

# MBCA



## morongo basin conservation association

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MBCA is a 501(c)3 non-profit, community based, all volunteer organization

June 13, 2026

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Reference: Pipes Canyon Subdivision - PROJ-2023-00064

Dear Reader,

The Morongo Basin Conservation Association is pleased to have this opportunity to offer substantive comments on this proposed project.

The proposed development is identified as within the Pioneertown community an unincorporated portion of the County. Page 1 of the Project Contact Information, the assertion that a Community Plan is not applicable does not reflect the Policies of the [County Wide Plan](#) (CWP). While Pioneertown does not have a Community Plan, the Community does have a [Community Action Guide](#) (CAG). These guides were prepared when all Community Plans were repealed concurrent with the adoption of the CWP in 2020.

Within the CWP, Goals and Policies of the Land Use Element include:

Goal LU-2 Land Use Mix and Compatibility. To achieve that goal employ:  
Policy LU-4.5 Community identity. We require that new development be consistent with and reinforce the physical and historical character and identity of our unincorporated communities, as described in Table LU-3 and in the values section of **Community Action Guides**. In addition, we consider the aspirations section of **Community Action Guides** in our review of new development.

Within the CAG for Pioneertown the following have not been addressed/reflected within the IS:

- Community Identified Issues / Strengths - “County Scenic Byway”
- Community Focus Statement - D.6 Protect Wildlife found in community

An environmental analysis for this project must include consistency with the values and aspirations of the CWP and the CAG. The proposed IS/MND fails to address these documents.

The IS fails to address other Principles and Policies within the [Land Use Element](#) of the CWP including:

- Principle: New development should be focused in areas where there is potable water, wastewater treatment, roadways, and public services.
- Policy LU-1.2 Infill development. We prefer new development to take place on existing vacant and underutilized lots where public services and **infrastructure are available**.
- Goal LU-2, Policy LU-1.2 Infill development. We prefer new development to take place on existing vacant and underutilized lots where public services and infrastructure are available.
- Goal LU-2, Policy LU-2.3 Compatibility with natural environment. We require that new development is located, scaled, buffered, and designed for compatibility with the surrounding natural environment and biodiversity.
- Policy LU-2.5 Hillside preservation. We require that new development in sloping hillside areas preserve the natural character of the surrounding environment and does not further exacerbate natural hazards or erosion.

The IS fails to address other Principles and Policies within the [Natural Resource Element](#) of the CWP including:

- Policy NR-4.1 Preservation of scenic resources We consider the location and scale of development to preserve regionally significant **scenic vistas** and **natural features**, including prominent hillsides, ridgelines, **dominant landforms**, and reservoirs. See Appendix Figure 4
- Policy NR-4.2 Coordination with agencies. We coordinate with adjacent federal, state, local, and tribal agencies to protect scenic resources that extend beyond the County's land use authority and are important to countywide residents, businesses, and tourists.

#### Project Description:

There is a discrepancy in the project description between the *NOTICE OF AVAILABILITY (NOA) AND NOTICE OF INTENT (NOI) TO ADOPT AN INITIAL STUDY / MITIGATED NEGATIVE DECLARATION*

and the

DRAFT INITIAL STUDY – MITIGATED NEGATIVE DECLARATION.

The former describes the project as:

Tentative Tract Map 20612 to subdivide one (1) parcel to create twelve (12) 5-acre Rural Living (RL)-zoned lots, with the remaining 61.36 acres of the parcel kept as Resource Conservation (RC) and preserved as Open Space and dedicated to Resource Conservation.

This equates to **121.36 acres**

The latter describes the project as:

The proposed Tentative Tract Map (TTM No.20612) will subdivide the existing approximately **122.98-acre** parcel into 13 lots.

This **1.32 acre** discrepancy requires an explanation that has not been provided within the any documents submitted for review.

Not included within the project description is the creation of an access road within the RC zoned portion of the site to provide access to Lot 1. The grading and disturbance needed for construction of this access requires analysis within the environmental impact study. See below for adjacency to County Scenic Route.

**Additional Approval Required By Other Public Agencies**

The IS fails to disclose the needed approval for work within, or adjacent to, the Blue Line Streams within the project site: See Appendix Figure 7.

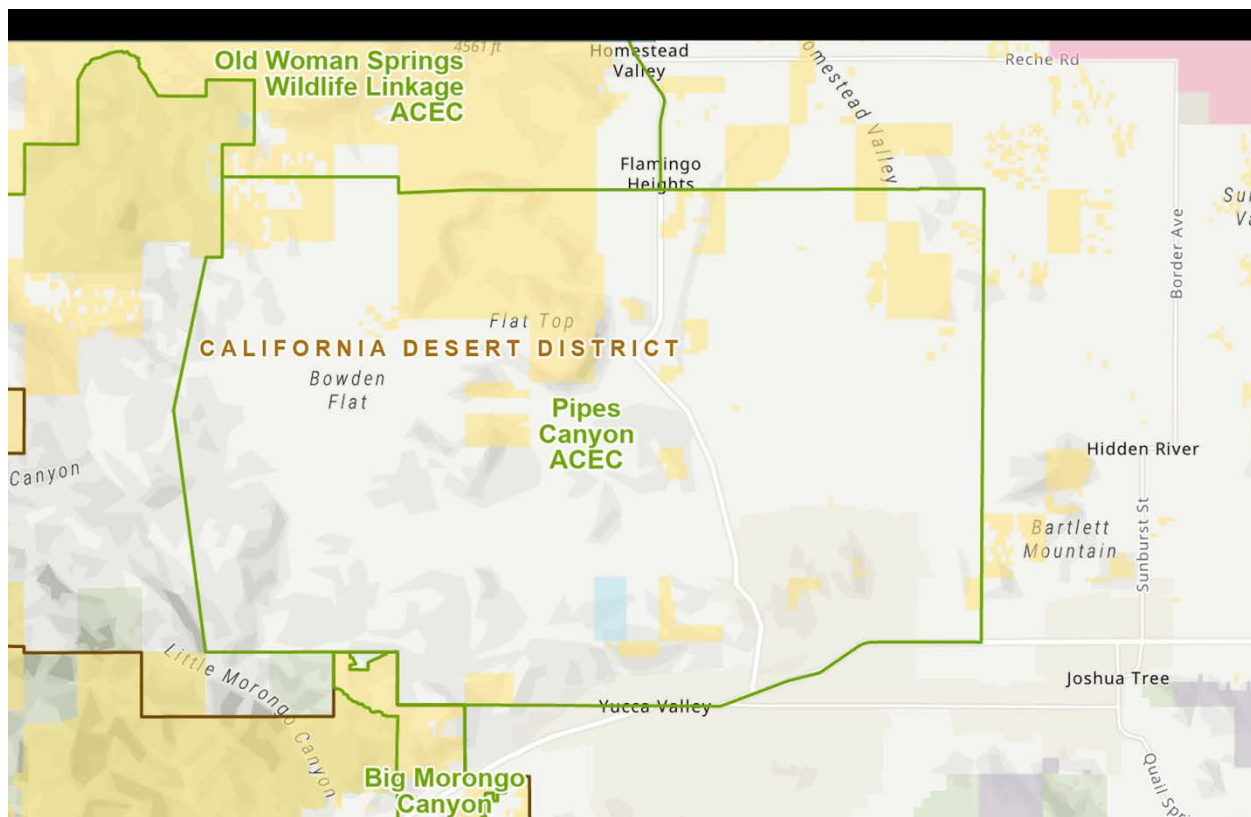
Federal: ~~None~~ **US Army Corps of Engineers**

State of California: California Fish and Wildlife- for Joshua trees and the Blue Line Streams.

**Colorado Regional Water Quality Control Board** - for Blue Line Streams

**Project setting**

MBCA believes an EIR is required for this project for among other reasons, its location within the [Pipes Canyon Area of Critical Environmental Concern](#). This area is unique with its history with Tribal Communities, it’s unique geological formations and presence threatened wildlife and flora. These special qualities, along with the spectacular visual setting were recognized and its protection codified, when adjacent Black Lava Butte and Flat Top Mesa were included in the Sand to Snow National Monument. The Draft Initial Study (IS) makes no mention of this National Monument within a stone’s throw or any recognition of the significance of being within an ACEC.



(From [BLM National Data](#) )

See Appendices Figures 2, 3, and 4 for information presented to the BLM re: nomination of the Pipes Canyon area for ACEC status and referenced at the time of designation of the Sand to Snow National Monument by President Obama.

County jurisdiction oversees projects in the Mojave Desert which contains many thousands of acres of federal and state lands, private conservation lands, local jurisdiction lands and tribal lands. It is important for the CEQA evaluation to inform decision makers and the public upfront where the proposed project area is set in relation to these lands. See Appendix Figure 1.

- The proposed subdivision is on land within a habitat linkage connecting the desert with the higher elevations of the mountains. This connection has not been recognized and evaluated in the preparation of the IS for its importance in our warming climate - See Appendix Figure 5 and Appendix Figure 6.  
An EIR is needed to study and provide recommendations consistent with the program for habitat connectivity prepared by the California Department of Fish and Wildlife.  
<https://wildlife.ca.gov/Data/Analysis/Connectivity>
- In 2024 The Mojave Desert Sentinel Landscape was formed. The Sentinel Landscape covers 3.5 million acres of the western Mojave Desert and is home to 5 military bases. This region is increasingly challenged by development pressures that pose significant threats to military operations, including airspace congestion, limited access to training routes, unauthorized off-road vehicle use, and energy development. To address these challenges, the Mojave Desert Sentinel Landscape brings together a diverse group of state, local, Federal, tribal, and private partners focused on reducing land use conflicts that threaten military readiness. San Bernardino County is the key local partner and the Alta Loma Residential Project is within the habitat linkage under its control along with MDLT, one of the private partners involved. As a partner in this agreement, the County must understand the need to protect the five military installations and surrounding areas to prevent encroachment and safeguard the training airspace.  
For more go to <https://sentinellandscapes.org/landscapes/mojave-desert/>  
See below re: cumulative impacts.

**The following comments are organized based upon CEQA Appendix G Environmental Checklist Form.**

See <https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/ab52/final-approved-appendix-G.pdf>

**I - Aesthetics**

The project is bisected by a County [designated Scenic Route](#) (See Appendix X). The aesthetic analysis makes no mention of the important designation. See above for conflict with CWP Natural Resources Element. The development of the access roads and structures on the sites will need significant grading and has the potential to significantly degrade the scenic vistas.

The exhibit *Tentative Tract Map No. 20612 Access And Pad Feasibility Exhibit* included within the IS shows existing topography and potential building pads. The exhibit illustrates preliminary cuts and fills needed to create the building pads that in some areas exceed 40 foot in height! This

unique and scenic topography of this entry into the Pipes Canyon area would be seriously and irreparably damaged by earthwork and grading if this magnitude. See Appendix 4

The project has the potential to incorporate residential structures of 36 feet in height. During both day and night this large visible feature will degrade the scenic vista for 256 homes and countless travelers and tourists visiting Pipes Canyon .  
See Appendix 8 for a viewshed analysis.

If this Project is approved, it will encourage other high-end developers in search of money-making ventures. What the Morongo Basin sorely needs is **affordable housing**. The County knows this and it should be addressed within an EIR.

**Summary: Under the environmental factor of I-Aesthetics the project *would*:**

- a) Have a substantial adverse effect on a scenic vista.
- b) Substantially damage scenic resources, including but not limited to trees, **rock outcroppings**, and historic buildings within a state **scenic highway**.
- c) ...substantially degrade the existing visual character or quality of public views of the site and the surroundings.
- d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

**III Air Quality and VII Geology and Soils**

The Pipes Canyon Subdivision would require significant grading and ground disturbance for entitlement. A consistent complaint of Morongo Basin residents concerns with the grading and scaping of sites for construction. The policies being employed by the County to monitor and control excessive clearing and unnecessary grading remain inadequate. The environmental analysis must anticipate and account for the quality of and attention to be expected based upon past experiences.

With our warming and dying climate, the standard for evaluating airborne emissions requires revision.

**Factors Influencing Dust Potential**

- **Disturbance impact:** While undisturbed desert surfaces often have a weak physical or biological crust that resists wind, even moderate disturbance (such as construction or vehicle traffic) significantly increases sediment production and dust emissions.
- **Aridity:** With mean annual precipitation as low as 4-6 inches, these soils remain dry most of the year, lacking the moisture needed to bind particles together.

**Environmental & Health Implications**

In regions like San Bernardino County and the Mojave Desert, where this soil association is found, dust emissions are a serious health concern.

- **Air Quality:** Dust contributes to PM10 (particulate matter) levels, which can lead to respiratory illnesses and cardiovascular disease. The Mojave Desert air basin is not in compliance with federal or state standards.

During construction on the 60+ acre parcel before all the roads and landscaping are in place, the Mojave Desert Air Quality Management District (MDAQMD) will require water trucks to be on site when the wind is blowing. Experience shows how colossally ineffective this “water the ground” approach to remediation is. This is the dry desert! The construction will last many months and will risk the health of downwind residents well after construction has ended.

See below re: water. This is our precious resource that is becoming ever more scarce in our desert and utilizing it in an ineffective manner to control dust is inappropriate.

**Summary: Under the environmental factor of III-Air Quality the project *would*:**

- a. Conflict with or obstruct implementation of the applicable air quality plan.
- b. Result in a cumulative considerable new increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
- c. Expose sensitive receptors to substantial pollutant concentrations.

