See also PC132

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: **PC133**

DATE VERIFIED: **July 3, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: February 24, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

BMP ID or General File ID PC133

PIN: 4610100002D

Subdivision, Tract, Business or Owner Name (if known): Williamsburg James City County Schools

Property Description: Jamestown High School

Site Address: 3751 John Tyler Highway

(For internal use only) **Box:** JC001 **Drawer:** 2

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

Comments:

Certifying Professionals: *(Note: A registered Professional Engineer or Certified Land Surveyor is responsible for the preparation of an "As-Built" plan of 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 the Stormwater Management/BMP facility during its construction.)*

Construction and As-Built Certifications for Stormwater Management / BMP Facilities

As-Built Plan Certification

Firm Name: Woodson Company
Mailing Address: 5251-18 J. Tyler Hwy #359
Williamsburg, VA 23185
Business Phone: 757-294-5310
Fax: 757-295 5446

Name: Charles Reid Sheckler
Title: President

Signature:
Date: 12/09/99

I hereby certify to the best of my judgement, knowledge and belief that this as-built plan was prepared under my direct supervision and control and represents the actual condition of the Stormwater Management/BMP structure(s) and contains information as required for certification. The Stormwater Management/ BMP facility complies with the approved design plan, James City County Guidelines for Design and Construction of BMP's and/or specifications on the approved Stormwater Management Plan, except as shown.

COMMONWEALTH OF VIRGINIA
CHARLES REID SHECKLER
NO. 1935
12-9-99
CERTIFIED LAND SURVEYOR

(Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

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

Name: _____
Title: _____

Signature: _____
Date: _____

I hereby certify to the best of my judgement, knowledge and belief that construction of this Stormwater Management/BMP facility was monitored under my direct control and supervision. The facility was constructed in accordance with the approved design plan, James City County Guidelines for Design and Construction of Stormwater Management BMP's and/or specifications on the approved Stormwater Management Plan.

_____ (Seal)

Virginia Registered Professional Engineer

RECORD MERIDIAN
P.B. 76, PG.53-56

READE'S WAY (55' R/W)

SUBDIVISION JAMESTOWN HUNDRED
P.B. 76, PG.53-56

NOTE: TREES IN DRAINAGE EASEMENT NOT ON COUNTY PROPERTY N.I.C.

90' ACCESS EASEMENT

ENTRANCE GATE

PARK ENTRANCE SIGN

32 LF OF 12" RCP 2-ES, 4 LF EA. S
INV. IN = 34.00
INV. OUT = 33.80

YDI
TOP=33.61
INV=26.55

16 LF OF 12" RCP 2-ES

CONCRETE MULTI-USE TRAIL BY OTHERS (N.I.C.)

SIDEWALK TO CONNECT TO EXISTING SIDEWALK

6' CONCRETE SIDEWALK CONNECT TO JHS PARKING LOT

PROPOSED WETLANDS

EXISTING WETLANDS

15"PINE REMOVE

15"PINE

18"OAK

20"OAK

14"OAK

3"PINE

LEVEL SPREADER 300 CF STORAGE

8'x60' LOW GRADIENT LOW IMPACT DRY SWALE

BIKE RACK

PICNIC SHELTER AND OUTDOOR CLASSROOM

BUSH LEGHER

TRANSITION CURB

8" CURB

TIE INTO EXISTING TRAIL

CONCRETE SIDEWALK

RESTROOMS

DIRT ROAD

6'x9' ROAD (TYP.)

EXISTING BMP

INV=25.17

YDI
TOP=35.43
INV=25.55

42" CPP

15" RCP

GRAVEL

10' CHAIN LINK

JAMESTOWN HIGH SCHOOL TENNIS COURTS

BUSINESS

YDI
TOP=34.35
INV=27.30

CONC.

1/2 SCALE 1"=40'

S:\Jobs\93221\33-Greensprings\Trailhead\dwg_By Others\Grnspr_Trail\plan20.dwg, 11/1/2006 8:35:01 AM, bruce.abbott

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 004

JAMES CITY COUNTY SCHOOL BOARD

GRAPHIC SCALE
20' 0' 20' 40'

RECORD MERIDIAN
P.B. 76, PG.53-56

READE'S WAY (55' R/W)

SUBDIVISION OF JAMESTOWN HUNDRED
P.B. 76, PG.53-56

NOTE: TREES IN DRAINAGE EASEMENT NOT ON COUNTY PROPERTY N.I.C.

90' ACCESS EASEMENT

· WQ
· QUANTITY OK
· ISSUES ON DRIP/TRAP

LINEAR SWALE
· W/ LANDSCAPING

15" PINE REMOVE

ENTRANCE GATE

32 LF OF 12" RCP 2-ES, 4 LF EA'S
INV. IN = 34.00
INV. OUT = 33.80

PARK ENTRANCE SIGN

YDI
TOP=33.61
INV=26.55

CONCRETE MULTI-USE TRAIL BY OTHERS (N.I.C.)

42" CPP

16 LF OF 12" RCP 2-ES

SIDEWALK TO CONNECT TO EXISTING SIDEWALK

PROPOSED WETLANDS

EXISTING WETLANDS

STORAGE AREA

BUS PARK

BUS

BUS

6" CONCRETE SIDEWALK CONNECT TO HS PARKING LOT

6" CURB

TRANSITION CURB

POLE MOUNTED LIGHTS

BIKE RACK

PICNIC SHELTER AND OUTDOOR CLASSROOM

LEVEL SPREADER 300 LF OF STORAGE

6'x60' LOW GRADIENT LOW IMPACT DRY SWALE

TIE INTO EXISTING TRAIL

CONCRETE SIDEWALK

RESTROOMS

DIRT ROAD

EXISTING BMP

INV=25.17

YDI
TOP=35.43
INV=25.55

· ENV INV
· D.P. CHECKLIST
· E&S PLAN
· DRAINAGE/SW (PLAT) PLAN

80' @ 0.0

10' CHAIN LINK

JAMESTOWN HIGH SCHOOL TENNIS COURTS

BUSHES

YDI
TOP=34.35
INV=27.30

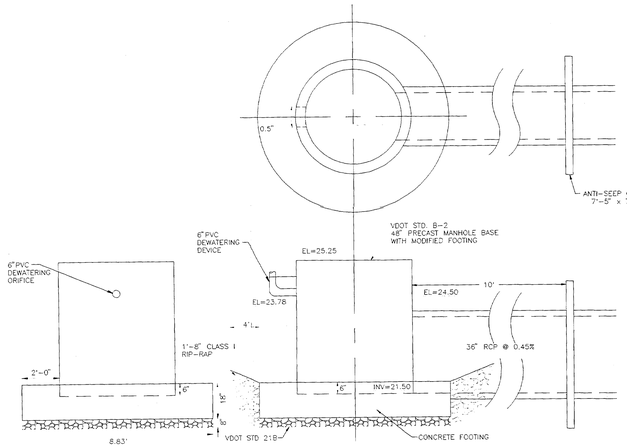
1/2 SCALE 1" = 40'

S:\Jobs\93221\33-Greensprings Trailhead\dwg_By Others\Grnspr_Trail\plan20.dwg, 11/1/2006 8:35:01 AM, bruce.abbott

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 005

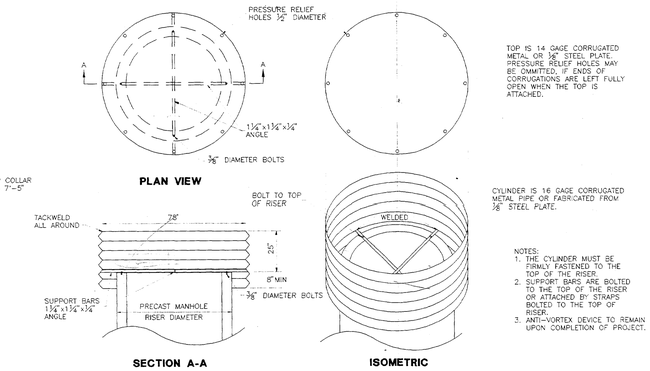
JAMES CITY COUNTY SCHOOL BOARD

GRAPHIC SCALE
20' 0' 20' 40'



NOTE:
ANTI-SEEP COLLAR NOT TO BE LOCATED CLOSER THAN 2' TO PIPE JOINT

POND OUTLET STRUCTURE
NTS

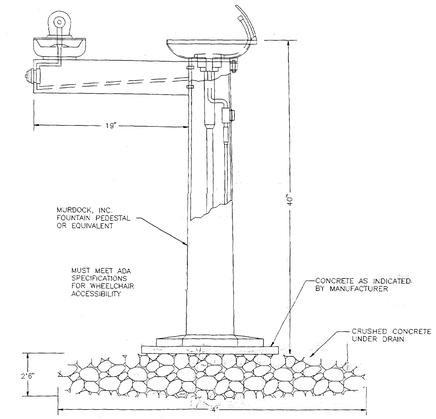


TOP IS 14 GAGE CORRUGATED METAL OR ⅛" STEEL PLATE. PRESSURE RELIEF HOLES MAY BE OMMITTED, IF ENDS OF CORRUGATIONS ARE LEFT FULLY OPEN WHEN THE TOP IS ATTACHED.

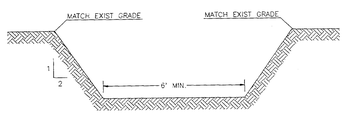
CYLINDER IS 16 GAGE CORRUGATED METAL PIPE OR FABRICATED FROM ⅛" STEEL PLATE.

NOTES:
1. THE CYLINDER MUST BE FIRMLY FASTENED TO THE TOP OF THE RISER.
2. SUPPORT BARS ARE BOLTED TO THE TOP OF THE RISER OR ATTACHED BY STRAPS BOLTED TO THE TOP OF RISER.
3. ANTI-VORTEX DEVICE TO REMAIN UPON COMPLETION OF PROJECT.

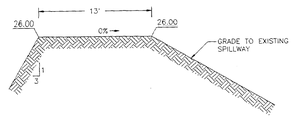
ANTI-VORTEX DEVICE/DESIGN
NTS



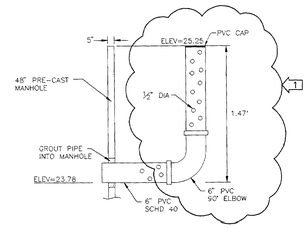
WATER FOUNTAIN
NTS



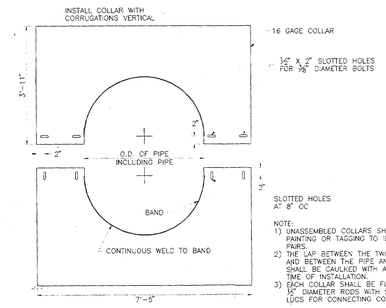
EMERGENCY EARTH SPILLWAY DITCH
NTS



EMERGENCY EARTH SPILLWAY PROFILE
NTS

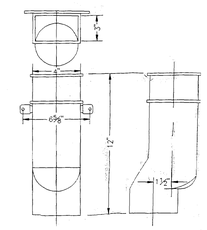


DEWATERING DEVICE
NTS

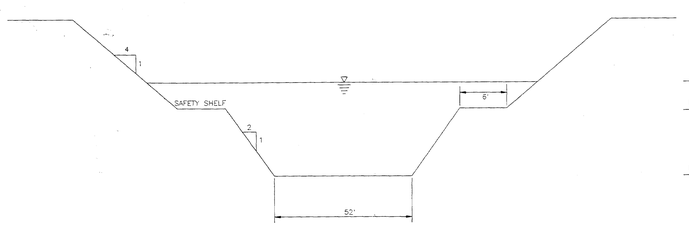


NOTE:
1) UNASSEMBLED COLLARS SHALL BE MARKED BY PAINTING OR TAGGING TO IDENTIFY MATCHING PAIRS.
2) THE LAP BETWEEN THE TWO HALF SECTIONS AND BETWEEN THE PIPE AND CONNECTING BAND SHALL BE CAULKED WITH ASPHALT MASTIC AT TIME OF INSTALLATION.
3) EACH COLLAR SHALL BE FURNISHED WITH TWO ½" DIAMETER RODS WITH STANDARD TANK LUGS FOR CONNECTING COLLARS TO PIPE.

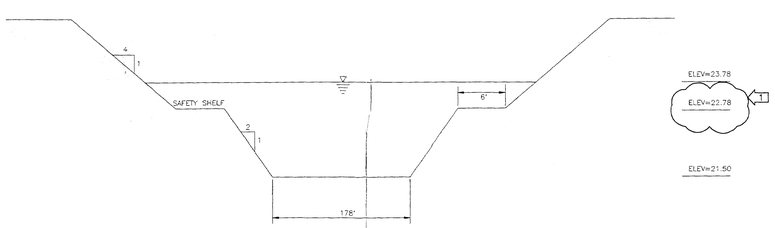
ANTI-SEEP COLLAR
NTS



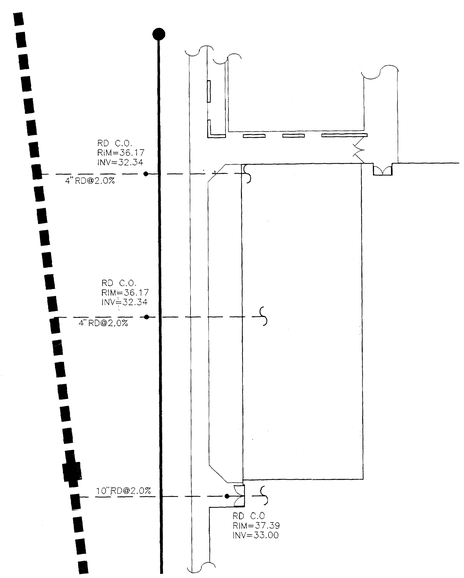
4"x3" RECTANGULAR DOWNSPOUT BOOT



SOUTH POND RESTORATION DETAIL
N.T.S.



WEST POND RESTORATION DETAIL
N.T.S.



ALTERNATE BID 1 ROOF DRAINS
1"=20'

Smith Demer Normar
Engineers – Planners – Surveyors
Central Park Six Manhattan Square Suite 10
Hampton, Virginia 23666
(804)865-9610 Fax: (804)865-1535

WJC

WILLIAMSBURG JAMES CITY COUNTY HIGH SCHOOL
Williamsburg, Virginia

ARCHITECTS
HBA ARCHITECTURE & INTERIOR DESIGN
222 Business Park Drive, Suite 200, Virginia Beach, VA 23462

ASSOCIATE ARCHITECTS
PERKINS & WILL
One Park Avenue, 19th Floor, New York, NY 10016

CONSULTING ENGINEERS
CIVIL • SMITH DEMER NORMANN, LTD
Central Park, Six Manhattan Square, Hampton, VA 23666
STRUCTURAL • STROUD PENCE & ASSOCIATES
204-2 Groston Avenue, Virginia Beach, VA 23462
M/E/P • ECI ENGINEERS
11825 Rock Landing Drive, Chesapeake Building, Suite 1, Newport News, Va 23606
LANDSCAPE • CARSON DESIGN GROUP
522 West 24th Street, Norfolk, Va 23517

ISSUES
1 PERMIT COMMENTS 8/23/95

COMMONWEALTH OF VIRGINIA
J. M. MILLER
048
PROFESSIONAL ENGINEER

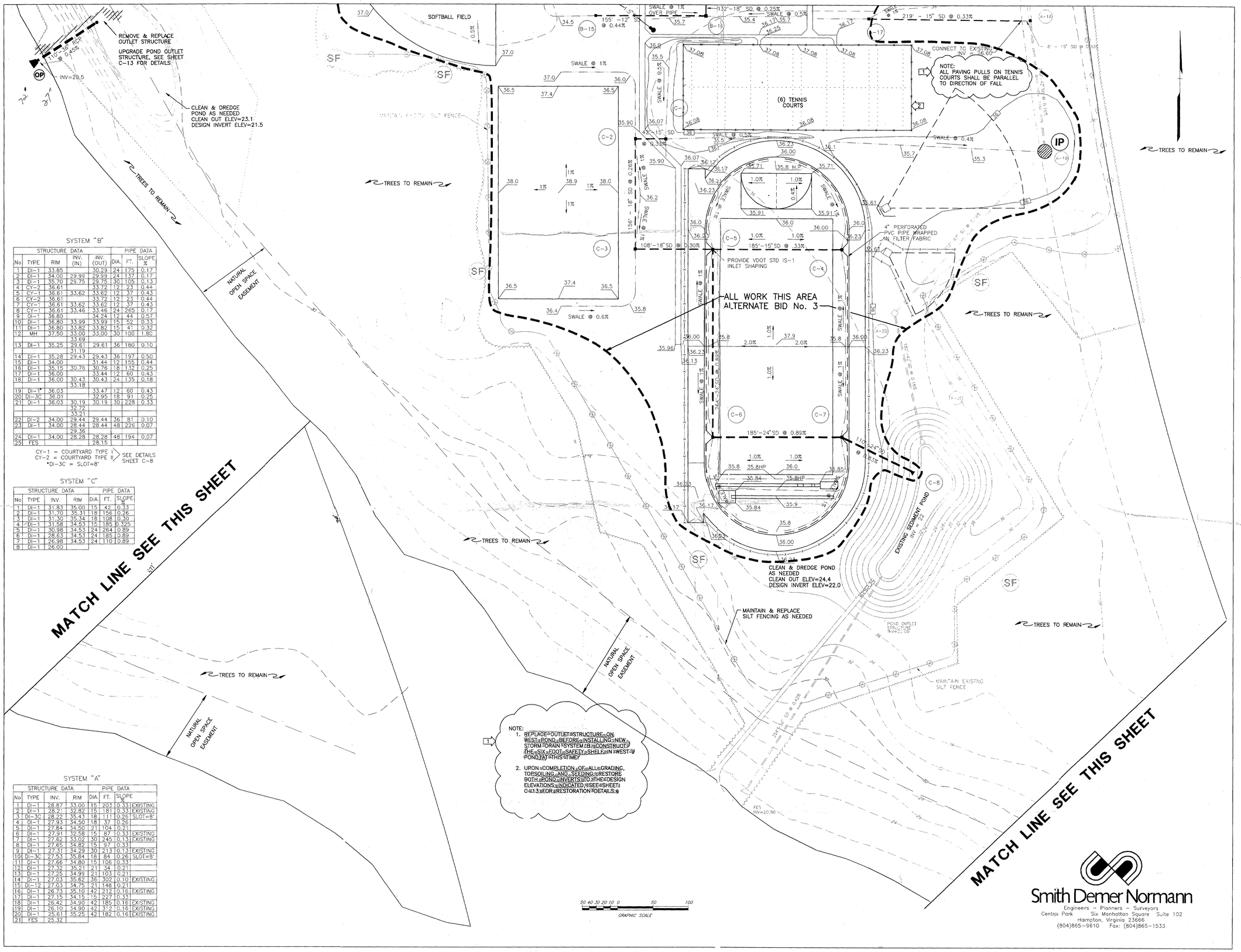
SCALE AS NOTED
DATE 10/0.11/95

SPINT POND OUTLESTRUCTURE

DWG. C-13

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 006

MATCH LINE SHEET C-4



SYSTEM "B"

STRUCTURE DATA					PIPE DATA		
No	TYPE	RIM	INV. (IN)	INV. (OUT)	DIA.	FT.	SLOPE %
1	DI-1	33.85		30.29	24	175	0.17
2	DI-1	34.00	29.99	29.99	24	137	0.17
3	DI-1	35.70	29.75	29.75	30	105	0.13
4	CY-2	36.61		33.72	12	23	0.44
5	CY-1	36.61	33.62	33.62	12	37	0.43
6	CY-2	36.61		33.72	12	23	0.44
7	CY-1	36.61	33.62	33.62	12	37	0.43
8	CY-1	36.61	33.46	33.46	24	265	0.17
9	DI-1	36.80		34.24	12	44	0.57
10	DI-1	36.80	33.99	33.99	15	52	0.33
11	DI-1	36.80	33.82	33.82	15	41	0.32
12	MH	37.50	33.00	33.00	30	100	1.80
			33.69				
13	DI-1	35.25	29.61	29.61	36	180	0.10
			31.19				
14	DI-1	35.28	29.43	29.43	36	197	0.50
15	DI-1	34.00		31.44	12	155	0.44
16	DI-1	35.15	30.76	30.76	18	132	0.25
17	DI-1	36.00		33.44	12	60	0.43
18	DI-1	36.00	30.43	30.43	24	135	0.18
			33.18				
19	DI-1*	36.03		33.47	12	60	0.43
20	DI-3C	36.01		32.95	18	91	0.25
21	DI-1	36.03	30.19	30.19	30	228	0.33
			32.72				
			33.21				
22	DI-2	34.00	29.44	29.44	36	81	0.10
23	DI-1	34.00	28.44	28.44	48	226	0.07
			29.36				
24	DI-1	34.00	28.28	28.28	48	194	0.07
25	FES			28.15			

CY-1 = COURTYARD TYPE I
CY-2 = COURTYARD TYPE II
*DI-3C = SLOT=8'
SEE DETAILS SHEET C-8

SYSTEM "C"

STRUCTURE DATA				PIPE DATA		
No	TYPE	INV.	RIM	DIA.	FT.	SLOPE %
1	DI-1	31.83	35.00	15	42	0.33
2	DI-1	31.70	35.31	18	156	0.26
3	DI-1	31.30	35.34	18	108	0.30
4	DI-1	31.58	34.53	15	185	0.325
5	DI-1	30.98	34.53	24	264	0.89
6	DI-1	28.63	34.53	24	185	0.89
7	DI-1	26.98	34.53	24	110	0.89
8	DI-1	26.00				

SYSTEM "A"

STRUCTURE DATA				PIPE DATA			
No	TYPE	INV.	RIM	DIA.	FT.	SLOPE %	
1	DI-1	28.97	33.00	15	203	0.33	EXISTING
2	DI-1	28.21	32.82	15	181	0.33	EXISTING
3	DI-3C	28.22	35.43	18	111	0.26	SLOT=8'
4	DI-1	27.93	34.50	18	37	0.26	
5	DI-1	27.84	34.50	21	104	0.21	
6	DI-1	27.91	32.58	15	87	0.33	EXISTING
7	DI-1	27.62	33.02	30	245	0.13	EXISTING
8	DI-1	27.65	34.82	15	97	0.33	
9	DI-1	27.31	34.29	30	213	0.13	EXISTING
10	DI-3C	27.53	35.84	18	84	0.26	SLOT=8'
11	DI-1	27.66	34.80	15	106	0.33	
12	DI-1	27.32	35.21	21	34	0.21	
13	DI-1	27.25	34.99	21	103	0.21	
14	DI-1	27.03	35.62	36	302	0.10	EXISTING
15	DI-12	27.03	34.75	21	148	0.21	
16	DI-1	26.73	35.10	42	212	0.16	EXISTING
17	DI-1	27.15	34.15	15	227	0.33	
18	DI-1	26.42	34.90	42	185	0.16	EXISTING
19	DI-1	26.10	34.90	42	312	0.16	EXISTING
20	DI-1	25.61	35.25	42	182	0.16	EXISTING
21	FES	25.32					

Smith Demer Normann
Engineers – Planners – Surveyors
Centrpx Park Six Manhattan Square Suite 102
Hampton, Virginia 23666
(804)865-9610 Fax: (804)865-1533

WILLIAMSBURG JAMES CITY COUNTY HIGH SCHOOL
Williamsburg, Virginia

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ASSOCIATE ARCHITECTS
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M/E/P · ECI ENGINEERS
11825 Rock Landing Drive, Chesapeake Building, Suite 1, Newport News, VA 23606
LANDSCAPE · CARSON DESIGN GROUP
523 West 24th Street, Norfolk, VA 23517

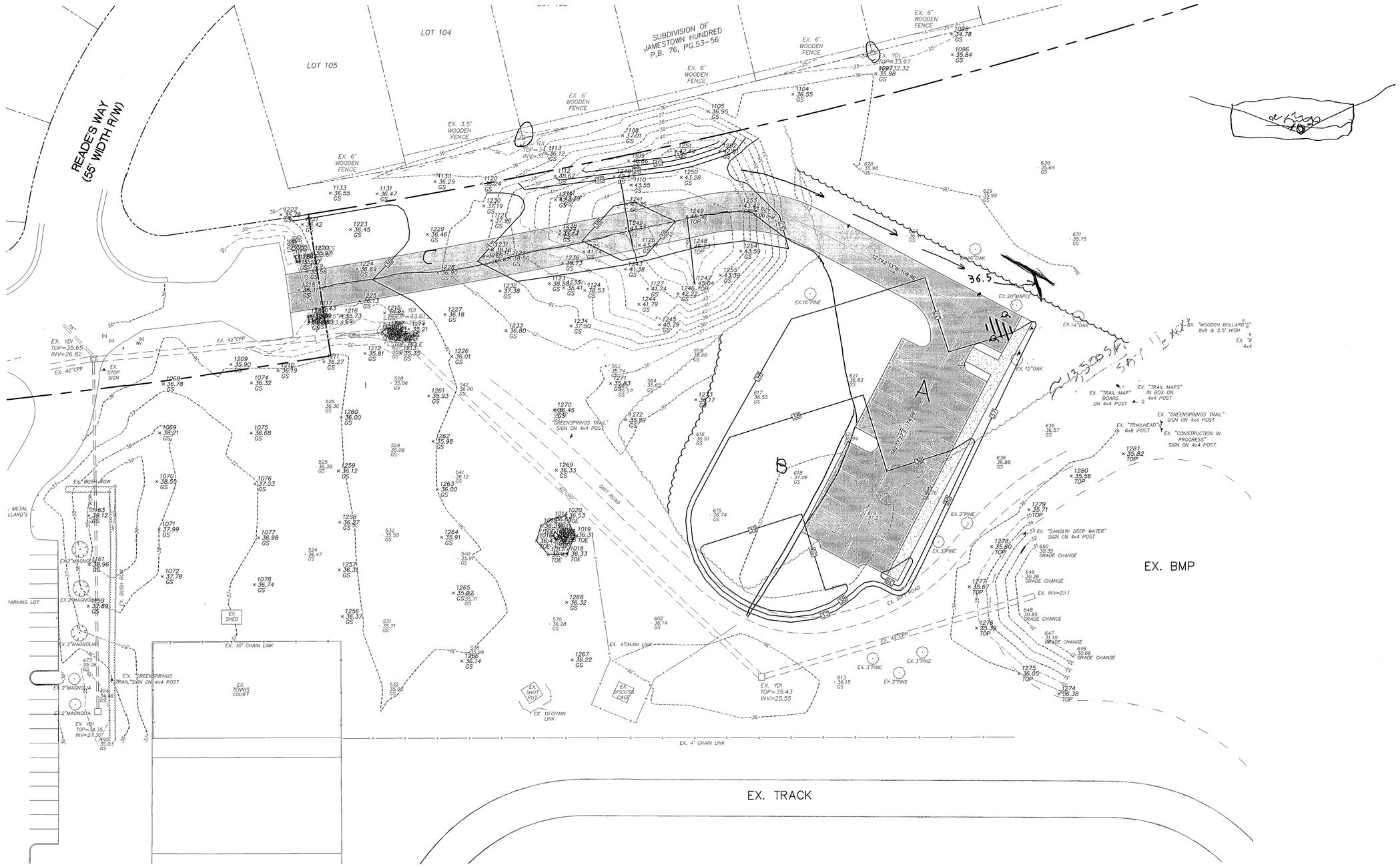
KEY PLAN

ISSUES
1 PER CITY COMMENTS 10/25/95
2 REGRADE TENNIS COURTS 10/24/95

SEAL
COMMONWEALTH OF VIRGINIA No. 20048 PROFESSIONAL ENGINEER 11/1/95

SCALE 1"=50'-0"
DATE 10/01/95
DRAWING TITLE
UTILITITES & GRADING PLAN-2
DRAWING NO.
C-5

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 007



1" = 30'

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 008

Smith Demer Normann
Engineers – Planners – Surveyors
Central Park Six Manhattan Square Suite 102
Hampton, Virginia 23666
(804)865-9610 Fax: (804)865-1533

SANITARY SEWER RIM & INVERT DATA				
PIPE	INVERT (IN)	INVERT (OUT)	RIM	
1		29.67	38.10	
2	28.72	28.62	38.07	
3	27.82	27.72	36.97	
4	26.85	26.76	36.05	
5	25.56	25.46	38.60	EXISTING
6	25.12	25.02	36.25	EXISTING
7	23.94	23.84	35.30	EXISTING
8		26.60	38.20	
9	25.56	25.46	37.90	
10	23.31	23.21	35.19	EXISTING

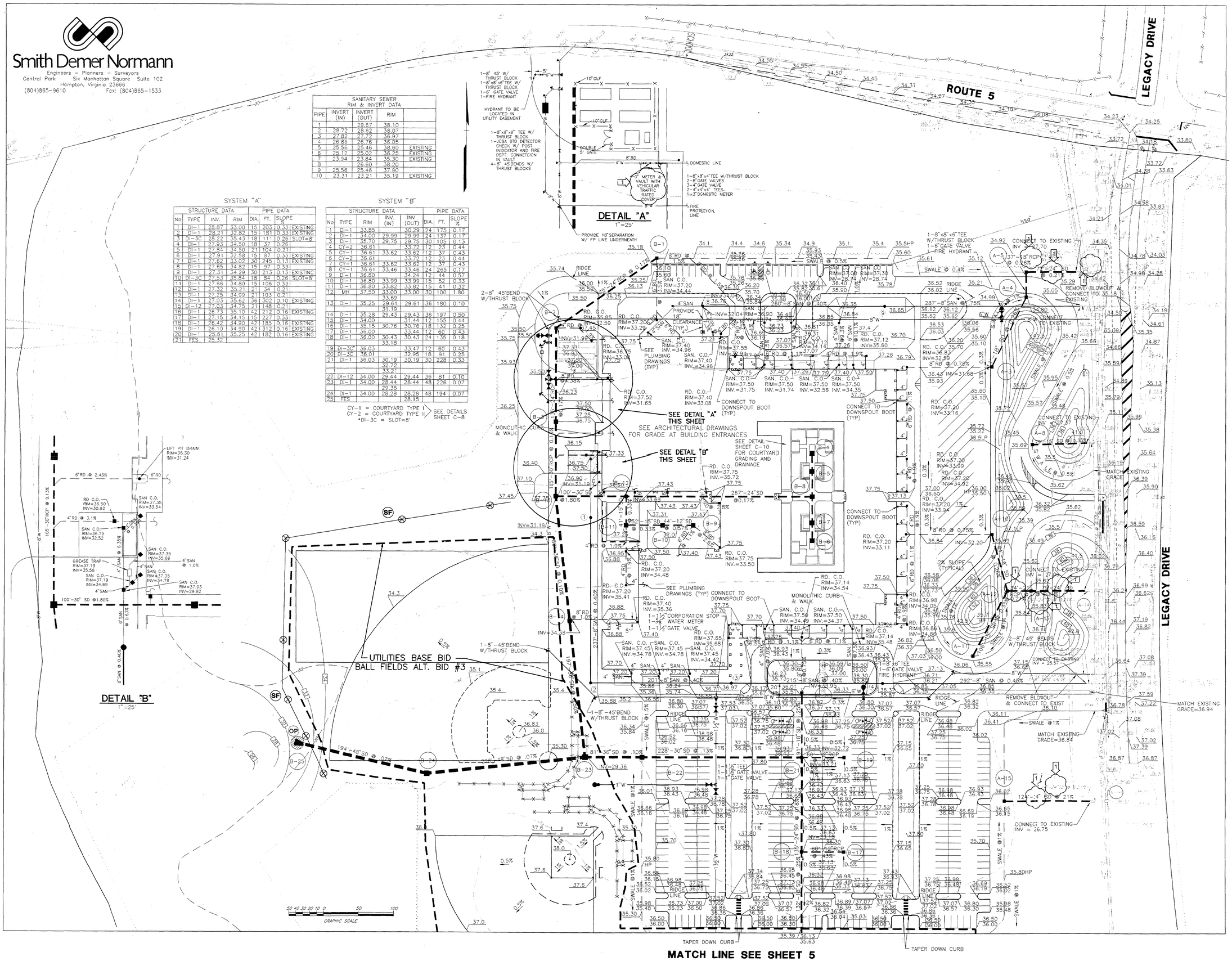
SYSTEM "A"

STRUCTURE DATA				PIPE DATA			
No	TYPE	INV.	RIM	DIA.	FT.	SLOPE %	
1	DI-1	28.87	33.00	15	203	0.33	EXISTING
2	DI-1	28.21	32.82	15	181	0.33	EXISTING
3	DI-3C	28.22	35.43	18	111	0.28	SLOT=8'
4	DI-1	27.93	34.50	18	37	0.26	
5	DI-1	27.84	34.50	21	104	0.21	
6	DI-1	27.91	32.58	15	87	0.33	EXISTING
7	DI-1	27.62	33.02	30	245	0.13	EXISTING
8	DI-1	27.65	34.82	15	97	0.33	
9	DI-1	27.31	34.29	30	213	0.13	EXISTING
10	DI-3C	27.53	35.84	18	84	0.26	SLOT=8'
11	DI-1	27.56	34.80	15	106	0.33	
12	DI-1	27.32	35.21	21	34	0.21	
13	DI-1	27.25	34.99	21	103	0.21	
14	DI-1	27.03	35.62	36	302	0.10	EXISTING
15	DI-12	27.03	34.75	21	148	0.21	
16	DI-1	26.73	35.10	42	212	0.16	EXISTING
17	DI-1	27.15	34.15	15	227	0.33	
18	DI-1	26.42	34.90	42	185	0.16	EXISTING
19	DI-1	26.10	34.90	42	312	0.16	EXISTING
20	DI-1	25.61	35.25	42	182	0.16	EXISTING
21	FES	25.32					

SYSTEM "B"

