

WORKSHEET B: REDEVELOPMENT

1. Compile site-specific data and determine site imperviousness (I<sub>site</sub>)

	PRE-DEVELOPMENT		POST-DEVELOPMENT	
A*	0.2640	acres	0.2640	acres
la**	0.0602	acres	0.0960	acres
STRUCTURES	0.0224	acres	0.0836	acres
PAVEMENT	0.0147	acres	0.0062	acres
SIDEWALKS	0.0071	acres	0.0058	acres
STOOPS/PORCH				
Total la =	0.1045	acres	0.1917	acres

I = (Total la/A) x 100

I =  $\frac{0.1045}{0.2640} \times 100 = 39.57$

I =  $\frac{0.1917}{0.2640} \times 100 = 72.61$

RV =  $0.05 + 0.009(I_{site})$

RV PRE =  $0.05 + 0.009(39.57) = 0.4062$

RV POST =  $0.05 + 0.009(72.61) = 0.7035$

\*A is the total area of the site  
\*\*la is the total amount of impervious cover.

C:	I >= 20 - 1.08	mg/L	72.61	% from step 1
	I < 20 - 0.26	mg/L	40.00	%
I% =	39.57	% from step 1	72.61	% from step 1
I% =	40	%	40.00	%
	If I site > I, I site will be returned		If I site > I, I site will be returned	
C =	0.26	mg/L when I < 20	0.26	mg/L when I < 20
C =	1.08	mg/L when I > 20	1.08	mg/L when I > 20
Since I is	40.00	C is	1.08	mg/L
		C is	1.08	mg/L

If there is no value in the above boxes, a waiver may be required.

2. Calculate the pre-development load (L<sub>pre</sub>)

LPRE = 8.16 x RV x C x A

LPRE =  $8.16 \times 0.4062 \times 1.08 \times 0.2640 = 0.9448$  pounds per year

5. Calculate the post-development load (L<sub>post</sub>)

Lpost = 8.16 x RV x C x A

Lpost =  $8.16 \times 0.7035 \times 1.08 \times 0.2640 = 1.637$  pounds per year

6. Calculate the pollutant removal requirement (RR)

RR = Lpost - 0.9 x Lpre

RR =  $1.637 - 0.9 \times 0.9448 = 0.786$  pounds per year

To determine the overall efficiency required (%RR) when selecting BMP options:

%RR =  $\frac{RR}{L_{pre}} \times 100$

%RR =  $\frac{0.786}{0.9448} \times 100 = 48.041$  %

POLLUTANTS REMOVAL WILL BE MET BY REDEVELOPMENT. POROUS PAVEMENT WITH INFILTRATION TRENCH WILL ACCOMMODATE THE SITE REQUIREMENTS

Worksheet C: Compliance

Select BMP options using screening tools and list them below. Then calculate the load removal for each option. DO NOT LIST BMP'S IN SERIES HERE.

Selects Option	Removal* Efficiency x	Fraction of CBPA Drainage Area Served (expressed in x decimal form)	Lpost = (lbs/yr)	Load Removed (lbs/yr)
Porous Pvm	80.00%	100.00% (of Impervious Area)	1.637	1.31
			1.31 lbs/yr	0.786 lbs/yr

BMP STORAGE

Part 7. Compute the Weighted Average "C" Factor for Each Proposed BMP Facility

A	Subarea Designation	"C"	Acres	Product
---	---------------------	-----	-------	---------

## STORMWATER COMPUTATIONS

Structure		Drainage Area (acre)		C	CA		Tc (minutes)	I (in/hr)	Q (cfs)	Slope (%)		n	Diameter		VEL		LENGTH		TIME IN PIPE MIN-SEC	Q CAPACITY CFS	Remarks
FROM	TO	Incr.	Accum.		Incr.	Accum.				(min)	actual		(mm)	(in)	F.F. FPS	ACT FPS	m	FEET			
EX.7	EX. 2	1.13	1.13	0.75	0.85	0.85	5.00	7.68	6.51	1.02	8.44	0.013	15	15.29	13.81		34.96	0.04	18.76		
EX. 4	EX. 2	1.04	1.04	0.75	0.78	0.78	5.00	7.68	6.00	2.83	3.31	0.013	12	8.26	9.27		32.30	0.06	6.48		
EX. 2	EX. 1	0.00	2.17	0.75	0.00	1.63	5.00	7.68	12.50	0.31	1.46	0.013	24	8.71	8.49		23.26	0.05	27.35		
EX. 5	EX. 1	0.36	0.36	0.73	0.26	0.26	5.00	7.68	2.03	0.32	3.50	0.013	12	8.49	7.30		45.93	0.10	6.67		
EX. 6	EX. 1	0.80	0.80	0.65	0.52	0.52	5.00	7.68	3.99	0.38	3.50	0.013	15	9.85	8.82		33.94	0.06	12.09		
EX. 1	EX	0.00	3.33	0.89	0.00	3.33	5.00	7.68	25.60	1.28	3.00	0.013	24	12.47	13.27		100.00	0.13	39.18	DOWN STREAM	

