



**Cogstone** Resource Management Inc.  
Paleontology • Archaeology • History

**THE ARCHAEOLOGY AND HISTORY  
OF THE  
ZANJA MADRE BELOW BROADWAY,  
CITY OF LOS ANGELES, CALIFORNIA**

**Submitted to:**  
Carl Ripaldi  
Metropolitan Transportation Authority  
One Gateway Plaza  
Los Angeles, CA

**Author and Principal Investigator:**  
Sherri Gust  
Registered Professional Archaeologist

**April 2007**

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## EXECUTIVE SUMMARY

Remnants of large diameter brick conduit were revealed during construction activities associated with installation of a new access road directly west of the Metro Rail Gold Line from approximately Chinatown Station to Midway Yard. Testing, archaeological evaluation, monitoring and research were conducted by Cogstone to provide accurate information and context. Cogstone determined that the brick conduit was a 75 foot long section of the Zanja Madre, the water ditch from the Los Angeles River to the City of Los Angeles. The original ditches were open, earthen channels replaced by brick conduit in the mid-1880s. Thus this remnant of the early water system survived more than 120 years in the base of the steep bluff below Broadway.

Architectural conservation experts analyzed the structural materials of the brick conduit and made recommendations for the preservation of the feature. The access road was redesigned to accommodate preservation of the segment of brick conduit Zanja Madre and a retaining wall and drainage system added for the same purpose through the efforts of Metro Rail Operations. They are also supporting nomination of the Zanja Madre to the National Register of Historic Places.

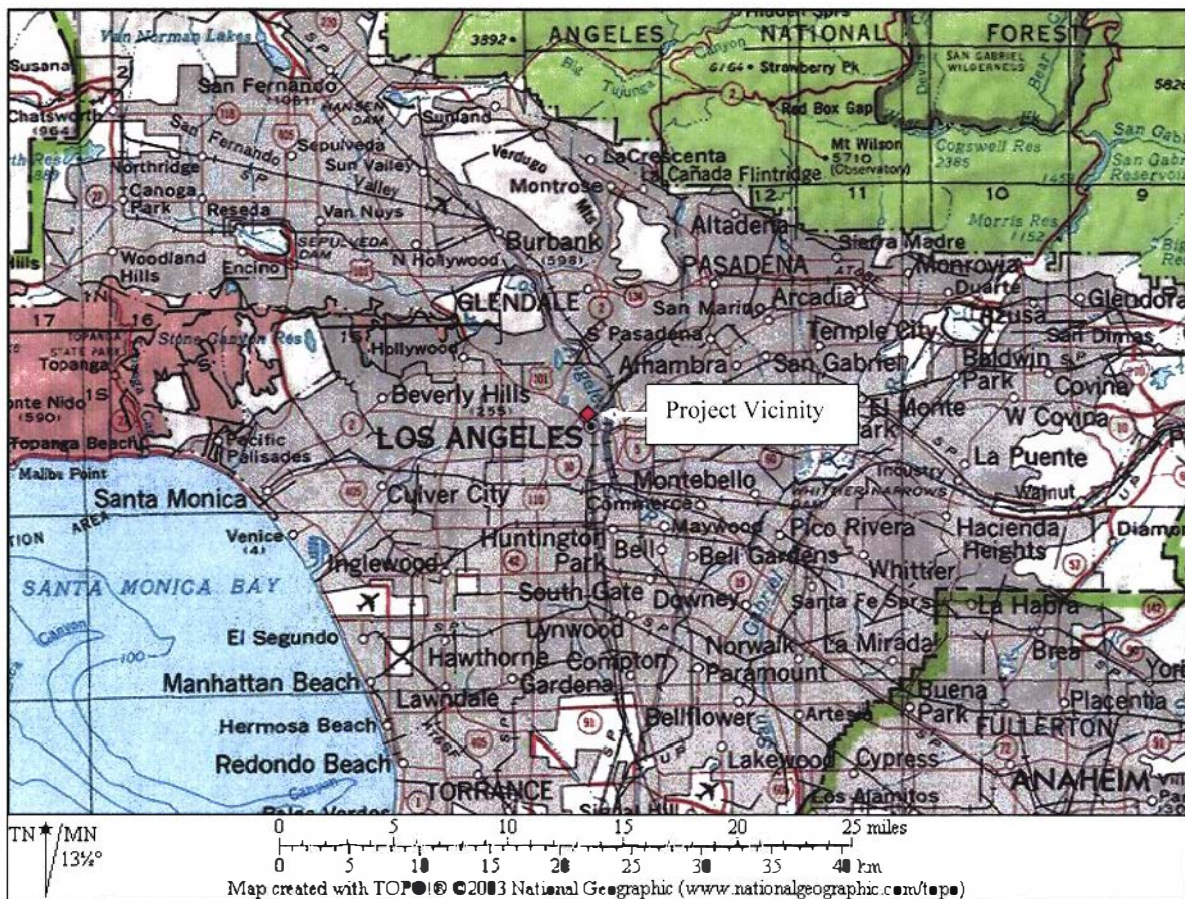
Zanja Madre water was used for household and irrigation purposes within the City of Los Angeles from 1781 into the late 1860s; thereafter it served mostly for irrigation. The Zanja Madre as a water system was a critical factor in the survival and growth of Los Angeles. Improvements to the Zanja Madre after 1884 consisting of replacement with brick conduit of 3 to 3.5 ft. diameter ending at First Street failed to keep pace with population growth and irrigation demand. By 1904 the zanja system was abandoned as a water source.

## INTRODUCTION

Remnants of large diameter brick conduit were revealed during construction activities associated with installation of a new access road directly north of the Metro Rail Gold Line from just east of Chinatown Station to Midway Yard. Cogstone was the on-call cultural resources subconsultant to the Metropolitan Transportation Authority of Los Angeles County (hereafter Metro) from 2004-2006 and was called in to evaluate the find. Cogstone determined that the brick conduit was a large section of the Zanja Madre, the original water ditch from the Los Angeles River to the fledgling pueblo of Los Angeles. Testing, archaeological evaluation, monitoring and research were conducted by Cogstone to provide accurate information and context. In addition, Cogstone brought in the Architectural Resources Group to provide evaluation for the long-term conservation of the zanja segment and provided all background research to Galvin Historic Preservation for nomination of the Zanja Madre to the National Register of Historic Places on behalf of Metro Rail Operations and the City of Los Angeles.

The remnant portion of the Zanja Madre is generally located at the edge of modern-day Los Angeles Chinatown, north of the current city center (Figure 1.1). Historically, the area of the discovery was part of a large rail yard including a 19<sup>th</sup> century Station and Hotel. It is bound on the north by Broadway, on the south by Spring, on the west by College and on the east by North Broadway Bridge. The yard is City of Los Angeles Cultural Monument Number 82 known as River Station Area/Southern Pacific Railroad. River Station tracks were continuous with tracks of Midway Yard, directly adjacent to the river but north of Broadway, and Cornfield Yard, south and slightly east of River Station (Mullaly & Petty 2002:50). The names and locations of these three yards have often been confused (LA Times 2000).





**Figure 1.1. Regional Location Map**

The Metro has retained ownership of only a small ribbon of River Station Yard consisting of the corridor of the Metro Rail Gold Line approach to Chinatown Station from the bridge across the Los Angeles River (Figure 1.2). The bulk of River Station has been purchased by California State Parks for rehabilitation as public space. This space has been called the “Cornfield” property in the political negotiations to acquire the space and designate appropriate uses (Clayton 2000, CSPAC 2003, Garcia et al. 2004, Gold 2001, Ramos 2000, Reynolds and Soto 2003) but is now known as Los Angeles State Historic Park. Southern Pacific Railroad personnel interviewed stated that Cornfield Yard was an informal name for an area directly across Spring Street from the southwest end of River Station Yard where corn oil was offloaded



to tanker trucks (C. Howell, personal communication, 2004). The remaining portion of the original River Station Yard that parallels N. Broadway, and is north of the Gold Line, is private property.



Figure 1.2. Project property and immediate neighbors

## PROJECT PERSONNEL

Cogstone Resource Management Inc. conducted the project. Sherri Gust, Registered Professional Archaeologist, served as principal investigator, performed the record search and much of the research and wrote the report. Armando Abeyta supervised the field work on the project, personally performed much of the testing and monitoring and drew the plan views of the features. Ruth Rhoades summarized the historic property ownership of the property. Other monitors included Leann Moore, Janell Mort, Michelle Goosens, Joseph Arnold, Luis Burgos,



Albert Knight and Francisco Arellano. Kim Scott evaluated sediments for the project. Amy Glover performed the lab work and evaluated small number of historical artifacts recovered. Armando Abeyta, Albert Knight, Michael Mirro, Juily Phun and Amy Glover assisted with research. Steven McCormick assisted by overlaying ten common reference points onto the historic maps. Steven Whalen computerized the field graphics. Mari Pritchard Parker and Brian Glenn were each briefly involved in the field work for the project in 2004 and 2005 respectively. Qualifications are appended (Appendix A).

### ACKNOWLEDGEMENTS

We appreciated the cooperation of Metro Rail Operations and their construction contractor, Balfour Beatty, during the project. We thank David Walker and Carl Ripaldi of Metro for always keeping us in the loop and facilitating our work.

We thank Melody Carver and Craig Howell of the Los Angeles History Slugs for giving us the benefit of their knowledge regarding the Zanja at the very beginning. Melinda Horne of Applied Earthworks graciously provided us with a copy of her report and discussed the Zanja with us. Christian Froelich provided his personal photographs of one Zanja segment.

We received research assistance from Jay Jones of the Los Angeles City Archives; Alan Jutzi, Jessica Smith and John Sullivan of the Huntington Library; William Hendricks of the Sherman Library and James Newland of the California Department of Parks and Recreation. The City Records Management Officer, Todd Gaydowski, went above and beyond the call of duty to personally drive original large scale maps belonging to the City Archives to the Huntington Library so they could be scanned at high resolution for inclusion in this report and for use by other researchers.

