

FULL GOSPEL FIRST CHURCH OF WASHINGTON

Mason District Fairfax County, Virginia

SPECIAL PERMIT AMENDMENT



VICINITY MAP
SCALE 1" = 2000'

Applicant:
TRUSTEES OF
THE FULL GOSPEL FIRST CHURCH OF WASHINGTON
6401 LINCOLNIA ROAD
ALEXANDRIA, VIRGINIA 22312

Application No. SPA 89-M-041-02

Alan P. DeGuzman
Chairman, Board of Zoning Appeals



Sheet Index

- 1. COVER SHEET
- 2. SPECIAL PERMIT AMENDMENT PLAT/
NOTES/TABULATION
- 3. STORMWATER MANAGEMENT - PRE-DEVELOPMENT
- 4. STORMWATER MANAGEMENT - POST-DEVELOPMENT

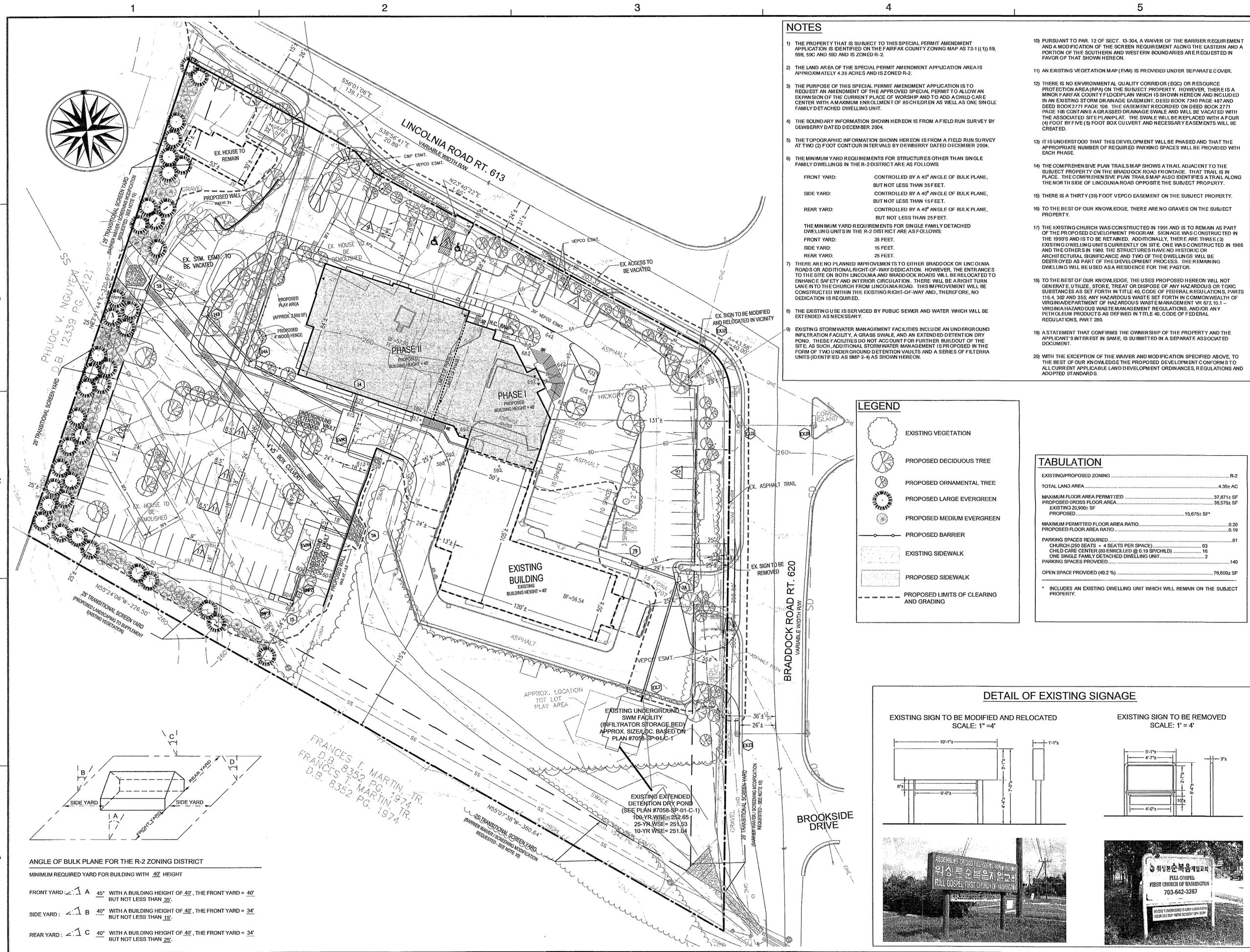
FULL GOSPEL FIRST CHURCH OF WASHINGTON
SPECIAL PERMIT AMENDMENT

Rev. November 30, 2005
August 3, 2005

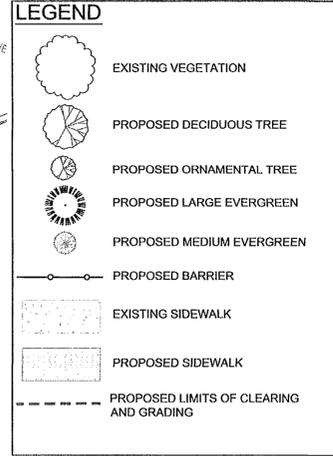
SUBMISSION DATE

RECEIVED
Department of Planning & Zoning
NOV 30 2005
Zoning Evaluation Division

M-10556



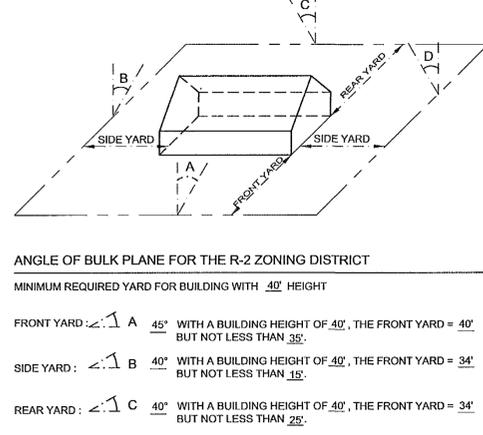
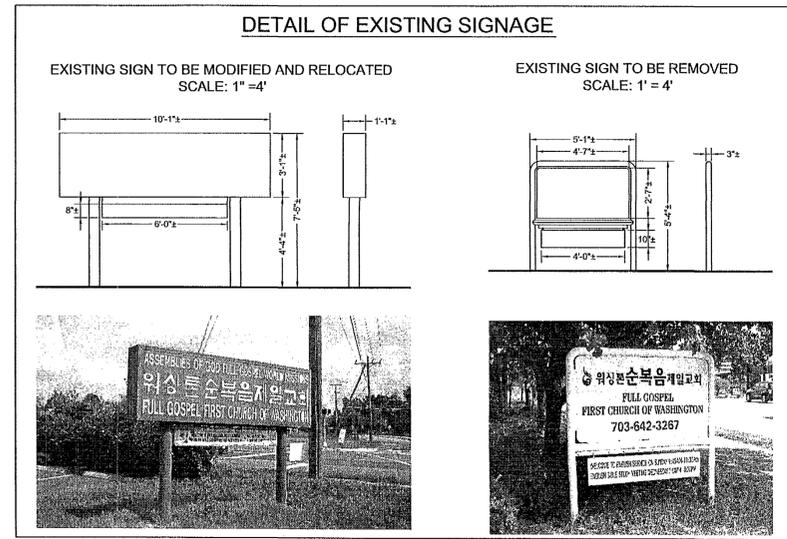
- ### NOTES
- THE PROPERTY THAT IS SUBJECT TO THIS SPECIAL PERMIT AMENDMENT APPLICATION IS IDENTIFIED ON THE FAIRFAX COUNTY ZONING MAP AS 72-1(1) 59, 59B, 59C AND 59D AND IS ZONED R-2.
 - THE LAND AREA OF THE SPECIAL PERMIT AMENDMENT APPLICATION AREA IS APPROXIMATELY 4.35 ACRES AND IS ZONED R-2.
 - THE PURPOSE OF THIS SPECIAL PERMIT AMENDMENT APPLICATION IS TO REQUEST AN AMENDMENT OF THE APPROVED SPECIAL PERMIT TO ALLOW AN EXPANSION OF THE CURRENT PLACE OF WORSHIP AND TO ADD A CHILD CARE CENTER WITH A MAXIMUM ENROLLMENT OF 80 CHILDREN AS WELL AS ONE SINGLE FAMILY DETACHED DWELLING UNIT.
 - THE BOUNDARY INFORMATION SHOWN HEREON IS FROM A FIELD RUN SURVEY BY DEWBERRY DATED DECEMBER 2004.
 - THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS FROM A FIELD RUN SURVEY AT TWO (2) FOOT CONTOUR INTERVALS BY DEWBERRY DATED DECEMBER 2004.
 - THE MINIMUM YARD REQUIREMENTS FOR STRUCTURES OTHER THAN SINGLE FAMILY DWELLINGS IN THE R-2 DISTRICT ARE AS FOLLOWS:
 FRONT YARD: CONTROLLED BY A 45° ANGLE OF BULK PLANE, BUT NOT LESS THAN 35 FEET.
 SIDE YARD: CONTROLLED BY A 40° ANGLE OF BULK PLANE, BUT NOT LESS THAN 15 FEET.
