

PREPARED BY:

**Kimley»»Horn**

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**NORTH SILVER SPRINGS**

# Area Drainage Master Plan

Draft | July 2024

*In Association With:*



# North Silver Springs

## AREA DRAINAGE MASTER PLAN

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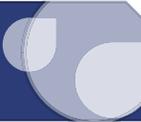
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# North Silver Springs

## AREA DRAINAGE MASTER PLAN

### 1 Purpose and Project Area

The purpose for the North Silver Springs Area Drainage Master Plan (NSS ADMP) is to identify flood mitigation solutions and flow paths that would protect existing and future structures from flooding. Further, the study identifies projects that if constructed, would reduce the effective FEMA Special Flood Hazard Areas (SFHAs) or floodplain currently impacting residential structures along Harvey Canal downstream of Highway 95. The study area is located in Silver Springs, Nevada, within the Ramsey Canyon Watershed and extends just northwest of US Highway 50 and bounded by Lahontan Reservoir to the southeast and Churchill Butte to the south. The Vicinity, Location and Aerial Maps can be seen in Figure 1, Figure 2, and Figure 3, respectively.

#### 1.1 Goals

The goal of the NSS ADMP is to define the existing flood hazards for this portion of Silver Springs using detailed two-dimensional (2D) surface modeling. The models incorporate current hydrologic and hydraulic parameters and current methodologies consistent with Lyon County standards. The modeling results are used to identify flood hazard areas and potential mitigation projects to reduce flooding impacts and enhance resiliency within the watershed.

Public input was collected from two public meetings and was a major input to the existing flood hazards determination and mitigation project development. The proposed mitigation projects were developed into design concepts with a corresponding engineer's estimate of probable cost for future planning purposes. The overarching goals for the NSS ADMP are as follows:

- Generate detailed 2D hydrologic and hydraulic flood models defining the existing conditions and capacity for the existing flood control channel that conveys upstream runoff through North Silver Springs
- Determine flood hazard areas based on the model results and public input
- Identify proposed mitigation solutions to reduce the existing floodplain and potential flood impacts to residents

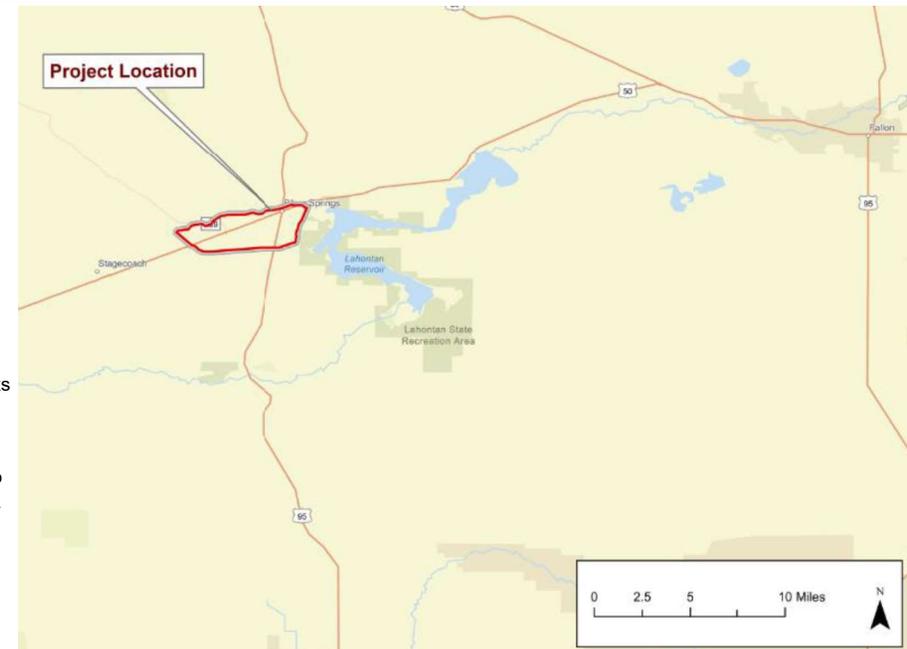


Figure 1: Vicinity Map





# North Silver Springs

## AREA DRAINAGE MASTER PLAN

### 2 Project History

The Silver Springs community has experienced some flooding in the past and continues to be at risk due to potential flooding and the regulatory constraints of the effective FEMA SFHA associated with the Ramsey Canyon Watershed. Previous studies conducted Silver Springs community have demonstrated that the current drainage infrastructure does not have capacity for the 100-year storm event.

#### Previous Studies

There are two studies associated with this area:

- Manhard Consulting completed a study to estimate the existing conditions floodplain mapping and identify preliminary flood mitigation alternatives for the *Ramsey Canyon Watershed Flood Control Study* (Manhard, 2010). The model developed for this study has been used as a basis for the NSS ADMP existing conditions.
- Kimley-Horn completed a study to develop peak flow hydrographs at existing and proposed drainage crossings along USA Parkway for the *USA Parkway Hydrologic Analysis* (Kimley-Horn, 2015)

#### FEMA Floodplain Delineation for Silver Springs

There is a FEMA delineated floodplain (Zone AE) and floodway defined from just south of US Highway 50 through North Silver Springs and ending at the railroad just west of Lahontan Lake. Lahontan Lake is mapped as Zone A with no defined base flood elevations or depths. Figure 4 shows the limits of the FEMA Special Flood Hazard Areas (SFHA) within the study boundary.

A Letter of Map Revision (LOMR) for the existing flood control channel is currently in progress. This LOMR is based on the modeling completed for the Ramsey Canyon Watershed Flood Control Study and will modify the extents and depths of the current effective floodplain.

### 3 Survey and Terrain Data

The terrain data used for this study was downloaded from USGS National Topographic Map (USGS, n.d.). USGS captured LiDAR for this portion of Silver Springs in 2020. The USGS LiDAR data used the following coordinate systems.

#### USGS LiDAR Coordinate System (USGS and DAS, 2022)

- Coordinate System: Universal Transverse Mercator 11 North
- Horizontal Datum: North American Datum of 1983 of 2011
- Vertical Datum: North American Vertical Datum of 1988
- Units: Meters

#### Project Coordinate System:

- Horizontal Datum: North American Datum of 1983 (NAD83)
- Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
- Units: Feet

The USGS Survey Report excerpts have been provided in Appendix A. A topographic map is provided in Figure 5.

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### 4 Hydrology

The Ramsey Canyon Watershed Flood Control Study (Manhard, 2010) was used as the basis for the hydrology for this study. The hydrology was reviewed, and no changes were proposed for the contributing area coming from the western portion of the Ramsey Canyon Watershed. The Churchill Butte area to the south of the existing Ramsey Canyon Study was identified as a gap in the offsite hydrology for the study area. This area was modeled as a part of this study to understand if contributing flows have an impact on the existing floodplain.

#### 4.1 Methodology

A 2D HEC-RAS model v. 6.2 was created for the contributing watershed to the south of the study area. The modeled area for this watershed extends to the watershed boundary; therefore, no incoming flows are modeled. Rainfall was applied to the 2D mesh in the HEC-RAS model to estimate runoff generated within this portion of the watershed. A hydrograph developed from this model was used to represent the contributing runoff from the basin.

Hydrographs acquired from the Ramsey Canyon Study were used to represent the remainder of the runoff contributing to the study area from the northwest portion of the watershed. The hydrograph input locations were determined in the original Ramsey Canyon Study. These input locations were reviewed. No changes were proposed to the hydrograph locations.

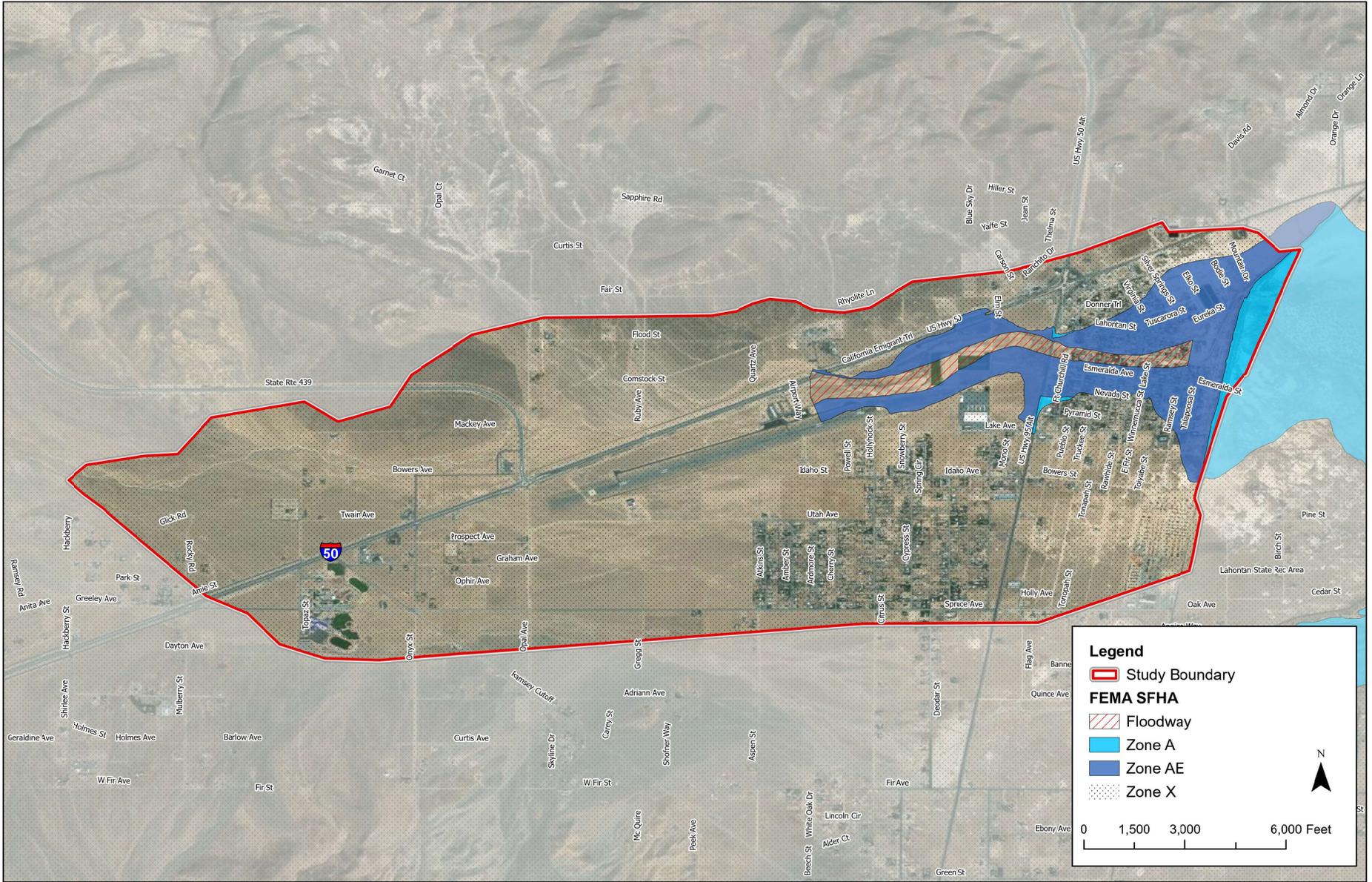
The boundary of the offsite hydrology study to the south and the basins from the hydrology for the Ramsey Canyon Study are shown in Figure 6.

#### 4.2 Rainfall and Storm Duration

NOAA14 rainfall was used in the HEC-RAS model developed for the contributing area south of the study area. Table 1 shows the rainfall depths that were used in the HEC-RAS 2D model input. SCS Type II rainfall distribution was applied to distribute the rainfall over the HEC-RAS 2D mesh.

Table 1: NOAA14 Rainfall Data

Storm Event	Rainfall (inches)
10-year, 24-hour	2.104
25-year, 24-hour	2.522
100-year, 24-hour	3.192



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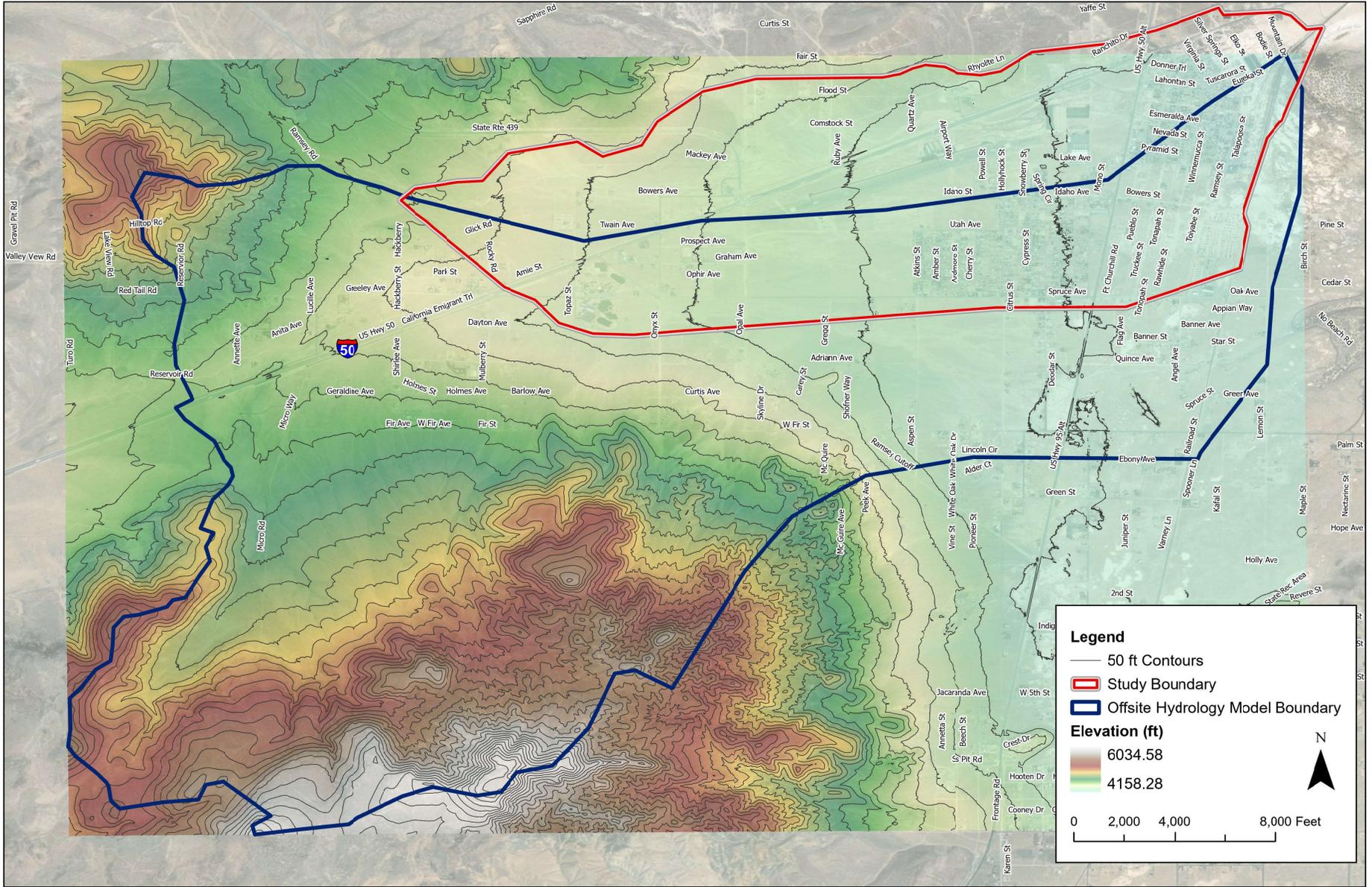
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**North Silver Springs  
 FEMA SFHA**

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 FEMA SFHA

Figure 4



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2024 KIMLEYHORN AND ASSOCIATES, INC. Engineering, Planning and Environmental Consultants 7740 North 19th Street, Suite 100 Phoenix, Arizona 85021 (602) 944-6500			
<b>North Silver Springs Topographic Map</b>			
DRAWING DATE: TOPOGRAPHIC MAP			
Figure 5			



# North Silver Springs

## AREA DRAINAGE MASTER PLAN

### 4.3 Soils

Soils data was extracted from the Natural Resource Conservation Service (NRCS) Soil Survey Geographic (SSURGO) data base for Silver Springs, Nevada (NRCS, 2023). The HEC-RAS 2D model uses the Green-Ampt Method to compute rainfall losses. The input data required for the Green-Ampt method are:

1. Initial Soil Water Content
2. Pore Size Distribution Index
3. Residual Soil Water Content
4. Saturated Hydraulic Conductivity (XKSAT)
5. Saturated Soil Water Content
6. Wetting Front Suction (PSIF)

Values for the Green-Ampt Method parameters were assigned to each soil type based on their soil texture classification. The Green-Ampt parameters were derived from published sources; The XKSAT, PSIF, Initial Soil Water Content, and Saturated Soil Water Content were obtained from the Ramsey Canyon Watershed Flood Control Study (Manhard, 2010). Residual Soil Water Content and Pore Size Distribution Index were obtained from the HEC-RAS 2D Technical Manual and assigned to the soils based on soil texture (USACE, 2020). Table 2 shows the infiltration parameters used in the HEC-RAS model. The soil map is provided in Figure 7.

**Table 2: Soil Parameters**

MUKEY	Soil Name	Initial Soil Water Content	Pore Size Distribution Index	Residual Soil Water Content	Saturated Hydraulic Conductivity (in/hr)	Saturated Soil Water Content	Wetting Front Suction (in)
474103	Water	0	0	0	0	0	11.6
474070	Piroutte extremely stony fine sandy loam, 15 to 30 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
474063	Yerington gravelly sandy loam, 2 to 4 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
474062	Yerington gravelly sandy loam, 0 to 2 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
474057	Malpais-Yerington complex, 4 to 8 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
474055	Malpais cobbly sandy loam, 2 to 4 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3

MUKEY	Soil Name	Initial Soil Water Content	Pore Size Distribution Index	Residual Soil Water Content	Saturated Hydraulic Conductivity (in/hr)	Saturated Soil Water Content	Wetting Front Suction (in)
474054	Malpais gravelly loamy sand, 2 to 8 percent slopes	0.089	0.553	0.035	1.18	0.401	2.4
474038	Vylach-Weena association	0.187	0.319	0.068	0.06	0.33	8.6
474032	Toulon gravelly loam, 0 to 4 percent slopes	0.241	0.252	0.027	0.26	0.434	3.5
474030	Isolde-Patna complex, 0 to 15 percent slopes	0.071	0.694	0.02	2	0.417	2
474029	Isolde fine sand, 0 to 15 percent slopes	0.071	0.694	0.02	2	0.417	2
474027	Theon-Rock outcrop-Old Camp, 50 to 75 percent slopes	0.244	0.242	0.075	0.04	0.39	8.2
474024	Theon very gravelly sandy loam, 8 to 30 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
474021	Tocan sandy loam, 2 to 4 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
474019	Singatse-Theon association	0.166	0.378	0.041	0.43	0.412	4.3
474008	Rusty-Playas complex, 0 to 2 percent slopes	0.071	0.694	0.02	2	0.417	2
474006	Rusty sand, 0 to 2 percent slopes	0.071	0.694	0.02	2	0.417	2
473993	Perazzo gravelly loam, 2 to 8 percent slopes	0.241	0.252	0.027	0.26	0.434	3.5
473986	Patna sandy loam, occasionally flooded, 0 to 2 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
473984	Patna sand, 0 to 4 percent slopes MLRA 27"	0.071	0.694	0.02	2	0.417	2
473983	Patna loamy sand, silty substratum, 0	0.089	0.553	0.035	1.18	0.401	2.4

# North Silver Springs

## AREA DRAINAGE MASTER PLAN

MUKEY	Soil Name	Initial Soil Water Content	Pore Size Distribution Index	Residual Soil Water Content	Saturated Hydraulic Conductivity (in/hr)	Saturated Soil Water Content	Wetting Front Suction (in)
	to 2 percent slopes						
473982	Patna fine sand, 15 to 30 percent slopes	0.071	0.694	0.02	2	0.417	2
473981	Patna fine sand, 4 to 15 percent slopes	0.071	0.694	0.02	2	0.417	2
473962	Lahontan silty clay loam, strongly saline-alkali	0.327	0.177	0.04	0.04	0.432	10.7
473961	Juva gravelly fine sandy loam, 2 to 4 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
473960	Juva gravelly silt loam, 0 to 2 percent slopes	0.071	0.694	0.02	2	0.417	2
473957	Hough sand, 0 to 2 percent slopes	0.071	0.694	0.02	2	0.417	2
473913	Delp-Orizaba complex, 0 to 15 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
473908	Cleaver association, sloping	0.244	0.242	0.075	0.04	0.39	8.2
473907	Cleaver very stony loam, 15 to 30 percent slopes	0.241	0.252	0.027	0.26	0.434	3.5
473906	Cleaver very stony loam, 2 to 4 percent slopes	0.241	0.252	0.027	0.26	0.434	3.5
473905	Cleaver stony sandy loam, 4 to 15 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
473904	Cleaver gravelly sandy loam, 2 to 4 percent slopes	0.166	0.378	0.041	0.43	0.412	4.3
473896	Bluewing very stony loamy sand, 2 to 8 percent slopes	0.089	0.553	0.035	1.18	0.401	2.4
473895	Bluewing very gravelly sand, 2 to 8 percent slopes	0.071	0.694	0.02	2	0.417	2

