



CERTIFICATE OF AUTHENTICITY

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

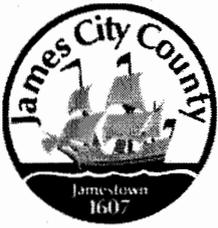
BMP NUMBER: YC015

DATE VERIFIED: January 14, 2013

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

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

General File ID or BMP ID: YC015

PIN: 2430100052

Subdivision, Tract, Business or Owner

Name (if known):

Briarwood Park Condos

Property Description:

Recreation Area

Site Address:

6395 Centerville Road

(For internal use only)

Box 22

Drawer: 9

Agreements: (in file as of scan date)

N

Book or Doc#:

Page:

Comments

EASEMENT AND MAINTENANCE AGREEMENT

This **EASEMENT AND MAINTENANCE AGREEMENT** (this "Agreement") is made this _____ day of _____ 2003, by and between **BRIARWOOD PARK CONDOMINIUM OWNER'S ASSOCIATION, INC.** ("ASSOCIATION"), Grantor, and **JAMES CITY COUNTY**, a Political Subdivision of the Commonwealth of Virginia ("COUNTY"), Grantee; and

RECITALS

WHEREAS, the ASSOCIATION is the umbrella homeowners' association responsible for the maintenance, management, operation, and control of the Common Areas in the residential community known as BRIARWOOD PARK, located in the County of James City, Virginia; and

WHEREAS, the ASSOCIATION is responsible for the maintenance and upkeep of the Common Areas in Briarwood Park; and

WHEREAS, there is one privately owned stormwater detention basin in Briarwood Park, located within a certain piece or parcel of land identified as "COMMON ELEMENT REMAINDER OF PARCEL 3" on a certain plat entitled "BRIARWOOD PARK CONDOMINIUMS PHASE FOUR," dated May 11, 1994, by Alfonso and Associates, Inc., Surveyors, Newport News, Virginia, which plat was recorded in the Williamsburg/James City County Circuit Court Clerk's Office in Plat Book 59, page 74. The one stormwater detention basin (BASIN) provides the stormwater management and treatment for the Briarwood Park community; and

WHEREAS, the ASSOCIATION and the COUNTY have agreed, subject to the provisions of Paragraph 14 herein, that the ASSOCIATION will be responsible for certain routine maintenance and repairs of the (BASIN), and the County will be responsible for certain non-routine maintenance, emergency repairs, and replacements all as hereinafter set forth; and

WHEREAS, the purpose of the maintenance is to ensure that the BASIN detains and releases stormwater in accordance with the approved BASIN design as presented in County plans except as otherwise provided for in Item 9 below.

NOW THEREFORE, in consideration of TEN DOLLARS (\$10.00), the mutual covenants contained herein and other good valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

- 1. County's Duties.** The COUNTY agrees, subject to the provisions of Paragraph 14 herein, to perform all "Non-Routine Work" (as hereinafter defined in Paragraph 3 below) to the BASIN. In connection with the exercise of its duties hereunder, the COUNTY agrees to complete all work lien free and in a good and workmanlike manner, and to restore all disturbed areas upon completion of the work to substantially the original condition of such areas.

2. Associations' Duties.

The ASSOCIATION:

- a) Agrees to perform all "Routine Work" (as hereinafter defined in Paragraph 3 below) to the BASIN; and
- b) Agrees to levy regular or special assessments, if necessary, to the fullest extent permitted under the Declaration of Covenants and/or Virginia law, against all present or subsequent owners of property, subject to the Declaration of Covenants and served by the SYSTEM to ensure that the ASSOCIATION has adequate funds available to perform its obligations in accordance with this Agreement; and
- c) Hereby grants and conveys to the COUNTY the non-exclusive right of ingress and egress over and across the common element owned by the ASSOCIATION for the purpose of: (i) providing access to and from the BASIN to enable the COUNTY to perform its duties under this Agreement; (ii) providing perpetual access from the public right-of-ways to the BASIN for the COUNTY, its employees, its agent, and its contractor, and (iii) for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining, or repairing the BASIN; and
- d) Hereby agrees to promptly notify the COUNTY when the ASSOCIATION legally transfers any of the responsibilities for the BASIN. The ASSOCIATION shall supply the COUNTY with a copy of any document of transfer, executed by the ASSOCIATION and by the transferee, indicating the transferee's agreement to assume the ASSOCIATION'S obligations hereunder.

3. Definitions.

A. "Routine Work." As used herein, the term "Routine Work" means the performance of the following duties:

- (i) Mowing and seeding of the stormwater detention basin embankment.
- (ii) Removal of downed trees from the stormwater detention basins themselves, insofar as they inhibit the function of the stormwater detention basins.
- (iii) Removal of tree growth from the dam embankment itself.
- (iv) Maintaining stormwater outlets and release structures free of trash and debris.
- (v) Management of vegetation, such that said vegetation does not interfere with the function of the stormwater detention basin and dam.
- (vi) Routine maintenance of dam embankment to prevent surface erosion of the dam.
- (vii) Reasonable action to control animals (such as beavers and muskrats) that may live in or around the stormwater detention basins, insofar as they pose a hazard to the function of the settlement basin.

B. "Non-Routine Work." As used herein, the term "Non-Routine Work" means performance of the following duties:

- (i) Dredging and cleaning of the stormwater detention basin to maintain an appropriate depth for stormwater management purposes.
- (ii) Periodic checks of the stormwater detention basin depths, as appropriate.

- (iii) Making all necessary structural repairs to the dam embankment and drainage structures, other than mowing and seeding.
- (iv) Replacing pipe spillways when damaged to the extent that their function is impaired.
- (v) Providing emergency repairs to the stormwater detention basins, dams, spillways, pipes, and embankments, to include dam embankment failures.

4. **Compliance with Laws.** The work performed by any party shall be completed in a good and workmanlike manner and shall comply with all Federal, State, and local laws, regulations, and ordinances.

5. **Reservation.** The ASSOCIATION reserves: (a) the right to landscape and grade the easement areas and to install fencing on easement areas other than easements for ingress/egress or access; (b) the right to install (or to grant others the right to install) other utilities in, on, or about the easement areas, and; (c) the right to otherwise use the easement areas for such other purposes as the ASSOCIATION may desire, provided that such use is not inconsistent with, and does not interfere with the easements granted by this instrument, and further provided that the function of the dam is not impaired by such use.

6. **Duration.** The easement hereby granted and the other covenants, agreements, and licenses contained herein shall be covenants and agreements running with the land and shall inure to the benefit of, and is binding upon, the parties hereto and all persons claiming under them, in perpetuity unless terminated or amended in accordance with

Paragraph 13 below.

7. **Remedies.** In addition to all rights and remedies otherwise available at law or in equity, in the event of any default under or violation or threatened violation of the Agreement by any part hereto, then the County shall after notice to the ASSOCIATION setting forth the specific failures to comply with this Agreement, if those failures are not corrected within thirty (30) days after the delivery of the notice, then the COUNTY shall have the right to correct the failures, and the ASSOCIATION shall pay the costs thereof.

8. **Separability.** The invalidation of any of the grants or covenants contained herein, by order of court, legislative mandate or otherwise, shall not affect any of the other provisions hereof and such other provisions shall remain in full force and effect.

9. **Notice.** Any notice required or intended to be given to any party under the terms of this Agreement shall be in writing and shall be deemed to be duly given if hand delivered or if deposited in the United States Mail, marked certified or registered, return receipt requested, postage prepaid, or if sent by commercial courier service (e.g., Federal Express or UPS), addressed to the party to whom notice is to be given at the party's address set forth above, or at such other address as the party may hereafter designate by notice.

10. **Nonwaiver.** The forbearance or waiver by any party of a breach of any provision of this Agreement shall not operate as or be construed to be a waiver of any continuing breach or subsequent breach of this Agreement.

11. **Miscellaneous.** Whenever used herein, the singular shall include the plural, the plural the singular, and the use of any gender shall include all other genders. The use of paragraph headings or captions is for ease of reference only, and such headings or captions shall have no substantive meaning in the interpretation of this Agreement.

12. **Governing Law.** This Agreement shall be construed in accordance with, and governed by, the laws of the Commonwealth of Virginia.

13. **Amendment/Termination.** This Agreement may not be amended or terminated except by an instrument in writing duly executed by all parties and recorded in the Clerk's Office. However, the parties agree that when the COUNTY implements a stormwater management maintenance program to limit and manage the volume of stormwater runoff and to prevent the degradation of the County's waterways, that the COUNTY will not exclude Briarwood Park from inclusion in the County's plan, based either in whole or in part on the existence of this Agreement, and once Briarwood Park is included in such a system, the parties agree that this Agreement will terminate and that all maintenance of the stormwater detention basins, whether routine or non-routine, will become the responsibility of the COUNTY.

14. **Appropriations Clause.** Notwithstanding any other provision herein to the contrary, this Agreement shall in no way obligate the County or the Board of Supervisors to appropriate money in order to fulfill any of the terms and conditions of this Agreement. However, it is the present intention of the County to fulfill the obligations under this Agreement.

WITNESS the following duly authorized signatures and seals:

**BRIARWOOD PARK CONDOMINIUM
OWNER'S ASSOCIATION, INC.**
A Virginia non-stock corporation

By: _____

Name: Joseph Cervini

Title: President

THE COUNTY OF JAMES CITY, a Political
Subdivision of the Commonwealth of Virginia

By: _____

Name: Sanford B. Wanner

Title: County Administrator

APPROVED AS TO FORM

County Attorney

COMMONWEALTH OF VIRGINIA
COUNTY OF JAMES CITY:

The foregoing instrument was acknowledged before me in James City County, Virginia, this _____ day of _____ 2003, by _____, _____, of Briarwood Park Condominium Owner's Association, Inc., a Virginia non-stock corporation, on its behalf.

Notary Public

My commission expires: _____

COMMONWEALTH OF VIRGINIA
COUNTY OF JAMES CITY:

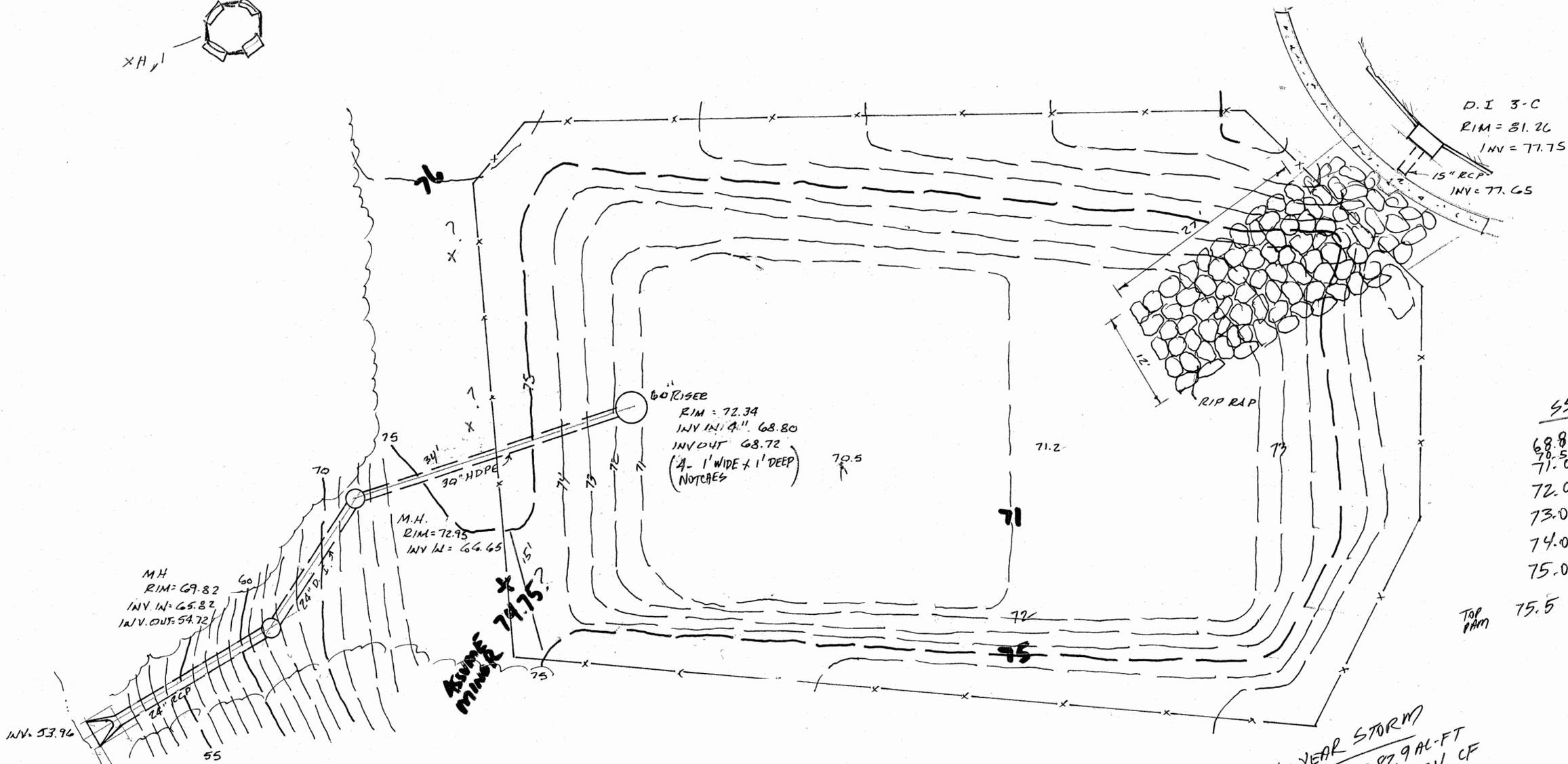
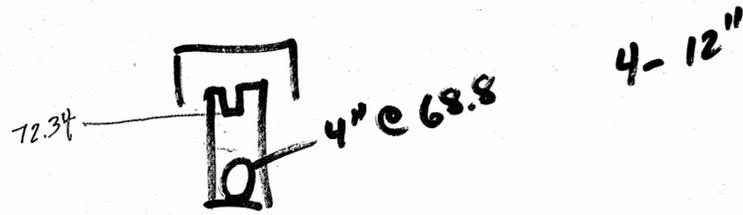
The foregoing instrument was acknowledged before me in James City County, Virginia, this _____ day of _____ 2003, by _____, _____, of James City County, a Political Subdivision of the Commonwealth of Virginia, on its behalf.

Notary Public

My commission expires: _____

This Instrument prepared by:
Leo P. Rogers, Esq.
James City County
101-C Mounts Bay Road
Williamsburg, VA 23185
(757) 253-6614

briarwd.agr



D.I 3-C
RIM = 81.26
INV = 77.75
15" RCP
INV = 77.65

60" RISER
RIM = 72.34
INV IN 4" 68.80
INV OUT 68.72
(4-1" WIDE x 1" DEEP NOTCHES)

M.H.
RIM = 72.95
INV IN = 66.65

M.H.
RIM = 69.82
INV IN = 65.82
INV. OUT = 59.72

SS CURVE

68.80	1,000 SF = 0.0230
70.5	1890 SF = 0.0434
72.0	3600 SF = 0.0826
73.0	4250 SF = 0.0976
74.0	4929 SF = 0.1132
75.0	5700 SF = 0.1309
75.5	6490 SF = 0.1490

POND MODIFICATIONS

DA = 7.00 AC
CN = 85
TC = 0.253 HRS.

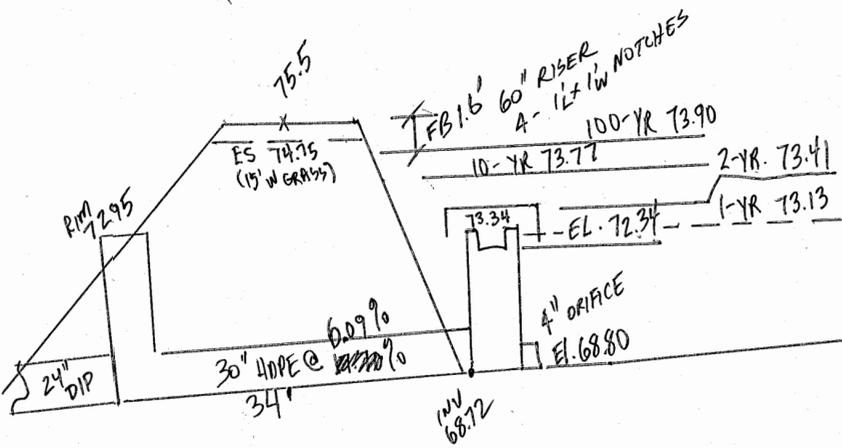
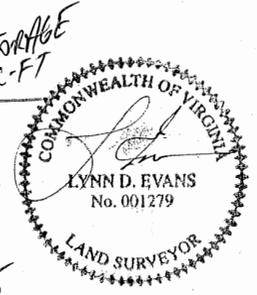
	WSEL
1-YR	73.13
2-YR	73.41
10-YR	73.77
100-YR	73.90

DISCHARGE	STORAGE AC-FT
9.91 CFS	0.194
16.74 CFS	0.222
35.52 CFS	0.261
39.54 CFS	0.275

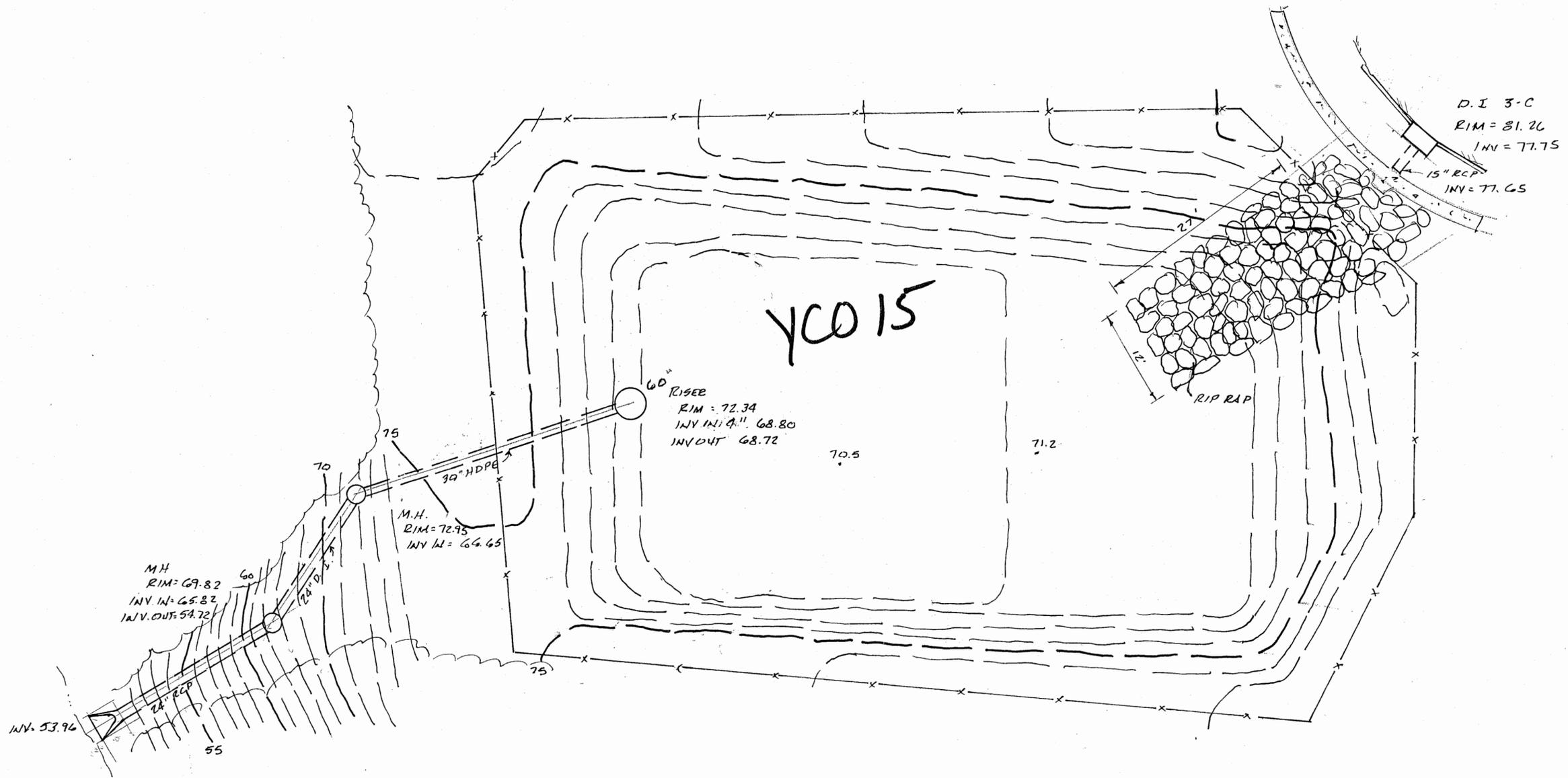
1-YEAR STORM
INFLOW 0.829 AC-FT
36,111.24 CF

EL. 73.13
H = 73.13 - 68.80 = 4.33'
4" = 0.0873 SF
CFS = 0.6√64.4(4) × 0.0873 SF
= 0.8407 CFS

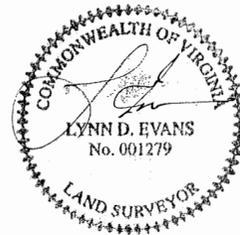
36,111.24 CF = 0.8407 AS BUILT SURVEY
T(60)(60) POND IMPROVEMENTS
AT BRIARWOOD
JAMES CITY COUNTY, VA.
T = 11.93 hrs.
ABOUT 12 hrs drawdown
OF 1-YEAR STORM
OCT 30, 2004
1" = 10'



SJT COMMENTS - YC015



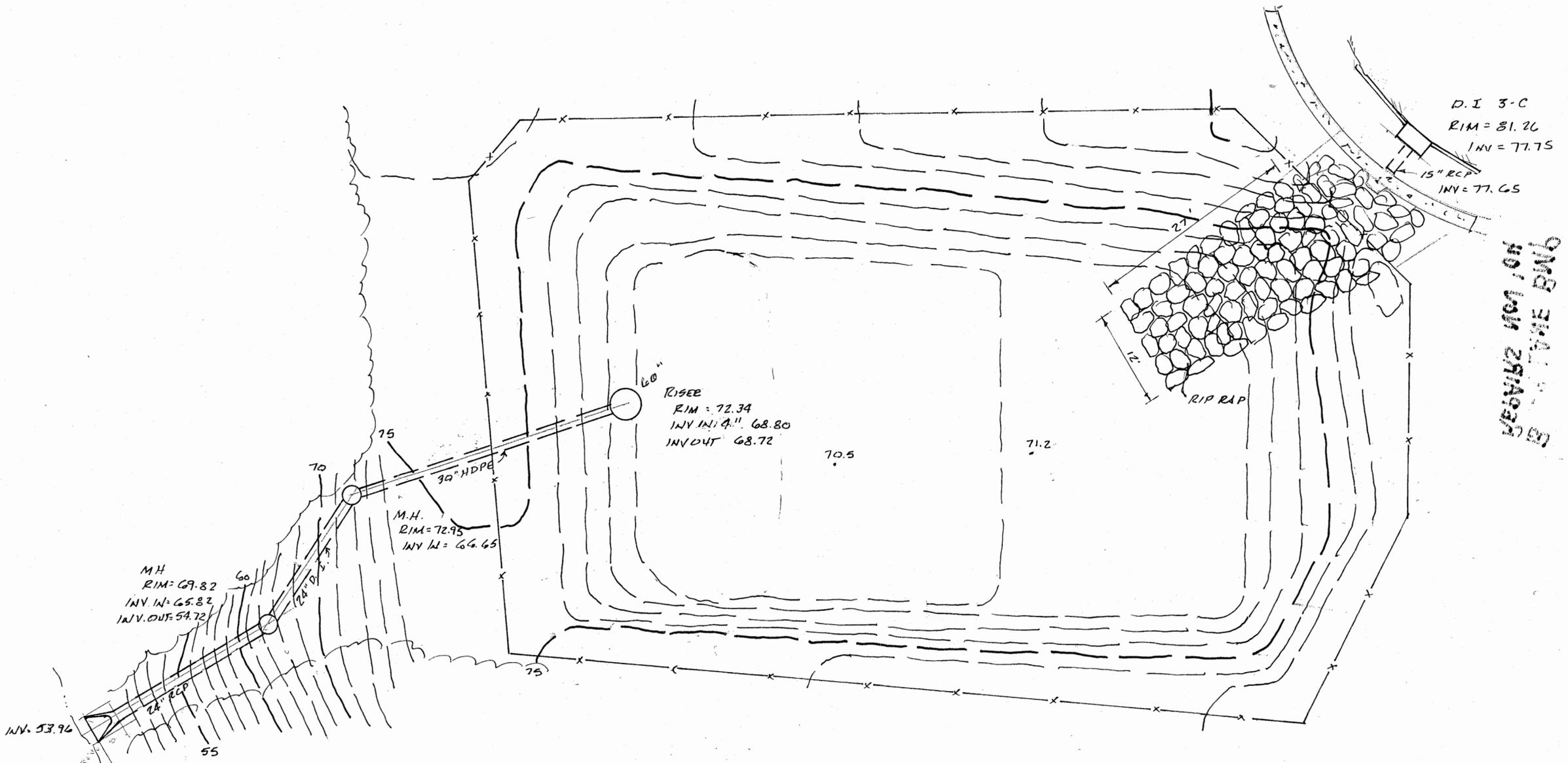
APPROVED
 James City County
 Environmental Division
 By: *[Signature]*
 Date: 12-8-07



A 5 BUILT SURVEY
 POND IMPROVEMENTS
 AT BRIARWOOD
 JAMES CITY COUNTY, VA.
 OCT 30, 2007

1" = 10'

EVANS SURVEYING, LLC
 WILLIAMSBURG, VA.



POND IMPROVEMENTS
 AT BRIARWOOD
 JAMES CITY COUNTY, VA.

APPROVED
 James City County
 Environmental Division
 By: *[Signature]*
 Date: 12-8-04



AS BUILT SURVEY
 POND IMPROVEMENTS
 AT BRIARWOOD
 JAMES CITY COUNTY, VA.
 OCT 30, 2004

1" = 10'

EVANS SURVEYING LLC
 WILLIAMSBURG, VA.

DRAINAGE MAP
SCALE: 1" = 300'

DRAINAGE AREA
206,345 SF = 4.73 AC.
* 212,345 SF = 4.87 AC.
** 305,345 SF = 7.00 AC.

* ADJUSTED AREA
BASED ON FIELD VISIT.
** ADJUSTED

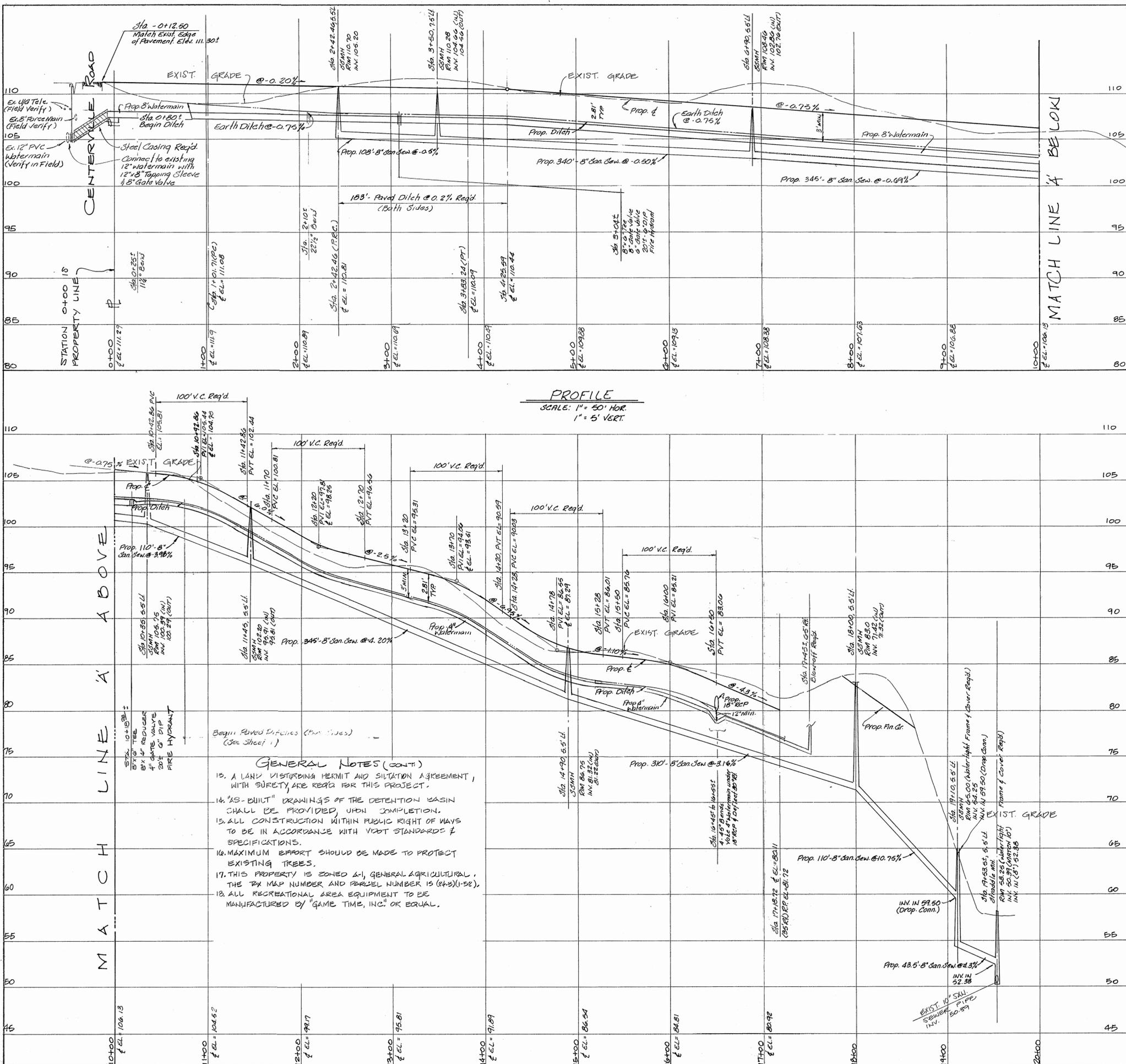
*A

**B

EL.110

EL.110

70
80
90
100



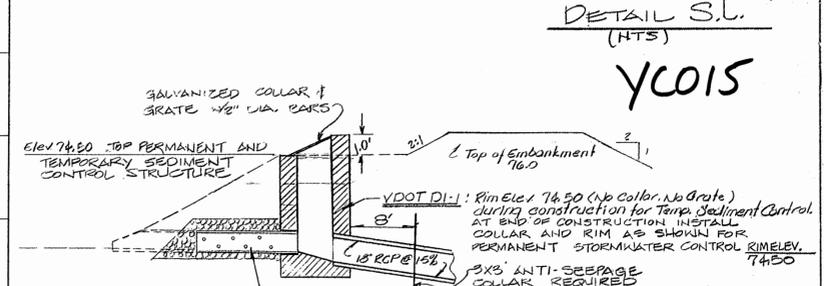
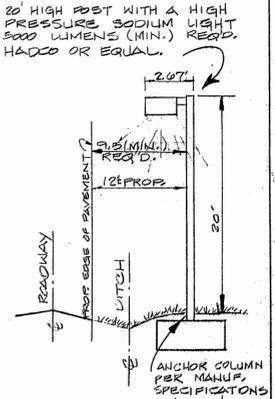
PROFILE
SCALE: 1" = 50' HOR.
1" = 5' VERT.

- GENERAL NOTES (CONT.)**
13. A LAND DISTURBANCE PERMIT AND SILTATION AGREEMENT, WITH SURETY, ARE REQUIRED FOR THIS PROJECT.
 14. "AS-BUILT" DRAWINGS OF THE DETENTION BASIN SHALL BE PROVIDED UPON COMPLETION.
 15. ALL CONSTRUCTION WITHIN PUBLIC RIGHT OF WAYS TO BE IN ACCORDANCE WITH VDOT STANDARDS & SPECIFICATIONS.
 16. MAXIMUM EFFORT SHOULD BE MADE TO PROTECT EXISTING TREES.
 17. THIS PROPERTY IS ZONED S-1, GENERAL AGRICULTURAL. THE TAX MAP NUMBER AND PARCEL NUMBER IS (842)(1-52).
 18. ALL RECREATIONAL AREA EQUIPMENT TO BE MANUFACTURED BY "GAME TIME, INC." OR EQUAL.

EROSION AND SEDIMENT CONTROL MEASURES

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

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK". THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE CONSTRUCTION PERMIT SHALL BE OBTAINED FROM VDOT PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS.
3. SEDIMENT BASINS AND TRAPS, PERIMETER DICES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS MUST BE SEEDED AND MULCHED WITHIN 15 DAYS OF INSTALLATION. AN ON-SITE PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE DEPARTMENT OF PUBLIC WORKS AND THE CONTRACTOR TO IDENTIFY THOSE MEASURES TO BE INITIALLY INSTALLED.
4. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK". MAINTENANCE WILL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUB-CONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT THE PRE-CONSTRUCTION MEETING, THE CONTRACTOR WILL SUPPLY THE COUNTY WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION SHALL BE INSTALLED, PER STANDARDS AND SPECIFICATIONS PRIOR TO THE END OF EACH WORKING DAY.
6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT THE TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. COUNTY APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.
7. THE CONTRACTOR SHALL STRIP AND PILE TOPSOIL AT THE LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. SILT FENCE SHALL BE PLACED AT THE TOE OF THE STOCKPILE AFTER STRIPPING OF TOPSOIL IS COMPLETE.
8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING BEGINS.
9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDEED AREAS WITHIN 15 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDEED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGETATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.
10. NO MORE THAN 300 FT. OF SANITARY SEWER, OR WATERLINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED THE SAME DAY OF CONSTRUCTION.
11. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATIONS, SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.
12. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME AND FERTILIZER IN ACCORDANCE WITH PERMANENT SEEDING SPECIFICATIONS. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.
13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKET SUCH AS EXCELOR BLANKET TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH MULCHING SPECIFICATIONS AND THE MANUFACTURER'S INSTRUCTIONS.
14. INLET PROTECTION SHALL BE PROVIDED, PER SPECIFICATIONS, FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.
15. TEMPORARY LINERS, SUCH POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.
16. PAVED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3%.
17. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.
18. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY JAMES CITY COUNTY PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
19. ALL PAVED AND/OR PIPED OUTFALLS WILL BE CONSTRUCTED BEFORE ROAD GRADING AND UTILITY INSTALLATION BEGINS.

