GREAT BASIN ENGINEERING INC

TERAKEE VILLAGE – PHASE 1
APPROX. 900 S 4500 W
WEST WEBER, UTAH 84404
STORM WATER STUDY
Project No. 16N719
5-28-2019
Updated 7-23-2020

General Site Information:

The Terakee Village is located on the north side of 900 South Street and on the east side of 4700 West Street in West Weber, Utah. Phase 1 construction will consist of a 36-lot residential subdivision, agricultural areas, a small senior assisted living center, common space / park features, roadways, a small parking lot, sidewalks, curb and gutter, and underground utilities when completed.

The study area is broken up into 2 drainage areas (labeled A-1 and A-2). Storm water from the site will be collected in inlet boxes and catch basins and will continue via storm drain to either an outfall on the northwest corner of the site or one on the south end of the site. Storm water will be detained in these ponding areas within A-1 and A-2. The site is allowed a unit-release of 0.1 cfs per acre for the 100-yr storm. Discharge from A-1 will be allowed to drain to an existing low spot (which serves as a regional stormwater storage pond) to the northeast of the project. The discharge from A-2 will be directed into the into an existing storm drainage system in 900 South Street and will continue westerly along 900 South in a historical fashion. The attached figure shows the project site and location of the storm water outfalls along 900 South. Detention calculations have been provided for the site. (See attached figure and calculations).

A runoff coefficient of 0.15 is used for natural ground and landscaped areas. A runoff coefficient of 0.90 is used for asphalt, concrete, buildings, and other hard surfaced areas. Average runoff coefficients of about 0.46 were calculated for A-1 and A-2.

Times of concentration are calculated using the FAA method assuming flow resistance coefficients of K=0.35 for landscape and K=0.91 for hardscape for each of the areas. The times of concentration are about 30 to 32 minutes A-1 and A-2, respectively. These times are based on the hydraulically longest drainage path inside each respective drainage area over grass or other vegetation, asphalt, concrete, and/or through a pipeline as applicable. Times calculated to be less than 5 minutes should be rounded to 5 minutes when using this method. Rainfall Intensities were taken from the NOAA website for pipe sizing and detention requirements. The values obtained were interpolated. A copy of this is attached.

Data showing area information, runoff coefficient, time of concentration, peak flow, and required detention for the site are also provided and can be found in the attached calculations.

Pipe Sizes:

Storm water pipes in the project are proposed to be polyvinylchloride pipes (PVC), concrete pipe (CP), and/or reinforced concrete pipe (RCP). All pipes in the project are sloped to provide the design capacity while maintaining a minimum scour speed of at least 2 feet per second when the pipes are flowing at least half full. The pipes and inlet boxes have sufficient capacity to convey the 10-year storm without surcharging.

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Orifice Plates:

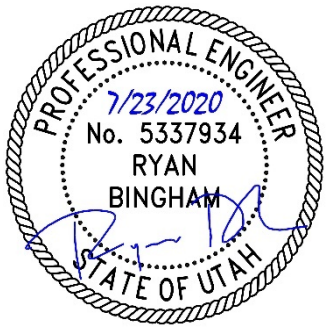
An orifice plate will be used at each facility to control the rate that storm water flows from the project. They will be located at the structures labeled as nodes 127 and 71 and are given the designations of 201 and 202 for convenience in modeling the reduced flow through the orifice plates (See attached figure). The orifice serving A-1 (201) will have a diameter of 4.4 inches for that detention facility to utilize its capacity during the required 100-yr design storm with an allowable release rate of 0.1 cfs/ac. Likewise, the orifice serving A-2 will have a diameter of 4.2 inches. The orifice plates will allow small flows to pass through without detention. As the rate of storm water into the pipes and detention facilities increases, the orifice plates will restrict the flow. The maximum flow through the plates will occur when the detention basins reach their maximum design depth. A detail of the orifice plates will be provided in the construction documents for the different phases.

Required Detention:

The required detention volumes for the 100-year storm with a release rate of 0.1 cfs/acre are 16,314 cubic feet (cf) for the facility serving A-1 (Pond 1, as called out on the attached figure) and 21,476 for the facility serving A-2 (Pond 2a and Pond 2b, as called out on the attached figure). The available volume in the facility serving A-1 is 17,336 cf. The available volume in the facility serving A-2 is 37,850 cf. There is significant excess volume in each ponding area. In the event any of the detention facilities experiences a storm larger than the design storm water will then spill out either onto the adjacent low area to the northeast or to 900 South Street and continue westerly in a historical fashion.

