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: **PC030**

DATE VERIFIED: **October 3, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 9, 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: PC030

PIN: 3720900001A

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

Property Description: Open Space Phase 3 & 4

Site Address:

(For internal use only) **Box** 6 **Drawer:** 3

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

Comments

Note: SJT met with Scott Sinclair of CA Barrs on 5/28/04 in field at this BMP while it was being converted from TSB to final BMP. Gave some direction on what was to be done.

James City County, Virginia
Environmental Division

Stormwater Management/BMP Record Drawing and Construction Certification Review
Tracking Form

County Plan No.: S-56-98
Project Name: SPRINGHILL PHASES III + IV
Stormwater Management Facility: WET POND
BMP Phase #: ☐ I ☒ II ☐ III

- ☑ Information Package Received. Date/By: LANDMARK June 3, 2004
- ☐ Administrative Check.
  - ☑ Record Drawing Date/By: LANDMARK 6/3/04
  - ☑ Construction Certification Date/By: LANDMARK 9/22/04
  - ☑ RD/CC Standard Forms (Required for all BMPs after Feb 1st 2001Only)
  - ☐ Insp/Maint Agreement #/Date: SPRINGHILL PH 2 5-29-96 ?; Nothing in file PH 3 & 4 NO ROMT EVER IMPOSED IN PR.
  - ☐ BMP Maintenance Plan Location: None on plan
  - ☐ Other:
- ☑ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
  ☐ Yes ☐ No Location: Note #18 on Sheet 9 requires AB&CC.
- ☑ Assign **County BMP ID Code #**: Code: PC030
- ☑ Preliminary Input/Log into Division's "As-Built Tracking Log"
- ☑ Add Location to GIS Database Map. Obtain site information (GPIN, Owner, Site Area, Address, etc.)
- ☑ Preliminary Log into Access BMP Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
- ☑ Active Project File Review (correspondence, H&H, etc.).
- ☑ Initial As-Built File setup (Label, copy hydraulics, BMP plan and detail information, etc.).
- ☐ Inspector Check of RD/CC (forward to inspector using transmittal for cursory review). GAVE TO MAT 8/22
- ☑ Pre-Inspection Drawing Review - Approved Plan (Quick look prior to Field Inspection).
- ☑ Final Inspection (FI) Performed Date: 9/8/04
- ☑ Record Drawing (RD) Review (***) Date: 9/8/04
- ☐ Construction Certification (CC) Review Date:
- ☑ Actions:
  - ☐ No comments.
  - ☑ Comments. Letter Forwarded. Date: 9/8/04
    - ☑ Record Drawing (RD) Approved
    - ☑ Construction Certification (CC) (NONE SUB.) SEE ATTACHED RD & CC STAMPED RCVD 11/23/04
    - ☑ Construction-Related (CR)
    - ☑ Site Issues (SI) (MOWING)
    - ☐ Other :
- ☐ Second Submission:
- ☑ Reinspection (if necessary): 11/22/04 – EMBANKMENT HAS BEEN MOWED
- ☑ Acceptable for stormwater managment facility purposes (RD/CC/CR/Other). Proceed with bond release.
- ☑ Notify Inspector and Inspector Supervisor using "Surety Request Form". 12/7/04
- ☑ Check/Clean active file of any remaining material and finish "As-Built" file.
- ☑ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
- ☑ Copy Final Inspection Report into County BMP Inspection Program file.
- ☐ Obtain Digital Photographs of BMP and log into computer. NO
- ☑ Request mylar/reproducible from As-Built plan preparer.
- ☑ Complete "As-built Tracking Log"
- ☑ Last check of BMP Access Database.
- ☐ NO Add to JCC Hydrology & Hydraulic database (optional).
- ☑ Add to PRIDE BMP ratings database.

DRAINAGE ISSUE SHANNON STOND BRINGS TO ATTEN OF INSPECT STAFF. 11-01-04 NO ACTION. NOT A BMP ISSUE. SJT

Final Sign-Off

Plan Reviewer: SJT 12-8-04 Date: 11/22/04

*** See separate checklist, if needed.

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 – Site Information:

Project Name: Springhill, Phases III & IV
Structure/BMP Name: _____
Project Location: Springhill Subdivision off of News Road
BMP Location Behind lots 118 and 119, Phase III, Springhill Subdivision
County Plan No.: _____ - _____ - _____

Project Type:			Tax Map/Parcel No.:	372090001A
	X Residential	ρ Business	BMP ID Code (if known):	
	ρ Commercial	ρ Office	Zoning District:	R-2
	ρ Institutional	ρ Industrial	Land Use:	Residential, Cluster Development
	ρ Public	ρ Roadway	Site Area (sf or acres):	72.78 Acres
	ρ Other _____			

Brief Description of Stormwater Management/BMP Facility: _____
Stormwater management pond converted from a sediment trap to a Dry Pond.

Nearest Visible Landmark to SWM/BMP Facility: Residences at 4261 and 4265 Teakwood Drive

Nearest Vertical Ground Control (if known):

ρ JCC Geodetic Ground Control ρ USGA ρ Temporary ρ Arbitrary ρ Other
Station Number or Name: _____
Datum or Reference Elevation: _____
Control Description: _____
Control Location from Subject Facility: _____

Section 2 – Stormwater Managen. . / BMP Facility Construction Information:

Pre Construction Meeting Held for Construction of SWM/BMP Facility: x Yes ρ No ρ Unknown
Approx. Construction Start Date for SWM/BMP Facility: 1998
Facility Monitored by County Representative during Construction: ρ Yes ρ No x Unknown
Name of Site Work Contractor who Constructed Facility: CA Barrs
Name of Professional Firm Who Routinely Monitored Construction: Scott StClair
Date of Completion for SWM/BMP Facility: May, 2004
Date of Record Drawing/Construction Certification Submittal: June 2, 2004

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

Section 3 – Owner/Designer/Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: Hampton Bay Group
Mailing Address: 4224 Holland Rd,
Virginia Beach, VA 23452
Business Phone: 757-340-5300 Fax: 757-498-0529
Contact Person: Lee Ward Title:

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

Firm Name: Landmark Design Group, Inc.
Mailing Address: 4029 Ironbound Rd., Suite 100
Williamsburg, VA 23188
Business Phone: 757-253-2975 Fax: 757-229-0049
Responsible Plan Preparer: Peter Farrell, LS
Title: Director of Surveys
Plan Name: BMP Record Drawing, Springhill, Phases III & IV
Firm's Project No. 1930039-000.47
Plan Date: June 2, 2004
Sheet No.'s Applicable to SWM/BMP Facility: R-1 / R-2 / _____ / _____

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

Name: CA Barrs, Contractor
Mailing Address: 7601 George Washington Memorial Highway
Grafton, VA 23692
Business Phone: 757-898-7282 Fax: 757-898-1282
Contact Person: Scott St. Clair
Site Foreman/Supervisor: Scott St. Clair
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 - Professional Certific ns:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: LandMark Design Group, Inc.
Mailing Address: 4029 Ironbound Road, Suite 100
Williamsburg, VA 23188
Business Phone: 757-253-2975
Fax: 757-229-0049

Name: Peter Farrell
Title: Land Surveyor
Signature: Peter Farrell
Date: 09/22/04

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

COMMONWEALTH OF VIRGINIA
PETER FARRELL
No. 002036
LAND SURVEYOR

_____ (Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

Firm Name: LandMark Design Group, Inc.
Mailing Address: 4029 Ironbound Road, Suite 100
Williamsburg, VA 23188
Business Phone: 757-253-2975
Fax: 757-229-0049

Name: James D. Brawley
Title: Professional Engineer
Signature: James D. B
Date: 09/22/04

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

COMMONWEALTH OF VIRGINIA
JAMES W. BRAWLEY III
No. 024305
PROFESSIONAL ENGINEER

_____ (Seal)

Virginia Registered Professional Engineer

Record Drawing / Construction Certification Submittal for a BMP

Date: 8/22/04

Inspector:
- ☑ Pat Menichino
- ☐ Joe Buchite
- ☐ Beth Davis
- ☐ Gerry Lewis
- ☐ Jim Rudnicky
- ☐ Other: _____

?

Project: Springhill Phases 3+4 (Behind Lot 118/119)
BMP Facility: Wet Pond
Plan No.: S-56-98
Assigned County BMP ID Code: PC 030

I have received a transmittal for a ☑ Record Drawing and ☐ Construction Certification for the above referenced facility on June 3, 2004. Prior to performing a field inspection of the BMP and performing a full review of these certification items, I am first forwarding the items to you to cursory review in case any major field changes were performed that I should be aware of and/or to ensure the record drawing accurately portrays what you saw observed in the field. Please review the drawing and return to me promptly so I can proceed with the review of certification material.

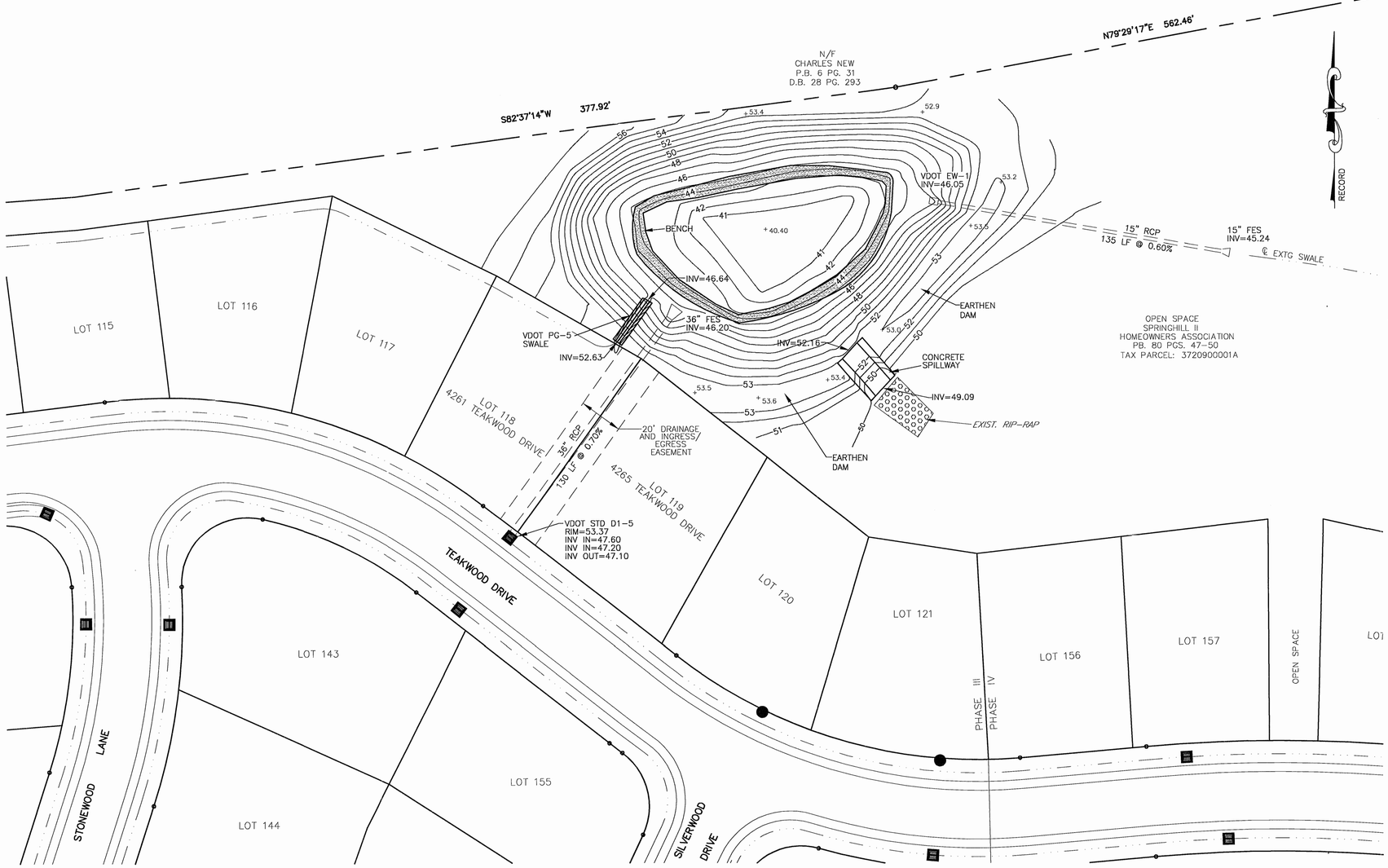
During my review, I will look at issues related to the BMP and its primary inflow and outflow conveyance systems, and may make comment on the following areas: Inspection/Maintenance agreement, Record Drawings (RD), Construction Certification (CC) and Construction-Related (CR) field items as it pertains to the BMP. If you have any other related non-BMP site issues such as site erosion, stabilization, removal of erosion & sediment controls, etc. that are not related to the BMP, you must proceed with closing out these items on your own accord; or alternatively, if needed, I can easily add these items to any comment letter that I may generate to the owner.

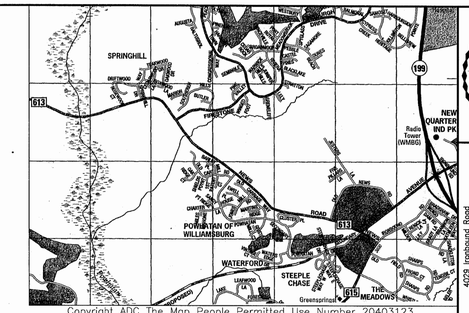
Let me know if I need to add any site-related items to my punch list.

Scott

Note: Basin was converted from TSB to BMP. SIT met Scott Sinclair CA Barrs onsite.

AsBuilts\Admin\z-inspector





Copyright ADC The Map People Permitted Use Number 20403123

VICINITY MAP

SCALE: 1"=2000'

NOTE: THESE RECORD DRAWINGS ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED BY LANDMARK DESIGN GROUP IN 1998 AND FIELD UPDATED JUNE 1, 2004

GRAPHIC SCALE

0 25 50 100

(IN FEET)
1 inch = 25 ft.

COMMONWEALTH OF VIRGINIA
6-3-04
PETER FARRELL
No. 002036
LAND SURVEYOR

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Fax. (757) 253-2678
Email: lmdg@landmarkdg.com
5544 Greenwich Road
Suite 200
Virginia Beach, VA 23462
Tel. (757) 497-7000
Fax. (757) 497-7833
Email: lmdg@landmarkdg.com

REVISIONS:

No.	Date	Comment	By

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

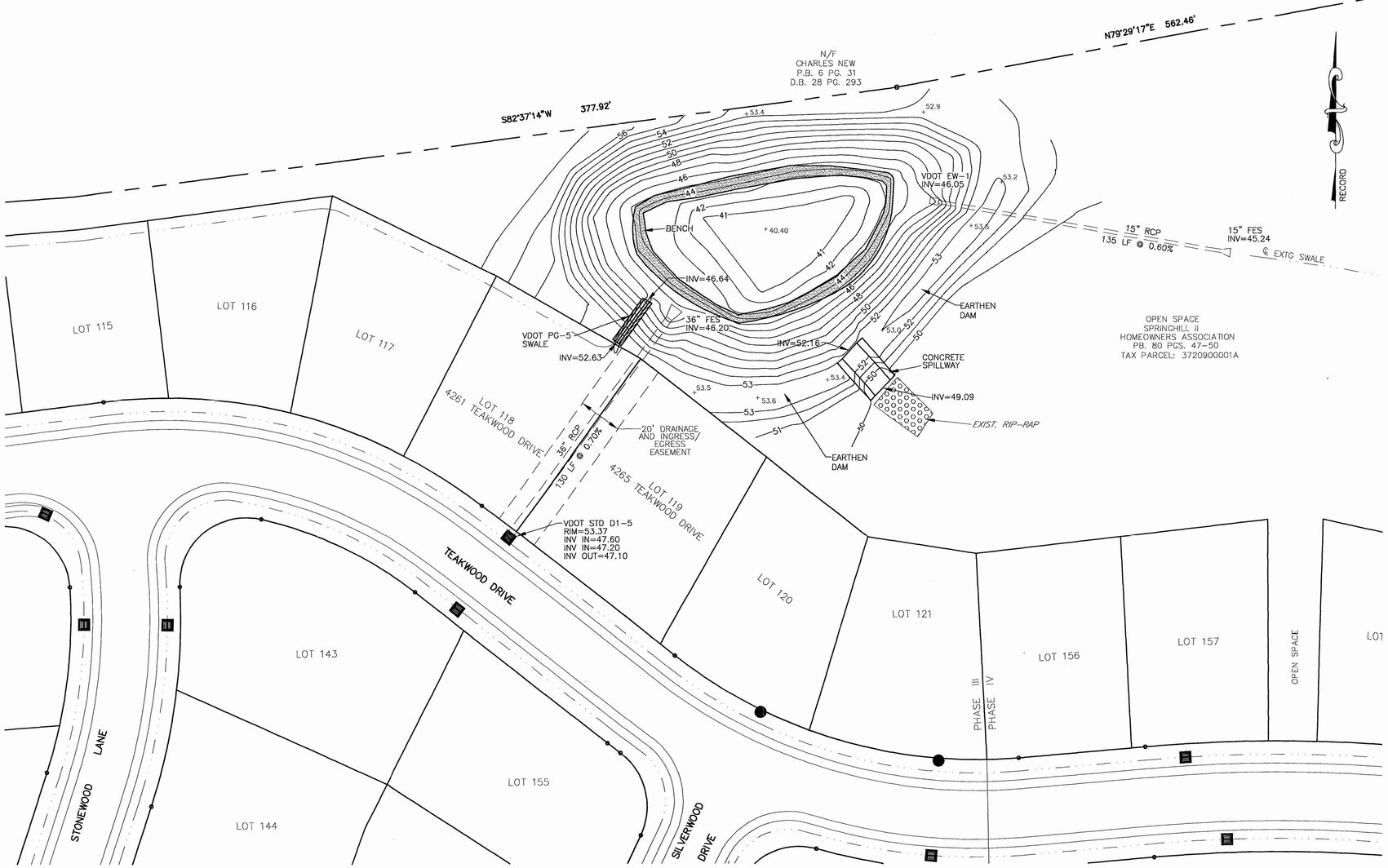
COUNTY APPROVAL
- 1st Submittal
- 2nd Submittal
- 3rd Submittal
- Approved

BMP RECORD DRAWINGS

SPRINGHILL PHASE III & IV

JAMES CITY COUNTY, VIRGINIA

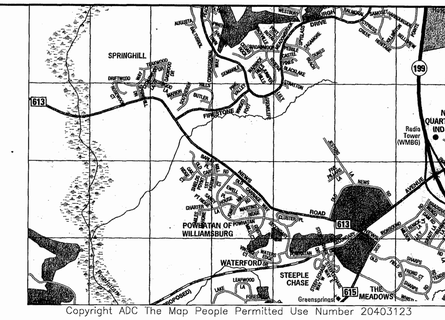
Designed:	Date: 6/2/04
Checked: PF	Scale: 1"=25'
File Mgr./Drawn: CRO	CADD File name: REC-BMP
Project Number: 1970009-000	Dwg. File No.: 15200VV
Drawing Number R-1	1 OF 2



GRAPHIC SCALE

0 25 50 100

(IN FEET)
1 inch = 25 ft.



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VICINITY MAP SCALE: 1"=2000'

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6-3-04
PETER FARRELL
No. 002036
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LANDMARK DESIGN GROUP
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Landscape Architects • Environmental Scientists

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Fax. (757) 229-0049
Email: lmdg@landmarkdg.com

5544 Greenwich Road
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Virginia Beach, VA 23462
Tel. (757) 497-1704
Fax. (757) 497-7833
Email: lmdg@landmarkdg.com

REVISIONS:		
No.	Date	Comment	By

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

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

BMP RECORD DRAWINGS

SPRINGHILL PHASE III & IV

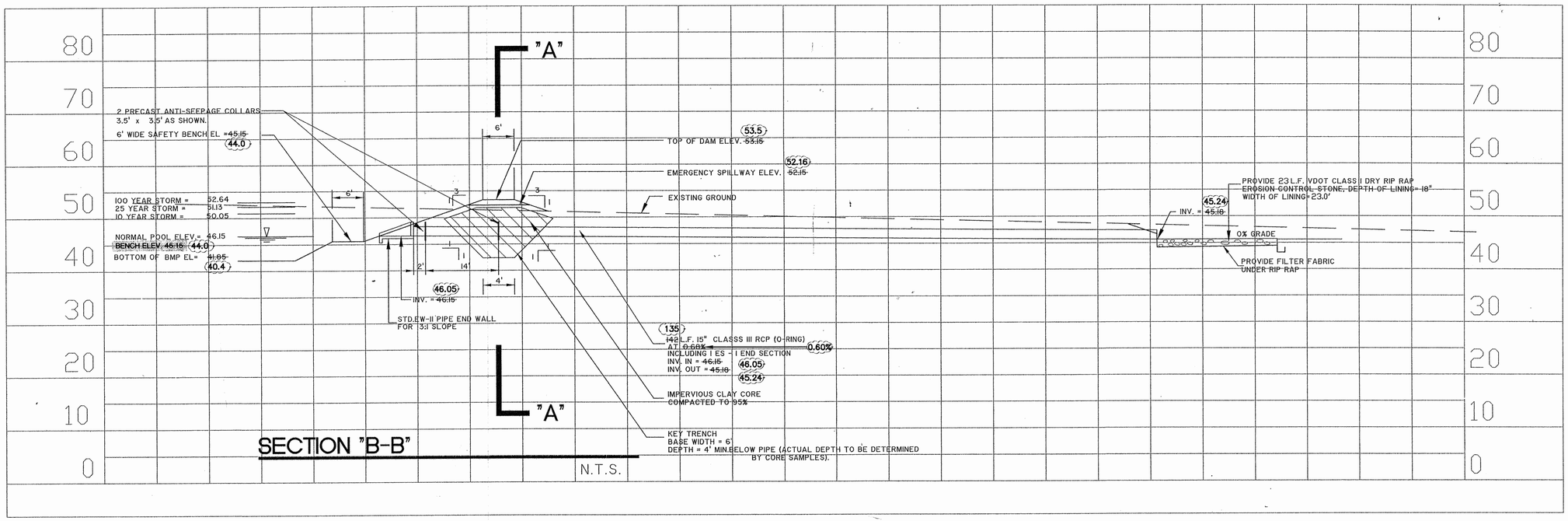
JAMES CITY COUNTY, VIRGINIA

Designed:	Date: 6/2/04
Checked: PF	Scale: 1"=25'
File Mgr./Drawn: CRO	CADD File name: REC-BMP
Project Number: 1970009-000	Dwg. File No.: 15200W

Drawing Number R-1

1 OF 2

PC 030; S-56-98



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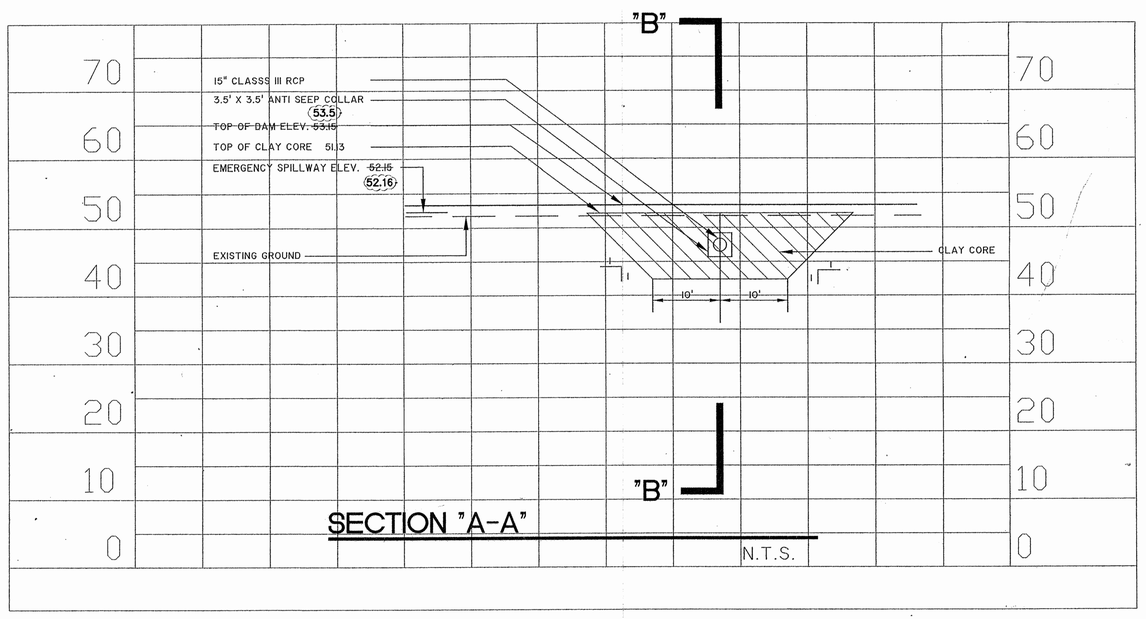

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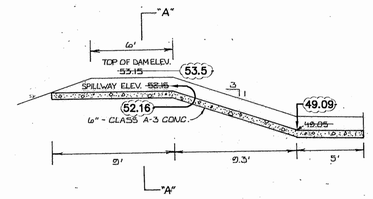
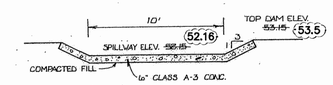


EMERGENCY SPILLWAY DETAIL
N.T.S.



SECTION A-A
N.T.S.

= RECORD DRAWING INFORMATION

NOTE: THESE RECORD DRAWINGS ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED BY LANDMARK DESIGN GROUP IN 1998 AND FIELD UPDATED JUNE 1, 2004

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6-3-04
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LANDMARK DESIGN GROUP
Engineers • Planners • Surveyors
Landscape Architects • Environmental Scientists

REVISIONS:			
No.	Date	Comment	By

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

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

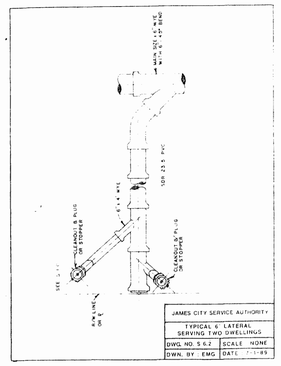
BMP RECORD DRAWINGS

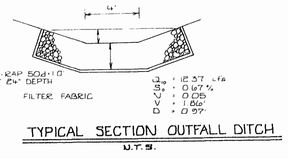
SPRINGHILL PHASE III & IV

JAMES CITY COUNTY, VIRGINIA

Designed:	Date: 6/2/04
Checked: PF	Scale: NTS
File Mgr./Drawn: CRO	CADD File name: REC-BMP
Project Number: 1970009-000	Dwg. File No.: 15199W
Drawing Number	R-2

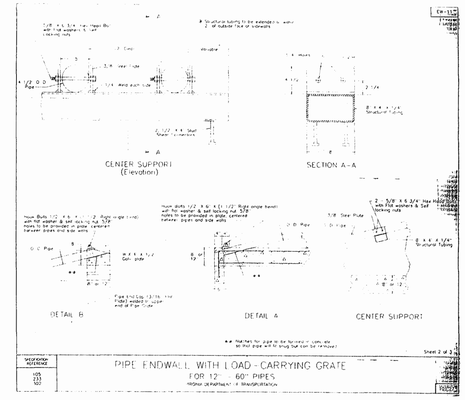
2 OF 2

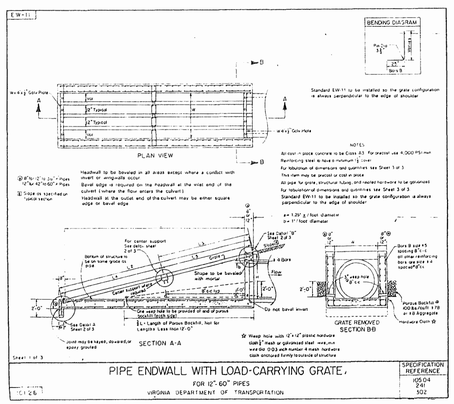


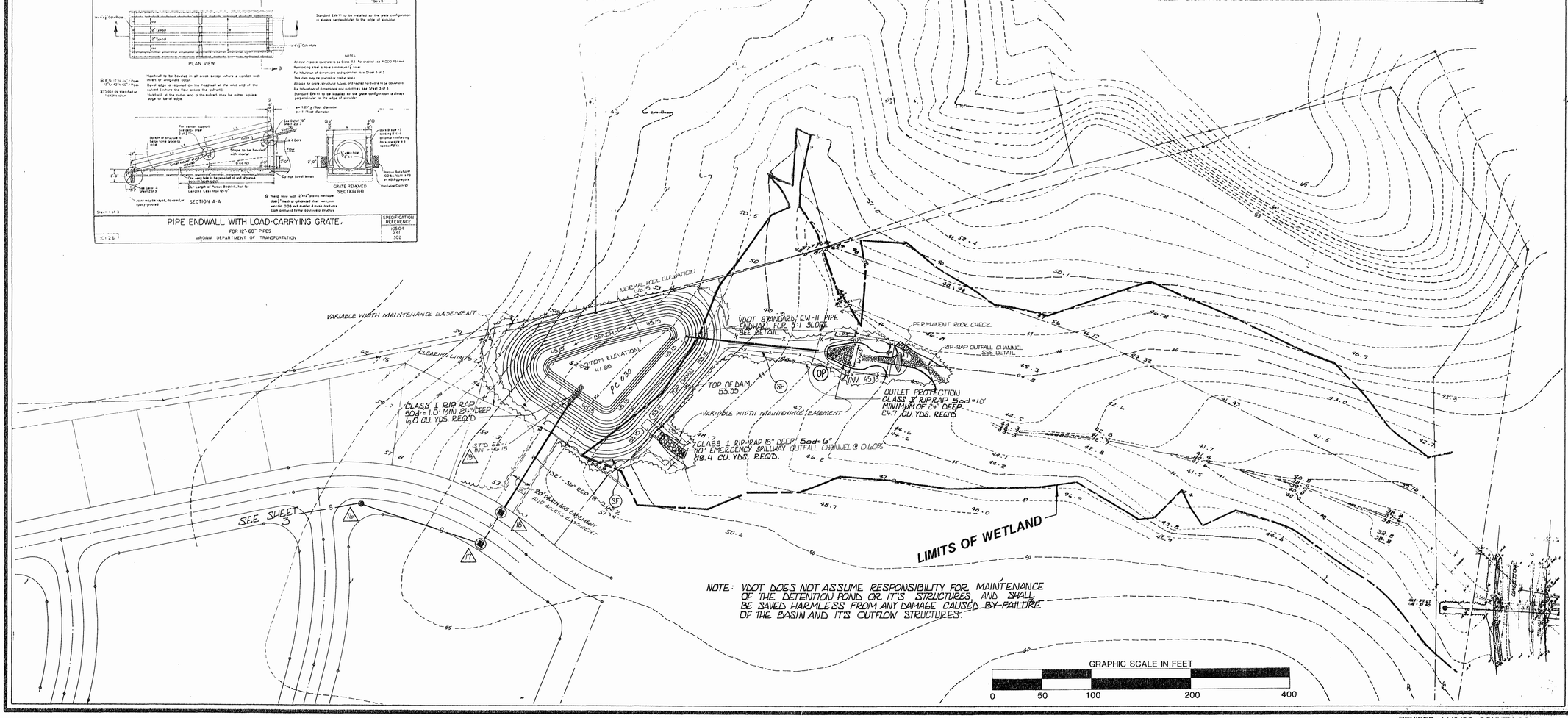


PIPE SIZE	3 : 1 SLOPE								
	H			W	PIPE O.D.	% PIPE REQ'D	PIPE GRATE		
12"	1'-4"±0"		5'-6"	2'-0"	3 1/2"	1	6'-9 1/2"		
15"or18"	2'-4 1/2"		7'-1 1/2"	2'-0"	3 1/2"	1	8'-6 1/4"		
21"or24"	2'-11"		8'-9"	3'-0"	3 1/2"	2	10'-2 3/4"		
27"or30"	3'-5 1/2"		10'-4 1/2"	3'-0"	3 1/2"	2	11'-11 1/4"		
33"or36"	4'-0"		12'-0"	4'-0"	4	3	13'-7 3/4"		
42"	4'-6 1/2"		13'-7 1/2"	4'-0"	4"	3	15'-4 1/4"		
48"	5'-1"		15'-3"	5'-0"	4 1/2"	3	17'-0 1/2"		
54"	5'-7 1/2"		16'-10 1/2"	6'-0"	4 1/2"	4	18'-9 1/2"		
60"	6'-2"		18'-6"	6'-0"	4 1/2"	4	20'-6"		

PIPE SIZE	APPROXIMATE QUANTITIES											
	3 : 1				4 : 1				6 : 1			
	CONCRETE CU. YDS.		LBS. REINF. STEEL	PIPE SIZE	CONCRETE CU. YDS.		LBS. REINF. STEEL	PIPE SIZE	CONCRETE CU. YDS.		LBS. REINF. STEEL
	CONC. PIPE	C.M. PIPE			CONC. PIPE	C.M. PIPE			CONC. PIPE	C.M. PIPE	
12"	.95	.97	240	12"	1.17	1.18	308	12"	1.64	1.66	1443
15"or18"	1.27	1.29	328	15"or18"	1.59	1.61	425	15"or18"	2.28	2.31	618
21"or24"	2.20	2.35	483	21"or24"	2.44	2.49	628	21"or24"	3.55	3.59	917
27"or30"	2.38	2.44	608	27"or30"	3.01	3.01	788	27"or30"	4.35	4.41	1157
33"or36"	3.28	3.38	809	33"or36"	4.20	4.29	1059	33"or36"	6.01	6.09	1556
42"	6.27	6.46	1050	42"	8.05	8.22	1368	42"	11.59	11.76	1997
48"	8.07	8.29	1327	48"	10.29	10.50	1647	48"	14.84	15.04	2514
54"	10.02	10.29	1612	54"	12.80	13.06	2105	54"	18.47	18.73	3094
60"	11.18	11.50	1826	60"	14.36	14.68	2391	60"	20.82	21.14	3517







COMMONWEALTH OF VIRGINIA
JOHN L. HUTCHERSON
No. 7753
CERTIFIED PROFESSIONAL ENGINEER

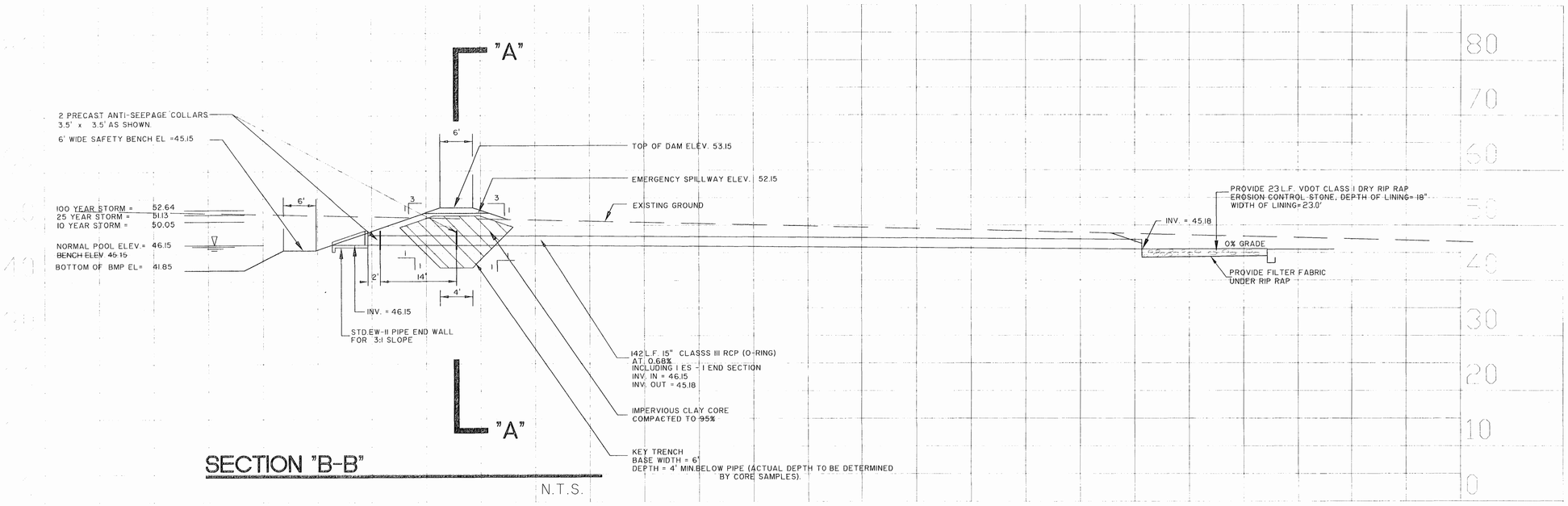
Langley and McDonald, P.C.
Engineers • Surveyors • Planners
Landscape Architects • Environmental Consultants
WILLIAMSBURG
VIRGINIA BEACH

DES.	WFB
DWN.	EEE
CHK.	CRO
DATE	10/12/95

BMP LOCATION
SpringHill
PHASE II
FOR
SPRINGHILL DEVELOPMENT COMPANY
JAMES CITY COUNTY, VIRGINIA

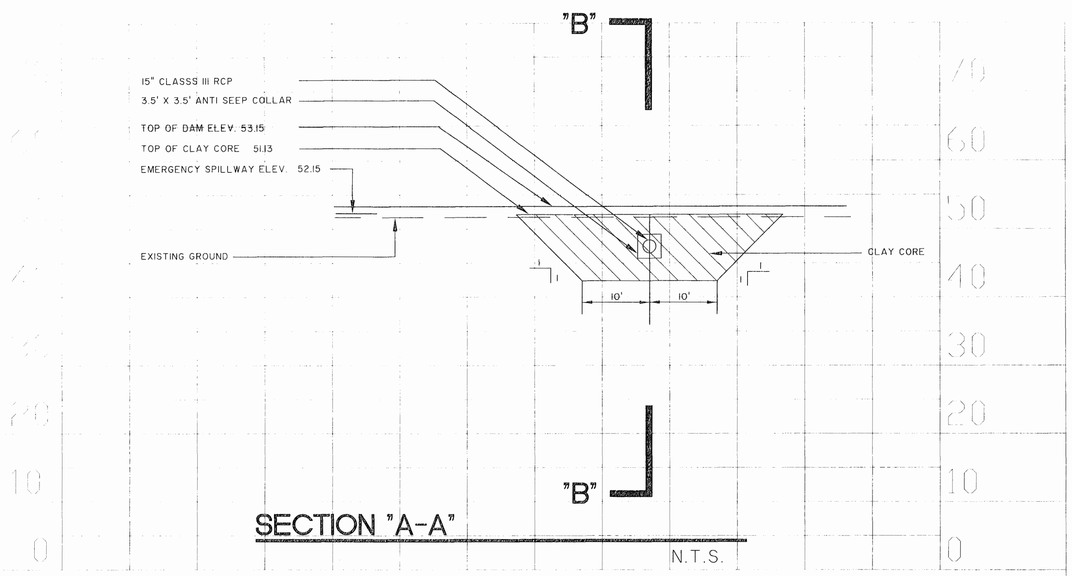
SHEET	14A OF 14
DISK	
PROJ. NO.	93039 19
DWG.	5618W

REVISED: 11/8/95 COUNTY COMMENTS
REVISED: 1/8/96 PER COUNTY COMMENTS



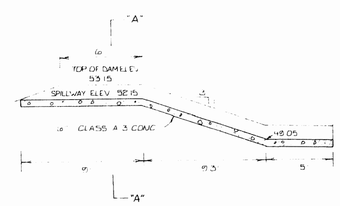
SECTION "B-B"

N.T.S.



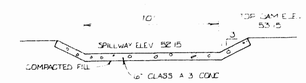
SECTION "A-A"

N.T.S.



EMERGENCY SPILLWAY DETAIL

N.T.S.



SECTION A-A

N.T.S.

COMMONWEALTH OF VIRGINIA
JOHN L. HUTCHERSON
No. 7753
CERTIFIED PROFESSIONAL ENGINEER

Langley and McDonald, P.C.
Engineers • Surveyors • Planners
Landscape Architects • Environmental Consultants
WILLIAMSBURG
VIRGINIA BEACH

DES.	WFB
DWN.	
CHK.	CRO
DATE	1/8/96

BMP DETAIL SHEET
of
Springhill
PHASE II
SPRINGHILL DEVELOPMENT COMPANY
JAMES CITY COUNTY, VIRGINIA

PROJ.NO.	93039-19
SCALE:	
SHEET	14B OF 14
DWG. NO.	

PLAT S-12-01

TAIL

EXCLUSIVE 10' SEMENT TO JCSA YPICAL FOR LOTS 9, 120, 121, 156, 141, & 142)

THE COORDINATES SHOWN ON THIS PLAT ARE REFERENCED TO VIRGINIA STATE PLANE COORDINATES SOUTH ZONE (NAD83), IN U.S. SURVEY FEET, BASED ON JAMES CITY COUNTY MONUMENT STATION NO. 322.

N/F
CHARLES NEW
(P.B. 6 PG. 31)
D.B. 28 PG. 293)

No building may be closer than 35 feet to property outside the residential cluster development.

20' BLDG SETBACK

24" OAK/CHOP

30" OAK/CHOP

10' DRAINAGE EASEMENT

BMP PC 030

LIMITS OF WETLANDS

OPEN SPACE EASEMENT
10.4906 AC

MATCHLINE SEE SHEET 2

NOTE: THIS AMENDED PLAT SERVES ONLY TO CHANGE THE NAME EARL LEE COVE. (PURSUANT TO A RESOLUTION ADOPTED B OF JAMES CITY COUNTY, VIRGINIA, DATED DEC. 19, 2000) A CALLED FOR IN NOTE 8 AND TO ADD NOTE 19 REGARDING THE AFOREMENTIONED NOTE NO. 8.

PHASE III

TEAKWOOD DRIVE (50' R/W)

TEAKWOOD LANE (50' R/W)

LOT 113 0.1305 AC.
LOT 114 0.1283 AC.
LOT 115 0.1224 AC.
LOT 116 0.1413 AC.
LOT 117 0.1488 AC.
LOT 118 0.1469 AC.
LOT 119 0.1725 AC.
LOT 120 0.1487 AC.
LOT 121 0.1421 AC.
LOT 122 0.1411 AC.
LOT 123 0.1255 AC.
LOT 124 0.1291 AC.
LOT 139 0.1566 AC.
LOT 140 0.1564 AC.
LOT 141 0.1502 AC.
LOT 142 0.2366 AC.
LOT 143 0.2354 AC.
LOT 144 0.1787 AC.
LOT 145 0.1535 AC.
LOT 146 0.1478 AC.
LOT 152 0.1665 AC.
LOT 153 0.1876 AC.
LOT 154 0.1898 AC.
LOT 155 0.1866 AC.
LOT 156 0.1430 AC.
LOT 157 0.1448 AC.
LOT 158 0.1409 AC.
LOT 159 0.1299 AC.
LOT 160
LOT 186 0.1342 AC.
LOT 187 0.1392 AC.
LOT 188 0.1496 AC.
LOT 189 0.1458 AC.
LOT 190 0.1276 AC.

VARIABLE WIDTH DRAINAGE EASEMENT

VARAIBLE WIDTH DRAINAGE EASEMENT

20' DRAINAGE EASEMENT

20' DRAINAGE & INGRESS/EGRESS EASEMENT

10' DRAINAGE EASEMENT

UTILITY ESM'T TO BE DEDICATED TO JCSA, TYP. SEE EASEMENT DETAIL.

PHASE IV
OPEN SPACE
0.7822 AC

20 DRAINAGE EASEMENT TO

PHASE II
D.B. 821 PG. 590
D.B. 821 PG. 69

THE COORDINATES SHOWN ON THIS PLAT ARE REFERENCED TO VIRGINIA STATE PLANE COORDINATES SOUTH ZONE (NAD83), IN U.S. SURVEY FEET, BASED ON JAMES CITY COUNTY MONUMENT STATION NO. 322.

N/F
CHARLES NEW
(P.B. 6 PG. 31)
D.B. 28 PG. 293)

No building may be closer than 35 feet to property outside the residential cluster development.

OPEN SPACE EASEMENT
10.4906 AC

NOTE: THIS AMENDED PLAT SERVES ONLY TO CHANGE THE NAME OF AMBER EARL LEE COVE. (PURSUANT TO A RESOLUTION ADOPTED BY THE BOA OF JAMES CITY COUNTY, VIRGINIA, DATED DEC. 19, 2000) AND TO CO CALLED FOR IN NOTE 8 AND TO ADD NOTE 19 REGARDING THE EASEM THE AFOREMENTIONED NOTE NO. 8.

PHASE III

PHASE IV
OPEN SPACE
0.7822 AC

TEAKWOOD DRIVE (50' R/W)

TEAKWOOD LANE (50' R/W)

LOT 113 0.1305 AC.
LOT 114 0.1283 AC.
LOT 115 0.1224 AC.
LOT 116 0.1413 AC.
LOT 117 0.1488 AC.
LOT 118 0.1469 AC.
LOT 119 0.1725 AC.
LOT 120 0.1487 AC.
LOT 121 0.1421 AC.
LOT 122 0.1411 AC.
LOT 123 0.1255 AC.
LOT 124
LOT 139 0.1566 AC.
LOT 140 0.1564 AC.
LOT 141 0.1502 AC.
LOT 142 0.2366 AC.
LOT 143 0.2354 AC.
LOT 144 0.1787 AC.
LOT 145 0.1535 AC.
LOT 154 0.1898 AC.
LOT 155 0.1866 AC.
LOT 156 0.1430 AC.
LOT 157 0.1448 AC.
LOT 158 0.1409 AC.
LOT 159 0.1299 AC.
LOT 160
LOT 16
LOT 170
LOT 187 0.1392 AC.
LOT 188 0.1496 AC.
LOT 189 0.1458 AC.
LOT 190 0.1276 AC.
LOT 186
LOT 72
LOT 112
LOT 111
LOT 110

LIMITS OF WETLANDS

MATCHLINE SEE SHEET 2

UTILITY ESM'T TO BE DEDICATED TO JCSA, TYP. SEE EASEMENT DETAIL.

VARIABLE WIDTH DRAINAGE EASEMENT

20' DRAINAGE EASEMENT

10' DRAINAGE EASEMENT

20' DRAINAGE & INGRESS/EGRESS EASEMENT

10' BLDG SETBACK

20' BLDG SETBACK

24" OAK/CHOP

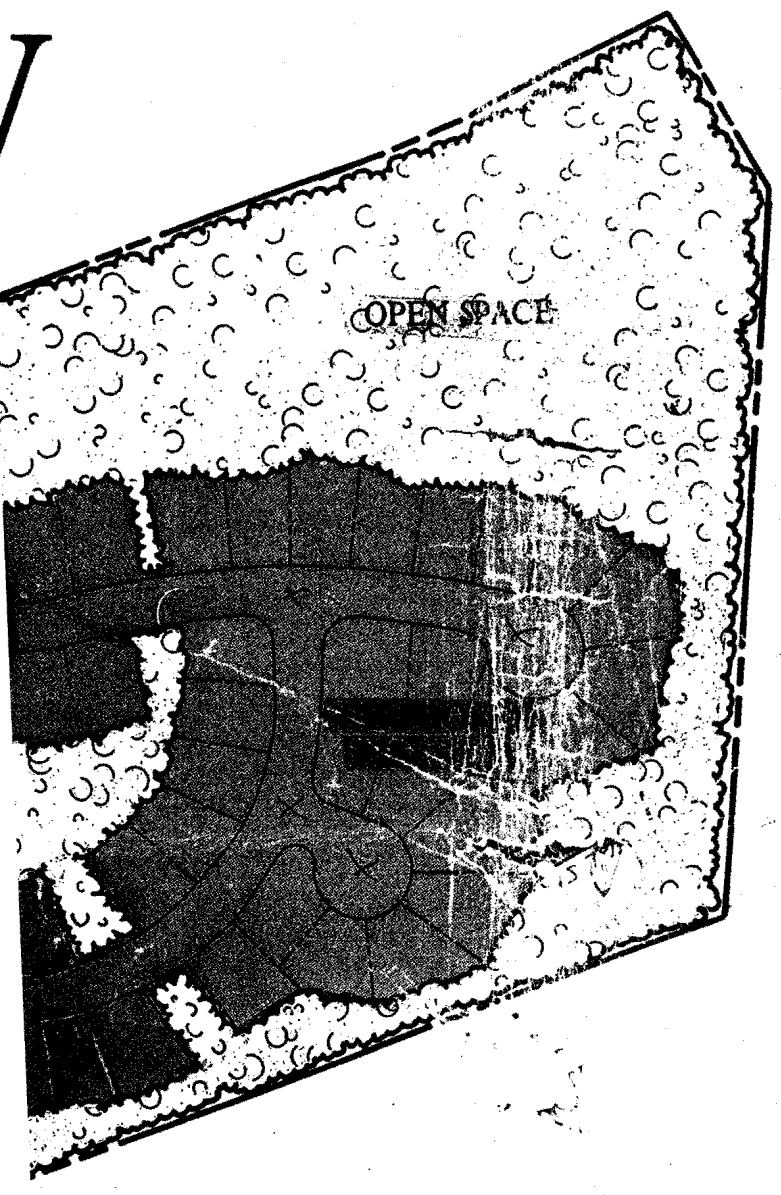
30" OAK/CHOP

COMMONWEALTH OF VIRGINIA
6-24-98
STEPHEN A. ROMEO
No. 14488
LAND SURVEYOR

COUNTY OF JAMES CITY
FINAL SUBDIVISION

APPROVALS	DATE
Fire Chief	
Health Dept.	
VDOT	
Planning	
Environ	
JCSA	
County Eng.	
REA	
Other	

S-56-98

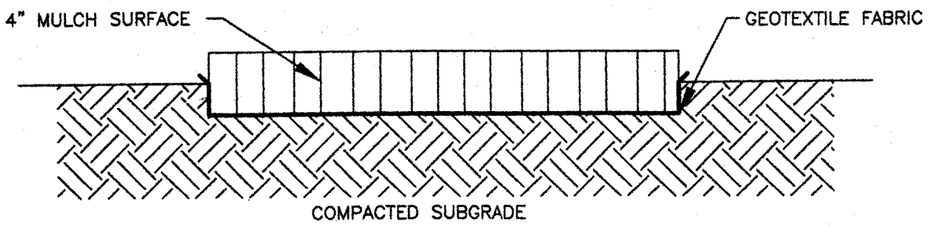


SEQUENCE OF CONSTRUCTION

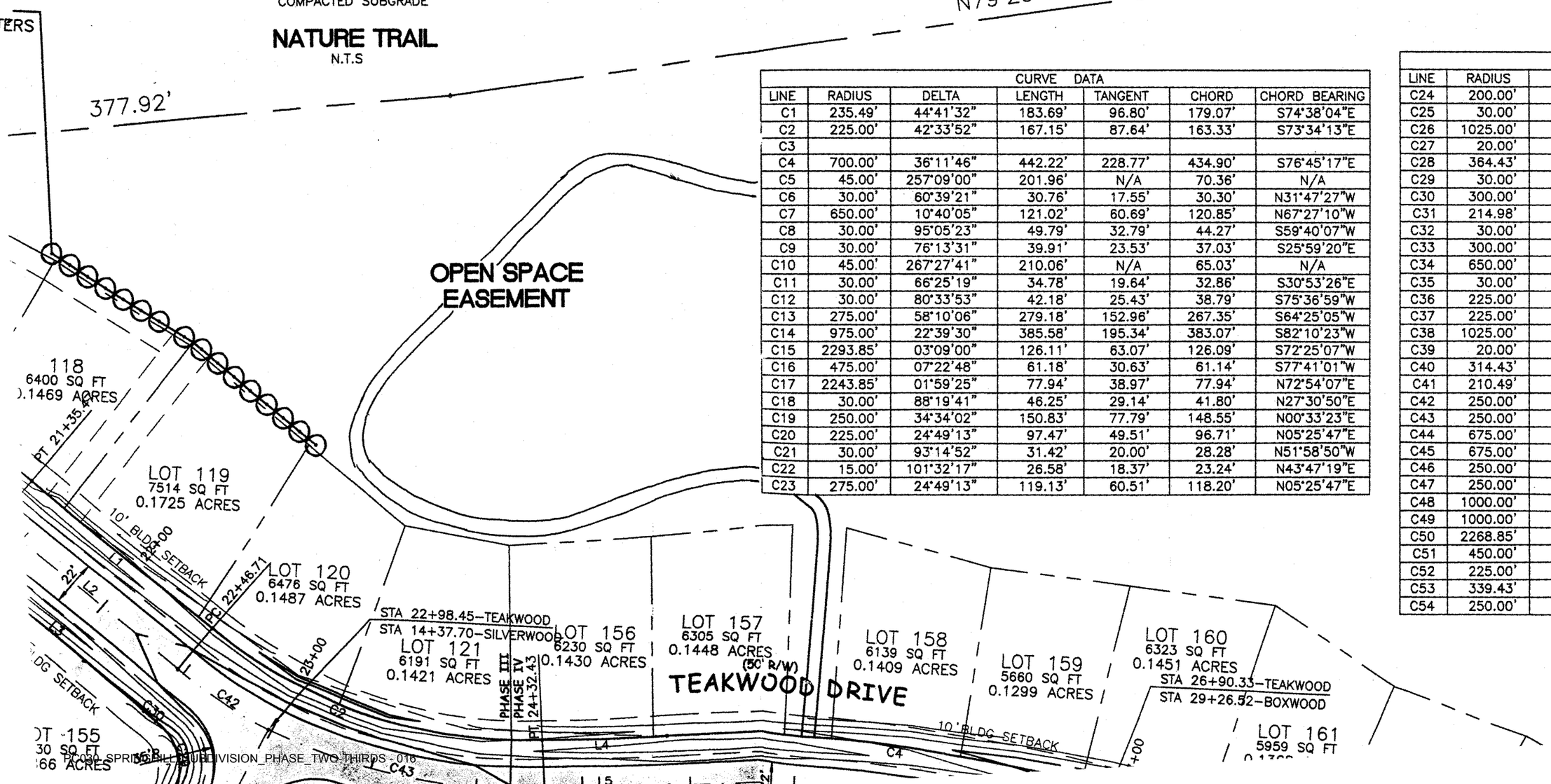
1. FLAG LIMITS OF CLEARING AND INSTALL SILT FENCE AT PERIMETER OF WORK AREA AS INDICATED OR AS OTHERWISE NECESSARY TO PREVENT SEDIMENT FROM MIGRATING TO ADJACENT AREAS.
2. INSTALL CONSTRUCTION ENTRANCE AT TEAKWOOD DRIVE.
3. INSTALL TEMPORARY CMP RISER IN EXISTING B.M.P. POND AND LOWER BOTTOM OF POND TO ELEVATION 41:00.
4. CONTRACTOR MUST CONSTRUCT A FILL DIVERSION DIKE ALONG THE NORTH SIDE OF TEAKWOOD DRIVE FORM STATION 21+00 TO STATION 27+25. THIS DIKE WILL REMAIN IN PLACE TO FORM THE FILL FOR THE ROAD SIDE DITCH ALONG THIS SECTION OF ROADWAY (SEE TYPICAL SECTION SHEET 9 OF 11). A SILT FENCE MUST BE INSTALLED ALONG THE TOE OF THIS FILL SLOPE.
5. CONTRACTOR MUST CONSTRUCT A FILL DIVERSION DIKE ALONG THE SOUTH SIDE OF BOXWOOD LANE FROM STATION 19+50 TO STATION 25+75. THIS DIKE WILL REMAIN IN PLACE TO FORM THE FILL FOR THE ROAD SIDE DITCH ALONG THIS SECTION OF ROADWAY (SEE TYPICAL SECTION SHEET 9 OF 11). A SILT FENCE MUST BE INSTALLED ALONG THE TOE OF THIS FILL SLOPE.
6. CLEAR AND GRUB ALL PROPOSED ROADS, DRAINAGE AND UTILITY EASEMENT.
7. INSTALL STORM SEWERS, INLET AND ROADSIDE DITCHES. STORM SEWERS MUST BE USED TO DIVERT SILT LADEN DRAINAGE INTO EXISTING B.M.P. POND. INSTALL INLET PROTECTION DEVICES AT ALL INLETS.
8. BRING ROADS TO SUBGRADE AND INSTALL UTILITIES.
9. CLEAN AND REMOVE ALL SEDIMENT AND DEBRIS FROM SEDIMENT BASIN AND INLET PROTECTION DEVICES AS REQUIRED.
10. COMPLETE CONSTRUCTION OF UTILITIES, GRADING ACTIVITIES AND ROADS.
11. CLEAN AND MAINTAIN ALL INLET PROTECTION DEVICES UNTIL ALL DISTURBED AREAS ARE STABILIZED.
12. AFTER AN ACCEPTABLE AND STABLE GROUND COVER HAS BEEN ESTABLISHED, REMOVE SILT FENCE AND OTHER TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.
13. REMOVE TEMPORARY CMP RISER AND BARREL FROM STORMWATER MANAGEMENT /B.M.P. BASIN, ALSO CLEAN AND REMOVE ALL SEDIMENT AND DEBRIS FROM BASIN. REGRADE BOTTOM TO ELEVATION 41:00 AND SIDE SLOPE AS SHOWN IN DETAIL ON SHEET 7 OF 11.

