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: 3291 cu. ft. Max @ 2 hrs
Orifice Size: 1.3" Dia. (Min)
0.8 cfs max outflow

Date: 01/21/16

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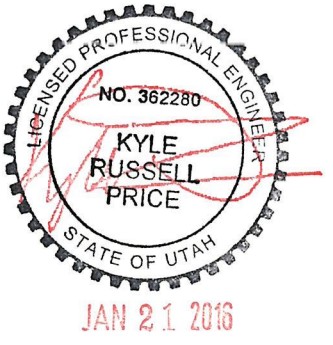

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Summary for Pond 2P: Detention Pond

Inflow Area = 0.865 ac, 0.00% Impervious, Inflow Depth = 1.29" for 100-Year event
Inflow = 0.28 cfs @ 0.00 hrs, Volume= 0.093 af
Outflow = 0.08 cfs @ 4.01 hrs, Volume= 0.093 af, Atten= 72%, Lag= 240.6 min
Primary = 0.08 cfs @ 4.01 hrs, Volume= 0.093 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 97.10' @ 4.01 hrs Surf.Area= 1,800 sf Storage= 3,188 cf

Plug-Flow detention time= 418.7 min calculated for 0.093 af (100% of inflow)
Center-of-Mass det. time= 417.9 min (537.9 - 120.0)

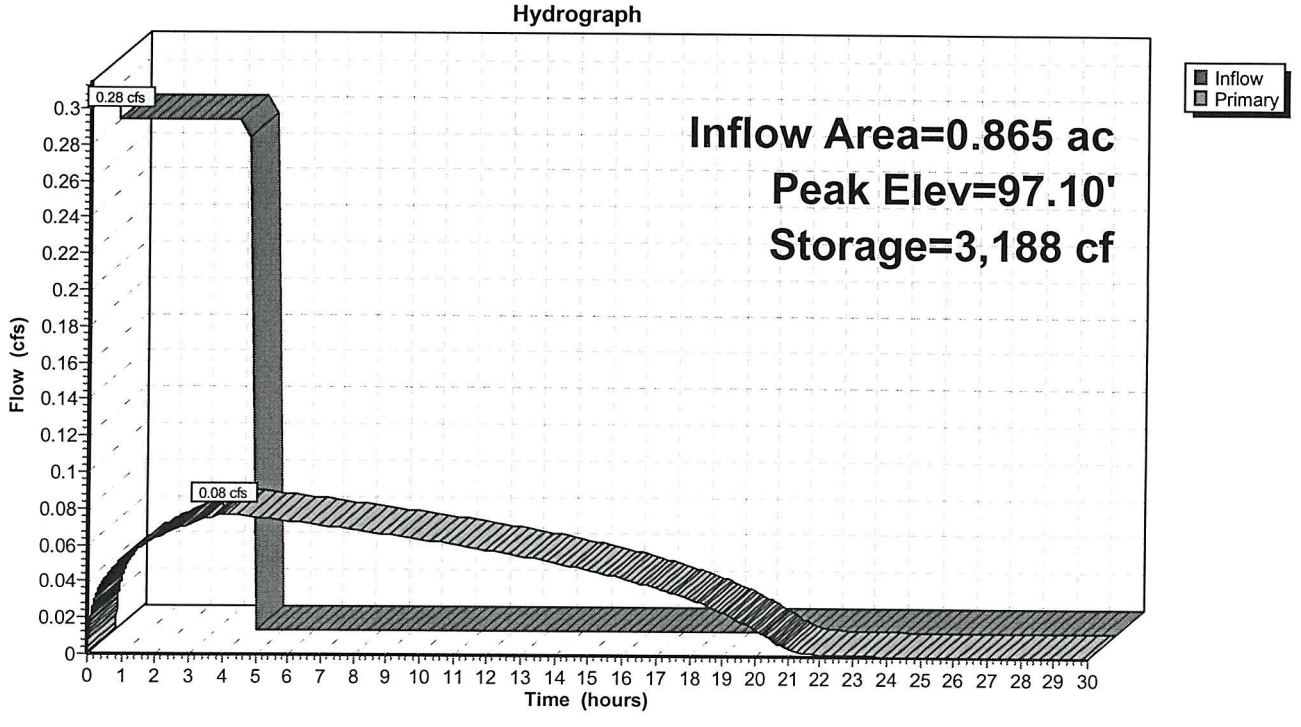
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	3,953 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

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'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 4.01 hrs HW=97.10' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 8.40 fps)

Pond 2P: Detention Pond



Area Listing (selected nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.000	**0.00**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Pond 2P: Detention Pond Peak Elev=97.10' Storage=3,188 cf Inflow=0.28 cfs 0.093 af
Outflow=0.08 cfs 0.093 af

Project: **Landmark Surveying Site Plan Valley Junction**
Design: K. Price
Date: 12/16/15

Uniform Flow
Mannings Eqation
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.
ß=	2.21	rad.
T=	0.80	ft.
Velocity=	2.73	ft./sec.
Q (flow)=	1.84	**cfs**
Fr=	0.52	Subcritical
Segment is	Outel	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, Lillian 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

PF_tabular | PF_graphical | Maps_&_aerials

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