



# SERGIO GOMA PROPERTIES DRAINAGE REPORT

Timothy Huskett  
11/17/20



**EXPIRES 3/31/2023**



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Appendix A – COFFE POT HEC-1 MODEL



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## Introduction and Background

### PROJECT DESCRIPTION

This project area contains two parcels at 2140 S.R. 89-A and 40 Goodrow Lane in the City of Sedona, Arizona. More specifically identified as Assessor's Parcel Number 408-24-070A and 408-24-070C located in the SE ¼ of the SE ¼ of Section 11, Township 17 North, Range 5 East of the Gila-Salt River Principal Meridian in Yavapai County. It is proposed that existing buildings on site be removed and replaced with structures in the same location with one additional building towards the north-east.

### PROPERTY OWNER/DEVELOPER

Blueflagiris LLC  
10981 Lopez Ridge Way  
San Diego, CA 92121-4165

### PURPOSE OF REPORT

This report presents the hydraulic analysis for a portion of the City of Sedona delineated floodplain identified as Profile 4100 within the City of Sedona Floodplain Management Study. This project consists of new hydrologic study using current watershed characteristics as described within the City of Sedona Stormwater Master Plan, resulting in an updated floodplain hazard area. This analysis focuses on the proposed development and is not an analysis of the entire watershed as delineated by the City of Sedona.

### STUDY LIMITS

The study limits consist of one segment of Profile 4100 through the City of Sedona, Arizona. The upstream limit of study for this analysis is approximately 350 feet upstream of the 48-inch diameter culvert crossing Yavapai Drive. The downstream limit of the study is along the western property boundary at the inlet of the existing 48-inch square box culvert crossing Goodrow Lane.

This hydraulic analysis presents the information and methods used to develop the one percent annual-chance (100-year) floodplain. This study is based on the best available information including City of Sedona 2-foot topography, on-site visits to identify existing hydraulic structures, and an updated hydrologic study developed for the City of Sedona.

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***In affiliation with:***

**Heritage Land Surveying & Mapping, Inc. with office in Sedona, Camp Verde & Colorado**



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## PROJECT CONDITIONS

Parcel 408-24-070C contains one building with a small parking lot to the west. The 1<sup>st</sup> floor currently sits at 4401.4' in this delineated flood area. The two buildings located on parcel 408-24-070A are at a first-floor elevation of 4403.3'. These two buildings are not located in the delineated Sedona floodplain. An existing 48" CMP culvert on the east property lines helps accommodate drainage flow to the head wall on the west property boundary.

The segment of Profile 4100 being studied is a portion of the Coffee Pot Watershed as identified within the City of Sedona Stormwater Master Plan. Within the Coffee Pot Watershed, the segment falls within the south half of Sub-Basin B59B.

## DRAINAGE DESIGN CRITERIA

### REGULATIONS

The following sources were referenced and used as guidelines to successfully model how development affects the watershed:

- City of Sedona Floodplain Management Study
- City of Sedona Stormwater Master Plan
- City of Sedona Drainage Manual

### HEC-RAS MODELING

The hydraulic analysis was carried out using the Hydrologic Engineering Center River Analysis System (HEC-RAS) version 5.0.7, developed by the Army Corps of Engineers. Two hydraulic models were developed: The Pre-Development hydraulic model and the Post-development hydraulic model. An Unsteady flow analysis was prepared using a 100-year peak discharge of 565 cubic feet per second as determined using Concentration Point B59C of the Coffee Pot Drainage Map of the City of Sedona Stormwater Master Plan dated March 2005.

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## MODEL RESULTS

When running the model, the 100-yr parameters produce a result that indicates the Base Flood Elevation (BFE) will be 4403.42' on the north side of the west building. This means that the regulatory flood elevation is to be 4404.42', which is shown on the plans.

## SITE DRAINAGE DESIGN

This site drainage will be accommodated by a few different features that include a 48" CMP Storm Drain, 443 LF of 2' Swales, 95 LF 4' Wide Channel, and a Flexstorm Pure catch basin. The channel on the west side of the property will be a minimum of 200 ft<sup>3</sup> and contain a 40% void bottom.

The following points give a general concept of the facility design:

- i. The proposed development will result in an increase in the overall runoff when comparing the pre-development runoff discharge to the post-development. The increase in the overall peak discharge is primarily associated with an increase in the impermeable area because of the development. The off-site developments stay the same therefore the drainage system will need to accommodate the change to the onsite development. Drainage patterns will stay relatively consistent with the proposed development, as the water will travel to the proposed driveway on Goodrow Lane where the existing headwall is located.

The following describes more specifically the specs of the storm water facilities:

- i. A detention channel will be constructed on the west side of the property alongside Goodrow Lane. The fashion in which the grade is designed in the lot will allow for water in the northern parcel to flow alongside the curb line to a scupper that allows water to enter. This northern part of the development requires 200 ft<sup>3</sup> of availability to accommodate the 100-yr. The channel will be 4' wide and 12" deep. Due to the 2:1 side slopes an 18" thick layer of D50-4" Riprap is required. Please see detail on sheet 15 of the construction set for clarity.
- ii. Swales alongside the east side of the property and between proposed buildings 1, 2, and 3 will help direct and store stormwater that may land on the roofs of these buildings or on the nearby landscape. These swales are to be 2' wide and 6" deep minimum. These too will have a 2:1 slope and require an 8" thick D50 Riprap layer to stabilize slopes. Please see the detail on sheet 15 of the construction set for clarity.