STRUCTURE DATA					PIPE DATA		
No	TYPE	RIM	INV. (IN)	INV. (OUT)	DIA.	FT.	SLOPE %
1	DI-1	33.85		30.29	24	175	0.17
2	DI-1	34.00	29.99	29.99	24	137	0.17
3	DI-1	30.70	29.75	29.75	30	105	0.13
4	CY-2	36.61		33.72	12	23	0.44
5	CY-1	36.61	33.62	33.62	12	37	0.43
6	CY-2	36.61		33.72	12	23	0.44
7	CY-1	36.61	33.62	33.62	12	37	0.43
8	CY-1	36.61	33.46	33.46	24	265	0.17
9	DI-1	36.80		34.24	12	44	0.57
10	DI-1	36.80	33.99	33.99	15	52	0.33
11	DI-1	36.80	33.82	33.82	15	41	0.32
12	MH	37.50	33.00	33.00	30	100	1.80
			33.69				
13	DI-1	35.25	29.61	29.61	36	180	0.10
			31.19				
14	DI-1	35.28	29.43	29.43	36	197	0.50
15	DI-1	34.00		31.44	12	155	0.44
16	DI-1	35.15	30.76	30.76	18	132	0.25
17	DI-1	35.00		33.44	12	60	0.43
18	DI-1	36.00	30.43	30.43	24	135	0.18
			33.18				
19	DI-3C	36.03		33.47	12	60	0.43
20	DI-3C	36.01		32.95	18	91	0.25
21	DI-1	36.03	30.19	30.19	30	228	0.33
			32.72				
			33.21				
22	DI-12	34.00	29.44	29.44	36	81	0.10
23	DI-1	34.00	28.44	28.44	48	226	0.07
			29.36				
24	DI-1	34.00	28.28	28.28	48	194	0.07
25	FES			28.15			

CY-1 = COURTYARD TYPE I
CY-2 = COURTYARD TYPE II
*DI-3C = SLOT=8'
SEE DETAILS SHEET C-8



WILLIAMSBURG JAMES CITY COUNTY HIGH SCHOOL
Williamsburg, Virginia

ARCHITECTS
HBA ARCHITECTURE & INTERIOR DESIGN
207 Business Park Drive, Suite 200, Virginia Beach, VA 23462

ASSOCIATE ARCHITECTS
PERKINS & WILL
One Park Avenue, 19th Floor, New York, NY 10016

CONSULTING ENGINEERS
CIVIL - SMITH DEMER NORMANN, LTD.
Central Park, Six Manhattan Square, Hampton, VA 23666
STRUCTURAL - STROUD PENCE & ASSOCIATES
204-A Grayson Avenue, Virginia Beach, VA 23452
M/E/P - ECI ENGINEERS
11825 Rock Landing Drive, Chesapeake Building, Suite 1, Newport News, VA 23606
LANDSCAPE - CARSON DESIGN GROUP
523 West 24th Street, Norfolk, VA 23517

KEY PLAN

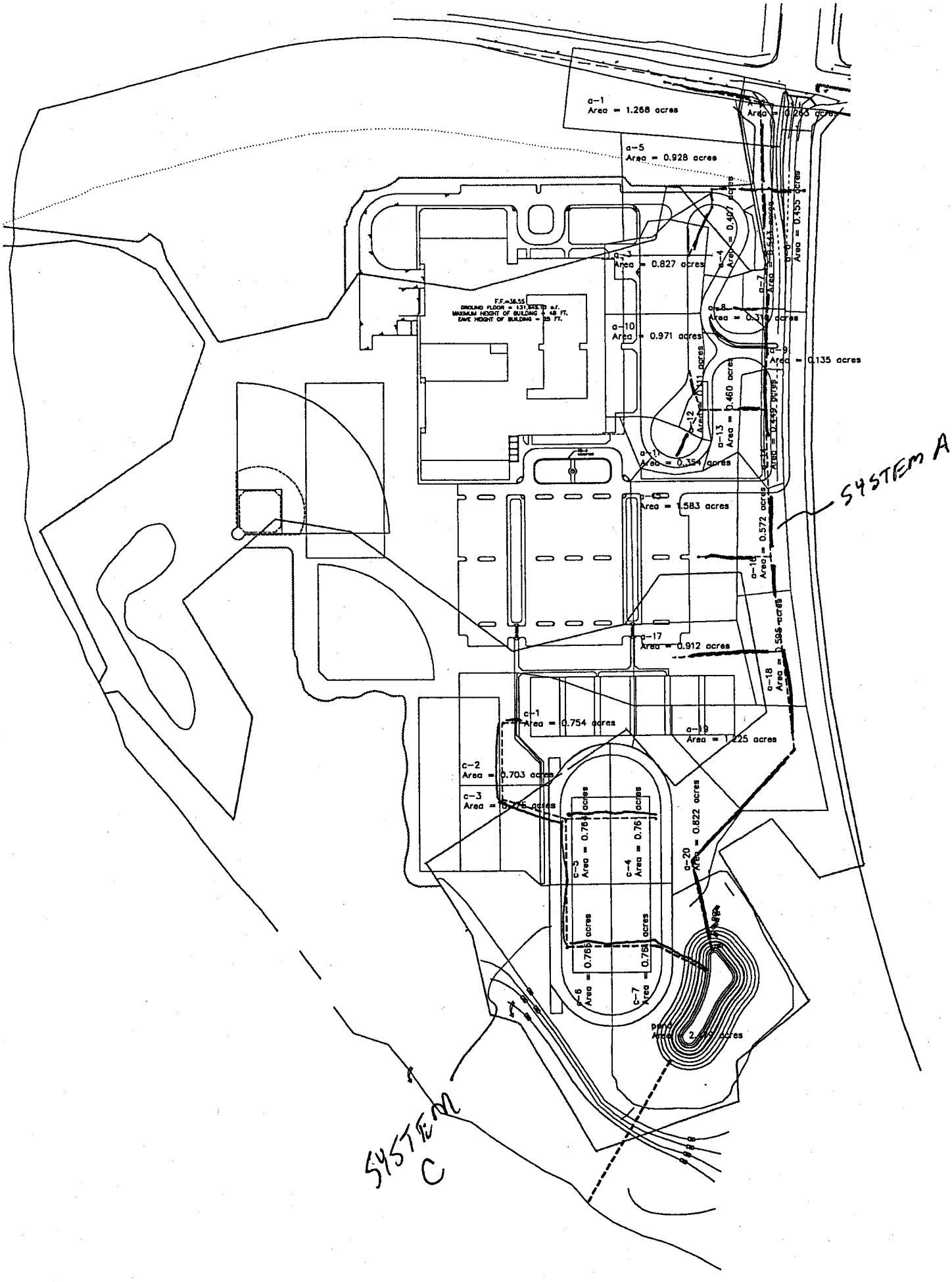
ISSUES
DESIGN REVIEW 10/23/95

SEAL
COMMONWEALTH OF VIRGINIA
MICHAEL W. MEEK
No. 20048
PROFESSIONAL ENGINEER

SCALE 1" = 50' – 0"
DATE 10/01/95
DRAWING TITLE
UTILITIES & GRADING PLAN - 1

DRAWING NO.
C-4

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 009


a-1
Area = 1.268 acres
a-5
Area = 0.928 acres
a-3
Area = 0.827 acres
a-4
Area = 0.407 acres
a-7
Area = 0.455 acres
a-8
Area = 0.319 acres
a-10
Area = 0.971 acres
a-9
Area = 0.135 acres
a-12
Area = 0.460 acres
a-13
Area = 0.249 acres
a-11
Area = 0.354 acres
a-15
Area = 1.583 acres
a-16
Area = 0.572 acres
a-17
Area = 0.912 acres
a-18
Area = 0.506 acres
c-1
Area = 0.754 acres
a-19
Area = 1.225 acres
c-2
Area = 0.703 acres
c-3
c-5
Area = 0.761 acres
c-4
Area = 0.761 acres
a-20
Area = 0.822 acres
c-6
Area = 0.761 acres
c-7
Area = 0.761 acres
SYSTEM A
SYSTEM C

Section 2 - Stormwater Management/BMP Facility Design Information (Continued):

Receiving Water Immediately Downstream of Facility Outfall:

☐ Tidal Estuary ☐ Reservoir ☐ River ☐ Stream ☐ Natural Channel
☐ Manmade Channel ☐ Existing Storm Drain/Inlet System ☐ Other: _____

Receiving Water Name or Description: _____

Nearest Offsite Land Tract / Use Downstream of Facility Outfall:

Tax Map/Parcel: _____ Use: _____

Does the SWM/BMP Facility control onsite or offsite runoff from a classified "Stormwater Hotpsot"?

☐ Yes ☐ No ☐ Unknown If yes, List Classification: _____

(Note: Refer to Chapter 2 Virginia SWM Handbook or Appendix F of theJames City County BMP Guidelines Manual for List of Classified Stormwater Hotspots.)

Section 3 - Stormwater Management/BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☐ Yes ☐ No ☐ Unknown

Approx. Construction Start Date for SWM/BMP Facility: _____

Facility Monitored by County Inspector/Engineer during Construction: ☐ Yes ☐ No ☐ Unknown

Name of County Inspector/Engineer who periodically monitored construction: _____

Construction Inspection Reports by Certifying Engineer Attached: ☐ Yes ☐ No

Construction Completion Date for SWM/BMP Facility: _____

Date of As-Built Submittal for SWM/BMP Facility: _____

(Note: As-built and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. As-builts must be reviewed and accepted by James City County Environmental Division or County Engineer prior to final inspection, acceptance and bond release.)

Section 4 - Owner / Designer / Contractor Information:

Owner/Developer:

Name: WILLIAMSBURG-JAMES CITY COUNTY PUBLIC SCHOOLS
Mailing Address: 101 MOUNTS BAY ROAD BLDG D
WILLIAMSBURG VIRGINIA 23185
Business Phone: 757.565.3838 Fax: 757.565.1462
Contact Person: JOE GREBBS Title: PROJECT MANAGER
Signature: _____

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: SMITH DEMORE NORLMANN
Mailing Address: CENTRAL PARK, SIX MANHATTAN SQ, SUITE 102
HAMPTON, VIRGINIA 23666
Business Phone: 757.865.9610 Fax: 757.865.1533
Person Responsible for Design: J. MICHAEL MILLER
Title: P.E.
Plan Name: WILLIAMSBURG JAMES CITY COUNTY HIGH SCHOOL
Firm's Project No. 131.14A Plan Date: 10.01.95
Sheet No.'s Applicable to SWM/BMP Facility: C12/ C13/ ___/ ___/ ___

Contractor:

Name: A.D. WHITTAKER CONST. INC.
Mailing Address: 11129 AIRPARK ROAD
ASHLAND VIRGINIA 23005
Business Phone: 804.798.3250 Fax: 804.798.8336
Contact Person: DAVID W. HANKY
Site Foreman/Supervisor: WIRT CROSS
Specialty Subcontractors & Purpose (BMP Construction Only): N/A

Revised: 5/13/96

Temporary Sediment Basin Design Data Sheet

(with or without an emergency spillway)

Project: New High School Route 5

Basin # 1 Location: James City County

Total area draining to basin: 15.02 acres

Basin Volume Design

Wet Storage:

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

   67 cu. yds. x 15.02 acres = 1,006 cu. yds.

2. Available basin Volume = 1,143 cu. yds. at elevation 23.78
   (from storage - elevation curve).

3. Excavate 1143 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 15.02 acres = 496 cu. yds.

5. Elevation corresponding to cleanout level = 22.76
   (from storage - elevation curve).

6. Distance from invert of the dewatering orifice to cleanout level = 1.02 ft.
   (Min. = 1.0 ft.) (ok)

Dry Storage:

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

   67 cu. yds. x 15.02 acres = 1,006 cu. yds.

8. Total available basin volume at crest of riser*= 2,888 cu. yds.
at elevation 25.25 (from storage - elevation curve).
which is 192.28 cu. yds/acre of total drainage area
(ok)
* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 6 in.

10. Diameter of PVC Tubing = 6 in. (alternative design).

Preliminary Design Elevations

	w/ Emergency Spillway	w/o Emergency Spillway
11. Crest of Riser =	25.25	25.25
Top of Dam =	27.50	28.25
Design High Water =	26.00	26.25
Upstream Toe of Dam =	21.50	21.50

Basin Shape

12. Length of Flow/Effective Width = 5.38
Baffles are NOT Required

L = 430.00 ft.
We = 80.00 ft.

Runoff

13. Q2 = 15.18 cfs (From Routing Calculations)

14. Q25 = 52.36 cfs (From Routing Calculations)

Principal Spillway Design

15. With emergency spillway, required spillway capacity (riser and barrel), Qp = Q2 = 15.18 cfs

With emergency spillway, required spillway capacity (riser and barrel), Qp = Q25 = 52.36 cfs

16. With Emergency Spillway:

Assume Available Head (h) = 0.75 ft. (Using Q2)

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

Without emergency spillway:

Assume Available Head (h) = 1.00 ft. (Using Q25)

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser Diameter (Dr) = 48 in.

Head on Riser = WS Elevation - Riser Rim Elevation

Actual Head (h), Q2 = 0.20 ft.
Actual Head (h), Q25 = 0.73 ft.

18. Barrel Length (l) = 110.00 ft.

Revisions

19. Barrel Diameter = 27.00 in.

Head on Barrel Through Embankment

Assume:

Ke =	0.65
Tail water Elevation =	23.50
n =	0.013
Area =	3.98 ft.^2
R =	0.56 ft.

Storm, yr.	Q, cfs	Vel., fps	Head, ft.	Elev.	w/Emergency Spillway *
2	15.18	3.82	0.64	24.14	
10	38.66	9.72	4.14	27.64	26.53
25	52.36	13.17	7.59	31.09	27.09

20. Trash rack and anti-vortex device

* see attached

Diameter = 78 inches.

Height = 25 inches.

Emergency Spillway Design

21. Required spillway capacity Qe = Q25 - Qp = 37.18 cfs.

22. Bottom width (b) = 6 ft.; the slope of the exit channel (s) = 3.19% ft./foot; and the minimum length of the exit channel (x) = N/A ft.
Will pass 25 year storm with water surface elevation at 26.93 if spillway becomes completely clogged. Flow will be supercritical.

Anti-Seep Collar Design

23. Depth of water at Principal Spillway crest (Y) = 3.75 ft.

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

Slope of principal spillway barrel (Sb) = 0.45%

Length of barrel in saturated zone (Ls) = 26.73 ft.

24. Number of collars required = 1

Dimension = Use a 7'-5" x 7'-5" collar

Final Design Elevations

25. Top of Dam = 29.00

Design High Water = 25.79

Emergency Spillway Crest = 26.00

Principal Spillway Crest = 25.25

Dewatering Orifice Invert = 23.78

Cleanout Elevation = 22.76

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 21.50

REVISED STORM DRAINAGE CALCULATIONS FOR RISER STRUCTURE BARREL FOR 27" PIPE WJCC HIGH SCHOOL

Governing Equation	Q_T = Qpipe barrel + Qspillway weir = Qp + Qw
Barrel Flow Equation	$$Qp = A\sqrt{\frac{H_T - T_W}{(1+ke)/2g + \frac{n^2L}{2.2082R^{4/3}}}}$$ A = area of pipe = 3.98 ft^2 (27 inch pipe) R = hydraulic radius = 0.56 ft n = 0.013 K_e = 0.65 H_T = water surface elevations T_W = 23.5 ft. L = 110 ft. g = gravity = 32.16 ft/sec^2
Weir Flow Equation	Qw = CL $(H_T - 26.0)^{3/2}$ L = weir length x 6' weir elevation = 26.0 ft. C = weir coefficients 2.4
Plug in Values and Simplify Both Equations	$$Q_P = 3.98\sqrt{\frac{H_T - 23.5}{(1+0.65)/64.32 + \frac{0.013^2 x 110}{2.2082(0.56)^{4/3}}}}$$ $$Qp = 3.95\sqrt{\frac{Ht - 23.5}{0.0439}}$$ <u>Qp = 18.997 $(Ht - 23.5)^{1/2}$</u> Qw = 2.4 * 6 * $(H_T - 26.0)^{3/2}$ <u>Qw= 14.4 $(H_T - 26.0)^{3/2}$</u>
Substitute into Governing Equation	<u>Q_T = 18.997 $(H_T - 23.5)^{1/2}$ + 14.4 $(H_T - 26.0)^{3/2}$</u>

REVISED STORM DRAINAGE CALCULATIONS FOR RISER STRUCTURE BARREL FOR 27" PIPE WJCC HIGH SCHOOL

Solutions	Q_T = 38.66 for 10 year storm H_T, Ft — Q_T, cfs 26.5 — 37.99 26.75 — 43.60
10 Year Storm	Solution: TRY: H_T = 26.53 FT. Q_T = 38.62 cfs (OK) Q_P = 33.07 cfs Q_W = 5.56 cfs = 1.75 ft/sec. V_W = 5.56/(6 * 0.53) = 1.75 ft/sec.
25 Year Storm	Q_T = 52.36 cfs for 25 year storm Solution: TRY: H_T = 27.09 ft. Q_T = 52.36 cfs (OK) Q_P = 35.99 cfs Q_W = 16.37 cfs V_W = 2.50 ft/sec.

	REM.	PTS
COST ↑ • DRY SWALE (60%)		10

- GRADES TOO FLAT FOR STORAGE
- FILL ON SITE NOT SUITABLE FOR ELEVATING SUBGRADE
- IMPORTING 100+ TRUCKS TO RAISE ELEVATION

$\approx \$15{,}000$ + BMP

$$\left(\approx 1 \text{ ACRE} \cdot \frac{6\text{-INCH}}{\frac{12\text{ INCH}}{\text{FT}}} \cdot \frac{43560\text{ FT}^2}{\text{AC}} \cdot \frac{\text{YD}^3}{27\text{ FT}^3} \cdot \frac{\text{TRUCK}}{8\text{ YD}^3}\right)$$

$\approx$ 100 TRUCKLOADS + HANDLING

- BENEFIT IS INCREASED TREATMENT PRIOR TO ENTERING FORESTED AREA.

• WETLANDS → SIMILAR ISSUES

• GRASSED FILTER STRIP
- LITTLE STORAGE REQ'D
- "... PRETREATMENT COMPONENT FOR STRUCTURAL BMP'S IN HIGHER DENSITY DEVELOPMENTS..."
- < 5 ACRES (≈ 1 AC)
- REQUIRE ENERGY DISSIPATORS
- * INFILTRATION LIKELY NOT SUFFICIENT (IMPROVE?)
- WATER TABLE > 2 FT DEPTH (PROBABLY)

½ ACRE PAVEMENT + @ 0.9 = C

10-YR i = 5.8 IN/HR

$C \cdot i \cdot A(AC)$

$= 0.9 \cdot 5.8 \cdot 0.5 = 2.61$ CFS

VS. PRE GOOD WOODS C = 0.3

$= 0.3 \cdot 5.8 \cdot 0.5 = 0.87$ CFS

WEST BASIN
PC132

Storm Water Runoff and Storm Sewer Design Calculations System B

New High School Route 5, Phase 2
Williamsburg-James City County Public Schools

James City County, Virginia

SDN File No. 93032

October 6, 1995

Smith Demer Normann
Engineers - Planners - Surveyors
Six Manhattan Square
Central Park Suite 102
Hampton, Virginia 23666

Design Calculations
Route 5 High School, Phase 2
Project No: 93032

General Description

These calculations cover the design of the stormwater infrastructure, System B, draining to the western most existing sediment basin and the modifications to this basin in Phase 2.

This project involves the development of a 1,250 student high school off of Route 5, John Tyler Highway, in James City County, Virginia. The project will be developed in two phases. The first phase involved the construction of a 800 +/- linear foot entrance road into the site, clearing of the site, and the relocation of an existing select material building pad. The second phase of the project will involve the actual construction of the high school, the parking lots and the athletic fields.

The property is located on a high point relative to the surrounding area. The total acreage of the property is 80.01 acres of which 18.47 acres was disturbed in Phase 1 and another 20 acres will be disturbed in Phase 2.

Presently, the majority of the existing site is wooded and drains to the west toward a swamp area which in turn drains to Powhatan Creek. This swamp area serves as a regional BMP for the surrounding properties. Presently, there are two existing sediment basins located on the property. The southern most sediment basin was constructed in Phase 1. Upon completion of the entire project, both basins will remain in tact to serve as preprocessors to the regional BMP.

Drainage Design Results

The existing sediment basin/BMP was designed to serve 25 acres. System B will drain 15.02 acres to this existing basin and will serve the school building area and parking area.

System A drains the entrance road to the site and the eastern section of the property, approximately 13.19 acres. The calculations for this system was submitted with Phase 1 and the majority of the system was built during Phase 1. Several "branches" of this system will be constructed in Phase 2.

System C will drain the athletic fields, approximately 5.28 acres. System C was designed but not constructed in Phase 1. The calculations for this system was submitted with Phase 1 since it drained to the southern most sediment basin. During the design development of Phase 2 the geometry of this system was modified slightly and some of the invert elevations were changed. Therefore, the calculations for this system submitted in Phase 1 have been revised and are included in Appendix A. The tail water for this system remains unchanged from the previous report, 28.96.

The pipe sizing for the storm sewer infrastructure was performed using the Rational Method and the Manning Equation with n = 0.013. The infrastructure was designed for a 10 year

recurrence interval storm and the Steele coefficients used were A = 201.00 and b = 23.90. The calculations for the pipe sizing are included in Appendix B along with a drainage map.

The tail water elevation, 31.35, used for the System B hydraulic gradeline calculations represents the elevation at 80% of the diameter of the downstream pipe. The routing calculations, below, show that the pond's peak elevation for the 10 year recurrence interval storm is below the invert of the outfall for this system, 28.00. Therefore, the tail water for this system is independent of the pond. Alternatively, the tail water could have been taken as the critical depth of flow in the downstream pipe which would have been at elevation 29.90. The more conservative tail water was chosen for the design calculations.

Sediment Basin Design Results

The outlet structure for the existing west basin must be modified to meet the newer erosion control standards (134 cu. yds. per acre versus 67 cu. yds. per acre) and to handle the increased flows. The shape of the existing basin does not need to be changed, but shall be dredged out after completion of all Phase 2 site work and grading.

The invert elevation of the dewatering device on the new riser pipe outlet structure was selected to provide a 67 cubic yards of permanent pool storage per acre. The design of the basin and the Temporary Sediment Basin Design Data Sheet[1] are included in Appendix C.

The routing through the sediment basin was performed for the 2, 10, and 25 year storms using the computer program PONDOPT[2]. The SCS hydrographs used in the routings were developed using SCSHYDRO[3]. The time of concentration for developing the SCS hydrographs were taken from the calculations for pipe sizing in Appendix B. The results of this program are included in Appendix D and summarized below:

	SCS Hydrograph		
Recurrence Interval Storm	Peak Elev. (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)
2	25.45	27.79	15.18
10	25.79	47.54	38.66
25	25.98	61.76	52.36

1 *Virginia Erosion and Sediment Control Handbook*, Third Edition, 1992, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

2 *Computer-Aided Hydrology & Hydraulics*, by A. Osman Akan, Ph.D., P.E. and John N. Paine, P.E., September, 1993, Akan Paine Incorporated.

3 *Ibid.*

The tail water for the pond outlet barrel was taken as elevation 23.5 for all storms. The normal water surface elevation for the swamp area is elevation 18.5 and is held back by a beaver dam with a weir elevation of the 18.7. From information obtained from the county, the approximate water surface elevation for a 100 year storm is elevation 20.55. The invert of the pipe from the pond is at elevation 20.50. Therefore as customary in culvert calculations, the design tail water is the lesser of the diameter of the pipe (3') or the critical depth of flow in the pipe plus half the diameter of the pipe (1.5'). For the most part, the diameter of the pipe ruled.

The outlet to the pond was checked with the culvert equation:

$$Head_{Reqd} = \left(1 + K_m + \frac{2gn^2L}{2.21R^{4/3}}\right)\frac{V^2}{2g}$$

where $K_m = K_e + K_b = 0.65$ and $n = 0.013$[4]. The following table summarizes the results:

Culvert Calculations				
Design Storm	Q (cfs)	Required Head (ft)	Elev.* (ft)	Velocity (fps)
2	15.18	0.18	23.68	2.15
10	38.66	1.14	24.64	5.47
25	52.36	2.09	25.59	7.41

*Elevation = Required head + tail water elevation

For the 2 year storm the required head elevation is below the invert to the dewatering structure, 23.78, and for the 10 year storm the required head is below the rim for the principal spillway, 25.25. For the 25 year storm, the flow from the pond riser will be controlled by the pipe barrel and not the weir at the top of the riser. Therefore, the peak elevation obtained from the routing equation will be slightly higher and the emergency spillway will convey some of the flow, which is its intended purpose.

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[4] *Virginia Erosion and Sediment Control Handbook*, Third Edition, 1992, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

Appendix A

Revised Calculations for System C

PC133_JAMESTOWN_HIGH_SCHOOL_WEST_&_SOUTH - 023

Storm Drainage Design Computations

James City County High School

System C

Project No: 93032

Data for a 10 Year Storm

Coefficient A = 201.00 Coefficient B = 23.90

FROM	TO	Drain Area acres	Run-off C	CA Incr	CA Accum	tc min	Rain fall in/hr	Runoff Q CFS	Invert Elevation Upper	Invert Elevation Lower	Length feet	Slope ft/ft	Dia in	Cap. cfs	Vel fps	Flow Time min
1	2	0.754	0.68	0.513	0.513	5.0	6.96	3.57	31.83	31.70	42	0.00310	15	3.59	2.93	0.24
2	3	0.703	0.24	0.169	0.681	5.2	6.90	4.70	31.70	31.30	156	0.00256	18	5.32	3.01	0.86
3	5	0.775	0.23	0.178	0.860	6.1	6.70	5.76	31.30	30.98	108	0.00296	18	5.72	3.26	0.55
4	5	0.761	0.37	0.282	0.282	5.0	6.96	1.96	31.58	30.98	185	0.00324	15	3.68	3.00	1.03
5	6	0.764	0.37	0.283	1.424	6.7	6.58	9.37	30.98	28.63	264	0.00890	24	21.34	6.79	0.65
6	7	0.765	0.37	0.283	1.707	7.3	6.44	11.00	28.63	26.98	185	0.00892	24	21.36	6.80	0.45
7	8	0.761	0.37	0.282	1.989	7.8	6.35	12.63	26.98	26.00	110	0.00891	24	21.35	6.80	0.27

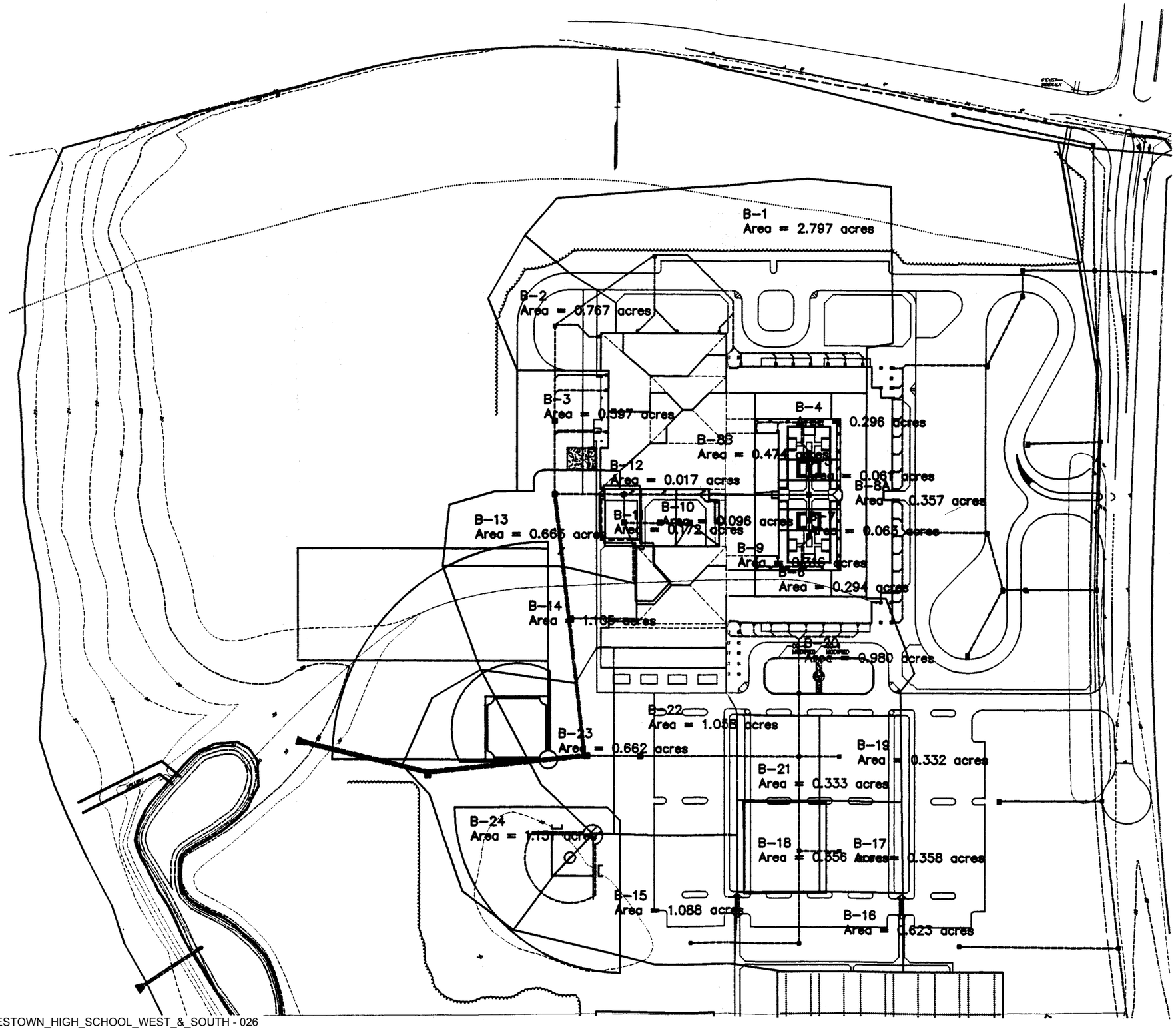
Hydraulic Grade Line Calculations

TailWater Elevation for Pt. 8 = 28.96 ft.