SHEET INDEX

1. COVER SHEET
2. STATISTICAL DATA SHEET
3. GEOMETRICAL SHEET
4. DRAINAGE & EROSION CONTROL PLAN
5. UTILITY PLAN
6. ROAD PROFILES
7. ROAD PROFILES
8. DETAIL SHEET
9. DETAIL SHEET
10. DRAINAGE AREA MAP
11. EVIRONMENTAL INVENTORY SHEET



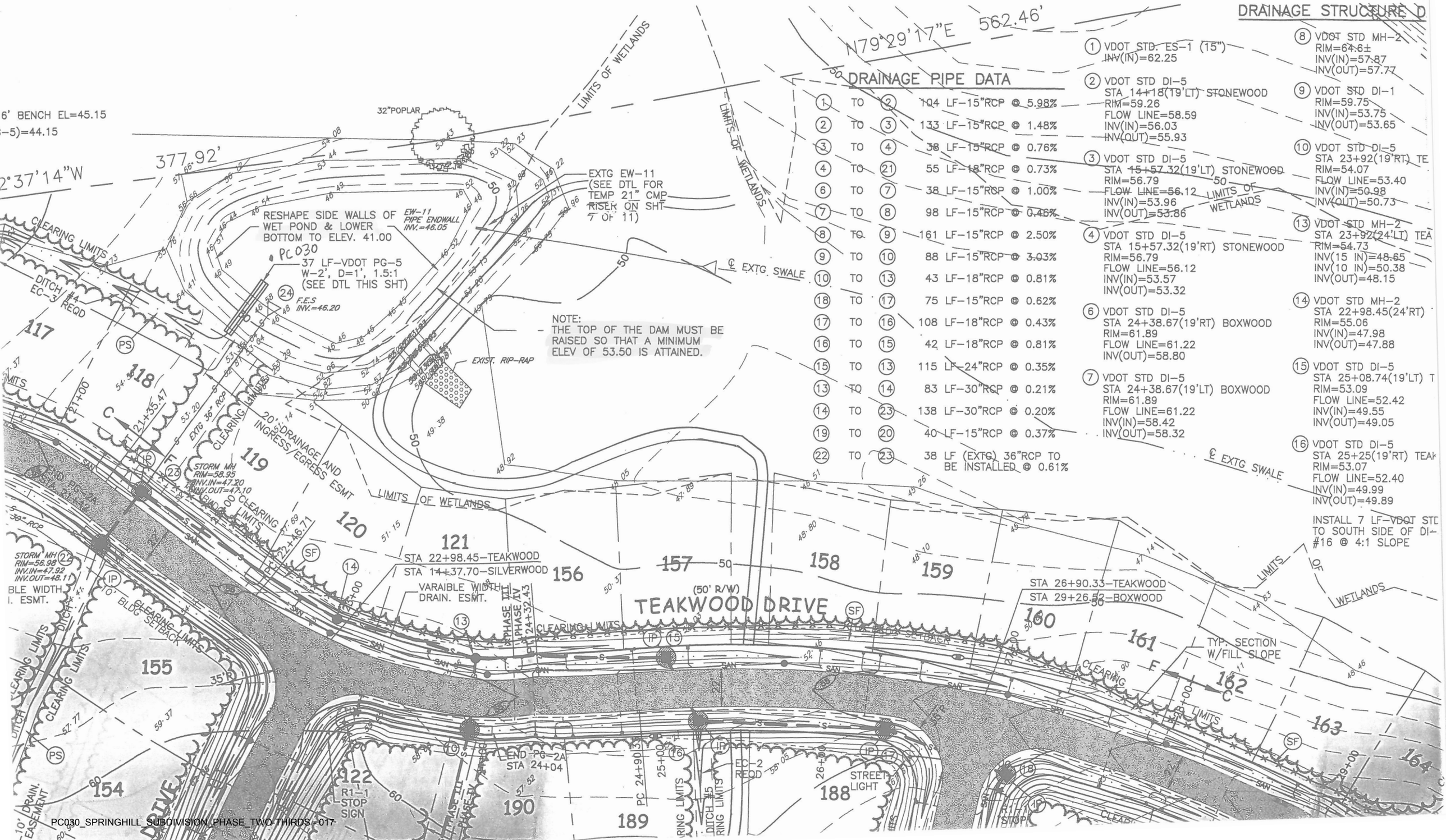
NATURE TRAIL
N.T.S



CURVE DATA						
LINE	RADIUS	DELTA	LENGTH	TANGENT	CHORD	CHORD BEARING
C1	235.49'	44°41'32"	183.69'	96.80'	179.07'	S74°38'04"E
C2	225.00'	42°33'52"	167.15'	87.64'	163.33'	S73°34'13"E
C3						
C4	700.00'	36°11'46"	442.22'	228.77'	434.90'	S76°45'17"E
C5	45.00'	257°09'00"	201.96'	N/A	70.36'	N/A
C6	30.00'	60°39'21"	30.76'	17.55'	30.30'	N31°47'27"W
C7	650.00'	10°40'05"	121.02'	60.69'	120.85'	N67°27'10"W
C8	30.00'	95°05'23"	49.79'	32.79'	44.27'	S59°40'07"W
C9	30.00'	76°13'31"	39.91'	23.53'	37.03'	S25°59'20"E
C10	45.00'	267°27'41"	210.06'	N/A	65.03'	N/A
C11	30.00'	66°25'19"	34.78'	19.64'	32.86'	S30°53'26"E
C12	30.00'	80°33'53"	42.18'	25.43'	38.79'	S75°36'59"W
C13	275.00'	58°10'06"	279.18'	152.96'	267.35'	S64°25'05"W
C14	975.00'	22°39'30"	385.58'	195.34'	383.07'	S82°10'23"W
C15	2293.85'	03°09'00"	126.11'	63.07'	126.09'	S72°25'07"W
C16	475.00'	07°22'48"	61.18'	30.63'	61.14'	S77°41'01"W
C17	2243.85'	01°59'25"	77.94'	38.97'	77.94'	N72°54'07"E
C18	30.00'	88°19'41"	46.25'	29.14'	41.80'	N27°30'50"E
C19	250.00'	34°34'02"	150.83'	77.79'	148.55'	N00°33'23"E
C20	225.00'	24°49'13"	97.47'	49.51'	96.71'	N05°25'47"E
C21	30.00'	93°14'52"	31.42'	20.00'	28.28'	N51°58'50"W
C22	15.00'	101°32'17"	26.58'	18.37'	23.24'	N43°47'19"E
C23	275.00'	24°49'13"	119.13'	60.51'	118.20'	N05°25'47"E

CURVE DATA				
LINE	RADIUS	DELTA	LENGTH	TANGENT
C24	200.00'	34°36'54"	120.83'	62.32'
C25	30.00'	83°50'58"	43.90'	26.94'
C26	1025.00'	07°43'20"	138.15'	69.18'
C27	20.00'	81°04'43"	28.30'	17.11'
C28	364.43'	27°59'34"	178.05'	90.84'
C29	30.00'	80°24'21"	42.10'	25.35'
C30	300.00'	10°13'01"	53.50'	26.82'
C31	214.98'	40°44'00"	152.84'	79.81'
C32	30.00'	80°24'21"	42.10'	25.35'
C33	300.00'	20°44'19"	108.59'	54.89'
C34	650.00'	11°53'14"	134.86'	67.67'
C35	30.00'	95°05'22"	49.79'	32.79'
C36	225.00'	11°48'53"	46.40'	23.28'
C37	225.00'	69°33'49"	273.18'	156.27'
C38	1025.00'	09°57'33"	178.17'	89.31'
C39	20.00'	95°55'23"	33.48'	22.18'
C40	314.43'	26°00'50"	142.76'	72.63'
C41	210.49'	44°41'32"	164.19'	86.53'
C42	250.00'	11°51'24"	51.73'	25.96'
C43	250.00'	30°42'28"	133.99'	68.65'
C44	675.00'	16°58'35"	200.00'	100.74'
C45	675.00'	16°15'33"	191.55'	96.42'
C46	250.00'	13°46'29"	60.10'	30.20'
C47	250.00'	67°36'13"	294.98'	167.37'
C48	1000.00'	12°36'28"	220.05'	110.47'
C49	1000.00'	10°03'02"	175.42'	87.93'
C50	2268.85'	03°09'00"	124.73'	62.38'
C51	450.00'	03°49'11"	30.00'	15.01'
C52	225.00'	36°59'46"	145.28'	75.28'
C53	339.43'	34°35'08"	204.89'	105.67'
C54	250.00'	24°49'13"	108.30'	55.01'

P:\030_SPRINGHILL SUBDIVISION_PHASE_TWO THIRDS - 016



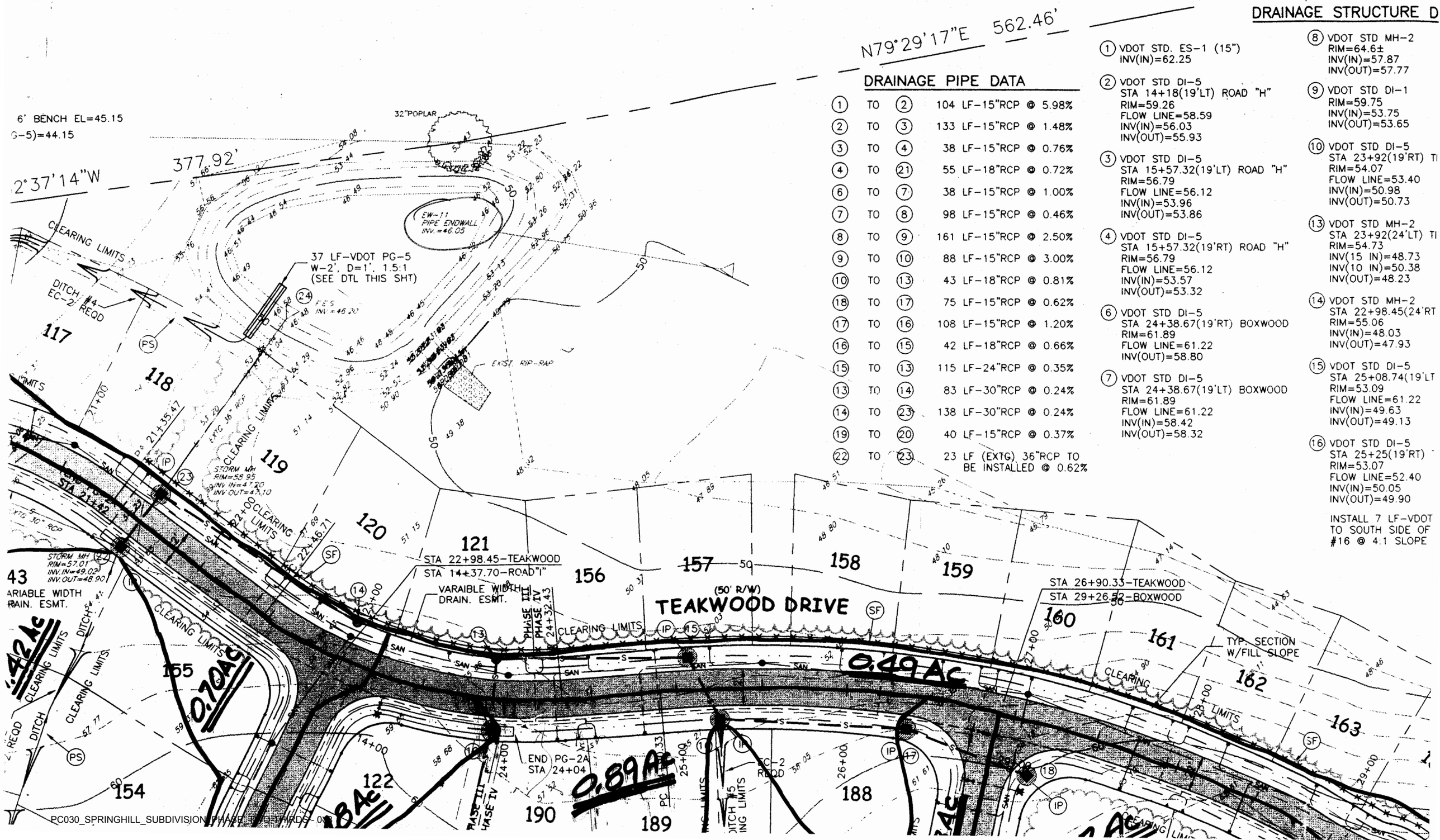
DRAINAGE PIPE DATA

1	TO	2	104 LF-15"RCP @ 5.98%
2	TO	3	133 LF-15"RCP @ 1.48%
3	TO	4	38 LF-15"RCP @ 0.76%
4	TO	21	55 LF-18"RCP @ 0.73%
6	TO	7	38 LF-15"RCP @ 1.00%
7	TO	8	98 LF-15"RCP @ 0.46%
8	TO	9	161 LF-15"RCP @ 2.50%
9	TO	10	88 LF-15"RCP @ 3.03%
10	TO	13	43 LF-18"RCP @ 0.81%
18	TO	17	75 LF-15"RCP @ 0.62%
17	TO	16	108 LF-18"RCP @ 0.43%
16	TO	15	42 LF-18"RCP @ 0.81%
15	TO	13	115 LF-24"RCP @ 0.35%
13	TO	14	83 LF-30"RCP @ 0.21%
14	TO	23	138 LF-30"RCP @ 0.20%
19	TO	20	40 LF-15"RCP @ 0.37%
22	TO	23	38 LF (EXTG) 36"RCP TO BE INSTALLED @ 0.61%

DRAINAGE STRUCTURE D

1. VDOT STD. ES-1 (15")
   INV(IN)=62.25
2. VDOT STD DI-5
   STA 14+18(19'LT) STONEWOOD
   RIM=59.26
   FLOW LINE=58.59
   INV(IN)=56.03
   INV(OUT)=55.93
3. VDOT STD DI-5
   STA 15+57.32(19'LT) STONEWOOD
   RIM=56.79
   FLOW LINE=56.12
   INV(IN)=53.96
   INV(OUT)=53.86
4. VDOT STD DI-5
   STA 15+57.32(19'RT) STONEWOOD
   RIM=56.79
   FLOW LINE=56.12
   INV(IN)=53.57
   INV(OUT)=53.32
6. VDOT STD DI-5
   STA 24+38.67(19'RT) BOXWOOD
   RIM=61.89
   FLOW LINE=61.22
   INV(OUT)=58.80
7. VDOT STD DI-5
   STA 24+38.67(19'LT) BOXWOOD
   RIM=61.89
   FLOW LINE=61.22
   INV(IN)=58.42
   INV(OUT)=58.32
8. VDOT STD MH-2
   RIM=64.6±
   INV(IN)=57.87
   INV(OUT)=57.77
9. VDOT STD DI-1
   RIM=59.75
   INV(IN)=53.75
   INV(OUT)=53.65
10. VDOT STD DI-5
    STA 23+92(19'RT) TE
    RIM=54.07
    FLOW LINE=53.40
    INV(IN)=50.98
    INV(OUT)=50.73
13. VDOT STD MH-2
    STA 23+92(24'LT) TEA
    RIM=54.73
    INV(15 IN)=48.65
    INV(10 IN)=50.38
    INV(OUT)=48.15
14. VDOT STD MH-2
    STA 22+98.45(24'RT)
    RIM=55.06
    INV(IN)=47.98
    INV(OUT)=47.88
15. VDOT STD DI-5
    STA 25+08.74(19'LT) T
    RIM=53.09
    FLOW LINE=52.42
    INV(IN)=49.55
    INV(OUT)=49.05
16. VDOT STD DI-5
    STA 25+25(19'RT) TEAK
    RIM=53.07
    FLOW LINE=52.40
    INV(IN)=49.99
    INV(OUT)=49.89

INSTALL 7 LF-VDOT STD
TO SOUTH SIDE OF DI-
#16 @ 4:1 SLOPE



DRAINAGE PIPE DATA

1	TO	2	104 LF-15"RCP @ 5.98%
2	TO	3	133 LF-15"RCP @ 1.48%
3	TO	4	38 LF-15"RCP @ 0.76%
4	TO	21	55 LF-18"RCP @ 0.72%
6	TO	7	38 LF-15"RCP @ 1.00%
7	TO	8	98 LF-15"RCP @ 0.46%
8	TO	9	161 LF-15"RCP @ 2.50%
9	TO	10	88 LF-15"RCP @ 3.00%
10	TO	13	43 LF-18"RCP @ 0.81%
18	TO	17	75 LF-15"RCP @ 0.62%
17	TO	16	108 LF-15"RCP @ 1.20%
16	TO	15	42 LF-18"RCP @ 0.66%
15	TO	13	115 LF-24"RCP @ 0.35%
13	TO	14	83 LF-30"RCP @ 0.24%
14	TO	23	138 LF-30"RCP @ 0.24%
19	TO	20	40 LF-15"RCP @ 0.37%
22	TO	23	23 LF (EXTG) 36"RCP TO BE INSTALLED @ 0.62%

DRAINAGE STRUCTURE D

(1) VDOT STD. ES-1 (15")
INV(IN)=62.25

(2) VDOT STD DI-5
STA 14+18(19'LT) ROAD "H"
RIM=59.26
FLOW LINE=58.59
INV(IN)=56.03
INV(OUT)=55.93

(3) VDOT STD DI-5
STA 15+57.32(19'LT) ROAD "H"
RIM=56.79
FLOW LINE=56.12
INV(IN)=53.96
INV(OUT)=53.86

(4) VDOT STD DI-5
STA 15+57.32(19'RT) ROAD "H"
RIM=56.79
FLOW LINE=56.12
INV(IN)=53.57
INV(OUT)=53.32

(6) VDOT STD DI-5
STA 24+38.67(19'RT) BOXWOOD
RIM=61.89
FLOW LINE=61.22
INV(OUT)=58.80

(7) VDOT STD DI-5
STA 24+38.67(19'LT) BOXWOOD
RIM=61.89
FLOW LINE=61.22
INV(IN)=58.42
INV(OUT)=58.32

(8) VDOT STD MH-2
RIM=64.6±
INV(IN)=57.87
INV(OUT)=57.77

(9) VDOT STD DI-1
RIM=59.75
INV(IN)=53.75
INV(OUT)=53.65

(10) VDOT STD DI-5
STA 23+92(19'RT) TI
RIM=54.07
FLOW LINE=53.40
INV(IN)=50.98
INV(OUT)=50.73

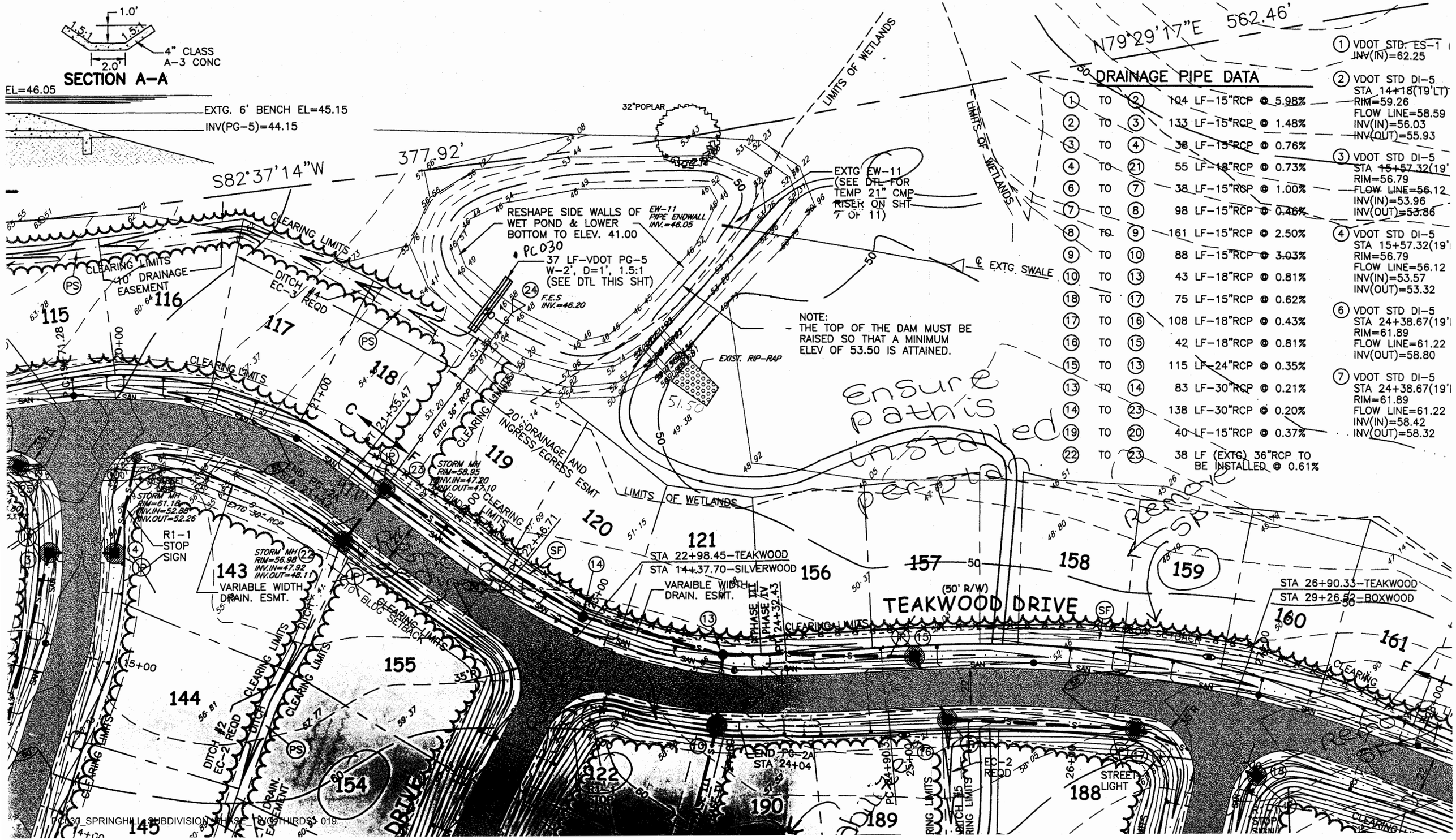
(13) VDOT STD MH-2
STA 23+92(24'LT) TI
RIM=54.73
INV(15 IN)=48.73
INV(10 IN)=50.38
INV(OUT)=48.23

(14) VDOT STD MH-2
STA 22+98.45(24'RT
RIM=55.06
INV(IN)=48.03
INV(OUT)=47.93

(15) VDOT STD DI-5
STA 25+08.74(19'LT
RIM=53.09
FLOW LINE=61.22
INV(IN)=49.63
INV(OUT)=49.13

(16) VDOT STD DI-5
STA 25+25(19'RT)
RIM=53.07
FLOW LINE=52.40
INV(IN)=50.05
INV(OUT)=49.90

INSTALL 7 LF-VDOT
TO SOUTH SIDE OF
#16 @ 4:1 SLOPE



DRAINAGE PIPE DATA

1	TO	2	104 LF-15"RCP @ 5.98%	
2	TO	3	133 LF-15"RCP @ 1.48%	
3	TO	4	38 LF-15"RCP @ 0.76%	
4	TO	21	55 LF-18"RCP @ 0.73%	
6	TO	7	38 LF-15"RCP @ 1.00%	
7	TO	8	98 LF-15"RCP @ 0.46%	
8	TO	9	161 LF-15"RCP @ 2.50%	
9	TO	10	88 LF-15"RCP @ 3.03%	
10	TO	13	43 LF-18"RCP @ 0.81%	
18	TO	17	75 LF-15"RCP @ 0.62%	
17	TO	16	108 LF-18"RCP @ 0.43%	
16	TO	15	42 LF-18"RCP @ 0.81%	
15	TO	13	115 LF-24"RCP @ 0.35%	
13	TO	14	83 LF-30"RCP @ 0.21%	
14	TO	23	138 LF-30"RCP @ 0.20%	
19	TO	20	40 LF-15"RCP @ 0.37%	
22	TO	23	38 LF (EXTG) 36"RCP TO BE INSTALLED @ 0.61%	

1. VDOT STD. ES-1 INV(IN)=62.25
2. VDOT STD DI-5 STA 14+18(19'LT) RIM=59.26 FLOW LINE=58.59 INV(IN)=56.03 INV(OUT)=55.93
3. VDOT STD DI-5 STA 15+57.32(19' RIM=56.79 FLOW LINE=56.12 INV(IN)=53.96 INV(OUT)=53.86
4. VDOT STD DI-5 STA 15+57.32(19' RIM=56.79 FLOW LINE=56.12 INV(IN)=53.57 INV(OUT)=53.32
6. VDOT STD DI-5 STA 24+38.67(19' RIM=61.89 FLOW LINE=61.22 INV(OUT)=58.80
7. VDOT STD DI-5 STA 24+38.67(19' RIM=61.89 FLOW LINE=61.22 INV(IN)=58.42 INV(OUT)=58.32

IMMEDIATELY STABILIZED (I.E., THE SAME DAY).

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 SPECIFICATION 3.35. 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 SPECIFICATION 3.32, PERMANENT SEEDING. 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 BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.

14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.

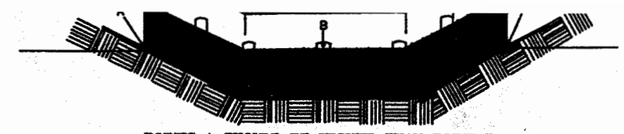
15. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.

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

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. AS-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER JUDGEMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.

Sheet 9 of Approved plan.



POINTS A SHOULD BE HIGHER THAN POINT B.

DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

PLATE 3.05-2

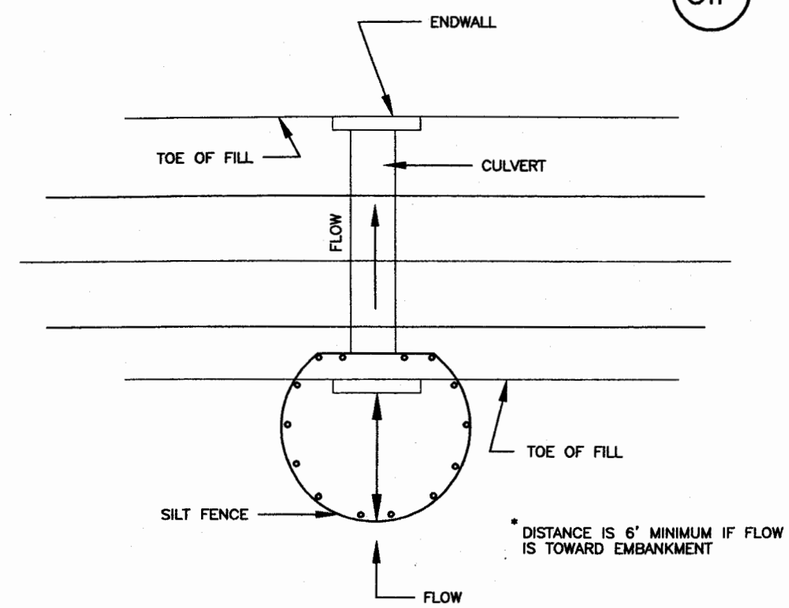
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE.

PLATE.

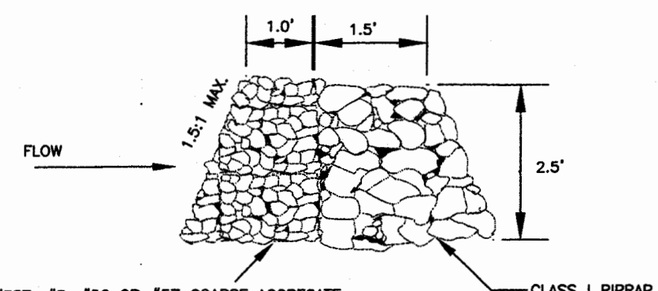
SILT FENCE CULVERT INLET PROTECTION

CIP



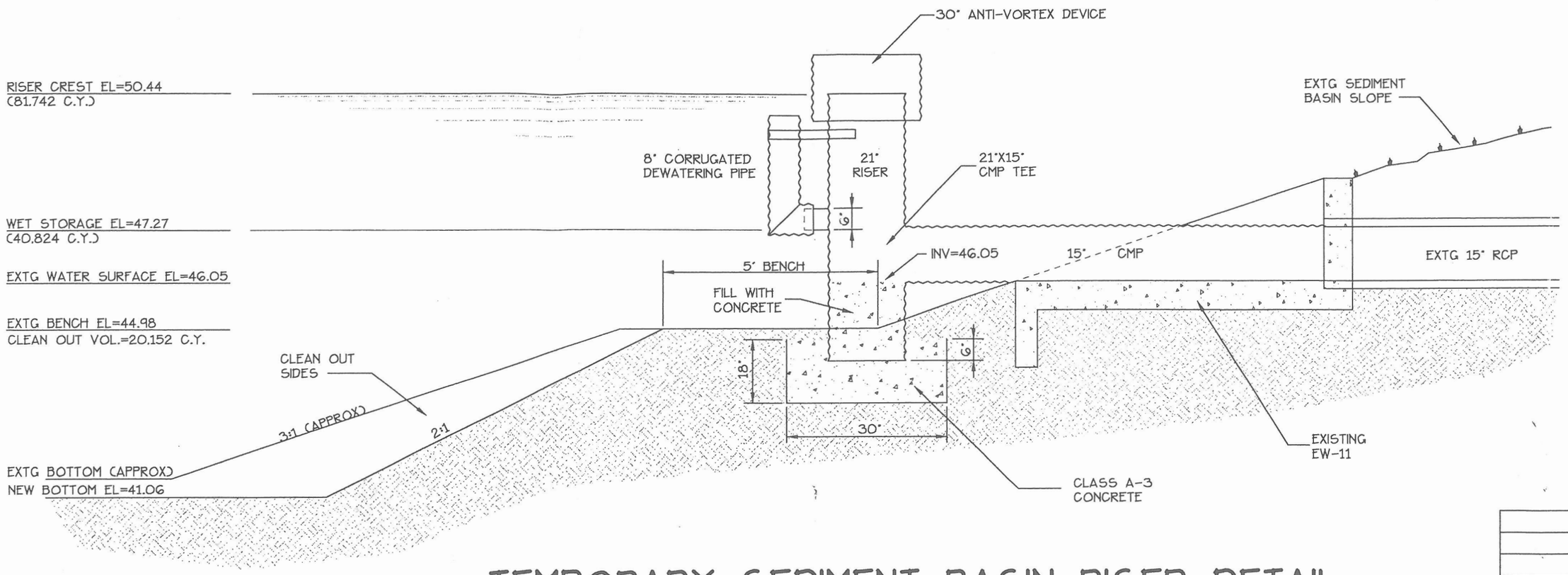
EXISTING GRADE
CUT SECTION

*OPTIONAL STONE COMBINATION



*VDOT #3, #357, #5, #56 OR #57 COARSE AGGREGATE TO REPLACE SILT FENCE IN " HORSESHOE " WHEN HIGH VELOCITY OF FLOW IS EXPECTED

PLATE. 3.08-1



TEMPORARY SEDIMENT BASIN RISER DETAIL

N.T.S.

TSB Mode
ONLY.

MARK	
	GENERAL REVISION PE
	GENERAL REVISION PE

ONTRACTOR TO PROVIDE JOINT RESTRAINT PER INDUSTRY STANDARD FOR ALL WATER LINES. SHOULD FIELD CONDITIONS DIFFER FROM "CL" SOILS TYPE & TYPE 3 TRENCHING, USE 150 PSI TEST

MAR 1999
RECEIVED
PLANNING DEPARTMENT

COMMONWEALTH OF VIRGINIA
6-24-98
STEPHEN A. ROMEO
No. 14484B
LAND SURVEYOR

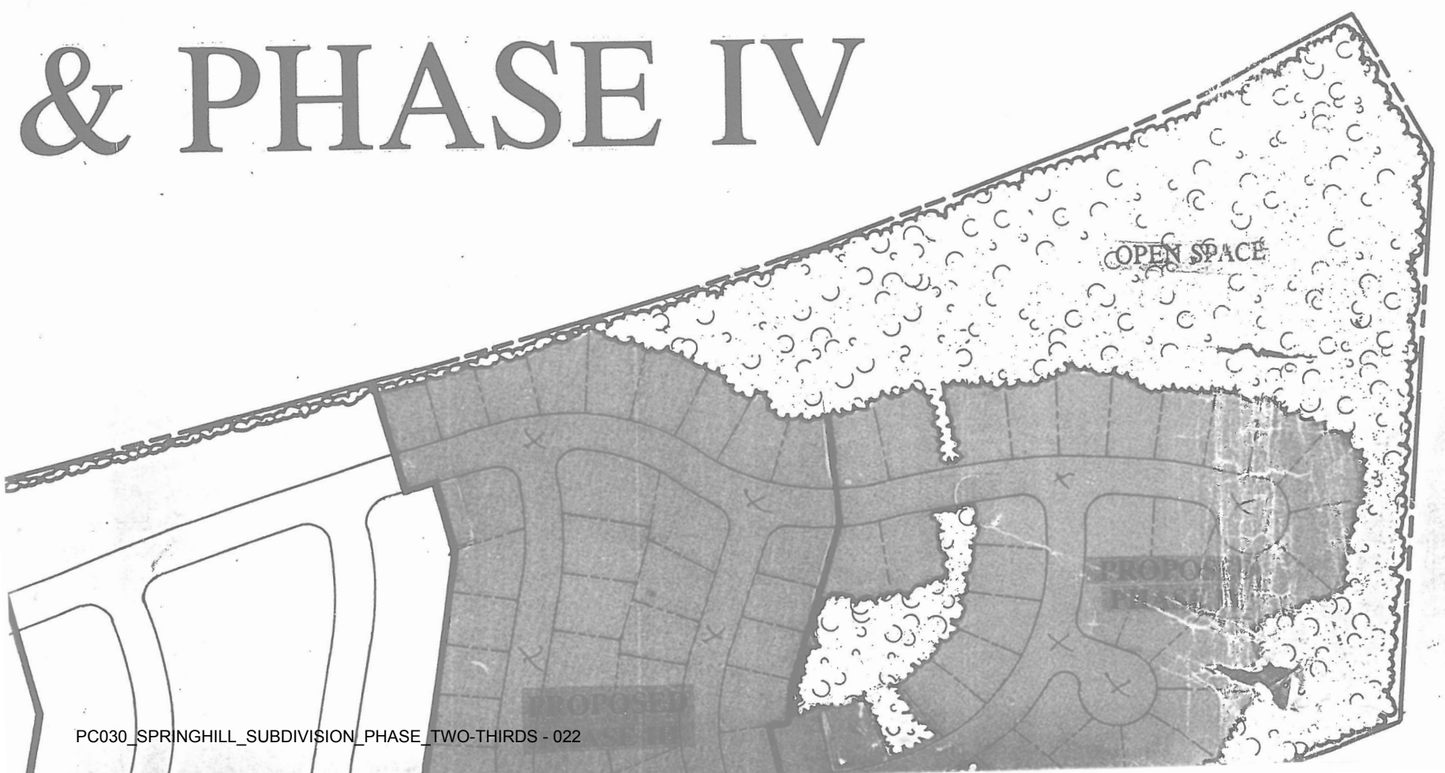
COUNTY OF JAMES CITY
FINAL SUBDIVISION

APPROVALS	DATE
Fire Dept.	
Health Dept.	
VDOT	
Planning	
Environ	
JCSA	
County Eng.	
REA	
Other	

S-56-98

TAKEN FROM SPRINGHILL PHASE 3+4
"MINOR MODIFICATION proposed TO BMP"

& PHASE IV



SEQUENCE OF CONSTRUCTION

1. FLAG LIMITS OF CLEARING AND INSTALL SILT FENCE AT PERIMETER OF WORK AREA AS INDICATED OR AS OTHERWISE NECESSARY TO PREVENT SEDIMENT FROM MIGRATING TO ADJACENT AREAS.
2. INSTALL CONSTRUCTION ENTRANCE AT TEAKWOOD DRIVE.
3. INSTALL TEMPORARY CMP RISER IN EXISTING B.M.P. POND AND LOWER BOTTOM OF POND TO ELEVATION 41:00.
4. CONTRACTOR MUST CONSTRUCT A FILL DIVERSION DIKE ALONG THE NORTH SIDE OF TEAKWOOD DRIVE FORM STATION 21+00 TO STATION 27+25. THIS DIKE WILL REMAIN IN PLACE TO FORM THE FILL FOR THE ROAD SIDE DITCH ALONG THIS SECTION OF ROADWAY (SEE TYPICAL SECTION SHEET 9 OF 11). A SILT FENCE MUST BE INSTALLED ALONG THE TOE OF THIS FILL SLOPE.
5. CONTRACTOR MUST CONSTRUCT A FILL DIVERSION DIKE ALONG THE SOUTH SIDE OF BOXWOOD LANE FROM STATION 19+50 TO STATION 25+75. THIS DIKE WILL REMAIN IN PLACE TO FORM THE FILL FOR THE ROAD SIDE DITCH ALONG THIS SECTION OF ROADWAY (SEE TYPICAL SECTION SHEET 9 OF 11). A SILT FENCE MUST BE INSTALLED ALONG THE TOE OF THIS FILL SLOPE.
6. CLEAR AND GRUB ALL PROPOSED ROADS, DRAINAGE AND UTILITY EASEMENT.
7. INSTALL STORM SEWERS, INLET AND ROADSIDE DITCHES. STORM SEWERS MUST BE USED TO DIVERT SILT LADEN DRAINAGE INTO EXISTING B.M.P. POND. INSTALL INLET PROTECTION DEVICES AT ALL INLETS.
8. BRING ROADS TO SUBGRADE AND INSTALL UTILITIES.
9. CLEAN AND REMOVE ALL SEDIMENT AND DEBRIS FROM SEDIMENT BASIN AND INLET PROTECTION DEVICES AS REQUIRED.
10. COMPLETE CONSTRUCTION OF UTILITIES, GRADING ACTIVITIES AND ROADS.

MAR 1999
RECEIVED
PLANNING DEPARTMENT

COMMONWEALTH OF VIRGINIA
6-24-98
STEPHEN A. ROMEO
No. 14484B
LAND SURVEYOR

COUNTY OF JAMES CITY
FINAL SUBDIVISION

APPROVALS	DATE
Fire Chief	
Health Dept.	
VDOT	
Planning	
Environ	
JCSA	
County Eng.	
REA	
Other	

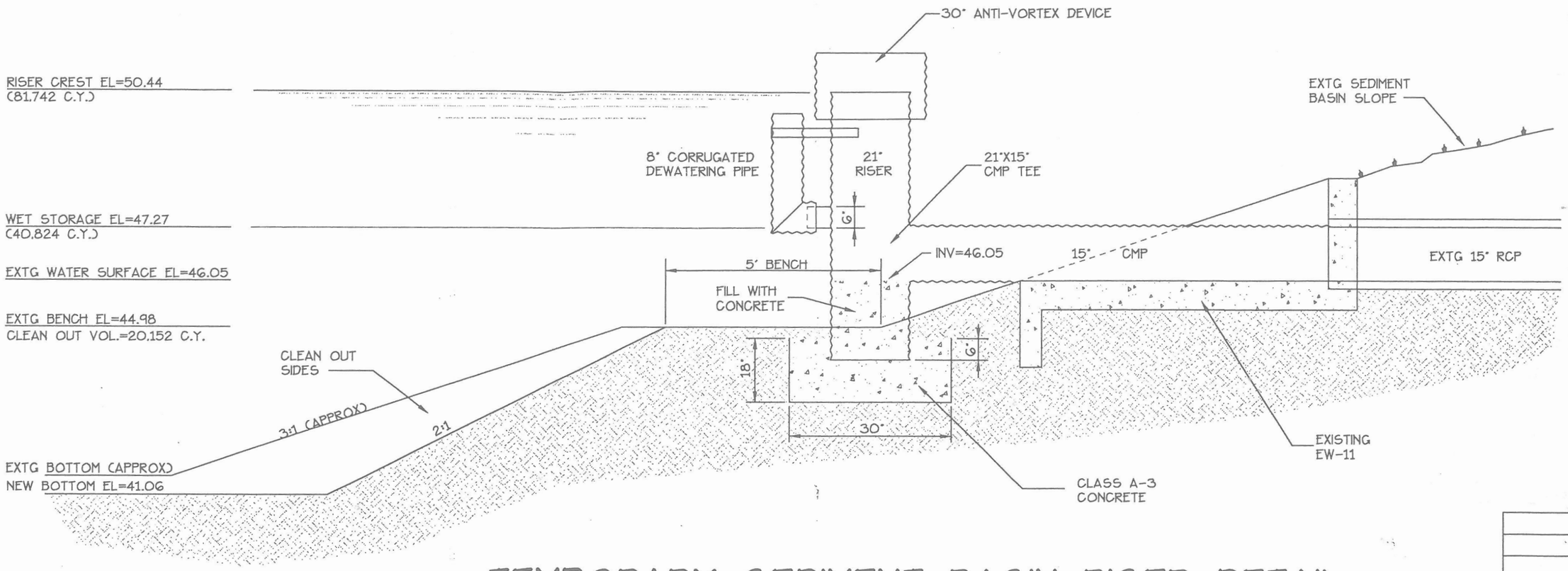
S-56-98

SEQUENCE OF CONSTRUCTION

1. FLAG LIMITS OF CLEARING AND INSTALL SILT FENCE AT PERIMETER OF WORK AREA AS INDICATED OR AS OTHERWISE NECESSARY TO PREVENT SEDIMENT FROM MIGRATING TO ADJACENT AREAS.
2. INSTALL CONSTRUCTION ENTRANCE AT TEAKWOOD DRIVE.
3. INSTALL TEMPORARY CMP RISER IN EXISTING B.M.P. POND AND LOWER BOTTOM OF POND TO ELEVATION 41:00.
4. CONTRACTOR MUST CONSTRUCT A FILL DIVERSION DIKE ALONG THE NORTH SIDE OF TEAKWOOD DRIVE FORM STATION 21+00 TO STATION 27+25. THIS DIKE WILL REMAIN IN PLACE TO FORM THE FILL FOR THE ROAD SIDE DITCH ALONG THIS SECTION OF ROADWAY (SEE TYPICAL SECTION SHEET 9 OF 11). A SILT FENCE MUST BE INSTALLED ALONG THE TOE OF THIS FILL SLOPE.
5. CONTRACTOR MUST CONSTRUCT A FILL DIVERSION DIKE ALONG THE SOUTH SIDE OF BOXWOOD LANE FROM STATION 19+50 TO STATION 25+75. THIS DIKE WILL REMAIN IN PLACE TO FORM THE FILL FOR THE ROAD SIDE DITCH ALONG THIS SECTION OF ROADWAY (SEE TYPICAL SECTION SHEET 9 OF 11). A SILT FENCE MUST BE INSTALLED ALONG THE TOE OF THIS FILL SLOPE.
6. CLEAR AND GRUB ALL PROPOSED ROADS, DRAINAGE AND UTILITY EASEMENT.
7. INSTALL STORM SEWERS, INLET AND ROADSIDE DITCHES. STORM SEWERS MUST BE USED TO DIVERT SILT LADEN DRAINAGE INTO EXISTING B.M.P. POND. INSTALL INLET PROTECTION DEVICES AT ALL INLETS.
8. BRING ROADS TO SUBGRADE AND INSTALL UTILITIES.
9. CLEAN AND REMOVE ALL SEDIMENT AND DEBRIS FROM SEDIMENT BASIN AND INLET PROTECTION DEVICES AS REQUIRED.
10. COMPLETE CONSTRUCTION OF UTILITIES, GRADING ACTIVITIES AND ROADS.
11. CLEAN AND MAINTAIN ALL INLET PROTECTION DEVICES UNTIL ALL DISTURBED AREAS ARE STABILIZED.
12. AFTER AN ACCEPTABLE AND STABLE GROUND COVER HAS BEEN ESTABLISHED, REMOVE SILT FENCE AND OTHER TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.
13. REMOVE TEMPORARY CMP RISER AND BARREL FROM STORMWATER MANAGEMENT /B.M.P. BASIN, ALSO CLEAN AND REMOVE ALL SEDIMENT AND DEBRIS FROM BASIN. REGRADE BOTTOM TO ELEVATION 41:00 AND SIDE SLOPE AS SHOWN IN DETAIL ON SHEET 7 OF 11.

SHEET INDEX

COVER SHEET
STATISTICAL DATA SHEET
GEOMETRICAL SHEET
DRAINAGE & EROSION CONTROL PLAN
UTILITY PLAN
ROAD PROFILES
ROAD PROFILES



TEMPORARY SEDIMENT BASIN RISER DETAIL

N.T.S.

MARK	
	GENERA
	GENERA

NOTE: CONTRACTOR TO PROVIDE JOINT RESTRAINT PER INDUSTRY STANDARD FOR ALL WATER LINES. SHOULD FIELD CONDITIONS DIFFER FROM "CL" SOILS TYPE & TYPE 3 TRENCHING, USE 15

-15"RCP @ 1.20%

-18"RCP @ 0.66%

-24"RCP @ 0.35%

-30"RCP @ 0.24%

-30"RCP @ 0.24%

-15"RCP @ 0.37%

(EXTG) 36"RCP TO
E INSTALLED @ 0.62%

(6) VDOT STD DI-5
STA 24+38.67(19'RT) BOXWOOD
RIM=61.89
FLOW LINE=61.22
INV(OUT)=58.80

(7) VDOT STD DI-5
STA 24+38.67(19'LT) BOXWOOD
RIM=61.89
FLOW LINE=61.22
INV(IN)=58.42
INV(OUT)=58.32

(14) VDOT STD DI-5
STA 22+98.45(24'RT) TEAKWOOD
RIM=55.06
INV(IN)=48.03
INV(OUT)=47.93

(15) VDOT STD DI-5
STA 25+08.74(19'LT) TEAKWOOD
RIM=53.09
FLOW LINE=61.22
INV(IN)=49.63
INV(OUT)=49.13

(16) VDOT STD DI-5
STA 25+25(19'RT) TEAKWOOD
RIM=53.07
FLOW LINE=52.40
INV(IN)=50.05
INV(OUT)=49.90

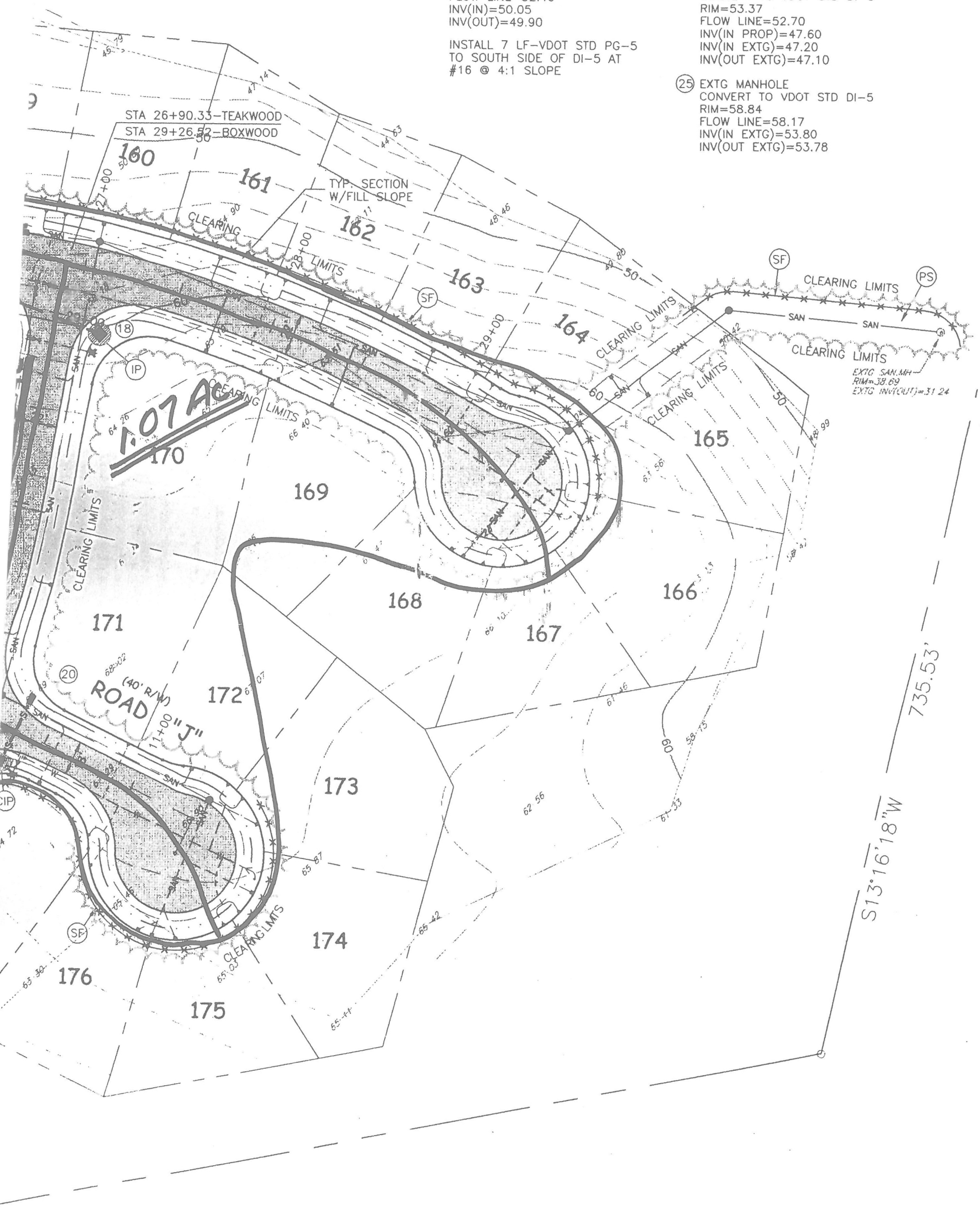
INSTALL 7 LF-VDOT STD PG-5
TO SOUTH SIDE OF DI-5 AT
#16 @ 4:1 SLOPE

(22) EXTG MANHOLE
CONVERT TO VDOT STD DI-5
RIM=53.37
FLOW LINE=52.70
INV(EXTG 30" IN)=49.02
INV(EXTG 36" OUT)=48.80
INV(36"OUT LOWERED)=47.43

INSTALL 10 LF-VDOT STD PG-5
TO SOUTH SIDE OF DI-5 AT
#22 @ 3.00%

(23) EXTG MANHOLE
CONVERT TO VDOT STD DI-5
RIM=53.37
FLOW LINE=52.70
INV(IN PROP)=47.60
INV(IN EXTG)=47.20
INV(OUT EXTG)=47.10

(25) EXTG MANHOLE
CONVERT TO VDOT STD DI-5
RIM=58.84
FLOW LINE=58.17
INV(IN EXTG)=53.80
INV(OUT EXTG)=53.78



1. RIM ELEVATIONS SHOWN ON ALL DI-5 STRUCTURES ARE 0.67 FEET ABOVE THE FLOW LINE OF THE DITCH.

2. USEDI-5 FOR PG-2A (D=8"), TYPE B1. DI-5 GRATES TO BE TYPE III.

3. EC-2 LINING TO BE INSTALLED IN ALL DITCHES THAT ARE NOT PAVED.

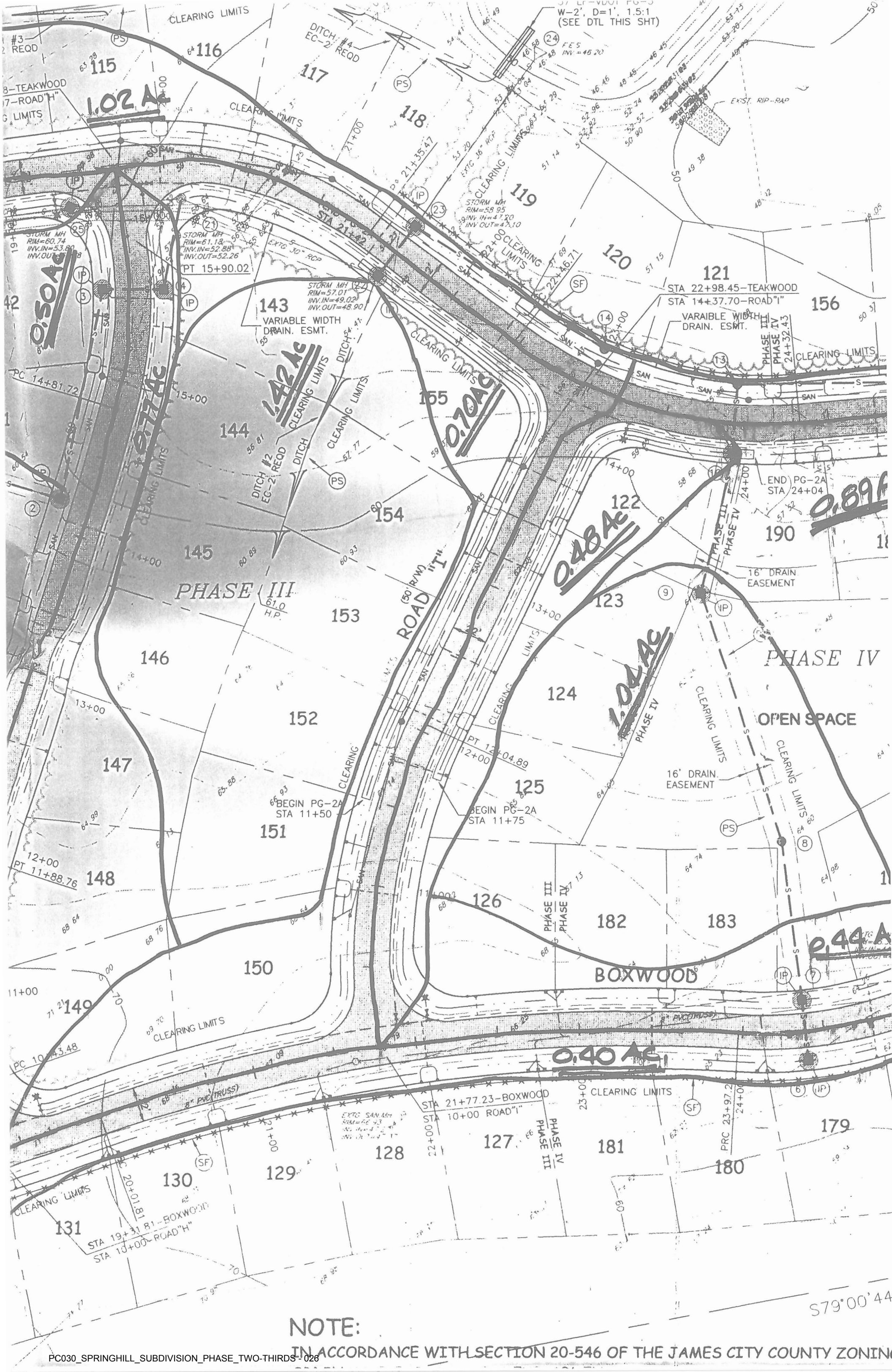
4. SEE DETAIL ON SHEET _ OF _ FOR PLACEMENT OF STORM DRAIN MANHOLES 3.5 FEET FROM THE EDGE OF PAVEMENT TO THE CENTER OF THE MANHOLE TOP.

