SF-80 BAYSHORE VIADUCT SEISMIC RETROFIT PROJECTS
REPORT ON CONSTRUCTION MONITORING, GEOARCHAEOLOGY, AND
TECHNICAL AND INTERPRETIVE STUDIES FOR HISTORICAL ARCHAEOLOGY

Prepared for California Department of Transportation
Cover: Aerial overview of SF-80 Bayshore Project area; view to north
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FOR HISTORICAL ARCHAEOLOGY

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EXECUTIVE SUMMARY

The SF-80 Bayshore Viaduct Seismic Retrofit Projects (SF-80 Bayshore Project), an undertaking of District 4 of the California Department of Transportation (Caltrans), involved the retrofit of columns and footings supporting the elevated structure of Interstate 80 on 10 city blocks in the city of San Francisco: from Fourth Street between Harrison and Bryant to the viaduct’s junction with SF-101, at Sixteenth Street between San Bruno and Vermont. The archaeological project reported on here was necessary to achieve compliance with the California Environmental Quality Act (CEQA). As part of its plan to comply with CEQA, Caltrans contracted with the Anthropological Studies Center at Sonoma State University (ASC) to address project impacts to prehistoric and historical archaeology.

Due to the time constraints placed upon the SF-80 Bayshore Project’s schedule, the project research design adopted the consolidated approach to CEQA compliance, wherein identification, evaluation, and data-recovery phases were collapsed into a single operation. Archaeological fieldwork took place intermittently between 19 May 1999 and 11 December 2001. ASC archaeologists monitored footing excavation at selected bents and directed the mechanical excavation of soil in sensitive areas. The predictive model developed for the project was found to be accurate; intact historic ground surfaces—a prerequisite for the occurrence of important remains—were located in the majority of footings monitored. Archaeological deposits that met the criteria described in the research design were excavated stratigraphically, by hand, using rapid-recovery methods. To identify potential prehistoric deposits associated with buried soil horizons that would be impacted by the new piles, a program of geoarchaeological soil coring was performed.

No prehistoric sites were identified. Among other remains, eight artifact-rich, historic-era privy deposits were discovered. By applying the criteria specified in the research design, one of the latter collections (Privy 7) was evaluated as ineligible to the California Register of Historical Resources due to lack of materials and poor focus; the remaining seven collections were determined eligible. The latter are curated at the Archaeological Collections Facility, Sonoma State University, Rohnert Park, California.

This report is organized into five parts, each of which describes a different project component. Part I introduces the archaeological studies for the SF-80 Bayshore Project—where the work took place, how it was envisioned, and how it developed. The results of the geoarchaeology program are reported in Part II. Though this coring program, an important stratigraphic sequence was defined that has since been used to refine the predictive modeling for prehistoric deposits in San Francisco. The program explains the apparent absence of prehistoric sites in the area of direct impact by the timing and extent of landscape changes that buried virtually all formerly stable prehistoric land surfaces. Part III describes the methods and findings of the archaeological monitoring program, including evaluations of significance. Data describing the seven California Register-eligible collections discovered during archaeological monitoring are presented in Block Technical Reports in Part IV for ease of comparison with the West Oakland/Cypress Data. Finally, in Part V the seven collections are used to address the project research design. Archaeological collections from the nearby San Francisco-Oakland Bay Bridge West Approach Project are added to the San Francisco database to allow statistical comparisons between the San Francisco collections and those found during the West Oakland/
Cypress Project. Through the use of rigorously consistent methods of recovery, lab analysis, and reporting, truly comparable samples of a population size unprecedented in the West are available for statistical analyses. Patterns are revealed at the household, neighborhood, and city levels, as well as consistencies and contrasts between San Francisco and West Oakland. A concluding reflection is offered on the implications of these results for urban archaeological research.
ACKNOWLEDGMENTS

During the Bayshore Viaduct Project’s five-year span, Caltrans’ supervision of the archaeology passed through the hands of several District 4 Environmental Planners/Archaeologists, beginning with Janet Pape and followed by Glenn Gmoser, before moving on to Thad Van Bueren, who took it to fruition. The project’s frequent logistical challenges were overcome through consultation with Caltrans project engineers Jenny Nielsen, Peter Vigliotti, and Andrew Yan, and construction contractors Mick Wilson (FCI), Mike Melvin (Balfour Beatty), and Gregg Johnson (Dillingham Construction).

