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: **PC083**

DATE VERIFIED: **May 31, 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 PC083

PIN: 3040100002

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

Property Description: Middle Plantation Parcel C Championship Blackheath Course Holes 1-18

Site Address:

(For internal use only) **Box:** FC001 **Drawer:** 1

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

Comments:

BMP#1

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

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

Section 1 – Site Information:

Project Name: Ford's Colony at Williamsburg - BMP #1
Structure/BMP Name: BMP #1 DAM #1
Project Location: Ford's Colony at Williamsburg
BMP Location: Adjacent to 1st Hole xxxx course and 18th Hole Blue Heron Course
County Plan No.: 5 - 78 - 85

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

Tax Map/Parcel No.: (37-2)(1-1)
BMP ID Code (if known): ~~PC-088~~ PC 083
Zoning District: R4
Land Use: Residential Planned Community
Site Area (sf or acres): n/a

Brief Description of Stormwater Management/BMP Facility: Wet Pond with normal pool elevation of 48.1

Nearest Visible Landmark to SWM/BMP Facility: Intersection of Dogleg Drive and St. Andrews Drive

Nearest Vertical Ground Control (if known):
☐ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☒ Other
Station Number or Name: Inline Storm Inlet on embankment
Datum or Reference Elevation: 46.42 – Ford's Colony Datum
Control Description: Top of Inlet Grate
Control Location from Subject Facility: North of structure

Section 2 – Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☐ Yes ☐ No ☒ Unknown
Approx. Construction Start Date for SWM/BMP Facility: Unknown
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☒ Unknown
Name of Site Work Contractor Who Constructed Facility: Unknown
Name of Professional Firm Who Routinely Monitored Construction: Unknown at time of construction
Date of Completion for SWM/BMP Facility: Approximately 1986
Date of Record Drawing/Construction Certification Submittal: _____

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

Section 3 – Owner / Designer / Contractor Information:

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

Name: Ford's Colony Home Owners Association
Mailing Address: 100 Manchester Drive
Williamsburg, VA 23188
Business Phone: (757) 258-4230 Fax:(757)258-4065
Contact Person: Drew Mulhare Title: _____

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

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, Suite 1
Williamsburg, VA 23188
Business Phone: (757) 253-0040
Fax: (757) 220-8994
Responsible Plan Preparer: Jason Grimes
Title: Project Manager
Plan Name: Ford's Colony at Williamsburg
Firm's Project No. 5652-33C
Plan Date: _____
Sheet No.'s Applicable to SWM/BMP Facility: / / / /

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

Name: Unknown
Mailing Address: _____
Business Phone: _____
Fax: _____
Contact Person: _____
Site Foreman/Supervisor: _____
Specialty Subcontractors & Purpose (for BMP Construction Only):

Section 4 – Professional Certifications:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

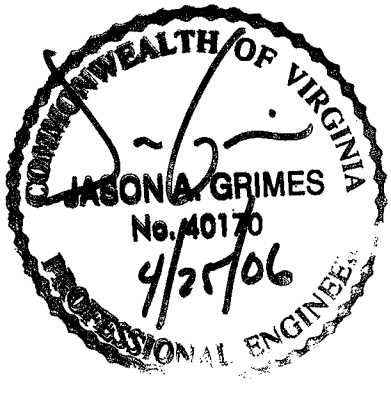
Record Drawing Certification

Firm Name: AES Consulting Engineers
Mailing Address: 5248 Olde Towne Road, STE 1
Williamsburg, VA 23188
Business Phone: (757) 253-0040
Fax: (757) 220-8994

Name: Jason Grimes, P.E.
Title: Project Manager

Signature:
Date: 4/25/06

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



(Seal)

Virginia Registered Professional Engineer
Or Certified Land Surveyor

Construction Certification

Firm Name:
Mailing Address:

Business Phone:
Fax:

SEE EARTHWORKS FIELD REPORT

Name:
Title:

Signature:
Date:

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

(Seal)

Virginia Registered
Professional Engineer

EARTHWORKS

Earthworks Consulting Engineers, Inc.
4305 Cutshaw Avenue · Richmond, Virginia 23230
Phone: (804) 355-4567 Fax: (804) 355-5958

FIELD REPORT No. 1

Project No. 1552

Permit No. N/A
Permit Date:

Project Name:
Fords Colony BMP Inspections

Location:
Fords Colony, James City Co., VA

Client:
Fords Colony

Contractor:
N/A

Scope of Services:
Dam Embankment Observations

Day/Date: **Thurs/6 April 06**
Weather/Temp: **Clear/60°**
Arrive on Site: **1100**
Depart Site: **1330**
Time on Site: **2.5**
Travel Time: **1.0**
Reporting Time: **0.5**
TOTAL CHARGEABLE HOURS: **4.0**
CHARGEABLE EXPENSES: **60 Mi.**

Deficiency Needing Correction ☐ No Deficiency Observed ☒

Professional Engineer visited site to observe condition of dam embankments at BMP's PC 083 and PC 088 within the Fords Colony Development. These impoundments are to serve as part of the stormwater management system for the Fords Colony Condominiums project to be located near the Club House.

Observations of the embankments were made for indications of erosion, seepage, slope failure, and damaging vegetation as well as seepage around the spillway pipe structures.

The existing embankments appear to be in good condition. No erosion or excessive seepage was present. No tree growth is present on the embankments. Grass cover is well established and maintained. Both embankments contain golf fairways, and their crest width and side slopes exceed typical design requirements for earthen dams.

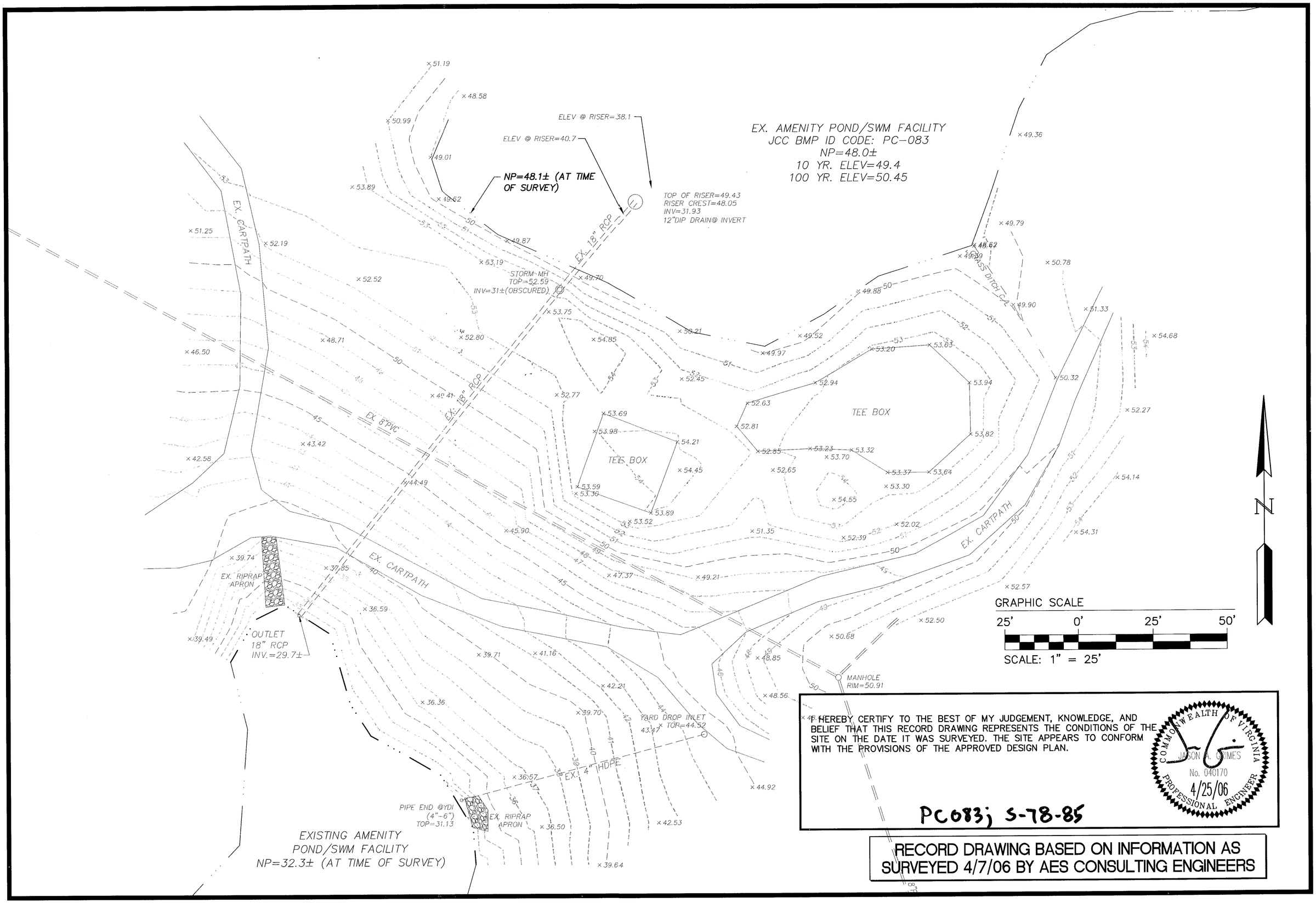
No embankment maintenance appears required at this time.

COMMONWEALTH OF VIRGINIA
ROBERT C. MOSS, III
No. 019982
PROFESSIONAL ENGINEER

Distribution:
(1) Client
(1) AES Consulting Engineers

By:

Robert C. Moss, PE
Earthworks Consulting Engineers, Inc.



I HEREBY CERTIFY TO THE BEST OF MY JUDGEMENT, KNOWLEDGE, AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE CONDITIONS OF THE SITE ON THE DATE IT WAS SURVEYED. THE SITE APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN.

COMMONWEALTH OF VIRGINIA
JASON A. GRIMES
No. 040170
4/25/06
PROFESSIONAL ENGINEER

PC083; S-78-85

RECORD DRAWING BASED ON INFORMATION AS SURVEYED 4/7/06 BY AES CONSULTING ENGINEERS

AES CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

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

AS-BUILT SURVEY OF DAM#1

FORD'S COLONY AT WILLIAMSBURG

OWNER / DEVELOPER : FORD'S COLONY COUNTRY CLUB

POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed CBR	Drawn DLD
Scale 1"=25'	Date 3/22/05
Project No. 5652-63	
Drawing No. 1 OF 1	

Engineering, Surveying and Planning
5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

(757) 253-0040
FAX (757) 220-8994

LETTER OF TRANSMITTAL

TO JCC Environmental

DATE	JOB NO.
4/25/06	5652-33c

ATTENTION Scott Thomas

RE: Ford's Colony
Eaglescliffe Condos

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
2			BMP As-builts BMP#1 BMP#2 PC083, PC088

RECEIVED
APR 25 2006
ENVIRONMENTAL DIVISION

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☒ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

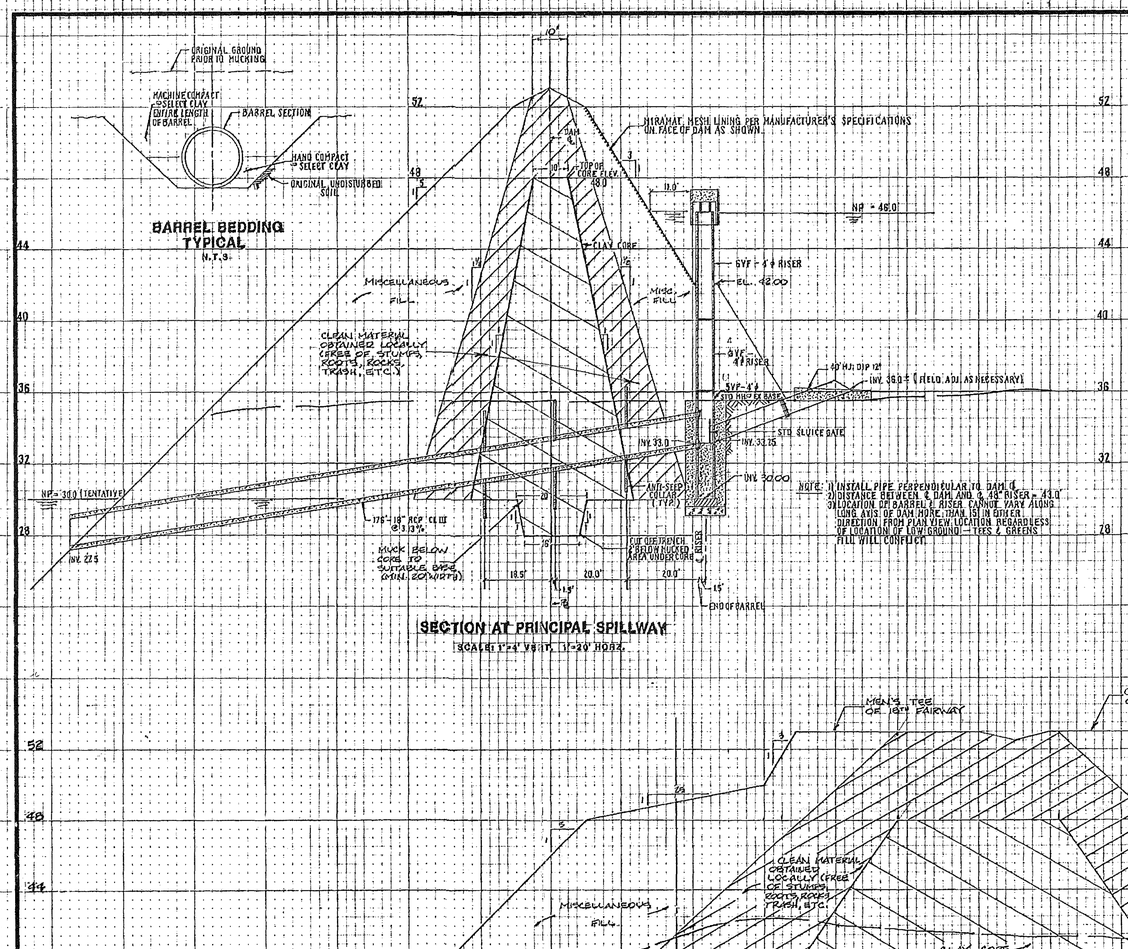
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

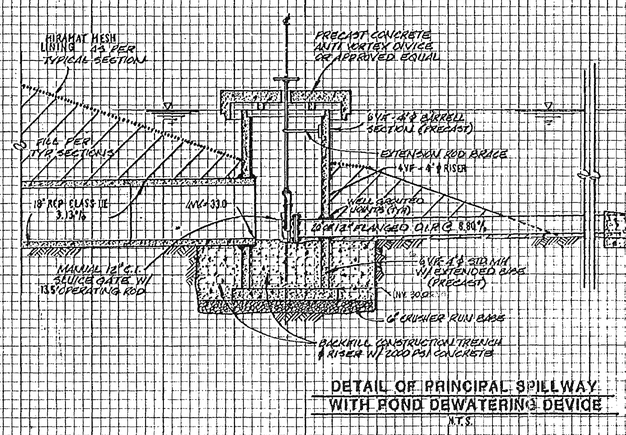
Please contact me on these as-builts.

COPY TO _____ SIGNED: Jason Grimes

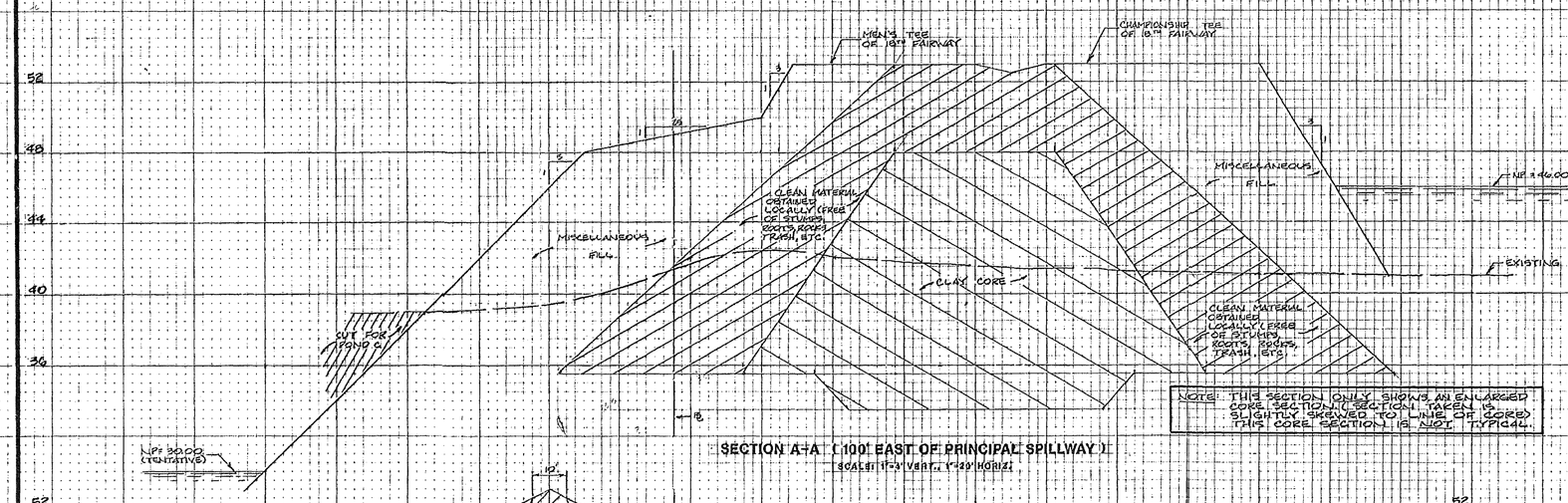
If enclosures are not as noted, kindly notify us at once.



