ABSTRACT

Title of Thesis: THE EFFECT OF LANDSCAPE EVOLUTION ON THE VISIBILITY OF THE ARCHAEOLOGICAL RECORD: A CASE STUDY FROM DEEPLY BURIED SITE CA-SLO-16, MORRO BAY, CALIFORNIA

Emily Marie Bales, Master in Professional Studies, 2023

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Morro Bay, California, is a biotically-diverse region with a rich cultural history. In the archaeological community, there is an ongoing debate over the probable cause for an occupational hiatus in the region during the Middle Period (2600-1000 BP). This case study addresses this disparity and presents the results of a single component, deeply buried, Middle Period archaeological site. This thesis highlights how landform age, landscape evolution, and geoarchaeological methodology can affect the probability of identifying deeply buried archaeological sites. Interdisciplinary data (e.g., seismology, geology, geography, paleoseismology) have proven useful in making a significant contribution in the understanding of a previously unknown period of occupation in Morro Bay.

THE EFFECT OF LANDSCAPE EVOLUTION ON THE VISIBILITY OF THE ARCHAEOLOGICAL RECORD: A CASE STUDY FROM DEEPLY BURIED SITE CA-SLO-16, MORRO BAY, CALIFORNIA

by

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Dedication

To my grandparents, without whom, none of this would have been possible.

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Countless friends, family, and colleagues deserve to be recognized here. I am so lucky to have a community that has lifted me over the difficult times and celebrated alongside me during good times. First, I would like to thank my brilliant professors at University of Maryland, College Park. I would also like to thank my undergraduate professors and advisors, Jenn Perry, Mike Glassow, and Amber VanDerwarker. I am eternally grateful to the company in that I am lucky enough to be employed, Far Western Anthropological Research Group. I cannot count the number of times my colleagues have listened to me talk about this research. I thank Kathleen Montgomery and Jill Bradeen for the beautiful maps and figures used in this research. A big thank you to Laura Harold and Jack Meyer for always answering my radiocarbon data questions, and to Jeff Rosenthal for providing books, finding references, and lending an ear when needed. I would especially thank Phil Kaijankoski for his mentorship and advice throughout this whole journey.

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Chapter 1: Introduction

Along the central coast lies one of the least known and last studied estuarine environments in California (Jones *et al.* 2019:1). Morro Bay, a small seaside town in San Luis Obispo County, is an incredibly biotically-diverse and culturally rich region (Figure 1). Archaeological research in the Morro Bay region has increased in the last thirty years, however studies have been isolated to either academic endeavors, which have been sparse (e.g., Joslin 2010; Phillip 2023; Wiggins 2022), or compliance work (e.g., Berg 2014; Far Western Anthropological Research Group 2016; Kaijankoski *et al.* 2019; Levulett and Fung 1993; Mikkelsen and Berg 2016; Mikkelsen *et al.* 1998;), which are often limited in both budget and time. Geoarchaeological research has been even more restricted and intermittent to preconstruction archaeological testing to determine the presence or absence and depth of an intact cultural deposit. Due to its methodology, (e.g., coring and mechanical trenching), geoarchaeological studies can offer archaeologists a chance to study cultural deposits that are deeper than safe hand-excavated testing allows. The research that has been conducted in Morro Bay has led to an ongoing debate within the discipline regarding a Middle Period occupational gap in Morro Bay's chronology; whether it exists, and if it does, what caused it (Jones *et al.* 2019; Wiggins 2022). This thesis will address the following questions:

1. What explains the apparent Middle Period gaps, specifically the Late Middle Period gap, in Morro Bay's archaeological record? What human activities were happening during that time?
2. How does landscape evolution and archaeological methodology affect the identification of deeply buried archaeological sites?
3. How does site CA-SLO-16 fit into the larger context of Morro Bay's prehistory and chronology?

Jones *et al.* (2019:25) argue that the gap is due to possible seismic activity, noting an "abrupt habitat deterioration which made for an overall unstable environment," specifically during the Middle Period. This theory is supported by Gallagher (1996:212), who states that between 2600-1400 cal BP "movements along the fault zone produced an abrupt deepening of the bay causing a sudden rise in relative sea level." Jones *et al.* (2019:17) theorize that "an abrupt rise in sea level could have affected shellfish habitat within the estuary." Later in the volume, Jones *et al.* (2019:242) state the estuary may have been cut off from the

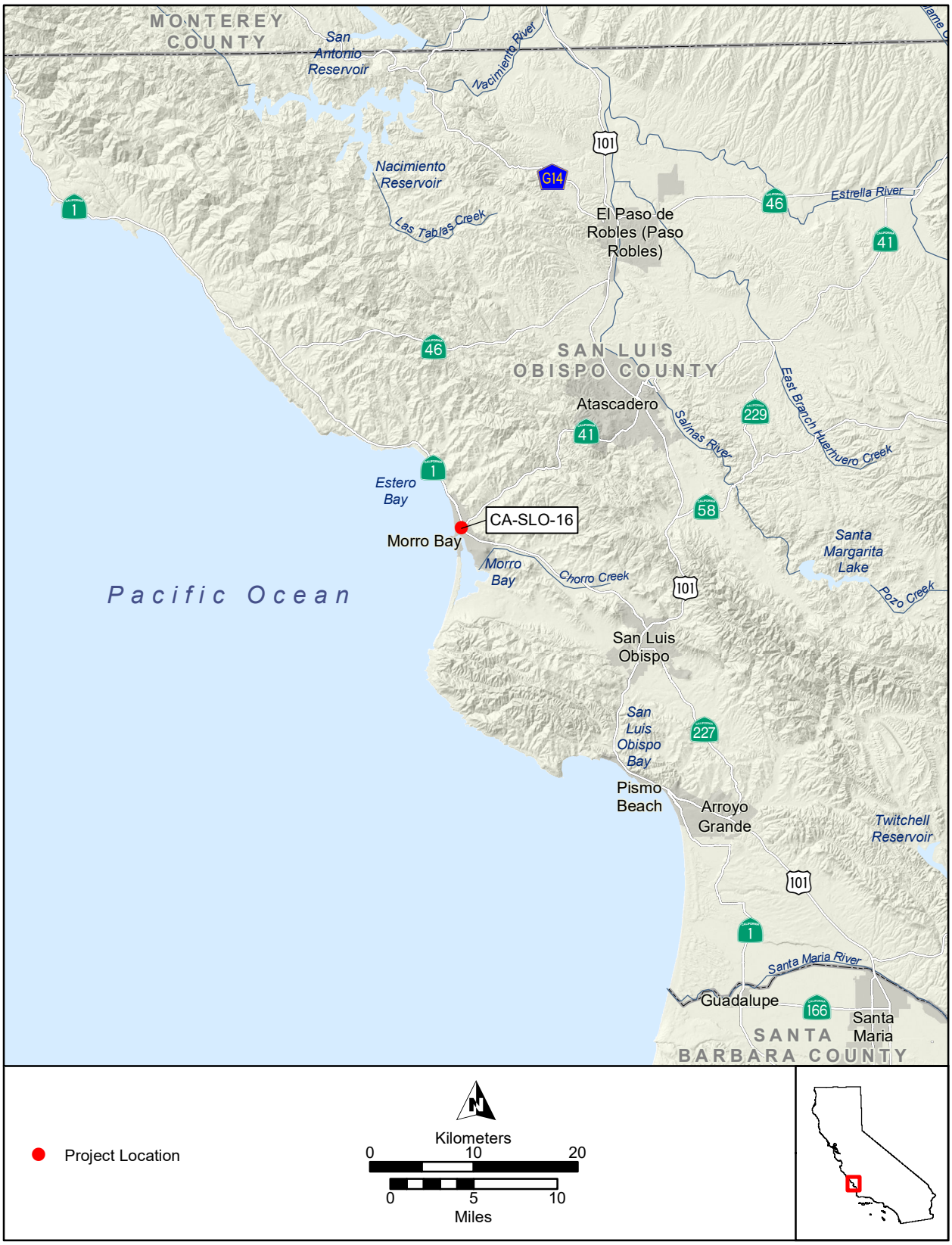

Figure 1: Research Vicinity

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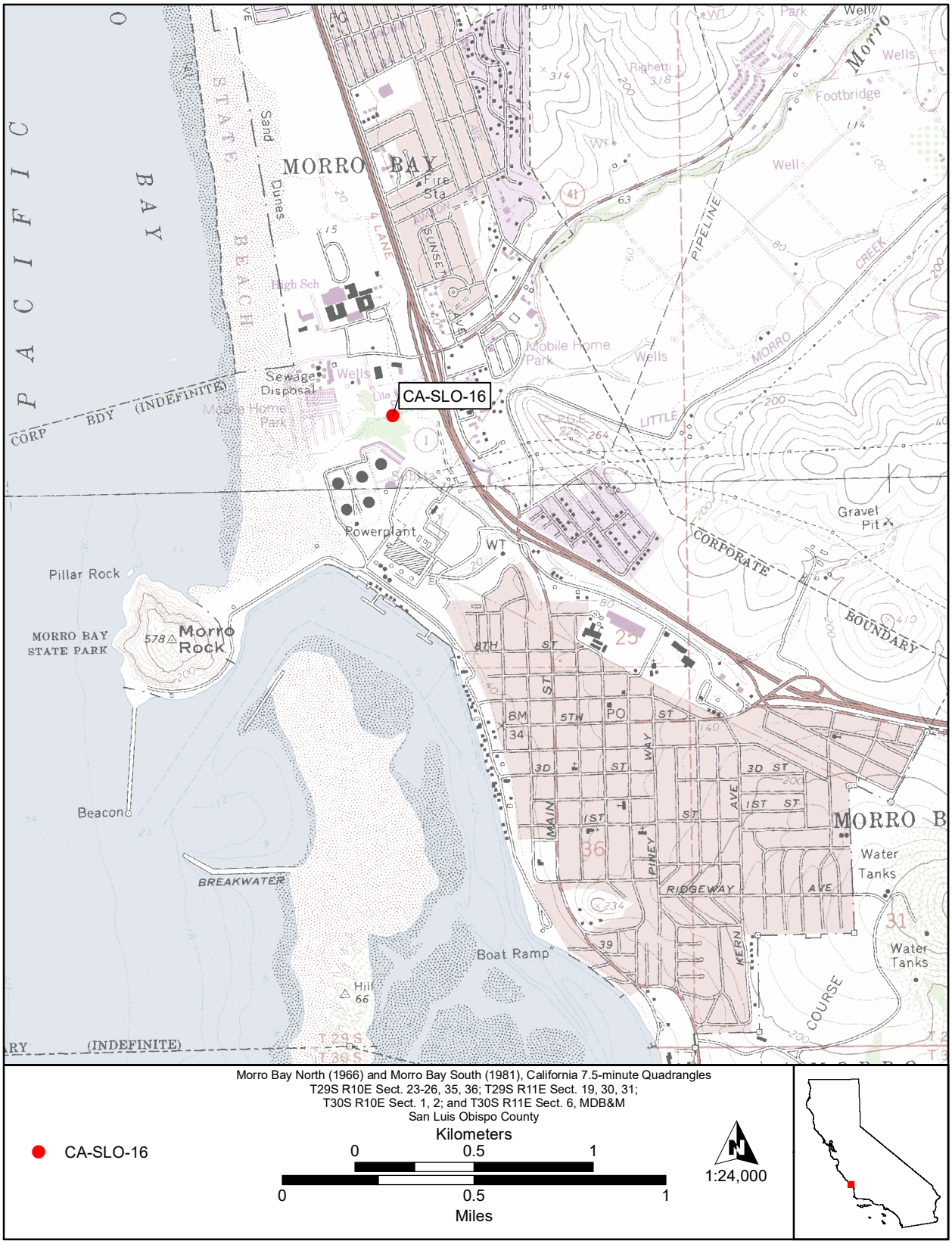

Figure 2: Morro Bay Region

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ocean during this time, implying the water level either stayed at the same level becoming stagnant or went up due to creek input.

The research included in this thesis will address the possible seismic activity using seismological principles of plate boundary types, information collected from a recent study of subduction in the area, and the data collected from a Middle Period site excavated in Morro Bay. The site, CA-SLO-16, is a deeply buried archaeological deposit, much deeper than regular archaeological methods allow access to. This site provides insight into the occupational hiatus previously mentioned, a period of time that has eluded archaeological research in the area. Additionally, available data produced by outside disciplines (e.g., seismology, geology, geography, paleoseismology) have been proven useful to better understand human occupation at that time (Gallagher 1996; Hanson *et al.* 1992; Lettis and Hall 1994). Although understudied, these interdisciplinary data have the potential to make a significant contribution in the understanding of a previously unknown period of occupation in Morro Bay.

1.1 Project Description

This thesis is one study of a much larger compliance project contracted by the City of Morro Bay (City) for a new Water Reclamation Facility (Figure 2). Federal funding for the project initiated compliance with Section 106 of the National Historic Preservation Act as well as State legal compliance through the California Environmental Quality Act (CEQA). These regulations require federal and California public agencies to consider the adverse effects of projects to historic properties. The City of Morro Bay contracted Far Western Anthropological Research Group (hereafter Far Western) to conduct the archaeological identification, evaluation, and mitigation efforts for the project which included investigations at site CA-SLO-16, adjacent to Morro Creek. A series of poorly documented archaeological investigations have been conducted at this precontact site since it was first identified in the late 1940s. Far Western's effort at the site included a geoarchaeological study in 2020, from which Far Western concluded that further testing was required after identifying a deeply buried archaeological deposit (Kaijankoski 2020). This thesis will detail the results of the Phase II testing and Phase III data recovery conducted at CA-SLO-16 and how the findings fit into the larger context of Morro Bay's prehistory and chronology.

1.2 Research Questions and Data Sources

The research discussed in this thesis differs from previous studies in Morro Bay because it uses a multidisciplinary approach, applying seismological and geoarchaeological principles to data collected from CA-SLO-16. The following are three research questions I will address in this thesis. I also include what expectations I have for each question.

1. What explains the apparent Middle Period gap in Morro Bay's archaeological record? What human activities were happening during that time?

Based on data collected from other sites in similar environments (i.e., Cayucos, San Simeon, Diablo Canyon, etc.), it would seem unlikely that human populations abandoned Morro Bay during this time. Native people were very resourceful and adaptable, utilizing both marine and terrestrial resources. To assume that Indigenous communities would migrate out of Morro Bay in response to "abrupt [marine] habitat deterioration," is to limit the abilities of past peoples to adapt, depending on the level of the deterioration (Jones *et al.* 2019:25). The adaptability of Indigenous peoples has been seen throughout the archaeological record across California. Although not an exact comparison, Braje *et al.* (2017) discuss a similar behavior on Santa Rosa Island off the coast of California. The Island Chumash's exploitation of shellfish resulted in the near depletion of local ecosystems. The island has limited terrestrial resources compared to the mainland, so the over-exploitation of shellfish led to adjusting subsistence strategies from shellfish toward productive fisheries to sustain the high population.

2. How does landscape evolution and archaeological methodology affect the identification of deeply buried archaeological sites?

I anticipate that the location of Morro Creek paired with naturally deposited alluvium has resulted in deeply buried sites. Relying on landscape evolution models, site sensitivity models, and historic information greatly assists in the identification of buried sites. I will discuss the historic route of Morro Creek in greater detail in the following chapters, as historic maps indicate that historically the creek was not in its current location. Therefore, the identification of other deeply buried sites along Morro Creek could be

missed if normal testing methods were implemented. This also applies to CA-SLO-16; if Far Western had implemented normal methods, the deeply buried cultural deposit could have been missed.

3. How does site CA-SLO-16 fit into the larger context of Morro Bay's prehistory and chronology?

CA-SLO-16 is unique because it is one of the only deeply buried sites identified in Morro Bay (approximately 2.4 meters below surface). Similar to the expectations of the research question above, archaeological methods, especially those utilized for Cultural Resource Management (CRM) projects, do not normally reach that depth unless the project's depth of impact requires it. Therefore, CA-SLO-16 tells us that other sites are either not being identified yet or inadvertently excluded from archaeological site inventory due to the depths of project impacts and methodology applied to the project. This is not to suggest that archaeologists should conduct unnecessary excavations to find these deeply buried sites, but geoarchaeological methods may be a less invasive, more productive method to identify these sites.

Far Western started this research as a contracted project to conduct archaeological identification which included presence-absence subsurface testing, in this case geoarchaeological coring, for new infrastructure. The project progressed to a Phase II assessment and based on the positive results, Far Western concluded that further data recovery was required. The phases employed at CA-SLO-16 provide an accurate representation of how a Cultural Resource Management (CRM) project progresses, with the addition of geoarchaeological methods.

To answer most research questions from an archaeological deposit it is vital to determine the age or age range of the cultural deposit. Field archaeologists complete this by first identifying soil structure and then by sampling the stratigraphic contexts (e.g., radiocarbon assays from shell or charcoal). Temporal components are critical when deciphering human change over time. Temporal indicators, such as radiocarbon dates, obsidian hydration data, and temporally diagnostic artifacts assist in the identification of temporal components. A comparison and analysis of subsistence change, settlement patterns, environmental change, and human behavior cannot be made without first defining temporal components of a site. The data compiled and analyzed for this thesis uses component definition to identify human change and behavior over time.

1.3 Thesis Organization

This thesis is organized into nine chapters. The first chapter, Chapter 1, provides a brief project description and outlines the research questions explored in this thesis. Chapter 1 also includes expectations and assumptions for each research question. Chapter 2 details the theoretical framework and models that guided this research. Chapter 2 includes geoarchaeological and seismological approaches, basic principles of landscape evolution, the significance of temporal component definition, and how relative sea level rise affected the Morro Bay estuary. The environmental setting and regional context chapters (Chapters 3-4) discuss the Central Coast Chronology, ethnographic research, and past archaeological research conducted at CA-SLO-16.

Chapter 5 provides a brief discussion of the project's research design, followed by a detailed account of the field and laboratory methods utilized during both the testing and data recovery phases of this research. Because this project was investigated throughout two phases, Chapter 5 includes very brief results of the testing phase (Phase II). Chapter 6 details the results of the data recovery (Phase III) and a summary of findings. Chapter 7 synthesizes the excavation results, discusses the site structure, and identifies the temporal indicators. Chapter 7 also applies these data to the larger chronostratigraphic data of Morro Bay's city soil profile. Finally, Chapter 8 discusses the site constituents including features, artifacts, dietary remains, and site seasonality. Chapter 9 reevaluates the research questions asked at the beginning of this thesis, provides interpretations of findings, and a discussion of future research potential. Due to the sensitive nature of cultural resources, the maps and figures included in this thesis will only include the general location of archaeological sites.

Chapter 2: Theoretical Background

The following chapter will briefly discuss a series of theoretical principles applied to this research, and how these approaches apply to site CA-SLO-16. The theoretical framework described below reflects the multidisciplinary approach of this research.

2.1 Geoarchaeological Approach

Historically, researchers have defined geoarchaeology as a subdiscipline of archaeology or subdiscipline of geology, but it is now more widely accepted that geoarchaeology is a separate discipline altogether. Geoarchaeology studies archaeological problems using earth science methods including geology, geomorphology, geography, pedology, and hydrology (Butzer 1982:5; Rapp and Hill 2006:1; Scher 2011:11). One major contribution of geoarchaeological studies is to identify deeply buried archaeological sites.

Archaeological discovery probability is dependent on three factors (Scher 2011). The first is site distribution during the time of occupation. Site distribution can be affected by both environmental conditions and human behavior. The second factor is site preservation, as environmental and cultural factors can cause disturbance or complete elimination of ancient sites (Rapp and Hill 2006). And lastly, the recognition of sites, which is how sites differ from their surroundings based on site characteristics including size or abundance of artifacts (Scher 2011:12; Schiffer 1988; Schiffer *et al.* 1978).

The most crucial factor that affects site discoverability is an appropriate methodology. There is a bias instilled into traditional archaeological methods of surface survey and subsurface hand-excavation that decreases the potential discovery of archaeological resources due to sediment deposition. Some landforms may have had multiple deposition episodes since human occupation, depending on the landform age, type, or location. Thus, a cultural deposit could be deeper than common archaeological hand excavation allows. A geoarchaeological assessment can increase the discovery probability of archaeological sites depending on the landform type and site type. Therefore, every study should start with a visibility and landform

assessment (Refer to Figures 3 and 4 for application to the Morro Bay region) to decide on appropriate methods.

Geoarchaeological Assumptions

Geoarchaeological and geomorphic studies rely on general principles and assumptions regarding stratigraphy, landform age, and soil formation (refer to Figures 3 and 4 for Landform Age and Buried Site Sensitivity Maps). These assumptions allow geoarchaeologists to evaluate landscape evolution, determine buried site potential, and interpret human-environment interaction.

Two basic stratigraphic principles are common in geoarchaeology: superposition and uniformitarianism. Uniformitarianism assumes that the current processes that are observed are the same processes that operated in the past, "although the extent and duration of these processes may have varied over time" (Rapp and Hill 1973; Scher 2011). The Law of Superposition assumes that if a deposit remains undisturbed over time, the lower deposits within a profile will always be older than those stratigraphically above (Boggs 1995; Harris 1979). These principles help geoarchaeologists understand the evolution of a deposit and the relationship between each layer or strata of sediment.

Soil Formation

Soil formation assumes that if a well-developed deposit, or a soil with distinct horizons (e.g., A-horizon, B-horizon, etc.), is identified, then it is either older or had been stable longer than those with little to no horizon development (Birkeland 1974; Birkland *et al.* 1991; Ritter *et al.* 2002; Scher 2011:17). Soil formation also notes that as humans occupy a landform for an extended time, the physical characteristics of that landform are more likely to exhibit archaeological evidence as a more well-developed soil horizon. Thus, paleosols are soils that exhibit a formerly stable land surface through soil features, including horizonation, pedogenic structures, root traces, etc. (Birkland *et al.* 1991). Geoarchaeologists use paleosols to help "enable correlation across broad regions and help attain chronologic resolution" (Scher 2011:18).

Geoarchaeologists acknowledge that landforms with well-developed soils offer an environment available for human occupation for a longer period of time than those with weakly developed soils

(Rosenthal *et al.* 2004). Therefore, in a stable landform, deposits of longer occupation will be more distinct within the soil profile than those of shorter occupation. In contrast, the rapid deposition and landscape instability are displayed by a lack of soil formation and erosional unconformities (Rosenthal *et al.* 2004). While evidence of past human occupation (archaeological deposits) is subject to the same processes that affect preservation, distribution, and visibility, as geological deposits, it is the progression of landscape evolution "that ultimately determines whether archaeological remains will be buried, destroyed, or redeposited" (Bettis 1992:119; Kuehn 1993; Rosenthal *et al.* 2004:9; Waters 1992).

Buried Site Sensitivity Model

Studying past landscapes is essential for understanding how and why past people chose where to live and how they moved within the ancient environment. The introduction of geomorphological studies within archaeology opened an entirely new avenue for understanding environmental change and the natural factors that alter the environment, including global warming, flooding, sea-level rise, etc. (Byrd *et al.* 2010). This change is especially evident in soil stratigraphy, presenting profound changes in a short amount of time. These drastic changes resemble a shift in environmental settings, which is reflected in the available natural resources.

Archaeologists apply the Archaeological Sensitivity Model (ASM) to prospective project areas to identify greater or lesser site potential areas. The ASM is the most commonly used and most effective way to identify surface sites, but the ASM does not consider the age of the landforms to which the model is applied, therefore ignoring the potential for deeply buried sites. A buried site model assumes that older landforms, meaning those developed prior to human colonization of North America, cannot contain buried archaeological deposits (Meyer 2020; Rosenthal and Meyer 2004). Younger landforms, in comparison, have more potential for sediment deposition and therefore more potential for buried sites. Thus, geoarchaeologists consider the depositional age of a landform when determining buried archaeological site potential.

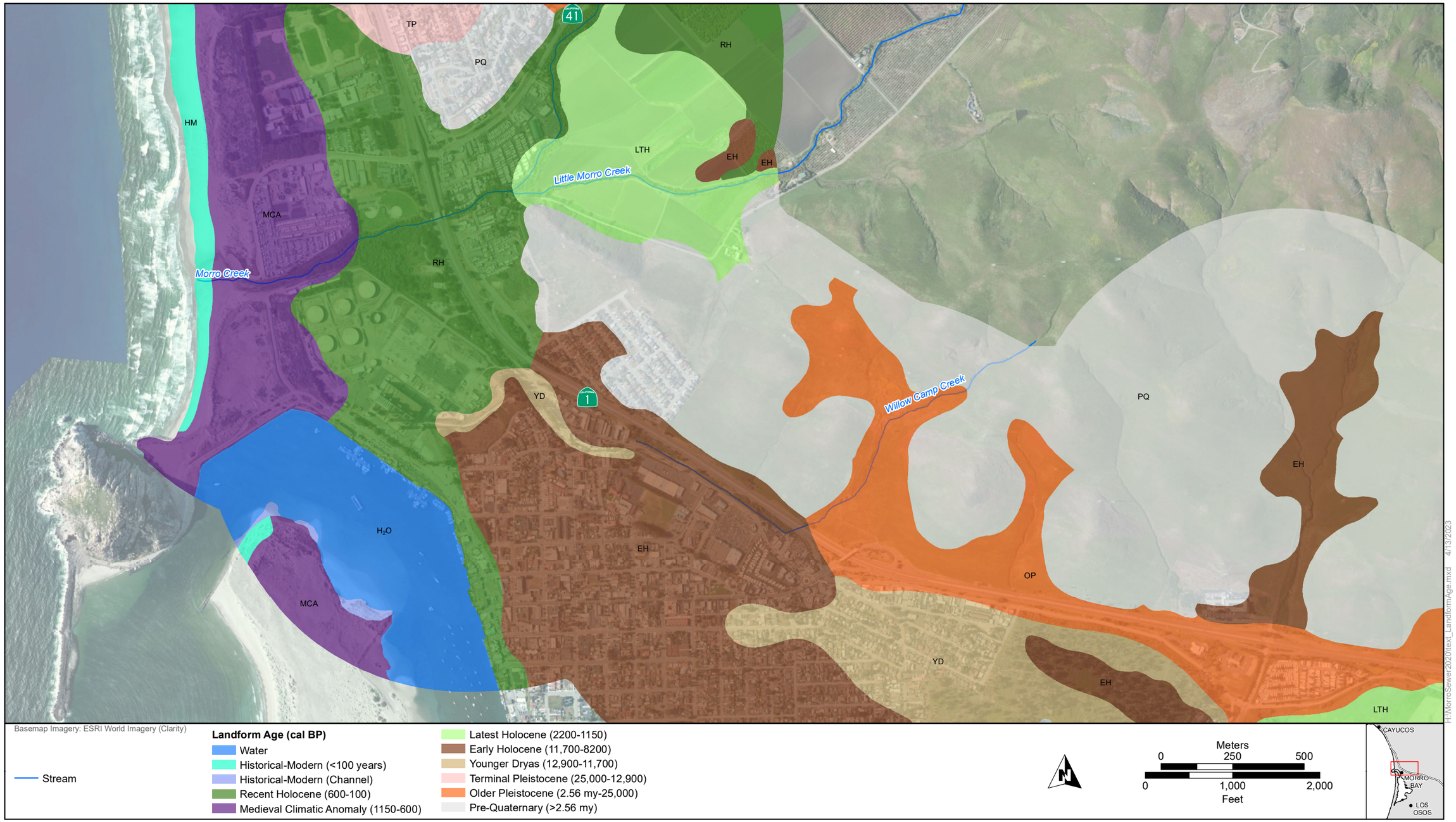

Figure 3: Landform Age Map of Morro Bay Region

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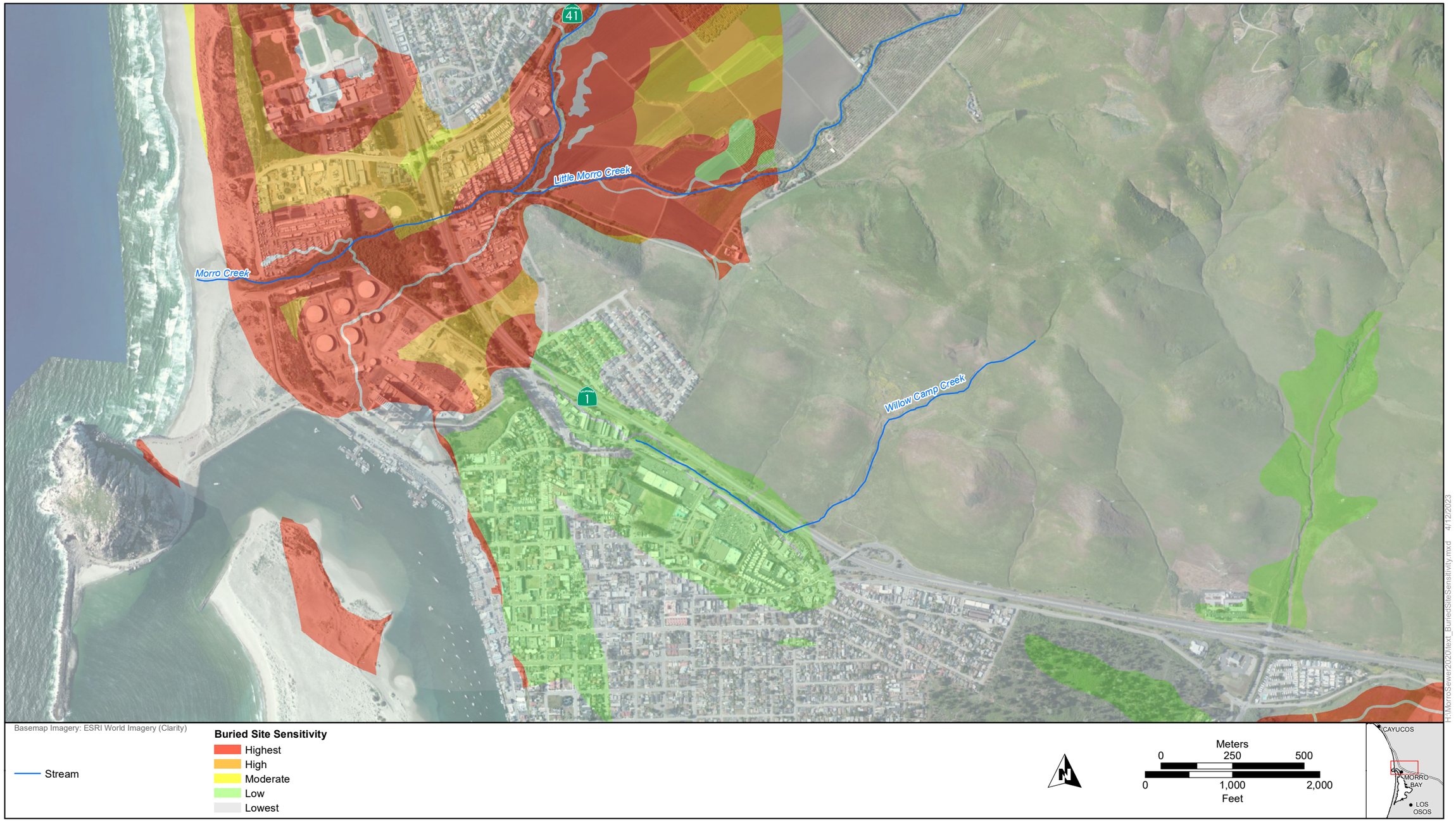

Figure 4: Buried Site Sensitivity of Morro Bay Region

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In CRM, archaeologists are limited when discussing the potential for buried sites to the depth of impact, or the maximum depth of a project. The buried site model, when applied to a CRM project, hinges on three factors: (1) the attractiveness for occupation, including access to natural resources (e.g., water source), topography[1], and protection from the elements (e.g., aspect); (2) the landform age, as discussed above; and (3) the depth of project impacts (Refer to Figure 3 and Figure 4 for application). The latter differentiates CRM projects from academic research; buried site identification within academia is often applied to answer a specific research question, whereas, in CRM, the buried site sensitivity model is necessary to complete archaeological identification efforts for a project with deep impacts.

Sensitivity Factors

Due to the geoarchaeological assumptions above, California's lowland depositional landforms have geological potential to contain deeply buried sites because most were formed after precontact occupation in the region during the Holocene. Comparably, upland landforms, which formed prior to documented human occupation in the region, have had less deposition events and therefore, a lower potential for deeply buried sites. This does not apply to older landforms that have been capped with younger sediment. Additionally, geoarchaeologists must acknowledge that archaeological deposits are not randomly distributed within a landscape but occur in specific geoenvironmental settings and therefore assist in the determination of a buried site location (Foster *et al.* 2005:4; Hansen *et al.* 2004:5; Kaijankoski *et al.* 2019:33; Foster *et al.* 2005:4; Hansen *et al.* 2004:5; Pilgram 1987; Rosenthal and Meyer 2004).

2.2 Seismological Approach

Although seismology is a few disciplines away from archaeology, the movement of the earth can have significant effects on the landscape and therefore impacts the human-environment relationship. Jones *et al.* (2019), cite seismic activity as the leading cause of the Late Middle Period hiatus in Morro Bay, noting "seismic activity in the bay area…shut the estuary off from the sea and caused sudden deterioration of shellfish habitat" (246), "…causing human populations to temporarily withdraw from the area" (251). The

[1] Topography has implications for both high and low sensitivity.

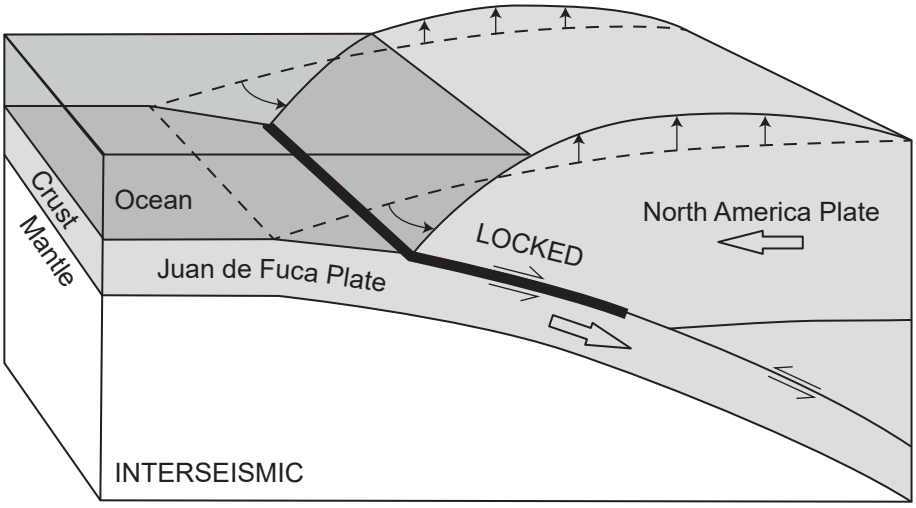
authors continue, “movements along the fault zone produced an abrupt deepening of the bay causing a sudden rise in relative sea level” (17; Gallagher 1996:212).

Gallagher’s 1996 dissertation is the most cited document when discussing the hiatus of occupation in Morro Bay during the Middle Period (Jones *et al.* 2019; Wiggins 2022). Gallagher’s research provides a detailed analysis and explanation for the relative sea level (RSL) change in Morro Bay over the past 4220 years (1996). The author compares the sea level rise of San Francisco Bay and worldwide rates to that of Morro Bay, stating that Morro Bay is comparable prior to 2500 BP and after 1500 BP. However, Morro Bay displays a faster rate of RSL rise (3.0 mm yr^1) between 2500 and 1500 years BP, compared to global data (Gallagher 1996:211). “Elsewhere, late Holocene rates of RSL rise were generally between 1.0 and 2.0 mm yr^1 with local differences dependent upon the glacioisostatic, hydroisostatic and tectonic history of each area,” (Gallagher 1996:210). Gallagher concludes that hydroisostatic or tectonic subsidence of the shelf caused this rapid rate of RSL rise comparing Morro Bay to the Pacific Northwest Cascadia subduction zone (Gallagher 1996:212-213): “Comparing the Morro Bay RSL curve with these ages, the steep portion of the curve, with the rise of 3.0 mm yr^1, occurs between 2500 and 1500 years BP, approximately covering the period of known activity on the Los Osos Fault’’ (Gallagher 1996:212).

Fault Behavior

To analyze how the environment reacts to seismic activity, it is essential to understand the fundamentals of fault behavior. The Earth’s outer crust is comprised of a series of tectonic plates that move on the asthenosphere (US Department of Commerce, National Oceanic and Atmospheric Administration 2014). A plate boundary is where two tectonic plates meet (Figure 5). There are three major types of plate boundaries; each plate boundary reacts differently both during co-seismic and between inter-seismic earthquakes, therefore resulting in different effects to the surrounding environment. A convergent plate boundary occurs when two plates collide, moving beneath one another causing subduction. An example of this process is the Cascadia subduction zone in the Pacific Northwest.

