

Maricopa #18-DS03072018
Entellus Prj #472.010
8/14/2018

City of Maricopa
Floodplain Analysis of the City's Heritage District

PROJECT SCOPE OF WORK

Phase

1 Project Purpose

1.1 Project Description

The Heritage District is a Low-Moderate income area in the northwestern portion of the City of Maricopa. This project is a focused floodplain analysis of the Heritage District, and development of recommendations for floodplain solutions, as well as possible funding sources for these solutions.

1.2 Project Goals

There are several goals of this project. They are summarized as follows:

- * Identify and remove properties from the existing floodplain
- * Identify properties that are at a significant risk of flooding
- * Identify solutions and develop a plan to improve the drainage in the area and remove additional properties from the floodplain
- * Identify any design policies that will have a positive impact on future development

2 Project Coordination and Administration

2.1 Project Administration

Project administration will be regular and continue throughout the project. This will include invoicing and progress reports and other administrative tasks.

2.2 Project Coordination Meetings (5)

It is anticipated that there will be five (5) project coordination meetings and that they will occur approximately every other month and will be held at the City.

2.3 Project Work Session Meeting

An additional coordination meeting will be scheduled and utilized as a project work session for alternatives selection. This is anticipated to be a longer meeting and will discuss the various alternative concepts.

3 Data Collection

3.1 Existing Data Collection

3.1.1 Existing Drainage Reports

The City and or County will provide drainage reports and models (when available) for the major drainage studies that have been conducted in the area. These will include the following:

- * Army Corps of Engineers study for the Lower Santa Cruz River by JEFuller*
- * Cooper Sky LOMR by J2*
- * Vekol Wash Tributary Study by Wood Patel*
- * Edison Road Analysis and FLO-2D model by EPS*
- * Santa Rosa Study by J2*

Entellus will review and evaluate these studies for use as part of this project.

The City will provide any As-Builts for drainage facilities (culverts, channels, levees, etc.) that are available in the project area.

3.1.2 GIS Data

Request and compile GIS data from the City, County and other pertinent sources.

3.1.3 Utility Information

The City will provide their available utility information for the study area, preferably in a GIS or CAD format. City staff will assist in coordinating utility mapping requests with the various utility companies. It is anticipated that this will not be a major undertaking

3.1.4 Documented Drainage Issues

The City will provide any documentation about flooding complaints within the study area including photos and reports.

3.2 Field Survey

Field survey data will be acquired to supplement the 2012 topographic mapping from the County. It is anticipated that the following two locations will require field survey to adequately model the existing conditions. The City will also provide As-Built information for these completed projects.

- * Edison Rd and Loma Rd.*
- * Sonoran Creek channel*

4 Flood Risk Analysis

4.1 Hydrologic Base Model

The Vekol Wash Tributary hydrology model by Wood-Patel is a FEMA approved hydrologic analysis for the area. It is assumed that the HEC-1 model from this study and any HEC-1 models utilized for the Copper Sky Park LOMR will be available for manipulation as part of this study.

This study will perform minimal modifications to the existing offsite hydrologic models. These models will be utilized as inflow hydrographs to the hydraulic model. It will be necessary to extract the hydrographs from the HEC-1 models for input into the hydraulic model, but no other modifications are anticipated.

Additionally, a large subbasin may be added to the HEC-1 model to determine the infiltration losses for the study area. This is necessary as HEC-RAS can perform a rain-on-grid analysis but does not determine infiltration losses. The results of this large subbasin would be utilized to modify the precipitation utilized in the HEC-RAS model.

4.2 Floodplain Delineation

The main goal of this task is to redelineate the existing floodplain in the Heritage District area for the 100-year flood event. This encompasses areas north and south of the UPRR and includes existing A, AE, AO and X flood zones.

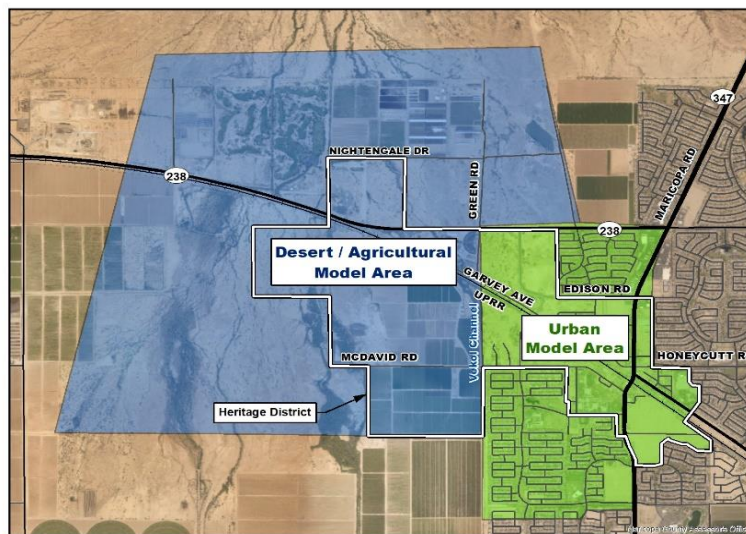
4.2.1 Floodplain Modeling

HEC-RAS 5.0.5 2D will be utilized for the floodplain delineation in the study area. The total heritage district redevelopment area is approximately 3 sq miles. It is anticipated that the required modeling area will be approximately 10 square miles.

