Drainage Reports

DRAINAGE REPORT
FOR
WINERY SUITES OF SCOTTSDALE
SWC GOLDWATER BOULEVARD AND 1ST STREET
SCOTTSDALE, ARIZONA

Prepared for:
Horizon Pediatric Therapy, Inc.
551 S. Higley Road
Mesa, AZ 85206

Prepared by:

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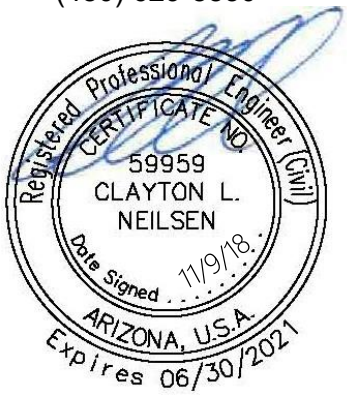
Tempe, AZ 85281
(480) 629-8830



November 9, 2018
Bowman Project No. 050609-01-002

24-ZN-2018
11/14/18

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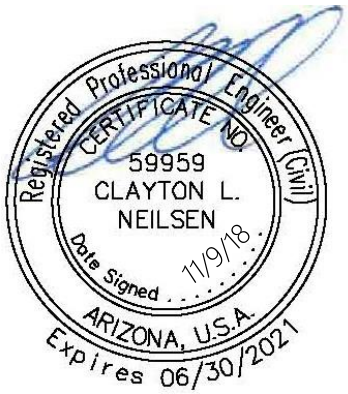


1.0 INTRODUCTION

Winery Suites of Scottsdale is a proposed development located at the southwest corner of Goldwater Boulevard and 1st Street. The development is located within a portion of the northeast quarter of Section 27, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site will consist of 0.39 acres. The site is bounded by 1st Street to the North, Goldwater Boulevard to the East, an alley to the South, and existing properties to the West. A vicinity map is provided in **Appendix A, Figure 1**.

The proposed site consists of the LDV Wine Gallery and Tasting Room and Studio B Interior Design; however, these tenants have since moved to new locations, leaving the current parcels occupied by three dwelling units with flexible lease terms. When redeveloped, the site will consist of approximately 1,500 square-feet of ground-floor retail space and 31 dwelling units with flexible leasing terms in a mid-rise building.

The Winery Suites of Scottsdale is within the jurisdiction of the City of Scottsdale and is designed to comply with the City of Scottsdale drainage policies, as outlined in Chapter 4 of the *City of Scottsdale Design Standards & Policies Manual, 2018* (Reference 1).

2.0 FLOOD PLAIN DESIGNATION

The site is located within Zone X as shown on the FEMA Flood Insurance Rate Map 04013C2235L (**Appendix A, Figure 2**) dated October 16, 2013. Flood Zone X is defined as:

> Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

3.0 EXISTING CONDITIONS

The adjacent Goldwater Boulevard and 1st Street are fully improved. There is existing catch basin on 1st Street that will convey runoff from the site into the existing City of Scottsdale storm drain system. No offsite improvements will be made as a part of this project. It is not anticipated that offsite flows will affect the site.

4.0 DRAINAGE / DESIGN CRITERIA

4.1 General Concept

The site will drain into the adjacent Goldwater Boulevard and 1st Street. Once in the streets, it will be conveyed to the existing catch basin on 1st Street. No stormwater will be retained onsite. The corresponding drainage map can be found in **Appendix A, Figure 3**.

4.2 Design Peak Flows

Onsite design peak flows are estimated using the Rational Method in accordance with the City of Scottsdale criteria. The time of concentration will be calculated using an iterative method based on rainfall intensities. If the time of concentration is calculated to be less than 5 minutes for any sub basin, 5 minutes will be used. Detailed calculations are in **Appendix B**.

4.3 Inlet Structures

Runoff will be conveyed into the existing storm drain system via an existing catch basin on 1st Street. The catch basin is existing and assumed to be properly sized to accommodate the flows that it receives. Consequently, inlet capacity calculations are not included in this report.

4.4 Storm Drains

Flows will be conveyed to the City's storm drain system via the existing catch basin. It is assumed that the storm drain system is designed to adequately accommodate the flows that it receives. A storm drain system analysis is not included in this report.

5.0 RETENTION REQUIREMENTS

As previously stated, all stormwater runoff from the site will be conveyed into the existing City of Scottsdale storm drain system. No runoff will be retained onsite. Because the re-development of the site will produce more runoff, a Stormwater Storage Waiver will be completed as a part of this project. A pre vs post volume was computed to determine how much volume would have to be waived. Calculations for the additional runoff and the waiver are in **Appendix C**. Per the City's Standards, the amount of runoff generated by the site is estimated using the 100-year, 2-hour storm. NOAA Atlas 14 rainfall data is included in **Appendix D**.

6.0 ULTIMATE OUTFALLS AND FINISHED FLOORS

An ultimate outfall will be provided for each onsite drainage area to allow flow in excess of the design storm or in back to back events to leave the drainage area without inundating finished floors of structures within that area. Finished floors will be set a minimum of 14 inches above the ultimate outfall.

