

# NIGHT AND DAY FURNITURE

## PRELIMINARY STORMWATER REPORT

**Prepared for:**

NIGHT AND DAY FURNITURE  
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08/25/2022

This project complies with the 2013 WMC Chapter 15.12 "Stormwater Management" as well as the WMC 15.10 2005 SMMWW.

DATE: 8/25/2022

JOB #: 2105

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## **SECTION A - PROJECT OVERVIEW**

The Night and Day Furniture site is located on parcel 507950100 north of the intersection of Guild Road and Howard Way in Woodland, WA 98674. The total site is 3.06 acres and consists of field grass. The project will construct a centrally located commercial building with an asphalt drive aisle and parking around the building as well as a small turn around to the Southeast of the site. The storm system will consist of stormfilter catch basins and a detention pond to treat and detain stormwater runoff from the improvements.

The site is classified as consisting of Caples silty clay loam and Maytown silt loam soils, which are generally not suitable for infiltration. The existing topography is flat with slopes of 0-5%. There are no existing facilities onsite. The frontage improvements along Howard Way will drain to an existing catch basin on the northern edge of the improvements. The treatment and detention of the Howard Way frontage improvements was previously accounted for with the Columbia Precast Project. A ditch is located north of the site that collects the majority of the existing runoff from the site. Groundwater was found in test pits at depths ranging from 8 to 10 feet below ground service. With these site parameters considered, stormfilter catch basins and a detention pond have been selected to treat and detain runoff from site improvements.

## **SECTION B – PRE APP NOTES SUMMARY**

Stormwater Notes from the Pre-Application Conference PRE 21-006:

*The stormwater plan for this project is to comply with the City of Woodland Stormwater Regulations per WMC 15.12 and WMC 15.10 (2005 Stormwater Management Manual for Western Washington).*

## **SECTION C – DOWNSTREAM ANALYSIS**

The site's stormwater runoff currently leaves the property along the northern border via ditch. The ditch leaving the site is a well-defined open channel that connects to a network of larger ditch, Burris Creek, and eventually the Columbia River. Runoff will be released from the site below predeveloped levels. See Section D for existing and proposed peak flows and volumes.

## **SECTION D – QUANTITY CONTROL ANALYSIS AND DESIGN**

The hydrologic analysis for this site follows methods and guidelines outlined in the WMC 15.12 and the 2005 SWMMWW. The SBUH Hydrograph method was used to compute storm flows and volumes used in designing the storm system. Hydrocad was used to complete the stormwater modeling. Refer to the basin summary sheet in Appendix C for acreage of pervious and impervious areas, curve numbers, length and grade of overland and channel flow, and other hydrologic parameters used in completing the analysis. Peak flows were calculated for the predeveloped and developed condition for the 2-year, 10-year, and 100-year storms. The precipitation depths used for all storms are included in Appendix B.

A detention pond is being proposed for the source of flow control design for stormwater onsite. The pond has been designed to detain and release ½ of the 2-year, the entire 10 and 100-year storms at or below predeveloped rates for the existing basin. Live storage will also be located above the high groundwater elevation. The following table summarizes the detention pond

design. For detailed information on the pond and outlet control structures see Section L – Technical Appendix.

**Table 1. Detention Pond Peak Flow Rates, Actual Release, Elevations**

24 HOUR STORM	SITE PEAK INFLOW (CFS)	DOCKS PEAK INFLOW (CFS)	PRE-DEV FLOW	ALLOWABLE DISCHARGE (CFS)	ACTUAL DISCHARGE (CFS)	STORAGE VOLUME REQUIRED (CF)	PEAK WATER SURFACE ELEVATION*
2-YEAR	1.32	0.05	0.32	0.11	0.11	11,240	2.30
10-YEAR	2.22	0.09	0.79	0.70	0.53	13,086	2.68
100-YEAR	3.20	0.13	1.37	1.24	1.23	15,927	3.26
*0' Assumed bottom elevation							

The “Docks” basin will bypass the detention pond and connect directly to the downstream manhole just prior to the discharge location. The peak inflow of the “Docks” basin for the 2, 10 and 100-year events has been subtracted from the predeveloped release flow rates for each storm event listed. The allowable discharge for the 2-year storm is equal to half of the predeveloped flow minus the “Docks” basin flow. A correction factor of 0.71 has been applied to the detention portion of the pond in HydroCAD.

An emergency overflow spillway will be provided in the form of a “bird cage” style grate on the outlet control manhole in the facility for flows over the 100-year storm. The overflow will be conveyed to the downstream manhole and eventually the discharge location at the existing ditch.

## SECTION E – CONVEYANCE SYSTEMS ANALYSIS AND DESIGN

The main storm system will consist of 12" storm pipes at a minimum. The majority of the site will sheet flow to throw catch basin locations. The two loading docks at the front of the building will be collected by catch basins and routed to the manhole downstream of the pond. A pipe analysis for the 100-year storm will be performed with the final engineering design.

## SECTION F – WATER QUALITY DESIGN

All proposed surfaces except roof area in site basin have been considered pollution generating and will require basic treatment. The stormwater runoff in the Site basin ‘A’ will receive water quality treatment by three stormfilter catch basins with a total of 4 cartridges.

BASIN	REQUIRED WQ FLOW RATE (CFS)	TREATMENT BMP	PROPOSED WQ FLOW RATE (CFS)
SITE	0.1344	(4) - 27" Psorb Stormfilters	0.168

See Section L – Technical Appendix – Water Quality Design for more information. WWHM modeling was used to calculate required water quality flow rate.

## SECTION G – SOIL EVALUATION

As mentioned above in Section A, the site's soil is classified as Caples silty clay loam and Maytown silt loam. Soil Group C was used to represent the site. The site is encumbered by several conditions that make infiltration not feasible including low infiltration rates, high groundwater, and imported fill. Refer to the Geotechnical Site Investigation by NV5 inc. dated October 25, 2021.

## **SECTION H – SPECIAL REPORTS AND STUDIES**

The Geotechnical Site Investigation by NV5 investigated seismic design, soil liquefaction and dynamic settlement as well as the typical geotechnical requirements. A preliminary structural design has been completed with consideration of dynamic settlement. Groundwater was found in multiple test pits onsite. Groundwater monitoring may be completed for final engineering design. No other special reports are required at this time.

## **SECTION I – OTHER PERMITS**

A NPDES permit will be required for this site as the is over 1 acre of disturbed area. This permit will be granted prior to construction.

## **SECTION J – GROUND WATER MONITORING PROGRAM**

Groundwater was discovered between 8 to 10 feet below existing ground surface near the proposed detention pond location during the geotechnical test pits on site. The approximate ground water elevation is 8' near the pond. The detention pond has been designed to be as shallow as feasible to maximize separation to groundwater. The grading plan proposes to fill the site up to 5' to further maximize separation to groundwater.

## **SECTION K – MAINTENANCE AND OPERATIONS MANUAL**

The detention pond on site will be privately owned and maintained by the property owner. A maintenance manual will be included with final engineering.

## **SECTION L – TECHNICAL APPENDIX**

All design documents are included in Appendix C.

**APPENDIX A – MAPS**

- A-1 General Location Map
- A-2 Pre-Developed Basin Map
- A-3 Developed Basin Map

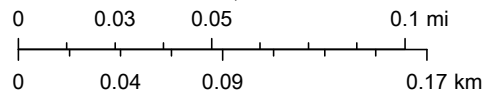
# GENERAL LOCATION MAP



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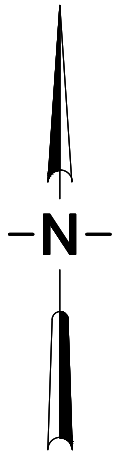
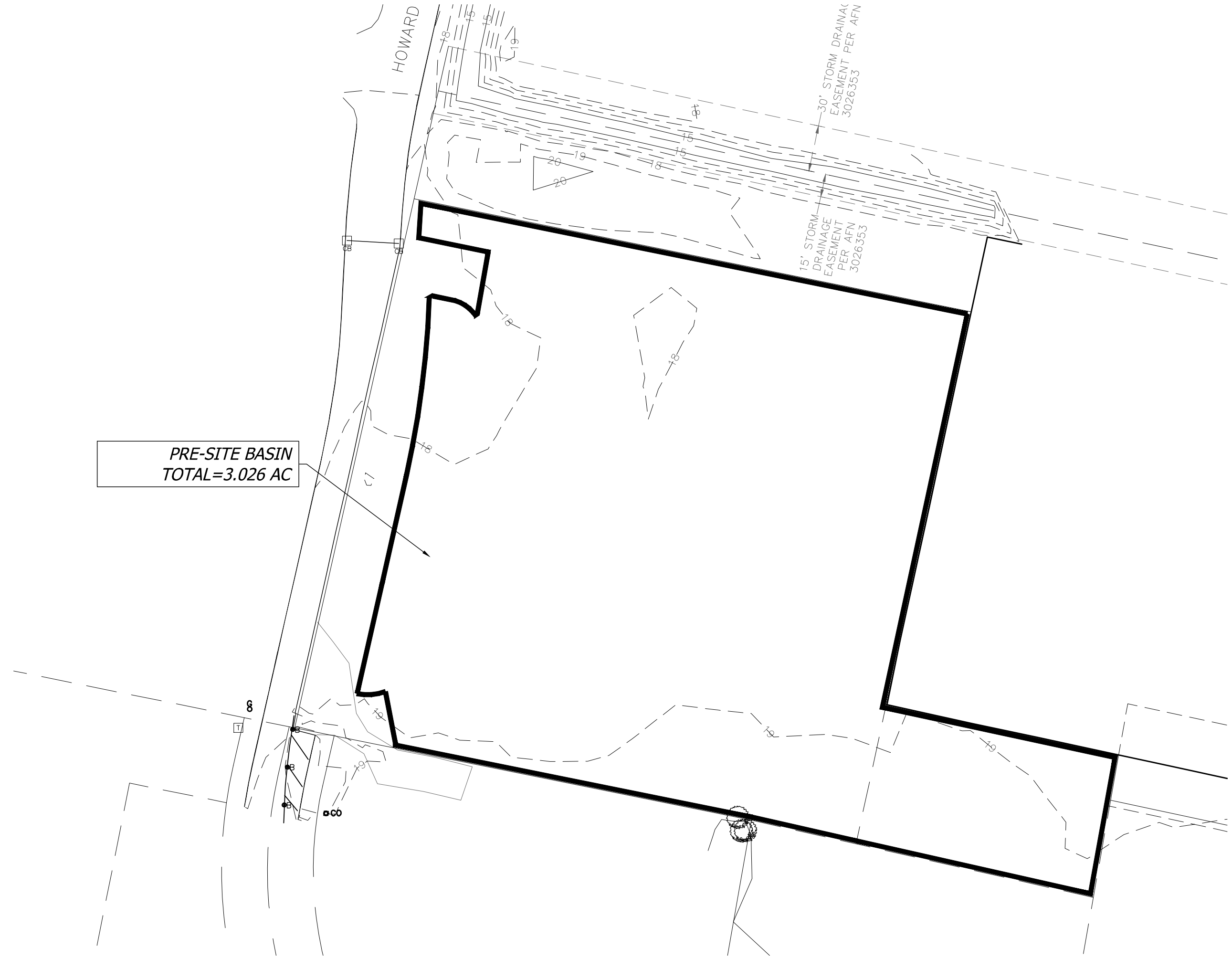
1:4,514

□ Parcels

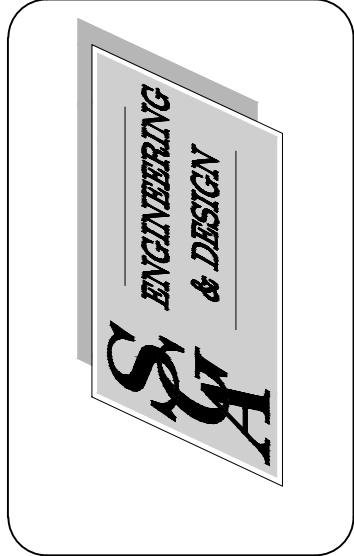


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PRE-SITE BASIN  
TOTAL=3.026 AC

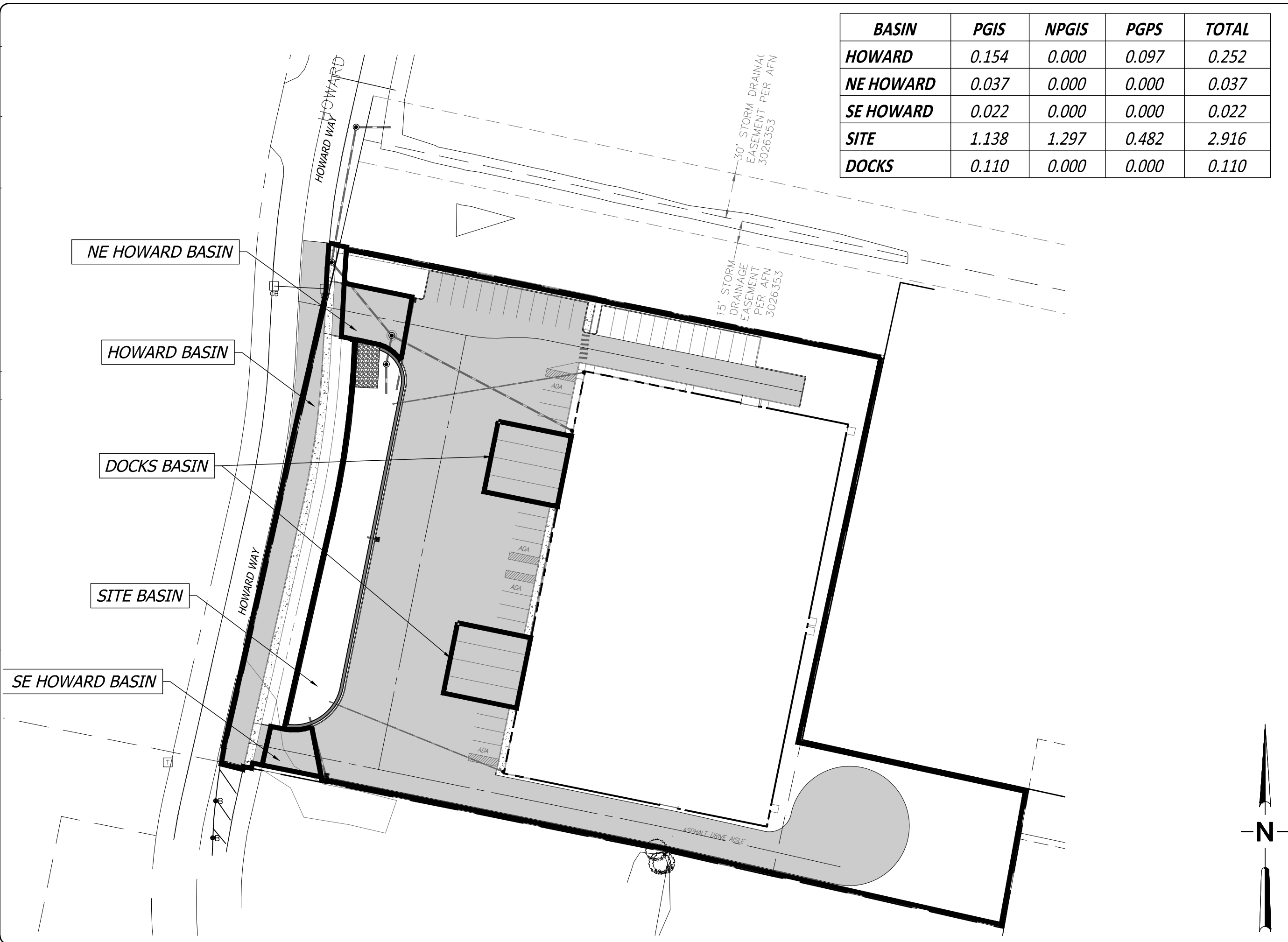


PRELIM PREDEVELOPED  
BASIN MAP  
NIGHT & DAY FURNITURE  
PARCEL #507950100  
CITY OF WOODLAND, WA

SCALE: 1" = 60'  
DATE: 5/12/2022  
PROJECT: SGA #2105



BASIN	PGIS	NPGIS	PGPS	TOTAL
HOWARD	0.154	0.000	0.097	0.252
NE HOWARD	0.037	0.000	0.000	0.037
SE HOWARD	0.022	0.000	0.000	0.022
SITE	1.138	1.297	0.482	2.916
DOCKS	0.110	0.000	0.000	0.110



**PRELIM DEVELOPED  
BASIN MAP  
NIGHT & DAY FURNITURE  
PARCEL #507950100  
CITY OF WOODLAND, WA**

SCALE: 1" = 60'  
DATE: 7/8/2022  
PROJECT: SGA #2105

## **APPENDIX B - DESIGN CRITERIA**

- B-1 NRCS Soil Types
- B-2 Curve Numbers
- B-3 n and K Values
- B-4 Isopluvials
- B-5 Cowlitz Soil Map

**APPENDIX H – NRCS Soil Type Maps**

This data is provided as a courtesy only, and should not be the sole basis for design (see SMMWW Volume III, Section 3.3.6 and <http://websoilsurvey.nrcs.usda.gov/app/>).

**Summary of Longview Soils**  
(Map on next page)



Soil ID #	Soil Name & Description	Hydrologic Group	Permeability (Ksat) in/hr		
			0 - 3' depth	3 - 6' depth	Average
17	Caples, Silty Clay Loam, 0 - 3 % Slopes	C	0.4	0.1	0.3
21 - 23	Centralia, Silt Loam, 0 - 30% Slopes	B	1.3	1.3	1.3
32	Clato, Silt Loam, 0 - 30% Slopes	B	1.3	1.3	1.3
33 - 34	Coweeman, Silt Loam, 5 - 15% Slopes	D	0.1	0.0	0.1
93 - 95	Kalama, Gravelly Loam, 8 - 60% Slopes	C	0.9	0.4	0.7
100 -103	Kelso, Silt Loam, 0 - 50% Slopes	C	1.2	0.1	0.7
141	Newberg, Fine Sandy Loam, 0 - 3% Slopes	B	6.0	13.0	9.5
142 - 145	Olequa, Silt Loam, 0 - 65% Slopes	B	1.3	1.3	1.3
146 - 150	Olympic, Silt Loam, 2 - 65% Slopes	B	1.3	1.3	1.3
160	Pilchuck, Fine Loamy Sand, 0 - 8% Slopes	A	13.0	42.5	27.8
174 - 175	Rose Valley, Silt Loam, 0 - 15% Slopes	D	0.7	0.2	0.4
188 - 191	Schneider, Very Gravelly Loam (& Rock Outcrop Complex), 5 - 90% Slopes	B	1.3	1.3	1.3
195	Semiahmoo Muck, 0 - 1% Slopes	D	1.3	0.8	1.0
199	Snohomish, Silty Clay Loam, 0 - 1% Slopes	D	0.8	1.3	1.0
<i>Other Soils</i>					
5	Arents, 0-5%	B	3.5	3.3	3.4
16	Camas, Cobbly Loam, 0 - 3%	A	18.8	21.1	19.9
65	Godfrey, Silt Loam, 0 - 30% Slopes	D	0.3	0.0	0.1
76 - 80	Hazeldell, Gravelly Silt Loam, 8 - 65%	B	1.3	1.3	1.3
127	Maytown, Silt Loam, 0 - 3%	C	1.3	0.4	0.9
162 - 165	Polepatch, Loamy Sand, (Overblown, Very Cobbly, & Extremely Bouldery), 0 - 90% Slopes	A	11	13	12
172	Riverwash	D	13	13	13
208 - 210	Stella, Silt Loam, 3 - 30%	C	1.0	0.3	0.7

Table III-1.3 SCS Western Washington Runoff Curve Numbers  
 (Published by SCS in 1982) Runoff curve numbers for selected agricultural, suburban and urban land use for Type 1A rainfall distribution, 24-hour storm duration.