SECTION AT PRINCIPAL SPILLWAY
SCALE: 1"=4' VERT., 1"=20' HORIZ.

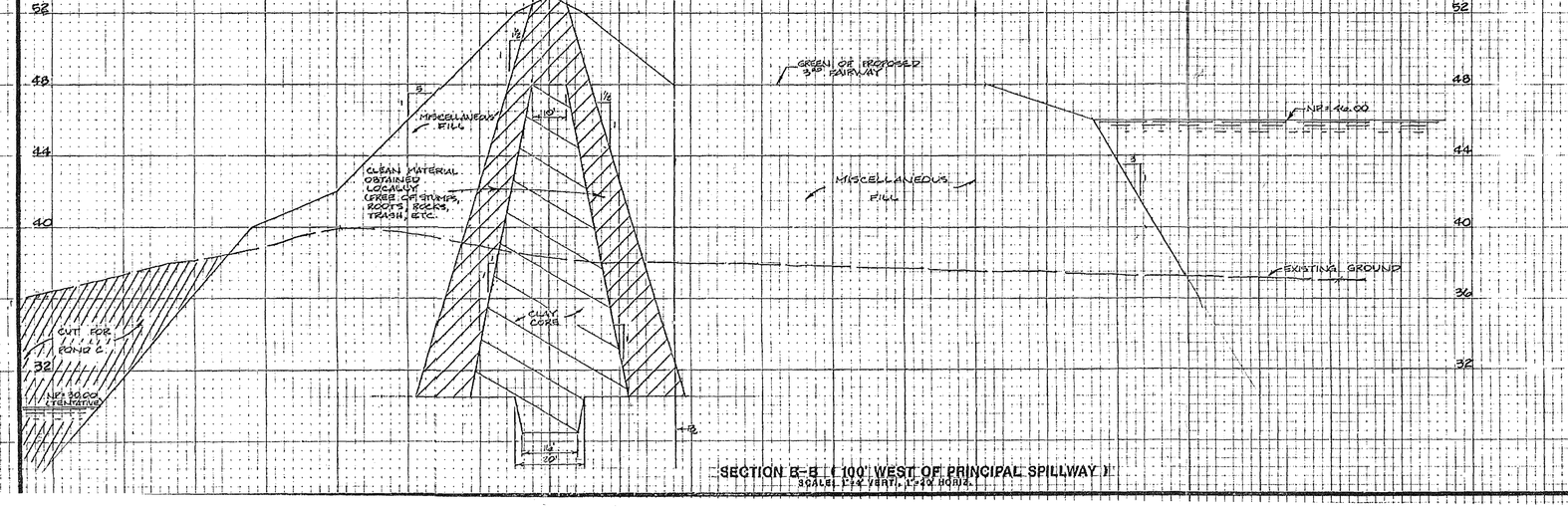


DETAIL OF PRINCIPAL SPILLWAY WITH POND DEWATERING DEVICE
N.T.S.



NOTE: THIS SECTION ONLY SHOWS AN ENLARGED CORE SECTION. SECTION TAKEN IS SLIGHTLY SKEWED TO LINE OF CORE. THIS CORE SECTION IS NOT TYPICAL.

SECTION A-A (100' EAST OF PRINCIPAL SPILLWAY)
SCALE: 1"=3' VERT., 1"=20' HORIZ.



SECTION B-B (100' WEST OF PRINCIPAL SPILLWAY)
SCALE: 1"=4' VERT., 1"=20' HORIZ.

NOTES:

1) SITE PREPARATION: AREAS UNDER THE EMBANKMENT SHALL BE CLEARED & STRIPPED OF TOPSOIL, VEGETATION, ROOTS AND SOILS FROM PREVIOUS EXCAVATION WORK.

2) EMBANKMENT: THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOOD VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER UNSUITABLE MATERIALS. THERE OF WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. THE FILL MATERIAL SHOULD CONTAIN SUFFICIENT MOISTURE SO THAT IT CAN BE FORMED WE HAND INTO A BALL TIT OUT CRUMBLES. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. FILL MATERIAL WILL BE PLACED IN ALL 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL. COMPACTION SHALL BE OBTAINED BY MOVING THE HAULING EQUIPMENT OVER THE FILL SO THAT THE ENTIRE SURFACE OF THE FILL IS TRAVERSED BY AT LEAST ONE WHEEL OR TREAD TRACK OF THE EQUIPMENT. AS THE FILL IS COMPACTED, THE EMBANKMENT SHALL BE CONSTRUCTED TO AN ELEVATION SO HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLEMENT. IF COMPACTION IS OBTAINED WITH HAULING EQUIPMENT, IF COMPACTORS ARE USED FOR COMPACTION, THE OVERBUILD MAY BE REDUCED TO NOT LESS THAN 5%.

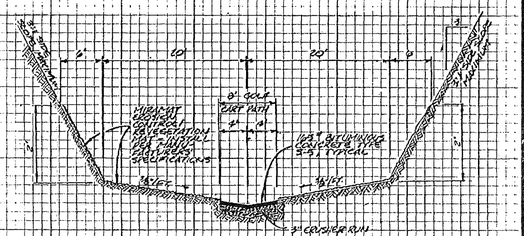
3) CUTOFF TRENCH: THE CUTOFF TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE DAM. THE MINIMUM DEPTH SHALL BE 3 FEET. THE CUTOFF TRENCH SHALL EXTEND UP NOT AWAY TO THE RESERVOIR ELEVATION. THE MINIMUM BOTTOM WIDTH SHALL BE 8 FEET, BUT WIDE ENOUGH TO PERMIT OPERATION OF COMPACTION EQUIPMENT. THE SIDE SLOPES SHALL BE NO STEEPER THAN 1:1. COMPACTION REQUIREMENTS SHALL BE THE SAME AS FOUND FOR THE EMBANKMENT. THE TRENCH SHALL BE DRAINED DURING THE BACKFILLING-COMPACTION OPERATIONS.

4) PRINCIPAL SPILLWAY: THE RISER OF THE PRINCIPAL SPILLWAY SHALL BE SECURELY ATTACHED TO THE BARREL IN A WATERTIGHT CONDITION. THE BARREL AND RISER SHALL BE PLACED ON A FIRM COMPACTED SOIL FOUNDATION. THE BASE OF THE RISER SHALL BE FINISHED ACCORDING TO DESIGN CRITERIA TO PROVIDE ITS FOUNDATION. PERVIOUS MATERIALS SUCH AS SAND, GRAVEL, & CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE BARREL. NOT-PERVIOUS FILL MATERIAL IS TO BE PLACED AROUND THE PIPE IN 6-INCH LAYERS AND COMPACTED BY HAND. A CLASS IV CUT BAND INSTALLED ON THE BARREL. A MINIMUM OF TWO FEET OF FILL SHALL BE HAND-COMPACTED OVER THE ENTIRE BARREL BEFORE USE OF CONSTRUCTION EQUIPMENT.

5) EMERGENCY SPILLWAY: THE EMERGENCY SPILLWAY SHOULD NOT BE CONSTRUCTED OVER FILL MATERIAL. DESIGN ELEVATIONS, WIDTHS, ENTRANCE AND EXIT CHANNEL SLOPES, AND GRAT CAN TO THE SUCCESSIVE OPERATION OF THE SPILLWAY AND SHOULD BE ADAPTED TO CLOSELY DURING CONSTRUCTION.

6) VEGETATIVE STABILIZATION: FINAL VEGETATIVE COVER ESTABILIZATION SHALL CONSIST OF TOPSOILING, LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS AS SOON AS PRACTICAL. SEDIMENT BASINS AND OTHER TEMPORARY EROSION CONTROL MEASURES MAY BE REMOVED ONLY WHEN STABILIZATION IS COMPLETE. FINAL VEGETATIVE COVER SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING:

TOPSOIL: AS LEAST 3" TO CORES OBTAINED FROM STOCKPILES ON SITE, FREE OF LARGE DEBRIS.
LIME: 3,000#/ACRE (CO#/1000 SF)
SEED: REDTOP 3; TALL FESCUE 35#/ACRE (CO#/1000 SF)
FERTILIZER: 10/20/10 SEE (100#/ACRE (CO#/1000 SF)
MULCH: STRAW OR HAY (LOCALLY OBTAINED) 1,000#/ACRE (CO#/1000 SF)



EMERGENCY SPILLWAY CROSS-SECTION DETAIL
SCALE: 1"=10' HORIZ., 1"=2' VERT.

AES, a professional corporation
1761 Jamestown Road, Williamsburg, Va. 23185
804-253-0040
Architecture, Engineering, Surveying, Planning

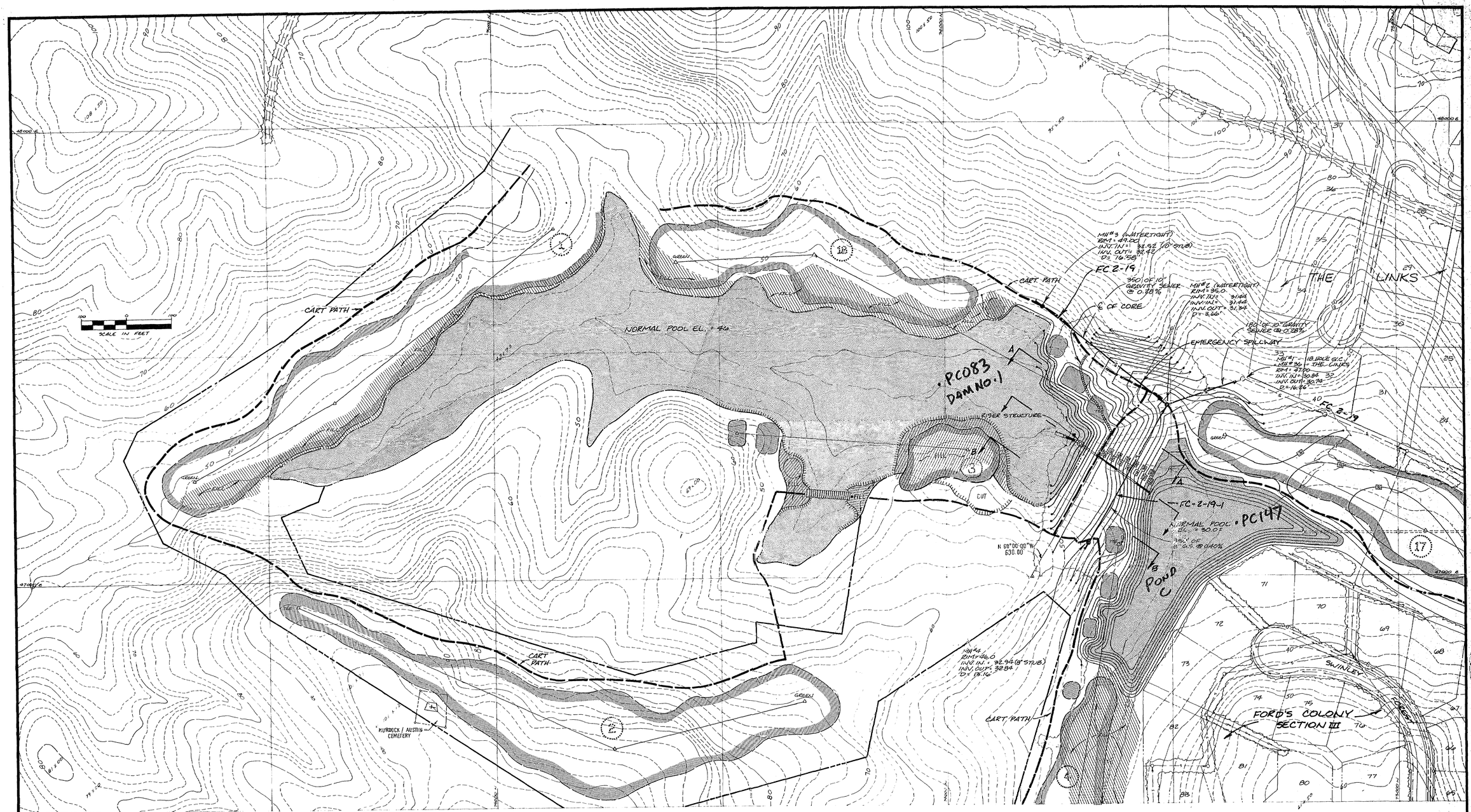
DAM #1 SECTIONS
FORD'S COLONY AT WILLIAMSBURG
OWNER / DEVELOPER: FORD'S COLONY AT WILLIAMSBURG, INC.
JAMES CITY COUNTY, VIRGINIA

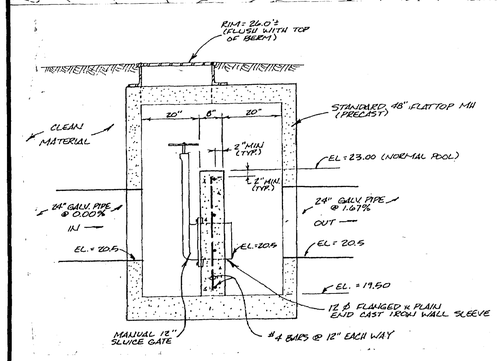
No.	DATE	REVISION / COMMENT / NOTE	BY

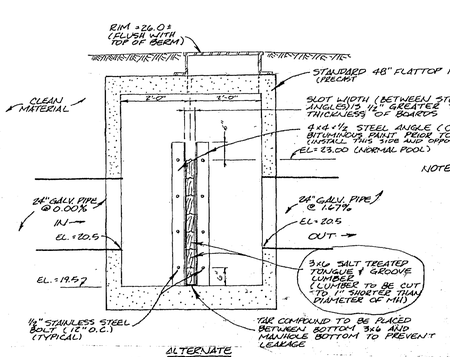
Designed QAR/JHB	Drawn DB
Scale NOTED	Date JAN. 1994
Project No. 6652	
Drawing No. 4	

PC083_FORDS_COLONY_DAM_1_LARGE_LAKE_NEAR_SEC_1 - 009

PC083_FORDS_COLONY_DAM_1_LARGE_LAKE_NEAR_SEC_1 - 010



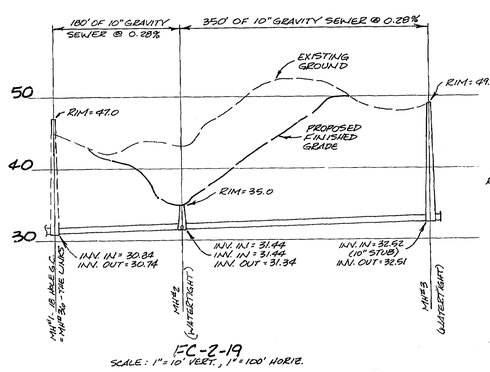




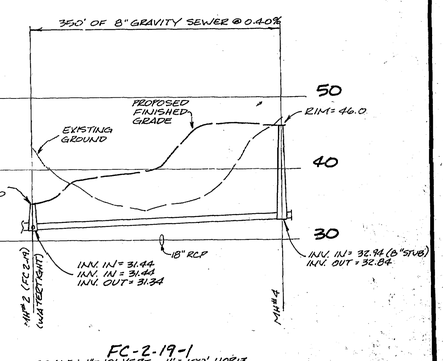
NOTE: 1/2"⌀ EYE BOLTS TO BE INSTALLED ON EACH 3x6 (2 PER 3x6, ALTERNATE ENDS, ALTERNATE FACE) FOR EASING THE REMOVAL OF THE 3x6 LUMBER.

POND D LEVEL CONTROL STRUCTURE
SCALE: 1/2" = 1'-0"

PC090



FC-2-19
SCALE: 1" = 10' VERT., 1" = 100' HORIZ.



FC-2-19-1
SCALE: 1" = 10' VERT., 1" = 100' HORIZ.