6.1 Extraordinary Storm Event

In the event that there is a storm event greater than the 100-year, 2-hour storm, a local and an ultimate outfall has been established. The ultimate outfall for the site is at the low top of curb on 1st Street, at an elevation of 1259.88 (NAVD88). Finished floors are placed 14 inches above this outfall at an elevation of 1261.05.

7.0 CONCLUSIONS

The proposed development is in compliance with City of Scottsdale design criteria and other required drainage laws. This study has determined that:

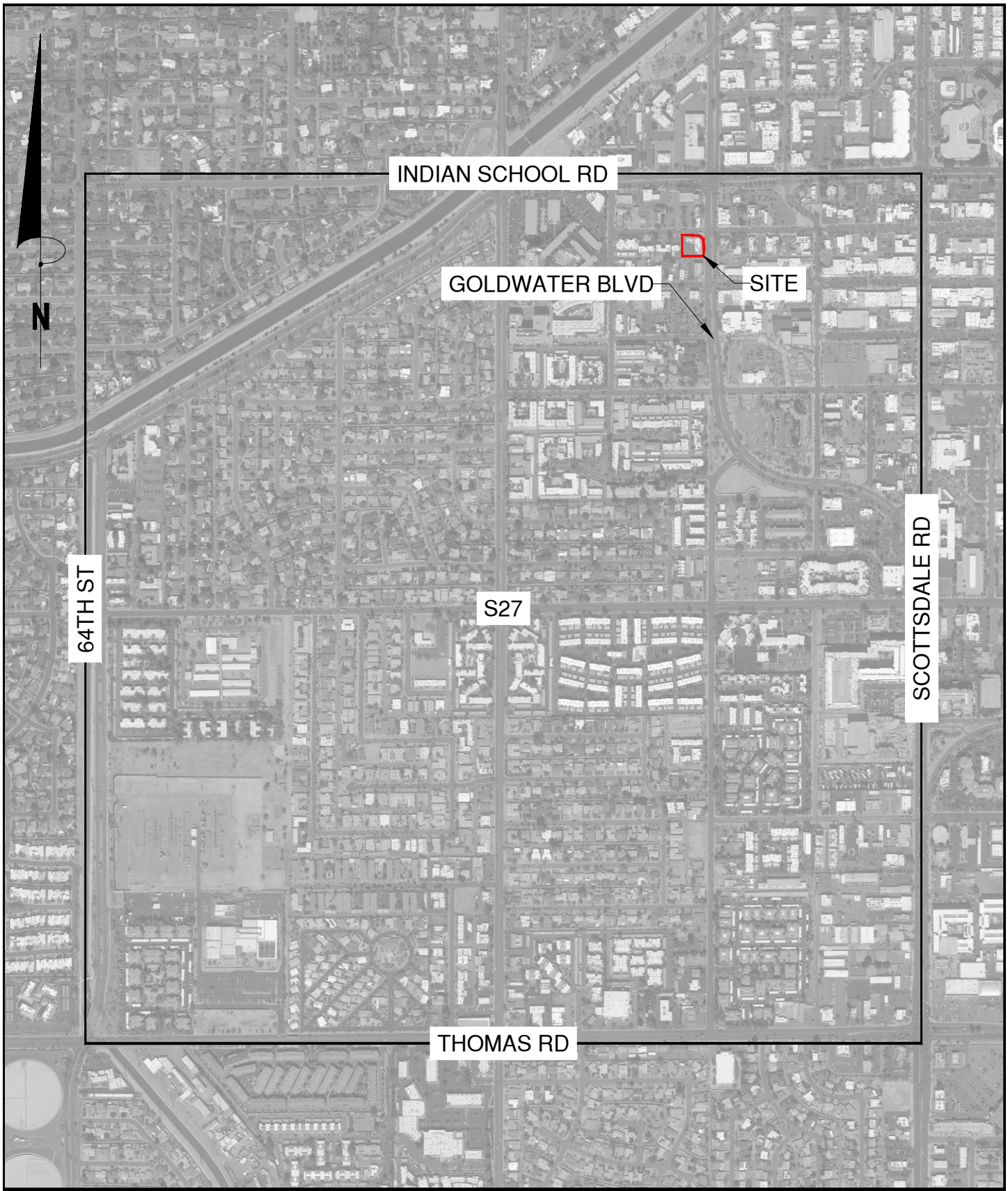
- Onsite flows will be conveyed to the existing storm drain system via an existing catch basin.
- All finished floor elevations will be a minimum of 14 inches above the ultimate outfall of the site.

