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: **SC001**

DATE VERIFIED: **May 11, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 10, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: SC001

PIN: 5920400001C

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

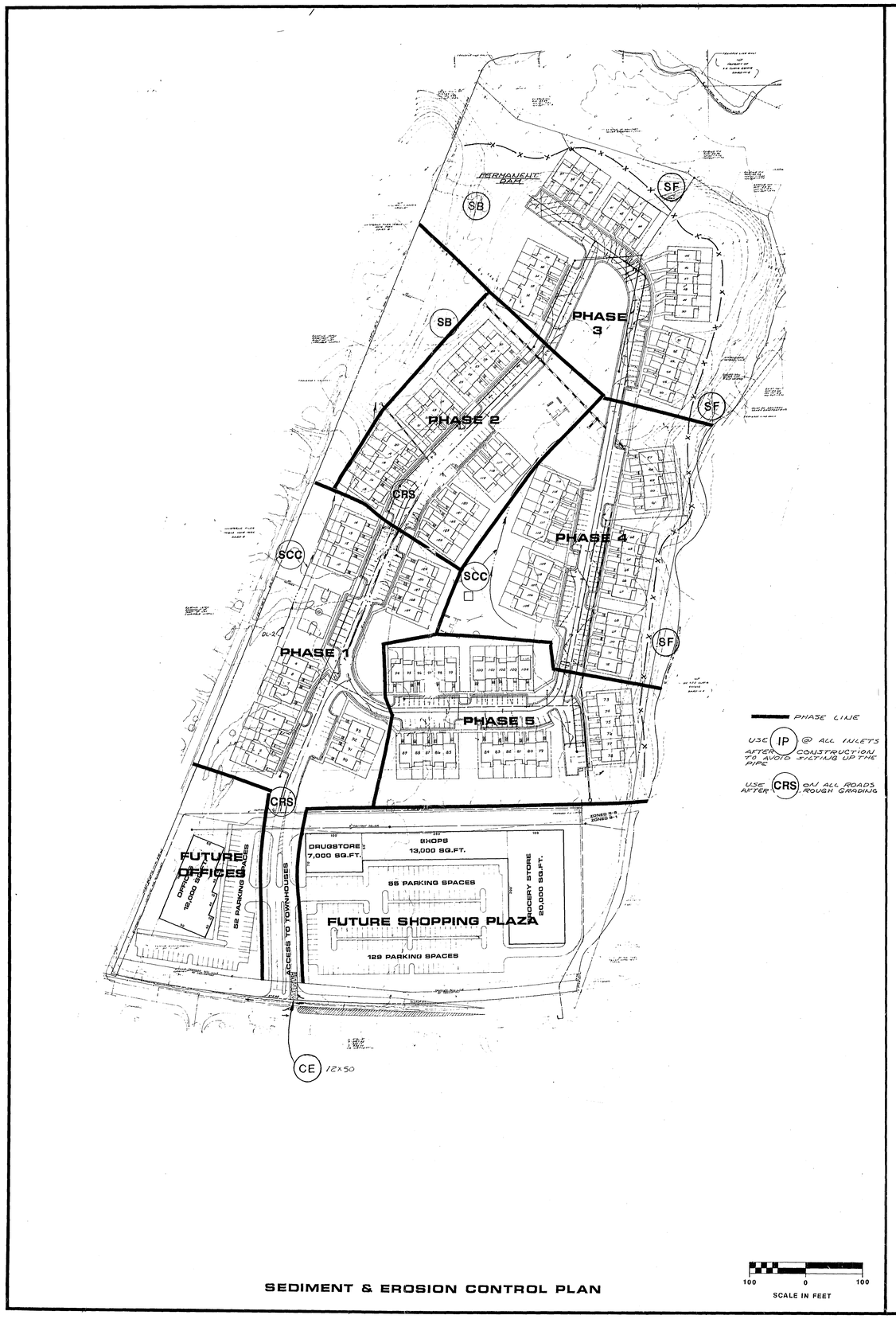
Property Description: Common Area Phase 3

Site Address:

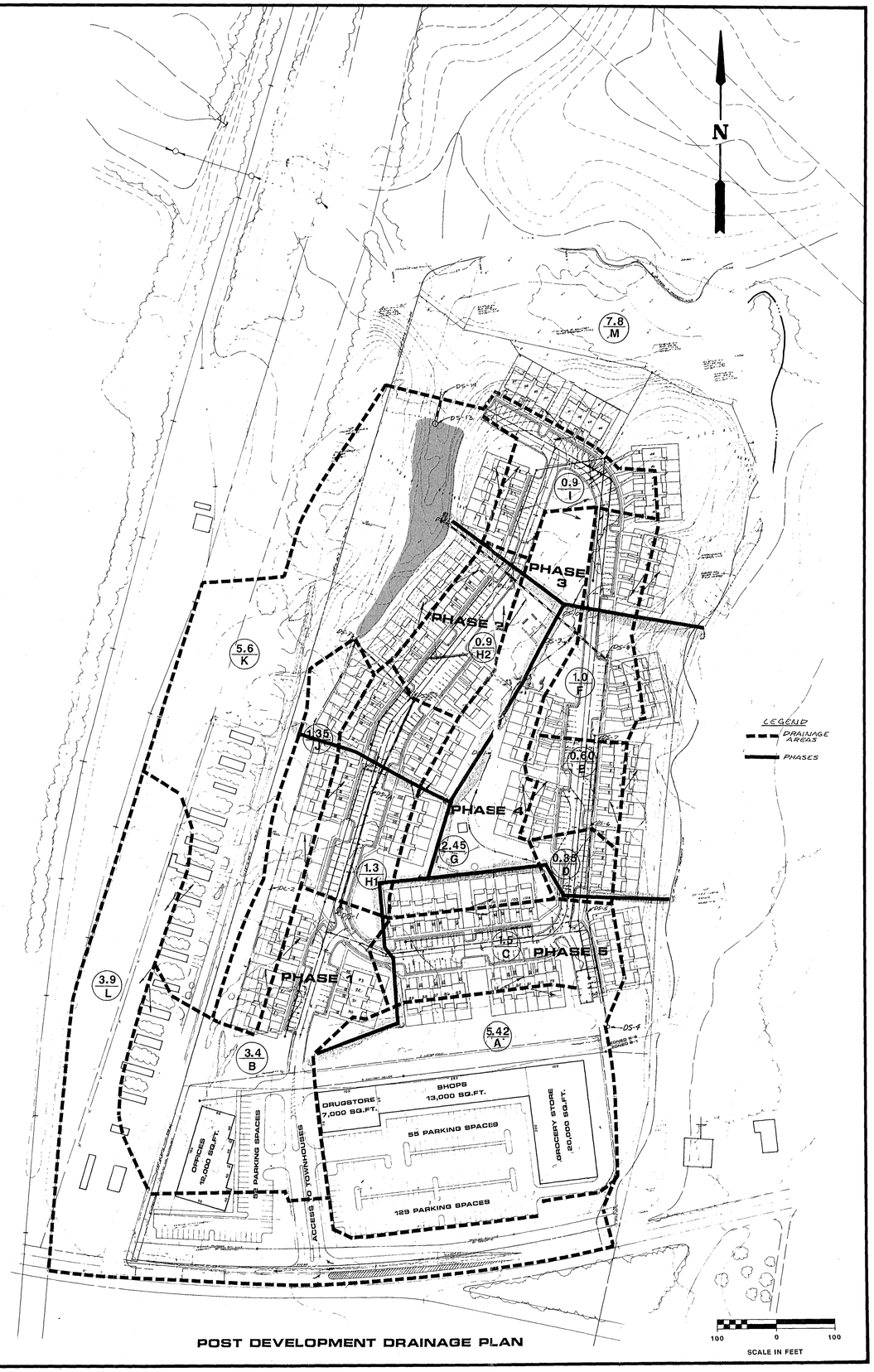
(For internal use only) **Box** 8 **Drawer:** 5

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

Comments



SEDIMENT & EROSION CONTROL PLAN



POST DEVELOPMENT DRAINAGE PLAN

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

SKIFFES CREEK COMMONS

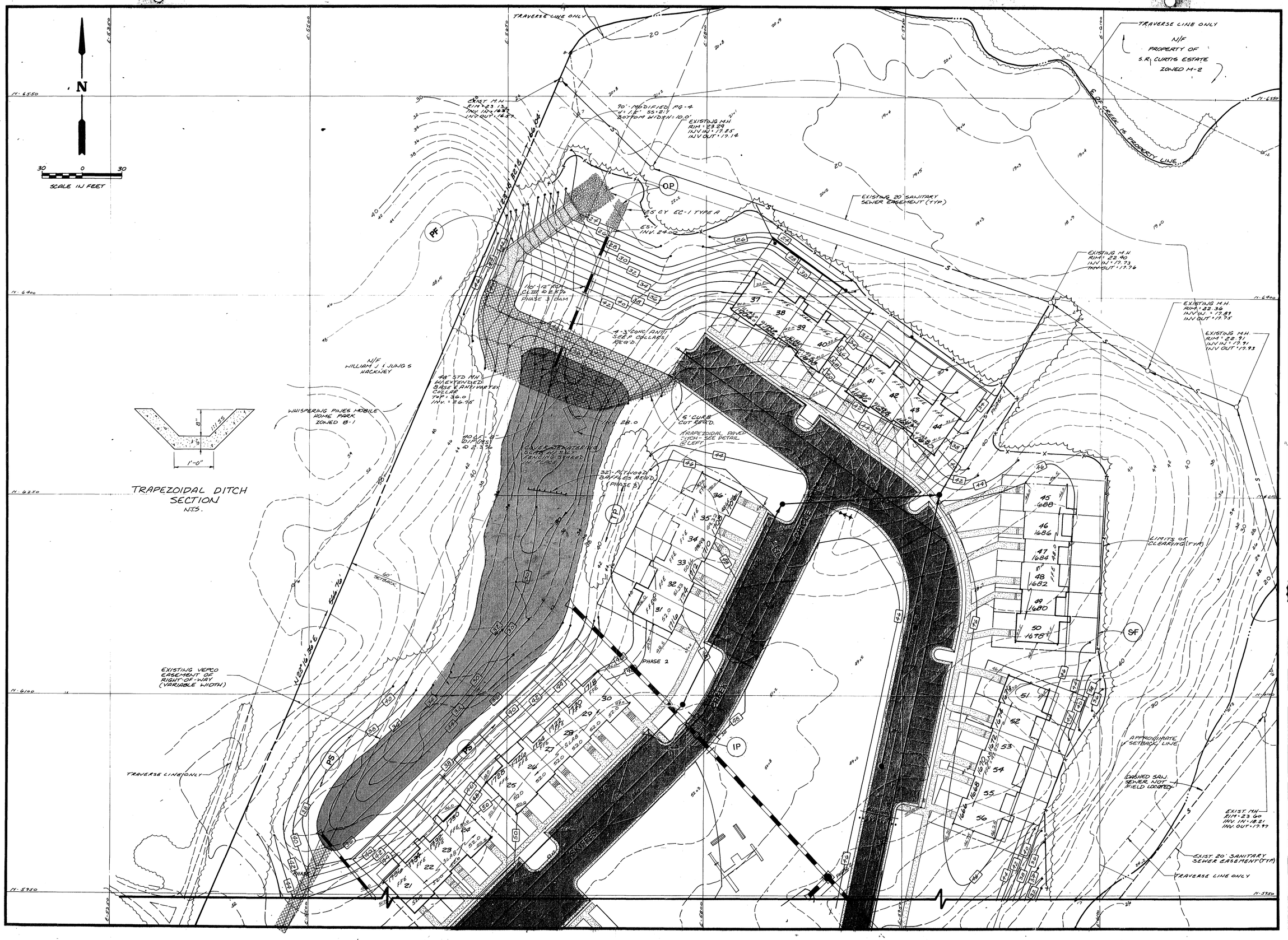
OWNER/DEVELOPER:
FERRELL CONSTRUCTION COMPANY
FERRELL, JESSE PRESIDENT

ROBERTS DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
RODERICK L. CASTELLO
CERTIFIED NO. 01259
COMPETENT ENGINEER PROFESSIONAL

No	DATE	REVISION / COMMENT / NOTE	BY
1	12-5-85	REVISED PER OWNERS COMMENTS	RAC

Designed RAC	Drawn
Scale 1"=100'	Date APRIL 85
Project No. 5868	
Drawing No. 9	



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

GRADING, SEDIMENT & EROSION CONTROL PLAN
SKIFFES CREEK TERRACE
OWNER / DEVELOPER:
FERRELL GENERAL CONSTRUCTION COMPANY
JESSE FERRELL, PRESIDENT
ROBERTS DISTRICT — JAMES CITY COUNTY — VIRGINIA

COMMONWEALTH OF VIRGINIA
RICHARD L. COSTELLO
CERTIFICATE NO. 011259
CERTIFIED PROFESSIONAL ENGINEER

No.	DATE	REVISION / COMMENT / NOTE		
2	2/4/97	REVISE UNIT TYPES PER OWNERS REQUEST	RAC	SY
1	12/2/96	REVISED PRELIMINARY PLAN PER OWNERS COMMENTS	RAC	

Designed RAC	Drawn CAG/RMB
Scale 1"=30'	Date NOV 1996
Project No. 5868	
Drawing No. 12	

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 6- 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 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.

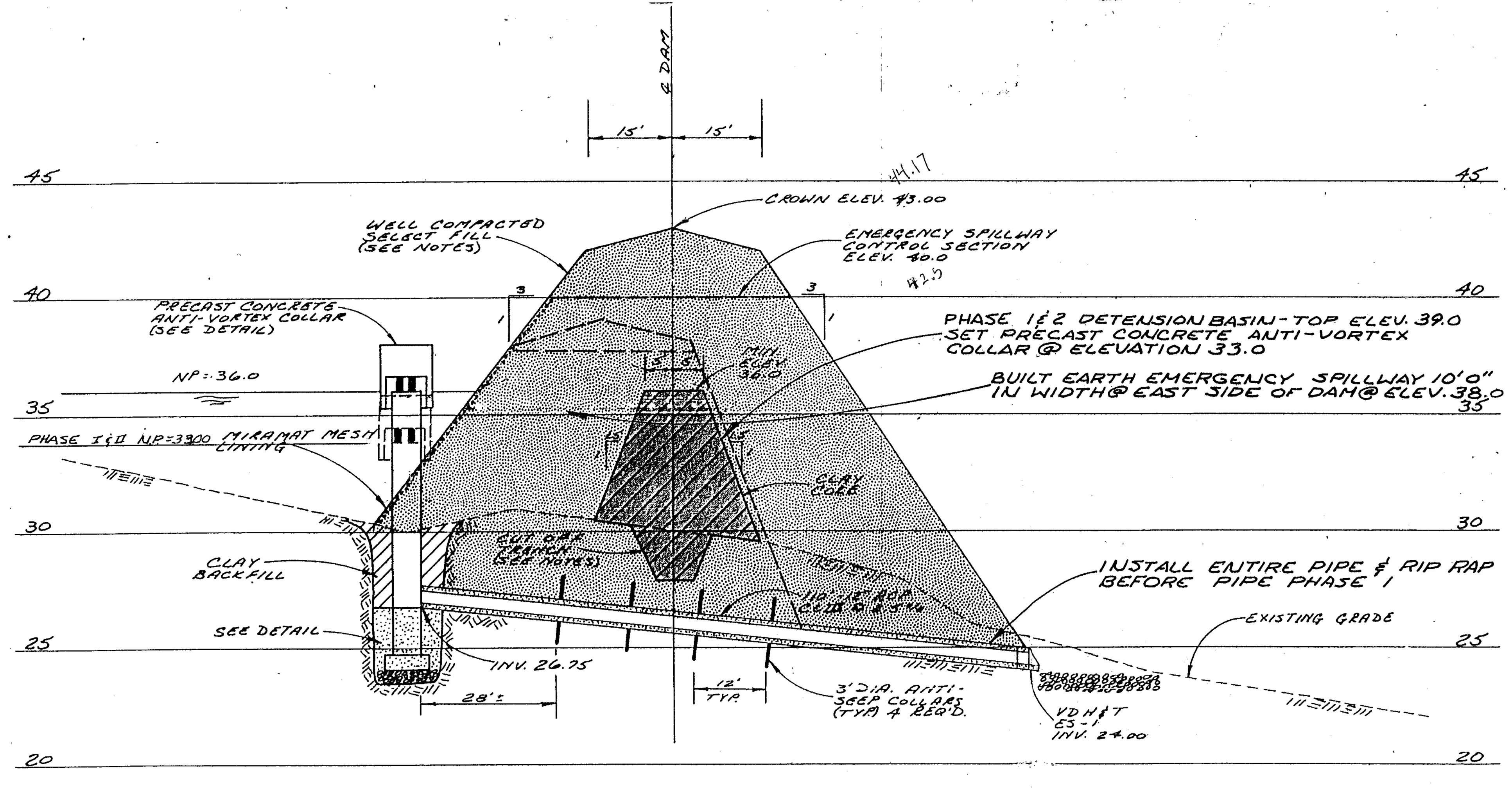
4) PRINCIPAL SPILLWAY: THE RISER OF THE PRINCIPAL SPILLWAY SHALL BE SECURELY ATTACHED TO THE BARREL BY A WATERTIGHT CONNECTION. THE BARREL AND RISER SHALL BE PLACED ON A FIRM COMPACTED SOIL FOUNDATION. THE BASE OF THE RISER SHALL BE FIRMLY ANCHORED ACCORDING TO DESIGN CRITERIA TO PREVENT ITS FLOATING. 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:

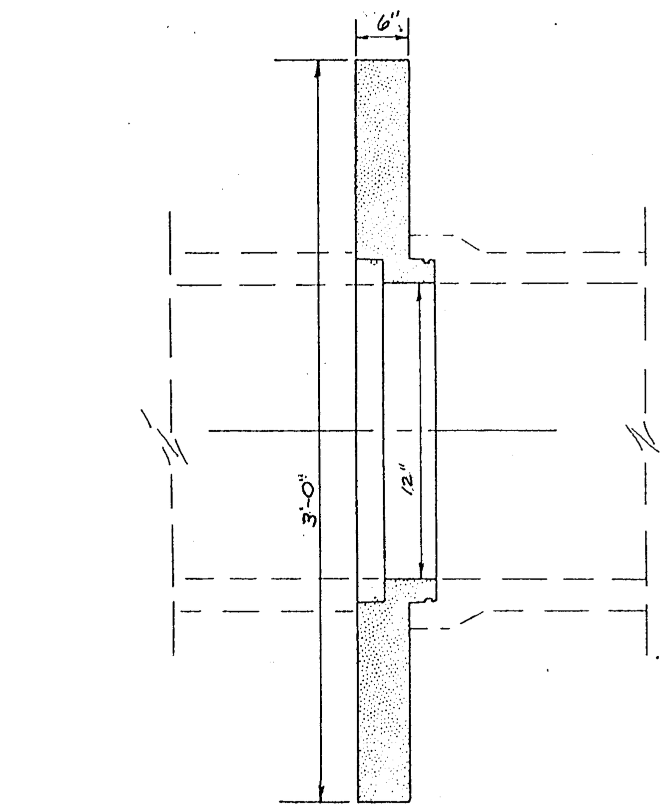
TOPSOIL:	AT LEAST 2" THICKNESS OBTAINED FROM STOCKPILES ON SITE, FREE OF LARGE DEBRIS
LIME:	4,000#/ACRE (90#/1000 SF)
SEED:	KENTUCKY 31 TALL FESCUE 250#/ACRE (6#/1000 SF)
FERTILIZER:	10/20/10 MIX, 1000#/ACRE (25#/1000 SF)
MULCH:	STRAW OR HAY (LOCALLY OBTAINED) 4000#/ACRE (90#/1000 SF)

7) RIP RAP: STONE USED SHALL BE SHOT QUARRY STONE WEIGHING BETWEEN 50 & 150 POUNDS WITH AT LEAST 60 PERCENT OF THE STONES WEIGHING MORE, THAN 100 POUNDS EXCEPT THAT APPROXIMATELY 10 PERCENT OF THE STONE WEIGH 50 POUNDS OR LESS.

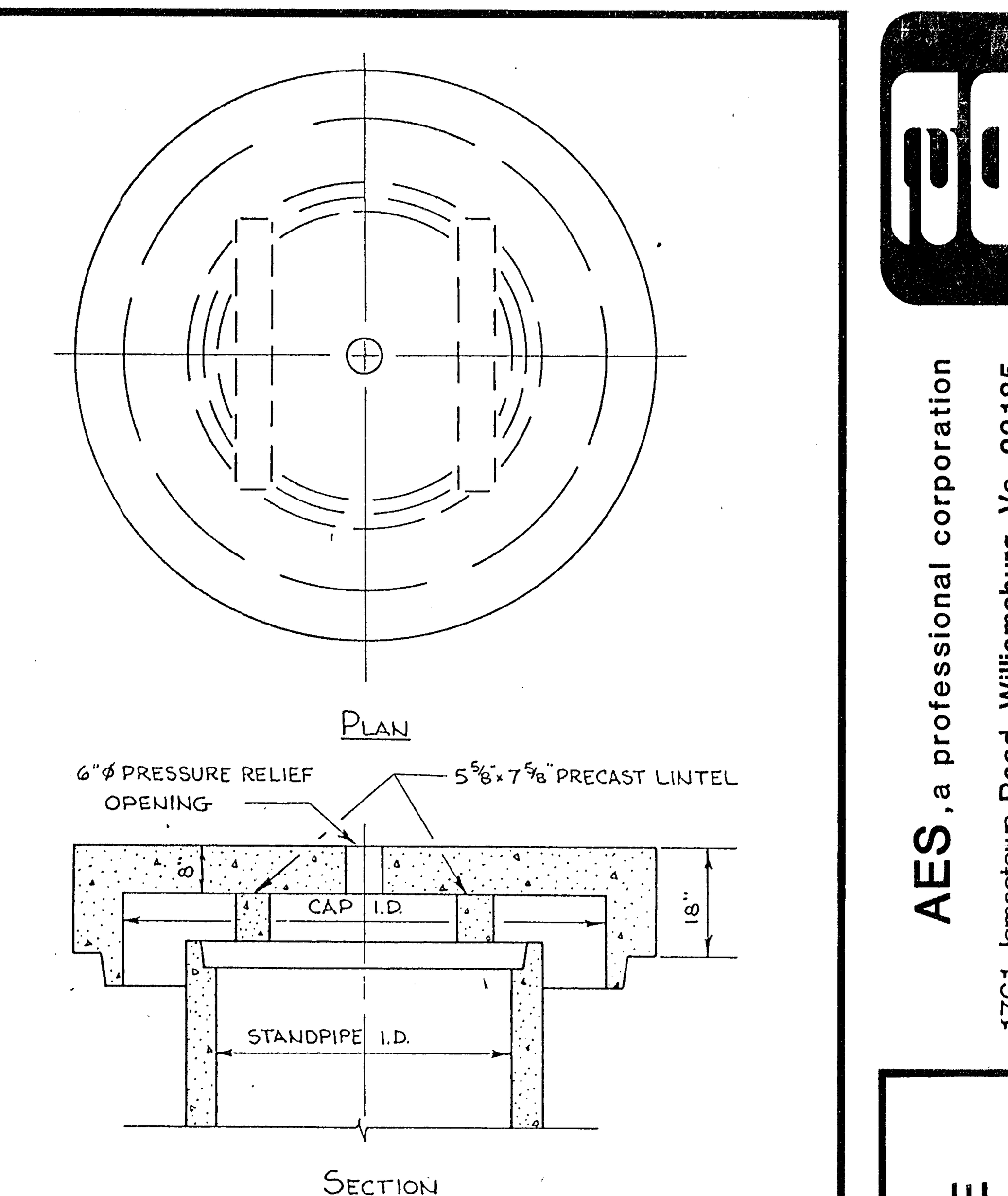


SECTION THROUGH PRINCIPAL SPILLWAY

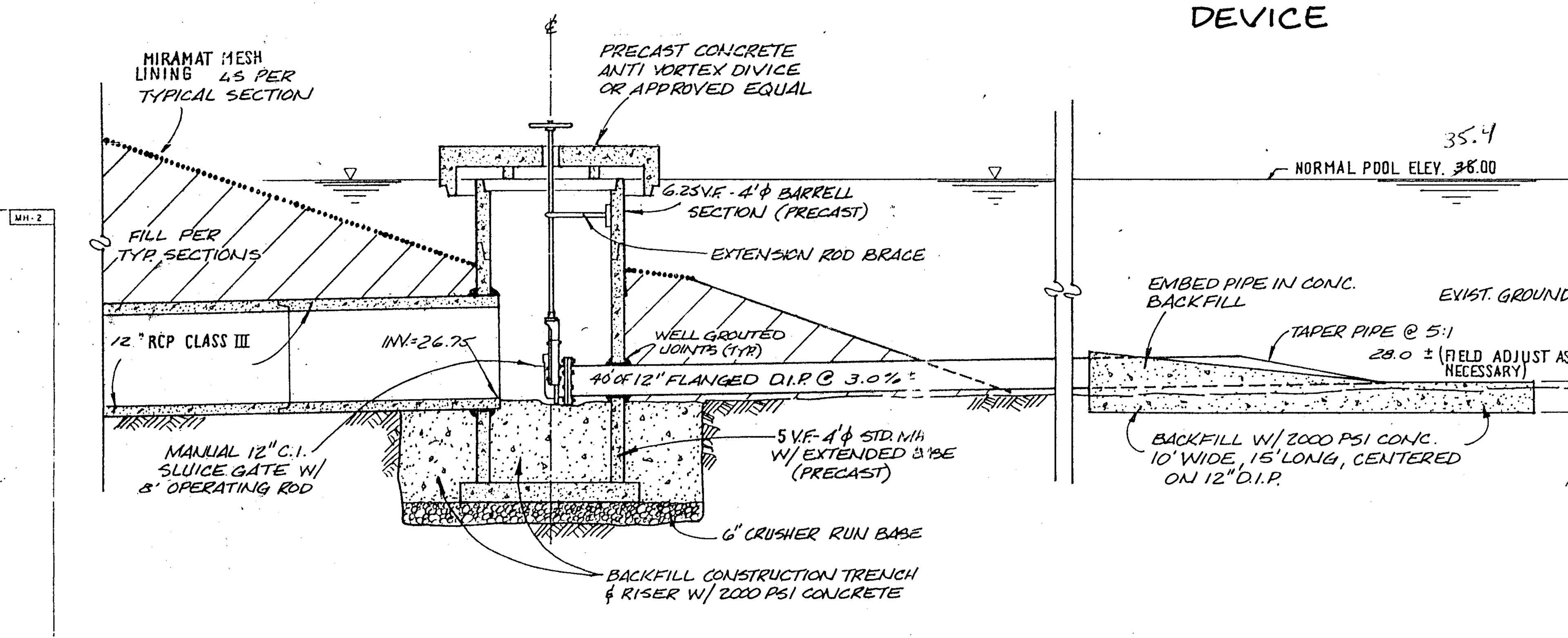
SCALE: 1" = 5' VERT.
1" = 20' HORIZ.



ANTI-SEEP COLLAR FOR DAM SECTION

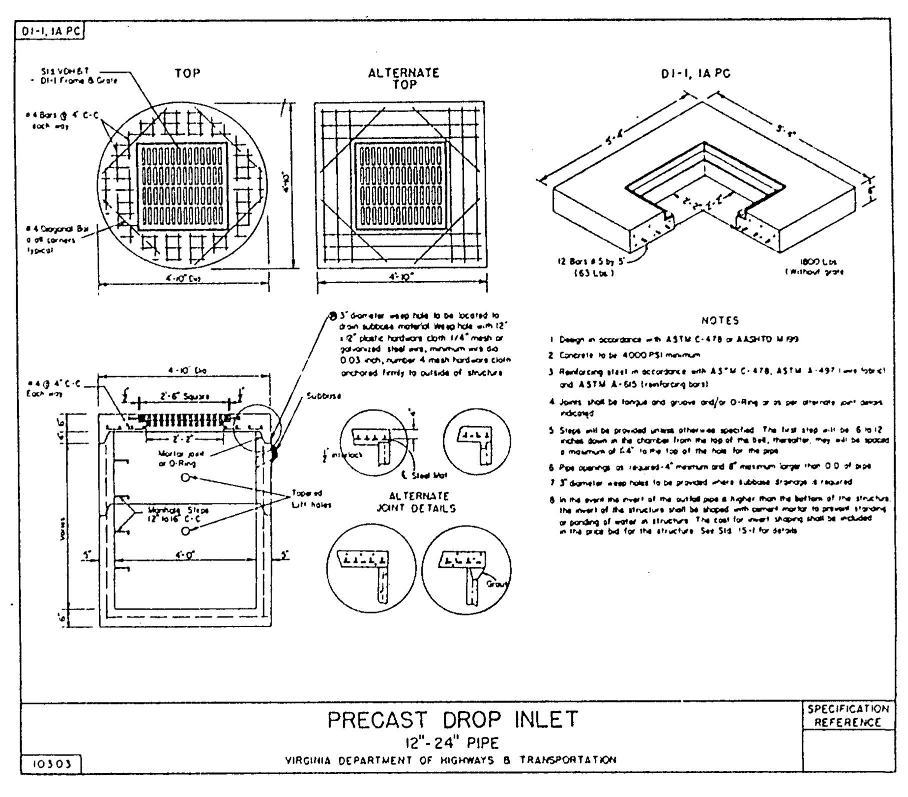


PRECAST CONC. ANTI-VORTEX DEVICE

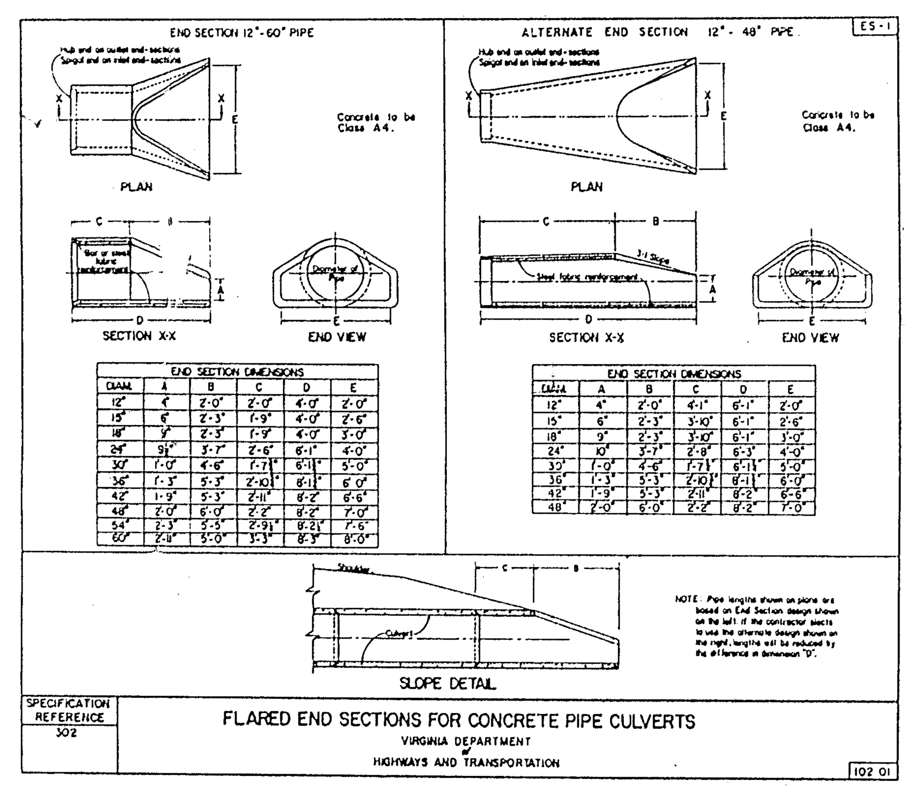


DETAIL OF PRINCIPAL SPILLWAY WITH POND DEWATERING DEVICE

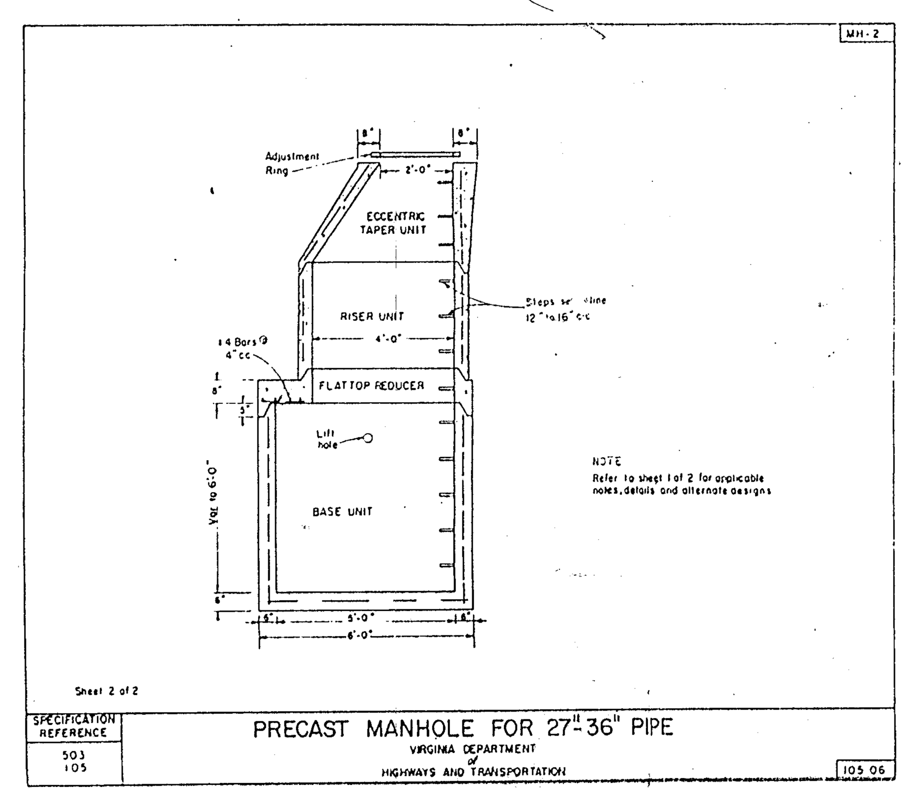
N.T.S.



