City of FRESNO

REPORT TO THE HISTORIC PRESERVATION COMMISSION

AGENDA ITEM NO. VIB HPC MEETING: 10/24/2016
APPROVED BY
DEPARTMENT DIRECTOR

October 24, 2016

FROM: DANIEL ZACK, AICP, Assistant Director DZ
Development and Resource Management Dept.

BY: KARANA HATTERSLEY-DRAYTON, M.A. KHD
Historic Preservation Project Manager
Secretary, Historic Preservation Commission

SUBJECT: REVIEW AND PROVIDE COMMENTS ON RECOMMENDATIONS INCLUDED IN REPORT, "AN ARCHAEOLOGICAL SURVEY-GROUND PENETRATING RADAR OF ASSESSOR PARCEL NUMBER 510-233-04 THE FORESTIERE UNDERGROUND GARDENS A HISTORIC PROPERTY" PURSUANT TO FMC 12-1606(a)(1).

RECOMMENDATION

Staff recommends that the Historic Preservation Commission review the attached archaeological report and support the recommendations for further investigations on the eastern 4.41 acre parcel of the Forestiere Underground Gardens.

EXECUTIVE SUMMARY

The Forestiere Underground Gardens is a designated historic property on the City's Local Register of Historic Resources (HP# 177). It is also a registered California Historical Landmark (No. 916) and is listed as well on the National Register of Historic Places. When designated, the site was a ten acre parcel "less streets and roads" (NR nomination 28 March 1977). In 1991 the parcel was divided between two branches of the Forestiere family, with the western 4.29 acres containing "all of the underground rooms, passages and courtyards commonly known as the 'Forestiere Underground Gardens'" partitioned from the "real property east of the interior fence line which does not contain the 'Forestiere Underground Gardens."

In late 2011 the property owner of the eastern 4.41 acre parcel, Mary Forestiere, requested that the Commission recommend to the City Council that her property be removed from the Local Register of Historic Resources. The Commission held three public hearings on December 12, 2011, January 9, 2012 and on January 23, 2016 to discuss this request. At issue was the question of whether the eastern parcel includes surface or sub-surface resources that contribute to this historic property. Following additional research (including review of aerials) and testimony from the Forestiere families and the public, staff and the Commission found that there was no compelling evidence that historic features exist on the eastern parcel, with the exception of stairs and a former smokehouse on the property line between the two parcels (Exhibit A). However, the Commission, on a 5-0 vote supported the staff recommendation that the agenda item be continued until such time as an archaeological survey is prepared for the parcel (Exhibit B).

The subject parcel is now in escrow as a site for a business that must be relocated due to the proposed High Speed Rail Project. The potential new owner contracted with J and R Environmental Services who conducted a pedestrian archaeological survey of the entire 4.41 acre site. The firm sub-contracted with Scott Byram, Ph.D. who prepared a Ground Penetrating Radar (GPR) study of the northern half of the parcel (Exhibit B). The results of the pedestrian survey were negative; however, several sub-surface anomalies were reported from the GPR study. Further archaeological investigations have been recommended to confirm whether or not these anomalies represent historic features. Staff recommends that the Commission review these recommendations and find that this work should be completed prior to any further entitlement reviews on this parcel.

BACKGROUND

From 1906 to 1946 Sicilian immigrant Baldassare Forestiere created an underground complex of 65 caverns, grottos, patios, and garden courts that encircled his subterranean home, north of the city of Fresno. He was born on July 8, 1879 in Filari, a small (now abandoned) village in the Peloritani Mountains of Messina Province, Sicily. In 1902 Baldasarre immigrated to the United States with his older brother Antonio where they worked in New York City as "sandhogs" on the Holland Tunnel and Crouton Aqueduct and later on the Boston subways. By 1906 the two brothers left the east Coast and travelled to California.

The Underground Gardens which Baldassare eventually constructed in Fresno were inter-connected with underground passageways and promenades; later he added an 800-foot-long auto tunnel. To support the great mass of earth and to give permanence to his earthen sculptings, Forestiere used Roman arches, columns, and domes, hardly the work of an amateur builder. As architect Malcolm Wells has noted: "Thirteen years of training and the best we [architects] can produce are metal and glass boxes standing in parking lots! Forestiere demolishes us with a wheelbarrow and a dream." Hardpan, mortar, and cement were used not only for structural purposes, but also for textural variety and aesthetics.

The Forestiere Underground Gardens was placed on the National Register of Historic Places on October 28, 1977. The boundaries for the site included the "ten acre parcel less streets and roads." The nomination for the California Historical Landmark, also prepared in 1977, noted 7 acres of "grottos, patios and garden courts," although the inscription on the State Landmark plaque referred to the site as 10 acres:

> ***NO. 916 FORESTIERE UNDERGROUND GARDENS*** *- Here, beneath the hot, arid surface of the San Joaquin Valley, Baldasare Forestiere (1879-1946) began in the early 1900s to sculpt a fantastic retreat. Excavating the hardpan by hand, he created a unique complex of underground rooms, passages, and gardens which rambled throughout a ten-acre parcel. His work is being preserved as a living monument to a creative and individualistic spirit unbounded by conventionality.*

The Underground Gardens was designated to Fresno's Local Register of Historic Resources by the Fresno City Council on 20 March 1984. The lot size noted on the inventory forms was 595 x 633 feet and the site map (also included in the nomination for the California Historical Landmark) appeared to depict extensive "unopened" resources throughout the entire parcel.

When Baldassare Forestiere died in 1946 the property was bequeathed to Guiseppi Forestiere, who in turn left the estate to his two sons, Joseph and Ricardo in 1973. In 1991 the property was partitioned between Joseph and Ricardo with Ricardo receiving the westerly portion and Joseph receiving the somewhat larger undeveloped eastern portion. In 1993 the Fifth District Court of Appeal affirmed the partition and the California Supreme Court denied Joseph Forestiere's petition for review (Bar Bulletin April 1994).

The 1991 "Interlocutory Judgment Directing Partition of Real Property and Personal Property" described a clear separation of the property based on the location of the "Forestiere Underground Gardens," granting to one party the "real property located west of the interior fence line which contain all of the underground rooms, passages and courtyards commonly known as "Forestiere Underground Gardens", from all of the real property east of the interior fence line which does not contain the "Forestiere Underground Gardens." The Highway City Neighborhood Specific Plan of 1998 also noted that the Gardens at one time "covered in excess of ten acres," however "as a result of indifferent and hostile land use policies and development, only approximately four acres remain of the original excavations" (1998:41).

Archaeological Survey

J and R Environmental Services were contracted by the proposed new owner of this eastern parcel to prepare the archaeological survey as requested by the Commission in January 2012. Jon Brady, the Principle Investigator, meets the Secretary of the Interior's Professional Qualifications as an Archaeologist. Mr. Brady and staff conducted a pedestrian survey of the entire 4.41 acre parcel and beyond those resources previously identified (Exhibit A), found no new archaeological resources. Dr. Scott Byram, however, the lead investigator for the Ground Penetrating Radar Study, found five sub-surface "areas of interest." Area A included the already documented subterranean staircase on the boundary adjacent to the Gardens. Area B included a single linear feature that may be a tunnel or a large culvert. Area C appears to be a filled excavation area or possible sinkhole. Area D is the most intriguing: a circular feature 16 meters in diameter which may represent a former garden area similar to those on the western parcel. The last anomaly, Area E, may represent a filled in excavation or a potential cavity.

Dr. Byram has recommended that further work should be conducted to ascertain the nature of these anomalies:

- Area A: Inspection of the interior of the tunnel; however, the tunnel is of similar construction as those found on the western parcel thus additional research may be unnecessary;
- Area B: To confirm the presence of a buried feature, monitored excavation of several east-west trenches across this north/south linear feature should suffice.

- Area C: Excavate two to four trenches of sufficient length to cross the rectangular area. Trench depths should extend to a maximum of five feet.
- Area D: Complete a minimum of eight auger probes within the circle to a depth of three meters to determine whether a filled cavity or buried pit feature is present. The sample auger bores should be examined by a qualified archaeologist familiar with Fresno/San Joaquin geology; and, finally,
- Area E: Complete a minimum of six mechanical auger bores to a depth of three meters to determine if a cavity or buried floor feature exists at depth.

The Principle Investigator for J and R Environmental Services has estimated that this additional archaeological work would cost the applicant around $3,000 and could be accomplished fairly quickly. It is important to remember that whether there are completed tunnels or rooms that are extant and structurally sound may be moot as both the National Register as well as the Local Register of Historic Resources include a provision for resources that "yield or may be likely to yield, information important in prehistory of history" (Criterion iv, Local Register FMC 12-1607 (a) (1) (iv)). However, the presence of sub-surface features on the eastern parcel does not preclude new development. Typical mitigation measures include encapsulation rather than digging an entire site.

CONCLUSION

Regardless of the presence or absence of sub-surface resources on the eastern parcel, the entire 8.8 acre site is currently listed on the National, California and Local Registers. Additionally the site is conditioned by mitigations included in the Highway City Neighborhood Specific Plan. Following completion of the recommended work---if these recommendations are supported by the Commission--- the findings will be analyzed as part of the required environmental review for any new project.

Attachments:
Exhibit A - 2008 Aerial of 8.70 Acre Sire Designated as the Forestiere Underground Gardens [showing extant resources on the eastern parcel] December 2011, by Karana Hattersley-Drayton for the City of Fresno.
Exhibit B - Staff Report and HPC Executive Minutes, January 23, 2012.
Exhibit C - "An Archaeological Survey---Ground Penetrating Radar of Assessor Parcel Number 510-233-04 The Forestiere Underground Gardens A Historic Property," Prepared by Jon L Brady, M.A. J and R Environmental Services, Clovis, CA, 30 September 2016.

2008 Aerial of 8.70 Acre Site Designated as the Forestiere Underground Gardens

A: Old Smoke House
B. Below Ground Patio
C. Exit Stairway
D. Lake site
G. Site of Old Souvenir Shop

City of FRESNO

REPORT TO THE HISTORIC PRESERVATION COMMISSION

AGENDA ITEM NO. VB HPC MEETING: 01/23/2012
APPROVED BY
DEPARTMENT DIRECTOR

January 23,, 2012

FROM: CRAIG SCHARTON, Assistant Director
Development and Resource Management Department

BY: KARANA HATTERSLEY-DRAYTON
Historic Preservation Project Manager
Secretary, Historic Preservation Commission

SUBJECT: CONSIDER RECOMMENDATION TO THE CITY COUNCIL APPROVAL OF A REQUEST BY THE OWNER OF THE 4.41 ACRE PARCEL LOCATED WITHIN THE BOUNDARY OF THE PROPERTY PREVIOULSY DESIGNATED AS HP#177, TO AMEND THE LOCAL REGISTER NOMINATION TO REMOVE HER PARCEL FROM THE AREA DESIGNATED AS A HISTORIC RESOURCE PURSUANT TO FMC 12-1614 AND 12-1609.

RECOMMENDATION

Staff recommends that the Historic Preservation Commission review the attached documents, as requested from staff at the January 9, 2012 Commission meeting. Staff further recommends that the Commission continue this item indefinitely, until such time as an archaeological investigation is prepared for the 4.41 acre parcel by a consultant meeting the Secretary of Interior's Professional Qualifications for Historic Archaeology.

