Virginia City/6 Mile Canyon Area Drainage Master Plan

August 16, 2023

CARSON WATER SUBCONSERVANCY DISTRICT

STOREY COUNTY NEVADA

U.S. DEPARTMENT OF HOMELAND SECURITY

FEMA

LUMOS & ASSOCIATES

JE FULLER

Project Purpose

- **Planning-level study of flooding hazards within the watershed**
- **Goals**
  - Develop a comprehensive understanding of the drainage existing conditions
  - Develop alternative mitigation solutions

Virginia City/6 Mile Canyon ADMP
Study Area: Unique Characteristics

Steep Topography

Historic Community

Minimal Storm Drain Infrastructure

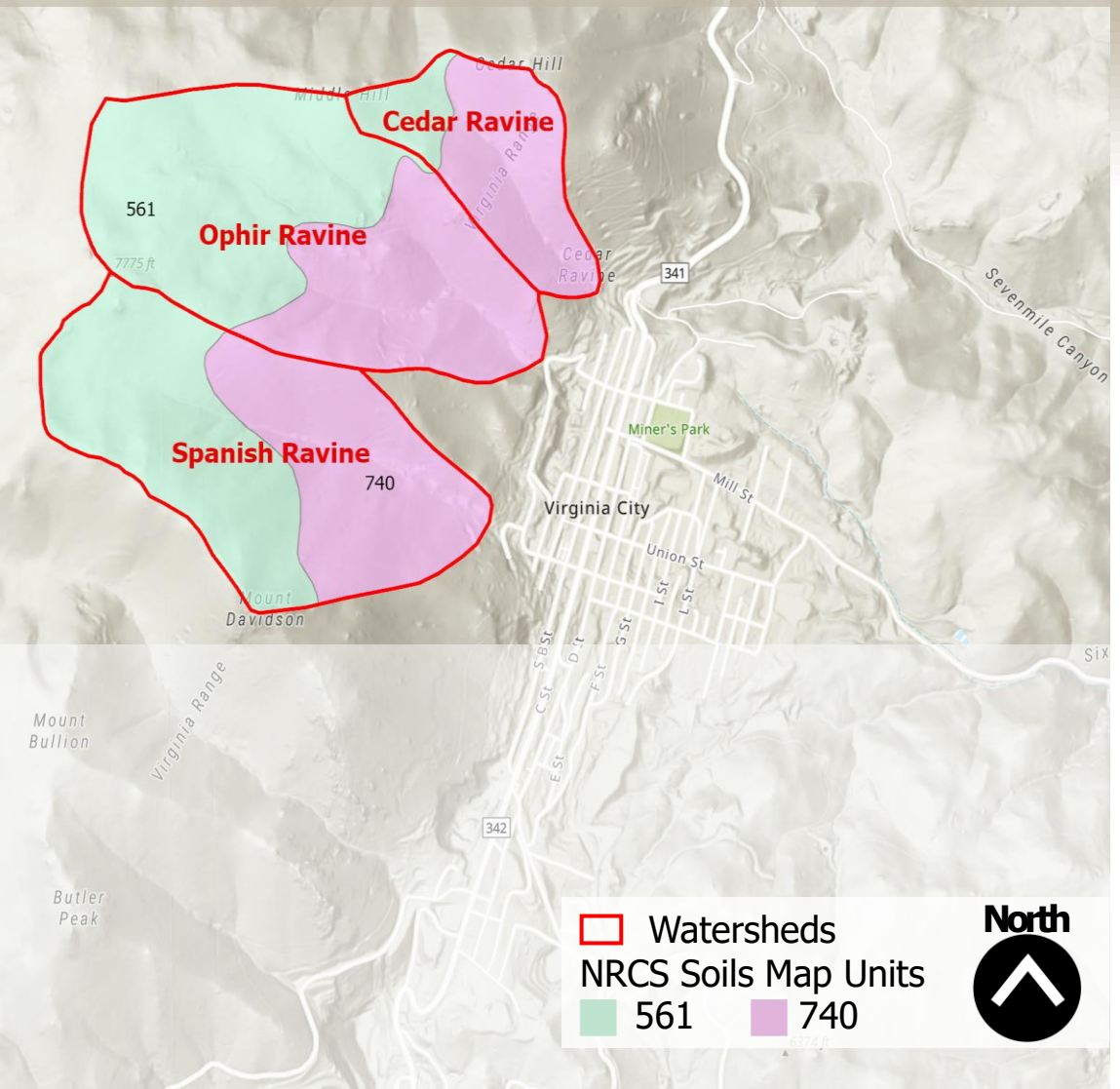
Sedimentation

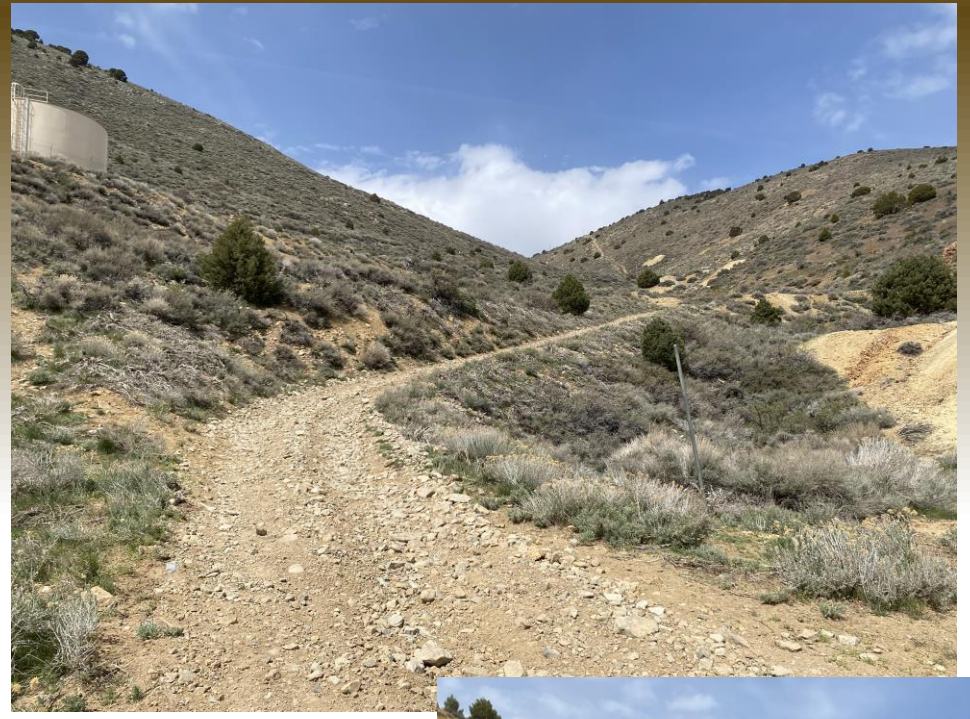
Erosion

Virginia City/6 Mile Canyon ADMP Study Area

Virginia City/6 Mile Canyon

Three Main Sub-watersheds

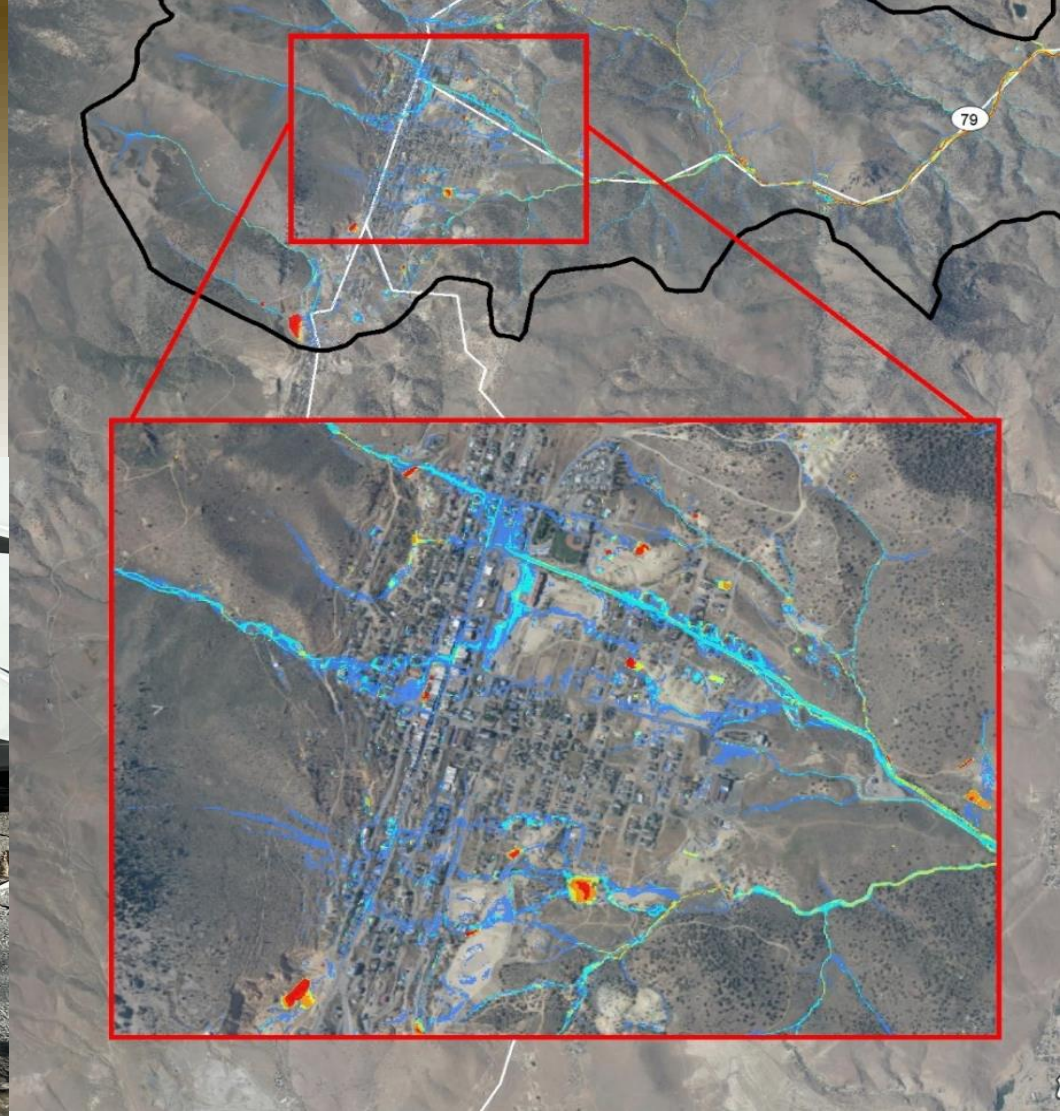




Virginia City/6 Mile Canyon ADMP Existing Conditions

In Town

- Flow depths are typically less than 1 ft
- Velocities are typically high



Existing Conditions

Minimal Storm Drain Infrastructure

- AC Berms/Curb and Gutter
- Short Sections of Storm Drain Pipes with Inlets
- Old Paved Swales
- Newer Rock Lined Channels/Shoulders