5. [illegible] PAVEMENT RADII FOR ALL RETURNS AT

Langley and McDonald

DES. WFB

DRAINAGE AREA MAP



NOTE:

IN ACCORDANCE WITH SECTION 20-546 OF THE JAMES CITY COUNTY ZONING

CLEARING LIMITS
DITCH #3
EC-2 REQD
113
114
115
116
STA 19+71.28-TEAKWOOD
STA 16+33.97-ROAD "H"
CLEARING LIMITS
1.02 Ac
0.20 Ac
0.50 Ac
0.77 Ac
1.42 Ac
0.71 Ac
1.14 Ac
142
143
144
141
140
139
138
137
136
135
134
133
132
131
130
129
145
146
147
148
149
150
151
152
153
PHASE III
PHASE II
OAKWOOD DRIVE
ROAD "H"
(50' R/W)
10' DRAIN EASEMENT
DITCH #1
EC-2 REQD
DITCH #2
EC-2 REQD
PT 15+90.02
PC 14+81.72
PT 11+88.76
PC 10+43.48
PCC 17+93.53
BEGIN PG-2A
STA 11+50
STA 19+31.81-BOXWOOD
STA 10+00-ROAD "H"
8" PVC(TRUSS)
WELL (TO BE ABANDONED)
WATER METER
PHONE PED
CABLE PED
VA POWER PAD
YARD DRAIN
PHONE PAD
WATER MAIN
EXTG 21" RCP
STORM MH
RIM=60.74
INV.IN=53.60
INV.OUT=
STORM MH
RIM=61.18
INV.IN=52.88
INV.OUT=52.26
VARIABLE WIDTH
DRAIN. ESMT.
DITCH
SAN
SF
CIP
PS
IP
H.P.

(18) TO (17) 75 LF-15"RCP @ 0.62%

(17) TO (16) 108 LF-15"RCP @ 1.20%

(16) TO (15) 42 LF-18"RCP @ 0.66%

(15) TO (13) 115 LF-24"RCP @ 0.35%

(13) TO (14) 83 LF-30"RCP @ 0.24%

(14) TO (23) 138 LF-30"RCP @ 0.24%

(19) TO (20) 40 LF-15"RCP @ 0.37%

(22) TO (23) 23 LF (EXTG) 36"RCP TO BE INSTALLED @ 0.62%

(6) VDOT STD DI-5
STA 24+38.67(19'RT) BOXWOOD
RIM=61.89
FLOW LINE=61.22
INV(OUT)=58.80

(7) VDOT STD DI-5
STA 24+38.67(19'LT) BOXWOOD
RIM=61.89
FLOW LINE=61.22
INV(IN)=58.42
INV(OUT)=58.32

(14) VDO
STA
RIM
INV(
INV(

(15) VDO
STA
RIM
FLO
INV(
INV(

(16) VDO
STA
RIM
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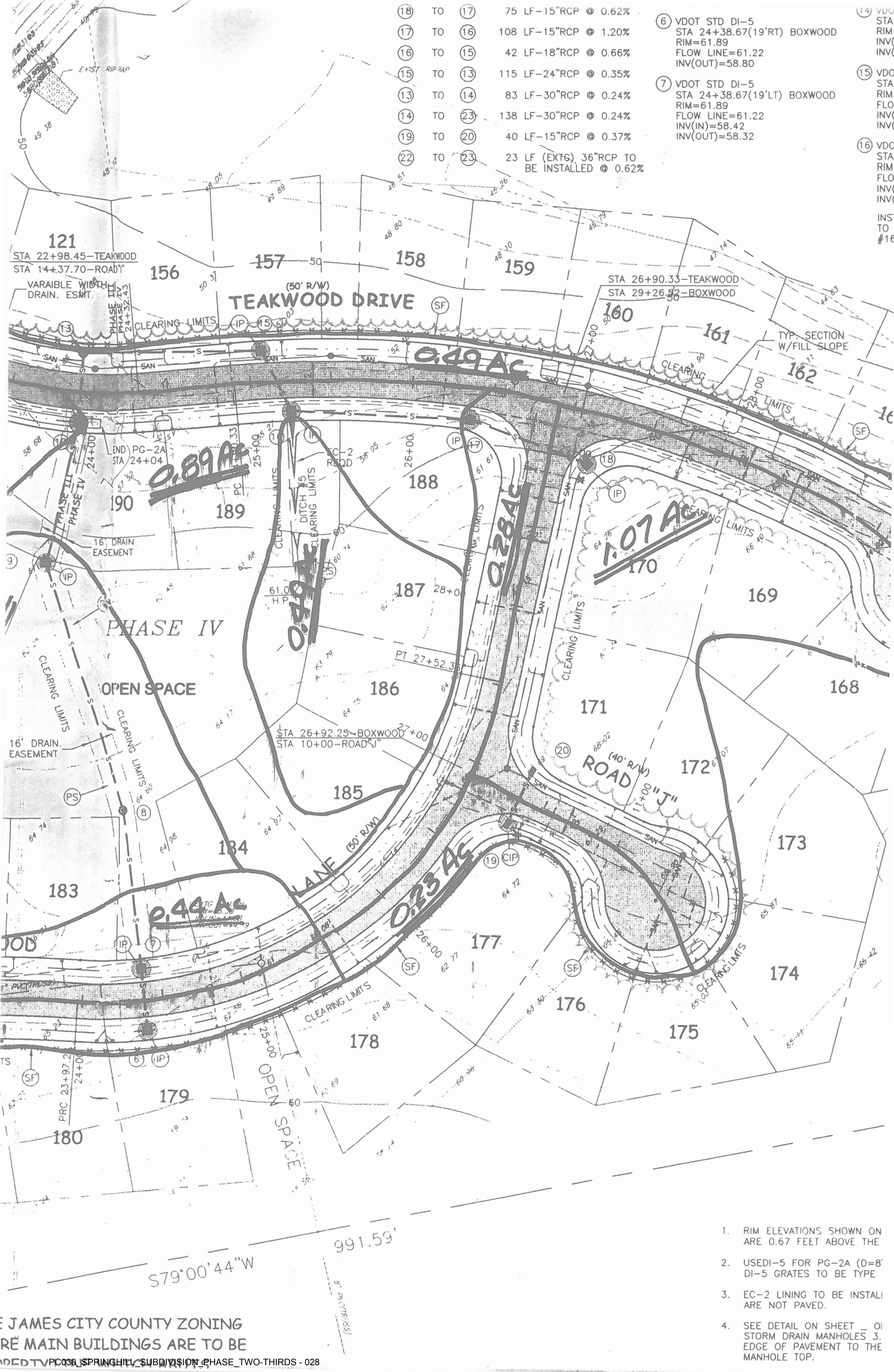
INV(
INV(

INS
TO
#16



1. RIM ELEVATIONS SHOWN ON ARE 0.67 FEET ABOVE THE

2. USEDI-5 FOR PG-2A (D=8' DI-5 GRATES TO BE TYPE

3. EC-2 LINING TO BE INSTALI ARE NOT PAVED.

4. SEE DETAIL ON SHEET _ OI STORM DRAIN MANHOLES 3. EDGE OF PAVEMENT TO THE MANHOLE TOP.

5. THE EDGE OF PAVEMENT RA

E JAMES CITY COUNTY ZONING
RE MAIN BUILDINGS ARE TO BE

MATERIAL ON AREAS TO BE PAVED.

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

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 SPECIFICATION 3.35. 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 SPECIFICATION 3.32, PERMANENT SEEDING. 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 BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.

14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.

15. TEMPORARY LINERS, SUCH AS 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 PERCENT.

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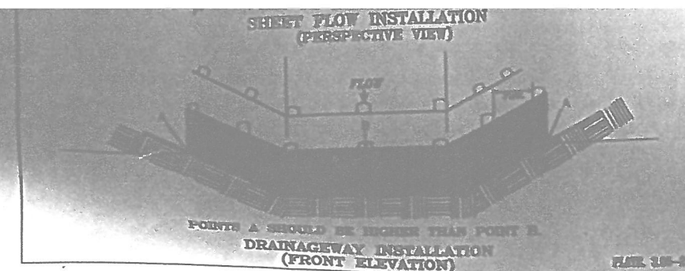
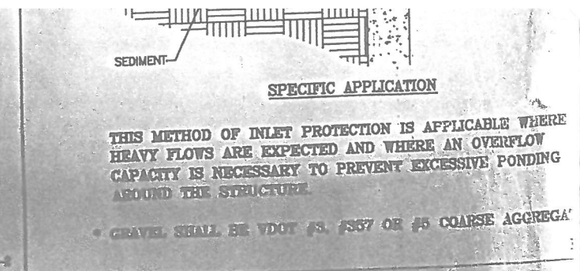
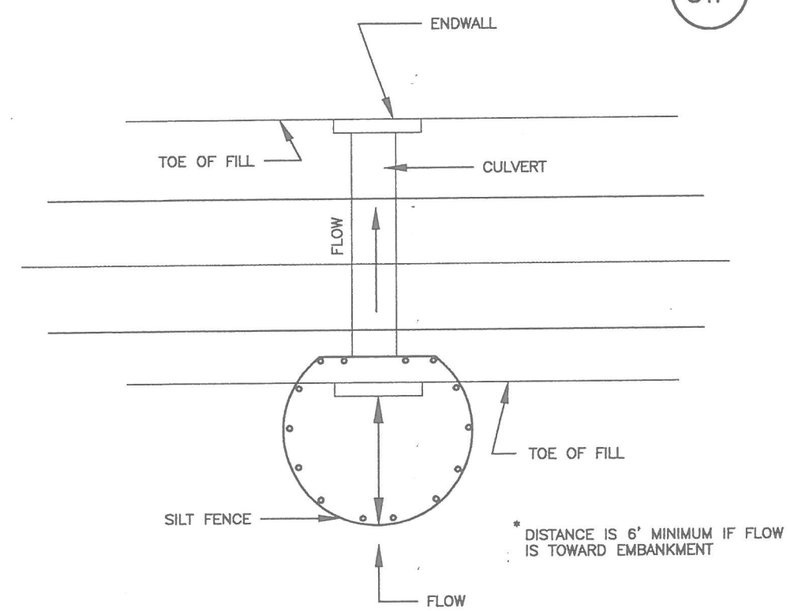


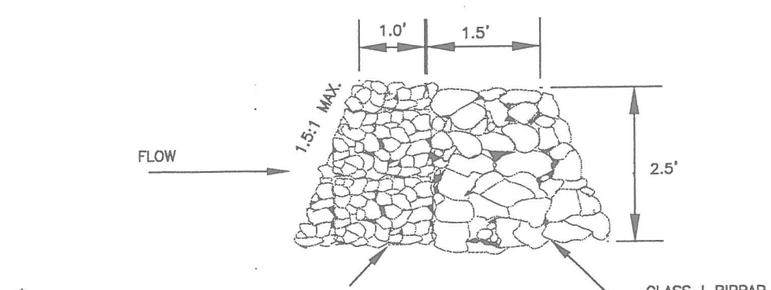


SILT FENCE CULVERT INLET PROTECTION

CIP



*OPTIONAL STONE COMBINATION

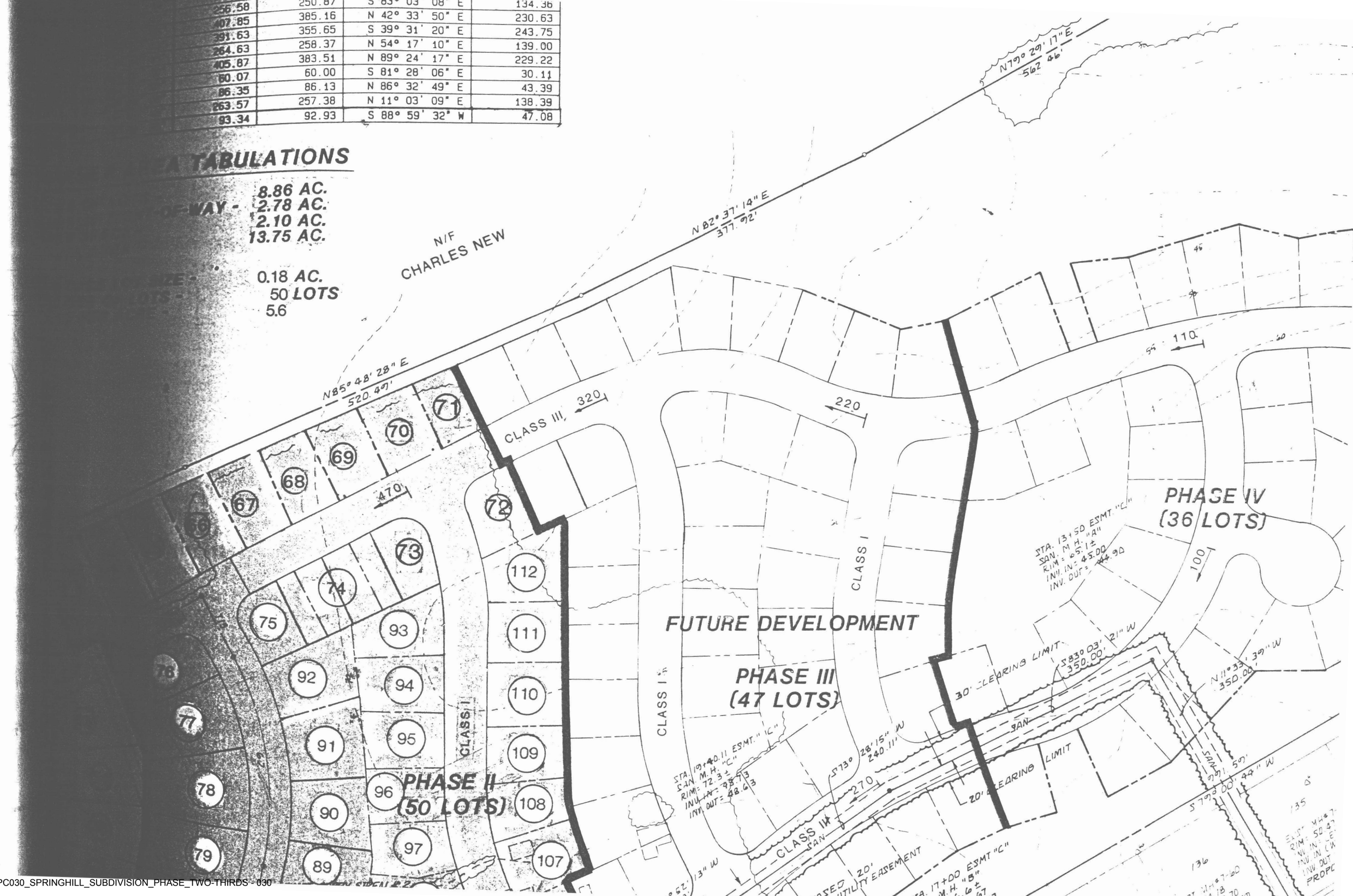


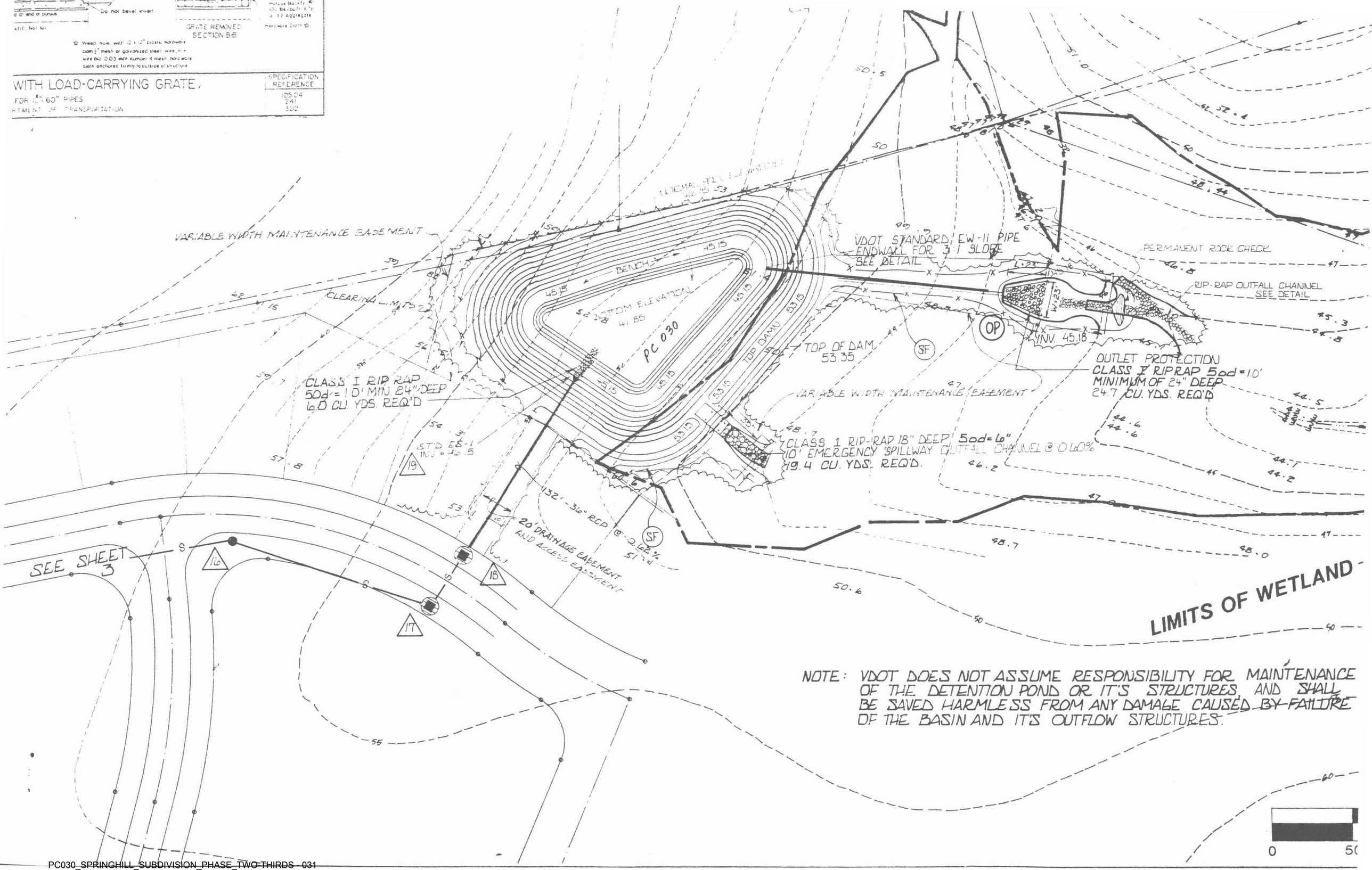
*VDOT #3, #357, #5, #56 OR #57 COARSE AGGREGATE TO REPLACE SILT FENCE IN " HORSESHOE " WHEN HIGH VELOCITY OF FLOW IS EXPECTED

PLATE. 3.08-1

EXISTIN
CUT SE

256.58	250.87	S 83° 03' 08" E	134.36
407.85	385.16	N 42° 33' 50" E	230.63
391.63	355.65	S 39° 31' 20" E	243.75
264.63	258.37	N 54° 17' 10" E	139.00
405.87	383.51	N 89° 24' 17" E	229.22
60.07	60.00	S 81° 28' 06" E	30.11
86.35	86.13	N 86° 32' 49" E	43.39
263.57	257.38	N 11° 03' 09" E	138.39
93.34	92.93	S 88° 59' 32" W	47.08





NOTE: VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE DETENTION POND OR IT'S STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE CAUSED BY FAILURE OF THE BASIN AND IT'S OUTFLOW STRUCTURES.

CLEAR VEG + SEDIMENT @ PIPE + CHANNEL OUTFALL.

REMOVE VEG + SEDIMENT AREA AT EW-11

KEEP TREE BUFFER

KEEP VEG

REMOVE TREES FROM DAM.

CLEAR OUTFALL

CLEAR VEG AT + ALONG EMERG. SPILLWAY

NCH EL=45.15
4.15

'14"W

377.92'

32"POPLAR

LIMITS OF WETLANDS

LIMITS OF WETLANDS

N79

DRAI

1 TO
2 TO
3 TO
4 TO
6 TO
7 TO
8 TO
9 TO
10 TO
18 TO
17 TO
16 TO
15 TO
13 TO
14 TO
19 TO
22 TO

EXTG EW-11
(SEE DTL FOR
TEMP 21" CMP
RISER ON SHT
7 OF 11)

RESHAPE SIDE WALLS OF
WET POND & LOWER
BOTTOM TO ELEV. 41.00

EW-11
PIPE ENDWALL
INV.=46.05

PC030

37 LF-VDOT PG-5
W-2', D=1', 1.5:1
(SEE DTL THIS SHT)

E.S
INV.=46.20

℄ EXTG. SWALE

NOTE:
- THE TOP OF THE DAM MUST BE
RAISED SO THAT A MINIMUM
ELEV OF 53.50 IS ATTAINED.

EXIST. RIP-RAP

CLEARING LIMITS

TCH 14
REQD

118

119

120

121

156

157

158

21+00

21+35.47

EXTG 36" RCP

CLEARING LIMITS

20' DRAINAGE AND
INGRESS/EGRESS ESMT

STORM MH
RIM=58.95
INV.IN=47.20
INV.OUT=47.10

BLDG. SETBACK LIMITS

CLEARING LIMITS

22+46.71

LIMITS OF WETLANDS

STA 22+98.45-TEAKWOOD
STA 14+37.70-SILVERWOOD

VARAIBLE WIDTH
DRAIN. ESMT.

PHASE III
PHASE IV
24+32.43

CLEARING LIMITS

(50' R/W)

TEAKWOOD DRIVE

TEAK WOOD LANE
Right SIDE

CUT — MED. — FILL

PROJECT _____ BY ____ DATE _____

STA. TO STA.		FLOW	0.9 WS/CA	0.5 WS/CA	0.3 WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft-Ft	ALLOW VEL	Earth n=.03 VEL.	Protective Lining n=.05 On	n=.05 VEL.	n=.05 DEP.	n=.015 On	n=.015 DEP.	I_{10}	Q_{10}	DEP.	REMARKS
17+06.72	18+00	↓	0.021	0.015	0.008	–	.044	5	5.7	.251		.0154				0.99	0.29			7.1	.312	0.32	
18+00	19+00	↓	0.023	0.016	0.007	.046	.090	6.6	5.3	.477		.0355				1.58	0.32	3.91	0.20	6.7	.603	0.22	Begin Pavoo Ditch 18+75
19+00	19+71.2	↓	0.016	0.011	0.004	.031	.121	7.7	5.1	.617		.03976						4.35	0.22	6.3	.762	0.24	
			EXISTING			STRUCTURE				#													
19+71.2	20+00		0.007	0.005	0.00	–	0.012	5	5.7	.068		.03976				1.60	0.15			7.1	.085	0.16	
21+00	21+69.8		0.014	0.01	0.002	0.026	0.038	5.3	5.6	.212		.001				1.27	0.29			7.0	.266	0.31	
			STRUCTURES				# 5																
23+90	25+08		0.026	0.019	0.177	–	0.222	5	5.7	1.27		.001				0.53	0.89			7.1	1.58	0.97	
			Structure				#11																
			PIPE		18		to		19														
27+10	28+00	↑	0.020	0.014	0.022	0.056	0.183	7.3	5.2	.952		.0174				1.44	0.47			6.4	1.171	0.51	
28+00	29+00	↑	0.023	0.016	0.035	0.074	0.127	5.9	5.5	.698		.0138				1.22	0.44			6.8	.864	0.47	
29+00	29+50	↑	0.023	0.016	0.014	–	0.053	5	5.7	.302		.0103				0.89	0.34			7.1	.376	0.37	

2-27

FILE: SP34-STORM.XLT
Project: **SPRINGHILL - PHASES 3 & 4**
Location: James City County, Virginia
Design: M.Gordon
Date: 8/24/98
Revision:
Yr. Storm: 10 Yr.
N Value: 0.013

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV UP	INVERT ELEV LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
		[E]	[E]			[E]				[E]		[E]		[E]						
1	2	0.71	0.35	0.25	0.25	10.00	5.93	1.47	1.47	62.25	56.03	104	0.0598	15	7.23	15.74	0.24	0.09	0.56	
2	3	1.14	0.45	0.51	0.76	10.24	5.89	3.02	4.48	55.93	53.96	133	0.0148	15	6.40	7.82	0.35	0.57	1.00	
3	4	0.50	0.40	0.20	0.96	10.59	5.83	1.17	5.60	53.86	53.57	38	0.0076	15	5.63	5.60	0.11	1.00	1.00	
4	21	0.77	0.75	0.58	1.54	10.70	5.81	3.35	8.94	53.32	52.92	55	0.0073	18	5.06	8.94	0.18	1.00	1.00	
26	25	5.61	0.50	2.79	2.79	15.00	5.17	14.42	14.42	56.00	53.80	256	0.0086	21	6.12	14.66	0.70	0.98	1.00	EXTG 21" RCP
25	21	0.20	0.50	0.10	2.89	15.70	5.08	0.51	14.67	53.78	52.88	70	0.0128	21	7.47	17.90	0.16	0.82	1.00	EXTG 21" RCP
21	22	0.00	MH-1	0.00	4.43	15.85	5.06	0.00	22.39	52.26	47.92	129	0.0336	30	12.94	75.10	0.17	0.30	0.85	EXTG 30" RCP
22	23	2.12	0.50	1.06	5.49	16.02	5.04	5.34	27.64	47.43	47.20	38	0.0061	36	7.39	52.00	0.09	0.53	1.00	EXTG 36" RCP
6	7	0.40	0.85	0.34	0.34	10.00	5.93	2.02	2.02	58.80	58.42	38	0.0100	15	4.52	6.44	0.14	0.31	0.86	
7	8	0.44	0.55	0.24	0.58	10.14	5.90	1.43	3.44	58.32	57.87	98	0.0046	15	3.58	4.38	0.46	0.78	1.00	
8	9	0.00	MH-1	0.00	0.58	10.60	5.83	0.00	3.39	57.77	53.75	161	0.0250	15	7.26	10.17	0.37	0.33	0.88	
9	10	1.04	0.40	0.42	1.00	12.00	5.60	2.33	5.59	53.65	50.98	88	0.0303	15	9.07	11.20	0.16	0.50	0.99	
10	13	0.48	0.65	0.31	1.31	12.16	5.57	1.74	7.30	50.73	50.38	43	0.0081	18	5.37	9.45	0.13	0.77	1.00	
18	17	1.30	0.60	0.78	0.78	12.00	5.60	4.37	4.37	51.03	50.56	75	0.0062	15	4.16	5.08	0.30	0.86	1.00	
17	16	0.28	0.70	0.20	0.98	12.30	5.55	1.09	5.42	50.46	49.99	108	0.0043	18	3.92	6.90	0.46	0.79	1.00	
16	15	1.38	0.55	0.76	1.74	13.00	5.45	4.13	9.45	49.89	49.55	42	0.0081	18	5.35	9.45	0.13	1.00	1.00	
15	13	0.49	0.85	0.42	2.15	13.13	5.43	2.26	11.68	49.05	48.65	115	0.0035	24	4.28	13.38	0.45	0.87	1.00	
13	14	0.00	MH-1	0.00	3.46	13.58	5.36	0.00	18.56	48.15	47.98	83	0.0021	30	3.78	18.56	0.37	1.00	1.00	
14	23	0.00	MH-1	0.00	3.46	13.94	5.31	0.00	18.38	47.88	47.60	138	0.0020	30	3.75	18.38	0.61	1.00	1.00	
23	24	1.02	0.50	0.51	9.46	16.11	5.02	2.56	47.53	47.10	46.20	134	0.0067	36	7.77	54.70	0.29	0.87	1.00	EXTG 36" RCP

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. SPRING HILL PHASE 3 & 4
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET _____ OF _____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	2	0.71	0.35	—	0.25	10	5.75	1.44	62.25	56.03	104'	.0598	15"	15.8	8.01	13.0	
2	3	1.14	0.45	0.51	0.76	10.2	5.75	4.37	55.93	53.96	133'	.0148	15"	7.51	6.35	20.9	
3	4	0.50	0.40	0.20	0.96	10.5	5.75	5.52	53.86	53.57	38'	.0076	15"	5.63	5.23	7.3	
4	#21 Exist.	0.77	0.75	0.58	1.54	10.6	5.75	8.86	53.32	52.92	55'	.0072	18"	8.91	5.75	9.6	
6	7	0.40	0.85	—	0.34	10	5.75	1.96	58.80	58.42	38'	.010	15"	6.46	4.62	8.2	.14
7	8	0.44	0.55	0.24	0.58	10	5.75	3.33	58.32	57.87	98'	.0046	15"	4.38	3.93	24.9	.42
8	9	—	—	—	—			3.33	57.77	53.75	161'	.025	15"	10.21	7.44	21.6	
9	10	1.04	0.40	0.42	1.00	12	5.6	6.63	53.65	50.98	88'	.030	15"	11.19	9.50	9.3	
10	13	0.48	0.65	0.31	1.31	12	5.6	7.33	50.73	50.38	43'	.0081	18"	9.45	5.41	7.9	
16	15	1.38	0.55	0.76	1.54	13	5.6	8.62	49.91	49.63	42'	.0067	18"	8.60	5.55	7.3	.12
15	13	0.49	0.85	0.42	1.96	13.1	5.6	10.98	49.13	48.73	115'	.0035	24"	13.38	4.79	24.2	.36
13	14	—	—	—	3.26	13.5	5.4	17.60	48.23	48.03	83'	.0024	30"	20.09	4.62	18.2	.28
14	23					13.8	5.4	17.60	47.93	47.60	138'	.0024	30"	20.09	4.62	30.7	.48
23	24							51.20	47.10	46.20	134'	.0067	36"	54.59	8.78	15.2	
18	17	1.30	0.60	—	0.78	12	5.6	4.37	51.92	51.45	75'	.0062	15"	5.09	4.66	16.1	
17	16	0.28	0.70	0.20	0.98	12.3	5.6	5.48	51.35	50.11	103'	.0120	15"	7.08	6.37	17.0	

22 (5-18)

Project SPRINGHILL #19 to #20

Plan Sheet No. ____ Designer ____ Rev. Date ____ Date ____

Sheet ____ of ____

HYDROLOGICAL DATA:

D.A. = 0.23 AC.

C = 0.75

i = 5.7

AHW Controls

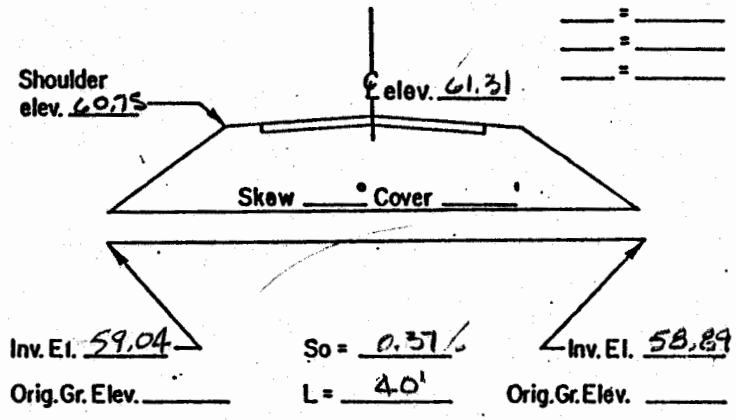
STATION: 10+33.81

100 yr. Flood plain ____ elev. ____

Design AHW depth ____ elev. ____

Structures ____ elev. ____

freq. TWelev.



DISCHARGES USED

Q 2 = ____ CFS

Q 10 = 0.98 CFS

Q ____ = ____ CFS

Q ____ = ____ CFS

Q ____ = ____ CFS

RISK ASSESSMENT

ADT ____

Detours Available ____ ; Length ____

Overtopping Stage ____

Flood Plain Management ____

Criteria and Significant Impact ____

CULVERT TYPE & SIZE	Q	Q/B	HEADWATER COMPUTATIONS									CONT. HW. ELEV.	OUTLET VELOCITY		End Treat.	COMMENTS
			INLET CONT.		OUTLET CONTROL											
			HW/D	HW	Ke	dc	$\frac{dc+D}{2}$	ho	H	LSo	HW		C.M.	Smooth		
RCP-15"	0.98	0.98	0.47													

Design Flood Exceed. Prob. ____ Elev. ____

Overtop Flood Exceed. Prob. ____ Elev. ____

Base Flood 1% Exceed. Prob. ____ Elev. ____

SUMMARY RECOMMENDATIONS:

(Rev. 1/85)

Culvert Calculator Report
CULVERT #19 TO #20

Comments: 40' - 15" RCP @ 0.37%

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	1.71 ft	Headwater Depth/ Height	0.47
Computed Headwater Elevation	59.63 ft	Discharge	0.98 cfs
Inlet Control HW Elev	59.57 ft	Tailwater Elevation	0.10 ft
Outlet Control HW Elev	59.63 ft	Control Type	Outlet Control

Grades			
Upstream Invert	59.04 ft	Downstream Invert	58.89 ft
Length	40.00 ft	Constructed Slope	0.003750 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	0.39 ft
Slope Type	Mild	Normal Depth	0.42 ft
Flow Regime	Subcritical	Critical Depth	0.39 ft
Velocity Downstream	3.01 ft/s	Critical Slope	0.005206 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.25 ft
Section Size	15 inch	Rise	1.25 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	59.63 ft	Upstream Velocity Head	0.11 ft
Ke	0.50	Entrance Loss	0.06 ft

Inlet Control Properties			
Inlet Control HW Elev	59.57 ft	Flow Control	Unsubmerged
Inlet Type	End-Section Conforming to fill slope	Area Full	1.2 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
CULVERT #19 TO #20

Comments: 40' - 15" RCP @ 0.37%

Solve For: Headwater Elevation

Culvert Summary				
Allowable HW Elevation	1.71 ft		Headwater Depth/ Height	0.47
Computed Headwater Elevation	59.63 ft		Discharge	0.98 cfs
Inlet Control HW Elev	59.57 ft		Tailwater Elevation	0.10 ft
Outlet Control HW Elev	59.63 ft		Control Type	Outlet Control

Grades				
Upstream Invert	59.04 ft		Downstream Invert	58.89 ft
Length	40.00 ft		Constructed Slope	0.003750 ft/ft

Hydraulic Profile				
Profile	M2		Depth, Downstream	0.39 ft
Slope Type	Mild		Normal Depth	0.42 ft
Flow Regime	Subcritical		Critical Depth	0.39 ft
Velocity Downstream	3.01 ft/s		Critical Slope	0.005206 ft/ft

Section				
Section Shape	Circular		Mannings Coefficient	0.013
Section Material	Concrete		Span	1.25 ft
Section Size	15 inch		Rise	1.25 ft
Number Sections	1			

Outlet Control Properties				
Outlet Control HW Elev	59.63 ft		Upstream Velocity Head	0.11 ft
Ke	0.50		Entrance Loss	0.06 ft

Inlet Control Properties				
Inlet Control HW Elev	59.57 ft		Flow Control	Unsubmerged
Inlet Type	End-Section Conforming to fill slope		Area Full	1.2 ft²
K	0.00980		HDS 5 Chart	1
M	2.00000		HDS 5 Scale	1
C	0.03980		Equation Form	1
Y	0.67000			

Culvert Calculator Report
PIPE @ #1

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2.00	ft	Headwater Depth/ Height	0.59	
Computed Headwater Elevation	62.99	ft	Discharge	1.44	cfs
Inlet Control HW Elev	62.88	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev	62.99	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	62.25	ft	Downstream Invert	56.03	ft
Length	104.00	ft	Constructed Slope	0.059808	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.26	ft
Slope Type	Steep		Normal Depth	0.26	ft
Flow Regime	Supercritical		Critical Depth	0.47	ft
Velocity Downstream	8.01	ft/s	Critical Slope	0.005288	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.25	ft
Section Size	15 inch		Rise	1.25	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev	62.99	ft	Upstream Velocity Head	0.18	ft
Ke	0.50		Entrance Loss	0.09	ft

Inlet Control Properties					
Inlet Control HW Elev	62.88	ft	Flow Control	Unsubmerged	
Inlet Type	End-Section Conforming to fill slope		Area Full	1.2	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Rating Table Report
PIPE @ #1

Range Data:				
	Minimum	Maximum	Increment	
Discharge	0.00	2.90	0.29	cfs

Discharge (cfs)	HW Elev (ft)
0.00	0.00
0.29	62.57
0.58	62.70
0.87	62.81
1.16	62.91
1.45	62.99
1.74	63.07
2.03	63.14
2.32	63.22
2.61	63.28
2.90	63.35

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #1 TO #2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.059800	ft/ft
Diameter	15.00	in
Discharge	1.44	cfs

Results		
Depth	0.26	ft
Flow Area	0.18	ft^2
Wetted Perimeter	1.17	ft
Top Width	1.01	ft
Critical Depth	0.47	ft
Percent Full	20.40	
Critical Slope	0.005295	ft/ft
Velocity	8.01	ft/s
Velocity Head	1.00	ft
Specific Energy	1.25	ft
Froude Number	3.34	
Maximum Discharge	16.99	cfs
Full Flow Capacity	15.80	cfs
Full Flow Slope	0.000497	ft/ft
Flow is supercritical.		

Notes:

104' - 15" RCP @ 5.98%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #2 TO #3
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.013500	ft/ft
Diameter	15.00	in
Discharge	4.37	cfs

Results		
Depth	0.69	ft
Flow Area	0.69	ft^2
Wetted Perimeter	2.08	ft
Top Width	1.24	ft
Critical Depth	0.85	ft
Percent Full	54.80	
Critical Slope	0.007122	ft/ft
Velocity	6.35	ft/s
Velocity Head	0.63	ft
Specific Energy	1.31	ft
Froude Number	1.50	
Maximum Discharge	8.07	cfs
Full Flow Capacity	7.51	cfs
Full Flow Slope	0.004577	ft/ft
Flow is supercritical.		

Notes:

133' - 15" RCP @ 1.35%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #3 TO #4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.007600	ft/ft
Diameter	15.00	in
Discharge	5.52	cfs

Results		
Depth	1.00	ft
Flow Area	1.06	ft^2
Wetted Perimeter	2.78	ft
Top Width	1.00	ft
Critical Depth	0.95	ft
Percent Full	80.23	
Critical Slope	0.008478	ft/ft
Velocity	5.23	ft/s
Velocity Head	0.43	ft
Specific Energy	1.43	ft
Froude Number	0.90	
Maximum Discharge	6.06	cfs
Full Flow Capacity	5.63	cfs
Full Flow Slope	0.007303	ft/ft
Flow is subcritical.		

Notes:

38' - 15" RCP @ 0.76%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #4 TO EXISTING
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.007200	ft/ft
Diameter	18.00	in
Discharge	8.86	cfs

Results		
Depth	14.7	in
Flow Area	1.54	ft²
Wetted Perimeter	3.38	ft
Top Width	1.17	ft
Critical Depth	1.15	ft
Percent Full	81.43	
Critical Slope	0.008108	ft/ft
Velocity	5.75	ft/s
Velocity Head	0.51	ft
Specific Energy	1.74	ft
Froude Number	0.88	
Maximum Discharge	9.59	cfs
Full Flow Capacity	8.91	cfs
Full Flow Slope	0.007115	ft/ft
Flow is subcritical.		

Notes:

55'- 18" RCP @ 0.72%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #6 TO #7
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	15.00	in
Discharge	1.96	cfs

Results		
Depth	0.47	ft
Flow Area	0.42	ft^2
Wetted Perimeter	1.66	ft
Top Width	1.21	ft
Critical Depth	0.56	ft
Percent Full	37.79	
Critical Slope	0.005476	ft/ft
Velocity	4.62	ft/s
Velocity Head	0.33	ft
Specific Energy	0.80	ft
Froude Number	1.37	
Maximum Discharge	6.95	cfs
Full Flow Capacity	6.46	cfs
Full Flow Slope	0.000921	ft/ft
Flow is supercritical.		

Notes:

38' - 15" RCP @ 1.0%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #7 TO #8
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.004600	ft/ft
Diameter	15.00	in
Discharge	3.33	cfs

Results		
Depth	0.82	ft
Flow Area	0.85	ft^2
Wetted Perimeter	2.35	ft
Top Width	1.19	ft
Critical Depth	0.74	ft
Percent Full	65.22	
Critical Slope	0.006247	ft/ft
Velocity	3.93	ft/s
Velocity Head	0.24	ft
Specific Energy	1.06	ft
Froude Number	0.82	
Maximum Discharge	4.71	cfs
Full Flow Capacity	4.38	cfs
Full Flow Slope	0.002658	ft/ft
Flow is subcritical.		

Notes:

98' - 15" RCP @ 0.46%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #8 TO #9
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	15.00	in
Discharge	3.33	cfs

Results		
Depth	0.49	ft
Flow Area	0.45	ft^2
Wetted Perimeter	1.69	ft
Top Width	1.22	ft
Critical Depth	0.74	ft
Percent Full	39.29	
Critical Slope	0.006248	ft/ft
Velocity	7.44	ft/s
Velocity Head	0.86	ft
Specific Energy	1.35	ft
Froude Number	2.17	
Maximum Discharge	10.99	cfs
Full Flow Capacity	10.21	cfs
Full Flow Slope	0.002658	ft/ft
Flow is supercritical.		

Notes:

161' - 15" RCP @ 2.50%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #9 TO #10
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.030000	ft/ft
Diameter	15.00	in
Discharge	6.63	cfs

Results		
Depth	0.69	ft
Flow Area	0.70	ft^2
Wetted Perimeter	2.10	ft
Top Width	1.24	ft
Critical Depth	1.04	ft
Percent Full	55.40	
Critical Slope	0.010330	ft/ft
Velocity	9.50	ft/s
Velocity Head	1.40	ft
Specific Energy	2.10	ft
Froude Number	2.24	
Maximum Discharge	12.04	cfs
Full Flow Capacity	11.19	cfs
Full Flow Slope	0.010535	ft/ft
Flow is supercritical.		

Notes:

88' - 15" RCP @ 3.00%

SPRINGHILL PHASES 3 & 3
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #10 TO #13
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.008100	ft/ft
Diameter	18.00	in
Discharge	7.33	cfs

Results		
Depth	0.99	ft
Flow Area	1.24	ft^2
Wetted Perimeter	2.85	ft
Top Width	1.42	ft
Critical Depth	1.05	ft
Percent Full	66.15	
Critical Slope	0.006969	ft/ft
Velocity	5.91	ft/s
Velocity Head	0.54	ft
Specific Energy	1.53	ft
Froude Number	1.11	
Maximum Discharge	10.17	cfs
Full Flow Capacity	9.45	cfs
Full Flow Slope	0.004870	ft/ft
Flow is supercritical.		

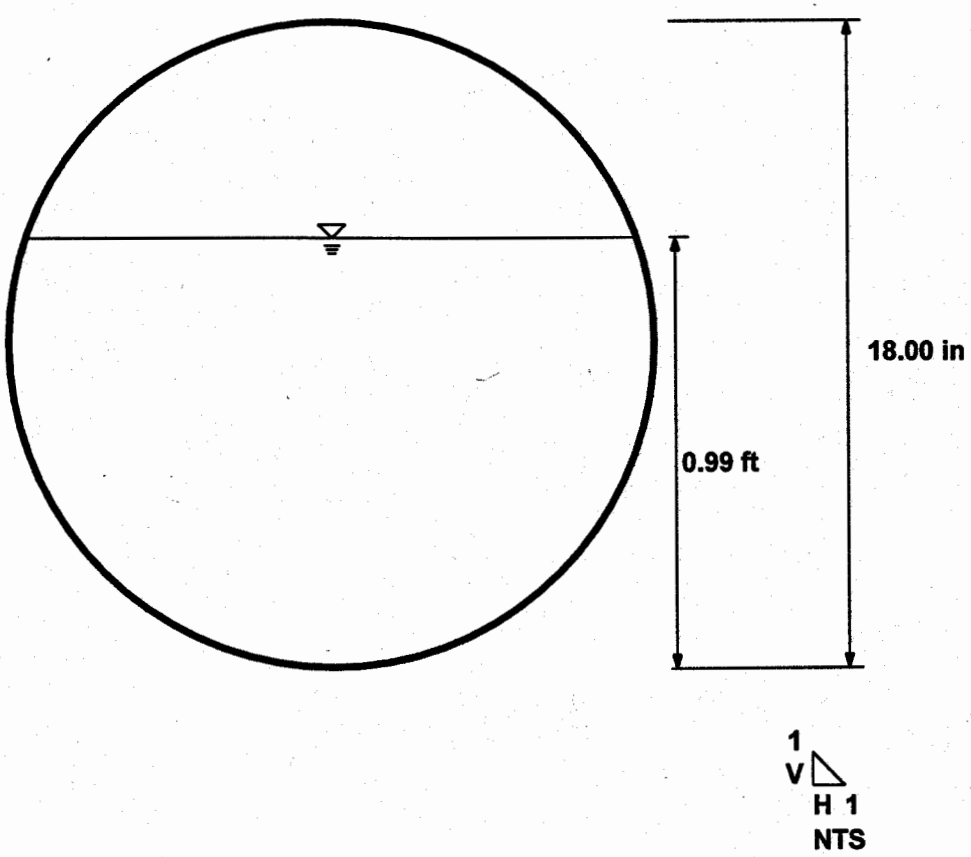
Notes:

43' - 15" RCP @ 0.81%

Cross Section
Cross Section for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #10 TO #13
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.008100	ft/ft
Depth	0.99	ft
Diameter	18.00	in
Discharge	7.33	cfs



SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #11 TO # 12
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.007200	ft/ft
Diameter	18.00	in
Discharge	8.62	cfs

Results		
Depth	1.19	ft
Flow Area	1.50	ft^2
Wetted Perimeter	3.29	ft
Top Width	1.22	ft
Critical Depth	1.14	ft
Percent Full	79.15	
Critical Slope	0.007906	ft/ft
Velocity	5.75	ft/s
Velocity Head	0.51	ft
Specific Energy	1.70	ft
Froude Number	0.91	
Maximum Discharge	9.59	cfs
Full Flow Capacity	8.91	cfs
Full Flow Slope	0.006735	ft/ft
Flow is subcritical.		

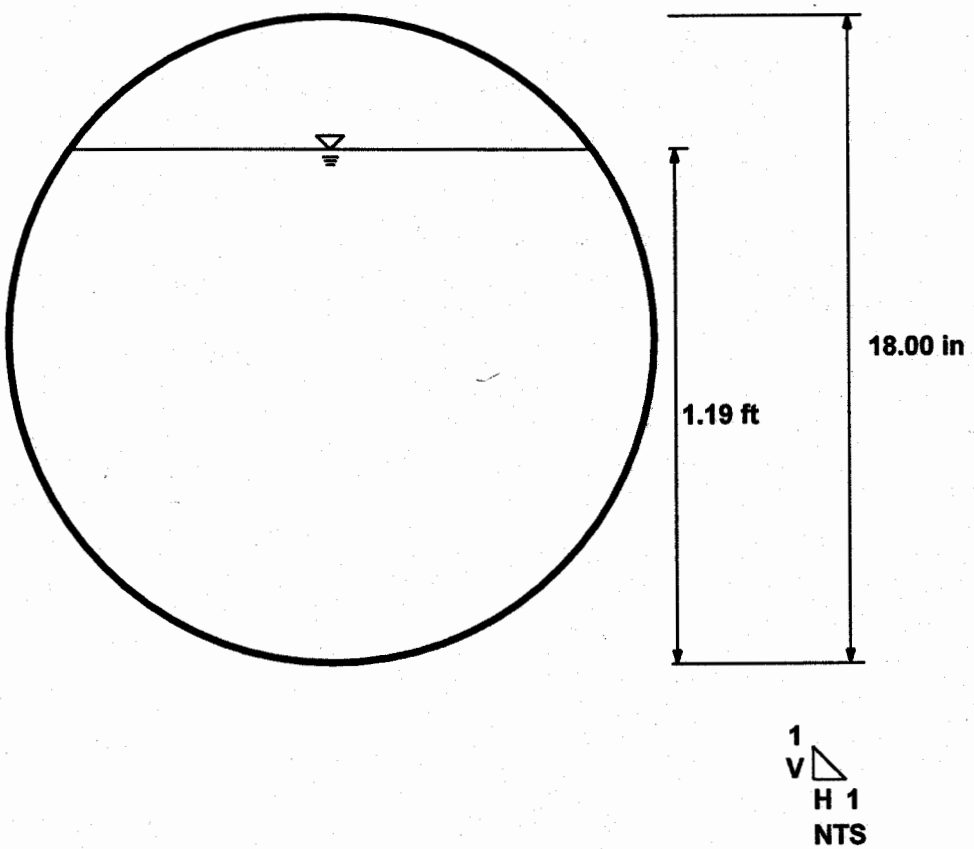
Notes:

42' - 15" RCP @ 0.72%

Cross Section
Cross Section for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #11 TO # 12
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.007200	ft/ft
Depth	1.19	ft
Diameter	18.00	in
Discharge	8.62	cfs



SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #12 TO #13
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.003500	ft/ft
Diameter	24.00	in
Discharge	10.98	cfs

Results		
Depth	1.38	ft
Flow Area	2.31	ft²
Wetted Perimeter	3.92	ft
Top Width	1.85	ft
Critical Depth	1.19	ft
Percent Full	68.93	
Critical Slope	0.005379	ft/ft
Velocity	4.75	ft/s
Velocity Head	0.35	ft
Specific Energy	1.73	ft
Froude Number	0.75	
Maximum Discharge	14.40	cfs
Full Flow Capacity	13.38	cfs
Full Flow Slope	0.002356	ft/ft
Flow is subcritical.		

Notes:

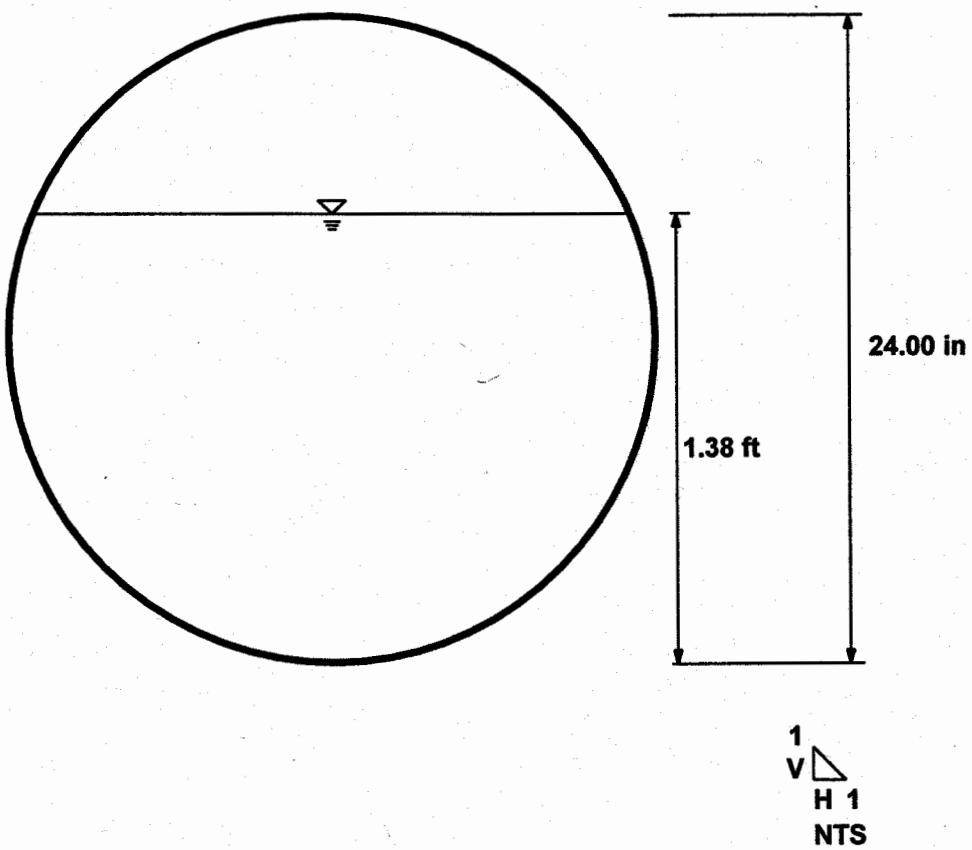
115' -15" RCP @ 0.35%

Cross Section
Cross Section for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #12 TO #13
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.003500	ft/ft
Depth	1.38	ft
Diameter	24.00	in
Discharge	10.98	cfs

V=4.75 ft/sec



SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #13 TO #14
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.002400	ft/ft
Diameter	30.00	in
Discharge	17.60	cfs

Results		
Depth	1.81	ft
Flow Area	3.81	ft^2
Wetted Perimeter	5.10	ft
Top Width	2.23	ft
Critical Depth	1.42	ft
Percent Full	72.53	
Critical Slope	0.004840	ft/ft
Velocity	4.62	ft/s
Velocity Head	0.33	ft
Specific Energy	2.14	ft
Froude Number	0.62	
Maximum Discharge	21.61	cfs
Full Flow Capacity	20.09	cfs
Full Flow Slope	0.001841	ft/ft
Flow is subcritical.		

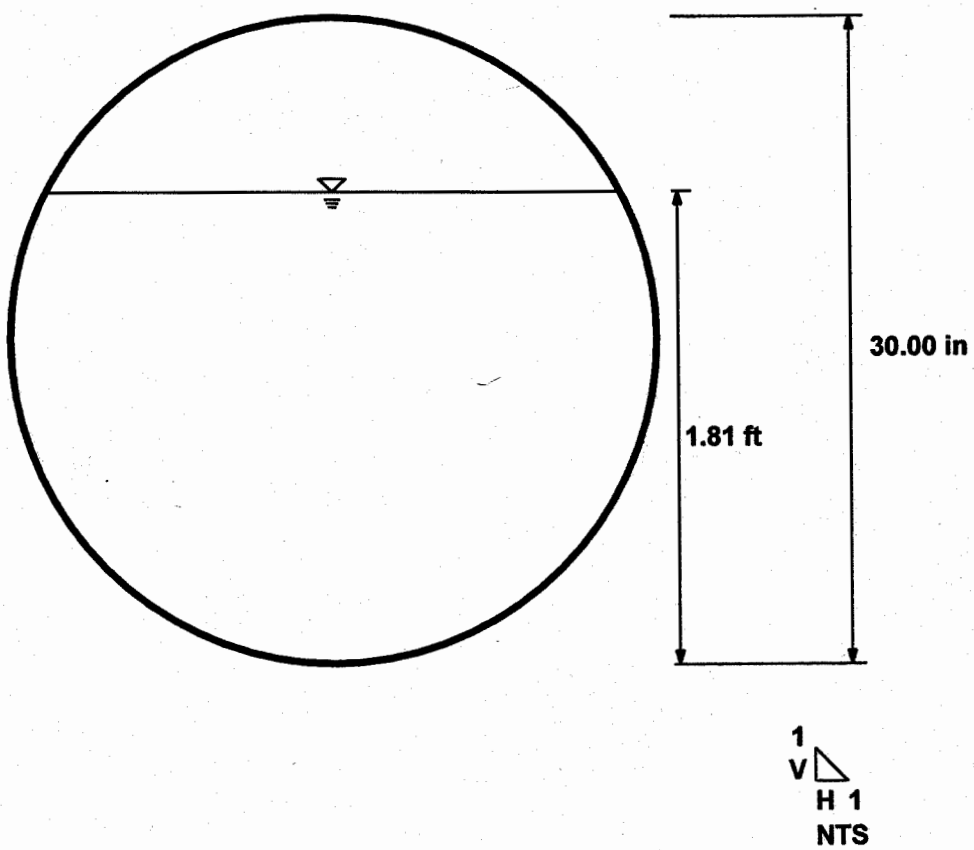
Notes:

83' - 30" RCP @ 0.24%

Cross Section
Cross Section for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #13 TO #14
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.002400	ft/ft
Depth	1.81	ft
Diameter	30.00	in
Discharge	17.60	cfs



SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #14 TO #15
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.002400	ft/ft
Diameter	30.00	in
Discharge	17.60	cfs

Results		
Depth	21.8	in
Flow Area	3.81	ft^2
Wetted Perimeter	5.10	ft
Top Width	2.23	ft
Critical Depth	1.42	ft
Percent Full	72.53	
Critical Slope	0.004840	ft/ft
Velocity	4.62	ft/s
Velocity Head	0.33	ft
Specific Energy	2.14	ft
Froude Number	0.62	
Maximum Discharge	21.61	cfs
Full Flow Capacity	20.09	cfs
Full Flow Slope	0.001841	ft/ft
Flow is subcritical.		

