NEW HOPE CHURCH

MOUNT VERNON DISTRICT FAIRFAX COUNTY, VIRGINIA

SPECIAL PERMIT AMENDMENT PLAT

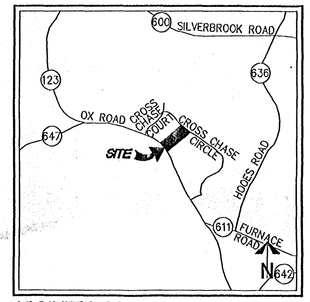
Application No. SPA 2005-MV-010
Approved
John S Rittler
Chairman, Board of Zoning Appeals

NOTES

1. OWNER: NEW HOPE CHURCH, INC.
   8905 OX ROAD
   LORTON, VA 22079
2. THIS APPLICATION REQUESTS A SPECIAL PERMIT AMENDMENT TO INCREASE THE NUMBER OF CHILDREN IN THE CHILD CARE CENTER TO 250, AND ADD AN OUTDOOR GATHERING AREA AND BAPTISTRY, AND A COVERED PICNIC AREA.
3. THE PROPERTY IS DESIGNATED BY FAIRFAX COUNTY, VIRGINIA, AS TAX ASSESSMENT MAP NUMBER 106-2-01-0007, AND IS ZONED R-1.
4. THE PROPERTY IS NOW IN THE NAME OF NEW HOPE CHURCH, INC.
5. TOTAL AREA OF THE PROPERTY IS 383,090 SQUARE FEET OR 8.79 ACRES.
6. TO THE BEST OF OUR KNOWLEDGE, ALL UTILITY EASEMENTS HAVING A WIDTH OF 25 FEET OR MORE ON THIS PROPERTY ARE SHOWN.
7. THIS PLAT DOES NOT SHOW ALL COVENANTS, EASEMENTS, RESTRICTIONS OR DEDICATIONS WHICH MAY EXIST IN THE CHAIN OF TITLE.
8. THE PROPOSED DEVELOPMENT CONFORMS TO ALL APPLICABLE FAIRFAX COUNTY ORDINANCES, REGULATIONS AND ADOPTED STANDARDS, EXCEPT AS NOTED IN THE WAIVERS REQUESTED SECTION.
9. BOUNDARY AND TOPOGRAPHIC INFORMATION IS TAKEN FROM A FIELD SURVEY PERFORMED BY THIS FIRM. CONTOUR INTERVAL IS 2 FOOT.
10. PROPERTY IS SERVED BY PUBLIC WATER AND SEWER.
11. ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP 5155250136D. DATED MARCH 1990, THIS PROPERTY IS SHOWN AS ZONE X, AREAS DETERMINED TO BE OUTSIDE OF THE 500-YEAR FLOOD PLAIN.
12. NO RESOURCE PROTECTION AREAS OR ENVIRONMENTAL QUALITY CORRIDORS, AS DEFINED, ARE DELINEATED ON THIS PROPERTY.
13. NO GRAVES OR OTHER EVIDENCE OF BURIAL PLACES HAVE BEEN FOUND ON THIS PROPERTY.
14. THIS PLAN IS CONCEPTUAL AND IS INTENDED TO BE USED IN CONJUNCTION WITH THE LAND USE APPROVAL PROCESS ONLY. IT IS NOT AN ENGINEERING CONSTRUCTION DRAWING; AND, MINOR DEVIATIONS AND ADJUSTMENTS MAY BE REQUIRED.
15. SITE SIGNAGE WILL BE PROVIDED IN ACCORDANCE WITH ARTICLE 12 OF THE FAIRFAX COUNTY ZONING ORDINANCE.
16. ALL EXISTING BUILDINGS ARE TO REMAIN.
17. THE MAJOR VEPCO EASEMENT ON THIS PROPERTY WAS GRANTED PRIOR TO THE EFFECTIVE DATE OF FAIRFAX COUNTY ZONING ORDINANCE.
18. PHASE I OF THE CHURCH IS CURRENTLY UNDER CONSTRUCTION AND INCLUDES A 685 SEAT SANCTUARY. PHASE II WILL INCLUDE THE ADDITION OF A MULTI-PURPOSE AREA. PHASE I OUTDOOR RECREATION AREA TO BE LOCATED IN THE AREA OF THE FUTURE PHASE II ADDITION. THE OUTDOOR RECREATION AREA WILL BE RELOCATED DURING PHASE II TO LOCATION AS SHOWN.
19. LIGHTING WILL BE IN ACCORDANCE WITH FAIRFAX COUNTY STANDARDS.

WAIVERS/MODIFICATIONS REQUESTED

1. MODIFY TRANSITIONAL SCREENING REQUIREMENT AND WAIVE BARRIER REQUIREMENT ON THE NORTHEASTERN SIDE ADJACENT TO LOTS 29, 30, 31, AND PARCEL B IN THE PORTION OF THE PROPOSED CONSERVATION EASEMENT AREA AND VEPCO EASEMENT. EXISTING TREES AND VEGETATION ARE TO REMAIN IN THE PROPOSED CONSERVATION EASEMENT AREA.
   (PREVIOUSLY APPROVED PER SITE PLAN #8036-SP-002)
2. MODIFY TRANSITIONAL SCREENING REQUIREMENT AND WAIVE BARRIER REQUIREMENT ON THE SOUTHEASTERN SIDE ADJACENT TO PARCEL 8 IN PORTION OF PROPOSED CONSERVATION EASEMENT. EXISTING TREES AND VEGETATION ARE TO REMAIN IN THIS AREA.
   (PREVIOUSLY APPROVED PER SITE PLAN #8036-SP-002)
3. WAIVE TRANSITIONAL SCREENING AND BARRIER REQUIREMENTS ON THE NORTHWESTERN SIDE OF THE SITE (ADJACENT TO REMINGTON PLACE) DUE TO EXISTING VEPCO EASEMENT.
   (PREVIOUSLY APPROVED PER SITE PLAN #8036-SP-002)
4. WAIVE TRANSITIONAL SCREENING AND BARRIER REQUIREMENTS ALONG THE SOUTHWESTERN PROPERTY LINE (ADJACENT TO ROUTE 123) DUE TO ACCESS EASEMENT AND VEPCO EASEMENT.
   (PREVIOUSLY APPROVED PER SITE PLAN #8036-SP-002)
5. **WAIVE BARRIER REQUIREMENT ON THE ENTIRE SOUTHEASTERN SIDE ADJACENT TO PARCEL 8.**



VICINITY MAP SCALE: 1"=2000'

ZONING TABULATION

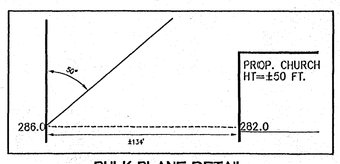
R-1, RESIDENTIAL DISTRICT: ONE DWELLING UNIT/ACRE

	REQUIRED	PROVIDED
SITE	N/A	383,090 SF/8.79 AC
MAX. BLDG. HT.	60 FT	±50 FT
MIN. YARD REQUIREMENTS		
FRONT	50' ABP, 40 FT	±134 FT
SIDE	45' ABP, 20 FT	±25 FT
REAR	45' ABP, 25 FT	±518 FT
MAX. FAR	0.15	±0.15
OPEN SPACE	N/A	±50%

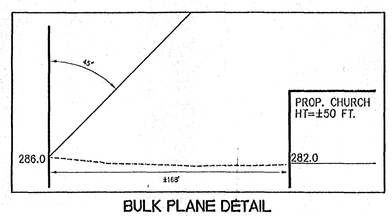
PARKING TABULATION

(PER APPROVED SITE PLAN #8036-SP-002)

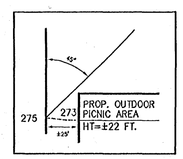
CHURCH: 685 SEATS @ 1 SP/4 SEATS
REQUIRED = 685/4 = 172 SPACES
DAYCARE: 250 CHILDREN @ 0.19 SP/CHILD
REQUIRED = 99 X 0.19 = 48 SPACES
TOTAL REQUIRED: 172 + 48 = 220 SPACES
PARKING PROVIDED: 246 PARKING SPACES (INCLUDING 7 ACCESSIBLE SPACES)

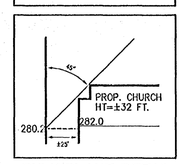


BULK PLANE DETAIL
OX ROAD
1" = 50'

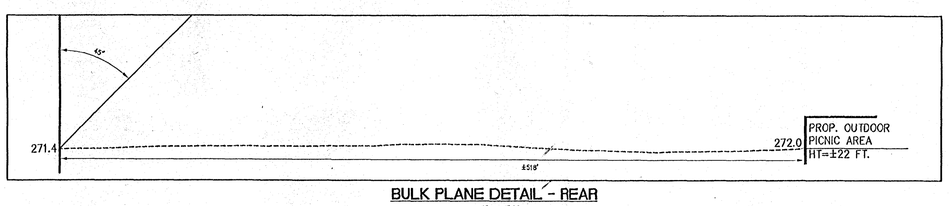


BULK PLANE DETAIL
ADJACENT TO REMINGTON PLACE
1" = 50'





BULK PLANE DETAIL
ADJACENT TO PARCEL 8
1" = 50'



BULK PLANE DETAIL - REAR
1" = 50'

SHEET INDEX

1. COVER SHEET
2. EXISTING CONDITIONS PLAN/EXISTING VEGETATION MAP
3. SPECIAL PERMIT AMENDMENT PLAT
4. CONCEPTUAL LANDSCAPE PLAN
5. STORMWATER MANAGEMENT CALCULATIONS (FOR INFORMATION ONLY)
6. BEST MANAGEMENT COMPUTATIONS (FOR INFORMATION ONLY)
7. BEST MANAGEMENT COMPUTATIONS (FOR INFORMATION ONLY)
8. BEST MANAGEMENT COMPUTATIONS (FOR INFORMATION ONLY)
9. ADEQUATE OUTFALL ANALYSIS (FOR INFORMATION ONLY)
10. STORM SEWER COMPUTATIONS AND OUTFALL NARRATIVE (FOR INFORMATION ONLY)
11. AREA OF INFLUENCE STUDY (FOR INFORMATION ONLY)

RECEIVED
Department of Planning & Zoning
JUL 18 2008
Zoning Evaluation Division

WALTER L. PHILLIPS
INCORPORATED
CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1301 WWW.WLPINC.COM

DATE: 3/13/08; 7/10/08 - DPZ COMMENTS DRAWN: MRW
SCALE: 1" = 50'

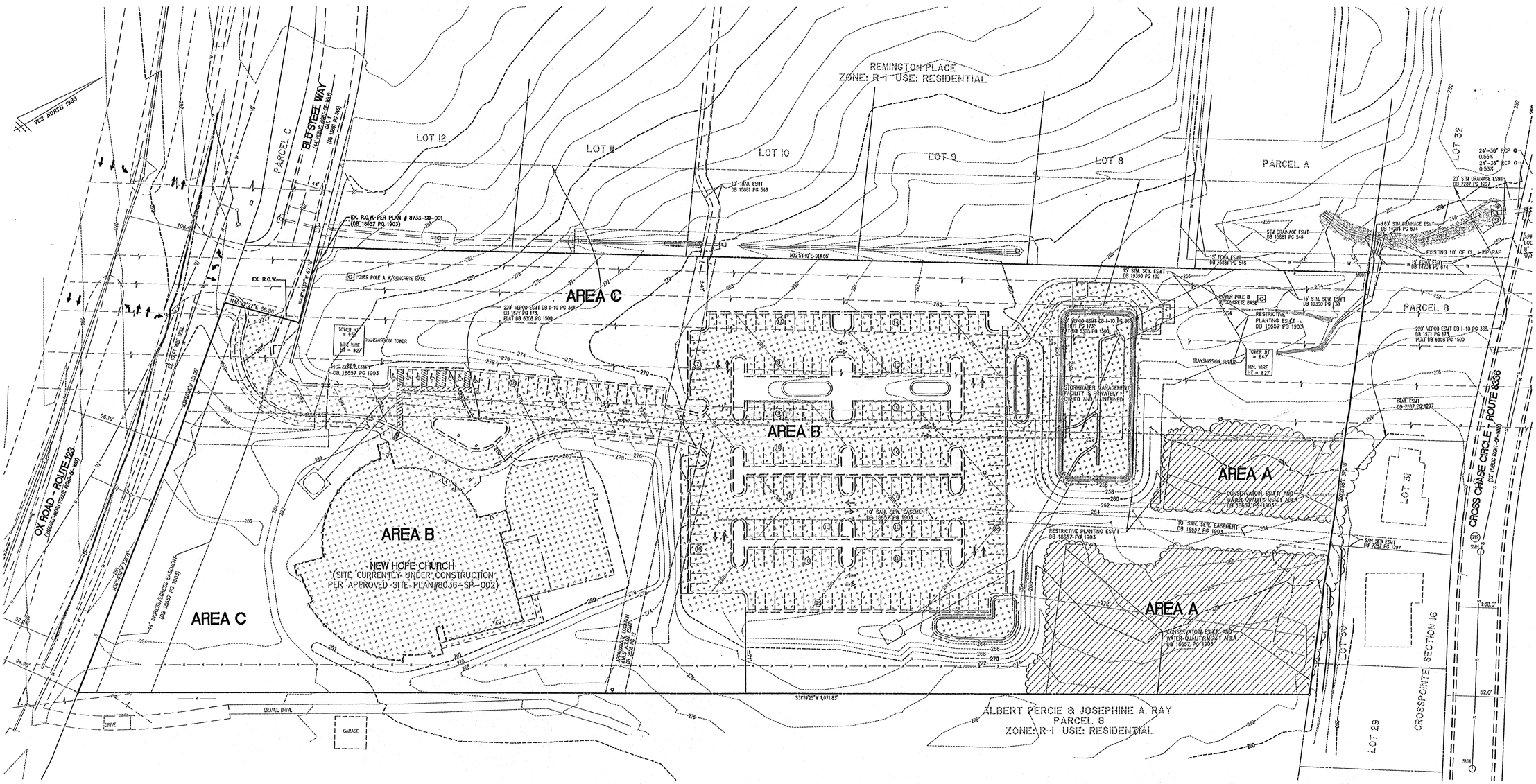
COMMONWEALTH OF VIRGINIA
CHARLES F. DUNLOP
No. 13098
3/13/08
LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

COVER SHEET

NEW HOPE CHURCH
MT. VERNON DISTRICT
FAIRFAX COUNTY, VIRGINIA



50 0 25 50 100 200

(IN FEET)
1 INCH = 50'

EXISTING VEGETATION MAP INFORMATION

KEY		COVER TYPE	PRIMARY SPECIES	SUCCESSIONAL STAGE	CONDITION	ACREAGE	COMMENTS
	A	UPLAND FOREST.	TULIP POPLAR, RED OAK VIRGINIA PINE, RED MAPLE, BEECH	SUB-CLIMAX	GOOD	41,126 SF OR 0.944 AC	
	B	DEVELOPED	BUILDING, PARKING LOT, DRIVE AISLES, WALKS, SWM FACILITY	N/A	N/A	141,916 SF OR 3.258 AC	
	C	MAINTAINED GRASSLAND	REDBUD, WHITE PINE RED MAPLE	N/A	GOOD	200,048 SF OR 4.592 AC	
					TOTAL SITE AREA:	383,090 SF OR 8.794 AC	