SOIL INFORMATION

SgB - SASSAFRAS-URBAN LAND COMPLEX, 0 TO 8 % SLOPES

SASSAFRAS COMPONENT MAKES UP 40 PERCENT OF THE MAP UNIT. THE ASSIGNED K<sub>w</sub> ERODIBILITY FACTOR IS .28. THIS SOIL IS WELL DRAINED. THE SLOWEST PERMEABILITY WITHIN 60 INCHES IS MODERATELY SLOW. AVAILABLE WATER CAPACITY IS VERY HIGH AND SHRINK POTENTIAL IS LOW. THIS SOIL IS NOT FLOODED AND IS NOT PONDED. THE WATER TABLE IS DEEPER THAN 6 FEET. THERE ARE NO SALINE HORIZONS. IT IS IN NONIRRIGATED LAND CAPABILITY CLASS 2e. THIS COMPONENT IS NOT A HYDRIC SOIL.

A	Subarea Designation	"C"	Acres	Product
1a**	STRUCTURES	0.90	0.0960	0.0864
	PAVEMENT	0.70	0.0836	0.0586
	SIDEWALKS	0.90	0.0062	0.0056
	STOOPS/PORCH	0.90	0.0058	0.0052
	(a)		0.1917	(b)
B				0.1558
C			(b)/(a) = c	0.8127

