

Preliminary Basis of Design

Drainage

FOR

Scottsdale Boutique Hotel

APN# 130-21-014D

7321 E Osborn Dr

Scottsdale, AZ 85251

Submittal - April 3, 2020

Prepared for:

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April 3, 2020



A handwritten signature in black ink, appearing to read "Mike Jackson", written over the bottom of the professional seal.

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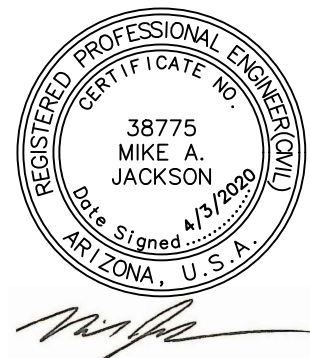
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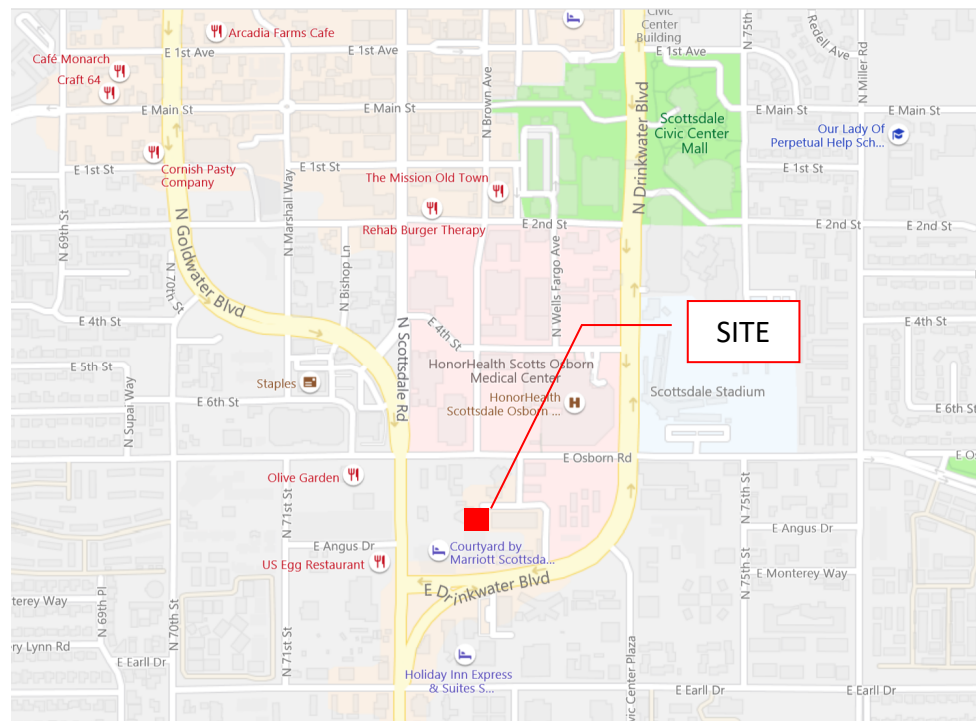
INTRODUCTION

The purpose of this report is to indicate the methods used and to provide discussion of the proposed stormwater drainage for a new 4 story boutique hotel near the intersection of Osborn Drive and N Scottsdale Rd, serving the City of Scottsdale. The boutique hotel will be a 68 room limited service hotel as well as 57 parking spaces with an additional loading/shuttle parking space. The proposed project is approximately 0.726 acres. The proposed improvements include construction of a parking lot, open space areas, a new building, driveways, pedestrian access ramps, sidewalks, utilities, and stormwater drainage structures. This report will indicate how the storm water generated on the subject property is addressed and how it complies with the City of Scottsdale drainage requirements.

EXISTING CONDITIONS

The project site is located southeast of the intersection of Osborn Road and N Scottsdale Rd at the end of a cul-de sac, E. Osborn Drive. is currently an existing medical facility on site. The site is bounded by existing commercial on all hotel to the south, restaurant to the east, and medical/office to the north and east. The total property area is approximately 0.76 acres and the existing development consists of an existing medical facility and supporting site improvements. Refer to Vicinity Map (Figure 1) below for a general graphical representation of the Site location.

Figure 1



EXISTING DRAINAGE

The Site is currently completely developed and is currently a dialyses center. The site generally slopes toward an existing drywell in the eastern row of the parking lot. The overall area generally drains to the southeast. Based on field observation and available topographic data some shallow ponding currently occurs in the existing open spaces but appears to eventually discharge to the pavement and to the drywell. The site ultimately overflows to the northeast into the cul-de-sac of Osborn Drive.

FEMA FLOOD ZONE / FIRM MAP

This is to certify that the above subject property lies within unshaded zone 'x' as designated on the FIRM flood insurance rate map, map number 04013C2235L, dated October 16, 2013. Unshaded zone 'x' is designated as being areas outside of the 0.2% annual chance flood.

