

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form*. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

DRAFT

1. Name of Property

Historic name: Judson and Brown Ditch
 Other names/site number: PSBR-22-H: Redlands Canal, Bear Valley Canal, Redlands Ditch
 Name of related multiple property listing:
N/A
 (Enter "N/A" if property is not part of a multiple property listing)

2. Location

Street & number: see Verbal Boundary Description
 City or town: Redlands State: California County: San Bernardino
 Not For Publication: Vicinity:

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property meets does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

national statewide local
 Applicable National Register Criteria:
 A B C D

| | |
|--|-------------------------------|
| <p>_____ Signature of certifying official/Title:</p> | <p>_____ Date</p> |
| <p>_____ State or Federal agency/bureau or Tribal Government</p> | |

| | |
|--|-------------------------------|
| <p>In my opinion, the property <input type="checkbox"/> meets <input type="checkbox"/> does not meet the National Register criteria.</p> | |
| <p>_____ Signature of commenting official:</p> | <p>_____ Date</p> |
| <p>_____ Title : State or Federal agency/bureau or Tribal Government</p> | |

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4. National Park Service Certification

I hereby certify that this property is:

- entered in the National Register
- determined eligible for the National Register
- determined not eligible for the National Register
- removed from the National Register
- other (explain:) _____

Signature of the Keeper

Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

- Private:
- Public – Local
- Public – State
- Public – Federal

Category of Property

(Check only **one** box.)

- Building(s)
- District
- Site
- Structure
- Object

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Number of Resources within Property

(Do not include previously listed resources in the count)

| Contributing | Noncontributing | |
|---------------|-----------------|------------|
| _____ | _____ | buildings |
| _____ | _____ | sites |
| _____ 1 _____ | _____ 2 _____ | structures |
| _____ | _____ | objects |
| _____ 1 _____ | _____ 2 _____ | Total |

Number of contributing resources previously listed in the National Register 0

6. Function or Use

Historic Functions

(Enter categories from instructions.)

AGRICULTURE/SUBSISTENCE: irrigation facility

Current Functions

(Enter categories from instructions.)

LANDSCAPE: unoccupied land

VACANT/NOT IN USE

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7. Description

Architectural Classification

(Enter categories from instructions.)

OTHER: lined canal

Materials: (enter categories from instructions.)

Principal exterior materials of the property: stone/granite, concrete

Narrative Description

(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with a **summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The nominated portion of the Judson and Brown Ditch starts in the northeastern corner of Redlands and is the northernmost 1.6 miles of a larger 5-mile irrigation system built in 1881. The resource begins as the Santa Ana Tunnel under the Santa Ana River and continues as an open ditch through the Redlands Conservancy parcel that has protected it from agricultural and commercial development. The tunnel is located in the southwest corner of Section 4, T1S, R2W of the San Bernardino Meridian-Baseline where it was constructed to carry water in a southwesterly route from under the river bed to a weir box, hereafter referred to as the Gateway, located in the northeast quadrant of Section 8, T1S, R2W of the San Bernardino Meridian-Baseline. The Santa Ana Tunnel is lined with boulders and is completely enclosed, though a small access point was created at the emergent end next to Greenspot Road. It is three feet tall with a top arch of about a 1.5 foot radius inside. Similarly, the open trench that carries the water from the gateway is three and a half feet deep: two feet wide on the bottom and five feet wide at the top. The whole system—tunnel and ditch—has a cobblestone-lined bottom and sides that were then paved and smoothed over to reduce water ripple and leakage (Walcott 1899:579). The Morton Canyon Tunnel (no longer extant) was also constructed as part of this irrigation system and flowed to the same gateway. The open portion of the Judson and Brown Ditch continues southwest to the southern border of the Redlands Conservancy parcel, north of the Mentone Citrus Orchard (Schmidt 2008:2). Due to the lack of surrounding development, the portion of the

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resource located on Redlands Conservancy land is the most visually prominent. The Judson and Brown Ditch consists of both the Santa Ana Tunnel and the open canal portions since they were built simultaneously and for the same purpose. Redwood flumes were also used, and are no longer extant. Water still flows through the tunnel, though it is carried over to the gateway in a pipeline under the Greenspot Bridge rather than a flume. The open ditch is no longer in use, though the portion that runs through town has been turned into a pipeline and is still in use (Atchley 2012: 8). The Judson and Brown Ditch is quite weathered, with some portions showing evidence of brush fires. It maintains all aspects of integrity.

Narrative Description

The Judson and Brown Ditch, including the Santa Ana Tunnel, is one contributing resource. Two noncontributing resources include the Gateway, a modified weir with insufficient integrity, and the Greenspot Bridge, constructed after the period of significance.

The Judson and Brown Ditch begins as a subterranean Santa Ana Tunnel that was constructed in the southwest corner of Section 4 under the river bed, crosses what became Greenspot Road, and heads south across the river, originally in a flume no longer extant (**Photo 1**). The trajectory then continues to the northeast quadrant of Section 8, T1S, R2W of the San Bernardino Meridian-Baseline, where it met the Morton Canyon Tunnel at the Gateway (Beattie 1951:15). This tunnel was built on bedrock under the Santa Ana River from the Morton Valley in the northwest quadrant of Section 9 to a weir in the northeast quadrant of Section 8 (Walcott 1899: 580) (**Figure 1**) The Gateway that lies directly to the east of Greenspot Road before Greenspot Bridge crosses the river was modernized circa 1995 and remains easily identifiable as the meeting point of the two tunnels and the beginning of the open ditch (**Photo 2**). The water flowed from the tunnel to the Gateway in a flume across the river. The flume has since been replaced with a pipeline under the bridge (**Photo 3**). The tunnel is lined with boulders and is three feet tall with a top arch of about a 1.5 foot radius inside, and was built in order to increase water flow to the land below via these flumes and the ditch (Walcott 1899: 580) (**Photo 4**). The balance of the nominated portion of the resource is a lined canal that begins at the mouth of the Santa Ana River canyon in the northeast quadrant of Section 8, where the Santa Ana Tunnel and the no longer extant Morton Canyon Tunnel met (**Figures 2, 3, and 4**).

The open ditch continues along the east side of Greenspot Road, cuts under the road north of Mill Creek, and would have crossed Mill Creek in a flume, now a pipeline. It continues through the lower southeast corner of Section 18, T1S, R3W. The ditch nearly bisects Section 19 as it continues southwest. The ditch was constructed through Section 25 that lays in east Redlands following a southwest trajectory, but only fragments of the ditch remain. West of Crafton School and the intersection of Sylvan Boulevard and Wabash, the ditch followed the remnants of the Maria Armenta Bermudez irrigation ditch of 1840s to Section 35. In Section 35 at the mouth of Reservoir Canyon, sometimes called Yucaipa Canyon, the ditch ended, delivering water to the reservoir in the area known since 1963 as Ford Park (Hall 1888: 168). The nominated portion of the ditch extends from the Santa Ana Tunnel in the San Bernardino Municipal Water District to the southern boundary (**Figure 5**) of Redlands Conservancy land. The Judson and Brown Ditch

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was dug some three and a half feet deep; two feet wide on the bottom and five feet wide at the top.

Integrity

The resource retains historic integrity in terms of location, design, setting, workmanship, feeling, and association, with a minor loss of materials in terms of the wooden covers that once sheltered the open ditch.

Location:

The resource maintains integrity of location, with the best preserved section of the canal remaining on Redlands Conservancy land (**Figures 4 & 5**). It is easily identified through aerials as the “most torturous” section of the entire construction, as described by Hall in his book about irrigation systems in Southern California, until it straightens out at the Sycamore Divide. Once the wash was traversed, construction went smoothly and right-of-way contracts were signed allowing passage (Hall 1888: 170) (**Figure 6; Photos 5-8**). The Conservancy zone attracts very little foot traffic and is only accessible to the public through a permit issued by the San Bernardino County Flood Control District. The two roads in the area are rarely used. The first is the San Bernardino Flood Control Road that is the only one that cuts through the ditch. The other road in the area is Greenspot Road. It grants a view of the Santa Ana Tunnel, as the trench begins to surface on the east side of the road and is then fully exposed on the west side (Hall 1888:171) (**Figure 7**). Mill Creek is the last element that transects the ditch. Originally, Judson and Brown built a flume to traverse the creek. The ditch was never moved or made to take a straighter course, but rather it was abandoned and its parallel counterpart was improved. Since its abandonment, the flumes disappeared and a pipeline was built. The remaining portion of the ditch south of Conservancy land is still visible in various parts of town. Due to its fragmentation, it is not included in the nomination. The water now flows through a pipeline through town, though portions of the original ditch and the ditch's trajectory are visible.

Design: The ditch was designed to transfer 400 inches of water, with an overall gravity fall of .02 inches for every 100 feet ...and did so without loss (Riverside Press and Horticulturalist [RPH], 2 July 1881:3; Hall 1888: 170). Both the tunnel and open ditch have cobblestone-lined bottoms and sides that were then paved across and smoothed over the surface to reduce water ripple and leakage. The cement and the cobblestones are still intact along the trajectory of the nominated portion of the ditch and the tunnel. The ditch also employed redwood flumes, the longest being built above Mill Creek, a tributary of the Santa Ana River. A flume connected the Santa Ana Tunnel water to the gateway before the 1912 Greenspot Bridge was constructed. None of the flume work survives. The Judson and Brown Ditch was improved by deepening the ditch and reinforcing the flume sections to carry more water during the second year of use. A cover was placed over the canal to keep small animals and children from falling into the rushing water that is also no longer extant (Beattie 1951:15).

Setting: The San Bernardino Valley was, and remains, an arid region with an elevation of about 1,300 to 2,300 feet in the southwestern Mojave Desert in San Bernardino County, California (Schmid 2008: 2). Water falls between November and April, and the remaining months are hot

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and dry, that dries the rivers (RPH 10 Oct 1881: 2). The surrounding vegetation is typical of areas with little rainfall, including plants like pure chamise, though the foliage varies throughout from juniper, to sagebrush, to evening primrose and buckwheat. Also in the area are needlegrass and wild oat (Schmid 2008: 3). Based on some geologic analysis, it was determined that subsurface deposits consist of poorly graded sand with granitic cobbles and boulders (Schmid 2008: 3; Altschul et al.1984: 7).

Materials: The Judson and Brown Ditch maintains its configuration of stone and concrete within the nominated boundary. Despite the loss of the wooden covers that once protected the open ditch from debris, the stone and concrete materials are still sufficient to hold water. The Santa Ana Tunnel maintains integrity of all of its materials, as it was covered with stone and concrete.

Workmanship: The tunnel is in its original state, with little improvements made to the exterior. Greenspot Road was built on top of one portion, though the tunnel remains unobstructed underneath. Since water is still flowing through it today, this may indicate that a modern pipeline is placed inside, but no references were found to prove this. The cobblestones and the cement that make up the tunnel has remained relatively unknown by the community, perhaps due to the heavy vegetation growing alongside the road, and it has been left alone by loiterers and vandals. The canal also maintains its integrity with respect to workmanship, especially in the Redlands Conservancy parcel. Besides some heavy vegetation and subsequent brush fires, there has been no damage to the cobblestones and cement paving. The portion closest to Greenspot Road though, has been subject to some littering and exposure to human activity.

Feeling: The resource has integrity of feeling due to the unobstructed views of both the Santa Ana River source and the valley below, along with the large sections of the irrigation system itself that remain intact. The trajectory of the canal and its role connecting the river to the town is obvious. There is little development around the resource which offers views of the surrounding San Bernardino Mountains and Redlands below.

