SVE

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June 3, 2019

Plainfield Conservation Commission
Attn: Judy William - Chair
Town of Plainfield
304 Main Street
Plainfield, MA 01070

RE: Plainfield Solar, LLC (G1905)
Stormwater Revision Summary for Additional Battery Storage

Dear Ms Williams,

On May 16, 2019, Rob Ritchie from Nexamp, Inc., and I went before the Zoning Board of Appeals (ZBA) for approval to construct a battery storage facility for the Plainfield Solar Project located at 29 Union Street. The proposed battery storage is not within the jurisdictional area of the Conservation Commission; however, per the request of Peg Keller, the ZBA chair, we are sending you updated stormwater management information to review and to provide comment to the ZBA.

Summary

Plainfield Solar is looking to add Battery Storage to their project at 29 Union Street. Essentially, this involves mounting a 40' x 8' storage container upon concrete footings and extending the gravel access road beyond the end of the container. The battery storage would be located north of the panels in the southern array but would still be contained within the fence. The energy storage is totally self-contained within the storage container and has several safety features built-in, including a fire suppression system.

Stormwater Management

The installation would generate approximately 1,600 square feet of additional impervious area to the Subcatchment Area (8S) of our Stormwater Management Plan (SWMP) – Revised April 25, 2017. The increase in impervious area will slightly increase runoff for this area. Our SWMP was divided into four (4) different Design Points in our analysis of the hydrology for the project. Subcatchment (8S) would have impact on Design Point #2 (DP2); however, after revising the impervious area within our hydrology calculations, DP2 would remain the same as when the project was permitted. Ultimately, as when originally permitted, this revision still results in a reduction in stormwater runoff over existing conditions for each of the 2-yr, 10-yr, or 100-yr storms. The following table summarizes the revisions for stormwater management with construction of the proposed battery storage.

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	Summary						
	Subcatchment (8S)			2			
	DEV Permitted (04 / 2017)	DEV Battery Storage	Δ	EX	DEV Permitted (04 / 2017)	DEV Battery Storage	Δ
Q2	5.10	5.12	+0.02	5.20	4.29	4.29	-0.91
Q10	11.14	11.19	+0.05	11.10	9.15	9.15	-1.95
Q100	19.64	19.72	+0.08	19.27	16.05	16.05	-3.23

ZBA Battery Storage Submittal

Attached to this letter you will find the documents submitted to and approved by the ZBA for the proposed battery storage. These documents include, a proposed battery storage exhibit detailing the location of the proposed storage within the array (Sheet 1), a detail of the area with dimensions (Sheet 2), and the technical foundation/mounting information for the storage container (Sheets 3-5). Also attached are the data and information sheets about the storage system and safety features.

Additionally, we are attaching the summary pages for Developed Conditions from our SWMP – Revised 04-25-17 and the Developed Hydrology Plan for your reference.

We appreciate you taking the time to review our Stormwater Management Revisions for the proposed battery storage for Plainfield Solar. If you or any of the other Commission members have any questions, please do not hesitate to call.

Yours very truly,
SVE Associates

Kelley Fike, EIT
Associate Engineer

CC: Peg Keller, ZBA Chair
Rob Ritchie, Nexamp
File

STORM WATER MANAGEMENT PLAN

PLAINFIELD SOLAR
29 UNION STREET
PLAINFIELD, MA

February 8, 2017
REVISED: APRIL 7, 2017
REVISED: APRIL 25, 2017

PREPARED FOR:
Plainfield Solar, LLC
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Chris Clark
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PREPARED BY:
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SVE Project No: G1905

Anthony Wonseski Jr., P.E. Date
RCE NO. 46615

3.0 Developed Conditions

3.1 Design Objectives

The objective of this SWMP is to analyze the pre and post development storm water runoff conditions and impacts to downstream property for the proposed solar development. In the report and drainage calculations for the developed conditions, we made the consideration that the solar panels, though impervious, simply redirect the runoff, and overall, the runoff is recharged into the soils below. Therefore, in our developed hydrology calculations, we considered the entire solar field as a meadow which will be planted with a solar seed mixture in the areas where the woods have been cleared.

3.2 Developed Hydrology

The developed drainage area studied for this project is the same as the existing and is reflected on the attached Developed Hydrology Plan. The plan shows the location of the solar panels and gravel access road in addition to any changes in grade. The developed hydrology areas have been broken into 12 different sub catchment areas. The areas and flow paths were used to calculate the expected runoff for the proposed development solar facility.

Refer to Pocket #2 for Developed Hydrology Plan used for the analysis

The table below summarizes the anticipated runoff from the developed site.

Design Storm			Developed Areas				
	1S	3S	4S	6S	7S	8S	9S
Q2	16.60	1.34	2.46	1.20	5.17	5.10	1.16
Q10	34.81	3.01	5.55	2.57	9.95	11.14	2.60
Q100	59.84	5.37	9.91	4.45	16.29	19.64	4.64

Design Storm			Developed Areas			
	10S	11S	12S	13S	14S	**Totals**
Q2	4.29	2.21	2.04	2.32	3.15	47.04
Q10	9.15	4.97	4.58	5.21	6.75	100.29
Q100	15.87	8.86	8.18	9.28	11.74	174.07

Refer to Appendix A for Hydrology Calculations

The developed flows did increase over the existing conditions. Vegetated swales, diversion ditches, and permanent stormwater detention basins were designed to reduce the flows leaving the project site to pre-development conditions.

The table below summarizes the basin characteristics for the five basins designed to aid in the reduction of flows for the developed site.

Plainfield Basin Characteristics

	2-yr Storm				10-yr Storm				100-yr Storm			
Basin	Q_{IN} (CFS)	Q_{OUT} (CFS)	Peak Elevation (FT)	Top of Basin (FT)	Q_{IN} (CFS)	Q_{OUT} (CFS)	Peak Elevation (FT)	Top of Basin (FT)	Q_{IN} (CFS)	Q_{OUT} (CFS)	Peak Elevation (FT)	Top of Basin (FT)
1	2.39	0.77	1684.91	1687.5	5.36	3.06	1686.17	1687.5	9.04	8.71	1686.43	1687.5
2	2.46	2.39	1688.21	1690.5	5.55	5.39	1688.66	1690.5	9.91	9.04	1689.38	1690.5
4	5.4	0.48	1675.51	1678.5	11.82	0.96	1676.75	1678.5	20.85	9.27	1677.37	1678.5
5	2.21	0.12	1659.2	1661	4.97	2.02	1659.6	1661	8.86	8.38	1659.79	1661

The table below summarizes the anticipated runoff from the developed site at each of the design points.

Design Storm	Design Points				
	1*	2	3	4	**Totals**
Q2	20.40	4.29	6.75	1.34	32.78
Q10	42.16	9.15	14.91	3.71	69.93
Q100	71.94	16.05	27.07	6.56	121.62

* Design Point #1 represents the existing runoff discharge onto the David P. Kramer property.

Refer to Pocket #2 for Developed Hydrology Plan which indicates the locations of the developed design points.

3.3 Summary of Pre and Post Redevelopment Hydrology (CFS)

The table below highlights the existing conditions versus the proposed development conditions at each of the four design points.

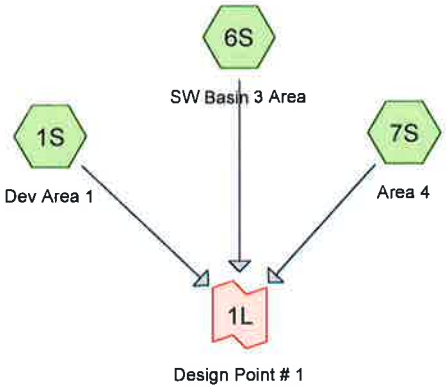
	Summary					
Design Point	1*			2		
	EX	DEV	Δ	EX	DEV	Δ
Q2	23.88	20.40	-3.48	5.20	4.29	-0.91
Q10	50.81	42.16	-8.65	11.10	9.15	-1.95
Q100	88.06	71.94	-16.12	19.27	16.05	-3.23

*Design Point #1 indicates the reduction of runoff to the Kramer property.

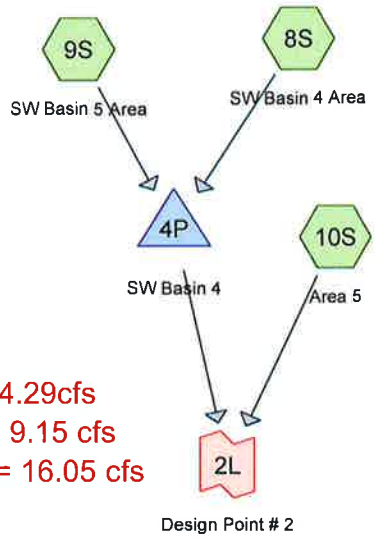
	Summary					
Design Point	3			4		
	EX	DEV	Δ	EX	DEV	Δ
Q2	9.89	6.75	-3.14	4.06	1.34	-2.72
Q10	21.63	14.91	-6.72	8.06	3.71	-4.35
Q100	38.03	27.07	-10.96	15.69	6.56	-9.13

Notes:

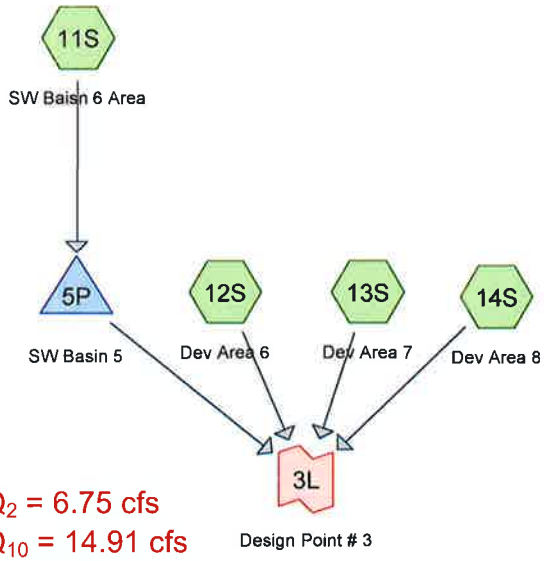
1. Existing condition runoff accounts for runoff expected to be generated from the site as it is today.
2. Developed condition runoff accounts for runoff considering the solar field as meadow.