Pt.	Dia	Q	L	Hf	Vo	Ho	Vi	Hi	Ang	Ha	Ht	1.3Ht	0.5Ht	Final Hydraulic H	Grade	Rim
1	15	3.6	42	0.1280	2.93	0.0333	0.00	0.0000	0	0.0000	0.0333	0.0433	0.0166	0.1446	32.34	35.00
2	18	4.7	156	0.3124	3.01	0.0352	2.93	0.0466	90	0.0985	0.1803	0.2343	0.0901	0.4025	32.19	35.31
3	18	5.8	108	0.3247	3.26	0.0412	3.01	0.0492	71	0.1014	0.1919	0.2495	0.0960	0.4207	31.79	35.34
4	15	2.0	185	0.1700	3.00	0.0349	0.00	0.0000	0	0.0000	0.0349	0.0454	0.0174	0.1875	31.56	34.53
5	24	9.4	264	0.4527	6.79	0.1792	3.26	0.0577	90	0.5017	0.7386	0.9602	0.3693	0.8220	31.37	34.53
6	24	11.0	185	0.4371	6.80	0.1795	6.79	0.2509	90	0.5027	0.9331	1.2130	0.4665	0.9037	30.55	34.53
7	24	12.6	110	0.3427	6.80	0.1793	6.80	0.2513	37	0.2511	0.6818	0.8863	0.3409	0.6836	29.64	34.53

Appendix B

System B Drainage Map and Infrastructure Calculations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B-2
Area = 0.767 acres
B-3
Area = 0.597 acres
B-4
Area = 0.296 acres
B-8B
Area = 0.474 acres
B-12
Area = 0.017 acres
Area = 0.061 acres
B-8A
Area = 0.357 acres
B-13
Area = 0.665 acres
B-11
Area = 0.172 acres
B-10
Area = 0.096 acres
Area = 0.063 acres
B-9
Area = 0.346 acres
B-6
Area = 0.294 acres
B-14
Area = 1.135 acres
B-20
Area = 0.980 acres
B-22
Area = 1.058 acres
B-23
Area = 0.662 acres
B-19
Area = 0.332 acres
B-21
Area = 0.333 acres
B-24
Area = 1.151 acres
B-18
Area = 0.356 acres
B-17
Area = 0.358 acres
B-15
Area = 1.088 acres
B-16
Area = 0.623 acres

James City County Schools
Post Development Drainage Areas
Broken Down by System

Runoff Coefficients:

Impervious	*0.90*
Grassed	*0.20*

System A
Entrance Road Catchment Areas

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite C	Total CA
Drop Inlet A-1	1.268	0.204	1.064	0.313	0.396
Drop Inlet A-2	0.263	0.103	0.160	0.474	0.125
Curb Inlet A-3	0.827	0.598	0.229	0.706	0.584
Drop Inlet A-4	0.407	0.152	0.255	0.461	0.188
Drop Inlet A-5	0.928	0.122	0.806	0.292	0.271
Drop Inlet A-6	0.455	0.159	0.296	0.445	0.202
Drop Inlet A-7	0.543	0.190	0.353	0.445	0.242
Drop Inlet A-8	0.310	0.122	0.188	0.475	0.147
Drop Inlet A-9	0.135	0.062	0.073	0.521	0.070
Curb Inlet A-10	0.971	0.672	0.299	0.684	0.665
Drop Inlet A-11	0.354	0.101	0.253	0.400	0.142
Drop Inlet A-12	0.111	0.032	0.079	0.402	0.045
Drop Inlet A-13	0.460	0.122	0.338	0.386	0.177
Drop Inlet A-14	0.449	0.173	0.276	0.470	0.211
Drop Inlet A-15	1.583	0.798	0.785	0.553	0.875
Drop Inlet A-16	0.572	0.048	0.524	0.259	0.148
Drop Inlet A-17	0.912	0.415	0.497	0.519	0.473
Drop Inlet A-18	0.595	0.000	0.595	0.200	0.119
Drop Inlet A-19	1.225	0.178	1.047	0.302	0.370
Drop Inlet A-20	0.822	0.107	0.715	0.291	0.239
System A Totals	**13.190**	**4.358**	**8.832**	**0.431**	**5.689**

James City County Schools
Post Development Drainage Areas
Broken Down by System

System B
Site Catchment Areas

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite C	Total CA
Drop Inlet B-1	2.797	1.056	1.741	0.464	1.299
Drop Inlet B-2	0.767	0.349	0.418	0.519	0.398
Drop Inlet B-3	0.597	0.597	0.000	0.900	0.537
Drop Inlet B-4	0.296	0.162	0.134	0.583	0.173
Drop Inlet B-5	0.061	0.041	0.020	0.667	0.041
Drop Inlet B-6	0.294	0.162	0.132	0.586	0.172
Drop Inlet B-7	0.063	0.042	0.021	0.667	0.042
Drop Inlet B-8	0.831	0.789	0.042	0.865	0.719
Drop Inlet B-9	0.316	0.316	0.000	0.900	0.284
Drop Inlet B-10	0.096	0.096	0.000	0.900	0.086
Drop Inlet B-11	0.172	0.172	0.000	0.900	0.155
Drop Inlet B-12	0.017	0.017	0.000	0.900	0.015
Drop Inlet B-13	0.665	0.042	0.623	0.244	0.162
Drop Inlet B-14	1.105	0.359	0.746	0.427	0.472
Drop Inlet B-15	1.088	0.316	0.772	0.403	0.439
Drop Inlet B-16	0.623	0.284	0.339	0.519	0.323
Drop Inlet B-17	0.358	0.313	0.045	0.812	0.291
Drop Inlet B-18	0.356	0.314	0.042	0.817	0.291
Drop Inlet B-19	0.332	0.293	0.039	0.818	0.272
Curb Inlet B-20	0.980	0.751	0.229	0.736	0.722
Drop Inlet B-21	0.333	0.294	0.039	0.818	0.272
Drop Inlet B-22	1.058	0.725	0.333	0.680	0.719
Drop Inlet B-23	0.662	0.037	0.625	0.239	0.158
Drop Inlet B-24	1.151	0.000	1.151	0.200	0.230
System B Totals	**15.018**	**7.527**	**7.491**	**0.551**	**8.272**

System C
Athletic Field Drainage

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite C	Total CA
Drop Inlet C-1	0.754	0.513	0.241	0.676	0.510
Drop Inlet C-2	0.703	0.044	0.659	0.244	0.171
Drop Inlet C-3	0.775	0.033	0.742	0.229	0.178
Drop Inlet C-4	0.761	0.185	0.576	0.370	0.282
Drop Inlet C-5	0.764	0.185	0.579	0.369	0.282
Drop Inlet C-6	0.765	0.185	0.580	0.369	0.282
Drop Inlet C-7	0.761	0.185	0.576	0.370	0.282
System C Totals	**5.283**	**1.329**	**3.954**	**0.376**	**1.987**

James City County Schools
Post Development Drainage Areas
Broken Down by System

Runoff Coefficients:

Impervious	*98.00*
Grassed	*78.00*

System A
Entrance Road Catchment Areas

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite CN	Total CN*A
Drop Inlet A-1	1.268	0.204	1.064	81.218	102.984
Drop Inlet A-2	0.263	0.103	0.160	85.833	22.574
Curb Inlet A-3	0.827	0.598	0.229	92.462	76.466
Drop Inlet A-4	0.407	0.152	0.255	85.469	34.786
Drop Inlet A-5	0.928	0.122	0.806	80.629	74.824
Drop Inlet A-6	0.455	0.159	0.296	84.989	38.670
Drop Inlet A-7	0.543	0.190	0.353	84.998	46.154
Drop Inlet A-8	0.310	0.122	0.188	85.871	26.620
Drop Inlet A-9	0.135	0.062	0.073	87.185	11.770
Curb Inlet A-10	0.971	0.672	0.299	91.841	89.178
Drop Inlet A-11	0.354	0.101	0.253	83.706	29.632
Drop Inlet A-12	0.111	0.032	0.079	83.766	9.298
Drop Inlet A-13	0.460	0.122	0.338	83.304	38.320
Drop Inlet A-14	0.449	0.173	0.276	85.706	38.482
Drop Inlet A-15	1.583	0.798	0.785	88.082	139.434
Drop Inlet A-16	0.572	0.048	0.524	79.678	45.576
Drop Inlet A-17	0.912	0.415	0.497	87.101	79.436
Drop Inlet A-18	0.595	0.000	0.595	78.000	46.410
Drop Inlet A-19	1.225	0.178	1.047	80.906	99.110
Drop Inlet A-20	0.822	0.107	0.715	80.603	66.256
System A Totals	**13.190**	**4.358**	**8.832**	**84.608**	**1115.980**

James City County Schools
Post Development Drainage Areas
Broken Down by System

System B
Site Catchment Areas

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite CN	Total CN*A
Drop Inlet B-1	2.797	1.056	1.741	85.551	239.286
Drop Inlet B-2	0.767	0.349	0.418	87.100	66.806
Drop Inlet B-3	0.597	0.597	0.000	98.000	58.506
Drop Inlet B-4	0.296	0.162	0.134	88.946	26.328
Drop Inlet B-5	0.061	0.041	0.020	91.333	5.571
Drop Inlet B-6	0.294	0.162	0.132	89.020	26.172
Drop Inlet B-7	0.063	0.042	0.021	91.333	5.754
Drop Inlet B-8	0.831	0.789	0.042	96.989	80.598
Drop Inlet B-9	0.316	0.316	0.000	98.000	30.968
Drop Inlet B-10	0.096	0.096	0.000	98.000	9.408
Drop Inlet B-11	0.172	0.172	0.000	98.000	16.856
Drop Inlet B-12	0.017	0.017	0.000	98.000	1.666
Drop Inlet B-13	0.665	0.042	0.623	79.263	52.710
Drop Inlet B-14	1.105	0.359	0.746	84.498	93.370
Drop Inlet B-15	1.088	0.316	0.772	83.809	91.184
Drop Inlet B-16	0.623	0.284	0.339	87.117	54.274
Drop Inlet B-17	0.358	0.313	0.045	95.486	34.184
Drop Inlet B-18	0.356	0.314	0.042	95.640	34.048
Drop Inlet B-19	0.332	0.293	0.039	95.651	31.756
Curb Inlet B-20	0.980	0.751	0.229	93.327	91.460
Drop Inlet B-21	0.333	0.294	0.039	95.658	31.854
Drop Inlet B-22	1.058	0.725	0.333	91.705	97.024
Drop Inlet B-23	0.662	0.037	0.625	79.118	52.376
Drop Inlet B-24	1.151	0.000	1.151	78.000	89.778
System B Totals	**15.018**	**7.527**	**7.491**	**88.024**	**1321.937**

System C
Athletic Field Drainage

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite CN	Total CN*A
Drop Inlet C-1	0.754	0.513	0.241	91.607	69.072
Drop Inlet C-2	0.703	0.044	0.659	79.254	55.716
Drop Inlet C-3	0.775	0.033	0.742	78.841	61.102
Drop Inlet C-4	0.761	0.185	0.576	82.857	63.054
Drop Inlet C-5	0.764	0.185	0.579	82.838	63.288
Drop Inlet C-6	0.765	0.185	0.580	82.831	63.366
Drop Inlet C-7	0.761	0.185	0.576	82.857	63.054
System C Totals	**5.283**	**1.329**	**3.954**	**83.031**	**438.652**

Storm Drainage Design Computations

James City County High School

System B

Project No: 93032

Data for a 10 Year Storm

Coefficient A = 201.00 Coefficient B = 23.90

FROM	TO	Drain Area acres	Run-off C	CA Incr	CA Accum	tc min	Rain fall in/hr	Runoff Q CFS	Invert Elevation Upper	Invert Elevation Lower	Length feet	Slope ft/ft	Dia in	Cap. cfs	Vel fps	Flow Time min
1	2	2.797	0.46	1.287	1.287	20.0	4.58	5.89	30.29	29.99	175	0.00171	24	9.37	2.98	0.98
2	3	0.767	0.52	0.399	1.685	21.0	4.48	7.55	29.99	29.75	137	0.00175	24	9.47	3.01	0.76
3	13	0.597	0.90	0.537	2.223	21.7	4.40	9.79	29.75	29.61	105	0.00133	30	14.98	3.05	0.57
4	5	0.296	0.58	0.172	0.172	5.0	6.96	1.19	33.72	33.62	23	0.00435	12	2.35	2.99	0.13
5	8	0.061	0.67	0.041	0.213	5.1	6.92	1.47	33.62	33.46	37	0.00432	12	2.34	2.98	0.21
6	7	0.294	0.59	0.173	0.173	5.0	6.96	1.21	33.72	33.62	23	0.00435	12	2.35	2.99	0.13
7	8	0.063	0.67	0.042	0.216	5.1	6.92	1.49	33.62	33.46	37	0.00432	12	2.34	2.98	0.21
8	12	0.831	0.86	0.715	1.143	5.3	6.88	7.86	33.46	33.00	265	0.00174	24	9.43	3.00	1.47
9	10	0.316	0.90	0.284	0.284	5.0	6.96	1.98	34.24	33.99	44	0.00568	12	2.69	3.42	0.21
10	11	0.096	0.90	0.086	0.371	5.2	6.90	2.56	33.99	33.82	52	0.00327	15	3.69	3.01	0.29
11	12	0.172	0.90	0.155	0.526	5.5	6.84	3.59	33.82	33.69	41	0.00317	15	3.64	2.96	0.23
12	13	0.017	0.90	0.015	1.684	6.8	6.55	11.02	33.00	29.61	100	0.03390	30	75.52	15.38	0.11
13	14	0.665	0.24	0.160	4.066	22.3	4.35	17.69	29.61	29.43	180	0.00100	36	21.09	2.98	1.01
14	23	1.105	0.43	0.475	4.541	23.3	4.26	19.33	29.43	28.44	197	0.00503	36	47.28	6.69	0.49
15	16	1.088	0.40	0.435	0.435	15.0	5.17	2.25	31.44	30.76	155	0.00439	12	2.36	3.00	0.86
16	18	0.623	0.52	0.324	0.759	15.9	5.06	3.84	30.76	30.43	132	0.00250	18	5.25	2.97	0.74
17	18	0.358	0.81	0.290	0.290	5.0	6.96	2.02	33.44	33.18	60	0.00433	12	2.35	2.99	0.33
18	21	0.356	0.82	0.292	1.341	16.6	4.96	6.66	30.43	30.19	135	0.00178	24	9.54	3.04	0.74
19	21	0.332	0.82	0.272	0.272	5.0	6.96	1.89	33.47	33.21	60	0.00433	12	2.35	2.99	0.33
20	21	0.960	0.74	0.710	0.710	5.0	6.96	4.94	32.95	32.72	91	0.00253	18	5.28	2.99	0.51
21	22	0.333	0.82	0.273	2.597	17.3	4.87	12.66	30.19	29.44	228	0.00329	30	23.52	4.79	0.79
22	23	1.058	0.68	0.719	3.316	18.1	4.78	15.86	29.44	29.36	81	0.00099	36	20.96	2.97	0.46
23	24	0.662	0.24	0.159	8.016	23.8	4.21	33.78	28.44	28.28	226	0.00071	48	38.22	3.04	1.24
24	25	1.151	0.20	0.230	8.247	25.0	4.11	33.87	28.28	28.15	194	0.00067	48	37.18	2.96	1.09

Hydraulic Grade Line Calculations

TailWater Elevation for Pt. 25 = 31.35 ft.

Pt.	Dia	Q	L	Hf	Vo	Ho	Vi	Hi	Ang	Ha	Ht	1.3Ht	0.5Ht	Final Hydraulic H	Grade	Rim
1	24	5.9	175	0.1187	2.98	0.0345	0.00	0.0000	55	0.0704	0.1049	0.1364	0.0525	0.1711	33.32	33.85
2	24	7.5	137	0.1526	3.01	0.0353	2.98	0.0483	0	0.0000	0.0836	0.1086	0.0418	0.1943	33.15	35.70
3	30	9.8	105	0.0598	3.05	0.0361	3.01	0.0494	7	0.0145	0.1000	0.1300	0.0500	0.1098	32.96	35.70
4	12	1.2	23	0.0258	2.99	0.0347	0.00	0.0000	0	0.0000	0.0347	0.0452	0.0174	0.0432	35.25	36.61
5	12	1.5	37	0.0631	2.98	0.0345	2.99	0.0486	90	0.0967	0.1799	0.2339	0.0899	0.1531	35.20	36.61
6	12	1.2	23	0.0264	2.99	0.0347	0.00	0.0000	0	0.0000	0.0347	0.0452	0.0174	0.0437	35.25	36.61
7	12	1.5	37	0.0650	2.98	0.0345	2.99	0.0486	90	0.0967	0.1799	0.2339	0.0899	0.1550	35.21	36.61
8	24	7.9	265	0.3197	3.00	0.0349	2.98	0.0484	0	0.0000	0.0833	0.1083	0.0417	0.3614	35.05	36.61
9	12	2.0	44	0.1356	3.42	0.0454	0.00	0.0000	0	0.0000	0.0454	0.0590	0.0227	0.1583	35.24	36.80
10	15	2.6	52	0.0817	3.01	0.0352	3.42	0.0635	90	0.0985	0.1972	0.2563	0.0986	0.1803	35.09	36.80
11	15	3.6	41	0.1269	2.96	0.0341	3.01	0.0492	90	0.0955	0.1788	0.2325	0.0894	0.2163	34.91	36.80
12	30	11.0	100	0.0722	15.38	0.9189	3.00	0.0489	90	2.5728	3.5405	4.6027	1.7703	1.8425	34.69	37.50
13	36	17.7	180	0.1266	2.98	0.0346	15.38	1.2864	0	0.0000	1.3210	1.7172	0.6605	0.7871	32.85	35.25
14	36	19.3	197	0.1655	6.69	0.1737	2.98	0.0484	0	0.0000	0.2221	0.2887	0.1110	0.2766	32.06	35.28
15	12	2.2	155	0.6175	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0456	0.0175	0.6351	33.29	34.00
16	18	3.8	132	0.1762	2.97	0.0343	3.00	0.0491	90	0.0960	0.1794	0.2332	0.0897	0.2659	32.65	35.15
17	12	2.0	60	0.1923	2.99	0.0346	0.00	0.0000	90	0.0969	0.1315	0.1710	0.0658	0.2581	34.24	36.00
18	24	6.7	135	0.1169	3.04	0.0358	2.99	0.0485	90	0.1002	0.1844	0.2398	0.0922	0.2091	32.39	36.00
19	12	1.9	60	0.1695	2.99	0.0346	0.00	0.0000	0	0.0000	0.0346	0.0450	0.0173	0.1868	34.20	36.03
20	18	4.9	91	0.2013	2.99	0.0347	0.00	0.0000	90	0.0971	0.1317	0.1713	0.0659	0.2672	34.19	36.01
21	30	12.7	228	0.2171	4.79	0.0892	3.04	0.0501	0	0.0000	0.1393	0.1810	0.0696	0.2867	32.18	36.03
22	36	15.9	81	0.0458	2.97	0.0341	4.79	0.1248	6	0.0137	0.1726	0.2244	0.0863	0.1321	31.89	34.00
23	48	33.8	226	0.1250	3.04	0.0359	6.69	0.2432	20	0.0230	0.3021	0.3927	0.1510	0.2760	31.78	34.00
24	48	33.9	194	0.1078	2.96	0.0340	3.04	0.0503	13	0.0136	0.0979	0.1272	0.0489	0.1568	31.51	34.00

Appendix C

Basin Design Information
&
Temporary Sediment Basin Design Data Sheet

James City County High School
Storm Water Basin Design

Acres Draining to Basin = 15.02 acres

Basin Capacity, 134 cyds/acre = **2,012** **cu. yds.**
54,335 cu. ft.

Permanent Pool Volume = 27,168 cu. ft.
Draw Down Volume = 27,168 cu. ft.

Elevation ft.	Area ft.^2	Area acres	Trapezoid Volume ft.^3	Total Volume ft.^3	Total Volume cu. yd.	Total Volume ac.-ft.	Description of Elevation
21.50	9,978.0	0.229	0				Pond Invert
22.76	11,245.9	0.258	13,392	13,392	496	0.307	Cleanout Mark
23.00	11,485.0	0.264	16,097	16,097	596	0.370	
23.78	26,365.1	0.605	14,762	30,859	1,143	0.708	Dewatering Structure
24.00	30,562.0	0.702	6,262	37,121	1,375	0.852	
25.00	33,798.0	0.776	32,180	69,301	2,567	1.591	
25.25	35,529.0	0.816	8,666	77,967	2,888	1.790	Riser Rim
26.00	40,722.0	0.935	28,594	106,561	3,947	2.446	Emergency Spillway
27.00	43,812.0	1.006	42,267	148,828	5,512	3.417	
28.00	52,717.0	1.210	48,265	197,092	7,300	4.525	

Temporary Sediment Basin Design Data Sheet

(with or without an emergency spillway)

Project: New High School Route 5

Basin # 1 Location: James City County

Total area draining to basin: 15.02 acres

<u>Basin Volume Design</u>

Wet Storage:

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

   67 cu. yds. x 15.02 acres = 1,006 cu. yds.

2. Available basin Volume = 1,143 cu. yds. at elevation 23.78
   (from storage - elevation curve).

3. Excavate 1143 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 15.02 acres = 496 cu. yds.

5. Elevation corresponding to cleanout level = 22.76
   (from storage - elevation curve).

6. Distance from invert of the dewatering orifice to cleanout level = 1.02 ft.
   (Min. = 1.0 ft.) (ok)

Dry Storage:

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

   67 cu. yds. x 15.02 acres = 1,006 cu. yds.

8. Total available basin volume at crest of riser*= 2,888 cu. yds.
at elevation 25.25 (from storage - elevation curve).
which is 192.28 cu. yds/acre of total drainage area
(ok)
* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 6 in.

10. Diameter of PVC Tubing = 6 in. (alternative design).

Preliminary Design Elevations

	w/ Emergency Spillway	w/o Emergency Spillway
11. Crest of Riser =	25.25	25.25
Top of Dam =	27.50	28.25
Design High Water =	26.00	26.25
Upstream Toe of Dam =	21.50	21.50

Basin Shape

12. Length of Flow/Effective Width = 5.38
Baffles are NOT Required

L = 430.00 ft.
We = 80.00 ft.

Runoff

13. Q2 = 15.18 cfs (From Routing Calculations)

14. Q25 = 52.36 cfs (From Routing Calculations)

Principal Spillway Design

15. With emergency spillway, required spillway capacity (riser and barrel), Qp = Q2 = 15.18 cfs

With emergency spillway, required spillway capacity (riser and barrel), Qp = Q25 = 52.36 cfs

16. With Emergency Spillway:

Assume Available Head (h) = 0.75 ft. (Using Q2)

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

Without emergency spillway:

Assume Available Head (h) = 1.00 ft. (Using Q25)

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser Diameter (Dr) = 48 in.

Head on Riser = WS Elevation - Riser Rim Elevation

Actual Head (h), Q2 = 0.20 ft.
Actual Head (h), Q25 = 0.73 ft.

18. Barrel Length (l) = 110.00 ft.

19. Barrel Diameter = 36.00 in.

Head on Barrel Through Embankment

Assume:

Ke =	0.65
Tail water Elevation =	23.50
n =	0.013
Area =	7.07 ft.^2
R =	0.75 ft.

Storm, yr.	Q, cfs	Vel., fps	Head, ft.	Elev.
2	15.18	2.15	0.18	23.68
10	38.66	5.47	1.14	24.64
25	52.36	7.41	2.09	25.59

20. Trash rack and anti-vortex device

Diameter = 78 inches.

Height = 25 inches.

Emergency Spillway Design

21. Required spillway capacity Qe = Q25 - Qp = 37.18 cfs.

22. Bottom width (b) = 6 ft.; the slope of the exit channel (s) = 3.19% ft./foot; and the minimum length of the exit channel (x) = N/A ft.
Will pass 25 year storm with water surface elevation at 26.93 if spillway becomes completely clogged. Flow will be supercritical.

Anti-Seep Collar Design

23. Depth of water at Principal Spillway crest (Y) = 3.75 ft.

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

Slope of principal spillway barrel (Sb) = 0.45%

Length of barrel in saturated zone (Ls) = 26.73 ft.

24. Number of collars required = 1

Dimension = Use a 7'-5" x 7'-5" collar

Final Design Elevations

25. Top of Dam = 29.00

Design High Water = 25.79

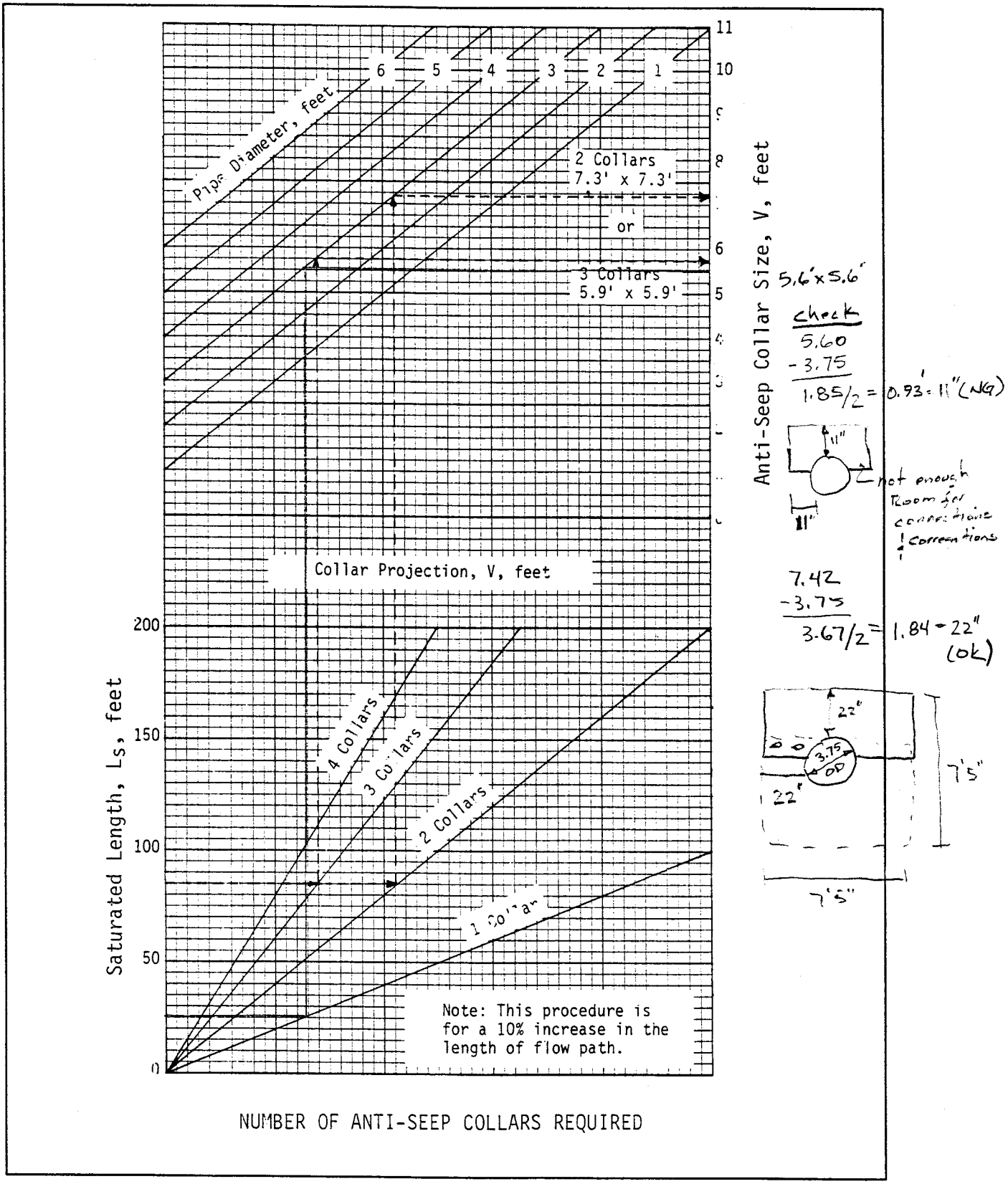
Emergency Spillway Crest = 26.00

Principal Spillway Crest = 25.25

Dewatering Orifice Invert = 23.78

Cleanout Elevation = 22.76

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 21.50



Source: USDA-SCS

Plate 3.14-12

Appendix D

Sediment Basin Simulation From PONDOPT Using SCS Hydrographs From SCSHYDRO

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************
```

PROJECT: New High School Route 5
User: SDN WATER RESOURCES
Date: 10/09/1995 Monday
Time: 15:54:14
Output: POND1.OUT

SOLUTION FOR 3 STORMS.

TIME INCREMENT: .100 Hours

STORM NUMBER	HYDROGRAPH IN FILE:
1	jcc2b.hyd
2	jcc10b.hyd
3	jcc25b.hyd

STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)	TAILWATER STAGE (ft)
1	27.789	N/A	1434.00	.1157E+06	23.500
2	47.541	N/A	1434.00	.2004E+06	23.500
3	61.758	N/A	1434.00	.2627E+06	23.500

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


=========================   OUTLET STRUCTURE          =========================

         STRUCTURE NUMBER 1

               Type 6: ORIFICE
                  DIAMETER:      .50 feet.

               INVERT ELEVATION :    23.78 feet.
                   ORIFICE COEF :     .600

         STRUCTURE NUMBER 2

               Type 4: CIRCULAR STAND PIPE
                  DIAMETER:     4.00 feet.

                CREST ELEVATION :    25.25 feet.
                      WEIR COEF :    3.100
                   ORIFICE COEF :     .600


                Note that the diameter listed here is the EFFECTIVE diameter.
                If this structure will have a grate, make sure the grate has
                this effective diameter (and perimeter).

         STRUCTURE NUMBER 3

               Type 3: RECTANGULAR WEIR OR SPILLWAY
                    LENGTH:     6.00 feet.

                CREST ELEVATION :    26.00 feet.
                 DISCHARGE COEF :    2.400
```

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


Stage-Area
Filename: POND1.DAT

          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   24.030 feet.

==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ==================

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  1      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
23.780	.0000	.0000
24.000	.1436	.0000
25.000	.8823	.9311
25.250	1.081	1.044
26.000	1.737	53.73
27.000	2.708	197.2
28.000	3.814	429.1

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   24.030 feet.

<<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        1    >>>>>>>>>>>>>>>>>>>>>>

    MAXIMUM ELEVATION:    25.45     feet.
       MAXIMUM INFLOW:    27.79     cfs.
      MAXIMUM OUTFLOW:    15.18     cfs.
      MAXIMUM STORAGE:    1.257     acre-feet.

     CONTINUITY ERROR:     .800E-03 percent.
```

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	.000	.000
6	.000	.000
12	.000	.000
18	.000	.000
24	.000	.000
30	.000	.000
36	.000	.000
42	.000	.000
48	.000	.000
54	.000	.000
60	.000	.000
66	.000	.000
72	.000	.000
78	.000	.000
84	.000	.000
90	.000	.000
96	.000	.000
102	.000	.000
108	.000	.000
114	.000	.000
120	.000	.000
126	.000	.000
132	.000	.000
138	.000	.000
144	.000	.000
150	.000	.000
156	.000	.000
162	.000	.000
168	.000	.000
174	.000	.000
180	.000	.000
186	.000	.000
192	.000	.000
198	.000	.000
204	.000	.000
210	.000	.000
216	.000	.000
222	.000	.000
228	.000	.000
234	.000	.000
240	.000	.000
246	.000	.000
252	.000	.000
258	.000	.000
264	.000	.000
270	.000	.000
276	.000	.000
282	.000	.000
288	.000	.000
294	.000	.000
300	.000	.000
306	.000	.000

312	.000	.000
318	.000	.000
324	.000	.000
330	.000	.000
336	.000	.000
342	.000	.000
348	.000	.000
354	.000	.000
360	.000	.000
366	.000	.000
372	.001	.000
378	.002	.000
384	.006	.000
390	.011	.000
396	.018	.000
402	.024	.001
408	.032	.001
414	.039	.001
420	.046	.002
426	.055	.002
432	.065	.003
438	.078	.004
444	.090	.004
450	.102	.005
456	.113	.006
462	.124	.008
468	.134	.009
474	.144	.010
480	.154	.012
486	.166	.013
492	.181	.015
498	.200	.017
504	.219	.019
510	.235	.021
516	.251	.024
522	.268	.026
528	.287	.029
534	.305	.032
540	.321	.035
546	.338	.038
552	.362	.041
558	.389	.045
564	.415	.048
570	.438	.053
576	.460	.057
582	.489	.061
588	.522	.066
594	.553	.071
600	.579	.076
606	.611	.082
612	.665	.088
618	.730	.094
624	.792	.101
630	.840	.109
636	.898	.117
642	.991	.126
648	1.107	.136
654	1.214	.147
660	1.297	.158
666	1.408	.171
672	1.611	.186
678	1.870	.202
684	2.110	.221
690	2.292	.242
696	2.754	.267
702	3.919	.299
708	6.420	.351
714	11.850	.445
720	20.523	.613
726	27.683	.863
732	27.789	1.027
738	22.294	11.213
744	16.069	15.184
750	11.963	14.602
756	9.470	12.666
762	7.541	10.593
768	6.007	8.690
774	4.896	7.076
780	4.220	5.822
786	3.781	4.914

792	3.389	4.252
798	3.008	3.727
804	2.730	3.299
810	2.575	2.977
816	2.465	2.749
822	2.326	2.573
828	2.172	2.412
834	2.046	2.261
840	1.968	2.134
846	1.895	2.033
852	1.777	1.935
858	1.635	1.821
864	1.516	1.699
870	1.440	1.589
876	1.397	1.504
882	1.372	1.444
888	1.357	1.405
894	1.349	1.379
900	1.345	1.363
906	1.343	1.354
912	1.342	1.348
918	1.342	1.345
924	1.342	1.344
930	1.343	1.343
936	1.344	1.343
942	1.344	1.344
948	1.345	1.344
954	1.346	1.345
960	1.347	1.346
966	1.318	1.339
972	1.225	1.305
978	1.097	1.233
984	.984	1.137
990	.912	1.044
996	.871	1.044
1002	.847	1.043
1008	.832	1.042
1014	.824	1.041
1020	.819	1.040
1026	.816	1.039
1032	.815	1.038
1038	.814	1.037
1044	.813	1.035
1050	.814	1.034
1056	.814	1.033
1062	.814	1.032
1068	.814	1.031
1074	.815	1.030
1080	.815	1.029
1086	.815	1.028
1092	.816	1.027
1098	.816	1.026
1104	.816	1.025
1110	.816	1.024
1116	.817	1.023
1122	.817	1.022
1128	.817	1.021
1134	.818	1.021
1140	.818	1.020
1146	.818	1.019
1152	.818	1.018
1158	.819	1.017
1164	.819	1.016
1170	.819	1.015
1176	.819	1.014
1182	.820	1.013
1188	.820	1.012
1194	.820	1.011
1200	.821	1.010
1206	.806	1.009
1212	.758	1.008
1218	.693	1.007
1224	.636	1.005
1230	.600	1.004
1236	.579	1.002
1242	.566	1.000
1248	.559	.998
1254	.554	.996
1260	.552	.993
1266	.550	.991

1272	.550	.989
1278	.549	.987
1284	.549	.985
1290	.549	.983
1296	.549	.981
1302	.549	.979
1308	.549	.977
1314	.549	.975
1320	.550	.973
1326	.550	.971
1332	.550	.969
1338	.550	.967
1344	.550	.965
1350	.550	.963
1356	.550	.961
1362	.550	.959
1368	.550	.958
1374	.550	.956
1380	.551	.954
1386	.551	.952
1392	.551	.950
1398	.551	.948
1404	.551	.946
1410	.551	.944
1416	.551	.943
1422	.551	.941
1428	.551	.939
1434	.552	.937
1440	.000	.934
1446	.000	.928
1452	.000	.918
1458	.000	.908
1464	.000	.898
1470	.000	.889
1476	.000	.879
1482	.000	.870
1488	.000	.860
1494	.000	.851
1500	.000	.842
1506	.000	.833
1512	.000	.824
1518	.000	.816
1524	.000	.807
1530	.000	.798
1536	.000	.790
1542	.000	.781
1548	.000	.773
1554	.000	.765
1560	.000	.757
1566	.000	.748
1572	.000	.740
1578	.000	.733
1584	.000	.725
1590	.000	.717
1596	.000	.709
1602	.000	.702
1608	.000	.694
1614	.000	.687
1620	.000	.680
1626	.000	.672
1632	.000	.665
1638	.000	.658
1644	.000	.651
1650	.000	.644
1656	.000	.637
1662	.000	.630
1668	.000	.624
1674	.000	.617
1680	.000	.611
1686	.000	.604
1692	.000	.598
1698	.000	.591
1704	.000	.585
1710	.000	.579
1716	.000	.572
1722	.000	.566
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1734	.000	.554
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1764	.000	.525
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1776	.000	.514
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1794	.000	.498
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1812	.000	.482
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1878	.000	.429
1884	.000	.424
1890	.000	.419
1896	.000	.415
1902	.000	.411
1908	.000	.406
1914	.000	.402
1920	.000	.398
1926	.000	.393
1932	.000	.389
1938	.000	.385
1944	.000	.381
1950	.000	.377
1956	.000	.373
1962	.000	.369
1968	.000	.365
1974	.000	.361
1980	.000	.357
1986	.000	.353
1992	.000	.350
1998	.000	.346
2004	.000	.342
2010	.000	.338
2016	.000	.335
2022	.000	.331
2028	.000	.328
2034	.000	.324
2040	.000	.321
2046	.000	.317
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2058	.000	.311
2064	.000	.307
2070	.000	.304
2076	.000	.301
2082	.000	.298
2088	.000	.294
2094	.000	.291
2100	.000	.288
2106	.000	.285
2112	.000	.282
2118	.000	.279
2124	.000	.276
2130	.000	.273
2136	.000	.270
2142	.000	.267
2148	.000	.265
2154	.000	.262
2160	.000	.259
2166	.000	.256
2172	.000	.253
2178	.000	.251
2184	.000	.248
2190	.000	.245
2196	.000	.243
2202	.000	.240
2208	.000	.238
2214	.000	.235
2220	.000	.233
2226	.000	.230

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2238	.000	.225
2244	.000	.223
2250	.000	.220
2256	.000	.218
2262	.000	.216
2268	.000	.213
2274	.000	.211
2280	.000	.209
2286	.000	.207
2292	.000	.204
2298	.000	.202
2304	.000	.200
2310	.000	.198
2316	.000	.196
2322	.000	.194
2328	.000	.192
2334	.000	.190
2340	.000	.188
2346	.000	.186
2352	.000	.184
2358	.000	.182
2364	.000	.180
2370	.000	.178
2376	.000	.176
2382	.000	.174
2388	.000	.172
2394	.000	.170
2400	.000	.169
2406	.000	.167
2412	.000	.165
2418	.000	.163
2424	.000	.162
2430	.000	.160
2436	.000	.158
2442	.000	.156
2448	.000	.155
2454	.000	.153
2460	.000	.151
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2472	.000	.148
2478	.000	.147
2484	.000	.145
2490	.000	.144
2496	.000	.142
2502	.000	.140
2508	.000	.139
2514	.000	.138
2520	.000	.136
2526	.000	.135
2532	.000	.133
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2544	.000	.130
2550	.000	.129
2556	.000	.128
2562	.000	.126
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2574	.000	.124
2580	.000	.122
2586	.000	.121
2592	.000	.120
2598	.000	.118
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2622	.000	.113
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2634	.000	.111
2640	.000	.110
2646	.000	.109
2652	.000	.107
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2664	.000	.105
2670	.000	.104
2676	.000	.103
2682	.000	.102
2688	.000	.101
2694	.000	.100
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2856	.000	.075
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2880	.000	.071
2886	.000	.071
2892	.000	.070
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2910	.000	.068
2916	.000	.067
2922	.000	.066
2928	.000	.066
2934	.000	.065
2940	.000	.064
2946	.000	.064
2952	.000	.063
2958	.000	.062
2964	.000	.062
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3018	.000	.056
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3066	.000	.051
3072	.000	.051
3078	.000	.050
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3096	.000	.049
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3204	.000	.040
3210	.000	.040
3216	.000	.039
3222	.000	.039
3228	.000	.038
3234	.000	.038
3240	.000	.038
3246	.000	.037
3252	.000	.037
3258	.000	.036
3264	.000	.036
3270	.000	.036
3276	.000	.035
3282	.000	.035
3288	.000	.034
3294	.000	.034
3300	.000	.034
3306	.000	.033
3312	.000	.033
3318	.000	.033
3324	.000	.032
3330	.000	.032
3336	.000	.032
3342	.000	.031
3348	.000	.031
3354	.000	.031
3360	.000	.030
3366	.000	.030
3372	.000	.030
3378	.000	.029
3384	.000	.029
3390	.000	.029
3396	.000	.028
3402	.000	.028
3408	.000	.028
3414	.000	.028
3420	.000	.027
3426	.000	.027
3432	.000	.027
3438	.000	.026
3444	.000	.026
3450	.000	.026
3456	.000	.026
3462	.000	.025
3468	.000	.025
3474	.000	.025
3480	.000	.024
3486	.000	.024
3492	.000	.024
3498	.000	.024
3504	.000	.023
3510	.000	.023
3516	.000	.023
3522	.000	.023
3528	.000	.022
3534	.000	.022
3540	.000	.022
3546	.000	.022
3552	.000	.022
3558	.000	.021
3564	.000	.021
3570	.000	.021
3576	.000	.021
3582	.000	.020
3588	.000	.020
3594	.000	.020
3600	.000	.020
3606	.000	.020
3612	.000	.019
3618	.000	.019
3624	.000	.019
3630	.000	.019
3636	.000	.019
3642	.000	.018
3648	.000	.018
3654	.000	.018
3660	.000	.018
3666	.000	.018

3672	.000	.017
3678	.000	.017
3684	.000	.017
3690	.000	.017
3696	.000	.017
3702	.000	.016
3708	.000	.016
3714	.000	.016
3720	.000	.016
3726	.000	.016
3732	.000	.016
3738	.000	.015
3744	.000	.015
3750	.000	.015
3756	.000	.015
3762	.000	.015
3768	.000	.015
3774	.000	.014
3780	.000	.014
3786	.000	.014
3792	.000	.014
3798	.000	.014
3804	.000	.014
3810	.000	.014
3816	.000	.013
3822	.000	.013
3828	.000	.013
3834	.000	.013
3840	.000	.013
3846	.000	.013
3852	.000	.013
3858	.000	.012
3864	.000	.012
3870	.000	.012
3876	.000	.012
3882	.000	.012
3888	.000	.012
3894	.000	.012
3900	.000	.012
3906	.000	.011
3912	.000	.011
3918	.000	.011
3924	.000	.011
3930	.000	.011
3936	.000	.011
3942	.000	.011
3948	.000	.011
3954	.000	.010
3960	.000	.010
3966	.000	.010
3972	.000	.010
3978	.000	.010
3984	.000	.010
3990	.000	.010
3996	.000	.010
4002	.000	.010
4008	.000	.010
4014	.000	.009
4020	.000	.009
4026	.000	.009
4032	.000	.009
4038	.000	.009
4044	.000	.009
4050	.000	.009
4056	.000	.009
4062	.000	.009
4068	.000	.009
4074	.000	.008
4080	.000	.008
4086	.000	.008
4092	.000	.008
4098	.000	.008
4104	.000	.008
4110	.000	.008
4116	.000	.008
4122	.000	.008
4128	.000	.008
4134	.000	.008
4140	.000	.008
4146	.000	.007

4152	.000	.007
4158	.000	.007
4164	.000	.007
4170	.000	.007
4176	.000	.007
4182	.000	.007
4188	.000	.007
4194	.000	.007
4200	.000	.007
4206	.000	.007
4212	.000	.007
4218	.000	.007
4224	.000	.006
4230	.000	.006
4236	.000	.006
4242	.000	.006
4248	.000	.006
4254	.000	.006
4260	.000	.006
4266	.000	.006
4272	.000	.006
4278	.000	.006
4284	.000	.006
4290	.000	.006
4296	.000	.006
4302	.000	.006
4308	.000	.006
4314	.000	.006
4320	.000	.005

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


Stage-Area
Filename: POND1.DAT

          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   24.030 feet.

==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ===================

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  2      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
23.780	.0000	.0000
24.000	.1436	.0000
25.000	.8823	.9311
25.250	1.081	1.044
26.000	1.737	53.73
27.000	2.708	197.2
28.000	3.814	429.1

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   24.030 feet.

<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        2    >>>>>>>>>>>>>>>>>>>>>>

    MAXIMUM ELEVATION:    25.79     feet.
       MAXIMUM INFLOW:    47.54     cfs.
      MAXIMUM OUTFLOW:    38.66     cfs.
      MAXIMUM STORAGE:    1.550     acre-feet.

     CONTINUITY ERROR:     .549E-03 percent.
```

