

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Infiltration Basin (Dry)**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = **41,150** ft²
 Target Depth Factor = **0.25** inch
Rv = 857.3 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = **1,069** ft³ **v O.K.**
 Elevation = **826.3** ft

Stormwater Practice Description:

primary outlet (WEIR) set at el. 826.3

secondary outlet device (Grate) set at el. 830.6

available storage volume (1,069 cf) verified with HydroCAD storage table @ el. 826.3

wetted area @ El. 826.3 = 3,550 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = **1,069** ft³
 Rawls Rate, K = **2.41** in/hr
 Bottom Area = **3,550** ft²
Time drawdown = 1.5 Hours **v O.K.**

Comments:

Infiltration Basin (dry) with sediment forebay

impervious area is 41,150 sf (OSRD Lots 1-9 & Roadway) - see subcatchments #20-22, 25-27 & 40

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits ($K=2.41$ in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P1), Lots #1-2**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 1,760 ft²
 Target Depth Factor = 0.25 inch
Rv = 36.7 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **✓ O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading

modeled as 15' x 30' x 2' infiltration practice

available volume (436 cf) verified with HydroCAD storage table

wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours ✓ O.K.

Comments:

Individual (onsite) Bio-swale or Basin

impervious area is 1,760 sf (OSRD Lots 1-2, #20)

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P2), Lots #1-2**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

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Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 1,280 ft²
 Target Depth Factor = 0.25 inch
Rv = 26.7 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **v O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading

modeled as 15' x 30' x 2' infiltration practice

available volume (436 cf) verified with HydroCAD storage table

wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours **v O.K.**

Comments:

Individual (onsite) Bio-swale or Basin

impervious area is 1,280 sf (OSRD Lots 1-2, #21)

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P3), Lot #4**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 1,680 ft²
 Target Depth Factor = 0.25 inch
Rv = 35.0 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **v O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading

modeled as 15' x 30' x 2' infiltration practice

available volume (436 cf) verified with HydroCAD storage table

wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours **v O.K.**

Comments:

Individual (onsite) Bio-swale or Basin

impervious area is 1,680 sf (OSRD Lot 4, #22)

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P4), Lot #5**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 1,540 ft²
 Target Depth Factor = 0.25 inch
Rv = 32.1 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **v O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading

modeled as 15' x 30' x 2' infiltration practice

available volume (436 cf) verified with HydroCAD storage table

wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours v O.K.

Comments:

Individual (onsite) Bio-swale or Basin

impervious area is 1,540 sf (OSRD Lot 5, #23)

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P5), Lot #6**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume
 F = Target Depth Factor
 Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 1,820 ft²
 Target Depth Factor = 0.25 inch
Rv = 37.9 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **v O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading
 modeled as 15' x 30' x 2' infiltration practice
 available volume (436 cf) verified with HydroCAD storage table
 wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume
 K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]
 Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours v O.K.

Comments:

Individual (onsite) Bio-swale or Basin
 impervious area is 1,820 sf (OSRD Lot 6, #24)
 HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P6), Lot #7**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 1,260 ft²
 Target Depth Factor = 0.25 inch
Rv = 26.3 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **v O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading

modeled as 15' x 30' x 2' infiltration practice

available volume (436 cf) verified with HydroCAD storage table

wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours **v O.K.**

Comments:

Individual (onsite) Bio-swale or Basin

impervious area is 1,260 sf (OSRD Lot 7, #25)

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.

Required Recharge Volume (Static Method)

Project Name: **Old Northfield Road Ashby, MA**
 Stormwater Practice: **Bio-Swale or Basin (P7), Lots #8-9**
 Job #: 18131

Date: 9/6/2016
 By: DPR
 Chk: PNJ

The purpose of this spreadsheet is to demonstrate design compliance with MasDEP Stormwater Handbook Standard 3; Stormwater Recharge. **The information contained on this document is project specific and may not be re-used for any reason other than its intended purpose.**

Stormwater Recharge Calculation:

Required Recharge Volume:

$$Rv = F \times \text{impervious area}$$

Rv = Required Recharge Volume

F = Target Depth Factor

Impervious Area = paved/roof area

Input Parameters:

Impervious Area = 3,600 ft²
 Target Depth Factor = 0.25 inch
Rv = 75.0 ft³

Provided Storage Volume:

Input Parameters:

Storage Volume Provided, Rv_p = 436 ft³ **v O.K.**
 Elevation = TBD ft

Stormwater Practice Description:

TBD: To be determined by actual site grading

modeled as 15' x 30' x 2' infiltration practice

available volume (436 cf) verified with HydroCAD storage table

wetted area = 450 sf

Drawdown Calculation:

$$Time_{drawdown} = \frac{Rv_p}{(K)(Bottom Area)}$$

Rv_p = Provided Storage Volume

K = Saturated Hydraulic Conductivity,
 [Rawls Rate (see Table 2.3.3)]

Bottom Area = Bottom of Practice

Input Parameters:

Rv_p = 436 ft³
 Rawls Rate, K = 2.41 in/hr
 Bottom Area = 450 ft²
Time drawdown = 4.8 Hours **v O.K.**

Comments:

Individual (onsite) Bio-swale or Basin

impervious area is 3,600 sf (OSRD Lots 8-9, #26)

HSG = C (NRCS), with Loamy Sand texture confirmed by test pits (K=2.41 in/hr)

References:

"Massachusetts Stormwater Handbook | MassDEP." Massachusetts Executive Office of Energy and Environmental Affairs. Web. 18 Dec. 2015.