Association: The resource maintains integrity of association since both its natural and manmade elements have remained intact since 1881. The landscape has remained mostly undeveloped, so it is easy to imagine that the methods the Judson and Brown used to survey the land and the manner in which construction must have taken place. The river runs the same course, as does the ditch, linking this manmade element to its original water source. For all intents and purposes, the nominated portion of the ditch could be used again, and in fact, the sealed portion (i.e., the Santa Ana Tunnel) still carries water to this day. With restoration of the portion that runs through town (that which is not nominated), the Ditch could still carry water to Redlands. The ditch still provides a link from town to the river above. The association of the ditch is also evident through the changes in its naming conventions. The historic maps (**Figures 8-15**) refer to the tunnel as the Redlands Tunnel and the Santa Ana Tunnel, but the ditch has many more names due to the changes in water flow ownership and management over time. It is known as the Judson and Brown Ditch, Redlands Canal, Bear Valley Canal, Redlands Ditch, Reservoir Ditch, and sometimes even erroneously labelled the Sunnyside Ditch. The “Redlands Ditch and the Judson and Brown Ditch, as originally built, together formed a continuous channel from the opening of

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the Santa Ana River canon southwesterly across the eastern end of the southern plain of San Bernardino Valley” (Hall 1888: 168). In 1881, the Judson and Brown was built parallel to the earlier Sunnyside Ditch of 1878 (**Figures 16-17**). It served as the domestic water supply until the Redlands, Lugonia and Crafton Domestic Water Company organized in 1887, which forced the northeastern section of the ditch to close by 1889. The Bear Valley Irrigation Company and the Redlands Water Company improved the Sunnyside Ditch by enlarging it and laying it parallel to the Judson and Brown Ditch/Redlands Canal, so that it could take over the role of the abandoned upper portion of the Judson and Brown Ditch (San Bernardino Index [SBI] 4 March 1881; Walcott 1899: 583) (**Figure 18-19**). When the Bear Valley Mutual Co. was formed, the canal from its head to its reservoir was known as the Bear Valley Canal, and maps label Judson and Brown's abandoned upper portion as such. The Sunnyside Ditch, that carried water to Lugonia, ran parallel to the south of the Judson and Brown until reaching a divide on Salerno Street, or the “Sycamore Divide,” in Mentone. At the divide, the Sunnyside water traveled due west to Lugonia along the north side of Lugonia Avenue, and went through a series of improvements under the Bear Valley ownership. See Time Series maps (**Figures 14-16**) for reference. No alterations were made to the nominated portion of the ditch system, though the names alone retain each association of ownership and management for this resource.

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8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B. Property is associated with the lives of persons significant in our past.
- C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

- A. Owned by a religious institution or used for religious purposes
- B. Removed from its original location
- C. A birthplace or grave
- D. A cemetery
- E. A reconstructed building, object, or structure
- F. A commemorative property
- G. Less than 50 years old or achieving significance within the past 50 years

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Areas of Significance

(Enter categories from instructions.)

EXPLORATION/SETTLEMENT

AGRICULTURE

COMMERCE

ENGINEERING

INVENTION

Period of Significance

1881 – 1889

Significant Dates

1881

Significant Person

(Complete only if Criterion B is marked above.)

Judson, Edward Glover

Brown, Frank Elwood

Cultural Affiliation

Architect/Builder

Judson, Edward Glover

Brown, Frank Elwood

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Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Judson and Brown Ditch is eligible for listing in the National Register of Historic Places under Criteria A, B, and C at the local level of significance. It is eligible under Criterion A in the area of Exploration/Settlement for its role in the development of Redlands, as it provided a crucial link from Santa Ana River water to the valley below once thought to be “undevelopable” (McCall 2012: 31). It is also eligible under Criterion B in the areas of Agriculture and Commerce, for its association with builders Edward Judson and Frank Brown, two young college graduates who envisioned an agricultural town in the warm San Bernardino Valley and became the founders of the community now known as Redlands, known for centuries by its orange production. The Judson and Brown Ditch is eligible under Criterion C in the areas of Engineering and Invention as the first example of a paved canal in southern California, an innovative and unprecedented idea that proved to be a model worth replicating by neighboring cities. The canal that brought water to the dry township without loss was an engineering feat and technological advancement built by Judson and Brown, two master engineers of Redlands. The Judson and Brown Ditch is an early example of these two men’s inventiveness in using surveying and grading techniques to calculate the water flow per acreage needed and using cement as a binding agent in order to minimize water loss. Though the nominated portion only functioned for eight years, the 1881 to 1889 period of significance, the Judson and Brown Ditch including the Santa Ana Tunnel was the missing link between the Santa Ana River and the arid valley below.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

The Judson and Brown Ditch was unique in its construction, making it the first successful attempt to bring enough water to Redlands. With the help of Native American and Chinese laborers under the direction of labor contractor Robert Morton, Judson and Brown began construction of their irrigation system. Workers began the construction of the Santa Ana Tunnel (extant), and the Morton Canyon Tunnel (not extant) in 1881 in order to increase water flow to the land below via the ditch (Walcott 1899: 580). These tunnels were built with the purpose of securing additional water for the Judson and Brown Ditch, the extant tunnel and ditch nominated as one comprehensive contributing resource (tunnel and open ditch) for this reason (Ingersoll 1904: 443).

Criterion A

The development of Redlands is due in great part to the ability to transport water from the Santa Ana River. Though many attempts were made to get water to the valley, the Judson and Brown Ditch built in 1881 was the first successful effort to bring residential and agricultural water to the area. Extensive water conveyance systems have been built throughout the area, in response to the

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arid valley and population growth. Systems include the Mill Creek Zanja from 1820, the Maria Armenta Bermudez Canal from 1840, and other major systems that were developed in the 1880s, including the nominated Judson and Brown Ditch and the Old Bear Valley Dam (Schmid 2008:3). Prior to the Judson and Brown Ditch, water ditches, known as *zanjas* to the locals in southern California,¹ were simply dug to divert water to nearby irrigation properties with little concern for porous sand and gravel conditions (Hall 1888: 171). Multiple canals existed using this model like the Maria Armenta in 1841, but only about 50 percent of the irrigation water ever reached its destination due to evaporation and water percolating through the bottom. Edward Judson realized this problem in 1877 during the construction of the Sunnyside Ditch, which started at the Sana Ana and flowed westward down Lugonia Avenue. After discovering that the Sunnyside Ditch was quite porous, he began envisioning a canal that could carry water to the town site of Redlands below instead of the highlands, using the subtle grade of the land and mitigating water loss.

Exploration/Settlement

When Judson met Brown, they combined efforts and sought to manifest their vision of bringing enough water to cultivate the Redlands tract. On April 9th of 1881, the two men began the construction of the irrigation system from the Santa Ana River to the Redlands Tract (RPH 9 April 1881:2). First, they filed claim for Morton Canyon surface flow and claimed the Santa Ana River wastewater. With the help of Native American workers, work began on the Morton Canyon tunnel, which developed 25 inches of water for the canal. In June of the same year, Judson and Brown had developed about 50 inches of water by cutting another short cross cut ditch about 8 feet deep and extending it down the river. This tunnel, the Santa Ana Tunnel begins underneath the river but emerges to the surface and is visible next to Greenspot Road (RPH 25 June 1881:3). From the tunnel, a flume was constructed to carry the water across the river to the gateway, where it would merge with the water from the Morton Canyon Tunnel. The Judson and Brown Ditch was constructed from this gateway to a proposed reservoir in Yucaipa Canyon. In July of 1881, the reservoir was completed and the ditch lined with red cement (Riverside Press and Horticulturalist [RPH], 2 July 1881; Walcott 1899, 580).

The canal was built and it successfully brought water from the Santa Ana River wash approximately four miles to a reservoir at the foot of Yucaipa Canyon (Hall 1888: 172). In November 26, 1881, Judson and Brown made a sale for 500 acres of Redlands Tract to help pay the men's debts due to their land purchases, tunnel work, the ditch, the reservoir, the cement, and the labor payments (Riverside Press and Horticulturalist, 26 Nov 1881). Each acre of property received a water share of the newly created Redlands Water Company. Each share could be transferred to land anywhere within the irrigation system (Atchley 2013:3). This was the first time water was sold as shares to people independent of owning land. Even though this land sale was one of the largest of the year, the \$19,000 did not cover all the expenses (Scott 1976:26). Judson and Brown were delivering water by 1882, but they needed more water to sell more land, and they turned to Big Bear Valley and the prospects of building a dam. The Old Bear Valley

¹ Per the Oxford University Press, translated from Spanish as ditch, trench, or irrigation channel.

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Dam was completed in 1884, and in 1886 more and more groups from the east coast, like the Chicago Colony, arrived and plotted their sites.

Along the foothills of the southern rise of the San Bernardino Range, sheltered by the mountains from the north winds of the passes and the heat of the desert, high enough to escape damaging frosts and beyond the reach of the fogs that roll inland from the coast, there lay in 1881 a stretch of bare, reddish mesa and upland...The land was divided into tracks...wide avenues and cross streets were laid off with shade trees planted along the thoroughfares, and a town site, with a plaza, was laid out in the center of the tract (Brown and Boyd 1922:201).

By 1888, Redlands had incorporated (Gonzalez 2006:7). The Judson and Brown Ditch of 1881 enabled thousands of acres of otherwise arid land to be irrigated with minimal loss of water in the delivery system. By 1897, Redlands “had grown to a community of 5,000 people, its citrus groves being estimated to produce about 1,200 carloads of fruit per annum, worth probably \$1,000,000. It is doubtful if this locality can be equaled for beauty, productiveness, progress, or wealth per acre anywhere west of the Mississippi River. Its development is a monument to the physical conditions of the district and to the energy of its people” (Walcott, 579).

Criterion B

The importance of Frank Elwood Brown and Edward Glover Judson cannot be underestimated as they established the community of Redlands by bringing water to the area. Scipio Craig, editor of the *Citrograph* wrote in 1889 that Frank Brown was “in a broad sense...the creator of the east San Bernardino Valley” (Gonzalez 2006:5). Brown, a graduate of Sheffield College in scientific agriculture, civil engineering, and mechanical engineering, was a compulsive surveyor, carrying a tripod and survey scope everywhere he traveled (Atchley 2013:2). Brown measured the altitude of various points of the San Bernardino Valley, Mount San Gorgonio, and Santa Ana River and tributaries. When he realized that the river was slightly higher than Prospect Park at the corner of Highland and Cajon, it was obvious that water would run downhill...“and thus Redlands was conceived” (McCall 2012: 32). His measurements ultimately led to a gravity flow irrigation system that could irrigate land forty miles away from the Bear Valley Dam of the San Bernardino Mountains.

Agriculture

Brown met Judson in 1877 at Crafton Retreat, just east of what became Redlands. Judson, a stock-broker from New York with a business education from Amherst, was working as an accountant and labor manager for the construction of the Sunnyside Ditch at the mouth of the Santa Ana River to Lugonia (McCall 2012: 31). Judson and Brown formed a partnership and purchased 20 acres of land in the relatively new village of Lugonia. They understood the key to development of the area for agriculture was water, so they purchased cheap railroad land south of the Mill Creek Zanja in Lugonia (Gonzalez 2006:5).

Judson filed for a Homestead of 160 acres adjacent to the Redlands Tract in 1881. He built a home on the property and followed scrupulously all the homestead requirements to assure the

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Judson and Brown firm a real profit if the first 1,000 acres' purchase and irrigation development proved expensive. Judson gave the community the name Redlands since the land was composed of red clay loam that was quite different than the sandy, gravelly loam of the Lugonia district (Atchley 2013: 6). It was this proactive approach to bring water to Redlands that attracted all types of people to settle and farm in the valley.

Planting oranges, grain, and flax on the Redlands Tract in the spring of 1881 convinced Brown that his calculation of one inch for every eight acres was too conservative and more water was needed (Hall 1888: 175). Desperate to find more water, he located a small flow in Morton Creek Canyon, at the mouth of the Santa Ana River. Judson and Brown purchased the mouth of the canyon and its water rights from mountain man Samuel Armstrong (Atchley 2013: 7).

On May 7, 1881, Judson and Brown formally claimed the surface flow and underground flow of the Santa Ana River (Ingersoll 1904: 443; *Judson and Brown to San Bernardino County*, contract for surface flow, 7 May 1881, SBCA, California). While the surface flow was decided in 1855 by the San Bernardino County Water Commission, a "waste-water right" had been granted to Berry Roberts in 1869 for water flowing down the Santa Ana River before general irrigation began in the Timber and City Creek ditches June 1 (Hall 1888: 170). A 33-acre water right purchased from Hezekiah W. Ball included a wastewater right to the Berry Roberts ditch. Brown correctly perceived that the wastewater right would enable a legal reservoir construction at a later date. He recorded a quit claim by Ball for this right to avoid legal difficulties later (Atchley 2013: 8). One source states, "The extensive water rights which Judson and Brown had acquired with this Ball property inspired them with the idea of founding and developing a colony on the red soil lands between what is today Colton Avenue in Redlands and the hills to the south" (Beattie 1951: 18).