Great Basin Engineering, Inc.

Prepared by
Ryan Bingham, P.E.



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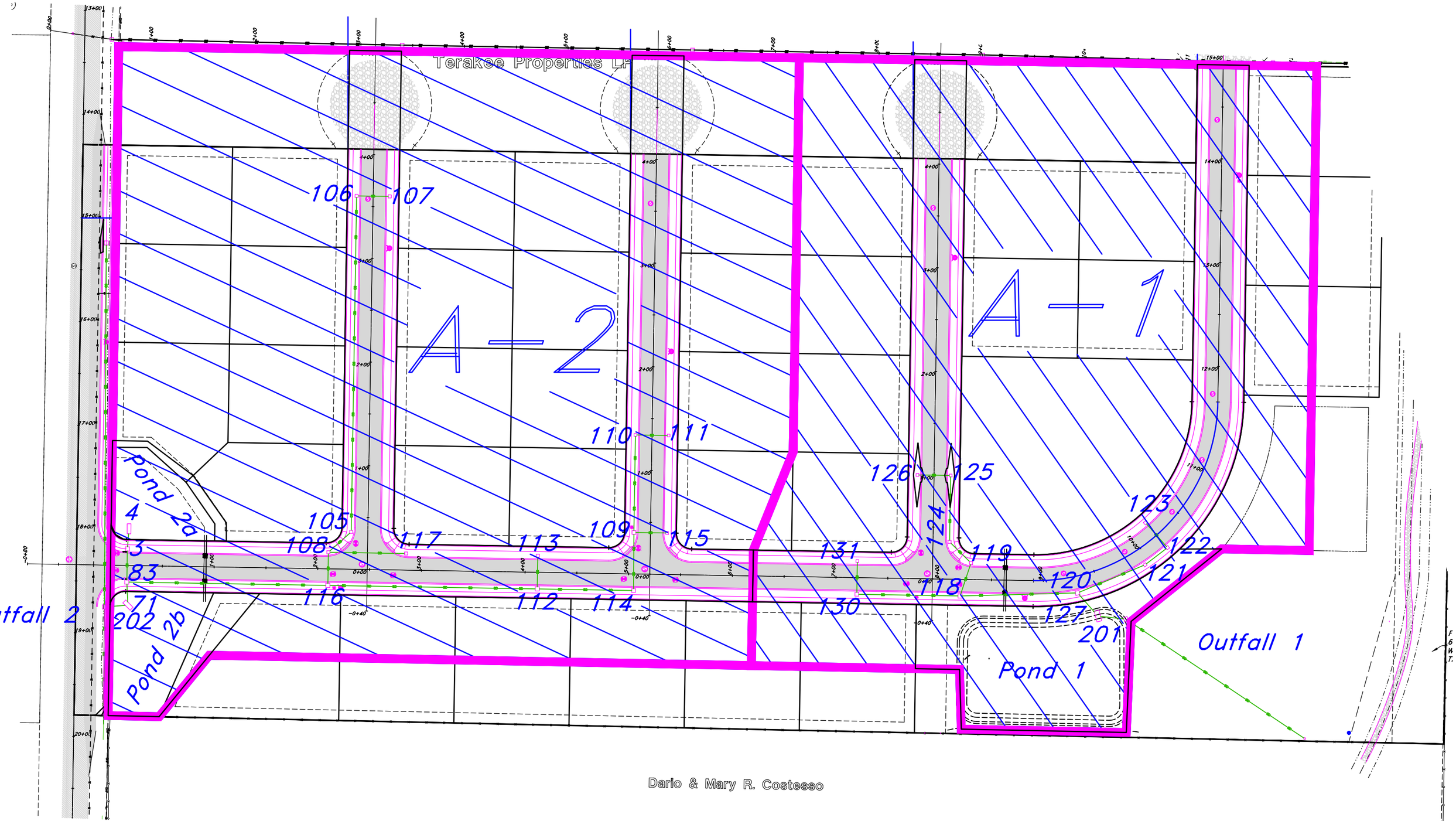

