

**STORM WATER RUNOFF
&
Detention Volume Calculations**

for

**Valley Junction
Site Plan
Rev. 08/20/15
4795 E. 2600 N.
Eden, UT**

Criteria & Conclusions

**Return Period: 100 year
Duration: 24 hr
Total Required Storage: 2748 cu. ft. Max @ 2 hrs
Orifice Size: 2.0" Dia. (Min)
0.17 cfs max outflow**

Date: 01/26/16



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JAN 26 2016

Valley Junction Eden

Eden 100-Year Duration=120 min, Inten=1.18 in/hr

Prepared by Price Engineering, Inc.

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Summary for Pond 2P: Detention Pond

Inflow Area = 0.865 ac, 0.00% Impervious, Inflow Depth = 1.19" for 100-Year event
 Inflow = 0.51 cfs @ 0.00 hrs, Volume= 0.086 af
 Outflow = 0.17 cfs @ 2.01 hrs, Volume= 0.086 af, Atten= 66%, Lag= 120.5 min
 Primary = 0.17 cfs @ 2.01 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.84' @ 2.01 hrs Surf.Area= 1,674 sf Storage= 2,748 cf

Plug-Flow detention time= 163.3 min calculated for 0.085 af (100% of inflow)
 Center-of-Mass det. time= 162.5 min (222.5 - 60.0)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	3,953 cf	Custom Stage Data (Prismatic) listed below (Recalc)

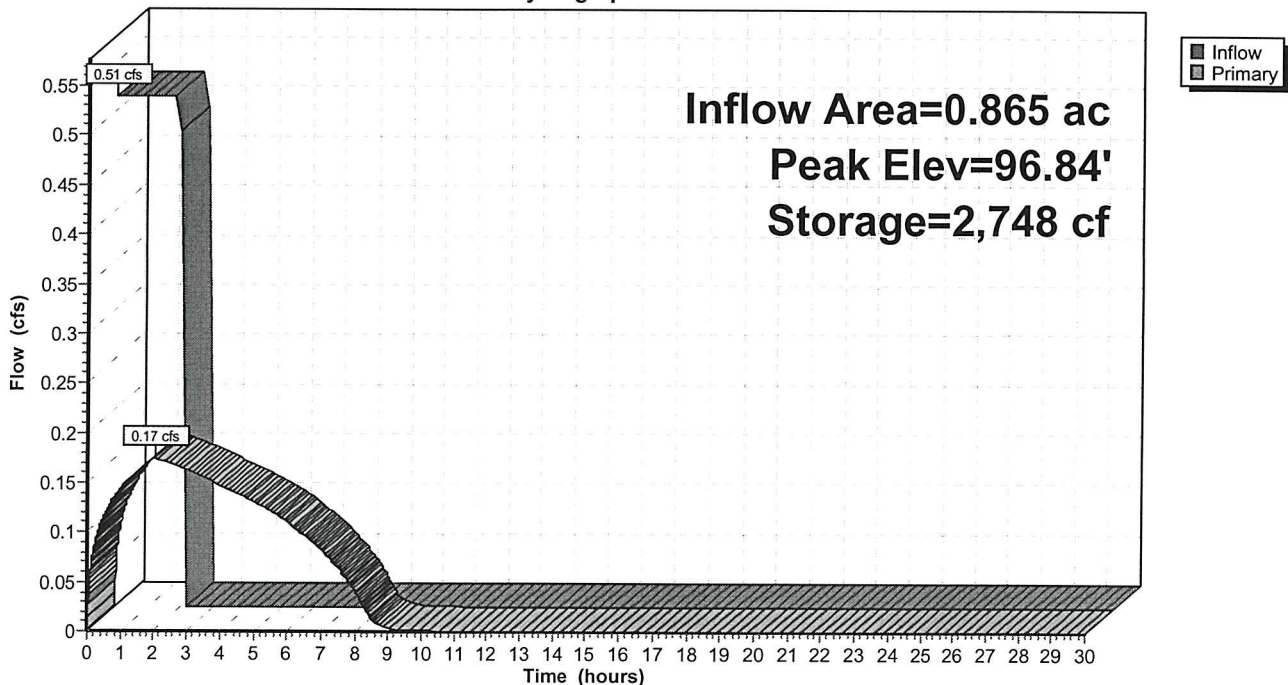
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	259	0	0
97.50	2,000	3,953	3,953

Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	2.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.17 cfs @ 2.01 hrs HW=96.84' (Free Discharge)
 ↳ **1=Orifice/Grate** (Orifice Controls 0.17 cfs @ 8.00 fps)

Pond 2P: Detention Pond

Hydrograph



Project: Landmark Surveying Site Plan Valley Junction

Design: K. Price
Date: 12/16/15

Uniform Flow
Mannings Equation
Single Pipe Segments

Pipe 1

y= 0.8 ft.
dia.= 1 ft.
slope= 0.2 %
n= 0.011
L= 270 ft.

Pipe Flow

A= 0.67 ft.^2
P= 2.21 ft.
Rh= 0.30 ft.
β= 2.21 rad.
T= 0.80 ft.
Velocity= 2.73 ft./sec.
Q (flow)= 1.84 cfs

Fr= 0.52 Subcritical
Segment is Outlet Controlled

Pipe 1

Inlet Flow

h= 2 ft.
Cd= 0.6
dia= 1 ft.
Q (flow)= 5.35 cfs



NOAA Atlas 14, Volume 1, Version 5
 Location name: Eden, Utah, US*
 Latitude: 41.3050°, Longitude: -111.8270°
 Elevation: 4963 ft*
 * source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lilian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic,
 Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel
 Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

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PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.90 (1.67-2.18)	2.40 (2.12-2.77)	3.25 (2.86-3.73)	4.03 (3.50-4.63)	5.26 (4.46-6.08)	6.37 (5.28-7.46)	7.69 (6.18-9.12)	9.28 (7.18-11.2)	11.8 (8.64-14.8)	14.3 (9.90-18.3)
10-min	1.45 (1.27-1.66)	1.82 (1.62-2.11)	2.47 (2.17-2.84)	3.07 (2.66-3.53)	4.00 (3.40-4.63)	4.85 (4.01-5.68)	5.86 (4.70-6.94)	7.06 (5.46-8.53)	9.01 (6.58-11.2)	10.8 (7.54-13.9)
15-min	1.19 (1.04-1.37)	1.51 (1.34-1.74)	2.04 (1.80-2.35)	2.53 (2.20-2.91)	3.30 (2.81-3.83)	4.01 (3.32-4.69)	4.84 (3.89-5.74)	5.83 (4.51-7.05)	7.44 (5.43-9.29)	8.96 (6.22-11.5)
30-min	0.804 (0.704-0.924)	1.02 (0.900-1.17)	1.38 (1.21-1.58)	1.71 (1.48-1.96)	2.22 (1.89-2.58)	2.70 (2.23-3.16)	3.26 (2.62-3.86)	3.93 (3.04-4.75)	5.01 (3.66-6.25)	6.04 (4.19-7.73)
60-min	0.497 (0.435-0.572)	0.629 (0.557-0.726)	0.852 (0.748-0.980)	1.05 (0.918-1.21)	1.38 (1.17-1.59)	1.67 (1.38-1.96)	2.02 (1.62-2.39)	2.43 (1.88-2.94)	3.10 (2.26-3.87)	3.73 (2.59-4.79)
2-hr	0.326 (0.290-0.370)	0.409 (0.364-0.464)	0.528 (0.467-0.598)	0.638 (0.560-0.726)	0.819 (0.704-0.940)	0.984 (0.826-1.14)	1.18 (0.960-1.38)	1.41 (1.11-1.69)	1.78 (1.32-2.20)	2.13 (1.51-2.70)
3-hr	0.250 (0.226-0.280)	0.310 (0.280-0.347)	0.387 (0.346-0.433)	0.460 (0.408-0.515)	0.575 (0.502-0.650)	0.683 (0.584-0.780)	0.813 (0.677-0.941)	0.964 (0.779-1.14)	1.21 (0.931-1.47)	1.44 (1.06-1.81)