Notes:

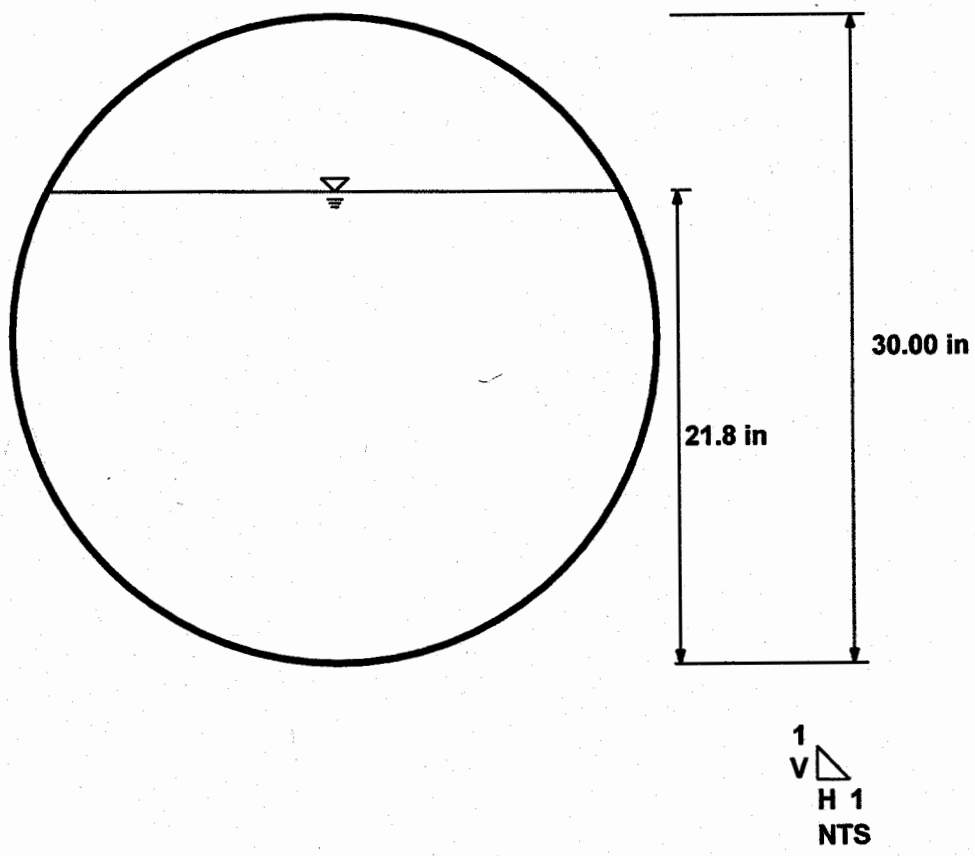
138' - 30 " RCP @ 0.24%

Cross Section
Cross Section for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #14 TO #15
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.002400	ft/ft
Depth	21.8	in
Diameter	30.00	in
Discharge	17.60	cfs

4.6 ft/sec



SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM # 15 TO # 16
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.006700	ft/ft
Diameter	36.00	in
Discharge	51.20	cfs

Results		
Depth	2.31	ft
Flow Area	5.83	ft^2
Wetted Perimeter	6.42	ft
Top Width	2.53	ft
Critical Depth	2.33	ft
Percent Full	76.89	
Critical Slope	0.006568	ft/ft
Velocity	8.78	ft/s
Velocity Head	1.20	ft
Specific Energy	3.50	ft
Froude Number	1.02	
Maximum Discharge	58.72	cfs
Full Flow Capacity	54.59	cfs
Full Flow Slope	0.005893	ft/ft
Flow is supercritical.		

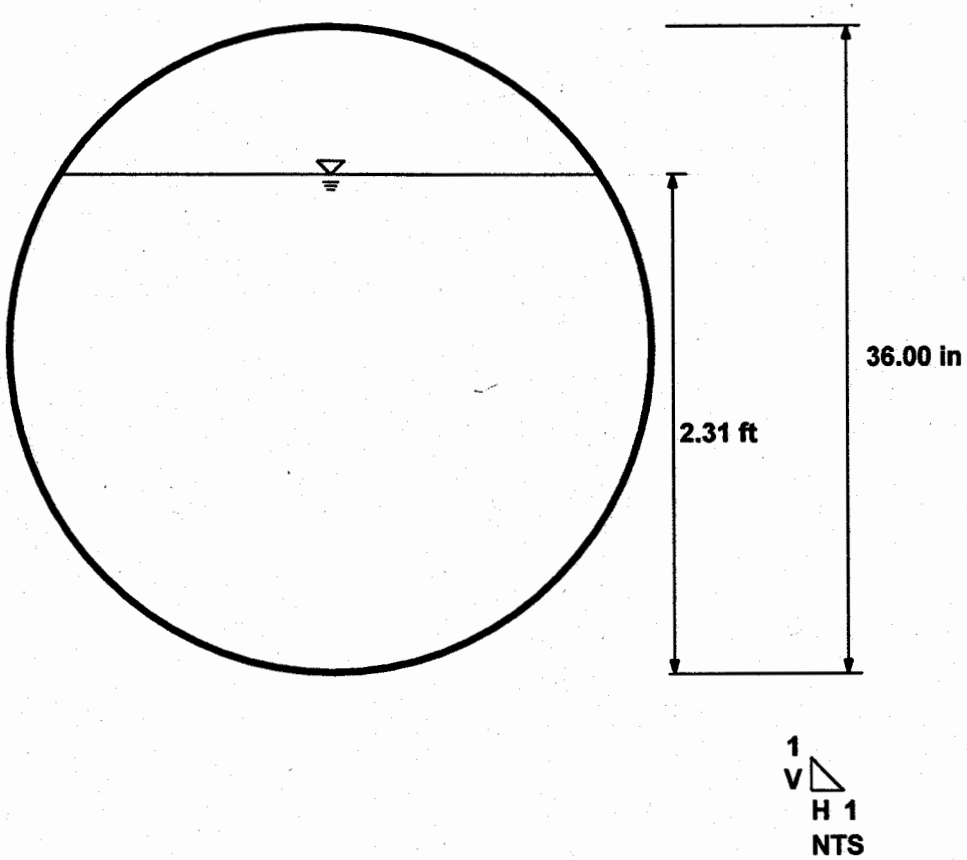
Notes:

EXISTING 36" OUTFALL
134' - 36" RCP @O.67%

Cross Section
Cross Section for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM # 15 TO # 16
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.006700	ft/ft
Depth	2.31	ft
Diameter	36.00	in
Discharge	51.20	cfs



SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #17 TO #11
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.012000	ft/ft
Diameter	15.00	in
Discharge	5.48	cfs

Results		
Depth	0.83	ft
Flow Area	0.86	ft^2
Wetted Perimeter	2.37	ft
Top Width	1.18	ft
Critical Depth	0.95	ft
Percent Full	66.09	
Critical Slope	0.008422	ft/ft
Velocity	6.37	ft/s
Velocity Head	0.63	ft
Specific Energy	1.46	ft
Froude Number	1.32	
Maximum Discharge	7.61	cfs
Full Flow Capacity	7.08	cfs
Full Flow Slope	0.007197	ft/ft
Flow is supercritical.		

Notes:

108' - 15" RCP @ 1.20%

SPRINGHILL PHASES 3 & 4
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\springhi.fm2
Worksheet	FROM #18 TO #17
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.006200	ft/ft
Diameter	15.00	in
Discharge	4.37	cfs

Results		
Depth	0.89	ft
Flow Area	0.94	ft^2
Wetted Perimeter	2.52	ft
Top Width	1.13	ft
Critical Depth	0.85	ft
Percent Full	71.42	
Critical Slope	0.007122	ft/ft
Velocity	4.66	ft/s
Velocity Head	0.34	ft
Specific Energy	1.23	ft
Froude Number	0.90	
Maximum Discharge	5.47	cfs
Full Flow Capacity	5.09	cfs
Full Flow Slope	0.004577	ft/ft
Flow is subcritical.		

Notes:

75' - 15" RCP @ 0.62%

SPRINGHILL PHASES 3 & 4
Worksheet for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\sphil di.fm2
Worksheet	DITCH #1
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.020000	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Discharge	1.42	cfs

Results		
Depth	0.52	ft
Flow Area	0.54	ft²
Wetted Perimeter	2.32	ft
Top Width	2.07	ft
Critical Depth	0.50	ft
Critical Slope	0.024152	ft/ft
Velocity	2.64	ft/s
Velocity Head	0.11	ft
Specific Energy	0.63	ft
Froude Number	0.92	
Flow is subcritical.		

SPRINGHILL PHASES 3 & 4
Worksheet for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\sphil di.fm2
Worksheet	DITCH #2
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.038000	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Discharge	2.83	cfs

Results		
Depth	0.60	ft
Flow Area	0.71	ft²
Wetted Perimeter	2.66	ft
Top Width	2.38	ft
Critical Depth	0.66	ft
Critical Slope	0.022032	ft/ft
Velocity	4.00	ft/s
Velocity Head	0.25	ft
Specific Energy	0.84	ft
Froude Number	1.29	
Flow is supercritical.		

SPRINGHILL PHASES 3 & 4
Worksheet for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\sphil di.fm2
Worksheet	DITCH #3
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.016000	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Discharge	3.33	cfs

Results		
Depth	0.74	ft
Flow Area	1.11	ft^2
Wetted Perimeter	3.33	ft
Top Width	2.98	ft
Critical Depth	0.70	ft
Critical Slope	0.021558	ft/ft
Velocity	3.01	ft/s
Velocity Head	0.14	ft
Specific Energy	0.88	ft
Froude Number	0.87	
Flow is subcritical.		

SPRINGHILL PHASES 3 & 4
Worksheet for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\sphil di.fm2
Worksheet	DITCH #4
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.052600	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Discharge	3.33	cfs

Results		
Depth	0.60	ft
Flow Area	0.71	ft^2
Wetted Perimeter	2.66	ft
Top Width	2.38	ft
Critical Depth	0.70	ft
Critical Slope	0.021558	ft/ft
Velocity	4.70	ft/s
Velocity Head	0.34	ft
Specific Energy	0.94	ft
Froude Number	1.52	
Flow is supercritical.		

SPRINGHILL PHASES 3 & 4
Worksheet for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\sphil di.fm2
Worksheet	DITCH #5
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.069000	ft/ft
Left Side Slope	2.000000	H : V
Right Side Slope	2.000000	H : V
Discharge	0.98	cfs

Results		
Depth	0.36	ft
Flow Area	0.26	ft^2
Wetted Perimeter	1.60	ft
Top Width	1.43	ft
Critical Depth	0.43	ft
Critical Slope	0.025378	ft/ft
Velocity	3.83	ft/s
Velocity Head	0.23	ft
Specific Energy	0.59	ft
Froude Number	1.60	
Flow is supercritical.		

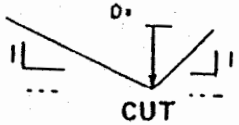
"H" LANE
LT & RT SIDE

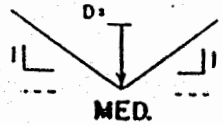
CUT — MED. — FILL

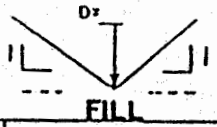
PROJECT Springhill Phases 3 & 4
BY ____ DATE ____

STA.	TO STA.	FLOW	0.9 WS/CA	0.5 WS/CA	0.3 WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft-Ft	ALLOW VEL	Earth n=.03 VEL.	Protective Lining n=.05 On	n=.05 VEL.	n=.05 DEP.	n=.015 On	n=.015 DEP.	I_{10}	Q_{10}	DEP.	REMARKS
18+81.51 Box Culv.	11+00	↓	0.034	0.024	0.01	—	0.068	5	5.7	0.39		.0208	2.5			1.23	0.32			7.1	0.48	0.35	
11+00	12+00	↓	0.023	0.016	0.04	0.079	0.147	7	5.3	0.78		.0225	2.5			1.51	0.42			6.5	0.96	0.45	
12+00	13+00	↓	0.023	0.016	0.09	0.129	0.276	8.2	5.0	1.38		.0248	2.5	EW		1.79	0.51			6.2	1.71	0.55	
13+00	14+00	↓	0.023	0.016	0.04	0.079	0.355	9.1	4.75	1.69		.0253	2.5	EW		1.91	0.54			6.0	2.13	0.59	
14+00	14+18	↓	0.004	0.003	0.021	0.034	0.389	9.3	4.75	1.85		.0253	2.5	EW		1.96	0.56			5.9	2.30	0.61	
STRUCTURE # 2																							
14+18	15+00	↓	0.002	0.013	0.039	—	0.072	5	5.7	0.41		.0177	2.5			1.17	0.34			7.1	0.51	0.37	
15+00	15+57	↓	0.013	0.009	0.038	0.060	0.132	6.7	5.5	0.72		.001	2.5			0.46	0.72			6.7	0.88	0.78	
STRUCTURE #3																							
15+57	16+12	↑	0.013	0.009	0.042	—	0.064	5	5.7	0.36		.001	2.5			0.39	0.56			7.1	0.45	0.61	
ROAD "H" RIGHT SIDE																							
10+00	11+00	↓	0.023	0.016	0.012	-	0.051	5	5.7	0.29		.0208	2.5			1.14	0.29			7.1	0.36	0.32	
11+00	12+00	↓	0.023	0.016	0.027	0.066	0.117	6.5	5.3	0.62		.0225	2.5			1.42	0.38			6.6	0.77	0.41	
12+00	13+00	↓	0.023	0.016	0.072	0.111	0.228	7.7	5.1	1.16		.0248	2.5	EW		1.73	0.47			6.3	1.40	0.51	
13+00	14+00	↓	0.023	0.016	0.016	0.055	0.283	8.7	4.9	1.39		.0253	2.5	EW		1.82	0.50			6.1	1.73	0.55	
14+00	15+00	↓	0.023	0.016	0.003	0.042	0.325	9.6	4.7	1.53		.0177	2.5	EW		1.63	0.56			5.9	1.92	0.61	
15+00	15+57	↓	0.013	0.009	0.002	0.024	0.349	10.6	4.6	1.61		.001	2.5			0.56	0.98			5.7	1.99	1.06	
STRUCTURE #4																							
15+57	16+12	↑	0.013	0.009	0.002	—	0.024	5	5.7	0.14		.001	2.5			0.31	0.39			7.1	0.17	0.42	

LANE ____ SIDE ____







PROJECT ____ BY ____ DATE ____

STA.	TO STA.	FLOW	0.9 WS/CA	0.5 WS/CA	0.3 WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft/Ft	ALLOW. VEL.	Earth n=.03 VEL.	Protective Lining n=.05 On	n=.05 VEL.	n=.05 DEP.	n=.015 Q/Q	n=.015 DEP.	I_{10}	Q_{10}	DEP.	REMARKS
	BOX WOOD					LEFT																	
19+31.81	20+00	↓	0.015	0.011	0.004	–	0.03	5	5.7	0.171		.0157				0.90	0.25			7.1	0.21	0.27	
20+00	21+00	↓	0.023	0.016	0.027	0.066	0.096	6.3	5.4	0.52		.0157				1.19	0.38			6.6	0.63	0.41	
21+00	21+77.2	↓	0.018	0.012	0.034	0.064	0.160	7.7	5.1	0.82		.0157				1.33	0.45			6.4	1.02	0.49	
	ROAD			'T'		LEFT																	
21+77.2 10+00	11+00	↓	0.023	0.016	0.01	0.049	0.209	8.7	4.8	1.00		.0280				1.74	0.44			6.1	1.27	0.48	
11+00	12+00	↓	0.023	0.016	0.003	0.042	0.251	9.6	4.6	1.15		.0311				1.88	0.45	4.67	0.29	5.8	1.46	0.31	STA 11+50 PAVED DITCH
12+00	13+00	↓	0.023	0.016	0.003	0.042	0.293	9.9	4.6	1.35		.0311						4.82	0.31	5.7	1.67	0.33	
13+00	14+00	↓	0.023	0.016	0.003	0.042	0.335	10.2	4.6	1.54		.001						1.37	0.61	5.7	1.91	0.66	
2.27 14+00	14+37.7	↓	0.009	0.006	0.001	0.016	0.351																
	TEAKWOOD					RIGHT																	
14+37.7 22+98.45	22+00	↓	0.022	0.016	0.026	0.064	0.415	10.7	4.5	1.87		.010						3.42	0.43	5.6	2.32	0.46	
22+00	21+55.62	↓	0.013	0.009	0.004	0.026	0.441	11	4.5	1.98		.001						1.46	0.67	5.6	2.47	0.73	
	STRUCTURE # 57																						

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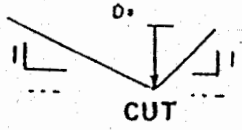
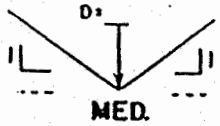
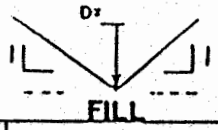
LANE

SIDE







PROJECT SPRINGHILL PHASES 3 & 4

BY ____ DATE ____

STA. TO STA.		FLOW	0.9 WS/CA	0.5 WS/CA	0.3 WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft-Ft	ALLOW VEL.	Earth n=.03 VEL.	Protective Lining n=.05 On	VEL.	DEP.	n=.015 Q	DEP.	I_{10}	Q_{10}	DEP.	REMARKS
	ROAD		'I'	RIGHT																			
10+00	11+00		.023	.016	.004	—	0.043	5	5.7	.245		.0280				0.79	0.13			7.1	.305	0.28	
11+00	12+00		.023	.016	.012	0.051	0.094	7.1	5.2	.489		.0311				1.52	0.33	3.74	0.21	6.4	.602	0.35	BEGIN FLOW DITCH 11+75
12+00	13+00		.023	.016	.011	0.050	0.144	8.2	4.9	.706		.0311						4.10	0.24	6.1	.878	0.26	
13+00	14+00		.023	.016	.030	0.069	0.213	8.6	4.8	1.02		.001						1.24	0.52	6.1	1.30	0.51	
14+00	14+37.7		.009	.006	.001	0.016	0.229	9.0	4.8	1.10		.001						1.26	0.54	6.0	1.37	0.43	
	TEAKWOOD			RIGHT																			
14+37.7 22+98.45	23+93		.021	.015	.011	0.047	0.276	9.5	4.7	1.29		.008						2.86	0.39	5.8	1.60	0.42	
	STRUCTURE			#	10																		

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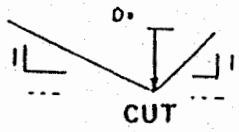
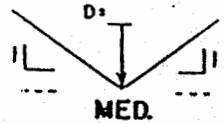
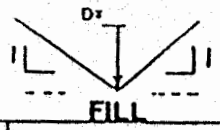
____ LANE

____ SIDE





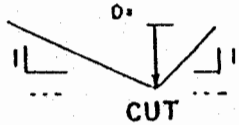


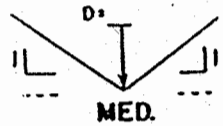
PROJECT _____

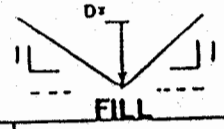
BY____ DATE _____

STA. TO STA.		FLOW	Q. WS/CA	Q. WS/CA	Q. WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft/Ft	ALLOW VEL.	Earth n=.03 VEL.	Protective Lining n=.05 On	n=.05 VEL.	n=.05 DEP.	n=.015 On	n=.015 DEP.	I_{10}	Q_{10}	DEP.	REMARKS
BOXWOOD LANE LEFT SIDE																							
21+77.25	22+00	↓	.005	.004	0	—	.009	5	5.7	.051		.0157				0.67	0.16			7.1	.064	0.17	
22+00	23+00	↓	.023	.016	.026	.065	.074	6.9	5.3	.392		.0157				1.80	0.27			6.5	.481	0.29	
23+00	24+00	↓	.023	.016	.011	.050	.124	7.8	5.1	.632		.0068				0.91	0.48			6.3	.781	0.52	
24+00	24+38.7	↓	.009	.006	.009	.024	.148	9.6	4.7	.696		.001				0.46	0.71			5.8	.858	0.77	
STRUCTURE #7																							
24+38.7	25+00	↑	.014	.01	.016	.04	.071	6.1	5.4	.383		.001				0.39	0.57			6.7	.476	0.62	
25+00	25+53.6	↑	.012	.009	.010	—	.031	5	5.7	.177		.0108				0.79	0.27			7.1	.22	0.30	
HIGH PT.																							
25+53.6	26+00	↓	.010	.007	.003	—	.02	5	5.7	.114		.0093				0.67	0.24			7.1	.142	0.26	
26+00	27+00	↓	.023	.016	.007	.046	.066	6.2	5.4	.356		.0296				1.37	0.29			6.7	.442	0.32	
27+00	28+00	↓	.023	.016	.007	.046	.112	7.4	5.1	.571		.0296				1.55	0.35			6.4	.717	0.38	
28+00	29+00	↓	.023	.016	.017	.056	.168	8.5	4.8	.806		.005				0.87	0.56			6.1	1.02	0.61	
29+00	29+26.5	↓	.006	.004	0	.010	.178	10.4	4.5	.801		.001				0.47	0.75			5.7	1.01	0.82	
TEAKWOOD DRIVE RIGHT SIDE																							
29+26.5 26+90.3	26+00		.021	.015	.026	—	.062	10.4	4.5	.279		.0174				1.06	0.30			5.7	.353	0.32	
26+00	25+25		.019	.012	.018	.049	.111	11.4	4.3	.477		.001				0.42	0.62			5.6	.622	0.68	
STRUCTURE #11																							

Boxwood LANE
Rt. SIDE





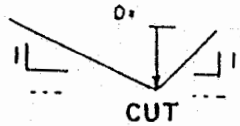


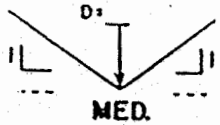
PROJECT Springhill Phases 3 & 4
BY ____ DATE ____

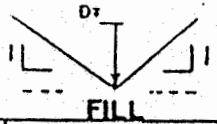
STA. TO STA.		FLOW	0.9 WS/CA	0.5 WS/CA	0.3 WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft-Ft	ALLOW VEL	Earth n=.03 VEL.	Protective Lining n=.05 On	n=.05 VEL.	n=.05 DEP.	n=.015 On	n=.015 DEP.	I_{10}	Q_{10}	DEP.	REMARKS
18+81.61	20+00	↓	0.027	0.019	0.01	—	0.056	5	5.7	0.32		.0157	2.5			1.06	0.32			7.1	0.40	0.35	
20+00	21+00	↓	0.023	0.016	0.003	0.042	0.098	6.9	5.25	0.51		.0157	2.5			1.22	0.39			6.6	0.65	0.41	
21+00	22+00	↓	0.023	0.016	0.003	0.042	0.140	8.3	5.0	0.70		.0157	2.5			1.28	0.43			6.1	0.85	0.46	
22+00	23+00	↓	0.023	0.016	0.003	0.042	0.182	9.6	4.7	0.86		.0157	2.5			1.35	0.46			5.8	1.06	0.50	
23+00	24+00	↓	0.023	0.016	0.003	0.042	0.224	10.8	4.5	1.01		.0068	2.5			1.03	0.57			5.6	1.25	0.62	
24+00	24+38.67	↓	0.009	0.006	0.001	0.016	0.240	12.4	4.3	1.03		.001	2.5			0.50	0.83			5.4	1.30	0.90	
	STRUCTURE #6																						
24+38.67	25+00	↑	0.014	0.01	0.002	0.026	0.048	7.2	5.2	0.25		.001	2.5			0.35	0.49			6.4	0.31	0.53	
25+00	25+53.68	↑	0.012	0.008	0.002	—	0.022	5	5.7	0.125		.0108	2.5			0.41	0.1			7.1	0.156	0.26	
	HIGH PT.																						
25+53.68	26+00	↓	0.011	0.015	0.002	—	0.028	5	5.7	0.16		.0093	2.5			0.73	0.27			7.1	0.199	0.29	
26+00	26+85	↓	0.023	0.016	0.003	0.042	0.070	6.9	5.25	0.362		.0265	2.5			1.33	0.30			6.5	0.46	0.33	
	PIPE 16 to 17																						
From Rd. J.		↓	0.104	0.042	0.010	—	0.156																
27+15	28+00	↓	0.023	0.016	0.156	0.195	0.351	10	4.6	1.61		.0296	2.5			2.0	0.52			5.8	2.04	0.57	
28+00	29+20	↓	0.027	0.019	0.043	0.089	0.440	10.8	4.5	1.98		.005	2.5			1.08	0.78			5.7	2.51	0.85	

2-27

TEAKWOOD LANE
Right SIDE







PROJECT _____
BY ____ DATE ____

STA.	TO STA.	FLOW	0.9 WS/CA	0.5 WS/CA	0.3 WS/CA	C A INCR.	C A ACC.	Tc	I_2	Q_2	C or F	Slope Ft/Ft	ALLOW. VEL.	Earth n=.03 VEL.	Protective Lining n=.05 On	n=.05 VEL.	n=.05 DEP.	n=.015 On	n=.015 DEP.	I_{10}	Q_{10}	DEP.	REMARKS
17+06.72	18+00	↓	0.021	0.015	0.008	–	.044	5	5.7	.251		.0154				0.99	0.29			7.1	.312	0.32	
18+00	19+00	↓	0.023	0.016	0.007	.046	.090	6.6	5.3	.477		.0355				1.58	0.32	3.91	0.20	6.7	.603	0.22	BEGIN PROPO DITCH 18+75
19+00	19+71.3	↓	0.016	0.011	0.004	.031	.121	7.7	5.1	.617		.03976						4.35	0.22	6.3	.762	0.24	
			EXISTING			STRUCTURE																	
19+71.3	20+00		0.007	0.005	0.026	–	0.038	5	5.7	.217		.03976						3.35	0.15	7.1	.270	0.16	
21+00	21+59.8		0.014	0.01	0.002	0.026	0.064	5.3	5.6	.358		.001						0.95	0.35	7.0	.448	0.38	
			STRUCTURE			#5																	
23+95	25+05		0.026	0.019	0.177	–	0.222	5	5.7	1.27		.001				0.53	0.89			7.1	1.58	0.97	
			STRUCTURE			#11																	
			PIPE			18		to		19													
27+10	28+00	↑	0.020	0.014	0.022	0.056	0.183	7.3	5.2	.952		.0174				1.44	0.47			6.4	1.171	0.51	
28+00	29+00	↑	0.023	0.016	0.035	0.074	0.127	5.9	5.5	.698		.0138				1.22	0.44			6.8	.864	0.47	
29+00	29+50	↑	0.023	0.016	0.014	–	0.053	5	5.7	.302		.0103				0.89	0.34			7.1	.376	0.37	

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FILE: HGL.XLT

21-May-98

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

Project: SPRINGHILL PHASES 3 & 4
Location: JAMES CITY COUNTY , VIRGINIA

HYDRAULIC GRADE LINE CALCULATIONS

1. Enter Tailwater Elev.(ft) ? 50.57 10 YEAR W/S IN POND

2. Enter "N" value for pipe? 0.013

3. Enter the following data: [E]

90 deg K=0.70	40 deg K=0.38
80 deg K=0.66	30 deg K=0.28
70 deg K=0.61	25 deg K=0.22
60 deg K=0.55	20 deg K=0.16
50 deg K=0.47	15 deg K=0.10

FROM PT.	TO PT.	Q OUT (cfs)	PIPE DIA.	L OUT (ft.)	FRICTION SLOPE	NSTREA INVERT	V OUT (FPS)	M.H.	INLET SHAPE	Q IN (cfs)	PIPE DIA.	ANGLE "K"	V IN (fps)	F.L.E.	H.G.E.	HF	HO	HI	HD	HT	.3HT	.5HT	H
[E]	[E]	[E]	[E]	[E]		[E]		[E]	[E]			[E]		RIM [E]									
18	17	4.37	15	75	0.0046	51.45	3.56	N	Y	0.00	0	0.00	0.00	54.34	53.80	0.35	0.05	0.00	0.00	0.05	0.01	0.01	0.35
17	16	5.48	15	108	0.0073	50.05	4.47	N	Y	4.37	15	0.16	3.56	53.86	53.45	0.78	0.08	0.07	0.03	0.18	0.05	0.03	0.81
16	15	8.62	18	42	0.0068	49.63	4.88	N	Y	5.48	15	0.55	4.47	53.07 52.40	52.64	0.28	0.09	0.11	0.17	0.37	0.11	0.06	0.34
15	13	10.98	24	115	0.0024	48.73	3.50	N	Y	8.62	18	0.55	4.88	52.42	52.30	0.27	0.05	0.13	0.20	0.38	0.11	0.06	0.33
13	14	17.60	30	83	0.0018	48.03	3.59	Y	Y	10.98	24	0.10	3.50	54.73	51.97	0.15	0.05	0.07	0.02	0.14	0.14	0.07	0.22
14	23	17.60	30	138	0.0018	47.60	3.59	Y	Y	17.60	30	0.10	3.59	55.06	51.75	0.25	0.05	0.07	0.02	0.14	0.14	0.07	0.32
23	24	51.20	36	134	0.0059	46.20	7.24	N	Y	17.60	30	0.70	3.59	52.70	51.42	0.79	0.20	0.07	0.14	0.41	0.12	0.06	0.85
															50.57 TAILWATER								

SPRINGHILL Phase 2

1. Project drains to 2 culverts under Congressional in Fords Colony

2. Fords Colony Design -

   DA = 55.47 C = 0.30 T_c = 30min

   Q_2 = 44.9 cfs

   Q_{10} = 59.9 cfs

3. 2 designs

   a) 2 - 30" pipes @ 1.25%

   Inlet Control - HW = 2.7

   invert in = 36.5 + 2.7 = 39.2'

   b) Revised Plan -

   2 - 36" ASCP, Type 2 culverts

   HW = 2.35 - Inlet Control - adjusted for ASCP -

   HW = 3.83' -

   - same slope + inverts.

4. Outfall Ditch

   Conc. 3' bott. Trapezoidal ditch w/ 1:1 SS @ 1.5%

   Capacity = 120 cfs

5. Culvert Capacity

   Dual 36" pipes -

   HW/D = 1.0 - Q = 35 cfs - inlet control HW = 3'

   Outlet control k_e = 0.5 L = 50', H = 1.1 HW = H + h_o - LS_o = 1.1 + 1.3 - .5 = 1.9'

   d_c = 1.8 h_o @ 70 cfs = 1.3

(over)

Try $HW/D = 1.1 = 3.3$

Inlet control - $Q = 40$ cfs / pipe

Qmax then for $Q_{10} = 80$ cfs.

SPRINGHILL - PHASE 2

1. Drainage area to culvert under Congressional in Fords Cor = 57.0 ac
   Capacity of dual culverts = 80 cfs - for Q_{10}

2. EXISTING Subarea of 27 acres which incl. Phase II (Subarea 3)
   Q_{10} = 50 cfs

3. BMP for Ph 2 + 3 - 19.85 ac
   Q_{10} = 12.

4. Area of 9.31 ac - called subarea 2 - undeveloped & not intercepted by BMP
   Q_{10} = 31 cfs

5. Remainder of W/S to culverts

BMP Q_{10}	= 12
9.31 Ac	= 31
9.75 AC (dev)	= 27
20.25 Ac (undev)	= 48
3.35 Ac (undev)	= 11
	129 cfs

6. Predev Q_{10} (wshed) = 125 cfs

   however timing of flows is not considered in model nor is ponding / swampy area @ the two culverts @ Congressional

7. Comparing to ~~rat~~ ratio eqn design t_c = 30 min I = 3.63
   Q = 3.63 x 57 x 0.4 = 82.8 cfs vs 80 cfs capacity - ok

STORMWATER MANAGEMENT
AND
B.M.P. CALCULATIONS
BASIN NO. 2

SPRINGHILL SUBDIVISION
PHASE 2

REVISED JANUARY 3, 1996

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STORMWATER MANAGEMENT/B.M.P.

BASIN #2

SUMMARY

SPRINGHILL SUBDIVISION
STORMWATER MANAGEMENT SUMMARY
BMP #2

STORM EVENT	WATER SURFACE ELEVATION	PEAK OUTFLOW FROM BASIN C.F.S.	PRE-DEVELOPED FLOW	TOTAL REDUCTION/INCREASE IN FLOWS
2 YEAR	49.07	10.14	15.03	4.89 LESS
10 YEAR	50.05	12.37	19.89	7.52 LESS
25 YEAR	51.13	14.49	22.54	8.05 LESS
100 YEAR	52.64	29.29	26.96	2.33 MORE

NOTE: 10 YEAR STORM EVENT ELEVATION 50.05 WAS USED AS THE TAILWATER ELEVATION FOR THE HYDRAULIC GRADE LINE CALCULATION

57 acres total w/s to culvert @
Q_{10} from 19.85 ac = 12.37 cfs
7.15 ac – uncontrolled + undeveloped.

B.M.P. CALCULATIONS

BASIN #2

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
#1 WET POND (#7)	9	x	16.42 / (82.03 - 33.3)=0.337	=	3.03 PHASE 1 EXISTING
#2 WET POND (#6)	8	x	19.85 / (82.03 - 33.3)=0.407	=	3.26 PHASE II, III, & IV
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 6.29

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
33.3 / 82.03 =0.406	x	10 (0.1 per 1%)	=	4.07

C. TOTAL WEIGHTED POINTS

6.29	+		=	10.36
Structural BMP Points		Natural Open Space Points		TOTAL

SPRINGHILL SUBDIVISION

BMP #2

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

The Drainage, Stormwater Management, and Erosion control facilities for Phase 2 have been developed in basic conformance with the "Overall Drainage and Stormwater Management Plan." We have designed the wet pond as an 8 point BMP using 2.5 times the volume required by the Chesapeake Bay Preservation Act. The design volume required is as follows:

Required Volume of BMP 2

$$V_r = \frac{(R_m)(R_v)}{12} \times Ac.$$

$R_v = (0.05 + 0.009I) =$ [0.05 + 0.009(30.0)] = 0.320 (Where I = 30% from CBLAM Sheet C-10, attached, ave. lot size 0.25 Ac.)

$R_m = 0.45"$

Ac. = 19.85 Acres

$$V_r = \frac{(0.45)(0.32)}{12} \times 19.85 = 0.238 \text{ ac.-ft.} = 10{,}376 \text{ cu. ft.}$$

An 8 Point BMP wet pond requires 2.5 x V_r normal storage.

V_r x 2.5 = 0.238 ac.-ft. x 2.5 = 0.60 ac.-ft. = 26,136 cu. ft.

The BMP pond was designed using the Modified Rational Method and run on Haestad Methods Inc.'s Quick TR-55 and Pond-2 software. Intensity, Duration, and Frequency Curve data used was taken from the VDOT Drainage Manual for Norfolk (Rev. 6/92).

ANNUAL STORM PHOSPHOROUS EXPORT *TABLE 1*

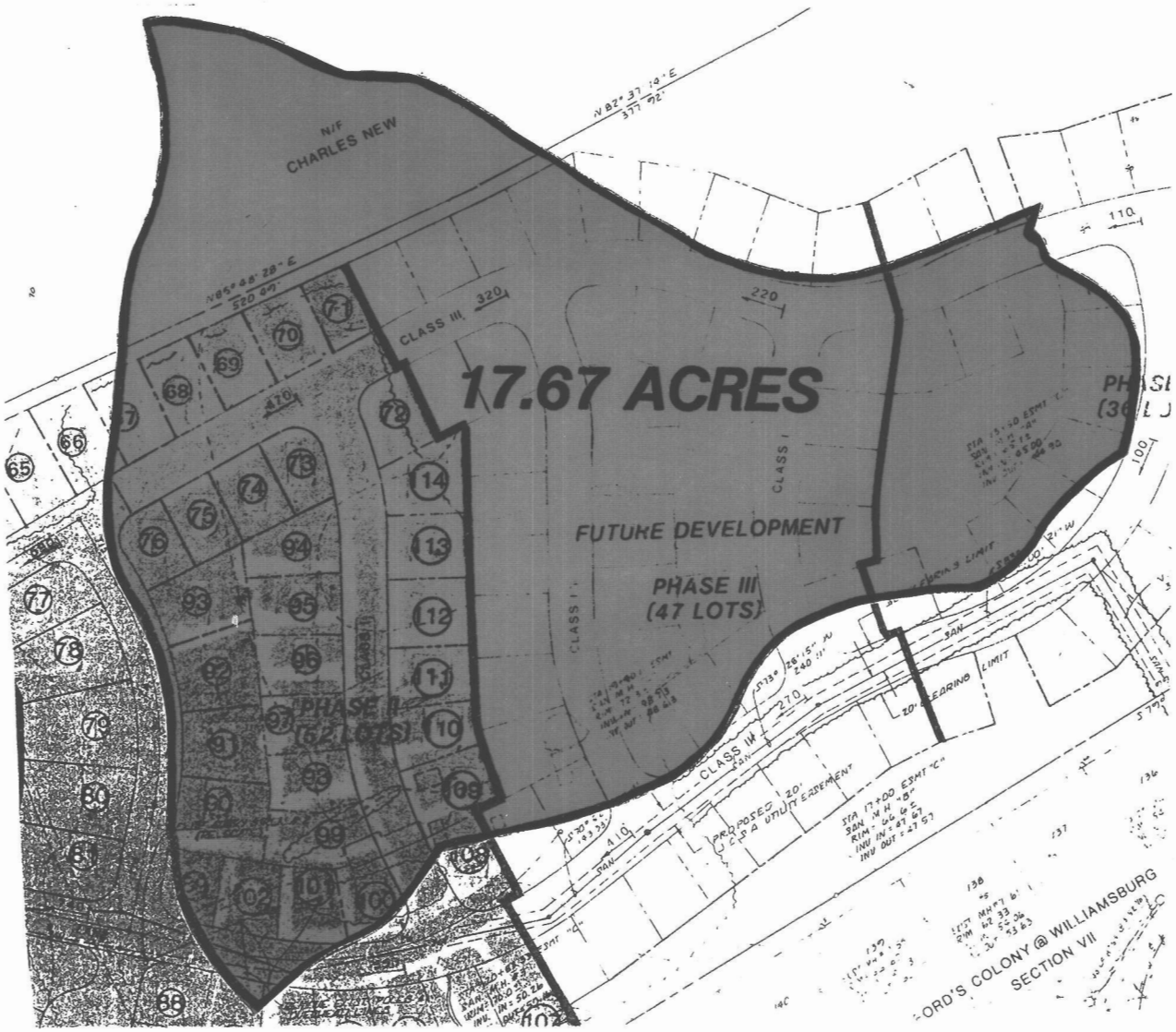
For Existing Urban Land Uses
(in pounds/acre/year)

LAND USES	IMPERVIOUS COVER (%)	ANNUAL RAINFALL (in) 40	41	42	43	44	45
	0	0.11	0.11	0.11	0.11	0.12	0.12
5.0 acre residential lots	5	0.20	0.21	0.21	0.22	0.22	0.23
2.0 acre residential lots	10	0.30	0.30	0.31	0.32	0.33	0.33
1.0 acre residential lots	15	0.39	0.40	0.41	0.42	0.43	0.44
	16	0.41	0.42	0.43	0.44	0.45	0.46
	17	0.43	0.44	0.45	0.46	0.47	0.48
	18	0.45	0.46	0.47	0.48	0.49	0.51
	19	0.47	0.48	0.49	0.50	0.52	0.53
0.50 acre residential lots	20	2.03	2.08	2.13	2.18	2.23	2.28
0.33 acre residential lots	25	2.42	2.48	2.54	2.61	2.67	2.72
0.25 acre residential lots	30	2.82	2.89	2.96	3.03	3.10	3.17
	35	3.22	3.30	3.38	3.46	3.54	3.62
Townhouses	40	3.61	3.70	3.79	3.88	3.97	4.06
	45	4.01	4.11	4.21	4.31	4.41	4.51
	50	4.41	4.52	4.63	4.74	4.85	4.96
Garden Apartments	55	4.80	4.92	5.04	5.16	5.28	5.40
	60	5.20	5.33	5.46	5.59	5.72	5.85
	65	5.60	5.74	5.88	6.02	6.16	6.30
Light	70	5.99	6.14	6.29	6.44	6.59	6.74
Commercial/Industrial	75	6.39	6.55	6.71	6.87	7.03	7.19
	80	6.79	6.96	7.13	7.29	7.46	7.63
Heavy	85	7.98	8.17	8.37	8.57	8.77	8.97
Commercial/Industrial	90	7.58	7.77	7.96	8.15	8.34	8.53
	95	7.98	8.17	8.37	8.57	8.77	8.97
Asphalt/Pavement	100	8.37	8.58	8.79	9.00	9.21	9.42

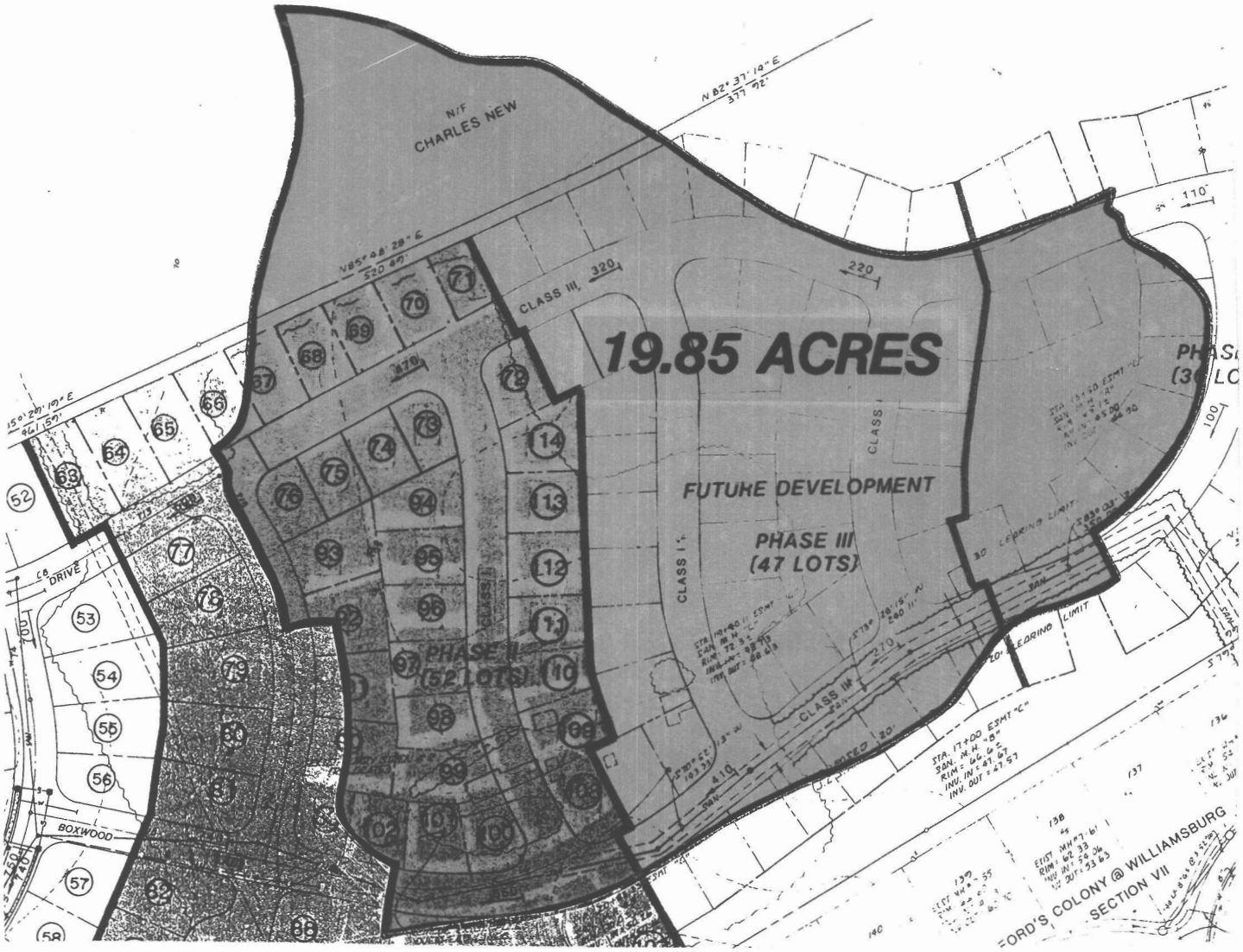
For Non-Urban Land Uses
(in pounds/acre/year)

LAND USE	SILT LOAM SOILS	LOAM SOILS	SANDY LOAM SOILS
Conventional Tillage Cropland	3.71	2.42	0.83
Conservation Tillage Cropland	2.32	1.52	0.52
Pasture Land	0.91	0.59	0.20
Forest Land	0.19	0.12	0.04

PRE AND POST DEVELOPMENT CALCULATIONS



SPRINGHILL SUBDIVISION
PRE-DEVELOPED WATERSHED



SPRINGHILL SUBDIVISION
POST-DEVELOPMENT WATERSHED

SPRINGHILL SUBDIVISION
STORMWATER MANAGEMENT
BMP #2

WATERSHED AREAS

PRE-DEVELOPED AREA	=	17.67 ACRES
POST-DEVELOPED AREA	=	19.85 ACRES

RUNOFF COEFFICIENT

PRE-DEVELOPED COEFFICIENT	=	0.25
POST-DEVELOPED COEFFICIENT (WEIGHTED)	=	0.46
1. 3.47 AC. OFF-SITE @ 0.30	=	1.04
2. 0.99 AC. OPEN SPACE @ 0.30	=	0.30
3. 15.39 AC. DEVELOPED AREA 0.50	=	7.70
TOTAL	=	9.04
COEFFICIENT 9.04 ÷ ACRES 19.85	=	0.46

TIME OF CONCENTRATION

0.5 in original calcs

PRE-DEVELOPED T_C	=	22 MINUTES
POST-DEVELOPED T_C	=	17 MINUTES (FROM DRAINAGE CALCULATIONS)

RAINFALL INTENSITIES

PRE-DEVELOPED (22 MINUTES)

2 YEAR STORM	=	3.4 INTENSITY
10 YEAR STORM	=	4.5 INTENSITY
25 YEAR STORM	=	5.1 INTENSITY
100 YEAR STORM	=	6.1 INTENSITY

PC030_SPRINGHILL_SUBDIVISION_PHASE_TWO-THIRDS - 088

SPRINGHILL SUBDIVISION
STORMWATER MANAGEMENT
BMP #2

POST-DEVELOPED (17 MINUTES)

2 YEAR STORM	=	3.8 INTENSITY
10 YEAR STORM	=	5.0 INTENSITY
25 YEAR STORM	=	5.8 INTENSITY
100 YEAR STORM	=	6.9 INTENSITY

FLOWS

PRE-DEVELOPED Q

AREA X COEFFICIENT				=		CA
17.67 X 0.25				=		4.42
2 YEAR STORM	4.42	X	3.4	=	Q_2	15.03
10 YEAR STORM	4.42	X	4.5	=	Q_{10}	19.89
25 YEAR STORM	4.42	X	5.1	=	Q_{25}	22.54
100 YEAR STORM	4.42	X	6.1	=	Q_{100}	26.96

POST-DEVELOPED Q

AREA X COEFFICIENT				=		CA
19.85 X 0.46				=		9.13
2 YEAR STORM	9.13	X	3.8	=	Q_2	34.70
10 YEAR STORM	9.13	X	5.0	=	Q_{10}	45.66
25 YEAR STORM	9.13	X	5.8	=	Q_{25}	57.96 + 1.1%
100 YEAR STORM	9.13	X	6.9	=	Q_{100}	63.00 + 1.25%

INFLOW HYDROGRAPH

BASIN #2

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

```
*****************************************************************************
*****************************************************************************
*                                                                           *
*                                                                           *
*                        MODIFIED RATIONAL METHOD                           *
*             ---- Grand Summary For All Storm Frequencies ----             *
*                                                                           *
*                                                                           *
*****************************************************************************
*****************************************************************************
```

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

Area = 19.85 acres Tc = 17.00 minutes

Frequency (years)	Adjusted 'C'	Duration minutes	Intens. in/hr	Qpeak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
2	0.455	54	1.920	17.34	15.03	56,192	24,179
10	0.455	46	2.910	26.29	19.89	72,549	34,957
25	0.501	50	3.250	32.29	22.54	96,879	51,574
100	0.569	88	2.863	32.33	26.96	170,706	85,782

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY:   2 yr      |  Allowable Outflow:   15.03 cfs          *
*  'C' Adjustment: 1.000         |  Required Storage:    24,179 cu.ft.      *
*---------------------------------------------------------------------------*
*  Peak Inflow:   17.34 cfs        Inflow .HYD stored: 2INS     .HYD        *
*****************************************************************************
```

```
   |                Td =  54 minutes                    |  Return Freq:      2 yr
   /------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.00
   |                                                    |
   |                                                    |
   |                 Tc=   17.00  minutes               |
   |                 I =   3.800  in/hr                 |  Area (ac):     19.85
   |               . Q =   34.33  cfs                   |  Weighted C:     0.46
   |              .|.                                   |  Adjusted C:     0.46
F  |             .   .                                  |
L  |            .  |  .              Required Storage   |
O  |          .       .        .--     24,179 cu.ft.   |  Td=       54 minutes
W  |         .    |    .       |                       |  I =    1.920 in/hr
   |        .     x x x x x x x|x x x x x x x x x x x   |  Q =    17.34 cfs
c  |       .                   |
f  |      .    x                                        |  x
s  |     .                                              |    o   Q=    15.03 cfs
   |    .   x                                o          |   |x  (Allow.Outflow)
   |   .  x                     .     o                 |
   |  .  x                o     .       NOT TO SCALE    |   x
   | . x        o                .      ============    |
   | o                            .                     |       x
   `-----------------------------------------------------|------------
                                                        56.27 minutes
```

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Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.455 Area= 19.850 acres Tc = 17.00 minutes

Adjusted C = 0.455 Td= 54.00 min. I= 1.92 in/hr Qp= 17.34 cfs

RETURN FREQUENCY: 2 year storm Adj.factor = 1.00
Output file: 2INS .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 2 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.02	2.04	3.06	4.08	5.10	6.12
7.00	7.14	8.16	9.18	10.20	11.22	12.24	13.26
14.00	14.28	15.30	16.32	17.34	17.34	17.34	17.34
21.00	17.34	17.34	17.34	17.34	17.34	17.34	17.34
28.00	17.34	17.34	17.34	17.34	17.34	17.34	17.34
35.00	17.34	17.34	17.34	17.34	17.34	17.34	17.34
42.00	17.34	17.34	17.34	17.34	17.34	17.34	17.34
49.00	17.34	17.34	17.34	17.34	17.34	17.34	16.32
56.00	15.30	14.28	13.26	12.24	11.22	10.20	9.18
63.00	8.16	7.14	6.12	5.10	4.08	3.06	2.04
70.00	1.02	0.00					

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	0.99						
DEV. AREA	0.500	15.39						
			17.00	0.455	0.455	3.800	19.85	34.33

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

Final peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

RETURN FREQUENCY: 2 yr 'C' Adjustment = 1.000 Allowable Q = 15.03 cfs

Hydrograph file duration= 54.00 minutes
Hydrograph file: 2INS .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.455	0.455	17	3.800	19.85	34.33	35,012	19,681
0.455	0.455	20	3.500	19.85	31.62	37,939	21,255
0.455	0.455	30	2.750	19.85	24.84	44,713	23,521
0.455	0.455	40	2.250	19.85	20.32	48,778	23,077
0.455	0.455	50	2.000	19.85	18.07	54,198	23,988
********** Storage Maximum							
0.455	0.455	54	1.920	19.85	17.34	56,192	24,179
0.455	0.455	60	1.800	19.85	16.26	58,534	23,815
0.455	0.455	120	1.150	19.85	10.39	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY:  10 yr      |  Allowable Outflow:     19.89 cfs      *
*  'C' Adjustment: 1.000         |  Required Storage:    34,957 cu.ft.   *
*---------------------------------------------------------------------------*
*  Peak Inflow:   26.29 cfs        Inflow .HYD stored: 10INS    .HYD      *
*****************************************************************************
```

```
   |                Td =  46 minutes                    |  Return Freq:     10 yr
   /------- Approx. Duration for Max. Storage ------/    |  C adj.factor: 1.00
   |                                                    |
   |                                                    |
   |                 Tc=   17.00  minutes               |
   |                 I =   5.030  in/hr                 |  Area (ac):     19.85
   |               . Q =   45.44  cfs                   |  Weighted C:     0.46
   |             .|.                                    |  Adjusted C:     0.46
F  |            .   .                                   |
L  |          .  |  .              Required Storage     |
O  |        .       .         .--     34,957 cu.ft.    |  Td=       46 minutes
W  |      .     |     .       |                        |  I =    2.910 in/hr
   |     .      x x x x x x x|x x x x x x x x x x x x   |  Q =    26.29 cfs
c  |    .                    |                          |
f  |   .    x                                           |  x
s  |  .                                                 |    o   Q=    19.89 cfs
   |  .   x                                o            |   |x  (Allow.Outflow)
   |  .  x                     .     o                 |
   |  .  x                o    .        NOT TO SCALE    |   x
   | . x        o                .       ============   |
   | o                            .                     |       x
   `-----------------------------------------------------|-----------
                                                        50.14 minutes
```

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Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.455 Area= 19.850 acres Tc = 17.00 minutes

Adjusted C = 0.455 Td= 46.00 min. I= 2.91 in/hr Qp= 26.29 cfs

RETURN FREQUENCY: 10 year storm Adj.factor = 1.00
Output file: 10INS .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 10 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.55	3.09	4.64	6.18	7.73	9.28
7.00	10.82	12.37	13.92	15.46	17.01	18.55	20.10
14.00	21.65	23.19	24.74	26.29	26.29	26.29	26.29
21.00	26.29	26.29	26.29	26.29	26.29	26.29	26.29
28.00	26.29	26.29	26.29	26.29	26.29	26.29	26.29
35.00	26.29	26.29	26.29	26.29	26.29	26.29	26.29
42.00	26.29	26.29	26.29	26.29	26.29	24.74	23.19
49.00	21.65	20.10	18.55	17.01	15.46	13.92	12.37
56.00	10.82	9.28	7.73	6.18	4.64	3.09	1.55
63.00	0.00						

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SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 10 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	0.99						
DEV. AREA	0.500	15.39						
			17.00	0.455	0.455	5.030	19.85	45.44

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

RETURN FREQUENCY: 10 yr 'C' Adjustment = 1.000 Allowable Q = 19.89 cfs

Hydrograph file duration= 46.00 minutes
Hydrograph file: 10INS .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.455	0.455	17	5.030	19.85	45.44	46,345	26,057
0.455	0.455	20	4.700	19.85	42.46	50,946	28,868
0.455	0.455	30	3.750	19.85	33.87	60,973	32,928
0.455	0.455	40	3.150	19.85	28.45	68,289	34,278
********** Storage Maximum							
0.455	0.455	46	2.910	19.85	26.29	72,549	34,957
**********							
0.455	0.455	50	2.750	19.85	24.84	74,522	34,543
0.455	0.455	60	2.450	19.85	22.13	79,671	33,725
0.455	0.455	120	1.600	19.85	14.45	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY:  25 yr      |  Allowable Outflow:     22.54 cfs      *
*  'C' Adjustment: 1.100         |  Required Storage:     51.574 cu.ft.  *
*---------------------------------------------------------------------------*
*  Peak Inflow:   32.29 cfs        Inflow .HYD stored: 25INS    .HYD      *
*****************************************************************************
```

