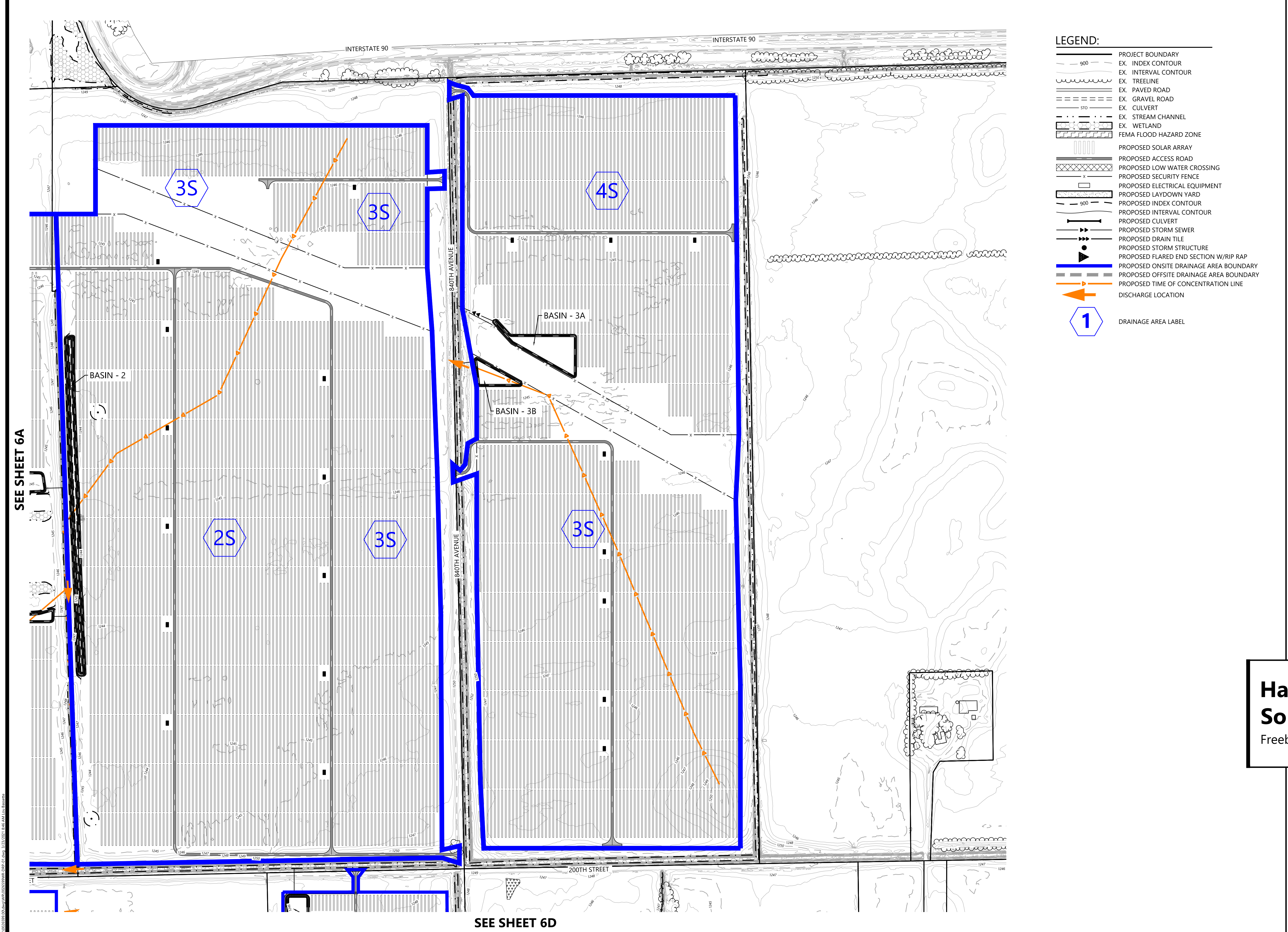




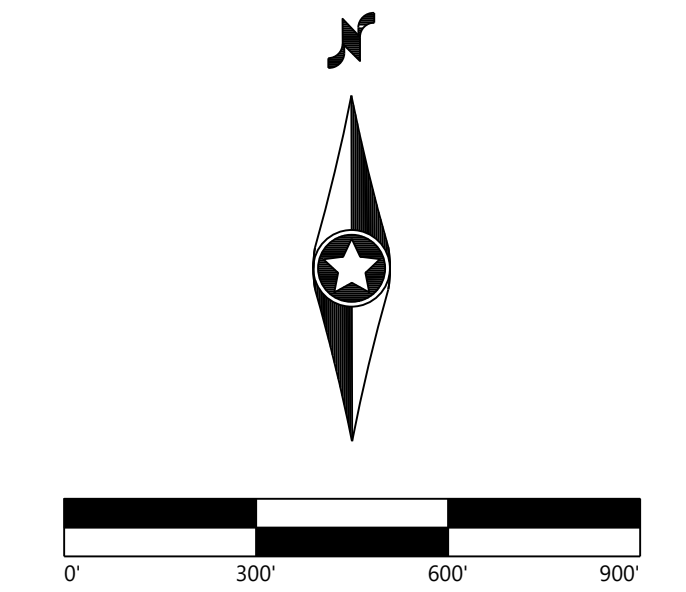
PREPARED FOR:

Capital Dynamics

Midwest Solar DevCo CEI, LLC
 47908 Oak Ridge Place Harrisburg, SD 57032

REVISIONS:

#	DATE	COMMENT



Hayward Solar Project

Freeborn County, MN

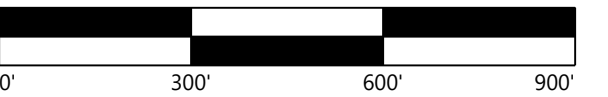
Proposed Drainage
 Map

NOT FOR CONSTRUCTION

DATE: 03/23/2021

SHEET: 6B

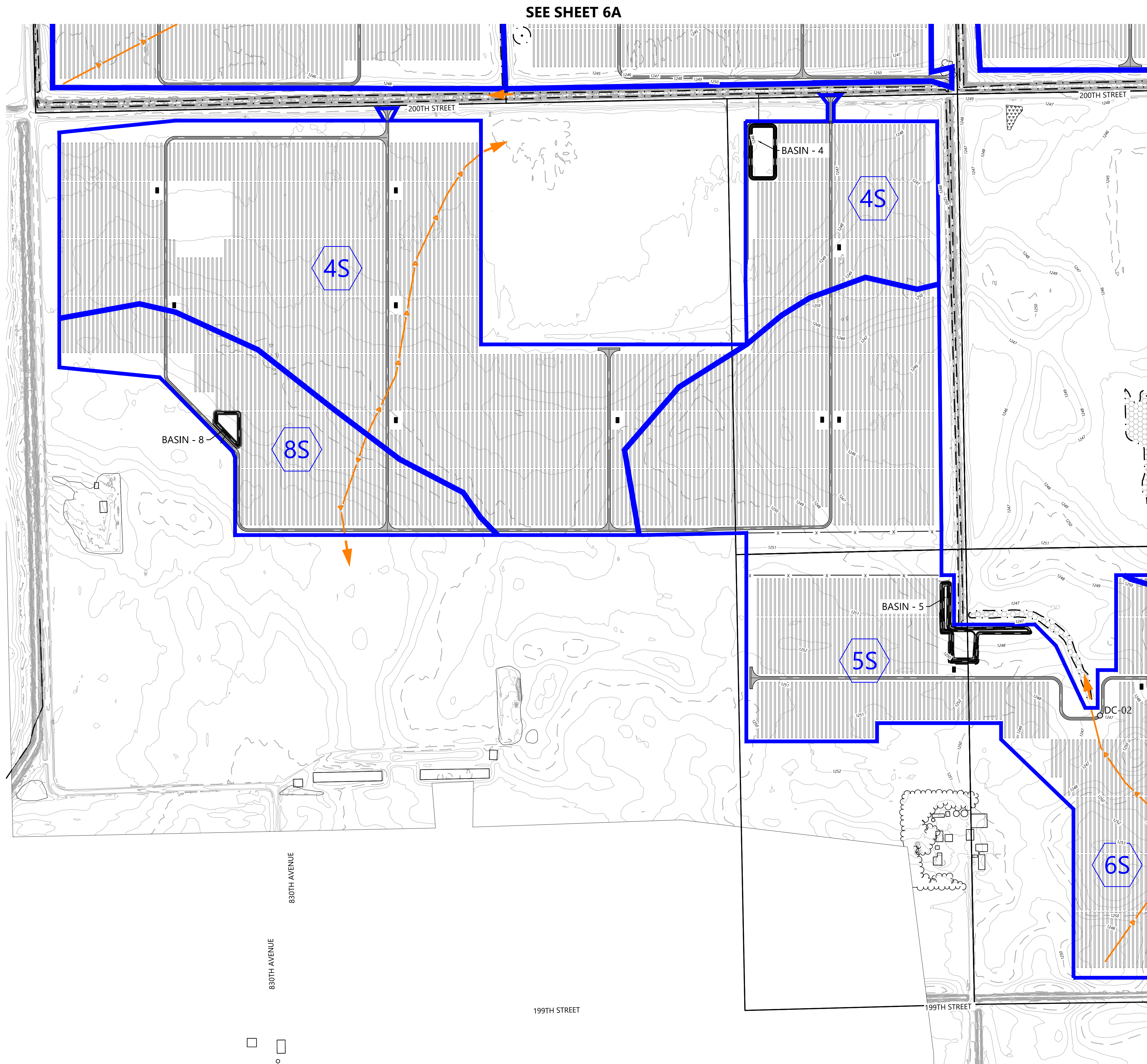
Capital Dynamics 

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Freeborn County, MN

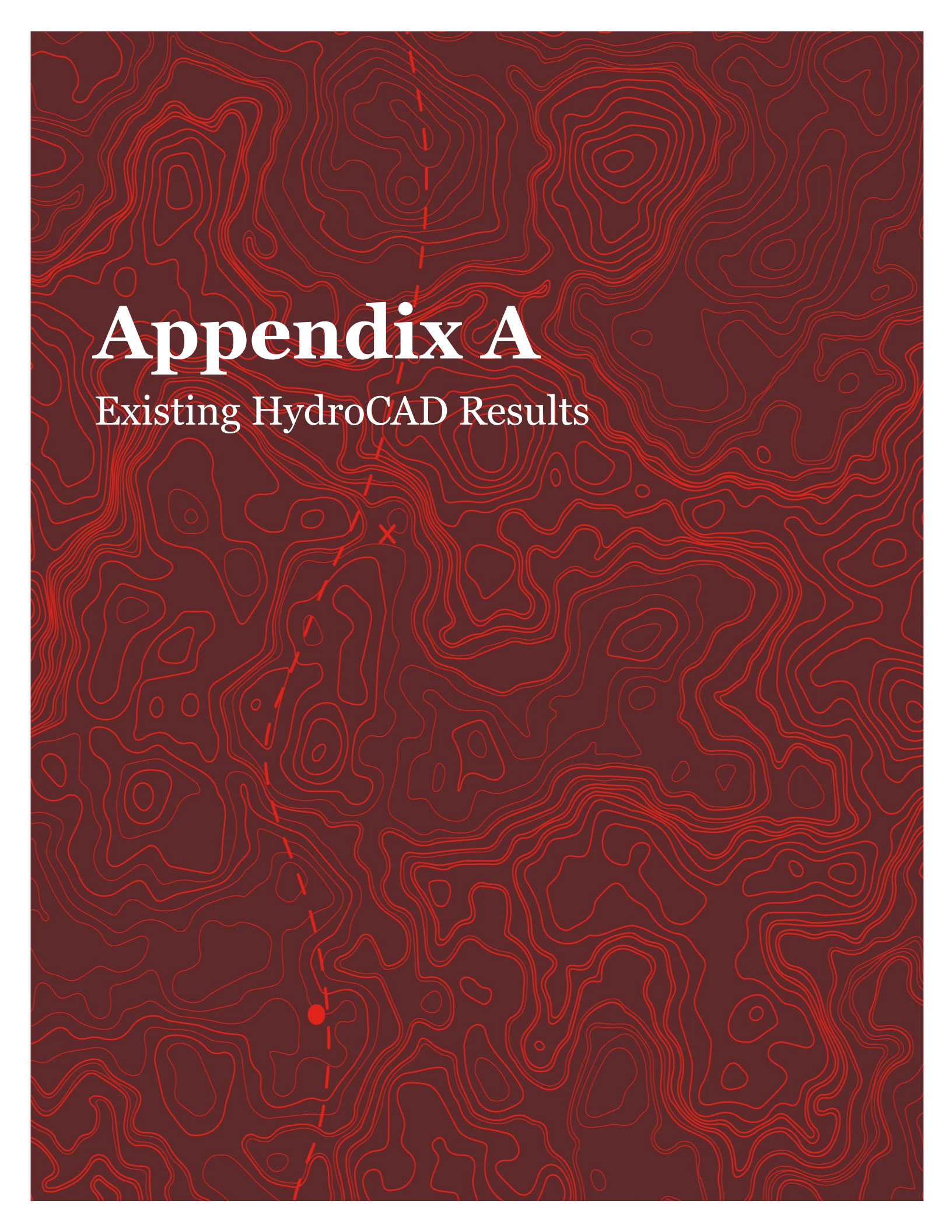
NOT FOR CONSTRUCTION

SHEET: 6C



PROJECT BOUNDARY
 EX. INDEX CONTOUR
 EX. INTERVAL CONTOUR
 EX. TREELINE
 EX. PAVED ROAD
 EX. GRAVEL ROAD
 EX. CULVERT
 EX. STREAM CHANNEL
 EX. WETLAND
 FEMA FLOOD HAZARD ZONE
 PROPOSED SOLAR ARRAY
 PROPOSED ACCESS ROAD
 PROPOSED LOW WATER CROSSING
 PROPOSED SECURITY FENCE
 PROPOSED ELECTRICAL EQUIPMENT
 PROPOSED LAYDOWN YARD
 PROPOSED INDEX CONTOUR
 PROPOSED INTERVAL CONTOUR
 PROPOSED CULVERT
 PROPOSED STORM SEWER
 PROPOSED DRAIN TILE
 PROPOSED STORM STRUCTURE
 PROPOSED FLARED END SECTION W/RIP RAP
 PROPOSED ONSITE DRAINAGE AREA BOUNDARY
 PROPOSED OFFSITE DRAINAGE AREA BOUNDARY
 PROPOSED TIME OF CONCENTRATION LINE
 DISCHARGE LOCATION
 DRAINAGE AREA LABEL

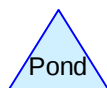
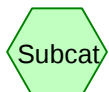
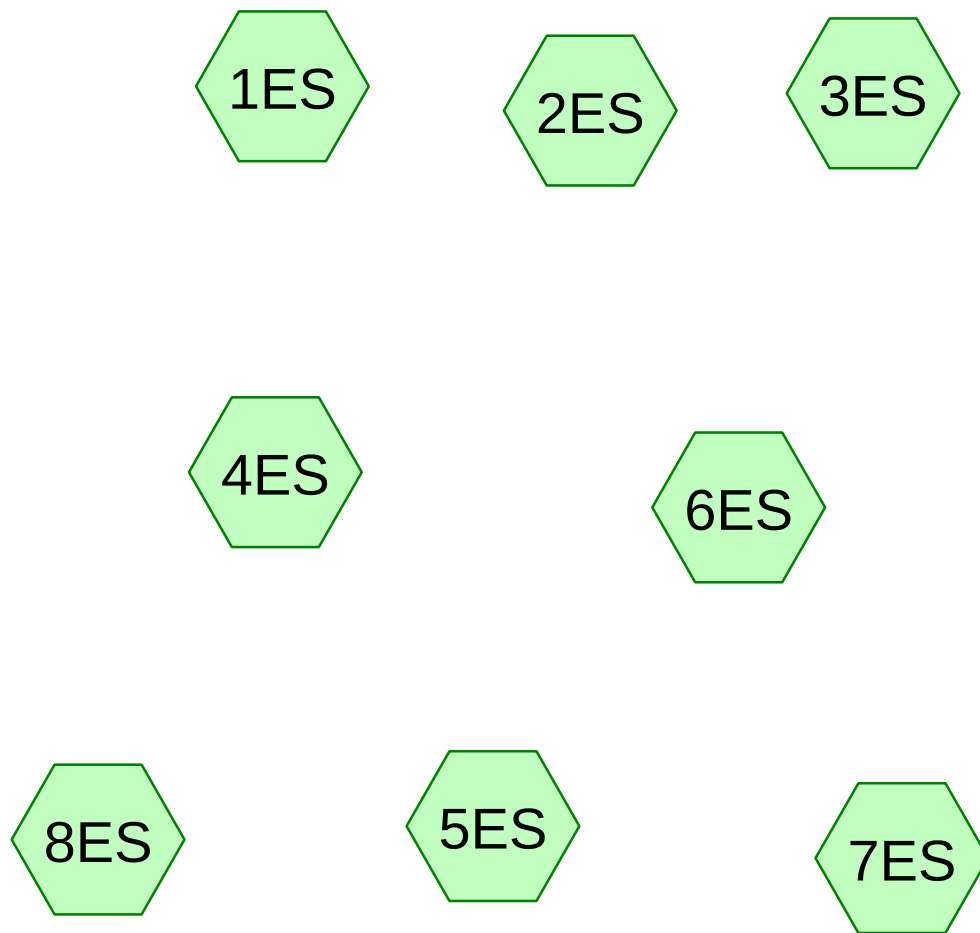
SEE SHEET 6D



Appendix A

Existing HydroCAD Results

Existing



Routing Diagram for 2021-03-15 Hayward Pre Post
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.900	78	Row crops, straight row, Good, HSG B (5ES)
1,269.500	89	Row crops, straight row, Good, HSG D (1ES, 2ES, 3ES, 4ES, 5ES, 6ES, 7ES, 8ES)
1,274.400	89	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.900	HSG B	5ES
0.000	HSG C	
1,269.500	HSG D	1ES, 2ES, 3ES, 4ES, 5ES, 6ES, 7ES, 8ES
0.000	Other	
1,274.400		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	4.900	0.000	1,269.500	0.000	1,274.400	Row crops, straight row, Good	1ES, 2ES, 3ES, 4ES, 5ES, 6ES, 7ES, 8ES
0.000	4.900	0.000	1,269.500	0.000	1,274.400	TOTAL AREA	

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Type II 24-hr 2-yr Rainfall=2.90"

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Summary for Subcatchment 1ES:

Runoff = 194.44 cfs @ 12.79 hrs, Volume= 35.334 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
234.300	89	Row crops, straight row, Good, HSG D
234.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
73.9	3,091	0.0060	0.70		Lag/CN Method,

Summary for Subcatchment 2ES:

Runoff = 81.52 cfs @ 15.80 hrs, Volume= 42.286 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
280.400	89	Row crops, straight row, Good, HSG D
280.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
290.6	5,582	0.0010	0.32		Lag/CN Method,

Summary for Subcatchment 3ES:

Runoff = 82.62 cfs @ 14.48 hrs, Volume= 31.428 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
208.400	89	Row crops, straight row, Good, HSG D
208.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
194.9	3,388	0.0010	0.29		Lag/CN Method,

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Type II 24-hr 2-yr Rainfall=2.90"

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Summary for Subcatchment 4ES:

Runoff = 119.33 cfs @ 12.71 hrs, Volume= 20.238 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
134.200	89	Row crops, straight row, Good, HSG D
134.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.3	1,782	0.0030	0.44		Lag/CN Method,

Summary for Subcatchment 5ES:

Runoff = 174.46 cfs @ 12.31 hrs, Volume= 18.926 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
120.600	89	Row crops, straight row, Good, HSG D
4.900	78	Row crops, straight row, Good, HSG B
125.500	89	Weighted Average
125.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	1,727	0.0100	0.80		Lag/CN Method,

Summary for Subcatchment 6ES:

Runoff = 39.43 cfs @ 12.53 hrs, Volume= 5.640 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
37.400	89	Row crops, straight row, Good, HSG D
37.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.4	1,596	0.0040	0.50		Lag/CN Method,

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Type II 24-hr 2-yr Rainfall=2.90"

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Summary for Subcatchment 7ES:

Runoff = 103.02 cfs @ 13.99 hrs, Volume= 33.675 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
223.300	89	Row crops, straight row, Good, HSG D
223.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
159.9	6,291	0.0040	0.66		Lag/CN Method,

Summary for Subcatchment 8ES:

Runoff = 66.53 cfs @ 12.10 hrs, Volume= 4.660 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
30.900	89	Row crops, straight row, Good, HSG D
30.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	607	0.0080	0.58		Lag/CN Method,

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Type II 24-hr 10-yr Rainfall=4.40"

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Summary for Subcatchment 1ES:

Runoff = 342.46 cfs @ 12.77 hrs, Volume= 62.486 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
234.300	89	Row crops, straight row, Good, HSG D
234.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
73.9	3,091	0.0060	0.70		Lag/CN Method,

Summary for Subcatchment 2ES:

Runoff = 144.10 cfs @ 15.79 hrs, Volume= 74.781 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
280.400	89	Row crops, straight row, Good, HSG D
280.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
290.6	5,582	0.0010	0.32		Lag/CN Method,

Summary for Subcatchment 3ES:

Runoff = 145.60 cfs @ 14.46 hrs, Volume= 55.579 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
208.400	89	Row crops, straight row, Good, HSG D
208.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
194.9	3,388	0.0010	0.29		Lag/CN Method,

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Type II 24-hr 10-yr Rainfall=4.40"

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Summary for Subcatchment 4ES:

Runoff = 209.87 cfs @ 12.69 hrs, Volume= 35.790 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
134.200	89	Row crops, straight row, Good, HSG D
134.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.3	1,782	0.0030	0.44		Lag/CN Method,

Summary for Subcatchment 5ES:

Runoff = 305.47 cfs @ 12.31 hrs, Volume= 33.470 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
120.600	89	Row crops, straight row, Good, HSG D
4.900	78	Row crops, straight row, Good, HSG B
125.500	89	Weighted Average
125.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	1,727	0.0100	0.80		Lag/CN Method,

Summary for Subcatchment 6ES:

Runoff = 69.31 cfs @ 12.52 hrs, Volume= 9.974 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
37.400	89	Row crops, straight row, Good, HSG D
37.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.4	1,596	0.0040	0.50		Lag/CN Method,

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Type II 24-hr 10-yr Rainfall=4.40"

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Summary for Subcatchment 7ES:

Runoff = 181.60 cfs @ 13.91 hrs, Volume= 59.553 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
223.300	89	Row crops, straight row, Good, HSG D
223.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
159.9	6,291	0.0040	0.66		Lag/CN Method,

Summary for Subcatchment 8ES:

Runoff = 115.51 cfs @ 12.09 hrs, Volume= 8.241 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
30.900	89	Row crops, straight row, Good, HSG D
30.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	607	0.0080	0.58		Lag/CN Method,

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 1ES:

Runoff = 530.99 cfs @ 12.77 hrs, Volume= 98.141 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
234.300	89	Row crops, straight row, Good, HSG D
234.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
73.9	3,091	0.0060	0.70		Lag/CN Method,

Summary for Subcatchment 2ES:

Runoff = 224.40 cfs @ 15.80 hrs, Volume= 117.451 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
280.400	89	Row crops, straight row, Good, HSG D
280.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
290.6	5,582	0.0010	0.32		Lag/CN Method,

Summary for Subcatchment 3ES:

Runoff = 226.67 cfs @ 14.32 hrs, Volume= 87.292 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
208.400	89	Row crops, straight row, Good, HSG D
208.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
194.9	3,388	0.0010	0.29		Lag/CN Method,

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 4ES:

Runoff = 325.31 cfs @ 12.68 hrs, Volume= 56.212 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
134.200	89	Row crops, straight row, Good, HSG D
134.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.3	1,782	0.0030	0.44		Lag/CN Method,

Summary for Subcatchment 5ES:

Runoff = 471.93 cfs @ 12.30 hrs, Volume= 52.568 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
120.600	89	Row crops, straight row, Good, HSG D
4.900	78	Row crops, straight row, Good, HSG B
125.500	89	Weighted Average
125.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	1,727	0.0100	0.80		Lag/CN Method,

Summary for Subcatchment 6ES:

Runoff = 107.29 cfs @ 12.52 hrs, Volume= 15.666 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
37.400	89	Row crops, straight row, Good, HSG D
37.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.4	1,596	0.0040	0.50		Lag/CN Method,

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 7ES:

Runoff = 282.55 cfs @ 13.87 hrs, Volume= 93.534 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
223.300	89	Row crops, straight row, Good, HSG D
223.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
159.9	6,291	0.0040	0.66		Lag/CN Method,

Summary for Subcatchment 8ES:

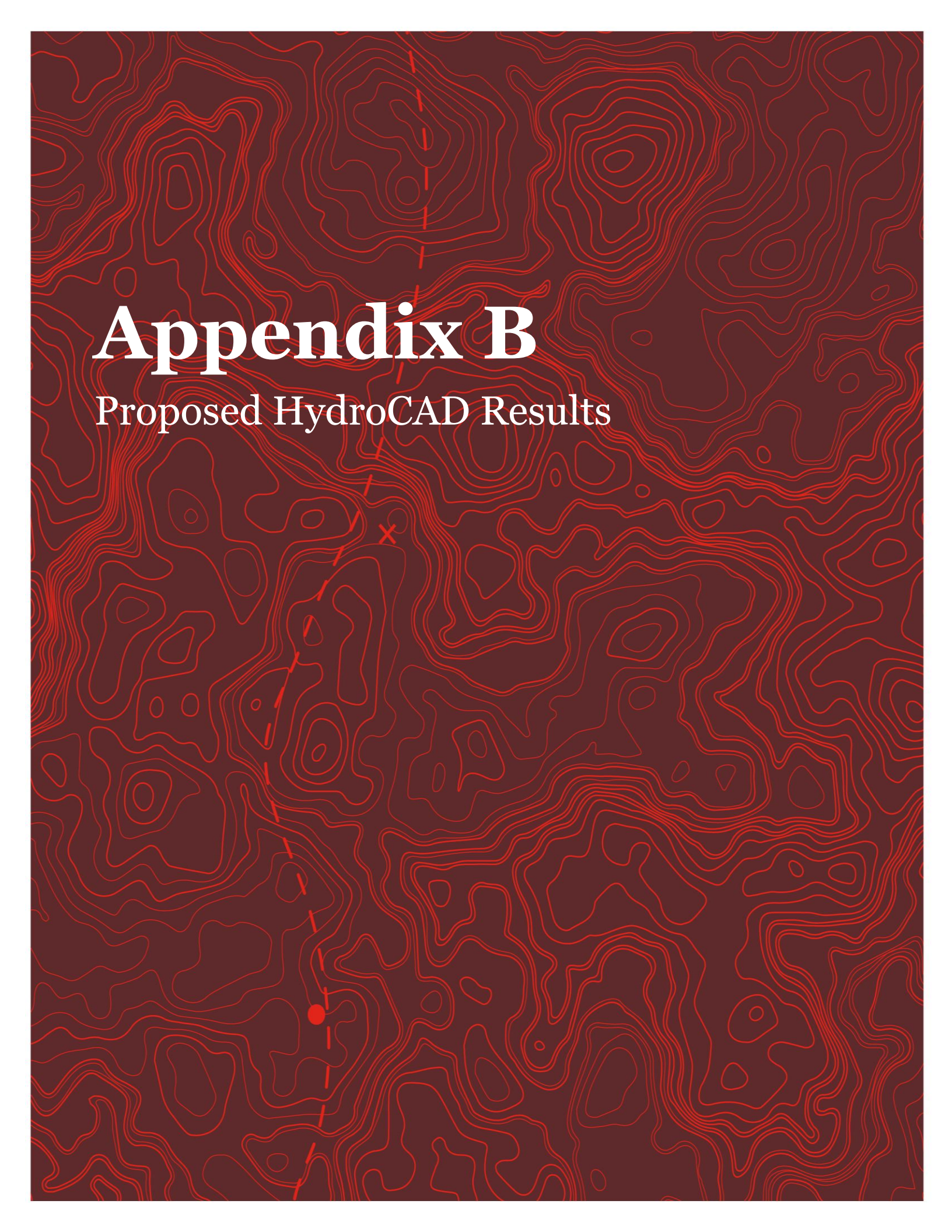
Runoff = 177.52 cfs @ 12.09 hrs, Volume= 12.943 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
30.900	89	Row crops, straight row, Good, HSG D
30.900		100.00% Pervious Area