Existing Conditions

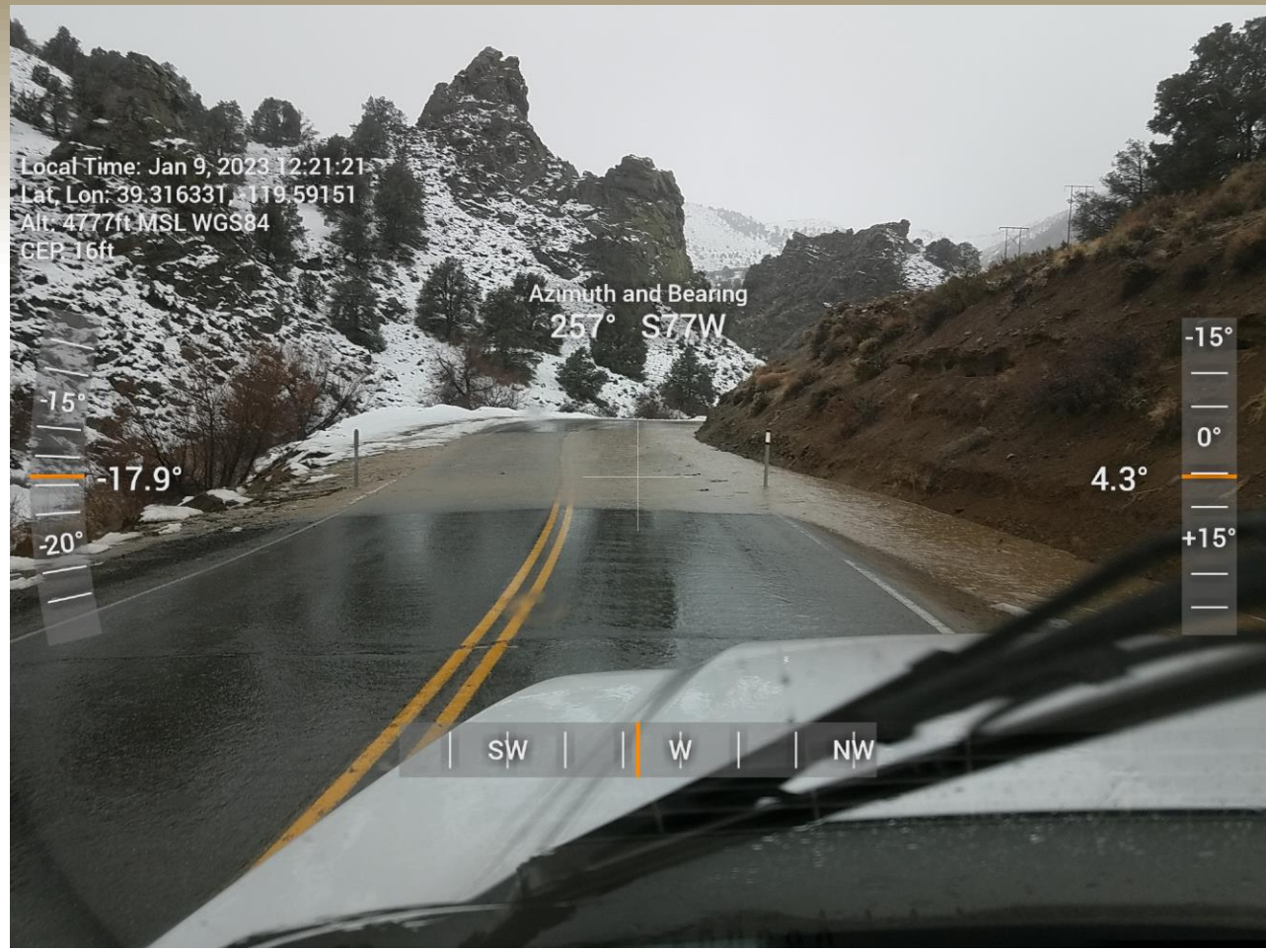
Existing Conditions

Existing Conditions

6-Mile Canyon

- Varying size/aged culverts
- Lined and unlined roadside channels
- Minimal shoulder area for channel construction