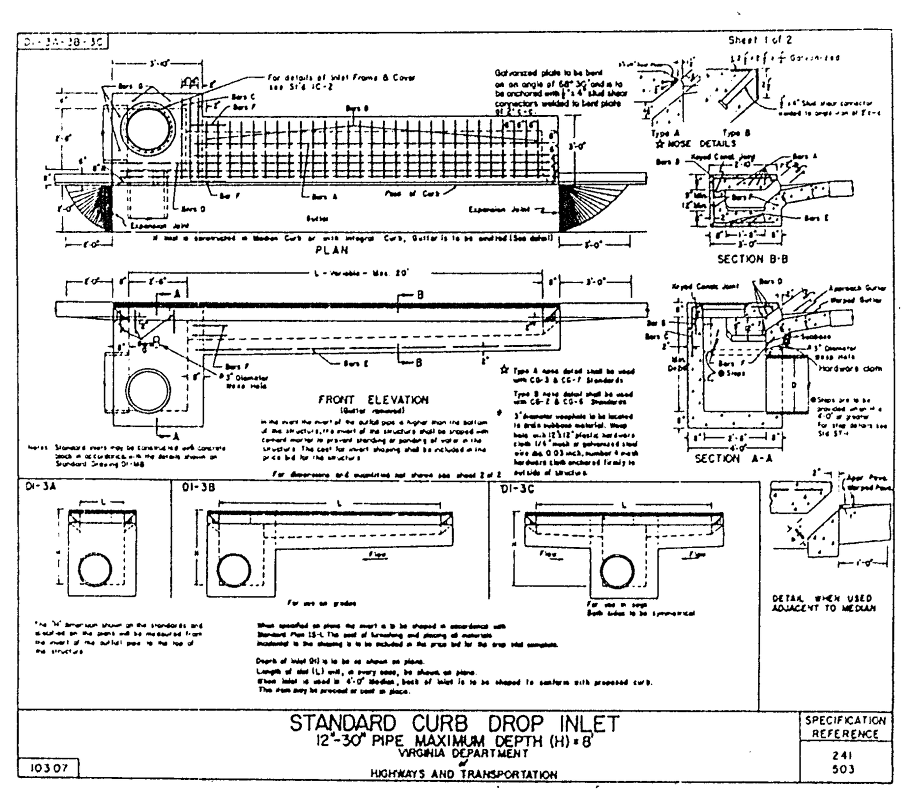
PRECAST DROP INLET
12"-24" PIPE
VIRGINIA DEPARTMENT OF HIGHWAYS & TRANSPORTATION



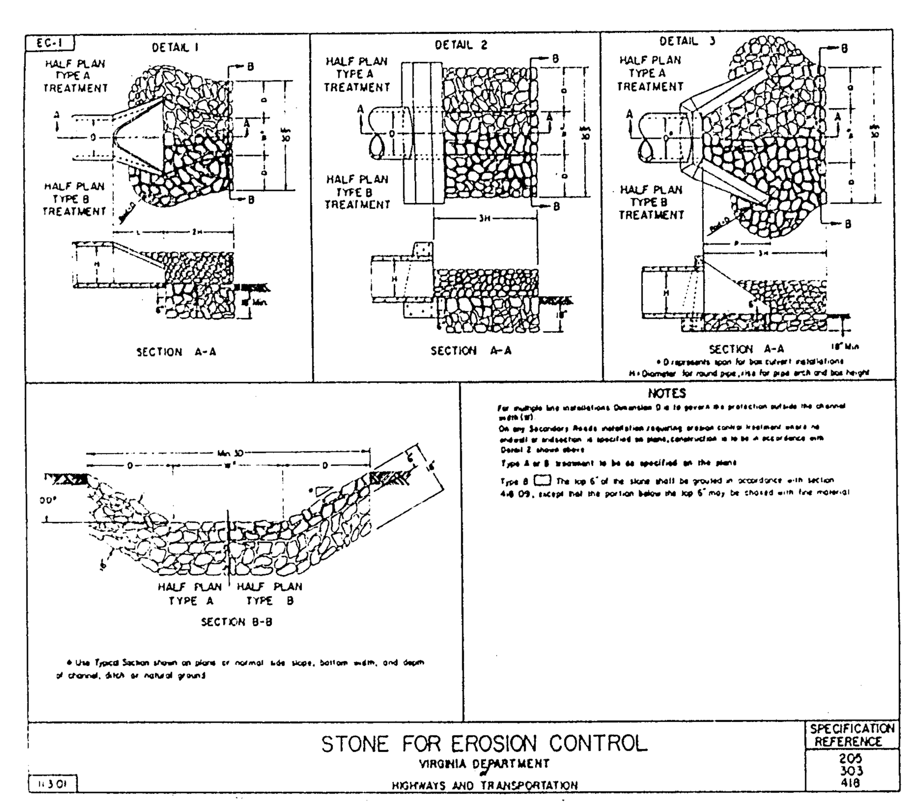
FLARED END SECTIONS FOR CONCRETE PIPE CULVERTS
VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION



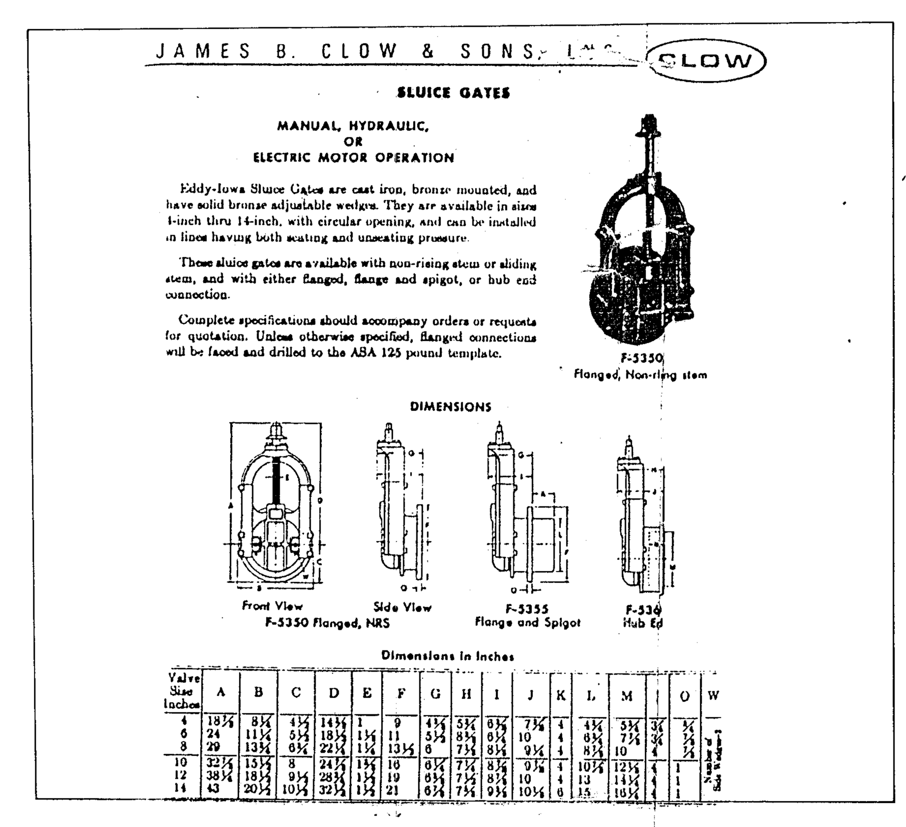
PRECAST MANHOLE FOR 27"-36" PIPE
VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION



STANDARD CURB DROP INLET
12"-30" PIPE MAXIMUM DEPTH (H)=8'
VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION



STONE FOR EROSION CONTROL
VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION



SLUICE GATE DETAIL

CONSTRUCTION SEQUENCE
DETENTION BASIN/SEDIMENT BASIN

1. INSTALL APPROPRIATE PHASE I SEDIMENT & EROSION CONTROL MEASURES. INSTALL PHASE I & II DETENTION BASIN.
2. COMPLETE PHASE I & II GENERAL CONSTRUCTION PER PLAN AND STABILIZE ALL DISTURBED AREAS.
3. INSTALL SILT FENCING ALONG PROPOSED TREE LINE ON NORTH SIDE OF PROJECT.
4. CLEAR AND GRUB VEGETATION AT POND SITE.
5. INSTALL RIP RAP @ PROPOSED LOCATION OF 12" BARREL OUTLET. TEMPORARILY SHAPE RIP RAP INTO CHECK DAM(S) CONFIGURATION.
6. INSTALL PRIMARY 12" RCP BARREL AND ANTI-SEEP COLLARS.
7. INSTALL RISER STRUCTURE AND DEWATERING DEVICE. (LEAVE SLUICE GATE OPEN)
8. FILL BERM TO PLAN GRADES.
9. INSTALL CONCRETE PAVED SECONDARY OUTLET.
10. STABILIZE ENTIRE BASIN. PHASE I & II AND PHASE III.
11. RESHAPE RIP RAP FROM CHECK DAM SHAPE TO EC-1 SECTION.
12. CLOSE SLUICE GATE.
13. INSTALL ALL REMAINING STORM SEWER PIPE WORK PER PLAN.
14. REMOVE SEDIMENT TRAPS ASSOCIATED WITH PHASE I & II DEVELOPMENT.
15. INSTALL APPROPRIATE SEDIMENT & EROSION CONTROL MEASURES AROUND REMAINDER OF SITE.
16. PROCEED WITH GENERAL CONSTRUCTION.

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

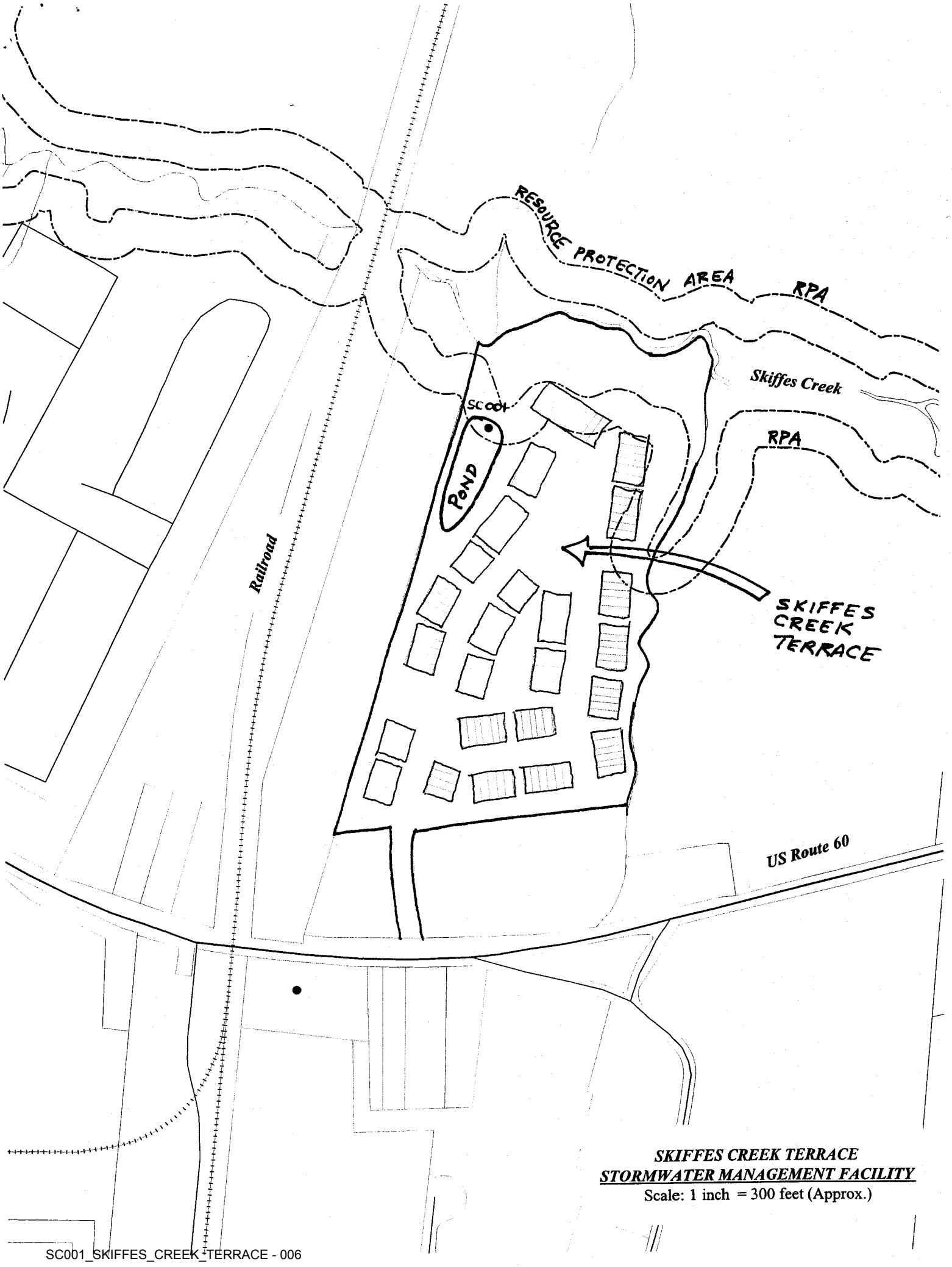
DETENSION POND & DRAINAGE STRUCTURE DETAILS
SKIFFES CREEK TERRACE
OWNER / DEVELOPER:
FERRELL GENERAL CONSTRUCTION COMPANY
JESSE FERRELL, PRESIDENT
ROBERTS DISTRICT — JAMES CITY COUNTY — VIRGINIA

No.	DATE	REVISION / COMMENT / NOTE	BY
1		REVISED PER J.C.C. & OWNER COMMENTS	DAR
2		REVISED PER J.C.C. COMMENTS	DAR
3		REVISED PER OWNERS COMMENTS	RAC
4		REVISED PER BUREAUCRATS	RAC

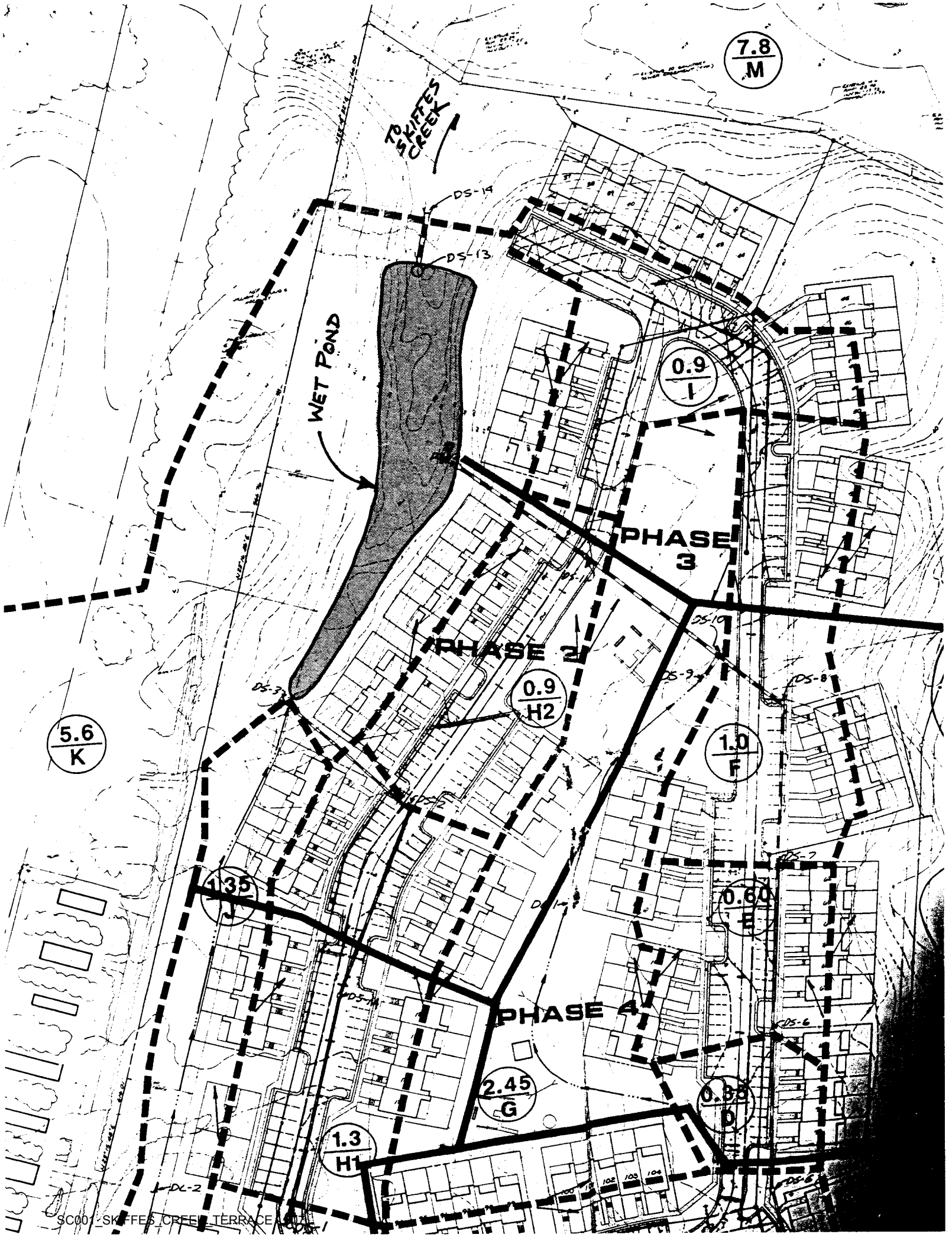
Designed	Drawn
DAR	VMB
Scale: NOTED	Date: AUG., 1985