EXISTING CONDITIONS EXHIBIT/EXISTING VEGETATION MAP

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

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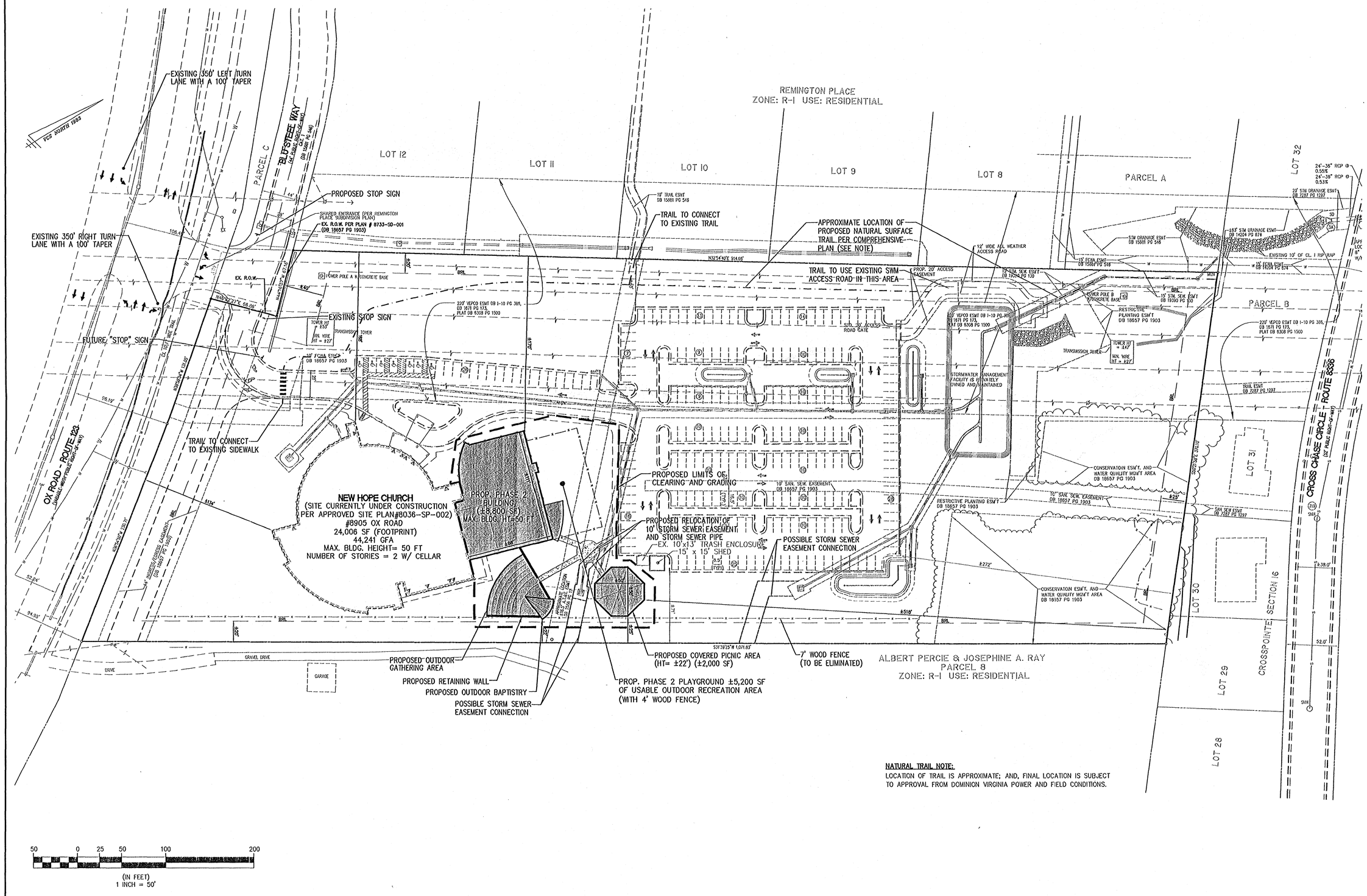
SCALE: 1" = 50' DATE: 3/13/08; 7/10/08 - DPZ COMMENTS DRAWN: MRW

COMMONWEALTH OF VIRGINIA
CHARLES F. DUNCAN
No. 13098
3/13/08
LAND SURVEYOR

NEW HOPE CHURCH

MT. VERNON DISTRICT

FAIRFAX COUNTY, VIRGINIA



NATURAL TRAIL NOTE:
LOCATION OF TRAIL IS APPROXIMATE; AND, FINAL LOCATION IS SUBJECT TO APPROVAL FROM DOMINION VIRGINIA POWER AND FIELD CONDITIONS.

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DATE: 3/13/08; 7/10/08 - DPZ COMMENTS | DRAWN: MRW

SCALE: 1" = 50'

COMMONWEALTH OF VIRGINIA
CHARLES F. COWLAP
No. 13058
3/13/08
LAND SURVEYOR

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

REVISION APPROVED BY

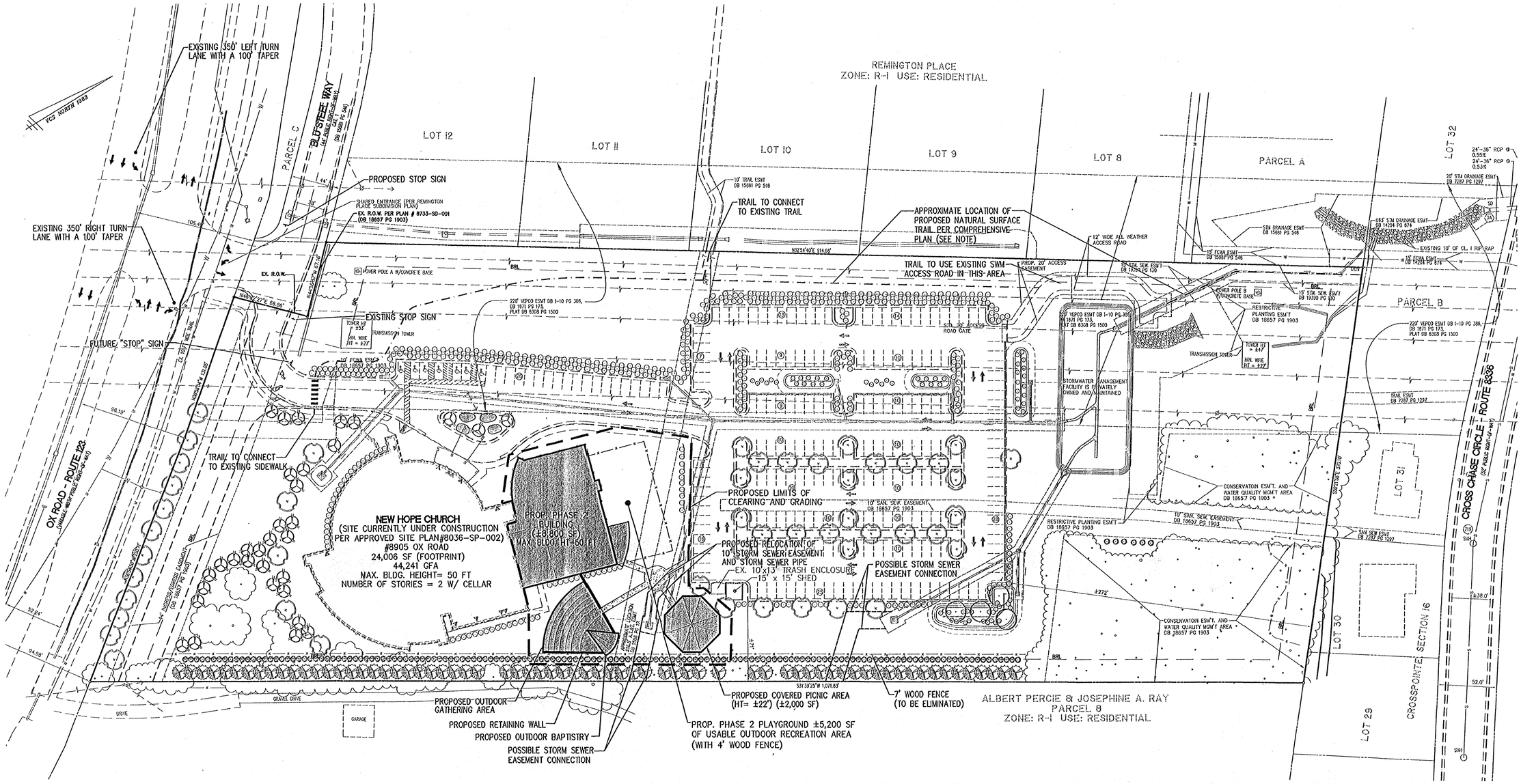
SPECIAL PERMIT AMENDMENT PLAT

NEW HOPE CHURCH

MT. VERNON DISTRICT

FAIRFAX COUNTY, VIRGINIA

File No. | Tax Map No. 106-2 | Job No. 04-065 | Cadd Dwg. File: 04065SPA | Xref:



LEGEND

PER APPROVED SITE PLAN #8036-SP-002

- PROPOSED DECIDUOUS TREES
- PROPOSED FLOWERING TREES
- PROPOSED LARGE EVERGREEN TREES
- PROPOSED MEDIUM EVERGREEN TREES
- PROPOSED SHRUBS (10' MAX HEIGHT; THE SHRUBS WITHIN THE TRANSMISSION RIGHT OF WAY ARE SELECTED FROM A SUGGESTED SPECIES LIST PER DOMINION VIRGINIA POWER)
- PROPOSED TREES USED AROUND STORMWATER MANAGEMENT AREA
- PROPOSED SHRUBS USED IN BIORETENTION AND STORMWATER MANAGEMENT AREA
- PROPOSED PERENNIALS

50 0 25 50 100 200

(IN FEET)
1 INCH = 50'

TREE COVER CALCULATIONS

TOTAL SITE AREA	383,090	S.F.*
EX. PHASE I BLDG. FOOTPRINT	- 24,006	S.F.
PROP. PHASE II BLDG. FOOTPRINT	- 8,800	S.F.
PROP. OUTDOOR BAPTISTRY FOOTPRINT	- 2,600	S.F.
PROP. COVERED PICNIC AREA FOOTPRINT	- 2,000	S.F.
PLAYGROUND	- 5,200	S.F.
ADJUSTED SITE AREA	340,484	S.F.
PERCENT REQUIRED	X 20	%
TREE COVER REQUIRED	**68,097**	**S.F.**
TREE COVER PROVIDED (PLANTED)	39,200	S.F.
EXISTING TREE COVERAGE (43,930 X 1.25)	+ 54,913	S.F.
TOTAL TREE COVERAGE	**94,116**	**S.F.**

*ADJUSTED SITE AREA REFLECTS 3,830 SF OF RIGHT OF WAY DEDICATION PER PLAN #8036-SP-002, DB 18657 PG 1903.

INTERIOR PARKING LOT LANDSCAPING CALCULATIONS

PER APPROVED SITE PLAN #8036-SP-002

TOTAL PARKING AREA	84,524 S.F.
PERCENT REQUIRED	x 5 %
REQUIRED	4,226 S.F.
PROPOSED (30 CATEGORY IV TREES @ 250 SF)	**7,500 S.F.**

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COMMONWEALTH OF VIRGINIA
CHARLES L. DANIELSON
No. 13098
3/13/08
LAND SURVEYOR

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE	REV. BY	APPROVED

REVISION APPROVED BY

CONCEPTUAL LANDSCAPE PLAN

NEW HOPE CHURCH

MT. VERNON DISTRICT

FAIRFAX COUNTY, VIRGINIA

File No. Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 04065SPA Xref:

STORMWATER MANAGEMENT SUMMARY (ENTIRE SITE)

I. PRE-DEVELOPMENT (EXISTING CONDITIONS)

A. CONTRIBUTING AREAS:

8.71 AC. @ 0.30 (GREEN AREA ON-SITE)
0.17 AC. @ 0.90 (ROOFS, DRIVEWAYS, SIDEWALKS, ETC.)

B. WEIGHTED 'C':

$$\frac{(8.71)(0.20)+(0.17)(0.90)}{8.88} = 0.21 \text{ (2 YR STORM)}$$

$$\frac{(8.71)(0.30)+(0.17)(0.90)}{8.88} = 0.31$$

C. TIME OF CONCENTRATION = 10 MIN.

D. RUNOFF: Q2 = (0.21)(4.60)(8.88) = 8.58 CFS
Q10 = (0.31)(5.92)(8.88) = 16.30 CFS

II. POST-DEVELOPMENT UNDETAINED (2-YEAR, 10-YEAR):

A. CONTRIBUTING AREAS:

2.17 AC. @ 0.30 (UNDETAINED GREEN, ON-SITE)
0.04 AC. @ 0.90 (UNDETAINED PAVED, ON-SITE)
2.21 AC.

B. WEIGHTED 'C':

$$\frac{(2.17)(0.30)+(0.04)(0.90)}{2.21} = 0.31$$

C. TIME OF CONCENTRATION = 5 MIN.

D. RUNOFF: Q2 = (0.31)(5.45)(2.21) = 3.73 CFS
Q10 = (0.31)(7.27)(2.21) = 4.98 CFS

III. POST-DEVELOPMENT DETAINED (TO POND):

A. CONTRIBUTING AREAS:

3.88 AC. @ 0.30 (GREEN AREA DETAINED, ON-SITE)
2.79 AC. @ 0.90 (PAVED AREA DETAINED, ON-SITE)
6.67 AC.

B. WEIGHTED 'C':

$$\frac{(3.88)(0.30)+(2.79)(0.90)}{6.67} = 0.55$$

C. RUNOFF: Q2 = (0.55)(5.45)(6.67) = 19.99 CFS
Q10 = (0.55)(7.27)(6.67) = 26.67 CFS

IV. OFFSITE ATEA (TO POND):

A. AREA = 1.74 AC.
B. C FACTOR = 0.33
C. Q2 = (0.33)(5.45)(1.74) = 3.13 CFS
Q10 = (0.33)(7.27)(1.74) = 4.17 CFS

V. MAX RELEASE:

QMAX REL. = QPRE - Q(POST UNDETAINED) + Q(OFFSITE)

Q2 = 8.58- 3.73 + 3.13 = 7.98 CFS
Q10 = 16.30 - 4.98 + 4.17 = 15.48 CFS

VI. ACTUAL RELEASE
Q2 = 6.39 CFS < 7.98 CFS
Q10 = 8.88 CFS < 15.48CFS

STORMWATER MANAGEMENT NARRATIVE

STORMWATER MANAGEMENT MEASURES ARE INCORPORATED AS A DRY POND THAT WILL REDUCE THE PEAK DRAINAGE FLOWS FROM 2 YEAR AND 10 YEAR STORMS FROM THE PROPERTY TO LEVELS AT OR BELOW THE PRE-DEVELOPEMENT RATES. THERE WILL ALSO BE UNDETAINED RUNOFF FROM THE PROPERTY THAT WILL NOT BE REGULATED; HOWEVER THIS WILL NOT RAISE THE 2 YEAR AND 10 YEAR RELEASE RATE ABOVE PRE-DEVELOPEMENT RATES. THE POND WILL OUTFALL THROUGH PROPOSED PIPES ON THE NORTH EASTERN SIDE OF THE SITE. THE OUTFALL WILL BE IN AN EXISTING STORMWATER EASEMENT ON THE ADJACENT PROPERTY.THERE IS ALSO AN EMERGENCY SPILLWAY THAT IN THE EVENT THE PRINCEPAL SPILLWAY IS BLOCKED WILL BE ABLE TO PASS THE 100 YEAR EVENT SAFELY THROUGH THE POND AND DISCHARGE THE RUNOFF INTO THE EXISTING EASEMENT ON THE ADJACENT SITE. THE UNDETAINED AREAS ARE THE SOUTH WESTERN CORNER OF THE SITE AND ALSO THE EASTERN SIDE OF THE SITE. PARTS OF THE EASTERN SIDE OF THE PROPERTY WILL REMAIN UNTOUCHED THROUGH OUT CONSTRUCTION AND A CONSERVATION EASEMENT WILL BE DESIGNATED IN THESE AREAS. THE TOTAL RELEASE FROM THE SITE FOR THE 2 YEAR STORM WILL BE 6.35 CFS WHICH IS BELOW THE PREDEVOLEMENT RATE OF 7.98 CFS AND THE 10 YEAR FLOW RATE IS 8.39 CFS WHICH IS BELOW THE 15.48 CFS.