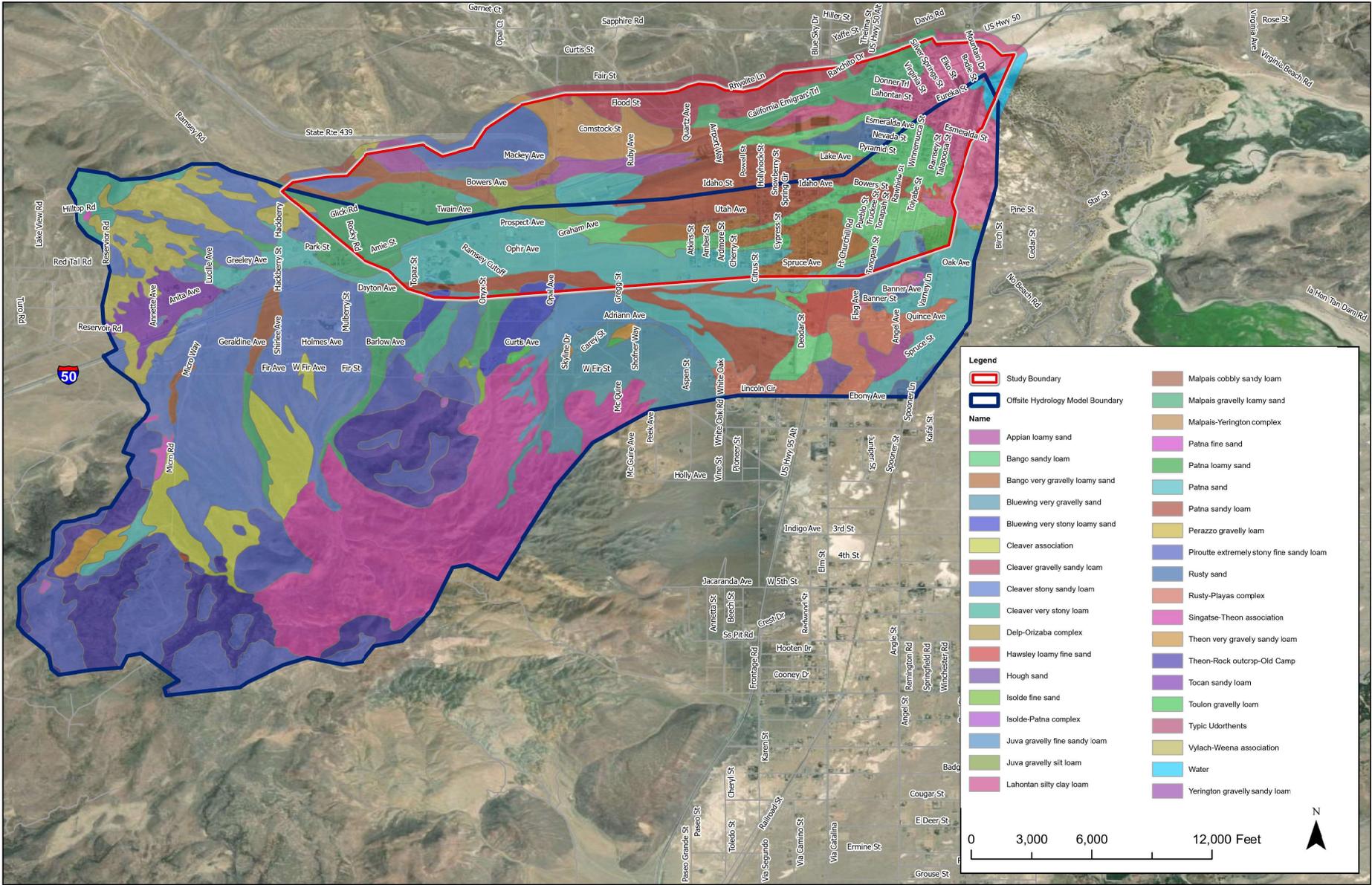
MUKEY	Soil Name	Initial Soil Water Content	Pore Size Distribution Index	Residual Soil Water Content	Saturated Hydraulic Conductivity (in/hr)	Saturated Soil Water Content	Wetting Front Suction (in)
473893	Bango very gravelly loamy sand	0.089	0.553	0.035	1.18	0.401	2.4
473892	Bango sandy loam	0.166	0.378	0.041	0.43	0.412	4.3
473888	Appian loamy sand	0.089	0.553	0.035	1.18	0.401	2.4
473875	Hawsley loamy fine sand, silty substratum, 0 to 2 percent slopes	0.071	0.694	0.02	2	0.417	2
3356295	Typic Udorthents, 0 to 1 percent slopes	0.327	0.177	0.04	0.04	0.432	10.7

### 4.4 Land Use

Land use coverages were obtained from the Ramsey Canyon Watershed Flood Control Study. This landuse was expanded to cover the watershed to the south using recent aerial data. This file was used to develop hydrology parameters for HEC-RAS 2D effective impervious areas (RTIMP). Table 3 shows the effective RTIMP associated with the land use type. The land use map is provided in Figure 8.

Table 3: Land Use Parameters

Land use Type	Effective RTIMP (%)
Commercial	65
Building	95
Industrial	65
Low Density Residential (0.2-3 du/ac or 5-0.33 ac/du)	20
Medium Density Residential (3-8 du/ac)	38
High Density Residential (8-36 du/ac)	45
Agricultural	0
Parks & Recreation	0
Rangeland	0
Roadway	98
Water	0
Dirt Lot	95
Building	98
Channel	0
Park (school)	40
Sage Grass	0



**Legend**

- Study Boundary
- Offsite Hydrology Model Boundary

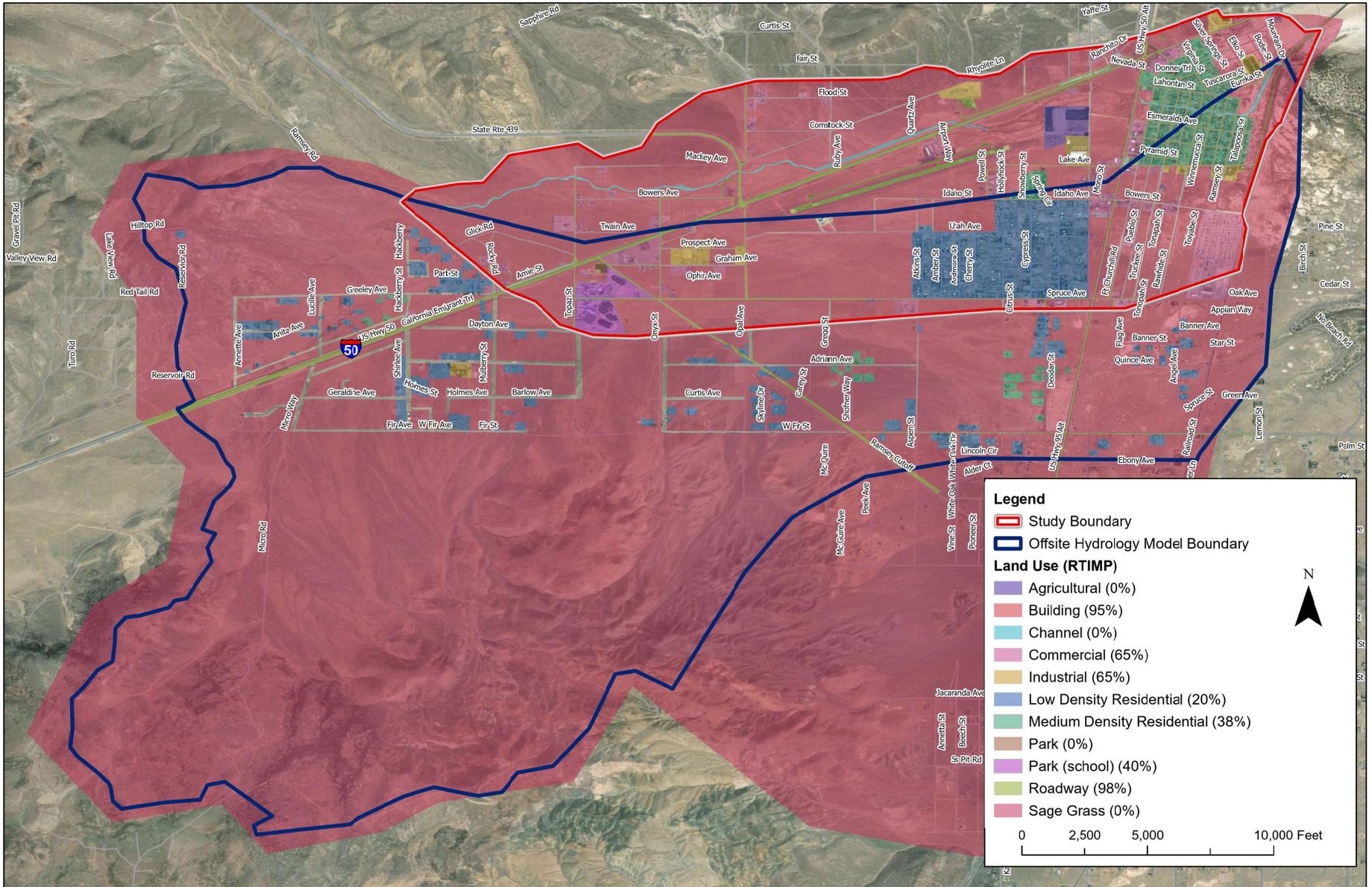
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<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e67e22; margin-right: 5px;"></span> Applan loamy sand</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #27ae60; margin-right: 5px;"></span> Bango sandy loam</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #8e44ad; margin-right: 5px;"></span> Bango very gravelly loamy sand</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #3498db; margin-right: 5px;"></span> Bluewing very gravelly sand</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #2980b9; margin-right: 5px;"></span> Bluewing very stony loamy sand</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #9b59b6; margin-right: 5px;"></span> Cleaver association</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e91e63; margin-right: 5px;"></span> Cleaver gravelly sandy loam</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #3498db; margin-right: 5px;"></span> Cleaver stony sandy loam</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #27ae60; margin-right: 5px;"></span> Cleaver very stony loam</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #8e44ad; margin-right: 5px;"></span> Delp-Orizaba complex</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e91e63; margin-right: 5px;"></span> Hawsley loamy fine sand</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #9b59b6; margin-right: 5px;"></span> Hough sand</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #27ae60; margin-right: 5px;"></span> Isolde fine sand</li> <li><span style="display: inline-block; 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width: 15px; height: 10px; background-color: #e91e63; margin-right: 5px;"></span> Typic Udorthents</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #9b59b6; margin-right: 5px;"></span> Vylach-Weena association</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #3498db; margin-right: 5px;"></span> Water</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #9b59b6; margin-right: 5px;"></span> Yerington gravelly sandy loam</li> </ul>
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0      3,000      6,000      12,000 Feet

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DESIGNED BY: AMH CHECKED BY: CSH DATE: 04/20/24	<b>North Silver Springs Soil Map</b>								
DRAWING SCALE: SOIL MAP									
Figure 7									



**Legend**

- Study Boundary
- Offsite Hydrology Model Boundary

**Land Use (RTIMP)**

- Agricultural (0%)
- Building (95%)
- Channel (0%)
- Commercial (65%)
- Industrial (65%)
- Low Density Residential (20%)
- Medium Density Residential (38%)
- Park (0%)
- Park (school) (40%)
- Roadway (98%)
- Sage Grass (0%)

N

0      2,500      5,000      10,000 Feet

DATE									
REV									

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 Phoenix, Arizona 85028 | (602) 944-6900

**North Silver Springs  
Land Use Map**

DESIGNED BY	AWB	CHECKED BY	CRB	DATE	04/20/24
-------------	-----	------------	-----	------	----------

DRAWING TITLE:  
LAND USE MAP

Figure 8

# North Silver Springs

## AREA DRAINAGE MASTER PLAN

### 5 Hydraulics

#### 5.1 Methodology

The HEC-RAS model developed for the Ramsey Canyon study was used as the basis for the hydraulic modeling and identification of flood hazard areas. The HEC-RAS model is composed of a 2D mesh. Hydrology is input into the mesh as internal boundary condition flow hydrographs. Existing culverts are modeled within the mesh as 2D connections.

#### 5.2 Model Controls

The model simulation time for the 24-hour storm duration was set to 72 hours. The timestep is 10 seconds and the mapping, hydrograph, and detailed output are 10 minutes each.

#### 5.3 Model Parameters

The mesh for the HEC-RAS model is comprised of 60' x 60' cells. Breaklines that were developed in the original Ramsey Canyon study were reviewed. These breaklines captured roads and conveyances throughout the study area, adding detail to the mesh to capture these features.

The mesh for the HEC-RAS model used to determine the runoff to the south is comprised 100' x 100' cells. Some breaklines were developed for this model; however, this was not refined as much as the study area. The intent of this model was to develop hydrology inputs for the study area.

#### 5.4 Manning's n-Values

Manning's n-values were derived from the land use file and were assigned spatially in the HEC-RAS 2D model. The n-values from the Ramsey Canyon study were reviewed and found to be typical values for two-dimensional models in and around Silver Springs. The same values were also applied to the hydrology model to the south. Figure 9 shows the Manning's n-values assigned in the HEC-RAS 2D model.

#### 5.5 Boundary Conditions

Outflow boundary conditions were placed along the downstream boundary of the HEC-RAS 2D model. The boundary conditions are input as lines and remove water from the 2D mesh using normal depth calculations.

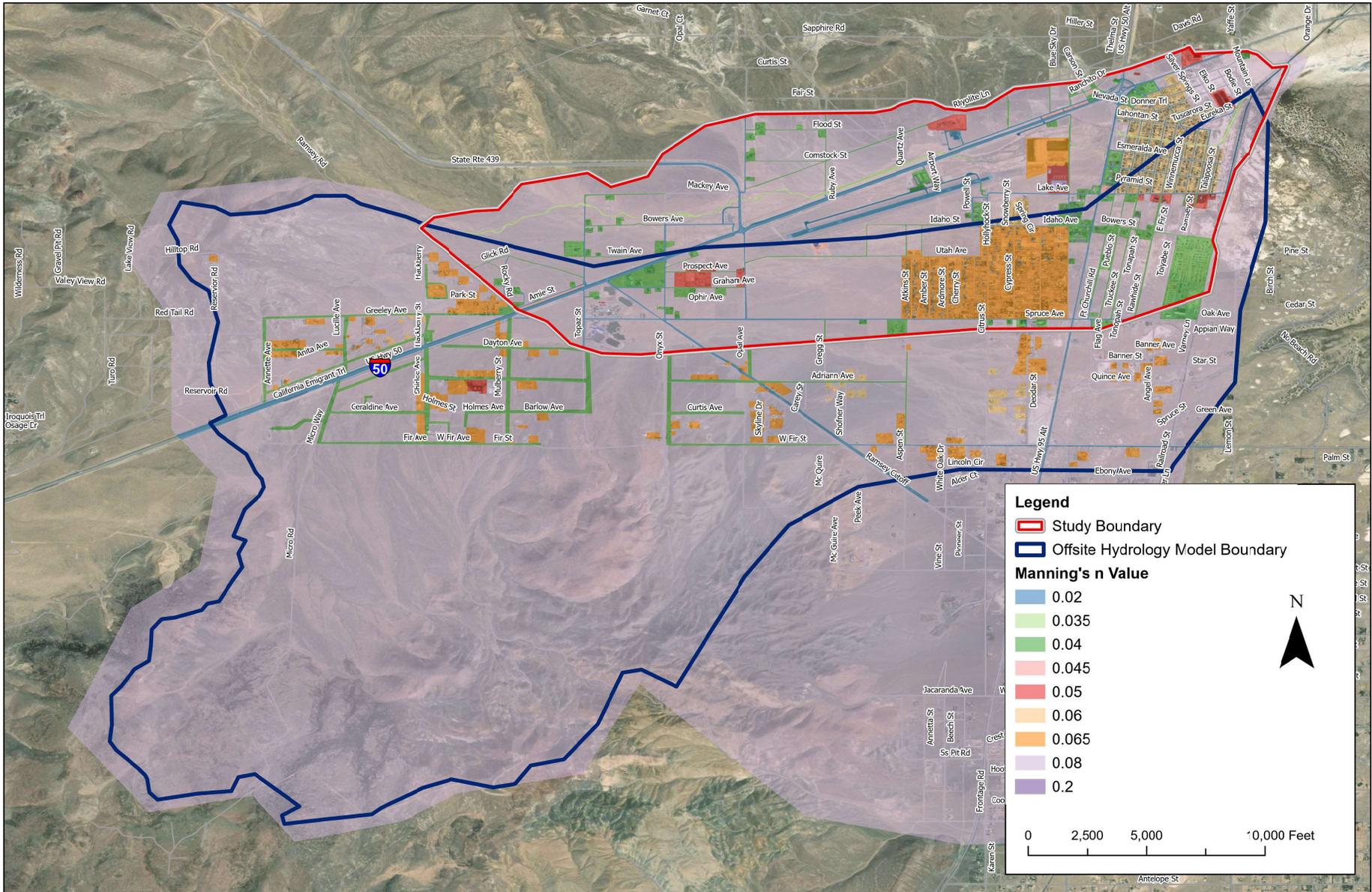
#### 5.6 Results

##### 5.6.1 Flood Hazard Areas

The HEC-RAS 2D model results are provided in Figure 10 through Figure 15. These results show the max flow depths and velocities for each storm event (10-, 25-, and 100-year).

Table 4: HEC-RAS 2D Floodplain n-Values

Land Use Type	Floodplain n-Values
Building	0.2
Low Density Residential	0.065
Commercial	0.04
Industrial	0.05
Channel	0.035
Medium Density Residential	0.06
Park	0.08
Park (School)	0.08
Roadway	0.02
Sage Grass	0.08
Agricultural	0.065
Dirt Lot	0.045
Dirt Road	0.04
Sage Grass	0.08
Medium Density Residential	0.06



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DESIGNED BY: AMH CHECKED BY: CRH DATE: 04/20/24	<b>North Silver Springs Manning's Values Map</b>						
DRAWING TITLE: MANNING'S VALUES Figure 9							













### 6 Damage Assessment

#### 6.1 Methodology

Damage calculations were performed to understand the economic impact of potential flooding. Calculations were performed using developed depth-damage curves and FEMA methodology.

Finished floor elevations (FFE) for structures were estimated to establish a comparison elevation for modeled water surface elevations. Structures throughout the study area were reviewed to understand the elevation of structures above existing ground. Residential structures were found to typically have 3-4 steps up to the front door. Based on standard riser heights for stairs, the residential structures were set to two feet above the ground elevation. Commercial structures were observed typically as slab-on-grade construction. These structures were set to three inches above the ground to reflect a building slab. Water surface elevations were assigned to buildings and the FFE was subtracted to determine flood depths for each building.

Damages for each structure and its contents were estimated using calculated flooding depths and US Army Corps of Engineering (USACE) depth-damage curves. There are not regional curves associated with Nevada, so the curves were reviewed for applicability to the project. Based on a review of the residential structures, it was determined that damage would occur to the structure below the FFE because of existing infrastructure including stairs and exterior walls that are below the FFE. A generic damage curve for residential structures was selected with damages up to two feet below the FFE. To estimate commercial damages, a curve from a study in Galveston, TX was selected for average retail structures. Expected damages for this curve start closer to the finished floor elevation which is expected with structures that are slab on grade. Refer to Figure 16 for the USACE Depth Damage Curves.

Each structure was assigned a percent damaged based on flood depth and the corresponding depth-damage curve. These percentages were multiplied against estimated structure and content values to determine existing damage costs.

#### 6.2 Results

The calculated damages based on existing flooding during the 100-year event was \$5,970,748. The average damage for residential structures experiencing damage was \$6,221.04, and the average damage for commercial structures was \$54,284.95. Figure 17 shows the estimated structure damages based on existing conditions flooding.