EXECUTIVE SUMMARY

The Forestiere Underground Gardens is a designated historic property on the City's Local Register of Historic Resources (HP# 177). It is also a registered California Historical Landmark (No. 916) and is listed as well on the National Register of Historic Places (Exhibit B). When designated, the site was a ten acre parcel "less streets and roads" (NR nomination 28 March 1977). In 1991 the parcel was divided between two branches of the Forestiere family, with the western 4.29 acres containing "all of the underground rooms, passages and courtyards commonly known as the 'Forestiere Underground Gardens'" partitioned from the "real property east of the interior fence line which does not contain the 'Forestiere Underground Gardens." Based on this 1991 court judgment, and the desire to sell and/or develop the eastern 4.41 acre parcel, the property owner, Mary Forestiere, is requesting that the Commission recommend to the City Council that her property be removed from the Local Register of Historic Resources. Pursuant to FMC 12-1609(b)(2), a public notice regarding this agenda item was published in the Fresno Bee on December 3, 2011.

To amend the designation of a property listed on the Local Register of Historic Resources the action "shall result from new information, the discovery of earlier misinformation or change of original circumstances, conditions or factors which justified the designation of the Resource or District" (FMC 12-1614). The request by the property owner to delist the eastern parcel from the boundaries of the historic resource designated as the Forestiere Underground Gardens was revlewed by the Commission on December 12, 2011 and continued to a Special Meeting of the Commission held on January 9, 2012. No final decision was made that evening to allow in part for additional research. On January 7 and January 14, 2012 staff and Commissioners toured both the eastern and western parcels of the Gardens with the property owners. Staff also researched the aerial maps available from 1937, contacted the Pop Laval archives and requested additional information from the Fresno Historical Society archives (Exhibit C). Family members representing the property owners Ric Forestiere (the Gardens) and Mary Forestiere (the eastern parcel) have also prepared materials for the Commission's review (Exhibit D).

Based on the site visits, review of all documents on file in the City's historic preservation archives and other sundry materials (see staff reports 12.12.11 and 1.9.12, Appendix E), staff finds that there is compelling evidence to support the Commission's charge pursuant to FMC 12-1614. However, due to ongoing concerns about any potential for sub-surface cultural resources, it is the City's position that an archaeological investigation prepared by a professional historical archaeologist is required for the 4.41 acre parcel, to ensure that all due diligence has been performed for this historic site with National, State and Local significance.

BACKGROUND

From 1906 to 1946 Sicilian immigrant Baldassare Forestiere created an underground complex of 65 caverns, grottos, patios, and garden courts that encircled his subterranean home, north of the city of Fresno. He was born on July 8, 1879 in Filari, a small (now abandoned) village in the Peloritani Mountains of Messina Province, Sicily. In 1902 Baldasarre immigrated to the United States with his older brother Antonio where they worked in New York City as "sandhogs" on the Holland Tunnel and Crouton Aqueduct and later on the Boston subways. By 1906 the two brothers left the east Coast and travelled to California.

The Underground Gardens which Baldassare eventually constructed in Fresno were inter-connected with underground passageways and promenades; later he added an 800-foot-long auto tunnel. To support the great mass of earth and to give permanence to his earthen sculptings, Forestiere used Roman arches, columns, and domes, hardly the work of an amateur builder. As architect Malcolm Wells has noted: "Thirteen years of training and the best we [architects] can produce are metal and glass boxes standing in parking lots! Forestiere demolishes us with a wheelbarrow and a dream." Hardpan, mortar, and cement were used not only for structural purposes, but also for textural variety and beautification.

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When Baldassare Forestiere died in 1946 the property was bequeathed to Guiseppi Forestiere, who in turn left the estate to his two sons, Joseph and Ricardo in 1973. In 1991 the property was partitioned between Joseph and Ricardo with Ricardo receiving the westerly portion and Joseph receiving the somewhat larger undeveloped eastern portion. In 1993 the Fifth District Court of Appeal affirmed the partition and the California Supreme Court denied Joseph Forestiere's petition for review (Bar Bulletin April 1994).

The question of whether underground resources associated with Forestiere are extant on the eastern (4.41 acre) parcel is critical to the request by the property owner to essentially delist her property from the Local Register of Historic Resources. In her letter of 2 November 2011, Mrs. Mary L. Forestiere cites the decision by Judge Stephen Henry in 1991 to award the "Underground Gardens" to Rick Forestiere whereas the remaining eastern parcel was undeveloped and therefore without historic status. She also notes that she has no plans to develop the property but is attempting to sell it and wishes to have the historic status removed prior to negotiating a contract.

The 1991 "Interlocutory Judgment Directing Partition of Real Property and Personal Property" in fact described a clear separation of the property based on the location of the "Forestiere Underground Gardens," granting to one party the "real property located west of the interior fence line which contain all of the underground rooms, passages and courtyards commonly known as "Forestiere Underground Gardens", from all of the real property east of the interior fence line which does not contain the "Forestiere Underground Gardens." The Highway City Neighborhood Specific Plan of 1998 also noted that the Gardens at one time "covered in excess of ten acres," however "as a result of indifferent and hostile land use policies and development, only approximately four acres remain of the original excavations" (1998:41).

New documents:

At the January 9, 2012 meeting of the Historic Preservation Commission, staff was requested to gather additional documents that may shed light on the question of extant resource above, or below the surface on the eastern 4.41 acres. Specifically the Commission requested aerials of the site, any historic photos from the Pop Laval collection, additional documents as they may exist in the Fresno Historical Society archives, as well as a copy of the National Register nomination from 1977.

High Speed Rail Consultants, AECOM of New Jersey, previously obtained and analyzed aerials for the subject parcel as part of their environmental work for the proposed High-Speed Train corridor. Their staff graciously forwarded aerials from 1937, c1946, c1961 and c2005. In correspondence with the architectural historian on the project, Patricia Ambacher noted that "looking at the aerials and the historic topos, it didn't appear to be much above ground on that eastern parcel." When questioned specifically about a lake, even on the 1937 aerial, she responded "I don't know anything about a lake being there" (e-mail communication 12 January 2012). In contrast was correspondence from Alan Tabachnick, National Director of Cultural Resources, Transportation, for AECOM who provided an aerial overlay which included images from c1946, c1961 and c2005. He noted that it appeared the images "show that there were elements of the resource on the eastern parcel, and perhaps even some underground elements along or over the parcel line" (e-mail correspondence 17 January 2012). His e-mail was followed up by telephone correspondence on the same day.

The "underground elements along or over the parcel line" would appear to include the steps, the former smokehouse and the west side room/leading to the steps, which once connected to a lake [please see prior discussion in the January 9, 2012 staff report, as attached]. In conversation, Mr. Tabachnick wondered if the region in the north part of the aerials is a stream, or some other water feature. As this is the site of the former lake it is possible that vegetation and contours of the lake are depicted in the aerials (Exhibit F). It should be recalled, however, that even by 1977 the National Register nomination for the full 8.8 acre property noted that there were only "vanishing traces" of this lake, which had mostly been in-filled

by tenants for a parking lot. By 1961 a structure (the "souvenir shop") and parking lot are clearly visible on the northern end of the eastern parcel.

On January 10, 2012 staff sent a request to Elizabeth Laval regarding any historic photos in the Pop Laval collection which depicted above ground resources, particularly on the eastern parcel. Ms. Laval responded on 12 January that there are no photos "from around the property" in their collection, only photos from the Gardens. Similarly, a request was sent to Sharon Hiigel at the Historical Society. In a telephone conversation with Ms. Hiigel, additional documents, not previously obtained or in the City's historic preservation archives, were identified. On 17 January 2012 copies of the following were hand delivered: "Creative Responses to the Italian American Experience in California: Baldassare Forestiere's 'Underground Gardens' and Simon Rodia's 'Watts Towers," (reprint from The Italian American Review 2001), a Fresno Morning Republican article dated 8 May 1927 "Forestiere's Folly: A Fresno Underground Chateau," and the 11 December 1946 obituary for Baldassare Forestiere from the Fresno Bee (Exhibit C).

The article by Kenneth Scambray in the Italian American Review is easily the most academic and thoughtful look at Forestiere and his life work in Fresno. The paper includes information from interviews with Forestiere family members and Conservancy member Silvio Manno, and describes Forestiere's work as "illuminating expressions of the Italian immigrant experience." One point of interest is that the author notes that before his death, Forestiere had excavated approximately one hundred rooms or chambers, although in a footnote Scambray observes that "it is difficult to agree on the exact number or rooms." Included in this footnote is mention of recent discoveries adjacent to the Gardens of "more Forestiere grottoes." It may be assumed that this references the three chamber underground "house" on the Hinojosa property to the west of the current Gardens which was included in a Caltrans study in 2002.

The Fresno Morning Republican article includes a series of photographs of the underground features of the Gardens, as they existed in 1927, with no additional information about a lake or any reference to potential resources which have been discussed on what is now the east parcel. The obituary of 1946 mentions "60 rooms under a five acre tract of land."

In addition to these primary and secondary documents, family members representing both Ric Forestiere and Mary Forestiere have submitted letters, as attached (Exhibit D).

Archaeological Survey

Over the past six weeks staff has analyzed numerous documents as well as testimony provided during the two prior hearings held on December 12, 2011 and January 9, 2012. In brief, there does not appear to be any substantial evidence that has been placed on the record that supports the existence of either surface or sub-surface deposits on the east parcel which meet the definition of a "historical resource," with the possible exception of the stairs and footings for the former "smokehouse" which lie along the parcel boundary, as previously discussed (January 9, 2012 staff report). However, the lingering concern that there MAY be resources underground, whether collapsed tunnels or a wine cellar, is enough to give City staff pause and to require, prior to any final recommendation, an archaeological survey of the east 4.41 acres. As discussed briefly in the December 12, 2011 staff report it is important to remember that whether there are completed tunnels or rooms that are extant and structurally sound may be moot as both the National Register as well as the Local Register of Historic Resources include a provision for resources that "yield or may be likely to yield, information important in prehistory of history" (Criterion iv, Local Register FMC 12-1607 (a) (1) (iv)).

CONCLUSION

Staff thus returns to the recommendation first made in the December 12th staff report, for an evaluation of the site by a professional cultural specialist/historic archaeologist, using perhaps the tool of Ground Penetrating Radar (GPR). Any study must be conducted by a professional meeting the Secretary of Interior's Professional Qualifications for the discipline. Staff, Commissioners, and of course property owners for the east parcel should work collaboratively with any consulting firm to design a reasonable scope of work that uses trenching and/or ground penetrating radar or other technologies to assess the location of any possible sub-surface features. It would seem reasonable to focus specifically on the area immediately east of the stairs, with only spot testing in other locations. This study would hope to conclusively support a final determination of the existence, or not, of features. One typical archaeological protocol, incidentally, is to record and then "cap" over resources, rather than to dig an entire site or even to restrict any and all future development.

Another option available to the property owner is to suspend the request for a boundary change, and allow any future project developer to prepare and provide required environmental reviews and studies. The entire 8.8 acre site is conditioned already by mitigations included in the Highway City Neighborhood Specific Plan (see December 12 staff report) and remains within the boundaries of both the National Register and California Landmark site. .

Attachments:
- Exhibit A - 2008 Aerial of the Forestiere Underground Gardens.
- Exhibit B - National Register and State Landmark Nominations 1977.
- Exhibit C - Archival materials, Fresno Historical Society.
- Exhibit D - Letter to Historic Preservation Commission from Marc Forestiere 9 January 2012; Presentation to the HPC by Anthony Forestiere, 9 January 2012; Response to Marc Forestiere's January 9, 2012 letter to The HPC 10 from Anthony Forestiere 10 January 2012.
- Exhibit E - Staff reports for December 12 2011 and January 9, 2012 (without appendices).
- Exhibit F - Aerials of Forestriere Underground Gardens 1937, c1946, c1950, c1961 and 2005.

Historic Preservation Commission: Action Agenda

The following actions were taken by the HPC at the January 23, 2012 meeting.

City Hall, Second Floor, CONFERENCE ROOM A, 2600 FRESNO STREET

I. CALL TO ORDER AND ROLL CALL,
The Meeting was called to order at 5:40 PM.

Commissioners Present: Smith, Moore, Boyd, Johnson, Simmons (arrived at 5:55 PM)
Commissioners Absent: Konczal
Staff Present: Hattersley-Drayton, Tackett and Scharton; John Fox Esq.