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	.000	.000
6	.000	.000
12	.000	.000
18	.000	.000
24	.000	.000
30	.000	.000
36	.000	.000
42	.000	.000
48	.000	.000
54	.000	.000
60	.000	.000
66	.000	.000
72	.000	.000
78	.000	.000
84	.000	.000
90	.000	.000
96	.000	.000
102	.000	.000
108	.000	.000
114	.000	.000
120	.000	.000
126	.000	.000
132	.000	.000
138	.000	.000
144	.000	.000
150	.000	.000
156	.000	.000
162	.000	.000
168	.000	.000
174	.000	.000
180	.000	.000
186	.000	.000
192	.000	.000
198	.000	.000
204	.000	.000
210	.000	.000
216	.000	.000
222	.000	.000
228	.000	.000
234	.000	.000
240	.000	.000
246	.000	.000
252	.000	.000
258	.000	.000
264	.000	.000
270	.001	.000
276	.003	.000
282	.009	.000
288	.018	.000
294	.029	.000
300	.041	.001
306	.053	.001

312	.066	.002
318	.079	.003
324	.091	.004
330	.104	.005
336	.116	.006
342	.129	.007
348	.141	.008
354	.153	.010
360	.164	.011
366	.178	.013
372	.194	.015
378	.212	.017
384	.230	.019
390	.246	.021
396	.261	.024
402	.275	.027
408	.289	.029
414	.302	.032
420	.314	.035
426	.331	.038
432	.358	.041
438	.391	.045
444	.422	.049
450	.448	.053
456	.470	.057
462	.490	.062
468	.507	.066
474	.524	.071
480	.540	.076
486	.562	.081
492	.596	.086
498	.639	.092
504	.678	.098
510	.711	.105
516	.741	.111
522	.775	.118
528	.811	.125
534	.844	.133
540	.873	.141
546	.905	.148
552	.951	.157
558	1.006	.166
564	1.057	.175
570	1.097	.184
576	1.138	.194
582	1.193	.205
588	1.256	.216
594	1.313	.227
600	1.359	.239
606	1.418	.251
612	1.522	.264
618	1.653	.278
624	1.772	.294
630	1.860	.310
636	1.965	.327
642	2.145	.345
648	2.368	.366
654	2.569	.388
660	2.717	.412
666	2.916	.438
672	3.296	.466
678	3.782	.499
684	4.221	.536
690	4.536	.577
696	5.367	.624
702	7.495	.686
708	11.972	.782
714	21.385	.940
720	35.943	3.810
726	47.541	22.711
732	47.170	34.990
738	37.553	38.663
744	26.908	35.458
750	19.903	29.453
756	15.649	23.634
762	12.392	18.844
768	9.827	14.990
774	7.978	11.957
780	6.852	9.694
786	6.120	8.095

792	5.471	6.949
798	4.845	6.057
804	4.390	5.340
810	4.137	4.803
816	3.958	4.427
822	3.732	4.137
828	3.482	3.873
834	3.278	3.627
840	3.152	3.422
846	3.034	3.258
852	2.843	3.099
858	2.615	2.915
864	2.423	2.717
870	2.302	2.541
876	2.232	2.404
882	2.191	2.308
888	2.167	2.244
894	2.153	2.202
900	2.145	2.176
906	2.141	2.159
912	2.139	2.150
918	2.138	2.144
924	2.138	2.141
930	2.138	2.140
936	2.139	2.139
942	2.140	2.139
948	2.141	2.140
954	2.142	2.141
960	2.142	2.141
966	2.096	2.130
972	1.947	2.076
978	1.743	1.961
984	1.564	1.808
990	1.450	1.658
996	1.384	1.538
1002	1.344	1.451
1008	1.321	1.392
1014	1.308	1.353
1020	1.300	1.329
1026	1.295	1.313
1032	1.293	1.304
1038	1.291	1.298
1044	1.290	1.294
1050	1.290	1.292
1056	1.290	1.291
1062	1.291	1.291
1068	1.291	1.291
1074	1.291	1.291
1080	1.291	1.291
1086	1.292	1.291
1092	1.292	1.292
1098	1.292	1.292
1104	1.292	1.292
1110	1.293	1.292
1116	1.293	1.293
1122	1.293	1.293
1128	1.293	1.293
1134	1.294	1.293
1140	1.294	1.294
1146	1.294	1.294
1152	1.294	1.294
1158	1.295	1.294
1164	1.295	1.295
1170	1.295	1.295
1176	1.295	1.295
1182	1.296	1.295
1188	1.296	1.296
1194	1.296	1.296
1200	1.296	1.296
1206	1.273	1.290
1212	1.198	1.263
1218	1.095	1.205
1224	1.004	1.127
1230	.947	1.052
1236	.913	1.044
1242	.893	1.043
1248	.882	1.042
1254	.875	1.042
1260	.871	1.041
1266	.869	1.040

1272	.867	1.039
1278	.866	1.038
1284	.866	1.038
1290	.866	1.037
1296	.866	1.036
1302	.866	1.035
1308	.866	1.034
1314	.866	1.034
1320	.866	1.033
1326	.866	1.032
1332	.866	1.031
1338	.867	1.030
1344	.867	1.030
1350	.867	1.029
1356	.867	1.028
1362	.867	1.027
1368	.867	1.027
1374	.867	1.026
1380	.867	1.025
1386	.867	1.024
1392	.867	1.024
1398	.868	1.023
1404	.868	1.022
1410	.868	1.022
1416	.868	1.021
1422	.868	1.020
1428	.868	1.019
1434	.868	1.019
1440	.000	1.016
1446	.000	1.011
1452	.000	1.006
1458	.000	1.002
1464	.000	.997
1470	.000	.992
1476	.000	.988
1482	.000	.983
1488	.000	.978
1494	.000	.974
1500	.000	.969
1506	.000	.965
1512	.000	.960
1518	.000	.956
1524	.000	.951
1530	.000	.947
1536	.000	.942
1542	.000	.938
1548	.000	.934
1554	.000	.927
1560	.000	.917
1566	.000	.907
1572	.000	.897
1578	.000	.888
1584	.000	.878
1590	.000	.869
1596	.000	.860
1602	.000	.850
1608	.000	.841
1614	.000	.832
1620	.000	.824
1626	.000	.815
1632	.000	.806
1638	.000	.797
1644	.000	.789
1650	.000	.781
1656	.000	.772
1662	.000	.764
1668	.000	.756
1674	.000	.748
1680	.000	.740
1686	.000	.732
1692	.000	.724
1698	.000	.716
1704	.000	.709
1710	.000	.701
1716	.000	.694
1722	.000	.686
1728	.000	.679
1734	.000	.672
1740	.000	.665
1746	.000	.657

1752	.000	.650
1758	.000	.644
1764	.000	.637
1770	.000	.630
1776	.000	.623
1782	.000	.617
1788	.000	.610
1794	.000	.603
1800	.000	.597
1806	.000	.591
1812	.000	.584
1818	.000	.578
1824	.000	.572
1830	.000	.566
1836	.000	.560
1842	.000	.554
1848	.000	.548
1854	.000	.542
1860	.000	.536
1866	.000	.531
1872	.000	.525
1878	.000	.519
1884	.000	.514
1890	.000	.508
1896	.000	.503
1902	.000	.498
1908	.000	.492
1914	.000	.487
1920	.000	.482
1926	.000	.477
1932	.000	.472
1938	.000	.467
1944	.000	.462
1950	.000	.457
1956	.000	.452
1962	.000	.447
1968	.000	.442
1974	.000	.437
1980	.000	.433
1986	.000	.428
1992	.000	.424
1998	.000	.419
2004	.000	.415
2010	.000	.410
2016	.000	.406
2022	.000	.401
2028	.000	.397
2034	.000	.393
2040	.000	.389
2046	.000	.385
2052	.000	.381
2058	.000	.376
2064	.000	.372
2070	.000	.368
2076	.000	.365
2082	.000	.361
2088	.000	.357
2094	.000	.353
2100	.000	.349
2106	.000	.346
2112	.000	.342
2118	.000	.338
2124	.000	.335
2130	.000	.331
2136	.000	.327
2142	.000	.324
2148	.000	.321
2154	.000	.317
2160	.000	.314
2166	.000	.310
2172	.000	.307
2178	.000	.304
2184	.000	.301
2190	.000	.297
2196	.000	.294
2202	.000	.291
2208	.000	.288
2214	.000	.285
2220	.000	.282
2226	.000	.279

2232	.000	.276
2238	.000	.273
2244	.000	.270
2250	.000	.267
2256	.000	.264
2262	.000	.261
2268	.000	.259
2274	.000	.256
2280	.000	.253
2286	.000	.250
2292	.000	.248
2298	.000	.245
2304	.000	.243
2310	.000	.240
2316	.000	.237
2322	.000	.235
2328	.000	.232
2334	.000	.230
2340	.000	.227
2346	.000	.225
2352	.000	.223
2358	.000	.220
2364	.000	.218
2370	.000	.216
2376	.000	.213
2382	.000	.211
2388	.000	.209
2394	.000	.206
2400	.000	.204
2406	.000	.202
2412	.000	.200
2418	.000	.198
2424	.000	.196
2430	.000	.194
2436	.000	.192
2442	.000	.190
2448	.000	.187
2454	.000	.185
2460	.000	.184
2466	.000	.182
2472	.000	.180
2478	.000	.178
2484	.000	.176
2490	.000	.174
2496	.000	.172
2502	.000	.170
2508	.000	.168
2514	.000	.167
2520	.000	.165
2526	.000	.163
2532	.000	.161
2538	.000	.160
2544	.000	.158
2550	.000	.156
2556	.000	.155
2562	.000	.153
2568	.000	.151
2574	.000	.150
2580	.000	.148
2586	.000	.147
2592	.000	.145
2598	.000	.143
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2622	.000	.137
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2634	.000	.134
2640	.000	.133
2646	.000	.132
2652	.000	.130
2658	.000	.129
2664	.000	.127
2670	.000	.126
2676	.000	.125
2682	.000	.123
2688	.000	.122
2694	.000	.121
2700	.000	.120
2706	.000	.118

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2730	.000	.113
2736	.000	.112
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2850	.000	.091
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2898	.000	.084
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3120	.000	.056
3126	.000	.056
3132	.000	.055
3138	.000	.055
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3168	.000	.052
3174	.000	.051
3180	.000	.051
3186	.000	.050

3192	.000	.050
3198	.000	.049
3204	.000	.049
3210	.000	.048
3216	.000	.048
3222	.000	.047
3228	.000	.047
3234	.000	.046
3240	.000	.046
3246	.000	.045
3252	.000	.045
3258	.000	.044
3264	.000	.044
3270	.000	.043
3276	.000	.043
3282	.000	.042
3288	.000	.042
3294	.000	.041
3300	.000	.041
3306	.000	.040
3312	.000	.040
3318	.000	.040
3324	.000	.039
3330	.000	.039
3336	.000	.038
3342	.000	.038
3348	.000	.038
3354	.000	.037
3360	.000	.037
3366	.000	.036
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3426	.000	.033
3432	.000	.032
3438	.000	.032
3444	.000	.032
3450	.000	.031
3456	.000	.031
3462	.000	.031
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3480	.000	.030
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3498	.000	.029
3504	.000	.028
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3516	.000	.028
3522	.000	.028
3528	.000	.027
3534	.000	.027
3540	.000	.027
3546	.000	.026
3552	.000	.026
3558	.000	.026
3564	.000	.026
3570	.000	.025
3576	.000	.025
3582	.000	.025
3588	.000	.024
3594	.000	.024
3600	.000	.024
3606	.000	.024
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3624	.000	.023
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3636	.000	.022
3642	.000	.022
3648	.000	.022
3654	.000	.022
3660	.000	.021
3666	.000	.021

3672	.000	.021
3678	.000	.021
3684	.000	.021
3690	.000	.020
3696	.000	.020
3702	.000	.020
3708	.000	.020
3714	.000	.020
3720	.000	.019
3726	.000	.019
3732	.000	.019
3738	.000	.019
3744	.000	.018
3750	.000	.018
3756	.000	.018
3762	.000	.018
3768	.000	.018
3774	.000	.018
3780	.000	.017
3786	.000	.017
3792	.000	.017
3798	.000	.017
3804	.000	.017
3810	.000	.016
3816	.000	.016
3822	.000	.016
3828	.000	.016
3834	.000	.016
3840	.000	.016
3846	.000	.015
3852	.000	.015
3858	.000	.015
3864	.000	.015
3870	.000	.015
3876	.000	.015
3882	.000	.014
3888	.000	.014
3894	.000	.014
3900	.000	.014
3906	.000	.014
3912	.000	.014
3918	.000	.014
3924	.000	.013
3930	.000	.013
3936	.000	.013
3942	.000	.013
3948	.000	.013
3954	.000	.013
3960	.000	.013
3966	.000	.012
3972	.000	.012
3978	.000	.012
3984	.000	.012
3990	.000	.012
3996	.000	.012
4002	.000	.012
4008	.000	.012
4014	.000	.011
4020	.000	.011
4026	.000	.011
4032	.000	.011
4038	.000	.011
4044	.000	.011
4050	.000	.011
4056	.000	.011
4062	.000	.010
4068	.000	.010
4074	.000	.010
4080	.000	.010
4086	.000	.010
4092	.000	.010
4098	.000	.010
4104	.000	.010
4110	.000	.010
4116	.000	.010
4122	.000	.009
4128	.000	.009
4134	.000	.009
4140	.000	.009
4146	.000	.009

4152	.000	.009
4158	.000	.009
4164	.000	.009
4170	.000	.009
4176	.000	.009
4182	.000	.008
4188	.000	.008
4194	.000	.008
4200	.000	.008
4206	.000	.008
4212	.000	.008
4218	.000	.008
4224	.000	.008
4230	.000	.008
4236	.000	.008
4242	.000	.008
4248	.000	.008
4254	.000	.007
4260	.000	.007
4266	.000	.007
4272	.000	.007
4278	.000	.007
4284	.000	.007
4290	.000	.007
4296	.000	.007
4302	.000	.007
4308	.000	.007
4314	.000	.007
4320	.000	.007

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


Stage-Area
Filename: POND1.DAT

          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   24.030 feet.

==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ===================

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  3      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
23.780	.0000	.0000
24.000	.1436	.0000
25.000	.8823	.9311
25.250	1.081	1.044
26.000	1.737	53.73
27.000	2.708	197.2
28.000	3.814	429.1

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: New High School Route 5
   User: SDN WATER RESOURCES
   Date: 10/09/1995    Monday
   Time: 15:54:14
 Output: POND1.OUT


          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   24.030 feet.

<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        3    >>>>>>>>>>>>>>>>>>>>>>

    MAXIMUM ELEVATION:    25.98     feet.
       MAXIMUM INFLOW:    61.76     cfs.
      MAXIMUM OUTFLOW:    52.36     cfs.
      MAXIMUM STORAGE:    1.720     acre-feet.

     CONTINUITY ERROR:     .478E-03 percent.
```

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	.000	.000
6	.000	.000
12	.000	.000
18	.000	.000
24	.000	.000
30	.000	.000
36	.000	.000
42	.000	.000
48	.000	.000
54	.000	.000
60	.000	.000
66	.000	.000
72	.000	.000
78	.000	.000
84	.000	.000
90	.000	.000
96	.000	.000
102	.000	.000
108	.000	.000
114	.000	.000
120	.000	.000
126	.000	.000
132	.000	.000
138	.000	.000
144	.000	.000
150	.000	.000
156	.000	.000
162	.000	.000
168	.000	.000
174	.000	.000
180	.000	.000
186	.000	.000
192	.000	.000
198	.000	.000
204	.000	.000
210	.000	.000
216	.000	.000
222	.000	.000
228	.001	.000
234	.004	.000
240	.010	.000
246	.020	.000
252	.034	.001
258	.051	.001
264	.070	.002
270	.090	.002
276	.109	.004
282	.128	.005
288	.147	.006
294	.166	.008
300	.184	.010
306	.202	.011

312	.220	.014
318	.237	.016
324	.254	.018
330	.271	.021
336	.287	.024
342	.303	.027
348	.319	.030
354	.334	.033
360	.349	.036
366	.367	.040
372	.390	.043
378	.418	.047
384	.444	.051
390	.467	.055
396	.488	.060
402	.506	.065
408	.523	.069
414	.540	.074
420	.556	.079
426	.579	.085
432	.619	.090
438	.668	.096
444	.715	.102
450	.752	.109
456	.782	.116
462	.808	.123
468	.831	.131
474	.852	.138
480	.871	.146
486	.900	.154
492	.949	.162
498	1.009	.171
504	1.066	.180
510	1.110	.190
516	1.150	.200
522	1.196	.210
528	1.245	.221
534	1.290	.232
540	1.327	.244
546	1.369	.255
552	1.432	.268
558	1.507	.280
564	1.576	.294
570	1.629	.308
576	1.683	.322
582	1.756	.337
588	1.841	.353
594	1.917	.369
600	1.976	.386
606	2.054	.403
612	2.197	.422
618	2.375	.441
624	2.537	.463
630	2.654	.486
636	2.793	.510
642	3.036	.535
648	3.338	.563
654	3.608	.595
660	3.801	.628
666	4.064	.663
672	4.573	.702
678	5.225	.747
684	5.807	.798
690	6.216	.853
696	7.314	.916
702	10.141	.961
708	16.045	1.018
714	28.309	8.804
720	47.043	23.190
726	61.758	38.741
732	61.003	50.022
738	48.424	52.360
744	34.620	46.960
750	25.546	38.550
756	20.034	30.697
762	15.832	24.337
768	12.533	19.277
774	10.160	15.326
780	8.714	12.392
786	7.775	10.325

792	6.943	8.847
798	6.143	7.699
804	5.563	6.779
810	5.240	6.093
816	5.012	5.611
822	4.725	5.241
828	4.407	4.905
834	4.149	4.592
840	3.988	4.331
846	3.838	4.123
852	3.596	3.921
858	3.307	3.687
864	3.064	3.437
870	2.910	3.213
876	2.822	3.040
882	2.769	2.918
888	2.738	2.836
894	2.720	2.783
900	2.711	2.749
906	2.705	2.729
912	2.702	2.716
918	2.701	2.709
924	2.700	2.705
930	2.700	2.702
936	2.701	2.701
942	2.702	2.701
948	2.703	2.702
954	2.703	2.702
960	2.704	2.703
966	2.645	2.689
972	2.457	2.620
978	2.199	2.475
984	1.973	2.281
990	1.829	2.092
996	1.746	1.940
1002	1.696	1.831
1008	1.667	1.756
1014	1.649	1.707
1020	1.640	1.676
1026	1.634	1.657
1032	1.630	1.644
1038	1.628	1.637
1044	1.627	1.632
1050	1.627	1.630
1056	1.627	1.628
1062	1.627	1.628
1068	1.627	1.627
1074	1.628	1.627
1080	1.628	1.628
1086	1.628	1.628
1092	1.628	1.628
1098	1.628	1.628
1104	1.629	1.628
1110	1.629	1.629
1116	1.629	1.629
1122	1.629	1.629
1128	1.630	1.629
1134	1.630	1.630
1140	1.630	1.630
1146	1.630	1.630
1152	1.630	1.630
1158	1.631	1.630
1164	1.631	1.631
1170	1.631	1.631
1176	1.631	1.631
1182	1.632	1.631
1188	1.632	1.632
1194	1.632	1.632
1200	1.632	1.632
1206	1.602	1.624
1212	1.508	1.590
1218	1.378	1.517
1224	1.264	1.419
1230	1.192	1.324
1236	1.150	1.248
1242	1.125	1.193
1248	1.110	1.155
1254	1.101	1.130
1260	1.096	1.115
1266	1.093	1.105

1272	1.091	1.098
1278	1.090	1.094
1284	1.090	1.092
1290	1.090	1.091
1296	1.090	1.091
1302	1.090	1.090
1308	1.090	1.090
1314	1.090	1.090
1320	1.090	1.090
1326	1.090	1.090
1332	1.090	1.090
1338	1.090	1.090
1344	1.090	1.090
1350	1.090	1.090
1356	1.091	1.090
1362	1.091	1.091
1368	1.091	1.091
1374	1.091	1.091
1380	1.091	1.091
1386	1.091	1.091
1392	1.091	1.091
1398	1.091	1.091
1404	1.091	1.091
1410	1.091	1.091
1416	1.091	1.091
1422	1.091	1.091
1428	1.092	1.091
1434	1.092	1.092
1440	.000	1.042
1446	.000	1.037
1452	.000	1.032
1458	.000	1.028
1464	.000	1.023
1470	.000	1.018
1476	.000	1.013
1482	.000	1.008
1488	.000	1.004
1494	.000	.999
1500	.000	.994
1506	.000	.990
1512	.000	.985
1518	.000	.980
1524	.000	.976
1530	.000	.971
1536	.000	.967
1542	.000	.962
1548	.000	.958
1554	.000	.953
1560	.000	.949
1566	.000	.944
1572	.000	.940
1578	.000	.935
1584	.000	.931
1590	.000	.921
1596	.000	.911
1602	.000	.901
1608	.000	.892
1614	.000	.882
1620	.000	.873
1626	.000	.864
1632	.000	.854
1638	.000	.845
1644	.000	.836
1650	.000	.827
1656	.000	.818
1662	.000	.810
1668	.000	.801
1674	.000	.793
1680	.000	.784
1686	.000	.776
1692	.000	.767
1698	.000	.759
1704	.000	.751
1710	.000	.743
1716	.000	.735
1722	.000	.727
1728	.000	.720
1734	.000	.712
1740	.000	.704
1746	.000	.697

1752	.000	.689
1758	.000	.682
1764	.000	.675
1770	.000	.668
1776	.000	.660
1782	.000	.653
1788	.000	.646
1794	.000	.640
1800	.000	.633
1806	.000	.626
1812	.000	.619
1818	.000	.613
1824	.000	.606
1830	.000	.600
1836	.000	.593
1842	.000	.587
1848	.000	.581
1854	.000	.575
1860	.000	.568
1866	.000	.562
1872	.000	.556
1878	.000	.550
1884	.000	.545
1890	.000	.539
1896	.000	.533
1902	.000	.527
1908	.000	.522
1914	.000	.516
1920	.000	.511
1926	.000	.505
1932	.000	.500
1938	.000	.494
1944	.000	.489
1950	.000	.484
1956	.000	.479
1962	.000	.474
1968	.000	.469
1974	.000	.464
1980	.000	.459
1986	.000	.454
1992	.000	.449
1998	.000	.444
2004	.000	.439
2010	.000	.435
2016	.000	.430
2022	.000	.426
2028	.000	.421
2034	.000	.416
2040	.000	.412
2046	.000	.408
2052	.000	.403
2058	.000	.399
2064	.000	.395
2070	.000	.391
2076	.000	.386
2082	.000	.382
2088	.000	.378
2094	.000	.374
2100	.000	.370
2106	.000	.366
2112	.000	.362
2118	.000	.358
2124	.000	.355
2130	.000	.351
2136	.000	.347
2142	.000	.343
2148	.000	.340
2154	.000	.336
2160	.000	.332
2166	.000	.329
2172	.000	.325
2178	.000	.322
2184	.000	.319
2190	.000	.315
2196	.000	.312
2202	.000	.308
2208	.000	.305
2214	.000	.302
2220	.000	.299
2226	.000	.295

2232	.000	.292
2238	.000	.289
2244	.000	.286
2250	.000	.283
2256	.000	.280
2262	.000	.277
2268	.000	.274
2274	.000	.271
2280	.000	.268
2286	.000	.265
2292	.000	.263
2298	.000	.260
2304	.000	.257
2310	.000	.254
2316	.000	.252
2322	.000	.249
2328	.000	.246
2334	.000	.244
2340	.000	.241
2346	.000	.238
2352	.000	.236
2358	.000	.233
2364	.000	.231
2370	.000	.228
2376	.000	.226
2382	.000	.224
2388	.000	.221
2394	.000	.219
2400	.000	.217
2406	.000	.214
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2430	.000	.205
2436	.000	.203
2442	.000	.201
2448	.000	.199
2454	.000	.197
2460	.000	.195
2466	.000	.192
2472	.000	.190
2478	.000	.188
2484	.000	.186
2490	.000	.184
2496	.000	.182
2502	.000	.180
2508	.000	.179
2514	.000	.177
2520	.000	.175
2526	.000	.173
2532	.000	.171
2538	.000	.169
2544	.000	.167
2550	.000	.166
2556	.000	.164
2562	.000	.162
2568	.000	.160
2574	.000	.159
2580	.000	.157
2586	.000	.155
2592	.000	.154
2598	.000	.152
2604	.000	.150
2610	.000	.149
2616	.000	.147
2622	.000	.146
2628	.000	.144
2634	.000	.143
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2646	.000	.139
2652	.000	.138
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2670	.000	.134
2676	.000	.132
2682	.000	.131
2688	.000	.129
2694	.000	.128
2700	.000	.127
2706	.000	.125

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2718	.000	.123
2724	.000	.121
2730	.000	.120
2736	.000	.119
2742	.000	.117
2748	.000	.116
2754	.000	.115
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2772	.000	.111
2778	.000	.110
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2790	.000	.108
2796	.000	.107
2802	.000	.106
2808	.000	.104
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2820	.000	.102
2826	.000	.101
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2868	.000	.094
2874	.000	.093
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2904	.000	.088
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2976	.000	.077
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2988	.000	.076
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3096	.000	.062
3102	.000	.062
3108	.000	.061
3114	.000	.060
3120	.000	.060
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3162	.000	.055
3168	.000	.055
3174	.000	.054
3180	.000	.054
3186	.000	.053

3192	.000	.053
3198	.000	.052
3204	.000	.051
3210	.000	.051
3216	.000	.050
3222	.000	.050
3228	.000	.049
3234	.000	.049
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3246	.000	.048
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3258	.000	.047
3264	.000	.046
3270	.000	.046
3276	.000	.045
3282	.000	.045
3288	.000	.044
3294	.000	.044
3300	.000	.043
3306	.000	.043
3312	.000	.042
3318	.000	.042
3324	.000	.042
3330	.000	.041
3336	.000	.041
3342	.000	.040
3348	.000	.040
3354	.000	.039
3360	.000	.039
3366	.000	.039
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3396	.000	.037
3402	.000	.036
3408	.000	.036
3414	.000	.035
3420	.000	.035
3426	.000	.035
3432	.000	.034
3438	.000	.034
3444	.000	.034
3450	.000	.033
3456	.000	.033
3462	.000	.032
3468	.000	.032
3474	.000	.032
3480	.000	.031
3486	.000	.031
3492	.000	.031
3498	.000	.030
3504	.000	.030
3510	.000	.030
3516	.000	.029
3522	.000	.029
3528	.000	.029
3534	.000	.029
3540	.000	.028
3546	.000	.028
3552	.000	.028
3558	.000	.027
3564	.000	.027
3570	.000	.027
3576	.000	.026
3582	.000	.026
3588	.000	.026
3594	.000	.026
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3606	.000	.025
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3618	.000	.025
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3630	.000	.024
3636	.000	.024
3642	.000	.024
3648	.000	.023
3654	.000	.023
3660	.000	.023
3666	.000	.023

3672	.000	.022
3678	.000	.022
3684	.000	.022
3690	.000	.022
3696	.000	.021
3702	.000	.021
3708	.000	.021
3714	.000	.021
3720	.000	.020
3726	.000	.020
3732	.000	.020
3738	.000	.020
3744	.000	.020
3750	.000	.019
3756	.000	.019
3762	.000	.019
3768	.000	.019
3774	.000	.019
3780	.000	.018
3786	.000	.018
3792	.000	.018
3798	.000	.018
3804	.000	.018
3810	.000	.017
3816	.000	.017
3822	.000	.017
3828	.000	.017
3834	.000	.017
3840	.000	.017
3846	.000	.016
3852	.000	.016
3858	.000	.016
3864	.000	.016
3870	.000	.016
3876	.000	.015
3882	.000	.015
3888	.000	.015
3894	.000	.015
3900	.000	.015
3906	.000	.015
3912	.000	.015
3918	.000	.014
3924	.000	.014
3930	.000	.014
3936	.000	.014
3942	.000	.014
3948	.000	.014
3954	.000	.013
3960	.000	.013
3966	.000	.013
3972	.000	.013
3978	.000	.013
3984	.000	.013
3990	.000	.013
3996	.000	.012
4002	.000	.012
4008	.000	.012
4014	.000	.012
4020	.000	.012
4026	.000	.012
4032	.000	.012
4038	.000	.012
4044	.000	.011
4050	.000	.011
4056	.000	.011
4062	.000	.011
4068	.000	.011
4074	.000	.011
4080	.000	.011
4086	.000	.011
4092	.000	.011
4098	.000	.010
4104	.000	.010
4110	.000	.010
4116	.000	.010
4122	.000	.010
4128	.000	.010
4134	.000	.010
4140	.000	.010
4146	.000	.010

4152	.000	.009
4158	.000	.009
4164	.000	.009
4170	.000	.009
4176	.000	.009
4182	.000	.009
4188	.000	.009
4194	.000	.009
4200	.000	.009
4206	.000	.009
4212	.000	.008
4218	.000	.008
4224	.000	.008
4230	.000	.008
4236	.000	.008
4242	.000	.008
4248	.000	.008
4254	.000	.008
4260	.000	.008
4266	.000	.008
4272	.000	.008
4278	.000	.008
4284	.000	.007
4290	.000	.007
4296	.000	.007
4302	.000	.007
4308	.000	.007
4314	.000	.007
4320	.000	.007