PROPOSED DRAINAGE PLAN

To mitigate the drainage flows we propose to retain the first flush volume within an underground storage system on-site.

An rational method analysis was performed for the pre vs post development and the first flush storage volumes for this project. Due to the site being completely developed and lacking any apparent existing retention volume, the first flush volume was greater than the pre vs post volume. The required storage volume is proposed to be stored in an 8ft dia. underground CMP pipe, referred to in this report as UG Pipe. The entire site will discharge via catch basins to the underground Pipe, the underground retention consists of 28 LF, 8ft dia. CMP pipe with a provided retention volume of 1,407 CF. Discharges to this storage pipe will be routed in 18" HDPE storm drain pipe and bleed off to a drywell which will drain in approximately 4 hours.

Building Finished Floor elevation shall be set a minimum of one foot above low top of curb of adjacent site outfall.

DATA ANALYSIS METHODS

The computations included in this report are based on the procedure described in the City of Scottsdale Design Standards and Policies Manual and the design standards and methodologies developed by the Flood Control District of Maricopa County. The first flush 2 storm event was used to calculate the retention volume required across the site.

Table 1-Retention Volume Requirements

Condition	Area (sf)	Area (ac)	C _w *	Precipitation** (in)	Retention Volume Required (cf)	Pre vs. Post Volume Analysis
Pre	31,612	0.73	0.89	2.16	5,064	Δ (cf) pre vs. post 228
Post	31,612	0.73	0.93	2.16	5,292	
FF	31,612	0.73	1	0.5	1,317	FF > Pre vs. Post

*Weighed C for drainage areas are based on the Commercial and Industrial Areas from Figure 4-1.4 of the DSPM, where C =1.0 was assumed for the FF analysis.

**100-yr, 2 hr precipitation = 2.16" Per NOAA14

Table 2- Retention Volume Provided

Retention	Pipe Dia [ft]	Pipe area [ft ²]	Length [ft]	Volume [ft ³]
UG pipe	8	50.27	28	1,407

Table 3- Drawdown Time

Retention Basin ID	Volume Pro [ft ³]	perc rate[cfs]	# of drywells	drawdown time [hrs]
UG pipe	1,407	0.1	1	4

WARNING AND DISCLAIMER OF LIABILITY

Refer to **Appendix 4** for a copy of the Warning & Disclaimer of Liability form.

CONCLUSION

This project has been designed to conform to the City of Scottsdale storm drainage design requirements. Proposed drainage improvements will include an underground retention system sized to retain the onsite volume for the first flush. Proposed storm drain inlets and storm drain pipes will be adequately sized to convey the expected peak flows to the underground storage system which will drain the retained volume within 36 hours via drywell. Excess flows generated onsite will overflow to E Osborn Drive. No

adverse impacts to the offsite downstream properties are anticipated as a result of the proposed improvements.