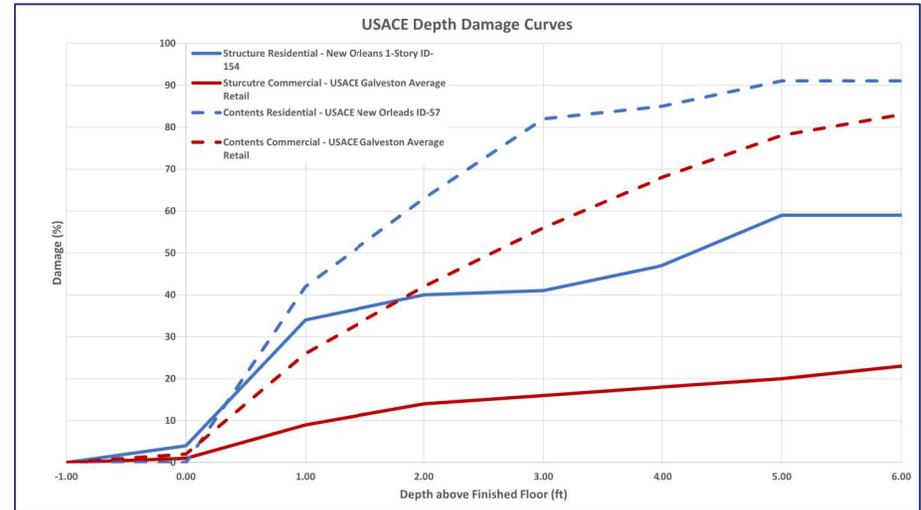


Figure 16: Damage Curves



# North Silver Springs

## AREA DRAINAGE MASTER PLAN

### 7 Area Drainage Master Plan

#### 7.1 Overview

The area drainage master plan focused on evaluating potential mitigation solutions to reduce the risk of flooding within the study boundary from a regional standpoint. Runoff from the Ramsey Canyon area contributes to the flood prone areas identified in this study. The watershed to the south was found to be separate from the floodplain delineated as a part of the Ramsey Canyon study and does not have an impact on the flooding shown in the main conveyance through North Silver Springs. Lyon County provided information on historical flooding and maintenance to identify potential project locations for the area drainage master plan. This area drainage master plan details the existing flood prone areas, watershed constraints, opportunities, and design concepts with construction cost estimates for the proposed drainage mitigation projects.

#### 7.2 Public Meetings

##### 7.2.1 Public Meeting

An in person public meeting was held on May 23<sup>rd</sup>, 2023 to introduce the flood study to the public and gather feedback on issues. Members of the public were notified of the meeting via postcard. The postcard created for the meeting can be seen in Figure 18. Residents were able to submit anecdotal flood evidence to the project team to be reviewed and documented as part of this study. Several residents submitted descriptions of flooding and/or photos of flooding. The detailed information from the public meeting including attendees, presented information, and comments provided by the public has been included in Appendix B.

##### 7.2.2 Stakeholder Meetings

A virtual stakeholder meeting was also held on May 23<sup>rd</sup>, 2023 to connect key stakeholders in the Silver Springs Community and gather feedback on the master drainage plan. The detailed information from the stakeholder meeting including attendees, presented information, and comments provided by stakeholders has been included in Appendix B.

A meeting with the Lyon County maintenance staff occurred on November 7<sup>th</sup>, 2023. The Lyon County maintenance team identified several locations throughout the study area where flooding issues regularly occur. It was also noted if flooding issues were in progress of being addressed by the County. Figure 19 shows the points of interest and details on each site.

#### 7.3 Flood Prone Areas

Information on flood prone areas was initially collected through conversations with the County and residents. Flood prone areas were developed based on the existing flow depths and velocities from the HEC-RAS modeling effort and verified based on data collected from the County and residents.

## COMMUNITY INFORMATION MEETING

### NORTH SILVER SPRINGS AREA DRAINAGE MASTER PLAN

Residents and property owners are invited to learn about the North Silver Springs Area Drainage Master Plan and share your input and comments on drainage infrastructure with drainage experts at our in-person meeting!



#### IN-PERSON MEETING

TIME: Tuesday, May 23<sup>rd</sup> 2023 | 5:30-6:30pm  
LOCATION: Silver Springs Community Center  
ADDRESS: 2945 Fort Churchhill Road, Silver Springs, Nevada 89429

Come in person with input and comments.

#### VIRTUAL MEETING

Listen in to the virtual stakeholder meeting from 12-1pm



Silver Springs Community Center  
2945 Fort Churchhill Road, Silver Springs,  
Nevada 89429

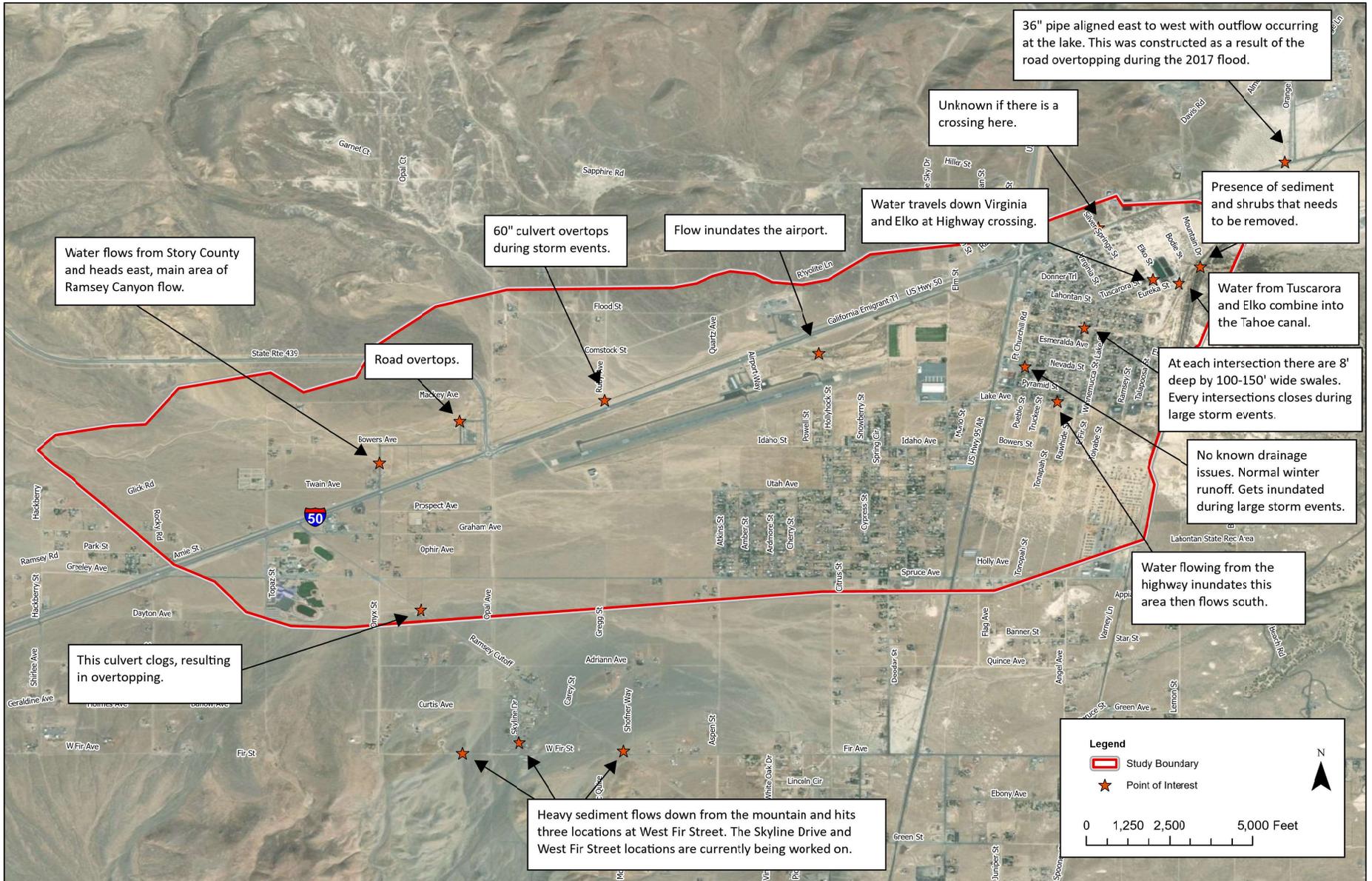


Please share your input and comments via email, phone, or website:

EMAIL: Geoffrey.Brownell@kimley-horn.com  
PHONE: 602-906-1183



Figure 18: Public Meeting Postcard



SCALE: 1" = 200'	DATE: 04/20/24	REVISION:
DESIGNED BY: AM	CHECKED BY: CSB	DATE: 04/20/24
PROJECT: 2024 NORTH SILVER SPRINGS COUNTY MAINTENANCE AND FLOOD CONCERNS	PROJECT: 2024 NORTH SILVER SPRINGS COUNTY MAINTENANCE AND FLOOD CONCERNS	PROJECT: 2024 NORTH SILVER SPRINGS COUNTY MAINTENANCE AND FLOOD CONCERNS
<b>Kimley-Horn</b>		
2024 KIMLEY-HORN AND ASSOCIATES, INC. Engineering, Planning and Environmental Consultants		
7740 North 108th Street, Suite 101 Overland Park, Kansas 66202   (913) 244-5500		
North Silver Springs County Maintenance and Flood Concerns		
Figure 19		

### 7.4 Constraints

For the NSS ADMP project area, several constraints were identified during the formulation of mitigation alternatives. The largest constraint is the existing Harvey Canal channel and right-of-way through North Silver Springs. The channel has been identified as not having capacity for the 100-year storm event in previous studies and there is not enough ROW to provide conveyance for the 100-year storm event without reconfiguring the channel as rectangular concrete or similar. This was deemed not feasible due to cost constraints. Storm runoff enters this channel through an existing culvert under US-95. This limits mitigation solutions to the area upstream of US-95. Because of this condition, flood mitigation was focused on areas where flows accumulated within the developed areas such that potential projects would reduce flood hazards for a number of structures.

An additional constraint was the overall damage assessment. Many of the residential structures in the community have a FFE two or more feet above ground. This resulted in an overall damage estimate that made a cost benefit ratio greater than one challenging to achieve.

### 7.5 Opportunities

There were several opportunities present within the project area as well. As previously discussed, it was identified that flood mitigation solutions would need to be upstream of US-95 due to constraints. There is a significant amount of undeveloped state land located upstream of US-95 and US-50. This presents the opportunity to provide flood relief for both the residential area and the Silver Springs airport. There is also a County owned property located directly between US-50 and US-95. This presents the opportunity to provide storage and control the flow to the channel immediately downstream.

## 8 Design Analysis

### Preliminary Analysis

Preliminary analysis for the project included assessing the capacity of the Harvey Canal channel. Based on typical cross sections, the calculated flow capacity for the channel was approximately that of a 10-year storm. This analysis indicated that storing runoff for storm events exceeding the 10-year event would be necessary to contain the flow within the channel.

Model results from the existing conditions model were analyzed to understand the volume difference between the 10-year and the 100-year event. The total volume required to be stored was determined to be around 1067 ac-ft.

Based on the identified land, there were two Areas of Mitigation Interest (AOMIs) that could provide storage options. The County owned parcel on Elm Street between US-50 and US-95 is 48.75 acres and is situated in the existing floodplain. This made this parcel ideal for providing storage and metering flows to the channel downstream; however, this parcel was too small to provide the full storage volume needed to mitigate runoff.

Another AOMI was focused on the state-owned land to the north to provide the additional storage volume needed. The parcel is over 2800 acres and is located upstream of the Silver Springs Airport as well as residential areas. See Figure 20 for an overview of the AOMI's.

Basins were situated within the AOMIs to capture runoff based on the existing 100-year flood depths. AOMI #1 is located just south of SR-439 and is comprised of three cascading basins that are eight feet in depth. In between each basin, there are low flow orifices as well as overflow weirs which control the flow rate leaving the basins. See Figure 21 for a design concept map of AOMI #1.

AOMI #2 is located just west of US-95 and is comprised of a single basin with a depth of eleven feet. This basin will have a low flow orifice which will outfall to the downstream channel just east of Truckee Street. There is an additional control structure proposed to control the discharge leaving the basin to be equal to the 10-year flow rate. See Figure 22 for a design concept map of AOMI #2.

The volume calculated for each of the basins is shown in the table below.

**Table 5: Runoff Volumes**

Storm Event	AOMI #1	AOMI #2
10-year, 24-hour	40	109
25-year, 24-hour	201	416
100-year, 24-hour	615	1176
Design Volume	685	465

### Recommended Projects

After consulting with the County, it was determined that the preliminary solutions developed for the AOMIs were suitable for project recommendations. In order to assess the proposed impacts to the floodplains and planning level estimate costs, designs for each AOMI were optimized.

Each AOMI was modeled in HEC-1. Inflow hydrographs from HEC-RAS were input into the HEC-1 models and the proposed orifices and weirs were adjusted to develop proposed conditions hydrographs that could be reinput into HEC-RAS. The detailed plan and profiles for each AOMI can be seen in Figure 23 through Figure 26. The proposed HEC-RAS 2D model results are provided in Figure 28 through Figure 33. These results show the max flow depths and velocities for each storm event (10-, 25-, and 100-year).

An Opinion of Probable Cost (OPC) was prepared to understand the cost-to-benefit ratio for the AOMIs. The costs for each AOMI are summarized in the table below, with a more detailed breakdown provided in Appendix C.

# North Silver Springs

## AREA DRAINAGE MASTER PLAN

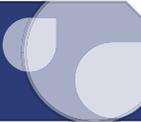
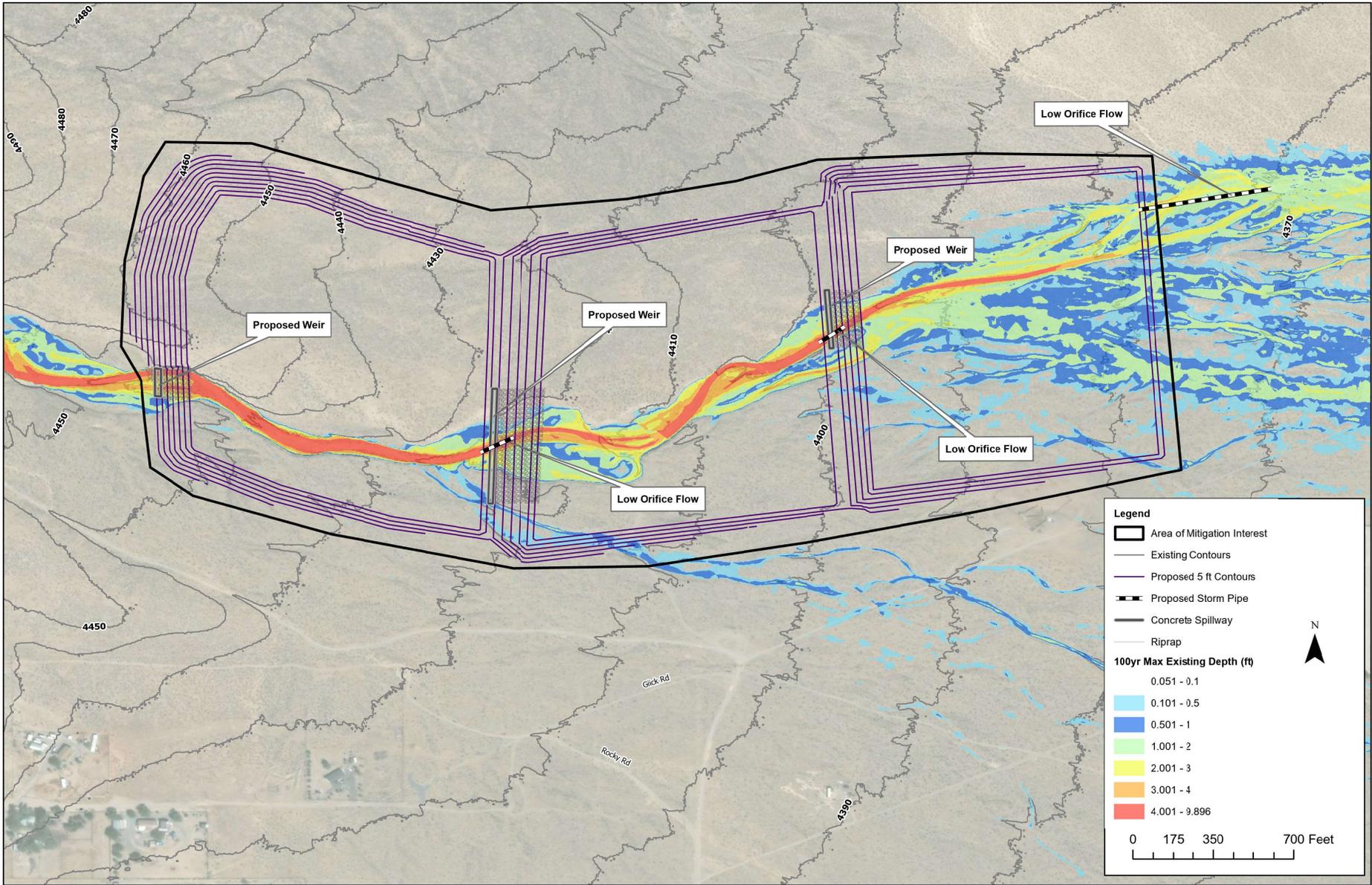


Table 6: Preliminary Cost Estimate

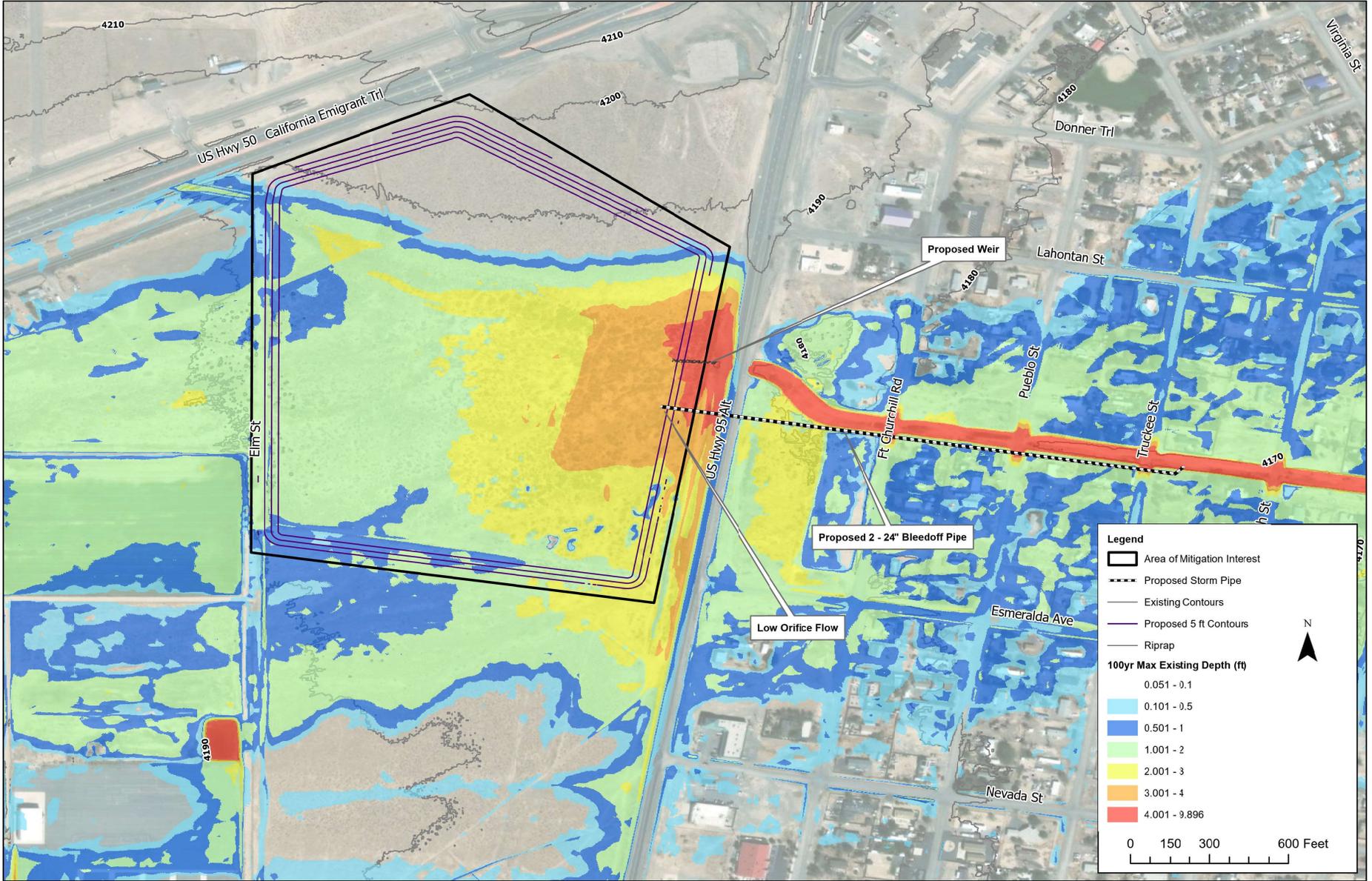
Item	AOMI #1	AOMI #2	Total, Both AOMIs
Design and Permitting	\$ 1.0M	\$ 536,000	\$ 1.5M
Construction	\$ 31 M	\$ 20 M	\$ 51 M
Land (Ownership)	TBD State Lands	Lyon County	-
Total	\$ 32 M	\$ 20.6 M	\$ 52.6 M

Several additional sediment basin and culvert crossing projects are also recommended to be considered for future design based on discussions with maintenance staff. However, modeling was not completed for these projects because they do not have a significant reduction in structure flooding and are more maintenance-oriented projects. Recommended potential projects are detailed in Figure 27.



