



The Retreat at Wolf Creek Utah Storm Drain Analysis

February 2009



Introduction

The following report summarizes the storm water modeling for Wolf Creek Parcel 7. HydroCAD (version 8.0) Stormwater modeling software was used to analyze the watershed basins and size the detention ponds. The USDA Soil Conservation Service (SCS) TR-20 method was used in this analysis, with a Type II 24 hr storm distribution.

Design Criteria

Design criteria from Weber County Design Standards:

- Design storm: 10 year, 2 hour
- Maximum post development runoff not to excel: 0.1 cfs/acre

Site Data

Site Location: Latitude 41.33111 N
Longitude 111.81833 W

Soil Type: Hydrological Soil Group C
Web Soil Survey <http://sebsoilssurvey.nrcs.usda.gov>

Procedure

Modeling was completed to size ponds that would meet the following criteria: 1) Retain 10 year, 2 hour storm, 2) Detain and release 10 year, 24 hour storm at a rate at or below the predevelopment release rate.

Tables 1 and 2 give the results of the 10yr-2hr and 10yr-24hr events respectively (see appendix A and B for detailed summaries of the 10yr-2hr and 10yr-24hr models):

Table 1, 10 year – 2 hour

Basin	Runoff (cfs)	Pond	Outflow (cfs)
A	0.38	1	0
B	1.17	1	0.43
C	1.01	3	0
D	0.17	4	0.17
E	0.36	5	0
F	1.32	6	0
G	1.15	7	0
1			0.02
2			0.00
3			0.00

Total: 0.62
Allowed Discharge @0.1 cfs/ac 3.57
 $0.62 < 3.57$
ok !

Table 2, 10 year - 24 hour

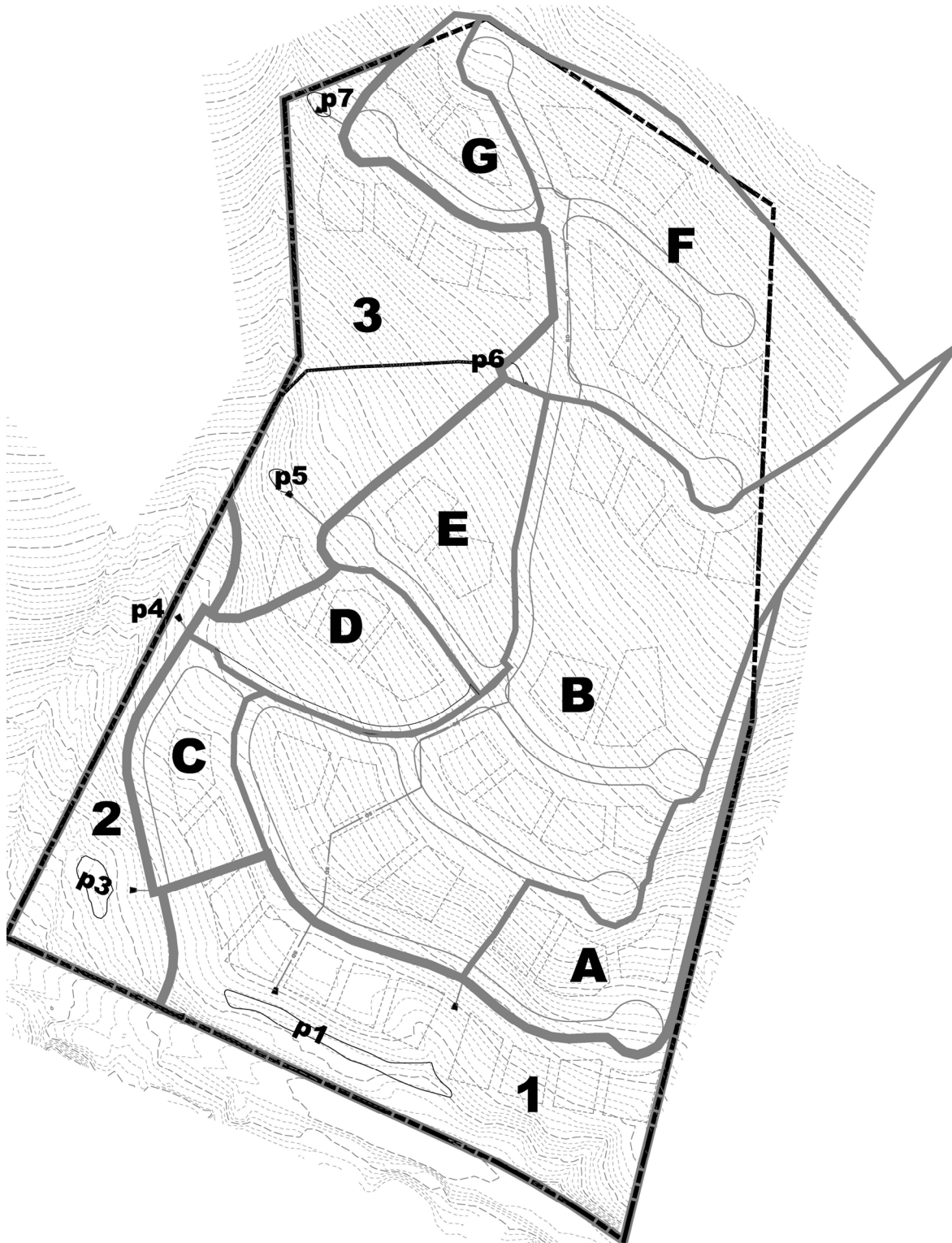
Basin	Runoff (cfs)	Pond	Outflow (cfs)
A	3.89	1	
B	13.76	1	5.75
C	3.92	3	0.13
D	2.49	4	2.49
E	3.61	5	0.22
F	11.66	6	1.41
G	3.80	7	0.11
1			2.67
2			0.82
3			3.86

Total 17.46
Pre-Development Flow = 22.18
17.46 < 22.2
ok!