Gradual Uplift at Cascadia Coast



Gradual Uplift at Cascadia Coast

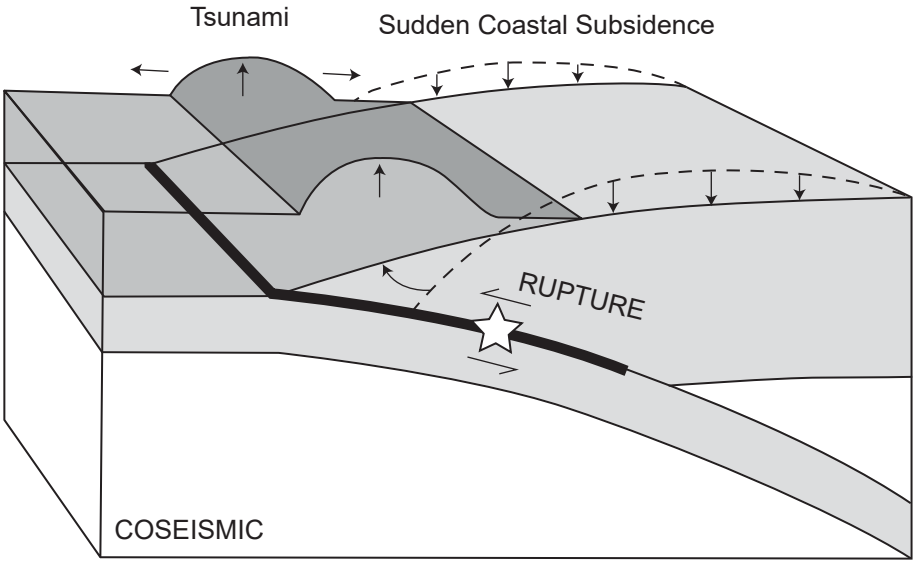


Figure 5: Example of Cascadia Plate Boundary Behavior

The second boundary type is a divergent plate boundary, which occurs when two plates move away from each other. The final plate boundary is called a transform plate boundary. This type of boundary is caused when two plates rub against each other in a horizontal motion, versus the vertical, upheaval motion of a convergent plate. The San Andreas Fault in California is an example of a transform plate boundary. Gallagher (1996:211) claims that Morro Bay is a fault-controlled basin, stating "Morro Bay is underlain by active traces of the Los Osos Fault zone, a series of south-west dipping reverse faults, and thus may be subject to localized tectonic subsidence." The differences of plate boundary types and their behavior will be a significant discussion within this thesis.

Wetland Development Model

Orson *et al.* (1985) state that when sedimentation rates cannot keep pace with sea-level rise (>2.5 mm yr^{1}) wetland landscapes cannot develop fully or at all. The Wetland Development Model uses stratigraphy, vegetation, and a three-dimensional development created by "linking core logs into fence diagrams," (Gallagher 1996:225). It is important to identify if a wetland existed during this time, because a lack of wetland could indicate a decline in the health of the local ecosystem and have negative impacts to the human communities who rely on these resources. Kaijankoski *et al.* (2019) note a decreased fish presence in archaeological deposits during the first half of the Middle Period (2600–1000 cal BP), which could signify increased siltation in the bay. Jones *et al.* (1994) also suggest that the estuary may have been cut off from the ocean at this time, providing similar examples of siltation and human abandonment along the California coast (Gallegos 1987, 1992).

Jones *et al.* argue that seismic activity and the relative sea level rise resulting from subsidence that followed "could have shut the estuary off from the sea and caused sudden deterioration of shellfish habitat" (2019:246). Gallagher states that "sedimentation rates calculated from radiocarbon ages never reached this rate[2]…[i]t seemed likely that a narrow, fringing wetlands existed in the upper intertidal zone around the bay…during this time" (1996:213). Gallagher concludes the wetland has not been even or continuous,

[2] Gallagher was stating that the rate of sedimentation needed to maintain an intertidal wetland would be 3.33 mm yr^{1} while radiocarbon ages never reached that rate, then RSL rise was too fast for significant wetlands to form, therefore Gallagher concludes that a narrow, fringing wetlands existed during the disputed time (1996:213).

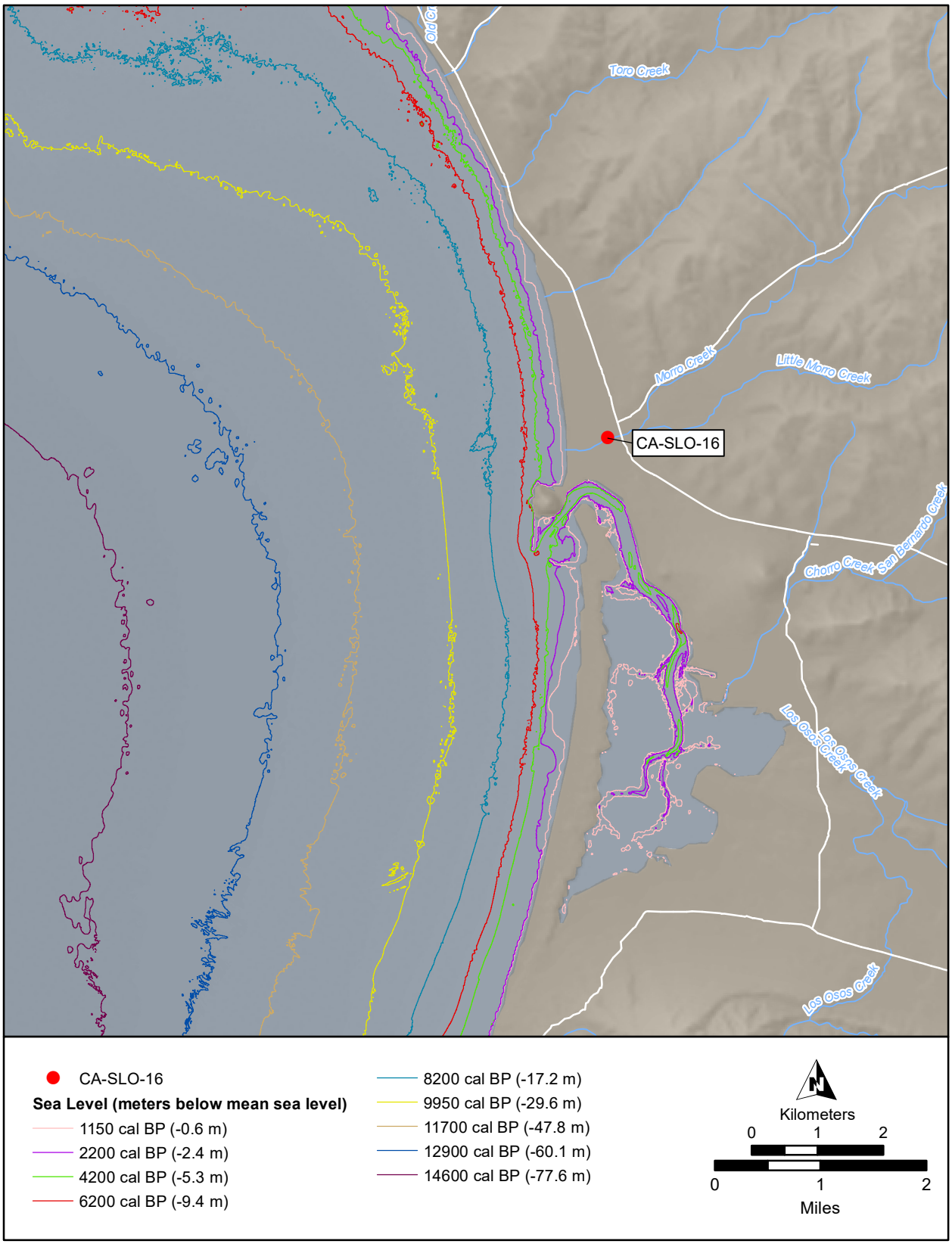
which has resulted in “vertical and lateral progradation at irregular and discontinuous rates, so ages of sediments equidistant from the apex may be different” (1996:233). Therefore, a single three-dimensional transect of the bay could not be assigned a reliable timeframe (Gallagher 1996:233). Overall, it can be deduced that although a reliable timeframe could not be assigned to the bay, the wetland development model suggests that the waterline boundary of the bay may have provided plant resources during a time of previously hypothesized marine depletion. Additionally, if an ephemeral wetland did exist, this could have also been true for the shellfish population.

2.3 Landscape Evolution

Landscape evolution occurs across the landscape but most notable for this research, near waterways, creeks, rivers, and the coastline. The route, amount of time, and result of introduced or increased water in an area all depends on the underlying geologic materials, but in general, water can move, deposit, and rearrange sediment across a landscape (Beckinsale and Chorley 1968; Davis 1889). Features of landforms are the result of continued change through erosion (i.e., wind, water, ice, etc.), which can create a cycle of erosion (Beckinsale and Chorley 1968). Although this is a basic principle of the erosional cycle discussion within geomorphology, it directly applies to the research area.

Many of the modern geomorphological principles evolved from theories expressed by Davis in 1889. Coulthard and Van De Wiel (2012) explore the modeling of river history and evolution using some of the basic principles introduced by Davis. The text includes brief explanations of landscape evolution models, alluvial architecture models, and meander models (Coulthard and Van De Wiel 2012:2123). Landscape Evolution Models, or LEMs, were introduced to study river networks and their evolution over time (Coulthard and Van De Wiel 2012:2126). Alluvial Architecture Models (AAM) are often designed to “simulate the vertical and horizontal development of basin stratigraphy” (Coulthard and Van De Wiel 2012:2129). Both models have the potential to help archaeologists understand the depositional process of sediment over time. Although some geologists use this information to understand the future structure of river landscapes and other waterways, archaeologists could apply the same principles to acknowledge floodplain evolution, and how a river or creek’s location may change over time, altering the landscape and

Figure 6: Sea Level Rise Map of Morro Bay Region



(Provided with permission from Far Western)

burying archaeological sites. The research discussed in this thesis will not include the use of landscape evolution models, however it is imperative to understand landscape evolution and its effects on buried sites.

2.4 Eustatic Sea Level, Relative Sea Level, and Submergence

Before discussing the effects of sea level rise, it is important to understand the differences between relative sea level rise (depicted in Figure 6) and eustatic sea level rise. Sea level can increase or decrease in several ways, including "variation in masses or volume in the oceans, or by changes of the land with respect to the sea surface" (Rovere *et al.* 2016:221). Although it may seem incorrect, depending on the local events, relative sea level could increase while eustatic sea level decrease (Rovere *et al.* 2016).

Eustatic Sea Level (ESL) is calculated by the distance from the center of the earth to the sea surface (Rovere *et al.* 2016; Schlager 2005). The purpose of eustatic sea level reconstruction is usually applied to calculate how climate change related events (e.g., glacio-eustasy, thermical expansion, thermo-steric changes, and halo-steric changes) affect global sea level. Eustatic sea level can also be affected by geological forces that expand or minimize the volume of the ocean basins including tectonic seafloor spreading (tectono-eustasy) or sedimentation (sedimento-eustasy; Rovere *et al.* 2016:222).

Relative Sea Level (RSL) change is isolated to a land-based reference frame (Kemp 2015). Rovere *et al.* (2016) state, "land uplift or subsidence can result in…a fall or rise in sea level that cannot be considered eustatic as the volume or mass of water does not change" (222). Relative sea level change can occur over a large spatial and temporal scale (Kahn *et al.* 2015). A few of these causes include sediment compaction, tectonic deformation, or human activity (e.g., anthropogenic deposition, urban development; Ericson 2006). Tectonic uplift and subsidence have been documented to be one of the primary causes of changes in relative sea level over short periods of time (e.g., the last century) and longer time scales (e.g., the Holocene or Quaternary; Dura *et al.* 2016; Kelsey and Bockheim 1994; Larson *et al.* 2003; Kato 1983; Rovere *et al.* 2016:225; Shennan *et al.* 1996; Simms *et al.* 2016a; Vacchi *et al.* 2012).

The Holocene evolution of the Morro Bay coastline near site CA-SLO-16 is depicted in Figure 6. This figure was developed using a model first introduced by Meyer *et al.* (2013). The model creates a

three-dimensional landscape below the estuary and adjacent coast by using a combination of water depth, or bathymetry, and the sea floor topography. To easily identify change over time, the lines on Figure 6 correlate with a significant landmark in time (e.g., 11,700 cal BP correlates to the Younger Dryas).

Simms *et al.* (2016b) conducted a study comparing estuaries developed in subsiding geological structures by looking at rates of vertical motion, relative sea level, and radiocarbon ages acquired from the gastropod *Cerithidea californica* shells from core samples. The core sample applied to this research was collected by Gallagher (1996) and interpreted by Simms *et al.* (2016b). Compared to other nearby estuaries, such as Goleta Slough, Carpinteria Slough, and Campus Lagoon, Morro Bay experienced a higher rate of subsidence[3] (Simms *et al.* 2016b). Simms *et al.* argue that although Morro Bay's bay was formed within a structural basin similar to other estuaries, the finger-like sandspit created a barrier between the bay and the ocean therefore "enhancing accommodation" (2016:1573). All these factors contribute to the estuary and bay's current location, size, and biotic and abiotic structure (Figure 6).

A basic understanding of relative sea level change can open a range of research questions regarding subsistence based on environmental status. Due to the native population's apparent dependence on the estuarian and bay shellfish species, many researchers have alluded to regional migration in response to shellfish depletion. This depletion was attributed to either the sudden deepening of the bay due to seismic activity (Gallagher 1996) or seismic activity that "shut the estuary off from the sea and caused sudden deterioration of [the] shellfish habitat" (Jones *et al.* 2019). Relative sea level and subsidence will be discussed at length throughout this thesis.

2.5 Temporal Component Definition

Defining a site's temporal component is the most important task in identifying change in human behavior over time. Temporal components are identified by examining the horizontal and vertical site structure, analyzing temporally diagnostic artifacts, and adjusting methods to properly test, analyze, and document each component (Mikkelsen *et al.* 2013). Temporal components are defined as "temporally related aggregates of artifacts, features, and other residues, representing the material remains produced

[3] For more information on how to calculate the rate of subsidence refer to Simms *et al.* 2016b.

during a specific time span of residence or other use at a specific location, and found associated with a definable horizontal/vertical fraction of a site or landform" (Mikkelsen *et al.* 2013: n.p.; White and Fredrickson 2002).

After components are clearly identified within a site, archaeologists should only use component-associated data for analysis. Mikkelsen *et al.* (2013) argues that if an archaeologist does not identify temporal components, then research issues cannot be adequately addressed due to the lack of comparative data. This argument applies to culture history, subsistence change, settlement patterns, trade, the human-environment relationship, exchange, and all other aspects of human behavior.

2.6 Application of Theoretical Framework

The theoretical framework outlined above will be applied as principles in which to analyze and discuss the research in this thesis. Geoarchaeological framework will be applied to both the identification of site CA-SLO-16 and in the discussion of future identification of deeply buried sites. Seismological principles provide significant insight to the interworking of plate boundary behaviors, which prove valuable when exploring the condition of the estuary and bay during the Late-Middle Period. Additionally, the wetland development model suggests that the waterline boundary of the bay may have supported an ephemeral wetland during a time of previously hypothesized marine depletion.

Landscape evolution is the common thread throughout this research. Landscape evolution plays a significant role in the location of deeply buried archaeological sites and what methodologies should be implemented when testing for deeply buried archaeological sites. Relative sea level and subsidence are discussed to provide a foundational knowledge of how a "sudden deepening of the bay" would occur (Gallagher 1996) and how this event may not have been dramatic enough to cause shellfish depletion. Finally, one of the most important discussions of this research, is the importance of temporal component definition. As stated above, if temporal components are not defined then there is no comparative data to highlight change in human behavior and activities over time. The case study discussed in this thesis highlights how an understanding of landscape evolution paired with geoarchaeological methodology can reveal deeply buried archaeological sites. Additionally, the archaeological deposit identified, site CA-SLO-

16, provided valuable insight into human behavior during the apparent Middle Period gap in Morro Bay's chronology.

Chapter 3: Morro Bay, California

As briefly discussed in Chapter 1, Morro Bay is a resource-rich coastal environment. The estuary provides an environment able to house a diverse population of shellfish, fish, marine and terrestrial animals, in addition to plant resources. As Morro Bay's environment changes with relative sea level, seismic activity, and climate, the surrounding resources fluctuate creating an evolving ecosystem. It is the mutability of Morro Bay's environment that speaks to the resilience and adaptability of past occupants.

3.1 Environment

Morro Bay, located on the Central Coast of California, is one of California's least-known and last-studied estuarine environments (Jones *et al.* 2019:1). Morro Bay region has a variety of biotic zones including grasslands, woodlands, and coastal sand dunes, creating a diverse biotic environment. One of Morro Bay's most notable features, the estuary and neighboring bay, is separated from the ocean by a five kilometer long, finger-like dune that is referred to as the "sandspit" (Figure 2). Previously, the estuary was fed by three drainages, Chorro, Los Osos, and Morro Creek, but Morro Creek was diverted and now feeds directly into the ocean (Figure 7; Jones *et al.* 2019:8). Morro Bay has been identified for hundreds of years by seafarers and travelers alike by its most significant landmark, Morro Rock. Morro Rock is one of nine volcanic plugs in San Luis Obispo County dating back to the Oligocene; today, it is connected to the coastline by a man-made landform.

It is important to acknowledge the environmental components of Morro Bay because of its diversity. Morro Bay is not only an estuary but has countless terrestrial resources as well; past Indigenous communities relied on both environments. The following sections briefly describe Morro Bay's diverse environment including geological and topographical setting, climate, flora, and fauna. This section is followed by a summary of the paleoenvironment and evolution of the estuary. This chapter will detail the diverse marine and terrestrial resources of Morro Bay, specifically in the research area. Additionally, I will discuss environmental change over time and the resulting occupant adaptability.

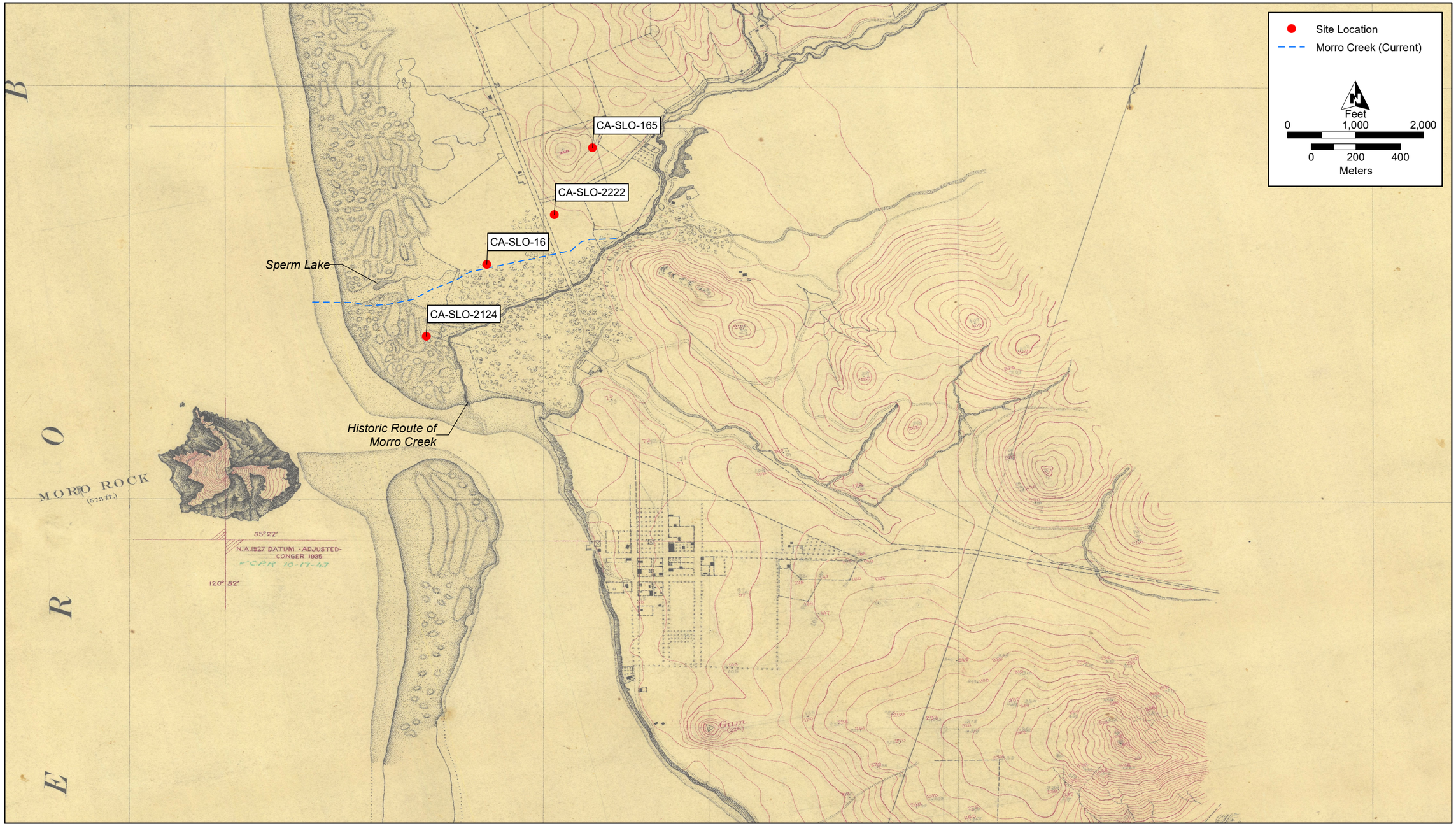


Figure 7: Historic Map of Morro Bay shown with the USCS 1883 T-Sheet T-1662

(Provided with permission from Far Western)

Landform Age

Morro Bay is comprised of a variety of landforms that date from the pre-Quaternary (>2.5 million years) to the Recent Holocene (600-100 cal BP; Figure 3). The age of surface landforms determines the potential for deeply buried sites due to depositional patterns. Most lowland depositional landforms have the geologic potential to contain buried sites. This is due to their formation during the Holocene as sediment was deposited while or after human occupation took place. This does not mean archaeological sites do not occur on upland pre-Holocene landforms, but rather sites on these ancient landforms usually occur on the surface.

Based on Figure 3, the eastern and southern portions of the immediate research area have a low or very low sensitivity for deeply buried sites due to the landform's age (e.g., pre-Quaternary, Older Pleistocene, Terminal Pleistocene, etc.). Comparatively, the west and northern areas of the research area contain landforms dating to the Recent Holocene (600-100 cal BP) and Medieval Climatic Anomaly (1150-600 cal BP). When preparing a buried site sensitivity assessment (Figure 4), certain geo-environmental settings must be taken into consideration in addition to landform age. These geo-environmental settings include low, level landforms and proximity to present or past water sources (Foster *et al.* 2005:4; Hansen *et al.* 2004:5; Pilgram 1987; Rosenthal and Meyer 2004).

Proximity to water is a consideration taken when applying the Archaeological Sensitivity Model, as water is a necessity for human existence. In terms of the buried site sensitivity assessment, an active waterway, such as a river or creek, is also a sediment source. As a creek ebbs and flows, meanders, widens and narrows throughout the seasons and over the years and as an effect of climate change, sediment is deposited causing sites to be buried. This is also represented in Figure 3, as Morro Creek shows the landform age as Recent Holocene Alluvium.

Climate

The Central Coast of California has a very temperate, Mediterranean climate. Although the summer months are warm and dry, coastal fog is not uncommon throughout the year. The fog that blankets the immediate coastline provides moisture to plants and cools down the coast (Joslin 2010). The warm

temperatures commonly extend into the fall months, while the winter months are cooler with most precipitation occurring between the months of December and March. The unique Mediterranean climate allows for a variety of vegetation to thrive.

Flora

Morro Bay's estuarine landscape allows for several biotic zones within the terrestrial and marine environment. The coastal sagebrush zone houses salt-tolerant taxa, including nightshade (*Solanum* spp.), verbena (*Verbena lasiostachys*.), coyote brush (*Baccharis pilularis)*, beach bur (*Ambrossia chamissionis*), sagebrush *(Artemesia californica*), and saltbush (*Atriplex* spp.; Jones *et al.* 2019:9; Timbrook 2007). In the near-shore scrub zone, bush lupine (*Lupinus* spp.) and deer weed (*Lotus scoparius*) can be found. Morro Bay's grasslands have replaced bunch grasses (*Festuca idahoensis*) and needle grass (*Nasella* spp.) with wild oats (*Avena* spp.), California poppy (*Eschscholzia californica*), native foxtail barley (*Hordeum jubatum*), and lupine (*Lupinus* spp.; Hickman 1993). Chaparral species are also present including scrub oak (*Quercus berberidifolia*), fiddleneck (*Amsinckia menziesii*), and toyon (*Heteromeles arbutifolia*). The woodlands include coast live oak (*Quercus agrifolia*), Monterey pine (*Pinus radiata*), and knobcone pine (*Pinus attenuata*; Jones *et al.* 2019). The riparian zones, surrounding creeks and drainages, hosts an array of species, including oaks (*Quercus* spp.), elderberry (*Sambucus* spp.), bay (*Umbellularia californica*), blackberry (*Rubus ursinus*), and poison oak (*Toxicodendron diversilobum*; Timbrook 2007). Jones *et al.* note that sedges (*Carex* spp), cattails (*Typha* spp.), and tule (*Schoenoplectus* spp.) were significant to native communities for weaving baskets and balsa rafts. The plants described, and many more, were of great importance to Indigenous communities, therefore it is no surprise that many of these species can be identified in the archaeological record.

Marine Resources, Birds, and Terrestrial Mammals

The marine environment is home to many species of fish and shellfish. The open sandy beaches house Pismo clam (*Tivela stultorum*), razor clams (*Siliqua patula*), and olive shells (*Callianix* spp. previously referred to as *Olivella biblicata*) in the more protected areas. Archaeological findings (Bertrando 2004b; Jones *et al.* 2019; Mikkelsen *et al*. 2000) have also alluded to native oysters (*Ostrea lurida*) being in

abundance in the past. While California mussel (*Mytilus californianus*), abalone (*Haliotis* spp.), limpets (*Lottia* spp.), black *tegula* (*Tegula funebralis*), and barnacle (*Balanus* spp.) attach to intertidal rocks. California mussel (*Mytilus californianus*) is one of the most common shellfish types identified in archaeological assemblages in the Morro Bay region. In the estuarine mud, over fifteen distinct types of clams can be found (e.g., *Saxidomus nuttalli, Clinocardium nuttalii,* etc.).

Some schooling fish can be found in multiple environments throughout the year (e.g., sardines are found nearshore and open oceans, but spawn inshore). While other fish species migrate to the estuary for spawning and feeding, including sculpin (*Leptocottus armatus*), surfperch (*Hyperprosopon argenteum*), flatfish (Pleuronectiformes), flounder (*Platichthys stellatus*), bat ray (*Myliobatis californica*), and requiem shark (*Carcharhinus* spp.). A wide variety of fish species including rockfish (*Sebastes* spp.), staghorn sculpin (*Leptocottus armatus*), black perch (*Embiotoca jacksoni*), shiner perch (*Cymatogaster aggregate*), and lingcod (*Ophiodon elongatus*) prefer the rocky coast. Fish that prefer the estuary and bay include shovelnose guitarfish (*Rhinobatus productus*), thornback guitarfish (*Platyrhinoides triseriata*), jacksmelt (*Atherinopsis californiensis*), and topsmelt (*Atherinopsis affinis*). Fish species found in freshwater resources include steelhead[4] (*Oncorhynchus mykiss*) and threespine stickleback (*Gasterosteus aculeatus*).

Common marine mammals include sea otters (*Enhydra lutris*), harbor seals (*Phoca vitalina*) and sea lions (*Zalophus californicus*). Although archaeological data collected from Diablo Canyon, approximately 12 miles from the research area, indicates that elephant seals (*Mirounga angustirostris*) and northern fur seals (*Callorhinus ursinus*) were also present historically (Jones *et al.* 2019:10). The coastline and estuary also attract over 75 bird species including waterfowl, shorebirds, and birds of prey (Gerdes and Browning 1974). A few species include the great blue heron (*Ardea herodias*), snowy plover (*Charadrius nivosus*), and red-tailed hawk (*Buteo jamaicensis*).

Gerdes and Browning (1974) provide valuable information of the many native terrestrial mammals of Morro Bay and the environment in which they live. Grassland and woodland environments have burrowing animals such as rabbits (*Sylvilagus* spp.), jackrabbits (*Lepus californicus*), squirrels

[4] Steelhead are technically anadromous.

(*Otospermophilus beecheyi*), and gophers (*Thomomys bottae;* Gerdes and Browning 1974:G-1). Deer (*Odocoileus hemionus*) are also common in these areas, as well as tule elk (*Cervus elaphus nannodes*) historically (Mikkelsen *et al.* 2000). Larger game identified within Morro Bay include brown bears (*Ursus horribilis*), bobcats (*Lynx rufus*), mountain lions (*Felis concolor*), and coyote (*Canis latrans*). These animals have also been identified in unlikely environments including near the bay and among the coastal dunes.

3.2 Paleoenvironment

Paleoenvironmental models rely on pollen data from across California to infer on the climatic conditions of the Late Pleistocene. West (2000) records cooler temperatures with a longer rainy season on the coast than the present based on pollen samples from the area. Jones *et al.* (2019), provide a paleoenvironmental study using paleo-sea surface temperatures, climate, and relative sea level rise. While stratigraphic and radiocarbon samples suggest that glacial recession was complete by approximately 12,000 years ago, the late glacial period was marked by massive landform change, including rapid deposition in lowland valleys and extensive erosion of upland slopes, (Anderson 1990; Anderson and Smith 1994; Clark and Gillespie 1997; Koehler and Anderson 1994; Pohl *et al*. 1996).

At the end of the Pleistocene, the continental ice sheets melted causing oceans to rise rapidly (eustatic sea level rise). Between 15,000 and 10,000 years ago, canyons and valleys along the Central Coast of California flooded as a result of the new sea level (Kaijankoski *et al.* 2019). Rapid rise in sea level (approximately 75 meters), followed by sea levels stabilization during the Younger Dryas (12,900–11,500 cal BP), resulted in the development of bays and estuaries along the coast (Jones *et al.* 2019; Masters and Aiello 2007). There is some speculation that the estuary was much larger during this time, due to the identification of Flandrian estuary mud offshore, approximately one mile from the sand spit barrier (Orme 1990). Orme (1990) also suspects a barrier similar to the sandspit must have existed during that time (late Pleistocene, early Holocene) for the Flandrian sediments to accumulate. Additionally, as sea-level rise slowed, sedimentation increased replacing tidal flats, marshes, and lagoons with bays and inlets, such as Elkhorn Slough, Morro Bay, and Halcyon Bay (Pismo Beach; Atwater 1979; Atwater et al. 1977; Bickel 1978; D. Jones et al. 2002; Jones and Waugh 1997; Mikkelsen et al. 2000; Wells and Gorman 1995; West 1988, 2000).

The environment adapted to warmer temperatures of the beginning Holocene, in Morro Bay coniferous trees were replaced with oak woodland, chaparral, and coastal sage (Jones *et al.* 2019; West *et al.* 2007). Sea temperatures cooled from 9000 to 4800 cal BP which intensified the offshore current increasing marine productivity (Jones *et al.* 2019). Rosenthal and Meyer (2004) argue that a rapid colluvial deposit was followed by a period of landform stability which is represented by buried soils in the alluvial valleys of the Diablo Range and adjacent lowlands. These buried soils suggest that after deposition, the landform remained stable throughout the remainder of the Middle Holocene.

West (2000) records pollen samples suggesting that conditions resembled modern climatic conditions during the Late Holocene. Precipitation is very variable after 3000 cal BP, with two periods of major drought, called the Medieval Climatic Anomaly (MCA). The MCA was identified by the low stands of Mono Lake between 1100 and 890 cal BP and 790 and 650 cal BP (Stine 1994). The drought period is represented across the west and resulted in extreme resource stress (Graumlich 1993; Jones *et al.* 1999; Waechter and Andolina 2005). Periods of soil stability and sediment deposition in the fans and floodplains are indicated by localized depositional events throughout the valleys of the Coast Ranges recorded 4000, 2800, 1300, and 650 years ago (Rosenthal and Meyer 2004:26). The fluctuation in stability could be a response to a change in vegetation coverage due to irregular precipitation possibly influenced by climate change.

In Morro Bay, the cooler temperatures of the middle and late Holocene, allowed for habitat stability (Gallagher 1996). But Gallagher (1996) argues that core samples from the estuary allude to a sudden deepening of the bay possibly caused by seismic activity. Jones *et al.* (2019) hypothesizes that this activity caused habitat devastation resulting in an occupational hiatus in the Morro Bay region. The following section will focus on the evolution of the estuary and bay.

3.3 Evolution of the Estuary

There is uncertainty as to when Morro Bay's estuary was formed, but based on radiocarbon data from similar environments it is thought to have been formed during the Holocene between 5,000 and 3,000 years ago (Figure 6; Far Western 2016). Based on the bathymetry and relative sea level, the shoreline

was approximately 6 to 10 kilometers west of the present coastline during the Pleistocene (Figure 6; Simms 2015; Gibson 1992). Over time, with increased sedimentation and the leveling of sea-level rise, a low barrier was created, blanketing the exposed rocky shelf. This barrier helped to foster perfect estuarine conditions for a lagoon. Later, the barrier shifted east and was eventually augmented by dune sands, which were gradually stabilized by vegetation (Orme 1991).

Past scholars have noted that the bay's changing environment over time required plants and animals to adapt (e.g., Gibson 1992; Jones *et al.* 1994; Mikkelsen *et al.* 2000). Jones *et al.* (1994:178) report that a relatively mature mud-flat could have lined the embayment as early as 8100 cal BP based on finding invertebrate remains (e.g., *Macoma, Tresus,* and *Saxidomus* species) at a nearby site. The estuary could have been at its greatest expanse during the Early Period, around 5500 cal BP (Kaijankoski *et al.* 2019). This claim is further supported by an increase of Pismo clam (*Tivela stultorum*), suggesting that the formally rocky shores had been replaced with sandy beaches (Jones *et al.* 1994:178).

There is debate as to how the estuary evolved during the Middle Period (2600–1000 cal BP). Some scholars speculate that there was an occupational hiatus during the Middle Period due to a lack of sites with dates of this time (Jones *et al.* 2019). Jones *et al.* (2019:246) argue that seismic activity could have "shut the estuary off from the sea and caused sudden deterioration of [the] shellfish habitat." There is also speculation as to whether this caused increased siltation within the bay resulting in a decreased fish population. Fish species collected from the excavations described in this thesis allude to a healthy bay condition as many identified species are known to inhabit the bay and estuary. Approximately 1100 cal BP, a smaller estuary is noted to have formed, however shellfish frequencies are significantly lower, and fish remains even fewer in sites dating to the time period (Jones *et al.* 1994).

Today, Morro Bay is part of larger Estero Bay, which is bound by Los Osos, Morro Bay, and Cayucos. Morro Bay's most notable landmark to the west, Morro Rock, sits north of the harbor mouth. In 1913, the Army Corps of Engineers artificially connected Morro Rock to the mainland during a massive harbor development project. Based on historic maps, Morro Creek used to flow into the bay (Figure 7). But eventually Morro Creek was diverted to flow into the ocean, where it currently flows today. There is speculation that Morro Creek meandered between its historic location and current location due to a small

water source noted on a historic map from 1883 (Figure 7). This water source is nicknamed “Sperm Lake” due to its shape. The location of Sperm Lake on the historic map suggests that Morro Creek, historically, may have meandered between the ocean and the bay. The change in the location of Morro Creek could have been caused by sedimentation, as discussed in Chapter 2, but dune development could have also diverted the creek. Dune development raises the base level of waterways which can cause the waterway to reroute.

Chapter 4: Regional Cultural Context and Ethnography

The following chapter provides a brief summary of the regional culture-historical sequence of the Central Coast made up of a series of temporal periods. The establishment of a region-specific chronology is vital to the development of research questions related to the understanding of human behavior and change over time. The Central Coast sequence is the most-widely accepted chronology of San Luis Obispo County (Jones 1995, 2003; Jones *et al.* 2007, 2019). This chronology, implemented from San Simeon to Point Conception, has evolved over many years of archaeological research and advancement (Table 1: Central Coast Sequence below).

Below, the current chronology is outlined first, followed by a brief discussion of the research area's cultural and ethnographic context of Morro Bay. Next, a discussion of the importance of including an ethnographic context in any research project is explored. Last, past archaeological research and studies at CA-SLO-16 will be provided.

4.1 The Central Coast Sequence

The Central Coast sequence was first proposed by Jones (1993) and has been refined with the advancement of archaeological research and dating methods (Jones *et al.* 2007; Jones and Ferneau 2002a). To divide time into temporal periods, researchers use radiocarbon dates and temporally assigned artifacts to delineate each period. In turn, changes in human behavior over time can be identified and examined.