 REAR YARD: CONTROLLED BY A 40° ANGLE OF BULK PLANE, BUT NOT LESS THAN 25 FEET.
 THE MINIMUM YARD REQUIREMENTS FOR SINGLE FAMILY DETACHED DWELLING UNIT IN THE R-2 DISTRICT ARE AS FOLLOWS:
 FRONT YARD: 35 FEET.
 SIDE YARD: 15 FEET.
 REAR YARD: 25 FEET.
 - THERE ARE NO PLANNED IMPROVEMENTS TO EITHER BRADDOCK OR LINCOLNIA ROADS OR ADDITIONAL RIGHT-OF-WAY DEDICATION. HOWEVER, THE ENTRANCES TO THE SITE ON BOTH LINCOLNIA AND BRADDOCK ROADS WILL BE RELOCATED TO ENHANCE SAFETY AND INTERIOR CIRCULATION. THERE WILL BE ARCHIT TURN LANE IN TO THE CHURCH FROM LINCOLNIA ROAD. THIS IMPROVEMENT WILL BE CONSTRUCTED WITHIN THE EXISTING RIGHT-OF-WAY AND, THEREFORE, NO DEDICATION IS REQUIRED.
 - THE EXISTING USE IS SERVICED BY PUBLIC SEWER AND WATER WHICH WILL BE EXTENDED AS NECESSARY.
 - EXISTING STORMWATER MANAGEMENT FACILITIES INCLUDE AN UNDERGROUND INFILTRATION FACILITY, A GRASS SWALE, AND AN EXTENDED DETENTION DRY POND. THESE FACILITIES DO NOT ACCOUNT FOR FURTHER BUILDOUT OF THE SITE, AS SUCH, ADDITIONAL STORMWATER MANAGEMENT IS PROPOSED IN THE FORM OF TWO UNDERGROUND DETENTION VAULTS AND A SERIES OF FILTERVA UNITS (IDENTIFIED AS BMP 2-4 AS SHOWN HEREON).
 - PURSUANT TO PAR. 12 OF SECT. 13.304, A WAIVER OF THE BARRIER REQUIREMENT AND A MODIFICATION OF THE SCREEN REQUIREMENT ALONG THE EASTERN AND A PORTION OF THE SOUTHERN AND WESTERN BOUNDARIES ARE REQUESTED IN FAVOR OF THAT SHOWN HEREON.
 - AN EXISTING VEGETATION MAP (EVM) IS PROVIDED UNDER SEPARATE COVER.
 - THERE IS NO ENVIRONMENTAL QUALITY CORRIDOR (EQC) OR RESOURCE PROTECTION AREA (RPA) ON THE SUBJECT PROPERTY. HOWEVER, THERE IS A MINOR FAIRFAX COUNTY FLOODPLAIN WHICH IS SHOWN HEREON AND INCLUDED IN AN EXISTING STORM DRAINAGE EASEMENT, DEED BOOK 7200 PAGE 487 AND DEED BOOK 2771 PAGE 106. THE EASEMENT RECORDED ON DEED BOOK 2771 PAGE 106 CONTAINS A GRASSED DRAINAGE SWALE AND WILL BE VACATED WITH THE ASSOCIATED SITE PLAN/PLAT. THE SWALE WILL BE REPLACED WITH A FOUR (4) FOOT BY FIVE (5) FOOT BOX CULVERT AND NECESSARY EASEMENTS WILL BE CREATED.