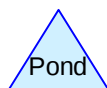
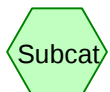
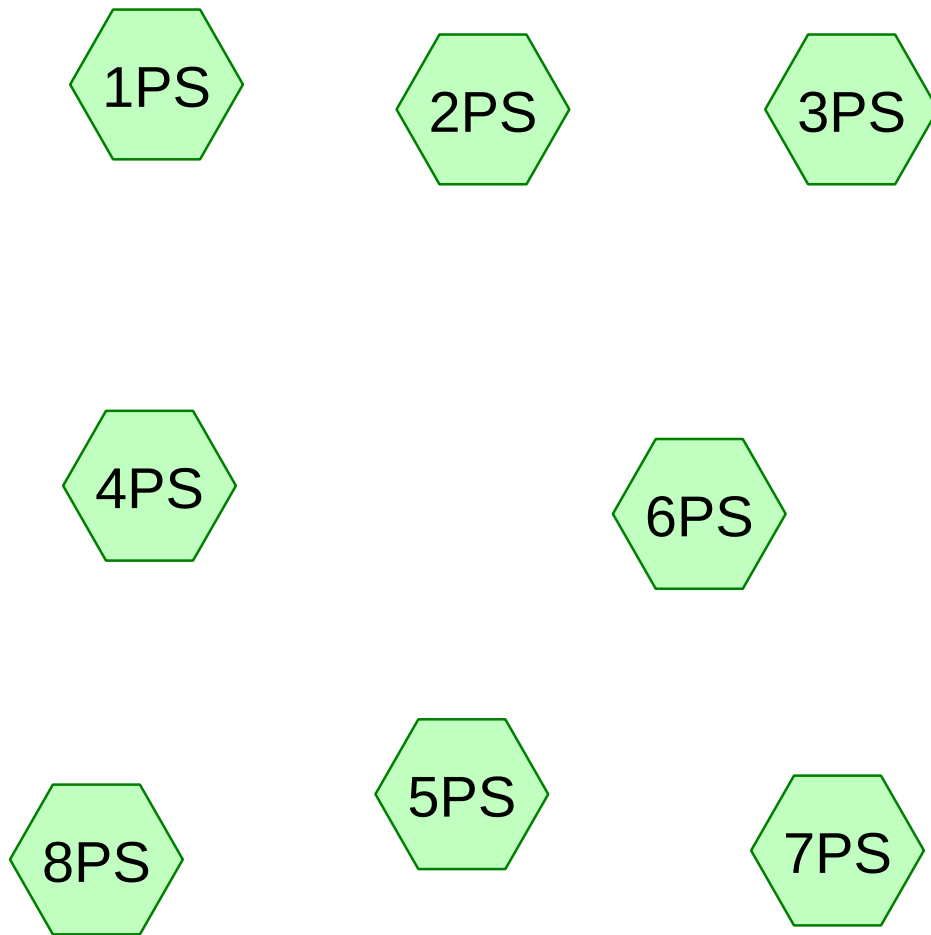
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	607	0.0080	0.58		Lag/CN Method,



Appendix B

Proposed HydroCAD Results

Proposed



2021-03-15 Hayward Pre Post

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.900	58	Meadow, non-grazed, HSG B (5PS)
1,238.600	78	Meadow, non-grazed, HSG D (1PS, 2PS, 3PS, 4PS, 5PS, 6PS, 7PS, 8PS)
30.900	98	Paved parking, HSG D (1PS, 2PS, 3PS, 4PS, 5PS, 6PS, 7PS, 8PS)
1,274.400	78	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.900	HSG B	5PS
0.000	HSG C	
1,269.500	HSG D	1PS, 2PS, 3PS, 4PS, 5PS, 6PS, 7PS, 8PS
0.000	Other	
1,274.400		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	4.900	0.000	1,238.600	0.000	1,243.500	Meadow, non-grazed	1PS, 2PS, 3PS, 4PS, 5PS, 6PS, 7PS, 8PS
0.000	0.000	0.000	30.900	0.000	30.900	Paved parking	1PS, 2PS, 3PS, 4PS, 5PS, 6PS, 7PS, 8PS
0.000	4.900	0.000	1,269.500	0.000	1,274.400	TOTAL AREA	

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Type II 24-hr 2-yr Rainfall=2.90"

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Summary for Subcatchment 1PS:

Runoff = 87.42 cfs @ 13.30 hrs, Volume= 21.788 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
224.900	78	Meadow, non-grazed, HSG D
9.400	98	Paved parking, HSG D
234.300	79	Weighted Average
224.900		95.99% Pervious Area
9.400		4.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
104.4	3,091	0.0060	0.49		Lag/CN Method,

Summary for Subcatchment 2PS:

Runoff = 32.99 cfs @ 17.40 hrs, Volume= 24.726 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
274.600	78	Meadow, non-grazed, HSG D
5.800	98	Paved parking, HSG D
280.400	78	Weighted Average
274.600		97.93% Pervious Area
5.800		2.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
422.8	5,582	0.0010	0.22		Lag/CN Method,

Summary for Subcatchment 3PS:

Runoff = 33.06 cfs @ 15.73 hrs, Volume= 18.377 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
205.200	78	Meadow, non-grazed, HSG D
3.200	98	Paved parking, HSG D
208.400	78	Weighted Average
205.200		98.46% Pervious Area
3.200		1.54% Impervious Area

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Type II 24-hr 2-yr Rainfall=2.90"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
283.6	3,388	0.0010	0.20		Lag/CN Method,

Summary for Subcatchment 4PS:

Runoff = 53.86 cfs @ 13.16 hrs, Volume= 12.479 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
130.800	78	Meadow, non-grazed, HSG D
3.400	98	Paved parking, HSG D
134.200	79	Weighted Average
130.800		97.47% Pervious Area
3.400		2.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
95.0	1,782	0.0030	0.31		Lag/CN Method,

Summary for Subcatchment 5PS:

Runoff = 73.87 cfs @ 12.56 hrs, Volume= 11.067 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
117.600	78	Meadow, non-grazed, HSG D
4.900	58	Meadow, non-grazed, HSG B
3.000	98	Paved parking, HSG D
125.500	78	Weighted Average
122.500		97.61% Pervious Area
3.000		2.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.3	1,727	0.0100	0.55		Lag/CN Method,

Summary for Subcatchment 6PS:

Runoff = 16.35 cfs @ 12.89 hrs, Volume= 3.298 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

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Type II 24-hr 2-yr Rainfall=2.90"

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Area (ac)	CN	Description
36.700	78	Meadow, non-grazed, HSG D
0.700	98	Paved parking, HSG D
37.400	78	Weighted Average
36.700		98.13% Pervious Area
0.700		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
77.6	1,596	0.0040	0.34		Lag/CN Method,

Summary for Subcatchment 7PS:

Runoff = 41.67 cfs @ 15.18 hrs, Volume= 19.691 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
219.400	78	Meadow, non-grazed, HSG D
3.900	98	Paved parking, HSG D
223.300	78	Weighted Average
219.400		98.25% Pervious Area
3.900		1.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
232.6	6,291	0.0040	0.45		Lag/CN Method,

Summary for Subcatchment 8PS:

Runoff = 32.75 cfs @ 12.19 hrs, Volume= 2.873 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.90"

Area (ac)	CN	Description
29.400	78	Meadow, non-grazed, HSG D
1.500	98	Paved parking, HSG D
30.900	79	Weighted Average
29.400		95.15% Pervious Area
1.500		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	607	0.0080	0.41		Lag/CN Method,

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Type II 24-hr 10-yr Rainfall=4.40"

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Summary for Subcatchment 1PS:

Runoff = 187.37 cfs @ 13.23 hrs, Volume= 44.767 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
224.900	78	Meadow, non-grazed, HSG D
9.400	98	Paved parking, HSG D
234.300	79	Weighted Average
224.900		95.99% Pervious Area
9.400		4.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
104.4	3,091	0.0060	0.49		Lag/CN Method,

Summary for Subcatchment 2PS:

Runoff = 72.12 cfs @ 17.40 hrs, Volume= 51.652 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
274.600	78	Meadow, non-grazed, HSG D
5.800	98	Paved parking, HSG D
280.400	78	Weighted Average
274.600		97.93% Pervious Area
5.800		2.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
422.8	5,582	0.0010	0.22		Lag/CN Method,

Summary for Subcatchment 3PS:

Runoff = 72.97 cfs @ 15.46 hrs, Volume= 38.389 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
205.200	78	Meadow, non-grazed, HSG D
3.200	98	Paved parking, HSG D
208.400	78	Weighted Average
205.200		98.46% Pervious Area
3.200		1.54% Impervious Area

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Type II 24-hr 10-yr Rainfall=4.40"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
283.6	3,388	0.0010	0.20		Lag/CN Method,

Summary for Subcatchment 4PS:

Runoff = 115.49 cfs @ 13.11 hrs, Volume= 25.641 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
130.800	78	Meadow, non-grazed, HSG D
3.400	98	Paved parking, HSG D
134.200	79	Weighted Average
130.800		97.47% Pervious Area
3.400		2.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
95.0	1,782	0.0030	0.31		Lag/CN Method,

Summary for Subcatchment 5PS:

Runoff = 162.33 cfs @ 12.52 hrs, Volume= 23.118 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
117.600	78	Meadow, non-grazed, HSG D
4.900	58	Meadow, non-grazed, HSG B
3.000	98	Paved parking, HSG D
125.500	78	Weighted Average
122.500		97.61% Pervious Area
3.000		2.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.3	1,727	0.0100	0.55		Lag/CN Method,

Summary for Subcatchment 6PS:

Runoff = 36.06 cfs @ 12.86 hrs, Volume= 6.889 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

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Type II 24-hr 10-yr Rainfall=4.40"

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Area (ac)	CN	Description
36.700	78	Meadow, non-grazed, HSG D
0.700	98	Paved parking, HSG D
37.400	78	Weighted Average
36.700		98.13% Pervious Area
0.700		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
77.6	1,596	0.0040	0.34		Lag/CN Method,

Summary for Subcatchment 7PS:

Runoff = 91.31 cfs @ 14.97 hrs, Volume= 41.134 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
219.400	78	Meadow, non-grazed, HSG D
3.900	98	Paved parking, HSG D
223.300	78	Weighted Average
219.400		98.25% Pervious Area
3.900		1.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
232.6	6,291	0.0040	0.45		Lag/CN Method,

Summary for Subcatchment 8PS:

Runoff = 69.28 cfs @ 12.18 hrs, Volume= 5.904 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.40"

Area (ac)	CN	Description
29.400	78	Meadow, non-grazed, HSG D
1.500	98	Paved parking, HSG D
30.900	79	Weighted Average
29.400		95.15% Pervious Area
1.500		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	607	0.0080	0.41		Lag/CN Method,

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 1PS:

Runoff = 326.17 cfs @ 13.20 hrs, Volume= 77.098 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
224.900	78	Meadow, non-grazed, HSG D
9.400	98	Paved parking, HSG D
234.300	79	Weighted Average
224.900		95.99% Pervious Area
9.400		4.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
104.4	3,091	0.0060	0.49		Lag/CN Method,

Summary for Subcatchment 2PS:

Runoff = 127.73 cfs @ 17.39 hrs, Volume= 89.848 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
274.600	78	Meadow, non-grazed, HSG D
5.800	98	Paved parking, HSG D
280.400	78	Weighted Average
274.600		97.93% Pervious Area
5.800		2.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
422.8	5,582	0.0010	0.22		Lag/CN Method,

Summary for Subcatchment 3PS:

Runoff = 129.60 cfs @ 15.45 hrs, Volume= 66.777 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
205.200	78	Meadow, non-grazed, HSG D
3.200	98	Paved parking, HSG D
208.400	78	Weighted Average
205.200		98.46% Pervious Area
3.200		1.54% Impervious Area

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Type II 24-hr 100-yr Rainfall=6.30"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
283.6	3,388	0.0010	0.20		Lag/CN Method,

Summary for Subcatchment 4PS:

Runoff = 200.91 cfs @ 13.08 hrs, Volume= 44.159 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
130.800	78	Meadow, non-grazed, HSG D
3.400	98	Paved parking, HSG D
134.200	79	Weighted Average
130.800		97.47% Pervious Area
3.400		2.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
95.0	1,782	0.0030	0.31		Lag/CN Method,

Summary for Subcatchment 5PS:

Runoff = 285.65 cfs @ 12.51 hrs, Volume= 40.214 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
117.600	78	Meadow, non-grazed, HSG D
4.900	58	Meadow, non-grazed, HSG B
3.000	98	Paved parking, HSG D
125.500	78	Weighted Average
122.500		97.61% Pervious Area
3.000		2.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.3	1,727	0.0100	0.55		Lag/CN Method,

Summary for Subcatchment 6PS:

Runoff = 63.55 cfs @ 12.85 hrs, Volume= 11.984 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

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Type II 24-hr 100-yr Rainfall=6.30"

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Area (ac)	CN	Description
36.700	78	Meadow, non-grazed, HSG D
0.700	98	Paved parking, HSG D
37.400	78	Weighted Average
36.700		98.13% Pervious Area
0.700		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
77.6	1,596	0.0040	0.34		Lag/CN Method,

Summary for Subcatchment 7PS:

Runoff = 161.90 cfs @ 14.77 hrs, Volume= 71.551 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
219.400	78	Meadow, non-grazed, HSG D
3.900	98	Paved parking, HSG D
223.300	78	Weighted Average
219.400		98.25% Pervious Area
3.900		1.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
232.6	6,291	0.0040	0.45		Lag/CN Method,

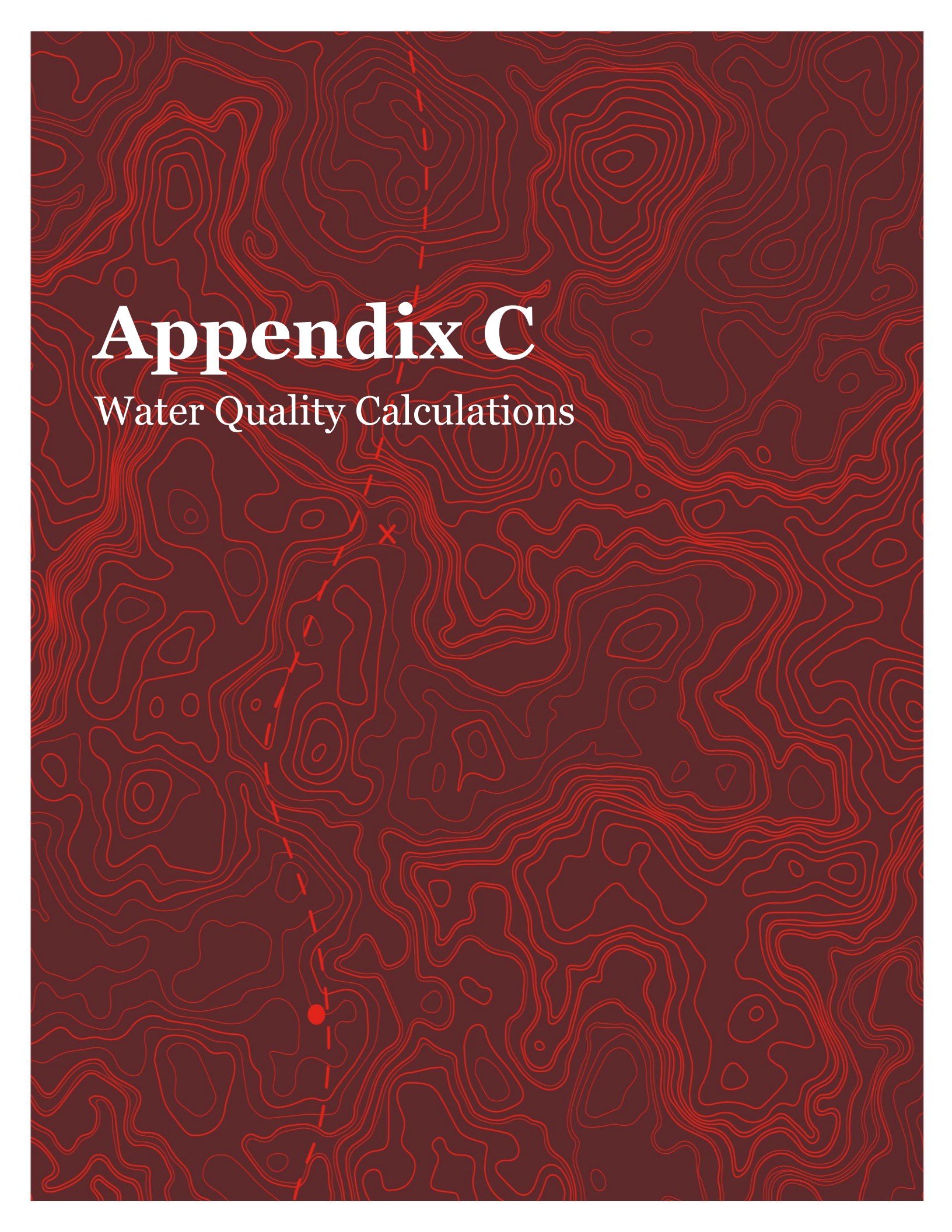
Summary for Subcatchment 8PS:

Runoff = 119.40 cfs @ 12.18 hrs, Volume= 10.168 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
29.400	78	Meadow, non-grazed, HSG D
1.500	98	Paved parking, HSG D
30.900	79	Weighted Average
29.400		95.15% Pervious Area
1.500		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	607	0.0080	0.41		Lag/CN Method,

The background of the page is a dark red color with a complex pattern of lighter red, wavy contour lines, resembling a topographic map. A dashed red line runs diagonally from the top left towards the bottom center. Along this line, there is a solid red dot in the lower-left quadrant and a red 'x' mark in the upper-middle section.

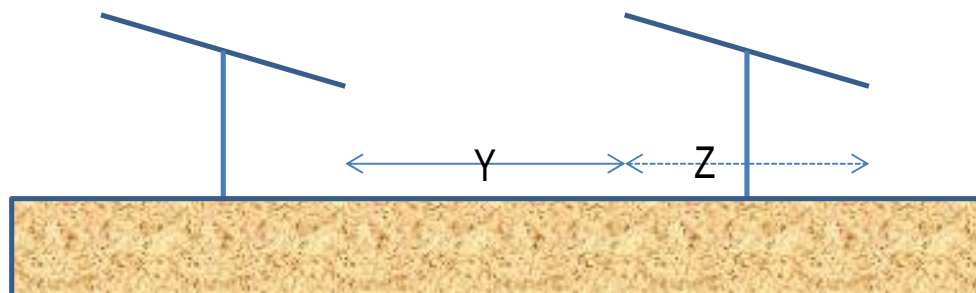
Appendix C

Water Quality Calculations

Drainage Area 1

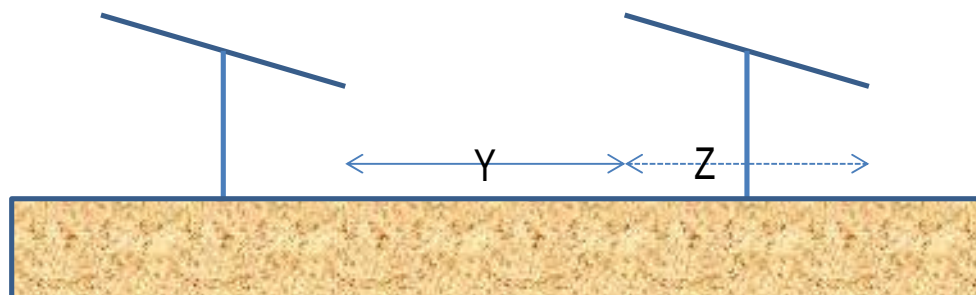
This spreadsheet makes calculations for an individual solar panel.

Enter values in blue cells		
Soil	D	
I/P ratio	0.287	
Term	Value	Units
Pervious area	7931023.20	square feet
Impervious area (area of solar panel)	2275084.80	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.15	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	4265784	ft3
Runoff from pervious	4758614	ft3
Total runoff	9024398	ft3
Post-disconnection		
Total runoff	6929947	ft3
Total runoff reduced	2094451	ft3
Runoff from pervious	4758614	ft3
Runoff from impervious	2171333	ft3
Adjusted impervious	#####	square feet
Performance Goal Summary		
Performance goal	189590.40	ft3
BMP volume credit (BMP _{volume credit})	102767.71	ft3
% of performance goal achieved	54.2	%
Remaining water quality volume to be treated (per panel)	86822.69	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance		



Drainage Area 2

This spreadsheet makes calculations for an individual solar panel.		
Enter values in blue cells		
Soil	D	
I/P ratio	0.286	
Term	Value	Units
Pervious area	9495432.00	square feet
Impervious area (area of solar panel)	2718792.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.14	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	5097735	ft3
Runoff from pervious	5697259	ft3
Total runoff	10794994	ft3
Post-disconnection		
Total runoff	8289387	ft3
Total runoff reduced	2505608	ft3
Runoff from pervious	5697259	ft3
Runoff from impervious	2592127	ft3
Adjusted impervious	#####	square feet
Performance Goal Summary		
Performance goal	226566.00	ft3
BMP volume credit (BMP _{volume credit})	122941.81	ft3
% of performance goal achieved	54.3	%
Remaining water quality volume to be treated (per panel)	103624.19	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance		



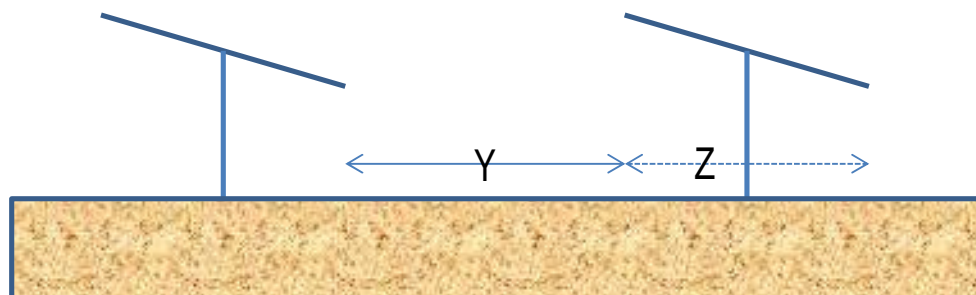
Drainage Area 3

This spreadsheet makes calculations for an individual solar panel.

Enter values in blue cells

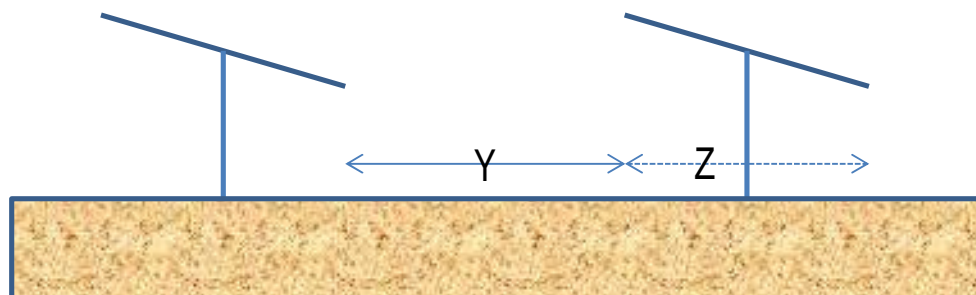
Soil	D	
I/P ratio	0.297	
Term	Value	Units
Pervious area	7000502.40	square feet
Impervious area (area of solar panel)	2077402.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.19	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	3895129	ft3
Runoff from pervious	4200301	ft3
Total runoff	8095430	ft3
Post-disconnection		
Total runoff	6194157	ft3
Total runoff reduced	1901273	ft3
Runoff from pervious	4200301	ft3
Runoff from impervious	1993855	ft3
Adjusted impervious	#####	square feet
Performance Goal Summary		
Performance goal	173116.83	ft3
BMP volume credit (BMP _{volume credit})	93289.15	ft3
% of performance goal achieved	53.9	%
Remaining water quality volume to be treated (per panel)	79827.68	ft3

Pervious area = $(Y + Z) * W$; where W is the width of the solar panel and Z is the average horizontal distance
 Impervious area = $Z * W$; where W is the width of the solar panel and Z is the average horizontal distance

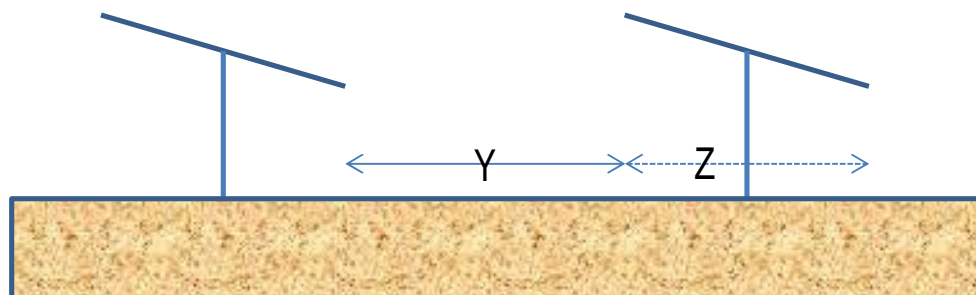


Drainage Area 4

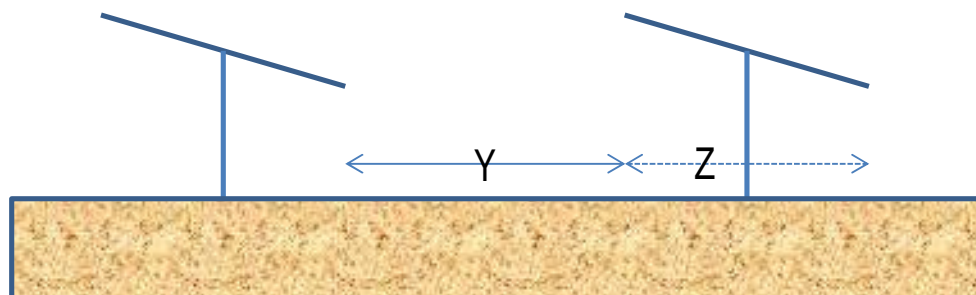
This spreadsheet makes calculations for an individual solar panel.		
Enter values in blue cells		
Soil	D	
I/P ratio	0.308	
Term	Value	Units
Pervious area	4470328.80	square feet
Impervious area (area of solar panel)	1375423.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.23	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	2578918	ft3
Runoff from pervious	2682197	ft3
Total runoff	5261115	ft3
Post-disconnection		
Total runoff	4010186	ft3
Total runoff reduced	1250930	ft3
Runoff from pervious	2682197	ft3
Runoff from impervious	1327988	ft3
Adjusted impervious	708260.509	square feet
Performance Goal Summary		
Performance goal	114618.58	ft3
BMP volume credit (BMP _{volume credit})	61378.95	ft3
% of performance goal achieved	53.6	%
Remaining water quality volume to be treated (per panel)	53239.63	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance		



This spreadsheet makes calculations for an individual solar panel.		
Enter values in blue cells		
Soil	D	
I/P ratio	0.288	
Term	Value	Units
Pervious area	4245753.60	square feet
Impervious area (area of solar panel)	1221026.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.15	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	2289424	ft3
Runoff from pervious	2547452	ft3
Total runoff	4836876	ft3
Post-disconnection		
Total runoff	3712854	ft3
Total runoff reduced	1124021	ft3
Runoff from pervious	2547452	ft3
Runoff from impervious	1165402	ft3
Adjusted impervious	621547.903	square feet
Performance Goal Summary		
Performance goal	101752.17	ft3
BMP volume credit (BMP _{volume credit})	55151.98	ft3
% of performance goal achieved	54.2	%
Remaining water quality volume to be treated (per panel)	46600.18	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance		

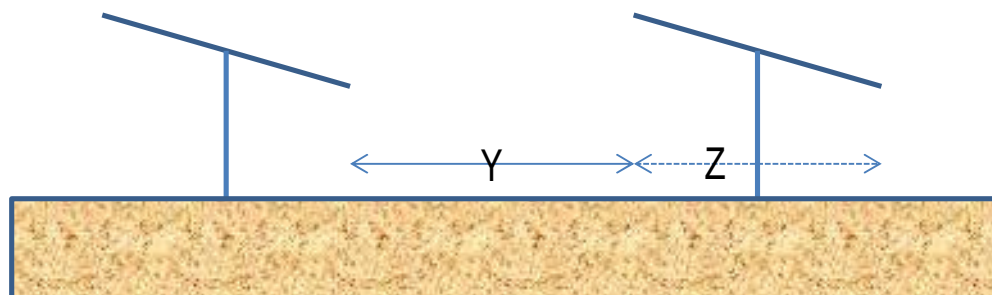


This spreadsheet makes calculations for an individual solar panel.		
Enter values in blue cells		
Soil	D	
I/P ratio	0.272	
Term	Value	Units
Pervious area	1280433.60	square feet
Impervious area (area of solar panel)	348710.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.09	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	653831	ft3
Runoff from pervious	768260	ft3
Total runoff	1422091	ft3
Post-disconnection		
Total runoff	1098043	ft3
Total runoff reduced	324049	ft3
Runoff from pervious	768260	ft3
Runoff from impervious	329783	ft3
Adjusted impervious	175884.067	square feet
Performance Goal Summary		
Performance goal	29059.17	ft3
BMP volume credit (BMP _{volume credit})	15899.99	ft3
% of performance goal achieved	54.7	%
Remaining water quality volume to be treated (per panel)	13159.18	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance		

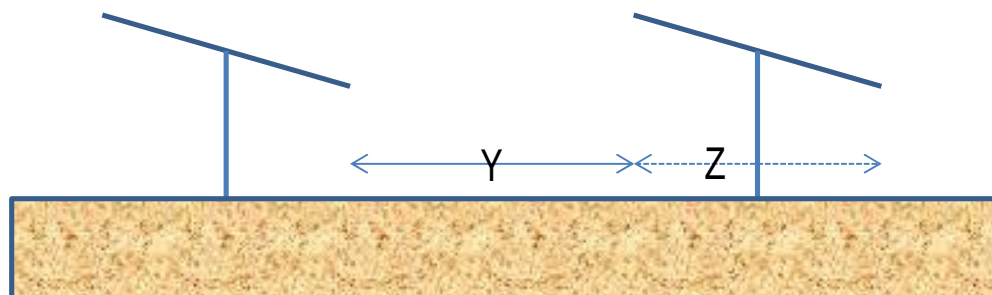


Drainage Area 7

This spreadsheet makes calculations for an individual solar panel.		
Enter values in blue cells		
Soil	D	
I/P ratio	0.270	
Term	Value	Units
Pervious area	7660540.80	square feet
Impervious area (area of solar panel)	2066407.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.08	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	3874513	ft3
Runoff from pervious	4596324	ft3
Total runoff	8470838	ft3
Post-disconnection		
Total runoff	6549478	ft3
Total runoff reduced	1921359	ft3
Runoff from pervious	4596324	ft3
Runoff from impervious	1953154	ft3
Adjusted impervious	1041681.976	square feet
Performance Goal Summary		
Performance goal	172200.58	ft3
BMP volume credit (BMP _{volume credit})	94274.70	ft3
% of performance goal achieved	54.7	%
Remaining water quality volume to be treated (per panel)	77925.88	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance o		