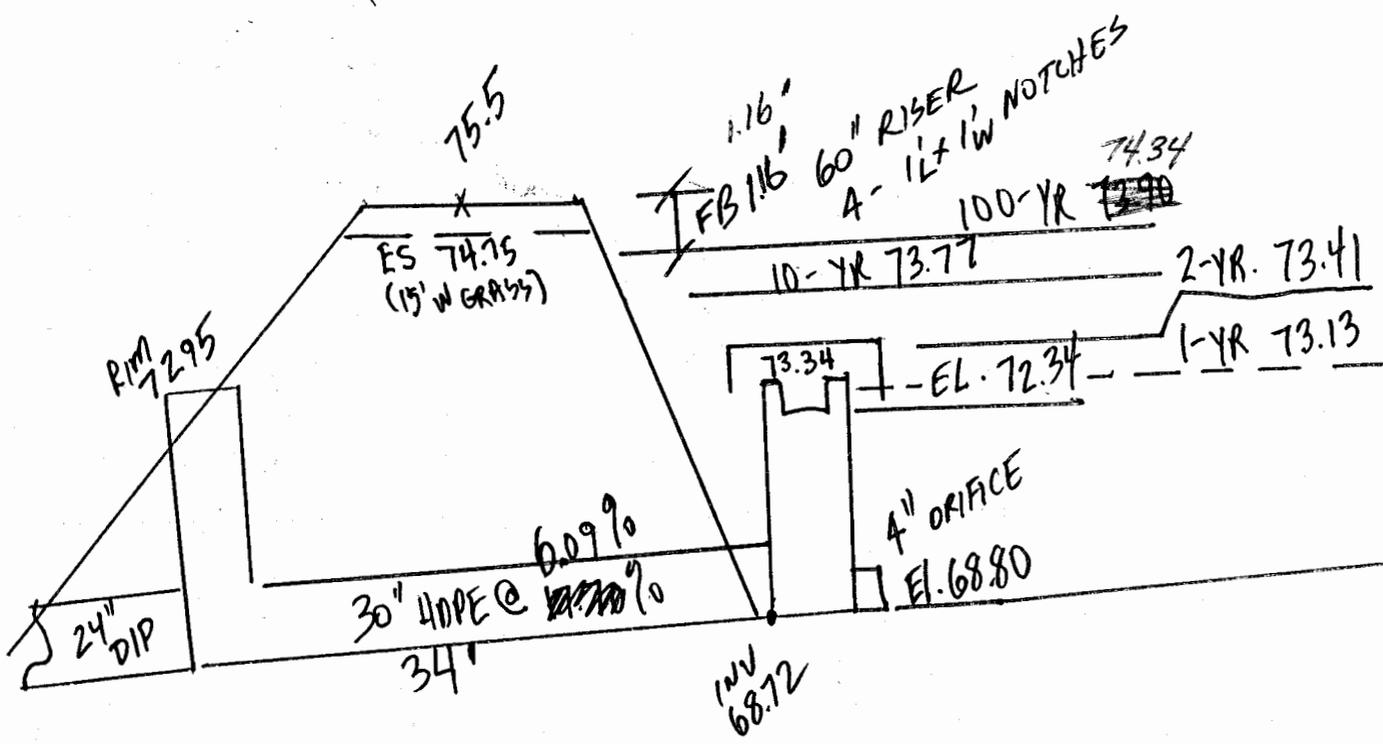
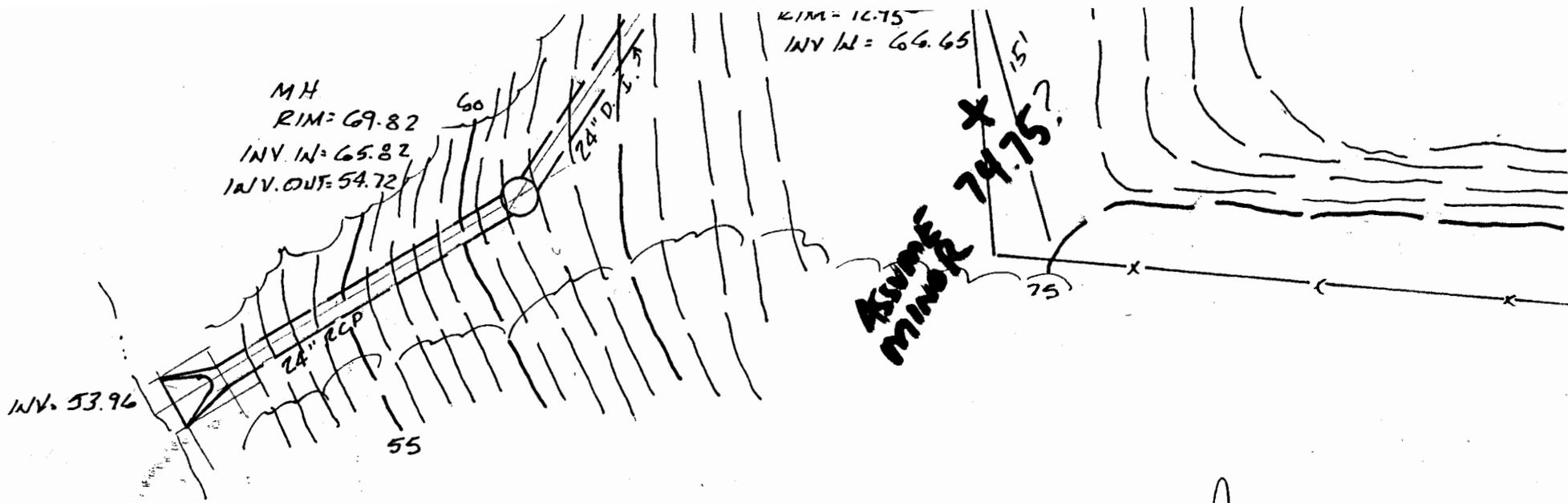


Install 1' Laying Length of 10" x perforated pipe w/ filter fabric & VDOT No. 1 stone bedding & cover, to divert sediment during construction. Replace with 12" x 10" RCP w/ 15'-1 after final site stabilization. (See sheet 1)

BASIN OUTLET CONTROL STRUCTURE
SCALE: 1" = 5'

NO.	DATE	DESCRIPTION	BY	CKD.
REVISIONS				
BRIARWOOD MOBILE HOME PARK CENTERVILLE ROAD JAMES CITY COUNTY, VA.				
DESIGNED BY:	DAC	JOB NO. 88-10-4335	FB J11	PG 32
DRAWN BY:		DATE 21 MARCH 1989	SHEET 2	OF 2
APPROVED BY:		SCALE 1" = 5' H, 1" = 5' V	FILE:	

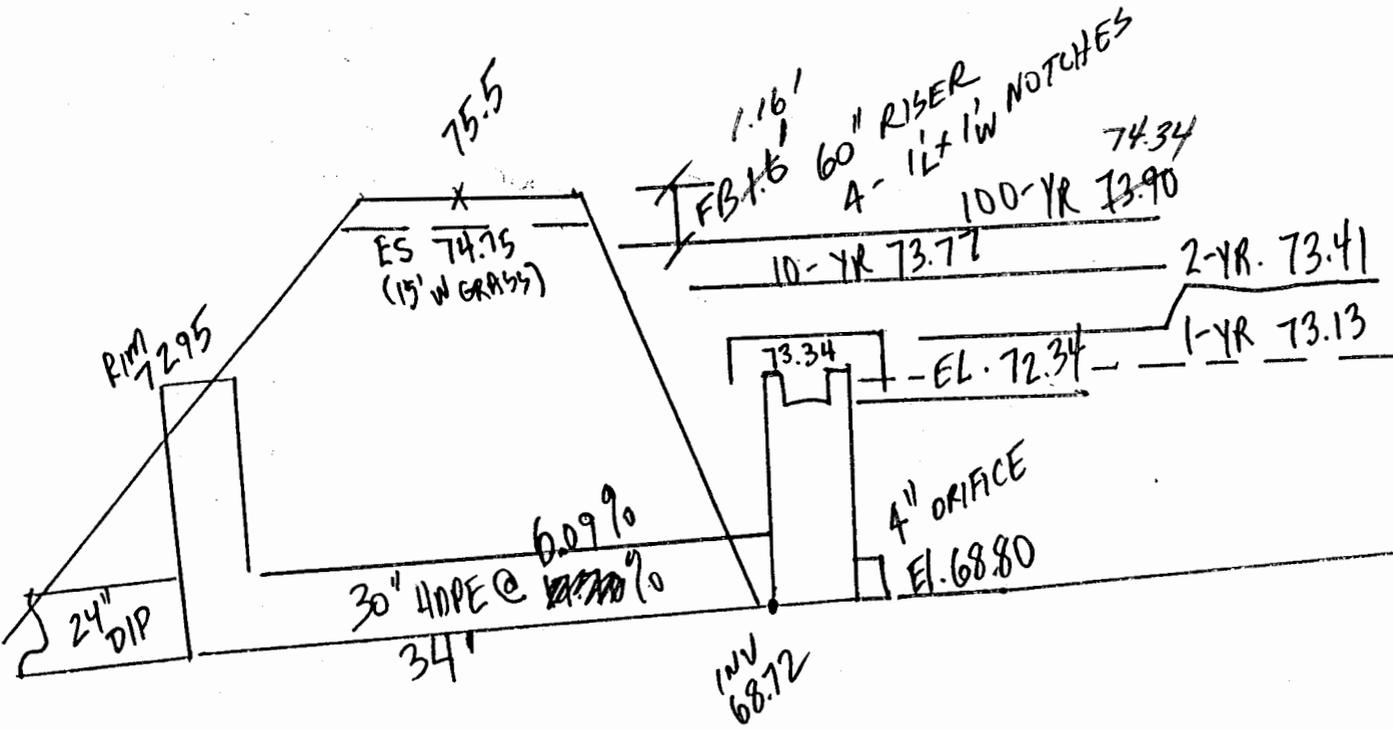
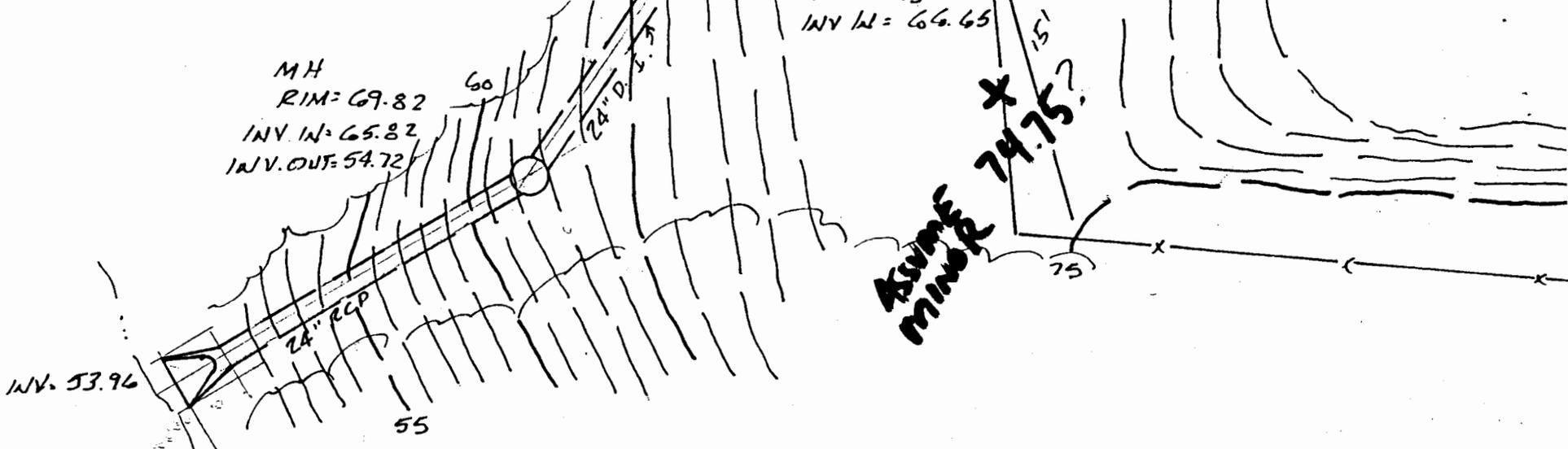




POND MODIFICATIONS

DA = 7.00 AC
CN = 85
Tc = 0.253 HRS.

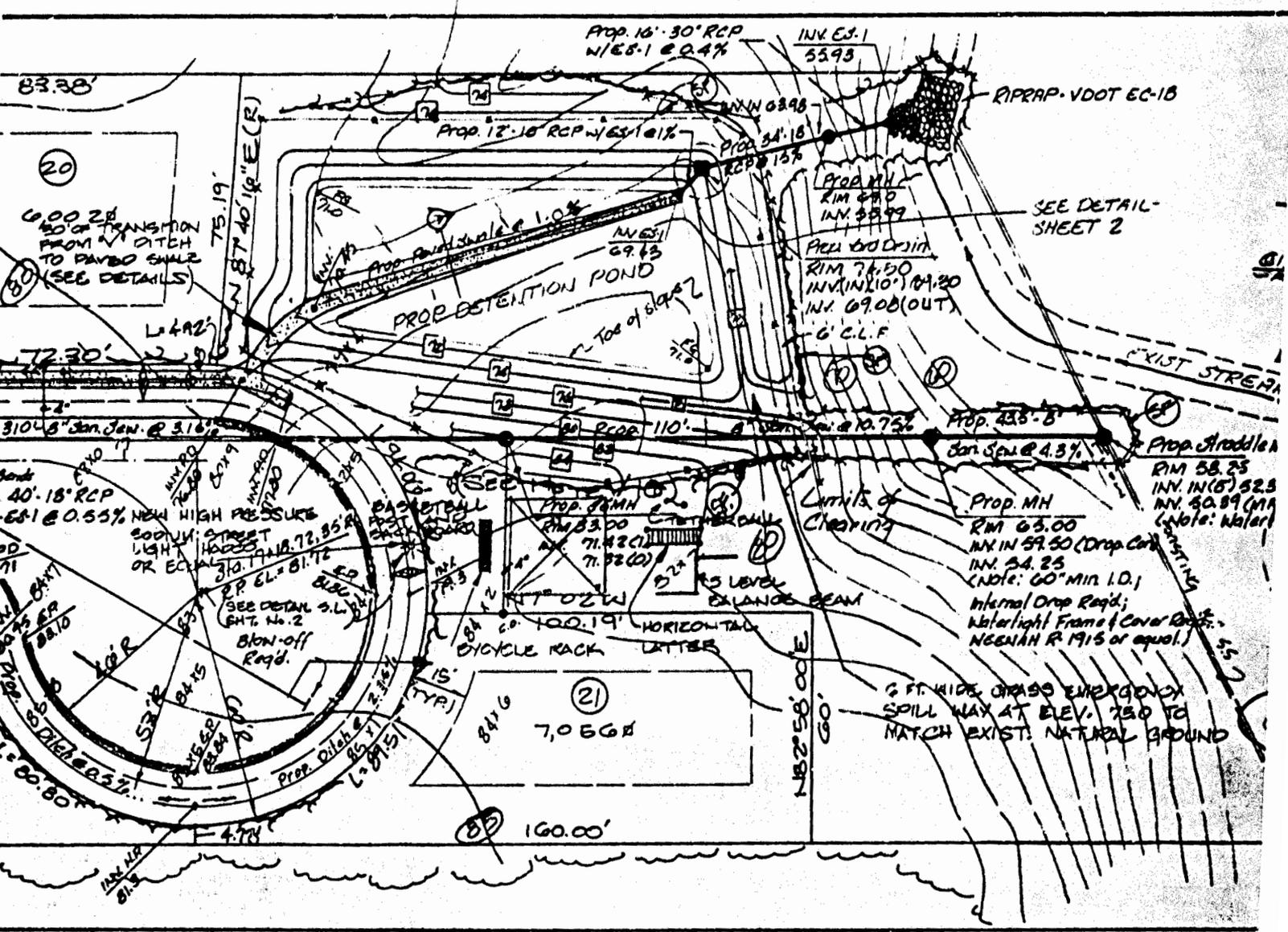
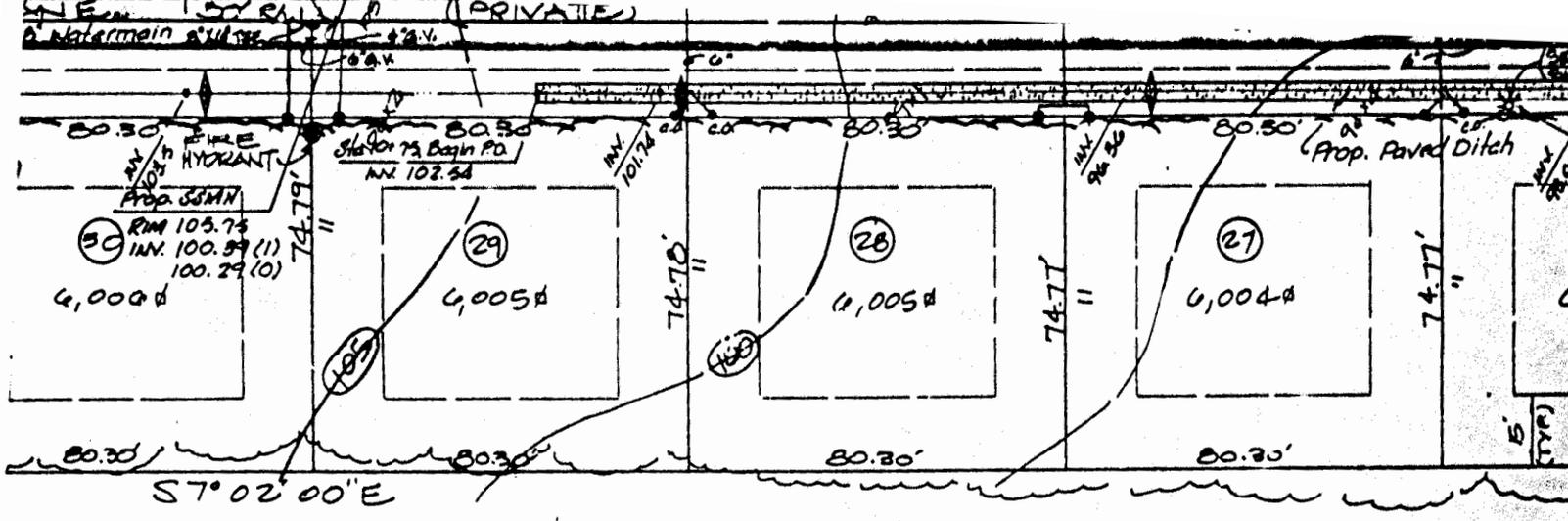
	U
1-YR	7
2-YR	7
10-YR	7
100-YR	7



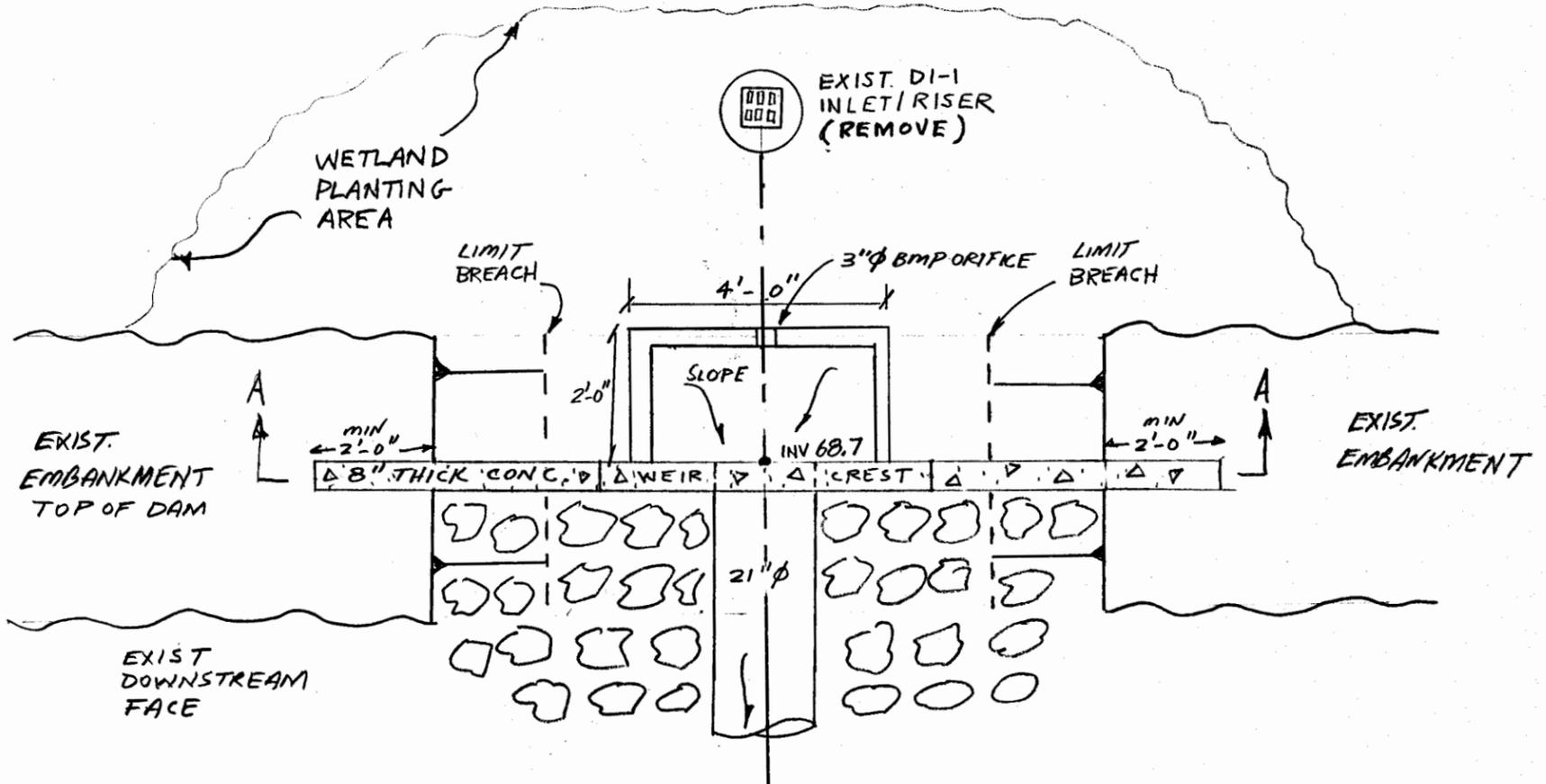
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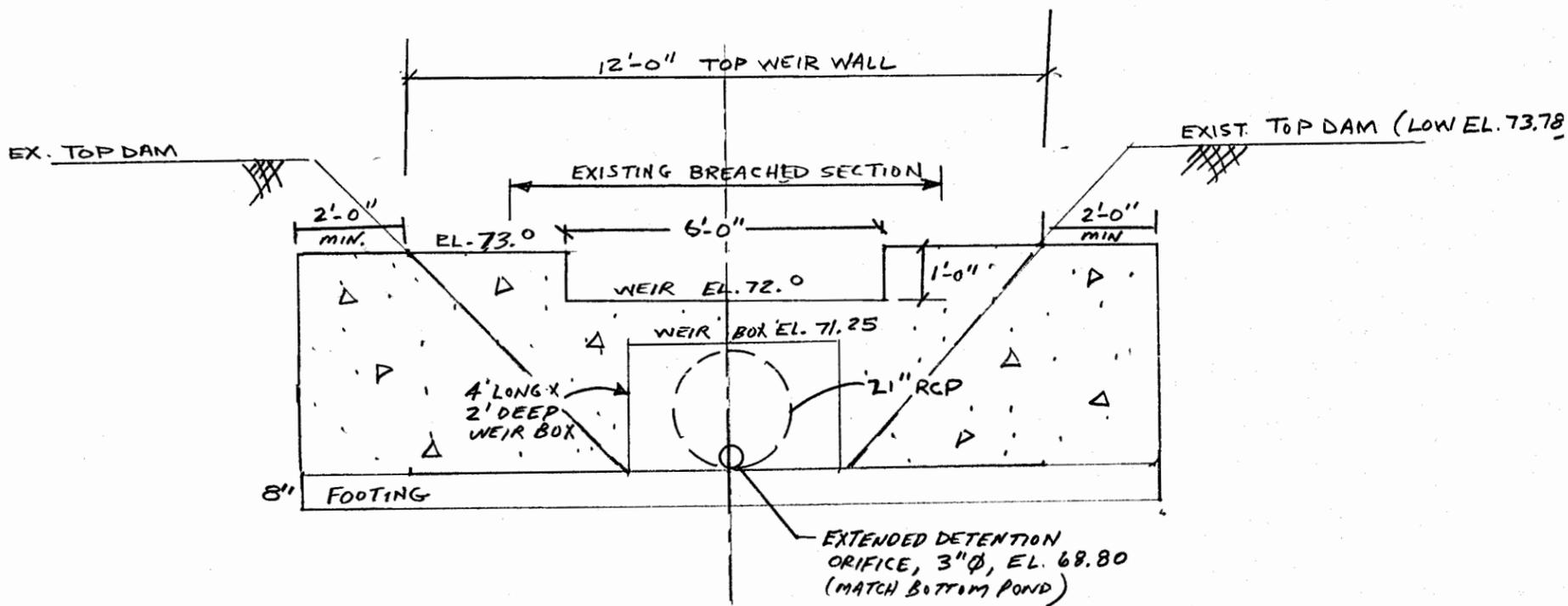
- 1-YR
- 2-YR
- 10-YR
- 100-YR



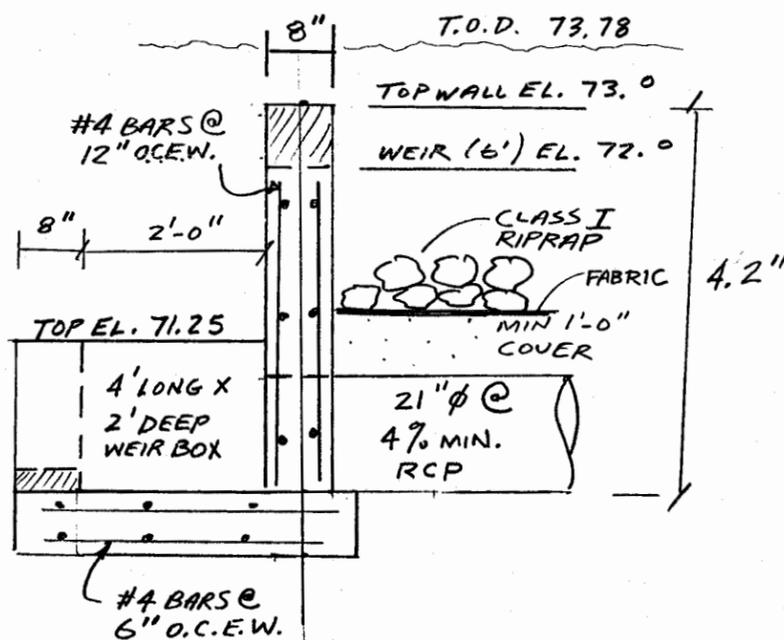
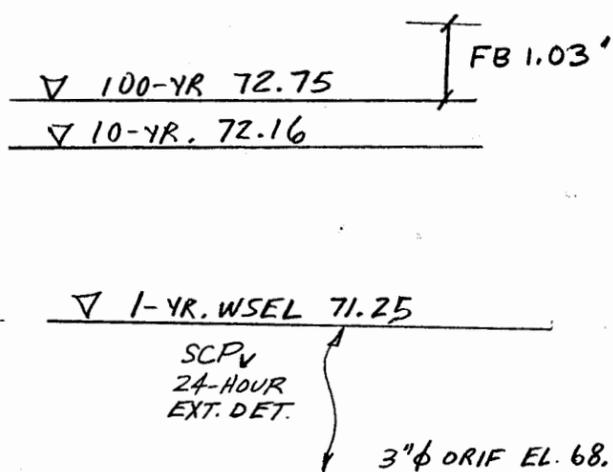
BRIAR LANE - BMP REPAIR



PLAN (AT BREACH)
SCALE: 1" = 3'-0"



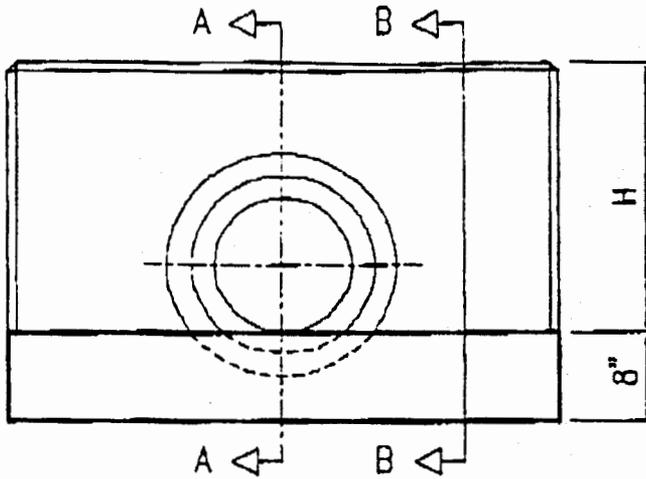
SECTION A-A (FACING DOWNSTREAM)
SCALE: 1" = 3'-0' HORIZ + VERT.



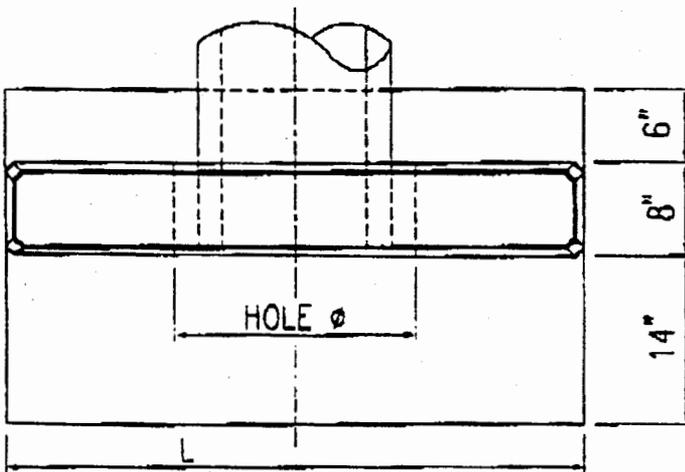
OUTLET PROTECTION
CLASS I RIPRAP
LA = 14'
W = 20'
VESCH M.S. 3.18
24" DEEP

HYDRAULIC INFO.			
STORM	IN	OUT	WSEL
1-YR.	12.79 CFS	0.44 CFS	71.27
2-YR.	18.16 CFS	2.96 CFS	71.42
10-YR.	36.41 CFS	19.04 CFS	72.16
100-YR	53.94 CFS	32.24 CFS	72.75

SECTION B-B (WALL)
SCALE: 1" = 3'-0"



ELEVATION

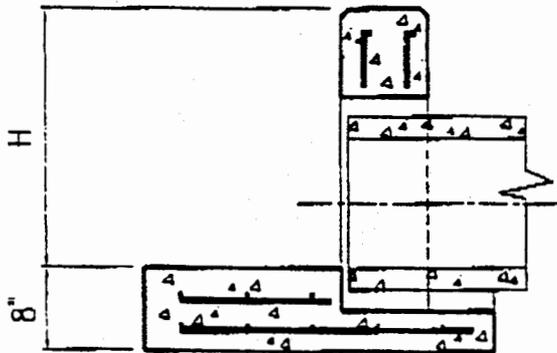


PLAN

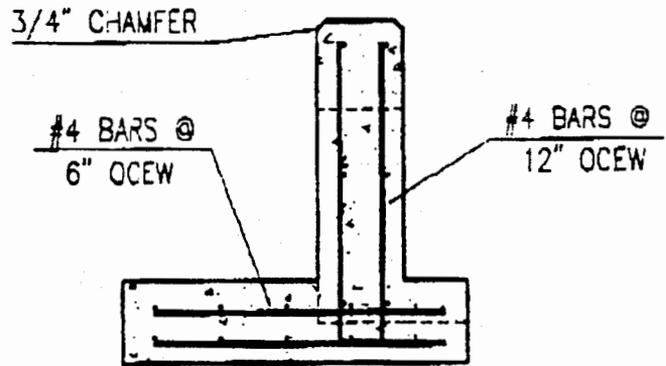
GENERAL NOTES:

1. MINIMUM CONCRETE COMPRESSIVE STRENGTH IS 4,000 psi. (27.6 MPa).
2. MINIMUM REINFORCEMENT YIELD STRENGTH IS 60,000 psi. (413.58 MPa). CONFORMING TO ASTM A 615.
3. STANDARD EW-1 FOR PIPE PERPENDICULAR TO ENDWALL. SPECIAL DESIGN REQUIRED FOR SKEWED PENETRATIONS.
4. PIPE OPENINGS AS REQUIRED, 4" MIN. & 8" MAX. LARGER THAN O.D. OF PIPE.

PIPE Ø	H	L	HOLE Ø
12"	24"	48"	20"
15"	27"	60"	24"
18"	30"	72"	28"
24"	38"	96"	34"
30"	46"	120"	42"
36"	52"	144"	48"



SECTION A-A



SECTION B-B

STRUCTURE 3 10

SCALE: N.T.S.