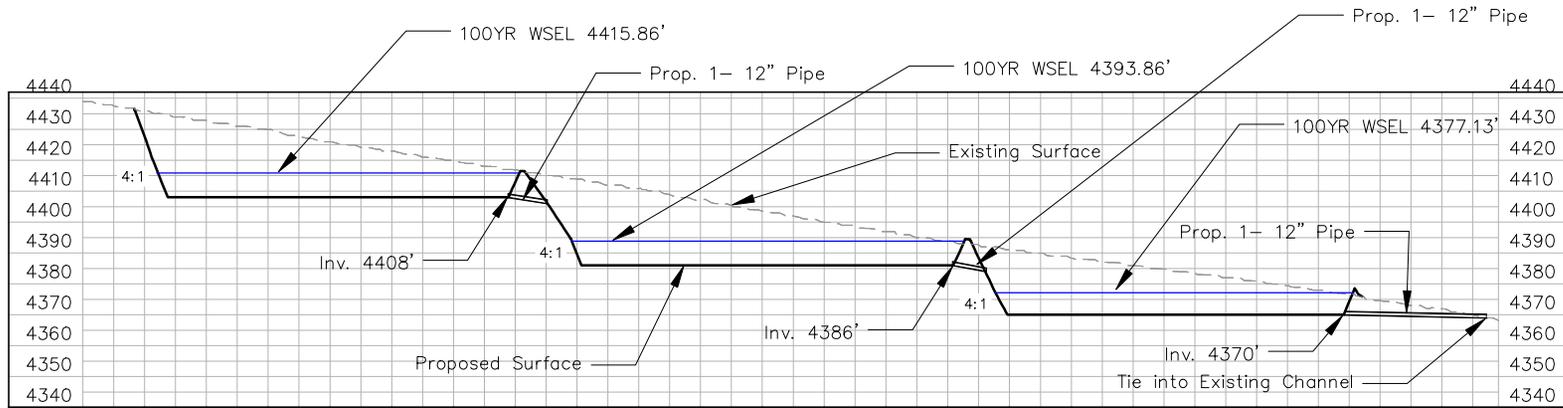
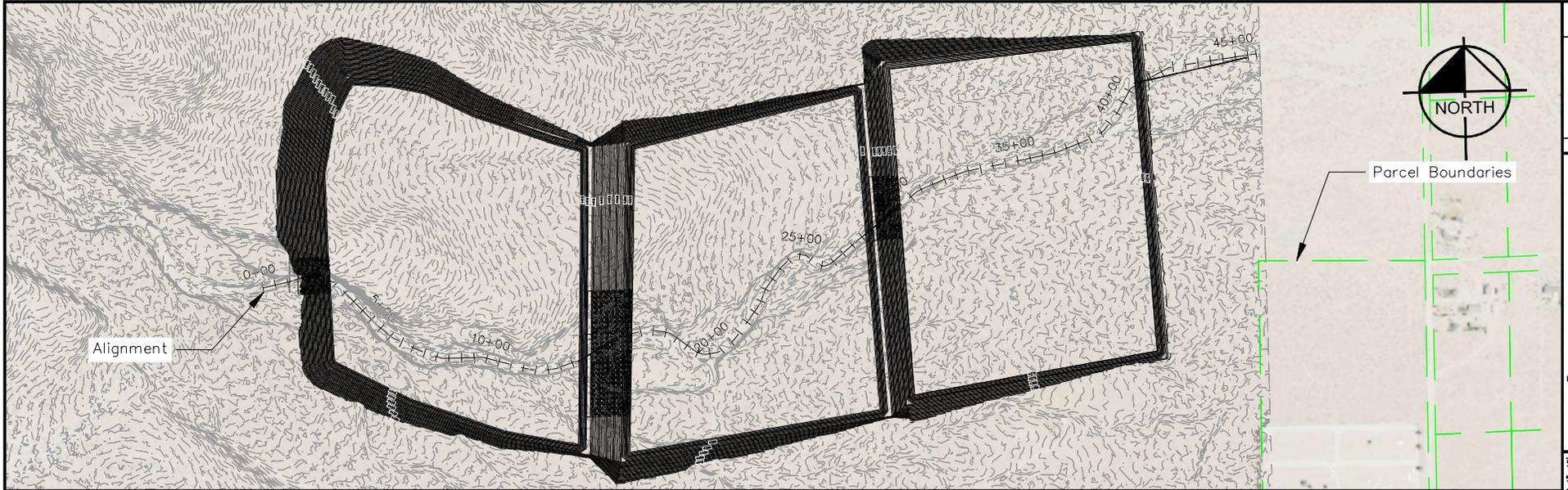


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CHECKED BY: CSR	DATE: 06/03/24	REVISION:	NO.
2024 KIMLEY-HORN AND ASSOCIATES, INC. Engineering, Planning and Environmental Consultants 7740 North 108th Street, Suite 100 Plymouth, MN 55425   (763) 944-6500			
<b>North Silver Springs          Design Concept Map          AOMI #1</b>			
DRAWING NAME: AOMI #1			
Figure 21			



DESIGNED BY: AOMI	DATE: 06/03/24	REVISION:	NO.
CHECKED BY: CHB			
<b>Kimley-Horn</b> 2024 KIMLEY-HORN AND ASSOCIATES, INC. Engineering, Planning and Environmental Consultants 7740 North 108th Street, Suite 100 Overland Park, Kansas 66202   (913) 944-6900			
<b>North Silver Springs          Design Concept Map          AOMI #2</b>			
DRAWING NAME: AOMI #2			
Figure 22			





Profile Follows Alignment



NO.	REVISION	DATE

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 7740 North 16th Street, Suite 200  
 Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=40'  
 SCALE (V): NONE  
 DESIGNED BY: AKM  
 DRAWN BY: AKM  
 CHECKED BY: GSB  
 DATE: 04/2024

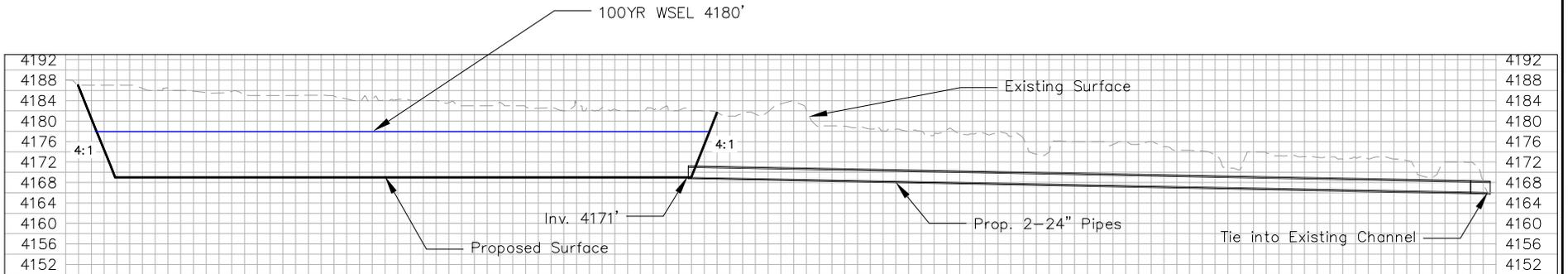
Southeast Carson ADMP  
 Cascading Basins Profile

PROJECT NO.  
291417003  
 DRAWING NAME  
Storm Profile

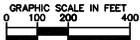
FIGURE 24

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 User: gsb  
 Plot Date: 04/20/24 10:40:00 AM  
 Plot Scale: 1"=40'  
 Plot Orientation: Landscape  
 Plot Range: All  
 Plot Style:.ctb  
 Plot Color: Black  
 Plot Lineweight: 0.20  
 Plot Linetype: Solid  
 Plot Font: Arial, 10  
 Plot Title: Southeast Carson ADMP Cascading Basins Profile  
 Plot Sheet: 24 of 24  
 Plot Status: OK





Profile Follows Alignment



NO.	REVISION	DATE

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 7740 North 16th Street, Suite 300  
 Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=200'  
 SCALE (V): NONE  
 DESIGNED BY: AKM  
 DRAWN BY: AKM  
 CHECKED BY: CTH  
 DATE: 05/2024

Southeast Carson ADMP  
 Elm Street Basin Profile

PROJECT NO.  
 281417003

DRAWING NAME  
 Profile

FIGURE 26

I:\Projects\2024\281417003\281417003\_01\281417003\_01\_SouthEastCarsonADMPElmStreetBasinProfile.dwg Apr 01, 2024 Administrator  
 W:\Projects\2024\281417003\281417003\_01\281417003\_01\_SouthEastCarsonADMPElmStreetBasinProfile.dwg Apr 01, 2024 Administrator  
 I:\Projects\2024\281417003\281417003\_01\281417003\_01\_SouthEastCarsonADMPElmStreetBasinProfile.dwg Apr 01, 2024 Administrator



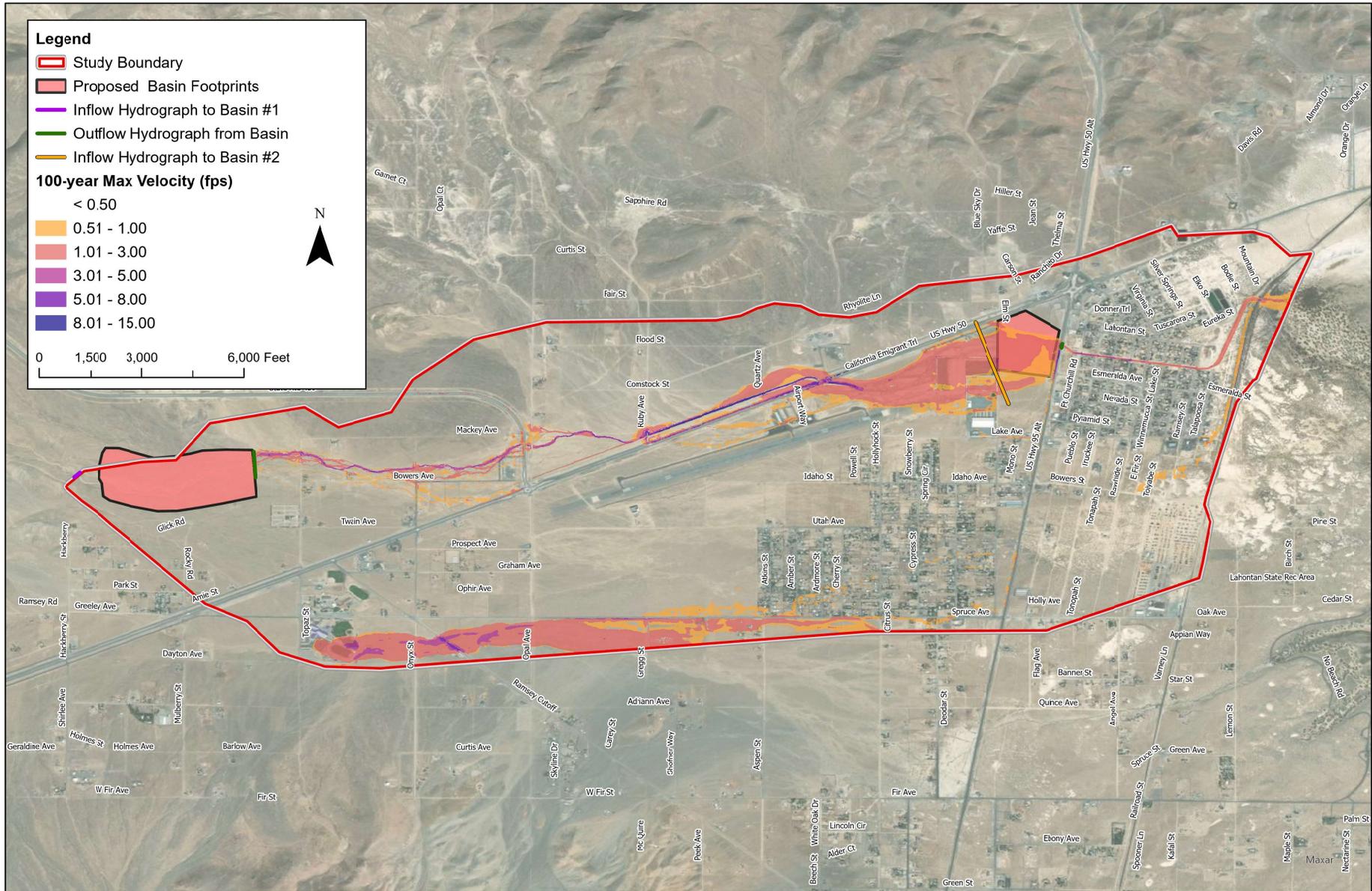












**Legend**

- Study Boundary
- Proposed Basin Footprints
- Inflow Hydrograph to Basin #1
- Outflow Hydrograph from Basin
- Inflow Hydrograph to Basin #2

**100-year Max Velocity (fps)**

- <math>< 0.50</math>
- 0.51 - 1.00
- 1.01 - 3.00
- 3.01 - 5.00
- 5.01 - 8.00
- 8.01 - 15.00

0    1,500    3,000    6,000 Feet

N  
▲

DESIGNED BY: AMH	CHECKED BY: CSR	DATE: 02/03/24	<b>Kimley</b> <b>Horn</b>						
			2024 KIMLEY-HORN AND ASSOCIATES, INC. Engineering, Planning and Governmental Consultants 7740 North 108th Street, Suite 100 Pleasanton, CA 94566 (925) 944-9500						
<b>North Silver Springs Proposed 100-year Max Velocities</b>									
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Figure 33									

### 9 Benefit Cost Analysis

A benefit cost analysis (BCA) was conducted in accordance with FEMA's BCA Toolkit (Version 6.0) to evaluate the fiscal benefits of the proposed projects. AOMIs #1 and #2 are designed to work together to relieve the existing flooding and were therefore assessed as one project for the BCA. In order to be eligible for FEMA grant funding, projects must have a BCR greater than 1. The total mitigation benefit associated with the project implementation includes reduction of flooding potential to structures as well as social benefits. The mitigation benefit is compared to the cost of construction and annual maintenance to understand the overall BCR. Costs used to calculate the BCR are adjusted using discount rates to adjust totals to present day value. FEMA has adopted a discount rate of 3.1% for all projects. Per FEMA's BCA Toolkit, standard benefits were evaluated per building structure based on pre- and post-project flow depths. Post project flow depths and associated structure damages were calculated based on proposed HEC-RAS 2D modeling. The social benefits are based on the total number of residents. Table 7 is a summary of the benefit cost ratio and the detailed FEMA output can be seen in Appendix D. The benefits are listed in present day dollars. The BCR for the project is above 1 indicating that the project would qualify for a Building Resilient Infrastructure and Communities (BRIC) grant. The benefit cost ration could likely be further increased by including additional data of economic losses associated with flooding disruptions to the airport and the Highway 50 transportation corridor. Because of this, there is a high confidence level that the ultimate BCR would be substantially greater than 1 if calculated using this data as part of a grant application effort. There may also be additional grant opportunities outside FEMA's Hazard Mitigation Grant Program (HMGP) and BRIC grants that the projects could qualify under due to the disadvantaged nature of the area.

**Table 7 : Benefit Cost Ratio**

<b>Number of Properties Impacted</b>	586
<b>Approximate Population</b>	2,342
<b>Social Benefit</b>	\$10.8 Million
<b>Standard Mitigation Benefit</b>	\$45.5 Million
<b>Total Mitigation Project Benefit</b>	\$56.4 Million
<b>Construction Cost</b>	\$51 Million
<b>Annual Maintenance Cost</b>	\$50,000
<b>Total Mitigation Project Cost</b>	\$52.6 Million
<b>Benefit Cost Ratio</b> Using 3.1% Discount Rate	1.04

### 10 Conclusion

The NSS ADMP developed a detailed two-dimensional HEC-RAS model that used recent LiDAR terrain, and current hydrologic and hydraulic methodologies to define existing flood hazard conditions for the 10-, 25-, 100-year storm events. Results from these analyses, discussions with stakeholders, and public input were used to define flood prone areas.

Based on available land and opportunities within the study area, two areas of mitigation interest were identified, and flood mitigation alternatives were developed for each. These projects would provide substantial improvements in a large portion of the study area. Conceptual plans and costs were developed for these locations.

The next step in advancing flood mitigation projects would be to complete a FEMA scoping project via a BRIC grant or other grant funding opportunity to further the design and perform an analysis of each flood mitigation alternative through a design concept report. This process would refine the hydrologic and hydraulic analyses, conduct required environmental evaluations, and advance the plans and cost closer to construction document level.

It should also be noted that based on the information collected during the second meeting with County maintenance staff, there are some additional smaller projects focusing on sediment accumulation and road overtopping from the south that could impact roadside conveyance and street intersections. Small design projects such as a sediment storage basin south of Spruce Avenue or enlarging culvert crossings would be effective in eliminating these maintenance changes.

# North Silver Springs

## AREA DRAINAGE MASTER PLAN

### 11 References

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### Appendices

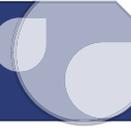
**Appendix A: USGS LiDAR Survey Report**

**Appendix B: Public Meeting #1**

**Appendix C: Engineers Opinion of Probable Cost**

**Appendix D: FEMA Benefit Cost Analysis**

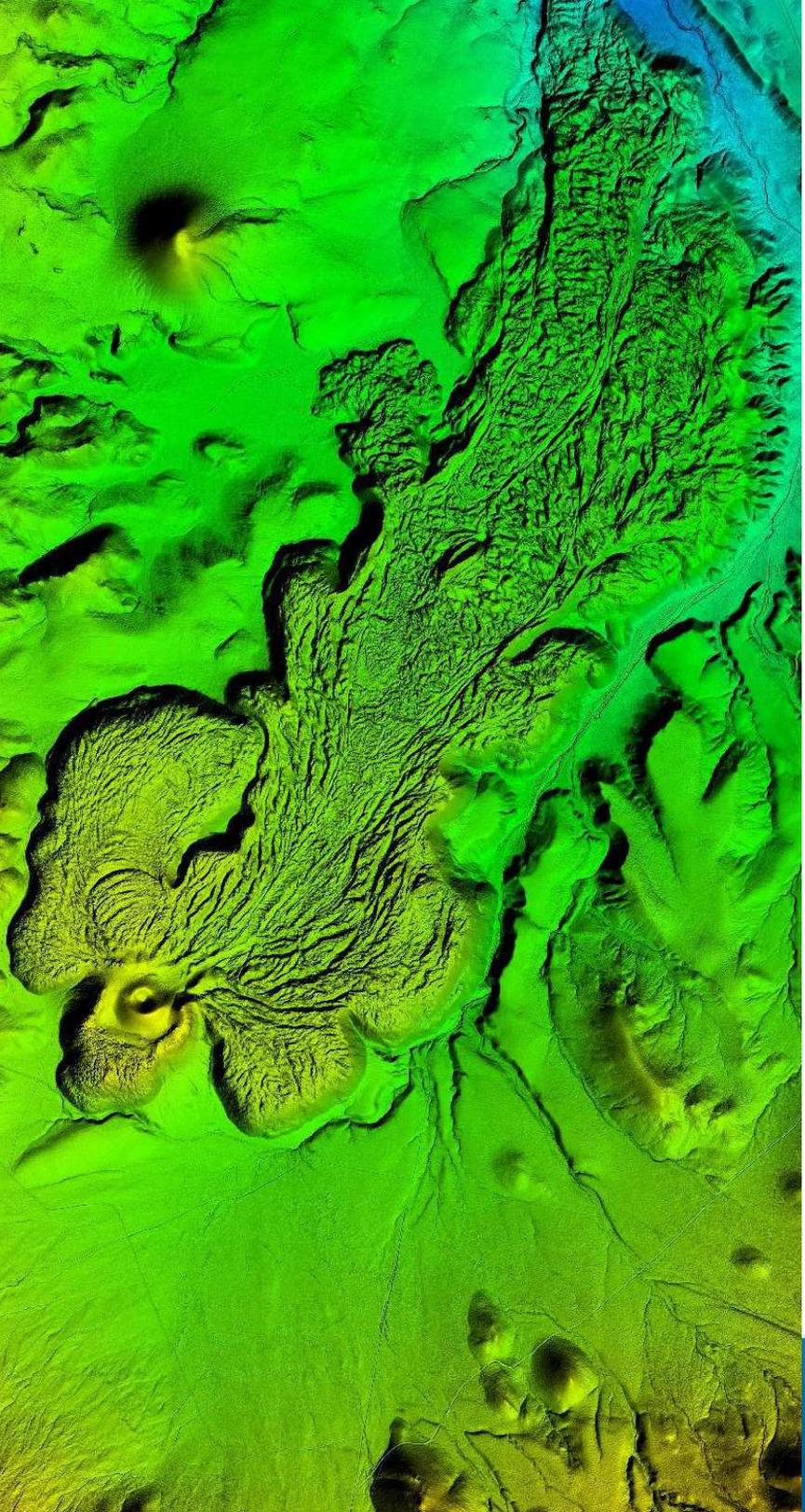
**Appendix E: Electronic Files**



# N|V|S

# GEOSPATIAL

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Submitted: September 13, 2022

## EarthMRI\_2020\_D20

# LIDAR PROCESSING REPORT

Project ID: 198162

Work Unit: 300013

# 2022

Prepared for:



Prepared by:

# N|V|S

# GEOSPATIAL

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# 1. Summary / Scope

## 1.1. Summary

This report contains a summary of the NV\_WestCentral\_EarthMRI\_2020\_D20, Work Unit 300013 lidar acquisition task order, issued by USGS under their Contract G16PC00016 on 09/15/2020. The task order yielded a project area covering 4,294 square miles over Nevada. The intent of this document is only to provide specific validation information for the data acquisition/collection, processing, and production of deliverables completed as specified in the task order.