II. APPROVE MEETING MINUTES

A . Approve minutes of December 3, 2011 Off-Site Workshop.
*Minutes approved 4-0, **Moore** (motion), **Johnson** (second).*

III. APPROVE AGENDA
*Agenda approved as presented 4-0, motion (**Johnson**) second (**Boyd**).*

IV. CONSENT CALENDAR

V. CONTINUED MATTERS

A. Review and Provide Comments on Revisions to the *Draft Policy and Procedures Manual for Enforcing the Historic Preservation Ordinance* Pursuant to FMC 12-1626.

*Secretary to the Commission, **Karana Hattersley-Drayton** reported that **Commissioner Konczal** is working on the revisions but will not be present tonight, due to a conflict at work.*

B. Consider Recommendation to the City Council on a Request by the Property Owner to Rescind the Designation of the 4.41 Acre Parcel (APN: 510-023-04) Included Within the Boundaries of the 8.70 Acre Forestiere Underground Gardens (HP#177) Pursuant to FMC 12-1614 and 12-1609 ***(ACTION ITEM, Continued from January 9th Special Meeting).***

*Hearing was reopened to allow staff to present new information, as requested at January 9th special meeting of the HPC. **Chair Smith** cautioned that only questions and/or a presentation of facts of new information would be allowed from the applicant and the public.*

*Staff gave a power point presentation that included an analysis of new materials collected since meeting of January 9, 3012. Presentations and testimony from **Anthony Forestiere** (representing Mary Forestiere, property owner) and **Marc Forestiere, Lyn Kosewski** representing the Forestiere Underground Gardens. Additional testimony from **Silvio Manno** (Forestiere Underground Gardens Conservancy).*

On a vote of 5-0 the Commission accepted the Staff's recommendation to continue the item until such time as the property owner submits an archaeological survey for the eastern parcel. Motion made by Commissioner Johnson, with second by Commissioner Simmons.

AN ARCHAEOLOGICAL SURVEY - GROUND PENETRATING RADAR OF ASSESSOR PARCEL NUMBER 510-233-04 THE FORESTIERE UNDERGROUND GARDENS A HISTORIC PROPERTY

Submitted To:

Karana Hattersley-Drayton
Historic Preservation Project Manager
City of Fresno
2600 Fresno Street
Fresno, CA 93721

Through:

Satnam and Nirmal Singh
4715 West Shaw Avenue, Suite 110
Fresno, CA 93722

Submitted By:

Jon L. Brady, M.A.
J&R Environmental Services
17900 Auberry Road
Clovis, CA 93619

September 30, 2016

Key Words:
USGS Herndon, California, 7.5' Quadrangles Section 13, T13S R19E,
Mount Diablo Base Meridian, Forestiere Underground Gardens, Historic Property

EXECUTIVE SUMMARY

In August 2016, J&R Environmental Services conducted a Phase I archaeological investigation of Assessor Parcel Number (APN) 510-233-04, located within the historic property boundaries of the Forestiere Underground Gardens located at 5021 West Shaw Avenue in Fresno, California. The investigation consisted of both an intensive pedestrian survey as well as a ground penetrating radar survey.

This parcel is currently being sold to Satnam and Nirmal Singh by Mary Forestiere, the owner of this vacant parcel. Prior to the sale of the property, the City of Fresno Historic Preservation Project Manager has requested that an archaeological investigation that includes ground penetrating radar (GPR) be conducted. In consultation with Karana Hattersley-Drayton, City of Fresno Historic Preservation Project Manager, only the north one-half of APN 510-233-04 will be subject to the GPR survey.

Currently, cultural resources known to exist within the boundaries of this parcel include the remains of a smoke house, the subterranean staircase, a well pressure tank, wood power poles, and the remnants of a collapsed souvenir shack. None of these resources are contributing elements of the historic property known as the Forestiere Underground Gardens. The pedestrian survey resulted in no new surface cultural resources being identified; the ground penetrating radar survey (Appendix C) identified five areas of interest. Dr. Byram, who conducted the GPR survey, reports his findings at Appendix C of this report.

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1.0 INTRODUCTION

This report presents the findings of an archaeological investigation, which includes both a pedestrian survey and ground penetrating radar (GPR) survey, of a 4.41-acre parcel identified as Assessor Parcel Number (APN) 510-233-04 located in Fresno, California (Figure 1). This parcel along with a second parcel identified as APN 510-233-03, a 4.29-acre parcel, form the legal boundaries of the property identified as the Forestiere Underground Gardens (hereinafter cited as the Gardens), a historic property (Figure 2). The Gardens were listed in the National Register of Historic Places (NPS #77000293) in 1977. One year later this property was designated a California Historical Landmark (No. 916). Seven years later the Gardens were added to the City of Fresno Local Register of Historic Resources (HP#177). The Gardens is a historic property under Section 106 and a historic resource for the purposes of CEQA.

The boundaries of the historic property are contiguous with the boundaries of the two parcels (APNs 510-233-03 and -04) combined. The eastern parcel (APN 510-233-04) is the subject of the current investigation. A pedestrian survey was conducted over the entire 4.41-acre parcel, while the GPR survey was limited to the northern one-half of the parcel (Figure 3).[1]

This report documents efforts to identify surface historic-era artifacts or potential buried cultural resources that could be affected directly or indirectly by the proposed project. The staff of J&R Environmental Services initially conducted an archaeological pedestrian survey within the project study area (APN 510-233-04) in August 2016 (Figure 3). Cultural resources and features previously reported (Hattersley-Drayton 2012) within the eastern parcel included the subterranean staircase, the subsurface remains of the smoke house, a well pressure tank, a collapsed wood building (utilized as a souvenir shop, and several wood poles. Based on the pedestrian survey of the 4.41-acre parcel, no new archaeological resources were identified. As part of the identification process, a non-invasive, GPR survey was conducted in the northern one-half of the parcel in an attempt to identify any subsurface cultural resources. The results of the GPR survey are discussed below.

1.1 PROJECT DESCRIPTION

This 4.41-arce parcel is being sold by Mary L. Forestiere to Satnam and Nirmal Singh. Because this parcel is located within the boundaries of the historic property, the City of Fresno Historic Preservation Project Manager has requested that an archaeological investigation, which included a GPR survey, be conducted on this parcel due to on-going concerns about potential for any subsurface cultural resources related to the Forestiere Gardens National Register Property.

1.2 PROJECT STUDY AREA

The Project Study Area (PSA) for the archaeological investigation is limited to the eastern parcel identified as APN 510-233-04 (Figure 3). The parcel is currently vacant.

This parcel is further described as being in a portion of Section 15, Township 13 South, Range 19 East; Mount Diablo Base & Meridian (M.D.B. & M) as shown on the Herndon 7.5 Minute topographic quadrangles (USGS 1985) (Figure 2).

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[1] In consultation with the City of Fresno Historic Program Manager, the GPR survey was limited to the northern half of APN 510-233-04.

The project study area encompasses only the parcel (APN 510-233-04) being purchased. Currently, the parcel is undeveloped, but historically, it did have water conveyance systems running through it, east to west based on historic aerial photographs (Fresno County 1937 and 1946). There is also evidence of a collapsed wood structure, asphalt covering the northern one-third of the parcel, as well as the remains of a smoke house, well pressure tank, a set of buried subterranean steps located along the western edge of the parcel, and wooden electrical poles (refer to Photographs 1-3).

Photograph 1: View west toward portion of asphalt parking area in northern one-third of parcel south of Shaw Avenue (Photo taken by Jon L. Brady in September 2016).

Photograph 2: View southwest toward collapsed souvenir building west of tree and just south of asphalt parking area (Photo taken by Jon L. Brady in September 2016).

Photograph 3: View southwest toward well pressure tank (Photo taken by Jon L. Brady in September 2016).

Photograph 4: View of underground stairwell covered by plywood and corrugated metal (center of photo; Photo taken by Jon L. Brady in September 2016

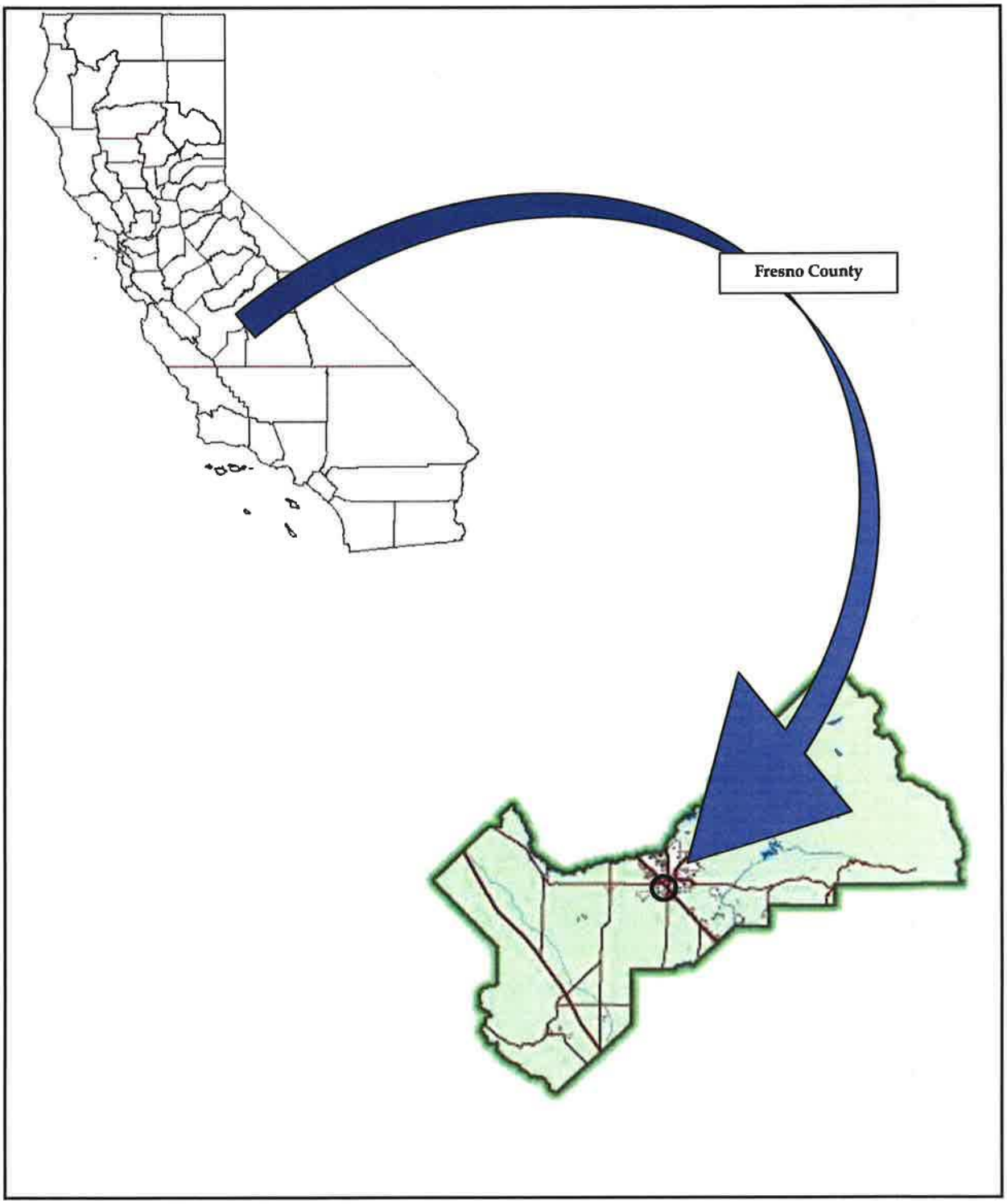

Figure 1. Project Vicinity (Fresno County).