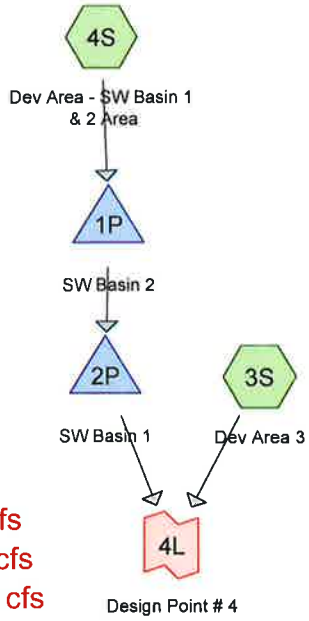
Q_2 = 20.40 cfs
Q_{10} = 42.16 cfs
Q_{100} = 71.94 cfs



Q_2 = 4.29cfs
Q_{10} = 9.15 cfs
Q_{100} = 16.05 cfs



Q_2 = 6.75 cfs
Q_{10} = 14.91 cfs
Q_{100} = 27.07 cfs



Q_2 = 1.34 cfs
Q_{10} = 3.71 cfs
Q_{100} = 6.56 cfs

Routing Diagram for G1905-Developed_Rev D Plans
Prepared by SVE Associates, Printed 4/25/2017
HydroCAD® 10.00-19 s/n 04481 © 2016 HydroCAD Software Solutions LLC

Time span=1.00-96.00 hrs, dt=0.02 hrs, 4751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dev Area 1 Runoff Area=862,818 sf 7.68% Impervious Runoff Depth=1.13"
Flow Length=1,694' Slope=0.0578 '/' Tc=21.4 min CN=78 Runoff=16.60 cfs 1.863 af

Subcatchment3S: Dev Area 3 Runoff Area=58,287 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=447' Slope=0.0649 '/' Tc=7.6 min CN=75 Runoff=1.34 cfs 0.107 af

Subcatchment4S: Dev Area - SW Basin 1 Runoff Area=129,078 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=746' Slope=0.0469 '/' Tc=13.5 min CN=75 Runoff=2.46 cfs 0.237 af

Subcatchment6S: SW Basin 3 Area Runoff Area=44,552 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=430' Slope=0.0674 '/' Tc=6.8 min CN=77 Runoff=1.20 cfs 0.091 af

Subcatchment7S: Area 4 Runoff Area=158,828 sf 23.69% Impervious Runoff Depth=1.38"
Flow Length=612' Slope=0.0441 '/' Tc=9.6 min CN=82 Runoff=5.17 cfs 0.419 af

Subcatchment8S: SW Basin 4 Area Runoff Area=365,369 sf 0.00% Impervious Runoff Depth=1.02"
Flow Length=2,501' Slope=0.0492 '/' Tc=33.6 min CN=76 Runoff=5.10 cfs 0.709 af

Subcatchment9S: SW Basin 5 Area Runoff Area=45,635 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=248' Slope=0.0645 '/' Tc=4.8 min CN=75 Runoff=1.16 cfs 0.084 af

Subcatchment10S: Area 5 Runoff Area=150,667 sf 5.58% Impervious Runoff Depth=1.07"
Flow Length=348' Slope=0.0805 '/' Tc=5.3 min CN=77 Runoff=4.29 cfs 0.309 af

Subcatchment11S: SW Baisn 6 Area Runoff Area=98,448 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=528' Slope=0.0720 '/' Tc=8.3 min CN=75 Runoff=2.21 cfs 0.181 af

Subcatchment12S: Dev Area 6 Runoff Area=88,709 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=579' Slope=0.0984 '/' Tc=7.6 min CN=75 Runoff=2.04 cfs 0.163 af

Subcatchment13S: Dev Area 7 Runoff Area=89,933 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=382' Slope=0.1499 '/' Tc=4.4 min CN=75 Runoff=2.32 cfs 0.165 af

Subcatchment14S: Dev Area 8 Runoff Area=140,788 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=1,097' Slope=0.0893 '/' Tc=12.5 min CN=77 Runoff=3.15 cfs 0.288 af

Pond 1P: SW Basin 2 Peak Elev=1,688.21' Storage=567 cf Inflow=2.46 cfs 0.237 af
Primary=2.39 cfs 0.233 af Secondary=0.00 cfs 0.000 af Outflow=2.39 cfs 0.233 af

Pond 2P: SW Basin 1 Peak Elev=1,684.91' Storage=3,251 cf Inflow=2.39 cfs 0.233 af
Primary=0.77 cfs 0.201 af Secondary=0.00 cfs 0.000 af Outflow=0.77 cfs 0.201 af

Pond 4P: SW Basin 4 Peak Elev=1,675.51' Storage=22,347 cf Inflow=5.40 cfs 0.793 af
Primary=0.48 cfs 0.467 af Secondary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.467 af

Pond 5P: SW Basin 5 Peak Elev=1,659.20' Storage=5,521 cf Inflow=2.21 cfs 0.181 af
Primary=0.12 cfs 0.069 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.069 af

Link 1L: Design Point # 1
Inflow=20.40 cfs 2.374 af
Primary=20.40 cfs 2.374 af

Link 2L: Design Point # 2
Inflow=4.29 cfs 0.776 af
Primary=4.29 cfs 0.776 af

Link 3L: Design Point # 3
Inflow=6.75 cfs 0.686 af
Primary=6.75 cfs 0.686 af

Link 4L: Design Point # 4
Inflow=1.34 cfs 0.308 af
Primary=1.34 cfs 0.308 af

Total Runoff Area = 51.265 ac Runoff Volume = 4.618 af Average Runoff Depth = 1.08"
94.97% Pervious = 48.686 ac 5.03% Impervious = 2.579 ac

Time span=1.00-96.00 hrs, dt=0.02 hrs, 4751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dev Area 1 Runoff Area=862,818 sf 7.68% Impervious Runoff Depth=2.29"
Flow Length=1,694' Slope=0.0578 '/' Tc=21.4 min CN=78 Runoff=34.81 cfs 3.785 af

Subcatchment3S: Dev Area 3 Runoff Area=58,287 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=447' Slope=0.0649 '/' Tc=7.6 min CN=75 Runoff=3.01 cfs 0.229 af

Subcatchment4S: Dev Area - SW Basin 1 Runoff Area=129,078 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=746' Slope=0.0469 '/' Tc=13.5 min CN=75 Runoff=5.55 cfs 0.506 af

Subcatchment6S: SW Basin 3 Area Runoff Area=44,552 sf 0.00% Impervious Runoff Depth=2.21"
Flow Length=430' Slope=0.0674 '/' Tc=6.8 min CN=77 Runoff=2.57 cfs 0.188 af

Subcatchment7S: Area 4 Runoff Area=158,828 sf 23.69% Impervious Runoff Depth=2.64"
Flow Length=612' Slope=0.0441 '/' Tc=9.6 min CN=82 Runoff=9.95 cfs 0.801 af

Subcatchment8S: SW Basin 4 Area Runoff Area=365,369 sf 0.00% Impervious Runoff Depth=2.13"
Flow Length=2,501' Slope=0.0492 '/' Tc=33.6 min CN=76 Runoff=11.14 cfs 1.489 af

Subcatchment9S: SW Basin 5 Area Runoff Area=45,635 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=248' Slope=0.0645 '/' Tc=4.8 min CN=75 Runoff=2.60 cfs 0.179 af

Subcatchment10S: Area 5 Runoff Area=150,667 sf 5.58% Impervious Runoff Depth=2.21"
Flow Length=348' Slope=0.0805 '/' Tc=5.3 min CN=77 Runoff=9.15 cfs 0.637 af

Subcatchment11S: SW Baisn 6 Area Runoff Area=98,448 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=528' Slope=0.0720 '/' Tc=8.3 min CN=75 Runoff=4.97 cfs 0.386 af

Subcatchment12S: Dev Area 6 Runoff Area=88,709 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=579' Slope=0.0984 '/' Tc=7.6 min CN=75 Runoff=4.58 cfs 0.348 af

Subcatchment13S: Dev Area 7 Runoff Area=89,933 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=382' Slope=0.1499 '/' Tc=4.4 min CN=75 Runoff=5.21 cfs 0.353 af

Subcatchment14S: Dev Area 8 Runoff Area=140,788 sf 0.00% Impervious Runoff Depth=2.21"
Flow Length=1,097' Slope=0.0893 '/' Tc=12.5 min CN=77 Runoff=6.75 cfs 0.595 af

Pond 1P: SW Basin 2 Peak Elev=1,688.66' Storage=931 cf Inflow=5.55 cfs 0.506 af
Primary=5.36 cfs 0.502 af Secondary=0.00 cfs 0.000 af Outflow=5.36 cfs 0.502 af

Pond 2P: SW Basin 1 Peak Elev=1,686.17' Storage=6,842 cf Inflow=5.36 cfs 0.502 af
Primary=1.31 cfs 0.429 af Secondary=1.75 cfs 0.041 af Outflow=3.06 cfs 0.470 af

Pond 4P: SW Basin 4 Peak Elev=1,676.75' Storage=46,051 cf Inflow=11.82 cfs 1.668 af
Primary=0.96 cfs 1.340 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 1.340 af

Pond 5P: SW Basin 5 Peak Elev=1,659.60' Storage=6,892 cf Inflow=4.97 cfs 0.386 af
Primary=0.56 cfs 0.234 af Secondary=1.46 cfs 0.041 af Outflow=2.02 cfs 0.275 af

Link 1L: Design Point # 1
Inflow=42.16 cfs 4.774 af
Primary=42.16 cfs 4.774 af

Link 2L: Design Point # 2
Inflow=9.15 cfs 1.977 af
Primary=9.15 cfs 1.977 af

Link 3L: Design Point # 3
Inflow=14.91 cfs 1.530 af
Primary=14.91 cfs 1.530 af

Link 4L: Design Point # 4
Inflow=3.71 cfs 0.658 af
Primary=3.71 cfs 0.658 af

Total Runoff Area = 51.265 ac Runoff Volume = 9.496 af Average Runoff Depth = 2.22"
94.97% Pervious = 48.686 ac 5.03% Impervious = 2.579 ac

Time span=1.00-96.00 hrs, dt=0.02 hrs, 4751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dev Area 1 Runoff Area=862,818 sf 7.68% Impervious Runoff Depth=3.93"
Flow Length=1,694' Slope=0.0578 '/' Tc=21.4 min CN=78 Runoff=59.84 cfs 6.494 af

Subcatchment3S: Dev Area 3 Runoff Area=58,287 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=447' Slope=0.0649 '/' Tc=7.6 min CN=75 Runoff=5.37 cfs 0.404 af

Subcatchment4S: Dev Area - SW Basin 1 Runoff Area=129,078 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=746' Slope=0.0469 '/' Tc=13.5 min CN=75 Runoff=9.91 cfs 0.895 af

Subcatchment6S: SW Basin 3 Area Runoff Area=44,552 sf 0.00% Impervious Runoff Depth=3.83"
Flow Length=430' Slope=0.0674 '/' Tc=6.8 min CN=77 Runoff=4.45 cfs 0.326 af

Subcatchment7S: Area 4 Runoff Area=158,828 sf 23.69% Impervious Runoff Depth=4.36"
Flow Length=612' Slope=0.0441 '/' Tc=9.6 min CN=82 Runoff=16.29 cfs 1.324 af

Subcatchment8S: SW Basin 4 Area Runoff Area=365,369 sf 0.00% Impervious Runoff Depth=3.73"
Flow Length=2,501' Slope=0.0492 '/' Tc=33.6 min CN=76 Runoff=19.64 cfs 2.606 af