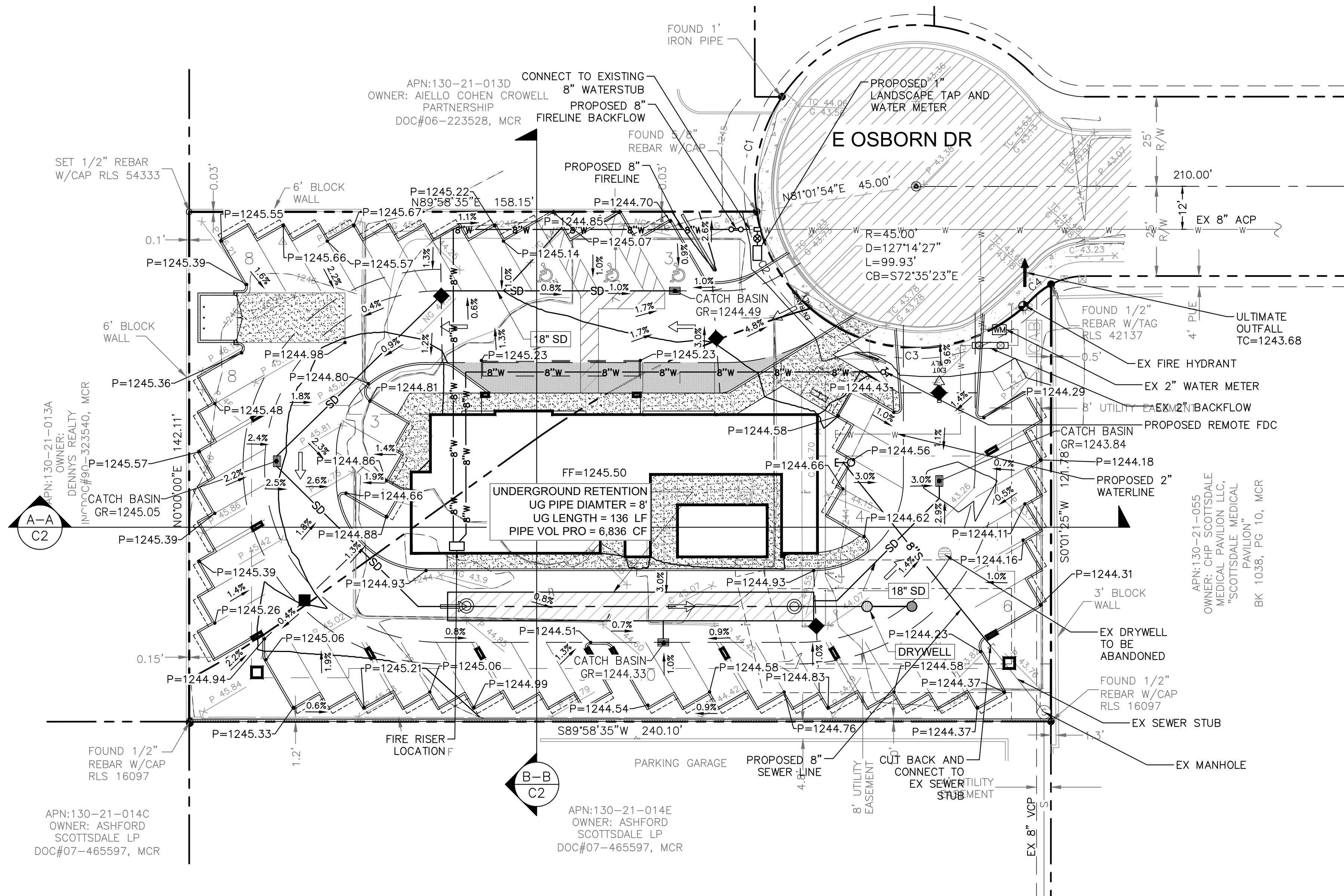
REFERENCES

City of Scottsdale, Design Standards & Policies Manual, January 2010.

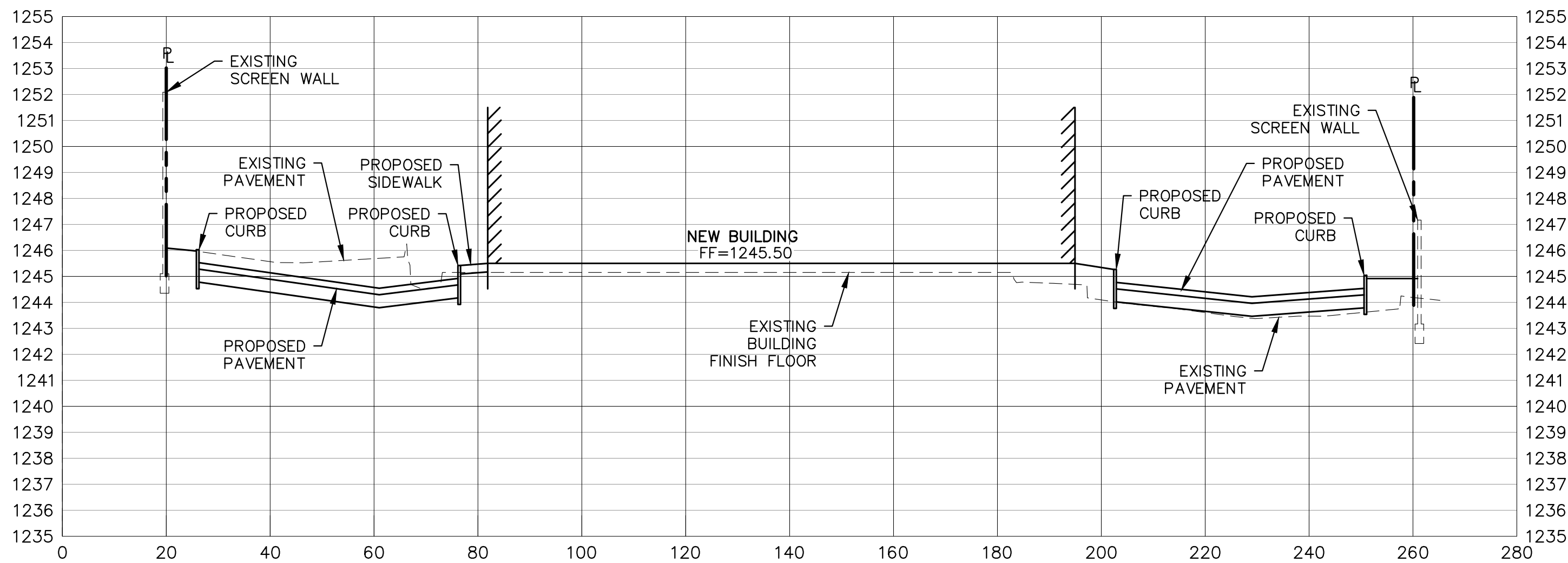
Flood Control District of Maricopa County. Drainage Design Manual for Maricopa County, Arizona, Volume 1. August 15, 2013.