2 YEAR ROUTING

GIVEN POND DATA / INTERMEDIATE ROUTING COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
251.50	0.0	0	0.0	0.0
251.75	0.0	125	0.8	0.8
252.00	0.1	997	6.6	6.7
252.25	0.1	2,525	16.8	16.9
252.50	0.1	4,120	27.5	27.6
252.75	0.1	5,783	38.6	38.7
253.00	0.9	7,515	50.1	51.0
253.25	2.8	9,315	62.1	64.9
253.50	5.0	11,187	74.6	79.6
253.75	6.2	13,130	87.5	93.7
254.00	7.2	15,145	101.0	108.2
254.25	8.1	17,233	114.9	123.0
254.50	18.6	19,396	129.3	147.9
254.75	37.8	21,632	144.2	182.0
255.00	62.4	23,945	159.6	222.0
255.25	91.2	26,334	175.6	266.8
255.50	123.7	28,801	192.0	315.7
255.75	159.2	31,345	209.0	368.2

Time increment (t) = 5.0 min.

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.001	-----	0.0	0.01	0.00	251.50
5.0	23.111	23.1	22.9	23.11	0.10	252.40
10.0	14.881	38.0	56.4	60.91	2.25	253.18
15.0	11.021	25.9	71.8	82.31	5.23	253.55
20.0	8.821	19.8	79.6	91.71	6.03	253.71
25.0	7.291	16.1	83.1	95.71	6.34	253.78
30.0	6.191	13.5	83.7	96.51	6.39	253.80
35.0	5.431	11.6	82.7	95.41	6.31	253.78
40.0	4.661	10.1	80.6	92.81	6.12	253.73
45.0	4.241	8.9	77.8	89.51	5.84	253.67
50.0	3.771	8.0	74.8	85.81	5.53	253.61
55.0	3.481	7.3	71.6	82.01	5.21	253.54
60.0	3.141	6.6	68.6	78.21	4.80	253.48
65.0	2.881	6.0	66.1	74.61	4.26	253.42
70.0	2.631	5.5	64.0	71.61	3.81	253.36
75.0	2.371	5.0	62.2	69.01	3.42	253.32
80.0	2.091	4.5	60.5	66.61	3.06	253.28
85.0	1.821	3.9	58.9	64.41	2.73	253.24
90.0	1.571	3.4	57.4	62.31	2.45	253.20
95.0	1.311	2.9	56.0	60.31	2.17	253.17
100.0	1.061	2.4	54.5	58.31	1.90	253.13
105.0	0.811	1.9	53.1	56.41	1.64	253.10
110.0	0.511	1.3	51.7	54.41	1.37	253.06
115.0	0.251	0.8	50.3	52.51	1.10	253.03
120.0	0.001	0.3	48.8	50.51	0.87	252.99

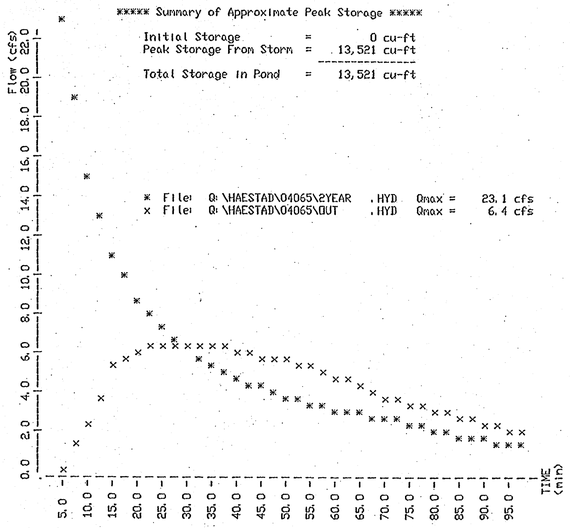
***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 23.11 cfs
Peak Outflow = 6.39 cfs
Peak Elevation = 253.80 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 13,521 cu-ft

Total Storage In Pond = 13,521 cu-ft



10 YEAR ROUTING

GIVEN POND DATA / INTERMEDIATE ROUTING COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
251.50	0.0	0	0.0	0.0
251.75	0.0	125	0.8	0.8
252.00	0.1	997	6.6	6.7
252.25	0.1	2,525	16.8	16.9
252.50	0.1	4,120	27.5	27.6
252.75	0.1	5,783	38.6	38.7
253.00	0.9	7,515	50.1	51.0
253.25	2.8	9,315	62.1	64.9
253.50	5.0	11,187	74.6	79.6
253.75	6.2	13,130	87.5	93.7
254.00	7.2	15,145	101.0	108.2
254.25	8.1	17,233	114.9	123.0
254.50	18.6	19,396	129.3	147.9
254.75	37.8	21,632	144.2	182.0
255.00	62.4	23,945	159.6	222.0
255.25	91.2	26,334	175.6	266.8
255.50	123.7	28,801	192.0	315.7
255.75	159.2	31,345	209.0	368.2

Time increment (t) = 5.0 min.

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.001	-----	0.0	0.01	0.00	251.50
5.0	30.821	30.8	30.6	30.81	0.10	252.57
10.0	19.841	50.7	71.0	81.31	5.14	253.53
15.0	14.671	34.5	91.5	105.51	7.02	253.95
20.0	11.741	26.4	102.3	117.91	7.79	254.16
25.0	9.711	21.5	106.9	123.81	8.42	254.26
30.0	8.231	17.9	107.1	124.91	8.88	254.27
35.0	7.121	15.4	106.3	122.41	8.07	254.24
40.0	6.231	13.4	103.9	119.61	7.90	254.19
45.0	5.551	11.8	100.3	115.61	7.65	254.13
50.0	5.001	10.6	96.1	110.91	7.36	254.05
55.0	4.581	9.6	91.7	105.71	7.03	253.96
60.0	4.201	8.8	87.1	100.41	6.67	253.87
65.0	3.861	8.1	82.6	95.21	6.30	253.77
70.0	3.521	7.4	78.2	90.01	5.88	253.68
75.0	3.141	6.7	74.0	84.91	5.45	253.59
80.0	2.801	5.9	69.8	79.91	5.03	253.51
85.0	2.461	5.3	66.4	75.11	4.33	253.42
90.0	2.121	4.6	63.6	71.01	3.72	253.35
95.0	1.741	3.9	61.1	67.51	3.18	253.29
100.0	1.401	3.1	58.8	64.21	2.71	253.24
105.0	1.061	2.5	56.7	61.31	2.30	253.18
110.0	0.721	1.8	54.6	58.41	1.92	253.13
115.0	0.341	1.1	52.6	55.71	1.54	253.08
120.0	0.001	0.3	50.6	52.91	1.16	253.03

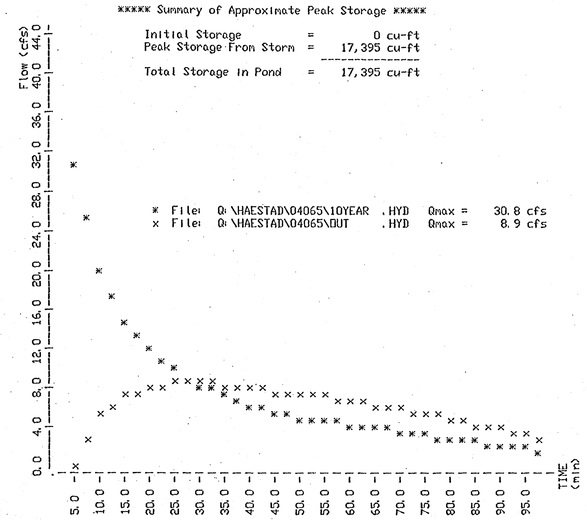
***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 30.82 cfs
Peak Outflow = 8.88 cfs
Peak Elevation = 254.27 ft

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

Initial Storage = 0 cu-ft
Peak Storage From Storm = 17,395 cu-ft

Total Storage In Pond = 17,395 cu-ft



File No. FL-6 Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 04065N01 Xref:

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SHEET 5 OF 11

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INCORPORATED
CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE, FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1301
WWW.WLPINC.COM

DRAWN: MRW, McLANE
DATE: 8-3-05
CO. REVISION: 12-12-05
SCALE: NOT TO SCALE

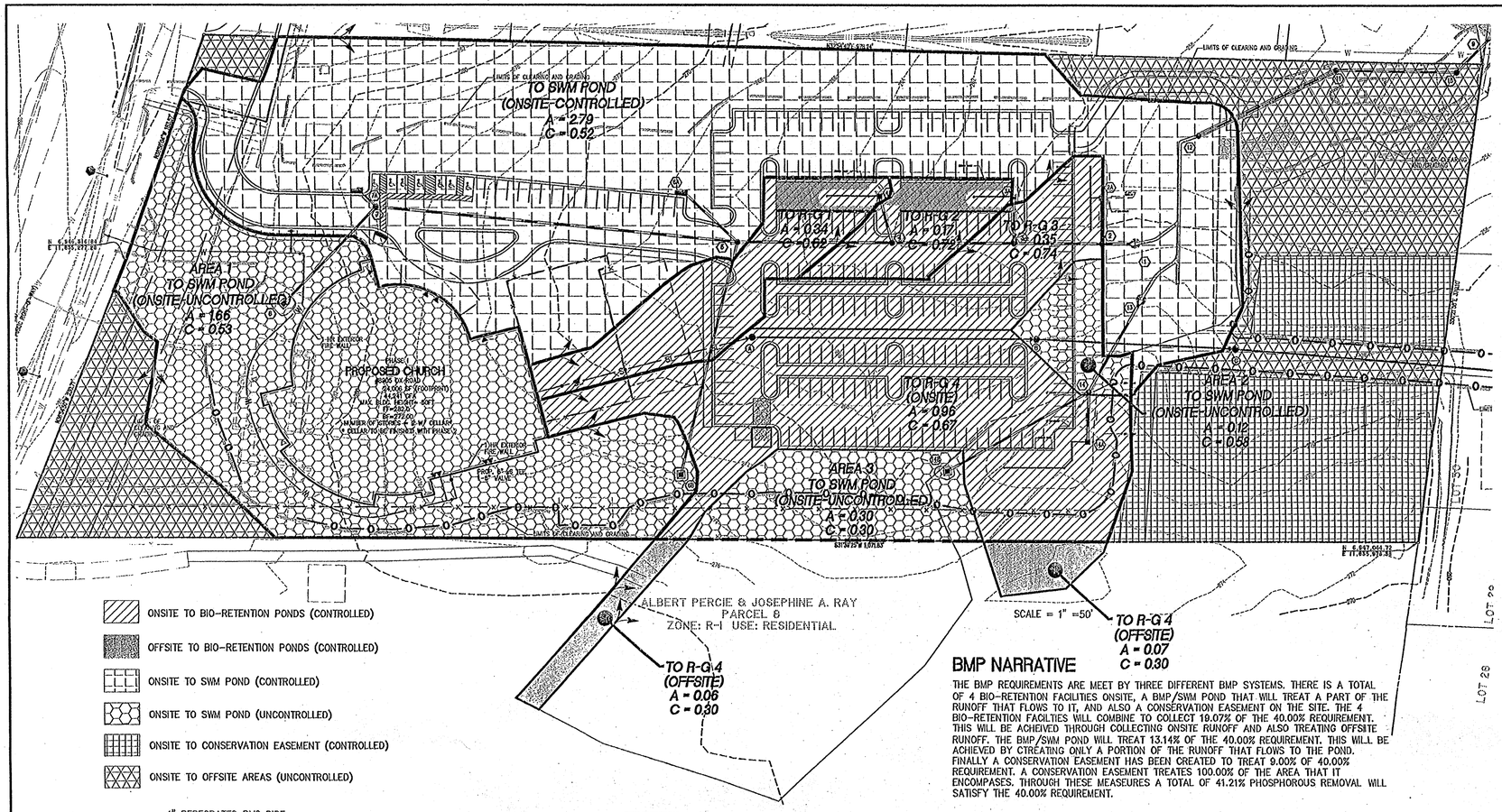
COMMONWEALTH OF VIRGINIA
CHARLES F. DOUGLAS
No. 13096
8/9/05
LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

STORMWATER MANAGEMENT CALCULATIONS

PROPOSED NEW HOPE CHURCH
MT. VERNON DISTRICT
FAIRFAX COUNTY, VIRGINIA



ONSITE TO BIO-RETENTION PONDS (CONTROLLED)

OFFSITE TO BIO-RETENTION PONDS (CONTROLLED)

ONSITE TO SWM POND (CONTROLLED)

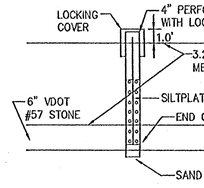
ONSITE TO SWM POND (UNCONTROLLED)

ONSITE TO CONSERVATION EASEMENT (CONTROLLED)

ONSITE TO OFFSITE AREAS (UNCONTROLLED)

BMP NARRATIVE

THE BMP REQUIREMENTS ARE MEET BY THREE DIFFERENT BMP SYSTEMS. THERE IS A TOTAL OF 4 BIO-RETENTION FACILITIES ONSITE, A BMP/SWM POND THAT WILL TREAT A PART OF THE RUNOFF THAT FLOWS TO IT, AND ALSO A CONSERVATION EASEMENT ON THE SITE. THE 4 BIO-RETENTION FACILTIES WILL COMBINE TO COLLECT 19.07% OF THE 40.00% REQUIREMENT. THIS WILL BE ACHEIVED THROUGH COLLECTING ONSITE RUNOFF AND ALSO TREATING OFFSITE RUNOFF. THE BMP/SWM POND WILL TREAT 13.14% OF THE 40.00% REQUIREMENT. THIS WILL BE ACHIEVED BY CTREATING ONLY A PORTION OF THE RUNOFF THAT FLOWS TO THE POND. FINALLY A CONSERVATION EASEMENT HAS BEEN CREATED TO TREAT 9.00% OF 40.00% REQUIREMENT. A CONSERVATION EASEMENT TREATES 100.00% OF THE AREA THAT IT ENCOMPASES. THROUGH THESE MEASEURES A TOTAL OF 41.21% PHOSPHOROUS REMOVAL WILL SATISFY THE 40.00% REQUIREMENT.