Summary

Model results indicate that the ponds are sized accordingly to meet the criteria of totally detaining the 10yr-2hr event, and discharging at or below the predevelopment rate in a 10yr-24hr storm.

Model Exhibit



HydroCAD Output

10 year, 24 hour Storm Event

10 year, 2 hour Storm Event

- Predevelopment Flows
- Basin / Pond Summaries A-G
- Basin Summaries 1-3

Wolf Creek - Pre Development

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Subcatchment PRE: Predevelopment

Runoff = 22.18 cfs @ 12.12 hrs, Volume= 81,190 cf, Depth= 0.63"

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

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
35.740	63	Sagebrush range, Fair, HSG C
35.740		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	200	0.1600	0.33		Sheet Flow, Overland Flow Range n= 0.130 P2= 1.41"
6.2	1,419	0.1470	3.83		Shallow Concentrated Flow, Overland Flow Nearly Bare & Untilled Kv= 10.0 fps
16.2	1,619	Total			

Subcatchment PRE: Predevelopment

Runoff = 0.47 cfs @ 2.04 hrs, Volume= 1,177 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
35.740	63	Sagebrush range, Fair, HSG C
35.740		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	200	0.1600	0.33		Sheet Flow, Overland Flow Range n= 0.130 P2= 1.41"
6.2	1,419	0.1470	3.83		Shallow Concentrated Flow, Overland Flow Nearly Bare & Untilled Kv= 10.0 fps
16.2	1,619	Total			

Wolf Creek - Basins A & B

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Subcatchment 2S: Basin B

Runoff = 13.76 cfs @ 12.11 hrs, Volume= 44,410 cf, Depth= 1.02"

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

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.950	98	Paved parking & roofs
1.900	98	Paved parking & roofs
9.150	63	Sagebrush range, Fair, HSG C
12.000	71	Weighted Average
9.150		Pervious Area
2.850		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	300	0.1470	0.47		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
5.3	605	0.1450	1.90		Shallow Concentrated Flow, Overland Flow Woodland Kv= 5.0 fps
0.8	200	0.0450	4.31		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.5	680	0.1290	21.35	37.73	Circular Channel (pipe), Pipe Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
17.3	1,785	Total			

Subcatchment 3S: Basin A

Runoff = 3.89 cfs @ 12.07 hrs, Volume= 10,969 cf, Depth= 1.08"

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

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.310	98	Paved parking & roofs
0.430	98	Paved parking & roofs
2.070	63	Sagebrush range, Fair, HSG C
2.810	72	Weighted Average
2.070		Pervious Area
0.740		Impervious Area

Wolf Creek - Basins A & B

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	300	0.3830	0.69		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
4.1	498	0.1670	2.04		Shallow Concentrated Flow, Overland Flow Woodland Kv= 5.0 fps
2.2	329	0.0150	2.49		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.1	70	0.1500	23.02	40.68	Circular Channel (pipe), Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
13.7	1,197	Total			

Pond 1P: Pond 1

Inflow Area = 645,124 sf, Inflow Depth = 1.03" for Wolf Creek 10yr 24hr event
 Inflow = 17.42 cfs @ 12.10 hrs, Volume= 55,379 cf
 Outflow = 5.75 cfs @ 12.40 hrs, Volume= 55,381 cf, Atten= 67%, Lag= 17.9 min
 Primary = 0.57 cfs @ 12.40 hrs, Volume= 31,490 cf
 Secondary = 5.17 cfs @ 12.40 hrs, Volume= 23,890 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,431.98' @ 12.40 hrs Surf.Area= 9,274 sf Storage= 17,235 cf

Plug-Flow detention time= 156.2 min calculated for 55,323 cf (100% of inflow)
 Center-of-Mass det. time= 156.4 min (1,029.6 - 873.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	5,427.00'	17,453 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
5,427.00	135	67.0	0	0	135
5,428.00	442	94.0	274	274	490
5,430.00	4,184	785.0	3,991	4,264	48,833
5,432.00	9,346	858.0	13,189	17,453	58,517

Device	Routing	Invert	Outlet Devices											
#1	Primary	5,426.00'	3.0" Vert. Orifice/Grate C= 0.600											
#2	Secondary	5,431.00'	2.0' long x 6.0' 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)	2.37	2.51	2.70	2.68	2.68	2.67	2.65	2.65	2.65		
				2.65	2.66	2.66	2.67	2.69	2.72	2.76	2.83			

Primary OutFlow Max=0.57 cfs @ 12.40 hrs HW=5,431.98' (Free Discharge)
 ↑ **1=Orifice/Grate** (Orifice Controls 0.57 cfs @ 11.65 fps)

Secondary OutFlow Max=5.17 cfs @ 12.40 hrs HW=5,431.98' (Free Discharge)
 ↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 5.17 cfs @ 2.65 fps)

Wolf Creek - Basins A & B

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

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Subcatchment 2S: Basin B

Runoff = 1.17 cfs @ 1.34 hrs, Volume= 3,276 cf, Depth= 0.08"

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

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.950	98	Paved parking & roofs
1.900	98	Paved parking & roofs
9.150	63	Sagebrush range, Fair, HSG C
12.000	71	Weighted Average
9.150		Pervious Area
2.850		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	300	0.1470	0.47		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
5.3	605	0.1450	1.90		Shallow Concentrated Flow, Overland Flow Woodland Kv= 5.0 fps
0.8	200	0.0450	4.31		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.5	680	0.1290	21.35	37.73	Circular Channel (pipe), Pipe Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
17.3	1,785	Total			

Subcatchment 3S: Basin A

Runoff = 0.38 cfs @ 1.25 hrs, Volume= 902 cf, Depth= 0.09"

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

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.310	98	Paved parking & roofs
0.430	98	Paved parking & roofs
2.070	63	Sagebrush range, Fair, HSG C
2.810	72	Weighted Average
2.070		Pervious Area
0.740		Impervious Area