Terakee Properties LP
106
107
A-2
A-1
110
111
126
125
123
124
105
108
117
113
109
115
131
119
122
121
120
118
116
112
114
130
127
201
Outfall 2
Pond 2a
Pond 2b
4
3
83
71
202
Pond 1
Outfall 1
Dario & Mary R. Costesso

Storm Water Calculations
Terakee Village
Approx. 900 S 4500 W West Weber, UT 84404
16N719 SWS-2.dwg

7/23/2020

2 Detained Areas

	Zone 1 (ft^2)
Avg. lot size	11000
Avg. home size	2700
Avg. patio/driveway size	1200
C =	0.416

Hardscape C =	0.90
Landscape C =	0.15

		Category Runoff Coefficients			
		0.660		0.250	0.416
Drainage Areas	Total Area (acres)	50' Road Area (acres)		Common Area (acres)	Zone 1 Area (acres)	**C**
∑ Det. Areas	15.473	3.356		1.024	11.093	0.458
∑ All Areas	15.473	3.356		1.024	11.093	0.458
A-1	6.674	1.547		0.574	4.553	0.458
A-2	8.799	1.809		0.449	6.541	0.458

Time of Concentration--use FAA Method

For FAA Method, use K's of..

K =	0.35	for landscape
K =	0.91	for hardscape

$$t_c = \frac{1.8(1.1 - K)\sqrt{L}}{\sqrt[3]{S}}$$

Assume Pipe Flow is at 2 ft/s Scour Speed

**Note: S is in percent, 5 min is smallest allowed Tc

Area	Length on Landscape (ft)	Slope of Landscape (%)	Time on Landscape (min.)	Length on Hardscape (ft)	Slope of Hardscape (%)	Time on Hardscape (min.)	Length in Pipe (ft)	Time in Pipe (min.)	TC for entire Area (min.)
A-1	447.00	1.00	28.54	0.00	2.00	0.00	170.00	1.42	29.96
A-2	378.00	1.00	26.25	0.00	2.00	0.00	691.00	5.76	32.01

Rainfall Intensities
Data From NOAA

10-Year and 100-Year Intensities

The equations used for the 10-Year and 100-Year Intensities were found using the attached Rainfall data as well as Interpolated data where applicable.

Storm Intensities

AREA	Tc (minutes)	I (10-yr.) (in./hr.)	I (100-yr.) (in./hr.)
A-1	30.0	1.37	2.75
A-2	32.0	1.32	2.66

Peak Flow Information
Use Rational Method
10-Year and 100-Year Intensities

Q=CIA

					Peak Flows	
				∑ detained =	9.53	19.12
AREA	C	I10 (in./hr.)	I100 (in./hr.)	A (acres)	Q (10-yr.) (cfs)	Q (100-yr.) (cfs)
A-1	0.458	1.371	2.753	6.67	4.19	8.42
A-2	0.458	1.324	2.658	8.80	5.33	10.70

Node Inlet Requirements

Size pipes for 10 year storm

Area	Node #	% of Total	Q (cfs)
A-1	123	14.0%	0.59
A-1	122	14.0%	0.59
A-1	121	3.0%	0.13
A-1	126	20.0%	0.84
A-1	125	18.0%	0.75
A-1	124	3.0%	0.13
A-1	119	5.0%	0.21
A-1	131	6.0%	0.25
A-1	130	6.0%	0.25
A-1	118	7.0%	0.29
A-1	120	2.0%	0.08
A-1	127	2.0%	0.08
A-1	201	-84.1%	(3.53)
A-2	111	11.0%	0.59
A-2	110	11.0%	0.59
A-2	115	2.0%	0.11
A-2	109	2.0%	0.11
A-2	114	6.0%	0.32
A-2	113	6.0%	0.32
A-2	112	10.0%	0.53
A-2	107	8.0%	0.43
A-2	106	8.0%	0.43
A-2	105	4.0%	0.21
A-2	117	6.0%	0.32
A-2	108	1.0%	0.05
A-2	116	10.0%	0.53
A-2	4	2.0%	0.11
A-2	3	5.0%	0.27
A-2	83	5.0%	0.27
A-2	71	3.0%	0.16
A-2	202	-83.5%	(4.45)