 - IT IS UNDERSTOOD THAT THIS DEVELOPMENT WILL BE PHASED AND THAT THE APPROPRIATE NUMBER OF REQUIRED PARKING SPACES WILL BE PROVIDED WITH EACH PHASE.
 - THE COMPREHENSIVE PLAN TRAILS MAP SHOWS A TRAIL ADJACENT TO THE SUBJECT PROPERTY ON THE BRADDOCK ROAD FRONTAGE. THAT TRAIL IS IN PLACE. THE COMPREHENSIVE PLAN TRAILS MAP ALSO IDENTIFIES A TRAIL ALONG THE NORTH SIDE OF LINCOLNIA ROAD OPPOSITE THE SUBJECT PROPERTY.
 - THERE IS A THIRTY (30) FOOT VEPCO EASEMENT ON THE SUBJECT PROPERTY.
 - TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO GRAVES ON THE SUBJECT PROPERTY.
 - THE EXISTING CHURCH WAS CONSTRUCTED IN 1991 AND IS TO REMAIN AS PART OF THE PROPOSED DEVELOPMENT PROGRAM. SIGNAGE WAS CONSTRUCTED IN THE 1990S AND IS TO BE RETAINED. ADDITIONALLY, THERE ARE THREE (3) EXISTING DWELLING UNITS CURRENTLY ON SITE. ONE WAS CONSTRUCTED IN 1966 AND THE OTHERS IN 1960. THE STRUCTURES HAVE NO HISTORIC OR ARCHITECTURAL SIGNIFICANCE AND TWO OF THE DWELLINGS WILL BE DESTROYED AS PART OF THE DEVELOPMENT PROCESS. THE REMAINING DWELLING WILL BE USED AS A RESIDENCE FOR THE PASTOR.
 - TO THE BEST OF OUR KNOWLEDGE, THE USES PROPOSED HEREON WILL NOT GENERATE, UTILIZE, STORE, TREAT OR DISPOSE OF ANY HAZARDOUS OR TOXIC SUBSTANCES AS SET FORTH IN TITLE 40, CODE OF FEDERAL REGULATIONS, PARTS 115.4, 302 AND 305; ANY HAZARDOUS WASTE SET FORTH IN COMMONWEALTH OF VIRGINIA DEPARTMENT OF HAZARDOUS WASTE MANAGEMENT VR 612-10; VIRGINIA HAZARDOUS WASTE MANAGEMENT REGULATIONS, AND/OR ANY PETROLEUM PRODUCTS AS DEFINED IN TITLE 40, CODE OF FEDERAL REGULATIONS, PART 280.
 - A STATEMENT THAT CONFIRMS THE OWNERSHIP OF THE PROPERTY AND THE APPLICANT'S INTEREST IN SAME, IS SUBMITTED IN A SEPARATE ASSOCIATED DOCUMENT.
 - WITH THE EXCEPTION OF THE WAIVER AND MODIFICATION SPECIFIED ABOVE, TO THE BEST OF OUR KNOWLEDGE THE PROPOSED DEVELOPMENT CONFORMS TO ALL CURRENT APPLICABLE LAND DEVELOPMENT ORDINANCES, REGULATIONS AND ADOPTED STANDARDS.