AES, a professional corporation
1761 Jamestown Road, Williamsburg, Va. 23185
804-253-0040
Architecture, Engineering, Surveying, Planning

DAM NO. 1 SITE PLAN

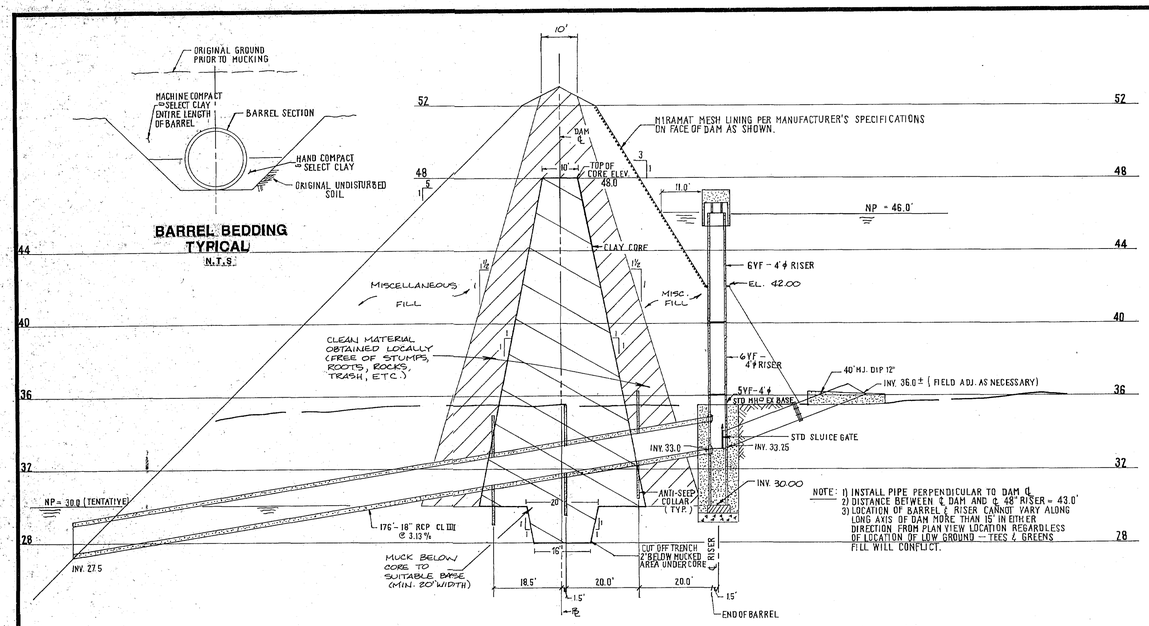
FORD'S COLONY AT WILLIAMSBURG

OWNER / DEVELOPER: FORD'S COLONY AT WILLIAMSBURG, INC.
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
PAUL C. SMALL
CERTIFICATE NO. 04267
LICENSED PROFESSIONAL ENGINEER

No.	DATE	REVISION / COMMENT / NOTE	BY
2.	1/5/87	ADDED MURDOCK / AUSTIN CEMETERY	JHB
1.	12/4/86	REVISED PER TAN MAPLES	JHB

Designed JHB	Drawn VMB
Scale 1"=100'	Date DEC./1986
Project No. 5652	
Drawing No. 3	

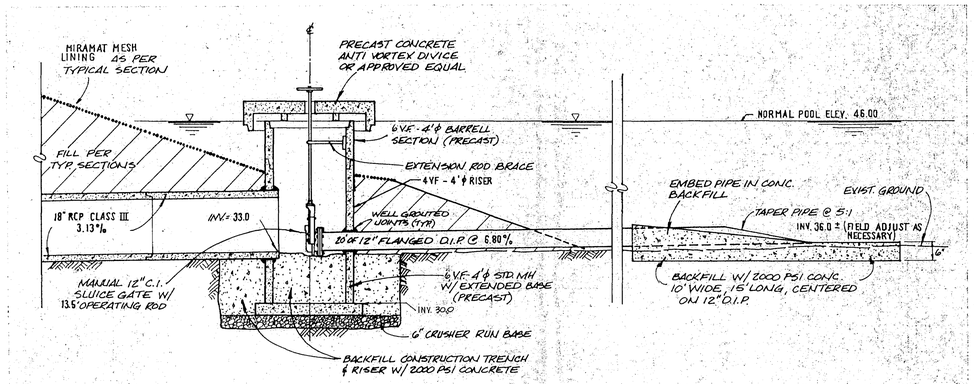


NOTE: 1) INSTALL PIPE PERPENDICULAR TO DAM ℄.
2) DISTANCE BETWEEN ℄ DAM AND ℄ 48" RISER = 43.0'
3) LOCATION OF BARREL & RISER CANNOT VARY ALONG LONG AXIS OF DAM MORE THAN 15' IN EITHER DIRECTION FROM PLAN VIEW LOCATION REGARDLESS OF LOCATION OF LOW GROUND -- TEES & GREENS FILL WILL CONFLICT.

SECTION AT PRINCIPAL SPILLWAY

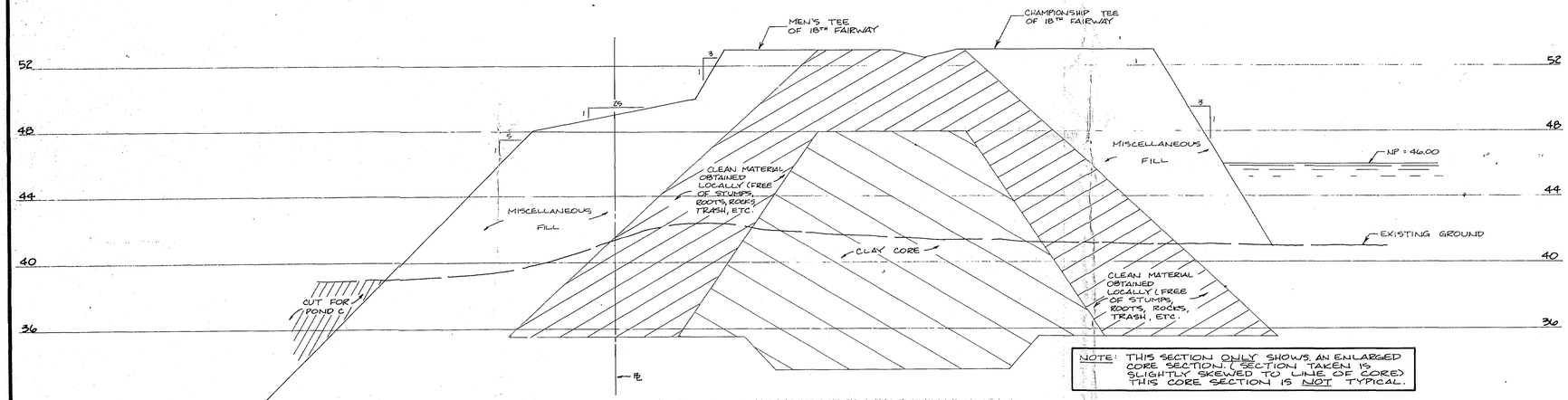
SCALE: 1"=4' VERT., 1"=20' HORZ.

PC083



DETAIL OF PRINCIPAL SPILLWAY WITH POND DEWATERING DEVICE

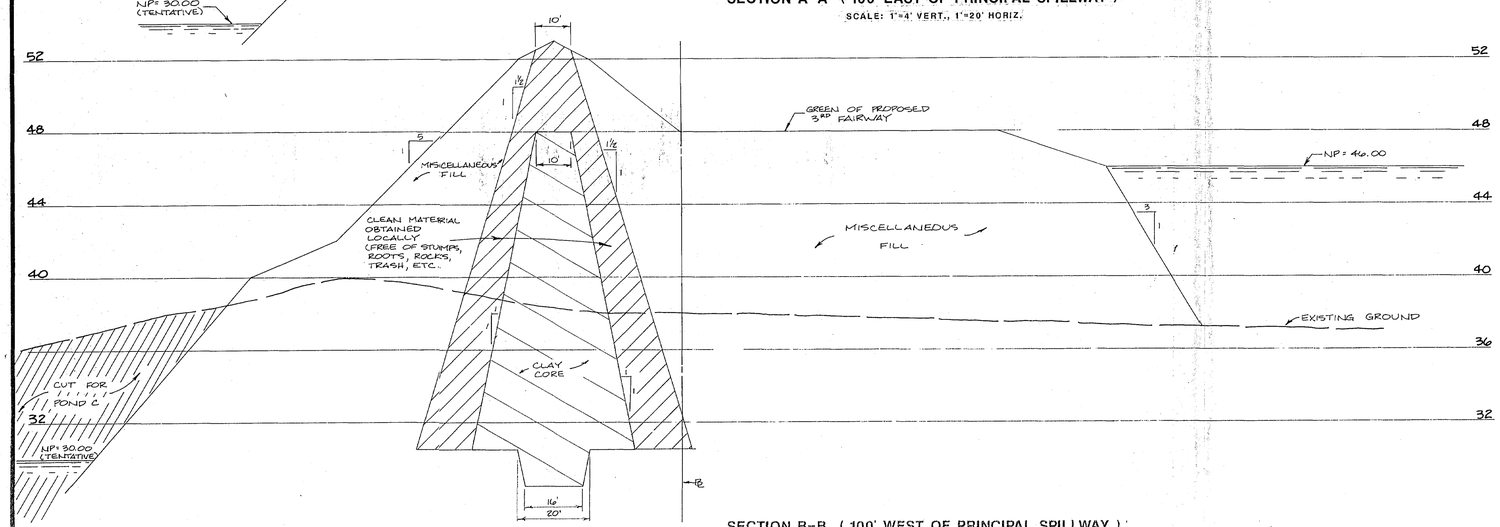
N.T.S.



NOTE: THIS SECTION ONLY SHOWS AN ENLARGED CORE SECTION. (SECTION TAKEN IS SLIGHTLY SKEWED TO LINE OF CORE) THIS CORE SECTION IS NOT TYPICAL.

SECTION A-A (100' EAST OF PRINCIPAL SPILLWAY)

SCALE: 1"=4' VERT., 1"=20' HORIZ.



SECTION B-B (100' WEST OF PRINCIPAL SPILLWAY)

SCALE: 1"=4' VERT., 1"=20' HORIZ.

NOTES:

1) SITE PREPARATION: AREAS UNDER THE EMBANKMENT SHALL BE CLEARED & STRIPPED OF TOPSOIL, VEGETATION, ROOTS AND SPOIL FROM PREVIOUS EXCAVATION WORK.

2) EMBANKMENT: THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER OBJECTIONABLE MATERIAL. AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. THE FILL MATERIAL SHOULD CONTAIN SUFFICIENT MOISTURE SO THAT IT CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. FILL MATERIAL WILL BE PLACED IN 4- TO 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL. COMPACTION SHALL BE OBTAINED BY ROUTING THE HAULING EQUIPMENT OVER THE FILL SO THAT THE ENTIRE SURFACE OF THE FILL IS TRAVERSED BY AT LEAST ONE WHEEL OR TREAD TRACK OF THE EQUIPMENT, OR BY USING A COMPACTOR. THE EMBANKMENT SHALL BE CONSTRUCTED TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLEMENT IF COMPACTION IS OBTAINED WITH HAULING EQUIPMENT. IF COMPACTORS ARE USED FOR COMPACTION, THE OVERBUILD MAY BE REDUCED TO NOT LESS THAN 5%.

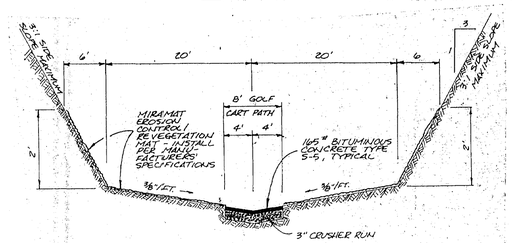
3) CUTOFF TRENCH: THE CUTOFF TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE DAM. THE MINIMUM DEPTH SHALL BE 2 FEET. THE CUTOFF TRENCH SHALL EXTEND UP BOTH ABUTMENTS TO THE RISER CREST ELEVATION. THE MINIMUM BOTTOM WIDTH SHALL BE 4 FEET, BUT WIDE ENOUGH TO PERMIT OPERATION OF COMPACTION EQUIPMENT. THE SIDE SLOPES SHALL BE NO STEEPER THAN 1:1. COMPACTION REQUIREMENTS SHALL BE THE SAME AS THOSE FOR THE EMBANKMENT. THE TRENCH SHALL BE DRAINED DURING THE BACKFILLING-COMPACTING OPERATIONS.

4) PRINCIPAL SPILLWAY: THE RISER OF THE PRINCIPAL SPILLWAY SHALL BE SECURELY ATTACHED TO THE BARREL BY A WATERTIGHT CONNECTION. THE BARREL AND RISER SHALL BE PLACED ON A FIRM COMPACTED SOIL FOUNDATION. THE BASE OF THE RISER SHALL BE FIRMLY ANCHORED ACCORDING TO DESIGN CRITERIA TO PREVENT ITS FLOATING. PERVIOUS MATERIALS SUCH AS SAND, GRAVEL OR CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE BARREL OR ANTI-SEEP COLLARS. FILL MATERIAL SHALL BE PLACED AROUND THE PIPE IN 4-INCH LAYERS AND COMPACTED BY HAND AT LEAST TO THE SAME DENSITY AS THE EMBANKMENT. A MINIMUM OF TWO FEET OF FILL SHALL BE HAND-COMPACTED OVER THE BARREL BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.

5) EMERGENCY SPILLWAY: THE EMERGENCY SPILLWAY SHOULD NOT BE CONSTRUCTED OVER FILL MATERIAL. DESIGN ELEVATIONS, WIDTHS, ENTRANCE AND EXIT CHANNEL SLOPES ARE CRITICAL TO THE SUCCESSFUL OPERATION OF THE SPILLWAY AND SHOULD BE ADHERED TO CLOSELY DURING CONSTRUCTION.

6) VEGETATIVE STABILIZATION: FINAL VEGETATIVE COVER (STABILIZATION) SHALL CONSIST OF TOPSOILING, LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS AS SOON AS PRACTICAL. SEDIMENT BASINS AND OTHER TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED ONLY WHEN STABILIZATION IS COMPLETE. FINAL VEGETAL COVER SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING:

TOPSOIL:	AT LEAST 2" THICKNESS OBTAINED FROM STOCKPILES ON SITE, FREE OF LARGE DEBRIS
LIME:	4,000#/ACRE (90#/1000 SF)
SEED:	KENTUCKY 31 TALL FESCUE 250#/ACRE (6#/1000 SF)
FERTILIZER:	10/20/10 MIX, 1000#/ACRE (25#/1000 SF)
MULCH:	STRAW OR HAY (LOCALLY OBTAINED) 4000#/ACRE (90#/1000 SF)



EMERGENCY SPILLWAY CROSS-SECTION DETAIL

SCALE: 1"=10' HORIZ., 1"=2' VERT.

AES, a professional corporation
1761 Jamestown Road, Williamsburg, Va. 23185
804-253-0040
Architecture, Engineering, Surveying, Planning

DAM #1 SECTIONS

FORD'S COLONY AT WILLIAMSBURG

OWNER/DEVELOPER: FORD'S COLONY AT WILLIAMSBURG, INC.

JAMES CITY COUNTY, VIRGINIA

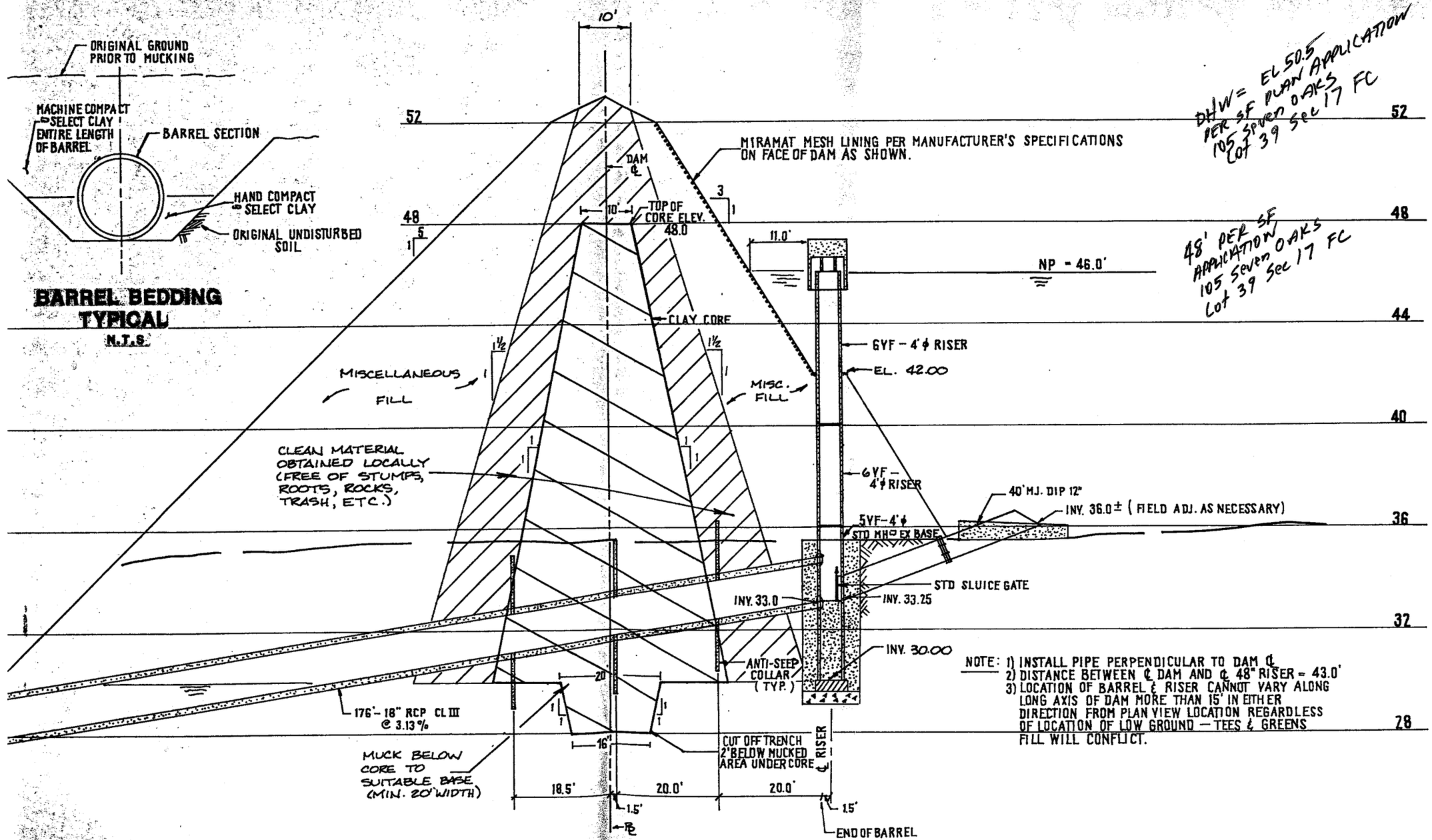
COMMONWEALTH OF VIRGINIA
DAVID A. CASTILLO
CERTIFICATE NO. 012250
PROFESSIONAL ENGINEER
CERTIFIED

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed DAR/JHB	Drawn BB
Scale NOTED	Date JAN. 1986
Project No. 5652	
Drawing No. 4	

BARREL BEDDING TYPICAL

N.T.S.