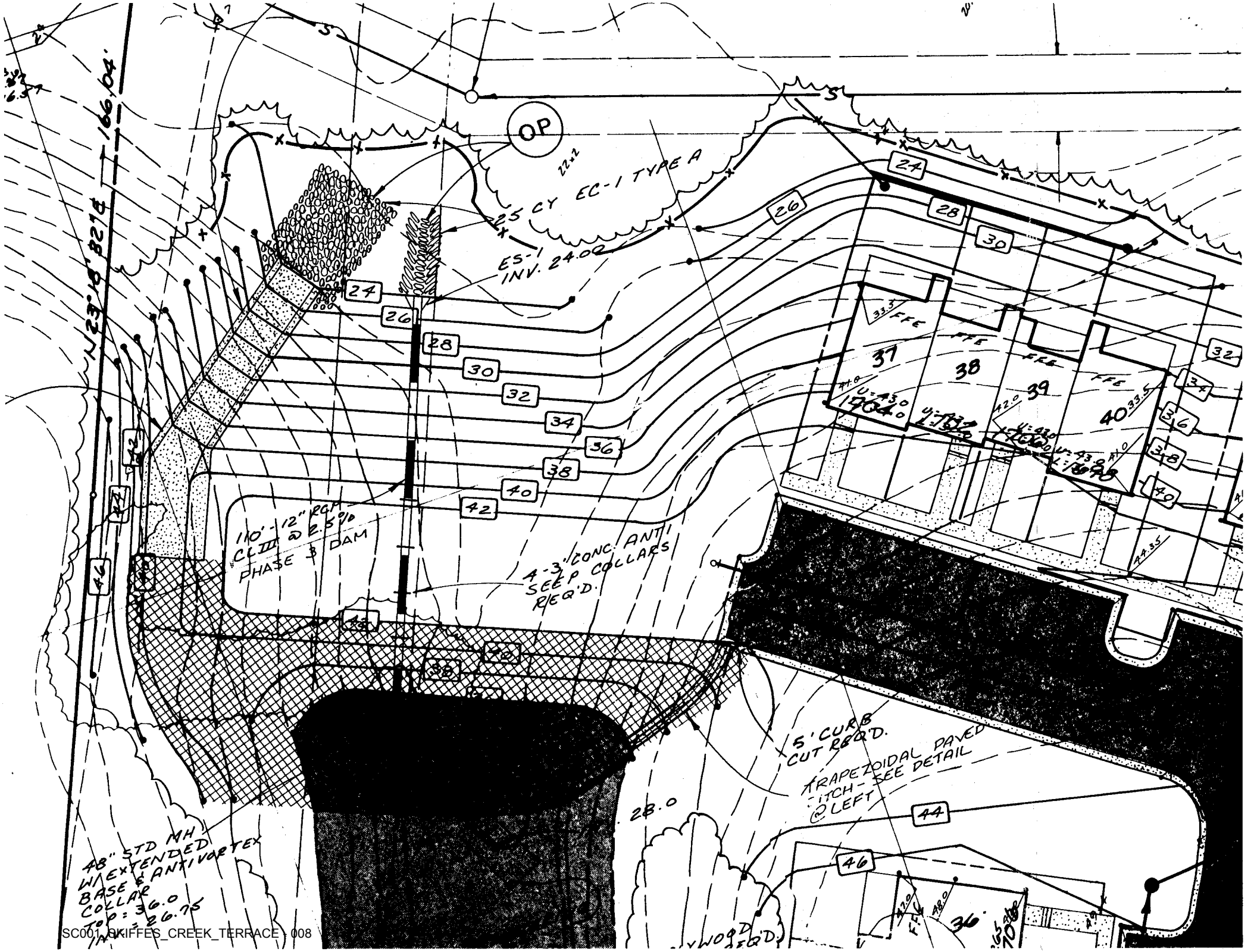
Project No. 5868

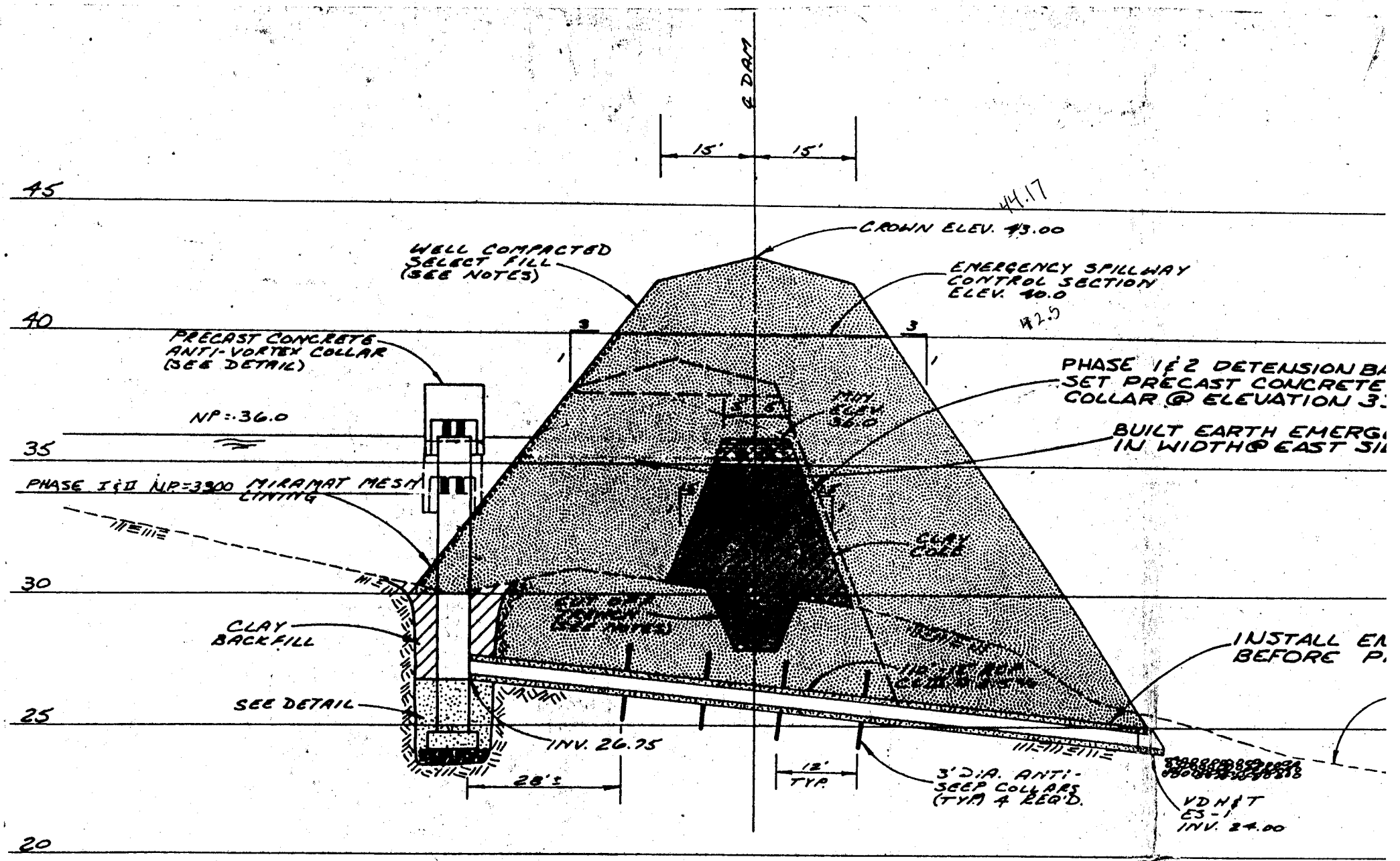
Drawing No. 13



SKIFFES CREEK TERRACE
STORMWATER MANAGEMENT FACILITY
Scale: 1 inch = 300 feet (Approx.)


7.8
M
TO SKIFFES CREEK
DS-14
DS-13
WET POND
0.9
I
PHASE 3
DS-10
PHASE 2
DS-9
DS-8
DS-3
0.9
H2
5.6
K
1.0
F
DS-2
DS-7
1.35
J
0.60
E
DS-11
PHASE 4
DS-6
2.45
G
0.88
D
1.3
H1
DL-2
DS-5
SC001_SKIFFES_CREEK_TERRACE_A01


N23°18'82"E 166.04'
OP
22.1
25 CY EC-1 TYPE A
ES-1
INV. 24.00
24
26
28
30
32
34
36
38
40
42
44
46
110'-12" RCP
CL III @ 2.5%
PHASE 3 DAM
4-3' CONC. ANTI
SEEP COLLARS
REQ'D.
5' CURB
CUT REQ'D.
TRAPEZOIDAL PAVED
DITCH - SEE DETAIL
@ LEFT
28.0
48" STD MH
W/ EXTENDED
BASE & ANTIVORTEX
COLLAR
TOP = 36.0
INV = 26.75
FFE
37
38
39
40
33.3
33.5
42.0
44.35
36

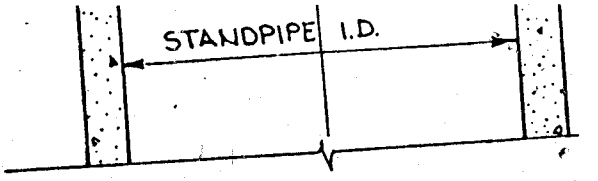


SECTION THROUGH PRINCIPAL SPILLWAY

SCALE : 1" = 5' VERT.
1" = 20' HORIZ.

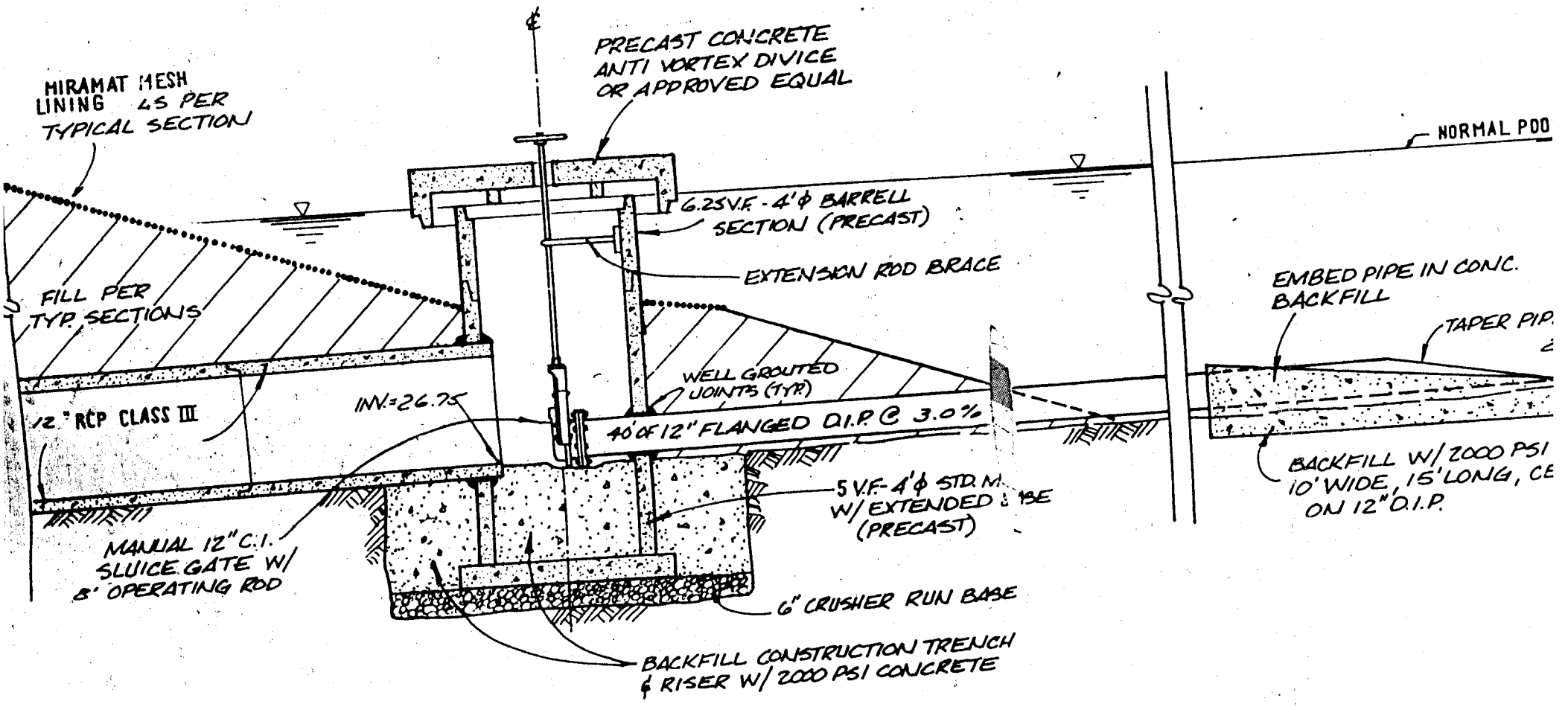
ANTI-SEEP COLLAR
SECTION

20



SECTION

PRECAST CONC. ANTI-V
DEVICE



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

Skiffes Creek Pond SC001

1. Pond design assumptions

$T_c = 20$ min

DA = 24.9 ac

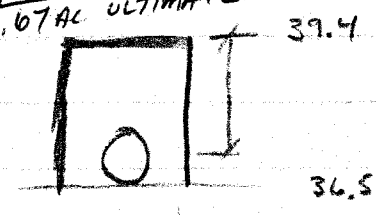
$C_N = 90$

$C = 0.67$

PostDev DA	
A	5.42
B	3.4
C	1.5
D	0.35
E	0.60
F	1.0
G	2.45
H1	1.3
H2	0.9
I	0.9
J	1.35
K	5.6
L	3.9
	28.67 AC ULTIMATE

2. Riser = 39.4

E.S. = 42.5



3. Try Normal Pool @ 36.5

12" orifice = 7 cfs

- Waller Method - V_s = 89,600 ft^3

ck design - available . 90,375 ft^3 - ok

4. Area of 12" orifice = 0.785 ft^2

Area of 8" orifice = 0.35 ft^2

" " 6" " = 0.20 ft^2

" " 4" " = 0.09

No of 8" req'd = 2

No of 6" req'd = 4

" " 4" " = 9

Skiffes Creek Terrace Pond

Loc.	BS	HI	FS	Elev	Design
Ex Manhole	24.70 + 1 = 25.70	48.83		23.13	
Pond ~~Inv Out~~ Top Pipe Out		"	23.65	25.18	
Pond Inv Out - 1.25		"		23.97	
Top Dam		"	4.64	44.17	42.0
Emer Spillway		"	6.32	42.51	40.0
Normal Pool		"	9.42	39.39	36.0
Storm Drain DS-12 Top of Debris		"	11.45	37.38	34.72
Top of Pipe		"	9.80	38.03	~~34.72~~
Inv. - 39"				≈ 34.9	34.72

Design

1) Elevation of Normal Pool
2) Size of Outlet Structures

Skiffes Creek Terrace

2/11/86
JN 5868

Drainage Calculations

Description of Property:

The Skiffes Ck Property is located in the Skiffes Ck Reservoir Watershed. Land use within & immediately adjacent to the site is mixed & includes Business & multi residential. Topographically, the site is bounded on the East & North by unnamed tributaries of Skiffes Ck, on the South by SR 60 & on the West by a Trailer Court. A well defined ravine is situated on site in the North West Quadrant. An existing drainage crest occurs through the site running roughly North/South.

Stormwater Management Strategy: Approximately 72% of the site's stormwater runoff will be intercepted & routed via storm sewers to a detention basin in the NW Quadrant. The remaining 28% will sheet flow across essentially undevelopable portions of the site directly into the previously described tributaries of Skiffes Creek. The detention basin is designed to release the post development 2YR storm @ a 2 YR predevelopment rate. Detention above minimum requirements is acheived to offset portions of the site left undetained.

DRAINAGE

CONT

ESTIMATE OF PRE DEVELOPMENT RUNOFF:

OFFSITE FLOW ONTO SITE ⇒ ZONED B-1 (TRAILER PARK) $c = 0.75$
ONSITE FLOW ⇒ ORIGINALLY TREED (RECENTLY TIMBERED) $c = 0.30$
T_c ⇒ 900' SHEET FLOW, $c = .3$, $S = 2.67\%$ ⇒ 28 MIN + 1500' CHANNEL FLOW, $\Delta H = 32'$
$= 9.5$ MIN ∴ PRE DEV. $T_c \cong 37.5$ MIN, $i_2 = 2.3$

TOTAL ACREAGE INTO SKIFFES CK (BASINS A thru M) this STUDY ⇒

36.3 ACRES w/ 6 ac @ 0.75 & 30.3 ac @ 0.3 ⇒

$6 \times .75 \times 2.3 + 30.3 \times .3 \times 2.3$ ⇒ 31.26 SAY 31 cfs FOR PRE DEV Q_2

ESTIMATE OF POST DEVELOPMENT RUNOFF:

NOTE: BASIN "M" c FACTOR INCREASE FROM 0.30 TO 0.35, ALL OF BASINS "K" "L" & "A" INCREASE TO 0.75 & REMAINING LANDS INCREASE TO 0.60.