Flood Control District of Maricopa County. Drainage Design Manual for Maricopa County, Arizona, Volume 2. August 15, 2013.

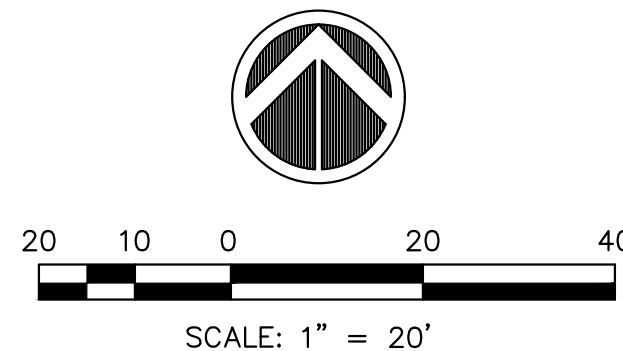
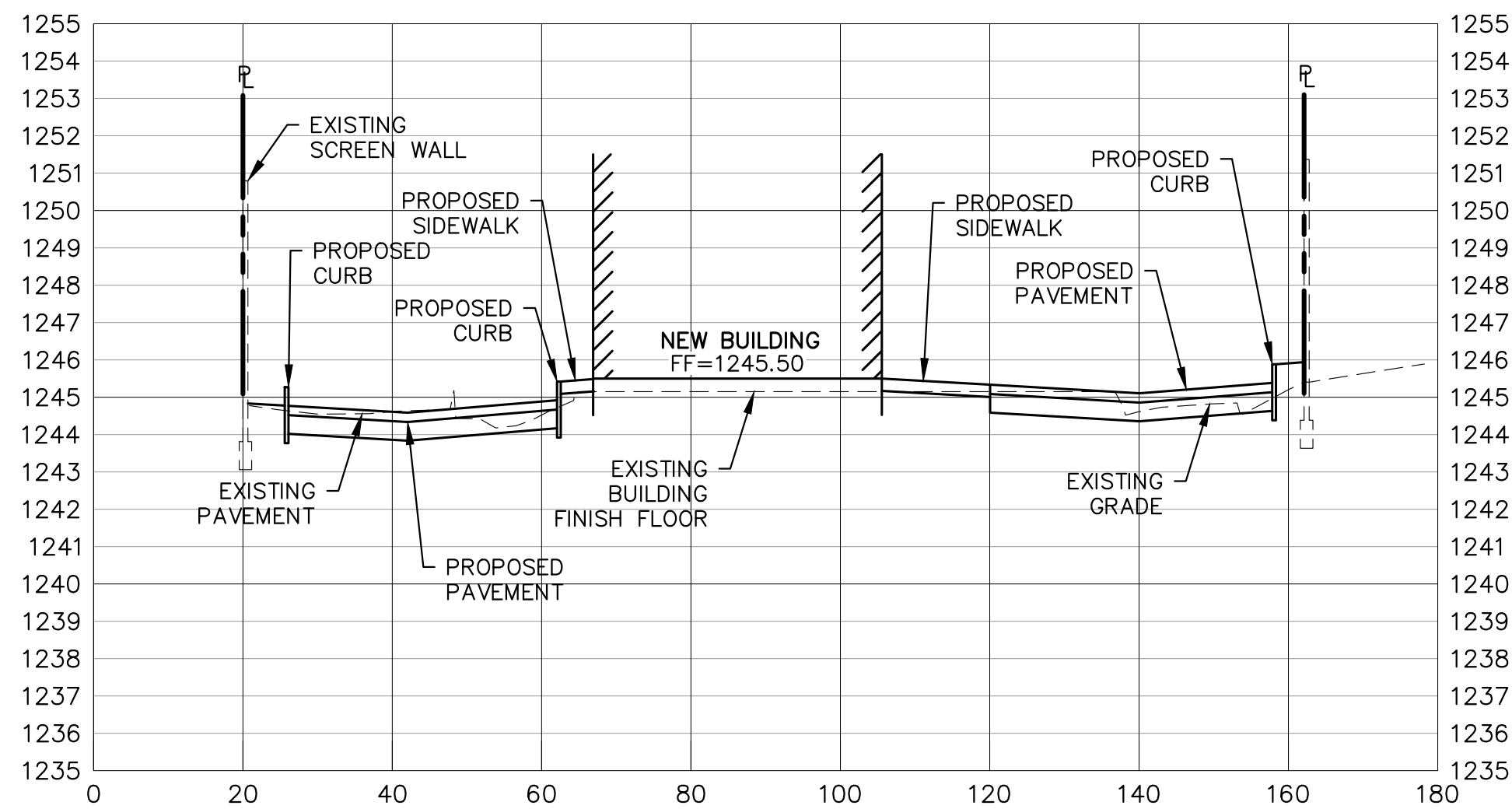
Appendix 1: Figures



