STORM SEWER CONVEYANCE DESIGN

CULVERT 100

25-YEAR STORM EVENT

Culvert 100 Analysis

The purpose of Culvert 100 is to provide water conveyance from the western upslope area of drainage area #6 under the entrance access drive then downslope to stream 3. Culvert 100 includes seven (7) 18-inch reinforced concrete pipes that empty into a 75-feet wide level spreader with a plunge pool.

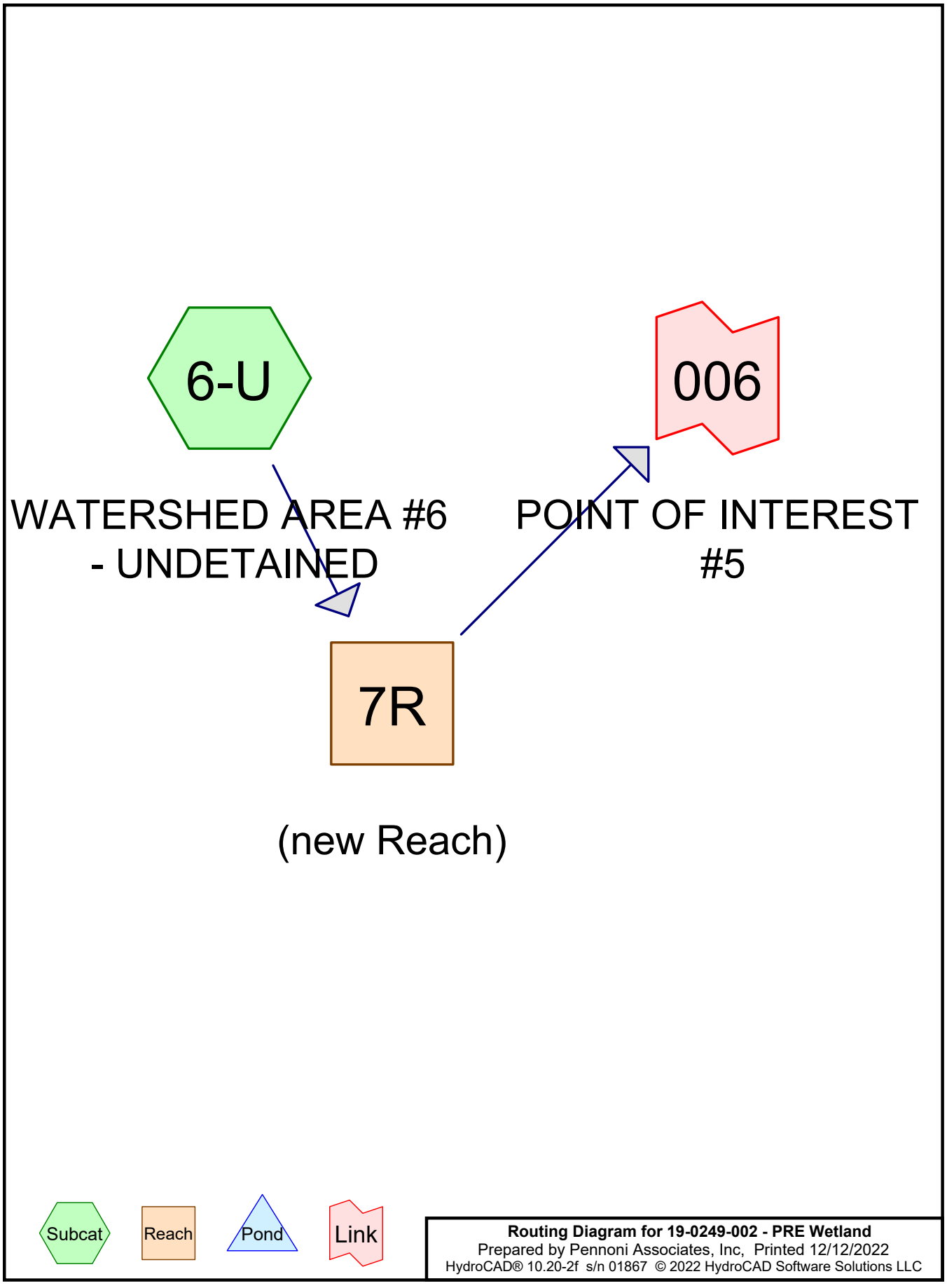
An analysis of the existing and proposed conditions was performed to provide estimates for flood elevations for the 100-year storm. A cross-section approximately 125-feet downstream of the proposed culvert was analyzed in the predevelopment and post-development condition. Additionally, the ponding area upstream of the proposed culvert was analyzed based on the existing contours that form a natural basin for ponding in front of the proposed culvert and level spreader.

Culvert 100 Conveyance Design 7 - 18" REINFORCED CONCRETE PIPES			
PEAK RATE			
Storm	**Existing (CFS)**	**Proposed (CFS)**	**Difference (CFS)**
100-YR	131.82	103.53	-28.29
VELOCITY			
Storm	**Existing (FPS)**	**Proposed (FPS)**	**Difference (FPS)**
100-YR	4.77	4.05	-0.72
ELEVATIONS DOWNSTREAM			
Storm	**Existing (FT)**	**Proposed (FT)**	**Difference (FT)**
100-YR	508.10	508.06	-0.04

The HydroCAD model routes watershed area #4 detained by BMP 9, watershed area #6 detained by BMP 8, and Watershed #6 which is undetained through the natural basin during a 100-year/24-hour storm. The runoff from these sources is routed to the seven (7) proposed 18" RCP culverts which discharge into the proposed plunge pool and is controlled by the plunge pool weir level spreader before reaching the downstream point of interest to determine the information noted in the table above.

Results of the hydraulic analysis demonstrate that in the proposed condition using the proposed culvert the 100-year water surface elevation will decrease by approximately 0.04-ft. Velocity was calculated on FlowMaster using Manning's to determine the peak velocity occurring during the peak depth for the pre- and post-development conditions. See attached worksheets for the pre-and-post development reach.