## ARCHAEOLOGY OF THE ZANJA MADRE

### PREVIOUS INVESTIGATIONS

At least two segments of brick conduit Zanja Madre are known associated with El Pueblo Historic Park. One was discovered under Avila Adobe during seismic retrofitting in 1971 and is still visible to the public. The second was discovered during construction of La Placita de Dolores, southeast of Olvera St. (Costello & Wilcoxin 1978).

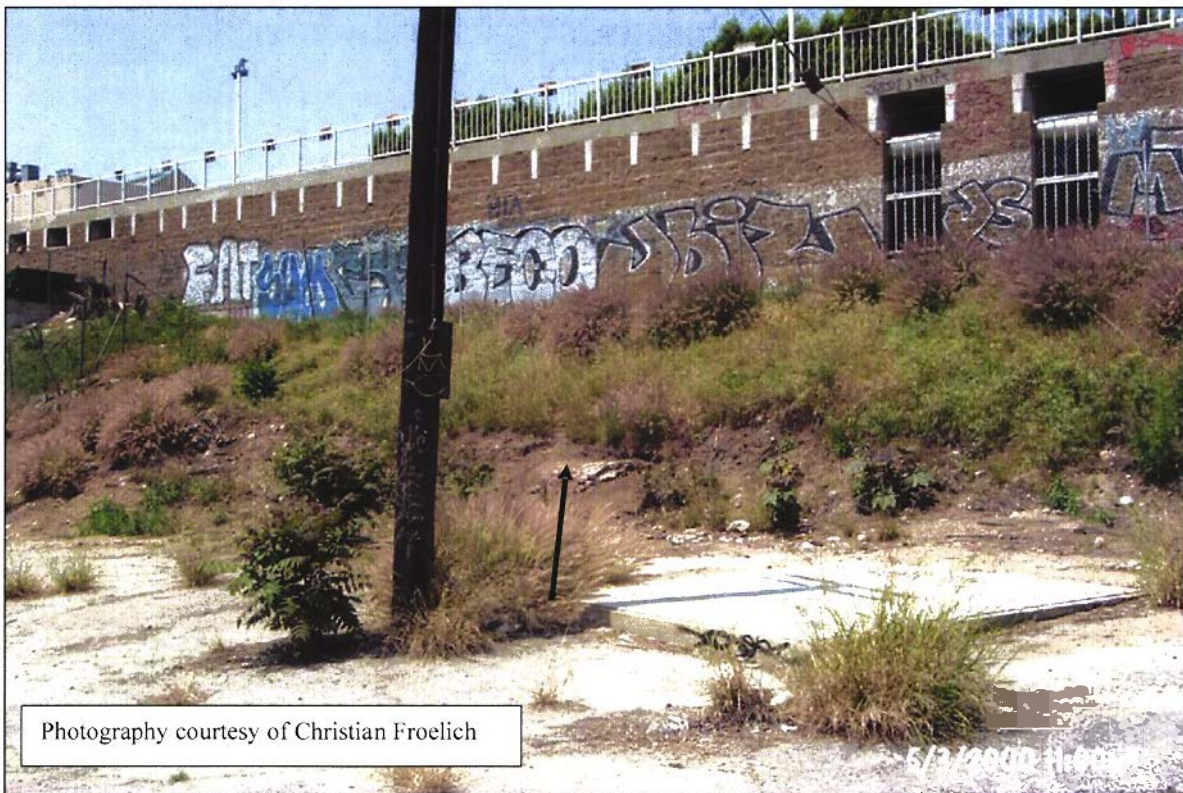
The old rail yard between Broadway and Spring was surveyed in 2002 by URS as part of the North Spring Street Bridge Seismic Retrofit and Widening project (Wesson 2002). An exposed five foot long section of brick conduit Zanja Madre was noted south of the parking garage on Broadway at Bernard Street (found two years earlier by local history buffs Craig Howell and Melody Carver; Ramos 2000, Maese 2000) and a formal archaeological site record was filed. The Zanja Madre was assigned primary number 19-003103 (trinomial CA-LAN-3103) by the California Historical Resources Inventory System.

Archaeological testing in relationship to construction of the Gold Line track was conducted in 2000 by Applied Earthworks (Horne 2003). This testing consisted of nine test trenches in the direct path of the track ranging from 10-30 feet in length and 5-6 feet in depth. Sediments encountered in the testing consisted mostly of disturbed fill sediments or disturbed fill sediments overlying native fluvial sands and gravels. Remnant building materials such as brick, steel pipe, sewer pipe, and cement slabs were encountered, as were scattered historical archaeological materials such as glass and ceramic. Small, torch-cut segments of track were also present in the fill. No remnants of the Zanja Madre were encountered on Metro property but the report noted the segments described by Wesson (2002) and provided photographs and coordinates.

In 2004, Metro requested evaluation of the areas north and northeast of the new Gold Line track for potential impacts due to planned construction of an access road. Cogstone conducted a reconnaissance survey on June 10, 2004. The survey was conducted on foot, surveying all Metro property. The area between the Gold Line's northeast fence and Broadway is private property

and was not accessible for pedestrian survey. That area was inspected visually and photographed.

No features related to the Zanja Madre were observed on Metro property during the survey. Cogstone relocated the segment of the Zanja Madre discovered on private property in 2000 south of the parking garage on Broadway at Bernard. We obtained a photo taken of the segment in 2000 (Figure 2.1). Comparison to a 2005 photograph of the same segment shows installation of pavement and curb and relocation of a power pole (Figure 2.2).



Photography courtesy of Christian Froelich

**Figure 2.1. Zanja segment on private property, as observed in 2000**





**Figure 2.2. Zanja segment on private property, as observed in 2005**

We found that two additional segments had been exposed sometime in 2003 or early 2004 adjacent to the original segment during weed removal associated with paving a new parking lot (Figure 2.3, 2.4). Both are located by following the slight curve of the hillside southwest from the 2000 segment (Figure 2.5).



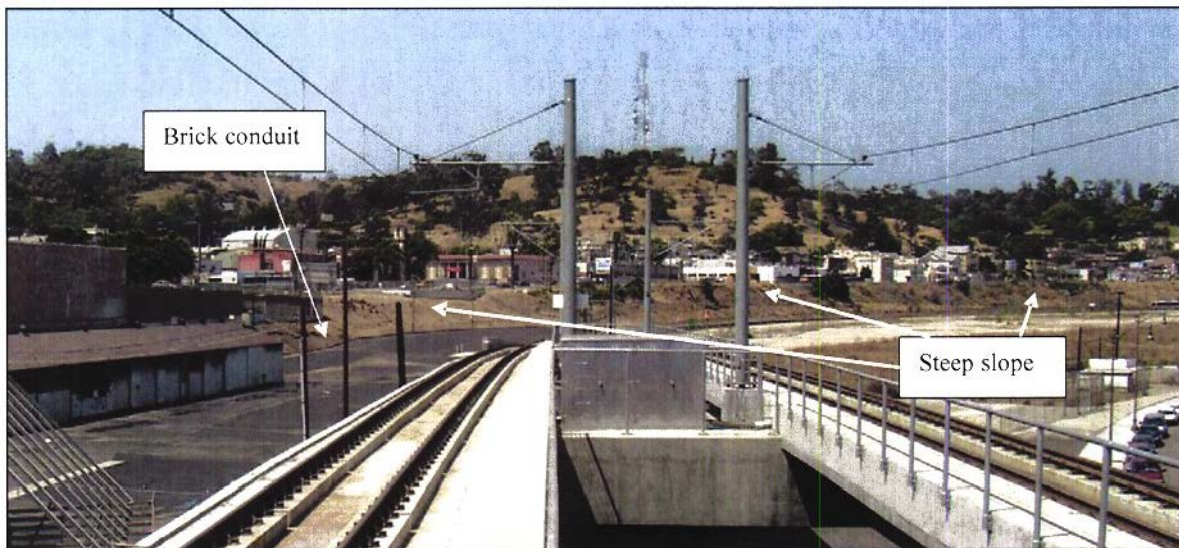


**Figure 2.3. Easterly 2004 segment of Zanja on private property**



**Figure 2.4. Westerly 2004 segment of Zanja on private property**

Cogstone concluded, based on the locations of the exposed segments of Zanja Madre on the private property hillside and the corresponding historical information, that more segments of intact Zanja Madre might exist in the steep slope below Broadway (Figure 2.5; Gust and Parker 2004).



**Figure 2.5. Location of exposed brick conduit (2000 segment) on private property northeast of Gold Line platform**

## 2005-2006 TESTING AND MONITORING

### Field Schedule and Methods

Cogstone was called to the Gold Line access road project March 29, 2005 due to discovery of cement and brick features by grading the previous day (Table 2.1). We found that current grading activities had only grazed surfaces damaged by construction activities of the past. Cogstone archaeologists used hand excavations and directed mechanical excavation to reveal the features for evaluation over several days. A backhoe was used to cut into the slope to fully expose the circumference of the central segment of brick-lined conduit.

**Table 2.1. Field Timeline**

Date	Year	Notes
March 28	2005	Zanja Madre segments revealed by grading for access road and fiber optic cable
March 29-April 3	2005	Cogstone conducts initial evaluation
April 5-June 17	2005	First monitoring period; grading for road and curbs
June 18-September 20	2005	No work on site; redesign of project to accommodate Zanja
September 21-November 2	2005	Second monitoring period; construction of access road and drainage; Oct. 10 conservators take samples for analysis
November 3-February 21	2005 - 2006	No work on site; design of retaining wall to protect Zanja from landslides
February 22-April 18	2006	Third monitoring period: construction of retaining wall: completion

On May 3, 2005 a survey of the area to the north of the exposed features was conducted for one mile within the Metro ROW from Gold Line Yard into Midway Yard as historical information indicated that the brick conduit Zanja continued along the base of the slope to the Los Angeles River. No additional segments of the Zanja were observed. Prior to finish grading, from September 23 to October 1, 2005, the intact slope areas adjacent to the exposed segment of Zanja were tested by Cogstone archaeologists using backhoe test units, shovel test probes and trowel testing to determine the existence and/or continuity of Zanja within the slope. No additional segments were located.