TABULATION

EXISTING/PROPOSED ZONING	R-2
TOTAL LAND AREA	4.35± AC
MAXIMUM FLOOR AREA PERMITTED	37,871± SF
PROPOSED GROSS FLOOR AREA	36,575± SF
EXISTING 30,000± SF	
PROPOSED	15,675± SF*
MAXIMUM PERMITTED FLOOR AREA RATIO	0.20
PROPOSED FLOOR AREA RATIO	0.19
PARKING SPACES REQUIRED	81
CHURCH (250 SEATS + 4 SEATS PER SPACE)	63
CHILD CARE CENTER (80 ENROLLED @ 0.19 SP/CHILD)	16
ONE SINGLE FAMILY DETACHED DWELLING UNIT	2
PARKING SPACES PROVIDED	140
OPEN SPACE PROVIDED (40.2%)	76,600± SF

* INCLUDES AN EXISTING DWELLING UNIT WHICH WILL REMAIN ON THE SUBJECT PROPERTY.



Dewberry
8403 ARLINGTON BLVD.
FAIRFAX, VA 22031
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FAX: 703.849.0519
www.dewberry.com

Dewberry & Davis LLC

FULL GOSPEL FIRST CHURCH OF WASHINGTON SPECIAL PERMIT AMENDMENT PLAT
MASON DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL
COMMONWEALTH OF VIRGINIA
PHILIP C. CHAMPAGNE
No. 030073
11-30-05
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

No.	DATE	BY	Description
1	11.30.05	gch	

REVISIONS

DRAWN BY: GAH
APPROVED BY: LAM
CHECKED BY: LAM
DATE: 08.03.05

TITLE
FULL GOSPEL FIRST CHURCH OF WASHINGTON SPECIAL PERMIT AMENDMENT PLAT

PROJECT NO. M-10556

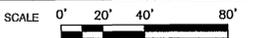
2

SHEET NO. 2 OF 4

FULL GOSPEL FIRST CHURCH OF WASHINGTON
SPECIAL PERMIT AMENDMENT PLAN
 MASON DISTRICT
 FAIRFAX COUNTY, VIRGINIA



KEY PLAN



No.	DATE	BY	Description
1	11.30.05	gsh	

REVISIONS

DRAWN BY: GAH
 APPROVED BY: LAM
 CHECKED BY: LAM
 DATE: 08.03.05

TITLE
FULL GOSPEL FIRST CHURCH OF WASHINGTON
STORMWATER MANAGEMENT
EXISTING CONDITIONS

PROJECT NO. M-10556

STORMWATER NARRATIVE

The 4.35 acre Full Gospel First Korean church is located in the Mason District of Fairfax County in the Cameron Run watershed. The current land use is divided: Parcel 59, a church, is a special permit use; parcels 59B, 59C and 59D are currently single family residences in accordance with the current zoning.

The existing stormwater management facilities include an extended detention dry pond (SWM 2), a grassed swale, and an underground infiltration facility (SWM 1); note, the grass swale and SWM pond are included in county storm drain easements recorded on DB 7240 PG 587 and DB 2771 PG 106. The majority of runoff created by the existing church and its parking facilities is directed to the underground infiltration facility: roof drains discharge onto the fire lane south of the existing church where the runoff is collected within the curb and gutter and directed to the inlet (EX. 7) in the southeast corner of the site, while the runoff from the parking area either sheet flows into or is directed toward, via curb and gutter, the same inlet. This facility was constructed as part of the previous addition to the church and was not sized to provide detention for any further improvements to the property. The underground infiltration facility outfalls into the extended detention dry pond located in the very southeast corner of the site. This extended detention dry pond, with a drainage area of approximately 65 acres, does not account for ultimate build-out of the entire watershed and as such does not account for additional improvements to the church. The pond outfalls through two culverts that run under Braddock Road into a tributary of Turkeycock Run. The parcel on the other side of Braddock Road where the culverts outfall is also encumbered by a Storm Drain Easement recorded in D.B. 7154 PG. 1842 and is owned by the applicant although not a part of this submission. There is an existing storm sewer system along Lincolnia that outfalls at the same point (parcel just south of the Braddock/Brookside intersection) as the above mentioned culverts. A capacity analysis for this storm sewer system for post-development conditions is included on sheet #4.

Given that the existing facilities were not designed to accommodate further expansion of the church, SWM in the form of detention and Best Management Practices (BMP) will be provided as part of this proposed development. Although there are two existing facilities on site, it is not our intention to modify these facilities as it would require substantial construction adjacent to and/or within the floodplain.

The proposed development includes a building addition along with a supplemental parking lot and associated utilities. The storm drainage easement on parcels 59B, C and D will be vacated as part of this plan and a 4'x5' box culvert (with a 24" easement) installed to safely convey the offsite runoff under the parking lot to the grass swale and SWM facility (SWM2) on parcel 59. The proposed culvert has been designed to convey the 100-year overland discharge from the upstream watershed through the culvert without going in to pressure flow. The offsite drainage area, "c" value and discharge were determined from Fairfax County approved Site Plan # 7058-SP-01-B which was obtained from microfilm records at the County. In order to meet the detention requirements of the County we are also proposing the construction of two underground detention vaults located in the proposed parking area and to augment the existing water quality system we are proposing two Filterra units also located in the proposed parking area. The existing infiltration system and SWM pond are being maintained as is. The primary outfalls are the SWM pond (SWM2) and the storm sewer system along Lincolnia which ultimately merge at the downstream end of the Braddock culverts.

The underground SWM vaults provide detention with approximately 4,500 cf of storage and effectively reduce the onsite contribution to SWM 2 to a rate below existing conditions (reduced from 11.44 cfs to 10.95 cfs). The post-development CA to the infiltration facility has been reduced from 1.33 to 1.02 and as such the facility is more than adequate as designed/constructed. As illustrated in the capacity analysis for the Braddock Road storm sewer system the system can adequately convey the small decrease in flow. The major outfall from the site is conveyed through an adjacent drainage easement to the county identified floodplain for Turkeycock Run downstream and is adequate to convey the flow as discharged.

While there is substantial existing infrastructure on the site, this project is not considered redevelopment in terms of BMP as the proposed imperviousness exceeds the existing imperviousness by more than 20%; as such, the BMP requirement for the proposed development is 40%. In terms of BMP, the infiltration unit was designed to replace the previous SWM facility located in that area which provided 2- and 10-year detention for the church and parking lots. By nature, the infiltration device is considered a BMP and since the facility was designed to provide detention for the 2-year, 2-hour storm a BMP removal efficiency of 70% is being claimed. Thus in the post-development condition, the BMP garnered from the existing infiltration facility is 29.72%. The three Filterra units proposed with this plan will treat 0.30 and 0.35 acres respectively. At a removal efficiency of 70% the units will yield a total of phosphorus removal credit of 16.55% for a total of 46.27%.