```
*******************************     PONDOPT      *******************************
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************
```

PROJECT: New High School Route 5
User: SDN WATER RESOURCES
Date: 10/09/1995 Monday
Time: 15:54:14
Output: POND1.OUT

ROUTING SUMMARY ----------
SIMULATION MODE ----------
FOR THE ABOVE CASE ----------

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	25.451	1.26	27.789	15.184
2	25.786	1.55	47.541	38.663
3	25.981	1.72	61.758	52.360

PC 133

Storm Water Runoff and Storm Sewer Design Calculations

SOUTHERN BASIN

Route 5 High School

James City County, Virginia

SDN File No. 93032

June 1, 1995

Smith Demer Normann
Engineers - Planners - Surveyors
Six Manhattan Square
Central Park Suite 102
Hampton, Virginia 23666

Design Calculations
Route 5 High School
Project No: 93032

General Description

This project involves the development of a 1,250 student high school off of Route 5, John Tyler Highway, in James City County, Virginia. The project will be developed in two phases. The first phase involves the construction of a 800 +/- linear foot entrance road into the site, clearing of the site, and the relocation of an existing select material building pad. The second phase of the project will involve the actual construction of the high school, the parking lots and the athletic fields.

The property is located on a high point relative to the surrounding area. The total acreage of the property is 80.01 acres of which 18.47 acres will be disturbed in Phase 1 and another 20 acres will be disturbed in Phase 2.

Presently, the majority of the existing site is wooded and drains to the west toward a swamp area which in turn drains to Powhatan Creek. This swamp area serves as a regional BMP for the surrounding properties. Presently, there is an existing sediment basin located on the west side of the property. An additional sediment basin will be constructed on the south end of the property to control the runoff from the Phase 1 construction. Upon completion of the entire project, both basins will remain in tact to serve as preprocessor to the regional BMP.

These calculations only cover the design of the sediment basin to be constructed in Phase 1 of this project. The runoff to the existing basin will not be increased by the construction in Phase 1; therefore, no additional analysis of this basin is required.

Storm Sewer Drainage Design Computations

The proposed sediment basin/BMP will serve 18.45 acres which are to be drained by two storm sewer systems. System A will drain the entrance road and the eastern portion of the property, approximately 13.19 acres. System C will drain the athletic fields, approximately 5.28 acres. System C will not be constructed in Phase 1; however, the sediment basin will be designed and sized to handle its eventual connection. A diagram of each system is included in the contract drawings.

System B will serve the school house and parking area and will drain to the existing basin. The design and calculations for this system are not included herein but will follow in Phase 2.

The pipe sizing for the storm sewer infrastructure was performed using the Rational Method and the Manning Equation with n = 0.013. The infrastructure was designed for a 10 year recurrence interval storm and the Steele coefficients used were A = 201.00 and b = 23.90. The calculations for the pipe sizing are included in Appendix A along with a drainage map. The tailwater for the hydraulic gradeline calculations were obtain by routing the storm through the sediment basin as described below.

check these

Sediment Basin Design Results

The basin was design to provide 134 cubic yards of storage per acre. The design of the basin is included in Appendix B. The routing through the basin was performed for the 2, 10, and 25 year storms using the computer program "Computer-Aided Hydrology & Hydraulics" by Akan Paine, Incorporated. This program was also used to develop SCS hydrographs for each of the recurrence interval storms. In addition, the programs were checked using triangular hydrographs from the rational method. The time of concentration for developing both hydrographs were taken from the calculations for pipe sizing in Appendix A. The results of this program are included in Appendices B-1 and B-2, respectively, and summarized below:

	SCS Hydrograph			Rational Formula Hydrographs		
Recurrence Interval Storm	Peak Elev. (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Elev. (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)
2	28.67	30.62	26.69	28.43	26.44	11.81
10	28.96	55.86	44.18	28.64	37.21	24.64
25	29.16	74.28	56.33	28.74	42.12	31.09

The hydraulic gradeline calculations in Appendix A were performed using the peak elevation for the SCS 10 year storm as the tailwater.

The tailwater for the pond outlet structure is based upon the flow in the outlet pipe. The normal water surface elevation for the swamp area is elevation 19.5 and is held back by a beaver dam with a weir elevation of the 20.1. From information obtained from the county, the approximate water surface elevation for a 100 year storm is elevation 20.55. The invert of the pipe from the pond is at elevation 20.50. Therefore, the design tailwater will be the lesser of the diameter of the pipe (3') or the critical depth of flow in the pipe plus half the diameter of the pipe (1.5'). For the most part, the diameter of the pipe ruled.

The outlet to the pond was checked with the culvert equation:

$$Head_{Reqd} = \left(1 + K_m + \frac{2gn^2L}{2.21R^{4/3}}\right)\frac{V^2}{2g}$$

where $K_m = K_e + K_b = 0.65$ and $n = 0.013$ as per the *Virginia Erosion and Sediment Control Handbook*. The following table summarizes the results:

Culvert Calculations				
Design Storm	Q (cfs)	Required Head (ft)	Elev. (ft)	Velocity (fps)
2	26.69	0.93	24.43	3.78
10	44.18	2.56	26.06	6.25
25	56.33	4.15	27.65	7.97

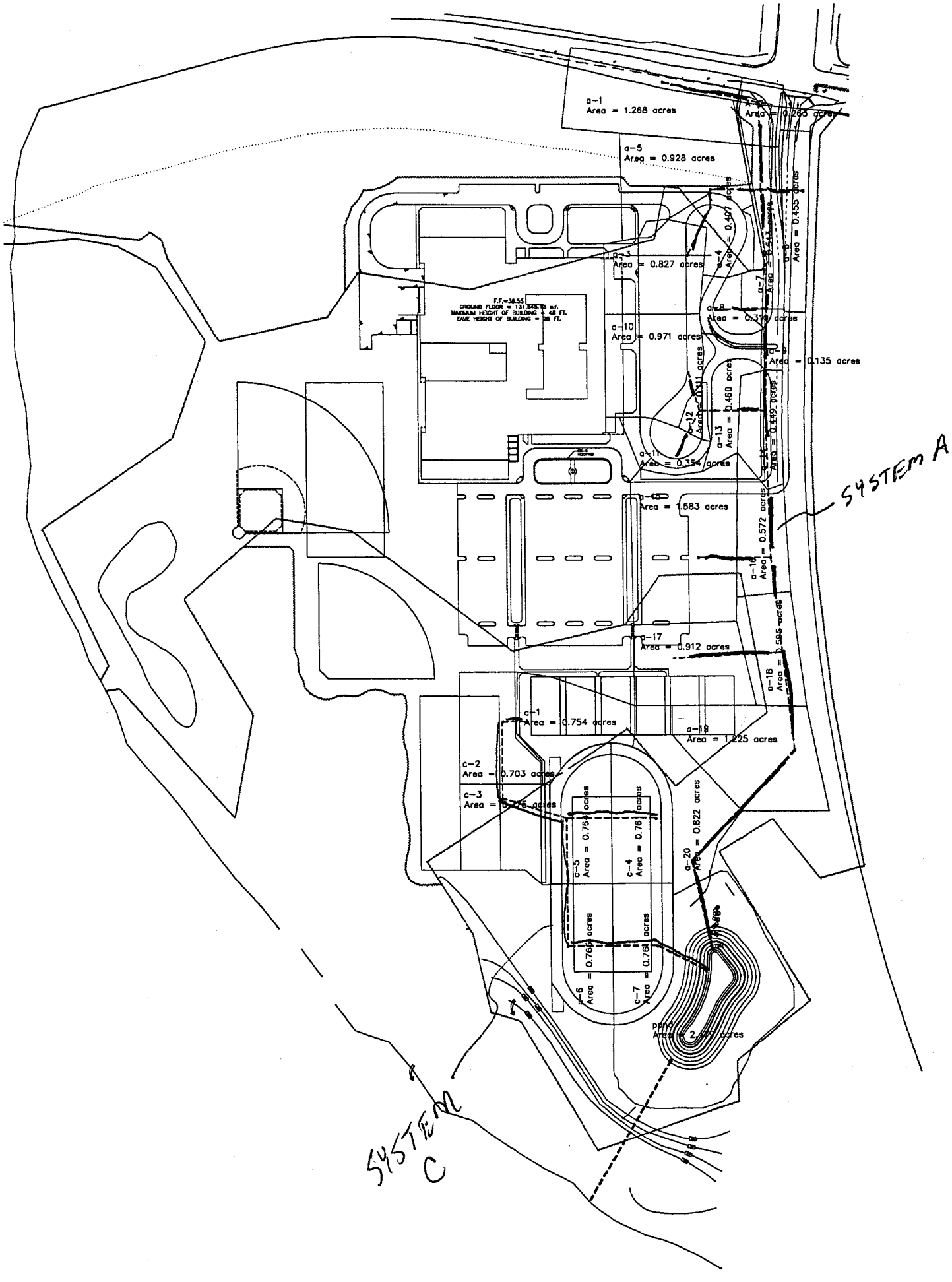
For the 10 year storm the required head elevation is below the invert to the dewatering structure and for all storms, the required head elevation is below the rim of the principle spillway.

Appendix C contains the Temporary Basin Design Data Sheet from the previously referenced handbook.

Appendix D contains the Worksheet For BMP Point System for the James City County.

Appendix A

Drainage Map and Infrastructure Calculations


a-1
Area = 1.268 acres
a-5
Area = 0.928 acres
a-3
Area = 0.827 acres
a-4
Area = 0.407 acres
a-8
a-10
Area = 0.971 acres
a-9
Area = 0.135 acres
a-12
a-13
Area = 0.460 acres
a-11
Area = 0.354 acres
a-15
Area = 1.583 acres
a-16
Area = 0.572 acres
a-17
Area = 0.912 acres
a-18
a-19
Area = 1.225 acres
c-1
Area = 0.754 acres
c-2
Area = 0.703 acres
c-3
c-5
c-4
c-6
c-7
a-20
Area = 0.822 acres
SYSTEM A
SYSTEM C

James City County Schools
Post Development Drainage Areas
Broken Down by System

IMP. COVER

Runoff Coefficients:

Impervious	*0.90*
Grassed	*0.20*

System A
Entrance Road Catchment Areas

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite C	Total CA
Drop Inlet A-1	1.268	0.204	1.064	0.313	0.396
Drop Inlet A-2	0.263	0.103	0.160	0.474	0.125
Curb Inlet A-3	0.827	0.598	0.229	0.706	0.584
Drop Inlet A-4	0.407	0.152	0.255	0.461	0.188
Drop Inlet A-5	0.928	0.122	0.806	0.292	0.271
Drop Inlet A-6	0.455	0.159	0.296	0.445	0.202
Drop Inlet A-7	0.543	0.190	0.353	0.445	0.242
Drop Inlet A-8	0.310	0.122	0.188	0.475	0.147
Drop Inlet A-9	0.135	0.062	0.073	0.521	0.070
Curb Inlet A-10	0.971	0.672	0.299	0.684	0.665
Drop Inlet A-11	0.354	0.101	0.253	0.400	0.142
Drop Inlet A-12	0.111	0.032	0.079	0.402	0.045
Drop Inlet A-13	0.460	0.122	0.338	0.386	0.177
Drop Inlet A-14	0.449	0.173	0.276	0.470	0.211
Drop Inlet A-15	1.583	0.798	0.785	0.553	0.875
Drop Inlet A-16	0.572	0.048	0.524	0.259	0.148
Drop Inlet A-17	0.912	0.415	0.497	0.519	0.473
Drop Inlet A-18	0.595	0.000	0.595	0.200	0.119
Drop Inlet A-19	1.225	0.178	1.047	0.302	0.370
Drop Inlet A-20	0.822	0.107	0.715	0.291	0.239
System A Totals	**13.190**	**4.358**	**8.832**	**0.431**	**5.689**

System C
Athletic Field Drainage

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite C	Total CA
Drop Inlet C-1	0.754	0.513	0.241	0.676	0.510
Drop Inlet C-2	0.703	0.044	0.659	0.244	0.171
Drop Inlet C-3	0.775	0.033	0.742	0.229	0.178
Drop Inlet C-4	0.761	0.185	0.576	0.370	0.282
Drop Inlet C-5	0.764	0.185	0.579	0.369	0.282
Drop Inlet C-6	0.765	0.185	0.580	0.369	0.282
Drop Inlet C-7	0.761	0.185	0.576	0.370	0.282
System C Totals	**5.283**	**1.329**	**3.954**	**0.376**	**1.987**

A C

IMP. ACRE = 4,358 + 1,329 = 5,687 AC.

2"/IMP. ACRE X 5.687 IMP ACRE X $\frac{43560 \text{ ft}^2/\text{ac}}{12"/\text{ft}}$

(A=2 WP)

= 41,288 CU. FT.

DEWATERING STRUCT. 36,619 CU. FT

James City County Schools
Post Development Drainage Areas
Broken Down by System

Runoff Coefficients:

Impervious	*98.00*
Grassed	*78.00*

System A
Entrance Road Catchment Areas

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite CN	Total CN*A
Drop Inlet A-1	1.268	0.204	1.064	81.218	102.984
Drop Inlet A-2	0.263	0.103	0.160	85.833	22.574
Curb Inlet A-3	0.827	0.598	0.229	92.462	76.466
Drop Inlet A-4	0.407	0.152	0.255	85.469	34.786
Drop Inlet A-5	0.928	0.122	0.806	80.629	74.824
Drop Inlet A-6	0.455	0.159	0.296	84.989	38.670
Drop Inlet A-7	0.543	0.190	0.353	84.998	46.154
Drop Inlet A-8	0.310	0.122	0.188	85.871	26.620
Drop Inlet A-9	0.135	0.062	0.073	87.185	11.770
Curb Inlet A-10	0.971	0.672	0.299	91.841	89.178
Drop Inlet A-11	0.354	0.101	0.253	83.706	29.632
Drop Inlet A-12	0.111	0.032	0.079	83.766	9.298
Drop Inlet A-13	0.460	0.122	0.338	83.304	38.320
Drop Inlet A-14	0.449	0.173	0.276	85.706	38.482
Drop Inlet A-15	1.583	0.798	0.785	88.082	139.434
Drop Inlet A-16	0.572	0.048	0.524	79.678	45.576
Drop Inlet A-17	0.912	0.415	0.497	87.101	79.436
Drop Inlet A-18	0.595	0.000	0.595	78.000	46.410
Drop Inlet A-19	1.225	0.178	1.047	80.906	99.110
Drop Inlet A-20	0.822	0.107	0.715	80.603	66.256
System A Totals	**13.190**	**4.358**	**8.832**	**84.608**	**1115.980**

System C
Athletic Field Drainage

Catchment Name	Total Area Acres	Impervious Area Acres	Grassed Area Acres	Composite CN	Total CN*A
Drop Inlet C-1	0.754	0.513	0.241	91.607	69.072
Drop Inlet C-2	0.703	0.044	0.659	79.254	55.716
Drop Inlet C-3	0.775	0.033	0.742	78.841	61.102
Drop Inlet C-4	0.761	0.185	0.576	82.857	63.054
Drop Inlet C-5	0.764	0.185	0.579	82.838	63.288
Drop Inlet C-6	0.765	0.185	0.580	82.831	63.366
Drop Inlet C-7	0.761	0.185	0.576	82.857	63.054
System C Totals	**5.283**	**1.329**	**3.954**	**83.031**	**438.652**

Storm Drainage Design Computatuions

James City County High School

System A

Project N0. : 93032

Data for a 10 Year Storm

Coefficient A = 201.00 Coefficient B = 23.90

FROM	TO	Drain Area acres	Run-off C	CA Incr	CA Accum	tc min	Rain fall in/hr	Runoff Q CFS	Invert Elevation Upper	Invert Elevation Lower	Length feet	Slope ft/ft	Dia in	Cap. cfs	Vel fps	Flow Time min
1	2	1.268	0.31	0.393	0.393	8.9	6.13	2.41	28.87	28.21	203	0.00325	15	3.68	3.00	1.13
2	7	0.263	0.47	0.124	0.517	10.0	5.92	3.06	28.21	27.63	181	0.00325	15	3.68	3.00	1.01
3	4	0.827	0.71	0.587	0.587	5.0	6.96	4.08	28.22	27.94	111	0.00255	18	5.30	3.00	0.62
4	5	0.407	0.46	0.187	0.774	5.6	6.81	5.27	27.94	27.84	37	0.00255	18	5.30	3.00	0.21
5	7	0.928	0.29	0.269	1.044	8.9	6.13	6.39	27.84	27.63	104	0.00207	21	7.21	3.00	0.58
6	7	0.455	0.45	0.205	0.205	5.0	6.96	1.42	27.91	27.63	87	0.00325	15	3.68	3.00	0.48
7	9	0.543	0.45	0.244	2.009	11.0	5.75	11.56	27.63	27.31	245	0.00129	30	14.73	3.00	1.36
8	9	0.310	0.47	0.146	0.146	5.0	6.96	1.01	27.65	27.31	105	0.00325	15	3.68	3.00	0.58
9	14	0.135	0.52	0.070	2.225	12.4	5.54	12.32	27.31	27.04	213	0.00129	30	14.73	3.00	1.18
10	12	0.971	0.68	0.660	0.660	5.0	6.96	4.59	27.53	27.32	84	0.00255	18	5.30	3.00	0.47
11	12	0.354	0.40	0.142	0.142	5.0	6.96	0.98	27.66	27.32	106	0.00325	15	3.68	3.00	0.59
12	13	0.111	0.40	0.044	0.846	5.6	6.82	5.77	27.32	27.25	34	0.00207	21	7.21	3.00	0.19
13	14	0.460	0.39	0.179	1.026	5.8	6.77	6.95	27.25	27.04	103	0.00207	21	7.21	3.00	0.57
14	16	0.449	0.47	0.211	3.462	13.6	5.36	18.57	27.04	26.73	302	0.00101	36	21.20	3.00	1.68
15	16	1.583	0.55	0.871	0.871	5.0	6.96	6.06	27.04	26.73	148	0.00207	21	7.21	3.00	0.82
16	18	0.572	0.26	0.149	4.481	15.3	5.13	23.00	26.73	26.57	197	0.00082	42	28.81	2.99	1.10
17	18	0.912	0.52	0.474	0.474	5.0	6.96	3.30	27.31	26.57	227	0.00325	15	3.68	3.00	1.26
18	19	0.595	0.20	0.119	5.075	16.4	4.99	25.34	26.57	26.41	200	0.00082	42	28.81	2.99	1.11
19	20	1.225	0.30	0.368	5.442	17.5	4.86	26.44	26.41	26.15	312	0.00082	42	28.81	2.99	1.74
20	21	0.822	0.29	0.238	5.680	19.2	4.66	26.49	26.15	26.00	182	0.00082	42	28.81	2.99	1.01

Tw ≈ 28.96'

CFS →	CAP	Q_{10}
20 → 21	28.81	26.49

EXC = 2.32 CFS

HGL @ 20	RIM
29.2 FT	35.25

PARKING ≈ 28800 SF ?

$Q = CIA$

$= 0.9(6.96 \text{ IN/HR})\left(\frac{28800}{43560}\right) = 4.14$ CFS

Hydraulic Grade Line Calculations

TailWater Elevation for Pt. 21 = 28.96 ft.

Pt.	Dia	Q	L	Hf	Vo	Ho	Vi	Hi	Ang	Ha	Ht	1.3Ht	0.5Ht	Final Hydraulic H	Grade	Rim
1	15	2.4	203	0.2823	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.2998	31.55	33.00
2	15	3.1	181	0.4065	3.00	0.0350	3.00	0.0489	90	0.0979	0.1818	0.2363	0.0909	0.4974	31.25	32.82
3	18	4.1	111	0.1678	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0455	0.0175	0.1853	31.35	35.00
4	18	5.3	37	0.0933	3.00	0.0350	3.00	0.0490	27	0.0341	0.1181	0.1535	0.0590	0.1523	31.17	35.00
5	21	6.4	104	0.1694	3.00	0.0349	3.00	0.0490	90	0.0976	0.1815	0.2359	0.0907	0.2601	31.02	35.00
6	15	1.4	87	0.0423	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.0598	30.82	32.27
7	30	11.6	245	0.1947	3.00	0.0350	3.00	0.0489	90	0.0979	0.1818	0.2364	0.0909	0.2856	30.76	32.73
8	15	1.0	105	0.0258	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.0433	30.51	35.00
9	30	12.3	213	0.1923	3.00	0.0350	3.00	0.0490	90	0.0979	0.1818	0.2364	0.0909	0.2832	30.47	33.59
10	18	4.6	84	0.1606	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0455	0.0175	0.1780	30.74	35.00
11	15	1.0	106	0.0246	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.0421	30.60	35.00
12	21	5.8	34	0.0451	3.00	0.0349	3.00	0.0490	90	0.0976	0.1815	0.2359	0.0907	0.1358	30.56	35.00
13	21	6.9	103	0.1980	3.00	0.0349	3.00	0.0488	0	0.0000	0.0837	0.1088	0.0418	0.2398	30.43	35.00
14	36	18.6	302	0.2341	3.00	0.0349	3.00	0.0490	90	0.0977	0.1816	0.2361	0.0908	0.3249	30.19	35.62
15	21	6.1	148	0.2162	3.00	0.0349	0.00	0.0000	0	0.0000	0.0349	0.0453	0.0174	0.2336	30.10	35.00
16	42	23.0	197	0.1030	2.99	0.0348	3.00	0.0489	90	0.0975	0.1811	0.2355	0.0906	0.1936	29.86	35.10
17	15	3.3	227	0.5919	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.6093	30.28	35.00
18	42	25.3	200	0.1269	2.99	0.0348	3.00	0.0489	90	0.0975	0.1812	0.2356	0.0906	0.2175	29.67	34.90
19	42	26.4	312	0.2156	2.99	0.0348	2.99	0.0487	50	0.0654	0.1490	0.1937	0.0745	0.2901	29.45	34.90
20	42	26.5	182	0.1262	2.99	0.0348	2.99	0.0487	50	0.0654	0.1490	0.1937	0.0745	0.2007	29.16	35.25

HGL

See revised calcs -

Appendix A
of Calcs for System B
Dated 10/6/95

Storm Drainage Design Computatuions

James City County High School

System C

Project N0. : 93032

Data for a 10 Year Storm

Coefficient A = 201.00 Coefficient B = 23.90

FROM	TO	Drain Area acres	Run-off C	CA Incr	CA Accum	tc min	Rain fall in/hr	Runoff Q CFS	Invert Elevation Upper	Invert Elevation Lower	Length feet	Slope ft/ft	Dia in	Cap. cfs	Vel fps	Flow Time min
1	2	0.754	0.68	0.513	0.513	5.0	6.96	3.57	27.68	27.52	50	0.00325	15	3.68	3.00	0.28
2	3	0.703	0.24	0.169	0.681	5.3	6.89	4.69	27.52	27.12	155	0.00255	18	5.30	3.00	0.86
3	5	0.775	0.23	0.178	0.860	6.1	6.69	5.75	27.12	26.84	137	0.00207	21	7.21	3.00	0.76
4	5	0.761	0.37	0.282	0.282	5.0	6.96	1.96	27.44	26.84	185	0.00325	15	3.68	3.00	1.03
5	6	0.764	0.37	0.283	1.424	6.9	6.53	9.29	26.84	26.38	264	0.00174	24	9.44	3.00	1.46
6	7	0.765	0.37	0.283	1.707	8.4	6.23	10.63	26.38	26.14	185	0.00129	30	14.73	3.00	1.03
7	8	0.761	0.37	0.282	1.989	9.4	6.04	12.01	26.14	26.00	110	0.00129	30	14.73	3.00	0.61

Hydraulic Grade Line Calculations

TailWater Elevation for Pt. 8 = 28.96 ft.

Pt.	Dia	Q	L	Hf	Vo	Ho	Vi	Hi	Ang	Ha	Ht	1.3Ht	0.5Ht	Final Hydraulic H	Grade	Rim
1	15	3.6	50	0.1524	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.1699	30.71	36.00
2	18	4.7	155	0.3096	3.00	0.0350	3.00	0.0489	90	0.0979	0.1819	0.2364	0.0909	0.4005	30.54	36.00
3	21	5.8	137	0.1806	3.00	0.0349	3.00	0.0490	71	0.0858	0.1696	0.2205	0.0848	0.2654	30.14	36.00
4	15	2.0	185	0.1700	3.00	0.0350	0.00	0.0000	0	0.0000	0.0350	0.0454	0.0175	0.1875	30.06	36.00
5	24	9.3	264	0.4455	3.00	0.0350	3.00	0.0489	90	0.0981	0.1820	0.2366	0.0910	0.5365	29.87	36.00
6	30	10.6	185	0.1244	3.00	0.0350	3.00	0.0490	90	0.0979	0.1819	0.2365	0.0910	0.2153	29.34	36.00
7	30	12.0	110	0.0942	3.00	0.0350	3.00	0.0490	37	0.0490	0.1329	0.1727	0.0664	0.1607	29.12	36.00

SOUTH BASIN

Appendix B

Basin Design Information

James City County High School
Storm Water Basin Design

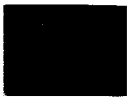
Acres Draining to Basin = 18.47 acres

Basin Capacity, 134 cyds/acre = 2475.38 cu. yds.
66,835 cu. ft.

Permanent Pool Volume = 33,418 cu. ft.
Draw Down Volume = 33,418 cu. ft.

Elevation ft.	Area ft.^2	Area acres	Trapezoid Volume ft.^3	Total Volume ft.^3	Total Volume cu. yd.	Description of Elevation
22.00	5,787	0.133	0			Pond Invert
24.00	7,615	0.175	13,402	13,402	496	
25.25	8,862	0.203	10,298	23,701	878	
25.25	11,902	0.273	0	23,701	878	Safety Shelf
26.00	13,398	0.308	9,487	33,188	1,229	
26.25	14,051	0.323	3,431	36,619	1,356	Dewatering Structure
28.00	17,943	0.412	27,994	64,613	2,393	
28.25	18,534	0.425	4,560	69,173	2,562	Riser Rim
29.25	20,981	0.482	19,757	88,930	3,294	Emergency Spillway
30.00	22,889	0.525	16,452	105,382	3,903	
32.00	28,238	0.648	51,128	156,509	5,797	
34.00	33,989	0.780	62,227	218,736	8,101	
36.00	40,138	0.921	74,127	292,863	10,847	Top of Pond

Cleanout Marking Elevation = 24.40



STAGE STOR

Appendix B-1

Sediment Basin Simulation Using SCS Hydrographs

```
1*******************************      PONDOPT      *******************************
*******************************    Version 1.45    *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:10:25
  Output: JCCSCS.OUT


 SOLUTION FOR  3  STORMS.


 TIME INCREMENT:   .300  Hours
```

STORM NUMBER	HYDROGRAPH IN FILE:
1	jcc2.hyd
2	jcc10.hyd
3	jcc25.hyd

STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)	TAILWATER STAGE (ft)
1	30.622	N/A	1422.00	.1218E+06	23.500
2	55.864	N/A	1422.00	.2214E+06	23.500
3	74.281	N/A	1422.00	.2959E+06	23.500

```
1*******************************      PONDOPT      *******************************
*******************************    Version 1.45    *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:10:25
  Output: JCCSCS.OUT


 ========================   OUTLET STRUCTURE   =======================

          STRUCTURE NUMBER 1

                Type 6: ORIFICE
                   DIAMETER:      .50 feet.

                INVERT ELEVATION :    26.25 feet.
                    ORIFICE COEF :     .600

          STRUCTURE NUMBER 2

                Type 4: CIRCULAR STAND PIPE
                   DIAMETER:     4.00 feet.

                 CREST ELEVATION :    28.25 feet.
                       WEIR COEF :    3.100
```

ORIFICE COEF : .600

Note that the diameter listed here is the EFFECTIVE diameter.
If this structure will have a grate, make sure the grate has
this effective diameter (and perimeter).

STRUCTURE NUMBER 3

Type 3: RECTANGULAR WEIR OR SPILLWAY
LENGTH: 6.00 feet.

CREST ELEVATION : 29.25 feet. – emergency –
DISCHARGE COEF : 2.400

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************
```

PROJECT: James City County High School
User: SDN WATER RESOURCES
Date: 05/31/1995 Wednesday
Time: 15:10:25
Output: JCCSCS.OUT

Stage-Area
Filename: JCCPOND.DAT

TAILWATER STAGE: 23.500 feet.
INITIAL STAGE: 26.500 feet.

```
==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ==================

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  1      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
26.250	.0000	.0000
28.000	.6415	1.158
28.250	.7462	1.251
29.250	1.199	62.07
30.000	1.577	156.9
32.000	2.748	646.4
34.000	4.174	1344.
36.000	5.873	2198.

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************
```

PROJECT: James City County High School
User: SDN WATER RESOURCES
Date: 05/31/1995 Wednesday
Time: 15:10:25
Output: JCCSCS.OUT

TAILWATER STAGE: 23.500 feet.
INITIAL STAGE: 26.500 feet.

```
<<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        1    >>>>>>>>>>>>>>>>>>>>>>>
```

MAXIMUM ELEVATION: 28.67 feet.
MAXIMUM INFLOW: 30.62 cfs.
MAXIMUM OUTFLOW: 26.69 cfs.
MAXIMUM STORAGE: .9357 acre-feet.

CONTINUITY ERROR: .560E-05 percent.