On May 4, 2005 a Cogstone archaeologist directed a Wagner Engineering Survey crew to shoot in location data for the various features associated with the Zanja Madre on Metro property and on private property to create an accurate map. In June, a sample of 50 bricks of the Zanja Madre were measured.

Archaeological monitors were present for all grading, excavation and construction activities to protect the Zanja Madre segment at the request of Metro. Cogstone archaeologist Armando Abeyta worked with Balfour Beatty to mark off the entire extent of grading spanning about 330 meters. As grading proceeded, more of the segment was uncovered and investigated. Some artifacts were recovered in the sediment inside the conduit and also in the slope fill overlying the conduit. These were collected and evaluated for significance also.

Wind and rain caused minor soil erosion and slides of the cut vertical slope above the features during the entire year the feature was exposed to the elements. However, this did not appear to affect the integrity of the brick conduit Zanja Madre.

## **FEATURE 1**

The most northerly feature exposed was a curved section of concrete with finished top edge partially of cement and partially of brick (Figure 2.6, 2.7). Several historic artifacts, including a cork bottle stopper, a horseshoe and several pieces of glass were recovered from the interior debris.

Feature 1 measured 1.7 meters high and 2.4 meters long (Figure 2.8). The south end of the top edge was comprised of 8 bricks mortared together into 2 stacks and inset into the concrete with the long edge of the brick parallel to the surface of the wall (figure 2.9). After clearing the top of the cement portion of the wall of sediment it was discovered to consist of 8 bricks laid with the short end parallel to the surface of the wall (perpendicular to the previous bricks) and skinned with cement (Figure 2.10). Only from the top view are the mortar lines between the bricks visible. In addition, a badly decomposed piece of wood about 3.75 inches wide, 1 inch deep, and 24 inches long was found on top of these bricks (Figure 2.10).





Figure 2.6. Feature 1 as first observed, view to west

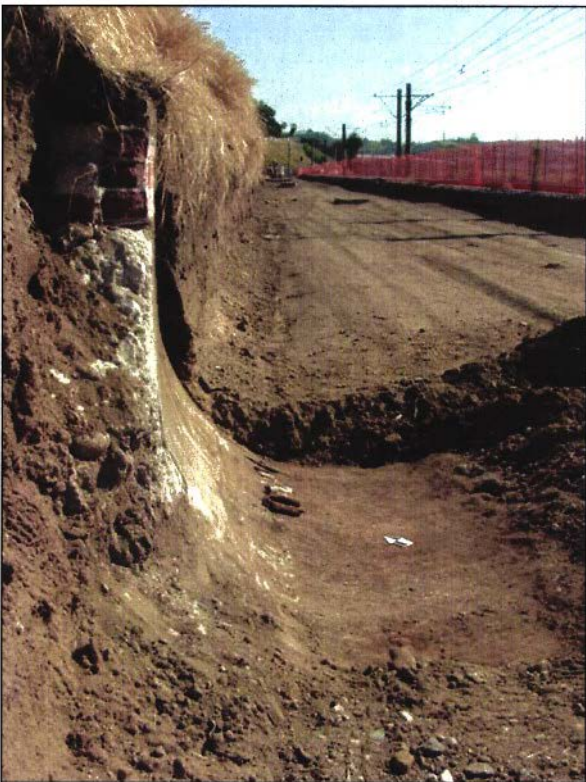


Figure 2.7. Feature 1, view to northwest, after clearing sediment

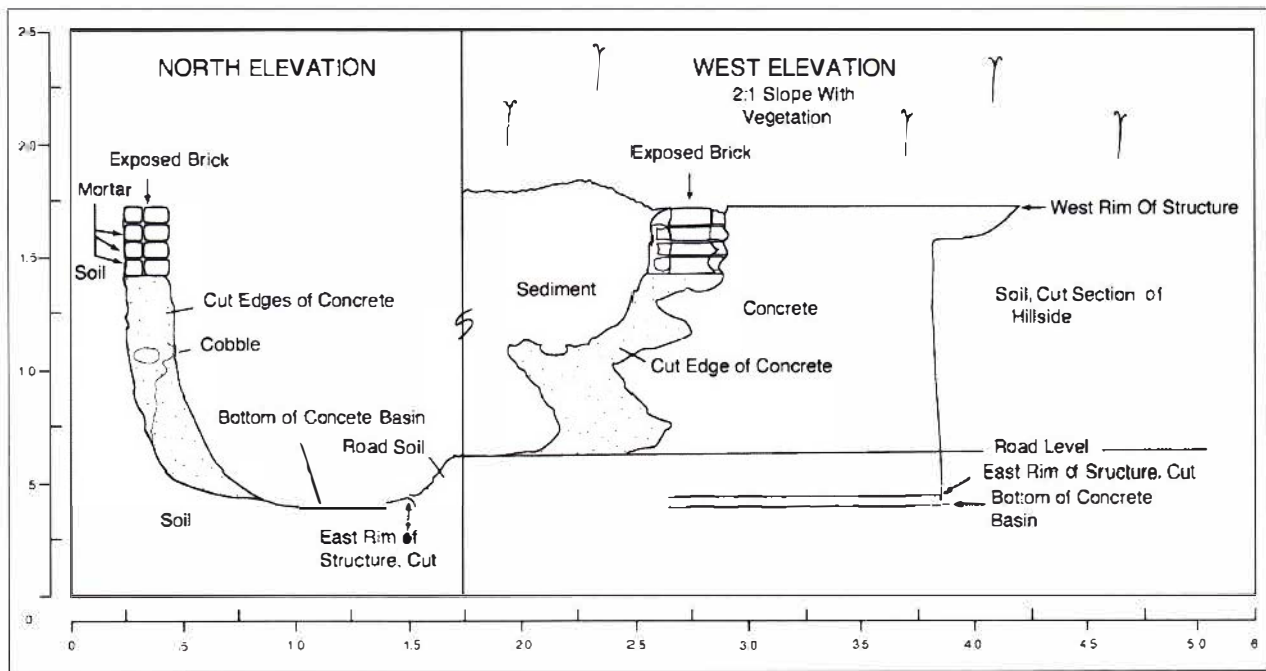


Figure 2.8. Feature 1 plan view (scale in meters)

This feature may have been a gate in the Zanja Madre where water was diverted into sister zanjias. The flat rim would have served to support a wooden access panel.





Figure 2.9. Feature 1 after rim cleanup, view to west

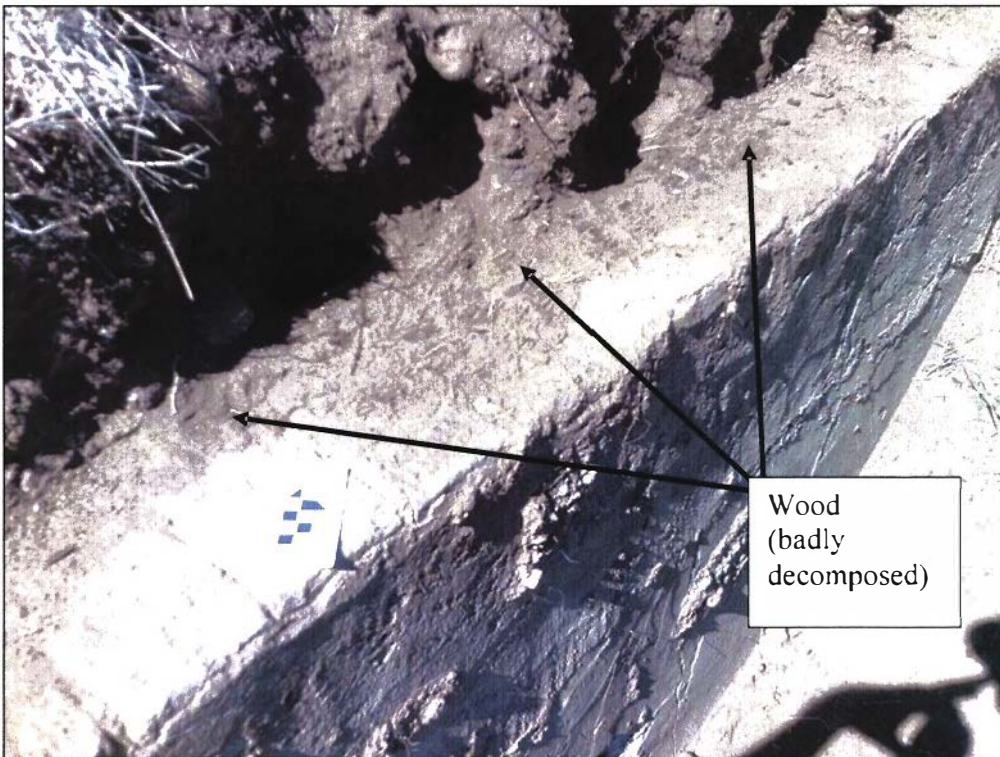


Figure 2.10. Feature 1 rim closeup, view to north

## FEATURE 2

Feature 2 consisted of an oblique cross-section of brick conduit of two courses of brick (Figure 2.11, 2.12). The current project activities grazed the surface of these bricks which has been impacted by historic construction activities. Note brick “shavings” in dirt below feature. It was located at the base of the hillside and was completely filled with sediment.