## 1.2. Scope

Aerial topographic lidar was acquired using state of the art technology along with the necessary surveyed ground control points (GCPs) and airborne GPS and inertial navigation systems. The aerial data collection was designed with the following specifications listed in Table 1 below.

**Table 1. Originally Planned Lidar Specifications**

Average Point Density	Flight Altitude (AGL)	Field of View	Minimum Side Overlap	RMSEz
2 pts / m2	2305 m	58.5°	20%	≤ 10 cm

## 1.3. Coverage

The project boundary covers 4,294 square miles over Nevada. Project extents are shown in Figure 1.

## 1.4. Duration

Lidar data was acquired from October 15, 2020 and November 02, 2020 in 48 total lifts. See “Section: 2.4. Time Period” for more details.

## 1.5. Issues

There were no issues to report.

**NV\_WestCentral\_EarthMRI\_2020\_D20 Work Unit 300013**  
**Projected Coordinate System: UTM Zone 11**  
**Horizontal Datum: NAD83(2011)**  
**Vertical Datum: NAVD88 (GEOID 18)**  
**Units: Meters**

Lidar Point Cloud	Classified Point Cloud in .LAS 1.4 format
Rasters	<ul style="list-style-type: none"> <li>• 1-meter Hydro-Flattened Bare Earth Digital Elevation Model (DEM) in GeoTIFF format</li> <li>• 1-meter Intensity Images in GeoTIFF format</li> </ul>
Vectors	<p>Shapefiles (*.shp)</p> <ul style="list-style-type: none"> <li>• Project Boundary</li> <li>• Lidar Tile Index</li> <li>• Calibration and QC Checkpoints (NVA/VVA)</li> <li>• Building Footprint Polygons</li> </ul> <p>Geodatabase (*.gdb)</p> <ul style="list-style-type: none"> <li>• Continuous Hydro-Flattened Breaklines</li> </ul>
Reports	<p>Reports in PDF format</p> <ul style="list-style-type: none"> <li>• Focus on Delivery</li> <li>• Focus on Accuracy</li> <li>• Processing Report</li> </ul>
Metadata	<p>XML Files (*.xml)</p> <ul style="list-style-type: none"> <li>• Breaklines</li> <li>• Classified Point Cloud</li> <li>• DEM</li> <li>• Intensity Imagery</li> </ul>

# NV\_WestCentral\_EarthMRI\_2020\_D20 Work Unit 300013 Boundary

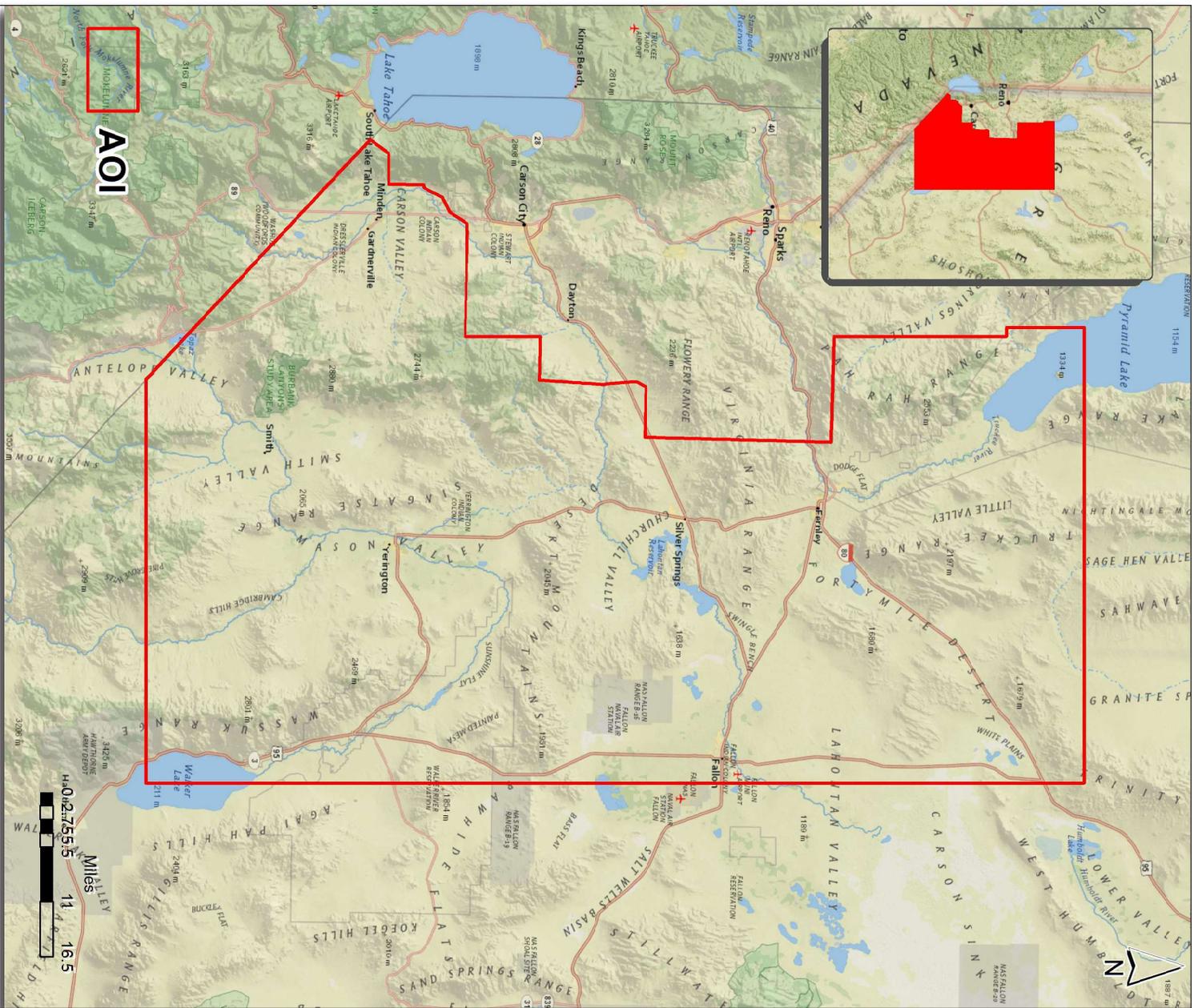
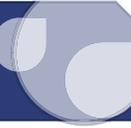


Figure 1. Work Unit Boundary



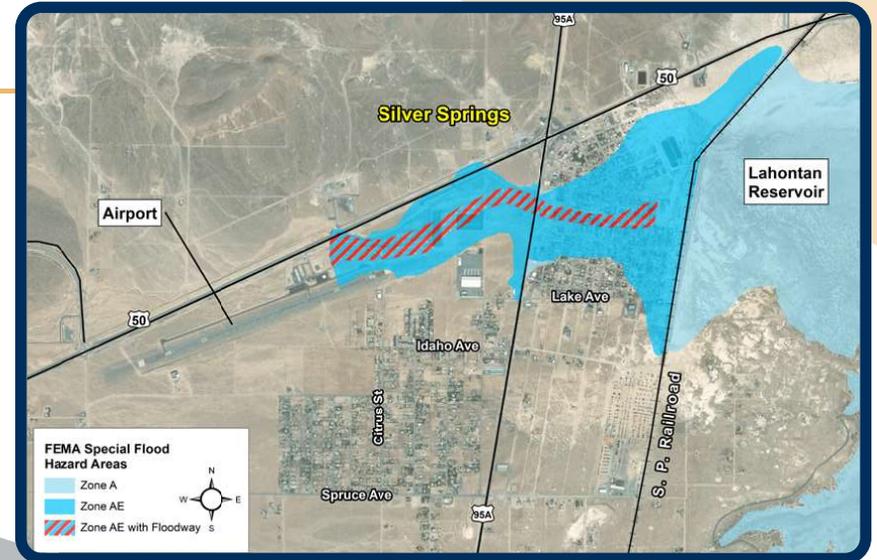
**Appendix B: Public Meeting #1 and Stakeholder Meeting (5/23/2023)**

Post Card  
Sign-In Sheet  
Presentation  
Public Meeting Annotated Maps  
Stakeholder Meeting Transcript

# COMMUNITY INFORMATION MEETING

## NORTH SILVER SPRINGS AREA DRAINAGE MASTER PLAN

Residents and property owners are invited to learn about the North Silver Springs Area Drainage Master Plan and share your input and comments on drainage infrastructure with drainage experts at our in-person meeting!



## IN-PERSON MEETING

TIME: Tuesday, May 23rd 2023 | 5:30-6:30pm

LOCATION: Silver Springs Community Center

ADDRESS: 2945 Fort Churchill Road, Silver Springs, Nevada 89429

Come in person with input and comments.

## VIRTUAL MEETING

Listen in to the virtual stakeholder meeting from 12-1pm



SCAN ME!

Silver Springs Community Center  
2945 Fort Churchill Road, Silver Springs,  
Nevada 89429



**FEMA**

**Please share your input and  
comments via email, phone,  
or website:**

EMAIL: [Geoffrey.Brownell@kimley-horn.com](mailto:Geoffrey.Brownell@kimley-horn.com)

PHONE: 602-906-1183







Sign In Sheet

Kimley»Horn

North Silver Springs Area Drainage Master Plan Public Information Meeting

Name	Address	Mobile Phone Number (xxx-xxx-xxxx)	Email	How did you hear about the virtual meeting?
Diane Clifford DIAKE VAL GROVER	1500 W. Spruce St		dmcfrackles@gmail.com	mail invite
	1835 TUSCARORA ST	775-294-1184	dianegrover36@yahoo.com	mailed postcard
RANDALL GREEN	2765 PUEBLO ST		greenrandall@usps.com	Post card
Scott Keller				

# NORTH SILVER SPRINGS

AREA DRAINAGE MASTER PLAN

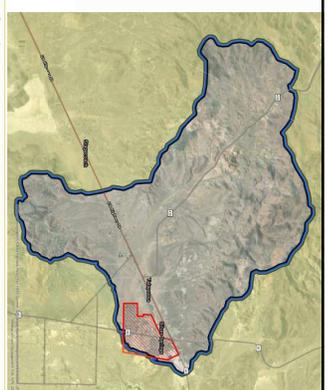




**SUPPORTED BY:**  
 Lyon County  
 Carson Water Subconservancy District  
 FEMA



1



**Study Area Map**

**North Silver Springs**  
 Area Drainage Master Plan

2

## Project Stakeholders

- Residents – 1174 unique addresses
- Lyon County School District
- Silver Springs Mutual Water Company
- Comstock Mining and LIniCo
- Miles Minerals
- Microsoft
- Silver Springs Airport
- NDOT

**North Silver Springs**  
 Area Drainage Master Plan

3

## Project Purpose

- Project will more accurately define flood hazards, including nuisance flooding, in the area
- Build on hydrologic and hydraulic studies
  - Ramsey Canyon LOMR
- Reduce flood hazards and increase community resiliency in the future

**North Silver Springs**  
 Area Drainage Master Plan

4

## Project Goals

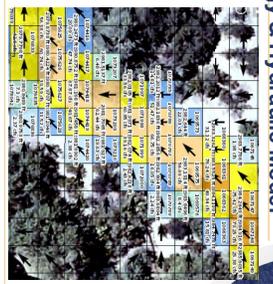
- Identify mitigation solutions for areas impacted by flood flows and erosion
- Formulate a plan to mitigate flooding with cost-effective infrastructure
- Reduce flood hazards for residents

**North Silver Springs**  
 Area Drainage Master Plan

5

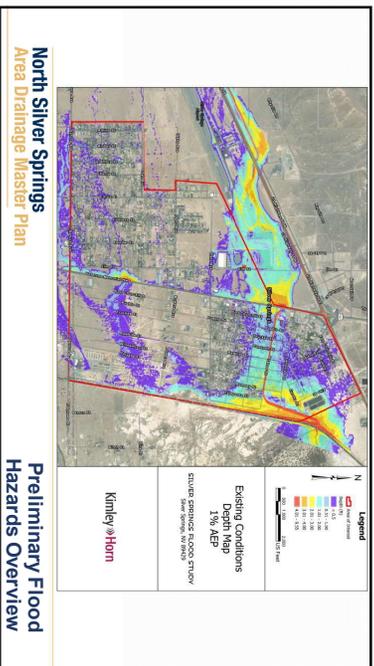
## Comprehensive Hydrology & Hydraulic Model

- **Grids**
  - Study area is divided into variable sized grids
  - Water depths
  - Velocities
  - Flows & Flow direction
- **Models**
  - Can be refined & updated
  - Use for Design & Planning new developmental infrastructure
- **End Users**
  - County
  - Engineers
  - Homeowners

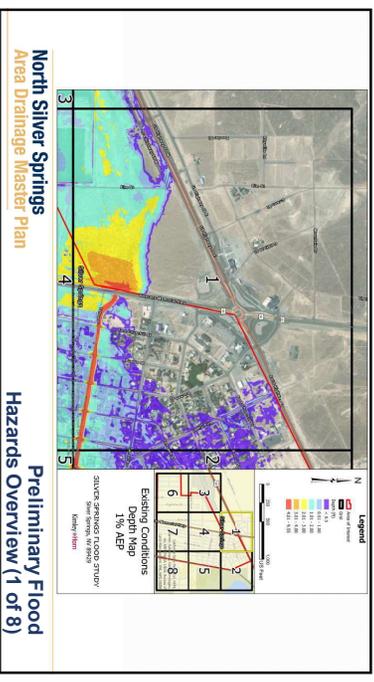


**North Silver Springs**  
 Area Drainage Master Plan

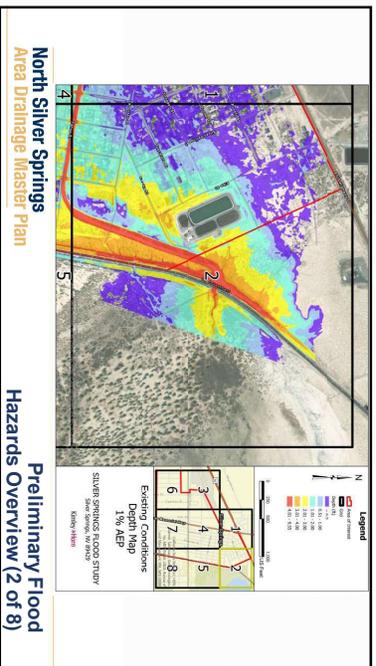
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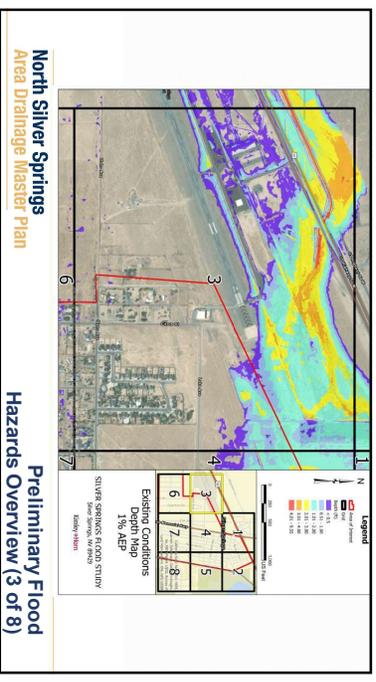
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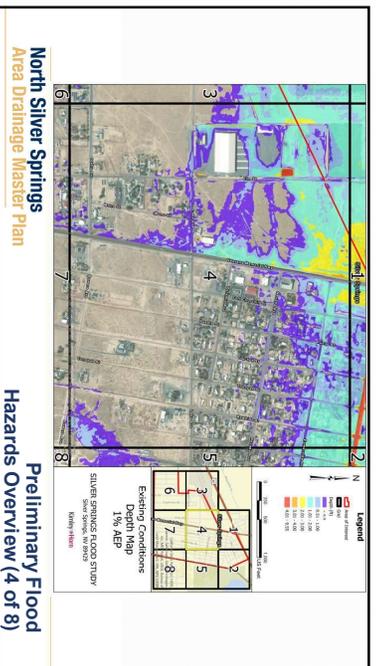
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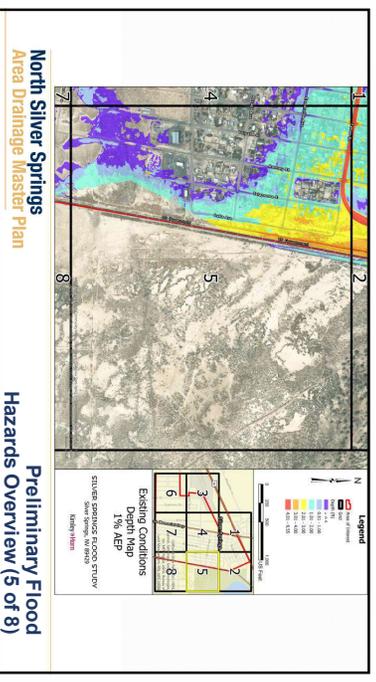
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10



11



12



## Next Steps

- Finish H&H Modeling
- Develop Implementable Conceptual Solutions
- Present to Stakeholders
- Finalize in Design Concept Report
- Present to Lyon County and CWSDB Boards

**North Silver Springs**  
**Area Drainage Master Plan**

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## Project Schedule

- **May 23, 2023** – Public Meeting to present initial results and solicit public input
- **Winter 2023** – Follow-up Public Meeting to present propose mitigation solutions (projects)
- **Spring 2024** – Final and present to Board of Commissioners

**North Silver Springs**  
**Area Drainage Master Plan**

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## Funding Options for Construction

- With Board Approval:
  - Develop grant application for FEMA or other federal agencies for possible construction projects
  - Lyon County CIP

**North Silver Springs**  
**Area Drainage Master Plan**

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## Contact Us

- Lyon County
- Louis Carola – Community Development Director
    - Email: [lcarola@lyon-county.org](mailto:lcarola@lyon-county.org)
    - Phone: 775-463-6692
  - Kinley-Horn
    - Geoff Brownell - Project Manager
      - Email: [Geoff.brownell@kinley-horn.com](mailto:Geoff.brownell@kinley-horn.com)
      - Phone: 775-722-4713

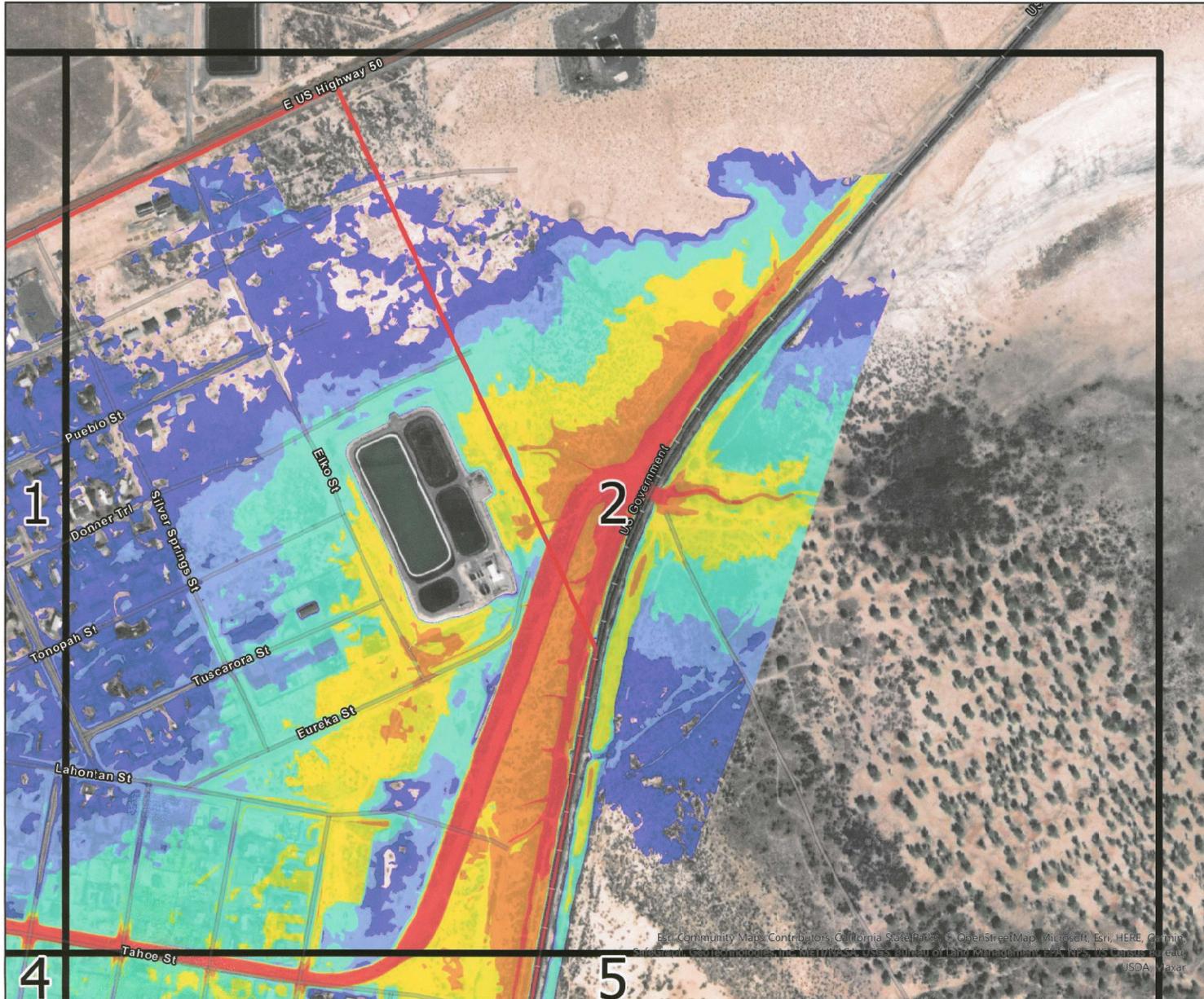
**North Silver Springs**  
**Area Drainage Master Plan**