DATE: 01-01-98 DWG#: CA-0220-01



STANDARD PRECAST EW-1

ENDWALL FOR 12" - 36" PIPE

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCC.RNQ

JCCSCSdata

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
A....1	2.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
A....2	3.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
A...10	5.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
A...25	6.4000	Synthetic Curve	SCSTYPES	TypeII 24hr
A..100	8.0000	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
EXISTCOND	AREA	1	.829		12.0000	12.75		
EXISTCOND	AREA	2	1.176		12.0000	18.10		
EXISTCOND	AREA	10	2.400		12.0000	36.30		
EXISTCOND	AREA	25	2.730		12.0000	41.08		
EXISTCOND	AREA	100	3.624		12.0000	53.78		
*OUTFALL	JCT	1	.829		12.1000	9.91		
*OUTFALL	JCT	2	1.176		12.0500	16.74		
*OUTFALL	JCT	10	2.400		12.0500	35.52		
*OUTFALL	JCT	25	2.730		12.0500	39.54		
*OUTFALL	JCT	100	3.624		12.0500	50.26		
WNBREPAIR	IN POND	1	.829		12.0000	12.75		
WNBREPAIR	IN POND	2	1.176		12.0000	18.10		
WNBREPAIR	IN POND	10	2.400		12.0000	36.30		
WNBREPAIR	IN POND	25	2.730		12.0000	41.08		
WNBREPAIR	IN POND	100	3.624		12.0000	53.78		
WNBREPAIR	OUT POND	1	.829		12.1000	9.91	73.13	.194
WNBREPAIR	OUT POND	2	1.176		12.0500	16.74	73.41	.222
WNBREPAIR	OUT POND	10	2.400		12.0500	35.52	73.77	.261
WNBREPAIR	OUT POND	25	2.730		12.0500	39.54	73.90	.275
		100	3.624		12.05	50.26	74.34 D.H.W	.326

} INFLOWS

POND ROUTING

Type.... Design Storms
Name.... JCCSCSdata

File.... C:\HAESTAD\PPKW\RAINFALL\JCC.RNQ
Title... Briar Lane-Briarwood Condos
BMP repair - WNB riser/barrel option

DESIGN STORMS SUMMARY

Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A....1
Description: 1-year event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A....2
Description: 2-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A...10
Description: 10-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A...25
Description: 25-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 6.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
 Duration = 24.0000 hrs Rain Depth = 2.8000 in
 Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
 Rain File -ID = SCSTYPES.RNF - TypeII 24hr
 Unit Hyd Type = Default Curvilinear
 HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
 HYG File - ID = JCCBRIAR.HYG - EXISTCOND A....1
 Tc = .2053 hrs
 Drainage Area = 7.000 acres Runoff CN= 85

=====
 Computational Time Increment = .02737 hrs
 Computed Peak Time = 12.0169 hrs
 Computed Peak Flow = 12.94 cfs

 Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.0000 hrs
 Peak Flow, Interpolated Output = 12.75 cfs
 =====

DRAINAGE AREA

 ID:None Selected
 CN = 85
 Area = 7.000 acres
 S = 1.7647 in
 0.2S = .3529 in

Cumulative Runoff

 1.4218 in
 .829 ac-ft

HYG Volume... .829 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20530 hrs (ID: None Selected)
 Computational Incr, Tm = .02737 hrs = 0.20000 Tp

 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

 Unit peak, qp = 38.63 cfs
 Unit peak time, Tp = .13687 hrs
 Unit receding limb, Tr = .54747 hrs
 Total unit time, Tb = .68433 hrs

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Title... Modified Pond Asbuilt 10/04 (Evans Surveying)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sq(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
68.80	-----	.0000	.0000	.000	.000
70.50	-----	.0230	.0230	.013	.013
71.00	-----	.0434	.0980	.016	.029
72.00	-----	.0826	.1859	.062	.091
73.00	-----	.0976	.2700	.090	.181
74.00	-----	.1132	.3159	.105	.287
75.00	-----	.1309	.3658	.122	.409
75.50	-----	.1490	.4196	.070	.478

*BASED
ON
ASBUILT
INFO.
COUNTY
POND
REPAIRS*

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
 Area1, Area2 = Areas computed for EL1, EL2, respectively
 Volume = Incremental volume between EL1 and EL2

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

OUTLET STRUCTURE INPUT DATA

Structure ID = ES
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 74.75 ft
Weir Length = 15.00 ft
Weir Coeff. = 3.330000

Weir TW effects (Use adjustment equation)

Structure ID = SP
Structure Type = Stand Pipe

of Openings = 1
Invert Elev. = 73.34 ft
Diameter = 5.0000 ft (60")
Orifice Area = 19.6350 sq.ft
Orifice Coeff. = .600
Weir Length = 15.71 ft
Weir Coeff. = 3.100
K, Submerged = .000
K, Reverse = 1.000
Kb, Barrel = .000000 (per ft of full flow)
Barrel Length = .00 ft
Mannings n = .0000

Structure ID = WR
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 72.34 ft
Weir Length = 4.00 ft = 4-1'x1' OPENINGS
Weir Coeff. = 3.300000

Weir TW effects (Use adjustment equation)

Type.... Outlet Input Data
Name.... PONDRROUTE

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

OUTLET STRUCTURE INPUT DATA

Structure ID	=	LF	
Structure Type	=	Orifice-Circular	

# of Openings	=	1	
Invert Elev.	=	68.80 ft	
Diameter	=	.3330 ft	(4 INCH)
Orifice Coeff.	=	.600	

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

OUTLET STRUCTURE INPUT DATA

Structure ID = CV
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 2.5000 ft
Upstream Invert = 68.72 ft
Dnstream Invert = 66.65 ft
Horiz. Length = 34.00 ft
Barrel Length = 34.06 ft
Barrel Slope = .06088 ft/ft

*30" HDPE
BARREL*

OUTLET CONTROL DATA...

Mannings n = .0900
Ke = .5000 (forward entrance loss)
Kb = .441764 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0078
Inlet Control M = 2.0000
Inlet Control c = .03790
Inlet Control Y = .6900
T1 ratio (HW/D) = 1.105
T2 ratio (HW/D) = 1.266
Slope Factor = -.500
Calc inlet only = Yes

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 71.48 ft ---> Flow = 27.16 cfs
At T2 Elev = 71.88 ft ---> Flow = 31.05 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...

Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

***** COMPOSITE OUTFLOW SUMMARY *****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
4" → 68.80	.00	Free	Outfall	(no Q: ES,SP,WR,LF,CV)
69.30	.24	Free	Outfall	LF,CV (no Q: ES,SP,WR)
69.80	.38	Free	Outfall	LF,CV (no Q: ES,SP,WR)
70.30	.48	Free	Outfall	LF,CV (no Q: ES,SP,WR)
70.80	.57	Free	Outfall	LF,CV (no Q: ES,SP,WR)
71.30	.64	Free	Outfall	LF,CV (no Q: ES,SP,WR)
71.80	.70	Free	Outfall	LF,CV (no Q: ES,SP,WR)
WEIRS → 72.30	.76	Free	Outfall	LF,CV (no Q: ES,SP,WR)
72.34	.76	Free	Outfall	LF,CV (no Q: ES,SP,WR)
72.80	4.77	Free	Outfall	WR,LF,CV (no Q: ES,SP)
73.30	12.54	Free	Outfall	WR,LF,CV (no Q: ES,SP)
RISER → 73.34	13.26	Free	Outfall	WR,LF,CV (no Q: ES,SP)
73.80	36.90	Free	Outfall	SP,WR,LF,CV (no Q: ES)
74.30	50.00	Free	Outfall	SP,CV (no Q: ES,WR,LF)
74.75	52.77	Free	Outfall	SP,CV (no Q: ES,WR,LF)
74.80	53.63	Free	Outfall	ES,SP,CV (no Q: WR,LF)
75.30	76.22	Free	Outfall	ES,SP,CV (no Q: WR,LF)
75.50	89.23	Free	Outfall	ES,SP,CV (no Q: WR,LF)

Type.... Runoff CN-Area
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Conditions

RUNOFF CURVE NUMBER DATA

.....

Current Conditions

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Impervious (Road-Lot)	98	2.160			98.00
Open Sp/Yard Areas (grass)	79	4.840			79.00
COMPOSITE AREA & WEIGHTED CN --->		7.000			84.86 (85)

CN=85

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

.....
TIME OF CONCENTRATION CALCULATOR
.....

Current Tc -Briar Lane

Segment #1: Tc: TR-55 Sheet
Description: Road - Sheet Flow

Mannings n .1500
Hydraulic Length 12.00 ft
2yr, 24hr P 3.5000 in
Slope .020000 ft/ft

Avg.Velocity .12 ft/sec

Segment #1 Time: .0286 hrs

Segment #2: Tc: TR-55 Shallow
Description: SC-Grassed Channel

Hydraulic Length 1200.00 ft
Slope .016700 ft/ft
Unpaved

Avg.Velocity 2.09 ft/sec

Segment #2 Time: .1599 hrs

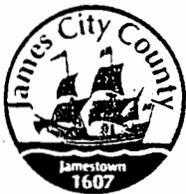
Segment #3: Tc: TR-55 Channel
Description: Paved Channel

Flow Area 2.0000 sq.ft
Wetted Perimeter 4.47 ft
Hydraulic Radius .45 ft
Slope .029300 ft/ft
Mannings n .0130
Hydraulic Length 700.00 ft

Avg.Velocity 11.48 ft/sec

Segment #3 Time: .0169 hrs

0.2054 HRS
12.32 min.



DEVELOPMENT MANAGEMENT

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 planning@james-city.va.us

COUNTY ENGINEER
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SOILS INFORMATION

SCS SOIL SURVEY, MAP 13 HSG
 SOILS 11B CRAVEN-UCHEE, 2 to 6% CIA
 14B EMPORIA FINE SANDY LOAM, 2 to 6% C

∴ USE HSG C FOR DESIGN

DRAINAGE AREA

PER COUNTY GIS AND SITE VISIT = ~~4.87~~ ACRES (7.00 AC.)

∴ USE ~~7.8~~ ACRE DESIGN DRAINAGE AREA.

CN VALUE

DA = 5 AC.

IMPERVIOUS PER LOT WITHIN D.A.

HOUSE 25x14 = 350 SF

DRIVEWAY 30x15 = 450 SF

SIDEWALK 4x25 = 100 SF

≈ 1/2 LOT-FRONT

TYPICAL LOT U-12 112 BRIAR
 HOUSE 50x28 = 1400 SF
 DRIVEWAY 30x15 = 450 SF
 20' GRASSED TO ROAD
 YARD = 4564 SF

900 SF / LOT TO ROAD EDGE

900 SF / LOT x ⁴⁰ 30 LOTS WITHIN D.A. = ^{36,000} 27,000 SF = 0.82 AC.

ROAD: 24' x ¹⁹⁵⁰ 1250 L.F. = ^{46,800} 22,400 SF = 0.74 AC.

CULDE SAC: $\pi D^{2/4} = \pi (100)^{2/4} = 7850 SF = 0.18 AC.$

PAVED CHANNEL = 4' x 1,000 L.F. = 4,000 SF = 0.09 AC.
 2.16 AC

∴ TOTAL IMPERVIOUS = ~~1.62~~ AC. CN = 98 HSG C

YARD + OPEN SP = ~~3.38~~ AC. CN = 79 HSG C

4.84 AC.
 CN = ~~85~~ CN = 85 (SAME)

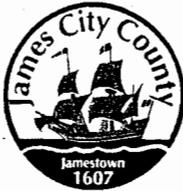
TIME OF CONC.

SHEET (ROAD) 0.15; 12'; 3.5"; 0.02% = 0.0286 HRS

SC (GRASS) ¹²⁰⁰ 600'; 0.0167% = 0.0799 HRS. (2.09 FPS)

CONC (PG-2A) 2 SF; 4.47' WP; 0.0293% = 0.0169 HRS (11.48 FPS)

0.1255 HRS
 6.2054
 12.32
 7.53 MIN



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BY: _____ DATE: _____ SHEET ____ OF ____
 CHKD: _____ DATE: _____ PROJECT NO. _____
 APRVD: _____ DATE: _____

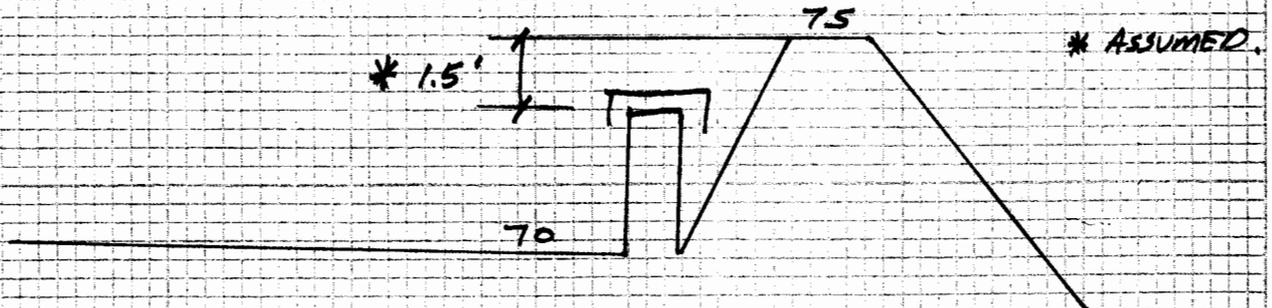
DESIGN DISCHARGES

Return Period	Peak Flow (CFS)	Peak Stage (ft)	Peak Velocity (ft/s)	Peak Discharge (CFS)	Peak Storage (AC-FT)
1-YR	2.8	0.592 AC-FT	0.830	10.34 CFS	12.79 CFS
2-YR	3.5	0.848 AC-FT	1.177	14.65 CFS	18.16 CFS
10-YR	5.8	1.714 AC-FT	2.401	29.50 CFS	36.41 CFS
25-YR	6.4	1.951 AC-FT	2.731	33.14 CFS	41.20 CFS
100-YR	8.0	2.589 AC-FT	3.625	43.36 CFS	53.94 CFS

ESTIMATE POND STORAGE

- RISER MEASURED IN FIELD (60" HEIGHT = 5')
- ASSUME CREST 1.5' BELOW TOP OF DAM *
- FROM AERIAL MAPPING TOP OF DAM BEFORE FAILURE/BREACH ESTIMATE EL. 75.0
- ∴ BOTTOM POND @ LOW FLOW ORIFICE / BASE RISER = EL. 70.00

ELEV.	AREA
70.	0
72.0	95 x 50 = 4,750 SF = 0.109 AC.
74.0	105 x 62 = 6,510 SF = 0.1494 AC.
75.0	120 x 70 = 8,400 SF = 0.1928 AC.



Storage EL. 70 to 75 = 0.501 AC-FT < 0.592 AC-FT
 1-YR STORM

∴ NEED FIELD DATA STAGE-STORAGE!

Original Riprap
Section for
over wall.

CONCEPT - BMP Repair at Briar Lane

- Originally thought repair approach would be best by use of bioretention. Following field visit, review of mapping and preliminary hydrology, different approach is warranted due to type of failure and size of drainage area. Use extended detention dry detention.
- Failure. Based on several field visits and preliminary hydraulics, it appears the dam may have failed during a large storm event due to lack of volume, clogging of the principal spillway DI-I inlet and lack of an adequately designed emergency spillway. Dam overtopped, eroding soil above barrel. Barrel failure followed.
- Original Design. Lack of data exists. Assume facility was designed to for quantity control and no quality control. Quantity control limiting the 2-year post to 2-year predevelopment levels and safely pass larger storm events. Therefore providing stream channel protection, ie. 24-hour detention of the 1-year 24-hour storm will meet meet design intent.

Preliminary Hydrology

Drainage Area = 7.00 acres (to Centerville Road)
 CN = 85 (impervious, open space & yard areas)
 Time of Conc.= 12.3 minutes (overland, shallow & paved channel flow)
 HSG C

SCS Hydrology-Peak Discharges

1-year	12.79 cfs	0.830 acre-ft.
2-year	18.16 cfs	1.177 acre-ft.
10-year	36.41 cfs	2.401 acre-ft.
25-year	41.2 cfs	2.731 acre-ft.
100-year	53.94 cfs	3.625 acre-ft.

- Use JCSA manhole to east of the facility as benchmark. Need shots bottom of pond and top of dam. Reference elevation of 78.78 at manhole.
- Stage-Storage: Available contour mapping showed lack of storage volume. Field recon was performed to obtain elevation data. Based on limited field obtained elevation data, total volume to top of dam is approximately works out to be 1.878 acre-ft. from bottom of pond to top of dam. Since 0.830 < 1.878 it appears there may be enough volume to detain the 1-year 24 hour storm for 24 hours.

Concept Design and Hydraulics

See 11 x 17 sketch for repair plan.

Preliminary Repair Plan Scope:

- Remove existing grate inlet, riser and 12-inch low flow pipe.
- Clean breached section of all debris and wash material. Remove existing inlet and riser..
- Reset outlet barrel through breached section. Bedding for pipe and select backfill to at least 12" over pipe.
- Riprap channel over pipe with grouted bottom to resist erosion of fill over pipe.
- 14' long x 20' wide outlet protection pad at end of riprap channel prior to natural stream channel.
- Reinforced concrete weir wall through dam breach, 8-inch thick, 4 ft. high. 2 ft. minimum embedment.
- 3-inch diameter low flow orifice on weir box wall for extended detention.
- Weir box (4' wide by 2' deep), 6" weir on concrete wall and wall crest for storm discharge control.
- Remove existing inlet and riser!
- Optional - Wetland plantings in shallow marsh at upstream embankment toe for aesthetic purposes.

CONCEPT
REPAIR
IDEAS ↓
HISTORICAL
INFO
SP-51-89

CONCEPT - BMP Repair at Briar Lane

- Originally thought repair approach would be best by use of bioretention. Following field visit, review of mapping and preliminary hydrology, different approach is warranted due to type of failure and size of drainage area. Use extended detention dry detention.
- Failure. Based on several field visits and preliminary hydraulics, it appears the dam may have failed during a large storm event due to lack of volume, clogging of the principal spillway DI-I inlet and lack of an adequately designed emergency spillway. Dam overtopped, eroding soil above barrel. Barrel failure followed.
- Original Design. Lack of data exists. Assume facility was designed to for quantity control and no quality control. Quantity control limiting the 2-year post to 2-year predevelopment levels and safely pass larger storm events. Therefore providing stream channel protection, ie. 24-hour detention of the 1-year 24-hour storm will meet design intent.
- Preliminary Hydrology
Drainage Area = 7.00 acres (to Centerville Road)
CN = 85 (impervious, open space & yard areas)
Time of Conc.= 12.3 minutes (overland, shallow & paved channel flow)
HSG C
- SCS Hydrology-Peak Discharges

1-year	12.79 cfs	0.830 acre-ft.
2-year	18.16 cfs	1.177 acre-ft.
10-year	36.41 cfs	2.401 acre-ft.
25-year	41.2 cfs	2.731 acre-ft.
100-year	53.94 cfs	3.625 acre-ft.
- Use JCSA manhole to east of the facility as benchmark. Need shots bottom of pond and top of dam. Reference elevation of 78.78 at manhole.
- Stage-Storage: Available contour mapping showed lack of storage volume. Field recon was performed to obtain elevation data. Based on limited field obtained elevation data, total volume to top of dam is approximately works out to be **1.878 acre-ft.** from bottom of pond to top of dam. Since $0.830 < 1.878$ it appears there may be enough volume to detain the 1-year 24 hour storm for 24 hours.
- Concept Design and Hydraulics
See 11 x 17 sketch for repair plan.
- Preliminary Repair Plan Scope:
Remove existing grate inlet, riser and 12-inch low flow pipe.
Clean breached section of all debris and wash material. Remove existing inlet and riser..
Reset outlet barrel through breached section. Bedding for pipe and select backfill to at least 12" over pipe.
Riprap channel over pipe with grouted bottom to resist erosion of fill over pipe.
14' long x 20 wide outlet protection pad at end of riprap channel prior to natural stream channel.
Reinforced concrete weir wall through dam breach, 8-inch thick, 4 ft. high. 2 ft. minimum embedment.
3-inch diameter low flow orifice on weir box wall for extended detention.
Weir box (4' wide by 2' deep), 6' weir on concrete wall and wall crest for storm discharge control.
Remove existing inlet and riserl
Optional - Wetland plantings in shallow marsh at upstream embankment toe for aesthetic purposes.

Design Riprap
Section for
over wall.
NOT USED

CONCEPT - BMP Repair at Briar Lane

- Originally thought repair approach would be best by use of bioretention. Following field visit, review of mapping and preliminary hydrology, different approach is warranted due to type of failure and size of drainage area. Use extended detention dry detention.
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Preliminary Hydrology

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HSG C

SCS Hydrology-Peak Discharges

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Concept Design and Hydraulics

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Weir box (4' wide by 2' deep), 6' weir on concrete wall and wall crest for storm discharge control.
Remove existing inlet and riser!
Optional - Wetland plantings in shallow marsh at upstream embankment toe for aesthetic purposes.

=====
JOB TITLE
=====

Briar Lane-Briarwood Condos
BMP repair - WNB riser/barrel option

BRIARWOOD - BRIAR LANE BMP REPAIR
YC015

FINAL ROUTING
USING ASBUILT INFO.
COUNTY REPAIR 10/2004

FINAL NOTES:

- 100-YEAR STORM CONTAINED WITH ^{1.16'} ~~7.6'~~ OF FREEBOARD.
- 1-YEAR STORM DOES NOT REACH RISER CREST.
- 1-YEAR STORM DETENTION TIME \approx 12 HOURS.
- DRY POND DESIGN
 - 4" LOW FLOW ORIFICE
 - NOTCHED RISER CREST
 - 60" RISER
 - 30" HDPE BARREL
- DRAINAGE AREA: 7 ACRES, CN 85, $T_c = 0.253$ HRS.
- POND ASBUILT WILL FUNCTION PROPERLY

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MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCC.RNQ

JCCSCSdata

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID	
A....1	2.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
A....2	3.5000	Synthetic Curve	SCSTYPES	TypeII	24hr
A...10	5.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
A...25	6.4000	Synthetic Curve	SCSTYPES	TypeII	24hr
A..100	8.0000	Synthetic Curve	SCSTYPES	TypeII	24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)

(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
EXISTCOND	AREA	1	.829		12.0000	12.75		
EXISTCOND	AREA	2	1.176		12.0000	18.10		
EXISTCOND	AREA	10	2.400		12.0000	36.30		
EXISTCOND	AREA	25	2.730		12.0000	41.08		
EXISTCOND	AREA	100	3.624		12.0000	53.78		
*OUTFALL	JCT	1	.829		12.1000	9.91		
*OUTFALL	JCT	2	1.176		12.0500	16.74		
*OUTFALL	JCT	10	2.400		12.0500	35.52		
*OUTFALL	JCT	25	2.730		12.0500	39.54		
*OUTFALL	JCT	100	3.624		12.0500	50.26		
WNBREPAIR	IN POND	1	.829		12.0000	12.75	} INFLDWS	
WNBREPAIR	IN POND	2	1.176		12.0000	18.10		
WNBREPAIR	IN POND	10	2.400		12.0000	36.30		
WNBREPAIR	IN POND	25	2.730		12.0000	41.08		
WNBREPAIR	IN POND	100	3.624		12.0000	53.78		
WNBREPAIR	OUT POND	1	.829		12.1000	9.91	73.13	.194
WNBREPAIR	OUT POND	2	1.176		12.0500	16.74	73.41	.222
WNBREPAIR	OUT POND	10	2.400		12.0500	35.52	73.77	.261
WNBREPAIR	OUT POND	25	2.730		12.0500	39.54	73.90	.275
		100	3.624		12.05	50.26	74.34 D.H.W	.326

POND ROUTING

Type.... Executive Summary (Nodes)
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Storm... TypeII 24hr Tag: A....1

Page 2.01
 Event: 1 yr

NETWORK SUMMARY -- NODES
 (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A....1
 Description: 1-year event

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 1 yr
 Total Rainfall Depth= 2.8000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
EXISTCOND	AREA	.829		12.0000	12.75	
Outfall	OUTFALL	.829		12.1000	9.91	
WNBREPAIR	IN POND	.829		12.0000	12.75	
WNBREPAIR	OUT POND	.829		12.1000	9.91	73.13

NETWORK SUMMARY -- NODES

(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A....2

Description: 2-year storm event

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr

Storm Frequency = 2 yr

Total Rainfall Depth= 3.5000 in

Duration Multiplier = 1

Resulting Duration = 24.0000 hrs

Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID		Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
	EXISTCOND	AREA	1.176	12.0000	18.10	
Outfall	OUTFALL	JCT	1.176	12.0500	16.74	
	WNBREPAIR	IN POND	1.176	12.0000	18.10	
	WNBREPAIR	OUT POND	1.176	12.0500	16.74	73.41

NETWORK SUMMARY -- NODES

(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A...10
 Description: 10-year storm event

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 10 yr
 Total Rainfall Depth= 5.8000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
EXISTCOND	AREA	2.400	12.0000	36.30	
Outfall OUTFALL	JCT	2.400	12.0500	35.52	
WNBREPAIR	IN POND	2.400	12.0000	36.30	
WNBREPAIR	OUT POND	2.400	12.0500	35.52	73.77

NETWORK SUMMARY -- NODES

(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A...25

Description: 25-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr

Storm Frequency = 25 yr

Total Rainfall Depth= 6.4000 in

Duration Multiplier = 1

Resulting Duration = 24.0000 hrs

Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
EXISTCOND	AREA	2.730	12.0000	41.08	
Outfall OUTFALL	JCT	2.730	12.0500	39.54	
WNBREPAIR	IN POND	2.730	12.0000	41.08	
WNBREPAIR	OUT POND	2.730	12.0500	39.54	73.90

NETWORK SUMMARY -- NODES

(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A..100
Description: 100-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
EXISTCOND	AREA	3.624	12.0000	53.78	
Outfall	OUTFALL	JCT	3.624	12.0500	50.26
WNBREPAIR	IN	POND	3.624	12.0000	53.78
WNBREPAIR	OUT	POND	3.624	12.0500	50.26

74.34 DHW

1.16' FB
To Top
DAM

Type.... Design Storms
Name.... JCCSCSdata

File.... C:\HAESTAD\PPKW\RAINFALL\JCC.RNQ
Title... Briar Lane-Briarwood Condos
BMP repair - WNB riser/barrel option

DESIGN STORMS SUMMARY

Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A....1
Description: 1-year event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A....2
Description: 2-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A...10
Description: 10-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A...25
Description: 25-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 6.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Type.... Design Storms
Name.... JCCSCSdata

Page 3.02

File.... C:\HAESTAD\PPKW\RAINFALL\JCC.RNQ
Title... Briar Lane-Briarwood Condos
BMP repair - WNB riser/barrel option

DESIGN STORMS SUMMARY

Design Storm File, ID = JCC.RNQ JCCSCSdata

Storm Tag Name = A..100
Description: 100-year storm event

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm

Duration = 24.0000 hrs Rain Depth = 2.8000 in

Rain Dir = C:\HAESTAD\PPKW\RAINFALL\

Rain File -ID = SCSTYPES.RNF - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\

HYG File - ID = JCCBRIAR.HYG - EXISTCOND A....1

Tc = .2053 hrs

Drainage Area = 7.000 acres Runoff CN= 85

```

=====
Computational Time Increment = .02737 hrs
Computed Peak Time          = 12.0169 hrs
Computed Peak Flow          = 12.94 cfs

```

```

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 12.75 cfs
=====

```

DRAINAGE AREA

```

-----
ID:None Selected
CN = 85
Area = 7.000 acres
S = 1.7647 in
0.2S = .3529 in

```

Cumulative Runoff

```

-----
1.4218 in
.829 ac-ft

```

HYG Volume... .829 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20530 hrs (ID: None Selected)
Computational Incr, Tm = .02737 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 38.63 cfs
Unit peak time Tp = .13687 hrs
Unit receding limb, Tr = .54747 hrs
Total unit time, Tb = .68433 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 3.5000 in

Rain Dir = C:\HAESTAD\PPKW\RAINFALL\

Rain File -ID = SCSTYPES.RNF - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\

HYG File - ID = JCCBRIAR.HYG - EXISTCOND A....2

Tc = .2053 hrs

Drainage Area = 7.000 acres Runoff CN= 85

=====
Computational Time Increment = .02737 hrs
Computed Peak Time = 12.0169 hrs
Computed Peak Flow = 18.30 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 18.10 cfs
=====

DRAINAGE AREA

ID:None Selected
CN = 85
Area = 7.000 acres
S = 1.7647 in
0.2S = .3529 in

Cumulative Runoff

2.0164 in
1.176 ac-ft

HYG Volume... 1.176 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20530 hrs (ID: None Selected)
Computational Incr, Tm = .02737 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 38.63 cfs
Unit peak time Tp = .13687 hrs
Unit receding limb, Tr = .54747 hrs
Total unit time, Tb = .68433 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
 Duration = 24.0000 hrs Rain Depth = 5.8000 in
 Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
 Rain File -ID = SCSTYPES.RNF - TypeII 24hr
 Unit Hyd Type = Default Curvilinear
 HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
 HYG File - ID = JCCBRIAR.HYG - EXISTCOND A...10
 Tc = .2053 hrs
 Drainage Area = 7.000 acres Runoff CN= 85

=====
 Computational Time Increment = .02737 hrs
 Computed Peak Time = 12.0169 hrs
 Computed Peak Flow = 36.46 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.0000 hrs
 Peak Flow, Interpolated Output = 36.30 cfs
 =====

DRAINAGE AREA

 ID:None Selected
 CN = 85
 Area = 7.000 acres
 S = 1.7647 in
 0.2S = .3529 in

Cumulative Runoff

 4.1142 in
 2.400 ac-ft

HYG Volume... 2.400 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20530 hrs (ID: None Selected)
 Computational Incr, Tm = .02737 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 38.63 cfs
 Unit peak time Tp = .13687 hrs
 Unit receding limb, Tr = .54747 hrs
 Total unit time, Tb = .68433 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm

Duration = 24.0000 hrs Rain Depth = 6.4000 in

Rain Dir = C:\HAESTAD\PPKW\RAINFALL\

Rain File -ID = SCSTYPES.RNF - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\

HYG File - ID = JCCBRIAR.HYG - EXISTCOND A...25

Tc = .2053 hrs

Drainage Area = 7.000 acres Runoff CN= 85

=====
 Computational Time Increment = .02737 hrs
 Computed Peak Time = 12.0169 hrs
 Computed Peak Flow = 41.23 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.0000 hrs
 Peak Flow, Interpolated Output = 41.08 cfs
 =====

DRAINAGE AREA

 ID:None Selected
 CN = 85
 Area = 7.000 acres
 S = 1.7647 in
 0.2S = .3529 in

Cumulative Runoff

 4.6810 in
 2.731 ac-ft

HYG Volume... 2.730 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20530 hrs (ID: None Selected)
 Computational Incr, Tm = .02737 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 38.63 cfs
 Unit peak time Tp = .13687 hrs
 Unit receding limb, Tr = .54747 hrs
 Total unit time, Tb = .68433 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
 Duration = 24.0000 hrs Rain Depth = 8.0000 in
 Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
 Rain File -ID = SCSTYPES.RNF - TypeII 24hr
 Unit Hyd Type = Default Curvilinear
 HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
 HYG File - ID = JCCBRIAR.HYG - EXISTCOND A..100
 Tc = .2053 hrs
 Drainage Area = 7.000 acres Runoff CN= 85

=====
 Computational Time Increment = .02737 hrs
 Computed Peak Time = 12.0169 hrs
 Computed Peak Flow = 53.89 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.0000 hrs
 Peak Flow, Interpolated Output = 53.78 cfs
 =====

DRAINAGE AREA

 ID:None Selected
 CN = 85
 Area = 7.000 acres
 S = 1.7647 in
 0.2S = .3529 in

Cumulative Runoff

 6.2132 in
 3.624 ac-ft

HYG Volume... 3.624 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20530 hrs (ID: None Selected)
 Computational Incr, Tm = .02737 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 38.63 cfs
 Unit peak time Tp = .13687 hrs
 Unit receding limb, Tr = .54747 hrs
 Total unit time, Tb = .68433 hrs

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Title... Modified Pond Asbuilt 10/04 (Evans Surveying)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sq(r(A1*A2)) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
68.80	-----	.0000	.0000	.000	.000
70.50	-----	.0230	.0230	.013	.013
71.00	-----	.0434	.0980	.016	.029
72.00	-----	.0826	.1859	.062	.091
73.00	-----	.0976	.2700	.090	.181
74.00	-----	.1132	.3159	.105	.287
75.00	-----	.1309	.3658	.122	.409
75.50	-----	.1490	.4196	.070	.478

*BASED
ON
ASBUILT
INFO.
COUNTY
POND
REPAIRS*

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
 Area1,Area2 = Areas computed for EL1, EL2, respectively
 Volume = Incremental volume between EL1 and EL2

Type.... Outlet Input Data
Name.... PONDROUTE

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 68.80 ft
Increment = .50 ft
Max. Elev.= 75.50 ft

OUTLET CONNECTIVITY

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	ES	--->	TW	74.750	75.500
Stand Pipe	SP	--->	CV	73.340	75.500
Weir-Rectangular	WR	--->	CV	72.340	75.500
Orifice-Circular	LF	--->	CV	68.800	75.500
Culvert-Circular	CV	--->	TW	68.720	75.500
TW SETUP, DS Channel					

Type.... Outlet Input Data
Name.... PONDRUTE

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

OUTLET STRUCTURE INPUT DATA

Structure ID = ES
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 74.75 ft
Weir Length = 15.00 ft
Weir Coeff. = 3.330000

Weir TW effects (Use adjustment equation)

Structure ID = SP
Structure Type = Stand Pipe

of Openings = 1
Invert Elev. = 73.34 ft
Diameter = 5.0000 ft (60")
Orifice Area = 19.6350 sq.ft
Orifice Coeff. = .600
Weir Length = 15.71 ft
Weir Coeff. = 3.100
K, Submerged = .000
K, Reverse = 1.000
Kb, Barrel = .000000 (per ft of full flow)
Barrel Length = .00 ft
Mannings n = .0000

Structure ID = WR
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 72.34 ft
Weir Length = 4.00 ft = 4 - 1'x1' OPENINGS
Weir Coeff. = 3.300000

Weir TW effects (Use adjustment equation)

Type.... Outlet Input Data
Name.... PONDRROUTE

Page 6.03

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

OUTLET STRUCTURE INPUT DATA

Structure ID	=	LF	
Structure Type	=	Orifice-Circular	

# of Openings	=	1	
Invert Elev.	=	68.80 ft	
Diameter	=	.3330 ft	(4 INCH)
Orifice Coeff.	=	.600	

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

OUTLET STRUCTURE INPUT DATA

Structure ID = CV
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 2.5000 ft
Upstream Invert = 68.72 ft
Dnstream Invert = 66.65 ft
Horiz. Length = 34.00 ft
Barrel Length = 34.06 ft
Barrel Slope = .06088 ft/ft

*30" HDPE
BARREL*

OUTLET CONTROL DATA...

Mannings n = .0900
Ke = .5000 (forward entrance loss)
Kb = .441764 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0078
Inlet Control M = 2.0000
Inlet Control c = .03790
Inlet Control Y = .6900
T1 ratio (HW/D) = 1.105
T2 ratio (HW/D) = 1.266
Slope Factor = -.500
Calc inlet only = Yes

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 71.48 ft ---> Flow = 27.16 cfs
At T2 Elev = 71.88 ft ---> Flow = 31.05 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...

Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Title... Modified Pond asbuilt 10/04 (riser/barrel)

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = ES (Weir-Rectangular)

 Upstream ID = (Pond Water Surface)
 DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
68.80	.00	Free Outfall		WS below an invert; no flow.
69.30	.00	Free Outfall		WS below an invert; no flow.
69.80	.00	Free Outfall		WS below an invert; no flow.
70.30	.00	Free Outfall		WS below an invert; no flow.
70.80	.00	Free Outfall		WS below an invert; no flow.
71.30	.00	Free Outfall		WS below an invert; no flow.
71.80	.00	Free Outfall		WS below an invert; no flow.
72.30	.00	Free Outfall		WS below an invert; no flow.
72.34	.00	Free Outfall		WS below an invert; no flow.
72.80	.00	Free Outfall		WS below an invert; no flow.
73.30	.00	Free Outfall		WS below an invert; no flow.
73.34	.00	Free Outfall		WS below an invert; no flow.
73.80	.00	Free Outfall		WS below an invert; no flow.
74.30	.00	Free Outfall		WS below an invert; no flow.
74.75	.00	Free Outfall		WS below an invert; no flow.
74.80	.56	Free Outfall		H=.05; Htw=.00; Qfree=.56;
75.30	20.22	Free Outfall		H=.55; Htw=.00; Qfree=20.22;
75.50	32.12	Free Outfall		H=.75; Htw=.00; Qfree=32.12;

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = SP (Stand Pipe)

 Upstream ID = (Pond Water Surface)
 DNstream ID = CV (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
70.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
70.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
71.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
71.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
72.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
72.34	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
72.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
73.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
73.34	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
73.80	15.19	73.80	Free	72.51	.000	.000	Free Outfall	
		Weir: H = .46						
74.30	50.00	74.30	74.30	74.30	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
74.75	52.77	74.75	74.75	74.75	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
74.80	53.07	74.80	74.80	74.80	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
75.30	55.99	75.30	75.30	75.30	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
75.50	57.11	75.50	75.50	75.50	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Title... Modified Pond asbuilt 10/04 (riser/barrel)

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = WR (Weir-Rectangular)

 Upstream ID = (Pond Water Surface)
 DNstream ID = CV (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
70.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
70.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
71.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
71.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
72.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
72.34	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
72.80	4.02	72.80	Free	69.63	.000	.000	Free Outfall	
		H=.46; Htw=.00; Qfree=4.02;						
73.30	11.82	73.30	Free	70.35	.000	.000	Free Outfall	
		H=.96; Htw=.00; Qfree=11.82;						
73.34	12.54	73.34	Free	70.40	.000	.000	Free Outfall	
		H=1.00; Htw=.00; Qfree=12.54;						
73.80	21.23	73.80	72.52	72.51	.006	.000	Free Outfall	
		H=1.46; Htw=.18; Qfree=21.59;						
74.30	.00	74.30	74.30	74.30	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
74.75	.00	74.75	74.75	74.75	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
74.80	.00	74.80	74.80	74.80	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
75.30	.00	75.30	75.30	75.30	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
75.50	.00	75.50	75.50	75.50	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Title... Modified Pond asbuilt 10/04 (riser/barrel)

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = LF (Orifice-Circular)

Upstream ID = (Pond Water Surface)

DNstream ID = CV (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert;		no flow.				
69.30	.24	69.30	68.86	68.86	.000	.000	Free Outfall	
		H =.33						
69.80	.38	69.80	68.91	68.91	.000	.000	Free Outfall	
		H =.83						
70.30	.48	70.30	68.94	68.94	.000	.000	Free Outfall	
		H =1.33						
70.80	.57	70.80	68.97	68.97	.002	.000	Free Outfall	
		H =1.83						
71.30	.64	71.30	68.99	68.99	.000	.000	Free Outfall	
		H =2.31						
71.80	.70	71.80	69.01	69.01	.002	.000	Free Outfall	
		H =2.79						
72.30	.76	72.30	69.02	69.02	.002	.000	Free Outfall	
		H =3.28						
72.34	.76	72.34	69.03	69.02	.002	.000	Free Outfall	
		H =3.31						
72.80	.75	72.80	69.64	69.63	.008	.000	Free Outfall	
		H =3.16						
73.30	.72	73.30	70.34	70.35	.000	.000	Free Outfall	
		H =2.96						
73.34	.72	73.34	70.40	70.40	.000	.000	Free Outfall	
		H =2.94						
73.80	.47	73.80	72.52	72.51	.006	.000	Free Outfall	
		H =1.28						
74.30	.00	74.30	74.30	74.30	.000	.000	Free Outfall	
				Full riser flow. Q=0 this opening.				
74.75	.00	74.75	74.75	74.75	.000	.000	Free Outfall	
				Full riser flow. Q=0 this opening.				
74.80	.00	74.80	74.80	74.80	.000	.000	Free Outfall	
				Full riser flow. Q=0 this opening.				
75.30	.00	75.30	75.30	75.30	.000	.000	Free Outfall	
				Full riser flow. Q=0 this opening.				
75.50	.00	75.50	75.50	75.50	.000	.000	Free Outfall	
				Full riser flow. Q=0 this opening.				

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Title... Modified Pond asbuilt 10/04 (riser/barrel)

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = CV (Culvert-Circular)

Mannings open channel maximum capacity: 15.72 cfs

UPstream ID's= SP, WR, LF

DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	68.72	Free	Free	.000	.000	Free	Outfall
69.30	.24	68.86	Free	Free	.000	.000	Free	Outfall
69.80	.38	68.91	Free	Free	.000	.000	Free	Outfall
70.30	.48	68.94	Free	Free	.000	.000	Free	Outfall
70.80	.57	68.97	Free	Free	.000	.000	Free	Outfall
71.30	.64	68.99	Free	Free	.000	.000	Free	Outfall
71.80	.70	69.01	Free	Free	.000	.000	Free	Outfall
72.30	.76	69.02	Free	Free	.000	.000	Free	Outfall
72.34	.76	69.02	Free	Free	.000	.000	Free	Outfall
72.80	4.77	69.63	Free	Free	.000	.000	Free	Outfall
73.30	12.54	70.35	Free	Free	.000	.000	Free	Outfall
73.34	13.26	70.40	Free	Free	.000	.000	Free	Outfall
73.80	36.90	72.51	Free	Free	.000	.000	Free	Outfall
74.30	50.00	74.30	Free	Free	.000	.000	Free	Outfall
74.75	52.77	74.75	Free	Free	.000	.000	Free	Outfall
74.80	53.07	74.80	Free	Free	.000	.000	Free	Outfall
75.30	55.99	75.30	Free	Free	.000	.000	Free	Outfall

Type.... Individual Outlet Curves
Name.... PONDRROUTE

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
Title... Modified Pond asbuilt 10/04 (riser/barrel)

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = CV (Culvert-Circular)

Mannings open channel maximum capacity: 15.72 cfs

UPstream ID's= SP, WR, LF

DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
75.50	57.11	75.50	Free	Free	.000	.000	Free Outfall	

INLET CONTROL... Submerged: HW =6.78

***** COMPOSITE OUTFLOW SUMMARY *****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
4" → 68.80	.00	Free	Outfall	(no Q: ES,SP,WR,LF,CV)
69.30	.24	Free	Outfall	LF,CV (no Q: ES,SP,WR)
69.80	.38	Free	Outfall	LF,CV (no Q: ES,SP,WR)
70.30	.48	Free	Outfall	LF,CV (no Q: ES,SP,WR)
70.80	.57	Free	Outfall	LF,CV (no Q: ES,SP,WR)
71.30	.64	Free	Outfall	LF,CV (no Q: ES,SP,WR)
71.80	.70	Free	Outfall	LF,CV (no Q: ES,SP,WR)
WEIRS → 72.30	.76	Free	Outfall	LF,CV (no Q: ES,SP,WR)
→ 72.34	.76	Free	Outfall	LF,CV (no Q: ES,SP,WR)
72.80	4.77	Free	Outfall	WR,LF,CV (no Q: ES,SP)
73.30	12.54	Free	Outfall	WR,LF,CV (no Q: ES,SP)
RISER → 73.34	13.26	Free	Outfall	WR,LF,CV (no Q: ES,SP)
73.80	36.90	Free	Outfall	SP,WR,LF,CV (no Q: ES)
74.30	50.00	Free	Outfall	SP,CV (no Q: ES,WR,LF)
74.75	52.77	Free	Outfall	SP,CV (no Q: ES,WR,LF)
74.80	53.63	Free	Outfall	ES,SP,CV (no Q: WR,LF)
75.30	76.22	Free	Outfall	ES,SP,CV (no Q: WR,LF)
75.50	89.23	Free	Outfall	ES,SP,CV (no Q: WR,LF)

Name.... WNBREPAIR

File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
 Inflow HYG file = JCCBRIAR.HYG - WNBREPAIR IN A....1
 Outflow HYG file = JCCBRIAR.HYG - WNBREPAIR OUT A....1

Pond Node Data = WNBREPAIR
 Pond Volume Data = WNBREPAIR
 Pond Outlet Data = PONDROUTE

No Infiltration

INITIAL CONDITIONS

 Starting WS Elev = 68.80 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout = .00 cfs
 Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infiltr. cfs	Q Total cfs	2S/t + 0 cfs
68.80	.00	.000	.0000	.00	.00	.00
69.30	.24	.000	.0020	.00	.24	.40
69.80	.38	.003	.0080	.00	.38	1.67
70.30	.48	.009	.0179	.00	.48	4.82
70.80	.57	.022	.0345	.00	.57	11.02
71.30	.64	.044	.0538	.00	.64	21.90
71.80	.70	.076	.0738	.00	.70	37.34
72.30	.76	.117	.0870	.00	.76	57.27
72.34	.76	.120	.0876	.00	.76	58.96
72.80	4.77	.162	.0945	.00	4.77	83.23
73.30	12.54	.211	.1022	.00	12.54	114.80
73.34	13.26	.215	.1028	.00	13.26	117.50
73.80	36.90	.264	.1100	.00	36.90	164.82
74.30	50.00	.321	.1184	.00	50.00	205.53
74.75	52.77	.376	.1264	.00	52.77	234.96
74.80	53.63	.383	.1273	.00	53.63	238.88
75.30	76.22	.449	.1416	.00	76.22	293.74
75.50	89.23	.478	.1490	.00	89.23	320.82

Type.... Pond Routing Summary Page 7.02
 Name.... WNBREPAIR OUT Tag: A....1 Event: 1 yr
 File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Storm... TypeII 24hr Tag: A....1

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
 Inflow HYG file = JCCBRIAR.HYG - WNBREPAIR IN A....1
 Outflow HYG file = JCCBRIAR.HYG - WNBREPAIR OUT A....1

Pond Node Data = WNBREPAIR
 Pond Volume Data = WNBREPAIR
 Pond Outlet Data = PONDROUTE

No Infiltration

INITIAL CONDITIONS

 Starting WS Elev = 68.80 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout = .00 cfs
 Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
 Peak Inflow = 12.75 cfs at 12.0000 hrs
 Peak Outflow = 9.91 cfs at 12.1000 hrs

 Peak Elevation = 73.13 ft
 Peak Storage = .194 ac-ft
 =====

MASS BALANCE (ac-ft)

 + Initial Vol = .000
 + HYG Vol IN = .829 *1-YEAR INFLOW VOLUME*
 - Infiltration = .000
 - HYG Vol OUT = .829
 - Retained Vol = .000

 Unrouted Vol = -.000 ac-ft (.000% of Inflow Volume)

POND ROUTED TOTAL OUTFLOW HYG...
 HYG file = C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIAR.HYG
 HYG ID = WNBREPAIR OUT
 HYG Tag = A....1

 Peak Discharge = 9.91 cfs
 Time to Peak = 12.1000 hrs
 HYG Volume = .829 ac-ft

HYDROGRAPH ORDINATES (cfs)
 Output Time increment = .0500 hrs
 Time on left represents time for first value in each row.

Time hrs						
8.4000	.00	.00	.00	.00	.01	.01
8.6500	.01	.01	.01	.02	.02	.02
8.9000	.02	.02	.03	.03	.03	.03
9.1500	.04	.04	.04	.05	.05	.05
9.4000	.05	.05	.06	.06	.06	.06
9.6500	.07	.07	.07	.08	.08	.08
9.9000	.09	.09	.10	.11	.11	.11
10.1500	.12	.12	.13	.14	.15	.15
10.4000	.16	.17	.18	.19	.20	.20
10.6500	.21	.22	.23	.25	.26	.26
10.9000	.26	.27	.28	.29	.31	.31
11.1500	.32	.34	.37	.39	.39	.39
11.4000	.40	.42	.43	.45	.48	.48
11.6500	.50	.53	.58	.62	.66	.66
11.9000	.71	.78	4.48	8.36	9.91	9.91
12.1500	9.52	8.07	6.44	5.07	4.28	4.28
12.4000	3.71	3.22	2.81	2.47	2.18	2.18
12.6500	1.94	1.75	1.59	1.47	1.37	1.37
12.9000	1.29	1.23	1.17	1.12	1.07	1.07
13.1500	1.03	.99	.96	.93	.90	.90
13.4000	.88	.86	.83	.81	.79	.79
13.6500	.77	.76	.76	.76	.76	.76
13.9000	.76	.76	.76	.76	.76	.76
14.1500	.76	.76	.75	.75	.75	.75
14.4000	.75	.75	.75	.75	.75	.75
14.6500	.74	.74	.74	.74	.74	.74
14.9000	.74	.74	.73	.73	.73	.73
15.1500	.73	.73	.73	.73	.72	.72
15.4000	.72	.72	.72	.72	.72	.72
15.6500	.71	.71	.71	.71	.71	.71
15.9000	.70	.70	.70	.70	.70	.70
16.1500	.69	.69	.69	.68	.68	.68
16.4000	.68	.68	.67	.67	.67	.67

Type.... Pond Routed HYG (total out)
 Name.... WNBREPAIR OUT Tag: A....1
 File.... C:\HAESTAD\PPKW\JCCPROJECTS\JCCBRIARLANE.ASBUILT.PPW
 Storm... TypeII 24hr Tag: A....1

Page 7.04
 Event: 1 yr

HYDROGRAPH ORDINATES (cfs)
 Output Time increment = .0500 hrs
 Time on left represents time for first value in each row.

Time hrs						
16.6500	.67	.66	.66	.66	.66	.66
16.9000	.65	.65	.65	.65	.65	.64
17.1500	.64	.64	.63	.63	.63	.63
17.4000	.62	.62	.61	.61	.61	.61
17.6500	.60	.60	.59	.59	.59	.59
17.9000	.58	.58	.58	.57	.57	.57
18.1500	.56	.55	.55	.54	.54	.53
18.4000	.53	.52	.51	.51	.51	.50
18.6500	.49	.49	.48	.47	.47	.45
18.9000	.44	.43	.42	.41	.41	.40
19.1500	.39	.37	.34	.32	.32	.30
19.4000	.29	.28	.27	.26	.26	.25
19.6500	.23	.23	.23	.22	.22	.22
19.9000	.22	.22	.22	.21	.21	.21
20.1500	.21	.21	.21	.21	.21	.21
20.4000	.21	.21	.21	.21	.21	.21
20.6500	.21	.21	.20	.20	.20	.20
20.9000	.20	.20	.20	.20	.20	.20
21.1500	.20	.20	.20	.20	.20	.20
21.4000	.20	.20	.20	.20	.20	.20
21.6500	.20	.20	.20	.20	.20	.20
21.9000	.20	.20	.20	.20	.20	.19
22.1500	.19	.19	.19	.19	.19	.19
22.4000	.19	.19	.19	.19	.19	.19
22.6500	.19	.19	.19	.19	.19	.19
22.9000	.19	.19	.19	.19	.19	.19
23.1500	.19	.19	.19	.19	.19	.19
23.4000	.19	.18	.18	.18	.18	.18
23.6500	.18	.18	.18	.18	.18	.18
23.9000	.18	.18	.18	.17	.17	.15
24.1500	.11	.07	.04	.02	.02	.01
24.4000	.01	.00	.00	.00	.00	.00

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JCCSCSdata... 3.01

----- P -----

PONDROUTE... 6.01, 6.05, 6.11

----- W -----

Watershed... 1.01, 2.01, 2.02, 2.03,
2.04, 2.05
WNBREPAIR... 5.01, 7.01, 7.02, 7.03

Type.... Runoff CN-Area
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Conditions

RUNOFF CURVE NUMBER DATA

.....

Current Conditions

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Impervious (Road-Lot)	98	2.160			98.00
Open Sp/Yard Areas (grass)	79	4.840			79.00
COMPOSITE AREA & WEIGHTED CN ---->		7.000			84.86 (85)

CN=85

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

.....
TIME OF CONCENTRATION CALCULATOR
.....

Current Tc -Briar Lane

Segment #1: Tc: TR-55 Sheet
Description: Road - Sheet Flow

Mannings n .1500
Hydraulic Length 12.00 ft
2yr, 24hr P 3.5000 in
Slope .020000 ft/ft

Avg.Velocity .12 ft/sec

Segment #1 Time: .0286 hrs

Segment #2: Tc: TR-55 Shallow
Description: SC-Grassed Channel

Hydraulic Length 1200.00 ft
Slope .016700 ft/ft
Unpaved

Avg.Velocity 2.09 ft/sec

Segment #2 Time: .1599 hrs

Segment #3: Tc: TR-55 Channel
Description: Paved Channel

Flow Area 2.0000 sq.ft
Wetted Perimeter 4.47 ft
Hydraulic Radius .45 ft
Slope .029300 ft/ft
Mannings n .0130
Hydraulic Length 700.00 ft

Avg.Velocity 11.48 ft/sec

Segment #3 Time: .0169 hrs

0.2054 HRS
12.32 min.

=====
JOB TITLE
=====

JCC DIP Project
Briarwood/Briar Lane
BMP Repair

HYDROLOGY - CURRENT CONDITIONS

$$DA = 7.0 \text{ AC}$$

$$CN = 85$$

$$T_c = 12.32 \text{ minutes}$$

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCCSTORM.RNQ JCC

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID	
A....1	2.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
A....2	3.5000	Synthetic Curve	SCSTYPES	TypeII	24hr
A...10	5.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
A...25	6.4000	Synthetic Curve	SCSTYPES	TypeII	24hr
A..100	8.0000	Synthetic Curve	SCSTYPES	TypeII	24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
CURRENT DEV	AREA	1	.830		12.0000	12.79		
CURRENT DEV	AREA	2	1.177		12.0000	18.16		
CURRENT DEV	AREA	10	2.401		12.0000	36.41		
CURRENT DEV	AREA	25	2.731		12.0000	41.20		
CURRENT DEV	AREA	100	3.625		12.0000	53.94		
EXIST POND	IN POND	1	.830		12.0000	12.79		
EXIST POND	IN POND	2	1.177		12.0000	18.16		
EXIST POND	IN POND	10	2.401		12.0000	36.41		
EXIST POND	IN POND	25	2.731		12.0000	41.20		
EXIST POND	IN POND	100	3.625		12.0000	53.94		
EXIST POND	OUT POND	1	.830		12.0000	12.79		
EXIST POND	OUT POND	2	1.177		12.0000	18.16		
EXIST POND	OUT POND	10	2.401		12.0000	36.41		
EXIST POND	OUT POND	25	2.731		12.0000	41.20		
EXIST POND	OUT POND	100	3.625		12.0000	53.94		
*OUTFALL	JCT	1	.830		12.0000	12.79		
*OUTFALL	JCT	2	1.177		12.0000	18.16		
*OUTFALL	JCT	10	2.401		12.0000	36.41		
*OUTFALL	JCT	25	2.731		12.0000	41.20		

Type.... Design Storms
Name.... JCC

File.... C:\HAESTAD\PPKW\RAINFALL\JCCSTORM.RNQ
Title... JCC DIP Project
Briarwood/Briar Lane
BMP Repair

DESIGN STORMS SUMMARY

Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = A....1

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A....2

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A...10

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A...25

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 6.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = A..100

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Type.... Tc Calcs
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

.....
TIME OF CONCENTRATION CALCULATOR
.....

Current Tc -Briar Lane

Segment #1: Tc: TR-55 Sheet
Description: Road - Sheet Flow

Mannings n .1500
Hydraulic Length 12.00 ft
2yr, 24hr P 3.5000 in
Slope .020000 ft/ft

Avg.Velocity .12 ft/sec

Segment #1 Time: .0286 hrs

Segment #2: Tc: TR-55 Shallow
Description: SC-Grassed Channel

Hydraulic Length 1200.00 ft
Slope .016700 ft/ft
Unpaved

Avg.Velocity 2.09 ft/sec

Segment #2 Time: .1599 hrs

Segment #3: Tc: TR-55 Channel
Description: Paved Channel

Flow Area 2.0000 sq.ft
Wetted Perimeter 4.47 ft
Hydraulic Radius .45 ft
Slope .029300 ft/ft
Mannings n .0130
Hydraulic Length 700.00 ft

Avg.Velocity 11.48 ft/sec

Segment #3 Time: .0169 hrs

Type.... Tc Calcs
Name.... CURRENT

Page 4.02

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

=====
Total Tc: .2054 hrs
=====

12.32 minutes

Type.... Runoff CN-Area
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Conditions

RUNOFF CURVE NUMBER DATA

Current Conditions

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Impervious (Road-Lot)	98	2.160			98.00
Open Sp/Yard Areas (grass)	79	4.840			79.00
COMPOSITE AREA & WEIGHTED CN --->		7.000			84.86 (85)

CN=85

Type.... SCS Unit Hyd. Summary
Name.... CURRENT DEV Tag: A....1
File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Storm... TypeII 24hr Tag: A....1

Page 6.01
Event: 1 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration = 24.0000 hrs Rain Depth = 2.8000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\HAESTAD\PPKW\SAMPLE\
HYG File - ID = BRIARLAN.HYG - CURRENT DEV A....1
Tc = .2054 hrs
Drainage Area = 7.000 acres Runoff CN= 85

=====
Computational Time Increment = .02739 hrs
Computed Peak Time = 12.0254 hrs
Computed Peak Flow = 12.94 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 12.79 cfs
=====

DRAINAGE AREA

ID:Current
CN = 85
Area = 7.000 acres
S = 1.7647 in
0.2S = .3529 in

Cumulative Runoff

1.4218 in
.829 ac-ft

HYG Volume... .830 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .20544 hrs (ID: Current)
Computational Incr, Tm = .02739 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 38.61 cfs
Unit peak time Tp = .13696 hrs
Unit receding limb, Tr = .54785 hrs
Total unit time, Tb = .68482 hrs

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
68.80	-----	.0000	.0000	.000	.000
69.00	-----	.1045	.1045	.007	.007
70.00	-----	.2112	.4643	.155	.162
72.00	-----	.5051	1.0429	.695	.857
73.78	-----	.6451	1.7210	1.021	1.878

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Existing Pond Volume
BASED ON FIELD SHOTS DATED 5-24-02

BMP Repair at Briarwood / Briar Lane

- Originally thought repair approach would be best by use of bioretention. Following field visit, review of mapping and preliminary hydrology different approach is warranted.

- Preliminary Hydrology

Drainage Area = ~~4.87~~⁷ acres (design for 5 acres)
 CN = 85 (impervious & yard areas)
 Time of Conc. = ~~7.5~~^{12.3} minutes (overland, shallow & paved channel conc flow)
 HSG C

- SCS Hydrology-Peak Discharges

1-year	10.34 ^{12.79} cfs	0.592 ^{0.830} acre-ft.
2-year	14.65 ^{18.16} cfs	0.840 ^{1.177} acre-ft.
10-year	29.30 ^{36.41} cfs	1.714 ^{2.401} acre-ft.
25-year	33.14 ^{41.2} cfs	1.951 ^{2.731} acre-ft.
100-year	43.36 ^{53.94} cfs	2.589 ^{3.625} acre-ft.

- Stage-Storage: Based on aerial mapping and assumed bottom depth, total volume works out to be ~~0.501~~^{1.878} acre-ft. from bottom of pond to top of dam. ~~(0.592 > 0.501)~~ therefore, ~~not~~ enough volume to contain the brim full 1-year, 24 hour storm for 24-hour detention time. Therefore, need field data to generate a true stage-storage curve for the facility.

- Use JCSA manhole to east of the facility as benchmark. Need shots bottom of pond and top of dam. **REF EL. 78.78**

- Preliminary Repair Plan:**

Clean breached section of all debris and wash material.
 Reset outlet barrel through breached section. Bedding for pipe and select backfill to at least 18" over pipe.
 Riprap channel over pipe with grouted bottom to resist erosion of fill over pipe.
 Outlet protection pad at end of riprap channel prior to natural stream channel.
 Reinforced concrete weir wall through dam breach.
 Low flow orifice on wall for ED.
 Slots & weirs on concrete wall for 2-, 10- and 100-year discharge to riprap channel.
 Use existing riser in dam for backup high storm control
 Seal low flow pipe in existing riser.
 Optional-Micropool & wetland plants at BMP orifice (base of wall)

BMP ORIFICE SIZE

ORIFICE REQUIRED
 24-hr ext. det. (1-yr, 24 hr storm)

$$\frac{36,154 \text{ CF}}{24 \times 60 \times 60} = 0.4185 \text{ CFS}$$

HEAD - BRIM FULL EL. 70.92
 BASE EL. 68.80
 2.12 FT.

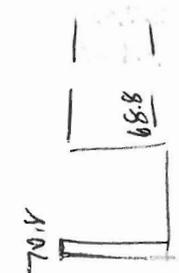
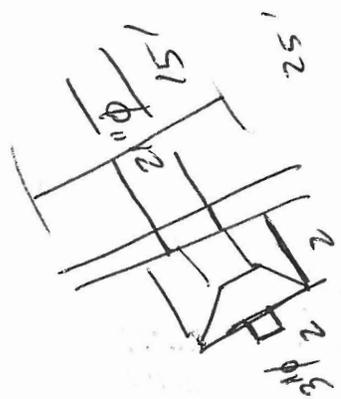
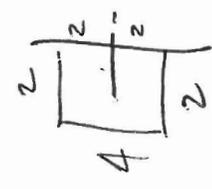
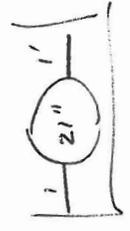
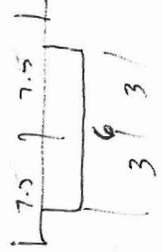
$$\frac{0.4185 \text{ CFS}}{0.6 \sqrt{(64.4)(2.12)}} = 0.0597 \text{ SF}$$

$$\frac{\pi D^2}{4} = 0.0597$$

D = 0.2757'
 D = 3.3" φ

1-7 HEAD

18



70.25

69.94

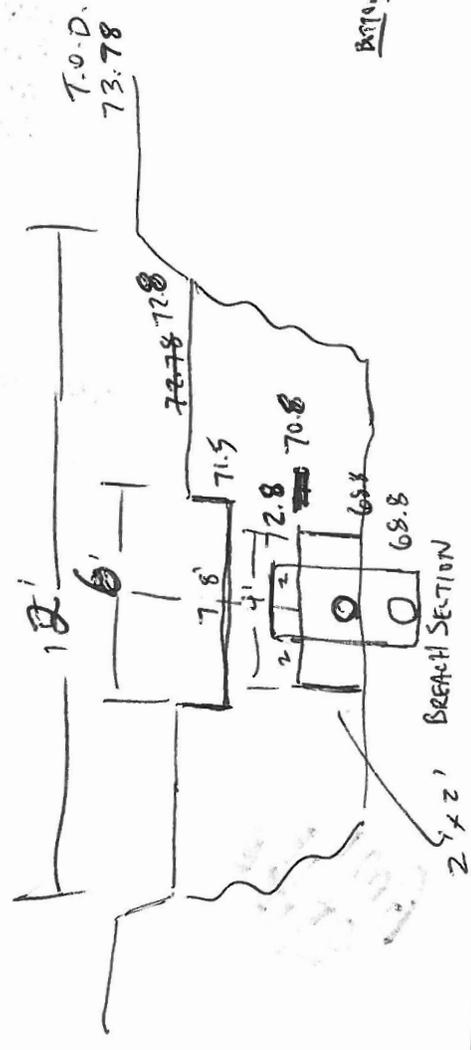
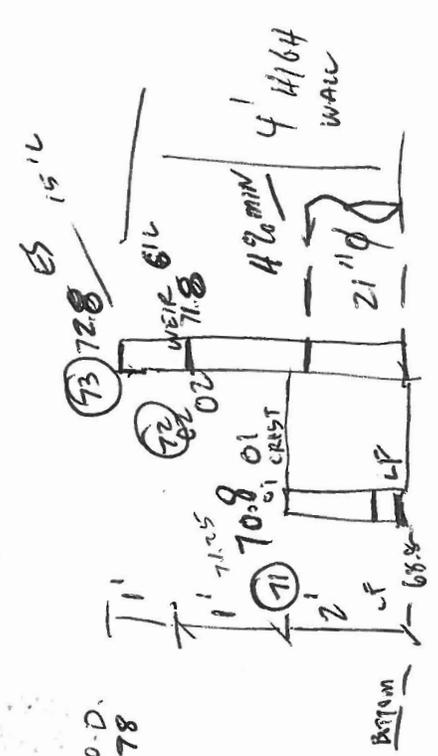
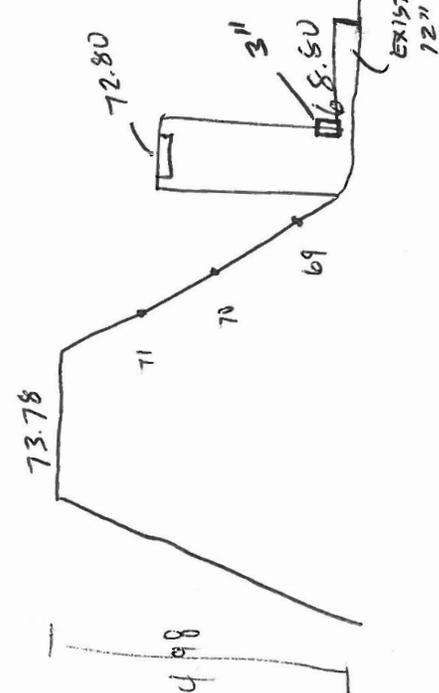
70
+
22.0

0.162
0.830
0.857

$$\frac{X-70}{72-70} = \frac{0.83-0.162}{0.857-0.162}$$

$$\frac{X-70}{2} = \frac{0.66}{0.69}$$

X-70 = 1.92
70.92



Job File: C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Rain Dir: C:\HAESTAD\PPKW\RAINFALL\

=====
JOB TITLE
=====

JCC DIP Project
Briarwood/Briar Lane
BMP Repair

PRELIMINARY DESIGN

S/N: 521502A06A8A
PondPack Ver. 7.5 (767)

James City County
Compute Time: 13:54:20 Date: 08/06/2002

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MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCCSTORM.RNQ JCC

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
B....1	2.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
B....2	3.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
B...10	5.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
B...25	6.4000	Synthetic Curve	SCSTYPES	TypeII 24hr
B..100	8.0000	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
CURRENT DEV	AREA	1	.830		12.0000	12.79		
CURRENT DEV	AREA	2	1.177		12.0000	18.16		
CURRENT DEV	AREA	10	2.401		12.0000	36.41		
CURRENT DEV	AREA	25	2.731		12.0000	41.20		
CURRENT DEV	AREA	100	3.625		12.0000	53.94		
EXIST POND	IN POND	1	.830		12.0000	12.79		
EXIST POND	IN POND	2	1.177		12.0000	18.16		
EXIST POND	IN POND	10	2.401		12.0000	36.41		
EXIST POND	IN POND	25	2.731		12.0000	41.20		
EXIST POND	IN POND	100	3.625		12.0000	53.94		
EXIST POND	OUT POND	1	.829		15.2000	.44	71.27	.533
EXIST POND	OUT POND	2	1.176		12.4500	2.96	71.42	.593
EXIST POND	OUT POND	10	2.400		12.1500	19.04	72.16	.938
EXIST POND	OUT POND	25	2.730		12.1500	22.45	72.34	1.032
EXIST POND	OUT POND	100	3.624		12.1500	32.24	72.75	1.259
*OUTFALL	JCT	1	.829		15.2000	.44		
*OUTFALL	JCT	2	1.176		12.4500	2.96		
*OUTFALL	JCT	10	2.400		12.1500	19.04		
*OUTFALL	JCT	25	2.730		12.1500	22.45		

Type.... Master Network Summary
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
*OUTFALL	JCT	100	3.624		12.1500	32.24		

Type.... Executive Summary (Nodes)
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Storm... TypeII 24hr Tag: B....1

Page 2.01
 Event: 1 yr

NETWORK SUMMARY -- NODES
 (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = B....1

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 1 yr
 Total Rainfall Depth= 2.8000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
CURRENT DEV	AREA	.830	12.0000	12.79	
EXIST POND	IN POND	.830	12.0000	12.79	
EXIST POND	OUT POND	.829	15.2000	.44	71.27
Outfall	OUTFALL JCT	.829	15.2000	.44	

Type.... Executive Summary (Nodes)
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Storm... TypeII 24hr Tag: B....2

Page 2.02
 Event: 2 yr

NETWORK SUMMARY -- NODES
 (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = B....2

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 2 yr
 Total Rainfall Depth= 3.5000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
CURRENT DEV	AREA	1.177	12.0000	18.16	
EXIST POND	IN POND	1.177	12.0000	18.16	
EXIST POND	OUT POND	1.176	12.4500	2.96	71.42
Outfall	OUTFALL JCT	1.176	12.4500	2.96	

Type.... Executive Summary (Nodes)
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Storm... TypeII 24hr Tag: B...10

NETWORK SUMMARY -- NODES
 (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = B...10

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 10 yr
 Total Rainfall Depth= 5.8000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
CURRENT DEV	AREA	2.401	12.0000	36.41	
EXIST POND	IN POND	2.401	12.0000	36.41	
EXIST POND	OUT POND	2.400	12.1500	19.04	72.16
Outfall	OUTFALL JCT	2.400	12.1500	19.04	

Type.... Executive Summary (Nodes)
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Storm... TypeII 24hr Tag: B...25

Page 2.04
 Event: 25 yr

NETWORK SUMMARY -- NODES
 (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = B...25

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 25 yr
 Total Rainfall Depth= 6.4000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
CURRENT DEV	AREA	2.731	12.0000	41.20	
EXIST POND IN	POND	2.731	12.0000	41.20	
EXIST POND OUT	POND	2.730	12.1500	22.45	72.34
Outfall OUTFALL	JCT	2.730	12.1500	22.45	

Type.... Executive Summary (Nodes)
 Name.... Watershed
 File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Storm... TypeII 24hr Tag: B..100

Page 2.05
 Event: 100 yr

NETWORK SUMMARY -- NODES
 (Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = B..100

 Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
 Storm Frequency = 100 yr
 Total Rainfall Depth= 8.0000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Qpeak Trun. hrs	Qpeak cfs	Max WSEL ft
CURRENT DEV	AREA	3.625	12.0000	53.94	
EXIST POND	IN POND	3.625	12.0000	53.94	
EXIST POND	OUT POND	3.624	12.1500	32.24	72.75
Outfall	OUTFALL	JCT	3.624	12.1500	32.24

Type.... Design Storms
Name.... JCC

File.... C:\HAESTAD\PPKW\RAINFALL\JCCSTORM.RNQ
Title... JCC DIP Project
Briarwood/Briar Lane
BMP Repair

DESIGN STORMS SUMMARY

Design Storm File, ID = JCCSTORM.RNQ JCC

Storm Tag Name = B....1

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = B....2

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = B...10

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = B...25

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 6.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = B..100

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Type.... Tc Calcs
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

.....
TIME OF CONCENTRATION CALCULATOR
.....