Morro Bay has a relatively limited sample of radiocarbon data, therefore researchers have had to rely on data collected in neighboring regions (e.g., San Luis Obispo, San Simeon, Big Sur; Jones *et al.* 2019), or diagnostic artifacts, to delineate certain periods of time. One artifact that is considered a reliable dating source is the *Olivella (*cf. *Callianix)* shell bead. After years of analysis, researchers have assigned

a complete temporal series to Olivella shell beads[5] which can be used to decipher the temporal components of an archaeological site (Milliken and Schwitalla 2012).

The following sections will include temporally diagnostic artifacts that are associated with each temporal period, including the *Olivella* (*Callianax biplicata*) shell bead types, and cultural patterns, settlement types, and a sample of San Luis Obispo County sites associated with the temporal period. Please refer to Figure 8 for proximity to Morro Bay for each site described.

Table 1: Central Coast Sequence

Period	**Subperiod**	**Years cal BP**	**Additional Information**
Post Contact		180–Present	
Late		700–180	
	Protohistoric	*450–180*	
Middle/Late Transition		950–700	
Middle		2550–950	
	Late Middle	1550–950	Adapted from King (1990) and Lambert (1994)
	Early Middle	2550–1550	Adapted from King (1990) and Lambert (1994)
Early		5700–2550	
Millingstone/Lower Archaic		10,000–5700	

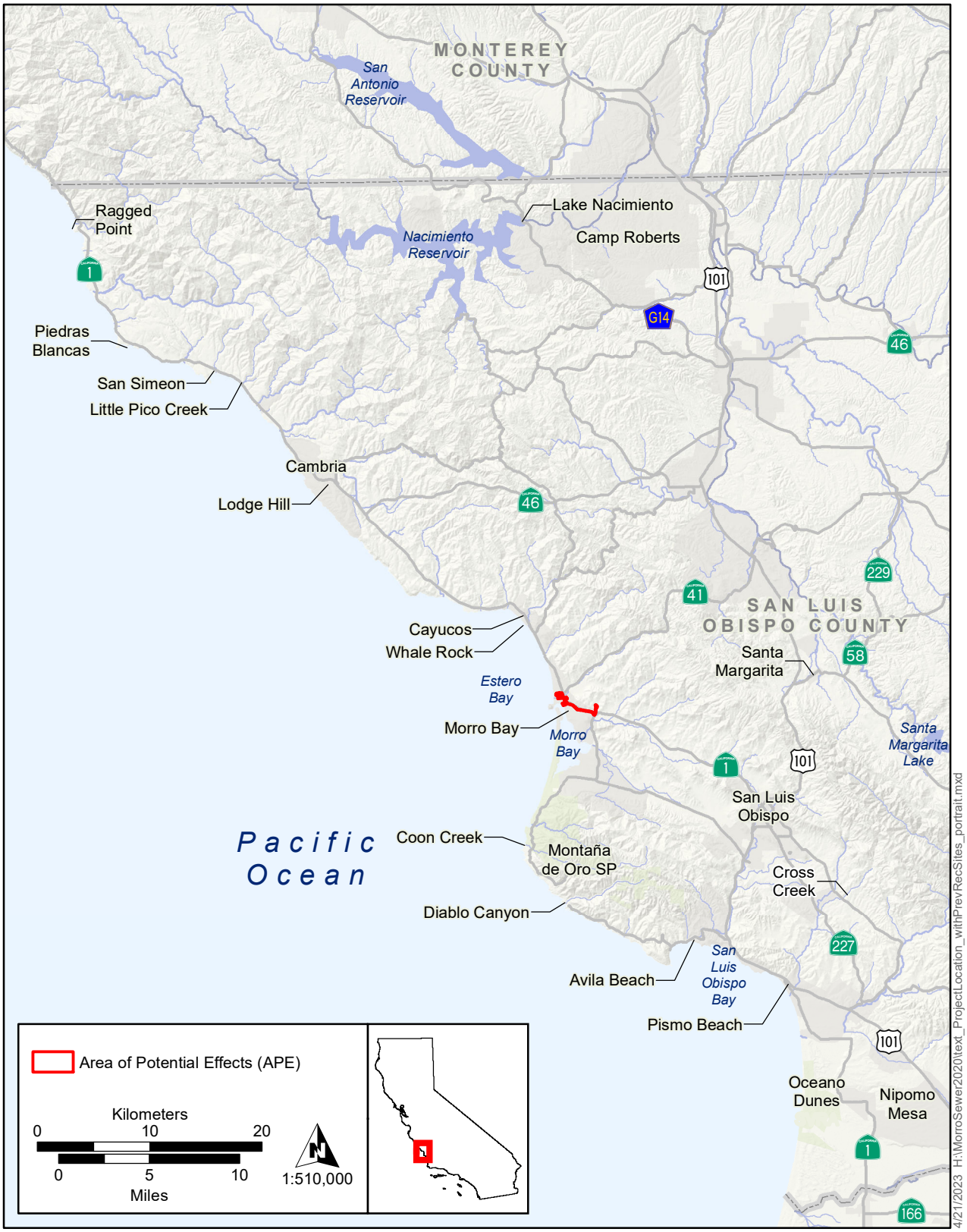
(Adapted from Jones *et al.* 2019:29)

Millingstone Period (10,000-5500 cal BP)

There is limited evidence (e.g., fluted points; CA-SLO-2, CA-SLO-1797) of human occupation as early as 13,000 years ago in San Luis Obispo County (Gibson 1996; Jones *et al.* 2019; Mills *et al.* 2005; Rondeau *et al.* 2007). Jones *et al.* (2019:37) argues that the earliest "substantive evidence for human occupation [in San Luis Obispo County] dates to 10,300 years ago." Millingstone Period, or Lower Archaic, assemblages are commonly identified by their abundance of milling slabs, handstones, and cobble-core tools, (Jones *et al.* 2019; Kaijankoski *et al.* 2019). Jones *et al.* (2019:37) note thick, rectangular, L-series *Olivella* shell beads could have occurred during this time, but very few have been recovered in this temporal context in this region.

[5] For a more detailed explanation please refer to Milliken and Schwitalla's (2012) California and Great Basin Olivella Shell Bead Guide.

Figure 8: San Luis Obispo County Region



(Provided with permission from Far Western)

Scholars note a high intensity of shellfish exploitation with terrestrial game and marine mammals contributing minimally to archaeological deposits in most locations (Hildebrandt *et al.* 2010; Jones *et al.* 2008). Additionally, as indicated by the temporal period's name, collection and processing of plants, seeds, and other botanicals were an important pursuit during this period and are reflected in the archaeological record (Hildebrandt *et al.* 2010).

There are a few well-studied archaeological sites within the county that have a Millingstone Period component. These sites include Cross Creek (CA-SLO-1797) northeast of Pismo Beach in Edna Valley (Fitzgerald 2000; T. L. Jones *et al.* 2002); CA-SLO-832 at Pismo Beach (D. Jones *et al.* 2002); CA-SLO-2 (arguably one of the most studied Millingstone Period sites) and CA-SLO-585 at Diablo Canyon (Greenwood 1972; Jones *et al.* 2008, 2009). Additionally, there are inland sites in the Upper Salinas Valley (Fitzgerald 1997; Stevens *et al.* 2004); and near Camp Roberts (Alvarez 2009). There is also a Millingstone Period component documented at Morro Bay site CA-SLO-165 (Mikkelsen *et al.* 2000), located just 0.1 miles northeast of the current study area.

Early Period (5500-2500 cal BP)

In San Luis Obispo County, there is extensive evidence for human occupation during the Early Period (5500-2500 cal BP; T. Jones *et al.* 2019; D. Jones *et al.* 2012). Many scholars (Basgall 1987; Jones and Waugh 1997; Mikkelsen *et al.* 2000) suggest there was a substantial increase in population during the Early Period, based on these findings. There is also a debate within the discipline that shifts in technology during this time suggest the introduction of an outside population (Harrison 1964; Lathrop and Troike 1984; Warren 1968;). Other scholars argue that these advancements are attributed to local communities' technological development and evolvement (Erlandson 1997; Glassow 1997).

Researchers acknowledge that increased population requires a more diverse and intensive resource source. Basgall (1987) argues that the introduction of mortars and pestles suggests a more intensive use of acorns to support the increased population. While Jones and Waugh (1997) argue that populations began storing resources, such as acorns, allowing for more sedentary settlements. There was also an increase in hunting tools, including Rossi square-stemmed projectile points, large side-notched

points, and contracting-stemmed points. Bead types attributed to the Early Period include thick, rectangular, L-series *Olivella* beads and steatite beads (Gibson and Koerper 2000; Milliken and Schwitalla 2012).

Sites with a well-defined Early Period component are more commonly identified along the coast than the interior in San Luis Obispo County. Mikkelsen *et al.* (2000) suggests that this regional site distribution could have been due to the effect drought conditions had on coastal resources during the Middle Holocene (e.g., coastal estuaries; see Hildebrandt 1997a, 1997b). Coastal sites with an Early Period component include Little Pico sites CA-SLO-175 and CA-SLO-1259, the Lodge Hill area sites CA-SLO-369, CA-SLO-383, and CA-SLO-697, CA-SLO-264 at Piedras Blancas, and CA-SLO-273 and CA-SLO-274 at Arroyo de los Chinos also produced Early Period assemblages (Hildebrandt *et al.* 2002; Jones and Ferneau 2002a; Jones and Waugh 1995). Just south of Morro Bay, in Los Osos, there are a few Early Period sites including CA-SLO-23, CA-SLO-458, CA-SLO-812, and CA-SLO-1795 (Jones *et al.* 2019:225). In Morro Bay, CA-SLO-165 has an extensive Early Period component. Research also suggest that inter-group exchange increased during this time as a result of increased intensification focused on the procurement of low-rank/high-cost resources, such as acorns, which is reflected by the increase of obsidian importation in the archaeological record (Jones and Waugh 1997).

Middle Period (2500-1000 cal BP)

Although the Middle Period is "highly visible in the central California coast," San Luis Obispo County has a few areas of nonconformity (Jones *et al.* 2019:39). In San Simeon, just a few miles north of the study area, Joslin (2006, 2010) reports a few sites with strong Early and Late components and missing Middle Period components. This is also true of Morro Bay. Only four Morro Bay sites, CA-SLO-14, CA-SLO-165, CA-SLO-2222, and CA-SLO-978, show any evidence of occupation during the Middle Period. Site CA-SLO-14 has yielded two dates of 2300 cal BP, while CA-SLO-165 and CA-SLO-978, have produced questionable dates. *Olivella* saucer beads recovered from an Early Period context at CA-SLO-165 resulted in two calibrated dates of 2300 and 2000 cal BP (see Mikkelsen *et al.* 2000). Similarly, CA-SLO-978 yielded mixed dates of 1900 and 1100 cal BP.

Sites with a well-dated Middle Period component in San Luis Obispo County include San Simeon's CA-SLO-175 and CA-SLO-267 (Jones and Ferneau 2002a; Jones and Waugh 1995) and Santa Margarita's CA-SLO-586, CA-SLO-1644, and CA-SLO-2518 (Farquhar *et al.* 2010; Fitzgerald 1997b; Wickstrom *et al.*1996). Scholars have suggested that a few important adaptations occurred during the Middle Period, noting a decreased dependence on shellfish and an increased intensification of processing and exploitation of acorns (Jones 2003; Jones and Waugh 1995, 1997). Jones and Ferneau (2002a) suggest that the intensification of acorns could have been a continuing trend from the Early Period and the reason for an increased use of mortars and pestles. Additionally, data gathered through obsidian hydration suggests that exchange of Coso and Casa Diablo obsidian from eastern California reached peak proportions during this temporal period (Bouey and Basgall 1991; Jones 1995, 1996).

I agree with Jones *et al.* (2019:39) who argue there is value in dividing the Middle period into phases. Jones compares this practice to that of King (1990), in the Santa Barbara area, who divided the Middle Period into five phases (M1-M5). The separation of this temporal period allows researchers to better understand changes in human movement, behavior, and environmental impacts during the Middle Period. Lambert (1994) simplified the phases to two: Early and Late Middle Period. Jones equates the Early Middle Period of the Central Coast sequence (2600-1500 cal BP) with Lambert's phases M1 and M2, while the Late Middle Period (1500-950 cal BP) "[correlates] approximately with his phases M3-M5" (Jones *et al.* 2019:39).

The separation of the Early Middle Period and the Late Middle Period is vital to the understanding of change in human occupation in Morro Bay. Jones *et al.* (2019) identifies two "gaps" of occupation in Morro Bay during the Middle Period. The first gap overlaps the beginning of the Early Middle Period, 2900-2300 cal BP, and the second occurs during the Late Middle Period, 1700-1100 cal BP (Jones *et al.* 2019). Jones *et al.* (2019) attributes the gaps in the radiocarbon record to seismic activity in the bay area heavily citing Gallagher (1996). Jones *et al.* (2019:250-251) alludes to severe seismic activity that caused habitat deterioration, a sudden deepening of the bay (Gallagher 1996), human populations to evacuate the area, and the estuary to be shut off from the sea (Jones *et al.* 2019:246). The Late Middle Period gap will be referred to throughout this research.

Due to the lack of Middle Period components in Morro Bay, researchers have applied regional data to allude to changes in the archaeological record during this time. The most common markers are *Olivella* shell beads; types include saucer beads (class G), specifically normal (G2) and irregular (G6). "*Haliotis* disk ornaments, perforated disks, rings with incised edges, and plain- and flat-ended rings" appear during this period (Jones *et al.* 2019:39; also, Jones 1995). Large side-notched and Rossi square-stemmed projectile points disappear, as do rectangular L-series *Olivella* beads (Jones *et al.* 2019). It is debated whether large concave-base points appear during this time as they are "rare on the Central Coast and not securely dated" (Jones *et al.* 2019:38). Contracting-stemmed projectile points are also noted during this period (Jones *et al.* 2007:136; Wiggins 2022) although this type of point spans across several temporal periods. Grooved stone net weights and curved shellfish hooks appear, in addition to bone tools such as needles, pins, awls, whistles, spatulas, gorge hooks, and antler tines (Jones *et al.* 2019).

Middle-Late Transition (1000-700 cal BP)

The Middle-Late Transition experienced Medieval droughts, settlement disruptions, and a debated decline in population. The San Luis Obispo County coast differs from neighboring coastlines, (e.g., Santa Barbara; Arnold 2001), in that evidence for archaeological materials during the Middle-Late Transition declines. Some scholars suggest this may reflect a more dispersed pattern of settlement, while others attribute the decline to environmental degradation and resulting decline in human population densities due to the severe Medieval dry period, also referred to as the Medieval Climatic Anomaly (1150-600 cal BP; Graumlich 1993; Jones 1995; Jones *et al.*1999; Stine 1994).

Coastal deposits dating to this temporal period include the Coon Creek Site CA-SLO-9 (Codding and Jones 2007), Little Pico Creek CA-SLO-175, and CA-SLO-165 and CA-SLO-239 in Morro Bay. CA-SLO-536 is a large Middle-Late Transition site in the Chorro Valley. While just north of Morro Bay, Cayucos has at least three sites that date to the Middle-Late Transition including CA-SLO-74, CA-SLO-879, and CA-SLO-2195 (Wiggins 2022:132). Due to the increase in fish remains during the Middle-Late Transition in the CA-SLO-9 deposit (Codding and Jones 2007; Codding *et al.* 2009, 2010) and in San Simeon (Joslin 2010), scholars argue that the severe effects of drought on terrestrial landscapes led populations to exploit marine resources. Jones (1995) states that obsidian exchange networks collapsed during this time as obsidian

declined dramatically in the archaeological record. Archaeological constituents attributed to the Middle-Late Transition include contracting-stemmed, small leaf, and double side-notched projectile points, curved shellfish hooks, hopper mortars, and a variety of *Olivella* shell bead types (B2, B3, G1, G6, K1, and possibly D1; Jones and Waugh 1995).

Late Period (700 cal BP – Historic Contact)

Radiocarbon data and accompanying deposits for the Late Period alludes to more mobile and dispersed settlements with a higher population density than previous temporal periods (Jones *et al.* 2019). Originally, researchers thought settlements were isolated to terrestrial landscapes, but excavations in Big Sur have identified seasonal or temporary camps on the shore (Hildebrandt and Jones 1998; Jones 2003; Wohlgemuth *et al.* 2002). Subsistence practices during the Late Period are still focused on acorn processing and marine resources with an increase of marine shellfish and the addition of plant and terrestrial foods, specifically deer (Bouey and Basgall 1991; Jones 1995; Jones *et al* 2019).

Deposit constituents continuing from the Middle-Late Transition include hopper mortars, milling slabs, handstones, circular shellfish hooks, and *Olivella* shell beads (types B2, B3, G1, G6, and K1; Jones *et al.* 2019:40). New constituents include the Desert Side-notched and Cottonwood arrow points, chipped stone bead drills, flowerpot mortars, clamshell disk beads, *Haliotis* disk beads, *Olivella* shell bead types E1 and E2, and steatite disk beads (Jones *et al.* 2019). The most notable development during this period is the appearance of bedrock mortars in interior regions (Bertrando 2007).

Joslin (2010) suggests that occupations of the Late Period were widening the diet breadth of the marine environment, noting a shift from mussel (high-ranked, low cost) to turban snail or similar (low-ranked, high cost). Jones *et al.* (2019) note that deer and rabbit remains decline in the record, while marine fish, specifically small schooling species, increase. Additionally, Jones *et al.* (2019) add that the average size of the mussel decreases during the Late Period alluding to over exploiting the resource. Bertrando and Joslin (2000) argue that the replacement of former technologies could be resulted from more reliance on coastal-valley resources during the latter half of the Holocene versus a coastal-subsistence focus. This could also be due to overexploitation of marine resources.

4.2 Ethnography

Archaeologists are often so focused on the findings of an excavation that the importance of historical context is lost. This fact is especially true regarding the history of Indigenous cultures. If archaeologists continue to dismiss the historically oppressed and exploited Indigenous cultures and the environments they are connected to, it will generate a discipline complicit in the continuing exploitation of Native Peoples (Bertrando, personal communication, February 20, 2023). Additionally, understanding the historical context of the cultures within the research area is paramount to asking and answering important research questions.

All researchers should consider and acknowledge the possible biases that may affect the research. These biases are present within ethnographic materials and researchers should consider these biases when applying ethnographic studies to research. LeCompte (1987:46) maintains that amateur travelers conducted early anthropological studies by writing informal observations of the "exotic sights they saw and the strange people they encountered." Researchers later accepted these observations as truth within the anthropological record for the observed culture. LeCompte suggests these observations, written in the "simple present tense" results in a "fraudulent timelessness" or "freeze-frame" assigned to the studied culture or peoples (1987:46; Fabian 2014). Additionally, ethnographic methodology creates a very generalized viewpoint, limiting the variation and diversity of a culture.

Scholars should consider the following questions when applying ethnographic, biographic, or autobiographic materials to their research (adapted from LeCompte 1987):

1. Who conducted the study or observations?
2. Where are they from? Their geographic location and their demographic.
3. How was the ethnographer selected for this work? Were they self-motivated?
4. Did the writer have formal training?
5. What potential biases may be reflected within the observations?

Regardless of the potential unconscious biases that may be in ethnographic information, ethnographies are an incredibly valuable resource to anthropologists and archaeologists. The information observed, collected, and documented in ethnographies has allowed scholars to identify patterns and trends over time.

Past scholars have relied on the written records from nearby missions to delineate the tribal territories of San Luis Obispo County. Roberta Greenwood (1978; Heizer 1978) assembled an extensive synthesis of the Obispeño and Purisimeño Chumash for the *Handbook of North American Indians* published by the Smithsonian. Although almost fifty years old, Greenwood's work is still relevant and referred to today.

Information regarding Morro Bay's prehistory and its occupants is limited prior to the missions. Early seafarers, such as Cabrillo and other explorers, documented Morro Bay and its neighboring coastline as useless and uninhabited due to its unnavigable harbor (Mason 1912). This lack of written record complicates the discussion of tribal boundaries, as there is not a clear delineation through Morro Bay. It is widely known that the region is a contested boundary of the Chumash and Salinan, but the discussion becomes even more complicated with the introduction of a third group, the Playaño. Some researchers speculate that this undefined boundary is an indication of "intermittent, seasonal, or special purpose occupation" (Greenwood 1978:520). Although defining cultural boundaries can be important for certain research questions, it is not necessary for the research presented in this thesis. The following is a brief discussion of the native communities related to the project area.

Chumash

Scholars argue that the Chumash are one of the most complex hunter-gatherer societies to have existed on earth (Arnold and Walsh 2010:100-124; Glassow *et al.* 2007; Gibson 1994a; Jones *et al.* 2019). The Chumash territory stretched across the California coast from Malibu to north San Luis Obispo County, extending west to the Northern Channel Islands, and east into the interior (Santa Barbara Museum of Natural History 2023). Data suggest the Chumash territory covered over 25,000 kilometers in arguably 150 villages (Arnold 2001:11; Santa Barbara Museum of Natural History 1986, 2023). The Chumash territory contained at least eight subgroups including the island Chumash, the Emigdiano, the Cuyama Chumash,

the Ventureño, the Barbareño, the Purisimeño, the Ynezeño, and the Obispeño (Arnold 2001; Johnson 1998). These subgroups interacted regularly, predominantly for trade and exchange (Arnold 2001).

Ethnographic research conducted on the Chumash and neighboring tribes has been focused on the language. The Chumash language, or Chumashan, has been applied to all languages within the same language family and their associated groups (Gibson 1994a; Jones *et al.* 2019). The Obispeño, or Northern Chumash, was the language spoken in San Luis Obispo County. Research suggests that the Chumash language is one of the oldest languages spoken in California due to its distinct phyla unlike any other language or language family in California (Golla 2007, 2019).

Scholars have compiled information regarding the Northern Chumash from Spanish documents, mission records, responses to the 1814 Spanish Interrogatorio, and the ethnographies collected by John Peabody Harrington (Jones *et al.* 2019). Greenwood notes that Pedro de Unamuno visited the Morro Bay coast in 1587, while the procession of Gaspar de Portolá "traversed the area in 1769" (1978:520). Spanish documents include diaries from the Portolá expedition (Bolton 1927; Boneu Companys 1983; Brown 2001; Piette 1947) and the Font expedition between 1775 and 1776 (Bolton 1930). In 2003, Milliken and Johnson compiled a comprehensive ethnogeography based on Spanish mission records and previous research related to the Northern Chumash.

Research suggests that the Northern Chumash were more culturally alike to their Central Coast neighbors than their linguistic relatives in the Santa Barbara Channel region (Milliken 2000:13; Wiggins 2022). Jones *et al.* (2019:17) argue, "there is a tendency to overemphasize cultural patterns from the Santa Barbara Channel and project them onto the Northern Chumash, even though there are clear cultural and environmental differences between the two areas" (e.g., Gibson 1991; Miller 1988; Perry *et al.* 1986). Even Greenwood (1978:521) argues the delineation of the Obispeño and the Purisimeño were "drawn more sharply by the ecological boundaries...than by the linguistic subdivisions."

The Northern Chumash, or in San Luis Obispo, the *yak titʸu titʸu yak tiłhini* (Applegate 1974:191), were a well-established, complex, maritime, hunter-gatherer economy (Jones *et al.* 2019). The socio-political structure was organized, with "headmen" given status privileges at the village level (Milliken and

Johnson 2005). The Chumash had extraordinary economic influence on surrounding tribal groups with the *Olivella* shell bead industry spanning from the Chumash on the Channel Islands, up through San Luis Obispo. This industry can be seen throughout the archaeological record of North America's west coast and into the interior (Kaijankoski *et al.* 2019). Greenwood (1978:521) notes that archaeological evidence supports the historic record that houses were round, underground dwellings, roofed with branches, often found on either side of streams.

Salinan

Similar to the Chumash, information regarding the Salinan is also very limited (Hester 1978; Kroeber 1925; Mason 1912). Mason (1912) notes, information concerning the Salinan people prior to mission records is "practically nothing." The Salinan were interior dwellers, camping along coastal cliffs, hills of the South Coast Range, along rivers, creeks, and floodplains (Wiggins 2022). Hester notes that "houses were domed with a pole framework covered with tule or rye grass," (1978:501). The Salinan were a hunter-gatherer community, subsisting on a variety of animal and plant foods exploited seasonally (Hester 1978). It is suggested that the tribe would travel to the coast to collect marine resources (e.g., shellfish, fish, seabirds, etc.) on a seasonal rotation (Tibesar 1956:140-142). Scholars of nearby regions note this practice in the neighboring Monterey Peninsula and in Carmel Bay (Tibesar 1956:140-142).

There is debate as to the hierarchical structure within the Salinan tribe. A few researchers believe the tribe was organized into independent small tribes or "tribelets" with a single chief ruling a village or a few villages (Mason 1912). Others argue that each of the larger villages had a hereditary chief with regional leaders (Mason 1912; Milliken 2006). Still other scholars suggest that the community may have recognized other high positions, including leaders of warfare or game aggregations (Mason 1912).

The Salinan shared boundaries with four other tribes: the *Ohlone* to the north; the *Esselen* to the north and northwest; *Yokuts* to the east; and the Northern Chumash to the South. Relations with the Yokuts seem to have been fairly stable compared to the Northern Chumash and *Ohlone*. The Salinans traded the Yokuts saltgrass, seeds, lake fish, obsidian, and tanned antelope and deer skins in exchange for access to the coastline (Hester 1978). Intermarriages between the Salinan and Yokuts were also common (Mason

1912). Scholars propose that resource competition played a role in the hostile relationship between the Salinan, Northern Chumash, and *Ohlone* (Hester 1978; Mason 1912). Nonetheless, the Salinan still participated in the trading industry; trading *Columella* ornaments, wooden dishes, and steatite for grasshoppers, acorns, and deer skins (Greenwood 1978; Hester 1978; Wiggins 2022).

Similar to the previous tribes described above, the Salinan language has become one of the most studied characteristics of the culture. The Salinan language is a descendent of the *Hokan* stock, which is arguably one of the "oldest linguistic phylum in the western North America" (Golla 2007:123, 2019). The distribution of *Hokan* languages and dialects is spread out, appearing in areas of California in the north, south, east, and west in a somewhat random display, as well as throughout the Southwest and into western mainland Mexico (Golla 2007). There are two recorded dialects in mission records. The first, *Antoniaño,* or Northern, is in the north and west, the second, *Migueleño,* or Southern, is to the south and east (Golla 2019:114-115). Golla (2019) suggests that the names of each dialect were given by the Spanish after the languages spoken at the missions. The dialects were then placed in the Salinan language family, named after the nearby Salinas River (Golla 2019; R.G. Latham 1856:65). Many linguists debate how many dialects can be attributed to the Salinan language family, but Golla (2019) argues that limiting the Salinan language to only two dialects is a mere reflection of "mission standardization obscuring a greater dialect diversity" (Wiggins 2022:36).

The Salinan population has been difficult to calculate as it was not the mission's intention to separate each tribe in their records. Estimations by seafarers and missions often encompass the Chumash, Salinan, and possibly the Playaño together. Documents from Mason (1912) and a manuscript prepared by C.H. Merriam (1933-1934, unpublished notes) alluded to twenty-one villages within the Salinan territory, while Kroeber (1925) argues these numbers are not limited to the Salinan population. Mason (1912) estimated there were twenty villages in a 20-mile radius from Mission San Antonio. Milliken and Johnson (2005) predicted that the population of San Luis Obispo County's coast and inland was approximately 0.2-2.0 people per square mile at the time Mission San Luis Obispo was established in 1772 (between 700-7,500).

Playaño

Information about the Playaño is limited and contested. Researchers speculate the Playaño language may have been a dialect of the Northern *Obispeño* Chumash (Kroeber 1925; Mason 1912) or the Salinan (Baldwin 1969; Gibson 1983; Joslin 2010; Millken and Johnson 2005). While Milliken and Johnson (2005) suggest it is possible it was a separate, now extinct, relic language. Mission records note a small group of individuals from the *playa*, who spoke a language different from the Chumash or Salinan (Milliken and Johnson 2005; Wiggins 2022). Milliken and Johnson (2005:143) wrote:

> The missionaries of both missions San Antonio and San Miguel indicated in their responses to the Spanish *Interrogatorio* of 1812 that non-Salinan coastal people came to their missions. Father Sancho noted that two languages were spoken at Mission San Antonio. The principal language, which must have been Salinan, was 'understood to the east, south, north, and the surrounding area of the west.' The less important language had been spoken by the 'Playaño or shore dwellers because they came from the sea-coast'…these Playaño-speakers were already few in number by 1813.

Mission records from Mission San Antonio and Mission San Miguel do not specify an exact location for the Playaño. Scholars speculate the Playaño lived as far south as Morro Bay (Milliken and Johnson 2005) while others (Baldwin 1969; Joslin 2010) map the Playaño between Point Estero and San Simeon.

4.3 Past Archaeological Research at CA-SLO-16

Site CA-SLO-16 was first recorded in 1948 by Harley J. Walker, who reported the removal of 49-59 human burials by private collectors and archaeologists affiliated with the Santa Barbara Museum of Natural History. Unfortunately, no formal record of that work is available. In 1952, Patton conducted a limited site record update, noting the presence of shell midden, mortars, and simply adding "burials were tightly flexed" (1952: n.p.). Patton did not include the location or number of burials.

In 1972, archaeologist Roberta Greenwood conducted a limited testing program to identify the site's boundaries during the Pacific Gas and Electric Company (PG&E) power plant storage facilities project. A 1972 site record update, presumably by Greenwood, included sketched profiles of the five test borings with a final depth of 3.4 meters. Greenwood (1973) reported the site was covered in redeposited fill, measuring 0.3 to 2.4 meters (1.0 to 7.9 feet) thick above the cultural deposit. The deposit, ranging from 0.3 to 2.7

meters (1 to 9 feet), was mostly buried beneath overburden. Greenwood (1973) estimated the site boundary to be 213 meters north-south, by 91 meters east-west, with approximately 40 looters' holes present. She strongly recommended that a data recovery investigation be conducted to stabilize the buried deposits (Greenwood 1973), but later, Singer (1991) reports that no other work was conducted by PG&E.

In 1997, a Morro Bay City employee reported a single human burial exposed in the cut bank directly under the proposed location for a pedestrian bridge over Morro Creek. Two years later, in 1999, archaeologist Clay Singer conducted a site visit based on this report. Singer could not relocate the burial, noting the creek had become densely vegetated. In a site record update, Singer suggested the burial was still present but did not expand the site boundary to include the presumed location, despite being approximately 150 meters outside the site boundary (2000).

Archaeologist John Parker surveyed the site again in 1999. Parker (1999) reported a buried shell midden exposed along a 150-meter-long section of the south Morro Creek cutbanks and 90-meter-long section of the north cutbank. Parker noted that artificial fill and alluvium buried the deposit, with a thickness of 0.3 to 2.0 meters (1.0 to 6.6 feet; Parker 1999). Parker noted that the deposit was a minimum of 1.2 meters thick, often extending below the base of the creek bed (1999). Additionally, Parker (1999) reported in the site record update, that a member of the Northern Chumash Council observed human remains eroding from the cutbank in 1996. There is speculation that the remains were collected and reburied nearby in an unknown location.

In 1999, an unknown archaeologist monitored the construction of the bike path, water pipelines, and pedestrian bridge over Morro Creek. Without a site record update, it is not clear exactly what occurred, but it appears that a reburial of human remains identified during the project took place immediately west of the southwest foundation of the bike bridge. A member of the Salinan Tribe of San Luis Obispo and Monterey Counties passed this information to the archaeological community as there is no formal record.

In early 2000, Parker (2000) conducted a damage assessment of the site after an unpermitted sheet piling construction for creek bank stabilization took place. Parker (2000) excavated two test trenches, one on the east end and one on the west end of the proposed project area. The east trench contained shell

midden at an unknown depth while the west trench was sterile. These findings terminated the construction project.

Two years later, Parker returned to the site to conduct a pedestrian survey of adjacent Lila Keiser Park (2002, 2003). Parker reported buried shell midden in the north bank of Morro Creek at depths of roughly 75 centimeters below surface and extending below the base of the cutbank. Parker (2002) also reported shell midden on the surface but suggested that it was redeposited during prior construction. In 2003, Parker monitored mechanical auguring at Lila Keiser Park with positive results. He reported sparse shell midden in one area between 3.0 and 3.2 meters (9.8 and 10.5 feet), and dense shell midden in two areas between 2.4 and 3.6 meters (7.9 to 11.8 feet). Parker did not update the site record with these findings.

4.4 Geoarchaeological Testing at CA-SLO-16

In 2020, the City of Morro Bay contracted Far Western to conduct archaeological identification, evaluation, and mitigation efforts for a new Water Reclamation Facility Project which included investigations at site CA-SLO-16. The goal of this testing effort was to delineate the site boundaries and identify any cultural deposits that may be impacted by the prospective project. The geoarchaeological methods implemented included a series of hydraulic-continuous cores at 25-meter intervals to the maximum depth of project impacts. The crew tested the soil with a hand auger where coring was not feasible.

Due to the findings from the geoarchaeological testing, the City of Morro Bay agreed to update the project plans to partially avoid the cultural deposit. It was during this testing phase that a geoarchaeologist identified a dense, deeply buried, shell midden deposit at CA-SLO-16 (Kaijankoski 2020). These findings redefined the site boundary and prompted further testing which I will discuss at length in the following chapters.

Chapter 5: Methodology

As previously discussed, the research addressed in this thesis is part of a larger CRM project conducted by Far Western. After the crew completed fieldwork, a cross-discipline approach was applied to the data, focusing on some unique contexts of precontact environmental change and human adaptation. This research, much like most archaeological studies, required both desktop research and fieldwork to form a strong argument.

5.1 Research Design

The purpose of the Phase II test excavation and Phase III data recovery discussed in this thesis is to determine the presence of a subsurface deposit and define its horizontal and vertical extent, expose the types and quantities of the cultural materials present, and apply those findings in the larger context of Morro Bay. CA-SLO-16 has a significant amount of research potential, which I will discuss at length in Chapter 9. The focus of this thesis is to demonstrate how implementing geoarchaeological methods can lead to new research opportunities not previously available using standard archaeological methods (e.g., hand excavation, monitoring, etc.).

Determining the temporal component(s), or the age of archaeological assemblages, is one of the most important tasks when studying an archaeological deposit. To complete this at CA-SLO-16, I first gained a familiarity of the site's sediment structure (as discussed in Chapter 2). Then, radiocarbon samples were taken from several intact, stratigraphic contexts. These samples, once dated, provided the location of each intact deposit and its associated temporal period. These data are critical for better understanding human behavior, the human-environment relationship, and change throughout time. This practice may seem like a basic analytical principle, but unfortunately, not all archaeologists complete temporal definition prior to analysis. Disregarding temporal component definition deprives the research of adequate comparison of human behavior over time. Chapter 2 further explains temporal component definition and Chapter 7 details the application of temporal component definition to this research.

5.2 Field Methods

Cultural Resource Management Practices

After preparing an archaeological survey, research design, and treatment plan for the project (Kaijankoski *et al.* 2019), a Programmatic Agreement was established among the City of Morro Bay, the Environmental Protection Agency (EPA), and the State Historic Preservation Officer (SHPO). This Programmatic Agreement divided the project construction components into four phases. These phases are construction specific and do not correlate with archaeological phases. The second construction phase, Construction Phase 2, included multiple project components but only the utility bridge and associated pipeline were within the research area.

The archaeological materials within site CA-SLO-16 were in primary stratigraphic contexts during the 2020 testing and were therefore determined eligible for inclusion to the National Register of Historic Places (NRHP) by the Environmental Protection Agency (EPA) under the Programmatic Agreement. Far Western prepared a site-specific treatment plan (Kaijankoski *et al.* 2019), which included a Phase II testing and Phase III data recovery. The next section details the methods of the evaluation.

