

Appendix G:
Stormwater Calculations for LVPC

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REGISTERED LANDSCAPE ARCHITECT

New

JAN 31 2025

BASIN B modeling

The initial model using the contour area of 76,441 sq. ft. for the basin bottom as well as the top of fill media (i.e., contour 286.00').

1.0' is removed (i.e., zero storage volume) from the routing, from 284.00 to 285.00 where the lowest orifice (underdrain orifice) is installed.

1.0' is 30% void space, from 285.00 to 286.00 with an area of 76,441.
 $76,441 \times 1 \times 30\% = 22,932 \text{ cu. ft.}$

This was then approximated by artificially adjusting the contour areas to achieve the noted volumes. Some volume was not utilized leaving the calculations slightly conservative. The remaining contours are reflective of the surface design conditions.

Pond Name BMP B

Row	Stage	Elevation	Contour Area	Incremental Storage	Total Storage
	(ft)	(ft)	(sqft)	(cuft)	(cuft)
0	0.00	284.00	0	0.000	0.000
1	2.00	286.00	34,400	22,931	22,931
2	2.01	286.01	76,441	540	23,471
3	4.00	288.00	87,488	162,969	186,441
4	6.00	290.00	95,788	183,195	369,636
5	8.00	292.00	104,371	200,078	569,713
6					

Fill 

Pond Report

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Thursday, 01 / 30 / 2025

Pond No. 2 - BMP B

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 284.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	284.00	00	0	0
2.00	286.00	34,400	22,931	22,931
2.01	286.01	76,441	540	23,471
4.00	288.00	87,488	162,970	186,441
6.00	290.00	95,788	183,105	369,636
8.00	292.00	104,371	200,078	569,713

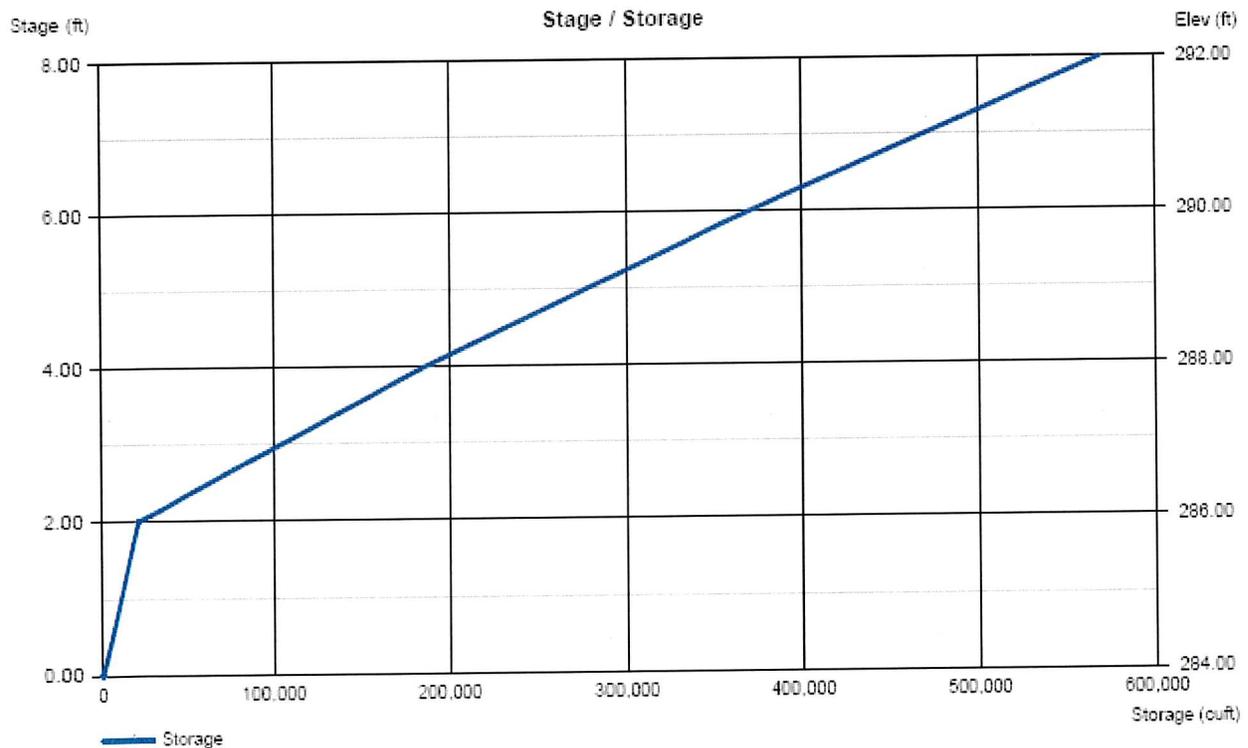
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	3.50	4.00	0.00
Span (in)	= 24.00	3.50	4.00	0.00
No. Barrels	= 1	3	2	0
Invert El. (ft)	= 285.00	285.00	288.50	0.00
Length (ft)	= 238.00	0.00	0.00	0.00
Slope (%)	= 29.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	300.00	Inactive	0.00
Crest El. (ft)	= 290.00	290.50	0.00	0.00
Weir Coeff.	= 3.33	2.80	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