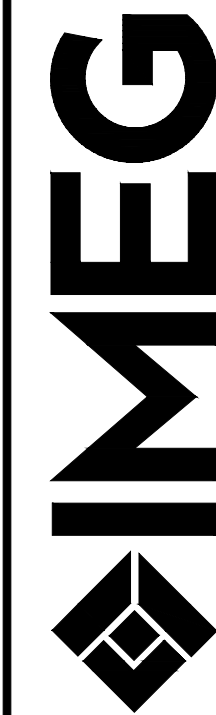
PROFILE VIEW OF SECTION A-A
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'



PROFILE VIEW OF SECTION B-B
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'

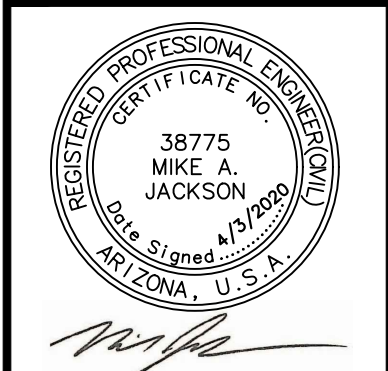


REVISIONS		DATE
No.	DESCRIPTION	



PH: 480.951.0517
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www.imegcorp.com

1600 N DESERT DRIVE
SUITE 230
TEMPE, AZ 85281



BOUTIQUE
7321 E. OSBORN DR. SCOTTSDALE, AZ 85251
PRELIMINARY GRADING & DRAINAGE PLAN

IMEG Project No:
20000160.00

File Name:
20000160-C2-Prelim G&D.dwg

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Field Book No:

Drawn By: RMR

Checked By: MAJ

Date: 03/31/2020

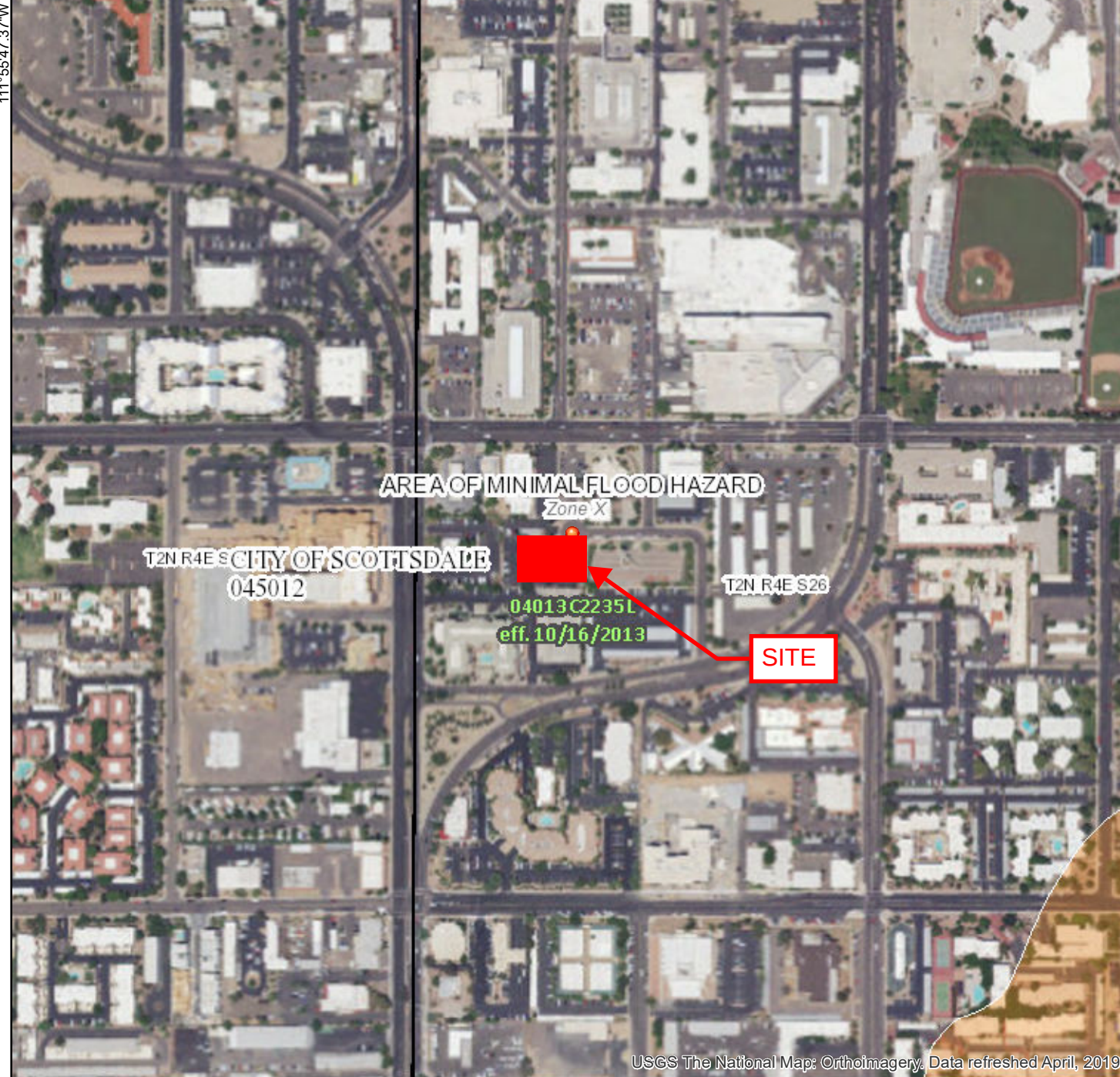
C2

Sheet 2 of 2

National Flood Hazard Layer FIRMette



33°29'27.55"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

USGS The National Map: Orthoimagery. Data refreshed April, 2019.

33°28'57.54"N

Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		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 Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
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
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
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 3/27/2020 at 9:12:56 AM 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 unmapped and unmodernized areas can regulatory purposes.

18-DR-2020
1/13/2021

Appendix 2: NOAA 14 Precipitation Values



NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4866°, Longitude: -111.9249°
Elevation: 1242.64 ft**