8.0 REFERENCES

1. City of Scottsdale, Design Standards & Policies Manual. 2018.

APPENDIX A

FIGURES



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Tempe, Arizona 85281
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www.bowmanconsulting.com

WINERY SUITES OF SCOTTSDALE

SCOTTSDALE, AZ

VICINITY MAP

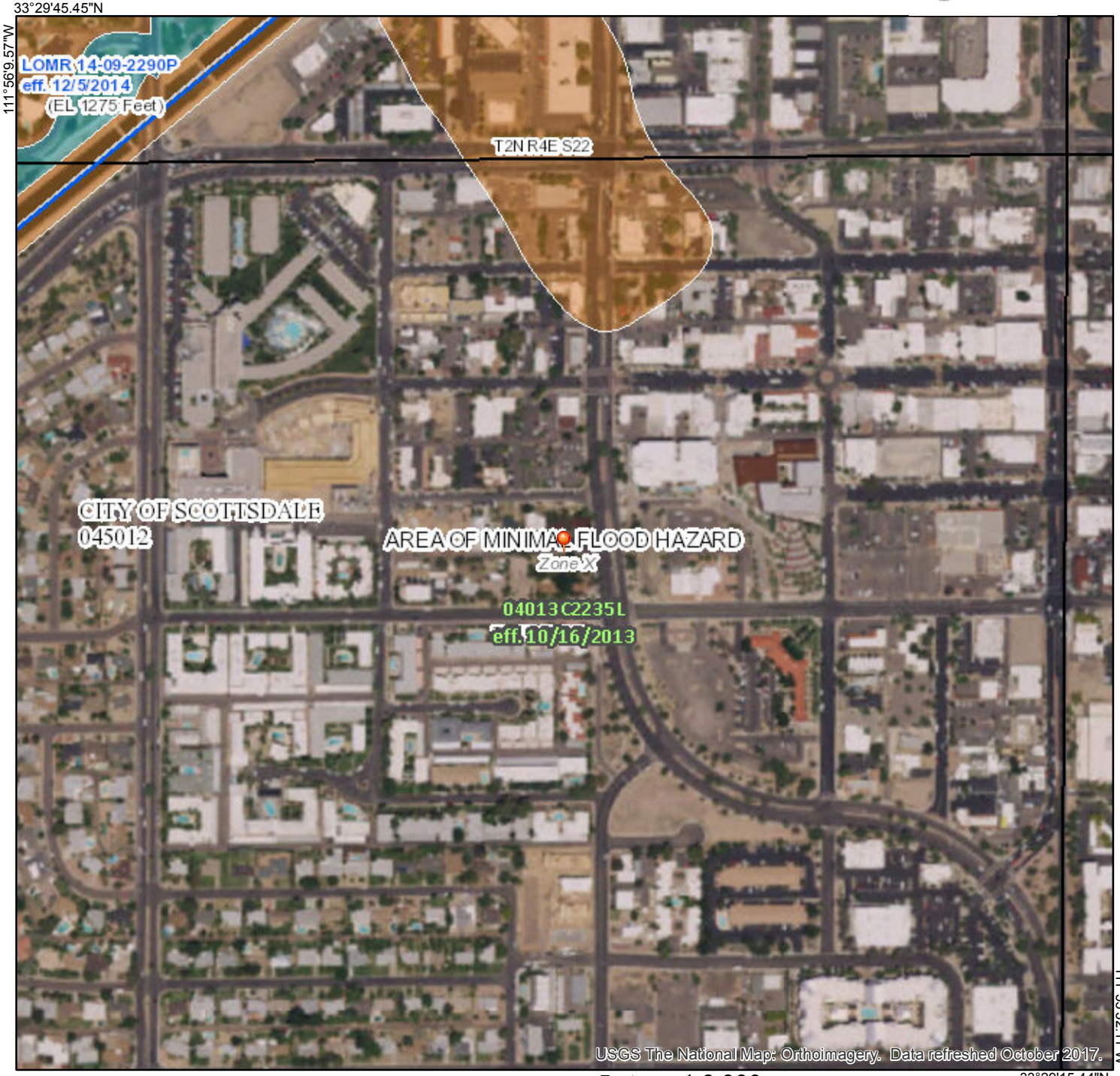
JOB #	050609
DATE	11/08/2018
SCALE	N.T.S.
DRAWN	PS
SHT	1 OF 1

CAD FILE NAME: V:\050609 - DPA Architects\050609-01-002 (ENG) - Winery Suites of Scottsdale\Engineering\Exhibits\050609-Vicinity Map.dwg 11/09/2018

24-ZN-2018
11/14/18

National Flood Hazard Layer FIRMette

FEMA



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 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 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

N

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 11/8/2018 at 3:12:02 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.