* Approximately 7.5 sq miles of open desert and agricultural area

* Approximately 2.5 sq miles of residential and urban areas

HEC-RAS 2D can utilize a variable sized mesh. It is anticipated that the open desert and agricultural areas will be modeled utilizing approximately a 100-foot mesh while the residential and urban areas will utilize a 20-foot mesh. Breaklines will be defined where needed to account for obstructions and adequately define any channels, levees and embankments.



4.2.2 Floodway Modeling

Floodway modeling is not a part of this scope of work.

4.2.3 Culverts

Significant culverts 24 inches or larger will be modeled in HEC-RAS. These will be added to the grid based on As-Built information provided by the City or if no As-Built information is available based on the existing facility inventory information with invert elevations being approximated from the terrain data. It is assumed that there will be no more than 50 culverts throughout the modeled area. Field verification of culvert data is not a part of the scope of work of this project. It is also anticipated that minimal As-Built information will be available.

4.2.4 Manning's 'n' Values

The n-values will be estimated as the average roughness for areas of similar conditions and will be based on surface conditions, vegetation coverage, level of obstructions, and topographic features.

One field visit will be made to establish the 'n' values for the project area and they will be documented in Technical Support Data Notebook (TSDN).

4.2.5 Modeling GIS Coverages

The majority of the modeling features will be developed based on existing GIS data including:

- * Building footprints*
- * Wall locations*
- * Culvert locations*

Breakline information needed for the HEC-RAS mesh boundary will be developed based on these existing coverages and through the examination of the aerial photography.

The terrain data will be developed based on the 2012 mapping from the County with the updated Survey from Entellus.

4.3 Elevation Certificates (20)

Upon the completion of the HEC-RAS 2D model Entellus will look at properties that may be on the fringes of the newly delineated floodplain. If it appears that these properties could be out of the floodplain, Entellus will generate an elevation certificate for each property. Entellus will perform up to 20 elevation certificates as part of this project.

4.4 Floodplain Documentation

4.4.1 Work Maps

Work Maps will be produced depicting the new and revised delineations. It is anticipated there will be two sets of work maps:

- * 8 work maps for the urban area at 200 scale*
- * 2 work maps for the mainly agricultural area at 400 scale*

The work maps will depict the existing floodplain limits, the proposed floodplain modifications and Base Flood Elevation lines throughout the modeled area. Four other maps will be produced at 400 scale to show and depict the flow depths throughout the modeling area.

4.4.2 Technical Support Data Notebook

A TSDN documenting all the hydrologic and hydraulic analyses will be prepared. This document will be prepared in a format to be submitted to FEMA and will document the entire modeling process and results.

4.4.3 Public Notifications

Entellus will prepare a one page mailer to be mailed to all property owners affected by the redelineation. Entellus will generate a list of addresses that require a mailer.

The City will mail the public notifications to the addresses identified.

4.5 FEMA Submittal

Entellus will submit the results to FEMA for review and acceptance and will address any clarification to technical issues resulting from the FEMA review process.

5 **Alternative Development**

5.1 Alternative Evaluation Criteria

Entellus will generate the draft alternative evaluation criteria and present this to the City and it will be discussed and finalized during a normal progress meeting. Entellus will generate an evaluation criteria memorandum to summarize the criteria and the decisions made. The final alternative evaluation criteria will be utilized to rank the various alternatives.

5.2 Initial Alternative Conception

It is anticipated that up to 10 alternative concepts will be developed. It is anticipated that at least 2 of these concepts can be eliminated without any extensive analysis and that the remaining 8 or fewer concepts will require a limited amount of analysis to determine their effectiveness. The City's goal is to have solutions that are implementable as small projects or phased improvements. These concepts will adhere to that goal.

5.3 Alternative Development and Analysis

Up to 8 alternative concepts will be analyzed with enough detail to determine their effectiveness in improving drainage conditions. These analyses may include modifications to the base hydraulic. The alternatives will be rated based on the alternative criteria developed for near-term improvements and input from the City.