This spreadsheet makes calculations for an individual solar panel.		
Enter values in blue cells		
Soil	D	
I/P ratio	0.330	
Term	Value	Units
Pervious area	1012305.60	square feet
Impervious area (area of solar panel)	333698.00	square feet
Runoff depth from pervious areas	7.20	inches
Redirected runoff depth from solar panel (called average annual runoff depth)	8.32	inches
Runoff depth from solar panel	22.50	inches
Performance goal	1.00	inches
SUMMARY		
Pre-disconnection		
Runoff from impervious	625684	ft3
Runoff from pervious	607383	ft3
Total runoff	1233067	ft3
Post-disconnection		
Total runoff	933229	ft3
Total runoff reduced	299838	ft3
Runoff from pervious	607383	ft3
Runoff from impervious	325846	ft3
Adjusted impervious	173784.428	square feet
Performance Goal Summary		
Performance goal	27808.17	ft3
BMP volume credit (BMP _{volume credit})	14712.05	ft3
% of performance goal achieved	52.9	%
Remaining water quality volume to be treated (per panel)	13096.12	ft3
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance		
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance o		



Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 1

Site Information

Total Drainage Area to Pond	234.30	ac
Non- panel Impervious Surface Area	9.40	ac
Req Solar Panel treatment volume from MPCA sheet	1.99	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1238.0</u>		<u>1.886</u>		
	1.0		1.975	1.975
<u>1239.0</u>		<u>2.064</u>		
	1.0		2.155	4.130
<u>1240.0</u>		<u>2.246</u>		
	1.0		2.338	6.468
<u>1241.0</u>		<u>2.429</u>		
	1.0		2.523	8.990
<u>1242.0</u>		<u>2.616</u>		
	1.0		2.711	11.701
<u>1243.0</u>	NWL	<u>2.806</u>		
	1.0		2.902	14.603
<u>1244.0</u>		<u>2.997</u>		
			0.000	14.603
			0.000	14.603

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 9.606 ac-ft

2. Provided Permanent Storage Volume = 11.701 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 2.773 ac-ft

a. Discharge @ Water Quality Volume = 5.16 cfs

b. Water Quality Volume Elevation= 1243.96 ft

b. Water Quality Surface Area= 2.989 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)

1.7263 cfs

W.Q. Surface Area (ac)

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 2

Site Information

Total Drainage Area to Pond	280.40	ac
Non- panel Impervious Surface Area	5.80	ac
Req Solar Panel treatment volume from MPCA sheet	2.38	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1235.0</u>		<u>0.512</u>		
	1.0		0.668	0.668
<u>1236.0</u>		<u>0.823</u>		
	1.0		0.979	1.647
<u>1237.0</u>		<u>1.135</u>		
	1.0		1.293	2.939
<u>1238.0</u>		<u>1.450</u>		
	1.0		1.608	4.547
<u>1239.0</u>		<u>1.765</u>		
	1.0		1.924	6.470
<u>1240.0</u>		<u>2.082</u>		
	1.0		2.241	8.711
<u>1241.0</u>		<u>2.400</u>		
	1.0		2.560	11.271
<u>1242.0</u>		<u>2.720</u>		
	0.3		0.720	11.991
<u>1243.0</u>	NWL	<u>3.041</u>		
				11.991

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 11.496 ac-ft

2. Provided Permanent Storage Volume = 11.991 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 2.863 ac-ft

a. Discharge @ Water Quality Volume = 1.23 cfs

b. Water Quality Volume Elevation= 1243.61 ft

b. Water Quality Surface Area= 6.378 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)	0.1929 cfs
W.Q. Surface Area (ac)	

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 3

Site Information

Total Drainage Area to Pond	208.40	ac
Non- panel Impervious Surface Area	3.20	ac
Req Solar Panel treatment volume from MPCA sheet	1.83	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1238.0</u>		<u>1.908</u>		
	1.0		1.986	1.986
<u>1239.0</u>		<u>2.063</u>		
	1.0		2.142	4.128
<u>1240.0</u>		<u>2.221</u>		
	1.0		2.302	6.430
<u>1241.0</u>		<u>2.383</u>		
	1.0		2.464	8.894
<u>1242.0</u>	NWL	<u>2.545</u>		
	1.0		2.629	11.522
<u>1243.0</u>		<u>2.712</u>		
			0.000	11.522
			0.000	11.522
			0.000	11.522

2

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 8.544 ac-ft

2. Provided Permanent Storage Volume = 8.894 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 2.097 ac-ft

a. Discharge @ Water Quality Volume = 4.10 cfs

b. Water Quality Volume Elevation= 1242.80 ft

b. Water Quality Surface Area= 2.678 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)

1.5310 cfs

W.Q. Surface Area (ac)

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 4

Site Information

Total Drainage Area to Pond	134.20	ac
Non- panel Impervious Surface Area	3.40	ac
Req Solar Panel treatment volume from MPCA sheet	1.22	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1239.0</u>		<u>0.766</u>		
	1.0		0.795	0.795
<u>1240.0</u>		<u>0.823</u>		
	1.0		0.852	1.647
<u>1241.0</u>		<u>0.881</u>		
	1.0		0.911	2.557
<u>1242.0</u>		<u>0.940</u>		
	1.0		0.971	3.528
<u>1243.0</u>		<u>1.001</u>		
	1.0		1.032	4.560
<u>1244.0</u>		<u>1.063</u>		
	1.0		1.095	5.655
<u>1245.0</u>	NWL	<u>1.127</u>		
			0.000	5.655
			0.000	5.655

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 5.502 ac-ft

2. Provided Permanent Storage Volume = 5.655 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 1.503 ac-ft

a. Discharge @ Water Quality Volume = 3.14 cfs

b. Water Quality Volume Elevation= 1246.19 ft

b. Water Quality Surface Area= 2.516 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)

1.2480 cfs

W.Q. Surface Area (ac)

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
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 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 5

Site Information

Total Drainage Area to Pond	125.50	ac
Non- panel Impervious Surface Area	3.00	ac
Req Solar Panel treatment volume from MPCA sheet	1.07	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1238.0</u>		<u>0.450</u>		
	1.0		0.487	0.487
<u>1239.0</u>		<u>0.523</u>		
	1.0		0.563	1.049
<u>1240.0</u>		<u>0.602</u>		
	1.0		0.675	1.724
<u>1241.0</u>		<u>0.747</u>		
	1.0		0.809	2.533
<u>1242.0</u>		<u>0.871</u>		
	1.0		0.935	3.467
<u>1243.0</u>		<u>0.998</u>		
	1.0		1.062	4.529
<u>1244.0</u>		<u>1.126</u>		
	1.0		1.191	5.720
<u>1245.0</u>	NWL	<u>1.255</u>		
			0.000	5.720
			0.000	5.720

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 5.146 ac-ft

2. Provided Permanent Storage Volume = 5.720 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 1.320 ac-ft

a. Discharge @ Water Quality Volume = 2.67 cfs

b. Water Quality Volume Elevation= 1246.00 ft

b. Water Quality Surface Area= 1.386 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)	1.9264 cfs
W.Q. Surface Area (ac)	

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 6

Site Information

Total Drainage Area to Pond	37.40	ac
Non- panel Impervious Surface Area	0.70	ac
Req Solar Panel treatment volume from MPCA sheet	0.30	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
			0.000	0.000
<u>1242.0</u>		<u>0.487</u>		
	1.0		0.531	0.531
<u>1243.0</u>		<u>0.574</u>		
	1.0		0.618	1.148
<u>1244.0</u>		<u>0.661</u>		
	1.0		0.706	1.854
<u>1245.0</u>	NWL	<u>0.750</u>		
			0.000	1.854
	0.0		0.000	1.854
			0.000	1.854
			0.000	1.854
			0.000	1.854

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 1.533 ac-ft

2. Provided Permanent Storage Volume = 1.854 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 0.358 ac-ft

a. Discharge @ Water Quality Volume = 0.81 cfs

b. Water Quality Volume Elevation= 1245.46 ft

b. Water Quality Surface Area= 0.792 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)

1.0227 cfs

W.Q. Surface Area (ac)

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 7

Site Information

Total Drainage Area to Pond	223.30	ac
Non- panel Impervious Surface Area	3.90	ac
Req Solar Panel treatment volume from MPCA sheet	1.79	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1239.0</u>		<u>2.500</u>		
	1.0		2.547	2.547
<u>1240.0</u>		<u>2.594</u>		
	1.0		2.643	5.190
<u>1241.0</u>		<u>2.691</u>		
	1.0		2.740	7.930
<u>1242.0</u>		<u>2.789</u>		
	1.0		2.839	10.768
<u>1243.0</u>	NWL	<u>2.888</u>		
			0.000	10.768
			0.000	10.768

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 9.155 ac-ft

2. Provided Permanent Storage Volume = 10.768 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 2.115 ac-ft

a. Discharge @ Water Quality Volume = 1.74 cfs

b. Water Quality Volume Elevation= 1243.72 ft

b. Water Quality Surface Area= 2.960 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)	0.5878 cfs
W.Q. Surface Area (ac)	

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Project Title: Hayward
 Project Number: 26599.00
 Designed By: TJB
 Design Date: 3/22/2021

MPCA SOLAR WET SEDIMENTATION BASIN SIZING REQUIREMENTS

POND MPCA Pond 8

Site Information

Total Drainage Area to Pond	30.90	ac
Non- panel Impervious Surface Area	1.50	ac
Req Solar Panel treatment volume from MPCA sheet	0.30	ac-ft

Pond Storage

Contour	Distance Feet	Acre Area	Ac-ft Storage	Cumm. Storage
<u>1241.0</u>		<u>0.251</u>		
	1.0		0.268	0.268
<u>1242.0</u>		<u>0.285</u>		
	1.0		0.303	0.571
<u>1243.0</u>		<u>0.321</u>		
	1.0		0.340	0.911
<u>1244.0</u>		<u>0.359</u>		
	1.0		0.379	1.290
<u>1245.0</u>		<u>0.399</u>		
	1.0		0.420	1.710
<u>1246.0</u>	NWL	<u>0.440</u>		
			0.000	1.710

NPDES Wet Sedimentation Basin Sizing Requirements

1. Required Permanent Storage Volume = 1800 cubic feet/acre= 1.267 ac-ft

2. Provided Permanent Storage Volume = 1.710 ac-ft

b. Provided Dead Storage Greater than Required Dead Storage = OK

3. Water Quality Volume = 1" over imp. + req panel WQV (from MPCA calculator)

4. Water Quality Volume = 0.425 ac-ft

a. Discharge @ Water Quality Volume = 2.40 cfs

b. Water Quality Volume Elevation= 1246.90 ft

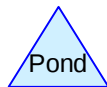
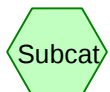
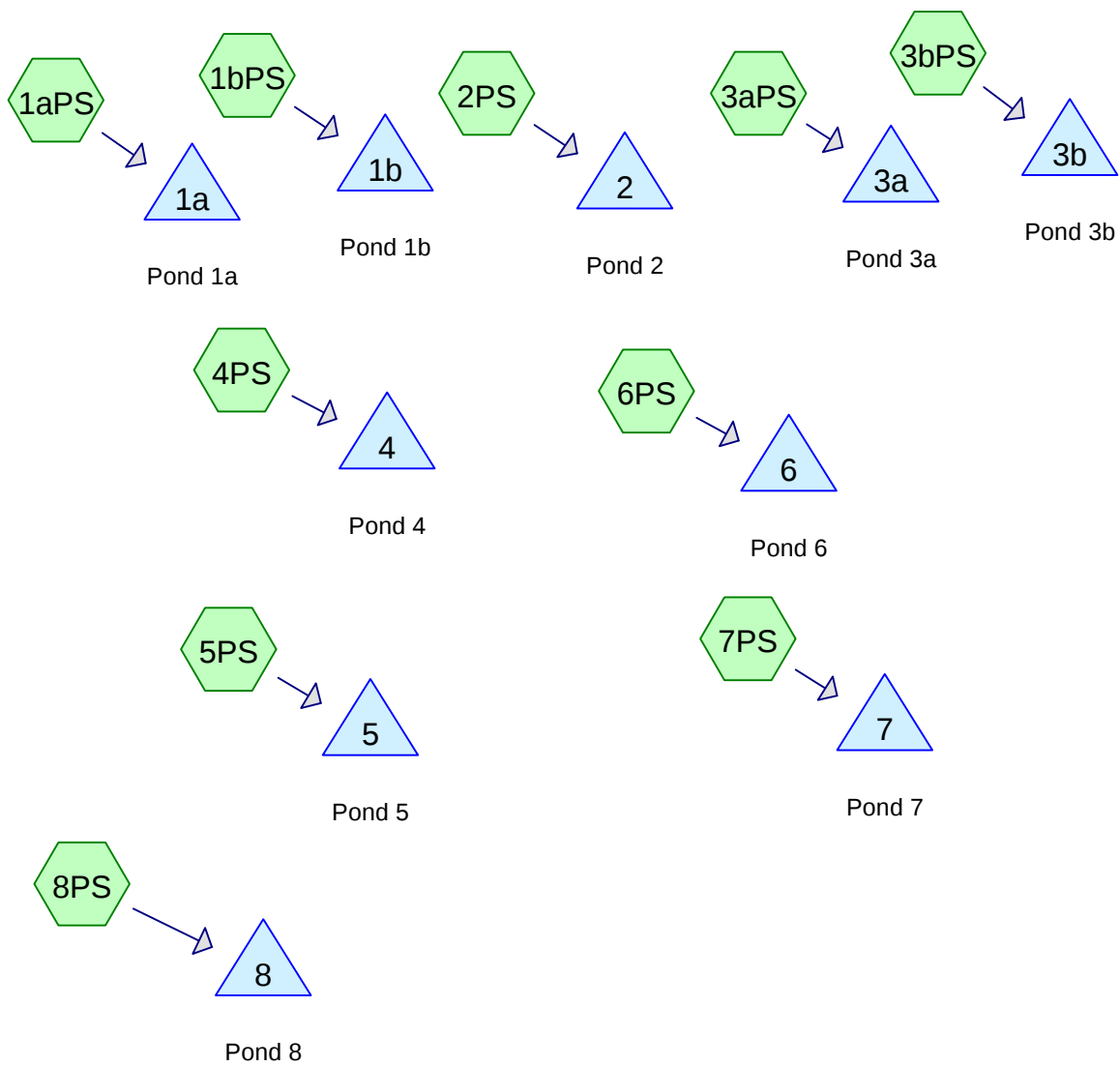
b. Water Quality Surface Area= 0.503 ac

5. Water Quality Discharge rate/acre=

W.Q. Discharge (cfs)	4.7714 cfs
W.Q. Surface Area (ac)	

a. Water Quality discharge must be less than 5.66 cfs per acre = OK

Proposed



Routing Diagram for 2021-03-16 Hayward Basin Sizing
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
617.559	78	Meadow, non-grazed, HSG D (1aPS, 1bPS, 2PS, 3aPS, 3bPS, 4PS, 5PS, 6PS, 7PS, 8PS)
9.542	98	Paved parking, HSG D (1aPS, 1bPS, 2PS, 3aPS, 3bPS, 4PS, 5PS, 6PS, 7PS)
627.101	78	TOTAL AREA

2021-03-16 Hayward Basin Sizing*Type II 24-hr 100-yr Rainfall=6.30"*

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1aPS:	Runoff Area=26.903 ac 1.04% Impervious Runoff Depth=3.85" Flow Length=1,531' Slope=0.0013 '/' Tc=131.7 min CN=78 Runoff=30.63 cfs 8.620 af
Subcatchment 1bPS:	Runoff Area=68.818 ac 1.74% Impervious Runoff Depth=3.85" Flow Length=2,757' Slope=0.0037 '/' Tc=125.0 min CN=78 Runoff=81.41 cfs 22.051 af
Subcatchment 2PS:	Runoff Area=280.400 ac 1.76% Impervious Runoff Depth=3.85" Flow Length=5,615' Slope=0.0010 '/' Tc=424.8 min CN=78 Runoff=127.54 cfs 89.848 af
Subcatchment 3aPS:	Runoff Area=15.240 ac 3.29% Impervious Runoff Depth=3.95" Flow Length=1,078' Slope=0.0015 '/' Tc=89.9 min CN=79 Runoff=23.83 cfs 5.015 af
Subcatchment 3bPS:	Runoff Area=98.114 ac 1.05% Impervious Runoff Depth=3.85" Flow Length=1,972' Slope=0.0010 '/' Tc=183.9 min CN=78 Runoff=85.61 cfs 31.438 af
Subcatchment 4PS:	Runoff Area=15.186 ac 2.21% Impervious Runoff Depth=3.85" Flow Length=1,267' Slope=0.0030 '/' Tc=74.5 min CN=78 Runoff=26.57 cfs 4.866 af
Subcatchment 5PS:	Runoff Area=16.801 ac 1.62% Impervious Runoff Depth=3.85" Flow Length=592' Slope=0.0080 '/' Tc=24.8 min CN=78 Runoff=62.93 cfs 5.384 af
Subcatchment 6PS:	Runoff Area=20.436 ac 0.42% Impervious Runoff Depth=3.85" Flow Length=932' Slope=0.0050 '/' Tc=45.2 min CN=78 Runoff=51.56 cfs 6.548 af
Subcatchment 7PS:	Runoff Area=81.791 ac 1.10% Impervious Runoff Depth=3.85" Flow Length=2,638' Slope=0.0010 '/' Tc=232.1 min CN=78 Runoff=59.38 cfs 26.208 af
Subcatchment 8PS:	Runoff Area=3.412 ac 0.00% Impervious Runoff Depth=3.85" Flow Length=350' Slope=0.0070 '/' Tc=17.4 min CN=78 Runoff=15.63 cfs 1.093 af
Pond 1a: Pond 1a	Peak Elev=1,244.36' Storage=3.387 af Inflow=30.63 cfs 8.620 af Outflow=14.12 cfs 8.504 af
Pond 1b: Pond 1b	Peak Elev=1,244.68' Storage=9.134 af Inflow=81.41 cfs 22.051 af Outflow=34.40 cfs 21.639 af
Pond 2: Pond 2	Peak Elev=1,244.60' Storage=43.569 af Inflow=127.54 cfs 89.848 af Outflow=49.92 cfs 86.029 af
Pond 3a: Pond 3a	Peak Elev=1,243.70' Storage=1.328 af Inflow=23.83 cfs 5.015 af Outflow=19.72 cfs 4.955 af
Pond 3b: Pond 3b	Peak Elev=1,244.31' Storage=4.467 af Inflow=85.61 cfs 31.438 af Outflow=83.14 cfs 31.009 af
Pond 4: Pond 4	Peak Elev=1,246.48' Storage=2.525 af Inflow=26.57 cfs 4.866 af Outflow=6.31 cfs 4.726 af

2021-03-16 Hayward Basin Sizing*Type II 24-hr 100-yr Rainfall=6.30"*

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Pond 5: Pond 5 Peak Elev=1,246.73' Storage=2.374 af Inflow=62.93 cfs 5.384 af
Outflow=21.10 cfs 5.219 af

Pond 6: Pond 6 Peak Elev=1,246.36' Storage=1.108 af Inflow=51.56 cfs 6.548 af
Outflow=46.61 cfs 6.488 af

Pond 7: Pond 7 Peak Elev=1,244.89' Storage=6.400 af Inflow=59.38 cfs 26.208 af
Outflow=49.54 cfs 25.186 af

Pond 8: Pond 8 Peak Elev=1,247.06' Storage=0.504 af Inflow=15.63 cfs 1.093 af
Outflow=3.64 cfs 1.074 af

Total Runoff Area = 627.101 ac Runoff Volume = 201.072 af Average Runoff Depth = 3.85"
98.48% Pervious = 617.559 ac 1.52% Impervious = 9.542 ac

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 1aPS:

Runoff = 30.63 cfs @ 13.58 hrs, Volume= 8.620 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

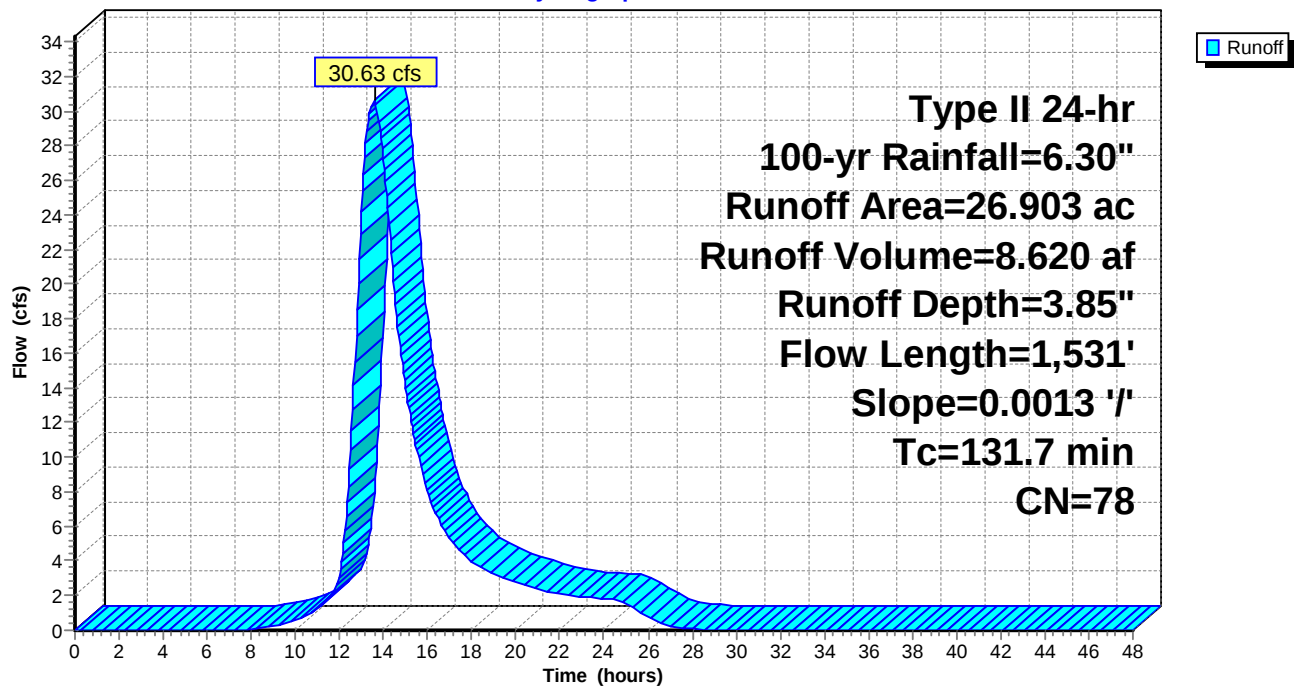
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
26.622	78	Meadow, non-grazed, HSG D
0.281	98	Paved parking, HSG D
26.903	78	Weighted Average
26.622		98.96% Pervious Area
0.281		1.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
131.7	1,531	0.0013	0.19		Lag/CN Method,

Subcatchment 1aPS:

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 1bPS:

Runoff = 81.41 cfs @ 13.46 hrs, Volume= 22.051 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

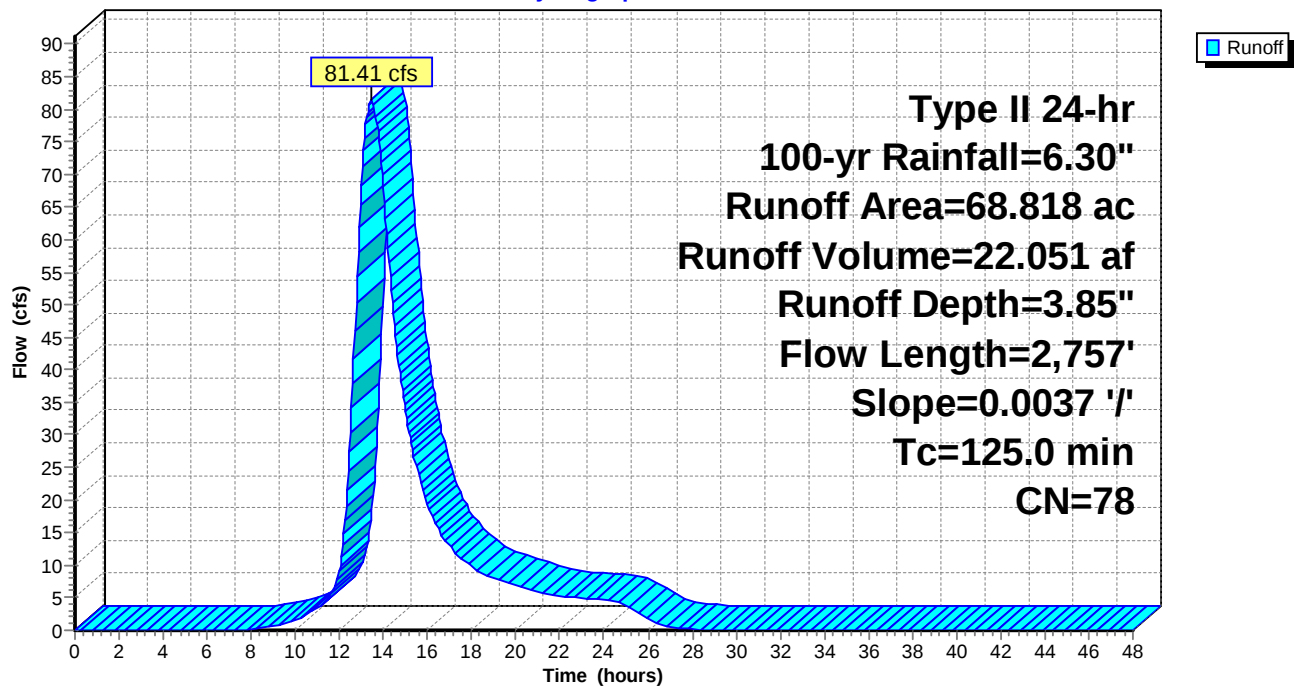
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
67.619	78	Meadow, non-grazed, HSG D
1.199	98	Paved parking, HSG D
68.818	78	Weighted Average
67.619		98.26% Pervious Area
1.199		1.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
125.0	2,757	0.0037	0.37		Lag/CN Method,

Subcatchment 1bPS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 2PS:

Runoff = 127.54 cfs @ 17.46 hrs, Volume= 89.848 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

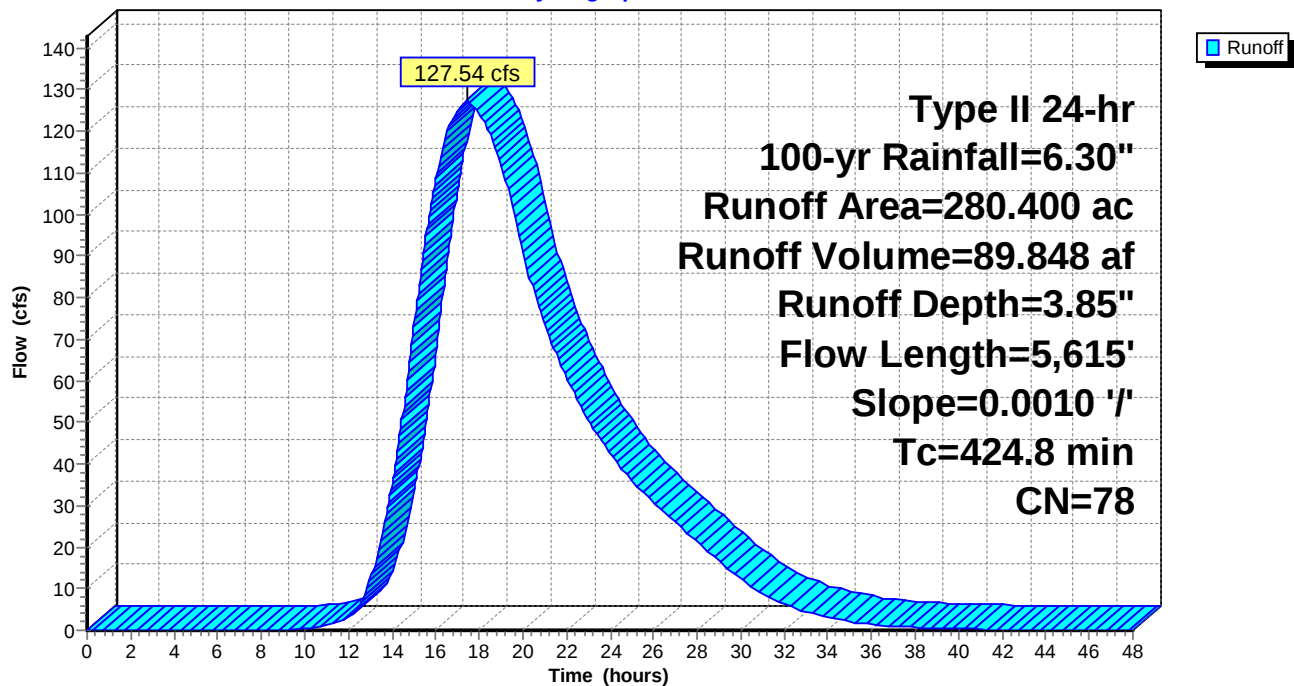
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
275.465	78	Meadow, non-grazed, HSG D
4.935	98	Paved parking, HSG D
280.400	78	Weighted Average
275.465		98.24% Pervious Area
4.935		1.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
424.8	5,615	0.0010	0.22		Lag/CN Method,