1) T_c ⇒ 900' SHEET FLOW $c = .75$ $S = 2.67$ ⇒ $T = 12$ MIN, 1000' PIPE FLOW $v = 5.5$ fps, $T = 3$ MIN ⇒ $T_c = 15$ MIN TOO CONSERVATIVE ⇒ USE $T_c = 20$ MIN

$i_2 = 3.5$ IN/HR, $i_{10} = 4.5$ IN/HR

2) Q_2 NOT GOING INTO DETENTION BASIN ⇒ "L" & "M"
⇒ $3.6 \times 0.75 \times 3.5 + 7.8 \times .35 \times 3.5 = 19.0$ cfs

3) MAX. ALLOWABLE PEAK Q_2 FROM DETENTION BASIN ⇒

PRE $Q_2 = 31$ cfs
POST $Q_2 \leq 19$ cfs + DETENTION $Q_{OUT} = 31$

DETENTION $Q_{OUT} \leq 12$ cfs

4) ESTIMATED Q_2 INTO DETENTION BASIN:

$$\underset{13.1}{(5.6 + 7.5)} \times .75 \times 3.5 + \underset{11.8}{11.8} \times .60 \times 3.5 \Rightarrow 59.2 \text{ cfs} \quad \underline{\text{SAY } 60 \text{ cfs}}$$

24.9 ac

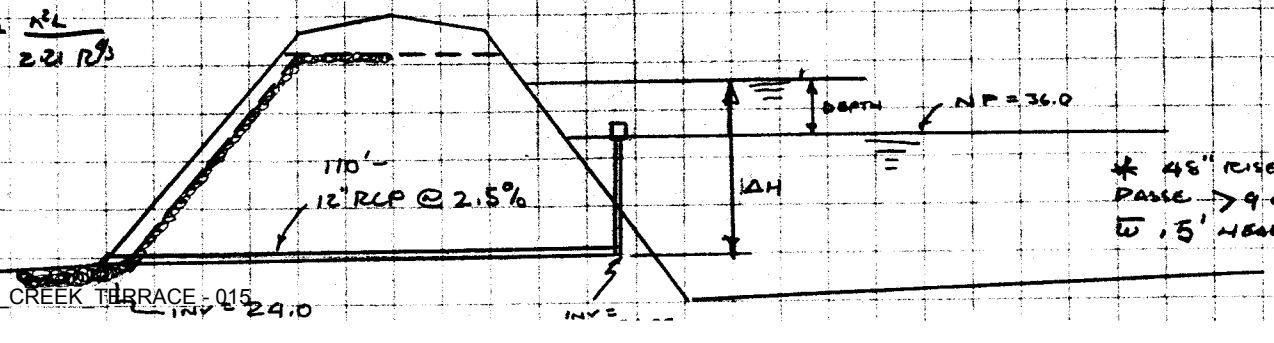
DETENTION BASIN GEOMETRY & HYDRAULICS

A) GEOMETRY

ELEV (f)	DEPTH (f)	WATER SURFACE AREA (ft^2)	VOL STORED (CF)	EST ΔH (f)	EST Q_{OUT} cfs
36	0	21,750	-0-		
36.5	.5	23,750	11,375	9.25	9.0*
37	1	25,750	23,750	9.75	9.2
37.5	1.5	27,750	37,125	10.25	9.4
38	2	29,750	51,500	10.75	9.6
38.5	2.5	32,250	67,000	11.25	9.9
39	3	34,750	83,750	11.75	10.0
39.5	3.5	37,250	101,750	12.25	10.3
40.0	4	39,750	121,000	12.75	10.5

$$V = \sqrt{\frac{\Delta H}{\left(\frac{1 + K_e}{2g}\right) + \frac{n^2 L}{2.21 R^{4/3}}}}$$

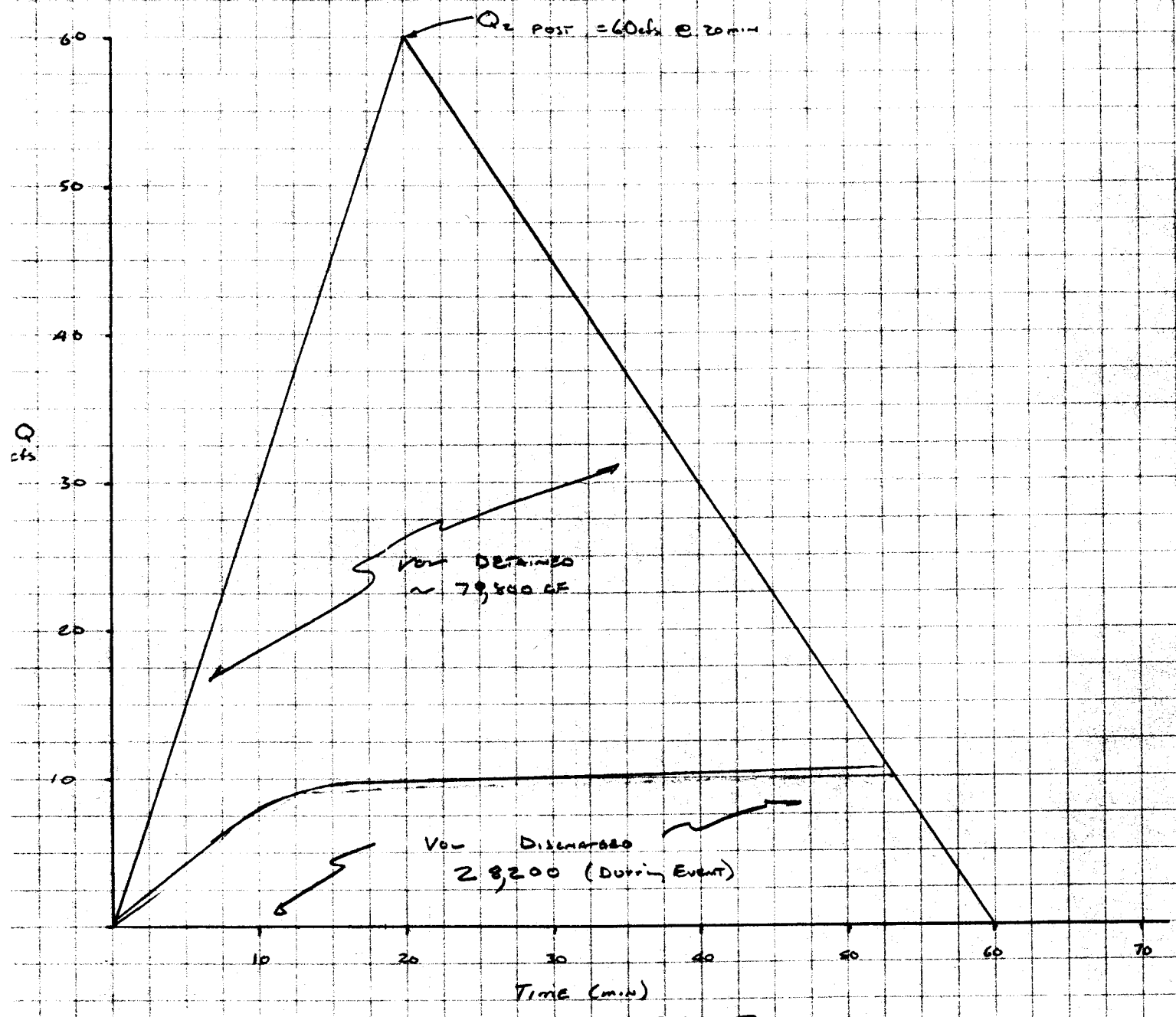
$K_e = .65$



* 48" RISER PASSES → 9 cfs @ .5' HEAD

(Cont)

Flood Routing:



2 YR EVENT

$V_{IN} = V_{OUT} + V_{DET}$

From $T=0 \Rightarrow T=20$; $V_{IN} = \frac{1}{2}(60)(3T)T \ldots\ ft^3 = 90T^2$

$V_{OUT} = \frac{1}{2}(9)(T)(60) = 270T$

@ $d = .5'$ $V_{DET} = 11{,}375$ $\therefore$ $90T^2 = 270T + 11{,}375$

Try $T=12$

$12960 \neq 14{,}615$

$T=14$ $17640 = 15155$

$T=13$ $15210 \neq$

$T=12.75$ $14631 = 14818$ OK

@ $d = 1.0$ $V_{DET} = 23,750$

$V_{OUT} = 9\,(T-12.75)\,60 + 3443$

Try T = 20

$36000 \neq 23750 + 7358$

$T = 18.5$ $30,803 = 30298$ ok

NOTE. DUE TO FLATNESS OF DISCHARGE GRAPH – SKIP NEXT PROCEDURE & GO DIRECTLY TO EST H.W.

ESTIMATED H.W. DURING 2 YR EVENT ⇒ ASSUME DISCHARGE CURVE PER HYDROGRAPH → PLANIMETER AREA OF DETAINED VOL → 79,800 CF ENTER GEOMETRY TABLE & FIND SAID VOL → 79563 CORRESPONDS TO ELEV 38.75 W DEPTH @ 2.75 ⇒ FREEBOARD ~ 1.25' ✓

TRY 10 YR

$I_{10} = 4.5$ $Q_{10} = 60 \times \frac{4.5}{3.5} \Rightarrow 77$ cfs

@ $d = .5$ $V_{DET} = 11,375$

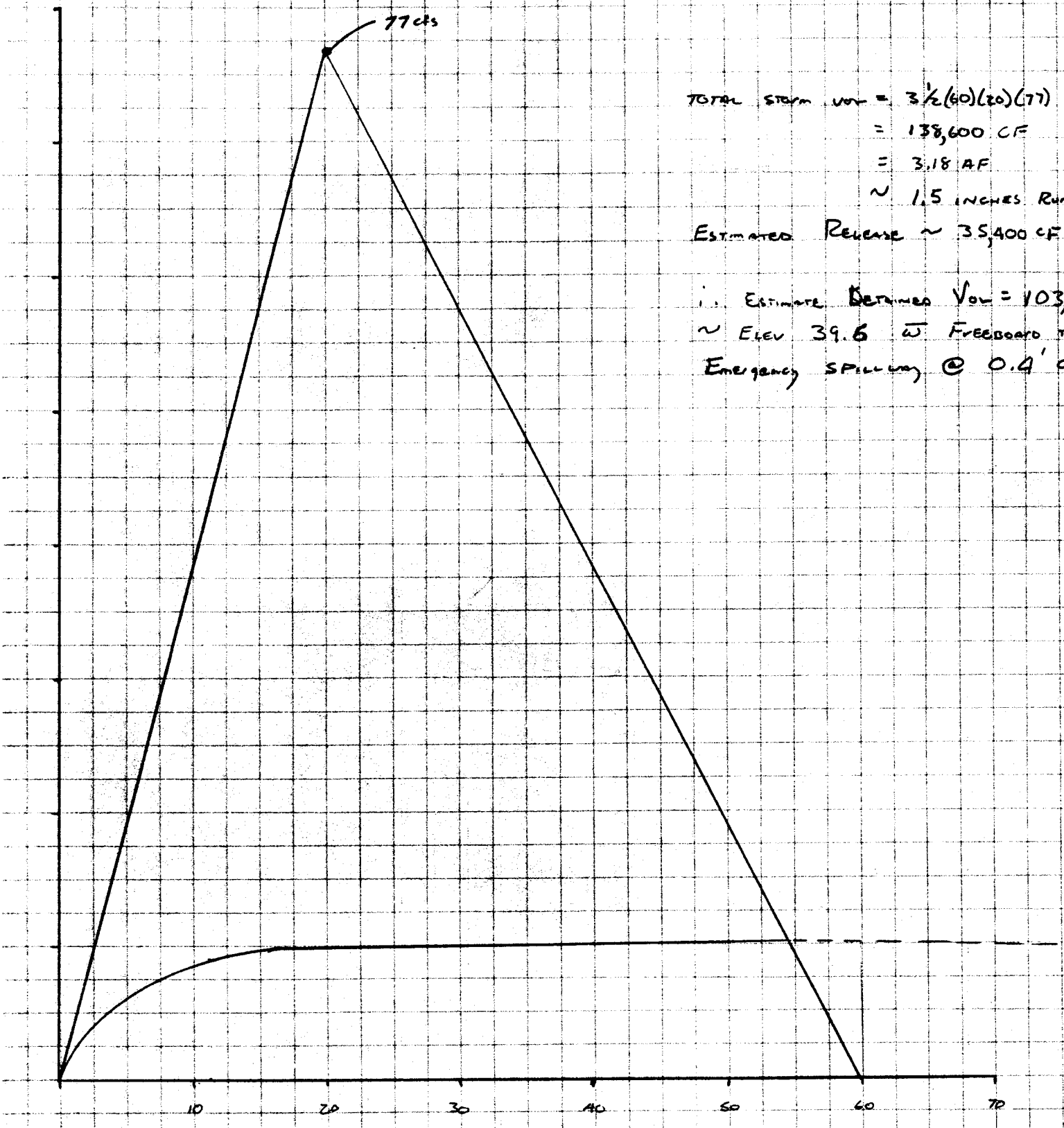
$V_{OUT} = 270\,T$, $V_{IN} = 115.5\,T^2$

Try T = 12 ⇒ $16,632 \neq 14,625$

Try T = 11 $13,975 \neq 14,345$

Try T = 11.25 $14,618 = 14,412$ OK

FLOOD ROUTING 10 YR EVENT



TOTAL STORM VOL = $3\frac{1}{2}(60)(20)(77)$
= 138,600 CF
= 3.18 AF
~ 1.5 INCHES RUNOFF

ESTIMATED RELEASE ~ 35,400 CF

∴ ESTIMATE DETAINED VOL = 103,200
~ ELEV 39.6 W/ FREEBOARD TO
EMERGENCY SPILLWAY @ 0.4' OK!

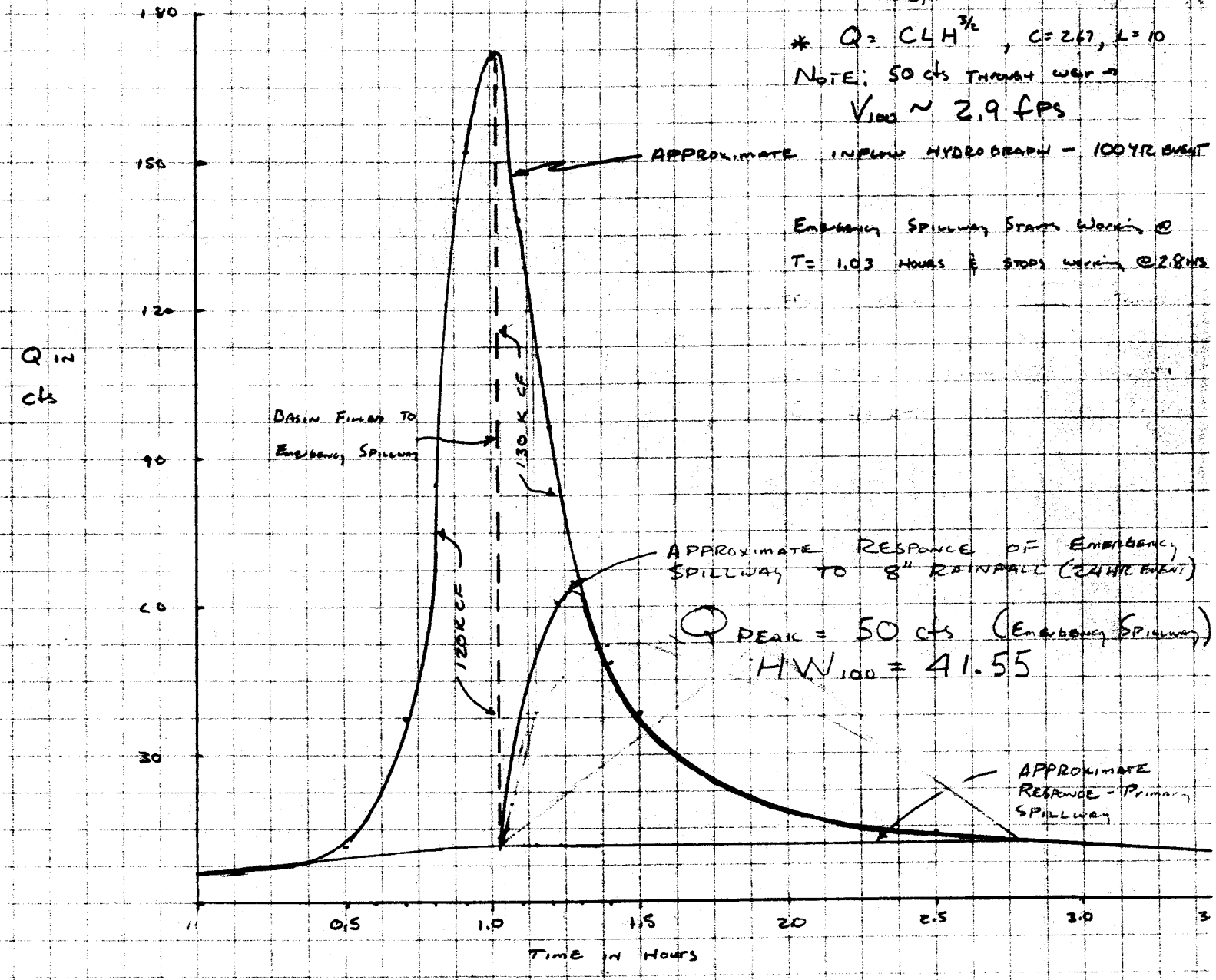
10 YR EVENT

CHECK DAM FREEBOARD TO 100 YR EVENT:

ASSUME CN = 90, 8" STORM, 6.65 IN RUNOFF

USE TC CHART 0.3 HOURS, $T_T = 0$

$\frac{24.9 \text{ AC}}{640 \text{ AC/SM}} \times 6.65 \text{ IN} \Rightarrow 0.2587$ MULTIPLIER



100 YR EVENT

MISC CALC 100 YR

ELEV	EST AREA	Q OUT (Every spillway early)	EST VOL DETAINED
40	39,750	0	121,000
40.25	40,730	3.3	131,060
40.50	41,712	9.4	141,366
40.75	42,693	17.3	151,916
41.0	43 675	26.7	162,711
41.25	44 656	37.3	173 753
41.50	45 638	49.0	185,040
41.75	46 619	62.0	196,572
42.00	47,600	75.0	208,350

$V_{IN} = V_{OUT} + V_{DET}$

$V_{OUT} = \frac{1}{2}(T)(Q_{OUT})$ or $\frac{1}{2} T(60)(60)(Q_{OUT})$

@ d = .25 $V_{DETAINED} = 10,060$, $Q_{OUT} = 3.3$

$V_{IN} = (160 + (160 - 400T) \div 2)(T)(60)(60)$

$V_{OUT} + V_{DET} = 5940\,T + 10,060$

Try T = .1 50,400 ≠

T = .05 27000 ≠

T = .02 11 232 = 10 178 ok

d = .75 $V_{OUT} = 31,140T$, $V_{DET} = 30916$

Try T = .08 41,472 ≠ 33407

T = .07 36,792 = 33096

T = .065

$d = 1.25$ MISC CALC 100 yr $V_{DET} = 52,753$

$V_{OUT} = 67,140\,T$

Try $T = .15$

$70,200 \neq 62824$

Try $T = .13$ $62,712 = 61480$ OK

$d = 1.5$ $V_{DET} = 64,040$

$V_{OUT} = 88,200\,T$

Try $T = 0.2$

$86,400 = 81680$ OK

Try 1.75 → $75,572 = V_{DET}$

SHOULD NOT REACH THIS LEVEL →

$V_{OUT} = 111,600\,T$

$T = .28$

$104,832 = 106820$ ✓

$T = .25$

$99,000 = 103472$

$T = .3$ NOTE → INTERCEPT OCCURS

CHECK DETENSION BASIN FOR USE AS SEDIMENT BASIN!