Figure 2.11. Feature 2, view to west, as first observed



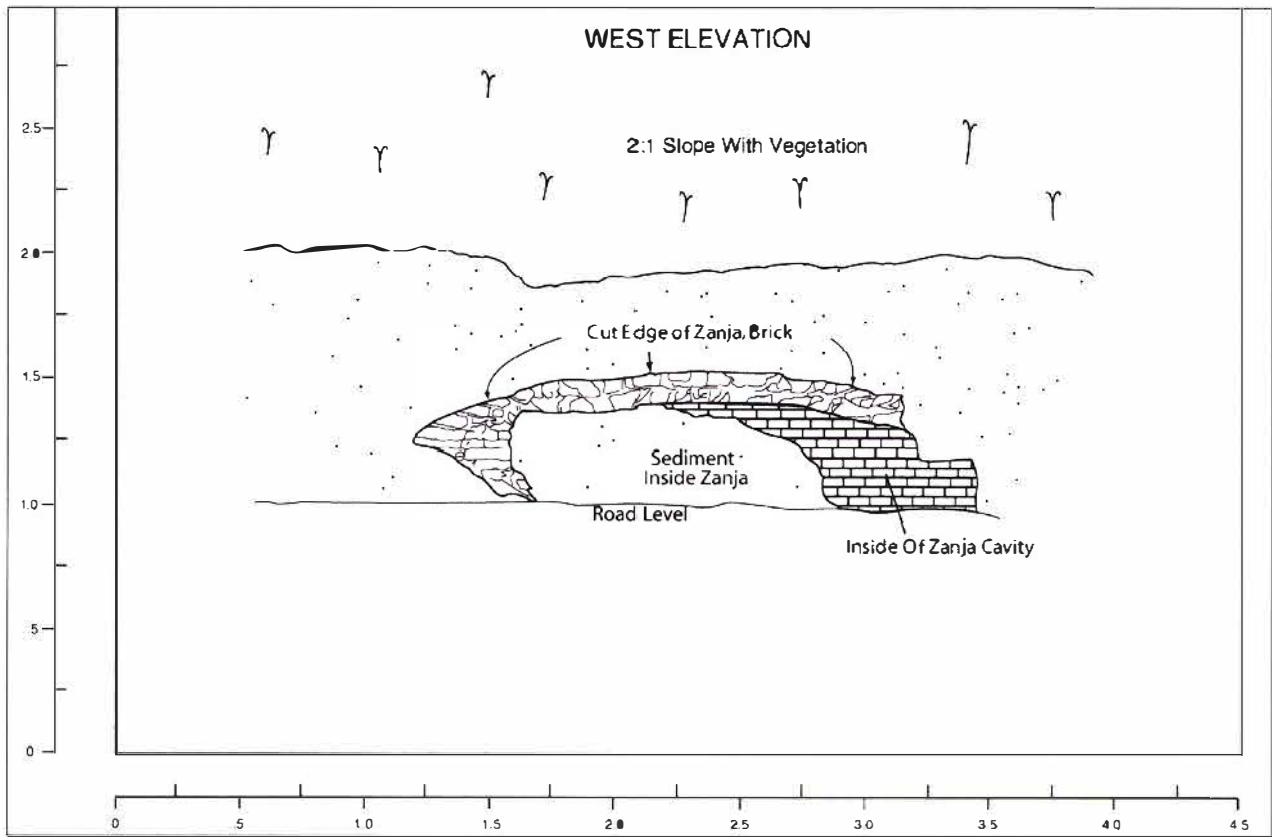


Figure 2.12. Feature 2 plan view (scale in meters)

### FEATURE 3

Feature 3, when first observed (Figure 2.13) consisted of a panel of mortared brick. Cogstone archaeologists directed a backhoe to remove the sediment over and behind about 1.5 meters of the feature which revealed an intact tube of brick conduit (Figure 2.14, 2.15).



**Figure 2.13. Feature 3 as first observed, view to west**



**Figure 2.14. Feature 3 after initial sediment removal, view to west**

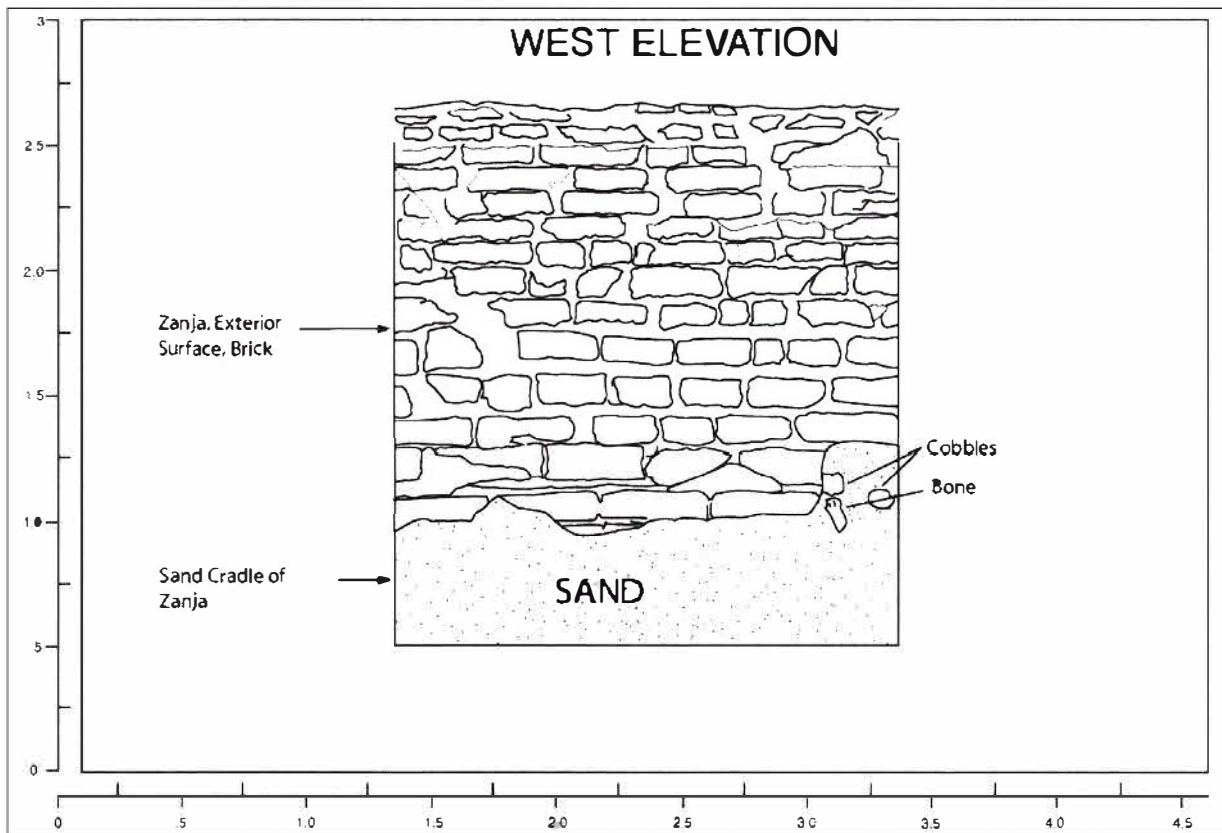
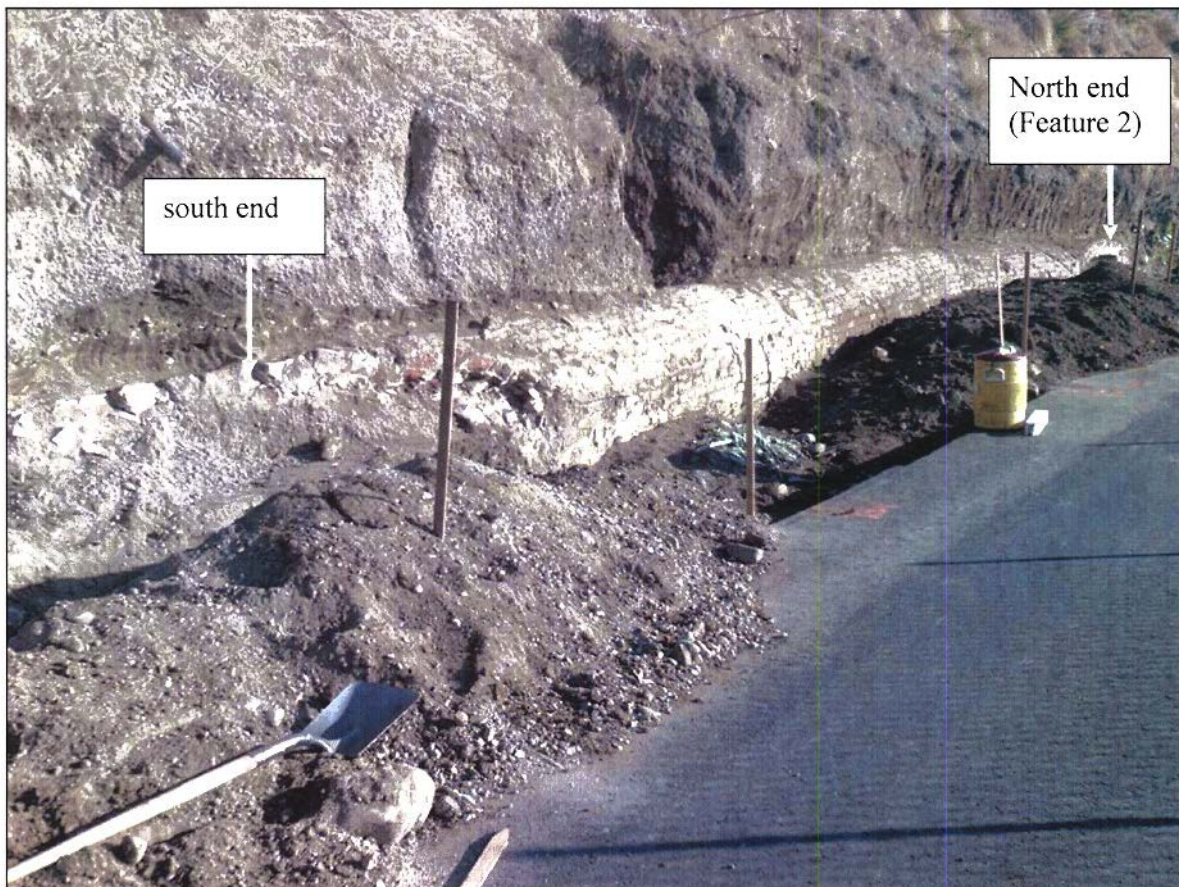