During the 100-year/24-hour storm, the natural ponding above the culvert reaches a maximum elevation of 516.15 in the existing natural basin showing that the water will not back up on the upstream property which sits at an approximate elevation of 525.



Routing Diagram for 19-0249-002 - PRE Wetland
Prepared by Pennoni Associates, Inc, Printed 12/12/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	2.40	2
2	2-Year	Type II 24-hr		Default	24.00	1	2.90	2
3	10-Year	Type II 24-hr		Default	24.00	1	4.36	2
4	25-Year	Type II 24-hr		Default	24.00	1	5.43	2
5	50-Year	Type II 24-hr		Default	24.00	1	6.38	2
6	100-Year	Type II 24-hr		Default	24.00	1	7.48	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,066	55	FOREST/GOOD/HSG B (6-U)
6,529	70	FOREST/GOOD/HSG C (6-U)
58,822	77	FOREST/GOOD/HSG D (6-U)
131,120	98	IMPERVIOUS (6-U)
317,602	61	OPEN SPACE/GOOD/HSG B (6-U)
99,782	74	OPEN SPACE/GOOD/HSG C (6-U)
228,723	80	OPEN SPACE/GOOD/HSG D (6-U)
847,644	**75**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
322,668	HSG B	6-U
106,311	HSG C	6-U
287,545	HSG D	6-U
131,120	Other	6-U
847,644		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Numbe
0	5,066	6,529	58,822	0	70,417	FOREST/GOOD/	
0	0	0	0	131,120	131,120	IMPERVIOUS	
0	317,602	99,782	228,723	0	646,107	OPEN SPACE/GOOD/	
0	**322,668**	**106,311**	**287,545**	**131,120**	**847,644**	**TOTAL AREA**	

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method

Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED Runoff Area=847,644 sf Runoff Depth=0.59"
Flow Length=1,409' Slope=0.0200 '/' Tc=10.9 min CN=75 Runoff=16.00 cfs 41,887 cf

Reach 7R: (new Reach) Avg. Flow Depth=0.27' Max Vel=10.91 fps Inflow=16.00 cfs 41,887 cf
n=0.035 L=55.0' S=0.0255 '/' Capacity=892.51 cfs Outflow=16.00 cfs 41,887 cf

Link 006: POINT OF INTEREST #5 Inflow=16.00 cfs 41,887 cf
Primary=16.00 cfs 41,887 cf

Total Runoff Area = 847,644 sf Runoff Volume = 41,887 cf Average Runoff Depth = 0.59"

Summary for Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED

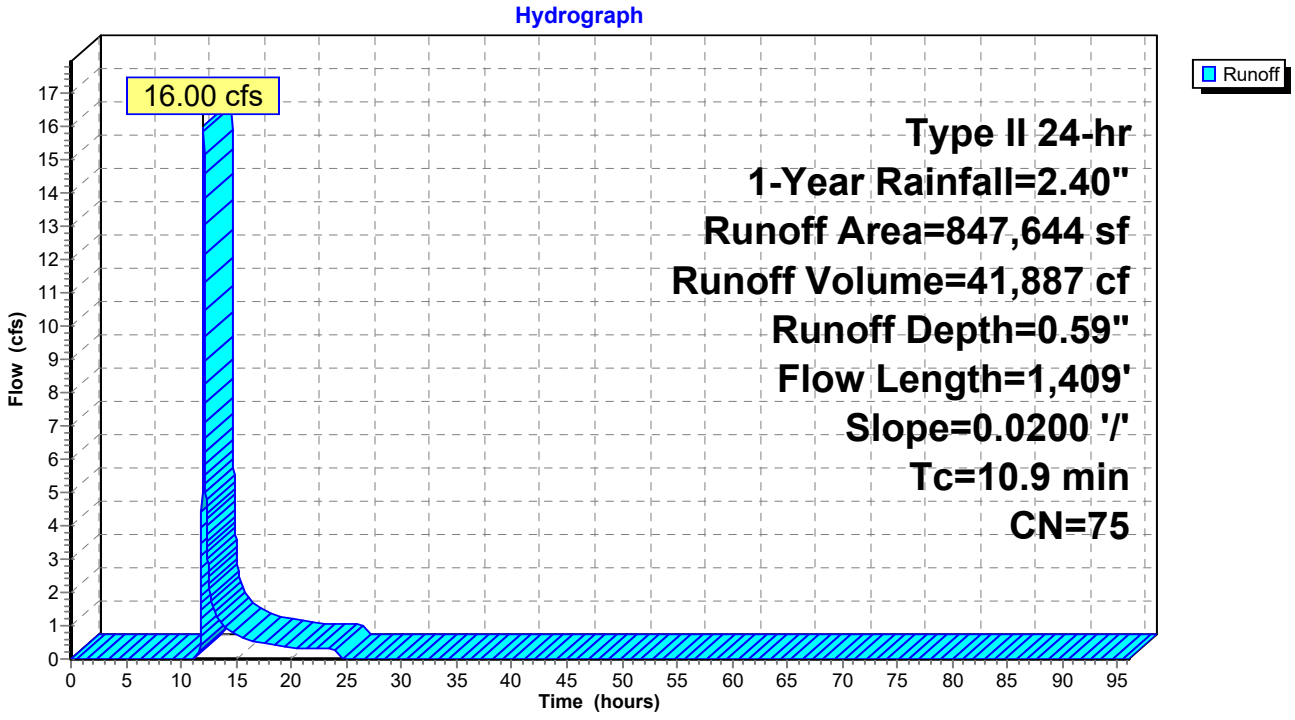
Runoff = 16.00 cfs @ 12.04 hrs, Volume= 41,887 cf, Depth= 0.59"
Routed to Reach 7R : (new Reach)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.40"