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	.000	.000
18	.000	.000
36	.000	.000
54	.000	.000
72	.000	.000
90	.000	.000
108	.000	.000
126	.000	.000
144	.000	.000
162	.000	.000
180	.000	.000
198	.000	.000
216	.000	.000
234	.000	.000
252	.000	.000
270	.000	.000
288	.000	.000
306	.000	.000
324	.000	.000
342	.000	.000
360	.000	.000
378	.000	.000
396	.000	.000
414	.000	.000
432	.000	.000
450	.000	.000
468	.009	.000
486	.029	.001
504	.064	.003
522	.110	.008
540	.158	.014
558	.227	.023
576	.297	.035
594	.380	.050
612	.513	.070
630	.651	.096
648	.956	.131
666	1.329	.182
684	1.954	.255
702	4.994	.416
720	30.622	1.214
738	15.937	26.687
756	8.265	8.467
774	4.923	6.127
792	3.547	3.763
810	2.884	3.079
828	2.342	2.497
846	2.030	2.109
864	1.674	1.788
882	1.556	1.572
900	1.533	1.538
918	1.531	1.531
936	1.534	1.533
954	1.539	1.537
972	1.267	1.370
990	1.027	1.248
1008	.953	1.242
1026	.937	1.236
1044	.934	1.229
1062	.934	1.223
1080	.936	1.217
1098	.937	1.211
1116	.939	1.205
1134	.940	1.199
1152	.942	1.193
1170	.943	1.188
1188	.945	1.182
1206	.875	1.177

1224	.709	1.168
1242	.650	1.157
1260	.637	1.131
1278	.634	1.107
1296	.634	1.083
1314	.635	1.060
1332	.635	1.039
1350	.636	1.019
1368	.636	1.000
1386	.637	.982
1404	.637	.964
1422	.638	.948
1440	.000	.917
1458	.000	.871
1476	.000	.827
1494	.000	.786
1512	.000	.746
1530	.000	.709
1548	.000	.674
1566	.000	.640
1584	.000	.608
1602	.000	.577
1620	.000	.549
1638	.000	.521
1656	.000	.495
1674	.000	.470
1692	.000	.447
1710	.000	.424
1728	.000	.403
1746	.000	.383
1764	.000	.364
1782	.000	.346
1800	.000	.328
1818	.000	.312
1836	.000	.296
1854	.000	.281
1872	.000	.267
1890	.000	.254
1908	.000	.241
1926	.000	.229
1944	.000	.218
1962	.000	.207
1980	.000	.196
1998	.000	.187
2016	.000	.177
2034	.000	.168
2052	.000	.160
2070	.000	.152
2088	.000	.144
2106	.000	.137
2124	.000	.130
2142	.000	.124
2160	.000	.118
2178	.000	.112
2196	.000	.106
2214	.000	.101
2232	.000	.096
2250	.000	.091
2268	.000	.086
2286	.000	.082
2304	.000	.078
2322	.000	.074
2340	.000	.070
2358	.000	.067
2376	.000	.063
2394	.000	.060
2412	.000	.057
2430	.000	.054
2448	.000	.052
2466	.000	.049
2484	.000	.047
2502	.000	.044
2520	.000	.042

2538	.000	.040
2556	.000	.038
2574	.000	.036
2592	.000	.034
2610	.000	.033
2628	.000	.031
2646	.000	.029
2664	.000	.028
2682	.000	.027
2700	.000	.025
2718	.000	.024
2736	.000	.023
2754	.000	.022
2772	.000	.021
2790	.000	.019
2808	.000	.019
2826	.000	.018
2844	.000	.017
2862	.000	.016
2880	.000	.015
2898	.000	.014
2916	.000	.014
2934	.000	.013
2952	.000	.012
2970	.000	.012
2988	.000	.011
3006	.000	.011
3024	.000	.010
3042	.000	.010
3060	.000	.009
3078	.000	.009
3096	.000	.008
3114	.000	.008
3132	.000	.007
3150	.000	.007
3168	.000	.007
3186	.000	.006
3204	.000	.006
3222	.000	.006
3240	.000	.005
3258	.000	.005
3276	.000	.005
3294	.000	.005
3312	.000	.004
3330	.000	.004
3348	.000	.004
3366	.000	.004
3384	.000	.004
3402	.000	.003
3420	.000	.003
3438	.000	.003
3456	.000	.003
3474	.000	.003
3492	.000	.003
3510	.000	.003
3528	.000	.002
3546	.000	.002
3564	.000	.002
3582	.000	.002
3600	.000	.002
3618	.000	.002
3636	.000	.002
3654	.000	.002
3672	.000	.002
3690	.000	.001
3708	.000	.001
3726	.000	.001
3744	.000	.001
3762	.000	.001
3780	.000	.001
3798	.000	.001
3816	.000	.001
3834	.000	.001

3852	.000	.001
3870	.000	.001
3888	.000	.001
3906	.000	.001
3924	.000	.001
3942	.000	.001
3960	.000	.001
3978	.000	.001
3996	.000	.001
4014	.000	.001
4032	.000	.001
4050	.000	.001
4068	.000	.001
4086	.000	.000

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:10:25
  Output: JCCSCS.OUT


 Stage-Area
 Filename: JCCPOND.DAT

           TAILWATER STAGE:   23.500 feet.
             INITIAL STAGE:   26.500 feet.

 ==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ===================

 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  2      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
26.250	.0000	.0000
28.000	.6415	1.158
28.250	.7462	1.251
29.250	1.199	62.07
30.000	1.577	156.9
32.000	2.748	646.4
34.000	4.174	1344.
36.000	5.873	2198.

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:10:25
  Output: JCCSCS.OUT


           TAILWATER STAGE:   23.500 feet.
             INITIAL STAGE:   26.500 feet.

 <<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        2    >>>>>>>>>>>>>>>>>>>>>>

     MAXIMUM ELEVATION:    28.96     feet.
        MAXIMUM INFLOW:    55.86     cfs.
       MAXIMUM OUTFLOW:    44.18     cfs.
       MAXIMUM STORAGE:    1.066     acre-feet.

      CONTINUITY ERROR:     .220E-05 percent.
```

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	.000	.000
18	.000	.000
36	.000	.000
54	.000	.000
72	.000	.000
90	.000	.000
108	.000	.000
126	.000	.000
144	.000	.000
162	.000	.000
180	.000	.000
198	.000	.000
216	.000	.000
234	.000	.000
252	.000	.000
270	.000	.000
288	.000	.000
306	.000	.000
324	.000	.000
342	.003	.000
360	.021	.001
378	.054	.003
396	.097	.006
414	.141	.012
432	.204	.020
450	.275	.031
468	.337	.045
486	.410	.061
504	.513	.081
522	.617	.105
540	.711	.133
558	.869	.166
576	1.012	.205
594	1.181	.250
612	1.474	.303
630	1.754	.369
648	2.417	.455
666	3.173	.572
684	4.412	.733
702	10.455	1.069
720	55.864	33.779
738	28.343	44.178
756	14.271	15.608
774	8.346	10.237
792	5.954	6.381
810	4.807	5.131
828	3.892	4.155
846	3.365	3.497
864	2.770	2.960
882	2.572	2.599
900	2.529	2.538
918	2.524	2.524
936	2.526	2.525
954	2.530	2.529
972	2.080	2.249
990	1.685	1.791
1008	1.561	1.581
1026	1.534	1.539
1044	1.528	1.529
1062	1.528	1.528
1080	1.530	1.529
1098	1.531	1.531
1116	1.533	1.532
1134	1.534	1.534
1152	1.536	1.535
1170	1.537	1.537
1188	1.538	1.538
1206	1.425	1.468
1224	1.152	1.251

1242	1.057	1.247
1260	1.035	1.243
1278	1.030	1.238
1296	1.029	1.234
1314	1.030	1.229
1332	1.030	1.225
1350	1.031	1.221
1368	1.032	1.217
1386	1.032	1.213
1404	1.033	1.209
1422	1.033	1.205
1440	.000	1.190
1458	.000	1.164
1476	.000	1.114
1494	.000	1.058
1512	.000	1.005
1530	.000	.955
1548	.000	.907
1566	.000	.862
1584	.000	.819
1602	.000	.778
1620	.000	.739
1638	.000	.702
1656	.000	.667
1674	.000	.633
1692	.000	.602
1710	.000	.572
1728	.000	.543
1746	.000	.516
1764	.000	.490
1782	.000	.465
1800	.000	.442
1818	.000	.420
1836	.000	.399
1854	.000	.379
1872	.000	.360
1890	.000	.342
1908	.000	.325
1926	.000	.309
1944	.000	.293
1962	.000	.279
1980	.000	.265
1998	.000	.251
2016	.000	.239
2034	.000	.227
2052	.000	.215
2070	.000	.205
2088	.000	.194
2106	.000	.185
2124	.000	.175
2142	.000	.167
2160	.000	.158
2178	.000	.150
2196	.000	.143
2214	.000	.136
2232	.000	.129
2250	.000	.122
2268	.000	.116
2286	.000	.111
2304	.000	.105
2322	.000	.100
2340	.000	.095
2358	.000	.090
2376	.000	.086
2394	.000	.081
2412	.000	.077
2430	.000	.073
2448	.000	.070
2466	.000	.066
2484	.000	.063
2502	.000	.060
2520	.000	.057
2538	.000	.054

2556	.000	.051
2574	.000	.049
2592	.000	.046
2610	.000	.044
2628	.000	.042
2646	.000	.040
2664	.000	.038
2682	.000	.036
2700	.000	.034
2718	.000	.032
2736	.000	.031
2754	.000	.029
2772	.000	.028
2790	.000	.026
2808	.000	.025
2826	.000	.024
2844	.000	.023
2862	.000	.021
2880	.000	.020
2898	.000	.019
2916	.000	.018
2934	.000	.017
2952	.000	.017
2970	.000	.016
2988	.000	.015
3006	.000	.014
3024	.000	.013
3042	.000	.013
3060	.000	.012
3078	.000	.012
3096	.000	.011
3114	.000	.010
3132	.000	.010
3150	.000	.009
3168	.000	.009
3186	.000	.008
3204	.000	.008
3222	.000	.008
3240	.000	.007
3258	.000	.007
3276	.000	.007
3294	.000	.006
3312	.000	.006
3330	.000	.006
3348	.000	.005
3366	.000	.005
3384	.000	.005
3402	.000	.005
3420	.000	.004
3438	.000	.004
3456	.000	.004
3474	.000	.004
3492	.000	.004
3510	.000	.003
3528	.000	.003
3546	.000	.003
3564	.000	.003
3582	.000	.003
3600	.000	.003
3618	.000	.002
3636	.000	.002
3654	.000	.002
3672	.000	.002
3690	.000	.002
3708	.000	.002
3726	.000	.002
3744	.000	.002
3762	.000	.002
3780	.000	.002
3798	.000	.001
3816	.000	.001
3834	.000	.001
3852	.000	.001

3870	.000	.001
3888	.000	.001
3906	.000	.001
3924	.000	.001
3942	.000	.001
3960	.000	.001
3978	.000	.001
3996	.000	.001
4014	.000	.001
4032	.000	.001
4050	.000	.001
4068	.000	.001
4086	.000	.001
4104	.000	.001
4122	.000	.001
4140	.000	.001
4158	.000	.001
4176	.000	.001
4194	.000	.000

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:10:25
  Output: JCCSCS.OUT


 Stage-Area
 Filename: JCCPOND.DAT

           TAILWATER STAGE:   23.500 feet.
             INITIAL STAGE:   26.500 feet.

 ==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ===================

 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  3   >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
26.250	.0000	.0000
28.000	.6415	1.158
28.250	.7462	1.251
29.250	1.199	62.07
30.000	1.577	156.9
32.000	2.748	646.4
34.000	4.174	1344.
36.000	5.873	2198.

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:10:25
  Output: JCCSCS.OUT


           TAILWATER STAGE:   23.500 feet.
             INITIAL STAGE:   26.500 feet.

 <<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        3    >>>>>>>>>>>>>>>>>>>>>

     MAXIMUM ELEVATION:    29.16     feet.
        MAXIMUM INFLOW:    74.28     cfs.
```

MAXIMUM OUTFLOW: 56.33 cfs.
MAXIMUM STORAGE: 1.157 acre-feet.

CONTINUITY ERROR: .498E-05 percent.

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	.000	.000
18	.000	.000
36	.000	.000
54	.000	.000
72	.000	.000
90	.000	.000
108	.000	.000
126	.000	.000
144	.000	.000
162	.000	.000
180	.000	.000
198	.000	.000
216	.000	.000
234	.000	.000
252	.000	.000
270	.000	.000
288	.004	.000
306	.028	.001
324	.071	.003
342	.123	.008
360	.175	.015
378	.247	.025
396	.312	.038
414	.371	.053
432	.473	.071
450	.580	.094
468	.664	.121
486	.768	.150
504	.922	.185
522	1.070	.226
540	1.197	.271
558	1.426	.323
576	1.624	.383
594	1.856	.451
612	2.274	.532
630	2.658	.629
648	3.597	.754
666	4.641	.922
684	6.337	1.151
702	14.628	7.400
720	74.281	53.688
738	37.319	56.326
756	18.578	20.877
774	10.787	13.139
792	7.665	8.251
810	6.171	6.586
828	4.992	5.331
846	4.312	4.483
864	3.547	3.792
882	3.292	3.327
900	3.236	3.248
918	3.227	3.227
936	3.228	3.228
954	3.232	3.231
972	2.656	2.873
990	2.150	2.286
1008	1.993	2.018
1026	1.957	1.964
1044	1.949	1.950
1062	1.949	1.949
1080	1.950	1.950
1098	1.952	1.951
1116	1.953	1.953
1134	1.954	1.954

1152	1.955	1.955
1170	1.957	1.956
1188	1.958	1.958
1206	1.813	1.867
1224	1.466	1.583
1242	1.344	1.361
1260	1.316	1.322
1278	1.310	1.311
1296	1.309	1.309
1314	1.309	1.309
1332	1.310	1.310
1350	1.310	1.310
1368	1.311	1.311
1386	1.311	1.311
1404	1.312	1.312
1422	1.312	1.312
1440	.000	1.237
1458	.000	1.211
1476	.000	1.184
1494	.000	1.158
1512	.000	1.101
1530	.000	1.046
1548	.000	.994
1566	.000	.944
1584	.000	.897
1602	.000	.852
1620	.000	.809
1638	.000	.769
1656	.000	.730
1674	.000	.694
1692	.000	.659
1710	.000	.626
1728	.000	.595
1746	.000	.565
1764	.000	.537
1782	.000	.510
1800	.000	.484
1818	.000	.460
1836	.000	.437
1854	.000	.415
1872	.000	.394
1890	.000	.375
1908	.000	.356
1926	.000	.338
1944	.000	.321
1962	.000	.305
1980	.000	.290
1998	.000	.275
2016	.000	.262
2034	.000	.248
2052	.000	.236
2070	.000	.224
2088	.000	.213
2106	.000	.202
2124	.000	.192
2142	.000	.183
2160	.000	.173
2178	.000	.165
2196	.000	.157
2214	.000	.149
2232	.000	.141
2250	.000	.134
2268	.000	.127
2286	.000	.121
2304	.000	.115
2322	.000	.109
2340	.000	.104
2358	.000	.099
2376	.000	.094
2394	.000	.089
2412	.000	.085
2430	.000	.080
2448	.000	.076

2466	.000	.072
2484	.000	.069
2502	.000	.065
2520	.000	.062
2538	.000	.059
2556	.000	.056
2574	.000	.053
2592	.000	.051
2610	.000	.048
2628	.000	.046
2646	.000	.043
2664	.000	.041
2682	.000	.039
2700	.000	.037
2718	.000	.035
2736	.000	.034
2754	.000	.032
2772	.000	.030
2790	.000	.029
2808	.000	.027
2826	.000	.026
2844	.000	.025
2862	.000	.023
2880	.000	.022
2898	.000	.021
2916	.000	.020
2934	.000	.019
2952	.000	.018
2970	.000	.017
2988	.000	.016
3006	.000	.016
3024	.000	.015
3042	.000	.014
3060	.000	.013
3078	.000	.013
3096	.000	.012
3114	.000	.011
3132	.000	.011
3150	.000	.010
3168	.000	.010
3186	.000	.009
3204	.000	.009
3222	.000	.008
3240	.000	.008
3258	.000	.008
3276	.000	.007
3294	.000	.007
3312	.000	.006
3330	.000	.006
3348	.000	.006
3366	.000	.006
3384	.000	.005
3402	.000	.005
3420	.000	.005
3438	.000	.005
3456	.000	.004
3474	.000	.004
3492	.000	.004
3510	.000	.004
3528	.000	.004
3546	.000	.003
3564	.000	.003
3582	.000	.003
3600	.000	.003
3618	.000	.003
3636	.000	.003
3654	.000	.002
3672	.000	.002
3690	.000	.002
3708	.000	.002
3726	.000	.002
3744	.000	.002
3762	.000	.002

3780	.000	.002
3798	.000	.002
3816	.000	.002
3834	.000	.001
3852	.000	.001
3870	.000	.001
3888	.000	.001
3906	.000	.001
3924	.000	.001
3942	.000	.001
3960	.000	.001
3978	.000	.001
3996	.000	.001
4014	.000	.001
4032	.000	.001
4050	.000	.001
4068	.000	.001
4086	.000	.001
4104	.000	.001
4122	.000	.001
4140	.000	.001
4158	.000	.001
4176	.000	.001
4194	.000	.001
4212	.000	.000

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************
```

PROJECT: James City County High School
User: SDN WATER RESOURCES
Date: 05/31/1995 Wednesday
Time: 15:10:25
Output: JCCSCS.OUT

ROUTING SUMMARY ----------
SIMULATION MODE ----------
FOR THE ABOVE CASE ----------

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	28.668	.936	30.622	26.687
2	28.956	1.07	55.864	44.178
3	29.155	1.16	74.281	56.326

Need to run 100-yr Storm

Appendix B-2

Sediment Basin Simulation Using Rational Method

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:22:39
  Output: JCCRA.OUT


 SOLUTION FOR  3  STORMS.


 TIME INCREMENT:   .008  Hours
```

STORM NUMBER	HYDROGRAPH IN FILE:
1	jcc2.txt
2	jcc10.txt
3	jcc25.txt

STORM NUMBER	PEAK INFLOW (cfs)	ALLOWABLE PEAK DISCHARGE (cfs)	DURATION (min)	RUNOFF VOLUME (ft3)	TAILWATER STAGE (ft)
1	26.440	N/A	39.84	.3817E+05	22.980
2	37.210	N/A	39.84	.5312E+05	23.500
3	42.120	N/A	39.84	.6033E+05	23.500

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:22:39
  Output: JCCRA.OUT


 ==========================   OUTLET STRUCTURE   =========================

          STRUCTURE NUMBER 1

                Type 6: ORIFICE
                   DIAMETER:      .50 feet.

                INVERT ELEVATION :    26.50 feet.
                    ORIFICE COEF :     .600

          STRUCTURE NUMBER 2

                Type 4: CIRCULAR STAND PIPE
                   DIAMETER:     4.00 feet.

                 CREST ELEVATION :    28.25 feet.
                       WEIR COEF :    3.100
```

ORIFICE COEF : .600

Note that the diameter listed here is the EFFECTIVE diameter.
If this structure will have a grate, make sure the grate has
this effective diameter (and perimeter).

STRUCTURE NUMBER 3

Type 3: RECTANGULAR WEIR OR SPILLWAY
LENGTH: 6.00 feet.

CREST ELEVATION : 29.25 feet.
DISCHARGE COEF : 2.400

1********** PONDOPT **********
********** Version 1.45 **********
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS **********

PROJECT: James City County High School
User: SDN WATER RESOURCES
Date: 05/31/1995 Wednesday
Time: 15:22:39
Output: JCCRA.OUT

Stage-Area
Filename: JCCPOND.DAT

TAILWATER STAGE: 22.980 feet.
INITIAL STAGE: 26.750 feet.

========== STAGE-STORAGE-DISCHARGE RELATIONSHIP ==========

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< STORM 1 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
26.250	.0000	.0000
28.000	.6415	1.057
28.250	.7462	1.158
29.250	1.199	62.00
30.000	1.577	156.8
32.000	2.748	646.3
34.000	4.174	1344.
36.000	5.873	2198.

1********** PONDOPT **********
********** Version 1.45 **********
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS **********

PROJECT: James City County High School
User: SDN WATER RESOURCES
Date: 05/31/1995 Wednesday
Time: 15:22:39
Output: JCCRA.OUT

TAILWATER STAGE: 22.980 feet.
INITIAL STAGE: 26.750 feet.

<<<<<<<<<<<<<<<<<<<<<<< ROUTING RESULTS FOR 1 >>>>>>>>>>>>>>>>>>>>>>>

MAXIMUM ELEVATION: 28.43 feet.
MAXIMUM INFLOW: 26.44 cfs.
MAXIMUM OUTFLOW: 11.81 cfs.
MAXIMUM STORAGE: .8255 acre-feet.

CONTINUITY ERROR: -.236 percent.

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	8.080	.000
0	9.020	.013
1	9.960	.028
1	10.890	.043
2	11.830	.061
2	12.770	.079
3	13.710	.100
3	14.650	.121
4	15.590	.144
4	16.520	.168
5	17.460	.194
5	18.400	.221
6	19.340	.250
6	20.280	.280
7	21.220	.311
7	22.150	.344
8	23.090	.378
8	24.030	.413
9	24.970	.450
9	25.910	.488
10	26.270	.527
10	26.250	.566
11	26.230	.606
11	26.210	.645
12	26.190	.684
12	26.170	.723
13	26.150	.762
13	26.130	.801
14	26.110	.839
14	26.090	.878
15	26.070	.916
15	26.050	.955
16	26.030	.993
16	26.010	1.031
17	25.980	1.062
17	25.960	1.079
18	25.940	1.095
18	25.920	1.112
19	25.900	1.128
19	25.980	1.145
20	26.440	1.593
20	26.360	3.777
21	25.900	5.745
21	17.370	7.144
22	16.910	8.024
22	16.450	8.786
23	15.990	9.440
23	15.530	9.997
24	15.070	10.464
24	14.610	10.849
25	14.150	11.160
25	13.690	11.403
26	13.240	11.584
26	12.780	11.710
27	12.320	11.784
27	11.860	11.811
28	11.400	11.795
28	10.940	11.740
29	10.480	11.649
29	10.020	11.526
30	9.560	11.373
30	9.110	11.194
31	8.650	10.990
31	8.190	10.764
32	7.730	10.517
32	7.270	10.251
33	6.810	9.969
33	6.350	9.670

34	5.890	9.358
34	5.430	9.032
35	4.970	8.695
35	4.520	8.347
36	4.060	7.990
36	3.600	7.624
37	3.140	7.249
37	2.680	6.867
38	2.220	6.478
38	1.760	6.083
39	1.300	5.682
39	.840	5.276
40	.390	4.866
40	.000	4.455
41	.000	4.063
41	.000	3.705
42	.000	3.379
42	.000	3.081
43	.000	2.810
43	.000	2.563
44	.000	2.337
44	.000	2.131
45	.000	1.944
45	.000	1.773
46	.000	1.616
46	.000	1.474
47	.000	1.344
47	.000	1.226
48	.000	1.158
48	.000	1.157
49	.000	1.156
49	.000	1.155
50	.000	1.155
50	.000	1.154
51	.000	1.153
51	.000	1.152
52	.000	1.151
52	.000	1.151
53	.000	1.150
53	.000	1.149
54	.000	1.148
54	.000	1.148
55	.000	1.147
55	.000	1.146
56	.000	1.145
56	.000	1.145
57	.000	1.144
57	.000	1.143
58	.000	1.142
58	.000	1.142
59	.000	1.141
59	.000	1.140
60	.000	1.139
60	.000	1.139
61	.000	1.138
61	.000	1.137
62	.000	1.136
62	.000	1.136
63	.000	1.135
63	.000	1.134
64	.000	1.133
64	.000	1.133
65	.000	1.132
65	.000	1.131
66	.000	1.130
66	.000	1.130
67	.000	1.129
67	.000	1.128
68	.000	1.127
68	.000	1.127
69	.000	1.126
69	.000	1.125
70	.000	1.124

70	.000	1.124
71	.000	1.123
71	.000	1.122
72	.000	1.121
72	.000	1.121
73	.000	1.120
73	.000	1.119
74	.000	1.118
74	.000	1.118
75	.000	1.117
75	.000	1.116
76	.000	1.116
76	.000	1.115
77	.000	1.114
77	.000	1.113
78	.000	1.113
78	.000	1.112
79	.000	1.111
79	.000	1.110
80	.000	1.110
80	.000	1.109
81	.000	1.108
81	.000	1.107
82	.000	1.107
82	.000	1.106
83	.000	1.105
83	.000	1.104
84	.000	1.104
84	.000	1.103
85	.000	1.102
85	.000	1.102
86	.000	1.101
86	.000	1.100
87	.000	1.099
87	.000	1.099
88	.000	1.098
88	.000	1.097
89	.000	1.096
89	.000	1.096
90	.000	1.095
90	.000	1.094
91	.000	1.094
91	.000	1.093
92	.000	1.092
92	.000	1.091
93	.000	1.091
93	.000	1.090
94	.000	1.089
94	.000	1.089
95	.000	1.088
95	.000	1.087
96	.000	1.086
96	.000	1.086
97	.000	1.085
97	.000	1.084
98	.000	1.084
98	.000	1.083
99	.000	1.082
99	.000	1.081
100	.000	1.081
100	.000	1.080
101	.000	1.079
101	.000	1.078
102	.000	1.078
102	.000	1.077
103	.000	1.076
103	.000	1.076
104	.000	1.075
104	.000	1.074
105	.000	1.074
105	.000	1.073
106	.000	1.072
106	.000	1.071

107	.000	1.071
107	.000	1.070
108	.000	1.069
108	.000	1.069
109	.000	1.068
109	.000	1.067
110	.000	1.066
110	.000	1.066
111	.000	1.065
111	.000	1.064
112	.000	1.064
112	.000	1.063
113	.000	1.062
113	.000	1.062
114	.000	1.061
114	.000	1.060
115	.000	1.059
115	.000	1.059
116	.000	1.058
116	.000	1.057
117	.000	1.056
117	.000	1.054
118	.000	1.053
118	.000	1.051
119	.000	1.050
119	.000	1.048
120	.000	1.046
120	.000	1.045
121	.000	1.043
121	.000	1.042
122	.000	1.040
122	.000	1.038
123	.000	1.037
123	.000	1.035
124	.000	1.034
124	.000	1.032
125	.000	1.031
125	.000	1.029
125	.000	1.027
126	.000	1.026
126	.000	1.024
127	.000	1.023
127	.000	1.021
128	.000	1.020
128	.000	1.018
129	.000	1.016
129	.000	1.015
130	.000	1.013
130	.000	1.012
131	.000	1.010
131	.000	1.009
132	.000	1.007
132	.000	1.006
133	.000	1.004
133	.000	1.003
134	.000	1.001
134	.000	.999
135	.000	.998
135	.000	.996
136	.000	.995
136	.000	.993
137	.000	.992
137	.000	.990
138	.000	.989
138	.000	.987
139	.000	.986
139	.000	.984
140	.000	.983
140	.000	.981
141	.000	.980
141	.000	.978
142	.000	.977
142	.000	.975

143	.000	.974
143	.000	.972
144	.000	.971
144	.000	.969
145	.000	.968
145	.000	.966
146	.000	.965
146	.000	.963
147	.000	.962
147	.000	.961
148	.000	.959
148	.000	.958
149	.000	.956
149	.000	.955
150	.000	.953
150	.000	.952
151	.000	.950
151	.000	.949
152	.000	.947
152	.000	.946
153	.000	.945
153	.000	.943
154	.000	.942
154	.000	.940
155	.000	.939
155	.000	.937
156	.000	.936
156	.000	.934
157	.000	.933
157	.000	.932
158	.000	.930
158	.000	.929
159	.000	.927
159	.000	.926
160	.000	.924
160	.000	.923
161	.000	.922

```
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:22:39
  Output: JCCRA.OUT


 Stage-Area
 Filename: JCCPOND.DAT

           TAILWATER STAGE:   23.500 feet.
             INITIAL STAGE:   26.750 feet.

 ==================   STAGE-STORAGE-DISCHARGE RELATIONSHIP   ===================

 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   STORM  2      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
26.250	.0000	.0000
28.000	.6415	1.057
28.250	.7462	1.158
29.250	1.199	62.00
30.000	1.577	156.8
32.000	2.748	646.3
34.000	4.174	1344.
36.000	5.873	2198.

```
1*******************************     PONDOPT      *******************************
```

```
*******************************   Version 1.45   *******************************
******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

PROJECT: James City County High School
   User: SDN WATER RESOURCES
   Date: 05/31/1995 Wednesday
   Time: 15:22:39
 Output: JCCRA.OUT


          TAILWATER STAGE:   23.500 feet.
            INITIAL STAGE:   26.750 feet.

<<<<<<<<<<<<<<<<<<<<<<<   ROUTING RESULTS FOR        2    >>>>>>>>>>>>>>>>>>>>>>>

    MAXIMUM ELEVATION:    28.64     feet.
       MAXIMUM INFLOW:    37.21     cfs.
      MAXIMUM OUTFLOW:    24.64     cfs.
      MAXIMUM STORAGE:    .9210     acre-feet.

     CONTINUITY ERROR:    -.250     percent.
```

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	11.000	.000
0	12.280	.018
1	13.560	.038
1	14.830	.059
2	16.110	.083
2	17.390	.108
3	18.670	.136
3	19.940	.165
4	21.220	.196
4	22.500	.229
5	23.780	.264
5	25.050	.301
6	26.330	.340
6	27.610	.381
7	28.890	.423
7	30.160	.468
8	31.440	.514
8	32.720	.562
9	34.000	.612
9	35.270	.664
10	35.800	.718
10	35.840	.771
11	35.870	.825
11	35.900	.879
12	35.940	.932
12	35.970	.986
13	36.000	1.039
13	36.040	1.072
14	36.070	1.096
14	36.100	1.119
15	36.140	1.142
15	36.170	2.104
16	36.200	5.105
16	36.240	7.844
17	36.270	10.345
17	36.300	12.629
18	36.340	14.715
18	36.370	16.620
19	36.400	18.360
19	36.560	19.955
20	37.210	21.446
20	37.110	22.829
21	36.450	24.057
21	24.800	24.635
22	24.140	24.621
22	23.490	24.550

23	22.830	24.428
23	22.180	24.258
24	21.520	24.046
24	20.870	23.795
25	20.210	23.509
25	19.560	23.190
26	18.900	22.841
26	18.250	22.465
27	17.590	22.065
27	16.930	21.642
28	16.280	21.199
28	15.620	20.737
29	14.970	20.258
29	14.310	19.763
30	13.660	19.254
30	13.000	18.733
31	12.350	18.199
31	11.690	17.655
32	11.040	17.102
32	10.380	16.539
33	9.730	15.968
33	9.070	15.390
34	8.410	14.804
34	7.760	14.213
35	7.100	13.616
35	6.450	13.014
36	5.790	12.407
36	5.140	11.796
37	4.480	11.181
37	3.830	10.562
38	3.170	9.940
38	2.520	9.316
39	1.860	8.688
39	1.210	8.059
40	.550	7.427
40	.000	6.797
41	.000	6.199
41	.000	5.653
42	.000	5.155
42	.000	4.701
43	.000	4.287
43	.000	3.910
44	.000	3.566
44	.000	3.252
45	.000	2.966
45	.000	2.704
46	.000	2.466
46	.000	2.249
47	.000	2.051
47	.000	1.871
48	.000	1.706
48	.000	1.556
49	.000	1.419
49	.000	1.294
50	.000	1.180
50	.000	1.157
51	.000	1.157
51	.000	1.156
52	.000	1.155
52	.000	1.154
53	.000	1.153
53	.000	1.153
54	.000	1.152
54	.000	1.151
55	.000	1.150
55	.000	1.150
56	.000	1.149
56	.000	1.148
57	.000	1.147
57	.000	1.147
58	.000	1.146
58	.000	1.145
59	.000	1.144

59	.000	1.144
60	.000	1.143
60	.000	1.142
61	.000	1.141
61	.000	1.141
62	.000	1.140
62	.000	1.139
63	.000	1.138
63	.000	1.138
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94	.000	1.093
94	.000	1.092
95	.000	1.091
95	.000	1.090

96	.000	1.090
96	.000	1.089
97	.000	1.088
97	.000	1.088
98	.000	1.087
98	.000	1.086
99	.000	1.085
99	.000	1.085
100	.000	1.084
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120	.000	1.052
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121	.000	1.049
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124	.000	1.041
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125	.000	1.038
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127	.000	1.028
128	.000	1.027
128	.000	1.025
129	.000	1.024
129	.000	1.022
130	.000	1.020
130	.000	1.019
131	.000	1.017
131	.000	1.016

132	.000	1.014
132	.000	1.013
133	.000	1.011
133	.000	1.010
134	.000	1.008
134	.000	1.007
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135	.000	1.003
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136	.000	1.000
137	.000	.999
137	.000	.997
138	.000	.996
138	.000	.994
139	.000	.993
139	.000	.991
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140	.000	.988
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142	.000	.982
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151	.000	.957
151	.000	.956
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152	.000	.953
153	.000	.951
153	.000	.950
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154	.000	.947
155	.000	.945
155	.000	.944
156	.000	.942
156	.000	.941
157	.000	.940
157	.000	.938
158	.000	.937
158	.000	.935
159	.000	.934
159	.000	.932
160	.000	.931
160	.000	.930
161	.000	.928

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1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 ******************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   ******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:22:39
  Output: JCCRA.OUT


 Stage-Area
 Filename: JCCPOND.DAT
```

TAILWATER STAGE: 23.500 feet.
INITIAL STAGE: 26.750 feet.

========== STAGE-STORAGE-DISCHARGE RELATIONSHIP ==========

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< STORM 3 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

STAGE (ft)	STORAGE VOLUME (ac-ft)	DISCHARGE (cfs)
26.250	.0000	.0000
28.000	.6415	1.057
28.250	.7462	1.158
29.250	1.199	62.00
30.000	1.577	156.8
32.000	2.748	646.3
34.000	4.174	1344.
36.000	5.873	2198.

1********** PONDOPT **********
********** Version 1.45 **********
********** COMPUTER-AIDED HYDROLOGY & HYDRAULICS **********

PROJECT: James City County High School
User: SDN WATER RESOURCES
Date: 05/31/1995 Wednesday
Time: 15:22:39
Output: JCCRA.OUT

TAILWATER STAGE: 23.500 feet.
INITIAL STAGE: 26.750 feet.

<<<<<<<<<<<<<<<<<<<<<< ROUTING RESULTS FOR 3 >>>>>>>>>>>>>>>>>>>>>>

MAXIMUM ELEVATION:	28.74	feet.
MAXIMUM INFLOW:	42.12	cfs.
MAXIMUM OUTFLOW:	31.09	cfs.
MAXIMUM STORAGE:	.9691	acre-feet.
CONTINUITY ERROR:	-.265	percent.

TIME (min)	INFLOW RATE (cfs)	OUTFLOW RATE (cfs)
0	12.880	.000
0	14.330	.021
1	15.780	.044
1	17.240	.069
2	18.690	.096
2	20.140	.126
3	21.590	.158
3	23.040	.191
4	24.490	.227
4	25.950	.266
5	27.400	.306
5	28.850	.349
6	30.300	.393
6	31.750	.440
7	33.200	.489
7	34.660	.540
8	36.110	.593
8	37.560	.649
9	39.010	.706
9	40.460	.766
10	41.050	.827
10	41.060	.889
11	41.070	.950
11	41.080	1.011

12	41.090	1.064
12	41.100	1.090
13	41.110	1.117
13	41.120	1.143
14	41.130	2.707
14	41.140	6.090
15	41.150	9.177
15	41.160	11.992
16	41.170	14.560
16	41.190	16.904
17	41.200	19.042
17	41.210	20.993
18	41.220	22.774
18	41.230	24.398
19	41.240	25.880
19	41.390	27.239
20	42.120	28.517
20	42.010	29.710
21	41.270	30.760
21	27.660	31.086
22	26.930	30.753
22	26.200	30.384
23	25.470	29.983
23	24.740	29.554
24	24.010	29.098
24	23.280	28.618
25	22.550	28.116
25	21.820	27.594
26	21.080	27.053
26	20.350	26.495
27	19.620	25.922
27	18.890	25.335
28	18.160	24.735
28	17.430	24.124
29	16.700	23.503
29	15.970	22.872
30	15.240	22.232
30	14.500	21.584
31	13.770	20.928
31	13.040	20.266
32	12.310	19.598
32	11.580	18.924
33	10.850	18.245
33	10.120	17.562
34	9.390	16.875
34	8.660	16.184
35	7.920	15.489
35	7.190	14.790
36	6.460	14.089
36	5.730	13.385
37	5.000	12.679
37	4.270	11.971
38	3.540	11.261
38	2.810	10.549
39	2.080	9.836
39	1.350	9.121
40	.610	8.404
40	.000	7.691
41	.000	7.014
41	.000	6.396
42	.000	5.833
42	.000	5.320
43	.000	4.851
43	.000	4.424
44	.000	4.035
44	.000	3.680
45	.000	3.356
45	.000	3.060
46	.000	2.791
46	.000	2.545
47	.000	2.321
47	.000	2.117
48	.000	1.930

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49	.000	1.464
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50	.000	1.218
51	.000	1.158
51	.000	1.157
52	.000	1.156
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53	.000	1.154
53	.000	1.154
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83	.000	1.109
84	.000	1.108
84	.000	1.107

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86	.000	1.105
86	.000	1.104
87	.000	1.104
87	.000	1.103
88	.000	1.102
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89	.000	1.101
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90	.000	1.099
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94	.000	1.093
95	.000	1.092
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96	.000	1.091
96	.000	1.090
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97	.000	1.088
98	.000	1.088
98	.000	1.087
99	.000	1.086
99	.000	1.086
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100	.000	1.084
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120	.000	1.054
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124	.000	1.042
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136	.000	1.002
137	.000	1.001
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139	.000	.995
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154	.000	.949
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155	.000	.946
156	.000	.944
156	.000	.943
157	.000	.942

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          157                .000                .940
          158                .000                .939
          158                .000                .937
          159                .000                .936
          159                .000                .934
          160                .000                .933
          160                .000                .931
          161                .000                .930
1*******************************     PONDOPT      *******************************
 *******************************   Version 1.45   *******************************
 *****************   COMPUTER-AIDED HYDROLOGY & HYDRAULICS   *******************

 PROJECT: James City County High School
    User: SDN WATER RESOURCES
    Date: 05/31/1995 Wednesday
    Time: 15:22:39
  Output: JCCRA.OUT
```

ROUTING SUMMARY ----------
SIMULATION MODE ----------
FOR THE ABOVE CASE ----------

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	28.425	.826	26.440	11.811
2	28.636	.921	37.210	24.635
3	28.742	.969	42.120	31.086

Appendix C

Temporary Sediment Basin Design Data Sheet

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project James City County High School

Basin # 2 Location South End of Property

Total area draining to basin: 18.47 acres.