LAND USE DESCRIPTION		CURVE NUMBERS BY HYDROLOGIC SOIL GROUP			
		A	B	C	D
Cultivated land(1):	winter condition	86	91	94	95
Mountain open areas:	low growing brush & grasslands	74	82	89	92
Meadow or pasture:		65	78	85	89
Wood or forest land:	undisturbed	42	64	76	81
Wood or forest land:	young second growth or brush	55	72	81	86
Orchard:	with cover crop	81	88	92	94
Open spaces, lawns, parks, golf courses, cemeteries, landscaping.					
Good condition:	grass cover on $\geq 75\%$ of the area	68	80	86	90
Fair condition:	grass cover on 50-75% of the area	77	85	90	92
Gravel roads & parking lots:		76	85	89	91
Dirt roads & parking lots:		72	82	87	89
Impervious surfaces, pavement, roofs etc.		98	98	98	98
Open water bodies:	lakes, wetlands, ponds etc.	100	100	100	100
Single family residential(2):					
Dwelling Unit/Gross Acre	%Impervious(3)				
1.0 DU/GA	15				
1.5 DU/GA	20				
2.0 DU/GA	25				
2.5 DU/GA	30				
3.0 DU/GA	34				
3.5 DU/GA	38				
4.0 DU/GA	42				
4.5 DU/GA	46				
5.0 DU/GA	48				
5.5 DU/GA	50				
6.0 DU/GA	52				
6.5 DU/GA	54				
7.0 DU/GA	56				
PUD's, condos, apartments, commercial businesses & industrial areas	%impervious must be computed				

- (1) For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Sec. 4, Hydrology, Chapter 9, August 1972.
- (2) Assumes roof and driveway runoff is directed into street/storm system.
- (3) The remaining pervious areas (lawn) are considered to be in good condition for these curve numbers.

Table III-1.4 "n" AND "k" Values Used in Time Calculations for Hydrographs

"n," Sheet Flow Equation Manning's Values (for the initial 300 ft. of travel)	$n_s$
Smooth surfaces (concrete, asphalt, gravel, or bare hand packed soil)	
0.011	
Fallow fields or loose soil surface (no residue)	0.05
Cultivated soil with residue cover ( $s \leq 0.20$ ft/ft)	0.06
Cultivated soil with residue cover ( $s > 0.20$ ft/ft)	0.17
Short prairie grass and lawns	0.15
→ <b>Dense grasses</b>	<b>0.24</b> ←
Bermuda grass	0.41
Range (natural)	0.13
Woods or forest with light underbrush	0.40
Woods or forest with dense underbrush	0.80
*Manning values for sheet flow only, from Overton and Meadows 1976 (See TR-55, 1986)	
<b>"k" Values Used in Travel Time/Time of Concentration Calculations</b>	
Shallow Concentrated Flow (After the initial 300 ft. of sheet flow, $R = 0.1$ )	$k_s$
1. Forest with heavy ground litter and meadows ( $n = 0.10$ )	3
2. Brushy ground with some trees ( $n = 0.060$ )	5
3. Fallow or minimum tillage cultivation ( $n = 0.040$ )	8
4. High grass ( $n = 0.035$ )	9
→ <b>5. Short grass, pasture and lawns (<math>n = 0.030</math>)</b>	<b>11</b> ←
6. Nearly bare ground ( $n = 0.25$ )	13
7. Paved and gravel areas ( $n = 0.012$ )	27
Channel Flow (intermittent) (At the beginning of visible channels $R = 0.2$ )	$k_c$
1. Forested swale with heavy ground litter ( $n = 0.10$ )	5
2. Forested drainage course/ravine with defined channel bed ( $n = 0.050$ )	10
3. Rock-lined waterway ( $n = 0.035$ )	15
4. Grassed waterway ( $n = 0.030$ )	17
5. Earth-lined waterway ( $n = 0.025$ )	20
6. CMP pipe ( $n = 0.024$ )	21
7. Concrete pipe (0.012)	42
8. Other waterways and pipe $0.508/n$	
Channel Flow (Continuous stream, $R = 0.4$ )	$k_c$
9. Meandering stream with some pools ( $n = 0.040$ )	20
10. Rock-lined stream ( $n = 0.035$ )	23
11. Grass-lined stream ( $n = 0.030$ )	27
12. Other streams, man-made channels and pipe $0.807/n^{**}$	

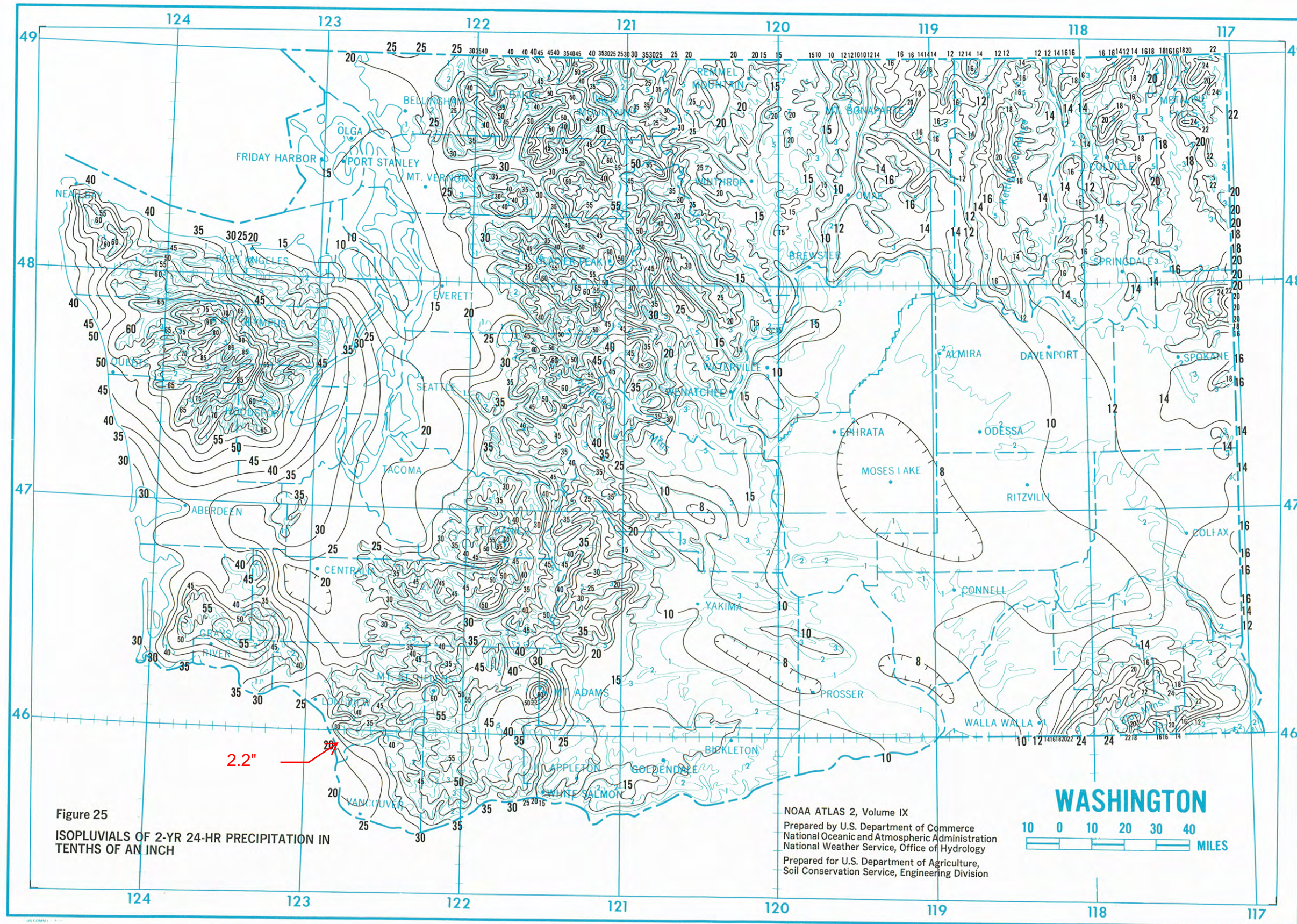


Figure 25  
ISOPLUVIALS OF 2-YR 24-HR PRECIPITATION IN  
TENTHS OF AN INCH

NOAA ATLAS 2, Volume IX  
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National Oceanic and Atmospheric Administration  
National Weather Service, Office of Hydrology  
Prepared for U.S. Department of Agriculture,  
Soil Conservation Service, Engineering Division

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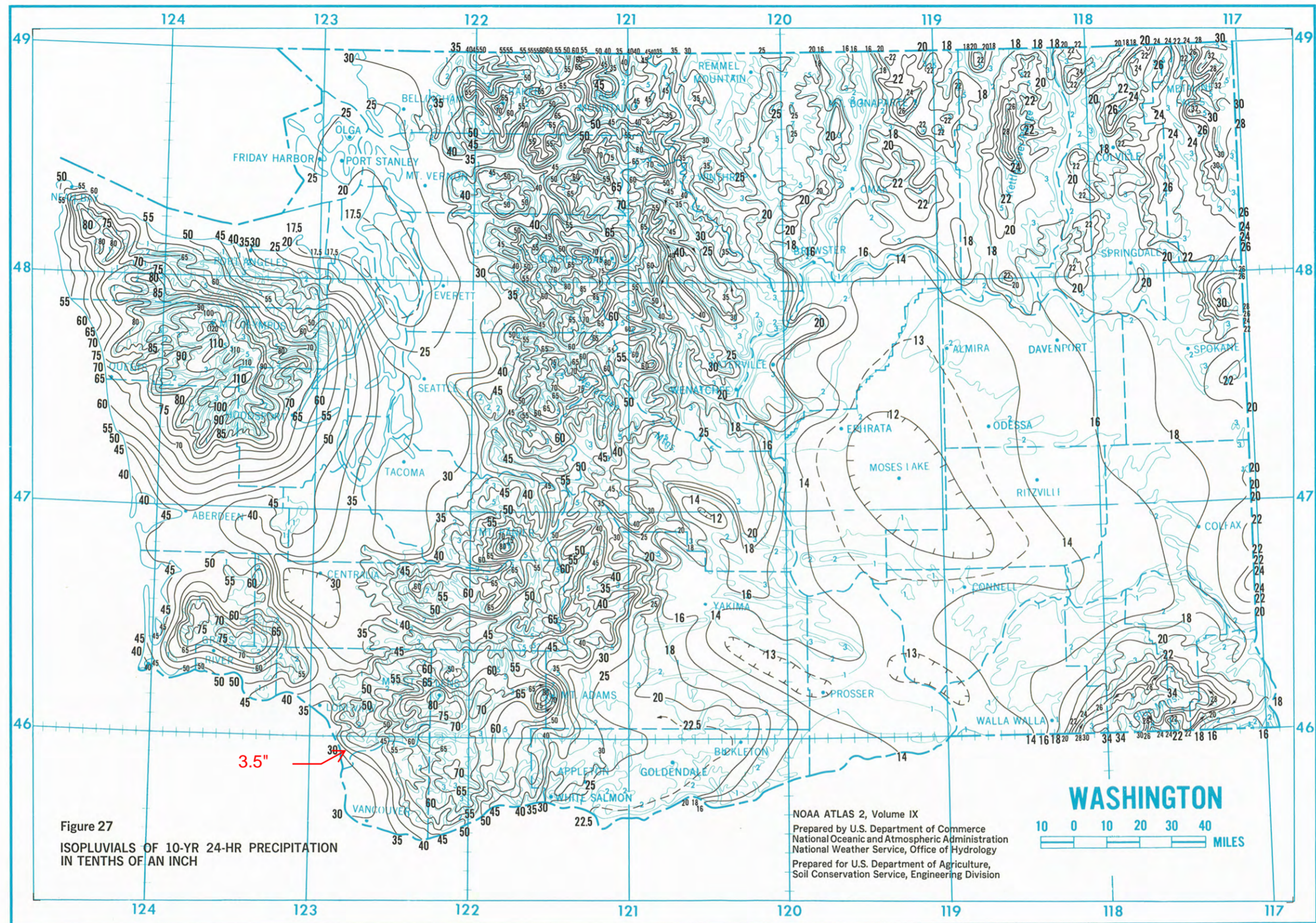
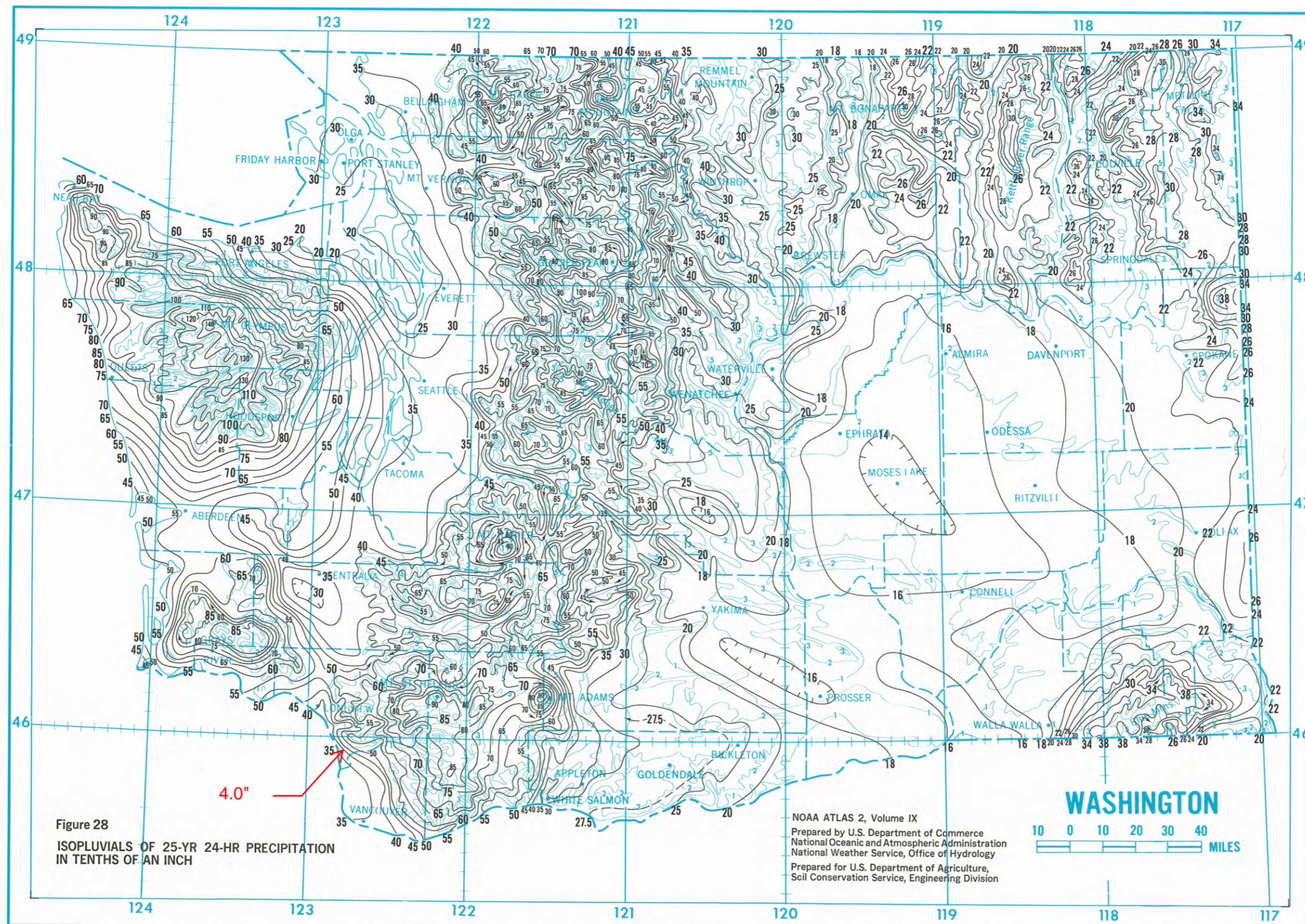


Figure 27  
ISOPLUVIALS OF 10-YR 24-HR PRECIPITATION  
IN TENTHS OF AN INCH

NOAA ATLAS 2, Volume IX  
Prepared by U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Weather Service, Office of Hydrology  
Prepared for U.S. Department of Agriculture,  
Soil Conservation Service, Engineering Division

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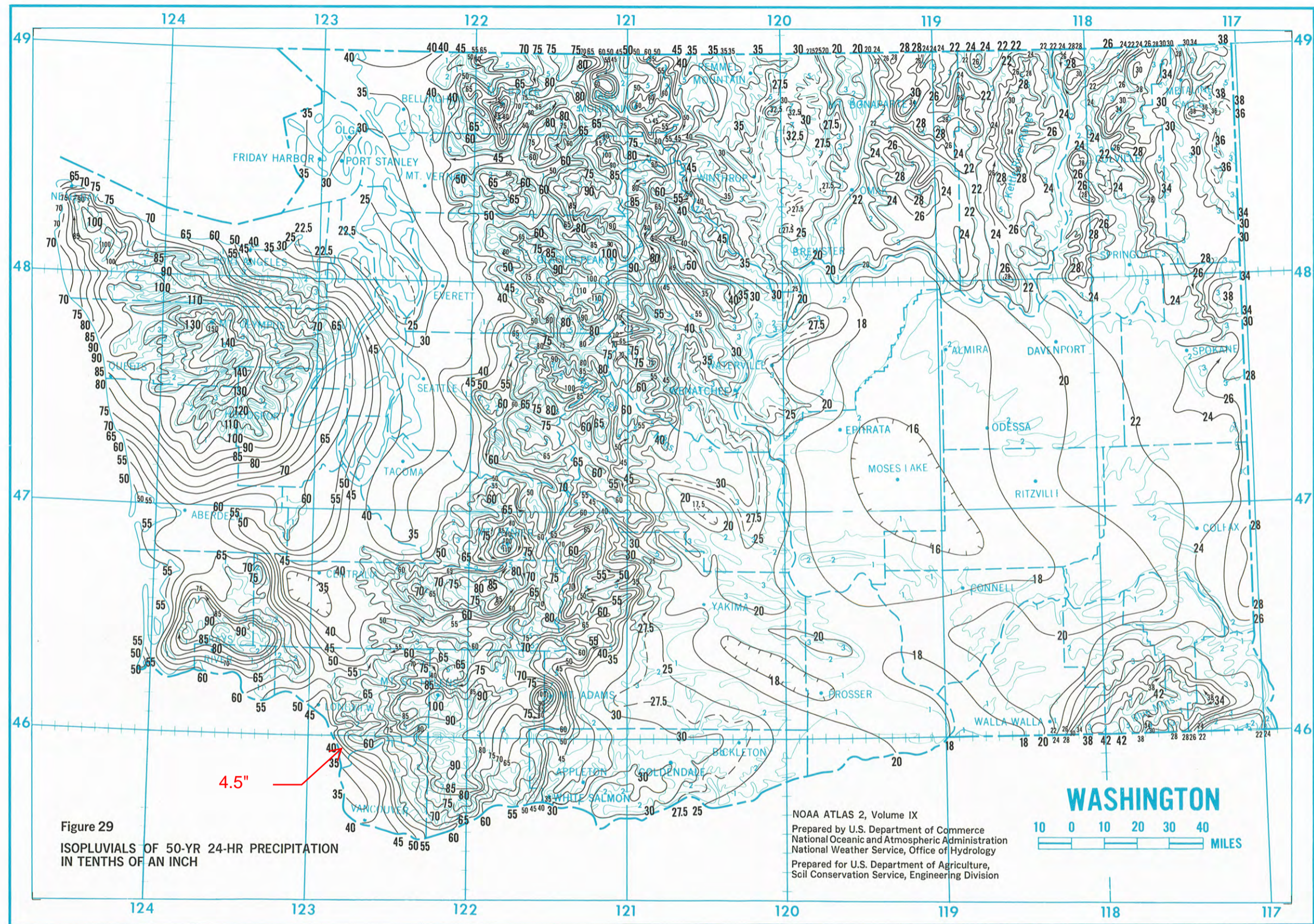


