

CALCULATIONS :

Project: Channel Protection Volume Calculations
2536 Rochester Road Canandaigua

Project No.: **2759.00**
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By: **JGC**
Sheet **1 of 4**

COMPUTE CHANNEL PROTECTION STORAGE VOLUME - STORMWATER MANAGEMENT FACILITY

Channel Protection Volume: Provide 24 hours of extended detention (T) for one-year event.

Design Storms 1-YEAR (in) 1.89

1. DETERMINE THE VALUE OF THE UNIT PEAK DISCHARGE (q_u) USING TR-55 AND TYPE II

DRAINAGE AREA (A) TO FACILITY= **1.67 acres**

RUNOFF CURVE NUMBER (CN) = **91.4**

$I_a = (200/CN - 2)$ **I_a VALUE = 0.188**

I_a/P **I_a/P VALUE = 0.100**

TIME OF CONCENTRATION (T_c) = **0.185 hrs.** (FROM DRAINAGE CALCULATIONS)

Peak Unit Discharge, (q_u) (Exhibit 4-II) **$q_u = 840$ csm/in**

When $T=24$ hours, find q_o/q_i (Figure 3-15) **$q_o/q_i = 0.020$**

$V_s/V_r = 0.683 - 1.43(q_o/q_i) + 1.64(q_o/q_i)^2 - 0.804(q_o/q_i)^3$
where V_s = channel protection storage (C_{pv}) and V_r = volume of runoff in inches

V_s/V_r **V_s/V_r VALUE = 0.655**

Direct Runoff, Q (Figure 2-1) **Q VALUE = 1.10 inches**

Channel Protection Storage, V_s
 $V_s = C_{pv} = (V_s/V_r)(Q)(1/12)(\text{AREA})$

V_s **V_s VALUE = 0.100 ac-ft
4368 CF** **$C_{pv} = 4368$ CF**

Release Rate over 24 Hours $4368 \text{ ft}^3 / [(24 \text{ hr})(3600 \text{ sec / hr})] =$ **0.051 cfs**

Channel Protection Storage, $V_s =$ 4369 cf
Runoff Reduction Volume Provided, $RR_v =$ 1114 cf

Channel Protection Storage Volume Remaining after runoff reduction, C_{pv} Required = 3255 cf

CHANNEL PROTECTION VOLUME PROVIDED

ELEVATION (ft)	Surface Area (sf)	TOTAL STORAGE (ft ³)
773.50	250	0
774.00	790	260
775.00	1,380	1,345
776.00	2,035	3,053
776.30	2,253	3,696

3,696 > 3,255
OK