Wolf Creek - Basins A & B

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	300	0.3830	0.69		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
4.1	498	0.1670	2.04		Shallow Concentrated Flow, Overland Flow Woodland Kv= 5.0 fps
2.2	329	0.0150	2.49		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.1	70	0.1500	23.02	40.68	Circular Channel (pipe), Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
13.7	1,197	Total			

Pond 1P: Pond 1

Inflow Area = 645,124 sf, Inflow Depth = 0.08" for Wolf Creek 10yr 2hr event
 Inflow = 1.52 cfs @ 1.32 hrs, Volume= 4,178 cf
 Outflow = 0.43 cfs @ 2.20 hrs, Volume= 4,188 cf, Atten= 72%, Lag= 53.0 min
 Primary = 0.43 cfs @ 2.20 hrs, Volume= 4,188 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,429.46' @ 2.20 hrs Surf.Area= 2,809 sf Storage= 2,405 cf

Plug-Flow detention time= 56.1 min calculated for 4,175 cf (100% of inflow)
 Center-of-Mass det. time= 56.3 min (153.4 - 97.0)

Volume #1	Invert 5,427.00'	Avail.Storage 17,453 cf	Storage Description Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
5,427.00	135	67.0	0	0	135
5,428.00	442	94.0	274	274	490
5,430.00	4,184	785.0	3,991	4,264	48,833
5,432.00	9,346	858.0	13,189	17,453	58,517

Device	Routing	Invert	Outlet Devices											
#1	Primary	5,426.00'	3.0" Vert. Orifice/Grate C= 0.600											
#2	Secondary	5,431.00'	2.0' long x 6.0' 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)	2.37	2.51	2.70	2.68	2.68	2.67	2.65	2.65	2.65		
				2.65	2.66	2.66	2.67	2.69	2.72	2.76	2.83			

Primary OutFlow Max=0.43 cfs @ 2.20 hrs HW=5,429.46' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 0.43 cfs @ 8.80 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5,427.00' (Free Discharge)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Wolf Creek - Basins C & D

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Subcatchment 3S: Basin C

Runoff = 3.92 cfs @ 11.91 hrs, Volume= 7,307 cf, Depth= 1.38"

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

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.360	98	Paved parking & roofs
0.210	98	Paved parking & roofs
0.890	63	Sagebrush range, Fair, HSG C
1.460	77	Weighted Average
0.890		Pervious Area
0.570		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	527	0.0800	5.74		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.0	26	0.5410	38.72	47.51	Circular Channel (pipe), Pipe Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
1.5	553	Total			

Subcatchment 4S: Basin D

Runoff = 2.49 cfs @ 12.02 hrs, Volume= 6,166 cf, Depth= 0.97"

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

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.160	98	Paved parking & roofs
0.210	98	Paved parking & roofs
1.390	63	Sagebrush range, Fair, HSG C
1.760	70	Weighted Average
1.390		Pervious Area
0.370		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	246	0.1500	0.45		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
0.5	150	0.0530	4.67		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.0	56	0.1070	19.44	34.36	Circular Channel (pipe), Storm Pipe Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
9.6	452	Total			

Wolf Creek - Basins C & D

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Pond 3P: Pond 3

Inflow Area = 63,598 sf, Inflow Depth = 1.38" for Wolf Creek 10yr 24hr event
 Inflow = 3.92 cfs @ 11.91 hrs, Volume= 7,307 cf
 Outflow = 0.13 cfs @ 14.04 hrs, Volume= 2,797 cf, Atten= 97%, Lag= 127.3 min
 Primary = 0.13 cfs @ 14.04 hrs, Volume= 2,797 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,413.09' @ 14.04 hrs Surf.Area= 2,558 sf Storage= 4,730 cf

Plug-Flow detention time= 364.0 min calculated for 2,797 cf (38% of inflow)
 Center-of-Mass det. time= 229.6 min (1,070.6 - 841.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	5,409.00'	7,477 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
5,409.00	196	84.0	0	0	196
5,410.00	559	108.0	362	362	575
5,412.00	1,640	166.0	2,104	2,466	1,869
5,414.00	3,485	250.0	5,010	7,477	4,681

Device	Routing	Invert	Outlet Devices											
#1	Primary	5,413.00'	2.0' long x 6.0' 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)	2.37	2.51	2.70	2.68	2.68	2.67	2.65	2.65	2.65		
				2.65	2.66	2.66	2.67	2.69	2.72	2.76	2.83			

Primary OutFlow Max=0.12 cfs @ 14.04 hrs HW=5,413.09' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 0.12 cfs @ 0.70 fps)

Pond 4P: Pond 4

Inflow Area = 76,666 sf, Inflow Depth = 0.97" for Wolf Creek 10yr 24hr event
 Inflow = 2.49 cfs @ 12.02 hrs, Volume= 6,166 cf
 Primary = 2.49 cfs @ 12.02 hrs, Volume= 6,166 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Wolf Creek - Basins C & D

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

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Subcatchment 3S: Basin C

Runoff = 1.01 cfs @ 1.02 hrs, Volume= 921 cf, Depth= 0.17"

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

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.360	98	Paved parking & roofs
0.210	98	Paved parking & roofs
0.890	63	Sagebrush range, Fair, HSG C
1.460	77	Weighted Average
0.890		Pervious Area
0.570		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	527	0.0800	5.74		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.0	26	0.5410	38.72	47.51	Circular Channel (pipe), Pipe Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
1.5	553	Total			

Subcatchment 4S: Basin D

Runoff = 0.17 cfs @ 1.22 hrs, Volume= 404 cf, Depth= 0.06"

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

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.160	98	Paved parking & roofs
0.210	98	Paved parking & roofs
1.390	63	Sagebrush range, Fair, HSG C
1.760	70	Weighted Average
1.390		Pervious Area
0.370		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	246	0.1500	0.45		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
0.5	150	0.0530	4.67		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.0	56	0.1070	19.44	34.36	Circular Channel (pipe), Storm Pipe Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
9.6	452	Total			