```
   |                Td =  50 minutes                    |  Return Freq:     25 yr
   /------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.10
   |                                                   |
   |                                                   |
   |                Tc=   17.00  minutes               |
   |                I =   5.760  in/hr                 |  Area (ac):     19.85
   |              . Q =   57.23  cfs                   |  Weighted C:     0.46
   |            .|.                                    |  Adjusted C:     0.50
F  |           .   .                                   |
L  |          .  |  .              Required Storage    |
O  |         .       .         .--    51.574 cu.ft.    |  Td=       50 minutes
W  |        .    |    .        |                      |  I =    3.250 in/hr
   |       .     x x x x x x x|x x x x x x x x x x x   |  Q =    32.29 cfs
c  |      .                   |
f  |     .    x                                        |  x
s  |    .                                                |    o   Q=   22.54 cfs
   |   .  x                                  o          |  |x  (Allow.Outflow)
   |  .  x                   .     o                   |
   | .  x                o     .        NOT TO SCALE    |   x
   |. x       o                .        ============    |
   |o                            .                      |       x
   '-------------------------------------------------------|------------
                                                        55.13 minutes
```

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.455 Area= 19.850 acres Tc = 17.00 minutes

Adjusted C = 0.501 Td= 50.00 min. I= 3.25 in/hr Qp= 32.29 cfs

RETURN FREQUENCY: 25 year storm Adj.factor = 1.10
Output file: 25INS .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 25 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.90	3.80	5.70	7.60	9.50	11.40
7.00	13.30	15.20	17.10	19.00	20.90	22.80	24.69
14.00	26.59	28.49	30.39	32.29	32.29	32.29	32.29
21.00	32.29	32.29	32.29	32.29	32.29	32.29	32.29
28.00	32.29	32.29	32.29	32.29	32.29	32.29	32.29
35.00	32.29	32.29	32.29	32.29	32.29	32.29	32.29
42.00	32.29	32.29	32.29	32.29	32.29	32.29	32.29
49.00	32.29	32.29	30.39	28.49	26.59	24.69	22.80
56.00	20.90	19.00	17.10	15.20	13.30	11.40	9.50
63.00	7.60	5.70	3.80	1.90	0.00		

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 25 years
'C' adjustment, k = 1.1
Adj. 'C' = Wtd.'C' x 1.1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	0.99						
DEV. AREA	0.500	15.39						
			17.00	0.455	0.501	5.760	19.85	57.23

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

RETURN FREQUENCY: 25 yr 'C' Adjustment = 1.100 Allowable Q = 22.54 cfs

Hydrograph file duration= 50.00 minutes
Hydrograph file: 25INS .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.455	0.501	17	5.760	19.85	57.23	58,378	35,387
0.455	0.501	20	5.400	19.85	53.66	64,387	39,368
0.455	0.501	30	4.400	19.85	43.72	78,696	46,914
0.455	0.501	40	3.600	19.85	35.77	85,850	47,306
********** Storage Maximum							
0.455	0.501	50	3.250	19.85	32.29	96,879	51,574
**********							
0.455	0.501	60	2.800	19.85	27.82	100,158	48,091
0.455	0.501	120	1.750	19.85	17.39	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY: 100 yr      |  Allowable Outflow:     26.96 cfs      *
*  'C' Adjustment: 1.250         |  Required Storage:     85,782 cu.ft.  *
*---------------------------------------------------------------------------*
*  Peak Inflow:    32.33 cfs        Inflow .HYD stored: 100INS  .HYD      *
*****************************************************************************
```

```
   |                 Td =  88 minutes                    |  Return Freq:    100 yr
   /-------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.25
   |                                                   |
   |                                                   |
   |                 Tc=    17.00  minutes             |
   |                 I =    6.920  in/hr               |  Area (ac):     19.85
   |               . Q =    78.14  cfs                 |  Weighted C:     0.46
   |             .|.                                   |  Adjusted C:     0.57
F  |            .   .                                  |
L  |           .  |  .              Required Storage   |
O  |          .       .        .--     85,782 cu.ft.   |  Td=       88 minutes
W  |         .    |    .       |                      |  I =    2.863 in/hr
   |        .     x x x x x x x|x x x x x x x x x x x  |  Q =    32.33 cfs
c  |       .                   |
f  |      .    x                                       |  x
s  |     .                                             |    o   Q=    26.96 cfs
   |    .   x                          o               |   |x  (Allow.Outflow)
   |   .  x                  .     o                   |
   |  .  x               o    .       NOT TO SCALE     |   x
   | . x       o                .      ============    |
   | o                            .                    |       x
   \-------------------------------------------------------|-------------
                                                        90.82 minutes
```

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.455 Area= 19.850 acres Tc = 17.00 minutes

Adjusted C = 0.569 Td= 88.00 min. I= 2.86 in/hr Qp= 32.33 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.25
Output file: 100INS .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 100 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.90	3.80	5.71	7.61	9.51	11.41
7.00	13.31	15.21	17.12	19.02	20.92	22.82	24.72
14.00	26.63	28.53	30.43	32.33	32.33	32.33	32.33
21.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
28.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
35.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
42.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
49.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
56.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
63.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
70.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
77.00	32.33	32.33	32.33	32.33	32.33	32.33	32.33
84.00	32.33	32.33	32.33	32.33	32.33	30.43	28.53
91.00	26.63	24.72	22.82	20.92	19.02	17.12	15.21
98.00	13.31	11.41	9.51	7.61	5.71	3.80	1.90
105.00	0.00						

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.25
Adj. 'C' = Wtd.'C' x 1.25

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	0.99						
DEV. AREA	0.500	15.39						
			17.00	0.455	0.569	6.920	19.85	78.14

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 17:13:09 01-03-1996

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

RETURN FREQUENCY: 100 yr C' Adjustment = 1.250 Allowable Q = 26.96 cfs

Hydrograph file duration= 88.00 minutes
Hydrograph file: 100INS .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.455	0.569	17	6.920	19.85	78.14	79,698	52,199
0.455	0.569	20	6.500	19.85	73.39	88,072	58,146
0.455	0.569	30	5.250	19.85	59.28	106,702	68,689
0.455	0.569	40	4.500	19.85	50.81	121,945	75,844
0.455	0.569	50	3.800	19.85	42.91	128,720	74,531
0.455	0.569	60	3.400	19.85	38.39	138,205	75,927
********** Storage Maximum							
0.455	0.569	88	2.863	19.85	32.33	170,706	85,782
**********							
0.455	0.569	120	2.250	19.85	25.41	Qpeak < Qallow	

VOLUME CALCULATIONS

BASIN #2

POND-2 Version: 5.17
S/N: 1295130250

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

CALCULATED 01-04-1996 08:21:46
DISK FILE: b:XHP .VOL

Planimeter scale: 1 inch = 50 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
41.85	1.75	4,375	0	0	0
42.00	1.81	4,525	13,349	667	667
43.00	2.02	5,050	14,355	4,785	5,453
44.00	2.29	5,725	16,152	5,384	10,837
45.00	2.60	6,500	18,325	6,108	16,945
46.00	3.70	9,250	23,504	7,835	24,780
47.00	4.18	10,450	29,532	9,844	34,624
48.00	4.65	11,625	33,097	11,032	45,656
49.00	5.27	13,175	37,176	12,392	58,048
50.00	5.80	14,500	41,497	13,832	71,880
51.00	6.41	16,025	45,768	15,256	87,136
52.00	6.98	17,450	50,197	16,732	103,869
53.00	7.60	19,000	54,659	18,220	122,088
54.00	8.22	20,550	59,310	19,770	141,858

Elevations With Areas Interpolated From
The Closest Two Planimeter Readings

46.15	-----	9,425	28,013	1,401	26,180

IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

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

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*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

BASIN #2 OUTLET STRUCTURES

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
41.85	0.0	
42.17	0.0	
42.49	0.0	
42.81	0.0	
43.13	0.0	
43.45	0.0	
43.77	0.0	
44.09	0.0	
44.41	0.0	
44.73	0.0	
45.05	0.0	
45.37	0.0	
45.69	0.0	
45.76	0.0	
46.01	0.0	
46.33	0.0	
46.65	0.9	1
46.97	2.1	1
47.29	3.5	1
47.61	5.1	1
47.93	6.7	1
48.25	7.8	1
48.57	8.8	1
48.89	9.7	1
49.21	10.5	1
49.53	11.3	1
49.85	12.0	1
50.17	12.6	1
50.49	13.3	1
50.81	13.9	1
51.13	14.5	1
51.45	15.0	1
51.77	15.6	1
52.09	16.1	1
52.41	20.9	1 +2
52.73	32.4	1 +2
53.05	49.1	1 +2
53.15	55.3	1 +2

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

****

Outlet Structure File: b:SHP2 .STR
Planimeter Input File: b:XHP .VOL
Rating Table Output File: b:XHP02 .PND

Min. Elev.(ft) = 41.85 Max. Elev.(ft) = 53.15 Incr.(ft) = .32

Additional elevations (ft) to be included in table:
* *
45.76

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
CULVERT-CR	1		->	1
WEIR-XY	2		->	2

Outflow rating table summary was stored in file:
b:XHP02 .PND

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	46.50
E2 elev.(ft)?	53.151
Diam. (ft)?	1.25
Inv. el.(ft)?	46.15
Slope (ft/ft)?	.0062
T1 ratio?	
T2 ratio?	
K Coeff.?	.0078
M Coeff.?	2.0
c Coeff.?	.0292
Y Coeff.?	.74
Form 1 or 2?	1
Slope factor?	-0.50

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

****

>>>>>> Structure No. 2 <<<<<<
(Input Data)

WEIR-XY
Weir - Defined by X, Y Coordinates
E1 (ft) = 52.15 E2 (ft) = 53.151

X dist.(ft)	Y elev.(ft)
0	53.15
3	52.15
13	52.15
16	53.15

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

****

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages		
41.85	0.0	E < Inv.El.= 46.15		
42.17	0.0	E < Inv.El.= 46.15		
42.49	0.0	E < Inv.El.= 46.15		
42.81	0.0	E < Inv.El.= 46.15		
43.13	0.0	E < Inv.El.= 46.15		
43.45	0.0	E < Inv.El.= 46.15		
43.77	0.0	E < Inv.El.= 46.15		
44.09	0.0	E < Inv.El.= 46.15		
44.41	0.0	E < Inv.El.= 46.15		
44.73	0.0	E < Inv.El.= 46.15		
45.05	0.0	E < Inv.El.= 46.15		
45.37	0.0	E < Inv.El.= 46.15		
45.69	0.0	E < Inv.El.= 46.15		
45.76	0.0	E < Inv.El.= 46.15		
46.01	0.0	E < Inv.El.= 46.15		
46.33	0.0	E < El=46.50		
46.65	0.9	Equ.1: HW =.5	dc=.361	Ac=.294
46.97	2.1	Equ.1: HW =.820	dc=.578	Ac=.555
47.29	3.5	Equ.1: HW =1.14	dc=.758	Ac=.779
47.61	5.1	Transition: HW =1.46		
47.93	6.7	Submerged: HW =1.78		
48.25	7.8	Submerged: HW =2.1		
48.57	8.8	Submerged: HW =2.42		
48.89	9.7	Submerged: HW =2.74		
49.21	10.5	Submerged: HW =3.06		
49.53	11.3	Submerged: HW =3.38		
49.85	12.0	Submerged: HW =3.7		
50.17	12.6	Submerged: HW =4.02		
50.49	13.3	Submerged: HW =4.34		
50.81	13.9	Submerged: HW =4.66		
51.13	14.5	Submerged: HW =4.98		

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
51.45	15.0	Submerged: HW =5.3
51.77	15.6	Submerged: HW =5.62
52.09	16.1	Submerged: HW =5.94
52.41	16.6	Submerged: HW =6.26
52.73	17.1	Submerged: HW =6.58
53.05	17.5	Submerged: HW =6.9
53.15	17.7	Submerged: HW =7.0

Used Unsubmerged Equ. Form (1) for elev. less than 47.56 ft
Used Submerged Equation for elevations greater than 47.66 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=47.56 ft; Q1=4.8 cfs; Dc=.89 ft; E2=47.66 ft; Q2=5.49 cfs

Outlet Structure File: SHP2 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****

SPRINGHILL PHASE 2
STORMWATER MANAGEMENT/B.M.P.
BASIN #2

****

Outflow Rating Table for Structure #2
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages	
41.85	0.0	E < Y min= 52.15	
42.17	0.0	E < Y min= 52.15	
42.49	0.0	E < Y min= 52.15	
42.81	0.0	E < Y min= 52.15	
43.13	0.0	E < Y min= 52.15	
43.45	0.0	E < Y min= 52.15	
43.77	0.0	E < Y min= 52.15	
44.09	0.0	E < Y min= 52.15	
44.41	0.0	E < Y min= 52.15	
44.73	0.0	E < Y min= 52.15	
45.05	0.0	E < Y min= 52.15	
45.37	0.0	E < Y min= 52.15	
45.69	0.0	E < Y min= 52.15	
45.76	0.0	E < Y min= 52.15	
46.01	0.0	E < Y min= 52.15	
46.33	0.0	E < E1= 52.15	
46.65	0.0	E < E1= 52.15	
46.97	0.0	E < E1= 52.15	
47.29	0.0	E < E1= 52.15	
47.61	0.0	E < E1= 52.15	
47.93	0.0	E < E1= 52.15	
48.25	0.0	E < E1= 52.15	
48.57	0.0	E < E1= 52.15	
48.89	0.0	E < E1= 52.15	
49.21	0.0	E < E1= 52.15	
49.53	0.0	E < E1= 52.15	
49.85	0.0	E < E1= 52.15	
50.17	0.0	E < E1= 52.15	
50.49	0.0	E < E1= 52.15	
50.81	0.0	E < E1= 52.15	
51.13	0.0	E < E1= 52.15	
51.45	0.0	E < E1= 52.15	
51.77	0.0	E < E1= 52.15	
52.09	0.0	E < E1= 52.15	
52.41	4.3	W(ft)=11.56	Max. D(ft)=.26
52.73	15.4	W(ft)=13.48	Max. D(ft)=.58
53.05	31.5	W(ft)=15.4	Max. D(ft)=.9
53.15	37.6	W(ft)=16.0	Max. D(ft)=1.0

ROUTING CALCULATIONS

BASIN #2

```
*********************************
*                               *
*      SPRINGHILL PHASE 2       *
*  STORMWATER MANAGEMENT/B.M.P. *
*            BASIN #2           *
*                               *
*                               *
*********************************
```

Inflow Hydrograph: b:2INS .HYD
Rating Table file: b:XHP02 .PND

----INITIAL CONDITIONS----
Elevation = 46.15 ft
Outflow = 0.00 cfs
Storage = 26,195 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.85	0.0	0	0.0	0.0
42.17	0.0	1,444	48.1	48.1
42.49	0.0	2,946	98.2	98.2
42.81	0.0	4,503	150.1	150.1
43.13	0.0	6,115	203.8	203.8
43.45	0.0	7,792	259.7	259.7
43.77	0.0	9,538	317.9	317.9
44.09	0.0	11,355	378.4	378.4
44.41	0.0	13,247	441.5	441.5
44.73	0.0	15,219	507.2	507.2
45.05	0.0	17,273	575.7	575.7
45.37	0.0	19,526	650.7	650.7
45.69	0.0	22,054	735.0	735.0
45.76	0.0	22,645	754.7	754.7
46.01	0.0	24,872	828.9	828.9
46.33	0.0	27,896	929.7	929.7
46.65	0.9	31,041	1034.5	1035.4
46.97	2.1	34,310	1143.5	1145.6
47.29	3.5	37,702	1256.5	1260.0
47.61	5.1	41,213	1373.5	1378.6
47.93	6.7	44,845	1494.5	1501.2
48.25	7.8	48,609	1620.0	1627.8
48.57	8.8	52,529	1750.6	1759.4
48.89	9.7	56,608	1886.6	1896.3
49.21	10.5	60,843	2027.7	2038.2
49.53	11.3	65,214	2173.4	2184.7
49.85	12.0	69,720	2323.5	2335.5
50.17	12.6	74,367	2478.4	2491.0
50.49	13.3	79,165	2638.3	2651.6
50.81	13.9	84,120	2803.4	2817.3
51.13	14.5	89,231	2973.8	2988.3

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
51.45	15.0	94,489	3149.0	3164.0
51.77	15.6	99,894	3329.1	3344.7
52.09	16.1	105,445	3514.1	3530.2
52.41	20.9	111,151	3704.3	3725.2
52.73	32.4	117,016	3899.7	3932.1
53.05	49.1	123,040	4100.5	4149.6
53.15	55.3	124,955	4164.3	4219.6

Time increment (t) = 1.0 min.

Pond File: b:XHPO2 .PND
Inflow Hydrograph: b:2INS .HYD
Outflow Hydrograph: b:2SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	873.0	873.0	0.00	46.15
1.0	1.02	1.0	874.0	874.0	0.00	46.15
2.0	2.04	3.1	877.1	877.1	0.00	46.16
3.0	3.06	5.1	882.2	882.2	0.00	46.18
4.0	4.08	7.1	889.3	889.3	0.00	46.20
5.0	5.10	9.2	898.5	898.5	0.00	46.23
6.0	6.12	11.2	909.7	909.7	0.00	46.27
7.0	7.14	13.3	923.0	923.0	0.00	46.31
8.0	8.16	15.3	938.1	938.3	0.07	46.36
9.0	9.18	17.3	955.0	955.5	0.22	46.41
10.0	10.20	19.4	973.6	974.4	0.38	46.47
11.0	11.22	21.4	994.0	995.1	0.56	46.53
12.0	12.24	23.5	1015.9	1017.4	0.75	46.60
13.0	13.26	25.5	1039.5	1041.4	0.97	46.67
14.0	14.28	27.5	1064.5	1067.0	1.24	46.74
15.0	15.30	29.6	1091.0	1094.1	1.54	46.82
16.0	16.32	31.6	1119.0	1122.7	1.85	46.90
17.0	17.34	33.7	1148.2	1152.6	2.19	46.99
18.0	17.34	34.7	1177.8	1182.9	2.56	47.07
19.0	17.34	34.7	1206.7	1212.5	2.92	47.16
20.0	17.34	34.7	1234.8	1241.3	3.27	47.24
21.0	17.34	34.7	1262.2	1269.5	3.63	47.32
22.0	17.34	34.7	1288.9	1296.9	4.00	47.39
23.0	17.34	34.7	1314.9	1323.6	4.36	47.46
24.0	17.34	34.7	1340.1	1349.5	4.71	47.53
25.0	17.34	34.7	1364.7	1374.8	5.05	47.60
26.0	17.34	34.7	1388.6	1399.4	5.37	47.66
27.0	17.34	34.7	1412.0	1423.3	5.68	47.73
28.0	17.34	34.7	1434.7	1446.6	5.99	47.79
29.0	17.34	34.7	1456.8	1469.3	6.28	47.85
30.0	17.34	34.7	1478.3	1491.5	6.57	47.90
31.0	17.34	34.7	1499.4	1513.0	6.80	47.96
32.0	17.34	34.7	1520.1	1534.1	6.99	48.01
33.0	17.34	34.7	1540.4	1554.8	7.17	48.07
34.0	17.34	34.7	1560.4	1575.1	7.34	48.12
35.0	17.34	34.7	1580.1	1595.1	7.52	48.17
36.0	17.34	34.7	1599.4	1614.8	7.69	48.22
37.0	17.34	34.7	1618.4	1634.1	7.85	48.27
38.0	17.34	34.7	1637.1	1653.1	7.99	48.31
39.0	17.34	34.7	1655.5	1671.8	8.13	48.36
40.0	17.34	34.7	1673.6	1690.2	8.27	48.40
41.0	17.34	34.7	1691.5	1708.3	8.41	48.45
42.0	17.34	34.7	1709.1	1726.2	8.55	48.49
43.0	17.34	34.7	1726.4	1743.7	8.68	48.53
44.0	17.34	34.7	1743.4	1761.1	8.81	48.57

EXECUTED: 01-04-1996 09:26:23 Return Freq: 2 years

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:2INS .HYD
Outflow Hydrograph: b:2SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	17.34	34.7	1760.3	1778.1	8.92	48.61
46.0	17.34	34.7	1776.9	1795.0	9.03	48.65
47.0	17.34	34.7	1793.3	1811.6	9.14	48.69
48.0	17.34	34.7	1809.5	1828.0	9.25	48.73
49.0	17.34	34.7	1825.4	1844.1	9.36	48.77
50.0	17.34	34.7	1841.2	1860.1	9.46	48.81
51.0	17.34	34.7	1856.7	1875.9	9.57	48.84
52.0	17.34	34.7	1872.1	1891.4	9.67	48.88
53.0	17.34	34.7	1887.2	1906.8	9.76	48.91
54.0	17.34	34.7	1902.2	1921.9	9.84	48.95
55.0	16.32	33.7	1916.0	1935.9	9.92	48.98
56.0	15.30	31.6	1927.7	1947.7	9.99	49.01
57.0	14.28	29.6	1937.2	1957.3	10.04	49.03
58.0	13.26	27.5	1944.5	1964.7	10.09	49.04
59.0	12.24	25.5	1949.8	1970.0	10.12	49.06
60.0	11.22	23.5	1953.0	1973.3	10.13	49.06
61.0	10.20	21.4	1954.1	1974.4	10.14	49.07
62.0	9.18	19.4	1953.2	1973.5	10.14	49.06
63.0	8.16	17.3	1950.3	1970.6	10.12	49.06
64.0	7.14	15.3	1945.5	1965.6	10.09	49.05
65.0	6.12	13.3	1938.6	1958.7	10.05	49.03
66.0	5.10	11.2	1929.8	1949.8	10.00	49.01
67.0	4.08	9.2	1919.1	1939.0	9.94	48.99
68.0	3.06	7.1	1906.5	1926.3	9.87	48.96
69.0	2.04	5.1	1892.1	1911.6	9.79	48.92
70.0	1.02	3.1	1875.7	1895.1	9.69	48.89
71.0	0.00	1.0	1857.6	1876.8	9.57	48.84

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:2INS .HYD
Outflow Hydrograph: b:2SOUT .HYD

Starting Pond W.S. Elevation = 46.15 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 17.34 cfs
Peak Outflow = 10.14 cfs
Peak Elevation = 49.07 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 26,195 cu-ft
Peak Storage From Storm = 32,745 cu-ft

Total Storage in Pond = 58,940 cu-ft

```
**********************************
*                                *
*       SPRINGHILL PHASE 2       *
*  STORMWATER MANAGEMENT/B.M.P.  *
*            BASIN #2            *
*                                *
*                                *
**********************************
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Inflow Hydrograph: b:10INS .HYD
Rating Table file: b:XHP02 .PND

----INITIAL CONDITIONS----
Elevation = 46.15 ft
Outflow = 0.00 cfs
Storage = 26,195 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.85	0.0	0	0.0	0.0
42.17	0.0	1,444	48.1	48.1
42.49	0.0	2,946	98.2	98.2
42.81	0.0	4,503	150.1	150.1
43.13	0.0	6,115	203.8	203.8
43.45	0.0	7,792	259.7	259.7
43.77	0.0	9,538	317.9	317.9
44.09	0.0	11,355	378.4	378.4
44.41	0.0	13,247	441.5	441.5
44.73	0.0	15,219	507.2	507.2
45.05	0.0	17,273	575.7	575.7
45.37	0.0	19,526	650.7	650.7
45.69	0.0	22,054	735.0	735.0
45.76	0.0	22,645	754.7	754.7
46.01	0.0	24,872	828.9	828.9
46.33	0.0	27,896	929.7	929.7
46.65	0.9	31,041	1034.5	1035.4
46.97	2.1	34,310	1143.5	1145.6
47.29	3.5	37,702	1256.5	1260.0
47.61	5.1	41,213	1373.5	1378.6
47.93	6.7	44,845	1494.5	1501.2
48.25	7.8	48,609	1620.0	1627.8
48.57	8.8	52,529	1750.6	1759.4
48.89	9.7	56,608	1886.6	1896.3
49.21	10.5	60,843	2027.7	2038.2
49.53	11.3	65,214	2173.4	2184.7
49.85	12.0	69,720	2323.5	2335.5
50.17	12.6	74,367	2478.4	2491.0
50.49	13.3	79,165	2638.3	2651.6
50.81	13.9	84,120	2803.4	2817.3
51.13	14.5	89,231	2973.8	2988.3

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
51.45	15.0	94,489	3149.0	3164.0
51.77	15.6	99,894	3329.1	3344.7
52.09	16.1	105,445	3514.1	3530.2
52.41	20.9	111,151	3704.3	3725.2
52.73	32.4	117,016	3899.7	3932.1
53.05	49.1	123,040	4100.5	4149.6
53.15	55.3	124,955	4164.3	4219.6

Time increment (t) = 1.0 min.

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:10INS .HYD
Outflow Hydrograph: b:10SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	873.0	873.0	0.00	46.15
1.0	1.55	1.6	874.5	874.5	0.00	46.15
2.0	3.09	4.6	879.2	879.2	0.00	46.17
3.0	4.64	7.7	886.9	886.9	0.00	46.19
4.0	6.18	10.8	897.7	897.7	0.00	46.23
5.0	7.73	13.9	911.6	911.6	0.00	46.27
6.0	9.28	17.0	928.7	928.7	0.00	46.33
7.0	10.82	20.1	948.4	948.8	0.16	46.39
8.0	12.37	23.2	970.9	971.6	0.36	46.46
9.0	13.92	26.3	996.0	997.2	0.57	46.53
10.0	15.46	29.4	1023.8	1025.4	0.82	46.62
11.0	17.01	32.5	1054.0	1056.3	1.13	46.71
12.0	18.55	35.6	1086.6	1089.6	1.49	46.81
13.0	20.10	38.7	1121.5	1125.2	1.88	46.91
14.0	21.65	41.8	1158.6	1163.2	2.32	47.02
15.0	23.19	44.8	1197.8	1203.4	2.81	47.13
16.0	24.74	47.9	1239.1	1245.8	3.33	47.25
17.0	26.29	51.0	1282.3	1290.1	3.91	47.37
18.0	26.29	52.6	1325.9	1334.9	4.51	47.49
19.0	26.29	52.6	1368.3	1378.5	5.10	47.61
20.0	26.29	52.6	1409.5	1420.8	5.65	47.72
21.0	26.29	52.6	1449.7	1462.1	6.19	47.83
22.0	26.29	52.6	1488.9	1502.3	6.71	47.93
23.0	26.29	52.6	1527.4	1541.5	7.05	48.03
24.0	26.29	52.6	1565.2	1580.0	7.38	48.13
25.0	26.29	52.6	1602.3	1617.8	7.71	48.22
26.0	26.29	52.6	1638.9	1654.9	8.01	48.32
27.0	26.29	52.6	1674.9	1691.5	8.28	48.40
28.0	26.29	52.6	1710.4	1727.5	8.56	48.49
29.0	26.29	52.6	1745.3	1763.0	8.82	48.58
30.0	26.29	52.6	1779.8	1797.9	9.05	48.66
31.0	26.29	52.6	1813.8	1832.4	9.28	48.74
32.0	26.29	52.6	1847.4	1866.4	9.50	48.82
33.0	26.29	52.6	1880.5	1900.0	9.72	48.90
34.0	26.29	52.6	1913.3	1933.1	9.91	48.97
35.0	26.29	52.6	1945.7	1965.9	10.09	49.05
36.0	26.29	52.6	1977.7	1998.3	10.27	49.12
37.0	26.29	52.6	2009.4	2030.3	10.46	49.19
38.0	26.29	52.6	2040.7	2062.0	10.63	49.26
39.0	26.29	52.6	2071.7	2093.3	10.80	49.33
40.0	26.29	52.6	2102.3	2124.3	10.97	49.40
41.0	26.29	52.6	2132.6	2154.9	11.14	49.47
42.0	26.29	52.6	2162.6	2185.2	11.30	49.53
43.0	26.29	52.6	2192.3	2215.2	11.44	49.59
44.0	26.29	52.6	2221.7	2244.9	11.58	49.66

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:10INS .HYD
Outflow Hydrograph: b:10SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	26.29	52.6	2250.9	2274.3	11.72	49.72
46.0	26.29	52.6	2279.8	2303.5	11.85	49.78
47.0	24.74	51.0	2306.8	2330.8	11.98	49.84
48.0	23.19	47.9	2330.6	2354.8	12.07	49.89
49.0	21.65	44.8	2351.1	2375.4	12.15	49.93
50.0	20.10	41.8	2368.4	2392.9	12.22	49.97
51.0	18.55	38.7	2382.5	2407.1	12.28	50.00
52.0	17.01	35.6	2393.5	2418.1	12.32	50.02
53.0	15.46	32.5	2401.2	2425.9	12.35	50.04
54.0	13.92	29.4	2405.9	2430.6	12.37	50.05
55.0	12.37	26.3	2407.4	2432.2	12.37	50.05
56.0	10.82	23.2	2405.9	2430.6	12.37	50.05
57.0	9.28	20.1	2401.3	2426.0	12.35	50.04
58.0	7.73	17.0	2393.7	2418.3	12.32	50.02
59.0	6.18	13.9	2383.0	2407.6	12.28	50.00
60.0	4.64	10.8	2369.4	2393.8	12.23	49.97
61.0	3.09	7.7	2352.8	2377.1	12.16	49.94
62.0	1.55	4.6	2333.3	2357.4	12.08	49.90
63.0	0.00	1.6	2310.8	2334.8	12.00	49.85

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:10INS .HYD
Outflow Hydrograph: b:10SOUT .HYD

Starting Pond W.S. Elevation = 46.15 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 26.29 cfs
Peak Outflow = 12.37 cfs
Peak Elevation = 50.05 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 26,195 cu-ft
Peak Storage From Storm = 46,413 cu-ft

Total Storage in Pond = 72,609 cu-ft

EXECUTED: 01-04-1996 09:37:47 Return Freq: 25 years

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**********************************
*                                *
*       SPRINGHILL PHASE 2 .     *
*  STORMWATER MANAGEMENT/B.M.P.  *
*            BASIN #2            *
*                                *
*                                *
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Inflow Hydrograph: b:25INS .HYD
Rating Table file: b:XHP02 .PND

----INITIAL CONDITIONS----
Elevation = 46.15 ft
Outflow = 0.00 cfs
Storage = 26,195 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.85	0.0	0	0.0	0.0
42.17	0.0	1,444	48.1	48.1
42.49	0.0	2,946	98.2	98.2
42.81	0.0	4,503	150.1	150.1
43.13	0.0	6,115	203.8	203.8
43.45	0.0	7,792	259.7	259.7
43.77	0.0	9,538	317.9	317.9
44.09	0.0	11,355	378.4	378.4
44.41	0.0	13,247	441.5	441.5
44.73	0.0	15,219	507.2	507.2
45.05	0.0	17,273	575.7	575.7
45.37	0.0	19,526	650.7	650.7
45.69	0.0	22,054	735.0	735.0
45.76	0.0	22,645	754.7	754.7
46.01	0.0	24,872	828.9	828.9
46.33	0.0	27,896	929.7	929.7
46.65	0.9	31,041	1034.5	1035.4
46.97	2.1	34,310	1143.5	1145.6
47.29	3.5	37,702	1256.5	1260.0
47.61	5.1	41,213	1373.5	1378.6
47.93	6.7	44,845	1494.5	1501.2
48.25	7.8	48,609	1620.0	1627.8
48.57	8.8	52,529	1750.6	1759.4
48.89	9.7	56,608	1886.6	1896.3
49.21	10.5	60,843	2027.7	2038.2
49.53	11.3	65,214	2173.4	2184.7
49.85	12.0	69,720	2323.5	2335.5
50.17	12.6	74,367	2478.4	2491.0
50.49	13.3	79,165	2638.3	2651.6
50.81	13.9	84,120	2803.4	2817.3
51.13	14.5	89,231	2973.8	2988.3

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
51.45	15.0	94,489	3149.0	3164.0
51.77	15.6	99,894	3329.1	3344.7
52.09	16.1	105,445	3514.1	3530.2
52.41	20.9	111,151	3704.3	3725.2
52.73	32.4	117,016	3899.7	3932.1
53.05	49.1	123,040	4100.5	4149.6
53.15	55.3	124,955	4164.3	4219.6

Time increment (t) = 1.0 min.

Pond File: b:XHPO2 .PND
Inflow Hydrograph: b:25INS .HYD
Outflow Hydrograph: b:25SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	873.0	873.0	0.00	46.15
1.0	1.90	1.9	874.9	874.9	0.00	46.16
2.0	3.80	5.7	880.6	880.6	0.00	46.17
3.0	5.70	9.5	890.1	890.1	0.00	46.20
4.0	7.60	13.3	903.4	903.4	0.00	46.25
5.0	9.50	17.1	920.5	920.5	0.00	46.30
6.0	11.40	20.9	941.2	941.4	0.10	46.37
7.0	13.30	24.7	965.3	965.9	0.31	46.44
8.0	15.20	28.5	992.7	993.8	0.55	46.52
9.0	17.10	32.3	1023.4	1025.0	0.81	46.62
10.0	19.00	36.1	1057.1	1059.5	1.16	46.72
11.0	20.90	39.9	1093.9	1097.0	1.57	46.83
12.0	22.80	43.7	1133.6	1137.6	2.01	46.95
13.0	24.69	47.5	1176.0	1181.1	2.53	47.07
14.0	26.59	51.3	1221.1	1227.3	3.10	47.20
15.0	28.49	55.1	1268.7	1276.2	3.72	47.33
16.0	30.39	58.9	1318.8	1327.6	4.41	47.47
17.0	32.29	62.7	1371.2	1381.5	5.14	47.62
18.0	32.29	64.6	1424.1	1435.8	5.85	47.76
19.0	32.29	64.6	1475.6	1488.6	6.54	47.90
20.0	32.29	64.6	1526.1	1540.2	7.04	48.03
21.0	32.29	64.6	1575.7	1590.7	7.48	48.16
22.0	32.29	64.6	1624.5	1640.3	7.90	48.28
23.0	32.29	64.6	1672.5	1689.1	8.27	48.40
24.0	32.29	64.6	1719.9	1737.1	8.63	48.52
25.0	32.29	64.6	1766.5	1784.4	8.96	48.63
26.0	32.29	64.6	1812.5	1831.1	9.27	48.74
27.0	32.29	64.6	1858.0	1877.1	9.57	48.85
28.0	32.29	64.6	1902.9	1922.6	9.85	48.95
29.0	32.29	64.6	1947.2	1967.4	10.10	49.05
30.0	32.29	64.6	1991.1	2011.8	10.35	49.15
31.0	32.29	64.6	2034.5	2055.7	10.60	49.25
32.0	32.29	64.6	2077.4	2099.1	10.83	49.34
33.0	32.29	64.6	2119.9	2142.0	11.07	49.44
34.0	32.29	64.6	2161.9	2184.4	11.30	49.53
35.0	32.29	64.6	2203.4	2226.4	11.49	49.62
36.0	32.29	64.6	2244.7	2268.0	11.69	49.71
37.0	32.29	64.6	2285.5	2309.2	11.88	49.79
38.0	32.29	64.6	2325.9	2350.1	12.06	49.88
39.0	32.29	64.6	2366.1	2390.5	12.21	49.96
40.0	32.29	64.6	2405.9	2430.7	12.37	50.05
41.0	32.29	64.6	2445.5	2470.5	12.52	50.13
42.0	32.29	64.6	2484.7	2510.1	12.68	50.21
43.0	32.29	64.6	2523.6	2549.3	12.85	50.29
44.0	32.29	64.6	2562.1	2588.1	13.02	50.36

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:25INS .HYD
Outflow Hydrograph: b:25SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	32.29	64.6	2600.3	2626.7	13.19	50.44
46.0	32.29	64.6	2638.2	2664.9	13.35	50.52
47.0	32.29	64.6	2675.8	2702.8	13.49	50.59
48.0	32.29	64.6	2713.1	2740.4	13.62	50.66
49.0	32.29	64.6	2750.2	2777.7	13.76	50.73
50.0	32.29	64.6	2787.0	2814.8	13.89	50.81
51.0	30.39	62.7	2821.6	2849.7	14.01	50.87
52.0	28.49	58.9	2852.3	2880.5	14.12	50.93
53.0	26.59	55.1	2878.9	2907.4	14.22	50.98
54.0	24.69	51.3	2901.6	2930.2	14.30	51.02
55.0	22.80	47.5	2920.4	2949.1	14.36	51.06
56.0	20.90	43.7	2935.3	2964.1	14.42	51.08
57.0	19.00	39.9	2946.2	2975.2	14.45	51.11
58.0	17.10	36.1	2953.4	2982.3	14.48	51.12
59.0	15.20	32.3	2956.7	2985.7	14.49	51.13
60.0	13.30	28.5	2956.2	2985.2	14.49	51.12
61.0	11.40	24.7	2952.0	2980.9	14.47	51.12
62.0	9.50	20.9	2944.0	2972.9	14.45	51.10
63.0	7.60	17.1	2932.3	2961.1	14.40	51.08
64.0	5.70	13.3	2916.9	2945.6	14.35	51.05
65.0	3.80	9.5	2897.8	2926.4	14.28	51.01
66.0	1.90	5.7	2875.1	2903.5	14.20	50.97
67.0	0.00	1.9	2848.8	2877.0	14.11	50.92

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: b:XHP02 .PND
Inflow Hydrograph: b:25INS .HYD
Outflow Hydrograph: b:25SOUT .HYD

Starting Pond W.S. Elevation = 46.15 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 32.29 cfs
Peak Outflow = 14.49 cfs
Peak Elevation = 51.13 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 26,195 cu-ft
Peak Storage From Storm = 62,959 cu-ft

Total Storage in Pond = 89,154 cu-ft

```
*********************************
*                               *
*       SPRINGHILL PHASE 2      *
*  STORMWATER MANAGEMENT/B.M.P. *
*            BASIN #2           *
*                               *
*                               *
*********************************
```

Inflow Hydrograph: b:100INS .HYD
Rating Table file: b:XHP02 .PND

----INITIAL CONDITIONS----
Elevation = 46.15 ft
Outflow = 0.00 cfs
Storage = 26,195 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.85	0.0	0	0.0	0.0
42.17	0.0	1,444	48.1	48.1
42.49	0.0	2,946	98.2	98.2
42.81	0.0	4,503	150.1	150.1
43.13	0.0	6,115	203.8	203.8
43.45	0.0	7,792	259.7	259.7
43.77	0.0	9,538	317.9	317.9
44.09	0.0	11,355	378.4	378.4
44.41	0.0	13,247	441.5	441.5
44.73	0.0	15,219	507.2	507.2
45.05	0.0	17,273	575.7	575.7
45.37	0.0	19,526	650.7	650.7
45.69	0.0	22,054	735.0	735.0
45.76	0.0	22,645	754.7	754.7
46.01	0.0	24,872	828.9	828.9
46.33	0.0	27,896	929.7	929.7
46.65	0.9	31,041	1034.5	1035.4
46.97	2.1	34,310	1143.5	1145.6
47.29	3.5	37,702	1256.5	1260.0
47.61	5.1	41,213	1373.5	1378.6
47.93	6.7	44,845	1494.5	1501.2
48.25	7.8	48,609	1620.0	1627.8
48.57	8.8	52,529	1750.6	1759.4
48.89	9.7	56,608	1886.6	1896.3
49.21	10.5	60,843	2027.7	2038.2
49.53	11.3	65,214	2173.4	2184.7
49.85	12.0	69,720	2323.5	2335.5
50.17	12.6	74,367	2478.4	2491.0
50.49	13.3	79,165	2638.3	2651.6
50.81	13.9	84,120	2803.4	2817.3
51.13	14.5	89,231	2973.8	2988.3

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
51.45	15.0	94,489	3149.0	3164.0
51.77	15.6	99,894	3329.1	3344.7
52.09	16.1	105,445	3514.1	3530.2
52.41	20.9	111,151	3704.3	3725.2
52.73	32.4	117,016	3899.7	3932.1
53.05	49.1	123,040	4100.5	4149.6
53.15	55.3	124,955	4164.3	4219.6

Time increment (t) = 1.0 min.

Pond File: b:XHPO2 .PND
Inflow Hydrograph: b:100INS .HYD
Outflow Hydrograph: b:100SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	873.0	873.0	0.00	46.15
1.0	1.90	1.9	874.9	874.9	0.00	46.16
2.0	3.80	5.7	880.6	880.6	0.00	46.17
3.0	5.71	9.5	890.1	890.1	0.00	46.20
4.0	7.61	13.3	903.4	903.4	0.00	46.25
5.0	9.51	17.1	920.5	920.5	0.00	46.30
6.0	11.41	20.9	941.3	941.5	0.10	46.37
7.0	13.31	24.7	965.4	966.0	0.31	46.44
8.0	15.21	28.5	992.8	993.9	0.55	46.52
9.0	17.12	32.3	1023.5	1025.1	0.81	46.62
10.0	19.02	36.1	1057.3	1059.6	1.16	46.72
11.0	20.92	39.9	1094.1	1097.3	1.57	46.83
12.0	22.82	43.7	1133.8	1137.8	2.02	46.95
13.0	24.72	47.5	1176.3	1181.4	2.54	47.07
14.0	26.63	51.3	1221.4	1227.6	3.10	47.20
15.0	28.53	55.2	1269.1	1276.6	3.72	47.33
16.0	30.43	59.0	1319.3	1328.1	4.42	47.47
17.0	32.33	62.8	1371.7	1382.0	5.14	47.62
18.0	32.33	64.7	1424.7	1436.4	5.85	47.76
19.0	32.33	64.7	1476.2	1489.3	6.54	47.90
20.0	32.33	64.7	1526.8	1540.9	7.04	48.03
21.0	32.33	64.7	1576.5	1591.5	7.48	48.16
22.0	32.33	64.7	1625.4	1641.2	7.90	48.28
23.0	32.33	64.7	1673.5	1690.0	8.27	48.40
24.0	32.33	64.7	1720.9	1738.1	8.64	48.52
25.0	32.33	64.7	1767.6	1785.5	8.97	48.63
26.0	32.33	64.7	1813.7	1832.2	9.28	48.74
27.0	32.33	64.7	1859.2	1878.3	9.58	48.85
28.0	32.33	64.7	1904.1	1923.8	9.86	48.95
29.0	32.33	64.7	1948.6	1968.8	10.11	49.05
30.0	32.33	64.7	1992.5	2013.2	10.36	49.15
31.0	32.33	64.7	2036.0	2057.2	10.60	49.25
32.0	32.33	64.7	2078.9	2100.6	10.84	49.35
33.0	32.33	64.7	2121.4	2143.6	11.08	49.44
34.0	32.33	64.7	2163.5	2186.1	11.31	49.53
35.0	32.33	64.7	2205.2	2228.2	11.50	49.62
36.0	32.33	64.7	2246.4	2269.8	11.70	49.71
37.0	32.33	64.7	2287.3	2311.1	11.89	49.80
38.0	32.33	64.7	2327.8	2352.0	12.06	49.88
39.0	32.33	64.7	2368.1	2392.5	12.22	49.97
40.0	32.33	64.7	2408.0	2432.7	12.38	50.05
41.0	32.33	64.7	2447.6	2472.6	12.53	50.13
42.0	32.33	64.7	2486.8	2512.2	12.69	50.21
43.0	32.33	64.7	2525.8	2551.5	12.86	50.29
44.0	32.33	64.7	2564.4	2590.4	13.03	50.37

Pond File: b:XHPO2 .PND
Inflow Hydrograph: b:100INS .HYD
Outflow Hydrograph: b:100SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	32.33	64.7	2602.6	2629.0	13.20	50.45
46.0	32.33	64.7	2640.6	2667.3	13.36	50.52
47.0	32.33	64.7	2678.2	2705.2	13.49	50.59
48.0	32.33	64.7	2715.6	2742.9	13.63	50.67
49.0	32.33	64.7	2752.8	2780.3	13.77	50.74
50.0	32.33	64.7	2789.6	2817.4	13.90	50.81
51.0	32.33	64.7	2826.2	2854.3	14.03	50.88
52.0	32.33	64.7	2862.6	2890.9	14.16	50.95
53.0	32.33	64.7	2898.7	2927.2	14.29	51.02
54.0	32.33	64.7	2934.5	2963.3	14.41	51.08
55.0	32.33	64.7	2970.1	2999.2	14.53	51.15
56.0	32.33	64.7	3005.5	3034.8	14.63	51.21
57.0	32.33	64.7	3040.7	3070.2	14.73	51.28
58.0	32.33	64.7	3075.7	3105.3	14.83	51.34
59.0	32.33	64.7	3110.5	3140.3	14.93	51.41
60.0	32.33	64.7	3145.1	3175.1	15.04	51.47
61.0	32.33	64.7	3179.4	3209.7	15.15	51.53
62.0	32.33	64.7	3213.5	3244.1	15.27	51.59
63.0	32.33	64.7	3247.5	3278.2	15.38	51.65
64.0	32.33	64.7	3281.1	3312.1	15.49	51.71
65.0	32.33	64.7	3314.6	3345.8	15.60	51.77
66.0	32.33	64.7	3347.9	3379.2	15.69	51.83
67.0	32.33	64.7	3381.0	3412.5	15.78	51.89
68.0	32.33	64.7	3413.9	3445.6	15.87	51.94
69.0	32.33	64.7	3446.6	3478.5	15.96	52.00
70.0	32.33	64.7	3479.2	3511.3	16.05	52.06
71.0	32.33	64.7	3511.0	3543.8	16.43	52.11
72.0	32.33	64.7	3541.2	3575.6	17.22	52.16
73.0	32.33	64.7	3569.9	3605.8	17.96	52.21
74.0	32.33	64.7	3597.2	3634.6	18.67	52.26
75.0	32.33	64.7	3623.2	3661.9	19.34	52.31
76.0	32.33	64.7	3647.9	3687.9	19.98	52.35
77.0	32.33	64.7	3671.4	3712.6	20.59	52.39
78.0	32.33	64.7	3693.1	3736.1	21.50	52.43
79.0	32.33	64.7	3712.3	3757.7	22.71	52.46
80.0	32.33	64.7	3729.4	3777.0	23.78	52.49
81.0	32.33	64.7	3744.6	3794.1	24.73	52.52
82.0	32.33	64.7	3758.1	3809.3	25.57	52.54
83.0	32.33	64.7	3770.1	3822.8	26.32	52.56
84.0	32.33	64.7	3780.8	3834.8	26.99	52.58
85.0	32.33	64.7	3790.3	3845.5	27.58	52.60
86.0	32.33	64.7	3798.7	3855.0	28.11	52.61
87.0	32.33	64.7	3806.2	3863.4	28.58	52.62
88.0	32.33	64.7	3812.9	3870.9	29.00	52.64
89.0	30.43	62.8	3817.1	3875.7	29.26	52.64
90.0	28.53	59.0	3817.5	3876.1	29.29	52.64

Pond File: b:XHPO2 .PND
Inflow Hydrograph: b:100INS .HYD
Outflow Hydrograph: b:100SOUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
91.0	26.63	55.2	3814.5	3872.7	29.10	52.64
92.0	24.72	51.3	3808.4	3865.9	28.72	52.63
93.0	22.82	47.5	3799.6	3856.0	28.17	52.61
94.0	20.92	43.7	3788.4	3843.4	27.47	52.59
95.0	19.02	39.9	3775.1	3828.4	26.63	52.57
96.0	17.12	36.1	3759.9	3811.2	25.68	52.54
97.0	15.21	32.3	3743.0	3792.2	24.62	52.51
98.0	13.31	28.5	3724.5	3771.5	23.47	52.48
99.0	11.41	24.7	3704.8	3749.3	22.24	52.45
100.0	9.51	20.9	3683.9	3725.7	20.93	52.41
101.0	7.61	17.1	3660.4	3701.0	20.30	52.37
102.0	5.71	13.3	3634.4	3673.7	19.63	52.33
103.0	3.80	9.5	3606.1	3643.9	18.90	52.28
104.0	1.90	5.7	3575.6	3611.8	18.11	52.22
105.0	0.00	1.9	3543.0	3577.5	17.26	52.17

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: b:XHPO2 .PND
Inflow Hydrograph: b:100INS .HYD
Outflow Hydrograph: b:100SOUT .HYD

Starting Pond W.S. Elevation = 46.15 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 32.33 cfs
Peak Outflow = 29.29 cfs
Peak Elevation = 52.64 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 26,195 cu-ft
Peak Storage From Storm = 89,233 cu-ft

Total Storage in Pond = 115,428 cu-ft

SPRINGHILL

PHASES 3 AND 4

ROUTING CALCULATIONS

EXISTING STORMWATER MANAGEMENT BASIN
BMP #2

PC030
BMP #2

January 7, 1999

Submitted 1/11/99

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Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

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*************************************************************************
*************************************************************************
*                                                                       *
*                                                                       *
*                        MODIFIED RATIONAL METHOD                       *
*          ---- Grand Summary For All Storm Frequencies ----            *
*                                                                       *
*                                                                       *
*************************************************************************
*************************************************************************
```

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

Area = 22.56 acres Tc = 17.00 minutes

Frequency (years)	Adjusted 'C'	Duration minutes	Intens. in/hr	Qpeak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	VOLUMES Storage (cu.ft.)
2	0.454	79	1.594	16.31	15.03	77,317	34,030
10	0.454	55	2.600	26.60	19.89	87,791	44,828
25	0.499	50	3.250	36.58	22.54	109,738	64,433
100	0.567	91	2.806	35.89	26.96	195,941	108,590

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*****************************************************************
*  RETURN FREQUENCY:   2 yr      |  Allowable Outflow:    15.03 cfs    *
*  'C' Adjustment: 1.000         |  Required Storage:    34,030 cu.ft. *
*---------------------------------------------------------------*
*  Peak Inflow:   16.31 cfs        Inflow .HYD stored: 2INS34  .HYD   *
*****************************************************************
```

```
|                Td =  79 minutes                  |  Return Freq:     2 yr
/------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.00
|                                                  |
|                                                  |
|                Tc=   17.00  minutes              |
|                I =   3.800  in/hr                |  Area (ac):    22.56
|              . Q =   38.88  cfs                  |  Weighted C:    0.45
|            .|.                                   |  Adjusted C:    0.45
F           .   .                                  |
L          .  |  .            Required Storage     |
O        .       .        .--    34,030 cu.ft.    |  Td=      79 minutes
W       .    |    .       |                       |  I =   1.594 in/hr
       .     x x x x x x x|x x x x x x x x x x x  |  Q =   16.31 cfs
c     .                   |                        |
f    .    x                                        |  x
s   .                                               |    o   Q=   15.03 cfs
   .   x                                o           |x  (Allow.Outflow)
  .  x                  .     o                    |
 .  x              o    .       NOT TO SCALE        |   x
. x       o               .      ============       |
o                          .                        |       x
`-------------------------------------------------|------------
                                                  80.34 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.454 Td= 79.00 min. I= 1.59 in/hr Qp= 16.31 cfs

RETURN FREQUENCY: 2 year storm Adj.factor = 1.00
Output file: 2INS34 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 2 Year Storm

Time Hours	Time increment = 0.017 Hours Time on left represents time for first Q in each row.						
0.000	0.00	0.96	1.92	2.88	3.84	4.80	5.76
0.117	6.72	7.68	8.64	9.60	10.55	11.51	12.47
0.233	13.43	14.39	15.35	16.31	16.31	16.31	16.31
0.350	16.31	16.31	16.31	16.31	16.31	16.31	16.31
0.467	16.31	16.31	16.31	16.31	16.31	16.31	16.31
0.583	16.31	16.31	16.31	16.31	16.31	16.31	16.31
0.700	16.31	16.31	16.31	16.31	16.31	16.31	16.31
0.817	16.31	16.31	16.31	16.31	16.31	16.31	16.31
0.933	16.31	16.31	16.31	16.31	16.31	16.31	16.31
1.050	16.31	16.31	16.31	16.31	16.31	16.31	16.31
1.167	16.31	16.31	16.31	16.31	16.31	16.31	16.31
1.283	16.31	16.31	16.31	15.35	14.39	13.43	12.47
1.400	11.51	10.55	9.60	8.64	7.68	6.72	5.76
1.517	4.80	3.84	2.88	1.92	0.96	0.00	

Quick TR-55 Ver.5.46 S/N:
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SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.454	3.800	22.56	38.88

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 2 yr 'C' Adjustment = 1.000 Allowable Q = 15.03 cfs

Hydrograph file duration= 79.00 minutes
Hydrograph file: 2INS34 .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.454	17	3.800	22.56	38.88	39,659	24,329
0.454	0.454	20	3.500	22.56	35.81	42,974	26,291
0.454	0.454	30	2.750	22.56	28.14	50,648	29,456
0.454	0.454	40	2.250	22.56	23.02	55,253	29,552
0.454	0.454	50	2.000	22.56	20.46	61,392	31,182
0.454	0.454	60	1.800	22.56	18.42	66,303	31,584
0.454	0.454	79	1.594	22.56	16.31	77,317	34,030
0.454	0.454	120	1.150	22.56	11.77	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*****************************************************************
*  RETURN FREQUENCY:  10 yr     |  Allowable Outflow:    19.89 cfs    *
*  'C' Adjustment: 1.000        |  Required Storage:    44,828 cu.ft. *
*---------------------------------------------------------------*
*  Peak Inflow:   26.60 cfs       Inflow .HYD stored: 10INS34 .HYD   *
*****************************************************************
```

```
|                Td =  55 minutes                  |  Return Freq:    10 yr
/------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.00
|                                                  |
|                                                  |
|                 Tc=   17.00  minutes             |
|                 I =   5.030  in/hr               |  Area (ac):    22.56
|               . Q =   51.47  cfs                 |  Weighted C:    0.45
|             .|.                                  |  Adjusted C:    0.45
F            .   .
L           .  |  .            Required Storage    |
O          .       .        .--    44,828 cu.ft.  |  Td=      55 minutes
W         .    |    .                             |  I =   2.600 in/hr
         .     x x x x x x x|x x x x x x x x x x x  Q =   26.60 cfs
c       .                   |
f      .    x                                      x
s     .                                              o   Q=   19.89 cfs
     .   x                                o          |x  (Allow.Outflow)
    .  x                  .     o                    |
   .  x              o    .       NOT TO SCALE       |   x
  . x       o               .      ============      |
 o                          .                        |       x
`-------------------------------------------------------|------------
                                                   59.29 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.454 Td= 55.00 min. I= 2.60 in/hr Qp= 26.60 cfs

RETURN FREQUENCY: 10 year storm Adj.factor = 1.00
Output file: 10INS34 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 10 Year Storm

Time Hours	Time increment = 0.017 Hours Time on left represents time for first Q in each row.						
0.000	0.00	1.56	3.13	4.69	6.26	7.82	9.39
0.117	10.95	12.52	14.08	15.65	17.21	18.78	20.34
0.233	21.91	23.47	25.04	26.60	26.60	26.60	26.60
0.350	26.60	26.60	26.60	26.60	26.60	26.60	26.60
0.467	26.60	26.60	26.60	26.60	26.60	26.60	26.60
0.583	26.60	26.60	26.60	26.60	26.60	26.60	26.60
0.700	26.60	26.60	26.60	26.60	26.60	26.60	26.60
0.817	26.60	26.60	26.60	26.60	26.60	26.60	26.60
0.933	25.04	23.47	21.91	20.34	18.78	17.21	15.65
1.050	14.08	12.52	10.95	9.39	7.82	6.26	4.69
1.167	3.13	1.56	0.00				

Quick TR-55 Ver.5.46 S/N:
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SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 10 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.454	5.030	22.56	51.47

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 10 yr 'C' Adjustment = 1.000 Allowable Q = 19.89 cfs

Hydrograph file duration= 55.00 minutes
Hydrograph file: 10INS34 .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.454	17	5.030	22.56	51.47	52,496	32,209
0.454	0.454	20	4.700	22.56	48.09	57,708	35,631
0.454	0.454	30	3.750	22.56	38.37	69,066	41,021
0.454	0.454	40	3.150	22.56	32.23	77,354	43,342
0.454	0.454	50	2.750	22.56	28.14	84,414	44,435
********** Storage Maximum							
0.454	0.454	55	2.600	22.56	26.60	87,791	44,828
**********							
0.454	0.454	60	2.450	22.56	25.07	90,246	44,300
0.454	0.454	120	1.600	22.56	16.37	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*****************************************************************
*  RETURN FREQUENCY:  25 yr     |  Allowable Outflow:    22.54 cfs    *
*  'C' Adjustment: 1.100        |  Required Storage:    64,433 cu.ft. *
*---------------------------------------------------------------*
*  Peak Inflow:   36.58 cfs       Inflow .HYD stored: 25INS34 .HYD   *
*****************************************************************
```

```
|                Td =  50 minutes                    |  Return Freq:    25 yr
/------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.10
|                                                    |
|                                                    |
|                 Tc=   17.00  minutes               |
|                 I =   5.760  in/hr                 |  Area (ac):    22.56
|               . Q =   64.83  cfs                   |  Weighted C:    0.45
|             .|.                                    |  Adjusted C:    0.50
F            .   .                                   |
L          .  |  .            Required Storage       |
O        .       .        .--    64,433 cu.ft.      |  Td=      50 minutes
W      .    |    .      |                           |  I =   3.250 in/hr
      .     x x x x x x x|x x x x x x x x x x x x x  Q =   36.58 cfs
c    .                   |
f   .    x                                          x
s  .                                                  o   Q=   22.54 cfs
  .   x                                   o          |x  (Allow.Outflow)
 .  x                  .     o                       |
 . x              o    .       NOT TO SCALE          |   x
. x       o               .      ============        |
o                          .                         |       x
`-----------------------------------------------------|------------
                                                   56.52 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.499 Td= 50.00 min. I= 3.25 in/hr Qp= 36.58 cfs

RETURN FREQUENCY: 25 year storm Adj.factor = 1.10
Output file: 25INS34 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 25 Year Storm

Time increment = 0.017 Hours
Time on left represents time for first Q in each row.

