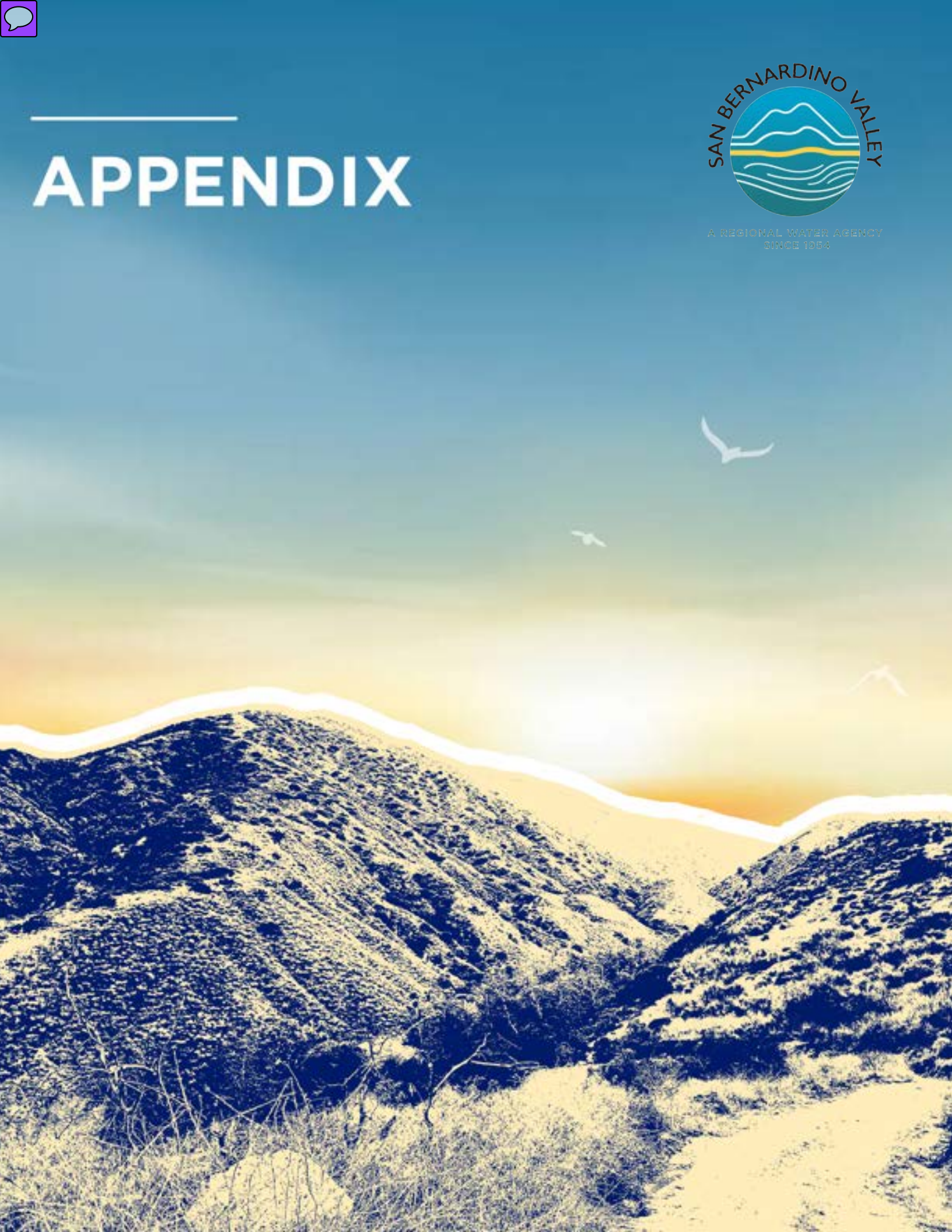
APPENDIX

SAN BERNARDINO VALLEY

A REGIONAL WATER AGENCY
SINCE 1954



Chapter 6

SITE HISTORY

CHAPTER 6 CONTENTS

Image Source The Redlands Area Historical Society

Figure 6-1 San Manuel territory

6.0 SITE HISTORY OVERVIEW

While the area is linked to the Gabrieliño (Tongva) people of the Los Angeles Basin, San Gabriel Valley, and San Bernardino Valley, as well as the Serrano and potentially the Cahuilla from adjacent desert regions, artifacts from the Serrano have been the only ones uncovered in the area. This group is currently recognized as the Yuhaaviatam of San Manuel Nation.

A. Yuhaaviatam People

The original ancestors of the area were known as the as Yuhaaviatam or "People of the Pines", a clan of the Maara'yam (renamed Serrano in Spanish). Their modern name is derived from "Santos Manuel", the Spanish name of a historical Yuhaaviatam leader. Their historical range covered the San Bernardino Mountains, San Gabriel Mountains, and Mojave Desert.

During the California Mission System of the 1700s, many were forced to live in missions or rancho outposts called estancias, effectively forcing them to give up traditional lifeways. Indigenous groups at the estancia in Redlands built the Mill Creek Zanja which is still visible in Redlands. Skirmishes between the Yuhaaviatam, settlers,

Figure 6-2 Farming on the tribal reservation, established 1891
Source Yuhaaviatam of San Manuel Nation

and other Indigenous groups in the 1800s forced the tribe to move around the modern day city of San Bernardino. They were inevitably moved to the Yuhaaviatam Reservation, where they remain today, and given the right to self-govern as a sovereign nation through the 1891 Act of Relief for Mission Indians.

There is a rich history of basket weaving using juncus, sumac, deergrass, and yucca. The yucca plant was used extensively for quivers, arrows, soap, fibers, and food. The Yucca Harvest is still an important festival for the Yuhaaviatam people in the area today.

Figure 6-3 Sunrise Ranch Orchard cover in 2007; **Source** Google Earth

B. Agricultural History

Agriculture began in the region in the 1850's with crops like apricots, peaches, grapes, and grains. In the 1890s, Orange groves started to dominate regional agriculture, aided by the arrival of the railroad which eased transportation. The area became known for its Washington navel & Valencia oranges.

The Roberts Ranch was established before 1895, which makes up a significant portion of the present-day Sunrise Ranch property. In 1907 the property was sold to the Mentone Heights Orange Company and eventually consolidated with other properties to the west and became known as Sunrise Ranch.

Following the destruction of the Sunrise Ranch by fire and the orchards removed, few remnants remain of the 1,000-acre operation except limited building foundations and irrigation features.

Extensive terracing and orchards can be seen on the site in aerial images dating back to 1938. Agriculture continued until approximately 1968 and the fields were abandoned around the 1980's and 1990's. The irrigation channels and smudge pots, used to deter frost from spoiling the fruit, can still be found on site. A former retention pond in the south center of the property and water wells along the western perimeter are also remnants of the orchard.

Mill Creek Canyon was named for the first sawmill in the San Bernardino Mountains. While the exact location of the mill - referred to as Vignes-Sexton Mill, Aliso Mill, or Chino Mill - is unknown, it was likely near the canyon mouth. It operated for over 30 years, providing a constant flow of lumber as summer water was plentiful and it never froze during the winter. Lumbering began in the 1890's in the mountains with the founding of Highland Lumber Company, later Brookings Lumber Company.

Figure 6-4 Orange picking in Redlands, CA
Source San Bernardino County Museum

Figure 6-5 Smudge pots in San Bernardino
Source Mark Landis, 1948

Figure 6-6 Postcard showing the orchards in Redlands, CA
Source The Redlands Area Historical Society

Figure 6-7 Mill Creek in the summer

C. Modern Day History

Fish Hatchery Road got its name from a fish hatchery which opened in 1913 but was flooded out by storms in 1965. Space is rented out to beekeepers to keep apiaries on a small portion of the site.

The site is a combination of two different properties:

- Braemar Property: northwest 600-700 acres (mix of former orchard, undeveloped land, and steep terrain)
- Sunrise Ranch Property: southeast 1,000 acres of site (former orchard and undeveloped land)

To the northwest of the site is Greenspot Bridge. The bridge was constructed in 1912 in Illinois at Joliet Iron & Steel Works, the second largest steel mill in the country at the time. Originally it was meant to span the Mojave River in Victorville but was moved to the Santa Ana River in 1933. It was used primarily for horse-drawn wagons full of fruit, and later for commuters (one-way traffic). Now it is a multi-use trail that could provide access to the site.

Figure 6-8 Greenspot Bridge

Figure 6-9 Seven Oaks Dam; **Source** Steve Schumaker, 2007

D. Water Body History

Santa Ana River - The Tongva (Gabrielino) people, who were among the first to live near the river, referred to it as Wanaawna. Villages were established within sight of the willows and sycamore that lined the riverbed. Oral history relays that the Santa Ana would flood once a generation and combine with the San Gabriel and Los Angeles rivers to become an ephemeral lake. The Santa Ana River watershed is the largest in the South Coast region of California, covering parts of San Bernardino, Riverside, Orange, and Los Angeles counties. The river runs to the north of the property.

Santa Ana Canal - In the 1890s, the Santa Ana Canal was built to bring water from the Santa Ana River and its main tributary Bear Creek to Crafton, Highland, Redlands, and Old San Bernardino. It was built to provide water for agricultural and household uses as the population began to grow in the region.

Seven Oaks Dam - The dam was built to regulate the Upper Santa Ana River for flood protection. Construction began in 1993 and was completed seven years later. Approximately six million cubic yards of material was excavated from the site for the dam. Stripping the soil created erosion and drainage issues, leading to road flooding and property damage for neighboring farms.

Mill Creek - Mill Creek is a 17 mile stream flowing from the San Bernardino Mountains into the Santa Ana River. The water quality is slightly better compared to lower portions of the Santa Ana River as the headwaters and drainage areas are less urbanized.

Mill Creek Powerhouse (Redlands Power Plant) In 1892, the Redlands Electric Power Company captured Mill Creek in a 6,000 foot pipeline. A year later, it became the site of the first commercial alternating current power plant in the US. It intended to help expand the cultivation potential of the surrounding hills as the orange groves took over Southern California.

Mill Creek Levee - The levee was constructed by the US Army Corps of Engineers (USACE) and is constructed with a mix of masonry wall and earth. It is located in Redlands and maintained by the San Bernardino County Flood Control District. In 2013, a USACE inspection report found the condition of the levee to be minimally acceptable and recommended upgrades.

Figure 6-10 Crafton inset from a 1888 map of Irrigation Region of Los Angeles and San Bernardino counties
Source Calisphere, University of California

6.1 TOPOGRAPHIC CONDITIONS

A. Topographic Overview

The property sits at the foothills of the rugged San Bernardino mountains, rising over 1,100 feet from west to east towards the entry of the San Bernardino National Forest. The San Andreas Fault runs through the upper portion of the site. The 2011 EIR shows there are five small secondary faults that run through the property, though there is not evidence of recent activity on the faults.

The elevation of the site varies greatly. From the western boundary, the site is approximately 1,800 feet above sea level; from the foothills on the northeast side of the property, the site is approximately 2,700 feet above sea level.

Given the vast changes in topography, there is an opportunity for the community to connect with the natural topography of adjacent mountains and the site's drainage features along multipurpose trails.

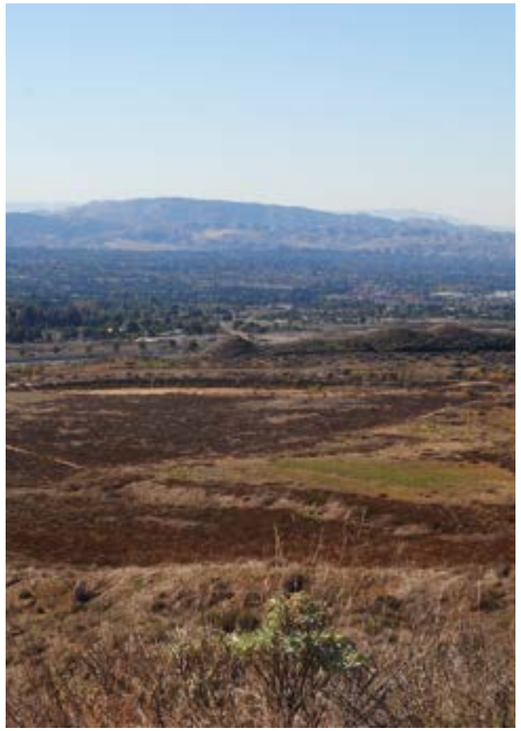


Figure 6-11 Existing mounds at the southern end of the Sunrise Ranch property

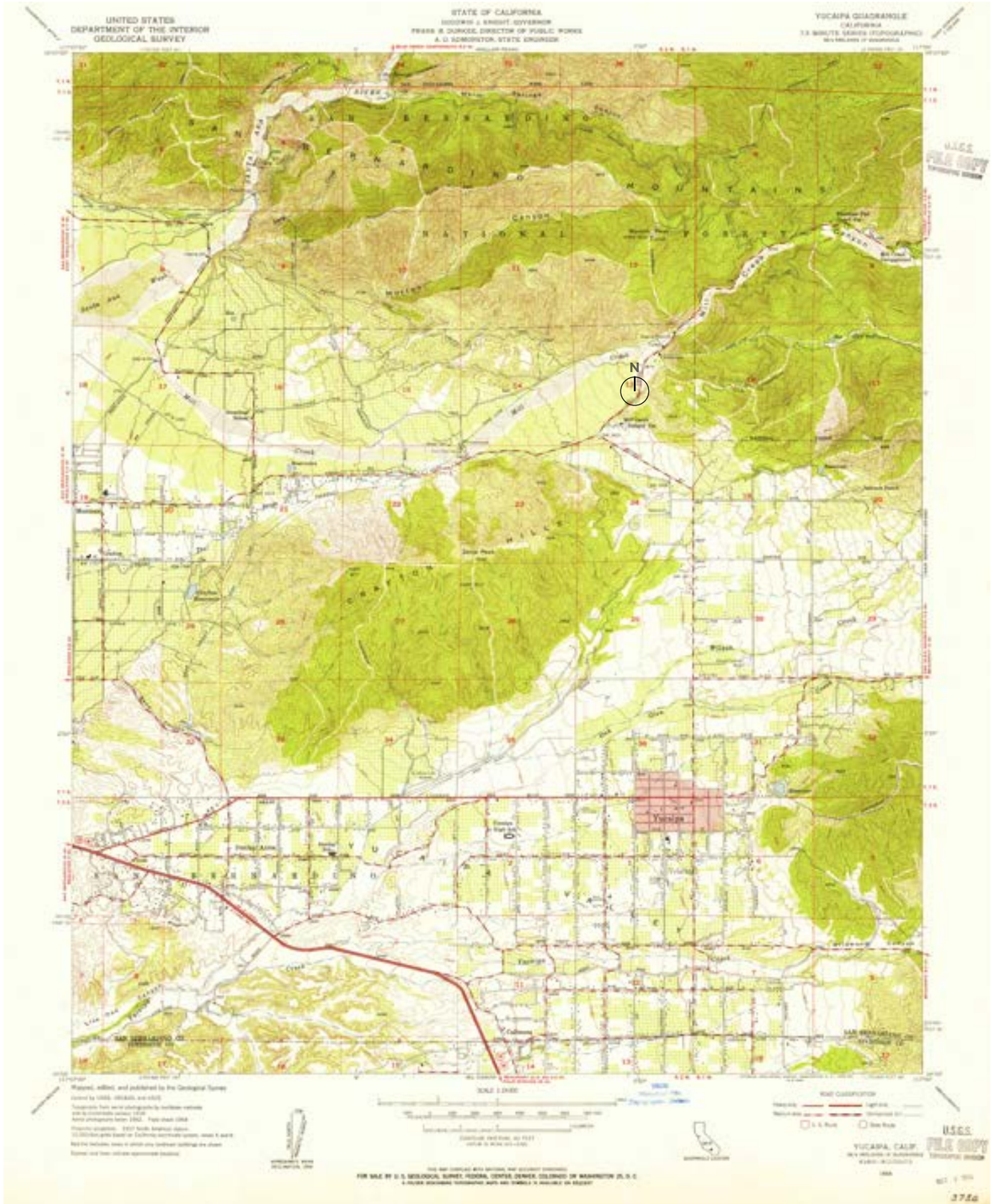


Figure 6-12 USGS topographic map from 1954
Source State of California Public Works

B. The Site Over Time

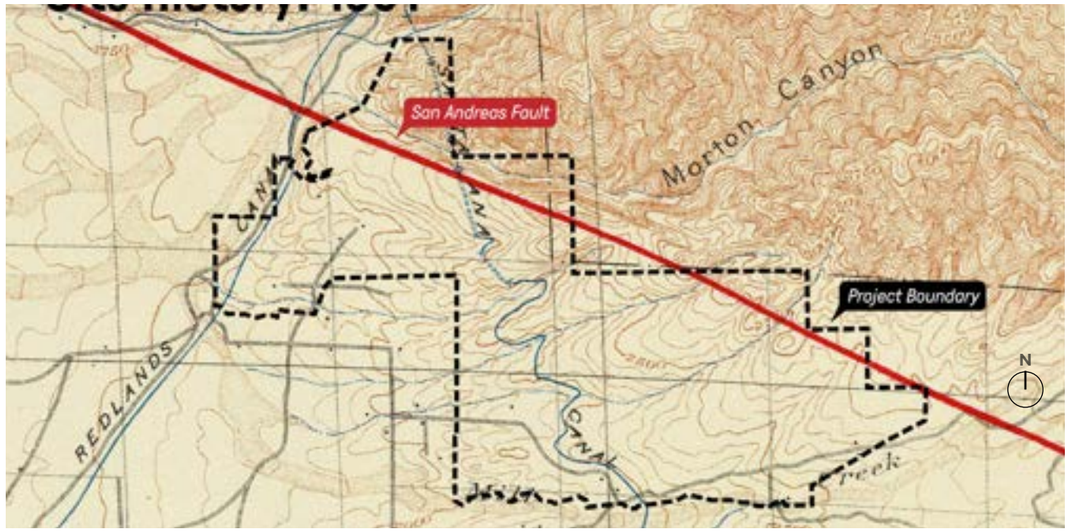


Figure 6-13 1901 map showing the untouched topography and drainages of the site; in the early 1990's the site's character, topography, and drainage features were impacted when it became a borrow site for materials used to construct the Seven Oaks Dam
Source USGS Redlands Quadrangle Map 13

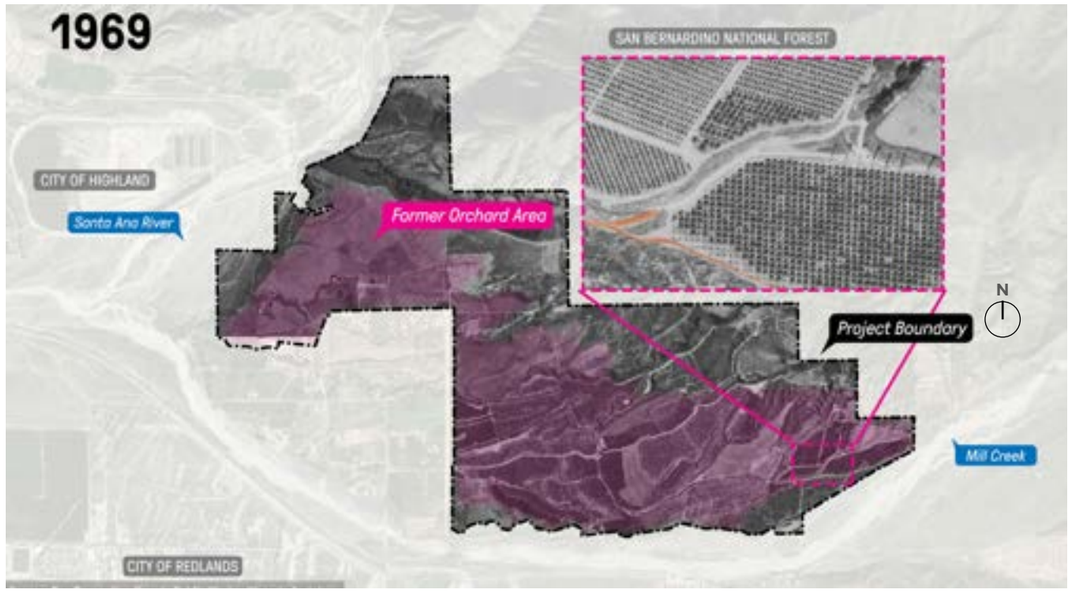


Figure 6-14 An aerial from 1938 shows the beginning of the orchard development on the property

Chapter 7

EXISTING CONDITIONS

CHAPTER 7 CONTENTS

Figure 7-1 Phases for the Santa Ana River Trail; **Source** San Bernardino County

7.0 TRAILS AND RECREATION

A. Santa Ana River Trail

The site is located in the planned path of the Santa Ana River Trail (SART), which is poised to be a regional trail that runs from the mountains to the sea. It was designated as a National Recreation Trail in 1977 and is planned to extend 100 miles across Southern California. The trail, like the river, begins in the San Bernardino Mountains, winding its way through the semiarid basin of the Inland Empire and coastal plain of Orange County past cities, agriculture, and open space before reaching the coast at Huntington Beach. The trail is a collaboration between many public and private agencies and non-governmental organizations.

In the 1990 Master Plan for the Santa Ana River Corridor Trail System, the proposed trail ran through the northern portion of the property as a multi-use segment. In 2014, the Santa Ana River Conservation Program was created within the State Coastal Conservancy to develop an open space plan to connect the parkway to regional recreation resources. They spearheaded the development of the Santa Ana River Parkway and Open Space Plan (SARCON) in 2018. The plan similarly shows the SART running through the site. As of 2023, the trail was roughly 60% complete.

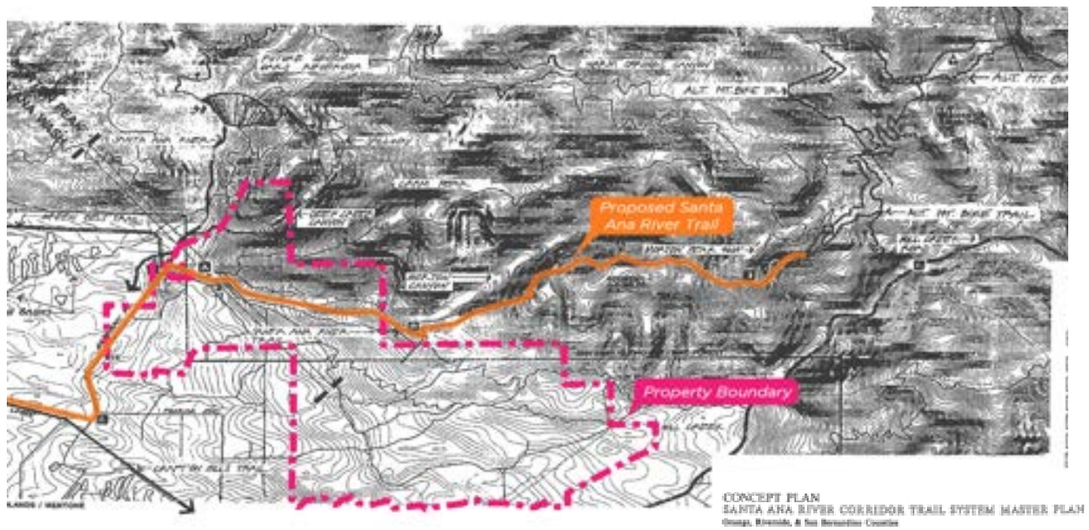


Figure 7-2 Master Plan 1990
Source Santa Ana River Corridor Trail System, EDAW Inc

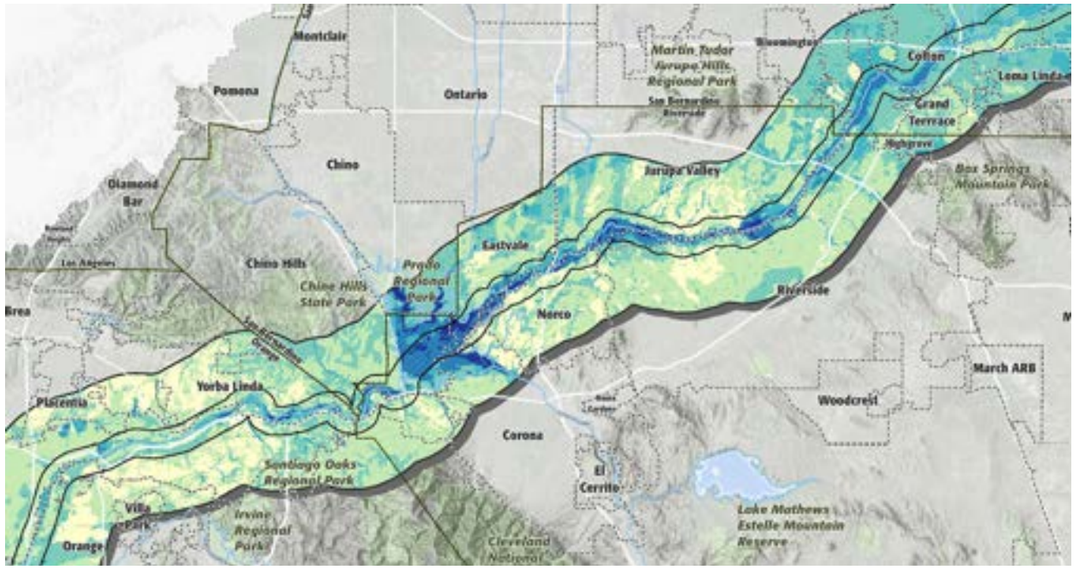


Figure 7-3 SARCON 2018 Plan
Source Placeworks

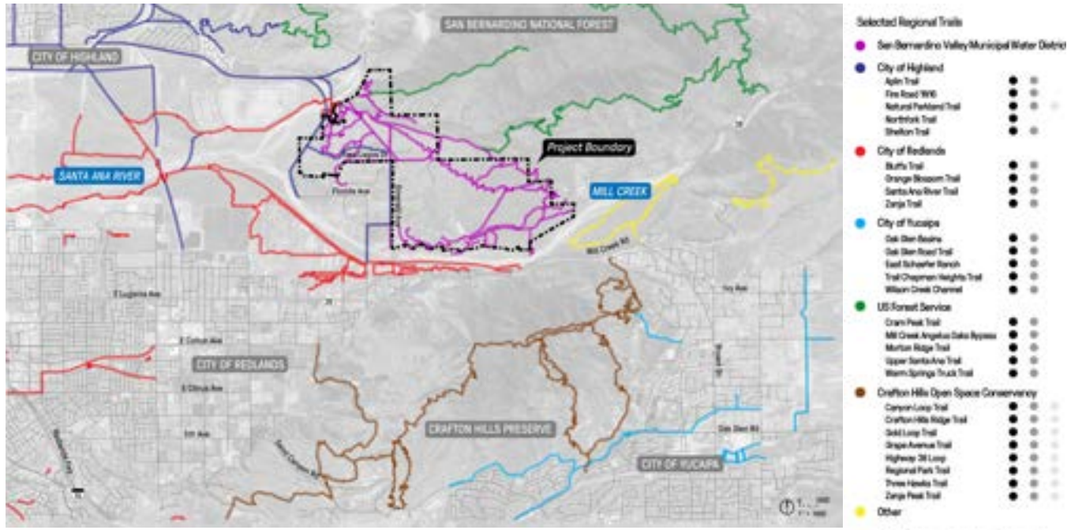


Figure 7-4 Existing trails nearby the site, organized by jurisdiction or managing agency

B. Regional Agency Trails

City of Highland - The City of Highland Community Trails Map lists 12 trails in the city. All of them are multi-use. Most of the trail connections into the Project site originate in Highland, coming down Greenspot Road. Ownership of trails that cross the Santa Ana Wash is shared between the City of Highland and City of Redlands, as established in the 2020 Upper Santa Ana River Wash Habitat Conservation Plan.

City of Redlands - There are more than 28 miles of trails and 560 acres of conserved natural open space in the City of Redlands managed by the Redlands Conservancy. The Emerald Necklace Trail and Scenic Route, open to cars and bicycles, wraps around the city past conserved citrus groves, natural open space, and the Santa Ana River Wash. All of the remaining public trails are open to pedestrians and bikers, while a few in the south are designated multi-use.

City of Yucaipa - The City of Yucaipa lists over 27 miles of multi-use, designated trails. Many of the trails follow the natural waterways and drainage canals that meander through the community. Yucaipa Regional Park sits at the base of the Crafton Hills, acting as a transition to the preserve.

Crafton Hills Open Space Conservancy - The Crafton Hills Preserve offers 3,400 acres of open space accessible through a myriad of multi-use trails. Equestrians are allowed on all hikes in the Preserve, but not the adjacent Yucaipa Regional Park.

Figure 7-5 Crafton Hills Ridge Trail
Source MTB Project

Figure 7-6 Yucaipa Regional Park picnic area and lawn; **Source** San Bernardino County

C. Regional Recreation

United States Forest Service - The Project sits below a portion of the San Bernardino National Forest. All of the trails and fire roads are open to hikers and bikers. Cram Peak and the Upper Santa Ana River Trail are the only two official trails that lead into the Project site. However, they provide connections to other trails and amenities within the USFS network.

Other - There are a few other trails that were logged on the app AllTrails. The app is used for outdoor activities like hiking, climbing, and biking and includes crowd-sourced information about trail conditions and photos. These trails are not necessarily managed by an agency, but are frequented by hikers and were added to show additional recreation opportunities.

Yucaipa Regional Park - In addition to hiking and biking, Yucaipa Regional Park offers camping, fishing, swimming, water recreation, and disc golf.

Crafton Hills Regional Park - Crafton Hills Regional Park is adjacent to Yucaipa Regional Park.

Figure 7-7 Campsite in San Bernardino National Forest
Source US Forest Service

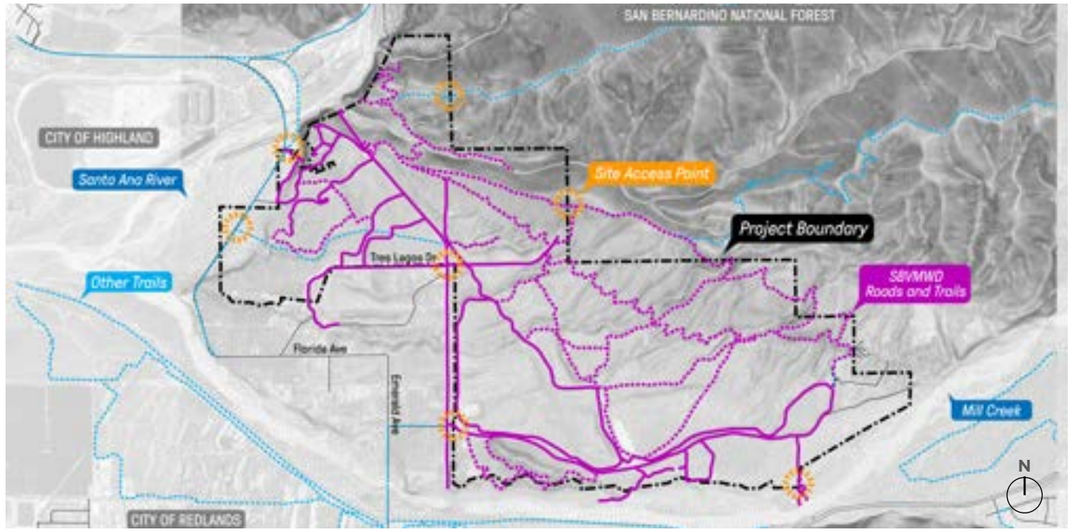


Figure 7-8 Existing trails around the site

D. Site Trails

There are over 18 miles of existing trails, dirt roads, and unofficial paths on the site. Newport Ave. runs through the southern portion of the site, leading to a small community of houses on the eastern edge of the property. Dirt roads run across the site, providing access to the Historic Mill Creek Powerhouse, take site for the Seven Oaks Dam, old water infrastructure, and the Greenspot Power Station. There are currently four access points connected to vehicular roads and two trails that provide entry into the site. There is an additional entry point near the Mill Creek Powerhouse, but requires cars to illegally cross over Mill Creek when it is dry.

The trails range in difficulty and traverse almost 1,000 feet of elevation gain across the site. While the site is not open to the public, there is evidence that many of the trails in the foothills of the San Bernardino National Forest are used by hikers looking for a challenge. All trails are compacted soil and vary in width. Much of the surrounding vegetation is over grown and the trails in the backcountry are slightly difficult to use due to the density of vegetation.

Figure 7-9 Backcountry trail with wildlife present

Figure 7-10 Maintenance road that doubles as a trail

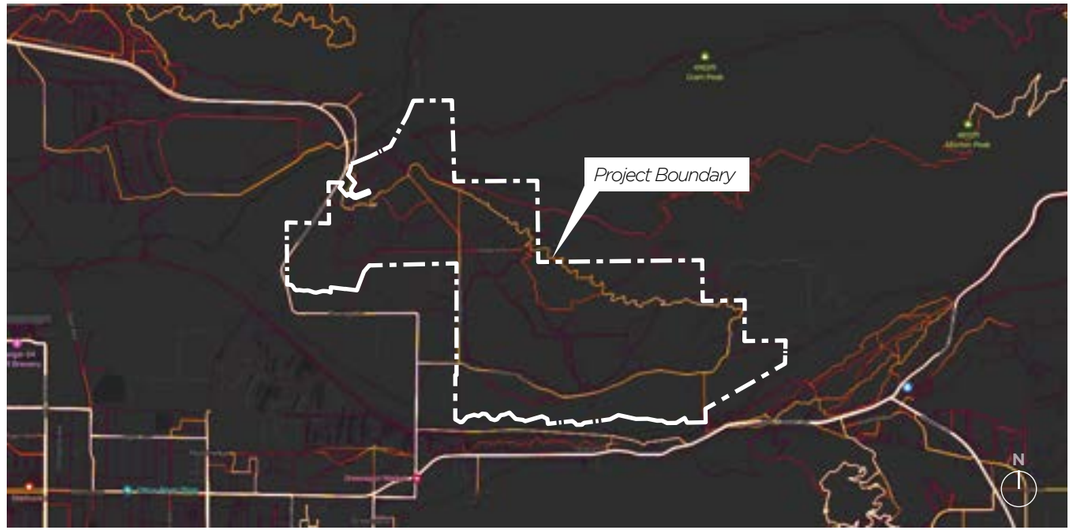


Figure 7-11 Heat map showing the popularity of trails on site by mountain bikers; **Source** Strava

E. Bike Usage

The crowd-sourced website MTB Project, which offers trail route ideas for mountain biking, indicates that many trails in the surrounding mountains.

The website Strava, which allows users to post bike routes, suggests a few trails in the eastern part of the site are frequently used by mountain bikers. Local nonprofit biking organizations often use one trail as route for a charity event called Hell Ride. The route follows the Upper Santa Ana River trail within the San Bernardino National Forest and utilizes a trail in the northeast part of the site before following Tres Lagos Dr. towards Emerald Ave.

While the property is not currently open to the public, cyclists currently trespass to use the trails. Based on site visits, they tend to stick to the paved trail without disturbing the habitat adjacent to them.

Figure 7-11 features roads/trails based on frequency of use.

Figure 7-12 Front Line Ridge Trail, one of the trails illegally used by cyclists

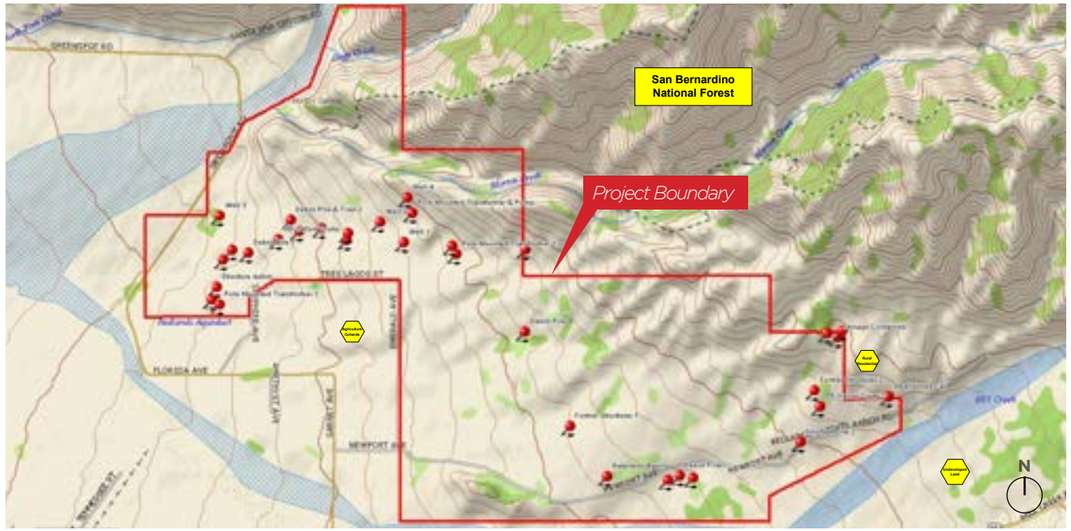


Figure 7-13 Location of relics on site; **Source** Harmony Development EIR, 2011

F. Site Relics

Numerous investigations over the years have documented the dilapidated infrastructure and relics left over from the orchards that used to dominate the site.

The 2011 EIR mapped 32 locations around the site where these relics could be found see Figure 7-13. Examples of relics include water wells, smudge pots, retention basin, gallon drums, and building foundations. Many of the relics can be seen from existing trails and could be incorporated into future educational signage along recreation routes.

