

## Calculation for Constructed Wetland Storage Capacity

Project Name: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

Property Address: \_\_\_\_\_

MSD Reviewer: \_\_\_\_\_  
 WM No. \_\_\_\_\_

Development/Property Name: \_\_\_\_\_

GMP Number: \_\_\_\_\_

Design Firm: \_\_\_\_\_

Design Engineer: \_\_\_\_\_ Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

KY PE No.: \_\_\_\_\_

### Step A. Site Planning Recommendation

Define goals and primary function of constructed wetlands based on the Constructed Wetlands Step by Step Design Procedures beginning on page 18.5.3-9 as well as Table 18.5.3-A. Refer to these sections as needed throughout the remainder of this calculation sheet.

### Step B. Determine the Required Water Quality Volume Rain Event, RE<sub>WQV</sub> in inches (Refer to Chapter 18.3; A minimum of 0.6 inches must be used):

\_\_\_\_\_ inches

### Step C. Calculate the Required Water Quality Volume (WQ<sub>V</sub> Required) of water to be removed by the Constructed Wetland

1. A = Contributing drainage area to constructed wetland: \_\_\_\_\_ ft<sup>2</sup>
2. RE<sub>WQV</sub> = Required WQ<sub>V</sub> Rain Event in inches: \_\_\_\_\_ inches
3. I = Impervious cover of the contribution drainage area in percent: \_\_\_\_\_ %
  - a.  $R_V = 0.05 + 0.009 (I) =$  \_\_\_\_\_
4. WQ<sub>V</sub> Required =  $(A/12)(RE_{WQV})(R_V) =$  \_\_\_\_\_ ft<sup>3</sup>

### Step D. Calculate the Provided Water Quality Volume (WQ<sub>V</sub> Provided), or storage capacity of Constructed Wetland

1. PD=Volume of Pretreatment Device (See Constructed Wetlands Step by Step Design Procedures or Table 18.5.3-A) \_\_\_\_\_ ft<sup>3</sup>
2. A = Area of constructed wetland: \_\_\_\_\_ ft<sup>2</sup>
3. φ = porosity of media (% void): \_\_\_\_\_ 40 %
4. M = depth of media \_\_\_\_\_ ft
5. P = ponding depth of water \_\_\_\_\_ ft
6. WQ<sub>V</sub> Provided =  $(A)[φ(M) + P]+PD$  \_\_\_\_\_ ft<sup>3</sup>

### Step E. Determine the Managed Water Quality Volume (MWQ<sub>V</sub>)

1. Determine the GMP Management Capacity of the constructed wetland in percent (Refer to Table 18.3-C for percent). Please attach model printouts or other documentation to verify retention times as required by Table 18.3-C. \_\_\_\_\_ %
2. MWQ<sub>V</sub> =  $(1/100)(\text{GMP Management Capacity in percent})(\text{WQ}_V \text{ Provided}) =$  \_\_\_\_\_ ft<sup>3</sup>
3. Is all of the WQ<sub>V</sub> Required managed or treated (i.e. is MWQ<sub>V</sub> greater than or equal to WQ<sub>V</sub> Required)? \_\_\_\_\_

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If No, adjust  $WQ_V$  Provided parameters to allow for greater storage capacity and/or proceed to Step F.

If Yes, proceed to step H.

### Step F. Calculate the Required Remaining Water Quality Volume (RWQ<sub>V</sub>)

1. Required  $RWQ_V = 2(WQ_V \text{ Required} - MWQ_V) =$  \_\_\_\_\_  $ft^3$

### Step G. Select Alternate GMPs to Treat RWQ<sub>V</sub>. Examples may include:

Check all that apply. Include additional calculation sheets as necessary.

- Green Wet Basin
- Green Dry Basin
- Catch Basin Inserts
- Proprietary Water Quality Units
- Other

1. How much additional  $WQ_V$  is removed by the Alternate GMPs? \_\_\_\_\_  $ft^3$

2. Does the Alternate GMP remove all the Required RWQV? \_\_\_\_\_

3. If Yes, proceed to step H. \_\_\_\_\_

If No, alter existing GMPs or add new ones to provide adequate storage.

### Step H. Complete O&M documentation.

Additional Calculations and Explanation (Required if design deviates from calculation sheet):

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