Commerce

Redlands Water Company was organized in October 1881 with 1500 shares worth \$100 each and raised stock worth \$150,000 (Walcott 1899:579). In November of 1881, Judson and Brown conducted their first sale of the Redlands Tract selling 500 acres, which was completed in one day and was unsurpassed for real estate. Each acre of property received a water share in the newly created Redlands Water Company and each share of water could be transferred to land anywhere within the irrigation system (Hall 1888: 172). Water shares separate from riparian land was yet another novel idea. They promised to sell another 500 acres in February of 1882 (Atchley 2012: 17). The sale of transferable water shares, as well as the modern construction of the ditch and reservoir, attracted buyers county- and statewide (Riverside Press and Horticulturalist, 10 Oct 1881). Their town boomed by the creation of their water company that broke the mold in allowing for the sale and transfer of water shares *independent* of land ownership.

Eventually, the Bear Valley Dam was constructed in 1884 as was such a success that Judson and Brown announced a dividend of water shares to each land owner in the Redlands Tract. The new water company contracted with Judson and Brown to enlarge their ditch so more water could be conveyed to Redlands. The amount of shares that now was allowed each farmer became one inch

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of water for every four acres, doubling the water available with no extra cost (Hall 1888: 176). Brown later testified, "I wanted to make the water shares as good as wheat," the expression farmers used to express excellent possibilities (Atchley 2013: 7).

Not only was the engineering unprecedented for the region, Judson and Brown soon constructed the Old Bear Valley Dam and solidified their place as master builders and founders of Redlands (Walcott 1899: 587). They were even able to pay off part of the ditch's construction costs by selling shares of water independent of land ownership, attracting more and more people who were eager to grow and invest in oranges, grain, and flax (Scott 1976:26). The ditch was abandoned in 1889 after the dam was built and the water system from Big Bear Lake was established. The ingenuity and unprecedented methods that were used to build the canal and the tunnels, and also to sell and transfer its shares, established Judson and Brown as pioneers of this area and the founders of Redlands.

Criterion C

The Judson and Brown Ditch was an engineering feat and technological advancement, as it was designed to transfer 400 miners' inches of water and do so without loss to a region that was thought to be undevelopable (Hall 1888: 170).

In 1880, Frank E. Brown and E.G. Judson, already somewhat familiar with the possibilities of the East San Bernardino Valley, had become impressed with the advantages of this particular area, if water could be secured. It had been neglected because there was a well-established idea that it was situated too high to be reached by water from the Santa Ana, while the Mill Creek waters, otherwise unavailable, were being utilized to the last drop (Brown and Boyd 1922: 201).

Engineering

Judson and Brown's tunnels proved to be the most astute part of the canal system; to build two tunnels into the debris cone of the Santa Ana River and mine for water in a moist area near the mouth of the river was completely unconventional. The first tunnel near the south wall of Morton Canyon tunneled several hundred yards with 30 inches of "developed" water (Hall 1888: 171). Only Judson's good reputation kept the North Fork and South Fork Ditch owners from suing the men from completing further work. Since the river bed and Morton Canyon was filled with gravel, the two men believed it to be the perfect place for a subterranean tunnel, built on the bedrock that would catch the percolating water (Walcott 1899:580; Hall 1888: 171). The land was also at such a grade that it would be possible to gather the water and drain it out to the surface. This tunnel began about 150 feet from the south wall of the canyon, and struck bedrock at about 9 feet deep, but not much water was produced due to the inconsistent levels of the bedrock (Hall, 1888: 171). The tunnel was lined with boulders and cemented. Its opening measures 1.5 feet by 3.5 feet. It delivered about 30 inches of water before it combined with the second tunnel (Hall 1888: 171). The first tunnel is no longer extant. It is believed to have been destroyed in the 1916 flood, and was replaced with a pipeline (Atchley 2012: 9).

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The other tunnel under the Santa Ana River was successfully dug with Chinese and Native American labor. When Edward Judson and Frank Brown surveyed the arid valley to calculate the water flow per acre needed, they quickly employed Native Americans and Chinese workers to begin construction on the new irrigation system under the direction of labor contractor Robert Morton and the guidance of Frank Brown. (San Bernardino County Archives [SBCA] 1881: Water Records Book [WRB] A: 214; Atchley 2013). This tunnel reached bedrock some fifty feet below the surface and skimmed over 130 inches of water from the underground (Walcott 1899:580) (**Figure 20**). The Santa Ana tunnel is 1600 feet in length, with about 300 hundred of those feet are an open trench, and is still visible from Greenspot Road. The tunnel known by Walcott as the “Bolen tunnel” was built under the Santa Ana River about 40 feet deep and it produced 130 inches of water. No other reference is made to what the characteristics of a Bolen tunnel are, nor are there any other references found for Bolen tunnel (Walcott 1899: 580). The Bolen tunnel is lined with boulders and is three feet tall with a top arch of about a 1.5 foot radius inside (Walcott 1899: 579-581). Both tunnels were cleverly placed about 40 feet below the water surface before the North and South fork ditches divided to their respective ditches (Beattie 1951: 16). This tunneling work would be the first of its kind in Southern California, influencing George and William Chaffey brothers to do the same months later in Ontario and Etiwanda. William McIntosh followed the pattern in Mentone with a tunnel project in 1887 (Atchley 2013: 10).

These tunnels added a significant amount of water to the ditch by collecting water that percolated through the river bed with little upset to the other canal owners because of Judson's previous purchase of a wastewater entitlement. The Ditch was meant to carry 50 shares of Sunnyside Ditch water along with the tunnel water. These 50 shares, which constituted 1/7 of Sunnyside Ditch water, were made up of 33 shares purchased from Ball and the rest from other Lugonia farms.

From the gateway where the tunnels met, the Judson and Brown Ditch was constructed to deliver water to the reservoir (RPH 2 July 1881) (Photo 2). Brown found that a five and a half mile canal with two attached reservoirs could irrigate close to 1,000 acres of land. He figured one inch to eight acres would suffice (Walcott 1899:579; Hall 1888: 174-5). The winter flow of the Santa Ana River would fill two reservoirs and perpetuate irrigation. His progressive ideas using concrete paved canals, redwood flumes and concrete pipes would insure irrigation success. Experimental plantings in the proximity had already proven successful in four years of efforts (Atchley 2013:3). Judson and Brown were two master engineers who are most well-known for the Old Bear Valley Dam, a designated “engineering wonder of the modern world” by the American Society of Civil Engineers (Foster 2014: 1-3).

Invention

Water ditches in Southern California were dug with little concern for porous sand and gravel conditions, even though nearly 50 percent of the irrigation water ever reached its destination due to evaporation and percolation (Hall 1888: 171; Beattie 1951: 13). The Judson and Brown Ditch employed concrete paving, wood covers, and flumes to carry water down the slope with minimal water loss. It was dug some three and a half feet deep; two feet wide on the bottom and five feet wide at the top and employed redwood flumes across gulches, streams, and impediments. It had

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an overall gravity fall of .02 inches for every 100 feet. Concrete was paved across a cobblestone-lined bottom and side and was smoothed across the surface to reduce water ripple (Los Angeles Herald [LAH], 20 December 1890). Flumes were also constructed and employed, with the longest section of flume built above Mill Creek, a tributary of the Santa Ana River (Beattie 1951: 13). None of the flume work survives, and water flow continues through pipelines.

Although it was only used for eight years, the Judson and Brown Ditch set a new precedence for the canal building in the region, as well as how water was sold and distributed. The sale of transferable water shares, as well as the modern construction of the ditch and reservoir, attracted buyers county-and statewide to the Redlands tract. Water was used to irrigate and establish the Redlands area and the selling of its first shares not only helped fund its construction, but established an agriculture settlement in the valley that grew and became the jewel of the Inland Empire.

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Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering Record # _____
- recorded by Historic American Landscape Survey # _____

Primary location of additional data:

- State Historic Preservation Office
- Other State agency
- Federal agency
- Local government
- University
- Other

Name of repository: Heritage Room, AK Smiley Library

Historic Resources Survey Number (if assigned): _____

10. Geographical Data

Acreeage of Property 0.97 acres

Latitude/Longitude Coordinates

Datum if other than WGS84: _____
(enter coordinates to 6 decimal places)

- | | |
|-----------------------------|---------------------------|
| 1. Latitude: 3773679.716500 | Longitude: -490422.139600 |
| 2. Latitude: 3773563.653600 | Longitude: -490215.628300 |
| 3. Latitude: 3773028.346200 | Longitude: -490241.488400 |
| 4. Latitude: 3772120.789600 | Longitude: -489358.933700 |
| 5. Latitude: 3772036.620600 | Longitude: -489220.668700 |
| 6. Latitude: 3771957.739900 | Longitude: -489076.200500 |
| 7. Latitude: 3771960.629400 | Longitude: -488885.749100 |

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8. Latitude: 3771762.474000 Longitude: -488764.068300

9. Latitude: 3771545.054300 Longitude: -488576.623600

Verbal Boundary Description (Describe the boundaries of the property.)

The nominated portion of the linear property has no address. It is oriented northeast to southwest, beginning under the Santa Ana River, about a quarter-mile northeast of Greenspot Road, in the southwest corner of Section 4, T1S, R2W. It crosses the San Bernardino Flood Control District road, and travels through the 100 acres of Redlands Conservancy land. The Conservancy land is the end of the best preserved section of the ditch, and therefore, the southern boundary of this parcel is where the nominated portion of the ditch ends. The Redlands Conservancy's southern boundary shares a border with at the northern edge of an orange grove at the corner of San Bernardino Ave and Opal Ave, where the ditch disappears from agricultural development. The Redlands Conservancy Parcel (No. 0297-111-13 Parcel 1: Lots 5, 6, 7, 8, and 9, in Block 14, Map of Mentone in the County of San Bernardino, State of California, as per map recorded in Book 8 of Maps, Page 81, in the office of the County Recorder of said County) is just north of the Mentone Citrus Orange Grove at the Opal Ave/San Bernardino Ave. intersection and, because it is protected from development, the ditch has remained there without disturbance. The town of Mentone begins just south of this border, placing the ditch within the City of Redlands boundaries.

Boundary Justification (Explain why the boundaries were selected.)

The boundaries encompass the best and longest preserved section of the Judson and Brown Ditch that retains sufficient integrity to meet National Register standards. The boundaries encompass the sealed tunnel, the open ditch and the right-of way historically associated with it. The nominated portion starts where it has been untouched at the tunnel and ends where the ditch is cut off by agricultural land, i.e., orange grove. This grove marks the end of the continuous portion of the ditch. The rest of the ditch, through town, is quite segmented as it has been covered or displaced by residential and commercial development.

11. Form Prepared By

name/title: Tamara Serrao-Leiva/Executive Assistant

organization: Statistical Research, Inc.

street & number: 21 W. Stuart Avenue

city or town: Redlands state: CA zip code: 92373

e-mail: tserrao-leiva@srcrm.com

telephone: (909) 335-1896

date: October 2014; Revised January 2015, May 2015

Additional contributions from:

Tom Atchley/President, Redlands Area Historical Society, Redlands, CA 92373

tomtatchley@aol.com

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Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.
- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.
- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Judson and Brown Ditch
City or Vicinity: Redlands (vicinity)
County: San Bernardino
State: California
Photographer: Tamara Serrao-Leiva
Date Photographed: 8 October 2014
Location of original data files: 21 W. Stuart Avenue, Redlands, CA 92373
Number of photographs: 8
Description of Photograph(s) and number, include description of view indicating direction of camera:

Photo 1 Santa Ana Tunnel at Greenspot Road, camera facing northeast

Photo 2 Gateway, camera facing north

Photo 3 Santa Ana Pipeline under Greenspot Bridge, camera facing northwest

Photo 4 Santa Ana Tunnel at Greenspot Road with cover removed, camera facing east

Photo 5 Judson and Brown Ditch, Redlands Conservancy parcel (Fig. 3), camera facing southwest

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Photo 6 Judson and Brown Ditch, Redlands Conservancy parcel (Fig. 3), camera facing northeast, shows the San Bernardino Mountains, the source of the Santa Ana River, and the Bear Valley Dam.