VOL ⇒ 24.9 AC × 67 CY/AC = 1668 CY REQ'D

@ NP ELEV OF 36 ⇒ V = .4 × A × D
V = .4 × 21,750 × 8 ⇒ 69600/27 ⇒ 2578 CY OK!

SHAPE ⇒ $L/W_e \geq 2$ $W_e = 21750/180 = 120.8$

L/W_e (@ PIPE) = 1.49

NEED L = 210' ±, ∴ MUST DEFLECT 30'

ANTI-SEEP COLLARS

$$L_s = 8(3+A)\left(1 + \frac{.025}{0.25-.025}\right)$$

$L_s = 62.2$

10% INCREASE YIELDS ⇒ 3 COLLARS W/ V = 3
NOTE: → CHARTS BASED ON SQUARE COLLARS → CONC. VERSION COMES IN ROUND
RECOMMEND 20% INCREASE IN SATURATION LENGTH ∴
ASSUME L_s = 70 ∴ USE A - 3' DIA COLLARS

.15 × 62.2 = 9.3

3 collars @ 4'

t_c ⇒ 800 OVERLAND, C=.8, S=2.5% ⇒ T=10.5 MIN + 1050 PIPE FLOW @ V=5.4FS ⇒ T=3.3 ∴ T_c=14 MIN
Too Conservative USE T_c=20 MIN
I_2=3.5
I_{10}=4.5

CMP VERSION

STORM SEWER DESIGN COMPUTATIONS

& D 229

ROUTE _____ PROJ. SKIFFES CREEK TERRACE
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCREMENT	CA ACCUMULATED	INLET TIME MINUTES	RAIN FALL 10YR IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPACITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
DS-1	DS-2 (Top=47.5)	7.5	0.8	6.0	6.0	20	4.5	27.0	42.39	42.33 (min)	8	0.0075	30"	27.1	5.5		n=0.017
DS-2	DS-3 (T=47.5)	–		–	6.0	20	4.5	27.0	42.23	42.02	28	0.0075	30"	27.1			n=0.017
DS-3	DS-4	0.35	0.8	0.28	6.28	20	4.5	28.3	41.52	41.46	12	0.005	36"	34.0			n=0.018
DS-4	DS-5 (T=47.0)	–	0.60	–	6.28	20	4.5	28.3	41.36	40.37	198	0.005	36"	34.0			n=0.018
DS-5	DS-6 (T=45.0)	2.6	0.60	1.56	7.84	20	4.5	35.3	40.27	39.40 (min)	145	0.006	36"	37.3			
DS-6	DS-7 (T=44.5)	0.35	0.60	0.21	8.05	20	4.5	36.2	39.30	38.43	145	0.006	36"	37.3			
DS-7	DS-8 (T=44.0)	0.60	0.60	0.36	8.41	20	4.5	37.9	38.33	37.48	142	0.0065	36"	38.8			
DS-8	DS-10	1.0	0.60	0.6	9.01	20	4.5	40.5	37.38	36.78	70	0.010	36"	48.2	5.7		
DS-9	DS-10	2.45	0.60	1.47	1.47	20	4.5	6.6			20	0.015	15"	8.5			
DS-10	DS-11	–	0.60	–	10.48	20	4.5	47.2	36.78	35.33	145	0.010	36"	48.2			SUBMERGED
DS-11	DS-12	2.2	0.60	1.32	11.80	20	4.5	53.1	35.23	33.54	135	0.0125	36"	53.9			SUBMERGED

HGL ABOVE DS-8, DS-7, DS-6 & DS-9

Conc. Version

STORM SEWER DESIGN COMPUTATIONS

& D 229

ROUTE _____ PROJ. SKIFFES CREEK TERRACE
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
D																	
DS-1	DS-2							27.0	42.64	42.58	8	0.0075	27"	29.0			n=0.012
DS-2	DS-3							27.0	42.48	42.27	28	0.0075	27"	29.0			
DS-3	DS-4							28.3	42.17	42.08	12	0.0075	27"	29.0			
DS-4	DS-5							28.3	41.83	40.84	198	0.0050	30"	31.4			
DS-5	DS-6							35.3	40.74	39.65	145	0.0075	30"	38.5			
DS-6	DS-7							36.2	39.55	38.46	145	0.0075	30"	38.5			
DS-7	DS-8							37.9	38.36	37.30	142	0.0075	30"	38.5			
DS-8	DS-10							40.5	36.80	36.45	70	0.0050	36"	51.0			
DS-9	DS-10							6.6	45.0	44.70	20	0.015	15"	8.6			
DS-10	DS-11							47.2	36.35	35.63	145	0.0050	36"	51.0			
DS-11	DS-12							53.1	35.53	34.72	135	0.0060	36"	56.0			Submerged

PLASTIC - BORE VERSION

STORM SEWER DESIGN COMPUTATIONS

& D 229

ROUTE _____ PROJ. SKIFFES CREEK TERRACE
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

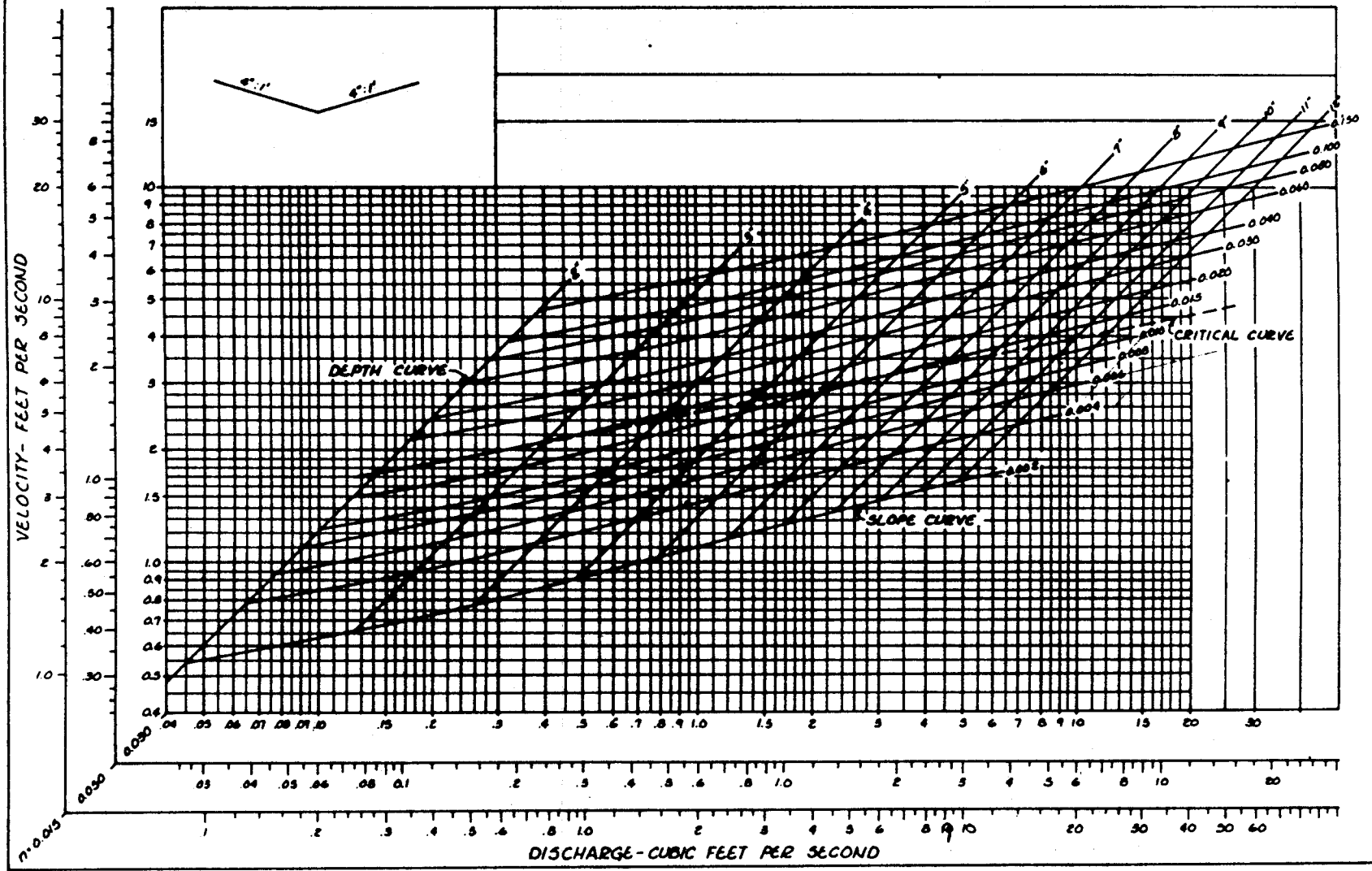
FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
DS-1	DS-2							27.0	42.89	42.83	8	0.0075	24	28.3			n = 0.009
DS-2	DS-3							27.0	42.73	42.52	28	0.0075	24	28.3			
DS-3	DS-4							28.3	42.42	42.33	12	0.0075	24	28.3			
DS-4	DS-5							28.3	42.23	40.75	198	0.0075	24	28.3			
DS-5	DS-6							35.3	40.50	39.41	145	0.0075	27	38.7			
DS-6	DS-7							36.2	39.31	38.22	145	0.0075	27	38.7			
DS-7	DS-8							37.9	38.12	37.06	142	0.0075	27	38.7			
DS-8	DS-10							40.5	36.56	36.28	70	0.0040	33	48.3			
DS-9	DS-10							6.6			20	0.015	15				
DS-10	DS-11							47.2	36.28	35.70	145	0.0040	33	48.3			
DS-11	DS-12							53.1	35.60	34.93	135	0.0050	33	54.0			

ERT	D.A.	TIME OF CONCENTRATION			I_{10}	$\psi/8$	PIPE DATA					CONTROL		OUTLET CONTROL					ING	ABLE	VELOCITY	REMARKS
	Acre	ΔH	LENGTH	T_c	(in/hr)	C=0.3 C_c=0.07 cfs	SIZE (IN.)	LENGTH (FT.)	SLOPE %	INV. IN	INV. OUT	H/D	HW	h_o	L	H	D	HW	HW	HW	(fps)	
1	3.6	—	—	20	4.5	C=.3 12.15	18"	76	1.0	51.0	50.4	1.9	2.85	1.35	2.75	.3	1.25	0.9	2.85	3.0	6.9	RIPRAP OUTLET FOR 5'

DITCH CALCULATIONS

$T_c = 20$ $i_2 = 3.5$ $i_{10} = 4.5$ $C = .6$

LOCATION	STATION	D.A. (Ac)	Q_2 cfs.	SLOPE %	VEL fps	LINING	ALLOWABLE VEL (FPS)	Q_{10} (cfs)	D.10 (IN)	DESCRIPTION
DL-1	@ DS-9	2.0	4.2	0.90	2.0	GRASS	5.0	5.4	11	Grass lined "V" 3:1 SS $\partial = 12''$
DL-2	@ POND	1.35	2.8	16.7	5.1	MIRROWMAT	10	3.6	6"	Mirrowmat lined V 3:1 SS $\partial = 12''$

