

Preliminary Drainage Report

For
Self Storage
FLW / Hayden Rd Self Storage
Scottsdale, AZ

Scottsdale Case:
Job: 528
November 2021
8-ZN-2021

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EXP 9-30-23

**PRELIMINARY DRAINAGE REPORT
FOR
Self Storage
FLW / Hayden Self Storage
Scottsdale, Arizona**

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1.0 INTRODUCTION

The proposed site is located north of the intersection of Frank Lloyd Wright and Hayden Road within the City of Scottsdale, Arizona. The site is situated within the Southeast Quarter of Section 1, Township 3 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is currently a vacant remnant land parcel left over from original construction of the Central Arizona Project. This site is bounded by CAP property to the north, retail property on the south and public streets on the east and west end. This project will develop self storage buildings on the site.

2.0 OBJECTIVES – PROJECT DEVELOPMENT AND BACKGROUND

The purpose of this report is to verify the site compliance with the drainage requirements set forth in the *Drainage Design Manual for Maricopa County, Volume II “Hydraulics*, prepared by the Maricopa County Flood Control District; and the City of Scottsdale Design Standards and Procedures Manual dated 2018.

3.0 EXISTING SITE CONDITIONS

Currently, the site is a vacant site. Loop 101 South frontage road abuts the east side of site, Fully developed retail buildings abut the south side of the site. The west side of the site abuts Frank Lloyd Wright Blvd. CAP maintains property on the north side of the site. Approximately 25' from the property line to the CAP security fence remains as CAP ownership. ADOT right of way at the east end of the job has controlled access now allowing access.

4.0 FLOOD PLAIN DESIGNATION

The west side of the site lies within zone X Shaded per (FEMA) Flood Insurance Rate Map (FIRM), Map Numbers 1320L, dated October 16, 2013. Finish floor of the new east building is set at elevation LF₈₈=1514.40 and west building is set at elevation LF₈₈=1514.60

See Figure 3 for a copy of the FEMA map.

5.0 PROPOSED STORMWATER SITE RETENTION

STORMWATER RETENTION AND ONSITE STORM DRAIN

The intent of design of this project is to provide the 100 year 2 hour volumes storage onsite. Onsite conveyance systems are designed to convey to the retention system and drywell systems are planned for disposal. This design is to retain events of the 100 year 2 hour and smaller onsite.

Several developments in this area are fully constructed with onsite retention. Loop 101 frontage road is higher in elevation and does not contribute to this site. Flows in

the frontage road are conveyed by existing ADOT storm drain to areas lower in the local watershed. Developed retail to the south has a developed site retention system and these sites outfall to the south following the prevailing grade in the areas.

Frank Lloyd Wright Blvd at the west end of the site is fully developed with curb and gutter and does not outfall to this site.

The undeveloped retained CAP land to the north will remain undeveloped. The area of land between the property lien and the security fence has a high point approximately as the mid point of this project. The west end of this area will outfall to the west and the east end will outfall to the east. North of the security fence, the grade drops significantly (4'+) to the CAP maintenance road next to the north canal concrete bank.

Offsite flows do not enter this site.

System is split into two areas. Area 1 is the west end of the site and outfalls to a triangular surface basin at the west end of the site.

Area 2 is the east end of the site and is retained by an 8' diameter underground retention system.

Project will be developed providing the 100 year 2 hour retention (2.29").

Underground pipe must meet DPSM 4-1.202. Pipe shall have a 75 year life, smooth floor per COP Std Det 2554, two access points, signage, O&M plan, and a notarized "Ownership responsibility statement" acknowledging ownership responsibility and recordation of this statement.

ONSITE STORM DRAIN

Onsite storm drain will collect and outfall to each retention basin. The west basin will outfall to a bubble up basin in the bottom of the basin. Drywell will be connected to the bottom of the bubble up basin to allow for bleedoff to the bottom of the inlet.

C FACTORS

A C factor of 0.90 is used for preliminary analysis. C factors will be per COS 2018 DPSM 4-1.504 E.3

ULTIMATE OUTFALLS

The west end of the site will outfall over sidewalk (elevation 13.60) into Frank Lloyd Wright Blvd. Flows in Frank Lloyd Wright proceed east and south in Hayden Rd.

The east end of the site will outfall thru the southeast corner of the site overtop curb at elevation 13.00. Flows will proceed along the west side of the 101 frontage road into the intersection of 101 and Frank Lloyd Wright and proceed south.

DISPOSAL

Surface basins and Underground retention will be disposed by drywell. No city storm drains are available in this area.

Basin 1: Dryup time based on 0.1 CFS drywell: 33.4 hrs. Rate based on 36 hrs: 0.093 CFS

Basin 2: Dryup time based on 0.1 CFS drywell: 36.6 hrs. Rate based on 36 hrs: 0.102 CFS

404 AND CONSTRUCTION STORMWATER

This project is not located in a 404 wash. Project exceeds 1 acre and will have a Stormwater Management Plan prepared and an NOI filed with ADEQ prior to improvement plan approval.

6.0 SUMMARY

- This project is the development of two self storage buildings.
- The site will provide retention for the 100 year 2 hour event.
- The Project Site is located within FEMA designated X Shaded.
- Site will outfall to the southwest and southeast corners of the site.

7.0 REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Rate Map, Maricopa County, Arizona and Incorporated Areas, Map Number 04013C1320L, Oct 16, 2013.
2. City of Scottsdale, Design Standards and Procedures Manual Chapter 4, 2018.