Figure 7-14 Building remnants from the rancher's house

Figure 7-15 Smudge pots on site

Figure 7-16 Irrigation canals created for the orchards

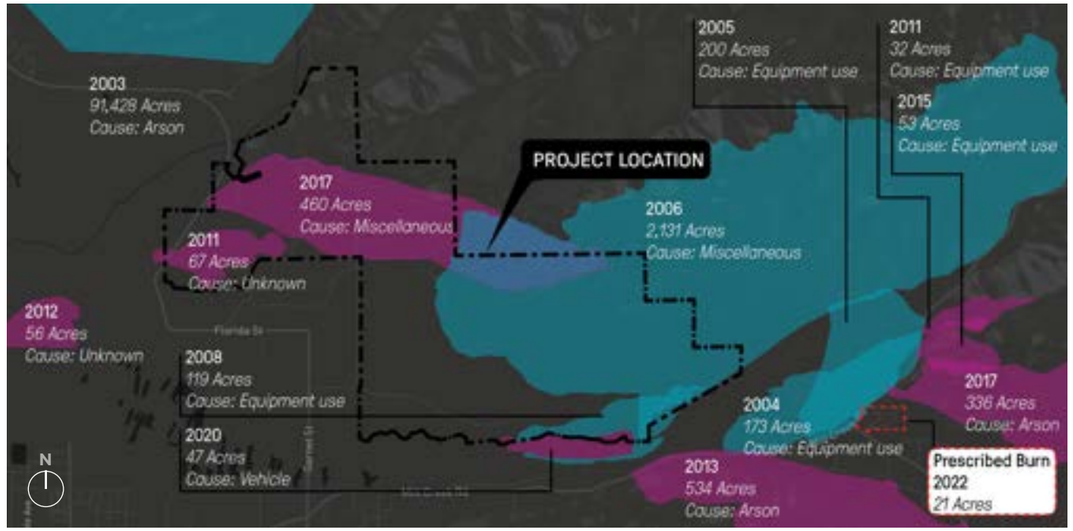


Figure 7-17 Historical prescribed burns on or near Sunrise Ranch; **Source** CAL FIRE - CA.gov

7.1 CLIMATE AND SPECIES

A. Weather Patterns

The property is located in the City of Highland at the foothills of the San Bernardino Mountains. The summers are hot and arid while the winters are cold and partly cloudy. Chances of precipitation are higher from November to April, though the average annual rainfall is just over 12 inches. Historically, the temperature varied between 41° to 96°F (5° to 35.5°C), but estimates from the most recent California Climate Change Assessment indicate the average maximum temperature could reach over 105°F by 2030.

B. Wildfires

Since the property is within the Wildland-Urban Interface, there is potential that wildfires could impact the site. In the last 20 years, 13 wildfires have been reported in the area around the property. CalFire and related agencies are beginning to host prescribed burns in the area in an effort to reduce fuel loads and other wildfire hazards.

Figure 7-18 Prescribed burn in the San Bernardino National Forest
Source USFS

Figure 7-19 Dried invasive plants and grasses add to the fuel potential for wildfires

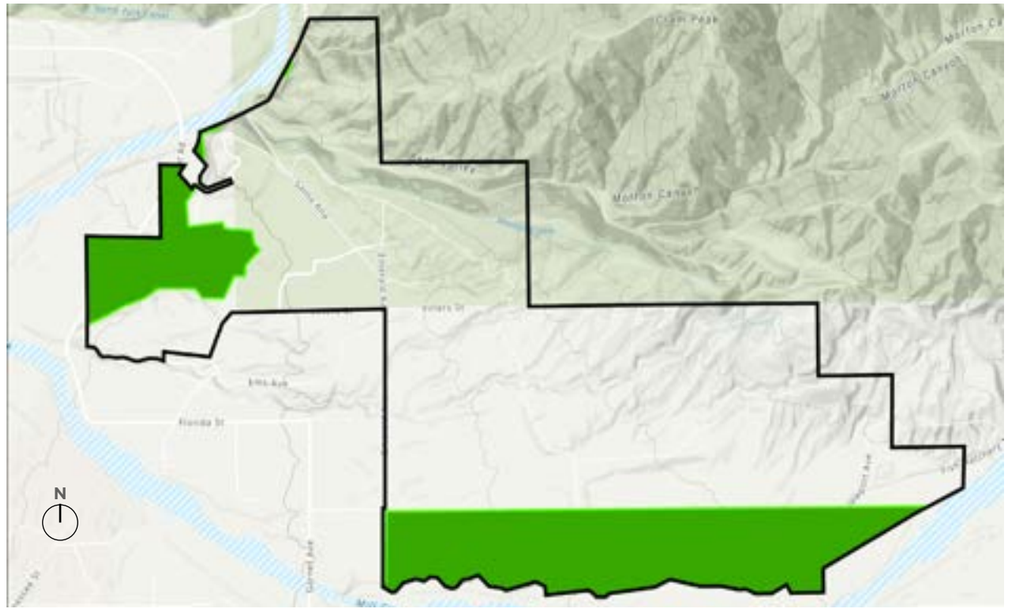


Figure 7-20 SBKR designated habitat (noted in green) on the site

C. Critical Habitat

In 2002 the U.S. Fish and Wildlife Service designated critical habitat for the San Bernardino kangaroo rat (SBKR) under the Endangered Species Act. Figure 7-20 depicts where USFWS designated critical habitat overlaps the property. Floodplains associated with Mill Creek and the Santa Ana River are listed as critical habitat and provide potentially suitable habitat. Critical habitat also occurs in foothill areas located immediately adjacent to Mill Creek and the Santa Ana River. Though these areas do not provide the necessary constituent elements for SBKR that are described in the critical habitat designated, the areas do provide a buffer that may afford benefit to areas of potentially suitable habitat.

Regardless of suitability, a federal nexus for any proposed project that overlaps critical habitat triggers a consultation between the federal agency and U.S. Fish and Wildlife Service (USFWS) before any federal permits can be issued.

Figure 7-21 Potential enhancement opportunity areas for SBKR; downstream of pilot channel

Figure 7-22 Potential enhancement opportunity areas for SBKR; sand piles

7.2 WATER RESOURCES

A. Surface Water Hydrology/Drainage

Surface flows through the site emanate from local tributary watersheds draining through the property. Two large regional conveyances, Mill Creek and the SAR, flank the south and west borders of the property. Some details about the regional and local watersheds are shown in Figure 7-23.

The hydrologic processes that generate runoff in these watersheds, and the nature of the flows from these watersheds, play a tremendous role in the subsurface hydrology, topography, physical characteristics, and types of habitat that exist and that can be fostered on the Sunrise Ranch property area. Surface flows on the property originate from a combination of local and regional watersheds.

1. Regional Watersheds and Floodplains

The Mill Creek watershed and the SAR watershed above Seven Oaks Dam, which border the Sunrise Ranch property to the south and west, are both environmentally significant, and have been affected by anthropogenic impoundments created for water use and distribution, power generation, and flood control. These two regional watersheds generate consistent perennial stream flows from regular runoff that provide nearly continuous flows in the SAR and Mill Creek.

Regional flows and associated periodic peak flow rate surges are essential components in the creation cycle and maintenance of the SBKR habitat that exists on the property. They also provide ongoing feed to local aquifers that supply groundwater to the Bunker Hill Subbasin. As a fundamental defining element of the Sunrise Ranch property, these flows create a location that is significant to the regional water cycle and an ideal setting for the planned project goals. Detailed flow rates for the regional watersheds are provided in Figure 7-29.

Both watersheds are fundamentally similar in that they are large, arid mountain watersheds in the transverse range. However, the nature of the SAR and Mill Creek channels is quite different, owing to the differences in the geology of the watersheds and the channels and the debris-capturing effects of Seven Oaks Dam.

A. Santa Ana River Watershed and Floodplain

The SAR watershed above Seven Oaks Dam is approximately 210 square miles, draining portions of both the San Gabriel and San Bernardino Mountains. The SAR drainages tributary to the project site include Big Bear Lake and the San Bernardino Mountains north of Big Bear. The SAR watershed extends from Big Bear Lake through portions of San Bernardino, Riverside, and Orange County on its way to the Pacific Ocean at Huntington Beach. The ecological significance of the watershed includes areas of high importance at the estuary and in the river channel along the Sunrise Ranch property. There are small amounts of SAR floodplain on the property, with much of the broader channel overbanks forming the western extents of the property and associated habitat areas.

The river itself flows nearly 100 miles from its northernmost reaches at the crest of the San Bernardino Mountains, south of Big Bear, out to the coast near Huntington Beach. The man-made installations of Prado Dam and Seven Oaks Dam have significantly altered the flow patterns and geomorphic behavior of the SAR. Seven Oaks Dam is immediately upstream of the Sunrise Ranch property and bears complete control over the possible flows in the SAR along and downstream of the property.

The upper SAR system can be broadly described using the Rosgen classification system. The slope is moderately steep past the Sunrise Ranch property, but the valley opens up to become Type VIII, a wide valley, with a gentle longitudinal slope downstream of the project, well developed floodplains, and terraces adjacent to the river. Soils are developed over predominantly alluvial depositions. The resultant stream is Type C, with moderate meandering, slightly entrenched and defined channels, and broad valleys associated with floodplains.

The SAR traverses several large groundwater basins that are recharged along its path. The strong flow to groundwater is a fortuitous result of the channel bed composition and subsurface geology. The channel bed material along the length of the river is predominantly sand composition.

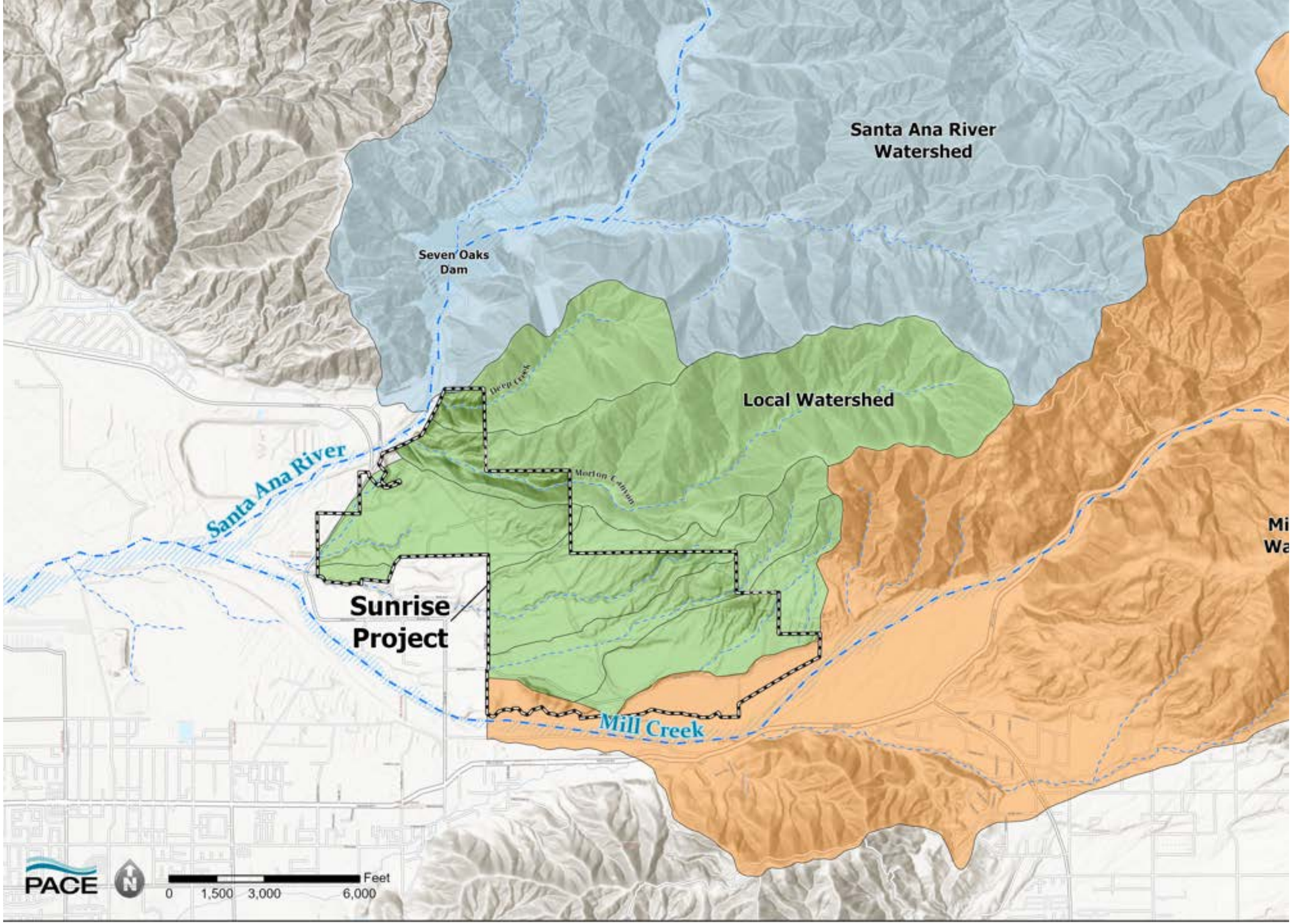
The SAR floodplain is relatively confined upstream of the confluence with Mill Creek, particularly along the north-westernmost border of the project property where the SAR channel is still steeply descending downstream from Seven Oaks Dam. The USACE and Federal Emergency Management Agency (FEMA) hydraulic modeling both show a moderately narrow floodplain, considering the flowrates in the SAR, with some widening as the channel approaches the Mill Creek confluence.

Watershed Name & Location	Watershed Area		% of Total Watershed
	(sq. miles)	(Acres)	
Santa Ana River (at Seven Oaks Dam)	210	134,122	79%
Mill Creek (above SAR Confluence)	49	31,323	19%
Sunrise Project Local Watersheds (upstream of project boundary)	3.4	2,191	1%
Sunrise Project (on site Watershed)	2.6	1,657	1%

Figure 7-23 Watershed area summary

Watershed Name & Location	Area (sq miles)	Area > 6,000 Elev.		Elevation	
		(%)	(sq. miles)	High Point	Low Point
Santa Ana River (at Seven Oaks Dam)	210	76%	160	11,400	1,890
Mill Creek (above SAR Confluence)	49	53%	26	11,200	2,050
Sunrise Project Local Watersheds (upstream of project boundary)	3.4	NA	NA	4,624	2,073
Sunrise Project (on site Watershed)	2.6	NA	NA	2,909	1,746

Figure 7-24 Watershed area and elevation details



igure 7-25 Sunrise project with the Mill Creek and Santa Ana River watersheds

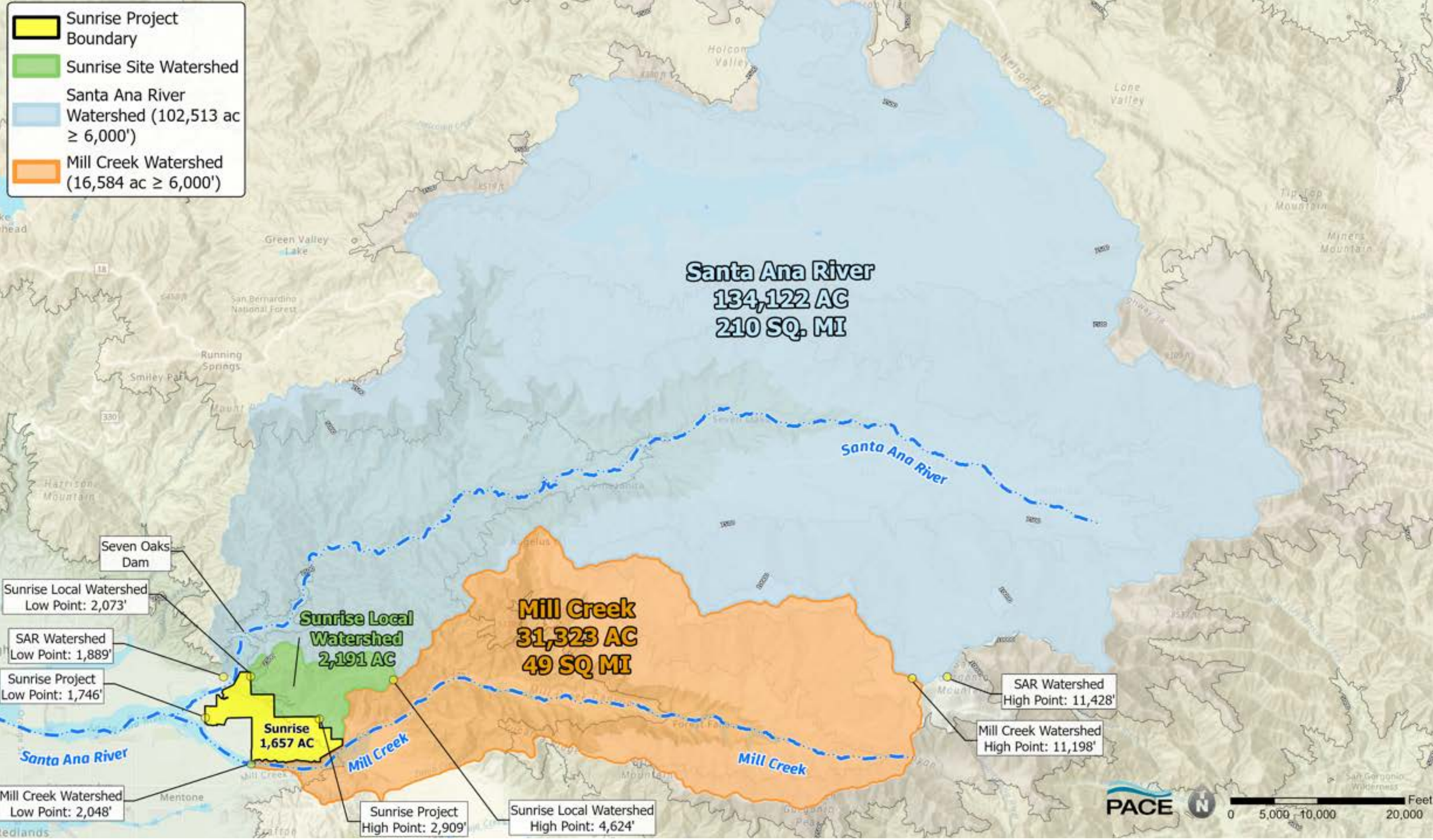


Figure 7-26 Sunrise project regional and local watersheds

Figure 7-27 Santa Ana River at Greenspot Road Bridge: view of Santa Ana River Enhanced Recharge in the distance

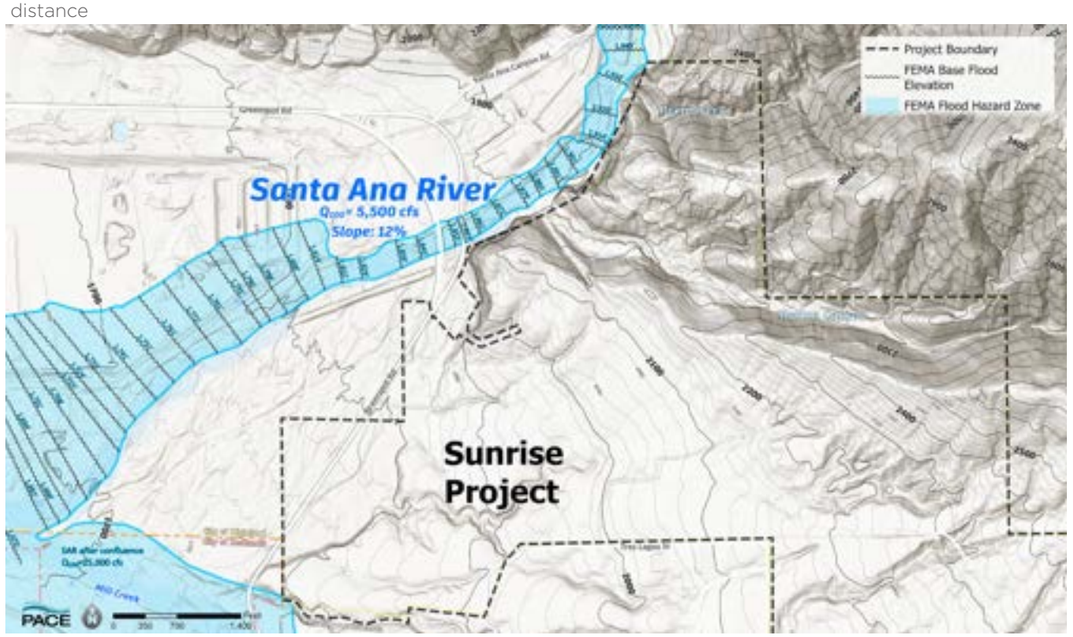


Figure 7-28 Santa Ana River Floodplain adjacent to Sunrise Ranch Property

Watershed Name & Location	Area (sq miles)	Area > 6,000 Elev. Elevation						
		2-yr 50%	5-yr 20%	10-yr 10%	25-yr 4%	50-yr 2%	100-yr 1%	200-yr 0.5%
Santa Ana River (Above Seven Oaks Dam)	210	1,100	4,300	8,800	20,500	34,000	58,000	88,000
Santa Ana River (Below Seven Oaks Dam)	210	500	2,000	2,150	3,150	4,200	5,500	6,900
Santa Ana River (Below Mill Creek Confluence)	259	760	2,050	4,300	9,300	15,500	25,000	37,000
Mill Creek (Above SAR Confluence)	49	225	1,250	2,900	7,700	13,000	22,000	33,000

Figure 7-29 SAR and Mill Creek flow rates

The SAR hydraulics and floodplain have been analyzed by both the USACE and FEMA. FEMA has a detailed Hydrologic Engineering Center – River Analysis System (HEC-RAS) model that was used to develop 100-year base flood elevations and floodplain extents. The effective FEMA floodplain is shown on Figure 7-28. The depicted floodplain limits are Flood Insurance Rate Map (FIRM) panel boundaries based on regional level hydraulic modeling and do not necessarily reflect the actual floodplain boundaries adjacent to the project property at a detail level.

B. Mill Creek Watershed and Floodplain

The Mill Creek watershed is a smaller regional watershed, approximately 65 square miles, draining a region of the San Bernardino Mountains immediately south of the SAR watershed, including Angeles Oaks and Forest Falls. The Mill Creek watershed is a significant component of the overall SAR tributary, flowing into the SAR at the western apex of the jut of land between the SAR and Mill Creek, west of the Sunrise Ranch property. There is significant habitat and habitat opportunity in the broader Mill Creek channel along the Sunrise Ranch property.

There are no flood control impoundments along Mill Creek; however, there are stream diversions for non-consumptive use through Southern California Edison's (SCE's) Mill Creek Power House (PH) 1 and 3, located upstream of the project property, followed by the Cooley Hat diversion into consumptive uses downstream.

Emanating from the mountainous area south of the upper SAR watershed, the creek plunges along the south border of the Sunrise Ranch property to the confluence with the SAR. The valley, which can be classified as Type II, is steep and cuts across the bottom parts of transverse ridges of tributary catchments. The colluvial slopes are composed of mainly rocky material with bedrock exposures. The creek is classified as Type B, which is relatively straight. The creek is dominated by rapids with occasional scour pools. The main channel creek bed material is predominantly cobble and rounded river rock, with a relatively low sediment supply.

Mill Creek flanks several thousand feet of the southern property boundary. The Mill Creek floodplain extends across a large part of the south part of the property, with 63 acres of FEMA 100-year Mill Creek floodplain within the property limits.

The Mill Creek hydraulics have been analyzed by the USACE in support of a federal floodwall project upstream of Sunrise Ranch. The model

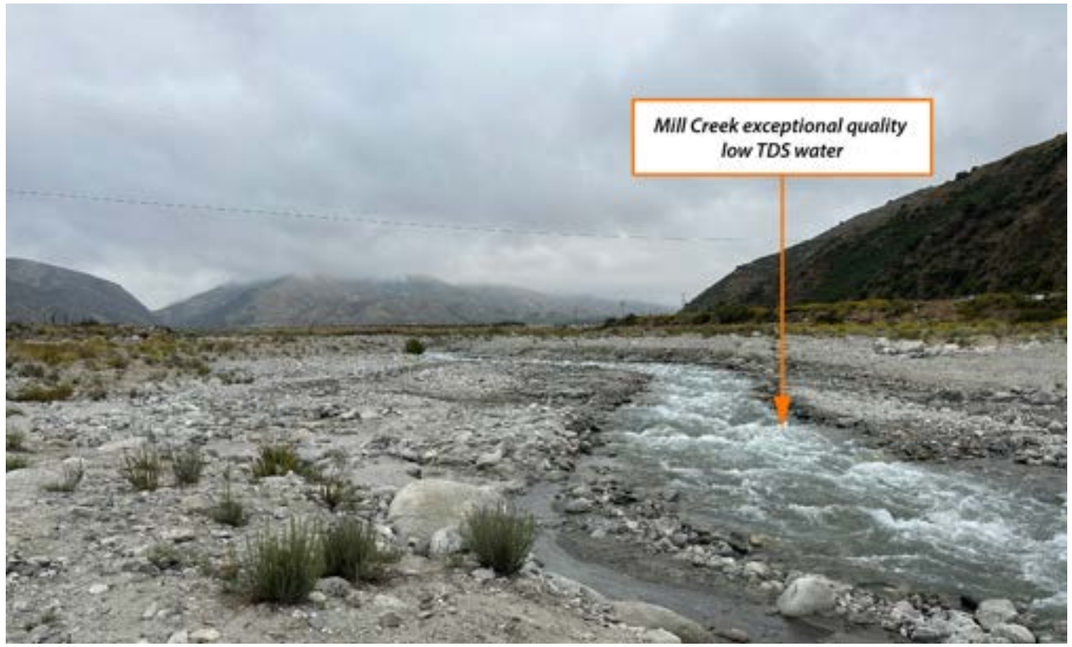


Figure 7-30 Mill Creek: Looking Upstream from Powerhouse 1

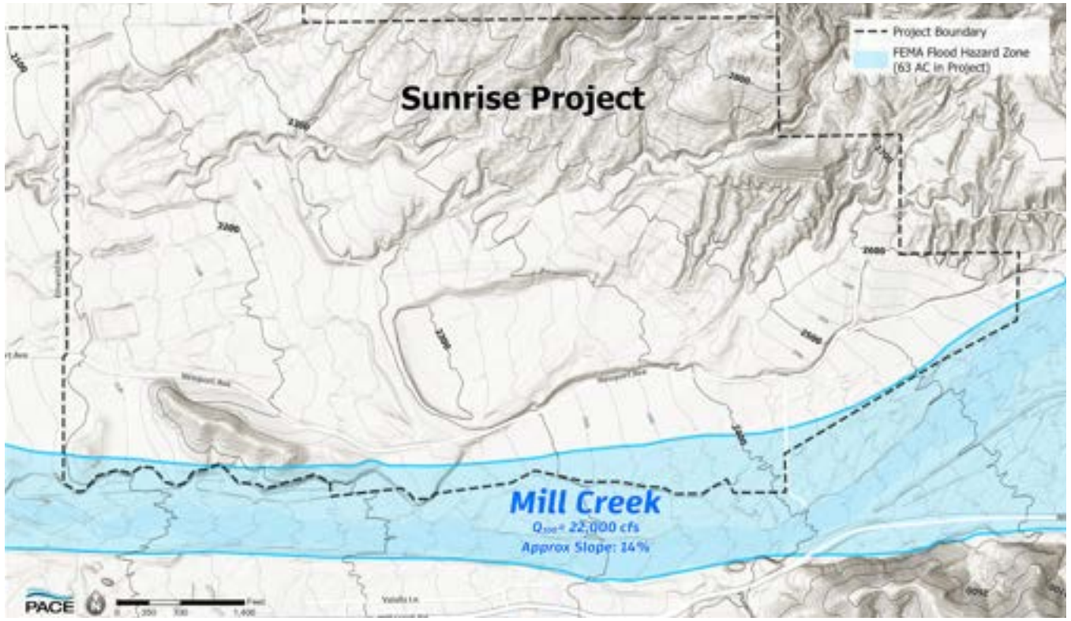


Figure 7-31 Mill Creek Floodplain Within Sunrise Project

was not available for project consideration in this document. FEMA has a published 100-year floodplain on Mill Creek, shown on Figure 7-31, which is based on approximation methods and does not provide any flood elevation data. The FEMA floodplain should, however, approximately represent the floodplain boundary expected from appropriate regional hydraulic analysis.

Much of the floodplain, based on assessment of topography and terrain, is on broader overbank terraces composed of sand and finer materials along the Sunrise Ranch property. These terraced overbanks support vegetation and are subject to periodic flushing and reset during high flow events in Mill Creek. The geologic and hydrologic conditions contribute to an environment that may be suitable for SBKR and other species.

2. Local Watersheds / Drainages

Surface flows at Sunrise Ranch also include ephemeral pulse-type flows from the local watersheds, which are tributary to, and drain through, the property. They comprise the "local watershed" drainage area shown in green on Figure 7-25. The watersheds range in size from less than 200 acres to approximately 1,500 acres, as shown on Figure 7-32, and provide occasional runoff when local precipitation is significant enough to generate surface excess. All of the local watersheds have similar hydrology and physiographic features.

Each of the local watersheds exhibits arid region hydrology with flows dominated entirely by local precipitation events. The local watersheds are generally dry and lack base flows, except for the Morton Canyon watershed, which has spring activity and attendant vegetation.

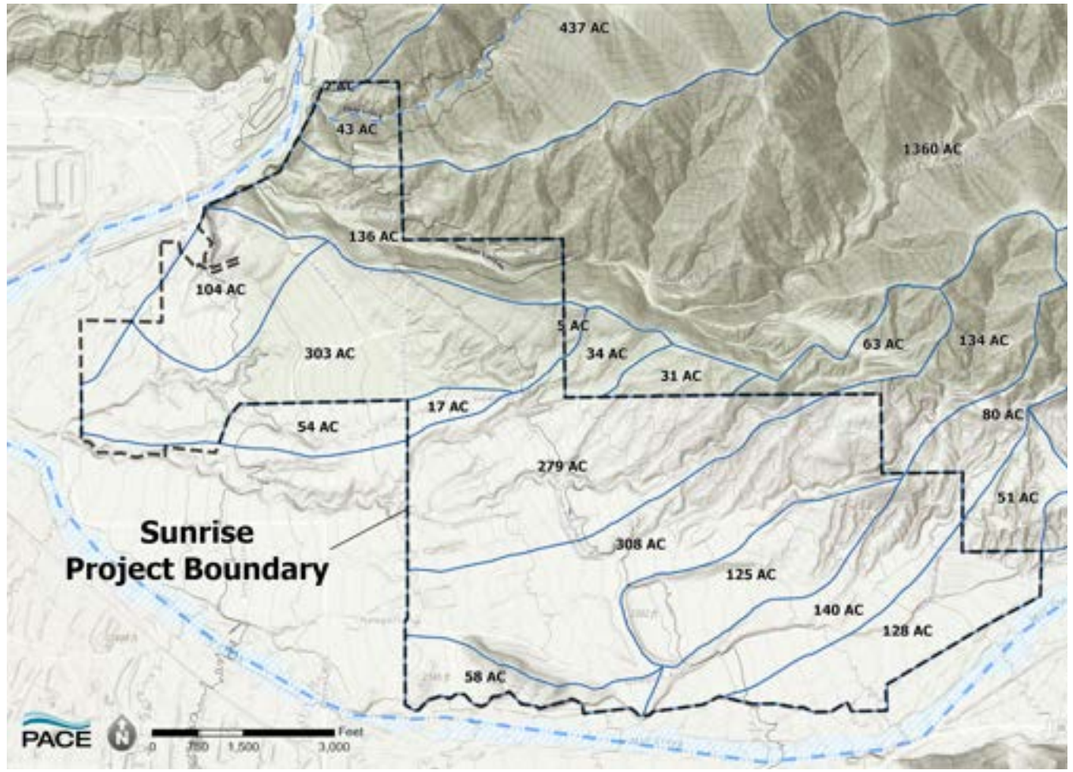


Figure 7-32 Existing local hydrology map

The occasional flows through the project area created by local rain events have established the site geography, which is dominated by rolling hillside and ridges with incisions, formed over time by flashy runoff through the ancient soil on the project surface. Although local runoff only occurs during local storms, it may be useful to consider when accounting for future water demand and usage.

Hydrologic calculations were performed for the local watersheds to calculate the peak flowrates and flow volumes tributary to points along the project border and at certain locations within the Sunrise Ranch property.

Hydrographic analysis was performed for 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storms to calculate runoff peak flow rates and volumes. The San Bernardino County storm pattern is constructed from nested blocks of intensity, built outward from the peak period of intensity. The storm pattern captures the high intensity peaks characteristic of short storms and the larger runoff volumes characteristic of long storms. Calculations used San Bernardino County Hydrology Manual loss rates and storm patterns and National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation data. The calculations used a short-form calculation, without convoluting with a unit hydrograph. Thus, the calculated peaks are slightly conservative, and the volumes are exact. The local hydrology results are summarized in Figure 7-34.

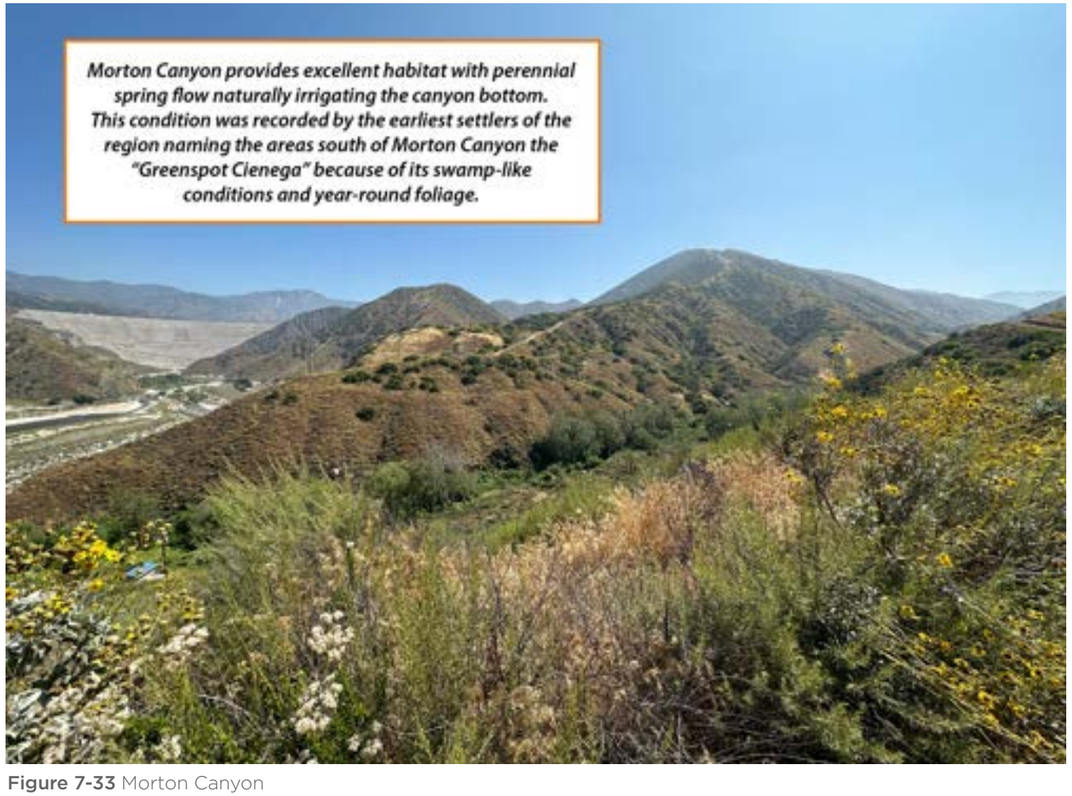


Figure 7-33 Morton Canyon

B. Groundwater / Hydrogeology and Faults

Groundwater basins in the San Bernardino Valley service area include the following:

- San Bernardino (Bunker Hill)
- Rialto-Colton
- Chino
- Riverside-Arlington
- Yucaipa
- San Timoteo

Of these, the San Bernardino Basin Area (historically known as the "Bunker Hill Subbasin") is a primary aquifer used for pumping, storage, and recharge in the San Bernardino Valley. As shown in Figure 7-37, the Sunrise Ranch property lies atop the northeast corner of the Bunker Hill Subbasin. Any groundwater extracted or recharged from the Sunrise Ranch property must be in conformance with the groundwater adjudications and management strategies associated with this subbasin.

"California's Groundwater" (Bulletin 118) is the State's official publication on the occurrence and nature of groundwater in California. The publication defines the groundwater basin boundaries and summarizes groundwater information for each of the State's 10 hydrologic regions. Information about the Santa Ana River watershed groundwater basins from this publication is presented in Figure 7-35.

