50	60.92	SS5-1 TO SS5-2
2	1	90.0	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.59	4.57	2.22	15	0.50	62.00	61.55	62.58	62.49	66.00	66.50	SS5-2 TO SS5-3

Project File: 8818-04-STRM-SYS-5.stm | IDF File: JCCstormsewer.IDF | Total number of lines: 2 | Run Date: 05-01-2002

NOTES: Intensity = 143.72 / (Inlet time + 19.20) ^ 0.94; Return period = 10 Yrs. ; Initial tailwater elevation = 60.46 (ft)

Storm sewer system #4