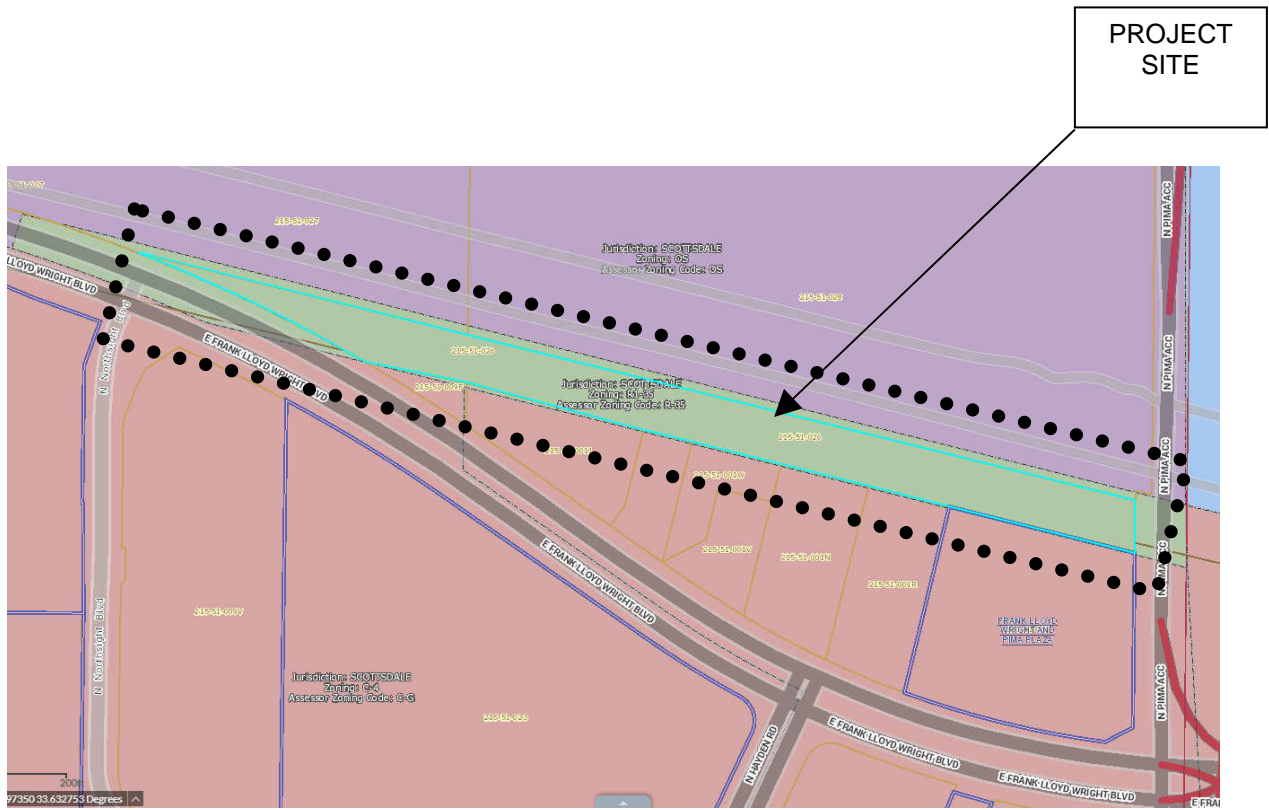


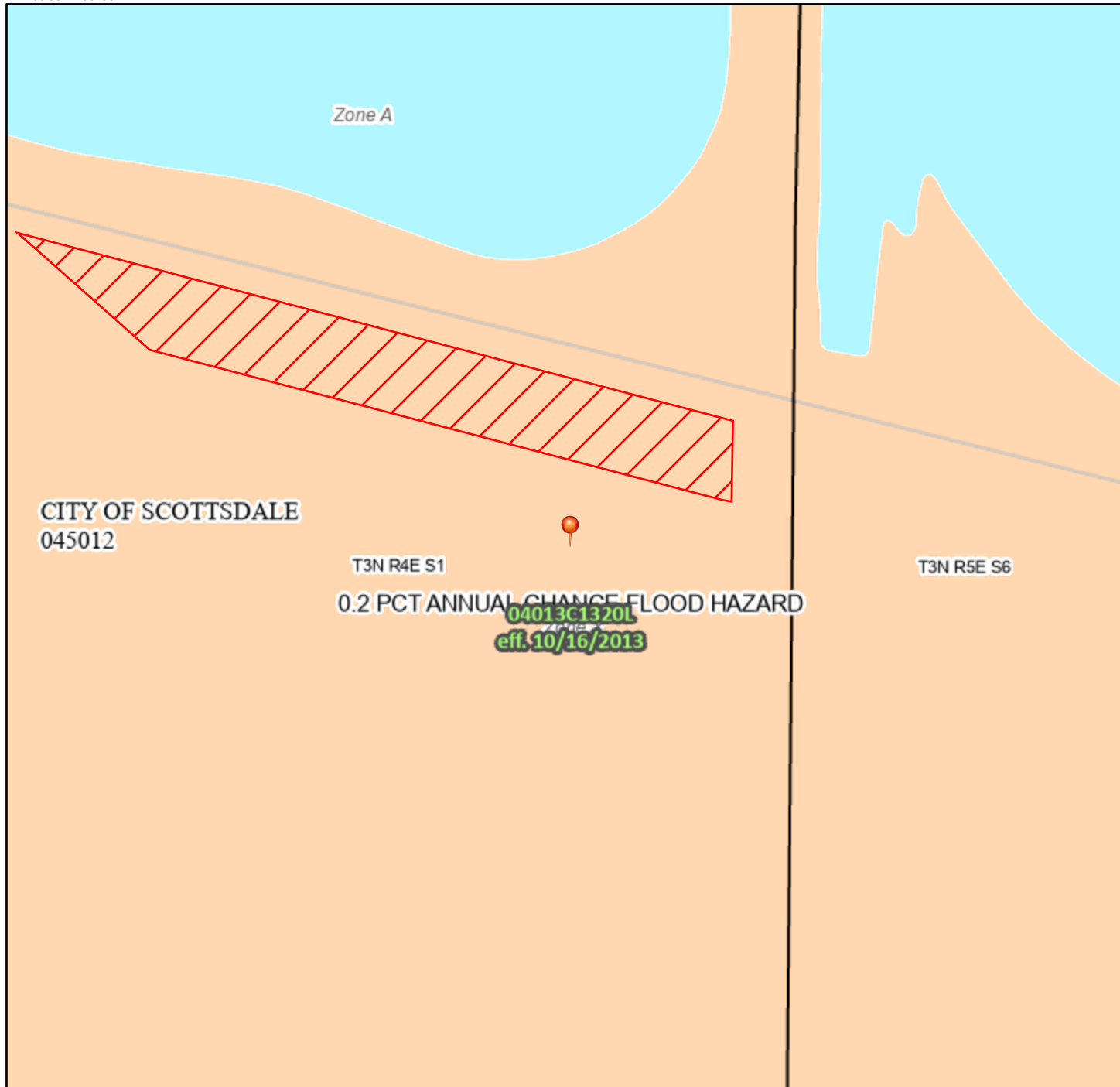
Figure 1-VICINITY MAP

Figure 3-FEMA MAP

National Flood Hazard Layer FIRMMette



111°53'53"W 33°38'4"N



1:6,000

111°53'16"W 33°37'34"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | | |
|------------------------------------|--|--|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> |
| | | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i> |
| | | Effective LOMRs |
| | | Area of Undetermined Flood Hazard <i>Zone D</i> |
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| | | Profile Baseline |
| | | Hydrographic Feature |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |
- The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

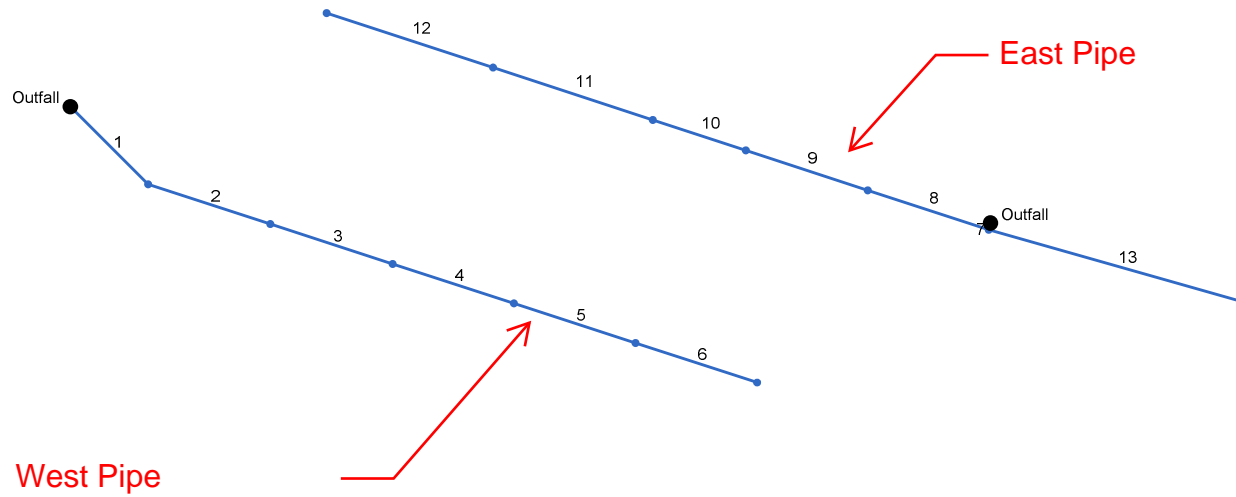
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/28/2021 at 8:05 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Figure 4-Retention and Hydraulic Calculations

				2.29 in (NOAA 14)						
100 Year 2 hr depth				0.1908	CxDxA					
				DEPTH	REQUIRE D (CFS)	PROVIDE D (CFS)	<i>excess</i>	<i>Notes</i>	(CF / 0.1 CFS) / 3600 SEC/HR	CF / 129,600 SECONDS
AREA NAME	SF AREA	EVENT	C FACTOR	Ft	CU FT	CU FT	<i>CU FT</i>		Dryup time at 0.1 CFS (HRS)	Dryup Rate at 36 hrs (CFS)
<u>Basin 1</u>	70,047	100-2	0.90	0.1908	12,031	12,991	<u>960</u>	Basin 1 surface	33.4	0.093