Node	Area (ac)	100-Year Q (cfs)	100-Year V (ac-ft)	50-Year Q (cfs)	50-Year V (ac-ft)	25-Year Q (cfs)	25-Year V (ac-ft)	10-Year Q (cfs)	10-Year V (ac-ft)	5-Year Q (cfs)	5-Year V (ac-ft)	2-Year Q (cfs)	2-Year V (ac-ft)	Area (ac)	Node
1	2	6	1.1	5	1.0	5	0.8	4	0.7	3	0.5	2	0.3	2	1
2	437	1288	158.8	1135	121.9	981	100.3	788	80.7	645	64.5	470	43.6	437	2
3	480	1416	174.6	1248	134.1	1078	110.3	866	88.7	709	71.0	516	47.9	480	3
4	1360	4010	494.5	3533	379.7	3053	312.4	2452	251.2	2008	201.0	1462	135.6	1360	4
5	1496	4555	827.9	4042	725.2	3529	621.0	2889	488.3	2418	387.6	1844	258.2	1496	5
6	5	16	2.8	15	2.4	13	2.0	10	1.5	9	1.1	6	0.7	5	6
7	104	313	49.4	277	41.4	241	33.1	195	22.2	162	17.2	120	14.0	104	7
8	373	1124	182.0	995	153.8	865	124.7	703	86.5	583	59.3	436	50.6	373	8
9	17	50	7.6	44	6.3	38	5.0	31	3.2	26	2.8	19	2.2	17	9
10	71	213	35.7	189	30.5	164	25.1	134	18.1	111	12.6	84	9.5	71	10
11	34	103	17.9	91	15.5	80	13.0	65	9.7	54	7.2	41	4.2	34	11
12	51	154	28.1	137	24.6	120	21.1	98	16.6	82	13.2	62	8.8	51	12
13	20	60	10.9	53	9.5	46	8.2	38	6.4	32	5.1	24	3.4	20	13
14	63	191	34.7	170	30.4	148	26.1	121	20.5	101	16.3	77	10.9	63	14
15	11	35	6.3	31	5.5	27	4.7	22	3.7	18	3.0	14	2.0	11	15
16	134	407	74.0	361	64.8	315	55.5	258	43.7	216	34.7	165	23.2	134	16
17	403	1203	174.7	1063	142.4	921	108.8	745	77.7	614	67.0	453	49.8	403	17
18	134	407	72.7	361	63.4	315	53.9	258	41.6	215	32.3	164	20.1	134	18
19	271	821	142.0	728	122.6	634	102.6	517	76.8	431	56.8	326	34.0	271	19
20	590	1786	305.4	1582	262.6	1378	218.6	1123	161.6	936	117.2	705	76.9	590	20
21	75	223	31.5	197	25.4	171	19.0	138	14.5	113	12.3	83	9.0	75	21
22	80	242	43.1	215	37.5	187	31.8	153	24.5	128	18.9	97	11.6	80	22
23	220	658	96.6	581	79.1	504	60.8	408	42.2	336	36.8	248	27.7	220	23
24	58	174	25.9	154	21.2	134	16.4	108	11.1	89	9.8	66	7.4	58	24
25	51	156	26.9	138	23.3	120	19.5	98	14.6	82	10.8	62	6.4	51	25
26	179	531	70.6	469	55.8	406	40.7	327	34.3	268	28.0	196	20.1	179	26
27	220	670	120.2	594	105.0	518	89.4	424	69.5	354	54.3	270	34.6	220	27
28	190	577	104.6	512	91.6	447	78.3	366	61.5	306	48.6	233	32.1	190	28
29	186	566	103	503	90.1	439	77.2	359	60.6	301	48.1	229	32.0	186	29

Figure 7-34 Sunrise project local hydrology runoff peak flow & volume table

Basin		Storage
Upper Watershed	Bunker Hill Basin	5.90 Million AF
	Riverside/Arlington Sub basin	0.25 Million AF
	Chino Basin	5.00 Million AF
Lower Watershed	Orange County Basin	38.00 Million AF

Figure 7-35 Major Santa Ana River Groundwater Basins
Source DWR, Bulletin 18; https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/8_002_06_BunkerHillSubbasin.pdf

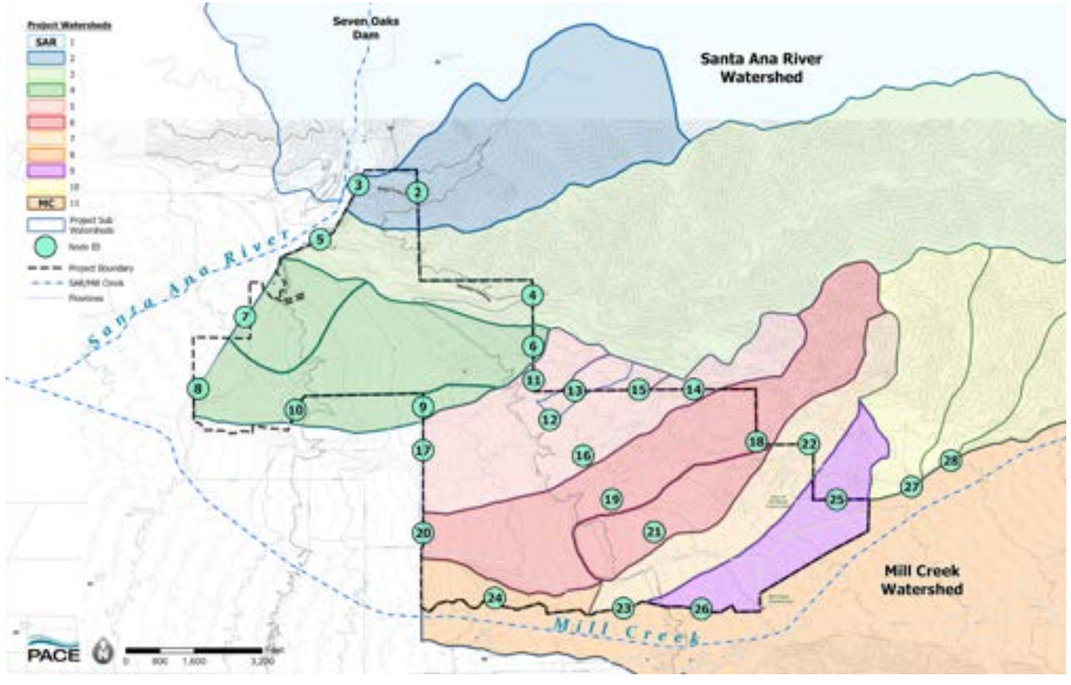


Figure 7-36 Existing local hydrology map

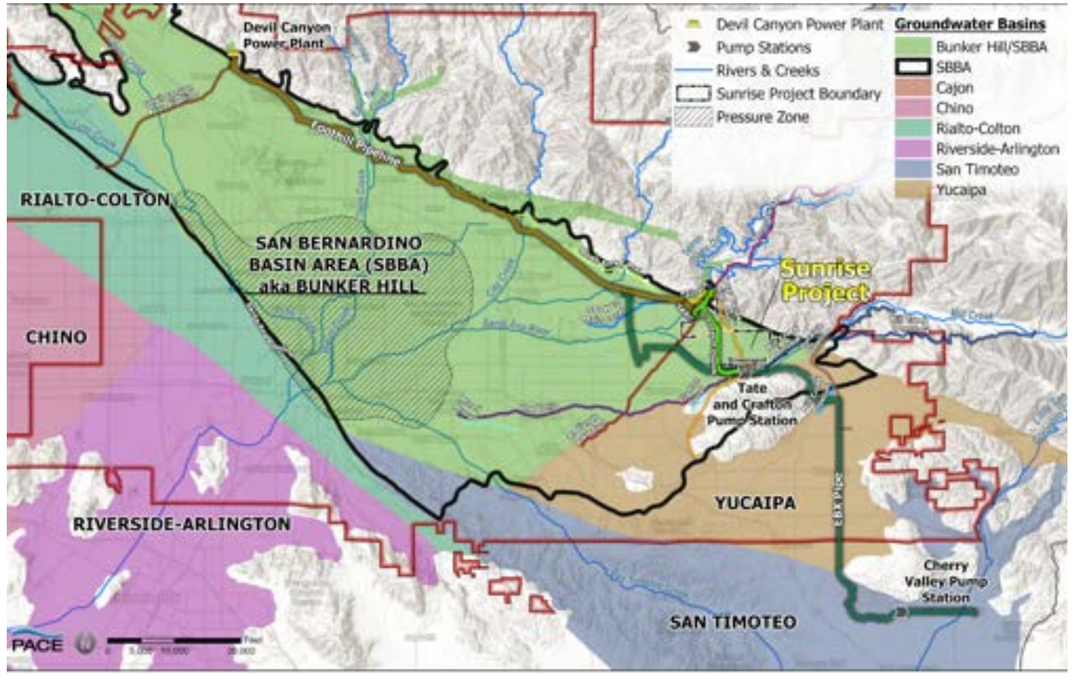


Figure 7-37 Groundwater basins located within Sunrise Project property

1. Regional Groundwater Basins – Bunker Hill (aka San Bernardino Basin Area SBBA or SBB)

The Bunker Hill Subbasin, also known as the San Bernardino Basin Area (SBBA), is the most relevant regional groundwater basin to the Sunrise Ranch property. From "California's Groundwater" (Bulletin 118), last updated in November 2021:

Basin Boundaries and Hydrology
The Bunker Hill Subbasin consists of the alluvial materials that underlie the San Bernardino Valley. This subbasin is bounded by contact with consolidated rocks of the San Gabriel Mountains, San Bernardino Mountains, and Crafton Hills, and by several faults. The southern boundary is the Banning fault, the east boundary is the Redlands fault, the San Andreas fault is roughly the northern boundary, the Glen Helen fault abuts the northwest boundary, and the southwest boundary is the San Jacinto fault. The SAR, Mill Creek, and Lytle Creek are the main tributary streams in the subbasin (SBVWCD 2000). The range in annual precipitation is 13 to 31 inches.

Hydrogeologic Information
Water Bearing Formations – The water-bearing material in the subbasin consists of Holocene and Pleistocene age alluvial deposits of sand, gravel, and boulders interspersed with deposits of silt and clay. The water-bearing material has been divided into upper and lower aquifers (Hardt and Hutchinson 1980). In the central part of the subbasin, a poorly permeable clay layer separates the aquifers, creating confined conditions in the lower aquifer under about 25 square miles of the valley. Maximum thickness of the upper aquifer is approximately 350 feet, and maximum thickness of the lower aquifer is approximately 650 feet. Groundwater generally converges toward the SAR in the southwestern part of the subbasin and discharges over the San Jacinto fault at Colton Narrows (USGS 1989). Wells yield up to 5,000 gallons per minute (gpm) and average about 1,245 gpm. Specific yield of these deposits ranges from 7 – 21 percent and average 13 percent.

Restrictive Structures – The San Andreas fault zone impedes movement of ground water, producing springs and a groundwater level change that marks the fault trace along the northern boundary of the subbasin. The San Jacinto fault forms a strong barrier to groundwater that raises the water table nearly to the surface below the course of the SAR. The combination of alluvial material with a high water-table in a seismically active area creates a hazard for liquefaction. The Redlands and Banning faults also impede ground water movement along the borders of the subbasin.

Recharge Areas – Recharge to the Bunker Hill Subbasin historically has resulted from infiltration of runoff from the San Gabriel and San Bernardino Mountains. The SAR, Mill Creek, and Lytle Creek contribute more than 60 percent of the total recharge to the ground-water system. Lesser contributors include Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino Mountains. The subbasin is also replenished by deep percolation of water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds.

Groundwater Level Trends – In general, the far eastern and northwestern portions of the Bunker Hill Subbasin show the largest decreases while the rest of the subbasin shows mostly stable or increasing ground water elevations. Average changes in ground water level elevations between Fall 1998 and Fall 1999 ranged up to an increase of about three feet.

Groundwater Storage – Groundwater Storage Capacity. Total groundwater storage of the subbasin is 5,976,000 (DWR 1986). The San Bernardino Valley has been calculating the change in groundwater storage for the San Bernardino Basin (SBB) since 1970.

Groundwater Budget (Type A) – Pumping data indicate 164,319 AF of urban extraction and 23,977 AF for water year 1998 (SBVWCD 2000). Natural recharge for 1998 is reported at 23,861 AF (SBVWCD 2000) and artificial recharge is reported at 15,835 AF (Crowly 2000). DWR (1986) determined an average subsurface inflow to be about 22,500 AF.

2. Local Groundwater Basin – Greenspot Area

The Sunrise Ranch property is located in an area of sloping terrain at the foothills of the San Bernardino National Forest, directly atop a local groundwater basin known as the Greenspot Area.

Faults sometimes form underground barriers to flow, trapping groundwater in local areas, depending on the nature of the faulting. A "fault gouge" can form a clay-like material between the displaced rocks, acting as a type of low permeability curtain. More often, barriers form when the stratigraphy on either side of the fault is displaced, interrupting the horizontal sandy layer flow paths by juxtaposing them against layers of clay, thus impeding the flow across the fault. Because the fault offset is buried beneath a blanket of recent alluvium, faults and barriers are usually mapped indirectly by mapping the elevation of groundwater in shallow wells on either side of the buried fault traces. A break in water surface elevations with a linear alignment is indicative of a flow barrier.

The Greenspot Fault is an example of a fault mapped by this method. Groundwater on the east side of the barrier is at or near ground surface, and on the west is much deeper. The written history and United States Geological Survey (USGS) studies performed in the past suggest that the area under the land constitutes a saturated "box" of groundwater up to 1,000 feet deep, 1 mile wide, and 2 miles long. What is not known is the hydraulic conductivity of the sediments. Normally, one would expect loose "high-energy" deposits this close to the eroding mountain fronts, but in this instance, with the presence of the Greenspot flow barrier and the known formation of the Greenspot Cienega within the graben, it might be that the depositional environment allowed for regular accumulation of a conglomerate of clayey material along with the sand, gravel, and rock. Drilling logs and past mining of "low permeability" material for construction of Seven Oaks Dam seem to suggest this.

Figure 7-38 Santa Ana River Greenspot Road: Historic and new bridges

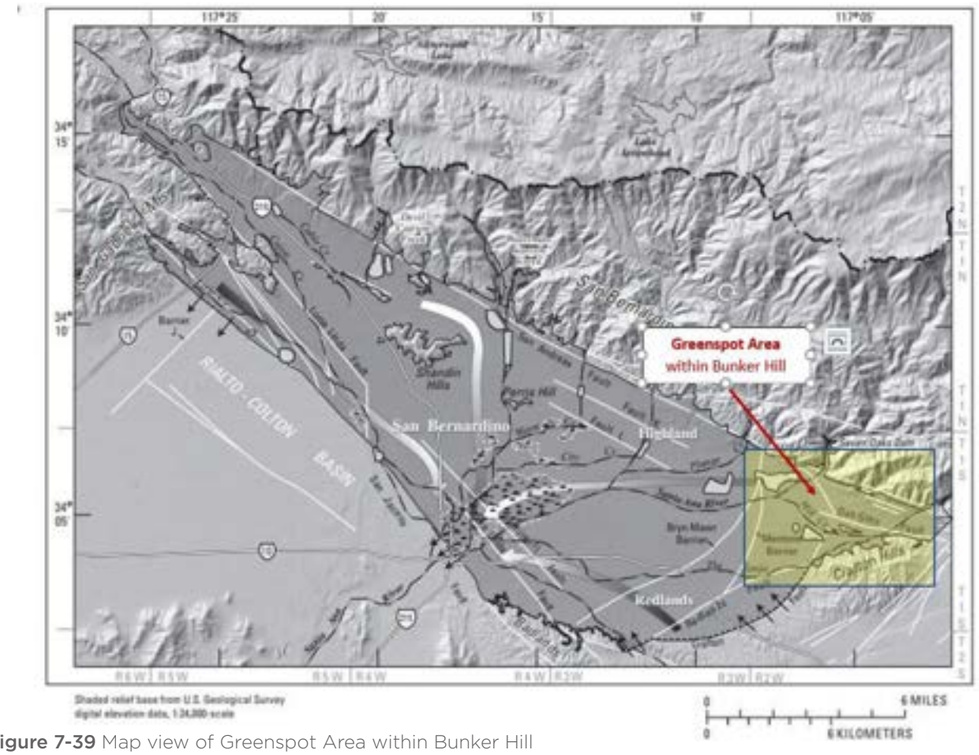


Figure 7-39 Map view of Greenspot Area within Bunker Hill
Source USGS 1959

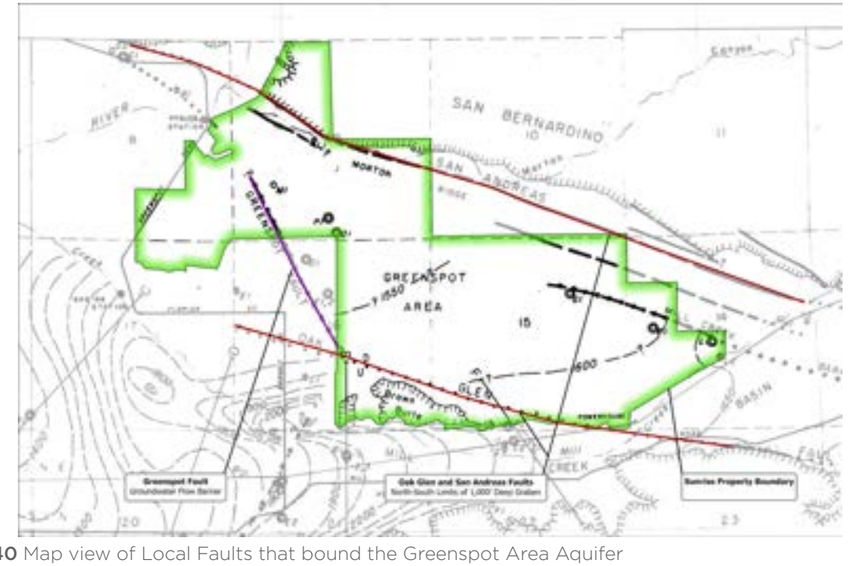


Figure 7-40 Map view of Local Faults that bound the Greenspot Area Aquifer
Source USGS 1959 - Plate 3 with Sunrise Property Boundary Overlay & Greenspot Area Faults Identified

Figure 7-41, 42 Historic pictures of flowing Artesian Well in the area
Source City of San Bernardino

The USGS mapped the geology of the area and described the north-easternmost tip of the Bunker Hill Subbasin as the "Greenspot Area," as shown in Figure 7-39 (USGS 1959). The Greenspot Area is bounded by faults, including the San Andreas Fault to the north, the Crafton Hills Fault to the east, the Oak Glen Fault to the south, and the Greenspot Fault to the west, shown in Figure 7-40.

The Greenspot name came from early migrants to the area who observed the area as green year-round with marshy soils (Greenspot Cienega). The condition was caused by westerly flowing groundwater encountering the Greenspot fault, causing it to upwell and overflow the fault barrier onto the surface, thus forming a type of oasis or swamp. In the early years, new wells placed upgradient of the fault produced water without pumping know as "flowing artesian" wells.

This is best described in an early account of the area titled "History of Water Rights in Mill Creek and the Zanja." A section in that account reads:

> The advent of hydro-electric power generation brought another problem to the zanja owners, this time in the form of a suit brought by the Mentone Irrigation Company. This company, organized in 1887 as the owner of a tunnel and a system of cuts and ditches together with two springs about 3,800 feet below the Zanja intake, from which the company tapped the underground water in the Mill Creek channel. The tunnel had been started in 1885 and by 1886 had been extended a distance of 1,300 feet eastward. Before 1893 the flow from the tunnel varied from 30 to 125 inches. However, in 1899 and 1900 the Mentone Irrigation Company drilled a well about 1,000 feet south of the tunnel. When the well was pumped there was no water at the tunnel.
> –SBVWCD 1937

Agricultural pumping drew down the groundwater levels (potentiometric heads), and the historically marshy conditions dried up. Historical records state that early citrus farmers in the Greenspot Area excavated horizontal water tunnels from a location downslope of the Greenspot Fault extending horizontally eastward through the fault zone, thus liberating the water trapped behind the low permeability fault. The water flowed freely out of the tunnel portal toward the west and downslope into the orchards. The tunnels reportedly worked for a while, but later collapsed, sealed themselves up, and were abandoned. The historical artesian conditions creating the Greenspot Area might also be responsible for the similar naturally wet condition encountered today in the Morton Canyon section of the property. The historical presence of the Greenspot Cienega also explains the presence of the low permeability soils that were mined for Seven Oaks Dam construction, typical of swamp deposits.

The Greenspot Area and the Sunrise Ranch property overlie the northeast corner of the Bunker Hill Subbasin, the largest groundwater basin in the upper SAR watershed. The site is less than 1 mile south of the San Andreas Fault, with some maps plotting the fault inside the property line. Early studies of the area show that

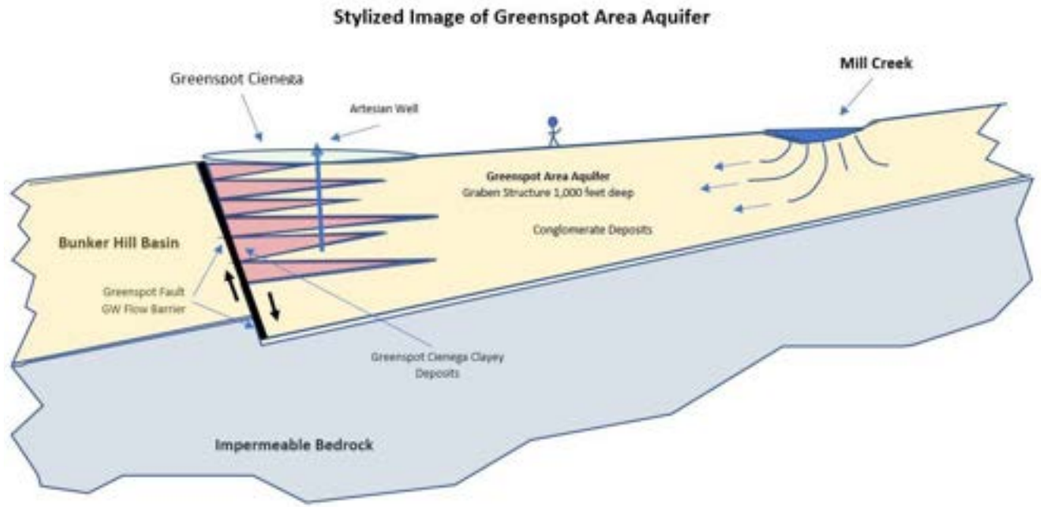


Figure 7-43 Stylized cross-section of Greenspot Area Aquifer

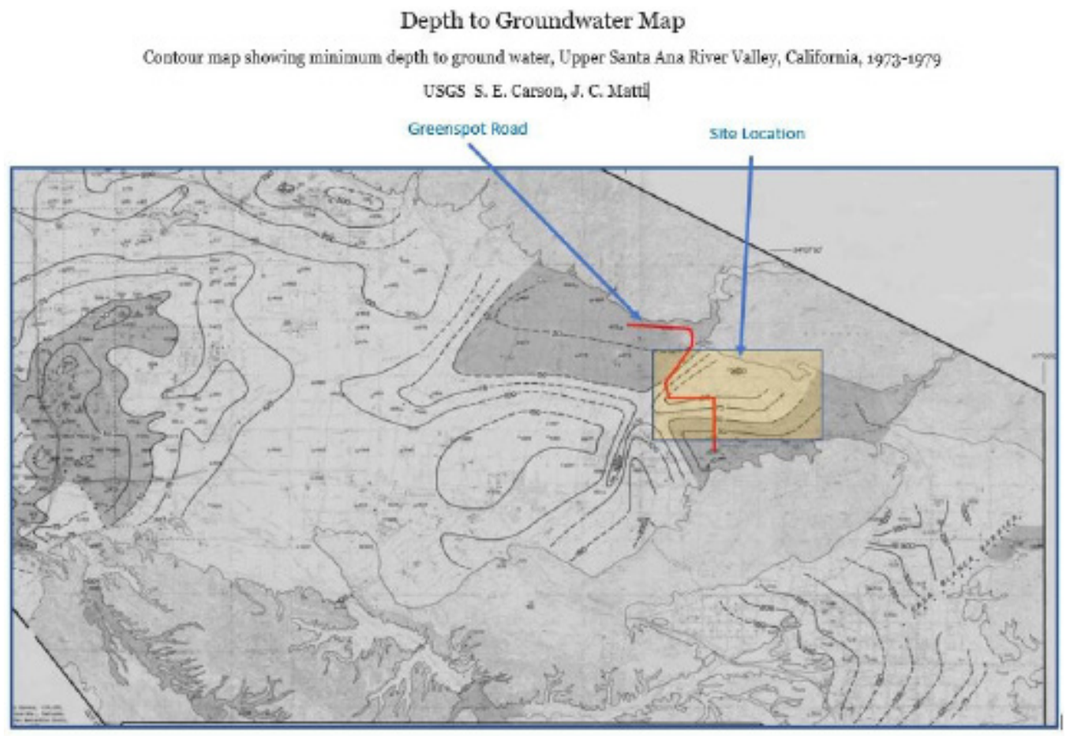


Figure 7-44 Depth to first Groundwater Map

the San Andreas Fault and the Oak Glen Fault, which run parallel to each other approximately 1 mile apart as shown on Figure 7-43, are spreading apart (north-south) and dropping the bedrock between the faults down about 1,000 feet. Geologically, this is known as a "horst and graben" structure, with the Greenspot Area being the now filled in graben (see Figure 7-45). The southern property line coincides with the "normal" Oak Glen Fault, the southern boundary of the graben structure. This is evidenced by the hard rock outcrop on the southern property line north of Mill Creek. This tertiary age granodiorite outcrop, described in the USGS publication as the "Brown Butte," is the on-property southern horst of this structure. This is an important consideration for the Sunrise Ranch property. If verified, then the property is underlain by sedimentary alluvial deposits down to a depth of 1,000 feet, which would make excavating large water reservoirs feasible without the possibility of encountering crystalline or cemented sedimentary bedrock. It also means there is likely to be an aquifer (aquitard) up to 1,000 feet thick capable of supporting the property and the Tres Lagos Mutual Water Company (TLMWC).

Underflow out of the Greenspot Area toward the larger aquifers such as Bunker Hill Subbasin is reported by the USGS to be "minimal," probably as a result of the Greenspot Fault and other unseen flow barriers (USGS 1959). The only challenge to this interpretation of the property as overlying a deeply dropped graben structure is the presence of "weathered granitic rock" detected by the previously proposed Harmony property developer's geologist in their Boring BH-3. The location of this boring is well within the graben and therefore should not be a location where shallow bedrock could be found. The geologist's report did, however, described it as "probable nested boulders," suggesting that it is not in-place bedrock. None of their additional 23 borings encountered similar weathered granitic rock. The investigation by the proponent of the Harmony development was limited to shallow depths because all borings hit "refusal" without getting very deep. The shallow depth of drilling was due to the fact that the property is a boulder field not suitable for hollow stem auger drilling equipment.

Review of a 996 feet deep well, log 1S/2W-14E01, drilled in 1932 indicates alluvial deposits to the maximum depth of the well. However, the rock descriptions indicate a large fraction of clay mixed in with sand and gravel for the entire depth. The geologist logging the well wrote, "no clean water bearing material in the well." Pump testing of the well, if it can be found, and possibly additional drilling would be needed to verify the ability to produce water from this property for use by the Agency or others.

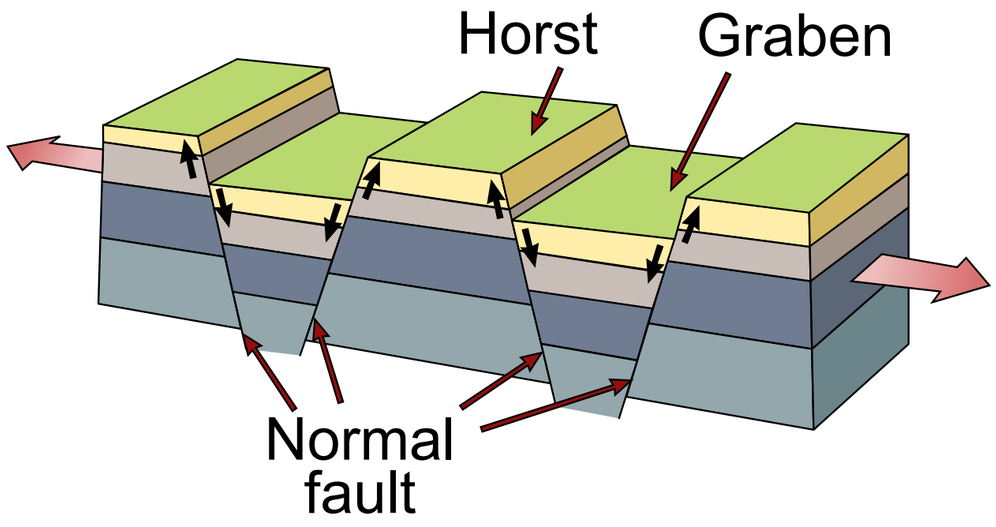


Figure 7-45 Stylized picture of Horst & Graben Structure
Source Wikipedia

Based on this hydrogeological description, the Greenspot Area can be thought of as a small subbasin of the larger Bunker Hill Subbasin. Although small in comparison to its neighboring basins, the Greenspot Area might hold 350,000 AF of water (2.5 miles x 0.8 miles x 900 feet deep x 30% porosity). This mini subbasin is hydrogeologically constrained from underflowing into the Mentone and Bunker Hill Sub-basins, and therefore does not currently play a significant role in the area's groundwater supply. Although abundant with water, the underlying sediments might constitute a slowly producing "aquitard" based on the presence of a significant fraction of clay intermixed within granular material. Well yield analysis and a water rights determination would be needed to determine the potential of this source.

C. Water Supply Managers, Wholesalers and Retailers

Water supply in the area is managed through a collaboration of agencies and water authorities, including:

- Wholesale water agencies
- Watermaster collaboration that oversees and regulates the extraction of groundwater
- Retail water agencies
- Mutual water companies

The region is rich with local and imported groundwater and surface water supply sources and a wide range of infrastructure to convey water to retail users and groundwater basins for storage and recharge.

Within the SAR watershed, water management activities are subdivided between the upper SAR and lower SAR watersheds, covering a combined total of 2,840 square miles. The subwatersheds are divided just upstream of Prado Dam along the east to west ridgeline of the San Gabriel and San Bernardino Mountains. The upper SAR watershed is approximately 2,213 square miles located primarily in San Bernardino and Riverside Counties. The lower SAR watershed is approximately 585 square miles located in Orange County.
The following sections describe the delineations of watershed and groundwater providers that support the region.

1. Wholesale Water Agencies

The SAR watershed is served by five wholesale water agencies, including:

1. San Bernardino Valley Municipal Water District (Agency)
2. Eastern Municipal Water District (EMWD)
3. Inland Empire Utilities Agency (IEUA)
4. Western Municipal Water District (WMWD)
5. Orange County Water District (OCWD)

These agencies are responsible for groundwater and imported water supply and cooperate in the management of the large areas that are tributary to the SAR.

Of these SAR watershed wholesale agencies, only the Agency is an SWP contractor. Those agencies west of San Bernardino receive imported water primarily from the Metropolitan Water District of Southern California (MWD).

The participation of these agencies in water supply management resources varies based on their involvement in groundwater and import sources and is summarized in Figure 7-47.

2. Watermaster – SAR Surface Water and Watershed Groundwater Basins

The 1969 Orange County and Western Judgments established Watermaster committees to administer both judgments. The Agency, WMWD, IEUA, and OCWD make up the SAR Watermaster committee and represent the interests of the upper and lower areas of the SAR with the responsibility to oversee the watershed. The Agency also participates in other Watermaster committees to ensure compliance with the following court determinations:

- Chino Groundwater Basin – 1978 groundwater adjudication
- Santa Ana River – 1969 surface water rights
- San Bernardino Basin Area – 1969 groundwater adjudication
- Santa Margarita River – 1964 surface and groundwater adjudication

3. State Water Project – Imported Water

The SWP (Figure 7-52) is planned, built, operated, and maintained by the California DWR and consists of approximately 700 miles of canals,

Figure 7-46 Santa Ana River Upper and Lower Watersheds
Source SAWPA

pipelines, and tunnels that span two-thirds the length of California. There are 36 storage facilities, 21 pumping plants, five hydroelectric power plants, and four pumping-generating plants included in the multi-purpose water storage and delivery system. As the nation's largest state-owned water and power generator, the SWP delivers water to 27 million people and 750,000 acres of farmland in California.

The California DWR administers long-term water supply contracts to 29 State Water Contractors (SWCs) for SWP deliveries. The Agency is the contract operator of the EBX and is the fifth largest SWC. The Inland Empire receives 28% of its average annual water supply from the SWP (SWC 2023). The Agency is allocated a "maximum take" of 102,600 acre-feet per year (AFY). That allocation is continually adjusted based on statewide hydrology and other factors and is regularly updated through the "Table A Allocation" as a percentage of the maximum allowed for each member.

The Sunrise Ranch property is located adjacent to the EBX. The EBX delivers water to San Bernardino County communities beginning at the Devil Canyon Power Plant in San Bernardino and ending on Noble Street, just south of Orchard Street in Cherry Valley. The EBX consists of two reservoirs, four pump stations, and 18.5 miles of pipeline (Figure 7-50).

4. San Gorgonio Pass Water Agency
The San Gorgonio Pass Water Agency is a SWP contractor connected to the eastern end of the EBX pipeline. However, they are not tributary to the SAR and operate independently of the others in the river basin.

From USARW IRUWMP:

> San Gorgonio Pass Water Agency (SGPWA) was established in 1961 by the California State Legislature. The service area includes the incorporated cities of Calimesa, Beaumont, and Banning, and the communities of Cherry Valley, Cabazon, Poppet Flat, San Timoteo Canyon, Live Oak Canyon, and the Banning Bench.
>
> San Gorgonio Pass Water Agency, a State Water Contractor, purchases water from the State of California and sells it to local retail water agencies in their service area in Riverside County, which use the water either for direct deliveries or for groundwater recharge. Water is imported into the service area by the East Branch of the California Aqueduct.

5. Retail Water Agencies
The retail water agencies in the area derive their supply from local groundwater, SAR and Mill Creek surface water, and/or imported water via the Agency. These agencies serve a blended mix of waters acquired from these sources to their retail customers in compliance with State policies and health department regulations. Private mutual water companies also serve isolated areas at a small scale. TLMWC, located adjacent the Sunrise Ranch property, is one such example. The larger retail water agencies adjacent to the site include:

a. East Valley Water District
b. Yucaipa Valley Water District
c. City of Redlands

There are a total of 18 retail water agencies within the local region as noted in Figure 7-54.

A. East Valley Water District
The property falls within the East Valley Water District (EVWD) retail service area, but currently there are no potable water or sewer utilities in or near the Sunrise Ranch property. EVWD is a California Special District established in 1954 that provides water and wastewater services to 103,000 residents within the cities of Highland, San Bernardino, and portions of San Bernardino County and encompasses 30.1 square miles.

D. Imported Water Supply and Demand

Forecasts of increasing demand are presenting a challenge for water managers. For the Agency, water demands primarily involve the wholesale supply to groundwater producers and municipal customers. For the purposes of this Plan, the delivery of imported water through the SWP is the most relevant consideration to meet this demand.

Water supply demands were studied as part of the 2020 Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan (WSC 2021). That plan and an associated study estimating future water demand growth for

Water Agency	SAR		Watermaster SAR	SWP Contractor	Water Wholesale	MWD Member
	Upper	Lower				
San Bernardino Valley Municipal Water District	X		X	X	X	
Eastern Municipal Water District	X		X		X	
Inland Empire Utilities Agency	X		X		X	X
Western Municipal Water District	X		X		X	X
Orange County Water District		X	X		X	
San Gorgonio Pass Water Authority (outside of the SAR watershed)				X	X	

Figure 7-47 Regional Wholesale Water Agencies roles in water supply management

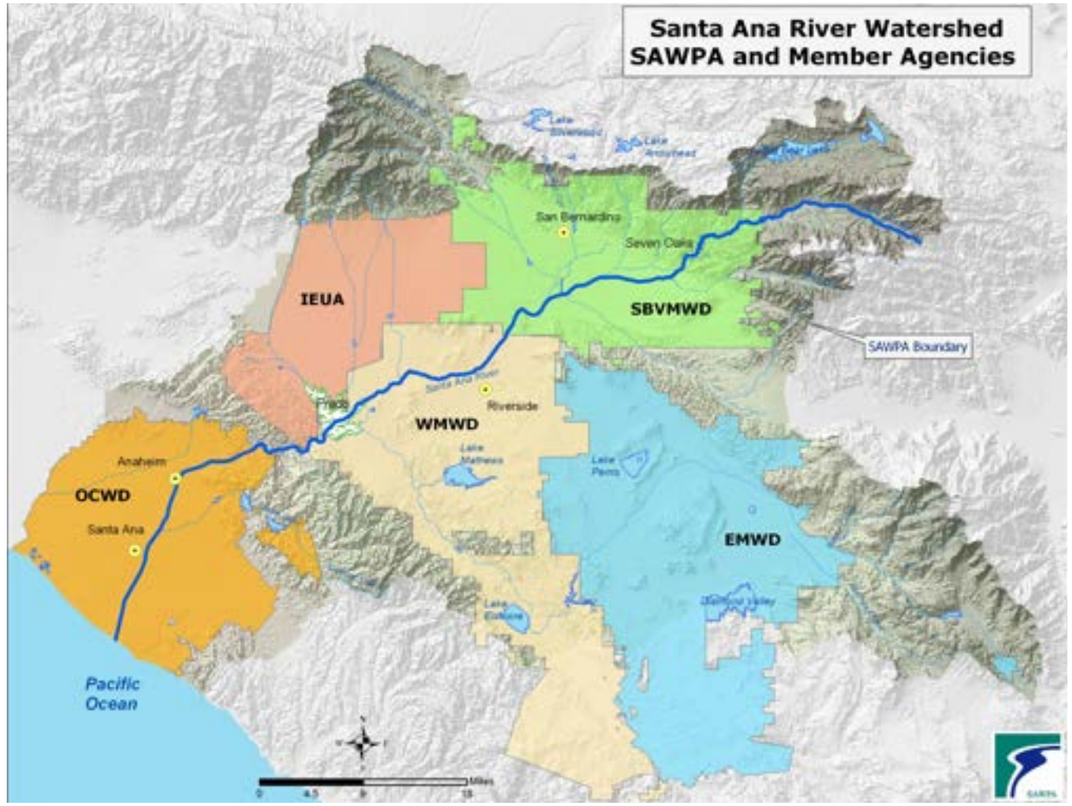


Figure 7-48 Wholesale Water Agencies serving Santa Ana River Basin
Source SAWPA

the Agency (RAND 2018) produced the following estimated growth (baseline), bounded by a range of uncertainty.

As can be seen in Figure 7-56, continued demand growth in the Agency service area is expected to be from 255,000 to 290,000 AFY (baseline) by 2040, a 14% increase over the next 17 years. It is reasonable to assume that the demands on EBX deliveries will be, at minimum, of similar proportions and probably higher. The current demand is met by full use of local water with imported water used as a supplemental supply. With current supplies fully accounted for, any growth in the region could only depend on increased importation via the SWP.

The SWP, like most California regional water systems, has high variability. Southern California is neither the driest nor the wettest hydrological climate, but it is the most variable in all of the United States. Precipitation not only changes seasonally but also exhibits dramatic swings from year to year. Figure 7-57 presents the past 93 years of rainfall statistics for the San Bernardino Valley area.

The SWP provides water to 29 public water agencies that serve 27 million Californians. Rainfall is only one of the many factors that influence import water availability to the area. The available water supply depends on how much precipitation occurs, where in the statewide system and at what elevation it occurs, and what the available storage capacity was before the rain/snowfall occurred. Other factors include maintenance needs and environmental requirements within the Bay Delta system, where conveyance is controlled to protect water ecology and endangered species, especially in dry years. All of these factors and others are distilled down to what is referred to by the SWP as a Table A Allocation. That allocation represents the percentage of available water for delivery to each SWP contractor.