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## STORM WATER QUALITY

Per ADOT Stormwater Requirements for External Parties, first flush means the minimum level of control at which stormwater pollution prevention practices must be put in place. The first 0.5 inches of direct runoff from a storm event must be retained or treated. First flush will be treated on site by Flexstorm Inlet Filters.

The minimum First Flush treatment discharge is calculated as follows:

$$Q_{FF} = CI_{FF}A \quad 6.2$$

where:

$Q_{FF}$  = minimum First Flush discharge in cfs,

$C$  = runoff coefficient (set =1),

$I_{FF}$  = maximum first flush intensity in in/hr, and

$$\text{where: } I_{FF} = \frac{P_{FF}}{T_c}$$

$$P_{FF} = 0.5 \text{ inches}$$

$T_c$  is the Time of Concentration of the upstream watershed in hours.

$A$  = area of project site, in acres.

$$Q_{FF} = 1(0.5/0.167)*0.89 = 2.66 \text{ CFS}$$

The following points describe the details of how storm water quality will be addressed:

- i. To comply with Arizona Pollutant Discharge Elimination System (AZPDES) the initial first flush from the development will be directed to the catch basin with a FLEXSTORM PURE Filter.
- ii. The method for managing storm water quality during the construction phase will be addressed on the 'Storm Water Pollution Plan' sheet, which will be included in the Construction Plans.
- iii. Mag STD. Catch Basin (Modified) - Type 'F' Double Grate (2' - 4 ½" x 4' - 4 ½") is the proposed catch basin. Rectangular Flexstorm Inlet filters will need to fit a grate size that has the specified opening noted before. The Distributor P/N for the proper filter is 62XLHDFX. The flow rating this filter can accommodate is 2.7 CFS which is greater than the calculated 2.66 CFS. A Nyoplast drain basin will be used to help convey the stormwater into the CMP.

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## SUMMARY AND CONCLUSION

After evaluation the finished floor is to be built at 4404.50' with the described stormwater facilities as described and shown in the plans. Using a large detention trench, multiple swales near buildings, and a FleXstorm catch basin filter will be efficient in stormwater management. It is the engineer's recommendation that the site be constructed as shown in the plans. The plan will satisfy the conditions for design while maintaining cost effective, low maintenance facilities. The facilities will mitigate any anticipated increase in runoff discharges related to the development. The project complies with the City of Sedona and Yavapai County criteria and regulations.

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# APPENDIX A

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SECTION E.2 Coffee Pot HEC-1 Model Output								
+		B70B	365.	11.95	30.	10.	5.	.12
	HYDROGRAPH AT	B63B	132.	12.05	15.	5.	2.	.05
+	6 COMBINED AT	B63C	3275.	12.05	377.	121.	58.	1.51
	ROUTED TO	B63R	3172.	12.10	377.	121.	58.	1.51
+	HYDROGRAPH AT	B52B	168.	12.05	16.	5.	2.	.07
	ROUTED TO	B52R	165.	12.10	16.	5.	2.	.07
+	HYDROGRAPH AT	B51B	262.	12.00	22.	7.	3.	.10
+	2 COMBINED AT	B51C	423.	12.05	38.	11.	6.	.17
	ROUTED TO	B51R	416.	12.10	38.	11.	6.	.17
+	HYDROGRAPH AT	B56B	162.	12.05	17.	5.	3.	.07
	ROUTED TO	B56R	157.	12.15	17.	5.	3.	.07
+	HYDROGRAPH AT	B50B	319.	12.00	31.	10.	5.	.12
+	3 COMBINED AT	B50C	849.	12.05	86.	27.	13.	.36
	ROUTED TO	B50R	810.	12.20	86.	27.	13.	.36
+	HYDROGRAPH AT	B61B	61.	12.05	5.	1.	1.	.03
	ROUTED TO	B61R	59.	12.10	5.	1.	1.	.03
+	HYDROGRAPH AT	B60B	212.	12.00	20.	7.	3.	.07
+	2 COMBINED AT	B60C	259.	12.00	25.	8.	4.	.10
	ROUTED TO	B60R	245.	12.15	25.	8.	4.	.10
+	HYDROGRAPH AT	B59B	348.	12.05	39.	13.	6.	.14
+	2 COMBINED AT	B59C	565.	12.05	64.	21.	10.	.24
	ROUTED TO	B59R	568.	12.10	64.	21.	10.	.24
+	HYDROGRAPH AT	A34B	451.	11.90	27.	8.	4.	.12
	DIVERSION TO	D1	355.	11.90	26.	8.	4.	.12
+	HYDROGRAPH AT	D01	96.	11.90	1.	0.	0.	.12
	ROUTED TO	A34R	45.	12.00	1.	0.	0.	.12
+	HYDROGRAPH AT	B48B	422.	12.05	46.	15.	7.	.16
+	4 COMBINED AT	B48C	1706.	12.10	197.	63.	30.	.87
	ROUTED TO	B48R	1693.	12.15	197.	63.	30.	.87
+	HYDROGRAPH AT	B47B	302.	11.95	25.	8.	4.	.09
+	2 COMBINED AT	B47C	1759.	12.15	222.	72.	34.	.96