<u>Basin 2</u>	76,764	100-2	0.90	0.1908	13,184	13,322	<u>137</u>	UG RETENTION Basin 2 UG Retention	36.6	0.102

528 FLW storage



Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID	
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)		Inlet/ Rim El (ft)
1	End	86.1	45.0	Grate	0.00	0.20	0.95	5.0	7.00	1.16	8.00	18	Cir	0.013	0.00	13.70	Inserted Line
2	1	100.4	-26.9	Grate	0.00	0.19	0.95	5.0	8.00	0.30	8.30	18	Cir	0.013	0.00	14.30	Inserted Line
3	2	100.6	0.0	Grate	0.00	0.23	0.95	5.0	8.30	0.50	8.80	18	Cir	0.013	0.00	14.30	Inserted Line
4	3	99.7	0.0	Grate	0.00	0.20	0.95	5.0	8.80	0.50	9.30	18	Cir	0.013	0.00	14.30	Inserted Line
5	4	100.0	0.0	Grate	0.00	0.21	0.95	5.0	9.30	0.50	9.80	18	Cir	0.013	0.00	14.30	Inserted Line
6	5	100.0	0.0	Grate	0.00	0.30	0.95	5.0	9.80	0.50	10.30	18	Cir	0.013	0.00	14.30	Inserted Line
7	End	5.5	105.2	Grate	0.00	0.18	0.95	5.0	7.00	12.73	7.70	18	Cir	0.013	0.00	13.10	Inserted Line
8	7	99.5	93.0	Grate	0.00	0.22	0.95	5.0	7.70	0.80	8.50	18	Cir	0.013	0.00	13.10	Inserted Line
9	8	100.3	0.0	Grate	0.00	0.19	0.95	5.0	8.50	0.50	9.00	18	Cir	0.013	0.00	13.40	Inserted Line
10	9	76.4	0.0	Grate	0.00	0.26	0.95	5.0	9.00	0.79	9.60	18	Cir	0.013	0.00	13.40	Inserted Line
11	10	131.5	0.0	Grate	0.00	0.24	0.95	5.0	9.60	0.76	10.60	18	Cir	0.013	0.00	14.30	Inserted Line
12	11	137.0	0.0	Grate	0.00	0.25	0.95	5.0	10.60	0.51	11.30	18	Cir	0.013	0.00	14.30	Inserted Line
13	7	206.2	-89.3	Grate	0.00	0.40	0.95	5.0	7.70	0.87	9.50	18	Cir	0.013	0.00	12.50	