**Summary: Under the environmental factor of VII-Geology and Soils the project *would*:**

- a. Result in substantial soil erosion or the loss of topsoil.

**IV-Biological Resources**

See above for designation of the Pipes Canyon ACEC. This designation confirms the importance of this unique area. This site is within a Conservation Planning Linkage area, just below Irreplaceable and Essential Corridors.

The placement of and nighttime glow from the 12, 2-story residences has the potential to be a major impediment to wildlife.

From the International Dark Sky Association <https://darksky.org/>

“For billions of years, all life has relied on Earth’s predictable rhythm of day and night. It’s encoded in the DNA of all plants and animals. Humans have radically disrupted this cycle by lighting up the night.

Plants and animals depend on Earth’s daily cycle of light and dark to govern life-sustaining behaviors such as reproduction, nourishment, sleep, and protection from predators.

Scientific evidence suggests that artificial light at night has negative and deadly effects on many creatures, including amphibians, birds, mammals, insects, and plants.”

**Key Behavioral and Ecological Impacts**

- **Disrupted navigation and Migration:** Many species rely on celestial cues (stars and the moon) to navigate. Artificial skyglow and building lights disorient migrating birds, leading to fatal collisions and exhausting detours.
- **Shifted Predator-Prey dynamics:** Light drastically alters the balance between hunters and the hunted.

- Interrupted Reproduction and Foraging: The timing of mating and feeding is highly dependent on light levels. Continuous artificial lighting suppresses natural rhythms, leading to disrupted breeding cycles and halting nocturnal foraging in small rodents.
- Impacts on Insects and Pollinators: Up to 60% of insects are active at dusk, dawn, or night. Artificial lights draw in night-flying moths and other pollinators, exhausting them, exposing them to predators, and severely reducing nighttime pollination rates.
- Habitat Fragmentation: For medium-sized mammals like badgers and foxes, brightly lit areas can trigger strong avoidance behavior, creating an artificial barrier that restricts their movement across natural landscapes.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC6205897/> (Google Scholar)

**Summary: Under the environmental factor of IV-Biological Resources the project *would*:**

- a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and wildlife or U.S. Fish and Wildlife Service.
- b. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
- c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrologic interruption, or other means.
- d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan

The project design and Tentative Tract Map layout appears to be the result of arbitrary planning parceling up the land into lots without regard for topography, existing native plants, watercourses or terrestrial connectivity for wildlife. Our rapidly changing environment requires deliberate and intentional design strategies to protect and conserve the environment for future generations. We believe the design of this project has not yet met the standard our changing environment requires for development in this unique area.

We believe that, with the continuing dramatic decline of wildlife and fragmentation of wildlife linkages being seen throughout the environment, this project requires a complete Environmental Impact Analysis.

**IX- Hazards and Hazardous Materials.**

The project is within a Very High Fire Hazard Severity Zone and, while the IS does not include the development of specific structures, ultimately and foreseeably, residences with associated ADUs and accessory structures would be constructed upon project approval. Humans are the leading cause of wildfires and this potentiality requires the more thorough analysis an EIR would provide. The cumulative effect of this development has not been considered within the IS as it pertains to wildfire exposure or the ability of County resources to respond.

**Summary: Under the environmental factor of IX- Hazards and Hazardous Materials the project would:**

- g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

**X- Hydrology and Water Quality.**

The availability of water to serve this subdivision requires additional study that has not provided within the IS. The site is not served by a water agency, and the source of water will be through private wells.

There are anecdotal reports of existing property owners in the area whose well have failed. There are no existing monitoring wells to evaluate groundwater quality and availability. This information is needed to ensure proper evaluation of the impacts and availability of water for this project.

The IS incorrectly states the site is within the Morongo Valley Groundwater Basin. The site is within the Ames Valley Basin see Appendix Figure 10. The IS also states that water could be provided by hauled water - this is incorrect. Hauled water is not a possibility. County residential permitting requires a well of a certain productivity.

The site is traversed by two Blue Line Streams – See Appendix Figure 8. This information has not been provided or analyzed within the IS. See above for permitting required by the State Federal government.

As with water supply, there is no wastewater treatment (sewer) serving this property. All wastewater will be disposed of through on-site wastewater treatment (septic). This was not mentioned in the IS. The suitability of the proposed lots for septic must be studied completely via an EIR.

*\*The errors and omissions above call into question the entire analysis of Hydrology and Water Quality and the conclusions presented.\**

**Summary: Under the environmental factor of X- Hydrology and Water Quality the project would:**

- a) Potentially violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.

- b) Potentially substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - i. result in substantial erosion or siltation on- or off-site;
  - ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite;
  - iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of runoff; or
  - iv. impede or redirect flood flows

**XI – Land Use and Planning**

See above re: inconsistency and conflict with Pioneertown CAG and CWP.

The IS incorrectly references the San Bernardino County **2007** General Plan in multiple locations. This suggest that the IS may have been prepared utilizing a cut-and-paste from another project with inadequate attention given to its applicability for this project.

The Pipes Canyon Subdivision is but the latest of many new developments proposed for the Morongo Basin. This project analysis requires consideration for its effect on a **cumulative** basis. The San Bernardino Countywide plan adopted in 2019 was based upon an environmental analysis that assumed little growth over a 20-year time horizon. Contrary to that assumption, the high desert communities have been the focus of intense development pressures. The Short-Term Rental (STR) boom of the COVID pandemic was focused on Joshua Tree and surrounding communities, and its effects continue with the evisceration of the community and the loss of affordable housing.

The County Wide Plan was adopted by the Board of Supervisors in 2020 at the same time Resolution 2020-197 was adopted See (Appendix Figure 9) and includes the following:

WHEREAS, a Program Environmental Impact Report (“PEIR”) (SCN 2017101033) was prepared for the Countywide Plan which adequately discussed the impacts of the project and indicates that significant environmental impacts will result; and

We believe an EIR is warranted for this project that includes an analysis of cumulative impacts.

**Summary: Under the environmental factor of XI – Land Use and Planning the project *would*:**

- a) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

**XIV – Population and Housing**

See above regarding need for affordable housing.

**Summary: Under the environmental factor of XIV – Population and Housing the project *would*:**

- a) Induce substantial unplanned population growth in an area (see above re: CWP)

**XV – Public Services**

See above regarding need Firefighting capability.

**Summary: Under the environmental factor of XV – Public Services the project *would*:**

- a) Result in substantial Fire Protection needs (see above)

**XVIII – Tribal Cultural Resources**

See Appendix X.

**Summary: Under the environmental factor of XVIII – Tribal Cultural Resources the project *would*:**

- a) Potentially affect Tribal Cultural Resources (see above)

The Basin is served by effectively, only one narrow, point of access from the main population centers of the greater LA area. The cumulative effect of this development must consider the traffic within the Morongo Basin as a whole.

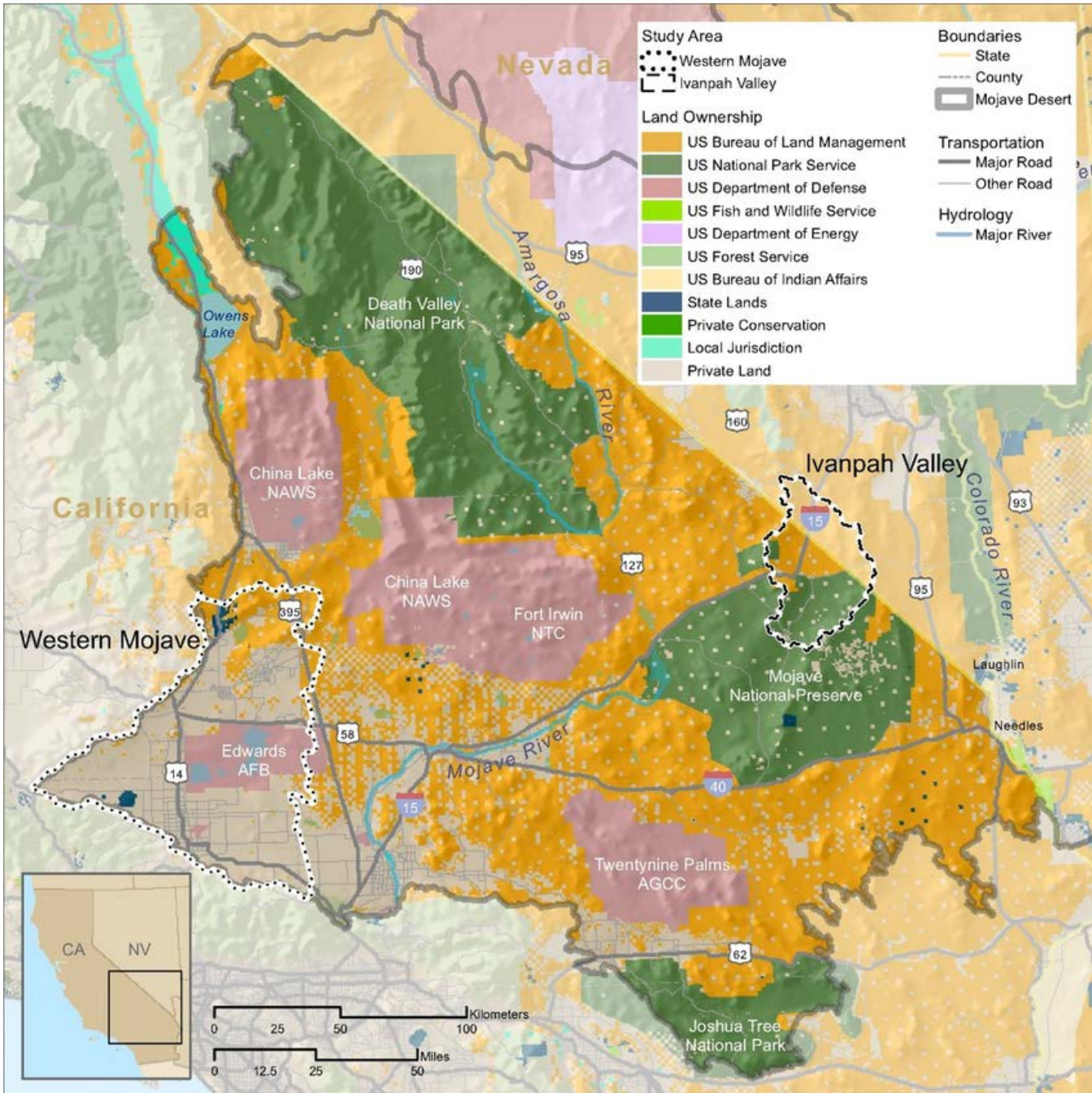
We appreciate this opportunity to provide comments on the Draft Initial Study / Mitigated Negative Declaration. Given the unique and sensitive nature of this site and environment related to the Aesthetics, Air quality, Biological resources, Geology and Soils, Hazards, Hydrology, Land Use and Planning and the cumulative impacts to the Basin as a whole, MBCA believes this Mitigated Negative Declaration must be denied and complete Environmental Impact Analysis be prepared that.

Thank you for your consideration,

Steve Bardwell, President  
Morongo Basin Conservation Association

# Appendix Figures

**Figure 1: Land ownership in the California Mojave Desert region**



## **Figure 2: Application for Pipes Canyon ACEC**

(This submission was made to the BLM with no response beyond the actual designation as an ACEC)

### **OUTSTANDING ENVIRONMENTAL RESOURCES AND VALUES OF BLACK LAVA BUTTE AND FLAT TOP MESA (ATE 'IVYAT)**

A Nomination to the U.S. Bureau of Land Management (Barstow Field Office) for Area of Critical  
Environmental Concern (ACEC) Status

#### **SUMMARY**

This petition nominates the public lands known collectively as Black Lava Butte and Flat Top Mesa for status as an Area of Critical Environmental Concern. Henceforth, the area will be referred to by its Serrano name "Ate 'ivyat" meaning "Rocky Place." The lands are located in Pipes Canyon, California, in the Mojave Desert, and comprise approximately 6,400 acres.

This nomination describes the significant environmental resources and values of these lands and the need for special management attention. These extremely unusual land formations that have resulted from thousands of years of volcanic activity and subsequent erosion are unique to the immediate area and are the only such specific formations in Southern California.

Such is the topology of Ate 'ivyat that human settlers have been continuously attracted to the area for several thousand years. In particular these lands are home to huge numbers of Native American sites that include evidence of habitation, rock art and possible ritual activities. For this reason, Serrano elders describe the area as sacred to the Serrano people.

In more recent times, non-native settlers have homesteaded the area because of its natural beauty, its abundant water supply and the unusually rich plant and animal resources that made the area a sheltered haven within the difficult terrain of the Mojave Desert. Today descendants of those settlers continue to make Pipes Canyon their home in the sacred shadow of Ate 'ivyat.

In addition to comprising an irreplaceable history of centuries of human habitation, Ate 'ivyat is also home to rich flora and fauna resources. Ate 'ivyat serves as a habitat for animals like kit fox and bighorn sheep, plants like Joshua trees and Parish's Daisy, and an incredible diversity of insects. Because of its location in the desert-mountain transition zone and its unique geology, Ate 'ivyat is home to a number of rare plant and animal species. This was confirmed in spring 2012, when experts and volunteers located several threatened plant and animal species such as desert tortoise and Robison's Monardella.