Time Hours							
0.000	0.00	2.15	4.30	6.46	8.61	10.76	12.91
0.117	15.06	17.21	19.37	21.52	23.67	25.82	27.97
0.233	30.12	32.28	34.43	36.58	36.58	36.58	36.58
0.350	36.58	36.58	36.58	36.58	36.58	36.58	36.58
0.467	36.58	36.58	36.58	36.58	36.58	36.58	36.58
0.583	36.58	36.58	36.58	36.58	36.58	36.58	36.58
0.700	36.58	36.58	36.58	36.58	36.58	36.58	36.58
0.817	36.58	36.58	34.43	32.28	30.12	27.97	25.82
0.933	23.67	21.52	19.37	17.21	15.06	12.91	10.76
1.050	8.61	6.46	4.30	2.15	0.00		

Quick TR-55 Ver.5.46 S/N:
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SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 25 years
'C' adjustment, k = 1.1
Adj. 'C' = Wtd.'C' x 1.1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.499	5.760	22.56	64.83

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 25 yr 'C' Adjustment = 1.100 Allowable Q = 22.54 cfs

Hydrograph file duration= 50.00 minutes
Hydrograph file: 25INS34 .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.499	17	5.760	22.56	64.83	66,127	43,136
0.454	0.499	20	5.400	22.56	60.78	72,934	47,914
0.454	0.499	30	4.400	22.56	49.52	89,141	57,360
0.454	0.499	40	3.600	22.56	40.52	97,245	58,702
********** Storage Maximum							
0.454	0.499	50	3.250	22.56	36.58	109,738	64,433
0.454	0.499	60	2.800	22.56	31.51	113,452	61,385
0.454	0.499	120	1.750	22.56	19.70	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*********************************************************************
*  RETURN FREQUENCY: 100 yr     |  Allowable Outflow:    26.96 cfs    *
*  'C' Adjustment: 1.250        |  Required Storage:   108,590 cu.ft. *
*-------------------------------------------------------------------*
*  Peak Inflow:   35.89 cfs       Inflow .HYD stored: 100INS34.HYD   *
*********************************************************************
```

```
   |                Td =  91 minutes                  |  Return Freq:   100 yr
  /------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.25
   |                                                  |
   |                                                  |
   |                Tc=   17.00  minutes              |
   |                I =   6.920  in/hr                |  Area (ac):    22.56
   |              . Q =   88.51  cfs                  |  Weighted C:    0.45
   |            .|.                                   |  Adjusted C:    0.57
F  |          .   .                                   |
L  |        .  |  .            Required Storage       |
O  |      .       .        .--   108,590 cu.ft.      |  Td=      91 minutes
W  |     .    |    .       |                         |  I =   2.806 in/hr
   |    .     x x x x x x x|x x x x x x x x x x x x  |  Q =   35.89 cfs
c  |   .                   |                          |
f  |  .    x                                          |  x
s  |  .                                               |    o   Q=   26.96 cfs
   |  .   x                              o            |  |x  (Allow.Outflow)
   |  .  x                  .     o                  |
   |  .  x              o    .       NOT TO SCALE     |  x
   | . x       o              .      ============     |
   | o                          .                     |      x
   `-------------------------------------------------|------------
                                                   95.23 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.567 Td= 91.00 min. I= 2.81 in/hr Qp= 35.89 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.25
Output file: 100INS34.HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 100 Year Storm

Time increment = 0.017 Hours
Time on left represents time for first Q in each row.

Time Hours							
0.000	0.00	2.11	4.22	6.33	8.44	10.55	12.67
0.117	14.78	16.89	19.00	21.11	23.22	25.33	27.44
0.233	29.55	31.66	33.78	35.89	35.89	35.89	35.89
0.350	35.89	35.89	35.89	35.89	35.89	35.89	35.89
0.467	35.89	35.89	35.89	35.89	35.89	35.89	35.89
0.583	35.89	35.89	35.89	35.89	35.89	35.89	35.89
0.700	35.89	35.89	35.89	35.89	35.89	35.89	35.89
0.817	35.89	35.89	35.89	35.89	35.89	35.89	35.89
0.933	35.89	35.89	35.89	35.89	35.89	35.89	35.89
1.050	35.89	35.89	35.89	35.89	35.89	35.89	35.89
1.167	35.89	35.89	35.89	35.89	35.89	35.89	35.89
1.283	35.89	35.89	35.89	35.89	35.89	35.89	35.89
1.400	35.89	35.89	35.89	35.89	35.89	35.89	35.89
1.517	35.89	33.78	31.66	29.55	27.44	25.33	23.22
1.633	21.11	19.00	16.89	14.78	12.67	10.55	8.44
1.750	6.33	4.22	2.11	0.00			

Quick TR-55 Ver.5.46 S/N:
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SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.25
Adj. 'C' = Wtd.'C' x 1.25

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.567	6.920	22.56	88.51

Quick TR-55 Ver.5.46 S/N:
Executed: 09:05:37 11-03-1999

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 100 yr 'C' Adjustment = 1.250 Allowable Q = 26.96 cfs

Hydrograph file duration= 91.00 minutes
Hydrograph file: 100INS34.HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.567	17	6.920	22.56	88.51	90,277	62,778
0.454	0.567	20	6.500	22.56	83.14	99,762	69,836
0.454	0.567	30	5.250	22.56	67.15	120,866	82,852
0.454	0.567	40	4.500	22.56	57.56	138,132	92,030
0.454	0.567	50	3.800	22.56	48.60	145,806	91,616
0.454	0.567	60	3.400	22.56	43.49	156,550	94,272
********** Storage Maximum							
0.454	0.567	91	2.806	22.56	35.89	195,941	108,590
**********							
0.454	0.567	120	2.250	22.56	28.78	207,198	96,392
0.454	0.567	180	1.700	22.56	21.74	Qpeak < Qallow	

POND-2 Version: 5.20
S/N:

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

CALCULATED 11-03-1999 09:09:49
DISK FILE: a:SPHILL34.VOL

Planimeter scale: 1 inch = 50 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
41.06	1.60	4,000	0	0	0
42.00	1.81	4,525	12,779	4,004	4,004
43.00	2.02	5,050	14,355	4,785	8,789
44.00	2.29	5,725	16,152	5,384	14,173
45.00	2.60	6,500	18,325	6,108	20,282
46.00	3.70	9,250	23,504	7,835	28,116
47.00	4.18	10,450	29,532	9,844	37,960
48.00	4.65	11,625	33,097	11,032	48,993
49.00	5.27	13,175	37,176	12,392	61,384
50.00	5.80	14,500	41,497	13,832	75,217
51.00	6.41	16,025	45,768	15,256	90,473
52.00	6.98	17,450	50,197	16,732	107,205
53.00	7.60	19,000	54,659	18,220	125,425
54.00	8.22	20,550	59,310	19,770	145,195

Elevations With Areas Interpolated From
The Closest Two Planimeter Readings

44.98	-----	6,484	18,302	5,979	20,152
46.15	-----	9,425	28,013	1,401	29,517
47.27	-----	10,761	31,815	2,863	40,824
50.44	-----	15,162	44,489	6,525	81,742

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

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

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

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

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2
****

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

Elevation (ft)	Q (cfs)	Contributing Structures
41.06	0.0	
41.38	0.0	
41.70	0.0	
42.02	0.0	
42.34	0.0	
42.66	0.0	
42.98	0.0	
43.30	0.0	
43.62	0.0	
43.94	0.0	
44.26	0.0	
44.58	0.0	
44.90	0.0	
45.22	0.0	
45.54	0.0	
45.86	0.0	
46.15	0.0	1
46.18	0.1	1
46.50	0.7	1
46.82	1.8	1
47.14	3.2	1
47.46	4.8	1
47.78	6.4	1
48.10	7.6	1
48.42	8.6	1
48.74	9.5	1
49.06	10.3	1
49.38	11.1	1
49.70	11.8	1
50.02	12.5	1
50.34	13.2	1
50.66	13.8	1
50.98	14.4	1
51.30	14.9	1
51.62	15.5	1
51.94	16.0	1
52.26	17.0	1 +2
52.58	24.9	1 +2
52.90	38.5	1 +2
53.15	0.0	

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

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*************************************
      SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
              BASIN #2

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Outlet Structure File:    a:SPHILL34.STR
Planimeter Input File:    a:SPHILL34.VOL
Rating Table Output File: a:SPHILL34.PND
```

Min. Elev.(ft) = 41.06 Max. Elev.(ft) = 53.15 Incr.(ft) = .32

Additional elevations (ft) to be included in table:
* *
46.15

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**********************************************
              SYSTEM CONNECTIVITY
**********************************************
```

Structure	No.	Q Table		Q Table
CULVERT-CR	1		->	1
WEIR-XY	2		->	2

Outflow rating table summary was stored in file:
a:SPHILL34.PND

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	46.15
E2 elev.(ft)?	53.15
Diam. (ft)?	1.25
Inv. el.(ft)?	46.06
Slope (ft/ft)?	.0062
T1 ratio?	
T2 ratio?	
K Coeff.?	.0078
M Coeff.?	2.0
c Coeff.?	.0292
Y Coeff.?	.74
Form 1 or 2?	1
Slope factor?	-0.50

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2
****

>>>>>> Structure No. 2 <<<<<<
(Input Data)

WEIR-XY
Weir - Defined by X, Y Coordinates
E1 (ft) =52.20 E2 (ft) =53.15

X dist.(ft)	Y elev.(ft)
0	53.15
3	52.2
13	52.2
16	53.15

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

****

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages		
41.06	0.0	E < Inv.El.= 46.06		
41.38	0.0	E < Inv.El.= 46.06		
41.70	0.0	E < Inv.El.= 46.06		
42.02	0.0	E < Inv.El.= 46.06		
42.34	0.0	E < Inv.El.= 46.06		
42.66	0.0	E < Inv.El.= 46.06		
42.98	0.0	E < Inv.El.= 46.06		
43.30	0.0	E < Inv.El.= 46.06		
43.62	0.0	E < Inv.El.= 46.06		
43.94	0.0	E < Inv.El.= 46.06		
44.26	0.0	E < Inv.El.= 46.06		
44.58	0.0	E < Inv.El.= 46.06		
44.90	0.0	E < Inv.El.= 46.06		
45.22	0.0	E < Inv.El.= 46.06		
45.54	0.0	E < Inv.El.= 46.06		
45.86	0.0	E < Inv.El.= 46.06		
46.15	0.0	Equ.1: HW =.09	dc=.068	Ac=.026
46.18	0.1	Equ.1: HW =.12	dc=.093	Ac=.042
46.50	0.7	Equ.1: HW =.44	dc=.319	Ac=.247
46.82	1.8	Equ.1: HW =.760	dc=.535	Ac=.502
47.14	3.2	Equ.1: HW =1.08	dc=.726	Ac=.74
47.46	4.8	Equ.1: HW =1.4	dc=.886	Ac=.930
47.78	6.4	Submerged: HW =1.72		
48.10	7.6	Submerged: HW =2.04		
48.42	8.6	Submerged: HW =2.36		
48.74	9.5	Submerged: HW =2.68		
49.06	10.3	Submerged: HW =3.0		
49.38	11.1	Submerged: HW =3.32		
49.70	11.8	Submerged: HW =3.64		
50.02	12.5	Submerged: HW =3.96		
50.34	13.2	Submerged: HW =4.28		

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
50.66	13.8	Submerged: HW =4.6
50.98	14.4	Submerged: HW =4.92
51.30	14.9	Submerged: HW =5.24
51.62	15.5	Submerged: HW =5.56
51.94	16.0	Submerged: HW =5.88
52.26	16.5	Submerged: HW =6.2
52.58	17.0	Submerged: HW =6.52
52.90	17.5	Submerged: HW =6.84
53.15	0.0	E = or > E2=53.15

Used Unsubmerged Equ. Form (1) for elev. less than 47.47 ft
Used Submerged Equation for elevations greater than 47.57 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=47.47 ft; Q1=4.8 cfs; Dc=.89 ft; E2=47.57 ft; Q2=5.49 cfs

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

****

Outflow Rating Table for Structure #2
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
41.06	0.0	E < Y min= 52.2
41.38	0.0	E < Y min= 52.2
41.70	0.0	E < Y min= 52.2
42.02	0.0	E < Y min= 52.2
42.34	0.0	E < Y min= 52.2
42.66	0.0	E < Y min= 52.2
42.98	0.0	E < Y min= 52.2
43.30	0.0	E < Y min= 52.2
43.62	0.0	E < Y min= 52.2
43.94	0.0	E < Y min= 52.2
44.26	0.0	E < Y min= 52.2
44.58	0.0	E < Y min= 52.2
44.90	0.0	E < Y min= 52.2
45.22	0.0	E < Y min= 52.2
45.54	0.0	E < Y min= 52.2
45.86	0.0	E < Y min= 52.2
46.15	0.0	E < E1=52.20
46.18	0.0	E < E1=52.20
46.50	0.0	E < E1=52.20
46.82	0.0	E < E1=52.20
47.14	0.0	E < E1=52.20
47.46	0.0	E < E1=52.20
47.78	0.0	E < E1=52.20
48.10	0.0	E < E1=52.20
48.42	0.0	E < E1=52.20
48.74	0.0	E < E1=52.20
49.06	0.0	E < E1=52.20
49.38	0.0	E < E1=52.20
49.70	0.0	E < E1=52.20
50.02	0.0	E < E1=52.20
50.34	0.0	E < E1=52.20
50.66	0.0	E < E1=52.20
50.98	0.0	E < E1=52.20
51.30	0.0	E < E1=52.20
51.62	0.0	E < E1=52.20
51.94	0.0	E < E1=52.20
52.26	0.5	W(ft)=10.379 Max. D(ft)=.06

Outlet Structure File: SPHILL34.STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

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Outflow Rating Table for Structure #2
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
52.58	7.9	W(ft)=12.4 Max. D(ft)=.38
52.90	21.0	W(ft)=14.421 Max. D(ft)=.7
53.15	0.0	E = or > E2=53.15

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*****************************************
*                                       *
*          .PRINGHILL PHASE 3 & 4       *
*   EXISTING STORMWATER MANAGEMENT / BMP *
*                 BASIN #2              *
*                                       *
*                                       *
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Inflow Hydrograph: a:2INS34 .HYD
Rating Table file: a:SPHILL34.PND

----INITIAL CONDITIONS----
Elevation = 46.05 ft
Outflow = 0.00 cfs
Storage = 28,598 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
41.06	0.0	0
41.38	0.0	1,308
41.70	0.0	2,672
42.02	0.0	4,095
42.34	0.0	5,572
42.66	0.0	7,103
42.98	0.0	8,688
43.30	0.0	10,334
43.62	0.0	12,048
43.94	0.0	13,831
44.26	0.0	15,687
44.58	0.0	17,622
44.90	0.0	19,636
45.22	0.0	21,773
45.54	0.0	24,170
45.86	0.0	26,850
46.15	0.0	29,517
46.18	0.1	29,800
46.50	0.7	32,888
46.82	1.8	36,099
47.14	3.2	39,434
47.46	4.8	42,889
47.78	6.4	46,464
48.10	7.6	50,162
48.42	8.6	54,009
48.74	9.5	58,013
49.06	10.3	62,177
49.38	11.1	66,485
49.70	11.8	70,927
50.02	12.5	75,507
50.34	13.2	80,233

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
43.6	43.6
89.1	89.1
136.5	136.5
185.7	185.7
236.7	236.7
289.6	289.6
344.4	344.4
401.5	401.5
460.9	460.9
522.8	522.8
587.3	587.3
654.4	654.4
725.6	725.6
805.5	805.5
894.8	894.8
983.7	983.7
993.1	993.2
1096.1	1096.8
1203.1	1204.9
1314.2	1317.4
1429.4	1434.2
1548.5	1554.9
1671.7	1679.3
1799.9	1808.5
1933.4	1942.9
2072.2	2082.5
2215.7	2226.8
2363.8	2375.6
2516.4	2528.9
2673.9	2687.1

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
50.66	13.8	85,114
50.98	14.4	90,153
51.30	14.9	95,343
51.62	15.5	100,679
51.94	16.0	106,161
52.26	17.0	111,794
52.58	24.9	117,584
52.90	38.5	123,533

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
2836.6	2850.4
3004.5	3018.9
3177.5	3192.4
3355.3	3370.8
3538.0	3554.0
3725.7	3742.7
3918.7	3943.6
4116.9	4155.4

Time increment (t) = 0.017 hrs.

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:2INS34 .HYD
Outflow Hydrograph: a:2SOU34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	953.1	953.1	0.00	46.05
0.017	0.96	1.0	954.0	954.0	0.00	46.05
0.033	1.92	2.9	956.9	956.9	0.00	46.06
0.050	2.88	4.8	961.7	961.7	0.00	46.08
0.067	3.84	6.7	968.4	968.4	0.00	46.10
0.083	4.80	8.6	977.1	977.1	0.00	46.13
0.100	5.76	10.6	987.5	987.6	0.04	46.16
0.117	6.72	12.5	999.7	1000.0	0.14	46.20
0.133	7.68	14.4	1013.7	1014.1	0.22	46.24
0.150	8.64	16.3	1029.4	1030.0	0.31	46.29
0.167	9.60	18.2	1046.8	1047.6	0.42	46.35
0.183	10.55	20.2	1065.9	1067.0	0.53	46.41
0.200	11.51	22.1	1086.7	1088.0	0.65	46.47
0.217	12.47	24.0	1109.0	1110.6	0.84	46.54
0.233	13.43	25.9	1132.7	1134.9	1.09	46.61
0.250	14.39	27.8	1157.8	1160.5	1.35	46.69
0.267	15.35	29.7	1184.3	1187.5	1.62	46.77
0.283	16.31	31.7	1212.1	1216.0	1.94	46.85
0.300	16.31	32.6	1240.1	1244.7	2.30	46.93
0.317	16.31	32.6	1267.4	1272.7	2.64	47.01
0.333	16.31	32.6	1294.1	1300.1	2.98	47.09
0.350	16.31	32.6	1320.1	1326.7	3.33	47.17
0.367	16.31	32.6	1345.3	1352.7	3.68	47.24
0.383	16.31	32.6	1369.9	1377.9	4.03	47.31
0.400	16.31	32.6	1393.8	1402.5	4.37	47.37
0.417	16.31	32.6	1417.0	1426.4	4.69	47.44
0.433	16.31	32.6	1439.6	1449.6	5.00	47.50
0.450	16.31	32.6	1461.6	1472.2	5.30	47.56
0.467	16.31	32.6	1483.0	1494.2	5.60	47.62
0.483	16.31	32.6	1503.9	1515.7	5.88	47.68
0.500	16.31	32.6	1524.2	1536.5	6.16	47.73
0.517	16.31	32.6	1544.0	1556.8	6.42	47.78
0.533	16.31	32.6	1563.4	1576.6	6.61	47.84
0.550	16.31	32.6	1582.4	1596.0	6.80	47.89
0.567	16.31	32.6	1601.1	1615.0	6.98	47.93
0.583	16.31	32.6	1619.4	1633.7	7.16	47.98
0.600	16.31	32.6	1637.3	1652.0	7.34	48.03
0.617	16.31	32.6	1654.9	1669.9	7.51	48.08
0.633	16.31	32.6	1672.2	1687.5	7.66	48.12
0.650	16.31	32.6	1689.2	1704.8	7.80	48.16
0.667	16.31	32.6	1706.0	1721.9	7.93	48.21
0.683	16.31	32.6	1722.5	1738.6	8.06	48.25
0.700	16.31	32.6	1738.8	1755.1	8.19	48.29
0.717	16.31	32.6	1754.8	1771.4	8.31	48.33
0.733	16.31	32.6	1770.5	1787.4	8.44	48.37

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:2INS34 .HYD
Outflow Hydrograph: a:2SOU34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	16.31	32.6	1786.0	1803.1	8.56	48.41
0.767	16.31	32.6	1801.3	1818.6	8.67	48.44
0.783	16.31	32.6	1816.4	1833.9	8.77	48.48
0.800	16.31	32.6	1831.2	1849.0	8.87	48.52
0.817	16.31	32.6	1845.9	1863.9	8.97	48.55
0.833	16.31	32.6	1860.4	1878.5	9.07	48.59
0.850	16.31	32.6	1874.7	1893.0	9.17	48.62
0.867	16.31	32.6	1888.8	1907.3	9.26	48.66
0.884	16.31	32.6	1902.7	1921.4	9.36	48.69
0.900	16.31	32.6	1916.4	1935.3	9.45	48.72
0.917	16.31	32.6	1930.0	1949.0	9.54	48.75
0.934	16.31	32.6	1943.4	1962.6	9.61	48.79
0.950	16.31	32.6	1956.6	1976.0	9.69	48.82
0.967	16.31	32.6	1969.7	1989.2	9.77	48.85
0.984	16.31	32.6	1982.6	2002.3	9.84	48.88
1.000	16.31	32.6	1995.4	2015.3	9.91	48.91
1.017	16.31	32.6	2008.1	2028.0	9.99	48.94
1.034	16.31	32.6	2020.6	2040.7	10.06	48.96
1.050	16.31	32.6	2032.9	2053.2	10.13	48.99
1.067	16.31	32.6	2045.1	2065.5	10.20	49.02
1.084	16.31	32.6	2057.2	2077.8	10.27	49.05
1.100	16.31	32.6	2069.1	2089.8	10.34	49.08
1.117	16.31	32.6	2081.0	2101.8	10.41	49.10
1.134	16.31	32.6	2092.6	2113.6	10.47	49.13
1.150	16.31	32.6	2104.2	2125.2	10.54	49.15
1.167	16.31	32.6	2115.6	2136.8	10.60	49.18
1.184	16.31	32.6	2126.9	2148.2	10.66	49.21
1.200	16.31	32.6	2138.0	2159.5	10.73	49.23
1.217	16.31	32.6	2149.1	2170.7	10.79	49.26
1.234	16.31	32.6	2160.0	2181.7	10.85	49.28
1.250	16.31	32.6	2170.8	2192.6	10.91	49.30
1.267	16.31	32.6	2181.5	2203.4	10.97	49.33
1.284	16.31	32.6	2192.0	2214.1	11.03	49.35
1.300	16.31	32.6	2202.5	2224.7	11.09	49.38
1.317	16.31	32.6	2212.8	2235.1	11.14	49.40
1.334	15.35	31.7	2222.1	2244.5	11.18	49.42
1.350	14.39	29.7	2229.4	2251.9	11.22	49.43
1.367	13.43	27.8	2234.8	2257.3	11.24	49.45
1.384	12.47	25.9	2238.1	2260.7	11.26	49.45
1.400	11.51	24.0	2239.6	2262.1	11.27	49.46
1.417	10.55	22.1	2239.1	2261.7	11.26	49.45
1.434	9.60	20.2	2236.8	2259.3	11.25	49.45
1.450	8.64	18.2	2232.5	2255.0	11.23	49.44
1.467	7.68	16.3	2226.5	2248.9	11.20	49.43
1.484	6.72	14.4	2218.5	2240.9	11.17	49.41
1.500	5.76	12.5	2208.8	2231.0	11.12	49.39

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:2INS34 .HYD
Outflow Hydrograph: a:2SOU34 .HYD

INFLOW HYDROGRAPH

TIME (hrs)	INFLOW (cfs)
1.517	4.80
1.534	3.84
1.550	2.88
1.567	1.92
1.584	0.96
1.600	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
10.6	2197.2	2219.3	11.06	49.36
8.6	2183.9	2205.9	10.98	49.33
6.7	2168.8	2190.6	10.90	49.30
4.8	2152.0	2173.6	10.81	49.26
2.9	2133.5	2154.9	10.70	49.22
1.0	2113.3	2134.4	10.59	49.18

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:2INS34 .HYD
Outflow Hydrograph: a:2SOU34 .HYD

Starting Pond W.S. Elevation = 46.05 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 16.31 cfs
Peak Outflow = 11.27 cfs
Peak Elevation = 49.46 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 28,598 cu-ft
Peak Storage From Storm = 38,942 cu-ft

Total Storage in Pond = 67,539 cu-ft

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*****************************************
*                                       *
*          .PRINGHILL PHASE 3 & 4       *
*   EXISTING STORMWATER MANAGEMENT / BMP *
*                 BASIN #2              *
*                                       *
*                                       *
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Inflow Hydrograph: a:10INS34 .HYD
Rating Table file: a:SPHILL34.PND

----INITIAL CONDITIONS----
Elevation = 46.05 ft
Outflow = 0.00 cfs
Storage = 28,598 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
41.06	0.0	0
41.38	0.0	1,308
41.70	0.0	2,672
42.02	0.0	4,095
42.34	0.0	5,572
42.66	0.0	7,103
42.98	0.0	8,688
43.30	0.0	10,334
43.62	0.0	12,048
43.94	0.0	13,831
44.26	0.0	15,687
44.58	0.0	17,622
44.90	0.0	19,636
45.22	0.0	21,773
45.54	0.0	24,170
45.86	0.0	26,850
46.15	0.0	29,517
46.18	0.1	29,800
46.50	0.7	32,888
46.82	1.8	36,099
47.14	3.2	39,434
47.46	4.8	42,889
47.78	6.4	46,464
48.10	7.6	50,162
48.42	8.6	54,009
48.74	9.5	58,013
49.06	10.3	62,177
49.38	11.1	66,485
49.70	11.8	70,927
50.02	12.5	75,507
50.34	13.2	80,233

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
43.6	43.6
89.1	89.1
136.5	136.5
185.7	185.7
236.7	236.7
289.6	289.6
344.4	344.4
401.5	401.5
460.9	460.9
522.8	522.8
587.3	587.3
654.4	654.4
725.6	725.6
805.5	805.5
894.8	894.8
983.7	983.7
993.1	993.2
1096.1	1096.8
1203.1	1204.9
1314.2	1317.4
1429.4	1434.2
1548.5	1554.9
1671.7	1679.3
1799.9	1808.5
1933.4	1942.9
2072.2	2082.5
2215.7	2226.8
2363.8	2375.6
2516.4	2528.9
2673.9	2687.1

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
50.66	13.8	85,114
50.98	14.4	90,153
51.30	14.9	95,343
51.62	15.5	100,679
51.94	16.0	106,161
52.26	17.0	111,794
52.58	24.9	117,584
52.90	38.5	123,533

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
2836.6	2850.4
3004.5	3018.9
3177.5	3192.4
3355.3	3370.8
3538.0	3554.0
3725.7	3742.7
3918.7	3943.6
4116.9	4155.4

Time increment (t) = 0.017 hrs.

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:10INS34 .HYD
Outflow Hydrograph: a:10SOU34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	953.1	953.1	0.00	46.05
0.017	1.56	1.6	954.6	954.6	0.00	46.06
0.033	3.13	4.7	959.3	959.3	0.00	46.07
0.050	4.69	7.8	967.1	967.1	0.00	46.10
0.067	6.26	11.0	978.1	978.1	0.00	46.13
0.083	7.82	14.1	992.0	992.2	0.09	46.18
0.100	9.39	17.2	1008.8	1009.2	0.19	46.23
0.117	10.95	20.3	1028.5	1029.1	0.31	46.29
0.133	12.52	23.5	1051.1	1052.0	0.44	46.36
0.150	14.08	26.6	1076.5	1077.7	0.59	46.44
0.167	15.65	29.7	1104.7	1106.3	0.80	46.53
0.183	17.21	32.9	1135.3	1137.5	1.11	46.62
0.200	18.78	36.0	1168.4	1171.3	1.46	46.72
0.217	20.34	39.1	1203.8	1207.5	1.83	46.83
0.233	21.91	42.3	1241.5	1246.1	2.31	46.94
0.250	23.47	45.4	1281.2	1286.8	2.82	47.05
0.267	25.04	48.5	1323.0	1329.7	3.37	47.17
0.283	26.60	51.6	1366.6	1374.6	3.98	47.30
0.300	26.60	53.2	1410.6	1419.8	4.60	47.42
0.317	26.60	53.2	1453.5	1463.8	5.19	47.54
0.333	26.60	53.2	1495.1	1506.7	5.76	47.65
0.350	26.60	53.2	1535.7	1548.3	6.31	47.76
0.367	26.60	53.2	1575.4	1588.9	6.73	47.87
0.383	26.60	53.2	1614.4	1628.6	7.11	47.97
0.400	26.60	53.2	1652.7	1667.6	7.49	48.07
0.417	26.60	53.2	1690.2	1705.9	7.81	48.17
0.433	26.60	53.2	1727.2	1743.4	8.10	48.26
0.450	26.60	53.2	1763.7	1780.4	8.38	48.35
0.467	26.60	53.2	1799.6	1816.9	8.66	48.44
0.483	26.60	53.2	1835.0	1852.8	8.90	48.53
0.500	26.60	53.2	1869.9	1888.2	9.13	48.61
0.517	26.60	53.2	1904.4	1923.1	9.37	48.69
0.533	26.60	53.2	1938.4	1957.6	9.58	48.77
0.550	26.60	53.2	1972.0	1991.6	9.78	48.85
0.567	26.60	53.2	2005.3	2025.2	9.97	48.93
0.583	26.60	53.2	2038.2	2058.5	10.16	49.01
0.600	26.60	53.2	2070.7	2091.4	10.35	49.08
0.617	26.60	53.2	2102.8	2123.9	10.53	49.15
0.633	26.60	53.2	2134.6	2156.0	10.71	49.22
0.650	26.60	53.2	2166.0	2187.8	10.88	49.29
0.667	26.60	53.2	2197.1	2219.2	11.06	49.36
0.683	26.60	53.2	2227.9	2250.3	11.21	49.43
0.700	26.60	53.2	2258.4	2281.1	11.36	49.50
0.717	26.60	53.2	2288.6	2311.6	11.50	49.56
0.733	26.60	53.2	2318.5	2341.8	11.64	49.63

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:10INS34 .HYD
Outflow Hydrograph: a:10SOU34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	26.60	53.2	2348.1	2371.7	11.78	49.69
0.767	26.60	53.2	2377.5	2401.3	11.92	49.75
0.783	26.60	53.2	2406.6	2430.7	12.05	49.82
0.800	26.60	53.2	2435.4	2459.8	12.18	49.88
0.817	26.60	53.2	2464.0	2488.6	12.32	49.94
0.833	26.60	53.2	2492.3	2517.2	12.45	50.00
0.850	26.60	53.2	2520.4	2545.5	12.57	50.05
0.867	26.60	53.2	2548.2	2573.6	12.70	50.11
0.884	26.60	53.2	2575.7	2601.4	12.82	50.17
0.900	26.60	53.2	2603.0	2628.9	12.94	50.22
0.917	26.60	53.2	2630.1	2656.2	13.06	50.28
0.934	25.04	51.6	2655.4	2681.8	13.18	50.33
0.950	23.47	48.5	2677.4	2703.9	13.26	50.37
0.967	21.91	45.4	2696.1	2722.8	13.33	50.41
0.984	20.34	42.3	2711.6	2738.4	13.39	50.44
1.000	18.78	39.1	2723.8	2750.7	13.43	50.46
1.017	17.21	36.0	2732.9	2759.8	13.47	50.48
1.034	15.65	32.9	2738.8	2765.8	13.49	50.49
1.050	14.08	29.7	2741.5	2768.5	13.50	50.50
1.067	12.52	26.6	2741.1	2768.1	13.50	50.50
1.084	10.95	23.5	2737.6	2764.6	13.48	50.49
1.100	9.39	20.3	2731.0	2757.9	13.46	50.48
1.117	7.82	17.2	2721.4	2748.2	13.42	50.46
1.134	6.26	14.1	2708.7	2735.5	13.38	50.43
1.150	4.69	11.0	2693.0	2719.7	13.32	50.40
1.167	3.13	7.8	2674.3	2700.8	13.25	50.37
1.184	1.56	4.7	2652.7	2679.0	13.16	50.32
1.200	0.00	1.6	2628.2	2654.3	13.05	50.27

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:10INS34 .HYD
Outflow Hydrograph: a:10SOU34 .HYD

Starting Pond W.S. Elevation = 46.05 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 26.60 cfs
Peak Outflow = 13.50 cfs
Peak Elevation = 50.50 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 28,598 cu-ft
Peak Storage From Storm = 54,069 cu-ft

Total Storage in Pond = 82,667 cu-ft

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*****************************************
*                                       *
*          .PRINGHILL PHASE 3 & 4       *
*  EXISTING STORMWATER MANAGEMENT / BMP *
*                BASIN #2               *
*                                       *
*                                       *
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Inflow Hydrograph: a:25INS34 .HYD
Rating Table file: a:SPHILL34.PND

----INITIAL CONDITIONS----
Elevation = 46.05 ft
Outflow = 0.00 cfs
Storage = 28,598 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.06	0.0	0	0.0	0.0
41.38	0.0	1,308	43.6	43.6
41.70	0.0	2,672	89.1	89.1
42.02	0.0	4,095	136.5	136.5
42.34	0.0	5,572	185.7	185.7
42.66	0.0	7,103	236.7	236.7
42.98	0.0	8,688	289.6	289.6
43.30	0.0	10,334	344.4	344.4
43.62	0.0	12,048	401.5	401.5
43.94	0.0	13,831	460.9	460.9
44.26	0.0	15,687	522.8	522.8
44.58	0.0	17,622	587.3	587.3
44.90	0.0	19,636	654.4	654.4
45.22	0.0	21,773	725.6	725.6
45.54	0.0	24,170	805.5	805.5
45.86	0.0	26,850	894.8	894.8
46.15	0.0	29,517	983.7	983.7
46.18	0.1	29,800	993.1	993.2
46.50	0.7	32,888	1096.1	1096.8
46.82	1.8	36,099	1203.1	1204.9
47.14	3.2	39,434	1314.2	1317.4
47.46	4.8	42,889	1429.4	1434.2
47.78	6.4	46,464	1548.5	1554.9
48.10	7.6	50,162	1671.7	1679.3
48.42	8.6	54,009	1799.9	1808.5
48.74	9.5	58,013	1933.4	1942.9
49.06	10.3	62,177	2072.2	2082.5
49.38	11.1	66,485	2215.7	2226.8
49.70	11.8	70,927	2363.8	2375.6
50.02	12.5	75,507	2516.4	2528.9
50.34	13.2	80,233	2673.9	2687.1

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
50.66	13.8	85,114
50.98	14.4	90,153
51.30	14.9	95,343
51.62	15.5	100,679
51.94	16.0	106,161
52.26	17.0	111,794
52.58	24.9	117,584
52.90	38.5	123,533

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
2836.6	2850.4
3004.5	3018.9
3177.5	3192.4
3355.3	3370.8
3538.0	3554.0
3725.7	3742.7
3918.7	3943.6
4116.9	4155.4

Time increment (t) = 0.017 hrs.

EXECUTED: 11-03-1999 09:15:23 Return Freq: 25 years

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:25INS34 .HYD
Outflow Hydrograph: a:25SOU34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	953.1	953.1	0.00	46.05
0.017	2.15	2.2	955.2	955.2	0.00	46.06
0.033	4.30	6.4	961.7	961.7	0.00	46.08
0.050	6.46	10.8	972.4	972.4	0.00	46.11
0.067	8.61	15.1	987.4	987.5	0.04	46.16
0.083	10.76	19.4	1006.4	1006.8	0.18	46.22
0.100	12.91	23.7	1029.5	1030.1	0.31	46.29
0.117	15.06	28.0	1056.5	1057.4	0.47	46.38
0.133	17.21	32.3	1087.5	1088.8	0.65	46.48
0.150	19.37	36.6	1122.1	1124.0	0.98	46.58
0.167	21.52	40.9	1160.2	1163.0	1.37	46.70
0.183	23.67	45.2	1201.8	1205.4	1.81	46.82
0.200	25.82	49.5	1246.5	1251.3	2.38	46.95
0.217	27.97	53.8	1294.3	1300.3	2.99	47.09
0.233	30.12	58.1	1345.1	1352.4	3.68	47.24
0.250	32.28	62.4	1398.6	1407.5	4.43	47.39
0.267	34.43	66.7	1454.9	1465.3	5.21	47.54
0.283	36.58	71.0	1513.9	1525.9	6.02	47.70
0.300	36.58	73.2	1573.6	1587.0	6.71	47.86
0.317	36.58	73.2	1632.2	1646.8	7.29	48.02
0.333	36.58	73.2	1689.8	1705.4	7.80	48.16
0.350	36.58	73.2	1746.4	1762.9	8.25	48.31
0.367	36.58	73.2	1802.2	1819.6	8.67	48.45
0.383	36.58	73.2	1857.3	1875.4	9.05	48.58
0.400	36.58	73.2	1911.6	1930.5	9.42	48.71
0.417	36.58	73.2	1965.3	1984.8	9.74	48.84
0.433	36.58	73.2	2018.4	2038.5	10.05	48.96
0.450	36.58	73.2	2070.8	2091.5	10.35	49.08
0.467	36.58	73.2	2122.7	2144.0	10.64	49.20
0.483	36.58	73.2	2174.0	2195.9	10.93	49.31
0.500	36.58	73.2	2224.8	2247.2	11.20	49.42
0.517	36.58	73.2	2275.1	2297.9	11.43	49.53
0.533	36.58	73.2	2324.9	2348.2	11.67	49.64
0.550	36.58	73.2	2374.2	2398.0	11.90	49.75
0.567	36.58	73.2	2423.1	2447.4	12.13	49.85
0.583	36.58	73.2	2471.6	2496.3	12.35	49.95
0.600	36.58	73.2	2519.6	2544.8	12.57	50.05
0.617	36.58	73.2	2567.2	2592.8	12.78	50.15
0.633	36.58	73.2	2614.4	2640.4	12.99	50.25
0.650	36.58	73.2	2661.1	2687.6	13.20	50.34
0.667	36.58	73.2	2707.6	2734.3	13.37	50.43
0.683	36.58	73.2	2753.6	2780.7	13.54	50.52
0.700	36.58	73.2	2799.4	2826.8	13.71	50.61
0.717	36.58	73.2	2844.8	2872.5	13.88	50.70
0.733	36.58	73.2	2889.8	2917.9	14.04	50.79

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:25INS34 .HYD
Outflow Hydrograph: a:25SOU34 .HYD

INFLOW HYDROGRAPH

TIME (hrs)	INFLOW (cfs)
0.750	36.58
0.767	36.58
0.783	36.58
0.800	36.58
0.817	36.58
0.833	36.58
0.850	34.43
0.867	32.28
0.884	30.12
0.900	27.97
0.917	25.82
0.934	23.67
0.950	21.52
0.967	19.37
0.984	17.21
1.000	15.06
1.017	12.91
1.034	10.76
1.050	8.61
1.067	6.46
1.084	4.30
1.100	2.15
1.117	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
73.2	2934.6	2963.0	14.20	50.87
73.2	2979.0	3007.8	14.36	50.96
73.2	3023.2	3052.2	14.50	51.04
73.2	3067.1	3096.4	14.62	51.12
73.2	3110.8	3140.3	14.75	51.20
73.2	3154.2	3183.9	14.88	51.28
71.0	3195.2	3225.2	15.01	51.36
66.7	3231.6	3261.9	15.13	51.42
62.4	3263.5	3294.0	15.24	51.48
58.1	3291.0	3321.6	15.33	51.53
53.8	3313.9	3344.8	15.41	51.57
49.5	3332.5	3363.4	15.48	51.61
45.2	3346.6	3377.7	15.52	51.63
40.9	3356.4	3387.5	15.55	51.65
36.6	3361.9	3393.0	15.56	51.66
32.3	3363.0	3394.1	15.56	51.66
28.0	3359.9	3391.0	15.56	51.66
23.7	3352.5	3383.6	15.53	51.64
19.4	3340.8	3371.9	15.50	51.62
15.1	3325.0	3355.9	15.45	51.59
10.8	3305.0	3335.8	15.38	51.56
6.4	3280.9	3311.5	15.30	51.51
2.2	3252.6	3283.0	15.20	51.46

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:25INS34 .HYD
Outflow Hydrograph: a:25SOU34 .HYD

Starting Pond W.S. Elevation = 46.05 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 36.58 cfs
Peak Outflow = 15.56 cfs
Peak Elevation = 51.66 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 28,598 cu-ft
Peak Storage From Storm = 72,780 cu-ft

Total Storage in Pond = 101,378 cu-ft

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*****************************************
*                                       *
*          .PRINGHILL PHASE 3 & 4       *
*  EXISTING STORMWATER MANAGEMENT / BMP *
*                BASIN #2               *
*                                       *
*                                       *
*****************************************
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Inflow Hydrograph: a:100INS34.HYD
Rating Table file: a:SPHILL34.PND

----INITIAL CONDITIONS----
Elevation = 46.05 ft
Outflow = 0.00 cfs
Storage = 28,598 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
41.06	0.0	0
41.38	0.0	1,308
41.70	0.0	2,672
42.02	0.0	4,095
42.34	0.0	5,572
42.66	0.0	7,103
42.98	0.0	8,688
43.30	0.0	10,334
43.62	0.0	12,048
43.94	0.0	13,831
44.26	0.0	15,687
44.58	0.0	17,622
44.90	0.0	19,636
45.22	0.0	21,773
45.54	0.0	24,170
45.86	0.0	26,850
46.15	0.0	29,517
46.18	0.1	29,800
46.50	0.7	32,888
46.82	1.8	36,099
47.14	3.2	39,434
47.46	4.8	42,889
47.78	6.4	46,464
48.10	7.6	50,162
48.42	8.6	54,009
48.74	9.5	58,013
49.06	10.3	62,177
49.38	11.1	66,485
49.70	11.8	70,927
50.02	12.5	75,507
50.34	13.2	80,233

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
43.6	43.6
89.1	89.1
136.5	136.5
185.7	185.7
236.7	236.7
289.6	289.6
344.4	344.4
401.5	401.5
460.9	460.9
522.8	522.8
587.3	587.3
654.4	654.4
725.6	725.6
805.5	805.5
894.8	894.8
983.7	983.7
993.1	993.2
1096.1	1096.8
1203.1	1204.9
1314.2	1317.4
1429.4	1434.2
1548.5	1554.9
1671.7	1679.3
1799.9	1808.5
1933.4	1942.9
2072.2	2082.5
2215.7	2226.8
2363.8	2375.6
2516.4	2528.9
2673.9	2687.1

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + 0 (cfs)
50.66	13.8	85,114	2836.6	2850.4
50.98	14.4	90,153	3004.5	3018.9
51.30	14.9	95,343	3177.5	3192.4
51.62	15.5	100,679	3355.3	3370.8
51.94	16.0	106,161	3538.0	3554.0
52.26	17.0	111,794	3725.7	3742.7
52.58	24.9	117,584	3918.7	3943.6
52.90	38.5	123,533	4116.9	4155.4

Time increment (t) = 0.017 hrs.

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:100INS34.HYD
Outflow Hydrograph: a:100SOU34.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	953.1	953.1	0.00	46.05
0.017	2.11	2.1	955.2	955.2	0.00	46.06
0.033	4.22	6.3	961.5	961.5	0.00	46.08
0.050	6.33	10.6	972.1	972.1	0.00	46.11
0.067	8.44	14.8	986.8	986.8	0.03	46.16
0.083	10.55	19.0	1005.4	1005.7	0.17	46.22
0.100	12.67	23.2	1028.0	1028.6	0.31	46.29
0.117	14.78	27.5	1054.5	1055.5	0.46	46.37
0.133	16.89	31.7	1084.9	1086.2	0.64	46.47
0.150	19.00	35.9	1118.9	1120.8	0.94	46.57
0.167	21.11	40.1	1156.4	1159.0	1.33	46.68
0.183	23.22	44.3	1197.2	1200.7	1.76	46.81
0.200	25.33	48.6	1241.1	1245.7	2.31	46.94
0.217	27.44	52.8	1288.1	1293.9	2.91	47.07
0.233	29.55	57.0	1337.9	1345.1	3.58	47.22
0.250	31.66	61.2	1390.5	1399.1	4.32	47.36
0.267	33.78	65.4	1445.7	1455.9	5.09	47.52
0.283	35.89	69.7	1503.7	1515.4	5.88	47.68
0.300	35.89	71.8	1562.2	1575.4	6.60	47.83
0.317	35.89	71.8	1619.7	1634.0	7.16	47.98
0.333	35.89	71.8	1676.1	1691.5	7.69	48.13
0.350	35.89	71.8	1731.6	1747.9	8.13	48.27
0.367	35.89	71.8	1786.3	1803.4	8.56	48.41
0.383	35.89	71.8	1840.2	1858.0	8.93	48.54
0.400	35.89	71.8	1893.4	1912.0	9.29	48.67
0.417	35.89	71.8	1945.9	1965.2	9.63	48.79
0.433	35.89	71.8	1997.8	2017.7	9.93	48.91
0.450	35.89	71.8	2049.2	2069.6	10.23	49.03
0.467	35.89	71.8	2099.9	2120.9	10.51	49.15
0.483	35.89	71.8	2150.1	2171.7	10.79	49.26
0.500	35.89	71.8	2199.7	2221.9	11.07	49.37
0.517	35.89	71.8	2248.9	2271.5	11.31	49.48
0.533	35.89	71.8	2297.6	2320.7	11.54	49.58
0.550	35.89	71.8	2345.8	2369.4	11.77	49.69
0.567	35.89	71.8	2393.6	2417.6	11.99	49.79
0.583	35.89	71.8	2441.0	2465.4	12.21	49.89
0.600	35.89	71.8	2487.9	2512.8	12.43	49.99
0.617	35.89	71.8	2534.4	2559.7	12.64	50.08
0.633	35.89	71.8	2580.5	2606.2	12.84	50.18
0.650	35.89	71.8	2626.2	2652.3	13.05	50.27
0.667	35.89	71.8	2671.5	2698.0	13.24	50.36
0.683	35.89	71.8	2716.5	2743.3	13.41	50.45
0.700	35.89	71.8	2761.1	2788.2	13.57	50.54
0.717	35.89	71.8	2805.4	2832.9	13.74	50.63
0.733	35.89	71.8	2849.4	2877.2	13.90	50.71

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:100INS34.HYD
Outflow Hydrograph: a:100SOU34.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	35.89	71.8	2893.1	2921.2	14.05	50.79
0.767	35.89	71.8	2936.4	2964.9	14.21	50.88
0.783	35.89	71.8	2979.5	3008.2	14.36	50.96
0.800	35.89	71.8	3022.3	3051.3	14.49	51.04
0.817	35.89	71.8	3064.8	3094.1	14.62	51.12
0.833	35.89	71.8	3107.1	3136.6	14.74	51.20
0.850	35.89	71.8	3149.2	3178.9	14.86	51.28
0.867	35.89	71.8	3191.0	3221.0	15.00	51.35
0.884	35.89	71.8	3232.5	3262.8	15.14	51.43
0.900	35.89	71.8	3273.7	3304.3	15.28	51.50
0.917	35.89	71.8	3314.7	3345.5	15.41	51.57
0.934	35.89	71.8	3355.4	3386.4	15.54	51.65
0.950	35.89	71.8	3395.8	3427.1	15.65	51.72
0.967	35.89	71.8	3436.1	3467.6	15.76	51.79
0.984	35.89	71.8	3476.1	3507.9	15.87	51.86
1.000	35.89	71.8	3515.9	3547.9	15.98	51.93
1.017	35.89	71.8	3555.4	3587.7	16.18	52.00
1.034	35.89	71.8	3594.4	3627.1	16.39	52.06
1.050	35.89	71.8	3633.0	3666.1	16.59	52.13
1.067	35.89	71.8	3671.1	3704.7	16.80	52.20
1.084	35.89	71.8	3708.9	3742.9	17.01	52.26
1.100	35.89	71.8	3743.7	3780.7	18.49	52.32
1.117	35.89	71.8	3775.7	3815.5	19.86	52.38
1.134	35.89	71.8	3805.3	3847.5	21.12	52.43
1.150	35.89	71.8	3832.5	3877.1	22.28	52.47
1.167	35.89	71.8	3857.6	3904.3	23.35	52.52
1.184	35.89	71.8	3880.7	3929.3	24.34	52.56
1.200	35.89	71.8	3901.5	3952.4	25.47	52.59
1.217	35.89	71.8	3919.7	3973.3	26.81	52.62
1.234	35.89	71.8	3935.5	3991.5	27.97	52.65
1.250	35.89	71.8	3949.3	4007.3	28.99	52.68
1.267	35.89	71.8	3961.3	4021.1	29.88	52.70
1.284	35.89	71.8	3971.8	4033.1	30.65	52.72
1.300	35.89	71.8	3981.0	4043.6	31.32	52.73
1.317	35.89	71.8	3988.9	4052.7	31.91	52.74
1.334	35.89	71.8	3995.9	4060.7	32.42	52.76
1.350	35.89	71.8	4001.9	4067.6	32.86	52.77
1.367	35.89	71.8	4007.2	4073.7	33.25	52.78
1.384	35.89	71.8	4011.8	4079.0	33.59	52.78
1.400	35.89	71.8	4015.8	4083.6	33.89	52.79
1.417	35.89	71.8	4019.3	4087.6	34.14	52.80
1.434	35.89	71.8	4022.3	4091.1	34.37	52.80
1.450	35.89	71.8	4025.0	4094.1	34.56	52.81
1.467	35.89	71.8	4027.3	4096.8	34.73	52.81
1.484	35.89	71.8	4029.3	4099.1	34.88	52.81
1.500	35.89	71.8	4031.1	4101.1	35.01	52.82

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:100INS34.HYD
Outflow Hydrograph: a:100SOU34.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
1.517	35.89	71.8	4032.6	4102.8	35.12	52.82
1.534	33.78	69.7	4032.1	4102.3	35.09	52.82
1.550	31.66	65.4	4028.0	4097.5	34.78	52.81
1.567	29.55	61.2	4020.7	4089.2	34.25	52.80
1.584	27.44	57.0	4010.7	4077.7	33.51	52.78
1.600	25.33	52.8	3998.2	4063.4	32.59	52.76
1.617	23.22	48.6	3983.7	4046.8	31.53	52.74
1.634	21.11	44.3	3967.4	4028.1	30.32	52.71
1.650	19.00	40.1	3949.5	4007.5	29.01	52.68
1.667	16.89	35.9	3930.2	3985.4	27.59	52.64
1.684	14.78	31.7	3909.8	3961.9	26.08	52.61
1.700	12.67	27.5	3887.9	3937.2	24.65	52.57
1.717	10.55	23.2	3863.9	3911.1	23.62	52.53
1.734	8.44	19.0	3837.8	3882.9	22.51	52.48
1.750	6.33	14.8	3810.0	3852.6	21.32	52.44
1.767	4.22	10.6	3780.4	3820.5	20.06	52.38
1.784	2.11	6.3	3749.3	3786.7	18.73	52.33
1.800	0.00	2.1	3716.7	3751.4	17.34	52.27

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: a:SPHILL34.PND
Inflow Hydrograph: a:100INS34.HYD
Outflow Hydrograph: a:100SOU34.HYD

Starting Pond W.S. Elevation = 46.05 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 35.89 cfs
Peak Outflow = 35.12 cfs
Peak Elevation = 52.82 ft

***** Summary of Approximate Peak Storage *****

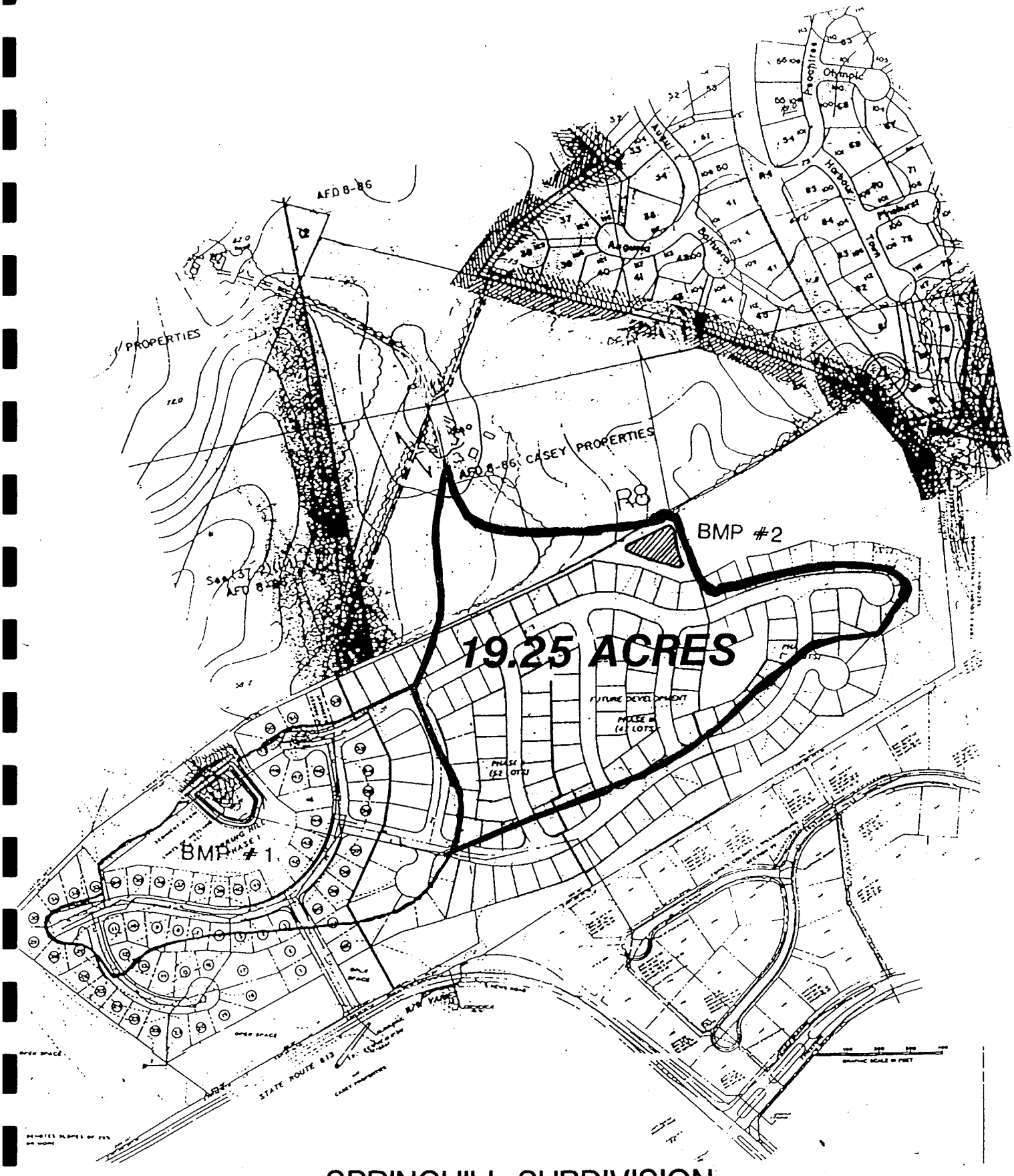
Initial Storage = 28,598 cu-ft
Peak Storage From Storm = 93,459 cu-ft

Total Storage in Pond = 122,056 cu-ft

SPRINGHILL SUBDIVISION
STORMWATER MANAGEMENT SUMMARY
BMP#2

STORM EVENT	WATER SURFACE EVALUATION	PEAK OUTFLOW FROM BASIN C.F.S.	PRE-DEVELOPED FLOW	TOTAL REDUCTION/INCREASE IN FLOWS
2 YEAR	49.46	11.27	15.03	3.74 LESS
10 YEAR	50.50*	13.50	19.89	6.45 LESS
25 YEAR	51.66	15.56	22.54	7.8 LESS
100 YEAR	52.82	35.89	26.96	8.43 MORE

*NOTE: 10 YEAR STORM EVENT ELEVATION 50.50 WAS USED AS THE TAILWATER ELEVATION FOR THE HYDRAULIC GRADE LINE CALCULATION.