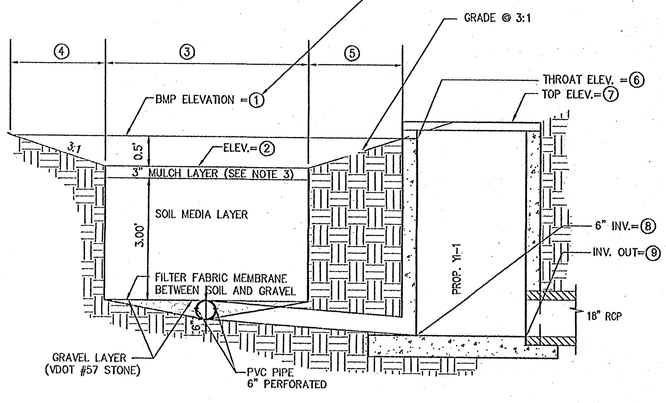
GENERAL MONITORING WELL DETAIL

N.T.S.

PLEASE NOTE THAT THE CIRCLED NUMBERS CORRESPOND TO THE CIRCLED NUMBERS ON THE DETAIL SHOWN BELOW.

BIO-RETENTION #	① BMP ELEV.	② MULCH ELEV.	③ WIDTH	④ SIDE WIDTH	⑤ SIDE WIDTH	⑥ THROAT ELEV.	⑦ TOP ELEV.	⑧ 6" INV.	⑨ 18" INV. OUT	⑩ LENGTH	⑪ 6" INV	⑫ 6" INV.
BIO-RETENTION 1	265.20	264.70	10'	5'	5'	265.20	266.03	260.29	259.51	42'	260.95	260.79
BIO-RETENTION 2	263.00	262.50	10'	5'	5'	263.00	263.83	258.14	257.88	32'	258.75	258.64
BIO-RETENTION 3	260.90	260.40	10'	5'	5'	260.90	261.73	256.43	256.33	57'	256.65	256.53
BIO-RETENTION 4	262.60	262.10	VARIES	5'	5'	262.60	263.43	257.82	257.72	82'	258.35	257.94

(@ SH. #14)

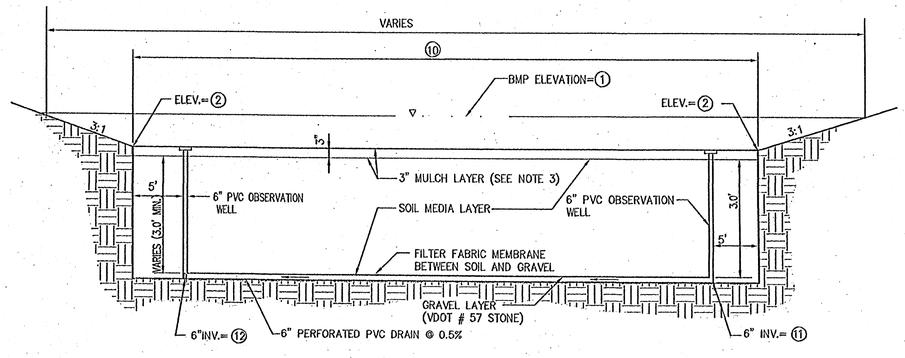


SECTION A-A

N.T.S.

NOTE: BMP FACILITY TO BE PRIVATELY OWNED AND MAINTAINED (A PRIVATE MAINTENANCE AGREEMENT SHALL BE REQUIRED)

BIO-RETENTION TYPICAL SECTIONS



SECTION B-B

N.T.S.

BMP FACILITY DESIGN CALCULATIONS

2. WATERSHED INFORMATION

#	SUBAREA DESIGNATION AND DESCRIPTION	"C"	ACRES
1.	ONSITE TO BIO-RETENTION #1	0.62	0.34
2.	ONSITE TO BIO-RETENTION #2	0.72	0.17
3.	ONSITE TO BIO-RETENTION #3	0.74	0.35
4.	ONSITE TO BIO-RETENTION #4	0.67	0.96
5.	ONSITE TO POND (NOT COVERED BY BIO-RENETION)	0.52	2.77
6.	ONSITE UNCONTROLLED (TO POND-AREA 1)	0.53	1.66
7.	ONSITE UNCONTROLLED (TO POND-AREA 2)	0.58	0.12
8.	ONSITE UNCONTROLLED (TO POND-AREA 3)	0.30	0.30
9.	ONSITE CONTROLLED (CONSERVATION EASEMENT)	0.30	0.88
10.	ONSITE UNCONTROLLED (OFFSITE)	0.32	1.33

3. WEIGHTED AVERAGE "C" FACTOR FOR THE SITE

(A) AREA OF THE SITE (SEE MAP BELOW) (a) 8.88 ACRES

(B)	SUBAREA DESIGNATION	"C"		ACRES		PRODUCT
1.	ONSITE TO BIO-RETENTION #1	0.62	*	0.34	=	0.21
2.	ONSITE TO BIO-RETENTION #2	0.72	*	0.17	=	0.12
3.	ONSITE TO BIO-RETENTION #3	0.74	*	0.35	=	0.26
4.	ONSITE TO BIO-RETENTION #4	0.67	*	0.96	=	0.64
5.	ONSITE TO POND (NOT COVERED BY BIO-RETENTION)	0.52	*	2.77	=	1.44
6.	ONSITE UNCONTROLLED (TO POND AREA-1)	0.53	*	1.66	=	0.88
7.	ONSITE UNCONTROLLED (TO POND AREA-2)	0.58	*	0.12	=	0.07
8.	ONSITE UNCONTROLLED (TO POND AREA-3)	0.30	*	0.30	=	0.09
9.	ONSITE UNCONTROLLED (CONSERVATION EASEMENT)	0.30	*	0.88	=	0.26
10.	ONSITE UNCONTROLLED (OFFSITE)	0.32	*	1.33	=	0.43
				(b) TOTAL =		4.39

(C) WEIGHTED AVERAGE "C" FACTOR (c)=(b)/(a) = 0.49

4. PHOSPHORUS REMOVAL FOR THE SITE

SUBAREA DESIGNATION (1)	BMP TYPE (2)	REMOVAL EFF. (%) (3)	AREA RATIO (4)	"C" FACTOR RATIO (5)	PRODUCT BMP SYSTEM (6)
1. BIO-RETENTION #1 (ONSITE)	65	X 0.34/8.88	= 0.04	X 0.62/0.49	= 3.30%
2. BIO-RETENTION #2 (ONSITE)	65	X 0.17/8.88	= 0.02	X 0.72/0.49	= 1.91%
3. BIO-RETENTION #3 (ONSITE)	65	X 0.35/8.88	= 0.04	X 0.74/0.49	= 3.93%
5. BIO-RETENTION #4 (ONSITE)	65	X 0.96/8.88	= 0.11	X 0.67/0.49	= 9.77%
6. BIO-RETENTION #4 (OFFSITE)	65	X 0.07/8.88	= 0.002	X 0.30/0.49	= 0.08%
7. BIO-RETENTION #4 (OFFSITE)	65	X 0.07/8.88(0.20)	= 0.002	X 0.30/0.49	= 0.08%
14. POND	40	X 2.79/8.88	= 0.31	X 0.52/0.49	= 13.14%
15. CONSERVATION EASEMENT	100	X 0.84/8.88	= 0.09	X 0.30/0.30	= 9.00%
				(a) TOTAL =	41.21%

5. DETERMINE COMPLIANCE WITH PHOSPHORUS REMOVAL REQUIREMENT

(A) SELECT REQUIREMENT (A) 40%

WATER SUPPLY OVERLAY DISTRICT (OCCOQUAN WATERSHED) = 50% (FAIRFAX COUNTY AND PRINCE WILLIAM COUNTY)

CHESAPEAKE BAY PRESERVATION AREA (NEW DEVELOPMENT) = 40% (FAIRFAX COUNTY) 50% (PRINCE WILLIAM COUNTY)

CHESAPEAKE BAY PRESERVATION AREA (REDEVELOPMENT) = [1-0.9X("I"pre/"I"post)] x 100 = ____

(B) IF LINE 4(A) 41.21% > LINE 5(A) 40.00% THEN PHOSPHOROUS REMOVAL REQUIREMENT IS SATISFIED.

6. WEIGHTED AVERAGE "C" FACTOR FOR THE BMP FACILITY

NOTE:
REFER TO THIS SHEET & 21 OF 40 FOR BIO-RETENTION DETAILS
REFER TO SHEET 19 OF 40 FOR STORM WATER/BMP POND DETAILS

PART 8: DETERMINE THE STORAGE REQUIRED FOR EACH POND #1

(A) EXTENDED DETENTION DRY POND
CHART A6-40 VALUE (APPENDIX 4-3) FOR BMP STORAGE PER ACRE
[4375 x "C") - 875] OR [31.25 x % IMP.] = (a) 919 CF/AC
* DESIGN 1 (48 HOUR DRAWDOWN)
6.67 x 919 = 6,129 CF

VI. OUTLET COMPUTATION

PART 9: DETERMINE THE REQUIRED ORIFICE SIZE FOR THE POND

(A) BMP STORAGE REQUIREMENT (S) FROM PART 8 (a) 6,129

(B) MAXIMUM HEAD (h) AT THE REQUIRED BMP STORAGE FROM THE ELEVATION-STORAGE CURVE FOR THE FACILITY (b) 1.80

(C) PEAK OUTFLOW RATE (Qp) AT THE MAXIMUM HEAD FOR A DRAWDOWN TIME OF 48 HRS [Qp = S/(0.5 x 3600 x 48)]
0.0000116 x LINE 9(a) 6,129 = (c) 0.07

(D) REQUIRED ORIFICE AREA (A) [A = Qp/(0.6 x (64.4 x h)$^{0.5}$)]
LINE 9(c) 0.07 / [0.6 x (64.4 x LINE 9(b) 1.80$^{0.5}$] (d) 0.011

(E) DIAMETER OF A CIRCULAR ORIFICE
2.0 x (LINE 9(d) 0.011/3.1415927) (e) 0.04

= 1" DIA.

WALTER L. PHILLIPS
INCORPORATED
CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE, FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1301 WWW.WLPINC.COM

DATE: 8-5-05, CO. REVS. 2-15-06
CO. REVISION 12-12-05
DRAWN: MRR, MCLANE
SCALE: AS SHOWN

COMMONWEALTH OF VIRGINIA
CHARLES E. DONLAP
No. 13039
8/5/05
LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	DATE	APPROVED	DATE

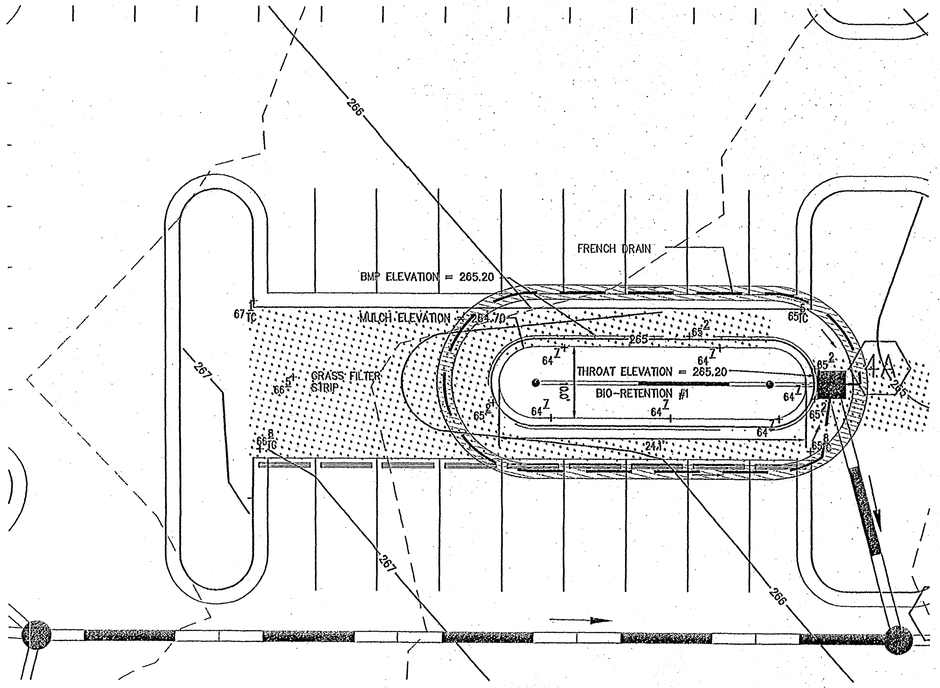
BEST MANAGEMENT COMPUTATIONS

PROPOSED NEW HOPE CHURCH
MT. VERNON DISTRICT
FAIRFAX COUNTY, VIRGINIA

File No. FL-6 Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 040658MP Xref:

FOR INFORMATION ONLY

BIO-RETENTION #1



6. WEIGHTED AVERAGE "C" FACTOR FOR THE BMP FACILITY

(A) AREA DRAINING TO THE BMP FACILITY (SEE MAP SHEET 16) (a) 0.34 ACRES

(B) SUBAREA DESIGNATION "C" ACRES PRODUCT

1. ONSITE TO BIO-RETENTION 0.62 X 0.34 = 0.21

(b) TOTAL = 0.21

(C) WEIGHTED AVERAGE "C" FACTOR (c)=(b)/(a) = 0.62

7. DETERMINE THE STORAGE REQUIREMENT FOR BMP FACILITY

1.0" STORAGE/IMP. AC.