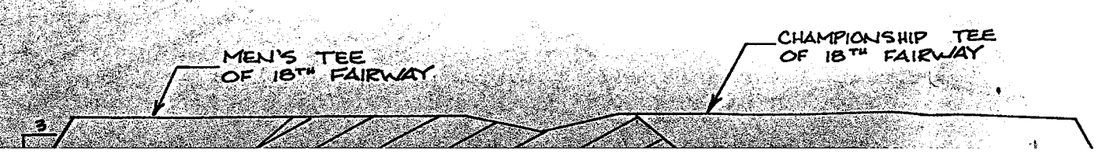
DHW = EL 50.5 PER SF PLAN APPLICATION 105 Seven OAKS Lot 39 Sec 17 FC

48' PER SF APPLICATION 105 Seven OAKS Lot 39 Sec 17 FC

NOTE:
1) INSTALL PIPE PERPENDICULAR TO DAM ℄
2) DISTANCE BETWEEN ℄ DAM AND ℄ 48" RISER = 43.0'
3) LOCATION OF BARREL & RISER CANNOT VARY ALONG LONG AXIS OF DAM MORE THAN 15' IN EITHER DIRECTION FROM PLAN VIEW LOCATION REGARDLESS OF LOCATION OF LOW GROUND — TEES & GREENS FILL WILL CONFLICT.

SECTION AT PRINCIPAL SPILLWAY

SCALE: 1"=4' VERT. 1"=20' HORZ.



TO STAKE, AS A
CHED ACCESSORY

EREON SHALL NOT BE THE

DATE 7/5/05

ITS):

THE FRONT LOT LINE.
25 PERCENT OF THE DEPTH OF
FROM THE REAR LOT LINE.)
THE SIDE LOT LINES.
CONTROL COMMITTEE SHALL
THE AFORESAID SETBACKS TO
SONABLY LIMIT THE USE
ECTIVELY DEPRIVE HIM OF AN
THE ENVIRONMENTAL CONTROL
NCE TO THE OWNER OF SAID
ESE SETBACK REQUIREMENTS.

REBY REFERRED TO FORD'S
OR MORE COMPLETE
DDITIONAL EXISTING EASEMENTS
HIS DRAWING.

N FIELD VERIFIED BY AES
SO PAVEMENT AND DITCH C/L
ELD VERIFIED AND ARE AS

OF THE 25 FOOT POND BUFFER
REQUIREMENT.

PC083

RECORD MERIDIAN
PLAT BOOK 66, PAGE 40

POND
NORMAL POOL
ELEV.=48.0±

SITE TBM
SAN MH
RIM=53.21

VARIABLE WIDTH PRIVATE DRAINAGE EASEMENT TO
COINCIDE WITH JCSA UTILITY EASEMENT & NORMAL POOL

20' JCSA UTILITY EASEMENT

EDGE OF WATER AT TIME OF SURVEY ELEV. 47.3±

S38°36'35"E 253.65' (TIE LINE)
PROPERTY LINE IS ALONG NORMAL
POOL OF LAKE

LIMITS OF 100 YR FLOOD (ELEV. 50.5)

NOTE:
25' POND BUFFER ESTABLISHED FROM
THE 100 YEAR DESIGN HIGH WATER OF
THE POND PER JAMES CITY COUNTY
ENVIRONMENTAL DIVISION.

USE SF!

CLEARING & GRADING STRUCTURES

25' POND BUFFER
OFFSET FROM 100 YEAR DESIGN
HIGH WATER, ELEVATION 50.5

S82°53'00"W 153.90'

IRF

N45°38'00"E 20.18'

LOT 41
T.M. (31-3)(9-41)

25' POND BUFFER

25% REAR B.S.L.

2 STORY
BRICK RESIDENCE
W/ BASEMENT
1ST F.F.E.=64.5
BSM'T F.F.E.=53.5

14.5' ABOVE DHW

3.5' ABOVE DHW

GARAGE
W/ BONUS ROOM
F.F.E.=62.5

CONC. DRIVE

PROPOSED UTILITY
AREA W/ WOODEN
SCREENING FENCE
(BUILDER TO
VERFIY LOCATION)

SILT FENCE
(TYPICAL)

SF

30' FRONT B.S.L.

N32°31'00"E 107.19'

N50°20'00"W 77.06'

LIMITS OF
CLEARING

CE

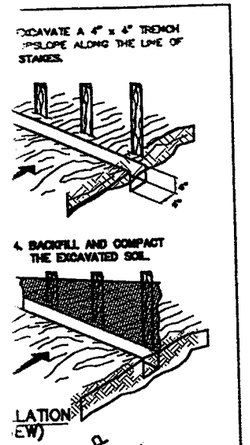
LOT 40
T.M. (31-3)(9-40)
VACANT

LOT 38
T.M. (31-3)(9-38)
VACANT

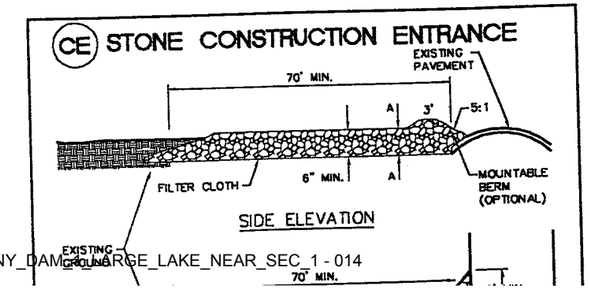
LIMITS OF
CLEARING
ALONG P/L

BEACON OF
BE INSTALL
OF THE CO
CONTROL C

OL NOTE:
SEDIMENT CONTROL ITEMS,
HALL BE REMOVED FROM LOT
E DITCH AND, IF APPLICABLE
F SEDIMENT/OR CONSTRUCTION
URING CONSTRUCTION.



NOTE:
PROVIDE STONE CONSTRUCTION ENTRANCE DURING
CONSTRUCTION. CONTRACTOR RESPONSIBLE FOR
KEEPING SEVEN OAKS FREE OF MUD AND DEBRIS
ADJACENT TO PROPOSED DRIVEWAY



NOTES:
1. ALL DISTURBED A
SODDED, OR MUL
REACHING FINAL GR
2. NO RPA CHESAP
ON OR ADJACENT

NOTE:
THIS PROPERTY LI
DETERMINED TO B
FLOOD PLAIN) PER

1 CURVE DATA

PC083_FORDS_COLONY_DAM_CHARGE_LAKE_NEAR_SEC_1 - 014

RACTOR TO VERIFY ALL
ING DIMENSIONS PRIOR
GINNING CONSTRUCTION.
DIMENSIONS AND PROPERTY LINE TIES
RE COMPUTED TO THE FACE OF STUD,
INE".)

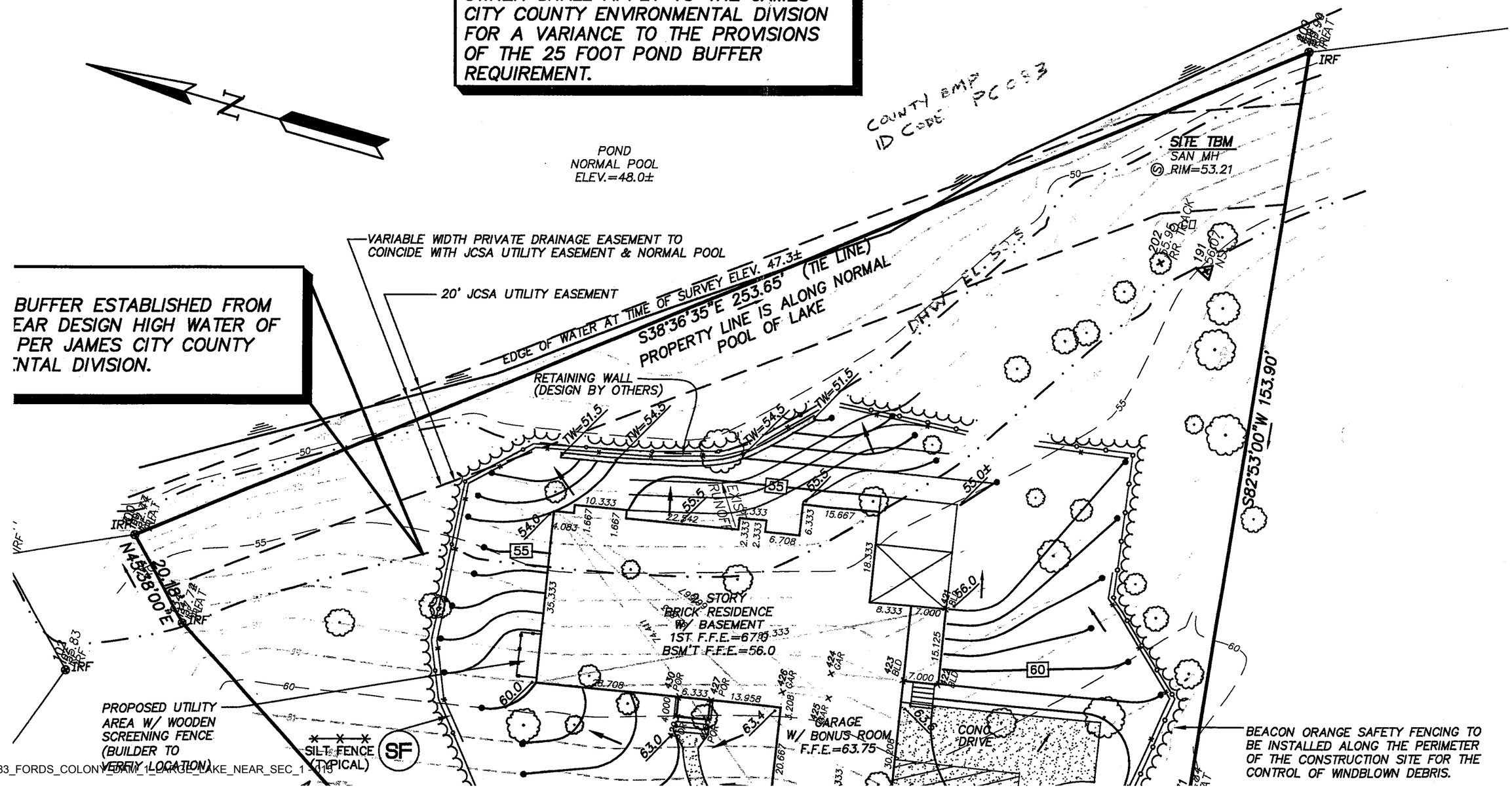
AREA OF LOT 39

25,875 S.F.±
0.594 ACRES±

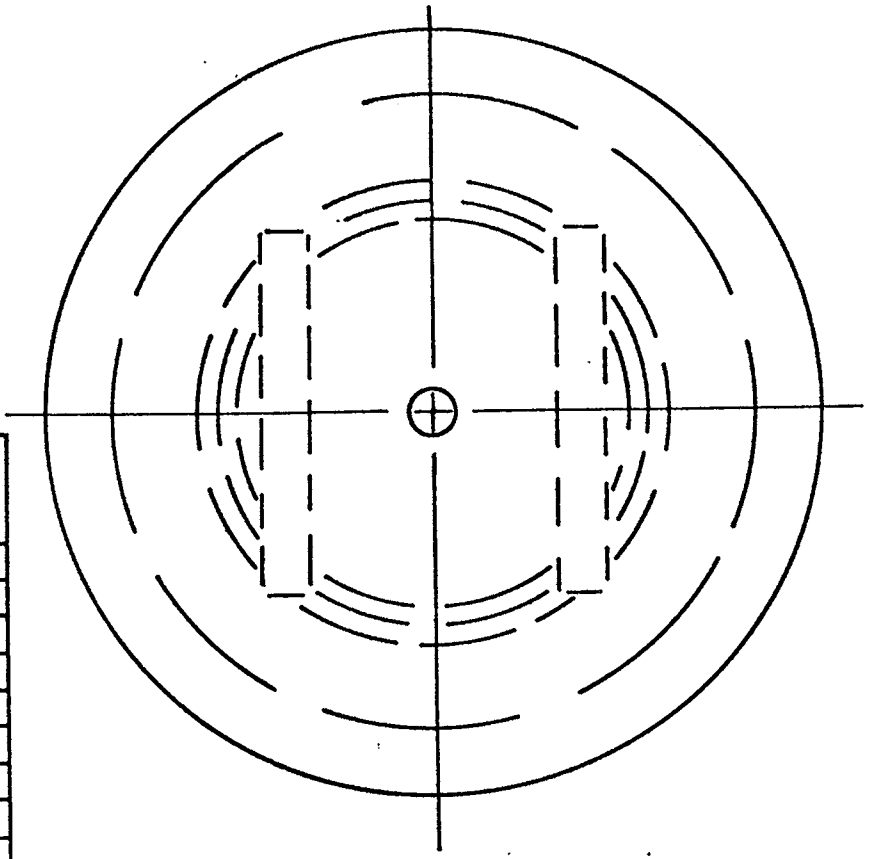
NOTE:
BUILDING SETBACK LINES ARE BASED UPON THE PURCHASER'S HANDBOOK FOR SINGLE FAMILY HOMEBUILDING AT FORD'S COLONY AND SHALL BE APPROVED BY THE FORD'S COLONY E.C.C..

NOTE:
OWNER SHALL APPLY TO THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION FOR A VARIANCE TO THE PROVISIONS OF THE 25 FOOT POND BUFFER REQUIREMENT.

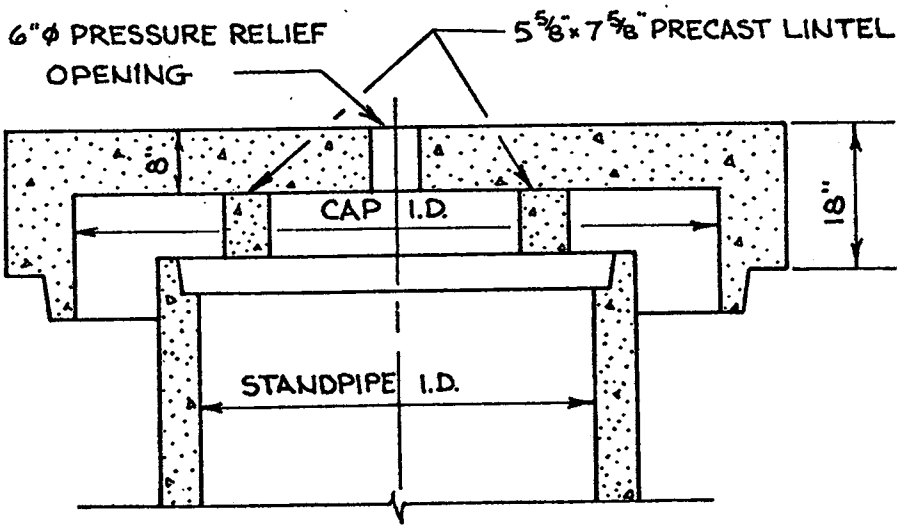
BUFFER ESTABLISHED FROM
EAR DESIGN HIGH WATER OF
PER JAMES CITY COUNTY
NTAL DIVISION.