528 FLW storage

Number of lines: 13

Date: 11/9/2021

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Inserted Line	4.65	18	Cir	86.1	7.00	8.00	1.161	13.60*	13.77*	0.00	13.77	End	Grate
2	Inserted Line	4.06	18	Cir	100.4	8.00	8.30	0.299	13.77*	13.92*	0.00	13.92	1	Grate
3	Inserted Line	3.50	18	Cir	100.6	8.30	8.80	0.497	13.92*	14.03*	0.00	14.03	2	Grate
4	Inserted Line	2.76	18	Cir	99.7	8.80	9.30	0.502	14.03*	14.10*	0.00	14.10	3	Grate
5	Inserted Line	2.12	18	Cir	100.0	9.30	9.80	0.500	14.10*	14.14*	0.00	14.14	4	Grate
6	Inserted Line	1.40	18	Cir	100.0	9.80	10.30	0.500	14.14*	14.16*	0.00	14.16	5	Grate
7	Inserted Line	5.70	18	Cir	5.5	7.00	7.70	12.727	13.00*	13.02*	0.00	13.02	End	Grate
8	Inserted Line	3.90	18	Cir	99.5	7.70	8.50	0.804	13.02*	13.15*	0.00	13.15	7	Grate
9	Inserted Line	3.26	18	Cir	100.3	8.50	9.00	0.499	13.15*	13.25*	0.00	13.25	8	Grate
10	Inserted Line	2.68	18	Cir	76.4	9.00	9.60	0.785	13.25*	13.30*	0.00	13.30	9	Grate
11	Inserted Line	1.90	18	Cir	131.5	9.60	10.60	0.760	13.30*	13.34*	0.00	13.34	10	Grate
12	Inserted Line	1.17	18	Cir	137.0	10.60	11.30	0.511	13.34*	13.36*	0.00	13.36	11	Grate
13		1.87	18	Cir	206.2	7.70	9.50	0.873	13.02*	13.08*	0.00	13.08	7	Grate

528 FLW storage

Number of lines: 13

Run Date: 11/9/2021

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown).

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	18	4.65	7.00	13.60	1.50	1.77	2.63	0.11	13.71	0.196	86.1	8.00	13.77	1.50	1.77	2.63	0.11	13.88	0.196	0.196	0.169	0.00	0.00
2	18	4.06	8.00	13.77	1.50	1.77	2.30	0.08	13.85	0.150	100.4	8.30	13.92	1.50	1.77	2.30	0.08	14.00	0.150	0.150	0.150	0.00	0.00
3	18	3.50	8.30	13.92	1.50	1.77	1.98	0.06	13.98	0.111	100.6	8.80	14.03	1.50	1.77	1.98	0.06	14.09	0.111	0.111	0.112	0.00	0.00
4	18	2.76	8.80	14.03	1.50	1.77	1.56	0.04	14.07	0.069	99.7	9.30	14.10	1.50	1.77	1.56	0.04	14.14	0.069	0.069	0.069	0.00	0.00
5	18	2.12	9.30	14.10	1.50	1.77	1.20	0.02	14.12	0.041	100.0	9.80	14.14	1.50	1.77	1.20	0.02	14.16	0.041	0.041	0.041	0.00	0.00
6	18	1.40	9.80	14.14	1.50	1.77	0.79	0.01	14.15	0.018	100.0	10.30	14.16	1.50	1.77	0.79	0.01	14.17	0.018	0.018	0.018	0.00	0.00
7	18	5.70	7.00	13.00	1.50	1.77	3.23	0.16	13.16	0.295	5.5	7.70	13.02	1.50	1.77	3.22	0.16	13.18	0.294	0.294	0.016	0.00	0.00
8	18	3.90	7.70	13.02	1.50	1.77	2.21	0.08	13.09	0.138	99.5	8.50	13.15	1.50	1.77	2.20	0.08	13.23	0.138	0.138	0.137	0.00	0.00
9	18	3.26	8.50	13.15	1.50	1.77	1.84	0.05	13.21	0.096	100.3	9.00	13.25	1.50	1.77	1.84	0.05	13.30	0.096	0.096	0.097	0.00	0.00
10	18	2.68	9.00	13.25	1.50	1.77	1.52	0.04	13.29	0.065	76.4	9.60	13.30	1.50	1.77	1.52	0.04	13.34	0.065	0.065	0.050	0.00	0.00
11	18	1.90	9.60	13.30	1.50	1.77	1.08	0.02	13.32	0.033	131.5	10.60	13.34	1.50	1.77	1.08	0.02	13.36	0.033	0.033	0.043	0.00	0.00
12	18	1.17	10.60	13.34	1.50	1.77	0.66	0.01	13.35	0.012	137.0	11.30	13.36	1.50	1.77	0.66	0.01	13.37	0.012	0.012	0.017	0.00	0.00
13	18	1.87	7.70	13.02	1.50	1.77	1.06	0.02	13.03	0.032	206.2	9.50	13.08	1.50	1.77	1.06	0.02	13.10	0.032	0.032	0.065	0.00	0.00