(A) BIORETENTION AREA WITH 65% PHOSPHORUS REMOVAL (5% OF IMPERVIOS AREA)

BIO-RETENTION 0.05 * 7,841 SF =392.0 SF (400 SF)

B) SURFACE VOLUME ABOVE FILTER:

SURFACE AREA OF BIORETENTION FILTER = 400 SF

BIO-RETENTION

ELEVATION	VOLUME
261.45	0
264.70	1,300 CF
265.20	1,538 CF

8. OUTFLOW COMPUTATIONS:

RAIN GARDEN 0.08 FT x 0.34 AC x 0.62 x 43,560 SF/AC = 735 CF

BMP STORAGE OUTFLOW IS THROUGH THE BIORETENTION AREA FACILITY. OUTFLOW FROM THE FACILITY IS THROUGH A 6" PVC PERFORATED DRAIN IN THE BOTTOM OF THE FILTER, WHICH DISCHARGES INTO STORM STRUCTURE 4A, AND IS DESIGNED TO DRAIN COMPLETELY WITHIN 48 HOURS OR LESS. THE 6" PVC PIPE HAS 1/2" HOLES ON EACH SIDE OF THE PIPE

FOR 1/2" DIA HOLE, $Q = CA\sqrt{(2gh)}$

$(0.60)(0.00136)\sqrt{(64.4)(3.75-.25)}$

$(0.60)(0.00136)(15.53) = 0.013$

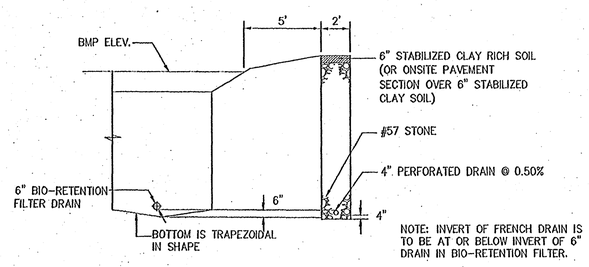
$= 0.013$ CFS / HOLE

4 SETS OF 2 HOLES ON CENTER EVERY 8'

735 CF / 0.013 CFS/hole x 8 HOLES = DRAW DOWN TIME

2.0 HOURS = DRAW DOWN TIME

h=THE HEIGHT (IN FEET) FROM THE BMP ELEVATION TO THE CENTERLINE OF THE 6" BMP PIPE. THE 1/2" DIAMETER HOLE WILL BE LOCATED ON THE CENTERLINE OF THE 6" PVC PIPE



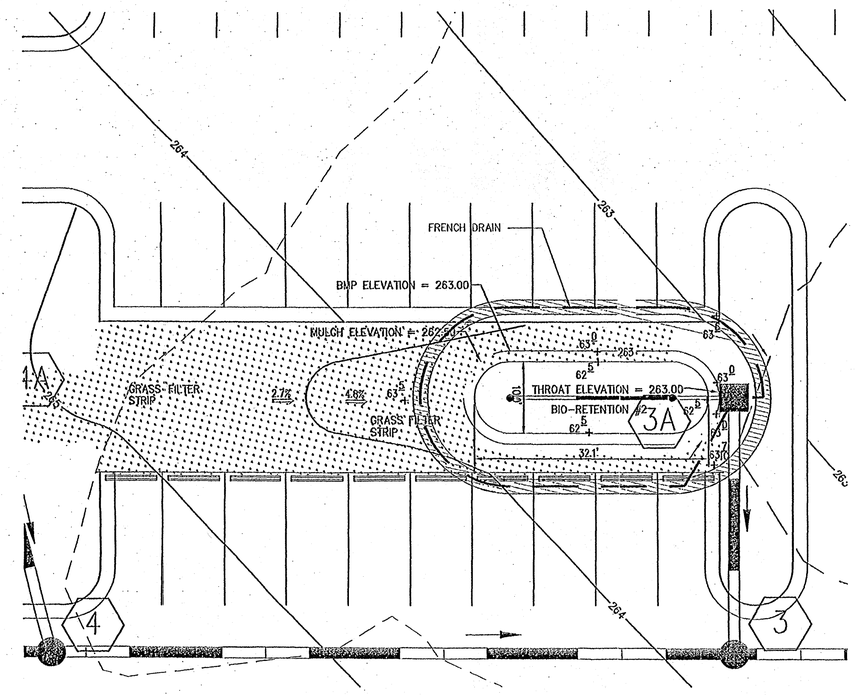
NOTE: INVERT OF FRENCH DRAIN IS TO BE AT OR BELOW INVERT OF 6" DRAIN IN BIO-RETENTION FILTER.

FRENCH DRAIN DETAIL*

N.T.S.

* SEE GEOSPECS, SHEET 22

BIORETENTION #2



6. WEIGHTED AVERAGE "C" FACTOR FOR THE BMP FACILITY

(A) AREA DRAINING TO THE BMP FACILITY (SEE MAP SHEET 16) (a) 0.17 ACRES

(B) SUBAREA DESIGNATION "C" ACRES PRODUCT

1. ONSITE TO BIO-RETENTION 0.72 X 0.17 = 0.12

(b) TOTAL = 0.12

(C) WEIGHTED AVERAGE "C" FACTOR (c)=(b)/(a) = 0.72

7. DETERMINE THE STORAGE REQUIREMENT FOR BMP FACILITY

1.0" STORAGE/IMP. AC.

(A) BIORETENTION AREA WITH 65% PHOSPHORUS REMOVAL (5% OF IMPERVIOS AREA)

BIO-RETENTION 0.05 * 5,213 SF =261 SF (300 SF)

B) SURFACE VOLUME ABOVE FILTER:

SURFACE AREA OF BIORETENTION FILTER = 300 SF

BIO-RETENTION

ELEVATION	VOLUME
259.25	0
262.50	975 CF
263.00	1,115 CF

8. OUTFLOW COMPUTATIONS:

RAIN GARDEN 0.08 FT x 0.17 AC x 0.72 x 43,560 SF/AC = 427 CF

BMP STORAGE OUTFLOW IS THROUGH THE BIORETENTION AREA FACILITY. OUTFLOW FROM THE FACILITY IS THROUGH A 6" PVC PERFORATED DRAIN IN THE BOTTOM OF THE FILTER, WHICH DISCHARGES INTO STORM STRUCTURE 3A, AND IS DESIGNED TO DRAIN COMPLETELY WITHIN 48 HOURS OR LESS. THE 6" PVC PIPE HAS 1/2" HOLES ON EACH SIDE OF THE PIPE

FOR 1/2" DIA HOLE, $Q = CA\sqrt{(2gh)}$

$(0.60)(0.00136)\sqrt{(64.4)(3.75-.25)}$

$(0.60)(0.00136)(15.53) = 0.013$

$= 0.013$ CFS / HOLE

2 SETS OF 2 HOLES ON CENTER EVERY 11'

427 CF / 0.013 CFS/hole x 4 HOLES = DRAW DOWN TIME

2.3 HOURS = DRAW DOWN TIME

h=THE HEIGHT (IN FEET) FROM THE BMP ELEVATION TO THE CENTERLINE OF THE 6" BMP PIPE. THE 1/2" DIAMETER HOLE WILL BE LOCATED ON THE CENTERLINE OF THE 6" PVC PIPE

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(703) 532-6163 FAX (703) 533-1371

DATE: 8-5-05, CO. REVS. 2-15-06
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DRAWN: MENG MALAVE
SCALE: 1"=10'

COMMONWEALTH OF VIRGINIA
CHARLES F. DUNLAP
No. 13098
5/9/18
LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

BEST MANAGEMENT COMPUTATIONS

PROPOSED NEW HOPE CHURCH

MT. VERNON DISTRICT

FAIRFAX COUNTY, VIRGINIA

File No. FL-6 Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 04065N01 Xref:

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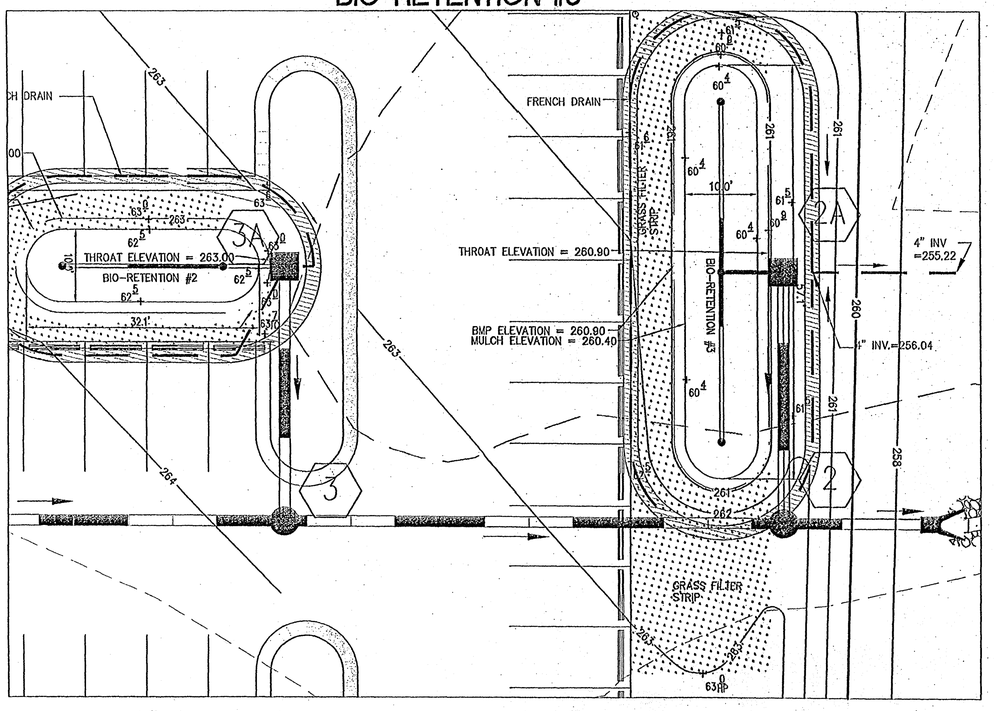
BIO-RETENTION #3



6. WEIGHTED AVERAGE "C" FACTOR FOR THE BMP FACILITY

(A) AREA DRAINING TO THE BMP FACILITY (SEE MAP SHEET 16) (a) 0.35 ACRES

(B) SUBAREA DESIGNATION "C" ACRES PRODUCT

1. ONSITE TO BIO-RETENTION 0.74 X 0.35 = 0.26

(b) TOTAL = 0.26

(C) WEIGHTED AVERAGE "C" FACTOR (c)=(b)/(a) = 0.74

7. DETERMINE THE STORAGE REQUIREMENT FOR BMP FACILITY

1.0" STORAGE/IMP. AC.

(A) BIORETENTION AREA WITH 65% PHOSPHORUS REMOVAL (5% OF IMPERVIOS AREA)

BIO-RETENTION 0.05 * 10,672 SF =533 SF (550 SF)

B) SURFACE VOLUME ABOVE FILTER:

SURFACE AREA OF BIORETENTION FILTER = 550 SF

BIO-RETENTION

ELEVATION	VOLUME
257.15	0
260.40	1,788 CF
260.90	2,112 CF

8. OUTFLOW COMPUTATIONS:

RAIN GARDEN 0.08 FT x 0.35 AC x 0.74 x 43,560 SF/AC = 903 CF

BMP STORAGE OUTFLOW IS THROUGH THE BIORETENTION AREA FACILITY. OUTFLOW FROM THE FACILITY IS THROUGH A 6" PVC PERFORATED DRAIN IN THE BOTTOM OF THE FILTER, WHICH DISCHARGES INTO STORM STRUCTURE 2A, AND IS DESIGNED TO DRAIN COMPLETELY WITHIN 48 HOURS OR LESS. THE 6" PVC PIPE HAS 1/2" HOLES ON EACH SIDE OF THE PIPE

FOR 1/2" DIA HOLE, $Q = CA\sqrt{(2gh)}$

$(0.60)(0.00136)\sqrt{(64.4)(4.75-.25)}$

$(0.60)(0.00136)(15.53) = 0.013$

=0.013 CFS / HOLE

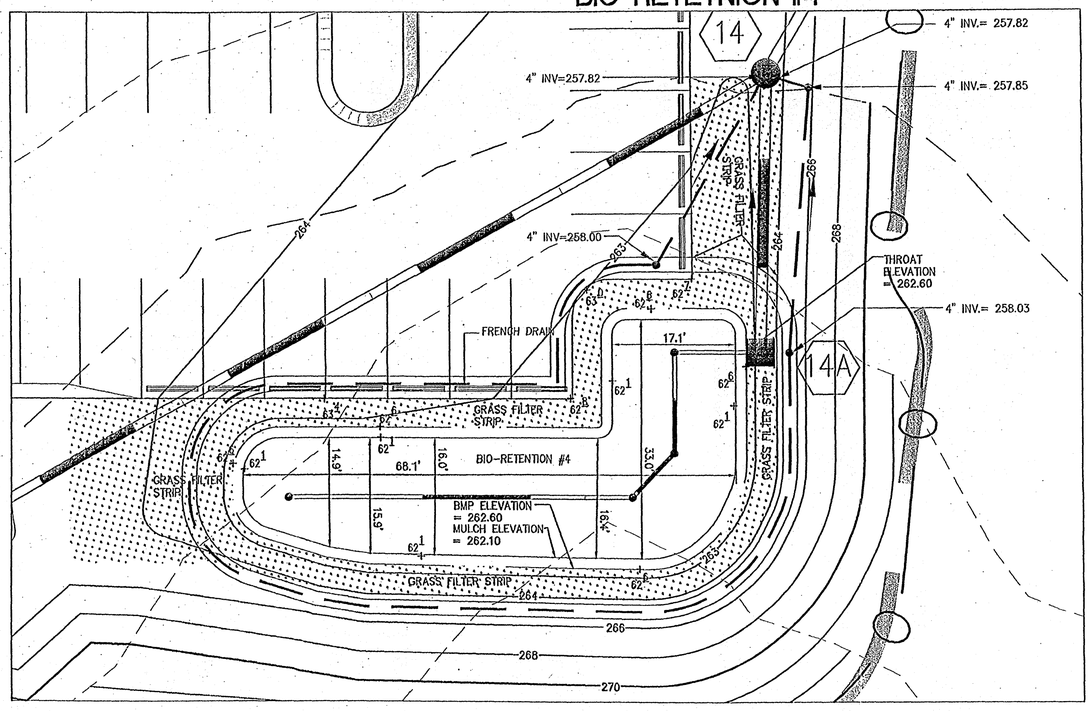
5 SETS OF 2 HOLES ON CENTER EVERY 12'

903 CF / 0.013 CFS/hole x 10 HOLES = DRAW DOWN TIME

1.9 HOURS = DRAW DOWN TIME

h=THE HEIGHT (IN FEET) FROM THE BMP ELEVATION TO THE CENTERLINE OF THE 6" BMP PIPE. THE 1/2" DIAMETER HOLE WILL BE LOCATED ON THE CENTERLINE OF THE 6" PVC PIPE

BIO-RETETNION #4



6. WEIGHTED AVERAGE "C" FACTOR FOR THE BMP FACILITY

(A) AREA DRAINING TO THE BMP FACILITY (SEE MAP SHEET 16) (a) 1.09 ACRES

(B) SUBAREA DESIGNATION "C" ACRES PRODUCT

1. ONSITE TO BIO-RETENTION 0.67 X 0.96 = 0.64
2. OFFSITE TO BIO-RETENTION 0.30 X 0.13 = 0.04

(b) TOTAL = 0.68

(C) WEIGHTED AVERAGE "C" FACTOR (c)=(b)/(a) = 0.62

7. DETERMINE THE STORAGE REQUIREMENT FOR BMP FACILITY

1.0" STORAGE/IMP. AC.

