## BMP Storage Capacity Calculations and Definitions

Use the table below to help determine which BMP you the Storage capacity (i.e. design storage volume, DSV) taken from Lake Champlain BMP Accounting and Tracking Tool (LC BATT).

<table>
<thead>
<tr>
<th>Stormwater Control Type</th>
<th>Description</th>
<th>Applicable Performance Curve</th>
<th>Method for calculating Design Storage Capacity</th>
</tr>
</thead>
</table>
| Infiltration Trench             | Provides storage of runoff using the void spaces within the soil/sand/gravel mixture within the trench for infiltration into the surrounding soils. | Infiltration Trench          | DSV = void space volumes of stone and sand layers  
DSV = \((A_{\text{trench}} \times D_{\text{stone}} \times n_{\text{stone}}) + (A_{\text{trench}} \times D_{\text{sand}} \times n_{\text{sand}})\) |
| Subsurface Infiltration         | Provides storage of runoff using the combination of storage structures and void spaces within the washed stone within the system for infiltration into the surrounding soils. | Infiltration Trench          | DSV = storage volume of storage units and void space of backfill materials. Example for subsurface galleys backfilled with washed stone:  
DSV = \((L \times W \times D)_{\text{galley}} + (A_{\text{backfill}} \times D_{\text{stone}} \times n_{\text{stone}})\) |
| Surface Infiltration            | Provides storage of runoff through surface ponding (e.g., basin or swale) for subsequent infiltration into the underlying soils. | Infiltration Basin           | DSV = volume of storage structure before bypass. Example for linear trapezoidal vegetated swale.  
DSV = \((L \times ((W_{\text{bottom}} + W_{\text{top}} @ D_{\text{max}})/2) \times D)\) |
| Rain Garden/Bio-retention (no underdrains) | Provides storage of runoff through surface ponding and possibly void spaces within the soil/sand/washed stone mixture that is used to filter runoff prior to infiltration into underlying soils. | Infiltration Basin           | DSV = Ponding water storage volume and void space volumes of soil filter media. Example for raingarden:  
DSV = \((A_{\text{pond}} \times D_{\text{pond}}) + (A_{\text{soil}} \times D_{\text{soil}} \times n_{\text{soil mix}})\) |
| **Bioretention** (w/underdrain) | Provides storage of runoff by filtering through an engineered soil media. The storage capacity includes void spaces in the filter media and temporary ponding at the surface. After runoff passes through the filter media it discharges through an under-drain pipe. | Bioretention | DSV = Ponding water storage volume and void space volume of soil filter media.  
DSV = \((A_{\text{bed}} \times D_{\text{ponding}}) + (A_{\text{bed}} \times D_{\text{soil}} \times n_{\text{soil}})\) |
|---|---|---|---|
| **Gravel Wetland** | Provides surface storage of runoff in a wetland cell that is routed to an underlying saturated gravel internal storage reservoir (ISR). Outflow is controlled by an orifice that has its invert elevation equal to the top of the ISR layer and provides retention of at least 24 hours. | Gravel Wetland | DSV = pretreatment volume + ponding volume + void space volume of gravel ISR.  
DSV = \((A_{\text{pretreatment}} \times D_{\text{pretreatment}}) + (A_{\text{wetland}} \times D_{\text{ponding}}) + (A_{\text{ISR}} \times D_{\text{gravel}} \times n_{\text{gravel}})\) |
| **Porous Pavement with subsurface infiltration** | Provides filtering of runoff through a filter course and temporary storage of runoff within the void spaces of a subsurface gravel reservoir prior to infiltration into subsoils. | Infiltration Trench | DSV = void space volumes of gravel layer  
DSV = \((A_{\text{pavement}} \times D_{\text{stone}} \times n_{\text{stone}})\) |
| **Porous pavement w/ impermeable underlining or underdrain** | Provides filtering of runoff through a filter course and temporary storage of runoff within the void spaces prior to discharge by way of an underdrain. | Porous Pavement | Depth of Filter Course = \(D_{\text{FC}}\) |
| **Sand Filter w/underdrain** | Provides filtering of runoff through a sand filter course and temporary storage of runoff through surface ponding and within void spaces of the sand and washed stone layers prior to discharge by way of an underdrain. | Sand Filter | DSV = pretreatment volume + ponding volume + void space volume of sand and washed stone layers.  
DSV = \((A_{\text{pretreatment}} \times D_{\text{pretreatment}}) + (A_{\text{bed}} \times D_{\text{ponding}}) + (A_{\text{bed}} \times D_{\text{sand}} \times n_{\text{sand}}) + (A_{\text{bed}} \times D_{\text{stone}} \times n_{\text{stone}})\) |
| **Wet Pond** | Provides treatment of runoff through routing through permanent pool. | Wet Pond | DSV= Permanent pool volume prior to high flow bypass  
DSV=\(A_{\text{pond}} \times D_{\text{pond}}\) (does not include pretreatment volume) |
| **Extended Dry Detention Basin** | Provides temporary detention storage for the design storage volume to drain in 24 hours through mutliple out let controls. | Dry Pond | DSV= Ponding volume prior to high flow bypass  
DSV=\(A_{\text{pond}} \times D_{\text{pond}}\) (does not include pretreatment volume) |
Grass Conveyance Swale | Conveys runoff through an open channel vegetated with grass. Primary removal mechanism is infiltration.
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Grass Swale | DSV = Volume of swale at full design flow
| \( DSV = L_{\text{swale}} \times A_{\text{crossect. swale}} \)

**Footnotes:**

DSV= Design Storage Volume = physical storage capacity to hold water

VSV=Void Space Volume

L= length, W= width, D= depth at design capacity before bypass, n=porosity fill material, A= average surface area for calculating volume

Infiltration rate = saturated soil hydraulic conductivity