Figure 29  
ISOPLUVIALS OF 50-YR 24-HR PRECIPITATION  
IN TENTHS OF AN INCH

NOAA ATLAS 2, Volume IX  
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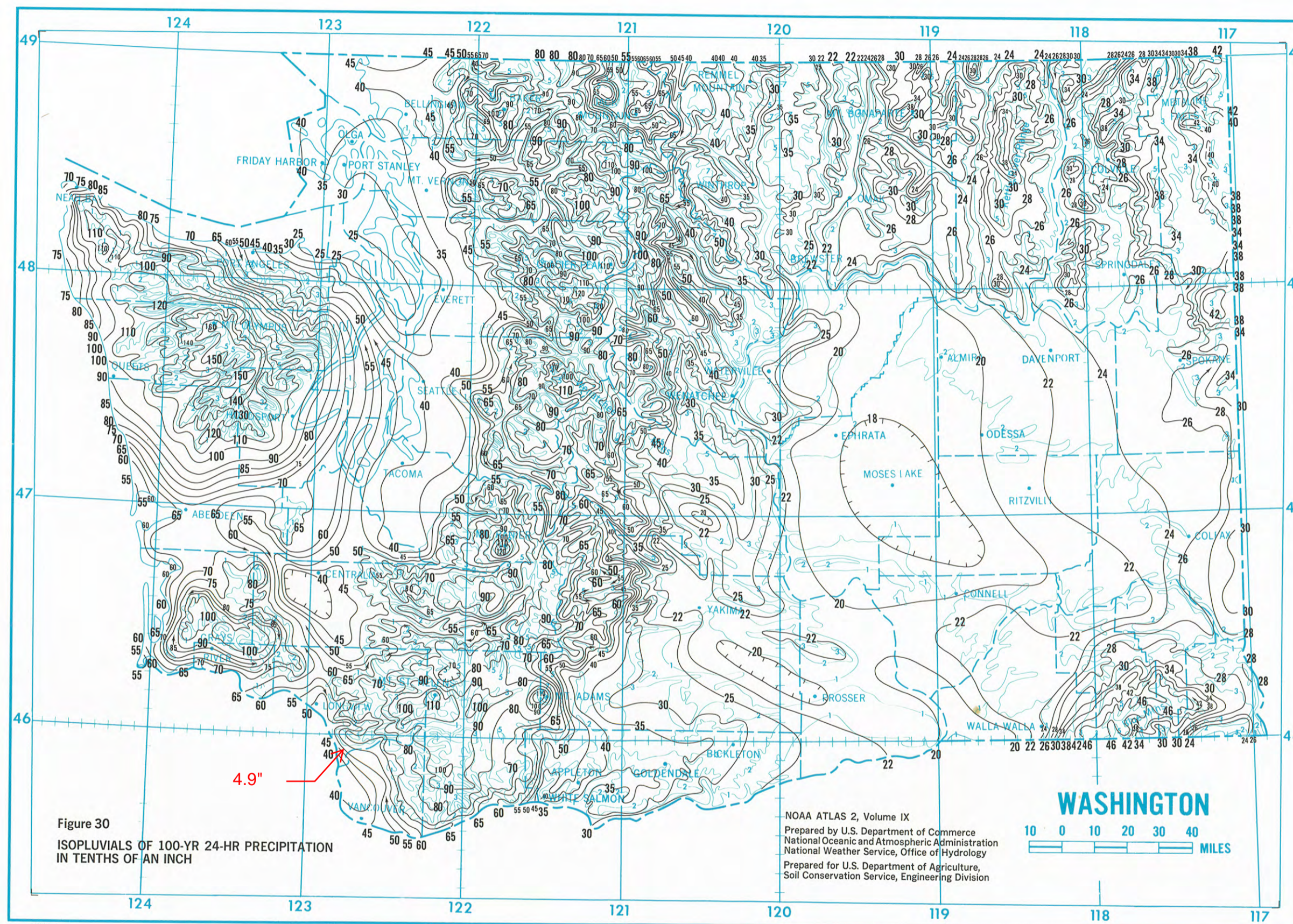


Figure 30  
ISOPLUVIALS OF 100-YR 24-HR PRECIPITATION  
IN TENTHS OF AN INCH

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## **APPENDIX C - DESIGN CALCULATIONS**

- C-1 Basin Summary Sheet
- C-2 WWHM Water Quality Analysis
- C-3 Hydrocad Predeveloped Basin Calcs
- C-4 Hydrocad Detention Design

**BASIN SUMMARY SHEET**

Night & Day Furniture

JOB #: **2105**

Basin Number	PERVIOUS		IMPERVIOUS		OVERLAND FLOW				SHALLOW / CHANNEL FLOW				Time of Conc. (min.)	PEAK FLOW				
	Area A (acres)	RCN	Area A (acres)	RCN	Length L (ft.)	Slope S (ft./ft)	"n"	Travel Time (min.)	Length L (ft.)	Slope S (ft./ft)	"k"	Vel. V (fps)		Travel Time (min.)	Water Quality (cfs)	2-Yr (cfs)	10-Yr (cfs)	100-Yr (cfs)
<b>PREDEVELOPED BASINS:</b>																		
PRE-SITE	3.03	85			300	0.01	0.24	53.54	121	0.0100	11	1.10	1.83	55.4		0.32	0.79	1.37
<b>DEVELOPED BASINS:</b>																		
SITE	0.48	86	2.44	98										*6.00		1.32	2.22	3.20
**DOCKS			0.11	98										*6.00		**0.05	**0.09	**0.13
														Allowable Wetpond Release:		0.11	0.70	1.24
														Wetpond Release:		0.11	0.53	1.23

\*\*Direct Release

Designed By: JAI  
 Checked By: JTM

W.Q. Precip.: 1.54 in.      70 % of 2-Yr.  
 2 Yr. Precip.: 2.20 in.  
 10 Yr. Precip.: 3.50 in.  
 100 Yr. Precip.: 4.90 in.

Hydrologic Soils Group: Caples

NOTES:

\*A minimum Tc of 6 minutes is used to calculate Peak Flows using the Hydrocad Program.  
 n Values: Grass= 0.24 Pavement=0.011  
 K Values: Grass = 11 Pavement = 27

# WWHM WATER QUALITY ANALYSIS

Required Water Quality Flow Rate = **0.1344 cfs**

Proposed Treatment Water Quality Flow Rate = **0.168 cfs** (4) – Contech 27" PSORB Cartridges

The screenshot displays the 'Basin 2 Mitigated' configuration window. The 'Subbasin Name' is 'WQ ROAD'. Under 'Flows To', 'Surface', 'Interflow', and 'Groundwater' are listed. The 'Area in Basin' section shows 'Available Pervious' as 0.48 acres (C, Lawn, Flat) and 'Available Impervious' as 1.42 acres (ROADS/FLAT). The 'Analysis' window is open, showing 'Water Quality' results for 'On-Line BMP' and 'Off-Line BMP'. The 'On-Line BMP' results are: 24 hour Volume (ac-ft) = 0.1938 and Standard Flow Rate (cfs) = 0.2434. The 'Off-Line BMP' result is: Standard Flow Rate (cfs) = 0.1344. At the bottom, the 'Analyze datasets' section shows '502 POC 2 Predeveloped flow' and '802 POC 2 Mitigated flow' (highlighted). The 'Flood Frequency Method' is set to 'Log Pearson Type III 17R'.

Available Pervious	Acres	Available Impervious	Acres
<input checked="" type="checkbox"/> C, Lawn, Flat	0.48	<input checked="" type="checkbox"/> ROADS/FLAT	1.42

Water Quality	On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft)	0.1938	
Standard Flow Rate (cfs)	0.2434	Standard Flow Rate (cfs) 0.1344

Analyze datasets:  Compact WDM  Delete Selected  Monthly FF

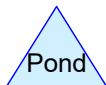
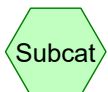
502 POC 2 Predeveloped flow  
802 POC 2 Mitigated flow

Evap POC 1 POC 2  
All Datasets Flow Stage Precip

Flood Frequency Method: Log Pearson Type III 17R



PRE A



**Routing Diagram for PREDEVELOPED**

Prepared by {enter your company name here}, Printed 8/24/2022  
HydroCAD® 10.10-5a s/n 05048 © 2020 HydroCAD Software Solutions LLC

**PREDEVELOPED**

Prepared by {enter your company name here}

HydroCAD® 10.10-5a s/n 05048 © 2020 HydroCAD Software Solutions LLC

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Page 2

**Rainfall Events Listing (selected events)**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type IA 24-hr		Default	24.00	1	2.20	2
2	10-YR	Type IA 24-hr		Default	24.00	1	3.50	2
3	100-YR	Type IA 24-hr		Default	24.00	1	4.90	2

**PREDEVELOPED**

Prepared by {enter your company name here}

Printed 8/24/2022

HydroCAD® 10.10-5a s/n 05048 © 2020 HydroCAD Software Solutions LLC

Page 3

**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
3.026	85	(PRE A)
<b>3.026</b>	<b>85</b>	<b>TOTAL AREA</b>



**PREDEVELOPED**

Prepared by {enter your company name here}

HydroCAD® 10.10-5a s/n 05048 © 2020 HydroCAD Software Solutions LLC

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Page 4

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
3.026	Other	PRE A
<b>3.026</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	3.026	3.026		PRE A
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>3.026</b>	<b>3.026</b>	<b>TOTAL AREA</b>	

**PREDEVELOPED**

Type IA 24-hr 2-YR Rainfall=2.20"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PRE A: PRE A**

Runoff Area=3.026 ac 0.00% Impervious Runoff Depth>0.91"

Tc=55.4 min CN=85/0 Runoff=0.32 cfs 0.230 af

**Total Runoff Area = 3.026 ac Runoff Volume = 0.230 af Average Runoff Depth = 0.91"**  
**100.00% Pervious = 3.026 ac 0.00% Impervious = 0.000 ac**

**PREDEVELOPED**

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Type IA 24-hr 2-YR Rainfall=2.20"

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**Summary for Subcatchment PRE A: PRE A**

Runoff = 0.32 cfs @ 8.32 hrs, Volume= 0.230 af, Depth> 0.91"

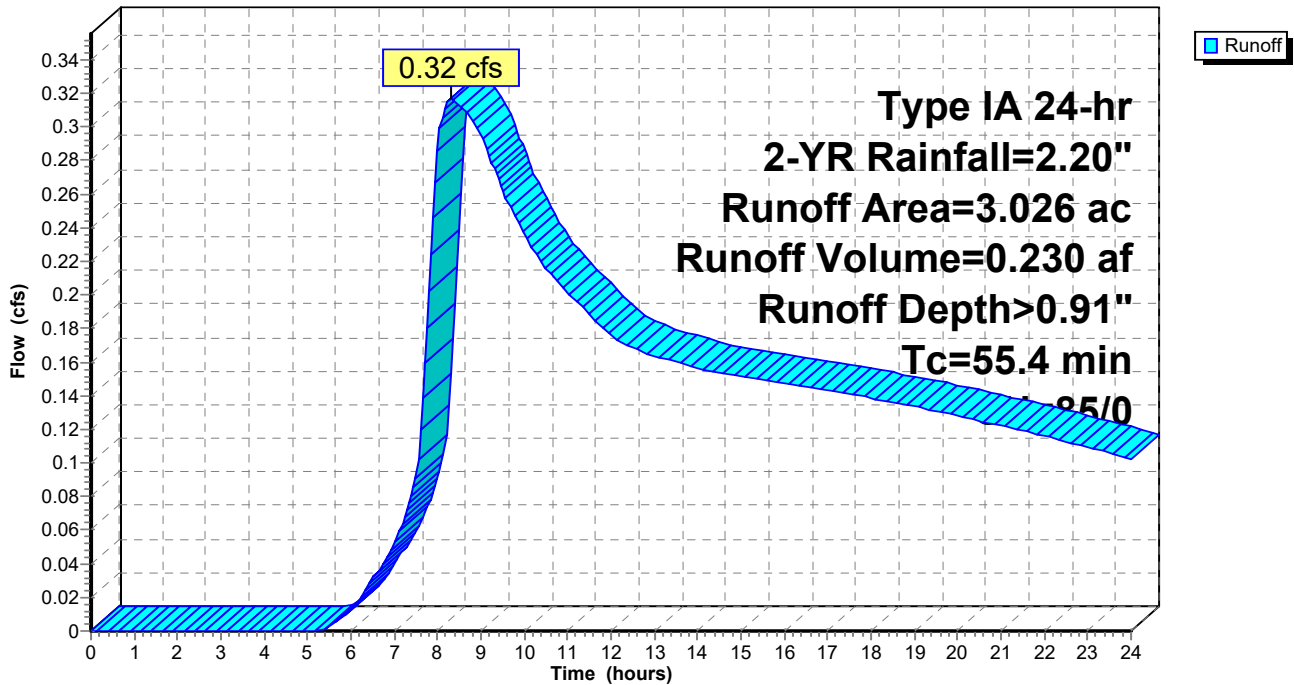
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2-YR Rainfall=2.20"

Area (ac)	CN	Description
* 3.026	85	
3.026		100.00% Pervious Area

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

**Subcatchment PRE A: PRE A**

Hydrograph



**PREDEVELOPED**

Type IA 24-hr 2-YR Rainfall=2.20"

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**Hydrograph for Subcatchment PRE A: PRE A**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	<b>0.00</b>	0.00
0.50	0.02	0.00	0.00	0.00
1.00	0.04	0.00	0.00	0.00
1.50	0.08	0.00	0.00	0.00
2.00	0.11	0.00	0.00	0.00
2.50	0.15	0.00	0.00	0.00
3.00	0.18	0.00	0.00	0.00
3.50	0.22	0.00	0.00	0.00
4.00	0.26	0.00	0.00	0.00
4.50	0.30	0.00	0.00	0.00
5.00	0.34	0.00	0.00	0.00
5.50	0.40	0.00	0.00	0.00
6.00	0.45	0.01	0.00	0.01
6.50	0.52	0.01	0.00	0.03
7.00	0.59	0.03	0.00	0.05
7.50	0.68	0.05	0.00	0.09
8.00	0.94	0.14	0.00	<b>0.29</b>
8.50	1.06	0.20	0.00	<b>0.31</b>
9.00	1.14	0.24	0.00	0.29
9.50	1.21	0.28	0.00	0.26
10.00	1.27	0.31	0.00	0.24
10.50	1.32	0.34	0.00	0.22
11.00	1.37	0.37	0.00	0.20
11.50	1.42	0.40	0.00	0.19
12.00	1.46	0.43	0.00	0.18
12.50	1.50	0.45	0.00	0.17
13.00	1.54	0.48	0.00	0.16
13.50	1.58	0.50	0.00	0.16
14.00	1.62	0.53	0.00	0.16
14.50	1.66	0.55	0.00	0.15
15.00	1.69	0.58	0.00	0.15
15.50	1.73	0.60	0.00	0.15
16.00	1.76	0.63	0.00	0.15
16.50	1.80	0.65	0.00	0.15
17.00	1.83	0.67	0.00	0.14
17.50	1.86	0.69	0.00	0.14
18.00	1.89	0.72	0.00	0.14
18.50	1.92	0.74	0.00	0.14
19.00	1.95	0.76	0.00	0.13
19.50	1.98	0.78	0.00	0.13
20.00	2.01	0.80	0.00	0.13
20.50	2.03	0.82	0.00	0.13
21.00	2.06	0.84	0.00	0.12
21.50	2.09	0.86	0.00	0.12
22.00	2.11	0.88	0.00	0.12
22.50	2.13	0.89	0.00	0.11
23.00	2.16	0.91	0.00	0.11
23.50	2.18	0.93	0.00	0.11
24.00	<b>2.20</b>	<b>0.94</b>	0.00	0.10

**PREDEVELOPED**

Type IA 24-hr 10-YR Rainfall=3.50"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PRE A: PRE A**

Runoff Area=3.026 ac 0.00% Impervious Runoff Depth>1.96"

Tc=55.4 min CN=85/0 Runoff=0.79 cfs 0.494 af

**Total Runoff Area = 3.026 ac Runoff Volume = 0.494 af Average Runoff Depth = 1.96"**  
**100.00% Pervious = 3.026 ac 0.00% Impervious = 0.000 ac**

**PREDEVELOPED**

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Type IA 24-hr 10-YR Rainfall=3.50"

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**Summary for Subcatchment PRE A: PRE A**

Runoff = 0.79 cfs @ 8.23 hrs, Volume= 0.494 af, Depth> 1.96"

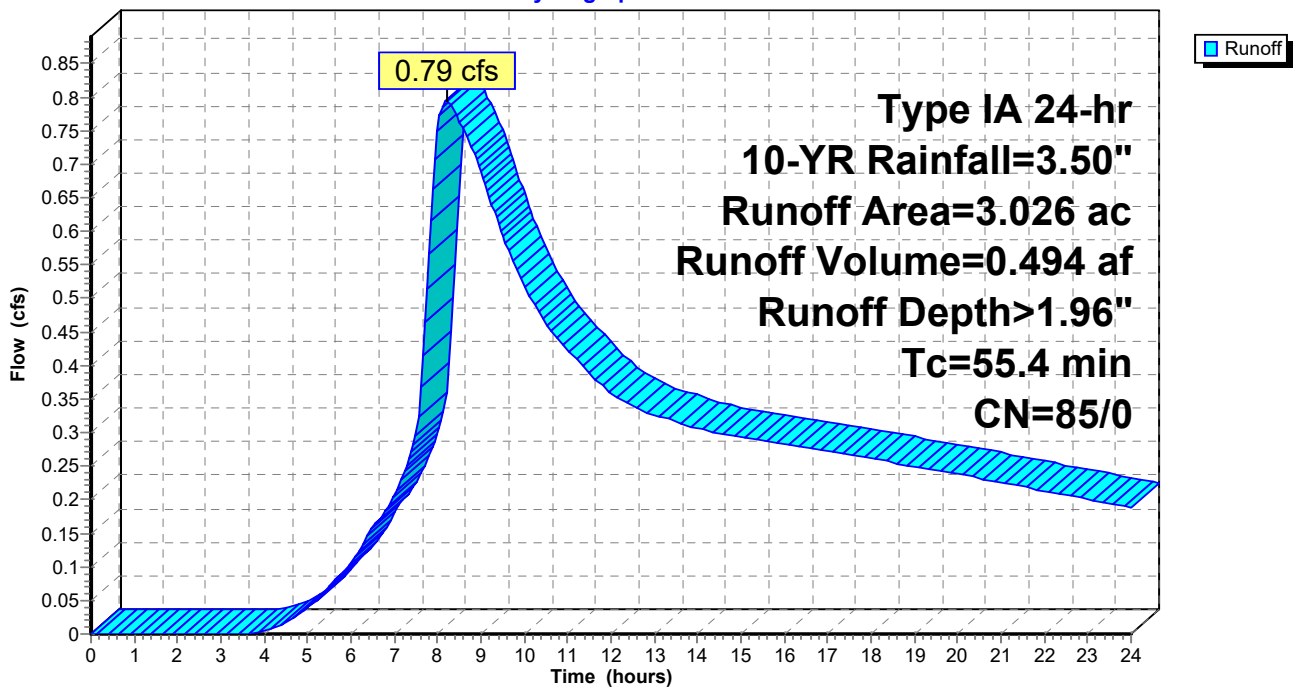
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10-YR Rainfall=3.50"

Area (ac)	CN	Description
* 3.026	85	
3.026		100.00% Pervious Area

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

**Subcatchment PRE A: PRE A**

Hydrograph



**PREDEVELOPED**

Type IA 24-hr 10-YR Rainfall=3.50"

