

**Kings Highway Improvements**  
**New Bedford, Mass.**  
**Recharge & Water Quality Volume Calculations**

Calculated By: E. Corey

Date: 4/5/2018

Revised: 7/10/2018 (S. Basel)

Existing Impervious Area	235040	sf
Proposed Impervious Area	264840	sf
Total Increase in Impervious Area	29800	sf
	0.684	ac

### Standard 3: Groundwater Recharge

#### Required Recharge Volume

Required Recharge volume = Target Depth Factor \* Impervious Area

$$Rv = F \times I$$

Hydrologic Soil Group	Urban land Udorthents
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From USGS Soil Survey

&gt;&gt; Assume a hydrologic soil group of C

NRCS HYDROLOGIC SOIL TYPE	APPROX. SOIL TEXTURE	TARGET DEPTH FACTOR (F)
A	sand	0.6-inch
B	loam	0.35-inch
C	silty loam	0.25-inch
D	clay	0.1-inch

Table 2.3.2: Recharge Target Depth by Hydrologic Soil Group

Target Depth Factor	0.25	in
Impervious Area	29800	sf
Required Recharge Volume (Rv)	621	cf
	0.01	ac-ft

From Table 2.3.2 (V3C1)

#### Provided Recharge Volume (Simple Dynamic Method)

Depth of Infiltration Facility (D)	1.50	ft
Saturated Hydraulic Conductivity	0.27	in/hr
Allowable Drawdown during Peak (T)	2	hrs
Minimum Required Surface Area (A)	402	sf

Rawls Rate for "C" Silt Loam

#### Provided Surface Area

Stormwater BMP 3	120	sf
Stormwater BMP 1	38	sf
Stormwater BMP 2	260	sf
Total Provided Surface Area	417	sf

#### Provided Recharge Volume (Simple Dynamic Method)

Stormwater BMP 3	179	cf
Stormwater BMP 1	56	cf
Stormwater BMP 2	390	cf
Total Provided Recharge Volume	626	cf
	0.01	ac-ft

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#### Drawdown Period

Drawdown Time = Recharge volume / (Rawl's Rate \* Bottom Area)

$Time (drawdown) = Rv / (K * A(bottom))$

Required Drawdown Period	72	hrs
Rawl's Rate of Site Soils (BMPs 1 & 2)	0.2609	in/hr
Rawl's Rate of Site Soils (BMP 3)	0.0039	in/hr

Based on Permability Tests 4/26/2018

Based on Permability Tests 4/26/2018

<u>Stormwater BMP 3</u>		
Groundwater Recharge Volume	179	cf
Bottom Area	120	sf
Time (drawdown)	4615	hrs

<u>Stormwater BMP 1</u>		
Groundwater Recharge Volume	56	cf
Bottom Area	38	sf
Time (drawdown)	69	hrs

<u>Stormwater BMP 2</u>		
Groundwater Recharge Volume	390	cf
Bottom Area	260	sf
Time (drawdown)	69	hrs

## Standard 4: Water Quality Volume

#### Required Water Quality Volume

Required Water Quality Volume = Water Quality Depth x Impervious Area

$Vwq = Dwq \times I$

Water Quality Depth	0.5	in
Impervious Area	29800	sf
Required Water Quality Volume (Vwq)	1242	cf
	0.03	ac-ft

Does not discharge to a Zone II, Interim Wellhead Protection Area, critical area, runoff from a LUHPPL or exfiltrate to soils with an infiltration rate >2.4 in/hr

#### Provided Water Quality Volume

Stormwater BMP 3	267	cf
Stormwater BMP 1	57	cf
Stormwater BMP 2	1054	cf
Total Provided Recharge Volume	1378	cf
	0.032	ac-ft

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**TSS Removal**

	<b>Project Area (sf)</b>	<b>Outside Project (sf)</b>	<b>TSS Rem.</b>	<b>Area x TSS</b>	
<b>Entrance to Fieldstone Marketplace</b>					
§ Street Sweeping (5%)	0.8	0.5	29%	0.232	0.145
§ Deep Sump Catch Basins (25%)					
<b>Route 140 Interchange</b>					
§ Street Sweeping (5%)	0.2	0.4	29%	0.058	0.116
§ Deep Sump Catch Basins (25%)					
<b>Church Street and Park Avenue</b>					
§ Street Sweeping (5%)	0.7	3.1	29%	0.203	0.899
§ Deep Sump Catch Basins (25%)					
<b>Kings Highway</b>					
<b>Tributary to WQ Swale</b>					
§ Street Sweeping (5%)	0.03	0.03	72%	0.0216	0.0216
§ Water Quality Swale – Dry (70%)					
<b>Tributary to Park Ave Bioretention Basin</b>					
§ Street Sweeping (5%)	0.43	0	91%	0.3913	0
§ Bioretention (90%)					
<b>Tributary to Tarklin Hill Road Bioretention Basin</b>					
§ Street Sweeping (5%)	0.03	0.55	91%	0.0273	0.5005
§ Bioretention (90%)					
<b>Tributary to Pipe System</b>					
§ Street Sweeping (5%)	4.21	19.42	29%	1.2209	5.6318
§ Deep Sump Catch Basins (25%)					
<b>Total:</b>	6.4	24.00		2.1541	7.3139
<b>Weighted Effective TSS ([AreaxTSS]/Area)</b>				34%	30%

Updated based on recent Geotechnical Information