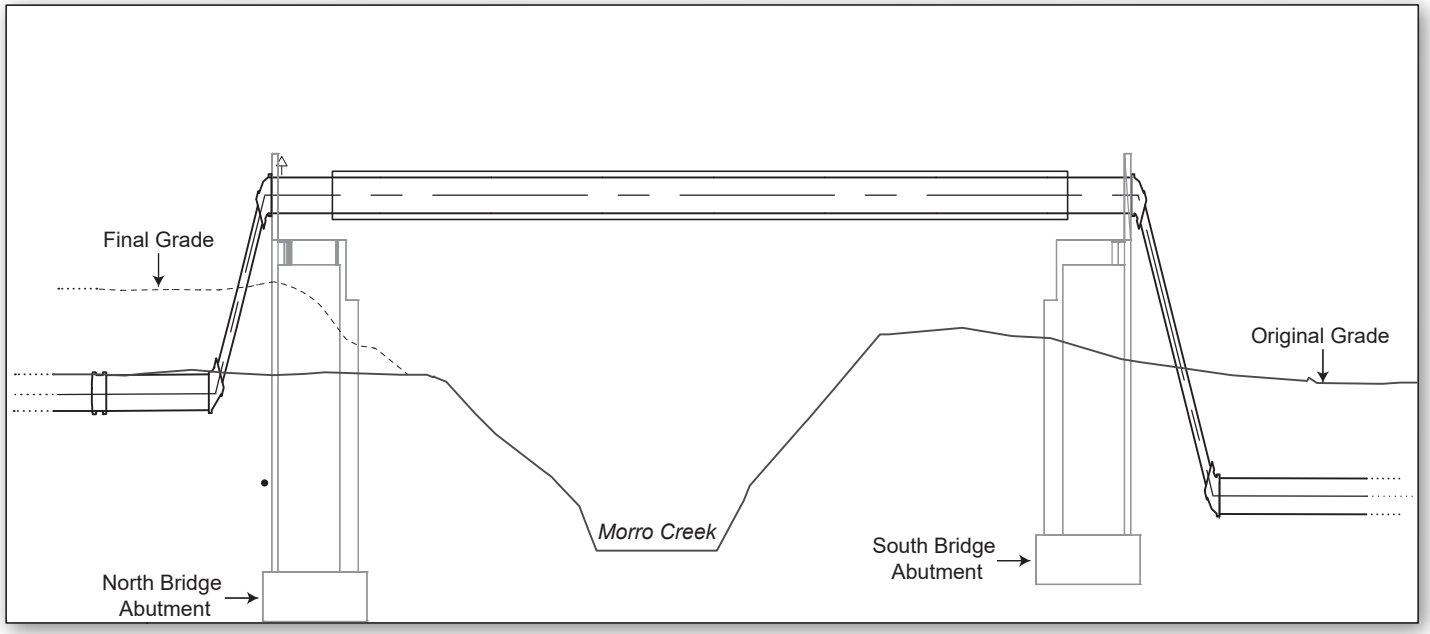
CEQA requires Native American consultation. A Native American tribal member or representative was present in the field during all ground disturbance. The project area lies within a contested boundary of the Chumash and Salinan, therefore monitors rotated between four tribes identified by the Native American Heritage Commission. These tribes included the Northern Chumash Tribal Council, the *yak titʸu titʸu yak tiłhini* Northern Chumash, the *Xolon* Salinan Tribe, and the Salinan Tribe of San Luis Obispo and Monterey Counties.

Project Components

As discussed briefly in Chapter 1, the City of Morro Bay is constructing a new Water Reclamation Facility. The project has many components within the Area of Potential Effects[6] (APE), but only the utility

[6] The Area Potential Effects is "the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)).

Figure 9: Project Components



• = Approximate depth of intact cultural deposit.
Scale Drawing of Morro Creek Pipe Bridge and Adjacent Force Main Pipeline, View to the East.

(Provided with permission from Far Western)

bridge, over Morro Creek, and associated pipeline were within the research area. Site CA-SLO-16, located on both sides of Morro Creek, is a deeply buried precontact archaeological site. Prior to fieldwork, the testing areas were separated into three spatial components: North Bridge Abutment, South Bridge Abutment, and Southern Pipeline Alignment (Figure 9). Unit excavation was completed in these three spatial components and the results detailed in the following chapters will be described by project component.

General Methods

In addition to the excavation methods implemented during this project, crew members also utilized general field methods as needed for the duration of the project. These field methods include construction monitoring, mechanical stripping, surface transect unit excavation, control unit excavation, and bulk soil sampling. Appendix B provides a description of these methods. Due to the geoarchaeological focus of this thesis, the identification of stratigraphy and soil descriptions will be described in greater length below.

Stratigraphic Identification and Soil Descriptions

As excavations were underway, an archaeologist (or I) would carefully examine the deposits exposed in the excavations for natural and cultural stratigraphy. Strata, or stratigraphic units, were identified by superposition, physical composition, textural transition (i.e., upward-fining sequences), characteristic of discrete depositional cycles and relative soil development (Waters 1992). It is common practice to assign each stratum a roman numeral, beginning with the oldest, or lowermost stratum, and ending with the youngest, or upper-most stratum (Waters 1992).

Geoarchaeological soil profiles are more detailed than an archaeological level record. Geoarchaeologists look for soil horizons to understand environmental change over time, these changes in the environment can have significant impacts to the area's human occupants. Buried soils, or paleosols, represent a formally stable ground surface. During this research, buried soils were identified by "color, structure, horizon development, bioturbation, lateral continuity, and the nature of the upper contact or boundary with the overlying deposit" (Kaijankoski and Whitaker 2020:21; Waters 1992). Many

geoarchaeologists including Birkeland *et al.* (1991), Holliday (1990), Retallack (1988), and Waters (1992), have described this practice.

This soil profiling methodology is consistent with that of Birkeland *et al.* (1991), Schoeneberger *et al.* (1998), the United States Department of Agriculture Soil Survey Staff (2014), and the Soil Science Division (Natural Resources Conservation Science [NRCS] 2017). Waters (1992:45) states:

> The soil forming processes—addition, translocation, transformation, and removal—are responsible for physically, chemically, and biologically altering a previously deposited, stable sediment mass into a soil profile…this creates a sequence of distinctive zones called horizons, which lie horizontal to one another and parallel to the surface.

Soil horizons have distinct properties; physical, chemical, and biological, that help geoarchaeologists recognize a subdivided soil profile (Waters 1992). There are two types of horizons: organic and mineral. Organic horizons are those whose properties are determined by the organic material that makes up approximately 20% or more of the horizon. Mineral horizons consist of, or have their properties determined by, mineral matter (Waters 1992:48). A mineral horizon should contain less than 20% organic material. Within the organic and mineral horizons (Table 2), there are six major soil horizons: O, A, E, B, C, and R, but usually only a few occur together in a soil profile (Waters 1992:45).

The upper-most part of a complete soil profile is usually the A-horizon, followed by the B-horizon or zone of accumulation in the center of the profile. The C-horizon is next, representing the "relatively unweathered parent material" in the lower part of the soil profile (Waters 1992). Lower-case letters are used to characterize distinctions that are specific to a particular master horizon (Waters 1992:48). Geoarchaeologists and soil scientists use the distinctions summarized in Table 3 to further describe characteristics of the horizons being studied. The combination of these numbers and letters creates a soil horizon description which indicates change of environment over time, by way of soil characteristics. Chapter 7 presents detailed descriptions of the soil profiles documented in the abutments, pipeline excavations, and excavation units. During excavation a few distinct horizons were identified, of those, the following are descriptions of the five most common. These descriptions include a Munsell color scale. Munsell defines colors by measuring the hue, value, and chroma of one color (Munsell 2017). The hue is the base color (e.g., 10YR, 10 yellow, red). Value is the lightness and darkness of the color within Munsell

Table 2: Master Horizons

O Horizon	Dark-colored surface accumulation of organic matter (from plants and animals) overlying mineral soil.
A Horizon	Mineral horizon that formed at the surface or below an O horizon. Characterized by the accumulation of humified organic matter mixed with solid mineral grains. Mineral portion of the horizon dominates. Typically, darker colored than underlying horizons.
Ap	Horizon with properties resulting from cultivation, pasturing, or similar types of disturbance.
E Horizon	Light-colored horizon that underlies an O or A horizon. Characterized by the loss of clay, soluble iron, soluble aluminum, organic matter, or some combination of these. This results in the concentration of quartz and other weather-resistant materials.
B Horizon	Mineral horizon formed below an A, E, or O horizon that shows little or no evidence of the original sediment or rock structure and is primarily characterized by illuvial concentrations of clay, iron, aluminum, humus, carbonates, gypsum, or silica. (Refer to Waters (1992) for all B horizons that are recognized).
C Horizon	Subsurface mineral horizon, excluding hard bedrock, is essentially unaltered or slightly altered parent material (sedimentary structures and textures are partly or totally preserved). This horizon may be unconsolidated or weakly consolidated and lack properties of O, A, E, or B horizons.
R Horizon	Consolidated, hard bedrock underlying soil.

(Adapted from Bettis 1984; Birkeland 1984; and Waters 1992:46-47)

Table 3: Subordinate Distinctions Within Master Horizons

b	Buried soil horizon.
c	Horizon contains concretions or hard nodules cemented by iron, aluminum, manganese, or titanium.
f	Horizon is frozen year-round.
g	Horizon in which gleying has occurred. Iron has been converted to a reduced state as a consequence of being saturated with water. Commonly, gleyed soils have a neutral color (gray) or are mottled. Strongly gleyed soils are blue to green.
k	Horizons are characterized by the accumulation of alkaline earth carbonates, mostly calcium carbonate.
m	A horizon that is more than 90% cemented or indurated. Cementing material is designated (e.g., km, carbonate; ym, gypsum).
n	Horizons characterized by an accumulation of sodium.
v	Horizons are characterized by the presence of iron-rich, humus-poor reddish material that hardens irreversibly when dried. This is called plinthite.
x	Horizon that is hard to very hard, with high hulk density, brittle, and seemingly cemented when dry (fragipan-like).
y	Horizon with an accumulation of gypsum.
z	Horizon with an accumulation of salts more soluble than gypsum.

(Adapted from Waters 1992: 49)

system (Munsell 2017). Finally, the chroma is how weak or strong a color is within the Munsell system (Munsell 2017). Therefore, the Munsell color scale would interpret a yellow-red soil, with a dark but weak color as 10YR 5/2. Many disciplines use this system internationally. Archaeologists employ this process to systematically compare soil colors and identify changes in soils.

2C - 2C is a thick deposit of grayish brown (10YR 5/2) silty loam. The soil is massive and friable. During the first "lift," (described below), the contact with 3Ab was clear, indicating a somewhat abrupt deposition period.

3Ab - 3Ab is a very dark gray (10YR 3/1) loam. It has a semi-blocky structure and is flexible. There are medium sized, angular, gravels, which were later determined to be fire cracked rock, concentrated to the upper contact. The lower contact, with the 3C horizon, is clear and wavy. A majority of the excavated materials were from this horizon as it contained a majority of the cultural materials.

3C - 3C is a parent material. It is a very dark grayish brown (10YR 3/2) friable loam with a massive structure. Portions of the 3C horizon have redoximorphic features noted, but it is generally isolated to the north end of the north bridge abutment. Redoximorphic features or patterns are usually formed by the oxidation and reduction of iron due to saturation.

4Ab - 4Ab is a black (10YR 2/1) loam with a semi-blocky structure. Portions of the 4Ab horizon had angular fire-cracked rock; in some units, the fire-cracked rock was the only identifiable feature of the horizon's presence.

4C1 - 4C1, a brown (10YR 4/3) loam, has a single-grain structure. The horizon is approximately 50% small, subrounded and rounded gravel. Archaeologists suggest this horizon could indicate a past channel of Morro Creek.

4C2 - 4C2 is a yellow brown (10YR) silty loam with common abandoned root holes. This can indicate that it is a developed soil that was on the surface for a longer period. This horizon had no gravel, massive structure, and was very friable.

The following sections will reference these soil types.

5.3 Phase II Testing Methods

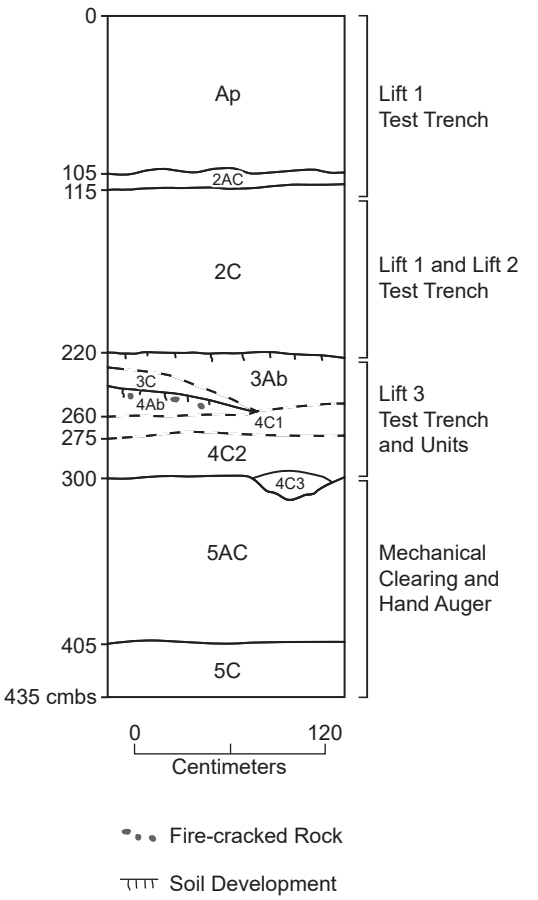
Each bridge abutment required excavation of an approximately 7.5-x-7.5-meter area to a depth of 4.3 meters below surface. As discussed, prior testing identified a deeply buried archaeological deposit near the north and south abutments at depths of 2.4 and 1.4 meters below surface, respectively. The depth of excavation was a safety concern; therefore, crews were not allowed to enter excavation areas deeper than 1.2 meters. Due to access, biological resources, and safety concerns, the construction crew secured the two bridge abutments with a slide rail shoring system prior to excavation (Figure 15 and 16).

The slide rail shoring system required a backhoe to excavate a series of 1.2 meter "lifts" during installation. Each "lift" was started by a backhoe excavating a single test trench in the center of the abutment to document the stratigraphy. After a backhoe excavated the test trench, an archaeologist would document the soil stratigraphy to identify any intact features or cultural deposits. All lifts were excavated using the same methods as mechanical stripping, very slow and monitored, as described in Appendix B.

The project impacts along the Southern Pipeline Alignment required a 2.4-meter-wide trench to a depth of 1.8 meters below surface. The construction crew excavated two test trenches to 1.2 meters below surface along this alignment. The crew then benched the trenches back using a backhoe at a 1:1 slope to allow for safe hand excavation (Figure 14).

Excavations in all three project components identified a layer of artificial fill of varying thickness at the surface containing sandy gravel with shell (Figures 10, 12, and 21). These results were consistent with prior testing (Kaijankoski 2020). At the southern pipeline alignment, field archaeologists determined that the material was dredge sediments deposited on the site for harbor and naval base development during World War II. While at the other two project components, it was determined to be either associated with dredge material or deposition from Morro Creek. Therefore, the shellfish identified in that context cannot be cultural in origin.

Figure 10: North Bridge Abutment Stratigraphic Summary



Excavation	Depth (cm)	Soil Horizon	Description	Interpretation	Cultural Materials
Lift 1 Test Trench	0 to 105	Ap	Brown; variable texture; 50% small tomedium, angular to water rounded gravels; very friable consistency; sparse shell throughout; abrupt, wavy lower contact.	Artificial fill	No
Lift 1 Test Trench	105 to 115	2AC	Very dark brown silt loam, massive structure, firm consistency; clear, smooth lower contact.	Weakly developed soil; historic-era ground surface	No, sampled in trench and screened representative sample
Lift 1 and 2 Test Trench	115 to 220	2C	Brown silt loam; massive structure; friable consistency; abrupt, smooth lower contact.	Unweathered alluvium	No
Lift 3 Test Trench and Units	see profile	3Ab	Very dark gray loam; fine subangular blocky structure; 10% medium angular gravels (all fire-cracked rock); very friable consistency; clear, wavy lower contact.	Buried soil containing archaeological deposit	Yes, common
Lift 3 Test Trench and Units	see profile	3C	Dark brown loam; massive structure; friable consistency; clear, smooth lower contact.	Thin isolated alluvial deposit on northern edge of the north bridge abutment	Yes, common
Lift 3 Test Trench and Units	see profile	4Ab	Black loam; fine subangular blocky structure; 10% medium angular gravels (all fire-cracked rock); friable consistency; clear, wavy lower contact.	Thin isolated buried soil containing archaeological deposit on northern edge of the north bridge abutment	Yes, common
Lift 3 Test Trench and Units	260 to 275	4C1	Brown loam with 50% small rounded gravels; single grain structure; single grain consistency; clear, wavy lower contact.	Unweathered alluvium (stream channel deposit)	Yes, very few
Lift 3 Test Trench and Units	275 to 300	4C2	Yellowish brown silt loam; massive structure; very friable consistency; and abrupt smooth lower contact	Unweathered alluvium	No
Lift 3 Test Trench and Units	see profile	4C3	Very dark brown sand with 50% small rounded gravels; single grain structure; loose consistency; and abrupt, wavy lower contact.	Unweathered alluvium (isolated stream channel deposit)	No
Mechanical Clearing and Hand Auger	300 to 405	5AC	Dark grayish brown silt loam; massive structure friable consistency; gradual, wavy lower contact.	Weakly developed buried soil	No
Mechanical Clearing and Hand Auger	405 to 435	5C	Dark brown loam grading to clay loam; massive structure, very friable consistency; lower contact not observed	Unweathered alluvium	No

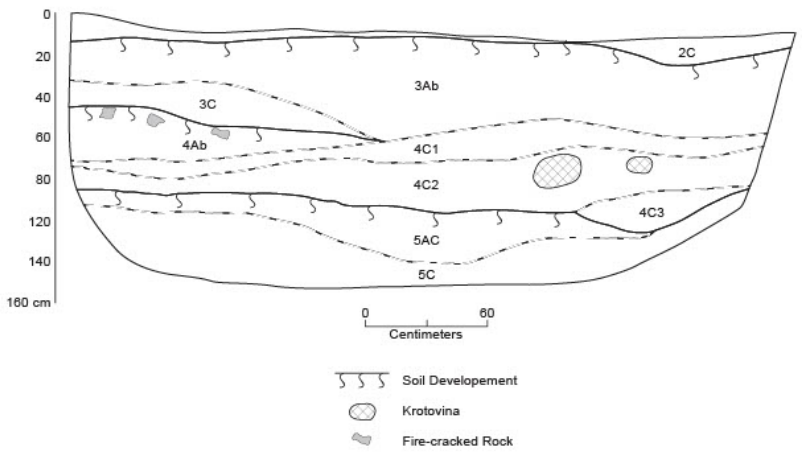
(Provided with permission from Far Western)

Figure 11: North Abutment Soil Profile



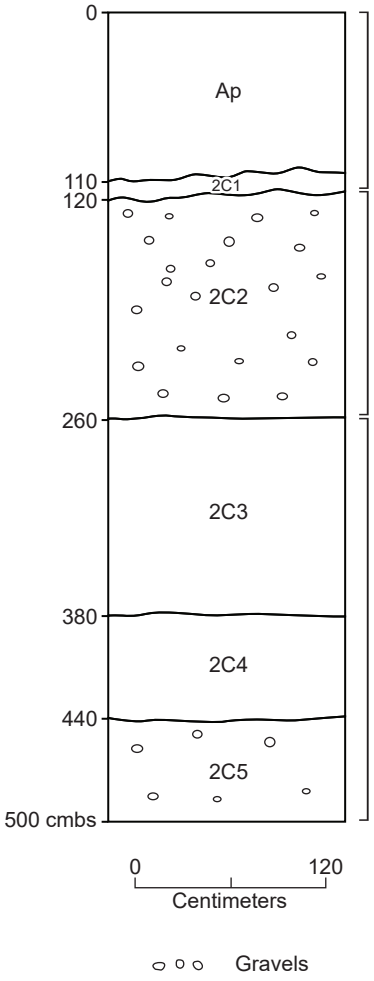
Photo on the left depicts the North Bridge Abutment lift 3 test trench soil profile. The depth is 240-360 centimeters below surface, view to the east.

The drawing to the right depicts the soil horizons identified in this test trench. Note, stratified archaeological deposits (3Ab/3C/4Ab) on the left gradually grading to alluvial parent material (4C1/4C2/4C3). This is overlying weakly developed, culturally sterile buried soil (5AC horizon).



(Adapted from Kaijankoski 2022; Photo provided with permission from Far Western)

Figure 12: South Bridge Abutment Stratigraphic Summary



EXCAVATION	DEPTH (CM)	SOIL HORIZON	DESCRIPTION	INTERPRETATION	CULTURAL MATERIALS
Lift 1 Test Trench	0 to 110	Ap	Brown variable texture; 50% small to medium, angular to water rounded gravels; very friable consistency; common shell in gravel lenses; abrupt, wavy lower contact.	Artificial Fill	No
Lift 1 Test Trench	110 to 120	2C1	Brown loam; massive structure; friable consistency; clear, wavy lower contact.	Recent alluvium	No, sampled in trench and screened representative sample
Lift 2 Test Trench and Hand Auger Units	120 to 260	2C2	Variable stratified alluvium of brown clay loam with lenses of 75% small waterworn gravels in sand matrix. Sandy gravel lenses more common in north toward Morro Creek	Recent stratified alluvium, infilled creek channel?	No, except for isolated pestle in STU 1; naturally reworked shell midden
Hand Auger/ Mechanical Clearing	260 to 380	2C3	Brown sandy loam; massive structure; very friable consistency; gradual lower contact	Unweathered alluvium	No
Hand Auger/ Mechanical Clearing	380 to 440	2C4	Dark gray saturated clay loam; massive structure; firm consistency; gradual lower contact	Unweathered alluvium	No
Hand Auger/ Mechanical Clearing	440 to 500	2C5	Dark gray sand with 25% small rounded gravels; single-grain structure; very friable consistency; extending to base of auger	Unweathered alluvium	No

(Provided with permission from Far Western)

Figure 13: South Bridge Abutment Soil Profile

Photo to the right is the South Abutment second lift profile. Depth is 120-240 centimeters below surface. Excavation exposed stratified layers of rounded channel gravels and fine grained alluvium (2C2 horizon), which was later determined to be a past channel of Morro Creek.





Photo to the left depicts the shell midden identified during mechanical excavation in the South Bridge Abutment. Once identified, all construction was stopped, and Shovel Transect Unit 9 excavated to take a sample. It was later determined that the shell had been naturally reworked into the area due to the adrupt lower contact with the soil below.

(Adapted from Kaijankoski 2022; photo provided with permission from Far Western)

Figure 14: Pipeline Alignment Excavations



Photo 1: Excavations of the South Pipeline Alignment, view North.



Photo 2: Pipeline Alignment excavation with trench benched back to allow for hand excavation.

(Photo provided with permission of Far Western)

Figure 15: Slide-rail System in North Bridge Abutment





Photo 1: Archaeologists monitor excavation of the first "lift."

Photo 2: Slide rail was thread through corner pillars and then driven into the ground by a backhoe as excavation advance down.

(Photo provided with permission of Far Western)

Figure16: Slide-rail System in South Bridge Abutment



Slide rail was thread through corner pillars and then pushed into the ground by a backhoe as excavation advance down. Center pillar is a old well that was later removed

(Photo provided with permission of Far Western)

Figure 17: Phase II and Phase III excavation in North Bridge Abutment



Photo to left: excavation crew excavates shovel transect units in North Bridge Abutment. Author drawing soil profile in left foreground.

Photo to right: North Bridge Abutment after Phase III data recovery was complete. Large trench in center is the third lift test trench.



(Photo provided with permission of Far Western)

Figure 18: Phase II and Phase III excavation in South Bridge Abutment



Archaeological crew excavating in South Bridge Abutment.

(Photo provided with permission of Far Western)

After the construction crew had installed the shoring system and an archaeologist documented the test trenches stratigraphy, hand excavation began. An archaeological crew excavated eight Survey Transect Units (STUs) and one Control Unit (CU) by hand for a total of 3.8 cubic meters (Figure 17 and Figure 18; Appendix A: General Catalogue).

5.4 Phase II Testing Results

The results of the survey transect unit excavations at the Southern Pipeline Alignment and South Bridge Abutment were negative, apart from one pestle fragment identified within channel gravels at a depth of 147 centimeters below surface[7]. Therefore, it was determined that a backhoe would mechanically strip the South Bridge Abutment and Southern Pipeline Alignment to the final depth of impact with no further treatment (Appendix B). Unlike the 2020 geoarchaeological testing, which revealed a stratified shell midden, a deeply buried cultural deposit generally devoid of shellfish was identified in the North Bridge Abutment (Figure 10). It was this significant intact deposit within the project area of direct impact that required Phase III mitigation in the form of data recovery.

5.5 Phase III Mitigation Methods

Consultation with the SHPO and EPA determined that due to the positive results of the Phase II testing, data recovery efforts would be required in the North Bridge Abutment area. The archaeological crew conducted Phase III mitigation in the form of data recovery, excavating additional STUs and CUs for a total of 10.02 cubic meters (refer to Table 4; Figure 19 and Figure 20).

North Bridge Abutment

After reestablishing the original grid system, crews excavated eight control units in the North Bridge Abutment (Figure 19). The size of the CUs varied based on the materials found in the adjacent STUs and proximity to features. Crews first placed units in the northwest, northeast, and southeast corners of the abutment due to the findings of the corresponding STUs. CUs thereafter were concentrated to the northern portion of the abutment due to the positive findings (Table 4; Appendix A). Compared to the other units,

[7] Due to its location within the channel gravels, it is assumed that this artifact was within an old channel of Morro Creek and had been redeposited.

STU6 produced the least amount of cultural materials and therefore a CU was not excavated in that area during the data recovery.

South Bridge Abutment

During mechanical stripping of the second "lift," a discontinuous layer of shell midden was identified at 240 centimeters below surface in the northwest corner of the South Bridge Abutment. In addition to the shell midden, two faunal bones and one ground stone fragment were also recovered. Two STUs (STU9 and STU10) were excavated to sample the deposits and expose their stratigraphy. STU9, located along the west boundary of the abutment, contained a very dense, thick shell midden.

Comparably, STU10, located along the north wall in the northwest quadrant, contained virtually no shell but did expose a dark layer of soil with rock, some of which was fire affected. The lower contact of STU10 was abrupt, supporting the idea that the deposit was naturally reworked or deposited. Both STUs were excavated to 40 centimeters (or 280 centimeters below surface). No shell was collected from either STU due to its amount, but a bulk soil sample was collected for flotation processing from each unit to characterize the constituents of this isolated deposit. Due to the nature of deposition, I did not include the samples in this research as the samples were out of context. After completing the excavation of the two STUs, mechanical stripping continued in the South Bridge Abutment, until reaching the final depth.

5.6 Laboratory Methods

Material collected during monitoring, testing, and data recovery was transferred to the Far Western laboratory in Davis, California, for processing, cataloging, and the creation of a digital database (Appendix A: General Catalogue). The cataloging of artifacts followed the Far Western standardized format: all materials were grouped by unit, trench, feature, and depth, then further organized into artifact classes (e.g., faunal remains, shell, flaked stone) and finally into subclasses (e.g., debitage, core, projectile point). Bulk categories, such as shell, bone, and debitage, were assigned a group number while tools were given individual catalog designations (Appendix A). Artifact groups were further analyzed within the laboratory

Table 4: CA-SLO-16 Phase II and Phase III Excavation Summary

Unit Name	Locus	Unit Location	Unit Size (NxS)	Feature #	Faunal Bone	Shell (g)	Flaked Stone and Debitage	FCR	Other	Vol. (m^3)
STU1	South	2N/1E	1X0.5	-	-	-	-	-	1	0.5
STU2	South	2N/5E	1X0.5	-	1	12.9	-	-	-	0.5
STU3	North	1N/5E	1X0.5	-	23	-	5	26.9	1	0.5
STU4	North	5N/5E	1X0.5	1, 4	83	-	10	7.05	-	0.5
STU5	North	6N/0E	1X0.5	-	48	5.5	13	11.02	2	0.5
STU6	North	1N/0E	1X0.5	-	1	-	-	4.41	4	0.3
STU7	Pipe	-	1X0.5	-	-	18.7	-	-	-	0.3
STU8	Pipe	-	1X0.5	-	-	6	-	-	-	0.3
STU9	South	4.3N/0.25E	1X0.5	-	328	479.9	9	2.2	-	0.2
STU10	South	7.3N/1.5E	0.5X1	-	113	-	2	22.05	-	0.2
CU1	North	5N/6.5E	1X1	-	186	-	51	42.99	-	0.6
CU2	North	1N/5.5E	1X1	-	207	0.4	39	19.84	1	0.6
CU3	North	6N/0.5E	1X1	-	644	0.2	66	37.48	3	0.75
CU4	North	6N/6E	1X1.25	-	183	0.4	57	22.05	2	0.5
CU5	North	5N/0E	1X2	-	600	3.9	68	46.3	1	1.2
CU6	North	4.5N/5.5E	2X1	2	216	0.1	81	31.97	9	0.8
CU7	North	4.5N/6.5E	2X1	-	433	-	33	30.86	1	0.8
CU8	North	6N/4E	1.5X1	3	796	0.1	69	30.86	-	0.75
CU9	North	0.25N/3E	1X1	-	40	-	4	9.92	-	0.4
				TOTAL	**3902**	**528.1 (g)**	**507**	**345.91 lbs.**	**25**	**10.02 m^3**

*Locus: South (South Bridge Abutment), North (North Bridge Abutment), and Pipe (Southern Pipeline Alignment)
**Other includes pestle, modified stone, modified bone, or awl/pin. FCR – fire-cracked rock (in lbs).

by specialized analysts. Analysts provided a detailed description, emphasizing important attributes to each artifact. A more detailed discussion of the appropriate analytical procedures employed for each artifact description, as well as the special studies used is in Appendix C. In the following chapter, Chapter 6, I will provide a brief summary of findings for each artifact type.

Chapter 6: Results

This chapter will summarize the findings of sampled portions of site CA-SLO-16, which will later be interpreted for age, duration of occupation, and other human-environment behaviors including subsistence, activity, and settlement. This chapter will also discuss specialized studies collected from the site to determine age and seasonality of occupation. At the time of writing, the analysis for a few of the artifact classes is ongoing, therefore only the preliminary findings will be provided.

6.1 Phase III Data Recovery Results

As discussed, based on the positive findings of the Phase II testing, field crews concentrated the data recovery effort to the North Bridge Abutment apart from the shell midden discovered during the mechanical excavation of the South Bridge Abutment. Two STUs were excavated to explore this inadvertent finding. The results from both the data recovery in the North Bridge Abutment and the rapid recovery excavation in the South Bridge Abutment are provided below. The following chapter will combine these results with the results of the geoarchaeological testing conducted in 2020.

North Bridge Abutment

Overall, cultural materials recovered from the North Bridge Abutment excavations included faunal bone, fire-cracked rock, debitage, and a very low quantity of shellfish (Table 4). Data recovery confirmed that the North Bridge Abutment cultural deposit was isolated primarily to the northern portion of the abutment, within the upper centimeters (2.4-2.8 meters below surface). The stratified shell midden identified in 2020 was found to be at the same depth as the buried cultural deposit devoid of shell in the North Bridge Abutment. The non-shell midden subsistence remains are unique for a coastal region and could indicate discrete activity areas within the site. These data illustrate site distribution, subsistence, and resource use to a the previously understudied Middle Period in Morro Bay.

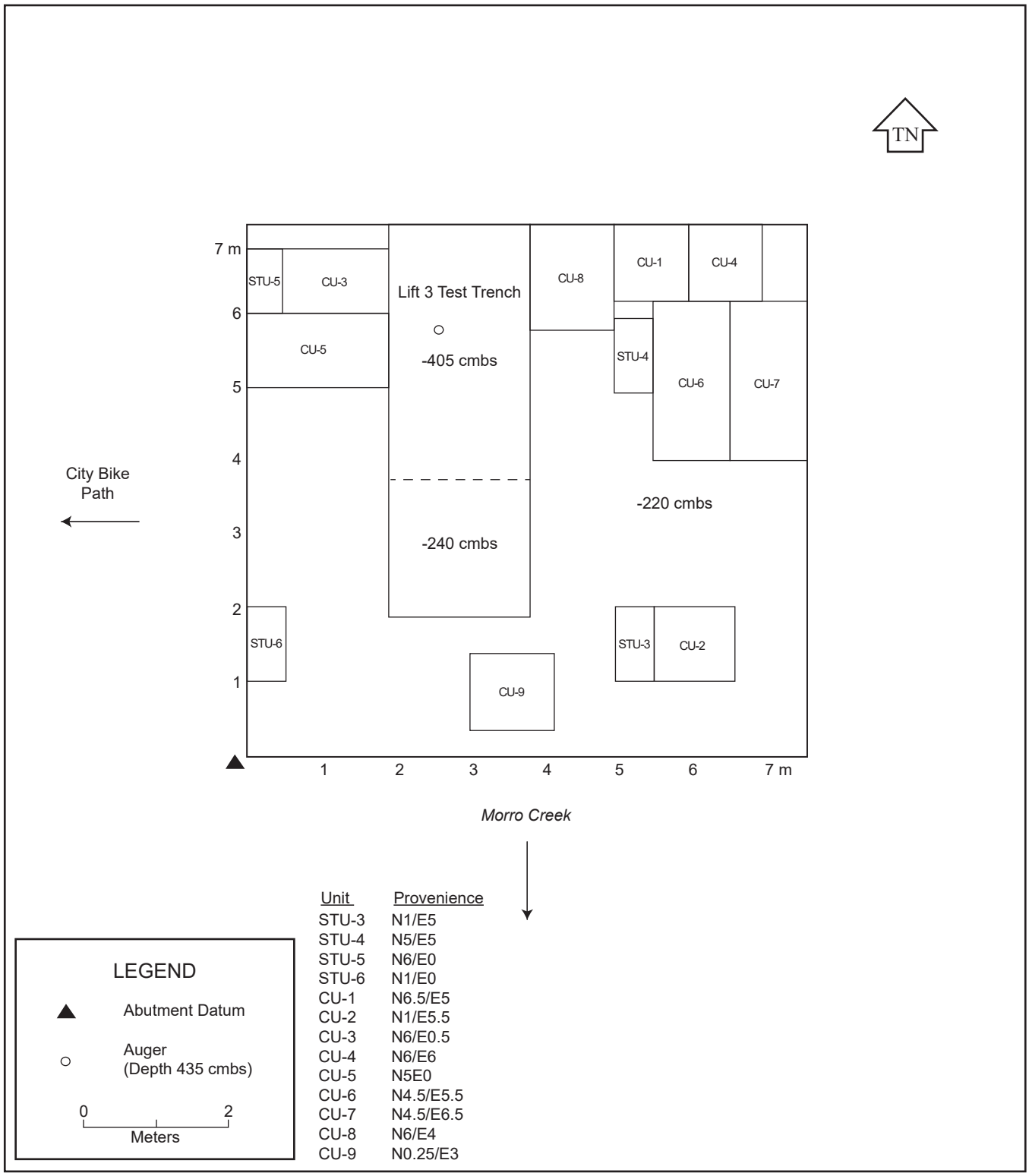


Figure 19: CA-SLO-16 North Bridge Abutment

(Provided with permission from Far Western)

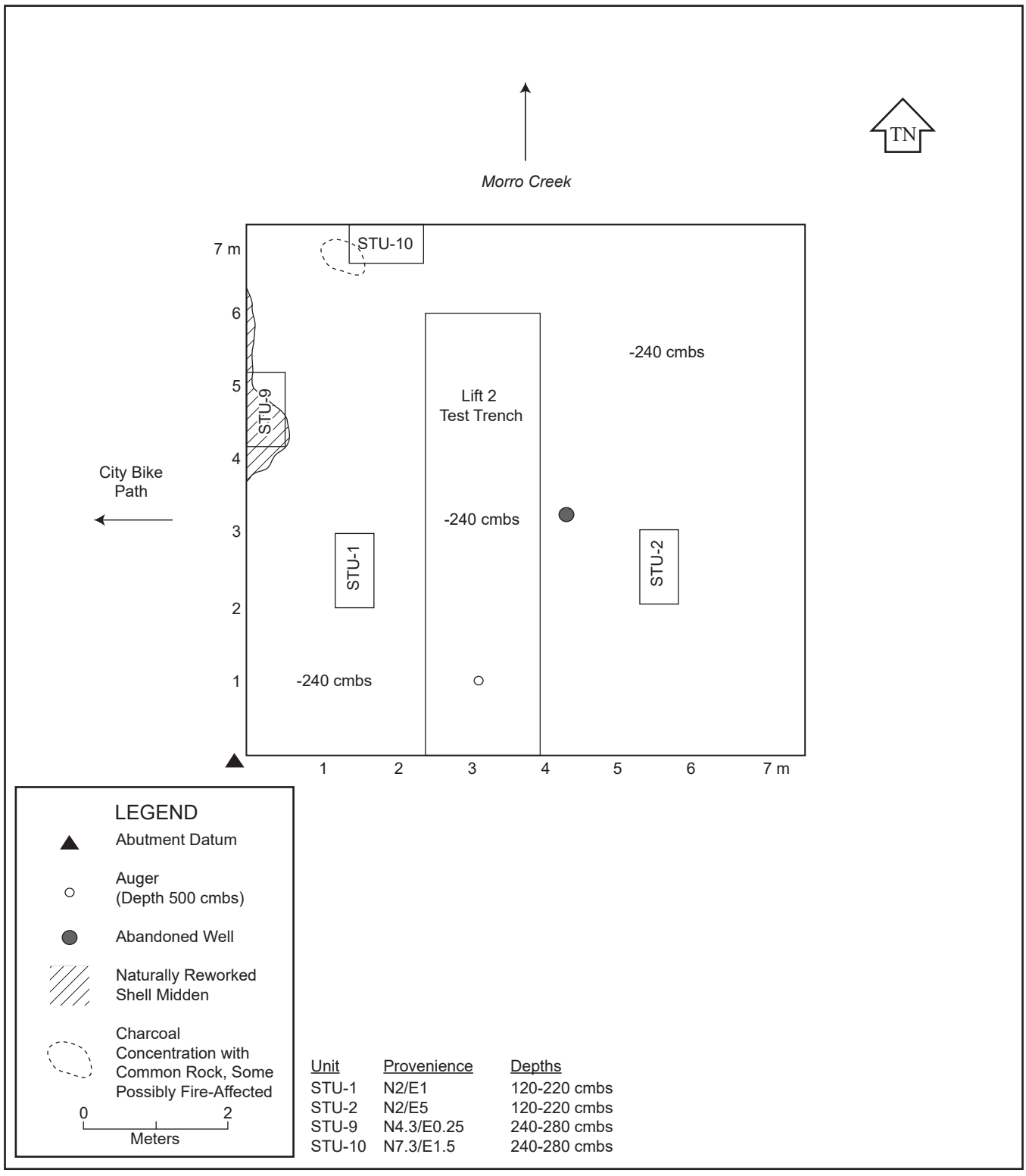


Figure 20: CA-SLO-16 South Bridge Abutment

(Provided with permission from Far Western)

Figure 21: Soil Stratigraphy of South Pipeline Alignment

Photo to the right is Surface Transect Unit 7, a unit excavated within the benched test trench of the Southern Pipeline Alignment. The west wall of this unit depicts a historic-era ground surface (black buried soil). The unit was excavated to the maximum depth of project impacts (120-180 centimeters below surface).