Summary of Node Inlet Requirements

Node	Is required to take (cfs)
3	0.27
4	0.11
71	0.16
83	0.27
105	0.21
106	0.43
107	0.43
108	0.05
109	0.11
110	0.59
111	0.59
112	0.53
113	0.32
114	0.32
115	0.11
116	0.53
117	0.32
118	0.29
119	0.21
120	0.08
121	0.13
122	0.59
123	0.59
124	0.13
125	0.75
126	0.84
127	0.08
130	0.25
131	0.25
201	-3.53
202	-4.45

PIPE FLOWS

Upstream Node	Downstream node	Pipe Flow (cfs)
3	83	0.37
4	3	0.11
71	202	5.33
83	71	5.17
105	108	1.07
106	105	0.85
107	106	0.43
108	116	1.44
109	114	1.39
110	109	1.17
111	110	0.59
112	116	2.56
113	112	0.32
114	112	1.71
115	109	0.11
116	83	4.53
117	108	0.32
118	120	2.73
119	118	1.93
120	127	4.11
121	120	1.30
122	121	1.17
123	122	0.59
124	119	1.72
125	124	1.59
126	125	0.84
127	201	4.19
130	118	0.50
131	130	0.25
201	Outfall 1	0.67
202	Outfall 2	0.88

Options for Pipe Sizes Between the Specified Nodes

Up Stream Node	Dn Stream Node	Q (cfs)	Pipe Size (in)	Design Min Slope (%)	Area (ft^2)	Rh (ft)	Manning's n	Scour Min. Slope (%)	First Trial Pipe Size
3	83	0.37	15	0.003%	1.227	0.313	0.013	0.150%	15
		0.37	18	0.001%	1.767	0.375	0.013	0.120%	
		0.37	24	0.000%	3.142	0.500	0.013	0.080%	
4	3	0.11	15	0.000%	1.227	0.313	0.013	0.150%	15
		0.11	18	0.000%	1.767	0.375	0.013	0.120%	
		0.11	24	0.000%	3.142	0.500	0.013	0.080%	
71	202	5.33	15	0.681%	1.227	0.313	0.013	0.150%	18
		5.33	18	0.258%	1.767	0.375	0.013	0.120%	
		5.33	24	0.056%	3.142	0.500	0.013	0.080%	
83	71	5.17	15	0.641%	1.227	0.313	0.013	0.150%	18
		5.17	18	0.242%	1.767	0.375	0.013	0.120%	
		5.17	24	0.052%	3.142	0.500	0.013	0.080%	
105	108	1.07	12	0.090%	0.785	0.250	0.013	0.200%	12
		1.07	15	0.027%	1.227	0.313	0.013	0.150%	
		1.07	18	0.010%	1.767	0.375	0.013	0.120%	
106	105	0.85	12	0.057%	0.785	0.250	0.013	0.200%	12
		0.85	15	0.017%	1.227	0.313	0.013	0.150%	
		0.85	18	0.007%	1.767	0.375	0.013	0.120%	
107	106	0.43	12	0.014%	0.785	0.250	0.013	0.200%	12
		0.43	15	0.004%	1.227	0.313	0.013	0.150%	
		0.43	18	0.002%	1.767	0.375	0.013	0.120%	
108	116	1.44	12	0.163%	0.785	0.250	0.013	0.200%	12
		1.44	15	0.050%	1.227	0.313	0.013	0.150%	
		1.44	18	0.019%	1.767	0.375	0.013	0.120%	
109	114	1.39	12	0.151%	0.785	0.250	0.013	0.200%	12
		1.39	15	0.046%	1.227	0.313	0.013	0.150%	
		1.39	18	0.017%	1.767	0.375	0.013	0.120%	
110	109	1.17	12	0.108%	0.785	0.250	0.013	0.200%	12
		1.17	15	0.033%	1.227	0.313	0.013	0.150%	
		1.17	18	0.012%	1.767	0.375	0.013	0.120%	
111	110	0.59	12	0.027%	0.785	0.250	0.013	0.200%	12
		0.59	15	0.008%	1.227	0.313	0.013	0.150%	
		0.59	18	0.003%	1.767	0.375	0.013	0.120%	
112	116	2.56	15	0.157%	1.227	0.313	0.013	0.150%	15
		2.56	18	0.059%	1.767	0.375	0.013	0.120%	
		2.56	24	0.013%	3.142	0.500	0.013	0.080%	
113	112	0.32	12	0.008%	0.785	0.250	0.013	0.200%	12
		0.32	15	0.002%	1.227	0.313	0.013	0.150%	
		0.32	18	0.001%	1.767	0.375	0.013	0.120%	
114	112	1.71	15	0.070%	1.227	0.313	0.013	0.150%	15
		1.71	18	0.026%	1.767	0.375	0.013	0.120%	
		1.71	24	0.006%	3.142	0.500	0.013	0.080%	