Photo 7 Judson and Brown Ditch, Redlands Conservancy parcel (Fig. 3), camera facing northwest, shows the sharp turns constructed to avoid natural impediments.

Photo 8 Judson and Brown Ditch, Redlands Conservancy parcel (Fig. 3), camera facing north, shows the torturous nature of the ditch along with the Mill Creek Wash in the background.

Photo Key



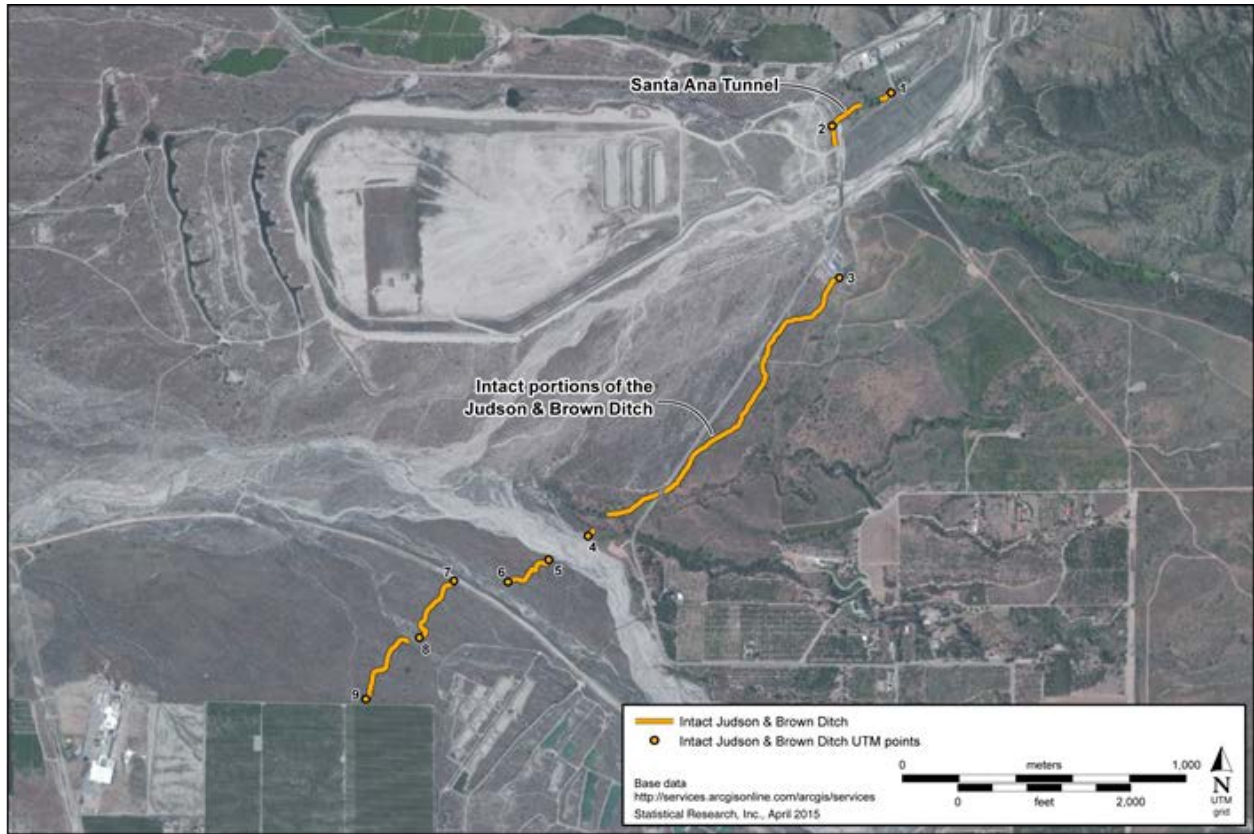
Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 100 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Office of Planning and Performance Management, U.S. Dept. of the Interior, 1849 C. Street, NW, Washington, DC.

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Latitude/Longitude Coordinates Key



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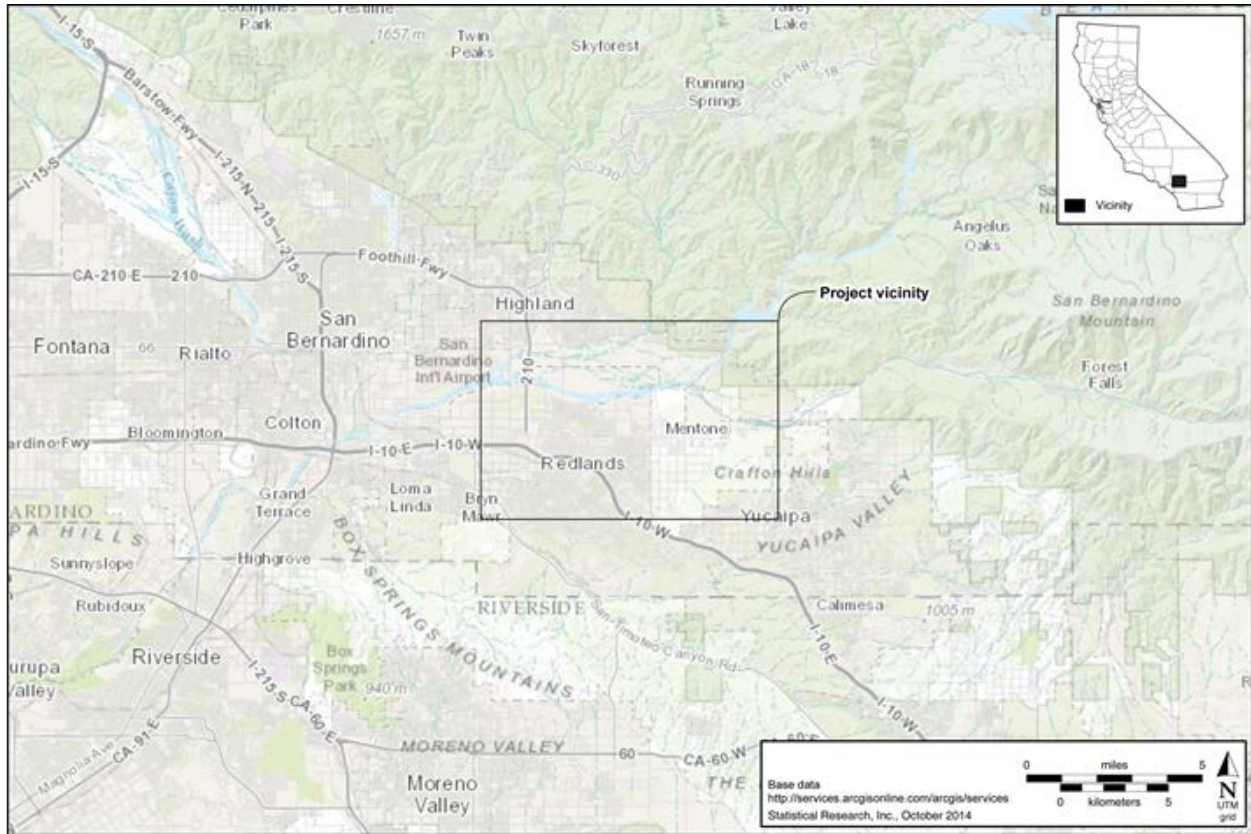
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- Figure 1 Digital Reproduction of USGS Map, Vicinity Map
- Figure 2 Map of Right-of-Way of the Judson and Brown Ditch
- Figure 3 Map of Extant Portions of the Judson and Brown Ditch
- Figure 4 Map of Nominated Portions of the Judson and Brown Ditch
- Figure 5 Grinker Property Parcel Map showing Redlands Conservancy parcel.
- Figure 6 Aerial View of extant portions of Judson and Brown Canal through Redlands
- Figure 7 Aerial View of Santa Ana Tunnel
- Figure 8 Historic 1954 Map of Early Canals and Ditches
- Figure 9 Historic 1888 Map of Judson and Brown Ditch
- Figure 10 Historic Map, date unknown
- Figure 11 Historic 1888 Sketch, Judson and Brown Ditch
- Figure 12 Historic 1887 Map, Judson and Brown Ditch
- Figure 13 Historic 1887 Map detail, Judson and Brown Ditch
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- Figure 16 Time Series 1878 Map
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- Figure 18 Time Series 1881 Map, detail
- Figure 19 Time Series 1889 Map
- Figure 20 Historic 1905 Map, Judson and Brown Ditch and Santa Ana Tunnel
- Figure 21 Historic photo, date, and photographer unknown

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Figure 1: VICINITY MAP (Digital Reproduction of USGS map)



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Figure 2. Map of Right-of-Way of Judson and Brown Ditch, showing the water's right-of-way including tunnels, flumes, and the canal to the reservoir.



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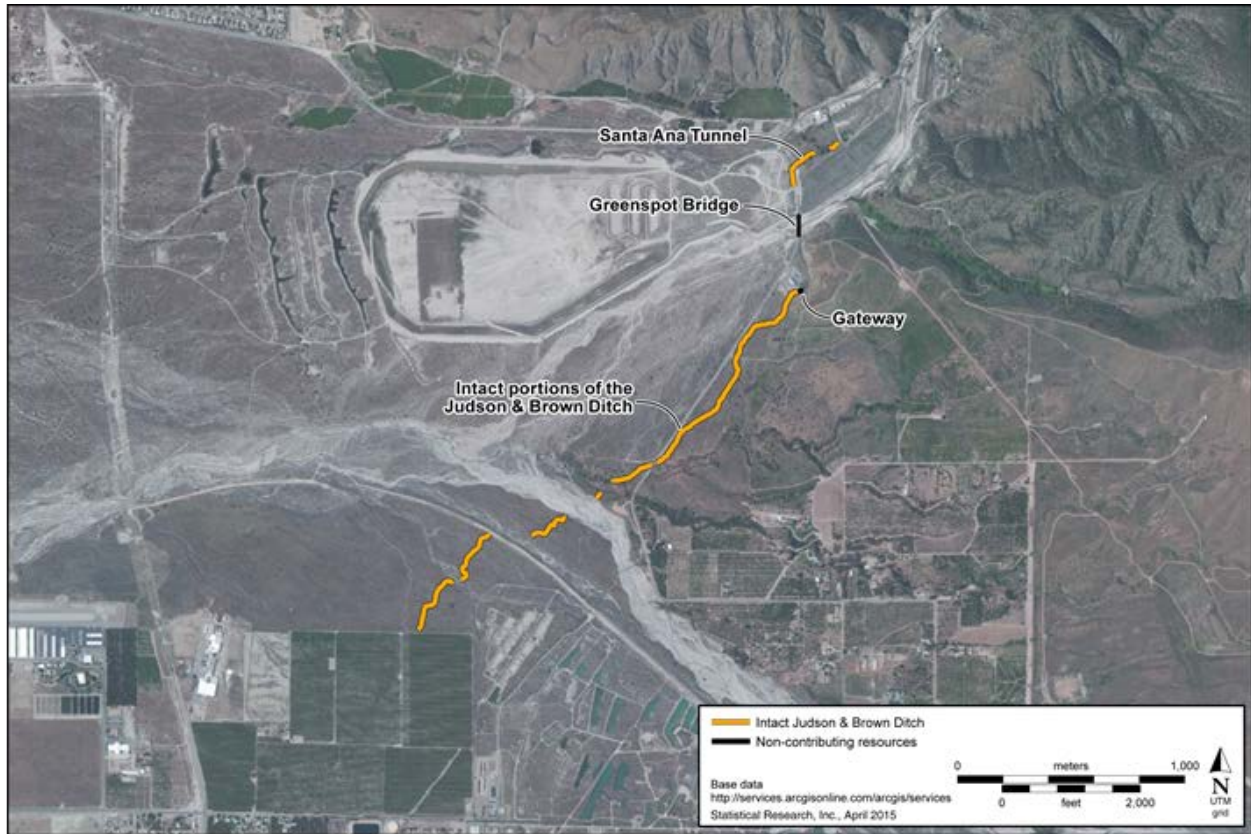
Figure 3. Map of Extant Portions of Judson and Brown Ditch, showing extant portions of canal and tunnels with nominated portion indicated in a box (See Figure 4).