Current Tc -Briar Lane

Segment #1: Tc: TR-55 Sheet
Description: Road - Sheet Flow

Mannings n .1500
Hydraulic Length 12.00 ft
2yr, 24hr P 3.5000 in
Slope .020000 ft/ft

Avg.Velocity .12 ft/sec

Segment #1 Time: .0286 hrs

Segment #2: Tc: TR-55 Shallow
Description: SC-Grassed Channel

Hydraulic Length 1200.00 ft
Slope .016700 ft/ft
Unpaved

Avg.Velocity 2.09 ft/sec

Segment #2 Time: .1599 hrs

Segment #3: Tc: TR-55 Channel
Description: Paved Channel

Flow Area 2.0000 sq.ft
Wetted Perimeter 4.47 ft
Hydraulic Radius .45 ft
Slope .029300 ft/ft
Mannings n .0130
Hydraulic Length 700.00 ft

Avg.Velocity 11.48 ft/sec

Segment #3 Time: .0169 hrs

Type.... Tc Calcs
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

=====
Total Tc: .2054 hrs
=====

Type.... Tc Calcs
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

Tc Equations used...

==== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))$$

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf**0.5)$$

Paved surface:

$$V = 20.3282 * (Sf**0.5)$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Tc -Briar Lane

==== SCS Channel Flow =====

$$R = Aq / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{-0.5})) / n$$

$$Tc = (Lf / V) / (3600\text{sec/hr})$$

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Runoff CN-Area
Name.... CURRENT

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... Current Conditions

RUNOFF CURVE NUMBER DATA

.....

Current Conditions

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Impervious (Road-Lot)	98	2.160			98.00
Open Sp/Yard Areas (grass)	79	4.840			79.00

COMPOSITE AREA & WEIGHTED CN ----> 7.000 84.86 (85)

.....

Type.... Vol: Elev-Area
Name.... EXIST POND

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sq ^r (A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
68.80	-----	.0000	.0000	.000	.000
69.00	-----	.1045	.1045	.007	.007
70.00	-----	.2112	.4643	.155	.162
72.00	-----	.5051	1.0429	.695	.857
73.78	-----	.6451	1.7210	1.021	1.878

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1, Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Type.... Outlet Input Data
Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... New BMP Wall Configuration

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 68.80 ft
Increment = .50 ft
Max. Elev.= 73.78 ft

OUTLET CONNECTIVITY

----> Forward Flow Only (UpStream to DnStream)
<---- Reverse Flow Only (DnStream to UpStream)
<----> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
-----	-----		-----	-----	-----
Weir-Rectangular	ES	---->	TW	73.000	73.780
Weir-Rectangular	02	---->	TW	72.000	73.780
Inlet Box	01	---->	CV	71.250	73.780
Orifice-Circular	LF	---->	CV	68.800	73.780
Culvert-Circular	CV	---->	TW	68.800	73.780
TW SETUP, DS Channel					

Type.... Outlet Input Data
Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... New BMP Wall Configuration

OUTLET STRUCTURE INPUT DATA

Structure ID = ES
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 73.00 ft
Weir Length = 12.00 ft
Weir Coeff. = 3.100000

Weir TW effects (Use adjustment equation)

Structure ID = 02
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 72.00 ft
Weir Length = 6.00 ft
Weir Coeff. = 3.100000

Weir TW effects (Use adjustment equation)

Structure ID = 01
Structure Type = Inlet Box

of Openings = 1
Invert Elev. = 71.25 ft
Orifice Area = 8.0000 sq.ft
Orifice Coeff. = .600
Weir Length = 8.00 ft
Weir Coeff. = 3.100
K, Submerged = .000
K, Reverse = 1.000
Kb, Barrel = .000000 (per ft of full flow)
Barrel Length = .00 ft
Mannings n = .0000

Type.... Outlet Input Data
Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... New BMP Wall Configuration

OUTLET STRUCTURE INPUT DATA

Structure ID	=	LF
Structure Type	=	Orifice-Circular

# of Openings	=	1
Invert Elev.	=	68.80 ft
Diameter	=	.2500 ft
Orifice Coeff.	=	.600

Type.... Outlet Input Data
Name.... NEW BMP

Page 7.04

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
Title... New BMP Wall Configuration

OUTLET STRUCTURE INPUT DATA

Structure ID = CV
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 1.7500 ft
Upstream Invert = 68.80 ft
Dnstream Invert = 64.80 ft
Horiz. Length = 100.00 ft
Barrel Length = 100.08 ft
Barrel Slope = .04000 ft/ft

OUTLET CONTROL DATA...

Mannings n = .0130
Ke = .5000 (forward entrance loss)
Kb = .014830 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0098
Inlet Control M = 2.0000
Inlet Control c = .03980
Inlet Control Y = .6700
T1 ratio (HW/D) = 1.140
T2 ratio (HW/D) = 1.287
Slope Factor = -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.

Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 70.80 ft ---> Flow = 11.14 cfs

At T2 Elev = 71.05 ft ---> Flow = 12.73 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...

Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

Type.... Individual Outlet Curves
 Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Title... New BMP Wall Configuration

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = ES (Weir-Rectangular)

 Upstream ID = (Pond Water Surface)
 DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
68.80	.00	Free Outfall		WS below an invert; no flow.
69.30	.00	Free Outfall		WS below an invert; no flow.
69.80	.00	Free Outfall		WS below an invert; no flow.
70.30	.00	Free Outfall		WS below an invert; no flow.
70.80	.00	Free Outfall		WS below an invert; no flow.
71.25	.00	Free Outfall		WS below an invert; no flow.
71.30	.00	Free Outfall		WS below an invert; no flow.
71.80	.00	Free Outfall		WS below an invert; no flow.
72.00	.00	Free Outfall		WS below an invert; no flow.
72.30	.00	Free Outfall		WS below an invert; no flow.
72.80	.00	Free Outfall		WS below an invert; no flow.
73.00	.00	Free Outfall		WS below an invert; no flow.
73.30	6.08	Free Outfall		H=.30; Htw=.00; Qfree=6.08;
73.78	25.29	Free Outfall		H=.78; Htw=.00; Qfree=25.29;

Type.... Individual Outlet Curves
 Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Title... New BMP Wall Configuration

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 02 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
68.80	.00	Free Outfall		WS below an invert; no flow.
69.30	.00	Free Outfall		WS below an invert; no flow.
69.80	.00	Free Outfall		WS below an invert; no flow.
70.30	.00	Free Outfall		WS below an invert; no flow.
70.80	.00	Free Outfall		WS below an invert; no flow.
71.25	.00	Free Outfall		WS below an invert; no flow.
71.30	.00	Free Outfall		WS below an invert; no flow.
71.80	.00	Free Outfall		WS below an invert; no flow.
72.00	.00	Free Outfall		WS below an invert; no flow.
72.30	3.03	Free Outfall		H=.30; Htw=.00; Qfree=3.03;
72.80	12.95	Free Outfall		H=.80; Htw=.00; Qfree=12.95;
73.00	17.98	Free Outfall		H=1.00; Htw=.00; Qfree=17.98;
73.30	26.37	Free Outfall		H=1.30; Htw=.00; Qfree=26.37;
73.78	41.55	Free Outfall		H=1.78; Htw=.00; Qfree=41.55;

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 01 (Inlet Box)

 Upstream ID = (Pond Water Surface)
 DNstream ID = CV (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
70.30	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
70.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
71.25	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
71.30	.28	71.30	Free	69.22	.000	.000	Free Outfall	
		Weir: H = .05						
71.80	10.12	71.80	Free	70.81	.000	.000	Free Outfall	
		Weir: H = .55						
72.00	16.23	72.00	72.00	72.00	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
72.30	18.53	72.30	72.30	72.30	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
72.80	20.40	72.80	72.80	72.80	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
73.00	21.10	73.00	73.00	73.00	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
73.30	22.11	73.30	73.30	73.30	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
73.78	23.63	73.78	73.78	73.78	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = LF (Orifice-Circular)

Upstream ID = (Pond Water Surface)

DNstream ID = CV (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.30	.13	69.30	68.99	68.99	.000	.000	Free Outfall	
		H = .31						
69.80	.20	69.80	69.05	69.04	.008	.000	Free Outfall	
		H = .75						
70.30	.26	70.30	69.08	69.07	.008	.000	Free Outfall	
		H = 1.22						
70.80	.31	70.80	69.10	69.10	.008	.000	Free Outfall	
		H = 1.70						
71.25	.34	71.25	69.12	69.12	.005	.000	Free Outfall	
		H = 2.13						
71.30	.34	71.30	69.23	69.22	.009	.000	Free Outfall	
		H = 2.07						
71.80	.24	71.80	70.81	70.81	.000	.000	Free Outfall	
		H = .99						
72.00	.00	72.00	72.00	72.00	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
72.30	.00	72.30	72.30	72.30	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
72.80	.00	72.80	72.80	72.80	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
73.00	.00	73.00	73.00	73.00	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
73.30	.00	73.30	73.30	73.30	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
73.78	.00	73.78	73.78	73.78	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = CV (Culvert-Circular)

Mannings open channel maximum capacity: 34.09 cfs

UPstream ID's= 01, LF

DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
68.80	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
69.30	.13	68.99	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .043ft Dcr= .126ft CRIT.DEPTH						
69.80	.20	69.04	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .055ft Dcr= .161ft CRIT.DEPTH						
70.30	.26	69.07	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .062ft Dcr= .181ft CRIT.DEPTH						
70.80	.31	69.10	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .067ft Dcr= .196ft CRIT.DEPTH						
71.25	.34	69.12	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .071ft Dcr= .208ft CRIT.DEPTH						
71.30	.62	69.22	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .097ft Dcr= .279ft CRIT.DEPTH						
71.80	10.35	70.81	Free	Free	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL Vh= .540ft Dcr= 1.199ft CRIT.DEPTH						
72.00	16.23	72.00	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL... Submerged: HW =3.20						
72.30	18.53	72.30	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL... Submerged: HW =3.50						
72.80	20.40	72.80	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL... Submerged: HW =4.00						
73.00	21.10	73.00	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL... Submerged: HW =4.20						
73.30	22.11	73.30	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL... Submerged: HW =4.50						
73.78	23.63	73.78	Free	Free	.000	.000	Free Outfall	
		INLET CONTROL... Submerged: HW =4.98						

Type.... Composite Rating Curve
 Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Title... New BMP Wall Configuration

***** COMPOSITE OUTFLOW SUMMARY *****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
68.80	.00	Free	Outfall	(no Q: ES,02,01,LF,CV)
69.30	.13	Free	Outfall	LF,CV (no Q: ES,02,01)
69.80	.20	Free	Outfall	LF,CV (no Q: ES,02,01)
70.30	.26	Free	Outfall	LF,CV (no Q: ES,02,01)
70.80	.31	Free	Outfall	LF,CV (no Q: ES,02,01)
71.25	.34	Free	Outfall	LF,CV (no Q: ES,02,01)
71.30	.62	Free	Outfall	01,LF,CV (no Q: ES,02)
71.80	10.35	Free	Outfall	01,LF,CV (no Q: ES,02)
72.00	16.23	Free	Outfall	01,CV (no Q: ES,02,LF)
72.30	21.56	Free	Outfall	02,01,CV (no Q: ES,LF)
72.80	33.35	Free	Outfall	02,01,CV (no Q: ES,LF)
73.00	39.08	Free	Outfall	02,01,CV (no Q: ES,LF)
73.30	54.56	Free	Outfall	ES,02,01,CV (no Q: LF)
73.78	90.48	Free	Outfall	ES,02,01,CV (no Q: LF)

Index of Starting Page Numbers for ID Names

----- C -----

CURRENT... 4.01, 5.01

----- E -----

EXIST POND... 6.01

----- J -----

JCC... 3.01

----- N -----

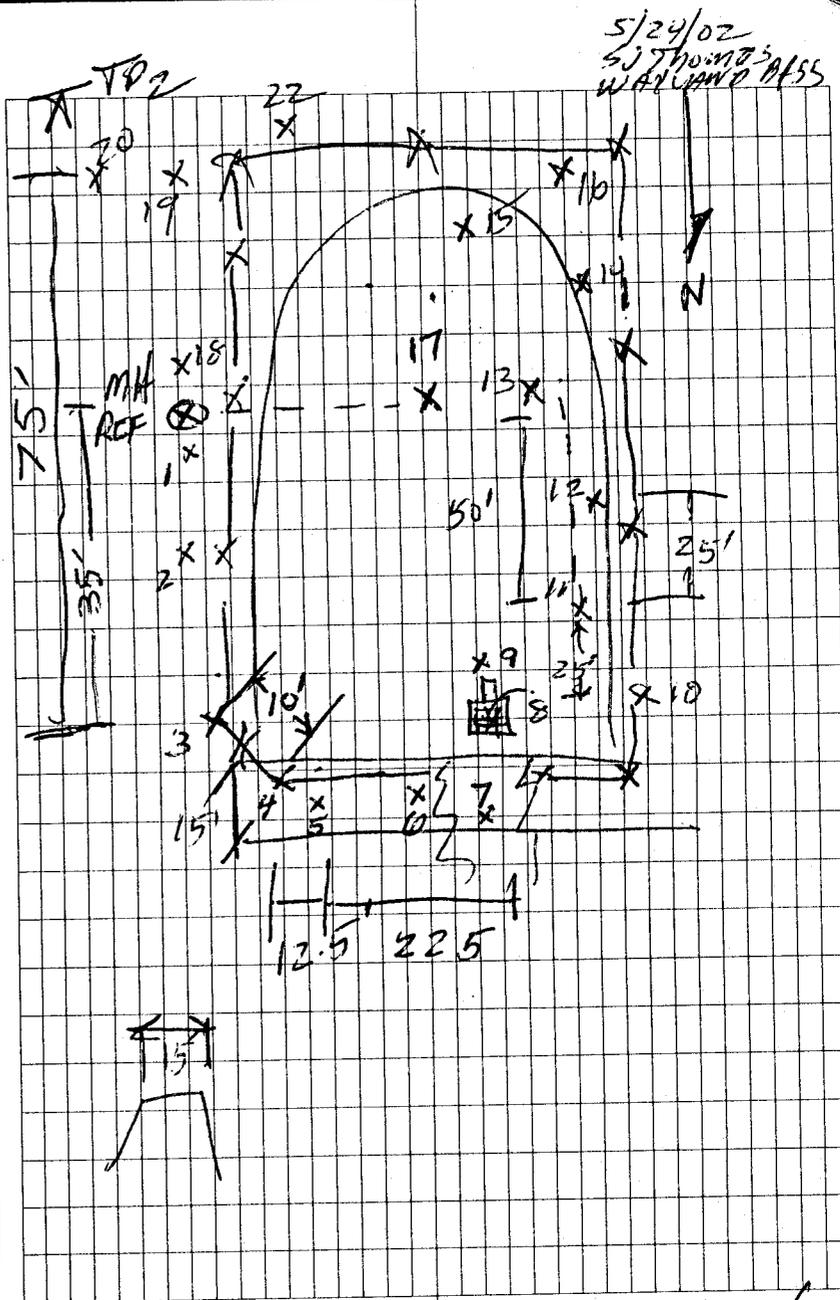
NEW BMP... 7.01, 7.05, 7.10

----- W -----

Watershed... 1.01, 2.01, 2.02, 2.03,
2.04, 2.05

BRIARWOOD/
Briar Lane As-Built Survey

	+	HI	-	ELEV.
REF JCSA MANHOLE				78.78
RIM COVER.				
π	223	81.01		
1	Basement	3.41	77.60	
2	25' MAN	3.81	77.20	
3	Fence Corner @ GATE	4.89	76.12	
4	" " "	5.60	75.41	
5	EMERG SOLLWAY 15' FROM CORNER	7.23	73.78	
6	TOP DAM @ BREACH	7.09	73.92	
7	Bottom Breach	19.87	61.14	
8	INLET RIM	8.21	72.80	
9	BASE RISER (4')	4.21	76.80	
10	TOP DAM	6.84	74.17	
11	Bottom	10.93	70.08	
12	TOP DAM	7.78	73.23	
13	BOTTOM BASIN	11.07	69.94 (MIDDLE)	
14	TOP DAM EDGE	7.72	73.29	
15	BOTTOM BASIN	10.56	70.45 (BACK)	
16	TOP BANK	5.81	75.2 (BACK CORNER)	
17	CENTER-BOTTOM BASIN	11.07	69.94	1/3



MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCCSTORM.RNQ JCC

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
B....1	2.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
B....2	3.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
B...10	5.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
B...25	6.4000	Synthetic Curve	SCSTYPES	TypeII 24hr
B..100	8.0000	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
CURRENT DEV	AREA	1	.830		12.0000	12.79		
CURRENT DEV	AREA	2	1.177		12.0000	18.16		
CURRENT DEV	AREA	10	2.401		12.0000	36.41		
CURRENT DEV	AREA	25	2.731		12.0000	41.20		
CURRENT DEV	AREA	100	3.625		12.0000	53.94		
EXIST POND	IN POND	1	.830		12.0000	12.79		
EXIST POND	IN POND	2	1.177		12.0000	18.16		
EXIST POND	IN POND	10	2.401		12.0000	36.41		
EXIST POND	IN POND	25	2.731		12.0000	41.20		
EXIST POND	IN POND	100	3.625		12.0000	53.94		
EXIST POND	OUT POND	1	.829		15.2000	.44	71.27	.533
EXIST POND	OUT POND	2	1.176		12.4500	2.96	71.42	.593
EXIST POND	OUT POND	10	2.400		12.1500	19.04	72.16	.938
EXIST POND	OUT POND	25	2.730		12.1500	22.45	72.34	1.032
EXIST POND	OUT POND	100	3.624		12.1500	32.24	72.75	1.259
*OUTFALL	JCT	1	.829		15.2000	.44		
*OUTFALL	JCT	2	1.176		12.4500	2.96		
*OUTFALL	JCT	10	2.400		12.1500	19.04		
*OUTFALL	JCT	25	2.730		12.1500	22.45		

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqrt(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
68.80	-----	.0000	.0000	.000	.000
69.00	-----	.1045	.1045	.007	.007
70.00	-----	.2112	.4643	.155	.162
72.00	-----	.5051	1.0429	.695	.857
73.78	-----	.6451	1.7210	1.021	1.878

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1, Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Type.... Outlet Input Data
 Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Title... New BMP Wall Configuration

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 68.80 ft
 Increment = .50 ft
 Max. Elev.= 73.78 ft

 OUTLET CONNECTIVITY

---> Forward Flow Only (UpStream to DnStream)
 <--- Reverse Flow Only (DnStream to UpStream)
 <---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	ES	--->	TW	73.000	73.780
Weir-Rectangular	O2	--->	TW	72.000	73.780
Inlet Box	O1	--->	CV	71.250	73.780
Orifice-Circular	LF	--->	CV	68.800	73.780
Culvert-Circular	CV	--->	TW	68.800	73.780
TW SETUP, DS Channel					

S/N: 521502A06A8A
 PondPack Ver. 7.5 (767)

James City County
 Compute Time: 13:54:20 Date: 08/06/2002

Type.... Composite Rating Curve
 Name.... NEW BMP

File.... C:\HAESTAD\PPKW\SAMPLE\JCCBRIARLANE.PPW
 Title... New BMP Wall Configuration

***** COMPOSITE OUTFLOW SUMMARY *****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
68.80	.00	Free Outfall		(no Q: ES,02,01,LF,CV)
69.30	.13	Free Outfall		LF,CV (no Q: ES,02,01)
69.80	.20	Free Outfall		LF,CV (no Q: ES,02,01)
70.30	.26	Free Outfall		LF,CV (no Q: ES,02,01)
70.80	.31	Free Outfall		LF,CV (no Q: ES,02,01)
71.25	.34	Free Outfall		LF,CV (no Q: ES,02,01)
71.30	.62	Free Outfall		01,LF,CV (no Q: ES,02)
71.80	10.35	Free Outfall		01,LF,CV (no Q: ES,02)
72.00	16.23	Free Outfall		01,CV (no Q: ES,02,LF)
72.30	21.56	Free Outfall		02,01,CV (no Q: ES,LF)
72.80	33.35	Free Outfall		02,01,CV (no Q: ES,LF)
73.00	39.08	Free Outfall		02,01,CV (no Q: ES,LF)
73.30	54.56	Free Outfall		ES,02,01,CV (no Q: LF)
73.78	90.48	Free Outfall		ES,02,01,CV (no Q: LF)

FOUNDATION ENGINEERING SCIENCE, INC.



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- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

October 25, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.013

YC015 COUNTY REPAIR

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on October 18, 2004. The specific purpose of this visit was to perform compaction density testing on the dam, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

O:\company\projects\2004\cmt\N574\N574.013

11843 B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114



FOUNDATION ENGINEERING SCIENCE, INC.

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FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		October 18, 2004		
Project No.		N574.013				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Sunny		
Gauge #	26814	Model #	3430	Density Std. Ct.	2371	Moisture Std. Ct.	649	FES REP.:	SR	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴				Source	Compaction Requirement	
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)				Off-site	Minimum effort	
TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12	-3.5 below grade	2	113.6	18.0	134.1	95.1	X		
2	6	-3 below grade	2	114.3	16.9	133.5	95.7	X		
3	6	-2.5 below grade	2	115.2	16.6	134.3	96.5	X		
4	6	-2 below grade	2	114.0	17.9	134.4	95.5	X		
5	6	-1.5 below grade	2	119.3	15.8	138.1	99.9	X		
6	6	-1 below grade	2	114.5	17.7	134.8	95.9	X		
TEST NO.	TEST LOCATION									
1	Dam, on top of Overflow Pipe, Site 1									
2	Dam, on top of Overflow Pipe, Site 1									
3	Dam, on top of Overflow Pipe, Site 1									
4	Dam, on top of Overflow Pipe, Site 1									
5	Dam, on top of Overflow Pipe, Site 1									
6	Dam, on top of Overflow Pipe, Site 1									
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)										95.0
MOISTURE (%)										OM ±20
Comments										
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
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October 25, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185

Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.013

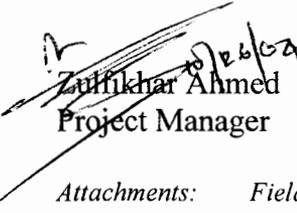
Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (**FES**) representative visited the project site on October 18, 2004. The specific purpose of this visit was to perform compaction density testing on the dam, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

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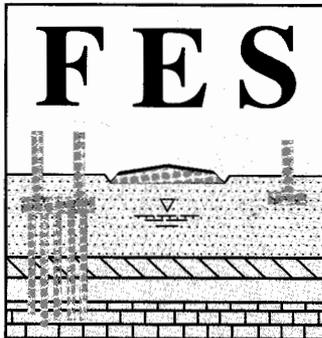
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FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		October 18, 2004			
Project No.		N574.013				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Sunny			
Gauge #	26814	Model #	3430	Density Std. Ct.	2371	Moisture Std. Ct.	649	FES REP.:	SR		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement			
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			Off-site	Minimum effort			
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12	-3.5 below grade		2	113.6	18.0	134.1	95.1	X		
2	6	-3 below grade		2	114.3	16.9	133.5	95.7	X		
3	6	-2.5 below grade		2	115.2	16.6	134.3	96.5	X		
4	6	-2 below grade		2	114.0	17.9	134.4	95.5	X		
5	6	-1.5 below grade		2	119.3	15.8	138.1	99.9	X		
6	6	-1 below grade		2	114.5	17.7	134.8	95.9	X		
TEST NO.	TEST LOCATION										
1	Dam, on top of Overflow Pipe, Site 1										
2	Dam, on top of Overflow Pipe, Site 1										
3	Dam, on top of Overflow Pipe, Site 1										
4	Dam, on top of Overflow Pipe, Site 1										
5	Dam, on top of Overflow Pipe, Site 1										
6	Dam, on top of Overflow Pipe, Site 1										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										95.0	
MOISTURE (%)										OM ±20	
Comments											
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

FOUNDATION ENGINEERING SCIENCE, INC.



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October 25, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.012

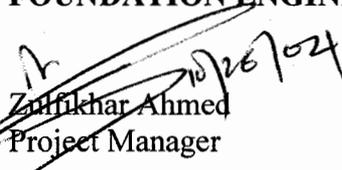
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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

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FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		October 13, 2004			
Project No.		N574.012				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Sunny			
Gauge #	26814	Model #	3430	Density Std. Ct.	2434	Moisture Std. Ct.	583	FES REP.:	SR		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement			
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			Off-site	Minimum effort			
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12	-4 below grade		2	94.8	23.4	116.9	79.4		X	
TEST NO.	TEST LOCATION										
1	Dam, on top of Overflow Pipe, Site 1										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										95.0	
MOISTURE (%)										OM ±20	
Comments											
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

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October 25, 2004

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101- E Mounts Bay Road
Williamsburg, Virginia 23185

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FES Report No. N574.012

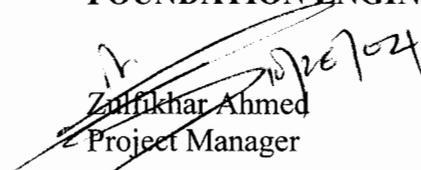
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Zulfikhar Ahmed
Project Manager

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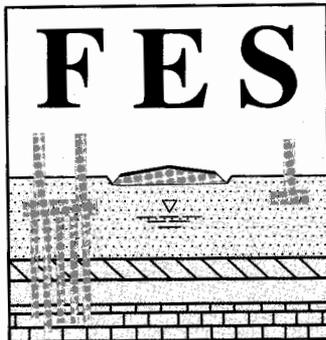
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FIELD COMPACTION DENSITY REPORT¹

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Project No.		N574.012				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
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COMPACTION (%)										95.0
MOISTURE (%)										OM ±20
Comments										
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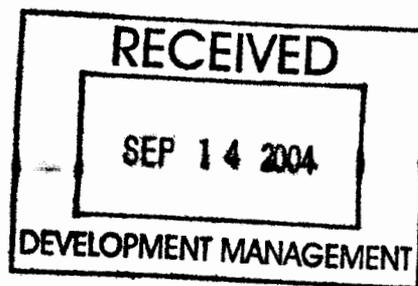
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September 9, 2004

Mr. Wayland N. Bass, P.E.
James City County
 101- E Mounts Bay Road
 Williamsburg, Virginia 23185



Re: Laboratory Testing Services Report
Briar Lane BMP/Outfall Project
 James City County, Virginia
 FES Report No. N574.002 Revised

Dear Mr. Bass:

On August 6, 2004 a Foundation Engineering Science, Inc. (FES) representative received two (2) bulk soil samples of the on-site material to be utilized as backfill material within the Briar Lane BMP/Outfall Project, located in James City County, Virginia.

The bulk samples were received in our laboratory for testing and classification. The laboratory testing program consisted of performing natural moisture content determination [ASTM D 2216], grain-size determination [Passing #200 Sieve, ASTM D 1140], and moisture-density relationship [Standard Proctor ASTM D 698] tests. The laboratory testing program was performed in general accordance with ASTM test procedures. The laboratory test results are shown in tabular format below and in Figures 1 attached to this report.

SAMPLE NO.	APPROX. DEPTH (FEET)	DESCRIPTION & CLASSIFICATION [USCS, ASTM D-2487]	NATURAL MOISTURE CONTENT (%)	OPT. MOIST. (%)	MAX. DRY DENSITY (pcf)	PASSING # 200 SIEVE (%)
1	1.5	Reddish brown, clayey SAND (SC)	12.8	----	----	37.3
2	1.5	Reddish brown, clayey SAND (SC)	12.0	13.0	119.4	46.8

The soil **sample No.1 did not** meet the project requirement and is not acceptable backfill material, however **sample No.2 meet** the project requirement and is acceptable backfill material at this project.

Laboratory Testing Services Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.002 Revised

FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

fer
Frya Barzanji
Frya Barzanji, E.I.T.
Lab Manager

Zulfikhar Ahmed
Zulfikhar Ahmed
Project Manager

Attachment: Figures 1: Moisture-Density Relationship Report

XCopies: (1) Client.

O:\company\project\2004\cmt\N574\N574.002

FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
- Environmental Services [Phase I & II]
- Construction Material Testing [Soil, Aggregate, Grout, Mortar, Asphalt & Steel]
- Foundation/Structures & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

September 9, 2004

Mr. Wayland N. Bass, P.E.
James City County
 101- E Mounts Bay Road
 Williamsburg, Virginia 23185

Re: Laboratory Testing Services Report
Briar Lane BMP/Outfall Project
 James City County, Virginia
FES Report No. N574.002 Revised

Dear Mr. Bass:

On August 6, 2004 a Foundation Engineering Science, Inc. (**FES**) representative received two (2) bulk soil samples of the on-site material to be utilized as backfill material within the Briar Lane BMP/Outfall Project, located in James City County, Virginia.

The bulk samples were received in our laboratory for testing and classification. The laboratory testing program consisted of performing natural moisture content determination [ASTM D 2216], grain-size determination [Passing #200 Sieve, ASTM D 1140], and moisture-density relationship [Standard Proctor ASTM D 698] tests. The laboratory testing program was performed in general accordance with ASTM test procedures. The laboratory test results are shown in tabular format below and in Figures 1 attached to this report.

SAMPLE NO.	APPROX. DEPTH (FEET)	DESCRIPTION & CLASSIFICATION [USCS, ASTM D-2487]	NATURAL MOISTURE CONTENT (%)	OPT. MOIST. (%)	MAX. DRY DENSITY (pcf)	PASSING # 200 SIEVE (%)
1	1.5	Reddish brown, clayey SAND (SC)	12.8	----	----	37.3
2	1.5	Reddish brown, clayey SAND (SC)	12.0	13.0	119.4	46.8

The soil **sample No.1 did not** meet the project requirement and is not acceptable backfill material, however **sample No.2 meet** the project requirement and is acceptable backfill material at this project.

Laboratory Testing Services Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.002 Revised

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- Non Destructive Testing Department
- Foundation/Structure & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]



Fax Cover Sheet

Date	September 10, 2004	Fax	757- ²⁵³⁻⁶⁸⁵⁰ 253-4033	Pages	2
To	Mr. Wayland Bass	Client	James City County		
From	Zulfikhar Ahmed	Ref.	Laboratory Testing Report – Briar Lane		
URGENT	FOR REVIEW	PLEASE COMMENT	PLEASE REPLY	ORIGINAL MAILED	

Let me know at 757-873-4113 if you do not receive a clear transmission of all pages.

Thank you,

Debbe

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James City County
 101- E Mounts Bay Road
 Williamsburg, Virginia 23185

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Briar Lane BMP/Outfall Project
 James City County, Virginia
 FES Report No. N574.002 Revised

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FES

*Laboratory Testing Services Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.002 Revised*

FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

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FOUNDATION ENGINEERING SCIENCE, INC.

for
Frya Barzanji
Frya Barzanji, E.I.T.
Lab Manager

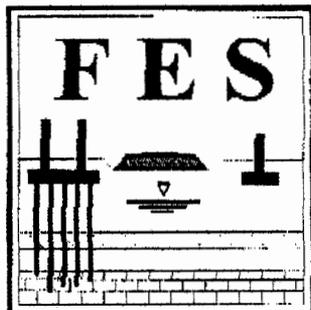
Zulfikhar Ahmed
Zulfikhar Ahmed
Project Manager

Attachment: Figures 1: Moisture-Density Relationship Report

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Fax Cover Sheet

Date	September 10, 2004	Fax	757-259-4038	Pages	2
To	Mr. Wayland Bass	Client	James City County		
From	Zulfikhar Ahmed	Ref.	Laboratory Testing Report – Briar Lanc		
URGENT	FOR REVIEW	PLEASE COMMENT	PLEASE REPLY	ORIGINAL MAILED	

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Thank you,

Dcbbc



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11843-B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873- 4113 FAX: 757-873- 4114

FOUNDATION ENGINEERING SCIENCE, INC.



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September 9, 2004

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James City County
 101- E Mounts Bay Road
 Williamsburg, Virginia 23185

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Briar Lane BMP/Outfall Project
 James City County, Virginia
FES Report No. N574.002 Revised

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11843-B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114

FES

** Laboratory Testing Services Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.002 Revised*

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

fw
Frya B.
Frya Barzanji, E.I.T.
Lab Manager

Zulfikhar Ahmed
~~Zulfikhar Ahmed~~
Project Manager

Attachment: Figures 1: Moisture-Density Relationship Report

XCopies: (1) Client.

O:\company\project\2004\cmt\N574\N574.002

FOUNDATION ENGINEERING SCIENCE, INC.

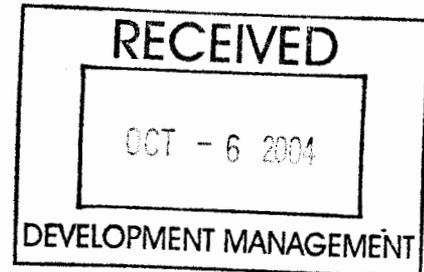
9/22



- Drilling Services [Geotechnical & Environmental]
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September 27, 2004

Mr. Wayland N. Bass, P.E.
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.004

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on **September 22, 2004**. The specific purpose of this visit was to perform compaction density testing on the dam key, 1st lift, within the Briar Lane BMP/Outfall Renovation Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: *Field Compaction Density Results*

XCopies: *(1) Client.*

O:\company\projects\2004\cmt\N574\N574.004

FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 22, 2004			
Project No.		N574.004				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Sunny			
Gauge #	26814	Model #	3430	Density Std. Ct.	2440	Moisture Std. Ct.	638	FES REP.:	NK		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement			
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			On-site	Minimum effort			
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	8	-12		2		25.0	-	83.8		X	
TEST NO.	TEST LOCATION										
1	Site 1, Dam key, 1 st lift										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										95%	
MOISTURE (%)										OM ±20	
Comments		Contractor advised to dry the backfill, select fill material, scarify, recompact and retest.									
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
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September 27, 2004

Mr. Wayland N. Bass, P.E.
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185

Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.004

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FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client.

O:\company\projects\2004\cmt\N574\N574.004

FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 22, 2004		
Project No.		N574.004				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Sunny		
Gauge #	26814	Model #	3430	Density Std. Ct.	2440	Moisture Std. Ct.	638	FES REP.:	NK	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement		
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COMPACTION (%)										95%
MOISTURE (%)										OM ±20
Comments		Contractor advised to dry the backfill, select fill material, scarify, recompact and retest.								
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

FOUNDATION ENGINEERING SCIENCE, INC.

9/23



- Drilling Services [Geotechnical & Environmental]
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September 28, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Earthen Dam Top Soil Evaluation Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.010

Dear Mr. Bass:

Pursuant to the contractor's request, an experienced Project Manager with Foundation Engineering Science, Inc. (FES) visited the project site on September 23, 2004. The specific purpose of this site visit was to evaluate the recently cleared and graded soils at the sides and up-stream side of the dam within the Briar's Lane BMP/Out Fall Project located in James City County, Virginia.