115	109	0.11	12	0.001%	0.785	0.250	0.013	0.200%	12
		0.11	15	0.000%	1.227	0.313	0.013	0.150%	
		0.11	18	0.000%	1.767	0.375	0.013	0.120%	
116	83	4.53	15	0.492%	1.227	0.313	0.013	0.150%	15
		4.53	18	0.186%	1.767	0.375	0.013	0.120%	
		4.53	24	0.040%	3.142	0.500	0.013	0.080%	
117	108	0.32	12	0.008%	0.785	0.250	0.013	0.200%	12
		0.32	15	0.002%	1.227	0.313	0.013	0.150%	
		0.32	18	0.001%	1.767	0.375	0.013	0.120%	
118	120	2.73	15	0.178%	1.227	0.313	0.013	0.150%	15
		2.73	18	0.067%	1.767	0.375	0.013	0.120%	
		2.73	24	0.015%	3.142	0.500	0.013	0.080%	
119	118	1.93	15	0.089%	1.227	0.313	0.013	0.150%	15
		1.93	18	0.034%	1.767	0.375	0.013	0.120%	
		1.93	24	0.007%	3.142	0.500	0.013	0.080%	
120	127	4.11	15	0.405%	1.227	0.313	0.013	0.150%	15
		4.11	18	0.153%	1.767	0.375	0.013	0.120%	
		4.11	24	0.033%	3.142	0.500	0.013	0.080%	
121	120	1.30	15	0.040%	1.227	0.313	0.013	0.150%	15
		1.30	18	0.015%	1.767	0.375	0.013	0.120%	
		1.30	24	0.003%	3.142	0.500	0.013	0.080%	
122	121	1.17	12	0.109%	0.785	0.250	0.013	0.200%	12
		1.17	15	0.033%	1.227	0.313	0.013	0.150%	
		1.17	18	0.012%	1.767	0.375	0.013	0.120%	
123	122	0.59	12	0.027%	0.785	0.250	0.013	0.200%	12
		0.59	15	0.008%	1.227	0.313	0.013	0.150%	
		0.59	18	0.003%	1.767	0.375	0.013	0.120%	
124	119	1.72	12	0.233%	0.785	0.250	0.013	0.200%	12
		1.72	15	0.071%	1.227	0.313	0.013	0.150%	
		1.72	18	0.027%	1.767	0.375	0.013	0.120%	
125	124	1.59	12	0.200%	0.785	0.250	0.013	0.200%	12
		1.59	15	0.061%	1.227	0.313	0.013	0.150%	
		1.59	18	0.023%	1.767	0.375	0.013	0.120%	
126	125	0.84	12	0.055%	0.785	0.250	0.013	0.200%	12
		0.84	15	0.017%	1.227	0.313	0.013	0.150%	
		0.84	18	0.006%	1.767	0.375	0.013	0.120%	
127	201	4.19	15	0.421%	1.227	0.313	0.013	0.150%	15
		4.19	18	0.159%	1.767	0.375	0.013	0.120%	
		4.19	24	0.034%	3.142	0.500	0.013	0.080%	
130	118	0.50	15	0.006%	1.227	0.313	0.013	0.150%	15
		0.50	18	0.002%	1.767	0.375	0.013	0.120%	
		0.50	24	0.000%	3.142	0.500	0.013	0.080%	