528 FLW storage

Number of lines: 13

Run Date: 11/9/2021

; c = cir e = ellip b = box

Onsite Flows per Rational Method

Flows at each Inlet

C= 0.95

Based on size of site, Tc=5 minutes for all inlets on this site

i10= 4.92 in/hr

i100= 7.72 in/hr

Sub-area Name	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
i-1	0.20	0.95	1.48
i-2	0.19	0.89	1.40
i-3	0.23	1.06	1.66
i-4	0.20	0.95	1.49
i-5	0.21	0.98	1.55
i-6	0.30	1.40	2.19
i-20	0.18	0.85	1.33
i-21	0.22	1.03	1.61
i-22	0.19	0.90	1.41
i-23	0.26	1.20	1.88
i-24	0.24	1.12	1.76
i-25	0.25	1.18	1.86
i-26	0.40	1.88	2.96

Capacity of Grated Catch Basins (MAG 535) (Sump)

Methodology: Drainage Design Manual for Maricopa County, Volume II, Hydraulics

Capacity for grated catch basin; weir flow:

$$Q_i = C_w \times P(d)^{1.5} \times 0.5$$

Where: C_w=Weir coefficient for grate inlet = 3.0

$$P = \text{Perimeter (MAG Std. Det. 535, Catch Basin F)} = 2 \times (L_{\text{effective}} + W_{\text{effective}})$$

$$= 2 \times (1.68 + 2.37) = 8.10 \text{ ft}$$

d = ponding depth

0.5=clogging factor for grated catch basins in sump condition

Sub-area Name	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)	Q _{at 6" depth}	Actual Depth (ft) (Q ₁₀)	Actual Depth (inches)
i-1	0.20	0.95	1.48	6.81	0.18	2.2
i-2	0.19	0.89	1.40	6.81	0.18	2.1
i-3	0.23	1.06	1.66	6.81	0.20	2.4
i-4	0.20	0.95	1.49	6.81	0.18	2.2
i-5	0.21	0.98	1.55	6.81	0.19	2.2
i-6	0.30	1.40	2.19	6.81	0.24	2.8
i-20	0.18	0.85	1.33	6.81	0.17	2.0
i-21	0.22	1.03	1.61	6.81	0.19	2.3
i-22	0.19	0.90	1.41	6.81	0.18	2.1
i-23	0.26	1.20	1.88	6.81	0.21	2.6
i-24	0.24	1.12	1.76	6.81	0.20	2.5
i-25	0.25	1.18	1.86	6.81	0.21	2.5
i-26	0.40	1.88	2.96	6.81	0.29	3.5



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 Yelke, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchuan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