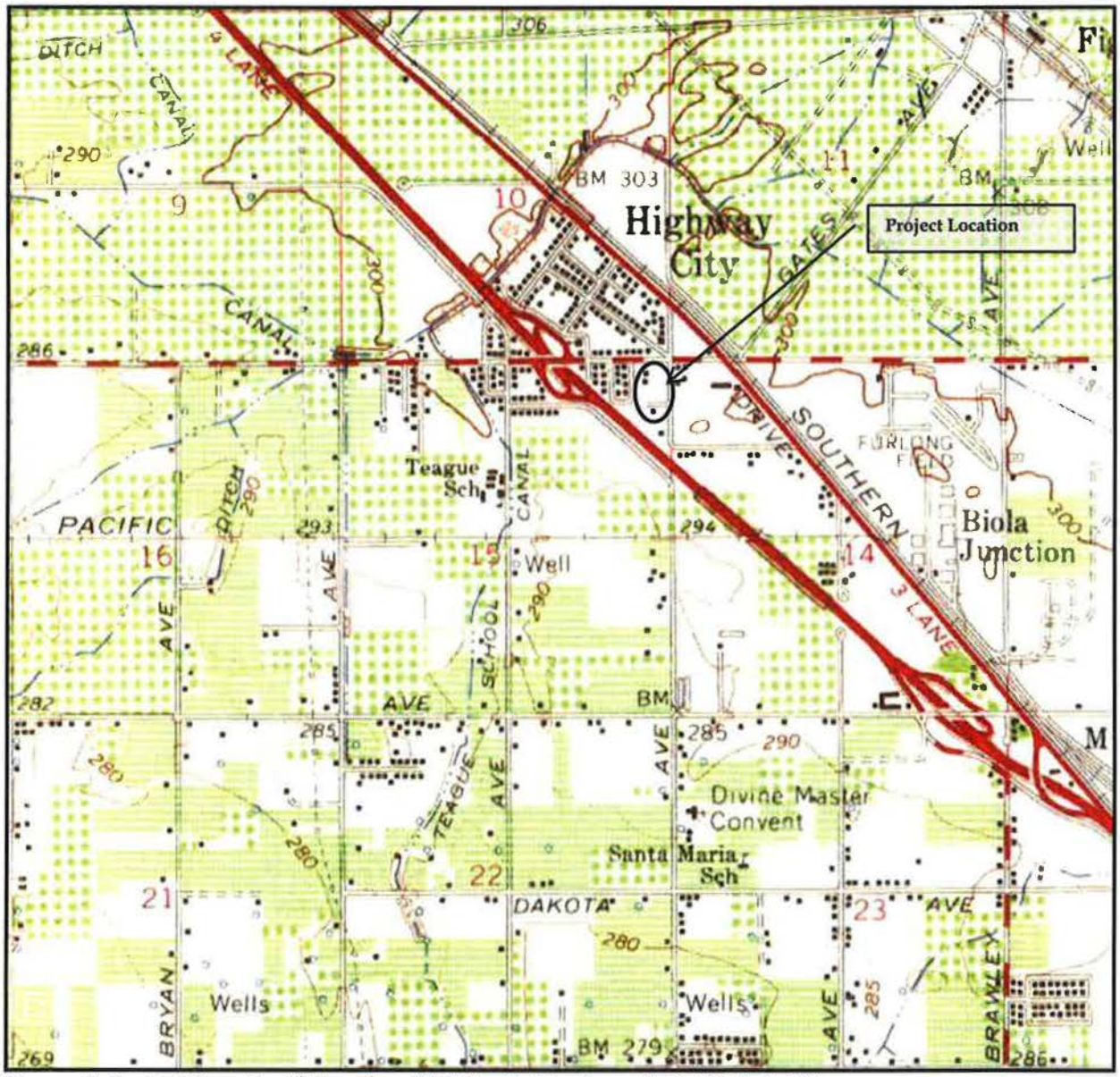

Figure 2. Project Location (Herndon 7.5 Minute Quadrangle, M.D.B. & M.).

Figure 3: Project Study Area and the GPR survey area.

2.0 BACKGROUND

2.1 HISTORY OF THE FORESTIERE UNDERGROUND GARDENS

Portions of the following history of the Gardens is summarized from a *Report to the Historic Preservation Commission* dated January 23, 2013 and authored by Karana Hattersley-Drayton, Historic Preservation Project Manager for the City of Fresno.

The Forestiere Underground Gardens were created by Sicilian immigrant Baldassare Forestiere between 1906 and 1946. He created an underground complex consisting of "...65 caverns, grottos, patios, and garden courts that encircled his subterranean home, north of the City of Fresno." Prior to coming to the Fresno area, Baldassare immigrated to the United States with his older brother Antonio in 1902. The brothers gained employment first in New York City where they worked as "groundhogs" on two large projects - the Holland Tunnel and the Crouton Aqueduct. Later they were part of the construction crews working on the Boston subway.

Upon arriving in the Fresno area, the Forestiere brothers bought an 80-acre parcel located in Highway City (presently City of Fresno), California just northwest of the City of Fresno. It was here that Baldassare commenced construction of the Underground Gardens. The complex included access of underground passageways and promenades connecting the caverns, grottos, patios, and garden courts. Baldassare would eventually construct an 800-foot long auto tunnel as well. According to Hattersley-Drayton (2012) "To support the great mass of earth and to give permanence to his earthen sculptings, Forestiere used Roman arches, columns, and domes...."

In 1946 Baldasarre Forestiere died. Forestiere left the Underground Gardens to his brother Guiseppe Forestiere and upon his death in 1973 the estate was left to his two sons, Joseph and Ricardo. Just eighteen years later, the property was partitioned between the two brothers with "...Richardo receiving the westerly portion and Joseph receiving the somewhat larger undeveloped eastern portion...," the subject of the current investigation.

While the most of the Underground Gardens are located on the parcel identified as APN 510-233-03, there are two features associated with the Underground Gardens that are located along the western edge of the APN 510-233-04. This includes the subterranean portion of the smoke house[2] (refer to Figure 3) and the subterranean staircase that was used to access the Underground Gardens from the eastern parcel. Historically, reference has been made to a lake being located on the eastern parcel. Valery Forestiere, the daughter of Richardo Forestiere, in a personal communication (August 2016) indicated that her father, Ric, remembers Baldessare and his father going across the lake/pond to one of the small islands.

Valery Forestiere related some additional information concerning the irregular shaped lake. The area within which the lake was created was originally nothing more than hog-wallows that were eventually deepened and interconnected by Balassare Forestiere. Water for the lake was provided from three sources. Well water was first pumped "...with a windmill, then by a centrifugal pump (belt-driven by a gasoline engine), ditch water, and ultimately, and electric pump as needed."The ditch water was drawn from an irrigation ditch that ran along the eastern edge (west side of present-day Cornelia Avenue). According to Marc C. Forestiere, Baldassare always drew his allotment of water from the irrigation ditch (Personal Communication, August 2016).

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[2] The roof to the smoke house was torn off (Valery Forestiere, Personal Communication August 2016).

Evidence of the irrigation ditch along the east side of APN 510-233-04 is clearly visible in a historic aerial photograph dated 1946 (Fresno County). Two ditches on the eastern parcel are visible in the 1946 historic aerial. One is located at the northern end and connecting to the lake/pond, while a second ditch oriented east/west is located about the midpoint the parcel.

Valery's father Ric shared some of his remembrances of the lake with his daughter (Forestiere, undated). Ric Forestiere notes that during 1920s during Prohibition, one of the islands was utilized by Baldassare's for his wine-making operation. The location is described as follows:

> *Housed within a hollow island in the center of the lake, thick in parts with cattail water plants and shrouded with rosebuses and other shrubbery, was his* [Baldassare] *prized wine-making operation. It was complete with fermentation tank and aging vats and barrels. It wasn't until the repeal of the Prohibition Amendment that Baldassare relocated his little hide-a-way winery within the main portion of the underground gardens.*

Although Baldassare intended to expand the lake, he never got around to doing it and with his death in 1946. With time the lake was left to dry up. Eventually, a tenant operator filled in the lake to make a parking lot on the north end of the eastern parcel.

Valery Forestiere indicated in another personal communication (September 2016) that the subterranean staircase on the eastern parcel had been created as part of the development of the lake for public use. According to Ric, Baldassare had dug the staircase so that the visiting public could go from the Gardens directly to the lake.

Finally, Valery Forestiere (Personal Communication, September 2016) noted that the souvenir shop was built in the 1950s. It was eventually torn down circa 2005. The remains of the collapsed building are still on the eastern parcel.

2.2 SIGNIFICANCE OF THE UNDERGROUND GARDENS

To this day, the Forestiere Underground Gardens remains an architectural marvel not only to the local public but across the nation. The significance of the Underground Gardens is recognized at the national, state, and local levels for its originality and uniqueness.

On October 28, 1977 the Forestiere Underground Gardens was placed on the National Register of Historic Places. The boundaries of the historic property were defined 10 acres less streets and roads (APNs 510-233-03 and -04).

In the same year, a nomination for the California Historic Landmark was also prepared. It was designated as California Historic Landmark Number 916. Seven years later, the Underground Gardens was placed on the City of Fresno's Local Register of Historic Resources (HP# 177).

Based on a review of the report entitled *Plan and Protection and Stabilization and Response Plan for Unanticipated Effects and Inadvertent Damage for 5021 W. Shaw Avenue Forestiere Underground Gardens* (JRP Historical Consulting, LLC 2015), the authors conclude the NRHP nomination that was used for both NRHP and CHL listings did not call out specific character defining features that contributed to the eligibility of the Gardens. JRP also notes that subsequent historic property recordations of the resource also failed to identify specific character defining features of the Gardens. JRP concluded that there were no character-defining features on the eastern parcel.

Based on current research, there are two features located on the eastern parcel that are associated with the Underground Gardens. This includes the remains of the smoke house and the subterranean staircases (refer to Figure 3).

3.0 RESEARCH METHODS

3.1 RECORDS SEARCH

Prior to conducting the archaeological investigation, an in-house records search (RS# 16-330) was conducted at the Southern San Joaquin Information Center of the California Historical Resource Information System (CHRIS), located on the campus of CSU, Bakersfield located in Bakersfield, California in August 2016. During the records search, the files of the SSJVIC were examined for known cultural resources in or near the project study area and previously cultural resources studies pertaining to the project vicinity. Additional sources consulted at the SSJVIC included the National Register of Historic Places, the California Register of Historical Resources, the California Landmarks List, Points of Historical Interest, the Historic Property Data File, the California Inventory of Historic Resources, as well as site records and existing cultural resources reports. The results of the research are presented below.

3.2 HISTORICAL RESEARCH

Additional research was conducted at several local repositories including the California History and Genealogy Room of the Fresno County Public Library, the Fresno County Assessor's Office, the Map Room of the Henry Madden Library on the campus of California State University, Fresno, the archives of the City of Fresno Historic Preservation Project Manager, as well as the archives of J&R Environmental Services. Internet resources included http://godfrey.org, http://ancestry.com, and http://googleearth.com.

3.3 FIELD METHODOLOGY

Prior to the archaeological investigation, a survey strategy was developed based on the culturally-modified landscape within the project study area.

The pedestrian survey was designed based on the topography, soils, and vegetation cover of the study area. The ground surface within the study area is flat and relatively heavy with vegetation, thus ground visibility was fair.

Field methodology for the GPR survey was developed by Dr. Scott Byram and is discussed at Appendix C.