Photo below depicts Surface Transect Unit 8, excavated within the benched test trench along the Southern Pipeline Alignment. The unit was excavated from 120-180 centimeters below surface, which was the maximum depth of impact.



(Adapted from Kaijankoski 2022; photos provided with permission from Far Western)

6.2 Special Studies

Far Western conducted two particularly important special analyses for this thesis. The first is Cementum Age Analysis, which is still ongoing. Cementum age analysis can suggest seasonality of occupation by testing the dental remains of faunal bone collected at an archaeological site. The process of cementum age analysis is described briefly in the Future Research Opportunities section of Chapter 9, and in much greater detail in Andrew Spiess's (1976) short paper titled, *Determining Season of Death of Archaeological Fauna by Analysis of Teeth*. The second, and arguably the most important of the two for the purpose of this thesis, was radiocarbon dating.

Table 5: Radiocarbon Samples Collected from CA-SLO-16

Project Phase	Project Component	Unit	Soil Horizon	Depth Below Surface (centimeters)	Material Dated	Conventional Radiocarbon Age	Min.	Median Probability (Cal BP)	Max.
2020 Testing	Pipelines	HA03	3Ab	150-230	Charcoal - Wood	2074 ± 22	1990	2035	2110
2020 Testing	Pipelines	HA03	3Ab	150-230	Shell - Clam	2566 ± 53	1695	1955	2250
2020 Testing	Pipelines	HA03	4AC	270-305	Charcoal - Wood	2416 ± 25	2350	2435	2495
2020 Testing	Pipelines	HA03	4AC	270-305	Shell - Clam	2643 ± 46	1795	2050	2315
2020 Testing	Pipelines	HA02	3Ab	150-215	Charcoal - Wood	2171 ± 24	2225	2205	2305
2020 Testing	Pipelines	HA02	4AC	270-305	Charcoal - Wood	2567 ± 21	2705	2730	2750
2020 Testing	Pipelines	HA01	2Ab	200-250	Charcoal - Wood	2011 ± 21	1890	1950	1995
2022 Data Recovery	North	STU 04, Feature 1	3Ab	235-245	Charcoal - Marah sp.	1531 ± 28	1350	1400	1420
2022 Data Recovery	North	CU 5, Feature 2	4Ab	242-244	Charcoal - Quercus sp. & Ribes sp.	1623 ± 27	1410	1480	1540
2022 Data Recovery	North	CU 3	3Ab	230-245	Charcoal - Quercus sp.	1477 ± 23	1310	1355	1390
2022 Data Recovery	North	CU 3	4Ab	260-270	Charcoal - Marah sp.	1870 ± 23	1715	1775	1825
2022 Data Recovery	North	CU 8, Feature 3	3Ab	222-230	Charcoal - Quercus sp.	1471 ± 23	1305	1350	1385
2022 Data Recovery	North	CU 8	3Ab	232-235	Charcoal - Marah sp.	1877 ± 23	1720	1780	1830
2022 Data Recovery	North	CU 8	4Ab	261-271	Charcoal - Wood	1963 ± 24	1830	1890	1945
2022 Data Recovery	South	STU 09	2C2	240-253	Charcoal - Wood	1519 ± 24	1345	1385	1415
2022 Data Recovery	South	STU 10	2C3	265-275	Charcoal - Quercus agrifolia	1785 ± 25	1610	1655	1675

*Refer to Figure 22 for the 2020 Testing core and hand-auger locations.

Radiocarbon Dating

Sixteen samples of organic material were submitted to DirectAMS in Bothell, Washington, for radiometric analysis. This included nine samples from cultural deposits and seven samples of non-cultural organic sediment as part of the 2020 geoarchaeological study (Kaijankoski 2020). There were a several dates obtained from the samples (Table 5: Radiocarbon Samples from CA-SLO-16). Far Western's laboratory director, Laura Harold, M.A., corrected the radiocarbon ages for both natural and machine fractionation using the AMS measured Delta-13. Harold also calibrated the conventional radiocarbon ages to calendar years (cal BP) using CALIB version 8.1 with IntCal20 atmospheric curve and Marine20 marine curve with Delta-R of 90±78 (Laura Harold, personal communication March 31, 2023; Heaton *et al.* 2020; Reimer *et al.* 2020). Additionally, she applied the international convention zero years before present equals AD 1950 to all dates. Please refer to Chapter 7 for a more detailed summary of these dates.

6.3 Summary of Findings

From the 10.02 cubic meters of soil excavated during the Phase II testing and Phase III Data Recovery, 4,450 artifacts and ecofacts were recovered (Table 4 and Table 6). Dietary bone, including fish bone, accounts for the largest portion of the assemblage (87%), while flaked stone debitage makes up a mere 10 percent. While flaked and ground stone tools, tested cobbles, modified bone, and miscellaneous modified stone account for only 1.3%.

Table 6: General Summary of Cultural Materials from 2020 Geoarchaeological Testing at CA-SLO-16

Description			C45	C46	C47	C49	HA01	HA02	HA03	Total
Flora/fauna	**Botanical remains**	-	-	-	-	1	1	2	2	6
	Faunal remains	Bone	-	-	1	2	23	44	114	184
		Fish bone	-	-	-	1	90	244	42	377
		Shell (g)	2.3	10.7	11	13.1	11.3	271.9	32.6	352.9
Prehistoric	**Flaked stone**	Debitage	-	-	-	4	15	48	17	84
Total			**2**	**2**	**3**	**10**	**130**	**340**	**177**	**664***

* Does not include shell weight

Historic artifacts that were determined of indefinite-use included 0.1% of the total assemblage. Additionally, the excavation recovered over 514.6 grams of shellfish. Due to the testing methodologies, it

appears that the 2020 geoarchaeological testing effort identified a much denser shell midden deposit, than the 2022 Phase II and Phase III excavations (Table 6). The next chapter will further explore this observation and its implications for site structure and activity distribution. Additionally, the following chapters will briefly describe the data from both the 2020 and 2022 investigations and apply these data to the larger context of the Morro Bay region.

Chapter 7: Chronostratigraphy and Component Definition

This chapter will summarize the findings of sampled portions of site CA-SLO-16 indicating age and duration of occupation. First, the next section will discuss site structure, both horizontally and vertically. Then I will highlight the temporal indicators identified within the archaeological sample, including temporarily sensitive artifacts and radiocarbon dates. These data are imperative for understanding how site CA-SLO-16 fits into the larger Morro Bay region's cultural history and chronology. Finally, this chapter will apply these data to the larger chronostratigraphic data of Morro Bay's City Soil Profile Schematic (Figure 25).

7.1 Site Structure

Unlike neighboring sites (e.g., CA-SLO-165, CA-SLO-2124, CA-SLO-2222), CA-SLO-16 had little stratigraphic variation with only one temporal component identified. A single component site is unique in itself; however, the spatial distribution of CA-SLO-16 adds to the site's significance. The methods applied during this project did not allow for an even investigation of the site, as data recovery was concentrated to the North Bridge Abutment. However, the findings provided valuable data to the site's overall context.

North of the North Bridge Abutment

The 2020 presence-absence testing consisted of a series of hydraulic-continuous cores at 25-meter intervals to the maximum depth of project impacts (Figure 22). Hand augering was completed in areas where coring was not feasible, indicated by HA on Figure 22.

During the 2020 geoarchaeological testing, Kaijankoski (2020:25) identified a complex archaeological deposit underlying approximately 1.5 meters of artificial fill or transported fill material (Figure 22 and Figure 24). Two dense, stratified shell middens were identified in Hand Auger (HA)2 and HA3, the former at depths of 1.5 to 2.3 meters and the latter at 2.7 to 3.1 meters (3Ab and 4AC, respectively). However, in HA1 and Core (C) 50 only the upper midden was identified (Kaijankoski 2020:25). Kaijankoski (2020) sampled wood charcoal and shellfish from the two distinct shell middens in HA3 for radiocarbon-dating. The upper shell midden yielded in dates of 1920 and 2040 cal BP while the lower midden retired

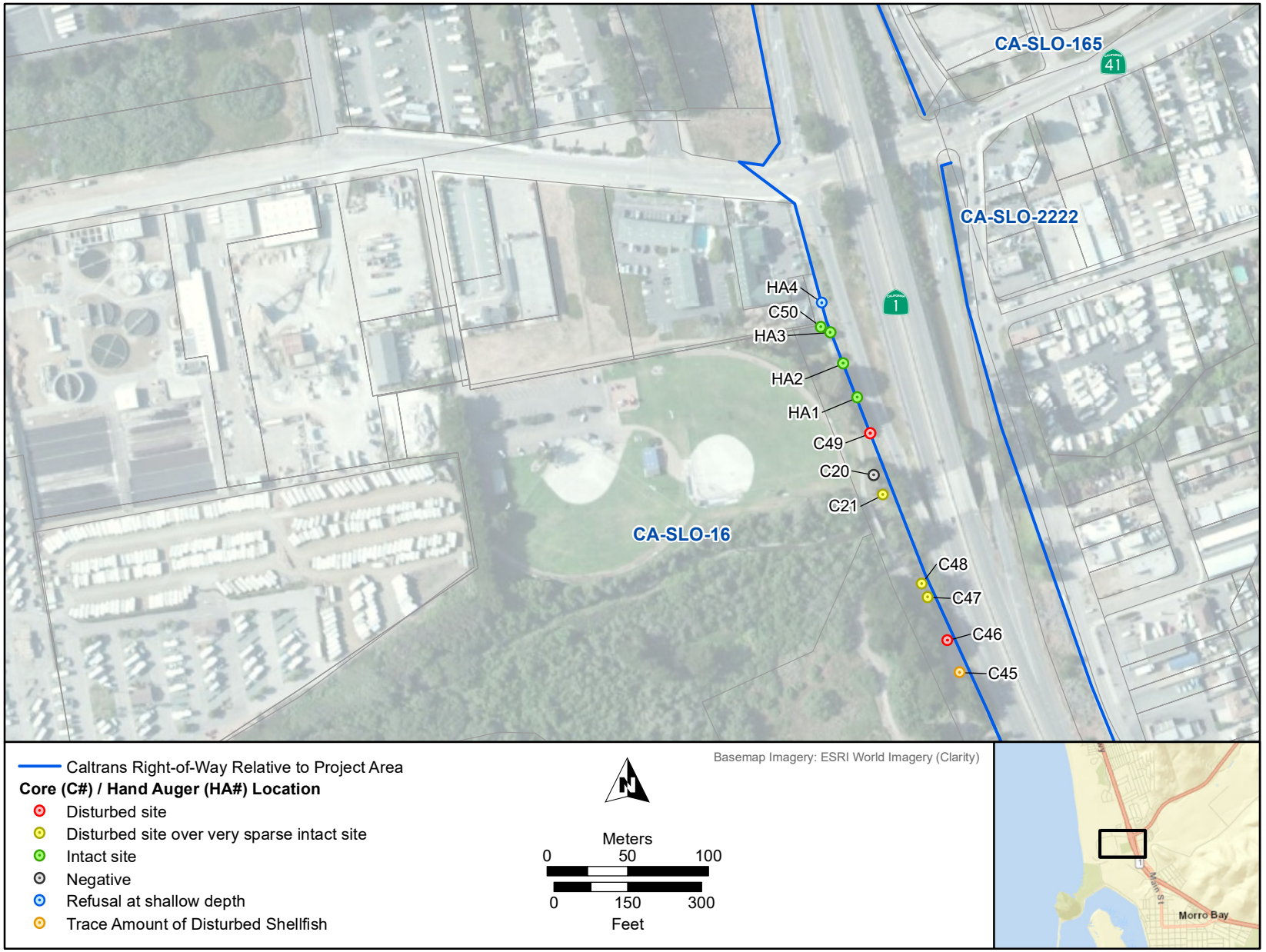
dates of 2010 and 2430 cal BP; thus, the upper and lower midden are separated by only a few hundred years of time (Kaijankoski 2020:25).

The northern boundary of the intact site could not be determined during testing due to underground utilities. The southern boundary was better defined by disturbed site deposits overlying a storm drain in C49 (Kaijankoski 2020:25), while C20 was negative. Disturbed deposits were above sparse, intact site deposits identified in C21 on the north side of Morro Creek and in C47 and C48 on the south side of Morro Creek. Finally, the 2020 geoarchaeological report noted disturbed site deposits in C46 with trace amounts of shellfish in C45. These results assisted in the delineation of the southern boundary of CA-SLO-16 (Figure 24). Most notable of these findings is the dense, stratified shell midden, concentrated to the northern portion of the site. Shell midden was very sparse or naturally reworked in the other testing areas.

North Bridge Abutment

As discussed in the previous chapter, the North Bridge Abutment was first mechanically excavated in 1.22-meter lifts (4 feet), then tested by Phase II testing and Phase III data recovery, and finally excavated to the final depth mechanically. The abutment excavations yielded four developed soils, two with cultural materials (Figure 10 and 11). The first A-horizon below the Ap horizon, 2AC, was identified as a historic-era, weakly developed soil between 105 and 115 centimeters below surface. This was underlined by an unweathered alluvium approximately five centimeters in thickness. In the north portion of the abutment, a buried soil containing an archaeological deposit (3Ab horizon) was identified (refer to Figure 24). The archaeological deposit had virtually no shellfish with an abundance of faunal bone and some debitage. The 3Ab horizon was above a second alluvium deposit (3C horizon), and a thin buried soil which was isolated to the northern edge of the north abutment (4Ab horizon). The soils following 4Ab consisted of a series of alluvial deposits associated with Morro Creek.

Figure 22: 2020 Geoarchaeological Core Locations



(Provided with permission from Far Western)

Figure 26: Cross Section Locations



(Provided with permission from Far Western)

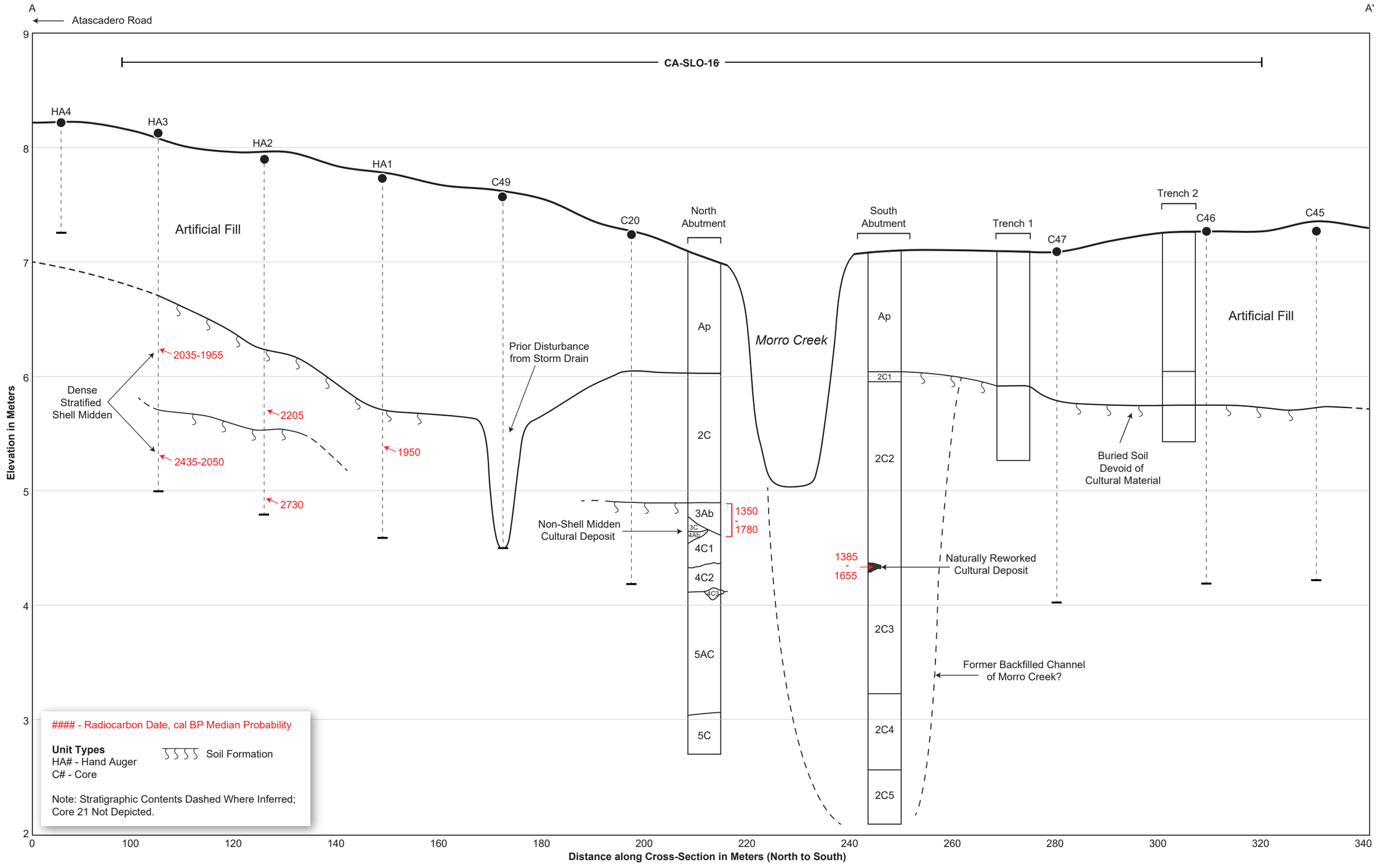


Figure 24: Site CA-SLO-16 Soil Profile Schematic

(Provided with permission from Far Western)

South Bridge Abutment

Much like the North Abutment, the South Bridge Abutment was mechanically excavated in 1.22-meter (4 feet) lifts, then tested by surface transect units. Field crews did not excavate control units for mitigation in the South Bridge Abutment due to the lack of an intact cultural deposit. The abutment excavations yielded a series of alluvial deposits devoid of intact soils, five in total. Soil horizon 2C2 was a variable stratified alluvium with small waterworn gravels in a sandy matrix (Feature 12 and 13). The sandy gravel was more common in the north, most likely associated with Morro Creek. This soil horizon also yielded one isolated pestle which was determined to be in a secondary location due to a lack of associated cultural materials. Soil horizons 2C3, 2C4, and 2C5 were alternating unweathered alluvium deposits, presumably associated with Morro Creek. Based on a historic map from 1883, the past location of Morro Creek supports this observation, as it was south of its current location (Figure 7).

During the excavation of the second lift (4-8 feet or 1.22-2.44 meters; Feature 13 and 24), a discontinuous, naturally reworked[8] shell midden was identified in the west wall, extending approximately 2 meters by 3 meters. A charcoal concentration with common rock, many fire-affected, was also identified in the north wall at approximately the same depth. Field crews tested both areas by shovel transect units but determined that the shell midden was naturally reworked. The charcoal concentration was within a stratified unweathered alluvium with an irregular, abrupt, and discontinuous lower contact indicating that it was also naturally reworked. Field crews sampled both contexts for flotation and radiocarbon dating. This data is out of context, but it is still valuable as it was determined to be a single temporal component.

Southern Pipeline Alignment

An archaeologist and Native monitor were present while the Southern Pipeline Alignment was mechanically excavated. The soils consisted of a disturbed fill material (Ap horizon; 0-120 centimeters below surface) underlain with a disturbed horizon (2Ab/2Ap) with pockets of above Ap horizon. The shell was not collected due to the deposit's disturbed nature.

[8] The term "naturally reworked" is merely the redeposit of cultural materials through environmental factors (e.g., natural erosion and depositional processes), not as a result of human activity.

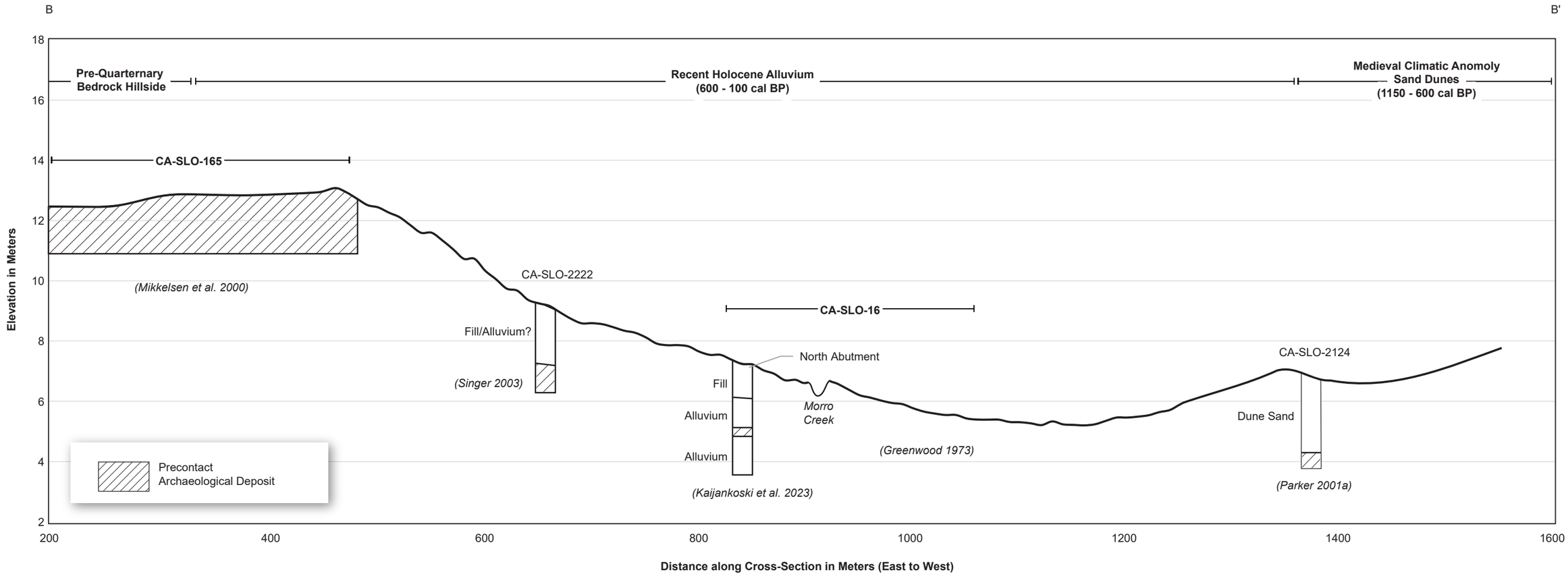


Figure 25: Morro Bay Soil Profile Schematic

Stratigraphic Summary

Prior geoarchaeological testing to the north of the utility bridge identified a dense, stratified shell midden overlain with alluvial deposits and artificial fill. Phase II testing and Phase III data recovery in the North Bridge Abutment revealed a diffuse, stratified deposit (devoid of shell) concentrated to the north and dissipating to the south within the abutment. The buried soil was overlain with a series of alluvial deposits. In the South Bridge Abutment, the archaeological monitor identified a shell midden during mechanical stripping but determined it to be naturally redeposited. The redeposited shell midden, out-of-context pestle, and series of alluvium alludes to the South Bridge Abutment being within a former backfilled channel of Morro Creek. Test trenches along the Southern Pipeline Abutment determined soils to be heavily disturbed by the past naval development. These findings in the South Bridge Abutment and Southern Pipeline Alignment did not warrant further excavation.

7.2 Temporal Indicators

Temporal periods, discussed in length in Chapter 2, were delineated by radiocarbon dates and change in artifact types to identify change in human behavior over time. These temporally diagnostic artifacts (e.g., shell beads, projectile points, ground stone types, etc.), paired with radiocarbon data help archaeologists determine a site's temporal period or periods, which in turn suggests change in human behavior and activities over time. Changes in human activity can also allude to shifts in population, resources, and environment.

Radiocarbon Dating

The 16 radiocarbon dates taken from site CA-SLO-16 were obtained from either charred plant remains or shell recovered from flotation samples or directly from the soil during excavation. All dates collected were in the correct stratigraphic order with no indication of stratigraphic inversion. These findings include samples taken for the 2020 geoarchaeological study. Although there is variation of depth across the site, this could be due to testing methodology and differing depositional patterns, specifically near Morro Creek where sedimentation occurs more frequently.

There are two clarifications that must be made while analyzing these results. The first is regarding the results from Hand Auger 3. Two sets of radiocarbon samples were taken from HA3, one from shell and one from charcoal, from both the 3Ab horizon and 4Ab horizon. The shell samples yielded dates younger than the charcoal samples, but this is common due to the testing process (Delta-R). Despite the difference in dates, the samples did have stratigraphic integrity as both samples were not stratigraphically inverted (Table 5). The second aspect of this analysis that may need clarifying is the spatial variation related to the dates. The site's horizontal stratigraphy may not be consistent because of the methodology implemented. The testing and data recovery efforts were isolated to the project's Area of Potential Effects which did not warrant a full grid-system data recovery. Therefore, only portions of the site were excavated, profiled, and analyzed. During this process, the field archaeologist or geoarchaeologist assigned horizons to each unit, core, or hand auger and then correlated after further exposure. The North Bridge Abutment was the only project component where an established, definitive soil profile was assigned as it was the primary area of excavation.

Two dates from CU3, in the North Bridge Abutment, are in correct stratigraphic order with the upper sample (3Ab) yielding dates between 1310 to 1390 cal BP (Late Middle Period) and the lower sample (4Ab) 1715 to 1825 cal BP (Middle Period). These dates occur again in CU8, in the North Bridge Abutment. CU8 radiocarbon samples resulted with an upper sample (3Ab) dating to 1305 to 1385 cal BP, and lower sample (4Ab) dating to 1830 to 1945 cal BP. These results are significant, specifically the upper sample, because it is within the Late Middle Period "gap" discussed by Jones *et al.* (2019). Additionally, soil horizon 3Ab yielded a relatively large cultural assemblage attributed to past occupation and settlement during this time.

Radiocarbon samples collected from the features in the North Bridge Abutment (Features 1, 2, and 3), yielded dates within 130 years of each other (median probability of 1400, 1480, and 1350, respectively). This finding further supports occupation during the Late Middle Period gap discussed by prior scholars.

Temporally Diagnostic Artifacts

This study recovered three projectile points that provided temporal information (Figure 26). All three points were identified during the North Bridge Abutment data recovery excavations. The first,

identified in CU7, is a Franciscan chert contracting-stemmed dart. The point was discovered in the 3Ab horizon which is temporally consistent with the point type (Jones *et al.* 2007:136; Jones *et al.* 2019; Wiggins 2022:28). The second point was identified in CU8 between 0-10 centimeters below unit surface (240-250 centimeters below surface). This depth corresponds with the 2C horizon. The final contracting-stemmed projectile point was also discovered in CU8, at a different depth. This artifact was recovered from the 20-40 centimeter level (270-280 centimeters below surface). This depth correlates with both the 3Ab horizon and 3C horizon. Although contracting-stemmed projectile points were introduced with the bow and arrow, and can span over many chronological periods, these points most resemble those assigned to the Middle Period by Jones *et al.* (2007:136) based on size and the diamond shape.

7.3 Component Definition

Site CA-SLO-16 is a single component, Middle Period, deeply buried site. Radiocarbon testing and diagnostic artifacts have confirmed that the site dates to the Middle Period. The lack of stratigraphic inversion supports that the site has stratigraphic integrity. Due to the methodology, soil horizons may yield differing dates, but within each excavation unit, the stratigraphy is intact. This variation could be due to varying depositional patterns especially in relation to Morro Creek. Additionally, some deposition could be anthropogenic relating to cultural activities. Refer to Figure 24, the CA-SLO-16 Soil Profile Schematic, for a better understanding of the horizontal and vertical relationships of these horizons.

There is a relatively thick deposit (approximately 1.0-2.1 meters) of artificial fill over the entire site (Figure 24). In the north portion of the site, a dense shell midden was identified, indicating an area of shell preparation activities. These findings are unique in that the creek-side excavations yielded virtually no shell. The North Bridge Abutment cultural deposit contained an extensive and diverse faunal assemblage. Additionally, the North Bridge Abutment had a diffuse, stratified deposit in the north portion, which dissipated to the south. These differing cultural deposits could indicate distribution of activities within the site.

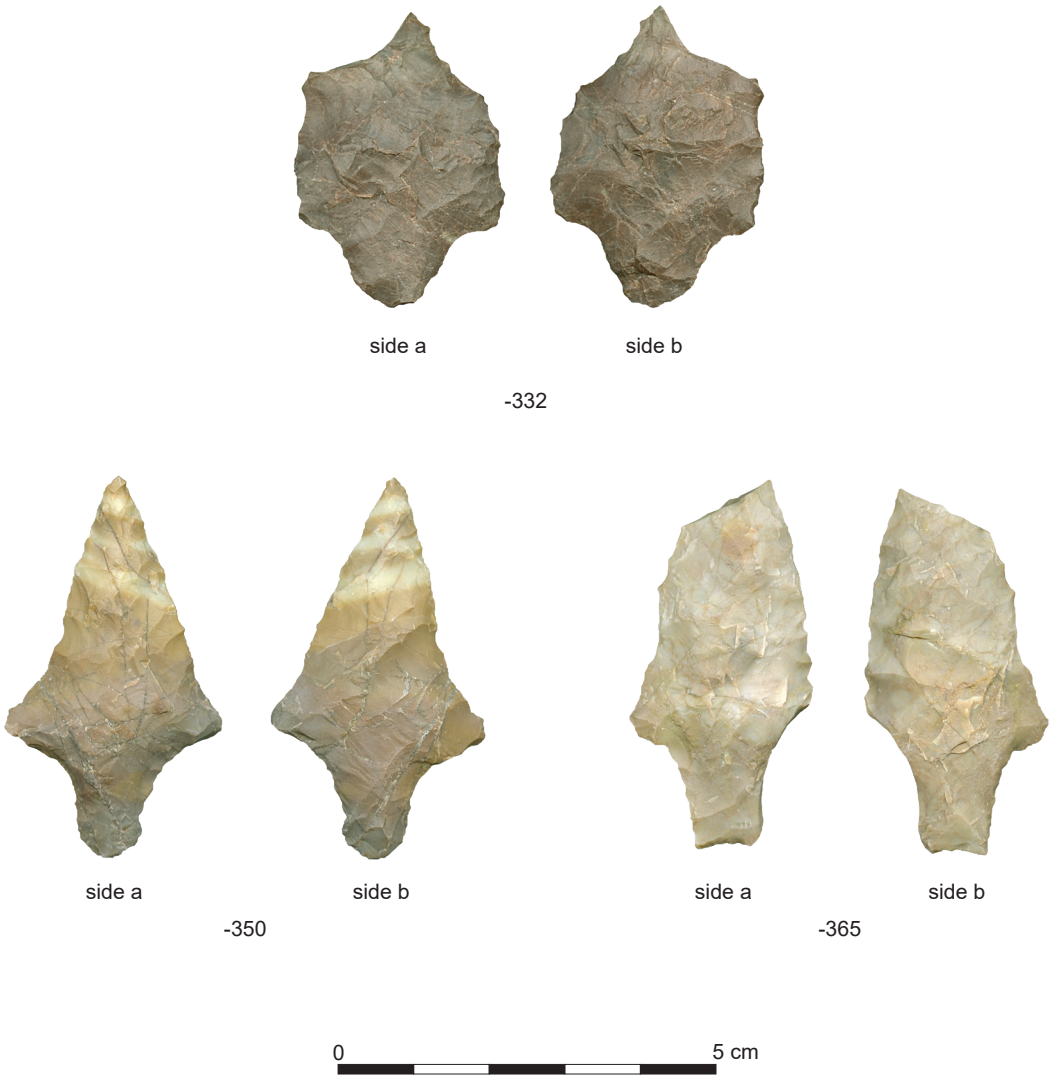


Figure 25: Contracting-Stemmed Projectile Points

There were two distinct intact archaeological deposits identified in the North Bridge Abutment. The first buried soil (2.2 to 2.6 meters below surface) yielded dates with a median probability of 1350 to 1780 cal BP. The second buried soil (varied in depth but approximately 5 centimeters in thickness; see Figures 10 and 24) yielded dates with a median probability of 1480 to 1890 cal BP (see Table 5). These dates align tightly into the Middle Period, specifically in the Late Middle Period (Jones *et al.* 2019).

A series of alluvial events were documented on the south side of Morro Creek, likely associated with past flooding events, while findings from the Southern Pipeline Alignment yielded disturbed deposits most likely associated with the historic naval base to the west and the construction of the bike path. As stated in the previous chapter, the disturbed nature of these findings did not warrant further excavation.

Chapter 8: Middle Period Component Assemblages

Site CA-SLO-16 is unique for both its position vertically, and for its activity distribution horizontally. The site provides valuable information for a previously unstudied period of time due to its narrow radiocarbon window. The following subsections describe the features, artifact types, and general observations made during this investigation. The five features identified were all at approximately the same depth; this observation supports the notion that CA-SLO-16 was occupied for a short time and has been overlain with multiple alluvium deposits.

8.1 Features

Testing and data recovery at CA-SLO-16 identified five features. These features were numbered sequentially. The features included four charcoal concentrations and one faunal bone concentration, described below.

Feature 1

Feature 1 (Figure 27) was discovered during hand excavation of STU4, (5N/5E), in the North Bridge Abutment (Figure 19). The feature consisted of a dense charcoal lens approximately 15 centimeters below the unit's beginning surface (approximately 235 centimeters below surface). The feature extends approximately 30 centimeters north-south in the west wall of the unit and has a maximum thickness of 23 centimeters in the center of the west wall. Feature 1 is underlain with 3Ab horizon soil. Radiocarbon dates sampled from Feature 1 yielded dates of 1350 to 1420 cal BP, with a median probability of 1400 cal BP (Table 5).

Feature 2

Feature 2, located in the North Bridge Abutment, was first identified when soil became increasingly ashy. Feature 2 was located 98 centimeters north and 30 centimeters east of the southwest corner of CU6 (N/E). The feature was oval in shape, measuring 19 centimeters northsouth and 37 centimeters east-west with a thickness of only 2 centimeters (approximately 242-244 centimeters below surface). Apart from the ash, Feature 2 (Figure 28) was comprised of charcoal, one burnt faunal bone, and one fire-cracked rock.

The feature was within the 4Ab horizon (Figure 10). From the flotation sample, radiocarbon studies returned dates of 1410 to 1540 cal BP (Table 5).

Feature 3

Feature 3 was identified in CU8 (N6/E4) in the North Abutment. The feature (Figure 29) has a thickness of 8 centimeters and measures 50 centimeters by 50 centimeters, north-south by east-west. Feature 3 is comprised of a charcoal concentration, fire-cracked rock (n=3), chert debitage, and a chert core. Feature 3 was identified within the 3Ab horizon approximately 222-230 centimeters below surface. Radiocarbon samples conducted on charcoal resulted in dates of 1305 to 1385 cal BP.

Feature 4

Feature 4 was first identified after faunal bone sticking out of the sidewall of STU4 was explored more thoroughly. The unit was expanded to expose a faunal bone feature. The removed soil was backfilled into an existing trench and was not screened. Feature 4 (Figure 30) was approximately 4 centimeters in thickness and measured 65 centimeters north-south by 50 centimeters east-west. The faunal bone was pedestaled, examined by a qualified osteologist, and found to be non-human. Preliminary faunal analysis suggests the faunal remains include a deer femur, sea lion tibia and fibula, and possibly a deer cranium. Feature 4 also had approximately fire-cracked rocks (n=15) of varying sizes and weights. Adjacent to the feature in CU8, a relatively large amount of faunal bone and chert debitage was identified. Feature 3 was also identified in CU8, approximately 50 centimeters to the north.