1.0 SITE OBSERVATIONS

The existing topsoils at the sides and up-stream side of the dam were observed and appeared to have been undercut approximately twelve (12) to twenty (20) inches from the existing grades of the dam. The cleared soils encountered at the base consisted of light brown, moist, sandy CLAY (CL) with shell fragments.

The exposed subgrade soils were visually observed by an experienced FES Project Manager and the base and sides of the dam were probed using a 5/8-inch geo probe. The penetrations were ranged from one (1) to two (2) inches indicating the soils to be of stiff consistency. In general, the result of these testing procedures indicated that the exposed existing subgrade at the base and the sides on the up-stream side appeared to be stable and suitable for placement of select-fill material in general accordance with project plans and details.

The geotechnical engineering report was not provided prior to our site visit.

2.0 CONCLUSIONS AND RECOMMENDATIONS

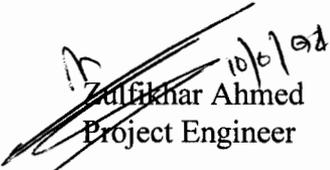
Based on the results of the proof rolling procedure, our site observations and engineering judgment, the following conclusions and recommendations are presented.

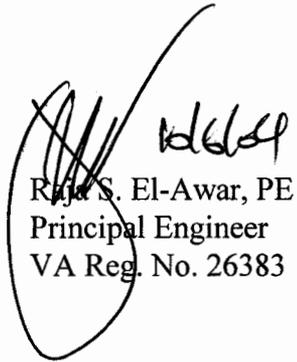
1. The exposed and evaluated subgrade soils of the dam and the soils at the sides of the dam structure appeared to be stable and suitable for placement of select-fill material in general accordance with project plans and details.
2. The exposed subgrade soils shall be compacted with a sheep foot roller and performing compaction density tests prior to placement of fill materials. The inspected subgrade soils shall be compacted to a minimum of 90.0 percent of the laboratory maximum dry density in general accordance with ASTM D-698 [Standard Proctor] and a moisture content of \pm twenty (20) percent of the optimum moisture content.
3. The fill material shall be compacted in lifts, eight (8) inches each lift, and perform compaction density tests on each lift. The compaction density tests shall achieve a minimum of 90.0 percent of the laboratory maximum dry density in general accordance with ASTM D-698 [Standard Proctor], to a maximum depth of eight (8) inches, and to a moisture content of \pm twenty (20) percent of the optimum moisture content.
4. We recommend utilizing off-site select fill material. The off-site select fill material shall consist of cohesive soils with minimum fines content [passing No. 200 Sieve] above forty (40) percent.
5. The existing subgrade soils are moisture sensitive. In this regard, a re-evaluation of the subgrade soils shall be performed if these soils are exposed to severe weather such as significant rainfall. This re-evaluation will consist of performing an additional inspection by an experienced **FES** Professional Engineer or his representative to determine if the subgrade soil conditions within the dam have deteriorated due to excessive moisture and/or are still capable of supporting the dam structural loads.

FES appreciates the opportunity to be of service to **James City County** on this important project and look forward to its successful completion. If you have any questions in regards to our report, please do not hesitate to contact the undersigned.

Respectfully Submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Engineer


Raja S. El-Awar, PE
Principal Engineer
VA Reg. No. 26383

XCopies: (1) Client

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FOUNDATION ENGINEERING SCIENCE, INC.



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September 28, 2004

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FES Report No. N574.010

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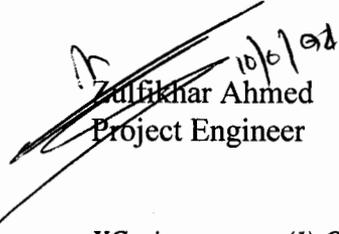
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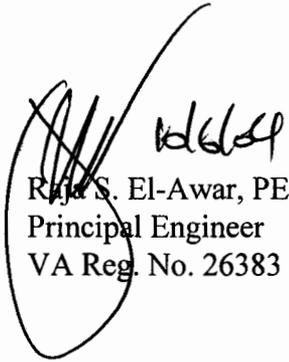
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Zulfikhar Ahmed
Project Engineer


R. S. El-Awar, PE
Principal Engineer
VA Reg. No. 26383

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FOUNDATION ENGINEERING SCIENCE, INC.

9/23



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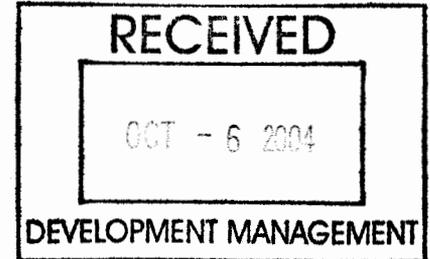
September 30, 2004

Mr. Wayland N. Bass, P.E.

James City County

101- E Mounts Bay Road

Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.005

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on **September 23, 2004**. The specific purpose of this visit was to perform compaction density testing on the dam key, within the Briar Lane BMP/Outfall Renovation Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

O:\company\projects\2004\cmt\N574\N574.005

11843 B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114

FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 23, 2004		
Project No.		N574.005				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Sunny		
Gauge #	26814	Model #	3430	Density Std. Ct.	2422	Moisture Std. Ct.	641	FES REP.:	NK	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴				Source	Compaction Requirement	
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)				On-site	Minimum effort	
TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	6	-12	2	107.8	20.7	130.1	90.3	X		
2	6	-11	2	110.1	20.7	132.9	92.2	X		
3	6	-10	2	109.5	21.3	132.8	91.7	X		
4	6	-9	2	107.5	21.2	130.3	90.0	X		
5	6	-8	2	108.1	20.3	130.0	90.5	X		
6	6	-7	2	121.6	18.1	143.6	101.8	X		
TEST NO.	TEST LOCATION									
1	Dam key									
2	Dam key									
3	Dam key									
4	Dam key									
5	Dam key									
6	Dam key									
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)										95%
MOISTURE (%)										OM ±20
Comments										
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
- Environmental Services [Phase I & II]
- Construction Material Testing [Soil, Aggregate, Grout, Mortar, Asphalt & Steel]
- Foundation/Structures & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]



September 30, 2004

Mr. Wayland N. Bass, P.E.
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185

Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.005

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on September 23, 2004. The specific purpose of this visit was to perform compaction density testing on the dam key, within the Briar Lane BMP/Outfall Renovation Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

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FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 23, 2004			
Project No.		N574.005				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Sunny			
Gauge #	26814	Model #	3430	Density Std. Ct.	2422	Moisture Std. Ct.	641	FES REP.:	NK		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴				Source	Compaction Requirement		
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)				On-site	Minimum effort		
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	6	-12		2	107.8	20.7	130.1	90.3	X		
2	6	-11		2	110.1	20.7	132.9	92.2	X		
3	6	-10		2	109.5	21.3	132.8	91.7	X		
4	6	-9		2	107.5	21.2	130.3	90.0	X		
5	6	-8		2	108.1	20.3	130.0	90.5	X		
6	6	-7		2	121.6	18.1	143.6	101.8	X		
TEST NO.	TEST LOCATION										
1	Dam key										
2	Dam key										
3	Dam key										
4	Dam key										
5	Dam key										
6	Dam key										
SPEC. REQUIREMENTS		Utility Trench			Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)											95%
MOISTURE (%)											OM ±20
Comments											
<p>Compaction density testing was performed in general accordance with ¹ASTM D2922, ²ASTM D698 (Procedure A), ³ASTM D1140, ⁴ASTM D2488 (Visual-Manual Procedure)</p>											

FOUNDATION ENGINEERING SCIENCE, INC.

9/24



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
- Environmental Services [Phase I & II]
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- Design & Build Segmental Retaining Walls [SRW]

September 30, 2004

Mr. Wayland N. Bass, P.E.
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.006

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on September 24, 2004. The specific purpose of this visit was to perform compaction density testing on the dam key, within the Briar Lane BMP/Outfall Renovation Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

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FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 24, 2004			
Project No.		N574.006				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Sunny			
Gauge #	26729	Model #	3430	Density Std. Ct.	2623	Moisture Std. Ct.	616	FES REP.:	NK		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement			
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			On-site	Minimum effort			
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	6	-7		2	108.5	24.1	134.7	90.9	X		
2	6	-6		2	108.9	23.3	134.2	91.2	X		
3	6	-5		2	108.3	22.3	132.5	90.7	X		
4	6	-4		2	107.6	24.1	133.5	90.1	X		
TEST NO.	TEST LOCATION										
1	Dam key										
2	Dam key										
3	Dam key										
4	Dam key										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										95%	
MOISTURE (%)										OM ±20	
Comments											
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

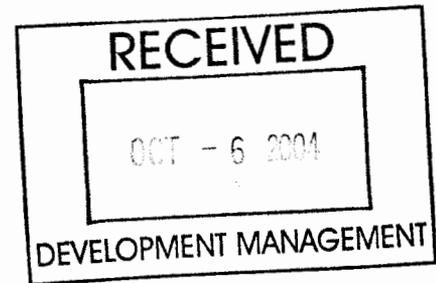
FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
- Environmental Services [Phase I & II]
- Construction Material Testing [Soil, Aggregate, Grout, Mortar, Asphalt & Steel]
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- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

September 30, 2004

Mr. Wayland N. Bass, P.E.
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.006

Dear Mr. Bass:

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfiqhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

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FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

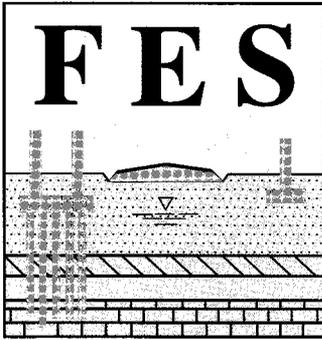
FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

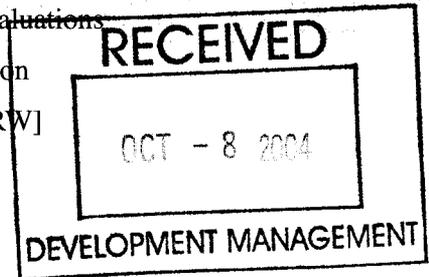
Project Name		Briar Lane BMP/Outfall Project				Date		September 24, 2004		
Project No.		N574.006				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Sunny		
Gauge #	26729	Model #	3430	Density Std. Ct.	2623	Moisture Std. Ct.	616	FES REP.:	NK	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement		
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			On-site	Minimum effort		
TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	6	-7	2	108.5	24.1	134.7	90.9	X		
2	6	-6	2	108.9	23.3	134.2	91.2	X		
3	6	-5	2	108.3	22.3	132.5	90.7	X		
4	6	-4	2	107.6	24.1	133.5	90.1	X		
TEST NO.	TEST LOCATION									
1	Dam key									
2	Dam key									
3	Dam key									
4	Dam key									
SPEC. REQUIREMENTS		Utility Trench	Sidewalk	Building Pad	Roadway/Parking (Access Road)	General				
COMPACTION (%)						95%				
MOISTURE (%)						OM ±20				
Comments										
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

FOUNDATION ENGINEERING SCIENCE, INC.

9/24



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
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- Construction Material Testing [Soil, Aggregate, Grout, Mortar, Asphalt & Steel]
- Foundation/Structures & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]



October 4, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185

Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.008

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (**FES**) representative visited the project site on September 24, 2004. The specific purpose of this visit was to perform compaction density testing on the dam, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

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FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 24, 2004		
Project No.		N574.008				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Cloudy		
Gauge #	26814	Model #	3430	Density Std. Ct.	2441	Moisture Std. Ct.	642	FES REP.:	RB	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement		
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			On-site	Minimum effort		
TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	8	-5 below grade	2	110.6	20.2	126.1	92.6	X		
TEST NO.	TEST LOCATION									
1	Dam key									
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)		90.0								
MOISTURE (%)		OM ±20								
Comments										
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

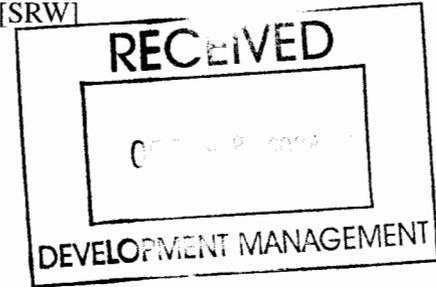
FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
- Environmental Services [Phase I & II]
- Construction Material Testing [Soil, Aggregate, Grout, Mortar, Asphalt & Steel]
- Foundation/Structures & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

October 4, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.008

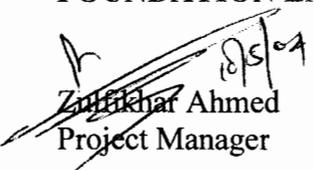
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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikar Ahmed
Project Manager

Attachments: Field Compaction Density Results

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FIELD COMPACTION DENSITY REPORT¹										Page 1 of 1	
Project Name		Briar Lane BMP/Outfall Project					Date		September 24, 2004		
Project No.		N574.008					General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185					Earth Contractor				
Project Location		James City County, Virginia					Weather		Cloudy		
Gauge #	26814	Model #	3430	Density Std. Ct.	2441	Moisture Std. Ct.	642	FES REP.:	RB		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴				Source	Compaction Requirement		
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1	8	-5 below grade		2	110.6	20.2	126.1	92.6	X		
TEST NO.	TEST LOCATION										
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MOISTURE (%)		OM ±20									
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FOUNDATION ENGINEERING SCIENCE, INC.

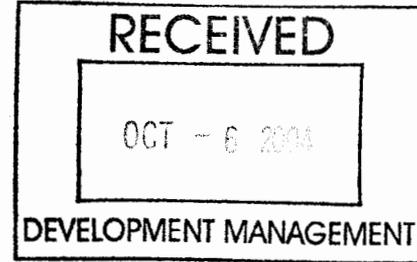
9/30



- Drilling Services [Geotechnical & Environmental]
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- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

October 1, 2004

Mr. Wayland N. Bass, P.E.
James City County
 101- E Mounts Bay Road
 Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
 James City County, Virginia
 FES Report No. N574.007

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on **September 30, 2004**. The specific purpose of this visit was to perform compaction density testing on the dam key, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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 Zulfikhar Ahmed
 Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

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FOUNDATION ENGINEERING SCIENCE, INC.

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Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		September 30, 2004			
Project No.		N574.007				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Cloudy			
Gauge #	26814	Model #	3430	Density Std. Ct.	2423	Moisture Std. Ct.	626	FES REP.:	SR		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement			
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			On-site	Minimum effort			
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12			2	105.0	17.5	123.4	87.9		X	
2	12			2	98.9	21.8	120.5	82.9		X	
TEST NO.	TEST LOCATION										
1	Dam key										
2	Dam key										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										90.0	
MOISTURE (%)										OM ±20	
Comments											
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

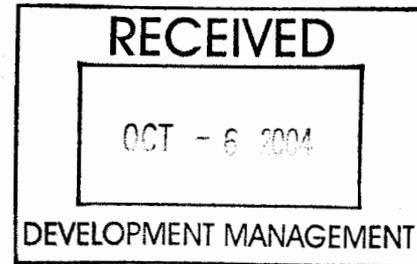
FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
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October 1, 2004

Mr. Wayland N. Bass, P.E.
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.007

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on September 30, 2004. The specific purpose of this visit was to perform compaction density testing on the dam key, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

FES appreciates the opportunity to be of service to **James City County** on this important project and looks forward to its successful completion. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

O:\company\projects\2004\cmt\N574\N574.007

11843 B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114

FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

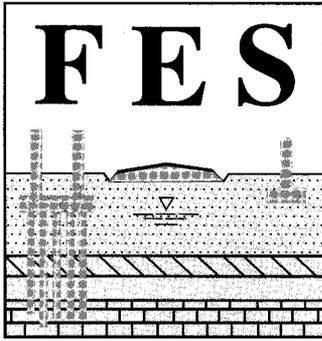
Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Project Name		Briar Lane BMP/Outfall Project				Date		September 30, 2004		
Project No.		N574.007				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Cloudy		
Gauge #	26814	Model #	3430	Density Std. Ct.	2423	Moisture Std. Ct.	626	FES REP.:	SR	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement		
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			On-site	Minimum effort		
TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12		2	105.0	17.5	123.4	87.9		X	
2	12		2	98.9	21.8	120.5	82.9		X	
TEST NO.	TEST LOCATION									
1	Dam key									
2	Dam key									
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)										90.0
MOISTURE (%)										OM ±20
Comments										
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

FOUNDATION ENGINEERING SCIENCE, INC.

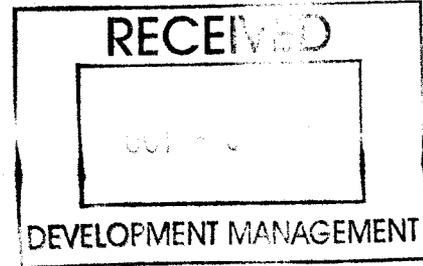
10/1



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
- Environmental Services [Phase I & II]
- Construction Material Testing [Soil, Aggregate, Grout, Mortar, Asphalt & Steel]
- Foundation/Structures & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

October 4, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.009

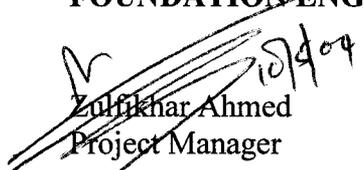
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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

O:\company\projects\2004\cmt\N574\N574.009

FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		October 1, 2004		
Project No.		N574.009				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Cloudy		
Gauge #	29129	Model #	3430	Density Std. Ct.	2716	Moisture Std. Ct.	658	FES REP.:	RB	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement		
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			Off-site	Minimum effort		
TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	8	-3 below grade	2	111.2	19.0	127.9	93.1	X		
2	8	-6 below grade (downstream)	2	110.4	20.8	126.2	92.4	X		
TEST NO.	TEST LOCATION									
1	Dam key									
2	Dam key									
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)		90.0								
MOISTURE (%)		OM ±20								
Comments										
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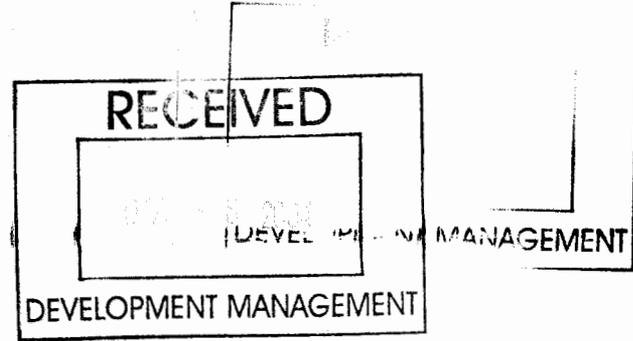
FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
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October 4, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.009

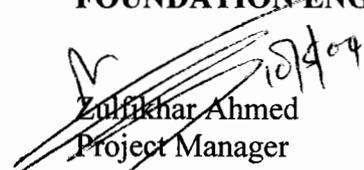
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Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (**FES**) representative visited the project site on October 1, 2004. The specific purpose of this visit was to perform compaction density testing on the dam, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.


Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

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FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

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FIELD COMPACTION DENSITY REPORT¹

Page 1 of 1

Project Name		Briar Lane BMP/Outfall Project				Date		October 1, 2004		
Project No.		N574.009				General Contractor				
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor				
Project Location		James City County, Virginia				Weather		Cloudy		
Gauge #	29129	Model #	3430	Density Std. Ct.	2716	Moisture Std. Ct.	658	FES REP.:	RB	
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement		
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TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	8	-3 below grade	2	111.2	19.0	127.9	93.1	X		
2	8	-6 below grade (downstream)	2	110.4	20.8	126.2	92.4	X		
TEST NO.		TEST LOCATION								
1		Dam key								
2		Dam key								
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General
COMPACTION (%)		90.0								
MOISTURE (%)		OM ±20								
Comments										
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)										

FOUNDATION ENGINEERING SCIENCE, INC.

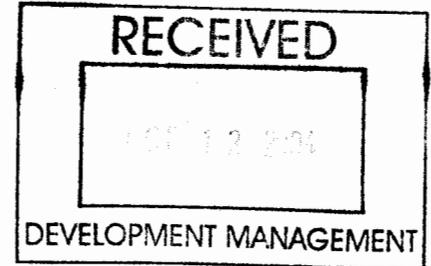
10/6



- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Walls & Pavement Design]
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- Value Engineering During Design & Construction
- Design & Build Segmental Retaining Walls [SRW]

October 7, 2004

Mr. Wayland N. Bass, PE
James City County
 101- E Mounts Bay Road
 Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
 James City County, Virginia
 FES Report No. N574.011

Dear Mr. Bass:

Pursuant to the Contractor's request, a Foundation Engineering Science, Inc. (FES) representative visited the project site on October 6, 2004. The specific purpose of this visit was to perform compaction density testing on the dam, within the Briar Lane BMP/Outfall Restoration Project located in James City County, Virginia. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)".

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Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

Zulfiqar Ahmed
 Zulfiqar Ahmed
 Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

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FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Project Name		Briar Lane BMP/Outfall Project				Date		October 6, 2004			
Project No.		N574.011				General Contractor					
Client		James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185				Earth Contractor					
Project Location		James City County, Virginia				Weather		Sunny			
Gauge #	26814	Model #	3430	Density Std. Ct.	2494	Moisture Std. Ct.	623	FES REP.:	SR		
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement			
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			Off-site	Minimum effort			
TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12	-4 below grade		2	112.3	20.2	135.0	94.1	X		
2	12	-4 below grade		2	109.9	20.7	132.7	92.1	X		
3	12	-3 below grade		2	109.6	20.6	132.2	91.8	X		
4	12	-3 below grade		2	108.4	20.3	130.4	90.8	X		
5	12	-2 below grade		2	111.1	18.9	132.2	93.1	X		
6	12	-2 below grade		2	109.5	20.6	132.1	91.7	X		
7	12	-1 below grade		2	108.5	20.6	130.9	90.9	X		
TEST NO.	TEST LOCATION										
1	Dam, Site 1										
2	Dam, Site 1										
3	Dam, Site 1										
4	Dam, Site 1										
5	Dam, Site 1										
6	Dam, Site 1										
7	Dam, Site 1										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										90.0	
MOISTURE (%)										OM ±20	
Comments											
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

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Project No.		N574.011				General Contractor					
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TEST NO.	DEPTH (inches)	ELEVATION (feet)		PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
8	12	-1 below grade		2	109.4	21.2	132.7	91.6	X		
9	12	Design Grade		2	108.0	20.3	129.9	90.5	X		
10	12	Design Grade		2	109.9	19.6	131.4	92.1	X		
11	12	+1 above grade		2	113.0	18.3	133.7	94.6	X		
12	12	+2 above grade		2	108.4	19.1	129.1	90.8	X		
13	12	+3 above grade		2	110.4	19.3	131.7	92.4	X		
14	12	+4 above grade		2	109.5	17.5	128.7	91.7	X		
TEST NO.	TEST LOCATION										
8	Dam, Site 1										
9	Dam, Site 1										
10	Dam, Site 1										
11	Dam, Site 1										
12	Dam, Site 1										
13	Dam, Site 1										
14	Dam, Site 1										
SPEC. REQUIREMENTS		Utility Trench		Sidewalk		Building Pad		Roadway/Parking (Access Road)		General	
COMPACTION (%)										90.0	
MOISTURE (%)										OM ±20	
Comments											
Compaction density testing was performed in general accordance with ¹ ASTM D2922, ² ASTM D698 (Procedure A), ³ ASTM D1140, ⁴ ASTM D2488 (Visual-Manual Procedure)											

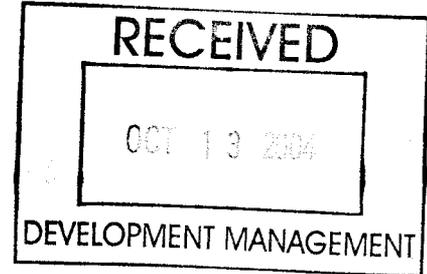
FOUNDATION ENGINEERING SCIENCE, INC.



- Drilling Services [Geotechnical & Environmental]
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- Foundation/Structures & Pavement Distress Evaluations
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- Design & Build Segmental Retaining Walls [SRW]

October 7, 2004

Mr. Wayland N. Bass, PE
James City County
101- E Mounts Bay Road
Williamsburg, Virginia 23185



Re: Field Compaction Density Report
Briar Lane BMP/Outfall Project
James City County, Virginia
FES Report No. N574.011

Dear Mr. Bass:

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Zulfikhar Ahmed
Project Manager

Attachments: Field Compaction Density Results

XCopies: (1) Client

O:\company\projects\2004\cmt\N574\N574.011

FOUNDATION ENGINEERING SCIENCE, INC.

11843 B Canon Boulevard

Newport News, Virginia 23606

Telephone: (757) 873-4113 Fax: (757) 873-4114

FIELD COMPACTION DENSITY REPORT¹

Project Name	Briar Lane BMP/Outfall Project	Date	October 6, 2004
Project No.	N574.011	General Contractor	
Client	James City County 101-E Mounts Bay Road Williamsburg, Virginia 23185	Earth Contractor	
Project Location	James City County, Virginia	Weather	Sunny

Gauge #	26814	Model #	3430	Density Std. Ct.	2494	Moisture Std. Ct.	623	FES REP.:	SR
Proctor	Dry Density ² (pcf)	Opt. Moist. (%)	Passing #200 ³ (%)	Material Description & Classification ⁴			Source	Compaction Requirement	
2	119.4	13.0	46.8	Reddish Brown Clayey SAND (SC)			Off-site	Minimum effort	

TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	COMP (%)	PASS	FAIL	REMARKS
1	12	-4 below grade	2	112.3	20.2	135.0	94.1	X		
2	12	-4 below grade	2	109.9	20.7	132.7	92.1	X		
3	12	-3 below grade	2	109.6	20.6	132.2	91.8	X		
4	12	-3 below grade	2	108.4	20.3	130.4	90.8	X		
5	12	-2 below grade	2	111.1	18.9	132.2	93.1	X		
6	12	-2 below grade	2	109.5	20.6	132.1	91.7	X		
7	12	-1 below grade	2	108.5	20.6	130.9	90.9	X		

TEST NO.	TEST LOCATION
1	Dam, Site 1
2	Dam, Site 1
3	Dam, Site 1
4	Dam, Site 1
5	Dam, Site 1
6	Dam, Site 1
7	Dam, Site 1

SPEC. REQUIREMENTS	Utility Trench	Sidewalk	Building Pad	Roadway/Parking (Access Road)	General
COMPACTION (%)					90.0
MOISTURE (%)					OM ±20

Comments

Compaction density testing was performed in general accordance with ¹ASTM D2922, ²ASTM D698 (Procedure A), ³ASTM D1140, ⁴ASTM D2488 (Visual-Manual Procedure)

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MOISTURE (%)											OM ±20
Comments											
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MEMORANDUM

DATE: August 12, 2003
TO: The Board of Supervisors
FROM: Wayland N. Bass, County Engineer
SUBJECT: Briarwood Park Easement and Maintenance Agreement

The Briarwood neighborhood, off Centerville Road, is shown on the attached map. The dam, at the stormwater pond, is breeched and the outlet structure has failed completely. This damage may have happened during Hurricane Floyd.

The Yarmouth Creek Watershed Management Plan recommends repair of this facility to stop ongoing soil erosion at the dam and to restore the stormwater treatment capability of the Best Management Practice (BMP). This project would be similar to other stormwater outfall repairs recently undertaken by the County in older developments, i.e., two Joanne Court stormwater outfalls; the Norge stormwater outfall; Hunters Creek stormwater outfall; the Hempstead Road stormwater outfall in Windsor Forest; and three outfalls on Louise Lane North.

The Briarwood BMP is on common area belonging to the Briarwood Park Condominium Owner's Association. The attached easement and maintenance agreement allows the County to perform non-routine work, i.e., the major repair currently needed. The document assigns more routine work to the owners association. This development occurred before maintenance agreements were required by the County, and no such agreement exists.

Staff recommends adoption of the attached resolution.

Wayland N. Bass

CONCUR:

John T. P. Horne

WNB/gs
briarease.mem

Attachments

RESOLUTION

BRIARWOOD PARK EASEMENT AND MAINTENANCE AGREEMENT

WHEREAS, the Briarwood stormwater management pond has failed; and

WHEREAS, the Yarmouth Creek Watershed Management Plan recommends repair of this facility; and

WHEREAS, the County's water quality program makes this type of stormwater-related repair in older developments; and

WHEREAS, the Briarwood Park Condominium Owner's Association has executed the required agreement.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, authorizes and directs the County Administrator to execute the attached easement and maintenance agreement on behalf of the County.

Jay T. Harrison, Sr.
Chairman, Board of Supervisors

ATTEST:

Sanford B. Wanner
Clerk to the Board

Adopted by the Board of Supervisors of James City County, Virginia, this 12th day of August, 2003.

briarwdease.res

8877 RICHMOND ROAD
TOANO, VA 23168
Phone: 757-566-3620
Fax: 757-566-3625

facsimile transmittal

To: Mary Armstead

From: DEB PHARES, Manager, VA Nursery

Pinelands Nursery, Toano, VA

Fax: 757-253-6733

Date: August 29, 2005

Phone: 757-253-6695

Pages: 3 Including Cover Sheet

Re: Dry Pond Planting

CC:

Urgent For Review Please Comment Please Reply Please Recycle

Notes: Mary -

Attached you will find some plants that I believe will work well in your dry pond. I recommend that you review our catalog (www.pinelandsnursery.com) and see if there are any other plants that may interest you. We suggest that you stick with FAC plants, and some that are FACW or FACU (including - and + for each). Higher on the banks the drier you would need to consider (FACU or FACU- or FAC- etc.) I am sure that Scott could look at the attached list and help to point you in the right direction.

Any questions, please give me a call.

Thanks

*Next supply truck from NJ - 9/14/05

Debbie



323 Island Road
Columbus, New Jersey 08022
Tel: 609-291-9486
Fax: 609-298-8939
Columbus, NJ, Toano, VA, Gloversville, NY

QUOTATION

****IMPORTANT**** Inventory changes daily.
Please send P.O. ASAP for best
availability. Prices quoted are valid for 60
days from August 29, 2005

PAGE: 1 of 2

QUOTED TO:

Mary Armstead

Plu 9/9

P-757-253-6695 (work)

Planting Date - 9/9 (Tentative)

F-757-253-6733 (work)

DATE: 8/29/05	CONTACT: Mary	TERMS:	P.O.#
---------------	---------------	--------	-------

QTY REQ	QTY AVAIL	DESCRIPTION	SIZE AVAIL	POT SIZE	PRICE PER	COMMENTS
	2,000	Panicum virgatum takes occasional deluge then very dry conditions gets up to 6 ft. tall		2" plus	\$.65	in stock
	1,643	Rudbeckia hirta drought-tolerant		2" plus	\$.70	in NJ
	9,551	Schizachyrium scoparium dry sites + poor soil		2" plus	\$.70	in NJ
	4,315	Sorghastrum nutans 6' tall - very tolerant of most site conditions				in NJ
	8,833	Andropogon virginicus dry, open sites		2" plus	\$.70	in NJ
	1,992	Aster novae-angliae Somewhat shade - drought tolerant		2" plus	\$.70	in NJ
	1,812	Baptisia australis well-drained floodplains		2" plus	\$.70	in NJ
	7,015	Danthonia spicata poor soil, dry meadows + old fields				in NJ
	850	Eupatorium coelestinum drier meadows		2" plus	\$.70	in NJ

SPECIAL INSTRUCTIONS—

PRICES ARE BASED ON QUANTITIES FOR ENTIRE QUOTATION

Sub Total		
Sales Tax		
Delivery		

Scott Thomas

From: Scott Thomas
Sent: Friday, June 13, 2003 8:46 AM
To: Wayland Bass; Mike Woolson
Subject: FW: Briarwood Condos BMP

Here is information on the HOA board for Briarwood Park Condo's.

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

Visit:

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

www.protectedwithpride.org

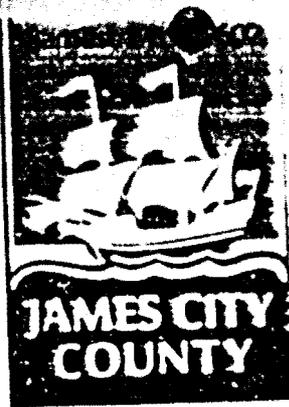
-----Original Message-----

From: Mary Armstead
Sent: Friday, June 13, 2003 8:32 AM
To: Scott Thomas
Subject: Briarwood Condos BMP

The legal name for our homeowners association is "Briarwood Park Condominiums Owner's Association, Inc." The current board members are:

Joe Cervini, President
Linwood Otey, Vice-President
Mary Armstead, Secretary
Patty Borders, Treasurer

Mailing Address.
P.O. Box 1C
Williamsburg, Va.
23187-3627



DEPARTMENT OF DEVELOPMENT MANAGEMENT
COUNTY GOVERNMENT CENTER, 101 MOUNTS BAY ROAD

Development Manager
(804) 253-6671
Code Compliance
253-6626
County Engineer
253-6678
Planning
253-6685

July 21, 1989

Mr. Victor Leichty
BLIS Construction
126 Denbigh Boulevard
Newport News, VA 23602

RE: Case No. SP-15-89. Briarwood

Dear Mr. Leichty:

I am pleased to inform you that your site plan has received preliminary approval contingent upon the conditions listed below. Please resubmit ten copies of the revised drawings for consideration of final approval.

Office of Code Compliance

The 15-inch pipe serving as an inlet to the detention basin needs to be increased to a 21-inch RCP and the height of the adjacent berm needs to be increased to at least elevation 77.7. A better configuration would be to use an open paved ditch system from the roadside ditch into the ditch on the bottom of the basin. This arrangement should be as straight as possible to keep the water in the ditch.

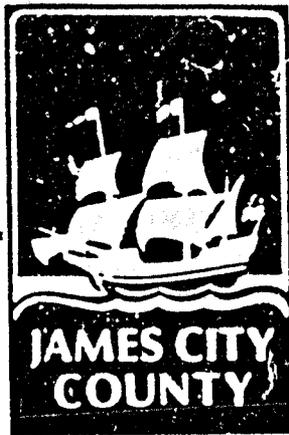
Virginia Department of Transportation

See attached letter dated July 21, 1989.

Preliminary site plan approval is valid for a period of six months, until January 21, 1990, during which time a final site plan must be submitted for approval. Final site plan approval is required before building construction may begin.

In order to ensure efficient emergency response by fire, police and EMS personnel, it is important that the Fire Chief be notified if the name of this project changes from that shown on the approved plan.