Basin Volume Design

Wet Storage:

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

   67 cu. yds. x 18.47 acres = 1,237.5 cu. yds.

2. Available basin volume = 1,356 cu. yds. at elevation 26.25. (From storage - elevation curve)

3. Excavate 1,356 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 18.47 acres = 609.5 cu. yds.

5. Elevation corresponding to cleanout level = 24.40.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1.85 ft. (Min. = 1.0 ft.)

Dry Storage:

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

   67 cu. yds. x 18.47 acres = 1,237.5 cu. yds.

8. Total available basin volume at crest of riser* = 2,562 cu. yds. at elevation 28.25. (From Storage - Elevation Curve)

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

9. Diameter of dewatering orifice = 6 in.

10. Diameter of ~~flexible~~ PVC tubing = 6 in. (~~diameter of dewatering orifice plus 2 inches~~ Alternate Design).

Preliminary Design Elevations

11. Crest of Riser = 28.25

Top of Dam = 36.0

Design High Water = 29.25

Upstream Toe of Dam = 22.0

Basin Shape

12. $\frac{\text{Length of Flow}}{\text{Effective Width}} = \frac{178}{52} = \frac{L}{We} =$ 3.4

If > 2, baffles are not required ok

If < 2, baffles are required _____

Runoff

13. Q_2 = 26.68 cfs (~~From Chapter 5~~) FROM Routing Calculations

14. Q_{25} = 56.33 cfs (~~From Chapter 5~~) FROM Routing Calculations

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = 26.28 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = 56.33 cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = 0.42 ft. (Using Q_2)

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

Without emergency spillway:

Assumed available head (h) = 0.92 ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 48" in. Actual head (h) = 0.42 ft. - 2 year storm
0.92 - 25 year storm

(~~From Plate 3.14-8.~~) Calculated from Routing Simulation

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 354 ft.

Head (H) on barrel through embankment = 0.93 ft. - 2 year storm
4.15 - 10 year storm

(~~From Plate 3.14-7~~). Calculated

19. Barrel diameter = 36" in.

(~~From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]~~). calculated ~~for~~ Smooth wall corrugated Polyethelyne Pipe

20. Trash rack and anti-vortex device

Diameter = 72 inches.

Height = 21 inches.

(From Table 3.14-D).

Emergency Spillway Design ~~Not needed~~

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = 29.65 cfs.

22. Bottom width (b) = 6 ft.; the slope of the exit channel (s) = 0.0215 ft./foot; and the minimum length of the exit channel (x) = NA ft. will pass 25 year storm with water surface elevation at 30.52 if spillway becomes ~~ob~~ completely clogged
~~(From Table 3.14-C).~~

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 6.25 ft.

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

Slope of principal spillway barrel (S_b) = 0.42 %

Length of barrel in saturated zone (L_s) = 44' ft.

24. Number of collars required = 1 dimensions = 7'5" x 7'5"

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 36

Design High Water = 28.96 10 year storm

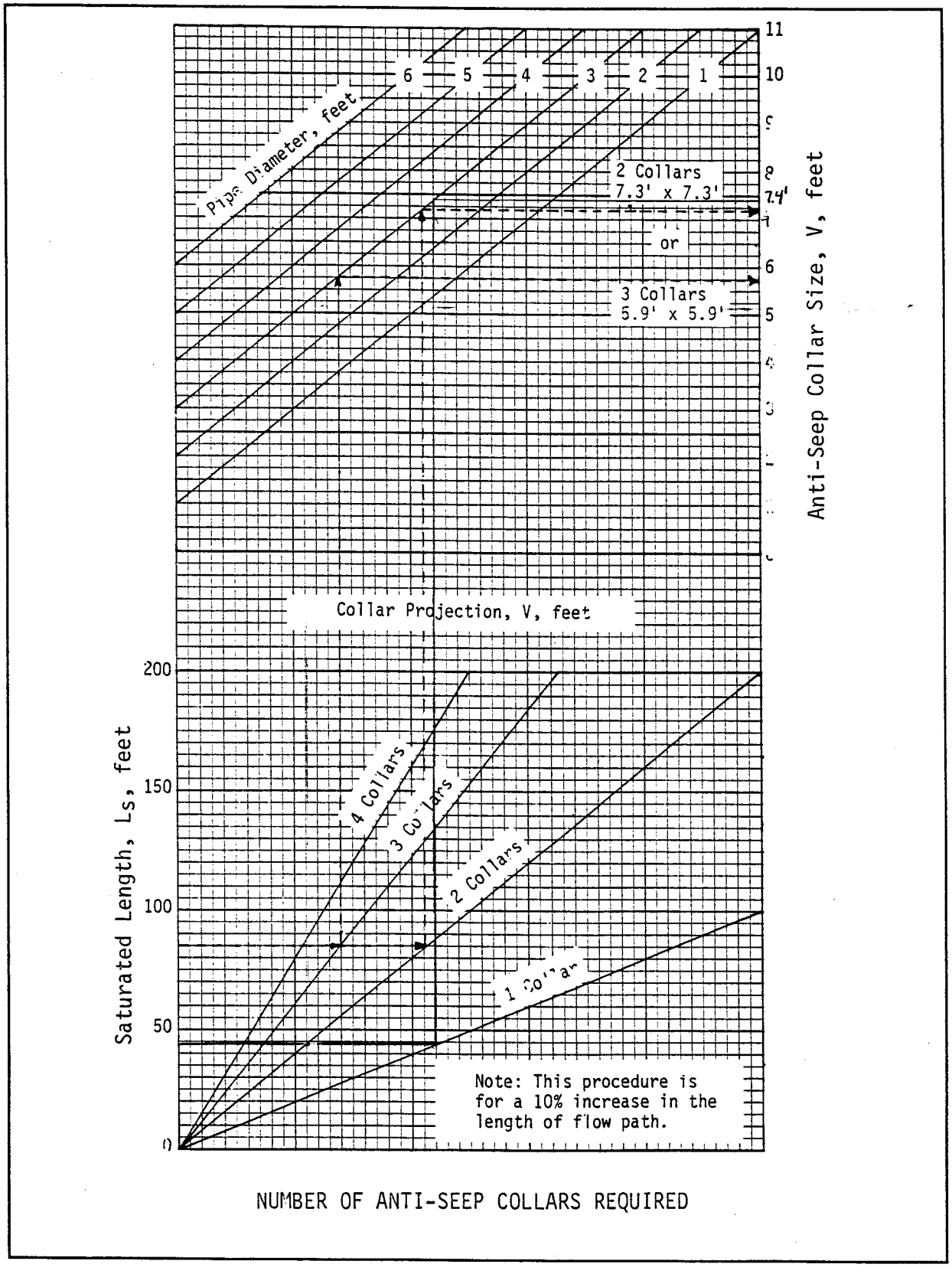
Emergency Spillway Crest = 29.25

Principal Spillway Crest = 28.25

Dewatering Orifice Invert = 26.25

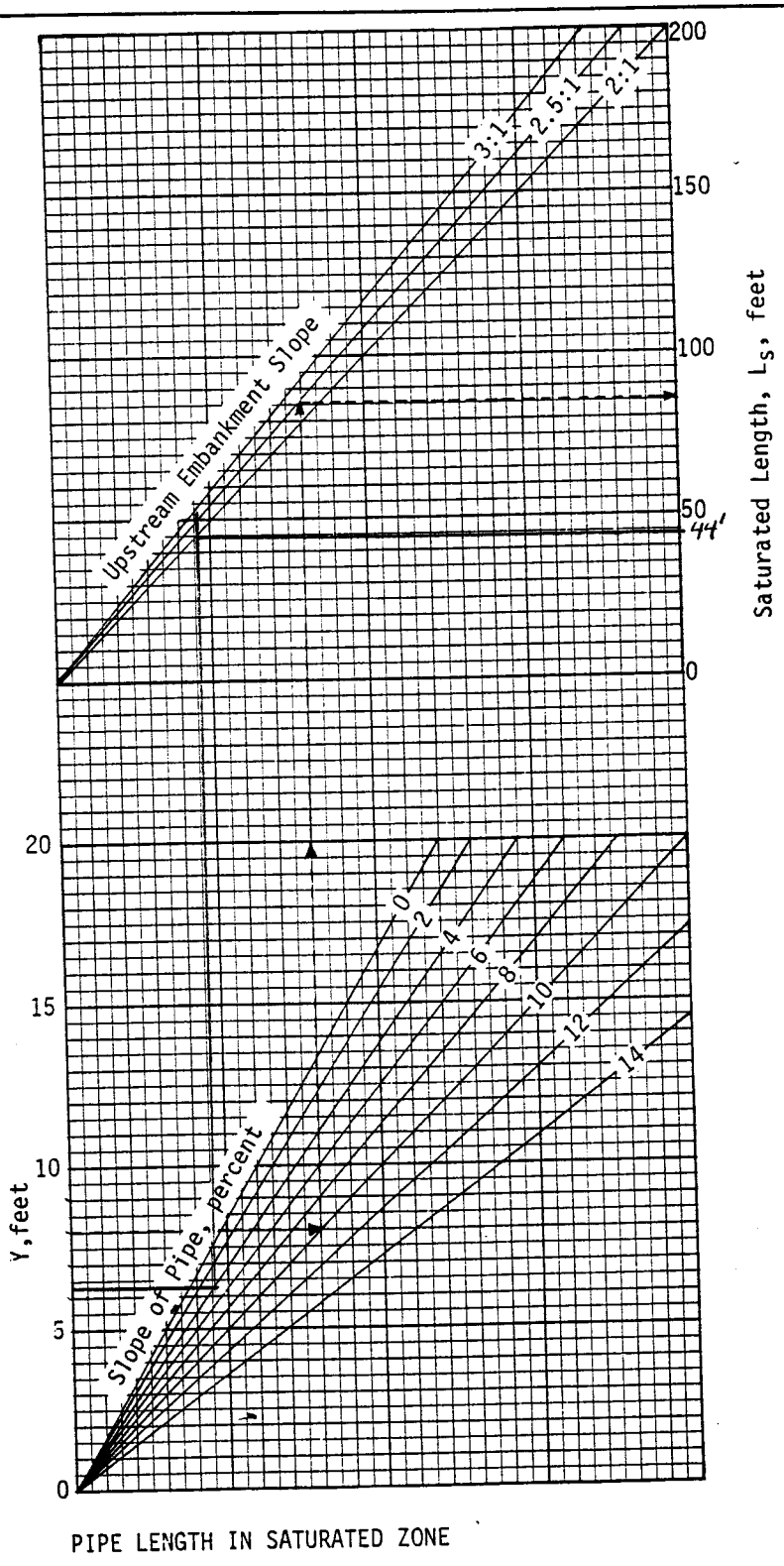
Cleanout Elevation = 24.40

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 22



Source: USDA-SCS

Plate 3.14-12



Source: USDA-SCS

Plate 3.14-11

Appendix D

James City County

Worksheet for BMP Point System

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
Regional BMP	9	x	100%	=	9
		x		=	
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 9

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit (0.1 per 1%)		Points for Natural Open Space
16%	x	0.1	=	1.6

C. TOTAL WEIGHTED POINTS

Structural BMP Points	+	Natural Open Space Points	=	TOTAL
9	+	1.6	=	10.6

ECS MID-ATLANTIC, LLC
Geotechnical • Construction Materials • Environmental • Facilities

December 11, 2006

Mr. Bruce Abbott
AES Consulting Engineers, Inc.
5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188

ECS Project No. 07:8817

RECEIVED
DEC 14 2006
AES CONSULTING ENGINEERS

Reference: Fill Evaluation
Eagles Way
James City County, Virginia

Dear Mr. Abbott,

ECS Mid-Atlantic, LLC has completed a subsurface exploration and engineering evaluation of the above referenced project. This report presents the results of the subsurface exploration and engineering analyses for the project referenced above. This portion of the project has been completed in accordance with our proposal No. 07:12861 dated November 28, 2006.

Introduction:

The project site is located at the end of Eagles Way adjacent to the Jamestown Hundred Subdivision and Jamestown High School in James City County, Virginia. We understand the project will consist of extending Eagles Way and terminating at a parking lot located on the backside of Jamestown High School property. There is an large stockpile located within the alignment that is proposed to be utilized as a fill source to grade the site. We have been requested to evaluate the condition of the stockpile soils for suitability of reuse.

Field Exploration Procedures:

Two (2) hand auger probes were drilled to depths of about 6 feet below existing site grades as referenced to opposite ends of the existing top elevation of the stockpile. The hand auger probes utilize a 3-inch diameter bucket auger that is advanced into the ground generally in 6-inch intervals and soil can be extracted for visual inspection. This method can not determine the exact consistency or density of in place soils. Rather, it is used to determine the general soil types but can provide alternative determination of the consistency or density of in-place soils by the ease of which the hand auger turns and advances. After recovery, each sample was removed from the sampler and visually classified. Representative portions of each sample were sealed in

plastic bags and delivered to our laboratory in Williamsburg, Virginia, for further visual examination.

Subsurface Conditions:

Our subsurface exploration and site reconnaissance determined that the site is covered with heavy vegetation. The soils encountered consisted of wet to saturated mixed soil types consisting of Silty and Clayey Sand, and Sandy Fat Clay with various debris consisting of wood, rocks, brick, and some pieces of steel, etc.

Groundwater was not encountered, however, these soils were obviously placed or not used due to their moisture content at the time of stockpiling. Also, we observed that water was "flowing" into the hand auger hole at one location.

Comments:

The soils encountered were wet to saturated. As such, a significant amount of drying time would be required to possibly attain a suitable moisture content for compaction purposes. However, we also encountered Sandy Fat Clay soils in the hand augers. These soils would not be considered suitable for reuse due to their shrink-swell characteristics.

Therefore, based on the conditions of the soils encountered, we have to assume the entire stockpile is made up of similar materials. As such, we do not believe any of these soils would be considered suitable for reuse as compacted structural fill for roadway support.

This report has been prepared in order to aid in the evaluation of this site and to assist the Contractor, Architect and Engineer in the design and planning of the project. The report scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to soil and foundation characteristics.

We have appreciated being of service to you during the design phase of this project and look forward to its successful construction. If you should have any questions regarding the information and recommendations contained in this report or if we can be of any further assistance, please contact our office.

Respectfully,

ECS MID-ATLANTIC, LLC

David Gordinier, E.I.T.
Project Engineer

COMMONWEALTH OF VIRGINIA
MICHAEL J. GALLI
No. 030684
12/11/06
PROFESSIONAL ENGINEER

Michael J. Galli, P.E.
Principal Engineer

A.D. Whittaker Constru

Phone (804) 798-3259

Mark -
What do you remember about the work they were to accomplish prior to closing this out?
4/7

March 28, 2000

Darryl

Mr. David Meador
Engineering Inspector
James City County
P. O. Box 8784
Williamsburg, Virginia 23187

Re: Williamsburg-James City County High School
E & S Bond No. 8131 21 79

Gentlemen:

Please be advised that all erosion control punch list items have been corrected at the above-referenced project. Furthermore, we have enclosed BMP certifications and as-built surveys of the two retention ponds on site.

ADW did not address or correct the issues as they pertain to the offsite drainage ditch at the south pond. We feel that if we attempt to stabilize this area, ADW will indeed accept the responsibility for maintenance and correction of deficient items in the future. Again, please be advised that ADW did not construct or agree to maintain this offsite drainage ditch as this was not part of our contractual obligations.

We trust that our efforts will satisfy James City County's environmental requirements and you will release the E & S Bond immediately. Should you have any questions or wish to meet at the site, please contact our office at your convenience.

Yours truly,

David W. Hanky
Project Manager

DWH:as

11129 Air Park Road • P.O. Box 6190 • Ashland, Virginia 23005

ADW

A.D. Whittaker Construction, Inc.

Phone (804) 798-3259

Fax (804) 798-8336

APR 2000
RECEIVED
ENVIRONMENTAL DIVISION

March 28, 2000

Mr. David Meador
Engineering Inspector
James City County
P. O. Box 8784
Williamsburg, Virginia 23187

COPY

Re: Williamsburg-James City County High School
E & S Bond No. 8131 21 79

Gentlemen:

Please be advised that all erosion control punch list items have been corrected at the above-referenced project. Furthermore, we have enclosed BMP certifications and as-built surveys of the two retention ponds on site.

ADW did not address or correct the issues as they pertain to the offsite drainage ditch at the south pond. We feel that if we attempt to stabilize this area, ADW will indeed accept the responsibility for maintenance and correction of deficient items in the future. Again, please be advised that ADW did not construct or agree to maintain this offsite drainage ditch as this was not part of our contractual obligations.

We trust that our efforts will satisfy James City County's environmental requirements and you will release the E & S Bond immediately. Should you have any questions or wish to meet at the site, please contact our office at your convenience.

Yours truly,

David W. Hanky
Project Manager

DWH:as

Per Ed Quattrough w/ School Bd offices, the outcome of litigation was that no more work was reqd. of Whitaker.
DEC 5/17/00

4/18/00 Follow-up: We have had no response to the above letter. Please advise if our Bond has been released. Thank you.

A.D.W., Inc.

11129 Air Park Road • P.O. Box 6190 • Ashland, Virginia 23005

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

July 10, 2000

Mr. David Hanky
A.D. Whittaker Construction, Inc.
P.O. Box 6190
Ashland, VA 23005

RE: Williamsburg-James City County High School As-Built Information

Dear Mr. Hanky:

I have reviewed the as-built and certification information submitted for the above project. The only remaining information that needs to be provided prior to release of the project bond is data regarding the emergency spillways for each detention basin. Resubmit the "Topographic Survey" as-built plans for each basin showing the elevation, longitudinal slope and width of the basin's emergency spillway.

Upon submission of that information assuming the spillways have been installed correctly, the sediment control bond can be released. Please contact me at 253-6673 if you have any questions.

Sincerely,

Darryl E. Cook

Darryl E. Cook, P.E.
Environmental Director

ADW

A.D. Whittaker Construction, Inc.

Phone (804) 798-3259

Fax (804) 798-8336

August 29, 2000

AUG 2000
RECEIVED
ENVIRONMENTAL DIVISION

Mr. Darryl E. Cook, P.E.
Environmental Director
James City County
P. O. Box 8784
Williamsburg, Virginia 23187

Re: Williamsburg-James City County High School

Dear Mr. Cook:

We are in receipt of a copy of a letter dated August 19, 2000 sent to you from the Woodson Company which transmitted the revised Topographic surveys for the subject project.

We trust that this is the final information you need in order to release the E & S Bond furnished by our company in 1996.

Please advise.

Yours truly,

Anne H. Shawn
Office Manager

Cc: David Hanky, Project Manager

11129 Air Park Road • P.O. Box 6190 • Ashland, Virginia 23005

THE WOODSON COMPANY
184 SHADOW LANE, SURRY, VIRGINIA 23883 757-294-5310

August 19, 2000

Daryl E. Cook
Development Management
James City County, VA 23185-8784

RE: Jamestown High School As-Built Information

Per your letter to David Hanky dated 7/20/00 I have revised the Topographic Surveys for each basin. For the south basin I have added cross sections of the emergency spillway. For the west basin, we were unable to locate any drainage structure that looked like the plans provided me. I have shown the low area at the edge of clearing where the emergency overflow channels away from the basin until it spreads out and into the swamp.

Sincerely,

Charles Reid Sheckler

Attachments

Cc: David Hanky

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

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codecomp@james-city.va.us

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environ@james-city.va.us

PLANNING
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planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 259-4116

September 22, 2000

Mr. Joe Grebb
Williamsburg/James City County Schools
Building Services
597 Jolly Pond Road
Williamsburg, VA 23185

RE: Jamestown High School Stormwater Facilities

Dear Mr. Grebb:

As I discussed with you recently, we have received the record or as-built drawings for the two detention facilities located on the high school property. The drawings indicate that the structures were built in general conformance with the plans and a field inspection showed they did not suffer much damage because of Hurricane Floyd last year.

One item the inspection did reveal was that the aquatic benches that were to be provided in each basin are not present around the entire perimeter of either basin. These benches are flat areas adjacent to the edge of the pond and are about six feet wide at an elevation of one foot under the surface of the water. They serve two purposes, one to allow wetlands plants to grow around the perimeter of the pond and the other is a safety function. They help someone recover footing if they happen to slide into the pond.

I understand no more work is to be accomplished by the contractor that built the school. Therefore, I would suggest that signs be placed near the ponds warning people that the ponds are about four feet in depth. Just for your information, the information that we have received regarding the ponds closes out the project for us and we will be releasing the remaining surety instrument we have on the project.

Sincerely,

Darryl E Cook

Darryl E. Cook, P.E.
Environmental Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
4451 IRONBOUND RD.
WILLIAMSBURG, VIRGINIA 23188-2621

CHARLES D. NOTTINGHAM
COMMISSIONER

QUINTIN D. ELLIOTT
RESIDENT ENGINEER

JUL 2000
RECEIVED
PLANNING DEPARTMENT

~~March 30,~~ 2000
July 13

Tammy Rosario
James City County Planning
P.O. Box 8784
Williamsburg, VA 23187

Ref: Jamestown Hundred
"T" Turn Around
Route 5, James City County

Dear Ms. Rosario:

We have received a revision to the plans for the above referenced project from the Engineer.

The proposed changes replace the previously proposed cul-de-sac at the end of Legacy Drive with a T-turnaround. This design change appears to meet all of our design criteria and is satisfactory in our opinion. It should also be noted that in previous conversations with Mr. Paul Tubac it appears that there will be an entrance to a park at the end of Legacy Drive, which will work well with this proposed T-turn around as we have discussed.

Should you have any further questions concerning this matter, please advise.

Sincerely,

John E. Mazur
Assistant Resident Engineer

JEM/ehw

cc: Deirdre P. Wells, AES
Cheryl D. Chance

WE KEEP VIRGINIA MOVING

To: Greensprings Trailhead

From: Bruce Abbott

Date: 11/1/2006

Re: Greensprings Trailhead- Project # 9322-33

Items of Discussion

- County review (no JCSA), what about VDOT?
- Environmental plans
- Does the buffer apply? (35 feet)
- Center the new road in center of 90' easement?
- The planned parking spaces are 9'x20'; however they need to be changed to 9'x18'.
- The planned driving aisles are 22'. Should they be changed to 24'?
- Currently the bus parking spaces are 40'; however the new buses are 40'. Should we increase the spaces to 44'?
- Drainage swale down drive aisle, center of this could eliminate curb and gutter and h.c. ramps.
- If the above is done, sidewalk could be installed.
- Need a 25' radius to accommodate the buses for layout purposes.
- Existing dirt on fill material. Most of the dirt has already been removed. The site may need additional off site fill to meet proposed grades.
- Dry swale? , ($2,000 LF)
- Soils (27), type D (bad for drainage).

9-
23-
27-
14C
15C

S:\Jobs\9322\33-GreenspringsTrailhead\Admin\Correspondence\Letters\Items to Discuss10-31-06.doc

AES CONSULTING ENGINEERS

To: Greensprings Trailhead

From: Bruce Abbott

Date: 11/1/2006

Re: Greensprings Trailhead- Project # 9322-33

Items of Discussion

YES P.T. APPROVED

- County review (no JCSA), what about VDOT?
- Environmental plans
- Does the buffer apply? (35 feet)
- Center the new road in center of 90' easement?
- The planned parking spaces are 9'x20'; however they need to be changed to 9'x18'.
- The planned driving aisles are 22'. Should they be changed to 24'?
- Currently the bus parking spaces are 40'; however the new buses are 40'. Should we increase the spaces to 44'?
- Drainage swale down drive aisle, center of this could eliminate curb and gutter and h.c. ramps.
- If the above is done, sidewalk could be installed.
- Need a 25' radius to accommodate the buses for layout purposes.
- Existing dirt on fill material. Most of the dirt has already been removed. The site may need additional off site fill to meet proposed grades.
- Dry swale? , ($2,000 LF)
- Soils (27), type D (bad for drainage).

S:\Jobs\9322\33-GreenspringsTrailhead\Admin\Correspondence\Letters\Items to Discuss10-31-06.doc

Barry Moses

To: Scott Thomas

Subject: Greensprings Trailhead Parking Lot

Are you comfortable with this?

---------->

Nick,

This email is to serve as the followup you and I discussed at our meeting concerning Greensprings Trailhead Parking Lot on Nov. 14. I believe the parking lot concept you presented meets the understanding reached at the initial November 1 meeting held at your office. However, at least one key design question needs to be addressed before the final grading and associated grassed swale design is completed. That is, "What is the quantity and suitability of the stockpiled material currently located in the entrance road area?" The quantity should be verifiable assuming the surveying on the concept plans is reasonably accurate and up to date. The suitability assessment should be carried out by a geotechnical engineer familiar with the project requirements.

NOT SENT FOR FILE

As discussed at the Nov. 1 meeting held at your office, the Parking Lot design concept was centered around breaking up the drainage area so the entire proposed parking lot would not drain directly to any one of the local stormwater management features. As shown on the working plan you provided at yesterday's meeting, the site has been broken up into three primary areas A, B & C:

Area A - The southern half of the entrance road and Phase I parking will drain to a grassed swale (VSMH MS 3.13) spanning the southeast edge of the Phase I parking and extend some distance along the entrance road. A level spreader with a filtered low flow release design will be provided near the southern end of the swale to direct sheetflow towards the downstream wooded area in a direction away from the nearby housing devlopment.

Area B - The eastern half of the northern portion of the entrance road will drain via road side swales to the existing cross culvert and eventually to the nearby storm sewer inlet which eventually leads to the existing BMP to the south.

Area C - The Phase II parking and the remainder of the entrance road will be direct under primarily sheetflow conditions to the lowlying, vegetated area northeast of the proposed parking which will overflow to the existing BMP inlets in larger storms.

Barry E. Moses, P.E.
James City County
Environmental Division

FILE - WJCC New High School

SMITH DEMER NORMANN, LTD.
RECORD OF TELEPHONE CONVERSATION

Date:	May 14, 1996	**Job No.:**	93032.06
Person Called:	Mr. Darryl E. Cooke	**Phone No.:**	253-6673
Company:	JCC Codes Compliance		
Subject:	Reduced Barrel Size for WJCC High School Outlet Structure		

Discussion:

Yesterday, Mr. Cooke and I discussed reducing the barrel pipe size from 36" to 27" for the sediment basin outlet structure to facilitate and improve the riser construction. I provided Mr. Cooke with the attached hydraulic calculations for the 27" pipe. The calculations for the 36" pipe showed that the emergency spill way would only be used during a 25 year recurrence interval storm. The calculations for the 27" pipe shows that the emergency spillway will be used during a 10 year recurrence interval storm. Under both cases, the system would operate as intended and in a satisfactory manner.

MAY 1996
RECEIVED
CODE COMPLIANCE
OFFICE

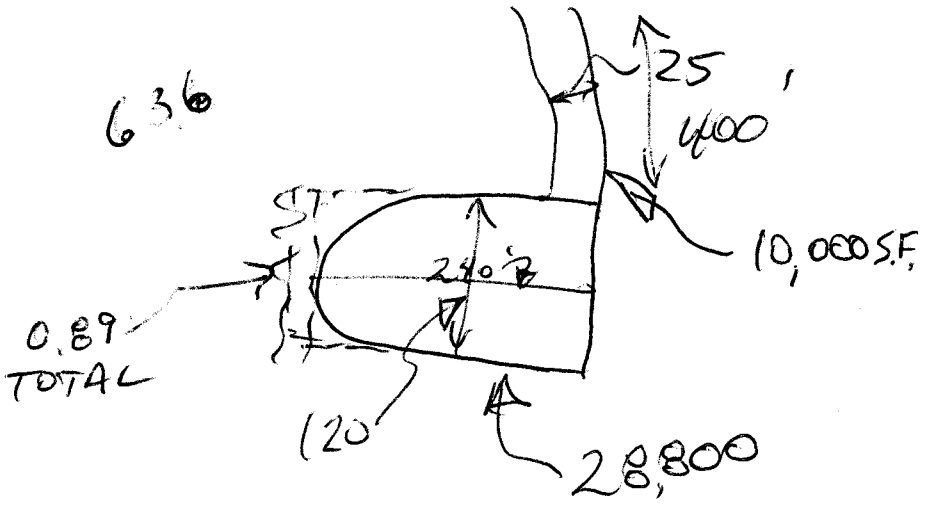
The invert of the drainage system connecting to this pond is disjointed from the pond, and the hydraulic gradeline is independent of the pond elevation. Therefore, the upstream drainage system will not be impacted by this change.

The velocity of flow through the 6' wide spillway weir for the 27" pipe for the 10 and 25 year recurrence interval storms will be low, 1.75 and 2.50 ft/sec, respectively. The channel downstream from the emergency spillway widens out considerably resulting in even lower flow velocities in the channel. Because of the low flow velocities, the probable increased use of the emergency spillway will not result in any erosion problems.

After reviewing the attached calculations, Mr. Cooke agreed in today's telephone conversation that the 27" barrel could be used in lieu of the 36" barrel.

Distribution: C. Michael Ross, AIA, HBA Architecture

Prepared by: J. Michael Miller, P.E.