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Figure 4. Map of Nominated Portions of Judson and Brown Ditch.



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Figure 5. Grinker Property Parcel Map/Lines showing Redlands Conservancy Parcel and the southern end of nominated portion of the Judson and Ditch, cut off by agricultural land.

The Conservancy's property is the rectangle due north of the citrus grove. Due north of that is Flood Control District property, then the river. The property description on the grant deed to the Conservancy states:

Assessor's Parcel No. 0297-111-13

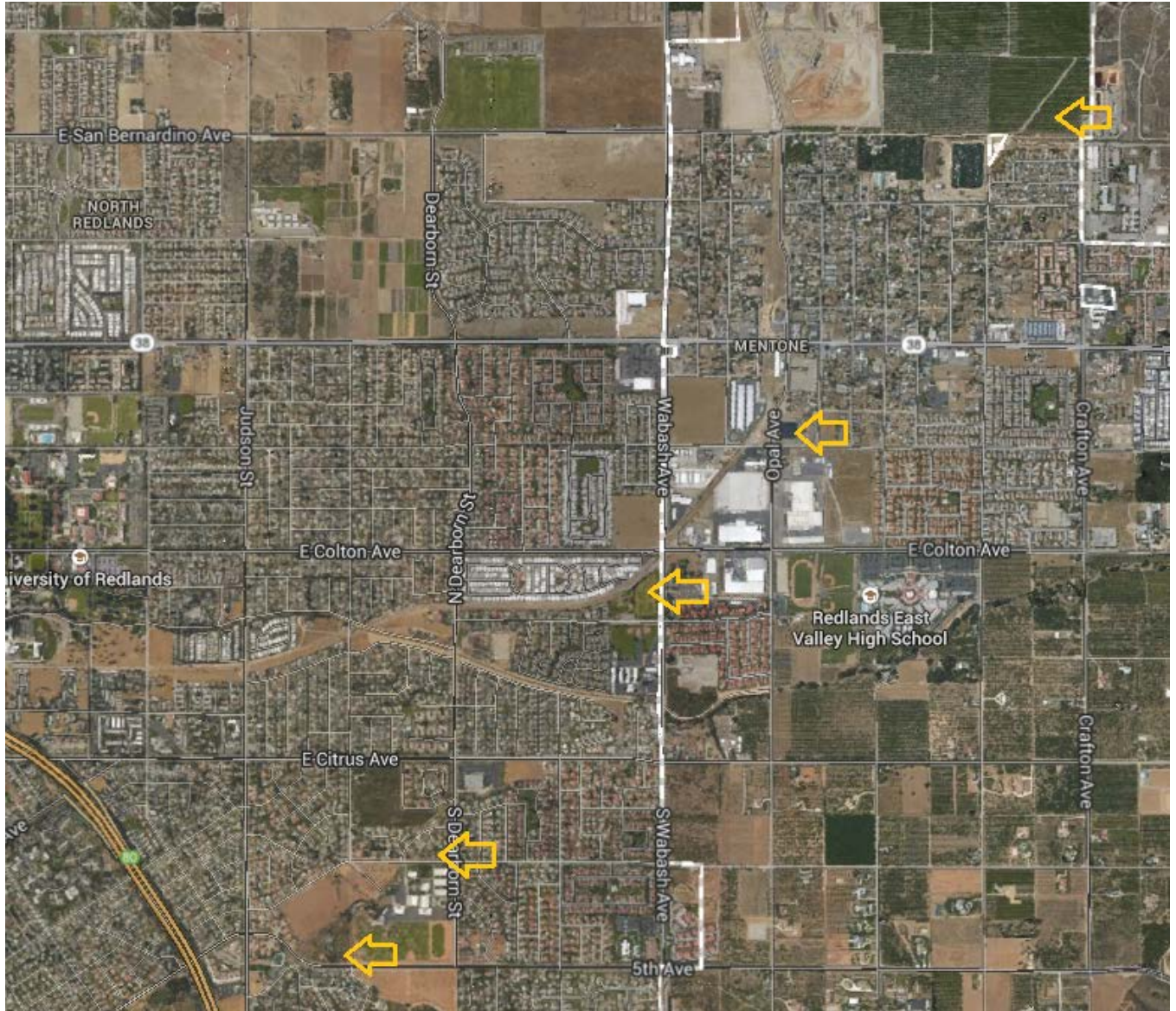
Parcel 1: Lots 5, 6, 7, 8, and 9, in Block 14, Map of Mentone, in the County of San Bernardino, State of California, as per map recorded in Book 8 of Maps, Page 81, in the office of the County Recorder of said County.



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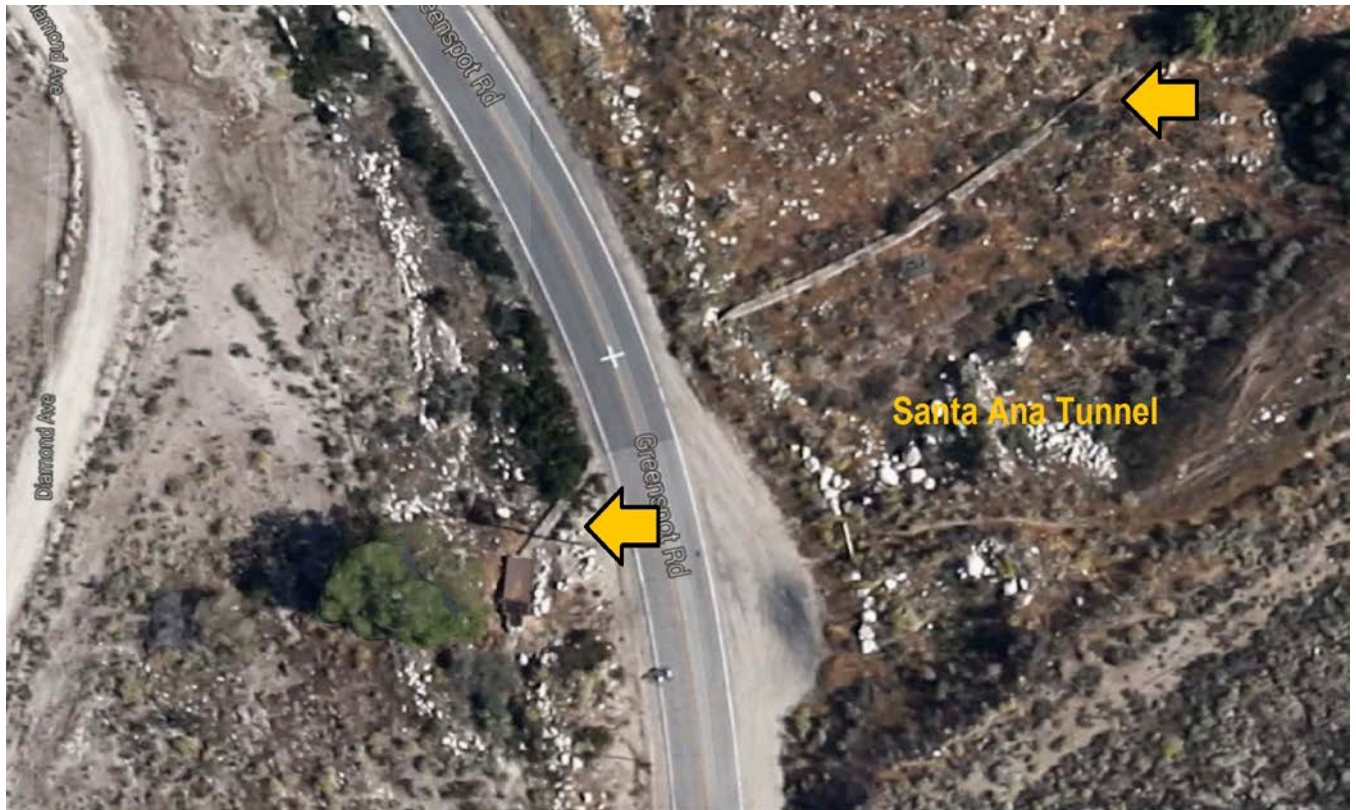
Figure 6. Aerial Photo, yellow arrows indicate the extant, discontinuous segments of the Judson and Brown Ditch through Redlands that are not nominated at this time.



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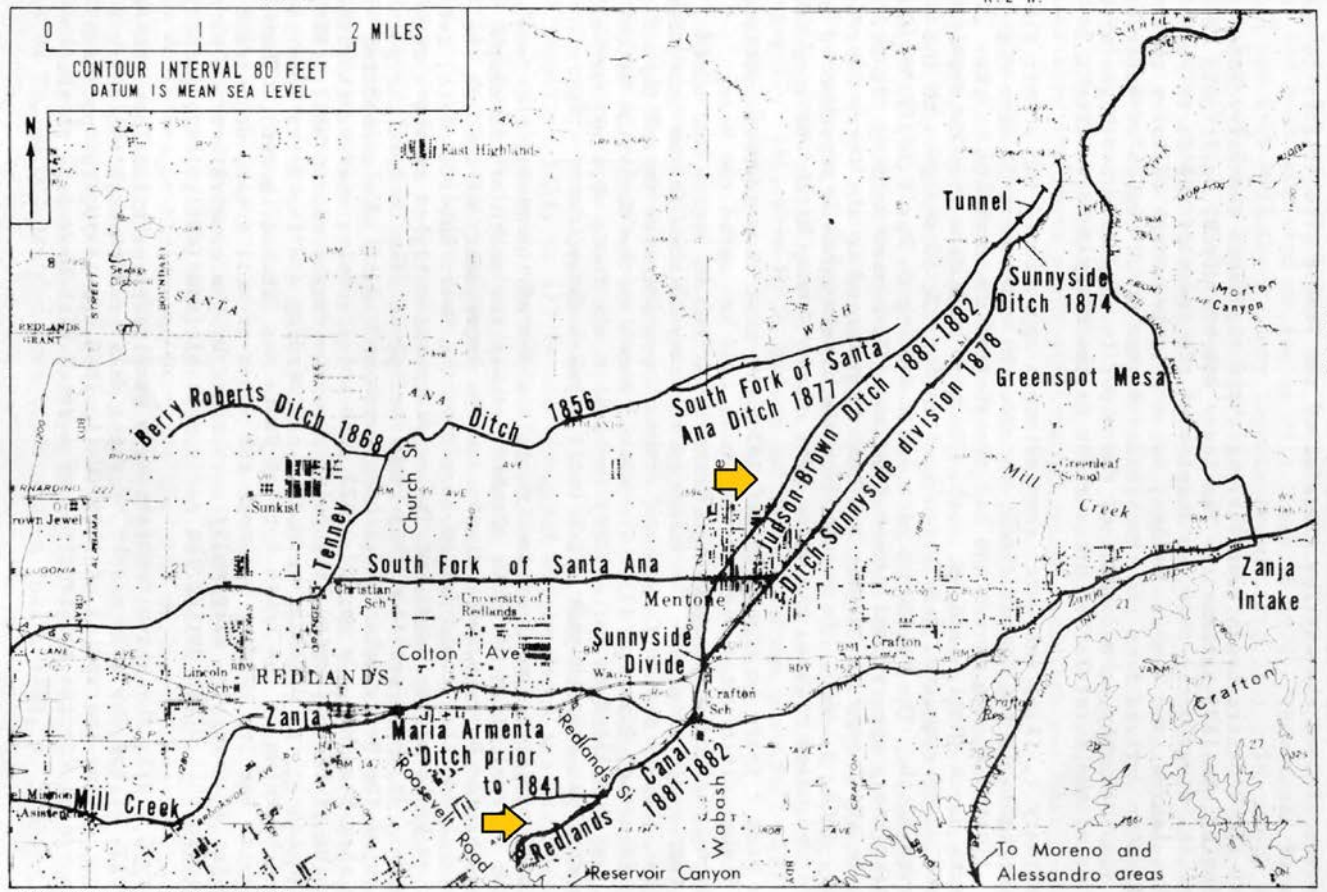
Figure 7. Aerial View, Yellow arrows indicate Santa Ana Tunnel crossing Greenspot Road