(A) BIORETENTION AREA (RAIN GARDEN) WITH 65% PHOSPHORUS REMOVAL (5% OF IMPERVIOS AREA)

BIO-RETENTION 0.05 * 25,700 SF =1,285 SF (1,300 SF)

B) SURFACE VOLUME ABOVE FILTER:

SURFACE AREA OF BIORETENTION FILTER = 1,300 SF

BIO-RETENTION

ELEVATION	VOLUME
259.35	0
262.60	1,560 CF *
263.10	2,398 CF

* 40% VOIDS ASSUMED FOR SOILS MEDIA AND NO STORAGE ASSUME FOR MULCH LAYER

8. OUTFLOW COMPUTATIONS:

RAIN GARDEN 0.08 FT x 1.09 AC x 0.62 x 43,560 SF/AC = 2,355 CF < 2,394 CF*

* STORAGE CAPACITY OK

BMP STORAGE OUTFLOW IS THROUGH THE BIORETENTION AREA FACILITY. OUTFLOW FROM THE FACILITY IS THROUGH A 6" PVC PERFORATED DRAIN IN THE BOTTOM OF THE FILTER, WHICH DISCHARGES INTO STORM STRUCTURE 14A, AND IS DESIGNED TO DRAIN COMPLETELY WITHIN 48 HOURS OR LESS. THE 6" PVC PIPE HAS 1/2" HOLES ON EACH SIDE OF THE PIPE

FOR 1/2" DIA HOLE, $Q = CA\sqrt{(2gh)}$

$(0.60)(0.00136)\sqrt{(64.4)(3.75-.25)}$

$(0.60)(0.00136)(16.01) = 0.013$

=0.013 CFS / HOLE

9 SETS OF 2 HOLES ON CENTER EVERY 8'

2355 CF / 0.013 CFS/hole x 18 HOLES = DRAW DOWN TIME

2.8 HOURS = DRAW DOWN TIME

h=THE HEIGHT (IN FEET) FROM THE BMP ELEVATION TO THE CENTERLINE OF THE 6" BMP PIPE. THE 1/2" DIAMETER HOLE WILL BE LOCATED ON THE CENTERLINE OF THE 6" PVC PIPE

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CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE, FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1301 WWW.WLPINC.COM

DATE: 6-5-05, CO. REVS. 2-15-06
CO. REVISION 12-12-05
DRAWN: MRW, McLANE
SCALE: 1"=10'

COMMONWEALTH OF VIRGINIA
CHARLES F. DUNCAN
No. 13939
7/5/05
LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

BEST MANAGEMENT COMPUTATIONS

PROPOSED NEW HOPE CHURCH

MT. VERNON DISTRICT

FAIRFAX COUNTY, VIRGINIA

File No. FL-6 Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 04065N01 Xref:

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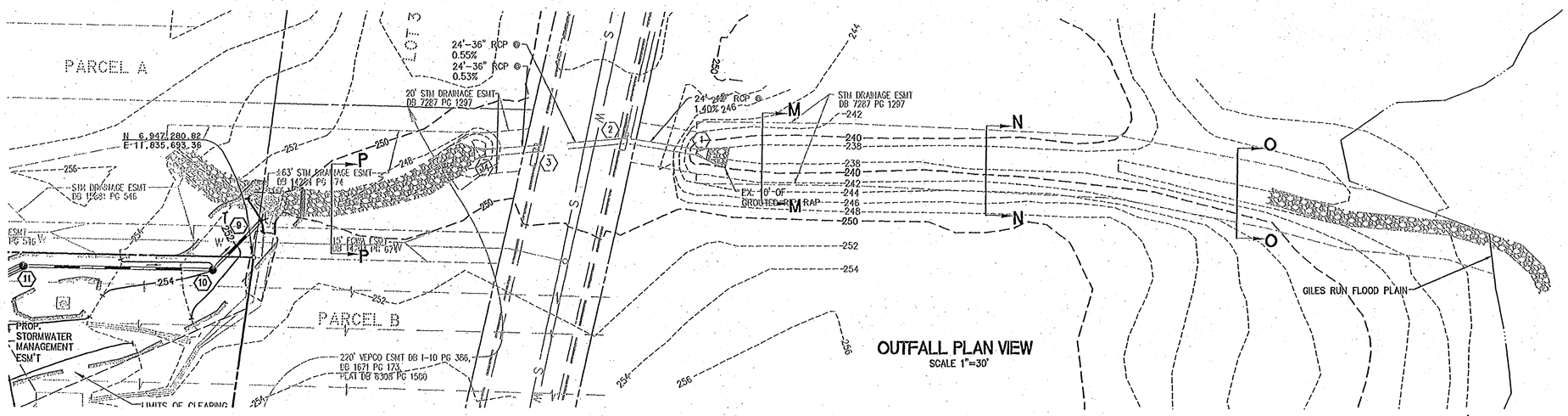
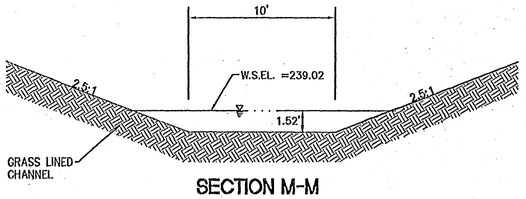
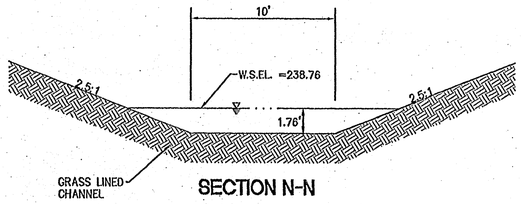


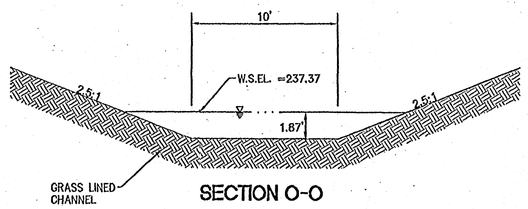
OUTFALL PLAN VIEW
SCALE 1"=30'



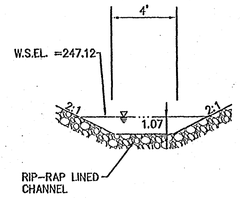
SECTION M-M
SCALE 1"=5' (H. AND V.)
Q_2 = 59.06 CFS
Q_{10} = 72.11 CFS
Q_{CAP} = 800 CFS
S = 0.010 FT/FT
N = 0.050 *
D = 1.52 FT
V_2 = 3.12 FT/S < 4.00 FT/S**
V_{10}= 3.32 FT/S
A = 21.73 SF
TOP WIDTH = 17.81 FT
CRITICAL DEPTH = 1.07 FT



SECTION N-N
SCALE 1"=5' (H. AND V.)
Q_2 = 69.92 CFS
Q_{10} = 90.00 CFS
Q_{CAP} = 800 CFS
S = 0.010 FT/FT
N = 0.050*
D = 1.76 FT
V_2 = 3.29 FT/S < 4.00 FT/S**
V_{10} = 3.54 FT/S
A = 25.19 SF
TOP WIDTH = 18.81 FT
CRITICAL DEPTH = 1.22 FT



SECTION O-O
SCALE 1"=5' (H. AND V.)
Q_2 = 77.69 CFS
Q_{10} = 100.00 CFS
Q_{CAP} = 800 CFS
S = 0.010 FT/FT
N = 0.050*
D = 1.87 FT
V_2 = 3.39 FT/S <4.00 FT/S**
V_{10}= 3.66 FT/S
A = 27.35 SF
TOP WIDTH = 19.33 FT
CRITICAL DEPTH = 1.30 FT



SECTION P-P
SCALE 1"=5' (H. AND V.)
Q_2 = 24.47 CFS
Q_{10} = 32.67 CFS
S = 0.020 FT/FT
N = 0.035
D = 1.07 FT
V_2 = 4.56 FT/S
V_{10}= 4.95 FT/S
A = 6.59 SF
TOP WIDTH = 8.29 FT
CRITICAL DEPTH = 1.06 FT

ADEQUATE OUTFALL NARRATIVE

DISCHARGES FORM THIS DEVELOPMENT ARE EITHER NON-CONCENTRATED SHEET FLOW OR INTO AN EXISTING RIP RAP CHANNEL WITHIN A RECORDED DRAINAGE EASEMENT IN PARCEL B, SECTION 6, CROSSPOINTE. THE NON-CONCENTRATED FLOWS ARE ALSO TO CROSSPOINTE. THE POST-DEVELOPMENT FLOWS FROM THE PROPERTY ARE LESS THAN THE PRE-DEVELOPMENT RATES DUE TO THE ONSITE DETENTION PROGRAM. ONCE ENTERING CROSSPOINTE, THESE FLOWS ARE COLLECTED IN AN EXISTING STORM DRAINAGE PIPE SYSTEM IN CROSS CHASE CIRCLE. FLOWS FROM THIS PIPE SYSTEM ARE THEN DISCHARGE INTO A WELL DEFINED RIP RAP AND GRASS CHANNEL LOCATED WITHIN AN EXISTING RECORDED DRAINAGE EASEMENT ESTABLISHED AS PART OF THE CROSSPOINTE DEVELOPMENT. THIS CHANNEL CONVEYS THE FLOWS TO THE GILES RUN FLOOD PLAIN. PHOTOGRAPHS OF THESE CHANNELS ARE INCORPORATED INTO THESE PLANS ON SHEET 24.

CROSS-SECTION P-P RELATES TO THE EXISTING RIP RAP CHANNEL BETWEEN PROPOSED STRUCTURE 9 AND CROSS CHASE CIRCLE. THE 2 YEAR STORM VELOCITY IS 4.8 FPS, WHICH IS AN ALLOWABLE VELOCITY FOR A RIP RAP CHANNEL; AND, THE 10 YEAR STORM FLOW IS CONTAINED WITHIN THE LIMITS OF THE CHANNEL. THIS CHANNEL MEETS THE DEFINITION OF A BED AND BANK CHANNEL.

CALCULATIONS FOR THE EXISTING STORM PIPE SYSTEM UNDER CROSS CHASE CIRCLE ARE INCLUDED IN THE PLAN ON THIS SHEET; AND. THESE CALCULATION DEMONSTRATE THAT THE PIPE SYSTEM IS ADEQUATE TO CONVEY THE 10-YEAR STORM FLOWS.

CROSS – SECTIONS M-M, N-N AND O-O PERTAIN TO THE GRASS LINED DITCH BETWEEN CROSS CHASE CIRCLE AND THE GILES RUN FLOOD PLAIN, CONSTRUCTED WITH THE CROSSPOINTE PROJECT (CROSS-SECTION M-M CORRESPONDS TO CROSS – SECTION B-B IN THE RECENTLY APPROVED PLANS FOR REMINGTON PLACE, PLAN #8733-SD-001.) THESE CROSS – SECTIONS DEMONSTRATE THAT THE 2 YEAR STORM VELOCITIES ARE ALL 3.5 fps OR LESS, WHICH IS LESS THAN THE ALLOWABLE VELOCITY OF 4.0 fps SPECIFIED IN PFM 6-1004.1A FOR A DESIGNED GRASS-LINED DITCH; AND THE 10 YEAR STORM FLOWS ARE CONTAINED ENTIRELY WITHIN THE LIMITS OF THE CHANNEL. THIS CHANNEL MEETS THE DEFINITION OF A BED AND BANKS CHANNEL.

BASED ON THE CALCULATIONS CONTAINED IN THE PLAN, SUPPLEMENTED BY A REVIEW OF THE FIELD CONDITIONS, IT IS THE SUBMITTING ENGINEER'S OPINION THAT THE RECEIVING CHANNELS ARE ADEQUATE; AND, THESE WILL BE NO ADVERSE IMPACT RESULTING FROM THE REDUCED DRAINAGE FLOWS GENERATED BY THIS DEVELOPMENT.

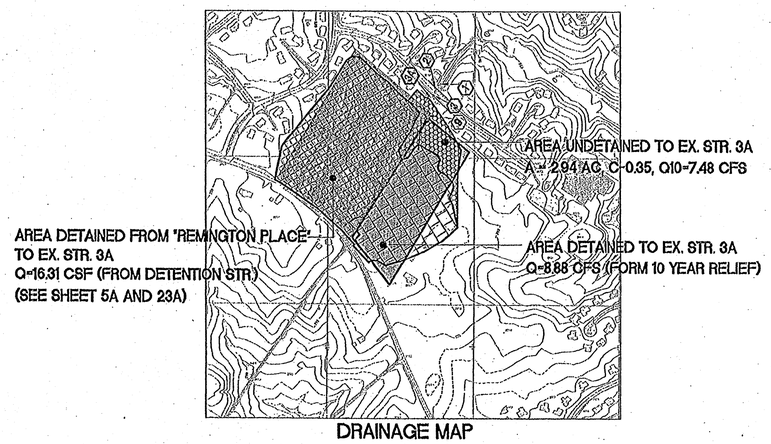
OVERLAND RELIEF NARRATIVE

IN THE EVENT OF A TOTAL STORM SEWER FAILURE THE RUNOFF WILL RUN FROM THE WESTERN SIDE OF THE SITE THROUGH THE PARKING LOT AREA DOWN TO THE POND. THE FLOW WILL CONTINUE TOWARDS THE EASTERN SIDE OF THE SITE WHERE IT WILL ENTER AN EXISTING STORM EASEMENT ON THE NORTH EASTERN SIDE OF THE SITE.

ALL DRAINAGE FLOWS ARE DIRECTED AWAY FROM THE PROPOSED BUILDING AND TOWARDS THE PARKING LOT AND PROPOSED INLETS.

IT IS THE SUBMITTING ENGINEER'S OPINION THAT THE BUILDING WILL NOT FLOOD IN THE EVENT OF A TOTAL STORM SEWER FAILURE, AND THE 100 YEAR OUTFALL IS ADEQUATE.

OUTFALL PROFILE VIEW
SCALE
1"=5' (H)
1"=5' (V)



DRAINAGE MAP

NOTE:

* "N" VALUE FROM APPROVED PLAN # 8733-SD-01-2 REMINGTON PLACE OUTFALL CHANNEL IS A GRASSED LINED CHANNEL

** BASED ON PFM 6-1004.1A

NOTES:

THE MAXIMUM DESIGN VELOCITY OF DISCHARGES SHALL BE NO GREATER THAN 4 FT/S. SWALES, DITCHES AND CHANNELS EXCEEDING THIS WILL REQUIRE SPECIAL LININGS.

STORM SEWER CALCULATIONS

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 ELEV'S UPPER END	INVERT ELEV'S LOWER END	LENGTH FT.	SLOPE FT./FT.	MANNING'S 'n'	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.
3A	3	26.57	0.35	9.30	9.30	5.00	7.27	32.67*	242.66	241.38	24	0.053	0.013	36	153.55	17.26	1.39
3	2	11.000	0.45	4.95	14.25	5.00	7.27	68.66	241.23	239.14	38	0.055	0.013	36	156.42	21.41	1.77
2	1	1.180	0.45	0.53	14.78	5.00	7.27	72.51	238.66	238.23	30	0.014	0.013	42	119.04	12.98	2.31

* AREA DETAINED TO EX. STR.3A FORM POND 10 YEAR ROUTING = 8.88 CFS
AREA DETAINED FORM REMINGTON PLACE TO EX. STR. 3A=16.31 CFS
AREA UNDETAINED TO EX. STR.3A =2.94 AC, C=0.35, Q10=7.48 CFS
TOTAL RUNOFF TO EXISTING STRUCTURE 3A AFTER DEVELOPMENT IS 8.88 CFS + 16.31 CFS +7.48 CFS =32.67 CFS (REDUCE 17.75%
COMPARE WITH REMINGTON PLACE (PLAN # 8733-SD-001) (SEE SHEET 25A)

EX. TWIN 36" CULVER COMPUTATIONS-25 YEAR STORM FOR STR. 3A

Project PROPOSED NEW HOPE CHURCH — Plan Sheet No. — Designer — Sheet — of — Rev. Date — Date 2-15-06

HYDROLOGICAL DATA:
D.A.=4.49* AC.
* FROM STORM SEWER COMPUTATION 10 YEAR RUNOFF = 32.67 CFS
Q = 33.67, FOR 10 YR. I = 7.27, AC=32.67 / 7.27= 4.49
(SEE STORM SEWER COMPUTATION THIS SHEET)

AHW Controls — STATION
100YR FLOOD PLAIN — ELEV.
DESIGN AHW DEPTH — ELEV.
STRUCTURES — ELEV.
FREQ. — TW ELEV.