Subcatchment9S: SW Basin 5 Area Runoff Area=45,635 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=248' Slope=0.0645 '/' Tc=4.8 min CN=75 Runoff=4.64 cfs 0.317 af

Subcatchment10S: Area 5 Runoff Area=150,667 sf 5.58% Impervious Runoff Depth=3.83"
Flow Length=348' Slope=0.0805 '/' Tc=5.3 min CN=77 Runoff=15.87 cfs 1.104 af

Subcatchment11S: SW Baisn 6 Area Runoff Area=98,448 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=528' Slope=0.0720 '/' Tc=8.3 min CN=75 Runoff=8.86 cfs 0.683 af

Subcatchment12S: Dev Area 6 Runoff Area=88,709 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=579' Slope=0.0984 '/' Tc=7.6 min CN=75 Runoff=8.18 cfs 0.615 af

Subcatchment13S: Dev Area 7 Runoff Area=89,933 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=382' Slope=0.1499 '/' Tc=4.4 min CN=75 Runoff=9.28 cfs 0.624 af

Subcatchment14S: Dev Area 8 Runoff Area=140,788 sf 0.00% Impervious Runoff Depth=3.83"
Flow Length=1,097' Slope=0.0893 '/' Tc=12.5 min CN=77 Runoff=11.74 cfs 1.032 af

Pond 1P: SW Basin 2 Peak Elev=1,689.38' Storage=1,735 cf Inflow=9.91 cfs 0.895 af
Primary=9.04 cfs 0.891 af Secondary=0.00 cfs 0.000 af Outflow=9.04 cfs 0.891 af

Pond 2P: SW Basin 1 Peak Elev=1,686.43' Storage=7,756 cf Inflow=9.04 cfs 0.891 af
Primary=1.34 cfs 0.611 af Secondary=7.36 cfs 0.248 af Outflow=8.71 cfs 0.859 af

Pond 4P: SW Basin 4 Peak Elev=1,677.37' Storage=59,820 cf Inflow=20.85 cfs 2.922 af
Primary=1.11 cfs 1.710 af Secondary=8.15 cfs 0.884 af Outflow=9.27 cfs 2.594 af

Pond 5P: SW Basin 5 Peak Elev=1,659.79' Storage=7,613 cf Inflow=8.86 cfs 0.683 af
Primary=0.70 cfs 0.322 af Secondary=7.68 cfs 0.249 af Outflow=8.38 cfs 0.571 af

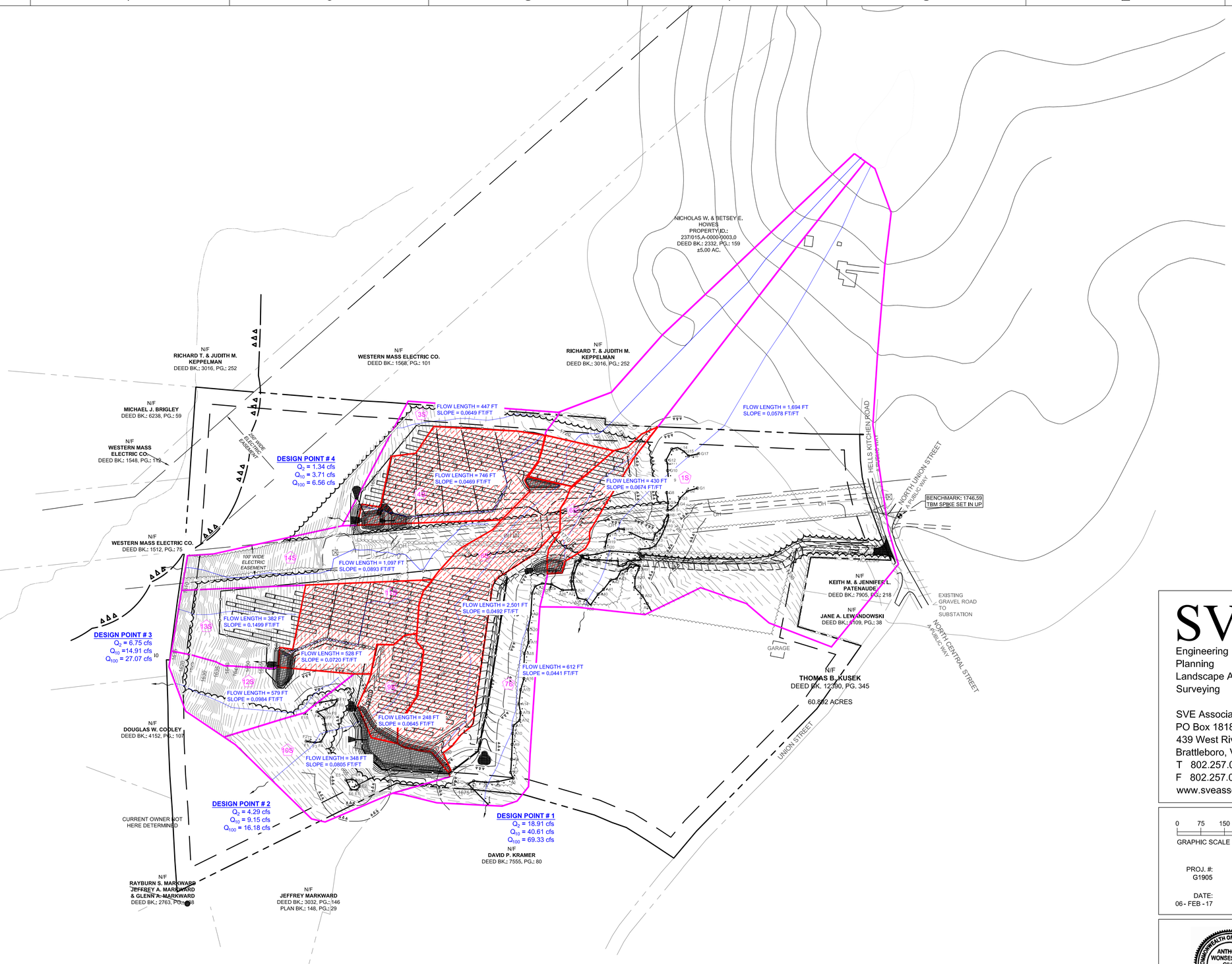
Link 1L: Design Point # 1 Inflow=71.94 cfs 8.144 af
Primary=71.94 cfs 8.144 af

Link 2L: Design Point # 2 Inflow=16.05 cfs 2.814 af
Primary=16.05 cfs 2.814 af

Link 3L: Design Point # 3 Inflow=27.07 cfs 2.593 af
Primary=27.07 cfs 2.593 af

Link 4L: Design Point # 4 Inflow=6.56 cfs 1.015 af
Primary=6.56 cfs 1.015 af

Total Runoff Area = 51.265 ac Runoff Volume = 16.424 af Average Runoff Depth = 3.84"
94.97% Pervious = 48.686 ac 5.03% Impervious = 2.579 ac



nexamp
4 Liberty Square, 3rd Floor Boston, Massachusetts 02109
Tel: (617) 431-1440 Web: nexamp.com

Rev	Issued For	Date Issued
C	Revised Per Review Comments	04-06-17
D	Revised Per Peer Review & ZBA Comments	04-25-17

P.E. seal/Consultant:

Project:

Plainfield Solar, LLC

29 UNION STREET
PLAINFIELD, MA 01070

SVE ©2017
Engineering
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0 75 150 300
GRAPHIC SCALE 1" = 150'

PROJ. #: G1905

DATE: 06 - FEB - 17

N
MAGNETIC NORTH

COMMONWEALTH OF MASSACHUSETTS
ANTHONY WONSESKI JR.
CIVIL
No. 46615
REGISTERED PROFESSIONAL ENGINEER

ANTHONY WONSESKI, JR. DATE
R.C.E. NUMBER: 46615

Drawing Title:

Developed Hydrology

Drawn by: K. Fike

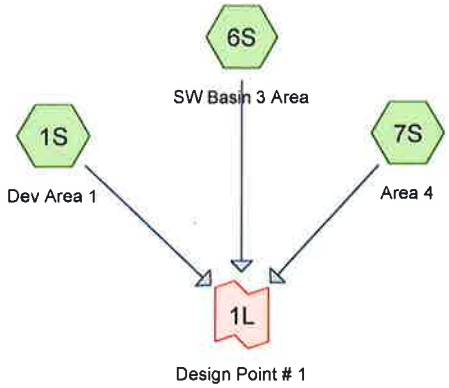
Scale: 1" = 150'

Date: January 26, 2017

Dwg No: C-0H2 Size: D Rev: D

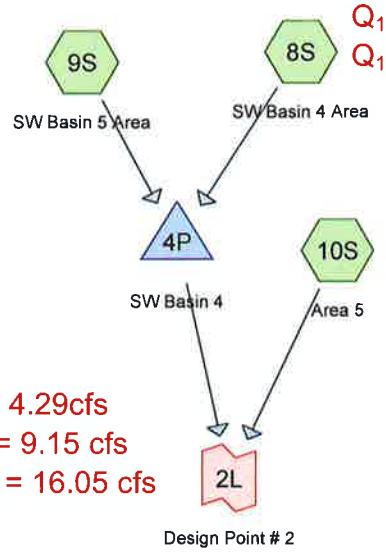
Drawing name: P:\Project\G1905 Nexamp, Inc-Plainfield, MA\Dwg\Concepts\G1905-CONC9_Rev D.dwg Apr 25, 2017 - 1:12pm

GERALD M. CONELL

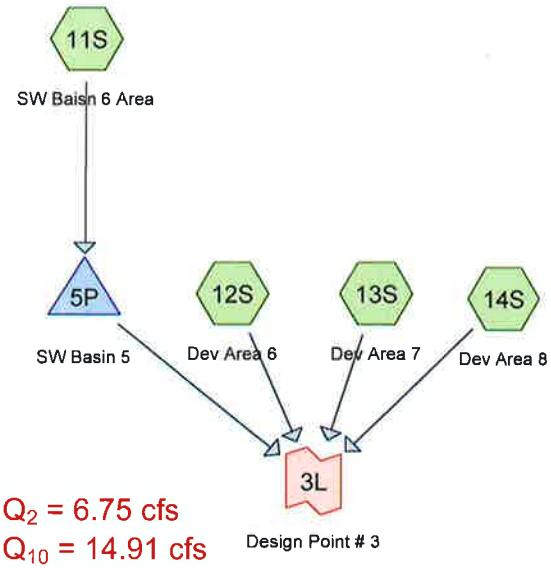


Q_2 = 20.40 cfs
Q_{10} = 42.16 cfs
Q_{100} = 71.94 cfs

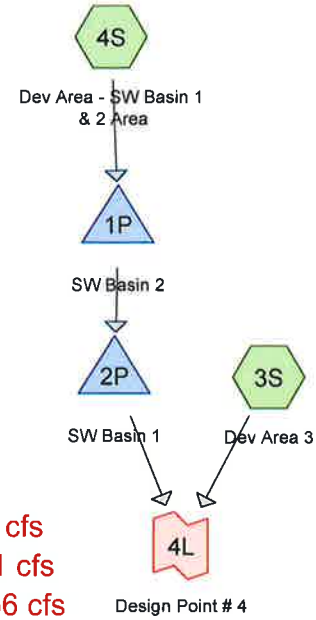
Q_2 = 5.12cfs
Q_{10} = 11.19 cfs
Q_{100} = 19.72 cfs