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**Hydrograph for Subcatchment PRE A: PRE A**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	<b>0.00</b>	0.00
0.50	0.03	0.00	0.00	0.00
1.00	0.07	0.00	0.00	0.00
1.50	0.12	0.00	0.00	0.00
2.00	0.18	0.00	0.00	0.00
2.50	0.23	0.00	0.00	0.00
3.00	0.29	0.00	0.00	0.00
3.50	0.34	0.00	0.00	0.00
4.00	0.41	0.00	0.00	0.00
4.50	0.47	0.01	0.00	0.02
5.00	0.55	0.02	0.00	0.04
5.50	0.63	0.04	0.00	0.07
6.00	0.72	0.06	0.00	0.11
6.50	0.83	0.10	0.00	0.16
7.00	0.94	0.15	0.00	0.21
7.50	1.09	0.21	0.00	0.30
8.00	1.49	0.44	0.00	<b>0.75</b>
8.50	1.68	0.57	0.00	<b>0.76</b>
9.00	1.82	0.67	0.00	0.69
9.50	1.92	0.74	0.00	0.59
10.00	2.02	0.81	0.00	0.52
10.50	2.10	0.87	0.00	0.46
11.00	2.18	0.93	0.00	0.42
11.50	2.26	0.99	0.00	0.39
12.00	2.32	1.04	0.00	0.36
12.50	2.39	1.09	0.00	0.34
13.00	2.45	1.14	0.00	0.33
13.50	2.52	1.19	0.00	0.32
14.00	2.58	1.24	0.00	0.31
14.50	2.63	1.29	0.00	0.30
15.00	2.69	1.33	0.00	0.29
15.50	2.75	1.38	0.00	0.29
16.00	2.80	1.42	0.00	0.28
16.50	2.86	1.47	0.00	0.28
17.00	2.91	1.51	0.00	0.27
17.50	2.96	1.55	0.00	0.27
18.00	3.01	1.60	0.00	0.26
18.50	3.06	1.64	0.00	0.26
19.00	3.10	1.68	0.00	0.25
19.50	3.15	1.72	0.00	0.24
20.00	3.19	1.75	0.00	0.24
20.50	3.24	1.79	0.00	0.23
21.00	3.28	1.82	0.00	0.23
21.50	3.32	1.86	0.00	0.22
22.00	3.36	1.89	0.00	0.21
22.50	3.40	1.93	0.00	0.21
23.00	3.43	1.96	0.00	0.20
23.50	3.47	1.99	0.00	0.19
24.00	<b>3.50</b>	<b>2.02</b>	0.00	0.19



**PREDEVELOPED**

Type IA 24-hr 100-YR Rainfall=4.90"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment PRE A: PRE A**

Runoff Area=3.026 ac 0.00% Impervious Runoff Depth>3.19"

Tc=55.4 min CN=85/0 Runoff=1.37 cfs 0.805 af

**Total Runoff Area = 3.026 ac Runoff Volume = 0.805 af Average Runoff Depth = 3.19"**  
**100.00% Pervious = 3.026 ac 0.00% Impervious = 0.000 ac**

**PREDEVELOPED**

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Type IA 24-hr 100-YR Rainfall=4.90"

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**Summary for Subcatchment PRE A: PRE A**

Runoff = 1.37 cfs @ 8.19 hrs, Volume= 0.805 af, Depth> 3.19"

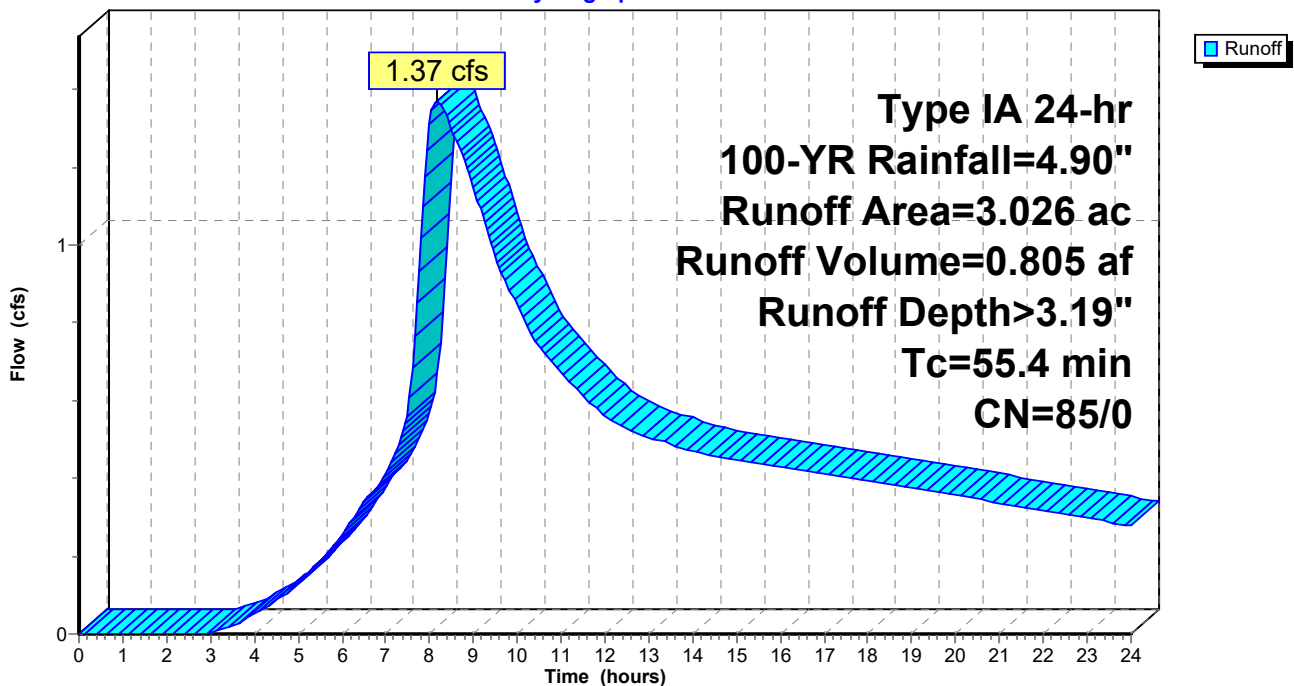
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100-YR Rainfall=4.90"

Area (ac)	CN	Description
* 3.026	85	
3.026		100.00% Pervious Area

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

**Subcatchment PRE A: PRE A**

Hydrograph



**PREDEVELOPED**

Type IA 24-hr 100-YR Rainfall=4.90"

Prepared by {enter your company name here}

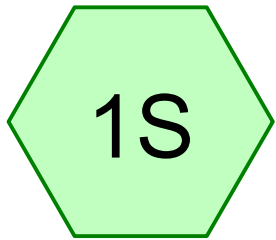
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**Hydrograph for Subcatchment PRE A: PRE A**

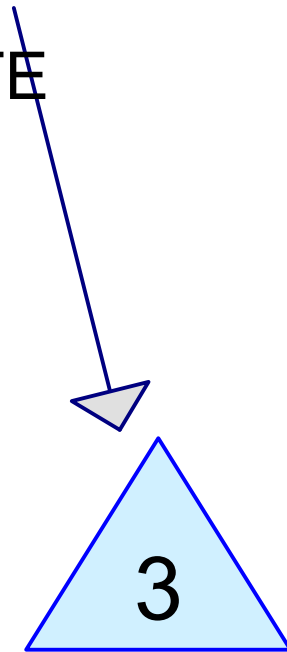
Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	<b>0.00</b>	0.00
0.50	0.05	0.00	0.00	0.00
1.00	0.10	0.00	0.00	0.00
1.50	0.17	0.00	0.00	0.00
2.00	0.25	0.00	0.00	0.00
2.50	0.32	0.00	0.00	0.00
3.00	0.40	0.00	0.00	0.00
3.50	0.48	0.01	0.00	0.02
4.00	0.57	0.02	0.00	0.05
4.50	0.66	0.05	0.00	0.09
5.00	0.76	0.08	0.00	0.13
5.50	0.88	0.12	0.00	0.19
6.00	1.01	0.18	0.00	0.25
6.50	1.16	0.25	0.00	0.34
7.00	1.31	0.34	0.00	0.41
7.50	1.52	0.46	0.00	0.56
8.00	2.08	0.86	0.00	<b>1.31</b>
8.50	2.35	1.06	0.00	<b>1.30</b>
9.00	2.55	1.22	0.00	1.15
9.50	2.69	1.34	0.00	0.97
10.00	2.83	1.44	0.00	0.84
10.50	2.94	1.54	0.00	0.74
11.00	3.06	1.64	0.00	0.67
11.50	3.16	1.72	0.00	0.61
12.00	3.25	1.80	0.00	0.56
12.50	3.35	1.88	0.00	0.53
13.00	3.43	1.96	0.00	0.50
13.50	3.52	2.04	0.00	0.49
14.00	3.61	2.11	0.00	0.47
14.50	3.69	2.18	0.00	0.46
15.00	3.77	2.25	0.00	0.45
15.50	3.85	2.32	0.00	0.44
16.00	3.92	2.39	0.00	0.43
16.50	4.00	2.46	0.00	0.42
17.00	4.07	2.52	0.00	0.41
17.50	4.14	2.59	0.00	0.40
18.00	4.21	2.65	0.00	0.39
18.50	4.28	2.71	0.00	0.38
19.00	4.35	2.77	0.00	0.38
19.50	4.41	2.83	0.00	0.37
20.00	4.47	2.88	0.00	0.36
20.50	4.53	2.94	0.00	0.35
21.00	4.59	2.99	0.00	0.34
21.50	4.65	3.04	0.00	0.33
22.00	4.70	3.09	0.00	0.32
22.50	4.75	3.14	0.00	0.31
23.00	4.80	3.19	0.00	0.30
23.50	4.85	3.23	0.00	0.29
24.00	<b>4.90</b>	<b>3.28</b>	0.00	0.28



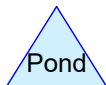
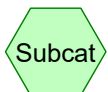
DOCKS



SITE



DETENTION A



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Page 2

**Rainfall Events Listing (selected events)**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type IA 24-hr		Default	24.00	1	2.20	2
2	10-YR	Type IA 24-hr		Default	24.00	1	3.50	2
3	100-YR	Type IA 24-hr		Default	24.00	1	4.90	2

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Page 3

**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
2.545	98	(1S, SITE)
0.482	86	(SITE)
<b>3.027</b>	<b>96</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
3.027	Other	1S, SITE
<b>3.027</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	3.027	3.027		1S, SITE
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>3.027</b>	<b>3.027</b>	<b>TOTAL AREA</b>	



**DEVELOPED**

Type IA 24-hr 2-YR Rainfall=2.20"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: DOCKS**

Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>1.97"  
Tc=6.0 min CN=0/98 Runoff=0.05 cfs 0.018 af

**Subcatchment SITE: SITE**

Runoff Area=2.917 ac 83.48% Impervious Runoff Depth>1.81"  
Tc=6.0 min CN=86/98 Runoff=1.32 cfs 0.440 af

**Pond 3: DETENTIONA**

Peak Elev=2.30' Storage=11,240 cf Inflow=1.32 cfs 0.440 af  
Outflow=0.13 cfs 0.182 af

**Total Runoff Area = 3.027 ac Runoff Volume = 0.458 af Average Runoff Depth = 1.81"**  
**15.92% Pervious = 0.482 ac 84.08% Impervious = 2.545 ac**

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Type IA 24-hr 2-YR Rainfall=2.20"

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**Summary for Subcatchment 1S: DOCKS**

Runoff = 0.05 cfs @ 7.92 hrs, Volume= 0.018 af, Depth> 1.97"

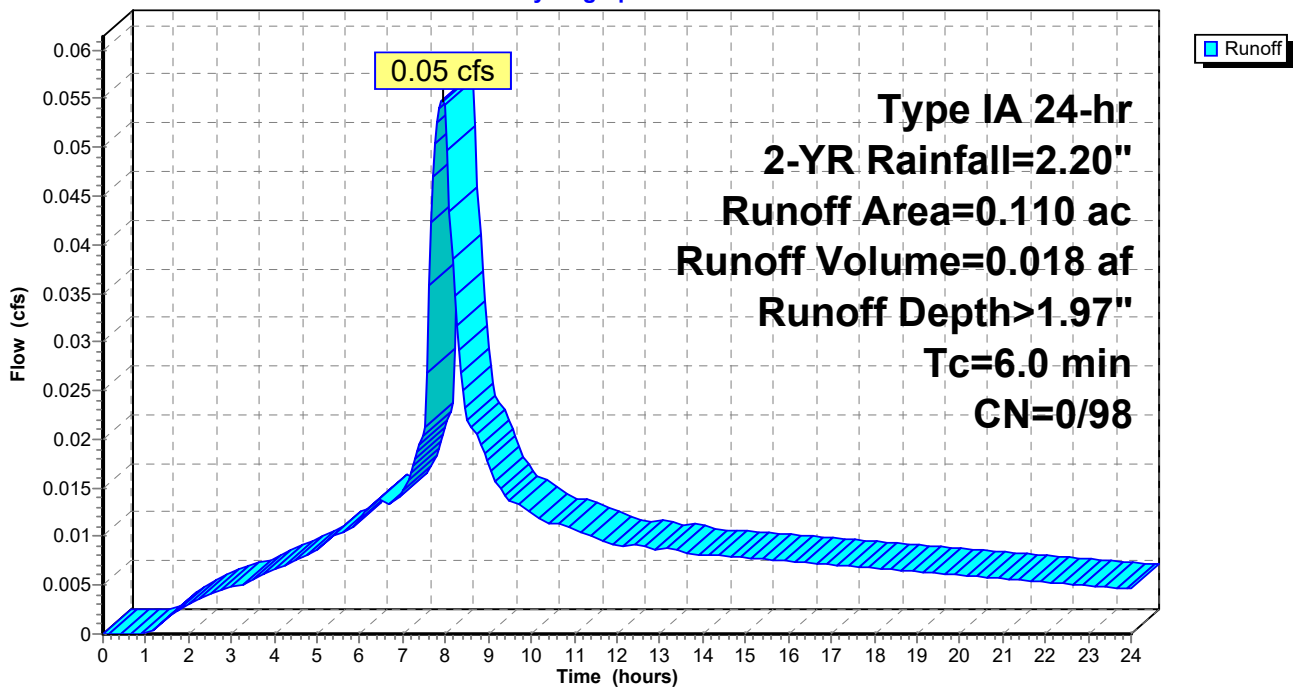
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2-YR Rainfall=2.20"

Area (ac)	CN	Description
* 0.110	98	
0.110		100.00% Impervious Area

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

**Subcatchment 1S: DOCKS**

Hydrograph



**DEVELOPED**

Type IA 24-hr 2-YR Rainfall=2.20"

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**Hydrograph for Subcatchment 1S: DOCKS**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	<b>0.00</b>	0.00	0.00
0.50	0.02	0.00	0.00	0.00
1.00	0.04	0.00	0.00	0.00
1.50	0.08	0.00	0.01	0.00
2.00	0.11	0.00	0.02	0.00
2.50	0.15	0.00	0.04	0.00
3.00	0.18	0.00	0.06	0.00
3.50	0.22	0.00	0.08	0.01
4.00	0.26	0.00	0.11	0.01
4.50	0.30	0.00	0.14	0.01
5.00	0.34	0.00	0.18	0.01
5.50	0.40	0.00	0.23	0.01
6.00	0.45	0.00	0.28	0.01
6.50	0.52	0.00	0.34	0.01
7.00	0.59	0.00	0.40	0.01
7.50	0.68	0.00	0.49	<b>0.02</b>
8.00	0.94	0.00	0.73	<b>0.05</b>
8.50	1.06	0.00	0.85	0.02
9.00	1.14	0.00	0.93	0.02
9.50	1.21	0.00	1.00	0.01
10.00	1.27	0.00	1.05	0.01
10.50	1.32	0.00	1.11	0.01
11.00	1.37	0.00	1.16	0.01
11.50	1.42	0.00	1.20	0.01
12.00	1.46	0.00	1.24	0.01
12.50	1.50	0.00	1.28	0.01
13.00	1.54	0.00	1.32	0.01
13.50	1.58	0.00	1.36	0.01
14.00	1.62	0.00	1.40	0.01
14.50	1.66	0.00	1.43	0.01
15.00	1.69	0.00	1.47	0.01
15.50	1.73	0.00	1.50	0.01
16.00	1.76	0.00	1.54	0.01
16.50	1.80	0.00	1.57	0.01
17.00	1.83	0.00	1.60	0.01
17.50	1.86	0.00	1.64	0.01
18.00	1.89	0.00	1.67	0.01
18.50	1.92	0.00	1.70	0.01
19.00	1.95	0.00	1.73	0.01
19.50	1.98	0.00	1.75	0.01
20.00	2.01	0.00	1.78	0.01
20.50	2.03	0.00	1.81	0.01
21.00	2.06	0.00	1.83	0.01
21.50	2.09	0.00	1.86	0.01
22.00	2.11	0.00	1.88	0.01
22.50	2.13	0.00	1.91	0.01
23.00	2.16	0.00	1.93	0.00
23.50	2.18	0.00	1.95	0.00
24.00	<b>2.20</b>	0.00	<b>1.97</b>	0.00

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Type IA 24-hr 2-YR Rainfall=2.20"

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**Summary for Subcatchment SITE: SITE**

Runoff = 1.32 cfs @ 7.93 hrs, Volume= 0.440 af, Depth> 1.81"

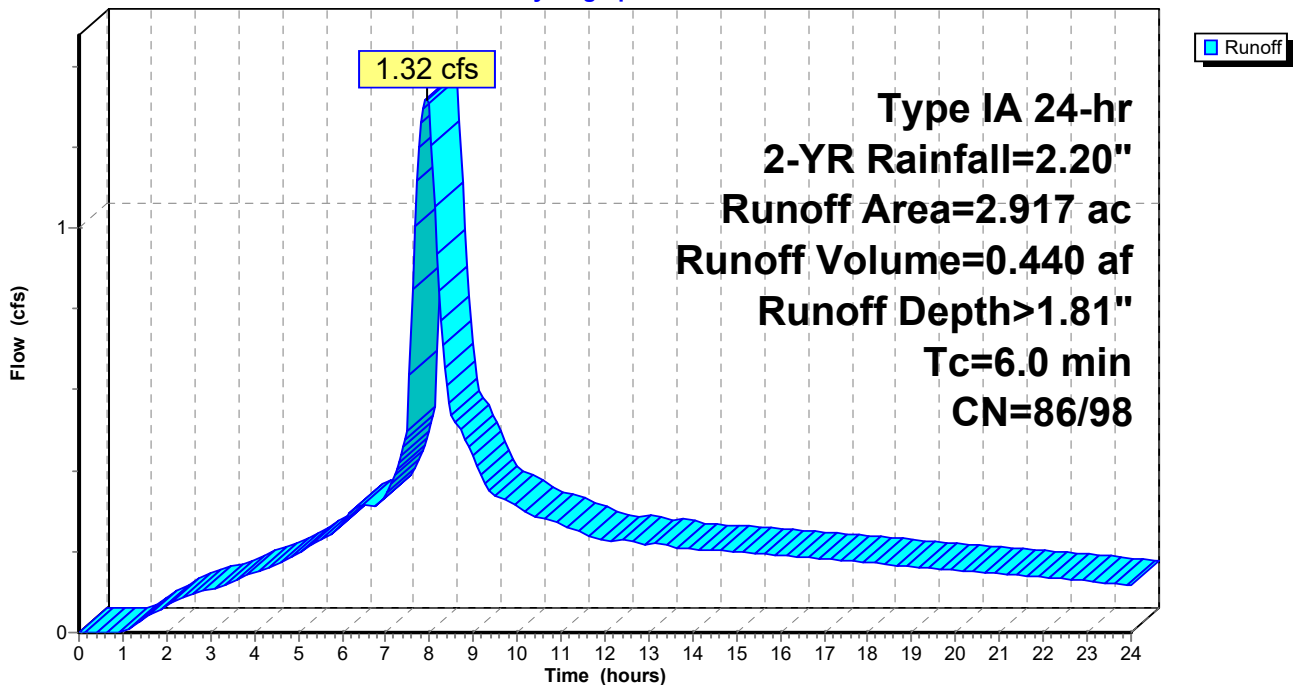
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 2-YR Rainfall=2.20"

