



Update to the SVGMD Board

Draft Reports: Irrigation Efficiency & Surface Water Management and Aquifer Recharge

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Irrigation Efficiency and LEPA Demonstration Program

- In 2021 and 2022, approximately **50 center pivots** were in operation, and an **estimated 20 wheel line** systems.
- **5,000 acres under groundwater irrigation as a sole source of water.**
- **3,400 acres under a combined groundwater and surface water irrigation.**
- Groundwater pumping for irrigation over the past two decades has averaged about **8,500 acre-feet per year**, but has varied between approximately 5,000 to 14,000 acre-feet per year, depending on wetness of the water-year, and availability of surface water.
- Modeling indicates **sustainable yield at approximately 6,000 to 7,000 AFA.**
- Modeling indicates **25-35% long-term pumping reduction** will be needed over the next 20 years.
- Recommend targeting **15-20% irrigation efficiency improvement**, by converting MESA to LEPA, along with implementing other irrigation efficiency improvements.
- A goal for Sierra Valley of achieving a 20% irrigation efficiency improvement for ~90% of the groundwater irrigated fields is estimated would save approximately **1,500 AFA** as a long-term average.

Convert MESA to LEPA and LESA

Center-pivot strategy for irrigation efficiency improvement and water use reduction

Approach being implemented in other *similar agricultural* areas (alfalfa crop, high-elevation basins):
Dixie Valley, Fish Lake Valley, NV

Being tested and encouraged or implemented in other western states: ID, WA, OR, UT, NM

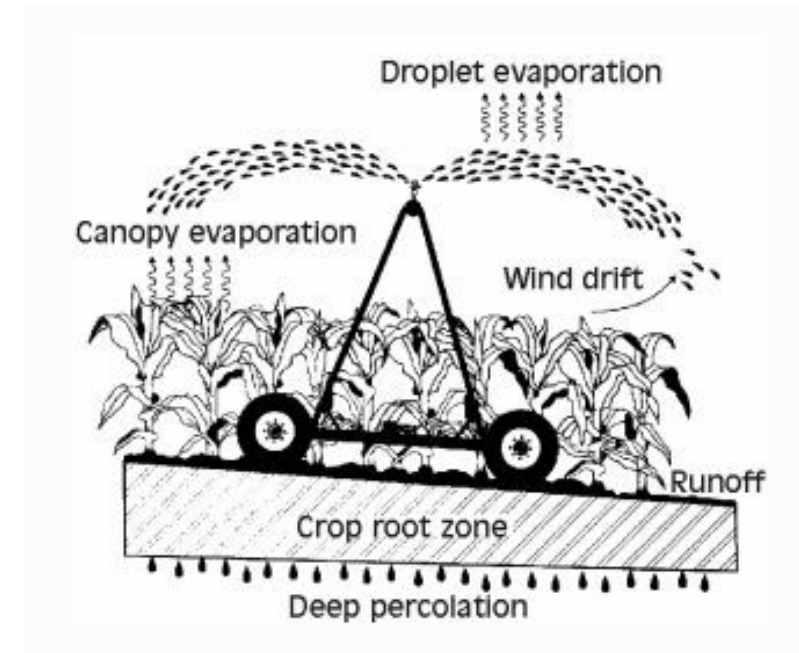
Additional Demonstration Testing for other makes and models of LEPA and LESA, more extensive use of soils moisture gages, VDFs, and soil moisture retention techniques recommended, subject to additional implementation funding.



Other Irrigation Efficiency Improvement Areas

Other notable areas to focus for further irrigation efficiency improvements include:

- **Soil moisture monitoring** to adjust water application to better match crop water demands,
- **VFD pump control** implementation to minimize over-watering in the spring when the water table is higher,
- **Convert wheel lines** to linear or center pivot systems,
- **Minimize groundwater conveyance losses**, by fixing pipe leaks and reducing conveyance losses in open ditches, where possible,
- **Improve soil moisture holding capacity**, and
- **Test alternative crops**, when potentially via options are present.

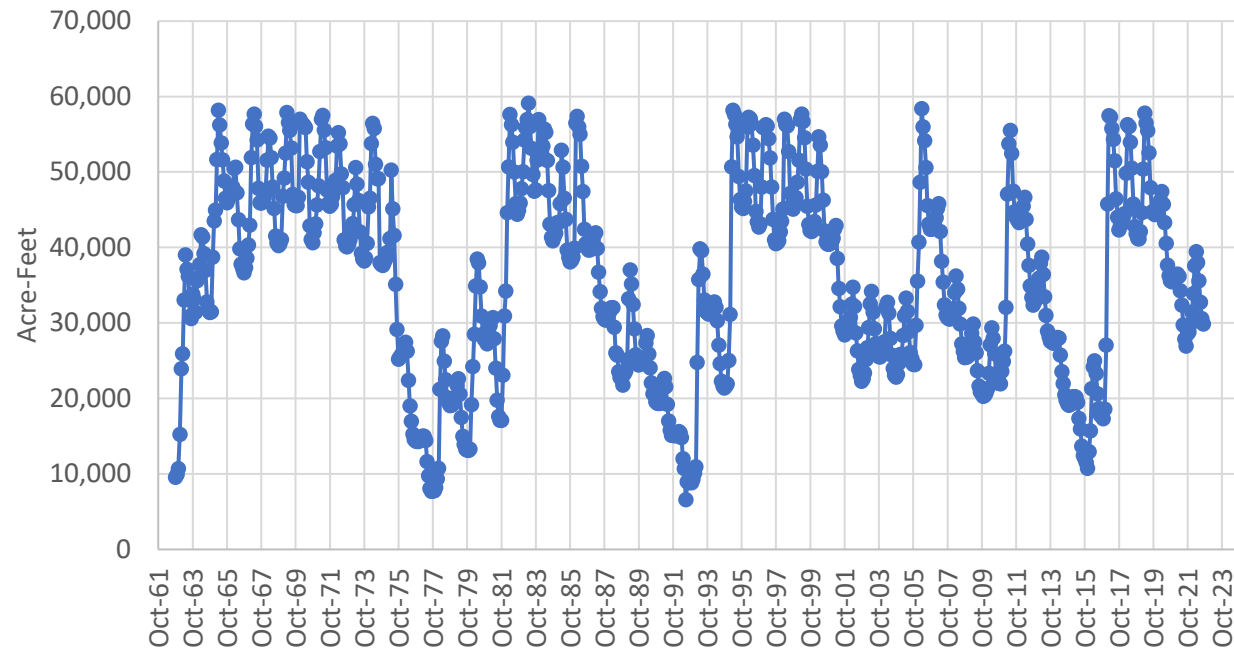


Review of Surface Water Management Actions & Potential Projects to Reduce Groundwater Pumping or Augment Aquifer Recharge