Wolf Creek - Basins C & D

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

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Pond 3P: Pond 3

Inflow Area = 63,598 sf, Inflow Depth = 0.17" for Wolf Creek10yr 2hr event
 Inflow = 1.01 cfs @ 1.02 hrs, Volume= 921 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,410.77' @ 2.15 hrs Surf.Area= 908 sf Storage= 921 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	5,409.00'	7,477 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
5,409.00	196	84.0	0	0	196
5,410.00	559	108.0	362	362	575
5,412.00	1,640	166.0	2,104	2,466	1,869
5,414.00	3,485	250.0	5,010	7,477	4,681

Device	Routing	Invert	Outlet Devices											
#1	Primary	5,413.00'	2.0' long x 6.0' 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)	2.37	2.51	2.70	2.68	2.68	2.67	2.65	2.65	2.65		
				2.65	2.66	2.66	2.67	2.69	2.72	2.76	2.83			

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5,409.00' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 4P: Pond 4

Inflow Area = 76,666 sf, Inflow Depth = 0.06" for Wolf Creek10yr 2hr event
 Inflow = 0.17 cfs @ 1.22 hrs, Volume= 404 cf
 Primary = 0.17 cfs @ 1.22 hrs, Volume= 404 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Wolf Creek - Basins E & F

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Subcatchment 5S: Basin E

Runoff = 3.61 cfs @ 12.01 hrs, Volume= 8,566 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.350	98	Paved parking & roofs
0.210	98	Paved parking & roofs
1.640	63	Sagebrush range, Fair, HSG C
2.200	72	Weighted Average
1.640		Pervious Area
0.560		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	200	0.1450	0.43		Sheet Flow, Range n= 0.130 P2= 2.51"
0.8	181	0.1380	3.71		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps
0.5	137	0.0510	4.58		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
9.1	518	Total			

Subcatchment 6S: Basin F

Runoff = 11.66 cfs @ 12.00 hrs, Volume= 25,690 cf, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
1.140	98	Paved parking & roofs
0.630	98	Paved parking & roofs
4.490	63	Sagebrush range, Fair, HSG C
6.260	73	Weighted Average
4.490		Pervious Area
1.770		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	148	0.1690	0.43		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
1.5	401	0.0500	4.54		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.3	357	0.0950	18.32	32.38	Circular Channel (pipe), Storm Pipe Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
7.5	906	Total			

Wolf Creek - Basins E & F

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Pond 5P: Pond 5

Inflow Area = 95,832 sf, Inflow Depth > 1.07" for Wolf Creek 10yr 24hr event
 Inflow = 3.61 cfs @ 12.01 hrs, Volume= 8,566 cf
 Outflow = 0.22 cfs @ 13.49 hrs, Volume= 4,011 cf, Atten= 94%, Lag= 88.3 min
 Primary = 0.22 cfs @ 13.49 hrs, Volume= 4,011 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,505.13' @ 13.49 hrs Surf.Area= 2,547 sf Storage= 4,744 cf

Plug-Flow detention time= 303.0 min calculated for 4,003 cf (47% of inflow)
 Center-of-Mass det. time= 163.6 min (1,025.8 - 862.1)

Volume	Invert	Avail.Storage	Storage Description											
#1	5,501.00'	7,326 cf	Custom Stage Data (Irregular) Listed below (Recalc)											
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)				Cum.Store (cubic-feet)				Wet.Area (sq-ft)			
5,501.00	196	84.0	0				0				196			
5,506.00	3,385	250.0	7,326				7,326				4,686			
Device	Routing	Invert	Outlet Devices											
#1	Primary	5,505.00'	2.0' long x 6.0' 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)	2.37	2.51	2.70	2.68	2.68	2.67	2.65	2.65	2.65		
				2.65	2.66	2.66	2.67	2.69	2.72	2.76	2.83			

Primary OutFlow Max=0.21 cfs @ 13.49 hrs HW=5,505.13' (Free Discharge)
 1=Broad-Crested Rectangular Weir (Weir Controls 0.21 cfs @ 0.84 fps)

Pond 6P: Pond 6

Inflow Area = 272,686 sf, Inflow Depth > 1.13" for Wolf Creek 10yr 24hr event
 Inflow = 11.66 cfs @ 12.00 hrs, Volume= 25,690 cf
 Outflow = 1.41 cfs @ 12.47 hrs, Volume= 16,475 cf, Atten= 88%, Lag= 28.2 min
 Primary = 1.41 cfs @ 12.47 hrs, Volume= 16,475 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,567.42' @ 12.47 hrs Surf.Area= 5,927 sf Storage= 11,006 cf

Plug-Flow detention time= 217.3 min calculated for 16,441 cf (64% of inflow)
 Center-of-Mass det. time= 96.2 min (954.0 - 857.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	5,563.00'	14,774 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
5,563.00	270	190.0	0	0	270	
5,568.00	7,200	480.0	14,774	14,774	15,822	

Wolf Creek - Basins E & F

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Device	Routing	Invert	Outlet Devices
#1	Primary	5,567.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.40 cfs @ 12.47 hrs HW=5,567.42' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.40 cfs @ 1.65 fps)

Wolf Creek - Basins E & F

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

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Subcatchment 5S: Basin E

Runoff = 0.36 cfs @ 1.17 hrs, Volume= 706 cf, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.350	98	Paved parking & roofs
0.210	98	Paved parking & roofs
1.640	63	Sagebrush range, Fair, HSG C
2.200	72	Weighted Average
1.640		Pervious Area
0.560		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	200	0.1450	0.43		Sheet Flow, Range n= 0.130 P2= 2.51"
0.8	181	0.1380	3.71		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps
0.5	137	0.0510	4.58		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
9.1	518	Total			