TOP OF CURB ELEV. 248.98 — ℄ ELEV 249.00 — SKEW — COVER
INV. EL 242.66 — So= 5.3% — INV. EL 241.38
ORIG. GR. ELEV. N/A — L= 24 — ORIG. GR. ELEV. N/A

DISCHARGE'S USED: Q25 YR= 37.13 CFS; Q= CFS; Q= CFS; Q= CFS; Q= CFS
RISK ASSESSMENT — ADT
DETOURS AVAILABLE — LENGTH
OVER TOPPING STAGE
FLOOD PLAIN MANAGEMENT
CRITERIA AND SIGNIFICANT IMPACT

CULVERT TYPE & SIZE	Q	Q/B	HW/D (INLET CONT.)	HW (INLET CONT.)	Ke (OUTLET CONTROL)	dc	(dc+D)/2	ho	H	LSo	HW	CONT. HW ELEV.	VELOCITY (OUTLET CONTROL)	CFS	END TREAT.	COMMENTS
EX. 36" RCP CULVERT	37.13	N/A	0.98	2.94								245.60		17.91		

NOTE: 36" PIP CULVERTS ARE ADEQUATE TO CARRY 25 YEAR DESIGN FLOW WITHOUT OVER TOPPING

DESIGN FLOOD EXCEED. PROB — ELEV.
OVERTOP FLOOD EXCEED. PROB — ELEV.
BASE FLOOD 1% EXCEED. PROB — ELEV.

WALTER L. PHILLIPS
INCORPORATED
CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1801 WWW.WLPINC.COM

DATE: 8-5-05, 03, REVS. 2-15-06
DR. BERGER 12-2-05 — DRAWN: MSK, McLANE
SCALE AS SHOWN

COMMONWEALTH OF VIRGINIA — CHARLES F. DUNLAP — No. 12039 — 8/5/05 — LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	DATE	APPROVED	DATE

ADEQUATE OUTFALL ANALYSIS

PROPOSED NEW HOPE CHURCH
MT. VERNON DISTRICT
FAIRFAX COUNTY, VIRGINIA

File No. FL-6 Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 040650UTFALL Xref:

FOR INFORMATION ONLY

STORM DRAIN DESIGN COMPUTATIONS

FROM	TO	DRAIN. AREA (ACRES)	RUNOFF COEF. C	C xA INCR.	C xA ACCUM	TIME OF CONCENTRATION: to TO PIPE (min.)	TIME IN PIPE (sec.)	TIME	I	Q (cfs) INCR (c.f.s.)	Q (cfs) ACCUM (c.f.s.)	DESIGN: PIPE DIA. In	SLOPE Ft/Ft	"n"	MAX Q (c.f.s.)	VEL Ft/Sec	PROFILE: LENGTH Ft	FALL Ft	UPPER INV	LOWER INV
17	16	0.26	0.35	0.091	0.091	5	-	5	7.27	0.66	0.66	FROM OFFSITE								
-	-	0.19	0.30	0.057	0.148	5	-	5	7.27	0.41	1.07	15	0.0050	0.013	4.68	3.04	30.00	0.15	283.25	283.10
16	15	0.17	0.70	0.119	0.267	5	-	5	7.27	0.87	1.94	15	0.0050	0.013	4.68	3.67	32.00	0.16	282.85	282.69
15	14	0.17	0.70	0.119	0.386	5	-	5	7.27	0.87	2.80	15	0.0580	0.013	15.65	9.61	107.00	6.19	282.44	276.25
14	13	0.39	0.30	0.117	0.503	5	-	5	7.27	0.85	3.65	15	0.0354	0.013	12.81	8.67	120.00	4.25	276.60	271.75
12B	12A	1.15	0.30	0.345	0.848	5	-	5	7.27	2.50	6.16	18	0.0300	0.013	18.24	9.30	14.50	0.44	268.57	268.07
12	11	1.97	0.30	0.591	1.439	5	-	5	7.27	4.30	10.46	18	0.0116	0.013	11.34	7.27	136.00	1.58	256.00	254.42
11	10	0.43	0.30	0.129	1.568	5	-	5	7.27	0.94	11.40	21	0.0309	0.013	27.86	10.49	54.00	1.67	254.17	252.50
9	8	1.66	0.35	0.581	0.581	5	-	5	7.27	4.22	4.22	FROM OFFSITE								
-	-	0.07	0.30	0.021	0.602	5	-	5	7.27	0.15	4.37	15	0.0799	0.013	18.65	12.22	170.00	10.47	281.59	268.60
8	7	0.92	0.35	0.322	0.924	5	-	5	7.27	2.34	6.72	FROM OFFSITE								
-	-	1.85	0.35	0.648	1.572	5	-	5	7.27	4.71	11.43	21	0.0060	0.013	13.26	5.80	186.00	1.12	267.60	266.38
7A	7	0.55	0.50	0.275	0.275	5	-	5	7.27	2.00	2.00	15	0.0050	0.013	4.68	3.60	32.00	0.16	275.75	275.59
7	6	0.65	0.55	0.358	2.204	5	-	5	7.27	2.60	16.03	21	0.0300	0.013	32.40	11.65	249.00	10.35	266.13	255.65
6A	6	0.75	0.35	0.263	0.263	5	-	5	7.27	1.91	1.91	FROM OFFSITE								
-	-	1.57	0.33	0.518	2.985	5	-	5	7.27	3.77	5.68	18	0.0050	0.013	7.43	4.66	90.00	0.45	259.60	259.15
6	5	0.56	0.45	0.252	3.238	5	-	5	7.27	1.83	23.54	24	0.0116	0.013	24.33	8.98	32.00	0.37	258.40	258.03
5	4	0.57	0.60	0.285	3.523	5	-	5	7.27	2.07	25.61	24	0.0150	0.013	27.71	10.02	108.00	1.62	257.63	256.01
4	3	0.50	0.55	0.275	3.798	5	-	5	7.27	2.00	27.61	24	0.0251	0.013	35.83	12.66	114.00	2.86	256.06	253.20
2	1	0.84	0.35	0.294	5.660	FROM DETENTION COMPUTATIONS					16.31	24	0.0089	0.013	21.38	7.46	58.00	0.59	251.78	251.28

OUTFALL NARRATIVE

THE SUBJECT PROPERTY DRAINS FROM WEST TO EAST INTO AN ON-SITE STORM DRAINAGE SYSTEM AND DRY DETENTION POND. DEVELOPMENT OF THE SITE WILL GENERALLY HONOR THESE DRAINAGE PATTERNS. THE DETENTION POND WILL DISCHARGE INTO AN OPEN CHANNEL AND CULVERT SYSTEM IN CROSSPOINTE CONSISTING OF 36" AND 42" R.C.P.S., THEN INTO A WELL-DEFINED, STABILIZED CHANNEL WHICH OUTFALLS INTO GILES RUN AND ITS FLOODPLAIN.

THE EXISTING STORM SYSTEM AT CROSS CHASE CIRCLE HAS BEEN ANALYZED AS FOLLOWS:

Q10 TO EXISTING 36" PIPE AT CROSS CHASE CIRCLE (EX. STRUCTURE # 3A) = Q10 DISCHARGED FROM THE ON-SITE DETENTION POND = 16.31 CFS PLUS REMAINING SHED TO EXISTING 36" OR 10.8 ACRES OF OFF-SITE + 0.5 ACRES OF ON-SITE UNCONTROLLED = 11.3 ACRES X 5.92 X 0.35 = 23.41 CFS + 16.31 CFS = 39.72 CFS.

THE ORIGINAL SHED TO EX. STRUCTURE # 3A, AS OBTAINED FROM THE DEWBERRY & DAVIS PLANS FOR "CROSSPOINTE, SEC. 16," = 19.74 ACRES WITH A Q10 OF 43.35 CFS. THE RUNOFF TO EX. STRUCTURE # 3A HAS THEREFORE BEEN REDUCED BY 3.64 CFS OR BY 8.4%. THE ADDITIONAL AREA TO THE EXISTING STORM SYSTEM (STORM LINE 1, 2, 3 AND 3A) AND CROSS-SECTION "B-B" JUST DOWNSTREAM OF THE STORM SYSTEM = 2.02 ACRES OF ON-SITE UNCONTROLLED PLUS 10.16 ACRES OF CROSSPOINTE OR 12.18 ACRES, APPROXIMATE "C" FACTOR = 0.45.

Q10 = 12.18 ACRES X 5.92 X 0.45 = 32.46 CFS

THE ACTUAL Q10 WITHIN THE SYSTEM IS APPROXIMATED TO BE 32.45 CFS + 39.72 CFS = 72.2 CFS. THE 10-YEAR FLOW PURSUANT TO THE DEWBERRY & DAVIS PLANS FOR CROSSPOINTE, SEC. 16 WAS ESTIMATED TO BE 80.2 CFS. THE NOMINAL CAPACITY OF THESE PIPES IS 120 CFS AS VERIFIED BY THE "AS-BUILT" (SEE DATA BELOW). AT CROSS-SECTION "B-B" (SEE THIS SHEET), THE DOWNSTREAM CHANNEL PROVIDES CAPACITY AND BED AND BANKS ALL THE WAY TO GILES RUN. THEREFORE, IT IS THE ENGINEER'S OPINION THAT AN ADEQUATE OUTFALL EXISTS FOR THIS SITE AND THAT ITS DEVELOPMENT WILL NOT ADVERSELY IMPACT DOWNSTREAM PROPERTIES.

AS-BUILT:

3A-3, 24' OF 36" @ 5.33% (155 CFS)
2-3, 38' OF 36" @ 6.61 (170 CFS)
2-1, 30.3' OF 42" @ 1.42% (120 CFS)

OVERLAND RELIEF

THE LOTS FOR THIS PROJECT WILL BE GRADED WITH THE HOUSE GRADING PLANS IN SUCH A MANNER AS TO PROVIDE OVERLAND RELIEF FOR THE 100-YEAR STORM EVENT.

DITCH DETAIL TO STRUCTURE #9

Date: 07-10-2002

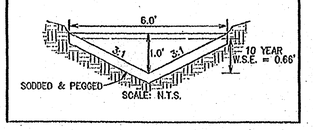
Project: COOKE PROPERTY

Description: DITCHOUT LEADING TO STRUCTURE #9
10 YEAR STORM

** Open Channel Flow - Trapezoidal Cross Section **

Side slope (H/IV)= 3

Discharge (cfs)	Ave. Vel. (ft/s)	Depth (ft)	Area (sq ft)	Top Width (ft)	Froude No.	Slope (ft/ ft)	n Value	Bottom Width (ft)
4.38	3.35	0.66	1.31	3.96	1.03	.05000	.0500	0.00



FOR INFORMATION ONLY

COMMONWEALTH OF VIRGINIA
CHARLES F. DUNLAP
No. 13098
8/5/05
LAND SURVEYOR

DITCH DETAIL TO STRUCTURE #12

Date: 07-10-2002

Project: COOKE PROPERTY

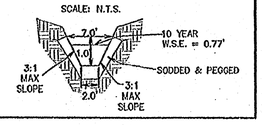
Description: DITCHOUT LEADING TO STRUCTURE #12
10 YEAR STORM

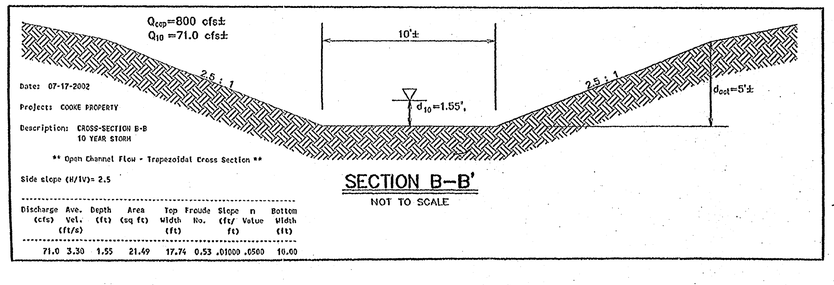
** Open Channel Flow - Trapezoidal Cross Section **

Side slope (H/IV)= 3

Discharge (cfs)	Ave. Vel. (ft/s)	Depth (ft)	Area (sq ft)	Top Width (ft)	Froude No.	Slope (ft/ ft)	n Value	Bottom Width (ft)
10.5	3.16	0.77	3.31	6.61	0.79	.03000	.0500	2.00

SCALE: N.T.S.