131	130	0.25	12	0.005%	0.785	0.250	0.013	0.200%	**12**
		0.25	15	0.002%	1.227	0.313	0.013	0.150%	
		0.25	18	0.001%	1.767	0.375	0.013	0.120%	
201	Outfall 1	0.67	15	0.011%	1.227	0.313	0.013	0.150%	**15**
		0.67	18	0.004%	1.767	0.375	0.013	0.120%	
		0.67	24	0.001%	3.142	0.500	0.013	0.080%	
202	Outfall 2	0.88	15	0.019%	1.227	0.313	0.013	0.150%	**15**
		0.88	18	0.007%	1.767	0.375	0.013	0.120%	
		0.88	24	0.002%	3.142	0.500	0.013	0.080%	

Terakee Village

Detention Facility Serving A-1

C = 0.46 Remaining Unit Discharge = 0.100 cfs/acre

Area = 6.67 acres

Release through Restriction = 0.667 cfs

Detention Pond Sized For The 100 Year Storm

Time	Rainfall Intensity	Accumulated Volume	Allowable Release	Needed Detention	
min	in./hr.	(CF)	(CF)	(CF)	
5	6.50	5963	200	5763	
10	4.95	9083	400	8682	
15	4.09	11257	601	10657	
20	3.48	12773	801	11972	
25	3.06	14052	1001	13050	
30	2.75	15138	1201	13937	
35	2.52	16185	1402	14784	
40	2.29	16831	1602	15229	
45	2.10	17379	1802	15577	
50	1.94	17827	2002	15825	
55	1.81	18249	2202	16046	
60	1.70	18716	2403	16314	<- Det
90	1.21	19914	3604	16310	
120	0.93	20434	4805	15628	
180	0.63	20907	7208	13699	
360	0.35	23318	14416	8902	
720	0.22	28405	28833	-428	
1440	0.12	31443	57665	-26222	