Q_2 = 4.29cfs
Q_{10} = 9.15 cfs
Q_{100} = 16.05 cfs



Q_2 = 6.75 cfs
Q_{10} = 14.91 cfs
Q_{100} = 27.07 cfs



Q_2 = 1.34 cfs
Q_{10} = 3.71 cfs
Q_{100} = 6.56 cfs

Routing Diagram for G1905-Developed_Rev D Plans_UP Maintenance Road Addition & Battery Storag

Prepared by SVE Associates, Printed 6/3/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.502	90	Access Road, HSG C/D (1S)
0.303	90	Easement Access Road, HSG C/D (1S)
0.152	74	Easement Brush, Fair, HSG, C/D (6S)
0.396	90	Easement Gravel Road, HSG C/D (14S)
1.379	74	Easement, Brush, Fair, C/D (14S)
1.730	74	Easement, Brush, Fair, HSG C/D (1S, 8S)
0.098	90	Gravel Access Road, C/D (6S)
0.391	90	Gravel Access Road, HSG C/D (4S, 7S)
0.041	90	Gravel Easement Drive, C/D (6S)
0.066	90	Gravel Easement Drive, HSG C/D (8S)
0.287	90	Gravel access road, HSG C/D (8S)
0.581	98	Hells Kitchen Road Pavement, HSG C/D (1S)
2.260	75	Meadow, Non-grazed, HSG C/D (11S)
27.922	75	Meadow, non-grazed, HSG C/D (1S, 3S, 4S, 6S, 7S, 8S, 9S, 10S, 13S)
2.436	75	Meadow, nongrazed, HSG C/D (12S, 14S)
0.260	98	Roofs, HSG C/D (1S)
1.738	98	Wetlands, HSG C/D (1S, 7S, 10S)
10.760	76	Woods, Fair, HSG C/D (1S, 3S, 6S, 7S, 8S, 10S, 12S, 13S, 14S)
51.302	**77**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
49.632	HSG C	1S, 3S, 4S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S
0.000	HSG D	
1.670	Other	6S, 14S
51.302		**TOTAL AREA**

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	0.502	0.000	0.000	0.502	Access Road	1S
0.000	0.000	0.303	0.000	0.000	0.303	Easement Access Road	1S
0.000	0.000	0.000	0.000	0.152	0.152	Easement Brush, Fair	6S
0.000	0.000	0.396	0.000	0.000	0.396	Easement Gravel Road	14S
0.000	0.000	1.730	0.000	0.000	1.730	Easement, Brush, Fair	1S, 8S
0.000	0.000	0.000	0.000	1.379	1.379	Easement, Brush, Fair, C/D	14S
0.000	0.000	0.391	0.000	0.000	0.391	Gravel Access Road	4S, 7S
0.000	0.000	0.000	0.000	0.098	0.098	Gravel Access Road, C/D	6S
0.000	0.000	0.066	0.000	0.000	0.066	Gravel Easement Drive	8S
0.000	0.000	0.000	0.000	0.041	0.041	Gravel Easement Drive, C/D	6S
0.000	0.000	0.287	0.000	0.000	0.287	Gravel access road	8S
0.000	0.000	0.581	0.000	0.000	0.581	Hells Kitchen Road Pavement	1S
0.000	0.000	2.260	0.000	0.000	2.260	Meadow, Non-grazed	11S
0.000	0.000	27.922	0.000	0.000	27.922	Meadow, non-grazed	1S, 3S, 4S, 6S, 7S, 8S, 9S, 10S, 13S
0.000	0.000	2.436	0.000	0.000	2.436	Meadow, nongrazed	12S, 14S
0.000	0.000	0.260	0.000	0.000	0.260	Roofs	1S
0.000	0.000	1.738	0.000	0.000	1.738	Wetlands	1S, 7S, 10S
0.000	0.000	10.760	0.000	0.000	10.760	Woods, Fair	1S, 3S, 6S, 7S, 8S, 10S, 12S, 13S, 14S
0.000	**0.000**	**49.632**	**0.000**	**1.670**	**51.302**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	1,687.50	1,686.50	32.0	0.0313	0.013	18.0	0.0	0.0
2	2P	1,684.00	1,681.00	67.0	0.0448	0.013	6.0	0.0	0.0
3	4P	1,675.00	1,674.50	41.0	0.0122	0.013	6.0	0.0	0.0
4	5P	1,659.00	1,658.50	27.0	0.0185	0.013	6.0	0.0	0.0

Time span=1.00-96.00 hrs, dt=0.02 hrs, 4751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dev Area 1 Runoff Area=862,818 sf 7.68% Impervious Runoff Depth=1.13"
Flow Length=1,694' Slope=0.0578 '/' Tc=21.4 min CN=78 Runoff=16.60 cfs 1.863 af

Subcatchment3S: Dev Area 3 Runoff Area=58,287 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=447' Slope=0.0649 '/' Tc=7.6 min CN=75 Runoff=1.34 cfs 0.107 af

Subcatchment4S: Dev Area - SW Basin 1 Runoff Area=129,078 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=746' Slope=0.0469 '/' Tc=13.5 min CN=75 Runoff=2.46 cfs 0.237 af

Subcatchment6S: SW Basin 3 Area Runoff Area=44,552 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=430' Slope=0.0674 '/' Tc=6.8 min CN=77 Runoff=1.20 cfs 0.091 af

Subcatchment7S: Area 4 Runoff Area=158,828 sf 23.69% Impervious Runoff Depth=1.38"
Flow Length=612' Slope=0.0441 '/' Tc=9.6 min CN=82 Runoff=5.17 cfs 0.419 af

Subcatchment8S: SW Basin 4 Area Runoff Area=366,969 sf 0.00% Impervious Runoff Depth=1.02"
Flow Length=2,501' Slope=0.0492 '/' Tc=33.6 min CN=76 Runoff=5.12 cfs 0.713 af

Subcatchment9S: SW Basin 5 Area Runoff Area=45,635 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=248' Slope=0.0645 '/' Tc=4.8 min CN=75 Runoff=1.16 cfs 0.084 af

Subcatchment10S: Area 5 Runoff Area=150,667 sf 5.58% Impervious Runoff Depth=1.07"
Flow Length=348' Slope=0.0805 '/' Tc=5.3 min CN=77 Runoff=4.29 cfs 0.309 af

Subcatchment11S: SW Baisn 6 Area Runoff Area=98,448 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=528' Slope=0.0720 '/' Tc=8.3 min CN=75 Runoff=2.21 cfs 0.181 af

Subcatchment12S: Dev Area 6 Runoff Area=88,709 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=579' Slope=0.0984 '/' Tc=7.6 min CN=75 Runoff=2.04 cfs 0.163 af

Subcatchment13S: Dev Area 7 Runoff Area=89,933 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=382' Slope=0.1499 '/' Tc=4.4 min CN=75 Runoff=2.32 cfs 0.165 af

Subcatchment14S: Dev Area 8 Runoff Area=140,788 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=1,097' Slope=0.0893 '/' Tc=12.5 min CN=77 Runoff=3.15 cfs 0.288 af

Pond 1P: SW Basin 2 Peak Elev=1,688.21' Storage=567 cf Inflow=2.46 cfs 0.237 af
Primary=2.39 cfs 0.233 af Secondary=0.00 cfs 0.000 af Outflow=2.39 cfs 0.233 af

Pond 2P: SW Basin 1 Peak Elev=1,684.91' Storage=3,251 cf Inflow=2.39 cfs 0.233 af
Primary=0.77 cfs 0.201 af Secondary=0.00 cfs 0.000 af Outflow=0.77 cfs 0.201 af

Pond 4P: SW Basin 4 Peak Elev=1,675.51' Storage=22,404 cf Inflow=5.42 cfs 0.796 af
Primary=0.48 cfs 0.470 af Secondary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.470 af

Pond 5P: SW Basin 5 Peak Elev=1,659.20' Storage=5,521 cf Inflow=2.21 cfs 0.181 af
Primary=0.12 cfs 0.069 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.069 af

Link 1L: Design Point # 1 Inflow=20.40 cfs 2.374 af
Primary=20.40 cfs 2.374 af

Link 2L: Design Point # 2 Inflow=4.29 cfs 0.779 af
Primary=4.29 cfs 0.779 af

Link 3L: Design Point # 3 Inflow=6.75 cfs 0.686 af
Primary=6.75 cfs 0.686 af

Link 4L: Design Point # 4 Inflow=1.34 cfs 0.308 af
Primary=1.34 cfs 0.308 af

Total Runoff Area = 51.302 ac Runoff Volume = 4.621 af Average Runoff Depth = 1.08"
94.97% Pervious = 48.723 ac 5.03% Impervious = 2.579 ac

Summary for Subcatchment 1S: Dev Area 1

Runoff = 16.60 cfs @ 12.31 hrs, Volume= 1.863 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	29,687	98	Wetlands, HSG C/D
*	455,521	75	Meadow, non-grazed, HSG C/D
*	21,856	90	Access Road, HSG C/D
*	63,759	74	Easement, Brush, Fair, HSG C/D
*	11,310	98	Roofs, HSG C/D
*	242,197	76	Woods, Fair, HSG C/D
*	25,310	98	Hells Kitchen Road Pavement, HSG C/D
*	13,178	90	Easement Access Road, HSG C/D
	862,818	78	Weighted Average
	796,511		92.32% Pervious Area
	66,307		7.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	1,694	0.0578	1.32		**Lag/CN Method,**

Summary for Subcatchment 3S: Dev Area 3

Runoff = 1.34 cfs @ 12.12 hrs, Volume= 0.107 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	50,633	75	Meadow, non-grazed, HSG C/D
*	7,654	76	Woods, Fair, HSG C/D
	58,287	75	Weighted Average
	58,287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	447	0.0649	0.98		**Lag/CN Method,**

Summary for Subcatchment 4S: Dev Area - SW Basin 1 & 2 Area

Runoff = 2.46 cfs @ 12.20 hrs, Volume= 0.237 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	127,760	75	Meadow, non-grazed, HSG C/D
*	1,318	90	Gravel Access Road, HSG C/D
	129,078	75	Weighted Average
	129,078		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	746	0.0469	0.92		**Lag/CN Method,**