Figure 2.15. Feature 3 plan view (scale in meters)



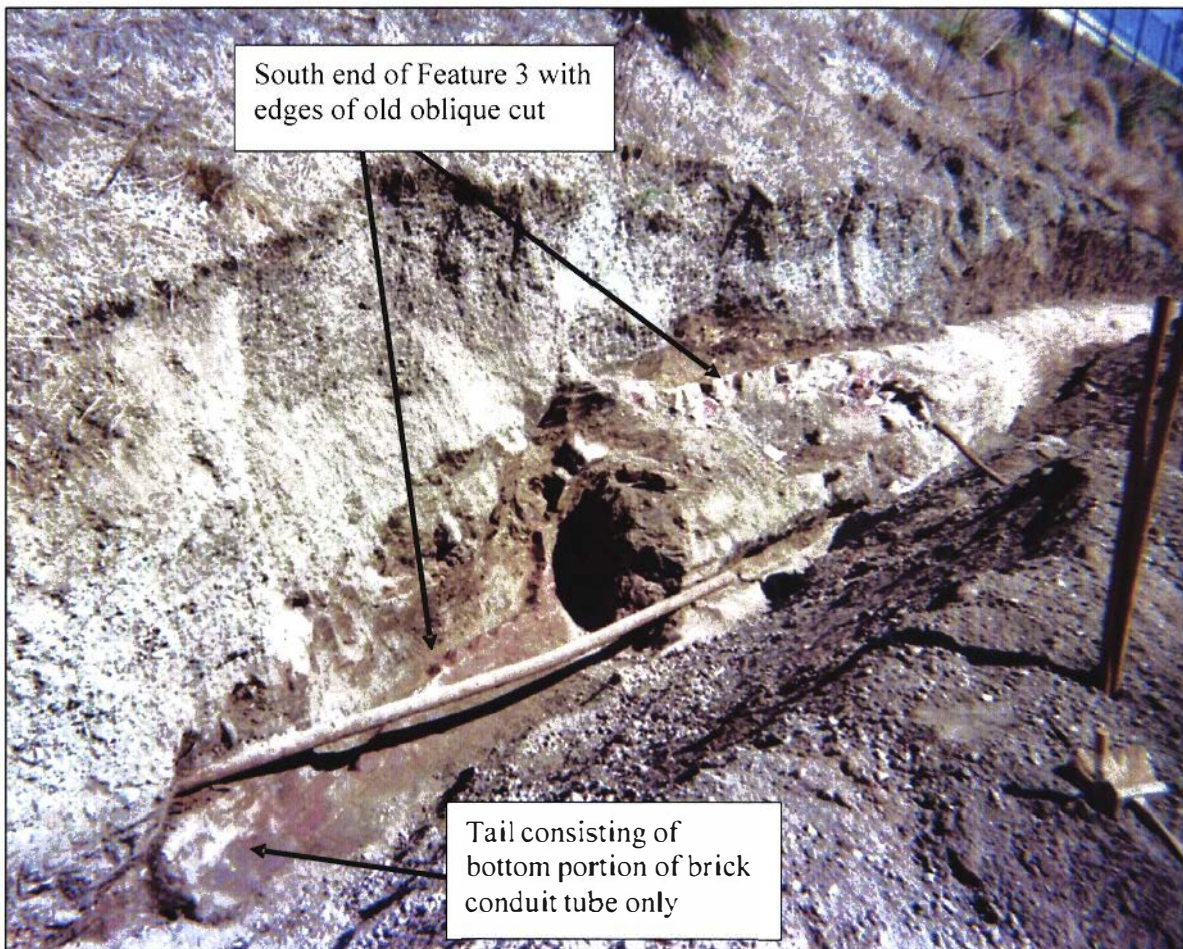
Further exploration eventually revealed that Features 2 and 3 were continuous with one another and had a total length of about 75 feet (Figure 2.16). Both the north (Feature 2) and south end of the tube of brick conduit had been obliquely impacted in the past (Figure 2.17). Historic iron pipe was associated with the cut southern end of the brick conduit.



**Figure 2.16. Zanja Madre segment of 75 feet, Features 2 & 3, view to northwest**

At both obliquely cut ends (Features 2 & 3), excavation of sediment revealed “tails” consisting of the bottom portion of the brick conduit only (Figure 2.17). Thus previous impacts were related to construction of specific elements, not destruction of the Zanja Madre.





**Figure 2.17. South end of Feature 3 showing old oblique cut and historic iron pipe, view to northwest**

This large segment of the Zanja Madre was built on a cradle of pale greenish gray, layered sand visible at the base. This distinct sand is the native sand of the Los Angeles River and was found one of many flood plain elements the Zanja site shared with the neighboring Los Angeles State Historic Park (revealed as it was graded; J. Newland, personal communication, 2006).

## FEATURE 5

Feature 5, as first observed south of Feature 3, consisted of several bricks joined by mortar sitting at an oblique angle as though slumped (Figure 2.18). Exploration revealed that this was a small piece of brick conduit Zanja Madre, consisting of about 9 partial bricks, displaced during historic construction activities.



**Figure 2.18. Feature 5 as first observed, view to west**

## ARTIFACTS RECOVERED

A few fragments were recovered from fill sediment inside the brick conduit. These were less than a dozen fragments, none of which were diagnostic (could be dated or identified specifically). The fragments were small pieces of rusty metal, glass or bone.



Artifacts less than 50 years old including partial glass bottles, can lids, nails, and miscellaneous building debris were recovered from throughout the surface most layer of slope fill (pale taupe sediments with small gravel). These artifacts were inspected and discarded.

Artifacts dating from the late 19<sup>th</sup> and early 20<sup>th</sup> centuries (1890s to 1910s) were recovered from two trash concentrations in a darker brown fill. These concentrations were about a third of a meter above and for about a meter behind the original location of the brick conduit Zanja Madre. This would appear to correspond to what would have been ground level after installation of the brick conduit Zanja Madre.

The first concentration to be noted was located 62 meters south of the south end of Feature 3 and was originally referred to as Feature 4. About two dozen rusty cut nails and a ceramic mug were recovered from the cut surface of the slope in this location. As grading eventually cut deeper into the slope additional materials were recovered including a cow rib and pig tibia plus diagnostic bottle glass, cut nails, metal fragments and rail spikes.

The other concentration was between one-half to four meters north of the north end of Feature 2 in the sidewall of the slope. Bone fragments, 669 in number, were recovered along with diagnostic bottle glass fragments, cut nails, rail spikes, rusty metal, earthenware dish fragments, etc. Cow skull fragments made up 16% of the total bone count with a minimum of six individuals present. The only other identifiable pieces of bone were two sheep metapodials and a pig humerus. Forty-one percent of the bone was heat affected. Of this total, 37% were calcined and 4% were burned. Studies have shown that only a fire of very high temperature in open air will calcine bone (turn it white). Presence of burned earth and numerous charcoal fragments indicate that this trash pile was burned in place, perhaps after an episode of dumping by area residents.

None of the artifacts recovered from trash concentrations can be associated with specific persons or events and thus do not meet significance criteria under state environmental laws. In addition, they are highly fragmented making them unsuitable for display purposes.

## THE FATE OF ZANJA MADRE FEATURES BELOW BROADWAY

Feature 1 was thoroughly mapped, measured, photographed and studied. Exploration of this feature and the surrounding area revealed it was isolated and had been impacted at both ends and bisected vertically during past construction activities, probably by Southern Pacific. This feature had low integrity and was eventually removed by backhoe as part of retaining wall construction.

Feature 5 was determined to be a small block of brick conduit that had been displaced and isolated from its original context by past construction activities. The block was comprised of damaged, partial bricks and was discarded.

The brick conduit segment represented by the conjoined Features 2 and 3 measured 63 feet in length across the top and 90 feet in length across the bottom from one obliquely cut point to the other. These “tails” of bottom-only brick conduit were carefully cut and removed as part of the process of building the retaining wall to protect the Zanja Madre. The bricks have been stockpiled in Midway Yard for potential future repairs of the Zanja Madre. Testing of brick and mortar by professional conservators to determine their constituents and provide recommendations to assist with preservation of the Zanja Madre were performed on samples from the “tails” taken on October 10, 2005. The conservators recommended a retaining wall to protect the Zanja Madre from landslides, an engineered drainage plan to prevent water pooling which might damage the bricks or mortar and no plants within six feet of the brick conduit for similar reason (Appendix B).

The remaining preserved segment of the Zanja Madre is 75 feet (23 meters) long (Figure 2.19). During construction of the retaining wall the Zanja Madre was entirely covered with black plastic and sediment, outlined with flagging tape and monitored by Cogstone archaeologists for protection of the resource. After completion of the retaining wall, the sediment was removed under the supervision of the archaeologists and gravel installed around the base for drainage (Figure 2.20). Sand and decorative boulders were then added to finish the project in April of 2006 (Figure 2.21).



**Figure 2.20. Zanja Madre with retaining wall & gravel, view to north**





**Figure 2.21. Zanja Madre final appearance, view to northwest**

The first Zanja Madre segment found on adjoining private property in 2000 is only about 5 feet long. However, the segments discovered to the south by Cogstone archaeologists in 2004 appear to represent another intact segment of brick conduit of about the same length as the one preserved by Metro on their property (Figure 2.22).



Figure 2.22. Zanja Madre segments below Broadway

## ZANJA MADRE HISTORY

The Zanja Madre was constructed by community labor within seven weeks of the founding of El Pueblo de Los Angeles in 1781 (Hoffman and Stern 2007:2). This open, earthen mother ditch originated at the Los Angeles River near the present N. Broadway bridge at the foot of the Elysian Hills and ran across the flat area at the base of a bluff past the original Plaza, then curved to serve fields southwest of the populated area (Hall 1888:567, Layne 1952; Figure 3). A brush and earth dam (toma) was used to divert river water into the ditch.