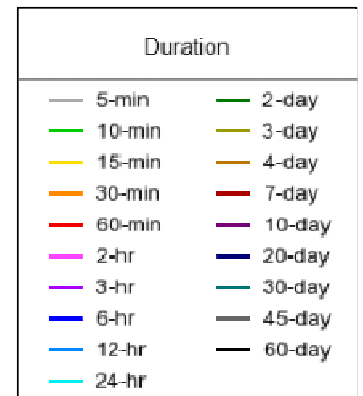
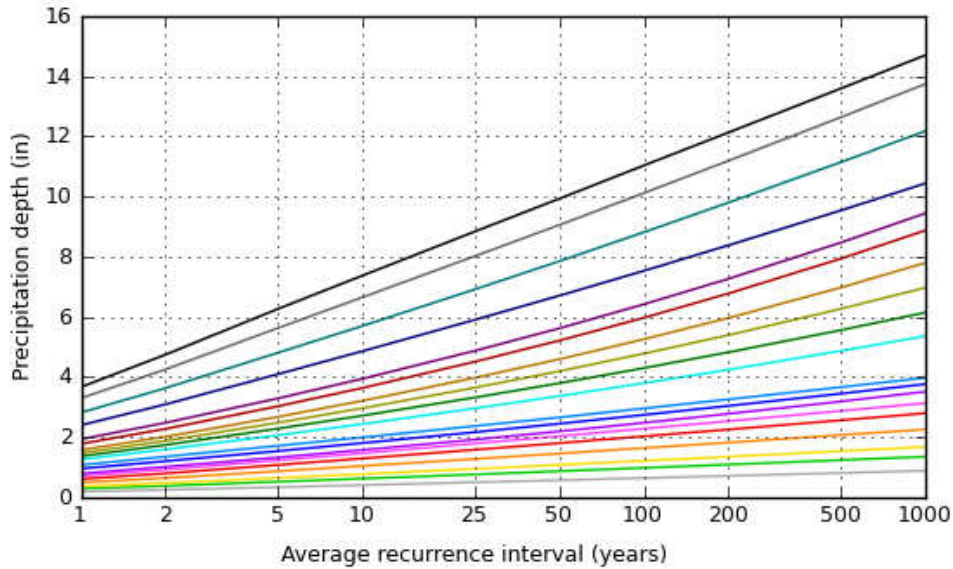
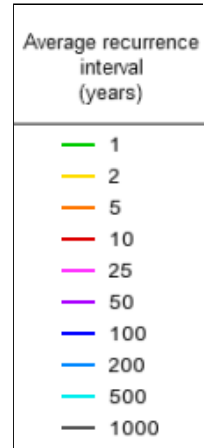
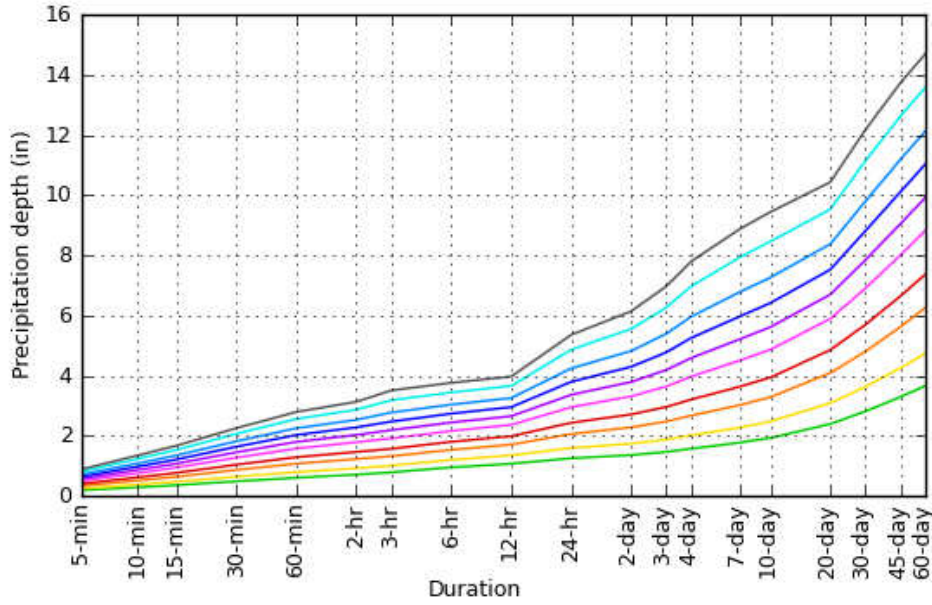
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.195 (0.162-0.239)	0.255 (0.213-0.312)	0.343 (0.285-0.420)	0.412 (0.339-0.502)	0.504 (0.408-0.611)	0.574 (0.460-0.691)	0.648 (0.509-0.777)	0.718 (0.556-0.862)	0.816 (0.615-0.980)	0.890 (0.658-1.07)
10-min	0.297 (0.246-0.364)	0.388 (0.324-0.475)	0.523 (0.433-0.639)	0.627 (0.517-0.764)	0.766 (0.621-0.930)	0.874 (0.700-1.05)	0.994 (0.774-1.19)	1.09 (0.846-1.31)	1.24 (0.937-1.49)	1.35 (1.00-1.63)
15-min	0.368 (0.306-0.451)	0.481 (0.401-0.589)	0.648 (0.537-0.792)	0.778 (0.640-0.947)	0.951 (0.770-1.15)	1.08 (0.868-1.30)	1.22 (0.960-1.47)	1.36 (1.05-1.63)	1.54 (1.16-1.85)	1.68 (1.24-2.02)
30-min	0.495 (0.412-0.608)	0.647 (0.541-0.794)	0.873 (0.723-1.07)	1.05 (0.862-1.27)	1.28 (1.04-1.55)	1.46 (1.17-1.76)	1.64 (1.29-1.97)	1.83 (1.41-2.19)	2.07 (1.56-2.49)	2.26 (1.67-2.72)
60-min	0.613 (0.509-0.752)	0.801 (0.669-0.982)	1.08 (0.895-1.32)	1.30 (1.07-1.58)	1.58 (1.28-1.92)	1.81 (1.45-2.17)	2.03 (1.60-2.44)	2.26 (1.75-2.71)	2.57 (1.94-3.08)	2.80 (2.07-3.37)
2-hr	0.718 (0.604-0.860)	0.929 (0.785-1.12)	1.24 (1.04-1.48)	1.47 (1.22-1.75)	1.79 (1.48-2.13)	2.04 (1.65-2.41)	2.29 (1.82-2.69)	2.54 (1.99-2.99)	2.87 (2.21-3.39)	3.14 (2.36-3.71)
3-hr	0.794 (0.669-0.973)	1.02 (0.860-1.25)	1.33 (1.12-1.63)	1.58 (1.31-1.92)	1.92 (1.57-2.32)	2.20 (1.78-2.64)	2.48 (1.97-2.98)	2.78 (2.17-3.33)	3.19 (2.41-3.82)	3.52 (2.60-4.21)
6-hr	0.958 (0.822-1.14)	1.21 (1.04-1.44)	1.54 (1.32-1.82)	1.81 (1.53-2.13)	2.17 (1.81-2.55)	2.45 (2.01-2.87)	2.74 (2.22-3.20)	3.04 (2.42-3.56)	3.45 (2.67-4.03)	3.77 (2.85-4.41)
12-hr	1.08 (0.930-1.27)	1.36 (1.17-1.60)	1.72 (1.47-2.01)	2.00 (1.70-2.33)	2.37 (2.00-2.77)	2.66 (2.21-3.10)	2.96 (2.43-3.44)	3.26 (2.64-3.79)	3.66 (2.89-4.28)	3.98 (3.08-4.67)
24-hr	1.26 (1.11-1.46)	1.60 (1.41-1.85)	2.07 (1.81-2.39)	2.44 (2.13-2.81)	2.96 (2.56-3.40)	3.37 (2.89-3.86)	3.80 (3.23-4.37)	4.25 (3.57-4.88)	4.87 (4.02-5.60)	5.36 (4.37-6.20)
2-day	1.37 (1.19-1.58)	1.75 (1.52-2.01)	2.29 (1.99-2.63)	2.72 (2.36-3.12)	3.32 (2.86-3.81)	3.80 (3.24-4.35)	4.30 (3.64-4.94)	4.83 (4.04-5.57)	5.56 (4.58-6.43)	6.14 (4.99-7.14)
3-day	1.47 (1.29-1.69)	1.88 (1.65-2.16)	2.48 (2.17-2.84)	2.97 (2.59-3.38)	3.65 (3.16-4.16)	4.19 (3.61-4.79)	4.78 (4.08-5.46)	5.39 (4.56-6.19)	6.26 (5.21-7.21)	6.97 (5.72-8.06)
4-day	1.58 (1.39-1.80)	2.02 (1.78-2.30)	2.68 (2.36-3.05)	3.21 (2.82-3.65)	3.97 (3.46-4.51)	4.59 (3.98-5.22)	5.26 (4.51-5.98)	5.96 (5.07-6.82)	6.97 (5.83-7.99)	7.80 (6.45-8.97)
7-day	1.78 (1.56-2.05)	2.28 (2.00-2.61)	3.03 (2.65-3.47)	3.64 (3.17-4.16)	4.51 (3.91-5.14)	5.21 (4.49-5.95)	5.97 (5.10-6.82)	6.78 (5.73-7.78)	7.93 (6.61-9.13)	8.87 (7.30-10.3)
10-day	1.94 (1.70-2.21)	2.48 (2.18-2.84)	3.29 (2.89-3.75)	3.94 (3.45-4.49)	4.87 (4.23-5.53)	5.62 (4.85-6.38)	6.42 (5.49-7.30)	7.27 (6.16-8.29)	8.46 (7.08-9.69)	9.44 (7.79-10.9)
20-day	2.40 (2.12-2.74)	3.10 (2.73-3.52)	4.09 (3.61-4.65)	4.86 (4.26-5.51)	5.90 (5.15-6.69)	6.70 (5.83-7.60)	7.53 (6.51-8.57)	8.38 (7.19-9.56)	9.53 (8.10-10.9)	10.4 (8.78-12.0)
30-day	2.82 (2.48-3.21)	3.63 (3.21-4.13)	4.81 (4.23-5.44)	5.70 (5.01-6.44)	6.91 (6.03-7.82)	7.85 (6.82-8.87)	8.81 (7.62-9.97)	9.80 (8.41-11.1)	11.1 (9.47-12.7)	12.2 (10.3-13.9)
45-day	3.30 (2.92-3.74)	4.26 (3.77-4.82)	5.63 (4.97-6.36)	6.65 (5.86-7.52)	8.01 (7.03-9.06)	9.05 (7.91-10.2)	10.1 (8.78-11.5)	11.2 (9.65-12.7)	12.6 (10.8-14.4)	13.7 (11.6-15.8)
60-day	3.67 (3.26-4.14)	4.75 (4.21-5.36)	6.26 (5.55-7.06)	7.37 (6.51-8.31)	8.83 (7.77-9.96)	9.92 (8.69-11.2)	11.0 (9.61-12.5)	12.1 (10.5-13.7)	13.6 (11.7-15.5)	14.7 (12.5-16.8)

