

WATER QUALITY VOLUME

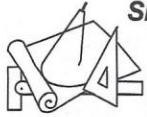
222 SOUTH PLEASANT STREET SITE PLAN
HINGHAM, MA
PROJ. NO. 0307
IMPERVIOUS AREA ASSESSMENT
12/9/2022

PREDEVELOPMENT:

	PAVEMENT AREAS (sf):		ROOF AREAS (sf)	
	"A" SOILS	"B" SOILS	"A" SOILS	"B" SOILS
WS1	1128.0	0.0	968.0	0.0
WS2	387.0	0.0	694.0	988.0
WS3	0.0	0.0	0.0	0.0
TOTAL PRE	1515.0	0.0	1662.0	988.0

POSTDEVELOPMENT:

	PAVEMENT AREAS (sf):		ROOF AREAS (sf)	
	"A" SOILS	"B" SOILS	"A" SOILS	"B" SOILS
WS1	1189.0	0.0	0.0	0.0
WS2	0.0	0.0	0.0	0.0
WS3	0.0	0.0	0.0	0.0
WS4	2043.0	6059.0	1187.0	5224.0
WS5	0.0	5397.0	0.0	0.0
TOTAL POST	3232.0	11456.0	1187.0	5224.0
DIFFERENCE	1717.0	11456.0 (PAVEMENT AREAS)		
DIFFERENCE	1242.0	15692.0 (IMPERVIOUS AREAS)		



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JOB 222 S. PLEASANT ST. SITE PLAN
SPRINGHAM, MA - #0302
SHEET NO. 1 OF _____
CALCULATED BY A.S. DATE 12/12/22
CHECKED BY _____ DATE _____
SCALE _____

CALCULATION OF WATER QUALITY VOLUME, V_{WQ} :

SITE IS IN A ZONE II AQUIFER PROTECTION DISTRICT!

$$\underline{V_{WQ} = D \times \Delta I_A}$$

ΔI_A = CHANGE IN IMPERVIOUS PAVEMENT AREAS

$\Delta I_A = (1717.0 \text{ st} + 11,456.0 \text{ st}) \Rightarrow$ FROM IMPERVIOUS AREA ASSESSMENT
 \hookrightarrow DIFF. BTWN. PRE & POST "A" SOILS
 \hookrightarrow DIFF. BTWN. PRE & POST "B" SOILS

$$\Delta I_A = 13,713.0 \text{ st}$$

$$D = 1.017 (= 0.0833 \text{ ft}) \Rightarrow \text{ZONE II APD.}$$

$$V_{WQ} = (0.0833 \text{ ft})(13,713 \text{ st})$$

$$\underline{V_{WQ} = 1097.7 \text{ cf}}$$

0307-POST-REV

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Summary for Pond RET1: RET1

Inflow Area = 22,712 sf, 63.99% Impervious, Inflow Depth > 6.99" for 100-Year event
 Inflow = 4.16 cfs @ 12.13 hrs, Volume= 13,221 cf
 Outflow = 2.81 cfs @ 12.20 hrs, Volume= 13,059 cf, Atten= 32%, Lag= 4.5 min
 Discarded = 0.23 cfs @ 12.20 hrs, Volume= 6,977 cf
 Primary = 2.59 cfs @ 12.20 hrs, Volume= 6,082 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 90.70' @ 12.20 hrs Surf.Area= 1,124 sf Storage= 2,339 cf

Plug-Flow detention time= 53.0 min calculated for 13,032 cf (99% of inflow)
 Center-of-Mass det. time= 45.3 min (834.8 - 789.5)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	2,473 cf	45.00'W x 24.98'L x 5.50'H Field A 6,183 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	88.00'	8.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	85.50'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 83.50'

Discarded OutFlow Max=0.23 cfs @ 12.20 hrs HW=90.69' (Free Discharge)
 ↳ **2=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=2.58 cfs @ 12.20 hrs HW=90.69' (Free Discharge)
 ↳ **1=Orifice/Grate** (Orifice Controls 2.58 cfs @ 7.39 fps)

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NRCC 24-hr C 100-Year Rainfall=8.68"

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Stage-Area-Storage for Pond RET1: RET1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
85.50	0	90.70	2,338
85.60	45	90.80	2,383
85.70	90	90.90	2,428
85.80	135	91.00	2,473
85.90	180		
86.00	225		
86.10	270		
86.20	315		
86.30	360		
86.40	405		
86.50	450		
86.60	495		
86.70	540		
86.80	585		
86.90	629		
87.00	674		
87.10	719		
87.20	764		
87.30	809		
87.40	854		
87.50	899		
87.60	944		
87.70	989		
87.80	1,034		
87.90	1,079		
88.00	1,124		
88.10	1,169		
88.20	1,214		
88.30	1,259		
88.40	1,304		
88.50	1,349		
88.60	1,394		
88.70	1,439		
88.80	1,484		
88.90	1,529		
89.00	1,574		
89.10	1,619		
89.20	1,664		
89.30	1,709		
89.40	1,754		
89.50	1,799		
89.60	1,844		
89.70	1,888		
89.80	1,933		
89.90	1,978		
90.00	2,023		
90.10	2,068		
90.20	2,113		
90.30	2,158		
90.40	2,203		
90.50	2,248		
90.60	2,293		

$= V_{WR\ PROVIDED} > V_{WR\ REQ'D} = 1097.7\ cf$
 (BELOW INV. ELEV. = 88.00)