4.0 RESULTS AND FINDINGS

4.1 RECORDS SEARCH

According to the records on file at the SSJVIC, there have been two surveys conducted within the project study area. This includes surveys conducted by Hudlow (1996; FR-00069) and City of Fresno (2001; FR-02011). Three additional surveys were conducted within a ½ mile radius of the project area. These includes surveys conducted by Granskog (1985; FR-00407), Lanner (2002; FR-2256) and Lanner (2008; FR-002408).

The records search revealed that one property (P-10-004416) within the project area is listed on the National Register of Historic Places and as a California Historical Landmark, the Forestiere Underground Gardens, Landmark Number 916. Four other cultural resources are located within ½ mile of the project area. This includes: P-10-003930 (segment of the Central Pacific Railroad), P-10-006024 (single family residence), P-10-006025 (a combination two-story residence/store), P-10-006027 (a single family residence), and P-10-006031 (a twelve unit apartment complex).

4.2 ARCHAEOLOGICAL SURVEY

4.2.1 Pedestrian Survey

The pedestrian survey was conducted by David Lanner and Justin Brady. They examined the visible ground surface of the project study area utilizing north/south transects spaced at 10 meter intervals. Ground visibility was fair due to the heavy vegetation in the southern two-thirds of the parcel. The archaeological survey team randomly removed vegetation to expose bare ground as part of the survey strategy. Beyond the resources already identified within the project study area, no additional cultural resources were identified.

The results of the pedestrian survey were negative.

4.2.2 GPR Survey

The GPR survey was conducted over a three day period. Dr. Scott Byram was the lead investigator for this part of the investigation. Jon L. Brady and Justin M. Brady assisted in the GPR survey.

The survey area for GPR investigation was limited to the northern one-half of the project study area. The boundaries for the GPR survey are shown on Figure 3 above. Ten grid areas (Grids 1-10) varied in size due to constraints imposed by standing as well as fallen trees. GPR transects were oriented north to south.

Five areas of interest (refer to GPR report at Appendix C) were identified by Dr. Byram after reviewing the data produced by the GPR survey. These areas are listed as A-E and are shown at Figure 3 of the GPR report (Byram 2016). These areas are discussed in detail as part of the GPR report.

4.3 FINDINGS

The pedestrian survey failed to identify any additional historic-era artifacts or features beyond those already identified within the project study area.

The GPR survey verified the presence of the subterranean staircase that was previously identified. The feature is identified in the survey as Area A. Area B resulted in the identification of a single linear feature. Dr. Byram describes this as a possible tunnel or a large culvert measuring a maximum of two meters wide and over four meters long. However, this feature was identified after the field work was completed.

Additional features were identified in Areas C-E. Area C is described by Dr. Byram as a filled excavation area or a possible sinkhole. This location is located along the east

edgy of Grid 2 (Figure 5 at Appendix C). Dr. Byram describes it as a possible filled channel area or it could be a collapsed excavated area. The results of the survey for Area D produced a circular feature that may be 16 meters in diameter. Dr. Byram suggests this circular feature may correspond with an opening that appears in a 1946 aerial photograph, he suggests this should be considered a possible former garden area such as those found on the western parcel.

Finally, Dr. Byram notes an anomaly roughly three meters by three meters defined as Area E. Dr. Byram suggests this may be a filled-in excavation or possibly the ceiling of a cavity or possibly perched water layer.

4.4 RECOMMENDATIONS

Dr. Byram has suggested the following actions be considered in relation to the five Areas of Interest (A-E):

- Area A: Inspection of the interior of the tunnel; however, the tunnel is of similar construction as those found on the western parcel thus additional research may be unnecessary;
- Area B: To confirm the presence of a buried feature, monitored excavation of several east-west trenches across this north/south linear feature should suffice.
- Area C: Excavate two to four trenches of sufficient length to cross the rectangular area. Trench depths should extend to a maximum of five feet.
- Area D: Complete a minimum of eight auger probes within the circle to a depth of three meters to determine whether a filled cavity or buried pit feature is present. The sample auger bores should be examined by a qualified archaeologist familiar with Fresno/San Joaquin geology; and, finally,
- Area E: Complete a minimum of six mechanical auger bores to a depth of three meters to determine if a cavity or buried floor feature exists at depth.

REFERENCES CITED

Forestiere, Valery

Nd Remembrances of Ric Forestiere. Prepared by Valery Forestiere.

Granskog, Jane, Ph.D.

1985 *Archaeological Survey and Historical Research Report on the Shaw Avenue Grade Separation Project Over the Southern Pacific Railroad for the City of Fresno* (FR-00407). Prepared by Cultural Resource Facility, California State College, Bakersfield, California.

Hattersley-Drayton, Karana

2012 *Historic Preservation Commission Agenda for January 23, 2012.* Prepared by the City of Fresno Development and Resource Management Department.

Hudlow, Scott H.

1996 *A Phase I Architectural Survey for the Highway City Specific Plan Area, City of Fresno, California* (FR-00069). Prepared by Hudlow Cultural Resource Associates, Bakersfield, California.

JRP Historical Consulting, LLC

2015 *Plan for Protection and Stabilization and Response Plan for Unanticipated Effects and Inadvertent Damage for 5021 W Shaw Avenue, Forestiere Underground Gardens – Merced to Fresno Section of the California High Speed Train Project.* Prepared

Lanner, David

2002 *Historic Property Survey Report – State 99/Shaw Avenue Interchange Improvement Project P.M. 27.32/28.3, Fresno, California 06-FRE-99, EA 06-442700 (Draft)* (FR-2256). Prepared by Caltrans, District 06, Fresno, California.

2008 *Archaeological Survey Report – Island Park and North Fresno Six Lane Expansion in Fresno County and Madera County 06-FRE/MAD-99 PM 26.6/30.7 & 30.3/31.6, 0.0/1.7 EA 06-442600* (FR-002408 & MA-001054). Prepared by Caltrans, District 06, Fresno, California.

Maps

USGS

1985 Herndon 7.5 Minute Topographic Quadrangle. 1985.

Henry Madden Library

1937 Aerial Photograph 13-ABI 49-77 (Fresno County). Map Room, Henry Madden Library, California State University, Fresno, Fresno, California.

1946 Aerial Photograph GS-CO 3-126 (Fresno County). Map Room, Henry Madden Library, California State University, Fresno, Fresno, California.

Personal Communication

Forestiere, Valery, August and September 2016.
Forestiere, Marc C., August 2016.

Appendix A: Qualifications of Preparers

Jon L. Brady meets the Secretary of the Interior's Guidelines for archaeology and architectural history. Mr. Brady holds a B.A. in both Political Science and Anthropology and an M.A. in History (with an emphasis on Historical Archaeology) from California State University, Fresno. Mr. Brady has worked as a consulting archaeologist and historian over the last thirty-six years working with both Section 106 and CEQA compliance documents. He has also taught at the community college level in California over a period of twenty years as an adjunct instructor. Courses taught include Ancient Civilizations, Modern European History, U.S. History, Political Science, Cultural Anthropology, and Field Methods in Archaeology.

Sarah E Johnston, archaeologist, peer reviewed this document. Sarah Johnston has conducted archaeological investigations professionally for 30 years. She holds a B.A in Anthropology from California State University Sacramento and an M.A. from California State University, Fresno. She served as Principal Archaeologist and Tribal Relations Manager for the Sierra National Forest and the Inyo National Forest. She held the position of Associate Archaeologist with the Department of Transportation (Caltrans), Central Region, for twelve years and designed numerous survey and excavation programs for large, complex transportation projects.

Justin M. Brady, working under the supervision of the Principal Investigator for this project, has fifteen years of archaeological survey experience in California. He has participated in numerous archaeological surveys in the Greater Central Valley and the Sierra Nevada. He has also participated as a research assistant in a number of architectural surveys in Fresno, Tulare, and Kern counties. Mr. Brady has also participated in a number of architectural surveys as a researcher and photographer. Mr. Brady is a junior at California State University, Fresno, majoring in History and Anthropology. He has an AA degree in Social Sciences from Willow International Community College.

David Lanner, archaeologist, participated in the pedestrian survey for this project. Mr. Lanner has completed all but one course for his BA in Anthropology and has a Bachelor of Fine Arts degree from Utah State University. Mr. Lanner has 20 years of field experience in archaeology and working with Section 106 and CEQA compliance documents.

APPENDIX B:
RECORDS SEARCH

August 9, 2016

From: J & R Environmental Services
17900 Auberry Road
Clovis, CA 93611

To: Southern San Joaquin Valley
Information Center
California State University, Fresno
9001 Stockdale Highway
Bakersfield, CA 93311-1099

RE: Record Search for Assessor Parcel Number 510-233-04 located in Highway City,Fresno County, California.

Dear Celeste:

This is a request for an in-house record search to be conducted by Justin Brady on behalf of J&R Environmental Services.

J&R Environmental Services will be conducting cultural resources surveys and the results of the survey will be submitted to City of Fresno Historic Preservation Manager, located in Fresno, Fresno County, California. The survey area is approximately 5 acres. The project study area is located on the USGS Herndon 7.5 Minute Quadrangle, M.D.B.&M., Township 13 South, Range 19 East, northeast ¼ of northeast ¼ Section 15.

Please bill me for the record search.

If you have any questions, please contact me at 559.299.4695, Cell No. 559.285.3575, or by e-mail at professorjlb@hughes.net. Thank you in advance for your cooperation in this matter.

Best regards,

/s/
Jon L. Brady
Consulting Archaeologist/
Architectural Historian

1 Encl: Project Study Area

APPENDIX C:
GPR Survey Report

Ground-Penetrating Radar Ground Penetrating Radar (GPR) for Assessor Parcel Number (APN) 510-233-04, A 4.41 Acre Parcel, Highway City, Fresno County, California

Prepared for J&R Environmental Inc

by Scott Byram, Ph.D.

August 30, 2016

Introduction

As part of archaeological site management for Assessor Parcel Number (APN) 510-233-04 for proposed development, the Ground Penetrating Radar (GPR) survey was conducted by Scott Byram in August, 2016. This is a 4.41 Acre Parcel, located at Shaw and Cornelia avenues in Highway City, Fresno County, California. A historic site on the adjacent parcel to the west had previously been identified (JRP Historical Consulting 2015).

The focal portion of the survey area is 80 meters wide and 90 meters north-south. This is approximately the northern half of a 10 acre parcel that is owned by the Forestiere family. The adjacent land to the west is the location of the Forestiere Underground Gardens, a NRHP listed property (see NRHP documents; JRP Historical Consulting, 2015). Tunnels, rooms and caverns excavated by hand from the layers of hardpan comprise a network of passages that were used for gardening as well as habitation in the first half of the 20th century. The semisubterranean nature of the property provided amelioration to a climate of extreme heat in summer and comparative cold in winter.

Prior to this study the extent of potential Forestiere excavations within the eastern parcel was not known, although excavations were known along the western edge of the eastern Forestiere parcel (JRP Historical Consulting 2015: Figure 1). The August, 2016 ground-penetrating radar project was conducted to provide a means of assessing potential subsurface passages without the need for extensive probing or trenching. Ground-penetrating radar is the most widely used technique for identifying large, buried archaeological features without excavation. However, GPR alone generally may not confirm or deny the presence of specific features, and probing of some kind may be needed to test GPR results.

The project took place August 18-21, 2016. Scott Byram, Ph.D. conducted the GPR fieldwork and analysis. Jon Brady, M.A. provided crew support and non-GPR equipment such as a Polaris quad and sled for the large GPR antenna. Brady's crew including field technician Justin Brady, operated the quad while Byram collected the GPR data.

It should be noted that this GPR survey does not constitute in any way an assessment of buried utilities or hazards, and it should not be used as a planning document for landscape engineering. This study is solely focused on designating areas for the archaeologist to probe or trench to identify features of historical significance as part of cultural resource management efforts. Prior to excavation, a safety assessment including utilities location should be conducted as is normally done for archaeological projects.