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## Q&A

**North Silver Springs**  
**Area Drainage Master Plan**

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**Legend**

Area of Interest

Grid

Depth (ft)

- < 0.5
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 9.55

0 250 500 1,000 US Feet

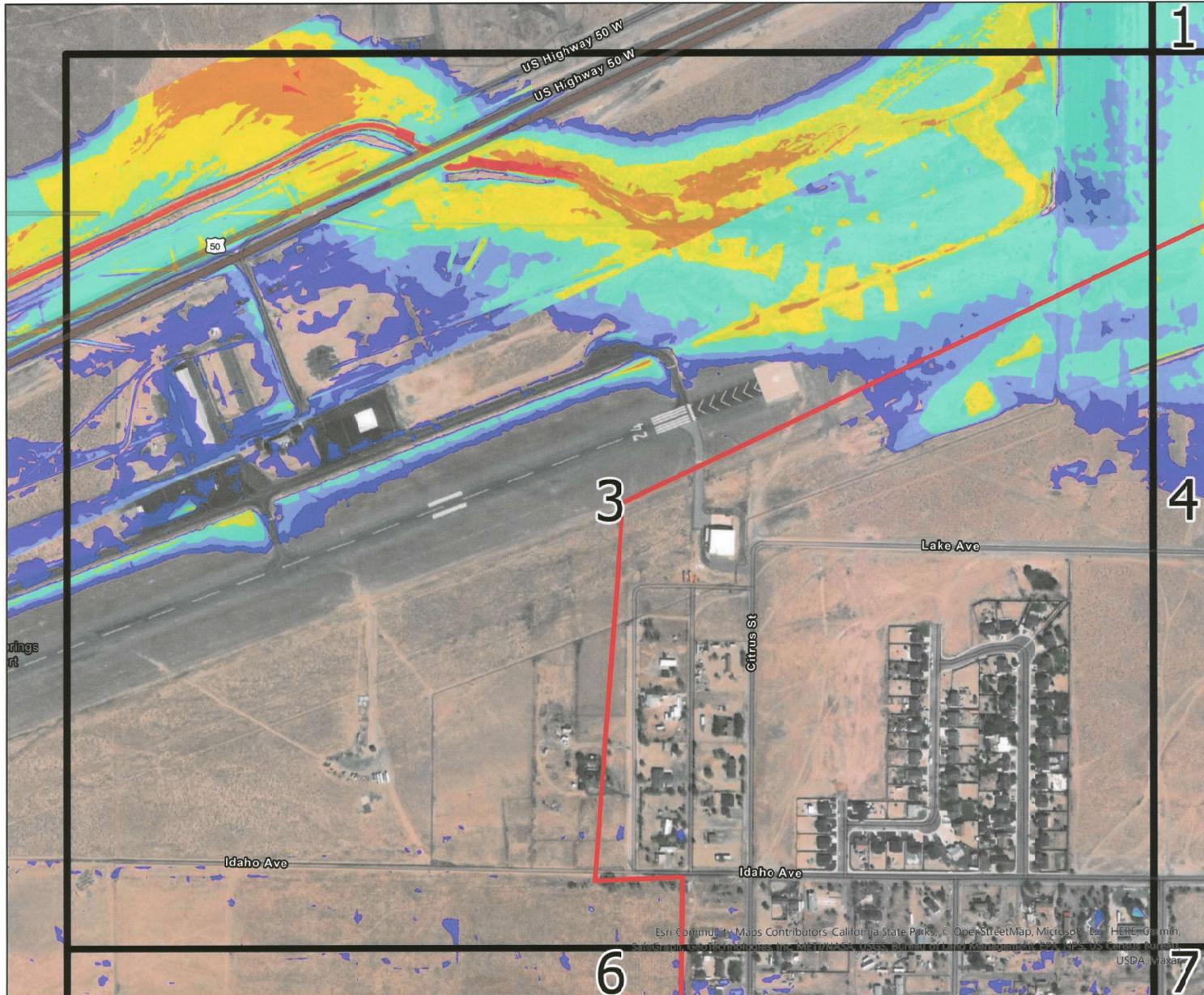


**Existing Conditions  
Depth Map  
1% AEP**

**SILVER SPRINGS FLOOD STUDY**  
Silver Springs, NV 89429



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**Legend**

- Area of Interest
- Grid
- Depth (ft)
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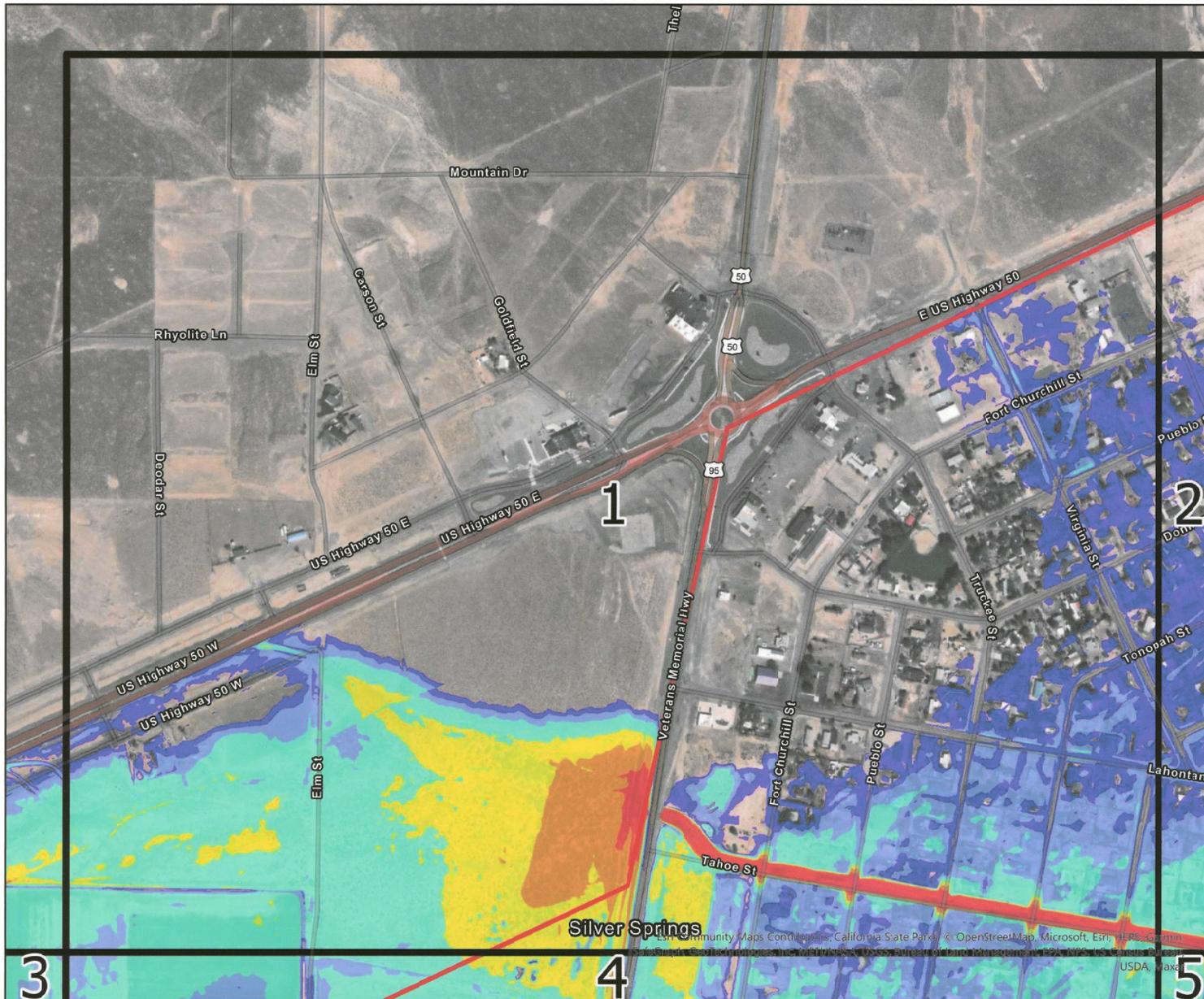
**SILVER SPRINGS FLOOD STUDY**  
Silver Springs, NV 89429

**Kimley»Horn**

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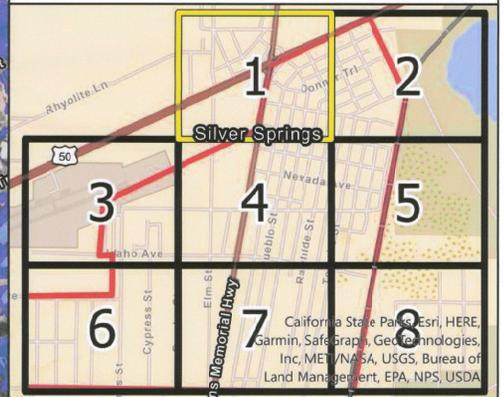


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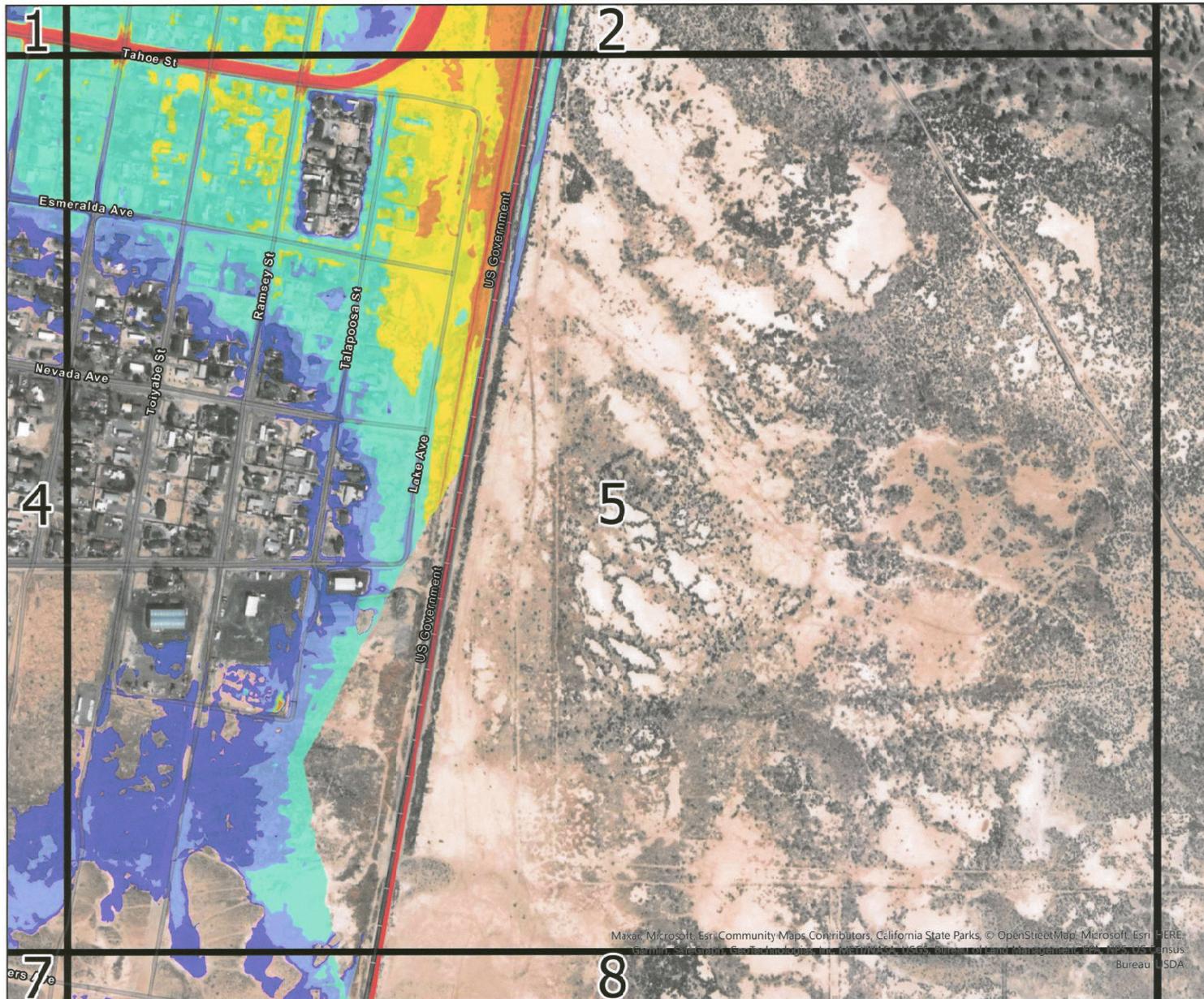


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**SILVER SPRINGS FLOOD STUDY**  
Silver Springs, NV 89429



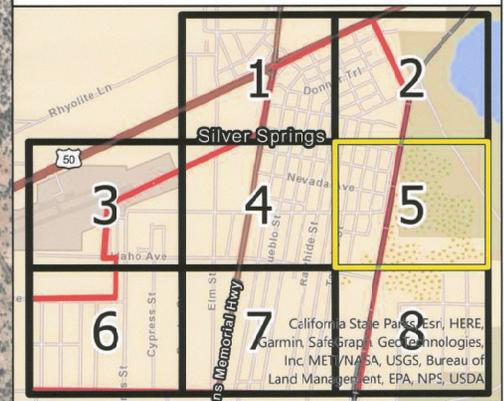
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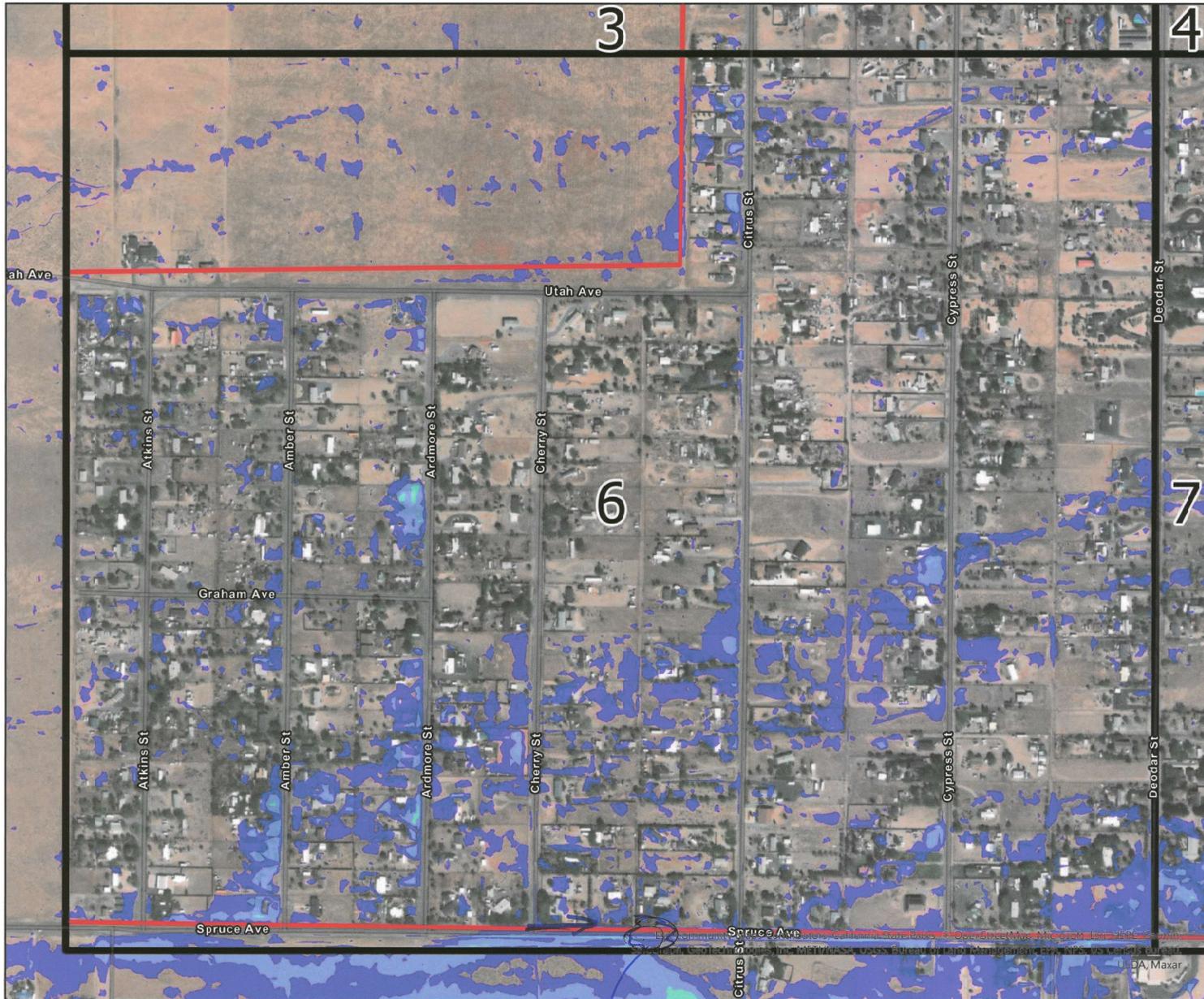


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**Legend**

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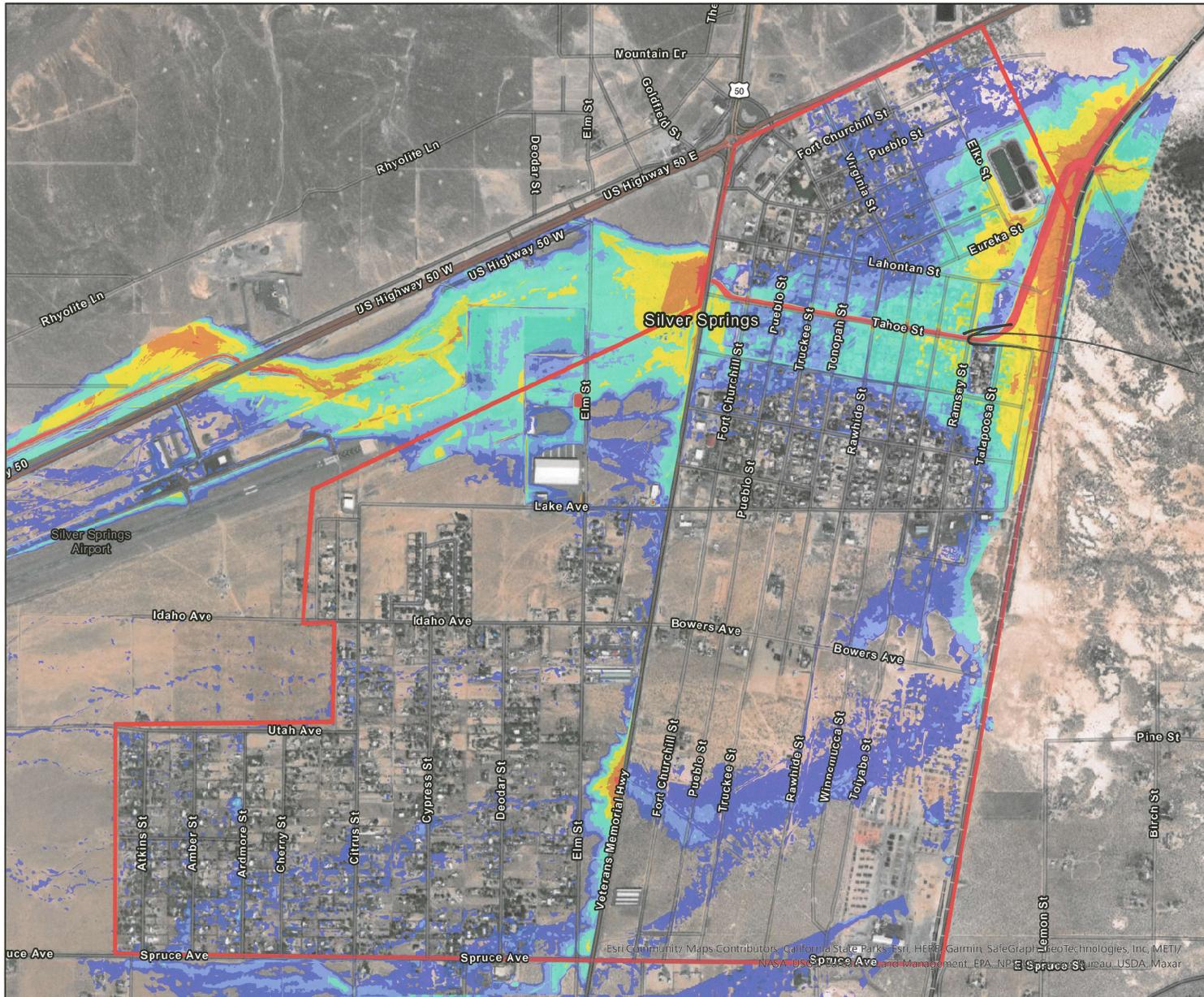
**SILVER SPRINGS FLOOD STUDY**  
Silver Springs, NV 89429

**Kimley»Horn**

*Grader ditch floods*







**Legend**

 Area of Interest  
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*Haivey Canal*

**Existing Conditions  
Depth Map  
1% AEP**

**SILVER SPRINGS FLOOD STUDY**  
Silver Springs, NV 89429

**Kimley»Horn**

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*← opportunity to slow down ups of development*

Oh, I don't.