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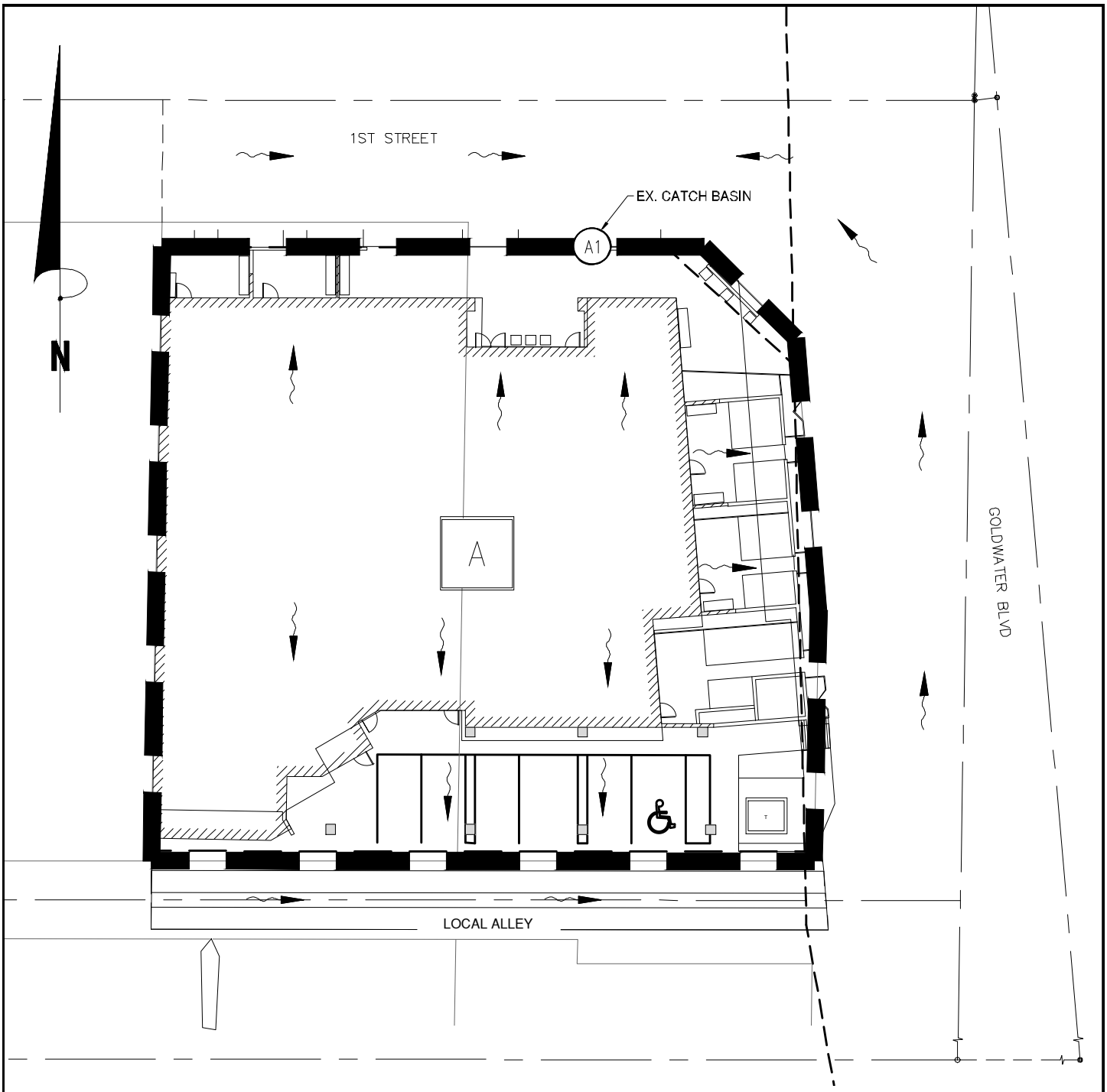

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WINERY SUITES OF SCOTTSDALE

SCOTTSDALE, AZ

DRAINAGE EXHIBIT

JOB #	050609
DATE	11/08/2018
SCALE	N.T.S.
DRAWN	PS
SHT	1 OF 1

CAD FILE NAME: V:\050609 - DPA Architects\050609-01-002 (ENG) - Winery Suites of Scottsdale\Engineering\Exhibits\Drainage\050609-EX-DDM.dwg 11/08/2018

24-ZN-2018
11/14/18

APPENDIX B

RATIONAL PEAK FLOW CALCULATIONS

Peak Inlet Flow Calculations Using The Rational Method

Project:	Winery Suites of Scottsdale
Proj #:	050609
Date:	11/8/18
By:	PS

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Desired Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.39	0.60	0.74	1.00	1.23
100-Yr	0.62	0.94	1.17	1.58	1.95
Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.70	3.58	2.96	1.99	1.23
100-Yr	7.44	5.66	4.68	3.16	1.95

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{100\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Drainage Area ID: -----

					10-Yr			100-Yr		
					Cw is adjusted as a function of the 100-year value per the table above					
Concent. Point	Contributing Sub-basins	Total Area (ac)	2-10 year Cw	Tc (min)	Cw AF=1.00	i (in/hr)	Q 10-Yr (cfs)	Cw AF=1.00	i (in/hr)	Q 100-Yr (cfs)
1	A1	0.38	0.95	5.0	0.95	4.70	1.7	0.95	7.44	2.7

Notes:

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11/14/18

APPENDIX C

Pre vs Post Volume Calculations
And
Stormwater Storage Waiver

RETENTION WORKSHEET FOR 100-YR, 2-HR EVENT

Project: 50609
Description: Winery Suites of Scottsdale
Prepared by: PS DATE: 11/9/2018