- Little Last Chance Creek & Frenchman Reservoir
 - Maximum 15,194 AFA storage for irrigation
 - Maximum 20,000 AFA refill for recreation
 - Watermaster determines annual allocation – last year set at 8,000 AF
 - Unregulated spill in past 20 years notably less than in prior decades
 - When occurs, is a volumes that exceed 1,000 AF and often 10,000 AF
 - Spill occurs in April – June in last 20 years
 - Infrequent winter spill = limited opportunities for other management (additional on-farm storage or releases for winter icing)
 - Possible potential for a little tighter fish flow management
 - Carrying irrigation water through July and August exposes to evaporation losses

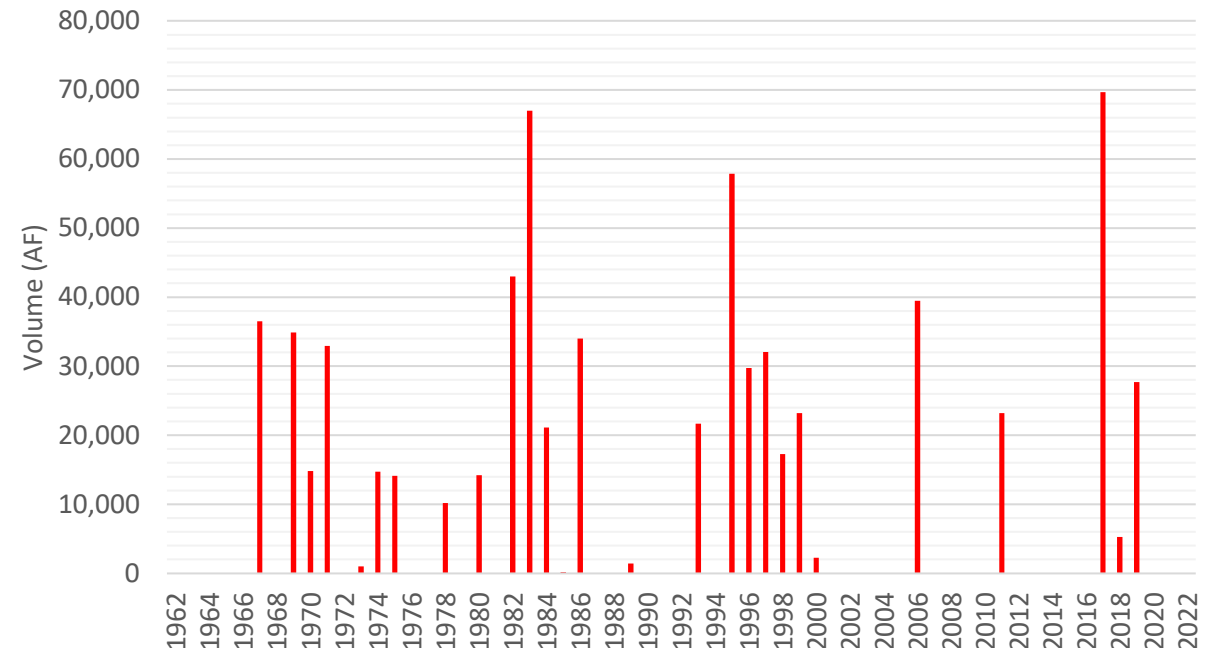
Frenchman Reservoir and Little Last Chance Creek

Frenchman Storage



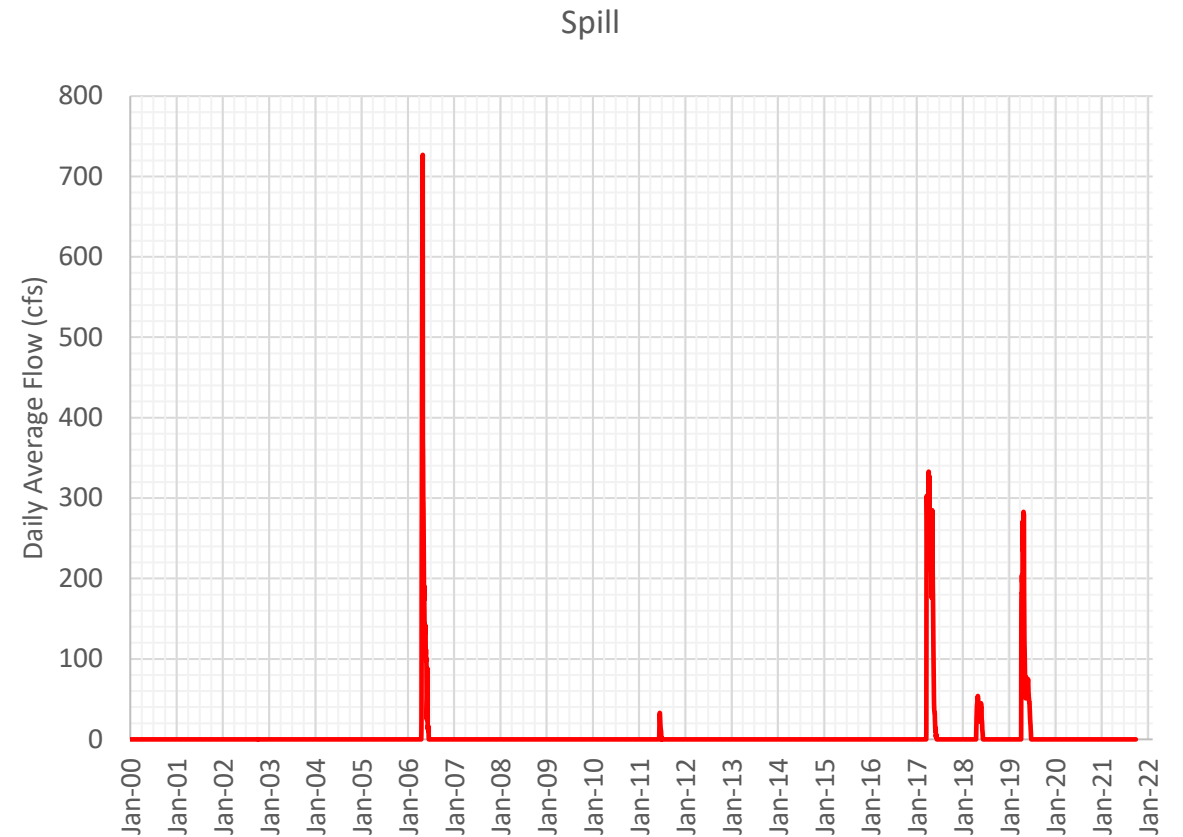
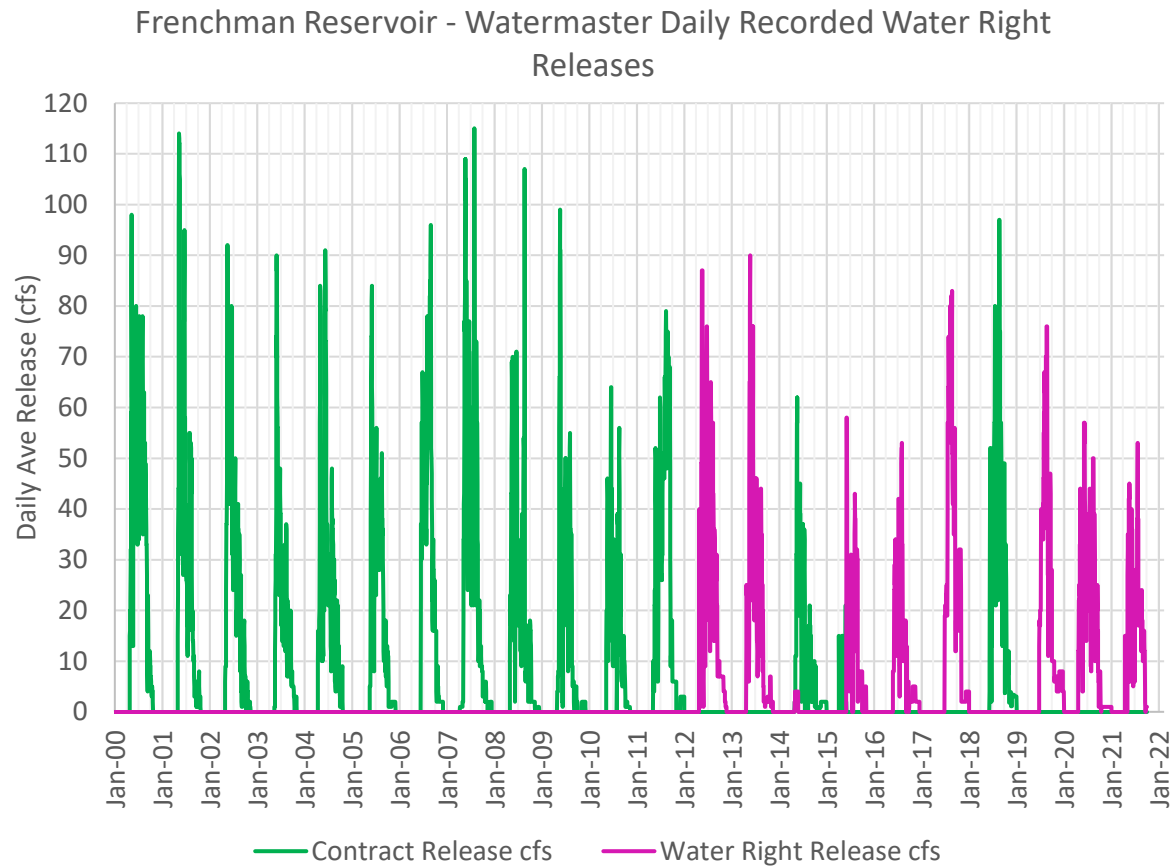
Note: 1960-2000 ~50% of years spill occurred
2000-2020 ~25% of years spill occurred

