

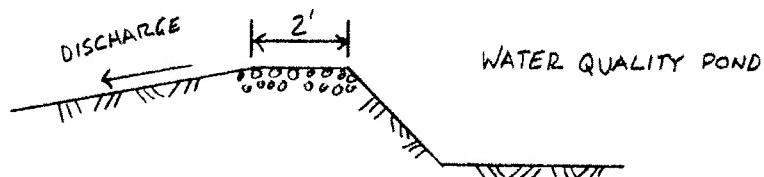
**APPENDIX F**  
**WEIR DISCHARGE ANALYSIS**

**Final Environmental Impact Statement**

**WAL-MART EXPANSION**  
**2348 NYS Route 19**  
**Town of Warsaw**  
**Wyoming County, NY**

I. WEIR DISCHARGE FROM THE PROPOSED WATER QUALITY POND

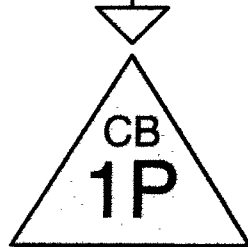
- LOOK AT 100-YEAR STORM EVENT
- USE BROAD-CRESTED RECTANGULAR WEIR,  $L = 60'$



- $Q_{IN} = Q_{OUT}$  : NO DETENTION VOLUME PROVIDED
- CONTRIBUTING AREA = 5.35 AC  
 $C_N = 95$   
 $T_C = 5 \text{ MIN.}$
- FROM HYDROCAD 9.00
  - $Q_{100-yr} = 37.46 \text{ CFS}$
  - $H = 0.38'$
  - $V = 1.61 \text{ FPS}$
- LOOK @ VELOCITY OVER A TYPICAL SECTION, DOWNSTREAM OF WEIR
  - USE 60', 80', + 120' WIDE SECTIONS
  - AVE. SLOPE = 2.76%
  - MANNING'S "N" =  
 FLOOD PLAINS - HIGH GRASS = 0.035
- SEE ATTACHED CALCS.
- AVE. FLOW VELOCITY OVER EXISTING GROUND COVER = 2.44 FPS
- SOILS INCLUDE: TOPSOIL, SILT & CLAY, GRAVEL & SHALE - PER GEOTECHNICAL ENGINEER
- FROM TABLE 3.6 -  
 OUR SITE HAS A PERMISSIBLE VELOCITY OF 5 FPS.
- $\therefore$  EXISTING GROUND COVER CAN CONVEY THE ANTICIPATED FLOW FROM THE WATER QUALITY POND WITHOUT ERODING.



INFLOW TO WATER  
QUALITY POND



(new Pond)



**Summary for Subcatchment ZONE: INFLOW TO WATER QUALITY POND**

Runoff = 37.46 cfs @ 11.96 hrs, Volume= 1.926 af, Depth= 4.32"