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Thursday, 01 / 30 / 2025

Pond No. 3 - BMP C

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 212.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	212.00	00	0	0
4.00	216.00	28,333	37,774	37,774
4.01	216.01	115,916	872	38,445
6.00	218.00	126,194	240,803	279,248
8.00	220.00	136,697	262,795	642,043
10.00	222.00	147,725	284,322	826,365
12.00	224.00	158,385	306,018	1,132,383

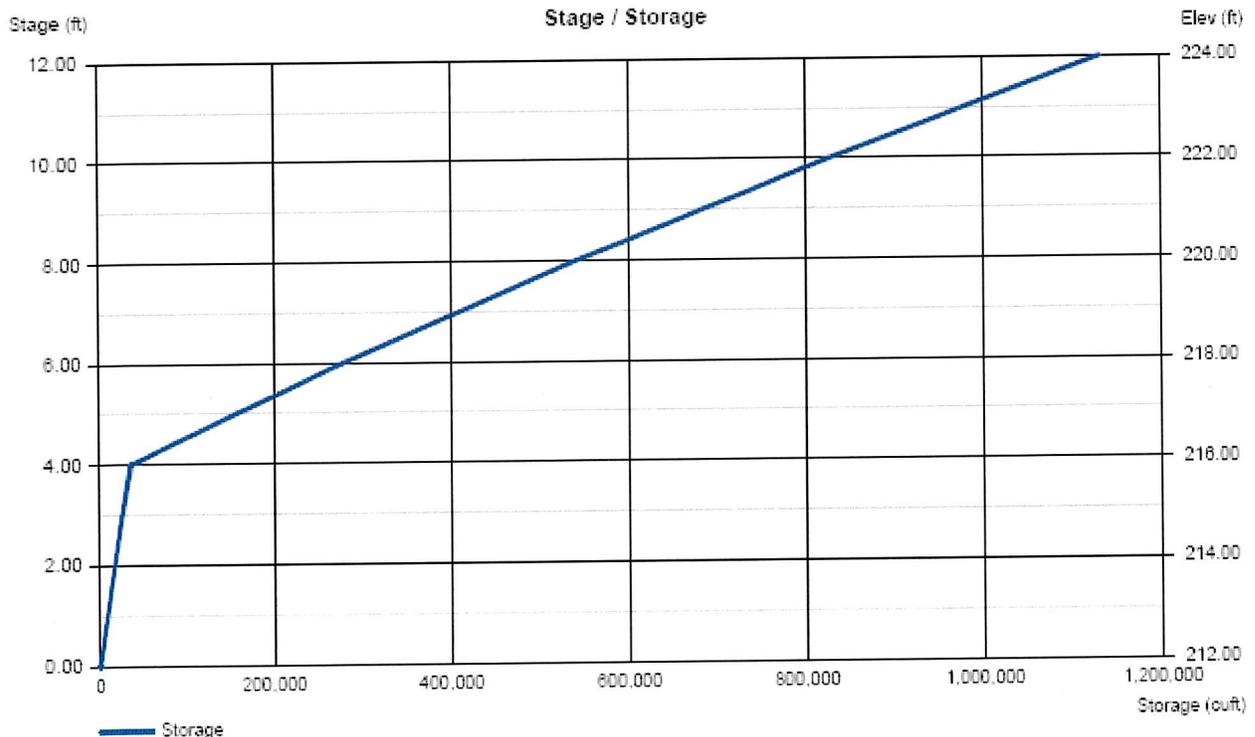
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	1.50	8.00	0.00
Span (in)	= 24.00	1.50	8.00	0.00
No. Barrels	= 1	4	4	0
Invert El. (ft)	= 215.00	215.00	216.30	0.00
Length (ft)	= 81.00	0.00	0.00	0.00
Slope (%)	= 3.26	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	100.00	Inactive	0.00
Crest El. (ft)	= 220.00	222.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil. (in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