Part 8. Determine the Storage Required for Each Proposed Facility

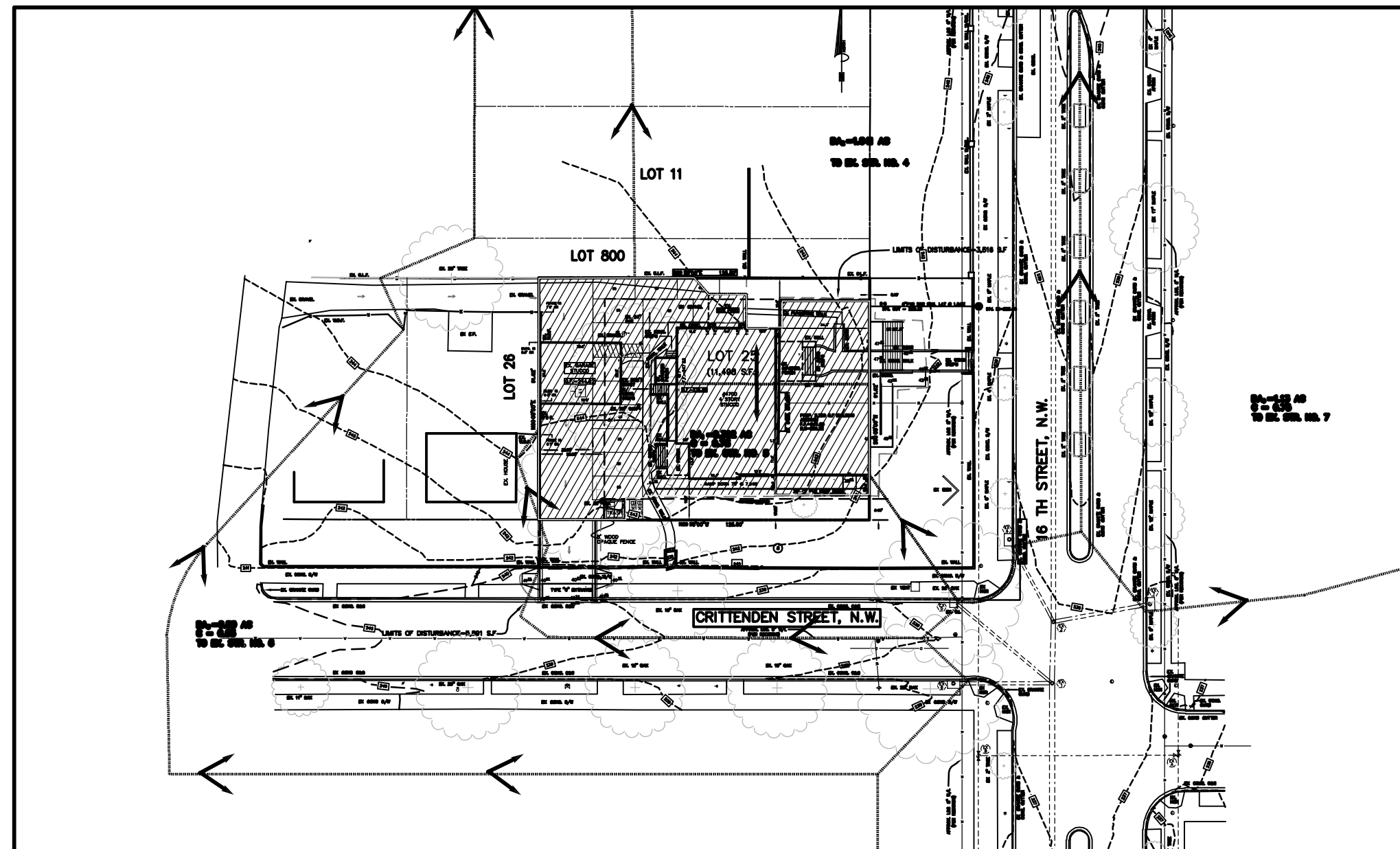
Infiltration Trench

Design 1 (0.50 inch per impervious acre)  
0.50 X 36.30 X (% Imp.) X Line (7a) X Line 8(b) = 252.64 cf

Outlet Computations

Part 9. Determine The Required Orifice Size for Each Facility

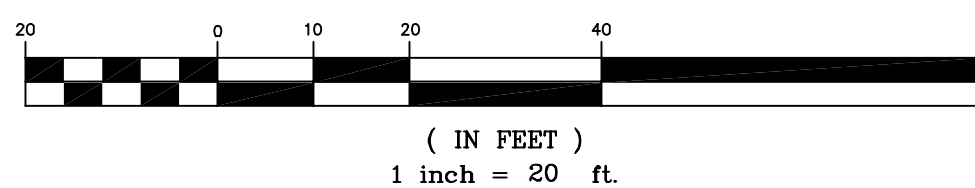
- BMP storage requirement (S) from Part 8. 252.64 cf
  - Max. Head (h) at the required BMP storage from the elevation-storage curve for the facility. 0.33 ft
  - Peak outflow rate (Q<sub>p</sub>) at the max. head for a drawdown time of 48 hrs [Q<sub>p</sub>=S/(0.5 X 3600 X 48)].  
0.0000116 X Line 9 (a) = 0.003 cfs
  - Required orifice area (A) [A=Q<sub>p</sub>/(0.6 X (64.4 X h)<sup>0.5</sup>)]  
Line 9c / (0.6 X (64.4 X Line 9(b))<sup>0.5</sup>) = 0.0001
  - Diameter of a circular orifice.  
2.0 X (Line 9(d))<sup>0.5</sup> = 0.0001
- Use: 1 in. orifice



BMP COVERAGE MAP

SCALE: H: 1"=50'

GRAPHIC SCALE



### BMP NARRATIVE

THE REDEVELOPMENT OF THIS SITE CONSTITUTE AN INCREASE OF IMPERVIOUSNESS FOR THE SITE AREA. IN ORDER TO SATISFY THE REQUIREMENTS FOR A REDUCTION IN THE POLLUTANTS THAT WILL BE INCREASE DUE TO THE BUILDING ADDITION AND REQUIRED PARKING, POROUS PAVEMENT IS PLANNED TO SUPPORT THE INFILTRATION OF THE RUNOFF. THE SITE SOIL IS CLASSIFIED AS SASSAFRAS, A SOIL THAT HAS VERY GOOD DRAINAGE CONDITIONS. THE POROUS PAVEMENT WILL BE INSTALLED PER THE DETAIL ON SHEET C-2.00 ENTITLED, 'POROUS PAVEMENT DETAIL'. 4" OR 0.33' OF STORAGE MEDIUM WITH THE PAVEMENT SECTION IS PROVIDED. IT IS ASSUMED THAT THE AREA OF PAVING IS SUFFICIENT TO SUPPORT THE REQUIRED VOLUME WITH THE ASSUMPTION THAT THERE IS A MINIMUM VOID OF 40% WITHIN THE MEDIUM. THE AREA OF PAVEMENT = 3,832 S.F THE VOLUME = 3,832 \* 0.30 \* 40% = 511 CF. THE REQUIRED BMP STORAGE = 253 CF BASED ON BMP INFILTRATION TRENCH COMPUTATIONS. BASED ON THIS COMPARISON, THE EQUIVALENT VOLUME PROVIDED IS SUFFICIENT TO TREAT THE REDEVELOPMENT INCREASE IN IMPERVIOUS AREA.

PA PHELPS  
CONSULTING

PA PHELPS CONSULTING L.L.C.  
38 Poplar View Drive  
Stafford, Virginia 22554

Phone: (540) 720-5988  
Fax: (540) 720-4173  
e-mail: pphelps@pphelps.com  
pph@pphelps.com

BMP, NARRATIVE, COMPUTATIONS  
WASHINGTON SEVENTH DAY BAPTIST CHURCH

WASHINGTON  
DISTRICT OF COLUMBIA

PLAN STATUS

7/15/08 REV. PER DOT

COMMENTS

DATE DESCRIPTION

PAP DESIGN PAP DRAWN ACM CHKD

SCALE H: 1"=20'

V: 1"=2'

JOB No.

DATE :

FILE No.

SHEET C-6.01