* source: ESRI Maps

** source: USGS



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

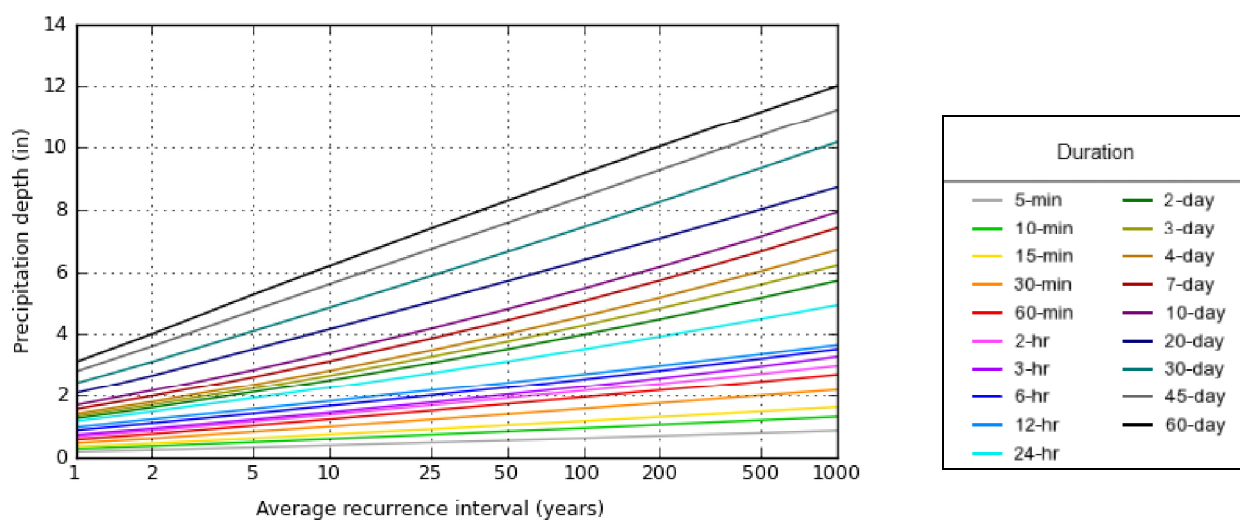
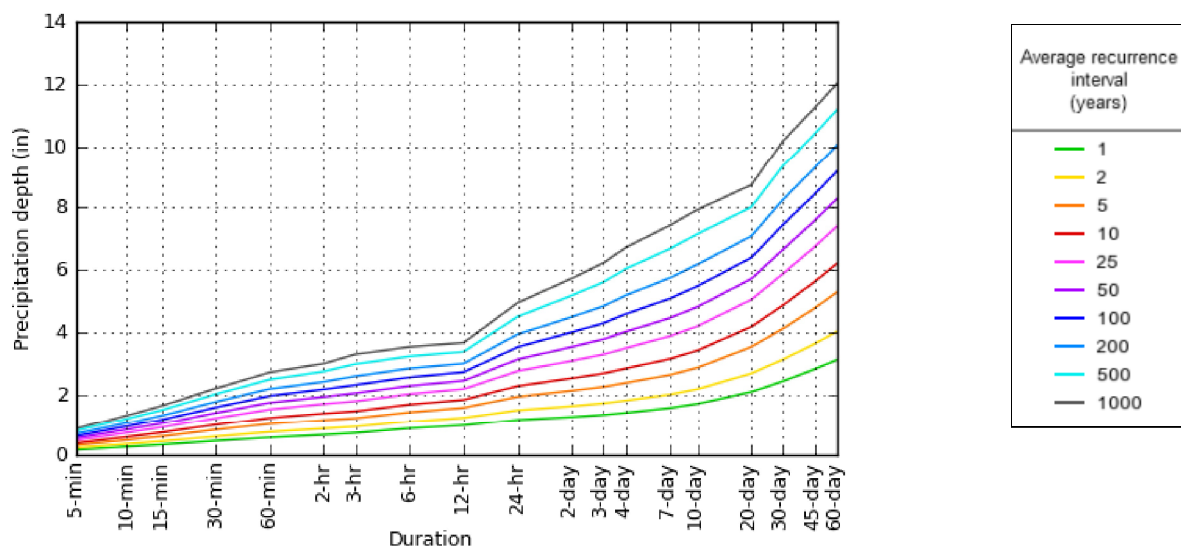
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.183 (0.153-0.222)	0.239 (0.202-0.290)	0.324 (0.272-0.394)	0.390 (0.325-0.471)	0.480 (0.393-0.576)	0.549 (0.444-0.656)	0.619 (0.491-0.738)	0.691 (0.539-0.822)	0.787 (0.598-0.938)	0.860 (0.641-1.03)
10-min	0.278 (0.233-0.338)	0.363 (0.307-0.442)	0.494 (0.414-0.599)	0.594 (0.495-0.717)	0.730 (0.598-0.876)	0.835 (0.675-0.998)	0.941 (0.747-1.12)	1.05 (0.820-1.25)	1.20 (0.909-1.43)	1.31 (0.975-1.56)
15-min	0.344 (0.289-0.419)	0.450 (0.380-0.548)	0.612 (0.513-0.742)	0.737 (0.613-0.889)	0.905 (0.741-1.09)	1.03 (0.837-1.24)	1.17 (0.926-1.39)	1.30 (1.02-1.55)	1.48 (1.13-1.77)	1.62 (1.21-1.94)
30-min	0.464 (0.389-0.564)	0.607 (0.512-0.738)	0.825 (0.691-1.00)	0.992 (0.826-1.20)	1.22 (0.998-1.46)	1.39 (1.13-1.67)	1.57 (1.25-1.87)	1.75 (1.37-2.09)	2.00 (1.52-2.38)	2.19 (1.63-2.61)
60-min	0.574 (0.481-0.698)	0.751 (0.633-0.913)	1.02 (0.855-1.24)	1.23 (1.02-1.48)	1.51 (1.24-1.81)	1.73 (1.39-2.06)	1.95 (1.54-2.32)	2.17 (1.69-2.59)	2.47 (1.88-2.95)	2.71 (2.01-3.23)
2-hr	0.664 (0.567-0.792)	0.861 (0.735-1.03)	1.15 (0.981-1.37)	1.38 (1.16-1.63)	1.68 (1.40-1.98)	1.92 (1.57-2.25)	2.16 (1.74-2.53)	2.40 (1.90-2.82)	2.73 (2.11-3.21)	2.99 (2.26-3.53)
3-hr	0.722 (0.613-0.867)	0.926 (0.790-1.12)	1.22 (1.03-1.46)	1.45 (1.22-1.73)	1.77 (1.47-2.10)	2.03 (1.66-2.40)	2.30 (1.85-2.72)	2.58 (2.04-3.05)	2.97 (2.27-3.51)	3.29 (2.45-3.90)
6-hr	0.869 (0.754-1.02)	1.10 (0.959-1.30)	1.41 (1.23-1.66)	1.66 (1.43-1.94)	2.00 (1.70-2.32)	2.27 (1.89-2.62)	2.55 (2.09-2.94)	2.83 (2.28-3.27)	3.22 (2.53-3.73)	3.52 (2.70-4.10)
12-hr	0.972 (0.851-1.13)	1.23 (1.08-1.43)	1.56 (1.36-1.80)	1.82 (1.58-2.10)	2.17 (1.86-2.49)	2.43 (2.06-2.79)	2.71 (2.26-3.11)	2.99 (2.46-3.44)	3.36 (2.70-3.89)	3.66 (2.88-4.26)