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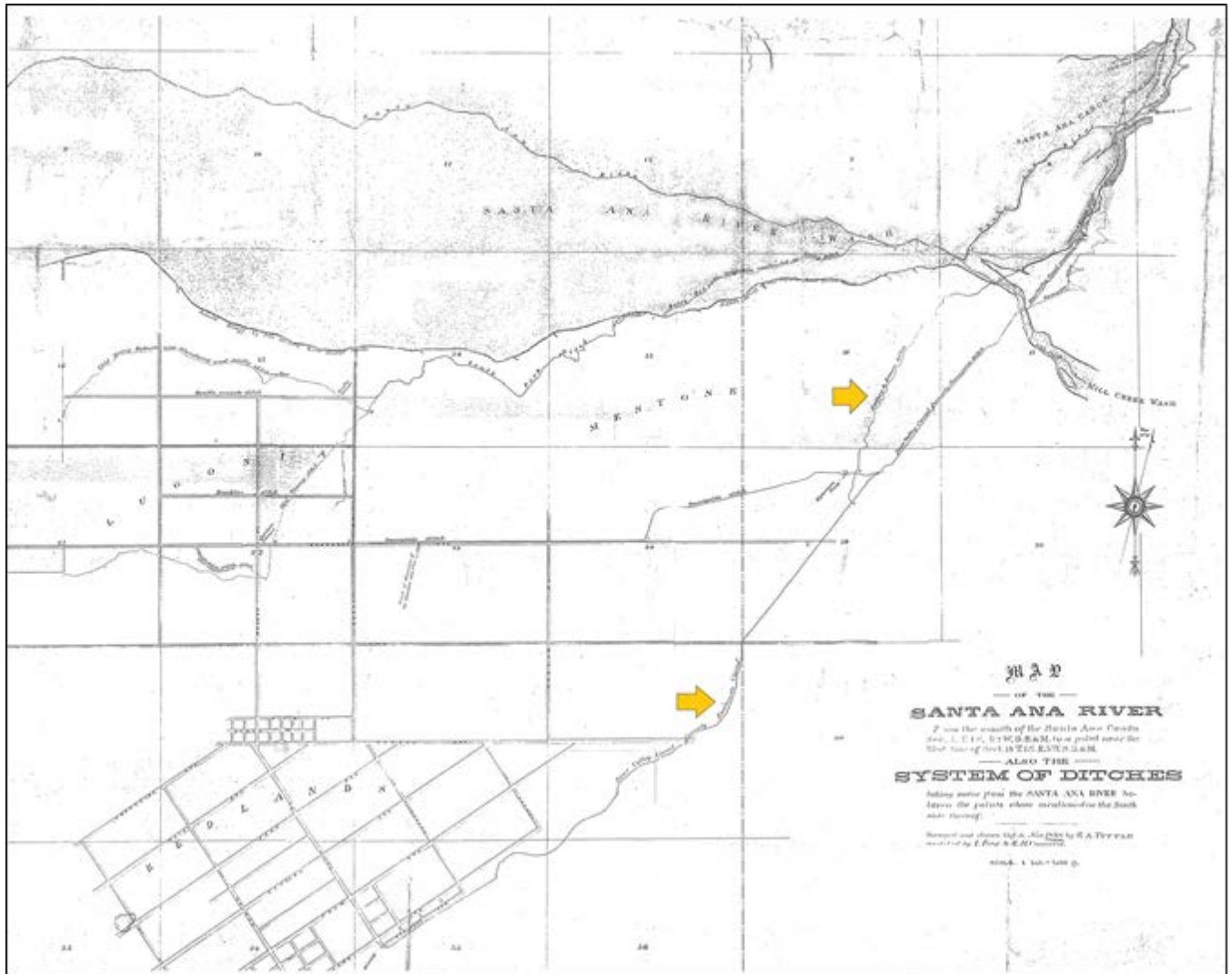
Figure 8. Historic 1954 Map of Early Canals/Ditches, including Maria Arments Ditch of 1840. Yellow arrows indicate Judson and Brown Ditch/Redlands Canal, USGS Map, 1954



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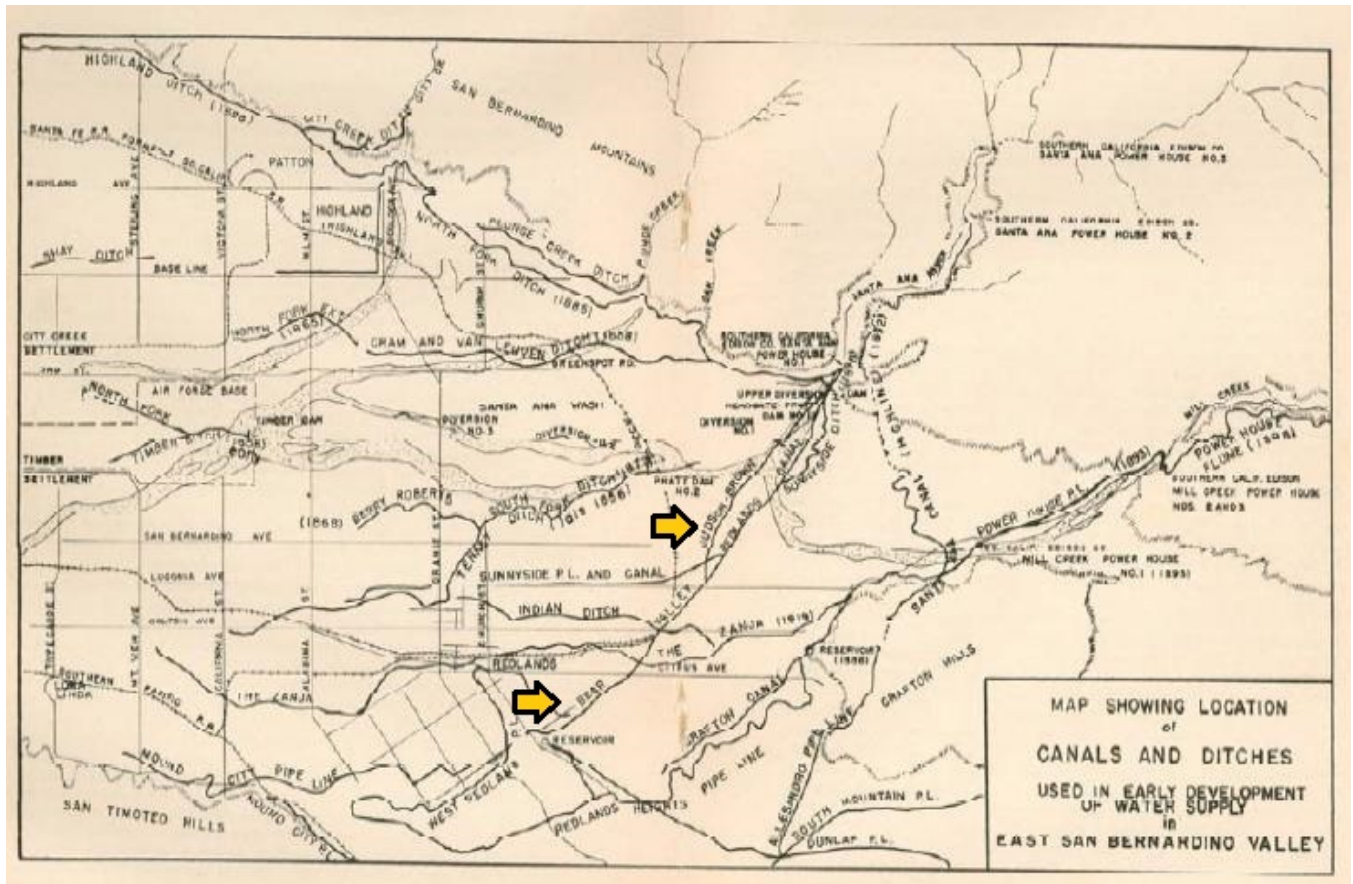
Figure 9. Historic 1888 Map, northern portion of Judson and Brown Ditch named as such, and southern portion named as subsequent owner, Bear Valley Canal. Yellow arrows indicate location of Judson and Brown Ditch.



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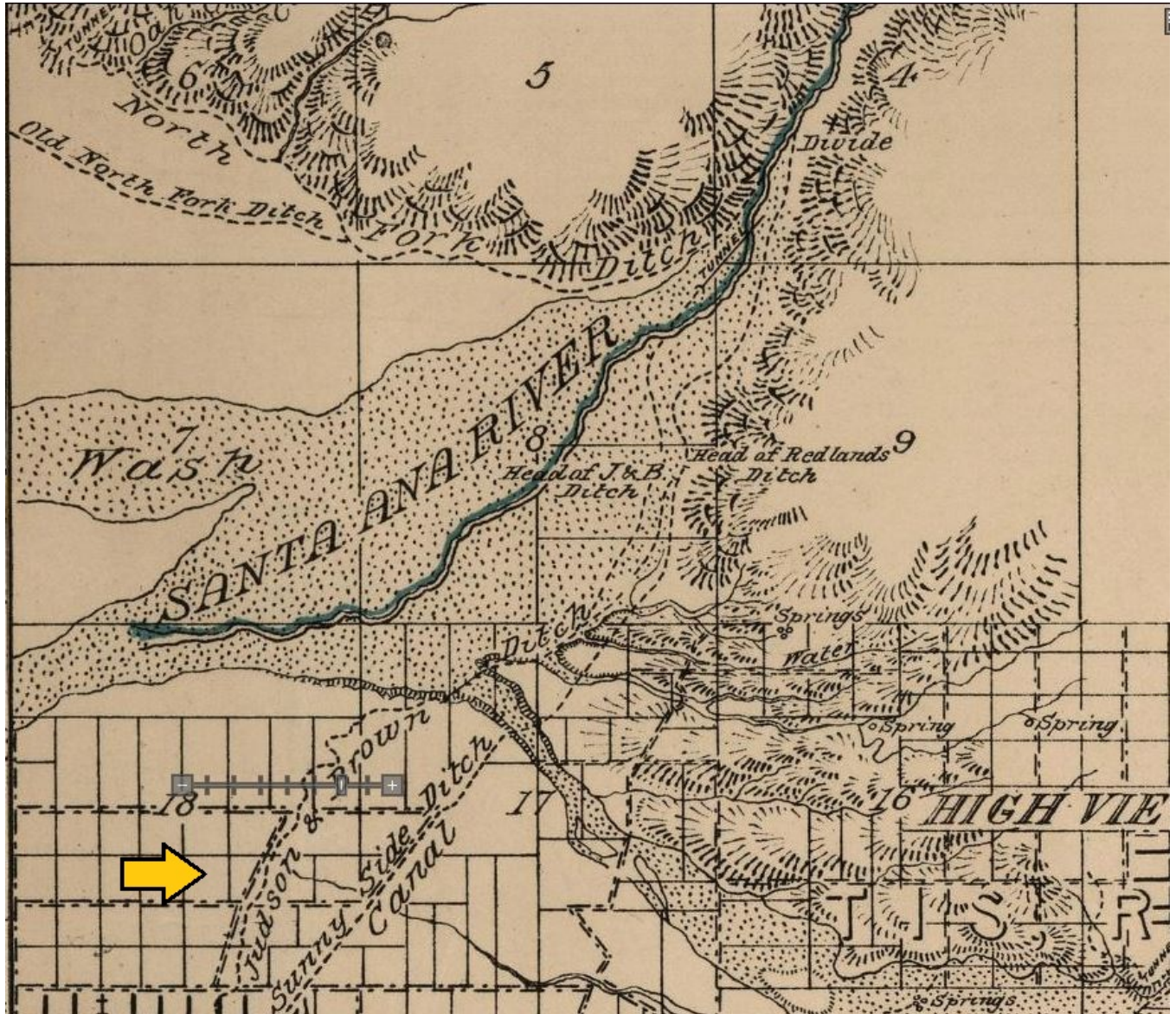
Figure 10. Historic Map showing location of canals and ditches used in early development of water supply in east San Bernardino Valley. From: http://www.highlandhistory.org/Water_History/A_Brief_History_of_North_Fork_Canal.pdf, accessed 12 July 2014. Yellow arrows indicate location of Judson and Brown Ditch.