Geoff Brownell: And so just that. And yeah, I think just monitoring things

Geoff Brownell: in case in case someone doesn't join the right link. Is that a possibility?

Jordan King: Yeah, but it should be really quite easy for me to promote them to a panelists, if that's the case. But yeah, I'll I'll be watching that as well. So so and also, Jeff, what we'll do is we'll record the meeting. what zoom does is they record video

Jordan King: and then they also do a transcript, so we can share both of those things. And then also we'll do a meeting summary. Then it will help put that together for you.

Jordan King: and we'll track like who participated, and any questions that were asked and what the answers were. and then during the Q. A. We'll help facilitate

Jordan King: the actual Q a. Piece. So if if, when we transition from the presentation to the Q. A. We'll just as

Jordan King: Ben and I have control to unmute and mute people. so we'll just say, you know, this is how you raise your hand. If you'd like to ask a question, or you can type it into the chat, and we'll and then it or I will read it and let the panelists respond to it. So it should be pretty easy.

Geoff Brownell: Okay, that works

Bennett Johnson: great cool. Okay, well, I can start letting these folks in. If that works with you guys. So

Bennett Johnson: okay.

Jordan King: And Jeff, will you be the one for presenting the material, sharing it?

Jordan King: yes, for the most part, yeah. Great. Just wanna make sure you have that.

Jordan King: And I noticed that you said you could hear us. That's because you're part of our panelists, team. I couldn't talk, but I could hear you guys talking. And it's like, Okay, do you know I'm here?

Jordan King: Yes, we do. Now I'm you. We you should be able to unmute what you did, and, said, Nicole, you should also be able to unmute yourself as well. I heard your whole conversation so good thing you didn't say anything bad, Jeff. I was looking to see.

Nicole Feledy: Hi, everyone! I'm here for Microsoft. just listening in, I guess.

Jordan King: Wonderful. So we'll start the official presentation just maybe a minute or 2 after what? To get people a chance to join

Jordan King: and

Jordan King: be excited. It'll be great.

Geoff Brownell: Yeah, we set this up 15 min early for panelists, some just so that we could make sure we

Geoff Brownell: smooth out any wrinkles and technology ahead of time. So yeah, we have a little bit of time here.

Nicole Feledy: Yeah. Sounds good. Gave me a chance to test out the zoom link.

Nicole Feledy: usually use teams here at Microsoft, so

Nicole Feledy: as do we?

Geoff Brownell: So I did. Jordan. I did notice one thing here when I went to a test. The share screen function. It says, host disabled participant screen sharing

Bennett Johnson: hold on, I should be able to.

Bennett Johnson: Jeff.

Bennett Johnson: Okay. So I think I switched it, Jeff. So you should be able to

Bennett Johnson: share your screen. Now.

Geoff Brownell: yep.

Bennett Johnson: okay.

Geoff Brownell: So add, were you

Geoff Brownell: as you were out of the office for a while, aren't you? Did you go to Aspm?

Ed James: No, I was actually at my daughter's house in Colorado, working on it.

Ed James: So we actually had a crew of people working on it

Ed James: so a while, yeah. that sounds more fun than going to a conference.

Ed James: I think it was kind of fun, you know, kept busy, but from Thursday, all the way through Sunday.

Ed James: when it ceilings fans put in the hardware floor.

Ed James: Rain, electrical.

Ed James: Put up a shed. Now, most of the stuff I can't do. So it's all the other people, you know. I was just basically bringing tools around everyone.

Geoff Brownell: No, no, your lane right?

Ed James: Painted certain walls. So.

Ed James: But it was a good time

Geoff Brownell: we're in Colorado.

Ed James: you know our long line is.

Ed James: it's between 4 Collins and Denver.

Ed James: Yeah. When I was out there years ago in the eighties, there were actually spaces between the towns. And now you get basically development all the way from Denver north to 4 columns. So it's amazing.

Ed James: Yeah, 2 people could hear a conversation.

Jordan King: Yeah, we have a couple of attendees on the call. Just

Jordan King: If you'll make sure you hang tight we'll get the official presentation started in just a few minutes

Jordan King: we'll be be ready to go right at about 10'clock. Thanks for joining us.

Jordan King: Okay. I think.

Jordan King: it's just after time right now, and I think we should be ready to go ahead and get started just for everyone's information. This meeting is being recorded for records and for minutes. And I'm gonna go ahead and hand it off. to Jeff Brownle.

Geoff Brownell: All right. Thank you, Jordan. So as we as we get going here, I just want to

Geoff Brownell: kind of outline the intent of this meeting. So this meeting is set up as a stakeholder discussion meeting. And so really, today's today's

Geoff Brownell: going to be more about a conversation between stakeholders. within the study area which we'll define here shortly and then tonight we'll have the ability to follow up in a public meeting setting in person

Geoff Brownell: in Silver Springs. for members of the public that want to learn more. Or it, you know, kind of express, any input into the you know about the study or about the area and that sort of thing. So that's the format today. and

Geoff Brownell: hopefully, all the stakeholders got an invite that is specific to them to allow stakeholders to be kind of panel panel members here, so we can all kind of unmute and talk through things as they come up. And if there's folks members of the public listening in You should have the opportunity at the end of this time.

Geoff Brownell: time pending to Submit. Q. questions in the chat, and we'll explain how to do that later on in the presentation

Geoff Brownell: or later on in the meeting. But if we run short on time, just know that you'll have you have that ability at the in person public meeting tonight as well?

Geoff Brownell: so I think it would be appropriate to go

Geoff Brownell: around the room here the virtual room and and introduce ourselves. so

Geoff Brownell: I will start. My name is Jeff Brownell. I'm with Kimly Horn and associates

Geoff Brownell: we were contracted by Carson Water subconservancy district. to be the engineering consultant for this flood study, and I'll explain more what the flood study is here in a bit. but that's our role in the project.

Geoff Brownell: so I think we can just kind of go around the Horn here.

Geoff Brownell: my 2

Geoff Brownell: partners in this phone with Kimmeli Horn can kind of introduce themselves.

Geoff Brownell: And that one you go first.

Bennett Johnson: Sure. Yeah, thanks, thanks, Jeff. I'm Bennett Johnson also with Kelly Horn just working with Jeff here to make sure that we're engaging the public here on this project and stakeholders. So we're we're grateful that you guys are joined today. So thank you.

Jordan King: Hi, and my name is Jordan King. I am part of our public involvement and engagement team with Kimly Horn and my role today is to just help facilitate the conversation as well as facilitating question and answers from our general public that are participating virtually.

Geoff Brownell: I'm just gonna call out name. So the way they appear on my screen, Max, why don't you go next?

Max Robinson: Hi! There! I am a Max Robinson. I am also with the Carson Water Subconservancy district. I am a water resource specialist.

Geoff Brownell: Ed.

Ed James: Hi, there! I'm Ed. James and the general manager for the Carson Water sub conservancy district. and we look forward to this study.

Geoff Brownell: Nicole.

Nicole Feledy: Hi, I'm Nicole. I'm with Microsoft. I've sit on the land development team and I support water and waste water infrastructure. just listening in today on the discussion.

Geoff Brownell: I'm Scott

Scott Keller: Lion County Commissioner here in Silver Springs.

Geoff Brownell: Lewis

Louis Carliola: Lewis Carol. I'm the Community Development Director for Lion County.

Awesome.

Geoff Brownell: Tammy.

Tammy Hendrix: I'm Tammy Hendricks, a Lion County Commissioner, and I also serve on the Carson Water Subconservancy District Board.

Geoff Brownell: Awesome Zack.

Zach Spencer: Yes, Zach Spencer with Comstock, and we have investments in both land and senior water rights in

Zach Spencer: and Silver Springs. Thank you. Awesome.

Geoff Brownell: And then finally, Corrado.

Corrado DeGasperis: I'm a

Corrado DeGasperis: like a water. Right?

Geoff Brownell: Okay. did I miss anyone

Geoff Brownell: else? I know we have other participants that are probably up, you know, with the public. And like I said, this is you know, for this is our stakeholder coordination meeting. So did I miss any other stakeholders.

Scott Keller: Hello! This is Scott Keller. hey? I noticed that you had on. Is there a way to?

Scott Keller: I'm looking at? These are stakeholders. They have participants. And I noticed that Dave Brown was in there on participants, and he owns he represents in. And I see which is that big industrial complex up there.

Scott Keller: You might want to move him to a panelist.

Geoff Brownell: Okay. Is is that possible to do on the fly, Bennett? He should be rejoining now. So there we go perfect. Thank you. This is Dave Brown. Thanks, Scott. I'm with Northern Nevada industrial center. I appreciate the ability to join here.

Geoff Brownell: if there's any other participants that don't have the ability that are. I should be in the kind of stakeholder bucket. Right? just throw your name.

Geoff Brownell: do they have the ability to throw their name in the chat minute

Bennett Johnson: they they should. So just let me know and I'd be happy to promote anyone. Okay.

Geoff Brownell: So women on hopefully. you all can see my screen. Can I get a confirmation of that?

Geoff Brownell: The Powerpoint? Okay. so I do have a presentation. this is structured for the public meeting tonight, but it's probably a good starting point for our discussion today. But please feel free at any point in this to, you know. Take yourself on mute and ask questions. because again, this is a

Geoff Brownell: intended for a stakeholder coordination meeting. so the name of This project is the North Silver Springs aer drainage master Plan. it's being funded by Fema administered through Carson waters up and services district and Lion County is the technical lead on this project.

Geoff Brownell: this is a map of the study area. And so it basically encompasses the watershed that contributes to the north part of Silver Springs. that watershed

Geoff Brownell: kind of extends to the west

Geoff Brownell: just this side of stagecoach to the north, about 10 miles up U.S.A. Parkway.

Geoff Brownell: just to the east of Silver Springs proper, and then a little bit. There's a little bit of a lobe of contributing area to the to the south here. if we want to

Geoff Brownell: drill into this any further, I can pull it Google Earth at any point. But, this is kind of the watershed that we're looking at. And the red area. Here is the actual kind of

Geoff Brownell: project area where that's where we would be focusing our efforts as far as creating mitigation solutions to flooding or ideas for reducing the team of flood plane and that sort of thing. The rest of this is mostly contributing. run off to that area.

Geoff Brownell: and I can get into that a little bit more as we go, because there is the ability to look at areas outside of that in some fashion as needed. as part of the the study.

Geoff Brownell: so this is kind of the project stakeholders, as we have them listed right now and then. Certainly not a comprehensive list, and we'll keep building this list as we go specifically with other folks on this call on. That might not be on this list. But I will say that we sent out mailers for the public meeting tonight to almost 1,200 unique addresses. So

Geoff Brownell: we'll see. what kind of participation we get tonight. it may. You know you never know how these things go, and it really depends what what's on everyone's mind at the time. And I study like this doesn't necessarily generate any kind of controversy. So sometimes turn out is not super, but we'll see, and you know, hopefully, it will be pleasantly surprised, but definitely looking for some public participation tonight.

Geoff Brownell: yeah, let me know if there's any striking or glaring

Geoff Brownell: you know, folks missing from this list. But this is kind of our our working list as it stands right now

Geoff Brownell: on the purpose of this project is really to more accurately define flood hazards, and that includes nuisance flooding. So this is not just focused on a fema flood plane, and and that those areas

Geoff Brownell: we know that there is currently a letter of map revision in with Fema to revise the

Geoff Brownell: flood plane in this area. Called the rams a canyon leather map revision. we're looking at it at a pretty, a, a, a, a more finite scale. But one of the most one of the important things we will do as part of this study is come up with pro, you know, projects, infrastructure projects, that type of thing that would reduce that flood line, because right now that flow play does impact

Geoff Brownell: quite a few structures. And so that you know, that's something that triggers all all kinds of encumbrances and that sort of thing, including flood insurance for mortgages.

Geoff Brownell: we will build on the hydrology and hydrolog studies that have previously been completed, and most notably that, but are a map revision. And then, you know, of course.

Geoff Brownell: ultimate goal is to reduce flood hazards and increase resiliency in the future with any projects proposed projects. I do want to be clear that.

Geoff Brownell: now, this, this is the first step in the process. This is conceptual kind of mitigation solutions or plans. it's not. Nothing's going to get built as part of this and, in fact, there's a number of steps that need to occur before anything could get built. you know, design projects. Grant, funding that kind of stuff. This is really kind of laying the groundwork for that and more of a conceptual understanding of what can be done and what the results could be.

Geoff Brownell: So the project. Goals, then, are to identify mitigation solutions. Like, I just said that impact

Geoff Brownell: but the air is impacted by foot flows, but also by erosion. If that is the concern in the area. And we'll figure that out is part of our kind of initial phase of data collection and modeling and that sort of thing which we're in the admit, in the midst of right now and then formulating that that plan to mitigate flooding with

Geoff Brownell: cost-effect events infrastructure. And that's the important part here is that

Geoff Brownell: flooding is easy to fix, but if it's not buildable because of cost, constraints, or other constraints, and it's it's not, it's, you know, by in the sky right? And then ultimately reducing flood hazard for residents.

Geoff Brownell: we're gonna do that by using kind of the latest technology in hydrology and hydraulic modeling, and that is a gridded 2D approach. And so the study area, the the area within that red

Geoff Brownell: polygon that we looked at at first on the first map is we'll be gridded in a variable size grid. that each unique grid, as kind of shown here on this screen. As an example, we have a a unique in a flood, depth, velocity, water, surface elevation, that sort of thing. So

Geoff Brownell: we really kind of drill down and look at things as a very finite level. And

Geoff Brownell: what this means is that we can identify flood

Geoff Brownell: flood prone to areas almost at a well, not almost at a kind of an intersection or a street level lot level, and then be able that we have the ability to be able to mitigate those those flood

Geoff Brownell: problems? at that same level. And so it's. It's really a powerful tool.

Geoff Brownell: to be able to look at things in this kind of nature. And so these models can be revised and updated with future development or development plans, and use. For, you know, design and planning, development and infrastructure, whether that's by the county or by private entities. So in users would be the county engineers hired by developers, or even homeowners.

Geoff Brownell: In in some cases.

Geoff Brownell: so here's what the results look like initially. And again, these are initial results a lot of this is this is kind of the same modeling that was used for the letter and app provision study. We just

Geoff Brownell: added onto it for some areas that weren't included. but a lot of it is just building on that that effort.

Geoff Brownell: so this is kind of zoomed out for the whole project area that we're looking at. And like, I said, for the modeling, the detailed modeling portion, we're not really extending above a highway 50,

Geoff Brownell: even though the watershed contributes to that area or the the wash that includes that area right? so that said we have. We've kind of developed a more

Geoff Brownell: kind of like

Geoff Brownell: coarser approach

Geoff Brownell: to defining the inflows into this area. And then we take a really detailed look at what the flood conditions are for this area.

Geoff Brownell: and I know I'm talking to stakeholders today. And so if your area of interest is outside of this red polygon here, there's something we should know, and it's something we should understand on what you know. Your main concerns are for your land holdings or your your Whatever your responsibilities are, because we may have the ability to kind of

Geoff Brownell: take those areas and and help you better define your flood hazards specifically as they impact your properties

Geoff Brownell: on the next. Few maps are really just kind of

Geoff Brownell: zoomed in versions of what I just showed on screen.

Geoff Brownell: so you know, we can always circle back on these up, for there's a specific area But the intent is really for the public tonight, hopefully to come out. Take a look at these maps and kind of figure out where their properties are. And say, Yeah.

Geoff Brownell: I've experienced this type of flooding. I know I've never seen a flood. And and just to kind of understand what reality is on the ground. because sometimes there's a disconnect between modeling and in reality, and we want our models to be as accurate as possible. And so that's really an important component to to these efforts is ground truth and things.

Geoff Brownell: But we do have to realize that these are 100 year events that we're modeling. At least, that's what we're showing here. and so

Geoff Brownell: this area

Geoff Brownell: you may not have experienced the kind the on the 100 year event

Geoff Brownell: to the scale that we're, you know, theoretically modeling here as well. So it's important to understand as well, and the airports impacted and I think that is definitely, one of the main areas of of concern is part of this study.

Geoff Brownell: So I'm just gonna page through the rest of these, and then

Geoff Brownell: kind of wrap up the presentation. We can

Geoff Brownell: like, I said, always circle back

Geoff Brownell: so just real quick on on how we identify hazards and risks, because the modeling is one thing that's just telling us, what potentially could happen, but identifying hazards and risks is a different proposition altogether.

Geoff Brownell: you know, house hazards and risks are in inherently associated with houses and buildings. but it also could be.

Geoff Brownell: you know, impacts on developed areas. with higher flood risk.

Geoff Brownell: It's interesting to note that 30% of all flood and transclaims happen outside of fema flood. map flow planes.

Geoff Brownell: And it's really a good practice for communities to in to encourage their residents to buy flood insurance, even if they're outside of Fema flow plans or special flood hazard areas. It is actually

Geoff Brownell: very

Geoff Brownell: cost, effective or inexpensive, I should say, affordable when you are not in a in a flood zone. And so it's a, it's kind of a good practice. for sure. Because, like I said, 30% happen outside of those areas.

Geoff Brownell: other areas that we look at as part of the store. These our road crossings. road crossings provide

Geoff Brownell: an opportunity for significant risk to our transportation systems. And they're they're usually weak points and flight conveyance because of the conveyance of those flood waters through bridges and culverts and that sort of thing.

Geoff Brownell: And then finally, erosion and sediment, deposition hazards, or another thing that we look at because those are things that

Geoff Brownell: that maintenance cruise, Kenny maintenance cruise and that sort of thing deal with on the daily basis, right? And so we can start to identify those locations as well as part of informing a more robust maintenance program. and that sort of thing and understanding kind of what maybe the annual sediment load is, or where areas need to be reinforced.

Geoff Brownell: We will develop solutions and recommendations out of this. And those solutions and recommendations can be a regional structural type. Solutions like shown here with a basin kind of a conceptual, 15% level plan basin. And those kind of solutions are for large areas and

Geoff Brownell: usually have a pretty good benefit to cost ratio, and something that may be applicable for a grand application to fema or other federal agencies. because they want to see benefit costs

Geoff Brownell: such that the project cost is less than the benefit, the the ultimate benefit. And so these types of regional structural solutions usually pencil out well, but they're also not always.

Geoff Brownell: An area doesn't always lend itself to having a a regional solution. So a lot of times there's local solutions that we can identify. And those local solutions are helpful for accounting cip or a city cip and that sort of thing. And they can program that in or even for maintenance programs.

Geoff Brownell: And then and then, even sometimes, we even like to look at things on on the individual property on our basis, and a lot of times that's for large lot, kind of development. And that sort of thing, or just what can property owners do on their own property to protect themselves from flooding that occurs locally.

Geoff Brownell: and that's what this slide here is. Kind of showing there's

Geoff Brownell: a number of handbooks, or just kind of details, and that sort of thing to help home learners do that and and just manage storm water better. And you know, as we go out and talk to the public and stakeholders.

Geoff Brownell: If that's something that

Geoff Brownell: there's a tangible benefit to, then that's something that could be a deliverable or an outcome of a study like this.

Geoff Brownell: So our next steps are to finish the hydrology and hydrologic modeling. we're pretty close to having that done for existing conditions.

Geoff Brownell: And then from there we're gonna start to work on developing those implementable conceptual solutions. and a lot of that is listening to stakeholders.

Geoff Brownell: and in residence on what you know they want to see in the ground.