SPECIAL PERMIT AND DEVELOPMENT PLAN APPLICATIONS

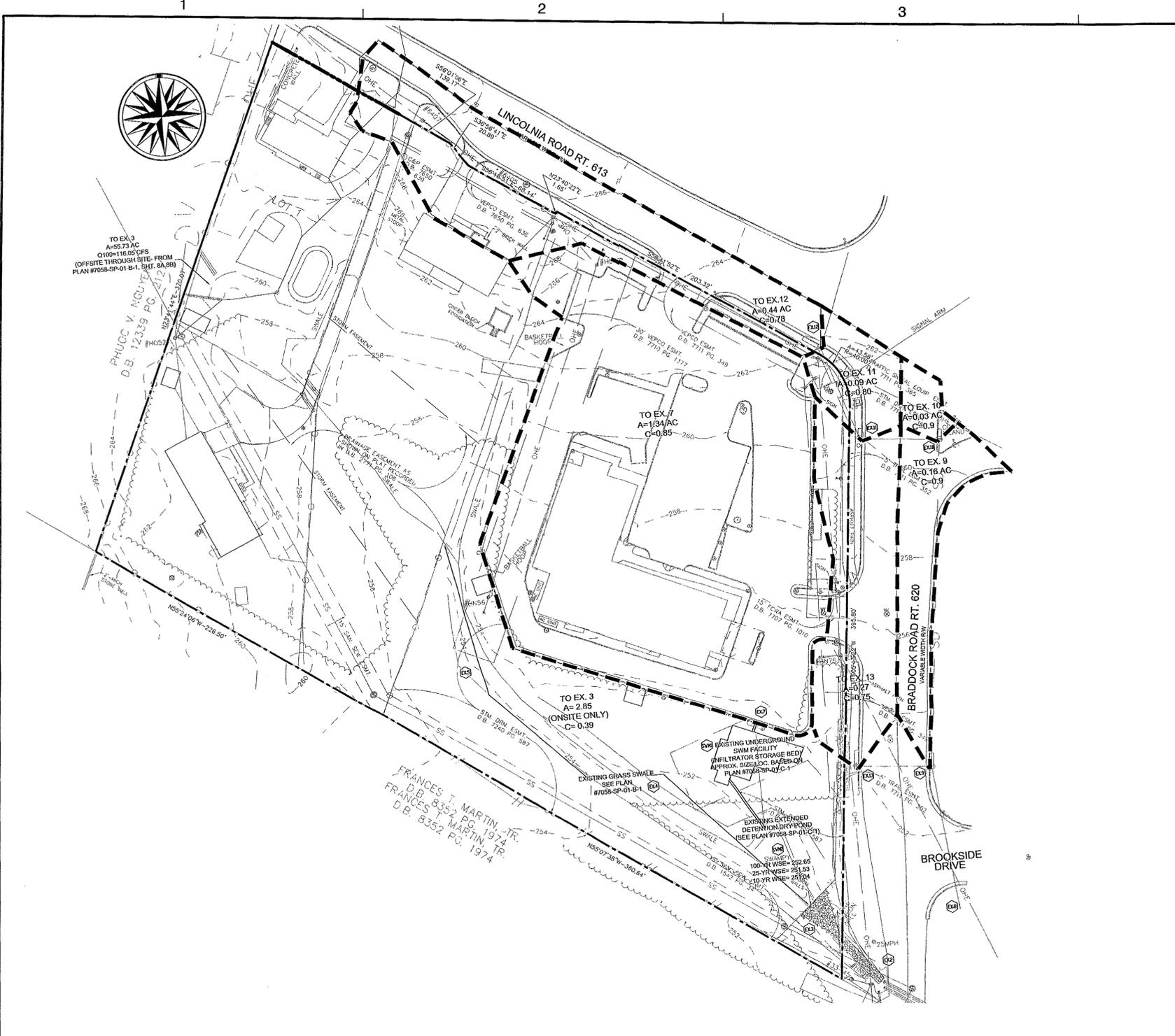
The following information is required to be shown or provided in all zoning applications, or a waiver request of the submission requirement with justification shall be attached. Note: Waivers will be acted upon separately. Failure to adequately address the required submission information may result in a delay in processing this application.

This information is required under the following Zoning Ordinance paragraphs:
 Special Permits (9-011 2J & 2L) Special Exceptions (9-011 2J & 2L)
 Cluster Subdivision (9-615 1G & 1N) Commercial Revitalization Districts (9-622 2A (12) & 14))
 Development Plans PRC District (16-302 3 & 4L) PRC Plan (16-303 1E & 1O)
 FDP P Districts (except PRC) (16-502 1F & 1Q) Amendments (18-202 10F & 10I)

- 1. Plat is at a minimum scale of 1" = 50' (unless it is depicted on one sheet with a minimum scale of 1" = 100').
- 2. A graphic depicting the stormwater management facility(ies) and limits of clearing and grading accommodate the stormwater management facility(ies), storm drainage pipe systems and outlet protection, pond spillways, access roads, site outfalls, energy dissipation devices, and stream stabilization measures as shown on Sheet 4.
- 3. Provide:

Facility Name/ Type & No.	On-site area served (acres)	Off-site area served (acres)	Drainage area (acres)	Footprint area (sf)	Storage Volume (cf)	If pond, dam height (ft)
SWM 3	0.64	N/A	0.64	N/A	2,000 CF	N/A
(e.g. dry pond A, inflill, trench, underground, vault, etc.)						
SWM 4	0.72	N/A	0.72	N/A	2,500 CF	N/A
BMP 2	0.30	N/A	0.30	N/A		
BMP 3	0.35	N/A	0.35	N/A		
Totals	2.01	N/A	2.01	N/A	4,500 CF	
- 4. Onsite drainage channels, outfalls and pipe systems are shown on Sheet 4. Pond inlet and outlet pipe systems are shown on Sheet 4.
- 5. Maintenance access (road) to stormwater management facility(ies) are shown on Sheet 4. Type of maintenance access road surface noted on the plat is asphalt (e.g. asphalt, geoblock, gravel, etc.).
- 6. Landscaping and tree preservation shown in and near the stormwater management facility is shown on Sheet N/A.
- 7. A stormwater management narrative which contains a description of how detention and best management practice requirements will be met is provided on Sheet 3.
- 8. A description of the existing conditions of each numbered site outfall extended downstream from the site to a point which is at least 100 times the site area or which has a drainage area of at least one square mile (640 acres) is provided on Sheet 3.
- 9. A description of how the outfall requirements, including contributing drainage areas of the Public Facilities Manual will be satisfied is provided on Sheet 3.
- 10. Existing topography with maximum contour intervals of two (2) feet and a note as to whether it is an air survey or field run is provided on Sheets 2,3 and 4.
- 11. A submission waiver is requested for N/A.
- 12. Stormwater management is not required because N/A.

Industry Letter 05-03 dated 02/02/05



Outlet	Area ID	Structure ID	Area, ac	C	CA	I,2	I,10	Q,d	Q,2	Q,10	Notes
	A1	To Ex. 12	0.44	0.78	0.34	5.45	7.27		1.87	2.50	Uncontrolled through ex. Storm Sewer along Braddock/Lincol nia Rd
	A2	To Ex. 11	0.09	0.80	0.07	5.45	7.27		0.39	0.52	
	A3	To Ex. 10	0.03	0.90	0.03	5.45	7.27		0.15	0.20	
	A4	To Ex. 9	0.16	0.90	0.14	5.45	7.27		0.78	1.05	
	A5	To Ex. 13	0.27	0.85	0.23	5.45	7.27		1.25	1.67	
			0.99		0.82	Total			4.45	5.93	
	A6	Onsite to Ex. 3	2.85	0.39	1.11	5.45	7.27		6.08	8.08	To ED Pond (SWM2) @ Braddock Rd Culvert
	A7	To Ex. 7	1.34	0.85	1.14	5.45	7.27		6.21	8.28	
	A8	Offsite to Ex. 3	55.75	0.21	11.72	5.45	7.27	115.4	63.90	85.24	
			59.94		13.97	Total			76.16	101.60	
A, Total			60.93		14.79				80.6	107.5	

FULL GOSPEL FIRST CHURCH OF WASHINGTON
SPECIAL PERMIT AMENDMENT PLAN
 MASON DISTRICT
 FAIRFAX COUNTY, VIRGINIA



KEY PLAN

SCALE

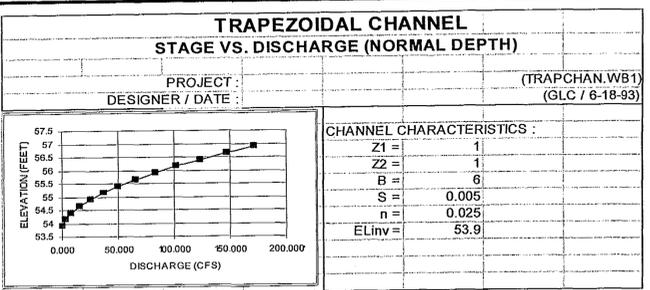
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REVISIONS

DRAWN BY: GAH
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TITLE
FULL GOSPEL FIRST CHURCH OF WASHINGTON
STORMWATER MANAGEMENT
PROPOSED CONDITIONS

PROJECT NO. M-10556



STAGE DATA				FLOW DATA			
Y (FT)	ELEV.	A (FT ²)	P (FT.)	R (FT)	Q (CFS)	V (FPS)	F
0.005	53.905	0.030	6.014	0.005	0.004	0.123	0.306
0.25	54.15	1.563	6.707	0.233	2.486	1.591	0.572
0.5	54.4	3.250	7.414	0.438	7.882	2.425	0.627
0.75	54.65	5.063	8.121	0.623	15.527	3.067	0.658
1	54.9	7.000	8.828	0.793	25.204	3.601	0.678
1.25	55.15	9.063	9.536	0.950	36.820	4.063	0.693
1.5	55.4	11.250	10.243	1.098	50.336	4.474	0.705
1.75	55.65	13.563	10.950	1.239	65.745	4.848	0.715
2	55.9	16.000	11.657	1.373	83.057	5.191	0.723
2.25	56.15	18.563	12.364	1.501	102.295	5.511	0.730
2.5	56.4	21.250	13.071	1.626	123.487	5.811	0.737
2.75	56.65	24.063	13.778	1.746	146.669	6.095	0.743
3	56.9	27.000	14.485	1.864	171.877	6.366	0.748

PROJECT: STATION: CULVERT DESIGN FORM
 SHEET: ENT. TYPE: SQ. EDGE WITH WINGWALLS
 DESIGNER / DATE:

HYDROLOGICAL DATA
 METHOD: DRAINAGE AREA: DESIGN FLOWS / TAILWATER
 R.L. (YEARS) FLOW (CFS) TW Elev.

