

## Exercise 2A – Instructions

### Given (EXAMPLE 1A):

- Drainage Area = 6.7 acres
- Post Development Land Cover:
  - Turf = 4.75 acres
  - Impervious Cover = 1.95 Acres.
- Assume “C” Soils throughout
- **ALSO GIVEN: 1-yr rainfall 2.6 inches**

### Determine:

- Approximate **Curve Number** for a **1-year storm**
- Post-development 1-year **Runoff Volume** (in watershed-inches)

### Instructions:

1. Start with the “Site Data” for EX1A
2. Copy the Site Data to DRAINAGE AREA A
3. Go to the “Channel and Flood Protection” Tab
4. Enter the Rainfall Amount
5. Review the DA A summary information
6. Save the spreadsheet for further use as “EX2A.xls” or similar

**Helpful Hints:** *Make sure to copy the site data to Drainage Area Tab.*

## **Exercise 2B – Instructions**

### **Given (EXAMPLE 2A):**

- Given the results from Exercise 2A:
  - Curve Number = 81
  - Post-Development Runoff Volume = 1.01 inches
  - Further given a pre-development CN of 74, resulting in
    - **Peak Q1 = 2.3 cfs**
    - **Runoff Volume= 0.62 in**

### **Determine:**

- Using the Energy Balance equation, determine the allowable discharge from the site

### **Instructions:**

1. Start with the results from Exercise 2A
2. Refer to the Energy Balance Equation on Pages 8-9 of Module 5 in the Participant Guide
3. Use the equation to determine the max allowable post-development rate
4. Save the spreadsheet as “EX2B.xls” or similar

**Helpful Hints:** *Be sure to use the 0.8 Improvement Factor for a site with greater than 1 acre of land disturbance.*

## **Exercise 2C – Instructions**

### **Given (EXAMPLE 1C):**

- Given the Runoff Reduction/ESD approach from Ex 1C:
  - The site is treated by a compost-amended grass channel draining to Extended Detention Level 2
    - Impervious Cover = 1.95 Acres
    - Open Space = 3.5 Acres
    - Managed Turf = 1.25 Acres
  - Further given a pre-development CN of 74, resulting in
    - **Peak Q1 = 2.3 cfs**
    - **Runoff Volume= 0.62 in**

### **Determine:**

- Using the Energy Balance equation, determine the allowable discharge from the Site

### **Instructions:**

1. Start with the results from Exercise 1C
2. Enter the 1-year precipitation (2.6 in.) into the “Channel and Flood Protection” tab
3. Review the Adjusted CN and the Post-Development Runoff Volume (with Runoff Reduction)
4. Use the Energy Balance Equation to evaluate the allowable discharge again
5. Save the spreadsheet as “EX2C.xls” or similar

**Helpful Hints:** *Be sure to use the 0.8 Improvement Factor for a site with greater than 1 acre of land disturbance.*

## **Exercise 2D – Facilitated Exercise**

### **Given:**

- The allowable discharges determined in Exercise 2B and 2C
- Post-development (1-year) inflows to the basin of:
  - 6.7 cfs (No Runoff Reduction or ESD – Scenario 1A/2A)
  - 4.2 cfs (Runoff Reduction and ESD – Scenario 1C/2C)

### **Estimate:**

- Typical detention basin volume requirements using TR-55 (Fig 6-1)

### **Instructions:**

1. Determine  $q_o/q_i$ 
  - i. No RR =  $1.1/6.7 = 0.16$
  - ii. RR/ESD =  $1.5/4.2 = 0.36$
2. Determine  $V_s/V_r$  (TR-55, Fig 6-1)
  - i. For No RR = 0.49
  - ii. For RR/ESD = 0.34
3. Multiply the Runoff Volume by the  $V_s/V_r$  ratio to identify approximate storage required for attenuation
  - i. For No RR =  $0.49 \times 0.56 \text{ ac-ft} = 0.27 \text{ ac-ft}$
  - ii. For RR/ESD =  $0.34 \times 0.44 \text{ ac-ft} = 0.15 \text{ ac-ft}$

**Helpful Hints:** Refer to Module 3 (pages 33-37) and Module 5 (pages 22-24) for additional information.