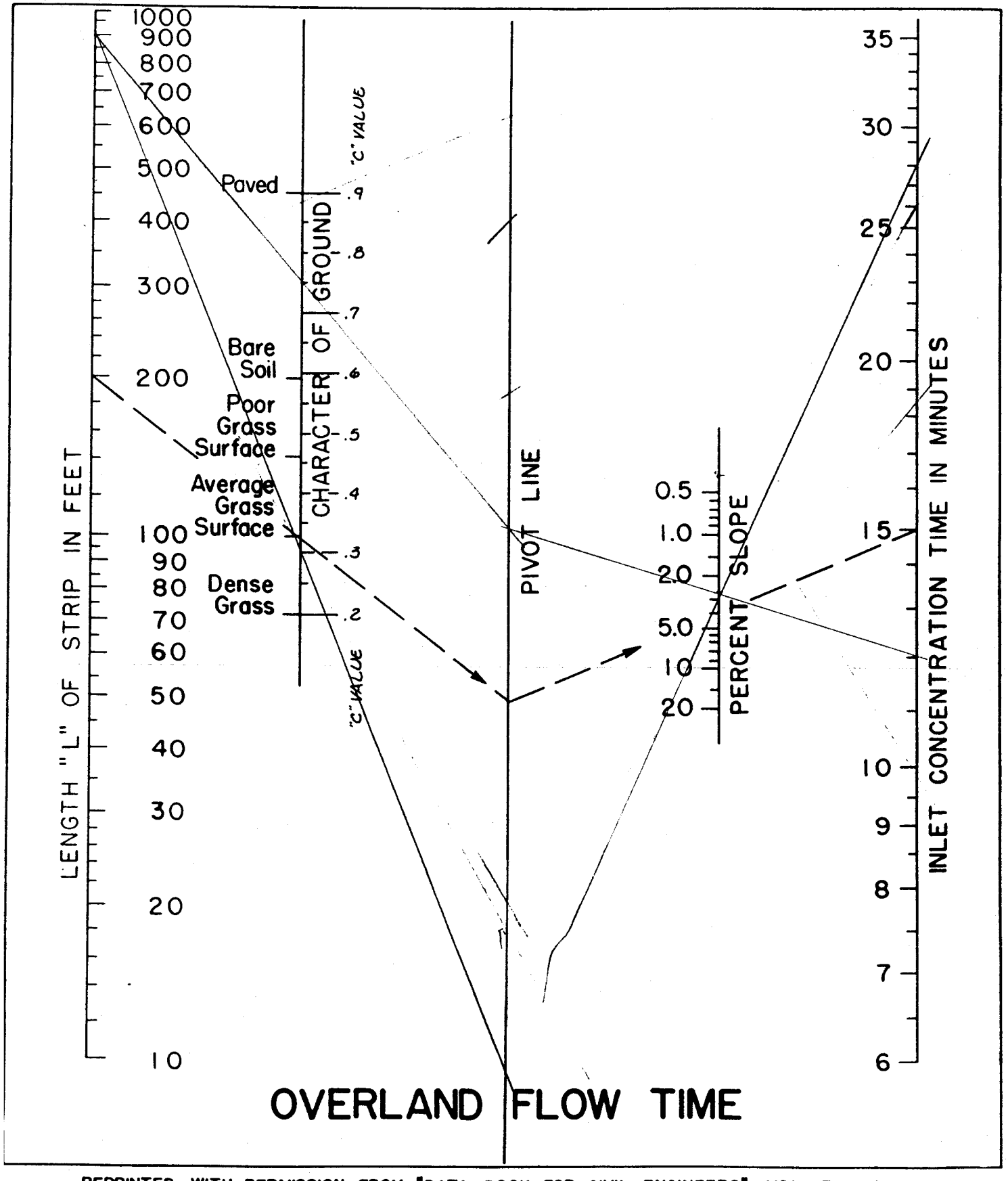


TRIANGULAR MEDIAN DITCH

FIG. 2.8.22

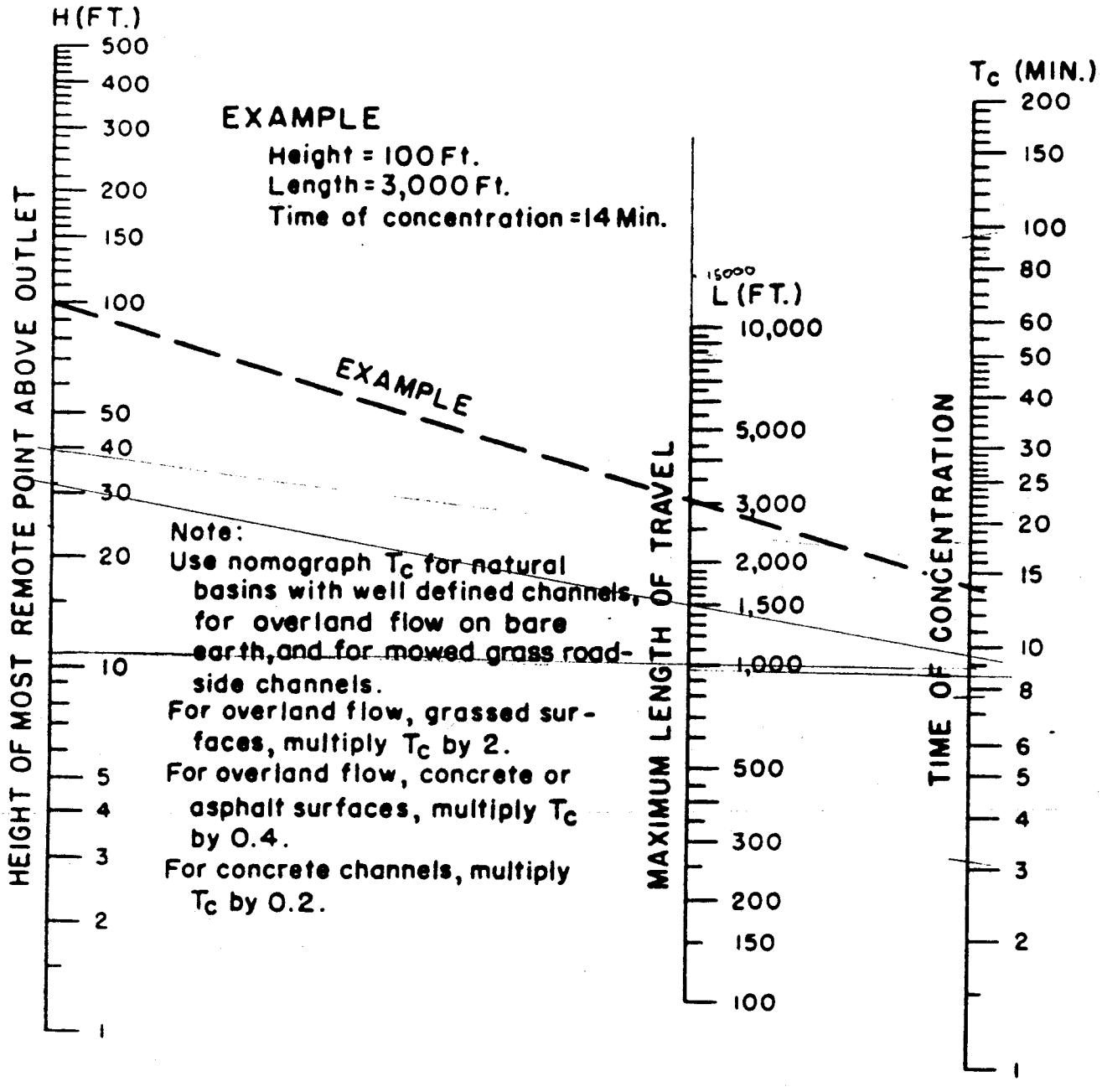
MD-3

FIG. 1.5.1.1



REPRINTED WITH PERMISSION FROM "DATA BOOK FOR CIVIL ENGINEERS" VOL. I - DESIGN
2ND EDITION (1951) BY E. E. SEELYE

TCC



Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p. 362

TIME OF CONCENTRATION OF SMALL DRAINAGE BASINS

Fig. 1.5.1.7

NORFOLK, VA.

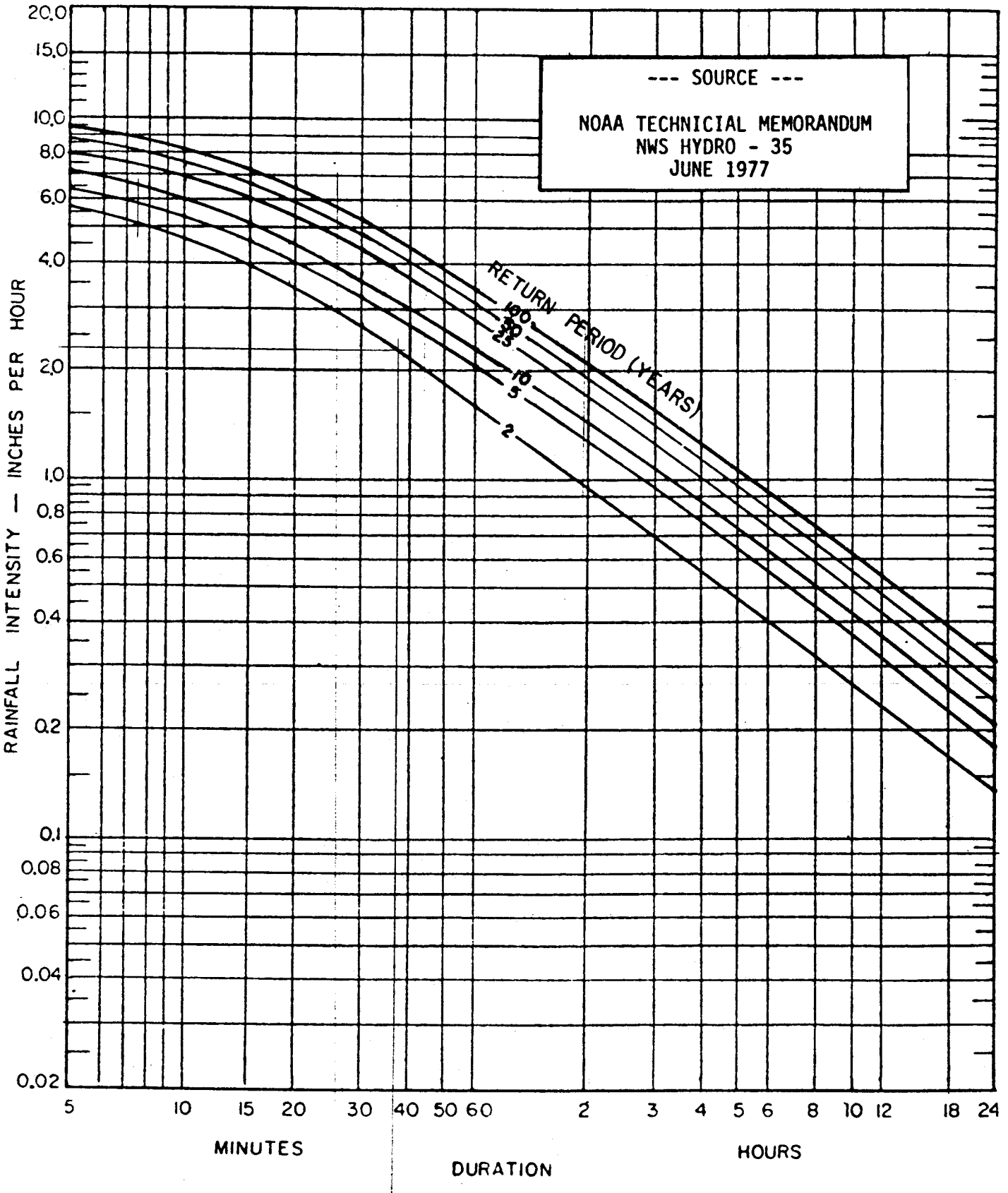


Table 5-12

Source: USDA-SCS

TIME OF CONCENTRATION = 0.3 HOURS

Hydrograph Time in Hours

T_t	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
	54	11	37	84	152	170	138	96	65	48	38	32	26	22	20	18	16	13	11	9	8			
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

TIME OF CONCENTRATION = 0.4 HOURS

Hydrograph Time in Hours

T_t	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	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

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 28, 2000

Mr. Bill Mazzeo
Skiffes Creek Terrace
1601 Skiffes Creek Circle
Williamsburg, Va. 23185

Re: Skiffes Creek Terrace
Stormwater Management Facility

Dear Mr. Mazzeo:

As discussed, the Environmental Division is willing to meet with you about fencing and maintenance concerns relative to the wet pond located within Skiffes Creek Terrace.

I have attached some "first contact" information for your use. The information includes general landscaping guidance for stormwater management BMP's (Best Management Practices) and a sample maintenance plan for a a wet (retention) pond facility. The maintenance plan can be expanded upon once we perform an inspection and review record plans, if available, for the facility.

Please contact me following your meeting on August 8th to schedule a meeting time. If you have any questions or comments in the meantime, please contact me at 757-253-6639.

Sincerely,

Scott J. Thomas

Scott J. Thomas, P.E.
Civil Engineer
Environmental Division

SP-078-99.4A

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

September 5, 2000

Mr. Bill Mazzeo
Skiffes Creek Terrace
1601 Skiffes Creek Circle
Williamsburg, Va. 23185

Re: Skiffes Creek Terrace
Stormwater Management Facility (SC 001)

Dear Mr. Mazzeo:

At your request, the Environmental Division is forwarding information relative to a meeting and general inspection held on Wednesday August 16th 2000 for the above referenced wet pond facility. In addition to specific comments as outlined below, the following additional information is also attached for your group's review and use:

- ❒ A 1 inch = 300 ft. scale map showing the General Location of the Skiffes Creek Terrace Stormwater Management Facility (Wet Pond).
- ❒ A current Inspection Report for the Wet Pond as performed on August 16th 2000.
- ❒ A Typical Maintenance Plan for the Wet Pond.
- ❒ General Landscaping Guidance (Tips).
- ❒ Two (2) Informative Brochures published by the Association of State Dam Safety Officials - *Dam Ownership: Responsibility and Liability* and *Dam Ownership: Procuring the Services of a Professional Engineer.*

Currently there are three (3) drainage, grading and detail drawings related to design and construction of the onsite storm drainage system and the wet pond in our records file. These plans were prepared by AES Consulting Engineers (Project No. 5868) and are dated 1986 and 1987. Photocopies of the pond grading plan and details are attached for your information.

Since the stormwater management facility is a wet pond with a large engineered embankment (fill) and a considerable normal pool area, a general Maintenance Plan was provided as a courtesy. The plan was prepared based on our general knowledge of maintenance required for these types of facilities. It is provided for information and guidance purposes when no other specifically approved maintenance plans are available for use. The plan is not meant to replace or supersede any specific recommendations offered by a qualified professional.

The maintenance plan only addresses normal structural, stormwater runoff control and aesthetic activities related to safe function of the facility. Landscaping, cosmetic or ornamental features associated with the facility is usually left to the discretion of the owner, or its designated representative, unless these features deter from the structural integrity or the performance of water quality or quantity controls as designed and constructed for the facility.

Specific Comments about the Wet Pond

Based on field observations, the facility appears to be in satisfactory condition for its age and trash removal and maintenance efforts on the upstream face of the dam embankment are performed routinely. However, the facility is in need of regular (routine) maintenance typical of most wet pond facilities. From our perspective, main concerns were the presence of tree vegetation on and along the downstream toe of the engineered fill embankment, vegetation and tree growth along the concrete emergency spillway, sediment and vegetation at the paved channel inflow into the pond and erosion at the fence near the storm drain inflow at the midpoint of the pond (between Units 30 and 31).

The pond's embankment is north of the water pool where the riser pipe is located. Heavy tree and ground vegetation cover most of the downstream embankment and lower portions of the emergency spillway. These trees should be removed. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. We recommend that the trees be cut to ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should be made to establish a good low-maintenance grass covering to replace the current tree covering, similar to that on the upstream face of the dam embankment. Also, vegetation and tree growth needs removed from along and within the joints of the concrete emergency spillway.

The pond has three primary inflow locations. One is a concrete open channel at the east side of the dam embankment (across from Unit 37), one is a storm drain located at about midpoint of the water pool (between Unit 30 and 31) and the last is a storm drain located at the back (rear) of the pond near Unit 21. Vegetation and tree growth in back areas surrounding the normal water pool may be removed or left in place at the preference of the owner, depending on whether a dressed or natural look is preferred. Access for future maintenance around the pool should be a consideration because at some point in the future access may be required to the two storm drain pipes that flow into the pond. The concrete open channel at the end of the parking area (across from Unit 37) is in need of immediate attention. Sediment and tree vegetation at the end of the channel needs removed as to not restrict inflow of stormwater into the pond. Clearing and sediment removal is only needed in the immediate vicinity of the end of channel.

Sediment was measured about one foot deep at the riser pipe and about 6 inches deep at the storm drain inflow point at the middle of the pond. Although cleaning of sediment from the bottom of the pond does not appear immediately necessary, it may be necessary sometime in the near future. Also, due to the concrete cap over the pond's riser pipe, the inside of the riser could not be observed. Although the exterior appeared acceptable and there were no signs of malfunction, future consideration should be given to hiring a contractor to remove the concrete lid and inspect, clean and perform general maintenance on the inside of the riser pipe and 12-inch sluice gate located at the bottom.

Also, all onsite storm drainage inlets (drop inlets) should be inspected and debris such as trash, grass clippings, sediment, etc. should be removed. Inlet clogging restricts the free flow of runoff to the pond and tends to create ponding at the inlet and parking areas.

Other Issues - Fencing

One specific concern raised during the inspection of the facility was applicability of fencing relative to the pond site. New stormwater management facilities would be required to incorporate features into the design to deter unauthorized entry. These features include screening, landscape buffers, shoreline plantings, gentler side slopes, benching and of course fencing, if a substantial danger/risk is anticipated by the designer, owner and County. For older facilities, there are no standard rules which apply to whether fencing is needed. Normally fencing is not required and is not used for most facilities, unless there are significant hazards. Fencing deters unauthorized access but it also may generate curiosity and limit routine maintenance operations such as mowing and visual inspection of the facility for trash, debris, etc. Site specific determinations should be made based on the pond's proximity to high risk areas (playgrounds, etc.), history of trespassing incidents, pond depth, interior basin side slopes and the condition (current and future) of perimeter areas.

Based on our assessment, the facility is generally located in a remote location within the subdivision. Back areas of the pond appear adequately protected from unauthorized entry due to wooded and vegetated adjacent property. Existing fencing along the back of residential lots within Skiffes Creek Terrace limits access to the water pool from the east side. Therefore, the only "exposed" area is at the embankment, which is highly visible from the road, parking areas and many of the back dwelling units. In addition, a "No Trespassing Sign" was present, the front face of the dam is adequately maintained, the water pool is relatively shallow along the shoreline, shoreline vegetation is present and side slopes are not excessively steep at this location. Therefore, unless there was an incident in the past which has created concern or if the association feels that a distinct need is present, fencing does not appear to be necessary at this time. The situation should be closely monitored and assessed as perimeter conditions may change.

If the decision is made to further deter access to the facility by use of fencing, it is suggested that the first step may be to incorporate a small portion of fence with a gate to tie into the existing fence line at the embankment area near the end of the parking lot.

Hopefully, this material is helpful to your group to understand maintenance associated with the wet pond. Please review the information and contact us at 757-253-6639 or 757-253-6673, if you have any further questions or comments.

Sincerely,

Scott J. Thomas, P.E.
Civil Engineer
Environmental Division

Enclosures
\SWMProg\Education\Subdivisions\SkiffesCr.let2

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

Database Inventory No. (if known): SC 001

Name of Facility: Skiffes Creek Terrace BMP No.: 1 of 1 Date: August 16 2000

Location: West of Skiffes Creek Circle, BACK OF UNITS 31-36

Name of Owner: Skiffes Creek Homeowners Association

Inspector: SJ Thomas (with Bill Mazzeo Skiffes Creek HOA)

Type of Facility: Wet Pond

Weather Conditions: P. Cloudy, Humid, High 80's

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

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory.
Routine - The item checked requires attention, but does not present an immediate threat to the function of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and prevent damage to the facility.