6-hr	0.173 (0.159-0.190)	0.212 (0.194-0.234)	0.256 (0.233-0.282)	0.296 (0.267-0.327)	0.356 (0.317-0.396)	0.406 (0.357-0.455)	0.463 (0.401-0.525)	0.527 (0.447-0.606)	0.654 (0.536-0.768)	0.769 (0.613-0.924)
12-hr	0.113 (0.103-0.124)	0.138 (0.126-0.152)	0.166 (0.151-0.183)	0.191 (0.173-0.212)	0.229 (0.205-0.255)	0.260 (0.229-0.292)	0.294 (0.254-0.334)	0.330 (0.280-0.380)	0.385 (0.317-0.453)	0.430 (0.345-0.516)
24-hr	0.073 (0.067-0.081)	0.090 (0.082-0.099)	0.107 (0.098-0.118)	0.122 (0.111-0.134)	0.142 (0.129-0.157)	0.158 (0.143-0.174)	0.174 (0.157-0.192)	0.191 (0.171-0.210)	0.213 (0.189-0.235)	0.230 (0.203-0.262)
2-day	0.044 (0.040-0.049)	0.054 (0.049-0.060)	0.064 (0.059-0.071)	0.073 (0.066-0.081)	0.085 (0.077-0.094)	0.094 (0.085-0.104)	0.104 (0.093-0.115)	0.113 (0.101-0.126)	0.126 (0.112-0.140)	0.136 (0.119-0.151)
3-day	0.033 (0.030-0.036)	0.040 (0.037-0.045)	0.048 (0.044-0.053)	0.055 (0.050-0.061)	0.064 (0.058-0.071)	0.072 (0.064-0.079)	0.079 (0.071-0.087)	0.087 (0.077-0.096)	0.097 (0.085-0.107)	0.105 (0.092-0.116)
4-day	0.027 (0.025-0.030)	0.034 (0.031-0.037)	0.040 (0.037-0.044)	0.046 (0.042-0.051)	0.054 (0.049-0.059)	0.060 (0.054-0.066)	0.067 (0.060-0.073)	0.073 (0.065-0.081)	0.082 (0.072-0.091)	0.089 (0.078-0.099)
7-day	0.019 (0.018-0.022)	0.024 (0.022-0.026)	0.029 (0.026-0.032)	0.033 (0.029-0.036)	0.038 (0.034-0.042)	0.042 (0.038-0.047)	0.047 (0.042-0.052)	0.051 (0.045-0.057)	0.057 (0.050-0.064)	0.062 (0.054-0.070)
10-day	0.016 (0.014-0.017)	0.019 (0.017-0.021)	0.023 (0.021-0.025)	0.026 (0.023-0.029)	0.030 (0.027-0.033)	0.033 (0.030-0.036)	0.036 (0.032-0.040)	0.039 (0.035-0.043)	0.043 (0.038-0.048)	0.046 (0.040-0.051)
20-day	0.010 (0.009-0.011)	0.013 (0.012-0.014)	0.015 (0.014-0.017)	0.017 (0.015-0.018)	0.019 (0.017-0.021)	0.021 (0.019-0.023)	0.022 (0.020-0.025)	0.024 (0.022-0.026)	0.026 (0.023-0.029)	0.027 (0.024-0.030)
30-day	0.008 (0.008-0.009)	0.010 (0.009-0.011)	0.012 (0.011-0.013)	0.014 (0.012-0.015)	0.015 (0.014-0.017)	0.017 (0.015-0.018)	0.018 (0.016-0.020)	0.019 (0.017-0.021)	0.021 (0.019-0.023)	0.022 (0.020-0.024)
45-day	0.007 (0.006-0.008)	0.009 (0.008-0.009)	0.010 (0.009-0.011)	0.011 (0.010-0.012)	0.013 (0.012-0.014)	0.014 (0.013-0.015)	0.015 (0.014-0.017)	0.016 (0.015-0.018)	0.018 (0.016-0.019)	0.018 (0.017-0.020)
60-day	0.006 (0.006-0.007)	0.008 (0.007-0.008)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.010-0.012)	0.012 (0.011-0.013)	0.013 (0.012-0.014)	0.014 (0.013-0.015)	0.015 (0.014-0.017)	0.016 (0.014-0.017)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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[PF graphical](#)