Area (ac)	CN	Description
* 2.435	98	
* 0.482	86	
2.917	96	Weighted Average
0.482		16.52% Pervious Area
2.435		83.48% Impervious Area

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

**Subcatchment SITE: SITE**

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.20"

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**Hydrograph for Subcatchment SITE: SITE**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00	0.00
1.00	0.04	0.00	0.00	0.00
1.50	0.08	0.00	0.01	0.04
2.00	0.11	0.00	0.02	0.07
2.50	0.15	0.00	0.04	0.09
3.00	0.18	0.00	0.06	0.11
3.50	0.22	0.00	0.08	0.12
4.00	0.26	0.00	0.11	0.15
4.50	0.30	0.00	0.14	0.17
5.00	0.34	0.00	0.18	0.19
5.50	0.40	0.00	0.23	0.23
6.00	0.45	0.01	0.28	0.26
6.50	0.52	0.02	0.34	0.32
7.00	0.59	0.04	0.40	0.34
7.50	0.68	0.06	0.49	<b>0.50</b>
8.00	0.94	0.17	0.73	<b>1.30</b>
8.50	1.06	0.23	0.85	0.54
9.00	1.14	0.27	0.93	0.43
9.50	1.21	0.31	1.00	0.34
10.00	1.27	0.35	1.05	0.31
10.50	1.32	0.38	1.11	0.28
11.00	1.37	0.41	1.16	0.27
11.50	1.42	0.44	1.20	0.25
12.00	1.46	0.47	1.24	0.23
12.50	1.50	0.49	1.28	0.23
13.00	1.54	0.52	1.32	0.22
13.50	1.58	0.55	1.36	0.21
14.00	1.62	0.57	1.40	0.20
14.50	1.66	0.60	1.43	0.20
15.00	1.69	0.62	1.47	0.20
15.50	1.73	0.65	1.50	0.19
16.00	1.76	0.67	1.54	0.19
16.50	1.80	0.70	1.57	0.19
17.00	1.83	0.72	1.60	0.18
17.50	1.86	0.74	1.64	0.18
18.00	1.89	0.77	1.67	0.17
18.50	1.92	0.79	1.70	0.17
19.00	1.95	0.81	1.73	0.16
19.50	1.98	0.83	1.75	0.16
20.00	2.01	0.85	1.78	0.15
20.50	2.03	0.88	1.81	0.15
21.00	2.06	0.90	1.83	0.15
21.50	2.09	0.91	1.86	0.14
22.00	2.11	0.93	1.88	0.14
22.50	2.13	0.95	1.91	0.13
23.00	2.16	0.97	1.93	0.13
23.50	2.18	0.99	1.95	0.12
24.00	<b>2.20</b>	<b>1.00</b>	<b>1.97</b>	0.12

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**Summary for Pond 3: DETENTION A**

Inflow Area = 2.917 ac, 83.48% Impervious, Inflow Depth > 1.81" for 2-YR event  
 Inflow = 1.32 cfs @ 7.93 hrs, Volume= 0.440 af  
 Outflow = 0.13 cfs @ 22.75 hrs, Volume= 0.182 af, Atten= 90%, Lag= 889.0 min  
 Primary = 0.13 cfs @ 22.75 hrs, Volume= 0.182 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 2.30' @ 22.75 hrs Surf.Area= 4,883 sf Storage= 11,240 cf

Plug-Flow detention time= 505.6 min calculated for 0.182 af (41% of inflow)  
 Center-of-Mass det. time= 213.3 min ( 903.4 - 690.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	29,300 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) x 0.71
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,878	0	0
1.00	6,878	6,878	6,878
2.00	6,878	6,878	13,756
3.00	6,878	6,878	20,634
4.00	6,878	6,878	27,512
5.00	6,878	6,878	34,390
6.00	6,878	6,878	41,268

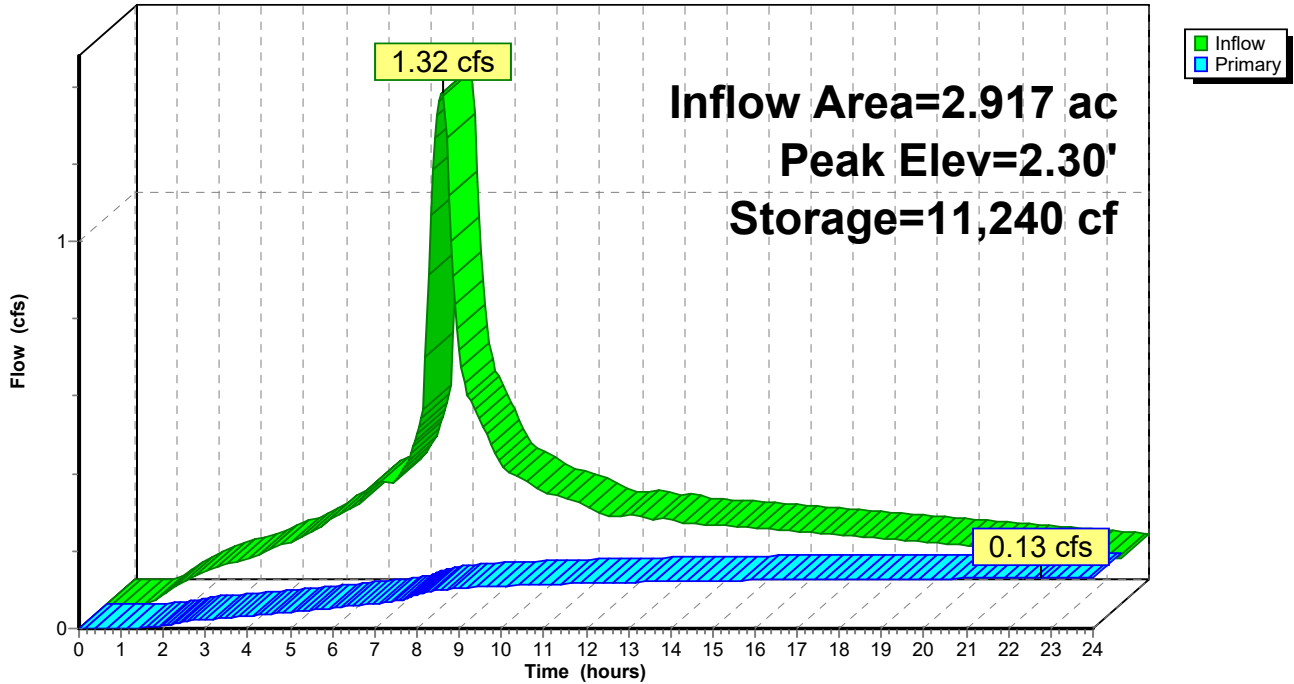
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>1.8" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	2.30'	<b>7.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	3.25'	<b>12.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.13 cfs @ 22.75 hrs HW=2.30' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.13 cfs @ 7.31 fps)
- 2=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.14 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

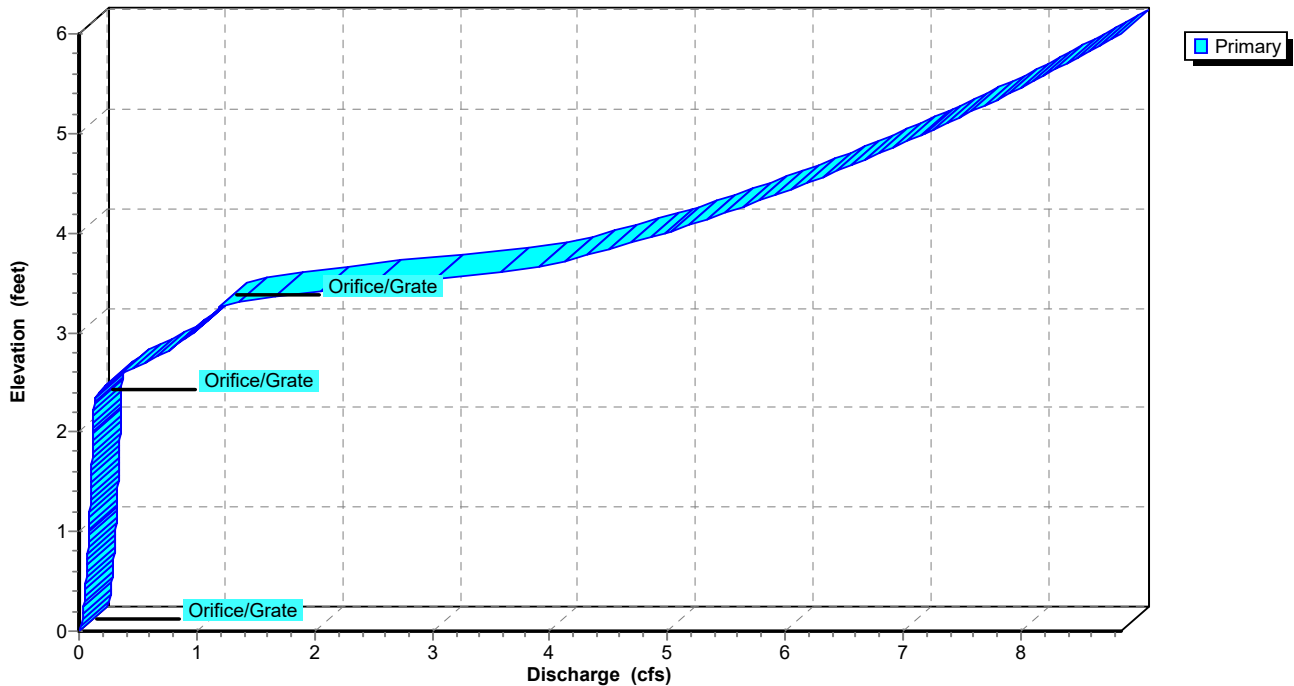
### Pond 3: DETENTION A

Hydrograph



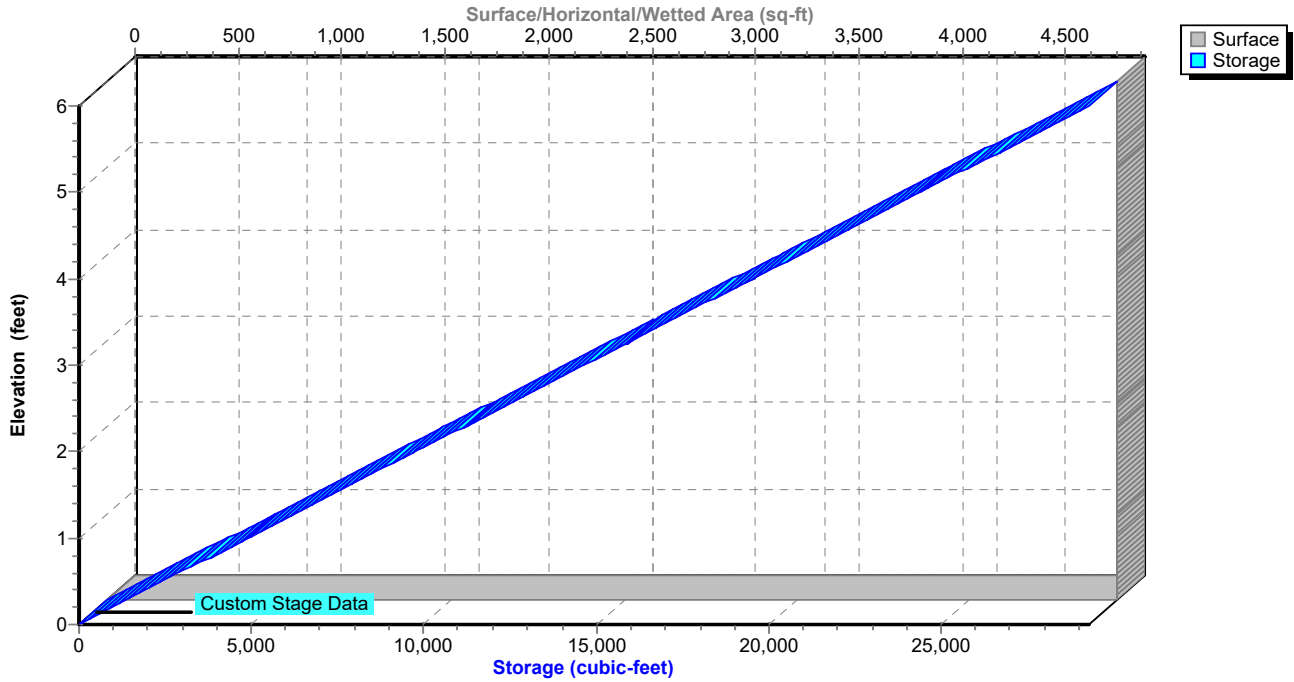
### Pond 3: DETENTION A

Stage-Discharge



### Pond 3: DETENTION A

#### Stage-Area-Storage





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**Hydrograph for Pond 3: DETENTION A**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.50	0.00	0	0.00	0.00
1.00	0.00	0	0.00	0.00
1.50	0.04	29	0.01	0.00
2.00	0.07	115	0.02	0.01
2.50	0.09	238	0.05	0.02
3.00	0.11	382	0.08	0.02
3.50	0.12	541	0.11	0.03
4.00	0.15	732	0.15	0.03
4.50	0.17	951	0.19	0.04
5.00	0.19	1,202	0.25	0.04
5.50	0.23	1,508	0.31	0.05
6.00	0.26	1,859	0.38	0.05
6.50	0.32	2,298	0.47	0.06
7.00	0.34	2,759	0.57	0.06
7.50	<b>0.50</b>	3,376	0.69	0.07
8.00	<b>1.30</b>	5,196	1.06	0.09
8.50	0.54	6,515	1.33	0.10
9.00	0.43	7,217	1.48	0.10
9.50	0.34	7,705	1.58	0.11
10.00	0.31	8,096	1.66	0.11
10.50	0.28	8,424	1.73	0.11
11.00	0.27	8,721	1.79	0.11
11.50	0.25	8,978	1.84	0.12
12.00	0.23	9,188	1.88	0.12
12.50	0.23	9,385	1.92	0.12
13.00	0.22	9,571	1.96	0.12
13.50	0.21	9,749	2.00	0.12
14.00	0.20	9,906	2.03	0.12
14.50	0.20	10,056	2.06	0.12
15.00	0.20	10,197	2.09	0.12
15.50	0.19	10,329	2.12	0.12
16.00	0.19	10,452	2.14	0.12
16.50	0.19	10,566	2.16	0.13
17.00	0.18	10,670	2.19	0.13
17.50	0.18	10,766	2.20	0.13
18.00	0.17	10,853	2.22	0.13
18.50	0.17	10,931	2.24	0.13
19.00	0.16	11,000	2.25	0.13
19.50	0.16	11,060	2.26	0.13
20.00	0.15	11,111	2.28	0.13
20.50	0.15	11,154	2.28	0.13
21.00	0.15	11,188	2.29	0.13
21.50	0.14	11,214	2.30	0.13
22.00	0.14	11,231	2.30	0.13
22.50	0.13	<b>11,239</b>	<b>2.30</b>	<b>0.13</b>
23.00	0.13	<b>11,239</b>	<b>2.30</b>	<b>0.13</b>
23.50	0.12	11,231	2.30	0.13
24.00	0.12	11,215	2.30	0.13

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**Stage-Discharge for Pond 3: DETENTION A**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.65	0.48	5.30	7.73
0.05	0.02	2.70	0.56	5.35	7.81
0.10	0.03	2.75	0.65	5.40	7.90
0.15	0.03	2.80	0.73	5.45	7.98
0.20	0.04	2.85	0.80	5.50	8.07
0.25	0.04	2.90	0.86	5.55	8.15
0.30	0.05	2.95	0.92	5.60	8.23
0.35	0.05	3.00	0.97	5.65	8.31
0.40	0.05	3.05	1.02	5.70	8.39
0.45	0.06	3.10	1.07	5.75	8.47
0.50	0.06	3.15	1.11	5.80	8.55
0.55	0.06	3.20	1.16	5.85	8.63
0.60	0.07	3.25	1.20	5.90	8.70
0.65	0.07	3.30	1.35	5.95	8.78
0.70	0.07	3.35	1.60	6.00	<b>8.86</b>
0.75	0.07	3.40	1.91		
0.80	0.08	3.45	2.27		
0.85	0.08	3.50	2.67		
0.90	0.08	3.55	3.11		
0.95	0.08	3.60	3.58		
1.00	0.09	3.65	3.88		
1.05	0.09	3.70	4.06		
1.10	0.09	3.75	4.22		
1.15	0.09	3.80	4.38		
1.20	0.09	3.85	4.54		
1.25	0.10	3.90	4.69		
1.30	0.10	3.95	4.83		
1.35	0.10	4.00	4.97		
1.40	0.10	4.05	5.11		
1.45	0.10	4.10	5.24		
1.50	0.10	4.15	5.37		
1.55	0.11	4.20	5.49		
1.60	0.11	4.25	5.61		
1.65	0.11	4.30	5.73		
1.70	0.11	4.35	5.85		
1.75	0.11	4.40	5.96		
1.80	0.11	4.45	6.08		
1.85	0.12	4.50	6.19		
1.90	0.12	4.55	6.29		
1.95	0.12	4.60	6.40		
2.00	0.12	4.65	6.50		
2.05	0.12	4.70	6.61		
2.10	0.12	4.75	6.71		
2.15	0.12	4.80	6.81		
2.20	0.13	4.85	6.90		
2.25	0.13	4.90	7.00		
2.30	0.13	4.95	7.10		
2.35	0.14	5.00	7.19		
2.40	0.16	5.05	7.28		
2.45	0.20	5.10	7.37		
2.50	0.26	5.15	7.46		
2.55	0.32	5.20	7.55		
2.60	0.40	5.25	7.64		

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**Stage-Area-Storage for Pond 3: DETENTION A**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
0.00	<b>4,883</b>	0	5.30	4,883	25,882
0.10	4,883	488	5.40	4,883	26,370
0.20	4,883	977	5.50	4,883	26,859
0.30	4,883	1,465	5.60	4,883	27,347
0.40	4,883	1,953	5.70	4,883	27,835
0.50	4,883	2,442	5.80	4,883	28,324
0.60	4,883	2,930	5.90	4,883	28,812
0.70	4,883	3,418	6.00	4,883	<b>29,300</b>
0.80	4,883	3,907			
0.90	4,883	4,395			
1.00	4,883	4,883			
1.10	4,883	5,372			
1.20	4,883	5,860			
1.30	4,883	6,348			
1.40	4,883	6,837			
1.50	4,883	7,325			
1.60	4,883	7,813			
1.70	4,883	8,302			
1.80	4,883	8,790			
1.90	4,883	9,278			
2.00	4,883	9,767			
2.10	4,883	10,255			
2.20	4,883	10,743			
2.30	4,883	11,232			
2.40	4,883	11,720			
2.50	4,883	12,208			
2.60	4,883	12,697			
2.70	4,883	13,185			
2.80	4,883	13,673			
2.90	4,883	14,162			
3.00	4,883	14,650			
3.10	4,883	15,138			
3.20	4,883	15,627			
3.30	4,883	16,115			
3.40	4,883	16,603			
3.50	4,883	17,092			
3.60	4,883	17,580			
3.70	4,883	18,069			
3.80	4,883	18,557			
3.90	4,883	19,045			
4.00	4,883	19,534			
4.10	4,883	20,022			
4.20	4,883	20,510			
4.30	4,883	20,999			
4.40	4,883	21,487			
4.50	4,883	21,975			
4.60	4,883	22,464			
4.70	4,883	22,952			
4.80	4,883	23,440			
4.90	4,883	23,929			
5.00	4,883	24,417			
5.10	4,883	24,905			
5.20	4,883	25,394			