In 1855 Abel Stearns built a flour mill and obtained permission to divert the entire Zanja Madre through the mill to power the millstones (Hoffman and Stearns 2007:10) before allowing it to flow toward the Plaza. We do not know the physical structure of this portion of the Zanja Madre but it seems likely to have been enclosed rather than open in order to create power.

Flooding events washed away the toma more than once and eventually the dam was moved north to the area of modern Riverside Bridge where the river is naturally higher in elevation (Guinn 1915:391-2; Figure 4). The new dam was constructed of wooden piles.

About this time, in the late 1850s, the City granted a contract for distribution of spring water for drinking. Additional contracts were later granted to pipe water directly into homes. An extensive household water system was constructed between 1868 and 1898 by private contractors entirely separate from the zanja system. When the contracts expired, the City residents voted a bond to buy the waterworks and create a municipal water system. [Hoffman and Stern 2007:19]

Prior to 1877 the Zanja Madre and its branches consisted of open earthen channels of irregular size and grade flowing across porous, sandy ground. In 1877 the Zanja commission recommended a tunnel, 3320 feet long, to carry water from the new wooden dam in place of the open earthen zanja (Hall 1888:567). The tunnel was cut into the soft sandstone of the bluff, a few feet in from, and parallel to the face. While it was intended to be five feet wide and five feet



high, the state engineer stated that it had no regularity of grade or alignment (Hall 1888:568). He further reported that after a few months of use, the tunnel caved badly and filled with sand. Repairs were attempted including partial lining with brick but the tunnel was abandoned after the flood of 1884 carried away the wooden pile dam. The toma and earthen zanja were placed back into use.

Subsequently, the City Council appointed a board of engineers to devise a plan for the improvement of the irrigation system (Hall 1888:568). The board recommended pipes be laid in all the zanjas throughout the city, that the tunnel at the head of the Zanja Madre be put back into use and that the Zanja Madre be carried in close brick conduit from the mouth of the tunnel to First Street and down First Street to the river as an outlet for storm waters among other changes. Admitting storm waters to the zanjas kept them entirely separated from the sewers. This work would have involved laying almost 2 million feet of pipe and over 12 thousand feet of brick conduit (Hall 1888:568). In the end, only a portion of the work was performed due to budgetary constraints.

The work actually performed between after 1885 included repair of the tunnel at the head of the Zanja Madre, a new dam and 3600 feet of concrete lining for the Zanja Madre (Hall 1888:548). As of 1888, the Zanja Madre consisted of 3300 feet of embanked channel from the head, 3600 feet of masonry lined canal out from the river, 1800 feet of brick conduit of 3 ft. diameter to Capitol Mills with a drop of 18 feet for power utilization and 4900 feet of brick conduit of 3.5 ft. diameter to end at First Street (Hall 1888:544). The branches of the Zanja Madre are listed as consisting of cement or iron 30 inch pipe in the City and as open ditches thereafter.

By 1888, there were over 93 miles of zanja within the city. By 1904 the zanja system was abandoned as a water source although the conduit was partially used for the storm water or sewer systems (Hoffman and Stern 2007:19).

## Historical Maps of the Zanja Madre below Broadway

Historical maps can reveal the less known history of the Zanja Madre may be revealed by use of historic maps. A series of such maps is presented here with ten landmarks consisting of 8 streets (modern names used for clarity rather than the series of historical names), the flour mill and the Plaza. All maps are oriented with north (as much as possible) at the top of the map.

Reference to maps related to the archaeology of the Zanja Madre below Broadway (see above) show that the segments present on Metro property are approximately at Bishops Road while the segments on adjacent private property are approximately adjacent to Bernard St. (just south of Cottage Home Street).

Various of the maps show that the Zanja Madre below Broadway crossed agricultural lands, from north to south, belonging to Rafael Carbajal, Ramon Orduno and Tomas Auzero, all recipients of land grants in the 1840s. Later, substantial portions of these lands were owned by Abel Stearns and partners.

The earliest map is the well known 1949 Ord Map of the City of Los Angeles (Figure 3.1). Note that the top of the map is at modern Bishops Road and that no road existing where Broadway now runs at the top of the bluff. At this point in time the Zanja Madre appears to end just south of Aliso St. However, a zanja-like blue line appears at the base of the bluff approaching First St. and thus may extend to this location.

The next map located is the 1856 map by Hansen of the Millseat of Mellus, Scott and Stearns. The Zanja Madre is clearly shown originating north of modern N. Broadway Bridge with a toma (dirt and brush dam) to force water into it and its course hugs the bottom of the bluff along most of its length (Figure 3.2). The mill building is present by this time.