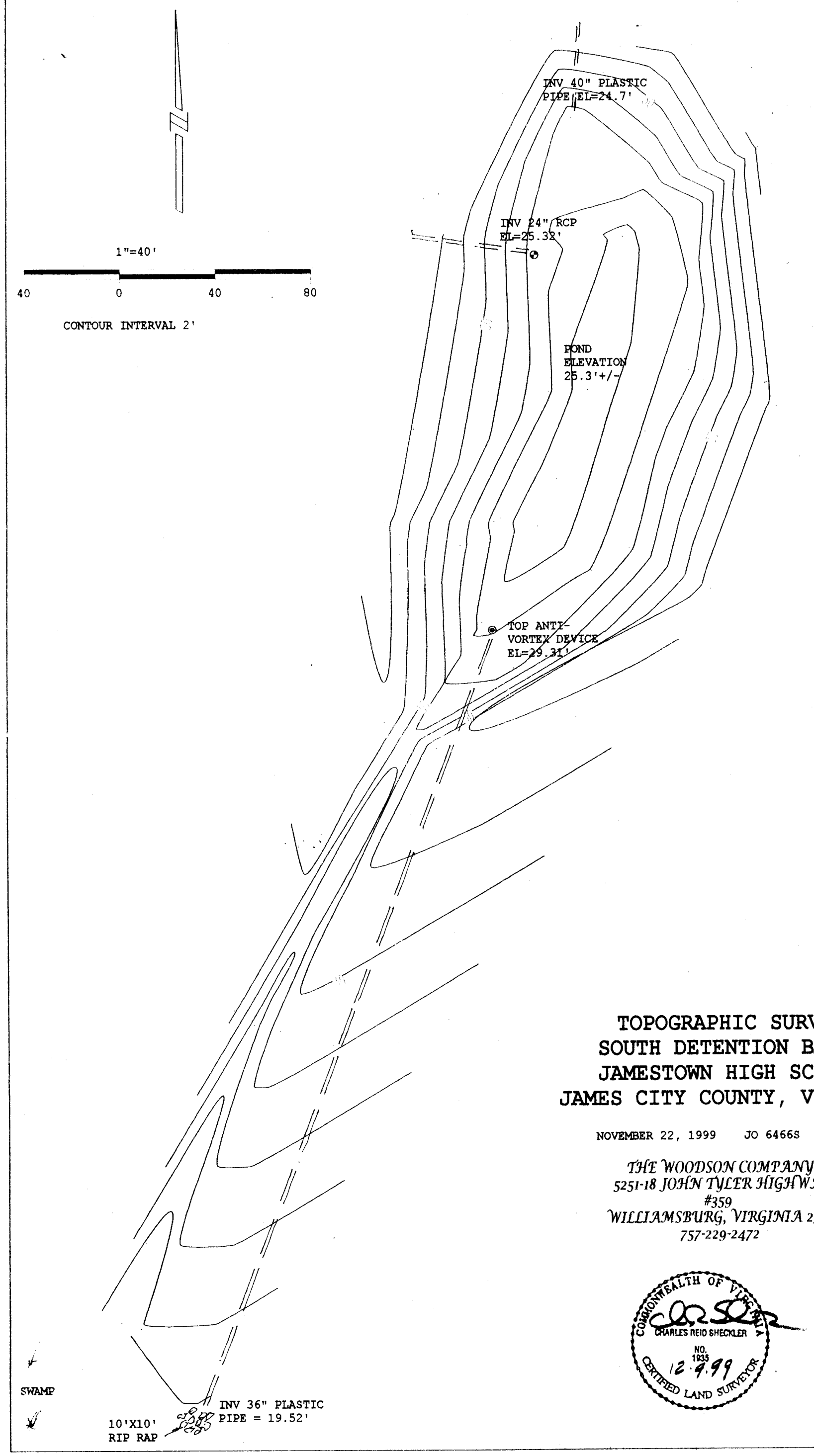


E & SC

CE
SF
TP
IP
TS/PS

IF SWALES/CULVERT
CD & CIP

PC133

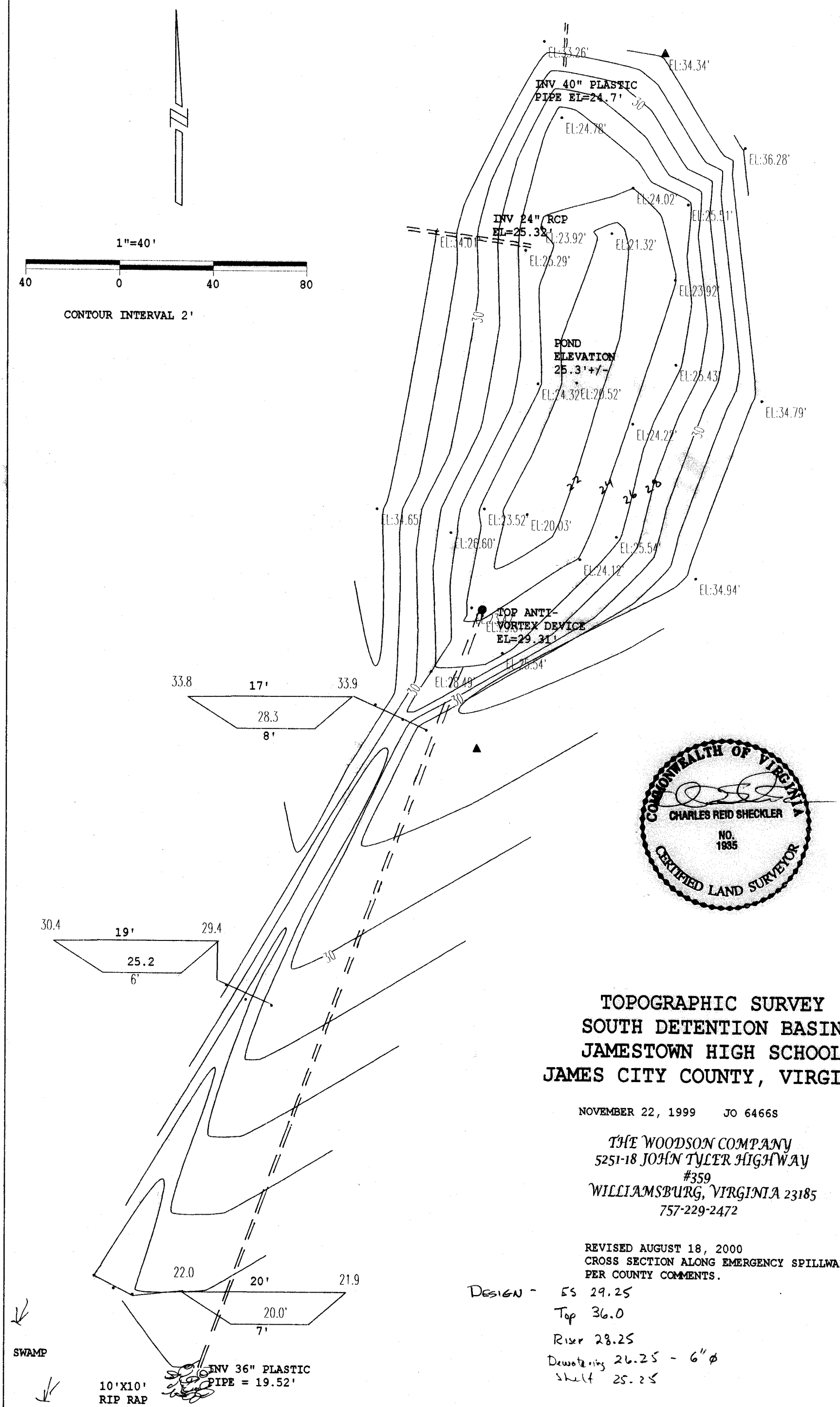


TOPOGRAPHIC SURVEY
SOUTH DETENTION BASIN
JAMESTOWN HIGH SCHOOL
JAMES CITY COUNTY, VIRGINIA

NOVEMBER 22, 1999 JO 6466S

THE WOODSON COMPANY
5251-18 JOHN TYLER HIGHWAY
#359
WILLIAMSBURG, VIRGINIA 23185
757-229-2472

COMMONWEALTH OF VIRGINIA
CHARLES REID SHECKLER
NO. 1935
12.9.99
CERTIFIED LAND SURVEYOR



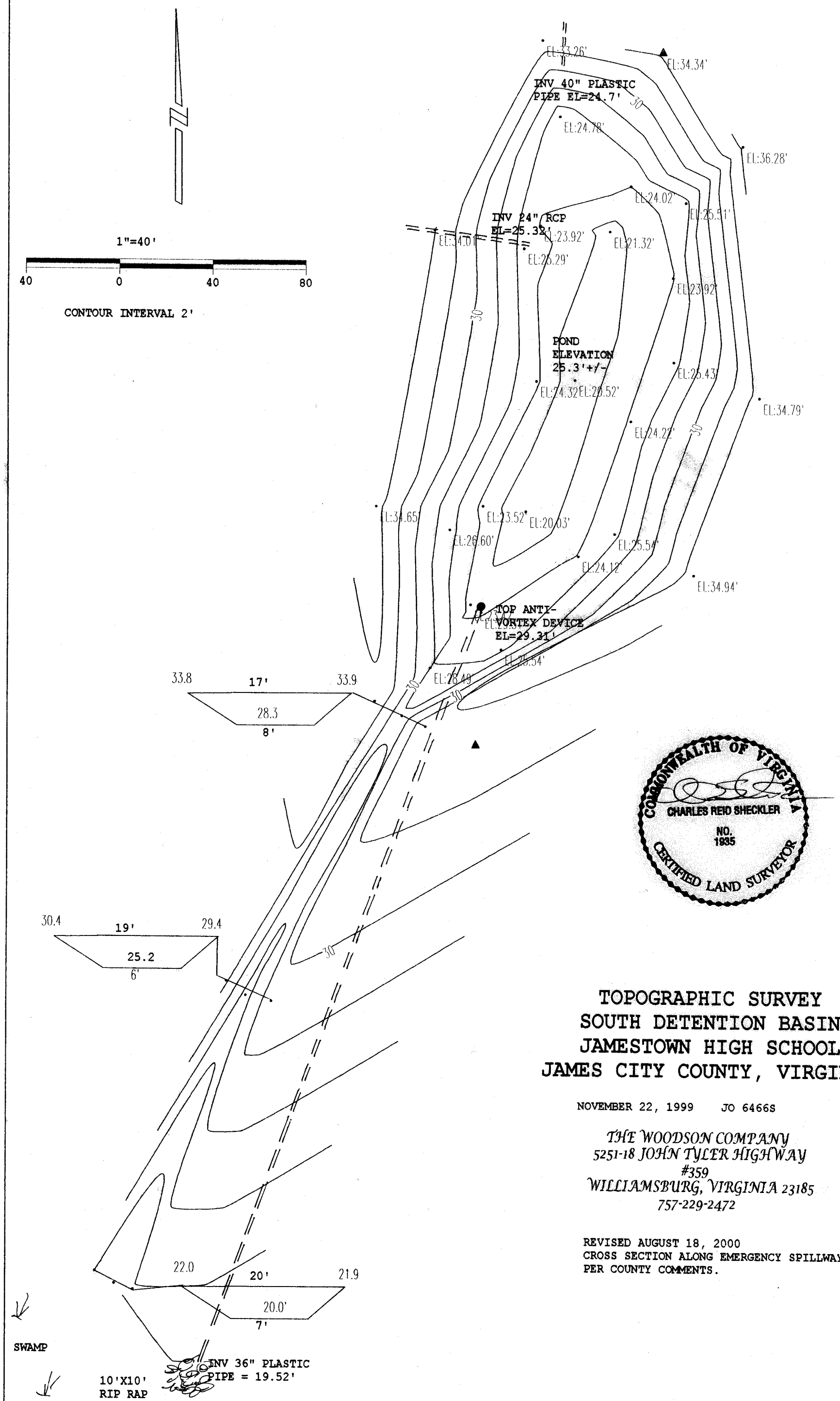
TOPOGRAPHIC SURVEY
SOUTH DETENTION BASIN
JAMESTOWN HIGH SCHOOL
JAMES CITY COUNTY, VIRGINIA

NOVEMBER 22, 1999 JO 6466S

THE WOODSON COMPANY
5251-18 JOHN TYLER HIGHWAY
#359
WILLIAMSBURG, VIRGINIA 23185
757-229-2472

REVISED AUGUST 18, 2000
CROSS SECTION ALONG EMERGENCY SPILLWAY
PER COUNTY COMMENTS.

DESIGN - ES 29.25
Top 36.0
Riser 28.25
Dewatering 26.25 - 6" ϕ
Shelf 25.25



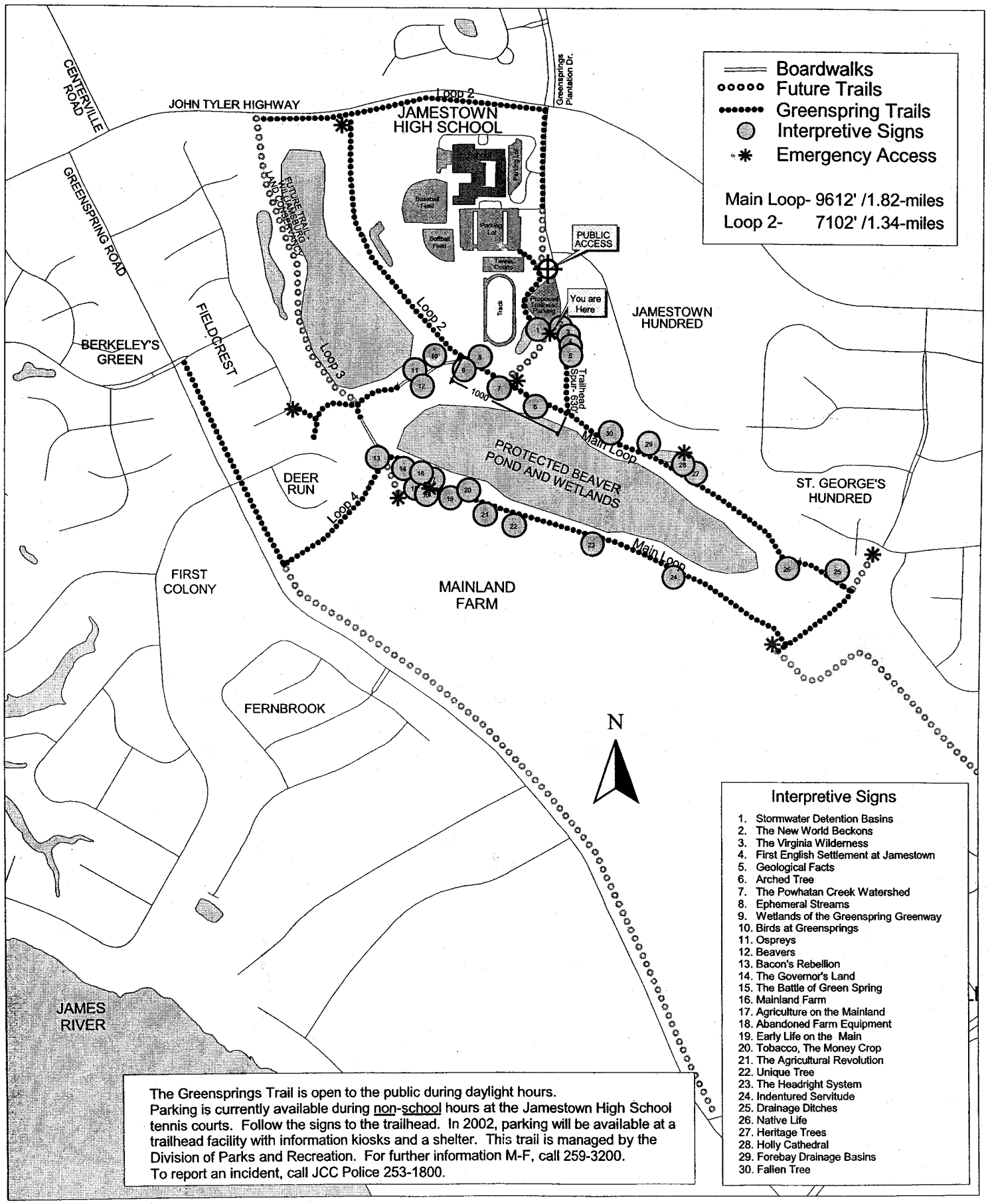
TOPOGRAPHIC SURVEY
SOUTH DETENTION BASIN
JAMESTOWN HIGH SCHOOL
JAMES CITY COUNTY, VIRGINIA

NOVEMBER 22, 1999 JO 6466S

THE WOODSON COMPANY
5251-18 JOHN TYLER HIGHWAY
#359
WILLIAMSBURG, VIRGINIA 23185
757-229-2472

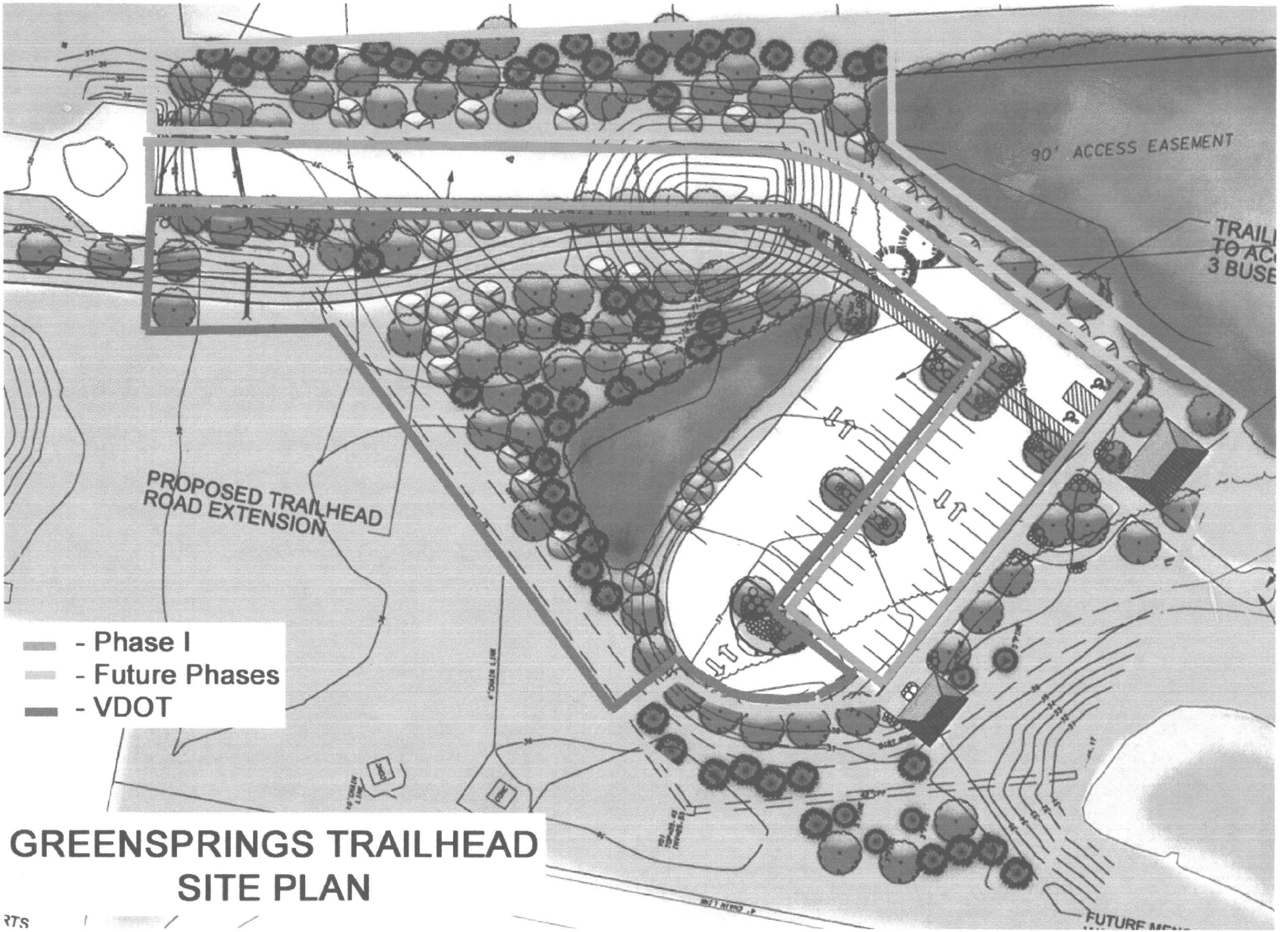
REVISED AUGUST 18, 2000
CROSS SECTION ALONG EMERGENCY SPILLWAY
PER COUNTY COMMENTS.

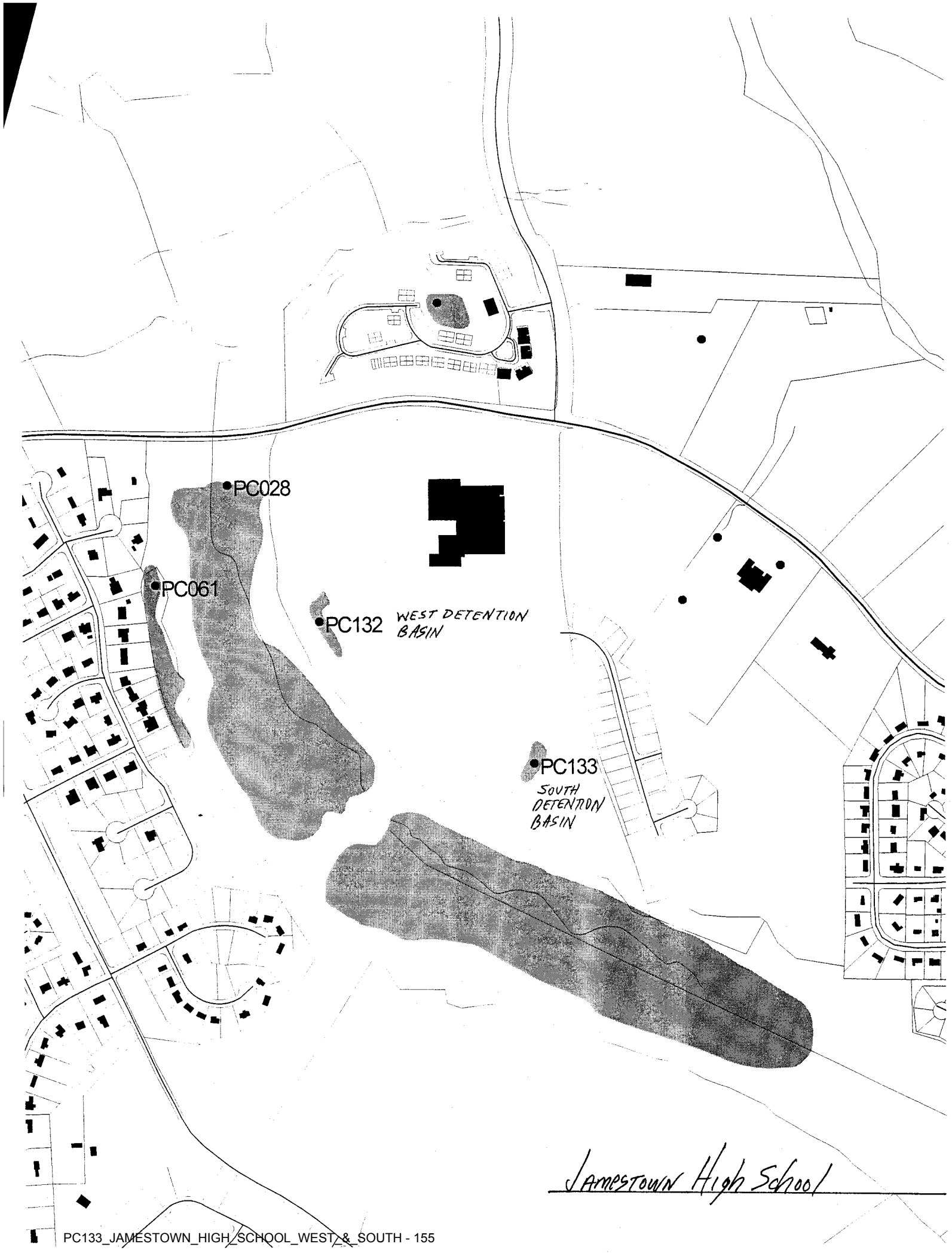
Greensprings Greenway Interpretive Hiking Trail

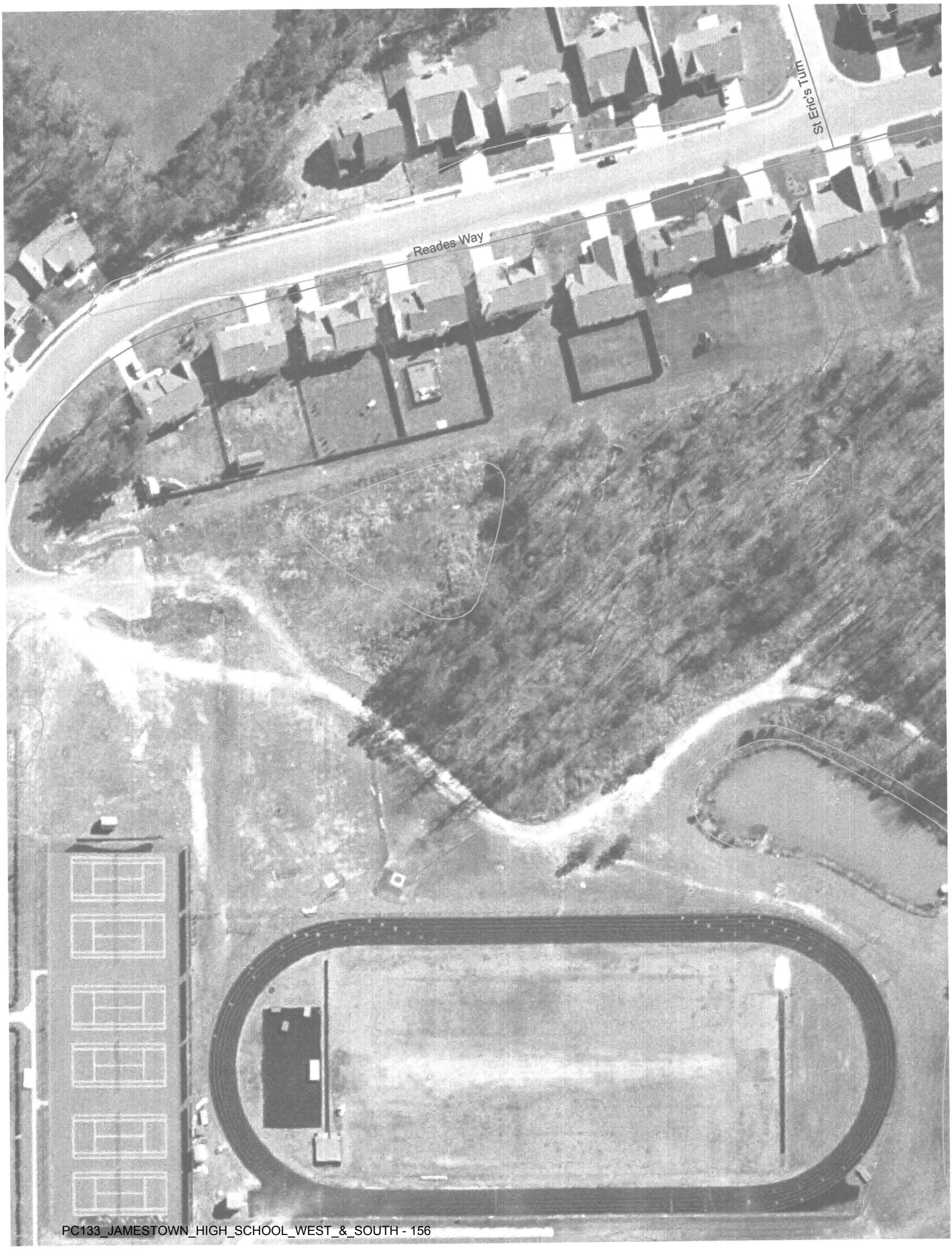


The Greensprings Trail is open to the public during daylight hours.
Parking is currently available during non-school hours at the Jamestown High School tennis courts. Follow the signs to the trailhead. In 2002, parking will be available at a trailhead facility with information kiosks and a shelter. This trail is managed by the Division of Parks and Recreation. For further information M-F, call 259-3200.
To report an incident, call JCC Police 253-1800.

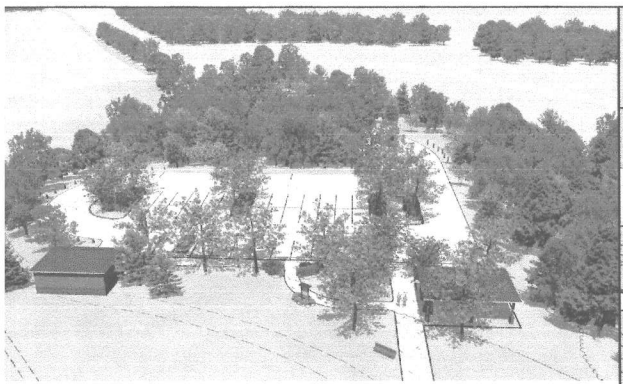
9AM – Wed Nov 1 – @AES

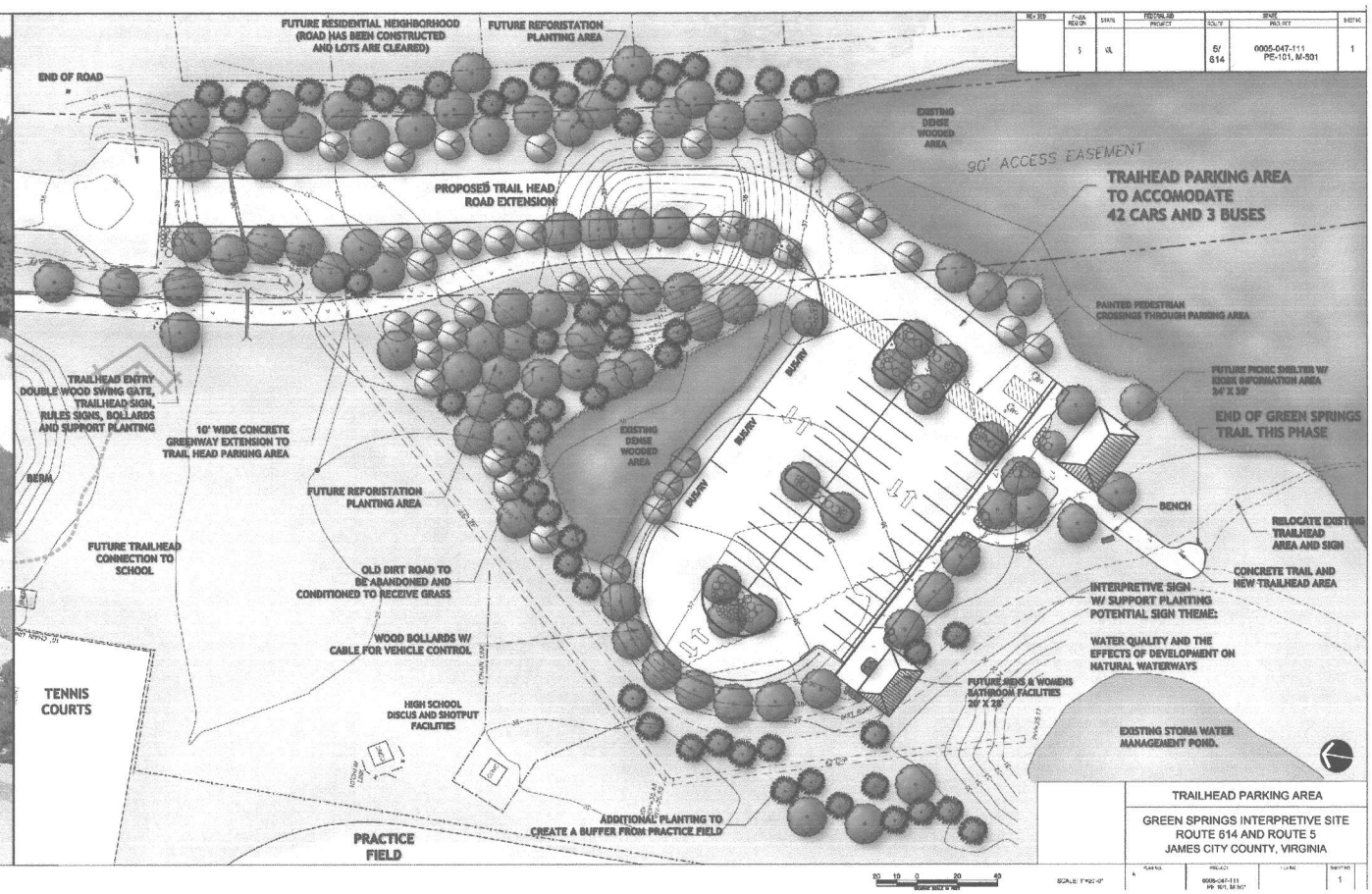



PC028
PC061
PC132
WEST DETENTION BASIN
PC133
SOUTH DETENTION BASIN
Jamestown High School


Reades Way
St Eric's Turn

3899 JOHN TYLER HGWY
St Eric's Turn
St Mary's Cir
Reades Way
3851 JOHN TYLER HGWY
Eagle Way
3751 JOHN TYLER HGWY
3651 JOHN TYLER HGWY




FUTURE RESIDENTIAL NEIGHBORHOOD (ROAD HAS BEEN CONSTRUCTED AND LOTS ARE CLEARED)
FUTURE REFORISTATION PLANTING AREA
END OF ROAD
EXISTING DENSE WOODED AREA
90' ACCESS EASEMENT
TRAIHEAD PARKING AREA TO ACCOMODATE 42 CARS AND 3 BUSES
PROPOSED TRAIL HEAD ROAD EXTENSION
PAINTED PEDESTRIAN CROSSINGS THROUGH PARKING AREA
FUTURE PICNIC SHELTER W/ BIGGIN INFORMATION AREA 24' X 30'
END OF GREEN SPRINGS TRAIL THIS PHASE
TRAILHEAD ENTRY DOUBLE WOOD SWING GATE, TRAILHEAD SIGN, RULES SIGNS, BOLLARDS AND SUPPORT PLANTING
10' WIDE CONCRETE GREENWAY EXTENSION TO TRAIL HEAD PARKING AREA
BERM
EXISTING DENSE WOODED AREA
FUTURE REFORISTATION PLANTING AREA
BENCH
RELOCATE EXISTING TRAILHEAD AREA AND SIGN
FUTURE TRAILHEAD CONNECTION TO SCHOOL
OLD DIRT ROAD TO BE ABANDONED AND CONDITIONED TO RECEIVE GRASS
CONCRETE TRAIL AND NEW TRAILHEAD AREA
INTERPRETIVE SIGN W/ SUPPORT PLANTING POTENTIAL SIGN THEME:
WOOD BOLLARDS W/ CABLE FOR VEHICLE CONTROL
WATER QUALITY AND THE EFFECTS OF DEVELOPMENT ON NATURAL WATERWAYS
TENNIS COURTS
HIGH SCHOOL DISCUS AND SHOTPUT FACILITIES
FUTURE MENS & WOMENS BATHROOM FACILITIES 20' X 28'
EXISTING STORM WATER MANAGEMENT POND.
ADDITIONAL PLANTING TO CREATE A BUFFER FROM PRACTICE FIELD
PRACTICE FIELD
TRAILHEAD PARKING AREA
GREEN SPRINGS INTERPRETIVE SITE
ROUTE 614 AND ROUTE 5
JAMES CITY COUNTY, VIRGINIA
0005-047-111
PE-101, M-501
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