Together with its expansive and essentially undisturbed view sheds, these attributes make Ate 'ivyat an increasingly unusual phenomenon in Southern California – an unspoiled ecosystem that for thousands of years has peacefully coexisted with human beings who have respected the land rather than exploited it. For all of the above reasons, Ate 'ivyat warrants designation as an ACEC.

## Figure 3: Designation of Sand to Snow National Monument

Office of the Press Secretary  
For Immediate Release

February 12, 2016

# Presidential Proclamation -- Establishment of the Sand to Snow National Monument

ESTABLISHMENT OF THE SAND TO SNOW NATIONAL MONUMENT

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BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

The Sand to Snow area of southern California is an ecological and cultural treasure, a microcosm of the great geographic diversity of the region. ...

The archaeological riches of the Black Lava Buttes,,,,

The human history of the Sand to Snow area extends back thousands of years. People now identified as part of the Takic subset of the large Uto-Aztecan group of Native Americans arrived in the region around 2,500 years ago. Ancient people of the area used a wide variety of plants from both the mountains and the Mojave desert, such as honey mesquite, oak, piñon, cactus fruits, yucca roots, and tubers as well as grasses, seeds, and berries. Common tools were made of wood, bone, shell, stone, clay, and plant fibers. These people also manufactured woven goods, pipes made of stone, awls made of bone, tools associated with archery, and fire drills. They made coiled basketry and simple undecorated ceramic pots used for storage and transport.

The name "Serrano" was given to people living in the Sand to Snow area by the Spanish missionaries in the late 18th century and translates from Spanish as a "person from the mountains." In 1834, the Spanish forcibly relocated many Serrano people to the missions. In 1840 the Serrano suffered a devastating smallpox outbreak, and the disease returned in 1860. Ruth Benedict, one of the world's foremost cultural anthropologists, studied the Serrano

extensively in 1924. However, by this time there were few remaining eastern groups and no old shamans or priests survived. Today, the rich archaeological resources in this area serve to preserve the history of the Serrano people. Black Lava Butte, topped by distinctive basaltic lava flows, is sacred to the Serrano Tribe and home to a substantial number of archaeological sites, including evidence of habitation, rock art, and possible ritual activities. Black Lava Butte contains an estimated 1,700 distinct petroglyphs, most of which have not yet been studied and may provide insight into the history of the Serrano and other tribes in the region. The mesa also contains dozens of isolated grinding and milling sites and at least one shelter site, where many milling stones are present.

IN WITNESS WHEREOF, I have hereunto set my hand this twelfth day of February, in the year of our Lord two thousand sixteen, and of the Independence of the United States of America the two hundred and fortieth.

BARACK OBAMA

## **Figure 4: Geologic History of Pipes Canyon** **A Brief Geological History of the** **Pioneertown Region**

By  
David J. Crane<sup>1</sup>  
March 8, 2018



*Figure 1 Pipes Wash channel with Flat Top Mesa in background from Hwy 247.*

Tucked into the southwest corner of the Hi-Desert region of the Mojave Desert, bound between Hwy 247 on the east and San Bernardino Mountains on the west, just north of the Sawtooth Mountains lies the Pioneertown Reserve. Paramount to the Pioneertown region is the presence of four prominent black-capped mesas rising upwards to 700 feet above the Pipes Wash river valley floor. Referred to as a fossil landscape, these imposing structures, with names like Flat Top, Black Lava, and Black Hill (Figure 4), are remnants of relentless erosion from numerous ancient river channels, now long abandon and obscure. In addition to the antiquity displayed within its desert vistas, the rocks concealed beneath its floor and exposed within the mesa walls represent immense spans of time that tell a story of mountain building episodes, earthquakes, vast grasslands roamed by bizarre prehistoric animals, violent volcanism, and finally culminating with deep erosion from long periods of increased moisture and alpine glaciation within neighboring highlands.

### **Building of a Foundation**

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<sup>1</sup> California Registered Geologist #4639

This tale begins with the oldest recorded geologic event within the Pioneertown region; a period in earth's history called the Precambrian. It is represented by isolated pockets of hard, brittle metamorphosed rocks found in the hills surrounding the mesas. These rocks first derived as sediment shed from the west coast of the ancient North American continent and collected on an oceanic floor as a thick wedge of muds and sands (Figure 1) dating back to 1.75 billion years ago<sup>2</sup>. Following and in conjunction with this time, all of earth's landmasses were in a process of drifting over the surface of the earth through a process referred to as plate tectonics. Eventually, this resulted in their collecting into a supercontinent about 1.4 billion years ago<sup>3</sup> called Rodina, with North America at its core (Figure 2). Caught between colliding continents, the ancient sediments deposited on the ocean floor were subsequently squeezed and uplifted into a mountain chain that traversed the edge of North America and



Figure 1 Cross sectional representation of Precambrian sedimentary wedge off passive edge of ancient North American plate



believed extended into the Antarctica continent<sup>4</sup>. Compression, and immense heat from this collision triggered chemical reactions, metamorphosing the sediment into the hard-crystalline rock. Locally referred to as Baldwin Gneiss<sup>5</sup> (pronounced 'nice'), today these rocks represent the roots of that long past mountain chain (Figure 5 shows their location colored green or olive-green). The Pinto Gneiss located in the western part of the Joshua Tree National Park are age equivalent and represent a continuation of these rocks.

Rodina eventually broke up at about 700 million years ago, with North America drifting eastward as part of a supercontinent called Gondwana. Marine deposition again resumed off the western shores of North America until the Mesozoic era<sup>6</sup> approximately 250 million years ago.

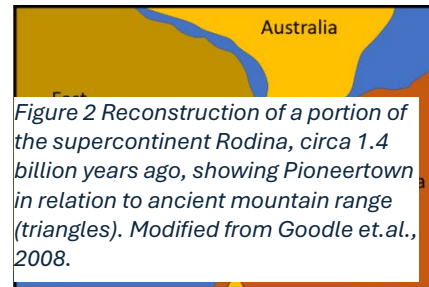
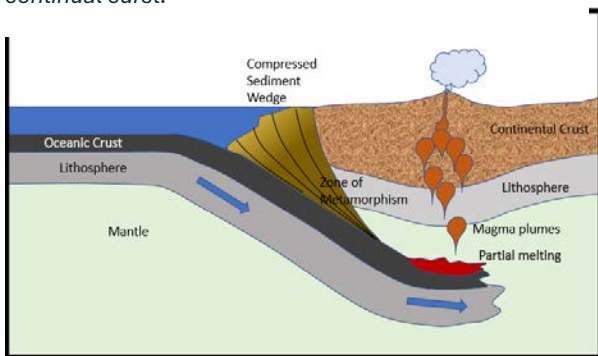


Figure 2 Reconstruction of a portion of the supercontinent Rodina, circa 1.4 billion years ago, showing Pioneertown in relation to ancient mountain range (triangles). Modified from Goodle et al., 2008.

250 ago.

Figure 3 Westward migration of North American continent resulted in subduction and partial melting of oceanic crust and sediment wedge. Plumes of molten rock subsequently rose to become incorporated into continental crust.



Following this time, the North American continent begins a long process of detachment from Gondwana, drifting westward by overriding the oceanic crust (Figure 3). The initial result is partial melting of the subducted oceanic crust which vented to the surface forming a chain of volcanism along the leading edge of the continent<sup>7</sup>. Westward drift became more prevalent in the Jurassic era (220 to 180 million years ago) marked by formation of great plumes of melted rock or molten magma beneath the leading edge of the continental crust. Each new rising plume added to the total, where it later slowly cooled and crystallized into vast accumulations of granite. Today

these rocks form the backbone of the Sierra Nevada Mountains, best seen in the walls of Yosemite Valley. In the Pioneertown region, these molten plumes shouldered their way up through the Baldwin Gneiss<sup>8</sup> forming a granitic crust underpinning the Mojave Desert. These rocks can be seen exposed at the base of the Pioneertown Basalt mesas and in the Sawtooth Mountains to the south of Pioneertown, shown as pink

<sup>2</sup> Silver, 1971

<sup>3</sup> Goodle, et. al., 2008

<sup>4</sup> Goodge, et.al.,2008

<sup>5</sup> Lowman, 1989

<sup>6</sup> Hollenbaugh, 1970; Silver, 1971; Wilson, 1985

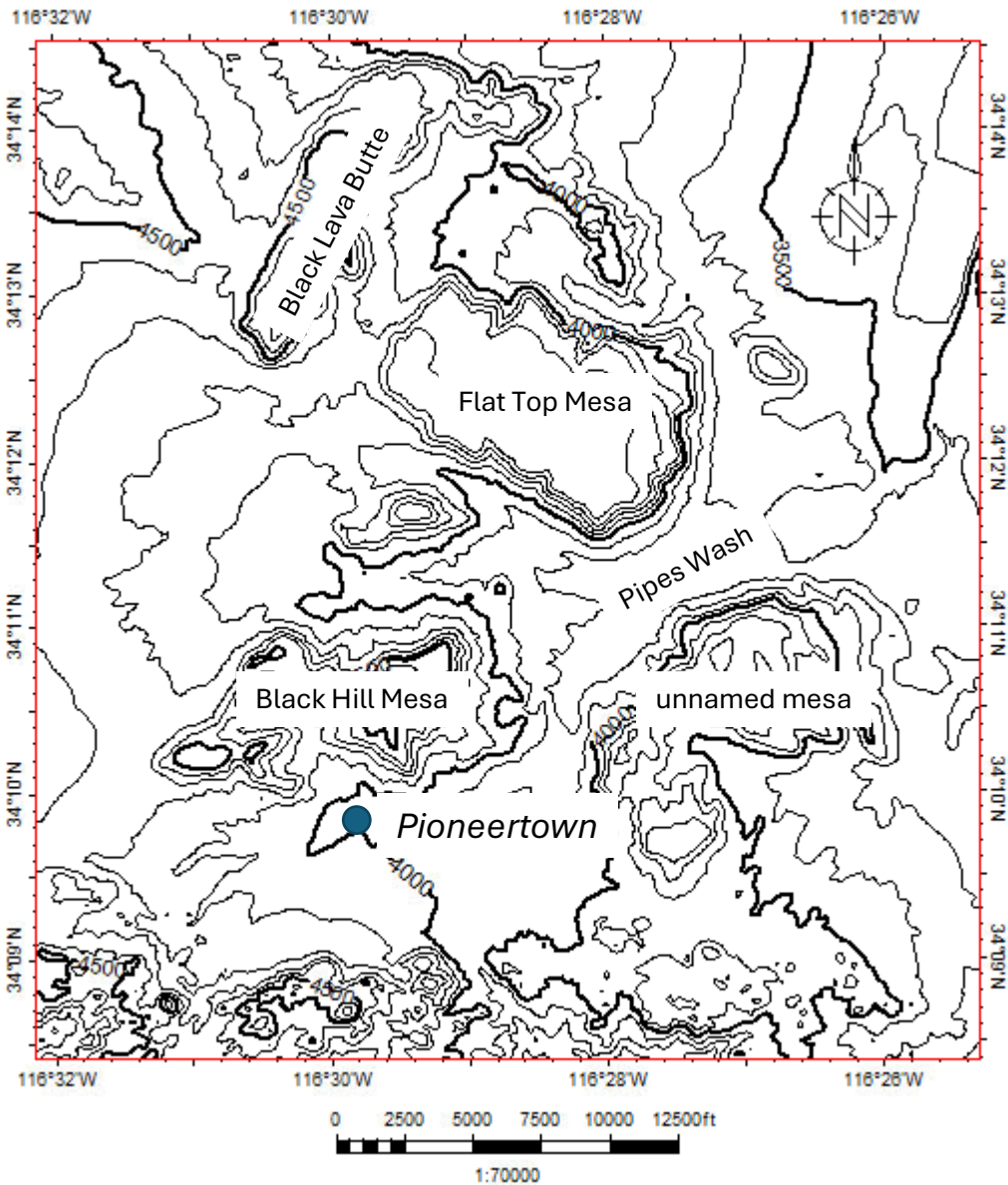
<sup>7</sup> Richmond, 1960; Hollenbaugh, 1970; Burchfiel and Davis, 1981; Burchfiel et.al., 1982

<sup>8</sup> Miller and Morton, 1980

on Figure 5. Described as Quartz Monzonite<sup>9</sup>, this crystallized magma contains lead-alpha ratios suggestive of an age between at 75-90 million years ago<sup>10</sup>; near the end of the reign of the dinosaurs. Between 23 and 34 million years ago (Oligocene epoch), basins developed within the Mojave Desert floor, along with other surface irregularities testify to the continued subduction of the Pacific oceanic crust beneath the North American continent<sup>11</sup>. Beginning around Mendocino, a slice of oceanic floor called the Pacific plate, slowly worked its way southeasterly beneath the continental crust<sup>12</sup>. By 22 Ma ago (Lower Miocene), this section of the Pacific oceanic floor is now consumed by the North American plate and begins its passage beneath the Mojave Desert<sup>13</sup> (Figure 6). Filling the newly formed basins is the Pioneer

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Figure 4 Contour and Mesa Location Map; contour interval is 100 ft.