SPRINGHILL SUBDIVISION
PRE-DEVELOPED WATERSHED

SPRINGHILL SUBDIVISION
POST-DEVELOPMENT WATERSHED

SPRINGHILL SUBDIVISION
STORMWATER MANAGEMENT
BMP #2

WATERSHED AREAS

PRE-DEVELOPED AREA	=	17.67 ACRES
POST-DEVELOPED AREA	=	22.56 ACRES

RUNOFF COEFFICIENT

PRE-DEVELOPED COEFFICIENT	=	0.25
POST-DEVELOPED COEFFICIENT (WEIGHTED)	=	0.46
1. 3.47 AC. OFF-SITE AT 0.30	=	1.04
2. 0.99 AC. OPEN SPACE AT 0.30	=	0.30
3. 18.10 AC. DEVELOPED AREA AT 0.50	=	9.05
TOTAL		10.39
COEFFICIENT 10.39 ÷ ACRES 22.56	=	0.46

TIME OF CONCENTRATION

PRE-DEVELOPED T_C	=	22 MINUTES
POST-DEVELOPED T_C	=	17 MINUTES (FROM DRAINAGE CALCULATIONS)

RAINFALL INTENSITIES

PRE-DEVELOPED (22 MINUTES)

2 YEAR STORM	=	3.4 INTENSITY
10 YEAR STORM	=	4.5 INTENSITY
25 YEAR STORM	=	5.1 INTENSITY
100 YEAR STORM	=	6.1 INTENSITY

SPRINGHILL SUBDIVISION
STORMWATER MANAGEMENT
BMP #2

POST-DEVELOPED (17 MINUTES)

2 YEAR STORM	=	3.8 INTENSITY
10 YEAR STORM	=	5.0 INTENSITY
25 YEAR STORM	=	5.8 INTENSITY
100 YEAR STORM	=	6.9 INTENSITY

FLOWS

PRE-DEVELOPED Q

AREA X COEFFICIENT				=		CA
17.67 X 0.25				=		4.42
2 YEAR STORM	4.42	X	3.4	=	Q_2	15.03
10 YEAR STORM	4.42	X	4.5	=	Q_{10}	19.89
25 YEAR STORM	4.42	X	5.1	=	Q_{25}	22.54
100 YEAR STORM	4.42	X	6.1	=	Q_{100}	26.96

POST-DEVELOPED Q

AREA X COEFFICIENT				=		CA
22.56 X 0.46				=		10.38
2 YEAR STORM	10.38	X	3.8	=	Q_2	39.44
10 YEAR STORM	10.38	X	5.0	=	Q_{10}	51.90
25 YEAR STORM	10.38	X	5.8	=	Q_{25}	60.70 + 1.1%
100 YEAR STORM	10.38	X	6.9	=	Q_{100}	26.96 + 1.25%

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
#1 WET POND (#7)	9	x	16.42 / (82.03 - 30.19)=0.3167	=	2.86 PHASE I EXISTING
#2 WET POND (#6)	8	x	22.56 * / (82.03 - 30.19)=0.4352	=	3.48 PHASE II, III, & IV
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 6.33 ✓

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
30.19 / 82.03 = 0.368	x	10 (0.1 per 1%)	=	3.68

$\frac{x}{82.03} \times \frac{10}{10} = \frac{.01}{10} \times 82.03$

C. TOTAL WEIGHTED POINTS

6.33	+	3.68	=	10.01
Structural BMP Points		Natural Open Space Points		TOTAL

* THIS INCLUDES 1.95 ACRES OFF-SITE DRAINAGE TREATED IN BASIN #2.

.01 excess point. ⇒ .1% of site or .082 ac ⇒ 3600 sq ft.

loss of 1 acre of site yields 3.60 open space + 6.33 = 9.93 pts

actual loss of x 10,000 SF of NOS $30.19 - 0.23 = \frac{29.96}{82.03} = .365 \times 10 = 3.65$

6.33

9.98

SPRINGHILL SUBDIVISION
BMP #2

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

The Drainage, Stormwater Management, and Erosion Control facilities for Phase 2 have been developed in basic conformance with the "Overall Drainage and Stormwater Management Plan." We have designed the wet pond as an 8 point BMP using 2.5 times the volume required by the Chesapeake Bay Preservation Act. The design volume required is as follows:

Required Volume of BMP 2

$$V_r = \frac{(R_M)(R_v)}{12} \times Ac.$$

$R_v = (0.05 + 0.009I)$ = $[0.06 + 0.009(30.01)] = 0.320$ (Where I = 30% from CBLAM Sheet C-10, attached, ave. lot size 0.25 Ac.)

$R_m = 0.45"$

Ac. = 22.56 Acres

$$V_r = \frac{(0.45)(0.32)}{12} \times 22.56 = 0.271 \text{ ac.-ft.} = 11{,}804.76 \text{ cu. ft.}$$

An 8 Point BMP wet pond requires 2.5 x V_r normal storage.

$V_r \times 2.5 = 0.271$ ac.-ft. x 2.5 = 0.6775 ac.-ft. = 29,511.90 cu. ft.

The BMP pond was designed using the Modified Rational Method and run on Haestad Methods Inc.'s Quick TR-55 and Pond-2 software. Intensity, Duration, and Frequency Curve data used was taken from the VDOT Drainage Manual for Norfolk (Rev. 6/92).

SEDIMENT BASIN CALCULATIONS BASIN NO. 2

SPRINGHILL SUBDIVISION PHASES 3 AND 4

SEPTEMBER 20, 1998

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

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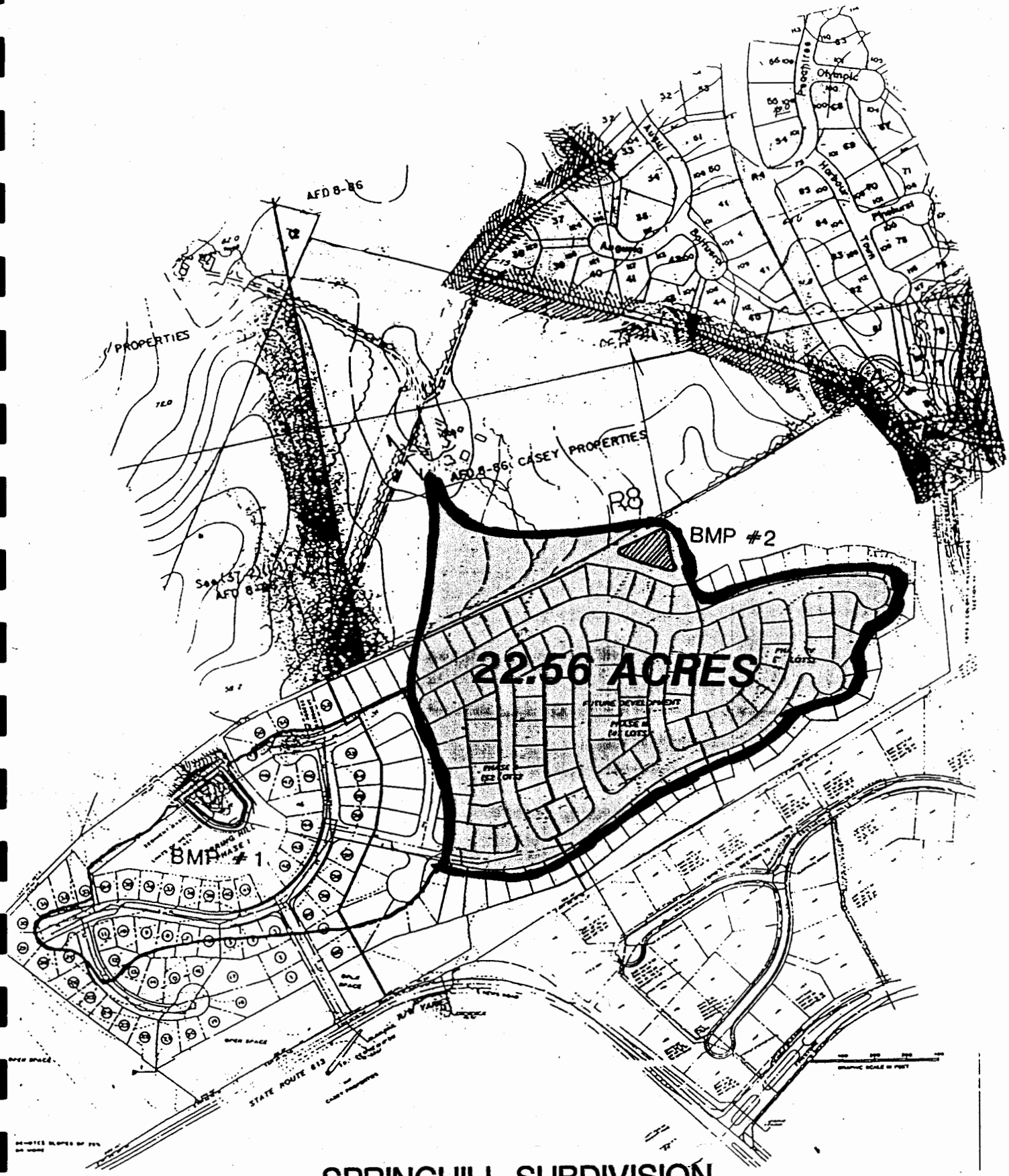
SEDIMENT BASIN
CALCULATIONS
BASIN NO. 2

SPRINGHILL SUBDIVISION
PHASES 3 AND 4

SEPTEMBER 20, 1998



SPRINGHILL SUBDIVISION
POST-DEVELOPMENT WATERSHED

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project SPRINGHILL PHASES 3 & 4

Basin # 2 Location _____

Total area draining to basin: 22.56 acres.

Basin Volume Design

Wet Storage:

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

   67 cu. yds. x 22.56 acres = 1,511.5 cu. yds.

2. Available basin volume = 1,512.0 cu. yds. at elevation 47.27. (From storage - elevation curve)

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

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

4. Available volume before cleanout required.

   33 cu. yds. x 22.56 acres = 744.5 cu. yds.

5. Elevation corresponding to cleanout level = 44.93.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 2.29 ft. (Min. = 1.0 ft.)

Dry Storage:

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

   67 cu. yds. x 22.56 acres = 1,511.5 cu. yds.

8. Total available basin volume at crest of riser* = 3,037.5 cu. yds. at elevation 50.44. (From Storage - Elevation Curve)

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

9. Diameter of dewatering orifice = 6 in.

10. Diameter of flexible tubing = 8 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 50.44

Top of Dam = 52.74 EXIST

Design High Water = 52.49 25 YEAR

Upstream Toe of Dam = 51 ±

Basin Shape

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

If > 2, baffles are not required _____

If < 2, baffles are required _____

Runoff

13. Q_2 = 38.83 cfs (From Chapter 5)

14. Q_{25} = 64.83 cfs (From Chapter 5)

Principal Spillway Design

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

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

16. With emergency spillway:

Assumed available head (h) = 1.76 ft. (Using Q_2)

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

Without emergency spillway:

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

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 21 in. Actual head (h) = _____ ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 162 ft.

Head (H) on barrel through embankment = _____ft.

(From Plate 3.14-7).

19. Barrel diameter = 15 in. EXISTING

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

20. Trash rack and anti-vortex device

Diameter = 30 inches.

Height = 11 inches.

(From Table 3.14-D).

Emergency Spillway Design

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

22. Bottom width (b) = 10 ft.; the slope of the exit channel (s) = _____ ft./foot; and the minimum length of the exit channel (x) = _____ ft.
(From Table 3.14-C).

Anti-Seep Collar Design

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

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

Slope of principal spillway barrel (S_b) = _____%

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

24. Number of collars required = _____ dimensions = _____

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 57.74

Design High Water = 52.49 25 YEAR

Emergency Spillway Crest = 52.20

Principal Spillway Crest = 50.44

Dewatering Orifice Invert = 47.27

Cleanout Elevation = 44.98

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

Quick TR-55 Ver.6.48 S/N:
Executed: 13:46:51 09-04-1998

```
*****************************************************************
*****************************************************************
*                                                               *
*                                                               *
*                    MODIFIED RATIONAL METHOD                   *
*          ---- Grand Summary For All Storm Frequencies ----    *
*                                                               *
*                                                               *
*****************************************************************
*****************************************************************
```

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

Area = 22.56 acres Tc = 17.00 minutes

Frequency (years)	Adjusted 'C'	Duration minutes	Intens. in/hr	Qpeak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
2	0.454	79	1.594	16.31	15.03	77,317	34,030
10	0.454	55	2.600	26.60	19.89	87,791	44,828
25	0.499	50	3.250	36.58	22.54	109,738	64,433
100	0.567	91	2.806	35.89	26.96	195,941	108,590

Quick TR-55 Ver.5.46 S/N:
Executed: 13:48:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY:    2 yr      |  Allowable Outflow:     15.03 cfs     *
*  'C' Adjustment: 1.000          |  Required Storage:    34,030 cu.ft.  *
*---------------------------------------------------------------------------*
*  Peak Inflow:    16.31 cfs        Inflow .HYD stored: 2INS34  .HYD      *
*****************************************************************************
```

```
|                Td =  79 minutes                    |  Return Freq:      2 yr
/------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.00
|                                                    |
|                                                    |
|                Tc=    17.00  minutes               |
|                I =    3.800  in/hr                 |  Area (ac):     22.56
|              . Q =    38.88  cfs                   |  Weighted C:     0.45
|            .|.                                     |  Adjusted C:     0.45
F           .   .                                    |
L          .  |  .              Required Storage     |
O        .       .         .--    34,030 cu.ft.      |  Td=       79 minutes
W       .    |    .       |                         |  I =    1.594 in/hr
       .     x x x x x x x|x x x x x x x x x x x x   Q =    16.31 cfs
c     .                   |
f    .    x                                          x
s   .                                                  o   Q=   15.03 cfs
   .   x                                   o          |x  (Allow.Outflow)
  .  x                    .     o                     |
 .  x                o    .       NOT TO SCALE        |   x
. x       o               .       ============        |
o                         .                           |       x
-----------------------------------------------------|------------
                                                     80.34 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 13:48:51 09-04-1998

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.454 Td= 79.00 min. I= 1.59 in/hr Qp= 16.31 cfs

RETURN FREQUENCY: 2 year storm Adj.factor = 1.00
Output file: 2IN834 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 2 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	0.96	1.92	2.88	3.84	4.80	5.76
7.00	6.72	7.68	8.64	9.60	10.55	11.51	12.47
14.00	13.43	14.39	15.35	16.31	16.31	16.31	16.31
21.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
28.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
35.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
42.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
49.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
56.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
63.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
70.00	16.31	16.31	16.31	16.31	16.31	16.31	16.31
77.00	16.31	16.31	16.31	15.35	14.39	13.43	12.47
84.00	11.51	10.55	9.60	8.64	7.68	6.72	5.76
91.00	4.80	3.84	2.88	1.92	0.96	0.00	

Quick TR-55 Ver.5.48 S/N:
Executed: 13:46:51 09-04-1998

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.454	3.800	22.56	38.88

Quick TR-55 Ver.5.46 S/N:
Executed: 18:48:51 09-04-1988

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 2 yr 'C' Adjustment = 1.000 Allowable Q = 15.03 cfs

Hydrograph file duration= 79.00 minutes
Hydrograph file: 2INS34 .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.454	17	3.800	22.56	38.88	39,659	24,329
0.454	0.454	20	3.500	22.56	35.81	42,974	26,291
0.454	0.454	30	2.750	22.56	28.14	50,648	29,456
0.454	0.454	40	2.250	22.56	23.02	55,253	29,552
0.454	0.454	50	2.000	22.56	20.46	61,392	31,182
0.454	0.454	60	1.800	22.56	18.42	66,303	31,584
**********						Storage	Maximum
0.454	0.454	79	1.594	22.56	16.31	77,317	34,030
**********							
0.454	0.454	120	1.150	22.56	11.77	Qpeak < Qallow	

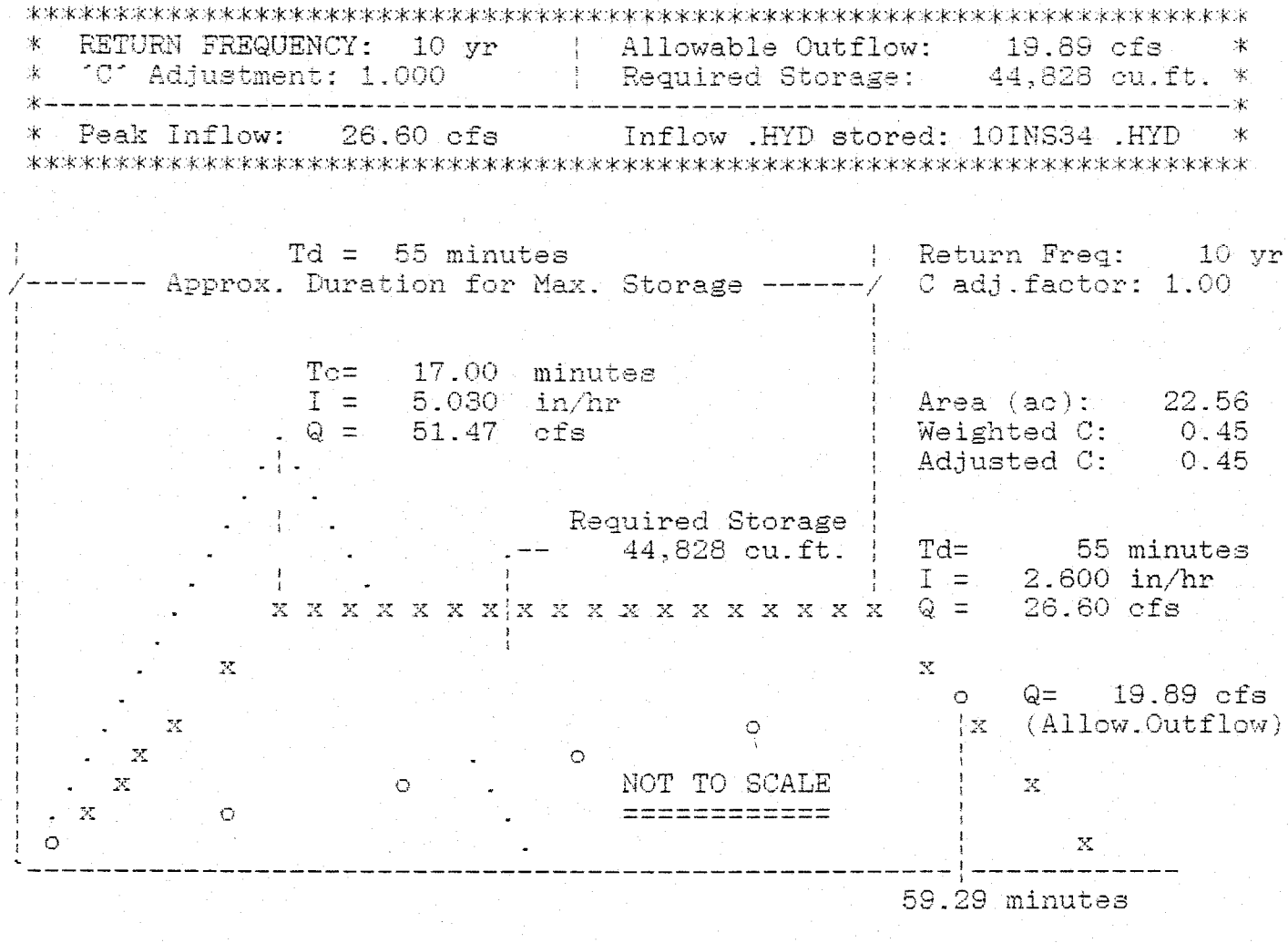
Quick TR-55 Ver.5.46 S/N:
Executed: 13:46:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 10 yr	Allowable Outflow: 19.89 cfs
'C' Adjustment: 1.000	Required Storage: 44,828 cu.ft.
Peak Inflow: 26.60 cfs	Inflow .HYD stored: 10INS34 .HYD



Quick TR-55 Ver.5.48 S/N:
Executed: 13:46:51 09-04-1998

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.454 Td= 55.00 min. I= 2.60 in/hr Qp= 26.60 cfs

RETURN FREQUENCY: 10 year storm Adj.factor = 1.00
Output file: 10IN534 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 10 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.56	3.13	4.69	6.26	7.82	9.39
7.00	10.95	12.52	14.08	15.65	17.21	18.78	20.34
14.00	21.91	23.47	25.04	26.60	26.60	26.60	26.60
21.00	26.60	26.60	26.60	26.60	26.60	26.60	26.60
28.00	26.60	26.60	26.60	26.60	26.60	26.60	26.60
35.00	26.60	26.60	26.60	26.60	26.60	26.60	26.60
42.00	26.60	26.60	26.60	26.60	26.60	26.60	26.60
49.00	26.60	26.60	26.60	26.60	26.60	26.60	26.60
56.00	25.04	23.47	21.91	20.34	18.78	17.21	15.65
63.00	14.08	12.52	10.95	9.39	7.82	6.26	4.69
70.00	3.13	1.56	0.00				

Quick TR-55 Ver.5.48 S/N:
Executed: 13:46:51 09-04-1998

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 10 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.454	5.030	22.56	51.47

Quick TR-55 Ver.5.46 S/N:
Executed: 13:46:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 10 yr `C' Adjustment = 1.000 Allowable Q = 19.89 cfs

Hydrograph file duration= 55.00 minutes
Hydrograph file: 10INS34 .HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.454	17	5.030	22.56	51.47	52,496	32,209
0.454	0.454	20	4.700	22.56	48.09	57,708	35,631
0.454	0.454	30	3.750	22.56	38.37	69,066	41,021
0.454	0.454	40	3.150	22.56	32.23	77,354	43,342
0.454	0.454	50	2.750	22.56	28.14	84,414	44,435
**********						Storage	Maximum
0.454	0.454	55	2.600	22.56	26.60	87,791	44,828
**********							
0.454	0.454	60	2.450	22.56	25.07	90,246	44,300
0.454	0.454	120	1.600	22.56	16.37	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:
Executed: 13:46:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY:  25 yr      |  Allowable Outflow:     22.54 cfs     *
*  'C' Adjustment: 1.100         |  Required Storage:     64,433 cu.ft. *
*---------------------------------------------------------------------------*
*  Peak Inflow:    36.58 cfs        Inflow .HYD stored: 25INS34 .HYD      *
*****************************************************************************
```

```
|                Td =  50 minutes                    |  Return Freq:     25 yr
/------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.10
|                                                   |
|                                                   |
|                Tc=   17.00  minutes               |
|                I =   5.760  in/hr                 |  Area (ac):     22.56
|              . Q =   64.83  cfs                   |  Weighted C:     0.45
|             .|.                                   |  Adjusted C:     0.50
F            .   .                                  |
L           .  |  .            Required Storage     |
O          .       .       .--    64,433 cu.ft.    |  Td=       50 minutes
W         .    |    .      |                       |  I =    3.250 in/hr
         .     x x x x x x x|x x x x x x x x x x x  Q =    36.58 cfs
c       .                   |
f      .    x                                       x
s     .                                              o   Q=   22.54 cfs
     .   x                                 o        |x  (Allow.Outflow)
    .  x                     .     o                |
   .  x              o    .       NOT TO SCALE       |   x
  . x       o              .      ============       |
 o                         .                         |       x
`-----------------------------------------------------|------------
                                                     56.52 minutes
```

Quick TR-55 Ver.6.46 S/N:
Executed: 13:48:51 09-04-1998

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

**** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.580 acres Tc = 17.00 minutes

Adjusted C = 0.499 Td= 50.00 min. I= 3.25 in/hr Qp= 36.58 cfs

RETURN FREQUENCY: 25 year storm Adj.factor = 1.10
Output file: 25INS34 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 25 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	2.15	4.30	6.46	8.61	10.76	12.91
7.00	15.06	17.21	19.37	21.52	23.67	25.82	27.97
14.00	30.12	32.28	34.43	36.58	36.58	36.58	36.58
21.00	36.58	36.58	36.58	36.58	36.58	36.58	36.58
28.00	36.58	36.58	36.58	36.58	36.58	36.58	36.58
35.00	36.58	36.58	36.58	36.58	36.58	36.58	36.58
42.00	36.58	36.58	36.58	36.58	36.58	36.58	36.58
49.00	36.58	36.58	34.43	32.28	30.12	27.97	25.82
56.00	23.67	21.52	19.37	17.21	15.06	12.91	10.76
63.00	8.61	6.46	4.30	2.15	0.00		

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SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 25 years
'C' adjustment, k = 1.1
Adj. 'C' = Wtd.'C' x 1.1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.499	5.760	22.56	64.83

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Executed: 13:48:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 100 yr `C' Adjustment = 1.250 Allowable Q = 26.96 cfs

Hydrograph file duration= 91.00 minutes
Hydrograph file: 100INS34.HYD Tc = 17.00 minutes

Weighted `C'	Adjusted `C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.567	17	6.920	22.56	88.51	90,277	62,778
0.454	0.567	20	6.500	22.56	83.14	99,762	69,836
0.454	0.567	30	5.250	22.56	67.15	120,866	82,852
0.454	0.567	40	4.500	22.56	57.56	138,132	92,030
0.454	0.567	50	3.800	22.56	48.60	145,806	91,616
0.454	0.567	60	3.400	22.56	43.49	156,550	94,272
**********						Storage	Maximum
0.454	0.567	91	2.806	22.56	35.89	195,941	108,590
**********							
0.454	0.567	120	2.250	22.56	28.78	207,198	96,392
0.454	0.567	180	1.700	22.56	21.74	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:
Executed: 13:46:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

```
*****************************************************************************
*  RETURN FREQUENCY: 100 yr      |  Allowable Outflow:     26.96 cfs      *
*  'C' Adjustment: 1.250         |  Required Storage:    108,590 cu.ft.  *
*---------------------------------------------------------------------------*
*  Peak Inflow:    35.89 cfs        Inflow .HYD stored: 100INS34.HYD      *
*****************************************************************************
```

```
|                Td =  91 minutes                    |  Return Freq:   100 yr
/------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.25
|                                                   |
|                                                   |
|                Tc=   17.00  minutes               |
|                I =   6.920  in/hr                 |  Area (ac):     22.56
|              . Q =   88.51  cfs                   |  Weighted C:     0.45
|            .|.                                    |  Adjusted C:     0.57
F           .   .                                   |
L          .  |  .            Required Storage      |
O         .       .        .--   108,590 cu.ft.    |  Td=      91 minutes
W        .    |    .       |                       |  I =   2.806 in/hr
        .     x x x x x x x|x x x x x x x x x x x  Q =   35.89 cfs
c      .                   |
f     .    x                                        x
s    .                                                o   Q=   26.96 cfs
    .   x                                 o          |x  (Allow.Outflow)
   .  x                     .     o                  |
  .  x                o     .       NOT TO SCALE     |   x
 . x       o                .       ============     |
 o                          .                        |       x
`-------------------------------------------------------|------------
                                                     95.23 minutes
```

Quick TR-55 Ver.5.48 S/N:
Executed: 13:48:51 08-04-1998

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

***** Modified Rational Hydrograph *****

Weighted C = 0.454 Area= 22.560 acres Tc = 17.00 minutes

Adjusted C = 0.567 Td= 91.00 min. I= 2.81 in/hr Qp= 35.89 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.25
Output file: 100INS34.HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 100 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	2.11	4.22	6.33	8.44	10.55	12.67
7.00	14.78	16.89	19.00	21.11	23.22	25.33	27.44
14.00	29.55	31.66	33.78	35.89	35.89	35.89	35.89
21.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
28.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
35.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
42.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
49.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
56.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
63.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
70.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
77.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
84.00	35.89	35.89	35.89	35.89	35.89	35.89	35.89
91.00	35.89	33.78	31.66	29.55	27.44	25.33	23.22
98.00	21.11	19.00	16.89	14.78	12.67	10.55	8.44
105.00	6.33	4.22	2.11	0.00			

Quick TR-55 Ver.5.46 S/N:
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SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.25
Adj. 'C' = Wtd.'C' x 1.25

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
OFF-SITE	0.300	3.47						
OPEN SPACE	0.300	1.77						
DEV. AREA	0.500	17.32						
			17.00	0.454	0.567	6.920	22.56	88.51

Quick TR-55 Ver.5.46 S/N:
Executed: 13:46:51 09-04-1998

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2

RETURN FREQUENCY: 25 yr `C' Adjustment = 1.100 Allowable Q = 22.54 cfs

Hydrograph file duration= 50.00 minutes
Hydrograph file: 25INS34 .HYD Tc = 17.00 minutes

Weighted `C'	Adjusted `C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.454	0.499	17	5.760	22.56	64.83	66,127	43,136
0.454	0.499	20	5.400	22.56	60.78	72,934	47,914
0.454	0.499	30	4.400	22.56	49.52	89,141	57,360
0.454	0.499	40	3.600	22.56	40.52	97,245	58,702
********** Storage Maximum							
0.454	0.499	50	3.250	22.56	36.58	109,738	64,433
0.454	0.499	60	2.800	22.56	31.51	113,452	61,385
0.454	0.499	120	1.750	22.56	19.70	Qpeak < Qallow	

POND-2 Version: 5.20
S/N:

SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

CALCULATED 09-04-1998 14:11:49
DISK FILE: A:SPHILL34.VOL

Planimeter scale: 1 inch = 50 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
41.06	1.60	4,000	0	0	0
42.00	1.81	4,525	12,779	4,004	4,004
43.00	2.02	5,050	14,355	4,785	8,789
44.00	2.29	5,725	16,152	5,384	14,173
45.00	2.60	6,500	18,325	6,108	20,282
46.00	3.70	9,250	23,504	7,835	28,116
47.00	4.18	10,450	29,532	9,844	37,960
48.00	4.65	11,625	33,097	11,032	48,993
49.00	5.27	13,175	37,176	12,392	61,384
50.00	5.80	14,500	41,497	13,832	75,217
51.00	6.41	16,025	45,768	15,256	90,473
52.00	6.98	17,450	50,197	16,732	107,205
53.00	7.60	19,000	54,659	18,220	125,425
54.00	8.22	20,550	59,310	19,770	145,195

Elevations With Areas Interpolated From
The Closest Two Planimeter Readings

44.98	-----	6,484	18,302	5,979	20,152
46.15	-----	9,425	28,013	1,401	29,517
47.27	-----	10,761	31,815	2,863	40,824
50.44	-----	15,162	44,489	6,525	81,742

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

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

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*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

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
41.06	0.0	
41.38	0.0	
41.70	0.0	
42.02	0.0	
42.34	0.0	
42.66	0.0	
42.98	0.0	
43.30	0.0	
43.62	0.0	
43.94	0.0	
44.26	0.0	
44.58	0.0	
44.90	0.0	
45.22	0.0	
45.54	0.0	
45.76	0.0	
45.86	0.0	
46.18	0.0	
46.50	0.0	
46.82	0.0	
47.14	0.0	
47.27	0.0	
47.46	0.0	
47.78	0.5	1
48.10	0.7	1
48.42	0.9	1
48.74	1.0	1
49.06	1.2	1
49.38	1.3	1
49.70	1.4	1
50.02	1.5	1
50.34	1.6	1
50.66	3.4	1 +2
50.98	8.5	1 +2
51.30	12.6	1 +2
51.62	14.5	1 +2
51.94	16.2	1 +2
52.26	18.1	1 +2 +4
52.58	26.9	1 +2 +4
52.90	40.7	1 +3 +4

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

```
*************************************
      SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

*************************************
```

Outlet Structure File: A:SPH34SB .STR
Planimeter Input File: A:SPHILL34.VOL
Rating Table Output File: A:SPH34SB .PND

Min. Elev.(ft) = 41.06 Max. Elev.(ft) = 53.15 Incr.(ft) = .32

Additional elevations (ft) to be included in table:
* *
45.76 47.27

```
*********************************************
              SYSTEM CONNECTIVITY
*********************************************
```

Structure	No.	Q Table		Q Table
ORIFICE-VC	1		->	1
STAND PIPE	2		->	2
CULVERT-CR	3	? 2	->	A
WEIR-XY	4		->	4

Outflow rating table summary was stored in file:
A:SPH34SB .PND

Outlet Structure File: SPHS4SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

>>>>>> Structure No. 1 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

E1 elev.(ft)?	47.77
E2 elev.(ft)?	53.15
Orifice coeff.?	0.6
Invert elev.(ft)?	47.27
Datum elev.(ft)?	47.52
Diameter (ft)?	0.5

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

```
*************************************
      SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

*************************************
```

>>>>>> Structure No. 2 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	50.44
E2 elev.(ft)?	53.15
Crest elev.(ft)?	50.44
Diameter (ft)?	1.75
Weir coefficient?	3.1
Orifice coefficient?	0.6
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

```
*************************************
      SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

*************************************
```

>>>>>> Structure No. 3 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	50.44
E2 elev.(ft)?	53.15
Diam. (ft)?	1.25
Inv. el.(ft)?	46.05
Slope (ft/ft)?	.0000
T1 ratio?	
T2 ratio?	
K Coeff.?	.0078
M Coeff.?	2.0
c Coeff.?	.0292
Y Coeff.?	.74
Form 1 or 2?	1
Slope factor?	-0.50

Outlet Structure File: SPH3&4B .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

>>>>>> Structure No. 4 <<<<<<
(Input Data)

WEIR-XY
Weir - Defined by X, Y Coordinates
E1 (ft) =52.20 E2 (ft) =53.15

X dist.(ft)	Y elev.(ft)
0	53.15
3	52.2
13	52.2
16	53.15

Outlet Structure File: SPHS4SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

Outflow Rating Table for Structure #1
ORIFICE-VC Orifice - Vertical Circular

Elevation (ft)	Q (cfs)	Computation Messages
41.06	0.0	E < E1=47.77
41.38	0.0	E < E1=47.77
41.70	0.0	E < E1=47.77
42.02	0.0	E < E1=47.77
42.34	0.0	E < E1=47.77
42.66	0.0	E < E1=47.77
42.98	0.0	E < E1=47.77
43.30	0.0	E < E1=47.77
43.62	0.0	E < E1=47.77
43.94	0.0	E < E1=47.77
44.26	0.0	E < E1=47.77
44.58	0.0	E < E1=47.77
44.90	0.0	E < E1=47.77
45.22	0.0	E < E1=47.77
45.54	0.0	E < E1=47.77
45.76	0.0	E < E1=47.77
45.86	0.0	E < E1=47.77
46.18	0.0	E < E1=47.77
46.50	0.0	E < E1=47.77
46.82	0.0	E < E1=47.77
47.14	0.0	E < E1=47.77
47.27	0.0	E < E1=47.77
47.46	0.0	E < E1=47.77
47.78	0.5	H =.26
48.10	0.7	H =.58
48.42	0.9	H =.9
48.74	1.0	H =1.22
49.06	1.2	H =1.54
49.38	1.3	H =1.86
49.70	1.4	H =2.18
50.02	1.5	H =2.5
50.34	1.6	H =2.82
50.66	1.7	H =3.14
50.98	1.8	H =3.46

Outlet Structure File: SPH3483 .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #1
ORIFICE-VC Orifice - Vertical Circular

Elevation (ft)	Q (cfs)	Computation Messages
51.30	1.8	H =3.78
51.62	1.9	H =4.1
51.94	2.0	H =4.42
52.26	2.1	H =4.74
52.58	2.1	H =5.06
52.90	2.2	H =5.38
53.15	0.0	E = or > E2=53.15

C = .6 A = .1963496 sq.ft.
H (ft) = Table elev. - Datum elev. (47.52 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

Outflow Rating Table for Structure #2
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
41.06	0.0	E < Inv.El.= 50.44
41.38	0.0	E < El=50.44
41.70	0.0	E < El=50.44
42.02	0.0	E < El=50.44
42.34	0.0	E < El=50.44
42.66	0.0	E < El=50.44
42.98	0.0	E < El=50.44
43.30	0.0	E < El=50.44
43.62	0.0	E < El=50.44
43.94	0.0	E < El=50.44
44.26	0.0	E < El=50.44
44.58	0.0	E < El=50.44
44.90	0.0	E < El=50.44
45.22	0.0	E < El=50.44
45.54	0.0	E < El=50.44
45.76	0.0	E < El=50.44
45.86	0.0	E < El=50.44
46.18	0.0	E < El=50.44
46.50	0.0	E < El=50.44
46.82	0.0	E < El=50.44
47.14	0.0	E < El=50.44
47.27	0.0	E < El=50.44
47.46	0.0	E < El=50.44
47.78	0.0	E < El=50.44
48.10	0.0	E < El=50.44
48.42	0.0	E < El=50.44
48.74	0.0	E < El=50.44
49.06	0.0	E < El=50.44
49.38	0.0	E < El=50.44
49.70	0.0	E < El=50.44
50.02	0.0	E < El=50.44
50.34	0.0	E < El=50.44

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #2
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages	
50.66	1.8	Weir:	H =.22
50.98	6.8	Weir:	H =.54
51.30	10.7	Orifice:	H =.86
51.62	12.6	Orifice:	H =1.18
51.94	14.2	Orifice:	H =1.5
52.26	15.6	Orifice:	H =1.82
52.58	16.9	Orifice:	H =2.14
52.90	18.2	Orifice:	H =2.46
53.15	0.0	E = or > E2=53.15	

Weir Cw = 3.1 Weir length = 5.497787 ft
Orifice Co = .6 Orifice area = 2.405282 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 51.11953 ft

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

Outflow Rating Table for Structure #3
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
41.06	0.0	E < Inv.El.= 46.05
41.38	0.0	E < Inv.El.= 46.05
41.70	0.0	E < Inv.El.= 46.05
42.02	0.0	E < Inv.El.= 46.05
42.34	0.0	E < Inv.El.= 46.05
42.66	0.0	E < Inv.El.= 46.05
42.98	0.0	E < Inv.El.= 46.05
43.30	0.0	E < Inv.El.= 46.05
43.62	0.0	E < Inv.El.= 46.05
43.94	0.0	E < Inv.El.= 46.05
44.26	0.0	E < Inv.El.= 46.05
44.58	0.0	E < Inv.El.= 46.05
44.90	0.0	E < Inv.El.= 46.05
45.22	0.0	E < Inv.El.= 46.05
45.54	0.0	E < Inv.El.= 46.05
45.76	0.0	E < Inv.El.= 46.05
45.86	0.0	E < Inv.El.= 46.05
46.18	0.0	E < El=50.44
46.50	0.0	E < El=50.44
46.82	0.0	E < El=50.44
47.14	0.0	E < El=50.44
47.27	0.0	E < El=50.44
47.46	0.0	E < El=50.44
47.78	0.0	E < El=50.44
48.10	0.0	E < El=50.44
48.42	0.0	E < El=50.44
48.74	0.0	E < El=50.44
49.06	0.0	E < El=50.44
49.38	0.0	E < El=50.44
49.70	0.0	E < El=50.44
50.02	0.0	E < El=50.44

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #3
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
50.34	0.0	E < E1=50.44
50.66	13.8	Submerged: HW =4.61
50.98	14.4	Submerged: HW =4.93
51.30	14.9	Submerged: HW =5.25
51.62	15.5	Submerged: HW =5.57
51.94	16.0	Submerged: HW =5.89
52.26	16.5	Submerged: HW =6.210
52.58	17.0	Submerged: HW =6.53
52.90	17.5	Submerged: HW =6.85
53.15	0.0	E = or > E2=53.15

Used Unsubmerged Equ. Form (1) for elev. less than 47.47 ft
Used Submerged Equation for elevations greater than 47.56 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=47.47 ft; Q1=4.8 cfs; Dc=.89 ft; E2=47.56 ft; Q2=5.49 cfs

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

Outflow Rating Table for Structure #4
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
41.06	0.0	E < Y min= 52.2
41.38	0.0	E < Y min= 52.2
41.70	0.0	E < Y min= 52.2
42.02	0.0	E < Y min= 52.2
42.34	0.0	E < Y min= 52.2
42.66	0.0	E < Y min= 52.2
42.98	0.0	E < Y min= 52.2
43.30	0.0	E < Y min= 52.2
43.62	0.0	E < Y min= 52.2
43.94	0.0	E < Y min= 52.2
44.26	0.0	E < Y min= 52.2
44.58	0.0	E < Y min= 52.2
44.90	0.0	E < Y min= 52.2
45.22	0.0	E < Y min= 52.2
45.54	0.0	E < Y min= 52.2
45.76	0.0	E < Y min= 52.2
45.86	0.0	E < Y min= 52.2
46.18	0.0	E < E1=52.20
46.50	0.0	E < E1=52.20
46.82	0.0	E < E1=52.20
47.14	0.0	E < E1=52.20
47.27	0.0	E < E1=52.20
47.46	0.0	E < E1=52.20
47.78	0.0	E < E1=52.20
48.10	0.0	E < E1=52.20
48.42	0.0	E < E1=52.20
48.74	0.0	E < E1=52.20
49.06	0.0	E < E1=52.20
49.38	0.0	E < E1=52.20
49.70	0.0	E < E1=52.20
50.02	0.0	E < E1=52.20
50.34	0.0	E < E1=52.20
50.66	0.0	E < E1=52.20
50.98	0.0	E < E1=52.20
51.30	0.0	E < E1=52.20
51.62	0.0	E < E1=52.20
51.94	0.0	E < E1=52.20

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #4
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages	
52.26	0.5	W(ft)=10.379	Max. D(ft)=.06
52.58	7.9	W(ft)=12.4	Max. D(ft)=.38
52.90	21.0	W(ft)=14.421	Max. D(ft)=.7
53.15	0.0	E = or > E2=53.15	

Outlet Structure File: SPH34SB .STR

POND-2 Version: 5.20 S/N:
Date Executed: Time Executed:

****
SPRINGHILL PHASE 3 & 4
EXISTING STORMWATER MANAGEMENT / BMP
BASIN #2 (CALC. FOR SEDIMENT BASIN)

****

Outflow Rating Table A
Table A = 2 ? 3

Elevation (ft)	Q (cfs)	Contributing Structures
41.06	0.0	-
41.38	0.0	-
41.70	0.0	-
42.02	0.0	-
42.34	0.0	-
42.66	0.0	-
42.98	0.0	-
43.30	0.0	-
43.62	0.0	-
43.94	0.0	-
44.26	0.0	-
44.58	0.0	-
44.90	0.0	-
45.22	0.0	-
45.54	0.0	-
45.76	0.0	-
45.86	0.0	-
46.18	0.0	-
46.50	0.0	-
46.82	0.0	-
47.14	0.0	-
47.27	0.0	-
47.46	0.0	-
47.78	0.0	-
48.10	0.0	-
48.42	0.0	-
48.74	0.0	-
49.06	0.0	-
49.38	0.0	-
49.70	0.0	-
50.02	0.0	-
50.34	0.0	-
50.66	1.8	2
50.98	6.8	2
51.30	10.7	2
51.62	12.6	2
51.94	14.2	2
52.26	15.6	2
52.58	16.9	2
52.90	17.5	2

Return Freq: 2 years