Frenchman Reservoir - Estimated Spill Volume

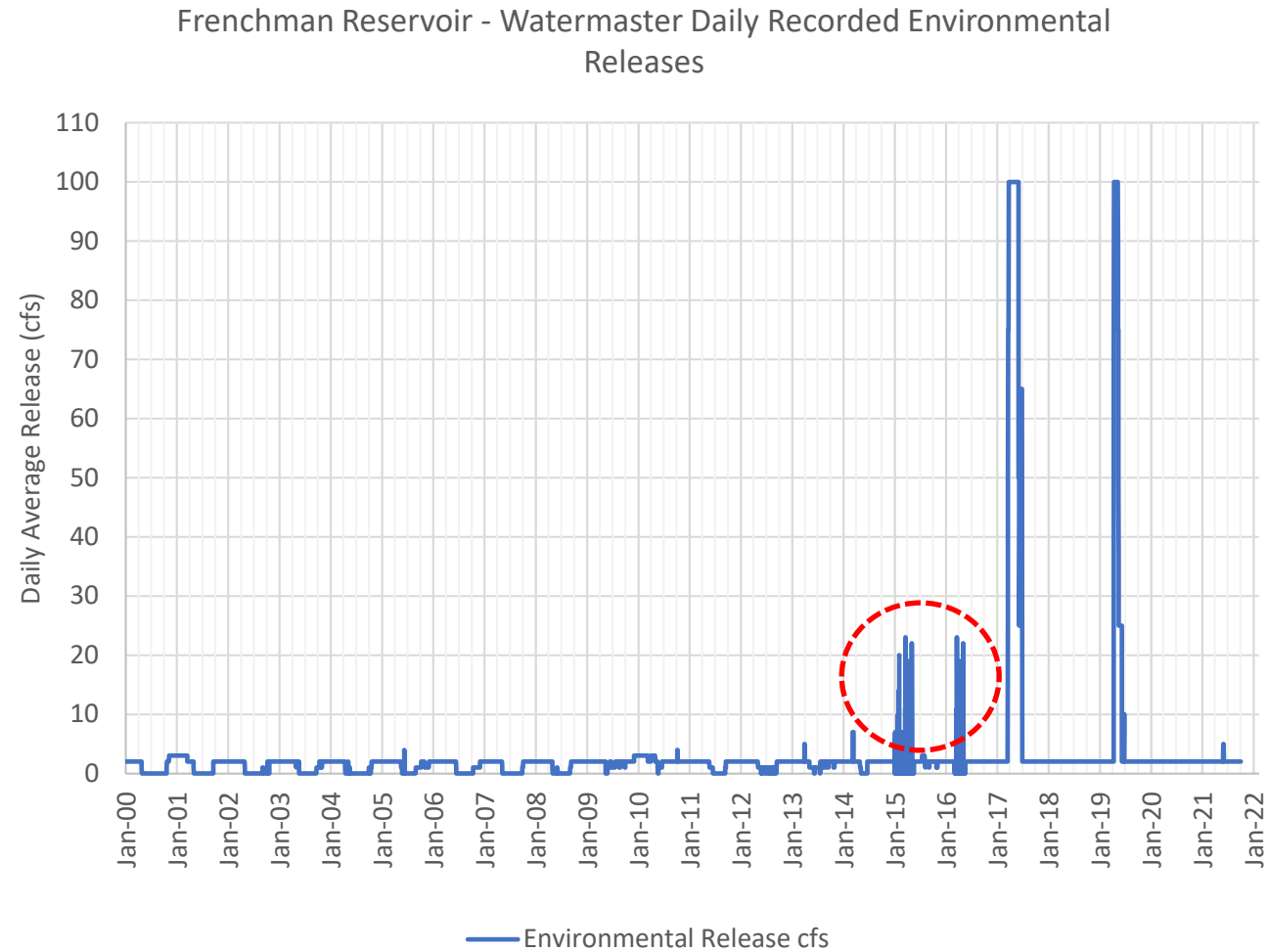


Note: When spill occurs, commonly exceeds 10,000 AF
2000-2022: 4 of 5 spill events exceed 10,000 AF