This report presents results based on a total of 215 GPR transects, most between 20 and 30 meters in length. Many of the transects were collected in systematic grids that allow processing of multicolor slice maps representing varying depths. Data from each individual transect has also been examined, and select transect profiles in grayscale are presented in this report. A metric scale appears on slice maps and transect profiles. Note that depths are approximate, and may vary by as much as 30% from actual stratum and feature depth due to the variable rate of radar travel through different sediments.

The use of a large, low frequency GPR antenna allowed for deeper penetration than is typical of GPR surveys. While the 200 MHz antenna is not suitable for identifying thin strata or small objects, tunnels and caverns suitable for human use are large enough to be readily evident with this antenna. A smaller 400 MHz antenna was also used in some areas, including corners where the large antenna was most difficult to deploy. None of the grid mapping was done with the 400 MHz antenna.

Qualifications of Surveyor

Scott Byram holds a Ph.D. in anthropology from the University of Oregon. He has supervised numerous excavations and surveys through his career, and he began involving GPR in his projects in 2005. He now primarily conducts GPR projects. During the past five years Byram's clients have included California State Parks (San Diego, Monterey, and Fort Ross), San Mateo County Parks, Oregon Parks and Recreation, the National Park Service, the Bureau of Land Management, University of California (Berkeley and Santa Cruz), Federal Energy Regulatory Commission licensees, the Confederated Tribes of Grand Ronde, and several archaeological and engineering firms in California. In addition to his consulting work, Byram is a research affiliate at the Archaeological Research Facility, University of California, Berkeley. His most recent publications include *Triangulating Archaeological Landscapes* (UC Berkeley *Contributions* Vol 65, 2013) and a forthcoming article on GPR at Sonoma Mission, in *Historical Archaeology* (Byram, Lightfoot et al. In Press).

GPR METHODS

Ground-Penetrating Radar (GPR) is a non-destructive subsurface survey technique used in geomorphology, archaeology, and other taphonomic studies (Conyers 2012, 2016). Many site types can be documented in detail with little or no excavation, depending on the nature of the GPR project. While GPR alone does not provide the data needed for detailed feature assessment, GPR plan maps and

profiles can enhance knowledge of site structure. Based on GPR findings in relation to other data sources such as probing, a strategy can be developed to focus archaeological excavations more efficiently, reducing the scale of exploratory probing and trenching (Byram et al., In Press).

GPR surveys focus on a variety of buried deposits in archaeology. These include component stratigraphy/depth and aerial extent; geomorphic stratum repose, composition, and conformity; feature size and distribution; and disturbance of deposits, such as bioturbation and pit excavation.

At the outset of a GPR project, characteristics of a site or survey location are considered in order to determine the most suitable equipment choice and survey strategy. Context geomorphology is often key to GPR setup and interpretation. Sources include soil surveys, vegetation and hydrology mapping, geotechnical bore logs, geological mapping, and auger probing. Consideration of site taphonomy from plowing, filling, weathering, frost heave, seasonal saturation and drying, and bioturbation (rodents, worms, roots) is also useful for interpreting GPR results.

Ground-penetrating radar data are generated by sending pulses of radar energy into the ground from a surface antenna at a specific time interval (Conyers 2004, 2012). The energy reflected off of buried objects, features, or strata is measured as the waves return to a receiving antenna as it is moved along a transect, collecting reflection traces at intervals tallied with a calibrated survey wheel. The data are sampled and processed by a CPU designed for this purpose, attached by cable to the receiving antenna.

As radar energy passes through different subsurface materials the velocity of the waves changes depending on the physical and chemical properties of the material (Conyers 2004). The larger the contrast in electromagnetic properties between two materials at an interface, the stronger the reflected signal. Therefore use of GPR data in archaeology depends on sediment mineralogy, ground moisture, feature depth and site topography. Electrically conductive or highly magnetic materials including some clays and salt will quickly dissipate radar energy, resulting in little or no reflection in profile and less depth of data profiles. Dry sediments are generally more reflective than saturated sediments, resulting in deeper penetration and more detailed reflections.

GPR profiles were recorded using a Geophysical Survey Systems SIR-3000 instrument with either a 200 MHz or a 400 MHz antenna, though the vast majority of the data was acquired with the lower frequency 200 MHz antenna. Data were processed using both profile viewing software (GPR Viewer) and GPR Process slice map software (Conyers and Lucius 2011), and reflection amplitude topographic plots generated with GPR Process and Surfer 7.0. Amplitude slice maps are generated for varying depths, with approximate scale at the left axis of GPR transect profile images. In some cases radar return time is displayed instead of depth, measured in nanoseconds.

Forestiere Underground Gardens

To begin the project, the adjacent property owners graciously provided access to an area of the underground gardens where subsurface rooms and tunnels could be surveyed for comparison. Both 200

and 400 MHz antennae were used in the park transects. No slice maps were made at this location but the transect profiles are informative. They confirmed that the lower frequency antenna was better suited for this study due to the size and depth of the focal features (e.g. tunnels). Below, two of the tunnels along with rooms in use appear in 200 MHz antenna transect profiles (Figures 1 and 2).

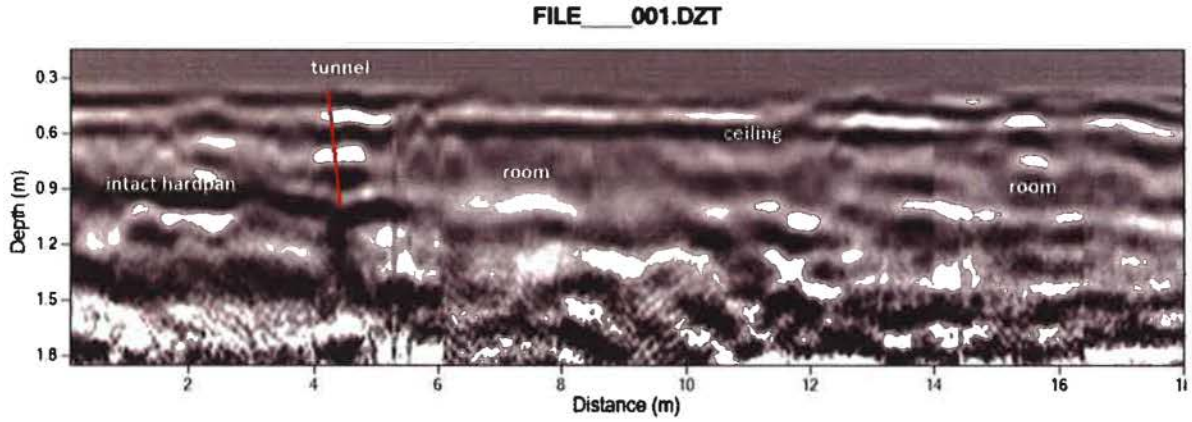

Figure 1: File 001 (200 MHz GPR transect profile) shows a partially filled, known tunnel roughly 1 meter below surface, and rooms to the right (view facing west).

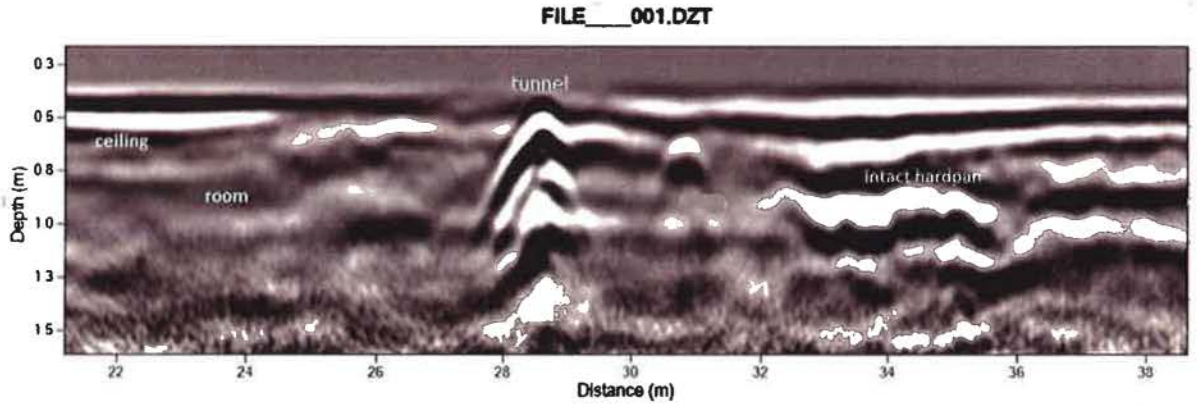

Figure 2: Transect profile in Forestiere Underground Gardens showing intact sediments at right, void spaces at left representing underground rooms and an east-west tunnel (view facing west).

Conditions and Stratigraphy at the Eastern Parcel (Survey Area)

Site conditions of the survey area, including sediments, vegetation, and obstructions, were all factors in the GPR survey results. Figure 3 is an aerial photo map of the survey area showing GPR grid locations. The west-central part of the survey area (west of Grid 6) is an area of trees, large bushes, concrete

blocks, structural wood, metal fencing, and other materials the considerably limit the potential of GPR slice map generation. Individual transects were surveyed through this area, including those crossing the stair tunnel, and each was examined for evidence of subsurface features. Grids 10 and 11 are quite narrow, but these provide slice map data from this area. In addition, the fenced perimeter presented limitations due to the presence of brush and trees, as well as the reflective properties of the metal.

Much of the southern portion of the survey area (Grids 5-9) was plowed field, with soft sediments being suitable for good antenna contact. However, the uneven plowed surface caused some up and down movement of the antenna, and this can make subsurface stratigraphic transitions appear less smooth than they actually are. The high furrows of the plowed area as well as the Russian thistle and other knee high brush required the use of a sled pulled by the quad ATV for the use of the 200 MHz antenna. This approach was found to be effective, and the data from these grids is good quality.

In the northern portion of the survey area (Grids 1-4 and perimeter), weathered but smooth asphalt pavement is present. Although cracked, this surface was consistent enough to allow consistent contact for the GPR antenna. The lack of reinforcing metal in this pavement meant that radar energy encountered little interference from the near surface.

Stratigraphy

The sedimentary sequence at the Forestiere location appears to be typical of the hardpan sequence in the Fresno area, which includes the San Joaquin Series. According to Strahorn et al. (1914:24) the soils of the San Joaquin Series "are of yellowish-red or brownish-red to deep-red color and are generally underlain by red to dark-red, heavy, compact subsoils, which are marked by the occurrence of a substratum of dense, impervious hardpan, cemented by iron solutions, and of red to red mottled gray or brown color."

As observed at the Forestiere parcel and the adjacent underground gardens (Figure 4), less than one meter of silt-clay loam overlies intact hardpan of varying depth and consistency. Tree roots, excavation, seismic activity, water erosion and other processes have broken up the hardpan in places, but these layers are widespread across the project area.

Throughout the survey area there is a depth limit to radar energy likely caused by the reflective properties of a geological layer beneath the hardpan. In much of the region there is an alkali layer beneath the hardpan (Strahorn et al. 1914). Salts are generally a limiting factor in GPR survey because salt crystals attenuate radar energy (Conyers 2004). Another possibility is that loss of radar energy throughout the soil to hardpan sequence limits the depth range of reflective data. Two meters seems to be the typical depth range for the GPR equipment used (200 MHz antenna) at the Forestiere property.