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Type IA 24-hr 10-YR Rainfall=3.50"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: DOCKS**

Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>3.26"  
Tc=6.0 min CN=0/98 Runoff=0.09 cfs 0.030 af

**Subcatchment SITE: SITE**

Runoff Area=2.917 ac 83.48% Impervious Runoff Depth>3.07"  
Tc=6.0 min CN=86/98 Runoff=2.22 cfs 0.746 af

**Pond 3: DETENTIONA**

Peak Elev=2.68' Storage=13,086 cf Inflow=2.22 cfs 0.746 af  
Outflow=0.53 cfs 0.470 af

**Total Runoff Area = 3.027 ac Runoff Volume = 0.775 af Average Runoff Depth = 3.07"**  
**15.92% Pervious = 0.482 ac 84.08% Impervious = 2.545 ac**

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Type IA 24-hr 10-YR Rainfall=3.50"

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**Summary for Subcatchment 1S: DOCKS**

Runoff = 0.09 cfs @ 7.92 hrs, Volume= 0.030 af, Depth> 3.26"

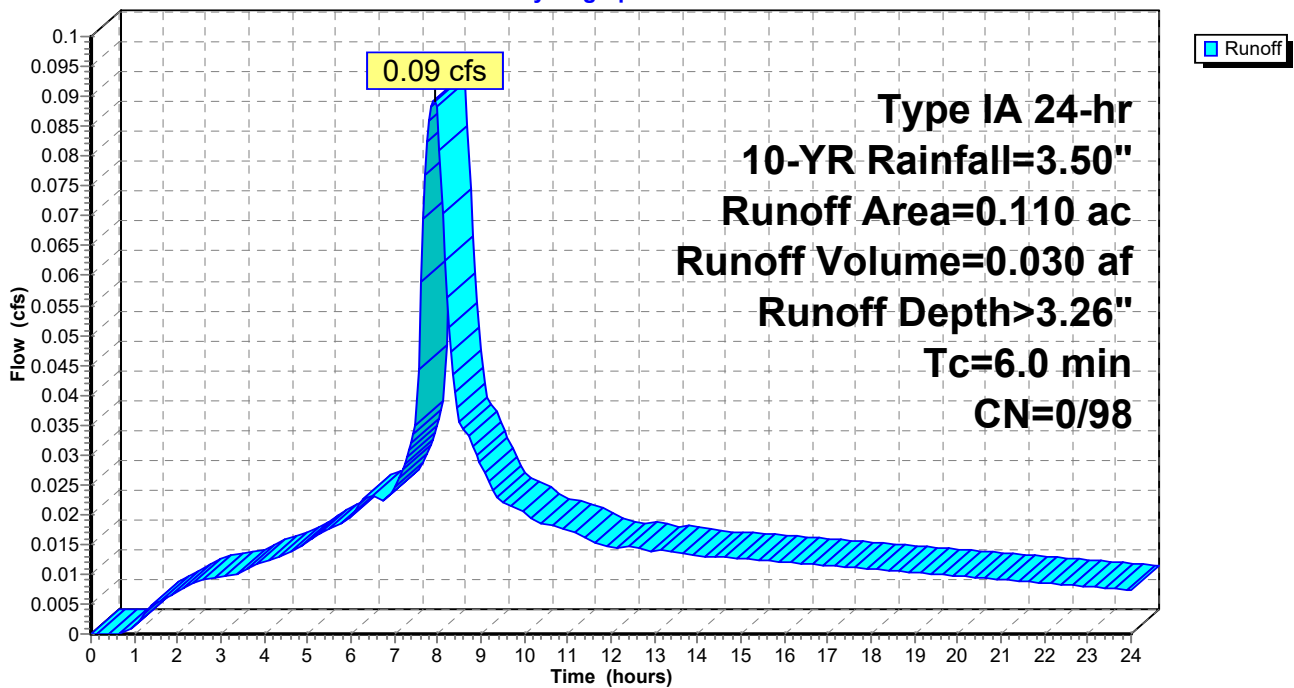
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10-YR Rainfall=3.50"

Area (ac)	CN	Description
* 0.110	98	
0.110		100.00% Impervious Area

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

**Subcatchment 1S: DOCKS**

Hydrograph



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Type IA 24-hr 10-YR Rainfall=3.50"

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**Hydrograph for Subcatchment 1S: DOCKS**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	<b>0.00</b>	0.00	0.00
0.50	0.03	0.00	0.00	0.00
1.00	0.07	0.00	0.00	0.00
1.50	0.12	0.00	0.02	0.01
2.00	0.18	0.00	0.05	0.01
2.50	0.23	0.00	0.09	0.01
3.00	0.29	0.00	0.13	0.01
3.50	0.34	0.00	0.18	0.01
4.00	0.41	0.00	0.23	0.01
4.50	0.47	0.00	0.29	0.01
5.00	0.55	0.00	0.36	0.02
5.50	0.63	0.00	0.44	0.02
6.00	0.72	0.00	0.52	0.02
6.50	0.83	0.00	0.63	0.02
7.00	0.94	0.00	0.73	0.02
7.50	1.09	0.00	0.87	<b>0.03</b>
8.00	1.49	0.00	1.27	<b>0.09</b>
8.50	1.68	0.00	1.46	0.04
9.00	1.82	0.00	1.60	0.03
9.50	1.92	0.00	1.70	0.02
10.00	2.02	0.00	1.79	0.02
10.50	2.10	0.00	1.88	0.02
11.00	2.18	0.00	1.96	0.02
11.50	2.26	0.00	2.03	0.02
12.00	2.32	0.00	2.10	0.01
12.50	2.39	0.00	2.16	0.01
13.00	2.45	0.00	2.22	0.01
13.50	2.52	0.00	2.29	0.01
14.00	2.58	0.00	2.35	0.01
14.50	2.63	0.00	2.40	0.01
15.00	2.69	0.00	2.46	0.01
15.50	2.75	0.00	2.52	0.01
16.00	2.80	0.00	2.57	0.01
16.50	2.86	0.00	2.63	0.01
17.00	2.91	0.00	2.68	0.01
17.50	2.96	0.00	2.73	0.01
18.00	3.01	0.00	2.78	0.01
18.50	3.06	0.00	2.83	0.01
19.00	3.10	0.00	2.87	0.01
19.50	3.15	0.00	2.92	0.01
20.00	3.19	0.00	2.96	0.01
20.50	3.24	0.00	3.00	0.01
21.00	3.28	0.00	3.05	0.01
21.50	3.32	0.00	3.09	0.01
22.00	3.36	0.00	3.12	0.01
22.50	3.40	0.00	3.16	0.01
23.00	3.43	0.00	3.20	0.01
23.50	3.47	0.00	3.23	0.01
24.00	<b>3.50</b>	0.00	<b>3.27</b>	0.01

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Type IA 24-hr 10-YR Rainfall=3.50"

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**Summary for Subcatchment SITE: SITE**

Runoff = 2.22 cfs @ 7.92 hrs, Volume= 0.746 af, Depth> 3.07"

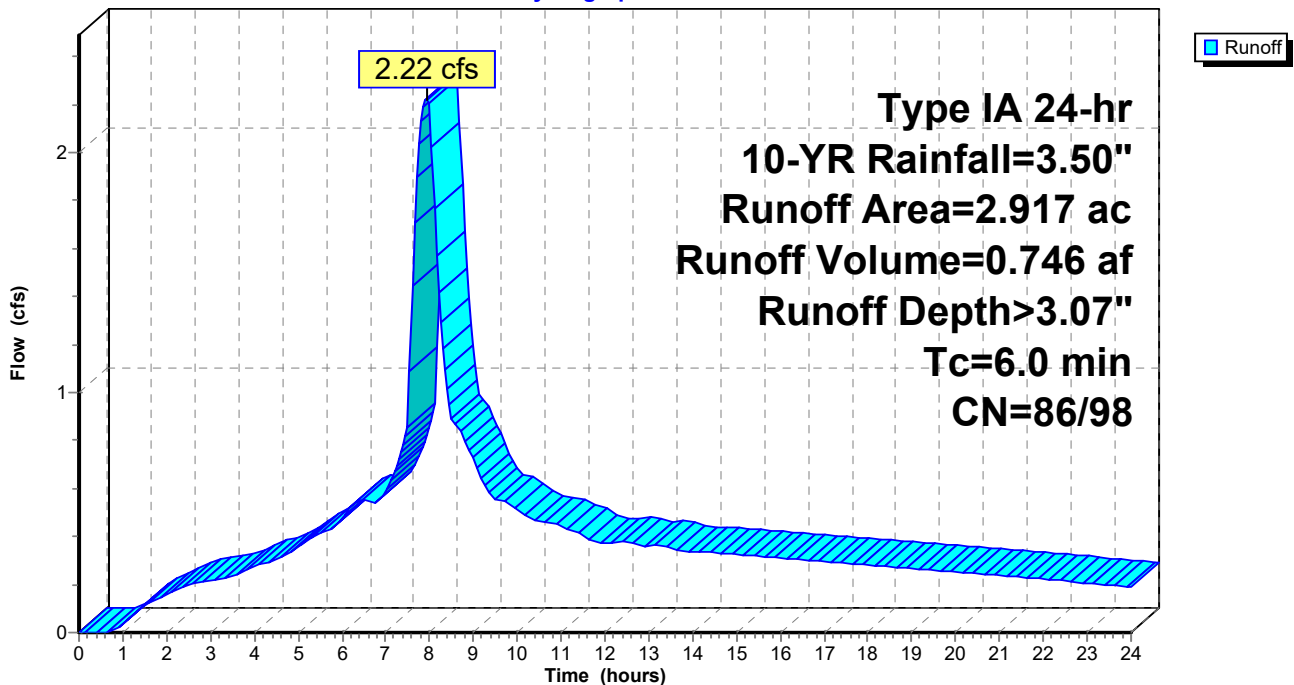
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 10-YR Rainfall=3.50"

Area (ac)	CN	Description
* 2.435	98	
* 0.482	86	
2.917	96	Weighted Average
0.482		16.52% Pervious Area
2.435		83.48% Impervious Area

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

**Subcatchment SITE: SITE**

Hydrograph



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Type IA 24-hr 10-YR Rainfall=3.50"

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**Hydrograph for Subcatchment SITE: SITE**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00	0.00
1.00	0.07	0.00	0.00	0.03
1.50	0.12	0.00	0.02	0.12
2.00	0.18	0.00	0.05	0.16
2.50	0.23	0.00	0.09	0.20
3.00	0.29	0.00	0.13	0.21
3.50	0.34	0.00	0.18	0.23
4.00	0.41	0.00	0.23	0.28
4.50	0.47	0.01	0.29	0.31
5.00	0.55	0.03	0.36	0.35
5.50	0.63	0.05	0.44	0.42
6.00	0.72	0.08	0.52	0.47
6.50	0.83	0.12	0.63	0.56
7.00	0.94	0.17	0.73	0.59
7.50	1.09	0.24	0.87	<b>0.85</b>
8.00	1.49	0.48	1.27	<b>2.19</b>
8.50	1.68	0.62	1.46	0.89
9.00	1.82	0.72	1.60	0.72
9.50	1.92	0.79	1.70	0.56
10.00	2.02	0.86	1.79	0.51
10.50	2.10	0.93	1.88	0.46
11.00	2.18	0.99	1.96	0.44
11.50	2.26	1.05	2.03	0.40
12.00	2.32	1.10	2.10	0.37
12.50	2.39	1.15	2.16	0.38
13.00	2.45	1.21	2.22	0.35
13.50	2.52	1.26	2.29	0.35
14.00	2.58	1.31	2.35	0.34
14.50	2.63	1.35	2.40	0.33
15.00	2.69	1.40	2.46	0.33
15.50	2.75	1.45	2.52	0.32
16.00	2.80	1.50	2.57	0.31
16.50	2.86	1.54	2.63	0.30
17.00	2.91	1.58	2.68	0.30
17.50	2.96	1.63	2.73	0.29
18.00	3.01	1.67	2.78	0.28
18.50	3.06	1.71	2.83	0.27
19.00	3.10	1.75	2.87	0.27
19.50	3.15	1.79	2.92	0.26
20.00	3.19	1.83	2.96	0.25
20.50	3.24	1.87	3.00	0.24
21.00	3.28	1.90	3.05	0.24
21.50	3.32	1.94	3.09	0.23
22.00	3.36	1.97	3.12	0.22
22.50	3.40	2.01	3.16	0.21
23.00	3.43	2.04	3.20	0.21
23.50	3.47	2.07	3.23	0.20
24.00	<b>3.50</b>	<b>2.10</b>	<b>3.27</b>	0.19



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**Summary for Pond 3: DETENTION A**

Inflow Area = 2.917 ac, 83.48% Impervious, Inflow Depth > 3.07" for 10-YR event  
 Inflow = 2.22 cfs @ 7.92 hrs, Volume= 0.746 af  
 Outflow = 0.53 cfs @ 9.90 hrs, Volume= 0.470 af, Atten= 76%, Lag= 118.3 min  
 Primary = 0.53 cfs @ 9.90 hrs, Volume= 0.470 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 2.68' @ 9.90 hrs Surf.Area= 4,883 sf Storage= 13,086 cf

Plug-Flow detention time= 407.8 min calculated for 0.470 af (63% of inflow)  
 Center-of-Mass det. time= 190.3 min ( 865.8 - 675.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	29,300 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) x 0.71
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,878	0	0
1.00	6,878	6,878	6,878
2.00	6,878	6,878	13,756
3.00	6,878	6,878	20,634
4.00	6,878	6,878	27,512
5.00	6,878	6,878	34,390
6.00	6,878	6,878	41,268

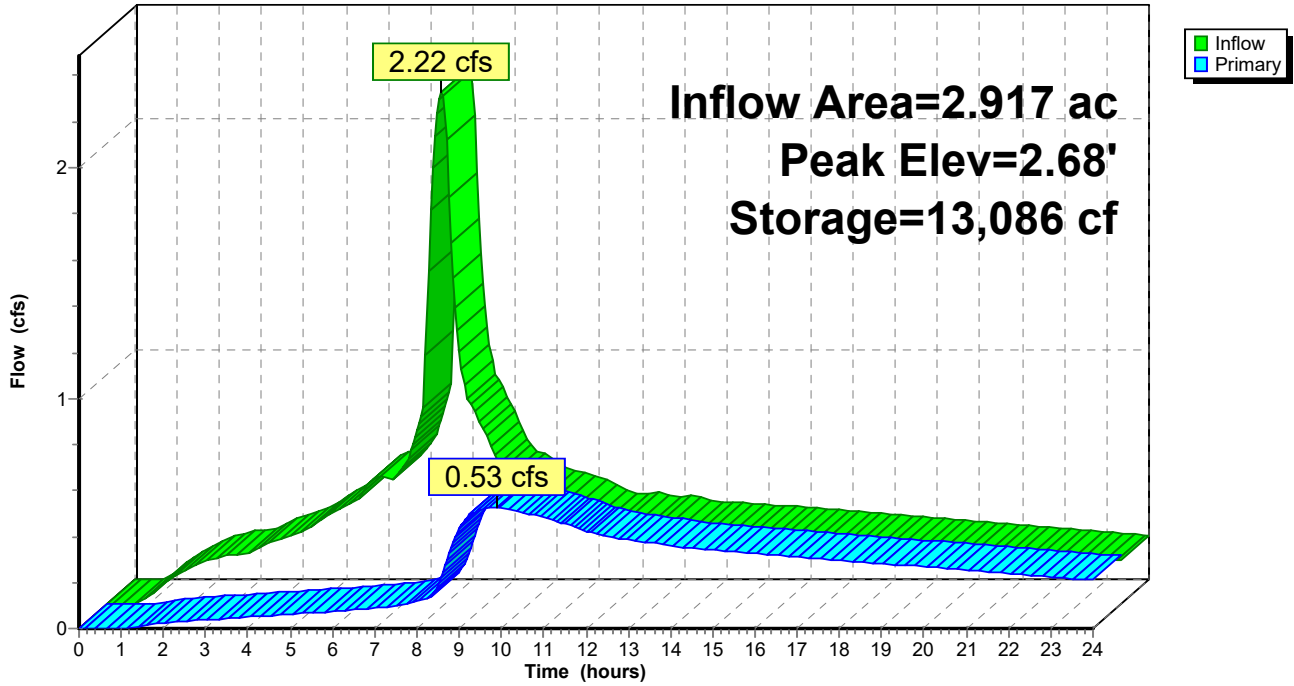
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>1.8" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	2.30'	<b>7.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	3.25'	<b>12.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.53 cfs @ 9.90 hrs HW=2.68' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.14 cfs @ 7.88 fps)
- 2=Orifice/Grate (Orifice Controls 0.39 cfs @ 2.10 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