Frenchman Reservoir and Little Last Chance Creek

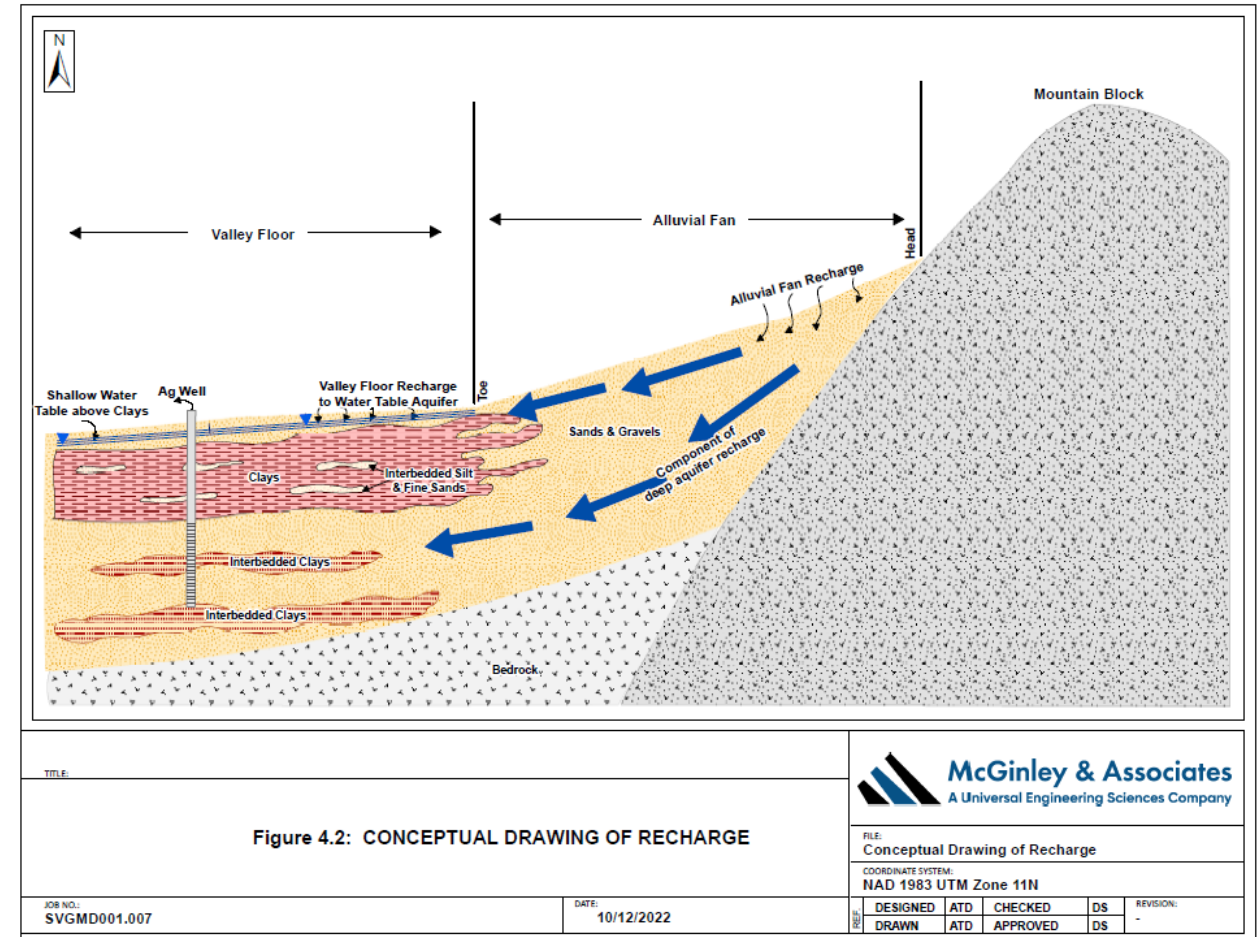


Frenchman Reservoir and Little Last Chance Creek



Managed Aquifer Recharge (MAR)

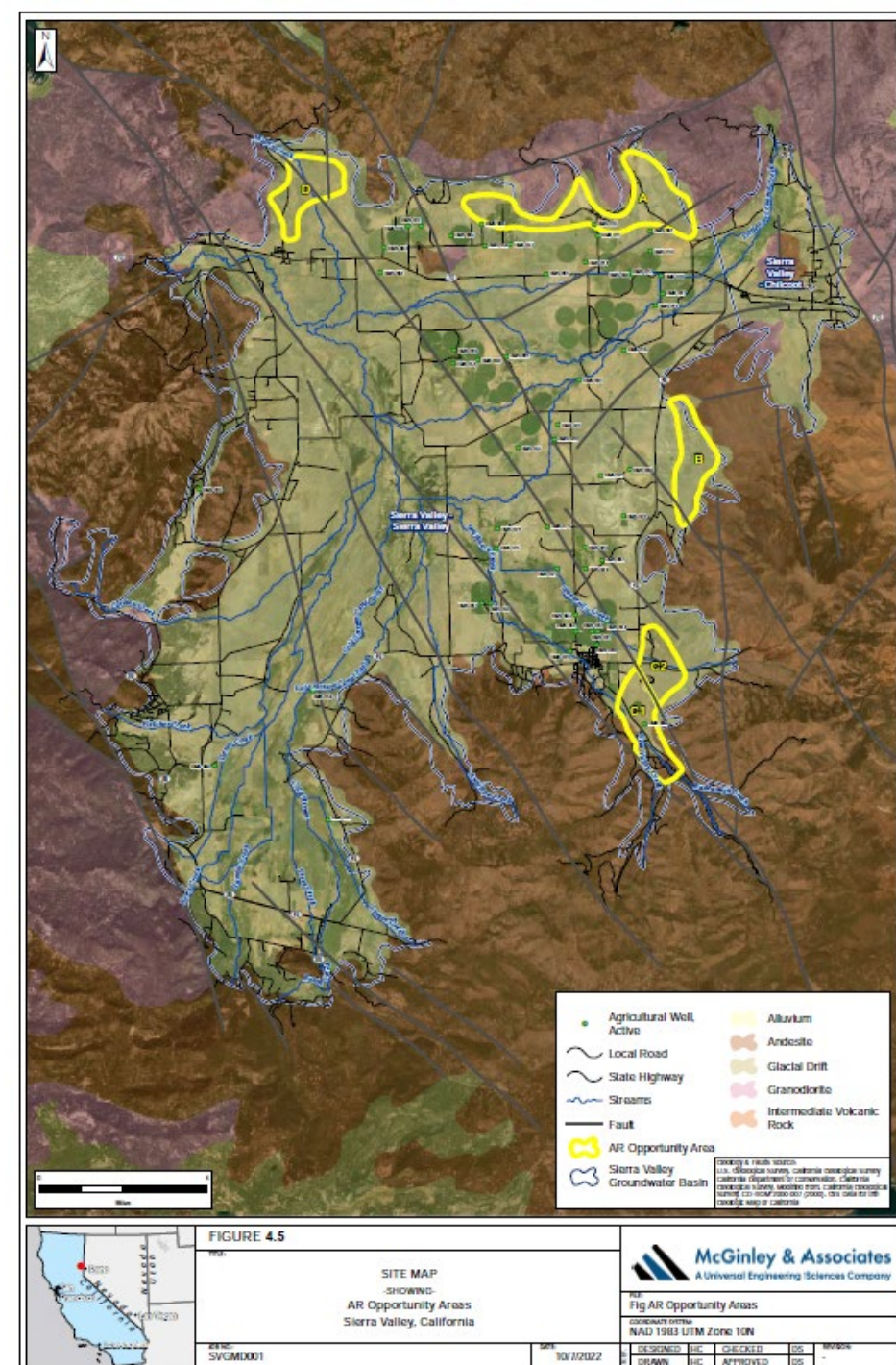
- Opportunity Areas
 - Proximity to a significant recharge water source,
 - Proximity to aquifer areas in need of recharge,
 - Sufficient infiltration capacity of soils to receive recharge water,
 - Ability for recharged water to reach the aquifer identified for recharge.
- On edges of valley – alluvial fans
- Geographically east of Grizzly Lake and Loyalton Faults