<sup>9</sup> Lowman, 1907  
<sup>10</sup> Silver, 1971  
<sup>11</sup> Crowell, 1981; Glazner, 1981  
<sup>12</sup> Atwater, 1970  
<sup>13</sup> Atwater, 1970; Jahns, 1973; Neville, 1983; Glazner, 1981; Dohrenwend, 1987  
<sup>14</sup> Spotile, et al., 1998  
<sup>15</sup> Reynolds, 1992

# Geology Map

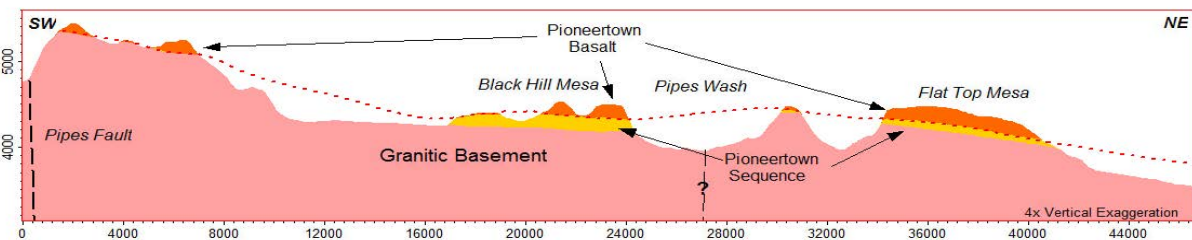
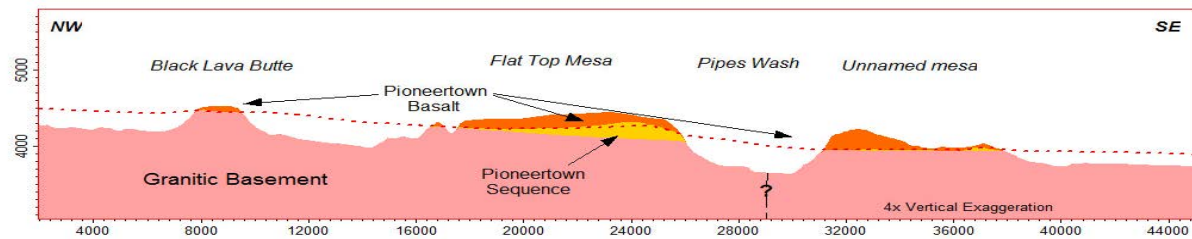
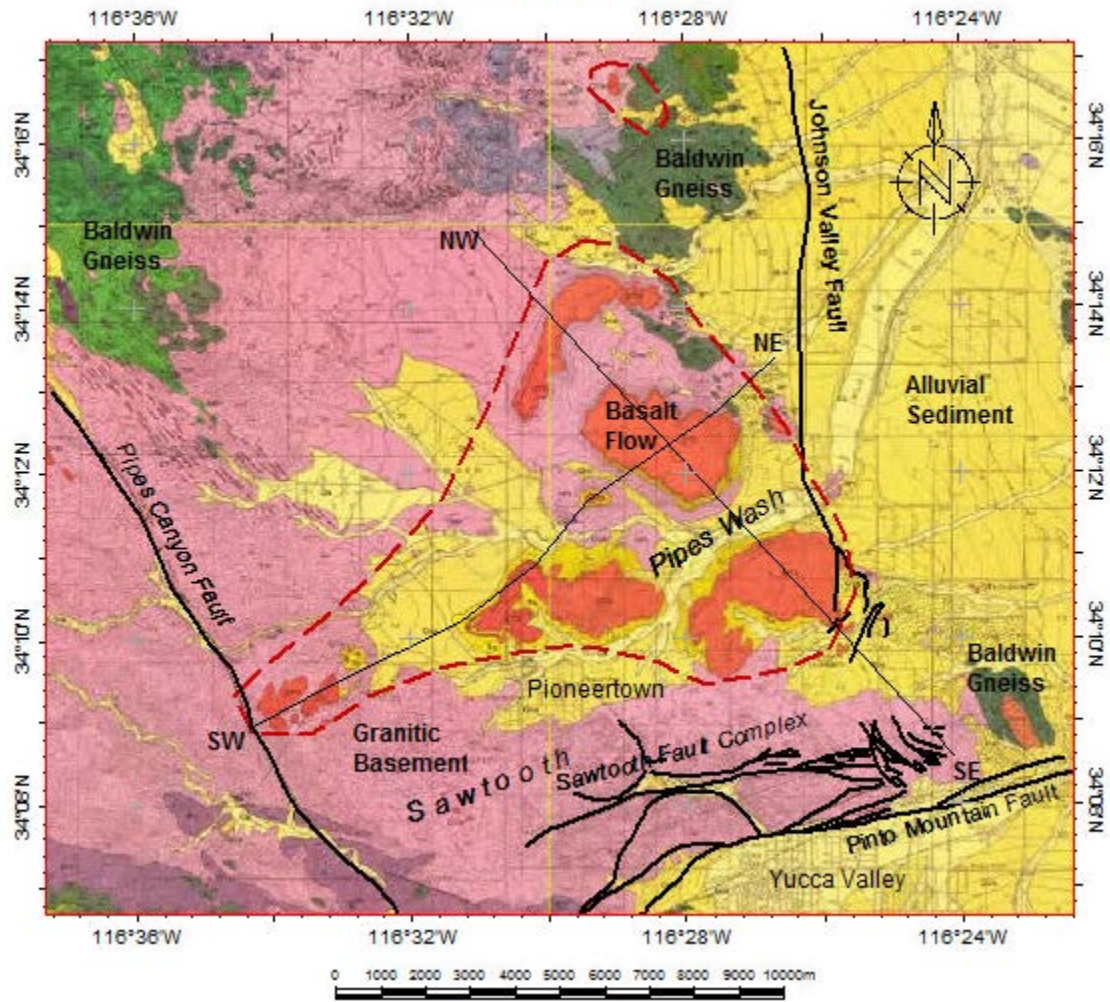


Figure 5 Geological Map and cross sections of Pipes Wash region (modified after Dibblee, 1967). Red dash line represents projected extent of Pioneerstown Basalts.

Previously referred to as the Old Woman Springs Sandstone<sup>16</sup>, or the Santa Ana Sandstone<sup>17</sup>, the Pioneertown Sequence, appears as a brown gravelly, silty sand containing metamorphosed rock fragments. Overlying this unit is an arkosic or sandy “white” member. Field work<sup>18</sup> suggests the white layer is a grus or gravelly remnants covering a flat regional erosional surface or pediment. The grus consists exclusively of quartz monzonite fragments, presumably locally derived<sup>19</sup>. At the contact between the brown layer and white sand is a reddish-brown paleosol<sup>20</sup> consistent with soil profiles common to moist temperate climate. Extensive weathering releases free iron oxides, coating particles in the soil with a thin reddish film called rubefaction. Hence, the paleosol, along with the grus, mark a stage of heavy erosion and pediment development during the Late Miocene<sup>21</sup>. Consequential with this erosion, the desert landscape is subsequently reduced to no more than 150 feet of relief<sup>22</sup>



Figure 8a Black Pioneertown Basalt covers the pinkish quartz monzonite through a series of flows, shown here as distinct 10-foot thick layers.

this water table to exist the lava fields



Figure 8b White cast to freshly exposed lava beds in center of photo results from accumulation of calcium deposits, marking top of “fossil” water table.

Volcanism in the form of lava flows takes place towards the end of the Miocene epoch, between 6.8 to 9.3 million years ago<sup>23</sup>. Through a series of at least seven to nine eruptions, these lava flows built up to a maximum thickness of about 200 feet, now seen capping the mesas (Figure 8a). Figure 5 shows an approximation of the lateral extent of those ancient lava flows.

Deposits of white calcium buildup (Figure 8b) about 80 feet below the uppermost lava flow mark the upper level of an ancient or “fossil” groundwater table that dates to no earlier than 40,000 years (Petersen, 1976), given the limitations of Carbon14 methodology, and may be considerably older. For

must have been a continuous layer within their projected extent, otherwise, these rocks could not have provided storage for the water. The tops of the flows are identified by scoriaceous basalt, clinker layers and ropy texture (Figure 9) capping relatively thick intervals of non-vesicular or massive basalt that locally contain lava tubes. Some “cooling units” or flow layers exhibit explosion tubes and pillow basalt, highly suggestive of flowing lavas periodically encountering pools of ponded water<sup>24</sup>).

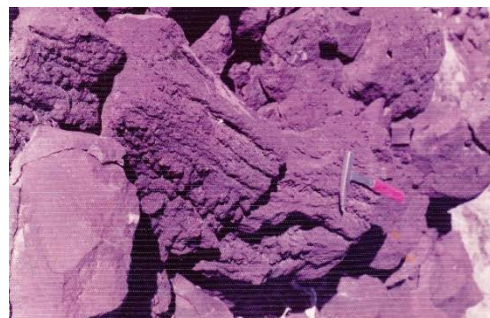


Figure 9 Clinker layers with ropy or folded texture commonly found at the tops of flows.

<sup>16</sup> Vaughan, 1922, Dibblee, 1967  
<sup>17</sup>Lowman, 1989  
<sup>18</sup> Petersen, 1976  
<sup>19</sup> Lowman, 1989  
<sup>20</sup> Oberlander, 1972  
<sup>21</sup> Petersen, 1976  
<sup>22</sup> Oberlander, 1972.  
<sup>23</sup> Petersen, 1976; Neville, 1983  
<sup>24</sup> (Lowman, 1989

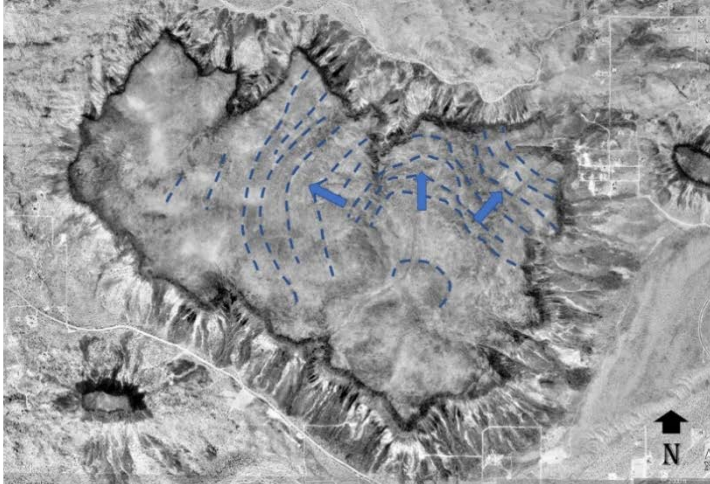


Figure 10 Air photo of Flat Top mesa. Dash lines trace a linear texture suggestive of pressure ridges. Arrows indicate inferred direction of

Linear features observed in air photo atop the Flat Top mesa (Figure 10) infer the presence of pressure ridges commonly associated with viscous lava flows. First detected from air photos obtained directly following a light snow storm and high winds<sup>25</sup>, linear accumulations of wind-blown snow, consistent with trapping by a network of ridges, were observed. An archival search of past air photos reinforced this interpretation, viewed as linear tonal variations, partially enhanced on black and white photos. Inferred flow direction is normal to the pressure ridge alignment suggest a northern and eastern direction of flow.

this fault served as a conduit for lava reaching the surface, flowing eastward down the slopes of the San Bernardino Mountains, and northeasterly flooding the desert floor to its current location. Best described as alkaline olivine basalt, these lavas originated from a calculated depth of 20 miles beneath the surface, based on “partial melt” models and rare earth chemistry<sup>26</sup>. Basalt of this type is common to oceanic regions and is considered a primary magma<sup>27</sup>. Volcanic eruptions throughout the Mojave Desert are attributed to the continued over-riding of the subducted oceanic crust<sup>28</sup>. Taking this into account, the Pioneertown Basalt is believed by this study to have derived from the partial melting of the subducted oceanic plate and venting to the surface by way of the Pipes Canyon fault (Figure 11).

Juxtaposition of basalt deposits with the Pipes Canyon fault, one mile west of the mesas, imply

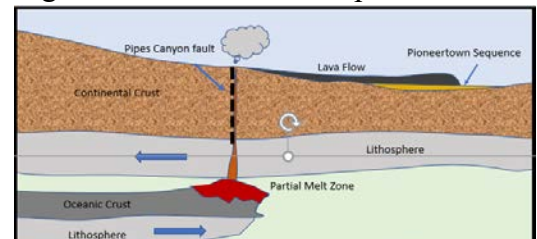


Figure 11 Cross sectional reconstruction of subsurface conditions beneath Pioneertown region. Partial melting of subducted oceanic floor vented to surface via Pipes Canyon fault sourced the Pioneertown Basalt.

Following this period of limited volcanism, deformation from regional extension came to an end<sup>29</sup>, succeeded by an onset of compressional stresses, renewed activation of the San Andreas fault<sup>30</sup>, and rejuvenated uplift of the San Bernardino Mountains<sup>31</sup>. Faulting of the Pioneertown Basalt<sup>32</sup> and regional tilting of 10 degrees to the northeast (Figure 12) may have been triggered by this activity. A clockwise rotation of the neighboring Little San Bernardino Mountains and the Eastern Transverse Ranges also occurs during this time<sup>33</sup>. Surface trace patterns of high angle reverse faulting mapped by the author and identified as the Sawtooth Complex (Figure 5) imply the Little San Bernardino Mountains are in collision with the Sawtooth Mountains at the west end of Yucca Valley and possibly under-thrust the Pioneertown region<sup>34</sup>. Recent field work<sup>35</sup> lead to propose the left lateral strike-slip Pinto Mountain fault, present along

<sup>25</sup> Google Earth, January 2016

<sup>26</sup> Lowman, 1989

<sup>27</sup> Turner and Verhoogen, 1960

<sup>28</sup> Armstrong and Higgins, 1973; Burchfiel et al., 1982

<sup>29</sup> Glazner, 1981; Yerkes and Campbell, 1971; Atwater, 1970

<sup>30</sup> Jahns, 1973

<sup>31</sup> Dibble, 1975; Richmond, 1960

<sup>32</sup> Lowman, 1989

<sup>33</sup> Richmond, 1960

<sup>34</sup> Crane, 2010 & 2011

<sup>35</sup> Gabriel et al., 2016,

the south side of the Sawtooth Mountains, serves as a conduit for strain transfer from the Mission Creek Fault<sup>36</sup> into the Mojave Desert region<sup>37</sup>. This implies surface ruptures along the eastern edge of the mesas (Johnson Valley Fault) associated with the 1992 7.2 Ma Landers earthquake<sup>38</sup> was a recent expression of this transfer of energy (Figure 5). The epicenter for that event is located just east of Flat Top mesa, between Hwy 247 and Pipes Wash.