The ASC field team consisted of Mike Meyer, Mike Stoyka, Bryan Mischke, Jack Mc Ilroy, Jack Meyer, Dina Coleman, Margo Schur, Mike Newland, Ginger Hellmann, and Grace Ziesing. Safety consultant Dani Renan navigated us through health-and-safety issues in the field.

Nancy Olmsted and the late Roger W. Olmsted undertook much of the project’s prefield historical research, while ASC historical researcher Elaine-Maryse Solari and her assistant, Sandra Massey, performed tightly focused, postfield research.

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Mary Praetzellis
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CHAPTER 1
INTRODUCTION

PROJECT LOCATION AND DESCRIPTION

The SF-80 Bayshore Viaduct Seismic Retrofit Projects (SF-80 Bayshore Project), an undertaking of District 4 of the California Department of Transportation (Caltrans), involved the retrofit of columns and footings supporting the elevated structure of Interstate 80 on 10 city blocks, from Fourth Street between Harrison and Bryant to the junction with SF-101 at Sixteenth Street, between San Bruno and Vermont, in the city of San Francisco (Figures 1.1 and 1.2). This portion of Route 80 was built in the early 1950s and serves as a vital transportation link between the San Francisco–Oakland Bay Bridge and points south along Route 101. Damage from the 1989 Loma Prieta earthquake created the need for such work and required that it be accomplished with the utmost dispatch.

The freeway retrofit was divided into three projects: Project 1 covered the area from Sixth Street to Eighth Street; Project 2 from Fourth Street to Sixth Street; and Project 3 from Eighth Street to the junction with SF-101 (Figure 1.3). This archaeological project was necessary to achieve compliance with the California Environmental Quality Act (CEQA). Compliance was achieved through implementation of a Treatment Plan (Mc Ilroy and Praetzellis 1997) approved by Caltrans.

The seismic retrofit projects for the SF-80 Bayshore Project were summarized in 1996 by an internal Caltrans scoping report as follows:

1. Provide bolted seat extensions with slotted holes as bearing retrofit at every girder. Provide strut ties at selected bents to transfer superstructure seismic loads to substructure.

2. At bents with steel columns, retrofit the existing column grillage anchorage and footing. The grillage retrofit consists of removing existing pedestal concrete, adding anchor plates and anchor bolts. The footing retrofit consists of increasing the existing footing size both horizontally and vertically and adding new 16-in.-diameter piles.

3. At the two-column concrete bents, retrofit the columns at every third bent. Provide cross brace and retrofit the footing at every bent. The column retrofit consists of adding longitudinal rebar and column encasement with steel jacket. The footing retrofit consists of increasing existing footing size both horizontally and vertically and adding new 24-in.-diameter pipe piles.

4. At the three-column concrete bents, retrofit columns and footings. The column footing retrofit consists of similar work as described in (3) above. The bent cap will be strengthened with the addition of reinforced concrete sections. 24-in.-diameter CIDH piles will be used and excavation underneath the existing footing is required at Seventh Street bents L64 & R62.

5. At the abutments: provide lateral shear keys and extend existing seat.
Figure 1.1. Project location – SF-80 Bayshore Viaduct Seismic Retrofit Projects, San Francisco, California
CONSTRUCTION IMPACTS

All construction was within existing Caltrans right-of-way. The potential archaeological impact derived from the retrofit, in which existing footing size was increased and new piles sunk. The original footings varied in size. On Blocks 1, 2, and 3, original footings were generally 9 x 9 ft., or 9 x 12 ft. on edge, and bottomed out around 5 to 6 ft. below grade. Retrofitted footings on these blocks are usually 17 x 17 ft., or 17 x 20 ft. on edge. Most original footings on the remaining blocks were 10 x 12 ft., 10 x 15 ft., 9 x 18 ft., or larger. Retrofitted footings now vary from 20 x 18 ft. to 33 x 21 ft. The retrofitted footings bottom out at about 6 ft. below grade. Piles were driven beneath the retrofitted footings. On Project 1 (Blocks 3 and 4), piles were driven to a depth of between 45 and 60 ft., and on Project 2 (Blocks 1 and 2), to between 45 and 80 ft. in depth. On Project 3 (Blocks 5 through 10), piles were driven to between 45 and 110 ft. in depth. The footing extensions, pile-driving, and sheet-piling were defined as an effect on any surviving buried archaeological materials in the areas of direct impact.