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

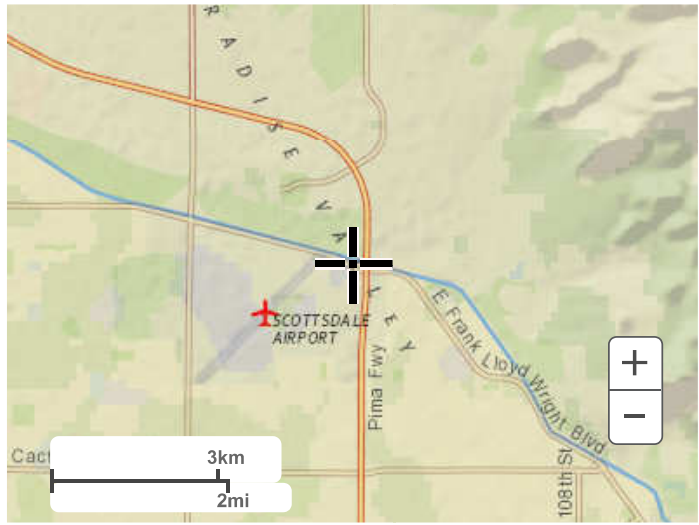
PDS-based depth-duration-frequency (DDF) curves
 Latitude: 33.6309°, Longitude: -111.8927°



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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Figure 5-Warning and Disclaimer of Liability

WARNING AND DISCLAIMER OF LIABILITY The flood protection provided by the Stormwater and Floodplain Management Ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the city, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder. Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations. I have read and understand the above.