As shown in Figure 7-58, the SWP Table A Allocation varies each year, with some years reaching nearly full allocation and others constrained to only 5% of the maximum take for each member agency.

Citrus Pump Station pumps imported water from the EBX to points to the east. Figure 7-59 shows the pump station's flow rates in the six years since startup, which is the best measure of the amount of imported water that has reached the area. As can be seen, the SWP deliveries are sometimes interrupted, which can be attributed to supply constraints resulting from both seasonal hydrology and the needs of the Bay Delta ecosystem.

The operating data from the Citrus Pump Station since its startup indicates several prominent delivery interruptions. Figure 7-60 and 7-61 identify those times when the pump station was shut down for more than seven consecutive days. The longest interruption occurred in late 2019 and continued for 154 days until May 31, 2020. All but three of these shutdowns could have been covered if continuous deliveries of 30 cfs or less were available for up to 50 days at a time.

In wet years, the San Bernardino Valley's water community is faced with oversupply from local drainages and ample availability of imported water. During dry years, the local drainages are committed to those with unmet water rights allocations, and the SWP source reservoirs are sometimes too low to continue their deliveries to the EBX.

Regional SWP Contractor	SWP Annual Allocation (AF/Year)
Metropolitan Water District of Southern California	1,911,500
San Bernardino Valley Municipal Water District	102,600
San Gorgonio Pass Water Agency	17,300

Figure 7-49 The SWP Final Delivery Report, 2021
Source DWR

Figure 7-50 State Water Project Map
Source DWR

Figure 7-51 Bear Valley Highline Pipeline

Figure 7-52 California Department of Water Resources State Water Project Infrastructure Map
Source California DWR https://water.ca.gov/-/media/DWR-Images/Maps/230726SWPPipelinesFacilitiesaav57.jpg

E. Existing Water Infrastructure

As shown in Figure 7-62, the Sunrise Ranch property is located in the center of a complex network of water distribution conveyances supplied by local sources such as the SAR, Mill Creek, and groundwater, along with imported supplies from the SWP. Since the early 1800's, this complex system of pipelines and canals has evolved to support the agricultural and urban developments of the area, and without it, the region would have remained dry and sparsely inhabited/utilized.

1. Seven Oaks Dam (USACE)

Seven Oaks Dam is a 550 feet high earth and rock fill embankment dam across the SAR at the narrowing of the upper SAR Canyon, where it impounds Seven Oaks Reservoir. The dam was constructed between 1994 and 1999 with flood control as its primary purpose. One of the largest embankment dams in the United States, the dam was built under contract from the USACE and is now owned by the County of San Bernardino Department of Public Works. Multiple local flood control districts share operation, including the Orange County, San Bernardino County, and Riverside County. The reservoir has a gross storage capacity of 145,600 AF, with 113,600 AF reserved for flood control and the remainder for sediment accumulation. At full pool, the reservoir lies at an elevation of 2,604.4 feet and has an area of 780 acres. Water releases are controlled by a 1,623 foot long gated tunnel outlet that runs through the base of the structure and a 500 feet wide ungated overflow spillway located on the southeast edge of the reservoir. The dam controls runoff from an area of 177 square miles, or 209 square miles including the drainage area of Baldwin Lake, which overflows into the SAR system during periods of heavy runoff.

2. Greenspot Pump Station and Pipeline

The Greenspot Pump Station (PS) was renovated in 2014 and is owned by the Department of Water Resources. The Greenspot PS and pipeline system supports flexibility in other aspects of the two- and three-way water transfers called for in the Exchange Plan. The pipeline and PS are reportedly in good condition and capable of conveying at least 60 cubic feet per second (cfs) from sources including the SWP and SAR to delivery points

Figure 7-53 Tate & Crafton Pump Station on south side of Mill Creek

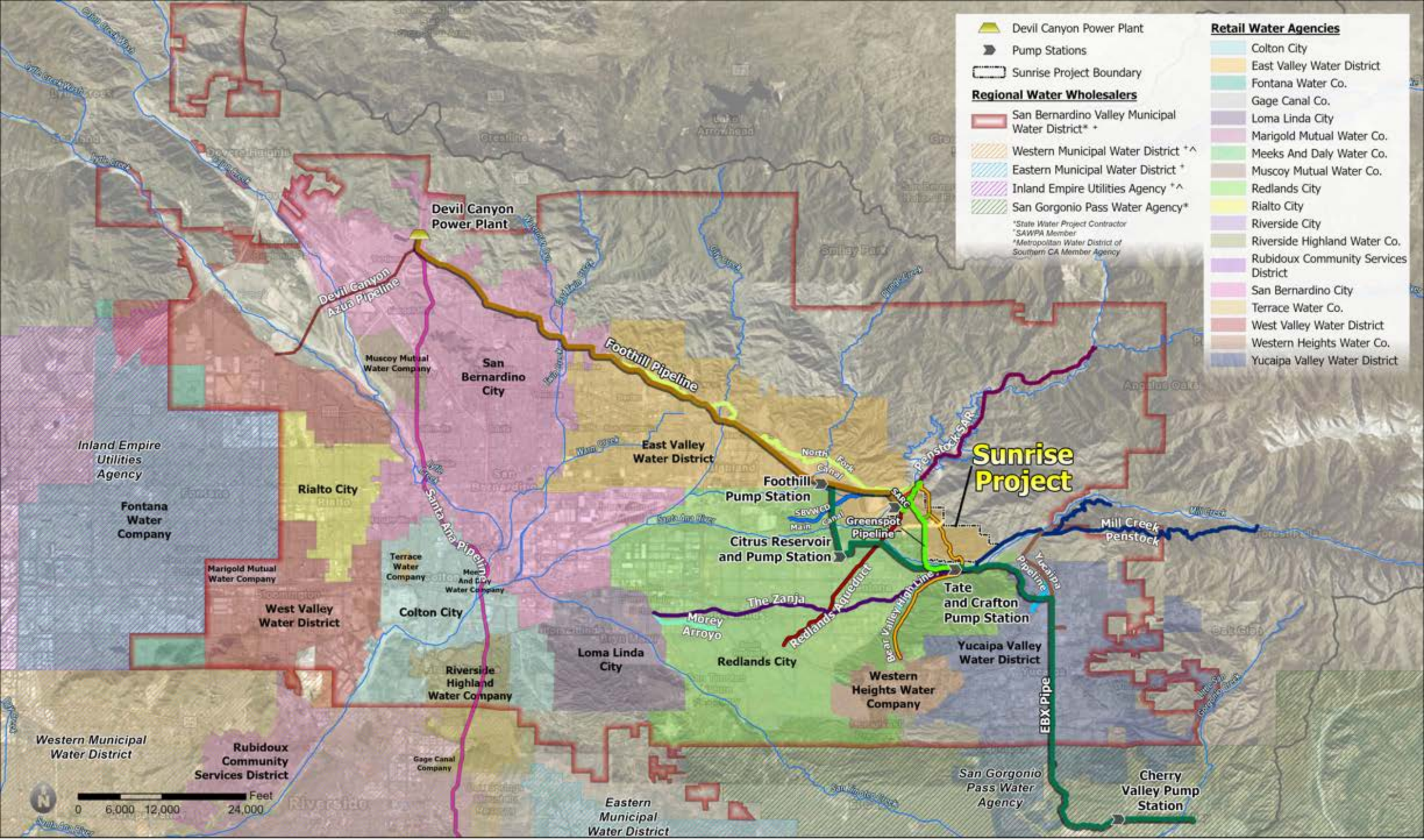


Figure 7-54 Valley and other water wholesale and retail service areas

such as the Tate and Crafton Hills PSs and Zanja-Tate Turnout.

As a result of the completion of the EBX Phase II in 2018, pumping of SAR water through the Greenspot PS has been limited and intermittent for many years because its primary use was replaced by the larger Citrus PS. The newer Citrus PS, built as part of the EBX project, is integrated into the newly aligned EBX pipeline. Figure 7-66 indicates the available capacity of the pipeline for water conveyance. Figure 7-67 indicates that the DWR frequently uses the line for deliveries of imported water from the SWP to the Greenspot Area.

There are turnouts along the Greenspot pipeline, notably at Newport, San Bernardino County Flood Control District, and TLMWC. Any modification of the conveyances through the property must accommodate the needs currently served by these turnout facilities.

3. State Water Project Infrastructure

SWP infrastructure is important to the regional and local water supply in the Sunrise Ranch property vicinity. There are on-site infrastructure components that connect directly or indirectly to the SWP. The locations of the following components are shown in Figure 7-69.

A. East Branch Extension

The EBX was developed as a partnership between DWR, the Agency, and the San Gorgonio Pass Water Agency, providing the capacity to supply over 2.6 million AF of water annually. The EBX was constructed over two phases between 1999 and 2018 and includes two reservoirs, four pump stations, and 18.5 miles of pipeline to supply water to the communities of San Bernardino, Mentone, Redlands, Cherry Valley, Beaumont, and San Gorgonio. The first phase included the Crafton Hill

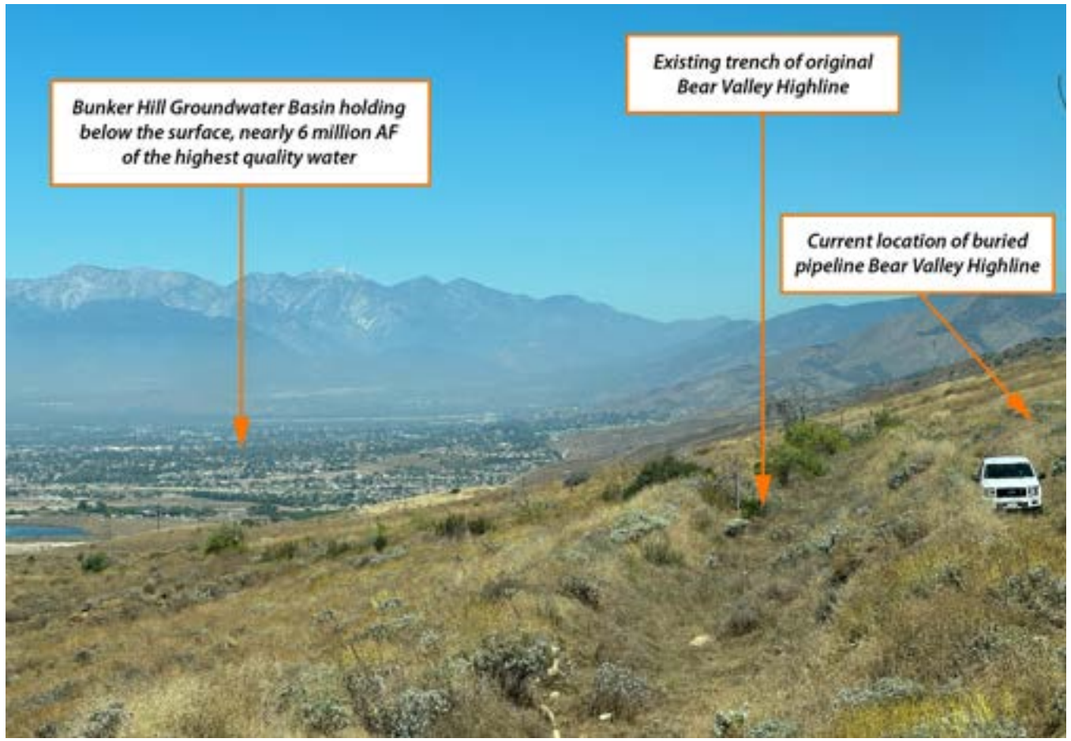


Figure 7-55 Bunker Hill Groundwater Basin and Bear Valley Highline Location

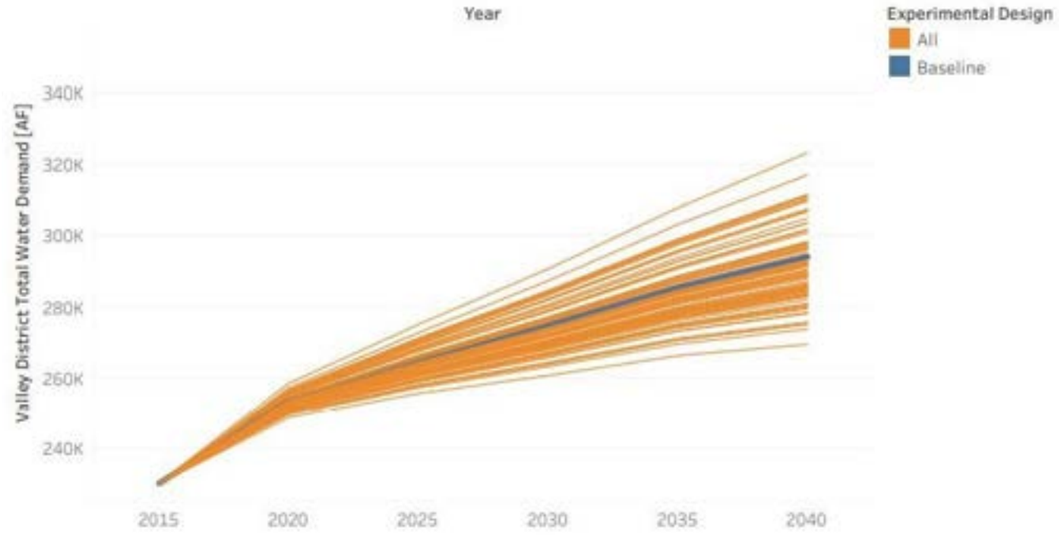


Figure 7-56 Plausible Range of Future Demand Growth Due to Uncertainty in Climate, Efficiency, & Population Growth
Source Estimating Future Water Demand Growth for Valley District, Rand 2018

Reservoir, Greenspot PS, Crafton Hills PS, Cherry Valley PS, and 13 miles of pipeline. The second phase consisted of the Citrus Reservoir, Citrus PS, expansion of the Crafton Hills PS, and 5.5 miles of the Mentone pipeline.

B. Citrus Reservoir

Citrus Reservoir provides approximately 400 AF of storage. The reservoir, with dimensions of approximately 1,000 feet by 900 feet, covers an area of approximately 21 acres. The reservoir has a maximum water surface elevation of 1,638 feet above mean sea level. The reservoir bottom is about 40 feet below the existing ground surface elevation on the western edge (approximately 70 feet below ground surface on the eastern edge). The reservoir increases storage capacity within the SWP EBX system, providing more operational flexibility and capacity.

C. Citrus Pump Station

The Citrus PS, located adjacent to Citrus Reservoir, pumps water from Citrus Reservoir through the 66 inch diameter EBX Mentone eastern pipeline to the Crafton Hills PS. Consisting of pumping units, motors, emergency generator, valve and flow meter vault, masonry building, connecting pipeline, and related equipment, the PS is housed in an approximately 20,000 square-foot, single-story structure. The building includes ten pumping units: two pumps each with 10 cfs capacity, four pumps each with 20 cfs capacity, and four pumps each with 25 cfs capacity, totaling 200 cfs pumping capacity.

D. Crafton Hills Reservoir and Pump Station

The Crafton Hills Reservoir storage capacity is 290 AF. The existing pump station currently has a total capacity of 135 cfs (with no pumps reserved as backup).

E. Cherry Valley Pump Station

The Cherry Valley PS is located within the San Gorgonio Pass Water Agency service area. Following a recent expansion, the PS has a total capacity of 56 cfs.

4. Onsite/Local Water Infrastructure

The existing water infrastructure described herein is located within either the Sunrise Ranch property boundary or the local region.

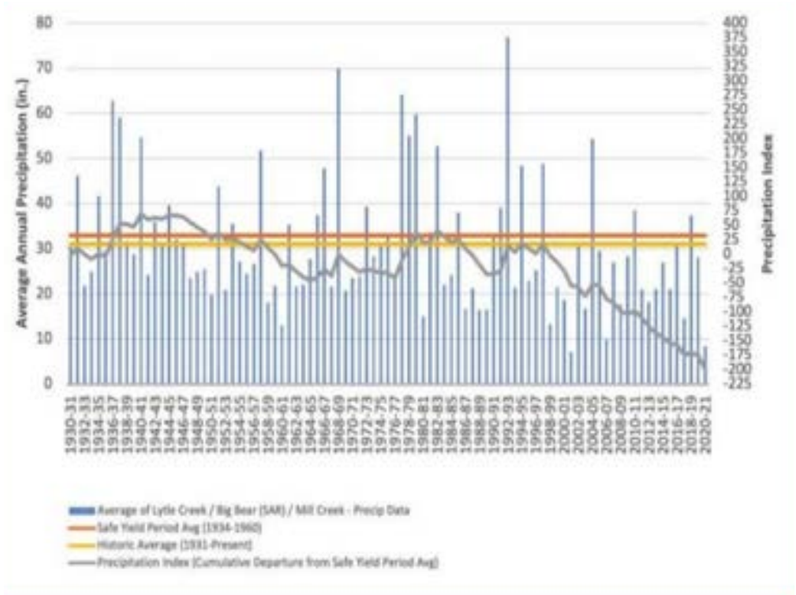


Figure 7-57 Chart showing historic rainfall variability in San Bernardino Valley Service Area

Figure 7-58 Chart showing annual variability in State Water Project - Table A Delivery Allocations

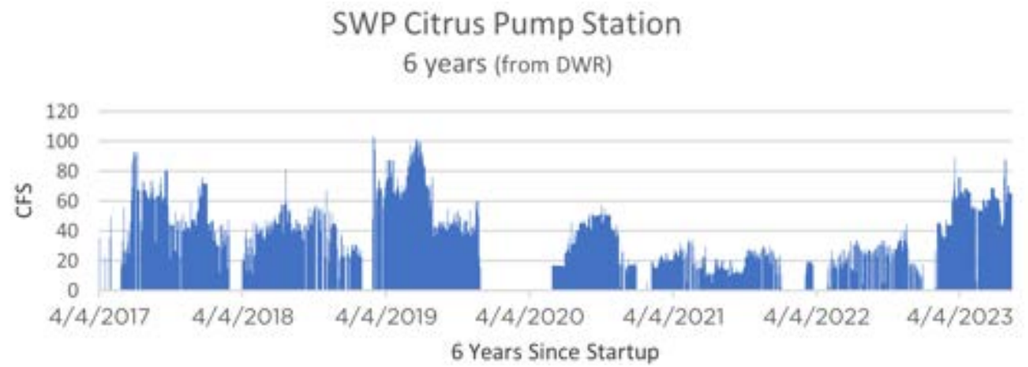


Figure 7-59 State Water Project Citrus Pump Station Flow Since Startup; **Source** DWR Public Records Request

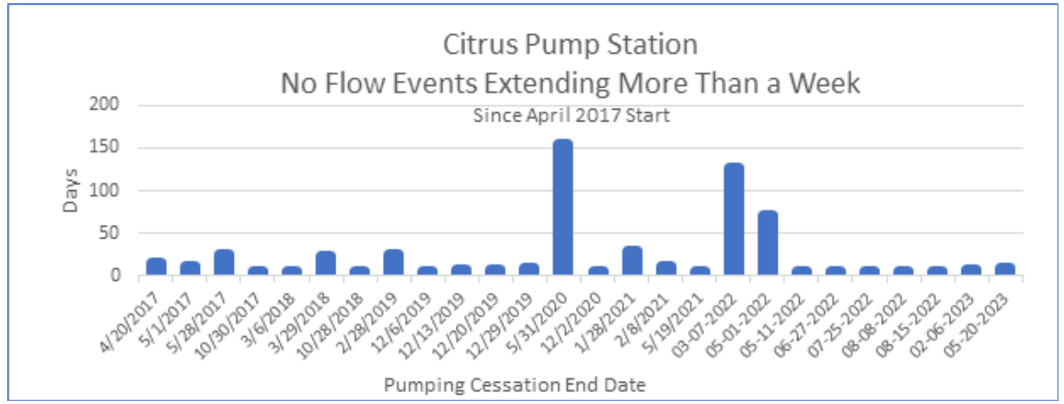


Figure 7-60 State Water Project Citrus Pump Station showing no-flow events

A. Bear Valley Highline

The Bear Valley Highline (BVHL) is a pipeline 10,350 feet in length owned and operated by the BVMWC. The Agency owns 1,180 shares of stock in BVMWC which owns the BVHL. The BVHL gathers water from the SAR SCE PH 3 forebay and sends it along the approximately 2,310 feet elevation topographic contour until it arrives at the Bullion Box, and from there onto the Zanja and other irrigation end uses. The line traverses the Sunrise Ranch property along most of its path. Additionally, there is a 1,400 feet long line that connects the BVHL to the Greenspot pipeline.

B. Redlands Aqueduct

The Redlands Aqueduct is operated by the BVMWC for the conveyance of SAR and SWP water, primarily serving end users such as the City of Redlands. The aqueduct is operated by the BVMWC for the conveyance of SAR water picked up near the SCE Phase 2-3 afterbay at an elevation of 1,950 feet to the Mentone Reservoir and the Mill Creek spreading grounds.

C. Mill Creek Zanja

The Mill Creek Zanja (Zanja) is approximately 12 miles in length with the intake located just over 1 mile below the mouth of Mill Creek Canyon, 4 miles east of Mentone (SBVWCD 1937). The Zanja was originally constructed in 1820 and is considered a historic waterway as the oldest irrigation ditch in San Bernardino County. The Zanja is still in operation, with its sources of water including the East Weir, the Bullion Box, the Tate PS, the West Weir, and the Zanja-Tate Metering Station.

Citrus Pump Station Consecutive Days of No Flow Exceeding One Week					
End Date	Days	End Date	Days	End Date	Days
4/20/17	15	12/13/19	7	05/01/22	72
5/1/17	11	12/20/19	7	05/11/22	6
5/28/17	26	12/29/19	9	06/27/22	6
10/30/17	5	5/31/20	154	07/25/22	6
3/6/18	6	12/2/20	5	08/08/22	6
3/29/18	23	1/28/21	29	08/15/22	5
10/28/18	5	2/8/21	11	02/06/23	8
2/28/19	26	5/19/21	5	05/20/23	10
12/6/19	6	03/07/22	126		

Figure 7-61 Citrus Pump Station – consecutive days of no flow exceeding one week

D. Southern California Edison (SCE)

SCE currently operates four hydropower plants near the Sunrise Ranch property. Two plants are located on the SAR and two on Mill Creek. These plants and their associated conveyance pipelines are important to local water operations.

When completed in 1898, Mill Creek PH 1 had the longest transmission line in existence and was the nation's first alternating current generator. Innovative features that became industry standards include the individual tailraces, internal revolving field alternators, and transposition of wires. When Mill Creek PH 3 was added, the system became the prototype for the larger hydroelectric systems of the twentieth century. PH 1 was nominated to the National Register of Historic Places and was named an American Society of Civil Engineers Historic Civil Engineering Landmark in 1985.

These plants and the ones on the SAR operate by use of stream diversions, forebays, penstocks, hydropower generator turbines, afterbays, and tailraces. While SCE has the right to divert and use the water for power generation, their rights are "non-consumptive." SCE's obligation after using the water is to deliver it to those holding rights to use the water consumptively.
The SAR hydroelectric facilities provide elevation heads at two important elevations. The 2,310 feet SCE PH 3 forebay is at an elevation designed not only to feed its penstock, but also to feed the BVHL without the need for pumping. The afterbay of this hydroelectric system also serves as a source for those facilities that depend on water at the 1,938 feet elevation head, including the Redlands Aqueduct.

The Mill Creek diversion is at an approximate elevation of 5,000 feet. From there, the water travels through penstock piping to SCE Mill Creek PH 3. Water from that facility enters another penstock to feed the lower elevation SCE Mill Creek PH 1 located near the southeast portion of the Sunrise Ranch property.

E. Santa Ana River and Mill Creek Water Pipeline Crossing

The Sunrise Ranch property sits between the confluence of the SAR and Mill Creek. As such, all the major water conveyances that traverse the property must cross one drainage or the other.

F. Tres Lagos Mutual Water Company

Two groundwater wells are operated by the TLMWC for a group of homeowners and citrus growers. In addition to these wells, the TLMWC also includes distribution pipelines and a hillside reservoir. The reservoir is located at 2,400 feet elevation on a steep hillside along the northern boundary of the Sunrise Ranch property. The

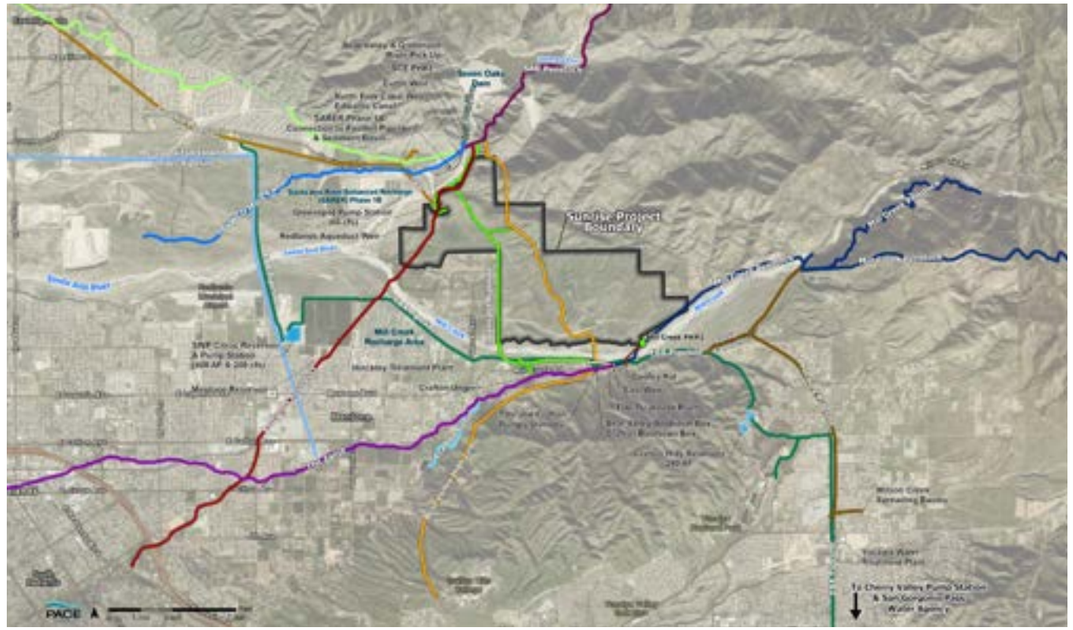


Figure 7-62 Existing regional water Infrastructure

Figure 7-63 Seven Oaks Dam viewed from the south

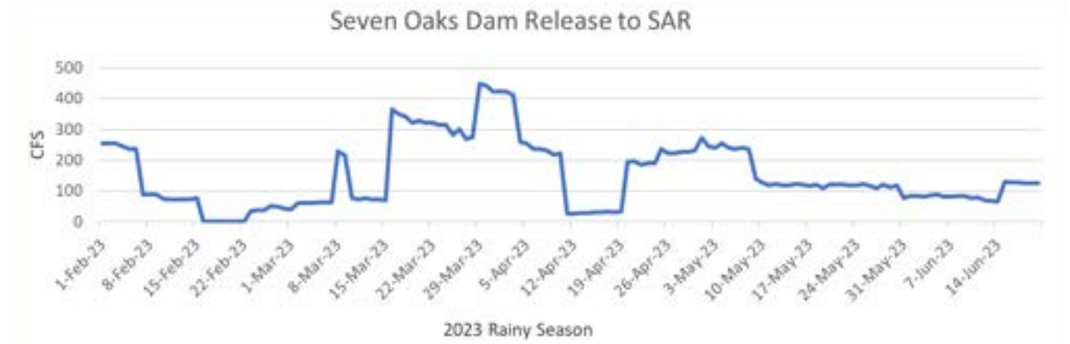


Figure 7-64 Seven Oaks Dam release to SAR, 2023 rainy season
Source Mentone Gauging Station, US ACOE

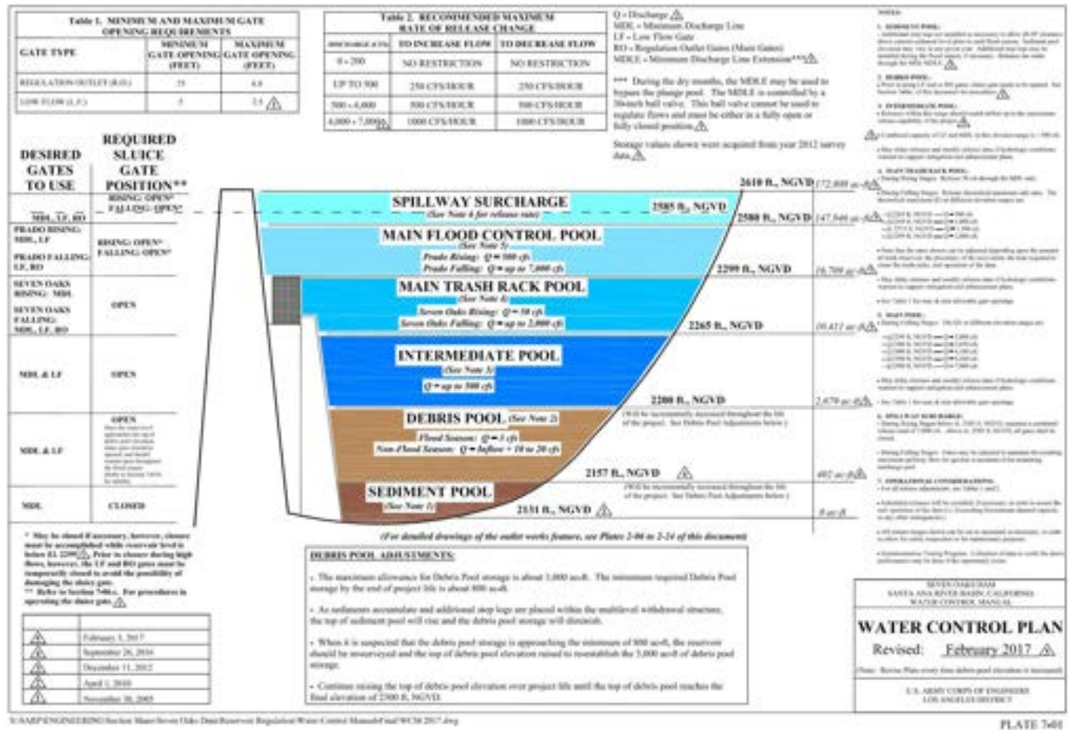


Figure 7-65 Seven Oaks Dam Water Control Plan
Source USACE

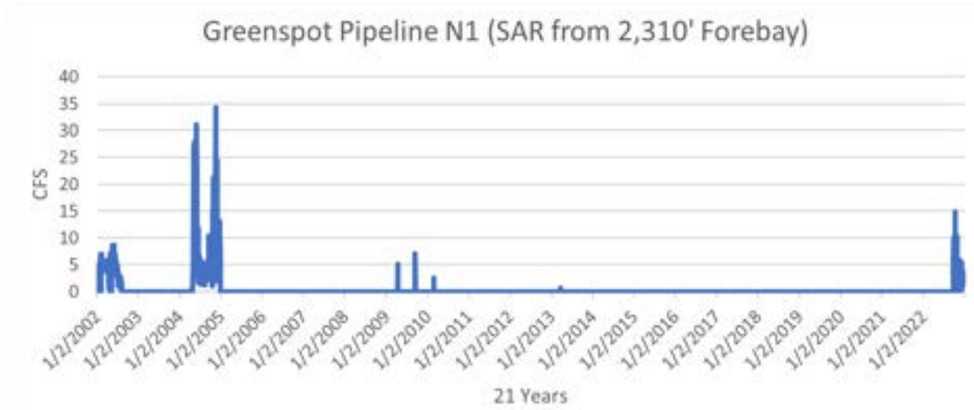


Figure 7-66 History of Greenspot Pipeline Conveyance of SAR Water
Source San Bernardino Valley District

Figure 7-67 History of Greenspot Pipeline Conveyance of SWP imported Water
Source DWR

reservoir is functional, but in a condition calling for inspection and possibly upgrade. The capacity is also reported to be lower than what is needed for optimal system reliability.

5. Groundwater Resources

California DWR records indicate dozens of wells drilled in the area over more than 100 years. Most of these wells have long since been lost or destroyed, but some have driller's logs that might be useful when considering the installation of new wells on the property. The local Watermaster report indicates seven non-functioning wells without any production records. Only those wells listed by the Watermaster are located with confidence, and these are therefore the only ones shown on Figure 7-79.

A. On-Site Wells

The only on-site wells still operating are the Tres Lagos wells discussed above. Many other wellheads can be seen, but the condition of the wells beneath the sealed caps is unknown.

B. Nearby Wells

The Watermaster recorded well locations for the surrounding area, which are shown in Figure 7-79. The databases accessed to identify the many additional wells recorded for the area are not kept following a standard protocol, nor are they held by a single entity. Locations of wells identified via modern GPS technology are given with resolutions of a few feet, while others are identified merely with the "centroid of a township

and range section." Many of the records are old enough to be unreliable, especially given that most of the wells have been abandoned for decades and some for more than 100 years. An accurate inventory and description of the existing wells will require a focused study outside of this planning effort.

There are up to fourteen wells visible or reported on or near the property. The official Watermaster well location map provided by Agency staff is assumed to be more accurate than other location maps for the area. However, precise locations will require visiting the wells in person to GPS locate each one by hand.

Because accurate documentation of the construction and locations of properties and nearby wells could not be verified, a separate water well study should be conducted according to the following steps:

4. GPS locate all existing wells at and near San Bernardino Valley property, including the Tres Lagos Wells (assumed to be at least ten), and cross-reference those locations with the State Water Well database. It is believed that some of the smaller citrus irrigation wells are not in the State system.
5. Open the existing wells using construction equipment if necessary. Some wells might require metal cutting of a welded cap or excavation by backhoe (as is the case in the flowing artesian well near the Greenspot Fault).
6. Monitor the elevation and total depth of each well and collect water samples for preliminary field screening analysis, such as total dissolved solids (TDS) and turbidity. Collect samples for laboratory analysis.
7. Attempt to determine if well is filled with soil, rock, or debris.
8. Obtain laboratory analysis for general minerals on collected samples.
9. Prepare a report of findings that lists next steps.

East Branch of the SWP	
Alamo Power Plant	Devil Canyon Afterbay 1 and Afterbay 2
Pearblossom Pumping Plant	Greenspot Pump Station (Backup)
Mojave Siphon	Citrus Reservoir
Mojave Siphon Power Plant	Citrus Pump Station
Cedar Springs Dam	Crafton Hills Reservoir
Silverwood Lake	Crafton Hills Pump Station
San Bernardino Intake Structure	Cherry Valley Pump Station
San Bernardino Tunnel	Perris Lake and Dam
Devil Canyon Power Plant	

Figure 7-68 SWP East Branch Facilities

Figure 7-69 EBX facility locations
Source DWR, https://water.ca.gov/-/media/DWR-Images/Maps/230726SWPPipelinesFacilitiesaav57.jpg

Facilities	Pipe Length (ft)	Diameter/Description
Bear Valley Highline	10,350	36-in diameter concrete pipe, installation in the late 1800's Size varies in diameter
Connector to Bear Valley Highline	1,400	30-inch CMLC, installed in 1985
Redlands Aqueduct	7,750	Size varies in diameter and shape (some portions are a canal), installation in the late 1800's
Greenspot Pipeline	9,900	48-inch CMLC, installed in 1980
Tres Lagos System	7,050	4-inch PVC, age unknown

Figure 7-70 Onsite Water Pipeline summary

C. Groundwater Recharge

Enhanced aquifer recharge in the area is currently being performed by the SBVWCD west of the property with waters originating from both the SAR and Mill Creek. Additional facilities are currently under construction as part of the Santa Ana River Enhanced Recharge (SARER) Phase 1-B spreading basins project. The SARER project will divert up to 500 cfs. The project is estimated to recharge an average of 15,500 AFY, or up to approximately 80,000 AFY, of stormwater during a wet year.

The Upper Santa Ana River Watershed IRWMP identifies water storage in local groundwater basins for later use during droughts as one of the primary management strategies (WSC 2021). Water conservation and groundwater activities have been conducted in the SBBA since 1912, with the Agency involved in these activities since 1972. The SBVWCD was created to recharge the Bunker Hill Subbasin with native water diverted from the SAR and Mill Creek and is also responsible for monitoring, operating, and reporting activities in compliance with the Exchange Plan.

D. San Bernardino Valley Water Conservation District

SBVWCD was created to recharge the Bunker Hill Groundwater Basin with native water diverted from the SAR and Mill Creek.

Source: USARW IRWMP

The San Bernardino Valley Water Conservation District (SBVWCD) was created to recharge the Bunker Hill Subbasin in an environmentally and economically responsible way using local native surface water to the maximum extent practicable. The SBVWCD and its predecessors have conducted water conservation (groundwater recharge) activities for more than 100 years. SBVWCD operates two areas that overlie the Bunker Hill Subbasin in the San Bernardino Valley. These areas are at the upper end of the SAR wash area below Seven Oaks Dam and adjacent to Mill Creek just upstream of the confluence with the SAR. The SBVWCD diverts surface water flows during both storm and normal runoff from the SAR and Mill Creek and channels the flows into two separate systems of recharge basins where it is percolated into the groundwater basin for later pumping and use by local entities and private producers.