## Mesa Development

Dissection of the landscape into its current mesa morphology began with the Pliocene epoch, about 5 million years ago. Though warm climatic conditions characterized the Pliocene, increased moisture

*Figure 12 Floor of gas pocket within basalt implies a regional tilted of at least 10 degrees to the northeast. Dime to left of gas pocket is for scale.*

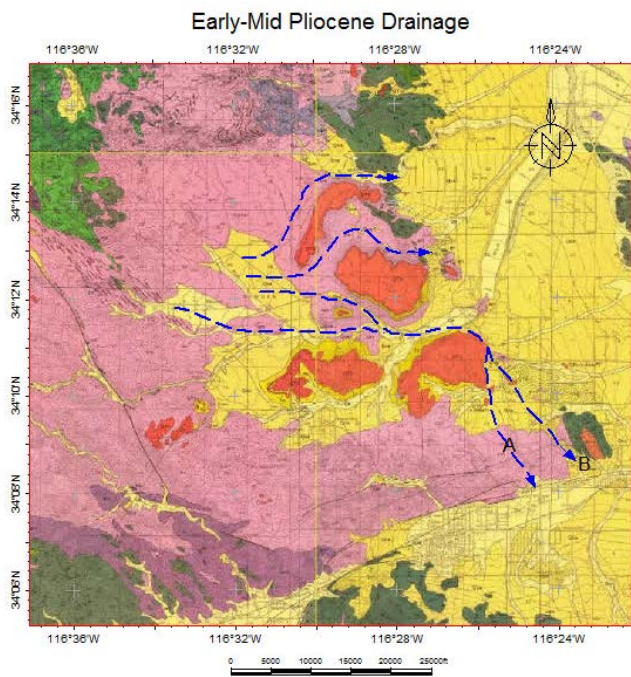


Figure 13 Map of inferred channel routes during early Pliocene.

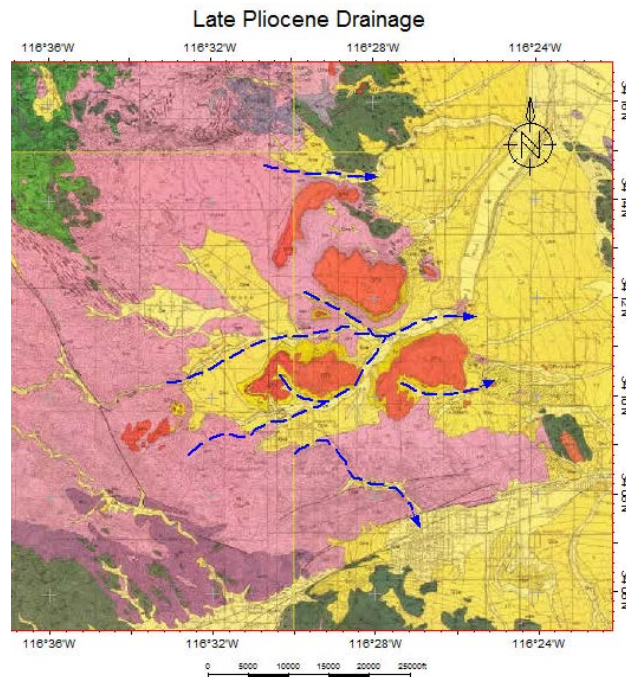


Figure 14 Map of inferred channel routes during late Pliocene

<sup>36</sup> a branch of the San Andreas fault

<sup>37</sup> aka Eastern California Shear Zone

<sup>38</sup> the strongest in California in 40 years

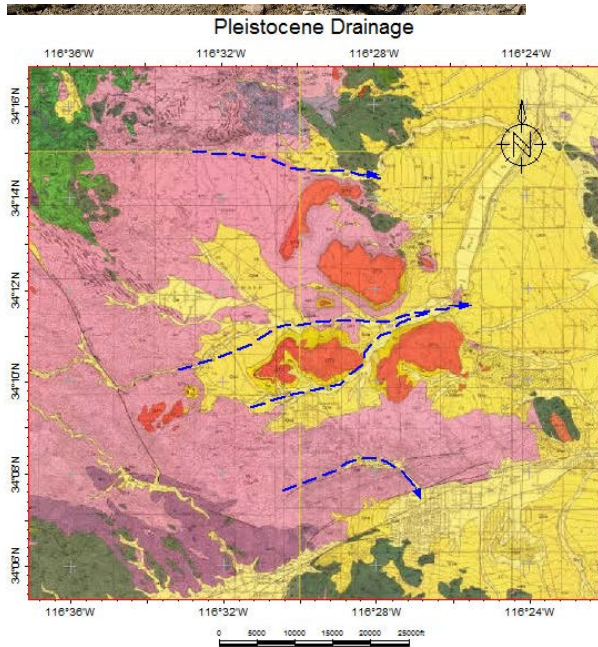


Figure 15 Map of inferred channel routes during Pleistocene

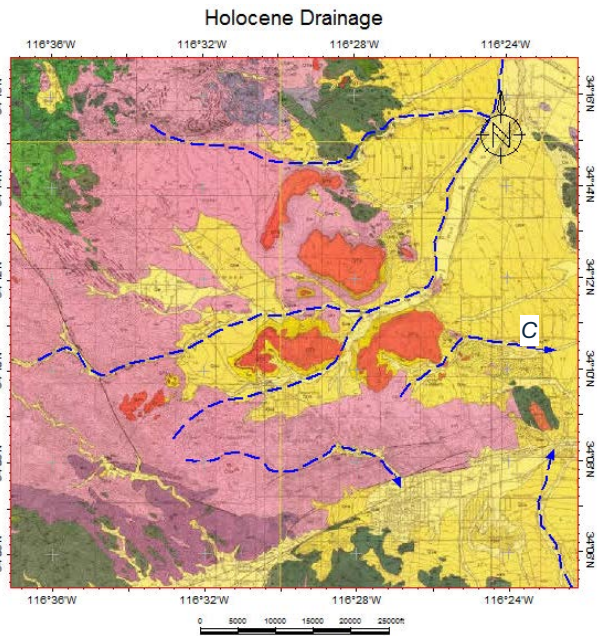


Figure 16 Map of inferred channel routes during Holocene

captured within the newly elevated San Bernardino Mountains apparently managed to facilitate seasonal runoff into the Mojave Desert region based on degree of erosion and alluvial deposition. Figures 13 through 16 show probable time sequence reconstruction of these channels. These reconstructions were primarily accomplished through the matching of rock compositions (index rocks) within remnant channel gravel deposits to a probable source or provenance. Other lines of evidence involved superposition of current channel deposits, elevation of ancient channel relative to other channels, termination of channels course by subsequent a channel and degree of abrasion displayed in the course-grained aggregate. Early drainage from the western highlands is represented by channel deposits found at locations A and B on Figure 13. At location A (Figure 17), channel lag lenses of very coarse-grained aggregate ranges from sub-rounded to rounded for the granitic elements and well-rounded for the gneissic gravel, consistent with long distance transport. A fine-grained matrix encases the pockets of channel lenses (Figure 18) interpreted to represent stages of abrupt outwash and debris flows common to flashflood conditions while



Figure 17 Location A; Roadcut exposing lens of rounded gravel representing period of sustained channel flow. Staff marked in decimeters.



Figure 18 Location A; Roadcut exposure showing fine-grained debris flow incorporating lens of channel lag. Edge of channel defined by crystalline rock to left of staff. Staff marked in decimeters.

the gravel lenses mark periods of sustained high discharge, capable of winnowing out fines from the



Figure 19 Exhumed fluvial deposit at Location B contains mixed metamorphic (gray), basalt (black), quartz (white), and quartz monzonite (pink).

bedload. Location B 19 and 20) is a large that appears filled an intermountain valley, later exhumed by subsequent Basalt and metamorphic these locations suggest streams originated in the northwest, and imply elevations in the highlands were greatest north, and by extension, captured increased



Figure 20 Location B showing well rounded basalt implying channel traversed lava beds.

(Figure deposit erosion. rocks at early

in the

moisture from westerly winds moving across this region.

The Late Pliocene, approximately 3-4 million years ago (Figure 14), opens with the shifting of the channel headwaters south, presumably resulting from continued uplift of the western highlands. The main artery through the central region of the mesas becomes well established resulting from outflow from Pipes Canyon and points south. Discharge from these channels truncate early water courses and subsequently

contribute to a massive accumulation of sand and gravel fans and aprons just east of the mesas. A south flowing channel is based on ancient channel detritus deposited within Water Canyon of the Sawtooth hills located south of Pioneertown.

Fluctuations in climatic conditions typify the Pleistocene epoch, starting about 2.6 million years ago (Figure 15). Up to four cooling events<sup>39</sup> introduced momentary increases in precipitation and snow accumulation within the highlands and desert. Having risen to an elevation of 11,503 feet, the San Bernardino Mountains hosted the farthest southerly accumulation of ice and glaciation within North America between approximately 18,000 to 5,000 years ago (Figure 21). Fossil remains of shelled invertebrates, fish, and plants that only could survive in perennial lake environments demonstrate

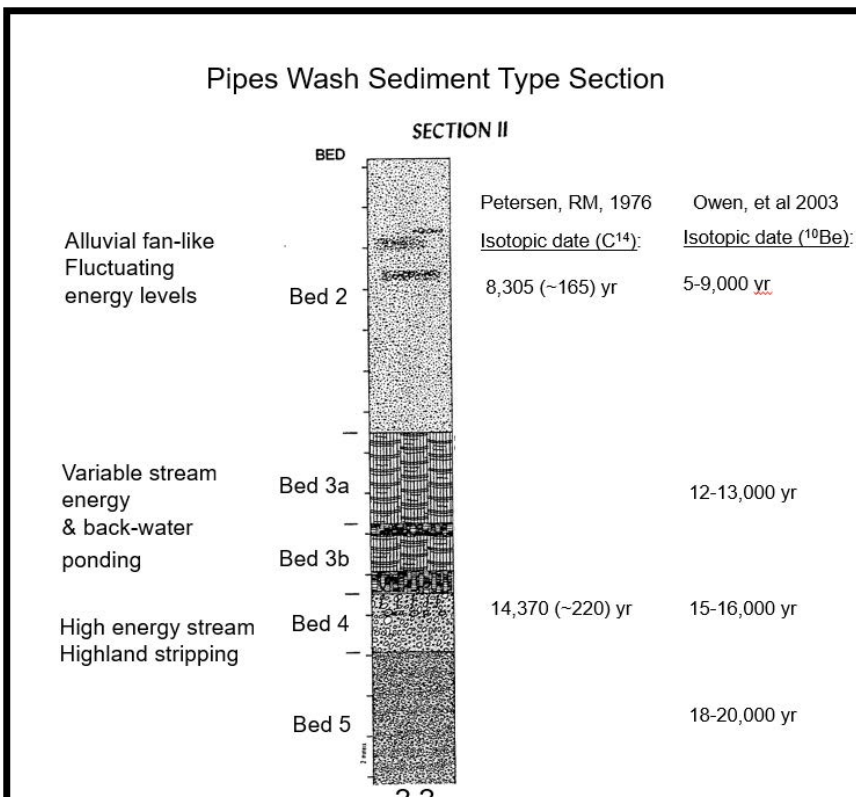


Figure 21 Representation of the sediment exposed within Pipes Wash and comparison of time sequences obtained from the alluvium deposits (Petersen) to those of the glacial events (Owen, et.al) recorded in the San Bernardino Mountains

sustained periods of high lake stands across the desert region that accompany this cool and wet climate. High-volume outflow eastward into the Mojave Desert region was also sustained with influx of meltwaters during climatic warming between interglacial stages. Building on early established channel

<sup>39</sup> Owen, et.al., 2003

courses, the increased eastern outflow relentlessly eroded and dissect the basaltic lava fields and underlying granitic basement rock, and further built up the sediment accumulation on the desert floor east of the lava beds. Up to 100 feet of these old alluvial sediments are now exposed in walls of the Pipes Wash Channel (Figure 22). Five different environments of deposition are recorded in these layers ranging from formerly high-energy rivers to periodic streams<sup>40</sup> as shown on Figure 22. Radioactive ages for these sediments range from about 14,000 years in the lower layers to over 8,000 years near the top. These dates, which span between the Late Pleistocene-Holocene epochs, are compatible with glaciation in the San Bernardino Mountains (Owen, et. al., 2003) and imply they result from the outwash of these events.