STAND-PIPE I.D.	CAP I.D.	STNPIPE. JOINT WEIGHT	CAP WEIGHT
12"	21"	368#	564#
15"	27"	504#	903#
18"	30"	688#	1,098#
21"	36"	864#	1,549#
24"	42"	2,160#	2,087#
27"	48"	2,616#	2,701#
30"	48"	3,120#	2,701#
36"	60"	4,256#	4,441#
42"	66"	5,568#	5,314#
48"	78"	7,056#	7,307#
54"	90"	10,024#	8,887#
60"	96"	11,992#	10,361#
66"	108"	14,136#	12,958#
72"	114"	16,448#	15,115#



PLAN



SECTION

FOR PIPE DETAILS, SEE DWG. RS-74-53

FORD'S COLONY - DAM # 1 ADDITIONAL 18 HOLE GOLF

PRECAST CONCRETE ANTI-VORTEX DEVICE	DATE	1-27-83	RWS
	SCALE	1/2" = 1'-0" FOR 48" & 78"	
CONCRETE PIPE & PRODUCTS CO., INC.	DWG. No.	RS-83-9	

PC083_FORDS_COLONY_DAM_1_LARGE_LAKE_NEAR_SEC_1 016

DAM NO. 1 DESIGN CALCULATIONS

1/23/86
JN 5652
FORD'S COLONY
REVISED 2/7/86

PC083

GIVEN:

1. DRAINAGE BASIN AT PRINCIPAL SPILLWAY = 204.5 ACRES
2. WEIGHTED COEFFICIENT OF RUNOFF FACTOR
   3 SUBBASINS CONTRIBUTE TO OVERALL DRAINAGE BASIN

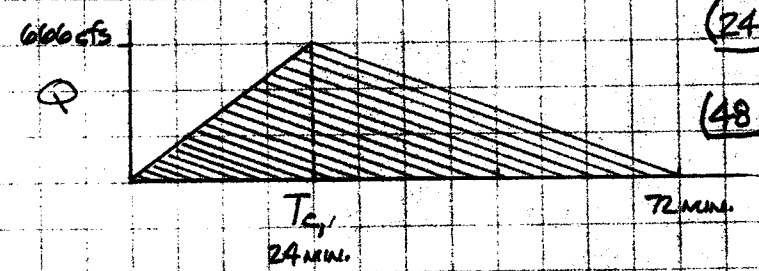
AREA 1	104.77 ACRES @ 0.424	=	44.423
AREA 2	79.84 ACRES @ 0.439	=	35.050
AREA 3	19.91 ACRES @ 0.462	=	9.198
			88.671 / 204.52 AC = 0.434

3. TIME OF CONCENTRATION
   ASSUME OVERLAND FLOW TIME = 10 MINUTES
   $\Delta H = 104 - 46 = 58'$ (CHANNEL ELEVATION DIFFERENCE)
   CHANNEL LENGTH = 2500', CHANNEL FLOW TIME = 14 MINUTES
   COMBINED T_c = 24 MINUTES

4. RAINFALL INTENSITY: CORRECTION FACTOR = 1.25 (100 YR EVENT)

$I_2 = 3.1$ IN/HR	$Q_2 = (204.5)(3.1)(0.434) =$	275 cfs
$I_{10} = 4.2$ IN/HR	$Q_{10} = (204.5)(4.2)(0.434) =$	373 cfs
$I_{100} = 6.0$ IN/HR	$Q_{100} = (204.5)(6.0)(0.434)(1.25) =$	666 cfs

5. VOLUME OF RUNOFF:
   FOR THE 100 YEAR EVENT, ASSUME THE STORM LASTS 3 TIMES THE TIME OF CONCENTRATION.



$$\frac{(24\text{ MIN})(60\text{ SEC/MIN})\,666\text{ cfs}}{2} = 479{,}520\text{ CF}$$

$$\frac{(48\text{ MIN})(60\text{ SEC/MIN})\,666\text{ cfs}}{2} = 959{,}040\text{ CF}$$

TOTAL VOLUME$_{100}$ = 1,438,560 CF OR 33.03 AC·FT

FOR THE 500 YEAR EVENT, THE STORM FOR THE WILLIAMSBURG AREA IS 10 INCHES/DAY. THE VOLUME FOR THE 500 YEAR EVENT, THEREFORE IS

$$V_{500} = \left[\frac{10\text{ IN}}{12\text{ IN/FT}}\right](0.434)(204.5)(1.25) = 92.45\text{ AC·FT}$$

6. SURFACE AREA OF LAKE AT ELEVATION 46 = 11.30 ACRES
   ALLOWABLE RISE IN LAKE = 4 FT ±. EMERGENCY SPILLWAY @ ELEV. 50
   SURFACE AREA OF LAKE AT ELEVATION 50 = 19.16 ACRES
   STORAGE IN LAKE = [(11.30 + 19.16)/2](4) = 60.9 AC·FT
   EXCESS VOLUME OF 500 YEAR STORM = 92.45 AC·FT − 60.9 AC·FT = 31.55 AC·FT/DAY

PRINCIPAL SPILLWAY DESIGN

DESIGN SPILLWAY TO PASS A MINIMUM OF 32 AC·FT/DAY

→ TRY 18" RCP BARREL SECTION, 48" MANHOLE, ANTI-VORTEX COLLAR ON TOP OF MANHOLE.

GIVEN

INV OUT (18" RCP) FROM PRINCIPAL SPILLWAY DROP INLET STRUCTURE = 33.00

INV IN (ANTI-VORTEX COLLAR) = 46.00

CALCULATE VELOCITY OF FLOW IN 18" RCP (ASSUME MANHOLE IS FULL OF WATER; I.E., HEAD = 13') SUBMERGED INLET / SUBMERGED OUTLET

$$V^{*} = \sqrt{\frac{h}{\frac{1+K_e}{2g} + \frac{n^2 L}{(2.2)(r_H)^{4/3}}}}$$

WHERE
- h = HEAD ON OUTLET PIPE
- K_e = FRICTION LOSS COEFFICIENT (OPENING)
- g = ACCELERATION OF GRAVITY
- n = ROUGHNESS COEFFICIENT (PIPE)
- r_H = WETTED PERIMETER (DIA. OF PIPE)
- L = BARREL LENGTH

*EQUATION 21-73b PER STANDARD HANDBOOK FOR CIVIL ENGINEERS. SEE ATTACHED XEROX COPIES.

$$V = \sqrt{\frac{13}{\frac{1+0.08}{2(32.2)} + \frac{(0.012)^2 126}{(2.2)(\frac{1.5}{4})^{4/3}}}} = 16.95 \text{ fps}$$

~~16.44~~ 12.04 ⇒ 15.6 ⇒ 16.04 ⇒ 17.44

$$Q = V \cdot A = (16.95)(\pi)(0.75)^2 = 29.95 \text{ cfs}$$

TO PASS 29.95 cfs HOWEVER, MANHOLE MUST BE FULL OF WATER. THIS WILL OCCUR AT SOME TIME AFTER THE ANTI-VORTEX COLLAR PERMITS MORE THAN 29.95 cfs INTO MANHOLE. ONCE THE MANHOLE IS FULL, THEN THE ANTI-VORTEX COLLAR WILL PASS INTO MANHOLE WHAT THE BARREL IS DISCHARGING INTO A LOWER POND. AFTER THE POND ELEVATION DROPS BELOW THE ELEVATION NECESSARY FOR ANTI-VORTEX COLLAR TO PASS 29.95 cfs, THE DISCHARGE OUT OF BARREL WILL BEGIN TO DECREASE.

DETERMINE DEPTH NECESSARY FOR ANTI-VORTEX COLLAR TO PASS 29.95 cfs. USE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK PLATE 1.26h TO DETERMINE DEPTH.

AT 29.95 cfs, HEAD FROM CREST OF RISER = 0.9' (WEIR FLOW)
THEREFORE, AS THE DEPTH OF WATER IN THE LAKE INCREASES FROM NORMAL POOL = 46.0 TO APPROXIMATELY 47.0', THE MANHOLE WILL FILL WITH WATER. AS THE POOL REACHES 47.0', THE OUTLET PIPE WILL THEN PASS 29.95 cfs.

IF THE OUTLET PIPE PASSES 29.95 cfs, DETERMINE THE VOLUME OF WATER DISCHARGED FROM POND IN 1 DAY.

$V = (29.95 \text{ cfs})(24)(60 \text{ sec/min})(60 \text{ min/hr}) = 2{,}587{,}680 \text{ cfd}$ OR 59.41 Ac·FT

PRINCIPAL SPILLWAY PASSES ABOUT 2 TIMES THAT NEEDED (32 Ac·FT/DAY WAS NEEDED). CONSEQUENTLY, UNLESS THE PRINCIPAL SPILLWAY MALFUNCTIONS, THE EMERGENCY SPILLWAY WILL NEVER BE USED.

<u>EMERGENCY SPILLWAY</u> SPILLWAY INVERT = 50.0 TOP OF DAM = 52.0

CALCULATE FLOW THROUGH WEIR AT CONTROL SECTION, 40' WIDE, 2' DEEP

FOR BROAD CRESTED WEIR, $Q = 2.67 L H^{3/2}$ OR $Q = 2.67(40)(2)^{1.5} = 302$ cfs

TRY 40' BOTTOM WIDTH, 3:1 SIDE SLOPES, 6.67% SLOPE, 2' DEEP.
NOTE MIDDLE OF SPILLWAY WILL BE PAVED GOLF CART PATH (APPROX. 8' WIDE) AND REMAINDER OF SPILLWAY WILL BE LINED WITH MIRAMAT EROSION CONTROL MAT (PER MANUFACTURER'S SPECIFICATIONS).
$V_{ALLOWABLE(MIRAMAT)} = 10$ fps. (PER MANUFACTURER) $n = 0.05$

USE VDH&T DRAINAGE MANUAL CHART 2-70 (FIGURE 2.8.39)
40' WIDE, 1:1 SIDE SLOPES (NOTE: THERE IS NO CHART FOR 3:1 SS)
$D_{(302 \text{ cfs})} \approx 1.0'$ $V_{(302 \text{ cfs})} = 7.6$ CFS

EMERGENCY SPILLWAY IS ADEQUATE BECAUSE
a) CENTER 8' IS PAVED
b) VELOCITY IS BELOW MAXIMUM ALLOWED BY VDH&T STANDARDS WHICH ARE TYPICALLY CONSERVATIVE
c) CHART IS FOR 1:1 SS. WITH ACTUAL 3:1 SS, VELOCITY AND DEPTH WILL BE SLIGHTLY LOWER.

CHECK PRE-DEVELOPMENT AND POST DEVELOPMENT STORMS.

ASSUME PRE-DEVELOPMENT C RANGES FROM 0.2 TO 0.3 AND THE TIME OF CONCENTRATION IS 1.5 TIMES THAT OF POST DEVELOPMENT.

	PRE-DEVELOPMENT C=0.2		C=0.3	POST DEVELOPMENT RELEASE RATE	% REDUCTION
2 YEAR	(204.5)(2.4)(0.20) = 98 cfs	→	147 cfs	30 cfs	327% / 490%
10 YEAR	(204.5)(3.2)(0.20) = 131 cfs	→	196 cfs	30 cfs	437% / 653%
100 YEAR	(204.5)(4.6)(0.20)(1.25) = 235 cfs	→	353 cfs	30 cfs	783% / 1177%

EXCERPTS FROM "STANDARD HANDBOOK FOR CIVIL ENGINEERS" -3RD EDITION, FREDERICK S. MERRITT, EDITOR

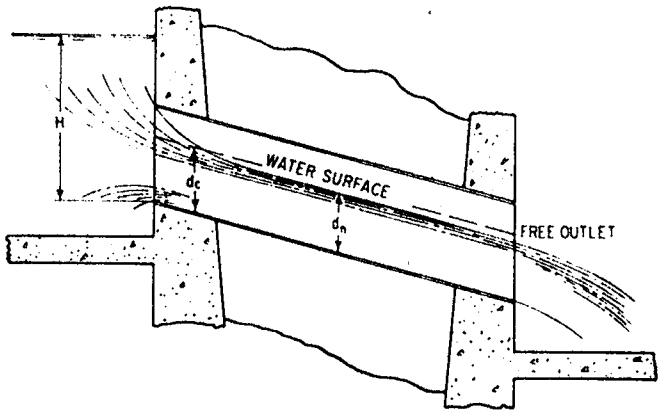


Fig. 21-36. Flow through a culvert with free discharge. Normal depth d_n is less than critical depth d_c; slope is greater than critical. Discharge depends on type of inlet and head H.

21-18. Culverts on Critical Slope or Steeper

Entrance Submerged or Unsubmerged but Free Exit ▪ If a culvert is on critical slope or steeper, that is, the normal depth is equal to or less than the critical depth (Art. 21-23), the discharge will be entirely dependent on the entrance conditions (Fig. 21-36). Increasing the slope of the culvert past critical slope (the slope just sufficient to maintain flow at critical depth) will decrease the depth of flow downstream from the entrance. But the increased slope will not increase the amount of water entering the culvert because the entrance depth will remain at critical.

The discharge is given by the equation for flow through an orifice if the entrance is submerged, or by the equation for flow over a weir if the entrance is not submerged. Coefficients of discharge for weirs and orifices give good results, but they do not cover the entire range of entry conditions encountered in culvert problems. For this reason, charts and nomographs have been developed and are used almost exclusively in design. ("Handbook of Concrete Culvert Pipe Hydraulics," EB058W, Portland Cement Association.)

Entrance Unsubmerged but Exit Submerged ▪ In this case, the submergence of the exit will cause a hydraulic jump to occur in the culvert (Fig. 21-37). The jump will not affect the culvert discharge, and the control will still be at the inlet.

Entrance and Exit Submerged ▪ When both the exit and entrance are submerged (Fig. 21-38), the culvert flows full, and the discharge is independent of the slope. This is normal pipe flow and is easily solved by using the Manning or Darcy-Weisbach formula for friction loss [Eq. (21-33*d*) or (21-30)]. From the Bernoulli equation for the entrance and exit, and the Manning equation for friction loss, the following equation is obtained:

$$H = (1 + K_e)\frac{V^2}{2g} + \frac{V^2 n^2 L}{2.21 R^{4/3}} \qquad (21\text{-}73)$$

$$V = \sqrt{\frac{H}{(1 + K_e/2g) + (n^2 L/2.21 R^{4/3})}} \qquad (21\text{-}74)$$

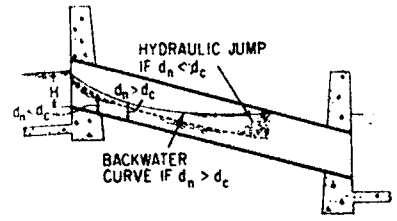


Fig. 21-37. Flow through a culvert with entrance unsubmerged but exit submerged. When slope is less than critical, open-channel flow takes place, and $d_n > d_c$. When slope exceeds critical, flow depends on inlet conditions, and $d_n < d_c$.

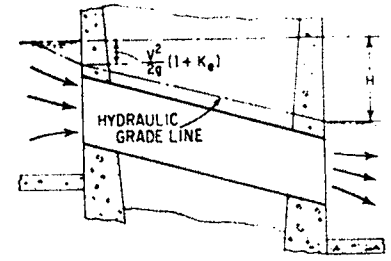


Fig. 21-38. With entrance and exit submerged, normal pipe flow occurs in a culvert, and discharge is independent of slope. The fluid flows under pressure. Discharge may be determined from Bernoulli and Manning equations.

where H = elevation difference between headwater and tailwater, ft
V = velocity in culvert, ft/s
g = acceleration due to gravity, 32.2 ft/s^2
K_e = entrance-loss coefficient (Art. 21-20)
n = Manning's roughness coefficient
L = length of culvert, ft
R = hydraulic radius of culvert, ft

This equation can be solved directly since the velocity is the only unknown.

21-19. Culverts with Slope Less than Critical

Critical slope is the slope just sufficient to maintain flow at critical depth (Art. 21-23).

Entrance Submerged or Unsubmerged but Free Exit ▪ For these conditions, depending on the head, the flow can be either pressure or open-channel.

The discharge, for the open-channel condition (Fig. 21-39), is obtained by writing the Bernoulli equation for a point just outside the entrance and a point a short distance downstream from the entrance. Thus,

$$H = K_e\frac{V^2}{2g} + \frac{V^2}{2g} + d_n \qquad (21\text{-}74)$$

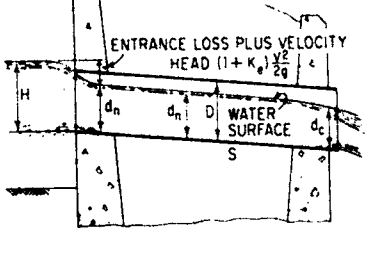


Fig. 21-39. Flow through culvert with free discharge and normal depth d_n greater than the critical depth d_c when the entrance is unsubmerged or slightly submerged. Open-channel flow occurs and discharge depends on head H, loss at entrance, and slope of culvert.

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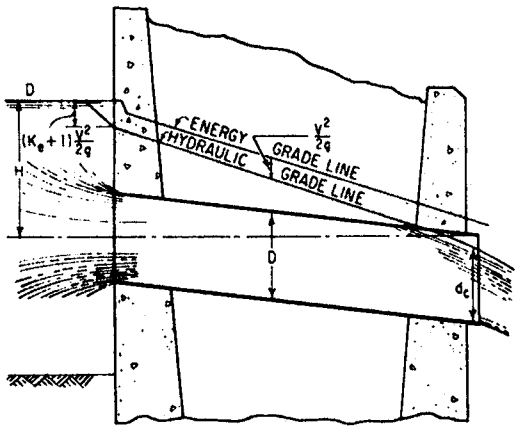

Fig. 21-40. Flow through culvert with free discharge and normal depth d_n greater than critical depth d_c when entrance is deeply submerged. The culvert flows full. Discharge is given by equations for pipe flow.

The velocity can be determined from the Manning equation:

$$V^2 = \frac{2.2SR^{4/3}}{n^2} \qquad (21\text{-}7$$

Substituting this into Eq. (21-74) yields

$$H = (1 + K_e)\frac{2.2}{2gn^2}SR^{4/3} + d_n \qquad (21\text{-}$$

where H = head on entrance measured from bottom of culvert, ft
K_e = entrance-loss coefficient (Art. 21-20)
S = slope of energy grade line, which for culverts is assumed to equal slope of bo of culvert
R = hydraulic radius of culvert, ft
d_n = normal depth of flow, ft

To solve Eq. (21-76), it is necessary to try different values of d_n and corresponding value R until a value is found that satisfies the equation. If the head on a culvert is high, a valu d_n less than the culvert diameter will not satisfy Eq. (21-76). This means the flow is u pressure (Fig. 21-40), and discharge is given by Eq. (21-73).

When the depth of the water is slightly below the top of the culvert, there is a range unstable flow fluctuating between pressure and open channel. If this condition exists, it is g practice to check the discharge for both pressure flow and open-channel flow. The condi that gives the lesser discharge should be assumed to exist.