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height		X		WELL MAINTAINED UPSTREAM. DOWNSTREAM TREES + VEG NEEDS REMOVED.
Vegetated Condition		X		" " "
Weed Growth	X			Low Growth.
Erosion	X			OK.
Trash & Debris	X			OK.
Seepage	X			None observed. Vegetation D/S Thick.
Fencing or Benches	X			None.
Constructed Wetlands (Interior Landscaped & Planted) Areas:	NOT APPLICABLE. WET POOL STANDING.			
Vegetated Conditions	N/A			
Trash & Debris	N/A			
Floatables	N/A			
Erosion	N/A			
Sediment	N/A			
Dead Plant	N/A			
Aesthetics	N/A			
Other	N/A			

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin)				POOL 4' DEEP MEASURED.
Shoreline Erosion	X			GOOD PERIMETER VEGETATION.
Algae	X			OK. SOME OBSERVED NEAR RISER NW CORN.
Trash & Debris	X			MINOR FLOATING PLASTICS.
Sediment	X			APPROX 1' deep measured @ Riser.
Aesthetics	X			Overall GOOD CONDITION.
Other	X			CARP, MINNOWS & Small Fish Present.
Inflow Stuctures (Describe Locations): PAVED CHANNEL NE CORNER; SD AT BACK MIDPOINT; SD AT BACK				
Condition of Structure		X		CATAILS & SEDIMENT AT PAVED CHANNEL.
Erosion	X			
Trash and Debris	X			
Sediment	X			AT PAVED CHANNEL NEEDS REMOVED, MONITOR
Aesthetics	X			AT SD AT MIDPOINT (6" DEEP)
Other	X			SLOPE EROSION @ SD (MIDPOINT) AT FENCE.
Principal Flow Control Structure - Intake, Riser, etc. (Describe Location):				INSIDE RISER (48"ϕ) INACCESSIBLE
Condition of Structure	X			OK EXTERIOR.
Corrosion	X			OK EXTERIOR.
Trash and Debris	X			OK.
Sediment	X			OK.
Aesthetics	X			OK.
Other		X		Suggest Removal of concrete cap to inspect riser in near future.
Principal Outlet Structure - Barrel, Conduit, etc. : 12" concrete				
Condition of Structure	X			
Settlement	X			
Trash & Debris	X			
Sediment	X			
Erosion	X			
Other	X			outlet Protection Stone good condition. Trees need removed.
Emergency Spillway (Overflow): West side of Embankment, Concrete-Lined				
Vegetation		X		Vegetation & Tree Growth in Joints.
Lining	X			Concrete GOOD SHAPE.
Erosion	X			Small SCOUR HOLE @ END PAVED CHANNEL.
Trash & Debris	X			
Other				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	X			NO UNUSUAL CONDITIONS.
Animal Burrows	X			None.
Graffiti	X			None.
Other				
Surrounding Perimeter Conditions:	MAINLY WOODED To west of Pool; Residential w/ Fence EAST.			
Land Uses	X			GOOD GROOMED OR THICK WOODS.
Vegetation	X			Acceptable.
Trash & Debris	X			Normal for Residential Subdivision.
Aesthetics	X			Embankment Dressed Look, Pool NATURAL.
Access /Maintenance Roads or Paths	X			Embankment Good ACCESS. Pool AREA NEEDS Tree Removal.
Other	X			Boat Accessible via HOA.

Remarks:

- Pond Built around 1986 (currently about 15 years old)
- Carp, Minnows + Small Fish (bass) present.
- Several Curb Drop Inlets (onsite site drainage system) Randomly inspected. Grass + debris present. ALL inlets need inspected and cleaned, if required.
- D/S Trees need removed from embankment area.

Overall Environmental Division Internal Rating: 3

Signature: [signature], P.E. **Date:** 9/05/00

Title: Civil Engineer Environmental Div. JCC

SWMProg\BMP\CoInspProg\DetRet.wpd

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

Submit by Email | Print Form

County BMP ID Code: SC001

Name of Facility: Skiffes Creek Terrace | BMP No: 1 of 1 | Date: Nov 13, 2008

Location: 1700 Skiffes Creek Blvd

Owner Name: Skiffes Creek Terrace HOA

Inspector Name: Michael Milkavich

Type of Facility: Detention/Retention Pond Facility

Weather Conditions: Rain/Cool

Type: ☐ Final Inspection ☒ County BMP Inspection Program ☐ Owner Inspection

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

O.K - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.

Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.

Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	X			
Vegetation Condition	X			
Tree Growth		X		Remove from dam
Erosion	X			
Trash & Debris		X		Remove Trash
Seepage	X			
Fencing or Benches	NN			
Interior Landscaping/ Planted Areas:	☐ **None**	☐ **Constructed Wetland Shallow Marsh**	☒ **Naturally Established Vegetatation**	
Vegetated Conditions	X			
Trash & Debris		X		Remove Trash
Floating Material	X			
Erosion	X			
Sediment	X			
Dead Plant	X			
Aesthetics	X			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools:	☒ Permanent Pool (Retention Basisn)	☐ **Shallow Marsh (Detention Basin)**	☐ **None, Dry (Detention Basin)**	
Shoreline Erosion	X			
Algae		X		
Trash & Debris		X		Remove Trash
Sediment	X			
Aesthetics	X			
Other				
Inflows (Describe Types/Locations):36" RCP				
Condition of Structure	X			
Erosion	X			
Trash & Debris	X			
Sediment	X			
Outlet Protection	X			
Other				
Principal Flow control Structure - Riser, Intake, etc. (Describe Type):48" RCP				
Condition of Structure	X			
Corrosion	X			
Trash & Debris	X			
Sediment	X			
Vegetation	X			
Other				
Principal Outlet Structure - Barrel, conduit, etc.:12" RCP Unable to locate				
Condition of Structure				
Settlement				
Trash & Debris				
Erosion/Sediment				
Outlet Protection				
Other				
Emergency Spillway (Overflow):				
Vegetation		X		Remove Trees from around spillway
Lining	X			
Erosion	X			
Trash & Debris	X			
OTher				

Notes

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

Remarks

1. Concrete flume from parking lot at dam needs to be repaired. Joint between sides and bottom of flume needs to be sealed.
2. Remove all trees from both sides (faces) of dam. This includes the 3 trees planted at the far side of the dam near emergency spwy.
3. Remove all vegetation and debris (leaves) from the concrete emergency spillway.
4. Establish grass on downstream face of dam.
5. If possible - remove sediment from below the pipe and concrete flume where water enters the pond.

Overall Stormwater Division Internal Rating: 3

6. Examine the dam/water interface for erosion. Repair any erosion with soil and stone rip-rap.

Signature

Date Nov 13, 2008

Title

DRAFT James City County Perennial Stream Protocol

DRAFT

Date: Project:

Evaluator: Evaluation Point:

	Indicator Type	Absent	Weak	Moderate	Strong
A. Geomorphology (Subtotal =)					
1. Continuous Bed and Bank *	Primary	0	1	2	3
2. Sinuosity	Secondary	0	0.5	1	1.5
3. In channel structure: riffle-pool sequence	Primary	0	1	2	3
4. Soil texture *	Secondary	0	0.5	1	1.5
5. Floodplain/Bankfull Bench	Secondary	0	0.5	1	1.5
6. Recent alluvial deposits *	Secondary	0	0.5	1	1.5
B. Hydrology (Subtotal =)					
7. Groundwater discharge	Secondary	0	0.5	1	1.5
8. Leaflitter (inverse relationship)	Secondary	1.5	1	0.5	0
9. Flowing water in channel	Primary	0	1	2	3
10. Yorktown Formation - exposed w/flow	Primary	0	1	2	3
C. Biology (Subtotal =)					
11. Fibrous roots in channel (inverse rel)	Secondary	1.5	1	0.5	0
12. Rooted plants in channel (inverse rel)	Secondary	1.5	1	0.5	0
13. Fish	Secondary	0	0.5	1	1.5
14. Gilled amphibians	Secondary	0	0.5	1	1.5
15. Macrobenthos	Primary	0	1	2	3
16. SAV present in streambed	Primary	0	1	2	3

* This metric must be evaluated with consideration of upstream conditions, primarily check for presence of an upstream stormwater discharge into the reach

Total Points

Is the Stream Perennial? **YES** **NO**

Reason:

Additional Factors on which Determination is Based:

- Soil mottling
- Channel geometry, manmade modifications
- Offsite stormflow inputs
- Periphyton
- Grade control

Primary Indicator is scored from 0 to 3 points, Secondary Indicator is scored from 0 to 1.5 points unless inverse relationship. If inverse relationship, Secondary Indicator is scored at 1.5 for absent down to 0 points for strong.

Date Record Created: [redacted]

Created By: [redacted]

WS_BMPNO: SC001

Print Record

PRINTED ON
Wednesday, March 10, 201
10:04:36 AM

WATERSHED	SC
BMP ID NO	001
PLAN NO	
TAX PARCEL	(59-2)(4-1A)
PIN NO	5920400001A
CONSTRUCTION DATE	9/1/1986
PROJECT NAME	Skiffes Creek Terrace
FACILITY LOCATION	W. Skiffes Cr Circle
CITY-STATE	Williamsburg, Va.
CURRENT OWNER	Skiffes Creek Terrace Homeowners Assoc.
OWNER ADDRESS	P.O. BOX 3244
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Lee Hall, Va. 23603-0244
OWNER PHONE	757-887-2087
MAINT AGREEMENT	No
EMERG ACTION PLAN	No

Get Last BMP No

Return to Menu

MAINTENANCE PLAN	No
SITE AREA acre	28.2
LAND USE	MFRES
old BMP TYP	Wet Pond
JCC BMP CODE	A2 Wet Pond
POINT VALUE	9
SVC DRAIN AREA acres	24.9
SERVICE AREA DESCRI	Entire Subdiv & Front Tract
IMPERV AREA acres	
RECV STREAM	Skiffes Creek
EXT DET-WQ-CTRL	No
WTR QUAL VOL acre-ft	2.2
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	1.8
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

CTRL STRUC DESC	RCP
CTRL STRUC SIZE inches	48
OTLT BARRL DESC	RCP
OTLT BARRL SIZE inch	12
EMERG SPILLWAY	Yes
DESIGN HW ELEV	41.55
PERM POOL ELEV	35.4
2-YR OUTFLOW cfs	12.00
10-YR OUTFLOW cfs	
REC DRAWING	No
CONSTR CERTIF	No
INTERNAL RATING	3

LAST INSP DATE 8/16/2000 Inspected by: [redacted]

MISC/COMMENTS

Letter to HOA 09/05/2000

Additional Comments: [redacted]

SKIFFES CREEK SUBDIVISION

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

Maintenance Plan (Detention or Retention Ponds)

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

The designated party will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period. Once per year (more or less) a representative of the County may jointly inspect the structure. Appropriate action will be taken to ensure appropriate maintenance. Where structures are to be maintained jointly, allocation of maintenance costs will be in accordance with terms established in maintenance agreements. Keys to locked access points or structures shall be made available to the County upon request.

Facility Description: The SWM/BMP facility is located west of Skiffes Creek Circle behind Units 31 through 36. The facility serves a drainage area of approximately 25 acres and is a County wet pond type facility. A wet pond has a permanent impoundment which enhances water quality and is normally "wet" even during non-rainfall periods. The maximum normal wet pool for the facility is about 7 feet deep. The facility contains a 48 inch vertical reinforced concrete pipe (riser), a concrete anti-vortex/trash rack cap, a 12 inch reinforced concrete outlet pipe barrel and a concrete lined trapezoidal shaped emergency spillway. There is one opening in the top of the riser pipe to provide control for normal and larger storm events at El. 35.4. During the 100-year storm, the maximum water level should rise above the top of the riser and discharge through the emergency spillway but the high water elevation in the facility should remain substantially below the top of dam. The emergency spillway, which is located 60 feet west of the riser structure, is provided as an auxiliary overflow device, should the riser become partially blocked. Although the emergency spillway can handle short-term duration flow, periodic or long duration discharge through the emergency spillway could be an indicator of potential problems with the principal riser or outlet pipe. If functioning properly, normal storm events should reach an elevation just over the top of the riser.

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

1. Inspect for sediment buildup by visual observation and a physical determination of sediment depth within pond's storage area. If sediment reaches a depth of 2' - 0" above the bottom of pond. At the same time, or at least once per year, clean storm drain and channel inflow locations, the riser bottom and outlet pipes of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area.

2. Perform maintenance mowing of pond grasses at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not be permitted to grow on any part of pond embankment that was constructed using engineered (compacted) fills.

3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed a qualified independent soil testing laboratory such as VPI&SU. Apply additional lime and fertilizer in accordance with test recommendations.

4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedlings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations of the Virginia Erosion and Sediment Control Handbook (VESCH).

5. Perform quarterly inspections of the riser section and crest spillway for the observance of collected trash and debris. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide for an attractive appearance.

6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the concrete pipe riser, anti-vortex and trash rack cap, orifices/weirs, outlet barrel and pond embankment. Exposed metal surfaces shall be painted to minimize rust damage or replaced if rust damage is irreversible. If damage is evident, further investigation by a registered professional engineer may be required to assess the integrity of the structure.

7. Perform quarterly inspections of the graded side slopes of the facility for signs of animal/rodent borrows or slope erosion. Immediately perform necessary repairs, refilling or reseeding.

8. Perform yearly observations of perimeter areas surrounding the facility to ensure changes in land use, topography or access have not occurred and do not affect the operation, maintenance, access or safety features provided for the facility. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the engineered embankment and principal flow control structures.

9. Record Keeping. Keep reasonable, accurate written records of inspections and maintenance activities performed for the BMP structure at all times. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.

10. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County.

General Landscaping Guidance for All Stormwater Management BMP's

- ❒ *Trees, shrubs and/or any type of woody vegetation are not allowed on the embankment.*
- ❒ *Keep trees and shrubs at least 15 feet away from the toe of constructed fill slopes.*
- ❒ *Keep trees or shrubs having long taproot systems away from earthen dams or subsurface drains.*
- ❒ *Keep trees and shrubs at least 25 feet away from perforated pipes.*
- ❒ *Keep trees and shrubs at least 25 feet away from principal flow control structures.*
- ❒ *Keep vegetation at least 15 feet from low flow orifice openings.*
- ❒ *Clean trash and debris as necessary from the facility and principal control structures. Only trained or authorized personnel should enter confined spaces or structural components of the facility.*
- ❒ *Keep herbaceous (not woody) embankment plantings limited to ten (10) inches in height.*
- ❒ *Maintain erosion control mats, blankets and fabrics in channels to reduce erosion potential.*
- ❒ *Sod channels that are not stabilized with erosion control mats.*
- ❒ *Keep emergency spillways stabilized with plant material that can withstand strong flows. Root material should be fibrous and substantial but lacking a taproot.*
- ❒ *Seed and mulch bare, exposed or formed erosion gullies. Divert surface runoff from any reseeded and mulched areas until stabilized.*
- ❒ *Check water tolerances of existing native plant materials prior to inundation of pond areas.*
- ❒ *Stabilize aquatic and safety benches with emergent wetland plant species and wet-seed mixes.*
- ❒ *Keep access to embankments or flow control structures free of trees or shrubs. Ensure areas that are planted adjacent to access routes can withstand compaction, damage or vibration that may occur due to passing vehicles or heavy equipment.*
- ❒ *To reduce thermal warming effects, shade inflow and outflow channels as well as southern exposures to the greatest extent possible.*
- ❒ *Avoid plantings that require routine or intensive chemical applications such as turf, etc.*
- ❒ *Use salt tolerant plants if excessive amounts of deicing salt are anticipated in inflow runoff.*
- ❒ *Soil test perimeter areas periodically to determine if soil amendments are necessary. Contact the local Virginia Cooperative Extension for assistance.*
- ❒ *Use native plant species which adapt to local soil and weather conditions over exotic or foreign species.*
- ❒ *Decrease or minimize areas where turf is used. Use low maintenance ground cover to absorb runoff where possible.*
- ❒ *Plant stream and normal pool buffers with trees, shrubs, ornamental grasses and herbaceous material where possible to stabilize banks, provide shade and provide for water quality enhancement.*
- ❒ *Use selective or strategic plantings to minimize access to deeper pools or steeper slopes.*
- ❒ *If warranted, provide educational signs around the perimeter of the facility to indicate that it is a Stormwater Management Area or to designate planting, maintenance or mowing zones.*
- ❒ *Avoid the overuse of any one type of plant material and material with weeds or invasive components.*
- ❒ *Preserve existing, native vegetation to the greatest extent possible unless it deters from structural aspects of the facility.*
- ❒ *Aesthetics and cosmetic characteristics should be a prime consideration. Strive to maintain a natural, scenic character for the BMP that blends well with the community theme, physical location and surrounding land uses and provides for screening, but yet maintains the structural aspects of the facility such as riser pipes, outlet barrels, spillways, trash racks, inlets, inflow channels, etc. Be certain original or enhanced landscaping does not encroach upon public or private roadways, sidewalks, trails or emergency vehicle access routes.*
- ❒ *Refer to the approved design or construction plan for the BMP. Some approved plans provide site specific information related to operation, inspection and maintenance. Please note, however, this is a current requirement of the Environmental Division for stormwater management plans and this information may not necessarily be found on all plans, especially for older facilities. Contact the Environmental Division at **757-253-6670** for additional information.*

Skiffes Creek Terrace Stormwater Management Facility

SC001_SKIFFES_CREEK_TERRACE - 048

Frances Geissler

From: Rick Hall
Sent: Wednesday, April 29, 2009 1:39 PM
To: Frances Geissler
Subject: RE: Skiffes Creek HOA meeting Tues. May 5th.

Yes, that be helpful. James River Rec. center, 7:00.

They have one or more signs to pick up after pets. I didn't sense there were a lot of pets but you can ask him. I did tell him about our "Scoop/Poop" program, he didn't respond.

His number is 888-0088.

Rick Hall
Stormwater Specialist
259-1443

From: Frances Geissler
Sent: Wednesday, April 29, 2009 1:33 PM
To: Rick Hall
Subject: RE: Skiffes Creek HOA meeting Tues. May 5th.

So where and when....Does it look as though they have a lot of pets in the neighborhood?

THANKS

From: Rick Hall
Sent: Wednesday, April 29, 2009 1:30 PM
To: Frances Geissler
Subject: Skiffes Creek HOA meeting Tues. May 5th.

I met with ~~Bret~~ Bert Parks this morning and walked the BMP. No big problems; they need to remove trees from the dam, mostly on the outside slope and they need to let the grass grow a little higher. There's some floating debris and a little algae, a little build up of sediment (plume) in front of one inlet pipe but not too severe yet.

I gave him your name and number said you'd likely attend the meeting.

Rick Hall

Stormwater Specialist
James City County
Stormwater Division
287 McLaws Circle, Suite 1
Williamsburg, VA 23185
Office: (757) 259-1443
Cell: (757) 645-5474