Feature 5

Feature 5 was discovered during final mechanical stripping of the North Bridge Abutment. It is difficult to define the thickness and size because the feature was impacted during discovery. Feature 5 (Figure 31) was a concentration of ash and thermally affected soil. The feature was approximately 50 centimeters north-south by 30 centimeters east-west and had a thickness of approximately 5 centimeters (approximately 255-260 centimeters below surface).

Figures 27-29: Features 1, 2, and 3







From top to bottom, Feature 1 (identified in the west wall of STU4), Feature 2 (identified in CU6), and Feature 3 (discovered in CU8).

(Adapted from Kaijankoski 2022; photos provided with permission from Far Western)

Figures 30-31: Features 4 and 5





From top to bottom: Photo 1, Feature 4 (identified in STU4).
Photo 2, Feature 5 (identified during mechanical stripping in the North Abutment, no photo due to its rapid recovery). This photo illustrates the logistics of mechanical excavation within the North Abutment.

(Adapted from Kaijankoski 2022; photos provided with permission from Far Western)

8.2 Artifacts

Flaked stone and debitage material types identified within the assemblage consisted of Monterey chert, Franciscan chert, cryptocrystalline silicate, metasedimentary, and obsidian. Stone tool artifacts included cores, bifaces, projectile points, and debitage. There were three projectile points identified in the North Bridge Abutment. All three points diagnostic to the Middle Period, as discussed in Chapter 7. One igneous pestle medial fragment was collected from the South Bridge Abutment. The pestle had evidence of grinding and was shaped. Unfortunately, the pestle was identified within a soil horizon deemed to be a previous route of Morro Creek and therefore the pestle was determined to be redeposited from another location.

One modified stone was recovered during the data recovery investigation in the North Bridge Abutment. The artifact is a fine-grained volcanic, modified stone fragment. It is rectangular in shape with an elliptical cross-section shape. There is evidence of pecking and shaping. Additionally, there are two parallel grooves on each side and a partial groove on the opposite side. The grooves are not straight or uniform in shape. No definitive determination of its use has been made.

Twenty-eight modified bone artifacts and fragments were identified during the Phase II testing and Phase III data recovery effort. Six of these artifacts were discovered during the mechanical stripping of the North Bridge Abutment and will not be discussed at length here due to their lack of provenience. The artifacts, categorized as an awl/pin, a manuport, a pin or miscellaneous, were all discovered in the North Bridge Abutment. One bone manuport, described as a bone fragment with smooth, round edges and a smooth, glossy polished surface, was identified in CU4 (Patricia Galindo Mayo, personal communication, March 9, 2023). Two of the bone awls/pins were discovered in CU3 and CU6. Control unit 6 had eight modified bone artifacts in total. In fact, six out of nine of the control units excavated in the North Bridge Abutment had at least one modified bone artifact. Most of the modified bone artifacts were of medium to large mammal long bones (81%). While one modified bone was determined to be rib of a medium-sized mammal.

Bone modifications include burning, shaping, cutting, evidence of striations, smoothing, scoring, snapping, and perforation. As analysis is ongoing, the use and activities related to these modified bone artifacts have not been determined at the time of writing. A more detailed account of the modified bone identified during this investigation will be provided in the final report.

8.3 Dietary Remains

A total of 2,534 faunal bone fragments and pieces were collected from the field screening, mechanical stripping, and flotation processing (Table 7). For the sample's size, there was a diverse variety of faunal bone, including coyote, dolphin, duck, elk, fur seal, rabbit, sea otter, dog, pig, sea lion, and kangaroo rat. A majority of the faunal remains were collected in the North Bridge Abutment excavations, indicating a distribution of site activities.

Over 1,890 fish bone elements were collected in the field or by flotation sampling, this makes up approximately 30.2% of the cultural material collected. Please refer to Table 8 and Table 9 for a detailed summary of the fish bone assemblage. Approximately 45% of the fish species identified from the excavation are known to inhabit bays and estuaries, while 56% are known to migrate from the open ocean to bays and estuaries. These data contradict the hypothesis that the bay was not a viable habitat or was cut off from the open ocean.

Of the 978 grams of shell identified, 52.6% (514.6 grams) were from the 2022 Phase II testing and Phase III data recovery. Due to the testing methods and amount of soil tested, it can be surmised that the 2020 geoarchaeological testing yielded a far denser shellfish midden than the Phase II and Phase III investigations. Of the shellfish collected, most of the species inhabit bays or estuarine habitats (refer to Table 10). Species of the bay and estuary include a variety of clam (Bivalvia*, Leukoma laciniata, Macoma* spp.*, Saxidomus nuttalli,* and *Tresus nuttallii*), cockle (Cardiidae), and oyster (*Ostrea lurida*). California mussel (*Mytilus californianus*) made up most of the open rocky coast species category, with very minimal black turban (*Chlorostroma funebralis*) and dogwinkle (*Nucella* spp).

Table 7: Summary of Mammal and Bird Bone Recovered from Phase II and Phase III Excavation at CA-SLO-16

Common Name	CU 1	CU 2	CU 3	CU 4	CU 5	CU 6	CU 7	CU 8	CU 9	STU 02	STU 03	STU 04	STU 05	STU 06	STU 09	STU 10	Total Count	Percentages
Bird or Small Mammal	7	1	22	6	-	4	-	11	-	-	-	-	-	-	-	-	**51**	**2.01%**
Bird, Indeterminate	2	-	6	-	3	-	-	2	-	-	-	-	-	-	-	-	**13**	**0.51%**
Bird, Medium	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	**3**	**0.12%**
Bird, Small/Medium	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-	1	**5**	**0.20%**
Carnivore, medium	-	9	-	-	-	4	-	-	-	-	-	-	-	-	1	-	**14**	**0.55%**
Cormorant	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Cow, Domestic	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	**1**	**0.04%**
Coyote	1	1	2	-	-	2	1	1	-	-	-	1	-	-	6	-	**15**	**0.59%**
Deer, Mule/Black-tailed	1	-	2	2	11	1	1	2	-	-	-	1	2	-	-	-	**23**	**0.91%**
Dog, Domestic	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	**2**	**0.08%**
Dog/Coyote	-	2	-	1	1	-	-	1	-	-	-	3	-	-	-	-	**8**	**0.32%**
Dolphin, Bottlenose	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	**2**	**0.08%**
Duck, Indeterminate	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	**2**	**0.08%**
Elk	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Fur Seal, Northern	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Grebe	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	**2**	**0.02%**
Hare, Black-tailed	-	1	7	1	2	1	-	-	-	-	-	-	-	-	-	-	**12**	**0.47%**
Hawk or Sharp-shinned	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Mammal	7	65	-	-	8	9	15	-	1	1	15	21	13	2	4	9	**170**	**6.71%**
Mammal, Marine	-	4	1	-	10	2	1	3	-	-	-	2	-	-	1	-	**24**	**0.95%**
Mammal, M/L	-	-	-	-	-	2	1	-	2	-	-	-	-	-	-	-	**5**	**0.20%**
Mammal, Medium+	24	35	23	31	25	34	37	62	4	-	8	47	19		4	17	**370**	**14.60%**
Mammal, S/M	7	3	30	9	16	2	12	13	-	-	-	2	3	1	-	1	**99**	**3.91%**
Mouse, Brush	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Otter, Sea	1	-	12	-	5	-	-	-	-	-	-	-	2	-	1	7	**28**	**1.10%**
Pig, Domestic	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Pocket Gopher, Bottae's	-	-	-	-	3	-	-	-	-	-	-	-	1	-	-	-	**4**	**0.16**
Rabbit, Brush Cottontail	4	2	8	-	4	1	-	9	-	-	-	-	-	-	-	-	**28**	**1.10%**

Common Name	CU 1	CU 2	CU 3	CU 4	CU 5	CU 6	CU 7	CU 8	CU 9	STU 02	STU 03	STU 04	STU 05	STU 06	STU 09	STU 10	Total Count	Percentages
Rat, Kangaroo	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Rodent, Indeterminate	-	-	6	-	2	-	-	2	-	-	-	-	-	-	-	-	**10**	**0.39%**
Rodent, Small/Medium	-	-	7	-	-	1	1	6	-	-	-	-	-	-	1	-	**16**	**0.63%**
Sea Lion, California	1	-	-	3	7	1	-	3	-	-	-	2	-	-	-	-	**17**	**0.67%**
Sea Lion/Fur Seal	-	-	-	1	-	-	8	1	-	-	-	-	-	-	-	-	**10**	**0.39%**
Seal/Sea Lion/Walrus, Large	-	-	-	-	-	1	-	2	-	-	1	-	-	-	-	-	**4**	**0.16%**
Squirrel, California Ground	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.04%**
Squirrel, Tree	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	**2**	**0.08%**
Vertebrate, Indeterminate	104	49	267	102	416	128	101	202	23	-	-	7	1	-	91	7	**1498**	**59.12%**
Vertebrate, Small/Medium	1	1	9	3	38	8	11	2	11	-	-	1	3	-	-	-	**88**	**3.47%**
Grand Total	**160**	**174**	**404**	**162**	**553**	**206**	**191**	**331**	**41**	**1**	**24**	**87**	**44**	**3**	**111**	**42**	**2534**	**100%**

Table 8: Summary of Fish Species from CA-SLO-16

Common Name	Taxon	2022 Testing	North Bridge Abutment	South Bridge Abutment	Site Total
Anchovy, Northern	*Engraulis mordax*	19	11	48	**78**
Flounder/Sole/Halibut	Pleuronectiformes	2	-	-	**2**
Guitarfish, Shovelnose	*Rhinobatos productus*	-	10	-	**10**
Guitarfish, Thornback	*Platyrhinoidis triseriata*	-	2	-	**2**
Hake, North Pacific	*Merluccius productus*	1	-	-	**1**
Herring/Sardine Family	Clupeidae	16	32	-	**48**
Jacksmelt	*Atherinopsis californiensis*	-	1	-	**1**
Lingcod	*Ophiodon elongatus*	-	2	-	**2**
Mackerel, Pacific Jack	*Trachurus symmetricus*	-	8	-	**8**
Mail-cheeked Fish	Scorpaeniformes	1	-	-	**1**
Midshipman	*Porichthys* sp.	-	2	-	**2**
Prickleback, Black/Rock	*Xiphister* sp.	-	1	-	**1**
Prickleback, Monkeyface	*Cebidichthys violaceus*	-	4	-	**4**
Ray, Bat	*Myliobatis californica*	-	11	5	**16**
Ray-finned Fish	Actinopterygii	213	308	43	**564**
Sardine, Pacific	*Sardinops sagax*	2	7	-	**9**
Sculpin Family	Cottidae	-	1	-	**1**
Sculpin spp.	*Artedius* sp.	-	1	-	**1**
Sculpin, Pacific Staghorn	*Leptocottus armatus*	8	17	-	**27**
Shark, Horn	*Heterodontus francisci*	-	2	-	**2**
Shark, Houndshark	Triakidae	-	14	14	**28**
Shark, Pacific Angel	*Squatina californica*	-	1	-	**1**
Shark, School	*Galeorhinus galeus*	1	-	-	**1**
Shark/Ray/Skate	Chondrichthyes	5	83	13	**101**
Silversides, New World	Atherinopsidae	94	609	138	**841**
Skate	Rajidae	-	2	-	**2**
Smelt	Osmeridae	-	1	-	**1**
Surfperch Family	Embiotocidae	9	85	24	**118**
Surfperch, Pile Perch	*Rhacochilus vacca*	6	15	-	**21**
Grand Total		**377**	**1230**	**285**	**1894**

Table 9: Identified Fish Remains by Habitat Type at CA-SLO-16

Habitat Type and Associated Fish	2020 Testing	2022 North Bridge Abutment	2022 South Bridge Abutment	Total Percentages
Bays and Estuaries	**24.93%**	**50.65%**	**48.42%**	**45.14%**
Guitarfish, Shovelnose	-	0.81%	-	0.53%
Guitarfish, Thornback	-	0.16%	-	0.11%
Jacksmelt	-	0.08%	-	0.05%
Silversides, New World	24.93%	49.51%	48.42%	44.40%
Smelt		0.08%		0.05%
Estuaries and Open Coast	**74.54%**	**48.13%**	**51.58%**	**53.96%**
Anchovy, Northern	5.04%	0.89%	16.84%	4.12%
Flounder/Sole/Halibut	0.53%	-	-	0.11%
Herring/Sardine Family	4.24%	2.60%	-	2.53%
Lingcod	-	0.16%	-	0.11%
Midshipman	-	0.16%	-	0.11%
Ray, Bat	-	0.89%	1.75%	0.84%
Ray-finned Fish	56.50%	25.04%	15.09%	29.78%
Sardine, Pacific	0.53%	0.57%	-	0.48%
Sculpin Family	-	0.08%	-	0.05%
Sculpin, Bonehead/Coralline/Padded/ Scalyhead/Smoothhead	-	0.08%	-	0.05%
Sculpin, Pacific Staghorn	2.12%	1.38%	-	1.43%
Shark, Houndshark	-	1.14%	4.91%	1.48%
Shark, Pacific Angel	-	0.08%	-	0.05%
Shark, School	0.27%	-	-	0.05%
Shark/Ray/Skate	1.33%	6.75%	4.56%	5.33%
Skate	-	0.16%	-	0.11%
Surfperch Family	2.39%	6.91%	8.42%	6.23%
Surfperch, Pile Perch	1.59%	1.22%	-	1.11%
Open Coast	**0.27%**	**1.22%**		**0.84%**
Hake, North Pacific	0.27%			0.05%
Mackerel, Pacific Jack		0.65%		0.42%

Habitat Type and Associated Fish	2020 Testing	2022 North Bridge Abutment	2022 South Bridge Abutment	Total Percentages
Prickleback, Black/Rock		0.08%		0.05%
Prickleback, Monkeyface		0.33%		0.21%
Shark, Horn		0.16%		0.11%
Various	**0.27%**			**0.05%**
Mail-cheeked Fish	0.27%			0.05%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

The representation of Pismo clam (*Tivela stultorum*) was isolated to the South Bridge Abutment, where soils were most likely redeposited. This was the only species of the habitat found on open sandy beaches, while barnacle (*Balanus* spp.), was the only representative species of the rocky shores. Approximately 0.7% of the shellfish sample collected from CA-SLO-16 was unidentifiable.

Table 10: Shellfish by Habitat Type at CA-SLO-16

		2020 Testing		2020 Phase II and Phase III		Site Total	
Habitat	**Common Name**	**Weight (g)**	**%**	**Weight (g)**	**%**	**Weight (g)**	**%**
Bay/Estuary		**294.8**	**68.21%**	**445.6**	**86.59%**	**740.4**	**78.20%**
	Oyster, Pacific (California Oyster)	6.4	1.48%	62.1	12.07%	68.5	7.23%
	Clam, Macoma	192.4	44.52%	346.8	67.39%	539.2	56.95%
	Clam, Pacific Gaper	47.7	11.04%	29.2	5.67%	76.9	8.12%
	Clam, Pacific Littleneck	36.5	8.45%	5	0.97%	41.5	4.38%
	Clam, Folded (Rough Littleneck)	1.7	0.39%	0.7	0.14%	2.4	0.25%
	Clam, Venus	0.4	0.09%	-	-	0.4	0.04%
	Clam, Washington	0.2	0.05%	0.3	0.06%	0.5	0.05%
	Cockle	2.9	0.67%	0.5	0.10%	3.4	0.36%
	Clam	6.2	1.43%	1	0.19%	7.2	0.76%
	Chiton, Mossy	0.4	0.09%	-	-	0.4	0.04%
Open Rocky Coast		**104.9**	**24.27%**	**42.6**	**8.28%**	**147.5**	**15.58%**
	Mussel, California	102.5	23.72%	41.8	8.12%	144.3	15.24%
	Snail, Black Turban	1.2	0.28%	0.4	0.08%	1.6	0.17%
	Snail, Dogwinkle	1.2	0.28%	0.4	0.08%	1.6	0.17%
Open Sandy Beaches		**2.5**	**30.86%**	**6.1**	**184.85%**	**8.6**	**75.44%**
	Clam, Pismo	2.5	0.58%	6.1	1.19%	8.6	0.91%
Rocky Shores, Bays		**20**	**4.63%**	16.3	3.17%	**36.3**	**3.83%**
	Barnacle	19.6	4.53%	16.3	3.17%	35.9	3.79%
	Barnacle, Leaf (Gooseneck)	0.4	0.09%	-	-	0.4	0.04%
Various		**10**	**2.31%**	**4**	**0.78%**	**14**	**1.48%**
	Chiton	0.4	0.09%	-	-	0.4	0.04%
	Snail, Terrestrial	0.1	0.02%	-	-	0.1	0.01%
	Crustacean	0.5	0.12%	-	-	0.5	0.05%
	Snail/Slug	0.9	0.21%	0.7	0.14%	1.6	0.17%
	Invertebrate, Indeterminate	8.1	1.87%	3.3	0.64%	11.4	1.20%
Grand Total		**432.2**	**100.00%**	**514.6**	**100.00%**	**946.8**	**100.00%**

Similar to the fish bone, 78.2% of shellfish species identified habituate in bays and estuaries (Table 10). Because CA-SLO-16 is a single-component site, there is no way to identify change at the site's activities over time. However, the data collected provides valuable insight into subsistence behaviors during

the Middle Period in Morro Bay, specifically the Late Middle Period. Additionally, this collection provides many research opportunities which will be explored in greater detail in Chapter 9.

Chapter 9: Conclusion

In the last thirty years, there has been an increase of archaeological studies in Morro Bay, but comparatively little geoarchaeological research has been done, limiting the results to surface or relatively shallow archaeological deposits. In this thesis, I have addressed this disparity and presented the results of a deeply buried site in the context of a CRM project. Additionally, I have discussed how the site's landscape evolution and landform age affect the identification of deeply buried archaeological sites. I now return to the three research questions posed in Chapter 1 of this thesis.

9.1 Research Questions and Goals

Middle Period Occupational Hiatus'

Gallagher's 1996 dissertation is the most common document cited to explain the hiatus of occupation in Morro Bay during the Middle Period gaps (Far Western 2016; Jones *et al*. 2019; Wiggins 2022). Without any archaeological sites with dates within these gaps, it is difficult to ignore the coincidence of the gaps in occupation aligning with Gallagher's (1996) estimated rapid rise in sea level. But there are a few inconsistencies with this argument.

First, Gallagher (1996) compares the seismic environment and resulting activity of the Los Osos fault zone to that of the Cascadia subduction zone (212). Darienzo and Peterson (1990) describe the tsunami deposits in the adjacent area to the Cascadia subduction zone, in Northern Oregon, as distinct sand layers interrupting wetland deposits that result from massive earthquakes. But researchers have not identified these deposits in the Chorro Delta cores taken by Gallagher in Morro Bay (1996). Additionally, the Cascadia subduction zone is a different plate boundary of the Los Osos fault zone, therefore acting in a more catastrophic way (e.g., tsunamis). A convergent plate boundary, as discussed in Chapter 2, can create a subduction zone when underwater or cause inter-seismic subsidence which has significant impacts to localized relative sea level and can, in drastic cases, result in tsunamis. A transform plate boundary, such as the San Andreas Fault, is when two plates rub up against each other. This activity can cause earthquakes but overall has very little or no impact on localized relative sea level change, especially on an

extended fault branch, or “active traces” such as the Los Osos fault zone (Gallagher 1996:212). Simms *et al.* (2016b) also notes subsidence has or may have occurred in Morro Bay, but it is not comparable to the consistent, substantial, and widespread subsidence identified in the Cascadia subduction zone. Although the Morro Bay region has been affected by “tsunamis” in the past (e.g., Orphan tsunami; Atwater *et al.* 2011), these “tsunamis’” have resulted from other plate activity offshore and have been rather insignificant compared to the Cascadia subduction zone. Additionally, Simms *et al.* suggests that there can be no separation of the relative importance of tectonic-subsidence and compaction in determining the magnitudes of subsidence in these estuaries (2016b:1580).

Secondly, there have been contradictory statements made of how a rise in relative sea level affected the estuary. Gallagher argues that movements along the fault zone *could* have produced “an abrupt deepening of the bay, causing a sudden rise in relative sea level” (1996:212). Jones *et al.* cites Gallagher and adds that “seismic activity in the bay area …shut the estuary off from the sea and caused sudden deterioration of shellfish habitat” (2019:246). It should be considered that the sandspit as a barrier to protect the estuary from seismic related tsunamis (e.g., orphan tsunamis) or the sandspit could have acted as a dam, which in turn would cause relative sea level to drive the bay up not related to eustatic sea level. But with this amount of water, it is plausible that over time water could have breached the dam or would have created an alternate route to the ocean.

Lastly, and arguably, most importantly, a deeply buried site in Morro Bay was identified, tested, and radiocarbon dated in 2022. Samples from site CA-SLO-16 yielded dates to the previously identified hiatus of occupation in Morro Bay. Therefore, even if relative sea level rose quickly, by seismic activity or other outside factors, it would not necessarily result in a massive migration. I argue that there is not so much an occupational hiatus as a lack of data. Deeply buried sites will always be more elusive and the archaeological methods implemented during CRM projects are limited in scope, time, and depth of project impacts. I am not implying that there is a systematic problem within Central Coast archaeology, this is merely an observation that geoarchaeological studies are less common, therefore the identification of deeply buried sites are less common. Archaeologists follow the data; therefore, the Middle Period occupational hiatus might be a sampling error. To identify these deeply buried sites, geoarchaeological

methods must be implemented, as sites dating to these gaps may be deeply buried and not yet identified due to the nature of identification practices.

Landscape Evolution and Archaeological Methods

The identification of CA-SLO-16 was not by chance but by methodology. Far Western conducted a buried site sensitivity assessment (Figure 4, page 12) as part of the archaeological survey report (Kaijankoski *et al.* 2019). The results of the assessment are dependent on three factors: "attractiveness for prehistoric occupants (e.g., access to freshwater or other resources, low-angle landforms), the landform age…and the depth of project impacts" (Kaijankoski *et al.* 2019:33). Formed during the Holocene, many lowland depositional landforms have geologic potential to contain buried sites. These time-sensitive depositional episodes paired with specific geo-environmental settings such as low, level landforms and near present or past water sources, are present at a majority of buried sites (Foster *et al.* 2005:4; Hansen *et al.* 2004:5; Pilgram 1987; Rosenthal and Meyer 2004). Proximity to an active or past water source relates directly to landscape evolution. The landforms that are subject to periodic flooding during wet seasons are also subject to increased sediment deposition (Rosenthal and Meyer 2004). These low-lying landforms adjacent to waterways are also where native people chose to live.

Completing a buried site sensitivity assessment prior to archaeological investigations will provide adequate reasoning for what methodology is used during an investigation. The complete Morro Bay Water Reclamation Facility Project spanned over a variety of landforms (Figure 3, page 11), from the pre-Quaternary (>2.5 million years) to the recent Holocene (600-100 BP), the differences of depositional rates on these landforms affect the probability of buried sites. Pre-Quaternary landforms have little to no potential for buried sites because a majority of those landforms "pre-date the Holocene and therefore few, if any, people were present in the region at that time" (Kaijankoski *et al.* 2019:33). This does not mean that there are no archaeological sites on pre-Quaternary landforms, it just means that the probability of *buried* archaeological deposits is lower and therefore testing methodology should be adjusted for those conditions (e.g., pedestrian survey and hand excavation versus mechanical excavation and/or hydraulic-continuous cores).

Morro Bay's archaeological studies have been isolated to sparse academic pursuits and the results of Cultural Resource Management projects confined to either the scope of work or the methodology chosen. The lack of archaeological sites identified in the Late Middle and Early Middle Period, or any chronological period for that matter, could be correlated to the absence of geoarchaeological studies in Morro Bay. Additionally, Morro Bay is prone to major flood events during the rainy season which can also cause significant sediment deposition to a landscape.

In 1995, Morro Creek's water level was at approximately 1.22 meters (or 4 feet) above its average rate causing severe property damage. This year, less than thirty years later, another severe storm caused Morro Creek to flood; the waterline was so high that Highway 1 (along the eastern boundary of CA-SLO-16) was underwater. These are just two flooding events that have happened in the last thirty years, it would be faulty to believe that these events did not occur in the past. Scholars have hypothesized that this behavior is in response to the historic reduction of watercourses by channel incision, channelization, and lowered groundwater levels (Grossinger 2012:118-119).

It is valuable to consider a waterway's past location in addition to its current position. Morro Creek previously flowed into the bay as shown in the 1883 US Coast Survey Map (Figure 7, page 23), but was diverted to drain into the ocean, just north of Morro Rock (Figure 2, page 3). There is speculation that Morro Creek meandered between the two locations historically due to an area of standing water, dubbed "Sperm Lake" (Figure 7, page 23) and sand dune deposition. Morro Creek would have been the water source to fill Sperm Lake during heavy rain. This is further supported by two deeply buried sites that are adjacent to the historic Morro Creek route, CA-SLO-2124 and CA-SLO-2222.

Site CA-SLO-2124, or the Duke Site, named after Duke Energy, was identified by John Parker in 2001. Parker notes, "It appears that the site was abandon [sic] and then buried by natural dune formation" (Parker 2001b:2). Parker notes the site's boundaries were incompletely defined because it was "buried below 3 meters of overburden" (Parker 2001b:2). This site is in close proximity to the dogleg of Morro Creek's historic route. Additionally, the site's proximity to the dune complex and underlying landform (Recent Holocene Alluvium; Figure 3, page 11) support the possibility that this site would be deeply buried.

In 2003, Clay Singer identified site CA-SLO-2222 on the corner of Main Street and State Route 41. Singer reported that the cultural deposit was buried between 2.2 and 2.7 meters below surface (Singer 2003). Additionally, the radiocarbon samples taken from this site returned dates between 1250 and 1740 cal BP, overlapping with the occupation at CA-SLO-16. Site CA-SLO-2222 is also close to Morro Creek, just adjacent to its current location. There are other sites (CA-SLO-29, CA-SLO-43, etc.) plotted near the past and present Morro Creek locations, but many have either been destroyed or cannot be relocated. Furthermore, past site records do not offer much information regarding the depth of these sites.

The purpose of discussing these adjacent sites is to highlight the importance of proper methods when conducting archaeological research on different landforms. The three deeply buried sites, CA-SLO-16, CA-SLO-2124, CA-SLO-2222, would not have been identified with safe hand excavation. All these sites were identified due to the archaeologist choosing mechanical testing to sample a project's deep depth of impact. To conclude, archaeological methodology paired with a knowledge of landscape evolution and buried site sensitivity models can greatly increase the amount of buried archaeological deposits identified versus standard hand excavation. These sites are important to the archaeological record especially because many of them have been protected from historic disturbance.

CA-SLO-16 and Morro Bay

This research provides valuable insight into human behavior during the previously referred to Middle Period "gap" in Morro Bay. Once considered an abandoned region during this time, this research suggests human occupation and behavior similar to that of the Middle Period: collecting shellfish, fishing, trading with interior groups and processing terrestrial animals and resources. The diversity of a coastline, both in landscape and resources, varies over time and therefore, the knowledge gleaned from an archaeological deposit, although informative, was limited due to the scope of work and sample size.

Theories regarding the estuary's status during this time do not seem to coincide with the findings. Unlike the previous theory that the estuary had become cut off from the ocean and resulted in siltation (Jones *et al.* 2019; Mikkelsen 2000), over 45% of the fish bone identified from the excavation are known to inhabit bays and estuaries, while 56% are known to migrate from the open ocean to bays and estuaries,

which could support an open connection between the estuary and ocean. This also applies to shellfish, in which 77.3% habituate in bays and estuaries. The appearance of these species suggests the estuary was still a viable habitat.

The comparison of radiocarbon samples from CA-SLO-16 to those taken from adjacent sites provides significant information to how the landscape has changed over time. Refer to Figure 25 for a linear cross-section of adjacent sites near the research area representing Morro Bay's City profile. Site CA-SLO-165, located just northeast of the research area, had temporal indicators of multiple temporal components but a very strong Early Period component. CA-SLO-165 is located on a bedrock hillside dating to the pre-Quaternary therefore buried sites are exceedingly rare. This was true for CA-SLO-165 which was identified on the surface and was approximately 2.5 meters in thickness (Mikkelsen *et al.* 2000). *Olivella* saucer beads recovered from an Early Period context at SLO-165 resulted in two calibrated dates of 2300 and 2000 cal BP but Mikkelsen *et al.* note that the samples were taken in a mixed Early Period deposit (2000). This could be determined as "mixed residual," meaning overlapping occupation at a site (Mikkelsen *et al.* 2014). Another theory is that CA-SLO-165 and adjacent site CA-SLO-2222 are one large occupational site separated by California State Route 41 (Singer 2003).

Singer (2003) identified the cultural deposit at CA-SLO-2222 during construction at the corner Chevron station. He notes the cultural deposit was approximately 2.2 to 2.7 meters below surface. Singer (2003) reports radiocarbon samples from the deposit returned dates of 1250 and 1740 cal BP. Between CA-SLO-165 and CA-SLO-2222 the landform is naturally sloped, turning from a pre-Quaternary bedrock to a Recent Holocene Alluvium (600-100 cal BP), as indicated on Figure 25. These sites could have been connected at one time, but due to environmental characteristics and differences in depth and time of discovery, the consideration of combining the sites was not feasible. Although Singer (2003) did note the close proximity, with only State Route 41 separating the two sites. The difference in landform, pre-Quaternary versus recent Holocene (Figure 3), is a clear reason that CA-SLO-2222 is deeply buried and CA-SLO-165 was identified on the surface.

West of CA-SLO-2222, across Highway 1, is CA-SLO-16. As I have stated throughout this research, CA-SLO-16 was a deeply buried site adjacent to Morro Creek. Figure 4 depicts CA-SLO-16

within the same landform as CA-SLO-2222, Recent Holocene Alluvium. Continuing southwest of CA-SLO-16, site CA-SLO-2124 was recorded by John Parker in 2001 (2001b). The site was identified under 3 meters of overburden during a construction project. This site is below a mix of alluvium, fill, and sand dune which is consistent with the landform boundary in which it sits (Figure 3). Parker reports, "Beta-155097 radiocarbon analysis on charcoal indicates the site is 450+60 BP", but also describes the deposit as "prehistoric," alluding to the ethnographic Chumash village of *Chotcagua* (Parker 2001a:2). The landform map indicates site CA-SLO-2124 is on the cusp of Recent Holocene Alluvium and Medieval Climatic Anomaly Sand Dunes (1150-600 cal BP).

These four sites are all within close proximity to the research area and to a sediment source, Morro Creek. As the creek meandered, overflowed during the wet season, and deposited sediment, the sites were buried. The formation of the sand dunes also could have played a role. As the sand dunes formed, the base level of Morro Creek rose, therefore depositing alluvium onto the floodplain and encouraging the creek to change course.

There are two additional sites along the present and historic Morro Creek route that have little to no information. The first, CA-SLO-43, located just south of Morro Creek, was recorded in 1900 by P.M. Jones. The site was described as a very large shell midden on top of a ridge. A site update by Pilling (1948:1), reports the site is "badly destroyed now." There is some debate as to where this site is located based on contradicting descriptions on the original site record and the updated record.

The second site, CA-SLO-29, was recorded by Walker in 1948. The site described as a "shell mound near the ocean" has never been relocated (Walker 1948:1). Based on the sketch map provided with the site record, the site was near CA-SLO-16, along the current Morro Creek route. There is a good chance, based on the proximity to the creek, the landform age, and proximity to development, that these sites are buried under meters of alluvium brought in by Morro Creek and fill from construction. At the time of writing, no documented geoarchaeological studies had been conducted in the vicinity of these two sites.

9.2 Interpretations

Morro Bay is an excellent case study of how an understanding of landform age and landscape evolution paired with proper archaeological methodology affects the probability of finding deeply buried sites. The data presented in this thesis is proof that valuable information can be discovered using geoarchaeological methods. Although my previous intention was to highlight the importance of geoarchaeological methods in areas with a high probability for buried sites, the data collected ultimately produced significant information regarding the chronology of Morro Bay.

The assumption that an occupational hiatus occurred during the Middle Period may have been made by a lack of data and constraint on testing methods by the parameters of the undertaking. The data collected suggest that the bay may have still been a viable habitat, but the overall health of the bay is yet to be determined. Whether there was a sudden deepening of the bay (Gallagher 1996; Jones *et al.* 2019:250-251) or seismic activity that "shut the estuary off from the sea and caused sudden deterioration of [the] shellfish habitat" (Jones *et al.* 2019) would require further testing. Wiggins (2022), prior to the data recovery at CA-SLO-16, suggested that people may have migrated north of Morro Bay, to Cayucos, (approximately 4 miles from research area). This theory is still plausible; if resources were depleted some communities may have relocated to Cayucos, while others stayed in Morro Bay utilizing terrestrial resources and the existing shellfish. Regardless of whether migration occurred, the methodology implemented to test archaeological sites has provided new data suggesting occupation during one of the alleged Middle Period gaps in Morro Bay.

The creation of landform age map and deeply buried site sensitivity models allow researchers to identify depositional areas within the landscape. These depositional areas have a higher probability for deeply buried sites. Coincidentally, these areas are often near creeks and rivers, as these waterways are a sediment source. The proximity to water courses also increases the likelihood of archaeological sites, as proximity to water is a major factor in the Archaeological Sensitivity Model. Applications of the buried site sensitivity model can be beneficial in both the physical studies of archaeological deposits and in the hypothetical studies of past cultures. Identifying areas of high sensitivity is just as important as investigating those areas but without the direct impact to a non-renewable cultural resource. In this case study,

employing the buried site sensitivity model to the project area led to geoarchaeological testing. This geoarchaeological testing provided valuable information regarding the depth of cultural materials and resulted in the City of Morro Bay readjusting the project to partially avoid the cultural deposit.

Lastly, it is important to discuss how some scholars may argue that deeply buried sites should still be investigated even if a project's direct impact is shallow. Protecting and preserving archaeological sites should be just as important, if not more important, as studying them. Although a project may lead to an archaeological site to be inaccessible at the time, the resource will continue to be preserved in its original context until future projects require its investigation. Historically, excavating more does not always prove to be better (Praetzellis 2003). Additionally, limiting the impact to cultural resources is a part of our discipline's ethics and illustrates respect for the past people we study and their living descendants. But this conundrum is two sides of the same coin, limiting excavation and the resulting data to the depth of safe hand excavation (i.e., 1.4 meters) does create a bias within the archaeological record. Therefore, researchers should address this bias and consider the possibility that these gaps in data may be a sampling error.

9.3 Future Research Opportunities

The research discussed in this thesis has provided valuable insight to how landscape evolution and archaeological methodologies affect the probability of identifying archaeological sites. But the collection excavated during this research has the potential to provide valuable information on the subsistence practices, settlement patterns, and tool technologies during the Middle Period in Morro Bay, California. Although archaeological studies have increased rapidly in the last thirty years, there is still much unknown regarding the prehistory of Morro Bay, specifically during the Middle Period (Jones *et al.* 2019:250-251).

Research Potential from the CA-SLO-16 Excavations

Due to the nature of this project's origin, analysis of the collection is still ongoing. The results of these analyses will be released in the report titled, *Data Recovery Excavations at CA-SLO-16 for Phase 2B of the Morro Bay Water Reclamation Facility Project, San Luis Obispo County, California,* published by Far Western Anthropological Research Group, Inc. But regardless of the ongoing analysis, this collection has

potential to answer many research questions. The following are three research opportunities that this collection has the potential to fulfill.

Shellfish

Although the shellfish collection is relatively small, there is the potential for further analysis of shellfish species and size. Studies have suggested the benefits of shellfish analysis for a multitude of reasons including resource condition (depletion, exploitation, etc.), collection strategy, division of labor, and subsistence practices. Although optimal foraging theory states that one maximizes the exploitation of high-ranked, low-cost resources. This behavior may change depending on resource availability and division of labor.

One example of this is shellfish collection strategy. Bettinger *et al.* (1997) and many others have studied shellfish collection along the Pacific coast and the Northern Channel Islands. It is hypothesized that population grows, collection strategies change, from plucking the biggest and best mussels, to "sheeting" full rock faces of all mussels. This change in procurement can be identified in the archaeological record by diversity of type and size of mussel, as well as the occurrence of "hitchhikers" or low-ranked shellfish in the archaeological record.

The identification of low ranked shellfish or smaller mussel shells could also indicate a change in division of labor. If an individual was collecting shellfish for a small group or only themselves to process and cook, it is assumed that they would pluck the largest mussels with the most caloric gain. The processing of these few large mussels would be less time consuming and energy consuming than that of many small mussels. But, if the labor was divided, one individual collects the mussels, while another processes them, the collector may take the least time-consuming collecting method (sheeting), as they will not be the one processing the shellfish.

Site Seasonality

Determining site seasonality can allude to migration and settlement patterns of past peoples. Although site seasonality can be determined in a number of ways, I will discuss two options that can be

accomplished with this small collection. The first is cementum age analysis and the second by analyzing migratory animals.