	Area (sf)	CN	Description
*	5,066	55	FOREST/GOOD/HSG B
*	6,529	70	FOREST/GOOD/HSG C
*	58,822	77	FOREST/GOOD/HSG D
*	131,120	98	IMPERVIOUS
*	317,602	61	OPEN SPACE/GOOD/HSG B
*	99,782	74	OPEN SPACE/GOOD/HSG C
*	228,723	80	OPEN SPACE/GOOD/HSG D
	847,644	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0200	1.31		**Sheet Flow, 1** Smooth surfaces n= 0.011 P2= 2.90"
9.6	1,309	0.0200	2.28		**Shallow Concentrated Flow, 2** Unpaved Kv= 16.1 fps
10.9	1,409	Total			

Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED



Hydrograph for Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	53.00	2.40	0.59	0.00
1.00	0.03	0.00	0.00	54.00	2.40	0.59	0.00
2.00	0.05	0.00	0.00	55.00	2.40	0.59	0.00
3.00	0.08	0.00	0.00	56.00	2.40	0.59	0.00
4.00	0.12	0.00	0.00	57.00	2.40	0.59	0.00
5.00	0.15	0.00	0.00	58.00	2.40	0.59	0.00
6.00	0.19	0.00	0.00	59.00	2.40	0.59	0.00
7.00	0.24	0.00	0.00	60.00	2.40	0.59	0.00
8.00	0.29	0.00	0.00	61.00	2.40	0.59	0.00
9.00	0.35	0.00	0.00	62.00	2.40	0.59	0.00
10.00	0.43	0.00	0.00	63.00	2.40	0.59	0.00
11.00	0.56	0.00	0.00	64.00	2.40	0.59	0.00
12.00	1.59	0.20	**14.44**	65.00	2.40	0.59	0.00
13.00	1.85	0.31	**1.48**	66.00	2.40	0.59	0.00
14.00	1.97	0.37	0.91	67.00	2.40	0.59	0.00
15.00	2.05	0.40	0.73	68.00	2.40	0.59	0.00
16.00	2.11	0.44	0.58	69.00	2.40	0.59	0.00
17.00	2.16	0.46	0.51	70.00	2.40	0.59	0.00
18.00	2.21	0.49	0.46	71.00	2.40	0.59	0.00
19.00	2.25	0.51	0.40	72.00	2.40	0.59	0.00
20.00	2.28	0.53	0.34	73.00	2.40	0.59	0.00
21.00	2.32	0.55	0.33	74.00	2.40	0.59	0.00
22.00	2.34	0.56	0.32	75.00	2.40	0.59	0.00
23.00	2.37	0.58	0.31	76.00	2.40	0.59	0.00
24.00	**2.40**	**0.59**	0.30	77.00	2.40	0.59	0.00
25.00	2.40	0.59	0.00	78.00	2.40	0.59	0.00
26.00	2.40	0.59	0.00	79.00	2.40	0.59	0.00
27.00	2.40	0.59	0.00	80.00	2.40	0.59	0.00
28.00	2.40	0.59	0.00	81.00	2.40	0.59	0.00
29.00	2.40	0.59	0.00	82.00	2.40	0.59	0.00
30.00	2.40	0.59	0.00	83.00	2.40	0.59	0.00
31.00	2.40	0.59	0.00	84.00	2.40	0.59	0.00
32.00	2.40	0.59	0.00	85.00	2.40	0.59	0.00
33.00	2.40	0.59	0.00	86.00	2.40	0.59	0.00
34.00	2.40	0.59	0.00	87.00	2.40	0.59	0.00
35.00	2.40	0.59	0.00	88.00	2.40	0.59	0.00
36.00	2.40	0.59	0.00	89.00	2.40	0.59	0.00
37.00	2.40	0.59	0.00	90.00	2.40	0.59	0.00
38.00	2.40	0.59	0.00	91.00	2.40	0.59	0.00
39.00	2.40	0.59	0.00	92.00	2.40	0.59	0.00
40.00	2.40	0.59	0.00	93.00	2.40	0.59	0.00
41.00	2.40	0.59	0.00	94.00	2.40	0.59	0.00
42.00	2.40	0.59	0.00	95.00	2.40	0.59	0.00
43.00	2.40	0.59	0.00	96.00	2.40	0.59	0.00
44.00	2.40	0.59	0.00				
45.00	2.40	0.59	0.00				
46.00	2.40	0.59	0.00				
47.00	2.40	0.59	0.00				
48.00	2.40	0.59	0.00				
49.00	2.40	0.59	0.00				
50.00	2.40	0.59	0.00				
51.00	2.40	0.59	0.00				
52.00	2.40	0.59	0.00				

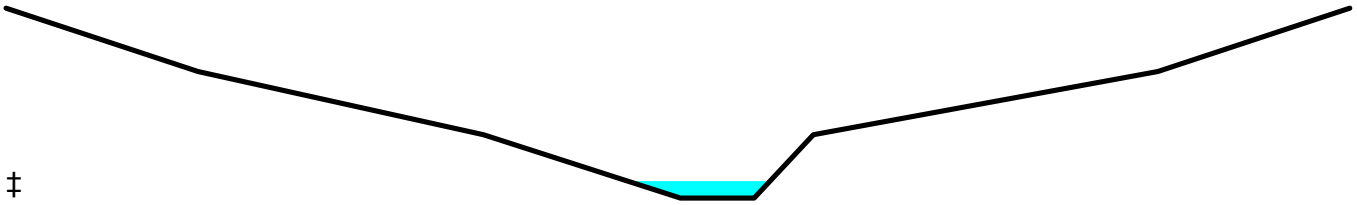
Summary for Reach 7R: (new Reach)

Inflow Area = 847,644 sf, Inflow Depth = 0.59" for 1-Year event
Inflow = 16.00 cfs @ 12.04 hrs, Volume= 41,887 cf
Outflow = 16.00 cfs @ 12.04 hrs, Volume= 41,887 cf, Atten= 0%, Lag= 0.1 min
Routed to Link 006 : POINT OF INTEREST #5