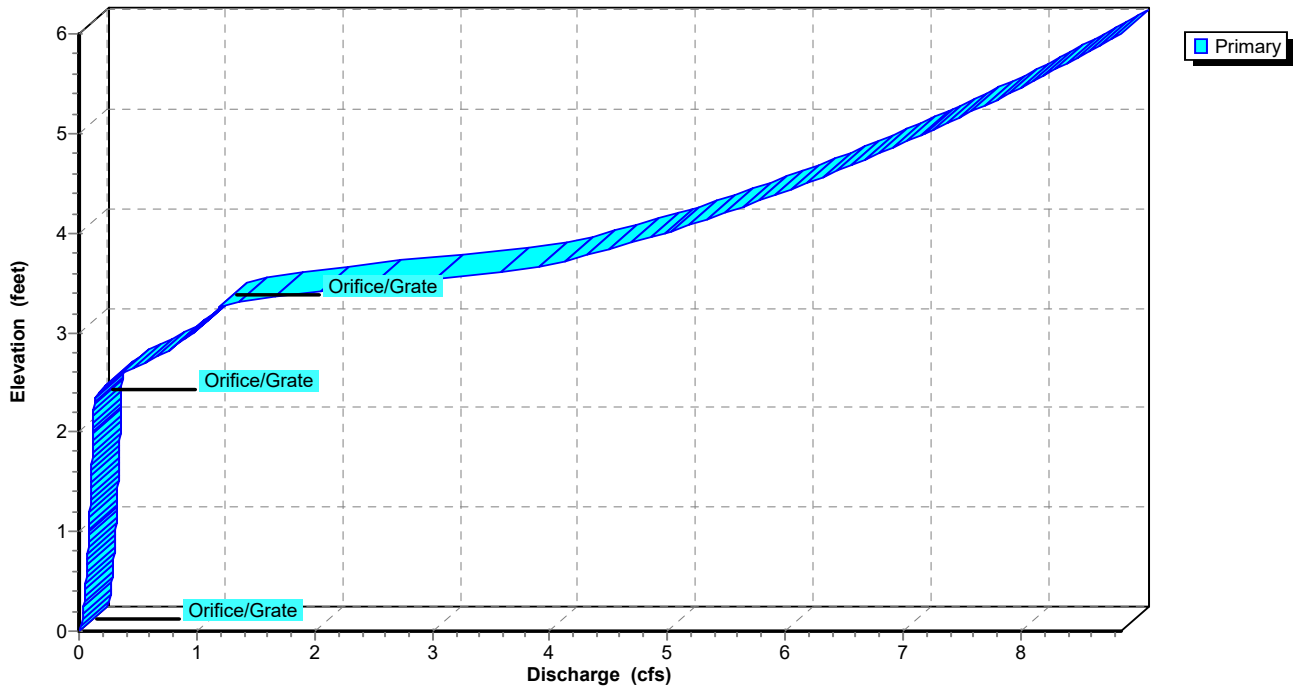
### Pond 3: DETENTION A

Hydrograph



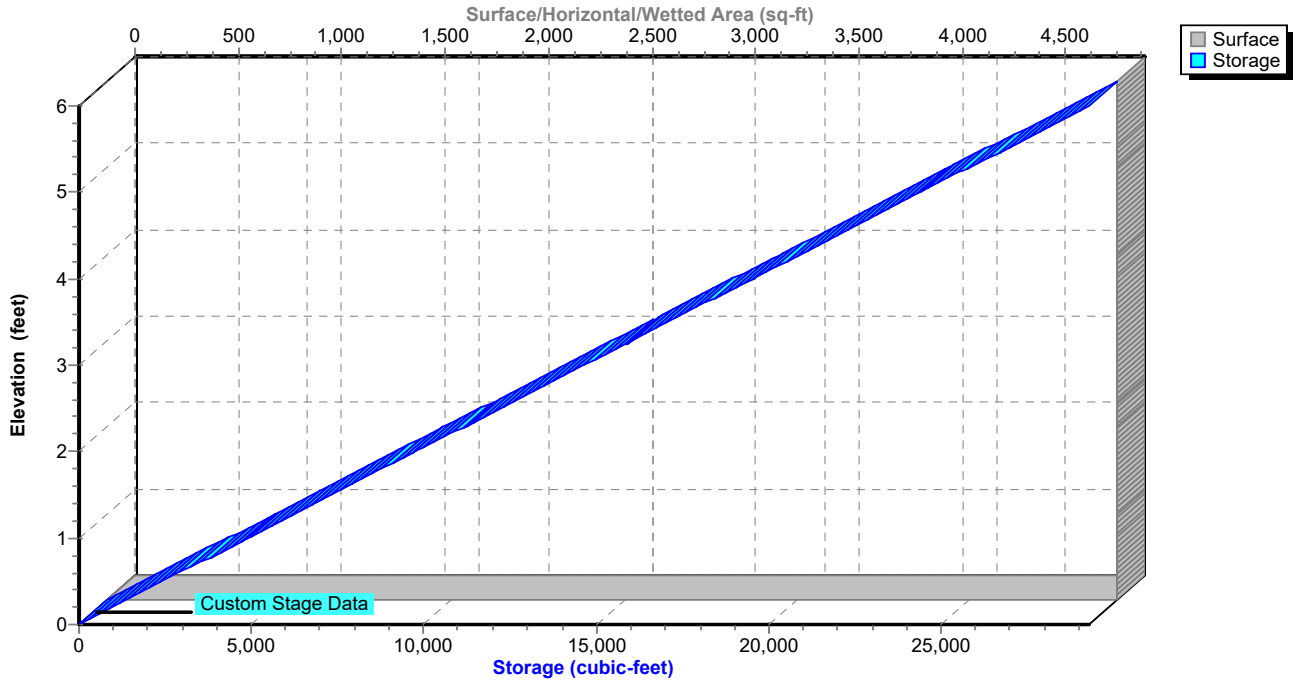
### Pond 3: DETENTION A

Stage-Discharge



### Pond 3: DETENTION A

#### Stage-Area-Storage



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**Hydrograph for Pond 3: DETENTION A**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.50	0.00	0	0.00	0.00
1.00	0.03	17	0.00	0.00
1.50	0.12	143	0.03	0.01
2.00	0.16	359	0.07	0.02
2.50	0.20	634	0.13	0.03
3.00	0.21	944	0.19	0.04
3.50	0.23	1,268	0.26	0.04
4.00	0.28	1,647	0.34	0.05
4.50	0.31	2,074	0.42	0.06
5.00	0.35	2,561	0.52	0.06
5.50	0.42	3,142	0.64	0.07
6.00	0.47	3,797	0.78	0.08
6.50	0.56	4,601	0.94	0.08
7.00	0.59	5,438	1.11	0.09
7.50	<b>0.85</b>	6,536	1.34	0.10
8.00	<b>2.19</b>	9,664	1.98	0.12
8.50	0.89	11,908	2.44	0.20
9.00	0.72	12,805	2.62	0.43
9.50	0.56	<b>13,056</b>	<b>2.67</b>	<b>0.52</b>
10.00	0.51	<b>13,084</b>	<b>2.68</b>	<b>0.53</b>
10.50	0.46	13,025	2.67	0.51
11.00	0.44	12,960	2.65	0.48
11.50	0.40	12,879	2.64	0.46
12.00	0.37	12,779	2.62	0.42
12.50	0.38	12,712	2.60	0.40
13.00	0.35	12,659	2.59	0.38
13.50	0.35	12,624	2.58	0.37
14.00	0.34	12,579	2.58	0.36
14.50	0.33	12,545	2.57	0.35
15.00	0.33	12,515	2.56	0.34
15.50	0.32	12,487	2.56	0.33
16.00	0.31	12,460	2.55	0.33
16.50	0.30	12,434	2.55	0.32
17.00	0.30	12,407	2.54	0.31
17.50	0.29	12,381	2.54	0.30
18.00	0.28	12,355	2.53	0.30
18.50	0.27	12,328	2.52	0.29
19.00	0.27	12,302	2.52	0.28
19.50	0.26	12,274	2.51	0.28
20.00	0.25	12,245	2.51	0.27
20.50	0.24	12,215	2.50	0.26
21.00	0.24	12,184	2.49	0.25
21.50	0.23	12,152	2.49	0.25
22.00	0.22	12,120	2.48	0.24
22.50	0.21	12,088	2.48	0.23
23.00	0.21	12,056	2.47	0.22
23.50	0.20	12,023	2.46	0.22
24.00	0.19	11,990	2.46	0.21

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**Stage-Discharge for Pond 3: DETENTION A**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.65	0.48	5.30	7.73
0.05	0.02	2.70	0.56	5.35	7.81
0.10	0.03	2.75	0.65	5.40	7.90
0.15	0.03	2.80	0.73	5.45	7.98
0.20	0.04	2.85	0.80	5.50	8.07
0.25	0.04	2.90	0.86	5.55	8.15
0.30	0.05	2.95	0.92	5.60	8.23
0.35	0.05	3.00	0.97	5.65	8.31
0.40	0.05	3.05	1.02	5.70	8.39
0.45	0.06	3.10	1.07	5.75	8.47
0.50	0.06	3.15	1.11	5.80	8.55
0.55	0.06	3.20	1.16	5.85	8.63
0.60	0.07	3.25	1.20	5.90	8.70
0.65	0.07	3.30	1.35	5.95	8.78
0.70	0.07	3.35	1.60	6.00	<b>8.86</b>
0.75	0.07	3.40	1.91		
0.80	0.08	3.45	2.27		
0.85	0.08	3.50	2.67		
0.90	0.08	3.55	3.11		
0.95	0.08	3.60	3.58		
1.00	0.09	3.65	3.88		
1.05	0.09	3.70	4.06		
1.10	0.09	3.75	4.22		
1.15	0.09	3.80	4.38		
1.20	0.09	3.85	4.54		
1.25	0.10	3.90	4.69		
1.30	0.10	3.95	4.83		
1.35	0.10	4.00	4.97		
1.40	0.10	4.05	5.11		
1.45	0.10	4.10	5.24		
1.50	0.10	4.15	5.37		
1.55	0.11	4.20	5.49		
1.60	0.11	4.25	5.61		
1.65	0.11	4.30	5.73		
1.70	0.11	4.35	5.85		
1.75	0.11	4.40	5.96		
1.80	0.11	4.45	6.08		
1.85	0.12	4.50	6.19		
1.90	0.12	4.55	6.29		
1.95	0.12	4.60	6.40		
2.00	0.12	4.65	6.50		
2.05	0.12	4.70	6.61		
2.10	0.12	4.75	6.71		
2.15	0.12	4.80	6.81		
2.20	0.13	4.85	6.90		
2.25	0.13	4.90	7.00		
2.30	0.13	4.95	7.10		
2.35	0.14	5.00	7.19		
2.40	0.16	5.05	7.28		
2.45	0.20	5.10	7.37		
2.50	0.26	5.15	7.46		
2.55	0.32	5.20	7.55		
2.60	0.40	5.25	7.64		

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**Stage-Area-Storage for Pond 3: DETENTION A**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
0.00	<b>4,883</b>	0	5.30	4,883	25,882
0.10	4,883	488	5.40	4,883	26,370
0.20	4,883	977	5.50	4,883	26,859
0.30	4,883	1,465	5.60	4,883	27,347
0.40	4,883	1,953	5.70	4,883	27,835
0.50	4,883	2,442	5.80	4,883	28,324
0.60	4,883	2,930	5.90	4,883	28,812
0.70	4,883	3,418	6.00	4,883	<b>29,300</b>
0.80	4,883	3,907			
0.90	4,883	4,395			
1.00	4,883	4,883			
1.10	4,883	5,372			
1.20	4,883	5,860			
1.30	4,883	6,348			
1.40	4,883	6,837			
1.50	4,883	7,325			
1.60	4,883	7,813			
1.70	4,883	8,302			
1.80	4,883	8,790			
1.90	4,883	9,278			
2.00	4,883	9,767			
2.10	4,883	10,255			
2.20	4,883	10,743			
2.30	4,883	11,232			
2.40	4,883	11,720			
2.50	4,883	12,208			
2.60	4,883	12,697			
2.70	4,883	13,185			
2.80	4,883	13,673			
2.90	4,883	14,162			
3.00	4,883	14,650			
3.10	4,883	15,138			
3.20	4,883	15,627			
3.30	4,883	16,115			
3.40	4,883	16,603			
3.50	4,883	17,092			
3.60	4,883	17,580			
3.70	4,883	18,069			
3.80	4,883	18,557			
3.90	4,883	19,045			
4.00	4,883	19,534			
4.10	4,883	20,022			
4.20	4,883	20,510			
4.30	4,883	20,999			
4.40	4,883	21,487			
4.50	4,883	21,975			
4.60	4,883	22,464			
4.70	4,883	22,952			
4.80	4,883	23,440			
4.90	4,883	23,929			
5.00	4,883	24,417			
5.10	4,883	24,905			
5.20	4,883	25,394			

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Type IA 24-hr 100-YR Rainfall=4.90"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: DOCKS**

Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>4.65"  
Tc=6.0 min CN=0/98 Runoff=0.13 cfs 0.043 af

**Subcatchment SITE: SITE**

Runoff Area=2.917 ac 83.48% Impervious Runoff Depth>4.44"  
Tc=6.0 min CN=86/98 Runoff=3.20 cfs 1.080 af

**Pond 3: DETENTIONA**

Peak Elev=3.26' Storage=15,927 cf Inflow=3.20 cfs 1.080 af  
Outflow=1.23 cfs 0.796 af

**Total Runoff Area = 3.027 ac Runoff Volume = 1.122 af Average Runoff Depth = 4.45"**  
**15.92% Pervious = 0.482 ac 84.08% Impervious = 2.545 ac**

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Type IA 24-hr 100-YR Rainfall=4.90"

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**Summary for Subcatchment 1S: DOCKS**

Runoff = 0.13 cfs @ 7.91 hrs, Volume= 0.043 af, Depth> 4.65"

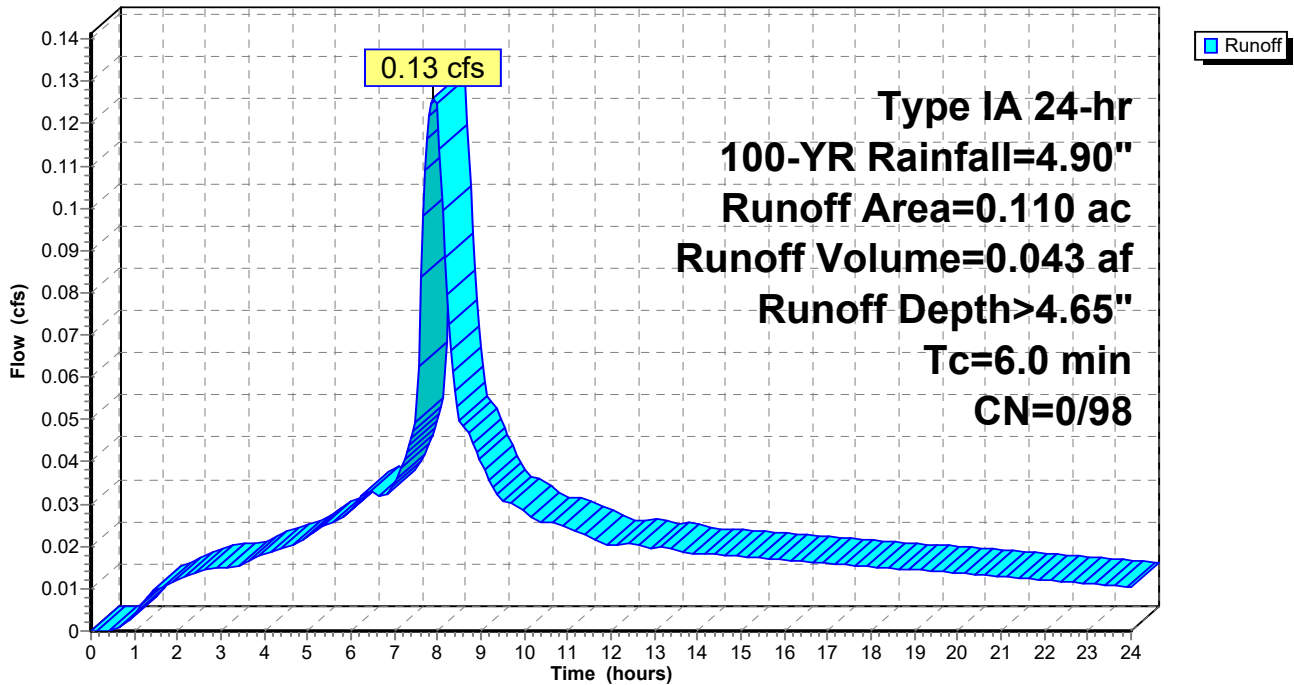
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100-YR Rainfall=4.90"

Area (ac)	CN	Description
* 0.110	98	
0.110		100.00% Impervious Area

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

**Subcatchment 1S: DOCKS**

Hydrograph





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**Hydrograph for Subcatchment 1S: DOCKS**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	<b>0.00</b>	0.00	0.00
0.50	0.05	0.00	0.00	0.00
1.00	0.10	0.00	0.01	0.00
1.50	0.17	0.00	0.05	0.01
2.00	0.25	0.00	0.10	0.01
2.50	0.32	0.00	0.16	0.01
3.00	0.40	0.00	0.23	0.01
3.50	0.48	0.00	0.30	0.02
4.00	0.57	0.00	0.38	0.02
4.50	0.66	0.00	0.47	0.02
5.00	0.76	0.00	0.56	0.02
5.50	0.88	0.00	0.68	0.03
6.00	1.01	0.00	0.80	0.03
6.50	1.16	0.00	0.95	0.03
7.00	1.31	0.00	1.10	0.03
7.50	1.52	0.00	1.30	<b>0.05</b>
8.00	2.08	0.00	1.86	<b>0.12</b>
8.50	2.35	0.00	2.12	0.05
9.00	2.55	0.00	2.32	0.04
9.50	2.69	0.00	2.46	0.03
10.00	2.83	0.00	2.60	0.03
10.50	2.94	0.00	2.71	0.03
11.00	3.06	0.00	2.83	0.02
11.50	3.16	0.00	2.93	0.02
12.00	3.25	0.00	3.02	0.02
12.50	3.35	0.00	3.11	0.02
13.00	3.43	0.00	3.20	0.02
13.50	3.52	0.00	3.29	0.02
14.00	3.61	0.00	3.37	0.02
14.50	3.69	0.00	3.45	0.02
15.00	3.77	0.00	3.53	0.02
15.50	3.85	0.00	3.61	0.02
16.00	3.92	0.00	3.69	0.02
16.50	4.00	0.00	3.76	0.02
17.00	4.07	0.00	3.84	0.02
17.50	4.14	0.00	3.91	0.02
18.00	4.21	0.00	3.98	0.02
18.50	4.28	0.00	4.05	0.01
19.00	4.35	0.00	4.11	0.01
19.50	4.41	0.00	4.17	0.01
20.00	4.47	0.00	4.24	0.01
20.50	4.53	0.00	4.30	0.01
21.00	4.59	0.00	4.35	0.01
21.50	4.65	0.00	4.41	0.01
22.00	4.70	0.00	4.46	0.01
22.50	4.75	0.00	4.52	0.01
23.00	4.80	0.00	4.57	0.01
23.50	4.85	0.00	4.62	0.01
24.00	<b>4.90</b>	0.00	<b>4.66</b>	0.01

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Type IA 24-hr 100-YR Rainfall=4.90"

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**Summary for Subcatchment SITE: SITE**

Runoff = 3.20 cfs @ 7.92 hrs, Volume= 1.080 af, Depth> 4.44"

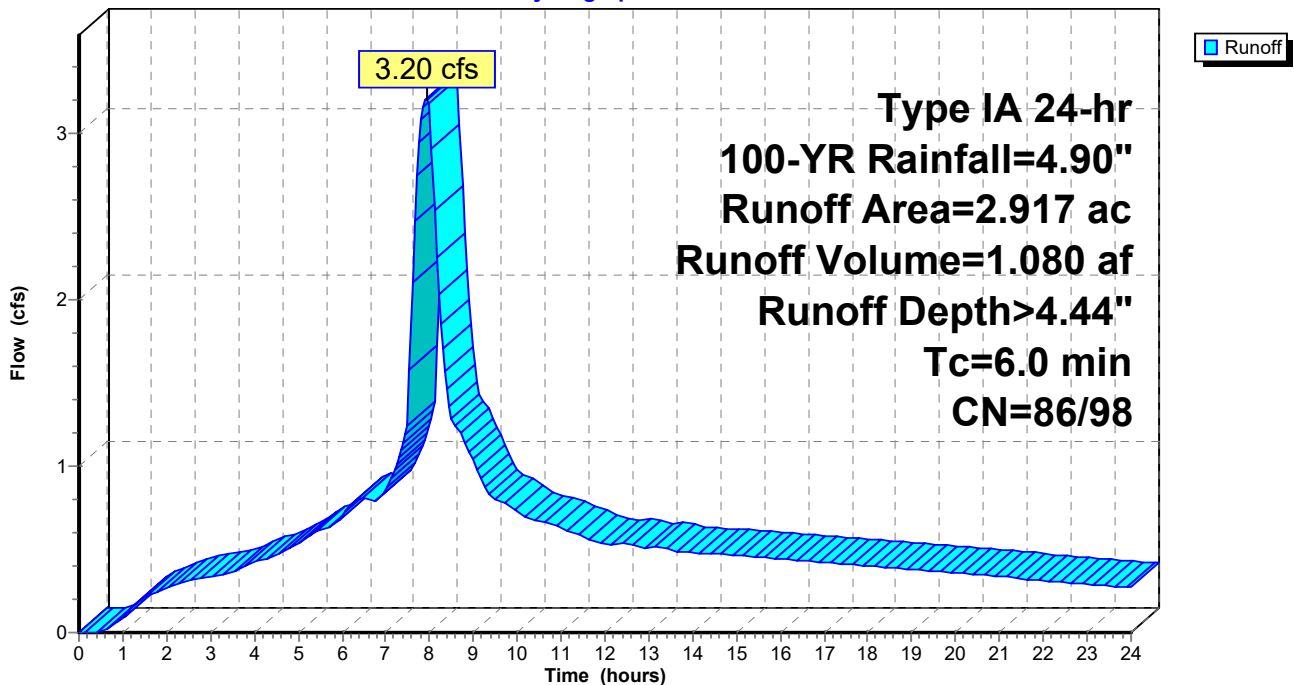
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 100-YR Rainfall=4.90"

Area (ac)	CN	Description
* 2.435	98	
* 0.482	86	
2.917	96	Weighted Average
0.482		16.52% Pervious Area
2.435		83.48% Impervious Area