Mailing Address:
P.O. Box JC
Williamsburg, Va.
23187-3627



DEPARTMENT OF DEVELOPMENT MANAGEMENT
COUNTY GOVERNMENT CENTER, 101 MOUNTS BAY ROAD

Development Manager
(804) 253-6671
Code Compliance
253-6626
County Engineer
253-6678
Planning
253-6685

June 12, 1989

BLIS Construction
Mr. Victor Leichty
126 Denbigh Boulevard
Newport News, VA 23602

RE: Case No. SP-51-89. Briarwood

Property Address: 6395 and 6397 Centerville Road

Dear Mr. Leichty:

We have reviewed the above-referenced site plan and have the following comments which shall be resolved prior to preliminary approval. Please resubmit ten copies of the revised drawings for consideration of preliminary approval.

Code Compliance

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.
2. As-built drawings shall be provided for the detention basin upon completion.
3. A preconstruction conference shall be held on-site between the County, the Developer, the Project Engineer and the Contractor prior to issuance of a Land Disturbing Permit.
4. The Land Disturbing Permit when issued will require construction of the sediment basin prior to any other construction activities on the remainder of the project.
5. Provide a stabilized construction entrance at the entrance to the project from Centerville Road.
6. Provide a standard Virginia Power, 5,000-lumen streetlight at the intersection of the project entrance road and Centerville Road.

7. Provide silt fence below the proposed detention pond to protect the stream during construction of the pond.
8. Provide silt fence on both sides of the road from Stations 0+00 to 2+50, on the left side of the road from Stations 10+50 to 13+00, and on the right side from Stations 13+50 to 16+00.
9. The detention basin design needs to be modified as follows:
 - a. Provide a 10-inch release pipe rather than a 12 inch.
 - b. Place the top of the riser at 74.5 for both sediment basin and permanent detention structure.
 - c. Provide one 3' x 3' anti-seep collar around the 18-inch barrel approximately 8 feet from the riser.
 - d. Do not provide a 4-inch diameter dewatering hole at elevation 72.45.
 - e. Provide a 6-foot wide grass emergency spillway at elevation 75.0. This shall be located at the end of the embankment where the sanitary sewer is located. The spillway is to be cut into natural ground and not placed on fill. A channel does not need to cut on the downstream side of the embankment, it can simply be cut through at elevation 75 and stopped where it daylights.
 - f. The horizontal grate trash rack on top of the riser will become clogged with debris and not function properly. The trash rack needs to be modified so that it is sloping or vertical.
 - g. Provide a 1% slope on the bottom of the basin to the paved ditch in the center.
10. Provide drainage calculations for all pipes and drainage ditches including the inlet pipe into the detention basin.

Private Street Comments

1. Private street exceeds 1,000 foot length for cul-de-sac streets. Recommended waiver as parcel configuration does not support alternate street design.
2. Water and sewer lines are located under street pavement; in-so-far-as it is practical, all longitudinal underground utilities shall be located under the shoulder of the road.
3. Please provide soils engineer report in accordance with Sections A and B of the attached Private Street Construction guidelines.

June 2, 1989

Darryl E. Cook, Engineer
James City County
Department of Development Management
County Government Center
101 Mounts Bay Road
James City County, Virginia



RE: Briarwood Mobile Home Park

Dear Mr. Cook:

We are in receipt of your letter of comments dated May 31, 1989, and are herewith responding to them as follows:

- Comment 1. A letter of credit in the amount of \$51,000.00 dated May 22, 1989 is in your possession. I would like a copy of the siltation agreement to be reviewed by us as soon as possible.
- Comment 2. As-built drawings will be provided upon completion.
- Comment 3. Items 3 & 4 on sheet 2 of drawings so prescribe.
- Comment 4. Item 3 on sheet 2 of the drawings address this, however if you are familiar with this site, you are aware that a certain amount of land disturbing must be done to reach the basin area.
- Comment 5. Item 2 on sheet 2 of the drawings addresses this. Also, an existing driveway was extended for our demolition work (permit# 89-0112). We will utilize this as a construction entrance.
- Comment 6. Virginia Power is in the process of engineering a plan including site lights. I will ascertain their knowledge of the 5,000 lumen requirement.
- Comment 7. Silt fence will be incorporated at this point.
- Comment 8. Silt fences will be incorporated at these points.
- Comment 9A. Will be done as per your direction.
- Comment 9B. Will be done as per your direction.
- Comment 9C. Will be done as per your direction.
- Comment 9D. Will be done as per your direction, however we are under the impression that State Code requires this.

Darryl E. Cook, Engineer
Page 2.

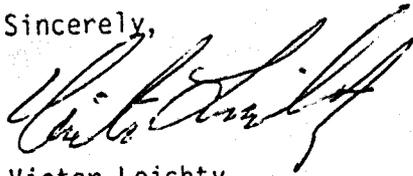
Comment 9E. Will be done as per your direction.

Comment 9F. Will be done as per your direction.

Comment 9G. Will be done as per your direction.

Comment 10. Will be done as per your direction.

Sincerely,

A handwritten signature in cursive script, appearing to read "Victor Leichty".

Victor Leichty

cc R. Patrick Friel

Scott Thomas

From: Scott Thomas
Sent: Tuesday, August 17, 2004 5:16 PM
To: Cheryl Waldren; John Horne; Wayland Bass
Subject: FW: Project Contribution (James City County)

Looks like if we are going to improve the forebay at Briarwood, it would have to be with County money.

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

-----Original Message-----

From: James Thomas [mailto:JamesTh@Flarock.com]
Sent: Tuesday, August 17, 2004 11:49 AM
To: Scott Thomas
Subject: RE: Project Contribution (James City County)

the state needed us to close this consent in a swift manner, to do this we had to move forward without a SEP agreement in place. The Briarwood Condo project, they felt, was something the county (JCC) needed to do as it was a necessary repair project, not an environmental enhancement ideal. Sorry for not conveying this, but all efforts on environmental projects seemingly lost appeal, as the state needed to close this

thanks again.

-----Original Message-----

From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Monday, August 16, 2004 3:49 PM
To: jamessth@flarock.com
Cc: Cheryl Waldren; Wayland Bass
Subject: Project Contribution (James City County)

James

I was just wondering what ever became of your efforts on this. We have reconstructed the dam at Briarwood Condos and were thinking about redoing the forebay at the back where the drainage comes in. It is pretty eroded and in bad shape. Our contractor onsite tells us this can be done as an extra to the project and cost would be about \$ 5,000. It would be beneficial to know if Florida Rock made the contribution (per the DEQ consent order) in helping us to make this decision. Did you ever get as far as making a contribution to the County on this project as we originally discussed?

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

Visit:

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

Scott Thomas

From: Scott Thomas
Sent: Wednesday, April 07, 2004 4:35 PM
To: Wayland Bass; John Horne
Cc: John Horne; Darryl Cook; Mike Woolson
Subject: Briarwood Repair - \$\$ Contribution

Wayland - When you get back I need to talk to you. I got TCS concrete from Newport News, who are under a consent order from DEQ due to a unregulated industrial stormwater discharge, to commit to a donation of \$ 7,000 each to two of our projects. One is the Briarwood Repair, the second (which is still a maybe) is the Eastern State Stream Restoration. I mentioned this to you about a week or so ago that they were looking for projects. I gave them the list of priority Powhatan/Yarmouth projects and some other misc. stuff (see the attached document) and they choose these two. They just recently called and said they (through their discussions with DEQ) preferred projects which would actually go to construction sometime shortly. Briarwood is one that fits that criterion as I see on the County website that it is out for bid. We will need to work out some details as they want to split the \$7,000 over a 3 or 4 month period.

John – this is one powerful aspect of our approved watershed management plans. This came about as a result of my relationship with a local HOA member who also is a manager at this concrete plant facility. If DEQ issues a consent order for an illicit stormwater discharge, sometimes they request that the offender look to local projects to contribute money, time or materials as part of their compensatory package. Unlike most localities which have just “ideas”, we have approved WM plans with a priority list of goals/objectives. I was able to get him a list of projects immediately. I think this will be more of a trend as DEQ becomes more active.

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

Scott Thomas

From: Scott Thomas
Sent: Tuesday, March 23, 2004 3:19 PM
To: 'jamesth@flarock.com'
Cc: Mike Woolson
Subject: Projects in JCC

James,

I've listed some ideas to contribute in time, materials or money, in order from biggest to smallest. I've split them up into the Powhatan Creek Watershed, the Yarmouth Creek watershed and other miscellaneous. I think we would want to stick to projects associated with our approved watershed management plans for Powhatan and Yarmouth Creeks, which are looked to favorably by the regulatory authorities. All the projects listed are consistent with those plans.

You can contact me at 253-6639 or our watershed planner, Mike Woolson, at 253-6823 if you need to discuss this further.

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

Visit:

http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html

and

www.protectedwithpride.org

Potential Projects in James City County

Powhatan Creek Watershed:

Please note that on February 26th 2002, the James City County Board of Supervisors adopted the Powhatan Creek Watershed Management Plan, consisting of 9 goals and 21 priorities. Some examples of specific priorities in this watershed include: purchase of conservation easements consistent with our Conservation Area report, stormwater BMP retrofits, long-term maintenance of stormwater BMPs, homeowner education for water quality, stream restorations and regional stormwater facilities.

Ideas to participate:

1. Time and material contribution to one of two stream restorations we are currently working on. One is at Eastern State Hospital and the second is at Powhatan Plantation. We are currently working on some preliminary design and permitting. (Priority # 16)
2. A stormwater BMP retrofit in the Powhatan Creek watershed. We have a list of 17 high and low priority BMPs to retrofit in the watershed. A low priority retrofit may be a good choice. (Priority # 9).
3. Purchase of some conservation easement area, in whole or portion. We have a list of 17 ranked priority areas the County is trying to pursue. (Priority # 6).

Yarmouth Creek Watershed:

{Please note that on October 14th 2003, the James City County Board of Supervisors adopted the Yarmouth Creek Watershed Management Plan, consisting of 6 goals and 14 priorities. Some examples of specific priorities in this watershed include: start a watershed stewardship group, purchase of conservation easements, 4 stormwater BMP retrofits, stream channel restoration, trash cleanup initiative, and boat and wake educational signs.

4. We are currently working to repair a failed BMP, which is in subwatershed 105. It is designated as retrofit 105-R2, an existing dry pond at Briarwood Condominiums off of Centerville Road. It failed during Hurricane Floyd and is conveying sediment downstream and is a safety hazard to the community. The County is currently pursuing bids for the repair for this BMP. (Priority # 6).
5. Seed money for the start of a Yarmouth Creek landowner/stakeholder watershed stewardship group (Priority # 2).

Other:

6. The County has a program called PRIDE – which is the educational component of our water quality program. It was developed as a result of Priority # 12 of the Powhatan Creek watershed management plan. (PRIDE stands for Protecting Resources in Delicate Environments. The goal of PRIDE is to improve water quality in James City County by teaching residents about the importance of watershed protection while providing residents and neighborhoods with specific watershed restoration and protection tools. We try to have two (2) smaller demonstration projects per year under the PRIDE program. Several opportunities exist to contribute to this program. Some examples of past demonstrations include: shoreline erosion control along an eroded pond bank, a small stream channel restoration, wetland planting and an RPA extension. We have not yet decided on a fall 2004 demonstration project, but are looking into the possibility of doing a permeable pavement/grassy paver type installation at our County Powhatan Creek Canoe Access Park on Jamestown Road. For more information and samples, visit our News/Projects section of the website at www.protectedwithpride.org.

Scott Thomas

From: Scott Thomas
Sent: Thursday, April 15, 2004 6:04 PM
To: 'jamesth@flarock.com'
Subject: FW: Donations

Here is some more information for you (SEE BELOW). The official name of the project is IFB 04-0068, Drainage Improvements at Briar Lane. The project is to repair a failed dry pond consistent with Priority # 6 (Perform 4 stormwater retrofits) of the approved Yarmouth Creek Watershed Management Plan. This retrofit is a high priority retrofit listed as ID # 105-R2. It is situated in Subwatershed 105 of Yarmouth Creek. The County ID Code # for the BMP is YC (Yarmouth Creek) 015.

Attached is a site map...Information about earmarking the donation is below the map.



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

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

and

www.protectedwithpride.org

-----Original Message-----

From: Cheryl Waldren

Sent: Wednesday, April 14, 2004 5:00 PM

To: John Horne; Scott Thomas

Cc: Cheryl Waldren

Subject: Donations

Hello:

Here is how the donation funds work. The agency can send the money to the Treasurer's office with a letter attached that SPECIFICALLY states what the money will be used for and the funds will be deposited in the Donation Fund account.

Second, when you need to get the funds for the project just submit a memo addressed to John McDonald, Ann Davis, and Sandy Wanner, for the funds.

Thanks.

Cheryl D. Waldren

James City County

Development Management

101 - E Mounts Bay Road

Williamsburg, VA 23187

(W) 757-253-6671, Fax 757-253-6850

4/15/2004

YC015_BRIARWOOD_PARK_CONDOMINIUMS - 190

WATERSHED	YC	MAINTENANCE PLAN	No	CTRL STRUC DESC	RCP Riser
BMP ID NO	015	SITE AREA acre	9	CTRL STRUC SIZE inches	60
PLAN NO	SP-51-89	LAND USE	SF Residential	OTLT BARRL DESC	HDPE
TAX PARCEL	(24-3)(01-52)	old BMP TYP	Dry Det	OTLT BARRL SIZE inch	30
PIN NO	2430100052	JCC BMP CODE			
CONSTRUCTION DATE	1/1/1990	POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Briarwood Park Condos			DESIGN HW ELEV	74.34
FACILITY LOCATION	Near End of Briar Lane			PERM POOL ELEV	na
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	7	2-YR OUTFLOW cfs	16.74
CURRENT OWNER	Blis Construction Ltd.			10-YR OUTFLOW cfs	35.52
OWNER ADDRESS	126 Dentigh Blvd.			REC DRAWING	Yes
OWNER ADDRESS 2	Newport News, Va.	SERVICE AREA DESCRI	SF Lots & Open Channel Roadways		
CITY-STATE-ZIP CODE	23602-3333	IMPERV AREA acres	2.16	CONSTR CERTIF	Yes
OWNER PHONE		RECV STREAM	UT of Yarmouth Creek		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	12/8/2004
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0.09	INTERNAL RATING	4
		CHAN PROT CTRL	Yes	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0.82	County Repair 10/2004. Yarmouth 105-R2	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

[Get Last BMP No](#)

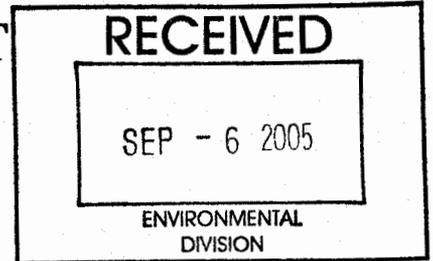
[Return to Menu](#)

RETENTION POND

BEAUTIFICATION PROJECT

WILL BEGIN AT 11:30 A.M.

ON FRIDAY, SEPTEMBER 9



Have you ever wondered what a retention pond is supposed to do? We will have several members of the James City County Pride Team assisting us, who can answer your questions.

Please come and help as little or as much as you would like. Any assistance with this project is appreciated!!

Pride Team Members will be:

Beth Davis
Environmental Education Coordinator
Development Management

Scott Thomas
Senior Engineer
Environmental Division

Mike Woolson
Watershed Planner
Environmental Division

THIS PROJECT IS IMPORTANT NOT ONLY FOR THE ENVIRONMENTAL BENEFIT, BUT WILL HELP WITH THE UPKEEP OF OUR BMP THAT WE ARE REQUIRED TO MAINTAIN!

**RETENTION POND
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**Scott Thomas
Senior Engineer
Environmental Division**

**Mike Woolson
Watershed Planner
Environmental Division**

**THIS PROJECT IS IMPORTANT NOT ONLY FOR THE
ENVIORNMENTAL BENEFIT, BUT WILL HELP WITH
THE UPKEEP OF OUR BMP THAT WE ARE
REQUIRED TO MAINTAIN!**



323 Island Road, Columbus, NJ 08022
Telephone: 609-291-9486 Fax: 609-298-8939

Thank you for your order!

To: Mary Sales Order#: 17568

Co.: Briarwood Homeowners Date: 8-30-05

Fax: 757-283-6733 Total Pages: 2

From: *Robin, Shipping Dept.*

Please provide the following if checked:

Approval signature

** Please review the Sales Order carefully and if it is correct, sign at the bottom of the Order where "Approved By" is indicated and fax back.*

Delivery/Pick up date (Mon-Fri 7:30 a.m. - 3:30 p.m.)

** Until a driver is secured, all delivery dates are tentative. I will notify you as soon as possible.*

Delivery time (NYCITY: before 7am or after 11am)

Directions

Tax Exempt Certificate, if applicable

Contact Name/Phone number at delivery site

** Note: All customers must have a crew on site to unload their order. Our drivers are not required to unload.*

Prepayment for orders shipping UPS/Motor Carrier _____

C.O.D. upon receipt of order 498.75

** 10% restocking fee will be charged for all orders cancelled or change after the truck has been loaded.*

** If a date appears next to the plant description, that is the expected release date for that plant. If no date is listed, the plants are ready to be released now.*

Thank you!

Visa, Master Card, Discover, Checks or Cash in exact amount.



Sales Order 17568

Customer No. BRIHOM

Phone # 757/253-6695

Fax # 757/253-8733

Cell #

PINELANDS NURSERY
 323 ISLAND ROAD
 COLUMBUS, NJ 08022
 Fax 609/298-8939
 Telephone 609/291-9486

Bill To:

BRIARWOOD HOMEOWNERS
ATTN: MARY ARMSTEAD
115 BRIAR LANE
WILLIAMSBURG, VA 23188

Ship To:

PICK UP IN TOANO SEPT. 8, 2005
BRIARWOOD HOMEOWNERS

Date		Ship Via		F.O.B.		Terms	
08/30/05		PICK UP/VA		Origin		C.O.D. OR PREPAYMENT	
Purchase Order Number			Requested Ship Date		Salesperson		Our Order Number
DRY POND PLANTING			09/08/05		RL		17568
Ordered	Quantity	B.O.	Item Number	Description	Tax	Unit Price	Amount
300			PAVI-PG-VA	*PANICUM VIRGATUM VA 2" PLUG	Y	0.65	195.00
200			VENO-PG-VA	VERNONIA NOVEBORACENSIS 2" PL VA	Y	0.70	140.00
200			EUPE-PG-VA	EUPATORIUM PERFOLIATUM 2" PL VA	Y	0.70	140.00

THANK YOU!

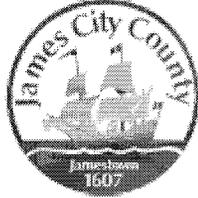
Approved By Mary Armstead
 Signature affirms accuracy of quantity and species ordered

Accepted By _____
 Signature affirms receipt of stated quantity of product and satisfaction in its condition

All claims to be made within 10 days of delivery

NonTaxable Subtotal	0.00
Taxable Subtotal	476.00
Tax @ 5.000 %	23.75
Total Order	499.75

Customer Original



Briarwood Park Condominiums - Dry Pond BMP Informational Meeting

*Thursday May 20th 2004
James City County Library (Croaker Road)*

Short History:

- Original subdivision plan approved under County Plan No. SP-51-89.
- Pond built when subdivision roads and ditches were built.
- Dry Pond situated at far northwest corner of community, left (west) of playground.
- Older design criteria, basic Dry Pond designed for 2-year storm control.
- Pond failed during Hurricane Floyd, September 1999 (14.63 inches of rain)
- Failure reason unknown.

Recent Developments:

- Documented as failed BMP as part of the County BMP Inventory and Inspection program.
- County BMP ID No. YC 015
- HOA's are responsible for BMP maintenance, upkeep and repair.
- Persistence by County staff and HOA representatives to formulate a repair action.
- Yarmouth Creek Watershed Management Plan as adopted by the Board of Supervisors on October 14, 2003 (6 goals and 14 priorities).
 - Subwatershed 205
 - Sensitive Subwatershed
 - Retrofit # 105-R2
 - High priority pond repair
- "Briarwood Park Easement and Maintenance Agreement" - August 12, 2003
- Concept Design (County Engineer & Environmental Division)
- Bid out by County in April 2004 (IFB 04-0068)
- Approximate cost \$ 40,000
- Working on contract documents with selected bidder. Construction start date June-July 2004 (Will keep HOA informed as appropriate)
- PRIDE (www.protectedwithpride.org) County water quality education

General Repair Plan:

- Mobilize equipment onsite.
- Remove and clear damaged pipes, debris, and trees as necessary to perform work and general (limited) cleaning of interior BMP area.
- Fill existing failure valley. New soils work as necessary. Properly tested and certified.
- New riser (standpipe), barrel (outflow pipe), manholes. Minor rework to outfall as needed.
- Generally, 1 to 2 week construction time depending on weather.

How Will the Dry Pond Work?

The BMP serves a drainage area of about 7 acres associated with development of Briarwood Park Condominiums. The BMP is considered to be dry-type detention pond BMP. A dry-type detention pond temporarily stores runoff and is normally dry during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. The facility will have a 60-inch diameter vertical concrete pipe riser, an anti-vortex/trash rack cap, and a 30-inch outlet pipe barrel. There will be a series of manhole structures along the outlet pipe alignment to drop in elevation and dissipate energy. There will be 2 openings in the riser pipe to provide for water quality draw down and to offer control for larger storm events. One will be a small diameter low flow orifice at the bottom of the riser and the second will be a large diameter opening at the top of the standpipe. The larger opening will be covered by the trash rack. During the 100-year storm, the maximum water level should rise to about 1 or 2 feet above the top of the riser to El. 73, which is below top of dam. If functioning properly, normal storm events should reach an elevation below the top of the riser and the pond should draw down in about 24 to 36 hours.

Beautification of the pond interior area by the HOA is encouraged, especially with wetland plants adaptable to the soils and moisture conditions!!!!

(SEE ATTACHED DRY POND BMP SCHEMATIC)

Responsibilities?

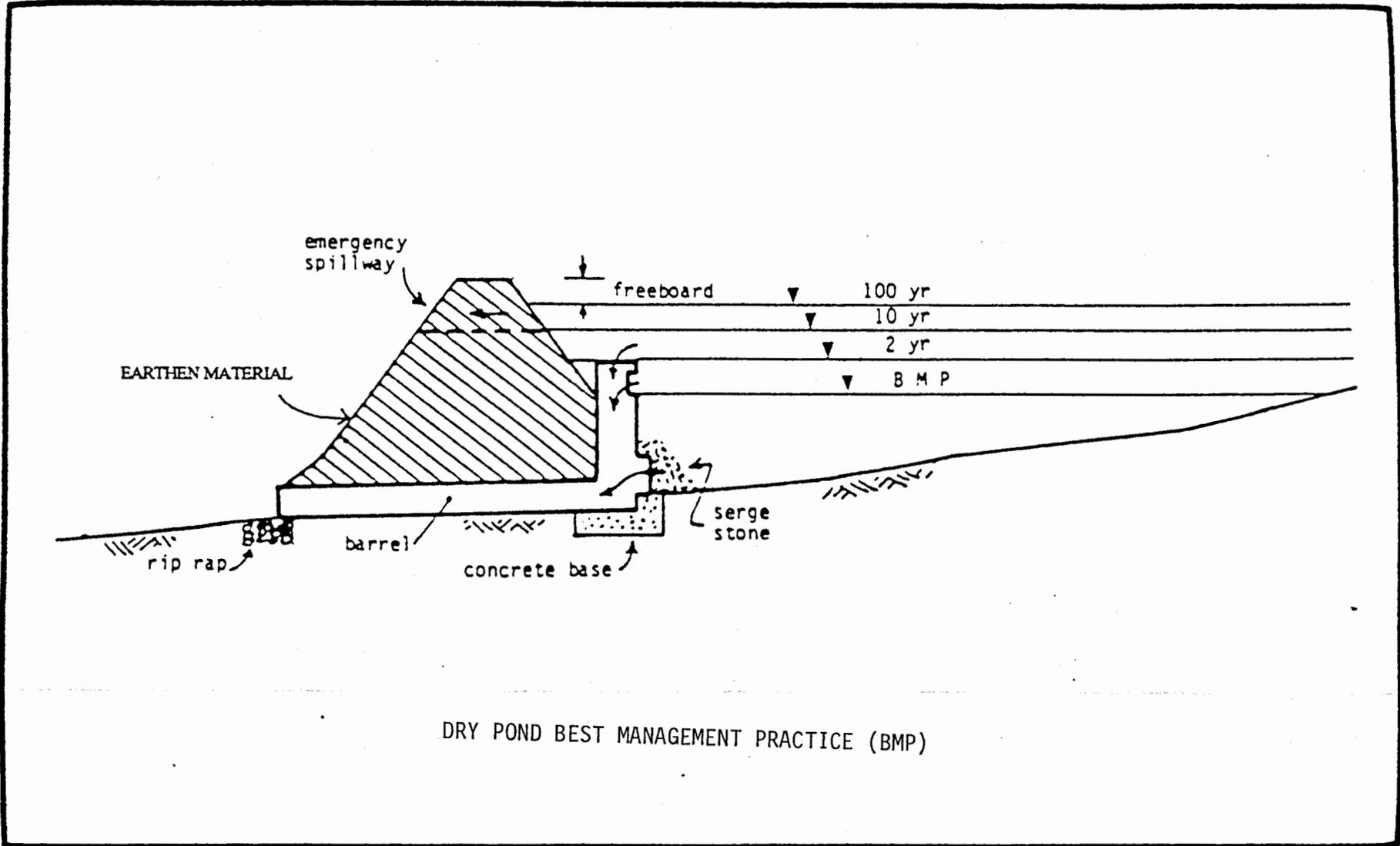
Refer to the Easement & Maintenance Agreement; however, in general, this is an overview:

County

- Perform repair work to re-establish the BMP
- Stabilize Site
- Non-Routine Maintenance
 - Future dredging & cleaning (if necessary)
 - Periodic checks on basin
 - Major structural repairs to dam and pipes (if necessary)
 - Replacing pipes (if necessary)
 - Emergency repairs

Homeowner Association

- Allow County future access for inspection/non-routine maintenance.
- Routine Maintenance
 - Mowing and seeding
 - Tree removal in basin and on dam
 - Removing trash, litter and debris periodically from flow control structures
 - Managing vegetation
 - Repairing minor erosion on dam
 - Nuisance animal control



DRY POND BEST MANAGEMENT PRACTICE (BMP)

SAMPLE BMP MAINTENANCE PLAN

Note: This is a Typical Maintenance Plan for a Detention (dry pond) or Retention (wet pond) facility. For general use by HOA's, or other designated parties which are responsible for operation, maintenance and inspection of BMP facilities when no other specifically approved plans are available. This is provided as a courtesy by the Environmental Division of James City County for informational purposes only. This plan addresses normal structural and stormwater runoff control aspects of the facility. It does not address landscaping, cosmetic, or ornamental features associated with the facility nor does it replace any specific recommendations offered by a registered professional.)

Maintenance Plan (Detention or Retention Pond BMP's)

A maintenance program is required to ensure the Stormwater Management (SWM) / Best Management Practice (BMP) pond facility functions as designed and to provide for reasonable aesthetic conditions. Proper maintenance is encouraged to prevent the introduction of debris and sediment into pretreatment areas (if applicable), the SWM/BMP itself, principal inflow and outflow control structures and downstream waterways. Following facility installation, certification approval and establishment of vegetation in disturbed areas, inspections for sediment buildups should be performed at least quarterly. It is anticipated that under normal conditions, sediment removal may be required once every 5 to 10 years. If other construction or related land-disturbing activities are performed upland of the facility, adequate protection measures should be implemented and inspection frequencies increased to at least once weekly.

The designated party will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period. Once per year (more or less) a representative of the County may jointly inspect the structure. Appropriate action will be taken to ensure appropriate maintenance. Keys to locked access points or structures shall be made available to the County upon request and adequate notice should be given to nearby residences of substantial maintenance activities that may take place such as vegetation removal, cleaning of sediment or draining or lowering the pond level.

Inspection and Maintenance of the Facility should consist of the following Additional Measures:

1. Inspect for sediment buildup by visual observation and a physical determination of sediment depth at various locations within the pond's bottom storage area. If sediment has accumulated significantly within the pond bottom to a point where it affects stormwater function of the facility or greatly reduces storage volume, removal should be considered. At the same time, or at least once per year, clean any pretreatment devices, the riser bottom and outlet pipes of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area. (Note: Typically, cleanout elevation is 10 to 25 percent of design water quality volume.)
2. Perform maintenance mowing of pond grasses at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not be permitted to grow on any part of the dam embankment that was constructed using engineered (compacted) fills.

3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed a qualified independent soil testing laboratory such as VPI&SU. Contact the local Virginia Cooperative Extension office for additional information. Apply additional lime and fertilizer in accordance with test recommendations.
4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedlings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations of the Virginia Erosion and Sediment Control Handbook (VESCH).
5. Perform quarterly inspections of all primary flow control structures within the BMP for collected floating wood pieces, trash and debris. This includes the crest (top) of the riser, outfall pipes and the emergency spillway. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide an attractive appearance.
6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the riser, anti-vortex and trash rack device, orifices/weirs, outlet barrel and pond embankment. Exposed metal surfaces shall be painted to minimize rust damage or replaced if rust damage is irreversible. If damage is evident, further investigation by a registered professional engineer may be required to assess the integrity of the structure.
7. Perform quarterly inspections of graded side slopes of the facility for signs of animal/rodent borrows or slope erosion. Immediately perform necessary repairs, refilling or reseedling.
8. Perform yearly observations of perimeter areas which surround the facility to ensure changes in land use, topography or access have not occurred and generally do not affect the operation, maintenance, access or safety features provided for the facility. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the embankment and principal flow control structures.
9. Inspect and exercise pond drain valves (if provided) on a regular basis.
10. Repair eroded perimeter shoreline areas, where normal water pools meet the graded side slopes of the pond. Stabilize with wet soil mix seed and mulch, appropriate wetland plants or other acceptable methods such as coconut fiber logs or erosion control matting.
11. Record Keeping. Keep reasonable, accurate written records of inspections and maintenance activities performed at the facility at all times. Written records can be simple hand notes or more formal report forms. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.
12. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County. Our general office phone number is 253-6670.