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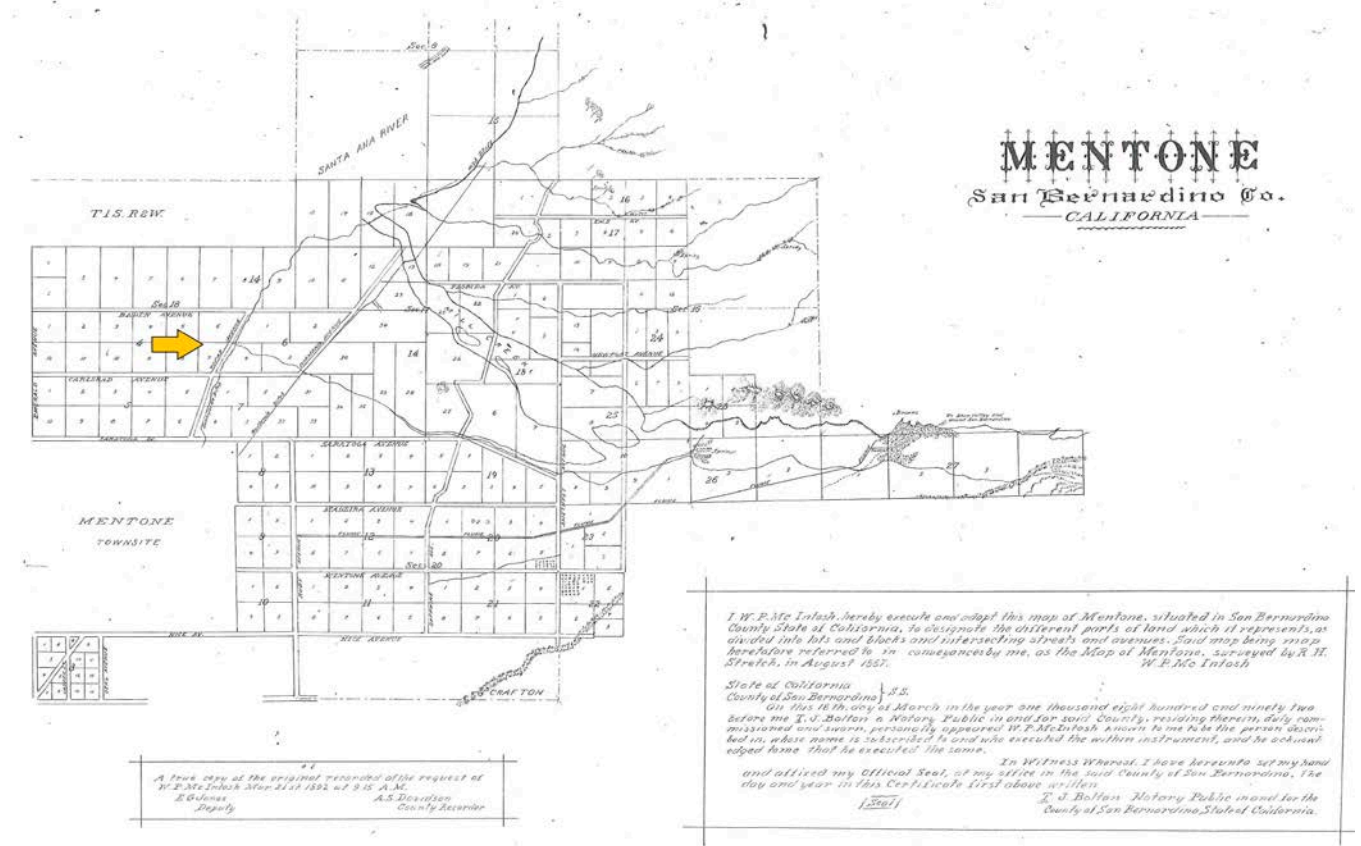
Figure 11. Historical 1888 Sketch Map of Judson and Brown Ditch. Yellow arrow indicates location of Judson and Brown Ditch.



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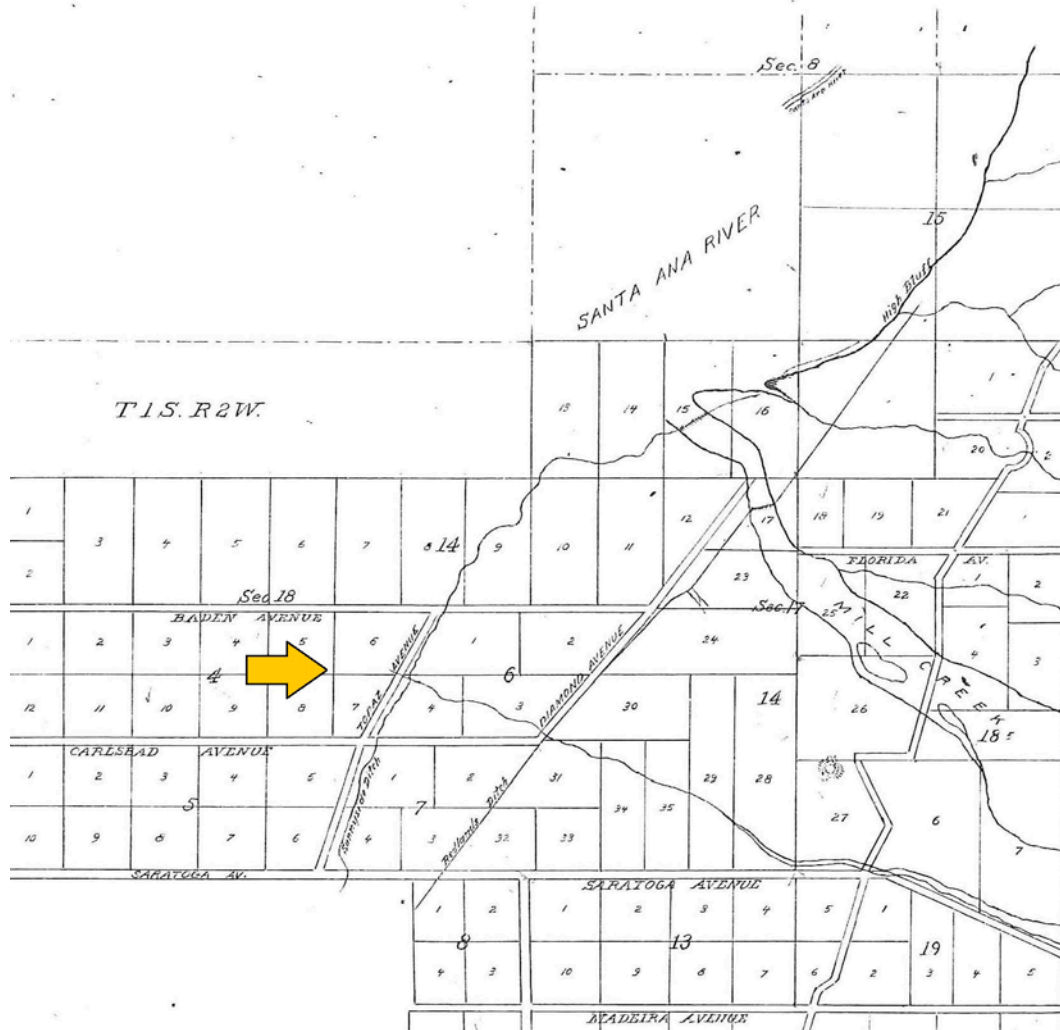
Figure 12. Historic 1887 Map, SBC Archives, see Figure 13 for detail. Yellow arrow indicates location of Judson and Brown Ditch.



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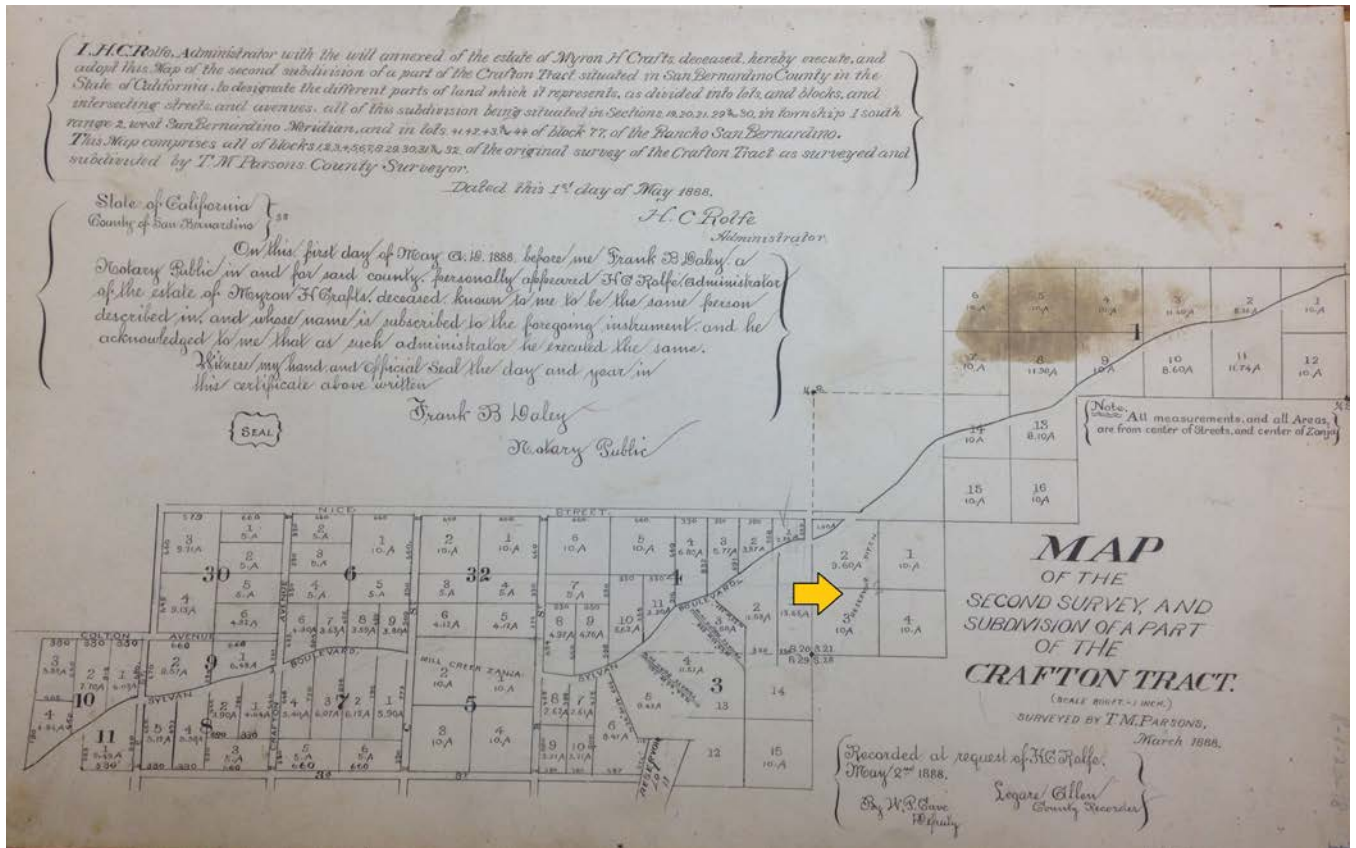
Figure 13. Historic 1887 Map, SBC Archives Detail, flumes indicated as hashtags. See Figure 12 for overview. Yellow arrow indicates location of Judson and Brown Ditch.