Managed Aquifer Recharge (MAR)

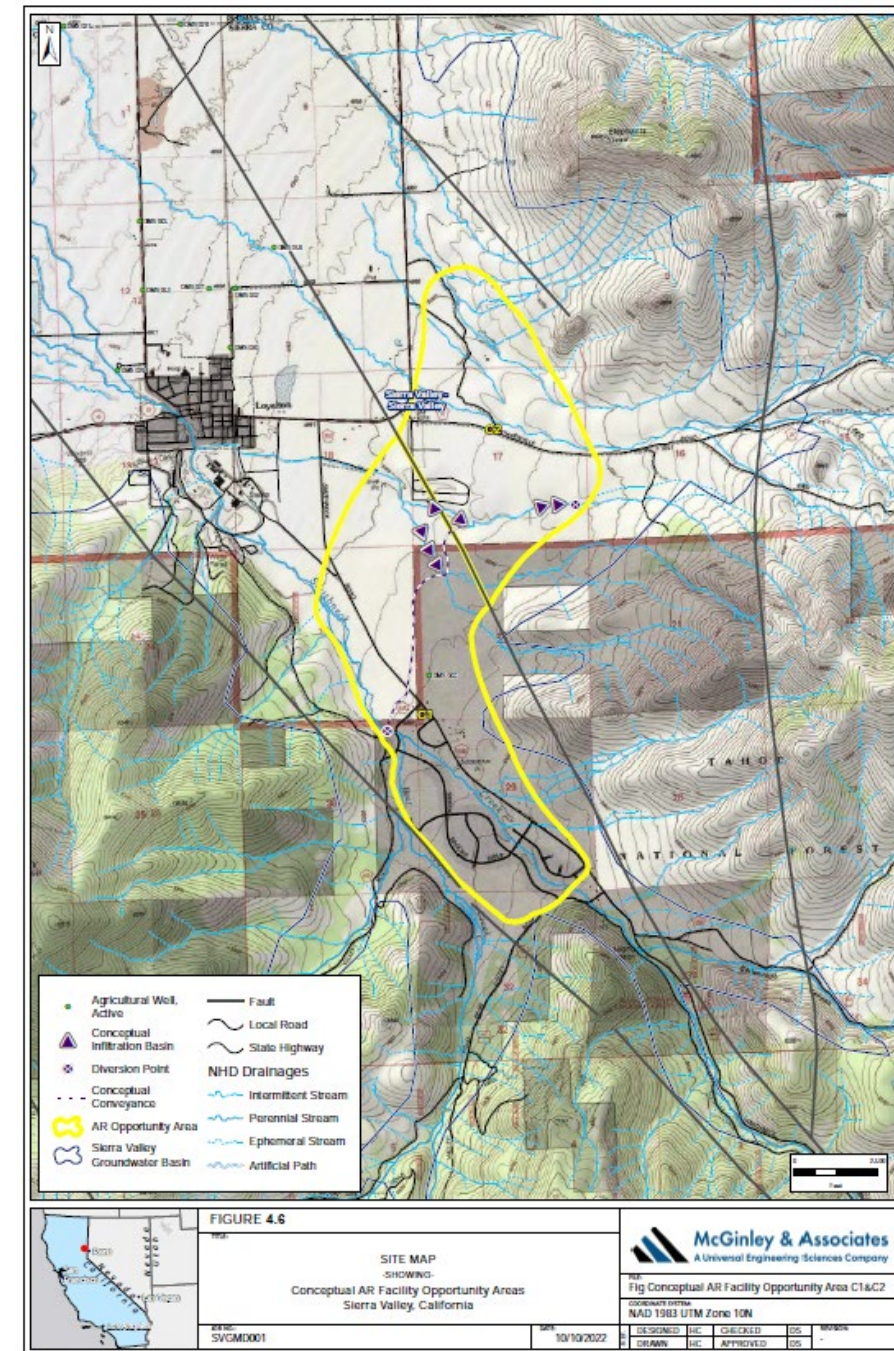
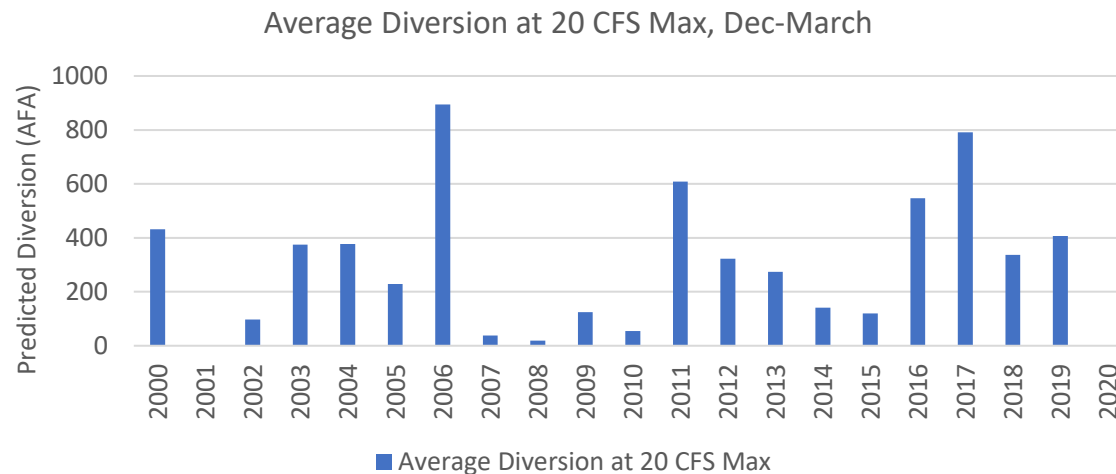
Opportunity Area Review:

- Proximity to **sources of water** for recharge,
- Surface **soil types**, and **infiltration rates** to accommodate high volume recharge,
- **Depths to groundwater** (water table mounding considerations),
- **Soil stratigraphy** from surface to down to the water table (perching considerations),
- **Land ownership** and access,
- Ability to secure surface **water rights** to divert for recharge purposes, without conflicting with adjudicated surface water rights in Sierra Valley, or State Water Project.