Pre vs Post Summary

Pre vs Post Volume: 268 cf

Volume Required:

Vr= D/12 x A x C

D = 100yr, 2hr Rainfall, 2.16 in.
A = Area in Square Feet
C = Coefficient of Runoff

Sub Area Type	Area (Sq. Ft.)	Runoff Coefficient	Retention Required (cf)	Retention Required (ac-ft)
Pre-Commercial	-	0.86	-	-
Post-Roof/Pavement	-	0.95	-	-
Pre vs Post	16,548	0.09	268 cf	0.01 Ac-ft
Totals	-		268 cf	0.01 Ac-ft
		Total Retention Required	**268 cf**	**0.01 Ac-ft**

24-ZN-2018
11/14/18

Request for Stormwater Storage Waiver

City of Scottsdale Plan/Case Numbers:

____ - DR - ___ ____ - PP - ____ PC#_____

Requests for stormwater storage waivers are reviewed as part of case submittals for the associated project. This form should be included in the preliminary drainage report with the applicant's portion completed. The preliminary drainage report shall include supporting documentation and analysis as needed to support the requested wavier.

Date 11/09/18 Project Name Winery Suites of Scottsdale

Project Location Southwest Corner of 1st Street and Goldwater Boulevard

Applicant Contact Clayton Neilsen Company Name Bowman Consulting Group

Phone 480-346-1429 E-mail cneilsen@bowmanco

Address 1295 W Washington Street, Suite 108, Tempe, AZ 85281

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed and sealed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

It should be noted that reductions in stormwater storage relating to

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☑ 2. The development is on a parcel less than one-half acre in size.

☐ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

100-year/2-hour storage is allowed, but not required for redevelopment projects and development within the ESL zoning overlay. Rather, these projects must store enough stormwater to attenuate post-development flows to predevelopment levels, considering the 10- and 100-year storm events (S.R.C. Sections 37-50 and 37-51).

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

_____ 11/09/18

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500

Request for Stormwater Storage Waiver

City of Scottsdale Plan/Case Numbers:

____ - DR - ___ ____ - PP - ____ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name Winery Suites of Scottsdale

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3

Recommended Conditions of Waiver:

☐ All storage requirements waived.

☐ Post-development peak discharge rates do not exceed pre-development conditions.

☐ Other:

Explain: _____

_____

☐ **Waiver approved per above conditions.**

_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500

24-ZN-2018
11/14/18

Request for Stormwater Storage Waiver

City of Scottsdale Plan/Case Numbers:

____ - DR - ___ ____ - PP - ____ PC#_____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $3.00 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater-related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name Winery Suites of Scottsdale

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where
V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = 2.16
ΔC= 0.09
A = 16,548
V = 268
V_p= N/A
V_w= 268

☑ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.00 per cubic foot = $804

☐ An in-kind contribution will be made, as follows:

_____
_____
_____

☐ No in-lieu fee is required. Reason:

_____
_____

Approved by:

_____ _____
Floodplain Administrator or Designee Date

Stormwater Management Department
7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500