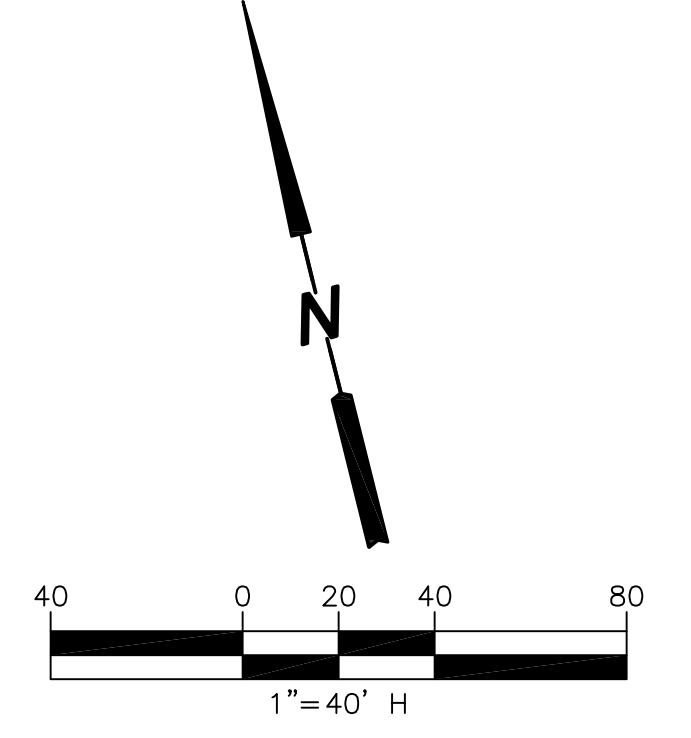
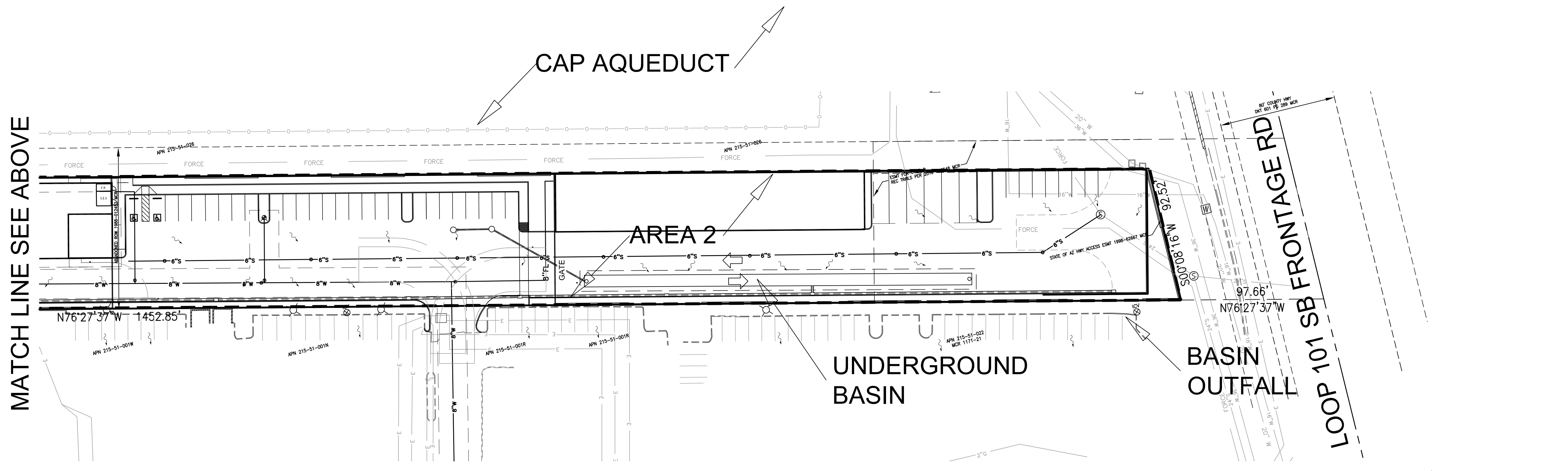
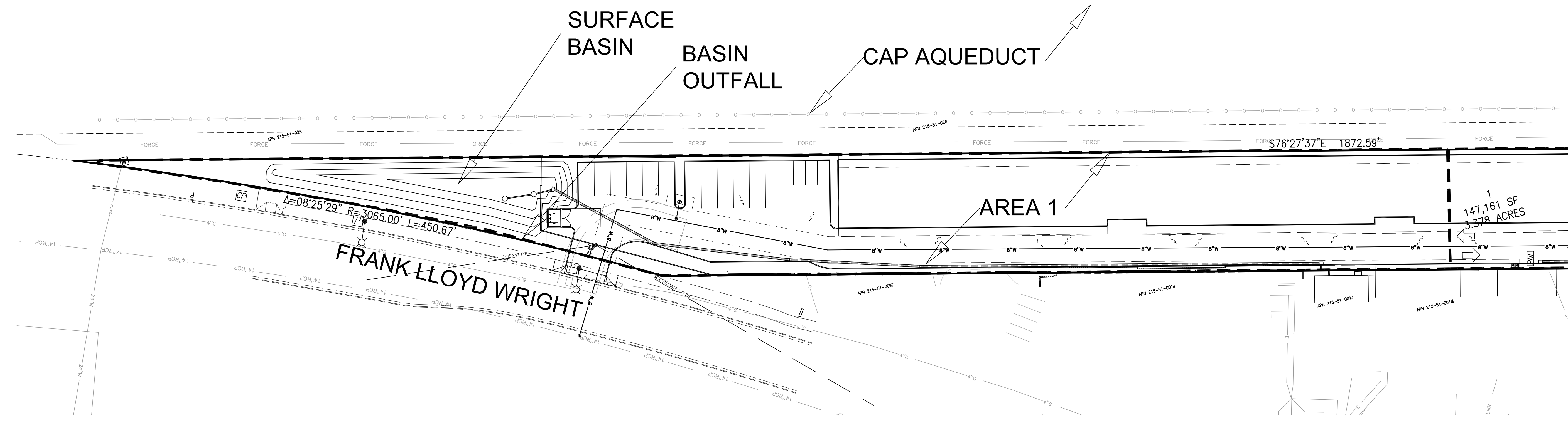
Plan Check #

Owner Signature

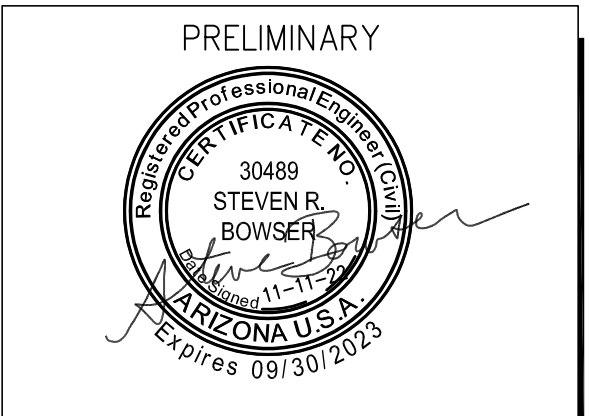
Date

Figure 6-Drainage Exhibit

Jun 11, 2022 - 3:52pm
 G:\055\528_FLW & Hayden\DWG\XREF\528_imp.plans.dwg



CLIENT:
 RKA Architects, Inc.
 2233 East Thomas Rd
 Phoenix, AZ 85016
 (602) 955-3900



Helix Engineering, LLC
 Engineering / Surveying / Consulting
 3240 E Union Hills
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 Phoenix AZ 85050
 (602) 788-2616
 www.hxeng.com

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RELEASE	
DATE	
3-30-21	PRELIM ENGR
4-28-21	REV SP
9-30-21	CITY COMMENTS
1-11-22	REV SP

REVISIONS	
NO.	DATE
1	
2	
3	

PROJECT NAME
 SELF STORAGE
 PROJECT ADDRESS
 FLW / Hayden
 SCOTTSDALE, ARIZONA
 85260
 PROJECT AREA

HELIX JOB NUMBER: 528
 IN HOUSE:
 DRAWN BY: MT
 CHECKED BY: SB
 SHEET TITLE

DRAINAGE EXHIBIT
 SHEET: _____ PAGE: _____
FIGURE 6 1 OF 1
 PLOT SCALE: 1:1 @ 24"x36"; 1:2.2 @ 11"x17"

COS 8-2N-2021