Figure 16 represents 5,000 years ago to present (Holocene). Dissection of the mesas is completed with the aid of outflow from the Pipes Canyon area during the last waning glacial state. This channel flowed through the center of the lava beds and subsequently incised into former alluvial sediment deposits forming Pipes Wash. An impressive 100-foot incision of the current Pipes Wash channel into former alluvial deposits and the downcutting of an exhumed granitic outcrop, marked C on Figure 16, locally referred to as “The Windmill gap”, implies regional uplift and lowering of the erosional base of the river. Drainage through Water Canyon and south into Warren Basin became increasingly established, delivering sediment into Yucca Valley area, helping to balance the subsidence of that basin. A very subdued alluvial



Figure 22 Stratified lays of old alluvium now exposed in walls of Pipe Wash



fan at the mouth of Water Canyon suggests rate of erosion and subsequent sedimentation managed to keep pace with basin development.

### Epilog

It is the authors opinion faulting controls most, if not all the channel courses within the granitic basement and therefore predates the onset of

significate outflow. High angle thrust faulting witnessed in the Sawtooth Mountains and Pipes Wash is also believed tied directly to activation of the Pinto Mountain fault<sup>41</sup>. Dating initial movement along the Pinto Mountain fault however, has been found inconclusive, but can be argued to be as old as late Miocene<sup>42</sup>. Field evidence also shows faulting within the Pipes Wash largely postdate the Pioneertown Basalt<sup>43</sup>. Misalignment of the flows from one mesa to the next also imply concealed faults beneath the alluvial cover between the mesas<sup>44</sup> which likewise, postdate the basalt. The earliest plausible date for faulting of the granitic basement lies between the latest Miocene to earliest Pliocene age, approximately 5 million years ago, just before the onset of extensive erosion and formation of the mesas. Faulting would then had had time to compromise the rocks integrity along the trace of the fault, rendering it susceptible to rapid erosion through stream action.

The mesas that define Pioneertown region bear witness to ages of crustal formation at the edge of a continent, epic periods of erosion, development of savanna-like grasslands due to outwash from western highlands, immense intervals of tropical rainfall, volcanic fury, seismic unrest, and later cyclic glacial outwash and erosion on a vast scale. Today the multitude of forces that sculptured this landscape are no

<sup>40</sup> Petersen, 1976

<sup>41</sup> Crane, 2010 & 2011

<sup>42</sup>Grimes, 1986

<sup>43</sup> Lowman, 1989

<sup>44</sup> Petersen, 1976

longer present and we pass into a different set of conditions that will leave its own unique mark on the land.

## Pioneertown/Yucca Valley Geologic Event Time Line Summary

| <u>Period</u> | <u>Age</u> | <u>Event</u>   |
|---------------|------------|--|
| Holocene      | Present    | Surface ruptures show recent activity on Johnson Valley and Pinto Mountain faults.<br><br>Alluvial deformation document current tectonics within the Sawtooth fault system.<br>Waning fluvial outflow results in flow transformation to an ephemeral braided-channel system due to progressive onset of xeric conditions.  |
|               | 5 Ka       | Last major fluvial stage associated with high-energy outpour from glacial meltwaters sourced along the eastern flank of San Bernardino Mountains.<br><br>Initiation of present day Pipes Wash channel and the subsequent drawing of early human habitation to the region.  |
| Pleistocene   | 5-9 Ka     | Cessation of glaciation within the San Bernardino Mountains.   |
|               | 18-20 Ka   | Four periods of major fluvial outflows (Petersen) coincident with interglacial stages within the San Bernardino Mountains (Owens) resulting in deposition of Pipes Wash alluvial beds, and by extension, infilling of Warner Basin receiving detritus actively eroded from the Sawtooths and neighboring highlands.<br><br>Onset of glaciation within the San Bernardino Mountains (Owens).  |
| Pliocene      | 1.8-5.3 Ma | Breaching and erosion of Pioneertown basalts by proto-Pipes Wash drainage.<br><br>Renewed uplift of San Bernardino Mountains (Dibble, 1975; Richmond, 1960). Major activity begins along the San Andreas fault resulting in clockwise rotation of the Little San Bernardino Mountains and the Eastern Transverse Ranges, utilizing the Pinto Mountain fault. High angle reverse faults of the Mojave Desert (Sawtooths fault complex) record under thrusting by the Little San Bernardino Mountains long the Pinto Mountain fault. (this report) |
|               |            | Cessation of extensional deformation (Glazner, 1981; Yerkes and Campbell, 1971; Atwater, 1970) with onset of compressional stresses and renewed activation of the San Andreas fault (Jahns, 1973). Possible faulting within  |

|            |            |  |
|------------|------------|--|
| Miocene    | 5.3-23 Ma  | <p>Pioneertown vicinity, with regional tilting of the Pioneertown Basalts 10 degrees to the northeast.</p> <p>Continued over-riding of subducted spreading center is marked by extrusion of the Pioneertown Basalts (Armstrong and Higgins, 1973; Burchfiel et al., 1982) between 6.8 to 9.3 Ma (Petersen, 1976; Neville, 1983). Juxtaposition of basalt deposits with the Pipes Canyon fault imply this fault served as the conduit for lava extrusion where upon reaching the surface, flowed eastward across the desert floor to their current location.</p> <p>First inferred movement of Pinto Mountain fault from deformation of sediment similar in appearance to Pioneertown Sequence adjacent to fault, (Grimes, 1986)</p> <p>A depositional hiatus (Glazner, 1981) along with pediment development marks the late Miocene (Petersen, 1976) Extensive erosion reduced surface expressions to about 45 meters of relief (Oberlander, 1972). Initial movement on the San Andreas fault and subsequent uplift of the San Bernardino Mountains is also recorded by the extensive erosion of eastern slopes (Spotila, 2002) and by the formation of grus covered pediments and development of the erosional surface preserved between the underlying Pioneertown Sequence and over lying Pioneertown lava beds.</p> <p>Terrestrial vertebrate fossils date the basin filling deposition of the Pioneertown sequence between 9.3 to 11.5 Ma (Reynolds, 1992).</p> <p>Miocene in the Mojave Desert opens with the Pacific plate spreading center consumed by the North American plate 22 Ma ago (Atwater, 1970; Jahns, 1973; Neville, 1983; Glazner, 1981; Dohrenwend, 1987)</p> |
| Oligocene  | 23-34 Ma   | <p>Basin development and surface irregularities testify to continued subduction of the Pacific oceanic crust by the North American plate and the resulting uplift of the Mojave Desert (Crowell, 1981; Glazner, 1981).</p>   |
| Cretaceous | 75-90 Ma   | <p>Intruding the Precambrian Baldwin Gneiss, the Quartz monzonite basement exposed within the Pioneertown region date to the late Cretaceous (Miller and Morton, 1980) between 75 to 90 Ma ago (Silver, 1971).</p>   |
| Jurassic   | 160-170 Ma | <p>Andean-type volcanic arcs forming during the Jurassic, accompanied by granitic intrusions that prevailed throughout this region into the Cretaceous (Burchfiel et al., 1982; Silver,</p>  |

1971). Lead-alpha ratios in zircon indicate an age range of 90-96 Ma (Petersen, 1976).

Marine deposition occurred prior to the Mesozoic (Hollenbaugh, 1970; Silver, 1971; Wilson, 1985)

|             |         |  |
|-------------|---------|--|
| Precambrian | 600+ Ma | Precambrian Pinto Gneiss composes the crustal foundation within the Little San Bernardino Mountains (Jennings, 1977; Hollenbaugh, 1970). Localized roof pendant outcrops exposed in Pioneertown region equate to Baldwin Gneiss (Lowman, 1989) dating to 1.75 Ga ago (Silver, 1971). |
|-------------|---------|--|

### Cited references

Armstrong, R. L., and Higgins, R. E., 1973, K-Ar dating and the beginning of Tertiary volcanism in the Mojave Desert, California: Geological Society of America Bulletin, Vol. 84, p. 1095-1100.

Atwater, T., 1970, Test of new global tectonics: discussion: American Association of Petroleum Geologist Bulletin, v. 56, p. 385-388.

Burchfiel, B. C. and Davis, G. A., 1981, Mojave Desert and Environs: in Ernst, W. G., ed., The geotectonic development of California: Rubey Volume 1, Prentice-Hall, p. 217-252.

\_\_\_\_\_, Lipman, P. W., Eaton, G. P., and Smith, R. B., 1982, The Cordilleran orogen: conterminous U. S. sector: in Palmer, A. R., ed., Perspectives in Regional Geological Synthesis, Geological Society of America D-NAG Special Publications, p. 91-98.

Crane, D., J., 2010, An Examination of the Surface Rupture Gap in the Landers Earthquake between Johnson Valley and Eureka Peak Faults, San Bernardino County, California (part 1 of 2), Pacific Petroleum Geology; Pacific Section, American Association of Petroleum Geologist, November-December, p. 12-14.

\_\_\_\_\_, 2011, An Examination of the Surface Rupture Gap in the Landers Earthquake between Johnson Valley and Eureka Peak Faults, San Bernardino County, California (part 2 of 2), Pacific Petroleum Geology; Pacific Section, American Association of Petroleum Geologist, January-February, p. 8-12.

Crowell, J. C., 1981, An outline of the tectonic history of southeastern California: in Ernst, W. G., ed., The geotectonic development of California: Rubey Volume 1, Prentice-Hall, p. 583-600.

Dibblee, T. W., 1967, Geologic map of Joshua Tree quadrangle, San Bernardino and Riverside Counties, California: U. S. Geological Survey Miscellaneous Geological Investigation Map I-516.

\_\_\_\_\_, 1975, Lat Quaternary uplift of the San Bernardino Mountains on the San Andreas and related faults, in Crowell, J. C., ed., San Andreas Fault in southern California: California Division of Mines and Geology Special Report 118, p. 127-135.

Dohrenwend, J. C., 1987, Basin and Range: in Graf, W. L., ed., Geomorphic Systems of North America: Geological Society of America Centennial Special Volume 2, p. 303-342.

Goode, J. W.; Vervoort, J. D.; Fanning, C. M.; Brecke, D. M.; Farmer, G. L.; Williams, I. S.; Myrow, P. M.; DePaolo, D. J. (2008). "*A positive test of East Antarctica-Laurentia juxtaposition within the Rodinia supercontinent*" (PDF). Science. **321** (5886): 235–240.

Gabriel, K., Yule, D., and Heermance, R.V., 2016, Preliminary late Pleistocene slip rate for the western Pinto Mountain fault, Morongo Valley, southern California., Poster presentation at the 2016 SCEC Annual Meeting.

Glazner, A., 1981, Cenozoic evolution of the Mojave block and adjacent areas: unpublished Ph.D. dissertation, University of California, Los Angeles, 170 p.

Grimes, G. J., 1986, Geology of the convergence of the Pinto Mountain Fault and Morongo Valley Fault, southern California [M.S. Thesis]: University of California, Los Angeles, 102 p.

Hollenbaugh, K. M., 1970, Geology of a portion of the north flank of the San Bernardino Mountains, California: Geological Society of America Abstracts with Program, v.2, p. 103.

Jahns, R. H., 1973, Tectonic evolution of the Transverse Ranges province as related to the San Andreas fault system: *in* Kovack, R. L, and New, A., eds., Proceedings of the Conference on Tectonic Problems of the San Andreas Fault System, Stanford University Press, Geological Sciences, v. xiii, p. 149-170.

Lowman, J. E., 1989, Geology of the Pioneertown Basalts, San Bernardino County, California: California [M.S. Thesis]: University of California, Los Angeles, 102 p.

Miller, F. K., and Morton, D. M., 1980, Potassium-argon geochronology of the Eastern Transverse Ranges and Southern Mojave Desert, Southern California: United States Geological Survey Professional Paper 1152, 30 p.

Neville, S. L., 1983, Late Miocene alkaline volcanism, south-central Mojave Desert and northeast San Bernardino Mountains, California: [M. S. Thesis]: University of California, Riverside, 156 p.

Oberlander, T. M. 1972, Morphogenesis of granitic boulder slopes in the Mojave Desert, California: *Journal of Geology*, v. 80, p. 1-19.

Owen, L. A., Finkel, R. C., Minnich, R. A., Perez, A. E., 2003, Extreme southwestern margin of Late Quaternary glaciation in North America: Timing and controls, *Geology*; August 2003; v. 31; no. 8; p. 729-732.

Petersen, R. M. 1976, Patterns of Quaternary denudation and deposition at Pipes Wash (Mohave Desert), California: unpublished Ph.D. dissertation, University of California, Riverside, 279 p.

Reynolds, R. E., 1992, The Tertiary Pioneertown Sequence; San Bernardino County Museum, Riverside Special Publication 92-2.

Richmond, J. F., 1960, Geology of the San Bernardino Mountains north of Big Bear Lake, California: California Division of Mines and Geology Special Report 65, 68 p.

Richard, S. M. 1993, Palinspatic reconstruction of southeastern California and southwest Arizona: *Tectonics*, Vol. 12, p. 830-854.

Silver, L. T., 1971, Problems of crystalline rocks of the Transverse Ranges: Geological Society of America Abstracts with Programs, v.3, p. 193-194.

Spotila, James A. and House, Martha A. and Blythe, Ann E. and Niemi, Nathan A. and Bank, Gregory C. (2002) Controls on the erosion and geomorphic evolution of the San Bernardino and San Gabriel Mountains, southern California. In: Contributions to crustal evolution of the southwestern United States. Special papers (Geological Society of America). No.365. Geological Society of America, Boulder, CO, pp. 205-230.