24-ZN-2018
11/14/18

APPENDIX D

NOAA ATLAS 14
RAINFALL DATA

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.492°, Longitude: -111.9308°
Elevation: 1258.97 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** (0.154-0.223)	**0.240** (0.202-0.291)	**0.326** (0.273-0.395)	**0.392** (0.326-0.472)	**0.481** (0.394-0.577)	**0.550** (0.444-0.657)	**0.620** (0.492-0.739)	**0.692** (0.540-0.824)	**0.788** (0.598-0.940)	**0.862** (0.641-1.03)
10-min	**0.279** (0.234-0.339)	**0.364** (0.307-0.443)	**0.495** (0.415-0.600)	**0.596** (0.496-0.719)	**0.732** (0.599-0.878)	**0.837** (0.676-1.00)	**0.944** (0.748-1.12)	**1.05** (0.821-1.25)	**1.20** (0.911-1.43)	**1.31** (0.976-1.57)
15-min	**0.345** (0.290-0.420)	**0.452** (0.381-0.549)	**0.614** (0.514-0.744)	**0.739** (0.614-0.891)	**0.907** (0.743-1.09)	**1.04** (0.838-1.24)	**1.17** (0.928-1.39)	**1.31** (1.02-1.55)	**1.49** (1.13-1.77)	**1.63** (1.21-1.94)
30-min	**0.465** (0.390-0.565)	**0.608** (0.513-0.740)	**0.827** (0.692-1.00)	**0.995** (0.827-1.20)	**1.22** (1.00-1.47)	**1.40** (1.13-1.67)	**1.58** (1.25-1.88)	**1.76** (1.37-2.09)	**2.00** (1.52-2.39)	**2.19** (1.63-2.61)
60-min	**0.575** (0.483-0.700)	**0.753** (0.635-0.915)	**1.02** (0.857-1.24)	**1.23** (1.02-1.49)	**1.51** (1.24-1.82)	**1.73** (1.40-2.07)	**1.95** (1.55-2.32)	**2.18** (1.70-2.59)	**2.48** (1.88-2.95)	**2.71** (2.02-3.24)
2-hr	**0.666** (0.569-0.795)	**0.863** (0.736-1.03)	**1.16** (0.983-1.37)	**1.38** (1.16-1.64)	**1.69** (1.40-1.99)	**1.92** (1.57-2.26)	**2.16** (1.75-2.54)	**2.41** (1.91-2.82)	**2.74** (2.12-3.21)	**2.99** (2.27-3.54)
3-hr	**0.724** (0.614-0.870)	**0.929** (0.793-1.12)	**1.22** (1.04-1.47)	**1.45** (1.22-1.74)	**1.78** (1.47-2.11)	**2.04** (1.66-2.41)	**2.31** (1.85-2.73)	**2.59** (2.04-3.06)	**2.98** (2.28-3.52)	**3.29** (2.46-3.91)
6-hr	**0.873** (0.756-1.03)	**1.11** (0.962-1.30)	**1.42** (1.23-1.66)	**1.67** (1.43-1.95)	**2.01** (1.70-2.33)	**2.28** (1.90-2.63)	**2.56** (2.10-2.95)	**2.84** (2.28-3.28)	**3.23** (2.53-3.74)	**3.53** (2.71-4.11)
12-hr	**0.977** (0.855-1.13)	**1.23** (1.08-1.44)	**1.57** (1.36-1.81)	**1.82** (1.58-2.11)	**2.17** (1.86-2.50)	**2.44** (2.07-2.81)	**2.72** (2.27-3.13)	**3.00** (2.47-3.45)	**3.37** (2.71-3.91)	**3.67** (2.89-4.28)
24-hr	**1.17** (1.05-1.32)	**1.49** (1.33-1.68)	**1.93** (1.72-2.18)	**2.28** (2.02-2.56)	**2.76** (2.43-3.11)	**3.14** (2.75-3.53)	**3.54** (3.08-3.97)	**3.95** (3.41-4.44)	**4.53** (3.86-5.08)	**4.98** (4.20-5.60)
2-day	**1.26** (1.13-1.43)	**1.62** (1.44-1.82)	**2.12** (1.89-2.39)	**2.53** (2.24-2.84)	**3.09** (2.73-3.47)	**3.54** (3.11-3.98)	**4.02** (3.50-4.52)	**4.51** (3.90-5.08)	**5.21** (4.45-5.87)	**5.76** (4.88-6.51)
3-day	**1.34** (1.19-1.51)	**1.71** (1.52-1.93)	**2.25** (2.00-2.53)	**2.69** (2.38-3.02)	**3.30** (2.91-3.70)	**3.79** (3.32-4.25)	**4.32** (3.75-4.84)	**4.87** (4.20-5.47)	**5.64** (4.80-6.34)	**6.26** (5.28-7.06)
4-day	**1.41** (1.25-1.59)	**1.80** (1.60-2.04)	**2.38** (2.11-2.68)	**2.85** (2.52-3.20)	**3.51** (3.08-3.94)	**4.04** (3.53-4.53)	**4.61** (4.00-5.17)	**5.22** (4.49-5.86)	**6.07** (5.16-6.82)	**6.77** (5.69-7.61)
7-day	**1.57** (1.39-1.77)	**2.00** (1.78-2.26)	**2.64** (2.34-2.98)	**3.16** (2.80-3.56)	**3.90** (3.43-4.38)	**4.49** (3.92-5.04)	**5.12** (4.44-5.75)	**5.79** (4.98-6.51)	**6.73** (5.72-7.57)	**7.49** (6.30-8.45)
10-day	**1.70** (1.51-1.92)	**2.18** (1.94-2.45)	**2.87** (2.55-3.23)	**3.44** (3.04-3.86)	**4.22** (3.71-4.73)	**4.85** (4.24-5.43)	**5.52** (4.79-6.18)	**6.22** (5.36-6.98)	**7.21** (6.14-8.08)	**8.00** (6.74-8.99)
20-day	**2.09** (1.87-2.34)	**2.69** (2.40-3.01)	**3.55** (3.17-3.97)	**4.20** (3.74-4.69)	**5.08** (4.50-5.67)	**5.76** (5.08-6.42)	**6.44** (5.65-7.19)	**7.14** (6.23-7.98)	**8.08** (6.99-9.05)	**8.81** (7.56-9.88)
30-day	**2.44** (2.17-2.74)	**3.14** (2.80-3.52)	**4.14** (3.68-4.63)	**4.90** (4.35-5.47)	**5.92** (5.23-6.60)	**6.70** (5.89-7.47)	**7.51** (6.57-8.36)	**8.32** (7.25-9.27)	**9.42** (8.14-10.5)	**10.3** (8.81-11.5)
45-day	**2.83** (2.53-3.16)	**3.64** (3.26-4.07)	**4.80** (4.29-5.36)	**5.66** (5.04-6.32)	**6.78** (6.02-7.57)	**7.63** (6.76-8.52)	**8.49** (7.49-9.49)	**9.35** (8.21-10.5)	**10.5** (9.13-11.8)	**11.3** (9.82-12.7)
60-day	**3.13** (2.81-3.49)	**4.04** (3.63-4.51)	**5.32** (4.76-5.92)	**6.24** (5.58-6.95)	**7.45** (6.64-8.29)	**8.34** (7.41-9.29)	**9.24** (8.17-10.3)	**10.1** (8.91-11.3)	**11.3** (9.87-12.6)	**12.1** (10.6-13.6)