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

**Subcatchment SITE: SITE**

Hydrograph



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**Hydrograph for Subcatchment SITE: SITE**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00	0.00
1.00	0.10	0.00	0.01	0.08
1.50	0.17	0.00	0.05	0.22
2.00	0.25	0.00	0.10	0.26
2.50	0.32	0.00	0.16	0.31
3.00	0.40	0.00	0.23	0.34
3.50	0.48	0.01	0.30	0.36
4.00	0.57	0.03	0.38	0.42
4.50	0.66	0.06	0.47	0.46
5.00	0.76	0.09	0.56	0.53
5.50	0.88	0.14	0.68	0.62
6.00	1.01	0.20	0.80	0.69
6.50	1.16	0.28	0.95	0.82
7.00	1.31	0.37	1.10	0.86
7.50	1.52	0.50	1.30	<b>1.24</b>
8.00	2.08	0.91	1.86	<b>3.15</b>
8.50	2.35	1.12	2.12	1.28
9.00	2.55	1.28	2.32	1.03
9.50	2.69	1.40	2.46	0.79
10.00	2.83	1.52	2.60	0.73
10.50	2.94	1.62	2.71	0.66
11.00	3.06	1.71	2.83	0.63
11.50	3.16	1.80	2.93	0.58
12.00	3.25	1.88	3.02	0.53
12.50	3.35	1.96	3.11	0.54
13.00	3.43	2.04	3.20	0.50
13.50	3.52	2.12	3.29	0.50
14.00	3.61	2.19	3.37	0.48
14.50	3.69	2.27	3.45	0.47
15.00	3.77	2.34	3.53	0.46
15.50	3.85	2.41	3.61	0.45
16.00	3.92	2.48	3.69	0.44
16.50	4.00	2.55	3.76	0.43
17.00	4.07	2.61	3.84	0.42
17.50	4.14	2.68	3.91	0.41
18.00	4.21	2.74	3.98	0.40
18.50	4.28	2.80	4.05	0.39
19.00	4.35	2.86	4.11	0.38
19.50	4.41	2.92	4.17	0.37
20.00	4.47	2.98	4.24	0.36
20.50	4.53	3.03	4.30	0.35
21.00	4.59	3.09	4.35	0.33
21.50	4.65	3.14	4.41	0.32
22.00	4.70	3.19	4.46	0.31
22.50	4.75	3.24	4.52	0.30
23.00	4.80	3.28	4.57	0.29
23.50	4.85	3.33	4.62	0.28
24.00	<b>4.90</b>	<b>3.37</b>	<b>4.66</b>	0.27

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**Summary for Pond 3: DETENTION A**

Inflow Area = 2.917 ac, 83.48% Impervious, Inflow Depth > 4.44" for 100-YR event  
 Inflow = 3.20 cfs @ 7.92 hrs, Volume= 1.080 af  
 Outflow = 1.23 cfs @ 8.65 hrs, Volume= 0.796 af, Atten= 61%, Lag= 44.0 min  
 Primary = 1.23 cfs @ 8.65 hrs, Volume= 0.796 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 3.26' @ 8.65 hrs Surf.Area= 4,883 sf Storage= 15,927 cf

Plug-Flow detention time= 312.5 min calculated for 0.796 af (74% of inflow)  
 Center-of-Mass det. time= 145.0 min ( 811.8 - 666.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	29,300 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) x 0.71
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,878	0	0
1.00	6,878	6,878	6,878
2.00	6,878	6,878	13,756
3.00	6,878	6,878	20,634
4.00	6,878	6,878	27,512
5.00	6,878	6,878	34,390
6.00	6,878	6,878	41,268

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>1.8" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	2.30'	<b>7.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	3.25'	<b>12.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=1.22 cfs @ 8.65 hrs HW=3.26' (Free Discharge)

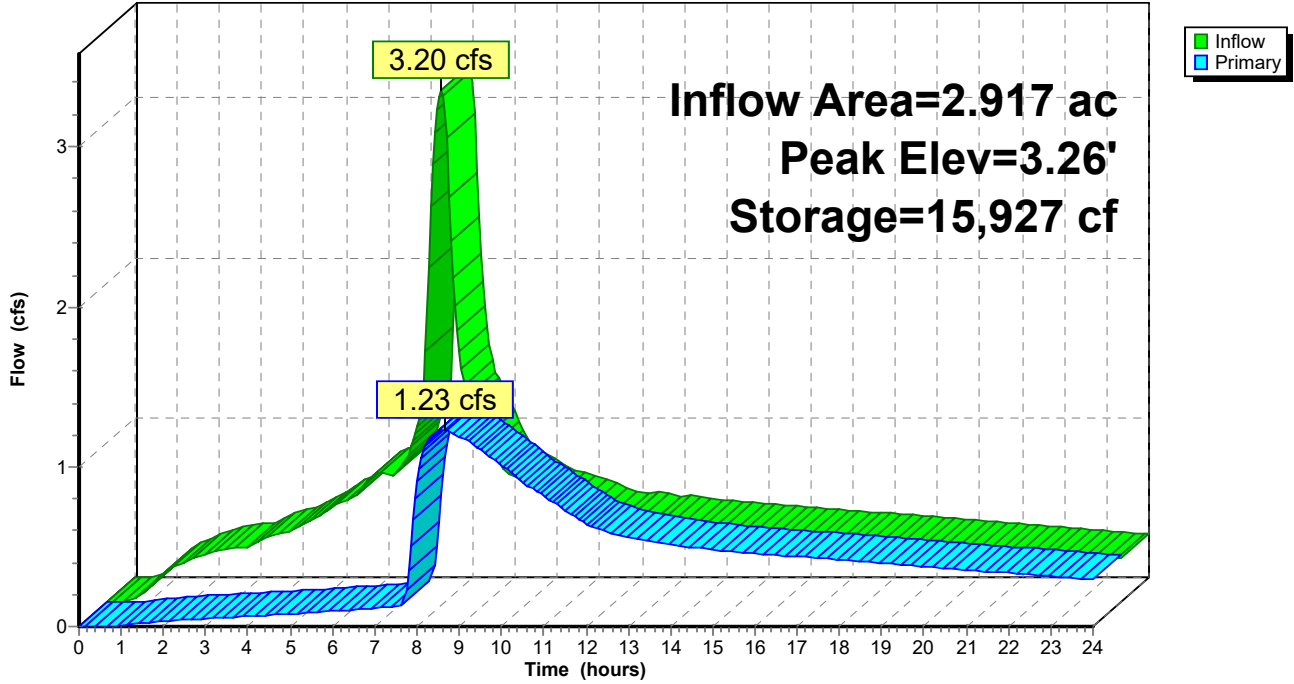
1=Orifice/Grate (Orifice Controls 0.15 cfs @ 8.70 fps)

2=Orifice/Grate (Orifice Controls 1.05 cfs @ 3.94 fps)

3=Orifice/Grate (Weir Controls 0.01 cfs @ 0.35 fps)

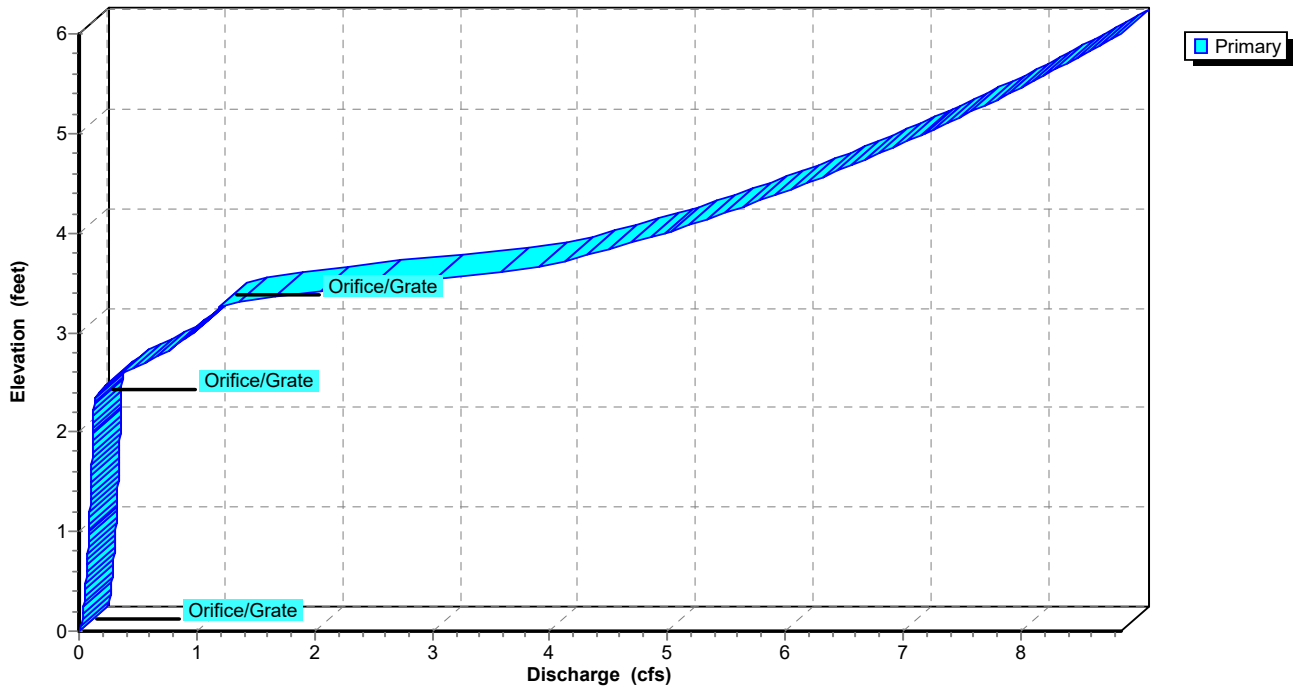
### Pond 3: DETENTION A

Hydrograph



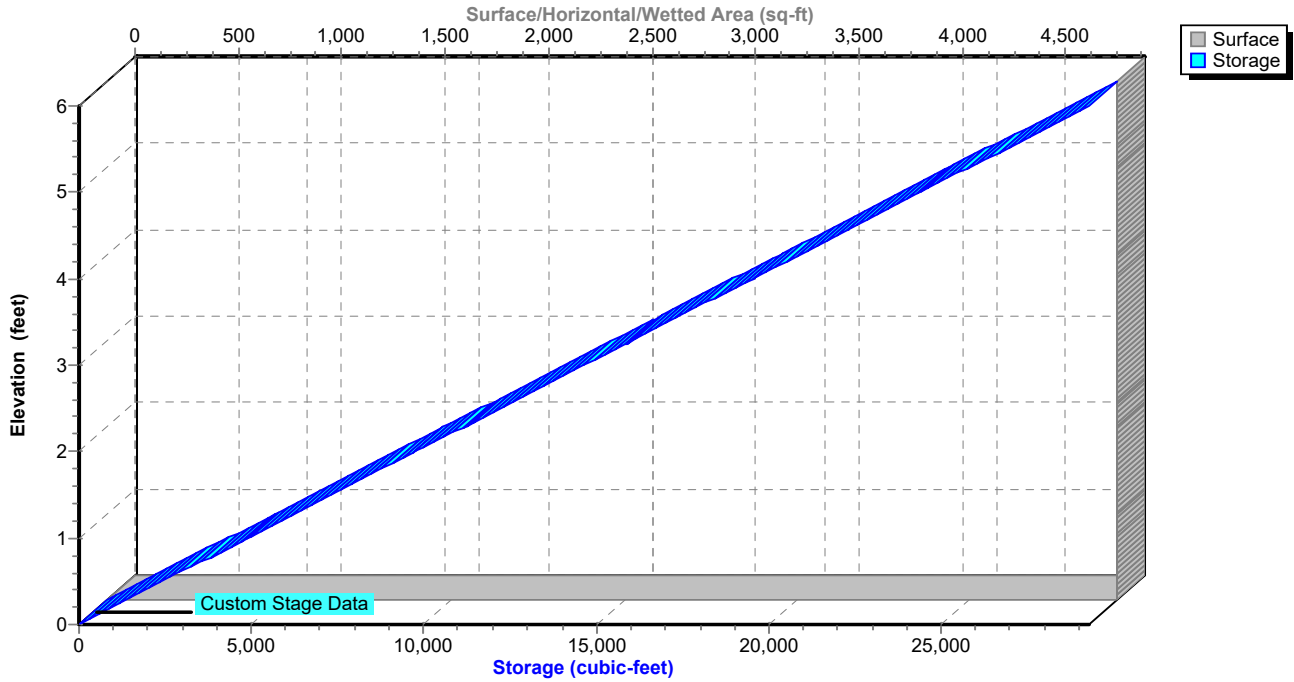
### Pond 3: DETENTION A

Stage-Discharge



### Pond 3: DETENTION A

#### Stage-Area-Storage



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**Hydrograph for Pond 3: DETENTION A**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.50	0.00	0	0.00	0.00
1.00	0.08	68	0.01	0.00
1.50	0.22	326	0.07	0.02
2.00	0.26	708	0.15	0.03
2.50	0.31	1,167	0.24	0.04
3.00	0.34	1,669	0.34	0.05
3.50	0.36	2,193	0.45	0.06
4.00	0.42	2,797	0.57	0.06
4.50	0.46	3,468	0.71	0.07
5.00	0.53	4,224	0.86	0.08
5.50	0.62	5,115	1.05	0.09
6.00	0.69	6,112	1.25	0.10
6.50	0.82	7,323	1.50	0.10
7.00	0.86	8,579	1.76	0.11
7.50	<b>1.24</b>	10,210	2.09	0.12
8.00	<b>3.15</b>	14,360	2.94	0.91
8.50	1.28	<b>15,915</b>	<b>3.26</b>	<b>1.23</b>
9.00	1.03	<b>15,827</b>	<b>3.24</b>	<b>1.19</b>
9.50	0.79	15,358	3.14	1.11
10.00	0.73	14,838	3.04	1.01
10.50	0.66	14,358	2.94	0.91
11.00	0.63	13,985	2.86	0.82
11.50	0.58	13,678	2.80	0.73
12.00	0.53	13,426	2.75	0.64
12.50	0.54	13,274	2.72	0.59
13.00	0.50	13,172	2.70	0.56
13.50	0.50	13,109	2.68	0.53
14.00	0.48	13,041	2.67	0.51
14.50	0.47	12,994	2.66	0.49
15.00	0.46	12,956	2.65	0.48
15.50	0.45	12,922	2.65	0.47
16.00	0.44	12,890	2.64	0.46
16.50	0.43	12,858	2.63	0.45
17.00	0.42	12,825	2.63	0.44
17.50	0.41	12,793	2.62	0.43
18.00	0.40	12,760	2.61	0.42
18.50	0.39	12,727	2.61	0.41
19.00	0.38	12,694	2.60	0.40
19.50	0.37	12,661	2.59	0.39
20.00	0.36	12,628	2.59	0.37
20.50	0.35	12,595	2.58	0.36
21.00	0.33	12,560	2.57	0.35
21.50	0.32	12,524	2.56	0.34
22.00	0.31	12,488	2.56	0.33
22.50	0.30	12,451	2.55	0.32
23.00	0.29	12,413	2.54	0.31
23.50	0.28	12,375	2.53	0.30
24.00	0.27	12,337	2.53	0.29

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**Stage-Discharge for Pond 3: DETENTION A**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.65	0.48	5.30	7.73
0.05	0.02	2.70	0.56	5.35	7.81
0.10	0.03	2.75	0.65	5.40	7.90
0.15	0.03	2.80	0.73	5.45	7.98
0.20	0.04	2.85	0.80	5.50	8.07
0.25	0.04	2.90	0.86	5.55	8.15
0.30	0.05	2.95	0.92	5.60	8.23
0.35	0.05	3.00	0.97	5.65	8.31
0.40	0.05	3.05	1.02	5.70	8.39
0.45	0.06	3.10	1.07	5.75	8.47
0.50	0.06	3.15	1.11	5.80	8.55
0.55	0.06	3.20	1.16	5.85	8.63
0.60	0.07	3.25	1.20	5.90	8.70
0.65	0.07	3.30	1.35	5.95	8.78
0.70	0.07	3.35	1.60	6.00	<b>8.86</b>
0.75	0.07	3.40	1.91		
0.80	0.08	3.45	2.27		
0.85	0.08	3.50	2.67		
0.90	0.08	3.55	3.11		
0.95	0.08	3.60	3.58		
1.00	0.09	3.65	3.88		
1.05	0.09	3.70	4.06		
1.10	0.09	3.75	4.22		
1.15	0.09	3.80	4.38		
1.20	0.09	3.85	4.54		
1.25	0.10	3.90	4.69		
1.30	0.10	3.95	4.83		
1.35	0.10	4.00	4.97		
1.40	0.10	4.05	5.11		
1.45	0.10	4.10	5.24		
1.50	0.10	4.15	5.37		
1.55	0.11	4.20	5.49		
1.60	0.11	4.25	5.61		
1.65	0.11	4.30	5.73		
1.70	0.11	4.35	5.85		
1.75	0.11	4.40	5.96		
1.80	0.11	4.45	6.08		
1.85	0.12	4.50	6.19		
1.90	0.12	4.55	6.29		
1.95	0.12	4.60	6.40		
2.00	0.12	4.65	6.50		
2.05	0.12	4.70	6.61		
2.10	0.12	4.75	6.71		
2.15	0.12	4.80	6.81		
2.20	0.13	4.85	6.90		
2.25	0.13	4.90	7.00		
2.30	0.13	4.95	7.10		
2.35	0.14	5.00	7.19		
2.40	0.16	5.05	7.28		
2.45	0.20	5.10	7.37		
2.50	0.26	5.15	7.46		
2.55	0.32	5.20	7.55		
2.60	0.40	5.25	7.64		



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**Stage-Area-Storage for Pond 3: DETENTION A**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
0.00	<b>4,883</b>	0	5.30	4,883	25,882
0.10	4,883	488	5.40	4,883	26,370
0.20	4,883	977	5.50	4,883	26,859
0.30	4,883	1,465	5.60	4,883	27,347
0.40	4,883	1,953	5.70	4,883	27,835
0.50	4,883	2,442	5.80	4,883	28,324
0.60	4,883	2,930	5.90	4,883	28,812
0.70	4,883	3,418	6.00	4,883	<b>29,300</b>
0.80	4,883	3,907			
0.90	4,883	4,395			
1.00	4,883	4,883			
1.10	4,883	5,372			
1.20	4,883	5,860			
1.30	4,883	6,348			
1.40	4,883	6,837			
1.50	4,883	7,325			
1.60	4,883	7,813			
1.70	4,883	8,302			
1.80	4,883	8,790			
1.90	4,883	9,278			
2.00	4,883	9,767			
2.10	4,883	10,255			
2.20	4,883	10,743			
2.30	4,883	11,232			
2.40	4,883	11,720			
2.50	4,883	12,208			
2.60	4,883	12,697			
2.70	4,883	13,185			
2.80	4,883	13,673			
2.90	4,883	14,162			
3.00	4,883	14,650			
3.10	4,883	15,138			
3.20	4,883	15,627			
3.30	4,883	16,115			
3.40	4,883	16,603			
3.50	4,883	17,092			
3.60	4,883	17,580			
3.70	4,883	18,069			
3.80	4,883	18,557			
3.90	4,883	19,045			
4.00	4,883	19,534			
4.10	4,883	20,022			
4.20	4,883	20,510			
4.30	4,883	20,999			
4.40	4,883	21,487			
4.50	4,883	21,975			
4.60	4,883	22,464			
4.70	4,883	22,952			
4.80	4,883	23,440			
4.90	4,883	23,929			
5.00	4,883	24,417			
5.10	4,883	24,905			
5.20	4,883	25,394			

**APPENDIX D – SOIL REPORT**

(Submitted with Preliminary Application)

**APPENDIX E – MAINTENANCE AND OPERATIONS MANUAL**

(Submitted with Final Engineering)