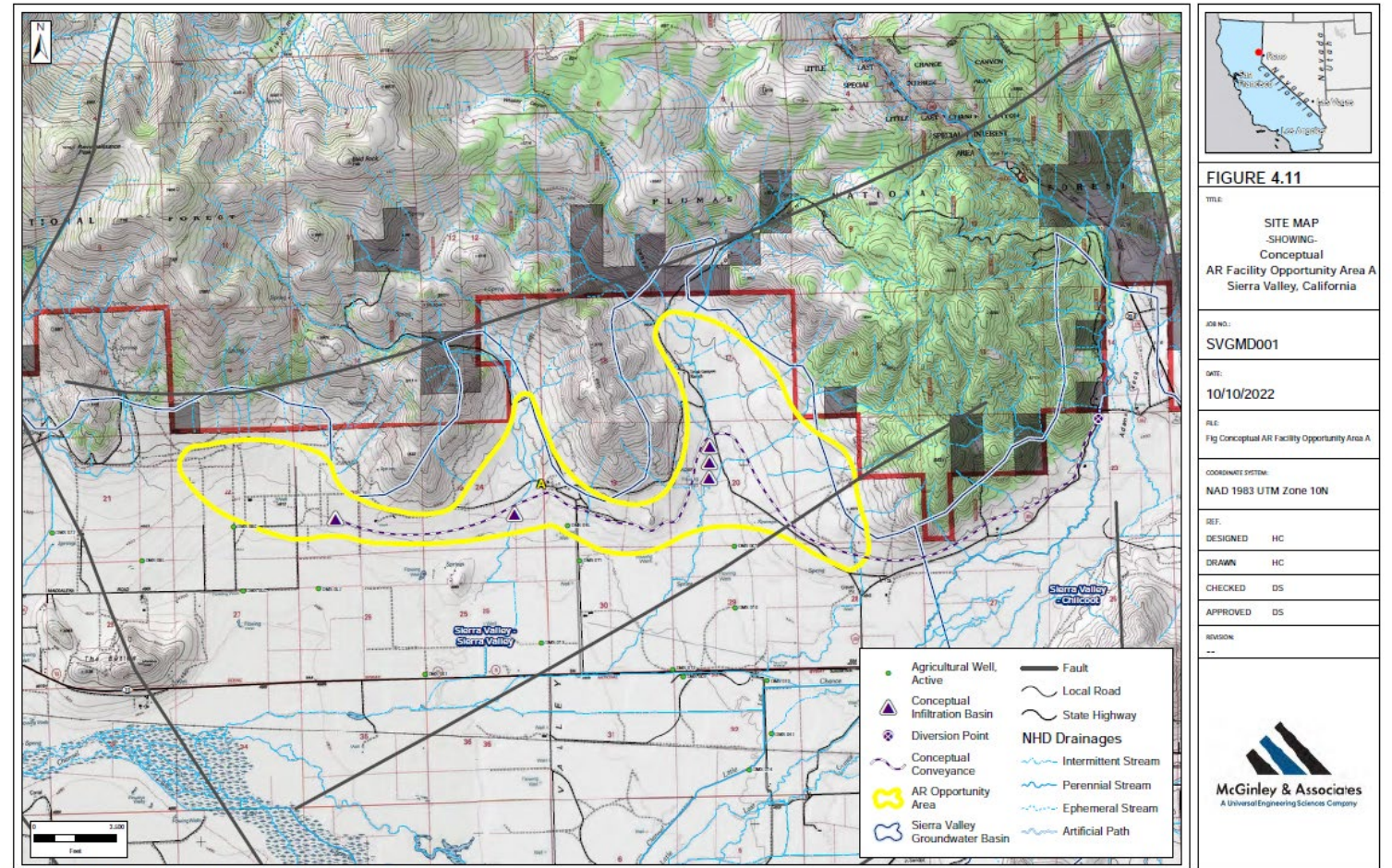
Smithneck Creek

- Divert 90th percentile flows, December through March, not exceeding 20% of stream flow
- 10 CFS facility = 177 AFA
- 20 CFS facility = 295 AFA
- Predictions made using the PRSM model
- Pilot Program & need Smithneck stream gage