[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

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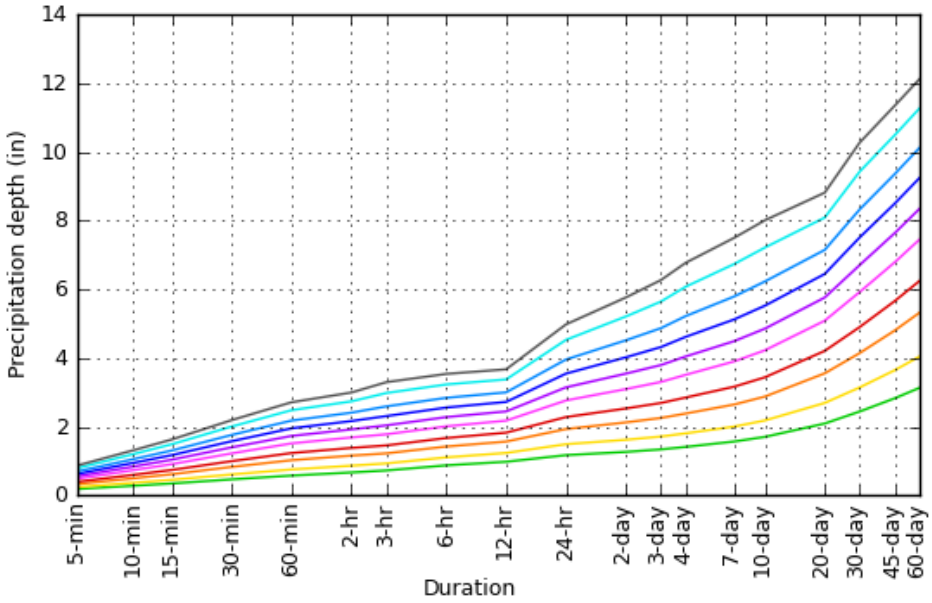
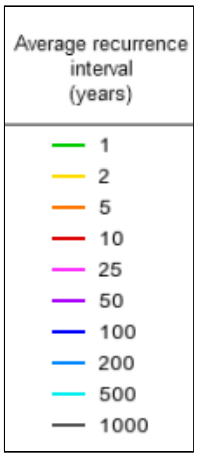
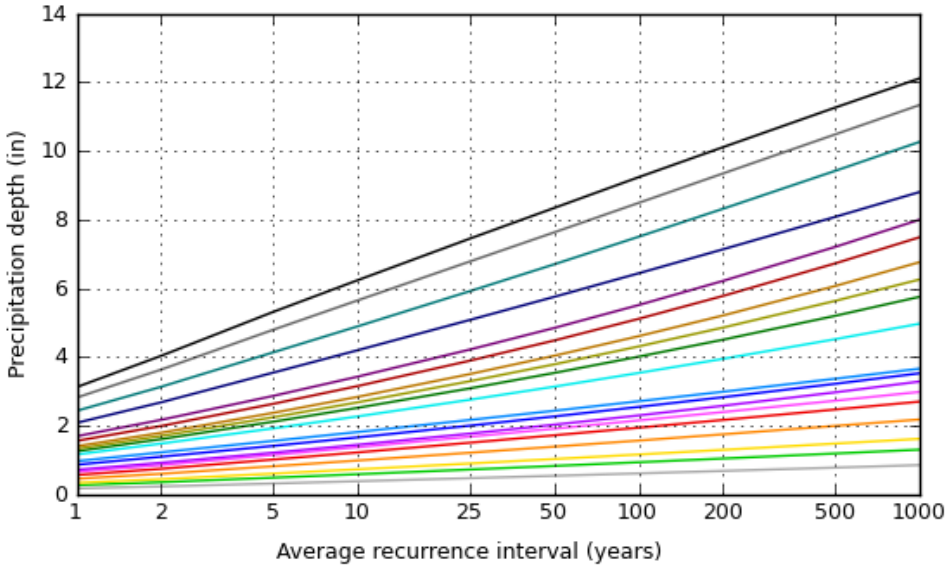
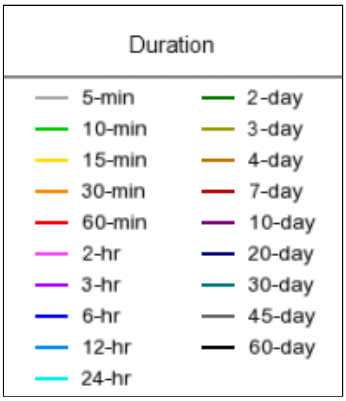
PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.4920°, Longitude: -111.9308°