Summary for Subcatchment 6S: SW Basin 3 Area

Runoff = 1.20 cfs @ 12.11 hrs, Volume= 0.091 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	27,310	75	Meadow, non-grazed, HSG C/D
*	4,565	76	Woods, Fair, HSG C/D
*	4,267	90	Gravel Access Road, C/D
*	1,775	90	Gravel Easement Drive, C/D
*	6,635	74	Easement Brush, Fair, HSG, C/D
	44,552	77	Weighted Average
	44,552		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	430	0.0674	1.05		**Lag/CN Method,**

Summary for Subcatchment 7S: Area 4

Runoff = 5.17 cfs @ 12.14 hrs, Volume= 0.419 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	37,630	98	Wetlands, HSG C/D
*	87,894	75	Meadow, non-grazed, HSG C/D
*	17,597	76	Woods, Fair, HSG C/D
*	15,707	90	Gravel Access Road, HSG C/D
	158,828	82	Weighted Average
	121,198		76.31% Pervious Area
	37,630		23.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	612	0.0441	1.06		**Lag/CN Method,**

Summary for Subcatchment 8S: SW Basin 4 Area

Runoff = 5.12 cfs @ 12.50 hrs, Volume= 0.713 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	12,487	90	Gravel access road, HSG C/D
*	295,192	75	Meadow, non-grazed, HSG C/D
*	2,879	90	Gravel Easement Drive, HSG C/D
*	44,794	76	Woods, Fair, HSG C/D
*	11,617	74	Easement, Brush, Fair, HSG C/D
	366,969	76	Weighted Average
	366,969		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.6	2,501	0.0492	1.24		**Lag/CN Method,**

Summary for Subcatchment 9S: SW Basin 5 Area

Runoff = 1.16 cfs @ 12.08 hrs, Volume= 0.084 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	45,635	75	Meadow, non-grazed, HSG C/D
	45,635		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	248	0.0645	0.87		**Lag/CN Method,**

Summary for Subcatchment 10S: Area 5

Runoff = 4.29 cfs @ 12.09 hrs, Volume= 0.309 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	45,489	75	Meadow, non-grazed, HSG C/D
*	96,776	76	Woods, Fair, HSG C/D
*	8,402	98	Wetlands, HSG C/D
	150,667	77	Weighted Average
	142,265		94.42% Pervious Area
	8,402		5.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	348	0.0805	1.10		**Lag/CN Method,**

Summary for Subcatchment 11S: SW Baisn 6 Area

Runoff = 2.21 cfs @ 12.13 hrs, Volume= 0.181 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	98,448	75	Meadow, Non-grazed, HSG C/D
	98,448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	528	0.0720	1.07		**Lag/CN Method,**

Summary for Subcatchment 12S: Dev Area 6

Runoff = 2.04 cfs @ 12.12 hrs, Volume= 0.163 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	55,232	75	Meadow, nongrazed, HSG C/D
*	33,477	76	Woods, Fair, HSG C/D
	88,709	75	Weighted Average
	88,709		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	579	0.0984	1.27		**Lag/CN Method,**

Summary for Subcatchment 13S: Dev Area 7

Runoff = 2.32 cfs @ 12.07 hrs, Volume= 0.165 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	80,843	75	Meadow, non-grazed, HSG C/D
*	9,090	76	Woods, Fair, HSG C/D
	89,933	75	Weighted Average
	89,933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	382	0.1499	1.44		**Lag/CN Method,**

Summary for Subcatchment 14S: Dev Area 8

Runoff = 3.15 cfs @ 12.18 hrs, Volume= 0.288 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	12,568	76	Woods, Fair, HSG C/D
*	17,262	90	Easement Gravel Road, HSG C/D
*	60,061	74	Easement, Brush, Fair, C/D
*	50,897	75	Meadow, nongrazed, HSG C/D
	140,788	77	Weighted Average
	140,788		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	1,097	0.0893	1.46		**Lag/CN Method,**

Summary for Pond 1P: SW Basin 2

Inflow Area = 2.963 ac, 0.00% Impervious, Inflow Depth = 0.96" for 2-Year event
Inflow = 2.46 cfs @ 12.20 hrs, Volume= 0.237 af
Outflow = 2.39 cfs @ 12.24 hrs, Volume= 0.233 af, Atten= 3%, Lag= 2.1 min
Primary = 2.39 cfs @ 12.24 hrs, Volume= 0.233 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 1,688.21' @ 12.24 hrs Surf.Area= 713 sf Storage= 567 cf

Plug-Flow detention time= 18.4 min calculated for 0.233 af (98% of inflow)
Center-of-Mass det. time= 9.3 min (879.1 - 869.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,687.00'	2,676 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,687.00	243	0	0
1,688.00	609	426	426
1,689.00	1,094	852	1,278
1,690.00	1,703	1,399	2,676

Device	Routing	Invert	Outlet Devices
#1	Primary	1,687.50'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,687.50' / 1,686.50' S= 0.0313 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	1,689.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=2.38 cfs @ 12.24 hrs HW=1,688.21' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.38 cfs @ 2.88 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,687.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: SW Basin 1

Inflow Area =	2.963 ac,	0.00% Impervious,	Inflow Depth =	0.95" for 2-Year event
Inflow =	2.39 cfs @	12.24 hrs,	Volume=	0.233 af
Outflow =	0.77 cfs @	12.71 hrs,	Volume=	0.201 af, Atten= 68%, Lag= 28.5 min
Primary =	0.77 cfs @	12.71 hrs,	Volume=	0.201 af
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,684.91' @ 12.71 hrs Surf.Area= 2,338 sf Storage= 3,251 cf

Plug-Flow detention time= 135.2 min calculated for 0.201 af (86% of inflow)
Center-of-Mass det. time= 71.3 min (950.4 - 879.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,683.00'	9,944 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,683.00	1,122	0	0
1,684.00	1,706	1,414	1,414
1,685.00	2,402	2,054	3,468
1,686.00	3,210	2,806	6,274
1,687.00	4,129	3,670	9,944

Device	Routing	Invert	Outlet Devices
#1	Primary	1,684.00'	**6.0" Round Culvert** L= 67.0' Ke= 0.500 Inlet / Outlet Invert= 1,684.00' / 1,681.00' S= 0.0448 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,686.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.77 cfs @ 12.71 hrs HW=1,684.91' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.77 cfs @ 3.91 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,683.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: SW Basin 4

Inflow Area =	9.472 ac,	0.00% Impervious,	Inflow Depth =	1.01"	for 2-Year event
Inflow =	5.42 cfs @	12.49 hrs,	Volume=	0.796 af	
Outflow =	0.48 cfs @	16.43 hrs,	Volume=	0.470 af,	Atten= 91%, Lag= 236.4 min
Primary =	0.48 cfs @	16.43 hrs,	Volume=	0.470 af	
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,675.51' @ 16.43 hrs Surf.Area= 17,229 sf Storage= 22,404 cf

Plug-Flow detention time= 580.9 min calculated for 0.470 af (59% of inflow)
Center-of-Mass det. time= 460.6 min (1,343.2 - 882.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,674.00'	74,899 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,674.00	12,265	0	0
1,675.00	15,682	13,974	13,974
1,676.00	18,701	17,192	31,165
1,677.00	21,848	20,275	51,440
1,678.00	25,071	23,460	74,899

Device	Routing	Invert	Outlet Devices
#1	Primary	1,675.00'	**6.0" Round Culvert** L= 41.0' Ke= 0.500 Inlet / Outlet Invert= 1,675.00' / 1,674.50' S= 0.0122 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,677.00'	**14.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.48 cfs @ 16.43 hrs HW=1,675.51' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.48 cfs @ 2.47 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,674.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: SW Basin 5

Inflow Area =	2.260 ac,	0.00% Impervious,	Inflow Depth =	0.96"	for 2-Year event
Inflow =	2.21 cfs @	12.13 hrs,	Volume=	0.181 af	
Outflow =	0.12 cfs @	15.94 hrs,	Volume=	0.069 af,	Atten= 95%, Lag= 229.1 min
Primary =	0.12 cfs @	15.94 hrs,	Volume=	0.069 af	
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,659.20' @ 15.94 hrs Surf.Area= 3,319 sf Storage= 5,521 cf

Plug-Flow detention time= 466.4 min calculated for 0.069 af (38% of inflow)
Center-of-Mass det. time= 327.7 min (1,192.7 - 865.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,657.00'	12,767 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,657.00	1,731	0	0
1,658.00	2,416	2,074	2,074
1,659.00	3,156	2,786	4,860
1,660.00	3,952	3,554	8,414
1,661.00	4,755	4,354	12,767

Device	Routing	Invert	Outlet Devices
#1	Primary	1,659.00'	**6.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 1,659.00' / 1,658.50' S= 0.0185 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,659.50'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.12 cfs @ 15.94 hrs HW=1,659.20' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.12 cfs @ 1.54 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,657.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Design Point # 1

Inflow Area = 24.477 ac, 9.75% Impervious, Inflow Depth = 1.16" for 2-Year event
Inflow = 20.40 cfs @ 12.29 hrs, Volume= 2.374 af
Primary = 20.40 cfs @ 12.29 hrs, Volume= 2.374 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 2L: Design Point # 2

Inflow Area = 12.931 ac, 1.49% Impervious, Inflow Depth > 0.72" for 2-Year event
Inflow = 4.29 cfs @ 12.09 hrs, Volume= 0.779 af
Primary = 4.29 cfs @ 12.09 hrs, Volume= 0.779 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 3L: Design Point # 3

Inflow Area = 9.593 ac, 0.00% Impervious, Inflow Depth = 0.86" for 2-Year event
Inflow = 6.75 cfs @ 12.12 hrs, Volume= 0.686 af
Primary = 6.75 cfs @ 12.12 hrs, Volume= 0.686 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 4L: Design Point # 4

Inflow Area = 4.301 ac, 0.00% Impervious, Inflow Depth = 0.86" for 2-Year event
Inflow = 1.34 cfs @ 12.12 hrs, Volume= 0.308 af
Primary = 1.34 cfs @ 12.12 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Time span=1.00-96.00 hrs, dt=0.02 hrs, 4751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dev Area 1 Runoff Area=862,818 sf 7.68% Impervious Runoff Depth=2.29"
Flow Length=1,694' Slope=0.0578 '/' Tc=21.4 min CN=78 Runoff=34.81 cfs 3.785 af

Subcatchment3S: Dev Area 3 Runoff Area=58,287 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=447' Slope=0.0649 '/' Tc=7.6 min CN=75 Runoff=3.01 cfs 0.229 af

Subcatchment4S: Dev Area - SW Basin 1 Runoff Area=129,078 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=746' Slope=0.0469 '/' Tc=13.5 min CN=75 Runoff=5.55 cfs 0.506 af

Subcatchment6S: SW Basin 3 Area Runoff Area=44,552 sf 0.00% Impervious Runoff Depth=2.21"
Flow Length=430' Slope=0.0674 '/' Tc=6.8 min CN=77 Runoff=2.57 cfs 0.188 af