Short Culvert with Free Exit ▪ When a culvert on a slope less than critical has a free there will be a drawdown of the water surface at the exit and for some distance upstream magnitude of the drawdown depends on the friction slope of the culvert and the differ between the critical and normal depths. If the friction slope approaches critical, the differ between normal depth and critical depth is small (Fig. 21-39), and the drawdown will extend for any significant distance upstream. When the friction slope is flat, there will

large difference between normal and critical depth. The effect of the drawdown will extend a greater distance upstream and may reach the entrance of a short culvert (Fig. 21-41). This drawdown of the water level in the entrance of the culvert will increase the discharge, causing it to be about the same as for a culvert on a slope steeper than critical (Art. 21-18). Most culverts, however, are on too steep a slope for the backwater to have any effect for an appreciable distance upstream.

Entrance Unsubmerged but Exit Submerged ▪ If the level of submergence of the exit is well below the bottom of the entrance (Fig. 21-37), the backwater from the submergence will not extend to the entrance. The discharge for this case will be given by Eq. (21-76).

If the level of submergence of the exit is close to the level of the entrance, it may be assumed that the backwater will cause the culvert to flow full and a pipe flow condition will result. The discharge for this case is given by Eq. (21-73).

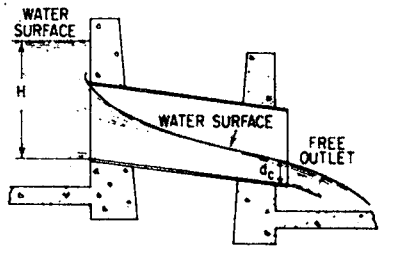

Fig. 21-41. Drawdown of water surface at free exit of a short culvert with slope less than critical affects depth at entrance and controls discharge.

When the level of submergence falls between these two cases and the project does not warrant a trial approach with backwater curves, it is good practice to assume the condition that gives the lesser discharge.

21-20. Entrance Losses for Culverts

Flow in a culvert may be significantly affected by loss in head because of conditions at the entrance (Arts. 21-18 and 21-19). Following are coefficients of entrance loss K_e for some typical entrance conditions:

Sharp-edged projecting inlet	0.9
Flush inlet, square edge	0.5
Concrete pipe, groove or bell, projecting	0.15
Concrete pipe, groove or bell, flush	0.10
Well-rounded entrance	0.08

These values are for culverts flowing full. When the entrance is not submerged, the coefficients are usually somewhat lower. But because of the many unknowns entering into culvert problems, the values tabulated can be used for submerged or unsubmerged cases without sacrificing accuracy.

Example 21-9 ▪ *Given:* Maximum head above the top of the culvert = 5 ft, slope = 0.01, length = 300 ft, discharge Q = 40 ft³/s, n = 0.013, and free exit. *Find:* size of culvert.

Procedure: First assume a trial culvert; then investigate the assumed section to find its discharge. Assume a 2 × 2 ft concrete box section. Calculate Q assuming entrance control, with Eq. (21-44) for discharge through an orifice. The coefficient of discharge C for a 2-ft-square orifice is about 0.6. Head h on center line of entrance = 5 + ½ × 2 = 6 ft. Entrance area a = 2 × 2 = 4 ft².

$$Q = Ca\sqrt{2gh} = 0.6 \times 4\sqrt{64.4 \times 6} = 47.2 \text{ ft}^3/\text{s}$$

For entrance control, the flow must be supercritical and d_n must be less than 2 ft. First find d_n.

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DRAINAGE BASIN STORM FLOW CALCULATION USING TR-55 METHOD (TABULAR)

FIND: PEAK DISCHARGE FOR 100 YEAR STORM AND TOTAL VOLUME OF RUNOFF FOR THE 100 YEAR EVENT.

1. DRAINAGE AREA = 204.5 ACRES
   HYDRAULIC LENGTH = 2500'
   SLOPES: ON CHANNEL = 2.2%
   AVERAGE FOR SURROUNDING BASIN = 5%

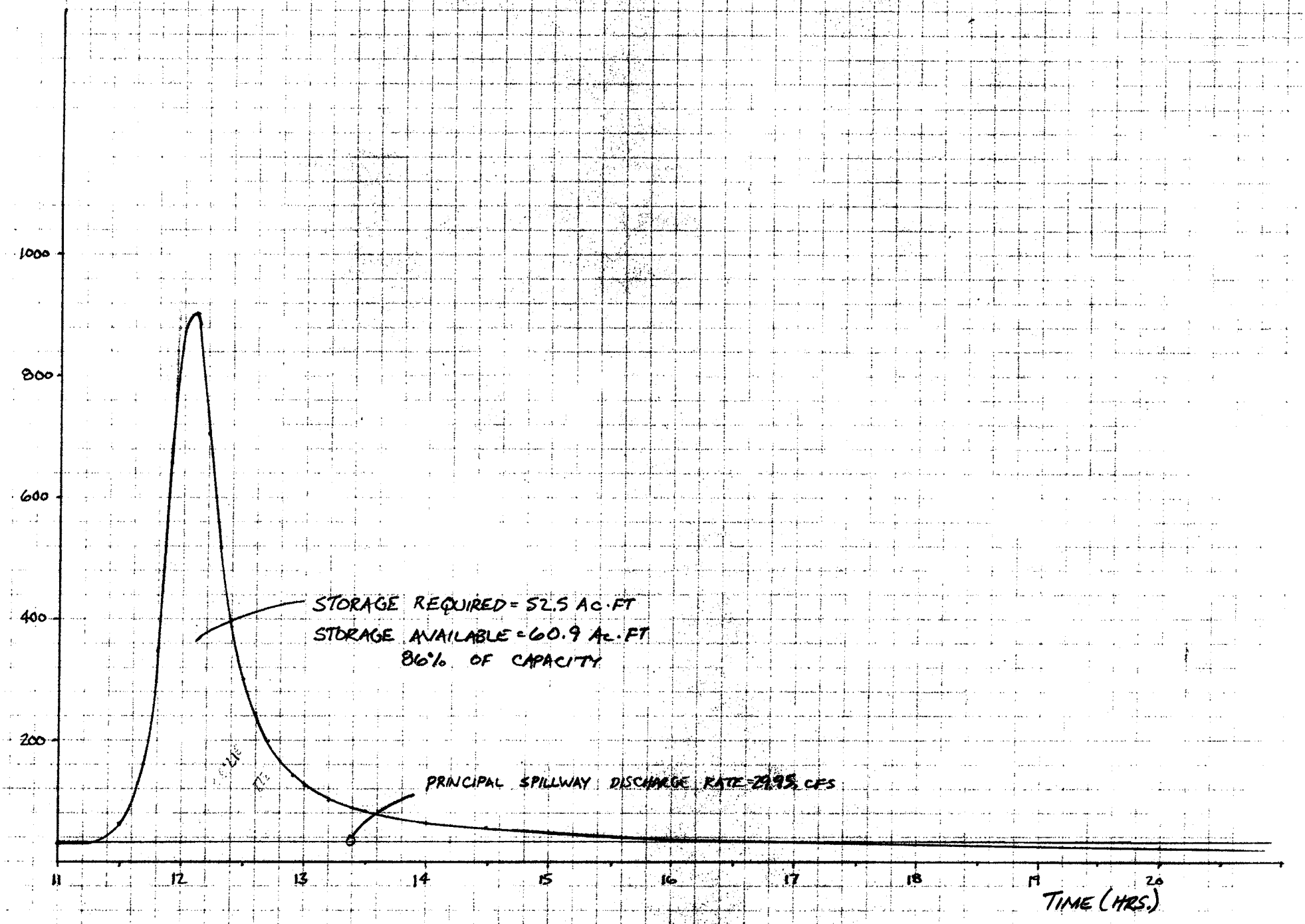
2. CURVE NUMBER (CN) USING TABLE 5-3 USING B AND C SOIL GROUPS

✓ GOLF COURSE AREA	= 69.13 ACRES	CN = 61	4216.93	
✓ PUBLIC SERVICE AREA	= 28.01 ACRES	CN = 88	2464.88	.7×28
LAKE	= 11.30 ACRES	CN = 98	1107.40	
✓ MULTI-FAMILY (1/6 ACRE LOTS)	= 74.29 AC.	CN = 81.5	6017.49	.65×75
✓ SINGLE-FAMILY (1/2 ACRE LOTS)	= 21.77	CN = 70	1523.00	.25×21
			15329.70 ÷ 204.5 = 74.96	

USE WEIGHTED CN VALUE OF 75

3. DETERMINE RUNOFF DEPTH AND VOLUME
   a. RAINFALL DEPTH FOR 100 YEAR STORM IN JAMES CITY COUNTY = 8.0 INCHES (USING PLATE 5-11)
   b. RUNOFF DEPTH$_{100}$ = 4.9 INCHES (FROM PLATE 5-12, GIVEN CN=74)
   c. RUNOFF VOLUME$_{100}$ FOR SITE EQUALS
   (5.0 IN)(204.5 AC/12 IN/FT) = 85.21 AC·FT (100 YEAR)

4. TIME OF CONCENTRATION
   ASSUME OVERLAND FLOW TIME = 10 MINUTES
   ΔH = 104 - 46 = 58' (CHANNEL ELEVATION DIFFERENCE)
   CHANNEL LENGTH = 2500', CHANNEL FLOW TIME = 14 MINUTES
   COMBINED T_c = 24 MINUTES OR 0.4 HRS



TIME OF CONCENTRATION = 0.4 HR.

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Table 5-12

Source: USDA-SCS

TIME OF CONCENTRATION = 0.3 HOURS

T_t	Hydrograph Time in Hours																							
	11.0	11.5	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.2	13.5	14.0	14.5	15.0	16.0	18.0	20.0
0	21	43	141	324	586	658	535	372	251	184	148	124	102	86	77	71	61	51	41	34	30	24	18	14
0.25	17	31	43	67	134	279	461	559	530	428	318	234	179	143	116	97	76	59	45	37	32	25	18	15
0.50	13	22	29	34	42	65	124	238	378	479	499	447	363	281	216	168	110	74	51	41	34	26	19	15
0.75	10	17	21	24	27	32	41	63	114	203	316	413	457	443	389	319	198	105	60	45	37	28	20	15
1.00	8	13	16	18	20	23	26	31	40	60	103	176	269	358	415	426	344	182	77	51	41	30	20	16
1.50	5	8	10	11	12	13	15	16	18	21	24	28	36	52	82	132	272	382	192	81	52	34	22	17
2.00	3	5	6	7	8	8	9	10	11	12	14	15	17	19	21	25	44	151	351	198	85	41	24	18
2.50	1	3	4	4	5	5	6	6	7	8	8	9	10	11	12	14	17	28	162	328	200	54	27	19
3.00	0	1	2	2	3	3	3	4	4	5	5	6	6	7	8	9	10	14	33	169	309	94	30	20
3.50	0	0	1	1	1	1	2	2	2	3	3	3	4	4	5	5	6	9	14	38	172	294	35	22
4.00	0	0	0	0	0	0	1	1	1	1	1	2	2	2	3	3	4	5	9	15	43	281	42	24

4.9 INCHES RUNOFF

TIME OF CONCENTRATION = 0.4 HOURS (24 MINUTES)

T_t	Hydrograph Time in Hours																							
	11.0	11.5	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.2	13.5	14.0	14.5	15.0	16.0	18.0	20.0
	31	61	161	351	656	874	900	706	518	387	297	243	199	164	141	125	103	83	66	55	47	36	28	22
0	20	39	103	224	419	558	575	451	331	247	190	155	127	105	90	80	66	53	42	35	30	24	18	14
0.25	15	28	38	54	98	196	343	467	508	464	380	295	228	180	145	119	87	64	47	38	32	26	19	15
0.50	12	20	26	30	37	53	92	172	286	395	462	453	402	332	266	211	137	84	54	42	35	27	19	15
0.75	10	16	19	22	25	29	36	51	85	150	242	338	407	429	406	356	241	128	65	47	38	29	20	16
1.00	8	12	15	17	19	21	24	28	34	49	78	132	208	292	362	403	368	220	88	55	42	30	21	16
1.50	5	8	9	10	11	12	14	15	17	19	22	25	31	43	65	102	220	365	224	93	56	35	22	17
2.00	3	5	6	6	7	8	9	9	10	11	13	14	16	17	20	23	37	119	338	225	99	43	24	18
2.50	1	3	3	4	4	5	5	6	6	7	8	9	10	11	12	13	16	25	132	317	225	58	27	19
3.00	0	1	2	2	2	3	3	3	4	4	5	5	6	7	7	8	10	13	28	140	300	107	31	21
3.50	0	0	1	1	1	1	1	2	2	2	3	3	3	4	4	5	6	8	13	32	146	286	36	22
4.00	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	3	3	5	8	14	36	275	44	24

1980

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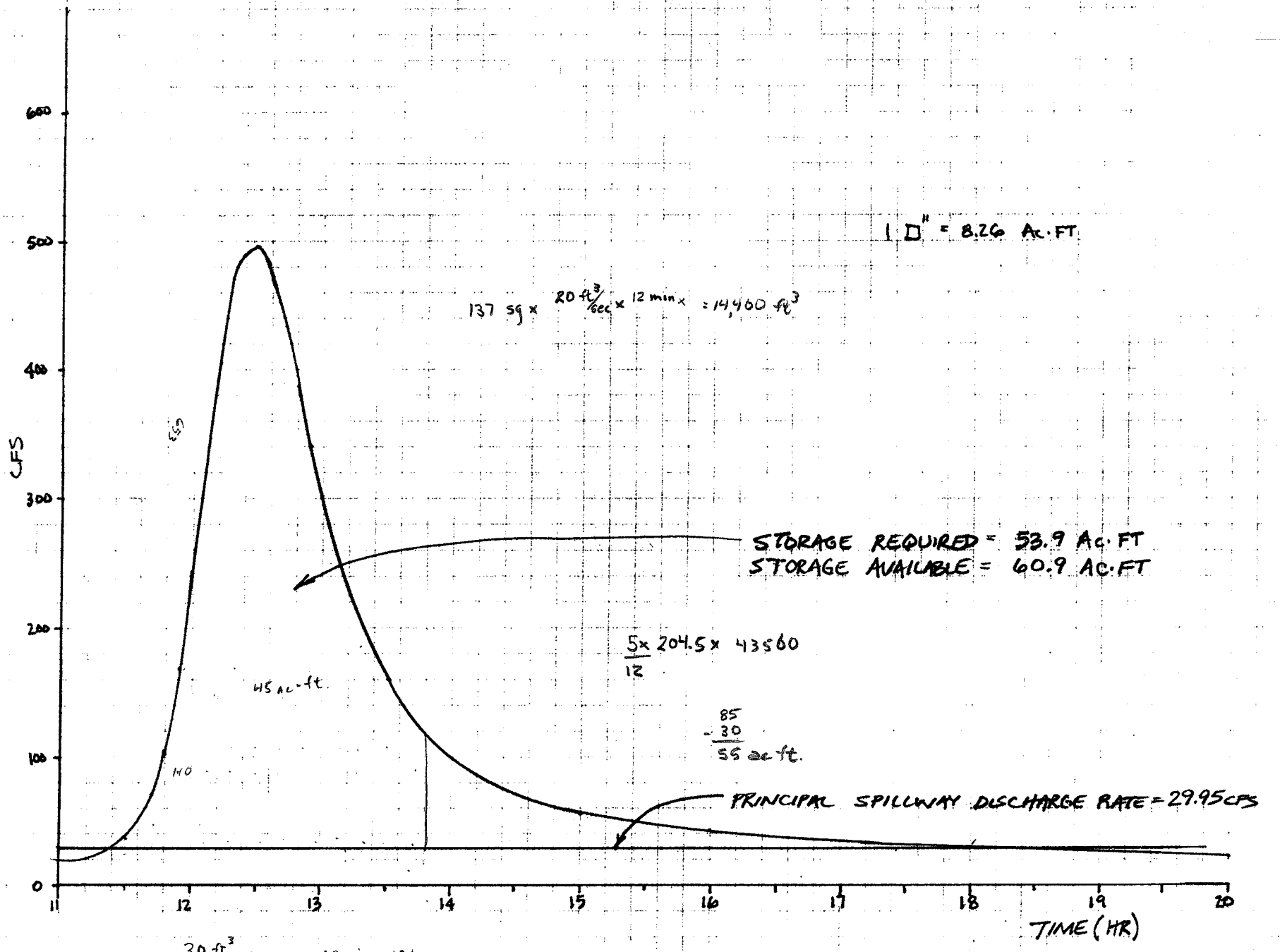
CFS
600
500
400
300
200
100
0
11
12
13
14
15
16
17
18
19
20
TIME (HR)
1 □" = 8.26 AC·FT
137 sq × 20 ft³/sec × 12 min × = 14,400 ft³
STORAGE REQUIRED = 53.9 AC·FT
STORAGE AVAILABLE = 60.9 AC·FT
5 × 204.5 × 43560 / 12
45 AC-ft.
85
- 30
55 ac-ft.
PRINCIPAL SPILLWAY DISCHARGE RATE = 29.95 CFS
30 ft³/sec × 60 sec/min × 60 min/hr × 12 hr
TIME OF CONCENTRATION = 1.0 HR.