Subcatchment 6S: Basin F

Runoff = 1.32 cfs @ 1.13 hrs, Volume= 2,337 cf, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
1.140	98	Paved parking & roofs
0.630	98	Paved parking & roofs
4.490	63	Sagebrush range, Fair, HSG C
6.260	73	Weighted Average
4.490		Pervious Area
1.770		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	148	0.1690	0.43		Sheet Flow, Overland Flow Range n= 0.130 P2= 2.51"
1.5	401	0.0500	4.54		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.3	357	0.0950	18.32	32.38	Circular Channel (pipe), Storm Pipe Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
7.5	906	Total			

Wolf Creek - Basins E & F

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

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Pond 5P: Pond 5

Inflow Area = 95,832 sf, Inflow Depth = 0.09" for Wolf Creek10yr 2hr event
 Inflow = 0.36 cfs @ 1.17 hrs, Volume= 706 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,502.56' @ 2.55 hrs Surf.Area= 772 sf Storage= 706 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description										
#1	5,501.00'	7,326 cf	Custom Stage Data (Irregular) Listed below (Recalc)										
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)			Cum.Store (cubic-feet)			Wet.Area (sq-ft)				
5,501.00	196	84.0	0			0			196				
5,506.00	3,385	250.0	7,326			7,326			4,686				
Device	Routing	Invert	Outlet Devices										
#1	Primary	5,505.00'	2.0' long x 6.0' 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)	2.37	2.51	2.70	2.68	2.68	2.67	2.65	2.65	2.65	
				2.65	2.66	2.66	2.67	2.69	2.72	2.76	2.83		

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5,501.00' (Free Discharge)
 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Pond 6

Inflow Area = 272,686 sf, Inflow Depth = 0.10" for Wolf Creek10yr 2hr event
 Inflow = 1.32 cfs @ 1.13 hrs, Volume= 2,337 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 5,565.20' @ 2.45 hrs Surf.Area= 2,160 sf Storage= 2,337 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description			
#1	5,563.00'	14,774 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
5,563.00	270	190.0	0	0	270	
5,568.00	7,200	480.0	14,774	14,774	15,822	

Wolf Creek - Basins E & F

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

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Device	Routing	Invert	Outlet Devices
#1	Primary	5,567.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5,563.00' (Free Discharge)↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Wolf Creek - Basins G

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Subcatchment 7S: Basin G

Runoff = 3.80 cfs @ 11.90 hrs, Volume= 6,856 cf, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.320	98	Paved parking & roofs
0.210	98	Paved parking & roofs
0.840	63	Sagebrush range, Fair, HSG C
1.370	77	Weighted Average
0.840		Pervious Area
0.530		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	214	0.2060	4.54		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps
0.1	62	0.1450	7.73		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.9	276	Total			

Pond 7P: Pond 7

Inflow Area = 59,677 sf, Inflow Depth > 1.38" for Wolf Creek 10yr 24hr event

Inflow = 3.80 cfs @ 11.90 hrs, Volume= 6,856 cf

Outflow = 0.11 cfs @ 14.60 hrs, Volume= 2,338 cf, Atten= 97%, Lag= 162.0 min

Primary = 0.11 cfs @ 14.60 hrs, Volume= 2,338 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 5,581.08' @ 14.60 hrs Surf.Area= 2,503 sf Storage= 4,620 cf

Plug-Flow detention time= 368.5 min calculated for 2,333 cf (34% of inflow)

Center-of-Mass det. time= 234.3 min (1,074.7 - 840.4)

Volume	Invert	Avail.Storage	Storage Description
#1	5,577.00'	7,326 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
5,577.00	196	84.0	0	0	196
5,582.00	3,385	250.0	7,326	7,326	4,686

Device	Routing	Invert	Outlet Devices
#1	Primary	5,581.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Wolf Creek - Basins G

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Primary OutFlow Max=0.10 cfs @ 14.60 hrs HW=5,581.08' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.10 cfs @ 0.66 fps)

Wolf Creek - Basins G

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

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Subcatchment 7S: Basin G

Runoff = 1.15 cfs @ 1.01 hrs, Volume= 864 cf, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr 2.00 hrs Wolf Creek10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.320	98	Paved parking & roofs
0.210	98	Paved parking & roofs
0.840	63	Sagebrush range, Fair, HSG C
1.370	77	Weighted Average
0.840		Pervious Area
0.530		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	214	0.2060	4.54		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps
0.1	62	0.1450	7.73		Shallow Concentrated Flow, Road Gutter Paved Kv= 20.3 fps
0.9	276	Total			

Pond 7P: Pond 7

Inflow Area = 59,677 sf, Inflow Depth = 0.17" for Wolf Creek10yr 2hr event

Inflow = 1.15 cfs @ 1.01 hrs, Volume= 864 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 5,578.75' @ 2.10 hrs Surf.Area= 870 sf Storage= 864 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	5,577.00'	7,326 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
5,577.00	196	84.0	0	0	196
5,582.00	3,385	250.0	7,326	7,326	4,686

Device	Routing	Invert	Outlet Devices
#1	Primary	5,581.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Wolf Creek - Basins G

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

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Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5,577.00' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Wolf Creek - Basins 1 2 3

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

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Subcatchment 8S: Basin 1

Runoff = 2.67 cfs @ 11.93 hrs, Volume= 5,603 cf, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.000	98	Paved parking & roofs
0.420	98	Paved parking & roofs
2.430	55	Sagebrush range, Fair, HSG B
2.850	61	Weighted Average
2.430		Pervious Area
0.420		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	250	0.1520	3.90		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 9S: Basin 2

Runoff = 0.82 cfs @ 11.95 hrs, Volume= 2,236 cf, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Area (ac)	CN	Description
0.000	98	Paved parking & roofs
0.000	98	Paved parking & roofs
1.910	55	Sagebrush range, Fair, HSG C
1.910	55	Weighted Average
1.910		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	259	0.1430	3.78		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 10S: Basin 3