0	83.90	
2.5	54.15	
7.9	54.40	
15.5	54.65	
25.2	54.90	
36.8	55.15	
50.3	55.40	
65.7	55.65	
83.1	55.90	
102.3	56.15	
123.5	56.40	

NO. OF CELLS = 1
 SPAN = 5
 HEIGHT = 4
 MANNING'S "N" = 0.013
 K_a = 0.4
 E₁ = 89
 E₁₀ = 53.9
 E₁ = 64.5
 E_{1sh} = 64.5
 L = 230

CULVERT DESCRIPTION: MATERIAL-SHAPE-SIZE-ENTRANCE	TOTAL FLOW Q (CFS)	FLOW PER BARREL C/N	HEADWATER CALCULATIONS										CONTROL HW Elev.	APPROX OUTLET VEL	COMMENTS
			HW	HWI	EL(h)	TW	Depth	dc+(D)/2	T _b	K _e	H	EL(ho)			
1.5' x 4' RCBB, sq. edge with wingwalls	1	0.09	0.34	58.34	0.10	0.11	2.05	1.05	0.4	0.00	56.95	58.34	1.86	I.C.	
"	10	0.19	0.77	58.77	0.57	0.50	2.25	1.28	0.4	0.01	56.16	58.77	3.51	I.C.	
"	20	0.30	1.20	59.20	0.87	0.79	2.40	1.40	0.4	0.04	56.33	59.20	4.92	I.C.	
"	30	0.40	1.58	59.58	1.10	1.04	2.54	1.54	0.4	0.08	56.50	59.58	5.44	I.C.	
"	40	0.48	1.93	59.93	1.31	1.28	2.63	1.63	0.4	0.15	56.68	59.93	6.11	I.C.	
"	50	0.58	2.25	60.25	1.49	1.45	2.73	1.73	0.4	0.23	56.86	60.25	6.89	I.C.	
"	60	0.64	2.55	60.55	1.68	1.65	2.83	1.83	0.4	0.33	57.09	60.55	7.24	I.C.	
"	70	0.71	2.82	60.82	1.81	1.83	2.91	1.91	0.4	0.45	57.27	60.82	7.85	I.C.	
"	80	0.77	3.09	61.09	1.98	2.00	3.00	2.00	0.4	0.59	57.49	61.09	8.00	I.C.	
"	90	0.84	3.34	61.34	2.09	2.16	3.08	2.08	0.4	0.75	57.73	61.34	8.32	I.C.	
"	100	0.90	3.59	61.59	2.22	2.32	3.15	2.15	0.4	0.92	57.98	61.59	8.62	I.C.	
"	110	0.98	3.84	61.84	2.34	2.47	3.24	2.24	0.4	1.12	58.25	61.84	8.90	I.C.	
"	116.5	1.00	4.01	62.01	2.42	2.57	3.28	2.28	0.4	1.25	58.44	62.01	9.07	I.C.	
"	118	1.01	4.04	62.04	2.44	2.59	3.30	2.30	0.4	1.29	58.48	62.04	9.11	I.C.	
"	119	1.02	4.07	62.07	2.45	2.61	3.30	2.30	0.4	1.31	58.51	62.07	9.13	I.C.	
"	120	1.02	4.09	62.09	2.46	2.62	3.31	2.31	0.4	1.33	58.54	62.09	9.16	I.C.	
"	121	1.03	4.12	62.12	2.47	2.64	3.32	2.32	0.4	1.35	58.57	62.12	9.18	I.C.	
"	122	1.04	4.15	62.15	2.48	2.65	3.32	2.32	0.4	1.37	58.60	62.15	9.21	I.C.	
"	123	1.04	4.17	62.17	2.49	2.66	3.33	2.33	0.4	1.40	58.63	62.17	9.23	I.C.	

TECHNICAL FOOTNOTES:
 1) HWI BASED ON POLYNOMIAL BEST-FIT EQUATIONS FROM THE FHA PUBLICATION ENTITLED CALCULATOR DESIGN SERIES #3
 2) HWI MAY NOT BE ACCURATE FOR VALUES < 0.5D AND > 4.5D
 3) EL(h) = HWI + ELI (INVERT OF INLET CONTROL SECTION)
 4) TW BASED ON DOWNSTREAM CONTROL OR FLOW DEPTH IN CHANNEL
 5) ho = TW OR (dc+D)/2 WHICHEVER IS GREATER
 6) H = (1 + K_e + (23 n² L) / R^{1.33}) V² / 2g
 7) EL(ho) = EL_o + H + ho

Date of last edit: 12/10/2002 by: GLC

STORM DRAINAGE COMPUTATIONS for EXISTING SS on Braddock, Post-Development Discharge

FROM STR #	TO STR #	AREA (ETIA) ac	TOTAL RUNOFF CA	ACCUM. CA	TC IN MIN	I IN/HR	INC. CFS	TOTAL CFS	DIA. IN	SLOPE IN/R	LENGTH FT	n	Q CAP CFS	VELOCITY ACTU. FPS	LOSSES FT	UPPER INVERT	LOWER INVERT	PROFILE DROP FT	TOP	
EX. 13	EX. 9	0.27	0.27	0.75	0.20	5.00	7.27	1.5	1.5	0.009	51.05	0.013	6.20	4.17	0.47	249.14	248.67	0.16	252.58	
EX. 12	EX. 11	0.39	0.39	0.80	0.31	5.00	7.27	2.27	18	0.015	68.40	0.013	7.85	5.58	1.01	256.80	255.79	0.05	262.41	
EX. 11	EX. 10	0.09	0.48	0.80	0.07	5.00	7.27	0.52	18	0.014	54.50	0.013	12.24	5.63	0.74	255.74	255.00	0.19	260.39	
EX. 10	EX. 9	0.03	0.51	0.90	0.03	5.00	7.27	0.20	18	0.027	226.70	0.013	17.28	7.40	6.14	254.81	248.67	0.16	261.20	
EX. 9	EX. 8	0.16	0.46	0.90	0.14	5.00	7.27	1.05	5.51	0.008	99.10	0.013	19.80	5.50	0.76	248.51	247.75	-	253.36	
EX. 7	SWM1	1.23	1.23	0.83	1.02	5.00	7.27	7.4	7.42	0.015	5.00	0.013	25.51	18.14	0.78	249.78	249.00	-	253.55	
Outflow from SWM1 to EX. 3=4.92 cfs																				
EX. 14	SWM3	0.74	0.68	0.50	5.00	7.27	3.66	3.66	15	0.022	47.00	0.013	9.65	7.38	1.05	260.30	259.25	-	264.30	
Outflow from SWM3 to EX. 3=L4.4 cfs																				
EX. 15	SWM4	1.22	0.72	0.90	0.65	5.00	7.27	4.71	4.71	0.005	13.00	0.013	4.74	4.38	0.07	255.90	255.83	-	259.90	
Outflow from SWM4 to EX. 3=1.48 cfs																				
SITE (uncontrolled)	EX. 3	1.34	4.03	0.35	0.47	5.00	7.27	3.41	10.95											