Subcatchment7S: Area 4 Runoff Area=158,828 sf 23.69% Impervious Runoff Depth=2.64"
Flow Length=612' Slope=0.0441 '/' Tc=9.6 min CN=82 Runoff=9.95 cfs 0.801 af

Subcatchment8S: SW Basin 4 Area Runoff Area=366,969 sf 0.00% Impervious Runoff Depth=2.13"
Flow Length=2,501' Slope=0.0492 '/' Tc=33.6 min CN=76 Runoff=11.19 cfs 1.495 af

Subcatchment9S: SW Basin 5 Area Runoff Area=45,635 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=248' Slope=0.0645 '/' Tc=4.8 min CN=75 Runoff=2.60 cfs 0.179 af

Subcatchment10S: Area 5 Runoff Area=150,667 sf 5.58% Impervious Runoff Depth=2.21"
Flow Length=348' Slope=0.0805 '/' Tc=5.3 min CN=77 Runoff=9.15 cfs 0.637 af

Subcatchment11S: SW Baisn 6 Area Runoff Area=98,448 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=528' Slope=0.0720 '/' Tc=8.3 min CN=75 Runoff=4.97 cfs 0.386 af

Subcatchment12S: Dev Area 6 Runoff Area=88,709 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=579' Slope=0.0984 '/' Tc=7.6 min CN=75 Runoff=4.58 cfs 0.348 af

Subcatchment13S: Dev Area 7 Runoff Area=89,933 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=382' Slope=0.1499 '/' Tc=4.4 min CN=75 Runoff=5.21 cfs 0.353 af

Subcatchment14S: Dev Area 8 Runoff Area=140,788 sf 0.00% Impervious Runoff Depth=2.21"
Flow Length=1,097' Slope=0.0893 '/' Tc=12.5 min CN=77 Runoff=6.75 cfs 0.595 af

Pond 1P: SW Basin 2 Peak Elev=1,688.66' Storage=931 cf Inflow=5.55 cfs 0.506 af
Primary=5.36 cfs 0.502 af Secondary=0.00 cfs 0.000 af Outflow=5.36 cfs 0.502 af

Pond 2P: SW Basin 1 Peak Elev=1,686.17' Storage=6,842 cf Inflow=5.36 cfs 0.502 af
Primary=1.31 cfs 0.429 af Secondary=1.75 cfs 0.041 af Outflow=3.06 cfs 0.470 af

Pond 4P: SW Basin 4 Peak Elev=1,676.76' Storage=46,244 cf Inflow=11.86 cfs 1.674 af
Primary=0.96 cfs 1.347 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 1.347 af

Pond 5P: SW Basin 5 Peak Elev=1,659.60' Storage=6,892 cf Inflow=4.97 cfs 0.386 af
Primary=0.56 cfs 0.234 af Secondary=1.46 cfs 0.041 af Outflow=2.02 cfs 0.275 af

Link 1L: Design Point # 1 Inflow=42.16 cfs 4.774 af
Primary=42.16 cfs 4.774 af

Link 2L: Design Point # 2 Inflow=9.15 cfs 1.984 af
Primary=9.15 cfs 1.984 af

Link 3L: Design Point # 3 Inflow=14.91 cfs 1.530 af
Primary=14.91 cfs 1.530 af

Link 4L: Design Point # 4 Inflow=3.71 cfs 0.658 af
Primary=3.71 cfs 0.658 af

Total Runoff Area = 51.302 ac Runoff Volume = 9.503 af Average Runoff Depth = 2.22"
94.97% Pervious = 48.723 ac 5.03% Impervious = 2.579 ac

Summary for Subcatchment 1S: Dev Area 1

Runoff = 34.81 cfs @ 12.30 hrs, Volume= 3.785 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	29,687	98	Wetlands, HSG C/D
*	455,521	75	Meadow, non-grazed, HSG C/D
*	21,856	90	Access Road, HSG C/D
*	63,759	74	Easement, Brush, Fair, HSG C/D
*	11,310	98	Roofs, HSG C/D
*	242,197	76	Woods, Fair, HSG C/D
*	25,310	98	Hells Kitchen Road Pavement, HSG C/D
*	13,178	90	Easement Access Road, HSG C/D
	862,818	78	Weighted Average
	796,511		92.32% Pervious Area
	66,307		7.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	1,694	0.0578	1.32		**Lag/CN Method,**

Summary for Subcatchment 3S: Dev Area 3

Runoff = 3.01 cfs @ 12.11 hrs, Volume= 0.229 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	50,633	75	Meadow, non-grazed, HSG C/D
*	7,654	76	Woods, Fair, HSG C/D
	58,287	75	Weighted Average
	58,287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	447	0.0649	0.98		**Lag/CN Method,**

Summary for Subcatchment 4S: Dev Area - SW Basin 1 & 2 Area

Runoff = 5.55 cfs @ 12.19 hrs, Volume= 0.506 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	127,760	75	Meadow, non-grazed, HSG C/D
*	1,318	90	Gravel Access Road, HSG C/D
	129,078	75	Weighted Average
	129,078		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	746	0.0469	0.92		**Lag/CN Method,**

Summary for Subcatchment 6S: SW Basin 3 Area

Runoff = 2.57 cfs @ 12.10 hrs, Volume= 0.188 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	27,310	75	Meadow, non-grazed, HSG C/D
*	4,565	76	Woods, Fair, HSG C/D
*	4,267	90	Gravel Access Road, C/D
*	1,775	90	Gravel Easement Drive, C/D
*	6,635	74	Easement Brush, Fair, HSG, C/D
	44,552	77	Weighted Average
	44,552		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	430	0.0674	1.05		**Lag/CN Method,**

Summary for Subcatchment 7S: Area 4

Runoff = 9.95 cfs @ 12.13 hrs, Volume= 0.801 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	37,630	98	Wetlands, HSG C/D
*	87,894	75	Meadow, non-grazed, HSG C/D
*	17,597	76	Woods, Fair, HSG C/D
*	15,707	90	Gravel Access Road, HSG C/D
	158,828	82	Weighted Average
	121,198		76.31% Pervious Area
	37,630		23.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	612	0.0441	1.06		**Lag/CN Method,**

Summary for Subcatchment 8S: SW Basin 4 Area

Runoff = 11.19 cfs @ 12.48 hrs, Volume= 1.495 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	12,487	90	Gravel access road, HSG C/D
*	295,192	75	Meadow, non-grazed, HSG C/D
*	2,879	90	Gravel Easement Drive, HSG C/D
*	44,794	76	Woods, Fair, HSG C/D
*	11,617	74	Easement, Brush, Fair, HSG C/D
	366,969	76	Weighted Average
	366,969		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.6	2,501	0.0492	1.24		**Lag/CN Method,**

Summary for Subcatchment 9S: SW Basin 5 Area

Runoff = 2.60 cfs @ 12.08 hrs, Volume= 0.179 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	45,635	75	Meadow, non-grazed, HSG C/D
	45,635		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	248	0.0645	0.87		**Lag/CN Method,**

Summary for Subcatchment 10S: Area 5

Runoff = 9.15 cfs @ 12.08 hrs, Volume= 0.637 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	45,489	75	Meadow, non-grazed, HSG C/D
*	96,776	76	Woods, Fair, HSG C/D
*	8,402	98	Wetlands, HSG C/D
	150,667	77	Weighted Average
	142,265		94.42% Pervious Area
	8,402		5.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	348	0.0805	1.10		**Lag/CN Method,**

Summary for Subcatchment 11S: SW Baisn 6 Area

Runoff = 4.97 cfs @ 12.12 hrs, Volume= 0.386 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	98,448	75	Meadow, Non-grazed, HSG C/D
	98,448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	528	0.0720	1.07		**Lag/CN Method,**

Summary for Subcatchment 12S: Dev Area 6

Runoff = 4.58 cfs @ 12.11 hrs, Volume= 0.348 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	55,232	75	Meadow, nongrazed, HSG C/D
*	33,477	76	Woods, Fair, HSG C/D
	88,709	75	Weighted Average
	88,709		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	579	0.0984	1.27		**Lag/CN Method,**

Summary for Subcatchment 13S: Dev Area 7

Runoff = 5.21 cfs @ 12.07 hrs, Volume= 0.353 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	80,843	75	Meadow, non-grazed, HSG C/D
*	9,090	76	Woods, Fair, HSG C/D
	89,933	75	Weighted Average
	89,933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	382	0.1499	1.44		**Lag/CN Method,**

Summary for Subcatchment 14S: Dev Area 8

Runoff = 6.75 cfs @ 12.18 hrs, Volume= 0.595 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	12,568	76	Woods, Fair, HSG C/D
*	17,262	90	Easement Gravel Road, HSG C/D
*	60,061	74	Easement, Brush, Fair, C/D
*	50,897	75	Meadow, nongrazed, HSG C/D
	140,788	77	Weighted Average
	140,788		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	1,097	0.0893	1.46		**Lag/CN Method,**

Summary for Pond 1P: SW Basin 2

Inflow Area = 2.963 ac, 0.00% Impervious, Inflow Depth = 2.05" for 10-Year event
Inflow = 5.55 cfs @ 12.19 hrs, Volume= 0.506 af
Outflow = 5.36 cfs @ 12.23 hrs, Volume= 0.502 af, Atten= 3%, Lag= 2.2 min
Primary = 5.36 cfs @ 12.23 hrs, Volume= 0.502 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 1,688.66' @ 12.23 hrs Surf.Area= 928 sf Storage= 931 cf

Plug-Flow detention time= 11.3 min calculated for 0.502 af (99% of inflow)
Center-of-Mass det. time= 6.6 min (853.6 - 847.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,687.00'	2,676 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,687.00	243	0	0
1,688.00	609	426	426
1,689.00	1,094	852	1,278
1,690.00	1,703	1,399	2,676

Device	Routing	Invert	Outlet Devices
#1	Primary	1,687.50'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,687.50' / 1,686.50' S= 0.0313 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	1,689.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=5.35 cfs @ 12.23 hrs HW=1,688.66' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.35 cfs @ 3.66 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,687.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: SW Basin 1

Inflow Area =	2.963 ac,	0.00% Impervious,	Inflow Depth = 2.03"	for 10-Year event
Inflow =	5.36 cfs @	12.23 hrs, Volume=	0.502 af	
Outflow =	3.06 cfs @	12.49 hrs, Volume=	0.470 af, Atten= 43%, Lag= 15.6 min	
Primary =	1.31 cfs @	12.49 hrs, Volume=	0.429 af	
Secondary =	1.75 cfs @	12.49 hrs, Volume=	0.041 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,686.17' @ 12.49 hrs Surf.Area= 3,369 sf Storage= 6,842 cf

Plug-Flow detention time= 92.6 min calculated for 0.470 af (94% of inflow)
Center-of-Mass det. time= 58.5 min (912.1 - 853.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,683.00'	9,944 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,683.00	1,122	0	0
1,684.00	1,706	1,414	1,414
1,685.00	2,402	2,054	3,468
1,686.00	3,210	2,806	6,274
1,687.00	4,129	3,670	9,944