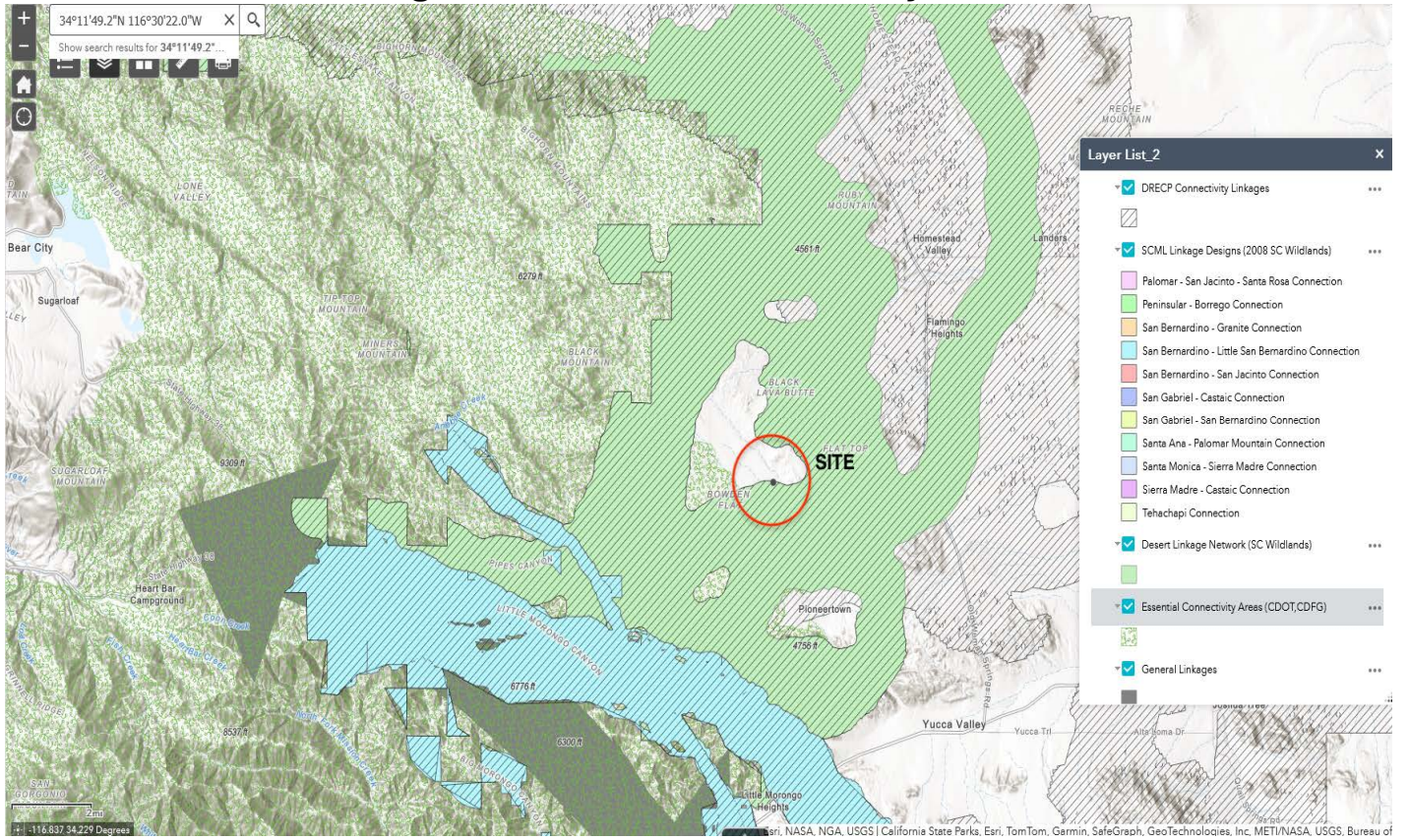
Turner, J. F. and Verhoogen, J. 1960: *Igneous and Metamorphic Petrology*. McGraw-Hill Book Company, New York.

Vaughn, F. E., 1922, Geology of the San Bernardino Mountains north of San Gorgonio Pass: California University Publications, Geological Science, v. 13, p. 3119-4110.

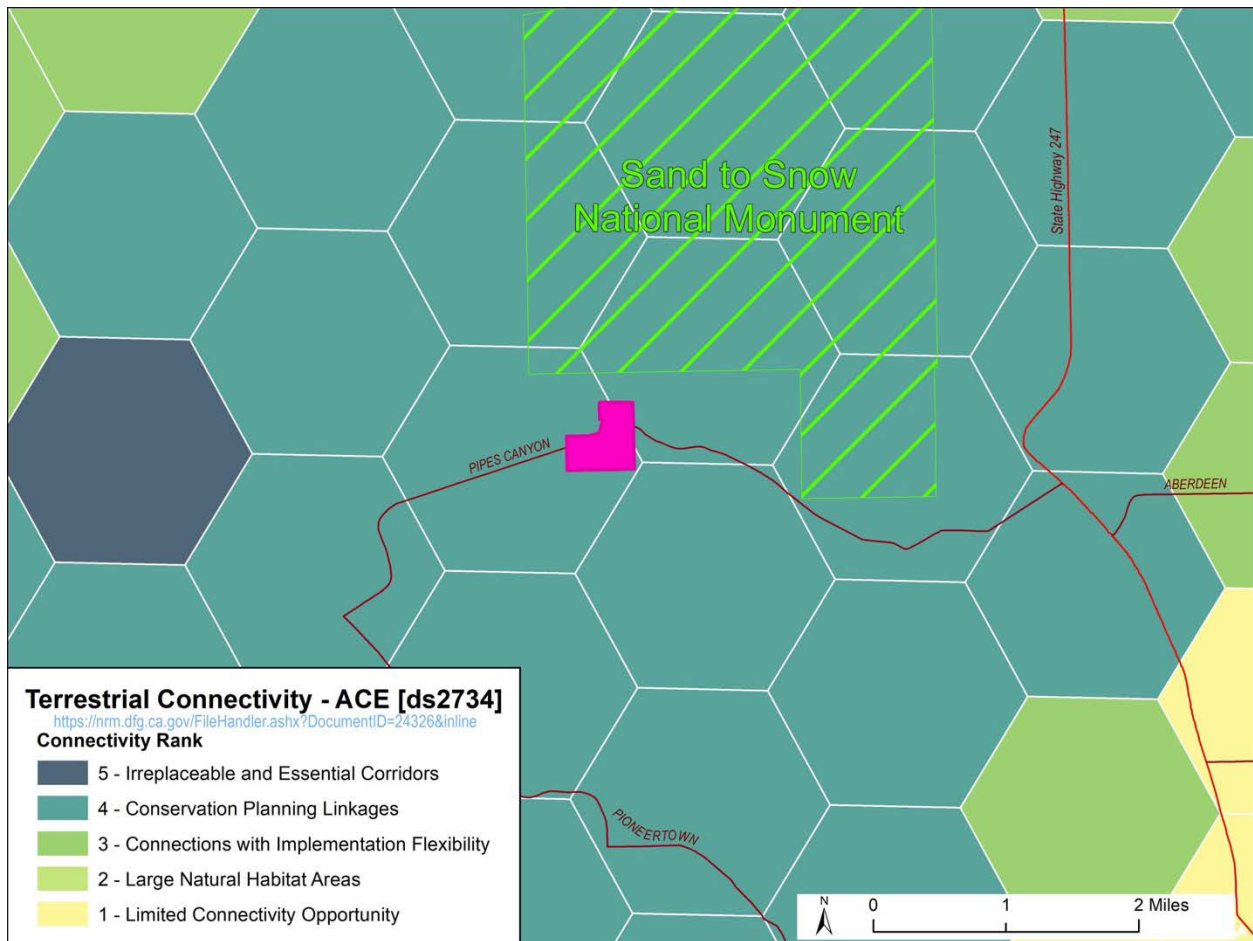
Wilson, S. O., 1985, Pre-plutonic structure and stratigraphy of the Little Shay Mountain area, San Bernardino Mountains, San Bernardino County, California [M.S. Thesis]: University of California, Riverside, 194 p.

Yerkes, R. F., and Campbell, R. H., Cenozoic evolution of the Santa Monica Mountains, Los Angeles basin area: Geological Society of America Abstracts with Programs, v. 3, p. 222-223.

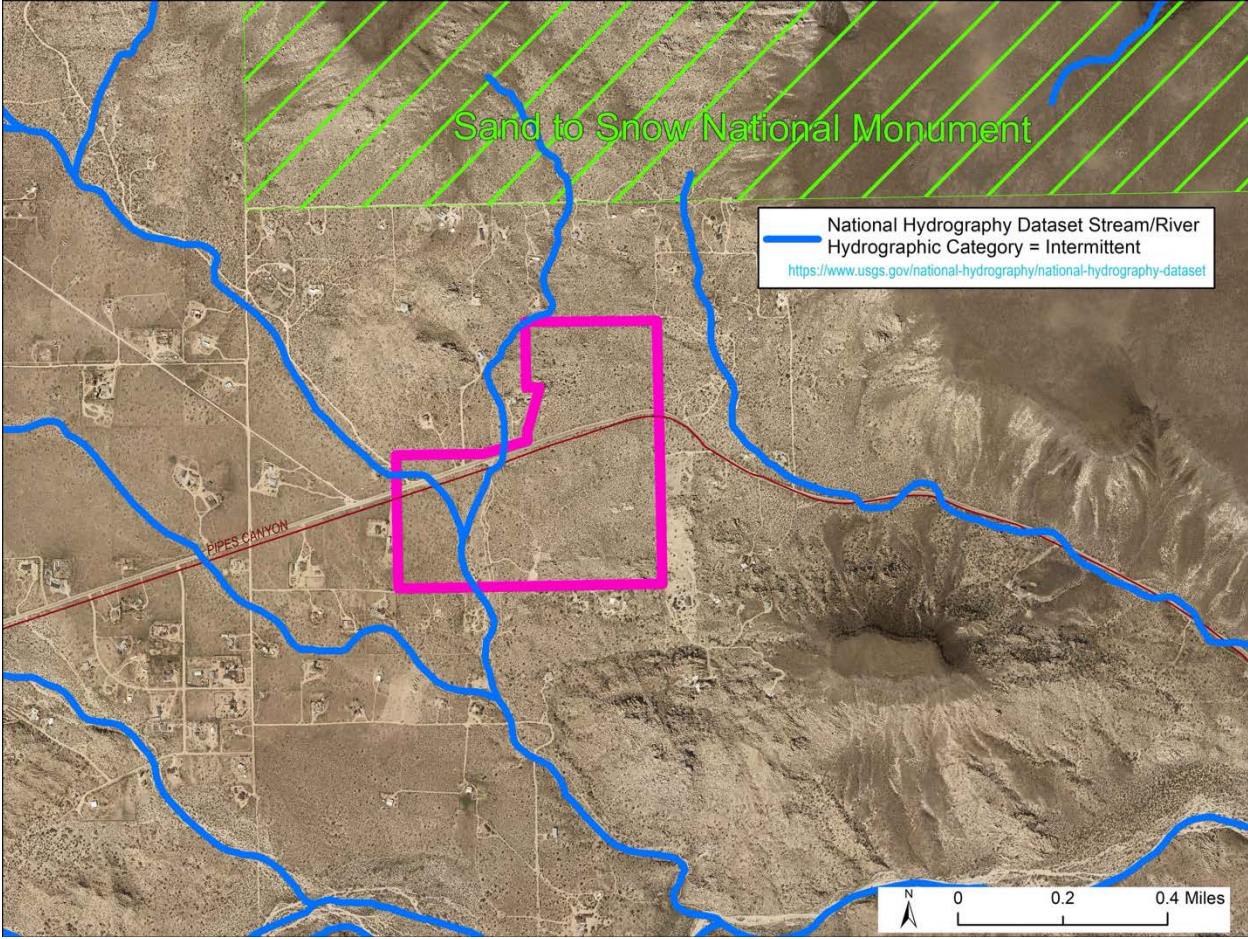
**Figure 5: Terrestrial Connectivity 1**