5.4 Alternative Recommendations

Entellus will further develop up to 6 recommended improvements. The recommended improvements analysis will be performed and will include ROW needs, utility conflicts, and prioritization scheme.

5.5 Field Visit

One field visit will be held during the alternatives development with the purpose of field verifying the conditions of the area of the proposed alternatives.

5.6 Cost Estimation

An engineers estimate of the anticipated construction costs will be developed for the 5 recommended alternatives.

5.7 Concept Plans

Design concept exhibits will be generated for the 3 recommended alternatives. Conceptual design exhibits will be prepared for the proposed improvements. It is anticipated that these will consist of plan alignment type drawings without profiles and will be large scale. These concept planning documents will be general in nature and based on existing mapping, right-of-way information, and will not include a significant amount of design detail.

5.8 Alternatives Analysis Report

As part of the Alternative Analysis process Entellus will prepare an alternatives analysis report documenting the alternatives analysis process. The report will document all assumptions, supporting documentation for all analyses of all alternatives and the basis of all analyses. A draft version of the report will be presented to the City for review and comment. All comments will be resolved and/or incorporated and a final report will be generated.

5.9 Policy Solutions

For areas outside of the currently developed area or areas of redevelopment, Entellus will devise policies that the City can enforce that will help ensure development has to consider the various affects of the drainage in the area.

These may include reduced retention requirements for donating right-of-way, providing regional solutions, or others.

5.10 Prioritization Plan

A prioritization and implementation plan will be developed with the City. The plan will be based on the estimated funds that can be made available and how many properties will be benefited by the proposed improvements.

6 Stakeholder and Public Involvement

6.1 Stakeholder Meetings (3)

Up to 3 stakeholder meetings will be held during the course of the project. The purpose of these meetings will be to keep major stakeholders informed of the progress of the project. It is anticipated that some of these meeting may be held with the following stakeholders: The Smith Family, UPRR, GRIC, Ak-Chin and others.

6.2 City Council Presentations (2)

Two presentations will be given to the City Council. The first is anticipated to occur as part of the alternative conceptualization and the second will be to present the final plan to the City Council. Entellus will help prepare information for the presentation including graphics, information and handouts for the Council. It is anticipated that City Staff will conduct the majority of the Presentation with Entellus providing technical support during the presentation as needed.

6.3 Stakeholder Presentations (2)

There will be 2 stakeholder presentations: one for Planning and Zoning and a second for the Heritage District. It is anticipated that the same presentation as presented to City Council will be utilized for these presentations.

6.4 Public Meetings (2)

There will be 2 public meetings as part of this project.

The 1st public meeting will combine the presentation of the floodplain mapping results as well as the initial alternative concepts. It is anticipated that there will be 6 boards at this public meeting: 3 for the floodplain mapping and 3 for the alternative concepts.

Entellus will provide a GIS workstation, color printer, and operator so that residents can see where their property falls in the new delineation and we can provide them with a personalized map of their property within the new floodplain. Entellus will provide cookies and water for the meeting.

It is anticipated that the 2nd public meeting will be held at the end of the project to present the final alternatives to the area residents. Entellus will provide 3 additional boards as well as water and cookies for the meeting.

7 Identification of Funding Sources

7.1 Identification of Funding Sources

Entellus will identify possible funding sources for implementation of the proposed improvements. The City has indicated that they may have CDBG funds which can potentially be utilized. Entellus will investigate other possible sources, including grants, IGAs, Public-Private Partnerships, impact fee, improvement districts, storm utility, etc.

8 Allowances

8.1 Additional Field Survey

Entellus may perform an additional 1 day of field survey as needed. This may include culvert or roadway survey.