Routing by Dyn-Muskingum-Cunge method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs / 3
Reference Flow= 669.38 cfs Estimated Depth= 2.71' Velocity= 8.11 fps
m= 1.344, c= 10.91 fps, dt= 0.6 min, dx= 55.0' / 1 = 55.0', K= 0.1 min, X= 0.000
Max. Velocity= 10.91 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.91 fps, Avg. Travel Time= 0.1 min

Peak Storage= 81 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 7.22'
Bank-Full Depth= 3.00' Flow Area= 101.5 sf, Capacity= 892.51 cfs

Custom cross-section, Length= 55.0' Slope= 0.0255 '/' (102 Elevation Intervals)
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 508.40', Outlet Invert= 507.00'



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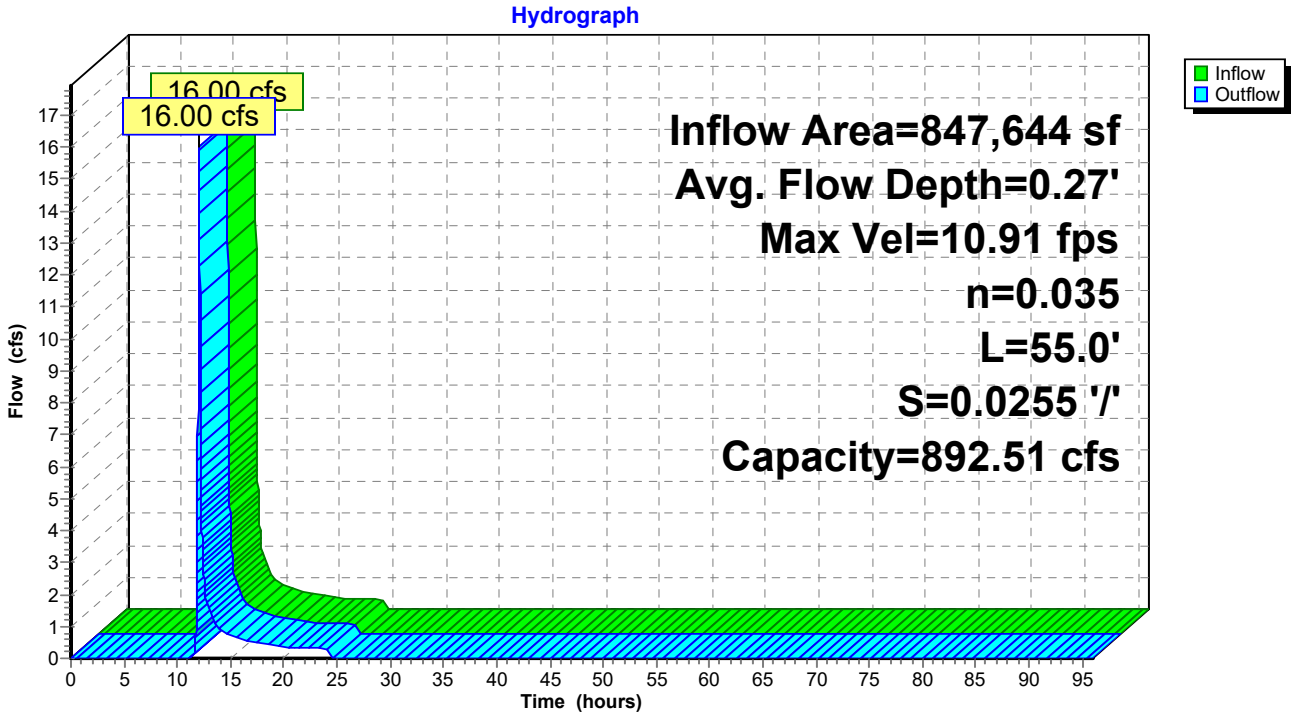
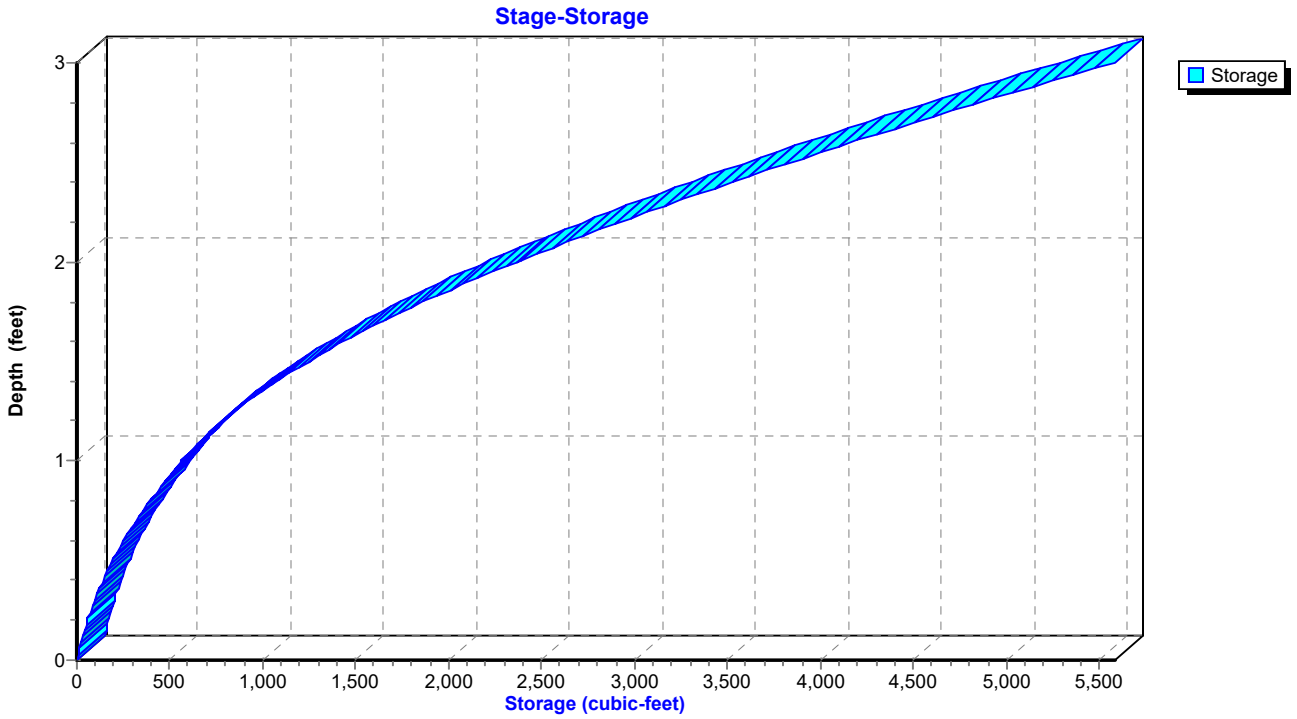
Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	510.00	0.00
9.75	509.00	1.00
24.25	508.00	2.00
34.25	507.00	3.00
38.00	507.00	3.00
41.00	508.00	2.00
58.50	509.00	1.00
68.25	510.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)	m
0.00	0.0	3.8	0.0	0	0.00	1.585
1.00	10.3	17.0	16.8	564	49.63	1.371
2.00	43.0	49.0	48.8	2,365	266.89	1.248
3.00	101.5	68.6	68.3	5,583	892.51	1.355