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Thursday, 01 / 30 / 2025

Pond No. 4 - BMP E

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 252.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	252.00	00	0	0
4.00	256.00	1,972	2,629	2,629
4.01	256.01	8,762	50	2,679
6.00	258.00	11,385	19,987	22,666
8.00	260.00	14,240	25,569	48,235
10.00	262.00	17,331	31,517	79,753

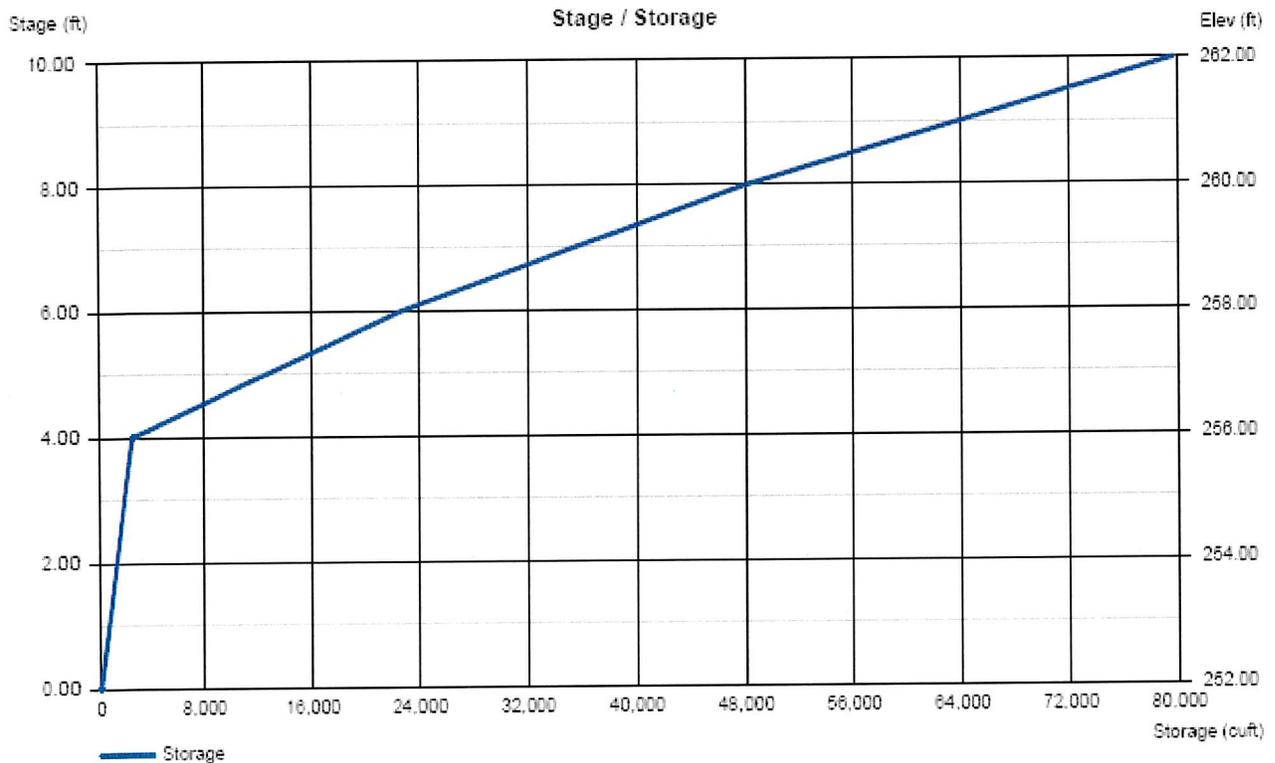
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	1.00	4.00	0.00
Span (in)	= 24.00	1.00	4.00	0.00
No. Barrels	= 1	1	2	0
Invert El. (ft)	= 255.00	255.00	256.80	0.00
Length (ft)	= 3.18	0.00	0.00	0.00
Slope (%)	= 5.42	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	Inactive	0.00
Crest El. (ft)	= 259.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	--	--	--
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