4.9 INCHES RUNOFF

Table 5-14

TIME OF CONCENTRATION = 1.0 HOURS

Hydrograph Time in Hours

Tt	11.0	11.5	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.2	13.5	14.0	14.5	15.0	16.0	18.0	20.0
	20	38	70	103	168	243	330	404	471	490	495	471	434	387	340	294	229	160	100	72	56	42	30	23
0	13	24	45	66	107	155	211	258	301	313	316	301	277	247	217	188	146	102	64	46	36	27	19	15
0.25	10	18	24	32	45	68	102	146	193	238	272	293	299	293	275	252	200	139	81	54	41	29	20	16
0.50	8	14	17	20	24	32	46	68	99	136	178	219	251	274	284	283	254	187	105	65	47	31	21	16
0.75	7	11	13	15	17	20	25	33	46	67	94	128	165	202	233	256	273	236	140	82	55	33	21	16
1.00	5	9	11	12	13	15	17	20	25	33	46	65	90	121	154	187	240	262	183	107	66	37	22	17
1.50	3	5	7	7	8	9	10	11	12	14	16	19	24	31	43	58	103	185	244	181	110	48	24	18
2.00	2	3	4	4	5	6	6	7	8	8	9	10	11	13	15	18	29	69	182	230	178	70	27	19
2.50	1	2	2	3	3	3	4	4	5	5	6	6	7	8	9	10	12	21	77	178	219	114	31	21
3.00	0	1	1	1	1	2	2	2	3	3	3	4	4	5	5	6	7	10	25	83	210	172	39	22
3.50	0	0	0	0	1	1	1	1	1	2	2	2	2	3	3	3	4	6	11	29	88	202	52	25
4.00	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	4	6	12	33	195	77	28

TIME OF CONCENTRATION = ~~1.0~~ 1.25 HOURS

Hydrograph Time in Hours

Tt	11.0	11.5	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.2	13.5	14.0	14.5	15.0	16.0	18.0	20.0
0	11	21	37	51	79	107	147	187	219	249	264	271	267	256	241	219	177	128	81	56	42	29	20	16
0.25	9	15	21	27	36	53	74	103	137	172	205	231	249	259	259	253	223	167	102	67	48	31	21	16
0.50	7	12	15	17	21	27	37	51	72	98	128	160	190	216	235	247	251	209	130	82	56	34	21	16
0.75	6	9	12	13	15	17	21	27	36	50	69	93	120	149	177	202	235	242	165	103	67	38	22	17
1.00	4	7	9	10	11	13	14	17	21	27	36	49	66	88	113	139	190	236	200	130	83	43	23	17
1.50	3	5	6	6	7	8	8	9	10	12	14	16	20	25	33	44	76	142	223	195	131	58	26	18
2.00	1	3	3	4	4	5	5	6	6	7	8	9	10	11	13	15	24	52	143	212	189	86	29	20
2.50	1	1	2	2	2	3	3	3	4	4	5	5	6	7	7	8	10	17	58	143	201	132	35	21
3.00	0	1	1	1	1	1	2	2	2	2	3	3	3	4	4	5	6	9	20	64	143	196	45	23
3.50	0	0	0	0	0	1	1	1	1	1	1	2	2	2	2	3	4	5	9	23	68	190	62	26
4.00	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	3	5	10	26	184	91	30

Source: USDA-SCS

1980

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DAM NO. 1 DESIGN CALCULATIONS

1/23/86

JN 5652
FORD'S COLONY

PC083

GIVEN:

1. DRAINAGE BASIN AT PRINCIPAL SPILLWAY = 204.5 ACRES
2. WEIGHTED COEFFICIENT OF RUNOFF FACTOR
   3 SUBBASINS CONTRIBUTE TO OVERALL DRAINAGE BASIN

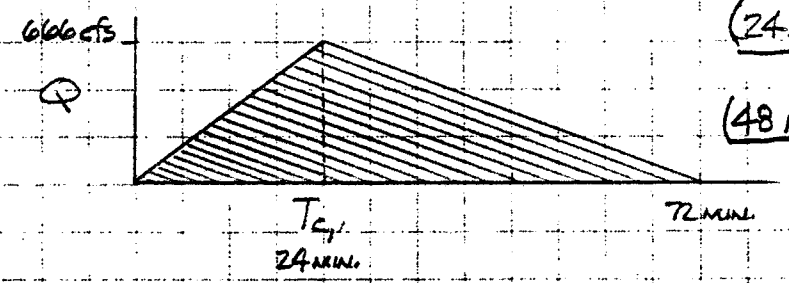
AREA 1	104.77 ACRES @ 0.424	=	44.423
AREA 2	79.84 ACRES @ 0.439	=	35.050
AREA 3	19.91 ACRES @ 0.462	=	9.198
			88.671 / 204.52 AC = 0.434

3. TIME OF CONCENTRATION
   ASSUME OVERLAND FLOW TIME = 10 MINUTES
   $\Delta H = 104 - 46 = 58'$ (CHANNEL ELEVATION DIFFERENCE)
   CHANNEL LENGTH = 2500', CHANNEL FLOW TIME = 14 MINUTES
   COMBINED T_c = 24 MINUTES

4. RAINFALL INTENSITY: CORRECTION FACTOR = 1.25 (100 YR EVENT)

$I_2 = 3.1$ IN/HR	$Q_2 = (204.5)(3.1)(0.434) =$	275 cfs
$I_{10} = 4.2$ IN/HR	$Q_{10} = (204.5)(4.2)(0.434) =$	373 cfs
$I_{100} = 6.0$ IN/HR	$Q_{100} = (204.5)(6.0)(0.434)(1.25) =$	666 cfs

5. VOLUME OF RUNOFF:
   FOR THE 100 YEAR EVENT, ASSUME THE STORM LASTS 3 TIMES THE TIME OF CONCENTRATION.



$$\frac{(24\text{ MIN})(60\text{ SEC/MIN})\,666\text{ cfs}}{2} = 479{,}520\text{ CF}$$

$$\frac{(48\text{ MIN})(60\text{ SEC/MIN})\,666\text{ cfs}}{2} = 959{,}040\text{ CF}$$

TOTAL VOLUME_{100} = 1,438,560 CF
OR 33.03 AC·FT

FOR THE 500 YEAR EVENT, THE STORM FOR THE WILLIAMSBURG AREA IS 10 INCHES/DAY. THE VOLUME FOR THE 500 YEAR EVENT, THEREFORE IS

$$V_{500} = \left[\frac{10\text{ IN}}{12\text{ IN/FT}}\right](0.434)(204.5)(1.25) = 92.45\text{ AC·FT}$$

6. SURFACE AREA OF LAKE AT ELEVATION 46 = 11.30 ACRES ✓
   ALLOWABLE RISE IN LAKE = 4 FT ±. EMERGENCY SPILLWAY @ ELEV. 50
   SURFACE AREA OF LAKE AT ELEVATION 50 = 19.16 ACRES
   STORAGE IN LAKE = $[(11.30 + 19.16)/2](4) = 60.9$ AC·FT
   EXCESS VOLUME OF 500 YEAR STORM = 92.45 AC·FT − 60.9 AC·FT = 31.55 AC·FT/DAY

POOR ORIGINAL

PRINCIPAL SPILLWAY DESIGN

DESIGN SPILLWAY TO PASS A MINIMUM OF 32 AC·FT/DAY

→ TRY 18" RCP BARREL SECTION, 48" MANHOLE, ANTI-VORTEX COLLAR ON TOP OF MANHOLE.

GIVEN

INV OUT (18" RCP) FROM PRINCIPAL SPILLWAY DROP INLET STRUCTURE = 33.00

INV IN (ANTI-VORTEX COLLAR) = 46.00

CALCULATE VELOCITY OF FLOW IN 18" RCP (ASSUME MANHOLE IS FULL OF WATER; I.E., HEAD = 13')

$$V = \sqrt{\frac{h}{\frac{1+K_e}{2g} + \frac{n^2 L}{(2.21)(r_H)^{4/3}}}}$$

WHERE
- h = HEAD ON OUTLET PIPE
- K_e = FRICTION LOSS COEFFICIENT (OPENING)
- g = ACCELERATION OF GRAVITY
- n = ROUGHNESS COEFFICIENT (PIPE)
- r_H = WETTED PERIMETER (DIA. OF PIPE)
- L = BARREL LENGTH

$$V = \sqrt{\frac{13}{\frac{1+0.5}{2(32.2)} + \frac{(0.015)^2 176}{(2.21)(1.5)^{4/3}}}} = 19.63 \text{ fps}$$

$$Q = V \cdot A = (19.63)(\pi)(0.75)^2 = 34.69 \text{ cfs}$$

TO PASS 34.69 cfs HOWEVER, MANHOLE MUST BE FULL OF WATER. THIS WILL OCCUR AT SOME TIME AFTER THE ANTI-VORTEX COLLAR PERMITS MORE THAN 34.69 cfs INTO MANHOLE. ONCE THE MANHOLE IS FULL, THEN THE ANTI-VORTEX COLLAR WILL PASS INTO MANHOLE WHAT THE BARREL IS DISCHARGING INTO A LOWER POND. AFTER THE POND ELEVATION DROPS BELOW THE ELEVATION NECESSARY FOR ANTI-VORTEX COLLAR TO PASS 34.69 cfs, THE DISCHARGE OUT OF BARREL WILL BEGIN TO DECREASE.

DETERMINE DEPTH NECESSARY FOR ANTI-VORTEX COLLAR TO PASS 34.69 cfs. USE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK PLATE 1.26h TO DETERMINE DEPTH.

AT 34.7 cfs, HEAD FROM CREST OF RISER = 0.9' (WEIR FLOW)

THEREFORE, AS THE DEPTH OF WATER IN THE LAKE INCREASES FROM NORMAL POOL = 46.0 TO APPROXIMATELY 47.0', THE MANHOLE WILL FILL WITH WATER. AS THE POOL REACHES 47.0', THE OUTLET PIPE WILL THEN PASS 34.7 cfs.

IF THE OUTLET PIPE PASSES 34.7 cfs, DETERMINE THE VOLUME OF WATER DISCHARGED FROM POND IN 1 DAY.

$V = (34.7\ cfs)(24)(60\ sec/min)(60\ min/hr) = 2{,}998{,}080\ cfd$ OR 68.8 Ac·FT

PRINCIPAL SPILLWAY PASSES ABOUT 2 TIMES THAT NEEDED (32 Ac·FT/DAY WAS NEEDED). CONSEQUENTLY, UNLESS THE PRINCIPAL SPILLWAY MALFUNCTIONS, THE EMERGENCY SPILLWAY WILL NEVER BE USED.

<u>EMERGENCY SPILLWAY</u> SPILLWAY INVERT = 50.0 TOP OF DAM = 52.0

ASSUME THE PRINCIPAL SPILLWAY FAILS TO FUNCTION. CALCULATE THE NECESSARY SPILLWAY TO PASS THE 100 YEAR EVENT (666 cfs)

TRY 40' BOTTOM WIDTH, 3:1 SIDE SLOPES, 6.67% SLOPE, 2' DEEP.
- NOTE MIDDLE OF SPILLWAY WILL BE PAVED GOLF CART PATH (APPROX. 8' WIDE) AND REMAINDER OF SPILLWAY WILL BE LINED WITH MIRAMAT EROSION CONTROL MAT (PER MANUFACTURER'S SPECIFICATIONS).
- $V_{ALLOWABLE(MIRAMAT)} = 10$ fps. (PER MANUFACTURER) $n = 0.05$

USE VDH&T DRAINAGE MANUAL CHART 2-70 (FIGURE 2.8.39)
40' WIDE, 1:1 SIDE SLOPES (NOTE: THERE IS NO CHART FOR 3:1 SS)
$D_{100} = 1.6'$, $V_{100} = 10.4$ fps

EMERGENCY SPILLWAY IS ADEQUATE BECAUSE
a) CENTER 8' IS PAVED
b) VELOCITY IS ONLY 4% IN EXCESS OF VDH&T STANDARDS WHICH ARE TYPICALLY CONSERVATIVE
c) CHART IS FOR 1:1 SS. WITH ACTUAL 3:1 SS, VELOCITY AND DEPTH WILL BE SLIGHTLY LOWER.
d) ASSUMED PRINCIPAL SPILLWAY IS COMPLETELY NON-FUNCTIONAL. WITH AN ANTI-VORTEX COLLAR, THIS WILL NOT BE THE CASE.

CHECK PRE-DEVELOPMENT AND POST DEVELOPMENT STORMS.

ASSUME PRE-DEVELOPMENT C RANGES FROM 0.2 TO 0.3 AND THE TIME OF CONCENTRATION IS 1.5 TIMES THAT OF POST DEVELOPMENT.

	C=0.2 PRE-DEVELOPMENT		C=0.3	POST DEVELOPMENT RELEASE RATE	% REDUCTION
2 YEAR	(204.5)(2.4)(0.20) = 98 cfs	→	147 cfs	35 cfs	280%, 420%
10 YEAR	(204.5)(3.2)(0.20) = 131 cfs	→	196 cfs	35 cfs	374%, 560%
100 YEAR	(204.5)(4.6)(0.20)(1.25) = 235 cfs	→	353 cfs	35 cfs	671%, 1009

Pc 083
Dam No. 1
Fords Colony

JOHN AND MARY ANN HURLEY
4710 BETHESDA AVE, APT 1019
BETHESDA MD 20814

RECEIVED
JUL 21 2005
ENVIRONMENTAL DIVISION

July 20, 2005

James City County Environmental Division
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187
Attn: Mr. Darryl E. Cook, P.E., Environmental Director

Dear Mr. Cook:

We are requesting a variance from the 25 ft. pond buffer requirement in order to permit construction of our home at Lot 39, Section XVII in Ford's Colony (105 Seven Oaks) as per plans submitted with building permit application 05-1295.

We purchased the above property in 2002 and have been working with our builder, Charles W. Ross, Builder, Inc. for some time to develop a home plan that would fit within the building envelope. A physical survey of the property by Spearman & Associates in July 2002 did not show the pond buffer, which we understand is a relatively new requirement.

With regard to flood considerations, our builder has suggested raising the finished floor elevation of the lower level from the 53.5 ft elevation indicated on the Site Development Plan by AES Consulting Engineers to 56 ft. This will provide a full 5.5 ft. height difference between the 100 year flood plain (50.5 ft.) and the finished floor elevation of the lower level (56 ft.) making any flooding highly unlikely.

Our home design has been constrained by the building set-back requirements in effect when we purchased the property. We believe a further restriction of our building envelope to provide a 25 ft. pond buffer unreasonably restricts our ability to construct the type of home we would like to build. We kindly request a variance from the pond buffer requirement.

Thank you for your consideration.

Sincerely,

Mary Ann Hurley
Owner

John Hurley
Owner

cc: Scott Thomas, Sr. Engineer, James City County
Keith Sobczak, AIA, Charles W. Ross, Builder, Inc.

LOCATION: Lot 39, Section 17, Ford's Colony, 105 Seven Oaks County BMP ID Code: PC 083)

Variance request as submitted on July 20th 2005 by the Owner/Applicant for clearing, grading and a permanent structure in the pond buffer/setback reviewed and found to be acceptable. Efforts should be made to preserve existing trees and vegetation in the buffer during construction and to landscape or stabilize impacted buffer to resemble meadow or forest area with native trees, shrubs and ground cover to the greatest extent possible.

Scott J. Thomas
Senior Engineer
Environmental Division

07-25-05
Date

JOHN AND MARY ANN HURLEY
4710 BETHESDA AVE, APT 1019
BETHESDA MD 20814

RECEIVED
JUL 21 2005
ENVIRONMENTAL DIVISION

July 20, 2005

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Sincerely,

Mary Ann Hurley
Owner

John Hurley
Owner

cc: Scott Thomas, Sr. Engineer, James City County
Keith Sobczak, AIA, Charles W. Ross, Builder, Inc.

CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1, Williamsburg, VA 23188 (757) 253-0040
614 Moorefield Park Drive, Richmond, VA 23236 (804) 330-8040
6632 Main Street, Gloucester, VA 23061 (804) 693-4450
www.aesva.com

FILE PL083

July 28, 2006

RECEIVED
JUL 28 2006
ENVIRONMENTAL DIVISION

Mr. Darryl E. Cook
James City County Environmental Division
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, Virginia 23187-8784

RE: Lot 39, Section XVII – 100 year storm elevation
AES Job Number 25727-1

Dear Mr. Cook;

AES was requested to investigate the impacts on the pond at the rear of Lot 39 in Section 17, due to the construction of a retaining wall. The design elevation of the 100-year storm is 50.5 feet, which has been impacted by the grading and construction associated with approximately 50 linear feet of retaining wall.

Based on the information provided to AES, the retaining wall was located along the 100-year storm elevation and does significantly impact the flood elevation. Assuming a minor impact of 500 cubic feet (10 cuft along the length of the wall) to the pond between elevations 50 and 52, the effects to the pond would be negligible. This impact results in a loss of approximately 0.08% of the total volume at the pond. These impacts should have no noticeable impact on the 100-year storm elevation (less than 0.1' change). Therefore it is AES's opinion that the construction activities, as displayed on the Development Plan, Lot 39, Section XVII as prepared by AES Consulting Engineers, do not present an adverse impact to the existing properties surrounding the pond or do they impact the functionality of the pond as a stormwater management feature.

If you have any questions or concerns, feel free to contact me at any time.