Figure 7-71 SCE Forebay Pipeline to Bear Valley Highline

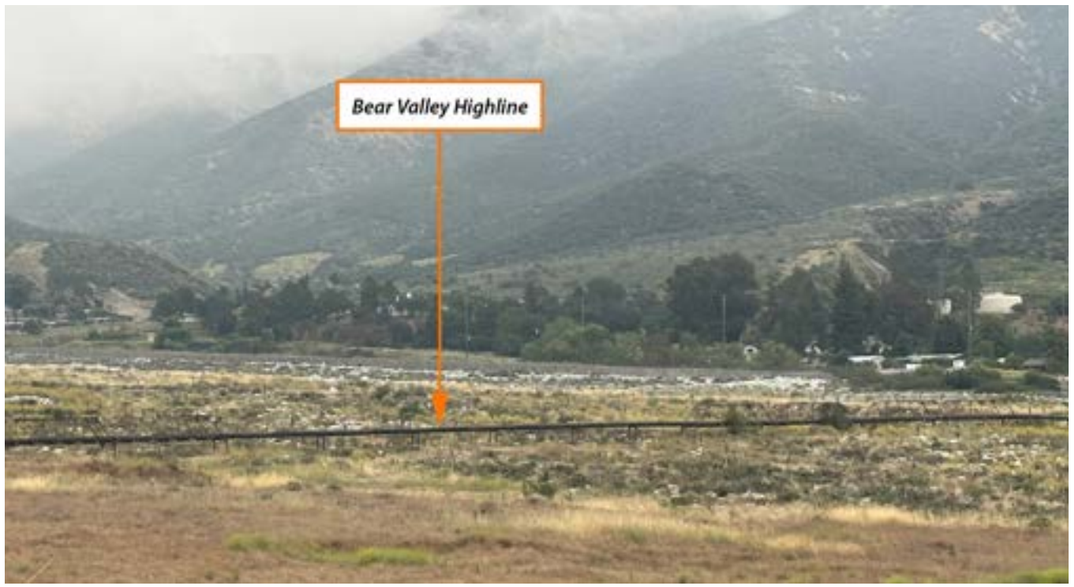


Figure 7-72 Mill Creek: Bear Valley Highline

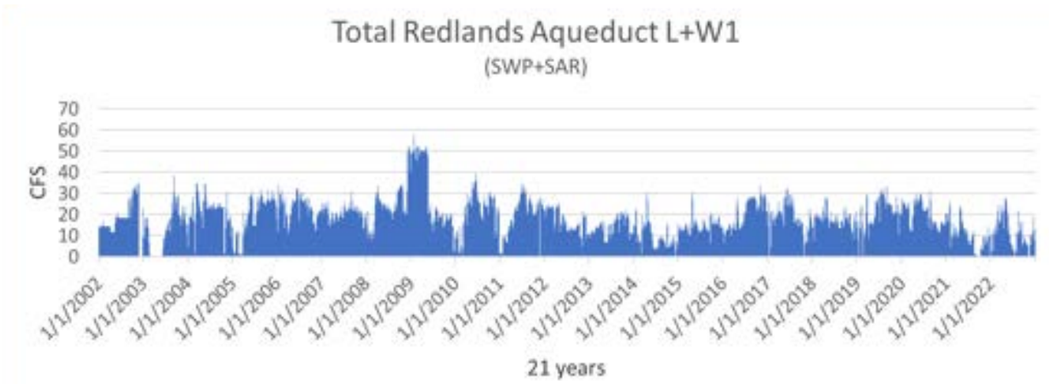


Figure 7-73 Redlands aqueduct flows, showing blended flows from both the SWP and SAR
Source SBVWCD

Santa Ana River and Mill Creek Crossings Near Sunrise Project			
Crossing	**Conveyance**	**Length**	**Comments**
Santa Ana River	Redlands Aqueduct	260'	SCE PH 3 tailrace crossing over the SAR with 260' elevated pipeline. Delivers water to aqueduct near the Redlands tunnel.
	Santa Ana River Crossing (SARC)	Est. 500'	SWP Foothill pipeline's buried undercrossing of the SAR near Morton Canyon.
Mill Creek	Redlands Aqueduct	400'	400-foot elevated crossing of the Mill Creek on two abutments and 5 piers. Reportedly in good condition.
	Bear Valley Highline	370'	Mill Creek crossing that has the potential to deliver flows from the Sunrise Ranch property to destinations south of the property.
	Mill Creek SCE Powerhouse Tailrace, also known as Tate Pipeline	360'	30" steel pipeline traverses a 360' pipeline bridge crossing the creek to feed the City of Redlands Tate WTP.
	Greenspot	560'	Greenspot crossing of Mill Creek is reportedly in need of repair due to persistent "scouring" problems in the creek bottom.

Figure 7-74 Santa Ana River & Mill Creek crossings near Sunrise Property

SBVWCD also recharges The SBVWCD's boundaries encompass more than 78 square miles and include portions of the communities of San Bernardino, Loma Linda, Redlands, Highland and Colton, as well as the unincorporated county area of Mentone and other unincorporated county "islands" within the incorporated cities.

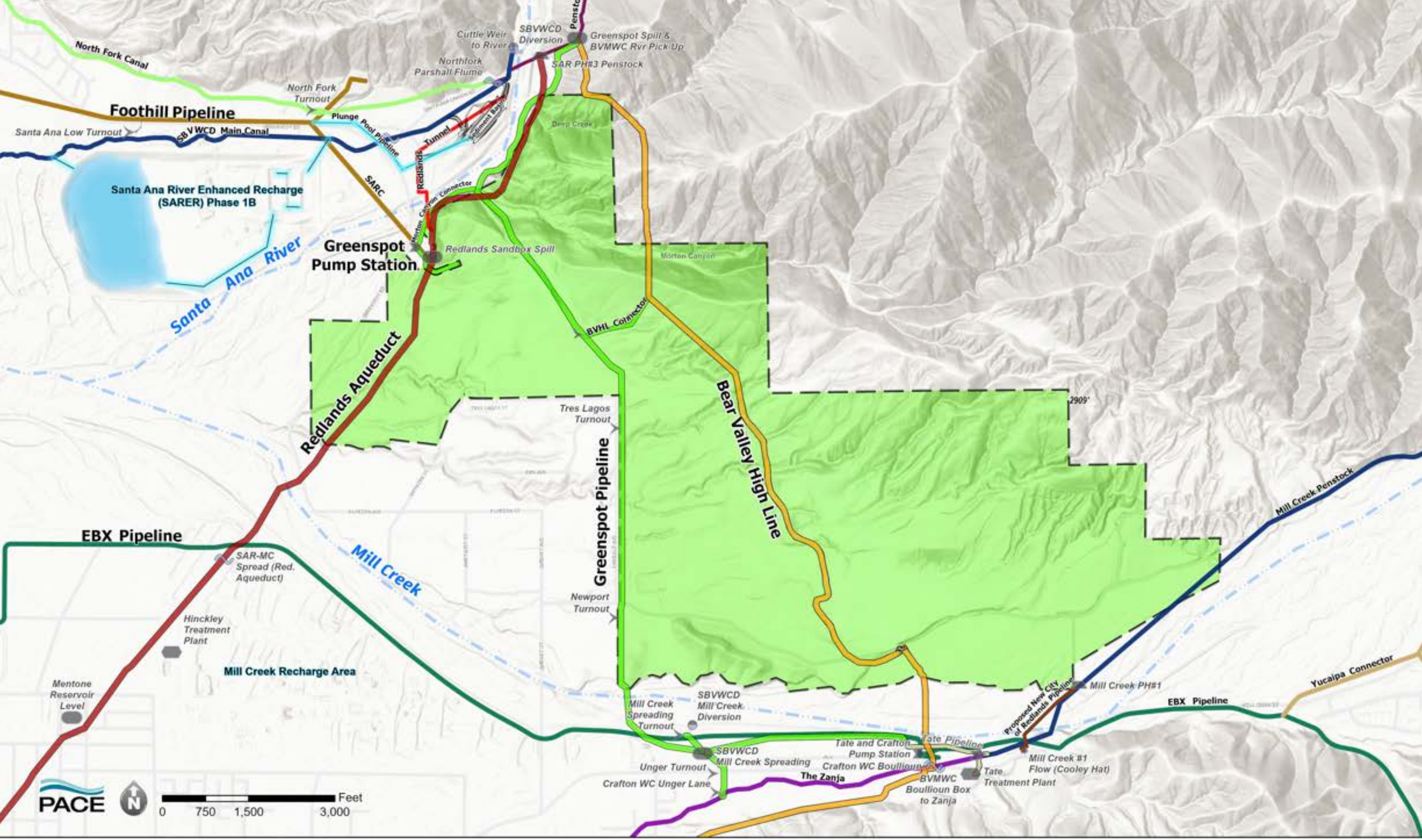


Figure 7-75 Local water pipelines and Infrastructure located within or near the Sunrise Property

Figure 7-76 Mill Creek: View Looking Downstream from SCE Powerhouse #1

Figure 7-77 Tres Lagos Wells – Local Municipal Water District within Sunrise Ranch Property

Figure 7-78 Existing agricultural well and structure

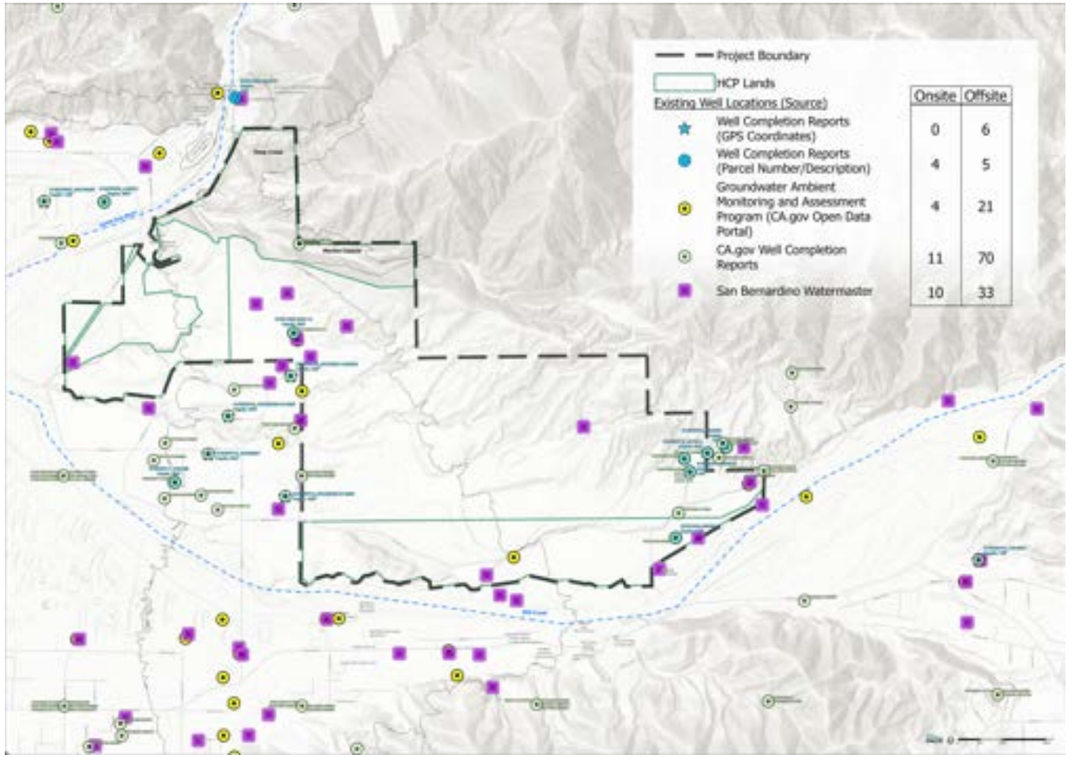


Figure 7-79 Map showing water well locations on and near the Sunrise Property

Figure 7-80 Typical unnamed wells on the Property

Figure 7-81 Existing orchard irrigation channel

Figure 7-82 Bear Valley Highline Pipeline

Figure 7-83 Desilting Basin below Seven Oaks Dam

Figure 7-84 Aquifer Recharge Operation of Bunker Hill Groundwater Basin

Figure 7-85 Groundwater recharge existing and proposed facilities below Seven Oaks Dam
Source San Bernardino Valley

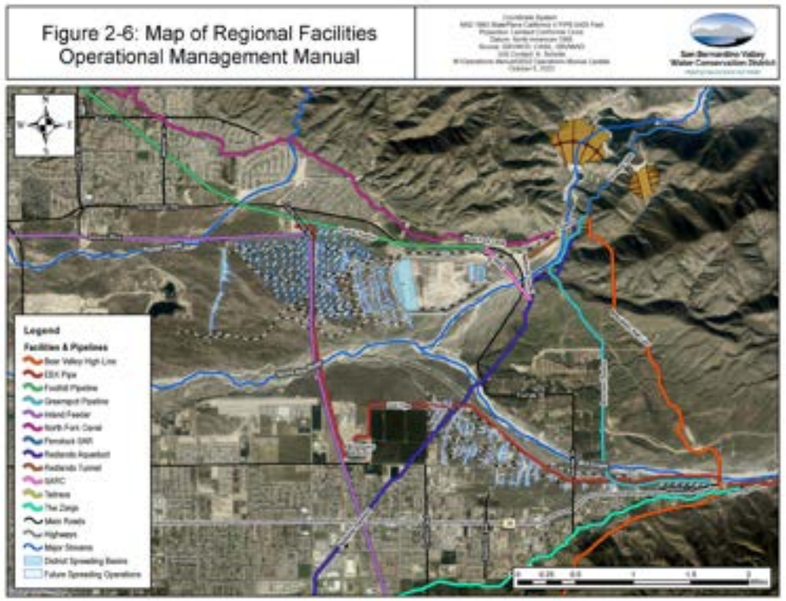


Figure 7-86 SBVWCD map of regional groundwater recharge facilities
Source SBVWCD 1992

7.3 EXISTING ENVIRONMENTAL CONDITIONS

A. Plant and Wildlife Species Observed or Likely to Occur

A search of special-status species that may occur within the property was conducted by:

- California Natural Diversity Database (CNDDB)
- California Native Plant Society (CNPS)
- Carlsbad U.S. Fish and Wildlife Service (USFWS) database
- Reviewing previous biological reports with the EIR
- Other incidental species observations (such as in eBird or iNaturalist)

The literature/database search identified 84 species that have been recorded within a U.S. Geological Survey Quadrangle search. Of these, 25 species have been previously observed or likely to occur on the property. Another ten species were determined to have a moderate potential to occur on the property. Listed or proposed listed species that were observed on the property during field work in 2023, their listing status, and their associated habitats include:

- Santa Ana River woolly-star (Eriastrum densifolium ssp. sanctorum), federally and state endangered – present in sandy soils on river floodplains or terraced fluvial deposits in coastal scrub and chaparral
    - Western spadefoot (Spea hammondii), federally proposed as threatened – present in open treeless grasslands, scrub, or mixed woodland and grassland with aquatic breeding habitat
- Coastal California gnatcatcher (Polioptila californica californica), federally threatened – present in low, coastal sage scrub in arid washes and on mesas and slopes

Listed or proposed listed species that have been previously observed or are likely to occur on the property, their listing status, and their associated habitats include:

- Least Bell's vireo (Vireo bellii pusillus), federally and state endangered – present in low riparian forest, scrub, and woodland in vicinity of water or in dry river bottoms
- San Bernardino kangaroo rat (Dipodomys merriami parvus), federally and state endangered – present in early to intermediate seral stages of alluvial scrub on sandy loam substrates characteristic of alluvial fans and flood plains

Non-listed species that have been previously observed on the property or are likely to occur, their regulatory status, their potential to occur, and associated habitats include:

- Parry's spineflower (Chorizanthe parryi var. parryi), CNPS California Rare Plant Rank 1B.1 - present in alluvial habitat associated with the Santa Ana River and Mill Creek, dry slopes and flats in coastal scrub, chaparral, cismontane woodland, valley and foothill grassland
- California glossy snake (Arizona elegans occidentalis), CDFW Species of Special Concern – likely occurs within alluvial sage scrub habitat on the property but may also occur in more open foothills of the property
- Red-diamond rattlesnake (Crotalus ruber), CDFW Species of Special Concern - likely occurs within alluvial sage scrub habitat on the property but may also occur in more open foothills of the property
- Two-striped garter snake (Thamnophis hammondii), CDFW Species of Special Concern – high potential to occur within riparian habitat of Morton Canyon
- Loggerhead shrike (Lanius ludovicianus), Species of Special Concern – moderate potential to breed in suitable sage scrub and chaparral habitat within the property; was recorded on the property during 2013-2014 surveys
- Yellow warbler (Setophaga petechia), Species of Special Concern – high potential to occur in suitable habitat within Morton Canyon and other riparian areas on the property; was recorded on the property in 2014 and 2023
- Coastal cactus wren (Campylorhynchus brunneicapillus sandiegensis), CDFW Species of Special Concern – Tall opuntia cactus present in coastal sage scrub, nests in cholla

have been recorded on the property west of Greenspot Road; unlikely elsewhere due to low abundance of cactus patches (primarily cholla)

- Cooper's hawk (Accipiter cooperii), CDFW Watch List – chiefly present in open, interrupted or marginal woodlands; nests mainly in riparian growths of deciduous trees in canyon bottoms on river flood plains and live oaks; observed during 2013-2014; likely uses property for foraging, dispersal, and nesting
- Sharp-shinned hawk (Accipiter striatus), CDFW Watch List – present in north-facing slopes with plucking perches in ponderous pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats; nests usually within 275 feet of water; observed during 2013-2014; likely uses property for wintering, foraging, and/or dispersal
- Golden eagle (Aquila chrysaetos), CDFW Fully Protected/Watch List, Watch List – present in woodlands and forests on rolling foothills, mountain areas, sage-juniper flats, and desert; nests in cliff-walled canyons and large trees in open areas; observed during 2013-2014. Likely uses property for wintering, foraging, and/or dispersal
- Short-eared owl (Asio flammeus), CDFW Species of Special Concern – present in swamp lands, lowland meadows, irrigated alfalfa fields; tule patches/tall grass needed for nesting/daytime seclusion; nests on dry ground in depression concealed in vegetation; observed during 2013-2014; likely uses property for wintering, foraging, and/or dispersal
- Long-eared owl (Asio otus), CDFW Species of Special Concern – present in riparian bottom lands grown to tall willows and cottonwoods and belts of live oak paralleling stream courses; observed during 2013-2014; likely uses property for wintering, foraging, and/or dispersal
- Burrowing owl (Athene cunicularia), CDFW Species of Special Concern – present in open, dry annual or perennial grasslands, deserts, and scrub lands characterized by low-growing vegetation; subterranean nester, dependent upon burrowing mammals, notably California ground squirrel; a wintering burrowing owl was recorded on the property near the basins in 2013-2014
- Ferruginous hawk (Buteo regalis), CDFW Watch List – present in open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon and juniper habitats; observed during 2013-2014, likely uses property for wintering, foraging, and/or dispersal
- Northern harrier (Circus hudsonius), CDFW Species of Special Concern – present in coastal salt and freshwater marsh; nests and forages in grasslands, from salt grass in desert sink to mountains; observed during 2013-2014; likely uses property for wintering, foraging, and/or dispersal; low potential for nesting
- White-tailed kite (Elanus leucurus), CDFW Fully Protected – present in rolling foothills and valley margins with scattered oaks and river bottom lands or marshes next to deciduous woodland; observed during 2013-2014; likely uses property occasionally for foraging and/or dispersal; low potential for nesting
- Merlin (Falco columbarius), CDFW Watch List – present in seacoast, tidal estuaries, savannas, edges of grasslands and deserts, farms and ranches; clumps of trees or windbreaks are required for roosting in open county; observed during 2013-2014; likely uses property for wintering, foraging, and/or dispersal
- Northwestern San Diego pocket mouse (Chaetodipus fallax) –Global ranking (G5) and State ranking (S3) - present in sandy, herbaceous areas in coastal scrub, chaparral, grasslands, sagebrush, etc.; usually in association with rocks or coarse grave; likely present on the property
- San Diego black-tailed jackrabbit (Lepus californicus bennettii) – G5 Global ranking and S3 State ranking - present in intermediate canopy stages of shrub habitats and open shrub/herbaceous and tree/herbaceous edges; known from alluvial sage scrub habitat in the Santa Ana River downstream of the property; has a low potential to occur within the property west of Greenspot Road and possibly alluvial habitat of Mill Creek
- San Diego desert woodrat (Neotoma lepida intermedia CDFW Species of Special Concern – prefers moderate to dense canopies in coastal scrub; abundant in rock outcrops, rocky cliffs, slopes; likely present on the property

7.4 EVALUATION AND ASSESSMENT FINDINGS FOR SBKR ON SUNRISE RANCH

A. Identification Areas of SBKR Habitat

1. SAR West of Greenspot Road

The areas west of Greenspot Road consist of sandy terraces with the potential to provide a moderate-quality SBKR habitat. These areas have yet to experience overbank flows in decades. Management actions incorporating a disturbance regime would enhance habitat suitability for SBKR and establish open areas to facilitate movement. A 1938 aerial of the area shows that this was once a braid of the Santa Ana River (SAR). A large flood control structure (levee) is currently blocked by flows south of the SAR mainstem.

Approximately 4.4 acres of enhancement/preservation credit could be gained through managing the vegetation to reduce overall nonnative plant cover and thinning shrubs to create the more open canopy conditions preferred by the species.

A potential constraint to management actions in this location is CAGN: this area was occupied by CAGN in 2023. However, habitat management for the benefit of SBKR can also benefit CAGN.

Also west of Greenspot Road are sandy terraces that are fairly heavily vegetated and ranges in quality from low to unsuitable for SBKR. Approximately 3.5 acres of creation/enhancement/preservation credit could be gained by managing the vegetation here to reduce overall invasive cover and thinning shrubs. In addition, the mechanical clearing of swaths would connect adjacent areas.

2. SAR East of Greenspot Road

The area east of Greenspot Road has a drainage channel that feeds from the Greenspot Pump Station and has some periodic flows that have created an unsuitable SBKR habitat due to dense fountain grass. This feature presents a land management opportunity; the drainage could be used to convey flows (if feasible) to mimic natural scour events. Sediment may also be added to nearby elevated terrace benches where the substrate conditions are unfavorable for SBKR. If periodic or consistent low flows are required, it could be feasible to construct a narrow, low-flow channel flanked by elevated sandy terrace benches that could support SBKR.

Initial grading may be required to remove or excavate the fountain grass. One limitation is that SBKR are unlikely to occur east of Greenspot Road, suggesting they would not naturally colonize the areas created. To facilitate movement by SBKR, a wildlife corridor (e.g., a wildlife tunnel) could potentially be constructed to connect the west and east sides of Greenspot Road.

SAR West of Greenspot Road (Polygon 1)
SAR East of Greenspot Road (Polygon 1)

The Terraces East of Greenspot Road (Polygons 2, 3, 4, 5)

3. The Terraces East of Greenspot Road

The terraces east of Greenspot Road have been long absent of fluvial processes and periodic disturbances, thus creating an area that is mostly unsuitable to SBKR. Most areas are covered by dense vegetation, but there are some small, remnant open areas. The suitable areas are not likely to be occupied by SBKR because they are isolated from other suitable occupied areas by unsuitable habitat and Greenspot Road. Some mechanical clearing of swaths may be the most efficient in this area. If feasible, the addition of sand would be beneficial to SBKR.

Because of the barrier posed by Greenspot Road, the efficacy of management actions for the benefit of SBKR in this area should be investigated further. One constraint is that SBKR would not naturally colonize such created areas at this location because it is isolated and fragmented; therefore, movement corridors across Greenspot Road would need to be established. This could include placing culverts underneath the roadway to facilitate wildlife movement. Alternatively (or in addition), the large existing concrete box culvert, located just outside of the southwest corner of the property, could be retrofitted to also accommodate wildlife movement.

An additional potential constraint to consider is the current suitability of habitat for California Gnatcatcher (CAGN). This area was occupied by CAGN in 2023. While habitat management for Greenspot Road would generate 20.4 acres of creation credit, it is important to note that the primary mitigation bank for San Bernardino Kangaroo Rat (SBKR) is located in Cajon Wash (Vulcan Bank). This bank offers credits that may comprise a mix of banking types: suitable habitat (preservation), habitat requiring enhancement, and currently unsuitable habitat (creation). These credits are not tracked individually and are not available for the Santa Ana River population. As a result, a credit specifically for SBKR creation would hold greater value than the equivalent credit currently offered at Vulcan Bank.

4. SAR West of Greenspot Road - Low to Unsuitable for SBKR

To the west of Greenspot Road, there are sandy terraces that are somewhat vegetated, with quality varying from low to unsuitable for SBKR. By managing the vegetation to reduce overall invasive cover and thinning shrubs, approximately 3.5 acres of creation/enhancement/preservation credit could be achieved. Mechanically clearing swaths to connect adjacent areas with more suitable conditions would also be beneficial for SBKR.

5. Mill Creek West

A historical terrace located north of Mill Creek currently exhibits vegetation cover that exceeds optimal levels and suggests the presence of a high water table. This elevated water table may be contributing to potential leaks in a nearby structure. As a result, this area is not currently suitable for SBKR implementation. SBKR creation credits could be achieved through vegetation management, which would involve reducing invasive cover, thinning or removing shrubs, and addressing the water source that is fostering riparian habitat. However, challenges may arise due to the existing riparian habitat, and eliminating the water source could prove difficult. Additionally, effective management may require actions outside the property boundary to connect with other suitable habitats, which is essential for viability. SBKR populations in this section of Mill Creek are not well-documented, so it has not been confirmed whether they are present nearby. Considering these constraints and the fact that only 1.4 acres would be created, this initiative is likely to be a low priority.

6. Mill Creek Central-existing Disturbed

An area north of Mill Creek has experienced significant disturbance; it previously supported citrus cultivation. Although the agricultural activities were cleared, the area has not recuperated and is now predominantly populated by dense, non-native vegetation, including grasses and mustards. Aerial imagery from 1938 indicates the presence of citrus, suggesting that some northern terraces of Mill Creek were cleared to facilitate this. There is a recent breakout channel of Mill Creek located approximately 130 feet to the south at its nearest point.

This presents an opportunity for creation of alluvial fan sage scrub (14.4 acres) that could be used by SBKR. The soils should be tested to determine if sand lenses from Mill Creek's historical scour lay below the surface, which would make this a viable opportunity. If so, a scrape can remove the existing non-native vegetation and reveal the sandy substrates below. Seeding and planting of natives would be required, as well as invasive control. If the scrape is deep enough and reveals sandy soils, there could be little remnant seed bank, which would be an advantage to creating native habitats.

At this location, the southern extent of the property is very close to more suitable SBKR habitat that would allow it to be connected, although some management may be needed just outside and south of the property boundary to accomplish this. A fire in 2020, just south of the property, has reduced vegetation cover possibly making it more suitable for SBKR. SBKR in this section of Mill Creek are not well-documented, and it is unclear if the upstream is a limit to their current range. If sand import is needed, this creation opportunity may be cost prohibitive.

7. Mill Creek East-existing Disturbed

This area, located north of Mill Creek on the eastern part of the property, was also the site of a citrus grove established in 1938. Although the grove has since been cleared, the area is now primarily characterized by dense, non-native vegetation, including grasses and mustards. Historical aerial imagery suggests that some portions of this site may have originally been alluvial fan sage scrub prior to its conversion for citrus production. This area is positioned directly adjacent to mature alluvial fan sage scrub

SAR West of Greenspot Road - Low to Unsuitable for SBKR (Polygon 7)

Mill Creek West (Polygon 8)

Mill Creek Central and East-existing Disturbed (Polygon 9a-9b)

Mill Creek Central-existing Sand Lens (Polygon 10)

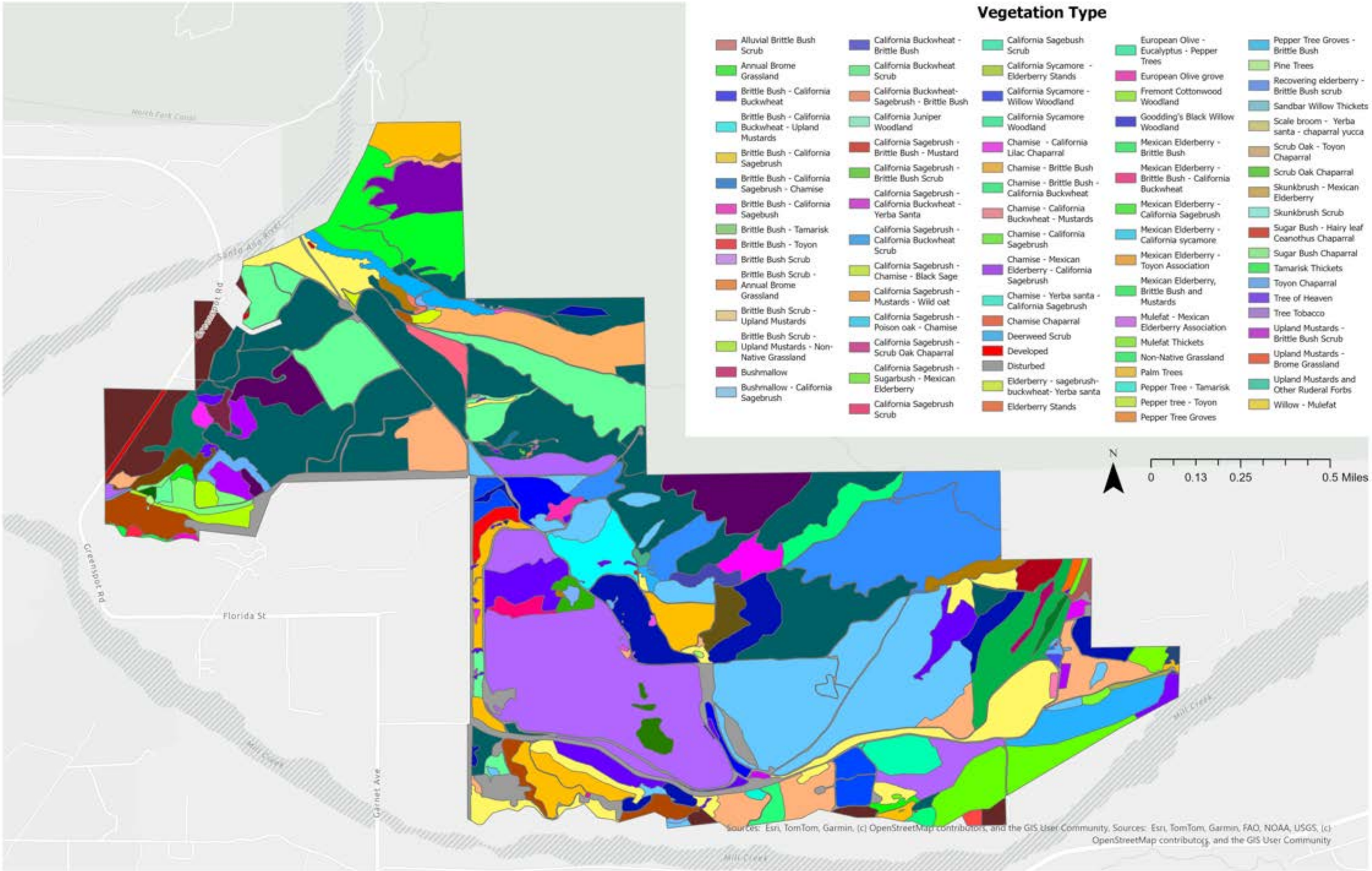


Figure 7-87 Vegetation types on Sunrise Ranch

associated with Mill Creek, which lies within a boundary predominantly marked by chamise chaparral, although some historical sandy breakouts remain visible.
This presents an opportunity for creation of alluvial fan sage scrub (13.7 acres) that could be used by SBKR. The soils should be tested to determine if sand lenses from Mill Creek's historical scour lay below the surface, which would make this a viable opportunity. If so, a scrape can remove the existing non-native vegetation and reveal the sandy substrates below. Seeding and planting of natives would be required, as well as invasive control. If the scrape is deep enough and reveals sandy soils, there could be little remnant seed bank, which would be an advantage to creating native habitats.

At this location, this created area could be directly connected to existing sandy areas within the boundary. Further evaluation would be needed beyond the property boundary to determine where SBKR suitable habitat occurs and whether there are corridors for colonizers. The distribution of SBKR in this section of Mill Creek are not well-documented, and it is unclear if the upstream is a limit to their current range. If sand import is needed, this creation opportunity may be cost prohibitive.

8. Mill Creek Central-existing Sand Lens

There is a small area (1.8 acres) on the southern limit of the property boundary adjacent to Mill Creek that appears as a historical terrace. It is currently fairly open due to a fire that burned the area in 2020. Some potential kangaroo rat burrows were observed inside this area, although they could belong to Delzura kangaroo rat.

This alluvial fan sage scrub area would benefit from enhancement activities, such as removing invasive vegetation. It occurs adjacent to burned areas that could support SBKR, so it appears well-connected to other suitable SBKR habitat to the south. One constraint is that the SBKR population in this section of Mill Creek is not well-documented so it is difficult to assess the upstream limit of their current range and whether they would colonize or inhabit enhanced areas.

9. Mill Creek Central-mature Terrace

To the east of the previously described area lies the mature, historical terraces of Mill Creek. This is characterized by a grassy understory and primarily a chamise overstory, which has largely remained un-flooded since prior to 1938. This location is deemed unsuitable for SBKR. An aerial photograph from 1938 indicates that it overlaps with the northern terraces of Mill Creek and contains some historical breakout channels. This area presents an opportunity for the creation of alluvial fan sage scrub through the removal of invasive vegetation and the exposure of underlying sandy substrates. However, there are surface rocky areas that may suggest limited soil suitability for SBKR at certain locations; thus, thorough testing should be conducted prior to initiating large-scale restoration efforts.

At a minimum, specific swaths could be identified for potential creation or enhancement opportunities based on field assessments that avoid areas with rocky surface soils and target sandy sections. This area encompasses a total of 28.5 acres. Similar to the other locations discussed, the SBKR population along this segment of Mill Creek is not well-documented. While CAGN have been observed in this area, they could benefit from focused restoration activities.

10. Historical Terrace of Mill Creek

Located east of the SCE powerhouse access road, this area consists of a mature, historical terrace of Mill Creek characterized by a relatively grassy understory and a predominance of chamise in the overstory. It appears less rocky than the adjacent areas to the west of the access road and shows more signs of sandy terraces formed by historical small breakout channels of Mill Creek. The likelihood of future breakout events is reduced due to a 15- to 20-foot-tall boulder berm constructed upstream. These small sandy areas present moderate suitability for SBKR, though the likelihood of their occurrence remains uncertain, as the SBKR population in this segment of Mill Creek is not well documented. There is potential to enhance the alluvial fan sage scrub for SBKR by removing invasive species and thinning shrubs where sand lenses exist.

The creation of new sand lenses could be feasible by clearing invasives and selective shrubs, which would significantly increase the amount of suitable habitat for SBKR. This area encompasses a total of 12.2 acres and is situated adjacent to a more scoured and less densely vegetated region comprised of a mix of sandy and rocky soils that may also support SBKR. There may be opportunities for natural colonization of the enhanced and newly created areas if they are developed nearby.

11. Mill Creek Central-rocky Alluvial Fan Sage Scrub

A historical braid of Mill Creek, which is currently disconnected from water flows due to an upstream flood control structure (large rock berm), is located in the southern part of the property, just west of the historical SCE powerhouse. While some small sand lenses are present, the majority of the area is characterized by boulders and rocky substrates, creating largely unsuitable living conditions for the SBKR. It is possible that SBKR could utilize this area for movement. Aerial photographs from 1938 and 1969 indicate that Mill Creek flooded this area, likely washing away much of the sand and exposing the boulders, resulting in limited sand deposits. There is potential to enhance SBKR habitat by importing sands, although this approach may be cost prohibitive.

12. Mill Creek Historical Braid

To the east of the SCE powerhouse access road is a historical braid of Mill Creek that is no longer connected to flows. This is due to an upstream flood control structure (large rock berm). There are some small, higher quality sand lenses present here that provide low-moderate suitability for SBKR. The likelihood for SBKR to occur is difficult to assess as their distribution in this part of Mill Creek is not well-documented. These two small areas (1.8 acres) could benefit from enhancement activities, particularly by removing invasive vegetation and thinning shrub cover in places. In addition, the eastern polygon is very close to the current low flow channel of Mill Creek.

Mill Creek Central-mature terrace (Polygons 11-12)

Mill Creek Central-rocky alluvial fan sage scrub (Polygon 13)

Historical Terrace of Mill Creek (Polygon 14)

Mill Creek historical braid (Polygons 15-16)

Figure 7-88 View of the San Bernardino Mountains and Valley

7.5 CONSERVATION AND MITIGATION BANKING PROGRAM OVERVIEW

Importance of Mitigation

Compensatory mitigation, through mitigation banking or a mitigation credit agreement, ensures impacts on environmental resources are offset by enhancing, restoring, and/or creating, and preserving resources at a different location, so that there is no net loss in ecological function.

Ensures/supports legal compliance. Multiple laws, including California Environmental Quality Act (CEQA), Clean Water Act (Section 401, Section 404), Endangered Species Act of 1973, California Endangered Species Act, California Fish and Game Code section 1600 et seq., and Porter-Cologne Water Quality Control Act, require mitigation when impacts cannot be avoided or minimized.

Compensatory mitigation is the final step in the regulatory process hierarchy:
1. Avoid
2. Minimize
3. Restore (on-site)
4. Compensate (off-site or through mitigation credits)

Without compensatory mitigation, incremental project-by-project impacts would gradually degrade ecosystems.

California Fish and Wildlife describes mitigation banking activities as:

"A conservation or mitigation bank is permanently protected land that is conserved and managed for its natural resource values. In exchange for permanently protecting, managing, and monitoring the land, the bank sponsor may sell or transfer aquatic resources and/or species/habitat credits to permittees/project proponents that need to meet compensatory requirements for the environmental impacts of projects. Use of mitigation bank credits must occur in advance of project impacts when the compensation cannot be achieved at the project site or would not be as environmentally beneficial.

Conservation Banking

A conservation bank generally protects important habitat including habitat for threatened, endangered, or other special status species that exists, has been, or will be created. Credits are established for the specific sensitive species and habitat. Agencies that typically participate in the regulation and approval of conservation banks are California Department of Fish Wildlife, the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration-National Marine Fisheries Service.