Required Storage Volume = **16314** ft^3

Terakee Village

Detention Facility Serving A-2

C = 0.46 Remaining Unit Discharge = 0.100 cfs/acre

Area = 8.80 acres

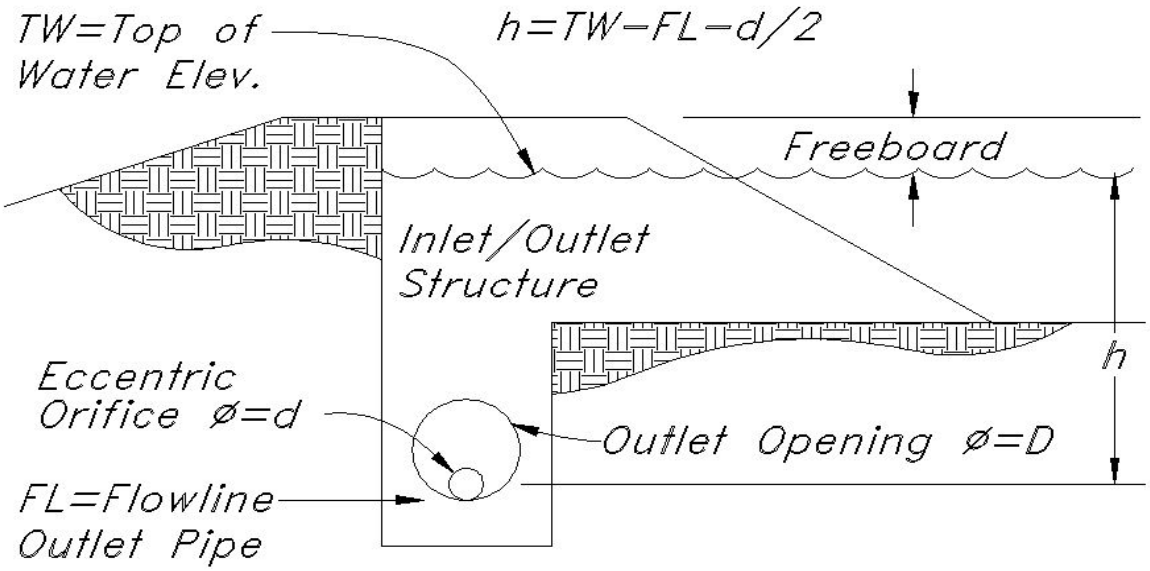
Release through Restriction = 0.880 cfs

Detention Pond Sized For The 100 Year Storm

Time	Rainfall Intensity	Accumulated Volume	Allowable Release	Needed Detention	
min	in./hr.	(CF)	(CF)	(CF)	
5	6.50	7852	264	7588	
10	4.95	11959	528	11431	
15	4.09	14822	792	14030	
20	3.48	16818	1056	15762	
25	3.06	18502	1320	17182	
30	2.75	19932	1584	18348	
35	2.52	21311	1848	19463	
40	2.29	22161	2112	20049	
45	2.10	22883	2376	20507	
50	1.94	23473	2640	20833	
55	1.81	24028	2904	21124	
60	1.70	24643	3168	21476	<- Det
90	1.21	26221	4752	21469	
120	0.93	26905	6335	20569	
180	0.63	27528	9503	18025	
360	0.35	30703	19006	11697	
720	0.22	37400	38013	-613	
1440	0.12	41401	76025	-34624	

Required Storage Volume = **21476** ft^3

ORIFICE PLATE CALCULATIONS



Q = Total Discharge Rate

$$Q = 0.62 \cdot A_o \cdot \sqrt{64.4 \cdot h}$$

$$A_o = \frac{\pi \cdot d^2}{4}$$

Solving for d, we have…..

$$d = \sqrt{\frac{4 \cdot Q}{0.62 \cdot \pi \cdot \sqrt{64.4 \cdot \left(TW - FL - d/2\right)}}}$$

Let

$$\Delta = d - \sqrt{\frac{4 \cdot Q}{0.62 \cdot \pi \cdot \sqrt{64.4 \cdot \left(TW - FL - d/2\right)}}}$$

Goal-seek Δ to zero by changing "trial d"

Stormwater Area	A-1	A-2	
TW =	37.10	37.50	
FL =	35.35	33.86	
Q =	0.667	0.880	cfs
trial d=	0.3695	0.3478	ft
Δ =	0.000	0.000	ft
d =	4.43	4.17	inches