Reach 7R: (new Reach)



Reach 7R: (new Reach)



Hydrograph for Reach 7R: (new Reach)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	508.40	0.00
2.00	0.00	0	508.40	0.00
4.00	0.00	0	508.40	0.00
6.00	0.00	0	508.40	0.00
8.00	0.00	0	508.40	0.00
10.00	0.00	0	508.40	0.00
12.00	**14.44**	**72**	**508.65**	**14.33**
14.00	**0.91**	**5**	**508.42**	**0.91**
16.00	0.58	3	508.41	0.58
18.00	0.46	2	508.41	0.46
20.00	0.34	2	508.41	0.34
22.00	0.32	2	508.41	0.32
24.00	0.30	1	508.41	0.30
26.00	0.00	0	508.40	0.00
28.00	0.00	0	508.40	0.00
30.00	0.00	0	508.40	0.00
32.00	0.00	0	508.40	0.00
34.00	0.00	0	508.40	0.00
36.00	0.00	0	508.40	0.00
38.00	0.00	0	508.40	0.00
40.00	0.00	0	508.40	0.00
42.00	0.00	0	508.40	0.00
44.00	0.00	0	508.40	0.00
46.00	0.00	0	508.40	0.00
48.00	0.00	0	508.40	0.00
50.00	0.00	0	508.40	0.00
52.00	0.00	0	508.40	0.00
54.00	0.00	0	508.40	0.00
56.00	0.00	0	508.40	0.00
58.00	0.00	0	508.40	0.00
60.00	0.00	0	508.40	0.00
62.00	0.00	0	508.40	0.00
64.00	0.00	0	508.40	0.00
66.00	0.00	0	508.40	0.00
68.00	0.00	0	508.40	0.00
70.00	0.00	0	508.40	0.00
72.00	0.00	0	508.40	0.00
74.00	0.00	0	508.40	0.00
76.00	0.00	0	508.40	0.00
78.00	0.00	0	508.40	0.00
80.00	0.00	0	508.40	0.00
82.00	0.00	0	508.40	0.00
84.00	0.00	0	508.40	0.00
86.00	0.00	0	508.40	0.00
88.00	0.00	0	508.40	0.00
90.00	0.00	0	508.40	0.00
92.00	0.00	0	508.40	0.00
94.00	0.00	0	508.40	0.00
96.00	0.00	0	508.40	0.00

Stage-Area-Storage for Reach 7R: (new Reach)