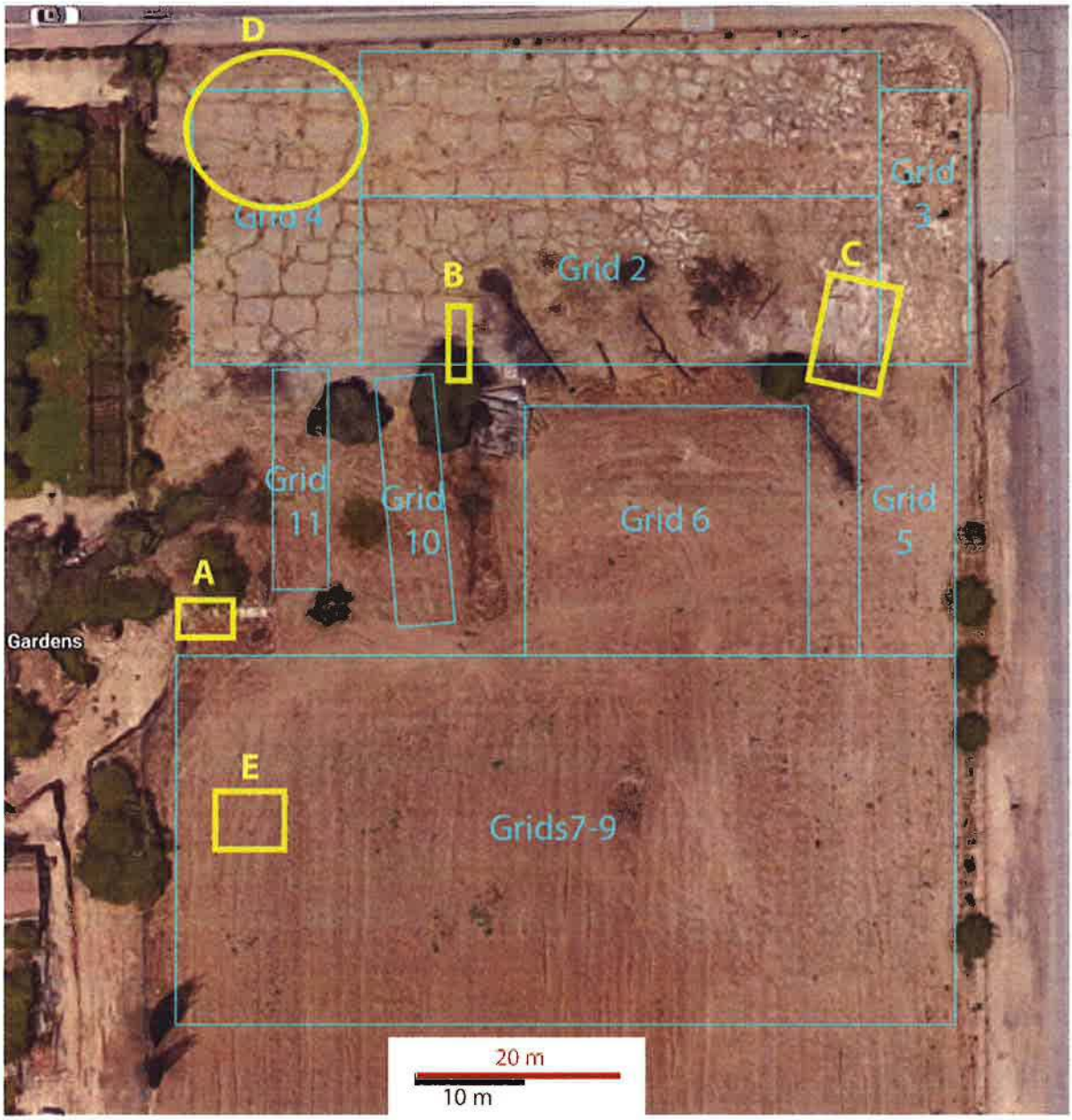

Figure 3: Project area map showing GPR grids and areas of interest A through E. In some cases these areas correspond to high amplitude reflections in slice maps shown in the following figure.

Figure 4: Photo of excavated area at the border between the two Forestiere parcels (view west from above the stair tunnel). Note the weathered stratigraphic exposure in the foreground, showing loose loam becoming more compacted, above reddish oxidized hardpan, overlying a more friable light gray substrate. This horizontal layering is evident in many of the GPR profiles.

Eastern Forestiere Parcel Survey Results

Several GPR transect profile images are shown in this report, appearing in grayscale. Combined slice maps are shown in Figure 5. For each of the 10 grids, transects that make up the grid were run in a back and forth pattern. So for a single grid, all odd (or even) numbered files go in one direction, and even (or odd) numbered files go in the opposite direction.

All GPR grids were surveyed with the 200 MHz (low frequency) antenna at one meter transect intervals. The time window (depth range) was 70 nanoseconds. Although much of the lower half of each transect profile was noise or repeated reflection from upper layers, the deeper time window was deemed best to identify deeper tunnels or cavities that may have been present.

In transect profiles results are shown as depth estimates, but these may range as much as 20-50cm from actual object or stratum depth. Surface interface settings varied as well, in particular because of varying densities of high furrows and pushed over brush (e.g. milkweed and Russian thistle) that sometimes limited instrument contact with the ground surface (affecting automatic settings). In general data are good quality despite the limitations with ground contact.

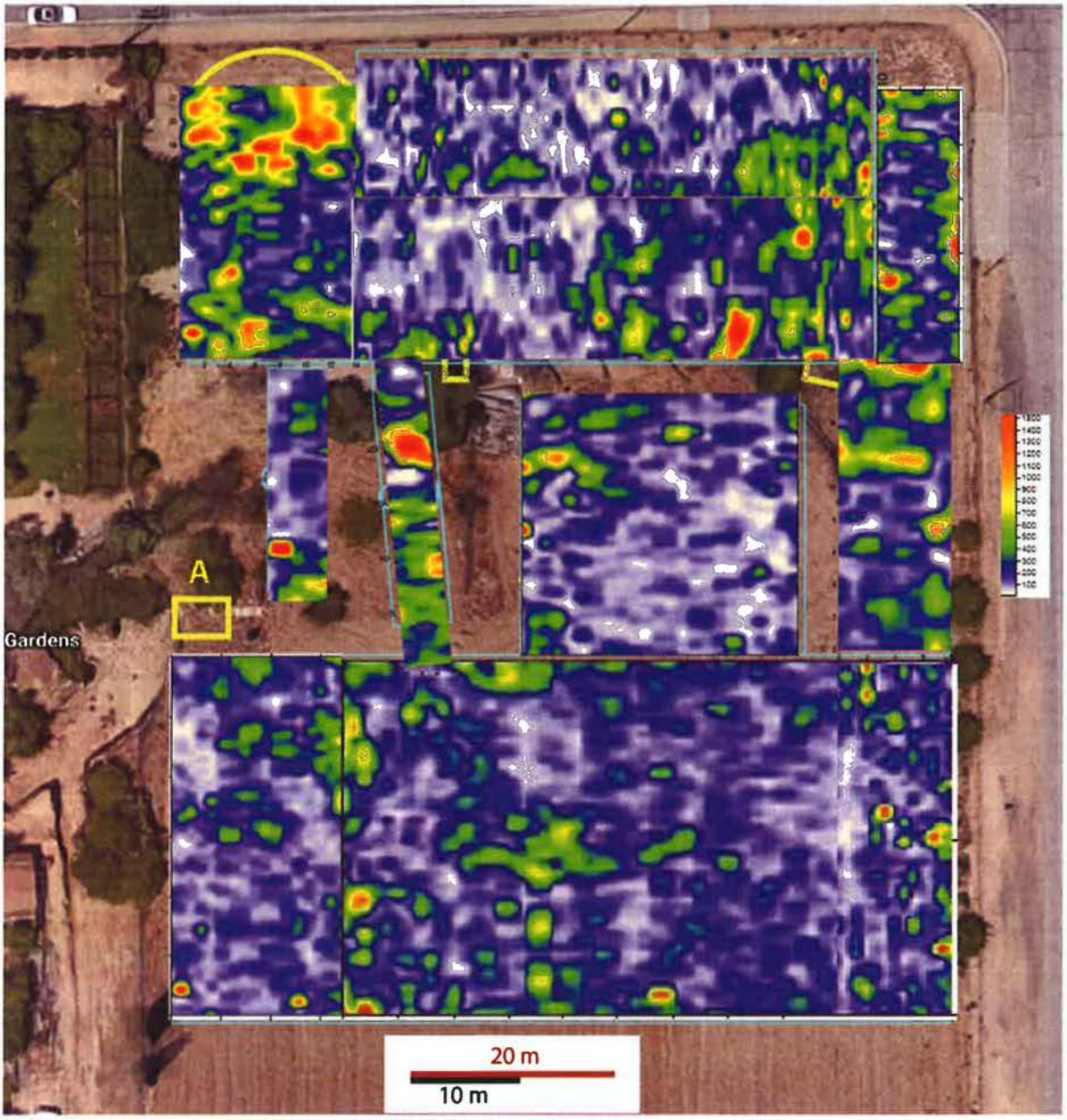

Figure 5: GPR survey area map showing amplitude slices for each grid. These slices represent a depth between 1.0 and 1.5 meters below surface. Grids were surveyed at 1 meter transect intervals with a 200 MHz GPR antenna and the SIR3000 computer. Grids 1 and 2 ran east-west, and all other grids ran north-south. Most of the higher amplitude (green, yellow, red) reflections are likely related to hardpan layers, water perching, or in some cases buried metal. Areas of interest have been determined largely though interpretation of sequences of transect profiles, as shown in other report figures.

The northern portion of the project area, grids 1-4, is an older asphalt paved surface. Cracks in the asphalt do not appear to affect the GPR signal, and the surface is comparatively smooth. The perimeter of these grids on the north, west and south edges is more vegetated, and there were limits to survey grid size in some areas. Standing trees and bushes, large debris piles, a well tank and chain link fence all limited GPR coverage in some areas, particularly in the central part of the parcel, but where possible individual (non-grid) transects were run through these tight spaces.

The southern and part of the central survey area has been under plow for many years, and GPR grid transects followed the north-south rows of these furrows. Data quality are generally good, but some topographic undulation likely produces corresponding subsurface undulation in transect profiles.

Area of Interest A: Stair Tunnel Area

In the central, western portion of the project area there is an excavated tunnel that is visible from a walkway in the adjacent property (Figure 6). This was an initial priority for GPR survey, however trees, debris, and a standing well tank make grid survey in this area impractical. Multiple GPR transects were recorded with both the 400 MHZ and 200 MHZ antennas, but the latter shows the feature in greatest detail due to depth (Figure 7).

Figure 6: Photo (facing east) of excavated "stair tunnel" entering the eastern 10 acre parcel from an excavated area in the Forestiere Underground Gardens. The tunnel was not entered during this project, but GPR transects crossed it on the grassy area between the fence and trees. This is Area of Interest A.

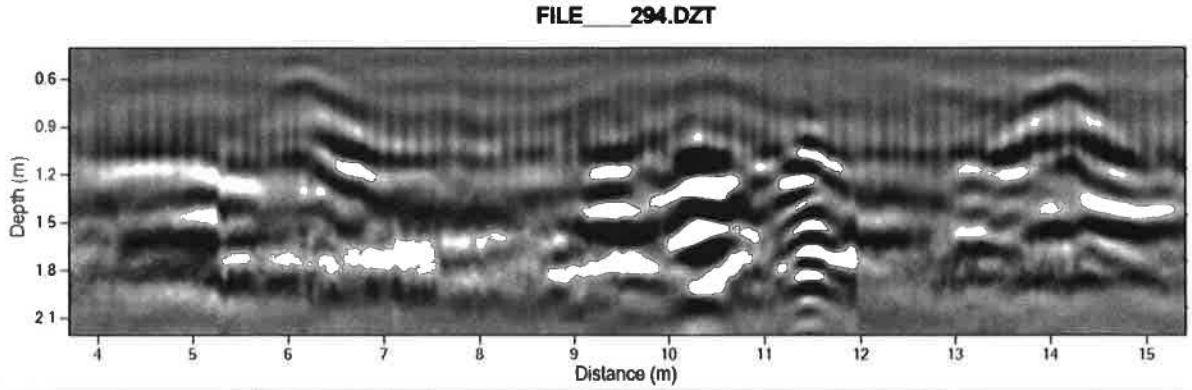

Figure 7: Transect from south to north across the stair tunnel area. Tunnel void at 9.5-10.5 meters may be bordered on the right by masonry or other objects in tunnel. Higher point reflections at 6 and 14 meters are related to metal fence poles. View facing west.