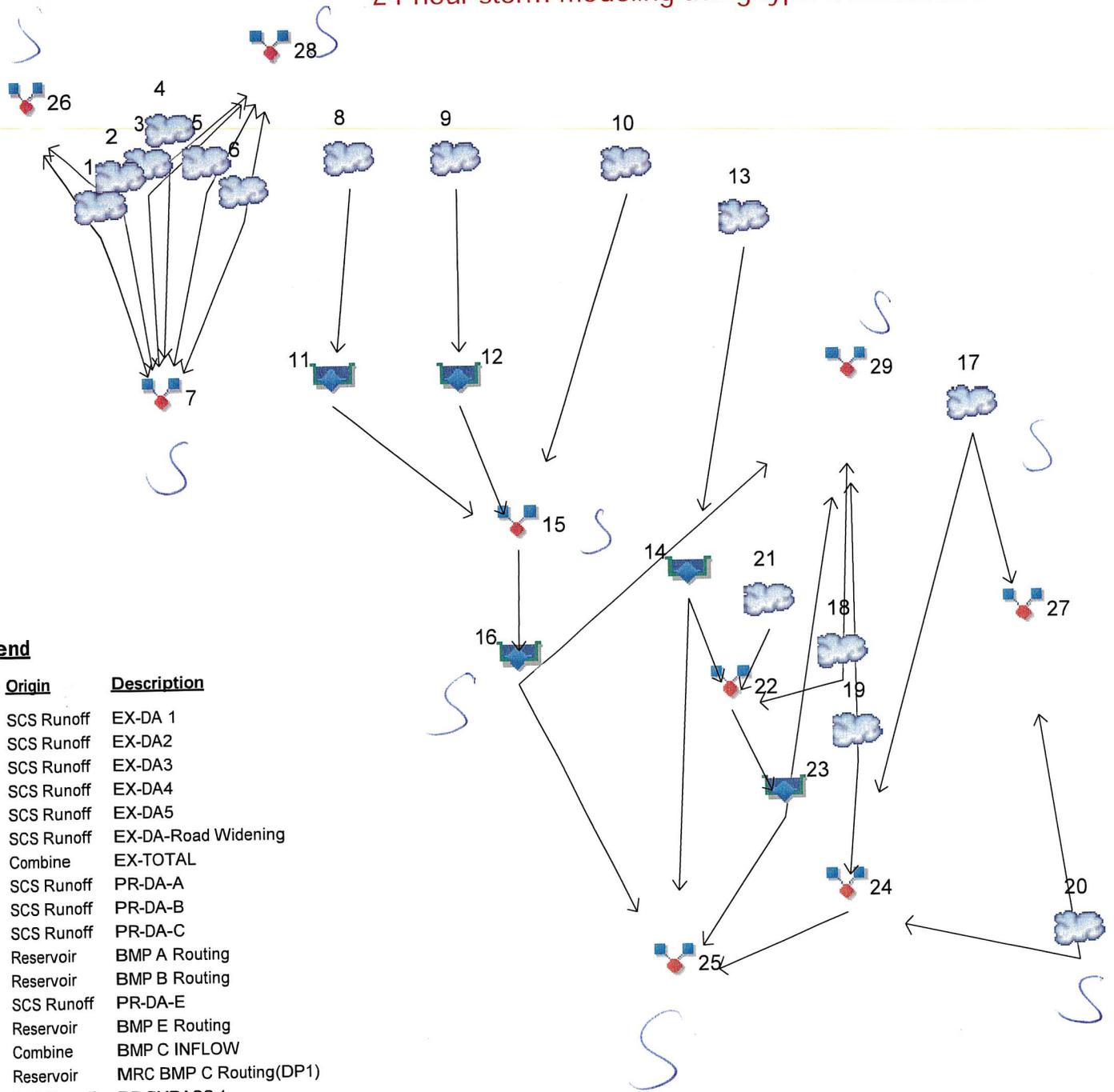
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