Date: 07-17-2002

Project: COOKE PROPERTY

Description: CROSS-SECTION B-B
10 YEAR STORM

** Open Channel Flow - Trapezoidal Cross Section **

Side slope (H/IV)= 2.5

Discharge (cfs)	Ave. Vel. (ft/s)	Depth (ft)	Area (sq ft)	Top Width (ft)	Froude No.	Slope (ft/ ft)	n Value	Bottom Width (ft)
71.0	3.30	1.55	21.49	17.74	0.53	.01000	.0500	10.00

SECTION B-B'
NOT TO SCALE

STORM WATER INLET COMPUTATIONS

INLET: NUMBER	TYPE	LENGTH	DRAINAGE AREA	C	C x A	RAINFALL INTENSITY	Q INCR	Q CARRY OVER	Q TOTAL	SX GUTTER SLOPE	SX CROSS SLOPE	T SPREAD	W	W/T	Sw	Sw/Sx	Eo	a	S' w	Se	Lt	P EFF. EDT LENGTH	L/Lt	d	E	h	INT Q	d/h	CB CARRY OVER	T SP. READ AT SAG	REMARKS
		Ft.	(Ac.)			(in/hr)	(cfs)	(cfs)	(cfs)	(ft/ft)	(Ft/Ft)	Ft.	Ft.		(ft/ft)						Ft.	Ft.		Ft.		Ft.	(cfs)		(cfs)	Ft.	
17	DI-12	GRATE	0.45	0.33	0.148	4.00	0.59	–	0.59	SUMP	–	–	–	–	–	–	–	–	–	–	–	4.0	–	0.13	–	–	0.59	–	–	–	SEE NOTE
16	DI-3BB	6	0.17	0.70	0.119	4.00	0.48	–	0.48	0.0100	0.0208	2.07	2.0	0.97	0.0833	4.0	1.00	3.5	0.146	0.167	4.4	–	1.36	–	1.00	–	0.48	–	0.00	–	–
15	DI-3BB	6	0.17	0.70	0.119	4.00	0.48	–	0.48	0.0100	0.0208	2.07	2.0	0.97	0.0833	4.0	1.00	3.5	0.146	0.167	4.4	–	1.36	–	1.00	–	0.48	–	0.00	–	–
14	YI-1	4	0.39	0.30	0.117	7.27	0.85	–	0.85	SUMP	–	–	–	–	–	–	–	–	–	–	–	–	–	0.20	–	–	0.50	0.40	0.00	–	0/L=0.21
11	YI-1	4	0.43	0.30	0.129	7.27	0.94	–	0.94	SUMP	–	–	–	–	–	–	–	–	–	–	–	–	–	0.20	–	–	0.50	0.39	0.00	–	0/L=0.23
9	YI-1	8	1.73	0.35	0.602	7.27	4.37	–	4.37	SUMP	–	–	–	–	–	–	–	–	–	–	–	–	–	0.36	–	–	0.50	0.72	0.00	–	0/L=0.55
8	YI-1	16	2.77	0.35	0.970	7.27	7.05	–	7.05	SUMP	–	–	–	–	–	–	–	–	–	–	–	–	–	0.31	–	–	0.50	0.62	0.00	–	0/L=0.44
7	DI-3BB	14	0.65	0.55	0.358	4.00	1.43	–	1.43	0.0640	0.0208	2.28	2.0	0.71	0.0833	4.0	0.99	3.5	0.146	0.165	12.2	–	1.15	–	1.00	–	1.43	–	0.00	–	–
7A	DI-3B	12	0.55	0.50	0.275	4.00	1.10	–	1.10	0.0640	0.0208	2.01	2.0	0.99	0.0833	4.0	1.00	3.5	0.146	0.167	10.9	–	1.10	–	1.00	–	1.10	–	0.00	–	–
6	DI-3B	10	0.56	0.45	0.252	4.00	1.01	–	1.01	0.0393	0.0208	2.49	2.0	0.80	0.0833	4.0	1.00	3.5	0.146	0.167	9.1	–	1.10	–	1.00	–	1.01	–	0.00	–	–
6A	YI-1	12	2.32	0.35	0.813	7.27	5.90	–	5.90	SUMP	–	–	–	–	–	–	–	–	–	–	–	–	–	0.39	–	–	0.50	0.78	0.00	–	0/L=0.49
5	DI-3B	10	0.57	0.50	0.285	4.00	1.14	–	1.14	0.0393	0.0208	2.87	2.0	0.70	0.0833	4.0	0.99	3.5	0.146	0.165	9.6	–	1.04	–	1.00	–	1.14	–	0.00	–	–
4	DI-3C	8	0.50	0.55	0.275	4.00	1.10	–	1.10	SUMP	0.0139	8.33	2.0	–	0.0833	–	–	–	–	–	–	11.6	–	0.12	–	0.50	1.10	–	–	8.58	–

NOTE: COMPUTATION FOR DI-12 ASSUME 50% CLOGGED.

Culvert Design Form

Manning's Roughness (n) =	0.013
Invert of Pipe Inlet =	290.4
Length of Pipe (ft) =	110
Slope of Pipe (ft/ft) =	0.012
Invert of Pipe Outlet =	289.08
Area =	1.16
Intensity =	7.27
C' Factor =	0.65
Q =	4.60

**NOTE: For Concrete Pipes n = 0.013
For Metal Pipes n = 0.024

COMPUTATIONS FOR CULVERT 14-18 TO 14-19 (15" RCP)

Pipe Size (in.)	Number of Barrels	Q to Each Barrel	Inlet Control: HW/D	HW	El (h)	Outlet Control: TW	do	(do+D)/2	ho	Ko	H	HW	El(hout)	Control HW Elevation
15	1	4.60	0.91	1.14	291.54	0	0.87	1.06	1.06	0.5	0.92	0.66	291.06	291.54

Culvert Design Form

Manning's Roughness (n) =	0.024
Invert of Pipe Inlet =	294.5
Length of Pipe (ft) =	60
Slope of Pipe (ft/ft) =	0.012
Invert of Pipe Outlet =	293.78
Area =	0.86
Intensity =	7.27
C' Factor =	0.55
Q =	3.44

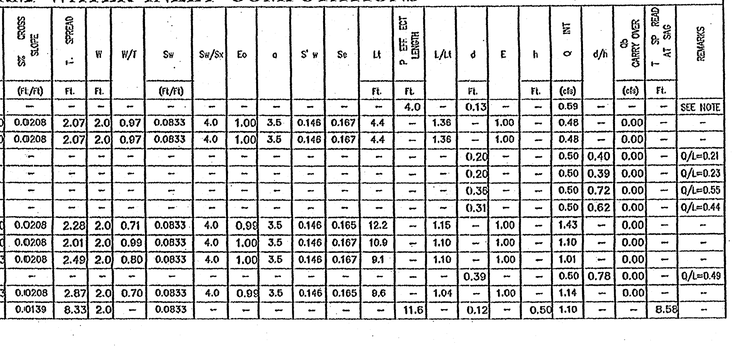
**NOTE: For Concrete Pipes n = 0.013
For Metal Pipes n = 0.024

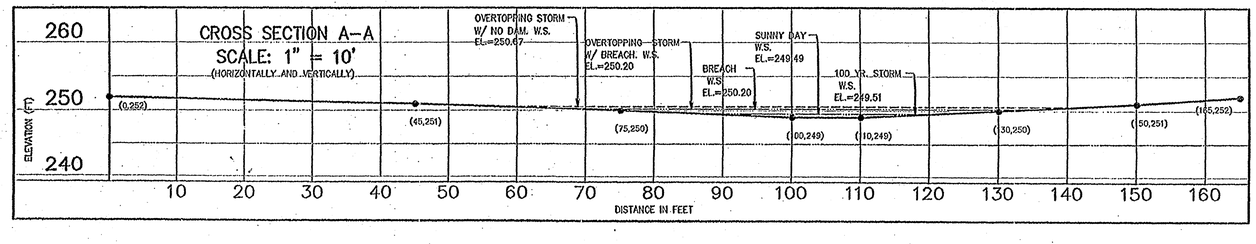
COMPUTATIONS FOR CULVERT 22-21 (15" CMP)

Pipe Size (in.)	Number of Barrels	Q to Each Barrel	Inlet Control: HW/D	HW	El (h)	Outlet Control: TW	do	(do+D)/2	ho	Ko	H	HW	El(hout)	Control HW Elevation
15	1	3.44	0.73	0.91	295.41	0	0.75	1.00	1.00	0.5	0.78	1.06	295.56	295.56

CULVERT TYPE & SIZE	TOTAL FLOW Q (CFS)	HEADWATER CALCULATIONS: INLET CONTROL HW/D	HW	Ke	OUTLET CONTROL do	(do+D)/2	ho	H	Ls	HW	CONTROL HW ELEV.	CONTROLLING ORIFICE
24" R.C.P. ROUND	10	0.82	1.64	0.50	1.13	1.57	1.57	0.35	0.50	1.42	253.64	INLET
	15	1.05	2.10	0.50	1.40	1.70	1.70	0.72	0.50	1.92	254.10	INLET
	20	1.30	2.60	0.50	1.61	1.81	1.81	0.25	0.50	2.56	254.60	INLET
	25	1.60	3.20	0.50	1.76	1.88	1.88	2.00	0.50	3.38	255.38	OUTLET
	30	2.10	4.20	0.50	1.86	1.93	1.93	2.80	0.50	4.23	256.23	OUTLET
	35	2.50	5.00	0.50	1.86	1.93	1.93	3.80	0.50	5.23	257.23	OUTLET
	40	3.00	6.00	0.50	1.86	1.93	1.93	5.0	0.50	6.43	258.43	OUTLET
	50	4.30	8.60	0.50	1.86	1.93	1.93	7.60	0.50	9.03	261.03	OUTLET

NOTE: A 48" RISER REQUIRES A FLOW OF 75 CFS OR GREATER TO BECOME ORIFICE FLOW. Qmax IN RISER IS APPROX. 21 CFS , AND THAT IS THE CAPACITY OF THE PIPE OUTFALL THEREFORE WEIR FLOW OCCURS AT RISER, AND PIPE FLOWS FULL BEFORE ORIFICE FLOW CAN EVER OCCUR.





REVISION PRIOR TO APPROVAL

NO. DATE

Charles P. Johnson & Associates, Inc.
PLANNERS ENGINEERS LANDSCAPE ARCHITECTS SURVEYORS
3959 PENDER DRIVE SUITE 210 FAIRFAX, VIRGINIA 22030 (703)385-7555
SILVER SPRING, MD FAX(703)273-8395

STORM SEWER COMPUTATIONS AND OUTFALL NARRATIVE

REMINGTON PLACE
(formerly COOKE PROP)
SPRINGFIELD DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
PAUL B. JOHNSON
No. 019450
2/25/03
PROFESSIONAL ENGINEER

NO. DESCRIPTION DRAWN APPROVED DATE BY
REVISIONS

DESIGN JPS | DRAFT RAR | APPROVED RLG | DATE JUL. 2002 | SCALE HORIZ. — VERT. —

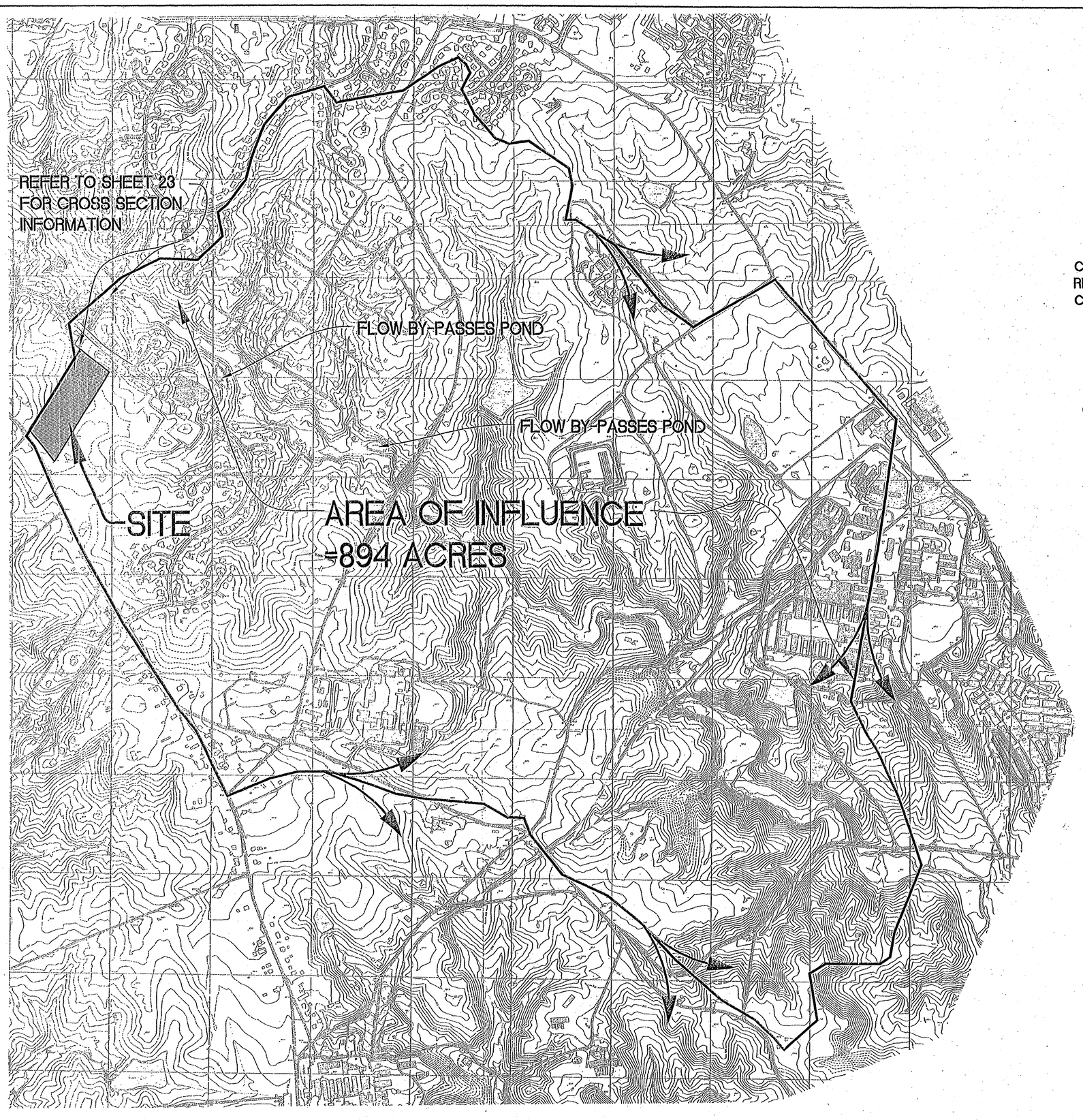
SHEET 8 OF 27

FILE NO.: 01-520-508

Wed, 2/26/03 11:20 Acad Dwg: N:\01520\DWG\DS-43001.DWG

CAD FILE: 04065ADE

FOR INFORMATION ONLY

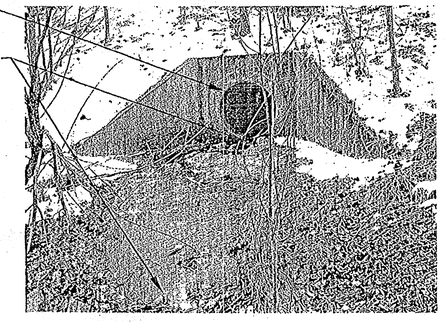


AREA OF INFLUENCE NARRATIVE

THE PROPERTY DRAINS TO THE GILES RUN FLOOD PLAN. AS THE PLAN VIEW SHOWS THERE ARE NO AREAS OF IMPOUNDMENT WITH THE 100 TIMES GREATER THAN DISTURBED AREA. THERE ARE APPROXIMATELY 7.2 ACRES OF DISTURBED AREA THUS 7.2 x 100 = 720 ACRE WHICH IS LESS THAN THE 894 OF THIS STUDY. PLEASE NOTE THAT THERE ARE SEVERAL PONDS THAT ARE NEAR GILES RUN BUT ARE NOT DIRECTLY FEED BY GILES THUS THESE ARE NOT AREAS OF IMPOUNDMENT.

THEREFORE, IT IS THE SUBMITTING ENGINEER'S OPINION THAT THERE ARE NO AREAS OF IMPOUNDMENT WITHIN THE ARE OF INFLUENCE.

VIEW LOOKING DOWNSTREAM
FROM CROSS SECTION P-P



VIEW LOOKING UPSTREAM
FROM CROSS SECTION M-M

WALTER L. PHILLIPS
INCORPORATED
CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1301 WWW.WLPINC.COM

DATE: 8-5-05 CD. REVS. 2-15-06
CD. REVISION 12-12-05
DRAWN: MPR, McANE
SCALE 1"=500'

COMMONWEALTH OF VIRGINIA
CHARLES F. DUNDON
No. 13059
8/5/05
LAND SURVEYOR

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

AREA OF INFLUENCE STUDY

PROPOSED NEW HOPE CHURCH

MT. VERNON DISTRICT

FAIRFAX COUNTY, VIRGINIA

File No. FL-6 Tax Map No. 106-2 Job No. 04-065 Cadd Dwg. File: 04065ADE Xref:

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