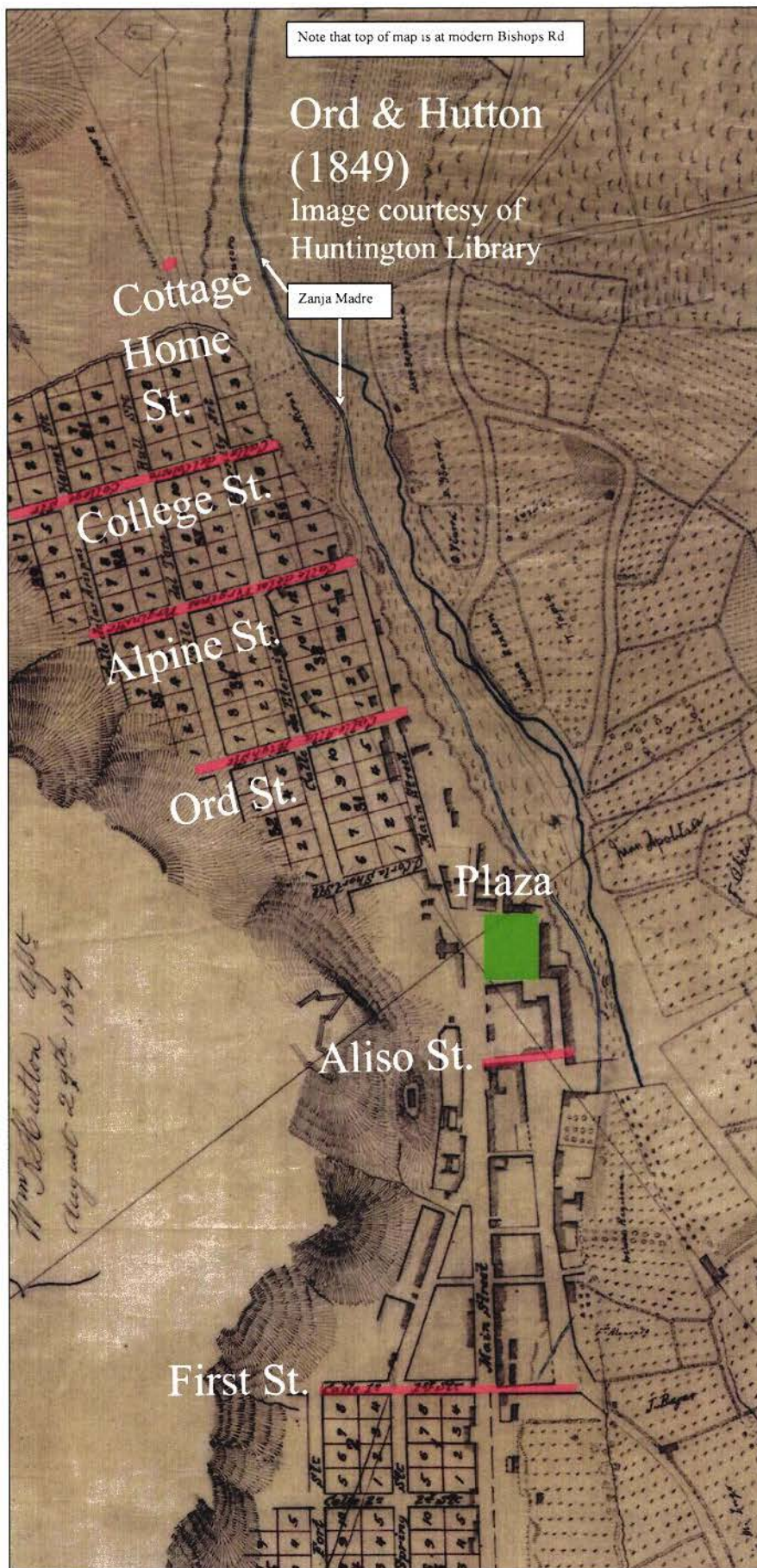


Figure 3.1. 1849 Zanja Madre



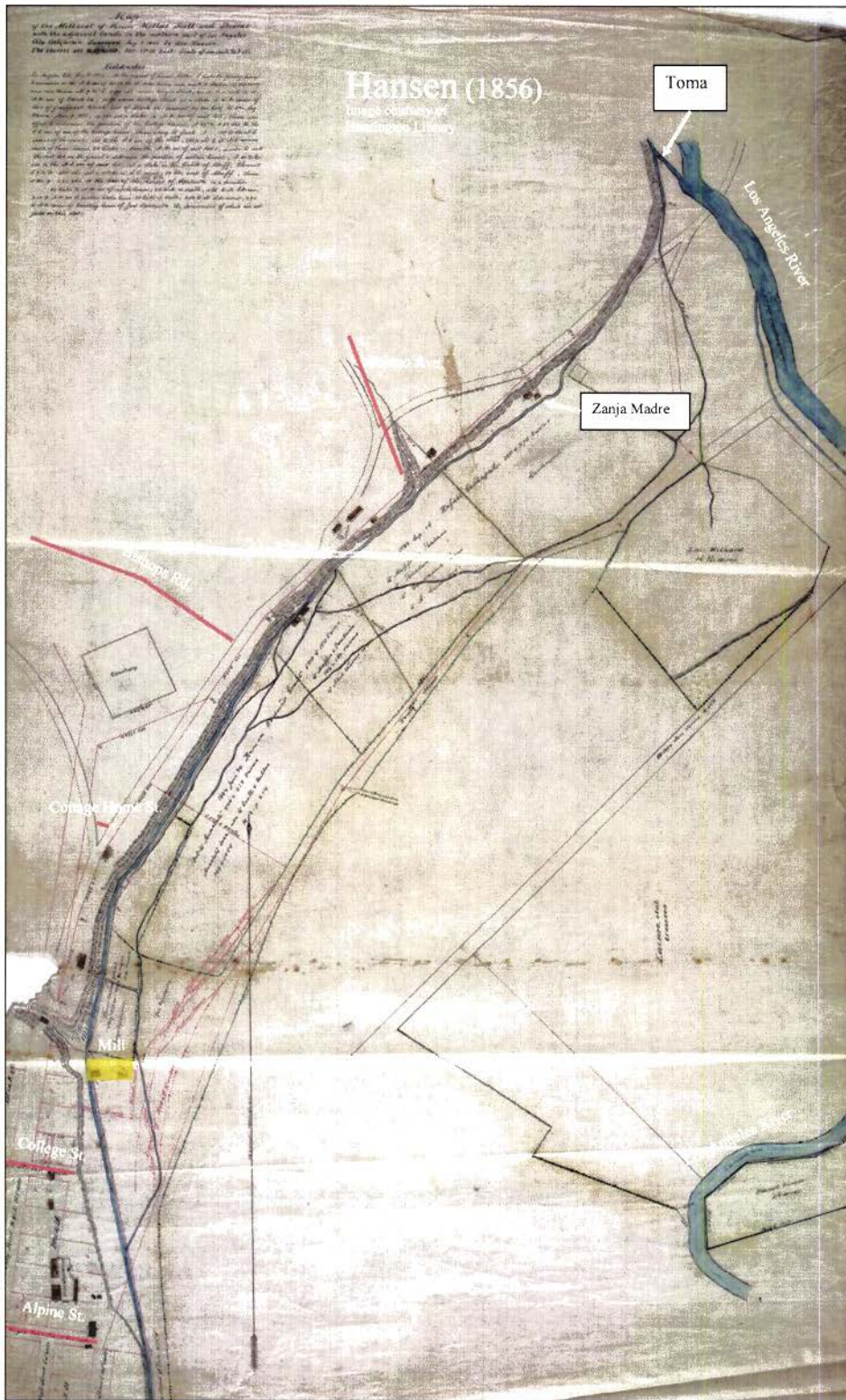


Figure 3.2. 1856 Zanja Madre

A survey plat (Hansen 1866) of the Los Angeles River shows a water wheel just south of the Zanja Madre intake which has moved substantially further northwest (Figure 3.3). This wheel elevated water to a drinking water reservoir above.

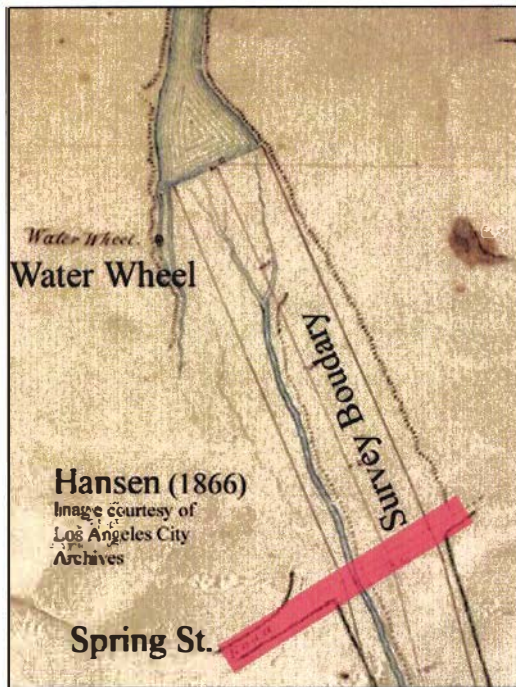


Figure 3.3. 1866 Zanja Madre origin

The 1868 map (Moore 1868; Figure 3.4), confirms more northwesterly intake of the Zanja Madre while the toma remains at the corner of the bluff (compare the curvature of the river to the position of the tomas in 1856 & 1868). Once again the Zanja Madre is shown at the base of the bluff along its course. It is shown ending a bit shy of half way between Aliso and First Streets. The first notation of a water wheel on the Zanja Madre at Solano Ave. is shown on this map. The wheel elevated water to a flume running to the drinking water reservoir at the foot of the Elysian Hills just southwest of the water wheel.

The intake, toma and water wheel of the Zanja Madre at all shown remaining in the same positions in 1875 (Kelleher; Figure 3.5). Notice also that the Zanja Madre is shown extending past First St.

A detail map for the extension of Broadway in 1876 (unknown) clearly shows the relationship of the roadway, the bluff and the Zanja Madre (Figure 3.6). It also shows the Southern Pacific Railroad as occupying the lands below the bluff.