Mitigation Banking

A mitigation bank is created to compensate for activities authorized pursuant to Section 404 of the federal Clean Water Act (33 U.S.C. Sec. 1344 et seq.) and protects, restores, creates, or enhances wetland habitats. Additionally, mitigation banks may also include the conservation and protection of state and/or federally listed threatened, endangered species and/or habitat. Credits are established to compensate for unavoidable impacts to aquatic resources and/or special status species and/or habitat. Mitigation banks are approved by the U.S. Army Corps of Engineers and may also be approved by the U.S. Environmental Protection Agency, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration-National Marine Fisheries Service, and State Water Resources Control Board.

Benefits of Conservation and Mitigation Banking

For the buyer or user of credits...

- Cost reductions over per project Permittee Responsible Mitigation, due to the economies of scale, a larger habitat bank generates and passes on to credit buyers/users together with cost certainty.
- "One-stop" permit compliance including habitat protection, long-term management, maintenance, and monitoring.
- More efficient. This means a permittee can likely satisfy mitigation requirements faster buying a credit than creating Permittee Responsible Mitigation.
- For the ecosystem...
- Protection and restoration of larger, more functional and longer-lasting ecological systems.
- No temporal loss of ecological function because protection/restoration is completed before the impacts occur.
- Management of the property for aquatic resources, sensitive species and/or their habitats in perpetuity.
- "No Net Loss" in wetland acres at minimum, often with a gain of wetland acres.
- Permanent protection in the form of a conservation easement or fee title held by a qualified conservation entity, enforced by a qualified third party."

https://wildlife.ca.gov/Conservation/Planning/Banking/Overview

General Process to Establish a Mitigation Bank or MCA

Establishing a mitigation bank/MCA involves a multi-year regulatory, biological, legal, and financial process. The general steps required to establish a mitigation bank/MCA include:

- Identifying a suitable site:
  - High-quality existing habitat or strong restoration/habitat creation potential
  - Located in an area where impacts are occurring and where compensatory mitigation is needed
  - Be of sufficient size to support ecological functions at a landscape scale
  - Provide similar/superior ecological values/functions compared to the ecological functions being impacted by projects
  - Have secure water rights/hydrology (required for wetland/stream mitigation banks); support populations of species and habitats they require for species mitigation banks.
- Determine the regulatory framework
  - Which regulations/agencies have purview over the types of impacts requiring the compensatory mitigation proposed at the mitigation bank? For example, mitigation banks providing stream/wetland resource value to offset impacts on streams/wetlands could involve Clean Water Act (section 404, 401) and/or the Porter-Cologne Water Quality Act, and California Fish and Game Code section 1600 et seq. The agencies with oversight over these resources and regulations include US Army Corps of Engineers, California Regional Water Quality Control Board, and California Department of Fish and Wildlife at a minimum. If federally threatened and/or endangered species are supported/occur within areas being impacted, the US Fish and Wildlife Service and NOAA Fisheries may also have purview.
- Determine market demand. Establishment of a mitigation bank is a large investment in time and capital. It is important to determine if there is sufficient market demand for the proposed ecological values (credits) the bank will provide.
- Develop mitigation banking governing documents that identify baseline ecological conditions of the mitigation banking site, restoration strategies, types of credits the bank may offer (e.g., wetland, streams, species, habitats), performance standards associated with restoration strategies, long-term monitoring and management plans, mitigation credit calculation methodology, financial assurances, endowment funding structure.
- Secure site protection in perpetuity. Mitigation bank lands must be permanently protected by a legal instrument that ensures the site is legally restricted to conservation use forever (e.g., conservation easement).
- Obtain CEQA/NEPA compliance. Depending on circumstances, establishment of a mitigation bank may require CEQA/NEPA documentation.
- Provide financial assurances. Before a mitigation bank can sell credits, several financial securities need to be established:
  - Construction/implementation security
  - Monitoring and adaptive management funding (covering the period of initial habitat restoration actions through achievement of performance criteria to ensure that ecological value of the credit being sold will appropriately offset the impacts the credit is being applied to).
  - Long-term management endowment
- Construct/restore/enhance habitat (e.g., grading, nonnative species control/management, reestablishment of hydrology, native planting)
- Credit Release Schedule
  - Credits are released incrementally to ensure that ecological performance criteria are being met, and that all of the bank assurances are successfully established.
- Long-term monitoring and management. Following achievement of performance criteria, the site will transition into long-term monitoring and management, with long-term management and monitoring funded by disbursements from the endowment. Annual reporting is required to ensure that the bank continues to support the ecological functions.

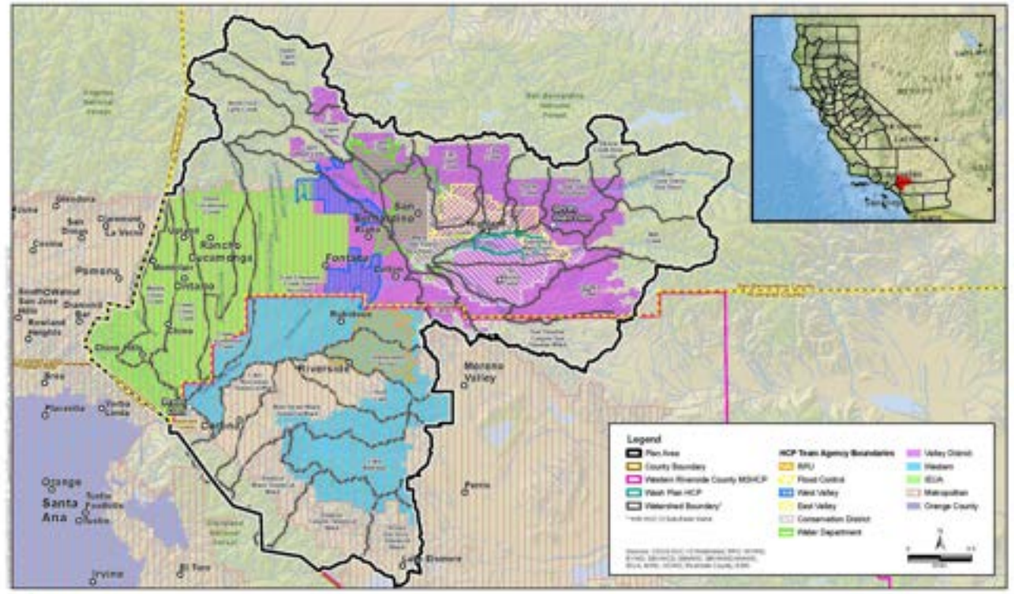


Figure 7-89 Upper Santa Ana River Habitat Conservation Plan Area

7.6 UPPER SANTA ANA RIVER HABITAT CONSERVATION PLAN

The Upper Santa Ana River Habitat Conservation Plan is a collaborative approach to programmatic permitting spanning 863,000 acres that contributes to watershed health and resiliency. The 50-year permit will streamline project specific approval for over 100 water projects including: surface water diversion, water reuse, groundwater recharge, wells and water conveyance infrastructure, and existing water facility routine operations and maintenance. Within the requirements of the Endangered Species Act, covered activities include ground-disturbing and complex hydrology impacts. The structure achieves federal regulatory assurances while also supporting the analysis and implementation required for other regulatory permits from agencies such as CDFW, Regional Water Quality Control Board, and the US Army Corps of Engineers.

Participating Agencies

- San Bernardino Valley Municipal Water District (Lead Agency)
- City of Rialto
- East Valley Water District
- Inland Empire Utility Agency
- Metropolitan Water District of Southern California
- Orange County Water District
- Riverside Public Utilities
- San Bernardino Municipal Water Department
- San Bernardino Valley Water Conservation District
- West Valley Water District
- Western Municipal Water District

Projects Benefiting from Sunrise Ranch Mitigation Acreage

San Bernardino Valley Water Conservation District
- Mill Creek Diversion Maintenance

East Valley Water District
- Operations & Maintenance of wells and pipelines

Inland Empire Utilities Agency
- Impacts associated with groundwater recharge projects

Metropolitan Water District of Southern California
- Impacts associated with right-of-way and patrol road maintenance

Riverside Public Utilities
- Construction of wells and pipelines in Bunker Hill Basin area, and O&M of these areas in the future
- Impacts associated with construction of new treatment plant
- Impacts associated with property maintenance
- Impacts associated with repair/ replacement of supply transmission mains, and O&M of supply transmission mains

San Bernardino Valley Municipal Water District
- Impacts associated with O&M of existing pipelines and pipeline crossings
- Mill Creek diversion stormwater capture project
- Oak Creek Basins/Plunge Creek diversion stormwater capture project

San Bernardino Municipal Water Department
- Maintenance, repair, replacement of pipelines under the Santa Ana River
- Impacts associated with Kenwood well field and pipelines
- Impacts associated with existing facilities maintenance

Covered Species

Plants
Slender-horned spineflower
Santa Ana River woolly-star

Fishes
Santa Ana sucker
Arroyo chub
Santa Ana speckled dace

Amphibians and Reptiles
Western spadefoot
Mountain yellow-legged frog
Western pond turtle
South coast garter snake
California glossy snake

Mammals
San Bernardino kangaroo rat
Los Angeles pocket mouse

Birds
Least Bell's vireo
Southwestern willow flycatcher
Yellow-breasted chat
Western yellow-billed cuckoo
Tricolored blackbird
Burrowing owl
Coastal California gnatcatcher
Cactus wren

Insect
Delhi Sands flower-loving fly

Fully Avoided Species
Arroyo toad

Figure 7-90 Annual Santa Ana River Fish Survey

Mitigation Strategy

In order to continue projects as stand alone efforts, to the rolled into the HCP upon approval, mitigation must occur prior to the impacts. By incorporating a multi-project mitigation strategy there are significant cost savings to the participating agencies. Additionally, the effort has been successful at receiving grant funds.

Chapter 8

COMMUNITY ENGAGEMENT

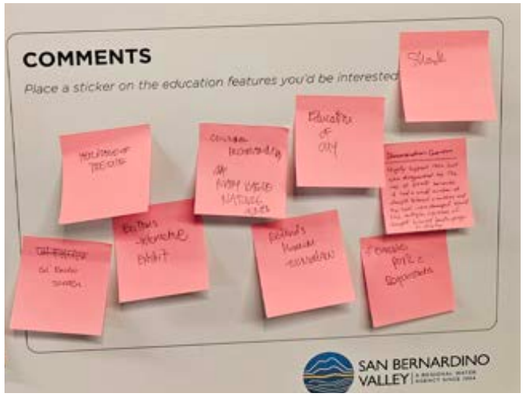
CHAPTER 8 CONTENTS

8.0 COMMUNITY ENGAGEMENT OVERVIEW

A. Approach

A thorough community engagement process ensured that local residents and other agencies near Sunrise Ranch Property could share their opinions on the future development and planning effort. The outreach was conducted in four phases. The first phase focused on introducing the Plan to the community and stakeholders. The second phase was to collect input to guide ideas for the Plan. The third phase served as a way for participants to weigh in on the current direction of the plan. The fourth and final phase was an open house to present the final Plan document.

There were two events in the first phase, during the summer of 2023, and one in each consecutive phase. The events were held in a variety of locations and at a variety of times to include a broad spectrum of participants. Community Workshops were public and open for all to attend.



PHASE 1
LAUNCH & LISTEN

Trails Day
June 3, 2023
Sunrise Ranch

Workshop #1
June 22, 2023
Mentone Senior Center

PHASE 2
LISTEN & ENGAGE

Workshop #2
October 18th, 2023
San Bernardino Valley HQ

PHASE 3
EXPLORE & SYNTHESIZE

Workshop #3
March 6, 2024
Ayres Hotel

PHASE 4
SHARE & EVALUATE

Workshop #4
June 18, 2024
Event Center, Bear Springs Hotel

8.1 PHASE 1 COMMUNITY EVENTS

A. Trails Day

Location: Newport Rd & Fish Hatchery Rd
Estimated attendance: 96

San Bernardino Valley hosted a Trails day with activities, hiking, and a vendor event on the Sunrise Ranch Property. San Bernardino Valley had an information table to introduce the Plan, answer questions, generate a community list, and solicit initial ideas.

B. Community Workshop #1

Location: Mentone Senior Center
Estimated attendance: 14

The first community workshop consisted of a presentation, a question and answer session, and tables for comment cards. The purpose of the first phase was to introduce the project and its goals to the community. The team delivered a high-level view of the Sunrise Ranch Property and spoke to all of the key interest areas.

C. Summary of Comments

8.2 PHASE 2 COMMUNITY EVENTS

A. Community Workshop #2

Location: San Bernardino Valley Municipal Water District HQ
Estimated attendance: 28

After the team met with the community during Phase 1, Workshop #2 was more interactive. The workshop included a presentation followed by activity tables and discussions. The goal was to understand the community's views.

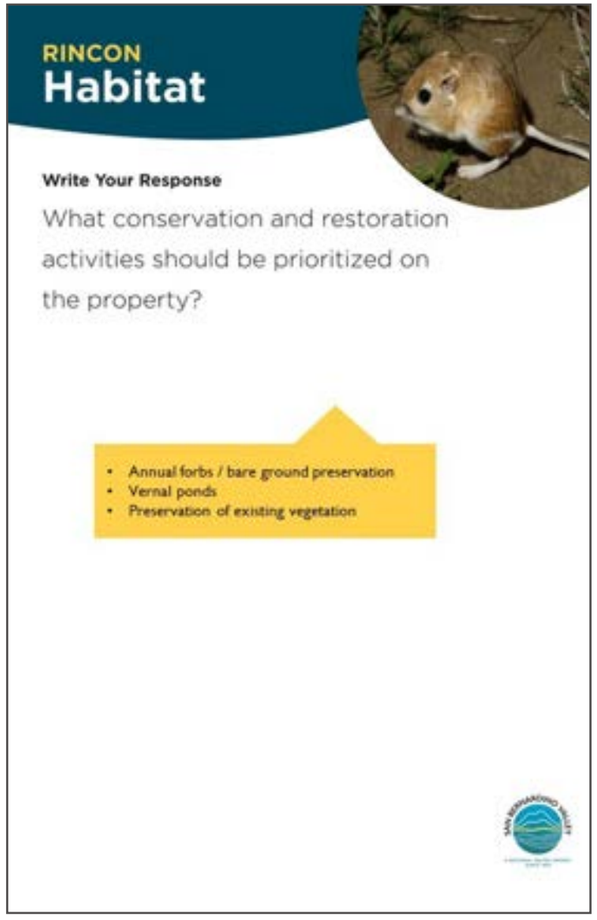
B. Summary of Comments

C. Activity Tables Summary

1. Habitat

Additional Thoughts

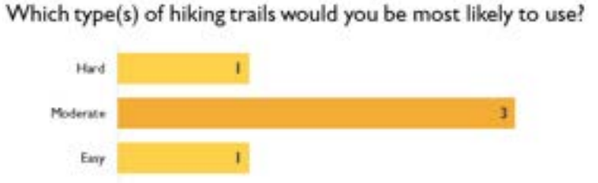
- Conservation
  - Mention of other property bidder conserving their land in East Valley
  - This land is closed to public and strict about mitigation
  - Concerns that “critical habitat” area will be closed for public use
  - Preference towards preservation/ enhancement of existing native vegetation, as opposed to restoration
  - Mention that Wildlands Conservancy could acquire back this land
  - Annual foreland/bare ground typically important for ground nesting arthropod species, reptiles, diminutive plant species, etc.; should be emphasized
- Wildflower blooms
  - Trespassing problems with neighboring properties during bloom season
  - Security concerns and habitat concerns
- Fauna
  - Interpret past radio collared deer study near site to analyze corridors



2. Site Trails

Additional Thoughts

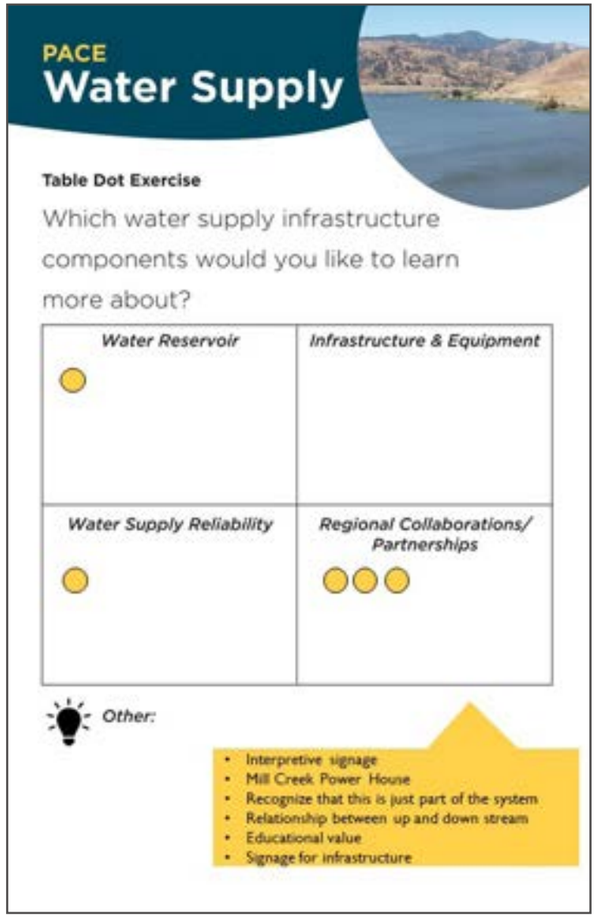
- Recreation
  - Non-motorized water recreation in reservoir (kayak, fishing)
  - Potential to connect to Crafton Regional Park campgrounds
  - Outdoor workout area
- Trails
  - Mention of Seven Oaks area trail being backcountry rugged and indistinct
  - Separation of trails for mountain bikers vs. hikers
  - Clear delineation of bike, pedestrian, and other modalities desirable for safety
  - Viewpoints are important
  - Trail safety and erosion concern
- Accessibility is a priority
  - Boardwalk, paved parts of path, and sections of path with handrails
  - Clear wayfinding for differently-abled bodies
- Orchard
  - Should be at least half an acre to simulate “orchard”
  - Narrow road leading to Newport Ave. is currently Marquez brother’s property on both sides, would need to discuss changes with them

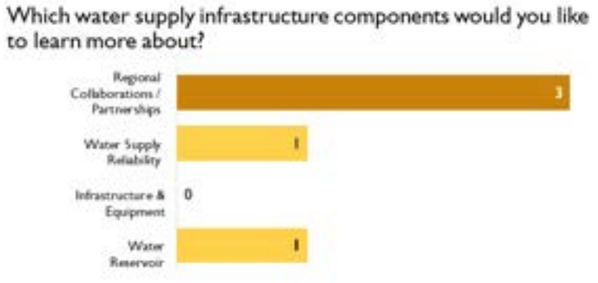


3. Water Supply

Additional Thoughts

- Bear Valley High Line alternative
  - Getting the Board to agree with alternative; what is the business case?
  - Parallel pipe for East Valley and San Bernardino Valley
  - Joint facility potential
- Overflooding of Seven Oaks Dam
  - People often swim in river downstream; this can be very dangerous
- Consider water on site
  - San Bernardino Lakes and Streams project with clay soil
  - Foothills have a lot of quartz, small sand is good for percolation
- Flood over Hanson Canyon history
  - Address if we introduce hydrology to the site, how will it be maintained in dry years?

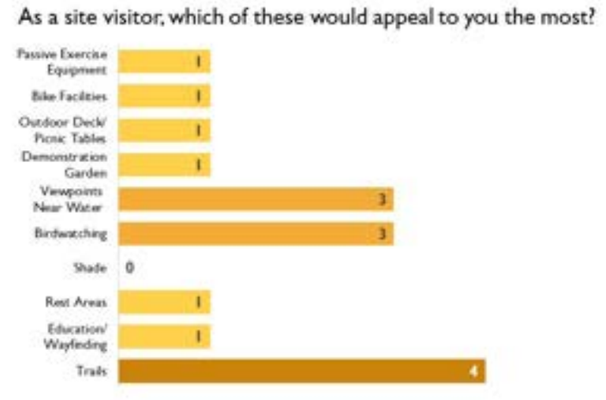




4. Site Program

Additional Thoughts

- Road
  - Request to widen road
- Security Concerns
  - Homeless encampments problematic; i.e. partiers, trash dumpers
  - How to prevent barbeques
  - Understand who manages and maintains security on site
- Amenities
  - Permanent toilets
  - Water bottle fill stations, drinking water/fountains
  - Interpretive signage
  - Mill Creek Power House
  - Talk about pipeline, BVHL, aqueduct and built hydroelectric power



5. Architecture Features

Additional Thoughts: Education Center

- Interior spaces
  - Meeting space for nonprofits to convene and provide lectures
  - Support programming for University/ Higher education
  - Space for interns working at SBVMWD to also work
  - Flexible multiple use spaces
- Amenities
  - Shade
  - Integrate Mill Creek Powerhouse
  - Maintain viewshed
  - Wildlife viewing blinds/ glass bird blinds
- Activities
  - Education center and activities opportunity for San Bernardino residents to stay and recreate
  - Other cities (Redlands, Rancho Cucamonga) have fancy developments (malls) that bring people in from neighboring cities and increase revenue; work to keep people here

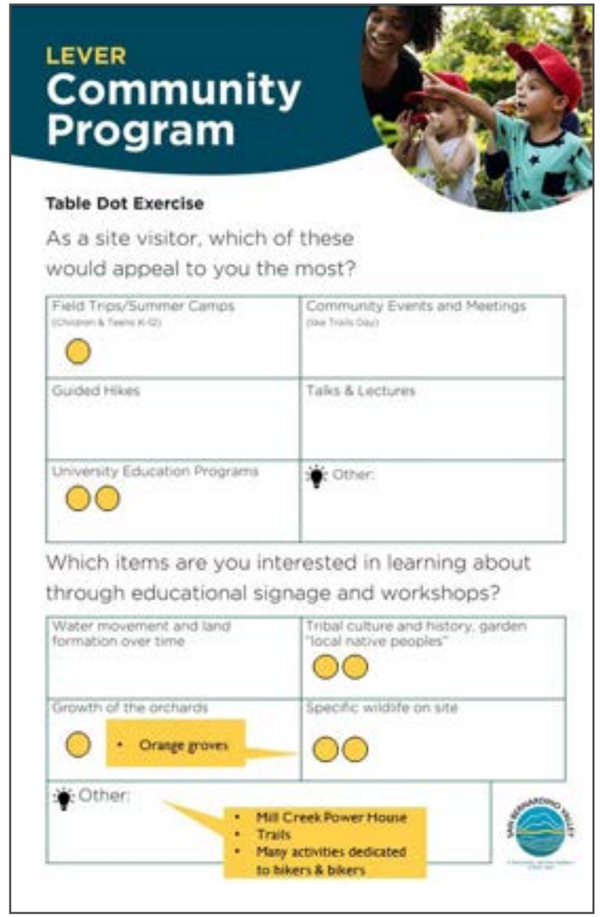
Additional Thoughts: Headquarters

- Transportation to site
  - Headquarters would be in the middle of nowhere
  - Can't easily access site via public transportation
  - East Valley HQ nearby and public can't get to easily

Additional Thoughts: Fire Training Center

- In coordination with San Bernardino Fire Department
- Educational component
  - Collaboration with education center; learn fire safety, prescribed burns

6. Community Program



8.3 PHASE 3 COMMUNITY EVENTS

A. Community Workshop #3

Location: Ayres Hotel
Estimated attendance: 20

For Workshop #3, the team was able to share more detailed vision plans for the Plan. Key topic areas were developed further and the community participated in table discussions.

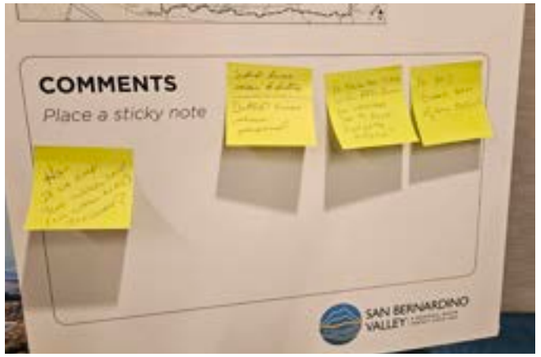
B. Summary of Comments

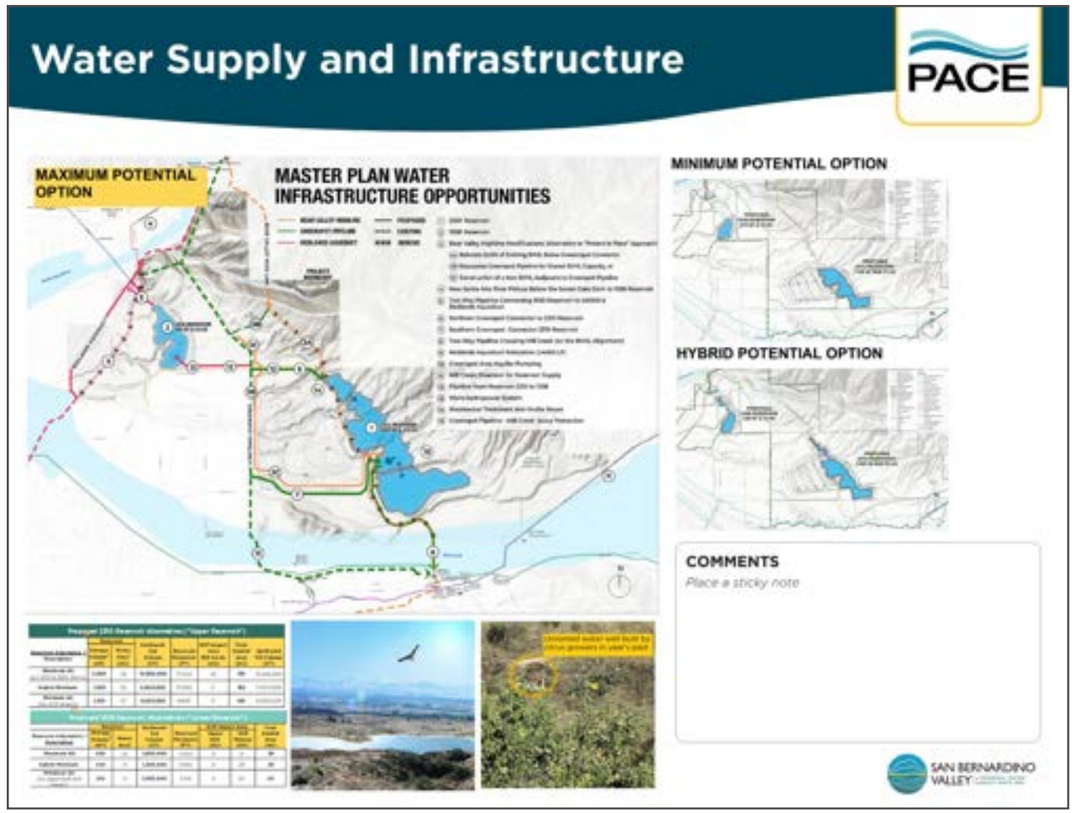
C. Activity Tables Summary

1. Water Supply Infrastructure

Additional Thoughts

- How do we keep the water level consistent?
- Is there an issue with PFAS from the watershed due to recent firefighting activities?
- Is Mill Creek a part of the project?

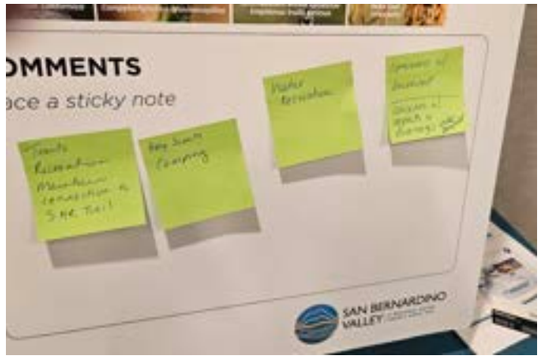


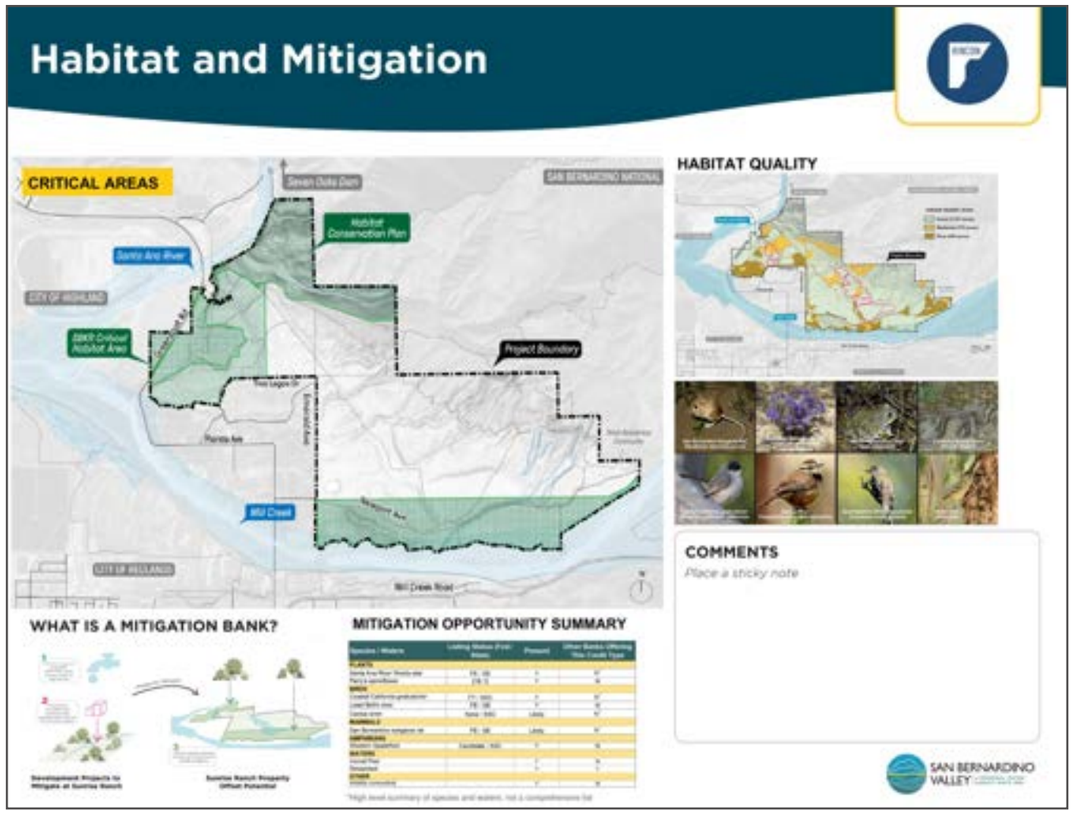


2. Habitat and Mitigation

Additional Thoughts

- Concerns with Greenspot Road
- Concerns with impacts to drainages under Emerald Ave.
- Trails and recreation; maintain connection to SAR Trail
- Boy scouts and camping opportunity
- Water recreation

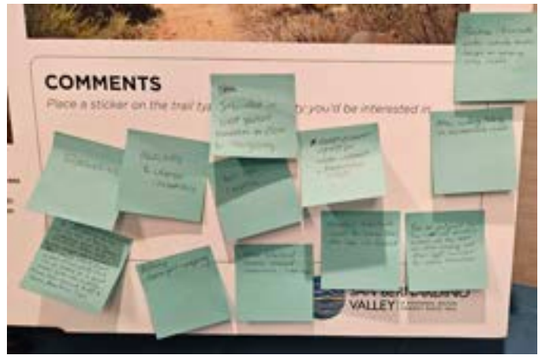




3. Site Experience

Additional Thoughts

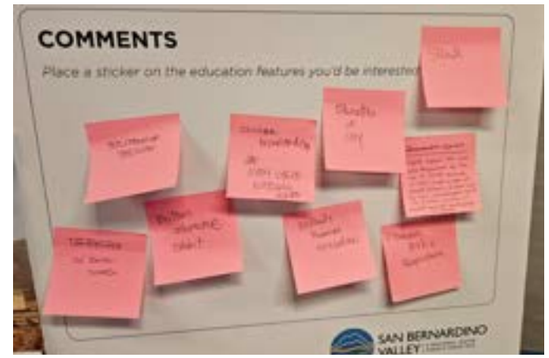
- Reduce/ eliminate motor vehicle access except on existing entry roads
- Allow walking/biking on maintenance roads
- Overnight camping; low impact backpacking only
- Be an endpoint for the road and mountain portions of the SART to allow camping and other light services for travelers
- Maintain bike/walk access to Seven Oaks Dam Loop via Greenspot Road
- Interested in light pollution mandates to allow stargazing
- Tent-like camping
- Allow bike/pedestrian access around the reservoirs
- Redlands and Crafton Conservancy partnerships
- Boy scout and university partnerships
- Xeriscape demo garden that shows native plants and how pretty they can be
- Connect trails to SART

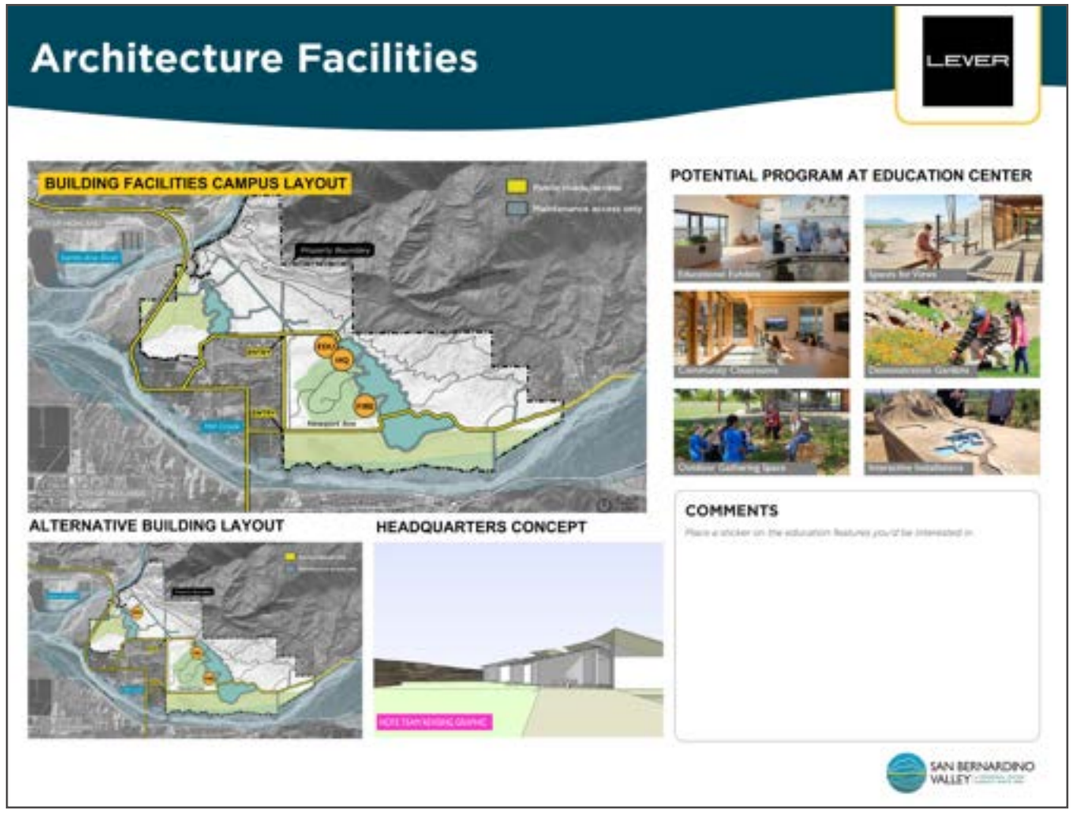


4. Architecture Facilities

Additional Thoughts

- Provide shade
- Demonstration garden; disappointed by the garden at EVWD because it had a small number of drought tolerant varieties and the sings were damaged; would like multiple versions of drought tolerant landscaping on display
- Education of the site
- Cal Environ-screen
- Interactive exhibits
- Cultural priority
- Mary Nagle Nature Center example
- Redlands Museum, too modern
- Education for the city





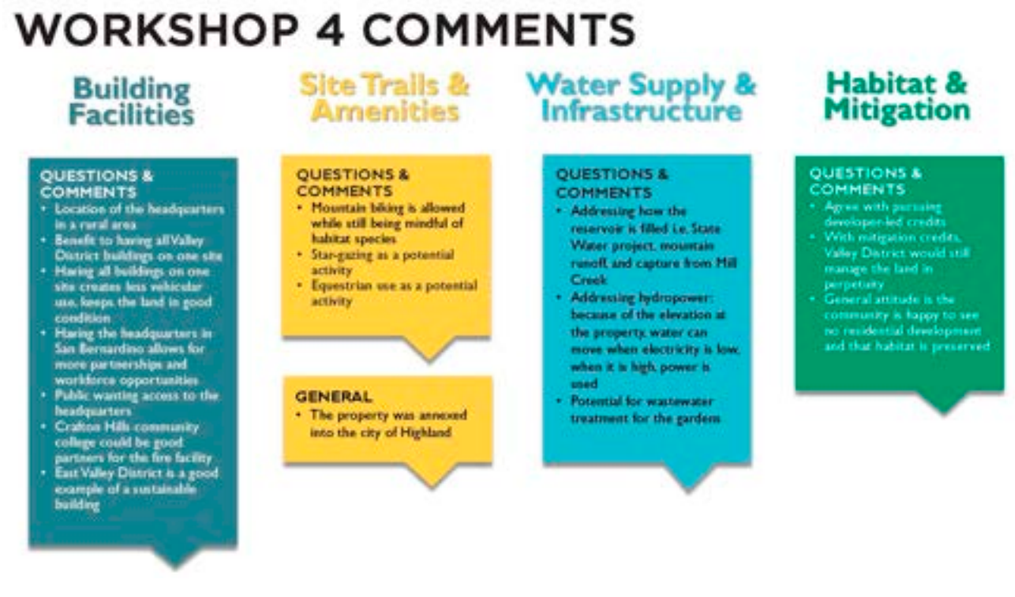
8.4 PHASE 4 COMMUNITY EVENTS

A. Community Workshop #4

Location: Ayres Hotel
Estimated attendance: 50

The final phase of the project was an opportunity for the team to share the Plan draft and solicit final input on the deliverable.