Subcatchment 2PS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 3aPS:

Runoff = 23.83 cfs @ 13.01 hrs, Volume= 5.015 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

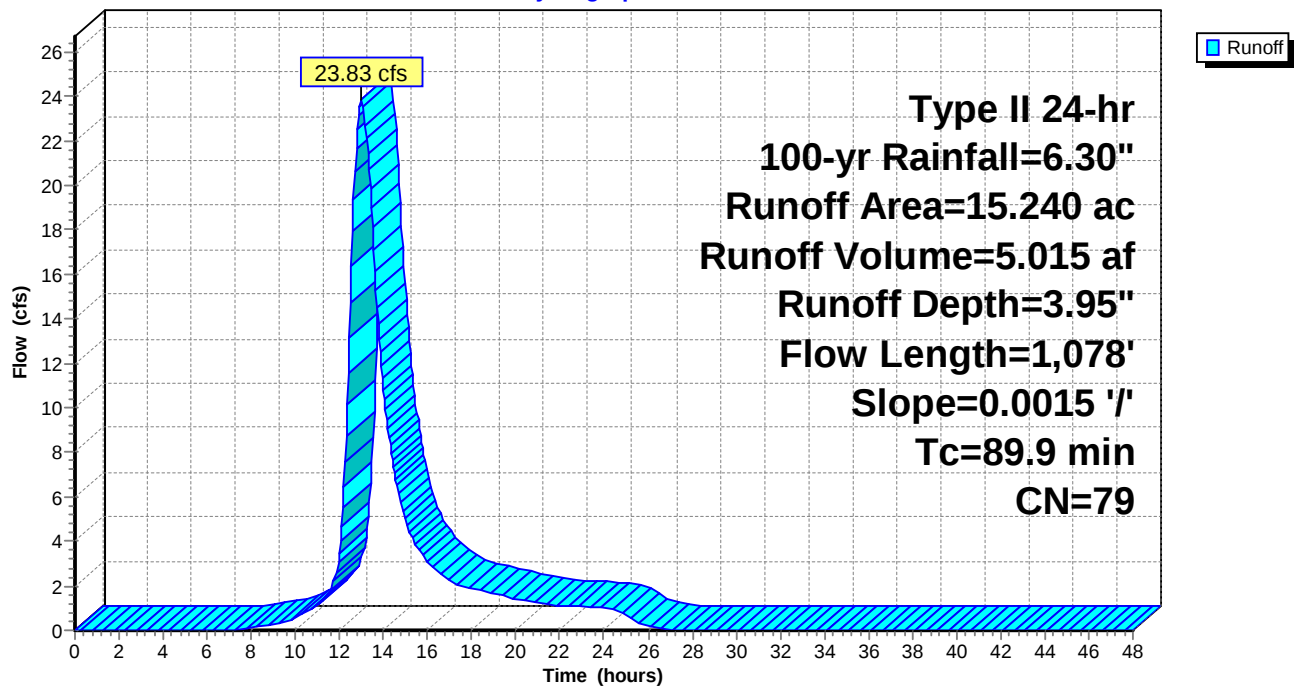
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
14.738	78	Meadow, non-grazed, HSG D
0.502	98	Paved parking, HSG D
15.240	79	Weighted Average
14.738		96.71% Pervious Area
0.502		3.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
89.9	1,078	0.0015	0.20		Lag/CN Method,

Subcatchment 3aPS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 3bPS:

Runoff = 85.61 cfs @ 14.28 hrs, Volume= 31.438 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

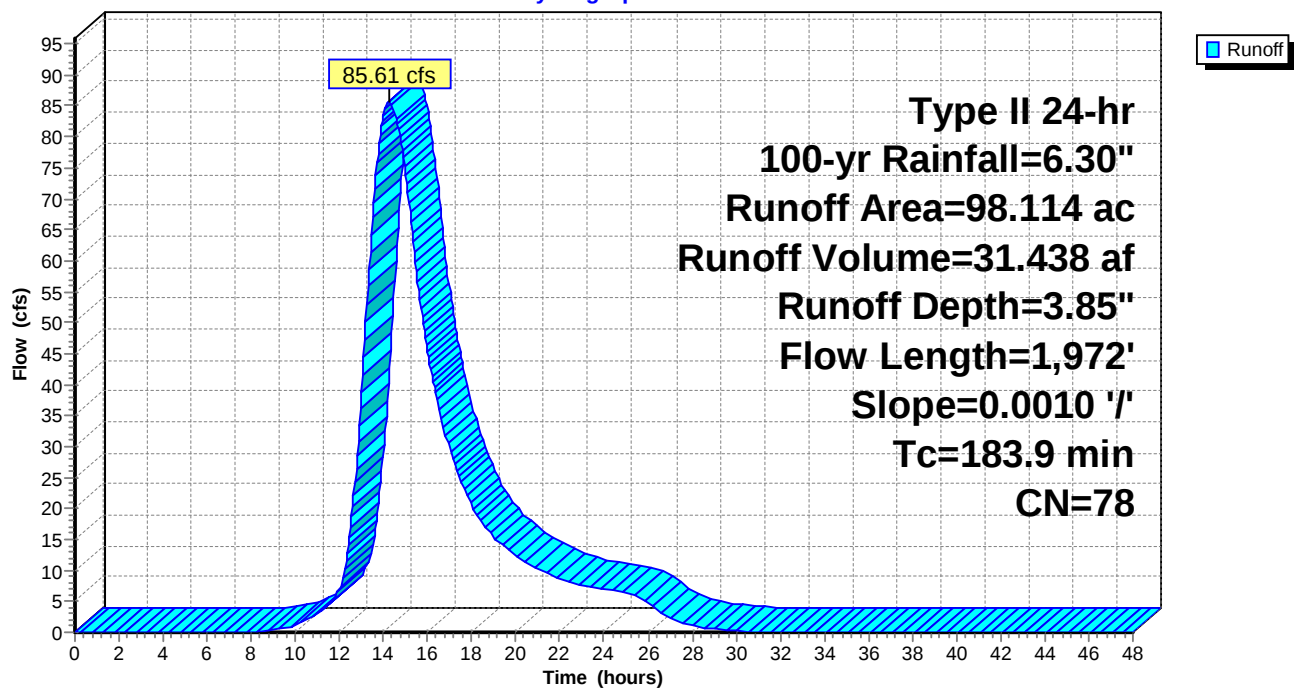
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
97.086	78	Meadow, non-grazed, HSG D
1.028	98	Paved parking, HSG D
98.114	78	Weighted Average
97.086		98.95% Pervious Area
1.028		1.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
183.9	1,972	0.0010	0.18		Lag/CN Method,

Subcatchment 3bPS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 4PS:

Runoff = 26.57 cfs @ 12.81 hrs, Volume= 4.866 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

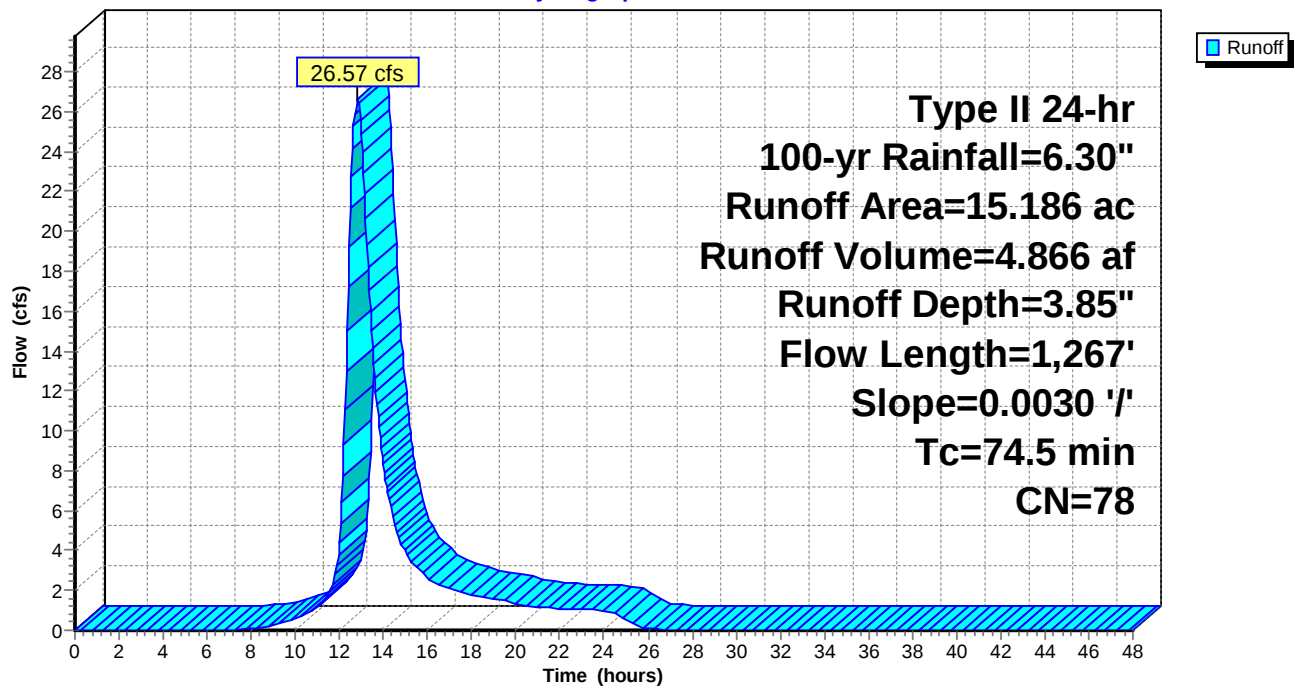
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
14.850	78	Meadow, non-grazed, HSG D
0.336	98	Paved parking, HSG D
15.186	78	Weighted Average
14.850		97.79% Pervious Area
0.336		2.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
74.5	1,267	0.0030	0.28		Lag/CN Method,

Subcatchment 4PS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 5PS:

Runoff = 62.93 cfs @ 12.18 hrs, Volume= 5.384 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

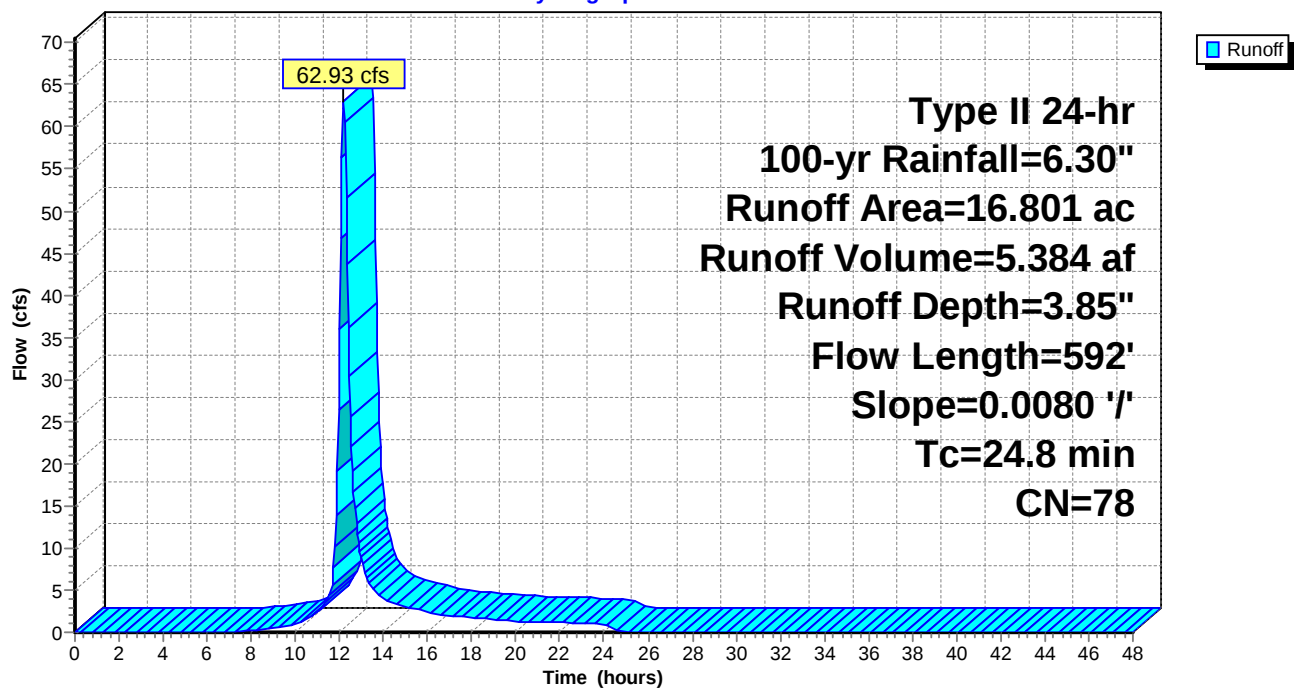
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
16.529	78	Meadow, non-grazed, HSG D
0.272	98	Paved parking, HSG D
16.801	78	Weighted Average
16.529		98.38% Pervious Area
0.272		1.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	592	0.0080	0.40		Lag/CN Method,

Subcatchment 5PS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 6PS:

Runoff = 51.56 cfs @ 12.42 hrs, Volume= 6.548 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

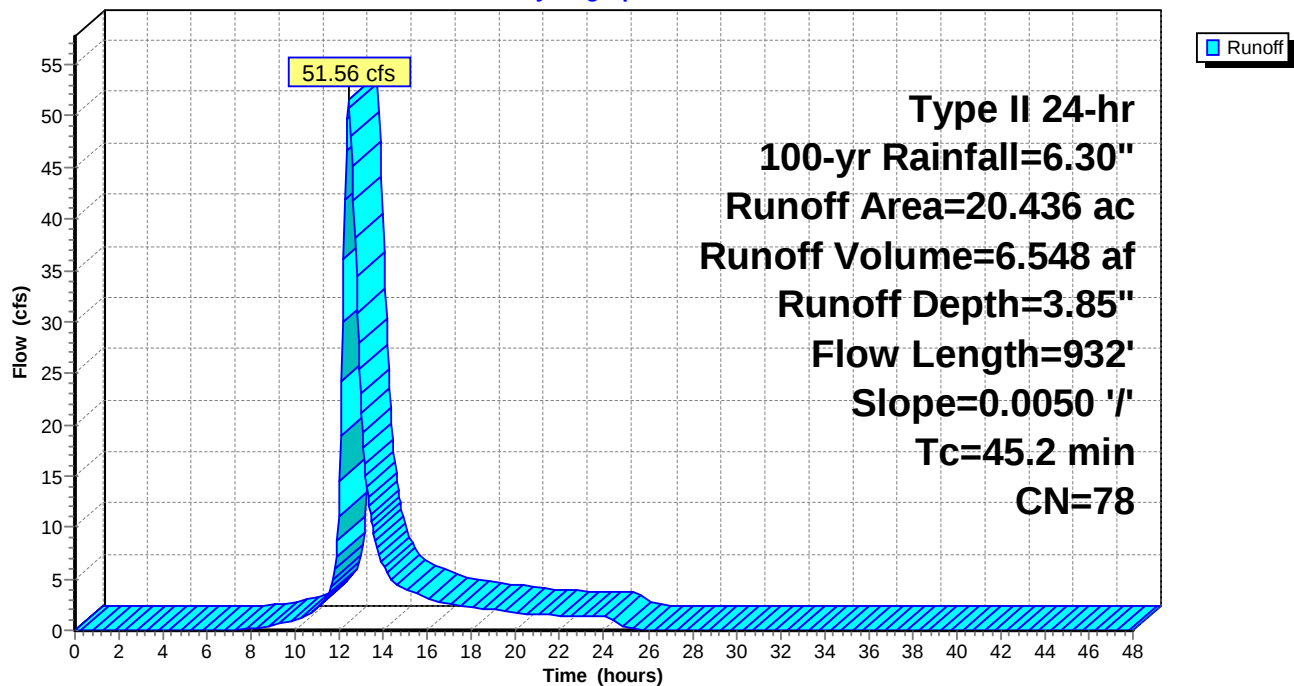
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
20.350	78	Meadow, non-grazed, HSG D
0.086	98	Paved parking, HSG D
20.436	78	Weighted Average
20.350		99.58% Pervious Area
0.086		0.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
45.2	932	0.0050	0.34		Lag/CN Method,

Subcatchment 6PS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 7PS:

Runoff = 59.38 cfs @ 14.93 hrs, Volume= 26.208 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

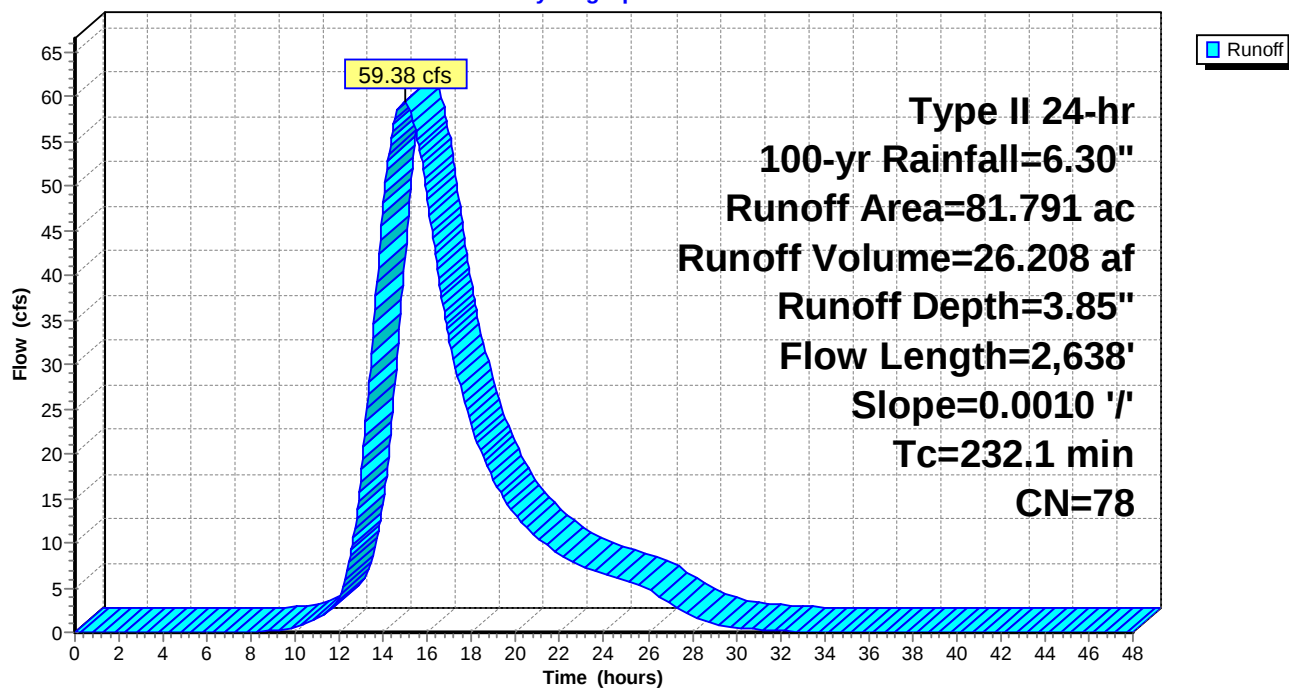
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
80.888	78	Meadow, non-grazed, HSG D
0.903	98	Paved parking, HSG D
81.791	78	Weighted Average
80.888		98.90% Pervious Area
0.903		1.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
232.1	2,638	0.0010	0.19		Lag/CN Method,

Subcatchment 7PS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Subcatchment 8PS:

Runoff = 15.63 cfs @ 12.10 hrs, Volume= 1.093 af, Depth= 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

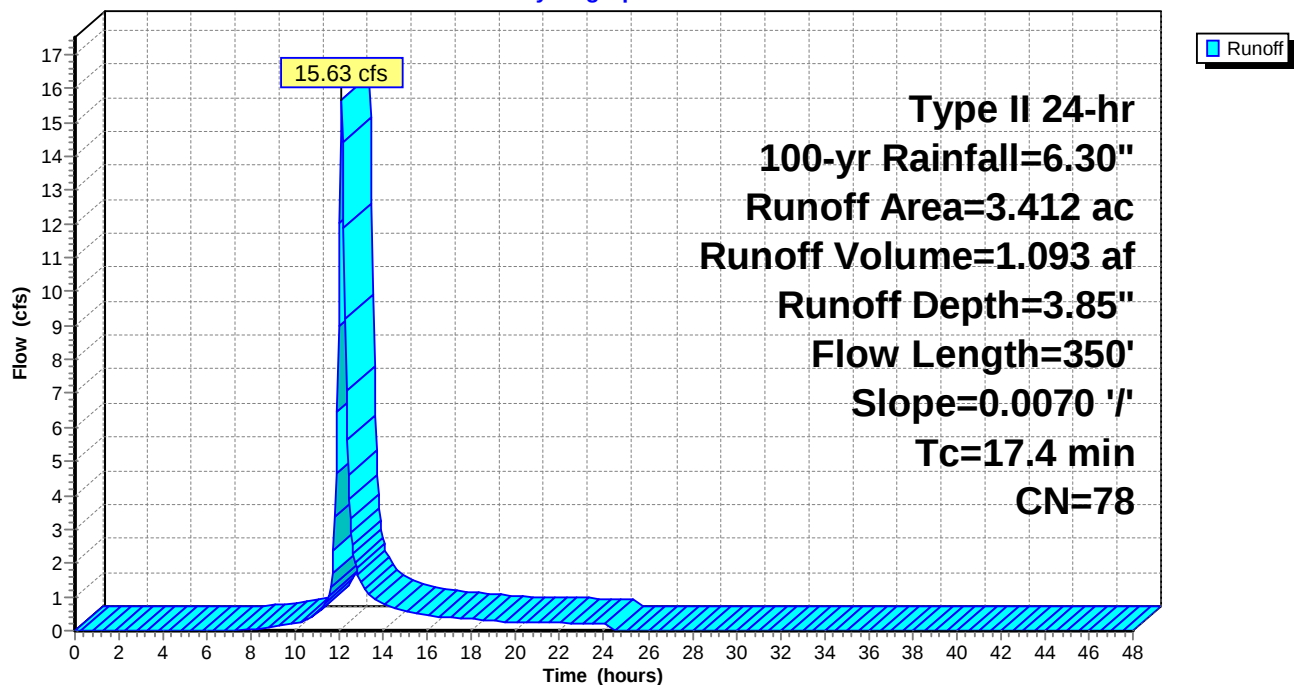
Type II 24-hr 100-yr Rainfall=6.30"

Area (ac)	CN	Description
3.412	78	Meadow, non-grazed, HSG D
3.412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	350	0.0070	0.33		Lag/CN Method,

Subcatchment 8PS:

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 1a: Pond 1a

Inflow Area = 26.903 ac, 1.04% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 30.63 cfs @ 13.58 hrs, Volume= 8.620 af
 Outflow = 14.12 cfs @ 14.99 hrs, Volume= 8.504 af, Atten= 54%, Lag= 84.2 min
 Primary = 14.12 cfs @ 14.99 hrs, Volume= 8.504 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,244.36' @ 14.99 hrs Surf.Area= 12.014 ac Storage= 3.387 af

Plug-Flow detention time= 203.4 min calculated for 8.495 af (99% of inflow)
 Center-of-Mass det. time= 195.8 min (1,126.0 - 930.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,243.00'	17.341 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,243.00	0.987	0.000	0.000
1,244.00	1.085	1.036	1.036
1,245.00	31.525	16.305	17.341

Device	Routing	Invert	Outlet Devices
#1	Primary	1,243.00'	12.0" Round Culvert L= 85.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,243.00' / 1,242.15' S= 0.0100 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,244.00'	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

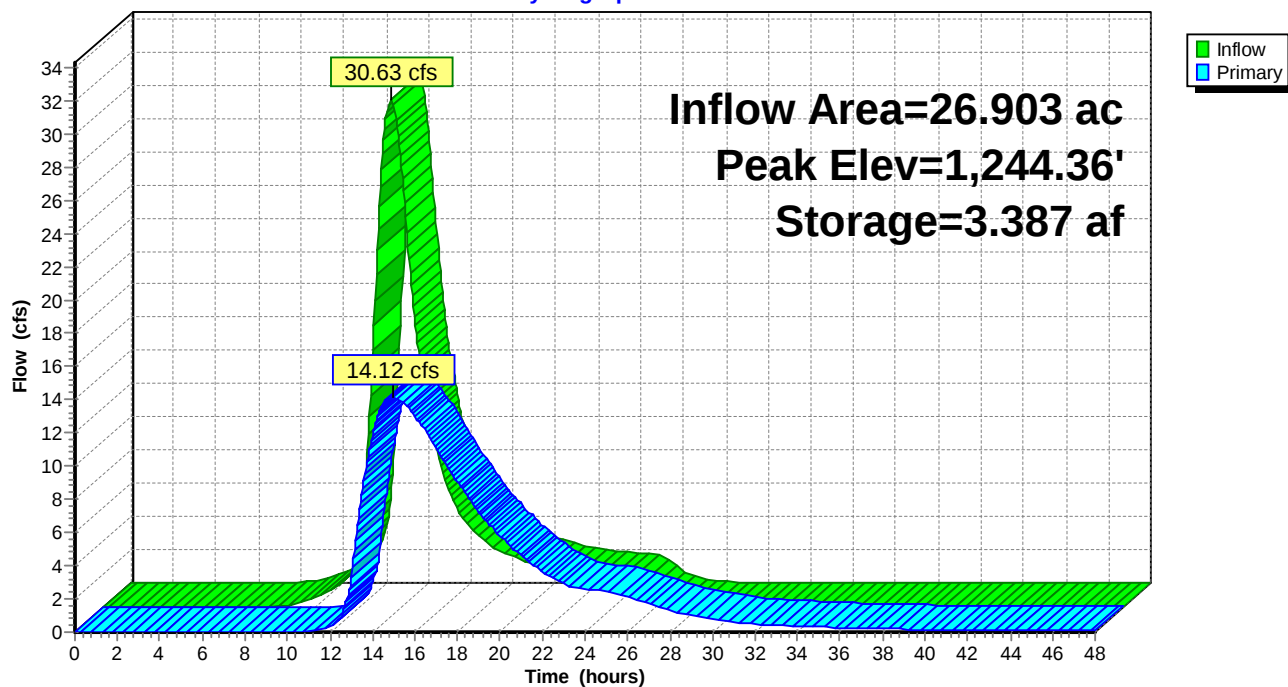
Primary OutFlow Max=14.12 cfs @ 14.99 hrs HW=1,244.36' (Free Discharge)

↑ **1=Culvert** (Inlet Controls 3.50 cfs @ 4.46 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 10.61 cfs @ 1.48 fps)

Pond 1a: Pond 1a

Hydrograph



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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 1a: Pond 1a

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,243.00	0.00	1,243.54	1.08	1,244.08	3.94	1,244.62	30.28
1,243.01	0.00	1,243.55	1.12	1,244.09	4.17	1,244.63	30.92
1,243.02	0.00	1,243.56	1.15	1,244.10	4.41	1,244.64	31.57
1,243.03	0.00	1,243.57	1.19	1,244.11	4.66	1,244.65	32.22
1,243.04	0.01	1,243.58	1.22	1,244.12	4.92	1,244.66	32.88
1,243.05	0.01	1,243.59	1.26	1,244.13	5.20	1,244.67	33.54
1,243.06	0.01	1,243.60	1.30	1,244.14	5.48	1,244.68	34.20
1,243.07	0.02	1,243.61	1.33	1,244.15	5.77	1,244.69	34.87
1,243.08	0.03	1,243.62	1.37	1,244.16	6.07	1,244.70	35.55
1,243.09	0.03	1,243.63	1.41	1,244.17	6.38	1,244.71	36.23
1,243.10	0.04	1,243.64	1.45	1,244.18	6.69	1,244.72	36.91
1,243.11	0.05	1,243.65	1.48	1,244.19	7.02	1,244.73	37.60
1,243.12	0.06	1,243.66	1.52	1,244.20	7.35	1,244.74	38.29
1,243.13	0.07	1,243.67	1.56	1,244.21	7.71	1,244.75	38.98
1,243.14	0.09	1,243.68	1.60	1,244.22	8.07	1,244.76	39.68
1,243.15	0.10	1,243.69	1.63	1,244.23	8.45	1,244.77	40.39
1,243.16	0.11	1,243.70	1.67	1,244.24	8.83	1,244.78	41.09
1,243.17	0.12	1,243.71	1.71	1,244.25	9.23	1,244.79	41.81
1,243.18	0.14	1,243.72	1.75	1,244.26	9.63	1,244.80	42.52
1,243.19	0.15	1,243.73	1.79	1,244.27	10.04	1,244.81	43.25
1,243.20	0.17	1,243.74	1.83	1,244.28	10.46	1,244.82	43.99
1,243.21	0.19	1,243.75	1.86	1,244.29	10.89	1,244.83	44.74
1,243.22	0.20	1,243.76	1.90	1,244.30	11.34	1,244.84	45.48
1,243.23	0.22	1,243.77	1.94	1,244.31	11.78	1,244.85	46.23
1,243.24	0.24	1,243.78	1.98	1,244.32	12.24	1,244.86	46.99
1,243.25	0.26	1,243.79	2.01	1,244.33	12.71	1,244.87	47.75
1,243.26	0.28	1,243.80	2.05	1,244.34	13.19	1,244.88	48.51
1,243.27	0.30	1,243.81	2.09	1,244.35	13.67	1,244.89	49.28
1,243.28	0.32	1,243.82	2.13	1,244.36	14.17	1,244.90	50.06
1,243.29	0.35	1,243.83	2.16	1,244.37	14.67	1,244.91	50.83
1,243.30	0.37	1,243.84	2.20	1,244.38	15.18	1,244.92	51.61
1,243.31	0.39	1,243.85	2.23	1,244.39	15.71	1,244.93	52.40
1,243.32	0.42	1,243.86	2.27	1,244.40	16.24	1,244.94	53.19
1,243.33	0.44	1,243.87	2.30	1,244.41	16.79	1,244.95	53.98
1,243.34	0.47	1,243.88	2.34	1,244.42	17.35	1,244.96	54.78
1,243.35	0.49	1,243.89	2.37	1,244.43	17.91	1,244.97	55.58
1,243.36	0.52	1,243.90	2.40	1,244.44	18.49	1,244.98	56.39
1,243.37	0.55	1,243.91	2.44	1,244.45	19.08	1,244.99	57.20
1,243.38	0.57	1,243.92	2.47	1,244.46	19.68	1,245.00	58.01
1,243.39	0.60	1,243.93	2.50	1,244.47	20.29		
1,243.40	0.63	1,243.94	2.53	1,244.48	20.90		
1,243.41	0.66	1,243.95	2.56	1,244.49	21.52		
1,243.42	0.69	1,243.96	2.58	1,244.50	22.15		
1,243.43	0.72	1,243.97	2.61	1,244.51	22.80		
1,243.44	0.75	1,243.98	2.63	1,244.52	23.45		
1,243.45	0.78	1,243.99	2.66	1,244.53	24.11		
1,243.46	0.81	1,244.00	2.67	1,244.54	24.78		
1,243.47	0.85	1,244.01	2.75	1,244.55	25.46		
1,243.48	0.88	1,244.02	2.86	1,244.56	26.15		
1,243.49	0.91	1,244.03	3.00	1,244.57	26.85		
1,243.50	0.95	1,244.04	3.15	1,244.58	27.56		
1,243.51	0.98	1,244.05	3.33	1,244.59	28.27		
1,243.52	1.01	1,244.06	3.52	1,244.60	29.00		
1,243.53	1.05	1,244.07	3.72	1,244.61	29.64		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 1a: Pond 1a