Recommendations for Area of Interest A: Inspection of the tunnel interior, if properly shored, or through fiber optic video, would allow assessment of the extent of this feature. Precision aerial photo mapping can determine if the adjacent open excavation area is within or outside the parcel.

Area of Interest B: Tunnel or Large Culvert

A single linear feature was identified in the western portion of Grid 2 running north-south past the southern edge of the grid towards the collapsed structure and olive tree at this location. Likely a tunnel or large culvert, one to two meters wide and over 4 meters long, this feature was identified subsequent to fieldwork (Figure 8). It does not appear clearly in the amplitude slice maps for Grid 2, likely because

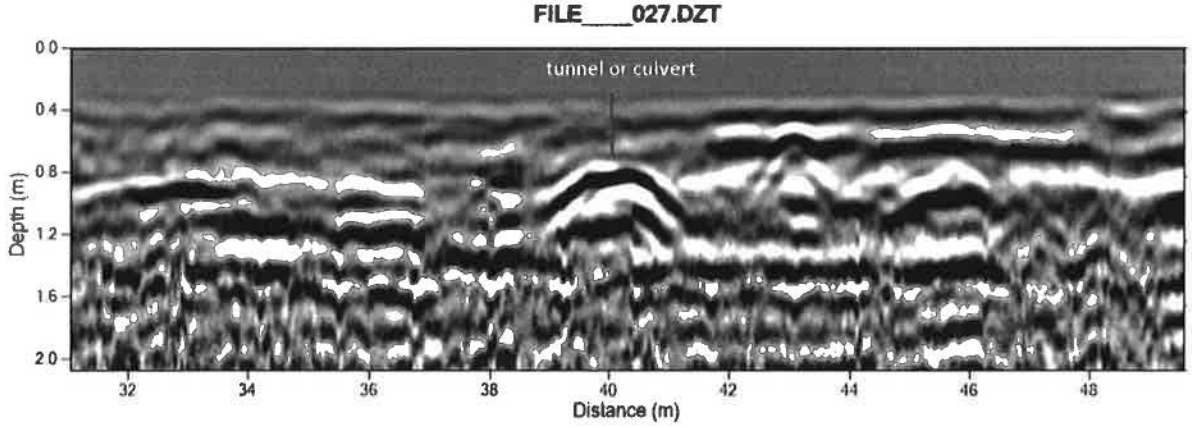

Figure 8: The western portion of the southernmost transect in Grid 2, view facing south. Area of interest B is based on a sequence of arching strata 10 meters from the west edge of the grid in four adjacent transects. The linear feature may extend farther north, but there is noise from radio interference in transects 22 and 23 to the north. The feature is not evident in more northerly transects.

of the high reflective capacity of nearby hardpan at this depth. There may also be a slope to the ceiling of the culvert or tunnel, descending southward. Sloping features are less likely to appear in slice maps, which isolate a specific depth range. The linear feature is 10 meters east of the west wall of Grid 2, or 50 meters west of the property fence along Cornelia Ave. Its sides and floor have not been documented.

Recommendations for Area of Interest B: To confirm the presence of a buried feature, monitored excavation of one or more east-west trenches crossing the north-south location of the identified linear feature should suffice. A trench depth of 5 feet should encounter the buried feature. Intact hardpan will likely need to be excavated if present, as this feature may be beneath hardpan.

Area of Interest C: Filled Excavation Area and Possible Sinkhole

This area of interest may extend north along the east edge of Grid 2, but it appears most distinct in the southwest corner of Grid 2 (though not as evident in slice maps [Figure 5] as in profiles [Figures 9, 10]). It was surveyed with 200 MHz antenna grids and limited 400 MHz transects. It may be a filled channel area, but the fill contains numerous objects (concrete rubble?). It could also be a collapsed excavated area.

On the surface, indications of a shallow sinkhole were noted immediately south of Grid 2 and west of Grid 5, in an area near a tree and log that was not suitable for grid survey.

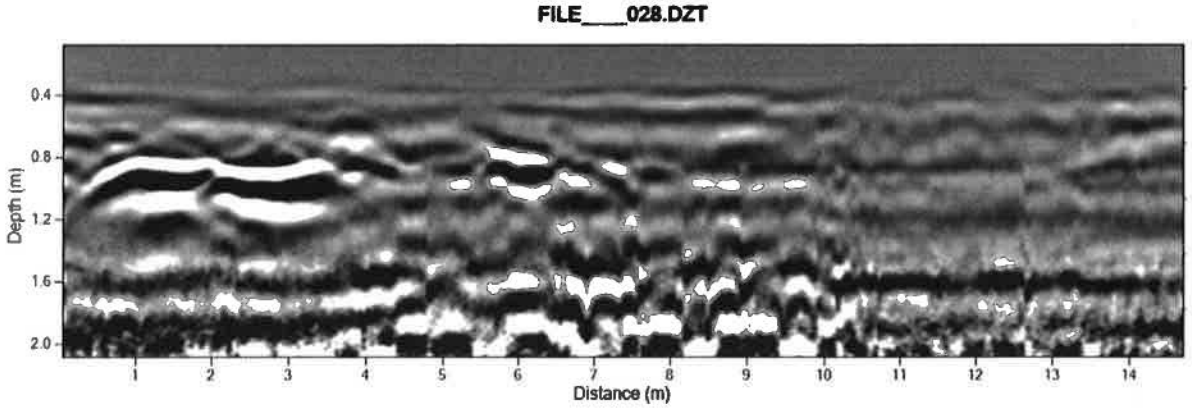

Figure 9: Planar feature in the southwest corner of Grid 3 (Area of Interest C) shows at 80-120 cm depth (from 0.5 to 3.5 m) in transect profile 28, the westernmost transect in this grid.

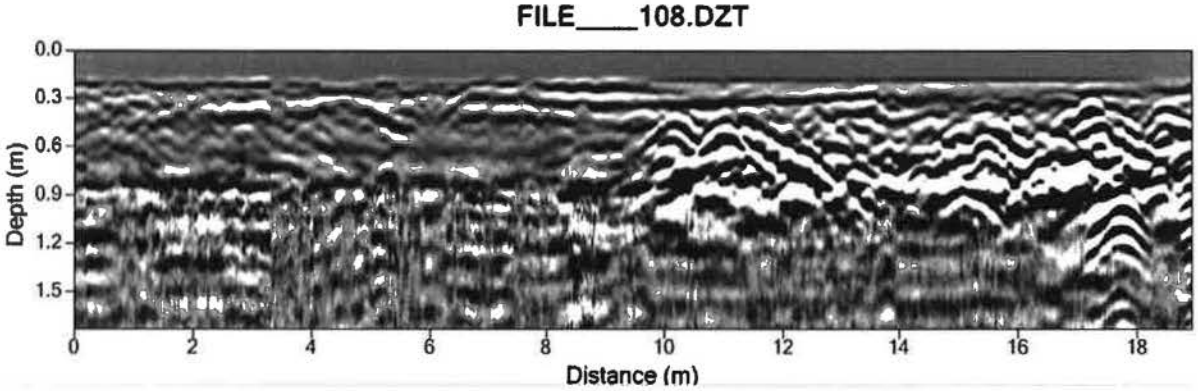

Figure 10: This is a 400 MHz (medium frequency) antenna transect running southwesterly from the eastern gate across Grid 3 and the southeast corner of Grid 2. Note the basin-shaped layer from 11-19 meters. This could be a filled channel or a collapsed cavity covered by fill. Deeper phenomena in this area are indicated in 200 MHz data. To the left, homogenous soils is indicated. Note that the medium frequency antenna is limited to less than 1.2 meters of reflected data, whereas the 200 MHz antenna recorded strata to approximately 2 meters in many areas.

Recommendations for Area of Interest C: Excavation of 2-4 trenches long enough to cross the rectangular area shown in Figure 3. Trenches should be monitored by an archaeologist. Trench depth between 3 and 5 feet should suffice. Intact hardpan need not be excavated, as this feature area appears to extend from the surface downward.

Area of Interest D:

This is a large, circular feature that may correspond with an opening that appears in a 1946 aerial photo of the parcel (Figures 3, 5). Given the correspondence between similar cleared areas and the underground garden openings in the park area to the west, this should be considered a possible former garden area. Profiles do not clearly show indications of a deep excavation here, but probing in the center of the circular area may be informative. The diameter of the feature is roughly 16 meters.

Recommendations for Area of Interest D: Excavation of at least 8 mechanical auger probes within the circled area to a depth of 3 meters to determine whether a filled cavity or buried pit feature is present. Excavated sediments should be examined by a qualified archaeologist familiar with Fresno/San Joaquin geology.

Area of Interest E

Located in the southwestern portion of the survey area, this reflective area is roughly 3x3 meters and appears in multiple slices at varying depths, though some repetition may be due to a "multiple" repeating pattern in the reflection, caused by some buried surfaces (Figures 3, 5). Probing or trenching

could reveal whether or not this is the ceiling of a cavity, a filled excavation or simply a highly reflective buried surface at depth (such as a perched water layer).

Recommendations for Area of Interest E: Excavation of at least 6 mechanical auger probes to a depth of 3 meters to determine whether a cavity or buried floor feature is present at depth. Excavated sediments should be examined by a qualified archaeologist familiar with Fresno/San Joaquin geology.

Conclusions

The extensive GPR survey conducted in August, 2016 has been highly informative. It allows additional interpretations of the history of the Forestiere property, and sets the stage for completion of archaeological resource assessment at the site. While low frequency GPR survey of the Forestiere property has been effective for identifying likely features in the upper two meters of site deposits, reflective properties of sediments limit survey of greater depths. Numerous tunnels and caverns in the adjacent underground gardens have ceilings within two meters of the surface, though there are also deeper caverns. These deeper caverns are associated with vertical shaft openings, shallow entrances, and support masonry that would be present in the upper two meters. Thus, the GPR survey of the eastern Forestiere parcel provides data needed to determine the likely extent of any such features on this unoccupied parcel. The five areas of interest shown in Figure 3 are the most likely areas for subsurface cavities to be present, whether filled or open. If probing and/or trenching at these locations reveals no subsurface historical features, then the presence of deeper features seems unlikely.

In the vicinity of Area of Interest A there may be Forestiere features that extend into the eastern parcel. These include the excavated area west of the stair tunnel as well as the stair tunnel itself. Mapping and tunnel inspection, if feasible, can determine whether these are part of the historical property. The cited subsurface map of the Forestiere Underground Gardens (JRH Historical Consulting 2015: Figure 1) should be updated as it relates to the focal eastern parcel. Historical aerial photos research conducted by Jon Brady will also address the potential for an extended east-west tunnel along the northern perimeter of the eastern parcel. Municipal widening of Shaw Avenue may have resulted in this unconfirmed feature being filled in or otherwise removed from the parcel acreage

As one of the largest archaeological GPR surveys in California, these findings demonstrate evidence of parcel usage different from today's agricultural use, but the nature of subsurface features may further be determined through excavation. The potential for subsurface tunnels and caverns on the parcel exists, but there is no indication of an extensive network of tunnels in the surveyed northern half of the eastern parcel. Some of the filled excavations may be related to historical drainage landscaping, surface gardening, structure use, farming, and parking for access to the Underground Gardens to the west. Tunnel inspection and mapping at Area of Interest A, and limited trenching or probing at the four other areas of interest will clarify the nature of the GPR patterns in these areas.