NOAA Atlas 14, Volume 1, Version 5
Location name: Ogden, Utah, USA*
Latitude: 41.25°, Longitude: -112.085°
Elevation: 4236.57 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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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	1.50 (1.31-1.74)	1.88 (1.67-2.20)	2.59 (2.27-3.00)	3.24 (2.82-3.77)	4.31 (3.66-5.04)	5.30 (4.36-6.29)	6.50 (5.16-7.79)	7.92 (6.05-9.67)	10.2 (7.36-12.9)	12.3 (8.46-15.9)
10-min	1.15 (0.996-1.33)	1.44 (1.27-1.67)	1.97 (1.72-2.29)	2.47 (2.14-2.87)	3.28 (2.78-3.84)	4.04 (3.32-4.79)	4.95 (3.92-5.92)	6.03 (4.60-7.36)	7.78 (5.60-9.79)	9.40 (6.44-12.1)
15-min	0.944 (0.824-1.10)	1.19 (1.05-1.38)	1.63 (1.42-1.89)	2.04 (1.77-2.37)	2.71 (2.30-3.17)	3.34 (2.74-3.96)	4.09 (3.24-4.90)	4.98 (3.80-6.09)	6.42 (4.63-8.09)	7.76 (5.32-10.0)
30-min	0.636 (0.554-0.736)	0.800 (0.706-0.930)	1.10 (0.960-1.27)	1.37 (1.19-1.60)	1.82 (1.55-2.14)	2.25 (1.85-2.66)	2.75 (2.18-3.30)	3.35 (2.56-4.10)	4.33 (3.11-5.45)	5.23 (3.58-6.73)
60-min	0.394 (0.343-0.456)	0.495 (0.437-0.576)	0.678 (0.594-0.787)	0.849 (0.738-0.988)	1.13 (0.958-1.32)	1.39 (1.14-1.65)	1.70 (1.35-2.04)	2.08 (1.58-2.54)	2.68 (1.93-3.37)	3.24 (2.22-4.17)
2-hr	0.248 (0.220-0.283)	0.310 (0.274-0.354)	0.401 (0.353-0.458)	0.488 (0.425-0.560)	0.634 (0.540-0.734)	0.768 (0.638-0.901)	0.928 (0.744-1.11)	1.12 (0.864-1.36)	1.42 (1.04-1.79)	1.71 (1.18-2.19)
3-hr	0.193 (0.173-0.217)	0.237 (0.213-0.268)	0.298 (0.266-0.335)	0.353 (0.314-0.399)	0.444 (0.386-0.506)	0.528 (0.450-0.609)	0.633 (0.525-0.742)	0.758 (0.608-0.909)	0.962 (0.734-1.20)	1.15 (0.841-1.48)
6-hr	0.131 (0.120-0.144)	0.160 (0.146-0.176)	0.193 (0.176-0.214)	0.224 (0.202-0.248)	0.270 (0.240-0.302)	0.309 (0.271-0.348)	0.353 (0.305-0.403)	0.403 (0.340-0.468)	0.505 (0.411-0.610)	0.598 (0.472-0.747)
12-hr	0.083 (0.076-0.090)	0.101 (0.093-0.111)	0.122 (0.112-0.134)	0.141 (0.128-0.154)	0.168 (0.152-0.186)	0.191 (0.170-0.212)	0.215 (0.188-0.243)	0.241 (0.207-0.277)	0.282 (0.234-0.331)	0.315 (0.255-0.378)
24-hr	0.050 (0.047-0.055)	0.062 (0.057-0.067)	0.074 (0.068-0.080)	0.084 (0.077-0.091)	0.098 (0.090-0.106)	0.108 (0.099-0.117)	0.119 (0.109-0.129)	0.130 (0.118-0.141)	0.145 (0.130-0.168)	0.160 (0.139-0.191)
2-day	0.029 (0.027-0.032)	0.036 (0.033-0.039)	0.042 (0.039-0.046)	0.048 (0.044-0.052)	0.055 (0.051-0.060)	0.061 (0.056-0.066)	0.067 (0.061-0.072)	0.072 (0.066-0.078)	0.080 (0.072-0.086)	0.085 (0.077-0.097)
3-day	0.021 (0.020-0.023)	0.026 (0.024-0.028)	0.031 (0.029-0.033)	0.035 (0.032-0.038)	0.040 (0.037-0.043)	0.044 (0.041-0.048)	0.049 (0.045-0.053)	0.053 (0.048-0.057)	0.059 (0.053-0.064)	0.063 (0.057-0.070)
4-day	0.017 (0.016-0.018)	0.021 (0.019-0.023)	0.025 (0.023-0.027)	0.028 (0.026-0.030)	0.033 (0.030-0.035)	0.036 (0.033-0.039)	0.040 (0.036-0.043)	0.043 (0.040-0.047)	0.048 (0.043-0.052)	0.052 (0.046-0.057)
7-day	0.011 (0.011-0.012)	0.014 (0.013-0.015)	0.017 (0.016-0.018)	0.019 (0.018-0.020)	0.022 (0.020-0.024)	0.024 (0.022-0.026)	0.026 (0.024-0.028)	0.028 (0.026-0.031)	0.031 (0.029-0.034)	0.033 (0.030-0.037)
10-day	0.009 (0.008-0.010)	0.011 (0.010-0.012)	0.013 (0.012-0.014)	0.015 (0.014-0.016)	0.017 (0.016-0.018)	0.019 (0.017-0.020)	0.020 (0.019-0.022)	0.022 (0.020-0.023)	0.023 (0.021-0.025)	0.025 (0.023-0.027)
20-day	0.006 (0.005-0.006)	0.007 (0.007-0.008)	0.008 (0.008-0.009)	0.009 (0.009-0.010)	0.011 (0.010-0.011)	0.012 (0.011-0.012)	0.012 (0.011-0.013)	0.013 (0.012-0.014)	0.014 (0.013-0.015)	0.015 (0.014-0.016)
30-day	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.008-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.010)	0.010 (0.010-0.011)	0.011 (0.010-0.012)	0.011 (0.011-0.012)
45-day	0.004 (0.004-0.004)	0.005 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.006)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.008)	0.008 (0.008-0.009)	0.009 (0.008-0.009)	0.009 (0.008-0.010)
60-day	0.003 (0.003-0.004)	0.004 (0.004-0.004)	0.005 (0.005-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.008)	0.008 (0.007-0.009)

[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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