The SF-80 Bayshore Project adjoins another Caltrans seismic retrofit project: the San Francisco-Oakland Bay Bridge, West Approach Replacement Project (SFOBB West Approach Project). The two projects combined form a continuous corridor from Main Street to the Route 101 interchange. SFOBB West Approach Project Block 11 meets SF-80 Bayshore Project Block 1 in the middle of the block bounded by Fourth/Fifth/Harrison/Bryant. Archaeological features from three SFOBB West Approach Project blocks will be used for comparative studies in the interpretive chapter of this report.

ARCHAEOLOGICAL RESEARCH DESIGN AND TREATMENT PLAN

Archaeological sites in San Francisco, as in most urban areas, are invisible, buried under modern created land surfaces. For this reason, the preliminary phase of archaeological research consisted of using available historical information to develop a predictive model indicating where significant historical resources were likely to exist. The project research design and treatment plan (RDTP), Vanished Community, 19th-Century San Francisco Neighborhoods: From Fourth Street to Mission Creek, and Beyond (Mc Ilroy and Praetzellis 1997) was created for Caltrans to guide the following primary project tasks:

- Identify archaeological test locations where high research and survival potential coincided with project impacts;
- Provide the context, including research questions, evaluation criteria, and data requirements, within which to evaluate resources discovered during testing; and
- Supply a treatment plan for data recovery for properties that were evaluated as eligible to the California Register of Historical Resources (CRHR)

Due to the time constraints placed upon the SF-80 Bayshore Project schedule, the RDTP adapted the consolidated approach developed for the Cypress Freeway Replacement Project, wherein identification, evaluation, and data-recovery phases could be combined into a single operation. Detailed archival research identified 63 footings on portions of 8 of the 10 project blocks where historical archaeological sites with high research and
Figure 1.2. Study area – SF-80 Bayshore Project
Figure 1.3. Project block numbers and right-of-way – SF-80 Bayshore Project
survival potential were predicted to occur. Analysis of the prehistoric landscape identified 27 footing locations where former dune surfaces capable of containing buried prehistoric deposits are present. Historic and prehistoric sensitive areas overlapped at 7 footing locations. The RDTP recommended archaeological testing at 83 of the projects’ 294 footings (28%) to determine the presence/absence of the predicted important deposits, subject to logistical constraints, new hazardous soils information, and undocumented disturbances.

ARCHAEOLOGICAL PROJECT

Due to logistical and engineering constraints, it was not possible to conduct test excavations between footings. Anthropological Studies Center (ASC) archaeologists worked with Caltrans archaeologists to ensure that despite the difficulties—limited workspace, the restriction against exposing existing freeway piles, and the presence of deep overburden and potentially contaminated soils—a good-faith effort to identify significant archaeological resources was carried out.

ASC archaeologists monitored footing excavation at the selected bents and directed the mechanical excavation of soil in sensitive areas. The predictive model developed for the project turned out to be accurate: intact historic ground surfaces—a prerequisite for the occurrence of important remains—were located in the majority of the footings monitored. The evaluation criteria developed in the RDTP allowed the archaeologists to quickly determine the significance of these deposits, the majority of which related to building construction or 1906-earthquake debris, neither type of deposit being deemed significant according to that document. Archaeological deposits meeting the RDTP data requirements were excavated stratigraphically by hand using rapid-recovery methods. Some deposits were bulk-bagged for processing at the ASC.

In conjunction with the monitoring phase, which focused on the top 5 to 6 feet of fill impacted by retrofit construction at each targeted existing footing, a geoarchaeological coring program was conducted. The geoarchaeology program consisted of soil coring to a depth of up to 40 feet to determine the presence/absence of prehistoric deposits associated with buried soil horizons that would be impacted by the new piles. Investigation of these deep deposits by any other means would have been cost-prohibitive.