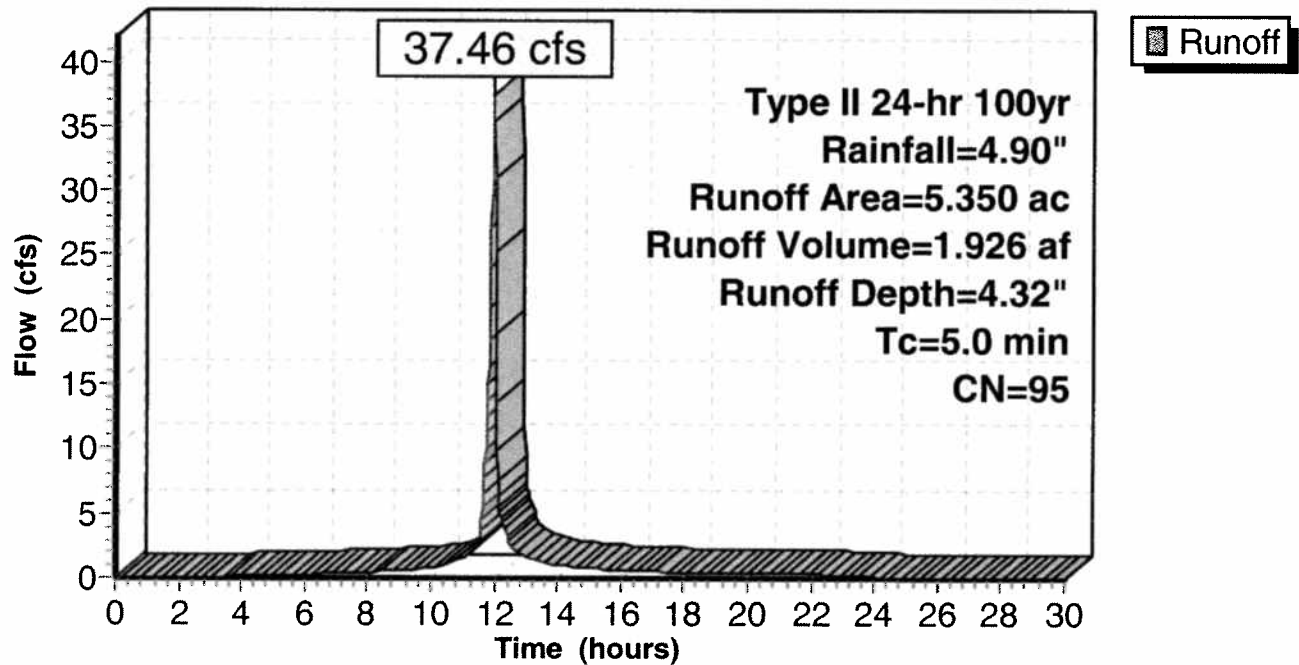
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100yr Rainfall=4.90"

Area (ac)	CN	Description
* 4.960	98	Asphalt and Building
0.390	61	>75% Grass cover, Good, HSG B
5.350	95	Weighted Average
0.390		7.29% Pervious Area
4.960		92.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment ZONE: INFLOW TO WATER QUALITY POND**

**Hydrograph**



**Summary for Pond 1P: (new Pond)**

Inflow Area = 5.350 ac, 92.71% Impervious, Inflow Depth = 4.32" for 100yr event  
 Inflow = 37.46 cfs @ 11.96 hrs, Volume= 1.926 af  
 Outflow = 37.46 cfs @ 11.96 hrs, Volume= 1.926 af, Atten= 0%, Lag= 0.0 min  
 Primary = 37.46 cfs @ 11.96 hrs, Volume= 1.926 af

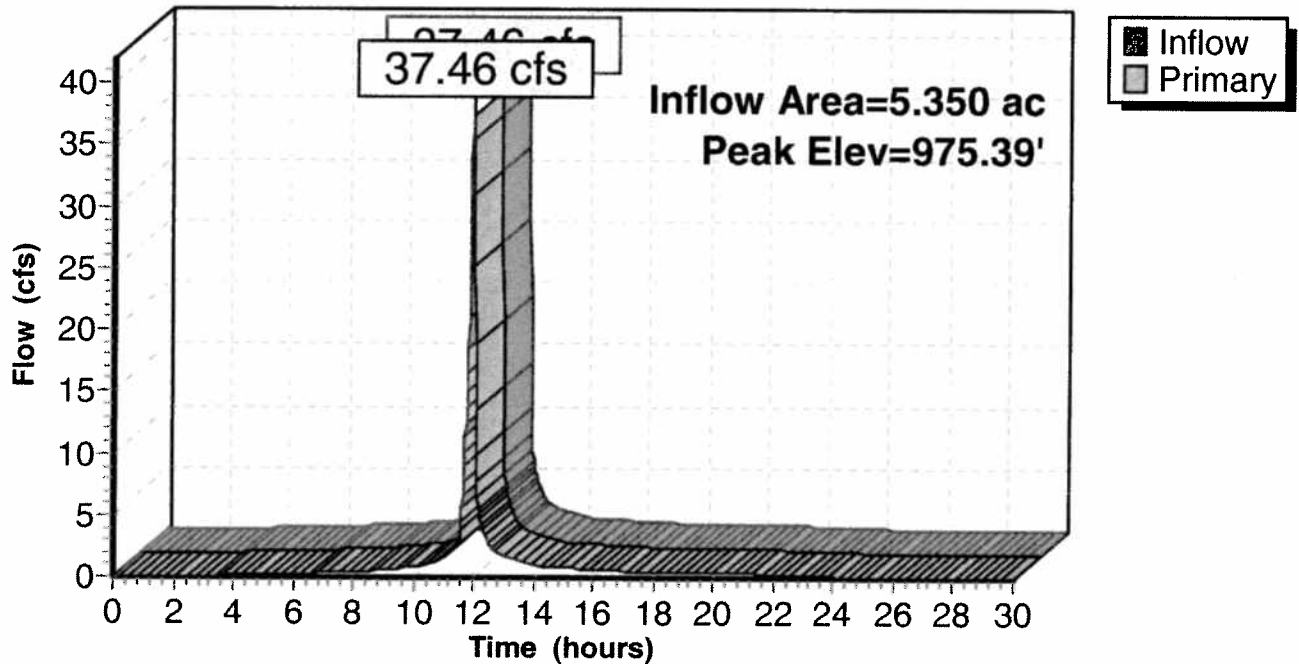
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs  
 Peak Elev= 975.39' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	975.00'	<b>60.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=37.24 cfs @ 11.96 hrs HW=975.38' (Free Discharge)  
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 37.24 cfs @ 1.61 fps)