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Maps & aerials

Small scale terrain

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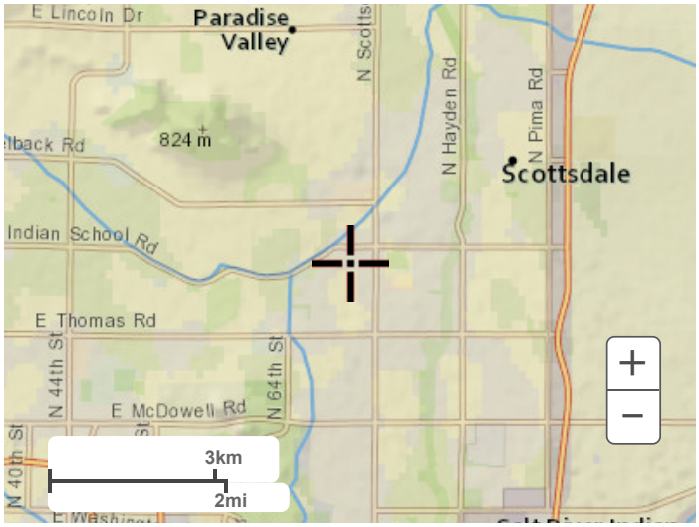
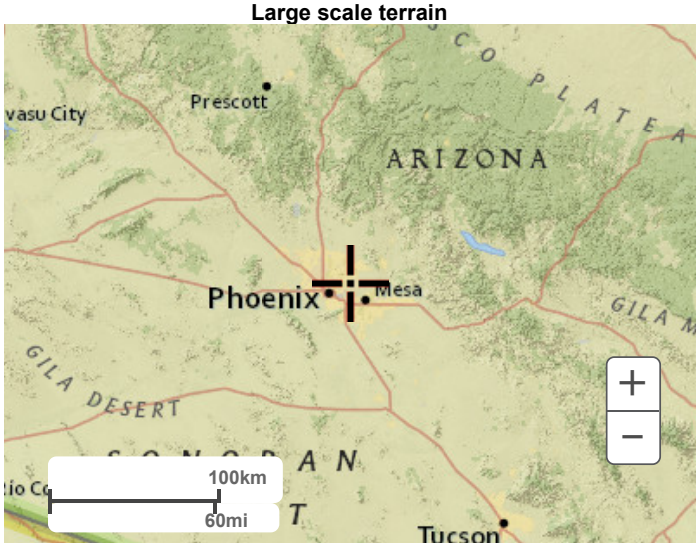
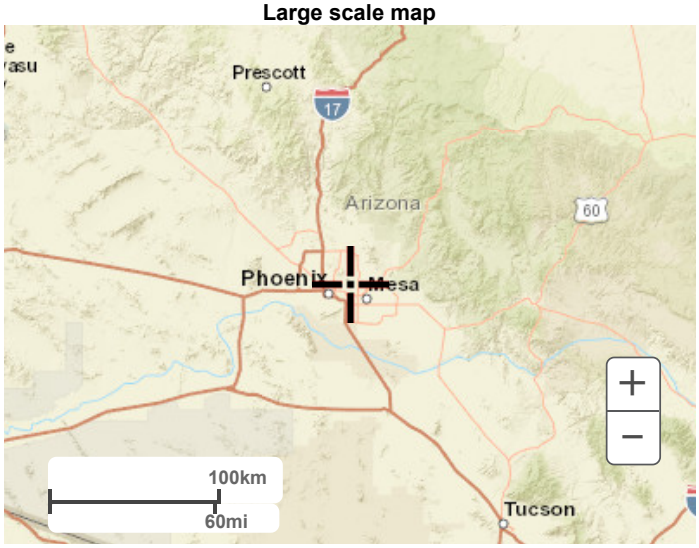


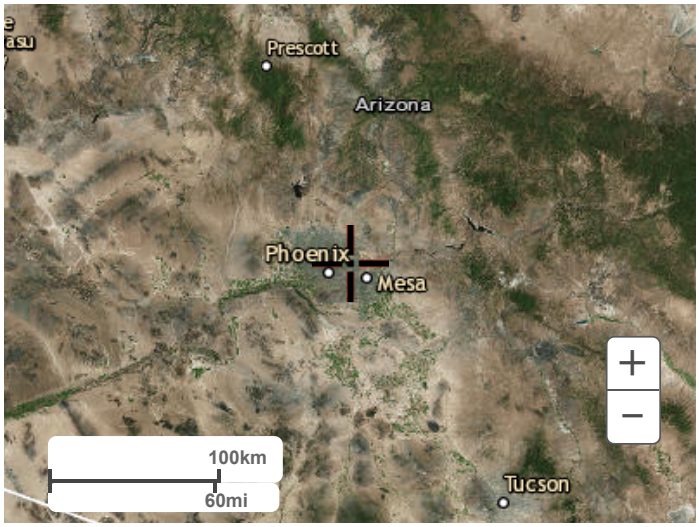
Large scale terrain



Large scale map



Large scale aerial



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