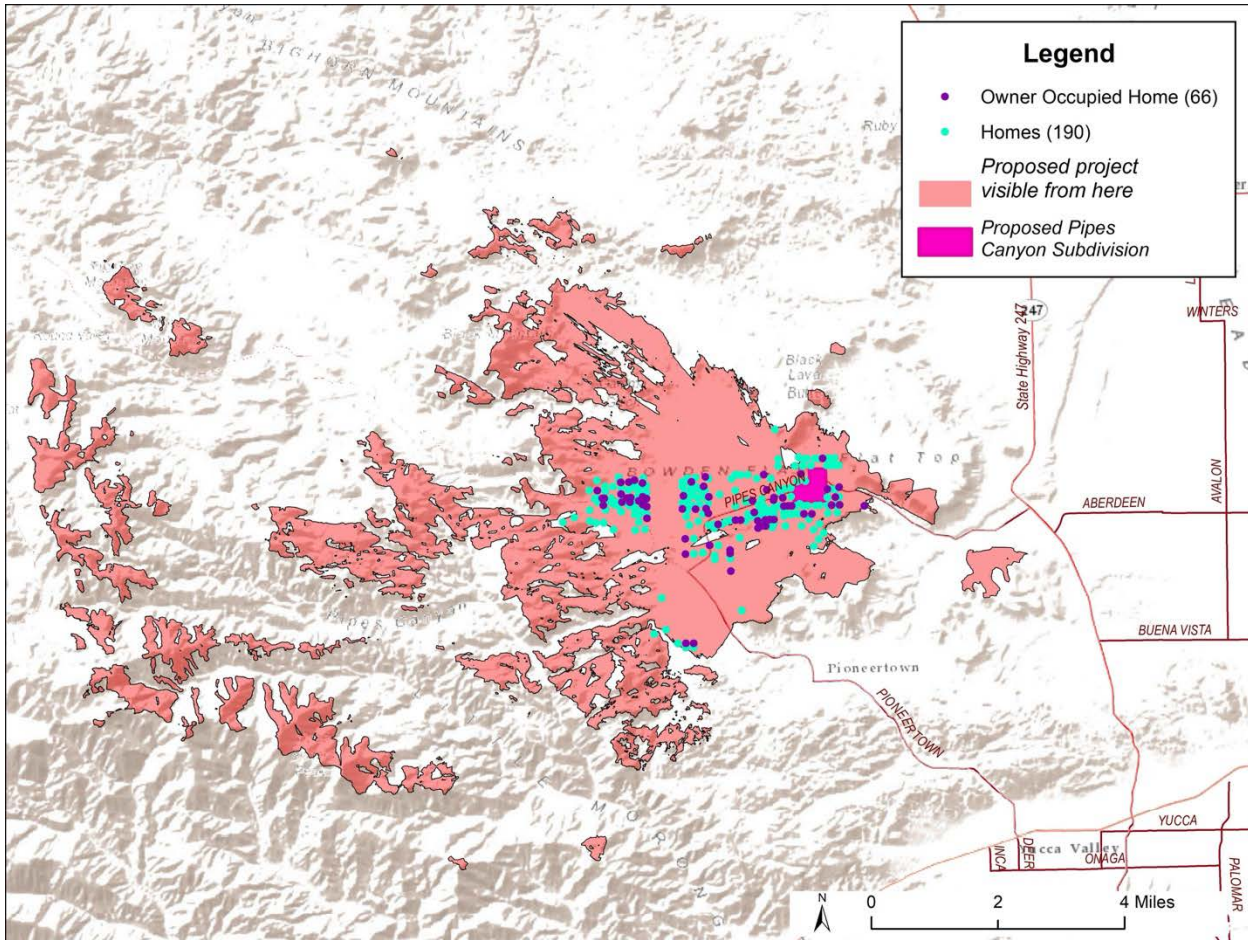
**Figure 6: Terrestrial Connectivity 2**



**Figure 7: Blue Line Streams within Pipes Canyon Subdivision**



**Figure 8: Regional view of Pipes Canyon Subdivision**



## Methodology for Viewshed

### Proposed Project Viewshed calculation

A viewshed raster was created in ESRI Spatial Analyst using the “Viewshed 2” tool. The Input vantage points are a selection of 12 points along the perimeter of the proposed site. These points were assigned 36’ heights based on the allowable roof height for this zoning under SBCO Building Codes.

An interpolated thirty-foot DEM was used for ground surface elevations. For calculations inside the “Viewshed 2” potential roof heights were used indicated as OFFSETA [Surface offset] inside the point shapefile. A value of 5.25 (5 foot 3 inches) was used as OFFSETB [Observer offset]. The methodology used to calculate observer height was the standing height of an average US male (5 feet 9.5 inches, Centers for Disease Control and Prevention between 2007 and 2010<sup>1</sup>) less a distance of 6.5 inches for the distance from the top of the observer’s head to the eyes.

The output raster integer type image from the “Viewshed 2” was converted to a polygon geospatial file. That shapefile is shown on the map.

## **Figure 9: Resolution #2020-197**

### **RESOLUTION NO. 2020-197**

#### **A RESOLUTION OF THE SAN BERNARDINO COUNTY BOARD OF SUPERVISORS AMENDING THE COUNTY GENERAL PLAN BY APPROVING THE COUNTYWIDE PLAN, POLICY PLAN TEXT, LAND USE DESIGNATION MAP, AND VARIOUS POLICY MAPS AND APPROVING THE COUNTYWIDE PLAN, BUSINESS PLAN TEXT**

On Tuesday October 27, 2020, on motion of Supervisor Rowe, duly seconded by Supervisor Gonzales and carried, the following resolution is adopted by the Board of Supervisors of San Bernardino County, State of California.

WHEREAS, the Countywide Vision was adopted by the Board of Supervisors in 2011 and serves as the guiding set of goals for the Countywide Plan; and

WHEREAS, the Countywide Plan is designed to serve as the comprehensive general plan for the County of San Bernardino ("County"); and

WHEREAS, the Countywide Plan consists of the following components: the Policy Plan which contains the required and optional elements of a general plan and their goals and policies as legally mandated by State law, with the exception of the previously adopted Housing Element and the Renewable Energy and Conservation Element; and the Business Plan which contains the Governance Element, Implementation Plan, Tracking and Feedback Program, and the Regional Issues Forum; and

WHEREAS, the Policy Plan and the Business Plan are policy components of the Countywide Plan and were designed to be internally consistent and used together to guide the County's actions in order to achieve the Countywide Vision; and

WHEREAS, a Program Environmental Impact Report ("PEIR") (SCN 2017101033) was prepared for the Countywide Plan which adequately discussed the impacts of the project and indicates that significant environmental impacts will result; and

WHEREAS, a Final PEIR was prepared for the Countywide Plan in compliance with the California Environmental Quality Act ("CEQA") and the State CEQA Guidelines; and

WHEREAS, on October 27, 2020, the Board of Supervisors reviewed, studied, and found that the environmental documentation of the project complied with CEQA and certified the Final PEIR prepared for the Countywide Plan, making environmental findings pursuant to CEQA, adopting a Statement of Overriding Considerations, and adopting a Mitigation Monitoring Program; and

WHEREAS, Section 65358 of the California Government Code requires that any mandatory element of a general plan shall be amended no more than four times during any calendar year; and

WHEREAS, the Countywide Plan contained in this Resolution constitutes the third amendment to the San Bernardino County General Plan during 2020; and

WHEREAS, the San Bernardino County Planning Commission and Board of Supervisors have

conducted legally noticed public hearings during which the Countywide Plan was considered and testimony received; and

WHEREAS, all other legal prerequisites to the adoption of this Resolution have occurred.

NOW THEREFORE, BE IT RESOLVED, that the Board of Supervisors hereby declares the following:

**SECTION 1.** The Board of Supervisors finds and determines that the foregoing recitals are true and correct and are incorporated by reference herein as if stated in full.

**SECTION 2.** The Board of Supervisors certifies the Final PEIR based on the following findings and conclusions:

- a) The Final PEIR for the Countywide Plan has been completed and processed in compliance with the requirements of CEQA and State CEQA Guidelines; and
- b) The Final PEIR was presented to the Board of Supervisors, and the Board of Supervisors as the decision-making body of the County reviewed and considered the information contained in the Final PEIR prior to approving the proposed project; and
- c) The Final PEIR reflects the Board of Supervisors independent judgement and analysis.

**SECTION 3.** The Board of Supervisors approves the Countywide Plan and hereby adopts the Countywide Plan (Policy Plan) as the updated general plan of the County. By adopting the Countywide Plan and all its components, the Board of Supervisors amends the County's 2007 General Plan (text and maps) in its entirety as follows, with the exception of the previously adopted Housing Element and the Renewable Energy and Conservation Element which are hereby incorporated into the Countywide Plan in their approved form:

- a) The Countywide Plan text located in Attachment "A" is adopted and is incorporated by reference herein as if stated in full.
- b) The following is a list of Land Use Designations adopted by this Resolution and applied to unincorporated County properties by the Policy Plan Map, LU-1 (Land Use Map):

| <u>Land Use Designation Prefix</u> | <u>Land Use Designation Name</u> |
|------------------------------------|----------------------------------|
| RL                                 | Rural Living                     |
| VLDR                               | Very Low Density Residential     |
| LDR                                | Low Density Residential          |
| MDR                                | Medium Density Residential       |
| C                                  | Commercial                       |
| IL                                 | Limited Industrial               |
| IG                                 | General Industrial               |
| PF                                 | Public Facility                  |
| RLM                                | Resource Land Management         |
| OS                                 | Open Space                       |
| SD                                 | Special Development              |

- c) All 2007 General Plan Maps are rescinded by this Resolution and replaced by the web-based maps located on the Countywide Plan official website and included for reference in Attachment "B".

**SECTION 4.** Based on the entire record before the Board of Supervisors and all written and oral evidence presented, and the findings made in this Resolution, the Board of Supervisors concludes as follows:

- a) That the Countywide Plan promotes the goals and objectives of the County of San Bernardino and is consistent with the Countywide Vision; and

- b) The Countywide Plan is a long-term, compatible, integrated, and internally consistent statement of polices relating to the development of a complete community concept and a sustainable county; and
- c) All aspects of the Countywide Plan (Policy Plan) are found to be consistent and in compliance with Government Code Section 65300 et seq.; and
- d) The Policy Plan text amendment is internally consistent with all other provisions of the Policy Plan and any adopted specific plan; and
- e) The Policy Plan text amendment would not be detrimental to the public interest, health, safety, convenience, or welfare of the County; and
- f) The Land Use Designation changes included within the Policy Plan are in the public interest, there will be a community benefit, and other existing and allowed uses will not be compromised; and
- g) The Land Use Designation changes included within the Policy Plan will not have a substantial adverse effect on surrounding property.

**SECTION 5.** The Board of Supervisors hereby approves the two map system for the County, consisting of the Land Use Map (LU-1) which identifies all property in the unincorporated County with a Land Use Designation which complies with and is consistent with the goals and polices contained in the Policy Plan, and a Zoning Map which, when adopted, will classify all property in the unincorporated County with a zone which is consistent with the Land Use Designation for the property and compliant with San Bernardino County Development Code (“Development Code”) requirements.

**SECTION 6.** The Board of Supervisors hereby determines that until such time as a Zoning Map is approved by the Board of Supervisors (referred to herein as the “interim period”), the following interim procedures for determining Policy Plan (General Plan) consistency and how properties in the unincorporated County can be used and/or developed will be in affect:

- a) The existing Land Use District classification for properties within the unincorporated County shall be deemed to be the Zone Classification (Zone) for each property until such time as an official Zoning Map is adopted by the Board of Supervisors. The development standards, uses, and applications identified in the current Development Code for each Zone shall remain in force during the interim period.
- b) During the interim period, in cases where a nonconformity exists between the Land Use Designation and the existing Land Use District (Zone) of a parcel, and a property owner desires to develop the land pursuant to the existing zoning of the property, a property owner may submit an application to develop in accordance with the existing zoning of the property. Applications that have been accepted as complete, in compliance with State law (Government Code Section 65943), by the County before the effective date of the updated Zoning Map, shall be processed pursuant to the existing Land Use District (Zone), regulations, and requirements for the property in effect at the time the application was accepted as complete. If an application is accepted as complete, the application must be pursued in good faith by the owner until a final action by the County has been made, but in no case longer than the time period provided in subsection (g), below. If approved, an entitlement must be vested (development begun or use commenced) prior to the initial expiration date as determined by the regulations and requirements in effect at the time of approval. If no application is submitted or if the entitlement has not been vested within the required timeframe, all land use actions including extensions of time must be consistent with the Land Use Designation and updated Zoning Map for the parcel.
- c) During the interim period, if a nonconformity exists between the Land Use Designation and the Land Use District (Zone) of a parcel, and a property owner desires to use or develop their property in conformance with the Land Use Designation, a property owner may submit an application

for a zone change consistent with the Land Use Designation along with the appropriate development or use application for approval by the County.

d) If a Zone classification does not exist for implementing the Land Use Designation, the County’s Planning Director or the Zoning Administrator, will determine which existing Land Use District (Zone) best achieves the purpose of carrying out the intent of the Land Use Designation and utilize that zone to apply development standards, until such time as an official Zoning Map is adopted by the Board.

e) Once a new Zone Map has been adopted by the Board of Supervisors or the time limits set forth in Section 5(b), if applicable, have expired, the interim period provisions will be terminated. Thereafter, all use and development applications must be consistent with the Policy Plan text, the Land Use Designation Map, and be implemented through the application of the Zone Map and applicable provisions of the Development Code. After the termination of the interim period, the County shall deny any use or development application that is not consistent with the Land Use Designation and applicable Zone Map.

f) If a nonconformity exists between the Land Use Designation and the Zone for a property after adoption of the new Zone Map, the County will, upon notification of such situation, determine the most appropriate Zone classification for the property, consistent with the Land Use Designation and in conformance with the Zone definitions, and, if necessary, recommend an update to the Zone Map to ensure consistency.

g) After the termination of the interim period, all formally submitted applications which have been deemed complete and are in the process of being reviewed for approval by the County shall have one year to be acted upon by the initial review authority. If not acted upon by that time period, the application shall be deemed to be denied with prejudice.

**SECTION 7.** The Policy Plan (general plan) adopted by this resolution shall be effective 30 days after its adoption.

PASSED AND ADOPTED by the Board of Supervisors of the County of San Bernardino, State of California, by the following vote:

|         |              |   |
|---------|--------------|---|
| AYES:   | SUPERVISORS: | Robert A. Lovingood, Janice Rutherford, Dawn Rowe,<br>Curt Hagman, Josie Gonzales |
| NOES:   | SUPERVISORS: | None  |
| ABSENT: | SUPERVISORS: | None  |

**Figure 10: Water Basin Serving Pipes Canyon Subdivision**