Runoff = 3.86 cfs @ 11.95 hrs, Volume= 8,751 cf, Depth> 0.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"

Wolf Creek - Basins 1 2 3*Type II 24-hr Wolf Creek 10yr 24hr Rainfall=3.43"*

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Area (ac)	CN	Description
0.000	98	Paved parking & roofs
0.530	98	Paved parking & roofs
4.680	55	Sagebrush range, Fair, HSG B
5.210	59	Weighted Average
4.680		Pervious Area
0.530		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	200	0.1500	3.87		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps
1.9	447	0.1570	3.96		Shallow Concentrated Flow, Overland Flow Nearly Bare & Untilled Kv= 10.0 fps
2.8	647	Total			

Wolf Creek - Basins 1 2 3

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

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Subcatchment 8S: Basin 1

Runoff = 0.02 cfs @ 1.94 hrs, Volume= 27 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.000	98	Paved parking & roofs
0.420	98	Paved parking & roofs
2.430	55	Sagebrush range, Fair, HSG B
2.850	61	Weighted Average
2.430		Pervious Area
0.420		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	250	0.1520	3.90		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 9S: Basin 2

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Area (ac)	CN	Description
0.000	98	Paved parking & roofs
0.000	98	Paved parking & roofs
1.910	55	Sagebrush range, Fair, HSG C
1.910	55	Weighted Average
1.910		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	259	0.1430	3.78		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment 10S: Basin 3

Runoff = 0.00 cfs @ 2.00 hrs, Volume= 1 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Wolf Creek - Basins 1 2 3

Type II 24-hr 2.00 hrs Wolf Creek 10yr 2hr Rainfall=1.41"

Prepared by {enter your company name here}

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2/23/2009

Area (ac)	CN	Description
0.000	98	Paved parking & roofs
0.530	98	Paved parking & roofs
4.680	55	Sagebrush range, Fair, HSG B
5.210	59	Weighted Average
4.680		Pervious Area
0.530		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	200	0.1500	3.87		Shallow Concentrated Flow, Overland Nearly Bare & Untilled Kv= 10.0 fps
1.9	447	0.1570	3.96		Shallow Concentrated Flow, Overland Flow Nearly Bare & Untilled Kv= 10.0 fps
2.8	647	Total			

NOAA Atlas 14 Precipitation Data



POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



Utah 41.33111 N 111.81833 W 5521 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Fri Sep 12 2008

Confidence Limits			Seasonality			Location Maps			Other Info.			GIS data		Maps	Docs	U.S. Map		
Precipitation Frequency Estimates (inches)																		
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.17	0.26	0.33	0.44	0.55	0.72	0.83	1.16	1.52	2.04	2.49	3.19	4.00	4.61	6.10	7.49	9.45	11.04
2	0.22	0.34	0.42	0.56	0.69	0.91	1.03	1.42	1.87	2.51	3.06	3.93	4.93	5.67	7.51	9.20	11.60	13.57
5	0.30	0.45	0.56	0.76	0.94	1.17	1.28	1.71	2.25	3.01	3.67	4.76	5.97	6.81	8.93	10.88	13.69	15.98
10	0.37	0.56	0.69	0.93	1.15	1.41	1.52	1.97	2.59	3.43	4.18	5.45	6.83	7.74	10.04	12.20	15.33	17.85
25	0.47	0.72	0.90	1.21	1.49	1.80	1.90	2.36	3.10	4.01	4.89	6.41	8.02	8.97	11.47	13.89	17.48	20.23
50	0.57	0.87	1.08	1.45	1.80	2.16	2.25	2.69	3.53	4.46	5.44	7.17	8.96	9.91	12.51	15.13	19.06	21.96
100	0.69	1.05	1.30	1.75	2.16	2.58	2.66	3.06	3.98	4.93	6.00	7.96	9.93	10.85	13.54	16.36	20.64	23.66
200	0.82	1.25	1.56	2.10	2.59	3.08	3.15	3.48	4.46	5.40	6.58	8.78	10.92	11.80	14.54	17.53	22.17	25.28
500	1.05	1.60	1.98	2.67	3.30	3.87	3.94	4.29	5.21	6.05	7.36	9.90	12.27	13.05	15.80	19.03	24.15	27.34
1000	1.26	1.92	2.38	3.21	3.97	4.62	4.67	5.03	5.80	6.55	7.97	10.78	13.34	14.00	16.73	20.13	25.62	28.85

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to the [documentation](#) for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.20	0.30	0.38	0.51	0.63	0.82	0.93	1.27	1.68	2.27	2.78	3.55	4.51	5.18	6.79	8.31	10.42	12.12
2	0.25	0.39	0.48	0.64	0.80	1.02	1.15	1.56	2.06	2.79	3.42	4.38	5.57	6.38	8.36	10.22	12.77	14.89
5	0.34	0.52	0.64	0.87	1.07	1.32	1.43	1.88	2.48	3.34	4.11	5.30	6.74	7.67	9.95	12.10	15.07	17.54
10	0.42	0.64	0.79	1.07	1.32	1.60	1.70	2.17	2.87	3.81	4.67	6.08	7.72	8.72	11.17	13.56	16.89	19.58
25	0.55	0.83	1.03	1.39	1.72	2.06	2.14	2.62	3.46	4.45	5.46	7.15	9.06	10.11	12.75	15.45	19.26	22.22
50	0.67	1.02	1.26	1.70	2.10	2.49	2.56	3.01	3.96	4.94	6.08	8.00	10.12	11.17	13.92	16.84	21.03	24.16
100	0.81	1.24	1.53	2.07	2.56	3.01	3.08	3.47	4.52	5.46	6.71	8.89	11.22	12.25	15.08	18.23	22.79	26.04
200	0.99	1.51	1.88	2.53	3.13	3.67	3.71	4.00	5.13	5.99	7.37	9.81	12.38	13.33	16.21	19.57	24.53	27.85
500	1.31	1.99	2.46	3.32	4.11	4.76	4.77	5.03	6.12	6.72	8.27	11.10	13.98	14.80	17.68	21.31	26.81	30.21
1000	1.62	2.46	3.05	4.11	5.08	5.83	5.89	6.03	6.96	7.30	8.97	12.12	15.23	15.93	18.77	22.61	28.56	31.97

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.

** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to the [documentation](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.15	0.23	0.29	0.39	0.48	0.65	0.75	1.06	1.39	1.84	2.24	2.87	3.58	4.13	5.49	6.79	8.58	10.05
2	0.20	0.30	0.37	0.50	0.61	0.81	0.93	1.30	1.71	2.27	2.75	3.54	4.42	5.09	6.76	8.34	10.53	12.34
5	0.26	0.40	0.49	0.67	0.82	1.03	1.15	1.56	2.05	2.71	3.30	4.28	5.33	6.10	8.02	9.84	12.40	14.53
10	0.32	0.49	0.60	0.81	1.00	1.24	1.35	1.78	2.34	3.08	3.75	4.89	6.09	6.92	9.00	11.01	13.87	16.21

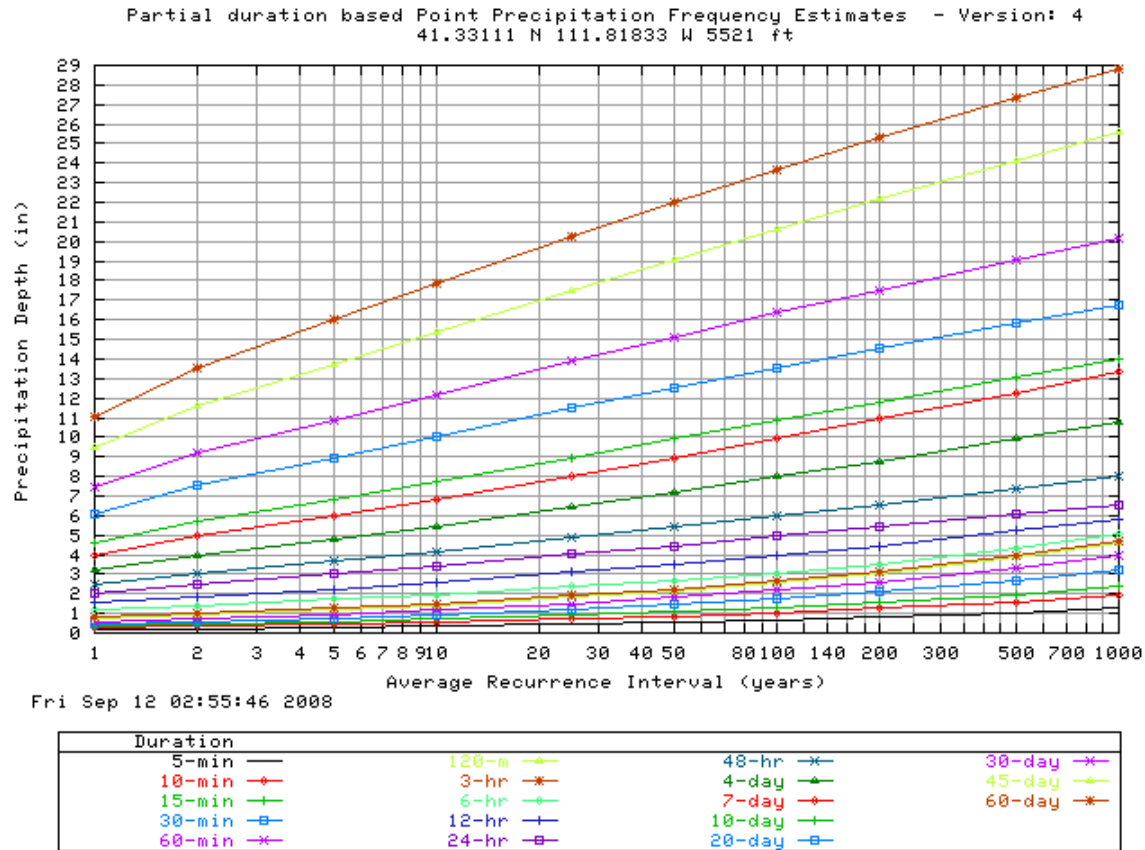
25	0.41	0.62	0.76	1.03	1.27	1.55	1.66	2.11	2.77	3.59	4.37	5.72	7.12	7.99	10.26	12.51	15.76	18.32
50	0.47	0.72	0.90	1.21	1.50	1.81	1.93	2.37	3.11	3.98	4.83	6.37	7.92	8.80	11.17	13.59	17.13	19.84
100	0.55	0.84	1.05	1.41	1.74	2.10	2.23	2.66	3.45	4.37	5.32	7.04	8.73	9.60	12.05	14.65	18.48	21.32
200	0.64	0.98	1.21	1.63	2.02	2.42	2.56	2.96	3.79	4.77	5.79	7.71	9.55	10.39	12.88	15.65	19.77	22.70
500	0.77	1.17	1.45	1.96	2.42	2.88	3.04	3.54	4.30	5.30	6.42	8.61	10.63	11.41	13.94	16.88	21.39	24.41
1000	0.88	1.34	1.66	2.24	2.77	3.28	3.47	4.03	4.67	5.70	6.90	9.29	11.46	12.16	14.70	17.75	22.57	25.62