Device	Routing	Invert	Outlet Devices
#1	Primary	1,684.00'	**6.0" Round Culvert** L= 67.0' Ke= 0.500 Inlet / Outlet Invert= 1,684.00' / 1,681.00' S= 0.0448 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,686.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=1.31 cfs @ 12.49 hrs HW=1,686.17' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.31 cfs @ 6.65 fps)

Secondary OutFlow Max=1.74 cfs @ 12.49 hrs HW=1,686.17' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.74 cfs @ 1.01 fps)

Summary for Pond 4P: SW Basin 4

Inflow Area =	9.472 ac,	0.00% Impervious,	Inflow Depth =	2.12"	for 10-Year event
Inflow =	11.86 cfs @	12.45 hrs,	Volume=	1.674 af	
Outflow =	0.96 cfs @	16.19 hrs,	Volume=	1.347 af,	Atten= 92%, Lag= 224.1 min
Primary =	0.96 cfs @	16.19 hrs,	Volume=	1.347 af	
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,676.76' @ 16.19 hrs Surf.Area= 21,086 sf Storage= 46,244 cf

Plug-Flow detention time= 582.6 min calculated for 1.347 af (80% of inflow)
Center-of-Mass det. time= 504.5 min (1,364.9 - 860.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,674.00'	74,899 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,674.00	12,265	0	0
1,675.00	15,682	13,974	13,974
1,676.00	18,701	17,192	31,165
1,677.00	21,848	20,275	51,440
1,678.00	25,071	23,460	74,899

Device	Routing	Invert	Outlet Devices
#1	Primary	1,675.00'	**6.0" Round Culvert** L= 41.0' Ke= 0.500 Inlet / Outlet Invert= 1,675.00' / 1,674.50' S= 0.0122 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,677.00'	**14.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.96 cfs @ 16.19 hrs HW=1,676.76' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.96 cfs @ 4.89 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,674.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 5P: SW Basin 5

Inflow Area =	2.260 ac,	0.00% Impervious,	Inflow Depth =	2.05"	for 10-Year event
Inflow =	4.97 cfs @	12.12 hrs,	Volume=	0.386 af	
Outflow =	2.02 cfs @	12.42 hrs,	Volume=	0.275 af,	Atten= 59%, Lag= 18.1 min
Primary =	0.56 cfs @	12.42 hrs,	Volume=	0.234 af	
Secondary =	1.46 cfs @	12.42 hrs,	Volume=	0.041 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,659.60' @ 12.42 hrs Surf.Area= 3,633 sf Storage= 6,892 cf

Plug-Flow detention time= 219.9 min calculated for 0.275 af (71% of inflow)
Center-of-Mass det. time= 123.0 min (965.2 - 842.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,657.00'	12,767 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,657.00	1,731	0	0
1,658.00	2,416	2,074	2,074
1,659.00	3,156	2,786	4,860
1,660.00	3,952	3,554	8,414
1,661.00	4,755	4,354	12,767

Device	Routing	Invert	Outlet Devices
#1	Primary	1,659.00'	**6.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 1,659.00' / 1,658.50' S= 0.0185 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,659.50'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.56 cfs @ 12.42 hrs HW=1,659.60' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.56 cfs @ 2.84 fps)

Secondary OutFlow Max=1.45 cfs @ 12.42 hrs HW=1,659.60' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.45 cfs @ 0.74 fps)

Summary for Link 1L: Design Point # 1

Inflow Area = 24.477 ac, 9.75% Impervious, Inflow Depth = 2.34" for 10-Year event
Inflow = 42.16 cfs @ 12.27 hrs, Volume= 4.774 af
Primary = 42.16 cfs @ 12.27 hrs, Volume= 4.774 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 2L: Design Point # 2

Inflow Area = 12.931 ac, 1.49% Impervious, Inflow Depth > 1.84" for 10-Year event
Inflow = 9.15 cfs @ 12.08 hrs, Volume= 1.984 af
Primary = 9.15 cfs @ 12.08 hrs, Volume= 1.984 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 3L: Design Point # 3

Inflow Area = 9.593 ac, 0.00% Impervious, Inflow Depth = 1.91" for 10-Year event
Inflow = 14.91 cfs @ 12.11 hrs, Volume= 1.530 af
Primary = 14.91 cfs @ 12.11 hrs, Volume= 1.530 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 4L: Design Point # 4

Inflow Area = 4.301 ac, 0.00% Impervious, Inflow Depth = 1.84" for 10-Year event
Inflow = 3.71 cfs @ 12.12 hrs, Volume= 0.658 af
Primary = 3.71 cfs @ 12.12 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Time span=1.00-96.00 hrs, dt=0.02 hrs, 4751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Dev Area 1 Runoff Area=862,818 sf 7.68% Impervious Runoff Depth=3.93"
Flow Length=1,694' Slope=0.0578 '/' Tc=21.4 min CN=78 Runoff=59.84 cfs 6.494 af

Subcatchment3S: Dev Area 3 Runoff Area=58,287 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=447' Slope=0.0649 '/' Tc=7.6 min CN=75 Runoff=5.37 cfs 0.404 af

Subcatchment4S: Dev Area - SW Basin 1 Runoff Area=129,078 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=746' Slope=0.0469 '/' Tc=13.5 min CN=75 Runoff=9.91 cfs 0.895 af

Subcatchment6S: SW Basin 3 Area Runoff Area=44,552 sf 0.00% Impervious Runoff Depth=3.83"
Flow Length=430' Slope=0.0674 '/' Tc=6.8 min CN=77 Runoff=4.45 cfs 0.326 af

Subcatchment7S: Area 4 Runoff Area=158,828 sf 23.69% Impervious Runoff Depth=4.36"
Flow Length=612' Slope=0.0441 '/' Tc=9.6 min CN=82 Runoff=16.29 cfs 1.324 af

Subcatchment8S: SW Basin 4 Area Runoff Area=366,969 sf 0.00% Impervious Runoff Depth=3.73"
Flow Length=2,501' Slope=0.0492 '/' Tc=33.6 min CN=76 Runoff=19.72 cfs 2.617 af

Subcatchment9S: SW Basin 5 Area Runoff Area=45,635 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=248' Slope=0.0645 '/' Tc=4.8 min CN=75 Runoff=4.64 cfs 0.317 af

Subcatchment10S: Area 5 Runoff Area=150,667 sf 5.58% Impervious Runoff Depth=3.83"
Flow Length=348' Slope=0.0805 '/' Tc=5.3 min CN=77 Runoff=15.87 cfs 1.104 af

Subcatchment11S: SW Baisn 6 Area Runoff Area=98,448 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=528' Slope=0.0720 '/' Tc=8.3 min CN=75 Runoff=8.86 cfs 0.683 af

Subcatchment12S: Dev Area 6 Runoff Area=88,709 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=579' Slope=0.0984 '/' Tc=7.6 min CN=75 Runoff=8.18 cfs 0.615 af

Subcatchment13S: Dev Area 7 Runoff Area=89,933 sf 0.00% Impervious Runoff Depth=3.63"
Flow Length=382' Slope=0.1499 '/' Tc=4.4 min CN=75 Runoff=9.28 cfs 0.624 af

Subcatchment14S: Dev Area 8 Runoff Area=140,788 sf 0.00% Impervious Runoff Depth=3.83"
Flow Length=1,097' Slope=0.0893 '/' Tc=12.5 min CN=77 Runoff=11.74 cfs 1.032 af

Pond 1P: SW Basin 2 Peak Elev=1,689.38' Storage=1,735 cf Inflow=9.91 cfs 0.895 af
Primary=9.04 cfs 0.891 af Secondary=0.00 cfs 0.000 af Outflow=9.04 cfs 0.891 af

Pond 2P: SW Basin 1 Peak Elev=1,686.43' Storage=7,756 cf Inflow=9.04 cfs 0.891 af
Primary=1.34 cfs 0.611 af Secondary=7.36 cfs 0.248 af Outflow=8.71 cfs 0.859 af

Pond 4P: SW Basin 4 Peak Elev=1,677.38' Storage=59,893 cf Inflow=20.93 cfs 2.934 af
Primary=1.12 cfs 1.712 af Secondary=8.26 cfs 0.893 af Outflow=9.38 cfs 2.606 af

Pond 5P: SW Basin 5 Peak Elev=1,659.79' Storage=7,613 cf Inflow=8.86 cfs 0.683 af
Primary=0.70 cfs 0.322 af Secondary=7.68 cfs 0.249 af Outflow=8.38 cfs 0.571 af

Link 1L: Design Point # 1 Inflow=71.94 cfs 8.144 af
Primary=71.94 cfs 8.144 af

Link 2L: Design Point # 2 Inflow=16.05 cfs 2.816 af
Primary=16.05 cfs 2.816 af

Link 3L: Design Point # 3 Inflow=27.07 cfs 2.593 af
Primary=27.07 cfs 2.593 af

Link 4L: Design Point # 4 Inflow=6.56 cfs 1.015 af
Primary=6.56 cfs 1.015 af

Total Runoff Area = 51.302 ac Runoff Volume = 16.435 af Average Runoff Depth = 3.84"
94.97% Pervious = 48.723 ac 5.03% Impervious = 2.579 ac

Summary for Subcatchment 1S: Dev Area 1

Runoff = 59.84 cfs @ 12.29 hrs, Volume= 6.494 af, Depth= 3.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	29,687	98	Wetlands, HSG C/D
*	455,521	75	Meadow, non-grazed, HSG C/D
*	21,856	90	Access Road, HSG C/D
*	63,759	74	Easement, Brush, Fair, HSG C/D
*	11,310	98	Roofs, HSG C/D
*	242,197	76	Woods, Fair, HSG C/D
*	25,310	98	Hells Kitchen Road Pavement, HSG C/D
*	13,178	90	Easement Access Road, HSG C/D
	862,818	78	Weighted Average
	796,511		92.32% Pervious Area
	66,307		7.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	1,694	0.0578	1.32		**Lag/CN Method,**

Summary for Subcatchment 3S: Dev Area 3

Runoff = 5.37 cfs @ 12.11 hrs, Volume= 0.404 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	50,633	75	Meadow, non-grazed, HSG C/D
*	7,654	76	Woods, Fair, HSG C/D
	58,287	75	Weighted Average
	58,287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	447	0.0649	0.98		**Lag/CN Method,**

Summary for Subcatchment 4S: Dev Area - SW Basin 1 & 2 Area

Runoff = 9.91 cfs @ 12.19 hrs, Volume= 0.895 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	127,760	75	Meadow, non-grazed, HSG C/D
*	1,318	90	Gravel Access Road, HSG C/D
	129,078	75	Weighted Average
	129,078		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	746	0.0469	0.92		**Lag/CN Method,**