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,243.00	0.987	0.000	1,244.08	3.520	1.220
1,243.02	0.989	0.020	1,244.10	4.129	1.297
1,243.04	0.991	0.040	1,244.12	4.738	1.385
1,243.06	0.993	0.059	1,244.14	5.347	1.486
1,243.08	0.995	0.079	1,244.16	5.955	1.599
1,243.10	0.997	0.099	1,244.18	6.564	1.724
1,243.12	0.999	0.119	1,244.20	7.173	1.862
1,243.14	1.001	0.139	1,244.22	7.782	2.011
1,243.16	1.003	0.159	1,244.24	8.391	2.173
1,243.18	1.005	0.179	1,244.26	8.999	2.347
1,243.20	1.007	0.199	1,244.28	9.608	2.533
1,243.22	1.009	0.220	1,244.30	10.217	2.731
1,243.24	1.011	0.240	1,244.32	10.826	2.942
1,243.26	1.012	0.260	1,244.34	11.435	3.164
1,243.28	1.014	0.280	1,244.36	12.043	3.399
1,243.30	1.016	0.301	1,244.38	12.652	3.646
1,243.32	1.018	0.321	1,244.40	13.261	3.905
1,243.34	1.020	0.341	1,244.42	13.870	4.177
1,243.36	1.022	0.362	1,244.44	14.479	4.460
1,243.38	1.024	0.382	1,244.46	15.087	4.756
1,243.40	1.026	0.403	1,244.48	15.696	5.063
1,243.42	1.028	0.423	1,244.50	16.305	5.383
1,243.44	1.030	0.444	1,244.52	16.914	5.716
1,243.46	1.032	0.464	1,244.54	17.523	6.060
1,243.48	1.034	0.485	1,244.56	18.131	6.417
1,243.50	1.036	0.506	1,244.58	18.740	6.785
1,243.52	1.038	0.526	1,244.60	19.349	7.166
1,243.54	1.040	0.547	1,244.62	19.958	7.559
1,243.56	1.042	0.568	1,244.64	20.567	7.965
1,243.58	1.044	0.589	1,244.66	21.175	8.382
1,243.60	1.046	0.610	1,244.68	21.784	8.812
1,243.62	1.048	0.631	1,244.70	22.393	9.253
1,243.64	1.050	0.652	1,244.72	23.002	9.707
1,243.66	1.052	0.673	1,244.74	23.611	10.173
1,243.68	1.054	0.694	1,244.76	24.219	10.652
1,243.70	1.056	0.715	1,244.78	24.828	11.142
1,243.72	1.058	0.736	1,244.80	25.437	11.645
1,243.74	1.060	0.757	1,244.82	26.046	12.160
1,243.76	1.061	0.778	1,244.84	26.655	12.687
1,243.78	1.063	0.800	1,244.86	27.263	13.226
1,243.80	1.065	0.821	1,244.88	27.872	13.777
1,243.82	1.067	0.842	1,244.90	28.481	14.341
1,243.84	1.069	0.864	1,244.92	29.090	14.916
1,243.86	1.071	0.885	1,244.94	29.699	15.504
1,243.88	1.073	0.907	1,244.96	30.307	16.104
1,243.90	1.075	0.928	1,244.98	30.916	16.717
1,243.92	1.077	0.950	1,245.00	31.525	17.341
1,243.94	1.079	0.971			
1,243.96	1.081	0.993			
1,243.98	1.083	1.014			
1,244.00	1.085	1.036			
1,244.02	1.694	1.064			
1,244.04	2.303	1.104			
1,244.06	2.911	1.156			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 1b: Pond 1b

Inflow Area = 68.818 ac, 1.74% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 81.41 cfs @ 13.46 hrs, Volume= 22.051 af
 Outflow = 34.40 cfs @ 14.96 hrs, Volume= 21.639 af, Atten= 58%, Lag= 90.2 min
 Primary = 34.40 cfs @ 14.96 hrs, Volume= 21.639 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,244.68' @ 14.96 hrs Surf.Area= 19.363 ac Storage= 9.134 af

Plug-Flow detention time= 223.4 min calculated for 21.617 af (98% of inflow)
 Center-of-Mass det. time= 212.8 min (1,136.7 - 923.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,243.00'	16.548 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,243.00	1.819	0.000	0.000
1,244.00	1.912	1.865	1.865
1,245.00	27.453	14.682	16.548

Device	Routing	Invert	Outlet Devices
#1	Primary	1,243.00'	12.0" Round Culvert L= 111.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,243.00' / 1,241.89' S= 0.0100 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,244.00'	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=34.39 cfs @ 14.96 hrs HW=1,244.68' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.99 cfs @ 5.08 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 30.40 cfs @ 2.22 fps)

2021-03-16 Hayward Basin Sizing

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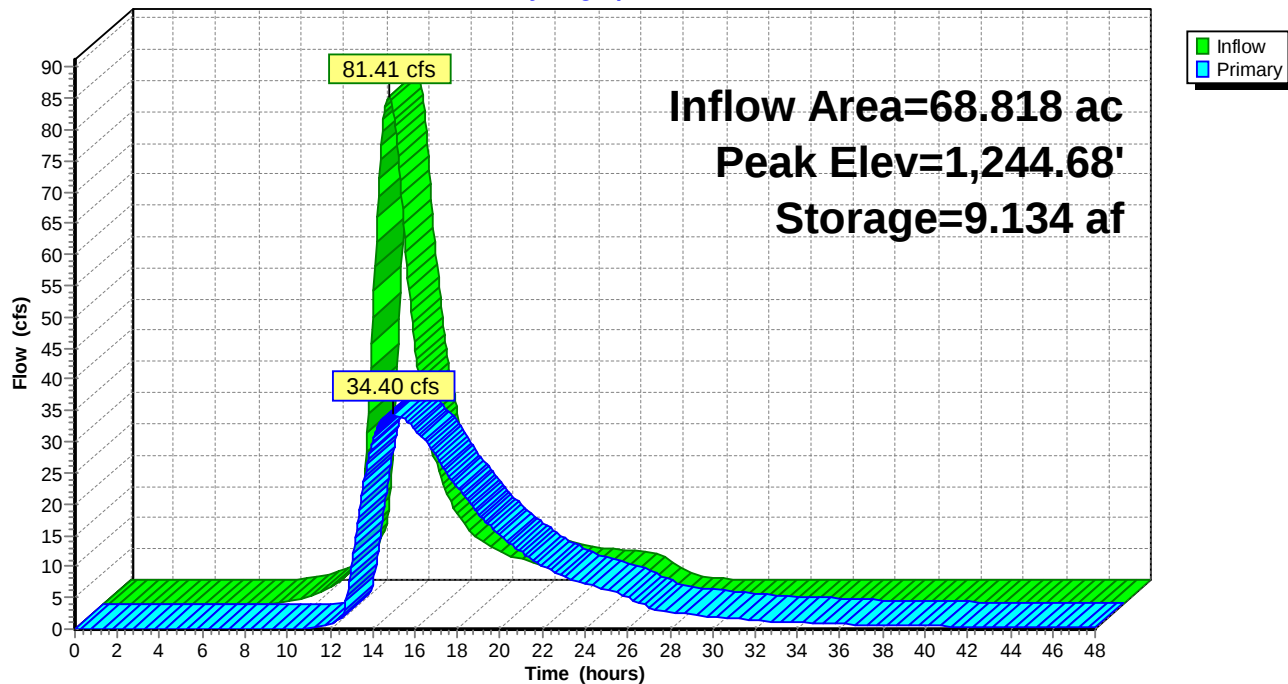
Type II 24-hr 100-yr Rainfall=6.30"

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Pond 1b: Pond 1b

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,243.00	0.00	1,243.54	1.08	1,244.08	3.94	1,244.62	30.26
1,243.01	0.00	1,243.55	1.12	1,244.09	4.17	1,244.63	30.91
1,243.02	0.00	1,243.56	1.15	1,244.10	4.41	1,244.64	31.55
1,243.03	0.00	1,243.57	1.19	1,244.11	4.66	1,244.65	32.20
1,243.04	0.01	1,243.58	1.22	1,244.12	4.92	1,244.66	32.86
1,243.05	0.01	1,243.59	1.26	1,244.13	5.20	1,244.67	33.52
1,243.06	0.01	1,243.60	1.30	1,244.14	5.48	1,244.68	34.18
1,243.07	0.02	1,243.61	1.33	1,244.15	5.77	1,244.69	34.85
1,243.08	0.03	1,243.62	1.37	1,244.16	6.07	1,244.70	35.52
1,243.09	0.03	1,243.63	1.41	1,244.17	6.38	1,244.71	36.20
1,243.10	0.04	1,243.64	1.45	1,244.18	6.69	1,244.72	36.88
1,243.11	0.05	1,243.65	1.48	1,244.19	7.02	1,244.73	37.56
1,243.12	0.06	1,243.66	1.52	1,244.20	7.35	1,244.74	38.25
1,243.13	0.07	1,243.67	1.56	1,244.21	7.71	1,244.75	38.95
1,243.14	0.09	1,243.68	1.60	1,244.22	8.07	1,244.76	39.64
1,243.15	0.10	1,243.69	1.63	1,244.23	8.45	1,244.77	40.34
1,243.16	0.11	1,243.70	1.67	1,244.24	8.83	1,244.78	41.05
1,243.17	0.12	1,243.71	1.71	1,244.25	9.23	1,244.79	41.76
1,243.18	0.14	1,243.72	1.75	1,244.26	9.63	1,244.80	42.47
1,243.19	0.15	1,243.73	1.79	1,244.27	10.04	1,244.81	43.21
1,243.20	0.17	1,243.74	1.83	1,244.28	10.46	1,244.82	43.94
1,243.21	0.19	1,243.75	1.86	1,244.29	10.89	1,244.83	44.68
1,243.22	0.20	1,243.76	1.90	1,244.30	11.34	1,244.84	45.43
1,243.23	0.22	1,243.77	1.94	1,244.31	11.78	1,244.85	46.18
1,243.24	0.24	1,243.78	1.98	1,244.32	12.24	1,244.86	46.93
1,243.25	0.26	1,243.79	2.01	1,244.33	12.71	1,244.87	47.69
1,243.26	0.28	1,243.80	2.05	1,244.34	13.19	1,244.88	48.45
1,243.27	0.30	1,243.81	2.09	1,244.35	13.67	1,244.89	49.22
1,243.28	0.32	1,243.82	2.13	1,244.36	14.17	1,244.90	49.99
1,243.29	0.35	1,243.83	2.16	1,244.37	14.67	1,244.91	50.77
1,243.30	0.37	1,243.84	2.20	1,244.38	15.18	1,244.92	51.55
1,243.31	0.39	1,243.85	2.23	1,244.39	15.71	1,244.93	52.33
1,243.32	0.42	1,243.86	2.27	1,244.40	16.24	1,244.94	53.12
1,243.33	0.44	1,243.87	2.30	1,244.41	16.79	1,244.95	53.91
1,243.34	0.47	1,243.88	2.34	1,244.42	17.35	1,244.96	54.71
1,243.35	0.49	1,243.89	2.37	1,244.43	17.91	1,244.97	55.51
1,243.36	0.52	1,243.90	2.40	1,244.44	18.49	1,244.98	56.31
1,243.37	0.55	1,243.91	2.44	1,244.45	19.08	1,244.99	57.12
1,243.38	0.57	1,243.92	2.47	1,244.46	19.68	1,245.00	57.93
1,243.39	0.60	1,243.93	2.50	1,244.47	20.29		
1,243.40	0.63	1,243.94	2.53	1,244.48	20.90		
1,243.41	0.66	1,243.95	2.56	1,244.49	21.53		
1,243.42	0.69	1,243.96	2.58	1,244.50	22.17		
1,243.43	0.72	1,243.97	2.61	1,244.51	22.81		
1,243.44	0.75	1,243.98	2.63	1,244.52	23.46		
1,243.45	0.78	1,243.99	2.66	1,244.53	24.11		
1,243.46	0.81	1,244.00	2.67	1,244.54	24.78		
1,243.47	0.85	1,244.01	2.75	1,244.55	25.46		
1,243.48	0.88	1,244.02	2.86	1,244.56	26.15		
1,243.49	0.91	1,244.03	3.00	1,244.57	26.84		
1,243.50	0.95	1,244.04	3.15	1,244.58	27.55		
1,243.51	0.98	1,244.05	3.33	1,244.59	28.27		
1,243.52	1.01	1,244.06	3.52	1,244.60	29.00		
1,243.53	1.05	1,244.07	3.72	1,244.61	29.63		

2021-03-16 Hayward Basin Sizing

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Stage-Area-Storage for Pond 1b: Pond 1b

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,243.00	1.819	0.000	1,244.08	3.955	2.100
1,243.02	1.821	0.036	1,244.10	4.466	2.184
1,243.04	1.823	0.073	1,244.12	4.977	2.279
1,243.06	1.825	0.109	1,244.14	5.488	2.383
1,243.08	1.826	0.146	1,244.16	5.999	2.498
1,243.10	1.828	0.182	1,244.18	6.509	2.623
1,243.12	1.830	0.219	1,244.20	7.020	2.759
1,243.14	1.832	0.256	1,244.22	7.531	2.904
1,243.16	1.834	0.292	1,244.24	8.042	3.060
1,243.18	1.836	0.329	1,244.26	8.553	3.226
1,243.20	1.838	0.366	1,244.28	9.063	3.402
1,243.22	1.839	0.402	1,244.30	9.574	3.588
1,243.24	1.841	0.439	1,244.32	10.085	3.785
1,243.26	1.843	0.476	1,244.34	10.596	3.992
1,243.28	1.845	0.513	1,244.36	11.107	4.209
1,243.30	1.847	0.550	1,244.38	11.618	4.436
1,243.32	1.849	0.587	1,244.40	12.128	4.674
1,243.34	1.851	0.624	1,244.42	12.639	4.921
1,243.36	1.852	0.661	1,244.44	13.150	5.179
1,243.38	1.854	0.698	1,244.46	13.661	5.447
1,243.40	1.856	0.735	1,244.48	14.172	5.726
1,243.42	1.858	0.772	1,244.50	14.682	6.014
1,243.44	1.860	0.809	1,244.52	15.193	6.313
1,243.46	1.862	0.847	1,244.54	15.704	6.622
1,243.48	1.864	0.884	1,244.56	16.215	6.941
1,243.50	1.865	0.921	1,244.58	16.726	7.270
1,243.52	1.867	0.958	1,244.60	17.237	7.610
1,243.54	1.869	0.996	1,244.62	17.747	7.960
1,243.56	1.871	1.033	1,244.64	18.258	8.320
1,243.58	1.873	1.071	1,244.66	18.769	8.690
1,243.60	1.875	1.108	1,244.68	19.280	9.071
1,243.62	1.877	1.146	1,244.70	19.791	9.461
1,243.64	1.879	1.183	1,244.72	20.302	9.862
1,243.66	1.880	1.221	1,244.74	20.812	10.274
1,243.68	1.882	1.258	1,244.76	21.323	10.695
1,243.70	1.884	1.296	1,244.78	21.834	11.126
1,243.72	1.886	1.334	1,244.80	22.345	11.568
1,243.74	1.888	1.372	1,244.82	22.856	12.020
1,243.76	1.890	1.409	1,244.84	23.366	12.482
1,243.78	1.892	1.447	1,244.86	23.877	12.955
1,243.80	1.893	1.485	1,244.88	24.388	13.438
1,243.82	1.895	1.523	1,244.90	24.899	13.930
1,243.84	1.897	1.561	1,244.92	25.410	14.433
1,243.86	1.899	1.599	1,244.94	25.921	14.947
1,243.88	1.901	1.637	1,244.96	26.431	15.470
1,243.90	1.903	1.675	1,244.98	26.942	16.004
1,243.92	1.905	1.713	1,245.00	27.453	16.548
1,243.94	1.906	1.751			
1,243.96	1.908	1.789			
1,243.98	1.910	1.827			
1,244.00	1.912	1.865			
1,244.02	2.423	1.909			
1,244.04	2.934	1.962			
1,244.06	3.444	2.026			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 2: Pond 2

Inflow Area = 280.400 ac, 1.76% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 127.54 cfs @ 17.46 hrs, Volume= 89.848 af
 Outflow = 49.92 cfs @ 23.08 hrs, Volume= 86.029 af, Atten= 61%, Lag= 337.3 min
 Primary = 49.92 cfs @ 23.08 hrs, Volume= 86.029 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,244.60' @ 23.08 hrs Surf.Area= 116.887 ac Storage= 43.569 af

Plug-Flow detention time= 500.5 min calculated for 85.939 af (96% of inflow)
 Center-of-Mass det. time= 469.6 min (1,670.9 - 1,201.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,243.00'	104.185 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,243.00	3.041	0.000	0.000
1,244.00	8.511	5.776	5.776
1,245.00	188.307	98.409	104.185

Device	Routing	Invert	Outlet Devices
#1	Primary	1,243.00'	12.0" Round Culvert L= 30.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,243.00' / 1,242.70' S= 0.0100 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,243.70'	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=49.92 cfs @ 23.08 hrs HW=1,244.60' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.95 cfs @ 5.02 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 45.98 cfs @ 2.55 fps)

2021-03-16 Hayward Basin Sizing

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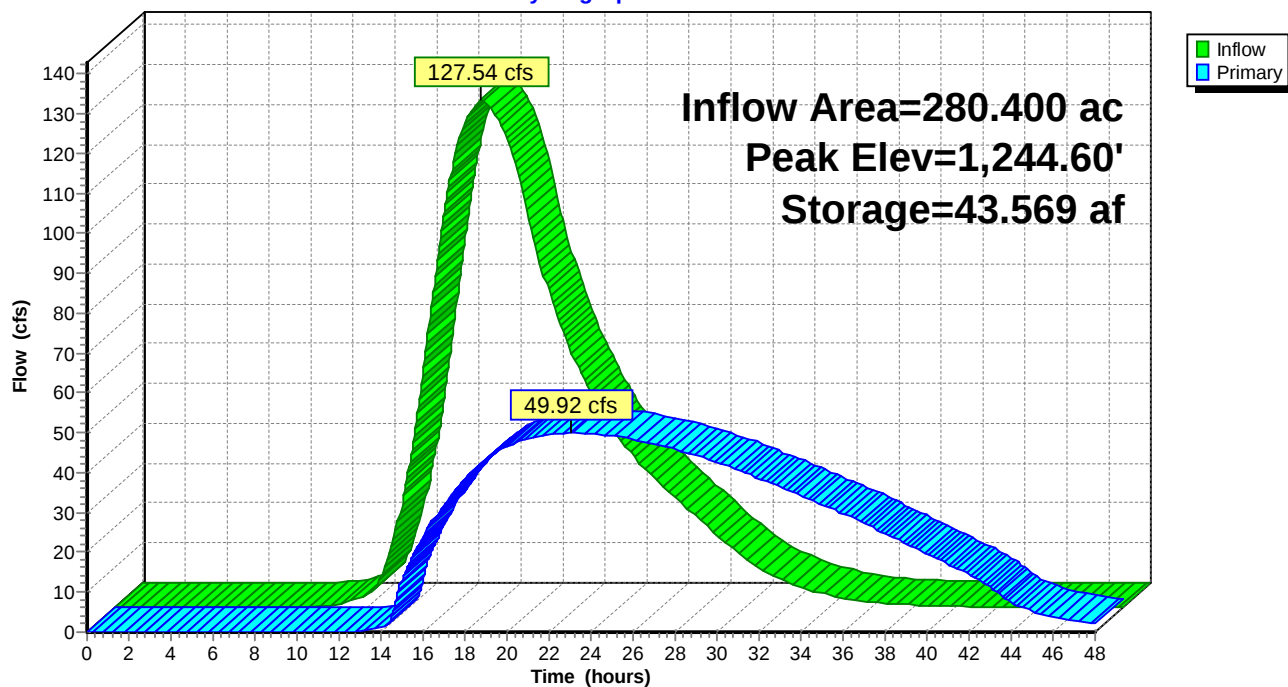
Type II 24-hr 100-yr Rainfall=6.30"

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Pond 2: Pond 2

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 2: Pond 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,243.00	0.00	1,243.54	1.00	1,244.08	14.47	1,244.62	51.28
1,243.01	0.00	1,243.55	1.04	1,244.09	15.01	1,244.63	52.08
1,243.02	0.00	1,243.56	1.07	1,244.10	15.55	1,244.64	52.88
1,243.03	0.00	1,243.57	1.10	1,244.11	16.11	1,244.65	53.68
1,243.04	0.01	1,243.58	1.13	1,244.12	16.68	1,244.66	54.49
1,243.05	0.01	1,243.59	1.16	1,244.13	17.25	1,244.67	55.30
1,243.06	0.01	1,243.60	1.20	1,244.14	17.84	1,244.68	56.11
1,243.07	0.02	1,243.61	1.23	1,244.15	18.44	1,244.69	56.92
1,243.08	0.03	1,243.62	1.26	1,244.16	19.04	1,244.70	57.74
1,243.09	0.03	1,243.63	1.30	1,244.17	19.66	1,244.71	58.55
1,243.10	0.04	1,243.64	1.33	1,244.18	20.28	1,244.72	59.35
1,243.11	0.05	1,243.65	1.36	1,244.19	20.91	1,244.73	60.16
1,243.12	0.06	1,243.66	1.40	1,244.20	21.55	1,244.74	60.97
1,243.13	0.07	1,243.67	1.43	1,244.21	22.20	1,244.75	61.79
1,243.14	0.08	1,243.68	1.46	1,244.22	22.86	1,244.76	62.61
1,243.15	0.09	1,243.69	1.50	1,244.23	23.53	1,244.77	63.43
1,243.16	0.11	1,243.70	1.53	1,244.24	24.20	1,244.78	64.26
1,243.17	0.12	1,243.71	1.61	1,244.25	24.89	1,244.79	65.09
1,243.18	0.13	1,243.72	1.73	1,244.26	25.58	1,244.80	65.92
1,243.19	0.15	1,243.73	1.88	1,244.27	26.28	1,244.81	66.75
1,243.20	0.17	1,243.74	2.05	1,244.28	26.99	1,244.82	67.59
1,243.21	0.18	1,243.75	2.23	1,244.29	27.71	1,244.83	68.43
1,243.22	0.20	1,243.76	2.43	1,244.30	28.43	1,244.84	69.28
1,243.23	0.22	1,243.77	2.64	1,244.31	29.06	1,244.85	70.13
1,243.24	0.23	1,243.78	2.87	1,244.32	29.68	1,244.86	70.98
1,243.25	0.25	1,243.79	3.11	1,244.33	30.30	1,244.87	71.83
1,243.26	0.27	1,243.80	3.36	1,244.34	30.93	1,244.88	72.69
1,243.27	0.29	1,243.81	3.63	1,244.35	31.59	1,244.89	73.55
1,243.28	0.31	1,243.82	3.90	1,244.36	32.26	1,244.90	74.41
1,243.29	0.33	1,243.83	4.18	1,244.37	32.94	1,244.91	75.29
1,243.30	0.36	1,243.84	4.48	1,244.38	33.62	1,244.92	76.17
1,243.31	0.38	1,243.85	4.78	1,244.39	34.30	1,244.93	77.05
1,243.32	0.40	1,243.86	5.09	1,244.40	34.98	1,244.94	77.94
1,243.33	0.42	1,243.87	5.41	1,244.41	35.67	1,244.95	78.83
1,243.34	0.45	1,243.88	5.74	1,244.42	36.37	1,244.96	79.73
1,243.35	0.47	1,243.89	6.08	1,244.43	37.07	1,244.97	80.63
1,243.36	0.50	1,243.90	6.42	1,244.44	37.77	1,244.98	81.53
1,243.37	0.52	1,243.91	6.79	1,244.45	38.48	1,244.99	82.43
1,243.38	0.55	1,243.92	7.17	1,244.46	39.19	1,245.00	83.34
1,243.39	0.57	1,243.93	7.56	1,244.47	39.90		
1,243.40	0.60	1,243.94	7.95	1,244.48	40.62		
1,243.41	0.62	1,243.95	8.36	1,244.49	41.34		
1,243.42	0.65	1,243.96	8.78	1,244.50	42.07		
1,243.43	0.68	1,243.97	9.20	1,244.51	42.81		
1,243.44	0.71	1,243.98	9.64	1,244.52	43.56		
1,243.45	0.73	1,243.99	10.08	1,244.53	44.31		
1,243.46	0.76	1,244.00	10.53	1,244.54	45.07		
1,243.47	0.79	1,244.01	10.99	1,244.55	45.83		
1,243.48	0.82	1,244.02	11.47	1,244.56	46.60		
1,243.49	0.85	1,244.03	11.95	1,244.57	47.37		
1,243.50	0.88	1,244.04	12.43	1,244.58	48.14		
1,243.51	0.91	1,244.05	12.93	1,244.59	48.92		
1,243.52	0.94	1,244.06	13.44	1,244.60	49.70		
1,243.53	0.97	1,244.07	13.95	1,244.61	50.49		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 2: Pond 2

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,243.00	3.041	0.000	1,244.08	22.895	7.032
1,243.02	3.150	0.062	1,244.10	26.491	7.526
1,243.04	3.260	0.126	1,244.12	30.087	8.092
1,243.06	3.369	0.192	1,244.14	33.682	8.730
1,243.08	3.479	0.261	1,244.16	37.278	9.439
1,243.10	3.588	0.331	1,244.18	40.874	10.221
1,243.12	3.697	0.404	1,244.20	44.470	11.074
1,243.14	3.807	0.479	1,244.22	48.066	11.999
1,243.16	3.916	0.557	1,244.24	51.662	12.997
1,243.18	4.026	0.636	1,244.26	55.258	14.066
1,243.20	4.135	0.718	1,244.28	58.854	15.207
1,243.22	4.244	0.801	1,244.30	62.450	16.420
1,243.24	4.354	0.887	1,244.32	66.046	17.705
1,243.26	4.463	0.976	1,244.34	69.642	19.062
1,243.28	4.573	1.066	1,244.36	73.238	20.491
1,243.30	4.682	1.158	1,244.38	76.833	21.991
1,243.32	4.791	1.253	1,244.40	80.429	23.564
1,243.34	4.901	1.350	1,244.42	84.025	25.209
1,243.36	5.010	1.449	1,244.44	87.621	26.925
1,243.38	5.120	1.551	1,244.46	91.217	28.713
1,243.40	5.229	1.654	1,244.48	94.813	30.574
1,243.42	5.338	1.760	1,244.50	98.409	32.506
1,243.44	5.448	1.868	1,244.52	102.005	34.510
1,243.46	5.557	1.978	1,244.54	105.601	36.586
1,243.48	5.667	2.090	1,244.56	109.197	38.734
1,243.50	5.776	2.204	1,244.58	112.793	40.954
1,243.52	5.885	2.321	1,244.60	116.389	43.246
1,243.54	5.995	2.440	1,244.62	119.985	45.610
1,243.56	6.104	2.561	1,244.64	123.580	48.045
1,243.58	6.214	2.684	1,244.66	127.176	50.553
1,243.60	6.323	2.809	1,244.68	130.772	53.132
1,243.62	6.432	2.937	1,244.70	134.368	55.784
1,243.64	6.542	3.066	1,244.72	137.964	58.507
1,243.66	6.651	3.198	1,244.74	141.560	61.302
1,243.68	6.761	3.333	1,244.76	145.156	64.169
1,243.70	6.870	3.469	1,244.78	148.752	67.109
1,243.72	6.979	3.607	1,244.80	152.348	70.120
1,243.74	7.089	3.748	1,244.82	155.944	73.202
1,243.76	7.198	3.891	1,244.84	159.540	76.357
1,243.78	7.308	4.036	1,244.86	163.136	79.584
1,243.80	7.417	4.183	1,244.88	166.731	82.883
1,243.82	7.526	4.333	1,244.90	170.327	86.253
1,243.84	7.636	4.484	1,244.92	173.923	89.696
1,243.86	7.745	4.638	1,244.94	177.519	93.210
1,243.88	7.855	4.794	1,244.96	181.115	96.797
1,243.90	7.964	4.952	1,244.98	184.711	100.455
1,243.92	8.073	5.113	1,245.00	188.307	104.185
1,243.94	8.183	5.275			
1,243.96	8.292	5.440			
1,243.98	8.402	5.607			
1,244.00	8.511	5.776			
1,244.02	12.107	5.982			
1,244.04	15.703	6.260			
1,244.06	19.299	6.610			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 3a: Pond 3a