Geoff Brownell: We'll then present those 2 stakeholders. And when I say, stakeholders in this case, that's more the broader overall overarching

Geoff Brownell: public and and kind of landholding type stakeholders right? And then finalize all of that. And the design concept report, and ultimately present this to the the various boards so line County Board, supervisors or Sorry County Commissioners, and the cwsd board. I

Geoff Brownell: I think line counties would look for board approval. Or maybe it's just an informational item. I I don't know. That's up to the line county folks, but

Geoff Brownell: The study will at least be presented to them.

Geoff Brownell: So from a schedule standpoint. here we are. May 20 third

Geoff Brownell: doing our initial public meeting and and stakeholder outreach. also list of public input tonight. Hopefully get some good good stuff.

Geoff Brownell: then I

Geoff Brownell: I would anticipate that. Follow up public meeting. will be in the the winter timeframe of this later this year.

Geoff Brownell: with finalization of the project and and presentation to the boards in spring of 2,024. So a little bit less than a year from now, we should be wrapped up.

Geoff Brownell: and I think that's it for the presentation one more slide.

Geoff Brownell: and that is you know what can happen with board approval. And that's you know, that's kind of the next phase is

Geoff Brownell: the ability to develop grant applications to Fema or other Federal Federal agencies.

Geoff Brownell: for, you know, funding construction projects or informing a cip. I mean, there's a lot of different directions. This can go. You can go into a Dcr phase, the design concept report phase for individual projects where you really start to look at, you know, cost and and progressing the design further, it really just kind of depends on what comes out of the study. And so those are some of the potential next phases.

Geoff Brownell: tonight. Then I will present contact information for folks to follow up including myself and Lewis, and let me know if if this is, you know, acceptable to you, if not, I can certainly describe it from here and field everything through me. But That's what I was intending.

Geoff Brownell: and then that is it for the presentation. And then from there we'll just query questions.

Geoff Brownell: And so for now we can do the same thing. we can

Geoff Brownell: open this up to questions for this group and any other questions that are in the chat, and kind of, you know. Open this up for discussion.

Louis Cariola: Well, I I can start quick. thanks, Jeff. one. I I'm happy to have my name

Louis Cariola: offered for the public to contact. And then I just had one question. I know you're you're building upon the Ramsey Canyon Lamar studies.

Louis Cariola: and I'm wondering if

Louis Cariola: the the further exploration through your modeling has the potential

Louis Cariola: to change the delineation of the floodway

Louis Carola: through the Ramsey Canyon, and and I ask, because, you know, we, we get a lot of phone calls in community development

Louis Carola: from property owners and potential investors who are looking at those properties. And they're on many of the properties. And you know it's it's a it's a grid

Louis Carola: subdivision, and the lots are on the order of a third of an acre. So if the delineation of the floodway moved, you know, 20 feet, in some cases 30 feet, it could make a difference between whether or not someone has a capability of rebuilding in the same location. and and certainly impacts their their construction standards. So I'm just, I'm anticipating that as a question, and I'm asking it now, the stakeholders meeting, so that if it comes up in the public

Louis Carola: you know, we're we're ready to answer.

Geoff Brownell: sure. And that's a is a good question. I don't think there's much potential that this study will change what's been delineated as part of the Ramsi Canyon letter map revision to Fema. And the main reason is that we're really not doing much new modeling as part of this. We're adding on a little bit that impacts

Geoff Brownell: some different parts of Silver Springs, but not the part that has the Fema flood plane. For the most part we're taking what the previous consultant did, and going to use that to define blood hazards a little bit differently. but but more so. start to develop those

Geoff Brownell: mitigation solutions. Now that, said one of the main

Geoff Brownell: goals of this project is to come up with mitigation solutions that would reduce the flood plane and floodways in those areas. And so

Geoff Brownell: now, that doesn't get relief for folks that gives at least a a roadmap on how that relief can occur.

Louis Carola: Okay, thank you.

Geoff Brownell: I I am did not mean to end the presentation, because I think you all are probably just staring at a blank screen right now. Black a black screen. Right?

Geoff Brownell: but some reason I can't get it to go back up.

Ed James: So, Jeff, I have a couple of things I want to bring up. First of all.

Ed James: You know, when we start looking in the study, the study area should be the entire one area, not just focusing on Solar Springs, because there may be things

Ed James: east of Highway 50 along 150 up Ramsey Canyon, that we may want to have some projects put in that would help reduce flooding downstream.

Ed James: but also in the area. So hopefully, as we look at this, we're looking at the entire area.

Ed James: I'm looking at where we may want to put different

Ed James: you know, facilities if they're possible. Sure

Ed James: to get back to Lewis's question. Yeah, this does not change it on regulatory product. And so it will not change what's going forward. The FEMA on the current flip maps and the Walmart.

Ed James: however, if we do identify projects and they are constructed in the future it may justify at that point doing another low mark that would then reduce the flood plan. At that time.

Ed James: Also, there may be some small tributaries that we want to look into that may not just be coming off rams, you know, like on the east part of highway 50. There may be something that goes in there that would help mitigate some of the flooding in that area

Ed James: besides, a hundred year. Have you been working with Lynd county, and possibly maybe a

Ed James: 2025 24 years storm event. Because that's I know what we've done. Other places where there's a stormwater requirement to. Are you looking at those opportunities.

Geoff Brownell: we are definitely going to look at smaller storm events.

Geoff Brownell: we can discuss what's most appropriate. for the study.

Geoff Brownell: I wanted to go back to the overall map here.

Geoff Brownell: so you know, going circle, and it's going back to your first, your first comment. I guess.

Geoff Brownell: you know we. So the we will be defining flood, hazard air, flood hazards in the areas above Highway 50. It's just the way the the modeling approach that on the previous consol did for the letter map revision. used kind of lump some parameter modeling. So heck Hms, for this areas with inflows into the flood plain areas. And so we don't have that gridded

Geoff Brownell: result for those areas. so but we can, we can talk about it. And we can.

Geoff Brownell: once we start to understand, like what we really want to look at, we can, we can adapt to that and use that information appropriately. It's just

Geoff Brownell: coming up with a better understanding of the needs and what is going to be the most useful information for for everybody involved. And so that's part of the the

Geoff Brownell: goals of today. Right? Is understanding those those things

Ed James: right? Because

Ed James: mitigation may be outside the area you showed and maybe upstream on Ramsey Canyon, and maybe other places, too, so which would benefit the downstream users. Right? That's something to be aware of as we go forward.

Ed James: and I think, with the other question I brought forward, that really is a lion county question. whether it's storm events. They would like to have models basically on their. because sometimes we've gone through this.

Ed James: you can't go to a hundred year. It's just too expensive. It's never going to justify the cost. But there may be things you can do at a lower level that would help maintenance and keep roads open, and other things too. So it's good to have a couple of different options to look into because of the costs

Ed James: issues.

Yeah?

Geoff Brownell: And and we can certainly, if we don't have an answer for that today, we can certainly answer that question as we proceed and start to figure things out. And and as long as we're

Geoff Brownell: all involved in that process and and

Geoff Brownell: that sort of thing. Then.

Geoff Brownell: yeah.

Geoff Brownell: Sorry.

Louis Carliola: Yeah, Jeff, this is Lewis. We can chat about it at tonight's meeting. I think that's a great suggestion by end.

Geoff Brownell: Okay.

Geoff Brownell: I was just trying to open up into yeah. So for the scope of work

Geoff Brownell: we're sc to to look at 10 year 25 year and 100 years. So that's a pretty good range. so we can talk beyond that. But yeah, we'll be looking at 1025 and 100 anyways.

Geoff Brownell: All right. What else

Geoff Brownell: Bennett or Jordan? Is there anything in the chat that we need to address?

Bennett Johnson: And it looks like Toronto? Asked Is Fema the ultimate funding agency.

Geoff Brownell: So yes, Fema is the ultimate funding agency for this study. In that Fema has a program called the Ctp Program, or cooperating technical partner program. And Carson water subconservancy district is a cooperating technical partner. So, and it may want to expand on this more. But Ed, this cwsd,

Geoff Brownell: proposes projects to Fema as part of that program for various types of flood, hazard mitigation. And then Fema figures out what they can fund each year and funds those projects. But they're they're minister through Cwsd, and usually have a technical partner like Lion County or anyone else within cs, our Csds kind of.

Geoff Brownell: you know, purview right? So the Carson River watershed and surrounding counties now and then. So fema's only role after that is to provide sometimes provide technical review. that sort of thing. or or just to kind of

Geoff Brownell: be the you know. the agency in charge kind of thing.

Ed James: I think it follow up on that. I think the question is also the next phase. After this is done. Fema has funding. If you meet with a call benefit cost analysis that's greater than one.

Ed James: So the benefits of doing the project have to offset the cost of doing the project.

Ed James: Fema has their own rules, how? What? They consider a benefit.

Ed James: So that's something that we will be working with Kimberly Horn. On developing those areas.

Ed James: there are other funding sources. The Lion County could develop a funding source if they think it's appropriate

Ed James: Carson City has a flood storm program. There may be other things out there.

Ed James: It really depends on the outcome of this and the cost.

Ed James: We find that a lot of these projects may not

Ed James: meet the fema requirements like on the Dayton area. A lot of those fixes are more expensive than the damage that they would cause on their famous calculations. And that's because the area has been fully developed.

Ed James: and there's no way to really mitigate it without some very expensive projects.

Ed James: So this may or may not come out that way. There are some things we may look into that may reduce the flooding or hazards, and those are things that we'll identify in this nice thing. Is this not a regulatory product?

Ed James: It really is a tool that the county can look at, and as over the years they can do things that they

Ed James: reduce flooding risk.

Ed James: but also the same time not enhance it. Sometimes without the study, you may find an area being developed that will actually accelerate the flooding problems. So that's kind of the goal of this is to give the county a tool, and they can look forward to the future.

Corrado DeGasperis: Hmm.

yeah, this is cloud. I would just add.

Corrado DeGasperis: And you think about

Corrado DeGasperis: and think about  
of this one

Corrado DeGasperis: for  
my.

Corrado DeGasperis: you are a little hard to hear. I don't know if anyone else aside the problem.

the mother

this

about.

Corrado DeGasperis: If we could interrupt Corrado on that

Scott Keller: we can't understand it.

Ed James: Yeah, we can't hear you.

Can you tell me better now?

Ed James: Yeah, yes.

no.

Geoff Brownell: Are you talking from a cave? He's going to use the chat. This is Zack. It looks like a lot of we use the chat.

Ed James: Okay?

Geoff Brownell: Well, he's typing that in. Is there any other chat items that we need to address?

Bennett Johnson: Jeff, I'm not seeing anything. So corridor. If you have a still have a question you can chat it in otherwise. I think that's

Bennett Johnson: looks like all we've got.

Geoff Brownell: Okay.

Ed James: I will bring it. One other thing to this is just strictly flood awareness and flood issues is that nothing you do with water supply.

Ed James: I know talk. So I just want people to understand that this will not do anything with water supply at all.

Geoff Brownell: Okay, it looks like we got crowds message in the chat, and it just says I was just gonna say that with the future development coming the benefits should be strong.

Geoff Brownell: yep, and that was it from him so. And and I think we agree with that for sure.

The

Bennett Johnson: it. It looks like the airport whoever is on that account just

Bennett Johnson: commented with being here an airport. Has anyone thought of faa grants for this? As well?

Geoff Brownell: not employ explicitly yet. But that is definitely. I think. I I refer to other Federal grant programs.

Geoff Brownell: and that would definitely be a good one to explore. there's EPA ones as well. F. Hwa ones. There's a lot of opportunities out there. And

Geoff Brownell: that's not necessarily a part of the study to explore those opportunities. But we may have the ability to list at least some potential opportunities. That that may, you know, constitute the next steps. So that's a definitely a good point.

Bennett Johnson: Okay, yeah, I'm I'm not seeing anything else. Jeff.

Geoff Brownell: All right. Well, let's give.

Geoff Brownell: Let's give folks

Geoff Brownell: a couple of more seconds here, and if there's nothing else. If no one raises their hand or comes off mute or types anything in the Q. A. Then we can

Geoff Brownell: we can adjourn, and you can get some time back in your day, and hopefully we'll see some folks tonight at the public meeting, and have a have a

Geoff Brownell: a good conversation then as well, and to understand some of the on the ground issues.

Ed James: Thank you, Jeff.

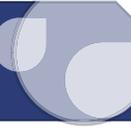
Geoff Brownell: All right, thanks everyone.

Scott Keller: Thank you, Jeff, and I can't wait for the night to see how that turns out.

Geoff Brownell: Hi, everyone have a good rest of your day.

Bennett Johnson: All right, thanks, Jeff.

Bennett Johnson: I will.





Project: **North Silver Springs**  
 Location **AOMI #1: Upstream Cascading Basins**

Level of Protection **100-year**

Designed by: **AKM** Date: **4/5/2023**  
 Checked by: **CTH** Date: **4/8/2023**

Item Description	Unit	Unit Price	Qty	Cost
<b>DESIGN</b>				
Design Concept Report	LS	\$ 150,000	1	\$ 150,000
Final Design	LS	\$ 600,000	1	\$ 600,000
<b>Design Sub-Total</b>				<b>\$ 750,000</b>
Contingency (10%)				\$ 75,000
<b>Design Total</b>				<b>\$ 825,000</b>
<b>PERMITTING</b>				
FEMA	LS	\$ 80,000	1	\$ 80,000
Environmental	LS	\$ 80,000	1	\$ 80,000
<b>Permitting Sub-Total</b>				<b>\$ 160,000</b>
Contingency (20%)				\$ 32,000
<b>Permitting Total</b>				<b>\$ 192,000</b>
<b>CONSTRUCTION</b>				
Miscellaneous Removals	LS	\$ 150,000	1	\$ 150,000
Clear and Grub	AC	\$ 17,000	82	\$ 1,394,000
Basin Earthwork	CY	\$ 15.0	1,106,000	\$ 16,590,000
Riprap	SF	\$ 5	45,000	\$ 225,000
Concrete Spillway	CY	\$ 1,100	335	\$ 369,000
12" Outfall Pipe	LF	\$ 85	700	\$ 60,000
Maintenance Road and Grading	SF	\$ 2	40,550	\$ 82,000
Landscape Seeding and Revegetation	SF	\$ 0.5	3,600,000	\$ 1,800,000
<b>Construction Sub-Total</b>				<b>\$ 20,670,000</b>
Miscellaneous Construction Costs (30%) <sup>1</sup>				\$ 6,201,000
Contingency (20%)				\$ 4,134,000
<b>Construction Total</b>				<b>\$ 31,005,000</b>
<b>LAND</b>				
To be determined by appraisal				
<b>TOTAL PROJECT COST</b>				<b>\$ 32,022,000</b>

(1) Includes Mobilization, Traffic Control, Construction Staking, Quality Control, SWPPP, and Construction Management

\* Cost does not include acquisition



Project: **North Silver Springs**

Location **AOMI #2: Elm Street Basin**

Level of Protection **100-year**

Designed by: **AKM**

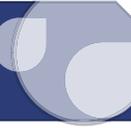
Date: **4/5/2024**

Checked by: **CTH**

Date: **4/8/2024**

Item Description	Unit	Unit Price	Qty	Cost
<b>DESIGN</b>				
Design Concept Report	LS	\$ 100,000	1	\$ 100,000
Final Design	LS	\$ 300,000	1	\$ 300,000
<b>Design Sub-Total</b>				\$ 400,000
Contingency (10%)				\$ 40,000
<b>Design Total</b>				\$ <b>440,000</b>
<b>PERMITTING</b>				
Environmental	LS	\$ 80,000	1	\$ 80,000
FEEMA	LS	\$ 80,000	1	\$ 80,000
<b>Permitting Sub-Total</b>				\$ 80,000
Contingency (20%)				\$ 16,000
<b>Permitting Total</b>				\$ <b>96,000</b>
<b>CONSTRUCTION</b>				
Miscellaneous Removals	LS	\$ 75,000	1	\$ 75,000
Concrete Outfall	LS	\$ 11,000	1	\$ 11,000
Clear and Grub	AC	\$ 17,000	42	\$ 714,000
Basin Earthwork	CY	\$ 15	750,500	\$ 11,258,000
Utility Coordination	LS	\$ 75,000	1	\$ 75,000
24" Outfall Pipe	LF	\$ 100	3,140	\$ 314,000
Riprap	SF	\$ 5	1,000	\$ 5,000
Landscape Seeding and Revegetation	SF	\$ 0.5	1,830,000	\$ 915,000
<b>Construction Sub-Total</b>				\$ 13,367,000
Miscellaneous Construction Costs (30%) <sup>1</sup>				\$ 4,010,000
Contingency (20%)				\$ 2,673,000
<b>Construction Total</b>				\$ <b>20,050,000</b>
<b>TOTAL PROJECT COST</b>				\$ <b>20,586,000</b>

(1) Includes Mobilization, Traffic Control, Construction Staking, Quality Control, SWPPP, and Construction Management





FEMA

# Benefit-Cost Calculator

V.6.0 (Build 20240510.2248 | Release Notes)

## Benefit-Cost Analysis

Project Name: North Silver Springs Proposed Basins



Map Marker	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)
1	Drainage Improvement @ 39.4111840; -119.2247470		DFA - Riverine Flood	3.1	\$ 56,365,054	\$ 54,057,520	1.04
<b>TOTAL (SELECTED)</b>					<b>\$ 56,365,054</b>	<b>\$ 54,057,520</b>	<b>1.04</b>
<b>TOTAL</b>					<b>\$ 56,365,054</b>	<b>\$ 54,057,520</b>	<b>1.04</b>

Property Configuration

Property Title: Drainage Improvement @ 39.4111840; -119.2247470  
Property Location: 89429, Lyon, Nevada  
Property Coordinates: 39.411184, -119.224747  
Hazard Type: Riverine Flood  
Mitigation Action Type: Drainage Improvement  
Property Type: Residential Building  
Analysis Method Type: Professional Expected Damages

Cost Estimation

Drainage Improvement @ 39.4111840; -119.2247470  
Discount Rate (%): 3.1% Use Default: Yes  
Project Useful Life (years): 75  
Project Cost: \$52,608,000  
Number of Maintenance Years: 75 Use Default: Yes  
Annual Maintenance Cost: \$50,000

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 39.4111840; -119.2247470  
Year of Analysis was Conducted: 2024  
Year Property was Built: 2024  
Analysis Duration: 75 Use Default: No

Professional Expected Damages Before Mitigation

Drainage Improvement @ 39.4111840; -119.2247470

Recurrence Interval (years)	OTHER Damages (\$)			OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL Damages (\$)
	Category 1 (\$)	Category 2 (\$)	Category 3 (\$)	Number of Volunteers	Number of Days				
100	5,970,748	0	0	0	0			5,970,748	

Annualized Damages Before Mitigation

Drainage Improvement @ 39.4111840; -119.2247470

Annualized Recurrence Interval (years)	Damages and Losses (\$)	Annualized Damages and Losses (\$)
100	5,970,748	59,707
	Sum Damages and Losses (\$)	Sum Annualized Damages and Losses (\$)
	5,970,748	59,707

Professional Expected Damages After Mitigation  
 Drainage Improvement @ 39,4111840; -119,2247470

Recurrence Interval (years)	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
	Damages (\$)	Category 1 (\$)	Category 2 (\$)	Category 3 (\$)	Number of Volunteers	Number of Days	Damages (\$)
100	1,349,875	0	0	0	0	0	1,349,875

Annualized Damages After Mitigation  
 Drainage Improvement @ 39,4111840; -119,2247470

Annualized Recurrence Interval (years)	Damages and Losses (\$)			Annualized Damages and Losses (\$)	
100	1,349,875			13,499	
		Sum Damages and Losses (\$)			Sum Annualized Damages and Losses (\$)
		1,349,875		13,499	

Standard Benefits - Ecosystem Services  
 Drainage Improvement @ 39,4111840; -119,2247470

**Total Project Area (acres):** 124

**Percentage of Urban Green Open Space:** 33.80%

**Percentage of Rural Green Open Space:** 66.20%

**Percentage of Riparian:** 0.00%

**Percentage of Coastal Wetlands:** 0.00%

**Percentage of Inland Wetlands:** 0.00%

**Percentage of Forests:** 0.00%

**Percentage of Coral Reefs:** 0.00%

**Percentage of Shellfish Reefs:** 0.00%

**Percentage of Beaches and Dunes:** 0.00%

**Expected Annual Ecosystem Services Benefits:** \$1,524,114

Additional Benefits - Social  
 Drainage Improvement @ 39,4111840; -119,2247470

**Number of Workers:** 586

**Expected Annual Social Benefits:** \$10,840,802

**Benefits-Costs Summary**

Drainage Improvement @ 39,4111840; -119,2247470

**Discount Rate (%):** 3.1% Use Default:Yes

**Total Standard Mitigation Benefits:** \$45,524,252

**Total Social Benefits:** \$10,840,802

**Total Mitigation Project Benefits:** \$56,365,054

**Total Mitigation Project Cost:** \$54,057,520

**Benefit Cost Ratio - Standard:** 0.84

**Benefit Cost Ratio - Standard + Social:** 1.04