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PROJECT HOURS AND FEES

PHASE	WORK ITEM DESCRIPTION	Principal \$ 185.00	PM \$ 170.00	PE \$ 127.00	EIT \$ 84.00	Survey RLS \$ 146.00	Survey 2-Man Crew \$ 132.00	GIS Manager \$ 116.00	GIS Analyst \$ 75.00	CADD \$ 77.00	Admin \$ 63.00	Total Hours	Total Amount	Direct Expenses
1	Project Purpose	0	0	0	0	0	0	0	0	0	0	0	\$ -	\$ -
	1.1 Project Description											0	\$ -	
	1.2 Project Goals											0	\$ -	
2	Project Coordination and Administration	18	54	0	0	0	0	40	0	0	16	128	\$ 18,158.00	\$ 180.00
	2.1 Project Administration		16								16	32	\$ 3,728.00	
	2.2 Project Coordination Meetings (5)	12	30					30				72	\$ 10,800.00	\$150.00
	2.3 Project Work Session Meeting	6	8					10				24	\$ 3,630.00	\$30.00
3	Data Collection	0	7	18	4	8	20	20	36	8	0	121	\$ 13,256.00	\$ 200.00
	3.1 Existing Data Collection											0	\$ -	
	3.1.1 Existing Drainage Reports		2	16								18	\$ 2,372.00	
	3.1.2 GIS Data		2					12	16			30	\$ 2,932.00	
	3.1.3 Utility Information			2				4	16			22	\$ 1,918.00	
	3.1.4 Documented Drainage Issues		1		4				4			9	\$ 806.00	
	3.2 Field Survey		2			8	20	4		8		42	\$ 5,228.00	\$200.00
4	Flood Risk Analysis	10	100	274	252	21	60	122	346	0	0	1185	\$ 125,904.00	\$ 60.00
	4.1 Hydrologic Base Model		2	16	24			4				46	\$ 4,852.00	
	4.2 Floodplain Delineation											0	\$ -	
	4.2.1 Floodplain Modeling	4	40	120	80			40	80			364	\$ 40,140.00	
	4.2.2 Floodway Modeling											0	\$ -	
	4.2.3 Culverts		2	20	40			4				66	\$ 6,704.00	
	4.2.4 Manning's 'n' Values		10	14				4	40			68	\$ 6,942.00	\$60.00
	4.2.5 Modeling GIS Coverages		4		20	1		12	10			47	\$ 4,648.00	
	4.3 Elevation Certificates (20)		4		40	20	60	4	16			144	\$ 16,544.00	
	4.4 Floodplain Documentation											0	\$ -	
	4.4.1 Work Maps	2	12	20	20			40	160			254	\$ 23,270.00	
	4.4.2 Technical Support Data Notebook	4	8	40	20			2	8			82	\$ 9,692.00	
	4.4.3 Public Notifications		2	12				4				18	\$ 2,328.00	
	4.5 FEMA Submittal		16	32	8			8	32			96	\$ 10,784.00	
5	Alternative Development	36	100	198	74	0	0	52	198	0	0	658	\$ 75,904.00	\$ 30.00
	5.1 Alternative Evaluation Criteria	1	4	2								7	\$ 1,119.00	
	5.2 Initial Alternative Conception	4	12	16				8	32			72	\$ 8,140.00	
	5.3 Alternative Development and Analysis	4	32	48	48			12	60			204	\$ 22,200.00	
	5.4 Alternative Recommendations	4	12	18				8	36			78	\$ 8,694.00	
	5.5 Field Visit		8	8								16	\$ 2,376.00	\$30.00
	5.6 Cost Estimation	1	2	16								19	\$ 2,557.00	
	5.7 Concept Plans	2	6	18	6			12	30			74	\$ 7,822.00	
	5.8 Alternatives Analysis Report	4	8	40	20			8	40			120	\$ 12,788.00	
	5.9 Policy Solutions	8	8	32								48	\$ 6,904.00	
	5.10 Prioritization Plan	8	8					4				20	\$ 3,304.00	



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		\$ 185.00	\$ 170.00	\$ 127.00	\$ 84.00	\$ 146.00	\$ 132.00	\$ 116.00	\$ 75.00	\$ 77.00	\$ 63.00			
6	Stakeholder and Public Involvement	40	76	52	10	0	0	38	46	0	0	262	\$ 35,622.00	\$ 1,330.00
	6.1 Stakeholder Meetings (3)	12	24	24	10			10	24			104	\$ 13,148.00	\$150.00
	6.2 City Council Presentations (2)	8	8					4				20	\$ 3,304.00	\$60.00
	6.3 Stakeholder Presentations (2)	8	16	8				8				40	\$ 6,144.00	\$60.00
	6.4 Public Meetings (2)	12	28	20				16	22			98	\$ 13,026.00	\$1,060.00
7	Identification of Funding Sources	16	8	0	0	0	0	8	0	0	0	32	\$ 5,248.00	\$0.00
	7.1 Identification of Funding Sources	16	8					8				32	\$ 5,248.00	
8	Allowances	0	1	0	0	2	8	0	0	0	0	11	\$ 1,518.00	\$39.00
	8.1 Additional Field Survey		1			2	8					11	\$ 1,518.00	\$39.00
TOTAL STAFF HOURS BASIC DESIGN SERVICES		120	346	542	340	31	88	280	626	8	16	2397		\$ 1,839.00
DIRECT LABOR COST		\$ 22,200.00	\$ 58,820.00	\$ 68,834.00	\$ 28,560.00	\$ 4,526.00	\$ 11,616.00	\$ 32,480.00	\$ 46,950.00	\$ 616.00	\$ 1,008.00		\$275,610.00	
TOTAL DIRECT EXPENSES														\$ 1,839.00
TOTAL BASE PROJECT COST													\$277,449.00	\$ 1,839.00