24-hr	1.16 (1.04-1.31)	1.48 (1.32-1.67)	1.92 (1.71-2.15)	2.26 (2.01-2.54)	2.74 (2.42-3.07)	3.12 (2.74-3.49)	3.52 (3.06-3.93)	3.93 (3.39-4.39)	4.49 (3.84-5.03)	4.94 (4.18-5.54)
2-day	1.26 (1.12-1.42)	1.61 (1.44-1.81)	2.11 (1.88-2.37)	2.51 (2.23-2.82)	3.07 (2.72-3.44)	3.52 (3.09-3.94)	3.99 (3.48-4.48)	4.48 (3.88-5.03)	5.17 (4.43-5.81)	5.72 (4.85-6.45)
3-day	1.33 (1.19-1.50)	1.70 (1.52-1.91)	2.24 (1.99-2.51)	2.67 (2.37-2.99)	3.28 (2.90-3.67)	3.77 (3.30-4.21)	4.28 (3.73-4.80)	4.83 (4.17-5.41)	5.60 (4.78-6.28)	6.21 (5.25-6.99)
4-day	1.40 (1.25-1.58)	1.79 (1.60-2.02)	2.36 (2.10-2.65)	2.83 (2.51-3.17)	3.48 (3.07-3.90)	4.01 (3.52-4.49)	4.58 (3.98-5.12)	5.18 (4.47-5.80)	6.02 (5.13-6.74)	6.71 (5.66-7.53)
7-day	1.55 (1.38-1.75)	1.98 (1.77-2.24)	2.62 (2.33-2.94)	3.13 (2.78-3.52)	3.86 (3.41-4.33)	4.44 (3.90-4.98)	5.07 (4.41-5.68)	5.73 (4.95-6.43)	6.66 (5.68-7.48)	7.42 (6.25-8.34)
10-day	1.69 (1.51-1.90)	2.16 (1.93-2.43)	2.85 (2.54-3.20)	3.41 (3.02-3.81)	4.18 (3.69-4.67)	4.81 (4.22-5.37)	5.47 (4.76-6.11)	6.16 (5.33-6.89)	7.14 (6.10-7.99)	7.92 (6.70-8.88)
20-day	2.07 (1.86-2.32)	2.67 (2.39-2.98)	3.52 (3.15-3.93)	4.17 (3.71-4.64)	5.04 (4.47-5.61)	5.71 (5.05-6.35)	6.39 (5.62-7.12)	7.08 (6.20-7.89)	8.01 (6.95-8.95)	8.72 (7.51-9.76)
30-day	2.42 (2.16-2.71)	3.12 (2.79-3.48)	4.11 (3.66-4.57)	4.86 (4.33-5.40)	5.87 (5.20-6.52)	6.64 (5.86-7.38)	7.44 (6.54-8.26)	8.25 (7.21-9.16)	9.34 (8.10-10.4)	10.2 (8.75-11.3)
45-day	2.81 (2.52-3.13)	3.62 (3.25-4.03)	4.76 (4.27-5.31)	5.61 (5.02-6.25)	6.73 (6.00-7.49)	7.57 (6.73-8.43)	8.42 (7.45-9.38)	9.27 (8.16-10.3)	10.4 (9.08-11.6)	11.2 (9.76-12.6)
60-day	3.11 (2.80-3.46)	4.01 (3.61-4.46)	5.28 (4.74-5.86)	6.20 (5.55-6.88)	7.39 (6.61-8.21)	8.28 (7.37-9.19)	9.17 (8.13-10.2)	10.0 (8.87-11.2)	11.2 (9.81-12.5)	12.0 (10.5-13.4)
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

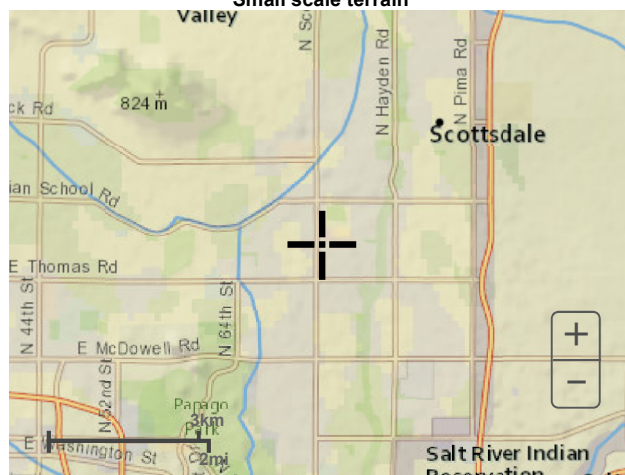
PDS-based depth-duration-frequency (DDF) curves

Latitude: 33.4866°, Longitude: -111.9249°



Maps & aerals

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

Appendix 3: Warning and Disclaimer of Liability