Summary for Subcatchment 6S: SW Basin 3 Area

Runoff = 4.45 cfs @ 12.10 hrs, Volume= 0.326 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	27,310	75	Meadow, non-grazed, HSG C/D
*	4,565	76	Woods, Fair, HSG C/D
*	4,267	90	Gravel Access Road, C/D
*	1,775	90	Gravel Easement Drive, C/D
*	6,635	74	Easement Brush, Fair, HSG, C/D
	44,552	77	Weighted Average
	44,552		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	430	0.0674	1.05		**Lag/CN Method,**

Summary for Subcatchment 7S: Area 4

Runoff = 16.29 cfs @ 12.13 hrs, Volume= 1.324 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	37,630	98	Wetlands, HSG C/D
*	87,894	75	Meadow, non-grazed, HSG C/D
*	17,597	76	Woods, Fair, HSG C/D
*	15,707	90	Gravel Access Road, HSG C/D
	158,828	82	Weighted Average
	121,198		76.31% Pervious Area
	37,630		23.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	612	0.0441	1.06		**Lag/CN Method,**

Summary for Subcatchment 8S: SW Basin 4 Area

Runoff = 19.72 cfs @ 12.46 hrs, Volume= 2.617 af, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	12,487	90	Gravel access road, HSG C/D
*	295,192	75	Meadow, non-grazed, HSG C/D
*	2,879	90	Gravel Easement Drive, HSG C/D
*	44,794	76	Woods, Fair, HSG C/D
*	11,617	74	Easement, Brush, Fair, HSG C/D
	366,969	76	Weighted Average
	366,969		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.6	2,501	0.0492	1.24		**Lag/CN Method,**

Summary for Subcatchment 9S: SW Basin 5 Area

Runoff = 4.64 cfs @ 12.07 hrs, Volume= 0.317 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	45,635	75	Meadow, non-grazed, HSG C/D
	45,635		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	248	0.0645	0.87		**Lag/CN Method,**

Summary for Subcatchment 10S: Area 5

Runoff = 15.87 cfs @ 12.08 hrs, Volume= 1.104 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	45,489	75	Meadow, non-grazed, HSG C/D
*	96,776	76	Woods, Fair, HSG C/D
*	8,402	98	Wetlands, HSG C/D
	150,667	77	Weighted Average
	142,265		94.42% Pervious Area
	8,402		5.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	348	0.0805	1.10		**Lag/CN Method,**

Summary for Subcatchment 11S: SW Baisn 6 Area

Runoff = 8.86 cfs @ 12.12 hrs, Volume= 0.683 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	98,448	75	Meadow, Non-grazed, HSG C/D
	98,448		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	528	0.0720	1.07		**Lag/CN Method,**

Summary for Subcatchment 12S: Dev Area 6

Runoff = 8.18 cfs @ 12.11 hrs, Volume= 0.615 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	55,232	75	Meadow, nongrazed, HSG C/D
*	33,477	76	Woods, Fair, HSG C/D
	88,709	75	Weighted Average
	88,709		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	579	0.0984	1.27		**Lag/CN Method,**

Summary for Subcatchment 13S: Dev Area 7

Runoff = 9.28 cfs @ 12.07 hrs, Volume= 0.624 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	80,843	75	Meadow, non-grazed, HSG C/D
*	9,090	76	Woods, Fair, HSG C/D
	89,933	75	Weighted Average
	89,933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	382	0.1499	1.44		**Lag/CN Method,**

Summary for Subcatchment 14S: Dev Area 8

Runoff = 11.74 cfs @ 12.17 hrs, Volume= 1.032 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=6.40"

	Area (sf)	CN	Description
*	12,568	76	Woods, Fair, HSG C/D
*	17,262	90	Easement Gravel Road, HSG C/D
*	60,061	74	Easement, Brush, Fair, C/D
*	50,897	75	Meadow, nongrazed, HSG C/D
	140,788	77	Weighted Average
	140,788		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	1,097	0.0893	1.46		**Lag/CN Method,**

Summary for Pond 1P: SW Basin 2

Inflow Area = 2.963 ac, 0.00% Impervious, Inflow Depth = 3.63" for 100-Year event
Inflow = 9.91 cfs @ 12.19 hrs, Volume= 0.895 af
Outflow = 9.04 cfs @ 12.25 hrs, Volume= 0.891 af, Atten= 9%, Lag= 3.7 min
Primary = 9.04 cfs @ 12.25 hrs, Volume= 0.891 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 1,689.38' @ 12.25 hrs Surf.Area= 1,324 sf Storage= 1,735 cf

Plug-Flow detention time= 8.3 min calculated for 0.891 af (100% of inflow)
Center-of-Mass det. time= 5.3 min (835.9 - 830.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,687.00'	2,676 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,687.00	243	0	0
1,688.00	609	426	426
1,689.00	1,094	852	1,278
1,690.00	1,703	1,399	2,676

Device	Routing	Invert	Outlet Devices
#1	Primary	1,687.50'	**18.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 1,687.50' / 1,686.50' S= 0.0313 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	1,689.50'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=9.03 cfs @ 12.25 hrs HW=1,689.38' (Free Discharge)
└**1=Culvert** (Inlet Controls 9.03 cfs @ 5.11 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,687.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: SW Basin 1

Inflow Area =	2.963 ac,	0.00% Impervious,	Inflow Depth =	3.61" for 100-Year event
Inflow =	9.04 cfs @	12.25 hrs,	Volume=	0.891 af
Outflow =	8.71 cfs @	12.30 hrs,	Volume=	0.859 af, Atten= 4%, Lag= 3.3 min
Primary =	1.34 cfs @	12.30 hrs,	Volume=	0.611 af
Secondary =	7.36 cfs @	12.30 hrs,	Volume=	0.248 af

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,686.43' @ 12.30 hrs Surf.Area= 3,609 sf Storage= 7,756 cf

Plug-Flow detention time= 66.7 min calculated for 0.859 af (96% of inflow)
Center-of-Mass det. time= 45.6 min (881.5 - 835.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,683.00'	9,944 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,683.00	1,122	0	0
1,684.00	1,706	1,414	1,414
1,685.00	2,402	2,054	3,468
1,686.00	3,210	2,806	6,274
1,687.00	4,129	3,670	9,944

Device	Routing	Invert	Outlet Devices
#1	Primary	1,684.00'	**6.0" Round Culvert** L= 67.0' Ke= 0.500 Inlet / Outlet Invert= 1,684.00' / 1,681.00' S= 0.0448 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,686.00'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=1.34 cfs @ 12.30 hrs HW=1,686.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.34 cfs @ 6.84 fps)

Secondary OutFlow Max=7.35 cfs @ 12.30 hrs HW=1,686.43' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 7.35 cfs @ 1.69 fps)

Summary for Pond 4P: SW Basin 4

Inflow Area =	9.472 ac,	0.00% Impervious,	Inflow Depth =	3.72"	for 100-Year event
Inflow =	20.93 cfs @	12.44 hrs,	Volume=	2.934 af	
Outflow =	9.38 cfs @	12.96 hrs,	Volume=	2.606 af,	Atten= 55%, Lag= 31.1 min
Primary =	1.12 cfs @	12.96 hrs,	Volume=	1.712 af	
Secondary =	8.26 cfs @	12.96 hrs,	Volume=	0.893 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,677.38' @ 12.96 hrs Surf.Area= 23,061 sf Storage= 59,893 cf

Plug-Flow detention time= 420.9 min calculated for 2.605 af (89% of inflow)
Center-of-Mass det. time= 368.9 min (1,213.0 - 844.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,674.00'	74,899 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,674.00	12,265	0	0
1,675.00	15,682	13,974	13,974
1,676.00	18,701	17,192	31,165
1,677.00	21,848	20,275	51,440
1,678.00	25,071	23,460	74,899

Device	Routing	Invert	Outlet Devices
#1	Primary	1,675.00'	**6.0" Round Culvert** L= 41.0' Ke= 0.500 Inlet / Outlet Invert= 1,675.00' / 1,674.50' S= 0.0122 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,677.00'	**14.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.12 cfs @ 12.96 hrs HW=1,677.38' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.12 cfs @ 5.68 fps)

Secondary OutFlow Max=8.25 cfs @ 12.96 hrs HW=1,677.38' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 8.25 cfs @ 1.57 fps)

Summary for Pond 5P: SW Basin 5

Inflow Area =	2.260 ac,	0.00% Impervious,	Inflow Depth =	3.63"	for 100-Year event
Inflow =	8.86 cfs @	12.12 hrs,	Volume=	0.683 af	
Outflow =	8.38 cfs @	12.15 hrs,	Volume=	0.571 af,	Atten= 5%, Lag= 2.0 min
Primary =	0.70 cfs @	12.15 hrs,	Volume=	0.322 af	
Secondary =	7.68 cfs @	12.15 hrs,	Volume=	0.249 af	

Routing by Stor-Ind method, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs
Peak Elev= 1,659.79' @ 12.15 hrs Surf.Area= 3,787 sf Storage= 7,613 cf

Plug-Flow detention time= 139.8 min calculated for 0.571 af (84% of inflow)
Center-of-Mass det. time= 71.8 min (897.5 - 825.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,657.00'	12,767 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,657.00	1,731	0	0
1,658.00	2,416	2,074	2,074
1,659.00	3,156	2,786	4,860
1,660.00	3,952	3,554	8,414
1,661.00	4,755	4,354	12,767

Device	Routing	Invert	Outlet Devices
#1	Primary	1,659.00'	**6.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 1,659.00' / 1,658.50' S= 0.0185 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	1,659.50'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.70 cfs @ 12.15 hrs HW=1,659.79' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.70 cfs @ 3.55 fps)

Secondary OutFlow Max=7.63 cfs @ 12.15 hrs HW=1,659.79' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 7.63 cfs @ 1.30 fps)

Summary for Link 1L: Design Point # 1

Inflow Area = 24.477 ac, 9.75% Impervious, Inflow Depth = 3.99" for 100-Year event
Inflow = 71.94 cfs @ 12.26 hrs, Volume= 8.144 af
Primary = 71.94 cfs @ 12.26 hrs, Volume= 8.144 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 2L: Design Point # 2

Inflow Area = 12.931 ac, 1.49% Impervious, Inflow Depth > 2.61" for 100-Year event
Inflow = 16.05 cfs @ 12.08 hrs, Volume= 2.816 af
Primary = 16.05 cfs @ 12.08 hrs, Volume= 2.816 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 3L: Design Point # 3

Inflow Area = 9.593 ac, 0.00% Impervious, Inflow Depth = 3.24" for 100-Year event
Inflow = 27.07 cfs @ 12.11 hrs, Volume= 2.593 af
Primary = 27.07 cfs @ 12.11 hrs, Volume= 2.593 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs

Summary for Link 4L: Design Point # 4

Inflow Area = 4.301 ac, 0.00% Impervious, Inflow Depth = 2.83" for 100-Year event
Inflow = 6.56 cfs @ 12.11 hrs, Volume= 1.015 af
Primary = 6.56 cfs @ 12.11 hrs, Volume= 1.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-96.00 hrs, dt= 0.02 hrs