In reference to Spiess (1976), mammalian species present dentin and cementum growth as layers similar to the rings of a tree. This analysis is completed by either grinding the faunal tooth down into a thin section or decalcifying the tooth in an acid solution and then cutting a thin section of the tool. Both require further analysis under a microscope to analyze the variation in the rate of dentin-cementum deposition, which appear light and dark under a microscope (Spiess 1976:53). Spiess (1976), suggests that the dark staining band is laid down into the pattern at different times of year for different species.

Spiess includes the example of caribou (1976). Spiess notes, if the dark-staining layer was in progress at the time of death, then one could surmise, that the caribou was killed between December and April (1976:53). Comparatively, if the band was light, then the date of death would be dependent on the thickness of that light band. "If the band is very thin, then death occurred within a few months of the end of deposition of the dark-straining band; or, if the light band is of approximately the same thickness as previously deposited light bands, then death occurred within a few months prior to the start of formation of another dark-staining band" (Spiess 1976:53). Although this specialized analysis can be expensive, it has the potential to provide very valuable information regarding the seasonality of the site.

The second option to determine site seasonality is to conduct further analysis of migratory species identified in the faunal collection (e.g., Guadalupe and northern fur seals, migratory aquatic birds, etc.). Jones *et al.* (2019) includes an excellent passage on the seasonality of occupation based on bird and mammal remains. Morro Bay, as understudied as it is from an archaeological perspective, has a diverse and well-studied biotic system. Data regarding bird seasonality (Edell 2006), fish seasonality (Gerdes and Browning 1974; Love 2011), and marine mammal migration (Reidman 1990) will prove extremely helpful in this undertaking (Jones *et al.* 2019:207). Comparing archaeological records to that of migratory patterns can allude to season of occupation if these migratory species are in an archaeological deposit.

Fish Bone

Further analysis of fish species within a collection has the potential to allude to marineland condition (e.g., river, estuary, bay, ocean, etc.), tool technologies, population, and even population growth or

depletion. Understanding fish species' habitats and seasonality can also be helpful. Joslin (2010:10) suggests that changes in marine resources (including fish) may allude to "environmental changes, marine resource intensification…, population growth, or adoption/development of new technology." Thus, an increase or decrease of bay or estuarian species may indicate a change in the bay's condition, new technology, or a behavioral change based on population growth or depletion. Comparatively, an increase in open ocean species may indicate a lack of resources in the bay, new technologies, or an increase of population.

In fact, a study of fishing technology development stems from changes in fish species within the archaeological record. In San Simeon Reef, just north of the research area, the simplest fishing technique was to hand collect fish trapped in intertidal pools, but Joslin notes, the introduction of circular fishhooks, often made of abalone shell, were noted as advancements fishing practices (2010:359). Joslin (2010:360) includes a very useful table of local fish species, habitats, methods of capture (technology), and even seasonal preference. This information could be easily applied to this collection to allude to subsistence practices, site seasonality, and tool technology.

Future Research Utilizing Landform Age, Landscape Evolution, and Geoarchaeological Methods

Schuldenrein (2006:11) argues that geoarchaeology has proved its value to CRM, so why isn't it implemented more often? Geoarchaeological methods paired with a basic knowledge of landform age and landscape evolution provide valuable information for archaeological studies. The following discussion will provide geoarchaeological applications for future research.

It is beneficial for archaeologists to gain an understanding of the research area's landscape evolution during the front end of a project's design. To complete this daunting task, archaeologists should consult historic maps, aerial photos, U.S. Geological Survey (USGS) topographic maps, and the U.S. Department of Agriculture (USDA) or Soil Conservation Service (SCS) soil maps. These resources provide insight to the composition of landform, the subsurface soil, and how the landscape may have changed over time (Schuldenrein 2007). As discussed in Chapter 2, archaeological sites are concentrated in certain environments, not randomly distributed across a landscape (Foster *et al.* 2005:4; Hansen *et al.* 2004;

Pilgram 1987; Rosenthal and Meyer 2004). Therefore, archaeologists should conduct a buried site sensitivity model based on landform age, depth of project impacts, and attractiveness for occupation, including access to natural resources (e.g., water source), topography, and protection from the elements (e.g., aspect).

The buried site sensitivity model can provide more time efficient and cost efficient geoarchaeological or archaeological methods for a project. The model may indicate areas of low sensitivity where therefore may only need to be monitored by an archaeologist until a certain depth, while other areas with a high sensitivity may require geoarchaeological testing (e.g., cores or mechanical trenching) in addition to Phase II testing and Phase III mitigation. Some archaeologists argue that geoarchaeological testing is a more expensive methodology, but this has been proven false in most cases. Labor costs decrease because geoarchaeological cores only require one or two archaeologists present, while trenching can be monitored by one geoarchaeologist. Additionally, conducting a coring study can cover a large area, identifying archaeological deposits and defining site boundaries quickly. Therefore, archaeologists can adjust the scope of work for Phase II and Phase III investigations based on the geoarchaeology study.

Application of the results of a geoarchaeological study to future project phases can also eliminate useless testing in areas of low sensitivity for buried sites to focus on areas of high sensitivity. One example is another phase of the Morro Bay Water Reclamation Facility project. After referencing historic maps and the landform age map, it was determined an area near the bay's shore had a very low sensitivity for buried sites, because it was underwater up until after 1883. Therefore, in this specific area, pedestrian survey and hand excavation would be sufficient. A second example was applied to this thesis research, Morro Creek. There is a high probability that there are precontact archaeological sites deeply buried along the historic route of Morro Creek (as demonstrated in Figure 7, page 23). Landscape evolution, dune development, relative sea level, and landform age all contribute to this hypothesis. Applied to any project, these methods could better prepare an archaeologist before going into the field and adjust methodology to better test a landscape.

Although some may argue that a geoarchaeologist must have an advanced degree, preferably a Ph.D., I do not find this to be true. A practicing geoarchaeologist should have an understanding of

landscape evolution and geomorphology. Geoarchaeology is a discipline of its own, utilizing principles from many earth sciences including geology, geography, hydrology, geophysics, anthropology, and pedology. Schuldenrein (2000) argued that net costs for Phase I and Phase II projects were reduced by 25-35 percent when geoarchaeological methods were employed. Schuldenrein continues to suggest that most State Historic Preservation Offices and federal regulators accept geoarchaeological studies as "a viable alternative to standard pedestrian survey and testing" (2007:22). Conducting research of landform age and buried site sensitivity assessment to a project's prefield tasks can improve the time and cost efficiency of a project. Additionally, applying geoarchaeological field methods, such as coring or trenching, can also impact a project's outcome. I urge readers to apply these methods to future projects.

Appendix A: General Catalogue

Phase	Component	Cat No	Prov Name	Level/Sample Name	Prov Location	Feature	Horizon	Top Depth	Bottom Depth	Depth Type	Category	Class	Description	Material	Count	Weight (g)	FW CatID
Geoarch Testing 2020 FW	Non-component	24	Core 21	Sample 49	-	-	Ap	0	4.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391125
Geoarch Testing 2020 FW	Non-component	25	Core 21	Sample 50	-	-	2Ab	4.5	5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391126
Geoarch Testing 2020 FW	Non-component	60	Core 21	Sample 49	-	-	Ap	0	4.5	feet	Flora/fauna	Faunal remains	Shell	Shell	0	1.4	391215
Geoarch Testing 2020 FW	Non-component	20	Core 21.1	Sample 45	-	-	Ap	0	4	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391121
Geoarch Testing 2020 FW	Non-component	21	Core 21.1	Sample 46	-	-	2Ab	4	4.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391122
Geoarch Testing 2020 FW	Middle Period	22	Core 21.1	Sample 47	-	-	3Ab	8	9.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391123
Geoarch Testing 2020 FW	Middle Period	23	Core 21.1	Sample 48	-	-	3Ab	8	8	feet	Non-cultural	Soil/flotation samples	Radiocarbon sample	-	1		391124
Geoarch Testing 2020 FW	Non-component	58	Core 21.1	Sample 45	-	-	Ap	0	4	feet	Flora/fauna	Faunal remains	Shell	Shell	0	6.1	391213
Geoarch Testing 2020 FW	Middle Period	59	Core 21.1	Sample 47	-	-	3Ab	8	9.5	feet	Prehistoric	Flaked stone	Core	Monterey Chert	1	83.8	391214
Geoarch Testing 2020 FW	Non-component	1	Core 45	Sample 12	-	-	2Ab	5	10	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391088
Geoarch Testing 2020 FW	Non-component	2	Core 45	Sample 13	-	-	Ap	0	5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391089
Geoarch Testing 2020 FW	Non-component	37	Core 45	Sample 12	-	-	2Ab	5	10	feet	Flora/fauna	Faunal remains	Shell	Shell	0	0.7	391183
Geoarch Testing 2020 FW	Non-component	38	Core 45	Sample 13	-	-	Ap	0	5	feet	Flora/fauna	Faunal remains	Shell	Shell	0	1.6	391184
Geoarch Testing 2020 FW	Non-component	3	Core 45.1	Sample 14	-	-	AC	0	2	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391090
Geoarch Testing 2020 FW	Non-component	4	Core 45.1	Sample 15	-	-	2Ab	4.5	6	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391091
Geoarch Testing 2020 FW	Non-component	39	Core 45.1	Sample 14	-	-	AC	0	2	feet	Flora/fauna	Faunal remains	Shell	Shell	0	1.7	391185
Geoarch Testing 2020 FW	Non-component	5	Core 46	Sample 16	-	-	Ap	0	8	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391092
Geoarch Testing 2020 FW	Non-component	6	Core 46	Sample 17	-	-	2Ab	8	10	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391093
Geoarch Testing 2020 FW	Non-component	40	Core 46	Sample 16	-	-	Ap	0	8	feet	Flora/fauna	Faunal remains	Shell	Shell	0	10.7	391186
Geoarch Testing 2020 FW	Non-component	7	Core 47	Sample 18	-	-	Ap	0	4.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391094
Geoarch Testing 2020 FW	Non-component	8	Core 47	Sample 19	-	-	2Ab	4.5	6	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391095
Geoarch Testing 2020 FW	Non-component	41	Core 47	Sample 18	-	-	Ap	0	4.5	feet	Flora/fauna	Faunal remains	Shell	Shell	0	9.7	391187
Geoarch Testing 2020 FW	Non-component	42	Core 47	Sample 19	-	-	2Ab	4.5	6	feet	Flora/fauna	Faunal remains	Bone	Bone/enamel	1	0.1	391188
Geoarch Testing 2020 FW	Non-component	43	Core 47	Sample 19	-	-	2Ab	4.5	6	feet	Flora/fauna	Faunal remains	Shell	Shell	0	1.3	391189
Geoarch Testing 2020 FW	Non-component	9	Core 47.1	Sample 20	-	-	Ap	0	4.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391096
Geoarch Testing 2020 FW	Non-component	10	Core 47.1	Sample 21	-	-	2Ab	4.5	7	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391097
Geoarch Testing 2020 FW	Non-component	44	Core 47.1	Sample 20	-	-	Ap	0	4.5	feet	Flora/fauna	Faunal remains	Shell	Shell	0	36.7	391190
Geoarch Testing 2020 FW	Non-component	45	Core 47.1	Sample 21	-	-	2Ab	4.5	7	feet	Flora/fauna	Faunal remains	Shell	Shell	0	11.9	391191
Geoarch Testing 2020 FW	Non-component	11	Core 48	Sample 22	-	-	Ap1	0	2	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391098
Geoarch Testing 2020 FW	Non-component	12	Core 48	Sample 23	-	-	Ap2	2	4.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391099
Geoarch Testing 2020 FW	Non-component	13	Core 48	Sample 24	-	-	2Ab	4.5	6	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391100
Geoarch Testing 2020 FW	Non-component	46	Core 48	Sample 22	-	-	Ap1	0	2	feet	Flora/fauna	Faunal remains	Shell	Shell	0	1.7	391192
Geoarch Testing 2020 FW	Non-component	47	Core 48	Sample 23	-	-	Ap2	2	4.5	feet	Flora/fauna	Faunal remains	Bone	Bone/enamel	1	0.2	391193
Geoarch Testing 2020 FW	Non-component	48	Core 48	Sample 23	-	-	Ap2	2	4.5	feet	Flora/fauna	Faunal remains	Shell	Shell	0	18.6	391194
Geoarch Testing 2020 FW	Non-component	49	Core 48	Sample 24	-	-	2Ab	4.5	6	feet	Flora/fauna	Faunal remains	Shell	Shell	0	0.6	391195
Geoarch Testing 2020 FW	Non-component	14	Core 49	Sample 25	-	-	Ap1	0	2	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391101
Geoarch Testing 2020 FW	Non-component	15	Core 49	Sample 26	-	-	Ap2	2	10	feet	Non-cultural	Soil/flotation samples	Flotation sample	-	1		391102
Geoarch Testing 2020 FW	Non-component	31	Core 49	Sample 26	-	-	Ap2	2	10	feet	Flora/fauna	Botanical remains	Light fraction	-	1		391173
Geoarch Testing 2020 FW	Non-component	50	Core 49	Sample 26	-	-	Ap2	2	10	feet	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.2	391196
Geoarch Testing 2020 FW	Non-component	51	Core 49	Sample 26	-	-	Ap2	2	10	feet	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.1	391197
Geoarch Testing 2020 FW	Non-component	52	Core 49	Sample 26	-	-	Ap2	2	10	feet	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	0.1	391198
Geoarch Testing 2020 FW	Non-component	53	Core 49	Sample 26	-	-	Ap2	2	10	feet	Flora/fauna	Faunal remains	Bone	Bone/enamel	2	0.1	391199
Geoarch Testing 2020 FW	Non-component	54	Core 49	Sample 26	-	-	Ap2	2	10	feet	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	391200
Geoarch Testing 2020 FW	Non-component	55	Core 49	Sample 26	-	-	Ap2	2	10	feet	Flora/fauna	Faunal remains	Shell	Shell	0	13.1	391201
Geoarch Testing 2020 FW	Non-component	16	Core 50	Sample 27	-	-	Ap	0	2.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391103
Geoarch Testing 2020 FW	Non-component	17	Core 50	Sample 28	-	-	2Ab1	2.5	4.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391104
Geoarch Testing 2020 FW	Middle Period	18	Core 50	Sample 29	-	-	2Ab2	4.5	6.5	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391105
Geoarch Testing 2020 FW	Middle Period	19	Core 50	Sample 30	-	-	2Ab3	6.5	8	feet	Non-cultural	Soil/flotation samples	Soil sample	-	1		391106
Geoarch Testing 2020 FW	Middle Period	56	Core 50	Sample 30	-	-	2Ab3	6.5	8	feet	Flora/fauna	Faunal remains	Bone	Bone/enamel	2	0.1	391202
Geoarch Testing 2020 FW	Middle Period	57	Core 50	Sample 30	-	-	2Ab3	6.5	8	feet	Flora/fauna	Faunal remains	Shell	Shell	0	0.6	391203
Geoarch Testing 2020 FW	Middle Period	26	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	5000	391156
Geoarch Testing 2020 FW	Middle Period	32	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Flora/fauna	Botanical remains	Light fraction	-	1	6.5	391174
Geoarch Testing 2020 FW	Middle Period	61	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	391317
Geoarch Testing 2020 FW	Middle Period	62	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	9	0.3	391318
Geoarch Testing 2020 FW	Middle Period	63	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.1	391319
Geoarch Testing 2020 FW	Middle Period	64	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	0.2	391320
Geoarch Testing 2020 FW	Middle Period	65	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	23	0.6	391321
Geoarch Testing 2020 FW	Middle Period	66	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	4	0.2	391322
Geoarch Testing 2020 FW	Middle Period	67	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	86	0.4	391323
Geoarch Testing 2020 FW	Middle Period	68	Core HA01	Sample 80	-	-	2Ab	200	250	cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	11.3	391324
Geoarch Testing 2020 FW	Middle Period	27	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	4200	391157
Geoarch Testing 2020 FW	Middle Period	28	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	3600	391158
Geoarch Testing 2020 FW	Middle Period	33	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Flora/fauna	Botanical remains	Light fraction	-	1	5.3	391175
Geoarch Testing 2020 FW	Middle Period	34	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Flora/fauna	Botanical remains	Light fraction	-	1	3.2	391176
Geoarch Testing 2020 FW	Middle Period	69	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	27	1.4	391328
Geoarch Testing 2020 FW	Middle Period	70	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	19	0.6	391329
Geoarch Testing 2020 FW	Middle Period	71	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	12	3.4	391330
Geoarch Testing 2020 FW	Middle Period	72	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	27	0.5	391331
Geoarch Testing 2020 FW	Middle Period	73	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	141	0.6	391332
Geoarch Testing 2020 FW	Middle Period	74	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	0.2	391464
Geoarch Testing 2020 FW	Middle Period	75	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	32	0.8	391465
Geoarch Testing 2020 FW	Middle Period	76	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	13	0.2	391466
Geoarch Testing 2020 FW	Middle Period	77	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	63	0.3	391467
Geoarch Testing 2020 FW	Middle Period	78	Core HA02	Sample 82	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	50.8	391468
Geoarch Testing 2020 FW	Middle Period	90	Core HA02	Sample 81	-	-	3Ab	150	215	cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	221.1	391558
Geoarch Testing 2020 FW	Middle Period	29	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	5200	391159
Geoarch Testing 2020 FW	Middle Period	30	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	3200	391160
Geoarch Testing 2020 FW	Middle Period	35	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Flora/fauna	Botanical remains	Light fraction	-	1	3.4	391177
Geoarch Testing 2020 FW	Middle Period	36	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Flora/fauna	Botanical remains	Light fraction	-	1	3.9	391178
Geoarch Testing 2020 FW	Middle Period	79	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	11	0.3	391469
Geoarch Testing 2020 FW	Middle Period	80	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	2	1	391470
Geoarch Testing 2020 FW	Middle Period	81	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	10	0.9	391471
Geoarch Testing 2020 FW	Middle Period	82	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	7	0.2	391472
Geoarch Testing 2020 FW	Middle Period	83	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	32	0.2	391473
Geoarch Testing 2020 FW	Middle Period	84	Core HA03	Sample 83	-	-	3Ab	150	230	cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	29.5	391474
Geoarch Testing 2020 FW	Middle Period	85	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	0.2	391475
Geoarch Testing 2020 FW	Middle Period	86	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	104	14.9	391476
Geoarch Testing 2020 FW	Middle Period	87	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	391477
Geoarch Testing 2020 FW	Middle Period	88	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	391478
Geoarch Testing 2020 FW	Middle Period	89	Core HA03	Sample 84	-	-	4AC	270	305	cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	3.1	391479

Testing/Data Recovery 2C	Middle Period	148	CU 1	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419486
Testing/Data Recovery 2C	Middle Period	149	CU 1	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	1.4	419487
Testing/Data Recovery 2C	Middle Period	150	CU 1	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	2	419488
Testing/Data Recovery 2C	Middle Period	151	CU 1	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	33	5.3	419489
Testing/Data Recovery 2C	Middle Period	152	CU 1	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Biface	Monterey Chert	1	1.8	419490
Testing/Data Recovery 2C	Middle Period	153	CU 1	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	6	13.9	419491
Testing/Data Recovery 2C	Middle Period	154	CU 1	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	4.6	419492
Testing/Data Recovery 2C	Middle Period	155	CU 1	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	20	5.2	419493
Testing/Data Recovery 2C	Middle Period	156	CU 1	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	5	0.3	419494
Testing/Data Recovery 2C	Middle Period	157	CU 1	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	6	5.1	419495
Testing/Data Recovery 2C	Middle Period	158	CU 1	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	8	13.6	419496
Testing/Data Recovery 2C	Middle Period	159	CU 1	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	27	6.4	419497
Testing/Data Recovery 2C	Middle Period	160	CU 1	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	6	0.3	419498
Testing/Data Recovery 2C	Middle Period	161	CU 1	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	0.5	419499
Testing/Data Recovery 2C	Middle Period	162	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Biface	Franciscan Chert	1	0.9	419500
Testing/Data Recovery 2C	Middle Period	163	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Formed flake tool	Franciscan Chert	1	13.4	419501
Testing/Data Recovery 2C	Middle Period	164	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419502
Testing/Data Recovery 2C	Middle Period	165	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	8	33.5	419503
Testing/Data Recovery 2C	Middle Period	166	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	8.7	419504
Testing/Data Recovery 2C	Middle Period	167	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Core	Metasedimentary	1	105.1	419505
Testing/Data Recovery 2C	Middle Period	169	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	86	32.6	419507
Testing/Data Recovery 2C	Middle Period	170	CU 1	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	9	1	419508
Testing/Data Recovery 2C	Middle Period	171	CU 2	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	18.1	419510
Testing/Data Recovery 2C	Middle Period	172	CU 2	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	2	0.1	419511
Testing/Data Recovery 2C	Middle Period	173	CU 2	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	5	24.3	419512
Testing/Data Recovery 2C	Middle Period	174	CU 2	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	3	419513
Testing/Data Recovery 2C	Middle Period	175	CU 2	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	18	4.1	419514
Testing/Data Recovery 2C	Middle Period	176	CU 2	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	419515
Testing/Data Recovery 2C	Middle Period	177	CU 2	010-020	North Bridge Abutment	-	-	250	260 cmbs	Historic	Indefinite use historic	Wire	Metal-ferrous	1	1.2	419516
Testing/Data Recovery 2C	Middle Period	178	CU 2	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419517
Testing/Data Recovery 2C	Middle Period	179	CU 2	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	5	29.8	419518
Testing/Data Recovery 2C	Middle Period	180	CU 2	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	0.2	419519
Testing/Data Recovery 2C	Middle Period	181	CU 2	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Fine-grained volcanic	1	0.1	419520
Testing/Data Recovery 2C	Middle Period	182	CU 2	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	94	16	419521
Testing/Data Recovery 2C	Middle Period	183	CU 2	020-030	North Bridge Abutment	-	-	260	270 cmbs	Historic	Indefinite use historic	Wire	Metal-ferrous	1	0.5	419522
Testing/Data Recovery 2C	Middle Period	184	CU 2	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	16.7	419523
Testing/Data Recovery 2C	Middle Period	185	CU 2	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	6	14.7	419524
Testing/Data Recovery 2C	Middle Period	186	CU 2	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Fine-grained volcanic	2	14.5	419525
Testing/Data Recovery 2C	Middle Period	187	CU 2	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	8	0.6	419526
Testing/Data Recovery 2C	Middle Period	188	CU 2	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419527
Testing/Data Recovery 2C	Middle Period	189	CU 2	030-040	North Bridge Abutment	-	-	270	280 cmbs	Historic	Indefinite use historic	Wire	Metal-ferrous	1	1	419528
Testing/Data Recovery 2C	Middle Period	190	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.4	419529
Testing/Data Recovery 2C	Middle Period	191	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	2.1	419530
Testing/Data Recovery 2C	Middle Period	192	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.1	419531
Testing/Data Recovery 2C	Middle Period	193	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Fine-grained volcanic	1	1.6	419532
Testing/Data Recovery 2C	Middle Period	194	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	6	0.6	419533
Testing/Data Recovery 2C	Middle Period	195	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419534
Testing/Data Recovery 2C	Middle Period	196	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.4	419535
Testing/Data Recovery 2C	Middle Period	197	CU 2	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	2.5	419536
Testing/Data Recovery 2C	Middle Period	198	CU 2	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	33.9	419537
Testing/Data Recovery 2C	Middle Period	199	CU 2	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Flaked stone	Debitage	Quartzite	1	0.9	419538
Testing/Data Recovery 2C	Middle Period	200	CU 2	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	1.1	419539
Testing/Data Recovery 2C	Middle Period	201	CU 2	050-060	North Bridge Abutment	-	-	290	300 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	24	7.1	419540
Testing/Data Recovery 2C	Middle Period	202	CU 2	050-060	North Bridge Abutment	-	-	290	300 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419541
Testing/Data Recovery 2C	Middle Period	428	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	10600	419860
Testing/Data Recovery 2C	Middle Period	442	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419875
Testing/Data Recovery 2C	Middle Period	470	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	3	12.4	419904
Testing/Data Recovery 2C	Middle Period	471	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	25	1.5	419905
Testing/Data Recovery 2C	Middle Period	472	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419906
Testing/Data Recovery 2C	Middle Period	473	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Historic	Indefinite use historic	Glass	Glass	1	0.1	419907
Testing/Data Recovery 2C	Middle Period	508	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	5.1	422849
Testing/Data Recovery 2C	Middle Period	522	CU 2	DR Sample 06	South wall; North Bridge A	-	3Ab	245	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	26	0.1	428637
Testing/Data Recovery 2C	Middle Period	203	CU 3	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.1	419542
Testing/Data Recovery 2C	Middle Period	204	CU 3	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419543
Testing/Data Recovery 2C	Middle Period	205	CU 3	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	12	19.7	419544
Testing/Data Recovery 2C	Middle Period	206	CU 3	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	1.5	419545
Testing/Data Recovery 2C	Middle Period	207	CU 3	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Quartzite	1	4.7	419546
Testing/Data Recovery 2C	Middle Period	208	CU 3	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Modified bone	Awl/Pin	Bone/enamel	1	0.2	419547
Testing/Data Recovery 2C	Middle Period	209	CU 3	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	155	43.4	419548
Testing/Data Recovery 2C	Middle Period	210	CU 3	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	2	1	419549
Testing/Data Recovery 2C	Middle Period	211	CU 3	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	6	4.3	419550
Testing/Data Recovery 2C	Middle Period	212	CU 3	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.4	419551
Testing/Data Recovery 2C	Middle Period	213	CU 3	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	57	6	419552
Testing/Data Recovery 2C	Middle Period	214	CU 3	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	4	0.1	419553
Testing/Data Recovery 2C	Middle Period	215	CU 3	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.1	419554
Testing/Data Recovery 2C	Middle Period	216	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Biface	Franciscan Chert	1	8.9	419555
Testing/Data Recovery 2C	Middle Period	217	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Biface	Franciscan Chert	1	76.8	419556
Testing/Data Recovery 2C	Middle Period	218	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419557
Testing/Data Recovery 2C	Middle Period	219	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	5	9.6	419558
Testing/Data Recovery 2C	Middle Period	220	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	13	38.2	419559
Testing/Data Recovery 2C	Middle Period	221	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.2	419560
Testing/Data Recovery 2C	Middle Period	222	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.5	419561
Testing/Data Recovery 2C	Middle Period	223	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	55	26.4	419562
Testing/Data Recovery 2C	Middle Period	224	CU 3	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	419564
Testing/Data Recovery 2C	Middle Period	225	CU 3	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.3	419565
Testing/Data Recovery 2C	Middle Period	226	CU 3	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	14.8	419567
Testing/Data Recovery 2C	Middle Period	227	CU 3	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	1.3	419568
Testing/Data Recovery 2C	Middle Period	228	CU 3	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	26	4.9	419569
Testing/Data Recovery 2C	Middle Period	429	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	8000	419861
Testing/Data Recovery 2C	Middle Period	430	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	8600	419862
Testing/Data Recovery 2C	Middle Period	443	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419876

Testing/Data Recovery 2C	Middle Period	444	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419877
Testing/Data Recovery 2C	Middle Period	474	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	2	0.1	419908
Testing/Data Recovery 2C	Middle Period	475	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.1	419909
Testing/Data Recovery 2C	Middle Period	476	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	3	0.6	419910
Testing/Data Recovery 2C	Middle Period	477	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	78	4.1	419911
Testing/Data Recovery 2C	Middle Period	478	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	11	0.3	419912
Testing/Data Recovery 2C	Middle Period	479	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	422654
Testing/Data Recovery 2C	Middle Period	480	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	2.1	422655
Testing/Data Recovery 2C	Middle Period	481	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	0.4	422656
Testing/Data Recovery 2C	Middle Period	482	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	33	1.3	422657
Testing/Data Recovery 2C	Middle Period	483	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	9	0.2	422658
Testing/Data Recovery 2C	Middle Period	509	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	5.5	422850
Testing/Data Recovery 2C	Middle Period	510	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	4.4	422851
Testing/Data Recovery 2C	Middle Period	523	CU 3	DR Sample 07	North wall; North Bridge A	-	3Ab	230	245 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	67	0.2	428638
Testing/Data Recovery 2C	Middle Period	524	CU 3	DR Sample 08	North wall; North Bridge A	-	4Ab	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	147	0.2	428639
Testing/Data Recovery 2C	Middle Period	229	CU 4	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	3	2.4	419571
Testing/Data Recovery 2C	Middle Period	230	CU 4	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	2.8	419572
Testing/Data Recovery 2C	Middle Period	231	CU 4	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Misc. prehistoric items	Manuport	Indeterminate/unknown	1	0.1	419573
Testing/Data Recovery 2C	Middle Period	232	CU 4	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	42	9.7	419574
Testing/Data Recovery 2C	Middle Period	233	CU 4	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	13	0.7	419575
Testing/Data Recovery 2C	Middle Period	234	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Biface	Obsidian	1	0.9	419577
Testing/Data Recovery 2C	Middle Period	235	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419578
Testing/Data Recovery 2C	Middle Period	236	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	3	8.4	419579
Testing/Data Recovery 2C	Middle Period	237	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	8	6.5	419580
Testing/Data Recovery 2C	Middle Period	238	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	1.3	419581
Testing/Data Recovery 2C	Middle Period	240	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.5	419583
Testing/Data Recovery 2C	Middle Period	241	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	29	5	419584
Testing/Data Recovery 2C	Middle Period	242	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419585
Testing/Data Recovery 2C	Middle Period	243	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	17.5	419587
Testing/Data Recovery 2C	Middle Period	244	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	10.4	419588
Testing/Data Recovery 2C	Middle Period	245	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	9	9.4	419590
Testing/Data Recovery 2C	Middle Period	246	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	3	24.9	419591
Testing/Data Recovery 2C	Middle Period	247	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	40	38.3	419592
Testing/Data Recovery 2C	Middle Period	248	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	7	0.5	419593
Testing/Data Recovery 2C	Middle Period	249	CU 4	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	1.1	419594
Testing/Data Recovery 2C	Middle Period	250	CU 4	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	2	0.1	419595
Testing/Data Recovery 2C	Middle Period	251	CU 4	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	3	0.5	419596
Testing/Data Recovery 2C	Middle Period	252	CU 4	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	11	22.3	419597
Testing/Data Recovery 2C	Middle Period	253	CU 4	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	46	43.5	419598
Testing/Data Recovery 2C	Middle Period	254	CU 4	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	5	0.3	419599
Testing/Data Recovery 2C	Middle Period	255	CU 4	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.1	419600
Testing/Data Recovery 2C	Middle Period	541	CU 4	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Biface	Obsidian	1	0.4	444085
Testing/Data Recovery 2C	Middle Period	544	CU 4	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Formed flake tool	Cryptocrystalline silicate	1	17.5	444251
Testing/Data Recovery 2C	Middle Period	256	CU 5	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	0.2	419601
Testing/Data Recovery 2C	Middle Period	257	CU 5	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.4	419602
Testing/Data Recovery 2C	Middle Period	258	CU 5	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	3	9.3	419603
Testing/Data Recovery 2C	Middle Period	259	CU 5	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	36	3.6	419604
Testing/Data Recovery 2C	Middle Period	260	CU 5	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.2	419605
Testing/Data Recovery 2C	Middle Period	261	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Prehistoric	Flaked stone	Biface	Monterey Chert	1	14.5	419607
Testing/Data Recovery 2C	Middle Period	262	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	24.9	419608
Testing/Data Recovery 2C	Middle Period	263	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	12	53.4	419609
Testing/Data Recovery 2C	Middle Period	264	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	17	35.9	419610
Testing/Data Recovery 2C	Middle Period	265	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.2	419611
Testing/Data Recovery 2C	Middle Period	266	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	215	43	419612
Testing/Data Recovery 2C	Middle Period	267	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.2	419613
Testing/Data Recovery 2C	Middle Period	268	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	1.9	419614
Testing/Data Recovery 2C	Middle Period	269	CU 5	020-030	North Bridge Abutment	2	-	260	270 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	1.4	419615
Testing/Data Recovery 2C	Middle Period	270	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	6.4	419620
Testing/Data Recovery 2C	Middle Period	271	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	11.9	419621
Testing/Data Recovery 2C	Middle Period	272	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.2	419622
Testing/Data Recovery 2C	Middle Period	273	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Fine-grained volcanic	1	3.1	419623
Testing/Data Recovery 2C	Middle Period	274	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	54	12.2	419624
Testing/Data Recovery 2C	Middle Period	275	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	4	0.4	419625
Testing/Data Recovery 2C	Middle Period	276	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	29	419626
Testing/Data Recovery 2C	Middle Period	277	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419627
Testing/Data Recovery 2C	Middle Period	278	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	5	5.4	419628
Testing/Data Recovery 2C	Middle Period	279	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	1.5	419629
Testing/Data Recovery 2C	Middle Period	280	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Fine-grained volcanic	1	8.7	419630
Testing/Data Recovery 2C	Middle Period	281	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	160	86.1	419631
Testing/Data Recovery 2C	Middle Period	282	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Antler	Antler	3	4.1	419632
Testing/Data Recovery 2C	Middle Period	283	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0	419633
Testing/Data Recovery 2C	Middle Period	284	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.4	419635
Testing/Data Recovery 2C	Middle Period	285	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	3	4.8	419636
Testing/Data Recovery 2C	Middle Period	286	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.1	419637
Testing/Data Recovery 2C	Middle Period	287	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	24	4.7	419638
Testing/Data Recovery 2C	Middle Period	288	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Flora/fauna	Faunal remains	Antler	Antler	2	1.5	419639
Testing/Data Recovery 2C	Middle Period	289	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	5	0.6	419640
Testing/Data Recovery 2C	Middle Period	291	CU 5	050-060	North Bridge Abutment	-	-	290	300 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	0.5	419642
Testing/Data Recovery 2C	Middle Period	426	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	800	419858
Testing/Data Recovery 2C	Middle Period	431	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	10000	419863
Testing/Data Recovery 2C	Middle Period	440	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419872
Testing/Data Recovery 2C	Middle Period	445	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419878
Testing/Data Recovery 2C	Middle Period	462	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	35	2.1	419896
Testing/Data Recovery 2C	Middle Period	463	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419897
Testing/Data Recovery 2C	Middle Period	464	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.6	419898
Testing/Data Recovery 2C	Middle Period	484	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	0.1	422659
Testing/Data Recovery 2C	Middle Period	485	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	2	0.1	422660
Testing/Data Recovery 2C	Middle Period	486	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	23	0.8	422661
Testing/Data Recovery 2C	Middle Period	487	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	7	0.2	422662
Testing/Data Recovery 2C	Middle Period	506	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	3.8	422847
Testing/Data Recovery 2C	Middle Period	511	CU 5	DR Sample 09	South wall; North Bridge A	-	3Ab	250	260 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	4.8	422852