B. Summary of Comments



Chapter 9

LEGACY OF PLANS AND PROJECTS

CHAPTER 9 CONTENTS

Image Source San Bernardino County DPW

9.0 SUMMARY OF EXISTING DOCUMENTS

Reviewing existing documents and other research material is the first step in the planning process. Planning documents, technical studies, and relevant materials are reviewed and analyzed to generate summaries and key issues. They are organized chronologically to illustrate how the development of the site has evolved over time and showcase today's priorities. The documents allowed the team to review the history, progress, and current status of the Sunrise Ranch Property in greater detail.

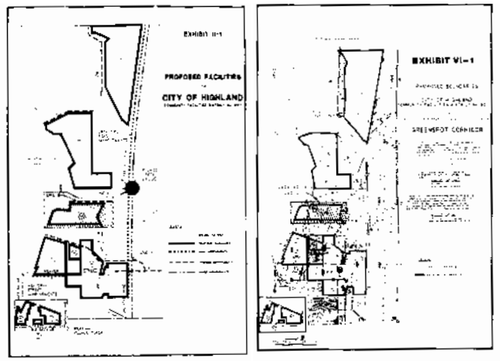


Figure 9-1 Proposed community facilities

Figure 9-2 Topographic map from 2007 showing easements for title report

A. April 1990- Engineers Report for City of Highland CFD 90-1 Greenspot Corridor

This report was prepared by J. F. Davidson Associates, Inc. and finalized in April 1990. The document summarizes the development of the City of Highland Community Facilities District No. 90-1, Greenspot Corridor. It includes a description of facilities, cost estimate, financial analysis, rate and method of apportionment, and district boundary. The development was proposed to the west of Greenspot Road near the Plunge Creek Bridge. It includes a description of facilities, cost estimate, financial analysis, rate and method of apportionment, and district boundary. The development was proposed to the west of Greenspot Road near the Plunge Creek Bridge.

B. October 2007- Record Constraints Mapping and Title Exception Investigation Report and Maps

The report was prepared by RBF Consulting for the County of Orange Resources & Development Management Department Geomatics/LIS Division/Corporate Real Estate Division. It describes the source information used to compile the record constraints exhibits and provides a summary of title encumbrances. It is accompanied by two topographic maps that show the various easements, which were used to determine the exterior boundary for the project.

C. December 2011- Phase 1 Environmental Site Assessment Report

The report was prepared by Converse consultants to LCD Greenspot LLC for Greenspot Property Project. The environmental site assessment was conducted during the period of August 15, 2011 to September 12, 2011. Converse compiled and reviewed information that was obtained from interviews, document research, and on-site and area reconnaissance to identify potential environmental conditions at the property. Main conclusions and recommendations from Converse includes:

- The potential presence of agricultural chemical residues in the surface and subsurface soils at the property, since the property was historically used for agriculture from at least 1938 until the present. Converse recommends further assessment.
- The oil-filled smudge pots located on the property should be removed according to applicable local and/or state regulations. Converse recommends that the stained soil be removed and transported to an offsite treatment and disposal facility according to applicable state and/or federal regulations.
- Several debris piles containing various building materials were observed across the property.
- Converse recommends that the debris be removed from the property according to applicable local/state regulations. Converse further recommends that the ground surface beneath the debris piles be monitored for discoloration, staining and malodors.
- The shipping containers and dilapidated construction equipment located near the northeast corner of the Property should be removed according to applicable local and/or state regulations.
- The above ground storage tank located near the caretakers residence on the northwest portion of the Property should be removed and disposed of according to applicable local/state regulations.
- The earthen dams located near the southeast corner of the northwest portion of the Property should be monitored during redevelopment and grading activities for buried debris, hazardous materials, malodors and staining.

Figure 9-3 View of debris and tire pile on northwest portion of property

Figure 9-4 View of smudge pots on northwest portion of property

Figure 9-5 View of smudge pots on southeast portion of property

Table G: 2015 (Phase 1) Without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Baseline Rd. west of Boulder Ave.	22,200	64	130	277	68.9
Baseline Rd. between Boulder Ave. and Highland Ave./Weaver St.	9,500	< 50	76	156	65.2
Baseline Rd. east of Highland Ave./Weaver St.	2,500	< 50	< 50	68	59.4
Boulder Ave. north of Baseline Rd.	13,600	< 50	94	198	66.7
Boulder Ave. between Baseline Rd. and Greenspot Rd.	7,400	< 50	65	133	64.1
Orange St. between Greenspot Rd. and SR-38	12,300	< 50	< 50	95	63.5
Orange St. between SR-38 and Colton Ave.	11,400	< 50	< 50	91	63.2
Orange St. south of Colton Ave.	11,800	< 50	< 50	93	63.3
Highland Ave. north of Baseline Rd.	2,700	< 50	< 50	< 50	56.9
Weaver St. between Baseline Rd. and Water St.	3,100	< 50	< 50	< 50	57.5
Weaver St. between Water St. and Greenspot Rd.	4,700	< 50	< 50	< 50	58.8
5th St. west of Palm Ave.	11,100	< 50	< 50	92	63.3
5th St./Greenspot Rd. between Palm Ave. and Boulder Ave.	20,200	60	121	256	68.4
Greenspot Rd. between Boulder Ave. and Church St.	23,500	65	133	283	69.1

Figure 9-6 Noise levels without project traffic

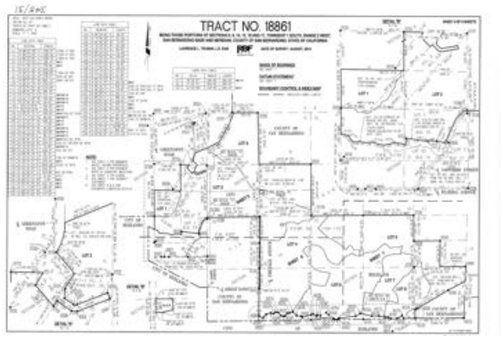


Figure 9-7 Proposed tract map

- Several irrigation standpipes and lines were observed across the Property. The irrigation lines appeared to be partially buried. There is a potential that underground transite (asbestos concrete) water pipes associated with the irrigation systems may be present on the Property.
- Converse recommends trenching along the irrigation lines to determine if transit pipes are present.

D. March 2014- Draft Noise Impact Analysis

This report was prepared by LSA Associates Inc for the LCD Greenspot Property Project. The updated draft describes the anticipated construction and traffic noise levels affected by the project during the five different phases. LSA Associates describes the short-term construction noise impacts on adjacent land uses and occupied residences constructed in early phases and potential long-term impacts on adjacent land uses. Mitigation measures are recommended to reduce traffic and stationary source noises to bring potential short- and long-term impacts to below a level of significance.

E. August 2014- Land Tract Map No. 18861

This set of survey maps was prepared for the Orange County Flood Control District in August 2014. It maps the various easements on the project site and is used for finance and conveyance purposes only.

F. September 2014- Letter Report for Oversight of Petroleum Impacted Soil Removal

The letter report summarized observations of the removal of petroleum impacted soil from beneath former smudge pots at the property site. The excavation was completed by Ocean Blue Environmental Services, and onsite mobile laboratory analyses were completed by Jones Environmental.

G. September 2014- Harmony Development Preliminary Budget

A collection of spreadsheets was prepared for LCD Greenspot LLC and accompanied the Draft EIR. The tables summarize the cost estimates for the five phases of development including fees and credits. The initial estimate in 2011 did not include credits, but the 2014 estimates do. There is a significant increase in total cost between the July 2014 sheet and September 2014.

H. May 2025- East Valley Water District Capital Improvements

This spreadsheet is provided by the East Valley Water District (EVWD) and was prepared in May 2015. The table summarizes the cost to develop infrastructure on site for potable and non-potable water and sewer lines. The cost is split between the Harmony development and EVWD with the latter paying $10 million more.

I. February 2026- Harmony Specific Plan Final Environmental Assessment, Volume 1

The report is prepared by Albert A. Webb Associates for LCD Greenspot LLC for Greenspot Property Project. Webb compiled comments on the Draft EIR and provides responses citing provisions in the Revised DEIR. The document ends with the proposed mitigation monitoring and program to address how the project will mitigate proposed impacts as required by CEQA. Main concerns acknowledged by community members include:

- Proximity of the Project to the San Bernardino National Forest and potential wildfire impacts as the development is sited in the wildland-urban interface. Comments note the proposed fuel management zones may also conflict with habitat for critical species.
- Traffic impacts, especially to SR-38 and local and regional transportation facilities. The bridges over the Santa Ana River and Mill Creek would need updates for increased traffic and the potential for a new bridge over Mill Creek may pose critical habitat concerns.
- Aesthetic impacts to rural and natural hillsides with landscaping that is antithetical to native

Figure 9-8 Examples of letters submitted in response to the Draft Environmental Impact Report from concerned agencies and citizens living near the Project

Figure 9-9 Examples of letters submitted in response to the Draft Environmental Impact Report from concerned agencies and citizens living near the Project

Figure 9-10 Example mitigation measures for biological resources chapter of EIR

Figure 9-11 Relationship of survey sites on the Project to historic sightings of the coastal California gnatcatcher on the adjacent Santa Ana River Wash site, from Attachment A

desert vegetation and light pollution from new residences.

- Water quality impacts to Mill Creek and the Santa Ana River from future stormwater and urban runoff
- Proposed habitat mitigation for the western spadefoot toad breeding habitat and other endangered or threatened species is considered not comprehensive. Officials at wildlife organizations discourage off-site mitigation for habitat loss as it is not an adequate solution for species on-site that will be displaced.
- Desire for further assessment of endangered and threatened species (such as the San Bernardino Kangaroo Rat, California gnatcatcher, Least Bell's Vireo, and slender-horned spineflower) on site due to their under representation in previous surveys, the presence of their preferred habitat on site, and elusive nature of some which likely allowed them to evade detection on previous site visits.
- Impact to health of historical bee colonies on the nearby San Bernardino County Flood Control property. One person notes the bees have the potential to become a hazard to residents too.
- Need for a Native American monitor on site during ground disturbing construction activity as the site falls within the Traditional Use Area of multiple groups including the Yuhaaviatam and Gabrielino Tongva Nation.

J. FEIR Attachment A: 2013-2014 Non-breeding Season Coastal California Gnatcatcher Survey Results; 2014 Breeding Season Coastal California Gnatcatcher Survey Results

This set of reports were prepared by Kidd Biological Inc for the Greenspot Project in 2014. Focused surveys were conducted in 2013 and 2014 during breeding and non-breeding season to assess whether the federally-threatened coastal California gnatcatcher (Polioptila californica californica) occupied the suitable habitat found on site. Though the species have been observed on the adjacent parcel within the Santa Ana River Wash, no California gnatcatchers were observed within the project site. The biologists noted observations of other federal and California species of special concern that were not a focus of the survey, including the burrowing owl, western spadefoot toad, and golden eagle during the non-breeding season and the Willow flycatcher, Least Bell's vireo (pair), and Santa Ana River wollystar during breeding season.

K. FEIR Attachment B, Construction Emissions Estimated for Phase 1 CalEEMod Results

This report contains the estimates of greenhouse gas and other emissions related to the Greenspot Project conducted in June 2014. The preparer used CalEEMod 2013.2.2 to estimate emissions for construction of Phase 1, 2, 3, and 4; operational emissions with proposed mitigation actions; and operational emission with "No Action Taken".

L. FEIR Attachment C, RAFSS Mitigation Credit Potential

This document was prepared by Michael Baker International for the Harmony Specific Plan Greenspot Mitigation Analysis in April 2015. The collection of maps and tables summarize the Riversidean Alluvial Fan Sage Scrub (RAFSS) habitat around the project site that could be used for mitigation credits. Parcels are owned by the City of Redlands, San Bernardino County Flood Control District, San Bernardino Valley Water Conservation District, and Southern California Edison Company. Mitigation opportunities include spot treatment/removal of non-native plant species within intermediate/mature RAFSS and thinning of mature RAFSS. The potential credits after mitigation are summarized below.

M. FEIR Attachment D San Bernardino Kangaroo Rat Presence or Absence Surveys for the Central Portion of the Harmony Project Site

Owner	Preservation (acres)	Enhancement (acres)
City of Redlands	90.05	43.91
SBCFCD	263.52	65.3
SBVWCD	306.59	138.69
SCE	313.5	112.42

Lewis Harmony - Construction Phase 1
San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	600.00	Student	8.30	72,309.00	0
General Light Industry	0.21	1000sqft	9.25	212.32	0
User Defined Parking	31.55	User Defined Unit	31.60	0.00	0
City Park	49.90	Acre	49.90	0.00	0
Health Club	1.22	1000sqft		182,600.00	0
Recreational Swimming Pool	4.66	1000sqft	0.11	4,660.00	0
User Defined Recreational	18.00	User Defined Unit	18.00	0.00	0
Apartments Low Rise	232.00	Dwelling Unit	36.30	232,000.00	664
Single Family Housing	618.00	Dwelling Unit	161.15	1,112,460.00	1767
Regional Shopping Center	70.78	1000sqft	1.62	70,785.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	501.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Figure 9-12 Land use emissions for construction phase 1, from Attachment B

Figure 9-13 Location of RAFSS habitat adjacent or near to the Greenspot Project. Habitat ranges from pioneer-intermediate-mature, from Attachment C

Figure 9-14 Examples of pioneer and intermediate RAFSS habitat on the SBCFCD property, from Attachment C

Figure 9-15 Study location for San Bernardino Kangaroo Rat, from Attachment D

Figure 9-16 Traplines for San Bernardino Kangaroo Rat study, from Attachment D

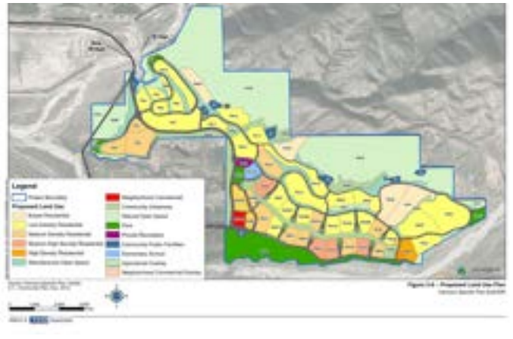


Figure 9-17 Proposed Land Use Plan from the Final Environmental Impact Report

This memo was prepared by the US Fish and Wildlife Service (USFWS) in February 2015. It contains the findings of a January 2015 survey focused on the San Bernardino Kangaroo Rat (SBKR) and assessing potentially suitable habitat. On the soil surface, signs of kangaroo rat species, such as scat, tracks, burrows, and sand bath sites, were present. However, no SBKR were captured within the 45 acres survey area. The biologist notes that many dulzura kangaroo rat were captured where few have been previously found. Since SBKR presence has been detected in other areas in the project site near Mill Creek, USFWS consultation is required if there is loss or modification of critical habitat.

N. Attachment E Harmony Specific Plan: Circulation Memorandum

This memo was prepared by Translutions Inc. for the Greenspot Project. The memo discusses roadway capacities for Greenspot Rd, Newport Ave, and Garnet St. It also evaluates the intersection of SR-38/Garnet St to verify if the intersection could provide adequate level of service until the Harmony residential units are constructed. It concludes that the proposed road network would allow for emergency evacuation in a timely manner and that a traffic signal at the intersection of SR-38/Garnet St would be sufficient mitigation to accommodate 500 residential units.

O. February 2016-Harmony Specific Plan Final Environmental Impact Report, Volume 2

This document was prepared by Albert A. Webb Associates for LCD Greenspot LLC for Greenspot Property Project. The revised DEIR describes the project, associated environmental effects found not significant, and anticipated environmental impacts. Mitigation measures which could minimize significant adverse impacts are addressed as well as the significant and unavoidable cumulative impact to air quality and transportation/traffic. CEQA topics considered less than significant with mitigation include: biological resources, cultural resources, hydrology/water quality, and noise.

P. August 2016- The Harmony Specific Plan

This document is prepared by PlaceWorks in association with nine other firms in August 2016 for LCD Greenspot. It is a comprehensive plan for the development of a new community of traditional residential neighborhoods with public amenities in 1,650 acres in Harmony, CA. The plan outlines the developer's goals to combine housing opportunities with environmental stewardship. In addition to a brief site description and history, the plan includes recommendations for:

- Overall community design
- Infrastructure needs
- Circulation concept and public transit options
- Residential design guidelines
- Neighborhood commercial design guidelines
- Landscape design guidelines, park and amenities
- Development regulations
- Implementation

Q. 2016-Related Resolutions and Ordinances

The City Council of the City of Highland and Planning Commission passed multiple ordinances and resolutions to approve the development of the Greenspot Property Project.

R. May 2016-City of Highland Planning Commission

- PC Resolution No. 2016-005- Recommending the approval of the above City Council Resolutions.

S. August 2016-City of Highland City Council Resolution

- CC Resolution No. 2016-046- Certifying an environmental impact report including the findings of fact, mitigation monitoring reporting program and statement of overriding considerations for the Harmony Specific Plan
- CC Resolution No. 2016-047- Approving General Plan Amendment GPA-011-003 to amend density table in Land Use Element and roadway network map in Circulation Element to not conflict with the Harmony Specific Plan
- CC Resolution No. 2016-048- Approving tentative Tract Map No. 18861, a finance and conveyance map for the Harmony Specific Plan
- CC Resolution No. 2016-049- Approving tentative Tract Map No. 18871 which will serve as Harmony Specific Plan master tract map

T. August 2016 City of Highland City Council Ordinance

- Ordinance No. 48- Amending the City's official zoning map to change the existing zoning designation from "Planned Development" to "Harmony Specific Plan SPR-0111-001"
- CC Ordinance No. 409- Approving the Harmony Specific Plan and establishing it as the legal document to implement the development
- CC Ordinance No. 410- Approving a development agreement between LCD Greenspot LLC and the City of Highland

U. August 2016-Development Agreement between the City of Highland and LCD Greenspot, LLC

A development agreement between the City and LCD Greenspot, LLC was entered into on August 23, 2016. It establishes provisions for the phasing of development and methods of financing of construction, operation, and maintenance of public facilities, infrastructure improvements, and services for the Specific Plan area. Exhibits attached to the Agreement include maps of the Property, estoppel certificate, development impact fees, additional agreements concerning development, financing plan, and description of a public works facility.

- Ordinance No. 408 (August 23, 2016)- Amending the City's official zoning map to change the existing zoning designation

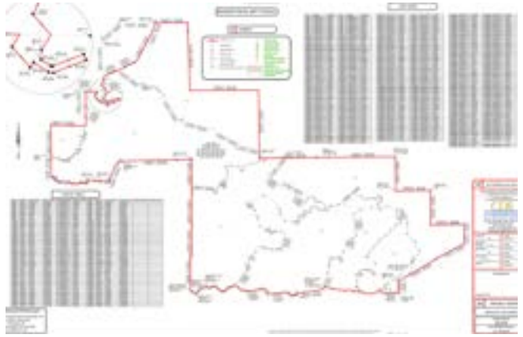


Figure 9-18 ALTA/NSPS Land Title Survey, boundary detail

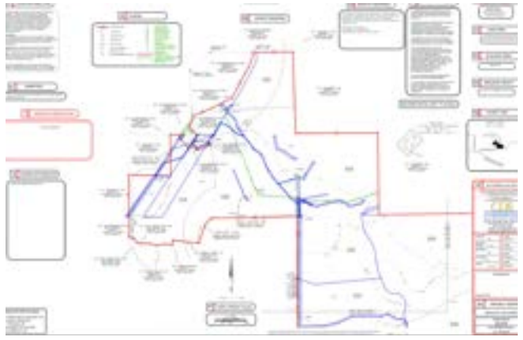


Figure 9-19 ALTA/NSPS Land Title Survey, survey details

from “Planned Development” to “Harmony Specific Plan SPR-0111-001”

- CC Ordinance No. 409 (August 23, 2016)- Approving the Harmony Specific Plan and establishing it as the legal document to implement the development
- CC Ordinance No. 410 (August 23, 2016)- Approving a development agreement between LCD Greenspot LLC and the City of Highland
- CC Resolution No. 2016-046- Certifying an environmental impact report including the findings of fact, mitigation monitoring reporting program and statement of overriding considerations for the Harmony Specific Plan
- CC Resolution No. 2016-047- Approving General Plan Amendment GPA-011-003 to amend density table in Land Use Element and roadway network map in Circulation Element to not conflict with the Harmony Specific Plan
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- CC Resolution No. 2016-049- Approving tentative Tract Map No. 18871 which will serve as Harmony Specific Plan master tract map
- PC Resolution No. 2016-005- Recommending the approval of the above City Council Resolutions.

V. January 2021-ALTA/NSPS Land Title Survey

This survey is prepared by CDS Commercial for the San Bernardino Valley Municipal Water District. The survey was completed in January 2021 and contains information abut utility easements, existing infrastructure, and adjacent property owner information.

W. July 2022-Tres Lagos Property Vision - Board of Directors Workshop Summary

San Bernardino Valley had a board meeting to explore a vision for the Tres Lagos property in preparation for the upcoming Master Plan Request for Proposals. Participants included board members and staff as well as members of the public in-person and online. This summary document explains the meeting format, agenda and lists the summary of the discussions/key takeaways, which includes:

- The need for a greater vision for the Tres Lagos property
- Opportunities on site for dedicated recreation, conservation, and recreation areas
- Opportunities for a new headquarters, education center, and co-location with state and regional facilities
- Safety concerns related to wildfire planning, prevention strategies, and emergency access connectivity
- Importance of awareness, communication, and engagement (with the organization and the public) for successful property development

X. Tres Lagos Property Vision - Board of Directors Workshop Presentation

To facilitate the workshop discussion, slides listed key bullets points about the Project site and presented several site analysis maps. Topics included:

- History of the Property
- Constraints and opportunities related to open space, habitat, and existing water infrastructure
- Partnerships and funding opportunities

Figure 9-20 Wall graphic from the workshop

Figure 9-21 Adjacent open space mapping

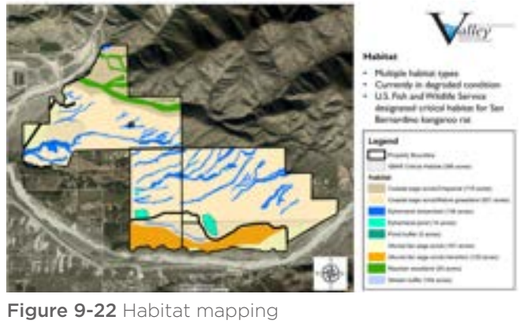


Figure 9-22 Habitat mapping

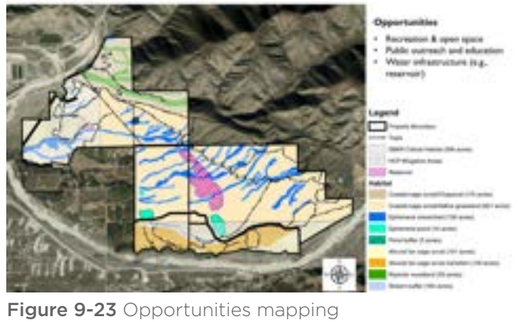
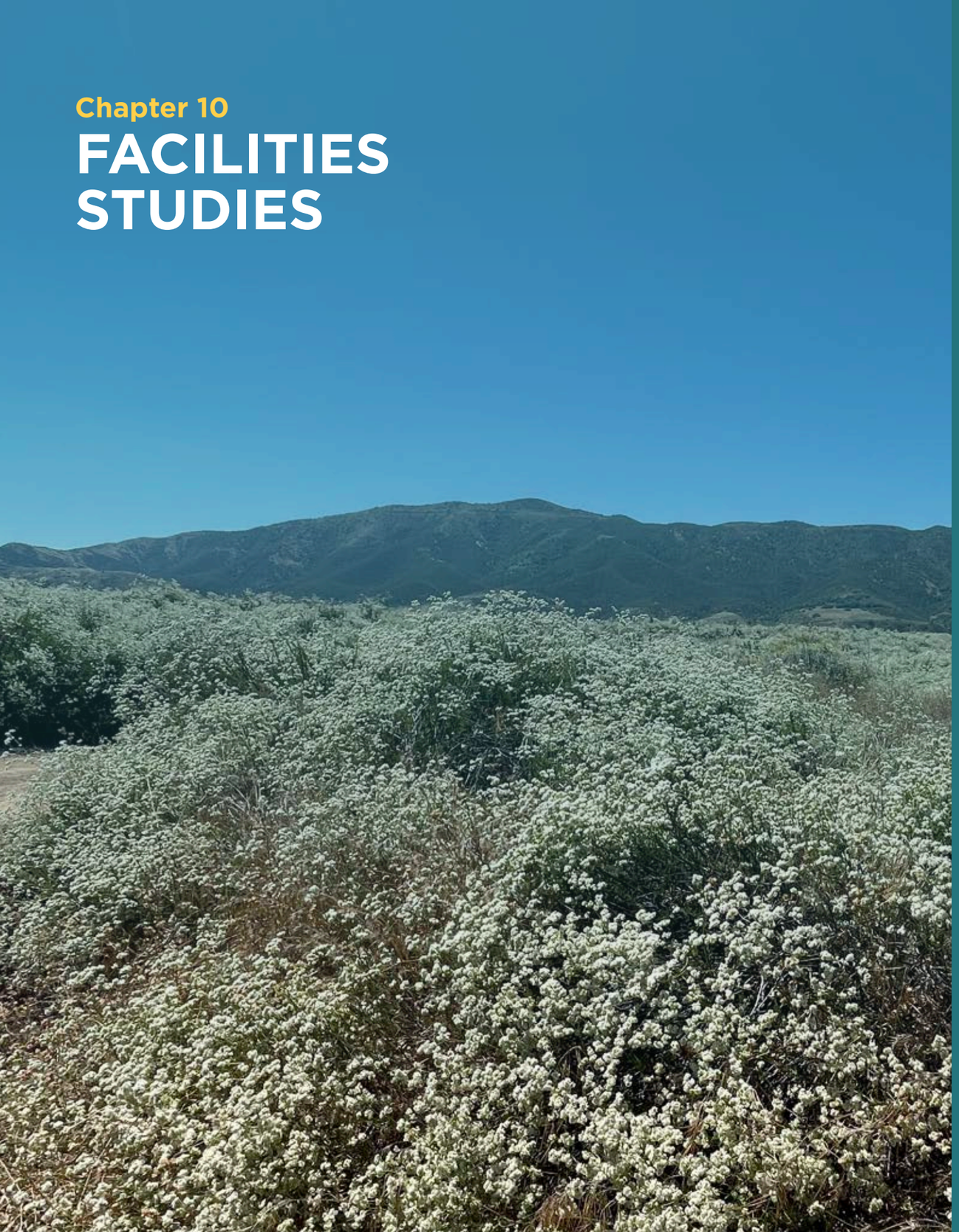


Figure 9-23 Opportunities mapping

Chapter 10

FACILITIES STUDIES



CHAPTER 10 CONTENTS

10.0 FACILITIES STUDIES

Different areas on the site were considered to host the conceptualized new buildings. These locations informed the building layout options. Recommendations regarding the location for new infrastructure on site are influenced by a variety of factors, described below, and are summarized in the following tables.

	Desirable	Less Desirable
Topography / Views For the Headquarters and Education center, views are measured by landmarks and vistas that users would experience from that site For the Fire Training Facility, views consider user experience as well as the visibility of the building from the headquarters	- Views of the mountain, landmarks, vistas, and the valley - Fire Training Facility not visible from Headquarters	- Obscured views across the site - Fire Training Facility visible from Headquarters
Impact to Habitat Impact to habitat relates to land disturbed from the reservoir construction and the quality of habitat it could potentially displace	- Poor quality/ designated as habitat enhancement or creation	- High quality/ designated at habitat preservation
Access Access is measured by distance to nearest vehicular road, nearby recreation amenities, and potential parking	- Clear access for San Bernardino Valley employees and visitors	- Infrastructure far from road and/or recreation amenities
Water Infrastructure Connection The relationship to the reservoirs is measured by construction phasing, distance from conceptual infrastructure to reservoir, and the potential of the reservoir to act as a fire break	- Near the reservoir and firebreak	- Distant from reservoir
Cost Implications Associated cost implications include those just beyond the construction cost that would impact siting such as road construction and habitat mitigation credits	-Minimizes necessary road improvements	- Additional road improvements required -High impact to high quality habitat

A. Building Siting Matrix: Headquarters

	Topography / Views	Impact to Habitat	Access	Water Infrastructure	Cost Implications
A	• Most scenic view within the valley • Mountains of San Bernardino Forest visible but Constance Peak mostly hidden • Gradual slope	• Within reservoir cut/fill area • Habitat enhancement recommended	• Access from Emerald Ave/Tres Lagos Rd • Uses existing road and new reservoir maintenance road (~0.55 mi) • Near road and trails; easy pedestrian access	• Could be built before reservoir • Near wetland reservoir • Reservoir act as a firebreak	• Less road improvements compared to Opt. C and D
B	• Good view of valley • View of San Bernardino Forest • Relatively flat • Potential view to valley blocked by fill	• Within reservoir cut/fill area • Near CAGN observation • Habitat creation recommended	• Access from Newport Ave • New main and maintenance road (~0.9 mi) • Near the main road • Easy pedestrian access, near relics	• Could be built before reservoir • Reservoir act as a firebreak	• Additional road extension
C	• View of valley and reservoirs • View of San Bernardino Forest in the distance, mostly view of site ridges • Potential to add more fill to total if built here	• Outside reservoir cut/fill, would require more construction • Located in preserve habitat area	• Access from Emerald Ave/Tres Lagos Rd • Existing road and new reservoir maintenance road (~0.6 mi)	• Could be built before reservoir • Near wetland reservoir	• Less road improvements compared to Opt. B and D • Would require more mitigation credits
D	• View of valley slightly lower, Santa Ana Wash foreground • Obscured view to San Bernardino Forest since at much lower elevation • Potential to be elevated on fill	• Outside reservoir cut/fill • Would require more construction • Habitat enhancement recommended	• Access from Emerald Ave • New road parallel to Tres Lagos and above reservoir (~0.7 mi) • Walkable to other relics and trails	• Could be built before reservoir • Lose connection to water if reservoir not built	• Most road improvements

Headquarters - Views of Site

Option A

Option B

Option C

Option D

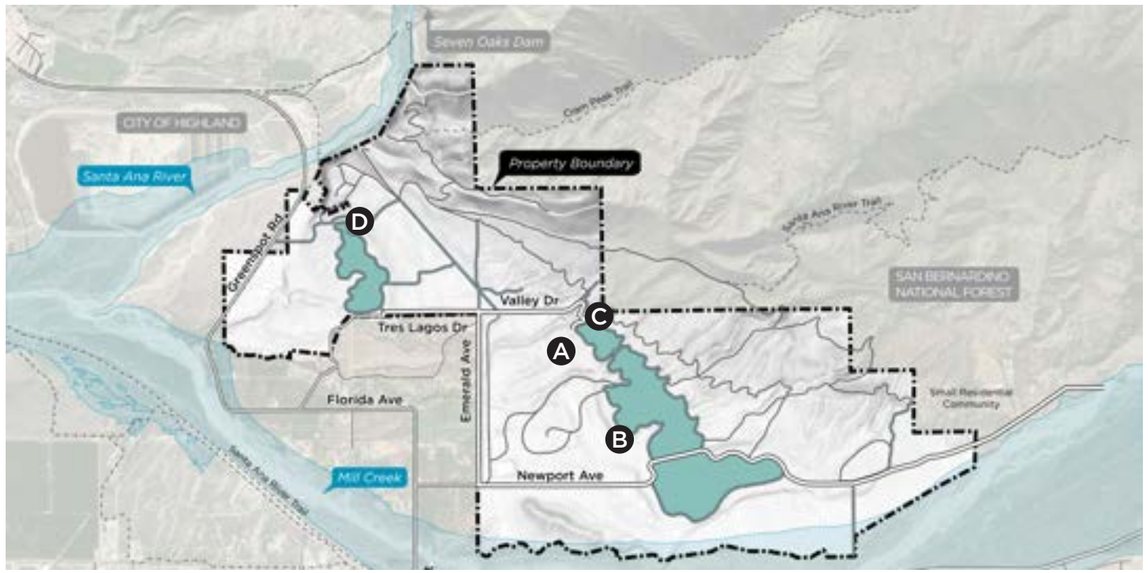


Figure 10-1 Siting studies for the headquarters

B. Building Siting Matrix: Education Center

	Topography / Views	Impact to Habitat	Access	Water Infrastructure	Cost Implications
A	• Most scenic view within the valley • Mountains of San Bernardino Forest visible but Constance Peak mostly hidden • Gradual slope	• Within reservoir cut/fill area • Habitat enhancement recommended	• Access from Emerald Ave/Tres Lagos Rd • Uses existing road and new reservoir maintenance road (~0.55 mi) • Near road and trails; easy pedestrian access	• Could be built before reservoir • Near wetland reservoir • Reservoir acts as a firebreak	• Less road improvements compared to Opt. B and C
B	• View of valley • Slightly obscured view of San Bernardino Forest • Relatively large flat area • Surrounded by steeper slopes	• Outside reservoir cut/fill • Disturbed area, habitat creation • Need grading for gardens	• Access from Emerald Ave and existing road (~0.6 mi) • Shares route with SART so need protected pedestrian trail • Near trailheads	• Slightly distant from 1938' reservoir (~0.2 mi)	• Additional cost dependent on parking • Enhanced trail to protect pedestrians
C	• View of ravines and Crafton Hills • Obscured view of San Bernardino Forest since up against ridge • Relatively flat, near Eyes of the World parking	• Outside reservoir cut/fill • Disturbed, habitat creation • Good open space for gardens	• Access from Newport Ave • New road and existing spur at end (~2.2 mi) • Uses existing parking lot • Near trailheads • Far from entrance, but is walkable by pedestrian	• Little connection to reservoirs (~0.8 mi) • Near orchard relics like irrigation channels	• May need to widen road
D	• View of valley slightly lower • Obscured view to San Bernardino Forest • Gentle slope, good for gardens or orchard	• Outside reservoir cut/fill • Habitat creation • Opportunity for gardens and orchards next to center	• Access from Emerald Ave • Existing road (~0.05 mi) • Immediate access SART, walkable to other trailheads • Near main road and relics along Orchard Trail	• Distant from 1938' reservoir, but walkable (~0.4 mi)	• Additional cost dependent on parking

Education Center - Views of Site

Option A

Option B

Option C

Option D

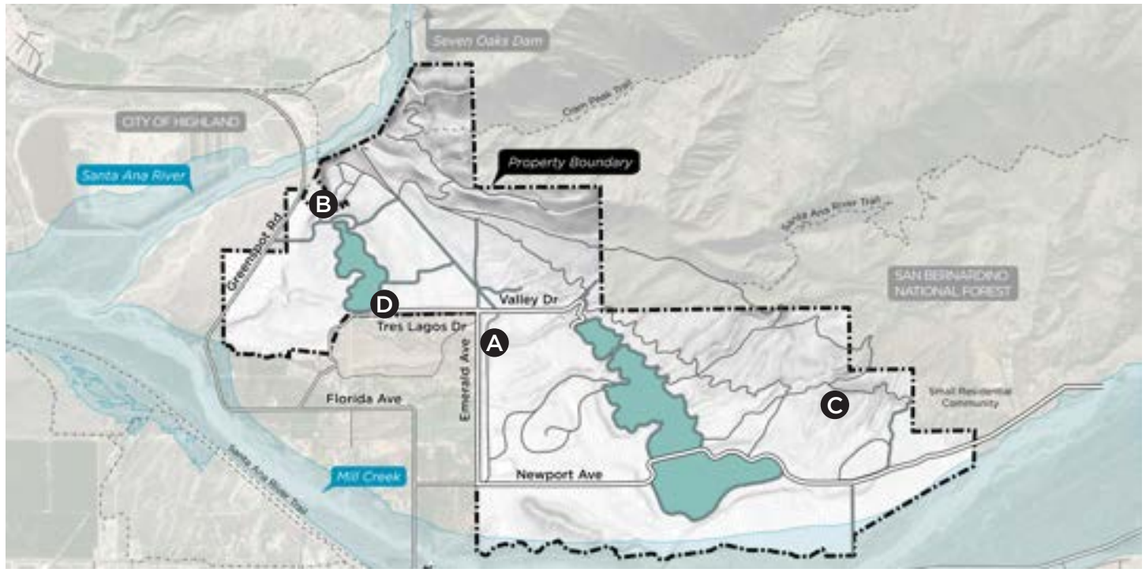


Figure 10-2 Siting studies for the education center

C. Building Siting Matrix: Fire Training Facility

	Topography / Views	Impact to Habitat	Access	Water Infrastructure	Cost Implications
A	• View to San Bernardino Forest • Potential to partially hide with fill, but might impact HQ view towards Crafton Hills	• Within reservoir cut/fill • Near CAGN observation	• Access from Newport Ave (~0.95 mi) • New road plus extension; parking	• Reservoir acts as a firebreak	• Potentially take away credits from habitat creation
B	• View of mounds on site, ravines, and Mentone/Crafton • Potential to hide from HQ at back of property and behind southern edges of ridges • Gentle slope	• Outside reservoir cut/fill • Habitat creation and enhancement	• Access from Newport Ave (~1.9-2.2 mi) • New and existing road • Existing parking lot • Near to previous burns and easy access to WUI areas	• Little connection to water	• Potentially take away credits from habitat creation • New road
C	• View towards mounds on site and Crafton • Reservoir fill and positioning further east can hide the building • Avoids sloping ravines	• Outside reservoir cut/fill • Preserve habitat • Would disturb more good habitat than necessary	• Access from Newport Ave (~1.4 mi) • New road; parking	• Overlook 2310' reservoir	• Would require more mitigation credits
D	• View to Front Line Ridge Trail and Morton Peak • Would directly be in sight line of HQ, might be slightly obscured by nearby orchards • Disturbed area relatively flat	• Outside reservoir cut/fill • Area disturbed, habitat creation	• Access from Emerald Ave (~0.55 mi) • New road; parking	• Reservoir acts as a firebreak	• Potentially take away credits from habitat creation • New road