Existing Conditions

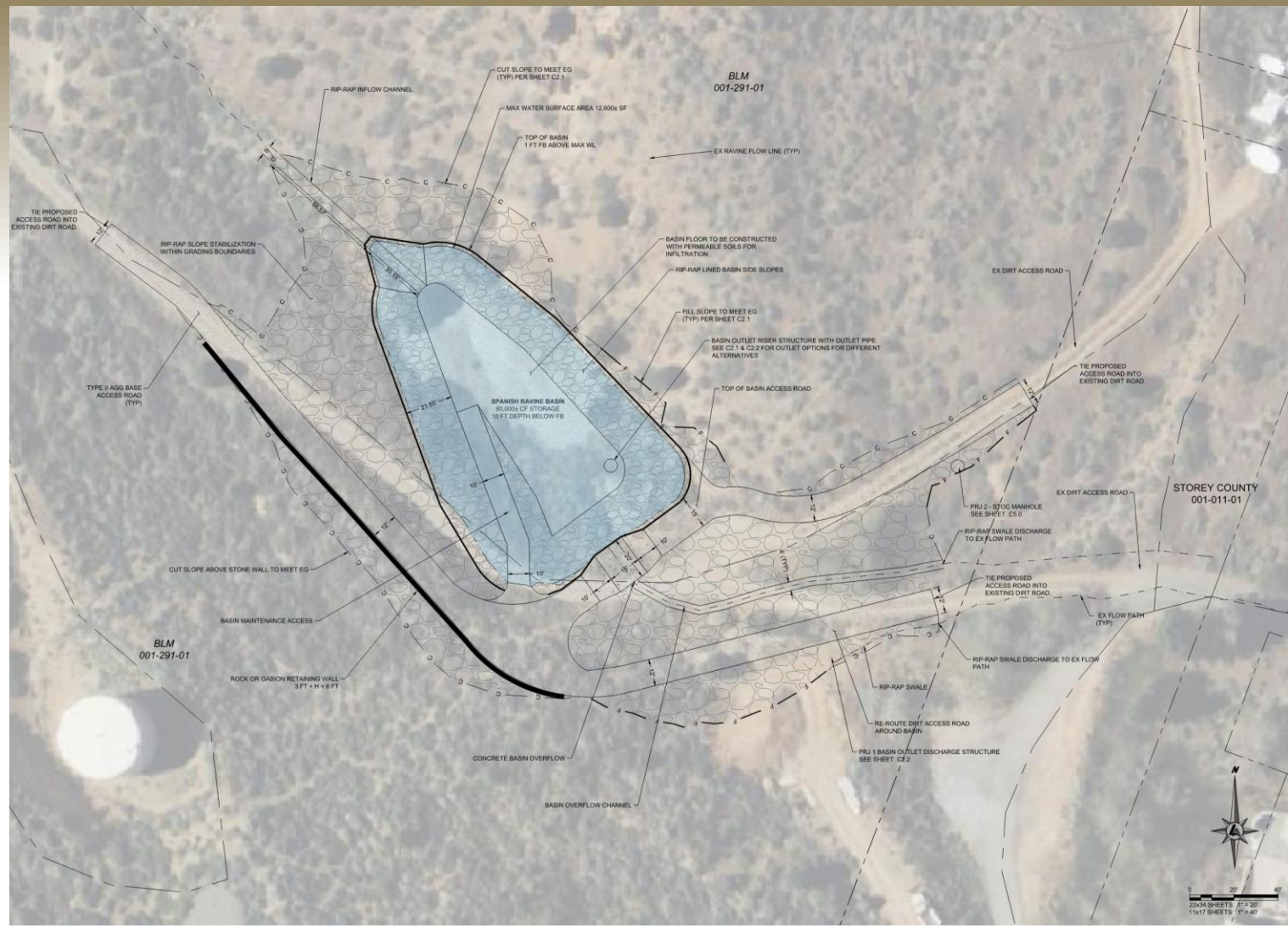


Existing Conditions

Virginia City/6 Mile Canyon ADMP Mitigation Alternatives

Alternatives Formulation

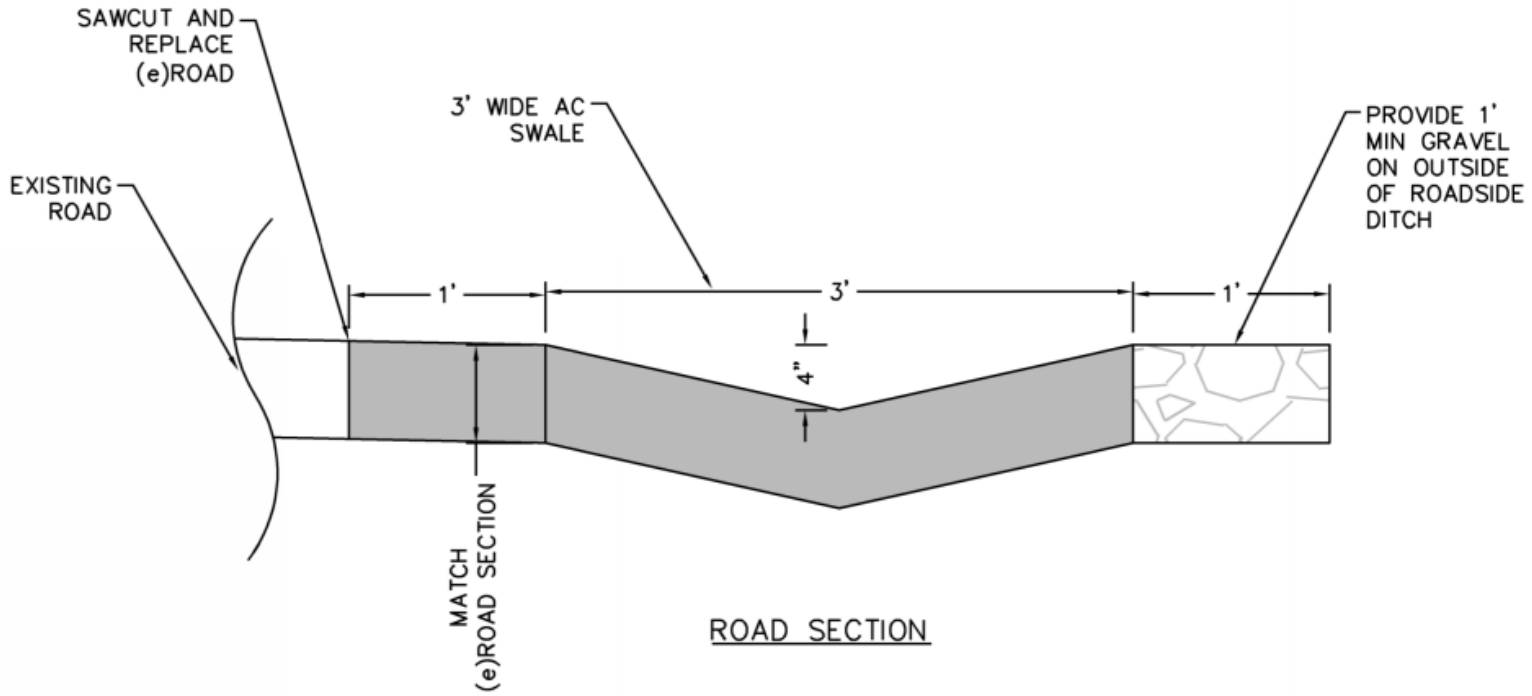
- Mitigation for the 25-year storm
- Mitigation for Sediment
- Conceptual Design Plans for Storm Drainage Improvements
  - Localized Flood Control Measures
  - Watershed/Sub-Watershed Level Flood Control Measures
- Management/Maintenance Recommendations