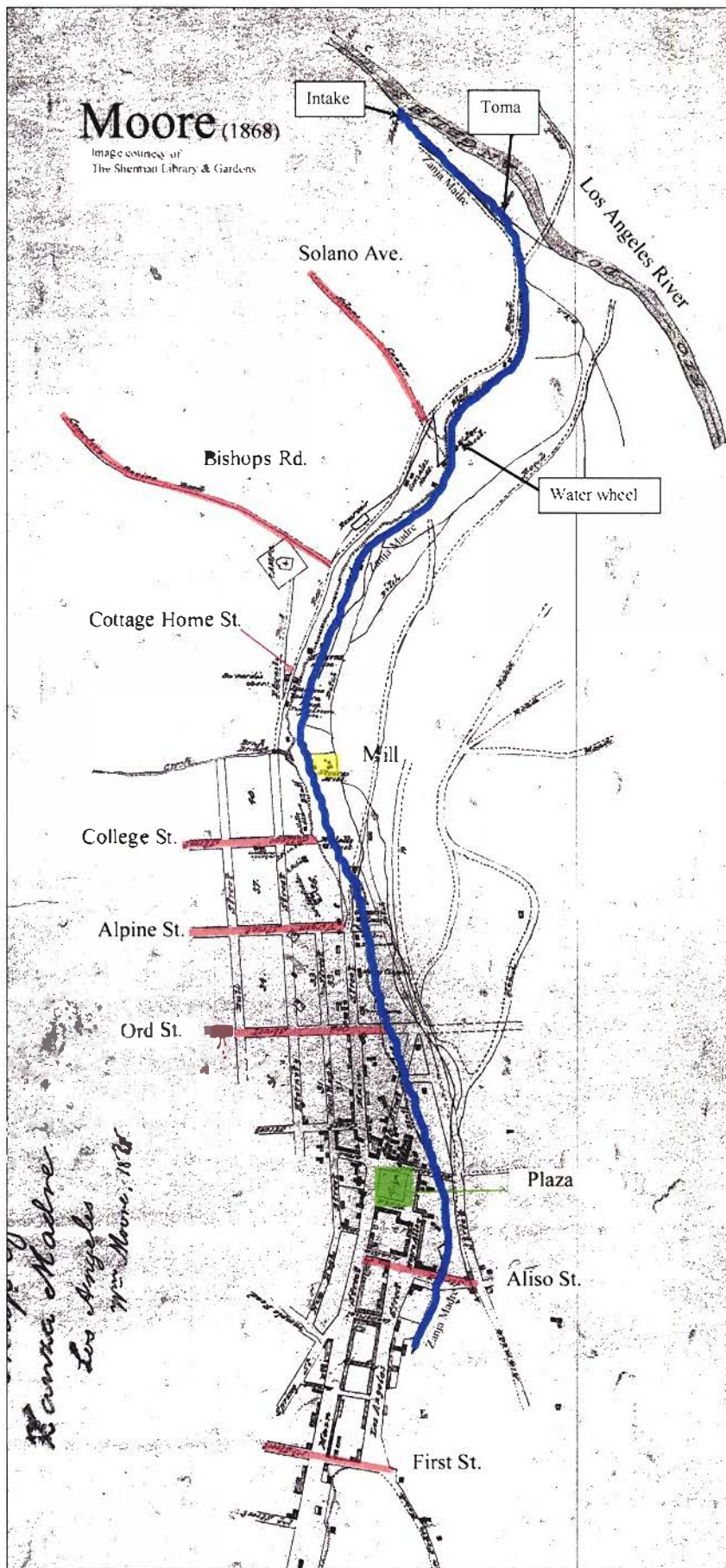


Figure 3.4. 1868 Zanja Madre



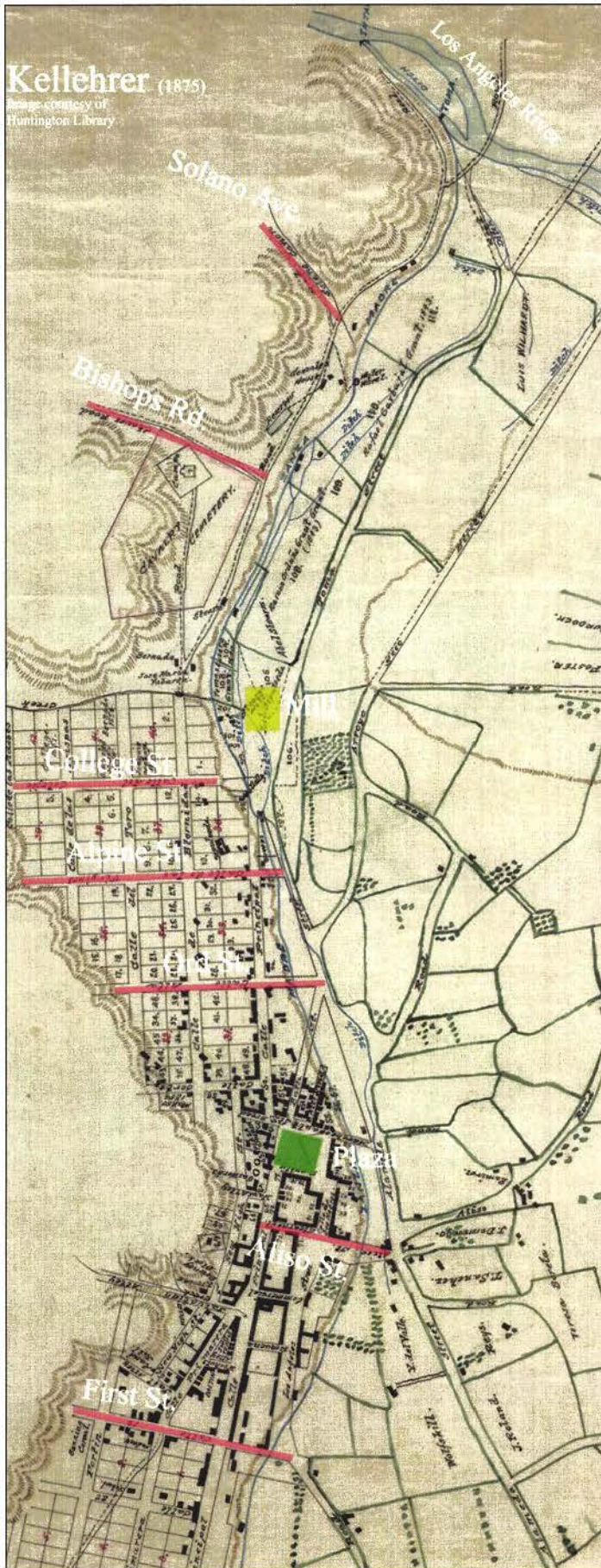


Figure 3.5. 1875 Zanja Madre

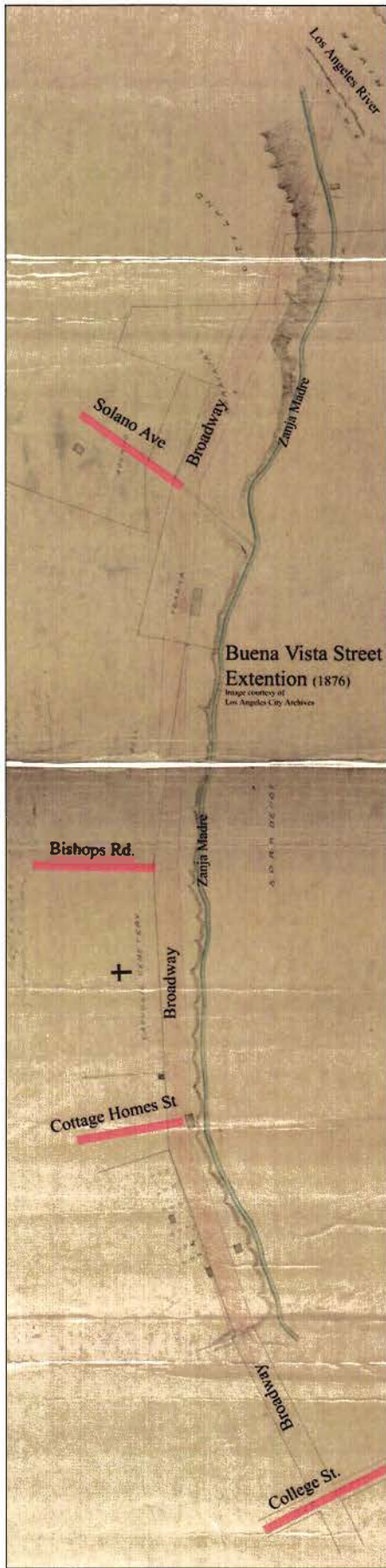


Figure 3.6. 1876 Zanja Madre

The 1888 Sanborn map shows the Zanja Madre at the base of the bluff about 20 feet west the closest track and about 30 feet west of the Round House (see Horne 2003). An 1892 map of the railyard also shows the Zanja Madre present below Broadway (then Buena Vista; Horne 2003: 6).

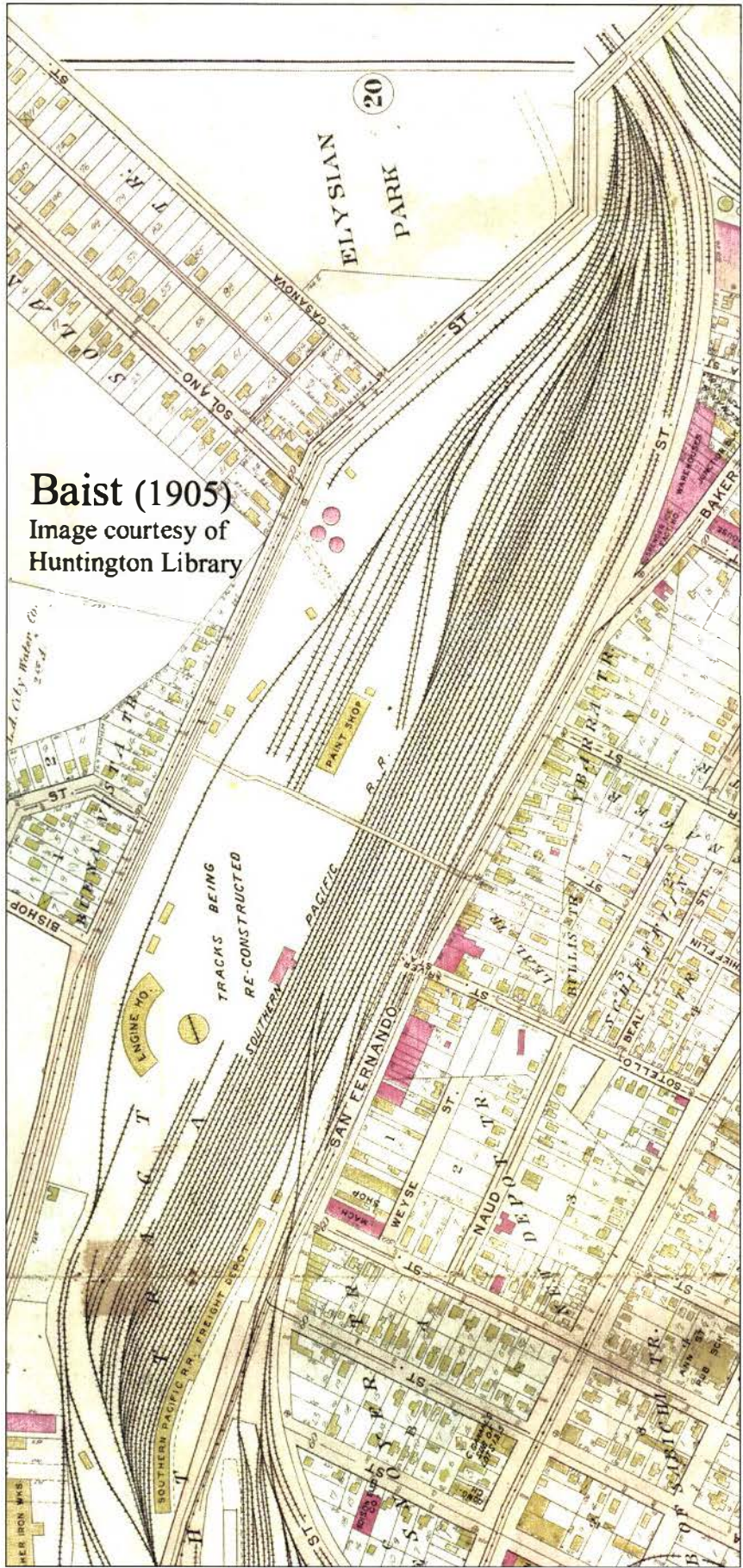
Later maps do not indicate presence of the Zanja Madre (1894 and later Sanborns and Baist Real Estate Atlases).

A 1905 map of the area of the Zanja Madre below Broadway shows construction of water tanks and small buildings between Solano Ave and Bishops Rd. that appear likely to have damaged the brick conduit Zanja Madre (Figure 3.7; Baist 1905).

A 1909 map (Gates) shows that the roundhouse present in 1894 has been removed, along with the other maintenance buildings (Figure 3.8). Several small building appear at the base of the bluff between Solano Ave. and Bishops Rd. that also appear likely to have damaged the Zanja Madre.

This is accentuated by 1914 where a new spur track appears overlying the position of the brick conduit Zanja Madre north of Bishops Rd. (Figure 3.9; Baist 1914).





Baist (1905)  
Image courtesy of  
Huntington Library

Figure 3.7. 1905 map of River Station Yard





Figure 3.8. 1909 map of River Station Yard looking north (Gates 1909)





Figure 3.9. 1914 map of River Station Yard looking northeast



## CONCLUSIONS

Partial remnants of brick conduit Zanja Madre were preserved for more than 120 years in the steep bluff below Broadway at its intersection with Bishops Rd. until rediscovery in 2005. Both archaeological and historical evidence indicate the brick conduit zanjas were built in the location of the original earthen ditches, probably by temporarily diverting water from sections.

A segment of the brick conduit Zanja Madre 75 feet long has been preserved through the efforts of Metro Rail Operations including building a retaining wall to prevent damage from slope landslides and an extensive drainage system. Currently, the structure is being nominated to the National Register of Historic Places. An update to the Zanja Madre site record was filed.

The original mother ditch or Zanja Madre was an open, earthen mother ditch that originated at the Los Angeles River near the foot of the Elysian Hills and ran across the flat area at the base of a bluff past the original Plaza. A brush and earth dam (toma) was used to divert river water into the ditch. The Zanja Madre water was used for household and irrigation purposes within the City of Los Angeles from 1781 into the late 1860s; thereafter it served mostly for irrigation. The Zanja Madre as a water system was a critical factor in the survival and growth of Los Angeles.

Improvements to the Zanja Madre and its branches failed to keep pace with population growth and were eventually discontinued. The first attempt in 1877 to enclose the Zanja Madre in a tunnel failed within months and the open ditches were returned to use. After 1884 the Zanja Madre consisted of embanked channel from the intake, masonry lined canal out from the river, brick conduit of 3 ft. diameter to Capitol Mills with a drop of 18 feet for power and 4900 feet of brick conduit of 3.5 ft. diameter ending at First Street. By 1904 the zanja system was abandoned as a water source.

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