Sincerely,

AES Consulting Engineers

Jason A. Grimes, P.E.
Project Manager
jgrimes@aesva.com

Attachment (1): Development Plan, Lot 39, Section XVII

cc: Jeff Silva, Decorative Wall Design

APPROVED
James City County
Environmental Division
By: [signature]
Date: 08-03-06

RETAINING WALL OUTSIDE 100-YEAR D.H.W ELEVATION, BUT WITHIN POND BUFFER. NO CONDITIONS.

WATERSHED	PC
BMP ID NO	083
PLAN NO	S-78-85
TAX PARCEL	(30-1)(1-2)
PIN NO	3010100002
CONSTRUCTION DATE	1/1/1992
PROJECT NAME	Fords Colony Dam No. 1
FACILITY LOCATION	Between Clubhouse and Sec. 17
CITY-STATE	Williamsburg, VA
CURRENT OWNER	Fords Colony Country Club
OWNER ADDRESS	240 Fords Colony Drive
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, VA 23188
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No

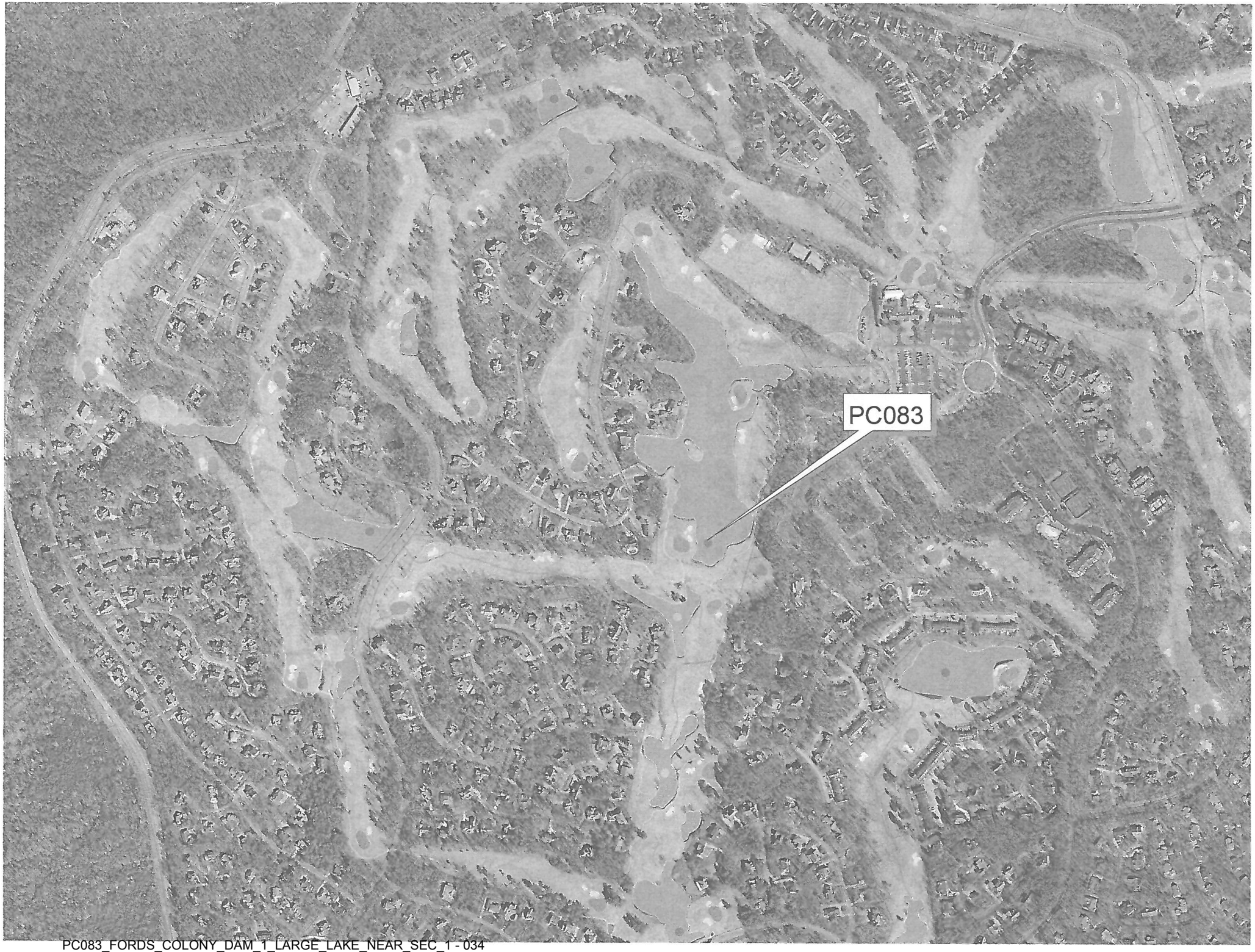
Return to Menu

MAINTENANCE PLAN	No
SITE AREA acre	2400
LAND USE	SF Residential
old BMP TYP	Wet Pond
JCC BMP CODE	
POINT VALUE	8
SVC DRAIN AREA acres	102.3
SERVICE AREA DESCRI	Sect 17 SF lots and roadways
IMPERV AREA acres	
RECV STREAM	UT of Powhatan Creek
EXT DET-WQ-CTRL	Yes
WTR QUAL VOL acre-ft	90
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	0
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

CTRL STRUC DESC	Riser
CTRL STRUC SIZE inches	48
OTLT BARRL DESC	RCP Barrel
OTLT BARRL SIZE inch	18
EMERG SPILLWAY	No
DESIGN HW ELEV	50.45
PERM POOL ELE	48.1
2-YR OUTFLOW cfs	
10-YR OUTFLOW cfs	
REC DRAWING	Yes
CONSTR CERTI	No
LAST INSP DATE	8/28/2000
INTERNAL RATING	4

MISC/COMMENTS

Large golf pond. AB received on Apr 25 2006. Near Sec 1.



PC083_FORDS_COLONY_DAM_1_LARGE_LAKE_NEAR_SEC_1 - 034

James City County Environmental Division - Single Family Site Plans
Variances to County BMP Manual Pond Buffer / Setback Requirements

	GPIN	Location	Address	Area (Ac.)	Owner	BMP Code	Variance Approved	Type
1	4320300023	Lot 23, Governor's Land, Nathaniels Green	1917 Miln House Road	0.425	McElroy, John J. & Patricia	JR 029	12/01/00	
2	3721000055	Lot 55, Sec 14B, Fords Colony	105 South Turnberry	0.39	Albanese, Anthony & Elizabeth	PC 112	08/13/01	
3	4420500036	Lot 36, Governor's Land, Planters Round	2924 Thomas Smith Lane	0.57	Max Walten	JR 017	10/01/01	
4	3720300149	Lot 149, Sec 6, Fords Colony	108 Berrow	0.39	Renfrow, Rod	PC 153	03/28/02	Clearing & grading in Buffer.
5	(37-2)(12-5)	Lot 5, Sec 14-A, Ford's Colony	116 North Turnberry	0.59	Dan & Barbara Desmond	PC 156	04/29/02	Clearing & grading in Buffer.
6	4320300002	Lot 2, Governor's Land, Nathaniels Green	1912 Nathaniels Close	0.439	David G. Campbell	JR 022	05/21/02	Clearing & Select Vegetation Removal in Buffer.
7	4510700027	Lot 27, Governor's Land, Planters Round	3028 John Vaughan Road	0.669	Ralph & Barbara Bresler	JR 017	05/30/02	Small deck and patio in buffer.
8	4420800026	Lot 26, Governor's Land, Wingfield Lake	3008 Margaret Jones Lane	0.539	Daniel & Judith Hall	JR 017	06/06/02	Small fill in DHW & perm structure in buffer.
9	4420800016	Lot 16 Block A, Governor's Land, Rivers Reach	3005 River Reach	0.55	John R. Beck	JR 021	07/12/02	Wood deck in buffer.
10	3140400013A	Lot 13A, Section 1, Tower Hill Longhill Gate	5319 Tower Hill	0.069	Jim Carter	PC 033	07/12/02	Duplex structure, deck, clearing & grading.
11	3140400013B	Lot 13B, Section 1, Tower Hill Longhill Gate	5321 Tower Hill	0.069	Jim Carter	PC 033	07/12/02	Duplex structure, deck, clearing & grading.
12	3140400012A	Lot 12A, Section 1, Tower Hill Longhill Gate	5323 Tower Hill	0.069	Jim Carter	PC 033	09/06/02	Duplex structure, deck, clearing & grading.
13	3140400012B	Lot 12B, Section 1, Tower Hill Longhill Gate	5325 Tower Hill	0.069	Jim Carter	PC 033	09/06/02	Duplex structure, deck, clearing & grading.
14	4722100013	Lot 13, Section 5 Westray Downs	3308 Dartmoor Court	0.95	Fred Nice	MC 019	10/07/02	Driveway, clearing and grading in buffer.
15	4320400005	Lot 5, Governor's Land, Fowlers Lake	3217 Fowlers Lake Road	0.767	John & Kaye Vickerman	JR 018	02/06/03	Clearing, grading and fence in buffer.
16	3810800021	Lot 21 Ford's Colony Section 13-B	116 Blenheim	0.8029	Alfred & Diane Woods	PC 111	02/12/03	Clearing & grading in buffer.
17	31402F0030	Lot 30 Ford's Colony Section 1	5 Minor Court	0.662	Ralph C. Simmons	PC 087	04/24/03	Clearing & structure (gazebo) in DHW and buffer.
18	4510800030	Lot 30, Governor's Land, Wingfield Lake	3005 Margaret Jones Lane	0.47	Robert & Marley Numbers	JR 017	05/05/03	Clearing & grading in DHW and buffer; deck and house in buffer.
19	4310700013	Lot 13, Governor's Land, Barrett's Point	2908 Barret's Pointe	0.227	Earl Hopgood	JR 042	05/12/03	Clearing, grading, deck and house in buffer.
20	1040200011	Lot 11, Section 2 Grove Hill Estates	1720 Waverly	3.00	Donald & Victoria Mowry	DC 014	7/21/2003	Clearing, grading & retaining wall in buffer.
21	4420500010	Lot 10, Governor's Land, Kitchum's Pond	2800 Lawne's Creek	0.62	Mark W & Donna M Hamilton	JR 019	7/28/2003	Clearing, grading & fence in buffer.
22	4320400008	Lot 8, Governor's Land, Fowler's Lake	3229 Fowler's Lake	0.695	John Woltjen	JR 018	8/26/2003	See SP6302. Clearing, grading & structure in buffer.
23	3140400011A	Lot 11A, Section 1 Tower Hill Longhill Gate	5327 Tower Hill	0.069	John Grier Construction	PC 033	9/9/2003	Duplex structure, deck, clearing & grading.
24	3140400011B	Lot 11B, Section 1, Tower Hill Longhill Gate	5329 Tower Hill	0.069	John Grier Construction	PC 033	09/09/03	Duplex structure, deck, clearing & grading.
25	3720500035	Lot 35, Ford's Colony Section 13A	113 Ridge Crossing	0.494	Theodore & Jean Cichaski	PC 112	1/21/2004	Clearing and fill in DHW; Clearing, fill and structure in buffer.
26	(13-3)(8-86)	Wellington Section 3, Lot 86	8408 Beckenham Court	0.3815	Builder - American Eastern	WC 067	3/15/2004	Clearing and Grading in Buffer.
27	3130900050	Lot 50, Ford's Colony Section 17	108 Stoneflake	0.61	Marc & Shawni Roth	PC 082	03/28/05	Clearing, grading (fill) and structure in buffer.
28	3640300141	Lot 141, Greensprings Phase 1	3408 William Hodgson	0.481	William & Lisa Foley	PC 058		Clearing, grading and structures in buffer.
29	3130900039	Lot 39, Ford's Colony Sec 17	105 Seven Oaks	0.594	Dr. John & Mary Ann Hurley	PC 083	7/25/2005	Clearing, grading and structure in the buffer.
30	4510800026	Lot 26, Governor's Land, Wingfield Lake	3013 Margaret Jones Lane	0.459	Julius Haynies	JR 017	2/17/2006	Clearing, grading and structure in the buffer.

Pending Cases						
3811100044	Lot 44 Ford's Colony Sec 16	201 Heritage Point	0.54	Marshall & Freda Atkins	PC 096	DHW & pond buffer not shown on SF plan.
(13-03)(08-81)	Wellington Section 3, Lot 81					Patio in buffer.
3721100035	Lot 35, Ford's Colony Sec 31	111 Western Gailes	0.325	Ronald & Barbara Smith	PC 191	Clearing, grading and structure in DHW and Buffer.
(13-03)(08-102)	Lot 102, Wellington Section 4	8405 Torbay Road	0.42	Wayne Harbin Builder Inc.	WC 067	Clearing and Grading in Buffer.

** Note: List shows variances submitted and approved. List does not include plans which were reviewed, comments forwarded and plan reconfigured to avoid pond design high water or buffer / setback.

Copy of signed variance approval, if issued, is sent regular mail to owner/applicant.

APPLICATION FOR BUILDING PERMIT

101-E Mounts Bay Road, P.O. Box 8784, Williamsburg, VA 23187-8784

(757) 253-6626
FAX: (757) 259-4038

Office Hours: Mon-Fri 8:00 a.m. - 5:00 p.m.

CONTRACTOR INFORMATION
License No. 2701 020 367 A
Company Name CHARLES W. ROSS, BUILDER INC.
Street Address 3206 IRONBOUND ROAD, SUITE B
City WILLIAMSBURG State VA Zip 23188
Phone No. (757) 565-5630 Fax. No. (757) 565-5633
E-Mail Address crbldr1@aol.com
Signature:
Print Name: TIMOTHY P. CLEARY

OWNER INFORMATION
Name DR. JOHN AND DR. MARY ANN HURLEY
Address 4710 BETHESDA AVE APT 1019
City BETHESDA State MD Zip 20814
Phone No. (240) 418-4659 Fax. No. ( )
E-Mail Address
Signature:
Print Name:

Agent:
Print Name:

RECEIVED
JUL 14 2005
ENVIRONMENTAL DIVISION

DESCRIPTION OF WORK
CONSTRUCT A SFD AS PER PLANS AND SPECS

SAME AS PLAN NUMBER _____ (Lists Options)

(For Commercial Projects Only)
Site Plan No. _____ Date Approved _____

LOCATION OF WORK
Tax Map No. (31-3) (- - 9 - 39)
Street Address 105 SEVEN OAKS
City WILLIAMSBURG State VA Zip 23188
Zone R-4 Subdivision FORD'S COLONY

MECHANICS' LIEN AGENT
Name:
Address:
City State Zip
Phone No. ( ) Fax. No. ( )

BUILDING INFORMATION
Stories 2 No. Rooms 13 No. Baths 3 1/2 No.Bath Fix. 14
No. Fireplaces 1 Type PRE-FAB GAS
Exterior Finish: (Vinyl, Brick, Wood, Other FIBER CEMENT)
Interior Finish: (Gypsum wallboard, Wood, Other TILE)
Flooring: (Carpet, Wood, Vinyl, Other TILE)
Roofing: (Asphalt-Fiberglass, Wood, Other)
Heat Type: (Gas, Heatpump, Electric, Other)
Air Conditioning-Type: (Central, Window, None)

Floor Area (sq.ft.) 4017
(Do not include Basement, Garage, and Deck/Porch)
Deck (sq.ft.) 102
Porch (sq.ft.) 187
Basement Area (sq.ft.) 1049
Garage Area (sq.ft.) 659
Total Area (sq.ft.) 6014

Estimated Construction Value 700,000 (Do not include Lot $)

Septic ____ Public Sewer X Grinder Pump ____
Well ____ Public H_2O X

OFFICE USE ONLY

Lot Width
Lot Depth
Front Property Line
Right Property Line
Left Property Line
Rear Property Line

PERMIT NO.
LINE NO. 05 1295
Time In 7/12/05 10:30
Reviewed

Improvement Code
Structure Used As
Use Group
Occupancy Load
Type Construction
Zoning Approved
Zoning Disapproved
Plan Approved
Plan Disapproved

PLAN REVIEW FEE
PERMIT FEE

Notes:

FORDS

RE: Hurley Residence
Fords Colony Sec 17, Lot 39
105 Seven OAKS

BMP ID CODE: PC083
Pond Buffer Variance 7/25/05
CBV- 06- 011

Pat,

Engineer's analyses is ok. I believe this should probably go to you next as it is a C.B.V case.

Scott - 8/2 ✓
I believe you need this.

Dave

Scott
08-03-06

SIT

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot # 39, Section 17 Ford's Colony (105 Seven Oaks)

Clearing, grading and placement of permanent structures as proposed are shown within the pond buffer/setback. The pond buffer/setback is required per page 38 of the James City County BMP manual and consists of an area which is to remain undisturbed 25 feet outward from the maximum water surface elevation of the adjacent stormwater management/BMP facility. Based on information as available in our record files, it appears the 100-year design high water surface elevation for the adjacent stormwater management facility (Dam No. 1, County BMP ID Code: PC 083) is at Elevation 50.5.

Reconfigure the plan to conform with current setback/buffer requirements by avoiding disturbance of the pond buffer/setback area; or alternatively, if encroachment cannot be avoided due to the configuration of the lot, submit a written request for waiver to the Environmental Division The variance request needs to be from the owner or tenant, current or future, rather than the builder/ contractor. Efforts should be made to preserve existing trees and vegetation in the buffer during construction and to stabilize or landscape disturbed buffer area back to meadow or forest condition using native trees, shrubs or ground cover to the greatest extent possible.