Testing/Data Recovery 2C	Middle Period	520	CU 5	DR Sample 04	98cmN/30cmE; North Brid	2	-	242	244 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	428635
Testing/Data Recovery 2C	Middle Period	525	CU 5	DR Sample 09	South wall; North Bridge	/ -	3Ab	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	26	0.1	428640
Testing/Data Recovery 2C	Middle Period	545	CU 5	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	25	444252
Testing/Data Recovery 2C	Middle Period	546	CU 5	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Flake tool	Monterey Chert	1	6.1	444253
Testing/Data Recovery 2C	Middle Period	292	CU 6	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	6	44.5	419644
Testing/Data Recovery 2C	Middle Period	293	CU 6	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	12	75.2	419645
Testing/Data Recovery 2C	Middle Period	294	CU 6	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	1.7	419646
Testing/Data Recovery 2C	Middle Period	295	CU 6	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	36	5.6	419647
Testing/Data Recovery 2C	Middle Period	296	CU 6	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	4	0.2	419648
Testing/Data Recovery 2C	Middle Period	297	CU 6	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	5.5	419649
Testing/Data Recovery 2C	Middle Period	298	CU 6	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	15	34.4	419650
Testing/Data Recovery 2C	Middle Period	299	CU 6	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	42	17.4	419651
Testing/Data Recovery 2C	Middle Period	300	CU 6	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.3	419652
Testing/Data Recovery 2C	Middle Period	301	CU 6	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.1	419653
Testing/Data Recovery 2C	Middle Period	302	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Core	Franciscan Chert	1	264.8	419654
Testing/Data Recovery 2C	Middle Period	303	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Tested cobble	Metasedimentary	1	108.2	419655
Testing/Data Recovery 2C	Middle Period	304	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	6	18.7	419656
Testing/Data Recovery 2C	Middle Period	305	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	12	32.9	419657
Testing/Data Recovery 2C	Middle Period	306	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.4	419658
Testing/Data Recovery 2C	Middle Period	307	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Awl/Pin	Bone/enamel	1	1.5	419659
Testing/Data Recovery 2C	Middle Period	308	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.2	419660
Testing/Data Recovery 2C	Middle Period	309	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.3	419661
Testing/Data Recovery 2C	Middle Period	310	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.1	419662
Testing/Data Recovery 2C	Middle Period	311	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.2	419663
Testing/Data Recovery 2C	Middle Period	312	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.4	419664
Testing/Data Recovery 2C	Middle Period	313	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.1	419665
Testing/Data Recovery 2C	Middle Period	314	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	51	81.2	419666
Testing/Data Recovery 2C	Middle Period	315	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	5	0.3	419667
Testing/Data Recovery 2C	Middle Period	316	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	18.7	419669
Testing/Data Recovery 2C	Middle Period	317	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Core	Metasedimentary	1	117.9	419670
Testing/Data Recovery 2C	Middle Period	318	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419671
Testing/Data Recovery 2C	Middle Period	319	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	5	38.8	419672
Testing/Data Recovery 2C	Middle Period	320	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	14	15.7	419673
Testing/Data Recovery 2C	Middle Period	321	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	19.7	419674
Testing/Data Recovery 2C	Middle Period	322	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Modified bone	Pin	Bone/enamel	1	0.2	419675
Testing/Data Recovery 2C	Middle Period	323	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	69	44.2	419676
Testing/Data Recovery 2C	Middle Period	324	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Antler	Antler	2	0.9	419677
Testing/Data Recovery 2C	Middle Period	325	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	5	1	419678
Testing/Data Recovery 2C	Middle Period	326	CU 6	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Modified stone	Misc. modified stone	Fine-grained volcanic	1	37.2	419679
Testing/Data Recovery 2C	Middle Period	547	CU 6	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Flake tool	Monterey Chert	1	10.7	444254
Testing/Data Recovery 2C	Middle Period	548	CU 6	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	10.5	444255
Testing/Data Recovery 2C	Middle Period	327	CU 7	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	1.1	419680
Testing/Data Recovery 2C	Middle Period	328	CU 7	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	8.1	419681
Testing/Data Recovery 2C	Middle Period	329	CU 7	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.7	419682
Testing/Data Recovery 2C	Middle Period	330	CU 7	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	74	46.6	419683
Testing/Data Recovery 2C	Middle Period	331	CU 7	000-010	North Bridge Abutment	-	-	240	250 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	0.6	419684
Testing/Data Recovery 2C	Middle Period	332	CU 7	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Projectile point	Franciscan Chert	1	6.6	419685
Testing/Data Recovery 2C	Middle Period	333	CU 7	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Tested cobble	Franciscan Chert	1	37.3	419686
Testing/Data Recovery 2C	Middle Period	334	CU 7	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	12.2	419687
Testing/Data Recovery 2C	Middle Period	335	CU 7	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	6	5.9	419688
Testing/Data Recovery 2C	Middle Period	336	CU 7	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	30	8.4	419691
Testing/Data Recovery 2C	Middle Period	337	CU 7	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	4	0.2	419692
Testing/Data Recovery 2C	Middle Period	338	CU 7	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	3.7	419693
Testing/Data Recovery 2C	Middle Period	339	CU 7	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Siltstone	1	10.1	419694
Testing/Data Recovery 2C	Middle Period	340	CU 7	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	31	11.3	419696
Testing/Data Recovery 2C	Middle Period	341	CU 7	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	419697
Testing/Data Recovery 2C	Middle Period	342	CU 7	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	10.8	419698
Testing/Data Recovery 2C	Middle Period	343	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	12.7	419699
Testing/Data Recovery 2C	Middle Period	344	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	3	0.9	419700
Testing/Data Recovery 2C	Middle Period	345	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	19.2	419701
Testing/Data Recovery 2C	Middle Period	346	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	21	5	419702
Testing/Data Recovery 2C	Middle Period	347	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Antler	Antler	1	3.4	419703
Testing/Data Recovery 2C	Middle Period	348	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	5	0.9	419704
Testing/Data Recovery 2C	Middle Period	349	CU 7	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	0.8	419705
Testing/Data Recovery 2C	Middle Period	432	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	11600	419864
Testing/Data Recovery 2C	Middle Period	446	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419879
Testing/Data Recovery 2C	Middle Period	488	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	2	0.1	422663
Testing/Data Recovery 2C	Middle Period	489	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	0.1	422664
Testing/Data Recovery 2C	Middle Period	490	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	41	1.8	422665
Testing/Data Recovery 2C	Middle Period	491	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	23	0.3	422666
Testing/Data Recovery 2C	Middle Period	512	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	4.1	422853
Testing/Data Recovery 2C	Middle Period	526	CU 7	DR Sample 10	South wall; North Bridge	/ -	3Ab	235	245 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	201	0.5	428641
Testing/Data Recovery 2C	Middle Period	549	CU 7	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Core	Monterey Chert	1	10.3	444256
Testing/Data Recovery 2C	Middle Period	350	CU 8	000-010	North Bridge Abutment	3	-	240	250 cmbs	Prehistoric	Flaked stone	Projectile point	Franciscan Chert	1	7.2	419708
Testing/Data Recovery 2C	Middle Period	351	CU 8	000-010	North Bridge Abutment	3	-	240	250 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	2.6	419709
Testing/Data Recovery 2C	Middle Period	352	CU 8	000-010	North Bridge Abutment	3	-	240	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	35	13.2	419710
Testing/Data Recovery 2C	Middle Period	353	CU 8	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Flake tool	Franciscan Chert	1	2.2	419711
Testing/Data Recovery 2C	Middle Period	354	CU 8	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	4	3.7	419712
Testing/Data Recovery 2C	Middle Period	355	CU 8	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	9.6	419713
Testing/Data Recovery 2C	Middle Period	356	CU 8	010-020	North Bridge Abutment	-	-	250	260 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	3	3.1	419714
Testing/Data Recovery 2C	Middle Period	357	CU 8	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	52	26.1	419715
Testing/Data Recovery 2C	Middle Period	358	CU 8	010-020	North Bridge Abutment	-	-	250	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	4	0.6	419716
Testing/Data Recovery 2C	Middle Period	359	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419717
Testing/Data Recovery 2C	Middle Period	360	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	2	17.3	419718
Testing/Data Recovery 2C	Middle Period	361	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	5.4	419719
Testing/Data Recovery 2C	Middle Period	362	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.2	419720
Testing/Data Recovery 2C	Middle Period	363	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	26	16.8	419721
Testing/Data Recovery 2C	Middle Period	364	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.6	419722
Testing/Data Recovery 2C	Middle Period	365	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Projectile point	Franciscan Chert	1	8.7	419723
Testing/Data Recovery 2C	Middle Period	366	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Core	Cryptocrystalline silicate	1	45.1	419724
Testing/Data Recovery 2C	Middle Period	367	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	10	71	419725

Testing/Data Recovery 2C	Middle Period	368	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	8	22.7	419726
Testing/Data Recovery 2C	Middle Period	369	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	5	8.2	419728
Testing/Data Recovery 2C	Middle Period	370	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	72	79.3	419729
Testing/Data Recovery 2C	Middle Period	371	CU 8	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	23	1.6	419730
Testing/Data Recovery 2C	Middle Period	372	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419731
Testing/Data Recovery 2C	Middle Period	373	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	6	9.2	419732
Testing/Data Recovery 2C	Middle Period	374	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.6	419733
Testing/Data Recovery 2C	Middle Period	375	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	48	6.9	419734
Testing/Data Recovery 2C	Middle Period	376	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	7	0.3	419735
Testing/Data Recovery 2C	Middle Period	377	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Misc. prehistoric items	Ochre	Ochre	0	0.1	419736
Testing/Data Recovery 2C	Middle Period	378	CU 8	040-050	North Bridge Abutment	-	-	280	290 cmbs	Prehistoric	Misc. prehistoric items	Baked earth	-	0	0.5	419737
Testing/Data Recovery 2C	Middle Period	427	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	7400	419859
Testing/Data Recovery 2C	Middle Period	433	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	7400	419865
Testing/Data Recovery 2C	Middle Period	434	CU 8	DR Sample 12	150-160cmN/24-60cmE; I	-	3Ab	232	253 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	8000	419866
Testing/Data Recovery 2C	Middle Period	441	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419874
Testing/Data Recovery 2C	Middle Period	447	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419880
Testing/Data Recovery 2C	Middle Period	448	CU 8	DR Sample 12	150-160cmN/24-60cmE; I	-	3Ab	232	253 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419881
Testing/Data Recovery 2C	Middle Period	465	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	29.6	419899
Testing/Data Recovery 2C	Middle Period	466	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	5	1.3	419900
Testing/Data Recovery 2C	Middle Period	467	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	50	4.9	419901
Testing/Data Recovery 2C	Middle Period	468	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	6	0.3	419902
Testing/Data Recovery 2C	Middle Period	469	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.1	419903
Testing/Data Recovery 2C	Middle Period	492	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	0.5	422667
Testing/Data Recovery 2C	Middle Period	493	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	48	7.3	422668
Testing/Data Recovery 2C	Middle Period	494	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	24	0.5	422669
Testing/Data Recovery 2C	Middle Period	495	CU 8	DR Sample 12	150-160cmN/24-60cmE; I	-	3Ab	232	253 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	32	1.5	422670
Testing/Data Recovery 2C	Middle Period	496	CU 8	DR Sample 12	150-160cmN/24-60cmE; I	-	3Ab	232	253 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	422671
Testing/Data Recovery 2C	Middle Period	507	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	4.1	422848
Testing/Data Recovery 2C	Middle Period	513	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	5.8	422854
Testing/Data Recovery 2C	Middle Period	514	CU 8	DR Sample 12	150-160cmN/24-60cmE; I	-	3Ab	232	253 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	5.6	422855
Testing/Data Recovery 2C	Middle Period	521	CU 8	DR Sample 05	CU 8; 0-47cmN/50-100cm	3	-	222	230 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	22	0.1	428636
Testing/Data Recovery 2C	Middle Period	527	CU 8	DR Sample 11	100-120cmN/0-40cmE; N	-	4Ab	261	271 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	329	0.5	428642
Testing/Data Recovery 2C	Middle Period	528	CU 8	DR Sample 12	150-160cmN/24-60cmE; I	-	3Ab	232	253 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	14	0.1	428643
Testing/Data Recovery 2C	Middle Period	550	CU 8	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Biface	Cryptocrystalline silicate	1	15.2	444257
Testing/Data Recovery 2C	Middle Period	379	CU 9	000-010	North Bridge Abutment	-	-	240	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	3	0.1	419738
Testing/Data Recovery 2C	Middle Period	380	CU 9	000-010	North Bridge Abutment	-	-	240	250 cmbs	Historic	Indefinite use historic	Metal	Metal-ferrous	1	0.4	419739
Testing/Data Recovery 2C	Middle Period	381	CU 9	020-030	North Bridge Abutment	-	-	260	270 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	6.1	419745
Testing/Data Recovery 2C	Middle Period	382	CU 9	020-030	North Bridge Abutment	-	-	260	270 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	5	1	419746
Testing/Data Recovery 2C	Middle Period	383	CU 9	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	13.7	419747
Testing/Data Recovery 2C	Middle Period	384	CU 9	030-040	North Bridge Abutment	-	-	270	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	32	8.8	419748
Testing/Data Recovery 2C	Middle Period	551	CU 9	030-040	North Bridge Abutment	-	-	270	280 cmbs	Prehistoric	Flaked stone	Core	Franciscan Chert	1	35.3	444258
Testing/Data Recovery 2C	Middle Period	385	Feature 4	Feature	65cmN/-50cmE from SW	4	-	26	26 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	24	244	419749
Testing/Data Recovery 2C	Middle Period	435	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	7800	419867
Testing/Data Recovery 2C	Middle Period	449	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419882
Testing/Data Recovery 2C	Middle Period	497	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	422672
Testing/Data Recovery 2C	Middle Period	498	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	13	0.9	422673
Testing/Data Recovery 2C	Middle Period	499	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	13	0.1	422674
Testing/Data Recovery 2C	Middle Period	515	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	5.9	422856
Testing/Data Recovery 2C	Middle Period	529	Feature 4	DR Sample 13	Soil under faunal bones	4	-	246	250 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	149	0.2	428644
Testing/Data Recovery 2C	Middle Period	436	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	8000	419868
Testing/Data Recovery 2C	Middle Period	450	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419883
Testing/Data Recovery 2C	Middle Period	500	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	21	1.5	422676
Testing/Data Recovery 2C	Middle Period	501	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Flora/fauna	Faunal remains	Antler	Antler	3	0.9	422677
Testing/Data Recovery 2C	Middle Period	502	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	2	0.1	422678
Testing/Data Recovery 2C	Middle Period	516	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	4.7	422857
Testing/Data Recovery 2C	Middle Period	530	Feature 5	DR Sample 14	Possible burned soil	5	-	260	260 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	6	0.1	428651
Testing/Data Recovery 2C	Non-component	531	Monitoring find	Backdirt	-	-	-			Prehistoric	Flaked stone	Flake tool	Franciscan Chert	1	24	428678
Testing/Data Recovery 2C	Non-component	532	Monitoring find	Backdirt	-	-	-			Prehistoric	Flaked stone	Debitage	Monterey Chert	3	16.5	428679
Testing/Data Recovery 2C	Non-component	401	North Bridge Abutment	-	-	-	-			Prehistoric	Flaked stone	Debitage	Franciscan Chert	2	16.9	419811
Testing/Data Recovery 2C	Non-component	402	North Bridge Abutment	-	-	-	-			Prehistoric	Flaked stone	Debitage	Monterey Chert	4	11.2	419812
Testing/Data Recovery 2C	Non-component	403	North Bridge Abutment	-	-	-	-			Prehistoric	Modified bone	Awl/Pin	Bone/enamel	1	5.8	419813
Testing/Data Recovery 2C	Non-component	404	North Bridge Abutment	-	-	-	-			Flora/fauna	Faunal remains	Bone	Bone/enamel	231	299.9	419817
Testing/Data Recovery 2C	Non-component	407	North Bridge Abutment	-	-	-	-	100	100 cmbs	Flora/fauna	Faunal remains	Antler	Antler	121	10.1	419824
Testing/Data Recovery 2C	Middle Period	391	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	240	430 cmbs	Prehistoric	Modified bone	Awl/Flaker/Smoother	Bone/enamel	1	2.2	419798
Testing/Data Recovery 2C	Middle Period	392	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	240	430 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.9	419799
Testing/Data Recovery 2C	Middle Period	393	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	240	430 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.1	419800
Testing/Data Recovery 2C	Middle Period	394	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	240	430 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	202	187.5	419801
Testing/Data Recovery 2C	Middle Period	395	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	243	243 cmbs	Prehistoric	Modified bone	Awl/Pin	Bone/enamel	1	3.7	419802
Testing/Data Recovery 2C	Middle Period	397	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	243	243 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	2.7	419804
Testing/Data Recovery 2C	Middle Period	398	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	243	243 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	131	493.4	419805
Testing/Data Recovery 2C	Middle Period	399	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	243	243 cmbs	Flora/fauna	Faunal remains	Antler	Antler	5	44.6	419806
Testing/Data Recovery 2C	Middle Period	400	North Lift 3 Test Trench	240-430	North Bridge Abutment	-	-	240	430 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419807
Testing/Data Recovery 2C	-	128	Number not used	-	-	-	-				-	Number not used	-	0		419447
Testing/Data Recovery 2C	-	168	Number not used	-	-	-	-				-	Number not used	-	0		419506
Testing/Data Recovery 2C	-	239	Number not used	-	-	-	-				-	Number not used	-	0		419582
Testing/Data Recovery 2C	-	290	Number not used	-	-	-	-				-	Number not used	-	0		419641
Testing/Data Recovery 2C	-	386	Number not used	-	-	-	-				-	Number not used	-	0		419754
Testing/Data Recovery 2C	-	387	Number not used	-	-	-	-				-	Number not used	-	0		419756
Testing/Data Recovery 2C	-	388	Number not used	-	-	-	-				-	Number not used	-	0		419757
Testing/Data Recovery 2C	-	389	Number not used	-	-	-	-				-	Number not used	-	0		419758
Testing/Data Recovery 2C	-	390	Number not used	-	-	-	-				-	Number not used	-	0		419797
Testing/Data Recovery 2C	-	396	Number not used	-	-	-	-				-	Number not used	-	0		419803
Testing/Data Recovery 2C	-	405	Number not used	-	-	-	-				-	Number not used	-	0		419821
Testing/Data Recovery 2C	-	406	Number not used	-	-	-	-				-	Number not used	-	0		419822
Testing/Data Recovery 2C	-	408	Number not used	-	-	-	-				-	Number not used	-	0		419828
Testing/Data Recovery 2C	-	409	Number not used	-	-	-	-				-	Number not used	-	0		419832
Testing/Data Recovery 2C	-	410	Number not used	-	-	-	-				-	Number not used	-	0		419840
Testing/Data Recovery 2C	-	411	Number not used	-	-	-	-				-	Number not used	-	0		419841
Testing/Data Recovery 2C	-	412	Number not used	-	-	-	-				-	Number not used	-	0		419842
Testing/Data Recovery 2C	-	413	Number not used	-	-	-	-				-	Number not used	-	0		419843
Testing/Data Recovery 2C	-	414	Number not used	-	-	-	-				-	Number not used	-	0		419844

Testing/Data Recovery 2C	-	415	Number not used	-	-	-	-					-	Number not used	-	0	419845
Testing/Data Recovery 2C	-	416	Number not used	-	-	-	-					-	Number not used	-	0	419846
Testing/Data Recovery 2C	-	417	Number not used	-	-	-	-					-	Number not used	-	0	419847
Testing/Data Recovery 2C	-	418	Number not used	-	-	-	-					-	Number not used	-	0	419848
Testing/Data Recovery 2C	-	419	Number not used	-	-	-	-					-	Number not used	-	0	419849
Testing/Data Recovery 2C	-	420	Number not used	-	-	-	-					-	Number not used	-	0	419850
Testing/Data Recovery 2C	-	421	Number not used	-	-	-	-					-	Number not used	-	0	419851
Testing/Data Recovery 2C	-	422	Number not used	-	-	-	-					-	Number not used	-	0	419852
Testing/Data Recovery 2C	-	533	Number not used	-	-	-	-					-	Number not used	-	0	428680
Testing/Data Recovery 2C	-	534	Number not used	-	-	-	-					-	Number not used	-	0	428681
Testing/Data Recovery 2C	-	535	Number not used	-	-	-	-					-	Number not used	-	0	428682
Testing/Data Recovery 2C	-	536	Number not used	-	-	-	-					-	Number not used	-	0	428683
Testing/Data Recovery 2C	-	537	Number not used	-	-	-	-					-	Number not used	-	0	428684
Testing/Data Recovery 2C	-	538	Number not used	-	-	-	-					-	Number not used	-	0	428686
Testing/Data Recovery 2C	-	539	Number not used	-	-	-	-					-	Number not used	-	0	428692
Testing/Data Recovery 2C	-	540	Number not used	-	-	-	-					-	Number not used	-	0	428702
Testing/Data Recovery 2C	Non-component	91	STU 01	020-040	South Bridge Abutment	-	-	27	27 cmbs	Prehistoric	Ground stone	Pestle	Igneous	1	682.5	419381
Testing/Data Recovery 2C	Non-component	92	STU 02	000-020	South Bridge Abutment	-	-	120	140 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	1	0.1	419383
Testing/Data Recovery 2C	Non-component	93	STU 02	000-020	South Bridge Abutment	-	-	120	140 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	5.9	419384
Testing/Data Recovery 2C	Non-component	94	STU 02	080-100	South Bridge Abutment	-	-	200	220 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	6.1	419385
Testing/Data Recovery 2C	Middle Period	95	STU 03	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419386
Testing/Data Recovery 2C	Middle Period	96	STU 03	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	0.1	419387
Testing/Data Recovery 2C	Middle Period	97	STU 03	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.7	419388
Testing/Data Recovery 2C	Middle Period	98	STU 03	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.1	419389
Testing/Data Recovery 2C	Middle Period	99	STU 03	020-040	North Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	11	2.9	419390
Testing/Data Recovery 2C	Middle Period	100	STU 03	020-040	North Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419391
Testing/Data Recovery 2C	Middle Period	101	STU 03	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	1.2	419392
Testing/Data Recovery 2C	Middle Period	102	STU 03	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	0.7	419393
Testing/Data Recovery 2C	Middle Period	103	STU 03	040-060	North Bridge Abutment	-	-	280	300 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	11	23.8	419394
Testing/Data Recovery 2C	Middle Period	104	STU 04	000-020	North Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	2	16.8	419395
Testing/Data Recovery 2C	Middle Period	105	STU 04	000-020	North Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	1.1	419396
Testing/Data Recovery 2C	Middle Period	106	STU 04	000-020	North Bridge Abutment	-	-	240	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	12	16.5	419397
Testing/Data Recovery 2C	Middle Period	107	STU 04	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Flake tool	Monterey Chert	1	3.5	419399
Testing/Data Recovery 2C	Middle Period	108	STU 04	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	4	2.8	419400
Testing/Data Recovery 2C	Middle Period	109	STU 04	020-040	North Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	50	66.1	419405
Testing/Data Recovery 2C	Middle Period	425	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	1200	419857
Testing/Data Recovery 2C	Middle Period	439	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419871
Testing/Data Recovery 2C	Middle Period	459	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	1.5	419893
Testing/Data Recovery 2C	Middle Period	460	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	13	1.3	419894
Testing/Data Recovery 2C	Middle Period	461	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419895
Testing/Data Recovery 2C	Middle Period	505	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	3.6	422846
Testing/Data Recovery 2C	Middle Period	519	STU 04	DR Sample 03	East wall; North Bridge At	1	-	235	245 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	7	0.1	428634
Testing/Data Recovery 2C	Middle Period	542	STU 04	000-020	North Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Flake tool	Monterey Chert	1	8.1	444089
Testing/Data Recovery 2C	Middle Period	110	STU 05	000-020	North Bridge Abutment	-	-	240	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	4	0.1	419409
Testing/Data Recovery 2C	Middle Period	111	STU 05	000-020	North Bridge Abutment	-	-	240	260 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.1	419410
Testing/Data Recovery 2C	Middle Period	112	STU 05	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	15.1	419411
Testing/Data Recovery 2C	Middle Period	113	STU 05	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	4.7	419412
Testing/Data Recovery 2C	Middle Period	114	STU 05	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	7.1	419413
Testing/Data Recovery 2C	Middle Period	115	STU 05	020-040	North Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	38	9.3	419420
Testing/Data Recovery 2C	Middle Period	116	STU 05	020-040	North Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.1	419421
Testing/Data Recovery 2C	Middle Period	117	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Flaked stone	Debitage	Obsidian	1	0.1	419423
Testing/Data Recovery 2C	Middle Period	118	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	3	55.3	419424
Testing/Data Recovery 2C	Middle Period	119	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	3	2.2	419425
Testing/Data Recovery 2C	Middle Period	120	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Flaked stone	Debitage	Cryptocrystalline silicate	1	0.2	419426
Testing/Data Recovery 2C	Middle Period	121	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	4	3.9	419427
Testing/Data Recovery 2C	Middle Period	122	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	5.3	419428
Testing/Data Recovery 2C	Middle Period	123	STU 05	040-060	North Bridge Abutment	-	-	280	300 cmbs	Prehistoric	Misc. prehistoric items	Quartz crystal	Quartz crystal	1	0.3	419430
Testing/Data Recovery 2C	Middle Period	124	STU 05	060-080	North Bridge Abutment	-	-	300	320 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	2.1	419431
Testing/Data Recovery 2C	Middle Period	125	STU 05	060-080	North Bridge Abutment	-	-	300	320 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	2	3.3	419432
Testing/Data Recovery 2C	Middle Period	126	STU 05	080-100	North Bridge Abutment	-	-	320	340 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	4.9	419435
Testing/Data Recovery 2C	Middle Period	127	STU 05	080-100	North Bridge Abutment	-	-	320	340 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	1.3	419436
Testing/Data Recovery 2C	Middle Period	129	STU 06	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	1.1	419448
Testing/Data Recovery 2C	Middle Period	130	STU 06	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.7	419449
Testing/Data Recovery 2C	Middle Period	131	STU 06	020-040	North Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Modified bone	Misc. modified bone	Bone/enamel	1	0.9	419450
Testing/Data Recovery 2C	Middle Period	132	STU 06	020-040	North Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	1	0.6	419451
Testing/Data Recovery 2C	Non-component	133	STU 07	000-020	Test Trench 1; South Pipe	-	-	120	140 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	17.3	419471
Testing/Data Recovery 2C	Non-component	134	STU 07	020-040	Test Trench 1; South Pipe	-	-	140	160 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.5	419472
Testing/Data Recovery 2C	Non-component	135	STU 07	040-060	Test Trench 1; South Pipe	-	-	160	180 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	1	419473
Testing/Data Recovery 2C	Non-component	136	STU 08	020-040	Test Trench 2; South Pipe	-	-	140	160 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	5.5	419474
Testing/Data Recovery 2C	Non-component	137	STU 08	040-060	Test Trench 2; South Pipe	-	-	160	180 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	0.9	419475
Testing/Data Recovery 2C	Middle Period	138	STU 09	000-020	South Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	2.4	419476
Testing/Data Recovery 2C	Middle Period	139	STU 09	000-020	South Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	13.7	419477
Testing/Data Recovery 2C	Middle Period	140	STU 09	000-020	South Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Fine-grained volcanic	1	2.1	419478
Testing/Data Recovery 2C	Middle Period	141	STU 09	000-020	South Bridge Abutment	-	-	240	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	2	2.4	419479
Testing/Data Recovery 2C	Middle Period	142	STU 09	020-040	South Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	3	0.1	419480
Testing/Data Recovery 2C	Middle Period	143	STU 09	020-040	South Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	1	0.1	419481
Testing/Data Recovery 2C	Middle Period	423	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	10000	419855
Testing/Data Recovery 2C	Middle Period	437	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419869
Testing/Data Recovery 2C	Middle Period	451	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	2	0.1	419884
Testing/Data Recovery 2C	Middle Period	452	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	2	3.5	419885
Testing/Data Recovery 2C	Middle Period	453	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	105	11.1	419886
Testing/Data Recovery 2C	Middle Period	454	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	6	0.2	419887
Testing/Data Recovery 2C	Middle Period	455	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Flora/fauna	Faunal remains	Antler	Antler	1	3	419888
Testing/Data Recovery 2C	Middle Period	456	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Flora/fauna	Faunal remains	Shell	Shell	0	468	419889
Testing/Data Recovery 2C	Middle Period	503	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	4.3	422844
Testing/Data Recovery 2C	Middle Period	517	STU 09	DR Sample 01	West wall; South Bridge A	-	-	240	253 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	210	0.4	428632
Testing/Data Recovery 2C	Middle Period	543	STU 09	000-020	South Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Metavolcanic	1	7.9	444090
Testing/Data Recovery 2C	Middle Period	144	STU 10	000-020	South Bridge Abutment	-	-	240	260 cmbs	Prehistoric	Flaked stone	Debitage	Franciscan Chert	1	0.7	419482
Testing/Data Recovery 2C	Middle Period	145	STU 10	000-020	South Bridge Abutment	-	-	240	260 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	34	24.4	419483
Testing/Data Recovery 2C	Middle Period	146	STU 10	020-040	South Bridge Abutment	-	-	260	280 cmbs	Prehistoric	Flaked stone	Debitage	Monterey Chert	1	6.1	419484
Testing/Data Recovery 2C	Middle Period	147	STU 10	020-040	South Bridge Abutment	-	-	260	280 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	12	0.8	419485

Testing/Data Recovery 2C	Middle Period	424	STU 10	DR Sample 02	North wall; South Bridge / -	-	265	275 cmbs	Non-cultural	Soil/flotation samples	Flotation sample	-	1	5600	419856
Testing/Data Recovery 2C	Middle Period	438	STU 10	DR Sample 02	North wall; South Bridge / -	-	265	275 cmbs	Flora/fauna	Botanical remains	Light fraction	-	1		419870
Testing/Data Recovery 2C	Middle Period	457	STU 10	DR Sample 02	North wall; South Bridge / -	-	265	275 cmbs	Flora/fauna	Faunal remains	Bone	Bone/enamel	9	0.3	419891
Testing/Data Recovery 2C	Middle Period	458	STU 10	DR Sample 02	North wall; South Bridge / -	-	265	275 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	21	7.7	419892
Testing/Data Recovery 2C	Middle Period	504	STU 10	DR Sample 02	North wall; South Bridge / -	-	265	275 cmbs	Non-cultural	Soil/flotation samples	Flotation subsample	-	1	3.2	422845
Testing/Data Recovery 2C	Middle Period	518	STU 10	DR Sample 02	North wall; South Bridge / -	-	265	275 cmbs	Flora/fauna	Faunal remains	Fish bone	Bone/enamel	37	0.1	428633

Appendix B: General Field Methods

General Field Methods:

Construction Monitoring—Construction monitoring was required for all ground disturbance activities. Construction activities subject to monitoring by Far Western included potholing, trench excavation, utility removal and/or repair, grading, slide rail installation and removal, fence post installation, and any other soil removal or displacement activities. Far Western monitors inspected soils during excavation including push piles, back dirt, and exposed trench sidewalls for evidence of cultural materials.

Mechanical Stripping—This project called for widespread mechanical clearing in both bridge abutments and for the pipeline alignments to the north and south of the utility bridge. The methodology implemented was warranted based on the results of the testing completed in 2020. All mechanical stripping was completed with an excavator equipped with a flat blade in thin layers (approximately 10 centimeters) under the direction of a qualified archaeologist. Additionally, one archaeologist closely observed the excavation while two examined and raked the excavated soil to identify any evidence of cultural materials or features. Crews investigated, documented, photographed, and collected any cultural materials identified in-situ during the mechanical stripping (see the discussion of Feature 5 in Chapter 8). Cultural materials identified in the back dirt during mechanical stripping were collected, bagged, and labeled by project component and approximate depth.

Surface Transect Units (STUs)—Prior to hand excavation a grid system was established in both the North Bridge Abutment and South Bridge Abutment. Due to its linear plans, the Pipeline alignment Station did not have grid organization. The southwest corner of each abutment was established as the datum. During the initial Phase II testing, crews excavated Surface Transect Units when a confirmed or suspected cultural deposit was encountered on any of the three project components. A Surface Transect Units, or STU, measures 1.0-x-0.5 meters and aims to determine the vertical extent of a deposit in a controlled manner. The STUs were excavated in arbitrary 20-centimeter levels and processed through 1/4-inch mesh.

Control Units (CUs)—Once the presence of an archaeological deposit was confirmed in a STU, a Control Unit (CU) was excavated to acquire a fine-grained sample. Control Units, measuring 1-x-1 meters, were excavated in arbitrary 10-centimeter levels, and processed through 1/8-inch mesh. All recovered cultural material from the hand excavated units was collected from the field screens with the exception of fire-cracked rock, which was counted, weighed, documented, and discarded. Cultural materials were bagged, labeled, and boxed by provenience, and then transported to the Far Western office in Davis, California, for further processing.

Bulk Soil Sampling—Bulk soil samples were collected stratigraphically from units and features to sample fine grained site constituents such as fish bone, charred plant remains, macrofossils, and small shell beads. The samples were documented, bagged, and then transported to the Far Western Davis laboratory for processing. Refer to the Archaeobotanical Remains section below for more information on the flotation processing methods applied to this analysis.

Appendix C: Laboratory Methods by Artifact Type

The following was adapted from Far Western's laboratory processing and analysis protocol.

Flaked Stone Assemblage

Flaked stone artifacts were classified and analyzed by Far Western's protocol. This protocol uses conventional morphological and functional descriptions to systematically analyze the data. Flaked stone analysis was completed by Lithic Analysts Dr. Lucas Martindale Johnson and Martijn Kuypers. Dr. Johnson divided the flake stone assemblage into the following categories: project points, bifaces, formed flake tools, simple flake tools, cobble tools, core tools, cores, and tested cobbles. He then determined blank type, primary flaking morphology, and the presence or absence of cortex, heat treatment, facial use wear, and weathering on each artifact. The following is a brief description of the additional analyses different artifacts received:

Projectile Points—projectile points are defined as "the bifacially flaked stone tips of projectile darts or arrows that retain characteristic basal or hafting elements" (Kaijankoski *et al.* 2023: 47). Attributes noted for projectile points include the shape of the tool, the presence of serration and/or reworking, applicable chronological diagnostic type, morphological measurements (e.g., axial length, stem length, neck width, basal width, distal shoulder angle, proximal shoulder angle, etc.).

Bifaces—bifaces are flaked stone tools with flaking on opposing sides of a continuous margin. Attributes noted for bifaces include shape of the tool, any breaks and/or break types, fragment type (e.g., distal fragment, medial, proximal fragment, etc.), presence of serration or reworking, and stage of reduction. There are five stages of reduction, the initial percussion shaping (Stage 1), to the finished tools with pressure flaking (Stage 5).

Flake Tools—formed flake tools are flakes that have a highly modified edge, specifically the shape of the original edge. Simple flake tools usually exhibit wear (unintentional byproduct of use) or simple modification to the edge (intentional modification), whereas formed flake tools have an intentional, moderate to advanced shaped edge. Additionally, simple flake tools usually still possess the original outline of the flake. Information noted about both formed and simple flake tools include

flake blank type, number of modified edges, and type of modification (e.g., unifacial micro-chipping, pressure retouch, edge rounding, bifacial pressure flaking, or dulling).

Cobble Tools—cobble tools or sometimes called flaked stone tools are typically larger in size and retain the outline of the original cobble. Similarly, to flake tools, recorded attributes included worked edges, type of modification, position of the worked edge, and the presence of grinding, microchipping, flaking, and stepping.

Cores—cores are tools that exhibit multiple flake scars in a uniform or multi-directional pattern, resulting from lithic reduction. Cores can exhibit both flake reduction and use-wear including grinding, battering, edge flaking, etc. Cobbles that display minimal flaking and no use-wear are recorded as tested cobbles. Attributes recorded for cores and core tools include flaking form (e.g., multidirectional, unidirectional, sporadic, uniform, etc.), blank type, cortex percentage, number of worked edges, types of use-wear.

Debitage— debitage is the most common flaked stone artifact recorded in precontact archaeological sites. Debitage are the flakes generated during the manufacture of flaked stone tools (Kaijankoski *et al.* 2023). Debitage were cataloged by material type, count, and weight. Debitage was then analyzed by technological type (e.g., core reduction, biface reduction, pressure flaking, retouch preparation, shatter, etc.), which is determined by the presence or absence of morphological attributes (e.g., cortex, number of flake scars, size, etc.).

Ground and Modified Stone

All ground stone artifacts were examined and analyzed by Far Western Groundstone Analyst Katie Hanrahan, M.A. and modified stone artifacts by Jill Eubanks, M.A. First the groundstone artifacts were separated by class: handstones, millingstones, mortars, pestles, etc. The attributes of each artifact were noted including plan and cross-section shape, the presence or absence of cortex and residue, and evidence of heat treatment, burning, and reworking. Next, use-wear was identified, analyzed, and documented (e.g., location, type of wear, degree of wear, and size). Use-wear includes striations, polish, and/or pecking on the artifact.

Attributes applied to groundstone artifacts are also applied to analyze modified stone artifacts. Other characteristics of modified stone artifacts include the presence of grooves, perforations, or other types of decoration carved into the stone. If present, the diameter, depth, width, length, and type of perforation or groove is recorded.

Bone Artifacts

Faunal remains with evidence of shaping or other modifications that appear to be intentional are classified as bone artifacts. These include bone awls, pendants, and/or beads. Bone artifact characteristics recorded include taxonomic identification, modification type, presence or absence of thermal alteration, shaping, flaking, sharpening, polishing, rounding, striations, and/or perforations. If applicable, functional categories were given to the specific bone artifact. Modified bone artifacts were analyzed by Far Western Laboratory Analyst Patty Galindo Mayo.

Miscellaneous Precontact Items

A few items were deemed miscellaneous precontact items within the assemblage. These items were described to the best of our ability but not assigned a functional category.

Mammal and Bird

All faunal remains were analyzed by Far Western Faunal Analyst Monique Sanchez. The methods described here are the accepted protocol utilized at Far Western Anthropological Research Group, Inc.'s laboratory. Sanchez utilized Far Western's reference collection and reference literature while conducting analysis. Faunal remains were identified to genus and species type, then, when applicable, attributes such as element, age, weight, and condition were noted. Fragments that could only be identified to taxon class were counted by size group (e.g., small, medium, large mammal), while fragmented faunal bone were categorized as unidentifiable.

Fish

Due to its small size, fish bone was collected in the field and by flotation sampling. Fish bone was analyzed by Dr. Kenneth Gobalet. Similar to the faunal bone collection, fish bone was analyzed to determine identifiable specimens, types of elements, and taxonomic identification. Chapter 6 provides a brief discussion of the fish bone analysis from this collection and their respective habitats.

Invertebrates

Shellfish collected from CA-SLO-16 was analyzed by Jill Eubanks, M.A., by utilizing marine, estuarine, and freshwater shellfish reference collections. Eubanks also referred to various shellfish reference guides including McConnaughty and McConnaughey (1986), Sept (2002), and Carlton (2007), housed at the Far Western library.

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