(End Maintenance Plan)



County Repair 2004





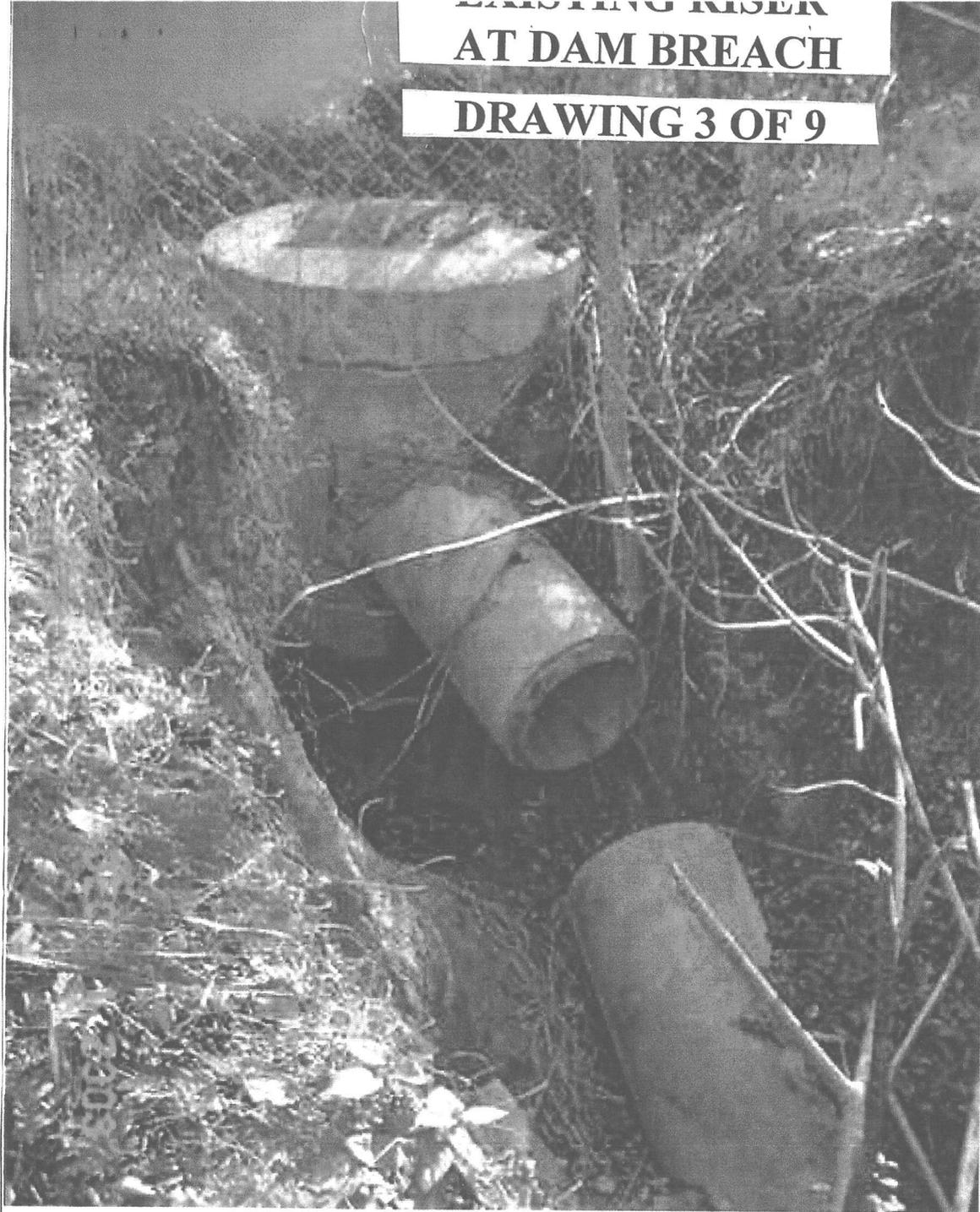


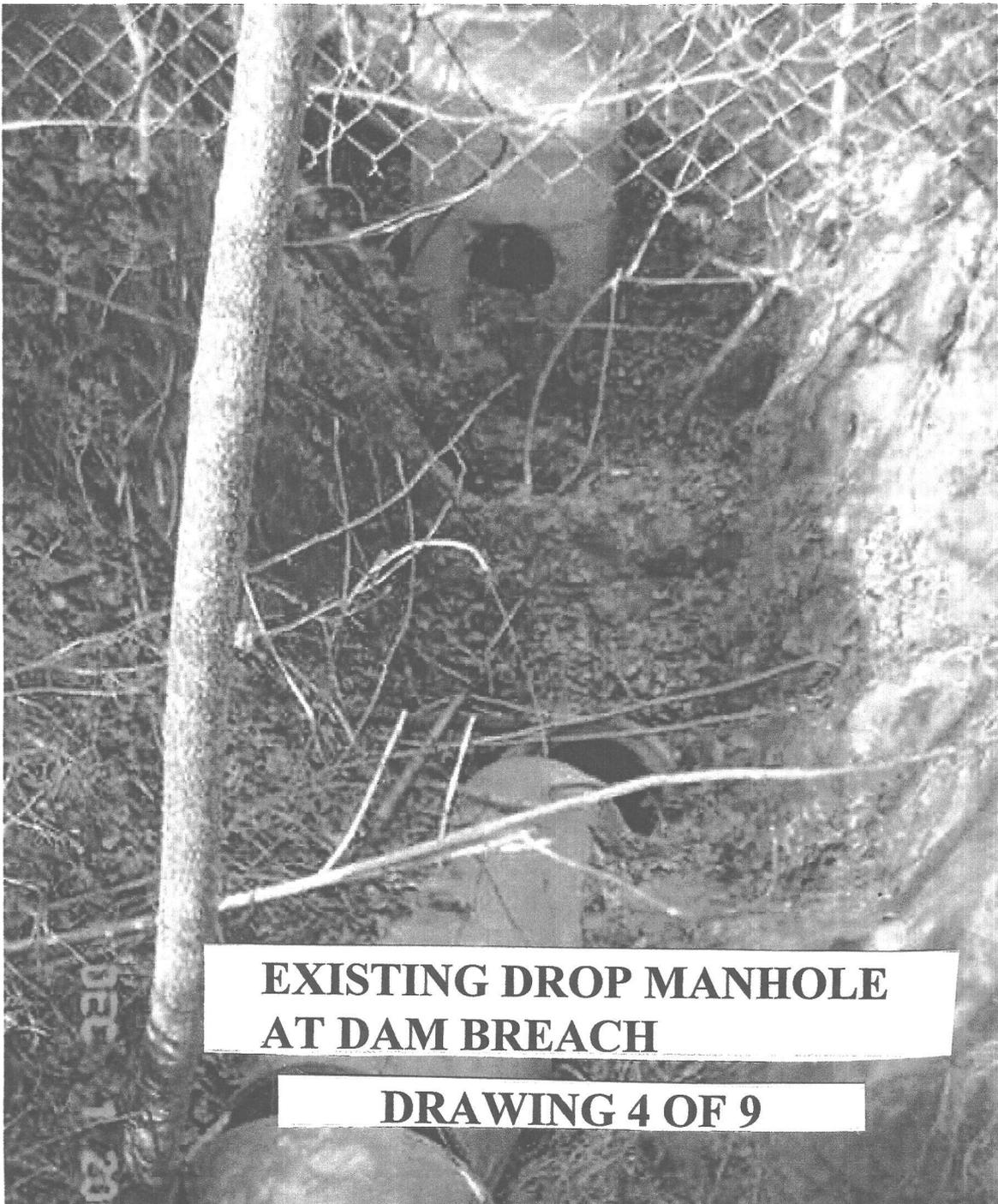




**EXISTING RISER
AT DAM BREACH**

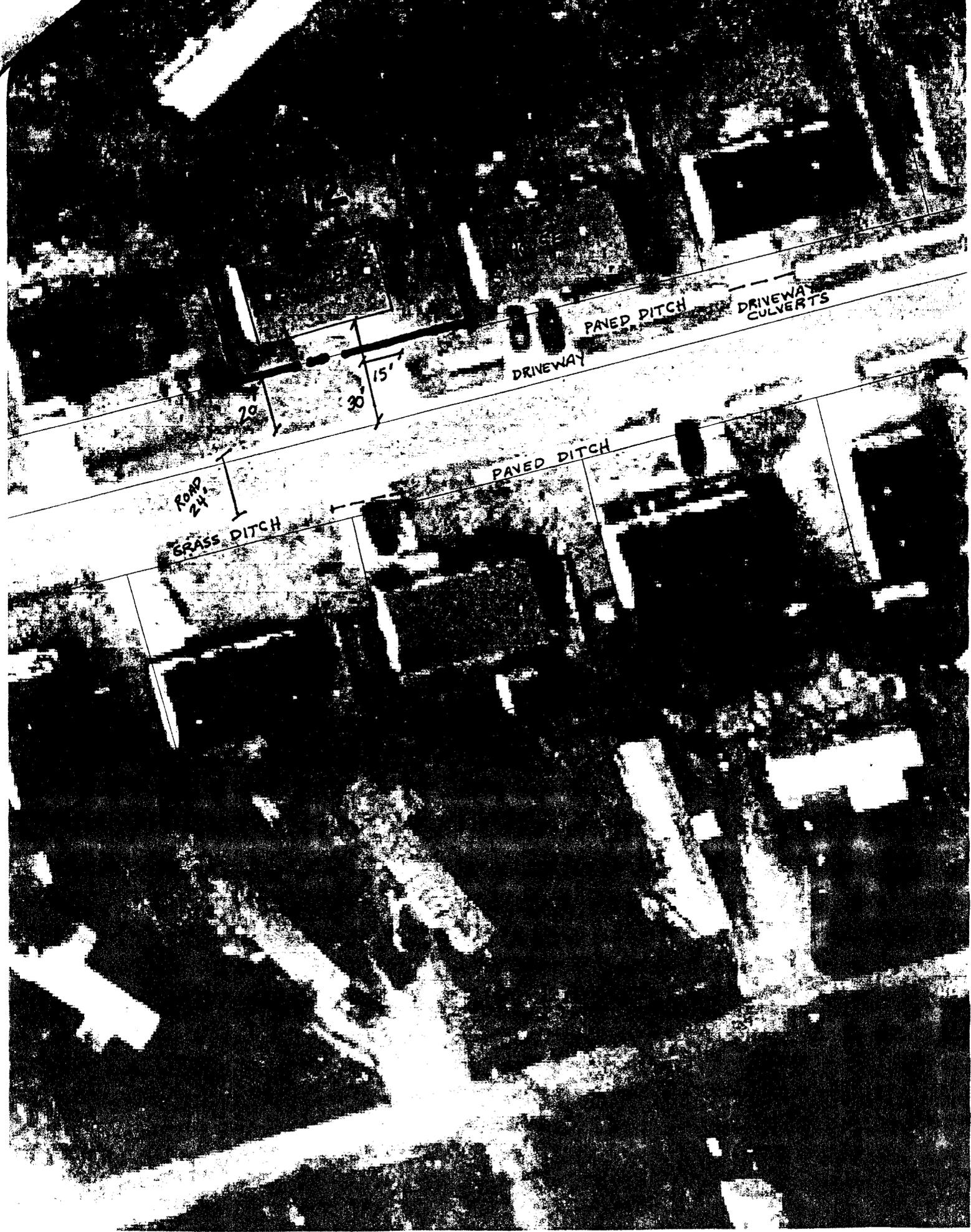
DRAWING 3 OF 9





**EXISTING DROP MANHOLE
AT DAM BREACH**

DRAWING 4 OF 9



TYPICAL LOT SCHEMATIC 1"=50'





Little
outflow
1" = 50
1316 or 770
1" = 100'

Briarwood - Briar Lane

Area to BMP (206,345 sq ft) 4.73 AC.

High Point Elev. Contour 110

Other High Point, EL. 100

EL. @ Flume EL. 78

Sample

Lot V-20 (120 Briar) 0.13 AC. A1 U-20 Ph 4
(Nearest to BMP)

* Lot V-12 (112 Briar Lane) 0.138 AC A1 V12 Ph 3

Lot V-11 (111 Briar Lane) 0.138 AC A U-11 Ph 3

Lot V-29 (129 Briar Lane) 0.1379 AC A1 U29 Ph 3

A = 0.138 AC.

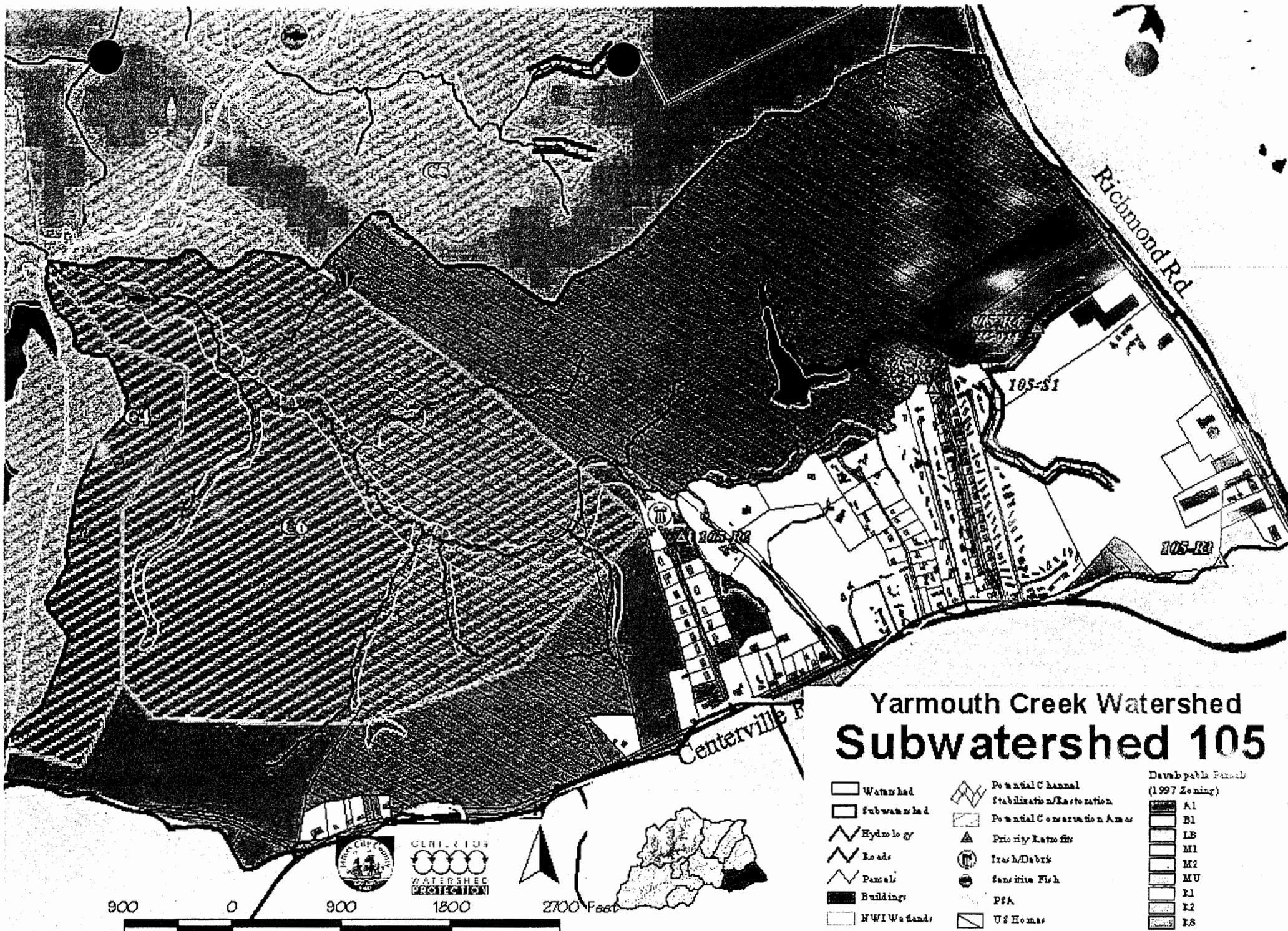
Road Width = 24' out to out

Typical House = 50' x 28' = 1,400 SF

Typical Driveway = 30' x 15' = 450 SF

Typical Width Lot Line to Road = 20' grassed w/ scc

Typical YARD = 4564 SF = 0.105 AC.



number would increase considerably with a larger purchase of development rights program or conservation easement program that would need to be funded at one million dollars a year for at least four years to be relatively successful. Long-term protection of water quality, fisheries, forest and biodiversity have quantifiable community benefits including increased property values and enhanced quality of life, which compound over time. More details on the economic benefits of watershed protection can be found in Appendix A. Detail for each of the priorities in Table E-2 can be found in Section 3 Watershed Recommendations.

Table E-2. Priorities and Costs for Watershed Protection and Restoration in Yarmouth Creek

Priority	Goals Achieved	Protection Tool or Evaluation Measure	Where	Costs to JCC and Action	Responsibility
1	1,3,6	Use of subwatershed maps to ensure local staff and stakeholder awareness of existing locations for restoration and potential conservation areas	Watershed wide	Small	JCC Planning, Development Management, Environmental Division
2	1,2,4	Foster development of a watershed group for Yarmouth Creek led by the landowners/ stakeholders in the Creek	Watershed wide	Small Consider initial seed money	Stakeholders, JCC Planning, Development Management, Environmental Division
3	1,2,3,5	Adopt Special Stormwater Criteria (SSC) in the Watershed to increase groundwater recharge in the development process	Sub-watersheds in PSA and re-zonings watershed wide	Small Criteria should be the same as Powhatan	Environmental Division
4	1,5	Establish a working group to address salinity issues and consider min flow from Little Creek	Tidal Yarmouth Creek	Small 0.1 FTE	Stakeholders, Development Management, Environmental Division
5	1,2	Work with stakeholder watershed group to conserve land through purchase development rights/ easements in sensitive areas	Watershed wide	Expensive 1million a year for 4 years	PDR Program, Development Management

Table E-2. Priorities and Costs for Watershed Protection and Restoration in Yarmouth Cree

Priority	Goals Achieved	Protection Tool or Evaluation Measure	Where	Costs to JCC and Action	Responsibility
6	1,2	Perform 4 stormwater retrofits	Sub-watersheds 102, 103, 104, 105	Expensive \$50k a year for 4 years	Environmental Division, Development Management
7	1,2	Perform stream restoration and channel stabilization projects	Sub-watersheds 103, 104	Expensive \$100k** a year for 4 years	Environmental Division, Development Management
8	1,2,3	Maintain priority of Purchase of Development Rights (PDR) program for special resource areas including buffers and conservation areas	Watershed wide	Small	PDR Program, Development Management
9	1,6	Meaningfully address trash issues in the watershed Arrange cleanups and work with stakeholder group to change behavior	Watershed wide	Small 0.1 FTE \$500 year for roll off dumpster rental	Environmental Division, Solid Waste Division
10	1,2,3,4	Encourage Better Site Design across the watershed and the county by improving code language and having a roundtable – a series of meetings with developers, VDOT, JCC staff and other stakeholders	Watershed wide	Moderate 0.5 FTE for a planner	Stakeholders, Developers, JCC Planning, Development Management, Environmental Division
11	1,4,5	Monitor salinity in Yarmouth Creek in cooperation with the stakeholder watershed group	Tidal Yarmouth Creek	Small \$100 in equipment	Stakeholder watershed group

Table E-2. Priorities and Costs for Watershed Protection and Restoration in Yarmouth Creek

Priority	Goals Achieved	Protection Tool or Evaluation Measure	Where	Costs to JCC and Action	Responsibility
12	1,4,6	Signage and educational materials to begin to address boat wake issues	Tidal Yarmouth and Chick boat ramps	Small \$1-2k over two years	Stakeholder watershed group, Environmental Division, Development Management
13	4,6	Monitor restoration efforts on stream channels and biota	Watershed wide	Small to Moderate 0.2 FTE or \$5k a year sub to W&M	Environmental Division, Development Management
14	1,2	Continue to strengthen enforcement of existing RPA laws on new development and as stated in the law protect all perennial streams and connected wetlands	Watershed wide	Small	Development Management, Environmental Division
Total	\$160k a year over 4 years + additional 1 million a year for an expanded PDR program and .75 FTE				
FTE- Full-time employee JCC- James City County PDR- Purchase of Development Rights VIMS- Virginia Institute of Marine Science					
Costs Small – Less than 5k Moderate -- \$5-40k Expensive >40k ** Bioengineering costs based on (City of Asheville, 1998) costs of \$25-\$55 linear ft					

Another key component of this watershed plan is measuring and monitoring the success of the plan. In Yarmouth Creek, this consists of monitoring the effects of management measures on stream channel stability, water quality, RTE species and impervious cover. This will enable county staff to learn from the successes and challenges of plan implementation and craft better strategies in the future.

Table 1-2 Retrofit Opportunities in Yarmouth Creek Watershed

ID (County ID)	Facility Type	Description	Comments	Priority
102-R1 (YC-020)	Existing Dry Pond	Enhancements including addition of a sediment forebay, and expansion of the wet pool area to incorporate greater water quality. Also, remove debris from clogged outlet.	Some trash at outlet. Simple retrofit.	Moderate
102-R2 (YC-019)	Existing Dry Pond	Enhancements including addition of a sediment forebay, and expansion of the wet pool area to incorporate greater water quality.	Some trash at outlet. Simple retrofit.	Moderate
102-R4 (YC-013)	Existing Wet Pond	Possible addition of a forebay.	Simple retrofit. Otherwise nice facility.	Moderate
103-R1 (YC-006)	Existing Wet Pond	Possible addition of a forebay.	Simple retrofit. Otherwise nice facility.	Moderate
103-R2	Infiltration Basin/Dry Pond	Infiltration basin which may be acting more like a dry pond Possible orifice retrofit to provide downstream channel protection	Simple retrofit	Moderate/ High
103-R3	No existing facility	Location where road runoff from Rt. 60 is entering the stream untreated possible linear bioretention facility in the median or on the side of the road	Would require design and coordination of with VDOT	Moderate
104-R1 (YC-002)	Infiltration Basin	Consider adding bioretention elements to enhance the facility. Mulch the base of the facility, and incorporate a variety of plants.	This facility is currently recorded as a dry pond.	Low
105-R1	Unmanaged Runoff	Add a stilling basin at the outfall. Small drainage area estimated at 7,500 square feet. Could incorporate wet storage for water quality.	Sewer line and wetlands present potential conflicts.	Low
105-R2 (YC-015)	Existing Dry Pond	Catastrophic failure. Undermining of the barrel has resulted in severe erosion, resulting in a roughly 20' deep canyon at the outfall, and trash in the facility. This problem should be repaired, and wet storage could possibly be incorporated as well during this enhancement.	This is a potentially high cost retrofit. JCC Development Management has been working to secure funding and landowner permission for this repair.	High
105-R3	Unmanaged Existing Development	Create a small wet pond to provide water quality and channel protection volumes.	Would result in loss of at least three large trees, but can help to control runoff from dense development	Moderate
105-R4 (YC-014)	Existing Dry Pond	Convert from a dry to wet storage to improve water quality treatment.	Facility also has an unlocked cover on the manhole, which can pose a safety hazard.	Moderate: Water Quality High: Unlocked manhole cover

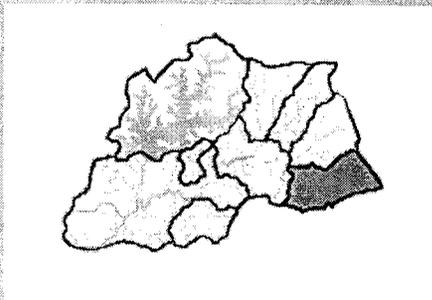
Stream Restoration

Six candidate sites for stream restoration were located during the field assessment portion of the watershed study. Five of the six sites are located in the upper watershed where impacts from the Rt. 60 commercial corridor are apparent. For this project, a distinction

Subwatershed 105

Overall Characterization

Subwatershed 105 is currently in the SENSITIVE category with 5.5% impervious cover. Under the current zoning this subwatershed was projected to have a buildout imperviousness of 8.3%, which means it would remain in the SENSITIVE category. Recently, a significant portion of the subwatershed was rezoned and the new development will shift the classification to IMPACTED and the future impervious cover to 16.7%. Currently the subwatershed is moderately developed with most of the development located in the upper portion including commercial and residential areas. Power lines and uncontrolled stormwater runoff from a commercial development may also have impacted stream quality here. The lower reaches of the watershed are in excellent condition with good diversity of habitat. The shell-marl ravine forest is found here as well as potential habitat for the small whorled pogonia. A 264 acre forested area has been identified as a potential contiguous forest conservation area.



General Characteristics

<i>Drainage Area</i>	931 acres
<i>Length of Mapped Streams</i>	5.4 miles

Current Land Use and Stream Classification in Subwatershed 105

<i>1996 Impervious Cover</i>	5.5%
<i>Initial Stream Classification</i>	Sensitive
<i>Current Stream Condition</i>	Good

Future Land Use and Stream Classification in Subwatershed 105

<i>Buildout Impervious Cover</i>	16.7%
<i>Projected Stream Classification</i>	Impacted
<i>Developable Area</i>	609.7
<i>Developable Area %</i>	65%

Conservation Areas in Subwatershed 105

<i>Existing RPA wetland area</i>	39.1 acres
<i>Existing RPA wetland %</i>	4%

Contiguous Forest: Potential contiguous forest area, 264 acre plot

Wetlands (from NWI): 52.7 acres of wetland (6% of subwatershed), mostly riparian. Good quality wetlands associated with the floodplain and some beaver dams occur in the upper portion of the watershed.

Other Conservation Areas: none identified.

Table 105-1. Yarmouth Creek Subwatershed 105 Priority Conservation Areas

Rank	ID	Approx. Area* (acres)		Description	Score	Management Recommendations
		Total	Developable			
6 out of 8	C6	260	190	Subwatershed 105; sensitive stream, contiguous forest, shell-marl, good fish	52	Targeted for development; RPA protection for all first order streams, BSD, stringent stormwater treatment

*These are approximate areas calculated using GIS and rounded to the nearest tenth. Total area represents the total acreage within the conservation area boundary. The developable area within those conservation areas was calculated by subtracting unbuildable land and built-out land from the total area. Unbuildable land included the NWI wetlands, open water, the existing RPAs (not including RPA buffer), stream valleys (a 100-foot buffer on either side of all streams), and slopes greater than 25% (derived from 5-foot contour lines). Because this estimate was based on limited data and certain assumptions were made about how to estimate this area, it should only be used as a planning tool only and not as an actual guide for development.

General Stream Conditions in Subwatershed 105

Habitat Assessment: The upper stream reaches have been somewhat degraded by uncontrolled stormwater runoff. The upper tributary and its floodplains have also been impacted by power and sewer lines. The lower portion of the subwatershed has excellent stream conditions and contained sensitive fish species in our assessment.

Stormwater Management in Subwatershed 105

The upper stream reaches have been somewhat degraded by uncontrolled stormwater runoff. A catastrophic failure of a dry pond was also noted which caused severe erosion and a safety hazard in one tributary although it does not seem to have had major impacts downstream. Some erosion was also noted at the bottom of a concrete channel that serves as an outfall for runoff from a residential development.

Table 105-2. Retrofit Opportunities in Subwatershed 105

ID	Facility Type	Description	Comments	Priority
105-R1	Unmanaged Runoff	Add a stilling basin at the outfall. Small drainage area estimated at 7,500 square feet. Could incorporate wet storage for water quality.	Sewer line and wetlands present potential conflicts.	Low
105-R2	Existing Dry Pond	Catastrophic failure. Undermining of the barrel has resulted in severe erosion, resulting in a roughly 20' deep canyon at the outfall, and trash in the facility. This problem should be repaired, and wet storage could possibly be incorporated as well during this enhancement.	This is a potentially high cost retrofit, but the facility in its current state is a public safety hazard, and exports sediment as well. JCC Development Management has been working to secure funding for this repair.	High
105-R3	Unmanaged Existing Development	Create a small wet pond to provide water quality and channel protection volume.	Would result in loss of at least three large trees, but can help to control runoff	Moderate

Table 105-2. Retrofit Opportunities in Subwatershed 105				
ID	Facility Type	Description	Comments	Priority
			from dense development	
105-R4	Existing Dry Pond	Convert from dry to wet storage to improve water quality.	Facility also has an unlocked cover on the manhole, which can pose a safety hazard.	Moderate :Water Quality High: Unlocked manhole cover

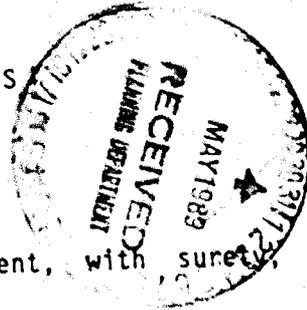
Channel Stabilization in Subwatershed 105

One channel stabilization project was identified in Subwatershed 105. The channel stabilization project is located on two adjacent upper reaches of the subwatershed. A description of the potential channel stabilization project is located in Table 105-3 and the project location is provided in the Subwatershed 105 Map.

Table 105-3. Channel Stabilization Opportunities in Subwatershed 105			
Site	Description	Type of Effort	Priority
105-S1	Upper reaches of Subwatershed 105 experiencing headcutting and erosion (Several thousand feet of channel is affected)	Channel stabilization	Medium

CODE COMPLIANCE PLAN REVIEW COMMENTS

BRIARWOOD *DEC*
PLAN NO. SP-51-89
May 25, 1989



1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.
2. As-built drawings shall be provided for the detention basin upon completion.
3. A preconstruction conference shall be held on-site between the County, the Developer, the Project Engineer and the Contractor prior to issuance of a Land Disturbing Permit.
4. The Land Disturbing Permit when issued will require construction of the sediment basin prior to any other construction activities on the remainder of the project.
5. Provide a stabilized construction entrance at the entrance to the project from Centerville Road.
6. Provide a standard Virginia Power, 5,000-lumen streetlight at the intersection of the project entrance road and Centerville Road.
7. Provide silt fence below the proposed detention pond to protect the stream during construction of the pond.
8. Provide silt fence on both sides of the road from Stations 0+00 to 2+50, on the left side of the road from Stations 10+50 to 13+00, and on the right side from Stations 13+50 to 16+00.
9. The detention basin design needs to be modified as follows:
 - a. Provide a 10-inch release pipe rather than a 12 inch.
 - b. Place the top of the riser at 74.5 for both sediment basin and permanent detention structure.
 - c. Provide one 3' x 3' anti-seep collar around the 18-inch barrel approximately 8 feet from the riser.
 - d. Do not provide a 4-inch diameter dewatering hole at elevation 72.45.
 - e. Provide a 6-foot wide grass emergency spillway at elevation 75.0. This shall be located at the end of the embankment where the sanitary sewer is located. The spillway is to be cut into natural ground and not placed on fill. A channel does not need to cut on the downstream side of the embankment, it can simply be cut through at elevation 75 and stopped where it daylight.
 - f. The horizontal grate trash rack on top of the riser will become clogged with debris and not function properly. The trash rack needs to be modified so that it is sloping or vertical.

- g. Provide a 1% slope on the bottom of the basin to the paved ditch in the center.
10. Provide drainage calculations for all pipes and drainage ditches including the inlet pipe into the detention basin.

0367C
4567c

YC015

Briar Lane

Centerville Road





Scale: 1 inch = 300 feet

DRAINAGE MAP
SCALE: 1" = 300'

□ DRAINAGE AREA
206,345 SF = 4.73 AC.
* 212,345 SF = 4.87 AC.
** 305,345 SF = 7.00 AC.

* ADJUSTED AREA
BASED ON FIELD VISIT.

** ADJUSTED

*A

**B

EL. 110

EL. 110

80

70

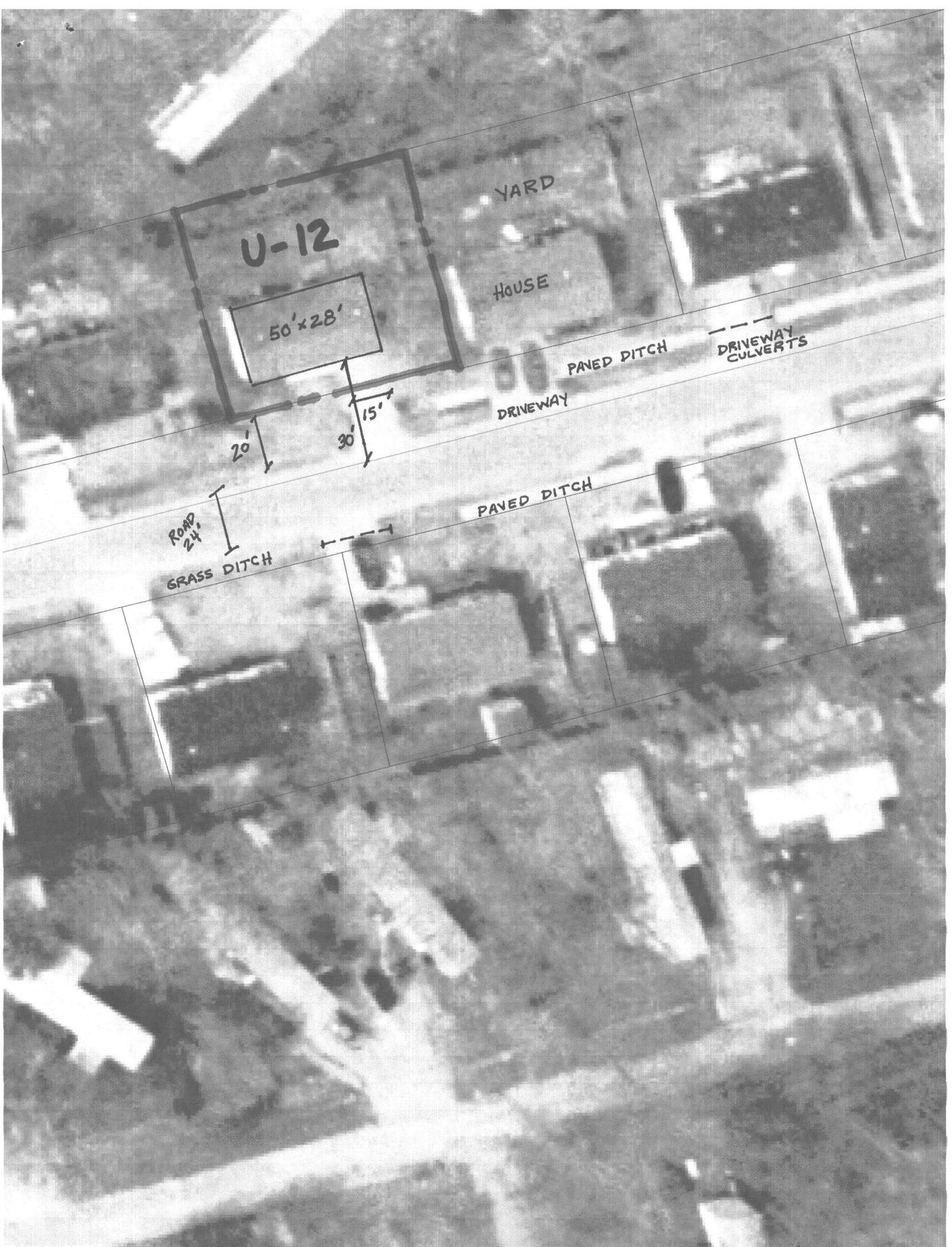
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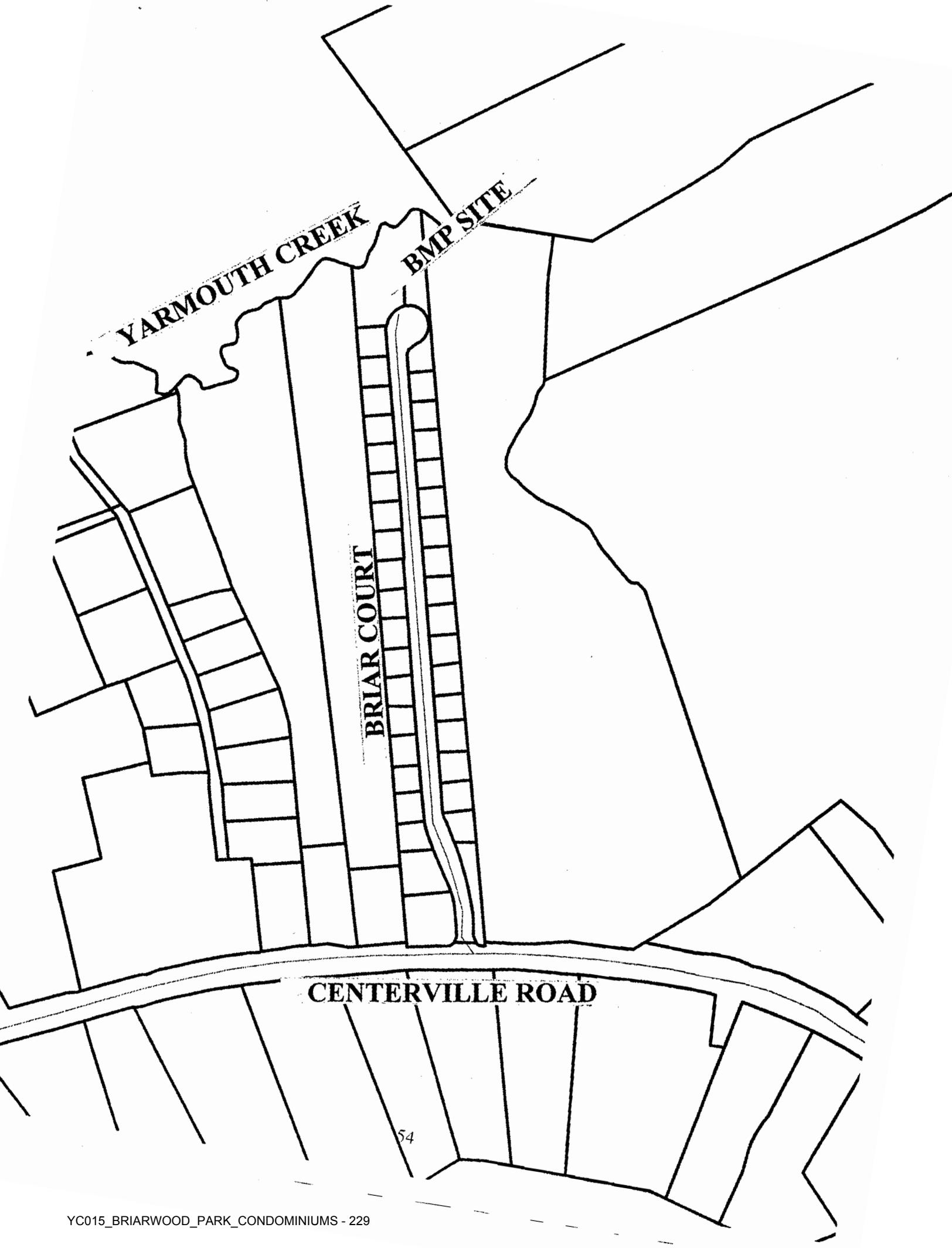
90

100



RAY
Ground





YARMOUTH CREEK

BMP SITE

BRIAR COURT

CENTERVILLE ROAD

54



0-12

50 x 28

HOUSE

DRIVEWAY

PAVED DITCH

DRIVEWAY CULVERTS

ROAD 24'

GRASS DITCH

PAVED DITCH

20'

30'

15'