Inflow Area = 15.240 ac, 3.29% Impervious, Inflow Depth = 3.95" for 100-yr event
 Inflow = 23.83 cfs @ 13.01 hrs, Volume= 5.015 af
 Outflow = 19.72 cfs @ 13.41 hrs, Volume= 4.955 af, Atten= 17%, Lag= 24.0 min
 Primary = 19.72 cfs @ 13.41 hrs, Volume= 4.955 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,243.70' @ 13.41 hrs Surf.Area= 0.830 ac Storage= 1.328 af

Plug-Flow detention time= 140.1 min calculated for 4.955 af (99% of inflow)
 Center-of-Mass det. time= 132.5 min (1,021.9 - 889.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,242.00'	1.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,242.00	0.730	0.000	0.000
1,243.00	0.789	0.759	0.759
1,244.00	0.848	0.818	1.578

Device	Routing	Invert	Outlet Devices
#1	Primary	1,242.00'	12.0" Round Culvert L= 110.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,242.00' / 1,241.00' S= 0.0091 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,243.00'	10.0' 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

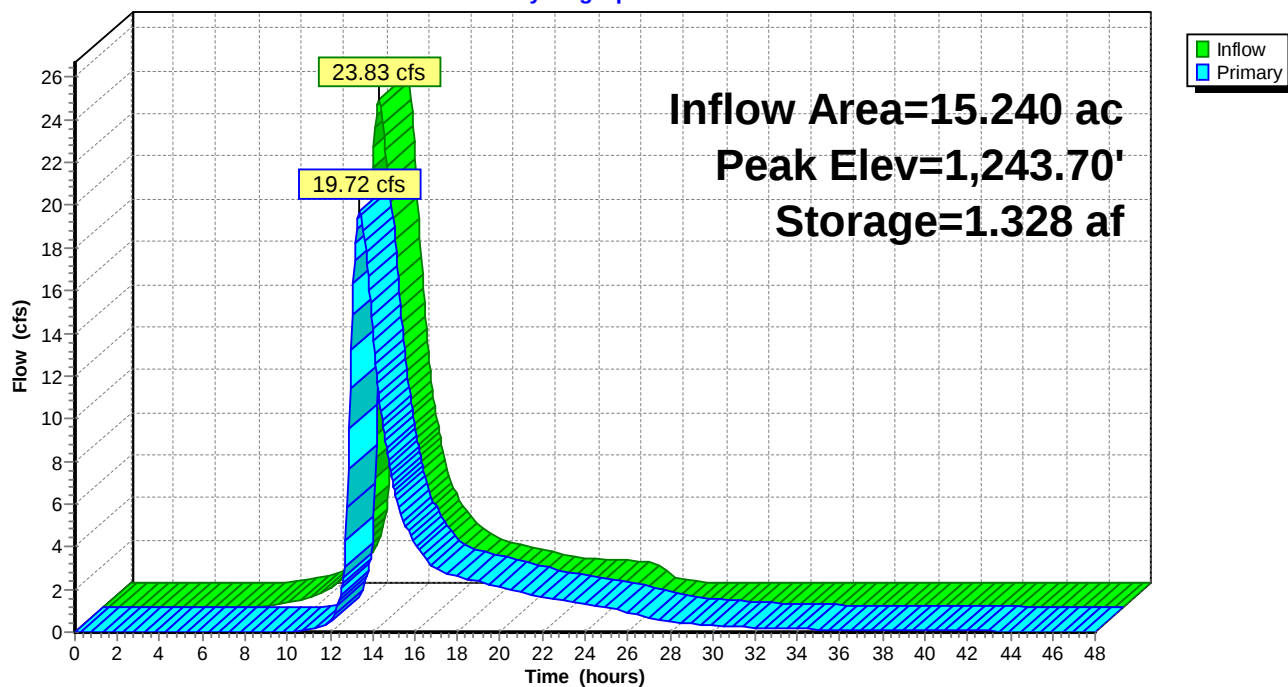
Primary OutFlow Max=19.71 cfs @ 13.41 hrs HW=1,243.70' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.90 cfs @ 4.97 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 15.81 cfs @ 2.25 fps)

Pond 3a: Pond 3a

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 3a: Pond 3a

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,242.00	0.00	1,242.54	1.08	1,243.08	3.41	1,243.62	16.98
1,242.01	0.00	1,242.55	1.12	1,243.09	3.54	1,243.63	17.30
1,242.02	0.00	1,242.56	1.15	1,243.10	3.67	1,243.64	17.63
1,242.03	0.00	1,242.57	1.19	1,243.11	3.81	1,243.65	17.96
1,242.04	0.01	1,242.58	1.22	1,243.12	3.95	1,243.66	18.30
1,242.05	0.01	1,242.59	1.26	1,243.13	4.10	1,243.67	18.63
1,242.06	0.01	1,242.60	1.30	1,243.14	4.25	1,243.68	18.97
1,242.07	0.02	1,242.61	1.33	1,243.15	4.41	1,243.69	19.31
1,242.08	0.03	1,242.62	1.37	1,243.16	4.57	1,243.70	19.65
1,242.09	0.03	1,242.63	1.41	1,243.17	4.74	1,243.71	20.00
1,242.10	0.04	1,242.64	1.45	1,243.18	4.91	1,243.72	20.34
1,242.11	0.05	1,242.65	1.48	1,243.19	5.08	1,243.73	20.69
1,242.12	0.06	1,242.66	1.52	1,243.20	5.26	1,243.74	21.04
1,242.13	0.07	1,242.67	1.56	1,243.21	5.45	1,243.75	21.40
1,242.14	0.08	1,242.68	1.60	1,243.22	5.64	1,243.76	21.75
1,242.15	0.10	1,242.69	1.63	1,243.23	5.84	1,243.77	22.11
1,242.16	0.11	1,242.70	1.67	1,243.24	6.04	1,243.78	22.47
1,242.17	0.12	1,242.71	1.71	1,243.25	6.25	1,243.79	22.83
1,242.18	0.14	1,242.72	1.75	1,243.26	6.46	1,243.80	23.19
1,242.19	0.15	1,242.73	1.79	1,243.27	6.68	1,243.81	23.56
1,242.20	0.17	1,242.74	1.83	1,243.28	6.90	1,243.82	23.93
1,242.21	0.19	1,242.75	1.86	1,243.29	7.13	1,243.83	24.31
1,242.22	0.20	1,242.76	1.90	1,243.30	7.36	1,243.84	24.69
1,242.23	0.22	1,242.77	1.94	1,243.31	7.59	1,243.85	25.07
1,242.24	0.24	1,242.78	1.98	1,243.32	7.83	1,243.86	25.45
1,242.25	0.26	1,242.79	2.01	1,243.33	8.08	1,243.87	25.84
1,242.26	0.28	1,242.80	2.05	1,243.34	8.32	1,243.88	26.22
1,242.27	0.30	1,242.81	2.09	1,243.35	8.57	1,243.89	26.61
1,242.28	0.32	1,242.82	2.13	1,243.36	8.82	1,243.90	27.00
1,242.29	0.35	1,242.83	2.16	1,243.37	9.07	1,243.91	27.40
1,242.30	0.37	1,242.84	2.20	1,243.38	9.33	1,243.92	27.79
1,242.31	0.39	1,242.85	2.23	1,243.39	9.59	1,243.93	28.19
1,242.32	0.42	1,242.86	2.27	1,243.40	9.86	1,243.94	28.59
1,242.33	0.44	1,242.87	2.30	1,243.41	10.14	1,243.95	28.99
1,242.34	0.47	1,242.88	2.34	1,243.42	10.42	1,243.96	29.39
1,242.35	0.49	1,242.89	2.37	1,243.43	10.71	1,243.97	29.80
1,242.36	0.52	1,242.90	2.40	1,243.44	11.00	1,243.98	30.21
1,242.37	0.55	1,242.91	2.44	1,243.45	11.30	1,243.99	30.62
1,242.38	0.57	1,242.92	2.47	1,243.46	11.60	1,244.00	31.03
1,242.39	0.60	1,242.93	2.50	1,243.47	11.91		
1,242.40	0.63	1,242.94	2.53	1,243.48	12.22		
1,242.41	0.66	1,242.95	2.56	1,243.49	12.53		
1,242.42	0.69	1,242.96	2.58	1,243.50	12.85		
1,242.43	0.72	1,242.97	2.61	1,243.51	13.18		
1,242.44	0.75	1,242.98	2.63	1,243.52	13.51		
1,242.45	0.78	1,242.99	2.66	1,243.53	13.85		
1,242.46	0.81	1,243.00	2.67	1,243.54	14.19		
1,242.47	0.85	1,243.01	2.72	1,243.55	14.53		
1,242.48	0.88	1,243.02	2.79	1,243.56	14.88		
1,242.49	0.91	1,243.03	2.87	1,243.57	15.24		
1,242.50	0.95	1,243.04	2.97	1,243.58	15.60		
1,242.51	0.98	1,243.05	3.07	1,243.59	15.96		
1,242.52	1.01	1,243.06	3.17	1,243.60	16.33		
1,242.53	1.05	1,243.07	3.29	1,243.61	16.65		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 3a: Pond 3a

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,242.00	0.730	0.000	1,243.08	0.794	0.823
1,242.02	0.731	0.015	1,243.10	0.795	0.839
1,242.04	0.732	0.029	1,243.12	0.796	0.855
1,242.06	0.734	0.044	1,243.14	0.797	0.871
1,242.08	0.735	0.059	1,243.16	0.798	0.886
1,242.10	0.736	0.073	1,243.18	0.800	0.902
1,242.12	0.737	0.088	1,243.20	0.801	0.918
1,242.14	0.738	0.103	1,243.22	0.802	0.935
1,242.16	0.739	0.118	1,243.24	0.803	0.951
1,242.18	0.741	0.132	1,243.26	0.804	0.967
1,242.20	0.742	0.147	1,243.28	0.806	0.983
1,242.22	0.743	0.162	1,243.30	0.807	0.999
1,242.24	0.744	0.177	1,243.32	0.808	1.015
1,242.26	0.745	0.192	1,243.34	0.809	1.031
1,242.28	0.747	0.207	1,243.36	0.810	1.047
1,242.30	0.748	0.222	1,243.38	0.811	1.064
1,242.32	0.749	0.237	1,243.40	0.813	1.080
1,242.34	0.750	0.252	1,243.42	0.814	1.096
1,242.36	0.751	0.267	1,243.44	0.815	1.112
1,242.38	0.752	0.282	1,243.46	0.816	1.129
1,242.40	0.754	0.297	1,243.48	0.817	1.145
1,242.42	0.755	0.312	1,243.50	0.818	1.161
1,242.44	0.756	0.327	1,243.52	0.820	1.178
1,242.46	0.757	0.342	1,243.54	0.821	1.194
1,242.48	0.758	0.357	1,243.56	0.822	1.211
1,242.50	0.759	0.372	1,243.58	0.823	1.227
1,242.52	0.761	0.388	1,243.60	0.824	1.244
1,242.54	0.762	0.403	1,243.62	0.826	1.260
1,242.56	0.763	0.418	1,243.64	0.827	1.277
1,242.58	0.764	0.433	1,243.66	0.828	1.293
1,242.60	0.765	0.449	1,243.68	0.829	1.310
1,242.62	0.767	0.464	1,243.70	0.830	1.326
1,242.64	0.768	0.479	1,243.72	0.831	1.343
1,242.66	0.769	0.495	1,243.74	0.833	1.360
1,242.68	0.770	0.510	1,243.76	0.834	1.376
1,242.70	0.771	0.525	1,243.78	0.835	1.393
1,242.72	0.772	0.541	1,243.80	0.836	1.410
1,242.74	0.774	0.556	1,243.82	0.837	1.426
1,242.76	0.775	0.572	1,243.84	0.839	1.443
1,242.78	0.776	0.587	1,243.86	0.840	1.460
1,242.80	0.777	0.603	1,243.88	0.841	1.477
1,242.82	0.778	0.618	1,243.90	0.842	1.493
1,242.84	0.780	0.634	1,243.92	0.843	1.510
1,242.86	0.781	0.650	1,243.94	0.844	1.527
1,242.88	0.782	0.665	1,243.96	0.846	1.544
1,242.90	0.783	0.681	1,243.98	0.847	1.561
1,242.92	0.784	0.697	1,244.00	0.848	1.578
1,242.94	0.785	0.712			
1,242.96	0.787	0.728			
1,242.98	0.788	0.744			
1,243.00	0.789	0.759			
1,243.02	0.790	0.775			
1,243.04	0.791	0.791			
1,243.06	0.793	0.807			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

Prepared by Westwood Professional Services

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Summary for Pond 3b: Pond 3b

Inflow Area = 98.114 ac, 1.05% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 85.61 cfs @ 14.28 hrs, Volume= 31.438 af
 Outflow = 83.14 cfs @ 14.59 hrs, Volume= 31.009 af, Atten= 3%, Lag= 18.7 min
 Primary = 83.14 cfs @ 14.59 hrs, Volume= 31.009 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,244.31' @ 14.59 hrs Surf.Area= 2.032 ac Storage= 4.467 af

Plug-Flow detention time= 100.1 min calculated for 30.977 af (99% of inflow)
 Center-of-Mass det. time= 92.2 min (1,071.7 - 979.6)

Volume	Invert	Avail.Storage	Storage Description
--------	--------	---------------	---------------------

#1	1,242.00'	5.878 af	Custom Stage Data (Prismatic) Listed below (Recalc)
----	-----------	----------	--

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,242.00	1.815	0.000	0.000
1,243.00	1.923	1.869	1.869
1,244.00	2.032	1.977	3.846
1,245.00	2.032	2.032	5.878

Device	Routing	Invert	Outlet Devices
--------	---------	--------	----------------

#1	Primary	1,242.00'	12.0" Round Culvert
----	---------	-----------	----------------------------

L= 259.0' RCP, end-section conforming to fill, Ke= 0.500
 Inlet / Outlet Invert= 1,242.00' / 1,240.00' S= 0.0077 ' /' Cc= 0.900
 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

#2	Primary	1,243.00'	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

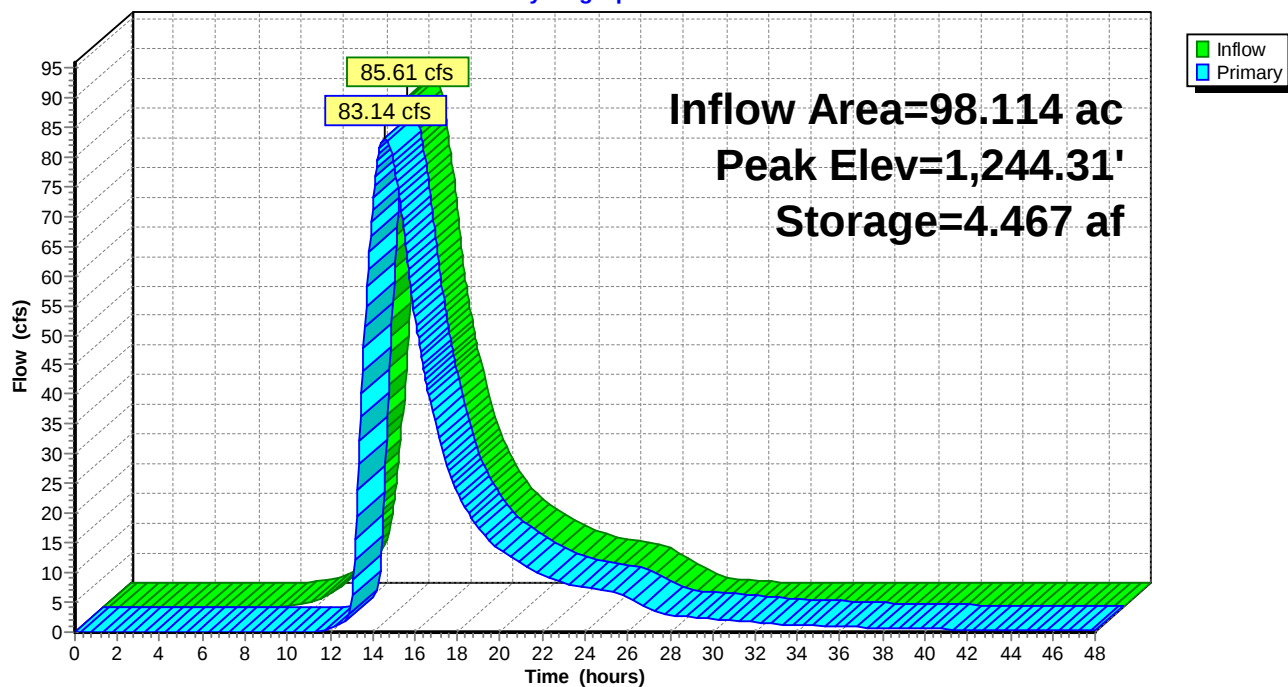
Primary OutFlow Max=83.13 cfs @ 14.59 hrs HW=1,244.31' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.95 cfs @ 5.03 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 79.18 cfs @ 3.03 fps)

Pond 3b: Pond 3b

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 3b: Pond 3b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,242.00	0.00	1,243.08	3.94	1,244.16	70.42
1,242.02	0.00	1,243.10	4.41	1,244.18	72.11
1,242.04	0.01	1,243.12	4.92	1,244.20	73.82
1,242.06	0.01	1,243.14	5.48	1,244.22	75.56
1,242.08	0.02	1,243.16	6.07	1,244.24	77.31
1,242.10	0.04	1,243.18	6.69	1,244.26	79.08
1,242.12	0.06	1,243.20	7.35	1,244.28	80.86
1,242.14	0.08	1,243.22	8.07	1,244.30	82.65
1,242.16	0.10	1,243.24	8.83	1,244.32	84.45
1,242.18	0.13	1,243.26	9.63	1,244.34	86.27
1,242.20	0.16	1,243.28	10.46	1,244.36	88.10
1,242.22	0.20	1,243.30	11.34	1,244.38	89.94
1,242.24	0.23	1,243.32	12.24	1,244.40	91.80
1,242.26	0.28	1,243.34	13.04	1,244.42	93.70
1,242.28	0.32	1,243.36	14.00	1,244.44	95.61
1,242.30	0.37	1,243.38	14.99	1,244.46	97.54
1,242.32	0.42	1,243.40	16.01	1,244.48	99.48
1,242.34	0.47	1,243.42	17.10	1,244.50	101.43
1,242.36	0.52	1,243.44	18.22	1,244.52	103.39
1,242.38	0.57	1,243.46	19.38	1,244.54	105.37
1,242.40	0.63	1,243.48	20.58	1,244.56	107.36
1,242.42	0.69	1,243.50	21.82	1,244.58	109.37
1,242.44	0.75	1,243.52	23.10	1,244.60	111.38
1,242.46	0.81	1,243.54	24.41	1,244.62	113.41
1,242.48	0.88	1,243.56	25.77	1,244.64	115.45
1,242.50	0.95	1,243.58	27.16	1,244.66	117.51
1,242.52	1.01	1,243.60	28.60	1,244.68	119.57
1,242.54	1.08	1,243.62	29.86	1,244.70	121.65
1,242.56	1.15	1,243.64	31.13	1,244.72	123.74
1,242.58	1.22	1,243.66	32.43	1,244.74	125.84
1,242.60	1.30	1,243.68	33.74	1,244.76	127.96
1,242.62	1.37	1,243.70	35.08	1,244.78	130.09
1,242.64	1.45	1,243.72	36.42	1,244.80	132.22
1,242.66	1.52	1,243.74	37.79	1,244.82	134.37
1,242.68	1.60	1,243.76	39.17	1,244.84	136.54
1,242.70	1.67	1,243.78	40.57	1,244.86	138.71
1,242.72	1.75	1,243.80	41.99	1,244.88	140.90
1,242.74	1.83	1,243.82	43.45	1,244.90	143.09
1,242.76	1.90	1,243.84	44.92	1,244.92	145.30
1,242.78	1.98	1,243.86	46.42	1,244.94	147.52
1,242.80	2.05	1,243.88	47.93	1,244.96	149.75
1,242.82	2.13	1,243.90	49.46	1,244.98	151.99
1,242.84	2.20	1,243.92	51.01	1,245.00	154.25
1,242.86	2.27	1,243.94	52.57		
1,242.88	2.34	1,243.96	54.15		
1,242.90	2.40	1,243.98	55.75		
1,242.92	2.47	1,244.00	57.36		
1,242.94	2.53	1,244.02	58.95		
1,242.96	2.58	1,244.04	60.55		
1,242.98	2.63	1,244.06	62.16		
1,243.00	2.67	1,244.08	63.79		
1,243.02	2.86	1,244.10	65.43		
1,243.04	3.15	1,244.12	67.08		
1,243.06	3.52	1,244.14	68.75		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 3b: Pond 3b

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,242.00	1.815	0.000	1,244.70	2.032	5.269
1,242.05	1.820	0.091	1,244.75	2.032	5.370
1,242.10	1.826	0.182	1,244.80	2.032	5.472
1,242.15	1.831	0.273	1,244.85	2.032	5.574
1,242.20	1.837	0.365	1,244.90	2.032	5.675
1,242.25	1.842	0.457	1,244.95	2.032	5.777
1,242.30	1.847	0.549	1,245.00	2.032	5.878
1,242.35	1.853	0.642			
1,242.40	1.858	0.735			
1,242.45	1.864	0.828			
1,242.50	1.869	0.921			
1,242.55	1.874	1.015			
1,242.60	1.880	1.108			
1,242.65	1.885	1.203			
1,242.70	1.891	1.297			
1,242.75	1.896	1.392			
1,242.80	1.901	1.487			
1,242.85	1.907	1.582			
1,242.90	1.912	1.677			
1,242.95	1.918	1.773			
1,243.00	1.923	1.869			
1,243.05	1.928	1.965			
1,243.10	1.934	2.062			
1,243.15	1.939	2.159			
1,243.20	1.945	2.256			
1,243.25	1.950	2.353			
1,243.30	1.956	2.451			
1,243.35	1.961	2.549			
1,243.40	1.967	2.647			
1,243.45	1.972	2.745			
1,243.50	1.977	2.844			
1,243.55	1.983	2.943			
1,243.60	1.988	3.042			
1,243.65	1.994	3.142			
1,243.70	1.999	3.242			
1,243.75	2.005	3.342			
1,243.80	2.010	3.442			
1,243.85	2.016	3.543			
1,243.90	2.021	3.644			
1,243.95	2.027	3.745			
1,244.00	2.032	3.846			
1,244.05	2.032	3.948			
1,244.10	2.032	4.050			
1,244.15	2.032	4.151			
1,244.20	2.032	4.253			
1,244.25	2.032	4.354			
1,244.30	2.032	4.456			
1,244.35	2.032	4.558			
1,244.40	2.032	4.659			
1,244.45	2.032	4.761			
1,244.50	2.032	4.862			
1,244.55	2.032	4.964			
1,244.60	2.032	5.066			
1,244.65	2.032	5.167			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 4: Pond 4

Inflow Area = 15.186 ac, 2.21% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 26.57 cfs @ 12.81 hrs, Volume= 4.866 af
 Outflow = 6.31 cfs @ 14.31 hrs, Volume= 4.726 af, Atten= 76%, Lag= 89.6 min
 Primary = 6.31 cfs @ 14.31 hrs, Volume= 4.726 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,246.48' @ 14.31 hrs Surf.Area= 4.522 ac Storage= 2.525 af

Plug-Flow detention time= 329.3 min calculated for 4.726 af (97% of inflow)
 Center-of-Mass det. time= 312.1 min (1,189.6 - 877.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,245.00'	5.835 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,245.00	1.127	0.000	0.000
1,246.00	1.192	1.159	1.159
1,247.00	8.159	4.675	5.835

Device	Routing	Invert	Outlet Devices
#1	Primary	1,245.00'	12.0" Round Culvert L= 173.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,245.00' / 1,243.27' S= 0.0100 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,246.25'	10.0' 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

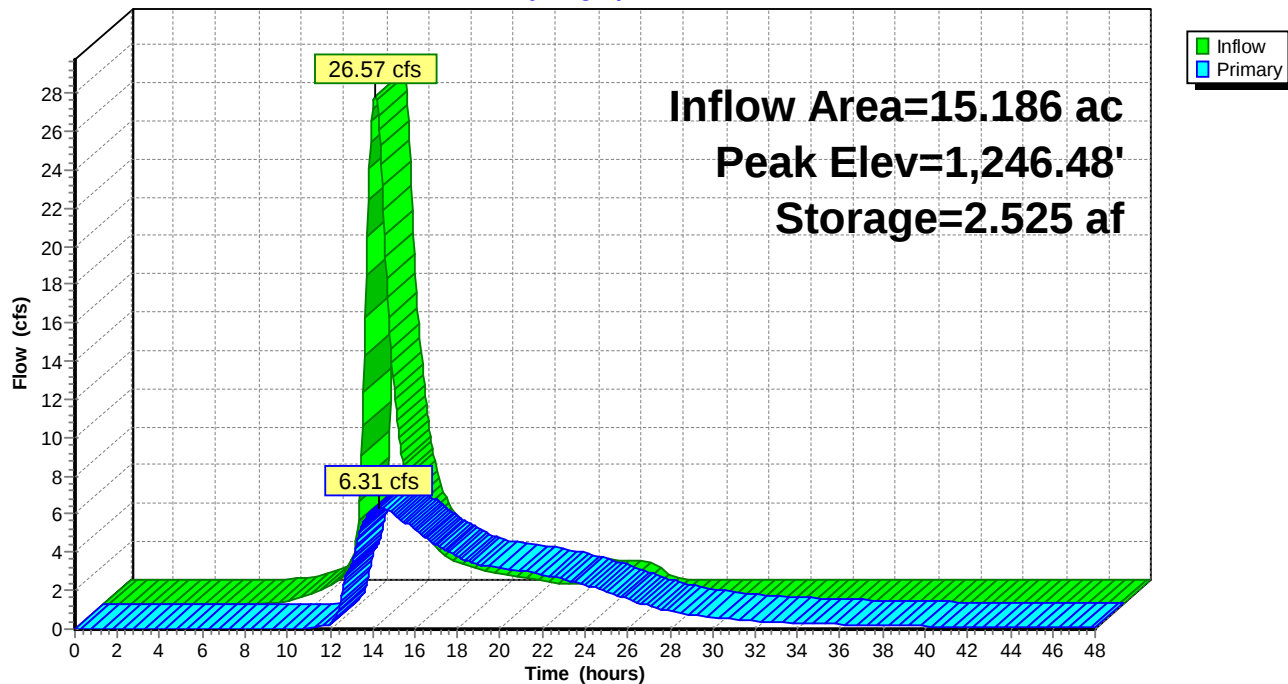
Primary OutFlow Max=6.31 cfs @ 14.31 hrs HW=1,246.48' (Free Discharge)

↑ **1=Culvert** (Inlet Controls 3.74 cfs @ 4.76 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 2.57 cfs @ 1.13 fps)