Virginia City/6 Mile Canyon ADMP
Localized Flood Control Measures

Virginia City Flood Control

- **Measures to reduce surface flows in streets**
  - **Shallow paved roadside shoulder swales**
  - **Broad valley gutters**
  - **Stabilizing discharge points of existing outlets**
- **Recommendations to reduce runoff from private driveways**

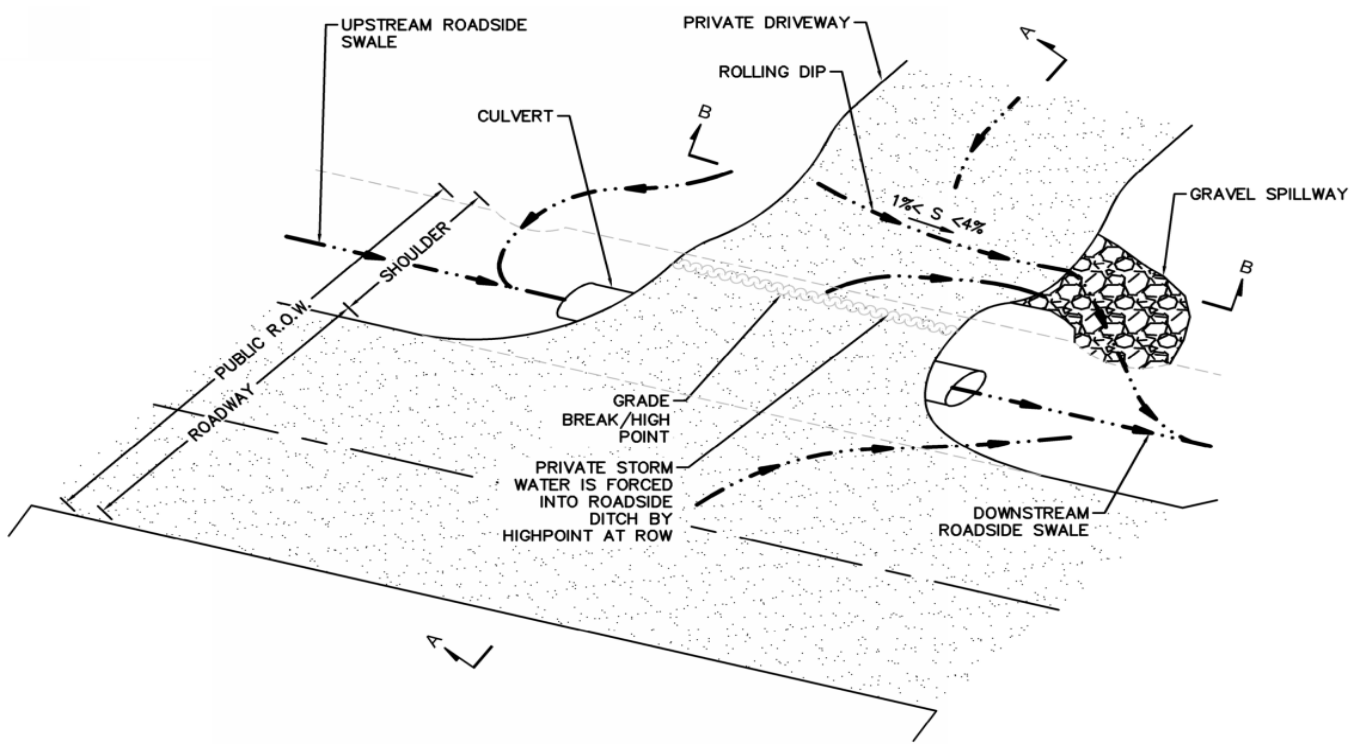


Virginia City/6 Mile Canyon ADMP
Localized Flood Control Measures

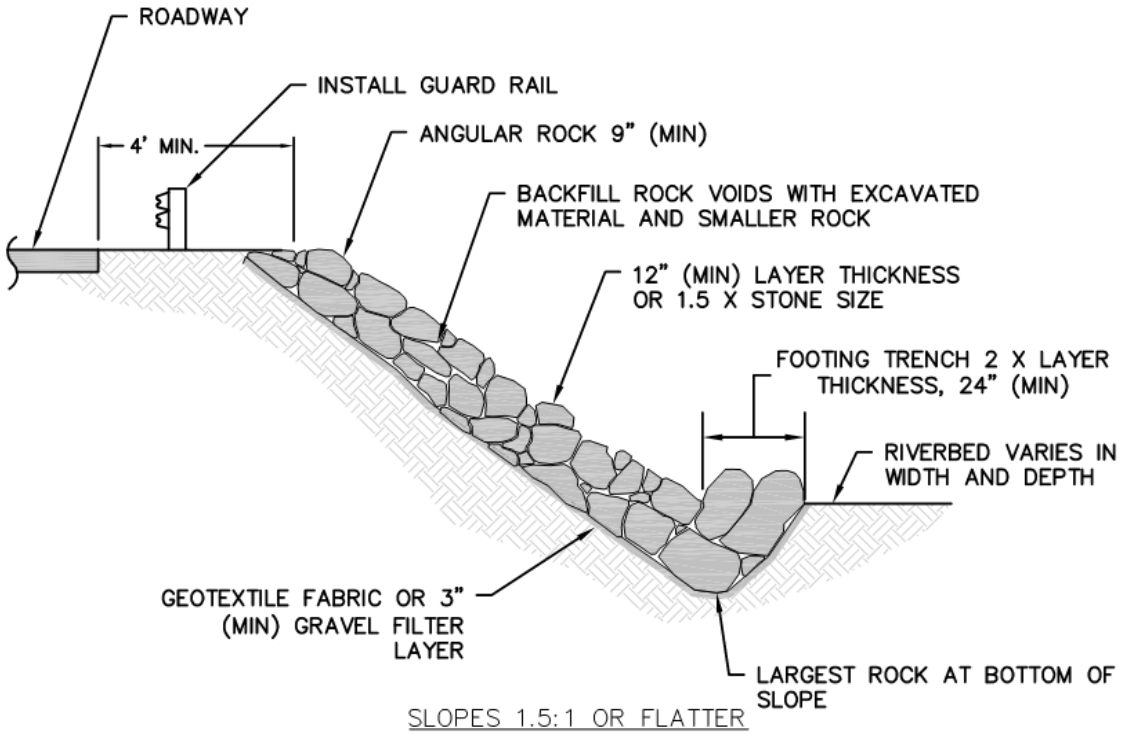
6 Mile Canyon Flood Control

- **Culvert Improvements**
  - Additional culverts at low points in roadside channels
  - Installation of headwalls
  - Stabilize inlets and outlets
  - Maintain ex. roadside channels and construct new ones where road shoulders allow
- **Access road/driveway connections improvements**
- **Roadway slope protection**