Fire Training Facility - Views of Site

Option A

Option B

Option C

Option D

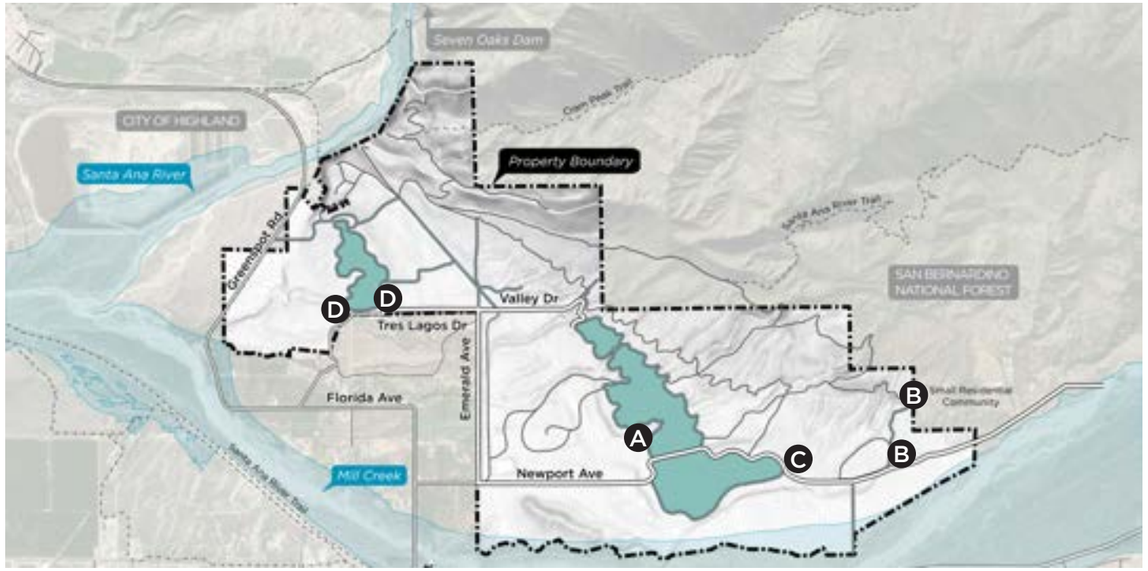


Figure 10-3 Siting studies for the fire training facility

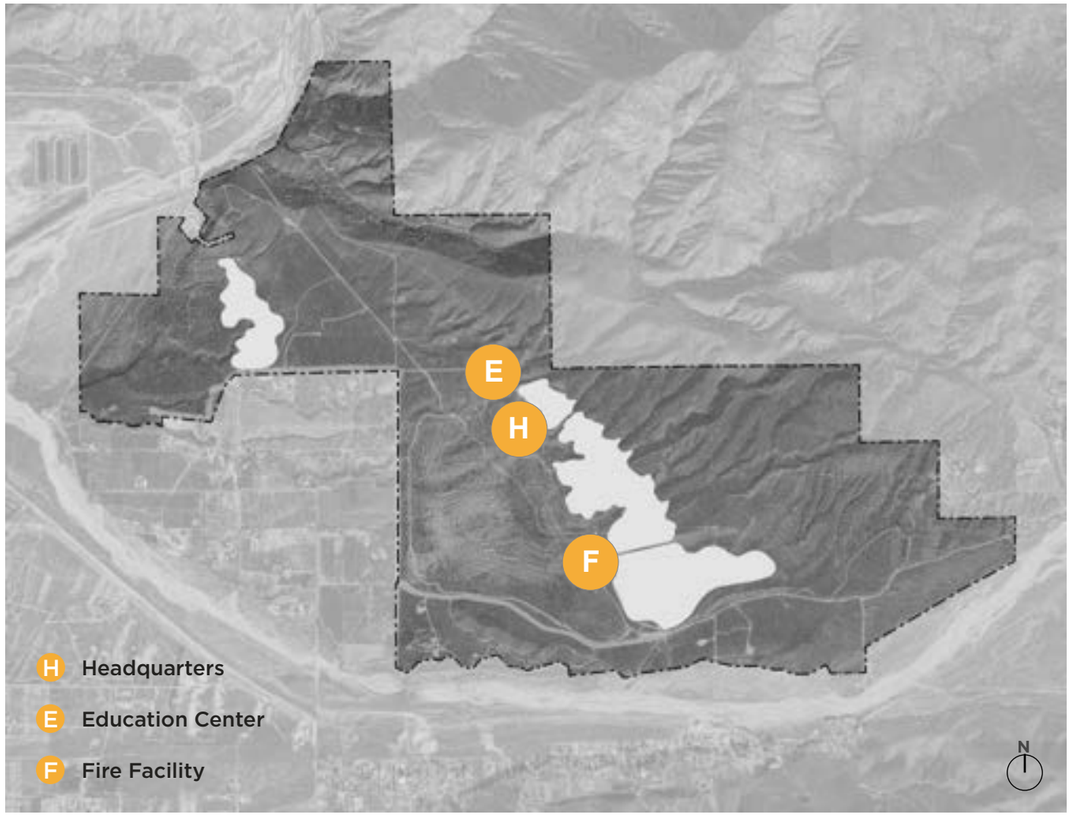


Figure 10-4 Preferred Campus Layout

D. Building Location Options

Once all site locations were reviewed, the buildings were studied together in two different layouts, Campus Layout and Alternative Satellite Layout. The description, advantages, and disadvantages are as follows:

A. Preferred Campus Layout: clustering buildings in one area

Potential Advantages

+ Parking can be shared between Headquarters and Education Center
+ Fewer roads and infrastructure needed
+ All construction occurring in cut/fill area
+ Easier to connect with community members
+ Less impact to habitat

Potential Disadvantages

- Views of the Education center may be seen from the Headquarters
- Less privacy
- More congestion with access road

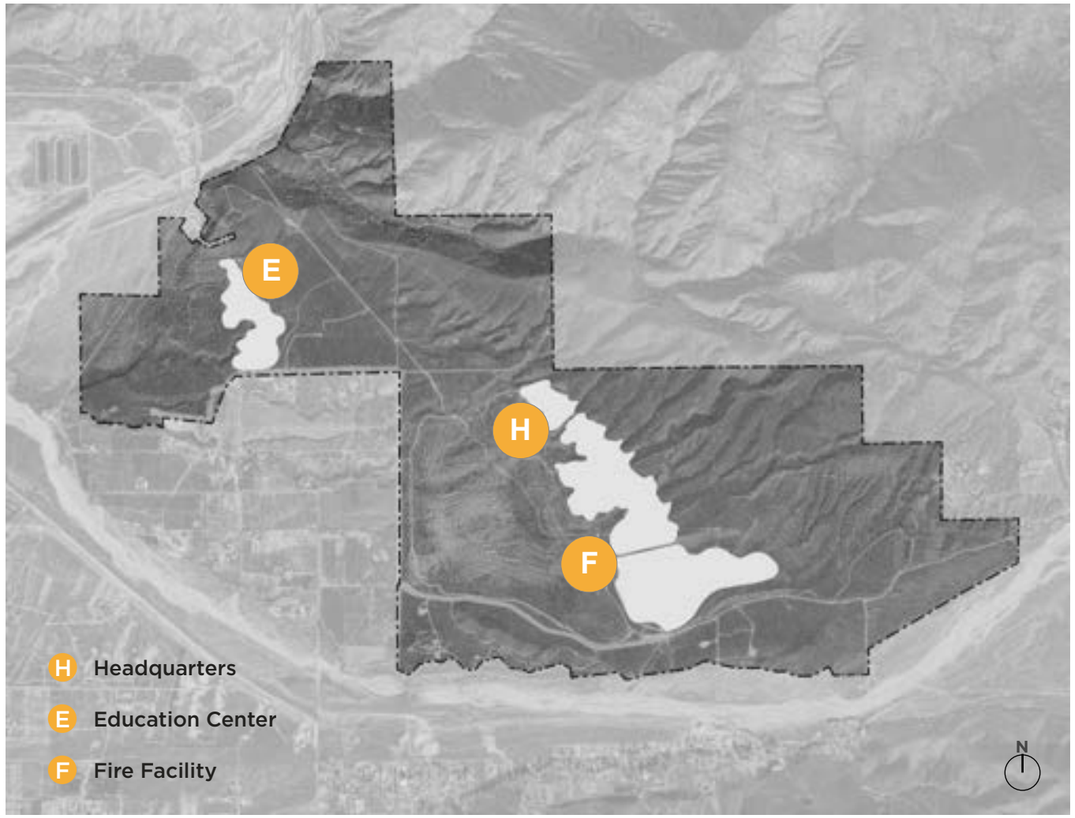


Figure 10-5 Alternative Satellite Layout

B. Alternative Satellite Layout: distributing the buildings throughout the property

Potential Advantages
+ More expansive experience across the site
+ More privacy
+ Less congestion on roads
+ Preserved views

Potential Disadvantages
- More roads/infrastructure needed
- Greater construction footprint
- Greater impact to the habitat
- More difficult to connect with community members

10.1 BUILDINGS ASSESSMENT AND FINDINGS

A. Preferred Site Plan

1. Campus for Community, Collaboration and Innovation

The building facilities of this Plan each contributes a critical role in San Bernardino Valley's Plan by creating places for engineers, biologists, educators, leaders, policy makers, community representatives and citizens to engage and collaborate on innovative solutions for water resiliency. Together, the Headquarters, Education Center, Fire Facility and other future development sites co-located on a single campus plan strengthens their value in an environment to share ideas, dream and deliver to the needs of the community served.

2. Planning Drivers

On a 1,685 acre site, there are many options to locate buildings. As described earlier in the chapter, several options were assessed against planning drivers to evaluate implications of each location. The preferred site plan co-locates all buildings at the center of the building site next to the conceptual 2310' Reservoir with the following opportunities:

Water Infrastructure
- Body of water as a fire break
- Source of water for use by fire facility for use for fire suppression
- Body of water providing evaporative cooling for the surrounding environment, creating a cooler microclimates

Topography and Views
- Shaping topography to optimize views to the valley and San Bernardino Forest
- Shaping of topography to conceal fire facility

Impact to Habitat
- Located within the grading area of the 2310' Reservoir, avoiding impact of other site areas
- Consolidates development in one primary location on the site.
- Habitat enhancement is recommended with access to campus for educational opportunities

Access
- Access from Tres Lagos Dr. / Newport Ave.
- Access to trail and recreational network
- Pedestrian access between buildings on a campus
- Easier to manage security and access

Cost
- Shared site development costs for infrastructure such as roads, utilities, power, water and site grading
- Shared parking
- Shared resources between buildings for events, meeting rooms, etc.

Figure 10-6 Potential Site Plan

Potential Site Plan

- **A** Headquarters
- **B** Education Center
- **C** Future Building Site
- **D** 2310' Reservoir
- **E** Visitor Parking
- **F** Learning Gardens

3. Views

Views outward towards the Valley and San Bernardino Forest are a key driver in locating the buildings, outdoor spaces and crafting the organization of the road and parking network.

1. Creating a First Impression
   Eastward views of the San Bernardino Forest upon entry at Tres Lagos Dr. / Emerald Ave. immerse the entry experience. The first impression at the first right turn is the education center and reservoir within a landscaped entry edge.

2. The Heart of the Campus
   The center of campus is defined by a 360 view of the salient components of the campus. The headquarters foregrounded by the learning gardens, views of the San Bernardino Forest foregrounded by the reservoir, and expansive views towards the valley.

3. Preserving Views of the Valley
   The southerly portion of the plan orients the headquarters, expansion site and future buildings and parking to the east of the primary access road. This preserves unobstructed views of the Valley.

Leverage Views of Valley and Mountains

The below diagrams indicate optimal views of the valley and mountains on each side of the building.

Valley Views

Mountain & Reservoir Views

Figure 10-7 Viewpoints of potential Site Plan

Viewpoints

- **A** Headquarters
- **B** Education Center
- **C** Future Building Site
- **D** 2310' Reservoir
- **E** Visitor Parking
- **F** Learning Gardens

Valley Views

The buildings are sited to maximize views out to the valley, in particular the headquarters public spaces such as the lobby, multi-purpose room and board room. With the construction of the 2310' reservoir, the campus will be located higher than the existing grade, offering even more panoramic views of key elements of elements of the watershed sch as the sediment pits, confluence and Citrus Pump Station.

Figure 10-8 Valley views from the conceptual headquarters

Mountain Views

The buildings are also oriented to maximize views of the mountains and future 2310' reservoir. With the construction of the reservoir, the additional grade may offer new views of the San Bernadino Forest Beyond.

Figure 10-9 Mountain views from the conceptual headquarters

B. Sustainability

The building facilities and supporting site development has a significant opportunity to be a state-of-the-art campus that exemplifies San Bernardino Valley's commitment to climate resiliency. At the time of this Plan document, several goals were identified and fall under current code requirements, whereas others are exceeding code. As these buildings become developed, San Bernardino Valley may consider selecting one or several sustainability certification systems such as LEED, WELL, or ILIFI.

1. Campus Sustainability

The site has several opportunities to demonstrate the use of water to build a sustainable campus. It has a unique opportunity to construct and demonstrate use of hydroelectric power leveraging the cycling of reservoir(s) to generate electricity for the site. Treating of onsite stormwater through a series of demonstration gardens and demonstration parking lot is an opportunity to provide education of sustainability on display.

Use of onsite PV through shade structures on parking lots and other site elements would provide on-site renewables as well as reduce urban heat island effect.

2. On-Site Potable Water and Sewer Utilities

A. Water Demand
Water demand on the property has been estimated based on anticipated numbers of staff and visitors for the concept buildings, including the headquarters building, the education center, and one trail restroom. It was assumed that the auditorium within the headquarters building would be used at full capacity once per week.

The estimated indoor water demand for these conceptual development opportunities is summarized in Figure 10-10. Landscape irrigation water demand was estimated based on the requirements set forth by the Modified Water Efficient Landscape Ordinance (MWELO). Estimated Total Water Use (ETWU) was determined using the following calculation:

$$ETWU=(ET\_O\ )(0.62)(PF/IE)(LA)$$

Where:

ETo = Reference Evapotranspiration
PF = Plant Factor
IE = Irrigation Efficiency
LA = Landscape Area
0.62 = Conversion Factor

In this equation, the reference evapotranspiration value is fixed based on the location. For Highland, CA, evapotranspiration is assumed to be 55.1" per year according to the California Irrigation Management Information System (CIMIS) for Zone 9 (South Coast Marine to Desert Transition Zone). Factors that will affect the irrigation demand include plant factor, irrigation efficiency, and landscape area. The estimate shown in Figure 10-11 on the following page assumes that the demonstration gardens will have a plant factor of 0.2 and the orchard will have a plant factor of 0.4. Irrigation efficiency is assumed to be 0.75 for both landscape areas, which allows for spray irrigation.

The total water demand will be the indoor water demand combined with the irrigation demand. Figure 10-12 includes the following total demand estimates:

Average Day Flow (ADF): yearly flow divided by 365 days
- Used to determine sufficient water supply

Max Month Average Day Flow (MMADF): highest average daily flow over the course of 1 month
- For indoor water usage, assumed to be 1.5 times ADF based on the size of the system
- Irrigation water usage based on the month with the highest evapotranspiration rate

Max Day Flow (MDF): highest daily flow over the year
- Used in determining storage facilities and well pumping capacity
- For indoor water usage, assumed to be 2.5 times ADF based on the size of the system and likelihood of events increasing the demand
- Irrigation water usage assumed to be the same as MMADF

Peak Hour Flow (PHF): highest hourly flow over the year
- Used in determining booster pump stations

and distribution pipelines
- For indoor water usage, typically assumed to be 3.5 times ADF, but due to the high variability expected on the Sunrise Ranch property, a peaking factor of 10 times ADF was used
- For irrigation water usage, assumed to be 3 times MDF, based on an 8-hour irrigation window at night

Fire Flow based on the requirements of California Fire Code Table B105.1(2)
- If automatic sprinklers are used in the building, fire flow can be reduced to 25%, to a minimum of 1,000 gpm
- Dependent upon square footage of the building and construction type
- Storage for fire flow is required on-site if off-site fire flow is not available
- Duration of 2 hours for construction types IA, IB, IIA, IIB, IIIA, IIIB, IV, and V-A
- Duration of 3 hours for construction type V-B

Wastewater generation rates are assumed to be 90% of the indoor potable water use, as shown in Figure 10-13.

B. Water System Elements

As stated previously, there are no potable water services available from the City of Highland or EVWD. Tres Lagos (Figure 10-14) is a very small municipal water district on the property that does not have capacity to provide water to the potential facilities. Therefore, a concept design for the potable water system will need to provide a complete, standalone on-site system made up of the following:

- A new well (and possibly a second well for redundancy) with a flow rate between 10 and 50 gpm
- Wellhead treatment (if necessary)
- Potable water storage tank (between 140,000 and 250,000 gallons based on the estimated demand)
- Distribution pumps and hydropneumatic tank
- Fire suppression pumps and backup power supply

C. Wastewater System

Wastewater would be generated in the new headquarters, the education center, the fire facility, the trail restroom, and other buildings that might be built on the Sunrise Ranch property in the future. Site and regional considerations for water management and civil infrastructure should consider:

1. The relatively low wastewater flow rates expected and the variability of flows over the weekends and holidays. This issue is particularly important when considering the education center, where service demands might be both weekly and seasonal.
2. Because of the sensitivity and necessity of groundwater in the area, a septic system with leach field effluent disposal would not be recommended and may not be allowable.
3. Construction costs associated with the distance and steep terrain to extend a new sewer line to the EVWD (City of Highland) collection system.
4. The desire to reuse the effluent for sustainable irrigation of the on-site native and active landscape areas and potential demonstration garden/orchard.

A viable option for wastewater management on the property would consist of using a "package plant," wherein a prefabricated treatment plant with a capacity of 10,000 gallons per day would be brought to the site and installed locally. These facilities are common in the marketplace and use a variety of different water treatment technologies depending on the nature of the wastewater being generated and the water quality needs for its effluent. In this case, the end use of the water will be "purple pipe" and will meet Title 22 disinfected tertiary effluent quality, allowing for unrestricted spray irrigation use or greywater toilet flushing. The treated effluent could not realistically be placed into the new on-site reservoirs considering the direct potable use of the reservoirs during emergency supplemental supply to the EBX.

Wastewater treatment technology worthy of further consideration includes an off-the-shelf membrane bioreactor (MBR) plant that includes screening, biological nutrient removal (BNR) with nitrification/de-nitrification using activated sludge, membrane filtration, and disinfection. An example of one such system is the Johkasou system shown in Figure 10-16. The challenge for any aerobic biological treatment system is the need to feed the bacterial culture on a continuous basis. When occupancy of the served buildings drops off and water flows reduce to de minimis flowrates, the bacteria can starve, cannibalize each other, and be reduced so thin that when flows return, their populations are not adequate to meet the demands of the resumed organic loading. To accommodate irregular feeding rates, a larger than normal flow equalization tank would be needed which could store several days' worth of raw sewage for steady and measured treatment over a holiday or long weekend.

A likely location for this facility would be near the west side of the 2,310' reservoir near the headquarters or other buildings. The facility will require an enclosed space roughly 20' by 20', similar to a garage with roll-up doors on two sides in order to access the equipment for maintenance. Locating the wastewater facility near the potential buildings would reduce the length of sewer line construction and would be at a high enough elevation to allow for gravity distribution of treated effluent for use as irrigation water.

Land Use	Bldg. Area (SF)1	People	Water Use Demand Factor	Avg. Day Demand (GPD)	Max Day Demand (GPD)2	Yearly Usage (AFY)
Headquarters	**15,000**	**256**		**2,034**	**8,300**	**2.3**
Staff (existing)		40	20 gpcd	800	2,000	0.9
Staff (growth)		20	20 gpcd	400	1,000	0.4
Staff (part time)		20	15 gpcd	300	750	0.3
Staff (night shift)		6	20 gpcd	120	300	0.1
Visitors		20	10 gpcd	200	500	0.2
Auditorium (1x per week)		150	10 gpcd	214	3,750	0.2
Education Center	**6,000**	**40**		**400**	**1,000**	**0.4**
Visitors		40	10 gpcd	400	1,000	0.4
Trail Restroom		**10**		**50**	**375**	**0.1**
Visitors		10	5 gpcd	50	375	0.1
Total Indoor Water Use		**306**		**2,484**	**9,675**	**2.8**

Figure 10-10 Estimated Indoor Water Usage
Notes 1. Auditorium is assumed to be used to capacity once per week for determining average day demand.
2. Maximum day demand is assumed to be 2.5 times the average day demand when the facility is at full capacity.

Land Use	Area (Acres)	PF/IE	Yearly Usage (AFY)1	Daily Usage (GPD)2
Headquarters			**3.8**	**3,411**
Demonstration Gardens	1.5	0.27	1.8	1,631
Orchard	1.0	0.53	2.0	1,780
Total Landscape Irrigation Water Use			**3.8**	**3,411**

Figure 10-11 Estimated Irrigation Water Usage
Notes 1. Daily usage shown is average over the year and does not consider seasonal fluctuations.
2. Calculated using the average annual evapotranspiration (ETo) of 55.1".

San Bernardino Valley may want to consider a "next level" wastewater recycling facility and piloting a State of California "direct potable reuse" system to place the treated effluent into either of the potential on-site reservoirs. This would require an independent analysis and program development requiring multiple additional high-level filtration steps, such as reverse osmosis. The permitting for this type of system would likely take 2 years or more and the cost would be 2-3 times the typical recycled water equipment and installation costs estimated herein. Additionally, there are substantial permitting requirements and full-time use testing/reporting requirements that are extensive for both indirect potable reuse and direct potable reuse systems.

	AFY	ADF (GPD)	MMADF (GPD)	MDF (GPD)	PHF (gpm)	Fire Flow (gpm)
Indoor Water Use	2.8	2,484	3,726	9,675	17	1,000
Outdoor Water Use	3.8	3,411	5,422	5,422	11	
Total Water Use	6.6	5,895	9,149	15,097	29	

Figure 10-12 Total estimated water usage

	ADF (GPD)	MMADF (GPD)	MDF (GPD)	PHF (gpm)
Total Water Use	2,236	3,354	8,708	16

Figure 10-13 Estimated wastewater generation

Figure 10-14 Tres Lagos Wells, access road, and power line

Parameter	Value
On-Site Well	
Flow Rate (gpm)	>211*
Potable Water Storage	
Fire Storage (gallons)	120,000**
Potable Storage (gallons)	20,000***
Total Storage Volume (gallons)	140,000
Potable Booster Pump Station	
Potable Peak Hour Flow (gpm)	29
Fire Flow (gpm)	1,000

Figure 10-15 Major water infrastructure sizing

Notes

1. *Delivers Max Day Demand in 12 hours.
2. **Fire storage based on values found in California Fire Code (CFC) Table 105.1(2). Assumes buildings will have automatic fire sprinklers, allowing for fire flow to be a minimum of 1,000 gpm. Duration of fire flow is 2 hours.
3. ***Potable storage is set at 125% of Max Day Flow.

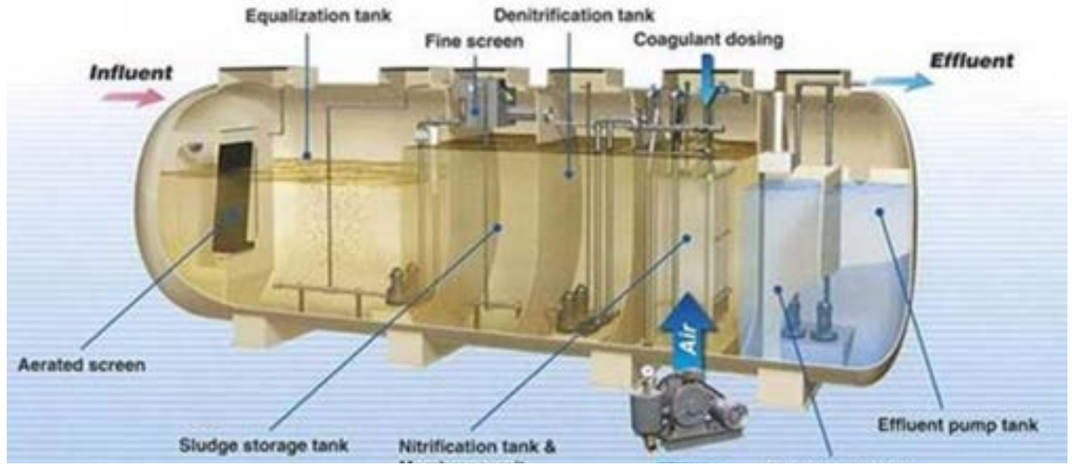


Figure 10-16 Johkasou MBR Schematic

C. Scaled Studies

To aid development of the headquarters program and size, several similar existing water district facilities were studied along with the existing headquarters. Each of the examples studied vary in size and function when compared to the existing facility. Some are retail agencies with more maintenance needs and public facing spaces such as the Moulton Niguel Water District. Others have developed outdoor spaces and programs with learning gardens such as the Chino Basin Water Conservation District. When developing the San Bernardino Valley conceptual headquarters, unique elements from each example were taken into consideration.

1. San Bernardino Valley Existing Location

Two levels of building - 14,260 SF Total
Other staff in multiple locations / buildings

2. East Valley Water District Headquarters

Two Buildings - 35,250 SF Total
Admin Building - 30,000 SF
Ops Building - 5,250 SF
Surface Parking with demonstration garden

3. Moulton Niguel Water District

Five Buildings - 85,575 SF Total
Operations Building - 2 story, 45,500 SF
Lockers & Maintenance - 1 story, 12,500 SF
Fleet Maintenance - 1 story, 5,840 SF
Existing warehouses , 330 surface parking stalls

4. Water Wise Community Center & Chino Basin Water Conservation District

Three Buildings (Water Conservation Center, Education, Multi-Fleet and Maintenance Building)
4.5 Acre Campus
Demonstration Gardens with public programs

D. Headquarters Program Benchmarking

In addition to the precedent scale studies, a basic analysis of the existing Headquarters space was benchmarked against typical programming benchmarks for commercial office spaces.

1. Benchmarking Program

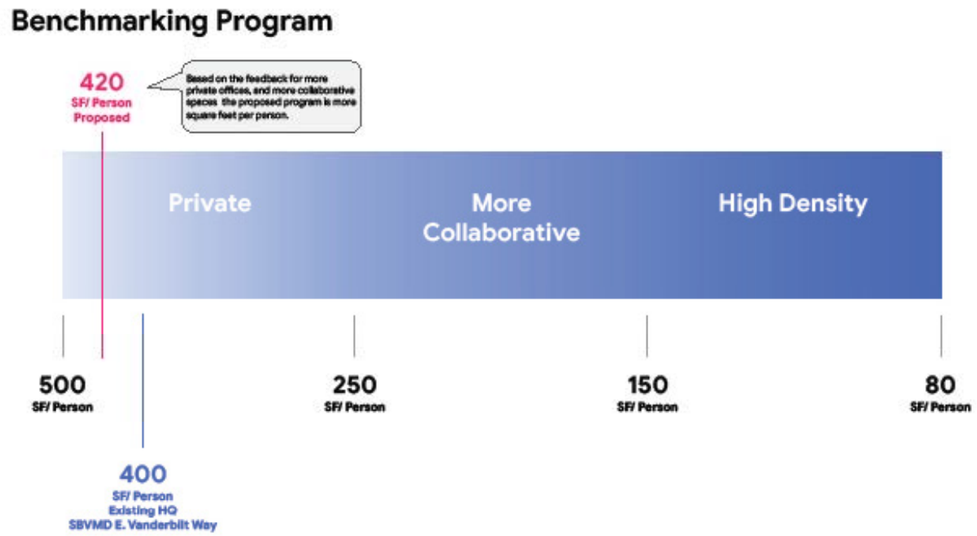
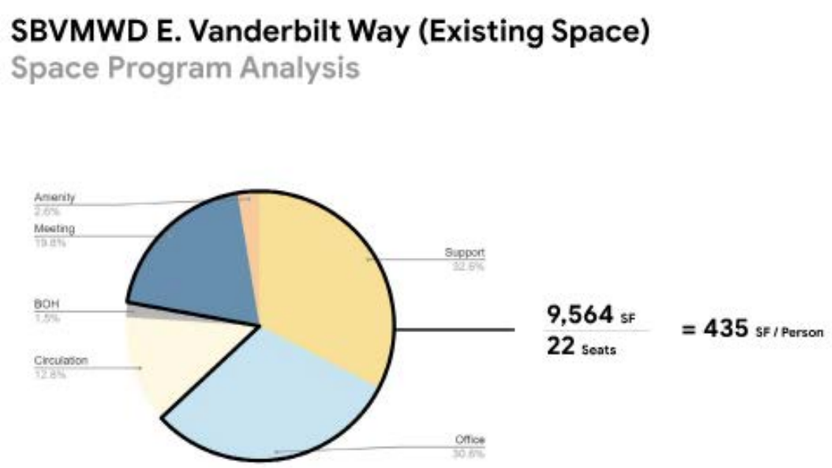


Figure 10-17 Benchmarking and spatial programming analysis at the current San Bernardino Valley headquarters

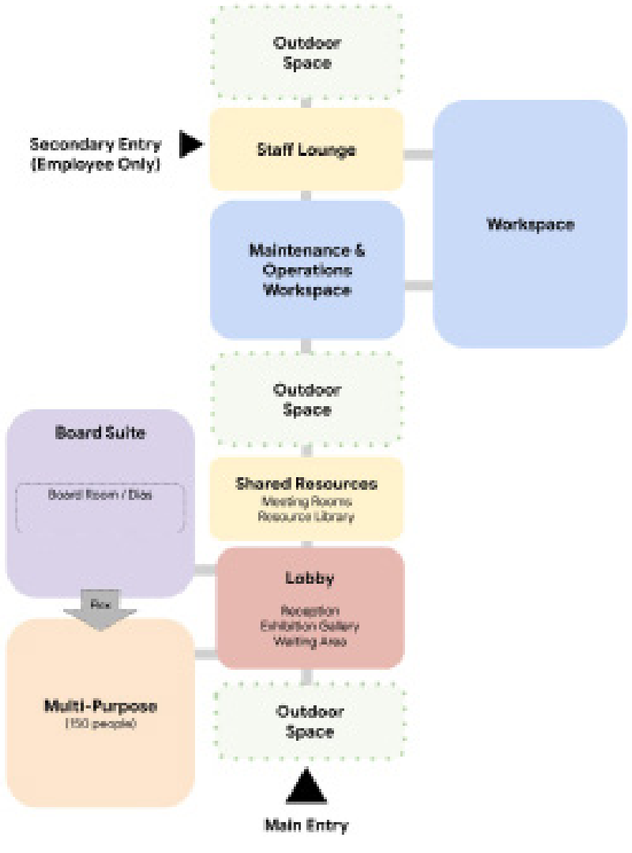


2. Program, All Under One Roof

The headquarters building on the Sunrise Ranch Property could be an opportunity to provide a space for all employees under one roof to continue to collaborate and serve as a regional water agency. The primary office currently sized at approximately 10,000 square feet of usable space is insufficient for their current needs for 40 staff with no room for future growth. The space lacks sufficient collaborative working spaces and connections to the outdoors and is functionally challenged.

The following concept program has been developed to identify functional requirements and approximate gross square footage of the building.

Program Adjacencies



Concept Program

	Space	NSF	Notes
Level 2	**Workspace**	***9,600***	
	(35) Private Offices	*5,250*	150 sf each
	(5) Large Private Offices	*1,250*	250 sf each
	Collaborative Work Space	*2,000*	No cubicles, open desks and chairs
	Coffee Bar	*100*	
	Print / Plotter Room / Plan Drawing Room	*1,000*	(2) Plotters, (1) Print/Fax, Plan Drawing Table, Office Supply Storage
Level 1	**Maintenance & Operations**	***2,250***	
	(6) Private Offices	*900*	150 sf each
	(2) Stand-In Offices	*300*	150 sf each, unassigned, doubles as a phone room
	Collaborative Work Space	*800*	No cubicles open workspace
	Locker Room	*150*	Access from employee dedicated entry
	Shower Room	*100*	(1) Shower, Sink, Toilet
	Staff Lounge	***1,000***	
	Kitchen		Can also support events
	Wellness Room		Sink, Fridge for Lactation Requirements
	Workspace Support	***1,500***	
	(2) 8- Person Conference Room	*500*	Internal or External Meetings
	(2) 4- Person Huddle Room	*300*	Internal or External Meetings
	Library/ Resource Room	*300*	
	Storage Room	*400*	
	Multi-Purpose Room	***3,000***	
	Multi-Purpose Room	*2,500*	Multiple layouts, 150 seated lecture,
	Support	*500*	Storage, AV
	Board Suite	***3,000***	
	Board Room / Dias	*2,000*	Sized For a Curved Dias, 55 seated occupants
	Board Lounge	*500*	Kitchenette, Seating, Personal Storage Lockers
	Closed Session Conference Room	*400*	
	Dedicated Restroom	*100*	
	Lobby *	***1,800***	Reception, Exhibition Gallery, Small Waiting
	Support	***850***	Restrooms, Elevator

Workspace	***14,350 sf***
Board Suite	***3,000 sf***
Public Functions	***4,800 sf***

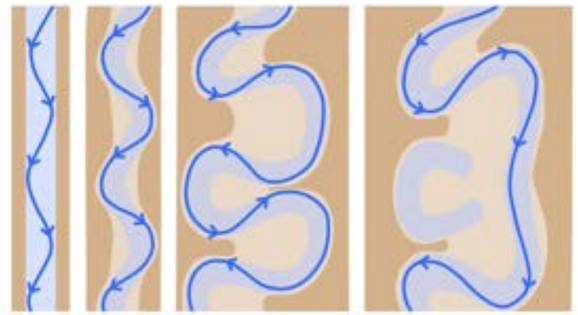
Totals	
Level 1	*9,600*
Level 2	*13,400*
Net Square Feet	***23,000***
35% Gross Up (Circulation, BOH)	*8,050*
Gross SF	***31,050 to 32,000***

High-Level Concept sizing to inform the general size of the building. Does not include below grade parking

E. Concept

The site organization, building organization and form is inspired by the watershed, and the power of water to shape space. This concept maximizes views and creates courtyards that offer intimate outdoor spaces, united by a roof form which blends into the landscape. There is a wide range of architectural styles to consider in the future design stages.

Santa Ana Watershed



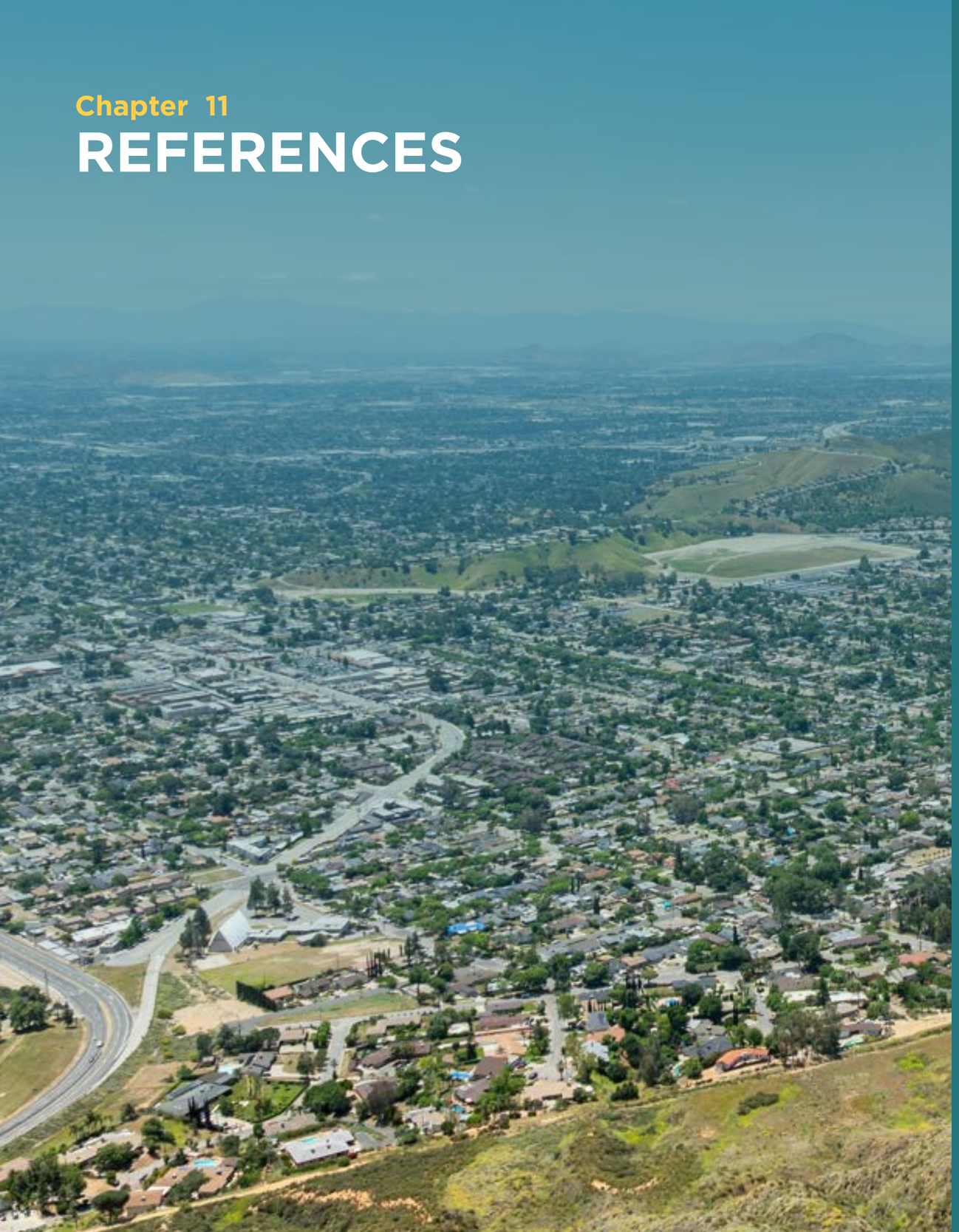
Power to Shape the Future

Inspiration to Organize Space

Figure 10-18 Headquarters conceptual studies

Chapter 11

REFERENCES



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