The areas recommended for monitoring were revised prior to and during fieldwork. Ultimately 45 locations were monitored for prehistoric sites, 41 for historic, and 2 for both. Ten of the targeted historic archaeological footings were dropped after fieldwork indicated that their research potential was low, resulting in archaeological work at just under 30 percent of the footings.

The archaeological fieldwork schedule was determined by the building contractors’ schedule. Engineering specifications limited the number and location of bents that could be excavated at a given time. Fieldwork for the SF-80 Bayshore Project took place intermittently between 19 May 1999 and 11 December 2001. Due to the potential presence of hazardous soils, all of the archaeological field personnel were Cal-OSHA- certified for Hazardous Waste Operations at the 40-hour level and were current with the 8-hour annual recertification. Appendix A contains a list of project personnel.
The ASC field team identified and excavated a total of eight privy deposits, which were processed by the lab crew. One of these (Privy 7) was evaluated as ineligible due to paucity of materials and focus. Site record forms were completed for all blocks on which monitoring occurred (Appendix D). No prehistoric sites were identified. The geoarchaeology coring program resulted in the reconstruction of an important stratigraphic sequence that has been used to refine the predictive modeling for prehistoric deposits in San Francisco.

The artifact collections are curated at the Archaeological Collections Facility, Sonoma State University, Rohnert Park, under the following accession numbers: Block 3, 2000-19; Block 4, 1999-9; Block 6, 2000-21.

An interactive website is being developed as part of the SF-80 Bayshore Project in accord with the public-outreach requirement of the RDTP.

**REPORT ORGANIZATION**

This report is organized into five parts, each describing a different project component. Part I provides an introduction to the archaeological study for the SF-80 Bayshore Project—where it took place, how it was envisioned, and how it developed. The ASC Geoarchaeologist provides an overview of research on buried sites in the project area and reports on the results of the geoarchaeology-coring program in Part II. Part III provides a research context for the historical archaeology, including a summary of the historical overview presented in the RDTP. It follows with descriptions of the methods and findings of the archaeological monitoring program, which developed from the RDTP testing program, including evaluations of significance. The seven CRHR-eligible historic features discovered during archaeological monitoring are presented in Part IV, using the Block Technical Report (BTR) format developed for the Cypress Replacement Archaeology Project. The BTR format allows the collection to be easily used for comparative research. Lastly, in Part V, the findings from the seven privies will be used to address the SF-80 Bayshore Project’s research design. Due to the limited scope and findings from the project, archaeological features from nearby Blocks 5, 9, and 11 of the SFOBB West Approach Project have been added to the San Francisco database to enable some preliminary comparisons between these San Francisco deposits and those found on Caltrans’ Cypress Freeway Replacement Project in West Oakland (Praetzellis and Praetzellis, eds. 2004).

Appendix A lists the duties and qualifications of project personnel. Appendix B contains tables of the Significant Statistical Findings of comparisons between aspects of the SF-80, SFOBB West Approach, and Cypress Replacement project collections. SFOBB West Approach Feature Snapshots are included as Appendix C. Appendixes D through I are included on the compact disk attached to this report. Site-record forms are presented as Appendix D. A concordance of numbers assigned to record site stratigraphy is presented as Appendix E. The geoarchaeology program boring logs comprise Appendix F and the accompanying radiocarbon findings make up Appendix G. Statistical studies of faunal remains, glass and ceramic containers, and ceramic vessels from SF-80 Bayshore, SFOBB West Approach, and the Cypress Freeway Replacement projects are included as
Appendix H. The detailed artifact catalog in its entirety is included as Appendix I. The database is also presented in both Excel 2000 and Access 2000 for ease of user accessibility. Researchers may add data fields for social and economic characteristics, date, and any other category that they chose to explore, or they may expand the database to include their own projects.

This report owes a debt to the contributors to the Caltrans research designs and treatment plans that preceded it, beginning with the SF-80 Terminal Separation Rebuild in 1993, the Cypress Freeway Replacement Project in 1994, and the present SF-80 Bayshore Project in 1997. In keeping with the technical nature of the current report, individual contributors are only given bylines for new, interpretive material presented for the first time herein.