Virginia City/6 Mile Canyon ADMP
Localized Flood Control Measures



Virginia City/6 Mile Canyon ADMP
Localized Flood Control Measures



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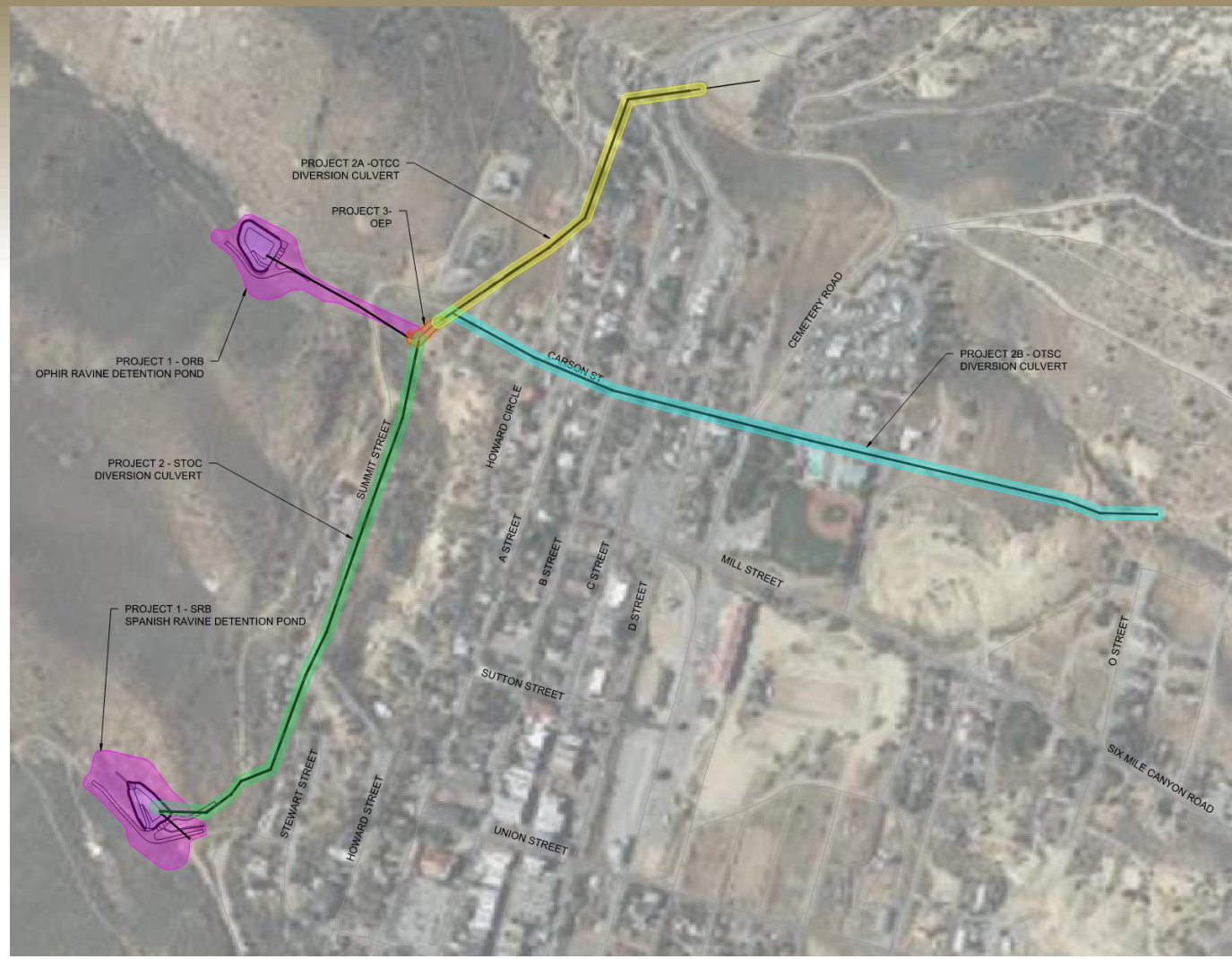
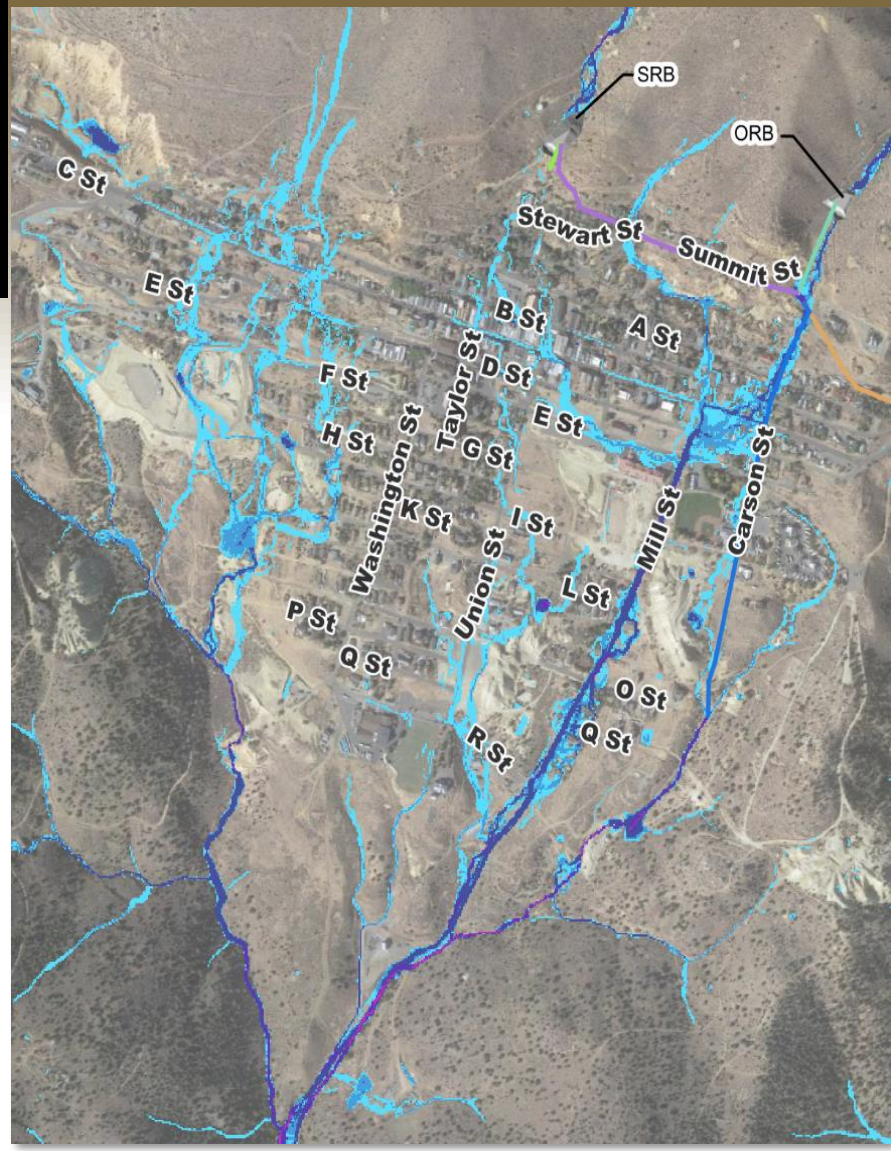
Virginia City/6 Mile Canyon ADMP
Proposed Flood Mitigation Concept Projects

- **Based on the project modeling that shows Virginia City flooding primarily comes from Spanish Ravine and Ophir Ravine**
- **Mitigation projects include:**
  - **Spanish Ravine Detention Basin**
  - **Ophir Ravine Detention Basin**
  - **Diversion Culvert Between the Two Basins**
  - **Two Options of New Storm Drain Piping from Ophir Basin**