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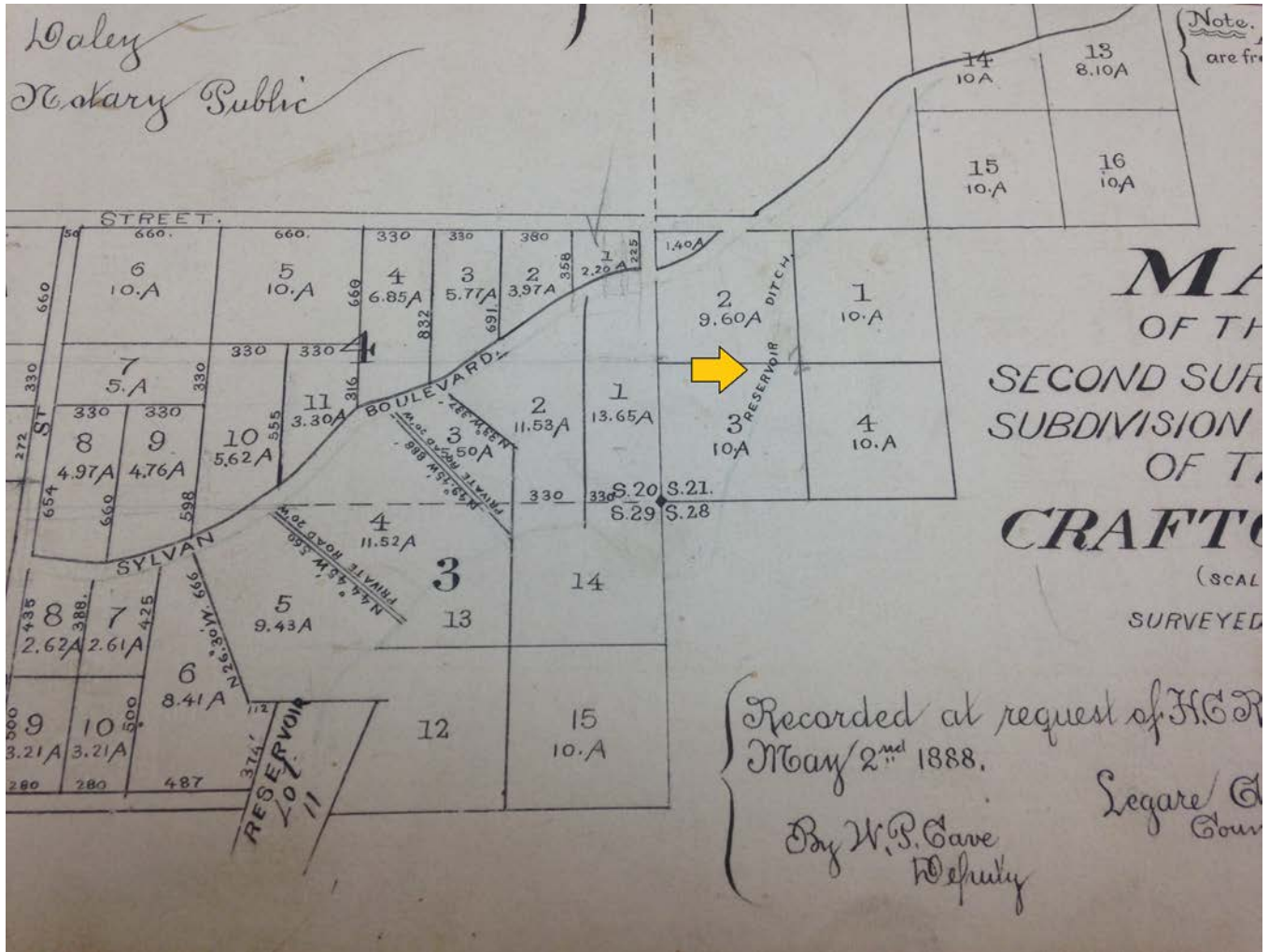
Figure 14. Historic 1888 Map of Judson and Brown Ditch. Recorded by Rolfe, labelled Reservoir ditch (light blue pencil), lower portion of ditch that runs through town. Only discontinuous segments of this portion are extant, and are not nominated at this time. Yellow arrow indicates location of Judson and Brown Ditch.



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Figure 15. Historic 1888 Map of Judson and Brown Ditch. Recorded by Rolfe, labelled Reservoir ditch (light blue pencil), detail of lower portion of ditch that runs through town. See Figure 14, overview. Yellow arrow indicates location of Judson and Brown Ditch.



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Figure 16. Time Series 1878 Map - The Sunnyside Ditch and various canals prior to the Judson and Brown Ditch.



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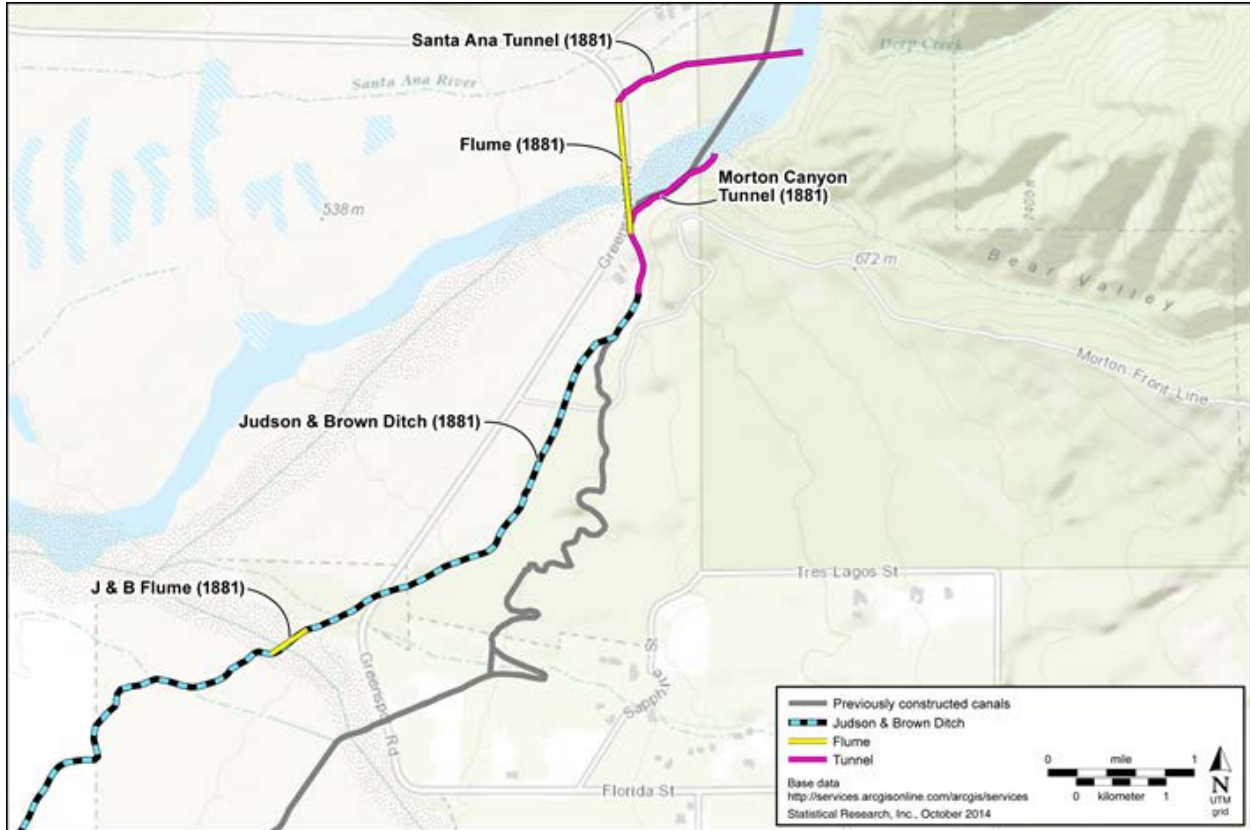
**Figure 17. Time Series 1881 Map - Judson and Brown Ditch and Tunnels constructed;
Sunnyside still in use.**



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**Figure 18. Time Series 1881 Map, Detail of Judson and Brown ditch, tunnels, and flumes.
Also with Sunnyside Ditch in grey.**



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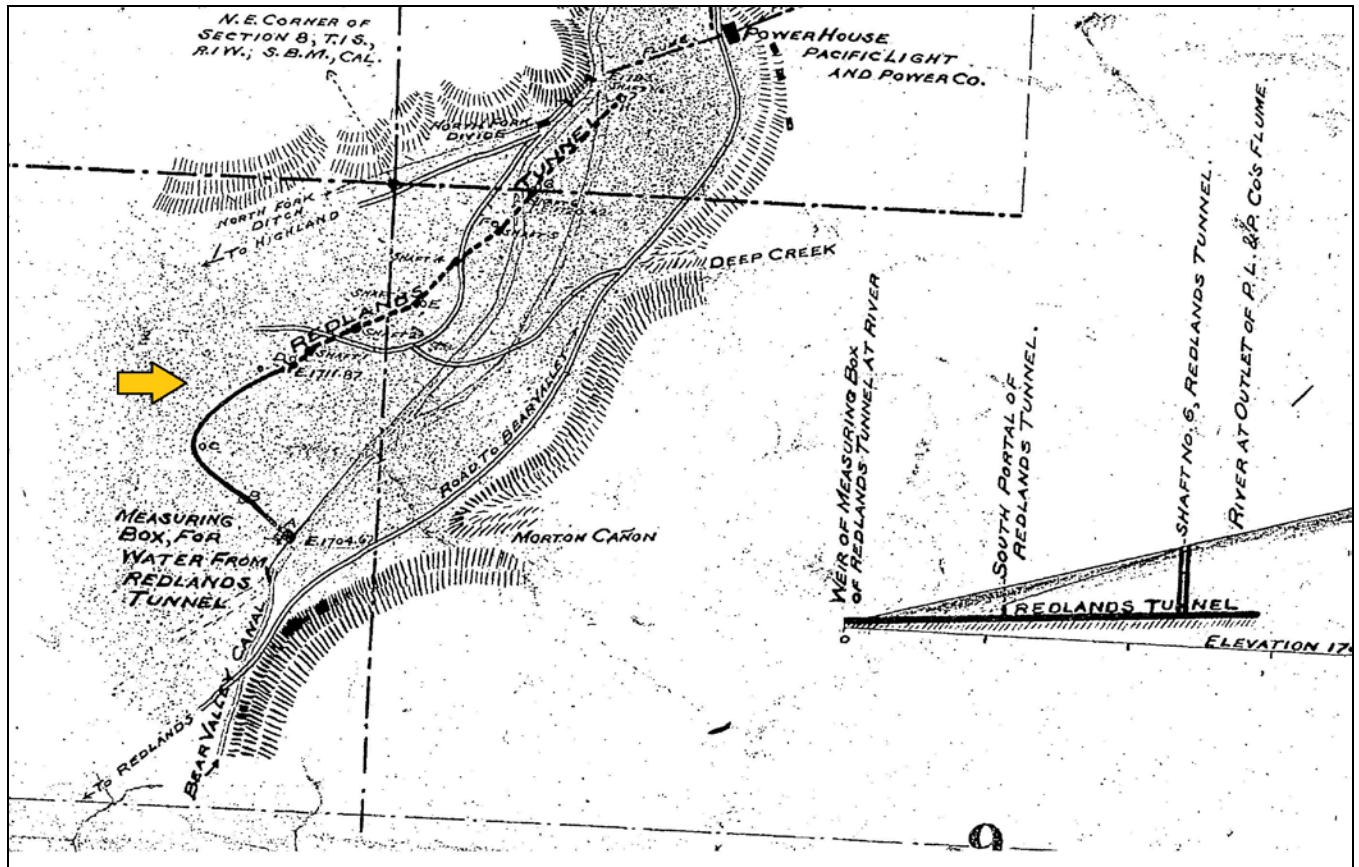
Figure 19 Time Series 1889 Map - Upper portion of Judson and Brown Ditch abandoned and Sunnyside improved under the Bear Valley Water Company. Upper portion of Sunnyside and lower portion of Judson and Brown together from the Redlands Canal/Bear Valley Canal.



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Figure 20. Historic 1905 Sketch Map, Detail of the Santa Ana Tunnel, by Isaac Ford, later improved and known as "Redlands Tunnel." Yellow arrow indicates location of Judson and Brown Ditch.



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Figure 21 Judson and Brown Ditch, date and photographer unknown.