**Pond 1P: (new Pond)**

**Hydrograph**



Walmart: Warsaw, NY Store # 2043-04  
Discharge from Water Quality Pond

$$Q=(1.49/n) AR^{2/3}S^{1/2}$$

Where

n=Manning's value

A = Flow Area

R = Hydraulic Radius (R=A/WP)

S = Slope

Assume 60' wide section of land

Flow Depth	Area (ft <sup>2</sup> )	WP	R	Slope	n	Q (cfs)	V (fps)
0.15	9	60.3	0.149	0.0192	0.035	14.94	1.66
0.19	11.4	60.38	0.189	0.0192	0.035	22.13	1.94
0.265	15.9	60.53	0.263	0.0192	0.035	38.47	2.42

Assume 80' wide section of land

Flow Depth	Area (ft <sup>2</sup> )	WP	R	Slope	n	Q (cfs)	V (fps)
0.10	8	60.2	0.133	0.0192	0.035	12.29	1.54
0.15	12	60.3	0.199	0.0192	0.035	24.13	2.01
0.20	16	60.4	0.265	0.0192	0.035	38.93	2.43

Assume 120' wide section of land

Flow Depth	Area (ft <sup>2</sup> )	WP	R	Slope	n	Q (cfs)	V (fps)
0.09	10.8	60.18	0.179	0.0192	0.035	20.27	1.88
0.10	12	60.2	0.199	0.0192	0.035	24.15	2.01
0.135	16.2	60.27	0.269	0.0192	0.035	39.80	2.46

**Table 3.6**  
**Maximum Permissible Velocities for Selected Seed Mixtures**

Cover	Slope Range <sup>2</sup> (%)	Permissible Velocity <sup>1</sup>	
		Erosion-resistant Soils (ft. per sec.) K=0.10 - 0.35 <sup>3</sup>	Easily Eroded Soils (ft. per sec.) K=0.36 - 0.80
Kentucky Bluegrass	0-5	7	5
Smooth Brome	5-10	6	4
Tall Fescue	Over 10	5	3
Grass Mixtures	<sup>2</sup> 0-5	5	4
Reed Canarygrass	5-10	4	3
Redtop Alfalfa Red Fescue	<sup>4</sup> 0-5	3.5	2.5



<sup>1</sup> Use velocities exceeding 5 feet per second only where good covers and proper maintenance can be obtained.

<sup>2</sup> Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

<sup>3</sup> K is the soil erodibility factor used in the Revised Universal Soil Loss Equation. Visit Appendix A or consult the appropriate USDA-NRCS technical guide for K values for New York State soils.

<sup>4</sup> Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

<sup>5</sup> Annuals - use on mild slopes or as temporary protection until permanent covers are established.

<sup>6</sup> Use on slopes steeper than 5 percent is not recommended.