Existing Conditions 25-yr Peak Flows

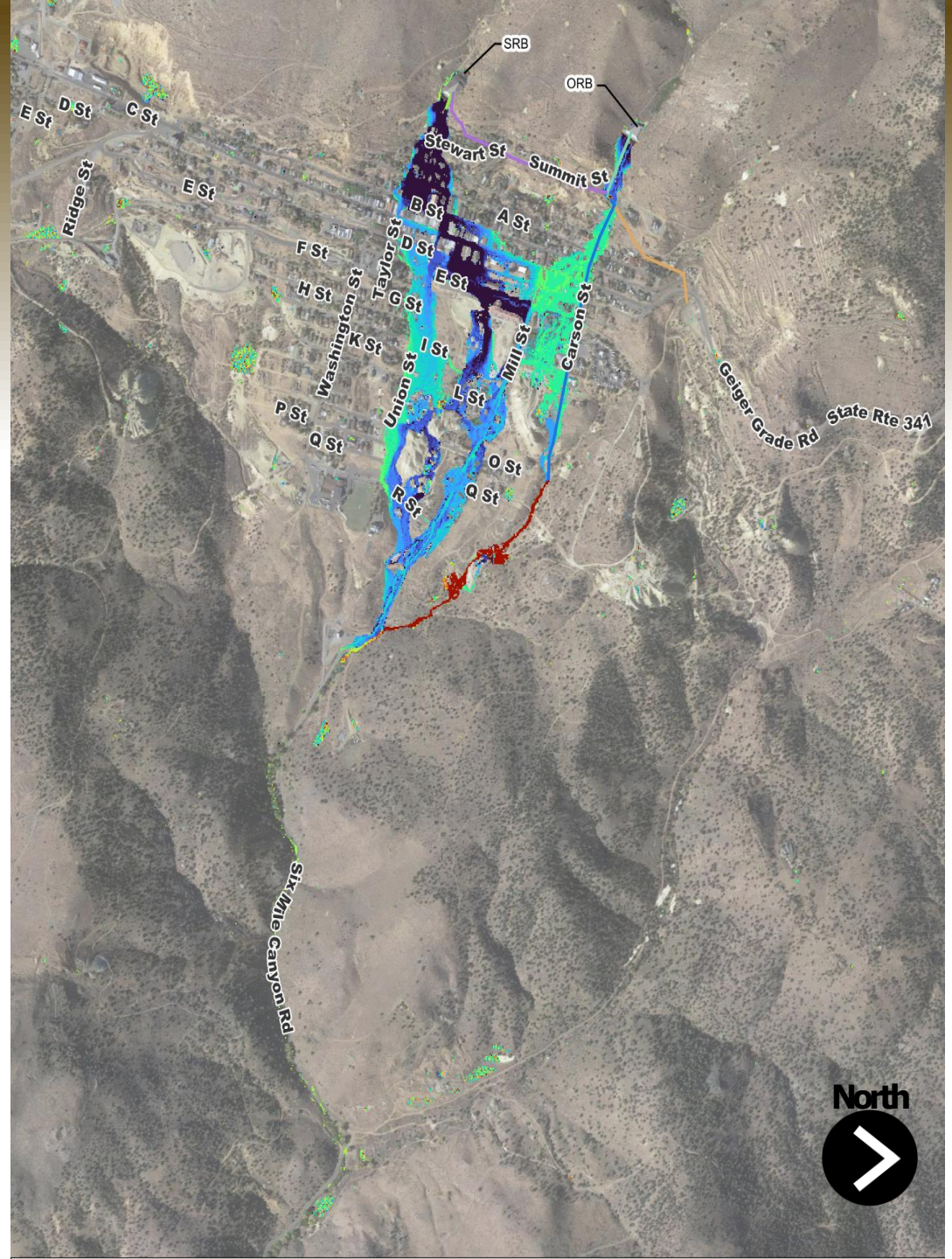
Concept 2b (SRB, ORB and Connecting Pipes) **25-yr Peak Flows**



Concept 2b
(SRB, ORB and Connecting Pipes)
25-yr Flow Reductions/Increases

*Positive Values Represent Percent Decrease, Negative Values Represent Percent Increase

Flow Reduction						
<= -90%	-70% - -60%	-60% - -50%	-50% - -40%	-40% - -30%	-30% - -20%	-20% - -10%
-10% - -5%	-5% - 5%	5% - 10%	10% - 20%	20%- 30%	30% - 40%	40% - 50%
50% - 60%	60% - 70%	70% - 80%	80% - 90%	> 90%		



Virginia City/6 Mile Canyon ADMP
Proposed Flood Mitigation Concept Projects

Project	Construction Costs	Non-Construction Costs	Total
SRB	$1,153,000	$230,600	$1,383,600
ORB	$1,158,000	$231,600	$1,389,600
STOC	$1,335,000	$267,000	$1,602,000
OTCC	$884,000	$176,800	$1,060,800
OTSC	$1,451,000	$290,200	$1,741,200
OEP	$37,000	$7,400	$44,400
SMC	$138,000	$27,600	$165,600

Project Status

Public Meeting #1

Jun **21** 2022

Draft Report to CWSD & Storey County

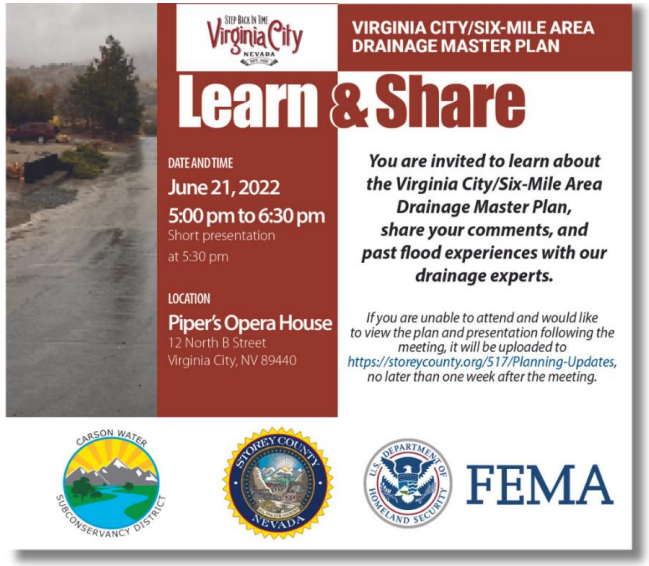
Aug **4** 2023

Final Report

Sep 2023

Scheduled Public Meeting #2

Oct **12** 2023



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Questions

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