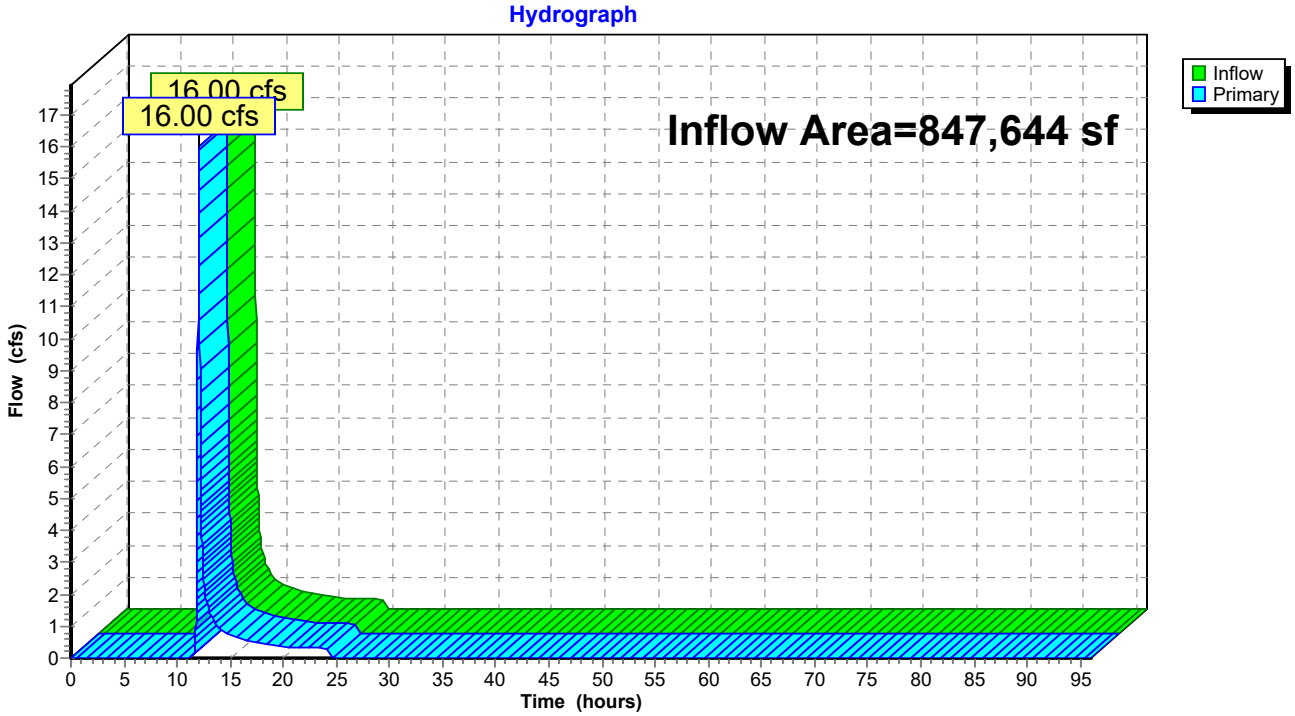
Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
508.40	0.0	0
508.45	0.2	11
508.50	0.4	24
508.55	0.7	39
508.60	1.0	56
508.65	1.3	74
508.70	1.7	94
508.75	2.1	116
508.80	2.5	140
508.85	3.0	165
508.90	3.5	193
508.95	4.0	222
509.00	4.6	252
509.05	5.2	285
509.10	5.8	320
509.15	6.5	356
509.20	7.2	394
509.25	7.9	434
509.30	8.6	475
509.35	9.4	519
509.40	10.3	564
509.45	11.1	612
509.50	12.1	665
509.55	13.1	722
509.60	14.2	783
509.65	15.4	849
509.70	16.7	920
509.75	18.1	994
509.80	19.5	1,073
509.85	21.0	1,157
509.90	22.6	1,244
509.95	24.3	1,337
510.00	26.1	1,433
510.05	27.9	1,534
510.10	29.8	1,640
510.15	31.8	1,750
510.20	33.9	1,864
510.25	36.1	1,983
510.30	38.3	2,106
510.35	40.6	2,233
510.40	43.0	2,365
510.45	45.5	2,501
510.50	48.0	2,638
510.55	50.5	2,779
510.60	53.1	2,923
510.65	55.8	3,069
510.70	58.5	3,218
510.75	61.3	3,369
510.80	64.1	3,523
510.85	66.9	3,680
510.90	69.8	3,840
510.95	72.8	4,002
511.00	75.8	4,167
511.05	78.8	4,334
511.10	81.9	4,505
511.15	85.0	4,678
511.20	88.2	4,853
511.25	91.5	5,032
511.30	94.8	5,213
511.35	98.1	5,396
511.40	**101.5**	**5,583**

Summary for Link 006: POINT OF INTEREST #5

Inflow Area = 847,644 sf, Inflow Depth = 0.59" for 1-Year event
Inflow = 16.00 cfs @ 12.04 hrs, Volume= 41,887 cf
Primary = 16.00 cfs @ 12.04 hrs, Volume= 41,887 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 006: POINT OF INTEREST #5



Hydrograph for Link 006: POINT OF INTEREST #5

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	53.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	54.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00	55.00	0.00	0.00	0.00
3.00	0.00	0.00	0.00	56.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00	57.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	58.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00	59.00	0.00	0.00	0.00
7.00	0.00	0.00	0.00	60.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00	61.00	0.00	0.00	0.00
9.00	0.00	0.00	0.00	62.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	63.00	0.00	0.00	0.00
11.00	0.00	0.00	0.00	64.00	0.00	0.00	0.00
12.00	**14.33**	0.00	**14.33**	65.00	0.00	0.00	0.00
13.00	**1.48**	0.00	**1.48**	66.00	0.00	0.00	0.00
14.00	0.91	0.00	0.91	67.00	0.00	0.00	0.00
15.00	0.73	0.00	0.73	68.00	0.00	0.00	0.00
16.00	0.58	0.00	0.58	69.00	0.00	0.00	0.00
17.00	0.51	0.00	0.51	70.00	0.00	0.00	0.00
18.00	0.46	0.00	0.46	71.00	0.00	0.00	0.00
19.00	0.40	0.00	0.40	72.00	0.00	0.00	0.00
20.00	0.34	0.00	0.34	73.00	0.00	0.00	0.00
21.00	0.33	0.00	0.33	74.00	0.00	0.00	0.00
22.00	0.32	0.00	0.32	75.00	0.00	0.00	0.00
23.00	0.31	0.00	0.31	76.00	0.00	0.00	0.00
24.00	0.30	0.00	0.30	77.00	0.00	0.00	0.00
25.00	0.00	0.00	0.00	78.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00	79.00	0.00	0.00	0.00
27.00	0.00	0.00	0.00	80.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00	81.00	0.00	0.00	0.00
29.00	0.00	0.00	0.00	82.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	83.00	0.00	0.00	0.00
31.00	0.00	0.00	0.00	84.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00	85.00	0.00	0.00	0.00
33.00	0.00	0.00	0.00	86.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	88.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00	89.00	0.00	0.00	0.00
37.00	0.00	0.00	0.00	90.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00	91.00	0.00	0.00	0.00
39.00	0.00	0.00	0.00	92.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00	93.00	0.00	0.00	0.00
41.00	0.00	0.00	0.00	94.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00	95.00	0.00	0.00	0.00
43.00	0.00	0.00	0.00	96.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				
52.00	0.00	0.00	0.00				

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method

Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED Runoff Area=847,644 sf Runoff Depth=0.90"
Flow Length=1,409' Slope=0.0200 '/' Tc=10.9 min CN=75 Runoff=25.23 cfs 63,291 cf