24-hour storm modeling using type II distribution for LVPC



Legend

Hvd.	Origin	Description
1	SCS Runoff	EX-DA 1
2	SCS Runoff	EX-DA2
3	SCS Runoff	EX-DA3
4	SCS Runoff	EX-DA4
5	SCS Runoff	EX-DA5
6	SCS Runoff	EX-DA-Road Widening
7	Combine	EX-TOTAL
8	SCS Runoff	PR-DA-A
9	SCS Runoff	PR-DA-B
10	SCS Runoff	PR-DA-C
11	Reservoir	BMP A Routing
12	Reservoir	BMP B Routing
13	SCS Runoff	PR-DA-E
14	Reservoir	BMP E Routing
15	Combine	BMP C INFLOW
16	Reservoir	MRC BMP C Routing(DP1)
17	SCS Runoff	PR-BYPASS 1
18	SCS Runoff	PR RG
19	SCS Runoff	PR-BYPASS 2
20	SCS Runoff	PR-BYPASS 3
21	SCS Runoff	PR-Road Widening
22	Combine	BMP E Outflow + PR Road Widening
23	Reservoir	RG Routing (DP2)
24	Combine	PR-BYPASS
25	Combine	PROPOSED ENTIRE SITE (POI)
26	Combine	EX-to- Bushkill
27	Combine	PR-to-Bushkill
28	Combine	EX-to-UNT
29	Combine	PR-to-UNT (DPs 001& 002)

Schematic Source of Data

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.129	2	896	4,430	----	----	----	EX-DA 1
2	SCS Runoff	3.627	2	724	13,895	----	----	----	EX-DA2
3	SCS Runoff	1.271	2	736	15,096	----	----	----	EX-DA3
4	SCS Runoff	9.002	2	722	24,306	----	----	----	EX-DA4
5	SCS Runoff	0.009	2	1440	144	----	----	----	EX-DA5
6	SCS Runoff	2.945	2	720	7,701	----	----	----	EX-DA-Road Widening
7	Combine	16.07	2	722	65,571	1, 2, 3, 4, 5, 6	----	----	EX-TOTAL
8	SCS Runoff	37.88	2	716	82,858	----	----	----	PR-DA-A
9	SCS Runoff	47.87	2	716	104,708	----	----	----	PR-DA-B
10	SCS Runoff	70.60	2	718	162,535	----	----	----	PR-DA-C
11	Reservoir	0.677	2	948	70,851	8	290.44	60,501	BMP A Routing
12	Reservoir	1.058	2	898	93,228	9	286.62	73,046	BMP B Routing
13	SCS Runoff	11.08	2	718	22,169	----	----	----	PR-DA-E
14	Reservoir	0.320	2	916	18,858	13	257.10	13,608	BMP E Routing
15	Combine	72.15	2	718	326,613	10, 11, 12,	----	----	BMP C INFLOW
16	Reservoir	2.896	2	1086	283,871	15	216.79	133,049	MRC BMP C Routing(DP1)
17	SCS Runoff	1.516	2	718	4,390	----	----	----	PR-BYPASS 1
18	SCS Runoff	0.739	2	720	1,926	----	----	----	PR RG
19	SCS Runoff	0.000	2	n/a	0	----	----	----	PR-BYPASS 2
20	SCS Runoff	0.302	2	720	1,438	----	----	----	PR-BYPASS 3
21	SCS Runoff	4.753	2	718	12,217	----	----	----	PR-Road Widening
22	Combine	5.457	2	718	33,001	14, 18, 21	----	----	BMP E Outflow + PR Road Widening
23	Reservoir	0.440	2	948	19,987	22	232.67	13,534	RG Routing (DP2)
24	Combine	1.777	2	720	5,828	17, 19, 20,	----	----	PR-BYPASS
25	Combine	3.667	2	1004	328,544	14, 16, 23, 24	----	----	PROPOSED ENTIRE SITE (POI)
26	Combine	3.627	2	724	18,325	1, 2,	----	----	EX-to- Bushkill
27	Combine	1.777	2	720	5,828	17, 20,	----	----	PR-to-Bushkill
28	Combine	12.48	2	722	47,246	3, 4, 5, 6,	----	----	EX-to-UNT
29	Combine	3.304	2	1036	305,785	16, 18, 19, 23,	----	----	PR-to-UNT (DPs 001& 002)
24hours_Sep for LVPC.gpw					Return Period: 1 Year			Wednesday, 01 / 29 / 2025	

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

Hyd. No. 1

EX-DA 1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.00	0.00	0.00	
Land slope (%)	= 2.99	0.00	0.00	
Travel Time (min)	= 11.92	+ 0.00	+ 0.00	= 11.92
Shallow Concentrated Flow				
Flow length (ft)	= 150.00	363.00	0.00	
Watercourse slope (%)	= 2.99	2.50	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	=2.79	2.55	0.00	
Travel Time (min)	= 0.90	+ 2.37	+ 0.00	= 3.27
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				15.20 min