Pond 4: Pond 4

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 4: Pond 4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,245.00	0.00	1,245.54	1.08	1,246.08	2.88	1,246.62	9.48
1,245.01	0.00	1,245.55	1.12	1,246.09	2.90	1,246.63	9.73
1,245.02	0.00	1,245.56	1.15	1,246.10	2.93	1,246.64	9.99
1,245.03	0.00	1,245.57	1.19	1,246.11	2.95	1,246.65	10.25
1,245.04	0.01	1,245.58	1.22	1,246.12	2.98	1,246.66	10.53
1,245.05	0.01	1,245.59	1.26	1,246.13	3.00	1,246.67	10.80
1,245.06	0.01	1,245.60	1.30	1,246.14	3.03	1,246.68	11.09
1,245.07	0.02	1,245.61	1.33	1,246.15	3.05	1,246.69	11.37
1,245.08	0.03	1,245.62	1.37	1,246.16	3.07	1,246.70	11.67
1,245.09	0.03	1,245.63	1.41	1,246.17	3.10	1,246.71	11.96
1,245.10	0.04	1,245.64	1.45	1,246.18	3.12	1,246.72	12.27
1,245.11	0.05	1,245.65	1.48	1,246.19	3.14	1,246.73	12.57
1,245.12	0.06	1,245.66	1.52	1,246.20	3.16	1,246.74	12.89
1,245.13	0.07	1,245.67	1.56	1,246.21	3.19	1,246.75	13.20
1,245.14	0.09	1,245.68	1.60	1,246.22	3.21	1,246.76	13.52
1,245.15	0.10	1,245.69	1.63	1,246.23	3.23	1,246.77	13.85
1,245.16	0.11	1,245.70	1.67	1,246.24	3.25	1,246.78	14.18
1,245.17	0.12	1,245.71	1.71	1,246.25	3.28	1,246.79	14.52
1,245.18	0.14	1,245.72	1.75	1,246.26	3.32	1,246.80	14.86
1,245.19	0.15	1,245.73	1.79	1,246.27	3.38	1,246.81	15.20
1,245.20	0.17	1,245.74	1.83	1,246.28	3.46	1,246.82	15.56
1,245.21	0.19	1,245.75	1.86	1,246.29	3.55	1,246.83	15.91
1,245.22	0.20	1,245.76	1.90	1,246.30	3.64	1,246.84	16.27
1,245.23	0.22	1,245.77	1.94	1,246.31	3.75	1,246.85	16.64
1,245.24	0.24	1,245.78	1.98	1,246.32	3.86	1,246.86	16.96
1,245.25	0.26	1,245.79	2.01	1,246.33	3.97	1,246.87	17.28
1,245.26	0.28	1,245.80	2.05	1,246.34	4.10	1,246.88	17.60
1,245.27	0.30	1,245.81	2.09	1,246.35	4.23	1,246.89	17.92
1,245.28	0.32	1,245.82	2.13	1,246.36	4.36	1,246.90	18.25
1,245.29	0.35	1,245.83	2.16	1,246.37	4.50	1,246.91	18.58
1,245.30	0.37	1,245.84	2.20	1,246.38	4.64	1,246.92	18.91
1,245.31	0.39	1,245.85	2.23	1,246.39	4.79	1,246.93	19.25
1,245.32	0.42	1,245.86	2.27	1,246.40	4.95	1,246.94	19.58
1,245.33	0.44	1,245.87	2.30	1,246.41	5.11	1,246.95	19.92
1,245.34	0.47	1,245.88	2.34	1,246.42	5.27	1,246.96	20.26
1,245.35	0.49	1,245.89	2.37	1,246.43	5.43	1,246.97	20.61
1,245.36	0.52	1,245.90	2.40	1,246.44	5.60	1,246.98	20.95
1,245.37	0.55	1,245.91	2.44	1,246.45	5.78	1,246.99	21.30
1,245.38	0.57	1,245.92	2.47	1,246.46	5.96	1,247.00	21.65
1,245.39	0.60	1,245.93	2.50	1,246.47	6.16		
1,245.40	0.63	1,245.94	2.53	1,246.48	6.35		
1,245.41	0.66	1,245.95	2.56	1,246.49	6.55		
1,245.42	0.69	1,245.96	2.58	1,246.50	6.76		
1,245.43	0.72	1,245.97	2.61	1,246.51	6.97		
1,245.44	0.75	1,245.98	2.63	1,246.52	7.18		
1,245.45	0.78	1,245.99	2.66	1,246.53	7.39		
1,245.46	0.81	1,246.00	2.67	1,246.54	7.60		
1,245.47	0.85	1,246.01	2.70	1,246.55	7.82		
1,245.48	0.88	1,246.02	2.73	1,246.56	8.04		
1,245.49	0.91	1,246.03	2.75	1,246.57	8.27		
1,245.50	0.95	1,246.04	2.78	1,246.58	8.50		
1,245.51	0.98	1,246.05	2.80	1,246.59	8.74		
1,245.52	1.01	1,246.06	2.83	1,246.60	8.98		
1,245.53	1.05	1,246.07	2.86	1,246.61	9.23		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 4: Pond 4

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,245.00	1.127	0.000	1,246.08	1.749	1.277
1,245.02	1.128	0.023	1,246.10	1.889	1.314
1,245.04	1.130	0.045	1,246.12	2.028	1.353
1,245.06	1.131	0.068	1,246.14	2.167	1.395
1,245.08	1.132	0.090	1,246.16	2.307	1.439
1,245.10	1.133	0.113	1,246.18	2.446	1.487
1,245.12	1.135	0.136	1,246.20	2.585	1.537
1,245.14	1.136	0.158	1,246.22	2.725	1.590
1,245.16	1.137	0.181	1,246.24	2.864	1.646
1,245.18	1.139	0.204	1,246.26	3.003	1.705
1,245.20	1.140	0.227	1,246.28	3.143	1.766
1,245.22	1.141	0.250	1,246.30	3.282	1.831
1,245.24	1.143	0.272	1,246.32	3.421	1.898
1,245.26	1.144	0.295	1,246.34	3.561	1.967
1,245.28	1.145	0.318	1,246.36	3.700	2.040
1,245.30	1.146	0.341	1,246.38	3.839	2.115
1,245.32	1.148	0.364	1,246.40	3.979	2.194
1,245.34	1.149	0.387	1,246.42	4.118	2.275
1,245.36	1.150	0.410	1,246.44	4.257	2.358
1,245.38	1.152	0.433	1,246.46	4.397	2.445
1,245.40	1.153	0.456	1,246.48	4.536	2.534
1,245.42	1.154	0.479	1,246.50	4.675	2.626
1,245.44	1.156	0.502	1,246.52	4.815	2.721
1,245.46	1.157	0.525	1,246.54	4.954	2.819
1,245.48	1.158	0.548	1,246.56	5.094	2.919
1,245.50	1.159	0.572	1,246.58	5.233	3.023
1,245.52	1.161	0.595	1,246.60	5.372	3.129
1,245.54	1.162	0.618	1,246.62	5.512	3.238
1,245.56	1.163	0.641	1,246.64	5.651	3.349
1,245.58	1.165	0.665	1,246.66	5.790	3.464
1,245.60	1.166	0.688	1,246.68	5.930	3.581
1,245.62	1.167	0.711	1,246.70	6.069	3.701
1,245.64	1.169	0.735	1,246.72	6.208	3.824
1,245.66	1.170	0.758	1,246.74	6.348	3.949
1,245.68	1.171	0.781	1,246.76	6.487	4.077
1,245.70	1.173	0.805	1,246.78	6.626	4.209
1,245.72	1.174	0.828	1,246.80	6.766	4.343
1,245.74	1.175	0.852	1,246.82	6.905	4.479
1,245.76	1.176	0.875	1,246.84	7.044	4.619
1,245.78	1.178	0.899	1,246.86	7.184	4.761
1,245.80	1.179	0.922	1,246.88	7.323	4.906
1,245.82	1.180	0.946	1,246.90	7.462	5.054
1,245.84	1.182	0.970	1,246.92	7.602	5.205
1,245.86	1.183	0.993	1,246.94	7.741	5.358
1,245.88	1.184	1.017	1,246.96	7.880	5.514
1,245.90	1.186	1.041	1,246.98	8.020	5.673
1,245.92	1.187	1.064	1,247.00	8.159	5.835
1,245.94	1.188	1.088			
1,245.96	1.189	1.112			
1,245.98	1.191	1.136			
1,246.00	1.192	1.159			
1,246.02	1.331	1.185			
1,246.04	1.471	1.213			
1,246.06	1.610	1.244			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 5: Pond 5

Inflow Area = 16.801 ac, 1.62% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 62.93 cfs @ 12.18 hrs, Volume= 5.384 af
 Outflow = 21.10 cfs @ 12.57 hrs, Volume= 5.219 af, Atten= 66%, Lag= 23.3 min
 Primary = 21.10 cfs @ 12.57 hrs, Volume= 5.219 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,246.73' @ 12.57 hrs Surf.Area= 1.483 ac Storage= 2.374 af

Plug-Flow detention time= 248.0 min calculated for 5.219 af (97% of inflow)
 Center-of-Mass det. time= 229.8 min (1,061.3 - 831.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,245.00'	2.773 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,245.00	1.255	0.000	0.000
1,246.00	1.386	1.321	1.321
1,247.00	1.518	1.452	2.773

Device	Routing	Invert	Outlet Devices
#1	Primary	1,245.00'	12.0" Round Culvert L= 41.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,245.00' / 1,244.59' S= 0.0100 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,246.00'	10.0' 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=21.06 cfs @ 12.57 hrs HW=1,246.73' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 4.18 cfs @ 5.33 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 16.88 cfs @ 2.30 fps)

2021-03-16 Hayward Basin Sizing

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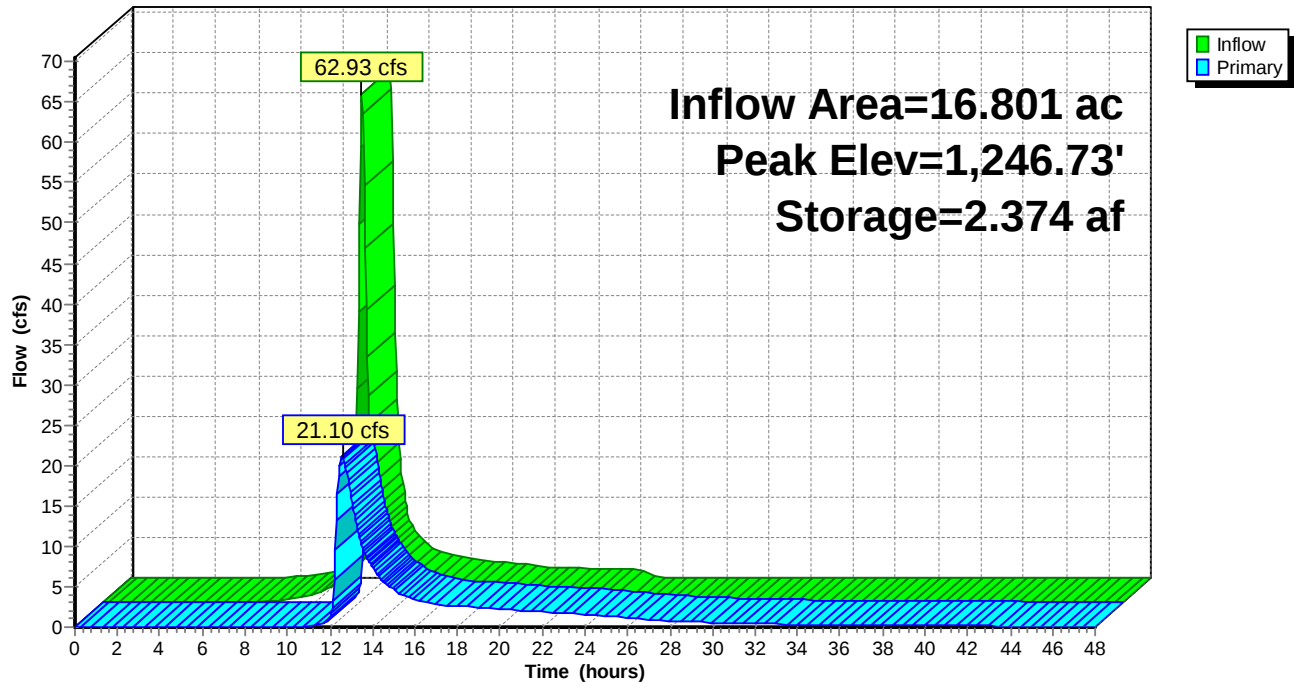
Type II 24-hr 100-yr Rainfall=6.30"

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Pond 5: Pond 5

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 5: Pond 5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,245.00	0.00	1,245.54	1.05	1,246.08	3.41	1,246.62	17.14
1,245.01	0.00	1,245.55	1.08	1,246.09	3.54	1,246.63	17.47
1,245.02	0.00	1,245.56	1.12	1,246.10	3.67	1,246.64	17.81
1,245.03	0.00	1,245.57	1.15	1,246.11	3.81	1,246.65	18.15
1,245.04	0.01	1,245.58	1.18	1,246.12	3.95	1,246.66	18.49
1,245.05	0.01	1,245.59	1.22	1,246.13	4.10	1,246.67	18.83
1,245.06	0.01	1,245.60	1.25	1,246.14	4.25	1,246.68	19.18
1,245.07	0.02	1,245.61	1.29	1,246.15	4.41	1,246.69	19.53
1,245.08	0.03	1,245.62	1.32	1,246.16	4.57	1,246.70	19.87
1,245.09	0.03	1,245.63	1.36	1,246.17	4.74	1,246.71	20.23
1,245.10	0.04	1,245.64	1.39	1,246.18	4.91	1,246.72	20.58
1,245.11	0.05	1,245.65	1.43	1,246.19	5.08	1,246.73	20.94
1,245.12	0.06	1,245.66	1.46	1,246.20	5.26	1,246.74	21.29
1,245.13	0.07	1,245.67	1.50	1,246.21	5.45	1,246.75	21.65
1,245.14	0.08	1,245.68	1.53	1,246.22	5.64	1,246.76	22.01
1,245.15	0.10	1,245.69	1.57	1,246.23	5.84	1,246.77	22.38
1,245.16	0.11	1,245.70	1.60	1,246.24	6.04	1,246.78	22.74
1,245.17	0.12	1,245.71	1.64	1,246.25	6.25	1,246.79	23.11
1,245.18	0.14	1,245.72	1.68	1,246.26	6.46	1,246.80	23.48
1,245.19	0.15	1,245.73	1.71	1,246.27	6.68	1,246.81	23.86
1,245.20	0.17	1,245.74	1.75	1,246.28	6.90	1,246.82	24.24
1,245.21	0.19	1,245.75	1.79	1,246.29	7.13	1,246.83	24.62
1,245.22	0.20	1,245.76	1.82	1,246.30	7.36	1,246.84	25.01
1,245.23	0.22	1,245.77	1.86	1,246.31	7.59	1,246.85	25.39
1,245.24	0.24	1,245.78	1.90	1,246.32	7.83	1,246.86	25.78
1,245.25	0.26	1,245.79	1.93	1,246.33	8.03	1,246.87	26.17
1,245.26	0.28	1,245.80	1.97	1,246.34	8.25	1,246.88	26.57
1,245.27	0.30	1,245.81	2.01	1,246.35	8.50	1,246.89	26.96
1,245.28	0.32	1,245.82	2.04	1,246.36	8.76	1,246.90	27.36
1,245.29	0.35	1,245.83	2.08	1,246.37	9.03	1,246.91	27.76
1,245.30	0.37	1,245.84	2.12	1,246.38	9.30	1,246.92	28.16
1,245.31	0.39	1,245.85	2.15	1,246.39	9.57	1,246.93	28.56
1,245.32	0.42	1,245.86	2.19	1,246.40	9.84	1,246.94	28.96
1,245.33	0.44	1,245.87	2.22	1,246.41	10.13	1,246.95	29.37
1,245.34	0.46	1,245.88	2.26	1,246.42	10.42	1,246.96	29.78
1,245.35	0.49	1,245.89	2.30	1,246.43	10.72	1,246.97	30.19
1,245.36	0.52	1,245.90	2.33	1,246.44	11.02	1,246.98	30.60
1,245.37	0.54	1,245.91	2.37	1,246.45	11.32	1,246.99	31.02
1,245.38	0.57	1,245.92	2.41	1,246.46	11.63	1,247.00	31.43
1,245.39	0.60	1,245.93	2.44	1,246.47	11.95		
1,245.40	0.62	1,245.94	2.48	1,246.48	12.27		
1,245.41	0.65	1,245.95	2.51	1,246.49	12.59		
1,245.42	0.68	1,245.96	2.55	1,246.50	12.92		
1,245.43	0.71	1,245.97	2.58	1,246.51	13.26		
1,245.44	0.74	1,245.98	2.62	1,246.52	13.60		
1,245.45	0.77	1,245.99	2.65	1,246.53	13.94		
1,245.46	0.80	1,246.00	2.67	1,246.54	14.29		
1,245.47	0.83	1,246.01	2.72	1,246.55	14.64		
1,245.48	0.86	1,246.02	2.79	1,246.56	15.00		
1,245.49	0.89	1,246.03	2.87	1,246.57	15.36		
1,245.50	0.92	1,246.04	2.97	1,246.58	15.73		
1,245.51	0.95	1,246.05	3.07	1,246.59	16.10		
1,245.52	0.99	1,246.06	3.17	1,246.60	16.48		
1,245.53	1.02	1,246.07	3.29	1,246.61	16.81		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 5: Pond 5

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,245.00	1.255	0.000	1,246.08	1.397	1.432
1,245.02	1.258	0.025	1,246.10	1.399	1.460
1,245.04	1.260	0.050	1,246.12	1.402	1.488
1,245.06	1.263	0.076	1,246.14	1.404	1.516
1,245.08	1.265	0.101	1,246.16	1.407	1.544
1,245.10	1.268	0.126	1,246.18	1.410	1.572
1,245.12	1.271	0.152	1,246.20	1.412	1.600
1,245.14	1.273	0.177	1,246.22	1.415	1.629
1,245.16	1.276	0.202	1,246.24	1.418	1.657
1,245.18	1.279	0.228	1,246.26	1.420	1.685
1,245.20	1.281	0.254	1,246.28	1.423	1.714
1,245.22	1.284	0.279	1,246.30	1.426	1.742
1,245.24	1.286	0.305	1,246.32	1.428	1.771
1,245.26	1.289	0.331	1,246.34	1.431	1.799
1,245.28	1.292	0.357	1,246.36	1.434	1.828
1,245.30	1.294	0.382	1,246.38	1.436	1.857
1,245.32	1.297	0.408	1,246.40	1.439	1.885
1,245.34	1.300	0.434	1,246.42	1.441	1.914
1,245.36	1.302	0.460	1,246.44	1.444	1.943
1,245.38	1.305	0.486	1,246.46	1.447	1.972
1,245.40	1.307	0.512	1,246.48	1.449	2.001
1,245.42	1.310	0.539	1,246.50	1.452	2.030
1,245.44	1.313	0.565	1,246.52	1.455	2.059
1,245.46	1.315	0.591	1,246.54	1.457	2.088
1,245.48	1.318	0.617	1,246.56	1.460	2.117
1,245.50	1.321	0.644	1,246.58	1.463	2.147
1,245.52	1.323	0.670	1,246.60	1.465	2.176
1,245.54	1.326	0.697	1,246.62	1.468	2.205
1,245.56	1.328	0.723	1,246.64	1.470	2.235
1,245.58	1.331	0.750	1,246.66	1.473	2.264
1,245.60	1.334	0.777	1,246.68	1.476	2.293
1,245.62	1.336	0.803	1,246.70	1.478	2.323
1,245.64	1.339	0.830	1,246.72	1.481	2.353
1,245.66	1.341	0.857	1,246.74	1.484	2.382
1,245.68	1.344	0.884	1,246.76	1.486	2.412
1,245.70	1.347	0.911	1,246.78	1.489	2.442
1,245.72	1.349	0.938	1,246.80	1.492	2.472
1,245.74	1.352	0.965	1,246.82	1.494	2.501
1,245.76	1.355	0.992	1,246.84	1.497	2.531
1,245.78	1.357	1.019	1,246.86	1.500	2.561
1,245.80	1.360	1.046	1,246.88	1.502	2.591
1,245.82	1.362	1.073	1,246.90	1.505	2.621
1,245.84	1.365	1.100	1,246.92	1.507	2.651
1,245.86	1.368	1.128	1,246.94	1.510	2.682
1,245.88	1.370	1.155	1,246.96	1.513	2.712
1,245.90	1.373	1.183	1,246.98	1.515	2.742
1,245.92	1.376	1.210	1,247.00	1.518	2.773
1,245.94	1.378	1.238			
1,245.96	1.381	1.265			
1,245.98	1.383	1.293			
1,246.00	1.386	1.321			
1,246.02	1.389	1.348			
1,246.04	1.391	1.376			
1,246.06	1.394	1.404			

2021-03-16 Hayward Basin Sizing

Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 6: Pond 6

Inflow Area = 20.436 ac, 0.42% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 51.56 cfs @ 12.42 hrs, Volume= 6.548 af
 Outflow = 46.61 cfs @ 12.58 hrs, Volume= 6.488 af, Atten= 10%, Lag= 9.2 min
 Primary = 46.61 cfs @ 12.58 hrs, Volume= 6.488 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,246.36' @ 12.58 hrs Surf.Area= 0.874 ac Storage= 1.108 af

Plug-Flow detention time= 80.2 min calculated for 6.481 af (99% of inflow)
 Center-of-Mass det. time= 75.8 min (926.2 - 850.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,245.00'	1.227 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,245.00	0.750	0.000	0.000
1,246.00	0.841	0.795	0.795
1,246.50	0.886	0.432	1.227

Device	Routing	Invert	Outlet Devices
#1	Primary	1,245.00'	12.0" Round Culvert L= 58.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,245.00' / 1,244.42' S= 0.0100 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,245.50'	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

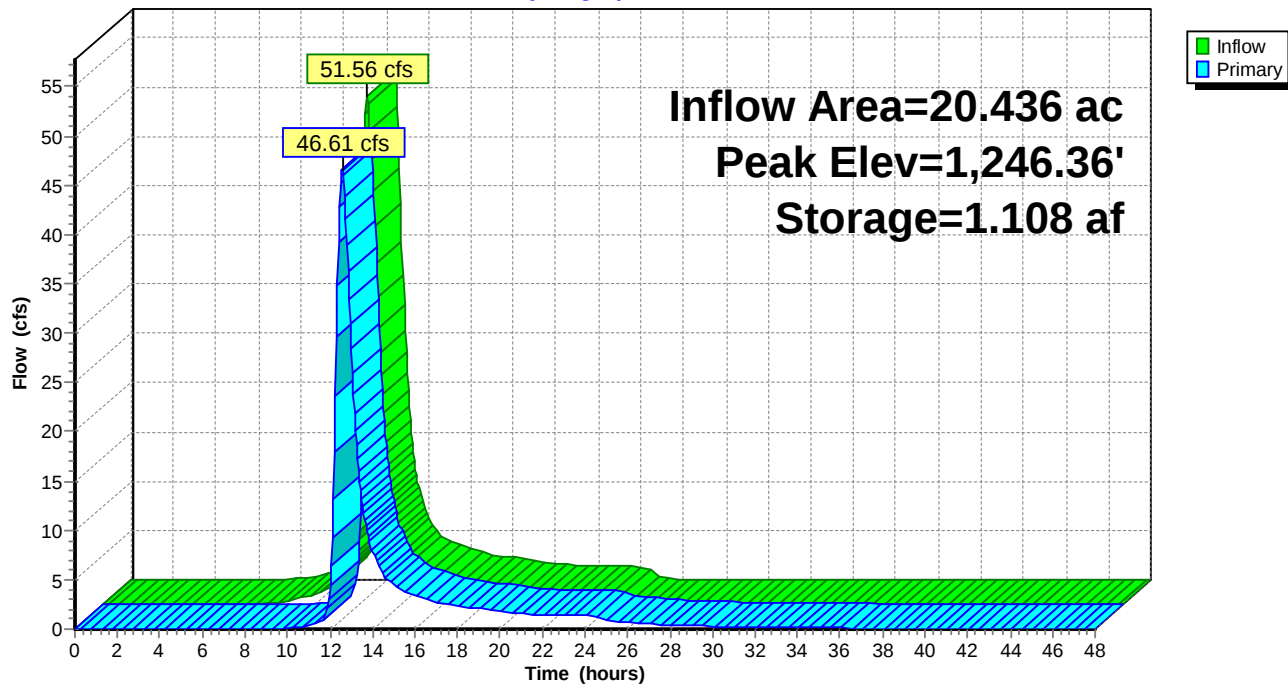
Primary OutFlow Max=46.49 cfs @ 12.58 hrs HW=1,246.36' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.50 cfs @ 4.46 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 42.98 cfs @ 2.49 fps)

Pond 6: Pond 6

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 6: Pond 6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,245.00	0.00	1,245.54	1.46	1,246.08	26.56
1,245.01	0.00	1,245.55	1.64	1,246.09	27.29
1,245.02	0.00	1,245.56	1.84	1,246.10	28.03
1,245.03	0.00	1,245.57	2.06	1,246.11	28.67
1,245.04	0.01	1,245.58	2.28	1,246.12	29.32
1,245.05	0.01	1,245.59	2.52	1,246.13	29.97
1,245.06	0.01	1,245.60	2.78	1,246.14	30.63
1,245.07	0.02	1,245.61	3.04	1,246.15	31.30
1,245.08	0.03	1,245.62	3.32	1,246.16	31.96
1,245.09	0.03	1,245.63	3.60	1,246.17	32.63
1,245.10	0.04	1,245.64	3.90	1,246.18	33.31
1,245.11	0.05	1,245.65	4.20	1,246.19	33.99
1,245.12	0.06	1,245.66	4.52	1,246.20	34.67
1,245.13	0.07	1,245.67	4.84	1,246.21	35.36
1,245.14	0.09	1,245.68	5.17	1,246.22	36.05
1,245.15	0.10	1,245.69	5.51	1,246.23	36.75
1,245.16	0.11	1,245.70	5.86	1,246.24	37.45
1,245.17	0.12	1,245.71	6.23	1,246.25	38.15
1,245.18	0.14	1,245.72	6.61	1,246.26	38.86
1,245.19	0.15	1,245.73	7.00	1,246.27	39.57
1,245.20	0.17	1,245.74	7.40	1,246.28	40.29
1,245.21	0.19	1,245.75	7.81	1,246.29	41.01
1,245.22	0.20	1,245.76	8.23	1,246.30	41.74
1,245.23	0.22	1,245.77	8.66	1,246.31	42.48
1,245.24	0.24	1,245.78	9.10	1,246.32	43.22
1,245.25	0.26	1,245.79	9.55	1,246.33	43.98
1,245.26	0.28	1,245.80	10.00	1,246.34	44.73
1,245.27	0.30	1,245.81	10.47	1,246.35	45.48
1,245.28	0.32	1,245.82	10.94	1,246.36	46.25
1,245.29	0.35	1,245.83	11.43	1,246.37	47.01
1,245.30	0.37	1,245.84	11.92	1,246.38	47.78
1,245.31	0.39	1,245.85	12.42	1,246.39	48.56
1,245.32	0.42	1,245.86	12.93	1,246.40	49.34
1,245.33	0.44	1,245.87	13.45	1,246.41	50.12
1,245.34	0.47	1,245.88	13.98	1,246.42	50.91
1,245.35	0.49	1,245.89	14.51	1,246.43	51.70
1,245.36	0.52	1,245.90	15.05	1,246.44	52.49
1,245.37	0.55	1,245.91	15.62	1,246.45	53.29
1,245.38	0.57	1,245.92	16.19	1,246.46	54.10
1,245.39	0.60	1,245.93	16.77	1,246.47	54.90
1,245.40	0.63	1,245.94	17.36	1,246.48	55.71
1,245.41	0.66	1,245.95	17.95	1,246.49	56.53
1,245.42	0.69	1,245.96	18.56	1,246.50	57.35
1,245.43	0.72	1,245.97	19.17		
1,245.44	0.75	1,245.98	19.79		
1,245.45	0.78	1,245.99	20.42		
1,245.46	0.81	1,246.00	21.06		
1,245.47	0.85	1,246.01	21.71		
1,245.48	0.88	1,246.02	22.38		
1,245.49	0.91	1,246.03	23.05		
1,245.50	0.95	1,246.04	23.73		
1,245.51	1.03	1,246.05	24.42		
1,245.52	1.15	1,246.06	25.12		
1,245.53	1.29	1,246.07	25.84		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 6: Pond 6

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,245.00	0.750	0.000	1,246.08	0.848	0.863
1,245.02	0.752	0.015	1,246.10	0.850	0.880
1,245.04	0.754	0.030	1,246.12	0.852	0.897
1,245.06	0.755	0.045	1,246.14	0.854	0.914
1,245.08	0.757	0.060	1,246.16	0.855	0.931
1,245.10	0.759	0.075	1,246.18	0.857	0.948
1,245.12	0.761	0.091	1,246.20	0.859	0.966
1,245.14	0.763	0.106	1,246.22	0.861	0.983
1,245.16	0.765	0.121	1,246.24	0.863	1.000
1,245.18	0.766	0.136	1,246.26	0.864	1.017
1,245.20	0.768	0.152	1,246.28	0.866	1.035
1,245.22	0.770	0.167	1,246.30	0.868	1.052
1,245.24	0.772	0.183	1,246.32	0.870	1.069
1,245.26	0.774	0.198	1,246.34	0.872	1.087
1,245.28	0.775	0.214	1,246.36	0.873	1.104
1,245.30	0.777	0.229	1,246.38	0.875	1.122
1,245.32	0.779	0.245	1,246.40	0.877	1.139
1,245.34	0.781	0.260	1,246.42	0.879	1.157
1,245.36	0.783	0.276	1,246.44	0.881	1.174
1,245.38	0.785	0.292	1,246.46	0.882	1.192
1,245.40	0.786	0.307	1,246.48	0.884	1.210
1,245.42	0.788	0.323	1,246.50	0.886	1.227
1,245.44	0.790	0.339			
1,245.46	0.792	0.355			
1,245.48	0.794	0.370			
1,245.50	0.795	0.386			
1,245.52	0.797	0.402			
1,245.54	0.799	0.418			
1,245.56	0.801	0.434			
1,245.58	0.803	0.450			
1,245.60	0.805	0.466			
1,245.62	0.806	0.482			
1,245.64	0.808	0.499			
1,245.66	0.810	0.515			
1,245.68	0.812	0.531			
1,245.70	0.814	0.547			
1,245.72	0.816	0.564			
1,245.74	0.817	0.580			
1,245.76	0.819	0.596			
1,245.78	0.821	0.613			
1,245.80	0.823	0.629			
1,245.82	0.825	0.646			
1,245.84	0.826	0.662			
1,245.86	0.828	0.679			
1,245.88	0.830	0.695			
1,245.90	0.832	0.712			
1,245.92	0.834	0.729			
1,245.94	0.836	0.745			
1,245.96	0.837	0.762			
1,245.98	0.839	0.779			
1,246.00	0.841	0.795			
1,246.02	0.843	0.812			
1,246.04	0.845	0.829			
1,246.06	0.846	0.846			