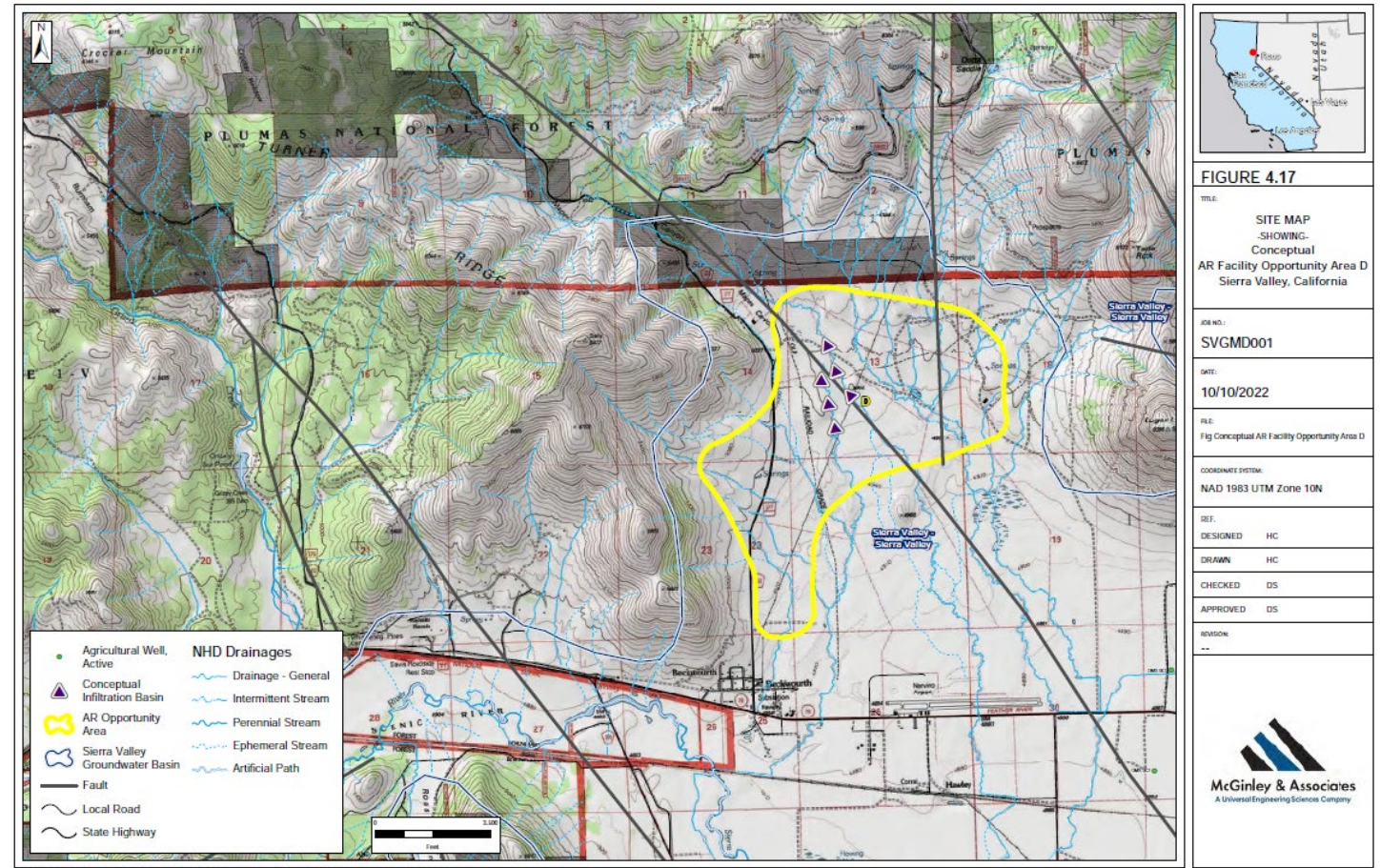
Little Last Chance Creek

- Regulated Flows by Frenchman Reservoir – Recharge of a Portion of Spill
- Contour gravity flow ditch to alluvial fans to the west
- If 1,000 AF Diverted to recharge facility each spill event = 250 AFA over long-term
- Crosses over a dozen privately owned parcels



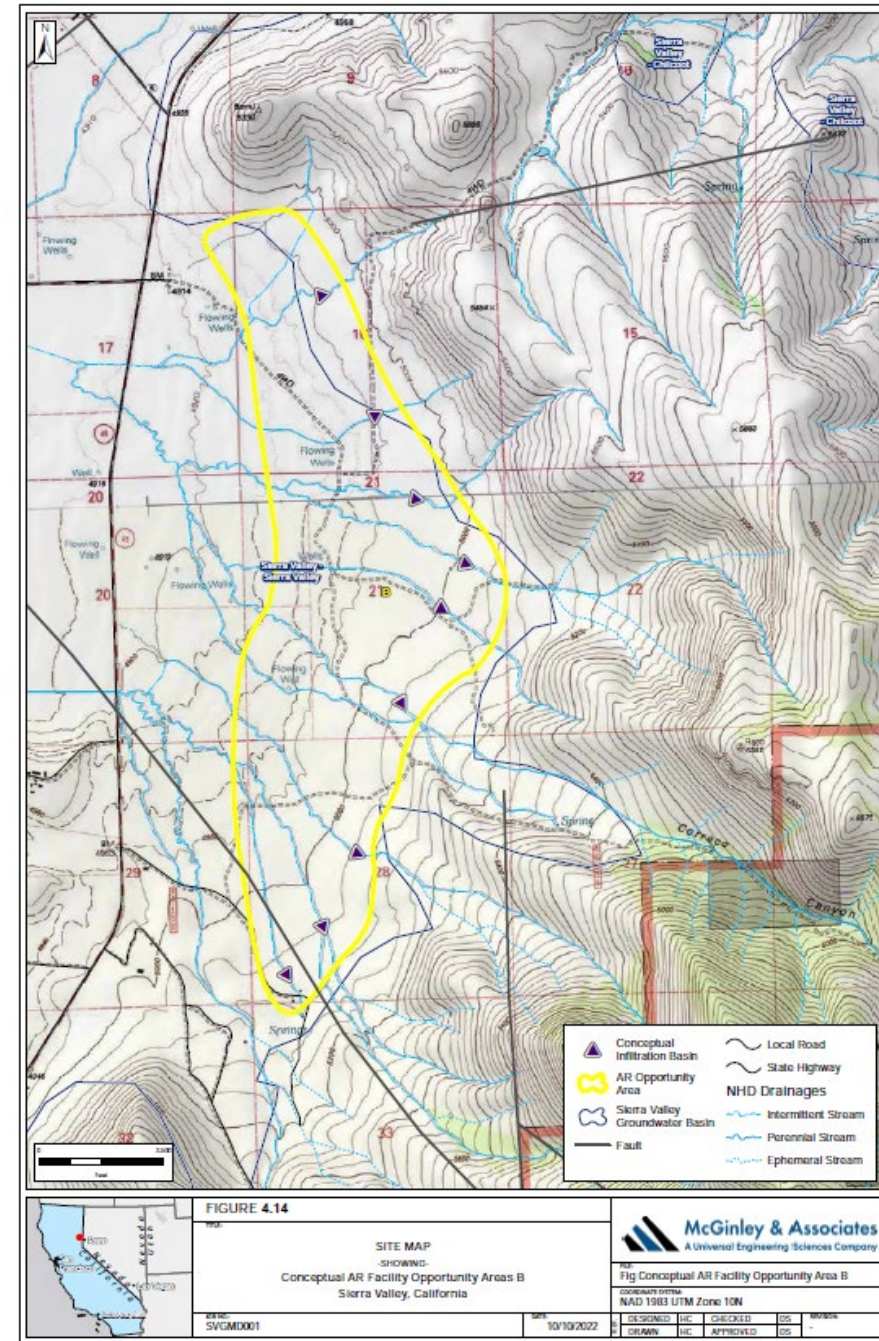
Mapes Creek

- Divert 90th percentile flows, December through March
- 10 CFS facility = 70 AFA
- Predictions made using the PRSM model
- Elevation of Grizzly Creek too low to route to recharge area via ditch system