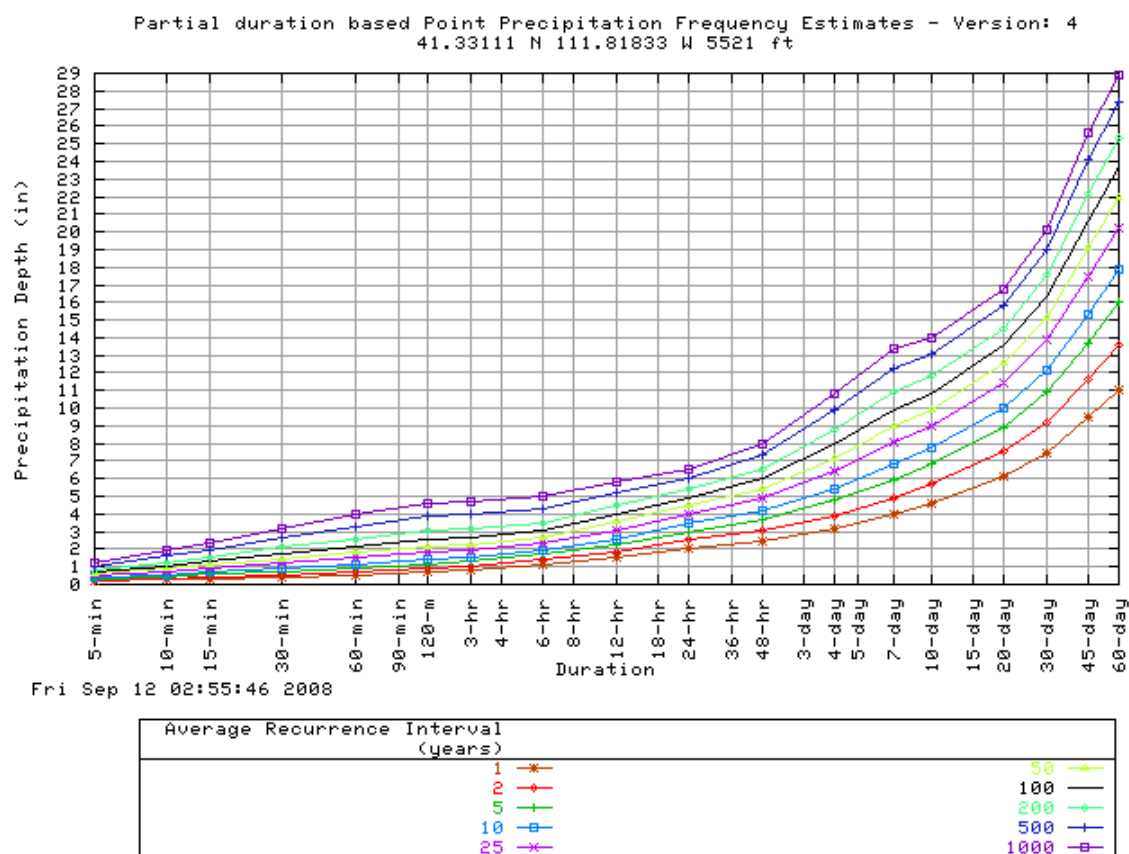
* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.

** These precipitation frequency estimates are based on a partial duration maxima series. **ARI** is the Average Recurrence Interval.

Please refer to the [documentation](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables



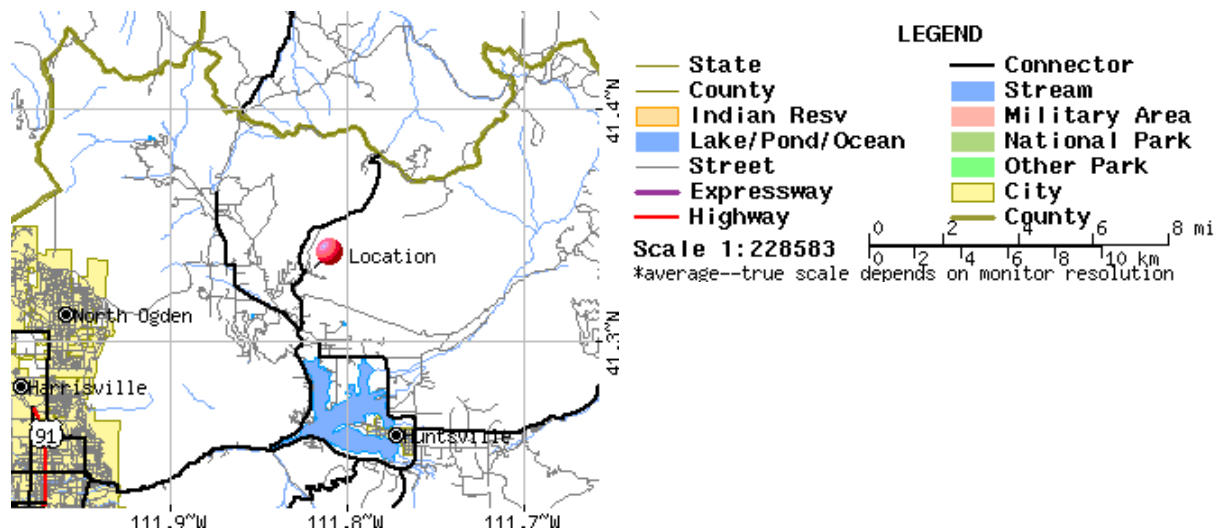


Maps -



These maps were produced using a direct map request from the
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Other Maps/Photographs -

[View USGS digital orthophoto quadrangle \(DOQ\)](#) covering this location from TerraServer; [USGS Aerial Photograph](#) may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the [USGS](#) for more information.

Watershed/Stream Flow Information -

[Find the Watershed](#) for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to our documentation.

Using the [National Climatic Data Center's \(NCDC\)](#) station search engine, locate other climate stations within:

...OR... of this location (41.3311/-111.8183). Digital ASCII data can be obtained directly from [NCDC](#).

Find [Natural Resources Conservation Service \(NRCS\)](#) SNOTEL (SNOWpack TELemetry) stations by visiting the [Western Regional Climate Center's state-specific SNOTEL station maps](#).

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