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Type II 24-hr 100-yr Rainfall=6.30"

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Summary for Pond 7: Pond 7

Inflow Area = 81.791 ac, 1.10% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 59.38 cfs @ 14.93 hrs, Volume= 26.208 af
 Outflow = 49.54 cfs @ 15.93 hrs, Volume= 25.186 af, Atten= 17%, Lag= 60.1 min
 Primary = 49.54 cfs @ 15.93 hrs, Volume= 25.186 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,244.89' @ 15.93 hrs Surf.Area= 12.747 ac Storage= 6.400 af

Plug-Flow detention time= 188.0 min calculated for 25.186 af (96% of inflow)
 Center-of-Mass det. time= 163.5 min (1,187.6 - 1,024.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,243.00'	8.373 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,243.00	2.888	0.000	0.000
1,244.00	2.988	2.938	2.938
1,244.80	3.786	2.710	5.648
1,245.00	23.468	2.725	8.373

Device	Routing	Invert	Outlet Devices
#1	Primary	1,243.00'	12.0" Round Culvert L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,243.00' / 1,242.50' S= 0.0104 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,244.00'	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=49.54 cfs @ 15.93 hrs HW=1,244.89' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 4.46 cfs @ 5.67 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 45.08 cfs @ 2.53 fps)

2021-03-16 Hayward Basin Sizing

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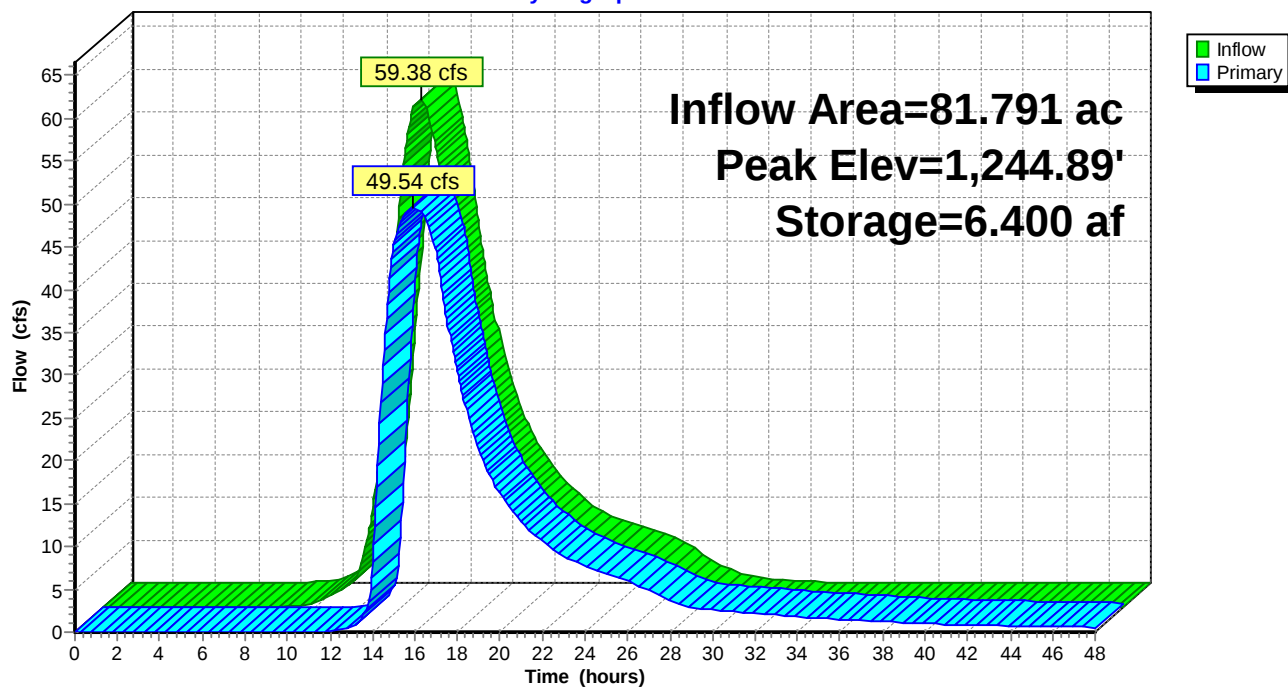
Type II 24-hr 100-yr Rainfall=6.30"

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Pond 7: Pond 7

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 7: Pond 7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,243.00	0.00	1,243.54	1.08	1,244.08	3.94	1,244.62	30.34
1,243.01	0.00	1,243.55	1.12	1,244.09	4.17	1,244.63	30.99
1,243.02	0.00	1,243.56	1.15	1,244.10	4.41	1,244.64	31.64
1,243.03	0.00	1,243.57	1.19	1,244.11	4.66	1,244.65	32.30
1,243.04	0.01	1,243.58	1.22	1,244.12	4.92	1,244.66	32.96
1,243.05	0.01	1,243.59	1.26	1,244.13	5.20	1,244.67	33.62
1,243.06	0.01	1,243.60	1.30	1,244.14	5.48	1,244.68	34.29
1,243.07	0.02	1,243.61	1.33	1,244.15	5.77	1,244.69	34.97
1,243.08	0.03	1,243.62	1.37	1,244.16	6.07	1,244.70	35.65
1,243.09	0.03	1,243.63	1.41	1,244.17	6.38	1,244.71	36.33
1,243.10	0.04	1,243.64	1.44	1,244.18	6.69	1,244.72	37.02
1,243.11	0.05	1,243.65	1.48	1,244.19	7.02	1,244.73	37.71
1,243.12	0.06	1,243.66	1.52	1,244.20	7.35	1,244.74	38.40
1,243.13	0.07	1,243.67	1.55	1,244.21	7.71	1,244.75	39.10
1,243.14	0.09	1,243.68	1.59	1,244.22	8.07	1,244.76	39.81
1,243.15	0.10	1,243.69	1.63	1,244.23	8.45	1,244.77	40.51
1,243.16	0.11	1,243.70	1.67	1,244.24	8.83	1,244.78	41.22
1,243.17	0.12	1,243.71	1.70	1,244.25	9.23	1,244.79	41.94
1,243.18	0.14	1,243.72	1.74	1,244.26	9.63	1,244.80	42.66
1,243.19	0.15	1,243.73	1.78	1,244.27	10.04	1,244.81	43.40
1,243.20	0.17	1,243.74	1.82	1,244.28	10.46	1,244.82	44.14
1,243.21	0.19	1,243.75	1.85	1,244.29	10.89	1,244.83	44.89
1,243.22	0.20	1,243.76	1.89	1,244.30	11.34	1,244.84	45.64
1,243.23	0.22	1,243.77	1.93	1,244.31	11.78	1,244.85	46.39
1,243.24	0.24	1,243.78	1.97	1,244.32	12.24	1,244.86	47.15
1,243.25	0.26	1,243.79	2.00	1,244.33	12.71	1,244.87	47.92
1,243.26	0.28	1,243.80	2.04	1,244.34	13.18	1,244.88	48.68
1,243.27	0.30	1,243.81	2.08	1,244.35	13.67	1,244.89	49.46
1,243.28	0.32	1,243.82	2.12	1,244.36	14.16	1,244.90	50.23
1,243.29	0.35	1,243.83	2.16	1,244.37	14.67	1,244.91	51.01
1,243.30	0.37	1,243.84	2.19	1,244.38	15.18	1,244.92	51.80
1,243.31	0.39	1,243.85	2.23	1,244.39	15.70	1,244.93	52.59
1,243.32	0.42	1,243.86	2.27	1,244.40	16.23	1,244.94	53.38
1,243.33	0.44	1,243.87	2.30	1,244.41	16.78	1,244.95	54.18
1,243.34	0.47	1,243.88	2.34	1,244.42	17.34	1,244.96	54.98
1,243.35	0.49	1,243.89	2.37	1,244.43	17.91	1,244.97	55.79
1,243.36	0.52	1,243.90	2.40	1,244.44	18.49	1,244.98	56.60
1,243.37	0.55	1,243.91	2.44	1,244.45	19.08	1,244.99	57.41
1,243.38	0.57	1,243.92	2.47	1,244.46	19.67	1,245.00	58.23
1,243.39	0.60	1,243.93	2.50	1,244.47	20.28		
1,243.40	0.63	1,243.94	2.53	1,244.48	20.90		
1,243.41	0.66	1,243.95	2.56	1,244.49	21.53		
1,243.42	0.69	1,243.96	2.58	1,244.50	22.16		
1,243.43	0.72	1,243.97	2.61	1,244.51	22.81		
1,243.44	0.75	1,243.98	2.63	1,244.52	23.46		
1,243.45	0.78	1,243.99	2.66	1,244.53	24.13		
1,243.46	0.81	1,244.00	2.67	1,244.54	24.80		
1,243.47	0.85	1,244.01	2.75	1,244.55	25.49		
1,243.48	0.88	1,244.02	2.86	1,244.56	26.18		
1,243.49	0.91	1,244.03	3.00	1,244.57	26.89		
1,243.50	0.95	1,244.04	3.15	1,244.58	27.60		
1,243.51	0.98	1,244.05	3.33	1,244.59	28.33		
1,243.52	1.01	1,244.06	3.52	1,244.60	29.06		
1,243.53	1.05	1,244.07	3.72	1,244.61	29.70		

2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Area-Storage for Pond 7: Pond 7

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,243.00	2.888	0.000	1,244.08	3.068	3.180
1,243.02	2.890	0.058	1,244.10	3.088	3.242
1,243.04	2.892	0.116	1,244.12	3.108	3.304
1,243.06	2.894	0.173	1,244.14	3.128	3.366
1,243.08	2.896	0.231	1,244.16	3.148	3.429
1,243.10	2.898	0.289	1,244.18	3.168	3.492
1,243.12	2.900	0.347	1,244.20	3.188	3.556
1,243.14	2.902	0.405	1,244.22	3.207	3.619
1,243.16	2.904	0.463	1,244.24	3.227	3.684
1,243.18	2.906	0.521	1,244.26	3.247	3.749
1,243.20	2.908	0.580	1,244.28	3.267	3.814
1,243.22	2.910	0.638	1,244.30	3.287	3.879
1,243.24	2.912	0.696	1,244.32	3.307	3.945
1,243.26	2.914	0.754	1,244.34	3.327	4.012
1,243.28	2.916	0.813	1,244.36	3.347	4.078
1,243.30	2.918	0.871	1,244.38	3.367	4.145
1,243.32	2.920	0.929	1,244.40	3.387	4.213
1,243.34	2.922	0.988	1,244.42	3.407	4.281
1,243.36	2.924	1.046	1,244.44	3.427	4.349
1,243.38	2.926	1.105	1,244.46	3.447	4.418
1,243.40	2.928	1.163	1,244.48	3.467	4.487
1,243.42	2.930	1.222	1,244.50	3.487	4.557
1,243.44	2.932	1.280	1,244.52	3.507	4.627
1,243.46	2.934	1.339	1,244.54	3.527	4.697
1,243.48	2.936	1.398	1,244.56	3.547	4.768
1,243.50	2.938	1.456	1,244.58	3.567	4.839
1,243.52	2.940	1.515	1,244.60	3.586	4.910
1,243.54	2.942	1.574	1,244.62	3.606	4.982
1,243.56	2.944	1.633	1,244.64	3.626	5.055
1,243.58	2.946	1.692	1,244.66	3.646	5.127
1,243.60	2.948	1.751	1,244.68	3.666	5.200
1,243.62	2.950	1.810	1,244.70	3.686	5.274
1,243.64	2.952	1.869	1,244.72	3.706	5.348
1,243.66	2.954	1.928	1,244.74	3.726	5.422
1,243.68	2.956	1.987	1,244.76	3.746	5.497
1,243.70	2.958	2.046	1,244.78	3.766	5.572
1,243.72	2.960	2.105	1,244.80	3.786	5.648
1,243.74	2.962	2.165	1,244.82	5.754	5.743
1,243.76	2.964	2.224	1,244.84	7.722	5.878
1,243.78	2.966	2.283	1,244.86	9.691	6.052
1,243.80	2.968	2.342	1,244.88	11.659	6.265
1,243.82	2.970	2.402	1,244.90	13.627	6.518
1,243.84	2.972	2.461	1,244.92	15.595	6.810
1,243.86	2.974	2.521	1,244.94	17.563	7.142
1,243.88	2.976	2.580	1,244.96	19.532	7.513
1,243.90	2.978	2.640	1,244.98	21.500	7.923
1,243.92	2.980	2.699	1,245.00	23.468	8.373
1,243.94	2.982	2.759			
1,243.96	2.984	2.819			
1,243.98	2.986	2.878			
1,244.00	2.988	2.938			
1,244.02	3.008	2.998			
1,244.04	3.028	3.058			
1,244.06	3.048	3.119			

2021-03-16 Hayward Basin Sizing

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Summary for Pond 8: Pond 8

Inflow Area = 3.412 ac, 0.00% Impervious, Inflow Depth = 3.85" for 100-yr event
 Inflow = 15.63 cfs @ 12.10 hrs, Volume= 1.093 af
 Outflow = 3.64 cfs @ 12.47 hrs, Volume= 1.074 af, Atten= 77%, Lag= 22.6 min
 Primary = 3.64 cfs @ 12.47 hrs, Volume= 1.074 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,247.06' @ 12.47 hrs Surf.Area= 0.511 ac Storage= 0.504 af

Plug-Flow detention time= 184.9 min calculated for 1.072 af (98% of inflow)
 Center-of-Mass det. time= 175.3 min (999.9 - 824.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,246.00'	0.994 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,246.00	0.440	0.000	0.000
1,247.00	0.510	0.475	0.475
1,248.00	0.529	0.519	0.994

Device	Routing	Invert	Outlet Devices
#1	Primary	1,246.00'	12.0" Round Culvert L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,246.00' / 1,245.50' S= 0.0100 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	1,247.00'	25.0' 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=3.62 cfs @ 12.47 hrs HW=1,247.06' (Free Discharge)

↑ **1=Culvert** (Inlet Controls 2.82 cfs @ 3.59 fps)

└ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.80 cfs @ 0.56 fps)

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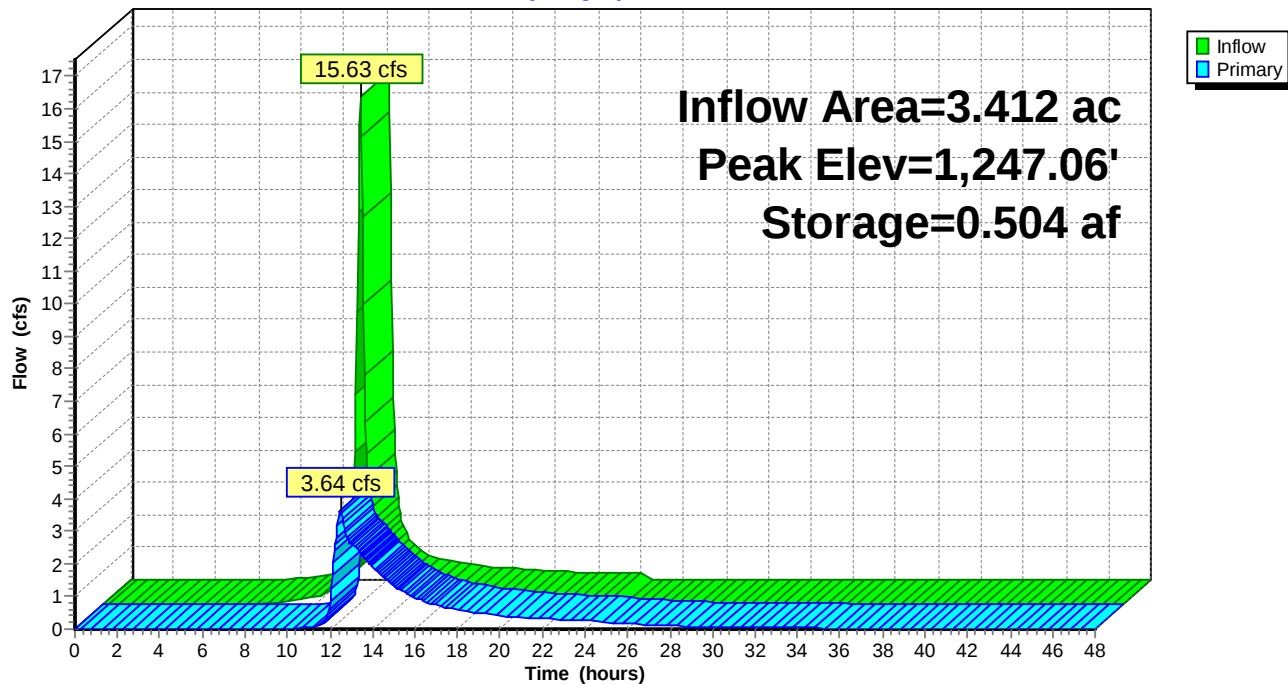
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Pond 8: Pond 8

Hydrograph



2021-03-16 Hayward Basin Sizing

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Type II 24-hr 100-yr Rainfall=6.30"

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Stage-Discharge for Pond 8: Pond 8

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,246.00	0.00	1,246.54	1.08	1,247.08	4.20	1,247.62	36.89
1,246.01	0.00	1,246.55	1.11	1,247.09	4.48	1,247.63	37.69
1,246.02	0.00	1,246.56	1.15	1,247.10	4.78	1,247.64	38.50
1,246.03	0.00	1,246.57	1.18	1,247.11	5.09	1,247.65	39.32
1,246.04	0.01	1,246.58	1.22	1,247.12	5.41	1,247.66	40.14
1,246.05	0.01	1,246.59	1.25	1,247.13	5.74	1,247.67	40.97
1,246.06	0.01	1,246.60	1.29	1,247.14	6.09	1,247.68	41.80
1,246.07	0.02	1,246.61	1.32	1,247.15	6.45	1,247.69	42.64
1,246.08	0.03	1,246.62	1.36	1,247.16	6.82	1,247.70	43.48
1,246.09	0.03	1,246.63	1.39	1,247.17	7.20	1,247.71	44.33
1,246.10	0.04	1,246.64	1.43	1,247.18	7.59	1,247.72	45.19
1,246.11	0.05	1,246.65	1.47	1,247.19	7.99	1,247.73	46.05
1,246.12	0.06	1,246.66	1.50	1,247.20	8.40	1,247.74	46.91
1,246.13	0.07	1,246.67	1.54	1,247.21	8.84	1,247.75	47.78
1,246.14	0.08	1,246.68	1.58	1,247.22	9.29	1,247.76	48.66
1,246.15	0.10	1,246.69	1.61	1,247.23	9.75	1,247.77	49.54
1,246.16	0.11	1,246.70	1.65	1,247.24	10.23	1,247.78	50.42
1,246.17	0.12	1,246.71	1.69	1,247.25	10.71	1,247.79	51.31
1,246.18	0.14	1,246.72	1.72	1,247.26	11.21	1,247.80	52.21
1,246.19	0.15	1,246.73	1.76	1,247.27	11.72	1,247.81	53.13
1,246.20	0.17	1,246.74	1.80	1,247.28	12.24	1,247.82	54.05
1,246.21	0.19	1,246.75	1.84	1,247.29	12.78	1,247.83	54.98
1,246.22	0.20	1,246.76	1.87	1,247.30	13.32	1,247.84	55.91
1,246.23	0.22	1,246.77	1.91	1,247.31	13.88	1,247.85	56.85
1,246.24	0.24	1,246.78	1.95	1,247.32	14.45	1,247.86	57.80
1,246.25	0.26	1,246.79	1.99	1,247.33	15.03	1,247.87	58.75
1,246.26	0.28	1,246.80	2.02	1,247.34	15.58	1,247.88	59.70
1,246.27	0.30	1,246.81	2.06	1,247.35	16.18	1,247.89	60.67
1,246.28	0.32	1,246.82	2.10	1,247.36	16.80	1,247.90	61.63
1,246.29	0.35	1,246.83	2.14	1,247.37	17.42	1,247.91	62.60
1,246.30	0.37	1,246.84	2.17	1,247.38	18.06	1,247.92	63.58
1,246.31	0.39	1,246.85	2.21	1,247.39	18.70	1,247.93	64.56
1,246.32	0.42	1,246.86	2.25	1,247.40	19.36	1,247.94	65.55
1,246.33	0.44	1,246.87	2.29	1,247.41	20.04	1,247.95	66.54
1,246.34	0.47	1,246.88	2.32	1,247.42	20.74	1,247.96	67.54
1,246.35	0.49	1,246.89	2.36	1,247.43	21.44	1,247.97	68.54
1,246.36	0.52	1,246.90	2.40	1,247.44	22.16	1,247.98	69.55
1,246.37	0.55	1,246.91	2.43	1,247.45	22.89	1,247.99	70.56
1,246.38	0.57	1,246.92	2.47	1,247.46	23.63	1,248.00	71.58
1,246.39	0.60	1,246.93	2.50	1,247.47	24.39		
1,246.40	0.63	1,246.94	2.53	1,247.48	25.15		
1,246.41	0.66	1,246.95	2.56	1,247.49	25.93		
1,246.42	0.69	1,246.96	2.58	1,247.50	26.72		
1,246.43	0.72	1,246.97	2.61	1,247.51	27.53		
1,246.44	0.75	1,246.98	2.63	1,247.52	28.34		
1,246.45	0.78	1,246.99	2.66	1,247.53	29.17		
1,246.46	0.81	1,247.00	2.67	1,247.54	30.01		
1,246.47	0.85	1,247.01	2.76	1,247.55	30.86		
1,246.48	0.88	1,247.02	2.89	1,247.56	31.72		
1,246.49	0.91	1,247.03	3.06	1,247.57	32.60		
1,246.50	0.95	1,247.04	3.25	1,247.58	33.48		
1,246.51	0.98	1,247.05	3.46	1,247.59	34.38		
1,246.52	1.01	1,247.06	3.69	1,247.60	35.30		
1,246.53	1.05	1,247.07	3.94	1,247.61	36.09		

2021-03-16 Hayward Basin Sizing

Prepared by Westwood Professional Services

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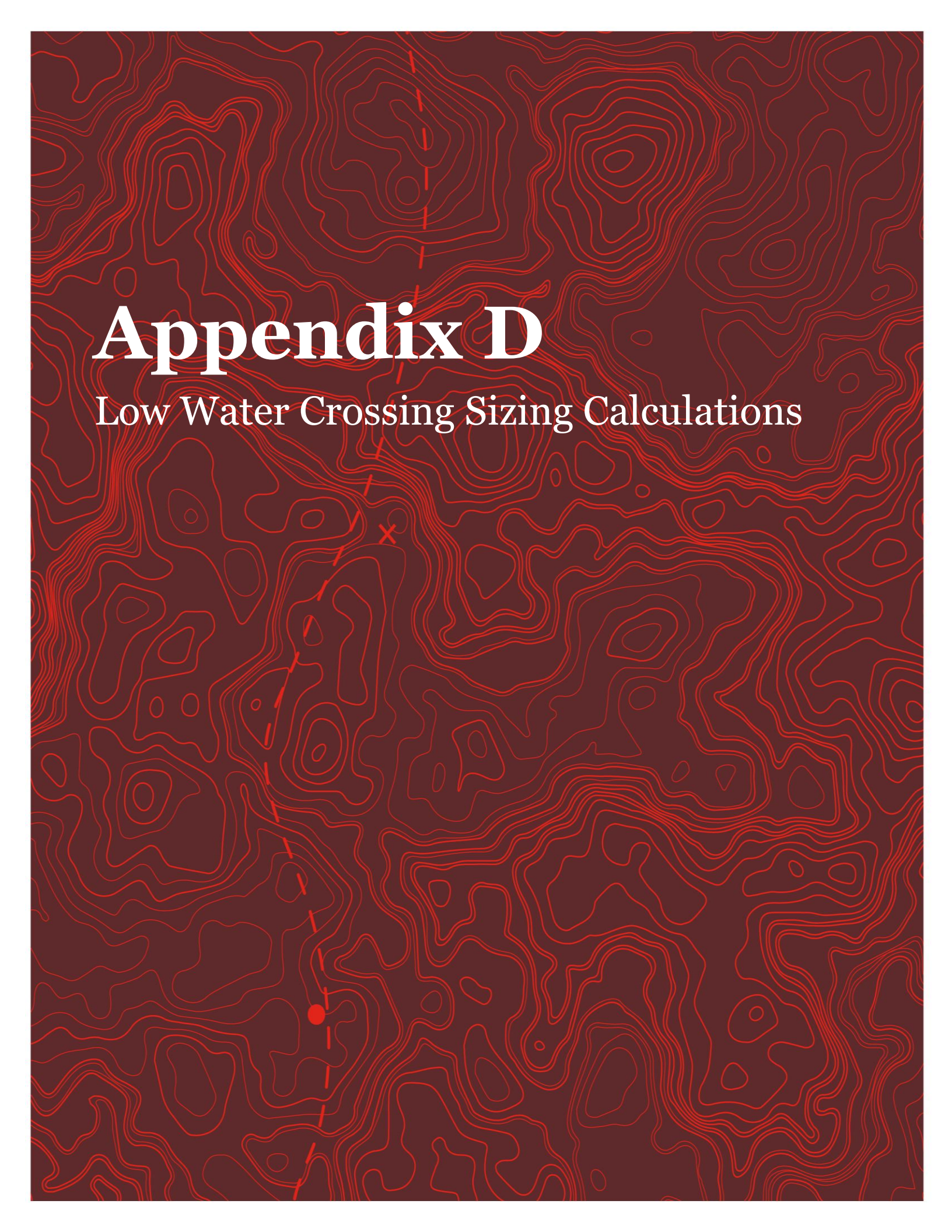
Type II 24-hr 100-yr Rainfall=6.30"

Printed 3/22/2021

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Stage-Area-Storage for Pond 8: Pond 8

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,246.00	0.440	0.000	1,247.08	0.512	0.516
1,246.02	0.441	0.009	1,247.10	0.512	0.526
1,246.04	0.443	0.018	1,247.12	0.512	0.536
1,246.06	0.444	0.027	1,247.14	0.513	0.547
1,246.08	0.446	0.035	1,247.16	0.513	0.557
1,246.10	0.447	0.044	1,247.18	0.513	0.567
1,246.12	0.448	0.053	1,247.20	0.514	0.577
1,246.14	0.450	0.062	1,247.22	0.514	0.588
1,246.16	0.451	0.071	1,247.24	0.515	0.598
1,246.18	0.453	0.080	1,247.26	0.515	0.608
1,246.20	0.454	0.089	1,247.28	0.515	0.619
1,246.22	0.455	0.098	1,247.30	0.516	0.629
1,246.24	0.457	0.108	1,247.32	0.516	0.639
1,246.26	0.458	0.117	1,247.34	0.516	0.649
1,246.28	0.460	0.126	1,247.36	0.517	0.660
1,246.30	0.461	0.135	1,247.38	0.517	0.670
1,246.32	0.462	0.144	1,247.40	0.518	0.681
1,246.34	0.464	0.154	1,247.42	0.518	0.691
1,246.36	0.465	0.163	1,247.44	0.518	0.701
1,246.38	0.467	0.172	1,247.46	0.519	0.712
1,246.40	0.468	0.182	1,247.48	0.519	0.722
1,246.42	0.469	0.191	1,247.50	0.519	0.732
1,246.44	0.471	0.200	1,247.52	0.520	0.743
1,246.46	0.472	0.210	1,247.54	0.520	0.753
1,246.48	0.474	0.219	1,247.56	0.521	0.764
1,246.50	0.475	0.229	1,247.58	0.521	0.774
1,246.52	0.476	0.238	1,247.60	0.521	0.784
1,246.54	0.478	0.248	1,247.62	0.522	0.795
1,246.56	0.479	0.257	1,247.64	0.522	0.805
1,246.58	0.481	0.267	1,247.66	0.523	0.816
1,246.60	0.482	0.277	1,247.68	0.523	0.826
1,246.62	0.483	0.286	1,247.70	0.523	0.837
1,246.64	0.485	0.296	1,247.72	0.524	0.847
1,246.66	0.486	0.306	1,247.74	0.524	0.858
1,246.68	0.488	0.315	1,247.76	0.524	0.868
1,246.70	0.489	0.325	1,247.78	0.525	0.879
1,246.72	0.490	0.335	1,247.80	0.525	0.889
1,246.74	0.492	0.345	1,247.82	0.526	0.900
1,246.76	0.493	0.355	1,247.84	0.526	0.910
1,246.78	0.495	0.364	1,247.86	0.526	0.921
1,246.80	0.496	0.374	1,247.88	0.527	0.931
1,246.82	0.497	0.384	1,247.90	0.527	0.942
1,246.84	0.499	0.394	1,247.92	0.527	0.952
1,246.86	0.500	0.404	1,247.94	0.528	0.963
1,246.88	0.502	0.414	1,247.96	0.528	0.973
1,246.90	0.503	0.424	1,247.98	0.529	0.984
1,246.92	0.504	0.434	1,248.00	0.529	0.994
1,246.94	0.506	0.445			
1,246.96	0.507	0.455			
1,246.98	0.509	0.465			
1,247.00	0.510	0.475			
1,247.02	0.510	0.485			
1,247.04	0.511	0.495			
1,247.06	0.511	0.506			



Appendix D

Low Water Crossing Sizing Calculations

				design storm (yr)				
Ditch Slope (%)	Max Flow Depth (ft)	Shear Stress	Partivle size necessary to Resist Shear Stress (in)	10	Heavy Duty LWC Max Depth Required for selected storm event	Standard LWC Minimum Depth Required for selected storm event	Heavy Duty LWC Length (ft)	Standard LWC Length (not including Heavy Duty length if applicable)
1.0	2.5	1.56	6	STANDARD DUTY	0	0.64		30