Based on proposed routing w/ this plan
 10-yr discharge from original SWM facility per plan 7058-SP-01
 Based on field survey completed for this plan

STORM DRAINAGE COMPUTATIONS for EXISTING SS on Braddock, Pre-Development Discharge

FROM STR #	TO STR #	AREA (ETIA) ac	TOTAL RUNOFF CA	ACCUM. CA	TC IN MIN	I IN/HR	INC. CFS	TOTAL CFS	DIA. IN	SLOPE IN/R	LENGTH FT	n	Q CAP CFS	VELOCITY ACTU. FPS	LOSSES FT	UPPER INVERT	LOWER INVERT	PROFILE DROP FT	TOP	
EX. 13	EX. 9	0.27	0.27	0.75	0.20	5.00	7.27	1.5	1.5	0.009	51.05	0.013	6.20	4.17	0.47	249.14	248.67	0.16	252.58	
EX. 12	EX. 11	0.44	0.44	0.78	0.34	5.00	7.27	2.50	15	0.015	68.40	0.013	7.85	5.79	1.01	256.80	255.79	0.05	262.41	
EX. 11	EX. 10	0.09	0.48	0.80	0.07	5.00	7.27	0.52	18	0.014	54.50	0.013	12.24	5.74	0.74	255.74	255.00	0.19	260.39	
EX. 10	EX. 9	0.03	0.51	0.90	0.03	5.00	7.27	0.20	18	0.027	226.70	0.013	17.28	7.54	6.14	254.81	248.67	0.16	261.20	
EX. 9	EX. 8	0.16	0.46	0.90	0.14	5.00	7.27	1.05	5.51	0.008	99.10	0.013	19.80	5.50	0.76	248.51	247.75	-	253.36	
EX. 7	SWM1	1.66	1.66	0.80	1.33	5.00	7.27	9.7	9.65	0.015	5.00	0.013	25.51	19.51	0.78	249.78	249.00	-	253.55	
Outflow from SWM1 to EX. 3=4.92 cfs																				
SITE (uncontrolled)	EX. 3	2.30	3.96	0.39	0.90	5.00	7.27	6.52	11.44											

Based on proposed routing w/ this plan
 10-yr discharge from original SWM facility per plan 7058-SP-01
 Based on field survey completed for this plan

Drainage Area Summary-Proposed Conditions

Outlet	Area ID	Structure ID	Area, ac	C	CA	I,2	I,10	Q,d	Q,2	Q,10	Notes
A1	To Ex. 12	0.40	0.70	0.28	5.45	7.27		1.53	2.04		Uncontrolled through ex. Storm
A2	To Ex. 11	0.10	0.72	0.07	5.45	7.27		0.39	0.52		
A3	To Ex. 10	0.03	0.90	0.03	5.45	7.27		0.15	0.20		sewer along Braddock/Lincolnia Rd
A4	To Ex. 9	0.16	0.90	0.14	5.45	7.27		0.78	1.05		
A5	To Ex. 13	0.40	0.49	0.20	5.45	7.27		1.07	1.42		
		1.09		0.72	Total			3.92	5.23		
A6	Roof To SWM3	0.34	0.90	0.31	5.45	7.27		1.67	2.22		
A6A	SS To SWM3	0.30	0.49	0.15	5.45	7.27		0.80	1.07		
A6B	Onsite to Ex. 3	1.50	0.34	0.51	5.45	7.27		2.78	3.71		To ED Pond (SWM2) @ Braddock Rd Culvert
A7	To Ex. 7 SS To SWM4	1.23	0.85	1.05	5.45	7.27		5.70	7.60		
A6C	Offsite to Ex. 3	0.72	0.90	0.65	5.45	7.27		3.53	4.71		
A8	Offsite to Ex. 3	55.75	0.21	11.72	5.45	7.27		115.4	63.90	85.24	
		58.84		14.38	Total			78.37	104.55		
A, Total		60.93		15.10				82.3	109.6		

BMP Summary

Drainage Area ID	Area (ac)	C	CA	Removal Efficiency	Area Ratio	C-factor	Product
To SS. On Braddock	0.30	0.33	0.099	0	0.077	0.519	0
To Ex. 7 (Infiltrator Units)	1.18	0.89	1.050	70	0.303	1.399	29.715
Uncontrolled to Ex. 3	1.50	0.34	0.510	0	0.386	0.535	0
To BMP 2	0.30	0.90	0.270	70	0.077	1.415	7.639
To BMP 3	0.35	0.90	0.315	70	0.090	1.415	8.913
Roof to SWM3	0.34	0.90	0.306	0	0.087	1.415	0
Untreated to SWM 3	0.30	0.49	0.147	0	0.077	0.770	0
Untreated to SWM 4	0.07	0.9	0.063	0	0.018	1.415	0
TOTALS							