```
*****************************************
*                                       *
*          SPRINGHILL PHASE 3 & 4       *
*  EXISTING STORMWATER MANAGEMENT / BMP *
*  BASIN #2 ( CALC. FOR SEDIMENT BASIN) *
*                                       *
*                                       *
*****************************************
```

Inflow Hydrograph: A:2INS34 .HYD
Rating Table file: A:SPH34SB .PND

----INITIAL CONDITIONS----
Elevation = 47.27 ft
Outflow = 0.00 cfs
Storage = 40,824 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
41.06	0.0	0
41.38	0.0	1,308
41.70	0.0	2,672
42.02	0.0	4,095
42.34	0.0	5,572
42.66	0.0	7,103
42.98	0.0	8,688
43.30	0.0	10,334
43.62	0.0	12,048
43.94	0.0	13,831
44.26	0.0	15,687
44.58	0.0	17,622
44.90	0.0	19,636
45.22	0.0	21,773
45.54	0.0	24,170
45.76	0.0	25,981
45.86	0.0	26,850
46.18	0.0	29,800
46.50	0.0	32,888
46.82	0.0	36,099
47.14	0.0	39,434
47.27	0.0	40,824
47.46	0.0	42,889
47.78	0.5	46,464
48.10	0.7	50,162
48.42	0.9	54,009
48.74	1.0	58,013
49.06	1.2	62,177
49.38	1.3	66,485
49.70	1.4	70,927
50.02	1.5	75,507

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
43.6	43.6
89.1	89.1
136.5	136.5
185.7	185.7
236.7	236.7
289.6	289.6
344.4	344.4
401.5	401.5
460.9	460.9
522.8	522.8
587.3	587.3
654.4	654.4
725.6	725.6
805.5	805.5
865.9	865.9
894.8	894.8
993.1	993.1
1096.1	1096.1
1203.1	1203.1
1314.2	1314.2
1360.5	1360.5
1429.4	1429.4
1548.5	1549.0
1671.7	1672.4
1799.9	1800.8
1933.4	1934.4
2072.2	2073.4
2215.7	2217.0
2363.8	2365.2
2516.4	2517.9

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
50.34	1.6	80,233
50.66	3.4	85,114
50.98	8.5	90,153
51.30	12.6	95,343
51.62	14.5	100,679
51.94	16.2	106,161
52.26	18.1	111,794
52.58	26.9	117,584
52.90	40.7	123,533

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
2673.9	2675.5
2836.6	2840.0
3004.5	3013.0
3177.5	3190.1
3355.3	3369.8
3538.0	3554.2
3725.7	3743.8
3918.7	3945.6
4116.9	4157.6

Time increment (t) = 0.017 hrs.

POND-2 Version: 5.20 S/N: Page 3
EXECUTED: 09-04-1998 16:42:40 Return Freq: 2 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:2INS34 .HYD
Outflow Hydrograph: A:2SOS34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	1360.5	1360.5	0.00	47.27
0.017	0.96	1.0	1361.5	1361.5	0.00	47.27
0.033	1.92	2.9	1364.4	1364.4	0.00	47.28
0.050	2.88	4.8	1369.2	1369.2	0.00	47.29
0.067	3.84	6.7	1375.9	1375.9	0.00	47.31
0.083	4.80	8.6	1384.5	1384.5	0.00	47.34
0.100	5.76	10.6	1395.1	1395.1	0.00	47.37
0.117	6.72	12.5	1407.6	1407.6	0.00	47.40
0.133	7.68	14.4	1422.0	1422.0	0.00	47.44
0.150	8.64	16.3	1438.2	1438.3	0.04	47.48
0.167	9.60	18.2	1456.2	1456.4	0.11	47.53
0.183	10.55	20.2	1476.0	1476.4	0.20	47.59
0.200	11.51	22.1	1497.5	1498.0	0.29	47.64
0.217	12.47	24.0	1520.7	1521.4	0.38	47.71
0.233	13.43	25.9	1545.6	1546.6	0.49	47.77
0.250	14.39	27.8	1572.3	1573.4	0.54	47.84
0.267	15.35	29.7	1600.9	1602.1	0.59	47.92
0.283	16.31	31.7	1631.3	1632.6	0.64	48.00
0.300	16.31	32.6	1662.5	1663.9	0.69	48.08
0.317	16.31	32.6	1693.7	1695.2	0.74	48.16
0.333	16.31	32.6	1724.7	1726.3	0.78	48.23
0.350	16.31	32.6	1755.7	1757.4	0.83	48.31
0.367	16.31	32.6	1786.5	1788.3	0.88	48.39
0.383	16.31	32.6	1817.3	1819.2	0.91	48.46
0.400	16.31	32.6	1848.1	1850.0	0.94	48.54
0.417	16.31	32.6	1878.8	1880.7	0.96	48.61
0.433	16.31	32.6	1909.4	1911.4	0.98	48.68
0.450	16.31	32.6	1940.0	1942.1	1.01	48.76
0.467	16.31	32.6	1970.5	1972.7	1.06	48.83
0.483	16.31	32.6	2001.0	2003.2	1.10	48.90
0.500	16.31	32.6	2031.3	2033.6	1.14	48.97
0.517	16.31	32.6	2061.6	2063.9	1.19	49.04
0.533	16.31	32.6	2091.7	2094.2	1.21	49.11
0.550	16.31	32.6	2121.9	2124.4	1.24	49.17
0.567	16.31	32.6	2152.0	2154.5	1.26	49.24
0.583	16.31	32.6	2182.1	2184.6	1.28	49.31
0.600	16.31	32.6	2212.1	2214.7	1.30	49.37
0.617	16.31	32.6	2242.1	2244.7	1.32	49.44
0.633	16.31	32.6	2272.0	2274.7	1.34	49.50
0.650	16.31	32.6	2301.9	2304.6	1.36	49.57
0.667	16.31	32.6	2331.8	2334.5	1.38	49.63
0.683	16.31	32.6	2361.6	2364.4	1.40	49.70
0.700	16.31	32.6	2391.4	2394.2	1.42	49.76
0.717	16.31	32.6	2421.1	2424.0	1.44	49.82
0.733	16.31	32.6	2450.8	2453.7	1.46	49.89

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 16:42:40

Return Freq: 2 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:2INS34 .HYD
Outflow Hydrograph: A:2SOS34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	16.31	32.6	2480.5	2483.4	1.48	49.95
0.767	16.31	32.6	2510.1	2513.1	1.50	50.01
0.783	16.31	32.6	2539.7	2542.7	1.52	50.07
0.800	16.31	32.6	2569.3	2572.3	1.53	50.13
0.817	16.31	32.6	2598.8	2601.9	1.55	50.19
0.833	16.31	32.6	2628.2	2631.4	1.57	50.25
0.850	16.31	32.6	2657.7	2660.9	1.59	50.31
0.867	16.31	32.6	2688.8	2690.3	1.76	50.37
0.884	16.31	32.6	2715.2	2719.4	2.08	50.43
0.900	16.31	32.6	2743.1	2747.9	2.39	50.48
0.917	16.31	32.6	2770.3	2775.7	2.70	50.53
0.934	16.31	32.6	2796.9	2802.9	2.99	50.59
0.950	16.31	32.6	2823.0	2829.6	3.29	50.64
0.967	16.31	32.6	2847.9	2855.6	3.86	50.69
0.984	16.31	32.6	2871.3	2880.5	4.59	50.73
1.000	16.31	32.6	2893.4	2903.9	5.29	50.78
1.017	16.31	32.6	2914.1	2926.0	5.94	50.82
1.034	16.31	32.6	2933.6	2946.7	6.55	50.86
1.050	16.31	32.6	2952.0	2966.3	7.12	50.89
1.067	16.31	32.6	2969.3	2984.6	7.66	50.93
1.084	16.31	32.6	2985.6	3001.9	8.17	50.96
1.100	16.31	32.6	3001.0	3018.2	8.62	50.99
1.117	16.31	32.6	3015.6	3033.6	8.98	51.02
1.134	16.31	32.6	3029.6	3048.2	9.32	51.04
1.150	16.31	32.6	3042.9	3062.2	9.64	51.07
1.167	16.31	32.6	3055.7	3075.6	9.95	51.09
1.184	16.31	32.6	3067.8	3088.3	10.24	51.12
1.200	16.31	32.6	3079.4	3100.4	10.52	51.14
1.217	16.31	32.6	3090.4	3112.0	10.79	51.16
1.234	16.31	32.6	3100.9	3123.0	11.05	51.18
1.250	16.31	32.6	3111.0	3133.6	11.29	51.20
1.267	16.31	32.6	3120.5	3143.6	11.52	51.22
1.284	16.31	32.6	3129.7	3153.2	11.75	51.23
1.300	16.31	32.6	3138.4	3162.3	11.96	51.25
1.317	16.31	32.6	3146.7	3171.0	12.16	51.27
1.334	15.35	31.7	3153.7	3178.3	12.33	51.28
1.350	14.39	29.7	3158.5	3183.4	12.45	51.29
1.367	13.43	27.8	3161.3	3186.4	12.51	51.29
1.384	12.47	25.9	3162.2	3187.2	12.53	51.29
1.400	11.51	24.0	3161.1	3186.1	12.51	51.29
1.417	10.55	22.1	3158.3	3183.2	12.44	51.29
1.434	9.60	20.2	3153.8	3178.4	12.33	51.28
1.450	8.64	18.2	3147.7	3172.0	12.18	51.27
1.467	7.68	16.3	3140.0	3164.0	12.00	51.25
1.484	6.72	14.4	3130.8	3154.4	11.77	51.24
1.500	5.76	12.5	3120.3	3143.3	11.52	51.22

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:2INS34 .HYD
Outflow Hydrograph: A:2SOS34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
1.517	4.80	10.6	3108.4	3130.8	11.23	51.19
1.534	3.84	8.6	3095.2	3117.0	10.91	51.17
1.550	2.88	6.7	3080.8	3101.9	10.56	51.14
1.567	1.92	4.8	3065.3	3085.6	10.18	51.11
1.584	0.96	2.9	3048.6	3068.1	9.78	51.08
1.600	0.00	1.0	3030.8	3049.5	9.35	51.05

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:2INS34 .HYD
Outflow Hydrograph: A:2SOS34 .HYD

Starting Pond W.S. Elevation = 47.27 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 16.31 cfs
Peak Outflow = 12.53 cfs
Peak Elevation = 51.29 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 40,824 cu-ft
Peak Storage From Storm = 54,436 cu-ft

Total Storage in Pond = 95,260 cu-ft

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*****************************************
*                                       *
*          SPRINGHILL PHASE 3 & 4       *
*  EXISTING STORMWATER MANAGEMENT / BMP *
*  BASIN #2 ( CALC. FOR SEDIMENT BASIN) *
*                                       *
*                                       *
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Inflow Hydrograph: A:10INS34 .HYD
Rating Table file: A:SPH34SB .PND

----INITIAL CONDITIONS----
Elevation = 47.27 ft
Outflow = 0.00 cfs
Storage = 40,824 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.06	0.0	0	0.0	0.0
41.38	0.0	1,308	43.6	43.6
41.70	0.0	2,672	89.1	89.1
42.02	0.0	4,095	136.5	136.5
42.34	0.0	5,572	185.7	185.7
42.66	0.0	7,103	236.7	236.7
42.98	0.0	8,688	289.6	289.6
43.30	0.0	10,334	344.4	344.4
43.62	0.0	12,048	401.5	401.5
43.94	0.0	13,831	460.9	460.9
44.26	0.0	15,687	522.8	522.8
44.58	0.0	17,622	587.3	587.3
44.90	0.0	19,636	654.4	654.4
45.22	0.0	21,773	725.6	725.6
45.54	0.0	24,170	805.5	805.5
45.76	0.0	25,981	865.9	865.9
45.86	0.0	26,850	894.8	894.8
46.18	0.0	29,800	993.1	993.1
46.50	0.0	32,888	1096.1	1096.1
46.82	0.0	36,099	1203.1	1203.1
47.14	0.0	39,434	1314.2	1314.2
47.27	0.0	40,824	1360.5	1360.5
47.46	0.0	42,889	1429.4	1429.4
47.78	0.5	46,464	1548.5	1549.0
48.10	0.7	50,162	1671.7	1672.4
48.42	0.9	54,009	1799.9	1800.8
48.74	1.0	58,013	1933.4	1934.4
49.06	1.2	62,177	2072.2	2073.4
49.38	1.3	66,485	2215.7	2217.0
49.70	1.4	70,927	2363.8	2365.2
50.02	1.5	75,507	2516.4	2517.9

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
50.34	1.6	80,233
50.66	3.4	85,114
50.98	8.5	90,153
51.30	12.6	95,343
51.62	14.5	100,679
51.94	16.2	106,161
52.26	18.1	111,794
52.58	26.9	117,584
52.90	40.7	123,533

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
2673.9	2675.5
2836.6	2840.0
3004.5	3013.0
3177.5	3190.1
3355.3	3369.8
3538.0	3554.2
3725.7	3743.8
3918.7	3945.6
4116.9	4157.6

Time increment (t) = 0.017 hrs.

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 16:42:43

Return Freq: 10 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:10INS34 .HYD
Outflow Hydrograph: A:10SOS34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	1360.5	1360.5	0.00	47.27
0.017	1.56	1.6	1362.1	1362.1	0.00	47.27
0.033	3.13	4.7	1366.8	1366.8	0.00	47.29
0.050	4.69	7.8	1374.6	1374.6	0.00	47.31
0.067	6.26	11.0	1385.5	1385.5	0.00	47.34
0.083	7.82	14.1	1399.6	1399.6	0.00	47.38
0.100	9.39	17.2	1416.8	1416.8	0.00	47.43
0.117	10.95	20.3	1437.1	1437.2	0.03	47.48
0.133	12.52	23.5	1460.3	1460.6	0.13	47.54
0.150	14.08	26.6	1486.4	1486.9	0.24	47.61
0.167	15.65	29.7	1515.4	1516.2	0.36	47.69
0.183	17.21	32.9	1547.3	1548.3	0.50	47.78
0.200	18.78	36.0	1582.2	1583.3	0.56	47.87
0.217	20.34	39.1	1620.1	1621.3	0.62	47.97
0.233	21.91	42.3	1660.9	1662.3	0.68	48.07
0.250	23.47	45.4	1704.8	1706.3	0.75	48.18
0.267	25.04	48.5	1751.7	1753.3	0.83	48.30
0.283	26.60	51.6	1801.5	1803.3	0.90	48.43
0.300	26.60	53.2	1852.8	1854.7	0.94	48.55
0.317	26.60	53.2	1904.1	1906.0	0.98	48.67
0.333	26.60	53.2	1955.2	1957.3	1.03	48.79
0.350	26.60	53.2	2006.2	2008.4	1.11	48.91
0.367	26.60	53.2	2057.0	2059.4	1.18	49.03
0.383	26.60	53.2	2107.8	2110.2	1.23	49.14
0.400	26.60	53.2	2158.5	2161.0	1.26	49.26
0.417	26.60	53.2	2209.1	2211.7	1.30	49.37
0.433	26.60	53.2	2259.6	2262.3	1.33	49.48
0.450	26.60	53.2	2310.1	2312.8	1.36	49.59
0.467	26.60	53.2	2360.5	2363.3	1.40	49.70
0.483	26.60	53.2	2410.8	2413.7	1.43	49.80
0.500	26.60	53.2	2461.1	2464.0	1.46	49.91
0.517	26.60	53.2	2511.3	2514.3	1.50	50.01
0.533	26.60	53.2	2561.4	2564.5	1.53	50.11
0.550	26.60	53.2	2611.5	2614.6	1.56	50.22
0.567	26.60	53.2	2661.5	2664.7	1.59	50.32
0.583	26.60	53.2	2710.7	2714.7	2.03	50.42
0.600	26.60	53.2	2758.7	2763.9	2.57	50.51
0.617	26.60	53.2	2805.7	2811.9	3.09	50.61
0.633	26.60	53.2	2851.0	2858.9	3.96	50.70
0.650	26.60	53.2	2893.6	2904.2	5.29	50.78
0.667	26.60	53.2	2933.7	2946.8	6.55	50.86
0.683	26.60	53.2	2971.5	2986.9	7.73	50.93
0.700	26.60	53.2	3007.1	3024.7	8.77	51.00
0.717	26.60	53.2	3041.1	3060.3	9.60	51.07
0.733	26.60	53.2	3073.6	3094.3	10.38	51.13

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 16:42:43

Return Freq: 10 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:10INS34 .HYD
Outflow Hydrograph: A:10SOS34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	26.60	53.2	3104.5	3126.8	11.13	51.19
0.767	26.60	53.2	3134.0	3157.7	11.85	51.24
0.783	26.60	53.2	3162.1	3187.2	12.53	51.29
0.800	26.60	53.2	3189.6	3215.3	12.87	51.34
0.817	26.60	53.2	3216.5	3242.8	13.16	51.39
0.833	26.60	53.2	3242.8	3269.7	13.44	51.44
0.850	26.60	53.2	3268.6	3296.0	13.72	51.49
0.867	26.60	53.2	3293.8	3321.8	13.99	51.53
0.884	26.60	53.2	3318.5	3347.0	14.26	51.58
0.900	26.60	53.2	3342.6	3371.7	14.52	51.62
0.917	26.60	53.2	3366.3	3395.8	14.74	51.67
0.934	25.04	51.6	3388.1	3418.0	14.94	51.70
0.950	23.47	48.5	3406.4	3436.6	15.12	51.74
0.967	21.91	45.4	3421.2	3451.8	15.26	51.76
0.984	20.34	42.3	3432.8	3463.5	15.36	51.78
1.000	18.78	39.1	3441.0	3471.9	15.44	51.80
1.017	17.21	36.0	3446.0	3477.0	15.49	51.81
1.034	15.65	32.9	3447.9	3478.9	15.51	51.81
1.050	14.08	29.7	3446.6	3477.6	15.49	51.81
1.067	12.52	26.6	3442.3	3473.2	15.45	51.80
1.084	10.95	23.5	3435.0	3465.8	15.38	51.79
1.100	9.39	20.3	3424.8	3455.3	15.29	51.77
1.117	7.82	17.2	3411.6	3442.0	15.17	51.75
1.134	6.26	14.1	3395.7	3425.7	15.02	51.72
1.150	4.69	11.0	3377.0	3406.6	14.84	51.68
1.167	3.13	7.8	3355.5	3384.8	14.64	51.65
1.184	1.56	4.7	3331.4	3360.2	14.40	51.60
1.200	0.00	1.6	3304.7	3333.0	14.11	51.55

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:10INS34 .HYD
Outflow Hydrograph: A:10SOS34 .HYD

Starting Pond W.S. Elevation = 47.27 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 26.60 cfs
Peak Outflow = 15.51 cfs
Peak Elevation = 51.81 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 40,824 cu-ft
Peak Storage From Storm = 63,098 cu-ft

Total Storage in Pond = 103,922 cu-ft

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*****************************************
*                                       *
*        SPRINGHILL PHASE 3 & 4         *
*  EXISTING STORMWATER MANAGEMENT / BMP *
*  BASIN #2 ( CALC. FOR SEDIMENT BASIN) *
*                                       *
*                                       *
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Inflow Hydrograph: A:25INS34 .HYD
Rating Table file: A:SPH34SB .PND

----INITIAL CONDITIONS----
Elevation = 47.27 ft
Outflow = 0.00 cfs
Storage = 40,824 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
41.06	0.0	0	0.0	0.0
41.38	0.0	1,308	43.6	43.6
41.70	0.0	2,672	89.1	89.1
42.02	0.0	4,095	136.5	136.5
42.34	0.0	5,572	185.7	185.7
42.66	0.0	7,103	236.7	236.7
42.98	0.0	8,688	289.6	289.6
43.30	0.0	10,334	344.4	344.4
43.62	0.0	12,048	401.5	401.5
43.94	0.0	13,831	460.9	460.9
44.26	0.0	15,687	522.8	522.8
44.58	0.0	17,622	587.3	587.3
44.90	0.0	19,636	654.4	654.4
45.22	0.0	21,773	725.6	725.6
45.54	0.0	24,170	805.5	805.5
45.76	0.0	25,981	865.9	865.9
45.86	0.0	26,850	894.8	894.8
46.18	0.0	29,800	993.1	993.1
46.50	0.0	32,888	1096.1	1096.1
46.82	0.0	36,099	1203.1	1203.1
47.14	0.0	39,434	1314.2	1314.2
47.27	0.0	40,824	1360.5	1360.5
47.46	0.0	42,889	1429.4	1429.4
47.78	0.5	46,464	1548.5	1549.0
48.10	0.7	50,162	1671.7	1672.4
48.42	0.9	54,009	1799.9	1800.8
48.74	1.0	58,013	1933.4	1934.4
49.06	1.2	62,177	2072.2	2073.4
49.38	1.3	66,485	2215.7	2217.0
49.70	1.4	70,927	2363.8	2365.2
50.02	1.5	75,507	2516.4	2517.9

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
50.34	1.6	80,233	2673.9	2675.5
50.66	3.4	85,114	2836.6	2840.0
50.98	8.5	90,153	3004.5	3013.0
51.30	12.6	95,343	3177.5	3190.1
51.62	14.5	100,679	3355.3	3369.8
51.94	16.2	106,161	3538.0	3554.2
52.26	18.1	111,794	3725.7	3743.8
52.58	26.9	117,584	3918.7	3945.6
52.90	40.7	123,533	4116.9	4157.6

Time increment (t) = 0.017 hrs.

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 16:42:45

Return Freq: 25 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:25INS34 .HYD
Outflow Hydrograph: A:25SOS34 .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	1360.5	1360.5	0.00	47.27
0.017	2.15	2.2	1362.7	1362.7	0.00	47.28
0.033	4.30	6.4	1369.1	1369.1	0.00	47.29
0.050	6.46	10.8	1379.9	1379.9	0.00	47.32
0.067	8.61	15.1	1394.9	1394.9	0.00	47.37
0.083	10.76	19.4	1414.3	1414.3	0.00	47.42
0.100	12.91	23.7	1437.9	1438.0	0.04	47.48
0.117	15.06	28.0	1465.6	1465.9	0.15	47.56
0.133	17.21	32.3	1497.3	1497.8	0.29	47.64
0.150	19.37	36.6	1533.0	1533.9	0.44	47.74
0.167	21.52	40.9	1572.8	1573.9	0.54	47.84
0.183	23.67	45.2	1616.8	1618.0	0.61	47.96
0.200	25.82	49.5	1664.9	1666.2	0.69	48.08
0.217	27.97	53.8	1717.1	1718.7	0.77	48.22
0.233	30.12	58.1	1773.5	1775.2	0.86	48.36
0.250	32.28	62.4	1834.0	1835.9	0.93	48.50
0.267	34.43	66.7	1898.8	1900.7	0.97	48.66
0.283	36.58	71.0	1967.7	1969.8	1.05	48.82
0.300	36.58	73.2	2038.6	2040.9	1.15	48.99
0.317	36.58	73.2	2109.3	2111.7	1.23	49.15
0.333	36.58	73.2	2179.9	2182.4	1.28	49.30
0.350	36.58	73.2	2250.4	2253.0	1.32	49.46
0.367	36.58	73.2	2320.8	2323.5	1.37	49.61
0.383	36.58	73.2	2391.1	2394.0	1.42	49.76
0.400	36.58	73.2	2461.3	2464.3	1.46	49.91
0.417	36.58	73.2	2531.5	2534.5	1.51	50.05
0.433	36.58	73.2	2601.5	2604.6	1.56	50.20
0.450	36.58	73.2	2671.5	2674.7	1.60	50.34
0.467	36.58	73.2	2739.9	2744.7	2.36	50.47
0.483	36.58	73.2	2806.9	2813.1	3.11	50.61
0.500	36.58	73.2	2870.9	2880.1	4.58	50.73
0.517	36.58	73.2	2931.1	2944.0	6.47	50.85
0.533	36.58	73.2	2987.8	3004.3	8.24	50.96
0.550	36.58	73.2	3041.7	3060.9	9.61	51.07
0.567	36.58	73.2	3093.2	3114.9	10.86	51.16
0.583	36.58	73.2	3142.2	3166.3	12.05	51.26
0.600	36.58	73.2	3189.7	3215.4	12.87	51.35
0.617	36.58	73.2	3236.1	3262.8	13.37	51.43
0.633	36.58	73.2	3281.5	3309.2	13.86	51.51
0.650	36.58	73.2	3326.0	3354.7	14.34	51.59
0.667	36.58	73.2	3369.6	3399.2	14.77	51.67
0.683	36.58	73.2	3412.4	3442.8	15.17	51.75
0.700	36.58	73.2	3454.5	3485.6	15.57	51.82
0.717	36.58	73.2	3495.7	3527.6	15.95	51.89
0.733	36.58	73.2	3536.2	3568.9	16.35	51.96

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 16:42:45

Return Freq: 25 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:25INS34 .HYD
Outflow Hydrograph: A:25SOS34 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	36.58	73.2	3575.8	3609.3	16.75	52.03
0.767	36.58	73.2	3614.7	3649.0	17.15	52.10
0.783	36.58	73.2	3652.8	3687.8	17.54	52.17
0.800	36.58	73.2	3690.1	3725.9	17.92	52.23
0.817	36.58	73.2	3725.3	3763.2	18.95	52.29
0.833	36.58	73.2	3757.5	3798.5	20.49	52.35
0.850	34.43	71.0	3785.0	3828.5	21.80	52.39
0.867	32.28	66.7	3806.1	3851.7	22.80	52.43
0.884	30.12	62.4	3821.4	3868.5	23.54	52.46
0.900	27.97	58.1	3831.4	3879.5	24.02	52.48
0.917	25.82	53.8	3836.7	3885.2	24.27	52.48
0.934	23.67	49.5	3837.6	3886.2	24.31	52.49
0.950	21.52	45.2	3834.4	3882.8	24.16	52.48
0.967	19.37	40.9	3827.7	3875.3	23.84	52.47
0.984	17.21	36.6	3817.5	3864.2	23.35	52.45
1.000	15.06	32.3	3804.4	3849.8	22.72	52.43
1.017	12.91	28.0	3788.4	3832.3	21.96	52.40
1.034	10.76	23.7	3769.9	3812.1	21.08	52.37
1.050	8.61	19.4	3749.1	3789.3	20.08	52.33
1.067	6.46	15.1	3726.2	3764.2	18.99	52.29
1.084	4.30	10.8	3700.9	3737.0	18.03	52.25
1.100	2.15	6.4	3671.9	3707.4	17.73	52.20
1.117	0.00	2.2	3639.2	3674.0	17.40	52.14

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:25INS34 .HYD
Outflow Hydrograph: A:25SOS34 .HYD

Starting Pond W.S. Elevation = 47.27 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	36.58 cfs
Peak Outflow	=	24.31 cfs
Peak Elevation	=	52.49 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	40,824 cu-ft
Peak Storage From Storm	=	75,056 cu-ft
Total Storage in Pond	=	115,879 cu-ft

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*****************************************
*                                       *
*        SPRINGHILL PHASE 3 & 4         *
*  EXISTING STORMWATER MANAGEMENT / BMP *
*  BASIN #2 ( CALC. FOR SEDIMENT BASIN) *
*                                       *
*                                       *
*****************************************
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Inflow Hydrograph: A:100INS34.HYD
Rating Table file: A:SPH34SB .PND

----INITIAL CONDITIONS----
Elevation = 47.27 ft
Outflow = 0.00 cfs
Storage = 40,824 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
41.06	0.0	0
41.38	0.0	1,308
41.70	0.0	2,672
42.02	0.0	4,095
42.34	0.0	5,572
42.66	0.0	7,103
42.98	0.0	8,688
43.30	0.0	10,334
43.62	0.0	12,048
43.94	0.0	13,831
44.26	0.0	15,687
44.58	0.0	17,622
44.90	0.0	19,636
45.22	0.0	21,773
45.54	0.0	24,170
45.76	0.0	25,981
45.86	0.0	26,850
46.18	0.0	29,800
46.50	0.0	32,888
46.82	0.0	36,099
47.14	0.0	39,434
47.27	0.0	40,824
47.46	0.0	42,889
47.78	0.5	46,464
48.10	0.7	50,162
48.42	0.9	54,009
48.74	1.0	58,013
49.06	1.2	62,177
49.38	1.3	66,485
49.70	1.4	70,927
50.02	1.5	75,507

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
43.6	43.6
89.1	89.1
136.5	136.5
185.7	185.7
236.7	236.7
289.6	289.6
344.4	344.4
401.5	401.5
460.9	460.9
522.8	522.8
587.3	587.3
654.4	654.4
725.6	725.6
805.5	805.5
865.9	865.9
894.8	894.8
993.1	993.1
1096.1	1096.1
1203.1	1203.1
1314.2	1314.2
1360.5	1360.5
1429.4	1429.4
1548.5	1549.0
1671.7	1672.4
1799.9	1800.8
1933.4	1934.4
2072.2	2073.4
2215.7	2217.0
2363.8	2365.2
2516.4	2517.9

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
50.34	1.6	80,233	2673.9	2675.5
50.66	3.4	85,114	2836.6	2840.0
50.98	8.5	90,153	3004.5	3013.0
51.30	12.6	95,343	3177.5	3190.1
51.62	14.5	100,679	3355.3	3369.8
51.94	16.2	106,161	3538.0	3554.2
52.26	18.1	111,794	3725.7	3743.8
52.58	26.9	117,584	3918.7	3945.6
52.90	40.7	123,533	4116.9	4157.6

Time increment (t) = 0.017 hrs.

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 16:42:47

Return Freq: 100 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:100INS34.HYD
Outflow Hydrograph: A:100SOS34.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.000	0.00	-----	1360.5	1360.5	0.00	47.27
0.017	2.11	2.1	1362.6	1362.6	0.00	47.28
0.033	4.22	6.3	1369.0	1369.0	0.00	47.29
0.050	6.33	10.6	1379.5	1379.5	0.00	47.32
0.067	8.44	14.8	1394.3	1394.3	0.00	47.36
0.083	10.55	19.0	1413.3	1413.3	0.00	47.42
0.100	12.67	23.2	1436.4	1436.5	0.03	47.48
0.117	14.78	27.5	1463.6	1463.9	0.14	47.55
0.133	16.89	31.7	1494.7	1495.3	0.28	47.64
0.150	19.00	35.9	1529.7	1530.6	0.42	47.73
0.167	21.11	40.1	1568.8	1569.9	0.53	47.83
0.183	23.22	44.3	1611.9	1613.1	0.60	47.95
0.200	25.33	48.6	1659.1	1660.5	0.68	48.07
0.217	27.44	52.8	1710.3	1711.9	0.76	48.20
0.233	29.55	57.0	1765.6	1767.3	0.85	48.34
0.250	31.66	61.2	1825.0	1826.9	0.92	48.48
0.267	33.78	65.4	1888.5	1890.5	0.97	48.63
0.283	35.89	69.7	1956.1	1958.2	1.03	48.79
0.300	35.89	71.8	2025.6	2027.9	1.13	48.96
0.317	35.89	71.8	2095.0	2097.4	1.22	49.11
0.333	35.89	71.8	2164.2	2166.8	1.27	49.27
0.350	35.89	71.8	2233.4	2236.0	1.31	49.42
0.367	35.89	71.8	2302.4	2305.2	1.36	49.57
0.383	35.89	71.8	2371.4	2374.2	1.41	49.72
0.400	35.89	71.8	2440.3	2443.2	1.45	49.86
0.417	35.89	71.8	2509.1	2512.1	1.50	50.01
0.433	35.89	71.8	2577.8	2580.9	1.54	50.15
0.450	35.89	71.8	2646.4	2649.6	1.58	50.29
0.467	35.89	71.8	2714.0	2718.2	2.07	50.42
0.483	35.89	71.8	2780.2	2785.8	2.81	50.55
0.500	35.89	71.8	2844.5	2852.0	3.75	50.68
0.517	35.89	71.8	2905.0	2916.3	5.65	50.80
0.533	35.89	71.8	2961.9	2976.7	7.43	50.91
0.550	35.89	71.8	3015.7	3033.7	8.98	51.02
0.567	35.89	71.8	3067.0	3087.5	10.22	51.11
0.583	35.89	71.8	3116.0	3138.8	11.41	51.21
0.600	35.89	71.8	3162.7	3187.8	12.55	51.30
0.617	35.89	71.8	3208.3	3234.4	13.07	51.38
0.633	35.89	71.8	3253.0	3280.1	13.55	51.46
0.650	35.89	71.8	3296.7	3324.8	14.02	51.54
0.667	35.89	71.8	3339.5	3368.5	14.49	51.62
0.683	35.89	71.8	3381.5	3411.3	14.88	51.69
0.700	35.89	71.8	3422.8	3453.3	15.27	51.76
0.717	35.89	71.8	3463.3	3494.6	15.65	51.84
0.733	35.89	71.8	3503.0	3535.0	16.02	51.91

POND-2 Version: 5.20 S/N:
EXECUTED: 09-04-1998 18:42:47

Return Freq: 100 years

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:100INS34.HYD
Outflow Hydrograph: A:100SOS34.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.750	35.89	71.8	3542.0	3574.8	16.41	51.97
0.767	35.89	71.8	3580.1	3613.7	16.80	52.04
0.783	35.89	71.8	3617.6	3651.9	17.18	52.10
0.800	35.89	71.8	3654.2	3689.3	17.55	52.17
0.817	35.89	71.8	3690.2	3726.0	17.92	52.23
0.833	35.89	71.8	3724.2	3762.0	18.89	52.29
0.850	35.89	71.8	3755.2	3796.0	20.37	52.34
0.867	35.89	71.8	3783.5	3827.0	21.73	52.39
0.884	35.89	71.8	3809.4	3855.3	22.96	52.44
0.900	35.89	71.8	3833.0	3881.2	24.09	52.48
0.917	35.89	71.8	3854.5	3904.8	25.12	52.52
0.934	35.89	71.8	3874.2	3926.3	26.06	52.55
0.950	35.89	71.8	3892.1	3946.0	26.93	52.58
0.967	35.89	71.8	3907.7	3963.9	28.09	52.61
0.984	35.89	71.8	3921.3	3979.5	29.11	52.63
1.000	35.89	71.8	3933.1	3993.1	29.99	52.65
1.017	35.89	71.8	3943.3	4004.9	30.76	52.67
1.034	35.89	71.8	3952.3	4015.1	31.43	52.68
1.050	35.89	71.8	3960.0	4024.0	32.01	52.70
1.067	35.89	71.8	3966.8	4031.8	32.51	52.71
1.084	35.89	71.8	3972.7	4038.6	32.95	52.72
1.100	35.89	71.8	3977.8	4044.4	33.33	52.73
1.117	35.89	71.8	3982.2	4049.6	33.67	52.74
1.134	35.89	71.8	3986.1	4054.0	33.96	52.74
1.150	35.89	71.8	3989.5	4057.9	34.21	52.75
1.167	35.89	71.8	3992.4	4061.2	34.43	52.75
1.184	35.89	71.8	3994.9	4064.2	34.62	52.76
1.200	35.89	71.8	3997.1	4066.7	34.78	52.76
1.217	35.89	71.8	3999.1	4068.9	34.93	52.77
1.234	35.89	71.8	4000.7	4070.8	35.05	52.77
1.250	35.89	71.8	4002.2	4072.5	35.16	52.77
1.267	35.89	71.8	4003.5	4074.0	35.26	52.77
1.284	35.89	71.8	4004.6	4075.2	35.34	52.78
1.300	35.89	71.8	4005.5	4076.3	35.41	52.78
1.317	35.89	71.8	4006.4	4077.3	35.47	52.78
1.334	35.89	71.8	4007.1	4078.1	35.53	52.78
1.350	35.89	71.8	4007.7	4078.9	35.57	52.78
1.367	35.89	71.8	4008.3	4079.5	35.62	52.78
1.384	35.89	71.8	4008.7	4080.0	35.65	52.78
1.400	35.89	71.8	4009.2	4080.5	35.68	52.78
1.417	35.89	71.8	4009.5	4080.9	35.71	52.78
1.434	35.89	71.8	4009.8	4081.3	35.73	52.78
1.450	35.89	71.8	4010.1	4081.6	35.75	52.79
1.467	35.89	71.8	4010.3	4081.9	35.77	52.79
1.484	35.89	71.8	4010.6	4082.1	35.79	52.79
1.500	35.89	71.8	4010.7	4082.3	35.80	52.79

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:100INS34.HYD
Outflow Hydrograph: A:100SOS34.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
1.517	35.89	71.8	4010.9	4082.5	35.81	52.79
1.534	33.78	69.7	4009.2	4080.6	35.68	52.78
1.550	31.66	65.4	4004.0	4074.6	35.30	52.77
1.567	29.55	61.2	3995.9	4065.2	34.69	52.76
1.584	27.44	57.0	3985.1	4052.9	33.88	52.74
1.600	25.33	52.8	3972.1	4037.9	32.91	52.72
1.617	23.22	48.6	3957.0	4020.6	31.78	52.69
1.634	21.11	44.3	3940.3	4001.4	30.53	52.66
1.650	19.00	40.1	3922.1	3980.4	29.17	52.63
1.667	16.89	35.9	3902.6	3958.0	27.71	52.60
1.684	14.78	31.7	3881.4	3934.2	26.41	52.56
1.700	12.67	27.5	3858.3	3908.9	25.30	52.52
1.717	10.55	23.2	3833.3	3881.5	24.10	52.48
1.734	8.44	19.0	3806.6	3852.3	22.83	52.43
1.750	6.33	14.8	3778.4	3821.4	21.48	52.38
1.767	4.22	10.6	3748.8	3789.0	20.07	52.33
1.784	2.11	6.3	3718.0	3755.2	18.59	52.28
1.800	0.00	2.1	3684.3	3720.1	17.86	52.22

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: A:SPH34SB .PND
Inflow Hydrograph: A:100INS34.HYD
Outflow Hydrograph: A:100SOS34.HYD

Starting Pond W.S. Elevation = 47.27 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 35.89 cfs
Peak Outflow = 35.81 cfs
Peak Elevation = 52.79 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 40,824 cu-ft
Peak Storage From Storm = 80,602 cu-ft

Total Storage in Pond = 121,425 cu-ft

JAMES CITY COUNTY – ENVIRONMENTAL DEPARTMENT

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

DATE SENT: September 8, 2004

Name: Peter Farrell
Firm or Company: Landmark Design Group
Facsimile Number: 259-0049
Number of pages including this submittal: 3
From: Bill Cain

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

Comments: Attached you will find a copy of the environmental division review comment letter for the As-Builts pertaining to the Spring Hill Wet Pond (JCC BMP # PC030). If you have any questions relating to the attached document, please feel free to contact Pat Menichino at 253-6675 or Bill Cain at 253-6702.

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

William Cain
Civil Engineer

Environmental Division
1010 Mounts Bay Road, P.O. Box 8784 (757) 253-6702
Williamsburg, VA 23187-8784 Fax: (757) 259-4032
E-Mail: wacain@james-city.va.us

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

September 8, 2004
mailed out 9/8

Mr. Scott StClair
C.A. Barrs Construction
7601 George Washington Memorial Highway
Grafton, VA 23692

Re: Spring Hill BMP As-Builts
County Plan No. S-56-98
County BMP ID Code: PC 030

Dear Mr. StClair:

The Environmental Division has reviewed the record drawing and construction certification information as submitted to our office for the BMP at the above referenced project. The record drawing provides as-built information for the wet pond BMP located to the rear of Lots 118 and 119 along the northern side of Teakwood Drive.

Based on our review of the project and a concurrent field inspection performed on September 7th 2004, the following items must be addressed prior to release of the developer's surety instrument for the drainage and stormwater management facilities and proceeding with closing out the project:

Construction Certification:

1. The Construction Certification must be submitted.

Record Drawing:

2. The Record Drawing dated February 3rd, 2004 is satisfactory for the above mentioned facility.

Construction-Related:

3. Vegetation on and around the BMP embankment at the time of our inspection was in excess of 4' in height and rather dense. This can be detrimental to the stability of the embankment while providing a breeding ground for mosquitoes and other unwanted pests. Additionally, an embankment in such condition cannot be approved as immediate maintenance would be required by the HOA. Therefore, prior to approval of the BMP as-

builts, the embankment and associated side slopes must be mowed/cleared to a state that requires minimal effort to maintain.

Once this work has been satisfactorily completed, contact our office so that a reinspection of the facility may be performed. It is then that the final release of surety and/or closing out the project may be performed. After the above items are adequately addressed, one reproducible and one blue/black line set of the record drawings must be submitted to the Environmental Division per county requirements.

If you have any further comments or questions, please feel free to contact me at 757-253-6702, or the assigned Environmental Division inspector Pat Menichino (757-259-6675).

Sincerely,

William A. Cain
Civil Engineer
Environmental Division

WAC/wac

cc: Peter Farrell, Landmark Design Group (FAX)
Scott J. Thomas, JCC Environmental Division
Pat Menichino, JCC Environmental Division Inspector

G:\AsBuilts\S5698.PC030

JAMES CITY COUNTY – ENVIRONMENTAL DEPARTMENT

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

DATE SENT: September 8, 2004

Name: Peter Farrell
Firm or Company: Landmark Design Group
Facsimile Number: 259-0049
Number of pages including this submittal: 3
From: Bill Cain

FILE

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

Comments: Attached you will find a copy of the environmental division review comment letter for the As-Builts pertaining to the Spring Hill Wet Pond (JCC BMP # PC030). If you have any questions relating to the attached document, please feel free to contact Pat Menichino at 253-6675 or Bill Cain at 253-6702.

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

William Cain
Civil Engineer

Environmental Division
1010 Mounts Bay Road, P.O. Box 8784 (757) 253-6702
Williamsburg, VA 23187-8784 Fax: (757) 259-4032
E-Mail: wacain@james-city.va.us

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
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planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

September 8, 2004

Mr. Scott StClair
C.A. Barrs Construction
7601 George Washington Memorial Highway
Grafton, VA 23692

Re: Spring Hill BMP As-Builts
County Plan No. S-56-98
County BMP ID Code: PC 030

Dear Mr. StClair:

The Environmental Division has reviewed the record drawing and construction certification information as submitted to our office for the BMP at the above referenced project. The record drawing provides as-built information for the wet pond BMP located to the rear of Lots 118 and 119 along the northern side of Teakwood Drive.

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builts, the embankment and associated side slopes must be mowed/cleared to a state that requires minimal effort to maintain.

Once this work has been satisfactorily completed, contact our office so that a reinspection of the facility may be performed. It is then that the final release of surety and/or closing out the project may be performed. After the above items are adequately addressed, one reproducible and one blue/black line set of the record drawings must be submitted to the Environmental Division per county requirements.

If you have any further comments or questions, please feel free to contact me at 757-253-6702, or the assigned Environmental Division inspector Pat Menichino (757-259-6675).

Sincerely,

William A. Cain
Civil Engineer
Environmental Division

WAC/wac

cc: Peter Farrell, Landmark Design Group (FAX)
Scott J. Thomas, JCC Environmental Division
Pat Menichino, JCC Environmental Division Inspector

G:\AsBuilts\S5698.PC030

LANDMARK
DESIGN GROUP

September 28, 2004

Mr. William A. Cain
Civil Engineer
Environmental Division
P.O. Box 8784
Williamsburg, VA 23187-8784

Re.: Springhill BMP As-Builts
JCC Plan No. S-56-98
County BMP ID Code: PC 030

Dear Mr. Cain:

Please find enclosed the construction certification required for the above referenced project. The Owner is currently scheduling efforts to mow/clear the required embankments to a level requiring minimal effort to maintain. We will call to schedule final inspection and approval upon completion of mowing efforts.

We trust this request is satisfactory for your approval. Please advise us if you need additional information, or have any questions or wish to further discuss this.

Sincerely,

The LandMark Design Group, Inc.

Alistair J. Ramsay, L.S.
Senior Project Manager

Copy: 1970009
Lee Ward Hampton Bay Group

Engineers • Planners • Surveyors • Landscape Architects • Environmental Scientists
4029 Ironbound Road, Suite 100, Williamsburg, VA 23188 (757) 253-2975 FAX: (757) 229-0049 lmdg@landmarkdg.com

Beth Davis

From: Scott Thomas
Sent: Monday, July 07, 2003 8:54 AM
To: Beth Davis
Subject: FW: Springhill Pond

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: WllSteelers@aol.com [mailto:WllSteelers@aol.com]
Sent: Wednesday, July 02, 2003 7:36 PM
To: Scott Thomas
Subject: Re: Springhill Pond

Thank you Scott for the information.
My husband and I are currently on the transition board of the homeowners association and will bring this information to Amanda Heath of Brooks Management company. We do have money budgeted for the pond when the builder is done with his part. Yes we are big steelers fan! We lived in Pittsburgh our whole lives except for the last four years. We miss our Pgh sport teams!
Again I would like to thank you for the information

Pamela and Bill Anderson

Beth Davis

From: Scott Thomas
Sent: Wednesday, July 02, 2003 5:13 PM
To: 'WllSteelers@aol.com'
Cc: Beth Davis
Subject: RE: Springhill Pond

Prior to the release of the developer's surety (bond), our division routinely ensures BMPs meet minimum local and state criteria and the provisions of the approved design plan. In general, this includes removing trees from dams, cleaning of sediment, vegetation, debris and trash from around flow control structures or any item which threatens the stormwater function or structural integrity of the dam or BMP structure. Usually the aesthetic look of stormwater management BMPs, whether it be a remote, ie. out of sight, out of mind look or a more manicured, landscaped (amenity) look is usually left to the discretion of the owner, which in this case will be the Homeowner Association. Adjacent landowners should express their opinions and preferences on how the BMP should look to the owner.

Although these particular areas are outside our area of expertise, we will try and address your two concerns.

1. Woodchips: Based on our experience, there is no evidence to suggest that the stockpiling of woodchips from the tree clearing operation would be harmful or provide a habitat for nuisance animals or pests. Although unsightly now, the intent is to uniformly spread the wood chips along the top of dam and/or other feasible locations. Many walking trails and home landscaping activities utilize wood or bark mulch chips on a larger scale without creating nuisance conditions. Similarly, we would not expect this operation to cause any condition as such.

2. Algae: Currently, the Environmental Division has no guidelines or public information available for management services nor any type of prequalification list for contractors who can aid in algae removal. Currently our division evaluates stormwater management facilities from a structural and stormwater function perspective and in most cases, the presence of algae or invasive vegetation on the surface of the pond is generally not detrimental to these components. It is our intent to sometime in the near future provide educational material to pond owners with guidance on this matter. It is unclear at this time the cause of the algae bloom on the surface of the lake. It does not appear related to direct residue from the tree clearing operation; although, as a result of tree clearing, more exposure to sunlight may have made the condition more noticeable and/or to a greater extent. It should be recognized that currently the pond is in sediment basin mode, that is the water surface elevation is a bit higher than when it is converted to a permanent BMP device. Also, some changes are necessary to the principal flow control structure, which in it's final state would enhance the flow characteristics of the BMP, thus a less stagnant condition would be present. It would be best to assess the algae condition after full conversion is complete and the BMP reaches an equilibrium point. Then the owner can evaluate possible no action, natural, chemical or biological treatment options. We can assist the HOA and the landowners adjacent to the BMP on this matter to the best of our ability at that time.

(PS. I notice the Steelers name in the email. Are you a Steeler fan. I am originally from Pennsylvania. Lived in Johnstown for 28 years before I moved here. Just interested if you are just a Steeler fan or a PA resident.)

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: WllSteelers@aol.com [mailto:WllSteelers@aol.com]
Sent: Wednesday, July 02, 2003 9:16 AM
To: Beth Davis
Subject: Re: Springhill Pond

I was not questioning if the work was being done correctly. I am in close contact with everything that is being done since it is right in my backyard. My concern was the wood chippings and the invitation it brings to pests. I was also concerned by the disgusting appearance of the pond with all the green swamp slime that has now developed from the cutting down of the trees. Hopefully when the work is complete this pond will not look this way.

Pamela Anderson
4261 Teakwood Drive
259-9190

Beth Davis

From: Beth Davis
Sent: Tuesday, July 01, 2003 2:52 PM
To: 'Carrie LaRose'
Cc: Scott Thomas
Subject: FW: pond

Ms. LaRose,

The Civil Engineer in our office inspected the pond work in Springhill and is satisfied with the work, as well as myself, that the developer has done thus far for what and how vegetation is to be removed. For your information, please reference the explanation from the Division's Civil Engineer, Scott J. Thomas, P.E., as to why the work must be done in order for the pond to operate and function correctly. Also, I spoke to the developer's representative, Nick Vacca of Hampton Bay Group, about the piles of woodchips. We recommended that those piles of woodchips be spread out, possibly over the dam embankment to continue the walking path, and he indicated that when the work is complete, they already had planned to do that and not leave the woodchips in piles.

"Usually trees, shrubs and woody vegetation are not permitted to grow on any part of pond embankments constructed using engineered (compacted) fills. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure conditions. For older facilities which may have established tree growth, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should then be made to reduce re-establishment and replace the tree growth with an established low-maintenance grass covering."

Another reference is the Virginia DCR, Division of Dam Safety. They have some good information relative to "vegetation and erosion on dams". The website link is:

http://www.dcr.state.va.us/sw/dsveget.htm

If you have any questions or comments or if I can be further assistance, please reply or contact me at the information below.

Thank you,
Catherine "Beth" Davis
Environmental Inspector
James City County Environmental Division
101 Mounts Bay Road
Post Office Box 8784
Williamsburg, Virginia 23187-8784
(757) 253-6702
FAX (757) 259-4032
bdavis@james-city.va.us
www.jccEgov.com

-----Original Message-----
From: Beth Davis
Sent: Monday, June 23, 2003 7:44 AM
To: 'Carrie LaRose'
Cc: Scott Thomas
Subject: RE: pond

Ms. LaRose,

In response to your call last week, I inspected the pond work and have asked the Civil Engineer in our office to also inspect the pond work since he gave the guidance as to what and how vegetation was to be removed. He was not able to go out into the field last week due to his schedule, but upon his inspection, I will contact you and Ms. Anderson with a response. Please pardon the delay.

Thank you,
Catherine "Beth" Davis
Environmental Inspector
James City County Environmental Division
101 Mounts Bay Road
Post Office Box 8784
Williamsburg, Virginia 23187-8784
(757) 253-6702
FAX (757) 259-4032
bdavis@james-city.va.us
www.jccEgov.com

-----Original Message-----
From: Carrie LaRose [mailto:cae7576@yahoo.com]
Sent: Sunday, June 22, 2003 9:52 PM
To: Beth Davis
Subject: ie:pond

Hello Beth, we were just wondering what came of your visit to the pond behind our homes (Teakwood dr.-springhill) last week. Pam Anderson, Dan Young, Greg and I were all talking about the promised professional landscaping that Nick said would take place now that all the pines had been stripped from our green space- we were wondering if as the environmental professional you had a hand in that and were providing guidance. I should be home today around 3pm if that is a convenient time for you, I'll give you a call so I can let the neighbors know what you say are our plans. (we do ALL recognize that this isn't the only area in the county you are paying attention too, we are sure there are many areas were the developers aren't being as kind to the land as they should!)
thank you for your time--

=====
Mrs. Carrie LaRose

Do you Yahoo!?
SBC Yahoo! DSL - Now only $29.95 per month! http://sbc.yahoo.com

Beth Davis

From: Beth Davis
Sent: Tuesday, July 01, 2003 2:55 PM
To: 'WllSteelers@aol.com'
Subject: Springhill Pond

Ms. Anderson,

For your information, the Civil Engineer in our office inspected the pond work in Springhill and is satisfied with the work, as well as myself, that the developer has done thus far for what and how vegetation is to be removed. For your information, please reference the explanation from the Division's Civil Engineer, Scott J. Thomas, P.E., as to why the work must be done in order for the pond to operate and function correctly. Also, I spoke to the developer's representative, Nick Vacca of Hampton Bay Group, about the piles of woodchips. We recommended that those piles of woodchips be spread out, possibly over the dam embankment to continue the walking path, and he indicated that when the work is complete, they already had planned to do that and not leave the woodchips in piles.

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If you have any questions or comments or if I can be further assistance, please reply or contact me at the information below.

Thank you,
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Williamsburg, Virginia 23187-8784
(757) 253-6702
FAX (757) 259-4032
bdavis@james-city.va.us
www.jccEgov.com

Beth Davis

From: Beth Davis
Sent: Tuesday, June 17, 2003 10:21 AM
To: Scott Thomas
Subject: FW: Springhill HOA Contact Information

Scott,

Below is information that I have been given as a contact for the Springhill, Phases 3 and 4 Homeowners' Association.

Also, below is the contact information for the homeowner that has become real active in the correspondence with the developer for the work being done to the BMP in Springhill, Phases 3 and 4.

Pam Anderson (Husband's name: Bill)
4261 Teakwood Drive
Williamsburg, Virginia
(757) 259-9190
WllSteelers@aol.com

Thank you,
Catherine "Beth" Davis
Environmental Inspector
James City County Environmental Division
101 Mounts Bay Road
Post Office Box 8784
Williamsburg, Virginia 23187-8784
(757) 253-6702
FAX (757) 259-4032
bdavis@james-city.va.us
www.jccEgov.com

-----Original Message-----
From: WllSteelers@aol.com [mailto:WllSteelers@aol.com]
Sent: Tuesday, May 06, 2003 10:06 AM
To: Beth Davis
Subject: (no subject)

Beth,
Here is the name of the gentleman in charge of springhill HOA 3-4. Michael Newsome, his phone number is (757) 340-5300. I hope this information is helpful.

Pamela Anderson
4261 Teakwood Drive
259-9190

Beth Davis

From: Beth Davis
Sent: Monday, June 23, 2003 7:44 AM
To: 'Carrie LaRose'
Cc: Scott Thomas
Subject: RE: pond

Ms. LaRose,

In response to your call last week, I inspected the pond work and have asked the Civil Engineer in our office to also inspect the pond work since he gave the guidance as to what and how vegetation was to be removed. He was not able to go out into the field last week due to his schedule, but upon his inspection, I will contact you and Ms. Anderson with a response. Please pardon the delay.

Thank you,
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-----Original Message-----
From: Carrie LaRose [mailto:cae7576@yahoo.com]
Sent: Sunday, June 22, 2003 9:52 PM
To: Beth Davis
Subject: ie:pond

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thank you for your time--

=====
Mrs. Carrie LaRose

Do you Yahoo!?
SBC Yahoo! DSL - Now only $29.95 per month! http://sbc.yahoo.com

LANDMARK DESIGN GROUP
TRANSMITTAL

To: SCOTT THOMAS

Company: JAMES CITY COUNTY, ENVIRONMENTAL

From: PETER FARRELL

Date: June 3, 2004

Subject: Springhill, Phase 3 & 4 BMP Record Drawing

LMDG Job No.: 2002001-WMI.SC

Attached please find:
- ☒ Prints
- ☐ Plans
- ☐ Specifications
- ☐ Drawings
- ☐ Report
- ☐ Letter
- ☐

Transmitted as checked below:
- ☐ For your use
- ☐ As requested
- ☒ For review and comment
- ☐ For approval
- ☐ Approved
- ☐

PC030
5-56-98

Copies	Date	Drawing No.	Description
3	06/02/04	15200w	RECORD DRAWINGS FOR STORMWATER DETENTION POND AT SPRINGHILL

Notes:
SUBMITTED FOR PRELIMINARY REVIEW

Copies	Enclosures
1. File: 1970009	☒
2.	☐
3.	☐
4.	☐
5.	☐

LandMark Design Group, Inc.

By: PF

**Acknowledgment by Recipient: _____ _____
Name Date

Engineers • Planners • Surveyors • Landscape Architects • Environmental Consultants
4029 Ironbound Road, Suite 100, Williamsburg, VA 23188 (757) 253-2975 FAX: (757) 229-0049 lmdg@landmarkdgwb.com

LANDMARK DESIGN GROUP

TRANSMITTAL

RECEIVED
NOV 23 2004
ENVIRONMENTAL DIVISION

To: William A. Cain

Company: JCC-Environmental

From: Al Ramsay

Date: 11/23/04

Subject: Springhill BMP As-builts

LMDG Job No.:1970009

Attached please find:
- ☐ Prints
- ☒ SWM/BMP Facilities Record Dwg & Const. Certificate form
- ☐ Specifications
- ☐ Drawings
- ☐ Report
- ☒ Letter
- ☐ Original Plat

Transmitted as checked below:
- ☒ For your use
- ☐ As requested
- ☐ For review and comment
- ☒ For approval
- ☐ Approved
- ☐

Copies	Date	Drawing No.	Description
1	9/28/04	N/A	Letter requesting final inspection & approval
1	9/22/04	N/A	SWM/BMP Facilities Record Drawing & Construction Certificate form
1	09/29/04	N/A	Original Transmittal from 09/29/04, received by Joan Etchberger

Notes:

Bill,

Attached are copies of what was submitted on 9/29/04 for your records. Please let me know if you need any additional information.

Copies	Enclosures
1. File: 1970009	☒
2.	☐
3.	☐

LandMark Design Group, Inc.

By: T. Penci

**Acknowledgment by Recipient: _____ _____

Name Date

Engineers ♦ Planners ♦ Surveyors ♦ Landscape Architects ♦ Environmental Scientists

4029 Ironbound Road, Suite 100, Williamsburg, VA 23188 (757) 253-2975 FAX: (757) 229-0049 lmdg@landmarkdg.com

LANDMARK DESIGN GROUP
TRANSMITTAL

To: William A. Cain

Company: JCC-Environmental

From: Al Ramsay

Date: 09/29/04

Subject: Springhill BMP As-builts

LMDG Job No.:1970009

Attached please find:
- ☐ Prints
- ☒ SWM/BMP Facilities Record Dwg & Const. Certificate form
- ☐ Specifications
- ☐ Drawings
- ☐ Report
- ☒ Letter
- ☐ Original Plat

Transmitted as checked below:
- ☐ For your use
- ☐ As requested
- ☐ For review and comment
- ☒ For approval
- ☐ Approved
- ☐

Copies	Date	Drawing No.	Description
1	9/28/04	N/A	Letter requesting final inspection & approval
1	9/22/04	N/A	SWM/BMP Facilities Record Drawing & Construction Certificate form

Notes:

Copies	Enclosures
1. File: 1970009	☒
2.	☐
3.	☐
4.	☐
5.	☐

LandMark Design Group, Inc.

By: MAL

**Acknowledgment by Recipient: Joan Eckberger (Name) 9/29/04 (Date)

Engineers ♦ Planners ♦ Surveyors ♦ Landscape Architects ♦ Environmental Scientists
4029 Ironbound Road, Suite 100, Williamsburg, VA 23188 (757) 253-2975 FAX: (757) 229-0049
lmdg@landmarkdg.com

LANDMARK DESIGN GROUP
TRANSMITTAL

RECEIVED
SEP 29 2004
ENVIRONMENTAL DIVISION

To: William A. Cain

Company: JCC-Environmental

From: Al Ramsay

Date: 09/29/04

Subject: Springhill BMP As-builts

LMDG Job No.:1970009

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

County BMP ID Code (if known): PC030

Name of Facility: WET POND BMP No.: 1 of 1 Date: 9/7/04

Location: SPRINGHILL PHASE III & IV

Name of Owner: HOA

Name of Inspector: PAT MENICHINO

Type of Facility: WET POND

Weather Conditions: CLOUDY / 87° Type: ☑ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height			—	EXCESS OF 4' TALL
Vegetation Condition	✓			
Tree Growth			✓	SAPLINGS ON EMBANKMENT
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches	✓			
Interior Landscaping/Planted Areas: ☑ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions	N/A			
Trash & Debris				
Floating Material				
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other				
Notes:				

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

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

Remarks: BMP DEPTH WAS MODIFIED TO OBTAIN VOLUME REQ'D. AND DUE TO AGE OF ALL ITEMS, STABILIZATION IS GOOD; HOWEVER, VEGITATION IS EXCESSIVELY HIGH. MOWING IS REQUIRED, BUT EVERYTHING APPEARS (FOR WHAT CAN BE SEEN) TO BE IN GOOD STANDING.

Overall Environmental Division Internal Rating: 4

Signature: (BILL CAIN) BC 12-8-04 **Date:** 9/8/04

Title: CIVIL ENGINEER

SWMProg\BMP\CoInspProg\InspForms\DetRet.wpd

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	EW-11 Grate
BMP ID NO	030	SITE AREA acre	82.03	CTRL STRUC SIZE inches	15
PLAN NO	S-65-95	LAND USE	SF Residential	OTLT BARRL DESC	RCP
TAX PARCEL	(37-2)(1-2)	old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	15
PIN NO	3720100002	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Springhill Phase 2/3 Wet Pond			DESIGN HW ELEV	
FACILITY LOCATION	Near Curve in Teakwood Drive Phase 3			PERM POOL ELEV	45.18
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Springhill Development Company			10-YR OUTFLOW cfs	
OWNER ADDRESS				REC DRAWING	No
OWNER ADDRESS 2		SERVICE AREA DESCRI	Services Ph 2/3 SF Lots & Roadways		
CITY-STATE-ZIP CODE		IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	9/6/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Still under construction. Located in Ph 3. EW-11 to 15 inch barrel.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

PC030
PC034
SPRING HILL

Springhill Phase 3/4
County Plan No. SP-56-98; BMP ID Code: PC 030

PRELIMINARY PUNCH LIST

- Basin was constructed as a temporary sediment basin in Phase 2 of the project. To be converted to final BMP following completion of Phases 3 and 4. Conversion per approved plan S-56-98

- Wet Pond # 2, 8 point BMP, serving 19.85 acres of development.

- ***Final Configuration***

  - 15-inch single culvert barrel with EW-11 endwall in basin.
  - 6 ft. wide safety bench at El. 45.15
  - Emergency spillway at south abutment, crest El. 52.15, 10 ft. wide.

  - ***Conversion Process:***

    - Provide asbuilt drawings (certified)
    - Provide construction certification

    Record Drawings and Construction Certification to be in accordance with the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions (copy attached)

    - Remove temporary CMP riser and barrel
    - Clean and remove all sediment and debris from basin.
    - Regrade bottom to El. 41.0 and side slope as shown on plan.
    - Raise top of dam elevation to achieve El. 53.5.
    - Other field-related items per Environmental Division - generally consists of removal of trees and woody vegetation from top and downstream face of dam; cleaning and removing sediment, vegetation, debris and trash which obstructs the primary flow control pipe (i.e 15-inch) and all inflow pipes/channels which lead to the basin.

Shannon Stoud
220-6673
cell 812-5958
4281 TEAKwood

Taken by Scott 11-1-04 12:00

Shannon Stoud 220-6673
cell - 812-5958

ENVIRONMENTAL DIVISION CITIZEN COMPLAINT RESPONSE FORM

Complainant's Name: Springhill Phases 3+4 Mark Hartman HOA for Shannon Stoud 4281 Teakwood

Address: 4256 Boxwood

Telephone No.: 565-5150

Date Received: 11/01/04

Date Assigned:

Location of Problem: 4281 Teakwood

Type of Complaint

- ☒ Drainage
- ☐ Erosion
- ☐ Land Disturbing
- ☐ Tree Removal
- ☐ Sink Hole
- ☐ Street Sign
- ☐ Street Light
- ☐ Other:

Mark called to get update on status of bond + BMP in Phases 3+4. We still hold $24,000 in ERS bond. Bill + I are working thru BMP issues, still need const. cert + some field issues need done for BMP. Mark stated Mrs. Stoud has a very serious drainage problem where water backs up the storm drain + floods house. Need to investigate. (won't sign off on BMP until we know this is resolved.)

Inspector Assigned:

Watershed Code:

Date Investigated:

Complainant Contacted? ☐ Yes ☐ No

Field Investigation? ☐ Yes ☐ No

Follow up Required? ☒ Yes ☐ No

Results of Investigation:

11-5-04 - spoke with SHANON STOUD, SHE SAID that she has not experienced ANY flooding this past summer, but the roadside ditch still FILLS up.
SHE STATED that she WAS told by Engineers representing Hampton ROADS, that the Pond WAS not built properly. She feels that the pond is CAUSING the problem with flooding + BACK up.

Downstream of BMP?
4281 TEAKWOOD
SHANNON STOND
(DRAINAGE PROBLEM)

Mark Hartman

EPS

$24,000

Springhill Phase 3+4

- Flooding thru storm system.
- Lot (4281) Shannon Teatlmond Stand. MS.

Note I/M comment never made!

ENVIRONMENTAL DIVISION REVIEW COMMENTS
SPRINGHILL PHASES 3 AND 4
PLAN NO. S-56-98 MCE/DEC
July 17, 1998

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.

2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots.

3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit.

4. Provide conservation easements for all natural open space claimed on these sections.

5. As-built drawings must be provided to verify the construction of the detention basin and for all basin modifications.

6. Provide a streetlight on lots 135, 143, 150, 122, 177, and 188 in the radius of the various intersections curve. Also, provide lights between lots 138/139, 179/180, and 164/165. A rental fee for the required number of lights must be paid prior to the recordation of the subdivision plat.

7. Provide and label the cut and fill slopes on the plan or provide final contours on the plan at no greater than 2 foot intervals.

8. Provide an environmental inventory in accordance with Chesapeake Bay Ordinance Section 23-10B.

9. Provide storm sewer design calculations for drainage inlets 22 and 23. Drainage areas are shown on sheet 10 of the plan for these structures but they do not appear on the calculation sheet provided.

10. Show any temporary soil stockpile areas, staging and equipment storage areas.

11. Identify any off-site land disturbing areas required with proper erosion control measures.

12. Provide a detail for culvert inlet protection on the erosion control detail sheet.

13. Provide a sequence of construction on the plan for all work associated with these sections.

14. Provide evidence that the existing sediment basin has been inspected by the design engineer, ensuring its proper operation and maintenance. The basin depth should be measured to determine whether it is in need of sediment removal.

15. The following comments pertain to the design of the detention basin:
    A. The calculation for the size of the water quality volume needs to be revised. It is still based on the 19.85 acre watershed determined for Phase 2 not the 22.56 acres that is the current drainage area.
    B. The same comment applies to the BMP Point Calculation. It needs to be revised based on the 22.56 acre watershed to BMP 2.
    C. Provide a map to update the amount and location of Natural Open Space.
    D. The calculation of the overall "c" factor needs to be revised and be based on the 22.56 acre drainage area.
    E. The basin must be examined for performance as a sediment basin during the construction of the project. Additional acreage of drainage will be piped to the existing basin, with no improvements or modifications shown. The outfall structure is not a typical riser/barrel structure, so its performance as a sediment basin is questionable.

16. Designate one entrance to the project as the construction entrance and label it on the plan. A note should be added to the plan that the construction entrance serving phase 2 (from News Road) will not be used in this phase.

17. The calculations show a paved ditch beginning at station 18+75 on the right side of Teakwood Drive. This needs to be provided on the plan.

18. Provide a 10-foot drainage easement for ditches 2, 3 and 4. Increase the width of the drainage easement from structure 7 to 10 to 20 feet.

19. Change the ditch liner for ditch 4 to EC-3 due to the high velocity of flow.

ENVIRONMENTAL DIVISION REVIEW COMMENTS
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July 17, 1998

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Log In
Spring hill Phases 3/4

PC030
5-56-98

Need Const. Cert.