Reach 7R: (new Reach) Avg. Flow Depth=0.37' Max Vel=10.91 fps Inflow=25.23 cfs 63,291 cf
n=0.035 L=55.0' S=0.0255 '/' Capacity=892.51 cfs Outflow=25.23 cfs 63,291 cf

Link 006: POINT OF INTEREST #5 Inflow=25.23 cfs 63,291 cf
Primary=25.23 cfs 63,291 cf

Total Runoff Area = 847,644 sf Runoff Volume = 63,291 cf Average Runoff Depth = 0.90"

Summary for Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED

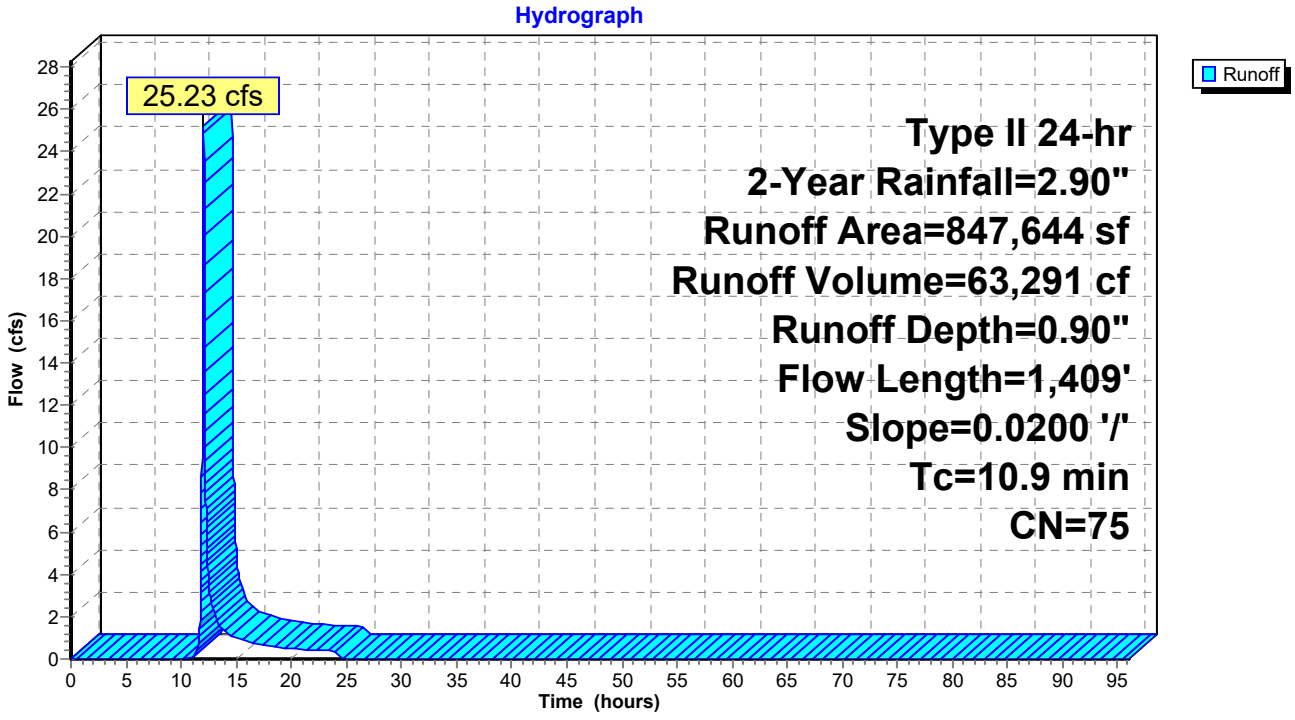
Runoff = 25.23 cfs @ 12.04 hrs, Volume= 63,291 cf, Depth= 0.90"
Routed to Reach 7R : (new Reach)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.90"

	Area (sf)	CN	Description
*	5,066	55	FOREST/GOOD/HSG B
*	6,529	70	FOREST/GOOD/HSG C
*	58,822	77	FOREST/GOOD/HSG D
*	131,120	98	IMPERVIOUS
*	317,602	61	OPEN SPACE/GOOD/HSG B
*	99,782	74	OPEN SPACE/GOOD/HSG C
*	228,723	80	OPEN SPACE/GOOD/HSG D
	847,644	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0200	1.31		**Sheet Flow, 1** Smooth surfaces n= 0.011 P2= 2.90"
9.6	1,309	0.0200	2.28		**Shallow Concentrated Flow, 2** Unpaved Kv= 16.1 fps
10.9	1,409	Total			

Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED



Hydrograph for Subcatchment 6-U: WATERSHED AREA #6 - UNDETAINED

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.03	0.00	0.00
2.00	0.06	0.00	0.00
3.00	0.10	0.00	0.00
4.00	0.14	0.00	0.00
5.00	0.18	0.00	0.00
6.00	0.23	0.00	0.00
7.00	0.29	0.00	0.00
8.00	0.35	0.00	0.00
9.00	0.43	0.00	0.00
10.00	0.52	0.00	0.00
11.00	0.68	0.00	0.00
12.00	1.92	0.34	**23.38**
13.00	2.24	0.50	**2.11**
14.00	2.38	0.58	1.29
15.00	2.48	0.64	1.02
16.00	2.55	0.68	0.81
17.00	2.62	0.72	0.71
18.00	2.67	0.75	0.64
19.00	2.72	0.78	0.56
20.00	2.76	0.81	0.47
21.00	2.80	0.83	0.45
22.00	2.83	0.85	0.43
23.00	2.87	0.88	0.42
24.00	**2.90**	**0.90**	0.40
25.00	2.90	0.90	0.00
26.00	2.90	0.90	0.00
27.00	2.90	0.90	0.00
28.00	2.90	0.90	0.00
29.00	2.90	0.90	0.00
30.00	2.90	0.90	0.00
31.00	2.90	0.90	0.00
32.00	2.90	0.90	0.00
33.00	2.90	0.90	0.00
34.00	2.90	0.90	0.00
35.00	2.90	0.90	0.00
36.00	2.90	0.90	0.00
37.00	2.90	0.90	0.00
38.00	2.90	0.90	0.00
39.00	2.90	0.90	0.00
40.00	2.90	0.90	0.00
41.00	2.90	0.90	0.00
42.00	2.90	0.90	0.00
43.00	2.90	0.90	0.00
44.00	2.90	0.90	0.00
45.00	2.90	0.90	0.00
46.00	2.90	0.90	0.00
47.00	2.90	0.90	0.00
48.00	2.90	0.90	0.00
49.00	2.90	0.90	0.00
50.00	2.90	0.90	0.00
51.00	2.90	0.90	0.00
52.00	2.90	0.90	0.00
53.00	2.90	0.90	0.00
54.00	2.90	0.90	0.00
55.00	2.90	0.90	0.00
56.00	2.90	0.90	0.00
57.00	2.90	0.90	0.00
58.00	2.90	0.90	0.00
59.00	2.90	0.90	0.00
60.00	2.90	0.90	0.00
61.00	2.90	0.90	0.00
62.00	2.90	0.90	0.00
63.00	2.90	0.90	0.00
64.00	2.90	0.90	0.00
65.00	2.90	0.90	0.00
66.00	2.90	0.90	0.00
67.00	2.90	0.90	0.00
68.00	2.90	0.90	0.00
69.00	2.90	0.90	0.00
70.00	2.90	0.90	0.00
71.00	2.90	0.90	0.00
72.00	2.90	0.90	0.00
73.00	2.90	0.90	0.00
74.00	2.90	0.90	0.00
75.00	2.90	0.90	0.00
76.00	2.90	0.90	0.00
77.00	2.90	0.90	0.00
78.00	2.90	0.90	0.00
79.00	2.90	0.90	0.00
80.00	2.90	0.90	0.00
81.00	2.90	0.90	0.00
82.00	2.90	0.90	0.00
83.00	2.90	0.90	0.00
84.00	2.90	0.90	0.00
85.00	2.90	0.90	0.00
86.00	2.90	0.90	0.00
87.00	2.90	0.90	0.00
88.00	2.90	0.90	0.00
89.00	2.90	0.90	0.00
90.00	2.90	0.90	0.00
91.00	2.90	0.90	0.00
92.00	2.90	0.90	0.00
93.00	2.90	0.90	0.00
94.00	2.90	0.90	0.00
95.00	2.90	0.90	0.00
96.00	2.90	0.90	0.00

CULVERT 100 ANALYSIS

This H&H analysis was taken from the PCSM Report Appendix D.3, which is also provided in Attachment K.

STORMWATER MANAGEMENT ANALYSIS WITH CONSISTENCY LETTER

The proposed development project is obtaining an NPDES Permit for stormwater discharges and a stormwater management consistency letter is being requested from the Township.

FLOODPLAIN MANAGEMENT ANALYSIS WITH CONSISTENCY LETTER

Based on guidance received from the Department of Environmental Protection (PADEP) at the pre-application meeting held on May 5, 2021 and given that the proposed development site is not located within a regulated floodplain area, no additional floodplain management analysis or consistency letter is required for this Joint Permit Application.

RISK ASSESSMENT

Based on guidance received from the Department of Environmental Protection (PADEP) at the pre-application meeting held on May 5, 2021 and given that the proposed development site is not located within a regulated floodplain area, risk assessment is not required for this Joint Permit Application.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

OnBase DEP Public Upload
Payment Submission Form

This form is utilized for the submission of payment to the Department of Environmental Protection (DEP) when an application is submitted through the OnBase – DEP Public Upload system. OnBase does not currently accept electronic payment submissions.

Please complete the information identified below and submit this form along with your payment to the DEP office reviewing your application. When you upload your application, the OnBase system will provide you a unique Reference #. Please include the Reference # on your check to ensure prompt recording of your payment.

Further questions regarding submission of payment, should be directed to the appropriate DEP office.

Checks and Money orders should be made payable to "**Commonwealth of Pennsylvania**".

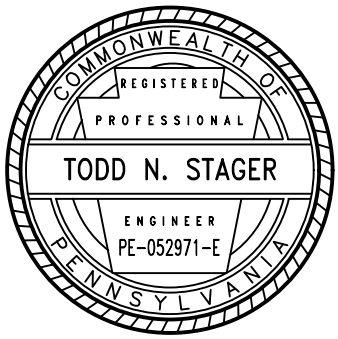
PAYMENT INFORMATION

Related ID#s (If Known)			
DEP Client ID#	**Site ID#**	**APS ID#**	**Employer ID# (EIN)** 94-3285362
DEP Bureau (Example: Air Quality, Clean Water, Mining Programs, Waste Management, etc.) WATERWAYS ENGINEERING AND WETLANDS			
Permit # / Project #			
Permit / Project Name CH 105 WO&E INDIVIDUAL PERMIT APPLCIATION/ 7464 & 7600 Linglestown Road Site, West Hanover Township, Dauphin County			

Required Information Below		
Reference # - UPLOAD 86216		
Check Number 041433	**Amount Paid** $17,950.00	
Application Type Joint Permit		
Applicant Name PROLOGIS, L.P.		
Applicant Address 7584 Morris Court, Suite 200 Allentown, PA 18106		
Contact Name David Koerner, Vice President of Construction		
Contact Phone 610-530-2864	**Contact Email** dkoerner@prologis.com	

Professional engineer's seal and certification:

"I (name) do hereby certify pursuant to the penalties of 18 Pa. C.S.A., Section 4904 to the best of my knowledge, information and belief, that the information contained in the accompanying plans, specifications and reports has been prepared in accordance with accepted engineering practice, is true and correct, and is in conformance with Chapter 105 of the rules and regulations of the Department of Environmental Protection."



Signed: _____