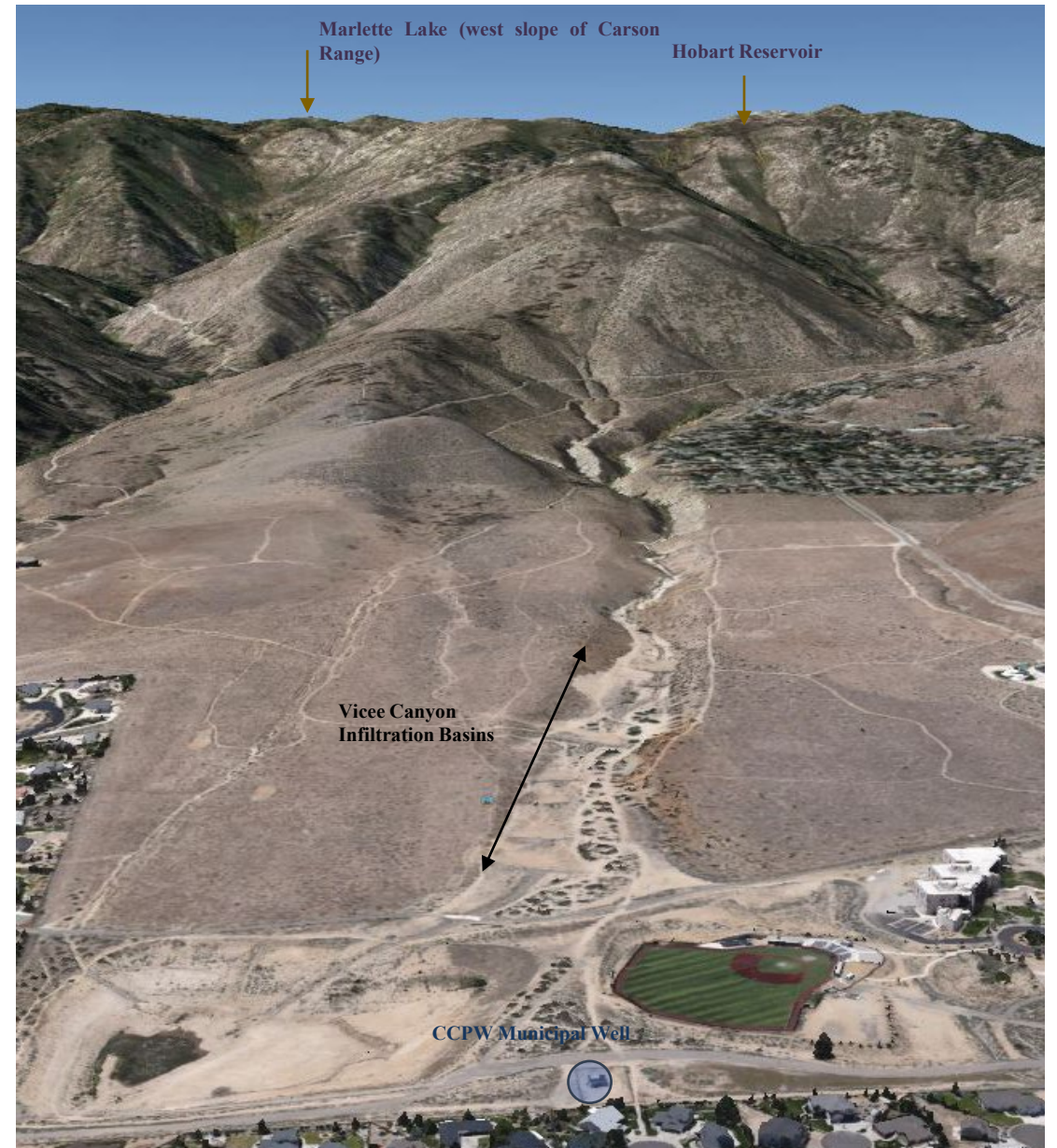
Eastern Watersheds

- Runoff detention basins
- No perennial source of water
- 20-30 AFA preliminary estimate

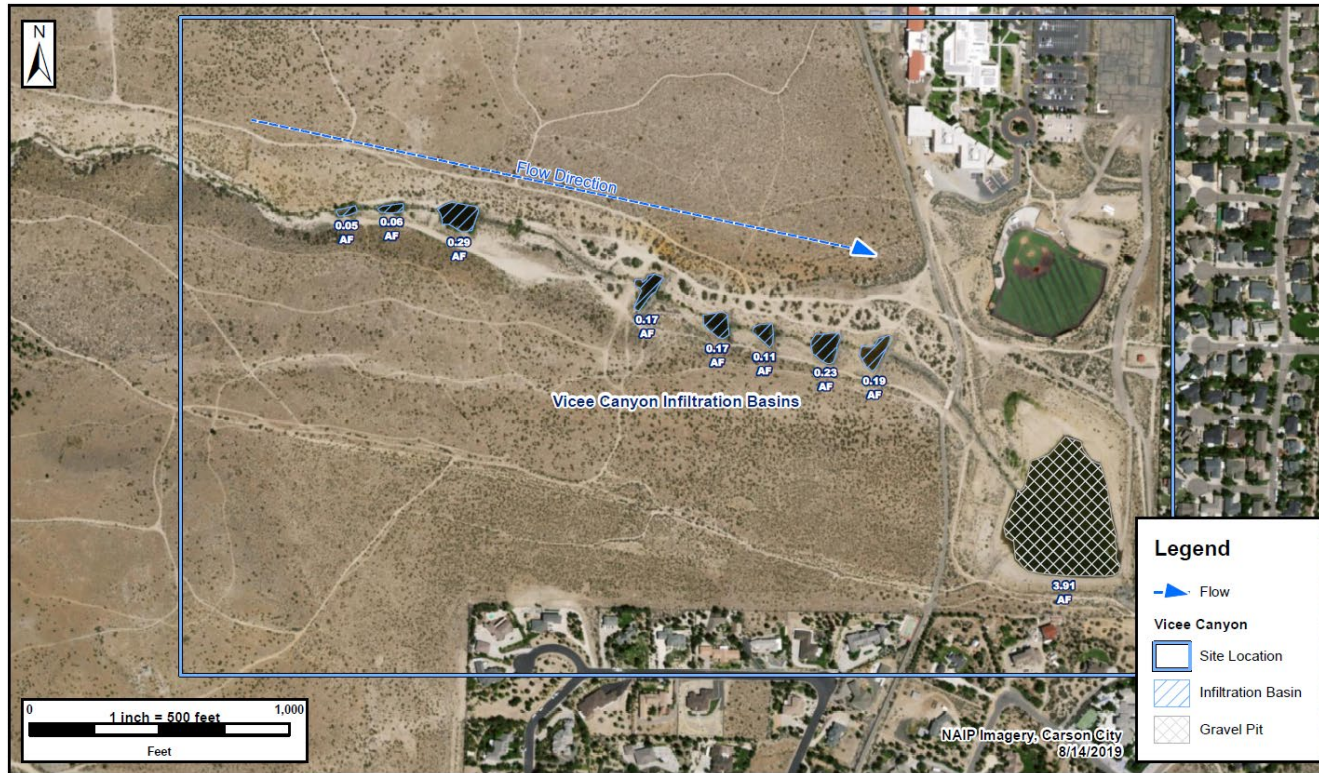



Vicee Canyon Example

- Operated by Carson City Public Works Department
- Operating since the 1990s
- 700 AFA, permit expanded to 1400 AFA
- Historically infiltrates ~325 AFA over the long-term
- Infiltration basins along ephemeral channel
- Augmented with Marlette Lake water diverted to Vicee Canyon in the spring months



Vicee Canyon MAR



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- Request Comment on Draft Reports by October 31st
 - Final Reports to be Completed for Approval at November 21st Board Meeting